



REPORT No. : XM20070009W09

TEST REPORT

MANUFACTURER : 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 : 2020-10-10

TEST DATE : 2021-01-13 to 2021-01-26

ISSUE DATE : 2021-02-19

Edited by : Qijie Xiao
Qijie Xiao

Approved by: Elvis Wang
Elvis Wang

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Change History		
Version	Date	Reason for change
1.0	2021-02-19	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

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

1.2. Equipment Under Test (EUT) Description

Product Name:	4G Mobile Phone	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	Q190_V1	
Software Version:	LTE_S02111.10_N_S62_0	
Frequency Range:	110kHz~205kHz	
Auxiliary equipment:	Wireless Charger	
	Model name:	CP60
	Onput:	5-12V \equiv 2A
	Manufacturer:	Huawei Technologies Co., Ltd.

Note:

1. For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.



1.3. 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 in CFR 47	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.207	Conducted Emission	Jan 26,2021	Yaming Luo	PASS
3	15.209	Radiated Emission	Jan 13,2021	Yaming Luo	PASS
4	15.215(c)	20dB Bandwidth	Jan 13,2021	Yaming Luo	PASS
Note 1: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013.					

1.4. 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

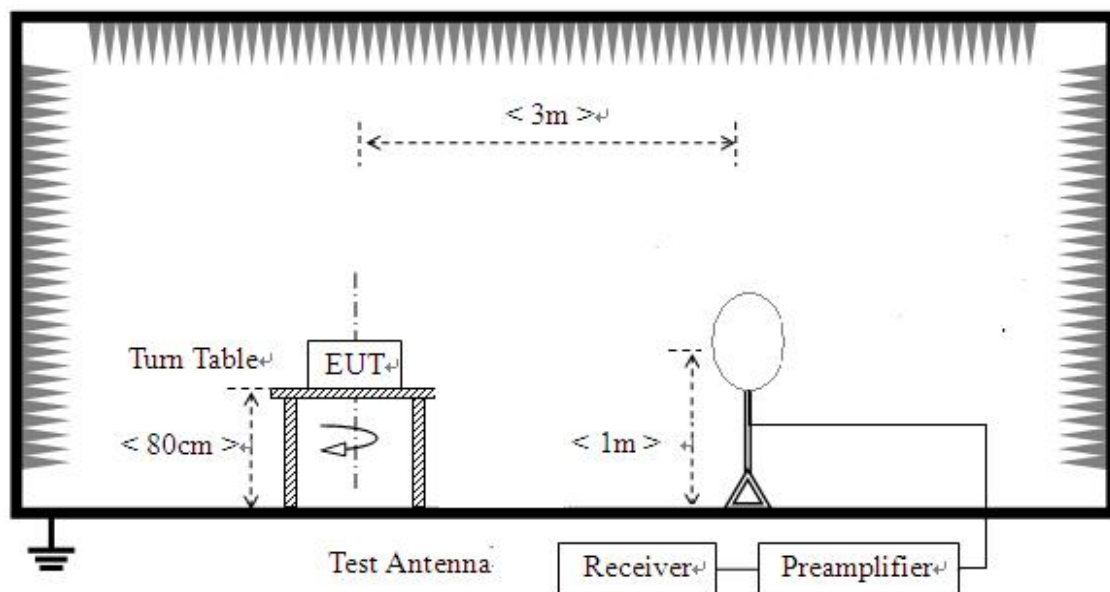
2.47 CFR Part 15C Requirements

2.1.20dB Bandwidth

2.1.1. Standard Applicable

According to FCC section 15.215(c), the 20dB bandwidth should be contained within the frequency band designated in the rule section under which the EUT is operated, it was measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

