

Wednesday, February 21, 2024



## **RE: Description of Bluetooth Antenna for FCC application: 2AVAZ-CFAS-G5-US**

The Cabinet uses BT / Wifi antenna JCW410 manufactured by Jiaxing Jinchang Electronic Technology Co.,Ltd to send / receive data via Bluetooth to the installer of the cabinet using the installer app on their phone. Once the installation process is complete the BT radio feature is de-activated.

The antenna is directly connected to the Raspberry Pi CM4 via a 100mm u.fl to sma cable. The cable physically soldered to 21000 CMKE Motherboard via through hole pins, these are for mechanical mounting only and are not electrically connected to the ground plane of the PCB.

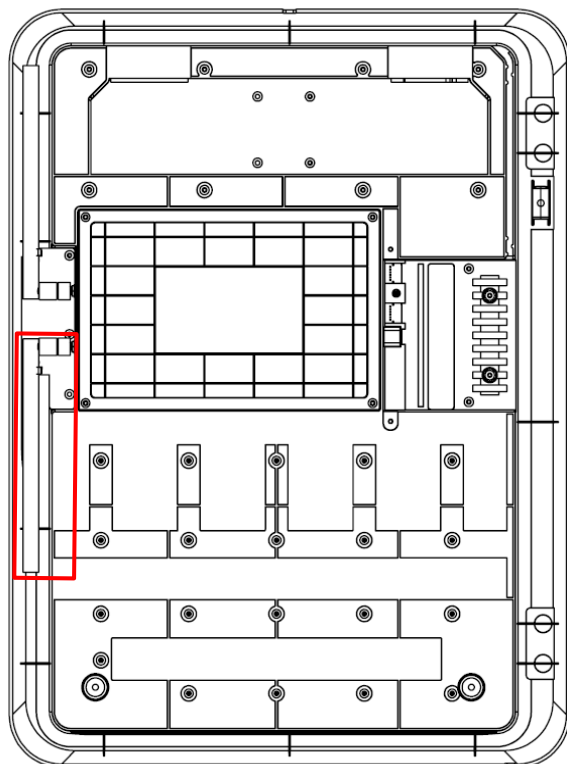
### **Specification**

See document JCW410.pdf for antenna specifications from the manufacturer.

See document FT8.7.0092-17A FT-SMA-KWE-1.37-100.pdf for specification of the antenna cable connecting the antenna to the LTE module.

### **Location**

The antenna is located on the right-hand side of the cabinet. Once the cabinet is installed by an authorized installer, the antenna is not visible or able to be accessed by the customer / end user.



*Figure 1: Bluetooth antenna location as viewed from the rear of the cabinet*

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## RE: Description of 21173 -PCBA Dipole (Antenna)

The UHF RFID uses a simple half wavelength pcb dipole antenna which consists of two copper elements on a single sided 1.6mm FR4 pcb. The right hand side element (with letters C, D) is directly soldered to the outer conductor of the coaxial cable. The inner conductor of the coax cable is soldered to the copper under letters (A and B) Note that the holes above the letters are for mechanical mountings (heat stake pin locations) and are in base FR4 only.

After a soldering process, the dipole is then low pressure over moulded over the soldered area to provide strain relief.

The theoretical maximum gain of the antenna is 2.15dBi.

