



RAY2 microwave links

Operating range

Calculation parameters:

Availability	99.95 %
Site A	Geographical Center of CZE - Borovina hill
Site B	Corresponding distance to the north
Antenna height	Minimum for free Fresnel zone
Calculation SW	Pathloss 5
Multipath algorithm	ITU-R P.530 - 13
Rain algorithm	ITU-R P.530 - 14
Rain rate data	ITU-R P.837 - 5
Rain attenuation	ITU-R P.838 - 3
Water vapour density	7.5 g/m3

Band	Frequency GHz	Polarization
RAy2 - 10	10.445	V
RAy2 - 11	11.2	V
RAy2 - 17	17.2	H
RAy2 - 18	18.7	V
RAy2 - 24	24.125	H

Min Fade Margin 6 dB
Range is lower distance from ITU and fade margin calculation
Gray background - min fade margin used

Date of actualization January 2018

Frequency band	10 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 1.75 MHz

Throughput		Mbps	2.54	4.95	6.26	7.37	8.89	-
Bandwidth		MHz	1.75	1.75	1.75	1.75	1.75	-
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	-
Sensitivity		dBm	-100	-92	-88	-87	-84	-
Tx Power		dBm	13	11	11	10	9	-
Antennas	30 cm	Range	km	64	44	37	34	27
	60 cm		km	93	64	55	51	44
	90 cm		km	>120	83	72	67	57
	120 cm		km	>120	106	89	83	72

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-96	-89	-86	-85	-82	-80
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	55	38	34	30	24
	60 cm		km	81	57	51	47	40
	90 cm		km	106	75	67	61	53
	120 cm		km	>120	93	83	78	67

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-94	-87	-84	-80	-78	-76
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	51	35	30	23	19
	60 cm		km	75	53	47	38	34
	90 cm		km	97	70	61	51	46
	120 cm		km	>120	86	78	64	57

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-92	-85	-81	-78	-75	-73
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	47	32	26	20	14
	60 cm		km	70	49	42	35	29
	90 cm		km	89	64	55	47	40
	120 cm		km	114	81	70	59	51

Frequency band	10 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-90	-82	-78	-75	-71	-69
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	44	27	21	16	9
	60 cm		km	64	44	37	30	23
	90 cm		km	83	57	49	42	34
	120 cm		km	106	72	61	53	44

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232
Bandwidth		MHz	40	40	40	40	40	40
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-80	-76	-73	-69	-67
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	38	24	19	13	7
	60 cm		km	57	40	34	27	20
	90 cm		km	75	53	46	38	30
	120 cm		km	93	67	57	49	40

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-86	-79	-75	-72	-68	-66
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	37	23	17	11	6
	60 cm		km	55	38	32	26	19
	90 cm		km	72	51	44	37	29
	120 cm		km	89	64	55	47	38

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-84	-77	-73	-69	-66	-63
Tx Power		dBm	13	11	11	10	9	8
Antennas	30 cm	Range	km	34	20	14	8	5
	60 cm		km	51	35	29	21	16
	90 cm		km	67	47	40	32	26
	120 cm		km	83	59	51	42	35

Frequency band	10 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 1.75 MHz

Throughput		Mbps	2.54	4.95	6.26	7.37	8.89	-
Bandwidth		MHz	1.75	1.75	1.75	1.75	1.75	-
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	-
Sensitivity		dBm	-100	-92	-88	-87	-84	-
Tx Power		dBm	3	3	3	3	3	-
Antennas	30 cm	Range	km	44	30	24	23	19
	60 cm		km	65	48	40	39	34
	90 cm		km	83	61	53	51	46
	120 cm		km	104	77	66	63	56

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-96	-89	-86	-85	-82	-80
Tx Power		dBm	3	3	3	3	3	3
Antennas	30 cm	Range	km	37	26	21	20	16
	60 cm		km	55	42	37	36	31
	90 cm		km	72	55	49	47	42
	120 cm		km	88	69	60	58	52

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-94	-87	-84	-80	-78	-76
Tx Power		dBm	3	3	3	3	3	3
Antennas	30 cm	Range	km	34	23	19	13	10
	60 cm		km	52	39	34	28	24
	90 cm		km	67	51	46	38	35
	120 cm		km	82	63	56	49	45

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-92	-85	-81	-78	-75	-73
Tx Power		dBm	3	3	3	3	3	3
Antennas	30 cm	Range	km	30	20	14	10	7
	60 cm		km	48	36	29	24	20
	90 cm		km	61	47	40	35	30
	120 cm		km	77	58	50	45	39

Frequency band	10 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171	
Bandwidth		MHz	28	28	28	28	28	28	
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM	
Sensitivity		dBm	-90	-82	-78	-75	-71	-69	
Tx Power		dBm	3	3	3	3	3	3	
Antennas	30 cm	Range	km	27	16	10	7	5	4
	60 cm		km	44	31	24	20	15	12
	90 cm		km	57	42	35	30	24	21
	120 cm		km	71	52	45	39	33	30

