FCC Test Report

Report No.:AGC00408180401FE02

FCC ID	:	ZL5B30
APPLICATION PURPOSE	:	Class II Permissive Change
PRODUCT DESIGNATION	:	3G Feature Phone
BRAND NAME	:	CAT
MODEL NAME	:	B30
CLIENT	:	Bullitt Group
DATE OF ISSUE	:	July 11, 2018
STANDARD(S)	:	FCC Part 22H & 24E Rules
REPORT VERSION	:	V1.0

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd.*

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 11, 2018	Valid	Class II Permissive Change

Note: In this report, only changed the adapter, software and the GSM/WCDMA antenna. The antenna gain is changed. The information of test results is almost identical to the report number-AGC00639150501FE02; All the test cases can be referred to the original test report. Based on the report, only the ERP/EIRP and the worst cases of Radiated Spurious Emission were verified for the differences.

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1.VERIFICATION OF COMPLIANCE

Applicant	Bullitt Group
Address	No. 4, The Aquarium, King Street, Reading, United Kingdom, RG1 2AN
Manufacturer	Leadsky International Development Co., Ltd.
Address	4F,BLDG B,HUAFENG INDUSTRIAL PAPK,GUSHU,XIXIANG, BAO'AN DISTRICT,SHENZHEN,CHINA
Product Designation	3G Feature Phone
Brand Name	CAT
Test Model	B30
Date of test	May, 18, 2018~June 11, 2018
Deviation	None
Condition of Test Sample	Normal

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance(Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA-603-E-2016. The sample tested as described in this report is in compliance with the FCC Rules Part 22H and 24E.

The test results of this report relate only to the tested sample identified in this report.

Tested By	Donjon Huang(Huang Dongyang)	June 11, 2018
Reviewed By	Bart Xie(Xie Xiaobin)	July 11, 2018
Approved By	Forrest Lei(Lei Yonggang) Authorized Officer	July 11, 2018

2. GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	3G Feature Phone
Hardware version:	S721M_MB_V1.0
Software version:	B30_L02_850_1900_2018_07_17_V2.0N
Frequency Bands:	☒GSM 850 ☒PCS1900 (U.S. Bands) ☒GSM 900 ☒DCS 1800 (Non-U.S. Bands) ☒UMTS FDD Band II ☐UMTS FDD Band IV ☒UMTS FDD Band V (U.S. Bands) ☐UMTS FDD Band I ☐UMTS FDD Band VIII (Non-U.S. Bands)
Antenna Type	PIFA Antenna
Type of Modulation	GSM / GPRS : GMSK WCDMA : QPSK
Antenna gain(GSM):	-1.2dBi(GSM/WCDMA 850), -1.0dBi (GSM/WCDMA 1900)
Power Supply:	DC 3.7V by battery
Battery parameter:	DC3.7V/1000mAh
Dual SIM Card	WCDMA / GSM Card Slot
GPRS Class	12
Extreme Vol. Limits:	DC3.4 V to 4.2V (Normal: DC3.7V)
Extreme Temp. Tolerance	-10℃ to +50℃
*** Note: 1. The High Voltage DC4.2V and Low Voltage DC3.4V were declared by manufacturer 2. The EUT couldn't be operating normally with higher or lower voltage.	

***** Note:**1.The maximum power levels are GSM for MCS-4：GMSK link, and RMC 12.2kbps mode for WCDMA band V, WCDMA II only these modes were used for all tests.

2. We found out the test mode with the highest power level after we analyze all the data rates. So we chose worst case as a representative.

2.2RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: ZL5B30**, filing to comply with the FCC Part 22H&24E requirements.

2.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-E-2016 and KDB 971168 D01 Power Means License Digital Systems V03R01.

