



Radio Frequency Exposure Evaluation Report

FOR:

Verizon Telematics Inc.

Model Name:

VT-100

Product Description:

GPS navigation device with GPS receiver, 1xRTT CDMA modem, OBD-II vehicle interface and a Bluetooth radio

FCC ID: ZOQVT-100

Applied Rules and Standards

CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General 24 RF Exposure Guidance v05r02

Report number: EMC_VERIT-009-15001_MPE

DATE: 11-09-2015



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Contents

1. Assessment	3
2. Administrative Data	4
2.1. Identification of the Testing Laboratory Issuing the Test Report	4
2.2. Identification of the Client / Manufacturer	4
3. Equipment under Assessment	5
4. RF Exposure Limits and FCC	6
4.1. Power Density Limits acc. to FCC 1.1310(e).....	6
4.2. Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1093(c)	6
4.3. RF Exposure Estimation (MPE Estimation).....	6
5. Evaluations	7
5.1. Routine Environmental Evaluation Applicability Stand Alone transmission	7
5.2. Compliance with MPE (Power Density) limits	7
6. Routine Environmental Evaluation Applicability Simultaneous Transmission.....	8
7. Maximum allowed Antenna Gain – Gmax	8
8. Revision History	9

1. Assessment

This RF Exposure evaluation report provides information about compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) under given conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant). In addition, maximum antenna gain or minimum distance towards the human body is calculated, respectively, where relevant.

The device meets the limits as stipulated by the above given FCC rule parts based on available specifications.

Company Name	Product Description	Model #
Verizon Telematics Inc.	GPS navigation device with GPS receiver, 1xRTT CDMA modem, OBD-II vehicle interface and a Bluetooth radio	VT-100

Responsible for Testing Laboratory:

		Franz Engert	
2015-11-09	Compliance	(Compliance Manager)	
Date	Section	Name	Signature

Responsible for the Report:

		Kris Lazarov	
2015-11-09	Compliance	(EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

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2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

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Compliance Manager:	Franz Engert
Responsible Project Leader:	Kris Lazarov

2.2. Identification of the Client / Manufacturer

Applicant's Name:	Verizon Telematics Inc.
Street Address:	2002 Summit Blvd #1800
City/Zip Code	Atlanta, GA 30319
Country	USA
Contact Person:	Chris Kang
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e-mail:	chris.kang@verizon.com

3. Equipment under Assessment

Model No	VT-100
HW Version / SW Version	A0 / V1.0.0
FCC-ID	ZOQVT-100
Product Description	GPS navigation device with GPS receiver, 1xRTT CDMA modem, OBD-II vehicle interface and a Bluetooth radio
Transceiver Technology / Type(s) of Modulation	CDMA 800 (BC0); 1900 (BC1) / QPSK / HPSK (CDMA2000)
Frequency Range	824 MHz to 849 MHz / 1850 MHz to 1910 MHz
Max. declared antenna gain	Pulse Custom Antenna for CDMA 1xRTT -1 dBi for BC0, -0.2 for BC1
Max. declared average conducted output power including tune up	23.5dBm BC0 23.5dBm BC1
Power Supply/ Rated Operating Voltage Range	Vmin: 6V DC / Vnom: 12.5V DC / Vmax: 18V DC
Operating Temperature Range	-30 °C to 70 °C
Other Radios included in the device	Bluetooth EDR 2.1 / GPS
Sample Revision	<input type="checkbox"/> Prototype <input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-Production
Device Category	<input type="checkbox"/> Fixed Installation <input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable
Exposure Category	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled

4. RF Exposure Limits and FCC

For the specific described radio apparatus the following basic limits and rules apply

4.1. Power Density Limits acc. to FCC 1.1310(e)

Frequency Range (MHz)	Power density (mW/cm ²)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

4.2. Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1093(c)

- Operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm;
- Operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm;

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications. When categorical exclusion cannot be claimed for mobile applications MPE measurement is required for TCB approval.

4.3. RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (mW/cm² or W/m²)

P = power input to the antenna (mW or W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm or m)

5. Evaluations

5.1. Routine Environmental Evaluation Applicability Stand Alone transmission

Transmission	EIRP	Duty Cycle	Total EIRP Simultaneous Transmissions Intra-band (worst cases only)	Limits for Routine Environmental Evaluation Applicability, EIRP	Exempt from Routine evaluation
Mode	dBm	%	dBm	dBm	(Yes/No)
BT 2.1 EDR	5	100	n.a.	34.8	Yes
CDMA 800	22.5(1)	100	n.a.	31.8	Yes
CDMA 1900	23.3(2)	100	n.a.	34.8	Yes

(1) Based on maximum declared power

(2) Based on maximum measured power as +0.1dB higher than declared power

Conclusion:

- Since the Peak EIRP is less than the FCC limit, this device is exempt from Routine evaluation. There are no intra-band co-transmissions possible in the device.

5.2. Compliance with MPE (Power Density) limits

Power Density Calculation						
Band of Operation	Max average EIRP	Maximum Duty Cycle	Distance	Power Density	Limit	Result
MHz	dBm	%	cm	mW/cm ²	mW/cm ²	
BT 2.1 2400 to 2483.5	5	100	20	0.0006	1.000	Pass
CDMA 800	22.5(1)	100	20	0.0362	0.566	Pass
CDMA 1900	23.3(2)	100	20	0.0425	1.000	Pass

(1) Based on maximum declared power

(2) Based on maximum measured power as +0.1dB higher than declared power

Conclusion:

- The equipment fulfills the MPE limits for the minimum distance between the antenna and the human body of 20cm.

6. Routine Environmental Evaluation Applicability Simultaneous Transmission

- Possible simultaneous transmissions: Cellular Radio and BT.

Transmission Mode	Ratio of Power Density to Applicable limit for Stand Alone Operation	Sum of the Ratios for the Highest Possible Simultaneous Operation	Limits for the Highest Combined Ratio	Exempt from Routine evaluation
BT 2.1 EDR	$0.0006 / 1 = 0.0006$	$0.0006 + 0.064 = 0.0646$	< 1	Yes
CDMA 800	$0.0362 / 0.566 = 0.064$	$0.0006 + 0.064 = 0.0646$	< 1	Yes
CDMA 1900	$0.0425 / 1 = 0.0425$	$0.0006 + 0.0425 = 0.0431$	< 1	Yes

Note: Power Density to Applicable limit for Stand Alone Operation are derived from table in section 5.2

Conclusion:

- The equipment is excluded from simultaneous transmission MPE test.

7. Maximum allowed Antenna Gain – Gmax

- Not applicable since fixed internal antenna is used in the product.

8. Revision History

Date	Report Name	Changes to report	Report prepared by
2015-11-03	EMC_VERIT-009-15001_MPE	Initial Version	Kris Lazarov
2015-11-09	EMC_VERIT-009-15001_MPE	Updated the EIRP based on gain and maximum output power declaration by customer	Franz Engert