

## 15. Repeater Solution



### FEATURE

- RF Repeater
- ICS Repeater
- TDD RF Repeater
- DAS Repeater
- Home, In-door, Out-door Type

### APPLICATION

- TETRA, GSM, WCDMA, LTE, 5G



## ■ Repeater Solution

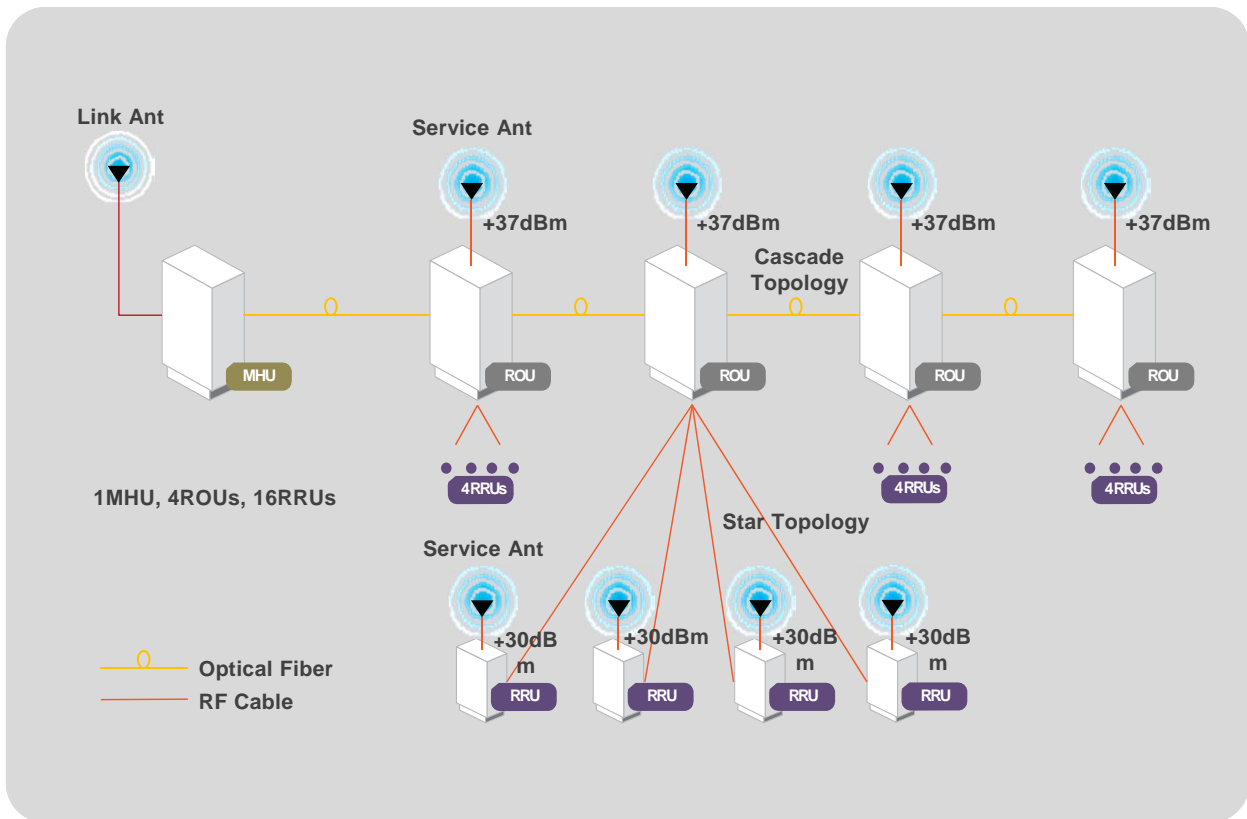
### DAS(Distributed Antenna System)

#### FEATURE

- Support Single Band or Dual Band Frequency
- High Quality Signal with the Digital Optical Transmission System
- Long Distance Transmission with Low Signal Loss
- Up to 4ROUs with Cascade and 4RRU with Star Connection
- Compact Size Optimized to Install on the Pole
- Supports Remote Monitoring with Data Modem
- High Density, Low Rise Residential Area



