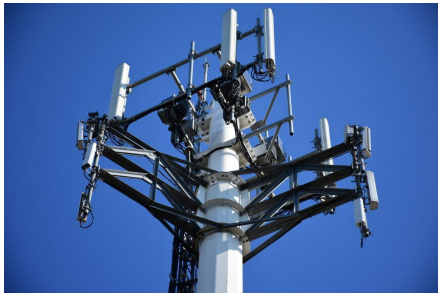
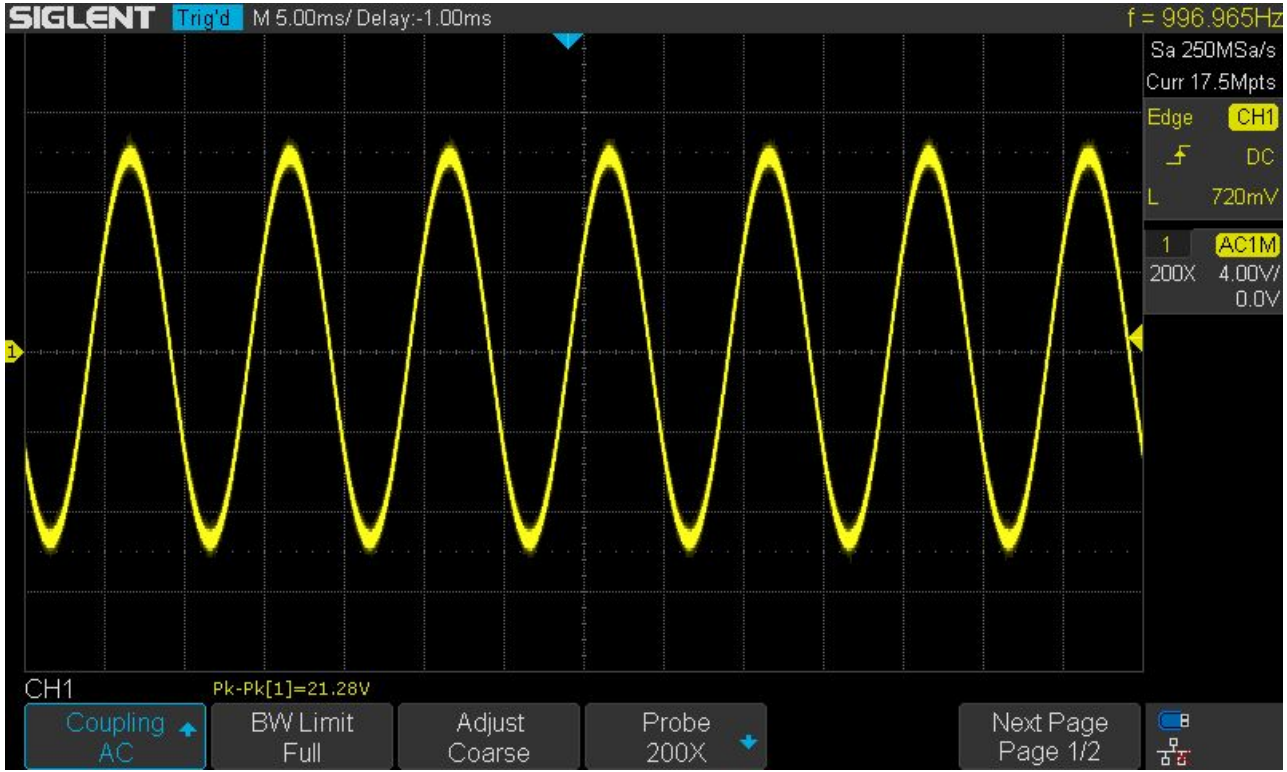
# Guida per Esploratori dello Spettro RF

