



FCC Part 1 Subpart I
FCC Part 2 Subpart J

CERTIFICATION TEST REPORT

FOR

MAGNETIC CHARGING CABLE

MODEL NO: A1923

FCC ID: BCGA1923

REPORT NUMBER: 12486407-E2V2

ISSUE DATE: SEPTEMBER 07, 2018

Prepared for
APPLE INC.
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	09/06/2018	Initial Issue	Chin Pang
V2	09/07/2018	Correction on EUT serial number	Chin Pang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: MAGNETIC CHARGING CABLE

MODEL NUMBER: A1923

SERIAL NUMBER: DLC824400PUJ0V64R, DLC8244002CJQHJ42,
DLC8245009PJQHK42.

DATE TESTED: AUGUST 17-23, 2018

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 1 SUBPART I & PART 2 SUBPART J	Complies

UL Verification Services Inc. calculated the RF Exposure of the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

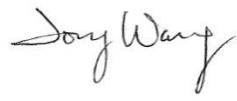
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Reviewed By:



Chin Pang
Senior Engineer
UL Verification Service Inc.

Prepared By:



Tony Wang
Test Engineer
UL Verification Services Inc.

2. TEST METHODOLOGY

All calculations were made in accordance with FCC OET Bulletin 65 Edition 97-01.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A (IC:2324B-1)	<input type="checkbox"/> Chamber D (IC:22541-1)
<input type="checkbox"/> Chamber B (IC:2324B-2)	<input type="checkbox"/> Chamber E (IC:22541-2)
<input type="checkbox"/> Chamber C (IC:2324B-3)	<input type="checkbox"/> Chamber F (IC:22541-3)
<input type="checkbox"/> Immunity Area	<input type="checkbox"/> Chamber G (IC:22541-4)
	<input type="checkbox"/> Chamber H (IC:22541-5)
	<input checked="" type="checkbox"/> Temperature B Room

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at [NVLAP Lab Search](#).

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

The EUT is a magnetic charging cable which has a single inductive charging coil to charge Apple Watch. The charging frequency is 326.5 kHz, and the maximum power consumption is 5W in charging status.

4.2. WORST-CASE CONFIGURATION AND MODE

The EUT is a single frequency magnetic charger enclosed in stainless steel case with different cable length USB -A type. For operation mode, it was tested with small and big watches to find the worst case. Both small and big watches were investigated and no significant different in reading was found between both watches. The big watch was chosen to test as the worst case condition since it has max load overall, hence all final data for operational mode represents EUT with the big watch.

Config	Mode	Descriptions
1	Standby	EUT Alone powered by AC/DC adapter
2	Operating	EUT and Watch (big) powered by AC/DC adapter

Note that the EUT was tested as standby and operation modes.

4.3. KDB 680106 D01 SECTION 5b EQUIPMENT APPROVAL CONSIDERATIONS

Requirement	Device
(1) Power transfer frequency is less than 1 MHz	Yes. Operating Frequency is 326.5KHz
(2) Output power from each primary coil is less than or equal to 15 watts	Yes. The maximum power is 5 Watts
(3) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Yes. The system includes one single primary and secondary coil and the device is designed to charge a single client
(4) Client device is placed directly in contact with the transmitter.	Yes. The client device is placed directly in contact with the transmitter.
(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	Yes. Mobile exposure condition apply.
(6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Yes. The aggregate fields at 15cm from the device was 1.35% of the FCC H field limit.

4.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Housing/Watch Band	Manufacturer	Model	Serial Number
Watch (big)	Stainless Steel/ Milanese Loop	Apple	A1976	D92WV001K47J
Watch (small)	Stainless Steel/Milanese Loop	Apple	A1975	D92X2006KNWV
AC/DC Adapter	N/A	Apple	A1385	N/A

