

Spoofing System & Drone Dome

Anti-Drone Solution

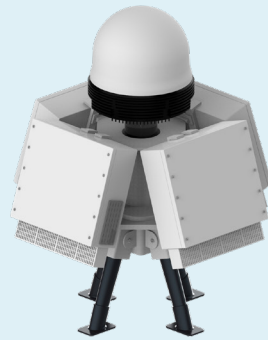


Bstarcom
TEST & MEASUREMENT

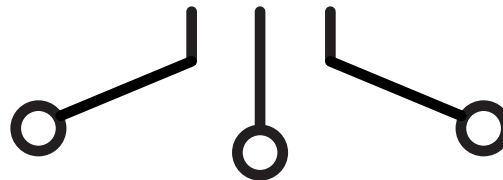
BSTARCOM CATALOG

01 Hybrid Anti-Drone System

Hybrid Anti-Drone System



RF based Detection & GNSS Spoofing & RF Jamming
3 in 1 Hybrid Anti-Drone System



Consists of



RF Scanner

- Drone detection/identification
- Detection range: Over 4 Km radius, Azimuth 360 °
- Detection frequency range: 400 MHz to 6 GHz
- Direction Finding accuracy: Within ±5 °
- AI based drone communication protocol detection / identification
- Tracking location of drone and controller



GNSS Spoofer

- GPS L1, GLONASS L1, GALILEO E1, BEIDOU B1 can be spoofed.
- Spoofing range: Over 500 m if output of 20 mW
- Managing drone swarm attack by creating 360 ° barrier



RF Jammer

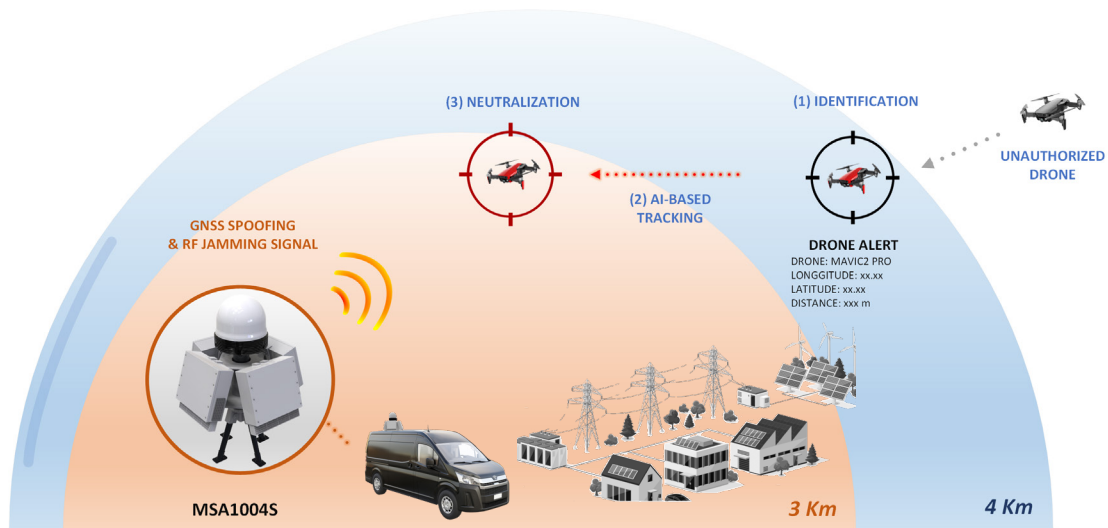
- 4 Sector Directional Jammer
- Jamming range: Over 3 km radius, azimuth 360 ° if all sectors are radiated.
- Jamming frequency range: 433 MHz & 900 MHz & 2.4 GHz & 5.8 GHz, GNSS L1, L2, L5 (selectable)

