



TEST REPORT


BUREAU
VERITAS

ENERGY EFFICIENCY - SMALL AIR CONDITIONER


Report Number:	BXH-EGZ-P22060461-3
Date of Issue:	29-Jun-2022
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Testing Laboratory/Address:	Bureau Veritas Consumer Products Services (Guangzhou) Co., Ltd, Science City Branch Rm.101, G5 Building, South China Advanced Materials Innovation Park, No.31 Kefeng Rd, Guangzhou Science City, Guangzhou, 510663 China
Applicant/Address:	Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd. No.218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, China
Manufacturing Site/Address:	Same as the applicant
Testing Location/Address:	Same as the applicant
Product:	VRF AIR-CONDITIONER(HEAT PUMP)
Trade Mark:	Hisense
Model(s):	Outdoor unit:AVW-54HJFHH1
Model Similarity:	N/A
Ratings:	220-240V~ 50/60Hz
Date of Sample(s) Received:	21-May-2022
Date of Test Started:	21-May-2022
Date of Test Finished:	27-May-2022
Standard(s)/Regulation(s):	(EU) 2016/2281 EN 14825:2018 EN 14511-1,2,3,4:2018
Conclusion:	The product tested complies with the ErP requirements.
Prepared by (name, function, signature):	Henry DENG Engineer
Approved by (name, function, signature):	Jeff ZHANG Performance Manager

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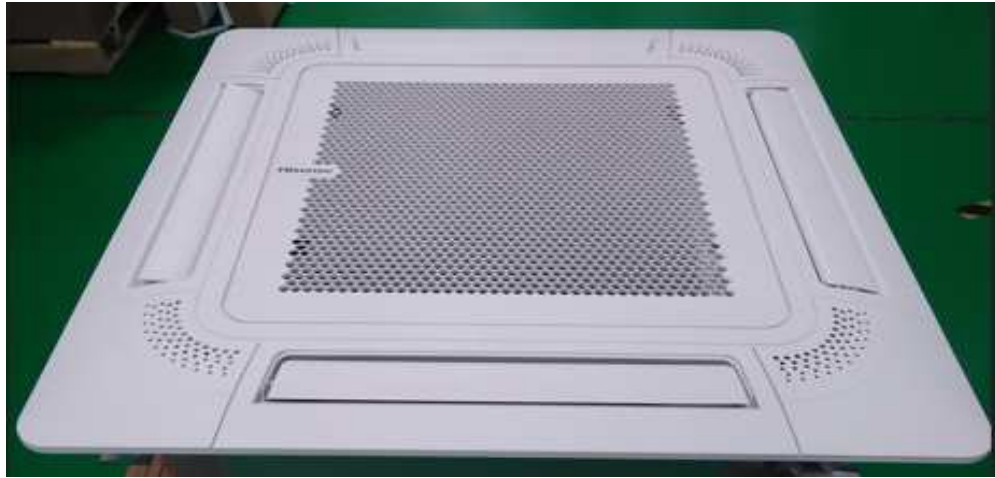
Photos:**1. Nameplate of indoor side showing model number and serial number (if applicable)**

Hisense VRF AIR-CONDITIONER(HEAT PUMP)			
MODEL AVW-54HJFHH1			
RATED POWER SUPPLY	220-240 V ~ 50/60 Hz	REFRIGERANT (R410A)	4.0 kg
COOLING CAPACITY	15.5 kW 53000 Btu/h	NET WEIGHT	90 kg
HEATING CAPACITY	18.0 kW 61500 Btu/h	AIR FLOW RATE	4260 m³/h
COOLING STANDARD INPUT	4.21 kW	DESIGN PRESSURE(HI/LO.)	4.15 / 2.21 MPa
HEATING STANDARD INPUT	4.50 kW	STANDARD COOLING CONDITION	INDOOR°C 27 DB 19 WB OUTDOOR °C 35 DB — WB
COOLING STANDARD CURRENT	19.3 A	STANDARD HEATING CONDITION	INDOOR°C 20 DB — WB OUTDOOR °C 7 DB 6 WB
HEATING STANDARD CURRENT	20.6 A	COOLING RATED.	30.0 A 35 DB 24 WB 6.60 kW OUTDOOR °C 37 DB — WB
ANTI-ELECTRIC SHOCK	CLASS I	HEATING RATED.	30.0 A 15 DB — WB 6.60 kW OUTDOOR °C 11 DB 7.5 WB
DEGREES OF PROTECTION	IPX4	SERIAL NO.	QSH63WATM003
		MANUFACTURE DATE	2022-04-13
 Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd. 218, Qianwangang Road, Economic & Technical Development Zone, Qingdao, P.R. China / 1KHW0205300000 / H7D22297C / MADE IN CHINA			

