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# FCC Test Report

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Report No.: AGC02472210903FE05A

**FCC ID** : 2AD56HLK-B36

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : 2.4GHz wireless LAN/Bluetooth module

**BRAND NAME** : HI-LINK

**MODEL NAME** : HLK-B36, HLK-B36-F

**APPLICANT** : Shenzhen Hi-Link Electronic CO., Ltd

**DATE OF ISSUE** : Feb. 02, 2023

**STANDARD(S)** : FCC Part 15.247

**TEST PROCEDURE(S)**

**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Feb. 02, 2023	Valid	Initial Release

**Note:** The original test report AGC02472210903FE05 (dated Oct. 18, 2021 and tested from Oct. 08, 2021 to Oct. 18, 2021) was modified on Feb. 02, 2023, including the following changes and additions:

- The original module adds the antenna naming series model difference only the antenna type is different;
- Change the address of the applicant;
- Change the address of the manufacture;
- Change the address of the factory;

Based on the above changes, additional tests for Radiation Emission and AC power line Conducted Emission.

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## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	Shenzhen Hi-Link Electronic CO., Ltd
<b>Address</b>	1705, 1706, 1709A, Building E, Xinghe WORLD, Minle Community, Minzhi Street, Longhua District, Shenzhen
<b>manufacturer</b>	Shenzhen Hi-Link Electronic CO., Ltd
<b>Address</b>	1705, 1706, 1709A, Building E, Xinghe WORLD, Minle Community, Minzhi Street, Longhua District, Shenzhen
<b>Factory</b>	Shenzhen Hi-Link Electronic CO., Ltd
<b>Address</b>	1705, 1706, 1709A, Building E, Xinghe WORLD, Minle Community, Minzhi Street, Longhua District, Shenzhen
<b>Product Designation</b>	2.4GHz wireless LAN/Bluetooth module
<b>Brand Name</b>	HI-LINK
<b>Test Model</b>	HLK-B36
<b>Series Model</b>	HLK-B36-F
<b>Difference description</b>	All the series models are the same as the test model except for the antenna: the HLK-B36-F adding an external antenna.
<b>Date of receipt of test item</b>	Jan. 03, 2023
<b>Date of test</b>	Jan. 04, 2023 to Feb. 02, 2023
<b>Deviation</b>	No any deviation from the test method
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Prepared By



Alan Duan  
(Project Engineer)

Feb. 02, 2023

Reviewed By



Calvin Liu  
(Reviewer)

Feb. 02, 2023

Approved By



Max Zhang  
(Authorized Officer)

Feb. 02, 2023

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as “2.4GHz wireless LAN/Bluetooth module”. It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Equipment Type</b>	WLAN 2.4G
<b>Frequency Band</b>	2400MHz ~ 2483.5MHz
<b>Operation Frequency</b>	2412MHz ~ 2462MHz
<b>Output Power (Average)</b>	IEEE 802.11b:16.66dBm; IEEE 802.11g:14.82dBm; IEEE 802.11n(20):13.85dBm; IEEE 802.11n(40):10.87dBm
<b>Output Power (Peak)</b>	IEEE 802.11b:19.07dBm; IEEE 802.11g:17.66dBm; IEEE 802.11n(20):16.91dBm; IEEE 802.11n(40):13.59dBm
<b>Modulation</b>	802.11b:DQPSK, DBPSK, CCK 802.11g/n: 64-QAM, 16-QAM, QPSK, BPSK
<b>Data Rate</b>	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps
<b>Number of channels</b>	11
<b>Hardware Version</b>	V1.4
<b>Software Version</b>	HLK-B36
<b>Antenna Designation</b>	Antenna 1: PCB Antenna Antenna 2: External Antenna (Comply with requirements of the FCC part 15.203)
<b>Antenna Gain</b>	1dBi
<b>Power Supply</b>	DC 3.3V

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## 2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
	6	2437 MHZ
	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11. For 40MHZ bandwidth system use Channel 3 to Channel 9

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### 2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps)	
									800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

### 2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AD56HLK-B36** filing to comply with the FCC Part 15 requirements.

