ICS REPEATER

Based on high-speed LTE/5G platforms, compact ICS repeaters are RF repeaters equipped with an Interference Cancellation System.
Its size and weight are optimized for in-building installation, and the optional internal and external antennas are also designed to be accessible in all situations.
In order to provide an extended range of wireless environments, miniature ICS repeaters are installed in a variety of locations.

- High-rise buildings/offices/shops/homes/parking lots, etc.

Home 2100MHz ICS Repeater

Home 900MHz ICS Repeater

Indoor Public Dual Band ICS Repeater

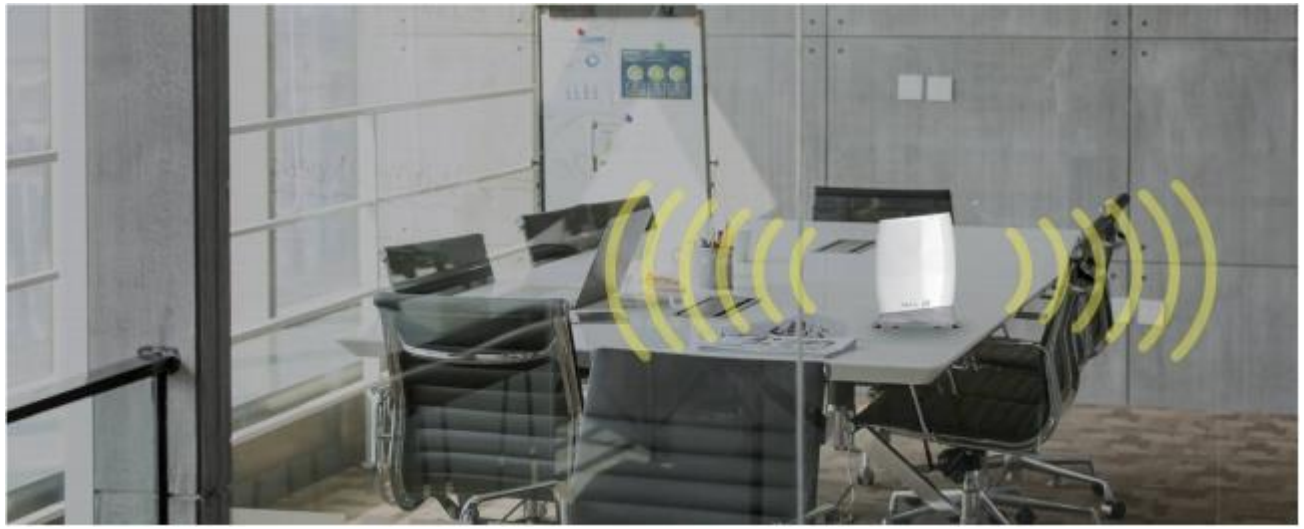
Outdoor ICS Repeater

IP1 [+10dBm ICS Repeater]

SINGLE BAND
ICS REPEATER

4G /5G ICS Repeater

- It can be easily installed on a table or near a window.
- There is no need to install a separate service and donor antenna.
- Ideal for servicing small offices, homes or restaurants.
- We provide stable service through overcurrent limitation.
- Compact design



IP1 [+10dBm ICS Repeater]

SINGLE BAND
ICS REPEATER

KEY FEATURES

- 4G LTE support
  - Low System delay design
- Demodulation
  - Obtain TDD synchronization directly from downlink RF inputs
- Auto gain setting function
  - System Gain configured by RSRP
- Isolation Detection and Elimination with Embedded ICS Systems
  - G = I + 15dB
  - Plug & Play ㎡
- Extended coverage for areas below 66 ㎡
- Switchable - built-in or external donor antenna
- Appropriate LED indication based on device status

PRODUCT DESCRIPTION

It is donor of small power, digital device of service antenna type built. Equipped with ICA (Interference Cancellation Algorithm) function, it secures isolation between antennas and eliminates feedback or interference signals for stable operation.

It is a device that relays and amplifies transmitted waves sent from LTE base stations and land mobile stations in the 2100MHz range, and is intended to improve the indoor radio wave environment in ordinary homes, small stores, convenience stores, restaurants, and offices.
It is an optimized device that meets the design and function that meets the requirements of the operator.
★Depending on the operator, the design may change.

