



RADIO EXPOSURE TEST REPORT

FCC ID : 2AV57GS1LTE1

Equipment : Video Telematics Sensor

Brand Name : Geotab Inc.

Model Name : GS1-LTE1

Applicant : Geotab Inc.
2440 Winston Park Drive, Oakville, Ontario, L6H 7V2, Canada

Manufacturer : Geotab Inc.
2440 Winston Park Drive, Oakville, Ontario, L6H 7V2, Canada

Standard : 47 CFR Part 2.1091

The product was received on Jan. 29, 2024, and testing was started from Feb. 22, 2024 and completed on Jun. 27, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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Photographs of EUT v01



History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

Page Number : 3 of 9
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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

1. The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
2. The presented declaration output power of WWAN for EUT in the report are provided by the manufacturer, and We, Sporton International Inc. Hsinchu Laboratory does not guarantee its accuracy.
3. Reference to Sporton Project No.: 411919

Reviewed by: Sam Chen**Report Producer: Muse Chan**



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: GFSK

RF General Information					
Evaluation Mode		Bandwidth (MHz)	TX Frequency (MHz)	RX Frequency (MHz)	Modulation Type
WWAN LTE	Band 2	1.4/3/5/10/15/20	1850 ~ 1910	1930 ~ 1990	QPSK / 16QAM
	Band 4	1.4/3/5/10/15/20	1710 ~ 1755	2110 ~ 2155	
	Band 5	1.4/3/5/10	824 ~ 849	869 ~ 894	
	Band 12	1.4/3/5/10	699 ~ 716	729 ~ 746	
	Band 13	5/10	777 ~ 787	746 ~ 756	
	Band 25	1.4/3/5/10/15/20	1850 ~ 1915	1930 ~ 1995	
	Band 26 (Part 22H)	1.4/3/5/10/15	824 ~ 849	869 ~ 894	
	Band 26 (Part 90S)	1.4/3/5/10	814 ~ 824	859 ~ 869	

1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	WNC	UCD-LI80	Monopole	N/A	2.55

Note 1: The WLAN 2.4GHz and Bluetooth cannot function at the same time.

Note 2: The above information was declared by manufacturer.

Note 3: **For 2.4GHz function:**

For IEEE 802.11 b/g/n (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.



1.3 Table of WWAN Module Function

Brand Name	Model Name	Function
Quectel	EG91-NAXD	LTE Band: 2 / 4 / 5 / 12 / 13 / 25 / 26

Note: The above information was declared by manufacturer.

1.4 Accessories

N/A

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
- ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ 47 CFR Part 1.1307
- ♦ 47 CFR Part 1.1310

1.6 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISCED.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= P_{th}.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance

R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
LTE Band2;G7D	1.59	24.50	23.94	0.50	277.971	20	B	3060.0	0.0909
LTE Band4;G7D	2.00	24.50	24.35	0.50	305.492	20	B	3060.0	0.0999
LTE Band5;G7D	2.13	24.50	24.48	0.50	314.775	20	B	1981.2	0.1589
LTE Band12;G7D	3.26	24.50	25.61	0.50	408.319	20	B	1714.8	0.2382
LTE Band13;G7D	4.45	24.50	26.80	0.50	537.032	20	B	1876.8	0.2862
LTE Band25;G7D	1.59	23.88	23.32	0.50	240.991	20	B	3060.0	0.0788
LTE Band26;G7D (Part 22H)	2.53	24.03	24.41	0.50	309.742	20	B	1979.3	0.1565
LTE Band26;G7D (Part 90S)	2.53	24.07	24.45	0.50	312.608	20	B	1955.3	0.1599
2.4G;D1D	2.55	19.90	20.30	0.50	120.226	20	B	3060.0	0.0393
2.4G;BT-BR	2.55	9.30	9.70	0.50	10.471	20	B	3060.0	0.0034
2.4G;BT-LE	2.55	8.85	9.25	0.50	9.441	20	B	3060.0	0.0031

Simultaneous Transmission Analysis Mode:

Test mode 1: WWAN + WLAN 2.4GHz

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
LTE Band13;G7D	4.45	24.50	26.80	0.50	537.032	20	B	1876.8	0.2862
2.4G;D1D	2.55	19.90	20.30	0.50	120.226	20	B	3060.0	0.0393
Sum TL Ratio_B	0.3255								
Ratio Limit	1								

Test mode 2: WWAN + Bluetooth

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
LTE Band13;G7D	4.45	24.50	26.80	0.50	537.032	20	B	1876.8	0.2862
2.4G;BT-BR	2.55	9.30	9.70	0.50	10.471	20	B	3060.0	0.0034
Sum TL Ratio_B	0.2896								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

—————THE END—————