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MPE Evaluation

Compiled by Fox Lane

Approved By:

Nic Johnson
Technical Manager

Summary and Operating Condition:

EUT	EN5061
EUT Received	18 January 2023
EUT Tested	24 January 2023- 31 January 2023
Serial No.	010369 (Lab Assigned Serial Number)
Operating Band	2400 – 2483.5 MHz
Device Type	☒ GMSK ☐ GFSK ☐ BT BR ☐ BT EDR 2MB ☐ BT EDR 3MB ☐ 802.11x ☒ 900MHz
Power Supply / Voltage	12 VAC Power Supply; Part No. W48A-J1000-2T

NOTE: For more detailed features description, please refer to the manufacturer's specifications or user's manual.

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FCC

Maximum exposure limits from CFR 47, FCC Part 1.1310:

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^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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Occupational/Controlled	☐
General Population/uncontrolled	☒

FCC Power Density Calculations, GMSK								
Frequency	**Conducted Power**	**Antenna Gain**	**Peak Power EIRP**	**Peak Power EIRP +10% for Tolerance**	**Power Density**	**Limit at specified distance**	**% of limit**	**Result**
MHz	**mW**	**numerical**	**mW**	**mW**	**mW/cm^2**	**mW/cm^2**	%	
2402	15.1600	**1.0000**	**15.1600**	**16.6760**	**0.0033**	1.0000	**0.3318**	PASS
2440	14.2360	**1.0000**	**14.2360**	**15.6596**	**0.0031**	1.0000	**0.3115**	PASS
2480	7.0110	**1.0000**	**7.0110**	**7.7121**	**0.0015**	1.0000	**0.1534**	PASS

Distance (d)	20	**cm**

*If Antenna Gain = 1, antenna gain was not used due to measurement being performed using radiated method.

Note: The user's manual will stipulate that a 20cm minimum distance from the user is to be maintained.
EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance.

The power density is calculated as shown below:
S = (Peak EIRP +10% Tol.)/(4 x π x d^2) – used to calculate exposure at "d" cm
EIRP = P x G, measured as field strength

S= power density
P = transmitter conducted power (mW)
G = antenna numeric gain
d = distance to radiation center (cm)

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Occupational/Controlled	☐
General Population/uncontrolled	☒

FCC Power Density Calculations, 900MHz								
Frequency	**Conducted Power**	**Antenna Gain**	**Peak Power EIRP**	**Peak Power EIRP +10% for Tolerance**	**Power Density**	**Limit at specified distance**	**% of limit**	**Result**
MHz	**mW**	**numerical**	**mW**	**mW**	**mW/cm^2**	**mW/cm^2**	%	
902.4	162.5170	**1.0000**	**162.5170**	**178.7687**	**0.0356**	0.6016	**5.9117**	PASS
914.8	155.4530	**1.0000**	**155.4530**	**170.9983**	**0.0340**	0.6099	**5.5781**	PASS
927.6	115.8240	**1.0000**	**115.8240**	**127.4064**	**0.0253**	0.6184	**4.0988**	PASS

Distance (d)	20	**cm**

*If Antenna Gain = 1, antenna gain was not used due to measurement being performed using radiated method.

Note: The user's manual will stipulate that a 20cm minimum distance from the user is to be maintained.
EIRP values in mW were multiplied by 1.1 to account for a 10% tolerance.

The power density is calculated as shown below:
S = (Peak EIRP +10% Tol.)/(4 x π x d^2) – used to calculate exposure at "d" cm
EIRP = P x G, measured as field strength

S= power density
P = transmitter conducted power (mW)
G = antenna numeric gain
d = distance to radiation center (cm)

Max Summation of Radio Percentages (FCC) = 6.2435% = 5.9117% (900MHz) + 0.3318% (GMSK)
Result: PASS

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IC / ISED

Using RSS-102, Issue 5, Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

• below 20 MHz6 and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

• at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 4.49/ƒ0.5 W (adjusted for tune-up tolerance), where ƒ is in MHz;

• at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

• at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10-2 ƒ^(0.6834) W (adjusted for tune-up tolerance), where ƒ is in MHz;

• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure

ISED Power Density Calculations						
Frequency	Peak EIRP	Antenna Gain Numerical	Peak EIRP Power	EIRP +10% Tolerance	Exemption Limit	Result
MHz	mW	Num.	mW	mW	mW	
2402	15.1600	1.0000	15.1600	16.6760	2676.4238	PASS
2440	14.2360	1.0000	14.2360	15.6596	2705.2880	PASS
2480	7.0110	1.0000	7.0110	7.7121	2735.5180	PASS

*If Antenna Gain = 1, antenna gain was not used due to measurement being performed using radiated method.

ISED Power Density Calculations, 900MHz						
Frequency	Peak EIRP	Antenna Gain Numerical	Peak EIRP Power	EIRP +10% Tolerance	Exemption Limit	Result
MHz	mW	Num.	mW	mW	mW	
902.4	162.5170	1.0000	162.5170	178.7687	1370.8535	PASS
914.8	155.4530	1.0000	155.4530	170.9983	1383.6989	PASS
927.6	115.8240	1.0000	115.8240	127.4064	1396.9010	PASS

*If Antenna Gain = 1, antenna gain was not used due to measurement being performed using radiated method.