



# RF TEST REPORT

**Applicant** Kizy Tracking SA

**FCC ID** 2AGPEWT2

**Product** Tracker

**Model** K-2

**Report No.** R1903A0135-R2

**Issue Date** April 26, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR 47 Part 22H (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Kai Xu

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## Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046	Refer to the Original
2	Effective Radiated Power	22.913(a)(5)	Refer to the Original
3	Occupied Bandwidth	2.1049	Refer to the Original
4	Band Edge Compliance	2.1051 / 22.917(a)	Refer to the Original
5	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	Refer to the Original
6	Frequency Stability	2.1055 / 22.355	Refer to the Original
7	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	Refer to the Original
8	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS
Note: PASS: The EUT complies with the essential requirements in the standard.			
FAIL: The EUT does not comply with the essential requirements in the standard.			
Date of Testing: April 26, 2019			

**K-2 (Report No: R1903A0135-R2) is a variant model of K-2 (Report No: RXA1712-0426RF01R2). Test values partial duplicated from Original for variant. GSM 850 was selected as the worst condition. There is only tested Radiates Spurious Emission of GSM 850 for variant in this report. The detailed product change description please refers to the ANNEX B.**



## 1. Test Laboratory

### 1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

### 1.2. Test facility

#### **CNAS (accreditation number: L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

#### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

#### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
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Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)



## 2. General Description of Equipment under Test

### Client Information

Applicant	Kizy Tracking SA
Applicant address	Maladiere 71c Neuchatel Switzerland 2002
Manufacturer	Xavi (Suzhou) Technologies CO., LTD.
Manufacturer address	No. 108# Huahong Rd., Wujiang , Suzhou , JiangSu Province, China

### General Information

EUT Description			
Model	K-2		
IMEI	/		
Hardware Version	WT2-N V0.2C		
Software Version	WT2_linux_350		
Power Supply	External Power Supply		
Antenna Type	Internal Antenna		
Antenna Gain	-4.00dBi		
Test Mode(s)	GSM 850: WCDMA Band V		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA)QPSK;		
Rated Power Supply Voltage	3.7V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.2V		
Extreme Temperature	Lowest: 0°C Highest: +55°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	WCDMA Band V	824 ~ 849	869 ~ 894
EUT Accessory			
USB Cable	32.5cm, shielded		
Battery	Manufacturer: Guangdong Power-Tech New Power Co.,Ltd. Model: PT50y3450 Power Rating: DC 3.7V, 900mAh, 3.33Wh		

Note: 1. The information of the EUT is declared by the manufacturer.



### 3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR47 Part 2 (2018)**

**FCC CFR 47 Part 22H (2018)**

**ANSI C63.26 (2015)**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**



## 4. Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation	
	GSM 850	WCDMA Band V
Radiates Spurious Emission	GSM	RMC



## 5. Test Case Results

### 5.1. Radiates Spurious Emission

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:  
Power(EIRP)=PMea- PAg - Pcl + Ga  
The measurement results are amend as described below:

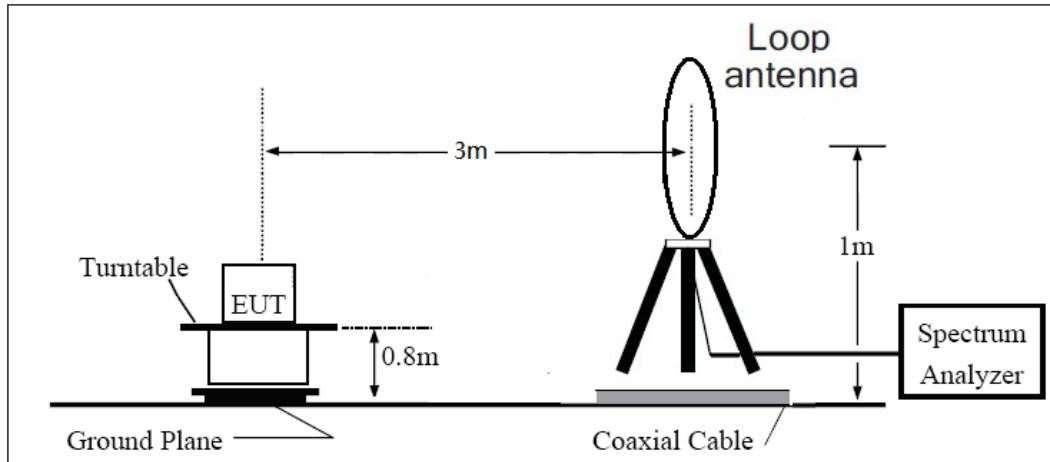
Power(EIRP)=PMea- Pcl + Ga

8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

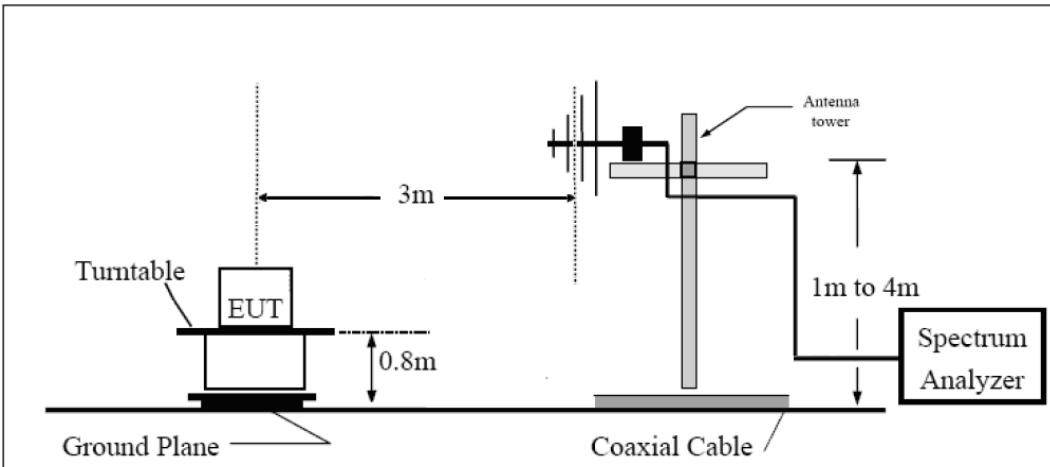
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

### Test setup

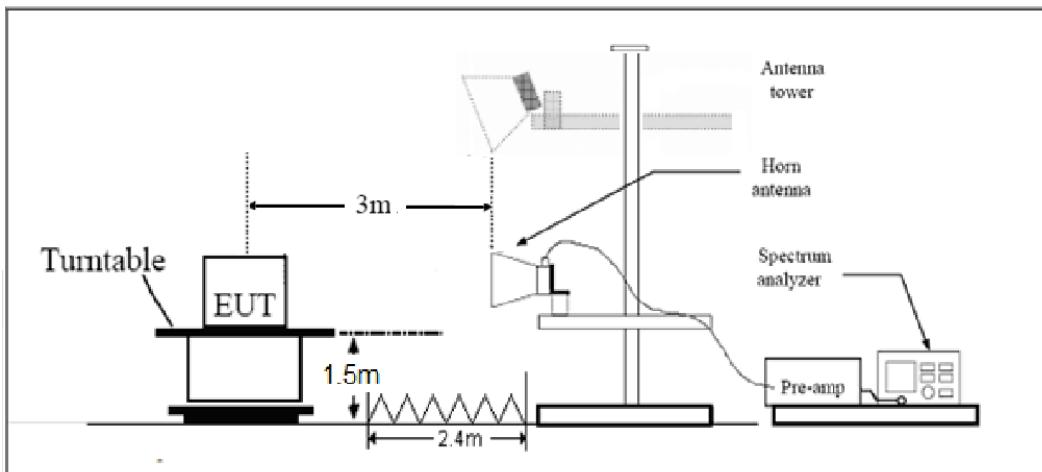
**9KHz ~ 30MHz**



**30MHz ~ 1GHz**



**Above 1GHz**



Note: Area side:2.4mX3.6m

### Limits

Rule Part 22.917(a) specifies that "The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB."

Limit	-13 dBm
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### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 3.55$  dB.

