Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	O6ZA21KW
Equipment	:	AT&T TV™ Device and Remote Control
Brand Name	:	AT&T
Model Name	:	A21KW-500
Applicant	:	Humax Co., Ltd. HUMAX BLDG., 2, Yeongmun-ro, Cheoin-gu, Yongin-si, Gyeonggi-do South Korea 17040
Manufacturer	:	Humax Co., Ltd. HUMAX BLDG., 2, Yeongmun-ro, Cheoin-gu, Yongin-si, Gyeonggi-do South Korea 17040
Standard	:	47 CFR Part 2.1091

The product was received on Oct. 19, 2020, and testing was started from Oct. 22, 2020 and completed on Mar. 10, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Cliff Chang

Sporton International Inc. Hsinchu Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA0O1903	01	Initial issue of report	Jun. 15, 2021
FA0O1903	02	Revise the information on section 1.4 Testing Location Information	Jun. 18, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan

1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	**Frequency Range (MHz)**	**Operating Frequency (MHz)**	**Modulation Type**
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / π/4-DQPSK / 8DPSK) LE: GFSK

1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Antenna Gain (dBi)					
						WLAN 2.4GHz	WLAN5GHz				Bluetooth
							Band 1	Band 2	Band 3	Band 4	
1	2	Galtronics	DB1	PCB	I-PEX	2.366	3.786	3.786	4.028	4.041	-
2	1	Galtronics	DB2	PCB	I-PEX	2.987	3.513	3.624	4.484	4.875	-
3	1	Galtronics	BT	Printed	I-PEX	-	-	-	-	-	2.867

Correlated Antenna Gain (dBi)				
WLAN 2.4GHz	WLAN5GHz			
	Band 1	Band 2	Band 3	Band 4
4.72	5.2	5.45	5.9	5.9

Note: The above information was declared by manufacturer.

For WLAN 2.4GHz function:
For IEEE 802.11b/g/n/ax mode (2TX/2RX):
Ant.1 and Ant.2 can be used as transmitting/receiving antenna.
Ant.1 and Ant.2 could transmit/receive simultaneously.
For WLAN 5GHz function:
For IEEE 802.11a/n/ac/ax mode (2TX/2RX):
Ant.1 and Ant.2 can be used as transmitting/receiving antenna.
Ant.1 and Ant.2 could transmit/receive simultaneously.
For Bluetooth (1TX/1RX):
Only Ant.3 can be used as transmitting/receiving antenna.

1.3 Accessories

Accessories				
No.	Equipment Name	Brand Name	Model Name	Rating
1	Adapter	AT&T	EPS18R1B-16	INPUT: 120V~0.5A Max 60Hz OUTPUT: 12V, 15A 18W
Other				
Remote Controller*1				

1.4 Testing Location

Testing Location Information		
Test Lab.：Sporton International Inc. Hsinchu Laboratory		
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)	
(TAF: 3787)	TEL: 886-3-656-9065	FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.	
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	

2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(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/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
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/ cm²)	Averaging Time |E|²,|H|² or S (minutes)
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f^2)	<30
30-300	27.5	0.073	0.2	<30
300-1500	-	-	f/1500	<30
1500-100,000	-	-	1.0	<30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 23 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $\frac{30 \times P \times G}{377 \times d^2}$

2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)
2.4G;BT-LE	2.867	12.24	15.11	0.50	15.61	0.03639	23	0.00547	1.00000
2.4G;G1D	2.987	29.89	32.88	0.50	33.38	2.17771	23	0.32759	1.00000
5.2G;D1D	5.200	28.46	33.66	0.50	34.16	2.60615	23	0.39204	1.00000
5.3G;D1D	5.450	23.89	29.34	0.50	29.84	0.96383	23	0.14499	1.00000
5.6G;D1D	5.900	23.95	29.85	0.14	29.99	0.99770	23	0.15008	1.00000
5.8G;D1D	5.900	29.95	35.85	0.14	35.99	3.97192	23	0.59750	1.00000

Simultaneous Transmission Analysis Mode:

Test Mode: Mode 1 Bluetooth+WLAN 2.4GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
2.4G;G1D	2.987	29.89	32.88	0.50	33.38	2.17771	23	0.32759	1.00000	0.32759
2.4G;BT-LE	2.867	12.24	15.11	0.50	15.61	0.03639	23	0.00547	1.00000	0.00547
									Sum Ratio	0.33306
									Ratio Limit	1

Test Mode: Mode 2 Bluetooth+ WLAN 5GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm^2)	S Limit (mW/cm^2)	Ratio (S/Limit)
5.8G;D1D	5.900	29.95	35.85	0.14	35.99	3.97192	23	0.5975	1.00000	0.5975
2.4G;BT-LE	2.867	12.24	15.11	0.50	15.61	0.03639	23	0.00547	1.00000	0.00547
									Sum Ratio	0.60297
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

———THE END———