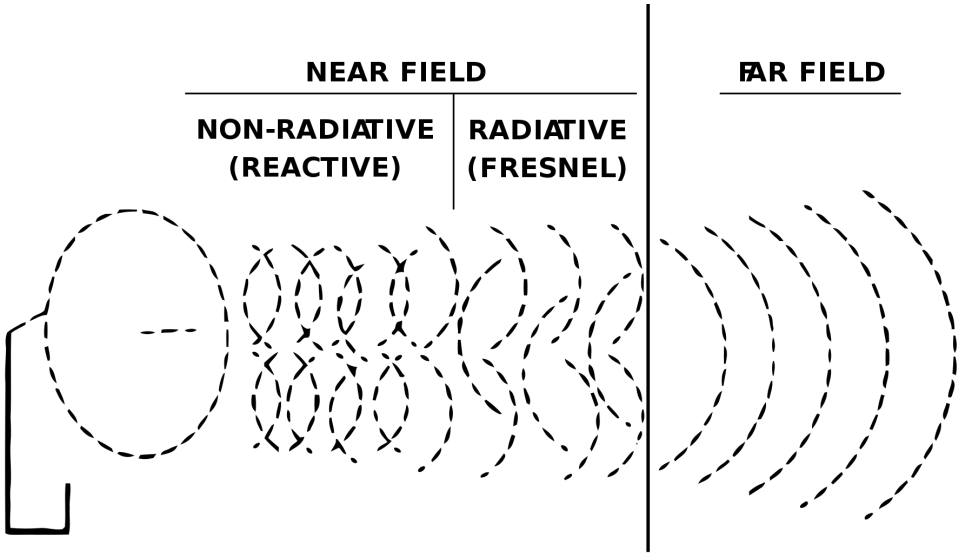


# Cenni introduttivi

# Frequenza (Hz)



# Campo vicino (Near Field) vs Campo Lontano (Far Field)

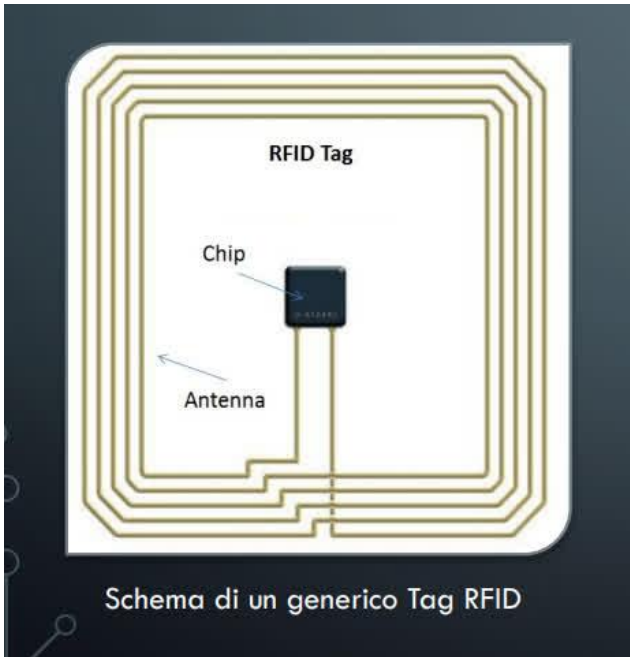


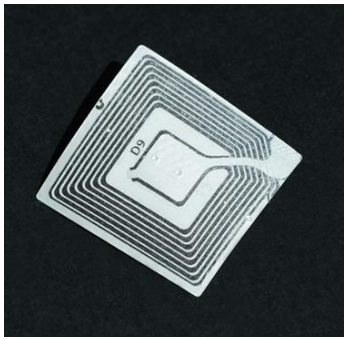
# Near Field

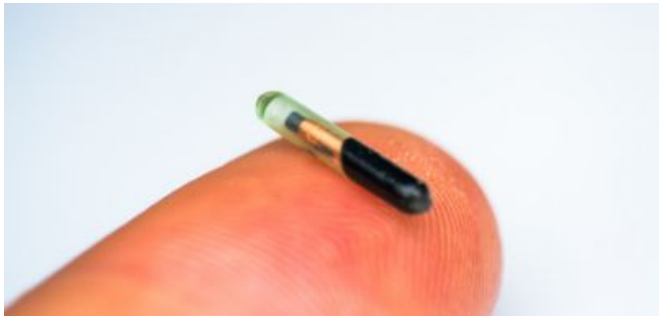
# RFID

120 – 150 kHz
13.56 Mhz
856 – 960 MHz

Radio Frequency Identification






# T55xx (T5577 etc.)

125 kHz


# NFC

13.56 MHz

Near Field Communication




Pay

Pay

pay

Samsung Pay

# MIFARE

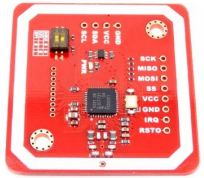
13.56 MHz

NXP (Phillips)