2. Nameplate of outdoor side showing model number and serial number (if applicable)

Hisense MULTI-SPLIT 4-WAY CASSETTE TYPE AIR CONDITIONER			
MODEL AVC-13UXCSFBXU			
RATED POWER SUPPLY	220-240 V ~ 50/60 Hz	REFRIGERANT (R410A)	0 kg
COOLING CAPACITY	3.9 kW 13300 Btu/h	NET WEIGHT	23 kg
HEATING CAPACITY	4.5 kW 15000 Btu/h	AIR FLOW RATE	906 m³/h
COOLING STANDARD INPUT	0.06 kW	DESIGN PRESSURE(HI/LO.)	4.15 / 2.21 MPa
HEATING STANDARD INPUT	0.06 kW	STANDARD COOLING CONDITION	INDOOR°C 27 DB 19 WB OUTDOOR°C 35 DB - WB
COOLING STANDARD CURRENT	0.6 A	STANDARD HEATING CONDITION	INDOOR°C 20 DB - WB OUTDOOR°C 7 DB 6 WB
HEATING STANDARD CURRENT	0.6 A	COOLING RATED.	0.8 A - DB - WB 0.08 kW OUTDOOR°C - DB - WB
ANTI-ELECTRIC SHOCK	CLASS I	HEATING RATED.	0.8 A - DB - WB 0.08 kW OUTDOOR°C - DB - WB
DEGREES OF PROTECTION	IPX0	SERIAL NO.	
		MANUFACTURE DATE	
 Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd. No. 218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, China / 1KHN0501300300 / H7D14762D / MADE IN CHINA			

3. Indoor side (including accessories if applicable)



4. Outdoor side (including accessories if applicable)



5. Additional photos (if necessary)
NONE

Product Details

Item	Data
Model Number of Unit Under Tested	Outdoor unit:AVW-54HJFHH1 Indoor units:AVC-13UXCSFBXU, 4 units
Serial Number	N/A
Condition of Sample(s)	Production
Air Conditioner Type	Double/Multi Split
Power Supply (Single Phase/Three Phase/DC)	Single phase
Rated Voltage [V]	220-240
Rated Frequency [Hz]	50/60
Refrigerant	R410A
Charge of the Refrigerant [g]	4000
Air Distribution of Indoor Side	Non ducted
Indoor side heat exchanger	Air
Outdoor side heat exchanger	Air
Air Conditioner Mode	Reversible
Unit Mounting (applicable to non ducted split system)	Cassette
Capacity Control	Variable
Rated Cooling Power @T1 [W]	4210
Rated Cooling Capacity @T1 [W]	15500
Rated EER @T1 [W/W]	3.68
Rated Heating Power @H1 [W]	4500
Rated Heating Capacity @H1 [W]	18000
Rated COP @H1 [W/W]	4.00
Dimensions (for split systems only dimensions of the indoor unit, Width [mm]*Height [mm]*Length [mm])	For outdoor unit:950*990*320 For indoor units:840*238*840