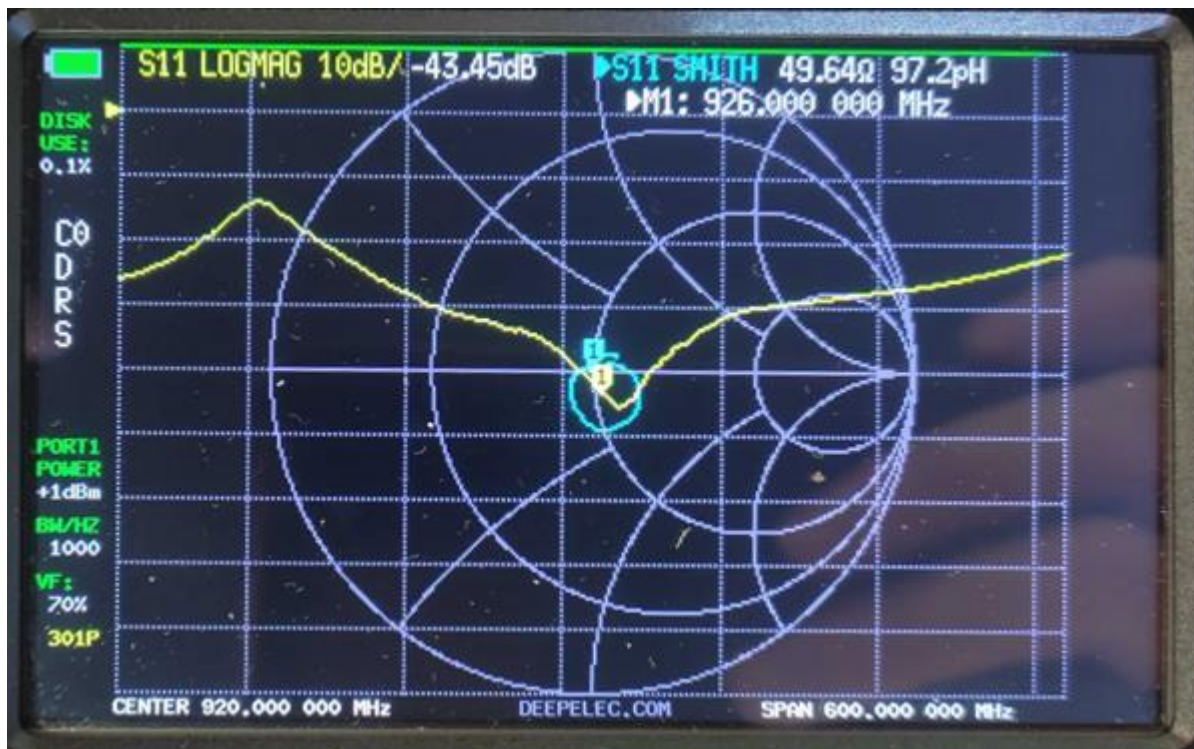


Figure 1: Antenna on VNA, Centrepont is 926MHz

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## Construction

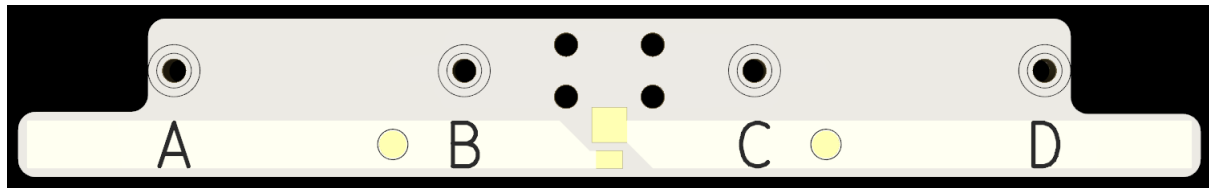


Figure 2: Dipole antenna copper areas

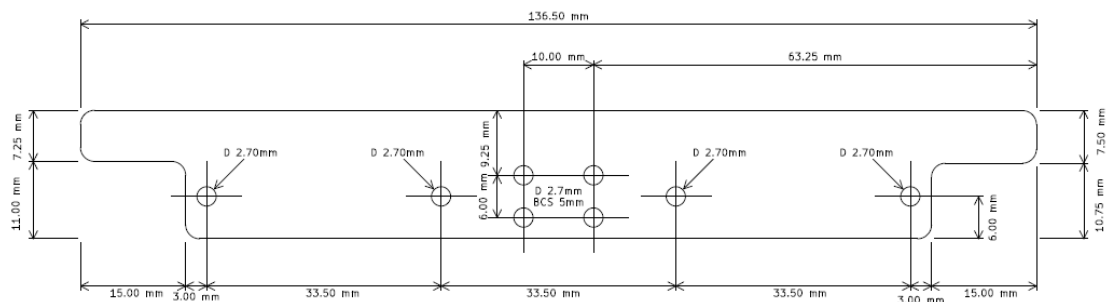


Figure 3: Dimensions of Antenna

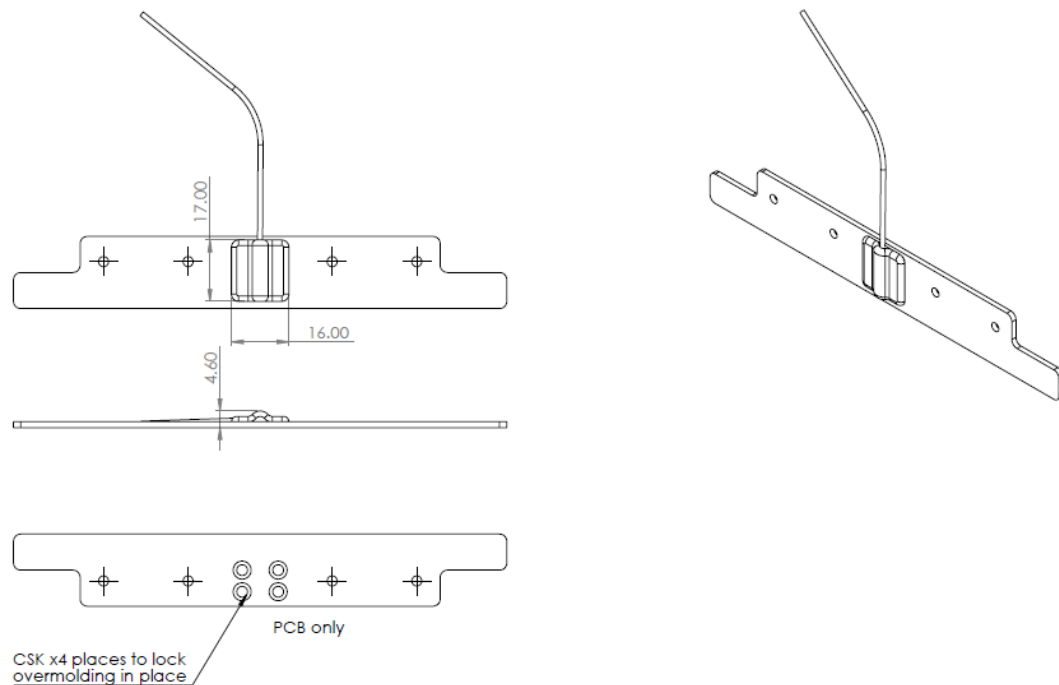


Figure 4: Mechanical Description of Over mould



## **Installation**

16 x 21173 CMKE PCBDipole Antennas are installed within the chassis of the cabinet, the dipoles are either soldered directly to 21000 CMKE Motherboard, which contains the UHF radio module (RED4S) or soldered directly to 21191 CMKE Sachet Antennas.

21191 CMKE Sachet Antennas is connected to 21000 CMKE Motherboard using 1.37mm coax cable terminated with MMCX connectors.

Only one antenna is active at a time, the selection of which is controlled through RF Switched P.N. SKY13418-485 and SKY13414-485 placed on 21000 and 21191.

Once soldered down, high temperature rated hot melt is applied over the solder joint to protect it from corrosion and to provide strain relief.

## **Locations**

Figure 5 shows the locations of the 16 x 21173 CMKE PCB Dipole Antennas installed inside the cabinet. Note the Figure is from the back perspective with the outer shielding removed. Please see exhibit "Antenna Photos.pdf" for more details on the installation location.



