

Huawei Technologies Co.,Ltd

Application
For
Certification

FCC ID: QISHG630V2

Home Gateway

Model: HG630 V2

Class B Personal Computer Peripherals

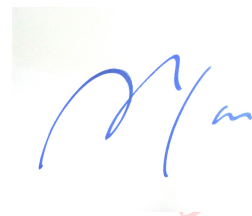
Report No.: 140717005SZN-002

Prepared and Checked by:

Approved by:

Sign on file

Lin Lin
Senior Project Engineer



Digitally signed
by Andy Yan
Location: Intertek
Testing Services

Andy Yan
Project Engineer
Date: 22 July 2014

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- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C_PC_b

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INTERTEK TESTING SERVICES

LIST OF EXHIBITS

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MEASUREMENT / TECHNICAL REPORT

Huawei Technologies Co.,Ltd

MODEL: HG630 V2

FCC ID: QISHG630V2

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type: JBP-Part 15 Class B Computing Device/Peripherals

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes ☐ No ☒

If no, assumed Part 15, Subpart B for unintentional radiator – the new 47 CFR [10-01-13 Edition] provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Home Gateway, It is powered by AC/DC Adapter. The personal computers can through this router to connect with internet for personal use. For more detailed features description, please refer to the user's manual.

1.2 Related Submittal(s) Grants

This is an application for certification of a computer peripherals.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The Semi-anechoic chamber and shielding room used to collect the radiated data and conducted data are **Intertek Test Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

EXHIBIT 2
SYSTEM TEST CONFIGURATION

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2.0 System Test Configuration

2.1 Justification

The system was configured for Test in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The device was powered by AC Adapter through 120V/60Hz during the test. The worst case data was reported in this report.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. The step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for Test in a typical fashion (as a customer would normally use it). The EUT was placed on turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The frequency range from 30MHz to 2GHz (EUT highest frequency is 375MHz, so according to 15.33, the test range is update to 2GHz) was searched for spurious emissions from the device. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

2.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted Test was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified Test.

2.3 Special Accessories

N/A

2.4 Equipment Modification

Any modifications installed previous to Test by Huawei Technologies Co.,Ltd Will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Test Services Shenzhen Ltd. Kejiyuan Branch.

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2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Refer List:

Description	Manufacturer	Model No.	
Laptop	Lenovo	T420	
Hard Disk	Smart.drive	HD-003	
USB Cable	Smart.drive	Unshielded, Length 155cm	
1394 Cable	Smart.drive	Unshielded, Length 180cm	
RJ45 Cable*4	N/A	Unshielded, Length: 200cm	
RJ11 Cable*1	N/A	Unshielded, Length: 600cm	
DSL simulator	Huawei	02GN	
USB storage	Kingston	2GB	
AC Adapter	Huawei	Xinqiao	HW-120050U1W Input:100-240V 50/60Hz; Output: 12Vdc, 1A
		Huntkey	
		Note: This production has two AC/DC Adapter suppliers, and had been arranged testing separately, and the worst-case test data was recorded in this report.	
Router*4	TP-LINK	TL-MR11U	

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EXHIBIT 3

EMISSION RESULTS

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3.0 **Emission Results**

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG$$

Example

Assume a receiver reading of 62.0dB μ V is obtained. The antenna factor of 7.4dB and cable factor of 1.6dB is added. The amplifier gain of 29dB is subtracted. The net field strength for comparison to the appropriate emission limit is 32dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0\text{dB}\mu\text{V}$$

$$AF = 7.4\text{dB}$$

$$CF = 1.6\text{dB}$$

$$AG = 29.0\text{dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 = 42\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(42\text{dB}\mu\text{V/m})/20] = 125.9\mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
At
45.689MHz (Data transfer Mode)

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 3.8dB margin (Data transfer Mode)

TEST PERSONNEL:

Sign on file

Lin Lin Senior Project Engineer
Typed/Printed Name

17 July 2014
Date

INTERTEK TESTING SERVICES

Applicant: Huawei Technologies Co.,Ltd

Model: HG630 V2

Worst case operating Mode: Data transfer (AC/DC Adapter: Huntkey)

Radiated Emissions (30MHz~2GHz)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	45.689	44.8	20.0	11.4	36.2	40.0	-3.8
Horizontal	130.595	52.0	20.0	7.5	39.5	43.5	-4.0
Horizontal	160.882	48.6	20.0	8.3	36.9	43.5	-6.6
Vertical	35.023	35.5	20.0	16.5	32.0	40.0	-8.0
Vertical	43.299	38.8	20.0	12.2	31.0	40.0	-9.0
Vertical	256.029	48.1	20.0	12.1	40.2	46.0	-5.8
Vertical	1843.000	35.9	20.0	29.9	45.8	54.0	-8.2

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz and PEAK detector is used for frequency from 1-2GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3 meter distances were measured at 0.3- meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. All emissions up to 1GHz are below the QP limit and all emissions between 1-2GHz are below the AV limit.

