

## RF EXPOSURE EVALUATION

### EUT Specification

<b>EUT</b>	SPNYH02-C Module
<b>Model Number</b>	SPNYH02-C
<b>FCC ID</b>	2A3ZU-SPNYH02
<b>Antenna gain (Max)</b>	0.75dBi
<b>Operation Frequency</b>	2402-2480MHz
<b>Input Rating</b>	DC 3V
<b>Standard</b>	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
<b>Modulation</b>	BLE

### Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Test Procedure:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### Calculated Result and Limit

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Maximum tune-up Power (mW)	Antenna gain		Power Density (S) (mW /cm <sup>2</sup> )	Limited of Power Density (S) (mW /cm <sup>2</sup> )	Test Result
						(dBi)	(Linear)			
BLE	2402	16.67	46.45	16±1	50.11	0.75	1.19	0.0192	1	Complies
	2440	16.52	44.87	16±1	50.11	0.75	1.19	0.0192	1	Complies
	2480	16.38	43.45	16±1	50.11	0.75	1.19	0.0192	1	Complies

The Maximum power is less than the limit, complies with the exemption requirements, SAR is exempted.

Remark: The Max Conducted Peak Output Power data refer to report Report No.:  
90163-23-72-23-PP001