Full Swing Golf, Inc.

REVISED TEST REPORT TO 105187-6

Golf Launch Monitor
Model: FSKIT1*
(*See Appendix A for Manufacturer Declaration)

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.245
(24.075GHz to 24.175GHz)

Report No.: 105187-6A

Date of issue: Juy 15, 2021

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Test Certificate # 803.01

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Full Swing Golf Inc.
1905 Aston Ave #100
Carlsbad, CA 92008-7392

Representatives:
Erin Littell - F-Squared Laboratories
Daniel Weitzner – Full Swing Golf, Inc.
Customer Reference Number: 5266R1

REPORT PREPARED BY:

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 105187

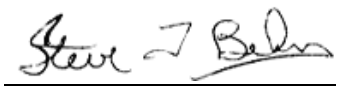
DATE OF EQUIPMENT RECEIPT: March 18, 2021
DATE(S) OF TESTING: March 18-19, 2021

Revision History

Original: Testing of the Golf Launch Monitor Model: FSKIT1 to FCC Part 15 Subpart C Section(s) 15.245 (24.075GHz to 24.175GHz).
Revision A: To clarify on the data that testing was performed with a fresh battery.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.19

Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Canada	Japan
Canyon Park, Bothell, WA	US0103	US1024	3082C	A-0136
Brea, CA	US0103	US1024	3082D	A-0136
Fremont, CA	US0103	US1024	3082B	A-0136
Mariposa, CA	US0103	US1024	3082A	A-0136

*CKC's list of NIST designated countries can be found at: https://standards.gov/cabs/designations.html

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.245

Test Procedure	Description	Modifications	Results
2.1049	Occupied Bandwidth	NA	PASS
15.245(b)	Field Strength of Fundamental	NA	PASS
15.245(b)(1)(i) and (ii)	Field Strength of Harmonics	NA	PASS
15.245(b)(3)	Field Strength of Radiated Emissions (except harmonics) & Band Edge	NA	PASS

NA = Not Applicable

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
Per the manufacturer request, Test Setup photos are incorporated by reference. 105187-6_TestSetup_Photos.

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Golf Launch Monitor	Full Swing Golf Inc.	FSKIT1*	LM31-9925

(*See Appendix A for Manufacturer Declaration)

Support Equipment:

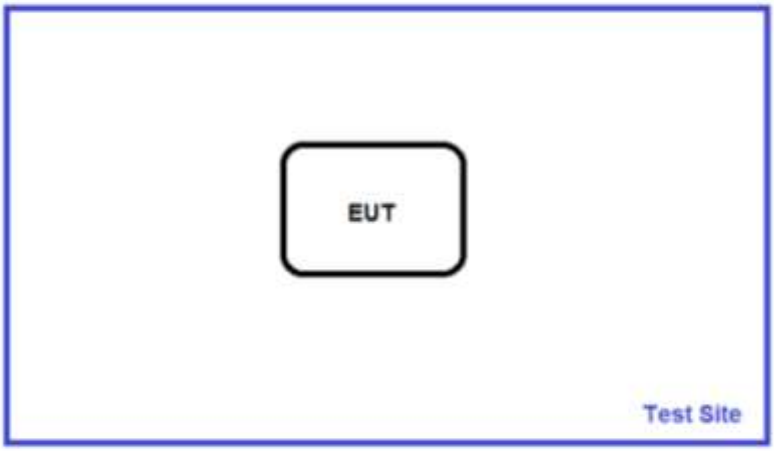
Device	Manufacturer	Model #	S/N
AC to DC Power Supply	Qualtek	QFWC-45-20-USCR	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of System:	Continuous Wave
Operating Frequency Range:	24.078GHz to 24. 172GHz
Modulation Type:	NA
Maximum Duty Cycle:	100%
Number of TX Chains:	2 (Manufacturer declares only one is used)
Antenna Type(s) and Gain:	Integral 2x2 CPW Array, 10dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	11.1V Lithium Ion Battery
Firmware / Software used for Test:	Digital Board: FSG_LM_ZYNQ_20210305_175436_DEBUG___IMG_20210305_1_v0.15.0_39a944e6 MP Board: fullswing-update-radar-full-1.4-beta2

Block Diagram of Test Setup(s)

Test Setup Block Diagram



FCC Part 15 Subpart C

2.1049 Occupied Bandwidth

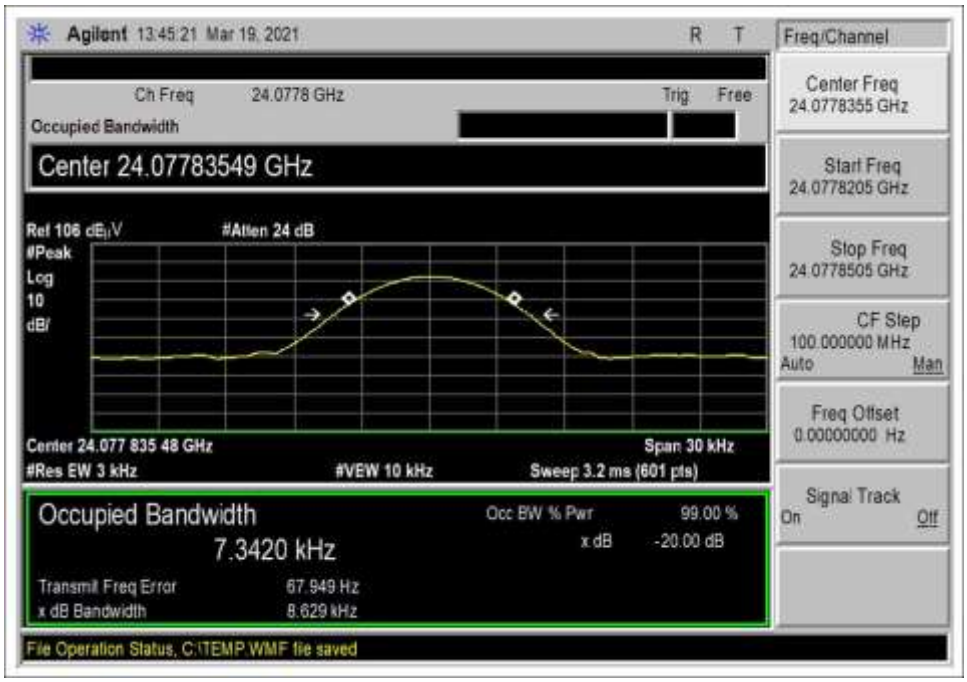
Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	S. Yamamoto
Test Method:	ANSI C63.10 (2013)	Test Date(s):	3/19/2021
Configuration:	1		
Test Setup:	The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels. Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz Firmware power setting: 20 Fundamental output is continuous wave. Peak = Ave. Antenna type: Integral Antenna Gain: 10dBi Duty Cycle: 100% The test was performed using a new battery.		