IP1 Specification

SINGLE BAND
ICS REPEATER

2.1GHz SYSTEM SPECIFICATION

Items	Downlink	Uplink	Remark
Frequency Range	2150MHz~ 2170MHz	1960MHz~ 1980MHz	
Bandwidth	20MHz		
TX-RX Frequency Separation	190MHz		
Frequency Stability	<±227 Hz	<±300 Hz	
Maximum Output Power	+10dBm /total	+13 dBm /total	DL +87~-62%/ UL +87~-74%
Maximum Input Power	> -25dBm /total±2 dB	> -22dBm /total±2 dB	
ALC Operative	+10dBm +2 dB	+13 dBm +2 dB	
Maximum Gain	70dB		
Out of Band Gain	Category A		
System Group Delay	<4usec LTE, <6usec3G		
Occupied Bandwidth	< 5/10/15/20MHz LTE, < 5 MHz3G		
Noise Figure	-	< 8dB	Maximum Gain
Input VSWR	<1.5		
EVM (Error Vector Magnitude)	< 8% LTE, <12.5%3G		64QAM
Spurious Emission	Category B		
Spurious Emission Receiver Side	Category C		
ACLR	Category D		
ACRR	-5MHz/ +5MHz> 20dB within		3GPP TS25.106 V12.10, TS36.106 V12.1.0 13 ACRR observance
Pass Band Flatness	<4dB p-p DL (2150.68~2169.32MHz)/UL (1960.68~1979.32MHz)		
Power Consumption	<15W		

IP2 [+10dBm ICS Repeater]

SINGLE BAND
ICS REPEATER

KEY FEATURES

- 4G LTE support– 900MHz
  - Low latency design
- Auto gain Setup Function
  - RSRP Consisting of System Gain
- Through Embedded ICS Systems
  Isolation Detection and Cancellation
  - G = I + 15dB
  - Plug & Play
- Extended coverage for areas up to 66 m²
- Switchable - built-in or external donor antenna
- Appropriate LED indication based on device status

PRODUCT DESCRIPTION

It is a donor of the small power, an integrated service antenna type device. Equipped with ICA (Interference Cancellation Algorithm) function, it secures isolation between antennas and eliminates feedback or interference signals for stable operation.

It is a device that amplifies the transmission waves sent from LTE base stations and land mobile stations in the 900MHz range, and is intended to improve the indoor radio wave environment of ordinary homes, small stores, convenience stores, restaurants, and offices.

TS36.106 (LTE) It is a product conforming to the Radio Act of Japan or the laws and ordinances concerned and comprises specifications which do not affect commercial networks by conforming technical condition (TELEC-T151) of small power repeater for cell-phone and PHS, electrical safety standard in Japan and abroad.

★Depending on the operator, the design may change.

IP2 Specification

SINGLE BAND
ICS REPEATER

900MHz SYSTEM SPECIFICATION

Items	Downlink	Uplink	Remark
Frequency Range	945MHz ~ 960MHz	900MHz ~ 915MHz	
Bandwidth	15MHz		
TX-RX Frequency Separation	30MHz		
Frequency Stability	<±102 Hz	<±300 Hz	
Maximum Output Power	+10dBm /total	+13 dBm /total	DL+87 ~ -62%/UL+87 ~ -74%
Maximum Input Power	> -25dBm /total ±2 dB	> -22dBm /total ±2 dB	
ALC Operative	+10dBm +2 dB	+13 dBm +2 dB	
Maximum Gain	70dB		
Out of Band Gain	Category A		
System Group Delay	< 4.5 μsec LTE		
Occupied Bandwidth	< 10/15MHz LTE		
Noise Figure	-	< 8dB	Maximum Gain
Input VSWR	<1.5		
EVM (Error Vector Magnitude)	< 8%_LTE		64QAM
Spurious Emission	Category B		
Spurious Emission Receiver Side	Category C		
ACLR	Category D		
ACRR	-5MHz/ +5MHz> 20dBwithin		TS36.106 13 ACRR observance
Pass Band Flatness	<4dB p-p DL (945.68~959.32MHz) / UL (900.68~914.32MHz)		
Power Consumption	<18W		

ID1 [+17dBm ICS Repeater]

DUAL BAND
ICS REPEATER

LTE Dual-Band ICS Repeater

- **Installation costs are low with simple installation.**
- **FA auto-select.**
- **It provides reliable service through overcurrent limitation.**