# Strumenti

- Telefono
  App:
  - NFC Tools
  - MIFARE Classic Tools

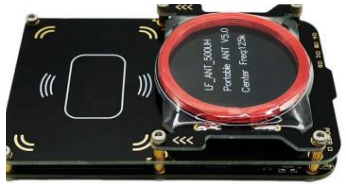
- ACR122U (pn532)
- Proxmark
- Chameleon



pn532

ACR122U

pn352



Proxmark3

Chameleon RDV2.0

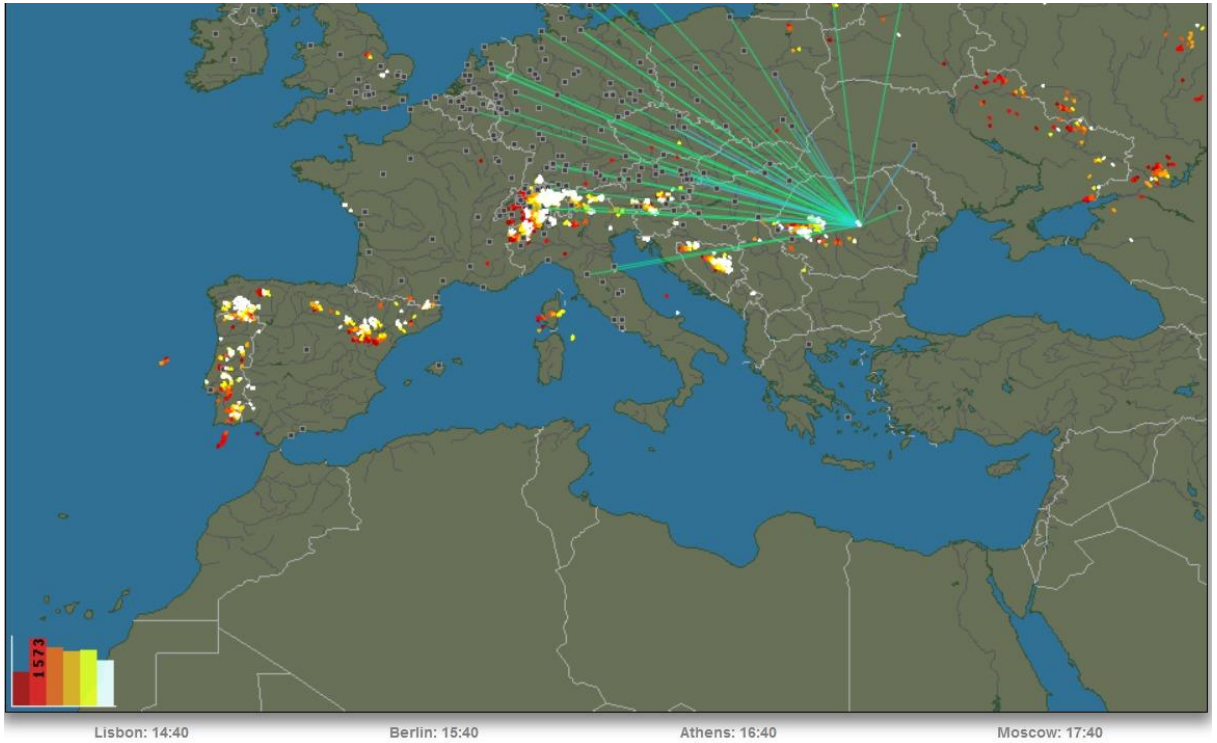
# Far Field

# Fulmini

3 – 300 kHz


# Fulmini

3 – 300 kHz