**Test Result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

GSM 850 CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1648.50	-48.09	2.00	10.15	Horizontal	-42.09	-13.00	29.09	225
3	2472.75	-38.12	2.51	11.35	Horizontal	-31.43	-13.00	18.43	90
4	3296.80	-58.75	4.20	10.85	Horizontal	-54.25	-13.00	41.25	135
5	4121.00	-51.31	5.20	11.35	Horizontal	-47.31	-13.00	34.31	90
6	4945.20	-54.02	5.50	11.95	Horizontal	-49.72	-13.00	36.72	315
7	5769.40	-57.99	5.70	13.55	Horizontal	-52.29	-13.00	39.29	225
8	6593.60	-52.78	6.30	13.75	Horizontal	-47.48	-13.00	34.48	180
9	7417.80	-53.20	6.80	13.85	Horizontal	-48.30	-13.00	35.30	270
10	8242.00	-54.34	6.90	14.25	Horizontal	-49.14	-13.00	36.14	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

GSM 850 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.20	-43.05	2.00	10.75	Horizontal	-36.45	-13.00	23.45	0
3	2509.80	-48.37	2.51	11.05	Horizontal	-41.98	-13.00	28.98	45
4	3346.40	-47.99	4.20	11.15	Horizontal	-43.19	-13.00	30.19	0
5	4183.00	-57.82	5.20	11.15	Horizontal	-54.02	-13.00	41.02	45
6	5019.60	-54.88	5.50	11.95	Horizontal	-50.58	-13.00	37.58	315
7	5856.20	-51.92	5.70	13.55	Horizontal	-46.22	-13.00	33.22	90
8	6692.80	-54.82	6.30	13.75	Horizontal	-49.52	-13.00	36.52	225
9	7529.40	-55.53	6.80	13.85	Horizontal	-50.63	-13.00	37.63	180
10	8366.00	-54.74	6.90	14.25	Horizontal	-49.54	-13.00	36.54	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



GSM 850 CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1697.60	-50.14	2.00	10.15	Horizontal	-44.14	-13.00	31.14	135
3	2546.40	-51.94	2.51	11.05	Horizontal	-45.55	-13.00	32.55	90
4	3395.20	-39.72	4.20	11.15	Horizontal	-34.92	-13.00	21.92	315
5	4244.00	-51.52	5.20	11.15	Horizontal	-47.72	-13.00	34.72	90
6	5092.80	-52.20	5.50	11.95	Horizontal	-47.90	-13.00	34.90	225
7	5941.60	-51.91	5.70	13.55	Horizontal	-46.21	-13.00	33.21	180
8	6790.40	-49.77	6.30	13.75	Horizontal	-44.47	-13.00	31.47	45
9	7639.20	-55.83	6.80	13.85	Horizontal	-50.93	-13.00	37.93	180
10	8488.00	-55.90	6.90	14.25	Horizontal	-50.70	-13.00	37.70	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## 6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preampflier	R&S	SCU18	102327	2018-05-20	2019-05-19
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-21	2019-05-20
RF Cable	Agilent	SMA 15cm	0001	2019-03-15	2019-06-14
Software	R&S	EMC32	9.26.0	/	/