#### TOPOLOGY



- MHU : Main Hub Unit
- ROU : Remote Optical Unit
- RRU : Remote RF Unit

• Topology can be customized

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### DAS(Distributed Antenna System)

#### SPECIFICATION

Parameter		Specification	Remark
Frequency Band		Single or Double Band	Can be customized
Input Level	DL	-60 ~ -30dBm	
	UL	-65dBm	
Output Level	DL	ROU	+37dBm/Total
		RRU	+30dBm/Total
	UL	0dm/Total	MHU
Gain	DL	+97dB ±1dB	
	UL	+65dB ±1dB	
Pass Band Ripple		±4dB	Peak to peak
VSWR		≤ 1.5:1	
System Delay		≤ 7μs	
Noise Figure		≤ 5dB	UL
Frequency Stability		≤ 0.01ppm	
Impedance		50Ω	
Power Supply		DC +29.4V/5A	220VAC/60Hz
Operating Temperature		-30~+70°C	
Operating Humidity		95%	
Heat Dissipation		Natural Convection	
Ingress Protection Rating		IP65	
Dimension	MHU	201x440x195mm	Single Band
	ROU	201x440x195mm	Single Band
	RRU	201x290x165mm	Single Band

• All Parameters can be Customized.

## ■ Repeater Solution

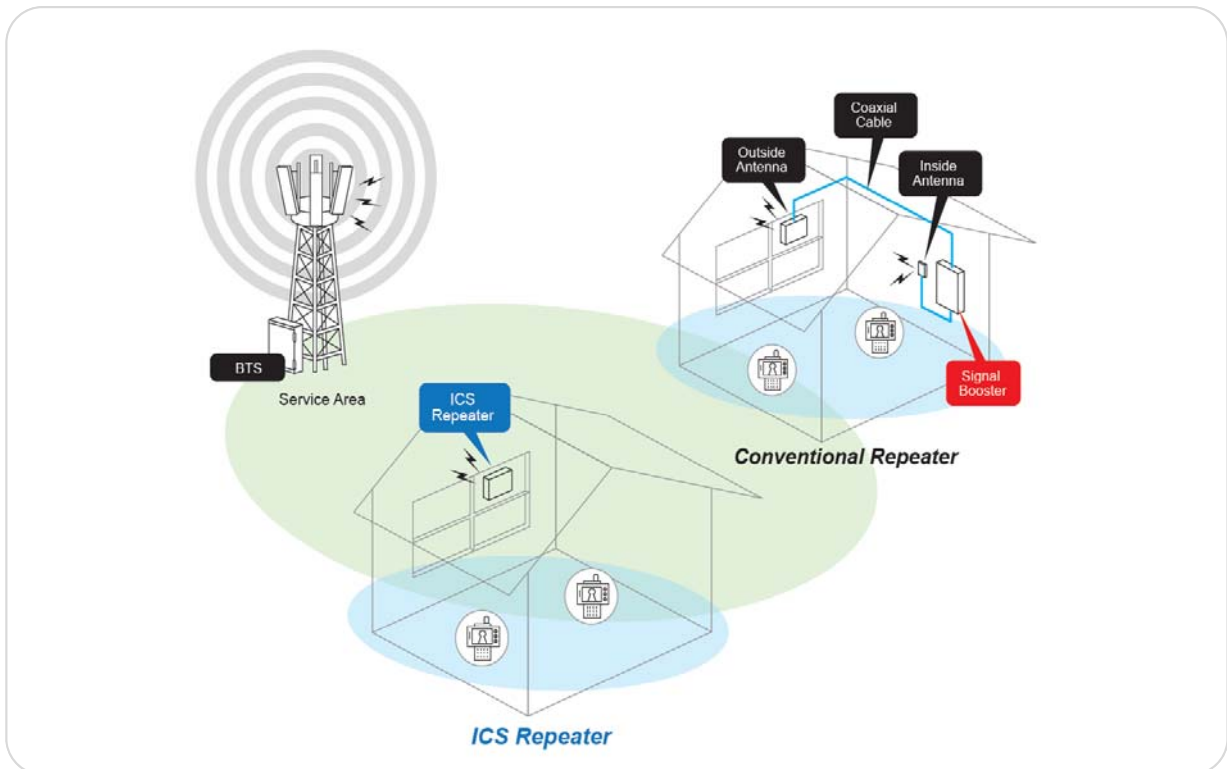
### ICS Repeater

#### FEATURE

- Built-in Both Donor and Service Antennas
- Support 1800MHz LTE & 2100MHz WCDMA Band Simultaneously
- DL: +10dBm, UL: +13dBm Output
- Cancellation Range  $G=I+13dB$
- LED Bars Show Input Signal Strength and Isolation
- Auto Gain control, Shutdown, isolation check and Gain Setup
- Auto Detection & Changeover for External Antenna
- Optional External Antenna & 10m 3d-FB Coaxial Cable
- External AC/DC Adaptor



#### DEPLOYMENT



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### ICS Repeater

#### SPECIFICATION

Parameter		Specification	Remark
Frequency Band		LTE1800 + WCDMA2100	Can be customized
Input Level	DL	-60 ~ -30dBm	Built in Antenna
	UL	-55dBm	
Output Level	DL	+10dBm/Total	
	UL	+13dBm/Total	
Gain	Built-in Ant	+75dB	Auto Switchover