www.lightningmaps.org www.blitzortung.org

# Comunicazioni Voce

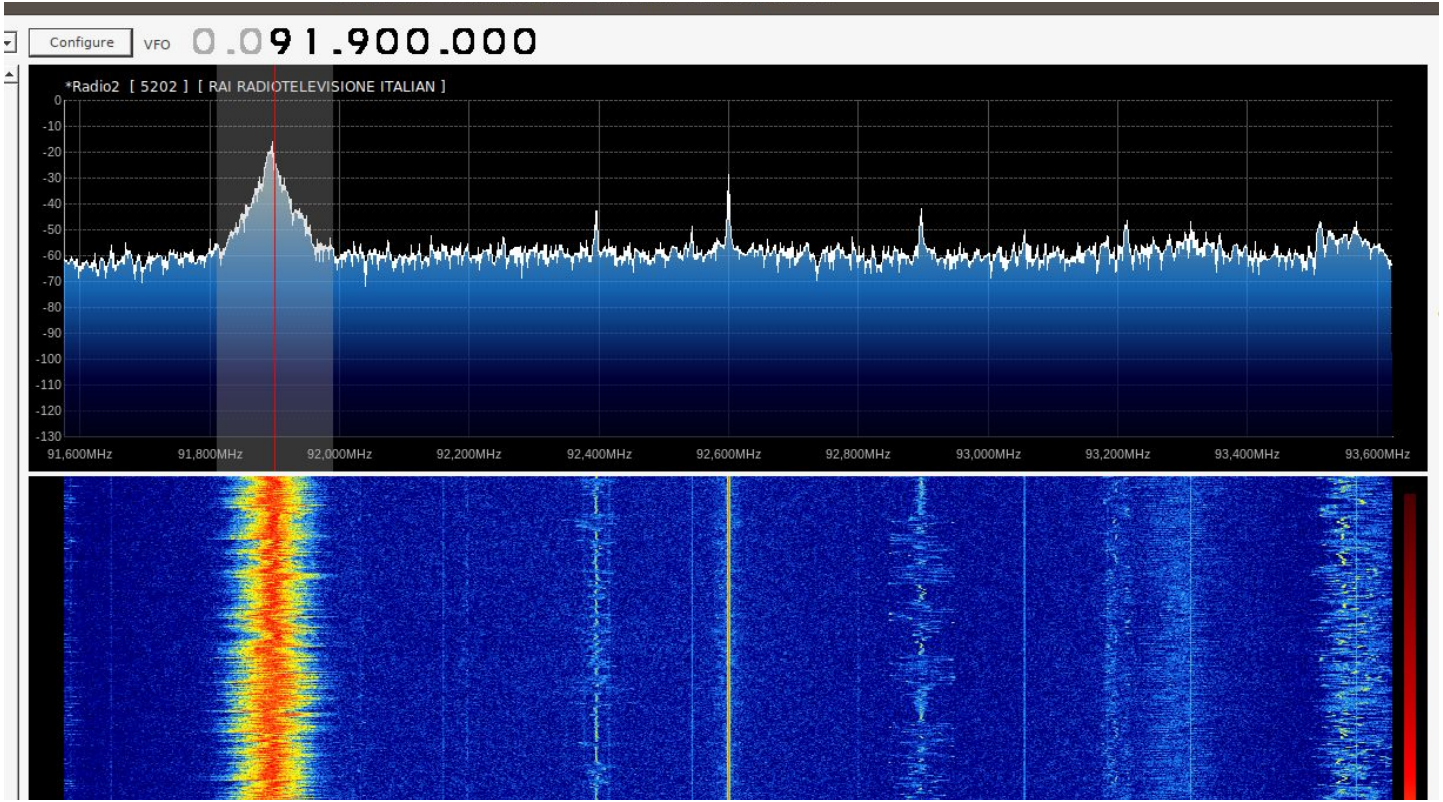
CB (26.965 – 27.405 MHz)

LPD433 (433,075 – 434,775 MHz)

PMR446 (446.0 – 446.2 MHz)

Baofeng
UV5R

# Spettrogrammi



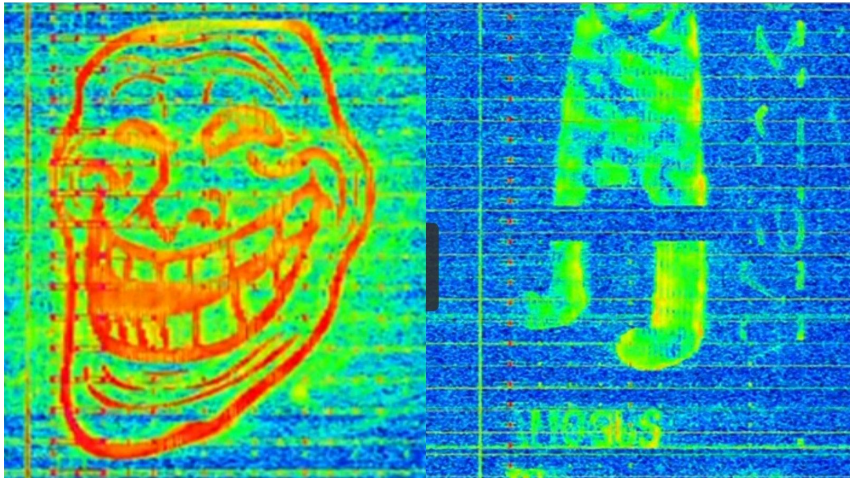
# Radio (AM, FM & DAB)

AM:

LW: 148.5 – 283.5 kHz

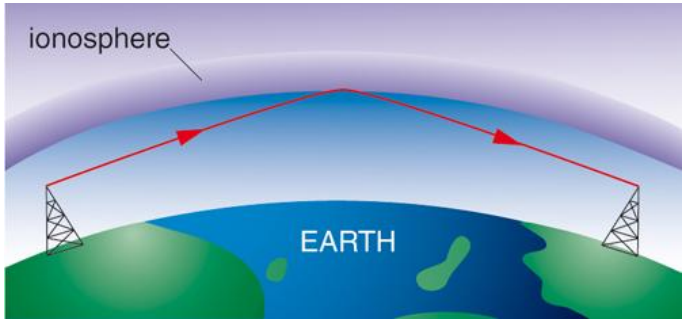
MW: 540 kHz – 1700 kHz

SW: 2.3 – 26.1 MHz



Number station УВБ-76 (UVB-76)

FM (modulazione WFM): 88.0 – 108.0 MHz



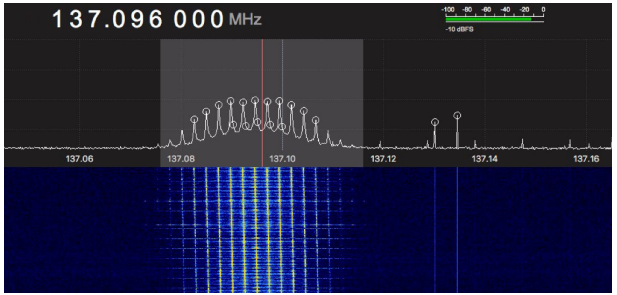
# Radar Over-The-Horizon

7 – 19 MHz

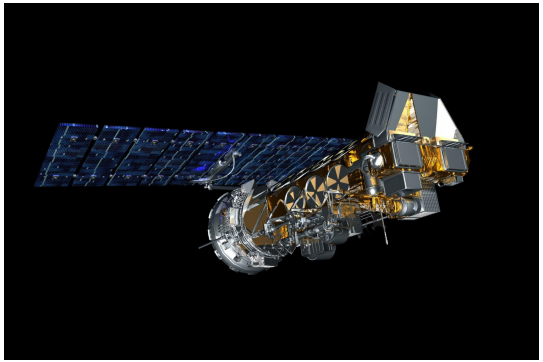
Дуга́-1 (DUGA-1), Chernobyl, Ucraina

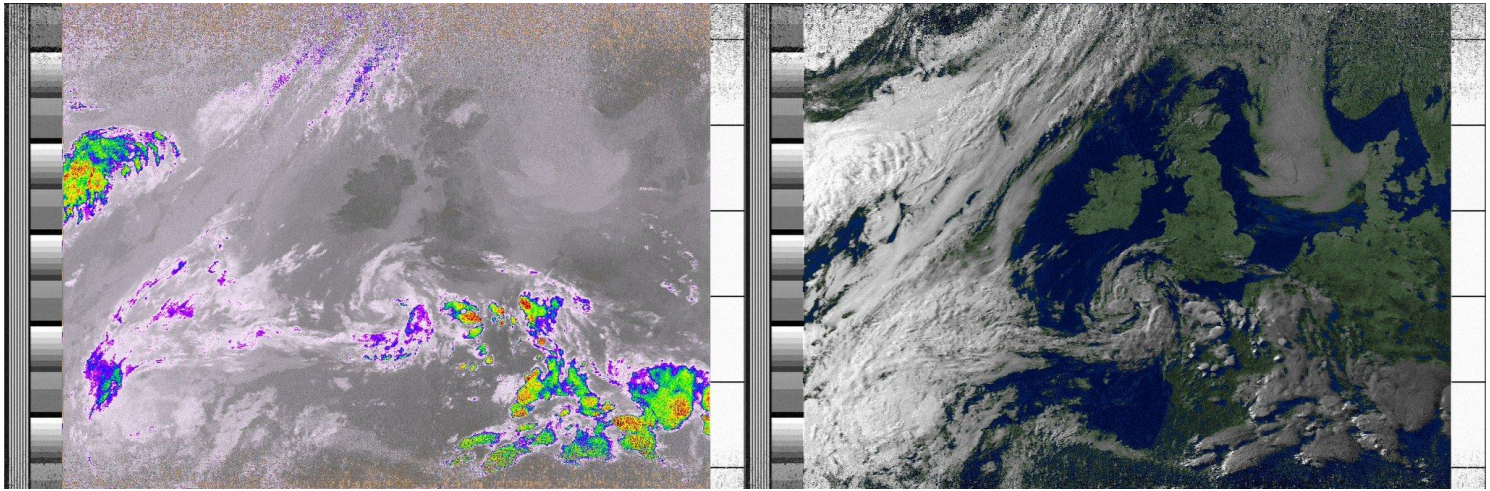
