



SensusRF

Licence Free Radio



SensusRF is an advanced walk-by / drive-by radio system for retrieving data from meter endpoints and providing it for further processing and analysis, creating information for billing and network management.

SensusRF is an optimised license-free radio communications system for battery powered endpoints. It provides a pathway to move from mobile read to fixed infra-structure for remote reading, without any changes to the endpoints. It is available for operation at 433MHz and 868MHz and is OMS compatible.



SensusRF offers two communication modes:

1. Unidirectional - BUP*

- Fast readout
- Easy to use
- Reliable battery lifetime of device
- Simple 'sniffing' for devices in a certain range
- Short and robust telegram (BUP*) with endpoint ID, total consumption, alarm flags
- Auto routing capability in radio network

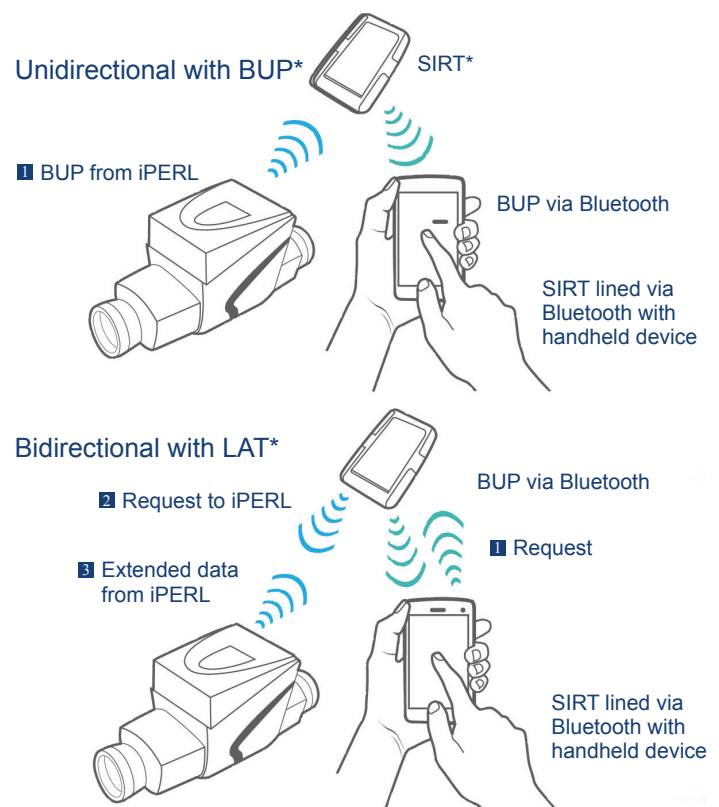
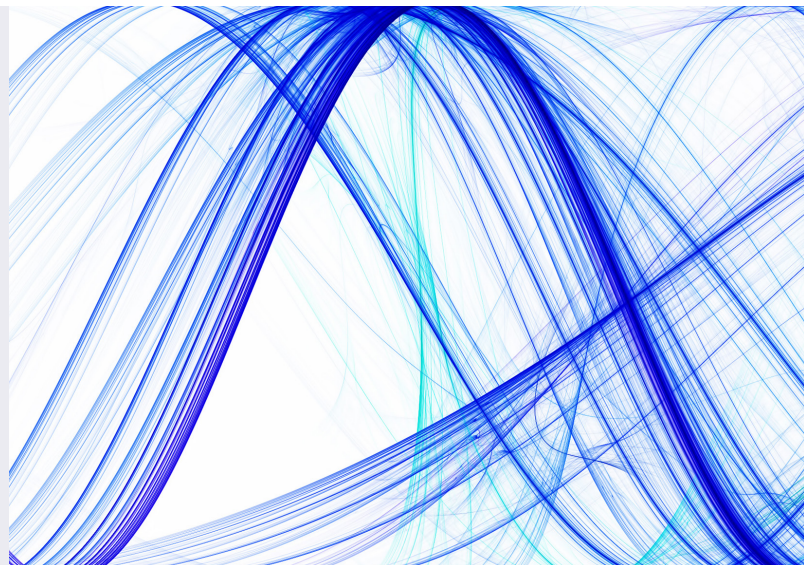
2. Bidirection - LAT*

- Extended data protocol
- Retrieve data on request
- Remote configuration (alarms, alarm resetting etc.)
- Download of data logger values