\*\*\*\*\*END OF REPORT\*\*\*\*\*

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance





b:USB Cable

**Picture 1 EUT and Accessory**

## A.2 Test Setup



30MHz ~ 1GHz



Above 1GHz

Picture 2 Radiated Spurious Emissions Test setup

## ANNEX B: Product Change Description

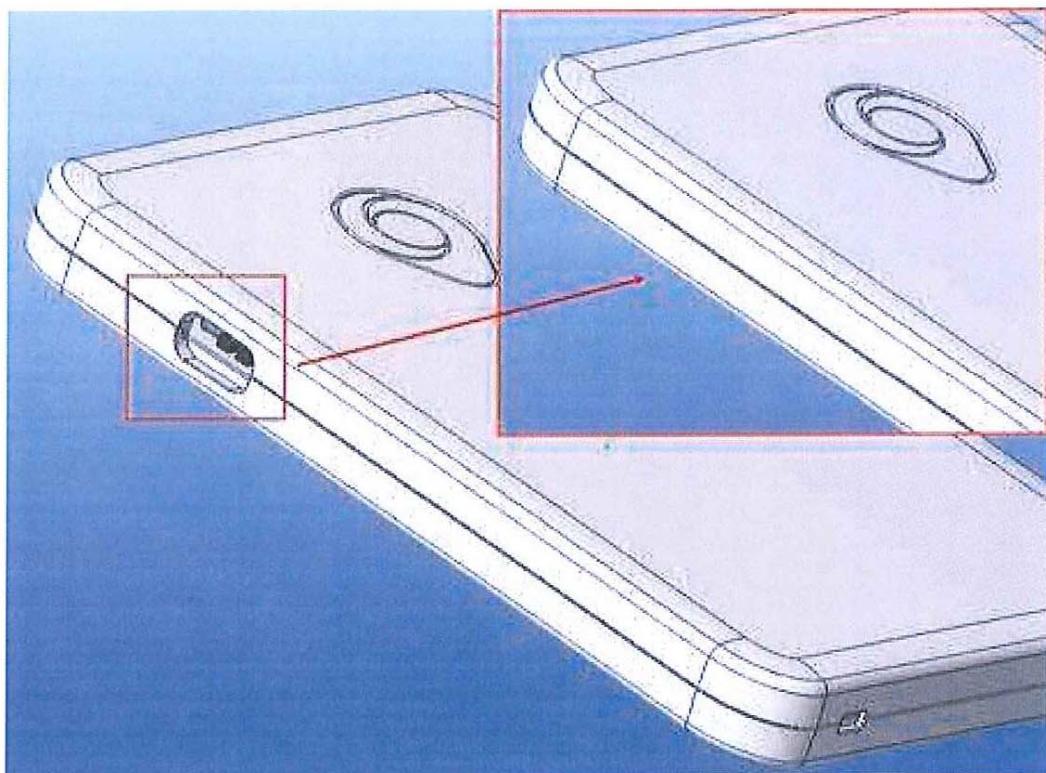
Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

### K-2 Difference statement

K-2 modified:

1. Appearance change:

There are no changes in the material, only the appearance changes: as shown below



## Kizy Tracking SA

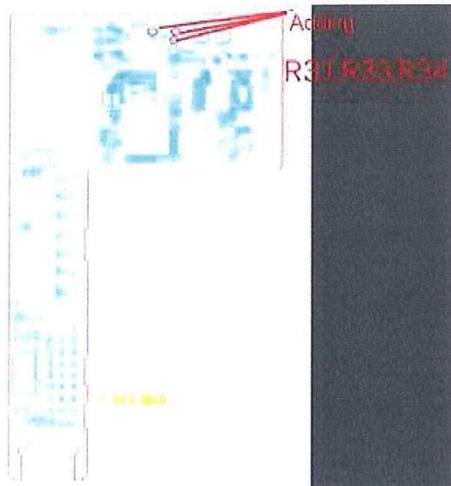
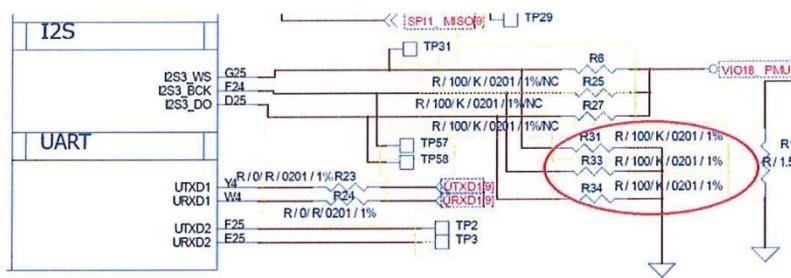
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

## 2. Modified PCBA(Modified K-2 For 0.2C PCB)

The following modifications and RF signals have no effect, that is, U6 (motion sensing chip) is removed, R18 is removed, D3 is removed, R32 & R24 is  $0\Omega$ , and R35, R36, R37, R38 are added, and R31, R33, R34, R6, R25 are added, R27 to confirm the hardware version.

