Maximum Permissible Exposure(MPE) Test Report

Product Name: Smart Phone

Model: LIO-L29/LIO-L09

Report No.: SYBH(Z-SAR)20200102050001

FCC ID QISLIO-LX9

	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	Wei Huanbin	Sun Shaobin
DATE	2020-01-21	2020-01-21

Reliability Laboratory of Huawei Technologies Co., Ltd.

(Global Compliance and Testing Center of Huawei Technologies Co., Ltd)

No.2, New City Avenue, Songshan Lake Sci. & Tech. Industry Park,
Dongguan, Guangdong, 523808, P.R.C
Tel: +86 769 23830808 Fax: +86 769 23837628

※ ※ Notice ※ ※

1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01 & 2174.02 & 2174.03
3. The laboratory (Reliability Lab of Huawei Technologies Co., Ltd) is also named as “Global Compliance and Testing Center of Huawei Technologies Co., Ltd”, the both names have coexisted since 2009.
4. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
5. The test report is invalid if there is any evidence of erasure and/or falsification.
6. The test report is only valid for the test samples.
7. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
8. If any question about this report, please contact the laboratory (PublicGCTC@huawei.com).

※ ※ **Modified History** ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	2020-01-21	Sun Shaobin

Table of Contents

1 EUT Description

Device Information：			
Product Name :	Smart Phone		
Model :	LIO-L29/LIO-L09		
FCC ID:	QISLIO-LX9		
Device Type :	Mobile Device		
Device Phase:	Identical Prototype		
Exposure Category:	Uncontrolled environment/general population		
Hardware Version :	HL1LIONM		
Software Version :	5.0.1.41（C432E87R4P1）		
Max Output power:	12W		
Device Operating Configurations:			
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	Wireless charging	110-148kHz	110-148kHz

1.1 General Description

LIO-L29/LIO-L09 is subscriber equipment in the GSM/WCDMA/LTE system. The Mobile Phone implements such functions as RF signal receiving/transmitting LTE/HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS ,WIFI and Wirelessly Charging etc. Externally it provides one micro SD card interface (it can also used as SIM card interface), earphone port (to provide voice service) and one SIM card interface. LIO-L29 is dual SIM smart phone. LIO-L09 is single SIM smart phone. The model LIO-L29 and LIO-L09 are identical except for LIO-L09 support single SIM card which deleted by software. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

Note:
1) Only Wireless charging test data is included in this test report.
2) LIO-L09 shares the same test data with LIO-L29

Name	Manufacturer/trademark	Description
Rechargeable Li-ion	HuaweiTechnologies Co., Ltd. (Manufacturer: Sunwoda)	Rated capacity: 4400mAh Nominal Voltage: +3.85V Charging Voltage: +4.43V
	HuaweiTechnologies Co., Ltd. (Manufacturer: SCUD)	

2 Test specification(s)

IEEE Std C95.1-1991	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
KDB 447498 D01	General RF Exposure Guidance v06
KDB 680106 D01	RF Exposure Wireless Charging Apps v03

3 Testing laboratory

Test Site	Reliability Laboratory of Huawei Technologies Co., Ltd.
Test Location	NO.2 New City Avenue Songshan Lake Sci. & Tech. Industry Park, Dongguan, Guangdong, P.R.C
Telephone	+86 769 23830808
Fax	+86 769 23837628
State of accreditation	The Test laboratory (area of testing) is accredited according to ISO/IEC 17025. CNAS Registration number: L0310 A2LA TESTING CERT #2174.01 & 2174.02 & 2174.03

4 Applicant and Manufacturer

Company Name	HUAWEI TECHNOLOGIES CO., LTD
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

5 Application details

Start Date of test	2019-08-05
End Date of test	2019-08-05

6 Ambient Condition

Ambient temperature	18°C – 25°C
Relative Humidity	30% – 70%

7 Test Equipment

	Manufacturer	Device	Type	Serial number	Date of last calibration	Valid period
☒	NARDA	Electric and Magnetic field Probe-Analyzer	EHP-200A	170WX81023	2019-03-04	One year

Support Client Device

	Manufacturer	Device	Model Name
☒	HUAWEI	Smart Phone	LIO-L29

8 RF Exposure Requirements

Per KDB 680106 D01:

1) The RF exposure requirements must be determined in conjunction with the device operating characteristics, according to the mobile and portable exposure requirements in Sections 2.1091 and 2.1093 of the rules. SAR and MPE limits do not cover the frequency range for wireless power transfer applications which operate below 100 kHz and 300 kHz respectively; therefore, RF exposure compliance needs to be determined with respect to Sections 1.1307 (c) and (d) of the FCC rules.

2) Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. The limit for Maximum Permissible Exposure (MPE), specified in 47CFR 1.1310, is listed below table:

Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/controlled Exposure				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm^2)	Averaging Time (minute)|E|^2,|H|^2 or S
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f^2)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/uncontrolled Exposure				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm^2)	Averaging Time (minute)|E|^2,|H|^2 or S
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	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	

9 Measurement procedure

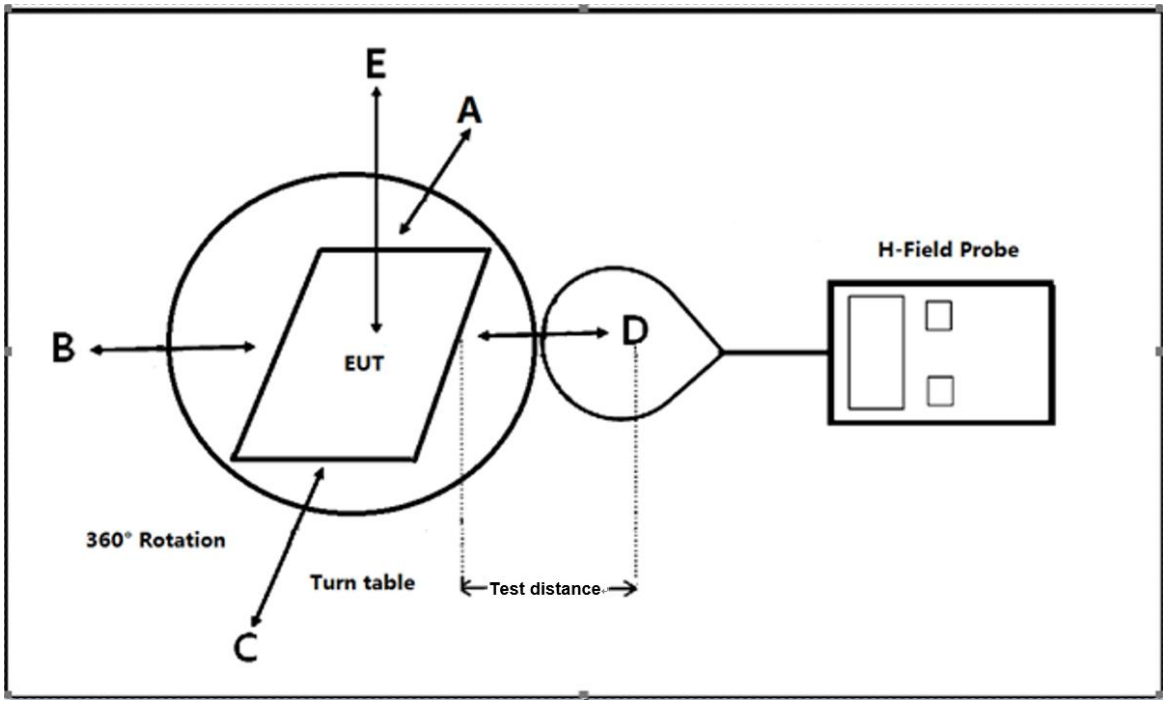

Figure: Test set-up

Client device is placed directly in contact with the transmitter. The measurement probe was placed at test distance (10 cm) which is between the edge of the charger and the geometric center of probe. The turn table was rotated 360 degree to search of the highest strength.

The electric field strength and H-field strength measurement results at 10 cm from all applicable edges surrounding the DUT while it is actively charging the client device are performed. The highest emission level was recorded and compared with limit.

The EUT were measured according to the requirement of KDB 680106 D01v03.

DUT configuration:

1) The wireless charging operating frequency: 110 kHz-148 kHz

2) The wireless charging maximum output power: 12W

3) The transfer system includes only single primary coil. The device only support one-to-one pairing with the client device.

4) The client device should be placed directly in contact with the transmitter.

5) The test results at three different charging conditions at 10%, 50% and 90% are

included.

