RF-DK-2652_1352 User Guide

Version 1.0

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1 Description

RF-DK-2652_1352 development board is a full set of test products that integrates RF-star SMT CC26xxxx (CC2642R, CC2652R, CC2652R7, CC2652P, and CC2652P7) and CC1352xx (CC1352R, CC1352P, and CC1352P7) modules and USB-to-UART IC to support the tests and development. This board greatly reduces the difficulty of customers' testing and development. This manual describes how to use the development board. For more information about our products, please visit the official website of RF-star.

1.1 Development Kit Function and Resources

The function region distribution is shown in Figure 1, and the function region description is shown in Table 1.

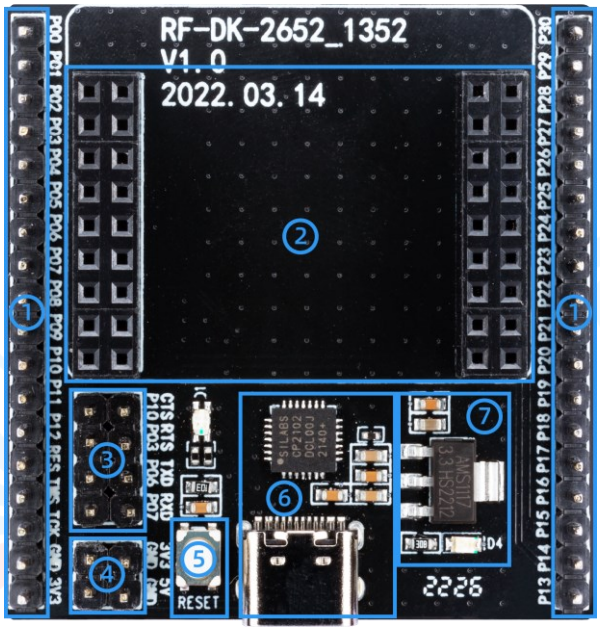

Figure 1. Function Region Distribution

Table 1. Function Region Description

No.	Function Region	Description
①	Module extension region	Supporting modules are shown in table 2.
②	Pin output region	All pins are pulled out, which is convenient for test.
③	UART jumper region	All modules' pins are default as follows: P10-CTS, P03-CTS, P06-RX, and P07-TX. Those pins can be connected to CTS, RTS, TXD, and RXD respectively by jumpers. If the other UART pins of the module need to be connected, just remove the jumper and connect to the related pins.
④	Power supply region	Power supply: 3.3 V / 5 V.
⑤	Button function region	Reset by pushing buttons.
⑥	USB-to-UART region	USB-to-UART function. Can be used as the USB-to-TTL tool without the module embedded.
⑦	Power supply switch region	Power supply witch from 5 V to 3.3 V.

1.2 Supporting Modules

Table 2. Table of Supporting Modules

Pinboard	Module List		
RF-TB-2652B1	RF-BM-4077B1/B2	RF-BM-2642B1	RF-BM-2652B1/B2
RF-TB-2652P1	RF-BM-2652P1	RF-BM-2652P2/P2I	RF-TI1352P1
RF-TB-2652P3	RF-BM-2652P3		
RF-TB-1352B1	RF-TI1352B1		
RF-TB-2652RB1	RF-BM-2652RB1		
RF-TB-2652RB2	RF-BM-2652RB2		

1.3 Supporting Modules

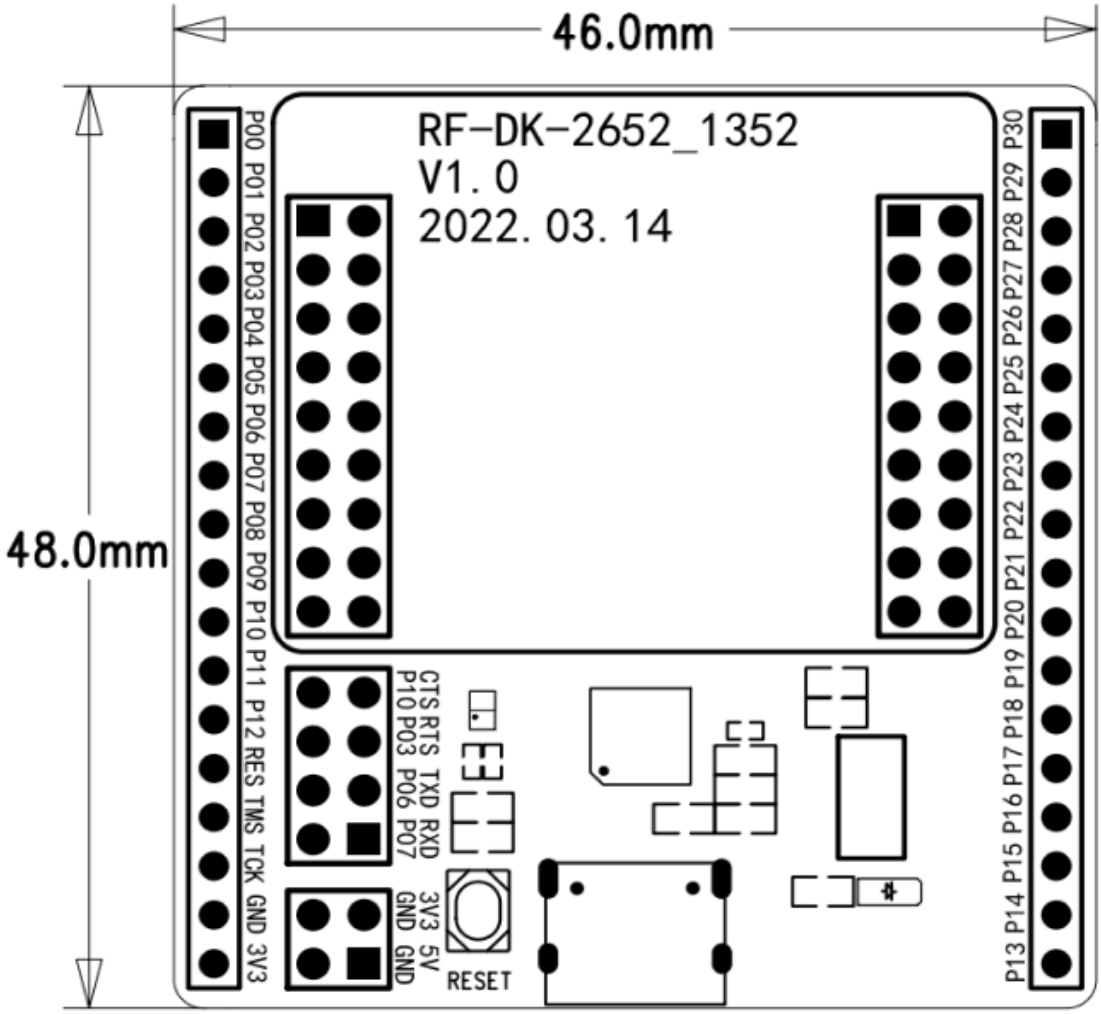

Figure 2. Pin Diagram of RF-DK-2652_1352

Table 3. Pin Functions of RF-DK-2652_1352

RF-DK-2652_1352 Pin	Description	RF-DK-2652_1352 Pin	Description
P00	GPIO	**P01**	GPIO
P02	GPIO	**P03**	GPIO
P04	GPIO	**P05**	GPIO
P06	GPIO	**P07**	GPIO
P08	GPIO	**P09**	GPIO
P10	GPIO	**P11**	GPIO
P12	GPIO	**RES**	Reset, active low
TMS	JTAG_TMSC	**TCK**	JTAG_TCKC
GND	Ground	**3V3**	Power supply pin
P13	GPIO	**P14**	GPIO
P15	GPIO	**P16**	GPIO
P17	GPIO	**P18**	GPIO
P19	GPIO	**P20**	GPIO
P21	GPIO	**P22**	GPIO
P23	GPIO	**P24**	GPIO
P25	GPIO	**P26**	GPIO
P27	GPIO	**P28**	GPIO
P29	GPIO	**P30**	GPIO
CTS	CTS (CP2102)	**RTS**	RTS (CP2102)
TXD	TXD (CP2102)	**RXD**	RXD (CP2102)
5V	Power supply pin		