### 2.5. TEST METHODOLOGY

KDB 558074 D01 15.247 Meas Guidance v05: Guidance for compliance measurements on Digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules  
ANSI C63.10:2013: American National Standard for Testing Unlicensed Wireless Devices

### 2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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## 2.8. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 3.1 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.8 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2.7 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$

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#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel transmitting (TX)
2	Middle channel transmitting (TX)
3	High channel transmitting (TX)

Note:  
Transmit by 802.11b with Data rate (1/2/5.5/11)  
Transmit by 802.11g with Data rate (6/9/12/18/24/36/48/54)  
Transmit by 802.11n (20MHz) with Data rate (6.5/13/19.5/26/39/52/58.5/65)  
Transmit by 802.11n (40MHz) with Data rate (13.5/27/40.5/54/81/108/121.5/135)  
The test channel for 20MHZ bandwidth system is channel 1, 6 and 11.  
The test channel for 40MHZ bandwidth system is channel 3, 6 and 9.

#### Note:

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the EUT is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.

#### Software Setting



无线网卡认证测试工具 V1.1.14

语言: ☒ 中文 ☐ English

端口: COM4 搜索模块

序号	端口	设备ID
1	COM4	286DCDA27AAA

Wi-Fi

信道: 13 模式: 11b 速率: 11M

发送测试

☒ 单载波测试 ☒ 温度补偿

增益: 23 包长: 512 间隔: 0 ms

启动发送

接收测试

期望包数: 接收包数: 收包率:

启动接收 查询收包数

Bluetooth

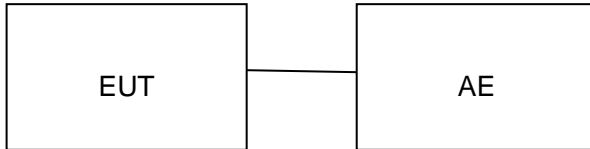
启动蓝牙测试 停止蓝牙测试

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## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure:



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	2.4GHz wireless LAN/Bluetooth module	HLK-B36-F	2AD56HLK-B36	EUT
2	Control Box	N/A	USB-TTL	AE
3	Redmi notebook PC 1	XMA2002-AB	--	AE
4	PC adapter 1	HW-200200CP1	--	AE

### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.207	Line Conduction Emission	Compliant

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## 6. TEST FACILITY

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Mar. 28, 2022	Mar. 27, 2023
LISN	R&S	ESH2-Z5	100086	Jun. 08, 2022	Jun. 07, 2023
Test software	R&S	ES-K1	Ver V1.71	N/A	N/A

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Mar. 28, 2022	Mar. 27, 2023
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
2.4GHz Fliter	Micro-tronics	087	N/A	N/A	N/A
Attenuator	Weinachel Corp	58-30-33	N/A	Aug. 04, 2022	Aug. 03, 2024
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Oct. 31, 2021	Oct. 30, 2023
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	00034609	Mar. 12, 2022	Mar. 21, 2024
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Aug. 04, 2022	Aug. 03, 2024
ANTENNA	SCHWARZBECK	VULB9168	D69250	Jan. 05, 2023	Jan. 04, 2025
Test software	Tonscend	JS32-RE	Ver.2.5	N/A	N/A

