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FIXED SERVICE SYSTEM PARAMETERS FOR FREQUENCY SHARING

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1. INTRODUCTION

The following tables provide information on fixed service system parameters for use in initial sharing studies. The tables were compiled from information supplied by members of CEPT Project Team SE19.

The table format follows that of ITU-R Recommendation F 758, with systems being identified by modulation type and system capacity, and systems grouped together by frequency band. The introduction to Recommendation F 758 contains information on the use of such tables, together with basic considerations in the development of sharing criteria. It gives advice on the basic transmitter and receiver characteristics required for interference evaluation and calculations for frequency sharing with other services.

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Table 1

Fixed service system parameters for frequency sharing
1 - 3 GHz point to multipoint systems

(a) Typical characteristics

PARAMETER	CENTRAL STATION	OUTSTATION
Antenna type	Omni/Sector	Dish/Horn
Antenna gain (dBi)	10/17	20 Analogue 27 Digital
e.i.r.p. (max.) (dBW) - Analogue - Digital	12 24	21 34
IF bandwidth (MHz)	2	2
Maximum permissible long term interference power (20% time)		
Total (dBW)	-142	-142
dB(W/4 kHz)	-170	-170
dB(W/MHz)	-147	-147

Table 2

Characteristics of example CDMA local access radio systems

Frequency band	2 GHz		4 GHz	
System type	Fixed point-to-multipoint (CDMA)		Fixed point-to-multipoint (DS CDMA)	
RF transmission rate	2 Mbit/s		2 Mbit/s	
Modulation	QPSK		QPSK	
	Central Station	Outstation	Central Station	Outstation
Transmit power (dBW)	-10.0 (per outstation)	-10.0	2	2
Antenna polarisation	Vertical	Vertical	Vertical	Vertical
Antenna maximum gain	10	9	16	16
Feeder loss	3.5	0	8	18
Maximum e.i.r.p.	-3.5/outstation(1)	-1.0(2)	10	0
Receiver IF bandwidth	3.2	3.2	21	21
Receiver thermal noise	-134.0	-134.0	-117	-117
Receiver threshold (dBW) (BER 10^{-6})	-135.0(3),(4)	-135.0(3),(4)	-118	-118
Maximum long term interference power (dB(W/MHz))	-150.0	-150.0	-140(5)	-140(5)
Availability target	99.99% of time	99.99% of time	99.99% of time	99.99% of time
Typical fade margin	< 20 dB	< 20 dB	30	30
Path length	1 - 15 km	1 - 15 km	3 km	3 km

(1) Maximum e.i.r.p.: 8.5 dBW
(2) Automatic power control is employed, therefore typical powers may be 0 - 20 dB less
(3) Typical signal level for a system with 15 outstations
(4) Threshold quoted for BER 10^{-7} for these systems
(5) Measured at antenna port

