

RF Exposure Report (FCC)

Report No.: FCC_RF_SL19110601_PST-001_BT_MPE_Rev01

FCC ID: 2AKA8-FA470NAXAA

Test Model: FA-470_NA_01_AA

Series Model: FA-470_NA_02_AA, FA-470_NA_03_AA

Received Date: 11/18/2019

Test Date: 11/20/2019 – 01/25/2019

Issued Date: 01/31/2020

Applicant: PST ELETRONICA LTD

Address: Av. Alan Turing, nº 385, Cidade Universitária, Campinas-SP, CEP 13083898

Manufacturer: PST ELETRONICA LTDA

Address: Av. Açaí, 2045 - lote 2.2, Distrito Industrial - Manaus – AM, CEP 69075-020

Issued By: Bureau Veritas Consumer Products Services, Inc.

Lab Address: 775 Montague Expressway, Milpitas, CA 95035

Test Location (1): 775 Montague Expressway, Milpitas, CA 95035

**FCC Registration /
Designation Number:** 540430/4842D



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Table of Contents

Release Control Record	3
1 Certificate of Conformity.....	4
2 RF Exposure.....	5
2.1 Limits for Maximum Permissible Exposure (MPE)	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	5
2.5 Calculation Result of Maximum Conducted Power	6
3 Conclusion	6

Release Control Record

Issue No.	Description	Date Issued
FCC_RF_SL19110601_PST-001_BTEDR_MPE	Original Release	12/18/2019
FCC_RF_SL19110601_PST-001_BTEDR_MPE_Rev01	Revision 01	01/31/2020

1 Certificate of Conformity

Product: FleetArc Gateway

Brand: Stoneridge

Test Model: FA-470_NA_01_AA

Series Model: FA-470_NA_02_AA, FA-470_NA_03_AA

Sample Status: Engineering Sample

Applicant: PST ELETRONICA LTDA

Test Date: 11/20/2019 – 01/25/2020

Product Type: Automotive Fleet Tracker

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** 01/31/2020
Yao Wei Lee / Test Engineer

Approved by :  , **Date:** 01/31/2020
Chen Ge / Engineer Reviewer

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
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

2.2 MPE Calculation Formula

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.
So, this device is classified as Mobile Device.

2.4 Antenna Gain

The BT antenna type is a PCB antenna with 0 dBi gain.

The BLE antenna type is a PCB antenna with 0 dBi gain.

LTE Band 2 has an antenna gain of 2.92dBi.

LTE Band 4 has an antenna gain of 3.05dBi.

LTE Band 12 has an antenna gain of -0.21dBi.

2.5 Calculation Result of Maximum Conducted Power

Type	Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Turn-Up Tolerance	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
BT-EDR	2402-2480	1.204	0.805	± 1dB	0	20	0.00033	1
BLE	2402-2480	-2.39	0.577	± 1dB	0	20	0.000145	1
LTE (Band 2)	1880	23	200	± 2dB	2.92	20	0.12330	1
LTE (Band 4)	1732.5	23	200	± 2dB	3.05	20	0.12704	1
LTE (Band 12)	707.5	23	200	± 2dB	-0.21	20	0.05997	0.471

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. This device contains Quectel LTE Module BG96 (FCC ID: XMR201707BG96).

3 Conclusion

Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Co-location worse case (LTE & BT-EDR)

$$\text{BT-EDR} = (0.00033 / 1) * 100\% = 0.033\%$$

$$\text{LTE Band 4} = (0.12704 / 1) * 100\% = 12.704\%$$

$$\text{Total MPE Percentage} = (0.033 + 12.704) = 12.737\% < 100\% \text{ for LTE \& BT to transmit simultaneously.}$$

Therefore the maximum calculations of above situations are less than the "1" limit.

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