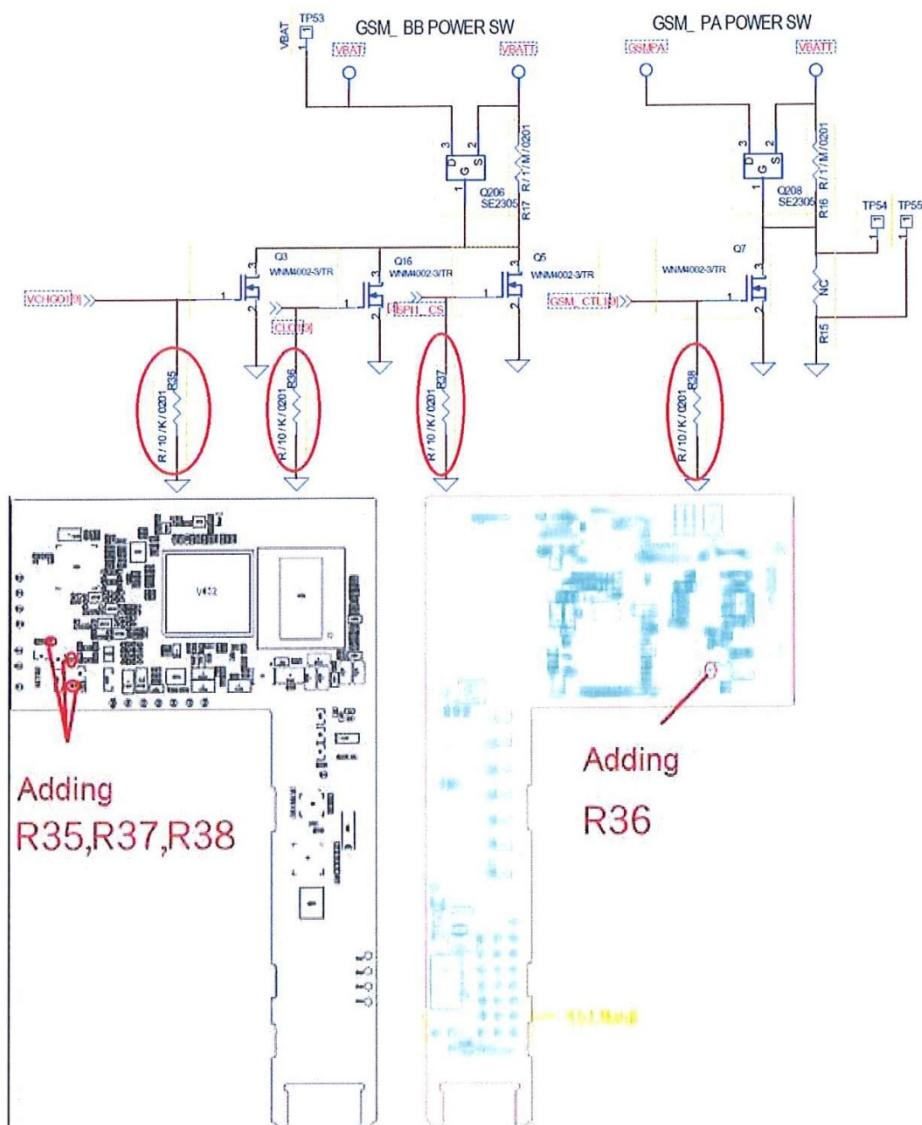
1. Added 3 resistors to confirm the version,R31,R33,R34,

			Add pull low resistance to check HW Ver. MTK U402 I2S3_WS(G25), I2S3_BCK(F24),I2S3_DO(D25), PCB version,PULL HIGH100K $\Omega$ ,VIO18_PMU, with PULL LOW 100K $\Omega$ to GND Actually the pieces are: U402_I2S3_WS(G25),PULL LOW U402_I2S3_BCK(F24),PULL LOW U402_I2S3_DO(D25),PULL LOW
1	WT2N	Hardware Ver. Control	