Table 3

Fixed service system parameters for frequency sharing
Fixed services below 3 GHz

Frequency band (GHz)	1.35 - 1.53																1.67 - 1.69
Modulation	FDM-FM	PSK-4-PSK	FDM-FM	FDM-FM	4-PSK	4-PSK	16-QAM	4-PSK	PCM	MSK	4-PSK	4-PSK	4-PSK	4-PSK	4-PSK		FDM-FM
Capacity	36 ch	704 kbit/s 2 Mbit/s	8 ch	2 ch	9.6 kbit/s	64 kbit/s	64 kbit/s	144 kbit/s	-	2 Mbit/s	2 Mbit/s	2×2 Mbit/s	2×2 Mbit/s	34 Mbit/s			2 ch
Channel spacing (MHz)	0.5	1	0.2	0.05	0.025	0.075	0.0375	0.225	0.5	2	2	2	4	29	3.5		0.05
															CS	OS	
Antenna gain (max.) (dBi)	33	33	33	33	33	33	33	33	33	33	33	33	33	33	17	27	33
Feeder/multiplexer loss (min) (dB)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1
Antenna type	dish	dish	Yagi	Yagi	Yagi/dish	Yagi/dish	Yagi/dish	Yagi/dish	Yagi/dish	dish	Yagi/horn /dish	Yagi	Yagi	dish	omni/ section	dish/ horn	Yagi
Max. Tx output power (dBW)	7	7	7	10	7	7	7	7	10	7	0	7	7	3	7	7	10
e.i.r.p. (max.) (dBW)	39	39	39	42	39	39	39	39	42	39	32	39	39	35	24	34	42
Receiver IF bandwidth (MHz)	0.4	0.7	0.3	0.04	0.005	0.032	0.016	0.072	0.35	1.2	1.5	1.2	3	20	3.5	3.5	0.04
Receiver noise figure (dB)	8	4.5	8	8	4	4	4	4	8	4	7	4	4	4	3.5	3.5	8
Receiver thermal noise (dBW)	-140	-141	-141	-149	-163	-155	-158	-151	-141	-139	-135	-139	-145	-127	-135	-135	-149
Nominal Rx input level (dBW)	-80	-90	-93	-105	-118	-112	-103.5	-106	-90	-126	-79	-124	-123	-73			-105
Rx input level for 10^{-3} BER (dBW)	N/A	-120	N/A	N/A	-143	-137	-128.5	-131	-	-86	-119	-84	-83	-113			N/A
Nominal short term interference (dBW) (% time)																	
Nominal long term interference (dBW)	-150	-151	-151	-158	-173	-167	-168	-161	-151	-145	-145	-145	-141	-137	-145	-145	-159
Equivalent power (dB(W/4 kHz))	-170	-	-170	-169	-	-	-	-	-					-	-174	-174	
Spectral density (dB(W/4 kHz))	-	-149	-	-	-150	-152	-150	-150	-146	-146		-146	-146	-150			-169
Refer to notes	(2),(5)	(2),(4)	(2),(5)	(2),(5)	(2),(4)	(2),(4)	(2),(4)	(2),(4)	(2),(4)		(2),(4)	(1),(4)	(1),(4)	(2),(4)			(2),(5)

N/A: Not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10% of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value

Table 4

Fixed service system parameters for frequency sharing
Fixed services below 3 GHz

Frequency band (GHz)	1.7- 2.45														
Modulation	FM-TVOB	FM-FDM	FM-MLT-PT		FM-TV	FM-FDM	FM-FDM tropo	4-PSK tropo	4-PSK	4-PSK	FM-FDM	4-PSK	4-PSK	FM-FDM	4-PSK
Capacity	625-line PAL	60-132 ch	94 ch		625-line PAL	960 ch	72-312 ch	2 Mbit/s	34 Mbit/s	8 Mbit/s	1-6 ch	48 ch	12.6 Mbit/s	600 ch	2 × 8 Mbit/s
Channel spacing (MHz)	Variable	14/1	3.5		29	29	Special	Special	29	14	0.4	2.5	28	28	14
			CS	OS											
Antenna gain (max.) (dBi)	25	35.7	10	19	35.7	35.7	49	45	35.7	35.7	25	35.7	35.7	35.7	35.7
Feeder/multiplexer loss (min) (dB)	0	1	3	3	1	1	2	2	1	1	3	1	1	1	1
Antenna type	1.2m dish	dish	omni	horn	dish	dish	12m dish	9m dish	dish	dish	Yagi	dish	dish	dish	dish
Max. Tx output power (dBW)	7	7	4	4	10	7	28	30	3	0	10	-9	-10	-5.2	3
e.i.r.p. (max.) (dBW)	32	41.7	13	22	44.7	41.7	75	73	37.7	34.7	32	25.7	24.7	29.5	37.7
Receiver IF bandwidth (MHz)	30	2.8	2	2	40	40	6	1	20	4	0.15	1.5	6.5	20	8
Receiver noise figure (dB)	8	7	9	9	10	10	2	4	4	5	4	6	9	10	4
Receiver thermal noise (dBW)	-121	-133	-132	-132	-118	-118	-132	-140	-127	-133	-148	-	-	-	-131
Nominal Rx input level (dBW)	-65	-79	-97	-97	-68	-64	-	-	-73	-78	-78	-78	-88.3	-78	
Rx input level for 10-3 BER (dBW)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-131	-113	-118	N/A	-	-	N/A	
Nominal short term interference (dBW) (% time)															
Nominal long term interference (dBW)	-127	-143	-142	-142	-128	-129	-138	-146	-137	-143	-158				-137
Equivalent power (dB(W/4 kHz))	-	-172	-169	-169	-	-169	-172	-	-	-	-174				-170
Spectral density (dB(W/4 kHz))	-142	-	-	-	-144	-	-	-146	-150	-149	-	-			-146
Refer to notes	(1),(4)	(2),(5)	(2),(5)	(2),(5)	(2),(4)	(2),(5)	(1),(5)	(1),(4)	(2),(4)	(2),(4)	(2),(5)	(3),(4)	(3),(4)	(3),(5)	(1),(4)

