RF Exposure Report

RF Exposure Measurement

The limit for Maximum Permissible Exposure (MPE) specified in clause 2.5.1 of RSS-102 Issue 4 is followed. The gain of the antennas used in the product is extracted from the Antenna data sheets provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis Transmission formula is far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

RF Exposure Limit

According to clause 2.5.1 of RSS-102 Issue 4: The criteria listed in the following table shall be used to evaluate the environmental impact of the human exposure to radio-frequency (RF) radiation as specified in 1.1307 (b)

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

F= Frequency in MHz

Friss Formula

Friss Transmission Formula: Pd = (Pout * G) / (4*pi*r²)

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 the center of radiator in cm

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.

EUT Operation condition

EUT was enabled to transmit and receive at lowest, middle and highest channels.

Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance from the antenna should be included in the User manual. So, this device is classified as Mobile device.

Test Results

Gain (G) = 3 dBi at 2.4 Ghz & 4.9 dBi at 5GHz

Frequency Band	Protocol	Output Power to Antenna (mW)	Power Density (mW/cm²)	Limit (mW/cm²)
2.4GHz – 2.4835GHz	802.11b_MHz	55.08	0.0219	1.000
	802.11g_20MHz	59.42	0.0236	1.000
	802.11n_20MHz	60.25	0.0239	1.000
	802.11n_40MHz	3.74	0.0015	1.000
	Zigbee	34.83	0.0138	1.000
	Bluetooth Classic	51.88	0.0206	1.000
	Bluetooth LE	29.04	0.0115	1.000
5150MHz – 5250MHz	802.11a_20MHz	9.88	0.0039	1.000
	802.11n_20MHz	10.25	0.0041	1.000
	802.11n_40MHz	4.19	0.0017	1.000
5725MHz – 5850MHz	802.11a_20MHz	5.57	0.0022	1.000
	802.11n_20MHz	5.09	0.0020	1.000
	802.11n_40MHz	3.24	0.0013	1.000