Wi20 Series Digital Microwave Radio

Wi20 FIDU 1.4 GHz Ethernet and 4 E1

Technical Specification

GENERAL

WiRake CFIP Wi20

Frequency Range	Reference	Tx-Rx offset
1350 – 1517 MHz	CEPT T/R 13-01 A ITU-R F.1242 p1	142 MHz
1375 – 1517 MHz	CEPT T/R 13-01 A	52 MHz
1427 – 1517 MHz	ITU-R F.1242 p2	65 MHz
1427 – 1518 MHz	IC SRSP-301.4	66.5 MHz
1427 – 1535 MHz	Australia FX3	60.5 MHz
1427 - 1525 MHz	India, Plan No-7	49 MHz
300 – 400 MHz	*Custom design*[1]	*Custom design*[1]

		Channel bandwidth	Capacity range[2]
Channel bandwidth[2]	Narrow bandwidths	0.25, 0.5, 1, 1.75, 2, 3.5, 4 MHz	*0.1 Mbps – 17 Mbps*
	Wide bandwidths	1, 1.75, 2, 3.5, 4, 5, 7, 8 MHz	*0.8 – 43 Mbps*
Modulation		4QAM / 16QAM / 32QAM / 64QAM / 128QAM	

		WiRake Wi20	WiRake Wi20 HP
Guaranteed max power	4QAM	+30 dBm	+36 dBm
	16QAM	+29 dBm	+35 dBm
	32QAM	+28 dBm	+34 dBm
	64QAM	+26 dBm	+32 dBm
	128QAM	+26 dBm	+32 dBm

PERFORMANCE

Configuration	1+0, 1+1 (HSB, SD, FD) Ring/Mesh (with RSTP) 2+0, 3+0, 4+0 (built-in Ethernet aggregation)
ACM and ATPC	Hitless
Protection switching	Hot Stand-by (<50ms), Space/Frequency diversity (hitless, errorless)

1 CFIP Wi20 supports various channel plan arrangements in the frequency range from 1350 MHz to 1535MHz. Please contact Hypercable to verify specific channel plan.

2 Total capacity is shared between Ethernet traffic, E1, service channels and other software configurable options.

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ETHERNET

Switch Type	Managed Gigabit Ethernet Layer 2
Maximum Frame Size	1536 bytes
MAC Table	4K entries; automatic learning and aging
Packet Buffer	128KB; non-blocking store & forward
Flow Control	802.3x
VLAN Support	802.1Q (up to 4K VLAN entries)
QinQ (Double Tagging)	Supported
QoS	64 level DiffServ (DSCP) or 8 level 802.1p mapped in 4 prioritization queues with VLAN support
QoS Queuing	Fixed or weighted (configurable ratio)
Spanning Tree Protocol	802.1D-2004 RSTP, 802.1Q-2005 MSTP

PORTS

RF Output (to antenna)	1x N-type Female	
Gigabit Ethernet	4x RJ-45 (data traffic, management port) 10/100/1000 Base-T	
E1 / T1	**WiRake Wi20**	4x RJ-45, 4x E1
	WiRake Wi20 HP	12x RJ-45, 12xE1[3]
	1x E1 port: with fractional E1 G.704 support	
AUX Serial interface port	**WiRake Wi20**	--
	WiRake Wi20 HP	2x DB-25[3] (e.g. RS-232C, V.24/V.28/V.11)
AUX RS-232 port	1x DB-9	
RSSI port for RSL	2x 2mm test jack, output V vs RSL: 0 to 2V vs -120 to -20dBm	
Serial port for MNGT configuration	1x DB-9	
Alarm	1x 26-pin hi-density D-SUB, 4 digital inputs, 4 relay outputs	
EOW port	2x 3.5mm, headset and mic, 64 Kbps	
1+1 Protection port	1x RJ-45, 1x Power protection port[3]	
DC power connector	1x 2ESDV-02 with screw locks	

MANAGEMENT

Management access	Ethernet VLAN or Separate Ethernet port (RJ-45)
SNMP	Yes, SNMP traps, MIB, SNMP v1/v2c
Element Management System	Web based HTTP, Telnet, FTP, Serial ASCII
Performance graphs	Uptime, Rx level, Tx level, System temperature, Radial MSE, LDPC decoder stress, constellation diagram, equalizer graph
Ethernet performance	Per port Ethernet statistics, Enhanced radio Ethernet statistics
Loopbacks	E1/T1, modem, RF loopback