N/A: Not applicable
TVOB: Television Outside Broadcast
(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)
(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)
(3) Specified interference will have a relative contribution of no more than 10% of total noise
(4) The specified interference level is total power within the receiver bandwidth
(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value

Table 5

Fixed service system parameters for frequency sharing
Fixed services below 3 GHz

Frequency band (GHz)	1.7 - 2.45							2.45 - 2.69			
Modulation	FM-QAM	4-PSK	4-PSK	4-PSK		4-OQPSK	4-OQPSK	FM-FDM tropo	MSK	4-PSK	FM-TVOB
Capacity	1 TV + 2 Mbit/s	8 Mbit/s	2 × 8 Mbit/s			8 Mbit/s	34 Mbit/s	72-312 ch	2 × 2 Mbit/s	34 Mbit/s	625-line PAL
Channel spacing (MHz)	3.5	7	14	3.5		14	14	Special	14		Variable
				CS	OS						
Antenna gain (max.) (dBi)	35.7	35.7	35.7	17	27	35.7	35.7	49	35.4	35.4	18
Feeder/multiplexer loss (min) (dB)	1	1	1	0	0	1	1	2	4	4	1
Antenna type	dish	dish	dish	omni/section	dish/horn	dish	dish	12m dish	dish	dish	dish
Max. Tx output power (dBW)	5	7	-3	7	7	0	0	28	5	-2	7
e.i.r.p. (max.) (dBW)	39.7	41.7	31.7	24	34	34.7	34.7	75	36.4	29.4	24
Receiver IF bandwidth (MHz)	3	3	4.6	3.5	3.5	5.4	21	6	3		30
Receiver noise figure (dB)	4	4	4	3.5	3.5	6	7	2	4		6
Receiver thermal noise (dBW)	-135	-135	-133	-135	-135	-131	-124	-132	-135		-123
Nominal Rx input level (dBW)		-83	-83	-	-	-78	-72	-65	-		-55
Rx input level for 10^{-3} BER (dBW)		-123	-123	-	-	-118	-112	N/A	-		N/A
Nominal short term interference (dBW) (% time)											
Nominal long term interference (dBW)	-141	-141	-139	-141	-141	-141	-130	-138	-141	-111.5	-123
Equivalent power (dB(W/4 kHz))	-170	-	-	-170	-170	-142	-137	-172	-170		-
Spectral density (dB(W/4 kHz))	-	-146	-146	-	-			-	-162		-129
Refer to notes		(1)	(1)	(1)	(1)	(2),(4)	(1),(4)	(1),(5)			

N/A: Not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10% of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value

Table 6

Fixed service system parameters for frequency sharing
Fixed services between 3 and 10 GHz

Frequency band (GHz)	3.4 - 3.456	3.4 - 3.6	3.6 - 4.2						3.7 - 4.2		3.8 - 4.2		
Modulation	FM	AM	4-PSK	4-PSK	4-PSK	16-QAM	RBQPSK	64 QAM	FM/FDM	QPSK	64-QAM	8-PSK	FM
Capacity	1 ch	TV	8 Mbit/s	2x8 Mbit/s	34 Mbit/s	51 Mbit/s	140 Mbit/s	140/155 Mbit/s	1800 ch	34 Mbit/s	140 Mbit/s	2×34 Mbit/s	video
Channel spacing (MHz)	1	6	7	14	28	28	90	28	29	29	29	29	29
Antenna gain (max.) (dBi)	40	40	41	41	41	41	41	41	41	41	41	41	41
Feeder/multiplexer loss (min) (dB)	4	4	3	3	3	3	3	3	3	3	4	4	4
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	19	17.6	10	10	10	10	6	10	13	0	2	0	10
e.i.r.p. (max.) (dBW)	55	53.6	48	48	48	48	44	48	51	38	39	37	47
Receiver IF bandwidth (MHz)	0.4	5.7	5.6	8.9	17.8	12.6	56	22.4	46	26	29.8	28.3	40
Receiver noise figure (dB)	5	6	6	6	6	5	6	5	8.5	4	3	6	9
Receiver thermal noise (dBW)	-143	-132	-136.5	-134.5	-131.5	-133	-122	-130.5	-119	-128	-126	-123	-119
Nominal Rx input level (dBW)	-75	-70	-111+M	-109+M	-106+M	-104+M	-65	-96+M	-47	-68	-62	-66	-59
Rx input level for 10^{-3} BER (dBW)			-114	-112	-109	-107	-105	-99	N/A	-114.5	-102	-106	N/A
Nominal short term interference (dBW) (% time)													
Nominal long term interference (dBW)							-132		-129	-138	-132	-133	-125
Equivalent power (dB(W/4 kHz))							-		-170	-	-171	-172	-165
Spectral density (dB(W/4 kHz))							-149		-	-152			
Refer to notes			(8)	(8)	(8)	(8)	(2),(4)	(8),(9),(10)	(2),(5)	(2),(4)	(1),(4)	(2),(4)	(1),(4)