1.4 Schematic Diagram of RF-DK-2652_1352

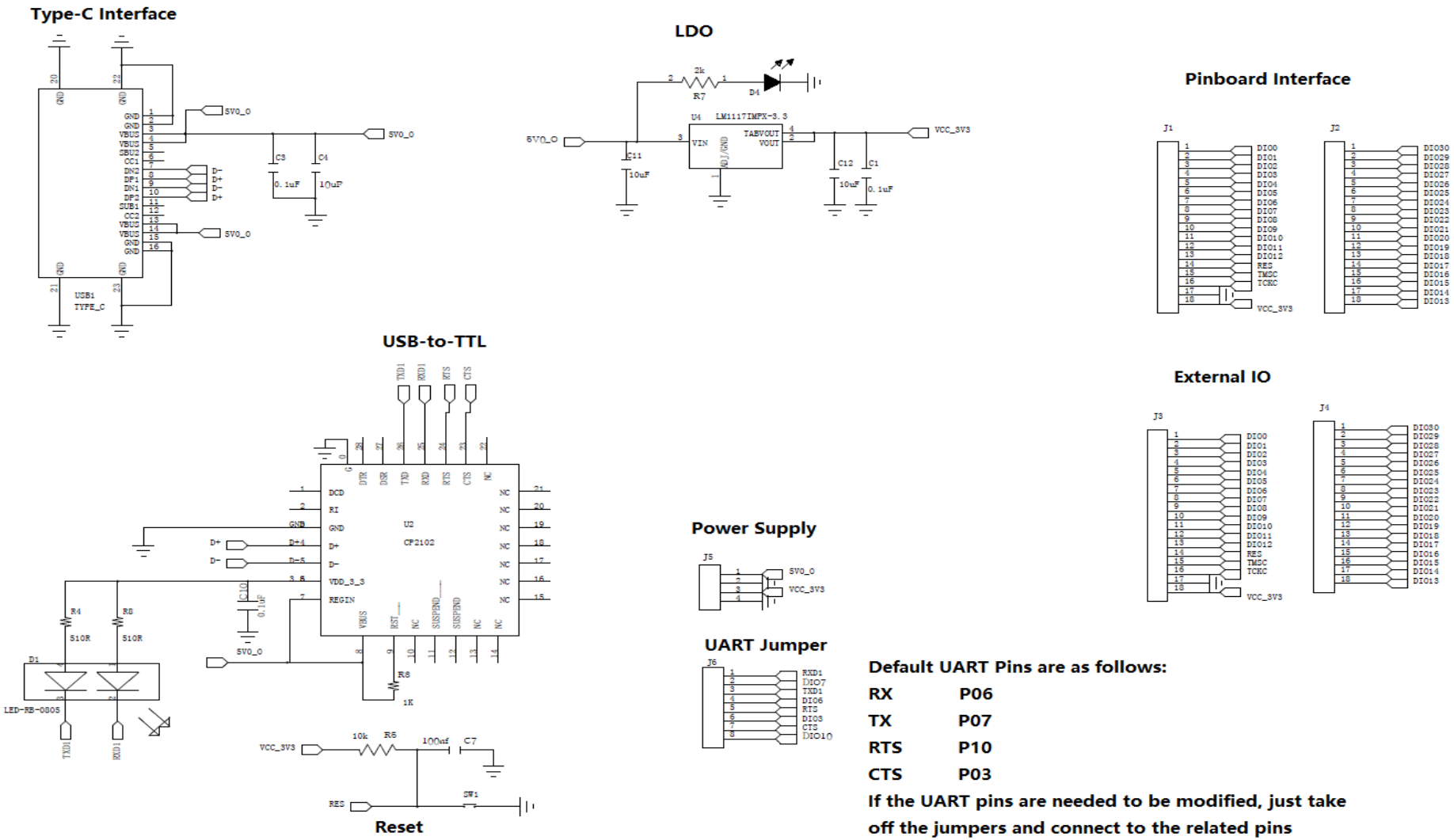

Figure 3. Schematic Diagram of RF-DK-2652_1352

2 Pinboard Description

Dimension of the pinboard. All the pinboards have the same dimension.

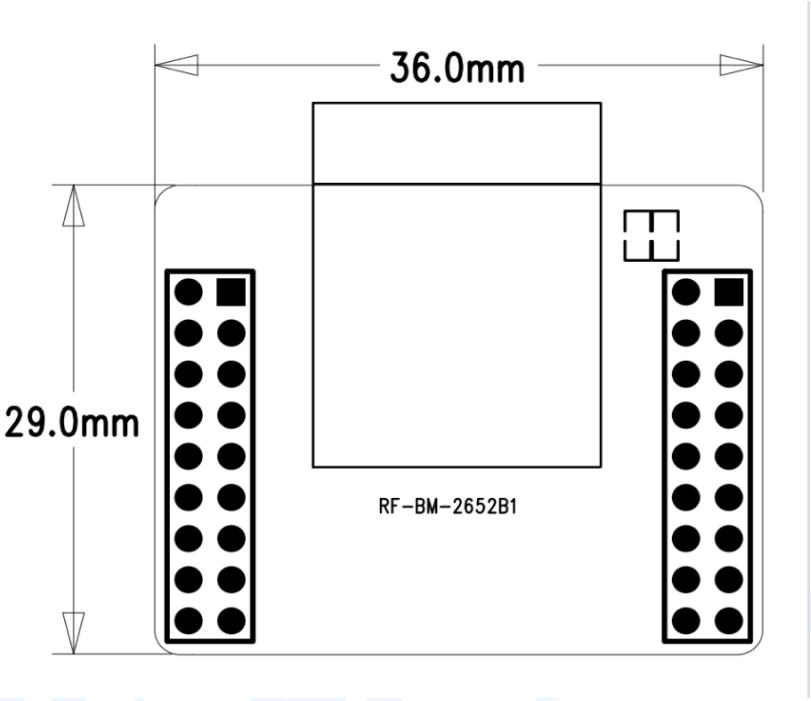

Figure 4. Dimension of the Pinboard

2.1 RF-TB-2652B1

RF-TB-2652B1 is the pinboard of the modules RF-BM-4077B1/B2, RF-BM-2642B1 and RF-BM-2652B1.

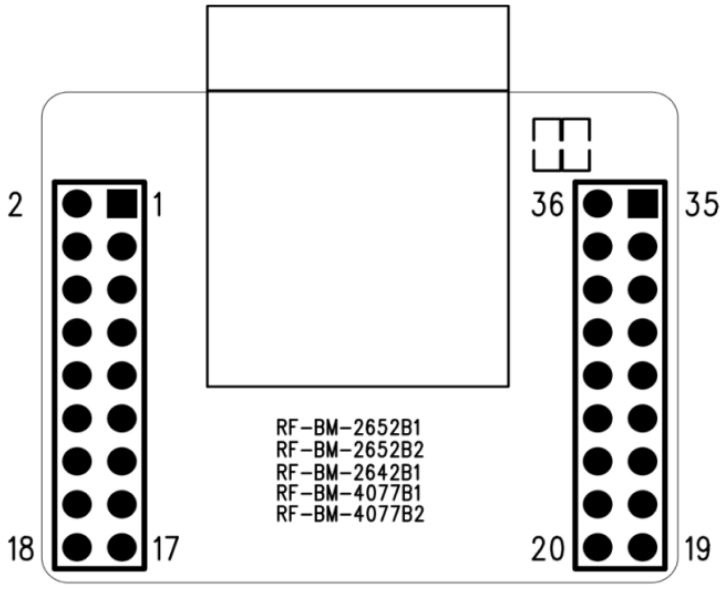

Figure 5. Pinboard RF-TB-2652B1

Table 4. Pin Functions of RF-TB-2652B1

No.	Pin Description	No.	Pin Description
1	P01	2	P00
3	P03	4	P02
5	P05	6	P04
7	P07	8	P06
9	P09	10	P08
11	P11	12	P10
13	RES	14	P12
15	TCK	16	TMS
17	3V3	18	GND
19	P13	20	P14
21	P15	22	P16
23	P17	24	P18
25	P19	26	P20
27	P21	28	P22
29	P23	30	P24
31	P25	32	P26
33	P27	34	P28
35	P29	36	P30

2.2 RF-TB-2652P1

RF-TB-2652P1 is the pinboard of the modules RF-BM-2652P1, RF-BM-2652P2/P2I and RF-TI1352P1.

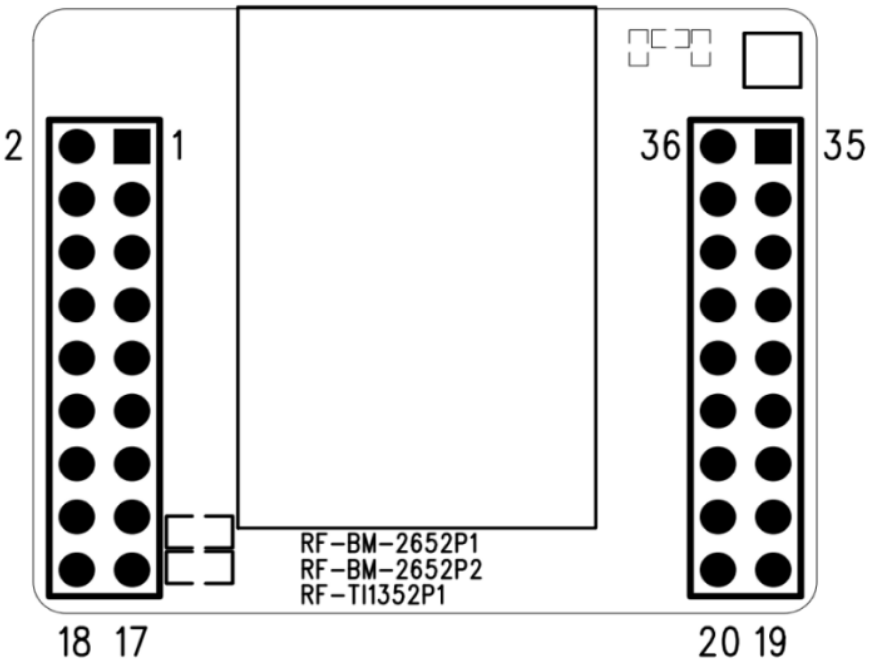

Figure 6. Pinboard RF-TB-2652P1

Table 5. Pin Functions of RF-TB-2652P1

No.	Pin Description	No.	Pin Description
1	NC	2	NC
3	NC	4	NC
5	P05（DIO5)	6	NC
7	P07（DIO7)	8	P06（DIO6)
9	P09（DIO9)	10	P08（DIO8)
11	P11（DIO11)	12	P10（DIO10)
13	RES	14	P12（DIO12)
15	TCK	16	TMS
17	3V3	18	GND
19	P13（DIO13)	20	P14（DIO14)
21	P15（DIO15)	22	P16（DIO16)
23	P17（DIO17)	24	P18（DIO18)
25	P19（DIO19)	26	P20（DIO20)
27	P21（DIO21)	28	P22（DIO22)

29	P23（DIO23)	**30**	P24（DIO24)
31	P25（DIO25)	**32**	P26（DIO26)
33	P27（DIO27)	**34**	NC
35	NC	**36**	NC

2.3 RF-TB-2652P3

RF-TB-2652P3 is the pinboard of the modules RF-BM-2652P3.