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## 7. RADIATED EMISSION

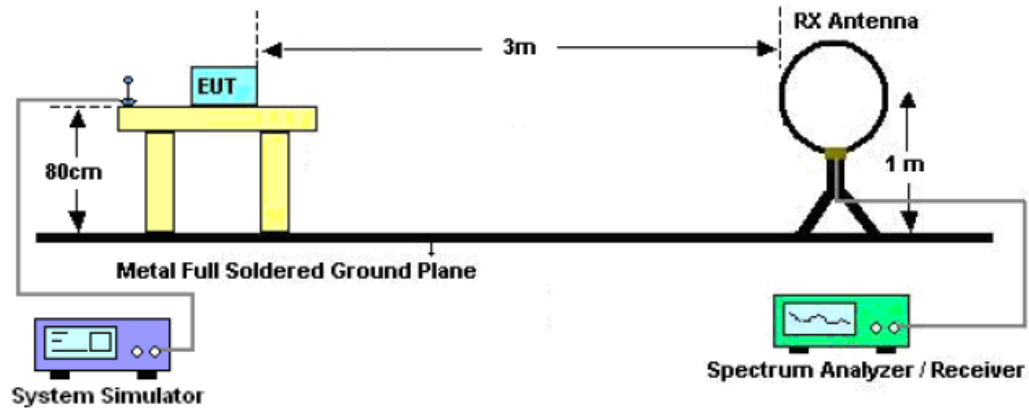
### 7.1. MEASUREMENT PROCEDURE

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 emission, 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 RBW and 3MHz VBW for peak reading. 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.

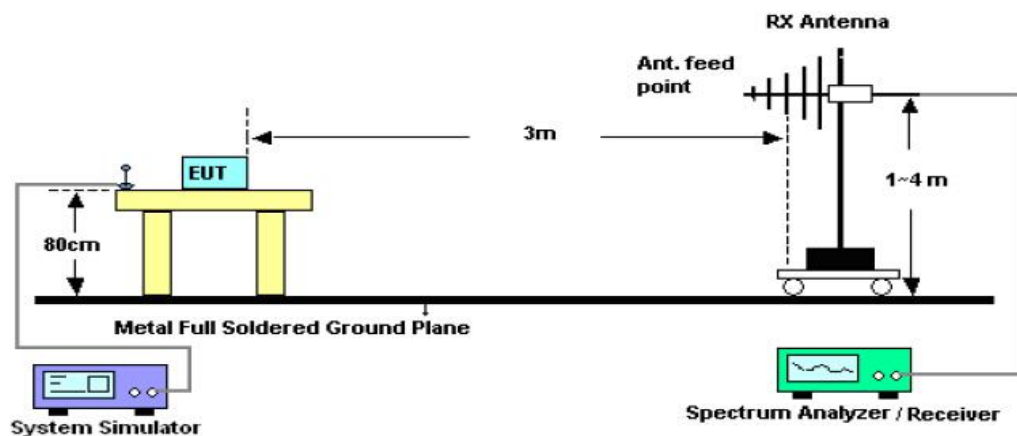
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## 7.2. TEST SETUP

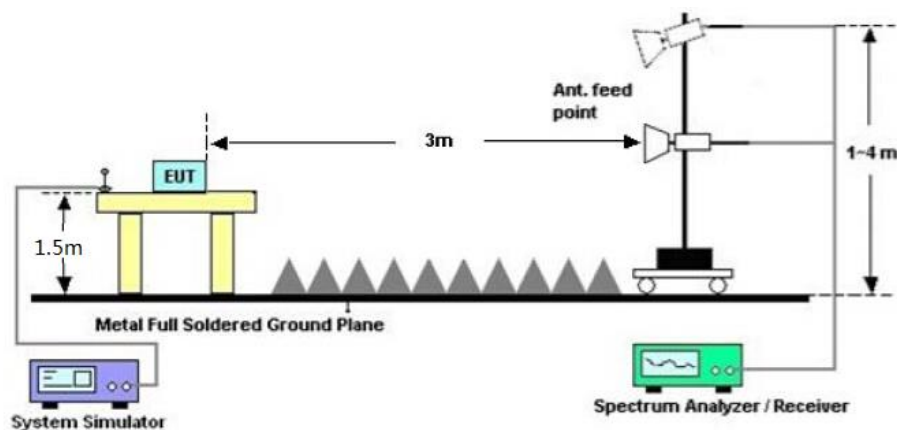
### Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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### 7.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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: All modes were tested for restricted band radiated emission,  
the test records reported below are the worst result compared to other modes.

