Product Service

Choose certainty.
Add value.

Report On

RF Exposure Assessment of the
GamesOnTrack A/S
GT-XConnect

FCC ID: 2AK9NGTX17263X
IC: 22454GTX17263X

Document 75937369 Report 3 Issue 1 July 2017

Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

RF Exposure Assessment of the
GamesOnTrack A/S
GTX17263X-0-5 Radio Master US+CDN

Document 75937369 Report 3 Issue 1

July 2017

PREPARED FOR

GamesOnTrack A/S
Uhresovej 35
Holstebro
DK-750
Denmark

PREPARED BY

David Guyett-Smith
Chief Safety Engineer - Technical Solutions

APPROVED BY

Simon Bennett
Authorised Signatory

DATED

3 October 2017

Product Service

CONTENTS

Section		Page No
1	**REPORT SUMMARY**	**3**
1.1	Introduction	4
1.2	Regional Requirements	5
1.3	Product Information	6
1.3.1	Technical Description	6
1.3.2	Supported Features	6
1.3.3	Antennas	6
1.4	Brief Summary of Results	7
2	**TEST DETAILS**	**9**
2.1	Rationale for Assessment of the RF Exposure	10
2.2	Test Result Details	11
3	**DISCLAIMERS AND COPYRIGHT**	**12**
3.1	Disclaimers and Copyright	13

SECTION 1

REPORT SUMMARY

RF Exposure Assessment of the
GamesOnTrack A/S
GTX17263X-0-5 Radio Master US+CDN

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the GamesOnTrack A/S GTX17263X-0-5 Radio Master US+CDN to the requirements of the applied test specifications.

Objective	To perform RF Exposure Assessment to determine the Equipment Under Test's (EUT's) compliance of the applied rules.
Applicant	GamesOnTrack A/S
Manufacturer	GamesOnTrack A/S
Manufacturing Description	Radio Master US+CDN
Model Number(s)	GTX17263X-0-5
Test Specification/Issue/Date	EN 62311:2008 CFR 47 Pt1.1310 (2016) Health Canada Safety Code 6 ARPANSA Radiation Protection Series No.3

1.2 REGIONAL REQUIREMENTS

The table below shows the regional requirements that are referenced in this test report. A full list of the requirements is shown in Annex A.

Report Reference	Regional Requirement
EU	EN 62311:2008
FCC	CFR 47 Pt1.1310 (2016)
IC	Health Canada Safety Code 6
AUS	ARPANSA Radiation Protection Series No.3

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment under test was a GamesOnTrack A/S GTX17263X-0-5 Radio Master US+CDN. A full technical description can be found in the manufacturer's documentation.

All reported calculations were carried out on the relevant information supplied for the GTX17263X-0-5 Radio Master US+CDN to demonstrate compliance with the applied test specification(s). The sample assessed was found to comply with the requirements of the applied rules.

1.3.2 Supported Features

The following radio access technologies and frequency bands are supported by the equipment under test.

Radio Access Technology	GTX
Frequency Band	903 to 927

1.3.3 Antennas

The following antennas are supported by the equipment under test.

No.	Model	Gain (dBi)
1	1	2

1.4 BRIEF SUMMARY OF RESULTS

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields for both General Public and Occupational. The calculations shown in this report were made in accordance with the procedures specified in the applied test specification(s).

Required Compliance Boundary (m)	
Occupational	General Population
0.2	0.2

Table 1 – Compliance Boundary Results

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.2 m					
	S Field (W/m^2)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
ICNIRP	0.0883	22.5750	5.7691	90.1499	0.0153	0.2404
FCC*	0.0088	3.0100	N/A	N/A	N/A	N/A
RSS	0.0883	19.3972	5.7691	85.5158	0.0153	0.2268
ARPANSA	0.0883	22.5750	5.7691	92.2534	0.0153	0.2446

* Requirement and Result in mW/cm^2

Table 2 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310 (2016), Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.2 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.2 m					
	S Field (W/m^2)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
ICNIRP	0.0883	4.5150	5.7691	41.3187	0.0153	0.1112
FCC*	0.0088	0.6020	N/A	N/A	N/A	N/A
RSS	0.0883	2.7419	5.7691	32.1488	0.0153	0.0853
ARPANSA	0.0883	4.5150	5.7691	41.1684	0.0153	0.1094

* Requirement and Result in mW/cm^2

Table 3 – General Population Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310 (2016), Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.2 m.