Environmental Conditions			
Temperature (ºC)	21	Relative Humidity (%):	44

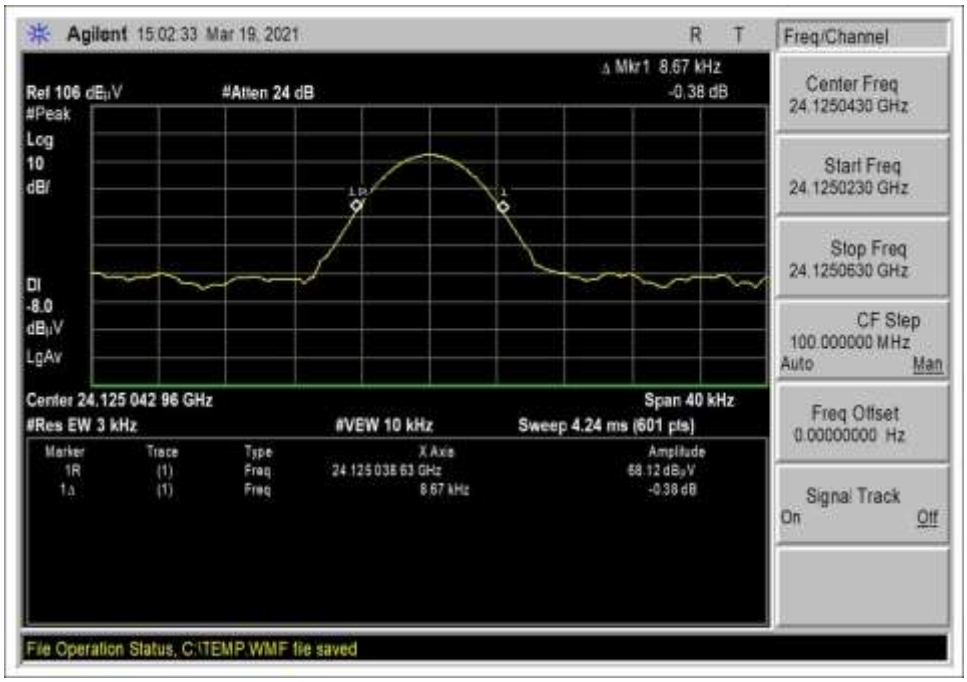
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02672	Spectrum Analyzer	Agilent	E4446A	4/29/2020	4/29/2022
P07656	Cable	Astrolab, Inc.	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
01413	Horn Antenna	HP	84125-80008	10/19/2020	10/19/2022

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
24078	1	NA	8.629	NA	Pass
24125	1	NA	8.67	NA	Pass
24172	1	NA	8.73	NA	Pass

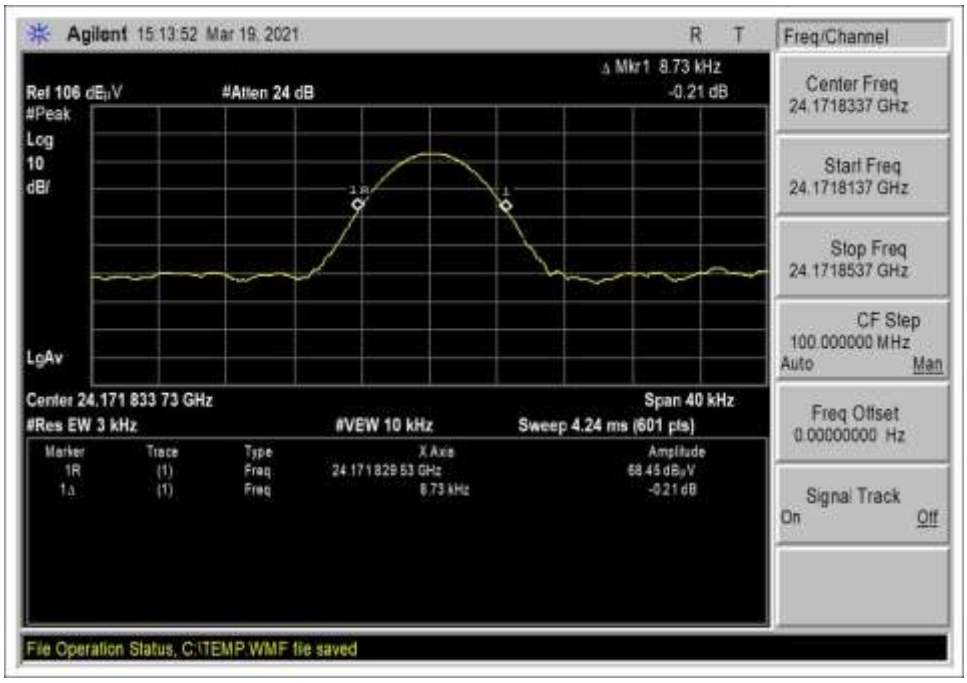
Plot(s)



Low Channel



Middle Channel



High Channel

15.245(b) Field Strength of Fundamental

Test Data Summary - Radiated Measurement						
Measurement Type: AVG						
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Field Strength (dBuV/m @3m)**	**Field Strength (mV/m @3m)**	**Limit (mV/m @3m)**	**Results**
24078	NA	Integral / 10	126.2	2041.7	≤2500	Pass
24125	NA	Integral / 10	125.8	1949.8	≤2500	Pass
24172	NA	Integral / 10	125.9	1972.4	≤2500	Pass

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 714-993-6112		
Customer:	**Full Swing Golf Inc.**		
Specification:	**15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)**		
Work Order #:	**105187**	Date:	3/18/2021
Test Type:	**Maximized Emissions**	Time:	11:57:48
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels.

Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz

Firmware power setting: 20

Fundamental output is continuous wave.

Antenna type: Integral
Antenna Gain: 10dBi.