I/O CABLES

N/A

TEST SETUP

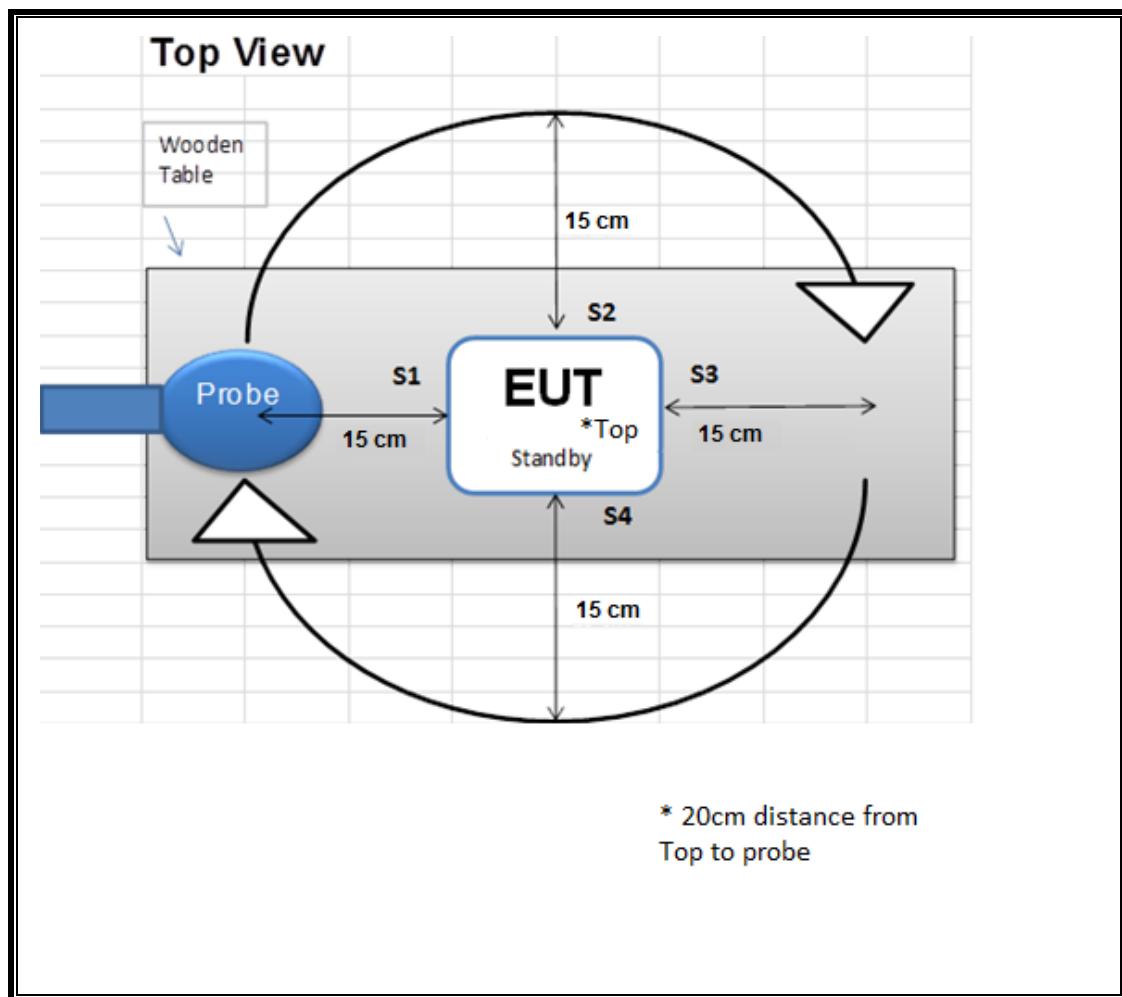
The following two configurations are tested:

Configuration	Mode	Descriptions
1	Standby	EUT Alone powered by AC/DC adapter
2	Operating (Watch ~10% Power Charging)	EUT and Watch powered by AC/DC Adapter
	Operating (Watch ~50% Power Charging) Note: For the configuration 2 operating with Watch, battery level of the Watch was a state of 20 - 50%	EUT and Watch powered by AC/DC adapter
	Operating (Watch >90% Power Charging)	EUT and Watch powered by AC/DC Adapter