Features

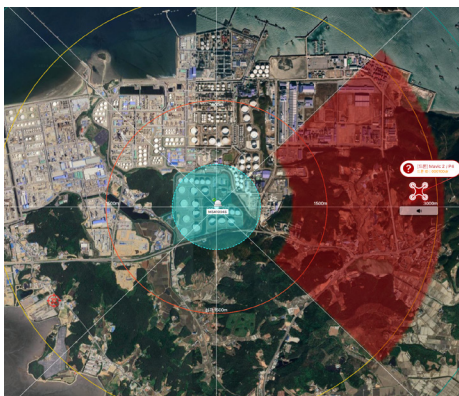
- HYBRID Anti-Drone System integrated with RF Scanner for Drone detection/identification, GNSS Spoofer for Drone neutralization and RF Jammer for Drone neutralization
- RF Scanner for Drone detection / identification : Over 4 km radius, Azimuth 360°
- GNSS Spoofer for Drone
- RF Jammer for Drone neutralization : Over 3 km radius, Sector 1 - 90° coverage, Sector 4 - 360° coverage
- Web-based integrated controlling SW, "ADWS(Anti-Drone Web server System)" provided
- User based installation platform options (Ground & Vehicle) provided

01 Hybrid Anti-Drone System

Operation Flowchart



ADWS



- ADWS is a dedicated web server SW that can operate MSA1004S in real time.
- It Provides early warning of drones intruding into a protected area with a radius of 4 km or more and real-time location tracking function for intruding drones.
- When intruding within a 3 km radius of a protected area, the control & video signal of the intruding drone are blocked to neutralize the intrusion into the protected area and the satellite navigation signal is deceived to expel the drone out of the protected area.
- ADWS provides storage and replay functions for the detection and neutralization history of drones intruding into protected areas.
- ADWS provides a user-friendly GUI and provides both online and offline satellite maps.

Specification

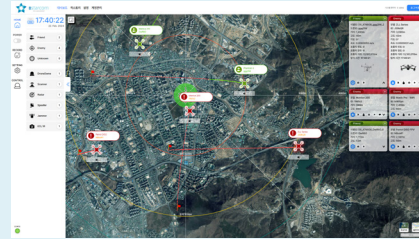
Name	Specification	Remarks
Detection Range	≥ 4 km	
Detection azimuth	360°	
Detection frequency range	400 MHz to 6 GHz	
Detection type	RF signal detection & drone communication protocol decoding	
Communication protocol for detection	Control communication signal and video signal of drone (DJI Ocusync, DJI Lightbridge, AUTEL SKYLINK, WI-FI, MavLink etc.)	
Direction Finding accuracy	Within 5 °(rms)	
GNSS Spoofing distance	≥ 500 m	
Types of deceptive satellite navigation signals	GPS L1, GLONASS L1, GALILEO E1, BEIDOU B1	
Jamming distance	Up to 3 km	
Jamming Frequency band	ISM Band 433 MHz / 900 MHz / 2.4 GHz / 5.8 GHz, GNSS L1, L2, L5	selectable
Antenna type	Directional (4 sectors)	
Antenna directivity	90 ° per one sector antenna (Based on 2.4 GHz, 5.8 GHz and GNSS L1 Bands)	
Operating Temp	-30° C~ + 55° C	
IP Rating	IP65	
Interface	TCP / IP	
Input power	220 VAC	

02 Drone Dome System

Drone Dome System



Neutralization **Drone Dome**



Integrated control **ADWS**

Features

- It's a UAV/drone defense system applying spoofing technology which can expel the UAV/drone out of defended area.
- Detected UAV/drone keeps away from defended area by spoofing satellite signals that the drone uses for navigation.
- It can be integrated with RF Scanner not to require manpower by managing whole steps: detection, identification and neutralization to operate automatically.
- Drones with both automated flight and manual flight can be managed.
- Unlike existing RF jamming, the system doesn't affect the other RF communication thanks to low output of 20 mW.
- Radius of 500 m and omni-directional dome-shaped barrier are created from installation site.
- It can operate round-the-clock and drone swarm attack can be dealt simultaneously.

Consists of

DSA804C Drone Dome

- Expelling satellite signal deceiver
- GPS L1, GLONASS L1, GALILEO E1, BEIDOU B1 can be spoofed.
- Spoofing range: 500 m if output of 20 mW
- Managing drone swarm attack by creating 360° barrier
- Designated as "Innovative Product" by Public Procurement Service in 2023 – 2025

ADWS integrated controlling SW

- Drone Dome real-time control SW
- Provides a user-friendly GUI environment based on satellite maps
- Equipment operation history (system access information, neutralizing radiation, etc.) display and storage functions
- Drone appearance and neutralization report output function
- Control map screen zoom-in / zoom-out function