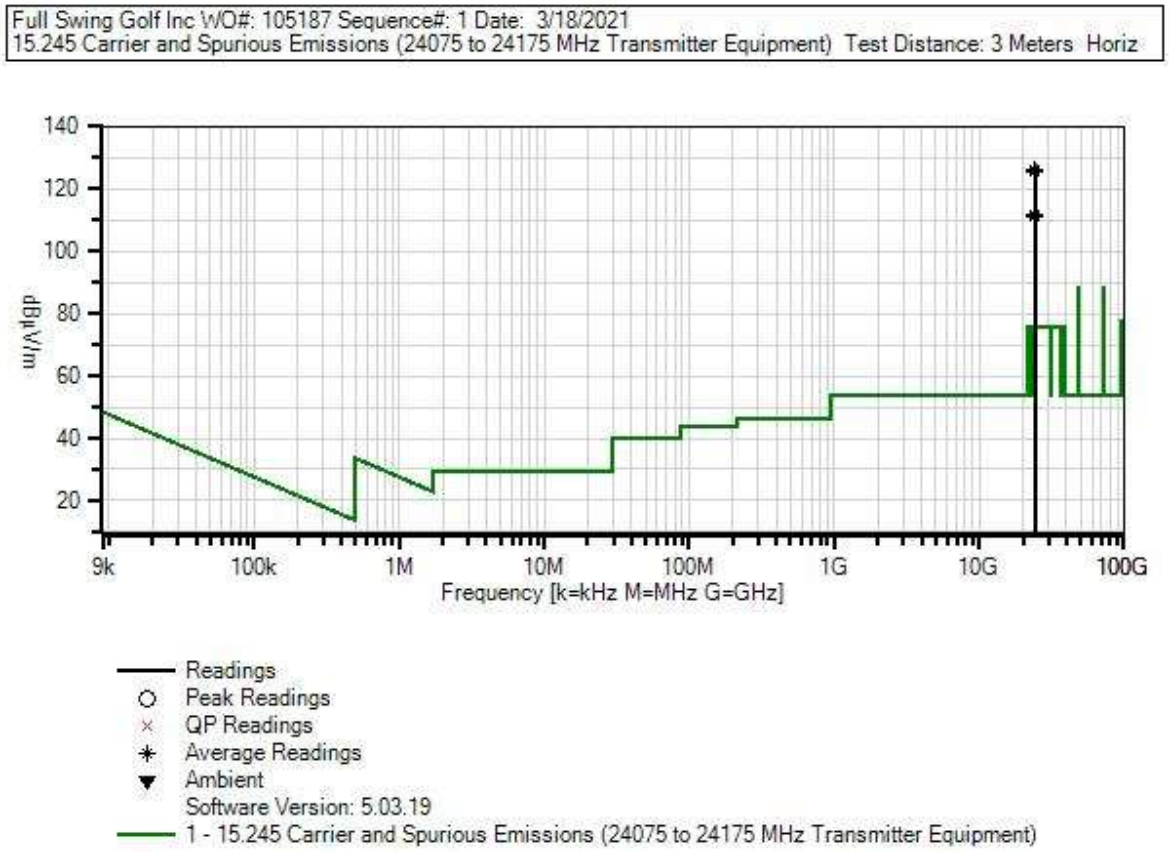
Duty Cycle: 100%

RBW 1MHz, VBW 3MHz

Test Method: ANSI C63.10 2013

Test Environment Conditions:
Temperature: 19°C
Relative Humidity: 42%
Pressure: 99kPa.

Site D
The test was performed using a new battery.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	4/29/2020	4/29/2022
T1	ANP07656	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T2	AN01413	Horn Antenna	84125-80008	10/19/2020	10/19/2022

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	24077.850 M Ave	84.4	+1.4	+40.4			+0.0	126.2	128.0	-1.8	Vert
2	24171.833 M Ave	84.2	+1.3	+40.4			+0.0	125.9	128.0	-2.1	Vert
3	24125.073 M Ave	84.1	+1.3	+40.4			+0.0	125.8	128.0	-2.2	Vert
4	24077.850 M Ave	70.0	+1.4	+40.4			+0.0	111.8	128.0	-16.2	Horiz
5	24125.023 M Ave	69.4	+1.3	+40.4			+0.0	111.1	128.0	-16.9	Horiz
6	24171.833 M Ave	69.3	+1.3	+40.4			+0.0	111.0	128.0	-17.0	Horiz

15.245(b)(1)(i) and (ii) Field Strength of Harmonics

Test Data Summary - Radiated Measurement						
Measurement Type: AVG						
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Field Strength (dBuV/m @3m)**	**Field Strength (mV/m @3m)**	**Limit (mV/m @3m)**	**Results**
48155.74	NA	Integral / 10	75.3	5.82	≤25	Pass
48250.12	NA	Integral / 10	77.1	7.16	≤25	Pass
48343.71	NA	Integral / 10	78.0	7.94	≤25	Pass
72233.49	NA	Integral / 10	78.8	8.71	≤25	Pass
72375.13	NA	Integral / 10	79.8	9.77	≤25	Pass
72515.50	NA	Integral / 10	79.0	8.91	≤25	Pass
96311.31	NA	Integral / 10	72.4	4.17	≤7.5	Pass
96500.12	NA	Integral / 10	73.5	4.73	≤7.5	Pass
96687.33	NA	Integral / 10	73.6	4.79	≤7.5	Pass

Test Data

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 714-993-6112		
Customer:	**Full Swing Golf Inc.**		
Specification:	**15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)**		
Work Order #:	**105187**	Date:	3/19/2021
Test Type:	**Maximized Emissions**	Time:	18:51:21
Tested By:	S. Yamamoto	Sequence#:	4
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels.

Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz

Frequency range of test 9kHz to 100GHz
9kHz to 150kHz, Res BW 200Hz
150kHz to 30MHz, Res BW 9kHz
30MHz to 1000MHz, Res BW 120kHz
1GHz to 100GHz, Res BW 1MHz

Firmware power setting: 20

Fundamental output is continuous wave.

Antenna type: Integral
Antenna Gain: 10dBi.