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3.4 Conducted Emission Configuration Photograph

Worst Case Live-Conducted Configuration
at
3.406 MHz (Data transfer Mode)

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

3.5 Conducted Emission Data

Judgement: Passed by 18.7 dB margin (Data transfer Mode)

TEST PERSONNEL:

Sign on file

Lin Lin Senior Project Engineer
Typed/Printed Name

17 July 2014
Date

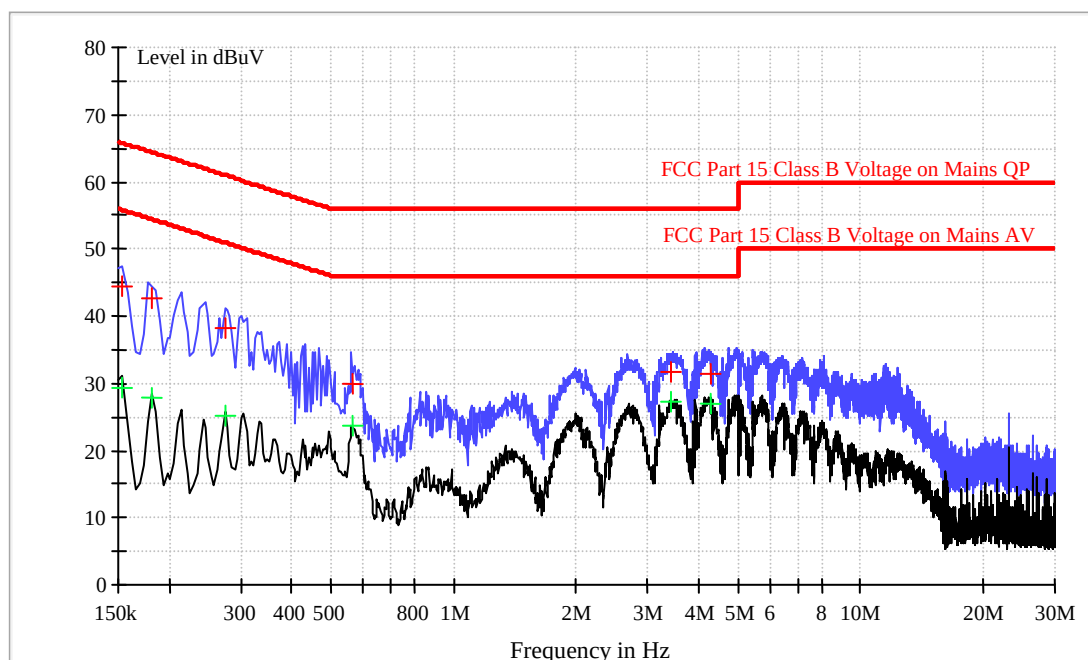
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Applicant: Huawei Technologies Co.,Ltd

Model: HG630 V2

Worst case operating Mode: Data transfer (AC/DC Adapter: Huntkey)

Conducted Emission Test – FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154000	44.4	L1	9.8	21.4	65.8
0.182000	42.6	L1	9.8	21.8	64.4
0.274000	38.1	L1	9.8	22.9	61.0
0.566000	29.9	L1	9.9	26.1	56.0
3.406000	31.7	L1	10.0	24.3	56.0
4.286000	31.5	L1	10.0	24.5	56.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154000	29.3	L1	9.8	26.5	55.8
0.182000	28.0	L1	9.8	26.4	54.4
0.274000	25.2	L1	9.8	25.8	51.0
0.566000	23.8	L1	9.9	22.2	46.0
3.406000	27.3	L1	10.0	18.7	46.0
4.286000	27.0	L1	10.0	19.0	46.0