Critical Components

Name	Manufacturer / Trademark	Type / Model	Technical data
Compressor	MITSUBISHI ELECTRIC (GUANGZHOU) COMPRESSOR CO., LTD.	MNB36FLAMC-L	DC 3Φ 39-328V, 30-360Hz, 3,58kW, 13,6A, R410A Synthetic insulation
Outdoor fan motor	Jiangsu ShangQi Group Co., Ltd.	ZWF-138K	DC280V, 138W, 8P, class E
Alternative	NIDEC SHIBAURA(Zhejiang) CORP	SIC-81FW-D8138-13	DC280V, 138W, 10P, class E
Alternative	WOLONG ELECTRIC GROUP CO.,LTD	ZWB378D58A	DC280V, 135W, Class B
Alternative	Panasonic	EHTS20AQH	Dimension W [mm]*H [mm]*D [mm] (970+941)*756*18.19 /Finned tube volume: 0.0262m ³

Ecodesign Requirements

Clause	Ecodesign requirements	Result - Remark	Verdict
1	Seasonal space heating energy efficiency of air heating products		--
(a)	From 1 January 2018, the seasonal space heating energy efficiency of air heating products shall not fall below the values in Table 1	(see appended table)	Pass
	For multi-split heat pumps, the manufacturer shall establish conformity with this regulation based on measurements and calculations according to Annex III.		Pass
	For each model of outdoor side unit, a list of recommended combinations with compatible indoor side units shall be included in the technical documentation.		Pass
	The declaration of conformity shall then apply to all combinations mentioned in this list.		Pass
	The list of recommended combinations shall be made available prior to the purchase/lease/hire of an outdoor side unit.		Pass
(b)	From 1 January 2021, the seasonal space heating energy efficiency of air heating products shall not fall below the values in Table 2	(see appended table)	Pass
	For multi-split heat pumps the manufacturer shall establish conformity with this regulation based on measurements and calculations according to Annex III.		Pass
	For each model of outdoor side unit, a list of recommended combinations with compatible indoor side units shall be included in the technical documentation.		Pass
	The declaration of conformity shall then apply to all combinations mentioned in this list.		Pass
	The list of recommended combinations shall be made available prior to the purchase/lease/hire of an outdoor side unit.		Pass
2	Seasonal space cooling energy efficiency of cooling products		--
(a)	From 1 January 2018, the seasonal space cooling energy efficiency of cooling products shall not fall below the values in Table 3	(see appended table)	Pass
	For multi-split air conditioners the manufacturer shall establish conformity with this regulation based on measurements and calculations according to Annex III.		Pass
	For each model of outdoor side unit, a list of recommended combinations with compatible indoor side units shall be included in the technical documentation.		Pass
	The declaration of conformity shall then apply to all combinations mentioned in this list.		Pass
	The list of recommended combinations shall be made available prior to the purchase/lease/hire of an outdoor side unit.		Pass
(b)	From 1 January 2021, the seasonal space cooling energy efficiency of cooling products shall not fall below the values in Table 4	(see appended table)	Pass

Clause	Ecodesign requirements	Result - Remark	Verdict
	For multi-split air conditioners the manufacturer shall establish conformity with this regulation based on measurements and calculations according to Annex III.		Pass
	For each model of outdoor side unit, a list of recommended combinations with compatible indoor side units shall be included in the technical documentation.		Pass
	The declaration of conformity shall then apply to all combinations mentioned in this list.		Pass
	The list of recommended combinations shall be made available prior to the purchase/lease/hire of an outdoor side unit.		
3	Seasonal energy performance ratio of high temperature process chillers		--
(a)	From 1 January 2018, the seasonal energy performance ratio of high temperature process chillers shall not fall below the values in Table 5	(see appended table)	Pass
(b)	From 1 January 2021, the seasonal energy performance ratio of high temperature process chillers shall not fall below the values in Table 6	(see appended table)	Pass
4	Emissions of nitrogen oxides		--
(a)	From 26 September 2018, the emissions of nitrogen oxides, expressed in nitrogen dioxide, of warm air heaters, heat pumps, comfort chillers and air conditioners shall not exceed values in Table 7		N/A
(b)	From 1 January 2021, the emissions of nitrogen oxides, expressed in nitrogen dioxide, of warm air heaters shall not exceed values in Table 8		N/A
5	Product information		--
(a)	From 1 January 2018, the instruction manuals for installers and end-users, and free access websites of manufacturers, their authorised representatives and importers shall provide the following product information		Pass
(1)	for warm air heaters, the information set out in Table 9 of this Annex, measured and calculated in accordance with Annex III		N/A
(2)	for comfort chillers, the information set out in Table 10 of this Annex, measured and calculated in accordance with Annex III		N/A
(3)	for air-to-air air conditioners, the information set out in Table 11 of this Annex, measured and calculated in accordance with Annex III		Pass
(4)	for water/brine-to-air air conditioners, the information set out in Table 12 of this Annex, measured and calculated in accordance with Annex III		N/A
(5)	for fan coil units, the information set out in Table 13 of this Annex, measured and calculated in accordance with Annex III		N/A
(6)	for heat pumps, the information set out in Table 14 of this Annex, measured and calculated in accordance with Annex III		Pass