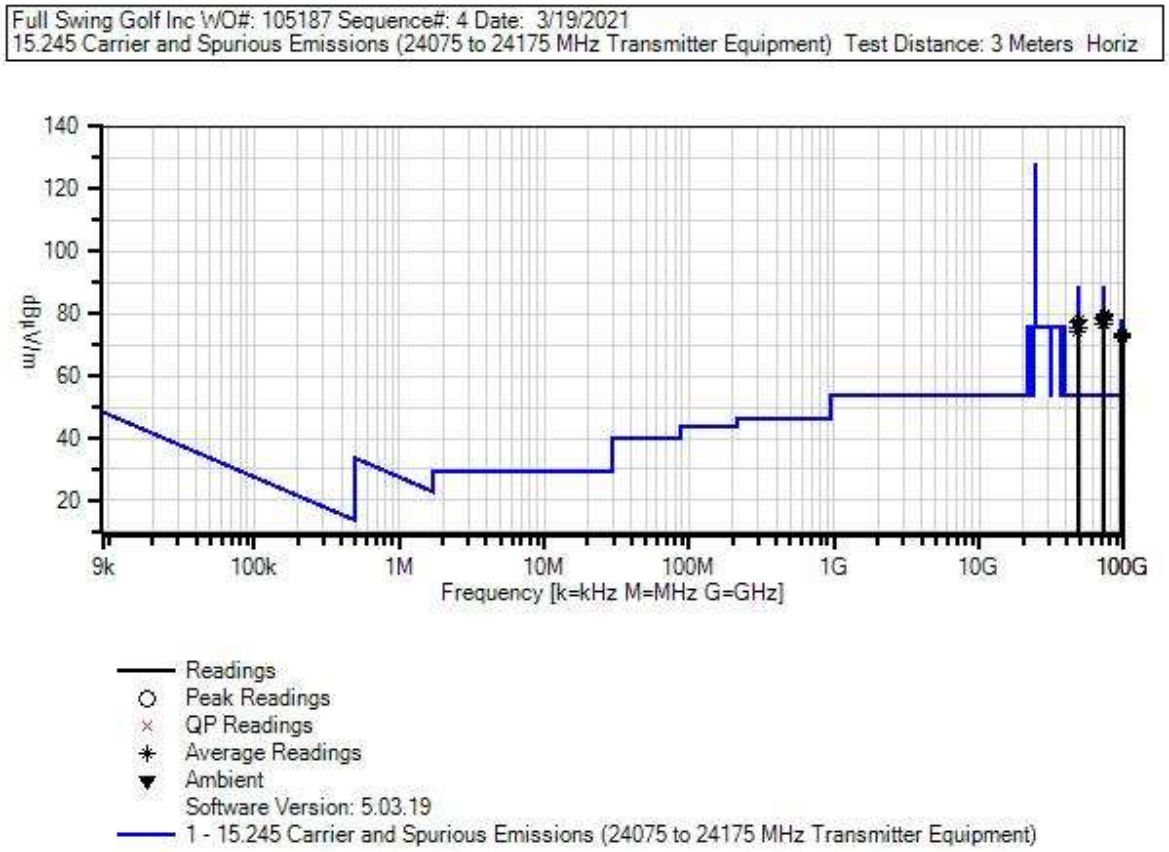
Duty Cycle: 100%

Test Method: ANSI C63.10 2013

Test Environment Conditions:
Temperature: 19°C
Relative Humidity: 42%
Pressure: 99kPa.

Site D

The test was performed using a new battery.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	4/29/2020	4/29/2022
T2	ANP07656	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T3	ANP07657	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T4	AN03158A	Horn Antenna	GH-28-25	8/15/2019	8/15/2021
	AN02347	Horn Antenna	M19HWA	3/9/2021	3/9/2023
	AN02348	Horn Antenna	M12HWA	3/9/2021	3/9/2023
	AN02349	Horn Antenna	M08HWA	3/9/2021	3/9/2023

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	96687.325 M Ave	11.3	+0.0	+0.0	+0.0	+0.0	-29.5	73.6	77.5	-3.9	Horiz
2	96500.123 M Ave	11.3	+0.0	+0.0	+0.0	+0.0	-29.5	73.5	77.5	-4.0	Horiz
3	96500.123 M Ave	10.6	+0.0	+0.0	+0.0	+0.0	-29.5	72.8	77.5	-4.7	Vert
4	96687.327 M Ave	10.2	+0.0	+0.0	+0.0	+0.0	-29.5	72.5	77.5	-5.0	Vert
5	96311.312 M Ave	10.4	+0.0	+0.0	+0.0	+0.0	-29.5	72.4	77.5	-5.1	Horiz
6	96311.311 M Ave	10.3	+0.0	+0.0	+0.0	+0.0	-29.5	72.3	77.5	-5.2	Vert
7	72375.132 M Ave	6.0	+0.0	+0.0	+0.0	+0.0	-9.5	79.8	88.0	-8.2	Horiz
8	72515.497 M Ave	5.3	+0.0	+0.0	+0.0	+0.0	-9.5	79.0	88.0	-9.0	Horiz
9	72233.496 M Ave	4.8	+0.0	+0.0	+0.0	+0.0	-9.5	78.8	88.0	-9.2	Horiz
10	72375.133 M Ave	4.2	+0.0	+0.0	+0.0	+0.0	-9.5	78.0	88.0	-10.0	Vert
11	48343.710 M Ave	6.7	+0.0	+0.0	+0.0	+0.0	+0.0	78.0	88.0	-10.0	Vert
12	48250.116 M Ave	5.7	+0.0	+0.0	+0.0	+0.0	+0.0	77.1	88.0	-10.9	Vert
13	72233.496 M Ave	2.8	+0.0	+0.0	+0.0	+0.0	-9.5	76.8	88.0	-11.2	Vert
14	72515.505 M Ave	3.0	+0.0	+0.0	+0.0	+0.0	-9.5	76.7	88.0	-11.3	Vert

15	48343.705 M Ave	4.4	+0.0	+0.0	+0.0	+0.0	+0.0	75.7	88.0	-12.3	Horiz
16	48250.122 M Ave	4.0	+0.0	+0.0	+0.0	+0.0	+0.0	75.4	88.0	-12.6	Horiz
17	48155.741 M Ave	3.9	+0.0	+0.0	+0.0	+0.0	+0.0	75.3	88.0	-12.7	Vert
18	48155.742 M Ave	2.9	+0.0	+0.0	+0.0	+0.0	+0.0	74.3	88.0	-13.7	Horiz

15.245(b)(3) Field Strength of Radiated Emissions and Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 714-993-6112		
Customer:	**Full Swing Golf Inc.**		
Specification:	**15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)**		
Work Order #:	**105187**	Date:	3/18/2021
Test Type:	**Maximized Emissions**	Time:	17:43:12
Tested By:	S. Yamamoto	Sequence#:	4
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels.

Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz

Frequency range of test 9kHz to 100GHz
9kHz to 150kHz, Res BW 200Hz
150kHz to 30MHz, Res BW 9kHz
30MHz to 1000MHz, Res BW 120kHz
1GHz to 100GHz, Res BW 1MHz
Firmware power setting: 20
Fundamental output is continuous wave.

Antenna type: Integral
Antenna Gain: 10dBi.