ENVIRONMENTAL REQUIREMENTS

Stationary use	Climatic Class 3.1E compliant (ETSI ETS 300 019-1-3); weather protected locations
Temperature range	-5° to +55°C

MECHANICAL & TECHNICAL DATA

	WiRake Wi20	**WiRake Wi20 HP**
Dimensions, HxWxD	44.5x482x230 mm, 1U 19" rack	88.9x482x230 mm, 2U 19" rack
Weight	3.8 kg	5.2 kg
DC port	-40.5V to -57V DC (conforms to ETSI EN 300 132-2)	
Built-in DC and antenna port surge protection	Conforms to ETSI EN 301 489-1; EN 61000-4-5; IEC 61000-4-5	
Maximum Power consumption	Up to 30W	Up to 45W

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Technical Specification

WiRake CFIP Wi20

WiRake CFIP Wi20 HP

Received Level threshold and Ethernet throughput data:

RECEIVED SENSITIVITY LEVEL (RSL) AT BER 10^{-6} AND ETHERNET THROUGHPUT

		Channel Bandwidth													
		0.25 MHz		0.5 MHz		1 MHz		1.75 MHz		2 MHz		3.5 MHz		4 MHz (AU)	
		RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate
Modulation	FEC	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps
4QAM	Strong	-106.5	278.0	-104.5	538	-101.5	1030	-98.5	1865	-97.5	2448	-95.5	4038	-94.5	4696
16QAM	Strong	-100.5	536.0	-97.5	1055	-95.0	2020	-92.0	3660	-91.0	4825	-89.0	8078	-88.0	9395
32QAM	Strong	-96.5	671.0	-93.5	1329	-90.5	2533	-87.5	4588	-86.5	6005	-84.5	9990	-84.0	11605
64 QAM	Strong	-94.5	895.0	-90.5	1764	-88.0	3376	-85.5	6113	-84.5	7563	-82.5	13379	-81.5	15566
128 QAM	Strong	-90.5	1073.0	-87.5	2116	-84.5	4050	-82.0	7326	-81.5	9048	-79.0	16012	-78.5	18631
	Weak	-87.5	1160.0	-85.5	2292	-82.0	4378	-79.5	7921	-79.5	9792	-75.5	17329	-75.5	20168

RECEIVED SENSITIVITY LEVEL (RSL) AT BER 10^{-6} AND ETHERNET THROUGHPUT

		Channel Bandwidth																			
		1 MHz		1.5 MHz		1.75 MHz		2 MHz		2.5 MHz		3.5 MHz		4 MHz (AU)		5 MHz		7 MHz		8 MHz	
		RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate	RSL	Bit rate
Modulation	FEC	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps	dBm	Kbps
4QAM	Strong	-102.5	1030	-100.5	1597	-99.5	1865	-98.5	2448	-97.5	3063	-96.5	4038	-96.0	4696	-95.5	5867	-93.0	8817	-92.5	10109
16QAM	Strong	-96.5	2020	-94.5	3124	-93.5	3660	-92.5	4825	-91.5	6037	-90.5	8078	-89.5	9395	-88.5	11728	-87.5	17428	-87.0	19968
32QAM	Strong	-91.5	2533	-89.5	3921	-89.0	4588	-88.5	6005	-87.5	7503	-86.0	9990	-85.5	11605	-84.5	14502	-83.5	21668	-83.0	24833
64 QAM	Strong	-89.5	3376	-87.5	5222	-86.5	6113	-86.5	7563	-85.5	9447	-83.5	13379	-83.5	15566	-82.5	19431	-81.5	28826	-80.5	33042
128 QAM	Strong	-86.5	4050	-84.5	6265	-83.5	7326	-83.5	9048	-82.5	11303	-80.5	16012	-79.5	18631	-78.5	23251	-77.5	34587	-77.5	39646
	Weak	-83.5	4378	-81.5	6775	-80.5	7921	-80.5	9792	-79.5	12241	-77.5	17329	-77.5	20168	-75.5	25165	-74.5	37781	-73.5	43294

Note: Adding service channels like EOW, 1+1 etc. can reduce capacity by up to 230 kbps.