



FCC RF Test Report

Product Name: Smart Phone

Model Number: WKG-LX9

Report No.: SYBH(Z-RF)20210525030001-2004

FCC ID: 2ATEYWKG-LX9

Authorized	Name	Date
Prepared by: (Test Engineer)	Qin Jianei	2021-07-12
Reviewed by: (Test Engineer)	Wen Hongyun	2021-07-12
Approved by: (Lab Manager)	He Hao	2021-07-12

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, 523808, P.R.C Telephone: +86 769 23830808 Fax: +86 769 23837628



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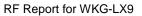


MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF)20210525030001-2004	First release.

DECLARATION

Туре	Description			
Multiple Models				
Applications	The present report applies to several models. The practical measurements are performed with the model			
	The present report only presents the worst test case of all modes, see relevant test results for detailed.			





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2 General Information

2.1 Test standard/s

Applied Rules :	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart C	
	FCC KDB 558074 D01 DTS Meas Guidance v05r02	
Test Method :	ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless	
	Devices.	

2.2 Test Environment

Temperature :	TN	15 t	o 30	°C du	ring room temperature tests
Ambient Relative Humidity:	25 to 75 %				
Atmospheric Pressure:	Not applicable				
Power supply :	VN	3.85		V	DC by Battery

NOTE 1: 1) VN= nominal voltage, VL= low extreme test voltage, VH= High extreme test voltage;

TN= normal temperature, TL= low extreme test temperature, TH= High extreme test temperature.

NOTE 2: The values used in the test report may be stringent than the declared.

2.3 Test Laboratories

Test Location 1 :	RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.	
Address of Test Location 1:	No.2 New City Avenue, Songshan Lake Science & Technology Industry Park Dongguan,	
Temperature of Test Location 1 :	Guangdong, 523808, People's Republic of China 25°C	
Relative humidity of Test Location 1 :	55 %	



2.4 Applicant and Manufacturer

Company Name :	Huawei Device Co., Ltd.		
Address :	No.2 of Xincheng Road, Songshan Lake Zone, Dongguan, Guangdong 523808, People's		
Address .	Republic of China		

2.5 Application details

2.5.1 Current Test Project/Report

Date of Receipt Sample:	2021-06-21
Start of test:	2021-06-22
End of test:	2021-07-12



3 Test Summary

Test Item	FCC Rule No.	Requirements	Test Result	Verdict	Testing location
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz.	Appendix A	Pass	Test Location 1
Occupied Bandwidth		No limit	Appendix B	Pass	Test Location 1
Duty Cycle	KDB 558074 D01(6.0)	No limit	Appendix C	Pass	Test Location 1
Maximum Average Output Power	15.247(b)(3)	FCC: For directional gain: Conducted < 30 dBm - (G[dBi] - 6 [dB]); Otherwise: Conducted < 30 dBm,	Appendix D	Pass	Test Location 1
Maximum Power Spectral Density Level	15.247(e)	Conducted < 8 dBm/3 kHz.	Appendix E	Pass	Test Location 1
Band Edges Compliance		00 10 (400111 1/4)	Appendix F	Pass	Test Location 1
Unwanted Emissions into Non-Restricted Frequency Bands	15.247(d)	< -30 dBr/100 kHz if total average power ≤ power limit.	Appendix G	Pass	Test Location 1
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	FCC Part 15.209 field strength limit;	Appendix H	Pass	Test Location 1
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit; .	Appendix I	Pass	Test Location 1

NOTE 1:According to KDB 558074 D01, antenna-port conducted measurements are acceptable as an alternative to radiated measurements for demonstrating compliance to the limits in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions will also be required.

NOTE2: The transmitter has an integral PCB loop antenna that is enclosed within the housing of the EUT and meets the requirements of FCC 15.203



4 Description of the Equipment under Test (EUT)

4.1 General Description

WKG-LX9 is subscriber equipment in the GSM/WCDMA/LTE system. The GSM frequency bands include GSM850, GSM900, DCS1800 and PCS1900. The UMTS frequency band includes band I, band II, band IV, band V and band VIII. The LTE frequency bands include band 1, band 2, band3, band 4, band 5, band 7, band 8, band 20, band 28, band 38, band 40, band 41, band 66 and band 26. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS, Wi-Fi etc. Externally it provides earphone port (to provide voice service), one micro SD card interface, and dual SIM/single SIM card interface. WKG-LX9 is dual/single SIM smart phone. 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 2.4G WIFI test data included in this report.

