RF Exposure Exemption Report

Safran Electronics & Defence Beacons SAS Model: ULTIMA-DT-05

In accordance with FCC CFR 47 Pt 1.1307

Prepared for: Safran Electronics & Defense Beacon SAS

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FCC Accreditation

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EXECUTIVE SUMMARY

The wireless devices described within this report are compliant with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.





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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	20-June-2023

Table 1

1.2 Introduction

Applicant Safran Electronics & Defence Beacons SAS Manufacturer Safran Electronics & Defence Beacons SAS

Model Number(s) ULTIMA-DT-05
Hardware Version(s) S1865601-01
Software Version(s) YLS1820A

Specification/Issue/Date FCC 47 CFR Part 1.1307: 2021

Order Number 55317

Date 02 May 2023

Related Document(s)
• KDB 447498 D04 v01



1.3 Brief Summary of Results

The wireless devices described within this report are compliant with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.

The calculations shown in this report were made in accordance with the procedures specified in the applied test specification(s).



1.4 Product Information

1.4.1 Technical Description

Emergency locator beacon with automatic distress tracking functionality.

1.4.2 Transmitter Description

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

Radio Access Frequency Band (MHz)		Minimum Frequency (MHz)	Output Power (dBm)	Duty Cycle (%)	
406 MHz	403.5 – 408.5	403.5	39	9.4	
121.5 MHz	120.6 – 122.4	120.6	26	37	

Table 2 - Transmitter Description

Note: Transmitter power includes upper bounds of uncertainty therefore maximum values are used.

1.4.3 Antenna Description

The following antennas are supported by the equipment under test.

Radio Access Technology	Antenna Model I (-		Antenna length (cm)	Minimum Separation Distance (cm)	
406 MHz	Dayton Granger Tri- frequency Antenna (406/121.5/GNSS) - ELT10-903	6	20.9	100	
121.5 MHz	Dayton Granger Tri- frequency Antenna (406/121.5/GNSS) - ELT10-903	-2.5	20.9	100	

Table 3 - Antenna description

In the case of more than one type of antenna being supported by the equipment, the calculation is based on the maximum of the antenna gains. If other antennas can be used that have greater gains, the minimum separation distances will need to be recalculated.

Note: Antenna gain includes upper bounds of uncertainty therefore maximum values are used.

1.4.4 Equipment Configuration

No simultaneous transmission is supported



2 Assessment Details

2.1 Single RF Source options for determination of exemption.

Option	Reference	RF Exposure Test Exemptions for Single S	Source				
A (1-mW Test Exemption)	FCC 1.1307(b)(3)(i)(A)	The available maximum time averaged power is no more than 1 mW, regardless of separation distance.					
B (SAR-Based Exemption)	FCC 1.1307(b)(3)(i)(B)	The available maximum timeaveraged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by: $P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \ cm} (d/20 \ \text{cm})^x & d \leq 20 \ \text{cm} \\ ERP_{20 \ cm} & 20 \ \text{cm} < d \leq 40 \ \text{cm} \end{cases}$ Where $x = -\log_{10}\left(\frac{60}{ERP_{20 \ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz};$ and $ERP_{20 \ cm} \text{ (mW)} = \begin{cases} 2040 f & 0.3 \ \text{GHz} \leq f < 1.5 \ \text{GHz} \\ 3060 & 1.5 \ \text{GHz} \leq f \leq 6 \ \text{GHz} \end{cases}$					
		<pre>d = the separation distance (cm);</pre>					
C (MPE-Based Exemption)	FCC 1.1307(b)(3)(i)(C)	Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the freespace operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value). TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRON-MENTAL EVALUATION					
			old ERP atts)				
		0.3-1.34 1,920 R². 1.34-30 3,450 R²/f². 30-300 3.83 R². 300-1,500 0.0128 R²f. 1,500-100,000 19.2R².					



2.2 Multiple RF Sources options for determination of exemption.

Option	Reference	
A 1-mW Test Exemption for Multiple Sources	FCC 1.1307(b)(3)(ii)(A)	The available maximum time averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).
B Simultaneous Transmission with both SAR-based and MPE- Based Test Exemptions	FCC 1.1307(b)(3)(ii)(B)	in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation. $\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$



2.3 Individual Antenna Port Exposure Results

2.3.1 Single Source Calculation of Exposure at Specified Separation Distance FCC 1.1307(b)(3)(i)(C) 'Option C' (MPE Based Exemption)

RAT	Frequency (MHz)	Conducted Power Output (mW)	Duty Cycle %	Time Average Conducted Power Output (mW)	Antenna Gain Ratio	Maximum Power (EIRP) mW	Maximum Power (ERP) mW	Minimum separation distance for MPE evaluation λ/2 π mm	Actual Distance (mm)	Threshold ERP (mW)	1.1307(b)(3)(i)(C) Exemption (Yes/No) (300 kHz to 100 GHz)
406 MHz	403.5	7943.28	9.4	746.668	3.981	2972.487	1812.49	118.3	1000	5165	Yes
121.5 MHz	120.6	398.11	37	147.301	0.562	82.827	50.50	395.9	1000	3830	Yes

Table 4 - Transmitter Result

The calculations show that the individual transmitters comply with FCC 1.1307(b)(3)(i)(C) MPE-based exception at a minimum distance of 100 cm.

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