

MEASUREMENT REPORT FCC PART 15.225 RFID

Applicant Name:

ClearTrac Technologies, LLC
730 Quail Hollow Drive
Elizabethton, TN 37643
United States

Date of Testing:

7/31/2020 to 8/22/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2009170148-02.2AVN9

FCC ID:

2AVN910632

APPLICANT:

ClearTrac Technologies, LLC

Application Type:

Certification

Model(s):

DCD-001F(female), DCD-001M(male)

EUT Type:

Urine Flow Device

Frequency:

13.56MHz

FCC Classification:

Low Power Communications Device Transmitter (DXX)

FCC Rule Part(s):

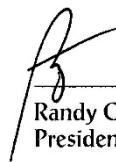
Part 15 Subpart C (15.225)

Test Procedure(s):

ANSI C63.10-2013

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.


Randy Ortanez
President



FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 1 of 26

T A B L E O F C O N T E N T S

1.0	Introduction	3
1.1	Scope.....	3
1.2	PCTEST Test Location	3
1.3	Test Facility / Accreditations	3
2.0	PRODUCT INFORMATION	4
2.1	Equipment Description.....	4
2.2	Device Capabilities	4
2.3	Test Support Equipment	4
2.4	Test Configuration	4
2.5	EMI Suppression Device(s)/Modifications.....	4
3.0	DESCRIPTION OF TEST	5
3.1	Evaluation Procedure.....	5
3.2	Radiated Emissions	5
3.3	Environmental Conditions	5
4.0	ANTENNA REQUIREMENTS	6
5.0	MEASUREMENT UNCERTAINTY	7
6.0	TEST EQUIPMENT CALIBRATION DATA.....	8
7.0	TEST DATA	9
7.1	Summary	9
7.2	Occupied Bandwidth Measurement	10
7.3	Frequency Stability Test Data	13
7.4	In-Band Radiated Spurious Emission Measurements.....	16
7.5	Radiated Spurious Emission Measurements, Out-of-Band.....	19
8.0	CONCLUSION	26

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 2 of 26	

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.



1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 3 of 26	

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **ClearTrac Technologies, LLC Urine Flow Device FCC ID: 2AVN910632**. The test data contained in this report pertains only to the emissions due to the RFID transmitter of the EUT.

Test Device Model No.: DCD-001F(female)
DCD-001M(male)

Test Device Serial No.: FIT29(female) & MIT22(male)

2.2 Device Capabilities

This device contains the following capabilities:

RFID

2.3 Test Support Equipment

Dell Precision laptop	Model:	M2800	S/N:	CRKJV32	Length:	N/A
Identiv	Model:	Utrust 3700	S/N:	5.50217E+13	Length:	45cm



Table 2-1. Test Support Equipment Used

2.4 Test Configuration

This device was tested in accordance with the guidance of ANSI C63.10-2013. See Sections 3.2 of this test report for a description of the radiated emissions test setups, respectively. The EUT was set to continuously transmit at 13.56MHz. This was performed using manufacturer software loaded a computer and a passive RFID tag with a disposable bucket to allow for continuous transmission.

2.5 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 4 of 26	

3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the EUT.

Deviation from measurement procedure.....None

3.2 Radiated Emissions



The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.3 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 5 of 26

4.0 ANTENNA REQUIREMENTS



Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the EUT are **permanently attached**.
- There are two variants of this EUT - a female version (Model: DCD-001F, S/N: FIT29) and a male version (Model: DCD-001M, S/N: MIT22). Testing was performed with both variants and the worst case emissions are shown herein.

Conclusion:

The EUT complies with the requirement of §15.203.

FCC ID: 2AVN910632	 <small>Proud to be part of element</small>	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 6 of 26	

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (\pm dB)
Radiated Disturbance (<1GHz)	4.98

FCC ID: 2AVN910632	 MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 7 of 26

6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Espec	ESX-2CA	Environmental Chamber	8/13/2019	Annual	8/13/2020	17620
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	7/9/2020	Biennial	7/9/2022	114451
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	1/9/2020	Annual	1/9/2021	NMLC-2
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	10/1/2019	Biennial	10/1/2021	310233
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 8 of 26	

7.0 TEST DATA

7.1 Summary

Company Name: ClearTrac Technologies, LLC
FCC ID: 2AVN910632
FCC Classification: Low Power Communications Device Transmitter (DXX)
Frequencies Examined: 13.56MHz

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	RSS-Gen [6.6]	Occupied Bandwidth	N/A	RADIATED	PASS	Section 7.2
15.225 (a)(b)(c)	RSS-210 [B.6]	In-Band Emissions	15,848µV/m @ 30m 13.553 – 13.567 MHz 334µV/m @ 30m 13.410 – 13.553 MHz 13.567 – 13.710 MHz 106µV/m @ 30m 13.110 – 13.410 MHz 13.710 – 14.010 MHz			Section 7.4
15.225 (d) 15.209	RSS-Gen [8.9]	Out-of-Band Emissions	Emissions outside of the specified band (13.110 – 14.010 MHz) must meet the radiated limits detailed in 15.209 (RSS-Gen [8.9])			Section 7.5
15.225 (e)	RSS-210 [B.6]	Frequency Stability Tolerance	± 0.01% of Operating Frequency	Temperature Chamber		Section 7.3

Table 7-1. Summary of Test Results

Note:

There are two variants of this EUT - a female version (Model: DCD-001F, S/N: FIT29) and a male version (Model: DCD-001M, S/N: MIT22). Testing was performed with both variants and the worst case emissions are shown herein.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 9 of 26	

7.2 Occupied Bandwidth Measurement

§2.1049; RSS-Gen (6.6)

Test Overview and Limit

The occupied bandwidth is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequency.