# Satelliti Meteo

137 MHz



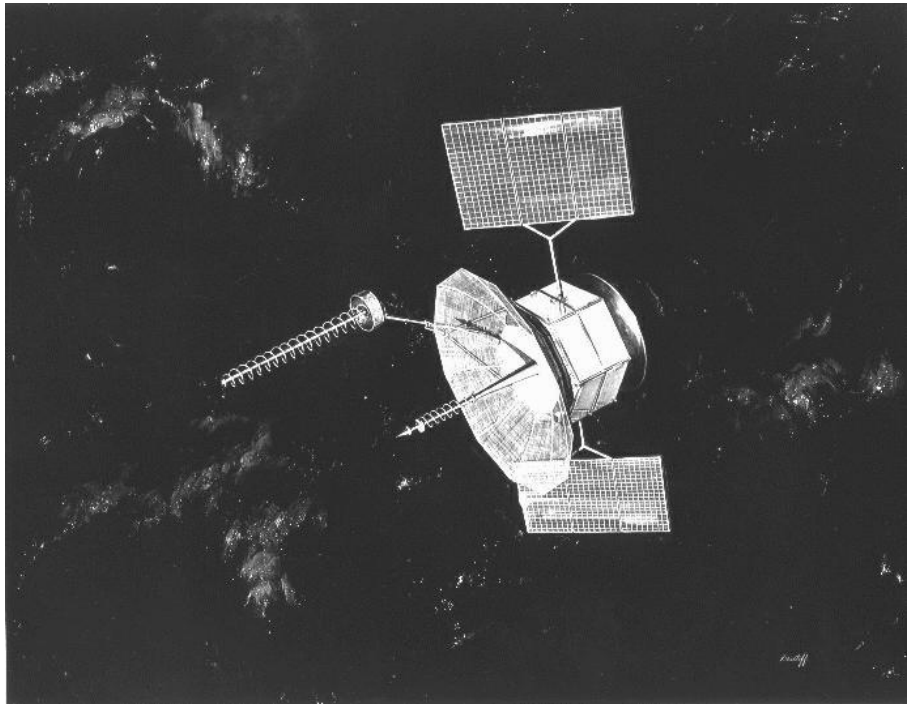

NOAA 18





# Ex Satelliti Voce Militari

240 – 400 MHz



FLTSATCOM (1978 - 1989)

# Polizia, Soccorsi e Sicurezza Privata


# Autovetture

433 MHz

## Telecomandi e sensori



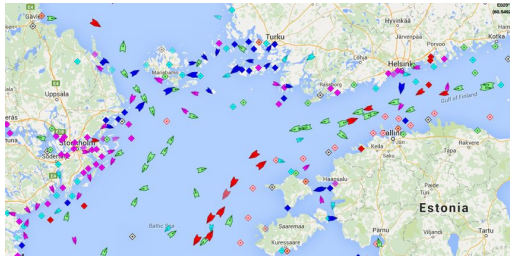
# Sensori Ambientali

433 MHz

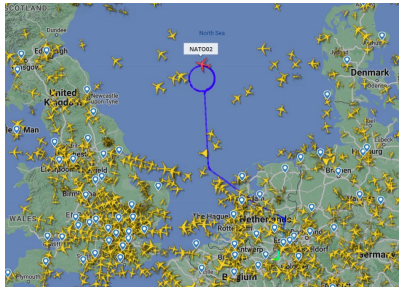
# Transponder Aeroplani (ADS-B) e Navi (AIS)