BUP* Bubble UP Meter Reading Packet Format

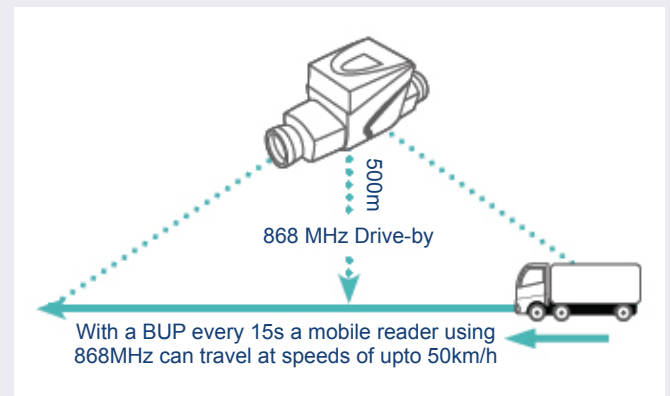
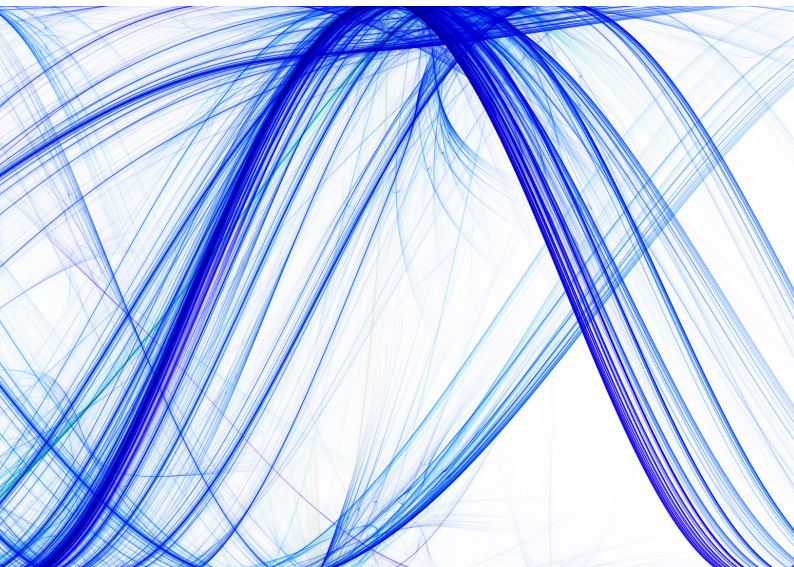
LAT* Listen After Talk

SIRT* Sensus Interface Radio Tool



Mobile read - walk-by or drive-by

- ✓ Unidirectional telegrams
- ✓ Spontaneous reception from all meters within range
- ✓ Bidirectional communication
- ✓ Configuration of the endpoint



Note: all distances for direct line-of-sight

SIRT (Sensus Interface Radio Tool)

SIRT is a radio modem for SensusRF radio connection to a handheld via Bluetooth and using SensusREAD software with the following features:

- ✓ Installation and readout of devices
- ✓ Reception of frequently transmitted radio messages from SensusRF radio endpoints
- ✓ Request additional information from the radio endpoints
- ✓ Change configuration of radio endpoints (alarm, level settings...)

SIRT provides two internal antennas and forwards radio messages from the strongest one received (diversity function). Technical features:

- ✓ IP 53 (water spray protected)
- ✓ Charging via USB from mains or PC instead of power supply
- ✓ External antenna available for drive-by applications
- ✓ Software library available to integrate SIRT into existing systems
- ✓ Data link via Bluetooth or USB



Mobile reading software

SensusREAD is the Sensus software for mobile terminals used to collect data from metering devices. The user can choose between a guided (route) or service readout.

Features include:

- ✓ Export of readout data/import of other MDM database
- ✓ Readout via radio by single address or broadcast
- ✓ Supports also other technologies like Sensus((S))cout



iPERL infrastructure

All iPERL and many future endpoints will have SensusRF technology integrated, giving the advantages of both uni and bi-directional communications as described above.

- Reliable battery lifetime determination
- Automatic endpoint detection via handheld computer or PC
- Short and fast BUP messages so less vulnerable to interference from other devices
- Remote programming
- Applicable for walk-by, drive-by and fixed radio network infrastructure without any configuration or exchange components

iPERL provides information every 15 seconds in a short telegram (BUP):

Fab. No.	24871973	Reception level (RSSI)**	95%
Meter reading	3683	Time stamp**	05.01.2011
Alarm information*	00000000		

* Possible alarms are; tampering with magnet, low battery, broken pipe, leakages, backward flow, empty pipe