10 H-field strength test

Charge amount	Frequency Range (kHz)	Distance (cm)	Test Position	Test Results (A/m)	Limit (A/m)	Battery	Note
10%	110~148	10cm	Front	0.084	1.63	1#	**pass**
	110~148	10cm	Back	**0.109**	1.63	1#	**pass**
	110~148	10cm	Back	0.104	1.63	2#	**pass**
	110~148	10cm	Left	0.062	1.63	1#	**pass**
	110~148	10cm	Right	0.055	1.63	1#	**pass**
	110~148	10cm	Top	0.049	1.63	1#	**pass**
	110~148	10cm	Bottom	0.056	1.63	1#	**pass**
50%	110~148	10cm	Front	0.093	1.63	1#	**pass**
	110~148	10cm	Back	0.108	1.63	1#	**pass**
	110~148	10cm	Left	0.054	1.63	1#	**pass**
	110~148	10cm	Right	0.065	1.63	1#	**pass**
	110~148	10cm	Top	0.062	1.63	1#	**pass**
	110~148	10cm	Bottom	0.063	1.63	1#	**pass**
90%	110~148	10cm	Front	0.091	1.63	1#	**pass**
	110~148	10cm	Back	0.100	1.63	1#	**pass**
	110~148	10cm	Left	0.048	1.63	1#	**pass**
	110~148	10cm	Right	0.066	1.63	1#	**pass**
	110~148	10cm	Top	0.058	1.63	1#	**pass**
	110~148	10cm	Bottom	0.047	1.63	1#	**pass**

According to the Table above, the maximum H-field strength of the device with 10 cm test distance is 0.109 A/m, which is below the reference level, so it is into compliance.

Appendix A. Calibration Certificate

(Please See Appendix No.: SYBH(Z-SAR)20200102050001-A, total: 5 pages)

Appendix B. Photo documentation

(Please See Appendix No.: SYBH(Z-SAR)20200102050001-B, total: 4 pages)

End

Appendix A. Calibration Certificate

Table of contents
Certificate Calibration

校 准 证 书

CALIBRATION CERTIFICATE

证书编号：
Certificate No. J201902213241-0009

委 托 方 Client	华为技术有限公司
委托方地址 Address	广东省深圳市龙岗区坂田华为基地
仪 器 名 称 Description	场强测试仪
型 号/规 格 Model/Type	EHP-200A
制 造 厂 Manufacturer	Narda
出厂编号 Serial No.	170WX81023
管 理 号 Asset No.	A181274678
校准日期 Date of Calibration	2019年03月04日 Y M D
样品接收日期 Date of Receipt	2019年02月22日 Y M D
批准人： Approved Signatory	
审 核： Inspected by	
校 准： Calibrated by	

证书专用章
（Stamp）

总部地址：广东省广州市黄埔大道西平云路163号（分场所地址见公司网站）
Headquarters Address:No.163.Pingyun Rd, West of HuangPu Ave.Guangzhou. Guangdong.China(Each Address Can be Found on The Company's Website)
计量校准机构备案号(The record number)：粤校备2017A019；(2014)浙量校(浙)S001号；(2018)宁量校(备)N003号；[2016]苏量校备S002号
联系电话（Tel.）：020-38699960,66830999,400-602-0999
扫一扫验真伪
传真（Fax）：020-38695185
邮政编码（Postcode）：510656
网站（Website）：http:// www.grgtest.com
电子邮件（E-mail）：grgtest@grgtest.com

校 准 说 明
DIRECTIONS OF CALIBRATION

1. 本实验室出具的数据均可溯源至国家计量基准和国际单位制(SI)。
(All data issued by GRGTest are traced to National Primary Standards and International System of Units(SI).)

2. 本结果仅对当次被测样品有效，如有疑问请在15个工作日内反馈。(The result is ONLY valid for the tested sample, please feedback to us within 15 working days if you have any question.)

3. 本证书编号具有唯一性，后缀若带有“-Gx”的证书为替换证书，自发出后原证书即刻作废。
(Each certificate has a unique number. The suffix of "-Gx" will be added to the number as a replacement of the old version. The original certificate will be officially invalid once the new certificate number is issued.)

4. 证书中如有最大允许误差、判定结果，仅供参考，其中“P”代表“合格”，“F”代表“不合格”。使用人员还应结合实际测量要求，评估校准结果测量不确定度对符合性评定的影响。 (MPE & judgement result in the datasheet is only for reference , "P" represents "Pass" and "F" represents "Fail".Whereas users should evaluate the effects of measurement uncertainty of calibration results on conformity determination associated with actual measurement.)

5.本次校准的技术依据及CNAS认可范围，超出范围的内容未被认可。注：详细的认可范围请查看CNAS网站中注册编号为L0446的证书附件。(Reference document and accredited scope by CNAS for calibration，beyond which isn't accredited. Please see the attachment of certificate No.L0446 on CNAS website for details.)
IEEE std 1309-2013频率为9kHz~40GHz的电磁场传感器和探头(天线除外)的校准:场强(1~1100)V/m,(0.01~2)A/m(10Hz~9kHz);(0.1~150)V/m,(0.01~1)A/m(9kHz~40GHz)