4.2 EUT Identity

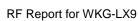
NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

4.2.1 Board

Board						
Description Software Version Hardware Version						
Main Board	11.0.1.109(C900E43R1P1)	HL1WKGM				

4.2.2 Sub- Assembly

Sub-Assembly						
Sub-Assembly Name	Model	Manufacturer	Description			
Adapter	HW-050200B02	Huawei Technologies Co., Ltd.	Input voltage: 100-240Vac Output voltage: 5V2A			
Adapter	HW-050200E02	Huawei Technologies Co., Ltd.	Input voltage: 100-240Vac Output voltage: 5V2A			
Adapter	HW-050200U02	Huawei Technologies Co., Ltd.	Input voltage: 100-240Vac Output voltage: 5V2A			
Battery	HB526489EEW	Huawei Technologies Co., Ltd.	Rated capacity: 4900mAh Nominal Voltage: +3.85V Charging Voltage: +4.43V			



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4.3 **Technical Description**

NOTE: For the detailed technical descriptions, see the applicant/manufacturer's specifications or user manual.

Characteristic	Description			
IEEE 802.11 WLAN Mode	⊠ 802.11b			
Supported	⊠ 802.11g			
	⊠ 802.11n		MHz	
		☐ HE SU	☐ 20 MHz, ☐ 40 MHz	
		☐ HE ER SU	☐ 20 MHz: 106-Tone/242-Tone	
	□ 000 11ev		20 MHz: 26-Tone/52-Tone/106-Tone/242-Tone	
	□ 802.11ax	│	40 MHz:26-Tone/52-Tone/106-Tone/242-Tone/484-Tone	
		☐ HE MU	20 MHz: 26-Tone/52-Tone/106-Tone/242-Tone	
			40 MHz:26-Tone/52-Tone/106-Tone/242-Tone/484-Tone	
TV/DV On anating Dange	2412-2462 MHz	2407 MHz + N * 5 M	1Hz, N = 111 (for 802.11b/g/n HT20).	
TX/RX Operating Range		2407 MHz + N * 5 M	1Hz, N = 39 (for 802.11n HT40).	
Baseband Modulation	802.11b : DBPSK	//DQPSK/CCK(DSSS)		
	802.11g : BPSK/0	QPSK/16QAM/64QAM	I(OFDM)	
	802.11n : BPSK/0	QPSK/16QAM/64QAM	I(OFDM)	
Emission Designator	9M04G7D (for 80	2.11b mode),		
	16M3G7D (for 80)	r 802.11g mod),		
	17M6G7D (for 80))2.11n20 mode),		
	36M3G7D (for 80			
TX Power Control	☐ Supported, ⊠	Not Supported		
Standby Mode	☐ Supported, ⊠	Not Supported		
Equipment Type		equipment, Plug-in radio device, Combined equipment		
Antenna	Description	Isotropic Antenna		
	Type	☐ Integral (permanent fixed antenna, which may be built-in, designed as an		
		indispensable part of	of EUT)	
		☐ Dedicated (remo	ovable antenna supplied with EUT, designed as an	
		indispensable part of		
	Ports	Ant 1, ☐ Ant 2	_	
	Smart System		1b/g/n),	
	-	☐ CDD (for 802.11	g), 2 Tx & 2 Rx,	
		☐ MIMO (for 802.1	1n), 2 Tx & 2 Rx,	
		☐ Diversity (for 80)	2.11b/g) : Tx & Rx	
	Gain	Ant 1: -2.9 (per ante	enna port, max.)	
	Remark	When the EUT is pu	t into service, the practical maximum antenna gain should NOT	
		exceed the value as	described above.	
Power Supply	Туре	☐ External DC ma	ins,	
		□ Battery,		



Characteristic	Description		
		☐ AC/DC Adapter,	
		☐ Powered over Ethernet (PoE).	
		□ USB	
		☐ Other	



5 General Test Conditions / Configurations

5.1 Test Modes

NOTE: Worst cases for each IEEE 802.11 mode are selected to perform tests.