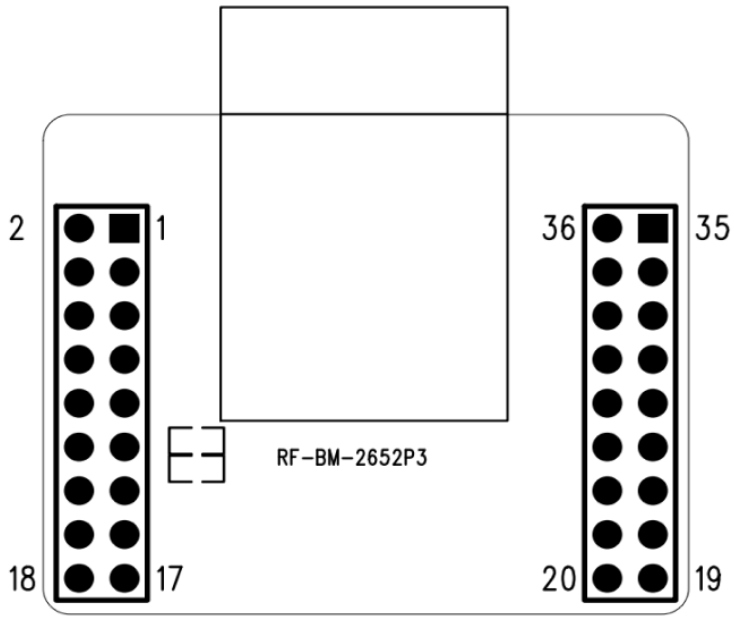

Figure 7. Pinboard RF-TB-2652B1

Table 6. Pin Functions of RF-TB-2652B1

No.	Pin Description	No.	Pin Description
1	NC	**2**	NC
3	NC	**4**	NC
5	P05（DIO5)	**6**	NC
7	P07（DIO7)	**8**	P06（DIO6)
9	NC	**10**	NC
11	NC	**12**	NC
13	RES	**14**	NC
15	TCK	**16**	TMS
17	3V3	**18**	GND
19	NC	**20**	NC
21	NC	**22**	P16（DIO16)

23	P17（DIO17)	**24**	NC
25	NC	**26**	P20（DIO20)
27	P21（DIO21)	**28**	NC
29	NC	**30**	P24（DIO24)
31	P25（DIO25)	**32**	P26（DIO26)
33	P27（DIO27)	**34**	NC
35	NC	**36**	NC

3 Quick Reference

3.1 Preparation of Hardware and Software

1. Prepare RF-DK-2652_1352 development board, USB-to-Type C wire, and any pinboard of the module.
2. Install USB-to-UART driver, the driver file is as follows:

Figure 8. Driver File

3. According to the type of computer operating system, click to install the corresponding program. Take 32-bit computer operating system as an example, install the program shown in the following. (64-bit operating system installs the program suffixed with * 64).

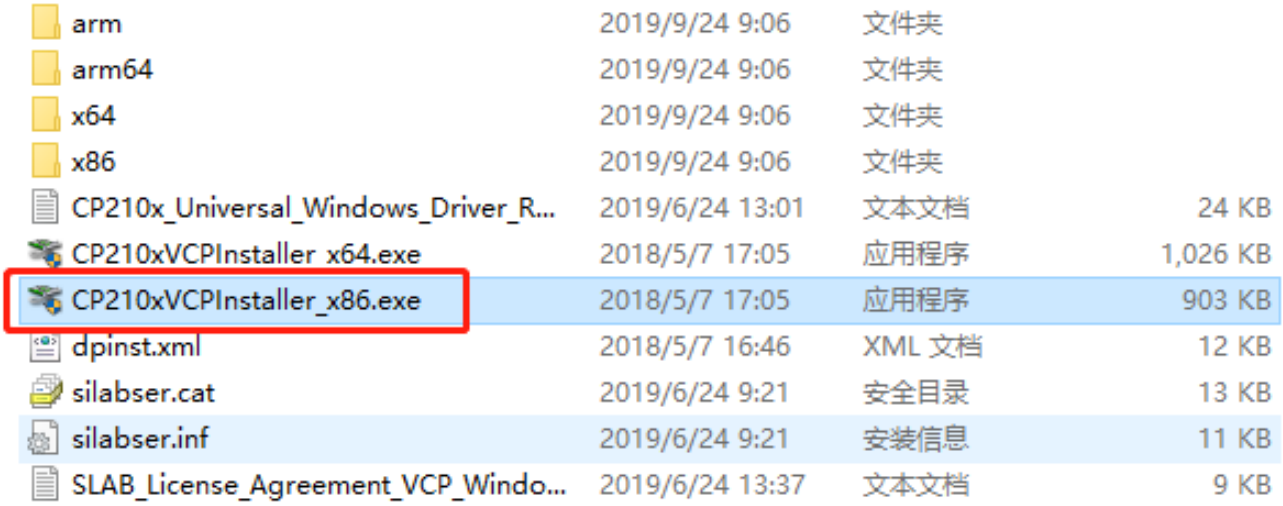

Figure 9. Program Installment

4. After installation, right-click on "Computer - Management - Device Manager - Port" to see if the driver has been installed successfully. The successful installation is shown in Figure 4 (Repeat step 2 if it is shown as a yellow exclamation mark).

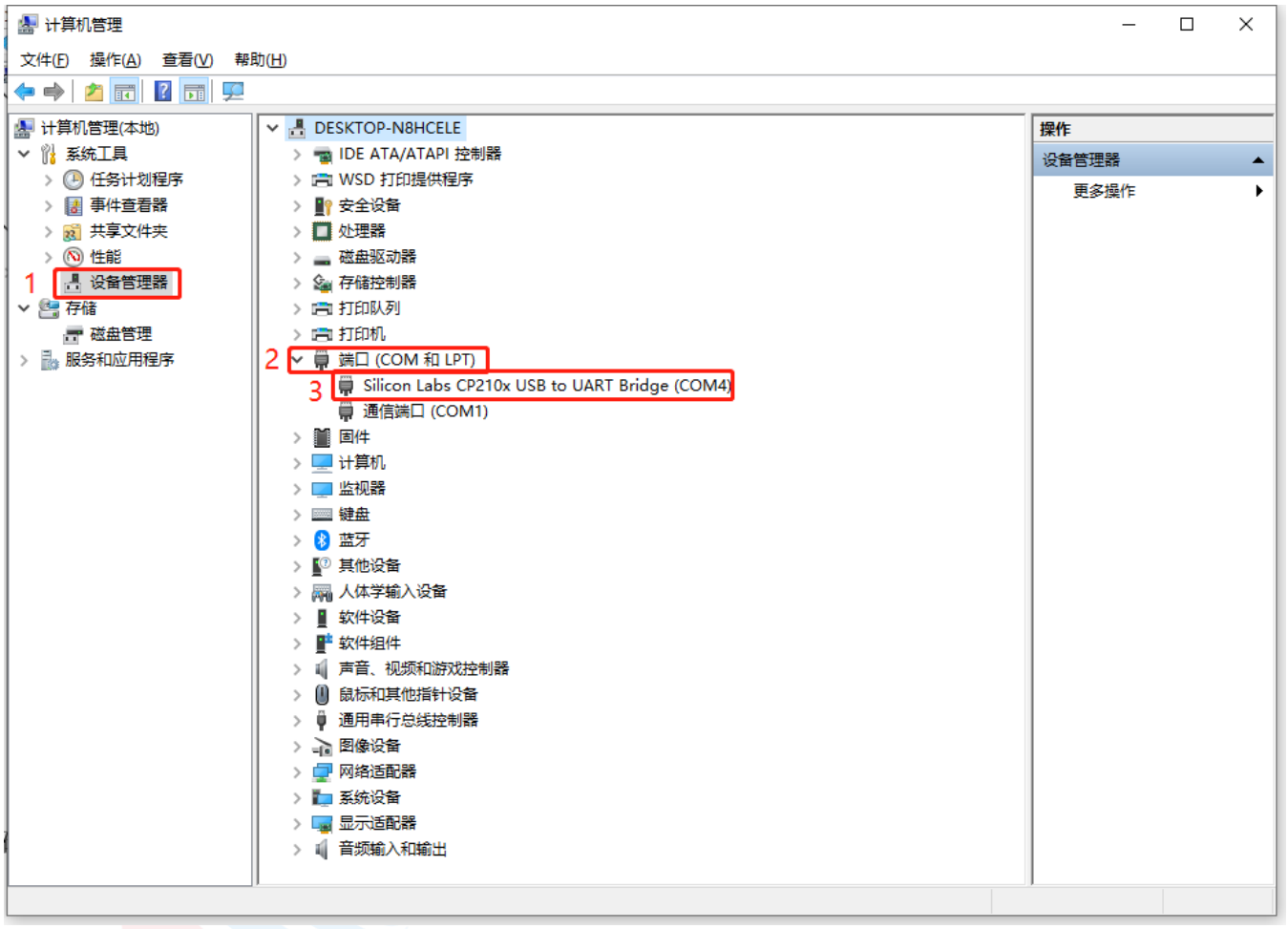

Figure 10. Successful Installation

5. Open the serial port tool software, this software will automatically identify the USB-to-UART tool driver. The software configuration is shown in Figure 5. After the settings are correct, click to open the serial port. (Note: If you use our transparent program, you need to set BRTS low to accept data.)

