



# TEST REPORT

**APPLICANT** : Bullitt Group  
**PRODUCT NAME** : 4G Mobile Phone  
**MODEL NAME** : S62  
**BRAND NAME** : CAT  
**FCC ID** : ZL5S62  
**STANDARD(S)** : 47 CFR Part 15 Subpart C  
**RECEIPT DATE** : 2021-06-04  
**TEST DATE** : 2021-07-23  
**ISSUE DATE** : 2021-08-20

Edited by: Zeng Xiaoying  
Zeng Xiaoying (Rapporteur)

Approved by: Shen Junsheng  
Shen Junsheng (Supervisor)

**NOTE:** This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.





# DIRECTORY

- 1. Technical Information ..... 3
  - 1.1. Applicant and Manufacturer Information ..... 3
  - 1.2. Equipment Under Test (EUT) Description ..... 3
  - 1.3. The Channel Number and Frequency ..... 5
  - 1.4. Test Standards and Results ..... 6
  - 1.5. Environmental Conditions ..... 6
- 2. 47 CFR Part 15C Requirements ..... 7
  - 2.1. Radiated Emission ..... 7
- Annex A Test Uncertainty ..... 12
- Annex B Testing Laboratory Information ..... 13

Change History		
Version	Date	Reason for change
1.0	2021-08-20	First edition



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Bullitt Group
<b>Applicant Address:</b>	One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom
<b>Manufacturer:</b>	Bullitt Group
<b>Manufacturer Address:</b>	One Valpy, Valpy Street, Reading, Berkshire, RG1 1AR, United Kingdom

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	4G Mobile Phone	
<b>Sample No.:</b>	1#	
<b>Hardware Version:</b>	Q190_V1	
<b>Software Version:</b>	LTE_S02111.10_N_S62_0	
<b>Modulation Technology:</b>	DSSS, OFDM	
<b>Modulation Type:</b>	Refer to section1.3	
<b>Operating Frequency Range:</b>	802.11b/g/ n (HT20): 2412MHz–2462MHz 802.11n (HT40): 2422MHz–2452MHz	
<b>Antenna Type:</b>	PIFA Antenna	
<b>Antenna Gain:</b>	0.21dBi	
<b>Accessory Information:</b>	Battery	
	<b>Brand Name:</b>	Gaoyuan Battery
	<b>Model No.:</b>	XQ6602G
	<b>Serial No.:</b>	N/A
	<b>Capacity:</b>	4000mAh
	<b>Rated Voltage:</b>	3.8V
	<b>Charge Limit:</b>	4.35V
	<b>Manufacturer:</b>	Hunan Gaoyuan Battery Co., Ltd.



<b>Accessory Information:</b>	AC Adapter 1	
	Brand Name:	AOHAI
	Model No.:	A138-120150C-US1
	Serial No.:	N/A
	Rated Output:	5V=3A, 9V=2A, 12V=1.5A 3.3-5.9V=3A, 3.3-11V=2A
	Rated Input:	100-240V~50/60Hz, 0.5A
	Manufacturer:	Jiangxi Jian Aohai Technology Co.,Ltd.
	AC Adapter 2	
	Brand Name:	N/A
	Model No.:	ZSS-018U120150
	Serial No.:	N/A
	Rated Output:	5V=3A, 9V=2A, 12V=1.5A 3.3-5.9V=3A, 3.3-11V=2A
	Rated Input:	100-240V~50/60Hz, 0.5A
	Manufacturer:	Zhuzhou Zopose Technology Co., Ltd

**Note 1:** This is a variant report to request a Class II Permissive change for the original report (Report No.: XM20070009W06, FCC ID: ZL5S62) which issued on Feb 19, 2021 by XIAMEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

Based on the similarity between before, modify the antenna and add an adapter. Antenna optimization, antenna pattern, antenna matching and antenna gain are different. The antenna type remains unchanged. Due to the above changes, we have evaluated and retested worst case of radiated emissions, the test results are better than before, all other test items are no need to be retested. We only recorded the worse case of radiated emissions in this report.