Clause	Ecodesign requirements	Result - Remark	Verdict
(7)	for high temperature process chillers, the information set out in Table 15 of this Annex, measured and calculated in accordance with Annex III		N/A
(8)	any specific precautions that must be taken when the product is assembled, installed or maintained		Pass
(9)	for heat generators or cold generators designed for air heating or cooling products, and air heating or cooling product housings to be equipped with such heat or cold generators, their characteristics, the requirements for assembly, to ensure compliance with the ecodesign requirements for air heating or cooling products and, where appropriate, the list of combinations recommended by the manufacturer		
(10)	for multi-split heat pumps and multi-split air conditioners, a list of appropriate indoor units		Pass
(11)	for B1, C2 and C4 warm air heaters the following standard text: 'This warm air heater is intended to be connected only to a flue shared between multiple dwellings in existing buildings. Due to a lower efficiency, any other use of this warm air heater shall be avoided and would result in higher energy consumption and higher operating costs'		N/A
(b)	From 1 January 2018, the instruction manuals for installers and end-users, and a part for professionals of the free-access websites of manufacturers, their authorised representatives and importers shall provide the following product information		Pass
(1)	information relevant for disassembly, recycling and/or disposal at end-of-life		Pass
(c)	The technical documentation for the purposes of conformity assessment pursuant to Article 4 shall contain the following elements		Pass
(1)	the elements specified in point (a)		Pass
(2)	where the information relating to a specific model has been obtained by calculation on the basis of design, and/or extrapolation from other combinations, the technical documentation shall include details of such calculations and/or extrapolations, and of tests undertaken to verify the accuracy of the calculations undertaken, including details of the mathematical model for calculating performance of such combinations, and of measurements taken to verify this model, and a list of any other models where the information included in the technical documentation was obtained on the same basis		Pass

Clause	Ecodesign requirements	Result - Remark	Verdict
(d)	The manufacturer, their authorised representatives and importers of comfort chillers, air-to-air and water/brine- to-air air conditioners, heat pumps and high temperature process chillers shall provide laboratories performing market surveillance checks, upon request, the necessary information on the setting of the unit, as applied for the establishment of declared capacities, SEER/EER, SCOP/COP, SEPR/COP values, where applicable, and provide contact information for obtaining such information		Pass