2.4 TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, ChaxiSanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, BaoanBldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
NVLAP LAB CODE	600153-0
Designation Number	CN5028
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

ALL TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.18, 2017	May.17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018
SIGNAL ANALYZER	Agilent	N9020A	MY52090123	Sep. 21, 2017	Sep. 20, 2018
USB Wideband Power Sensor	Agilent	U2021XA	MY54110007	Sep. 21, 2017	Sep. 20, 2018
Universal Radio Communication Tester	R&S	CMU200	120237	Mar.01,2018	Feb.28,2019
Universal Radio Communication Tester	Agilent	8960	GB46200384	July 16,2017	July 15,2018
Power Splitter	Agilent	11636A	34	Sep.21,2017	Sep.20,2018
Attenuator	JFW	50FHC-006-50	N/A	June 20, 2017	June 19, 2018

2.6 SPECIAL ACCESSORIES

The battery wassupplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

3.3 CONFIGURATION OF EUT SYSTEM

Fig. 2-1 Configuration of EUT System

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Remark
1	3G Feature Phone	B30	ZL5B30	EUT
2	Adapter	DCS10-0500550F	DC 5.0V 550mA	Accessory
3	Battery	BL-5C	DC3.7V/ 1000mAh	Accessory
4	USB Cable	N/A	N/A	Accessory

***Note: All the accessories have been used during the test. The following "EUT" in setup diagram means EUT system.

4. SUMMARY OF TEST RESULTS

Item Number	Item Description		FCC Rules	Result
1	Output Power	Radiated Output Power	2.1046/22.913(a) (2) / 24.232 (c)	Pass
2	Spurious Emission	Radiated Spurious Emission	2.1051/22.917/24.238	Pass

5. DESCRIPTION OF TEST MODES

During the testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication Tester (CMU 200)to ensure max power transmission and proper modulation. Three channels (The top channel, the middle channel and the bottom channel) were chosen for testing on both GSM and PCS frequency band.

*****Note:** GSM/GPRS850, GSM/GPRS1900, WCDMA/HSPA band II, WCDMA/HSPA band V, mode have been tested during the test.

The worst condition was recorded in the test report if no other modes test data.

6. OUTPUT POWER

6.1 RADIATED OUTPUT POWER

6.1.1 MEASUREMENT METHOD

The measurements procedures specified in ANSI/TIA-603-E-2016wereapplied.

1. Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signal operating below 1GHz are performed using dipole antennas. Measurements on signals operating above 1GHz are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT operating at its maximum duty cycle, at maximum power, and at the approximate frequencies.
2. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
3. The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established as ARpl=Pin + 2.15 - Pr. TheARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl
4. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
5. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
6. The EUT is then put into continuously transmitting mode at its maximum power level.
7. Power mode measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
8. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power (Pin).
9. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi...

6.1.2 PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b)specifies, “Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power” and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.”Rule Part 22.913(a) specifies “Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitter sand auxiliary test transmitters must not exceed 7 Watts.”

Mode	Nominal Peak Power
GSM/GPRS 850	<=38.45dBm (7W)
GSM/GPRS 1900	<=33dBm (2W)
UMTS BANDV	<=38.45dBm (7W)
UMTS BAND II	<=33dBm (2W)

6.1.3 MEASUREMENT RESULT

Radiated Power (ERP) for GSM/GPRS 850				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. ERP	
GSM	824.2	30.14	Horizontal	Pass
	836.6	**30.22**	Horizontal	Pass
	848.8	30.16	Horizontal	Pass
	824.2	28.44	Vertical	Pass
	836.6	28.46	Vertical	Pass
	848.8	28.50	Vertical	Pass

Radiated Power (E.I.R.P) for GSM/GPRS1900				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P.(dBm)	Polarization Of Max. E.I.R.P.	
GSM	1850.2	**26.95**	Horizontal	Pass
	1880.0	26.86	Horizontal	Pass
	1909.8	26.90	Horizontal	Pass
	1850.2	26.55	Vertical	Pass
	1880.0	26.34	Vertical	Pass
	1909.8	26.43	Vertical	Pass