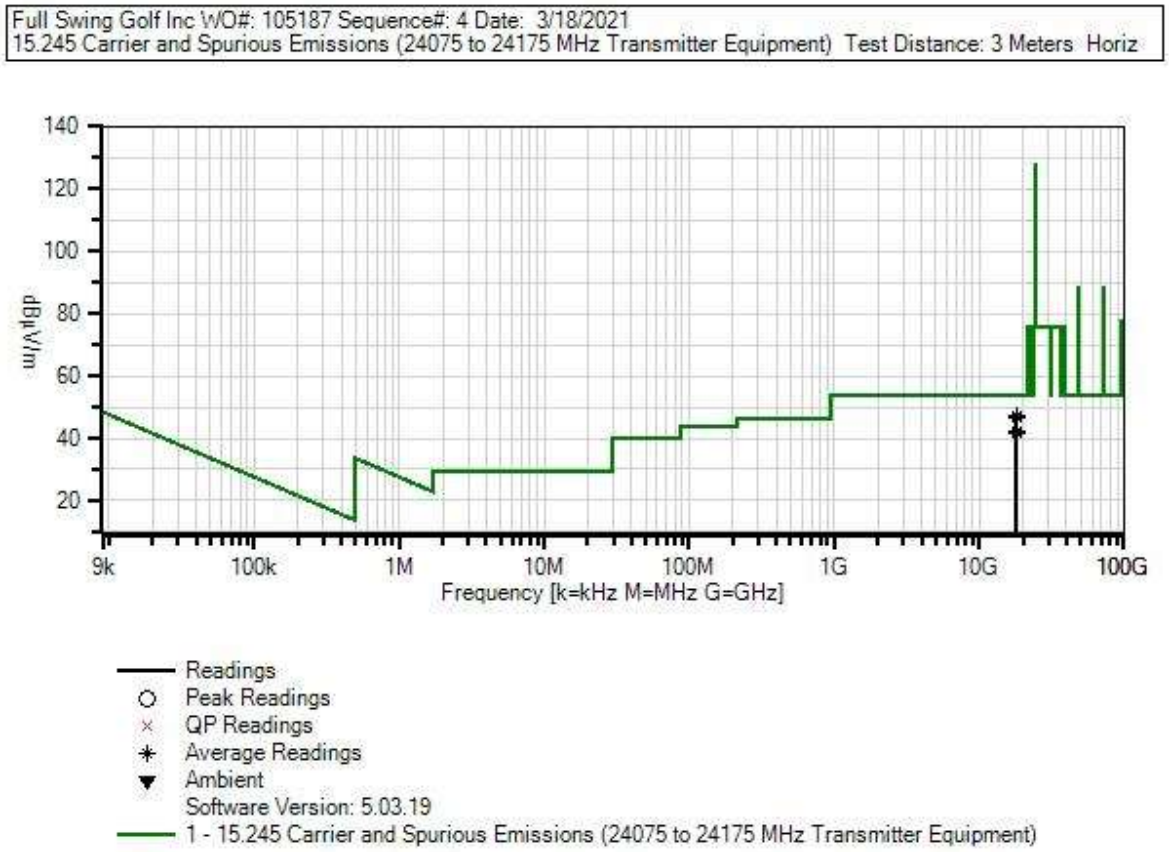
Duty Cycle: 100%

Test Method: ANSI C63.10 2013

Test Environment Conditions:
Temperature: 19°C
Relative Humidity: 42%
Pressure: 99kPa.

Site D

The test was performed using a new battery.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	4/29/2020	4/29/2022
T1	ANP07656	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T2	AN01413	Horn Antenna	84125-80008	10/19/2020	10/19/2022
T3	AN00787	Preamp	83017A	5/31/2019	5/31/2021
T4	ANP07657	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	18093.783 M Ave	42.0	+1.3	+40.0	-37.2	+1.3	+0.0	47.4	54.0	-6.6	Vert
^	18093.783 M	49.0	+1.3	+40.0	-37.2	+1.3	+0.0	54.4	54.0	+0.4	Vert
3	18058.385 M Ave	41.3	+1.3	+40.0	-37.2	+1.3	+0.0	46.7	54.0	-7.3	Vert
^	18058.385 M	47.6	+1.3	+40.0	-37.2	+1.3	+0.0	53.0	54.0	-1.0	Vert
5	18128.881 M Ave	41.1	+1.3	+40.0	-37.3	+1.3	+0.0	46.4	54.0	-7.6	Vert
^	18128.881 M	48.9	+1.3	+40.0	-37.3	+1.3	+0.0	54.2	54.0	+0.2	Vert
7	18093.783 M Ave	36.7	+1.3	+40.0	-37.2	+1.3	+0.0	42.1	54.0	-11.9	Horiz
^	18093.783 M	49.0	+1.3	+40.0	-37.2	+1.3	+0.0	54.4	54.0	+0.4	Horiz
9	18128.881 M Ave	36.2	+1.3	+40.0	-37.3	+1.3	+0.0	41.5	54.0	-12.5	Horiz
^	18128.851 M	49.2	+1.3	+40.0	-37.3	+1.3	+0.0	54.5	54.0	+0.5	Horiz
11	18058.385 M Ave	36.1	+1.3	+40.0	-37.2	+1.3	+0.0	41.5	54.0	-12.5	Horiz
^	18058.385 M	45.7	+1.3	+40.0	-37.2	+1.3	+0.0	51.1	54.0	-2.9	Horiz

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 714-993-6112		
Customer:	**Full Swing Golf Inc.**		
Specification:	**15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)**		
Work Order #:	**105187**	Date:	3/19/2021
Test Type:	**Maximized Emissions**	Time:	18:51:21
Tested By:	S. Yamamoto	Sequence#:	4
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels.

Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz

Frequency range of test 9kHz to 100GHz
9kHz to 150kHz, Res BW 200Hz
150kHz to 30MHz, Res BW 9kHz
30MHz to 1000MHz, Res BW 120kHz
1GHz to 100GHz, Res BW 1MHz

Firmware power setting: 20

Fundamental output is continuous wave.

