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Data Sheet: MTF LEO Satellite / MTF Earth Station

Description	DownLink	UpLink
Tx Power	51dBm/Satellite	51dBm/Satellite
Bit Rate	0.64Gbps/Satellite	12.8Gbps/Satellite
# of Users	1 Ground Station	1 Satellite
Tx Antenna Gain	30dBi	18dBi
Tx Antenna Type	16X16 AESA, π lobe	4X4 PESA, π lobe
Rx Antenna Gain	18dBi	30dBi
Rx Antenna Type	4X4 PESA, π lobe	16X16 AESA, π lobe
Rooftop Loss	0dB	0dB
Range	600Km	600Km
Modulation	MTFM™	MTFM™
Coding Gain	0dB	0dB
Tx/Rx H/W	Apart	Apart
Carrier Frequency	3.5GHz	3.5GHz
BW	10MHz	10MHz
Sampling Type	RF	RF
ADC	Dual: 7GHz @ 4bit/sample	Dual: 7GHz @ 4bit/sample
PAPR	0dB	0dB
MAC	MTFMA™ with Dynamic Channel Allocation	
Multiple Access	Point-to-Multipoint	Multipoint-to-Point

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Data Sheet: Existing FW Systems

Description	DownLink	UpLink
Tx Power	51dBm/Satellite	51dBm/Satellite
Bit Rate	0.64Gbps/Satellite	12.8Gbps/Satellite
# of Users	1 Ground Station	1 Satellite
Tx Antenna Gain	30dBi	18dBi
Tx Antenna Type	16X16 AESA, π lobe	4X4 PESA, π lobe
Rx Antenna Gain	18dBi	30dBi
Rx Antenna Type	4X4 PESA, π lobe	16X16 AESA, π lobe
Rooftop Loss	0dB	0dB
Range	100Km	100Km
Modulation	16QAM	16QAM
Coding Gain	9dB	9dB
Tx/Rx H/W	Apart	Apart
Carrier Frequency	Ku/Ka	Ku/Ka
BW	3.5GHz	3.5GHz
Sampling Type	IF	IF
ADC	Dual: 3.5GHz @ 8bit/sample	Dual: 3.5GHz @ 8bit/sample
PAPR	6dB	6dB
MAC	TDD	
Multiple Access	Point-to-Multipoint	Multipoint-to-Point

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Comparison: MTF LEO Systems Versus Existing LEO Systems

For a fixed Tx power, bit rate, antenna gain and types, the MTF systems offer 3 types of advantages compared to existing systems:

1. The bandwidth is reduced from for current systems to for MTF systems.
2. The range is increased from for current systems to for MTF systems.
3. The complexity for current systems is substantially reduced for MTF systems as shown below:
   a. The Up-Converters/Down-Converters are not required for MTF systems.
   b. Forward Error Correction (FEC) Encoders are not required for MTF systems.
   c. The resolution of the ADC is smaller for MTF systems.
   d. The PA in the downlink for MTF systems is selected to be highly efficient.

Assumptions:
1. For a LEO satellite and earth-based transceivers, Tx and Rx are separated such that Full Duplex communications is possible for both current systems and MTF systems.
2. All transceivers are in a LOS environment.
3. Each array element in both Tx and Rx antennas has a steradian lobe.