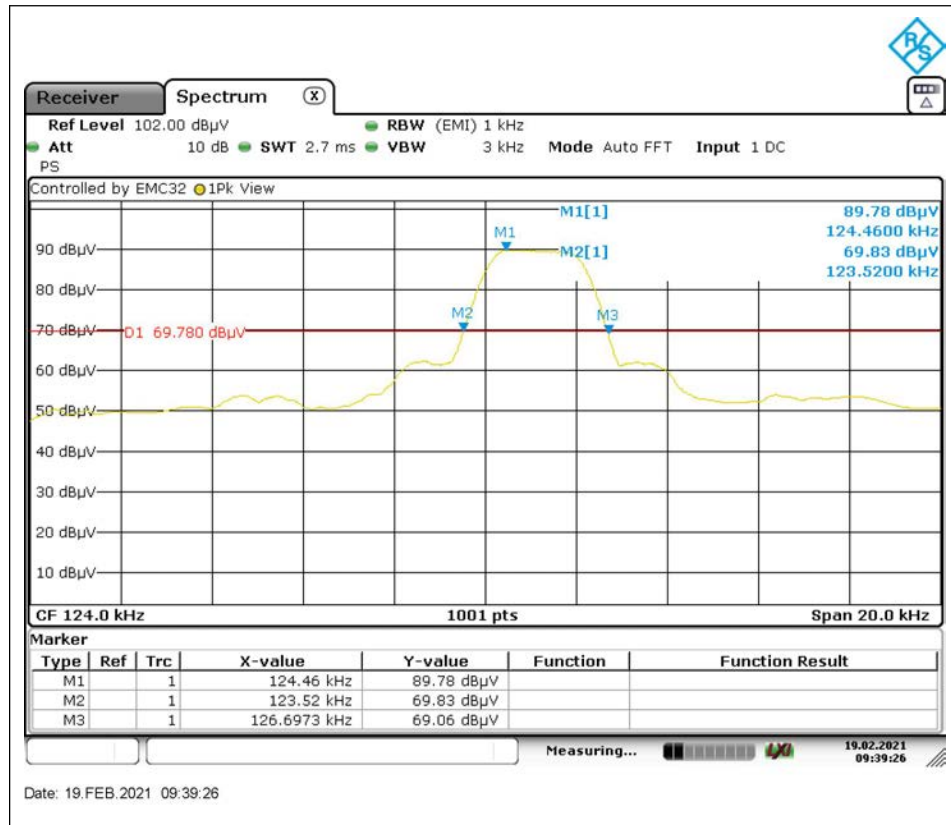
2.1.2. Test Setup



2.1.3. Test Result

20dB Bandwidth (kHz)	Verdict
3.17	PASS

Please refer to the following plot:



2.2. Conducted Emission

2.2.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

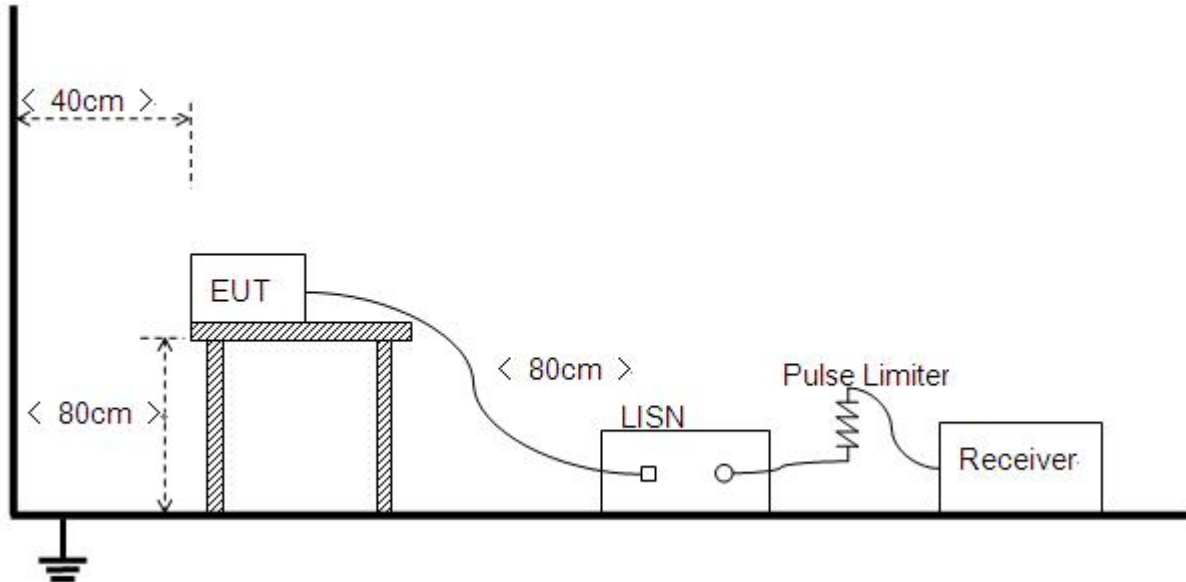
Frequency (MHz)	range	Conducted Limit (dB μ V)	
		Quai-peak	Average
0.15 - 0.50		66 to 56	56 to 46
0.50 - 5		56	46
5- 30		60	50

NOTE:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.2.2. Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

B. Equipments List:

Please refer ANNEX B(4).