Bandwidth 40 MHz

Throughput			Mbps	50.1	110	139	176	211	232
Bandwidth			MHz	40	40	40	40	40	40
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-87	-80	-76	-73	-69	-67
Tx Power			dBm	3	3	3	3	3	3
Antennas	30 cm	Range	km	23	13	8	6	4	3
	60 cm		km	39	28	22	18	12	9
	90 cm		km	51	38	32	27	21	19
	120 cm		km	63	49	41	36	30	27

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-86	-79	-75	-72	-68	-66
Tx Power		dBm	3	3	3	3	3	3
Antennas	30 cm	Range	km	21	11	7	5	3
	60 cm		km	37	26	20	16	10
	90 cm		km	49	37	30	26	20
	120 cm		km	60	47	39	35	28

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359	
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO	
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM	
Sensitivity		dBm	-84	-77	-73	-69	-66	-63	
Tx Power		dBm	3	3	3	3	3	3	
Antennas	30 cm	Range	km	19	9	6	4	3	2
	60 cm		km	34	23	18	12	8	6
	90 cm		km	46	34	27	21	17	13
	120 cm		km	56	43	36	30	25	21

Frequency band	11 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 1.75 MHz

Throughput		Mbps	2.54	4.95	6.26	7.37	8.89	-
Bandwidth		MHz	1.75	1.75	1.75	1.75	1.75	-
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	-
Sensitivity		dBm	-99	-93	-89	-88	-84	-
Tx Power		dBm	24	22	22	21	20	-
Antennas	30 cm	Range	km	90	67	59	55	46
	60 cm		km	>120	101	80	76	65
	90 cm		km	>120	>120	>120	106	80
	120 cm		km	>120	>120	>120	>120	106

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-97	-90	-87	-84	-81	-79
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	80	61	55	48	40
	60 cm		km	>120	85	76	67	59
	90 cm		km	>120	>120	106	85	74
	120 cm		km	>120	>120	>120	111	90

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-95	-88	-85	-81	-79	-76
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	76	57	51	42	37
	60 cm		km	>120	78	72	61	55
	90 cm		km	>120	111	96	76	69
	120 cm		km	>120	>120	>120	96	80

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-93	-86	-82	-79	-75	-73
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	72	53	46	38	30
	60 cm		km	>120	74	65	57	48
	90 cm		km	>120	101	80	72	61
	120 cm		km	>120	>120	106	85	72

Frequency band	11 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-91	-83	-79	-76	-72	-70
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	67	48	40	33	25
	60 cm		km	101	67	59	51	42
	90 cm		km	>120	85	74	65	55
	120 cm		km	>120	111	90	76	65

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232
Bandwidth		MHz	40	40	40	40	40	40
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-88	-81	-77	-74	-70	-68
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	61	44	37	30	22
	60 cm		km	85	63	55	48	38
	90 cm		km	>120	78	69	61	51
	120 cm		km	>120	101	80	72	61

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-80	-76	-73	-69	-67
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	59	42	35	28	20
	60 cm		km	80	61	53	46	37
	90 cm		km	>120	76	67	59	50
	120 cm		km	>120	96	78	69	59

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-85	-78	-74	-70	-67	-64
Tx Power		dBm	24	22	22	21	20	19
Antennas	30 cm	Range	km	55	38	32	23	18
	60 cm		km	76	57	50	40	33
	90 cm		km	106	72	63	53	46
	120 cm		km	>120	85	74	63	55

Frequency band	17 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-97	-90	-87	-84	-83	-81
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	31	22	18	16	14
	60 cm		km	53	39	33	28	24
	90 cm		km	75	51	45	39	33
	120 cm		km	95	65	54	48	42

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-95	-88	-85	-81	-79	-77
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	27	20	17	14	11
	60 cm		km	49	35	30	24	20
	90 cm		km	67	47	41	33	27
	120 cm		km	86	57	50	42	35

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-92	-85	-81	-78	-75	-73
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	24	17	14	12	9
	60 cm		km	43	30	24	21	16
	90 cm		km	55	41	33	28	22
	120 cm		km	74	50	42	36	27

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-90	-83	-79	-76	-72	-69
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	22	16	13	11	7
	60 cm		km	39	27	22	19	14
	90 cm		km	51	37	30	26	18
	120 cm		km	65	46	38	33	23

Frequency band	17 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232
Bandwidth		MHz	40	40	40	40	40	40
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-88	-81	-77	-74	-70	-68
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	20	14	11	9	7
	60 cm		km	35	24	20	17	14
	90 cm		km	47	33	27	23	19
	120 cm		km	57	42	35	29	24