Radiated Power (ERP) for UMTS band V				
Mode	Frequency	Result		Conclusion
		Max. Peak ERP (dBm)	Polarization Of Max. E.I.R.P.	
UMTS	826.4	**21.42**	Horizontal	Pass
	836.4	21.36	Horizontal	Pass
	846.6	21.40	Horizontal	Pass
	826.4	20.66	Vertical	Pass
	836.4	20.59	Vertical	Pass
	846.6	20.61	Vertical	Pass

Radiated Power (E.I.R.P) for UMTS band II				
Mode	Frequency	Result		Conclusion
		Max. Peak E.I.R.P (dBm)	Polarization Of Max. E.I.R.P	
UMTS	1852.4	**21.52**	Horizontal	Pass
	1880	21.47	Horizontal	Pass
	1907.6	21.51	Horizontal	Pass
	1852.4	20.46	Vertical	Pass
	1880	20.44	Vertical	Pass
	1907.6	20.19	Vertical	Pass

Note: Above is the worst mode data.

7. SPURIOUS EMISSION

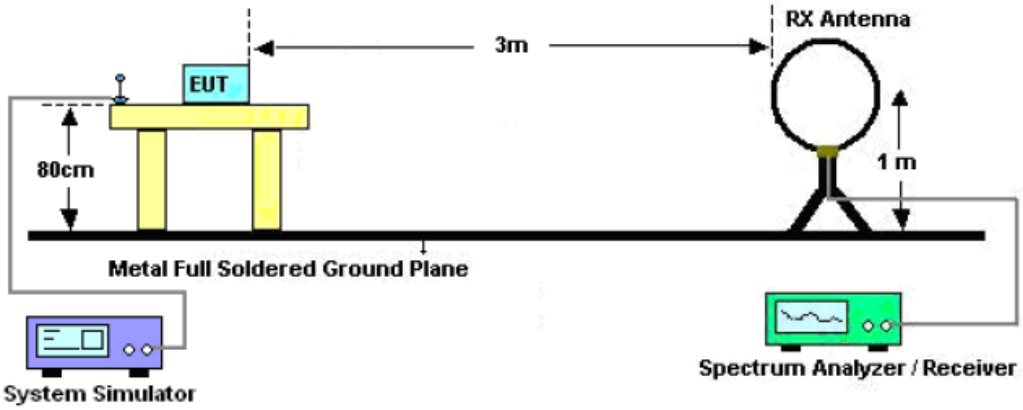
7.1 RADIATED SPURIOUS EMISSION

7.1.1MEASUREMENT METHOD

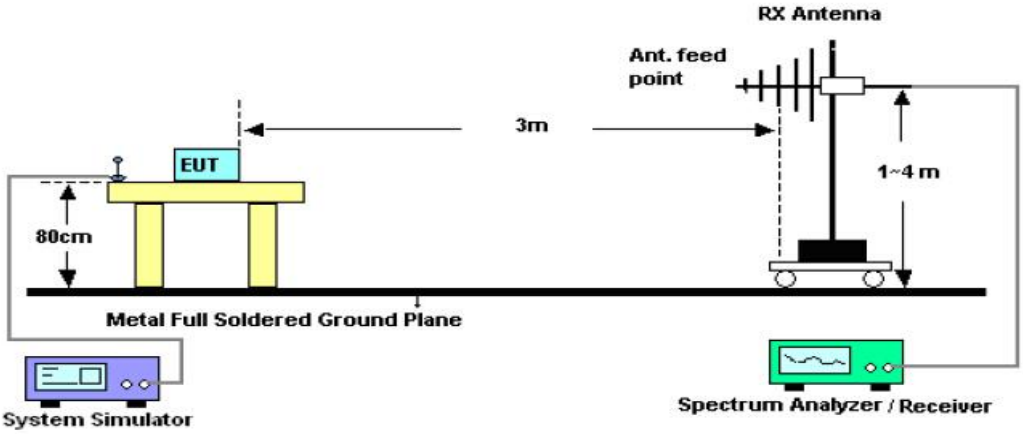
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

