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RF Exposure Evaluation Report

Report No. :	CQASZ20200500448E-02
Applicant:	Elettromedia s.r.l.
Address of Applicant:	62018 Potenza Picena (MC) Italy
Equipment Under Test (EUT):	
EUT Name:	Marine Audio receiver
Model No.:	HMR 20
Brand Name:	Hertz
FCC ID:	2ASUD-HMR20
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2020-05-28
Date of Test:	2020-05-28 to 2020-06-04
Date of Issue:	2020-06-04
Test Result :	**PASS***

***In the configuration tested, the EUT complied with the standards specified above**

Tested By: Tom Chen.

(Tom Chen)

Reviewed By: Sheek Luo

(Sheek Luo)

Approved By:

(Jack Ai)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200500448E-02	Rev.01	Initial report	2020-06-04

2 Contents

3 General Information

3.1 Client Information

Applicant:	Elettromedia s.r.l.
Address of Applicant:	62018 Potenza Picena (MC) Italy
Manufacturer:	Elettromedia s.r.l.
Address of Manufacturer:	62018 Potenza Picena (MC) Italy
Factory:	Eastern Partner Limited
Address of Factory:	Room 1413, ICC Tower, Fuhau San Road, Futian CBD, Shenzhen 518048, China

3.2 General Description of EUT

Product Name:	Marine Audio receiver
Model No.:	HMR 20
Trade Mark:	Hertz
Hardware Version:	MB: 1120-H200320MB01 VER:C; KB: 1120-H20052-KB VER:C
Software Version:	MCU: HMR20_V1.01; DECODER: HMR20-200518
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK
Number of Channel:	79
Transfer Rate:	1Mbps/2Mbps
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	FCCAssist 2.4 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	-0.58dBi
Power Supply:	DC 12V

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limitst

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) 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

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd id the limit of MPE, 1 mW/cm2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure

1) For BT

Antenna Gain: -0.58dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.87 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-2.850	-3.5±1	-2.5	0.562
Middle(2441MHz)	-2.420	-3.0±1	-2.0	0.631
Highest(2480MHz)	-1.970	-2.5±1	-1.5	0.708
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-2.130	-3.0±1	-2.0	0.631
Middle(2441MHz)	-1.730	-2.5±1	-1.5	0.708
Highest(2480MHz)	-1.240	-2.0±1	-1.0	0.794

The worst case:

Maximum tune-up Power (mW)	**Antenna Gain (dBi)**	**Power Density at R = 20 cm (mW/cm^2)**	**Limit**	**Result**
0.794	-0.58	0.00014	1.0	PASS

Note: 1) Refer to report No. CQASZ20200500448E-01 for EUT test Max Conducted Peak Output Power value.

2) $Pd = (Pout*G)/(4* Pi * R^2)=(0.794*0.87)/(4*3.1416*20^2)=0.00014$