Test Procedure Used

ANSI C63.10-2013 – Section 6.9.3

Test Settings

1. Spectrum analyzer frequency is set to the nominal EUT channel center frequency.
2. RBW = 1 – 5% OBW
3. VBW $\geq 3 \times$ RBW
4. Reference level set to keep signal from exceeding maximum input mixer level for linear operation.
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. The trace was allowed to stabilize
9. Using the 99% power bandwidth function of the instrument and report the measured bandwidth.

Test Notes

None.

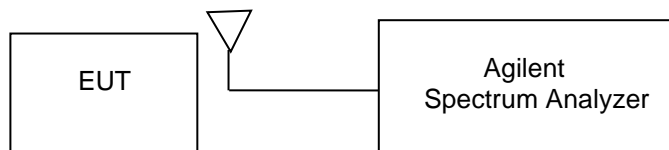


Figure 7-1. Test Instrument & Measurement Setup

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 10 of 26

Frequency	Handset	Occupied Bandwidth
13.56MHz	FIT29	430.47
13.56MHz	MIT22	435.08

Table 7-2. Occupied Bandwidth Measurement

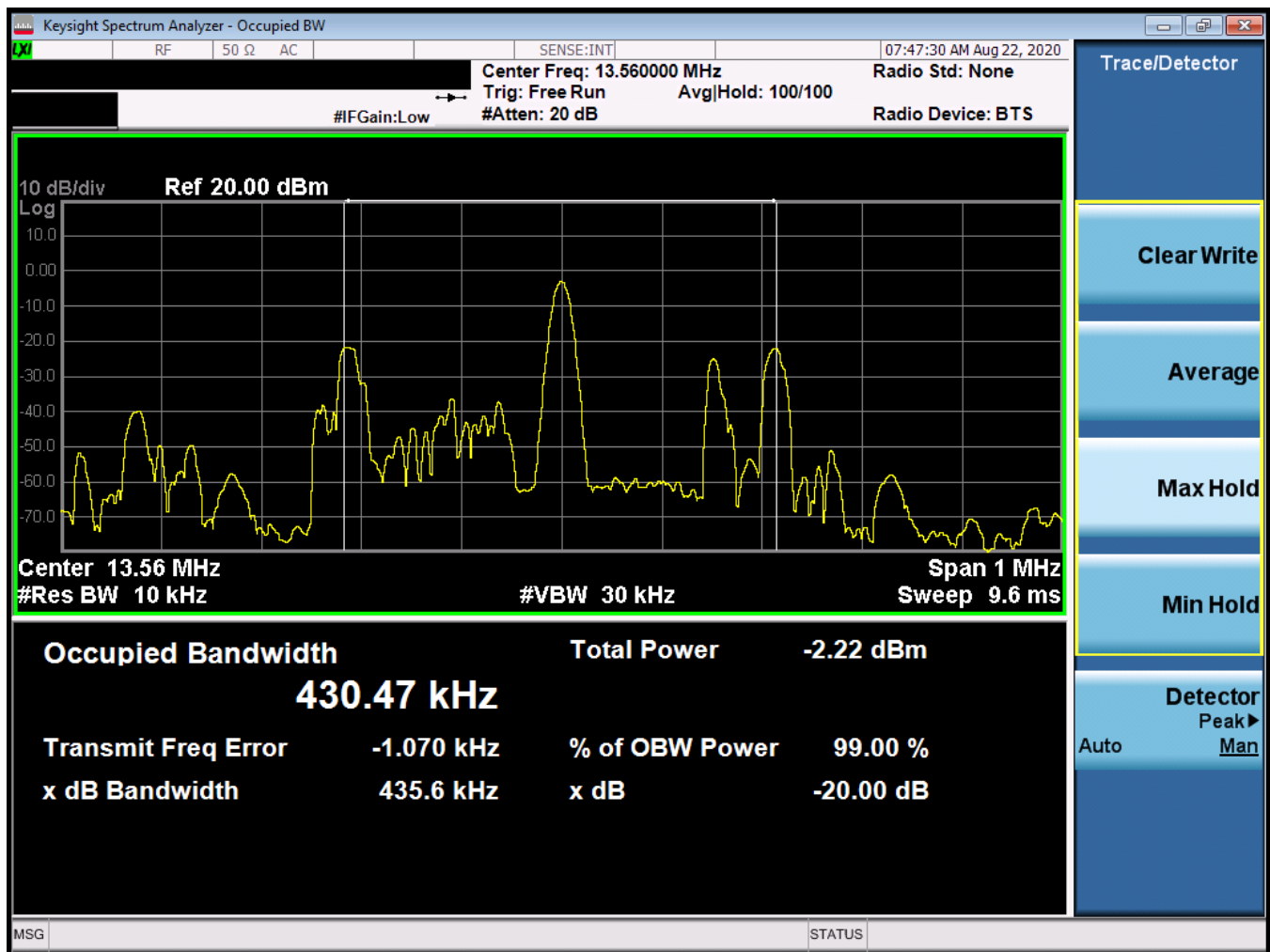


Figure 7-2. Occupied Bandwidth Plot FIT29

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC.COM	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 11 of 26



Figure 7-3. Occupied Bandwidth Plot MIT22

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC.COM	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 12 of 26

7.3 Frequency Stability Test Data

§15.225; RSS-210 (B.6)

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.10-2013. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -20°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 15.225, the frequency stability of the transmitter shall be maintained within $\pm 0.01\%$ of the center frequency.