Ecodesign Requirements

Clause	2018/1/1	2021/1/1	Measured value	Declared value
Air heating product - Warm air heater using electricity	30	31	--	--
Air heating product - Air-to-air heat pump, driven by an electric motor, except rooftop heat pump	133	137	175.9	175.9
Air heating product - Rooftop heat pump	115	125	--	--
Air heating product - Air-to-air heat pump, driven by an internal combustion engine	120	130	--	--
Cooling product - Air-to-water chiller with rated cooling capacity < 400 kW, when driven by an electric motor	149	161	--	--
Cooling product - Air-to-water chiller with rated cooling capacity ≥ 400 kW when driven by an electric motor	161	179	--	--
Cooling product - Water/brine to-water chiller with rated cooling capacity < 400 kW when driven by an electric motor	196	200	--	--
Cooling product - Water/brine to-water chiller with ≥ 400 kW rated cooling capacity < 1500 kW when driven by an electric motor	227	252	--	--
Cooling product - Water/brine to-water chiller with rated cooling capacity ≥ 1500 kW when driven by an electric motor	245	272	--	--
Cooling product - Air-to-water comfort chiller, when driven by an internal combustion engine	144	154	--	--
Cooling product - Air-to-air air conditioner, driven by an electric motor, except rooftop air conditioners	181	189	284.9	284
Cooling product - Rooftop air conditioner	117	138	--	--
Cooling product - Air-to-air air conditioner, driven by an internal combustion engine	157	167	--	--
Cooling product - Water/brine-to-air air conditioner	NA	NA	--	--
High temperature process chiller - Air, PA < 400 kW	4.5	5	--	--
High temperature process chiller - Air, PA ≥ 400 kW	5	5.5	--	--
High temperature process chiller - Water, PA < 400 kW	6.5	7	--	--
High temperature process chiller - Water, 400 kW ≤ PA < 1500 kW	7.5	8	--	--
High temperature process chiller - PA ≥ 1500 kW	8	8.5	--	--
Fan coil unit	NA	NA	--	--

Information requirements for air-to-air conditioners

Models				See the cover page			
Outdoor side heat exchanger of air conditioner				Air			
Indoor side heat exchanger of air conditioner				Air			
Type				Compressor driven vapour compression			
Driver of compressor				Electric motor			
If the heater is equipped with a supplementary heater				No			
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	15.5	kW	Seasonal space cooling energy efficiency	$\eta_{s,c}$	284.0	%
Declared capacity (*) for cooling, at indoor temperature 27(19) °C and outdoor temperature T_j				Declared energy efficiency ratio (*), at indoor temperature 27(19) °C and outdoor temperature T_j			
$T_j = 35\text{ °C}$	P_{dc}	14.8	kW	$T_j = 35\text{ °C}$	EER_d	3.5	—
$T_j = 30\text{ °C}$	P_{dc}	10.9	kW	$T_j = 30\text{ °C}$	EER_d	5.2	—
$T_j = 25\text{ °C}$	P_{dc}	7.1	kW	$T_j = 25\text{ °C}$	EER_d	8.0	—
$T_j = 20\text{ °C}$	P_{dc}	3.8	kW	$T_j = 20\text{ °C}$	EER_d	14.6	—
Degradation co-efficient cooling (**)	C_{dc}	0.25	—				
Power consumption in modes other than active mode/Cooling							
Off mode	P_{OFF}	0.019	kW	Crankcase heater mode	P_{CK}	0	kW
Thermostat-off mode	P_{TO}	0	kW	Standby mode	P_{SB}	0.019	kW
Other items							
Capacity control	Variable			Air flow rate, outdoor measured		4260	m ³ /h
Sound power level (indoor/outdoor) measured	LWA	-/67	dB(A)	Global warming potential	GWP	2088	kgCO ₂ eq.

Information requirements for heat pumps

Models				See the cover page			
Outdoor side heat exchanger of air conditioner				Air			
Indoor side heat exchanger of air conditioner				Air			
Type				Compressor driven vapour compression			
Driver of compressor				Electric motor			
If the heater is equipped with a supplementary heater				No			
Heating, if reversible?				Y			
Average (mandatory)				Y			
Warmer (optional)				N/A			
Colder (optional)				N/A			
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity/Average	$P_{rated,h}$	18.0	kW	Seasonal space heating energy efficiency	$\eta_{s,c}$	175.9	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
$T_j = -7\text{ °C}$	P_{dh}	9.7	kW	$T_j = -7\text{ °C}$	COP_d	2.7	—
$T_j = 2\text{ °C}$	P_{dh}	5.8	kW	$T_j = 2\text{ °C}$	COP_d	4.1	—
$T_j = 7\text{ °C}$	P_{dh}	3.6	kW	$T_j = 7\text{ °C}$	COP_d	6.7	—
$T_j = 12\text{ °C}$	P_{dh}	2.1	kW	$T_j = 12\text{ °C}$	COP_d	8.7	—
$T_j = \text{bivalent temperature}$	P_{dh}	9.7	kW	$T_j = \text{bivalent temperature}$	COP_d	2.7	—
$T_j = \text{operating limit}$	P_{dh}	9.1	kW	$T_j = \text{operating limit}$	COP_d	2.6	—
Bivalent temperature	T_{biv}	-7	°C	Operating limit temperature	TOL	-10	°C
Degradation co-efficient heat pumps	C_{dh}	0.25	—				
Power consumption in modes other than active mode/Cooling							
Off mode	P_{OFF}	0.020	kW	Back-up heating capacity (*)	e_{bu}	0	kW
Thermostat-off mode	P_{TO}	0.031	kW	Type of energy input			
Crankcase heater mode	P_{CK}	0.010	kW	Standby mode	P_{SB}	0.020	kW
Other items							
Capacity control	Variable			Air flow rate, outdoor measured		4260	m ³ /h
Sound power level (indoor/outdoor) measured	LWA	-/67	dB(A)	Global warming potential	GWP	2088	kgCO ₂ eq.

