



Product Service

**Choose certainty.
Add value.**

Report On

RF Exposure Assessment of the
FCS
MCT-US/STD Tri-corr Touch Pro

FCC ID: RUZ-068



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
FCS
MCT-US/STD Tri-corr Touch Pro

Document 75940615 Report 06 Issue 2

January 2018

PREPARED FOR

HWM-Water Ltd
Llantarnam Park Way
Cwmbran
NP44 3AW
United Kingdom

On Behalf of:

Fluid Conservation Systems
502 TechneCenter Drive
Suite B
Milford
OH 45150
USA

PREPARED BY

David Guyett-Smith
Chief Safety Engineer - Technical Solutions

APPROVED BY

Ryan Henley
Authorised Signatory

DATED

16 January 2018

This report has been up-issued to Issue 2 to amend the applicant name.



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
2	TEST DETAILS 8
2.1	Rationale for Assessment of the RF Exposure 9
2.2	Test Result Details 10
3	DISCLAIMERS AND COPYRIGHT 11
3.1	Disclaimers and Copyright 12



Product Service

SECTION 1

REPORT SUMMARY

RF Exposure Assessment of the
FCS
MCT-US/STD Tri-corr Touch Pro



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the FCS MCT-US/STD Tri-corr Touch Pro 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	HWM-Water Ltd
Manufacturer	FCS
Manufacturing Description	Tri-corr Touch Pro
Model Number(s)	MCT-US/STD
Test Specification/Issue/Date	CFR 47 Pt1.1310 (2016)



Product Service

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
FCC	CFR 47 Pt1.1310 (2016)



Product Service

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment under test was a FCS MCT-US/STD Tri-corr Touch Pro. 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 MCT-US/STD Tri-corr Touch Pro 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	Land Mobile Station
Frequency Band	438-472 MHz

1.3.3 Antennas

The following antennas are supported by the equipment under test.

No.	Model	Gain(dBi)
1	Not Specified	5

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
0.10	0.21

Table 1 – Compliance Boundary Results



Product Service

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.10 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
FCC*	1.2583	1.4600	N/A	N/A	N/A	N/A

* Requirement and Result in mW/cm²

Table 2 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the and CFR 47 Pt1.1310 (2016) at the point of investigation, 0.10 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.21 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
FCC*	0.2853	0.2920	N/A	N/A	N/A	N/A

* Requirement and Result in mW/cm²

Table 3 – General Population Results

The calculations show that the EUT complies with the general population exposure levels described in the and CFR 47 Pt1.1310 (2016) at the point of investigation, 0.21 m.



Product Service

SECTION 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 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 MCT-US/STD Tri-corr Touch Pro 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):

$$H = \frac{E}{\eta_0}$$

Where:

P = Average Power (W)

G = Antenna Gain (dBi)

r = Distance (cm) or (m)

$\eta_0 = 377$



Product Service

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 0.10 m		
								S Field (W/m ²)	E Field (V/m)	H Field (A/m)
1	1	1	Land Mobile Station	1.581	100	5	438	12.5832	68.8748	0.1827

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 0.21 m		
								S Field (W/m ²)	E Field (V/m)	H Field (A/m)
1	1	1	Land Mobile Station	1.581	100	5	438	2.8533	32.7975	0.0870

Table 5 – General Population Transmitter Summary



Product Service

SECTION 3

DISCLAIMERS AND COPYRIGHT



Product Service

3.1 DISCLAIMERS AND COPYRIGHT

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

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service

© 2018 TÜV SÜD Product Service



Product Service

ANNEX A

REGIONAL REQUIREMENTS



Product Service

Frequency Range (MHz)	Power Density (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.1 – CFR 47 Pt1.1310 (2016) Occupational Limits

Frequency Range (MHz)	Power Density (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.2 – CFR 47 Pt1.1310 (2016) General Population Limits