Test Procedure Used

ANSI C63.10-2013 – Section 6.8

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -20°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 13 of 26	

Frequency Stability Test Data

§15.225; RSS-210 (B.6)

OPERATING FREQUENCY: 13,560,000 Hz
 REFERENCE VOLTAGE: 23090
 DEVIATION LIMIT: ±0.01% = 1356Hz VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	12.00	- 30	13,559,999	-1	-0.0000103
100 %	12.00	- 20	13,559,995	-5	-0.0000383
100 %	12.00	- 10	13,559,996	-4	-0.0000288
100 %	12.00	0	13,559,998	-2	-0.0000118
100 %	12.00	+ 10	13,560,002	2	0.0000170
100 %	12.00	+ 20	13,560,003	3	0.0000251
100 %	12.00	+ 30	13,560,006	6	0.0000450
100 %	12.00	+ 40	13,560,005	5	0.0000398
100 %	12.00	+ 50	13,559,998	-2	-0.0000170

Table 7-3. Frequency Stability Test Data

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 14 of 26

Frequency Stability Test Data

§15.225; RSS-210 (B.6)

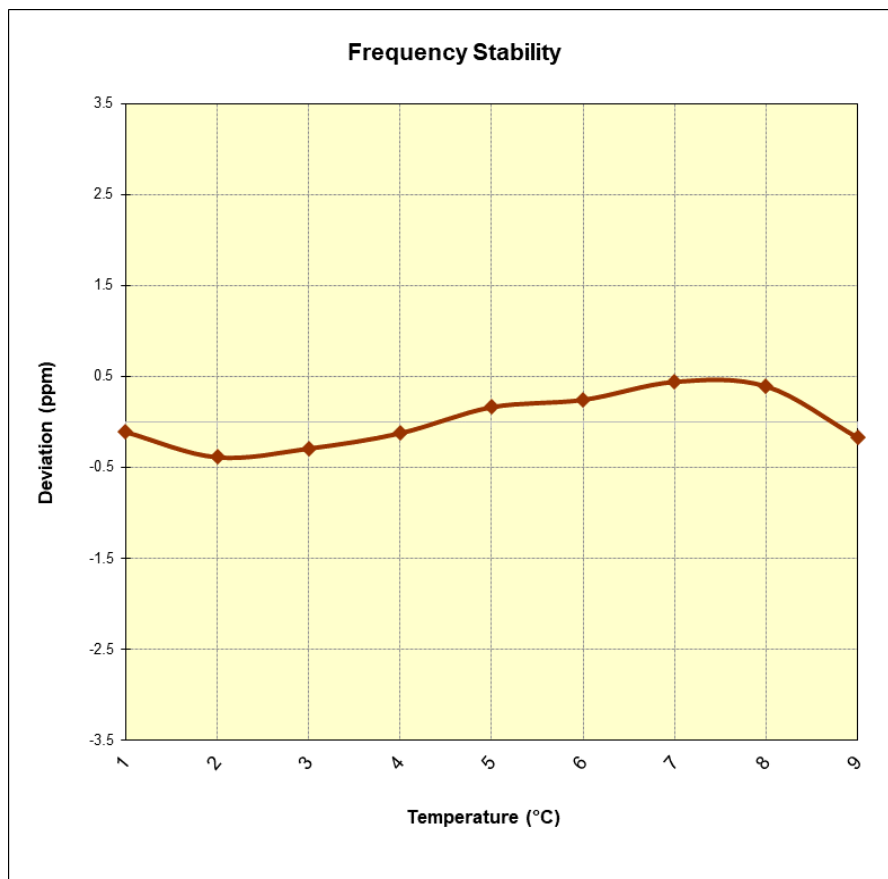


Figure 7-4. Frequency Stability Plot

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC.COM	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 15 of 26	

7.4 In-Band Radiated Spurious Emission Measurements

§15.225(a)(b)(c); RSS-210 (B.6)

Test Overview and Limit

The EUT was tested from 13.110 – 14.010 MHz. All in-band radiated spurious emissions are measured with a spectrum analyzer connected to a loop antenna while the EUT is operating at appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All in-band emissions appearing in a restricted band as specified in Section 15.225 of the Title 47 CFR must not exceed the limits shown in Table 7-4.

Frequency [MHz]	Field Strength [μ V/m]	Measured Distance [Meters]
13.553-13.567 MHz	15,848	30
13.410-13.553 MHz and 13.567-13.710 MHz	334	30
13.110-13.410 MHz and 13.710-14.010 MHz	106	30

Table 7-4. Radiated Limits

Test Procedures Used

ANSI C63.10-2013 – Section 6.4.7

Test Settings

1. RBW = 9kHz
2. VBW \geq 3 x RBW
3. Detector = peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 16 of 26

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

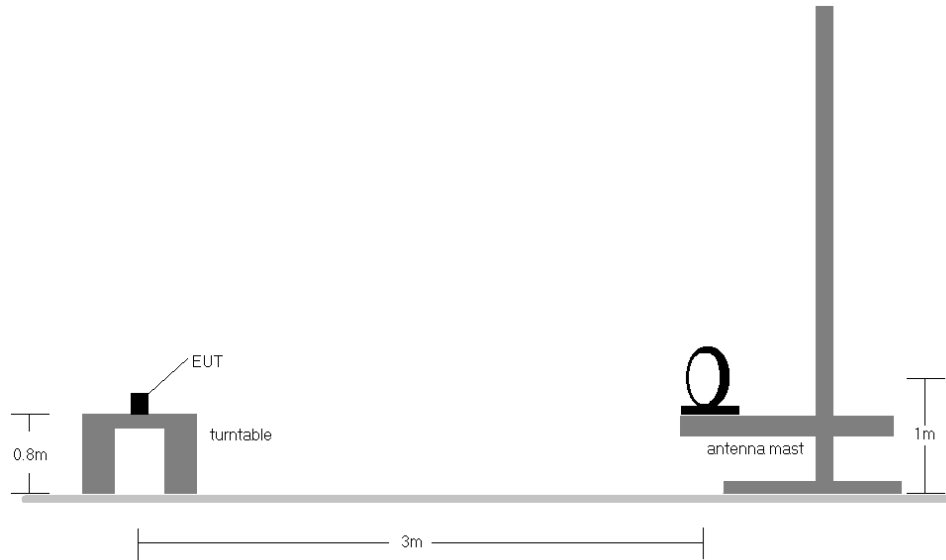


Figure 7-5. Radiated Test Setup

Test Notes:

1. All emissions lying in restricted bands specified in §15.225 and RSS-210 are below the limit shown in Table 7-4.
2. All measurements were performed using a loop antenna. The antenna was positioned in three orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.
3. The EUT was positioned in three orthogonal planes to determine the orientation resulting in the worst case emissions.
4. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2). Extrapolation Factor = $20 \log_{10}(30/3)^2 = 40\text{dB}$.
5. The spectrum was investigated from 9kHz up to 30MHz using the loop antenna. Only the emissions shown in the table below were found to be significant.
6. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
7. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

Sample Calculation

- Field Strength Level $[\text{dB}\mu\text{V/m}] = \text{Analyzer Level} [\text{dBm}] + 107 + \text{AFCL} [\text{dB/m}]$
- $\text{AFCL} [\text{dB/m}] = \text{Antenna Factor} [\text{dB/m}] + \text{Cable Loss} [\text{dB}]$
- $\text{Margin} [\text{dB}] = \text{Field Strength Level} [\text{dB}\mu\text{V/m}] - \text{Limit} [\text{dB}\mu\text{V/m}]$

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 17 of 26

In-Band Radiated Spurious Emission Measurements

§15.225(a)(b)(c); RSS-210 (B.6)

Frequency: 13.56MHz

Measurement Distance: 3 Meters

Frequency [MHz]	Ant. Pol. [X/Y/Z]	Antenna Height [cm]	Turntable Azimuth [degree]	Level [dBm]	AFCL [dB/m]	3m Field Strength [dBµV/m]	30m Field Strength [dBµV/m]	Limit [µV/m]	Limit [dBµV/m]	Margin [dB]
13.240	X	100	227	-90.82	14.76	30.94	-9.06	106	40.51	-49.57
13.348	X	100	227	-89.36	14.77	32.41	-7.59	106	40.51	-48.10
13.483	X	100	227	-86.93	14.77	34.84	-5.16	334	50.47	-55.63
13.560	X	100	227	-71.49	14.78	50.29	10.29	15848	84.00	-73.71
13.650	X	100	227	-87.66	14.78	34.12	-5.88	334	50.47	-56.35
13.769	X	100	227	-87.79	14.79	34.00	-6.00	106	40.51	-46.51
13.977	X	100	227	-91.51	14.80	30.29	-9.71	106	40.51	-50.22

Table 7-5. FIT29 In-Band Radiated Measurements

Frequency [MHz]	Ant. Pol. [X/Y/Z]	Antenna Height [cm]	Turntable Azimuth [degree]	Level [dBm]	AFCL [dB/m]	3m Field Strength [dBµV/m]	30m Field Strength [dBµV/m]	Limit [µV/m]	Limit [dBµV/m]	Margin [dB]
13.190	X	100	205	-91.70	14.76	30.06	-9.94	106	40.51	-50.45
13.350	X	100	205	-91.69	14.77	30.08	-9.92	106	40.51	-50.43
13.454	X	100	205	-89.49	14.77	32.28	-7.72	334	50.47	-58.19
13.559	X	100	205	-71.76	14.78	50.02	10.02	15848	84.00	-73.98
13.662	X	100	205	-89.95	14.78	31.83	-8.17	334	50.47	-58.64
13.773	X	100	205	-89.97	14.79	31.82	-8.18	106	40.51	-48.69
13.959	X	100	205	-91.28	14.80	30.52	-9.48	106	40.51	-49.99

Table 7-6. MIT22 In-Band Radiated Measurements

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 18 of 26

7.5 Radiated Spurious Emission Measurements, Out-of-Band

§15.209 §15.225(d); RSS-Gen (8.9)

Test Overview and Limit

The EUT was tested from 9kHz up to the 1GHz excluding the band 13.110 – 14.010 MHz. All measurements up to 960MHz were recorded with a spectrum analyzer employing a quasi-peak detector.

All out-of-band emissions appearing in a restricted band as specified in Section 15.225 of the Title 47 CFR must not exceed the limits shown in Table 7-7 per Section 15.209.

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3



Table 7-7. Radiated Limits – Out of band

Test Procedures Used

ANSI C63.10-2013 – Section 6.5.4

Test Settings

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 9kHz for emissions below 30MHz and 100kHz for emissions between 30MHz and 1GHz
3. VBW ≥ 3 x RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 19 of 26	

