RF Exposure Evaluation Report

Equipment	: Digital Satellite Receiver
Brand Name	: AT&T
Model No.	: HR54-500
FCC ID	: O6ZHR54R1
Standard	: 47 CFR Part 2.1091
Applicant	: Humax Co., Ltd. HUMAX Village, 11-4, Sunae-dong, Bundang-gu Seongnam city, Gyeonggi-do South Korea 463-825
Manufacturer	: Humax Co., Ltd. HUMAX Village, 11-4, Sunae-dong, Bundang-gu Seongnam city, Gyeonggi-do South Korea 463-825

The product sample received on Oct. 25, 2017 and completely tested on Nov. 28, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091 and pass the limit.

Cliff Chang
SPORTON INTERNATIONAL INC.

Testing Laboratory
1190

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7O2406	Rev. 01	Initial issue of report	Dec. 06, 2017

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)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
RF4CE	2400-2483.5	2425-2475	O-QPSK

1.2 Table for Mode

Operating Mode	
1	WLAN 2.4GHz + RF4CE
2	WLAN 5GHz + RF4CE

1.3 Testing Location

Testing Location			
☐	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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)*	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)*	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 20 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;D1D	3.70	25.63	29.33	0.50	29.83	0.96161	20	0.19140	1.00000
5.2G;D1D	3.80	23.94	27.74	0.50	28.24	0.66681	20	0.13266	1.00000
5.3G;D1D	3.60	23.38	26.98	0.50	27.48	0.55976	20	0.11136	1.00000
5.6G;D1D	4.00	22.94	26.94	0.50	27.44	0.55463	20	0.11034	1.00000
5.8G;D1D	4.10	26.82	30.92	0.50	31.42	1.38676	20	0.27602	1.00000
RF4CE	4.80	-6.17	-1.37	0.50	-0.87	0.00082	20	0.00016	1.00000

Simultaneous Transmission Analysis Mode:

Test Mode 1: WLAN 2.4GHz + RF4CE

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;D1D	3.70	25.63	29.33	0.50	29.83	0.96161	20	0.19140	1.00000	0.19140
RF4CE	4.80	-6.17	-1.37	0.50	-0.87	0.00082	20	0.00016	1.00000	0.00016
									Sum Ratio	0.19156
									Ratio Limit	1

Test Mode 2: WLAN 5GHz + RF4CE

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	4.10	26.82	30.92	0.50	31.42	1.38676	20	0.27602	1.00000	0.27602
RF4CE	4.80	-6.17	-1.37	0.50	-0.87	0.00082	20	0.00016	1.00000	0.00016
									Sum Ratio	0.27618
									Ratio Limit	1