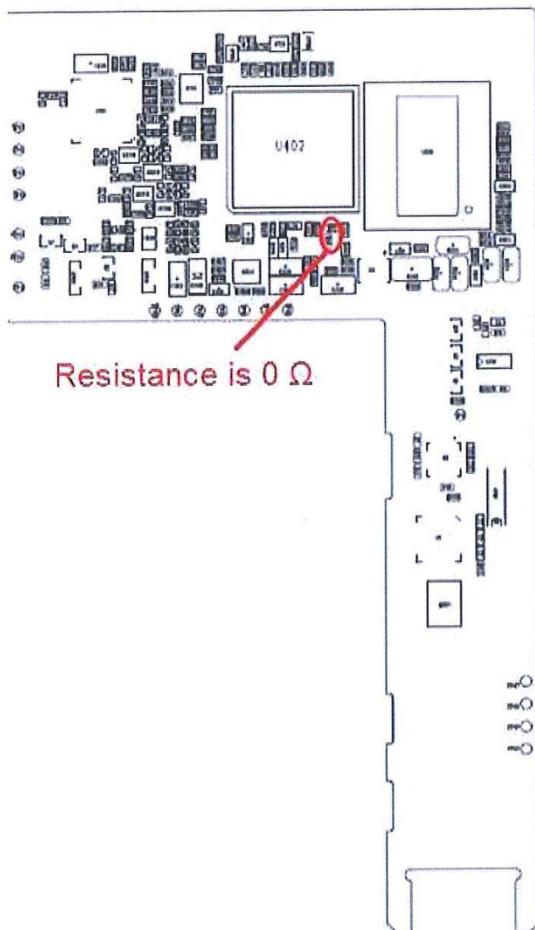
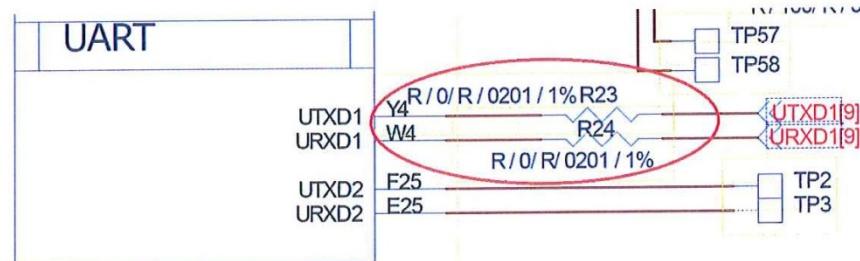
Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

2	WT2N	Power Leakage When Off Switch	Add pull low resistance to shut down VBATT power Because it cannot be completely shut down, it must be 1.Q3' s G PIN parallel 10K $\Omega$ to GND 2.Q160' s G PIN parallel 10K $\Omega$ to GND 3.Q5' s G PIN parallel 10K $\Omega$ to GND 4.Q7' s G PIN parallel 10K $\Omega$ to GND
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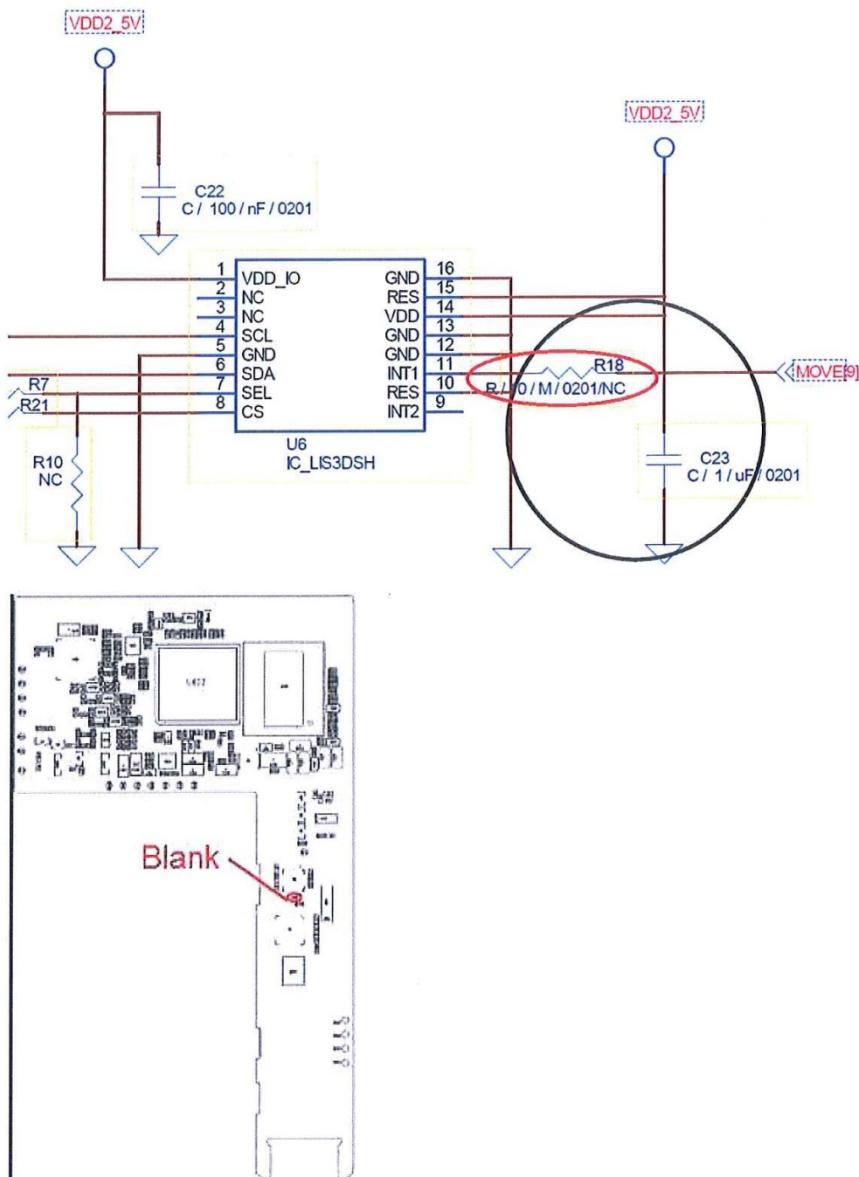
Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