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

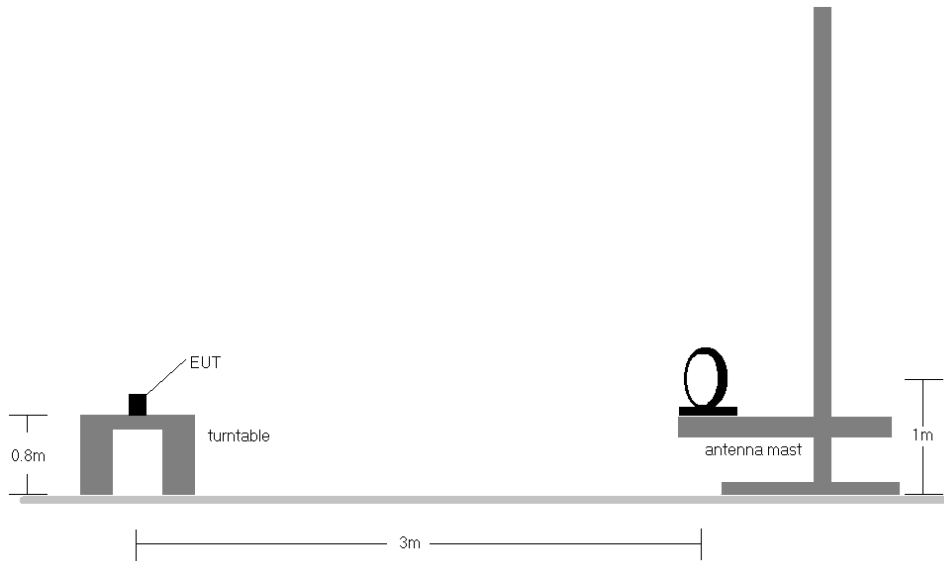


Figure 7-6. Radiated Test Setup < 30MHz

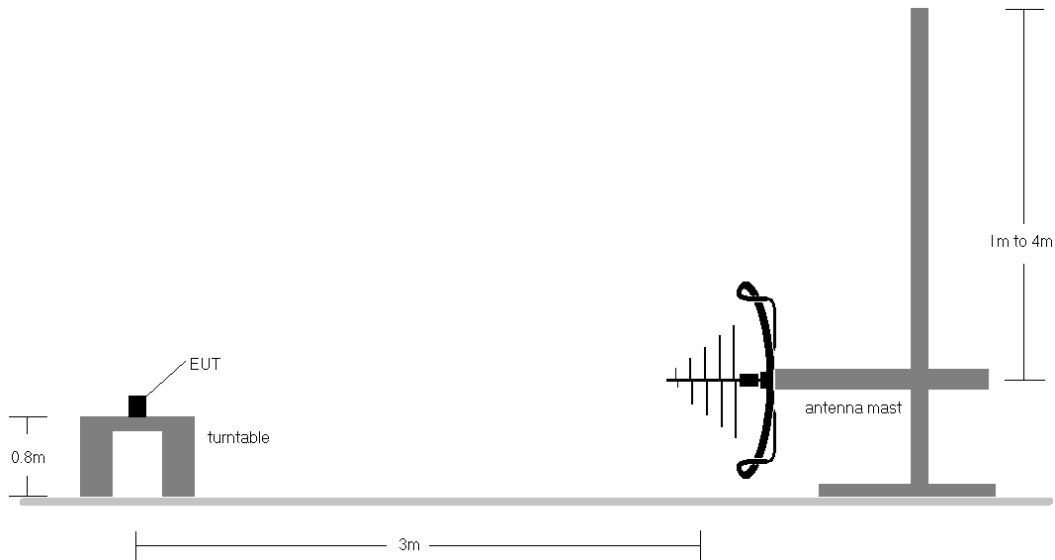


Figure 7-7. Radiated Test Setup > 30MHz


FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 20 of 26

Test Notes:

1. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector for emissions below 960MHz.
2. A loop antenna was used to investigate emissions below 30MHz.
3. Both Vertical and Horizontal polarities of the receive antenna were evaluated with the worst case emissions being reported. Below 30MHz the loop antenna was positioned in 3 orthogonal planes (X front, Y side, Z top) to determine the orientation resulting in the worst case emissions.
4. The EUT was positioned in three orthogonal planes to determine the orientation resulting in the worst case emissions.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
6. No spurious emissions levels were found to be greater than the level of the fundamental.
7. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

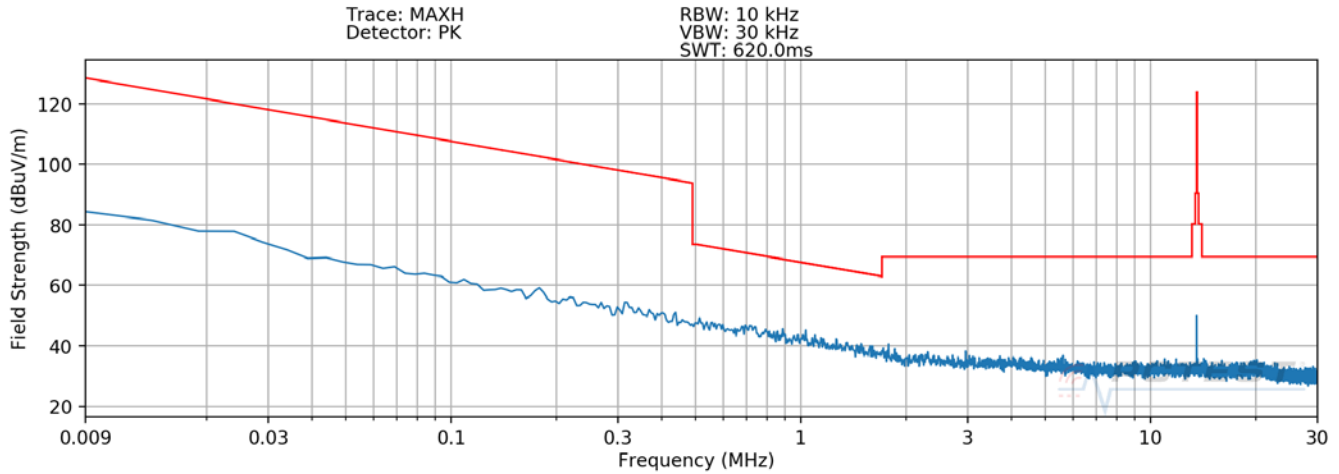
Sample Calculation

- Field Strength Level [dB μ V/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- Margin [dB] = Field Strength Level [dB μ V/m] – Limit [dB μ V/m]

