



REPORT No.: SZ24070051S01

RF EXPOSURE EVALUATION REPORT

APPLICANT : FJ Dynamics Co.,Ltd.
PRODUCT NAME : FJDynamics AG1 Guidance System
MODEL NAME : MG100;AG1
BRAND NAME : FJDynamics
FCC ID : 2A2LL-MG100
STANDARD(S) : FCC 47 CFR Part 2 (2.1091)
RECEIPT DATE : 2024-07-09
TEST DATE : 2024-07-30
ISSUE DATE : 2024-09-29



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Change History		
Version	Date	Reason for Change
1.0	2024-09-29	First edition



1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	FJ Dynamics Co.,Ltd.
Applicant Address:	Floor 21, Das Tower, No. 28, 1st South Keji Road, High-tech Zone, Yuehai Subdistrict, Nanshan District, Shenzhen, China
Manufacturer:	FJ Dynamics Co.,Ltd.
Manufacturer Address:	Floor 21, Das Tower, No. 28, 1st South Keji Road, High-tech Zone, Yuehai Subdistrict, Nanshan District, Shenzhen, China

1.2 Equipment under Test (EUT) Description

Product Name:	FJDynamics AG1 Guidance System
EUT No.:	4#
Hardware Version:	F30-MB-V1.1
Software Version:	TP1A.220624.014release-keys
Frequency Bands:	GSM 850: 824 MHz ~ 849 MHz GSM 1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2555 MHz ~ 2655 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5.2GHz: 5180 MHz ~ 5240 MHz WLAN 5.8GHz: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Modulation Mode:	GSM/GPRS: GMSK EDGE: 8PSK WCDMA: QPSK,16QAM LTE: QPSK,16QAM 802.11b: DSSS 802.11g/n-HT20/HT40/ac-VHT20/40/80: OFDM BR+EDR: GFSK (1Mbps), $\pi/4$ -DQPSK (2Mbps), 8-DPSK (3Mbps) Bluetooth LE: GFSK (1Mbps, 2Mbps)
Antenna Type:	WWAN: FPC Antenna



	WLAN: FPC Antenna Bluetooth: FPC Antenna	
Antenna Gain:	Frequency Bands	Antenna Gain (dBi)
	GSM 850	1.50
	GSM 1900	1.50
	WCDMA Band II	1.50
	WCDMA Band V	1.5
	LTE Band 5	-1.67
	LTE Band 7	1.27
	LTE Band 38	1.59
	LTE Band 41	-1.54
	WLAN 2.4GHz	2.27
	WLAN 5.2GHz	1.96
	WLAN 5.8GHz	1.59
	Bluetooth	2.27

Note:

1. There are two models in this report, MG100 and AG1, both of them are different from model names.
2. When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.



1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method determination /Remark
FCC 47 CFR Part 2 (2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	No deviation
KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note 1: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		



2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeters separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz* = Plane-wave equivalent power density



3. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial No./ SW Version	Calibration	
				Last Cal.	Due Date
Anritsu	Network Emulator	MT8820C	6201091290	2024.01.25	2025.01.24

Note:

The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration. For the maximum power, it was established between EUT and Base Station with following setting:

1. For GPRS testing, the MS TX Level was set 5 for low frequency bands and 0 for high frequency bands. For EDGE testing, the MS TX Level was set 8 for low frequency bands and 2 for high frequency bands.
2. For WCDMA testing, Power Ctrl Mode = All Up bits, and the transmitted maximum output power was recorded.
3. For LTE testing, the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and different configurations which are requested to be reported to FCC.