6. 本次校准使用的主要测量标准(Main Standards of Measurement Used in the Calibration.)：

名称 / 型号 Description / Model	编 号 Serial No.	证书号/有效期 Certificate No./ Due Date	溯源机构 Traceability Institute	技术特征 Technique Character
函数信号发生器/AFG1062	1601276	J201807066572-0008 2019-07-04	广州广电计量检测股份有限公司	频率准确度：2E-6;幅度准确度：±1%
探头/NRP40T	1424.6150K02-101067-ES	GFJGJL1002180004781 2019-04-24	北京无线电计量测试研究所	功率测量的不确定度：U_{rel}=0.010%（k=2）
TEM小室/TEMZ5233	00010	J201811269153-0003 2019-11-25	广州广电计量检测股份有限公司	U≤0.03dB (k=2)
微波功率放大器/350AH1A	0350948	J201812288400-0006 2020-01-02	广州广电计量检测股份有限公司	功率：350W（10Hz-1MHz）
大功率衰减器/WDTS1000-50dB-6G-A	16031401	J201902114630-0001 2020-02-10	广州广电计量检测股份有限公司	MPE:2.0dB k=2

7. 校准地点、环境条件(Place and environmental conditions of the calibration)：

地点 Place	广州计量大功率室	温度 Temperature	23	℃	相对湿度 Relative Humidity	48	%

8. 建 议 复 校 时 间 间 隔： 1 年，送校单位也可按实际使用情况自主决定。
Suggested calibration interval is 1 year or it can be altered depending on the actual usage of the user.

校 准 结 果
RESULTS OF CALIBRATION

1、外观以及一般性检查：正常

In view of External and Generality check : Pass

2、 场强测量准确度：

Field Strength Measuring Accuracy:

频率 Frequency (MHz)	标准场强 Reference (V/m)	指示值 Indicated (V/m)	校准因子 Cal Factor /	偏差值 Deviation (%)	允许误差 MPE (%)	不确定度 $U(k=2)$ (dB)	结 论 Conclusion (Pass/Fail)
0.13	2.00	2.1336	0.94	6.68	± 10.0	0.8	P
	5.00	5.2712	0.95	5.42	± 10.0	0.8	P
	10.00	10.472	0.95	4.72	± 10.0	0.8	P
	20.00	20.554	0.97	2.77	± 10.0	0.8	P
	50.00	52.448	0.95	4.90	± 10.0	0.8	P
	100.00	104.07	0.96	4.07	± 10.0	0.8	P
15	2.00	1.8954	1.06	-5.23	± 10.0	0.8	P
	5.00	4.7973	1.04	-4.05	± 10.0	0.8	P
	10.00	9.8645	1.01	-1.36	± 10.0	0.8	P
	20.00	19.684	1.02	-1.58	± 10.0	0.8	P
	50.00	48.418	1.03	-3.16	± 10.0	0.8	P
	100.00	97.376	1.03	-2.62	± 10.0	0.8	P

校 准 结 果
RESULTS OF CALIBRATION

4、频率响应

Frequency Response

频率 Frequency (MHz)	标准场强 Reference (V/m)	指示值 Indicated (V/m)	校准因子 Cal Factor /	偏差值 Deviation (%)	允许误差 MPE (%)	不确定度 $U(k=2)$ (dB)	结 论 Conclusion (Pass/Fail)
0.01	20.00	20.402	0.98	2.01	± 10.0	0.8	P
0.10	20.00	20.114	0.99	0.57	± 10.0	0.8	P
0.11	20.00	20.293	0.99	1.47	± 10.0	0.8	P
0.13	20.00	20.545	0.97	2.73	± 10.0	0.8	P
0.15	20.00	20.342	0.98	1.71	± 10.0	0.8	P
0.5	20.00	20.641	0.97	3.20	± 10.0	0.8	P
1	20.00	20.508	0.98	2.54	± 10.0	0.8	P
2	20.00	20.244	0.99	1.22	± 10.0	0.8	P
4	20.00	20.123	0.99	0.62	± 10.0	0.8	P
8	20.00	19.482	1.03	-2.59	± 10.0	0.8	P
16	20.00	19.724	1.01	-1.38	± 10.0	0.8	P
30	20.00	18.964	1.05	-5.18	± 10.0	0.8	P

备注：

Notes：

结论（Conclusion): 所校项目符合技术要求

1.本报告中的扩展不确定度是由标准不确定度乘以包含概率约为95%时的包含因子k。

The expanded uncertainty is given in the report by the standard uncertainty multiplied by the probability of about 95% when the factor k.

2.依据(Reference document)

JJF 1059.1-2012 测量不确定度评定与表示

(JJF 1059.1-2012 Evaluation and Expression of Uncertainty in Measurement)

(以下空白)

(The below is blank)