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-80	-76	-73	-69	-66
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	18	13	11	9	7
	60 cm		km	33	23	19	16	14
	90 cm		km	45	31	26	22	18
	120 cm		km	54	40	33	27	23

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-85	-78	-74	-70	-67	-64
Tx Power		dBm	5	5	5	5	5	5
Antennas	30 cm	Range	km	17	12	9	7	6
	60 cm		km	30	21	17	14	12
	90 cm		km	41	28	23	19	16
	120 cm		km	50	36	29	24	21

Frequency band	17 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 3.5 MHz

Throughput			Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth			MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-97	-90	-87	-84	-83	-81
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	12	8	6	5	5	4
	60 cm		km	16	11	9	8	7	6
	90 cm		km	18	13	11	9	9	8
	120 cm		km	21	15	13	11	10	9

Bandwidth 7 MHz

Throughput			Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth			MHz	7	7	7	7	7	7
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-95	-88	-85	-81	-79	-77
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	11	7	6	4	3	2
	60 cm		km	15	10	8	6	5	5
	90 cm		km	17	12	10	8	7	6
	120 cm		km	19	14	12	9	8	7

Bandwidth 14 MHz

Throughput			Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth			MHz	14	14	14	14	14	14
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-92	-85	-81	-78	-75	-73
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	9	6	4	3	2	2
	60 cm		km	13	8	6	5	4	3
	90 cm		km	15	10	8	6	5	4
	120 cm		km	16	12	9	7	6	5

Bandwidth 28 MHz

Throughput			Mbps	36.8	80.9	102	130	155	171
Bandwidth			MHz	28	28	28	28	28	28
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-90	-83	-79	-76	-72	-69
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	8	5	3	2	1	1
	60 cm		km	11	7	5	4	3	2
	90 cm		km	13	9	7	5	4	3
	120 cm		km	15	10	8	6	5	3

Frequency band	17 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232
Bandwidth		MHz	40	40	40	40	40	40
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-88	-81	-77	-74	-70	-68
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	7	4	2	2	1
	60 cm		km	10	6	5	3	2
	90 cm		km	12	8	6	5	3
	120 cm		km	14	9	7	6	4

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-80	-76	-73	-69	-66
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	6	3	2	2	1
	60 cm		km	9	6	4	3	2
	90 cm		km	11	7	5	4	3
	120 cm		km	13	8	6	5	4

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-85	-78	-74	-70	-67	-64
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	6	3	2	1	1
	60 cm		km	8	5	3	2	1
	90 cm		km	10	6	5	3	2
	120 cm		km	12	7	6	4	3

Frequency band	18 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 1.75 MHz

Throughput		Mbps	2.54	4.95	6.26	7.37	8.89	-
Bandwidth		MHz	1.75	1.75	1.75	1.75	1.75	-
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	-
Sensitivity		dBm	-97	-91	-88	-85	-82.5	-
Tx Power		dBm	24	23	22	21	20	-
Antennas	30 cm	Range	km	71	54	45	38	33
	60 cm		km	102	79	69	59	51
	90 cm		km	0	104	90	78	69
	120 cm		km	>120	0	102	88	77

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-95.5	-89.5	-86	-84.5	-82	-81.5
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	67	51	41	37	33
	60 cm		km	97	75	64	58	50
	90 cm		km	0	99	83	76	68
	120 cm		km	>120	110	95	87	76

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-93	-86	-83	-81	-78.5	-78
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	61	43	37	33	28
	60 cm		km	88	66	56	50	42
	90 cm		km	114	87	75	68	59
	120 cm		km	120	98	85	76	67

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-89	-83	-80	-77	-74	-71
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	52	38	33	27	22
	60 cm		km	76	59	50	41	35
	90 cm		km	100	78	68	58	49
	120 cm		km	112	88	76	66	56

Frequency band	18 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-79	-76	-73	-70	-67
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	48	33	27	22	18
	60 cm		km	71	50	41	35	30
	90 cm		km	94	68	58	49	40
	120 cm		km	105	76	66	56	48

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-84	-75	-72.5	-70	-67	-64
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	41	27	23	19	16
	60 cm		km	64	41	36	31	26
	90 cm		km	83	58	50	42	36
	120 cm		km	95	66	58	50	41

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-82	-75	-70.5	-68	-65	-62
Tx Power		dBm	24	23	22	21	20	19
Antennas	30 cm	Range	km	38	27	20	17	14
	60 cm		km	59	41	33	29	23
	90 cm		km	78	58	46	39	33
	120 cm		km	88	66	53	45	38

Frequency band	24 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-96	-89	-86	-83	-79	-77
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	26	20	18	16	14
	60 cm		km	41	30	26	24	21
	90 cm		km	52	40	36	31	26
	120 cm		km	62	48	44	39	29