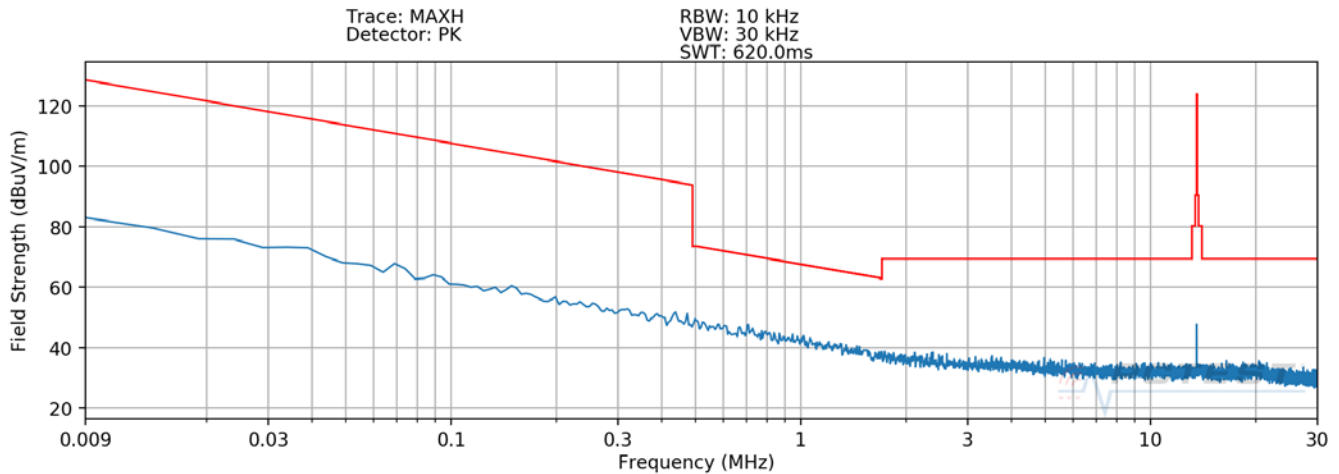
FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 21 of 26	

Radiated Spurious Emission Measurements, Out-of-Band

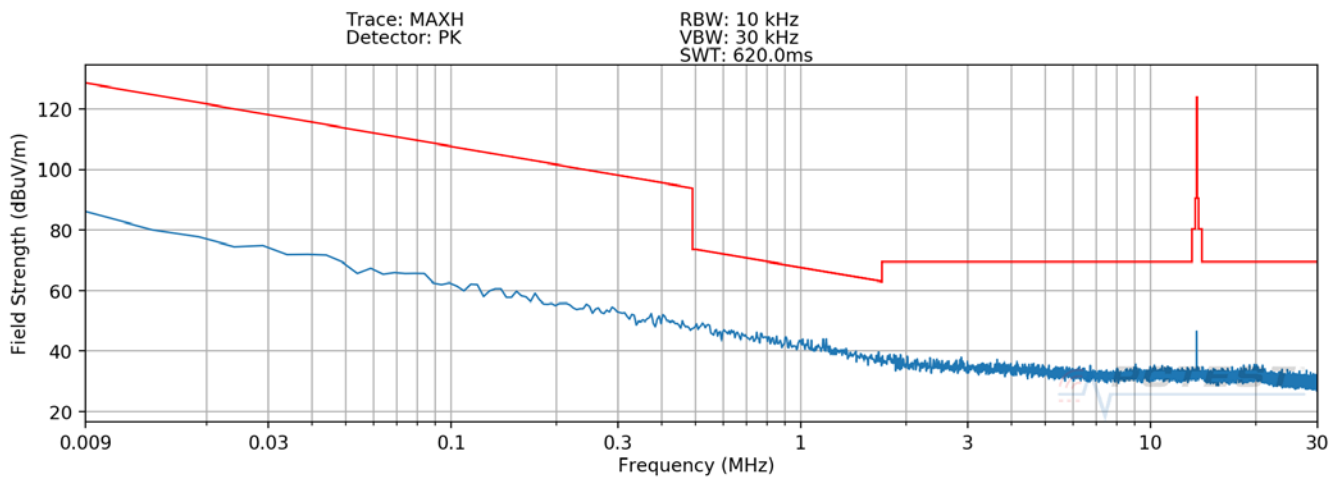
§15.209 §15.225(d); RSS-Gen (8.9)



Plot 7-1. Radiated Spurious Plot 9kHz – 30MHz (FIT29 Pol. X)

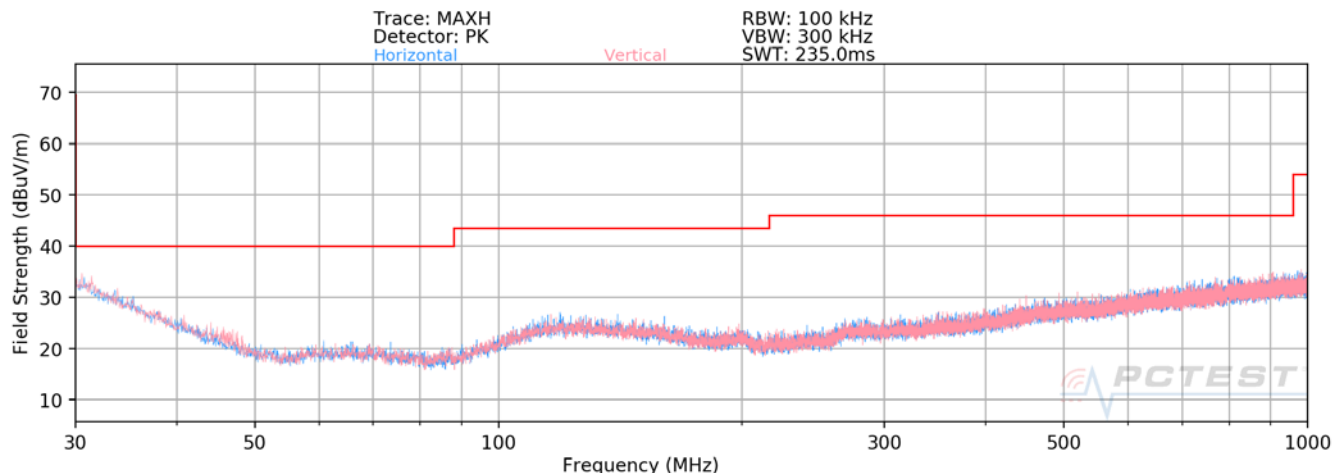


Plot 7-2. Radiated Spurious Plot 9kHz – 30MHz (FIT29 Pol. Y)