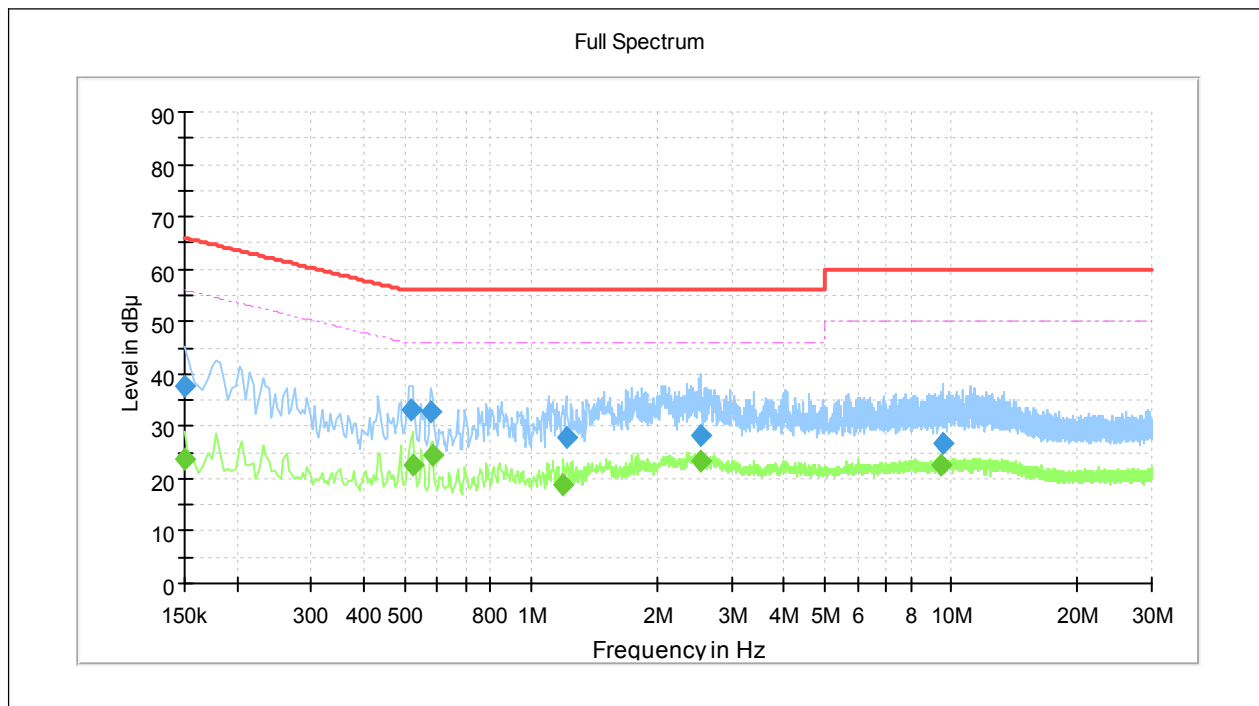
2.2.3. Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