Test Mode	Test Modes Description
11B	IEEE 802.11b with data rate of 1 Mbps using SISO mode.
11G	IEEE 802.11g with data rate of 6 Mbps using SISO mode.
11N20SISO	IEEE 802.11n with data rate of MCS0 and bandwidth of 20 MHz, using SISO mode
11N40SISO	IEEE 802.11n with data rate of MCS0 and bandwidth of 40 MHz, using SISO mode



5.2 EUT Configurations

5.2.1 General Configurations

Configuration	Description	
Test Antenna Ports	Until otherwise specified,	
	- All TX tests are performed at all TX antenna ports of the EUT, and	
	- All RX tests are performed at all RX antenna ports of the EUT.	
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during	
	measurements.	
Sensors and Antenna	Sensors and Antenna optimization function should be disabled during testing by software method to	
	get the stable maximum power and avoid the influence of uncertain conditions	

5.2.2 Customized Configurations

Test Mode	Power Level Setting defined by Manufacturer			
	ANT1			
11B	17.5			
	CH1/11: 8.0			
440	CH2/10: 13.0			
11G	CH3/9: 15.0			
	Others: 17.0			
	CH1/11: 8.0			
44N200100	CH2/10: 13.0			
11N20SISO	CH3/9: 15.0			
	Others: 17.0			
441400100	CH3/4/8/9: 11.0			
11N40SISO	Others:12.0			



5.3 Antenna requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

The antennas of the WKG-LX9 are permanently attached.

There are no provisions for connection to an external antenna.

Conclusion:

The EUT unit complies with the requirement of §15.203.

Ch. Frequency (MHz)

Ch.	Frequency (MHz)
01	2412
•	
06	2437
•	
11	2462

Frequency/ Channel Operations



5.4 Description of tests

5.4.1 Bandwidth measurement

- (a) Connect EUT test port to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz, then set the measured frequency number and test the bandwidth with spectrum analyzer.

5.4.2 Average output power

- (a) Connect EUT test port to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

5.4.3 Band edge spurious emission

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.

5.4.4 Conducted RF spurious

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted spurious separately.

5.4.5 Power spectral density

- (a) Connect EUT test port to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted power spectral density.

5.4.6 Radiated spurious emission & spurious in restricted band

For frequency below 1GHz, the test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). The EUT was set-up on insulator 80cm above the Ground Plane. For frequency above 1GHz, the test site full-anechoic chamber has met the requirement of ANSI C63.10 (2013). 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 Radiated Disturbance measurements were made using a Rohde and Schwarz Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using a Quasi-Peak Detector below 1GHz, Peak Detector and AV Detector above 1GHz. The maximal emission value was acquired by



adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, and the azimuth range of turntable was 0°to 360°. The receive antenna has two polarizations V and H.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other nonmetallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized.

The EUT communicates with the BTS simulator through Air interface. The EUT operated on the typical channel.

Measurement bandwidth: 30 MHz - 1000 MHz: 120 kHz

Measurement bandwidth: 1000 MHz – 10th Carrier Frequency: 1 MHz

5.4.7 Conducted Emission at Power Port

The Table-top EUT was placed upon a non-metallic table 0.8 m 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.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT communicates with the BTS simulator through Air interface, the BTS simulator controls the Wireless Modem to transmitter the maximum power which defined in specification of product. The Wireless Modem operated on the typical channel.