7.1.2 TEST SETUP

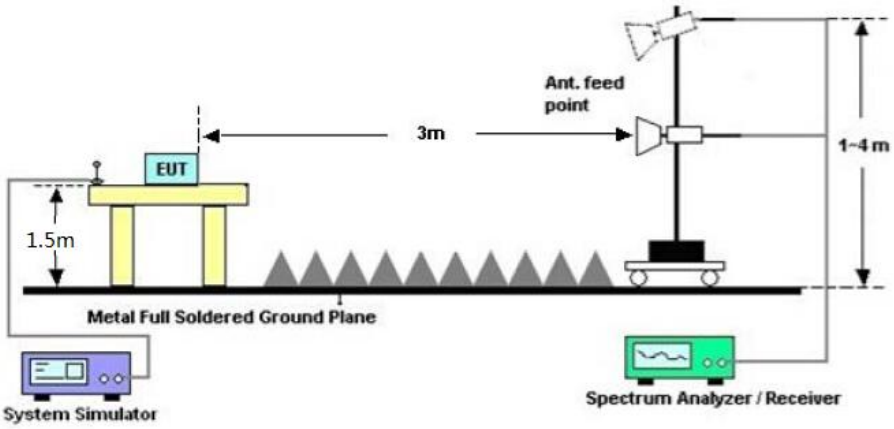
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



9.2.3 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: only result the worst condition of each test mode:

7.1.4 MEASUREMENT RESULT

GSM 850:

The Worst Test Results for Channel 251/848.8 MHz(1GHz-9GHz)				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1696.47	-46.69	-13	-33.69	Horizontal
2358.69	-38.55	-13	-25.55	Horizontal
3746.46	-39.41	-13	-26.41	Horizontal
1596.22	-50.12	-13	-37.12	Vertical
2456.64	-42.11	-13	-29.11	Vertical
3895.45	-36.41	-13	-23.41	Vertical

PCS 1900:

The Worst Test Results for Channel 810/1909.8MHz(1GHz-20GHz)				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1837.33	-50.12	-13	-37.12	Horizontal
3842.46	-42.56	-13	-29.56	Horizontal
7652.49	-39.44	-13	-26.44	Horizontal
1769.54	-49.54	-13	-36.54	Vertical
3821.38	-40.11	-13	-27.11	Vertical
7655.57	-38.11	-13	-25.11	Vertical

HSPA band V:

The Worst Test Results for Channel 4233/846.6MHz(1GHz-9GHz)				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1674.15	-48.69	-13	-35.69	Horizontal
2377.59	-39.45	-13	-26.45	Horizontal
3755.42	-38.44	-13	-25.44	Horizontal
1636.11	-52.01	-13	-39.01	Vertical
2347.69	-40.19	-13	-27.19	Vertical
3770.55	-40.11	-13	-27.11	Vertical

HSPA band II:

The Worst Test Results for Channel 9538/1907.6MHz(1GHz-20GHz)				
Frequency	Emission Level	Limits	Margin	Comment
(MHz)	(dBm)	(dBm)	(dB)	
1870.11	-50.51	-13	-37.51	Horizontal
3846.66	-39.55	-13	-26.55	Horizontal
7526.45	-39.46	-13	-26.46	Horizontal
1758.41	-48.52	-13	-35.52	Vertical
3691.15	-39.65	-13	-26.65	Vertical
7344.58	-35.11	-13	-22.11	Vertical