A. Test setup:

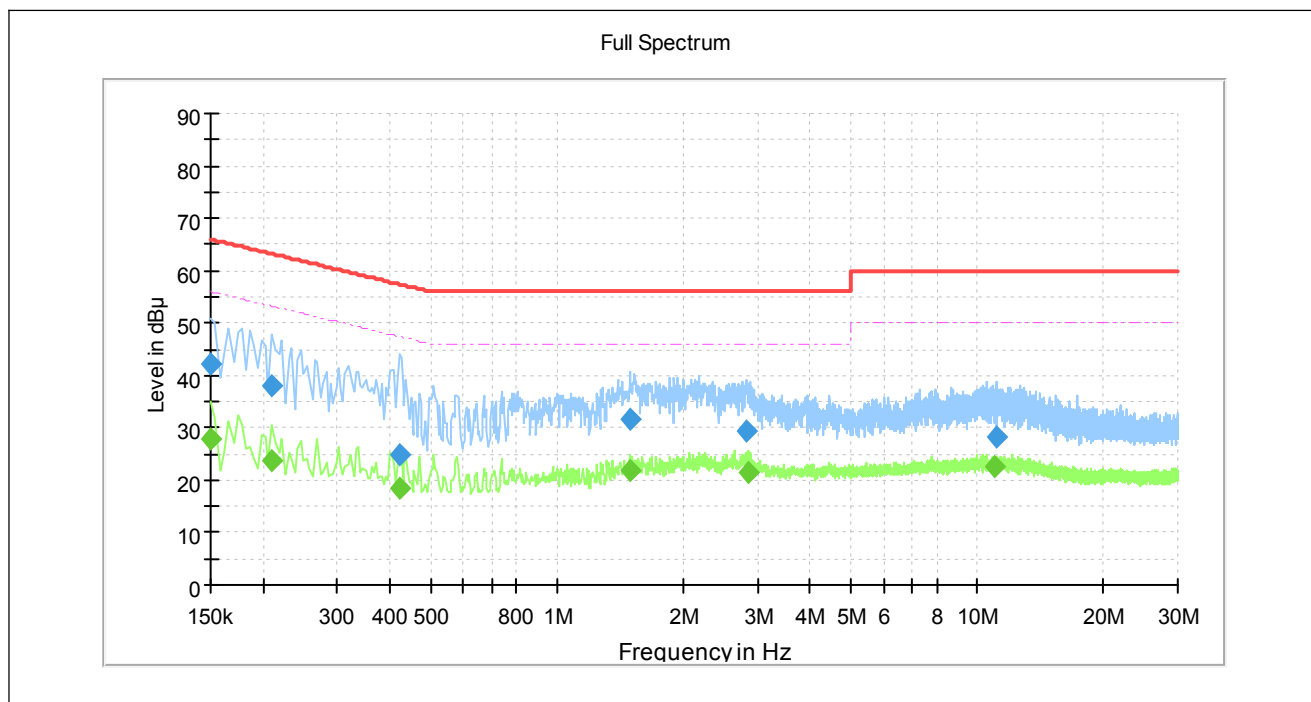
Mode 1: EUT + Wireless Charger + Adapter +Tx

B. Test Plots:



(Plot A: L Phase)

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Verdict
0.150000	---	23.63	56.00	32.37	L1	10.2	PASS
0.150000	37.68	---	66.00	28.32	L1	10.2	PASS
0.518000	33.29	---	56.00	22.71	L1	10.2	PASS
0.522000	---	22.45	46.00	23.55	L1	10.2	PASS
0.578000	32.73	---	56.00	23.27	L1	10.2	PASS
0.582000	---	24.51	46.00	21.49	L1	10.2	PASS
1.190000	---	18.88	46.00	27.12	L1	10.3	PASS
1.214000	27.76	---	56.00	28.24	L1	10.3	PASS
2.538000	28.29	---	56.00	27.71	L1	10.3	PASS
2.542000	---	23.39	46.00	22.61	L1	10.3	PASS
9.494000	---	22.41	50.00	27.59	L1	10.6	PASS
9.558000	26.75	---	60.00	33.25	L1	10.6	PASS



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	Verdict
0.150000	---	28.00	56.00	28.00	N	10.2	PASS
0.150000	42.02	---	66.00	23.98	N	10.2	PASS
0.210000	---	23.83	53.21	29.37	N	10.2	PASS
0.210000	38.07	---	63.21	25.14	N	10.2	PASS
0.422000	---	18.47	47.41	28.94	N	10.2	PASS
0.422000	24.99	---	57.41	32.41	N	10.2	PASS
1.486000	---	21.97	46.00	24.03	N	10.3	PASS
1.490000	31.73	---	56.00	24.27	N	10.3	PASS
2.814000	29.39	---	56.00	26.61	N	10.3	PASS
2.850000	---	21.37	46.00	24.63	N	10.3	PASS
10.946000	---	22.77	50.00	27.23	N	10.6	PASS
11.066000	28.36	---	60.00	31.64	N	10.6	PASS



2.3. Radiated Emission

2.3.1. 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 ($\mu\text{V/m}$)	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

Note:

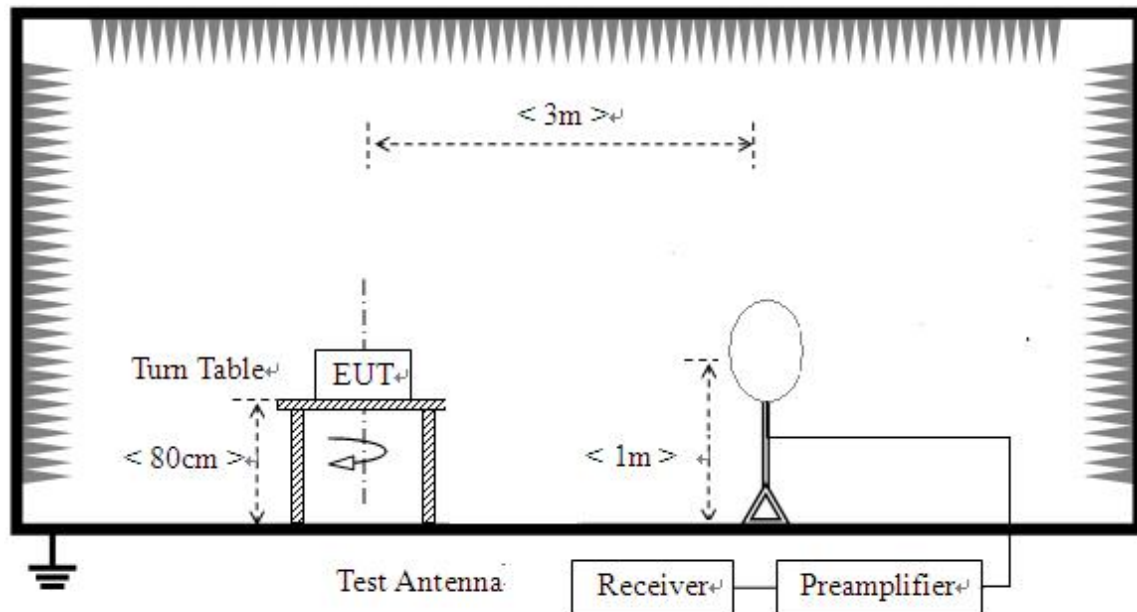
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength 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)