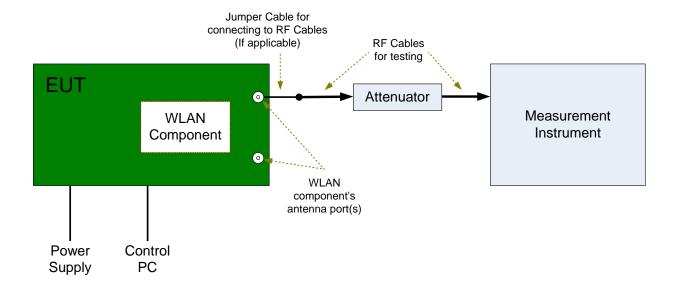
Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;



5.5 Test Setups

5.5.1 Test Setup 1

The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.

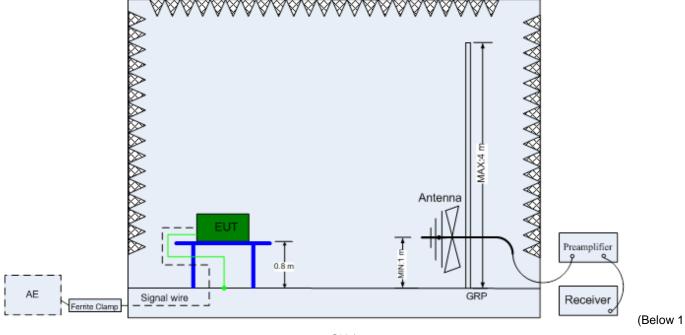


5.5.2 Test Setup 2

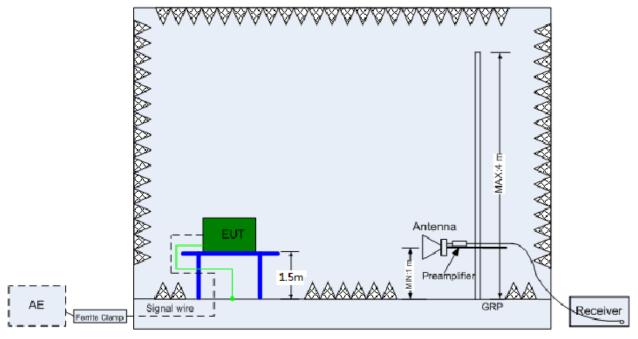
The semi-anechoic chamber and full-anechoic chamber has met the requirement of ANSI C63.4. The test distance is 3m.The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).





GHz)



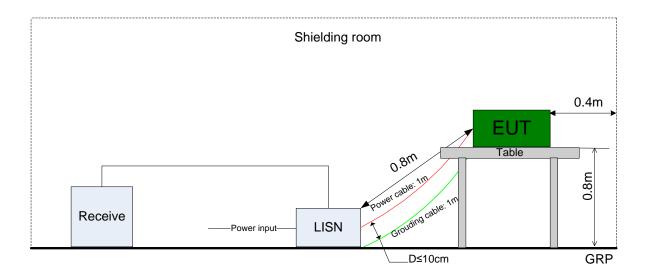
(Above 1 GHz)

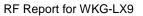


5.5.3 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.









5.6 Test Conditions

Test Case	Test Conditions				
	Configuration	Description			
DTS (6 dB)	Measurement Method	FCC KDB 558074 D01 §8.2 Option 1.			
Bandwidth	Test Environment	TN/VN			
	Test Setup	Test Setup 1			
	EUT Configuration	All EUT conf. with Tx modes.			
Occupied	Measurement Method	ANSI C63.10 Section 6.9.3			
Bandwidth	Test Environment	TN/VN			
	Test Setup	Test Setup 1			
	EUT Configuration	All EUT conf. with Tx modes.			
Maximum	Measurement Method	FCC KDB 558074 D01 §8.3.2.3			
Conducted Average	Test Environment	TN/VN			
Output Power	Test Setup	Test Setup 1			
	EUT Configuration	All EUT conf. with Tx modes.			
Maximum Power	Measurement Method	FCC KDB 558074 D01 §8.4			
Spectral Density	Test Environment	TN/VN			
Level	Test Setup	Test Setup 1			
	EUT Configuration	All EUT conf. with Tx modes.			
Band Edges	Measurement Method	FCC KDB 558074 D01 §8.7			
Compliance	Test Environment	TN/VN			
	Test Setup	Test Setup 1			
	EUT Configuration	All EUT conf. with Tx modes.			
Unwanted	Measurement Method	FCC KDB 558074 D01 §8.5			
Emissions into	Test Environment	TN/VN			
Non-Restricted	Test Setup	Test Setup 1			
Frequency Bands	EUT Configuration	All EUT conf. with Tx modes.			
Unwanted	Measurement Method	ANSI C63.10; FCC KDB 558074 D01 §8.6, Radiated			
Emissions into	Test Environment	TN/VN			
Restricted	Test Setup	Test Setup 2			
Frequency Bands	EUT Placement	☐ Flatwise, ☐ Upright, ☐ Hung			
(Radiated)	EUT Configuration	All EUT conf. with Tx modes.			
AC Power Line	Measurement Method	AC mains conducted.			
Conducted	Test Environment	TN/VN			
Emissions	Test Setup	Test Setup 3			
	EUT Configuration	11B@Ant1 (Worst Conf.).			