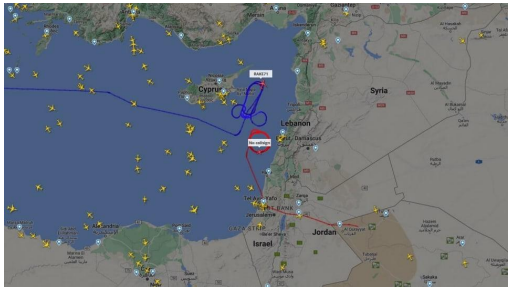
978 / 1090 MHz







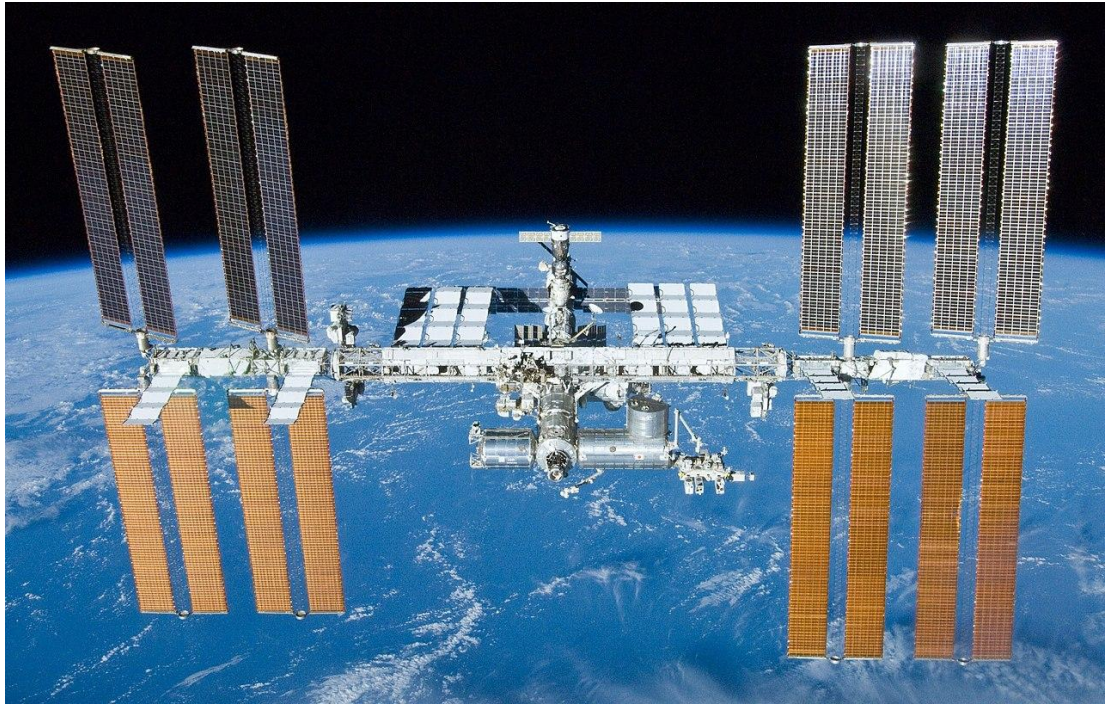



www.flightradar24.com www.marinetraffic.com

# ISS Voce

145.99 / 437.8 MHz

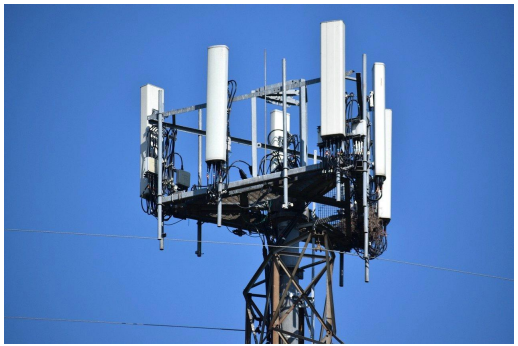


S104E5092 2001/07/16 03:02:36

ISS024E013398

# Altro:


- TV
- Comunicazioni Cellulari (2G - 5G)
- WiFi & Bluetooth (2.4 / 5 – 7 GHz)
- Periferiche Wireless (2.4 GHz)
- Satelliti TV (10 – 12 GHz)
- Radar Autovelox

# Strumenti

Hardware:

- SDR
    - RTL-SDR (25 – 1750MHz)
    - HackRF (1 MHz – 6 GHz)
    - WebSDR (www.websdr.org, websdr.ewi.utwente.nl:8901)
- NanoVNA