	External Ant	+70dB	
Gain Control Range/Step		30dB/1dB	
Auto Shutdown Level	DL	+13dBm/Total	
	UL	+16dBm/Total	
System Delay		≤ 4.5μs	
In-band Flatness		3dB	Peak to Peak
VSWR		≤ 1.5:1	
Noise Figure		≤ 5dB	@ Max. Gain
Impedance		50Ω	
Power Supply		AC 100V ~240V	AC/DC Adaptor
Operating Temperature		-20~+60°C	
Operating Humidity		95%	
Heat Dissipation		Natura Convection	
Interference Cancellation Widow Size		1μs	UL, DL
Gain Tracking Time		1sec	Target Gain±1dB
Fading Performance (Multi-path 10)	Static	EVM ≤8%(LTE), ≤10%(3G) Gain Variation ≤±2dB	G=I+13dB
	3Hz	EVM ≤8%(LTE), ≤10%(3G) Gain Variation ≤±2dB	G=I
Weight		1.8Kg Max.	
Dimension(WHD)		158x252x75mm	

• All Parameters can be Customized.

## ■ Repeater Solution

### TD-LTE RF Repeater

#### FEATURE

- Support Single Band TD-LTE Service
- Built in TDD Sync Detection Module
- High Working Gain up to +80dB
- RF Output Power up to +24dBm
- Flexible TDD DL/UL Allocation configured by Automatically
- Automatic Gain Control



#### SPECIFICATION

Parameter	Specification	Remark
Frequency Range	2496~2690MHz(Band41)	Can be customized
Operating Bandwidth	20MHz	Can be customized
Output Power	DL: +23dBm, UL: +17dBm	Can be customized
Gain	+80dB±2dB	
Gain Flatness	3dB	Peak to peak
Gain Variation over Temp.	±3dB	
Gain Control Rang	30dB/1dB Step	
ALC Range	30dB	
Shutdown	≥ +25dBm	
VSWR	1.5:1	
System Group Delay	≤ 4μs	
Noise Figure	≤6dB	Uplink, @Max Gain
ACRR	20dBc	
EVM	≤ 8%	vs. Source
Sync Detection Level	≥ -85dBm	
Out of Band Gain	60dB @1.0 ≤ offset < 1.8MHz	
	45dB @1.8 ≤ offset < 10.8MHz	
	35dB @10.8MHz ≤ offset	
Spurious Emission	-36dBm @9KHz~1GHz	
	-30dBm @1GHz~12.5GHz	
Impedance	50Ω	
Operating Temperature	-20~+60°C	
Operating Humidity	95%	
Input Voltage	100~240VAC/50~60Hz	

• All Parameters can be Customized.