N/A: Not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10% of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value

(6) I/N = -13 dB: objective for FS systems employing space diversity

(7) -7 dBW transmit power and 30 dBW e.i.r.p. without APC

(8) M is fade margin, dependent on path length, polarisation and availability required

(9) Channel spacing assumes adjacent 140/155 Mbit/s systems using 28 MHz cross-polar channels

(10) 140/155 Mbit/s calculation based on 64 QAM , higher order schemes may be used as appropriate

Table 7

Fixed service system parameters for frequency sharing
Fixed services between 3 and 10 GHz

Frequency band (GHz)	5.85 - 5.925	5.85 - 6.425	5.925 - 6.425			6.425 - 7.11				
Modulation	FM	RBQPSK	FM/FDM	FM	64-QAM	FM	FM	QPSK	16-QAM	64-QAM
Capacity	TV	140 Mbit/s	1800 ch	video	140 Mbit/s	TV	TV	34 Mbit/s	140 Mbit/s	140 Mbit/s
Channel spacing (MHz)	18	90	29.65	29.65	29.65	20	40	20	40	40
Antenna gain (max.) (dBi)	40	45	45	45	45	46	46	46	46	46
Feeder/multiplexer loss (min) (dB)	4	4	4	4	4	4	4	4	4	4
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	17.6	6	13	12	2	10	13	0	0	0
e.i.r.p. (max.) (dBW)	53.6	47	54	53	43	52	55	42	42	42
Receiver IF bandwidth (MHz)	17	56	40	40	29	28	40	26	44	42
Receiver noise figure (dB)	6	6	8	11	4	8.5	11	4	4	3
Receiver thermal noise (dBW)	-130.4	-122	-121	-117	-127	-122	-117	-128	-126	-125
Nominal Rx input level (dBW)	-70	-65	-60	-57	-63	-60.5	-57	-68	-65	-65
Rx input level for 10^{-3} BER (dBW)		-105	N/A	N/A	-103	N/A	N/A	-114.5	-105	-105
Nominal short term interference (dBW) (% time)										
Nominal long term interference (dBW)		-132	-131	-123	-137	-132	-127	-138	-136	-131
Equivalent power (dB(W/4 kHz))		-	-171	-163	-	-170	-167	-	-	-171
Spectral density (dB(W/4 kHz))		-149	-		-152	-		-152	-152	
Refer to notes		(2),(4)	(2),(5)	(1),(4)	(2),(4)	(2),(5)	(2),(4)	(2),(4)	(2),(4)	(1),(4)

N/A: Not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10% of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value

(6) I/N = -13 dB: objective for FS systems employing space diversity

Table 8

Fixed service system parameters for frequency sharing
Fixed services between 3 and 10 GHz

Frequency band (GHz)	7.125 - 7.750			7.425 - 7.900				8 - 8.5	
Modulation	FM	4-OQPSK	4-OQPSK	4-PSK	4-PSK	4-PSK	64-QAM	4-PSK	8-PSK
Capacity	960 ch	8 Mbit/s	34 Mbit/s	8 Mbit/s	2x8 Mbit/s	34 Mbit/s	140/155 Mbit/s	34 Mbit/s	2×34 Mbit/s
Channel spacing (MHz)	20	7	28	7	14	28	28	32.5	32.5
Antenna gain (max.) (dBi)	46	46	46	46.4	46.4	46.4	46.4	45.5	45.5
Feeder/multiplexer loss (min) (dB)	4	4	4	4	4	4	4	4	4
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	10	-3	-3	10	10	10	10	-4.5	-4.5
e.i.r.p. (max.) (dBW)	54	39	39	52.4	52.4	52.4	52.4	37	37
Receiver IF bandwidth (MHz)	27	5.4	21	5.6	8.9	17.8	22.4	20.4	28.3
Receiver noise figure (dB)	7	5	5	6	6	6	6	8	6
Receiver thermal noise (dBW)	-122.7	-132	-126	-136.5	-134.5	-131.5	-130.5	-123	-123
Nominal Rx input level (dBW)	-70	-79	-73	-111+M	-109+M	-106+M	-95+M	-66	-63
Rx input level for 10^{-3} BER (dBW)		-119	-113	-114	-112	-109	-98	-106	-103
Nominal short term interference (dBW) (% time)									
Nominal long term interference (dBW)		-142	-136					-133	-133
Equivalent power (dB(W/4 kHz))		-173	-173					-170	-172
Spectral density (dB(W/4 kHz))									
Refer to notes		(2),(4)	(2),(4)	(7)	(7)	(7)	(7),(8),(9)	(2),(4)	(2),(4)