### 7.4. TEST RESULT

#### Radiated emission below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

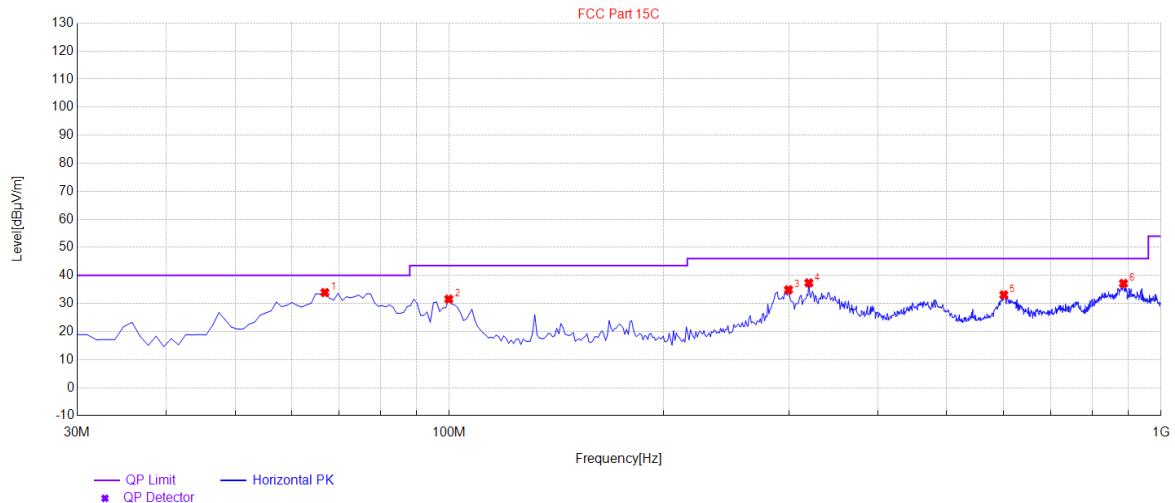
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### Radiated emission from 30MHz to 1000MHz

<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHz	<b>Antenna</b>	Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	66.86	33.89	11.83	40.00	6.11	100	40	Horizontal
2	99.84	31.53	21.38	43.50	11.97	100	360	Horizontal
3	299.66	34.87	16.63	46.00	11.13	100	10	Horizontal
4	320.03	37.34	21.33	46.00	8.66	100	260	Horizontal
5	601.33	33.09	28.67	46.00	12.91	100	170	Horizontal
6	885.54	37.14	32.82	46.00	8.86	100	170	Horizontal