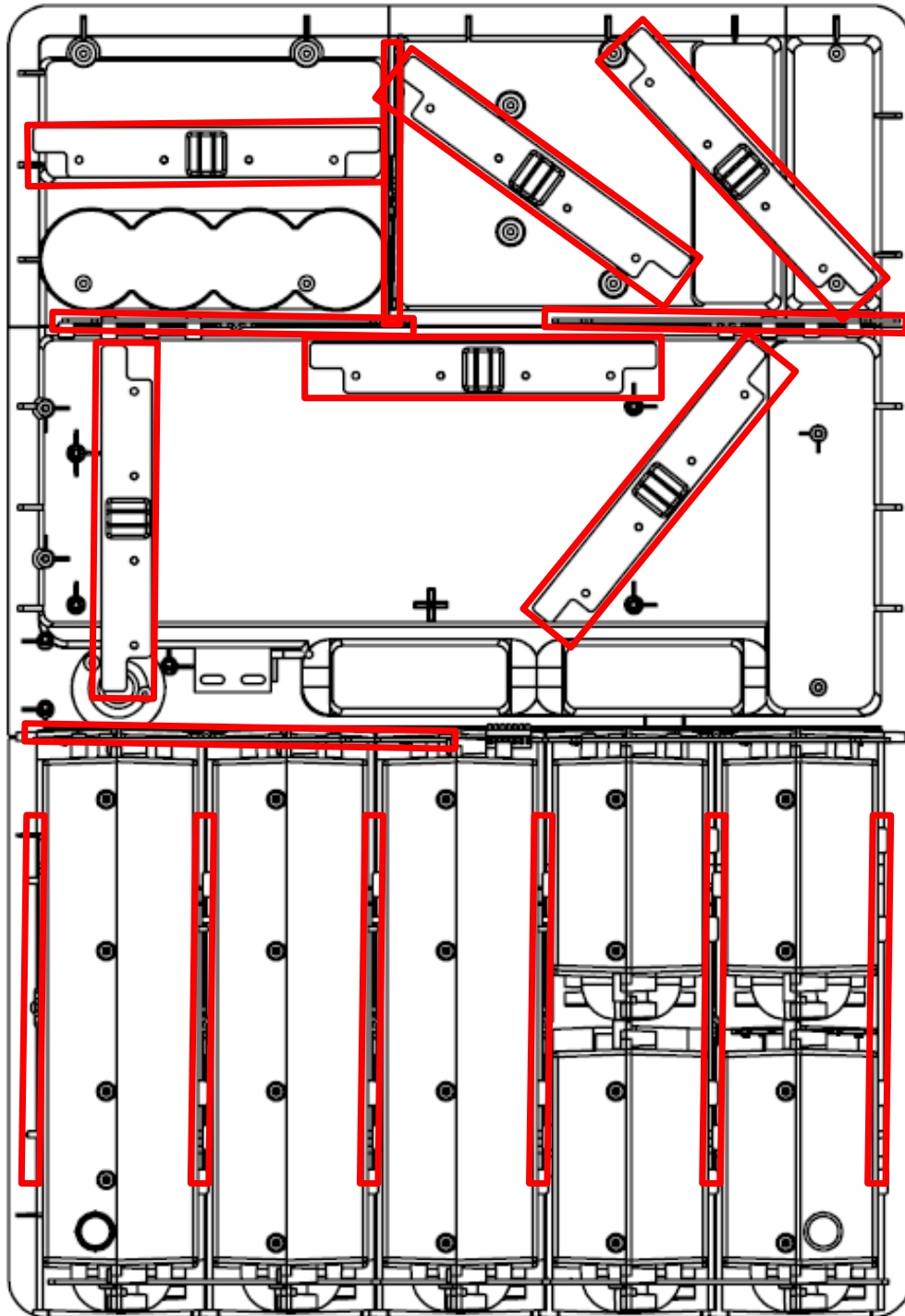


Figure 5: 16x 21173 CMKE PCB Dipole Locations

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## **RE: Description of NFC Antennas**

### **Frequency Bands**

- 13.56MHz
- Bandwidth: 2.26kHz

### **Description**

The NFC on the cabinet utilises the ST25R3911B chip from ST Electronics. The chip is placed on the 21000 CMKE Motherboard and is powered from 3.3V regulators.