Plot 7-3. Radiated Spurious Plot 9kHz – 30MHz (FIT29 Pol. Z)

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC.COM	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 22 of 26



Plot 7-4. Radiated Spurious Plot 30MHz – 1GHz (FIT29 Pol. H & V)

Radiated Spurious Emission Measurements, Out-of-Band §15.209 §15.225(d); RSS-Gen (8.9)

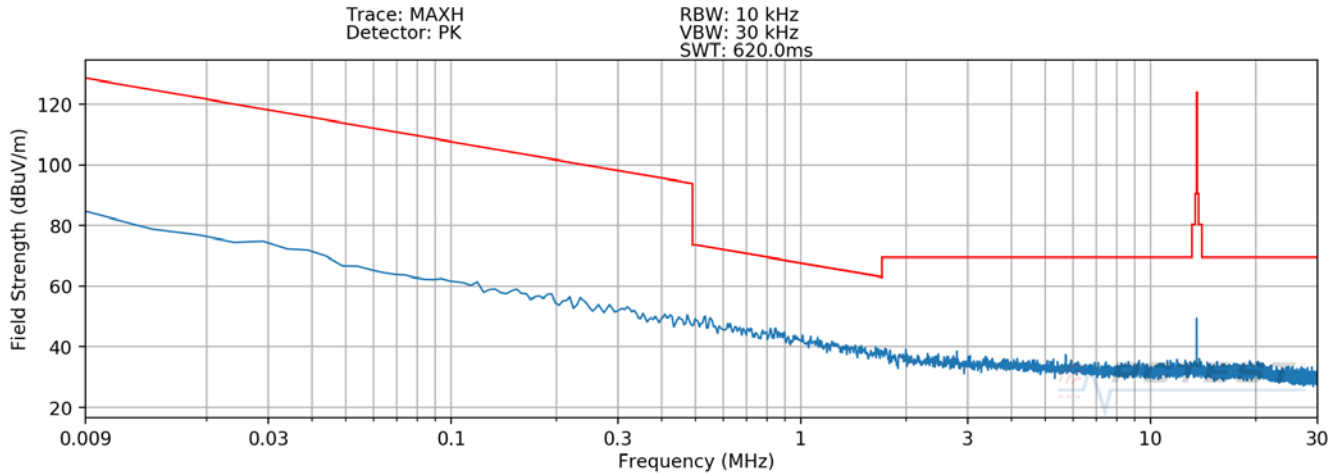
Tx Frequency: 13.56MHz

Measurement Distance: 3 Meters

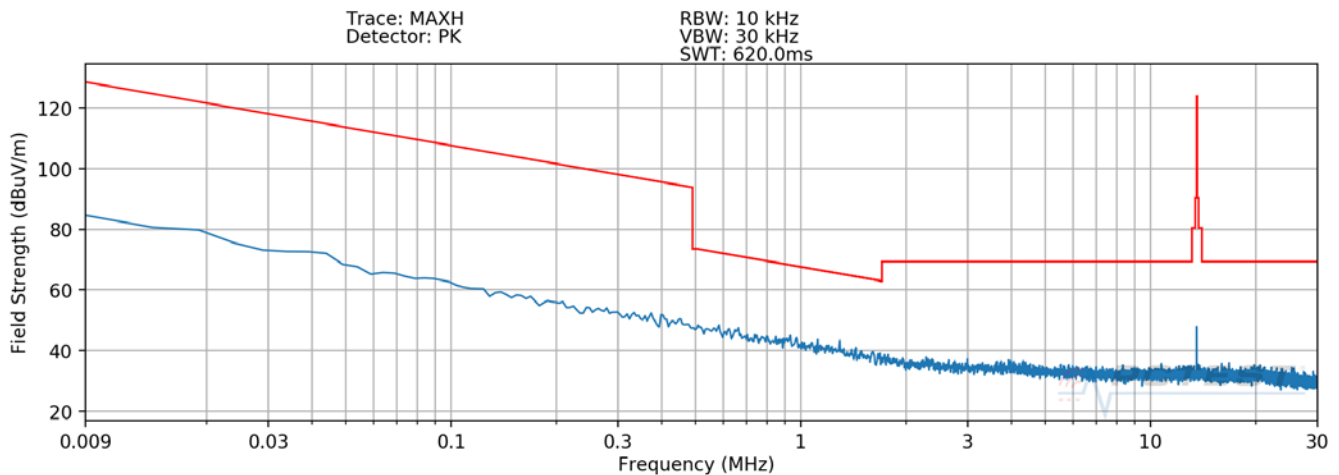
Frequency [MHz]	Ant. Pol. [H/V]	Level [dBm]	AFCL [dB/m]	3m Field Strength [dBuV/m]	Limit [uV/m]	Limit [dBuV/m]	Margin [dB]
27.12	X	-91.12	12.46	28.34	3000.00	69.54	-41.21
40.68	V	-97.64	18.44	27.80	100.00	40.00	-12.20
54.24	V	-97.31	12.31	22.00	100.00	40.00	-18.00
67.80	V	-98.70	12.55	20.85	100.00	40.00	-19.15
81.36	V	-98.25	11.85	20.60	100.00	40.00	-19.40
94.92	V	-97.01	14.30	24.29	150.00	43.52	-19.23
108.48	V	-97.61	17.53	26.92	150.00	43.52	-16.60