3	WT2N	UART Slew Rate	Resistance value change to $0\Omega$ For UART R23 and R24 Change the resistance to $0\Omega$
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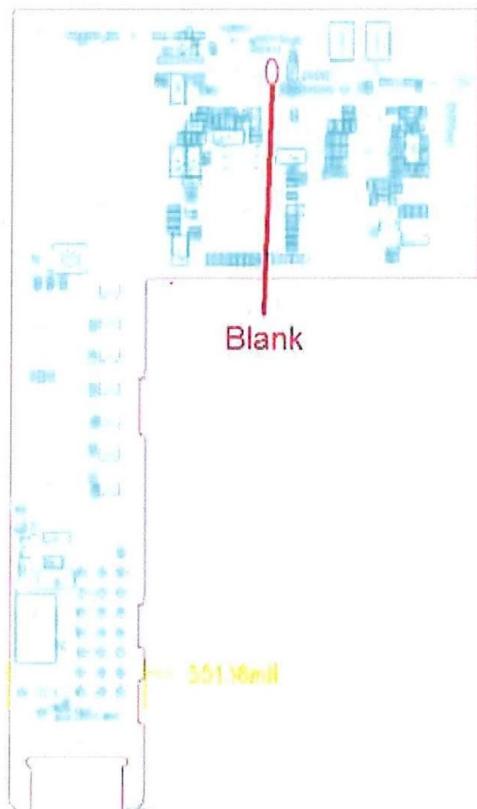
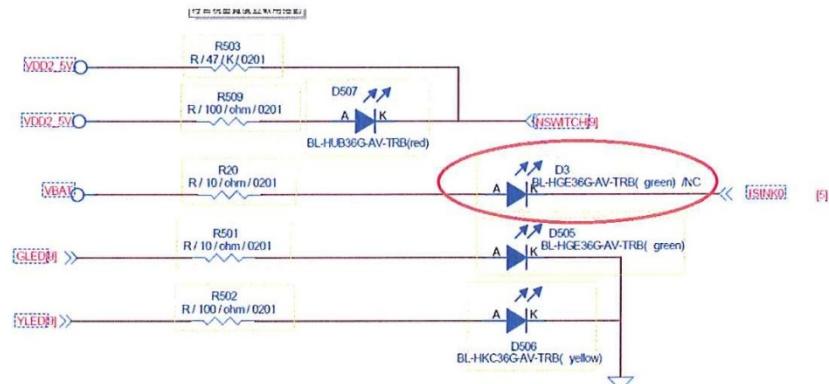
Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