4. Maximum Average Power Summary

➤ Maximum Average Power

Wireless Mode	Channel	Frequency (MHz)	Max. Average Power (dBm)	Tune-up Limit (dBm)
GSM 850	CH 189	836.4	24.61	25.50
GSM 1900	CH 661	1880	21.33	22.24
WCDMA Band II	CH 9400	1880	22.64	23.50
WCDMA Band V	CH 4182	836.4	22.62	23.50
LTE Band 5	CH 20525	836.5	23.19	24.00
LTE Band 7	CH 21100	2535	23.22	24.00
LTE Band 38	CH 3800	2595	23.30	24.00
LTE Band 41	CH 40740	2605	23.31	24.00
WLAN 2.4GHz	CH 6	2437	21.53	22.00
WLAN 5.2GHz	CH 38	5190	14.85	15.50
WLAN 5.8GHz	CH 149	5745	11.34	12.00
Bluetooth	CH 00	2402	6.30	7.00

Note:

- The output power of WLAN & Bluetooth is derived from the report SZ24070051W01/02/03/04.
- The output power of GSM/WCDMA/LTE was recorded in annex B of this report.
- For GSM, the average power should be scaled with the correct factor:

Remark:

- The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method is shown as below:

The duty cycle "x" of different time slots as below:

1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8

Based on the calculation formula:

Frame-averaged power = Burst averaged power + 10 log (x)

So,

Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot) – 9.03

Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots) – 6.02

Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots) – 4.26

Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01

- CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

No. of Slots:	Slot 1	Slot 2	Slot 3	Slot 4
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Slot Consignation:	1Up 4Down	2Up 3Down	3Up 2Down	4Up 1Down
Duty Cycle:	1:8.3	1:4.15	1:2.77	1:2.08
Correct Factor:	-9.03dB	-6.02dB	-4.26dB	-3.01dB

5. RF Exposure Assessment

➤ Standalone Transmission Assessment

<Standalone Antenna Transmission Assessment>

Bands	Frequency (MHz)	Tune-up Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	PD (mW/cm ²)	Limit Value (mW/cm ²)
GSM 850	836.4	25.50	1.50	501.19	0.100	0.558
GSM 1900	1880	22.24	1.50	236.59	0.047	1.0
WCDMA Band II	1880	23.50	1.50	316.23	0.063	1.0
WCDMA Band V	836.4	23.50	1.50	316.23	0.063	0.558
LTE Band 5	836.5	24.00	-1.67	171.00	0.034	0.558
LTE Band 7	2535	24.00	1.27	336.51	0.067	1.0
LTE Band 38	2595	24.00	1.59	362.24	0.072	1.0
LTE Band 41	2605	24.00	-1.54	176.20	0.035	1.0
WLAN 2.4GHz	2437	22.00	2.27	267.30	0.053	1.0
WLAN 5.2GHz	5190	15.50	1.96	55.72	0.011	1.0
WLAN 5.8GHz	5745	12.00	1.59	22.86	0.005	1.0
Bluetooth	2402	7.00	2.27	8.45	0.002	1.0

Note:

1. According to KDB 447498, MPE assessment is based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

$$S = PG/4\pi R^2$$

Where: S= Power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune-up power (in appropriate units, e.g. dBm)

G = numeric gain of the antenna (in appropriate units, e.g. dBi)

R = Separation distance to the centre of radiation of the antenna (20cm)



➤ **Simultaneous Transmission Assessment**

Multi-Band Simultaneous Transmission Consideration

Simultaneous Transmission Consideration	Position	Applicable Combination
	Body	WWAN+WLAN 2.4GHz+Bluetooth
		WWAN+WLAN 5GHz+Bluetooth

1. This device contains transmitters that may operate simultaneously, therefore simultaneous transmission analysis is required.
2. The worst condition for WWAN & WLAN 2.4GHz/5GHz & Bluetooth will be calculated for transmitting simultaneously.

Formula: $\text{Result} = \text{Power density}_1 / \text{limit}_1 + \text{Power density}_2 / \text{limit}_2 + \text{Power density}_3 / \text{limit}_3 < 1$.

Transmission Bands	Power Density/ SAR	Limit	Simultaneous Transmission Result
WWAN	0.100	0.558	0.234
WLAN 2.4GHz	0.053	1.0	
Bluetooth	0.002	1.0	

Transmission Bands	Power Density/ SAR	Limit	Simultaneous Transmission Result
WWAN	0.100	0.558	0.192
WLAN 5GHz	0.011	1.0	
Bluetooth	0.002	1.0	

➤ **Conclusion**

According to FCC 47 CFR Part 2 (2.1091), this device complies with human exposure basic restrictions.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

Note:

The main report is end here and the other Annex B will be submitted separately.

_____ END OF REPORT _____