

RF-EXPOSURE REPORT					
	FCC 47 CFR Part 2.1091 ISED RSS-102				
Ма	ximum permissible exposure				
Report Reference No	G0M-2208-1596-TFC091MP-Etronic-V02				
Testing Laboratory	Eurofins Product Service GmbH				
Address	Storkower Str. 38c 15526 Reichenwalde Germany				
Accreditation	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 ISED Testing Laboratory site: 3470A-2				
Applicant	The Chicago faucet Company				
Address	2100 S. Clearwater Drive IL-60018 Des Plaines USA				
Test Specification	According to FCC rules				
Standard	FCC 47 CFR 2.1091				
Non-Standard Test Method	None				
Equipment under Test (EUT):					
Product Description	Electronic Tap with BLE				
Model(s)	IWT-07-A Etronic				
Additional Model(s)	None				
Brand Name(s)	Chicago Faucets				
Hardware Version(s)	RS00 TS03				
Software Version(s)	RS00 TS21				
FCC ID	2APTX-CFC02				
Test Result	PASSED				

Test Report No.: G0M-2208-1596-TFC091MP-Etronic-V02



required by standard but not tested		N/T		
257	N/R			
	P(PASS)			
	F(FAIL)			
	20 °C - 30 °C	-		
	25 % - 55 %			
	2018-01-01			
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2023-05-30		D. MOCK		
13				
Total number of pages 13 General Remarks:				
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VERSION HISTORY

	Version History			
Version	Issue Date	Remarks	Revised By	
01	01 2022-11-03 Initial Release			
02	02 2023-05-30 Change of the given antenna gain.		Dhamia Almozani	



ABBREVIATIONS AND ACRONYMS

Acronyms		
Acronym	Description	
EIRP	Equivalent Isotropic Radiated Power	
EUT	Equipment Under Test	
MPE	Maximum Permissible Exposure	



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1 Equipment (Test Item) Under Test

Description	Electronic Tap with BLE
Model	IWT-07-A Etronic
Additional Model(s)	None
Brand Name(s)	Chicago Faucets
Serial Number(s)	Prototype
Hardware Version(s)	RS00 TS03
Software Version(s)	RS00 TS21
FCC ID	2APTX-CFC02
Equipment type	End Product
Environment	General public



1.1 Reference Documents

Document Type	Document No.	Issued by	Date
Radio Test Report 47 CRF Part 15.247	20CH-01574.R02	Eurofins Electric & Electronics Product Testing AG	2023-05-22



1.2 Power density radiation sources

Mode	Operating Frequency [MHz]	Maximum conducted power [dBm]	Maximum radiated power [dBm EIRP]	Maximum duty cycle [%]	Maximum antenna gain [dBi]	Maximum antenna diameter [cm]
Bluetooth LE	2440	-1.45	-1.45	100	0	N/A
Comment:		•				

1.3 Field strength radiation sources

None

1.4 Concurrent Sources

No concurrent radiation sources



2 Result Summary

FCC MPE Evaluation - Single radiation sources					
Product Standard Requirement Reference Method Mode Distance [m] Verdict					Verdict
47 CFR 2.1091 Maximum permissible exposure FCC KDB 447498 Bluetooth LE 0.20 PASS					
Comment:					



3 RF-Exposure classification

RF-Exposure Categories			
Fixed A fixed device is defined as a device physically secured at one fixed local cannot be easily re-located.			
Mobile A mobile device is defined as a transmitting device designed to be used than fixed locations and to generally be used in such a way that a sed distance of at least 20 centimeters is normally maintained between the transmitting structure(s) and the body of the user or nearby persons.			
Portable	A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.		

RF-Exposure Categories			
Occupational / Controlled	Limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.		
General population / Uncontrolled	Exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.		



