Spectrum-DMRIP-100D
Complete Radio Solution
4.45GHz to 38GHz

880M Throughput
1024QAM Support

Product Overview

Spectrum's Complete Radio DMRIP-100D is a new generation of microwave backhaul solution for 4G (LTE/WiMAX) mobile network. DMRIP-100D is designed to guarantee easy installation and offers seamless compatibility for all IP based operators. In DMRIP-100D the conventional IDU function (modem/switch) incorporate into one box. Spectrum provides the most cost-effective solution on the market allowing considerable reduction of customer OPEX and increase of feasibility without sacrificing performance and reliability. **Optional High Power Radio available**

Light & Compact, Zero Footprint

- With 4.8kg weight, the unit is easy to carry and installed by a single field technician
- Allows considerable CAPEX and OPEX reduction without need of site lease and 20% energy saving compared with conventional IDU+ODU configuration

Hitless Adaptive Coding & Modulation (ACM)
- Programmable HAACM to ensure hitless performance for QPSK-1024QAM over channel bandwidth of 14MHz-112MHz to maximize

Feature-rich Network Management Layer
- Built-in software for SNMP v.1, Web HTTP, FTP and Telnet command line interface protocol for fast integration
- QoS with IEEE802.1p CoS / ToS / Diffserv, SP/DWRR or hybrid SP + DWRR
- 4 or 8 level priority and scalable to be served by 4 or 8 queues, increase traffic level flexibility
- OAM support for IEEE802.1ag/ITU-T

Extreme Durability
- Provided the highest Ingress protection (IP65) enclosure to withstand dust, water or incursion of solid object
- Lightening protection compliant with ITU-T K.21
- Operational temperature: -33 C to +55C

Configurable Data Ports
- Versatile configuration for 1 Gigabit Ethernet port using in-band management.

Standard Compliance
- Compliant to international standard CE, ETSI, FCC & ITU
- EMC: EN 55022 Class B
- EN 301 489-1/EN 301 489-4

Link Reliability
- Provide un-interrupt traffic performance

Fully Software Configurable
- DMRIP-100s configuration selection can be configured on-the-fly and remotely for easy installation, commissioning and operation

Remote Upgrades
- Future-proof installation with remote software/firmware/FPGA code upgrades
- Traffic is not interrupted with above remote upgrade operation

Diagnostics & Maintenance
- Provide system network diagnostics with near-end and far-end loopback
- Built-in OAM for performance monitoring & metering
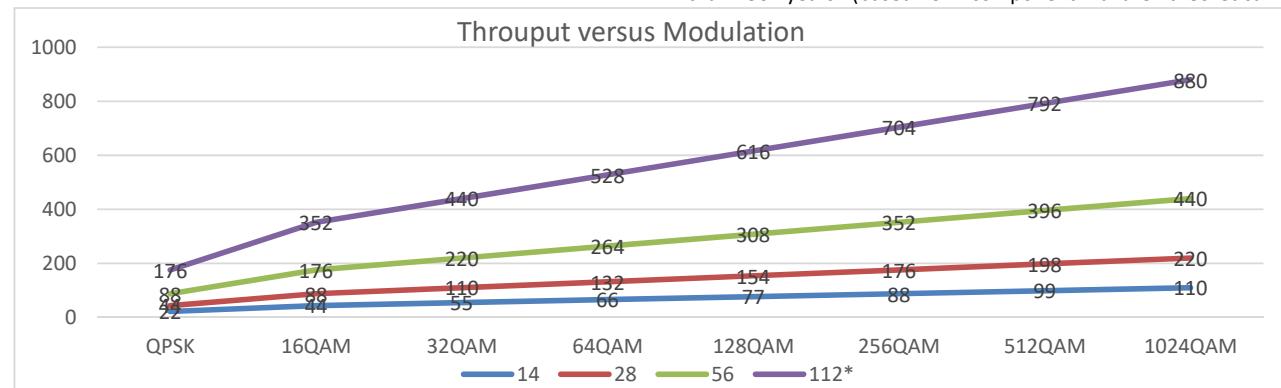
Synchronization
- Configurable Sync-E (with ESMC or manually setting for master and slave clock)