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)
(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)
(3) Specified interference will have a relative contribution of no more than 10% of total noise
(4) The specified interference level is total power within the receiver bandwidth
(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth must not exceed this value
(6) I/N = -13 dB: objective for FS systems employing space diversity
(7) M is fade margin, dependent on path length, polarisation and availability required
(8) Channel spacing assumes adjacent 140/155 Mbit/s systems using 28 MHz cross-polar channels
(9) 140/155 Mbit/s calculation based on 64 QAM , higher order schemes may be used as appropriate

Table 9

Fixed service system parameters for frequency sharing
Fixed services above 10 GHz

Frequency band (GHz)	10.2 - 10.68		10.5 - 10.68			10.7 - 11.7								12.2 - 12.44	
Modulation	9QPRS	9QPRS	4-PSK	FM	FM	64 QAM	4-PSK	FM-FDM	FM-TV	16-QAM	8-PSK	16-QAM	16-QAM	4-PSK	16-QAM
Capacity	2 Mbit/s	8 Mbit/s	34 Mbit/s	video	video	155 Mbit/s	140 Mbit/s	960 ch	625-line PAL	140 Mbit/s	140 Mbit/s	140 Mbit/s	140 Mbit/s	13.9 Mbit/s	50.4 Mbit/s
Channel spacing (MHz)	1.25	5	14	14	28	40	67	40	40	40	60	60	40	20	20
Antenna gain (max.) (dBi)	45	45	45	45	32.2	50	50	50	50	50	50	50	50	50	50
Feeder/multiplexer loss (min) (dB)	0	0	4	4	4	2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	1	1
Antenna type	dish	dish	dish	dish		shell (offset)	dish	dish	dish	dish	dish	dish		dish	dish
Max. Tx output power (dBW)	0	0	-7	-7	-20	1	10	10	10	7	9	9	-4	-5	-5
e.i.r.p. (max.) (dBW)	45	45	34	34	8.2	48.5	56.5	56.5	56.5	53.5	55.5	55.5	42.5	44	44
Receiver IF bandwidth (MHz)			20.4	28	28		68	29	29		56.4	42		12.3	17.2
Receiver noise figure (dB)	5	5	8	8	3	2.5	7	7	8		7	3		7	5
Receiver thermal noise (dBW)			-123	-122	-111		-119	-121	-121		-119	-125	-118	-	
Nominal Rx input level (dBW)	-65	-65	-68	-62		-80	-62	-65	-65		-63	-65		-59+M	-59+M
Rx input level for 10^{-3} BER (dBW)	-120	-114	-108	N/A		-106	-104	N/A	N/A	-103.3	-103	-105	-104		
Nominal short term interference (dBW) (% time)															
Nominal long term interference (dBW)	-148	-142	-129	-128		-140	-129	-131	-131		-129	-135			
Equivalent power (dB(W/4 kHz))			-166	-166			-	-170	-		-171	-175			
Spectral density (dB(W/4 kHz))							-147	-	-146						
Refer to notes			(1),(4)	(1),(4)			(2),(4)	(2),(5)	(2),(4)		(2),(4)	(2),(4)		(3),(7)	(3),(7)

N/A: not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

(6) I/N = -13 dB: objective for FS systems employing space diversity

(7) M is fade margin, dependent on path length, polarisation and availability required

Table 10

Fixed service system parameters for frequency sharing
Fixed services above 10 GHz