6 Main Test Instruments

6.1 Current Test Project/Report

Main Test Equipments(BT/WIFI test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Power Sensor	R&S	NRP2	103085/106211	2021/03/13	2022/03/12
Spectrum Analyzer	R&S	FSW26	101474	2020/08/09	2021/08/08
Universal Radio Communication Tester	R&S	CMW500	164698	2021/03/13	2022/03/12

Main Test Equipments(RE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100150	2020/11/06	2021/11/05
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2021/04/28	2023/04/27
Trilog Broadband Antenna	SCHWARZB	VULB 9163	9163-1303	2020/08/10	2022/08/09
(30M~3GHz)	ECK	VOLB 9103	9103-1303	2020/06/10	2022/06/09
Trilog Broadband Antenna	SCHWARZB	HF907	100391	2019/10/16	2021/10/15
(1GHz~18GHz)	ECK	111-907	100391	2019/10/10	2021/10/13
Trilog Broadband Antenna	SCHWARZB	BBHA 9170	BBHA9170647	2019/10/29	2021/10/28
(18GHz~40GHz)	ECK	BBHA 9170	BBI IA9170047	2019/10/29	2021/10/20
Software Information					
Test Item	Software Name		Manufacturer		Version
RE	EMC32		R&S		V9.25.0

Main Test Equipments(CE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100150	2020/11/06	2021/11/05
Line Impedance Stabilization Network	R&S	ENV216	101176	2020/7/13	2021/07/12
	Software Information				
Test Item	Software Name		Manufacturer		Version
CE	EMC32		R&S		V9.25.0



7 Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmit Output Power Data	Power [dBm]	U = 0.39 dB
RF Power Density, Conducted	Power [dBm]	U = 0.66 dB
Bandwidth	Magnitude [kHz]	20MHz: U=41.78kHz
		40MHz: U=82.12kHz
Band Edge Compliance	Disturbance Power [dBm]	U = 0.9 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	20MHz~3.6GHz: U=0.88dB
		3.6GHz~8.4GHz: U=1.08dB
		8.4GHz~13.6GHz: U=1.24dB
		13.6GHz~22GHz: U=1.34dB
		22GHz~26.5GHz: U=1.36dB
Field Strength of Spurious Radiation	ERP/EIRP [dBm]	For 3 m Chamber:
		U = 3.868 dB (9 kHz to 150 kHz)
		U = 3.782 dB (150 kHz to 30 MHz)
		U = 5.24 dB (30 MHz-1 GHz)
		U = 4.84 dB (1 GHz-18 GHz)
		U = 4.62 dB (18 GHz-26.5 GHz)
AC Power Line Conducted Emissions	Disturbance Voltage[dBµV]	U=2.3 dB
Duty Cycle	Duty Cycle [%]	U=±2.06 %

8 Appendixes

Appendix No.	Description
SYBH(Z-RF)20210525030001-2004-A	Appendix for 2.4G WLAN(Conducted)
SYBH(Z-RF)20210525030001-2004-B	Appendix for 2.4G WLAN(Radiated)

Note: We tested all modes & antennas, and the data presented in the appendix is the worst case.

END