ID1 [+17dBm ICS Repeater]

DUAL BAND
ICS REPEATER

KEY FEATURES

- 4G LTE support
  - Low latency design
  - 900MHz+2100Mhz
- Auto gain
  - System Gain configured by RSRP
- Isolation Detection and elimination
  - G = I + 15dB
  - Plug & Play
- Extended coverage for areas up to 100 m²
- Switchable - built-in or external donor antenna
- Appropriate LED indication based on device status

PRODUCT DESCRIPTION

It is a relay device that removes multi-fading and feedback signals, and is a wireless relay device for the purpose of improving indoor radio waves in small stores and corporate offices, as a device that relays and amplifies transmission waves from WCDMA/LTE base stations and land mobile stations in the 900MHz and 2.1GHz bands.

If WCDMA or LTE service is provided and WCDMA signal is present, it will be operated in WCDMA mode, and if there is only LTE signal, it will automatically switch to LTE mode. In addition, the built-in modem (WCDMA &LTE compatible) communicates with the management server and enables remote monitoring and control.

An external donor antenna and a service antenna can be connected to provide a flexible installation environment.

You can check status information and operation status with LED indication.

ID1 Specification

DUAL BAND
ICS REPEATER

SYSTEM SPECIFICATION – 900MHz

Items	Downlink	Uplink	Remark
Frequency Range	945MHz~ 960MHz	900MHz~ 915MHz	
Bandwidth	15MHz		
TX-RX Frequency Separation	45MHz		
Frequency Stability	<±102 Hz	<±300 Hz	
Maximum Output Power	+17 dBm /total	+13 dBm /total	Downlink+87~-62% Uplink+87~-74%
Maximum Input Power	> -23 dBm /total±2 dB	> -27 dBm /total±2 dB	
ALC Operative	+17 dBm + 2 dB	+13 dBm + 2 dB	
Maximum Gain	75dB ±2 dB		
Out of Band Gain	Category A		
Group Delay	< 4.5usec LTE, <8.0usecWCDMA		
Occupied Bandwidth	15 MHz		
Noise Figure		< 8dB	Maximum Gain
IN VSWR	< 1.5		
EVM (Error Vector Magnitude)	< 8% LTE, <12.5% WCDMA		
PCDE (Peak Code Domain Error)	< -35dB		WCDMA only
Spurious Emission	Category B		
Spurious Emission Receiver Side	Category C		
ACLR	Category D		
Input Inter-Modulation	2 CW carriers、Signal Level-40dBm、f_offset 3.5MHz		WCDMA
	2 CW carriers、Signal Level-40dBm、f_offset 1MHz		LTE
ACRR	-5MHz/ +5MHz> 20dB within		
Pass Band Flatness	<4dB p-p Downlink (945.68~959.32MHz) Uplink (900.68~914.32MHz)		
Main Power & Power Consumption	Input: AC100V ±10% (50/60Hz) < 36W		