Ethernet Traffic
- Up to 880Mbps L1 throughput
- Low latency

Mean Time Between Failures (MTBF)
- Projected elapsed time between equipment failure is more than 50 years (based on component failure theoretical

Throuput versus Modulation

	QPSK	16QAM	32QAM	64QAM	128QAM	256QAM	512QAM	1024QAM
14	22	44	55	66	77	88	99	110
28	44	88	110	132	154	176	198	220
56	88	176	220	264	308	352	396	440
112*	176	352	440	528	616	704	792	880

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Spectrum Communications

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Applications

Cellular Backhaul

DMRIP-100s is a perfect fit for 3G/LTE/WiMAX base station backhaul to replace optical fiber and FSO, ideally for new all-packet base station, and caters to various connection needs: voice, data, management and control. With SynE synchronization, DMRIP-100s could meet any RAN network requirement.

With external PWE3 interface unit, DMRIP-100s could provide up to 16E1 and 4FE interfaces for 2G/3G/LTE co-site scenario.

ISP Backhaul
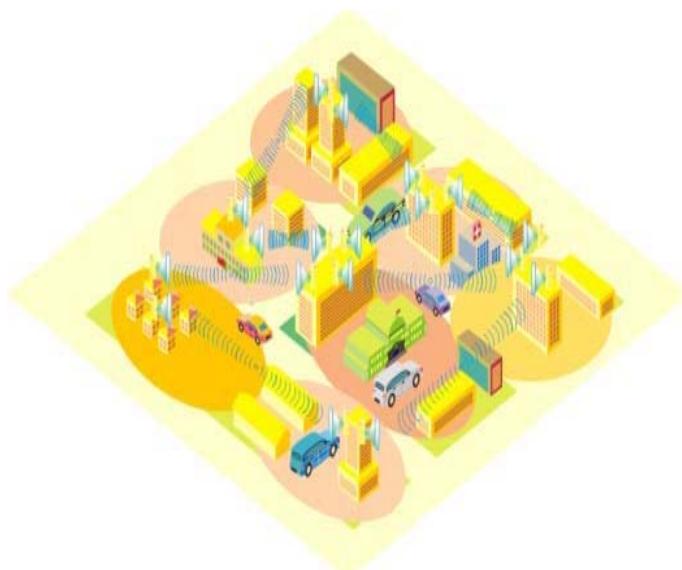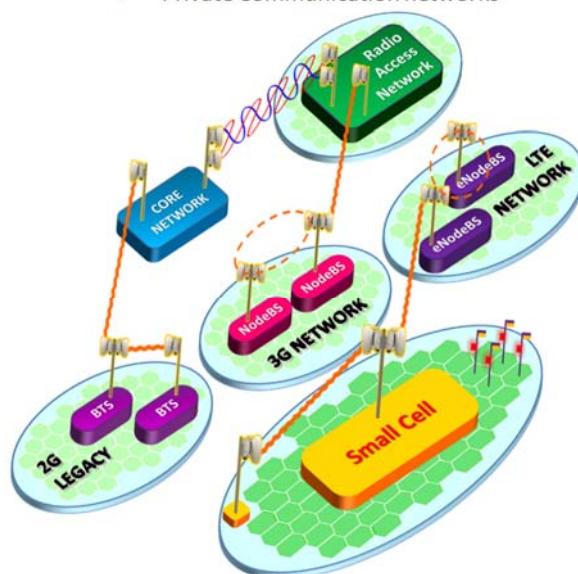
DMRIP-100s allows ISPs, who own no land lines, to quickly establish a backhaul without quality compromises. ISPs can grow up their profits by delivering services with guaranteed SLA or reaching distant clients from their PoP using radios with similar cost at licensed frequencies to avoid spectrum congestion.

Broadband Access

DMRIP-100s is an affordable medium capacity radio solution for enterprises that need private lines and broadband Ethernet traffic.

It offers solutions with fine combination of cost effectiveness & short commission time for the following applications:

- DSLAM backhaul
- No right-of-way
- Extending network from a fiber POP
- Private Communication networks

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Switch for IP Radio 2+0 Aggregation

Switch S6110S is a unique L2 Smart Gigabit Ethernet Switch for IP Radio transport with 2+0 load balance capability based on L2 to L4 information for traffic distribution. S6110S can work in terminal and Add/Drop modes as shown in figure 1 and figure 2. Unique ACL policies and proprietary algorithm are adopted to have load balance without losing in-band IP-Radio management function under running LACP protocol. One dedicated 10/100Mbps management port for in-band IP radio management is supported.

