RF exposure Estimation

Introduction

Applicant:	WinTide Brand Limited
Address:	4/F, NO.1, Donghuang Building, NO.2 Fengxing Road, Chenghai District, Shantou City, Guangdong, China
Product:	27MHZ Four-Direction Off-Road Vehicle
FCC ID:	2BB6I-6367
Model No.:	6936735306367, 6936735306350, 6936735306343, 2011857812119, 2011857811105, 2011857810108
Reference RF report #	68.940.23.0026.01

1. Limit and Guidelines on Exposure to Electromagnetic Fields

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v06, Mobile Portable RF Exposure, no SAR required if power is lower than the flowing threshold:
The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]
$[\sqrt{f(GHz)}]$ ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation25
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

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2. Calculation method

[(max. power of` channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0

According to ANSI C63.10-2013 (G.2 Field strength approach (linear terms)),

$$\text{EIRP} = p_t \times g_t = (E \times d)^2 / 30 \qquad \text{(G.1)}$$

where

p_t	is the transmitter output power in watts
g_t	is the numeric gain of the transmitting antenna (dimensionless)
E	is the electric field strength in V/m
d	is the measurement distance in meters (m)

$$\text{ERP} = \text{EIRP}/1.64 = (E \times d)^2 / (30 \times 1.64) = (E \times d)^2 / 49.2 \qquad \text{(G.2)}$$
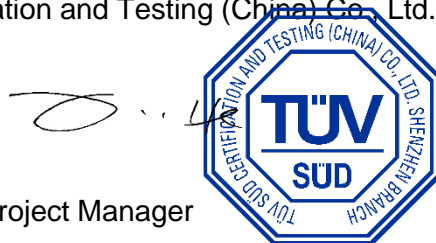
where all terms are as previously defined.

Field Strength (E_Meas):	72.76 (dBuV/m) (f=0.027GHz)
Measurement Distance(d_Meas):	3 (m)
Equivalent Isotropically Radiated Power(EIRP):	0.000003 (mW)

Radiated Power + tune up tolerance = 0.000003 mW
Distance = 5 mm
f = 0.027 GHz

[0.000003/5] * SQRT(0.027) =0.0000001
0.0000001 ≤ 3.0
Therefore, excluded from SAR testing.

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