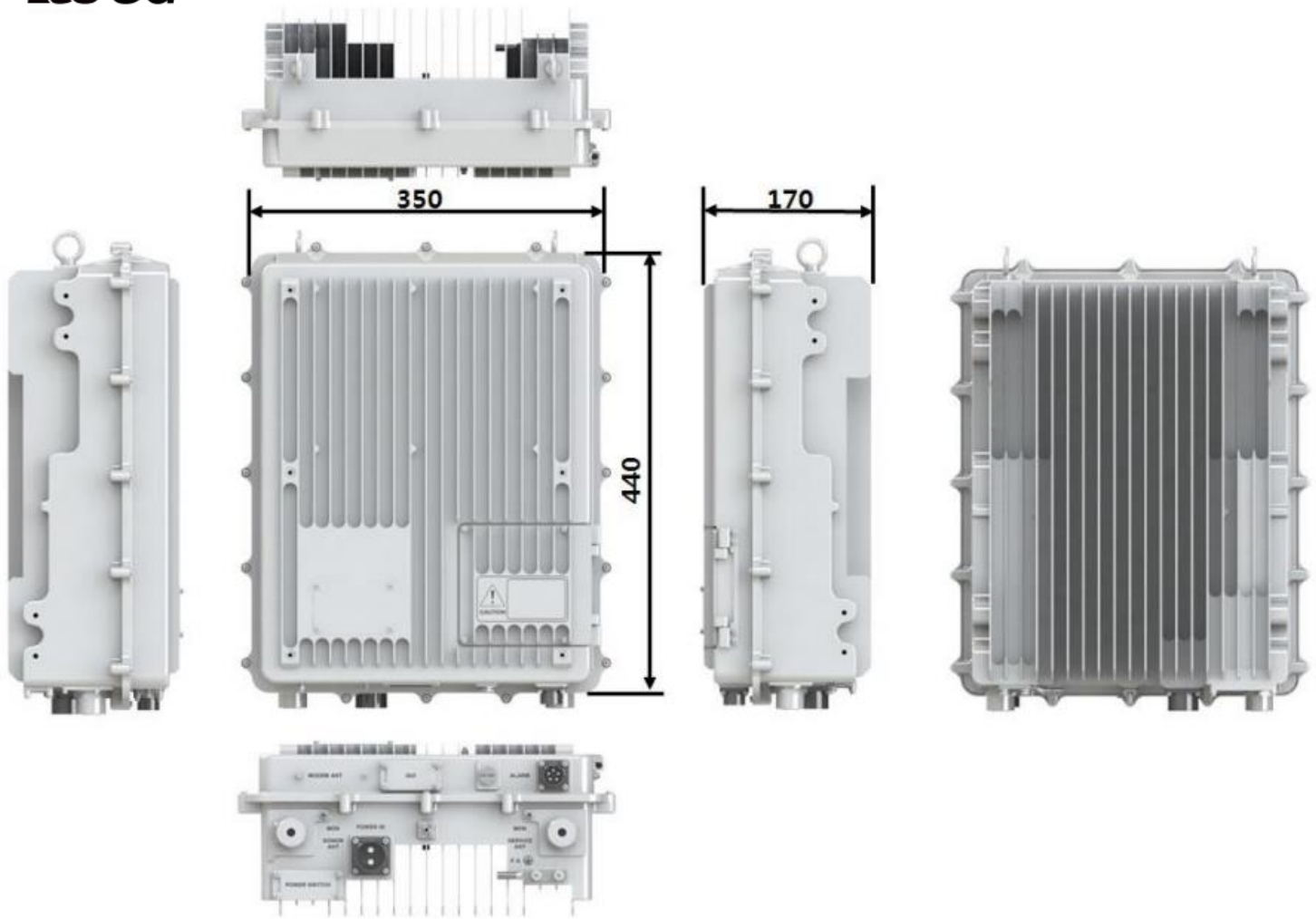
ID1 Specification

DUAL BAND
ICS REPEATER

SYSTEM SPECIFICATION – 2100MHz

Items	Downlink	Uplink	Remark
Frequency Range	2150MHz~ 2170MHz	1960MHz~ 1980MHz	
Bandwidth	20MHz		
TX-RX Frequency Separation	190MHz		
Frequency Stability	<±227 Hz	<±300 Hz	
Maximum Output Power	+17 dBm /total	+13 dBm /total	Downlink+87~-62% Uplink+87~-74%
Maximum Input Power	> -23 dBm /total±2 dB	> -27 dBm /total±2 dB	
ALC Operative	+17 dBm + 2 dB	+13 dBm + 2 dB	
Maximum Gain	75dB ±2 dB		
Out of Band Gain	Category A		
Group Delay	< 4.5usec LTE, <8.0usecWCDMA		
Occupied Bandwidth	20 MHz		
Noise Figure		< 8dB	Maximum Gain
IN VSWR	< 1.5		
EVM (Error Vector Magnitude)	< 8% LTE, <12.5% WCDMA		
PCDE (Peak Code Domain Error)	< -35dB		WCDMA only
Spurious Emission	Category B		
Spurious Emission Receiver Side	Category C		
ACLR	Category D		
Input Inter-Modulation	2 CW carriers、Signal Level-40dBm、f_offset 3.5MHz		WCDMA
	2 CW carriers、Signal Level-40dBm、f_offset 1MHz		LTE
ACRR	-5MHz/ +5MHz> 20dB within		
Pass Band Flatness	<4dB p-p Downlink (2150.68~2169.32MHz) Uplink (1960.68~1979.32MHz)		
Main Power & Power Consumption	Input: AC100V ±10% (50/60Hz) < 36W		