Cooling capacity test

Item	Unit	Test A	Test B	Test C	Test D
Barometric pressure	<i>kPa</i>	101.1	101.8	101	101.9
Voltage	<i>V</i>	229.5	229.7	230	229.8
Frequency	<i>Hz</i>	50	50	50	50
Total current	<i>A</i>	20.114	9.678	4.077	1.212
Total power input	<i>W</i>	4270	2074	889	261
Speed control setting of the fan speed	-	Turbo	Turbo	Turbo	Turbo
Rotational speed of the fan	<i>r/min</i>	-	-	-	-
External resistance to airflow	<i>Pa</i>	-0.6	-0.3	1	-1
Dry-bulb temp. of air entering equipment, indoor side	<i>°C</i>	26.96	26.98	26.92	27.06
Wet-bulb temp. of air entering equipment, indoor side	<i>°C</i>	18.92	18.98	19.02	18.98
Dry-bulb temp. of air entering equipment, outdoor side	<i>°C</i>	34.98	29.96	17.8	18.88
Wet-bulb temp. of air entering equipment, outdoor side	<i>°C</i>	24.04	24.09	16.92	18.09
Data collection period	<i>min</i>	35	35	35	35
Total Cooling Capacity	<i>W</i>	14819	10850	7070	3810
Sensible cooling capacity	<i>W</i>	13749	10504	6993	3810
Latent cooling capacity	<i>W</i>	1070	346	77	0
EER (Energy Efficiency Ratio)	<i>W/W</i>	3.47	5.23	7.95	14.6

Heating/Average capacity test

Item	Unit	Test A (-7°C)	Test B (2°C)	Test C (7°C)	Test D (12°C)	Test E (TOL)	Test F (T _{biv})
Barometric pressure	kPa	100.9	100.8	101.9	102	102	100.9
Voltage	V	230.9	229.4	230	231	230.2	230.9
Frequency	Hz	50	50	50	50	50	50
Total current	A	16.717	6.612	2.508	1.145	16.134	16.717
Total power input	W	3636	1394	541	247	3480	3636
Speed control setting of the fan speed	-	Turbo	Turbo	Turbo	Turbo	Turbo	Turbo
Rotational speed of the fan	r/min	-	-	-	-	-	-
External resistance to airflow	Pa	0	-0.7	-0.7	-0.3	0.2	0
Dry-bulb temp. of air entering equipment, indoor side	°C	20.07	19.96	19.97	19.96	20.1	20.07
Wet-bulb temp. of air entering equipment, indoor side	°C	15.06	15.04	14.94	14.91	14.93	15.06
Dry-bulb temp. of air entering equipment, outdoor side	°C	-7.01	2	6.93	11.93	-9.93	-7.01
Wet-bulb temp. of air entering equipment, outdoor side	°C	-8.06	0.94	6	10.97	-10.98	-8.06
Data collection period	min	35	35	35	35	35	35
Total Heating Capacity	W	9709	5760	3610	2149	9120	9709
COP (Coefficient of Performance)	W/W	2.67	4.13	6.67	8.7	2.62	2.67

Revision Summary

[illegible]