FEATURES

- Support 2+0 IP radio with load balance function
- Traffic distribution is based on L2 to L4 information for Load balance
- Remain in-band IP-Radio management function under running LACP protocol
- Two LACP ports for Terminal or Add/Drop 2+0 Connections
- **Two 1000 base-X SFP fiber ports and two** 10/100/1000 copper ports for Service transport
- **One 10/100Mbps management**
- Supports port-based and 802.1q tag-based VLAN .
- Provides full wire-speed forwarding
- Copper port supports auto-negotiation and auto-MDI-MD1-X detection
- Support jumbo frames up to 9K bytes
- Support SNMP, Web-based and Console management

Technical Specifications

Interfaces

- Two LACP ports for Terminal or Add/Drop 2+0 Connections
- **Two 1000 base-X SFP fiber ports and two** 10/100/1000 copper ports for Service transport
- 1 Console and 1 Management interface port.

L2 Interfaces

- Port Based VLAN and MAC Base VLAN (Maximum 4K vlan)
- Support IEEE 802.1q tagged VLAN
- Auto-negotiation and auto-MDI-MD1-X detection.
- Support IEEE 802.1w: Rapid Spanning Tree Protocol (RSTP)
- Compatibility with IEEE 802.1D Spanning Tree Protocol (STP)
- Traffic distribution is based on L2 to L4 information for Load balance
- Support IEEE 802.3x Flow Control
- Capable of storing 4K MAC addresses
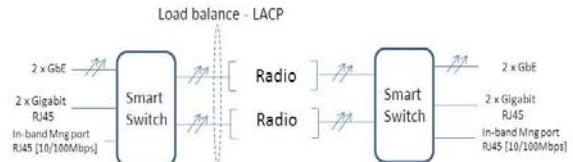
Fig. 1: 2+0 IP Radio with LACP and in-band management access to radio for configuration and monitoring
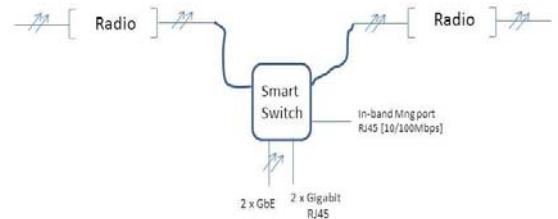
Fig. 2 : Add/Drop application of IP Radios

Management

- Support HTTP and SNMP
- Provides port status, statistic monitoring, and control function
- Upgrade firmware and backup configuration through TFTP