02 Drone Dome System

Specification



Drone Dome

Name	Specification	Remarks
Frequency range	1.2 GHz to 1.6 GHz	
Capable of spoofing signal	GPS L1, GLONASS L1, BEIDOU B1, GALILEO E1	
Spoofing range & altitude	≥ 500 m	Range can be adjusted
Azimuth	360°	
Output	Within 20 mW	Output can be adjusted
Managing drone flight	Automated flight & manual flight	If drone uses satellite signal for navigation
Simultaneous detection capacity	Unlimited	
Consumption	Within 50 W	
Interface	Ethernet	
Power input	AC 220V	
Weight	Within 20 kg	
IP rating	IP65	
Operating temperature	-30°C to +55°C	

Stability comparison

Name	Drone Dome	RF jammer	Remarks
Neutralizing way	Spoofing satellite signal	Jamming RF signal	
Correspond to satellite signal	Deceived	Blocked	
Output requirement	≤ 20 mW	≥ 5 W	If range of 500 m
Neutralization effect	Expelled	Crash/forced-landing	
Safety	Drone can't reach the defended area	Concern of collateral damage	Collateral damage by drone crash & explosives

Operation mode

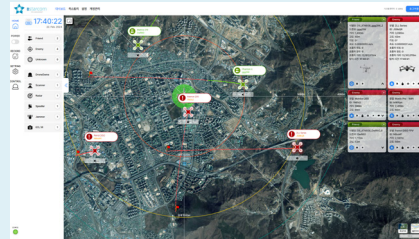
- Range of defense can be changed by adjusting output of the equipment so that both stationary defense system for main facility and mobile defense system for moving asset or VIPs can be installed



Stationary defense system



Mobile defense system

Detection & identification **RF Scanner**Integrated control **ADWS**

Features

- Drone detection system using RF sensor-based direction finding technology and AI-based real-time digital signal analysis processing technology
- Detection range over 4 km or more
- Detection range: 360°, direction finding accuracy within $\pm 5^\circ$
- Detection frequency range 400 MHz ~ 6 GHz
- Provides drone communication protocol and model identification library
- Provides black & white list function
- Provides drone and pilot location tracking function
- 24-hour unmanned operation possible with real-time monitoring and automation software provided

Consists of

DSA604C RF Scanner

- Detection frequency range: 400 MHz to 6 GHz
- Detecting drone-controlling communication signal & image signal
- Detection range: 4 km
- Azimuth: 360°
- Providing library for communication protocol analysis
- Selective jamming by integrated with Smart Jammer

ADWS integrated controlling SW

- RF scanner real-time monitoring SW
- Displays map-based intuitive detection information and provides alarm functions
- Drone detection history (detection time, location information, etc.) display and storage function
- Drone appearance and neutralization report output function
- Control map screen zoom-in/zoom-out function