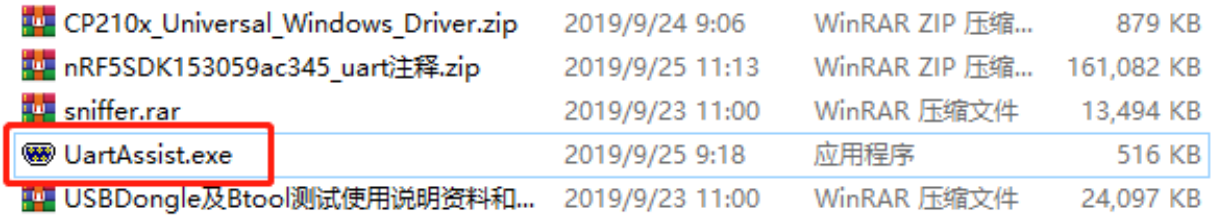

Figure 11. UART Assist

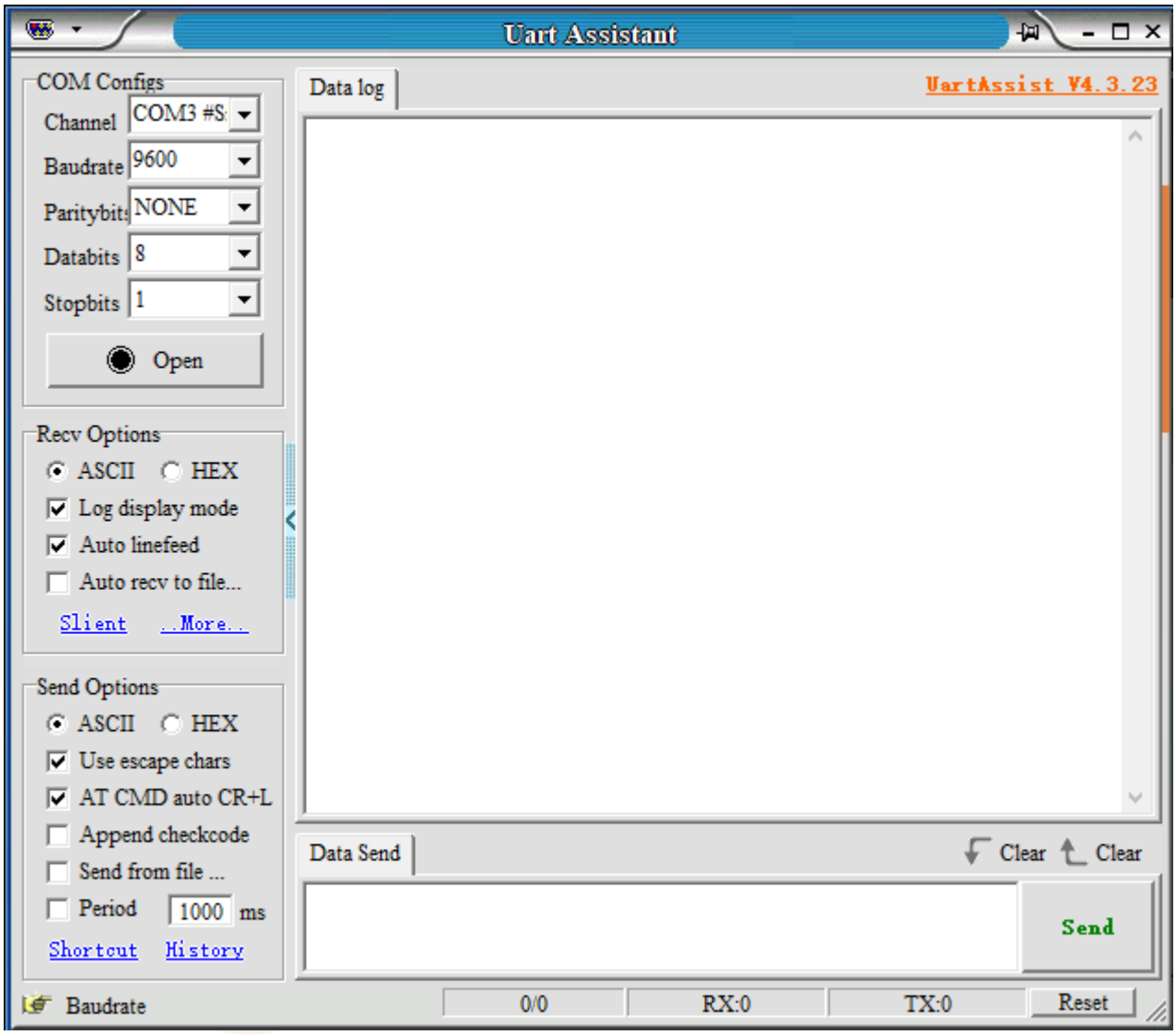

Figure 12. Successful Application

3.2 Transparent Transmission Test by APP (iOS)

1. Search for nRF Connect in the APP store:

Figure 13. nRF Connect APP

2. Open nRF Connect and the cellphone Bluetooth, press “scan” to search surrounding devices. As shown in the following figure, there will be a Bluetooth device list being broadcast nearby. After clicking on the BLE device you

want to connect to, the connection process begins.