Table 7-8. Radiated Measurements FIT29

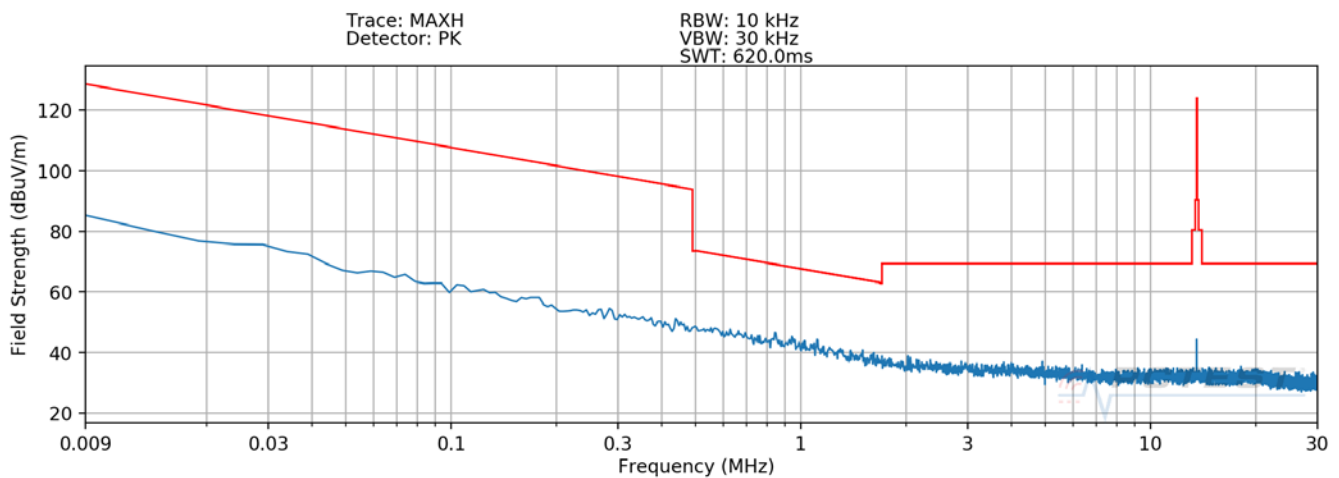
FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 23 of 26



Plot 7-5. Radiated Spurious Plot 9kHz – 30MHz (MIT22 Pol. X)

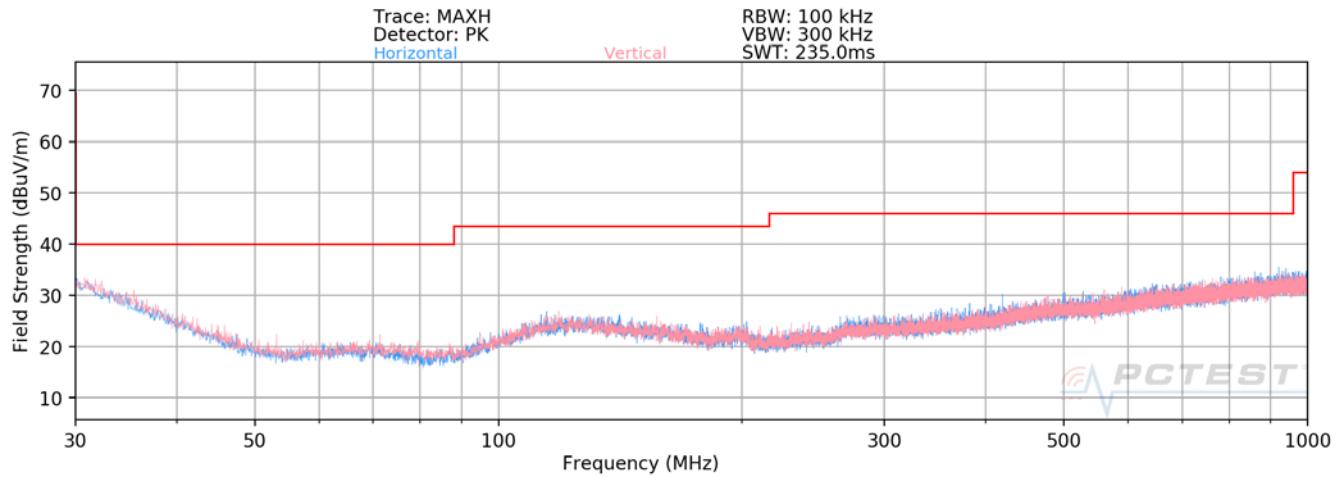


Plot 7-6. Radiated Spurious Plot 9kHz – 30MHz (MIT22 Pol. Y)



Plot 7-7. Radiated Spurious Plot 9kHz – 30MHz (MIT22 Pol. Z)

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC.COM	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 24 of 26



Plot 7-8. Radiated Spurious Plot 30MHz – 1GHz (MIT22 Pol. H & V)

Radiated Spurious Emission Measurements, Out-of-Band §15.209 §15.225(d); RSS-Gen (8.9)

Frequency [MHz]	Ant. Pol. [H/V]	Level [dBm]	AFCL [dB/m]	3m Field Strength [dBμV/m]	Limit [μV/m]	Limit [dBμV/m]	Margin [dB]
27.12	X	-90.78	12.46	28.68	3000.00	69.54	-40.87
40.68	V	-97.75	18.44	27.69	100.00	40.00	-12.31
54.24	V	-98.28	12.31	21.03	100.00	40.00	-18.97
67.80	V	-99.02	12.55	20.53	100.00	40.00	-19.47
81.36	V	-98.17	11.85	20.68	100.00	40.00	-19.32
94.92	V	-98.13	14.30	23.17	150.00	43.52	-20.35
108.48	V	-98.46	17.53	26.07	150.00	43.52	-17.45

Table 7-9. Radiated Measurements MIT22

FCC ID: 2AVN910632	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	ClearTrac CLEARTRAC CORPORATION	Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device		Page 25 of 26

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **ClearTrac Technologies, LLC Urine Flow Device FCC ID: 2AVN910632** has been tested to show compliance with Part 15 Subpart C (15.225) of the FCC Rules.

FCC ID: 2AVN910632		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2009170148-02.2AVN9	Test Dates: 7/31/2020 to 8/22/2020	EUT Type: Urine Flow Device	Page 26 of 26	