4 RF-Exposure limits

FCC Limits – General Population / Uncontrolled Exposure					
Frequency range Electric field Magnetic field Power density Averaging time [MHz] strength [V/M] strength [A/M] [W/m²] [min]					
0.3 – 1.34	614	1.63	1000	30	
1.34 – 30	824/f	2.19/f	1800/f ²	30	
30 – 300	27.5	0.073	2	30	
300 – 1500	•	-	f/150	30	
1500 – 100000	-	-	10.0	30	

FCC Limits – Occupational / Controlled Exposure					
Frequency range [MHz]	Electric field strength [V/M]	Magnetic field strength [A/M]	Power density [W/m²]	Averaging time [min]	
0.3 - 3.0	614	1.63	1000	6	
3.0 - 30	1842/f	4.89/f	9000/f ²	6	
30 – 300	61.4	0.163	10.0	6	
300 – 1500	=	-	f/30	6	
1500 – 100000	-	-	50	6	



5 RF-Exposure Evaluation

Evaluation Relations

$$\begin{split} \lambda[m] &= \frac{c \left[\frac{m}{S} \right]}{f[Hz]} \; ; \; R_{FF}[m] \geq \frac{2 \cdot D[m]^2}{\lambda[m]} \\ S[W/m^2] &= \frac{P_{EJ,R,P}[W]}{4\pi R[m]^2} \; ; \; R[m] = \sqrt{\frac{P_{EJ,R,P}[W]}{4\pi S[W/m^2]}} \\ DCC \; [dB] &= 10 \cdot Log_{10} \left(\frac{DC[\%]}{100} \right) \\ \sum_{i=1}^{N} \frac{S_i \left[\frac{W}{m^2} \right]}{S_{Li} \left[\frac{W}{m^2} \right]} + \sum_{j=1}^{M} \left(\frac{E_j \left[\frac{V}{m} \right]}{E_{Lj} \left[\frac{V}{m} \right]} \right)^2 + \sum_{k=1}^{O} \left(\frac{H_k \left[\frac{A}{m} \right]}{H_{Lk} \left[\frac{A}{m} \right]} \right)^2 < 1 \end{split}$$

Evaluation Procedure

Standalone operation evaluation:

For each radio and frequency band the worst case transmission mode with the highest peak conducted or radiated power is evaluated at the frequency that results in the most restrictive rf-exposure limit. From the peak power values, antenna gains and duty cycles taken from the reference documents, the source average radiated power values are calculated. From the average radiated power the power densities at antenna far-field distance is calculated. The distance from the radiation source for compliance power density is calculated. If the separation distance is lower than the far-field distance, the far-field distance is given as compliance separation distance because the plane wave power density assessment is only valid in the far-field of the radiation source.

For radiation sources for which the average electric and magnetic fields are measured using field probes, the measured field strength values are compared to the reference limits. For those sources no calculations are performed. Compliance with the reference values is determined with the near field measurements.

Concurrent operation evaluation:

First the evaluation distance is set to an appropriate value. For all radiation sources for which power densities are calculated, the power densities at the evaluation distance are calculated and for all other sources the electric or magnetic field strengths are measured using field probes. Finally the ratios of the power densities and/or field strength values and the corresponding limits are calculated and summed and the sum is compared to the maximum of 1.



6 Single Source Evaluation Results - FCC

Bluetooth LE				
Transmission Mode				
Transmission Frequency (f) [MHz]	2440			
Antenna far-field distance				
Maximum antenna diameter (D) [m]	N/A			
Transmission wavelength (λ) [m]	N/A			
Antenna far-field distance (R _{FF}) [m]	N/A			
Source average power				
Peak radiated power (PR) [dBm EIRP]	-1.45			
Maximum transmission duty cycle (DC)	1.00			
Duty cycle correction (DCC) [dB]	0.00			
Average radiated power (PRAVG) [dBm EIRP]	-1.45			
Power density				
Compliance power density limit [W/m²]	10.000			
Power density (S) @ Antenna far-field distance [W/m²]	N/A			
Power density (S) @ 0.20 m [W/m ²]	0.001			
Power density ratio @ 0.20 m	0.00			
Distance for compliance power density (S=SL) [m]	0.002			
Compliance				
Verdict	PASS			
Comment:				