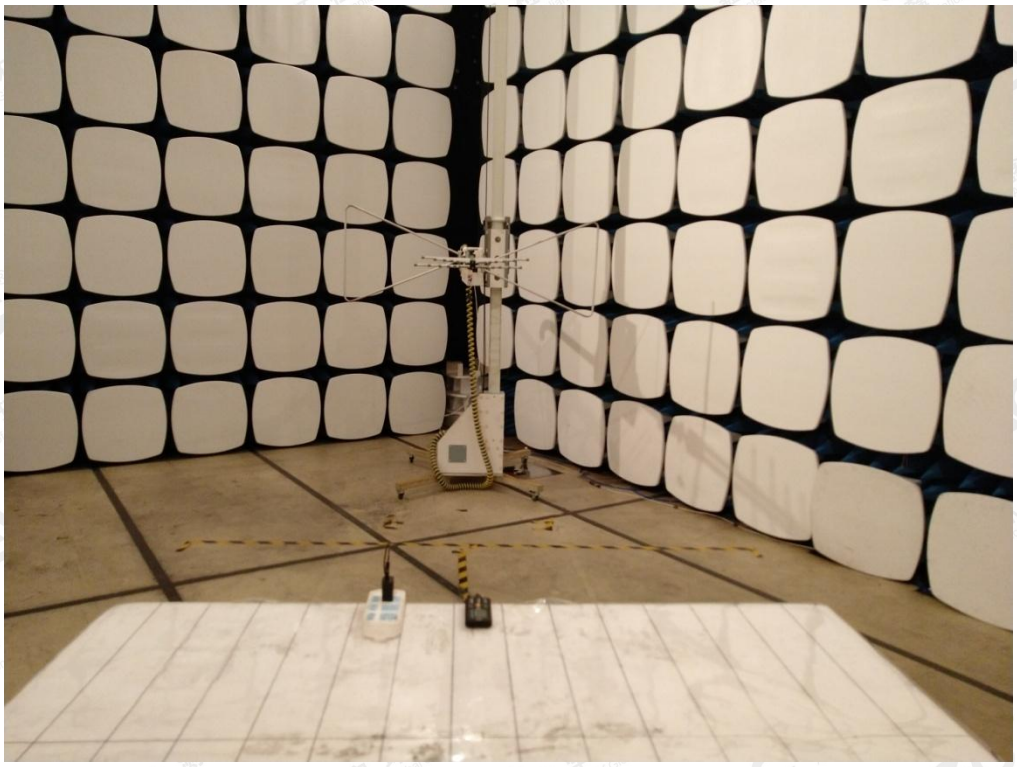
RESULT: PASS

Note:

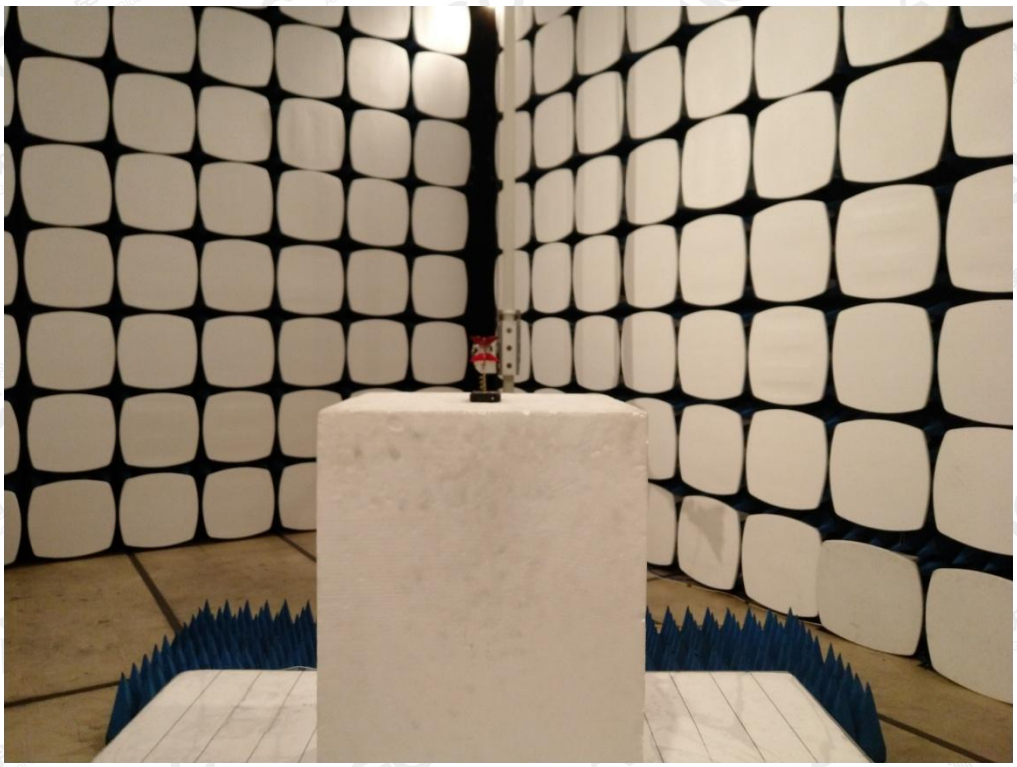
1. Margin = Emission Leve -Limit
2. Below 30MHZ no Spurious found and Above is the worst mode data.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