Frequency band (GHz)	13/14											14.25 - 14.5		
Modulation	4-PSK	4-PSK	4-PSK	4-PSK	FM	QPSK	QPSK	4-CPOQPSK	4-CPOQPSK	FSK	4-PSK	4-PSK	16-QAM	8-PSK
Capacity	2 Mbit/s	8 Mbit/s	16 Mbit/s	34 Mbit/s	1 Video	34 Mbit/s	34 Mbit/s	4 Mbit/s	8 Mbit/s	52 Mbit/s	2×34 Mbit/s	8 Mbit/s	34 Mbit/s	34 Mbit/s
Channel spacing (MHz)	3.5	7	14	28	28	28	28	3.5	7	28	28	10	14	28
Antenna gain (max.) (dBi)	49	49	49	49	49	49	49	49	49	49	49	46	46	46
Feeder/multiplexer loss (min) (dB)	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	10	10	10	10	10	0	-7.5	-10	-10	-6	-7	-10	-8	-12
e.i.r.p. (max.) (dBW)	56	56	56	56	56	46	38.5	36	36	40	39	33	35	31
Receiver IF bandwidth (MHz)	1	2	4	17	24			3	5.4	26	42	5.2	10.3	20.4
Receiver noise figure (dB)	10	10	10	10	10	9.5	10.5	5	6	8	7.5	4	4	8
Receiver thermal noise (dBW)	-134	-131	-128	-122	-120			-134	-131	-122	-120	-133	-130	-123
Nominal Rx input level (dBW)	-74	-71	-68	-65	-65			-83	-80	-65	-65	-80	-70	-69
Rx input level for 10^{-3} BER (dBW)	-116	-113	-111	-109	N/A	-108	-109	-123	-120	-105	-105	-120	-112	-109
Nominal short term interference (dBW) (% time)														
Nominal long term interference (dBW)	-144	-141	-138	-132	-130			-144	-137	-132	-126	-143	-140	-133
Equivalent power (dB(W/4 kHz))	-	-	-	-	-			-173	-168	-170	-166	-174	-174	-170
Spectral density (dB(W/4 kHz))	-144	-144	-144	-144	-144									
Refer to notes	(1),(4)	(1),(4)	(1),(4)	(1),(4)	(1),(4)			(2),(4)	(1),(4)	(2),(4)	(1),(4)	(2),(4)	(2),(4)	(2),(4)

N/A: not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

Table 11

Fixed service system parameters for frequency sharing
Fixed services above 10 GHz

Frequency band (GHz)	14.4 - 15.35											
Modulation	64-QAM	FM-FDM	8-PSK	4-PSK	16-QAM	64-QAM	2-FSK	4-PSK	MSK	4-FSK	4-FSK	QPSK
Capacity	140 Mbit/s	2 700 ch	156 Mbit/s	16 Mbit/s	140 Mbit/s	140 Mbit/s	2 Mbit/s	8 Mbit/s	8 Mbit/s	2 Mbit/s	8 Mbit/s	2 Mbit/s
Channel spacing (MHz)	28	40	40	14	56	28	10	7	7	3.5		
Antenna gain (max.) (dBi)	52	52	52	52	52	52	52	52	52	52	52	52
Feeder/multiplexer loss (min) (dB)	2	2	2	2	2	2	2	2	2	2	2	2
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish				
Max. Tx output power (dBW)	5	3	0	-10	7	5.5	-9	-10	-7	-1	-13	-13
e.i.r.p. (max.) (dBW)	55	53	50	40	57	55.5	41	40	43	49	37	37
Receiver IF bandwidth (MHz)	40	56	50	10			5.2	5.2			10	
Receiver noise figure (dB)	4	10	5	6			13	4			8.5	
Receiver thermal noise (dBW)	-124			-126			-124	-133				
Nominal Rx input level (dBW)	-66	-48	-44	-70			-69	-80				
Rx input level for 10^{-3} BER (dBW)	-101			-115	-103.3	-99	-109	-120	-116		-109	-119
Nominal short term interference (dBW) (% time)												
Nominal long term interference (dBW)	-134			-138			-134	-143				
Equivalent power (dB(W/4 kHz))	-						-165	-174				
Spectral density (dB(W/4 kHz))	-150			-148								
Refer to notes	(1),(4)						(2),(4)	(2),(4)				

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

Table 12

Fixed service system parameters for frequency sharing
Fixed services above 10 GHz