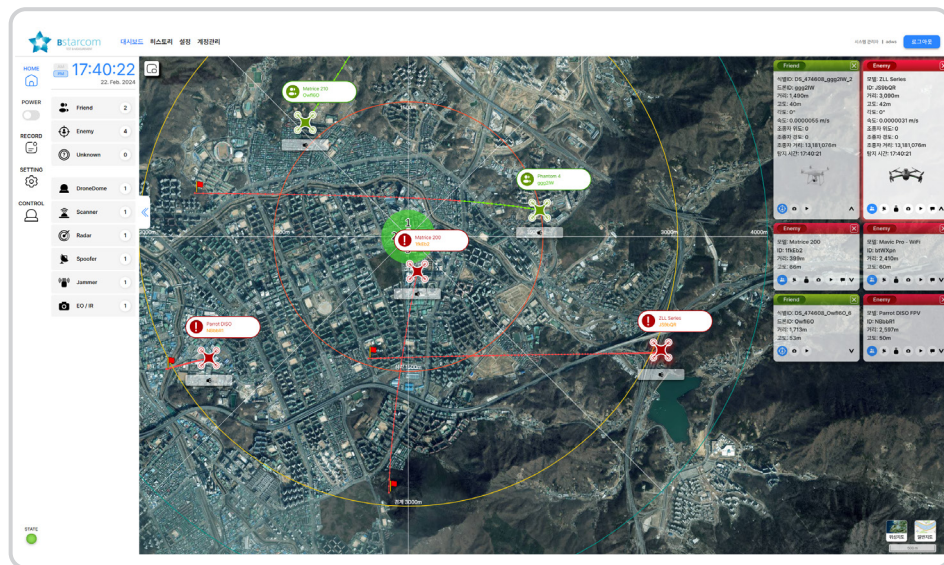
03 RF Scanner

Specification



RF Scanner

Name	Specification	Remarks
Frequency range	400 MHz to 6 GHz	
Detection range	≥ 4 km	
Detection coverage	Azimuth 360°	
DF Accuracy	Within RMS 5°	
Detection type	RF signal detection & drone protocol decoding	
Simultaneous detection capacity	≤ 50	
Simultaneous tracking capacity	≤ 100	
Identifying drone types	Min. 100 units	Library can be updated.
Location of drone & pilot	Latitude, longitude, & altitude of drone & pilot can be detected	If drones using DJI communication protocol
Identification friend/foe	Positive	
IP rating	IP65	
Weight	Within 30 kg	



Drone Dome

04 Spoofing System

Inducement & Capture System



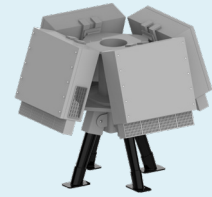
Detection
Radar



Identification
EO/IR Camera



Neutralization(inducement)
GNSS Spoofer



Neutralization(capture)
RF Jammer

Features

- It's a UAV/drone defense system applying spoofing technology which can induce the UAV/drone to specific place.
- Detected UAV/drone are induced to safe area by spoofing satellite signals that the drone uses for navigation and eventually be captured.
- Defensed area will be safe from collateral damage such as explosives and debris of drone by inducing the drone to outside of defensed area to avoid the purpose of threat.
- It can be integrated with EO/IR Camera.

Consists of



DSA704C GNSS Spoofer

- Satellite signal deceiver
- GPS L1, GLONASS L1, GALILEO E1 & BEIDOU B1 can be spoofed.
- Spoofing range: 5 km if output of 5 W
- Accuracy: within 100 m
- Necessary



DSA504C RADAR

- Low altitude drone detection radar
- Ku band 3D radar
- Detection range: 5 km if RCS 0.01 m²
- Azimuth: 360° for horizontal & 30° for vertical
- Location & speed info are undated within
1 sec. if Tracking mode
6 sec. if Normal mode
- Necessary



DSA104C EO/IR CAMERA

- Image identification range:
3 km at day & 1 km at night
- Integrated with the radar
- Automated drone detection & tracking
- Optional



DSA404C RF JAMMER

- Frequency band: ISM & GNSS band
- Directional sector antenna
- Jamming range: 5 km
- Necessary

04 Spoofing System

Operation Flowchart



Specification

Name	Specification	Remarks
Capable of spoofing signal	GPS L1, GLONASS L1, GALILEO E1, BEIDOU B1	
Detection range	≥ 5 km	If RCS 0.01m ²
Spoofing range	≥ 5 km	
Circular Error Probability	Within 100 m	
Defense angle	360°	
Antenna beamwidth	± 18°	
Spoofing output	Within 5 W	If range of 5 km
Power input	AC 220 V	
Consumption	Within 1 kW	Including radar & jammer
Weight	Within 100 kg	Including radar & jammer
Operating temperature	-20°C to +55°C	

05 Drone Gun

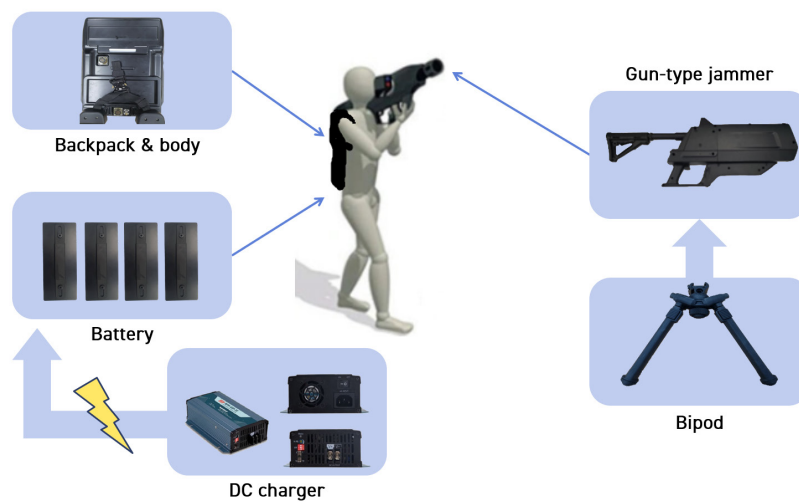
Drone Gun



Features

- Jamming range: ≤ 700 m if ISM band & ≤ 1 km if GNSS band
- Jamming frequency band: ISM band and GNSS L1 & L2
- High power & linearity LDMOS & GaN TR are applied. Lightweight design applied.
- UWB antenna installed
- LCD applied
- Built-in self-test provided
- RF Scanning Mode supported
- Media selections for design in 2022