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### Home RF Repeater

#### FEATURE

- TETRA, GSM, WCDMA or LTE Type is available
- Support **Single Band** or **Dual Band** Frequency Range
- Compact Size
- Easy Installation
- Auto Level Control Function (ALC)
- Suitable for Home Area Service



#### SPECIFICATION

Parameter	Specification	Remark
Frequency Range	Tetra, GSM, WCDMA or LTE	Single or Dual
Operating Bandwidth	20MHz (Single or Dual)	Can be customized
Output Power	DL: +10dBm, UL: +10dBm	
Gain	+65dB	
Gain Flatness	3dB	Peak to peak
Maximum Input Power	-20dBm	
Gain Control Rang	15dB/1dB Step	
ALC Range	15dB	
Shutdown	$\geq +13\text{dBm}$	
VSWR	1.5:1	
System Group Delay	$\leq 5\mu\text{s}$	
Noise Figure	$\leq 7\text{dB}$	Uplink, @Max Gain
Out of Band Gain	3GPP	
Function	Over Power Check Auto Gain Control	Can be customized
LED	DC Power, ALC, Shutdown	Can be customized
Input Voltage	100~240VAC/50~60Hz	+6VDC Adaptor

- All Parameters can be Customized.

## ■ Repeater Solution

### Indoor RF Repeater

#### FEATURE

- TETRA, GSM, WCDMA or LTE Type is available
- Support **Single Band** or **Dual Band** Frequency Range
- Indoor Type Repeater
- Easy Installation
- Auto Level Control Function (ALC)
- Optional Modem for Network Management System
- Suitable for In-building Area



#### SPECIFICATION

Parameter	Specification	Remark
Frequency Range	Tetra, GSM, WCDMA or LTE	Single or Dual
Operating Bandwidth	20MHz (Single or Dual)	Can be customized
Output Power	DL: +23dBm, UL: +17dBm	
Gain	+80dB±2dB	
Gain Flatness	3dB	Peak to peak
Gain Variation over Temp.	±3dB	
Gain Control Rang	30dB/1dB Step	
ALC Range	30dB	
Shutdown	≥ +25dBm	
VSWR	1.5:1	
System Group Delay	≤ 5μs	
Noise Figure	≤ 7dB	Uplink, @Max Gain
Out of Band Gain	3GPP	
Function	Isolation and Over Power Check Auto Gain Control, GUI(Optional)	Can be customized
LED	DC Power, ALC, Shutdown	Can be customized
Input Voltage	100~240VAC/50~60Hz	

- All Parameters can be Customized.



## Outdoor RF Repeater

### FEATURE

- TETRA, GSM, WCDMA or LTE Type is available
- Support **Single Band** or **Dual Band** Frequency Range
- Outdoor Type Repeater
- Cabinet Type Repeater
- Auto Level Control Function (ALC)
- Optional Modem for Network Management System
- Suitable for Outdoor Shadow Area



### SPECIFICATION

Parameter	Specification	Remark
Frequency Range	Tetra, GSM, WCDMA or LTE	Single or Dual
Operating Bandwidth	20MHz (Single or Dual)	Can be customized
Output Power	DL: +37dBm, UL: +23dBm	
Gain	+95dB±2dB	
Gain Flatness	3dB	Peak to peak
Gain Variation over Temp.	±3dB	
Gain Control Rang	30dB/1dB Step	
ALC Range	30dB	
Shutdown	≥ +39dBm	
VSWR	1.5:1	
System Group Delay	≤ 5μs	
Noise Figure	≤ 7dB	Uplink, @Max Gain
Out of Band Gain	3GPP	
Function	Isolation and Over Power Check Auto Gain Control, GUI(Optional) NMS(Optional)	Can be customized
LED	DC Power, ALC, Shutdown	Can be customized
Input Voltage	100~240VAC/50~60Hz	

- All Parameters can be Customized.