4	WT2N	Accelerometer malfunction	Take off R18
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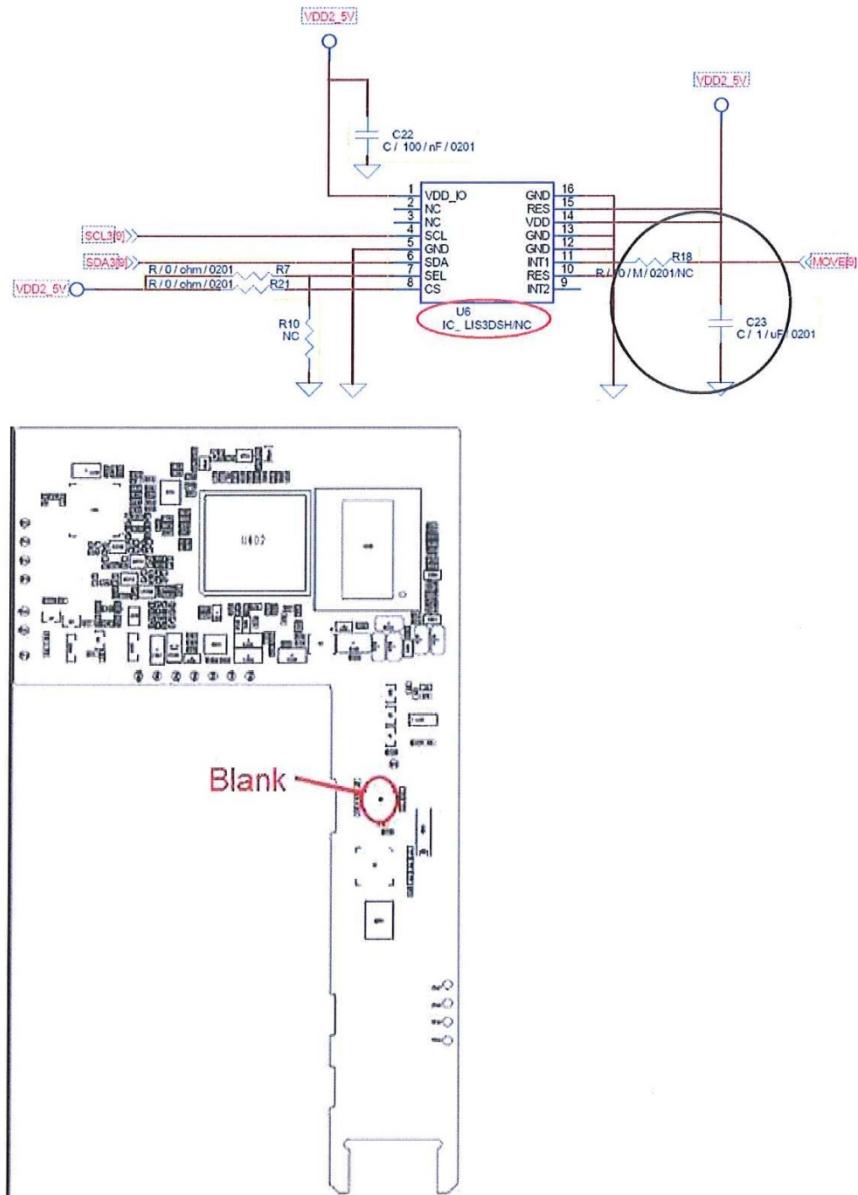
Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

5	WT2N	4th LED removed	Take off D3
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rue de la Maladière 71C, 2000 Neuchatel, Switzerland

6	WT2N	Accelerometer removed	Take off U6
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Kizy Tracking SA  
rue de la Maladière 71C, 2000 Neuchatel, Switzerland

RF: No Change  
HW: 6 items As above  
SW: No Change

Company Name: Kizy Tracking SA

Signature: *Bell Chang*

Date: 2019/03/22