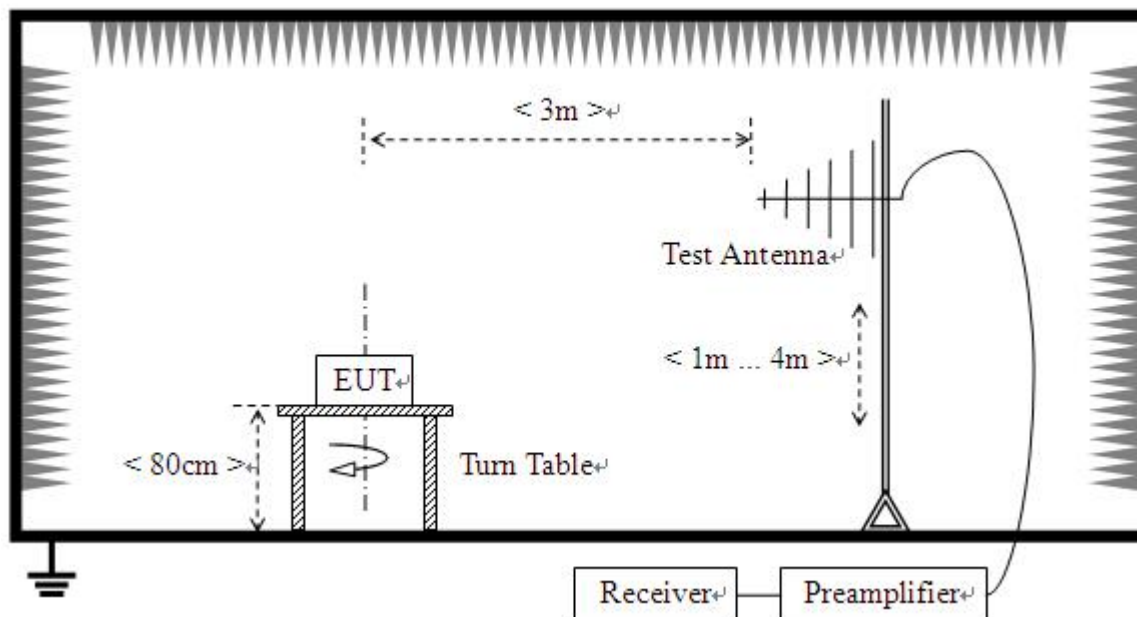
2.3.2. Test Description

A. Test Setup:

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



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





The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014. The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10:2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013. The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. All radiated emission tests were performed in three antenna orientations (parallel, perpendicular, and ground-parallel) only the worst orientation (parallel) was recorded in this test report. For the Test Antenna: (a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT. (b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) is used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test 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 test antenna elevation shall be that which maximizes the emissions. The test 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. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Please refer ANNEX B(4).

2.3.3. Test Result

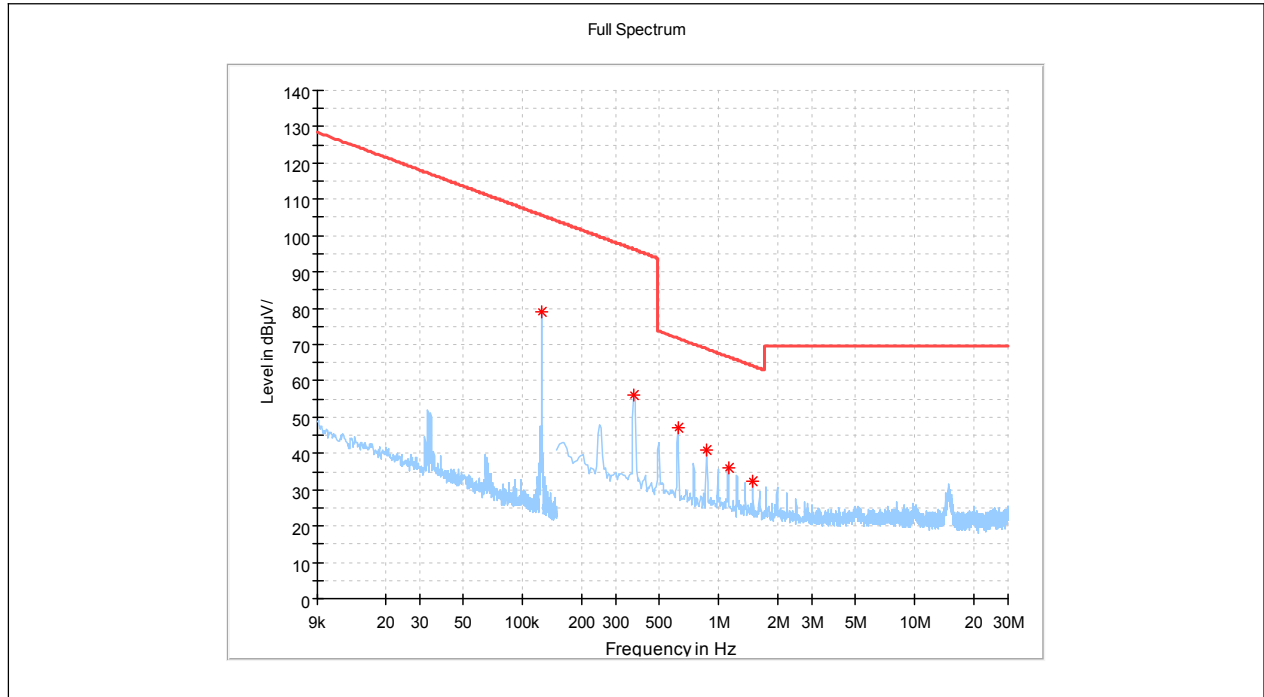
According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with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

Note:

All radiated emission tests were performed in full charging mode and 10% charging mode, only the worst mode (10% charging mode) was recorded in this test report. And all of the three antenna

