
Project #: 23228-15

Company: Swimmersive Co. dba Zygo

EUT Name: Swimmersive Zygo
EUT Model: ZY300

RF Exposure Evaluation Report

Prepared for:

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July 23, 2022

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1.0 Maximum Permissible Exposure Evaluation (Supplements the test report.)

The measured power is considered for the intended use of the device and resulting RF exposure to the user.

1.1 Applicable Documents

Table 1.1.1: Applicable Documents

Document	Title
RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES
OET Bulletin 65 Edition 97-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

1.2 Criteria

Section Reference	Test Detail
FCC 47 CFR Part 1 I, 1.1310 // RSS-102, Issue 5	Radiofrequency radiation exposure limits

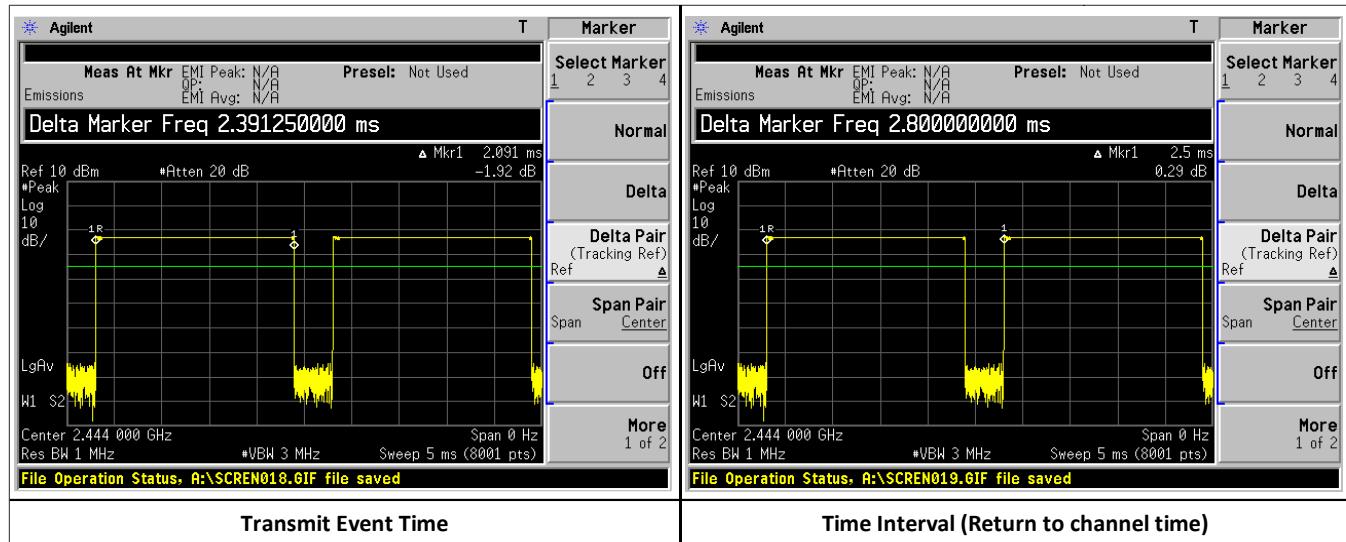
1.1 Exposure Weighing Factor

Duty cycle measurement is based on intervals not to exceed 100 msec. Maximum transmitter on time is divided by the lesser of 100 msec or the actual measured minimum transmitter interval time. The result is converted to dB and applied as needed to peak measurements of transmitter artifacts to determine average power. This is not a pass/fail measurement.

Continuous packet transmission mode was used for the duty cycle measurement, which would represent a worst-case operating scenario.

On Time (msec)	Time Interval (msec)	Duty Cycle (On Time/Interval)	Exposure Weighing Factor (dB) (10 * Log ₁₀ (Duty Cycle))
0.3772	1.25	= 0.31	= -5.2

Plotted measurements appear below:



1.2 Power to Exposure Calculation, Conducted

The EUT transmitter power is determined by conducted measurement. Safe exposure distance was calculated for the allowed maximum uncontrolled public exposure limit.

Measured Conducted Peak Power (dBm)	Exposure Weighing Factor (dB)	Antenna Gain (dBi)	Corrected Peak Power EIRP (dBm)	EIRP In Linear Terms (mW)
7.815	-5.20	-0.52	2.09	1.62

1.1 Antenna Separation Distance Analysis

According to figure below antenna is located 8 mm from the outside edge of the unit's chassis. Therefore, 8 mm is the closest contact distance from the antenna to the user.



Antenna to Chassis Separation Distance

1.2 MPE Calculation – FCC

According to KDB 447498 D01 General RF Exposure Guidance v06 section 4.3.1:

a) For 100 MHz to 6 GHz and test separation distances \leq 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Calculated power (max power including tune up tolerance) = 1.62 mW.

SAR exemption calculation applying 8 mm separation distance:

$$[(1.62 \text{ mW}) / (8 \text{ mm})] \cdot [\sqrt{2.48 \text{ (GHz)}}] = 0.32$$

So, $0.32 \leq 3.0$ at a separation distance of 8 mm.

1.3 MPE Calculation – IC

SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance.

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Applying above Table 1, row 2450 MHz, the linear interpolation of 8 mm separation distance limit is:

X = 8 mm (EUT antenna to housing separation distance)

X1 = 5 mm, Y1 = 4 mW

X2 = 10 mm, Y2 = 7 mW

$$\begin{aligned}
 \text{Limit} &= (Y2 - Y1) / (X2 - X1) * (X - X1) + Y1 \\
 &= (7 - 4) / (10 - 5) * (8 - 5) + 4 \\
 &= 5.8 \text{ mV}
 \end{aligned}$$

So, 1.62 mV < 5.8 mV at a separation distance of 8 mm.

1.1 Conclusion

Based on 8 mm separation distance between the user and the EUT, FCC and IC comply with MPE exposure limits.

End of Report