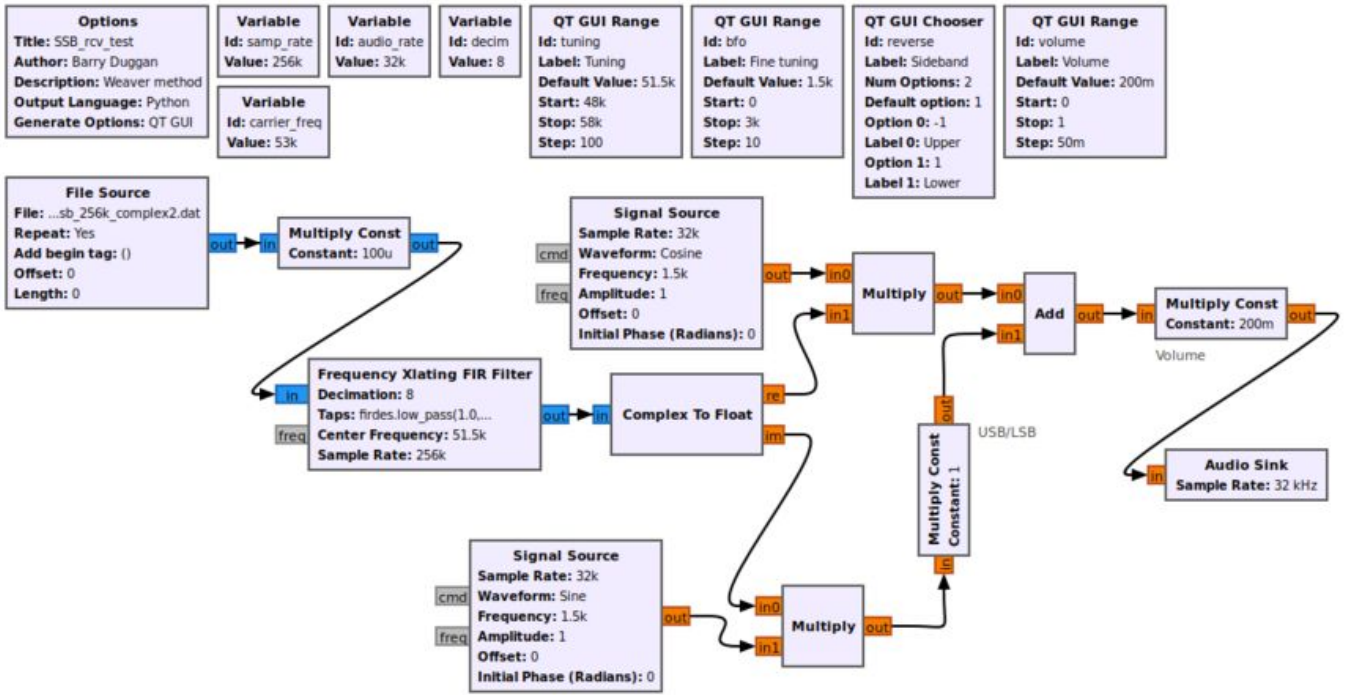


Software:

- SDR Sharp
- GQRX
- rtl_433
- GNURadio


# Demo (GQRX, rtl_433)

# GNURadio


Options
Title: SSB_rcv_test
Author: Barry Duggan
Description: Weaver method
Output Language: Python
Generate Options: QT GUI
Variable
Id: samp_rate
Value: 256k
Variable
Id: audio_rate
Value: 32k
Variable
Id: decim
Value: 8
Variable
Id: carrier_freq
Value: 53k
QT GUI Range
Id: tuning
Label: Tuning
Default Value: 51.5k
Start: 48k
Stop: 58k
Step: 100
QT GUI Range
Id: bfo
Label: Fine tuning
Default Value: 1.5k
Start: 0
Stop: 3k
Step: 10
QT GUI Chooser
Id: reverse
Label: Sideband
Num Options: 2
Default option: 1
Option 0: -1
Label 0: Upper
Option 1: 1
Label 1: Lower
QT GUI Range
Id: volume
Label: Volume
Default Value: 200m
Start: 0
Stop: 1
Step: 50m
File Source
File: ...sb_256k_complex2.dat
Repeat: Yes
Add begin tag: ()
Offset: 0
Length: 0
Multiply Const
Constant: 100u
Signal Source
Sample Rate: 32k
Waveform: Cosine
Frequency: 1.5k
Amplitude: 1
Offset: 0
Initial Phase (Radians): 0
Multiply
Add
Multiply Const
Constant: 200m
Volume
Frequency Xlating FIR Filter
Decimation: 8
Taps: firdes.low_pass(1.0,...
Center Frequency: 51.5k
Sample Rate: 256k
Complex To Float
Multiply Const
Constant: 1
USB/LSB
Audio Sink
Sample Rate: 32 kHz
Signal Source
Sample Rate: 32k
Waveform: Sine
Frequency: 1.5k
Amplitude: 1
Offset: 0
Initial Phase (Radians): 0
Multiply

# Contatti

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μhack
www.muhack.org

t.me/muhack