SECTION 2

2 TEST DETAILS

2.1 RATIONALE FOR ASSESSMENT OF THE RF EXPOSURE

The aim of the assessment report is to evaluate the compliance boundary for a set of given input power(s) according to the basic restrictions (directly or indirectly via compliance with reference levels) related to human exposure to radio frequency electromagnetic fields.
The chosen assessment method to establish the compliance boundary in the far-field region is the reference method as defined in the relevant specifications.

The RF exposure assessment is based upon the following criteria:

The GTX17263X-0-5 Radio Master US+CDN operates with the following transmitters active on the antenna ports shown in Section 1.3.3. For each transmitter, the Radio Access Technology (RAT), EIRP inclusive of antenna gain and duty cycle, gain of the antenna and lowest frequency of operation are shown as they contribute to the calculation of S Field, E field and H field values according to the following formulas.

The power flux (S Field):

$$S = \frac{PG_{(\theta,\phi)}}{4\pi r^2}$$

The electric field strength (E Field):

$$E = \frac{\sqrt{30PG}_{(\theta,\phi)}}{r}$$

The magnetic field strength (H Field):

$$H = \frac{E}{\eta_o}$$

Where:

P = Average Power (W)
G = Antenna Gain (dBi)
r = Distance (cm) or (m)
η_o = 377

2.2 TEST RESULT DETAILS

The frequencies shown in the tables below have been chosen based on the lowest possible frequency that the EUT can transmit.

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.2 m		
								S Field (W/m^2)	E Field (V/m)	H Field (A/m)
1	1	1	GTX	0.044	28	2	903	0.0883	5.7691	0.0153

Table 4 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.2 m		
								S Field (W/m^2)	E Field (V/m)	H Field (A/m)
1	1	1	GTX	0.044	28	2	903	0.0883	5.7691	0.0153

Table 5 – General Population Transmitter Summary

SECTION 3

3 DISCLAIMERS AND COPYRIGHT

3.1 DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

ANNEX A

REGIONAL REQUIREMENTS

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.065 - 1	-	610	1.6/f
1 - 10	-	610/f	1.6/f
10 - 400	10	61	0.162
400 - 2000	f/40	3*f^0.5	0.008*f^0.5
2000 - 300000	50	137	0.36

Table A.1 – EN 62311:2008 Occupational Limits

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.003 - 0.15	-	87	5
0.15 - 1	-	87	0.73/f
1 - 10	-	87/f^0.5	0.73/f
10 - 400	2	28	0.073
400 - 2000	f/200	1.375*f^0.5	0.0037*f^0.5
2000 - 300000	10	61	0.16

Table A.2 – EN 62311:2008 General Population Limits

Frequency Range (MHz)	S Field (mW/cm^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	900/f^2	1842/f	4.89/f
30 - 300	1	61.4	0.163
300 - 1500	f/300	-	-
1500 - 100000	5	-	-

Table A.3 – CFR 47 Pt1.1310 (2016) Occupational Limits

Frequency Range (MHz)	S Field (mW/cm^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	180/f^2	824/f	2.19/f
30 - 300	0.2	27.5	0.073
300 - 1500	f/1500	-	-
1500 - 100000	1	-	-

Table A.4 – CFR 47 Pt1.1310 (2016) General Population Limits

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	10	61.4	0.163
20 - 48	44.72/f^0.5	129.8/f^0.25	0.3444/f^0.25
48 - 100	6.455	49.33	0.1309
100 - 6000	0.6455*f^0.5	15.60*f^0.25	0.04138*f^0.25
6000 - 150000	50	137	0.364

Table A.5 – Health Canada Safety Code 6 Occupational Limits

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	2	27.46	0.0728
20 - 48	8.944/f^0.5	58.07/f^0.25	0.1540/f^0.25
48 - 300	1.291	22.06	0.05852
300 - 6000	0.02619*f^0.6834	3.142*f^0.3417	0.008335*f^0.3417
6000 - 15000	10	61.4	0.163

Table A.6 – Health Canada Safety Code 6 General Population Limits

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 1	-	614	1.63/f

1 - 10	1000/f^2	614	1.63/f
10 - 400	10	61.4	0.163
400 - 2000	f/40	3.07*f^0.5	0.00814*f^0.5
2000 - 300000	50	137	0.364

Table A.7 – ARPANSA Radiation Protection Series No.3 Occupational Limits

Frequency Range (MHz)	Power Density (W/m^2)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 0.15	-	86.8	4.86
0.15 - 1	-	86.8	0.729/f
1 - 10	-	86.8/f^0.5	0.729/f
10 - 400	2	27.4	0.0729
400 - 2000	f/200	1.37*f^0.5	0.00364*f^0.5
2000 - 300000	10	61.4	0.163

Table A.8 – ARPANSA Radiation Protection Series No.3 General Population Limits