** Added by the receiving device

Endpoint dependent protocol – iPERL

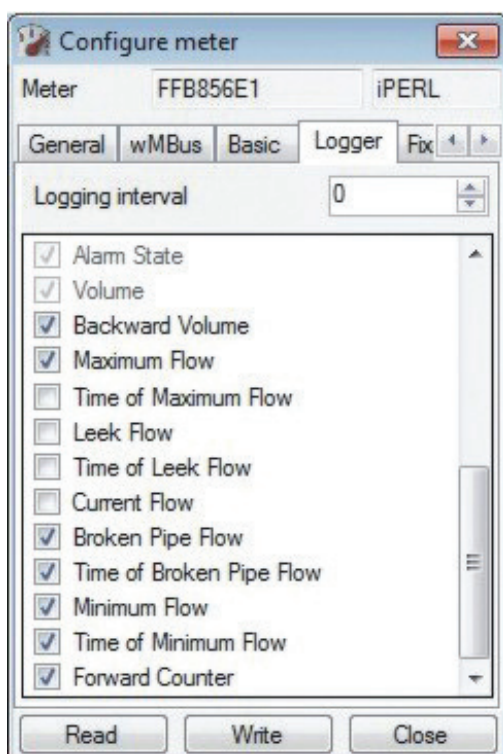
Using SensusRF a range of parameters and additional information can be retrieved from iPERL on request, - see table below:

Meter type	OMS status	Leak start
Fab. No.	OMS interval	Leak end
Meter reading	Alarm activation	Magnet tamper start
Alarm information	Leakage detection	Magnet tamper end
Reception level (RSSI)	Broken pipe detection	Empty pipe start
Time stamp	Remaining battery	Empty pipe end
BUP interval	Max. flow rate	Backflow start
LAT interval	Time since max. flow	Backflow end
Current flow rate	Min. flow rate	Broken pipe start
Backward volume	Time since min. flow	Broken pipe end
Units	Time since low battery detected	Fixed date reading

Data logger and fixed date reading are special telegrams requested by command.

The integrated data-logger can provide from 2 to 13 parameters, with up to 2880 steps within the rotating memory - see table:

The time interval can be selected from one minute up to one day.



SensusRF fixed radio solution

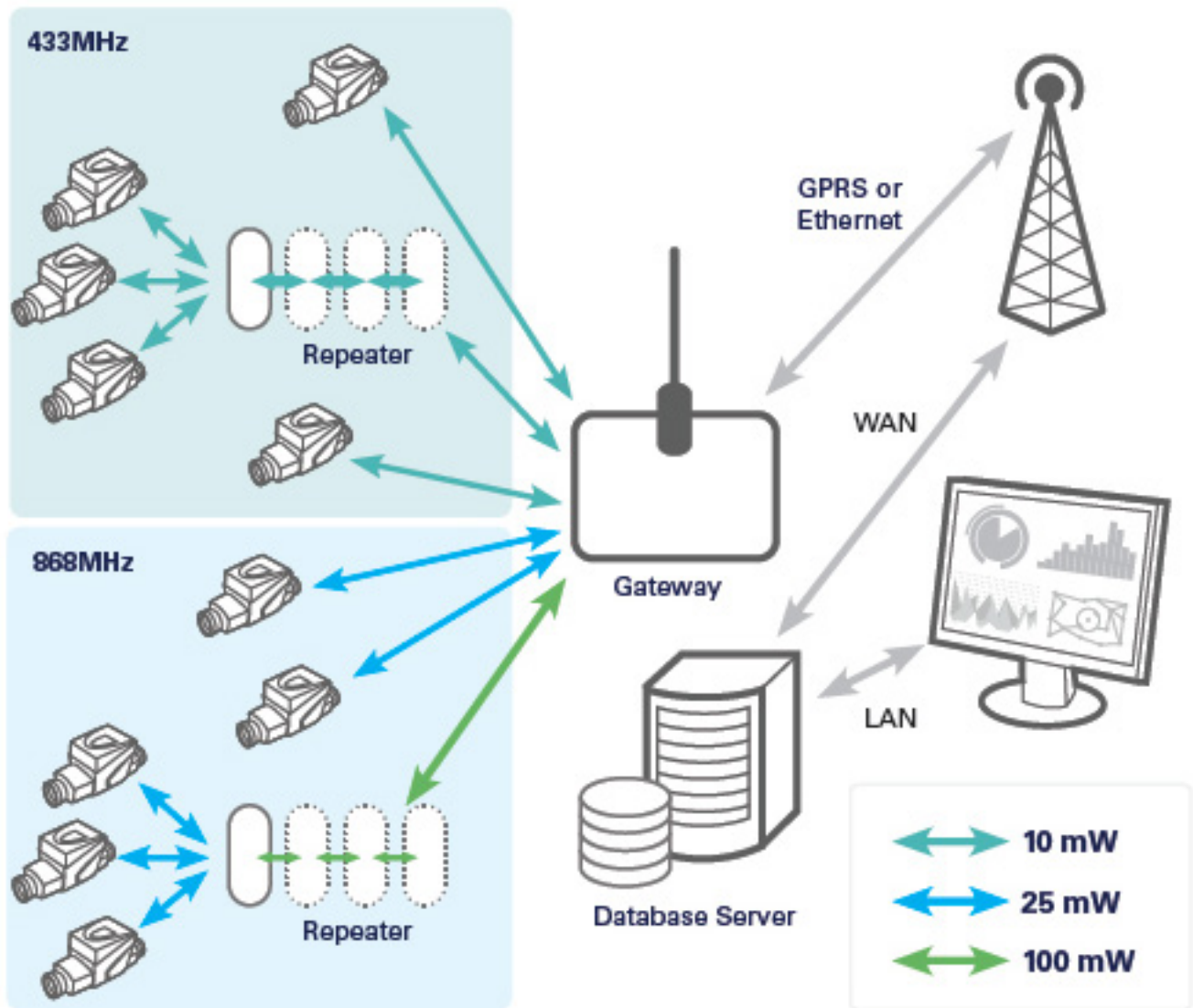
- Auto configuration wizard (gateway sniffing for endpoints and repeaters)
- Integrating repeaters
- Self-healing network (using alternative routes)
- Meter reading transparent and local
- Fast track alarms
- DMA snap shot (snap shot of a water network for evaluation)
- TCP/IP technology for the WAN communication'
- High level data security (encryption end-to-end)
- Enables cloud technologies, FTP and other remote database applications