Frequency band	(GHz)	17.7 - 19.7							
Modulation		4-PSK	4-QAM	4-FSK	4-PSK	2-PSK	4-PSK	0-QPSK	4-PSK
Capacity		140 Mbit/s	140 Mbit/s	8 Mbit/s	8 Mbit/s	8 Mbit/s	34 Mbit/s	44.7 Mbit/s	2×140 Mbit/s
Channel spacing	(MHz)	110	55	20	20	20	27.5	40	220
Antenna gain (max.)	(dBi)	48	48	48	48	48	48	48	48
Feeder/multiplexer loss (min)	(dB)	3	3	3	3	3	3	3	3
Antenna type		dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power	(dBW)	-10	-4	-16	-6	-9	-8	-9	-10
e.i.r.p. (max.)	(dBW)	35	41	29	39	36	37	36	35
Receiver IF bandwidth	(MHz)	68	68	8	4	8	18	40	168
Receiver noise figure	(dB)	7	8	13	7	7	7	5	9
Receiver thermal noise	(dBW)	-119	-118	-122	-131	-128	-124	-125	-113
Nominal Rx input level	(dBW)	-63	-64	-65	-65	-65	-65	-70	-62
Rx input level for 10^{-3} BER	(dBW)	-103	-104	-106	-116	-116	-113	-106	-102
Nominal short term interference	(dBW) (% time)								
Nominal long term interference	(dBW)	-129	-131	-132	-141	-138	-143	-131	-123
Equivalent power	(dB(W/4 kHz))	-	-	-	-	-		-171	-169
Spectral density	(dB(W/4 kHz))	-147	-149	-141	-147	-147			
Refer to notes		(2),(4)	(2),(4)	(2),(4)	(2),(4)	(2),(4)	(2),(4)	(1)	(2),(4)

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

Table 13

Fixed service system parameters for frequency sharing
Fixed services above 10 GHz

Frequency band (GHz)	21.12 - 29.5														
Modulation	2-FSK	2-FSK	2-FSK	4-PSK	4-PSK	FM	4-PSK	ASK	ASK	2-FSK	64-QAM	QPSK	4-FSK	4-FSK	FM
Capacity	2 Mbit/s	4 Mbit/s	8 Mbit/s	34 Mbit/s	140 Mbit/s	1 Video	34 Mbit/s	2 Mbit/s	4x2 Mbit/s	2 Mbit/s	140 Mbit/s	34 Mbit/s	2 Mbit/s	8 Mbit/s	video
Channel spacing (MHz)	7	7	14	28	112	28	28	28	28	5	40	28	3.5	7	28
Antenna gain (max.) (dBi)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Feeder/multiplexer loss (min) (dB)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	0	0	0	0	0	0	0	-16	-14	-10	-4	-17	-12	-12	-12
e.i.r.p. (max.) (dBW)	47	47	47	47	47	47	47	31	33	37	43	30	35	35	35
Receiver IF bandwidth (MHz)	2	4	8	17	70	24	18	5	14	2	40		4.2	8.4	32
Receiver noise figure (dB)	9	9	9	9	9	9	12	4	4	11	5	9	8	8	4
Receiver thermal noise (dBW)	-132	-129	-126	-123	-116	-121	-119	-133	-128		-123		-130	-127	-125
Nominal Rx input level (dBW)	-105+M	-104+M	-103+M	-100+M	-94+M	-84+M	-87	-108+M	-109+M	-115	-73		-76	-73	-65
Rx input level for 10^{-3} BER (dBW)	-108	-	-106	-103	-97	N/A	-103	-112	-113		-96	-105	-116	-113	N/A
Nominal short term interference (dBW) (% time)															
Nominal long term interference (dBW)	-142	-139	-136	-133	-126	-131	-129	-139	-136		-131		-136	-133	-131
Equivalent power (dB(W/4 kHz))	-	-170	-	-	-	-	-	-	-		-171		-166	-166	-170
Spectral density (dB(W/4 kHz))	-143	-143	-143	-143	-143	-143	-141	-146	-148		-147				
Refer to notes	(1),(4), (7)	(1),(4), (7)	(1),(4), (7)	(1),(4), (7)	(1),(4), (7)	(1),(4), (7)	(1),(4)	(1),(4), (7)	(1),(4), (7)	(3),(4)			(1),(4)	(1),(4)	(1),(4)

N/A: not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

(6) I/N = -13 dB: objective for FS systems employing space diversity

(7) M is fade margin, dependent on path length, polarisation and availability required