ML-30W [+45dBm ICS Repeater]

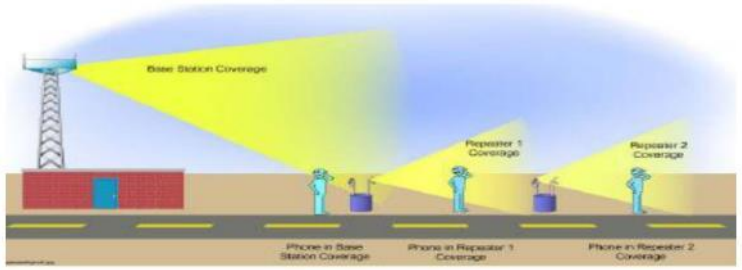


PRODUCT DESCRIPTION

The equipment receives signals from base stations at 2100 MHz, 900 MHz, or 1700 MHz, amplifies them, and transmits them back to extend the wireless coverage area to expand the LTE/5G coverage area or effectively amplify and relay weak signals in the wireless shadow area.

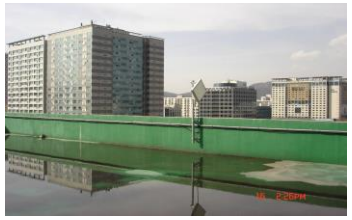
It supports LTE (Forward/Reverse) service, 5G (Forward/Reverse) service, AGC function, Automatic Level Control (ALC) and Automatic Shut Down (ASD) function.

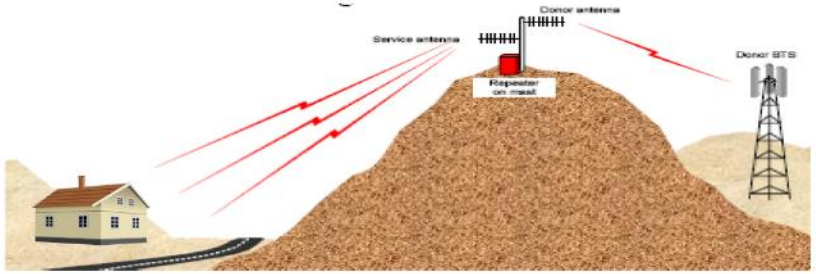
ML-30W - Outdoor ICS application range



Suburbs – Highways and Tunnels

Urban residential areas





Rural areas

Urban Building Area

General Specification

No.	Item		Parameter/Explanation	Remark
1	Technology		FD/TD-LTE/5G	
2	Operating Bandwidth		20M,40M	
3	No. of FA		4	
4	Max. Output power	Downlink	+44.8dBm +2.7~-4.1dB / Total 30W	
		Uplink	+30dBm +2.7 ~ -3.8dB / Total 1W	
5	Input level & Max System Gain	Downlink	-80dBm ~ -25dBm / 100dB	
		Uplink	~ -45 dBm / 100dB	
6	Gain Control & Accuracy		0 ~ 40 dB / 1 dB step	
7	Noise figure	Uplink	6 dB Max.	@Max. Gain
8	Frequency Stability		$3x10^{-6}$ Max.	
9	Input V.S.W.R		1 : 2.0 Max.	
10	In-Band Flatness		3dB Peak-to-Peak Max.	
11	*EVM / PCDE / ACLR / Spurious Emissions / Out of Band Gain*		*3GPP Recommended*	
12	System delay		< 4.5usec (LTE), < 2.0usec (5G)	

ICS Specification

No.	Item	Parameter/Explanation	Remark
1	Direct Feedback(Antenna)	+15dB Min.	
2	Multi-path Feedback	0dB, 8-Multi-path, Rayleigh Fading 5Hz Min.	
3	Cancellation window size	6usec Min.	

Mechanical Specification

No.	Item	Parameter/Explanation	Remark
1	Housing Type	Outdoor	
2	Cooling Type	Natural Cooling	
3	Dimension	350 x 440 x 170 mm (W x H x D)	
4	Weight	20 Kg	
5	Operating Temperature & humidity	-35℃ ~ +55℃ / 5 - 100 %	
6	Storage Temperature	-30℃~ +70℃	
7	Power Consumption	DC -48V±15%, Max 300W	