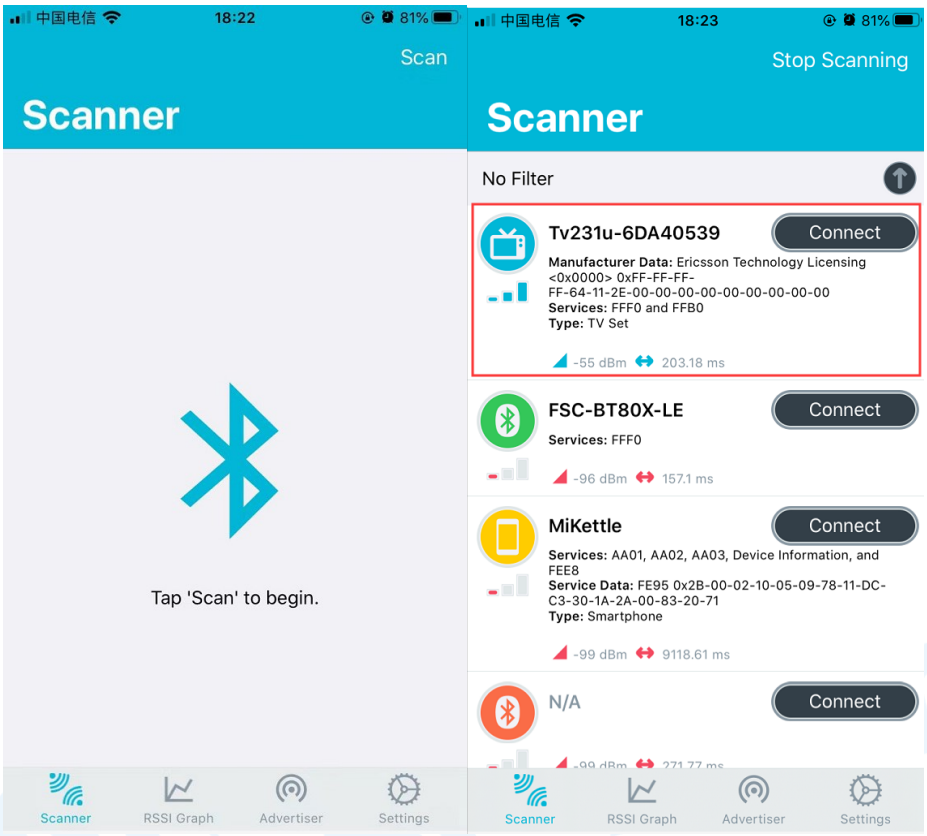

Figure 14. Bluetooth Device List

3. Successful connection of nRF Connect screen and the UART Assistant screen is shown as follows:

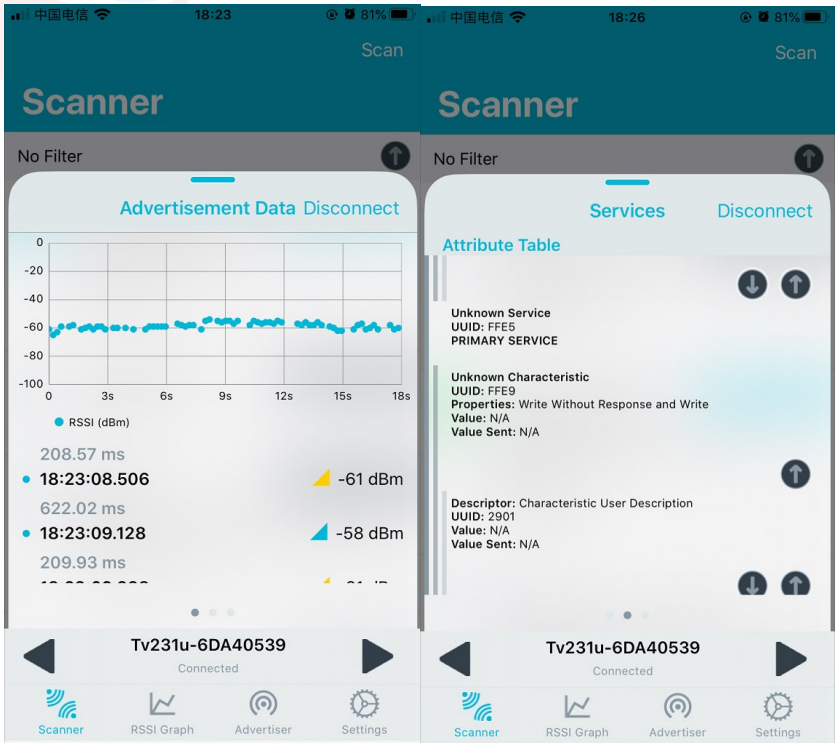

Figure 15. Successful Connection of nRF Connect Screen

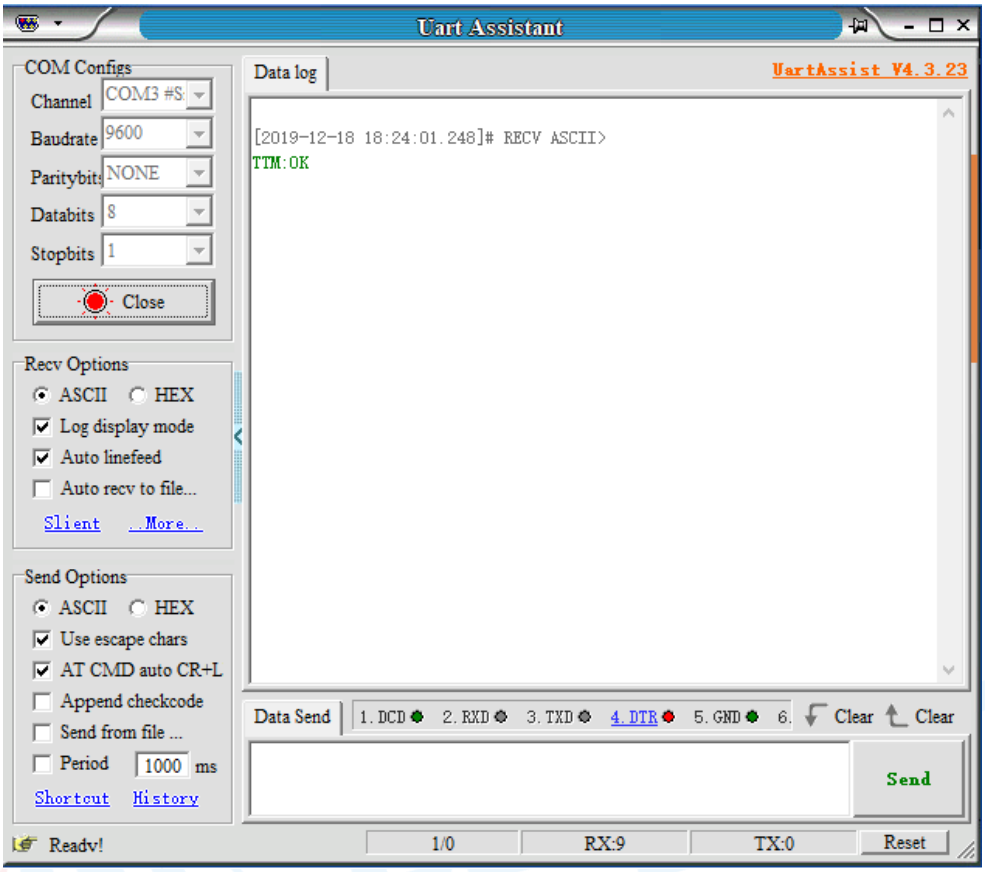

Figure 16. Successful Connection of UART Assistant Screen

4. Click the FFE9 channel in nRF Connect to write.

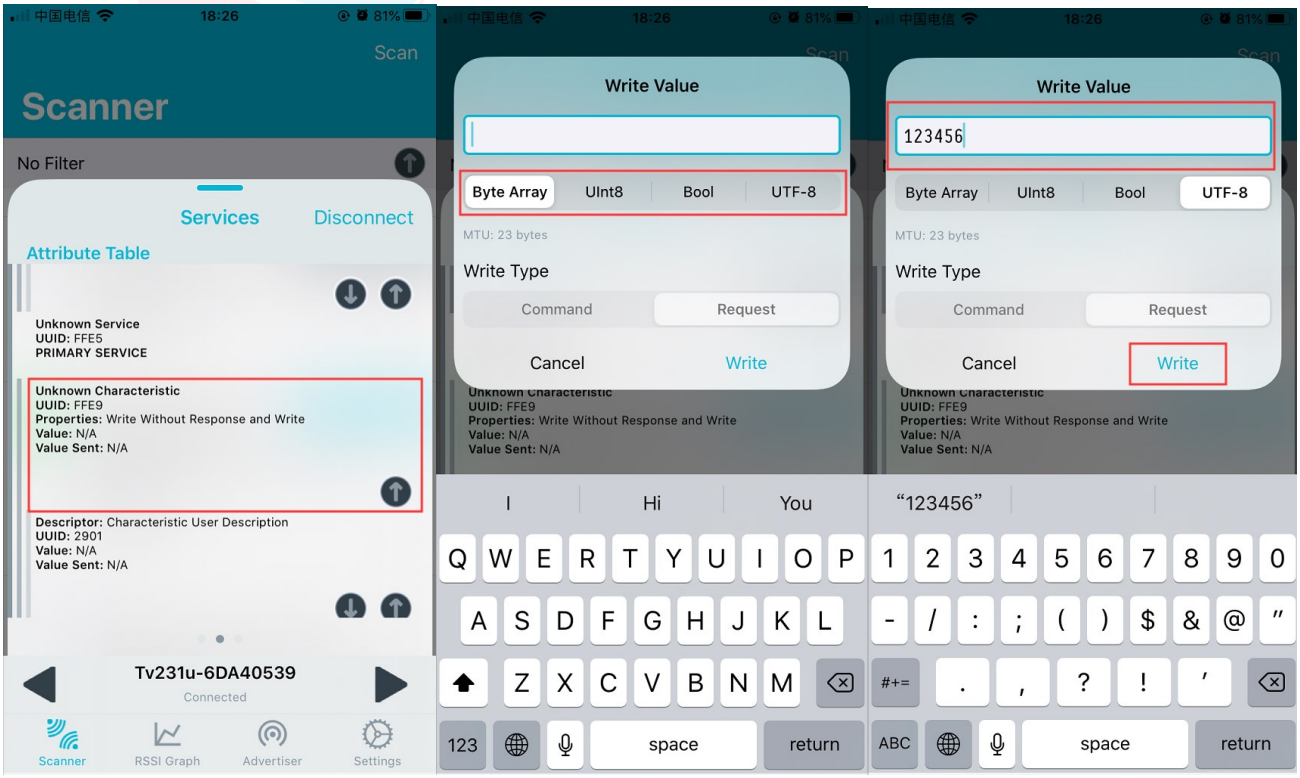

Figure 17. Write in FFE9 Channel

5. Then, UART Assistant will receive the data sent by APP:

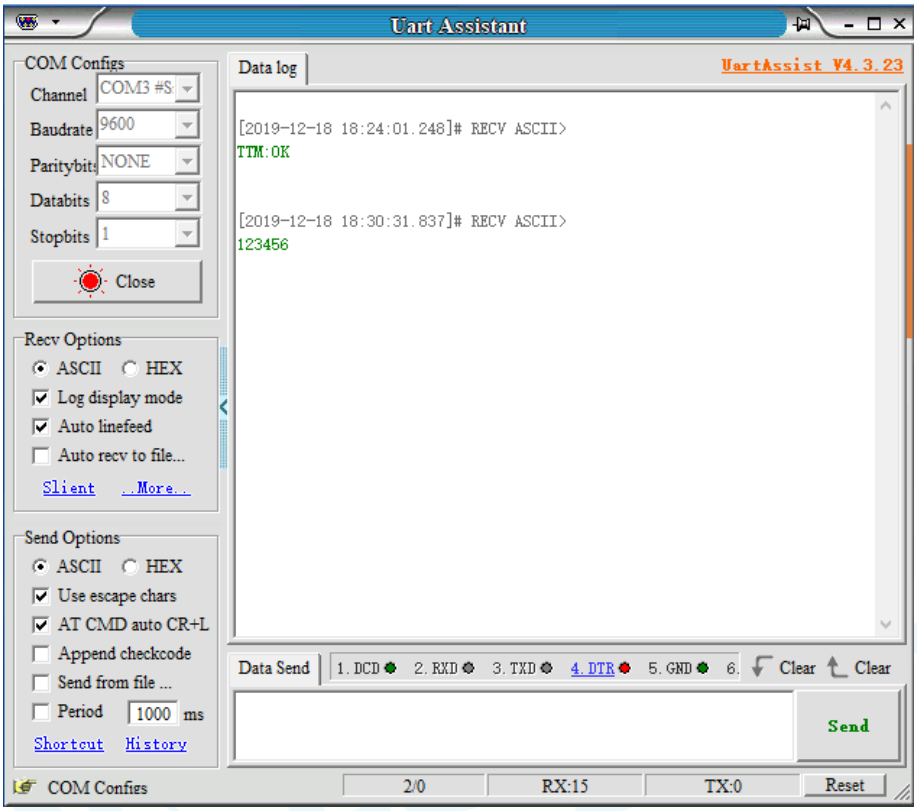

Figure 18. Successful Write

6. Click the FFE4 channel in nRF Connect to turn on Notification:

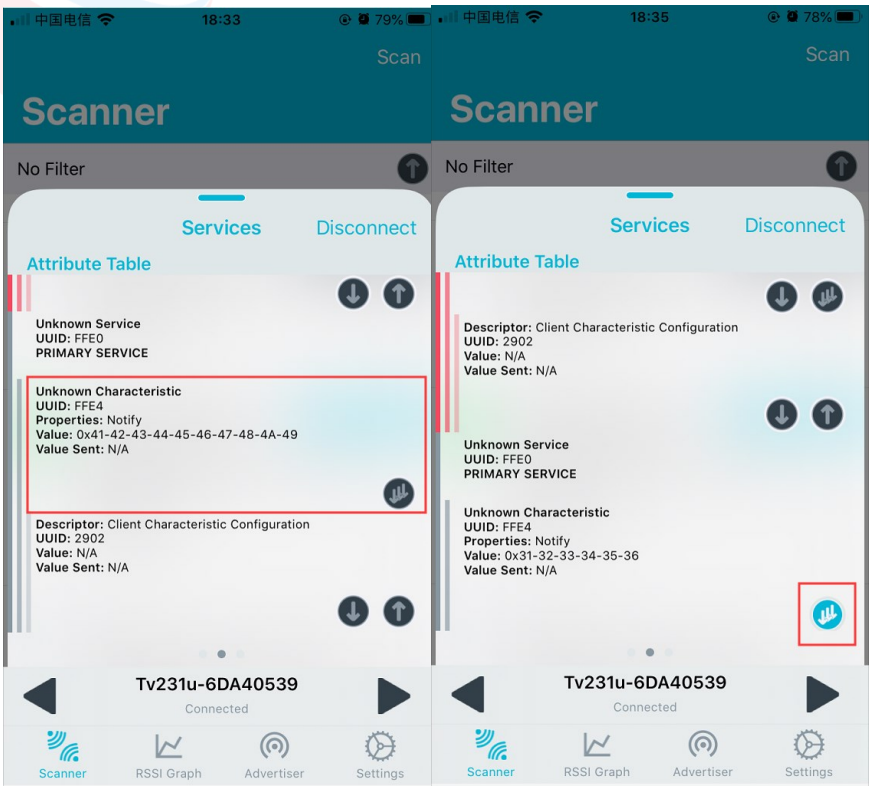