Table 14

Fixed service system parameters for frequency sharing
30-60 GHz fixed services

Frequency band (GHz)	31 - 31.3	37 - 39.5											50
Modulation	FM	4 PSK	2-FSK	2-FSK	4-PSK	4-PSK	FM	FM	FSK	4-OQPSK	4-OQPSK	FM	FSK
Capacity	2 Mbit/s	8 Mbit/s	2 Mbit/s	8 Mbit/s	34 Mbit/s	140 Mbit/s	1 Video	1 Video	8 Mbit/s	4 Mbit/s	8 Mbit/s	video	8 Mbit/s
Channel spacing (MHz)	35	7	7	14	28	140	28	56	14	3.5	7	28	20
Antenna gain (max.) (dBi)	35	47	47	47	47	47	47	47	47	47	47	47	39
Feeder/multiplexer loss (min) (dB)	2	3	3	3	3	3	3	3	3	3	3	3	0
Antenna type	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	-13	-14	0	0	0	0	0	0	-15	-12	-12	-13	-23
e.i.r.p. (max.) (dBW)	20	30	44	44	44	44	44	44	29	32	32	31	16
Receiver IF bandwidth (MHz)	16		2	8	17	70	16	40		4.2	8.4	32	
Receiver noise figure (dB)	10	10	11	11	11	11	12	12	10	10	10	10	10.5
Receiver thermal noise (dBW)	-122		-130	-124	-121	-114	-120	-116		-128	-125	-119	
Nominal Rx input level (dBW)	-62	-65	-108+M	-102+M	-99+M	-93+M	-98+M	-85+M		-79	-76	-59	
Rx input level for 10^{-3} BER (dBW)	-102	-114	-111	-105	-102	-95	N/A	N/A	-109	-119	-116	N/A	-109
Nominal short term interference (dBW) (% time)													
Nominal long term interference (dBW)	-132	-134	-140	-134	-131	-124	-130	-126		-134	-131	-125	
Equivalent power (dB(W/4 kHz))	-168		-	-	-		-	-		-164	-164	-164	
Spectral density (dB(W/4 kHz))			-143	-143	-143	-143	-142	-142					
Refer to notes	(2),(4)		(1),(4)	(1),(4)	(1),(4)		(1),(4)	(1),(4)		(1),(4)	(1),(4)	(1),(4)	

M: fade margin

N/A: not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value

Table 15

Fixed service system parameters for frequency sharing
30-60 GHz fixed services

Frequency band (GHz)	55.2 - 57.2					
Modulation	2-FSK	2-FSK	4-PSK	4-PSK	FM	FM
Capacity	2 Mbit/s	8 Mbit/s	34 Mbit/s	140 Mbit/s	1 Video	1 Video
Channel spacing (MHz)	14	14	28	140	28	56
Antenna gain (max.) (dBi)	42	42	42	42	42	42
Feeder/multiplexer loss (min) (dB)	3	3	3	3	3	3
Antenna type	dish	dish	dish	dish	dish	dish
Max. Tx output power (dBW)	-10	-10	-10	-10	-10	-10
e.i.r.p. (max.) (dBW)	29	29	29	29	29	29
Receiver IF bandwidth (MHz)	2	8	17	70	16	40
Receiver noise figure (dB)	11	11	11	11	12	12
Receiver thermal noise (dBW)	-130	-124	-121	-114	-120	-116
Nominal Rx input level (dBW)	-108+M	-102+M	-99+M	-93+M	-98+M	-85+M
Rx input level for 10^{-3} BER (dBW)	-111	-105	-102	-95	N/A	N/A
Nominal short term interference (dBW) (% time)						
Nominal long term interference (dBW)	-140	-134	-131	-124	-130	-126
Equivalent power (dB(W/4 kHz))	-	-	-		-	-
Spectral density (dB(W/4 kHz))	-143	-143	-143	-143	-142	-142
Refer to notes	(1),(4)	(1),(4)	(1),(4)		(1),(4)	(1),(4)

M: fade margin
N/A: not applicable

(1) Specified interference will reduce system C/N by 1 dB (interference 6 dB below receiver thermal noise floor)

(2) Specified interference will reduce system C/N by 0.5 dB (interference 10 dB below receiver thermal noise floor)

(3) Specified interference will have a relative contribution of no more than 10 % of total noise

(4) The specified interference level is total power within the receiver bandwidth

(5) The specified interference level should be divided by the receiver bandwidth to obtain an average spectral density. The interference spectral density, averaged over any 4 kHz within the receiver bandwidth, must not exceed this value