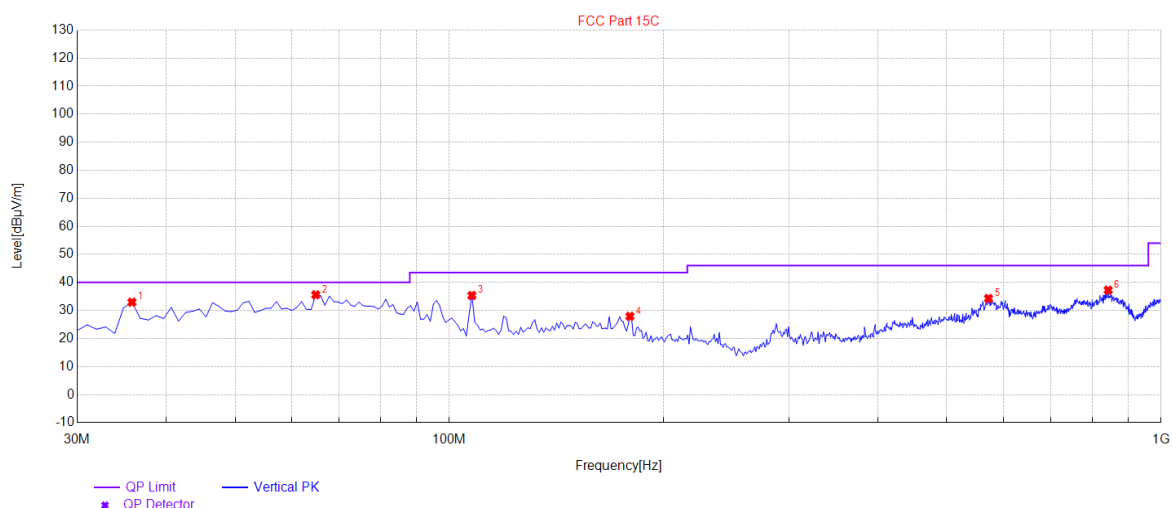
**RESULT: PASS**

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EUT	2.4GHz wireless LAN/Bluetooth module	Model Name	HLK-B36-F
Temperature	25°C	Relative Humidity	58%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHz	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.82	32.95	10.94	40.00	7.05	100	110	Vertical
2	64.92	35.58	14.24	40.00	4.42	100	180	Vertical
3	107.6	35.35	14.62	43.50	8.15	100	80	Vertical
4	179.38	27.90	15.21	43.50	15.60	100	130	Vertical
5	572.23	34.29	25.57	46.00	11.71	100	0	Vertical
6	842.86	37.25	32.45	46.00	8.75	100	10	Vertical

## RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

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### Radiated emission above 1GHz

<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHz	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.000	54.69	0.08	54.77	74	-19.23	peak
4824.000	45.34	0.08	45.42	54	-8.58	AVG
7236.000	49.62	2.21	51.83	74	-22.17	peak
7236.000	40.13	2.21	42.34	54	-11.66	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2412MHz	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4824.000	55.13	0.08	55.21	74	-18.79	peak
4824.000	46.31	0.08	46.39	54	-7.61	AVG
7236.000	50.25	2.21	52.46	74	-21.54	peak
7236.000	41.39	2.21	43.6	54	-10.4	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2437MHz	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.000	55.39	0.14	55.53	74	-18.47	peak
4874.000	46.34	0.14	46.48	54	-7.52	AVG
7311.000	51.27	2.36	53.63	74	-20.37	peak
7311.000	41.03	2.36	43.39	54	-10.61	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2437MHz	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4874.000	56.27	0.14	56.41	74	-17.59	peak
4874.000	46.21	0.14	46.35	54	-7.65	AVG
7311.000	50.13	2.36	52.49	74	-21.51	peak
7311.000	41.25	2.36	43.61	54	-10.39	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

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<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHz	<b>Antenna</b>	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.000	55.39	0.22	55.61	74	-18.39	peak
4924.000	46.31	0.22	46.53	54	-7.47	AVG
7386.000	50.13	2.64	52.77	74	-21.23	peak
7386.000	41.35	2.64	43.99	54	-10.01	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

<b>EUT</b>	2.4GHz wireless LAN/Bluetooth module	<b>Model Name</b>	HLK-B36-F
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	58%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	802.11b with data rate 1 2462MHz	<b>Antenna</b>	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4924.000	56.91	0.22	57.13	74	-16.87	peak
4924.000	46.28	0.22	46.5	54	-7.5	AVG
7386.000	51.03	2.64	53.67	74	-20.33	peak
7386.000	42.34	2.64	44.98	54	-9.02	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

## RESULT: PASS

### Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The “Factor” value can be calculated automatically by software of measurement system.

All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report.