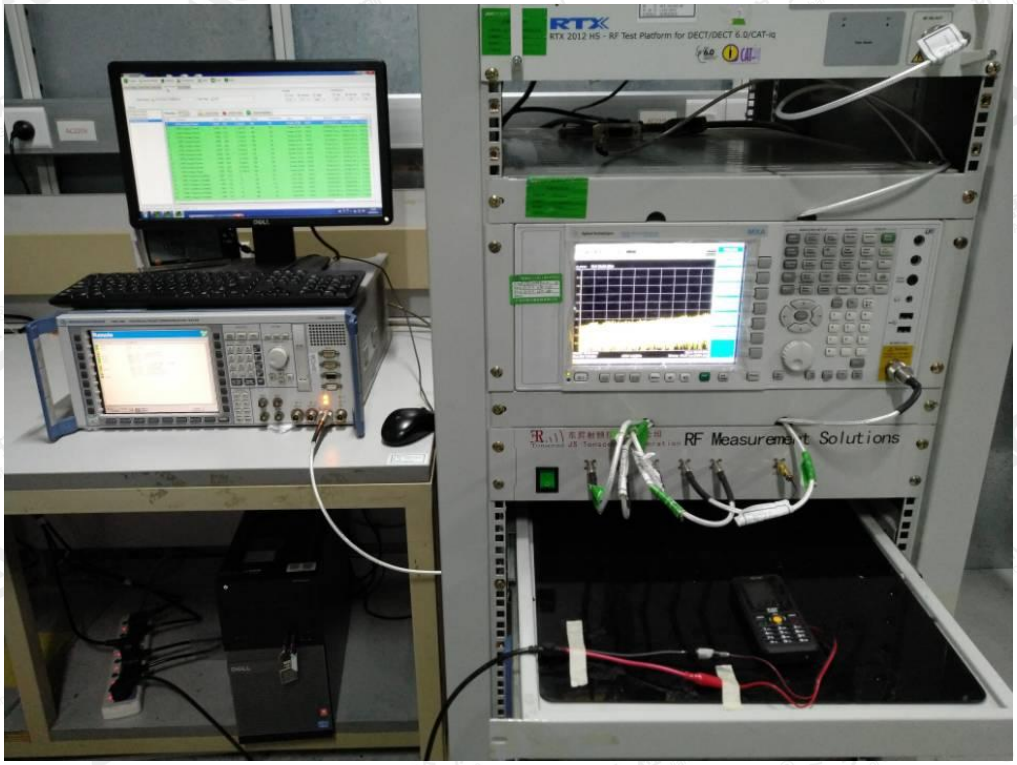
RADIATED SPURIOUS EMISSION



RADIATED SPURIOUS ABOVE 1G EMISSION



CONDUCTED MEASUREMENTS



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