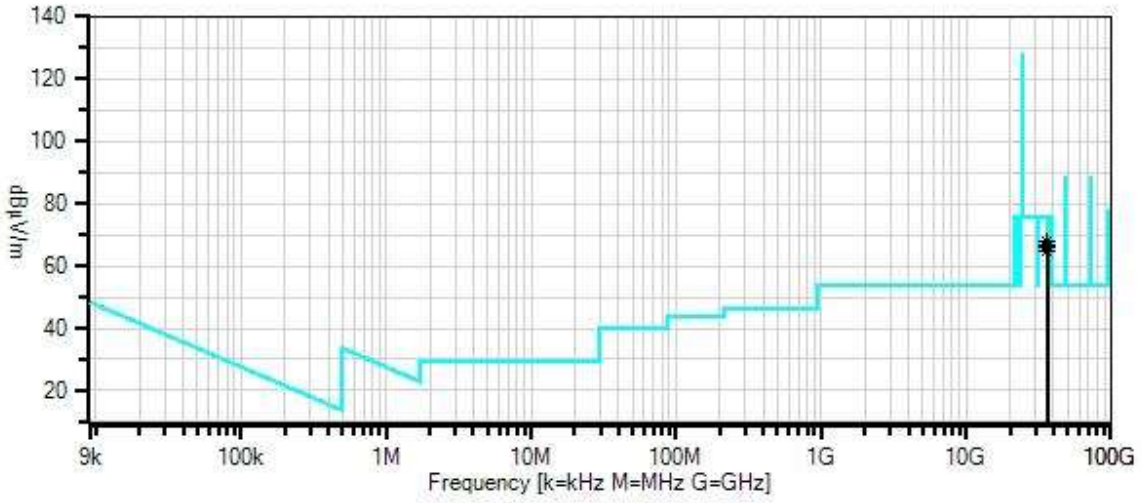
Antenna type: Integral
Antenna Gain: 10dBi.

Duty Cycle: 100%

Test Method: ANSI C63.10 2013
Test Environment Conditions:
Temperature: 19°C
Relative Humidity: 42%
Pressure: 99kPa.

Site D
The test was performed using a new battery.

Full Swing Golf Inc WO#: 105187 Sequence#: 4 Date: 3/19/2021
15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment) Test Distance: 3 Meters Horiz



Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.19
1 - 15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	4/29/2020	4/29/2022
T2	ANP07656	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T3	ANP07657	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T4	AN03158A	Horn Antenna	GH-28-25	8/15/2019	8/15/2021
	AN02347	Horn Antenna	M19HWA	3/9/2021	3/9/2023
	AN02348	Horn Antenna	M12HWA	3/9/2021	3/9/2023
	AN02349	Horn Antenna	M08HWA	3/9/2021	3/9/2023
	AN01646	Horn Antenna	3115	3/17/2020	3/17/2022
	AN00787	Preamp	83017A	5/31/2019	5/31/2021
	ANP07692	Cable	LDF1-50	8/20/2020	8/20/2022
	ANP04382	Cable	LDF-50	5/15/2020	5/15/2022
	AN03367	Horn Antenna	62-GH-62-25.	8/1/2019	8/1/2021
	AN01994	Biconilog Antenna	CBL6111C	4/14/2020	4/14/2022
	ANP05283	Attenuator	ATT-0218-06-NNN-02	3/26/2020	3/26/2022
	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/14/2020	12/14/2022
	ANP06978	Cable	Sucoflex 104A	3/26/2020	3/26/2022
	AN00010	Preamp	8447D	1/2/2020	1/2/2022
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022

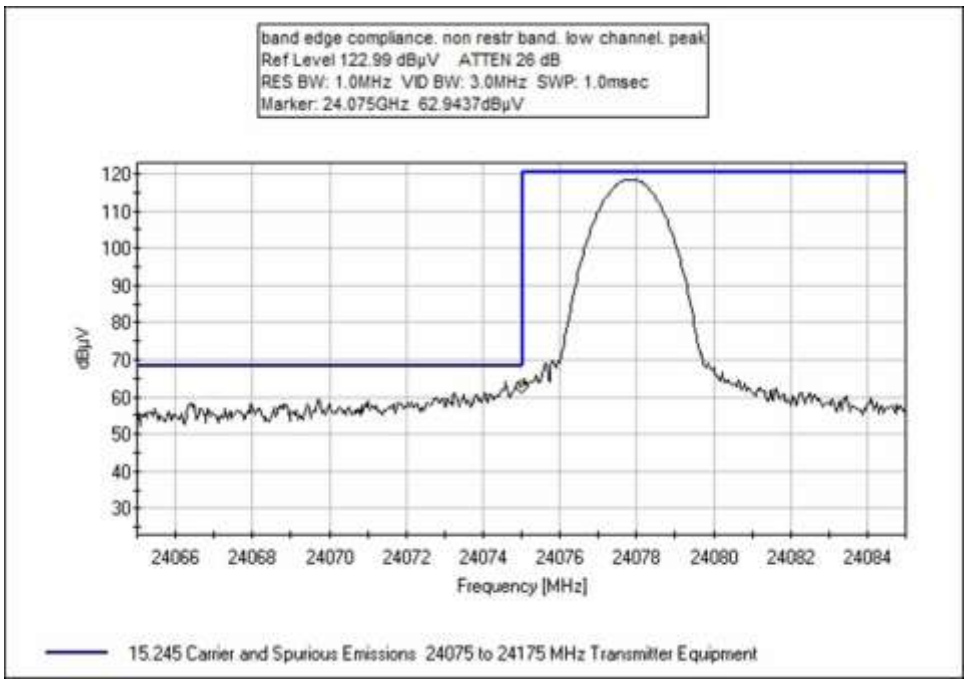
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

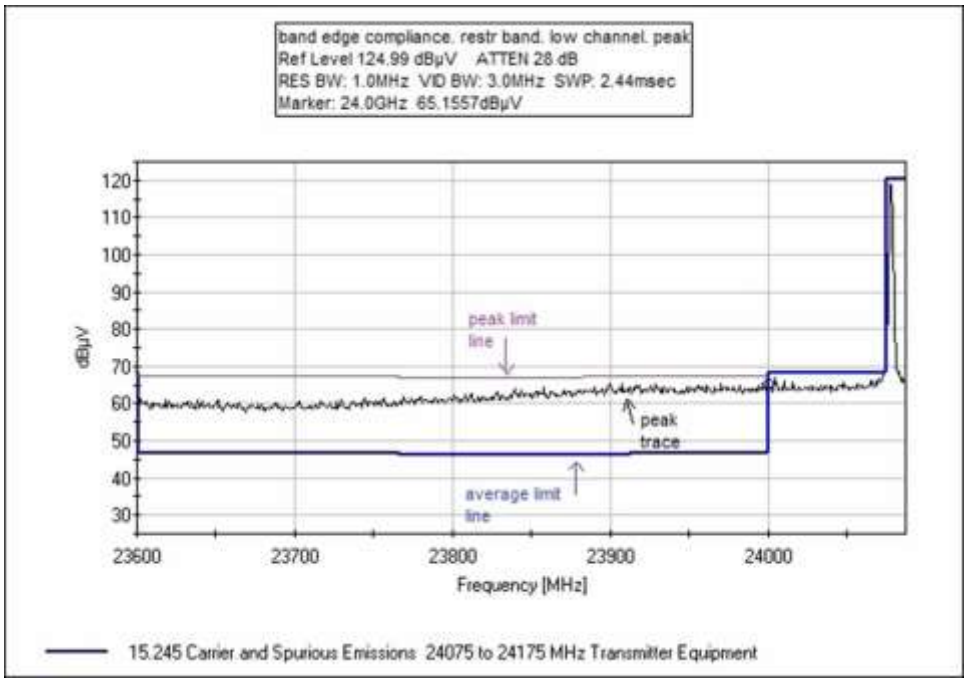
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	36116.600 M Ave	59.9	+0.0	+1.8	+1.7	+4.7	+0.0	68.1	76.0	-7.9	Horiz
2	36257.670 M Ave	58.7	+0.0	+1.8	+1.7	+4.7	+0.0	66.9	76.0	-9.1	Horiz
3	36187.510 M Ave	58.6	+0.0	+1.8	+1.7	+4.7	+0.0	66.8	76.0	-9.2	Horiz
4	36257.797 M Ave	58.1	+0.0	+1.8	+1.7	+4.7	+0.0	66.3	76.0	-9.7	Vert
5	36187.717 M Ave	56.8	+0.0	+1.8	+1.7	+4.7	+0.0	65.0	76.0	-11.0	Vert
6	36116.717 M Ave	56.4	+0.0	+1.8	+1.7	+4.7	+0.0	64.6	76.0	-11.4	Vert