**Note 2:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



### 1.3. The Channel Number and Frequency

Test Mode	Channel	Frequency (MHz)	Channel	Frequency (MHz)
802.11b/g/ n (HT20)	<b>1</b>	<b>2412</b>	8	2447
	2	2417	9	2452
	3	2422	10	2457
	4	2427	<b>11</b>	<b>2462</b>
	5	2432		
	<b>6</b>	<b>2437</b>		
	7	2442		
Test Mode	Channel	Frequency (MHz)	Channel	Frequency (MHz)
802.11n (HT40)	<b>3</b>	<b>2422</b>	8	2447
	4	2427	<b>9</b>	<b>2452</b>
	5	2432		
	<b>6</b>	<b>2437</b>		
	7	2442		

**Note 1:** The black bold channels were selected for test.



## 1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
1	15.209, 15.247(d)	Radiated Emission	Jul 23, 2021	Lin Jiayong	PASS	No deviation

**Note 1:** The test results of all test items please refer to the original test report (Report No.: XM20070009W06, FCC ID: ZL5S62) which issued on Feb 19, 2021 by XIAMEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

**Note 2:** 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.

**Note 3:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

## 1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106



## 2. 47 CFR Part 15C Requirements

### 2.1. Radiated Emission

#### 2.1.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

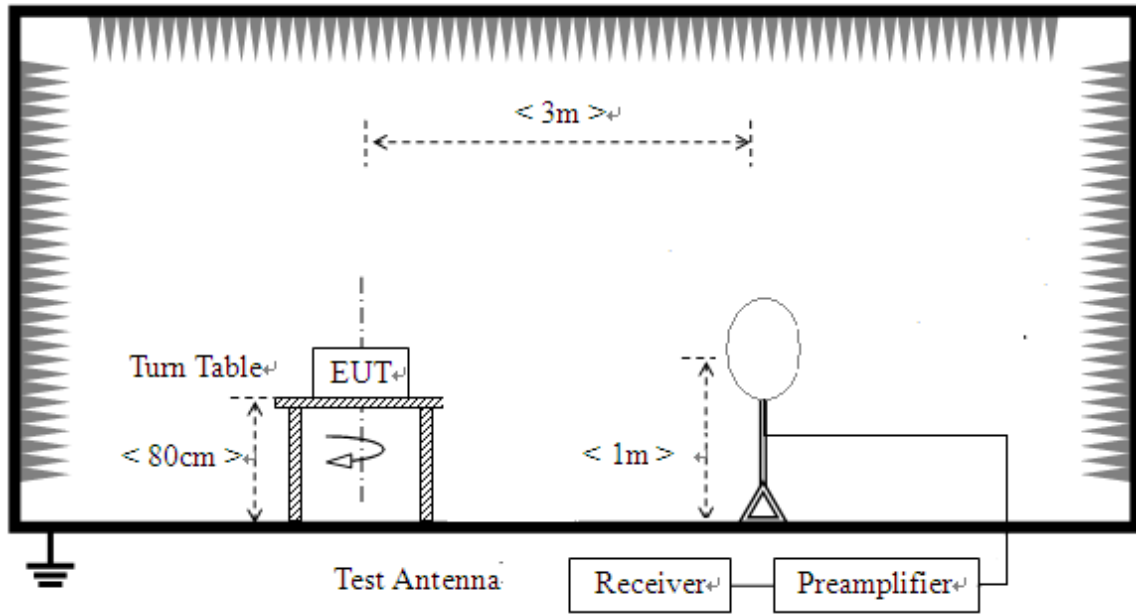
**Note1:** For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

**Note2:** For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK). In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).