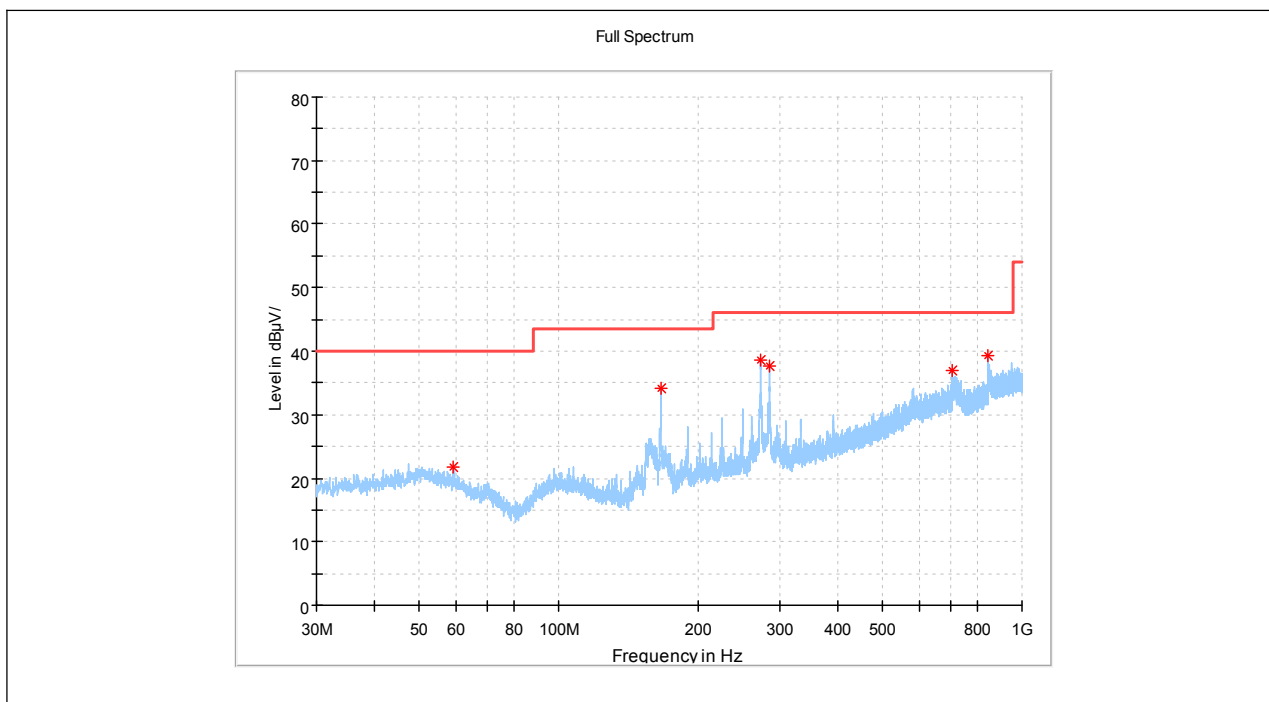
orientations(parallel, perpendicular and ground-parallel)were tested, the worst case (perpendicular) was reported