Consists of



05 Drone Gun

Specification

Name	Specification	
Frequency band/range	GNSS L1	1,548.8 - 1,630.2 MHz
	GNSS L2	1,136.8 - 1,327.2 MHz
	ISM 2.4 GHz	2,400 - 2,483.5 MHz
	ISM 5.8 GHz	5,725 - 5,850 MHz
	ISM 400 MHz	432.702 - 435.138 MHz
	ISM 900 MHz	902 - 928 MHz
	Customized band	Customized specific band
Jamming range	GNSS L1 & L2	≤ 1 km
	ISM band 2.4 GHz & 5.8 GHz	≤ 700 m
	ISM band 400 MHz & 900 MHz	≤ 700 m
Running time	1 hour if full output	
Operating temperature	-20 °C to + 50 °C	
IP rating	IP65	
Weight	3 kg for gun	
	12 kg for body	
Beamwidth	40°	

Drone detection Features

- Mobile RF scanning function is supported installed in body.
- It scans range of max. 2 km to detect drones from User.
- Detected drones are neutralized by frequency jamming.

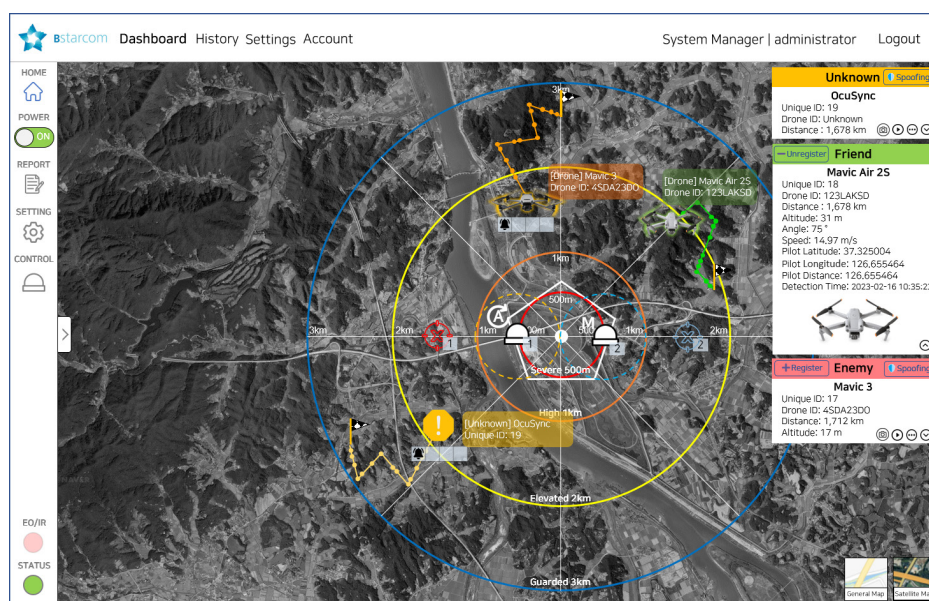


Anti-drone Integrated SW

Integrated controlling SW

Specification

- Open API SW can integrate with detection, identification, neutralization, and display equipment.
- Web server can be remotely updated and maintained.
- Client devices connected to internal network can be accessed through web browser.
- All equipment can be controlled through dashboard where shows real-time detecting status.
- Information that user needs briefly shows through intuitive UI.
- Customized operation modes are supported as Drone Dome automated/manual operation mode.
- Round-the-clock automated operation without manpower.
- Alert system activates on each level once approaching UAV/drone are detected.
- Real-time flying directions and trajectory of UAV/drone shows on the main screen.
- Tracking images by EO/IR camera can be monitored in real-time.
- Flight trajectories of detected UAV/drone are automatically saved and User can see as videos.
- UAV/drone detection, log-in, operation logs are saved.
- Records of detection and neutralization are saved as report in Excel and PDF form.
- Records are analyzed with statistics and graphs based on operation time and detection time.