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Frequency		4.5 - 5GHz**	6.5GHz	7GHz	8GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz*	38 GHz*
Standard		ETSI/ITU or customer specified										
RF Output Power (dBm-Max)	1024QAM	23	23	23	23	16	16	16	15	15	14	13
	512QAM	24	24	24	24	17	17	17	16	16	15	14
	256QAM	25	25	25	25	18	18	18	17	17	16	15
	128QAM	25	25	25	25	18	18	18	17	17	16	15
	64QAM	25	25	25	25	19	19	19	18	18	17	16
	32QAM	25	25	25	25	20	20	20	19	19	18	17
	16QAM	25	25	25	25	21	21	21	20	20	19	18
	QPSK	27	25	25	25	23	23	23	21	21	20	19
RF Output Power(dBm- Min)		0										
Tuning Increment (dB)		1										
Accuracy (dB)		±2										
RX at BER=10-6 (dBm)	**112MHz** 1024QAM	-52.9	-52.9	N/A	-52.9	-52.4	N/A	-52.4	-52.0	-52.0	-51.0	-51.0
	512QAM	-56.5	-56.5	N/A	-56.5	-56.0	N/A	-56.0	-55.6	-55.6	-54.6	-54.6
	256QAM	-59.5	-59.5	N/A	-59.5	-59.0	N/A	-59.0	-58.6	-58.6	-57.6	-57.6
	128QAM	-62.5	-62.5	N/A	-62.5	-62.0	N/A	-62.0	-61.6	-61.6	-60.6	-60.6
	64QAM	-65.5	-65.5	N/A	-65.5	-65.0	N/A	-65.0	-64.6	-64.6	-63.6	-63.6
	32QAM	-68.5	-68.5	N/A	-68.5	-68.0	N/A	-68.0	-67.6	-67.6	-66.6	-66.6
	16QAM	-71.4	-71.4	N/A	-71.4	-71.0	N/A	-71.0	-70.6	-70.6	-69.6	-69.6
	QPSK	-77.8	-77.8	N/A	-77.8	-77.3	N/A	-77.3	-76.7	-76.7	-75.7	-75.7
	56MHz 1024QAM	-55.9	-55.9	N/A	-55.9	-55.4	-55.4	-55.4	-55.0	-55.0	-54.0	-54.0
	512QAM	-59.5	-59.5	N/A	-59.5	-59.0	-59.0	-59.0	-58.6	-58.6	-57.6	-57.6
	256QAM	-62.5	-62.5	N/A	-62.5	-62.0	-62.0	-62.0	-61.6	-61.6	-60.6	-60.6
	128QAM	-65.5	-65.5	N/A	-65.5	-65.0	-65.0	-65.0	-64.6	-64.6	-63.6	-63.6
	64QAM	-68.5	-68.5	N/A	-68.5	-68.0	-68.0	-68.0	-67.6	-67.6	-66.6	-66.6
	32QAM	-71.4	-71.4	N/A	-71.4	-71.0	-71.0	-71.0	-70.6	-70.6	-69.6	-69.6
	16QAM	-74.4	-74.4	N/A	-74.4	-74.0	-74.0	-74.0	-73.6	-73.6	-72.6	-72.6
	QPSK	-80.8	-80.8	N/A	-80.8	-80.3	-80.3	-80.3	-79.7	-79.7	-78.7	-78.7
	28MHz 1024QAM	-57.9	-57.9	-57.9	-57.9	-57.4	-57.4	-57.4	-57.0	-57.0	-56.0	-56.0
	512QAM	-62.4	-62.4	-62.4	-62.4	-61.9	-61.9	-61.9	-61.5	-61.5	-60.5	-60.5
	256QAM	-65.4	-65.4	-65.4	-65.4	-65.1	-65.1	-65.1	-64.7	-64.7	-63.7	-63.7
	128QAM	-68.5	-68.5	-68.5	-68.5	-68.0	-68.0	-68.0	-67.6	-67.6	-66.6	-66.6
	64QAM	-71.5	-71.5	-71.5	-71.5	-71.2	-71.2	-71.2	-70.8	-70.8	-69.8	-69.8
	32QAM	-74.5	-74.5	-74.5	-74.5	-74.0	-74.0	-74.0	-73.6	-73.6	-72.6	-72.6
	16QAM	-77.3	-77.3	-77.3	-77.3	-76.8	-76.8	-76.8	-76.4	-76.4	-75.4	-75.4
	QPSK	-83.7	-83.7	-83.7	-83.7	-83.1	-83.1	-83.1	-82.7	-82.7	-81.7	-81.7
	14MHz 1024QAM	61.1	-61.1	-61.1	-61.1	-60.6	-60.6	-60.6	-60.2	-60.2	-59.2	-59.2
	512QAM	64.9	-64.9	-64.9	-64.9	-64.5	-64.5	-64.5	-64.1	-64.1	-63.1	-63.1
	256QAM	67.9	-67.9	-67.9	-67.9	-67.4	-67.4	-67.4	-67.0	-67.0	-66.0	-66.0
	128QAM	70.6	-70.6	-70.6	-70.6	-70.1	-70.1	-70.1	-69.7	-69.7	-68.7	-68.7
	64QAM	73.3	-73.3	-73.3	-73.3	-72.8	-72.8	-72.8	-72.4	-72.4	-71.4	-71.4
	32QAM	76.1	-76.1	-76.1	-76.1	-75.6	-75.6	-75.6	-75.2	-75.2	-74.2	-74.2
	16QAM	80.3	-80.3	-80.3	-80.3	-79.8	-79.8	-79.8	-79.4	-79.4	-78.4	-78.4
	QPSK	86.1	-86.1	-86.1	-86.1	-85.6	-85.6	-85.6	-85.2	-85.2	-84.2	-84.2
	7MHz 1024QAM	63.4	-63.4	-63.4	-63.4	-62.9	-62.9	-62.9	-62.5	-62.5	-61.5	-61.5
	512QAM	67.6	-67.6	-67.6	-67.6	-67.1	-67.1	-67.1	-66.7	-66.7	-65.7	-65.7
	256QAM	70.6	-70.6	-70.6	-70.6	-70.1	-70.1	-70.1	-69.7	-69.7	-68.7	-68.7
	128QAM	73.4	-73.4	-73.4	-73.4	-72.9	-72.9	-72.9	-72.5	-72.5	-71.5	-71.5
	64QAM	76.9	-76.9	-76.9	-76.9	-76.4	-76.4	-76.4	-76.0	-76.0	-75.0	-75.0
	32QAM	80.4	-80.4	-80.4	-80.4	-79.9	-79.9	-79.9	-79.5	-79.5	-78.5	-78.5
	16QAM	83.2	-83.2	-83.2	-83.2	-82.7	-82.7	-82.7	-82.3	-82.3	-81.3	-81.3
	QPSK	88.8	-88.9	-88.9	-88.9	-88.4	-88.4	-88.4	-88.0	-88.0	-87.0	-87.0
	3.5MHz 1024QAM	65.9										
	512QAM	70.1										
	256QAM	73.1										
	128QAM	75.9										
	64QAM	79.4										
	32QAM	82.9										
	16QAM	85.7										
	QPSK	91.3										