Network devices - Sensus repeater and gateways

- Gateways can use repeaters to extend the radio range of a network
- Scheduled reading of programmed meters
- Transparent mode
- Remote reading and network maintenance
- Auto routing of a network (repeater and endpoints)
- Auto maintenance in case of endpoints missed
- GPRS and Ethernet connection
- IP65 (wet/humid environment, outdoor usage)
- Mains power supply, solar panel
- Up to 7 repeaters hops in a chain

IPERL fixed radio network - remote access and monitoring



Europe

Sensus UK Systems Ltd
3 Lindenwood Crockford Lane
Chineham Business Park
Basingstoke, RG24 8QY
UK
+44 20 7112 1565
info.gb@sensus.com

Sensus GmbH Ludwigshafen
Industriestraße 16
67063 Ludwigshafen
Germany
+49 621 6904 1000
info.de@sensus.com

Sensus France S.A.S
Zac du Champ Perrier
41 Porte du Grand Lyon, 01700 Neyron
France
+33 4 72 01 85 50
info.fr@sensus.com

Sensus España S. A.
C/ Llacuna n° 166, 1° A y B
08018 Barcelona
Spain
+34 93 460 10 64
info.es@sensus.com

Sensus Italia SRL
Via Valtellina, 33
20092 Cinisello Balsamo
Italy
+39 02 61291861
info.it@sensus.com

Sensus Polska Sp. z o.o.
ul. Mazowiecka 63/65,
PL 87-100, Torun
Poland
+48 56 654 3303
info.pl@sensus.com

Sensus Slovensko a.s.
Nám. Dr. Alberta Schweitzera 194
91601, Stara Tura
Slovakia
+421 32 775 2244
info.sk@sensus.com

Sensus Česká Republika spol. s r.o.
Olšanská 54/3
130 00 Praha 3 – Žižkov
Czech Republic
+420 286 588 995-6
info.cz@sensus.com

Africa

Sensus Algérie SPA
B.P. 02 Route de Batna
El-Eulma- Wilaya de Sétif
Algeria
+213 36 8749 72
info.dz@sensus.com

Sensus Maroc SA
23 Lot Beau fruit II
Zone industrielle, 12013 Ain Atiq
Morocco
+212 538 02 32 50
info.mr@sensus.com

Sensus South Africa Limited
17 Monza Close
Kyalami Park
Kyalami, Midrand
South Africa
+27 1146 616 80
info.za@sensus.com

Asia

Allied Power Technology Ltd.
11/F, Long to Building
Lai Chi Kok, Kowloon
Hong Kong
+852 3746903
Contact@alliedpower.com.hk

Sensus Metering Systems Co., Ltd
Tieling North Road
Economic and Technological
Development Zone
Minhou, Fuzhou, 350101
China
+86 591 2863 1389
info.cn@sensus.com

Sensus Japan
12th floor, Yurakucho ITOCIA
2-7-1 Yuraku-cho, Chiyoda-ku
Tokyo 100-0006
Japan
+81 3 6860 4673
info.jp@sensus.com

South America

Sensus Chile S.A.
Las Araucarias 9041
Casilla 512 V, Quilicura – Santiago
Chile
+ 56 2482 6600
info.cl@sensus.com

Sensus de México, S. de R. L. de C.V.
Av. Ejército Nacional no. 6225 int. 37
Col. del Márqu z, Cd. Juárez, Chihuahua
Mexico
+52 55 2621 2245
info.mx@sensus.com

For more information call +852 3746 9033
or visit www.alliedpower.com.hk

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