The antennas used for the NFC scanning are all located on the same PCB: 21191 CMKE Sachet Antennas

The RF connection is made between the 21000 CMKE Motherboard and 21191 CMKE Sachet Antennas using 1.37mm 50R Coax cable, terminated with MMCX connectors. Access to the two boards is not possible to the customer without full unauthorized disassembly of the unit.

21191 CMKE Sachet Antennas contains 10x NFC antennas, all the same physical dimension and tuning.

Only one Antenna is active at a time, the selection of which is controlled through RF Switches P.N. SKY13418-485 and SKY13414-485 placed on 21191.



## Construction

21191 CMKE Sachet Antennas measures 212mm x 336mm and is constructed from 4 layer 1.6mm FR4.

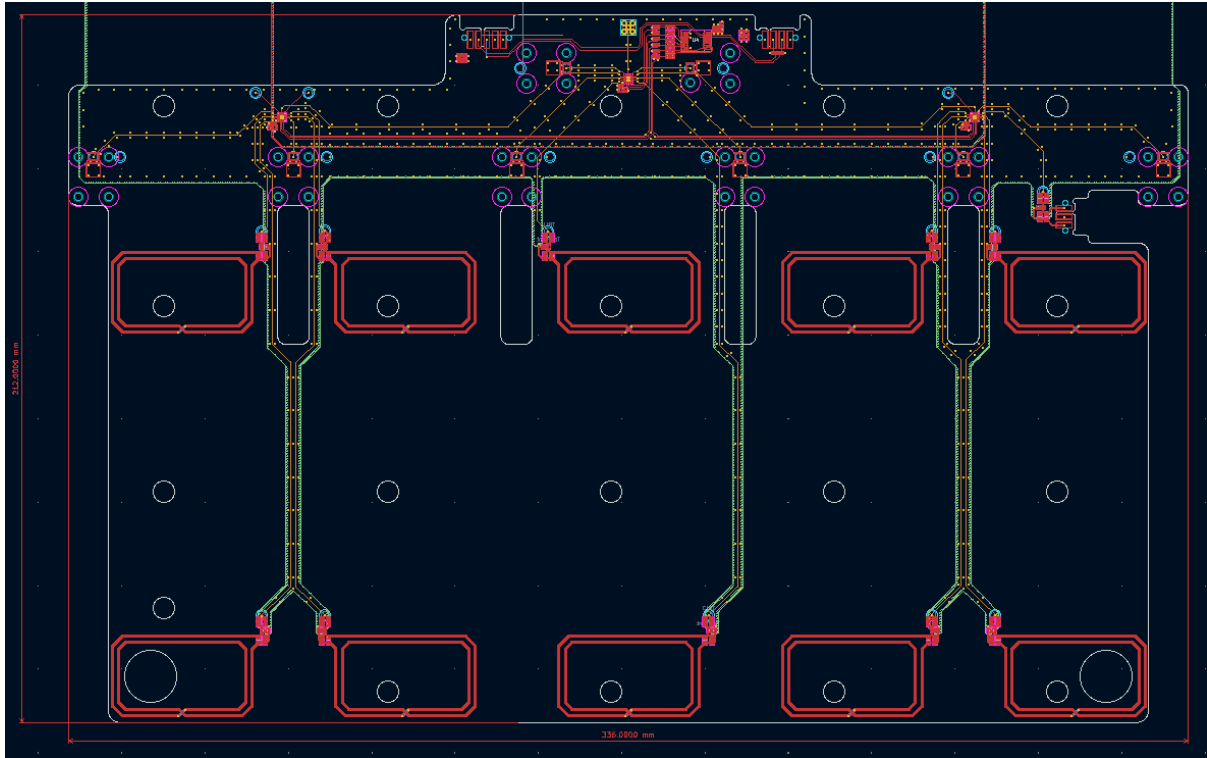


Figure 1: 21191 CMKE Sachet Antennas

The antenna is constructed from two loops of 1mm wide microstrip on the outer loop measures 25mm x 43mm.