TRF No.: FCC 15C_PC_b

FCC ID: QISHG630V2

Report No.: 140717005SZN-002

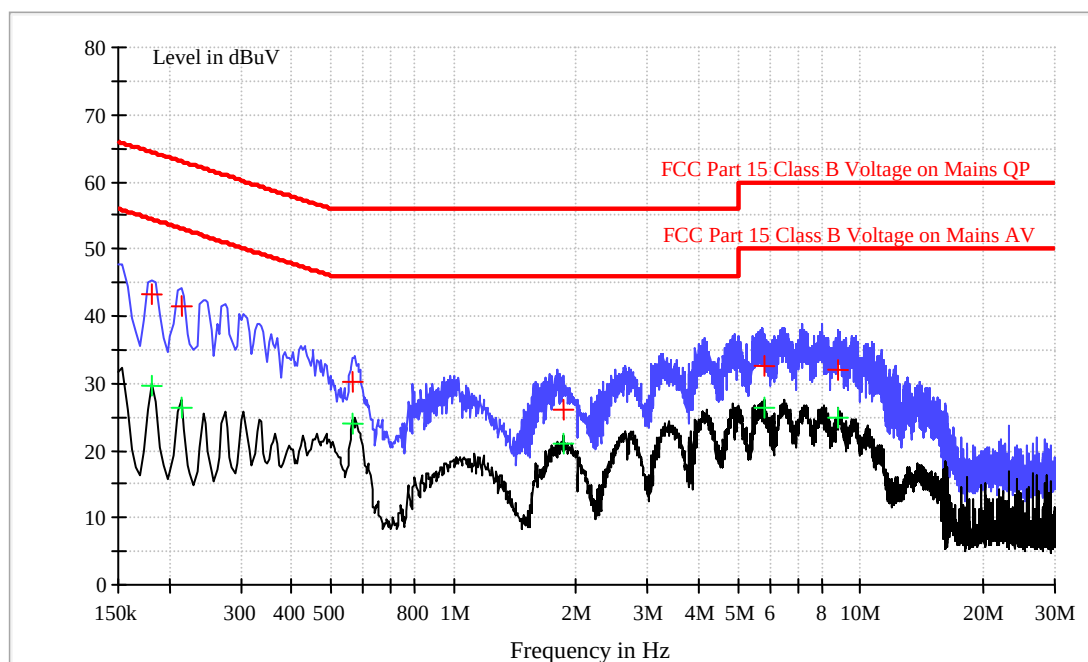
INTERTEK TESTING SERVICES

Applicant: Huawei Technologies Co.,Ltd

Model: HG630 V2

Worst case operating Mode: Data transfer (AC/DC Adapter: Huntkey)

Conducted Emission Test – FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.182000	43.3	N	10.1	21.1	64.4
0.214000	41.4	N	10.1	21.6	63.0
0.566000	30.3	N	10.2	25.7	56.0
1.870000	26.2	N	10.3	29.8	56.0
5.786000	32.6	N	10.3	27.4	60.0
8.822000	31.9	N	10.4	28.1	60.0

Result Table AV

Frequency (MHz)	CAverage (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.182000	29.6	N	10.1	24.8	54.4
0.214000	26.3	N	10.1	26.7	53.0
0.566000	24.1	N	10.2	21.9	46.0
1.870000	21.1	N	10.3	24.9	46.0
5.786000	26.5	N	10.3	23.5	50.0
8.822000	25.0	N	10.4	25.0	50.0

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EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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4.0 **Equipment Photographs**

For electronic filing, photographs of the tested EUT are saved with filename: external photos.pdf and internal photos.pdf.

EXHIBIT 5
PRODUCT LABELLING

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5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

EXHIBIT 6
TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram of the tested EUT is saved with filename: block.pdf.

EXHIBIT 7
INSTRUCTION MANUAL

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7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold / leased in the United States.

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EXHIBIT 8

MISCELLANEOUS INFORMATION

INTERTEK TESTING SERVICES

8.0 Miscellaneous Information

This miscellaneous information includes emission measuring procedure.

8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Test Services in the measurements of computer peripheral operating under Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2009.

The computer equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are varied during the Test to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions are in QP mode from the frequency band 30MHz to 1GHz with RBW setting 120kHz. Detector function for radiated emissions are in PK&AV mode from the frequency band above 1GHz with RBW setting 1MHz. Detector function for conducted emissions are in QP & AV mode and IFBW setting is 9kHz from the frequency band 150kHz to 30MHz.

For radiated emission, the frequency range scanned is 30MHz to 2GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

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8.1 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

Conducted measurements are made as described in ANSI C63.4 - 2009.

EXHIBIT 9
CONFIDENTIALITY REQUEST

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9.0 **Confidentiality Request**

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

EXHIBIT 10
TEST EQUIPMENT LIST

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10.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	28-Jun-2014	28-Jun-2015
SZ185-01	EMI Receiver	R&S	ESCI	100547	10-Mar-2014	10-Mar-2015
SZ061-09	Horn Antenna	ETS	3115	00092346	16-Nov-2013	16-Nov-2014
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	10-Mar-2014	10-Mar-2015
SZ181-04	Preamplifier	Agilent	8449B	3008A0247 4	10-Mar-2014	10-Mar-2015
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	19-Apr-2014	19-Apr-2015
SZ062-02	RF Cable	RADIAL	RG 213U	--	19-Apr-2014	19-Oct-2014
SZ062-05	RF Cable	RADIAL	0.04-26.5GHz	--	19-Apr-2014	19-Oct-2014
SZ062-12	RF Cable	RADIAL	0.04-26.5GHz	--	19-Apr-2014	19-Oct-2014
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	9-Nov-2013	9-Nov-2014
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	9-Nov-2013	9-Nov-2014
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	9-Nov-2013	9-Nov-2014
SZ188-03	Shielding Room	ETS	RFD-100	4100	23-Aug-2013	23-Aug-2014