A. Test Plots:

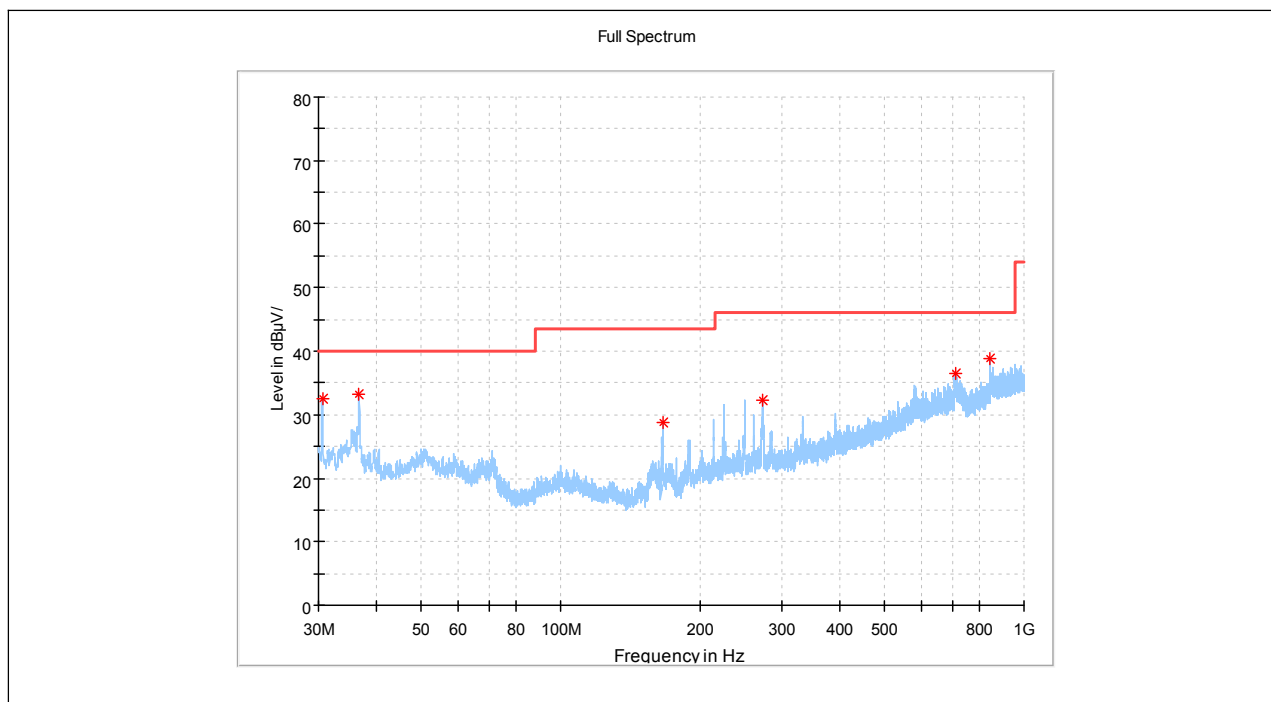


(9kHz to 30MHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)	Verdict
0.124796	79.13	105.67	26.54	V	-9.6	PASS
0.369485	56.15	96.25	40.10	V	-9.6	PASS
0.619699	46.88	71.77	24.88	V	-9.6	PASS
0.869912	40.83	68.83	28.00	V	-9.7	PASS
1.120125	36.13	66.64	30.51	V	-9.7	PASS
1.493250	32.47	64.15	31.67	V	-9.8	PASS



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)	Verdict
59.382917	21.83	40.00	18.17	H	14.0	PASS
166.123333	34.22	43.50	9.28	H	10.8	PASS
272.742500	38.62	46.00	7.38	H	15.5	PASS
284.867500	37.61	46.00	8.39	H	15.7	PASS
709.000000	36.93	46.00	9.07	H	24.5	PASS
844.961667	39.23	46.00	6.77	H	26.8	PASS



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)	Verdict
30.565833	32.43	40.00	7.57	H	11.3	PASS
36.709167	33.17	40.00	6.83	H	12.9	PASS
166.042500	28.72	43.50	14.78	H	10.8	PASS
272.904167	32.27	46.00	13.73	H	15.5	PASS
709.767917	36.56	46.00	9.44	H	24.5	PASS
845.446667	38.93	46.00	7.07	H	26.8	PASS

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
Peak Output Power	$\pm 2.22\text{dB}$
Power spectral density (PSD)	$\pm 2.22\text{dB}$
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77\text{ dB}$
Restricted Frequency Bands	$\pm 5\%$
Radiated Emission	$\pm 3.1\text{dB}$
Conducted Emission	$\pm 1.8\text{dB}$

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

Laboratory Name:	Kehu-Morlab Test Laboratory
Laboratory Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China
Telephone:	+86 592 5612050
Facsimile:	+86 592 5612095

2. Identification of the Responsible Testing Location

Name:	Kehu-Morlab Test Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China

3. Accreditation Certificate

Accredited Testing Laboratory:	The FCC designation number is CN1249. (Kehu-Morlab Test Laboratory)
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4. Test Equipments Utilized

4.1 Conducted Emission Test Equipments

No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Due Date
1	EMI Receiver	102174	ESR3	R&S	2021.03.15
2	LISN	101338	ENV432	R&S	2021.03.09

4.2 List of Software Used

Description	Manufacturer	Software Version
EMC32	R&S	V10.00.00
EMC32	R&S	V10.20.01

4.3 Radiated Test Equipments

No.	Equipment Name	Serial No.	Model No.	Manufacturer	Cal.Due Date
1	Anechoic Chamber	N/A	9m*6m*6m	ETS-Lindgren	2022.07.20
2	Active Ring Antenna	FMZB 1513 #269	FMZB 1513	Schwarzbeck	2022.01.11
3	Linear Log Periodic Broad Band Antenna	949	VULB 9163	Schwarzbeck	2021.09.24
4	Receiver	101799	ESR7	R&S	2021.03.15

_____ END OF REPORT _____