07

Public Safety digital repeater

Public Safety digital repeater



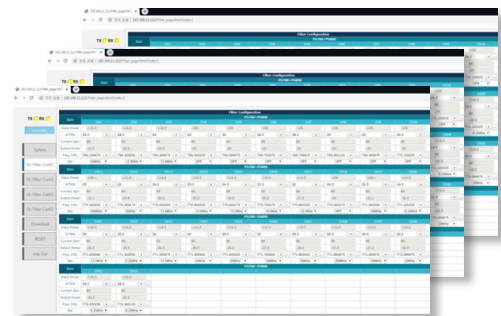
BS-PSR-7080-M1

Features

- BSTARCOM's BS-PSR-7080-M1 is an innovative digital public safety repeater designed to protect the lives of first responders and building occupants.
- The BS-PSR-7080-M1 uses digital filtering technology (DSP) to eliminate adjacent channel interference, allowing frequency band selectivity and supporting 700 MHz and 800 MHz public safety frequencies, including FirstNet.
- The user-friendly web-based GUI can support up to 2 non-contiguous wideband filters and 64 non-contiguous narrowband filters simultaneously at each of the 700 MHz and 800 MHz public safety frequencies, providing users with versatility and complete control.
- The BS-PSR-7080-M1 is a best-in-class public safety repeater that supports FirstNet and is fully compliant with the International Fire Code (IFC) and National Fire Protection Association (NFPA). BS-PSR-7080-M1 supports battery backup function operation. (Separate purchase only).

Web Based GUI Features

- Filter Type Control (BW & On/Off)
- Output Power Display
- Input Power Display
- ALC (Auto Limit Control) Level & Enable
- Manual Att. Set
- PAU (Power Amp Unit) Control
- System Info & Alarm Log
- Remote Download: System F.W & Software Update
- Battery Monitoring Function



07 Public Safety digital repeater



BS-PSR-7080-M1


Specification


Items		Specification		Remarks
Band		FirstNet + PS700 + PS800		
Items		Downlink	Uplink	
Frequency Band	FirstNet (Wideband)	758 ~ 768 MHz	788 ~ 798 MHz	
	PS700 (Narrowband)	769 ~ 775 MHz	799 ~ 805 MHz	
	PS800 (Narrowband)	851 ~ 861 MHz	806 ~ 816 MHz	
Composite Output Power	FirstNet (10 MHz) or PS700	33 dBm	27 dBm	
	FirstNet + PS700	33 dBm	27 dBm	
	PS800	33 dBm	27 dBm	
	FirstNet + PS700 + PS800	36 dBm	27 dBm	
System Gain		90 dB	90 dB	
Filter Selection	FirstNet (LTE Service)	2(5 + 5 M & 10 MHz non-contiguous)		
	PS700 + PS800	Up to 64 CH(Non-contiguous)		
Filter Bandwidth	Wideband	5, 10 MHz		
	Narrowband	6.25, 12.5, 25, 200 KHz Channel setting step 0.025 KHz		
WidebandFilter Roll-off (Out of band gain)	$0.2 \text{ MHz} \leq f_{\text{offset_CW}} < 1.0 \text{ MHz}$	$\leq 60 \text{ dB}$		3 GPP TS 36.106
	$1 \text{ MHz} \leq f_{\text{offset_CW}} < 5 \text{ MHz}$	$\leq 45 \text{ dB}$		
	$5 \text{ MHz} \leq f_{\text{offset_CW}} < 10 \text{ MHz}$	$\leq 45 \text{ dB}$		
	$10 \text{ MHz} \leq f_{\text{offset_CW}}$	$\leq 35 \text{ dB}$		
Wideband : Operating band unwanted emissions	$0.05 \text{ MHz} < f_{\text{offset}} < 5.05 \text{ MHz}$	$\leq -14 \text{ dBm /RB=100 KHz}$		3 GPP TS 36.106 , Table 9.1.2.1.1-2
	$5.05 \text{ MHz} < f_{\text{offset}} < 10.05 \text{ MHz}$	$\leq -16 \text{ dBm /RB=100 KHz}$		Band 12, Band 14
	$10.05 \text{ MHz} < f_{\text{offset}} < f_{\text{offsetmax}}$	$\leq -16 \text{ dBm /RB=100 KHz}$		



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