Figure 19. Turn-on Notification

7. Write the string in UART Assistant and send:

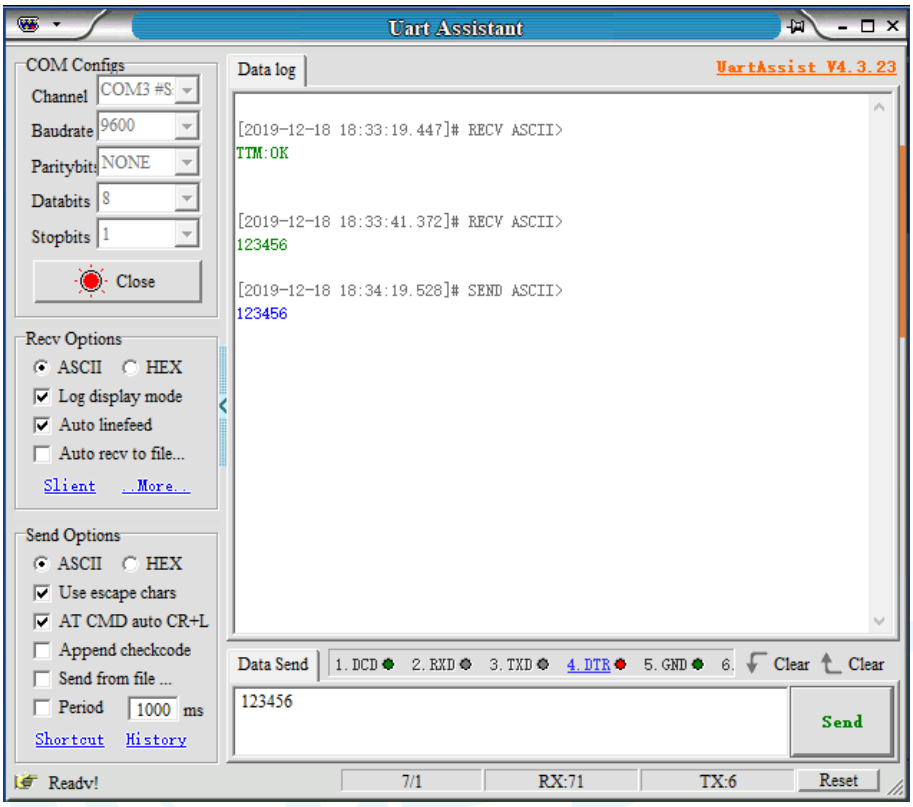

Figure 20. Send Data

8. nRF Connect will receive the data written in UART Assistant:

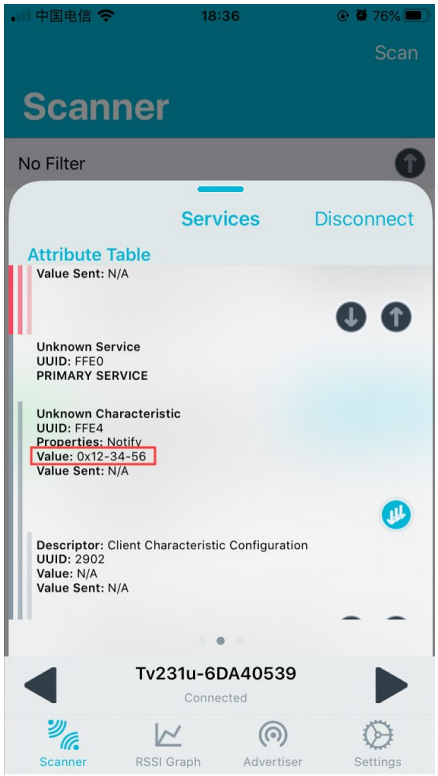

Figure 21. Successful Write

3.3 Transparent Transmission Test by APP (Android)

1. Install APP “nRF Connect”:

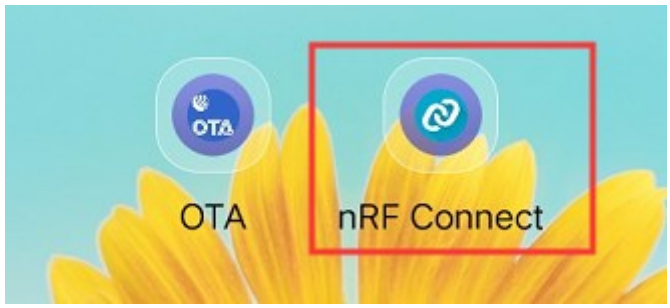

Figure 22. nRF Connect APP

2. Open nRF Connect and the cellphone Bluetooth, and press “scan” to search surrounding devices. As shown in the following figure, there will be a Bluetooth device list being broadcast nearby. After clicking on the BLE device you want to connect to, the connection process begins.

