



RF Exposure Evaluation Report

Equipment : DVR
Brand Name : AT&T DIRECTV
Model No. : HR54-700
FCC ID : NQ8HR54
Standard : 47 CFR Part 2.1091
Applicant : ARRIS Global Limited
Victoria Road, Saltaire Shipley, West Yorkshire
United Kingdom BD18 3LF
Manufacturer : ARRIS Global Limited
Victoria Road, Saltaire Shipley, West Yorkshire
United Kingdom BD18 3LF

The product sample received on Oct. 17, 2017 and completely tested on Mar. 20, 2018. 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.

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Cliff Chang
SPORTON INTERNATIONAL INC.





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PHOTOGRAPHS OF EUT V01



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	QPSK

1.2 Table for Mode

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

1.3 Testing Location

Testing Location		
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	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/ cm ²)	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/ cm ²)	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:

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

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)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;D1D	3.30	25.25	28.55	29.00	0.79433	20	0.15810	1
5.2G;D1D	4.20	23.07	27.27	27.50	0.56234	20	0.11193	1.
5.3G;D1D	5.00	21.96	26.96	27.00	0.50119	20	0.09975	1
5.6G;D1D	5.90	21.07	26.97	27.00	0.50119	20	0.09975	1
5.8G;D1D	4.40	23.86	28.26	28.50	0.70795	20	0.14091	1
RF4CE	3.95	-4.41	-0.46	0	0.00100	20	0.00019	1

Simultaneous Transmission Analysis Mode:

Test Mode 1: WLAN 2.4GHz + RF4CE

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
RF4CE	3.95	-4.41	-0.46	0	0.00100	20	0.00019	1	0.00019
2.4G;D1D	3.30	25.25	28.55	29.00	0.79433	20	0.15810	1	0.15810
								Sum Ratio	0.15829
								Ratio Limit	1

Test Mode 2: WLAN 5.8GHz + RF4CE

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
RF4CE	3.95	-4.41	-0.46	0	0.00100	20	0.00019	1	0.00019
5.8;D1D	4.40	23.86	28.26	28.50	0.70795	20	0.14091	1	0.14091
								Sum Ratio	0.14110
								Ratio Limit	1