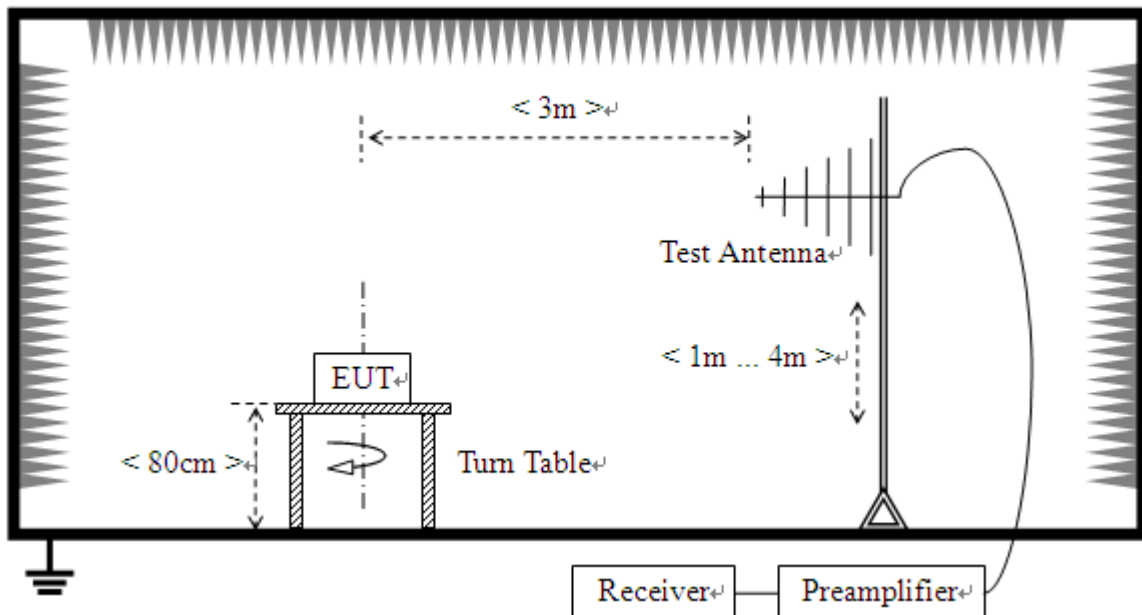
### 2.1.2. Test Description

#### Test Setup:

- 1) For radiated emissions from 9kHz to 30MHz

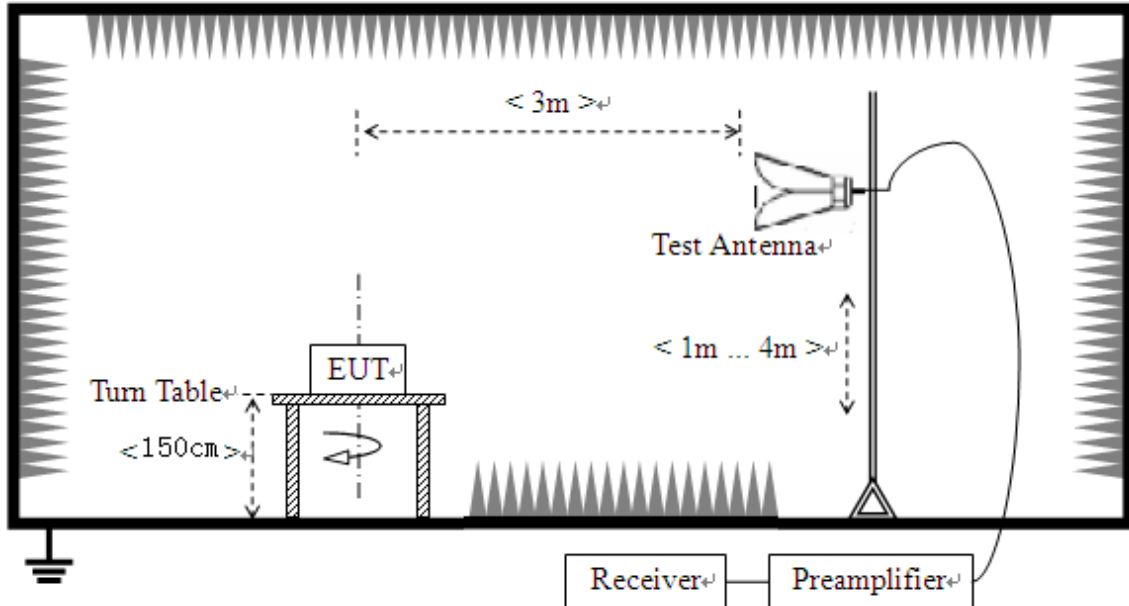


- 2) For radiated emissions from 30MHz to 1GHz





3) For radiated emissions above 1GHz



The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.



### 2.1.3. Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V/m]} = U_R + A_T + A_{\text{Factor}} \text{ [dB]}; A_T = L_{\text{Cable loss}} \text{ [dB]} - G_{\text{preamp}} \text{ [dB]}$$

$A_T$ : Total correction Factor except Antenna

$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

During the test, the total correction Factor  $A_T$  and  $A_{\text{Factor}}$  were built in test software.

**Note1:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

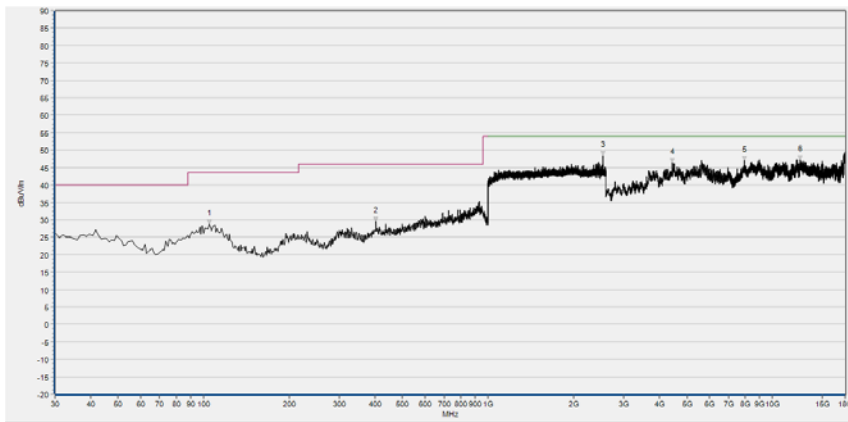
**Note2:** For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**Note3:** For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.



**802.11b Mode**

Plot for Channel 1



Fre. (MHz)	PK (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
104.690	28.74	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
403.450	29.48	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2527.467	48.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4444.920	46.27	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
7968.440	46.90	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12496.040	47.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



## Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Radiated Emission	$\pm 2.95\text{dB}$

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$



## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Laboratory Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Laboratory Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

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

### 3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



#### 4. Test Equipments Utilized

##### Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2021.07.16	2022.07.15
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2019.02.14	2022.02.13
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2022.07.25
Test Antenna – Horn	BBHA9170 #774	BBHA9170	Schwarzbeck	2019.07.26	2022.07.25
Coaxial Cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial Cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial Cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
Coaxial Cable (N male) (30MHz-40GHz)	CB05	EMC05	Morlab	N/A	N/A
1-18GHz pre-Amplifier	61171/61172	S020180L32 03	Tonscend	2021.07.16	2022.07.15
18-26.5GHz pre-Amplifier	46732	S10M100L38 02	Tonscend	2021.07.16	2022.07.15
26-40GHz pre-Amplifier	56774	S40M400L40 02	Tonscend	2021.07.16	2022.07.15
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2021.07.16	2022.07.15
Anechoic Chamber	N/A	9m*6m*6m	CRT	2020.01.06	2023.01.05

————— END OF REPORT —————