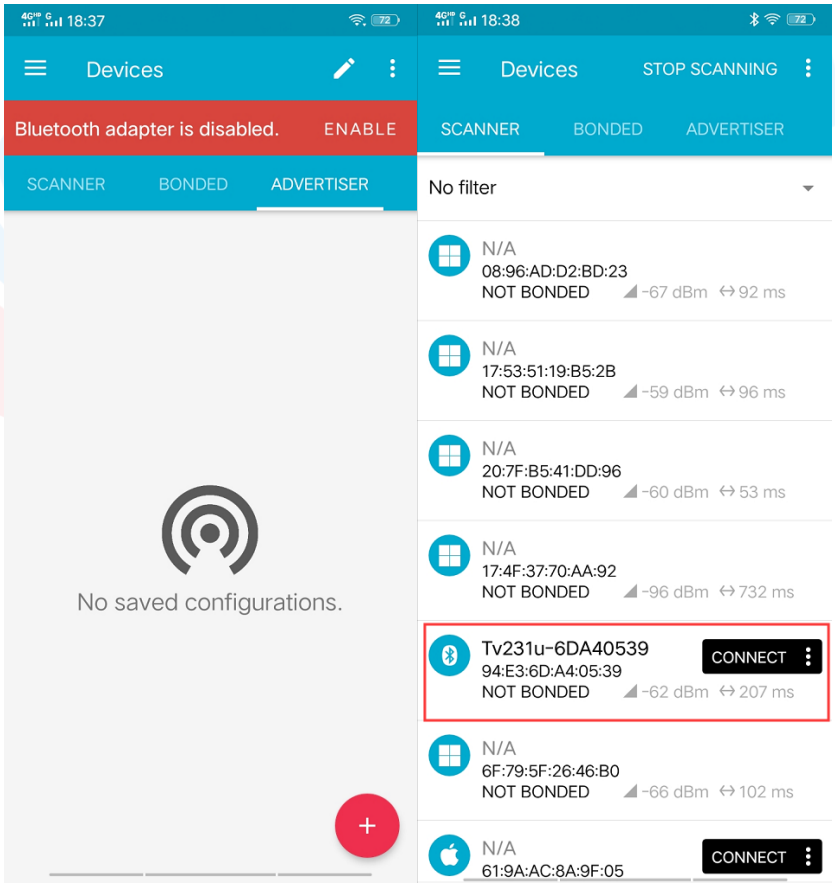

Figure 23. Bluetooth Device List

3. Successful connection of nRF Connect screen and the UART Assistant screen are shown as follows:

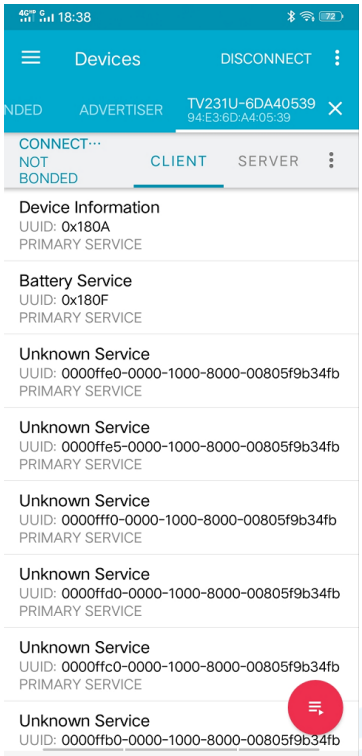

Figure 24. Successful Connection of nRF Connect Screen

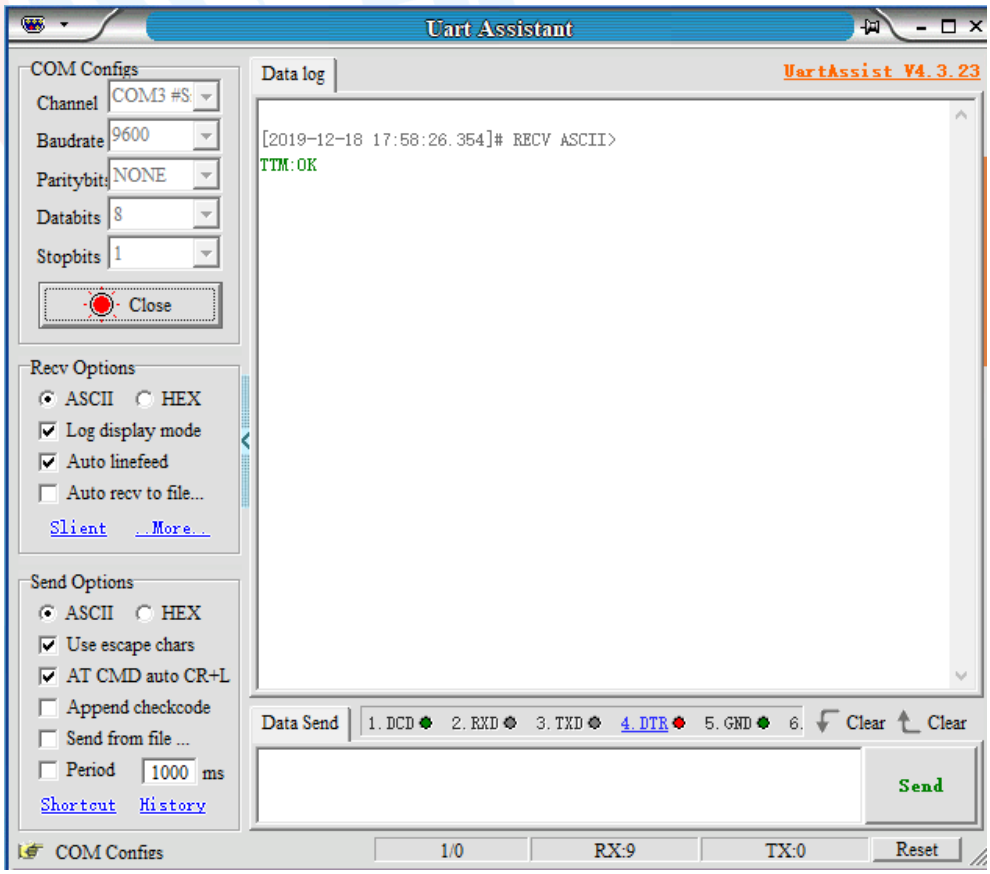

Figure 25. Successful Connection of UART Assistant Screen

4. Click the FFE9 channel in nRF Connect to write. Text mode: Text.

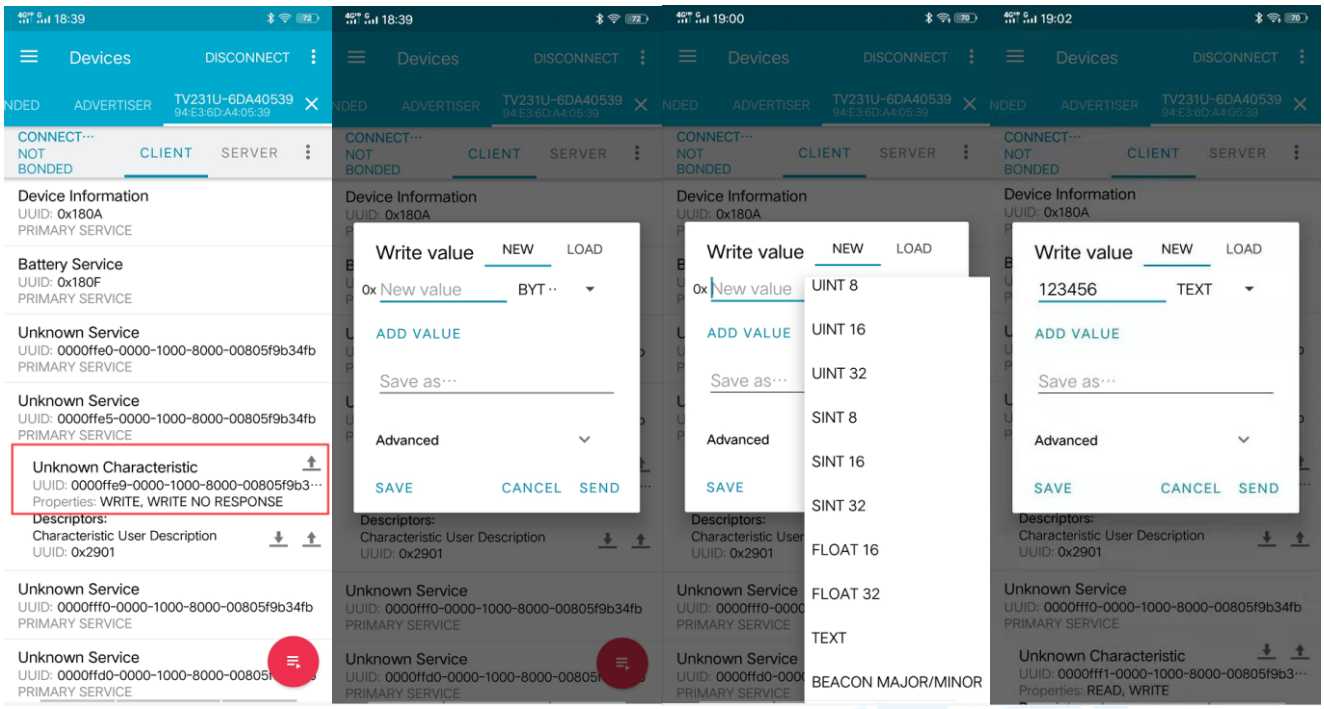

Figure 26. Write in FFE9 Channel

5. Then, UART Assistant will receive the data sent by APP:

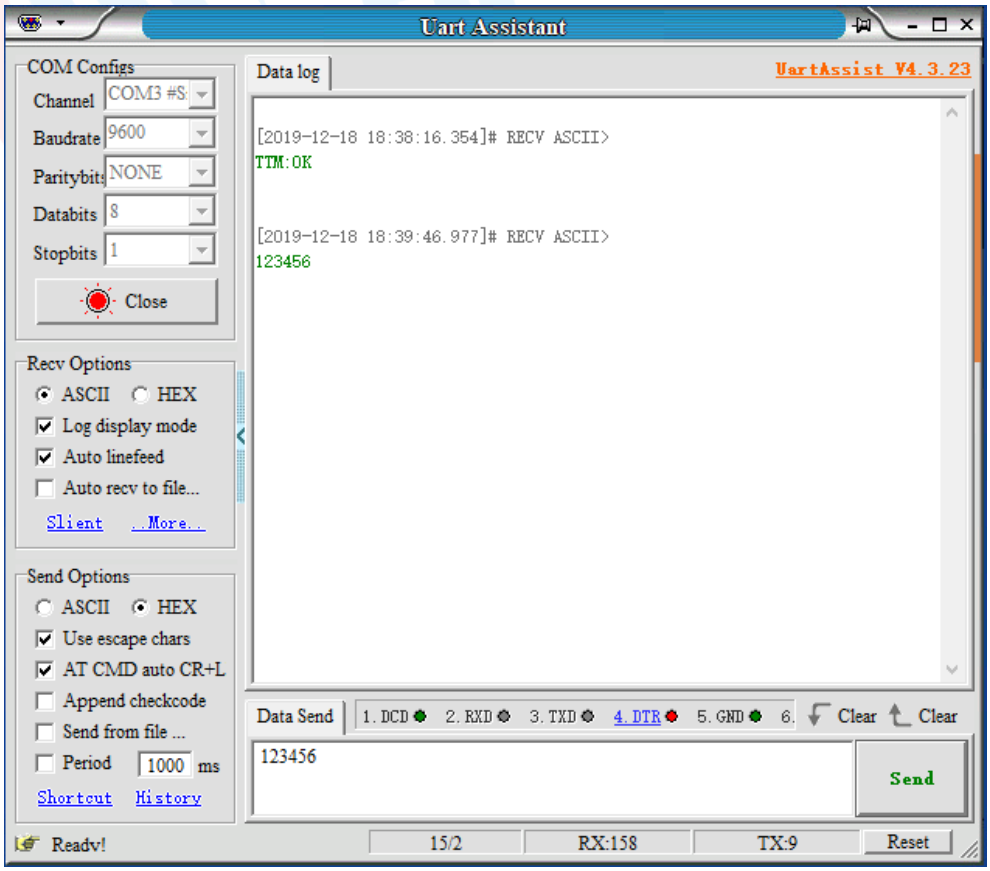

Figure 27. Successful Write

6. Click the FFE4 channel in nRF Connect to turn on Notification:

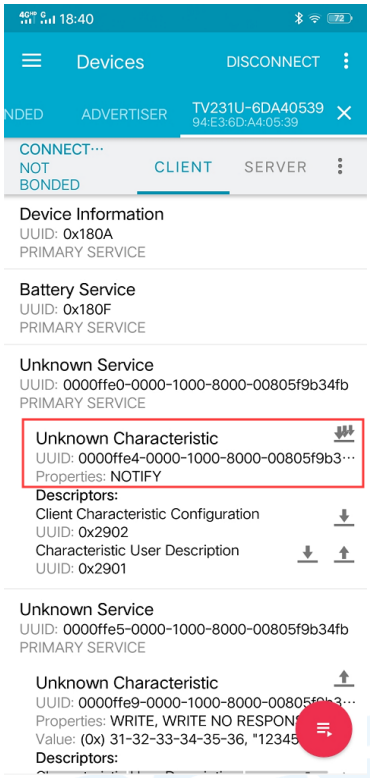

Figure 28. Write in FFE4

7. Write the string in UART Assistant and send:

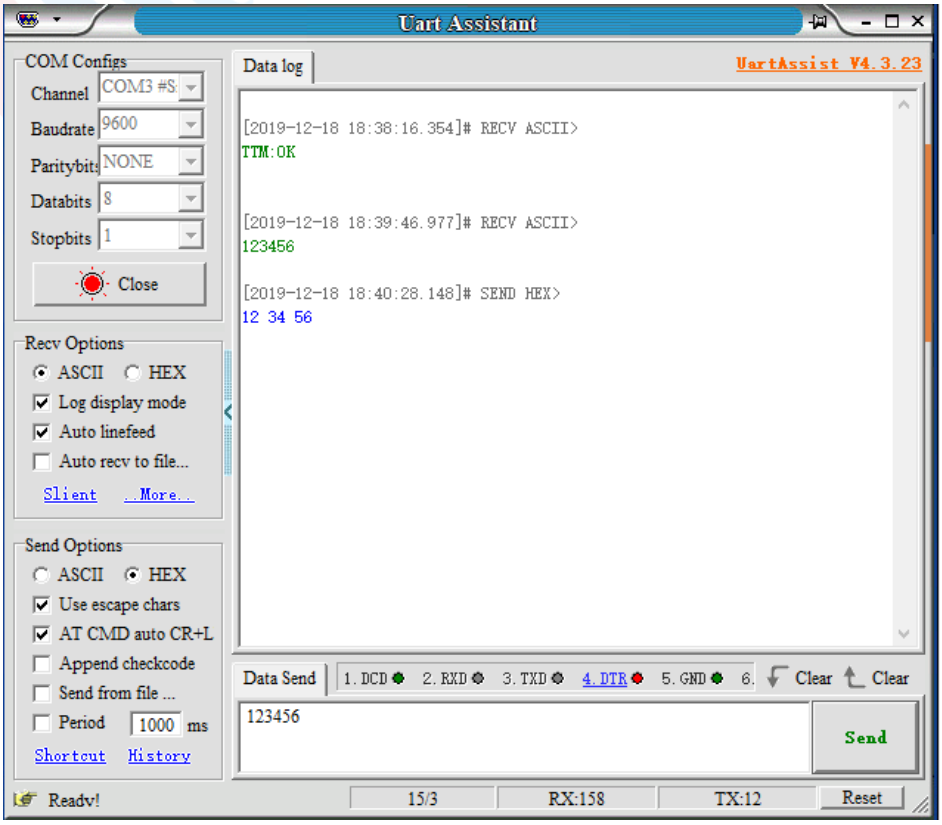

Figure 29. Send Data

8. nRF Connect will receive the data written in UART Assistant:

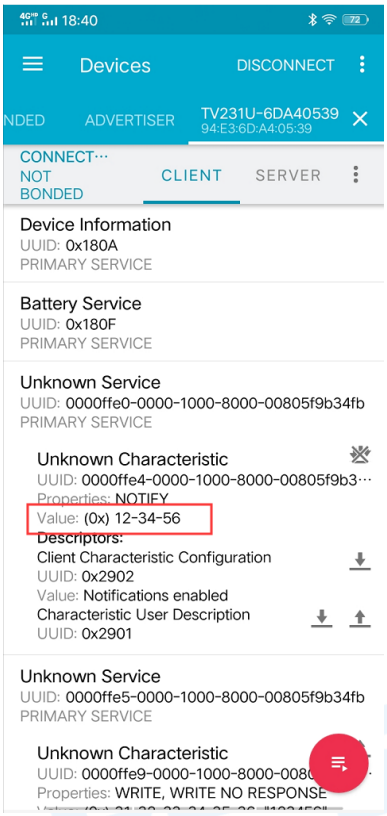

Figure 30. Successful Write

4 Trouble Shooting

4.1 Unsatisfactory Transmission Distance

1. When there is a linear communication obstacle, the communication distance will be correspondingly weakened. Temperature, humidity, and co-channel interference will lead to an increase in the communication packet loss rate. The performance of ground absorption and reflection of radio waves will be poor when the module is tested close to the ground.
2. Seawater has a strong ability to absorb radio waves, so the test results by the seaside are poor.
3. The signal attenuation will be very obvious if there is metal near the antenna or if the module is placed inside the metal shell.