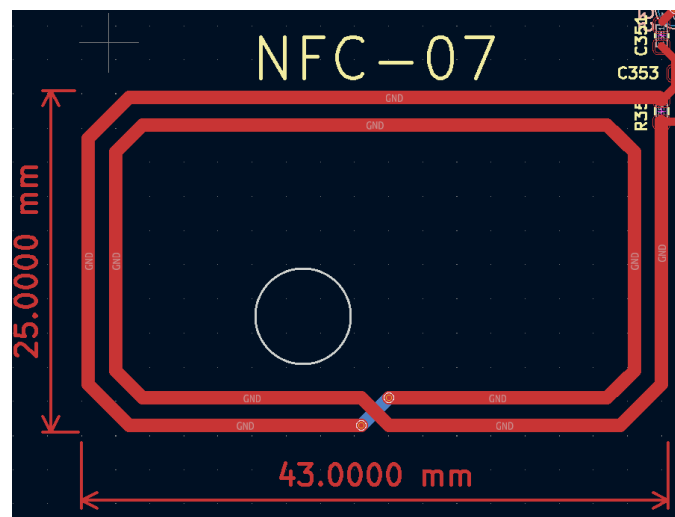
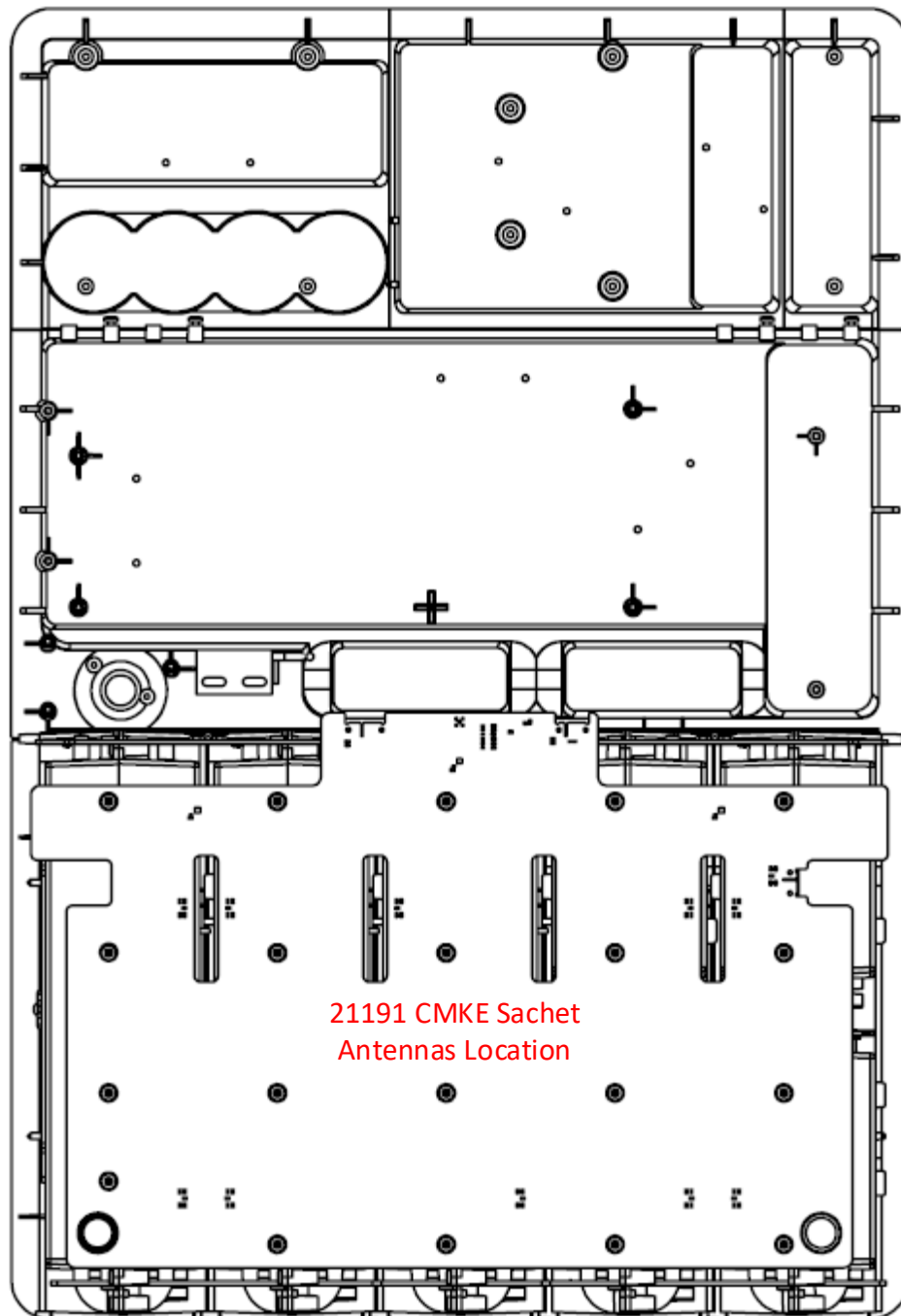