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## 8. LINE CONDUCTED EMISSION TEST

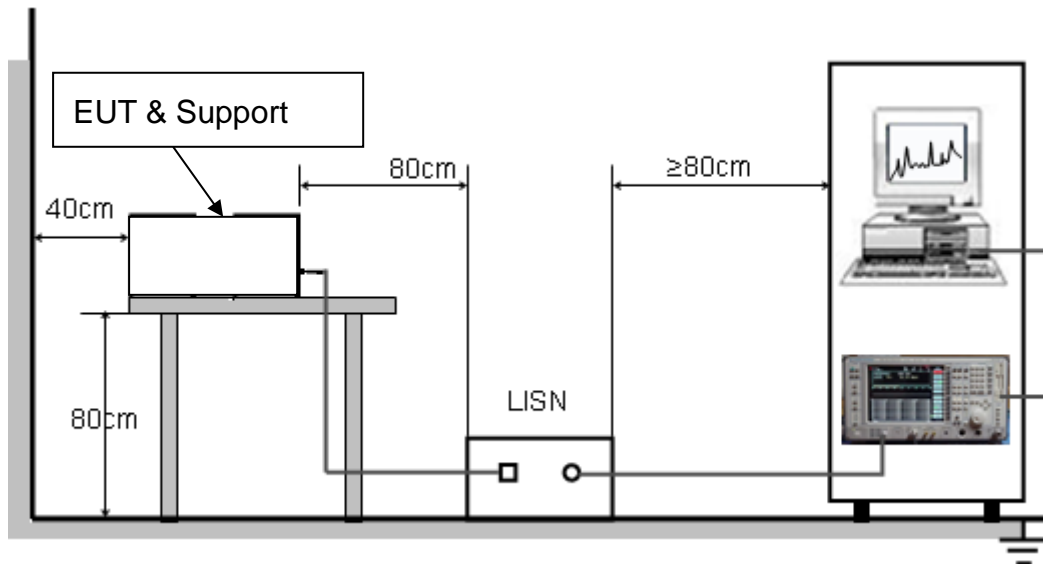
### 8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P (dB $\mu$ V)	Average (dB $\mu$ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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### 8.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 Ohm load; the second scan had Line 1 connected to a 50 Ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

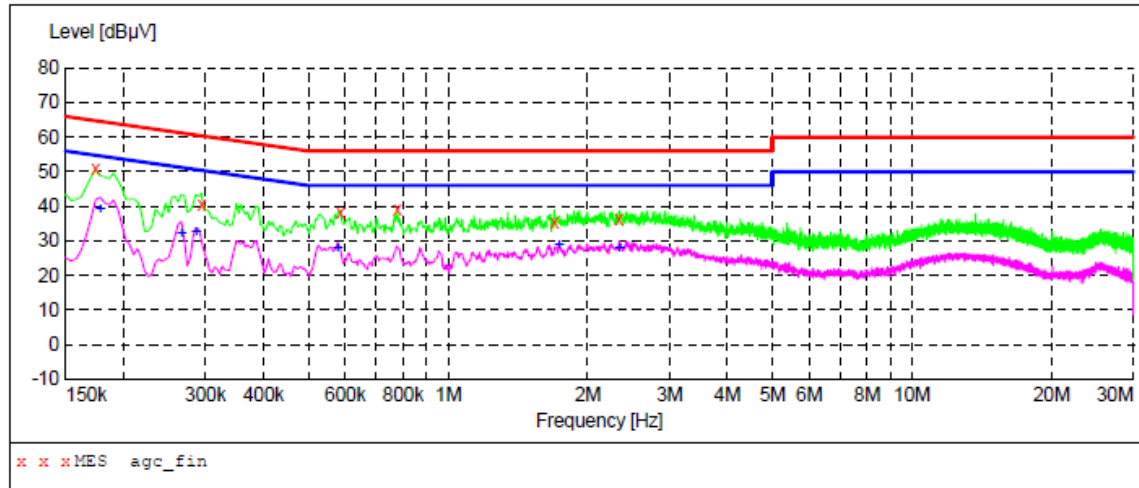
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case was reported on the Summary Data page.

