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RF Exposure Evaluation Report

Report No. :	CQASZ20220400634E-02
Applicant:	Shenzhen Hollyland Technology Co.,Ltd
Address of Applicant:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District Shenzhen, China.
Equipment Under Test (EUT):	
Product:	WIRELESS VIDEO TRANSMISSION SYSTEM
Model No.:	MARS 300 PRO II, MARS 300 PRO Premium, MARS 300 PRO 2022, MARS 300 PRO Max
Test Model No.:	MARS 300 PRO II
Brand Name:	Hollyland
FCC ID:	2ADZC-9802HR
Standards:	47 CFR Part 1.1307
	47 CFR Part 1.1310
	KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2022-04-13
Date of Test:	2022-04-13 to 2022-05-27
Date of Issue:	2022-05-31
Test Result :	**PASS***

***In the configuration tested, the EUT complied with the standards specified above**

Tested By: lewis zhou

(Lewis Zhou)

Reviewed By: K. Liao

(K Liao)

Approved By:

(Jack Ai)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20220400634E-02	Rev.01	Initial report	2022-05-31

2 Contents

3 General Information

3.1 Client Information

Applicant:	Shenzhen Hollyland Technology Co.,Ltd
Address of Applicant:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District Shenzhen, China.
Manufacturer:	Shenzhen Hollyland Technology Co.,Ltd
Address of Manufacturer:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District Shenzhen, China.
Factory:	Shenzhen Hollyland Technology Co.,Ltd BanTian Branch
Address of Factory:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District Shenzhen, China.

3.2 General Description of EUT

Product Name:	WIRELESS VIDEO TRANSMISSION SYSTEM	
Model No.:	MARS 300 PRO II, MARS 300 PRO Premium, MARS 300 PRO 2022, MARS 300 PRO Max	
Test Model No.:	MARS 300 PRO II	
Trade Mark:	Hollyland	
EUT Supports Radios application	5GHz: custom: U-NII-1: 5.15-5.25GHz; U-NII-3: 5.725-5.850GHz;	
Software Version:	V1.0.0.5	
Hardware Version:	V1.1.0	
Power Supply:	DC 12V 2A	
Product Type:	☒ Mobile ☐ Portable ☐ Fix Location	
Test Software of EUT:	MainWindow (manufacturer declare)	
Antenna Type:	External antenna	
Antenna Gain:	5G custom	3 dBi

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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				
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

F= Frequency in MHz

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation standalone operations

For 5G WIFI

Antenna Gain: 3 dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

(U-NII-1)				
Test channel	AV Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(5180MHz)	12.63	12.5±1	13.5	22.387
Highest(5220MHz)	12.35	12.0±1	13.0	19.953

(U-NII-3)				
Test channel	AV Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(5745MHz)	12.25	12.0±1	13.0	19.953
Middle(5785MHz)	12.14	12.0±1	13.0	19.953
Highest(5825MHz)	12.77	12.5±1	13.5	22.387

The worst case:

Maximum tune-up Power (mW)	**Antenna Gain (dBi)**	**Power Density at R = 20 cm (mW/cm^2)**	**Limit**	**Result**
22.387	3	0.0089	1.0	PASS

Note: 1) Refer to report No. CQASZ20220400634E-01 for EUT test Max AV Power value.

2) $Pd = (Pout*G)/(4* Pi * R^2)=(22.387 *1.995)/(4*3.14*20^2)=0.0089$