Figure 2: Example of NFC Antenna on 21191

## Location

21191 CMKE Sachet Antennas is installed at the back of the sachet bin area of the chassis as shown in Figure 3.

For more detailed photograph of installation location see exhibit "Antenna Photos.pdf"



21191 CMKE Sachet  
Antennas Location

Figure 3: NFC Antenna locations



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## **RE: Description of LTE Antenna for FCC application: 2AVAZ-CFAS-G5-US**

The Cabinet uses LTE antenna JCG410L manufactured by Jiaxing Jinchang Electronic Technology Co.,Ltd to send / receive data via the cellular network.

The antenna is directly connected to the cellular modem module (BG96 or EC21) via a 55mm u.fl to sma cable. The cable physically soldered to 21000 CMKE Motherboard via through hole pins, these are for mechanical mounting only and are not electrically connected to the ground plane of the PCB.

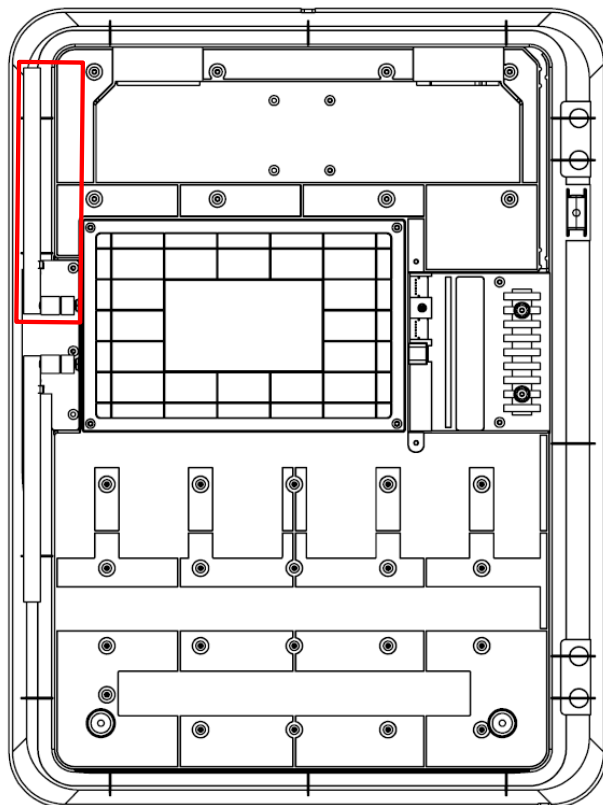
### **Specification**

See document JCG410L for antenna specifications from the manufacturer.

See document FT8.7.0092-16A FT-SMA-KWE-1.37-55.pdf for specification of the antenna cable connecting the antenna to the LTE module.

### **Location**

The antenna is located on the right-hand side of the cabinet. Once the cabinet is installed by an authorized installer, the antenna is not visible or able to be accessed by the customer / end user.



*Figure 1: LTE antenna location as viewed from the rear of the cabinet.*