## 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

### Line Conducted Emission Test Line 1-L



#### MEASUREMENT RESULT: "agc\_fin"

2023/1/31 15:31

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.174000	50.70	6.7	65	14.1	QP	L1
0.294000	40.40	6.1	60	20.0	QP	L1
0.586000	38.00	5.4	56	18.0	QP	L1
0.778000	38.90	5.4	56	17.1	QP	L1
1.694000	35.10	6.2	56	20.9	QP	L1
2.338000	36.10	6.5	56	19.9	QP	L1

#### MEASUREMENT RESULT: "agc\_fin2"

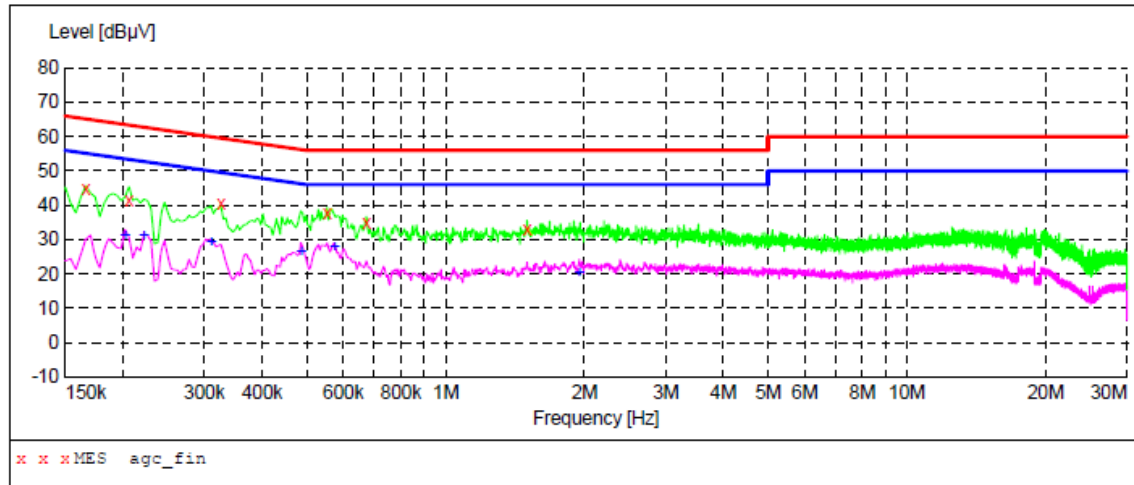
2023/1/31 15:30

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.178000	39.20	6.7	55	15.4	AV	L1
0.266000	31.90	6.2	51	19.3	AV	L1
0.286000	32.40	6.1	51	18.2	AV	L1
0.578000	27.60	5.4	46	18.4	AV	L1
1.734000	28.60	6.3	46	17.4	AV	L1
2.338000	27.90	6.5	46	18.1	AV	L1

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### Line Conducted Emission Test Line 2-N



#### MEASUREMENT RESULT: "agc\_fin"

2023/1/31 15:35

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.166000	44.70	6.8	65	20.5	QP	N
0.206000	41.50	6.5	63	21.9	QP	N
0.326000	40.50	5.9	60	19.1	QP	N
0.554000	37.80	5.4	56	18.2	QP	N
0.674000	34.80	5.4	56	21.2	QP	N
1.502000	33.00	6.0	56	23.0	QP	N

#### MEASUREMENT RESULT: "agc\_fin2"

2023/1/31 15:36

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.202000	31.00	6.5	54	22.5	AV	N
0.222000	31.30	6.4	53	21.4	AV	N
0.310000	29.10	6.0	50	20.9	AV	N
0.486000	26.50	5.4	46	19.7	AV	N
0.574000	27.70	5.4	46	18.3	AV	N
1.950000	20.20	6.4	46	25.8	AV	N

### RESULT: PASS

**Note:** All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.

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## **APPENDIX A: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC02472210903AP01

## **APPENDIX B: PHOTOGRAPHS OF EUT**

Refer to the Report No.: AGC02472210903AP02

**----END OF REPORT----**

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3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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