4. The incorrect power register set or the high data rate in the open air may shorten the communication distance. The higher the data rate, the closer the distance.
5. The low voltage of the power supply is lower than the recommended value at ambient temperature, and the lower the voltage, the smaller the power is.
6. The unmatchable antennas and modules or the poor quality of antenna will affect the communication distance.

4.2 Vulnerable Module

1. Please ensure the supply voltage is between the recommended values. The module will be permanently damaged if the voltage exceeds the maximum value. Please ensure a stable power supply and no frequently fluctuating voltage.
2. Please ensure the anti-static installation and the electrostatic sensitivity of high-frequency devices.
3. Due to some humidity-sensitive components, please ensure suitable humidity during installation and application. If there is no special demand, it is not recommended to use at too high or too low temperature.

4.3 High Bit Error Rate

1. There are co-channel signal interferences nearby. It is recommended to be away from the interference sources or modify the frequency and channel to avoid interferences.
2. The unsatisfactory power supply may also cause garbled. It is necessary to ensure the power supply's reliability.
3. If the extension wire or feeder wire is of poor quality or too long, the bit error rate will be high.

5 Revision History

Date	Version No.	Description
2022.10.11	V1.0	The Initial version is released.

Note:

1. The document will be optimized and updated from time to time. Before using this document, please make sure it is the latest version.
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