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Flange	N-Type	UBR84	UBR84	UBR84	UBR100	UBR140	UBR140	UBR220	UBR220	UBR220	UBR320
RSSI	Output voltage vs. RSL: 0 ~ 1.4V vs. -90 ~ -20dBm(10dB/200mV)										
RSL Accuracy	±2 dB@-80~-30dBm, ±3 dB@-90~-80dBm or -30~-20dBm										
Frequency Stability	±5ppm										
Frequency Source	Synthesizer										
Max Input Level Without Damage	0dBm										
Modulation	QPSK~1024QAM										
ACM switching	Hitless										
Throughput (single channel)/Mbps	Up to 880 Mbps										
Protection	2+0 with external smart sw										
Switch type	GE Layer 2			QoS					802.1p		
Max frame size	9216 bytes			QoS queuing					Yes		
MAC table	1k entries, auto learning & aging			VLAN support					802.1Q, QinQ		
Packet buffer	31kBB;non-blocking store & forward			Spanning tree protocol					802.1D-1998 STP&RSTP		
Flow control	802.3x			Synchronization					SyncE		
SNMP	SNMP traps, MIB, SNMP v1/v2c										
EMS	Web based HTTP, Telnet, FTP, SNMP										
Interface	1-GE optical and 1GE electrical										
Ethernet physical Interface	LC connector(Single mode, optical fibre)										
RSSI	BNC										
Power	N-type connector or RJ45 with POE										
Power Supply	-48V±20%										
Power Consumption	<40W										
Ambient Temperature	-35~ +55℃										
Weight &Dimension (kg/mm)	6/315×265×130										
Humidity	All weather										
Elevation	15,000ft / 4572 m, IP67										

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Capacity (Mbps)								
Mod BW	QPSK	16QAM	32QAM	64QAM	128QAM	256QAM	512QAM	1024QAM
3.5**	5.3	11	13.5	16.2	18.5	22	24.5	27.5
7**	11	22	27.5	33	37.5	44	49.5	55
14	22	44	55	66	77	88	99	110
20	31	63	79	94	110	126	141	157
28	44	88	110	132	154	176	198	220
40	63	126	157	189	220	251	283	314
56	88	176	220	264	308	352	396	440
60	94	189	236	283	330	377	424	471
80	126	252	315	377	441	503	566	630
112	176	352	440	528	616	704	792	880

Notes: *All Specifications are typical values and subject to change without prior notice*

* *Subject to Special Order.*

** *For 4.5 to 5GHZ radio*

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