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-93	-86	-83	-79	-76	-74
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	24	18	16	14	11
	60 cm		km	36	26	24	21	17
	90 cm		km	47	36	31	26	22
	120 cm		km	55	44	39	32	26

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-91	-84	-80	-77	-73	-71
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	22	17	15	13	10
	60 cm		km	33	25	21	19	15
	90 cm		km	44	32	27	25	20
	120 cm		km	52	40	34	29	24

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-89	-82	-78	-75	-71	-68
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	20	16	13	12	8
	60 cm		km	30	23	20	17	14
	90 cm		km	40	29	25	23	17
	120 cm		km	48	37	31	27	21

Frequency band	24 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232
Bandwidth		MHz	40	40	40	40	40	40
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-87	-80	-76	-73	-69	-67
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	19	15	12	11	8
	60 cm		km	27	21	18	16	14
	90 cm		km	37	27	24	21	18
	120 cm		km	45	34	28	25	22

Bandwidth 56 MHz

Throughput		Mbps	72.9	160	203	257	304	338
Bandwidth		MHz	56	56	56	56	56	56
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-86	-79	-75	-72	-68	-65
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	18	14	12	10	8
	60 cm		km	26	21	17	16	14
	90 cm		km	36	26	23	20	17
	120 cm		km	44	32	27	25	21

Bandwidth 56 MHz TO

Throughput		Mbps	85.8	170	206	268	309	359
Bandwidth		MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-84	-77	-73	-69	-66	-63
Tx Power		dBm	10	10	10	10	10	10
Antennas	30 cm	Range	km	17	13	11	8	7
	60 cm		km	25	19	16	14	12
	90 cm		km	32	25	21	18	16
	120 cm		km	40	29	25	22	20

Frequency band	24 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 3.5 MHz

Throughput		Mbps	4.91	9.58	12.1	14.3	17.2	19.7
Bandwidth		MHz	3.5	3.5	3.5	3.5	3.5	3.5
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-96	-89	-86	-83	-79	-77
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	9	6	5	4	3
	60 cm		km	11	8	7	6	4
	90 cm		km	13	9	8	7	5
	120 cm		km	15	11	9	8	6

Bandwidth 7 MHz

Throughput		Mbps	8.48	12.2	22.1	29.7	34.7	39.7
Bandwidth		MHz	7	7	7	7	7	7
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-93	-86	-83	-79	-76	-74
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	7	5	4	3	2
	60 cm		km	10	7	6	4	3
	90 cm		km	12	8	7	5	4
	120 cm		km	13	9	8	6	5

Bandwidth 14 MHz

Throughput		Mbps	19.9	38.8	49.1	62.3	73.1	81.2
Bandwidth		MHz	14	14	14	14	14	14
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-91	-84	-80	-77	-73	-71
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	7	4	3	2	1
	60 cm		km	9	6	5	4	3
	90 cm		km	10	7	6	5	4
	120 cm		km	12	8	7	6	5

Bandwidth 28 MHz

Throughput		Mbps	36.8	80.9	102	130	155	171
Bandwidth		MHz	28	28	28	28	28	28
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity		dBm	-89	-82	-78	-75	-71	-68
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	6	4	3	2	1
	60 cm		km	8	5	4	3	2
	90 cm		km	9	6	5	4	3
	120 cm		km	11	7	6	5	4

Frequency band	24 GHz
Availability	99.95 %
Antennas manufacturer	LEAX-RAY

Bandwidth 40 MHz

Throughput		Mbps	50.1	110	139	176	211	232	
Bandwidth		MHz	40	40	40	40	40	40	
Modulation		-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM	
Sensitivity		dBm	-87	-80	-76	-73	-69	-67	
Tx Power		dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	
Antennas	30 cm	Range	km	5	3	2	2	1	0
	60 cm		km	7	5	3	3	2	1
	90 cm		km	8	6	4	4	3	2
	120 cm		km	10	7	5	4	3	3

Bandwidth 56 MHz

Throughput			Mbps	72.9	160	203	257	304	338
Bandwidth			MHz	56	56	56	56	56	56
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-86	-79	-75	-72	-68	-65
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	5	3	2	1	1	0
	60 cm		km	7	4	3	2	2	1
	90 cm		km	8	5	4	3	2	2
	120 cm		km	9	6	5	4	3	2

Bandwidth 56 MHz TO

Throughput			Mbps	85.8	170	206	268	309	359
Bandwidth			MHz	56 TO	56 TO	56 TO	56 TO	56 TO	56 TO
Modulation			-	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
Sensitivity			dBm	-84	-77	-73	-69	-66	-63
Tx Power			dBm	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP	20 EIRP
Antennas	30 cm	Range	km	4	2	2	1	0	0
	60 cm		km	6	4	3	2	1	1
	90 cm		km	7	5	4	3	2	1
	120 cm		km	8	6	4	3	2	2