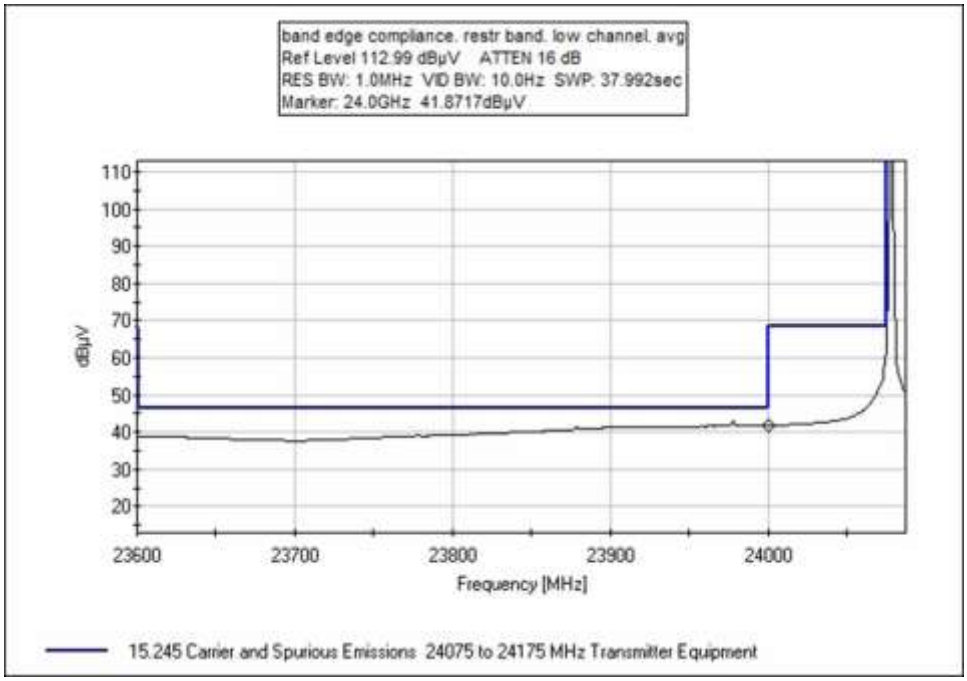
Band Edge

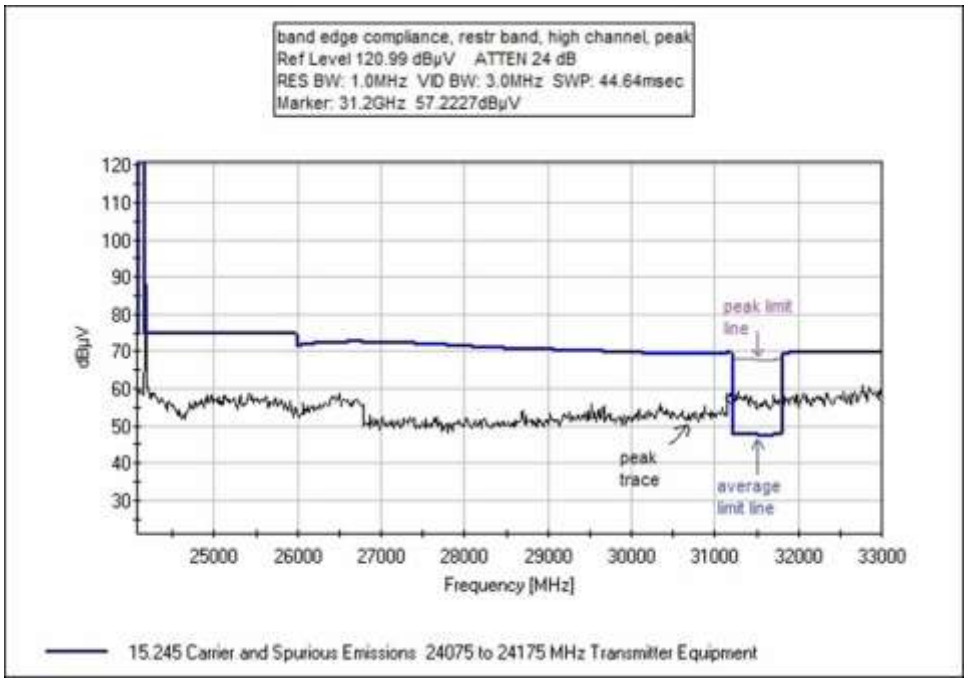
Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
24000	NA	Integral	49.5	<54	Pass
24075	NA	Integral	70.5	<76	Pass
24175	NA	Integral	73.7	<76	Pass
31200	NA	Integral	51.2	<54	Pass

