EN 62311 EMF REPORT

For

Zhengzhou Eshow Import and Export Trade Co., Ltd.

Two way radio

Model No.:RT5

Model No.	:	RT5
Trade Name	:	N/A
Prepared for	:	Zhengzhou Eshow Import and Export Trade Co., Ltd.
Address	:	Room 722, Sanjiang Building, No. 170, Nanyang Road, Huiji District, Zhengzhou City, Henan, China
Prepared by	:	Beide (UK) Product Service Limited
Address	:	6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China
Report No.	:	B-E16049603
Date of Report	:	Apr .28, 2016
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Contents

Possible test case verdicts :	
Test case does not apply to the test object …….. :	N (.A.)
Test object does meet the requirement …….. :	P(ass)
Test object does not meet the requirement ……. :	F(ail)

Name and address of the testing laboratory: **Beide (UK) Product Service Limited**
6F, Bldg E, Hourui 3rd Ind Zone, Xixiang,
Bao'an Dist, Shenzhen, China

Report by : Signature / Rocky Apr.28.2016 Date

Checked by : Signature / Apollo Apr.28.2016 Date

Approved by : Signature / Bruce Apr.28.2016 Date

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	Two way radio
Model No.	:	RT5
DIFF	:	Only differ in model number.
Trademark	:	N/A
Power supply	:	DC 7.4V from battery, DC 10V from adapter for charging
Radio Technology	:	PMR
Operation frequency	:	136MHz-174MHz 400MHz-480MHz
Output Power	:	4W
Modulation	:	FM
Antenna Type	:	Integrated Antenna, Maximum Gain is 3dBi
Intend use environment	:	Residential, commercial and light industrial environment
Applicant	:	Zhengzhou Eshow Import and Export Trade Co., Ltd.
Address	:	Room 722, Sanjiang Building, No. 170, Nanyang Road, Huiji District, Zhengzhou City, Henan, China
manufacture	:	Shenzhen Retevis Technology Co.,Ltd
Address	:	Room 700, 7/F., 13-C, Zhonghaixin Science &Technology Park, No.12 Ganli 6th Road, Buji Street, Longgang District, Shenzhen, China

1.2. Test Lab information

Beide (UK) Product Service Limited □□
6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, □□Bao'an Dist, Shenzhen, China □□
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Standard : EN 62321
Registration Number:B-E16049603

1.3. Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU	Remark
1.	Uncertainty for Conducted Emission Test	2.50dB	
2.	Uncertainty for Radiation Emission test in 3m chamber	3.04 dB	Polarize: V
		3.02dB	Polarize: H
4.	Radio Frequency	1×10^{-9}	
5.	Temperature	0.2℃	
6.	Humidity	1%	
7.	Uncertainty for conducted RF Power	0.65dB	

2. Limit

2.1. Basic Restrictions Reference levels

Council Recommendation 99/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties.

In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimeter but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dissymmetric quantities have conservation values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoplastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

2.2. Reference Levels

Council Recommendation 99/519/EC Annex III

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	$3,2\times10^4$	4×10^4	-
1-8Hz	1000	$3,2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	$87/f^{1/2}$	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046f^{1/2}$	f/200
2-300GHz	61	0,16	0,20	10

Note:

1. As indicated in the frequency range column.
2. For frequencies between 100kHz and 10GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10GHz, Seq, E2, H2 and B2 are to be averaged over any 68/.1.05-minute period (.in GHz).
4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

2.3. Limit calculations for radiated electric field strength measurement

For the calculation of the limits, the near field proportionality factor 1/d3 has been used. For ten times the distance, the level is decreased by the cubical, giving 60 dB.

Frequency range	EMF Limit V/m at 0.3m	Limit V/m at 3m	Limit (add. span)
30MHz 400MHz	28V/m(149dBuV/m)	89dBuV/m	69dBuV/m
400MHz – 2GHz	27.5V/m- 61.5V/m	89dBuV/m----- 95dBuV/m	69dBuV/m------- 75dBuV/m
	149dBuV/m – 155dBuV/m		
2GHz – 300GHz	61V/m(155dBuV/m)	95dBuV/m	75dBuV/m

To deal with reflexions, other effects due to the measurement in 3 m distance and to deal with a measurement uncertainty of at least 5 dB, an additional span of 20 dB has been added.

For additional three times the distance, the level is decreased by additional 30 dB.

Frequency range	Limit V/m at 0.3m	Limit V/m at 3m	Limit (add. span)
30MHz 400MHz	28V/m(149dBuV/m)	69dBuV/m	39dBuV/m
400MHz – 2GHz	27.5V/m- 61.5V/m	69dBuV/m	39dBuV/m
	149dBuV/m – 155dBuV/m	75dBuV/m	45dBuV/m
2GHz – 300GHz	61V/m(155dBuV/m)	75dBuV/m	45dBuV/m

Limits for radiated field according to EN 55022 / CISPR 22 for a class B appliance:

Frequecncy Range	Limit dBuV/m at 3m Peak	Limit dBuV/m at 3m QP or Average
30MHz – 230MHz		40dBuV/m quasi-peak
230MHz -1GHz		47dBuV/m quasi-peak
1GHz-3GHz	70dBuV/m peak	50dBuV/m average
3GHz-6GHz	74dBuV/m peak	54dBuV/m average

Conclusion: If the requirements for radiated emissions according to EN 55022 / CISPR 22 or other standards with the same limits are fulfilled, also the EMF requirements for the measured frequency range are fulfilled

3. Assess Result

Frequency range (MHz)	Maximum output power (W)	Power density at 0.6m distanc (W/m^2)	Limit (W/m^2)	Conclusion
136-174MHz	8	1.756	2	PASS
400-480MHz	8	1.756	2	PASS
Note: Maximum output power means Maximum output EIRP。				

Note: 1 The output power comes from the Operating description and specified by the application for this device.

2 $\mathbf{S = PG / 4\pi R^2}$

P = Power input to antenna

G = Antenna Gain

R = distance to the center of radiation of antenna (in meter) = 0.3 m

-------END OF THE REPORT-------