



# FCC RF Exposure Evaluation

## 1. Product Information

EUT : Transceiver Module  
Test Model : RC-SPIRIT2-915  
Additional Model No. : RC-SPIRIT2-915-NA  
Model Declaration : PCB board, structure and internal of these model(s) are the same,  
So no additional models were tested  
Hardware version : /  
Software version : /  
Power Supply : DC 3.3V  
Operation frequency : 905-925MHz  
Modulation Type : 2-FSK, 4-FSK, 2-GFSK1, 2-GFSK05, 4-GFSK1, 4-GFSK05, OOK,  
ASK  
Channel Number : 41  
Antenna Type : External antenna ANT-916-CW-QW by LINX, 1.8dBi(Max.)  
Exposure category : General population/uncontrolled environment  
EUT Type : Production Unit  
Device Type : Mobile Devices





### 2. Evaluation method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0. The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

### 3. Refer Evaluation Method

- [ANSI C95.1–1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- [FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
- [FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.
- [FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices

### 4.Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
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

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

\*=Plane-wave equivalent power density





### 5. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \text{EIRP} / 4 \pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

EIRP = equivalent (or effective) isotropically radiated power

### 6. Test Results

Mode	Frequency(MHz)	Max. Field strength(dBuV/m@3)	Max. EIRP (dBm)
ASK	905	90.90	-4.36

Note: 1. Max. Pout EIRP(dBm) = Field strength of Fundamental(dBuV/m@3)-95.26

Frequency(MHz)	905
Target(dBm)	-4.0
Tolerance ±(dB)	1.0

### 7. Evaluation Results

Band/Mode	RF output power		MPE (mW/cm <sup>2</sup> )	MPE Limits (mW/cm <sup>2</sup> )
	dBm	mW		
2-GFSK1	-3.0	0.5012	0.0002	1.0000

Remark:

1. Output power including tune-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;

### 8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

.....THE END OF REPORT.....

