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GPS INDUSTRIES, LLC MPE REPORT

SCOPE OF WORK
MPE CALCULATION
ON THE V3-1005AQNS

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105040967LEX-002b

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MPE TEST REPORT

Report Number: 105040967LEX-002b
Project Number: G105040967

Report Issue Date: 5/17/2022

Product Name: V3-1005AQNS

Standards: FCC Part 1.1310 Limits for Maximum
Permissible Exposure (MPE)

RSS-102 Issue 5 RF Field Strength Limits for
Devices Used by the General Public

Tested by:
Intertek Testing Services NA, Inc.
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USA


Client:
GPS INDUSTRIES, LLC
1074 N. Orange Ave.
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USA

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
8	FCC Part 1.1310 Limits for Maximum Permissible Exposure (MPE) (Limits for General Population / Uncontrolled Exposure)	Pass
	RSS-102 Issue 5 RF Field Strength Limits (For Devices Used by the General Public)	Pass



3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	GPS INDUSTRIES, LLC
Address:	1074 N. Orange Ave. Sarasota, FL 34236 USA
Contact:	Bruce Tenerowicz
Telephone:	+1 (803) 295-8082
Email:	Bruce.Tenerowicz@clubcar.com
Manufacturer Information	
Manufacturer Name:	GPS INDUSTRIES, LLC
Manufacturer Address:	1074 N. Orange Ave. Sarasota, FL 34236 USA



4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	V3-1005AQNS
Model Number	V3-1005AQNS
Serial Number	G 22 15 1007
Hardware Version	Rev D.
Software Version	Android build number vdu3-eng 7.1.1 v1.83 1_83
Supported Transmit Bands	LTE Bands 2, 4, 5, 7, 12, 13, 25, 26, 29, 30, 41, 66 WCDMA Bands II, IV, V
Antenna	Taoglas P/N GSA.8841.A.105111
Embedded Module	Quectel EM06
Embedded Module FCCID	XPYTOBYL201 with XMR201906EM06A
Receive Date	4/26/2022
Test Start Date	4/26/2022
Test End Date	5/17/2022
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	12VDC
Description of Equipment Under Test (provided by client)	
The V3-1005AQNS is a mobile golf information system with an embedded wireless module.	

4.1 Variant Models:

There were no variant models covered by this evaluation.



5 FCC Limits

§ 1.1310: The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Part 1.1310 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 Exposures				
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
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	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
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



6 RSS-102 Issue 5 Exposure Limits:

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$
Note: f is frequency in MHz. * Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				



7 Test Procedure

An MPE evaluation for was performed in order to show that the device was compliant with the general population exposure limits from FCC §2.1091 and RSS-102 Issue 5. The maximum power density was calculated for each transmitter band at a separation distance of 20cm using the maximum declared output power including tune up tolerance.

The maximum output power was taken from the original equipment authorization of module FCCID XMR201906EM06A, provided by the client. Intertek did not measure these values, and deviations from these values may affect compliance.

The antenna gain was taken from the datasheet of Taoglas P/N GSA.8841.A.105111, provided by the client. Intertek did not measure these values, and deviations from these values may affect compliance.

For each transmitter the maximum RF exposure at a 20 cm distance using the formula:

$$ConductedPower_{mW} = 10^{ConductedPower(dBm)/10}$$

$$PowerDensity = \frac{ConductedPower_{mW} \times Ant.Gain}{4\pi \times (20_{cm})^2}$$

**8 Results:**

The calculated maximum power density at 20cm distance was equal to or less than the required limits for general population exposure for FCC Part 1.1310 and RSS-102 Issue 5.

Duty Cycle	100 (%)					
Separation Dist.	20 (cm)					
Operating Mode	Frequency (MHz)	Declared Max Cond. Power (Inc. Tolerance) (dBm)	Duty Cycle Adjusted Cond. Output Power (dBm)	Antenna Gain (dB)	MPE Value (mW/cm ²)	MPE Limit (mW/cm ²)
WCDMA Band II	1852.4	24.00	24.00	4.76	0.1495	1.0000
WCDMA Band IV	1712.4	24.00	24.00	4.76	0.1495	1.0000
WCDMA Band V	826.4	24.00	24.00	1.65	0.0731	0.5509
LTE B2	1850.7	24.00	24.00	4.76	0.1495	1.0000
LTE B4	1710.7	24.00	24.00	4.76	0.1495	1.0000
LTE B5	824.7	24.00	24.00	1.65	0.0731	0.5498
LTE B7	2502.5	24.00	24.00	5.35	0.1713	1.0000
LTE 12	699.7	24.00	24.00	1.65	0.0731	0.4665
LTE B13	779.5	24.00	24.00	1.65	0.0731	0.5197
LTE B25	1850.7	24.00	24.00	4.76	0.1495	1.0000
LTE B26	814.7	24.00	24.00	1.65	0.0731	0.5431
LTE B30	2307.5	24.00	24.00	5.75	0.1878	1.0000
LTE B41	2498.5	24.00	24.00	5.75	0.1878	1.0000
LTE B66	1710.7	24.00	24.00	4.76	0.1495	1.0000

FCC MPE Data

Duty Cycle	100 (%)					
Separation Dist.	20 (cm)					
Operating Mode	Frequency (MHz)	Declared Max Cond. Power (Inc. Tolerance) (dBm)	Duty Cycle Adjusted Cond. Output Power (dBm)	Antenna Gain (dB)	MPE Value (W/m ²)	MPE Limit (W/m ²)
WCDMA Band II	1852.4	24.00	24.00	4.76	1.4953	4.4803
WCDMA Band IV	1712.4	24.00	24.00	4.76	1.4953	4.2460
WCDMA Band V	826.4	24.00	24.00	1.65	0.7307	2.5807
LTE B2	1850.7	24.00	24.00	4.76	1.4953	4.4775
LTE B4	1710.7	24.00	24.00	4.76	1.4953	4.2431
LTE B5	824.7	24.00	24.00	1.65	0.7307	2.5771
LTE B7	2502.5	24.00	24.00	5.35	1.7129	5.5028
LTE 12	699.7	24.00	24.00	1.65	0.7307	2.3033
LTE B13	779.5	24.00	24.00	1.65	0.7307	2.4797
LTE B25	1850.7	24.00	24.00	4.76	1.4953	4.4775
LTE B26	814.7	24.00	24.00	1.65	0.7307	2.5557
LTE B30	2307.5	24.00	24.00	5.75	1.8781	5.2060
LTE B41	2498.5	24.00	24.00	5.75	1.8781	5.4968
LTE B66	1710.7	24.00	24.00	4.76	1.4953	4.2431

RSS-102 Issue 5 MPE Data



9 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	5/17/2022	105040967LEX-002b	BZ	JTS	Original Issue