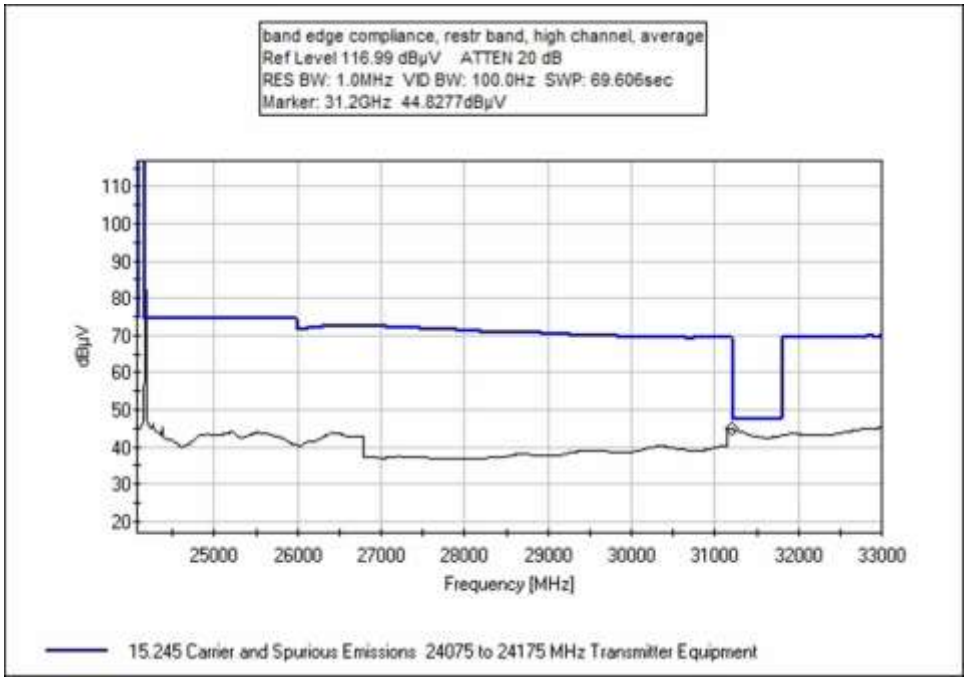
Band Edge Plots




band edge compliance. restr band. low channel. peak
Ref Level 124.99 dBµV ATTEN 28 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 2.44msec
Marker: 24.0GHz 65.1557dBµV
dBµV
peak limit line
peak trace
average limit line
Frequency [MHz]
15.245 Carrier and Spurious Emissions 24075 to 24175 MHz Transmitter Equipment


band edge compliance. restr band. low channel. avg
Ref Level 112.99 dBµV ATTEN 16 dB
RES BW: 1.0MHz VID BW: 10.0Hz SWP: 37.992sec
Marker: 24.0GHz 41.8717dBµV
dBµV
Frequency [MHz]
15.245 Carrier and Spurious Emissions 24075 to 24175 MHz Transmitter Equipment


band edge compliance, restr band, high channel, peak
Ref Level 120.99 dBµV ATTEN 24 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 44.64msec
Marker: 31.2GHz 57.2227dBµV
dBµV
peak limit line
peak trace
average limit line
Frequency [MHz]
15.245 Carrier and Spurious Emissions 24075 to 24175 MHz Transmitter Equipment


band edge compliance, restr band, high channel, average
Ref Level 116.99 dBµV ATTEN 20 dB
RES BW: 1.0MHz VID BW: 100.0Hz SWP: 69.606sec
Marker: 31.2GHz 44.8277dBµV
dBµV
Frequency [MHz]
15.245 Carrier and Spurious Emissions 24075 to 24175 MHz Transmitter Equipment

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc • 110 N Olinda Pl • Brea CA 92823 • 714-993-6112		
Customer:	**Full Swing Golf Inc**		
Specification:	**15.245 Carrier and Spurious Emissions (24075 to 24175 MHz Transmitter Equipment)**		
Work Order #:	**105187**	Date:	3/18/2021
Test Type:	**Maximized Emissions**	Time:	15:24:10
Tested By:	S. Yamamoto	Sequence#:	2
Software:	EMITest 5.03.19		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the Styrofoam table. The EUT is set to transmit continuously at its lowest, middle, and highest channels.

Frequencies tested: Low 24.078GHz, Middle 24.125GHz, High 24.172GHz

Firmware power setting: 20

Fundamental output is continuous wave.

Antenna type: Integral
Antenna Gain: 10dBi.

Duty Cycle: 100%

Test Method: ANSI C63.10 2013

Test Environment Conditions:
Temperature: 19°C
Relative Humidity: 42%
Pressure: 99kPa.

Site D
The test was performed using a new battery.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	4/29/2020	4/29/2022
T2	ANP07656	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T3	AN01413	Horn Antenna	84125-80008	10/19/2020	10/19/2022
T4	AN00787	Preamp	83017A	5/31/2019	5/31/2021
T5	ANP07657	Cable	32022-29094K-29094K-24TC	7/30/2020	7/30/2022
T6	AN03158A	Horn Antenna	GH-28-25	8/15/2019	8/15/2021

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	24175.000 M	66.4	+0.0 +1.2	+1.3 +0.0	+40.4	-35.6	+0.0	73.7	76.0	-2.3	Vert
2	31200.000 M Ave	44.8	+0.0 +0.0	+1.5 +4.9	+0.0	+0.0	+0.0	51.2	54.0	-2.8	Vert
^	31200.000 M	57.2	+0.0 +0.0	+1.5 +4.9	+0.0	+0.0	+0.0	63.6	54.0	+9.6	Vert
4	24000.000 M Ave	41.9	+0.0 +1.3	+1.4 +0.0	+40.4	-35.5	+0.0	49.5	54.0	-4.5	Vert
^	24000.000 M	65.2	+0.0 +1.3	+1.4 +0.0	+40.4	-35.5	+0.0	72.8	54.0	+18.8	Vert
6	24075.000 M	62.9	+0.0 +1.3	+1.4 +0.0	+40.4	-35.5	+0.0	70.5	76.0	-5.5	Vert

Appendix A: Manufacturer Declaration

The following device and model has been tested by CKC Laboratories:
Device: Golf Launch Monitor
Model: FSKIT1101

Since the time of testing, the manufacturer declares that the EUT should be referenced by its base model name and that any differences between the names does not affect their EMC characteristics and therefore meets the level of testing equivalent to the tested model name.
Base Model ID: FSKIT1

KIT MODEL NUMBER		
FSKIT1 FSKIT1	**FCC ID BASE #** **Industry Canada BASE #**	**Notes:** FSKIT1 represents the FCC and IC certified model, and serves as the base of the Model number
FSKIT1101	**MODEL # Architecture**	
FSKIT1111	**EMC/Radar Iteration**	Update with any relevant HW change which requires new RF/FCC certification
FSKIT11XX	**Safety Cert. Iteration**	Update with any relevant HW change requiring new SAFETY certification
FSKIT1101	**CMF-G**	Update with any change of SKU/CMF-G, e.g. Black, Silver, Branding

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.