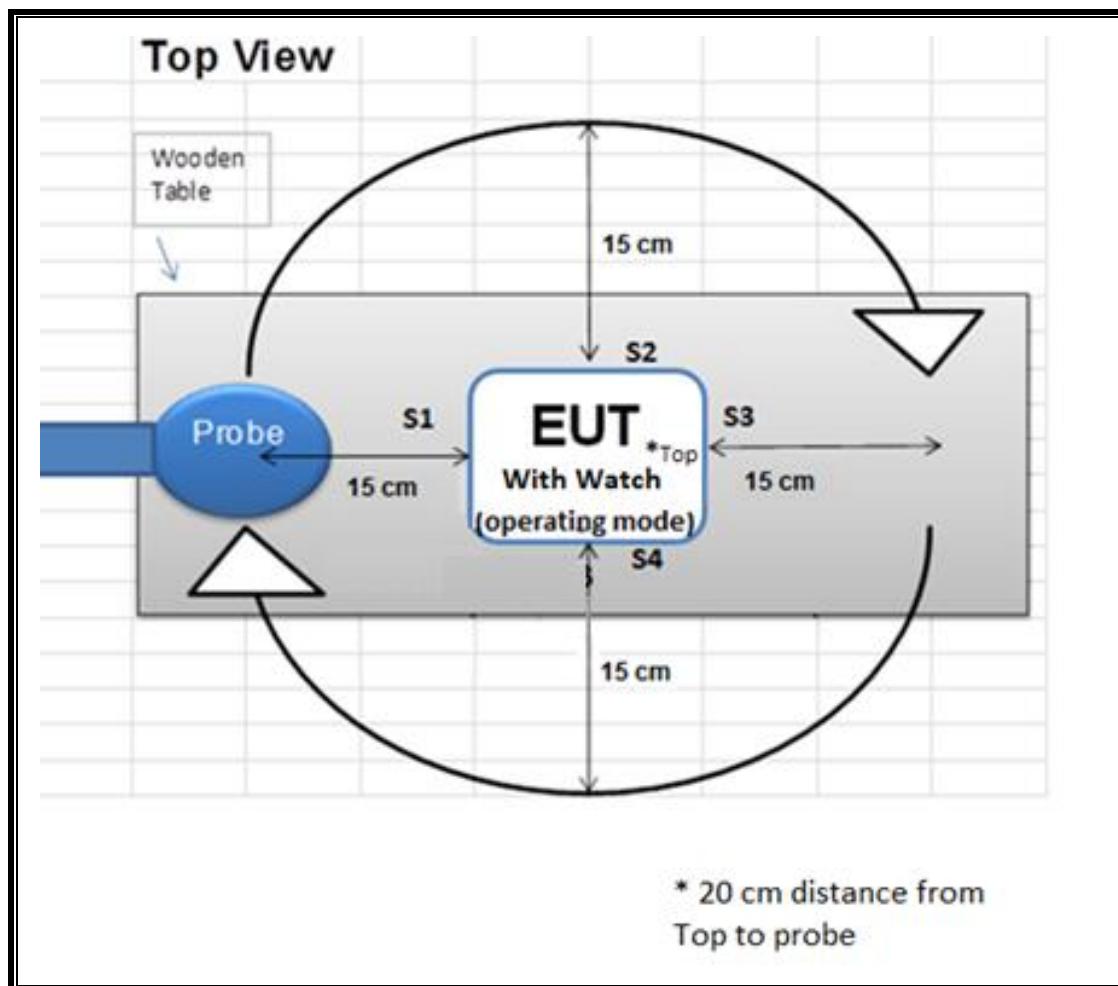
MEASUREMENT SETUP

The measurement was taken using a probe placed 15 cm surrounding the device and 20 cm above the top surface of the EUT. Measurements were taken from the top and all sides of the EUT per KDB680106 D01 v03.

CONFIGURATION 1



CONFIGURATION 2



5. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was used for the tests documented in this report:

Test Equipment List					
Description	Manufacturer	Model	S/N	Cal Date	Cal Due
Electric and Magnetic Field Probe	Narda	EHP-200A	170WX80318	04/06/2018	04/06/19

6. DUTY CYCLE

LIMITS

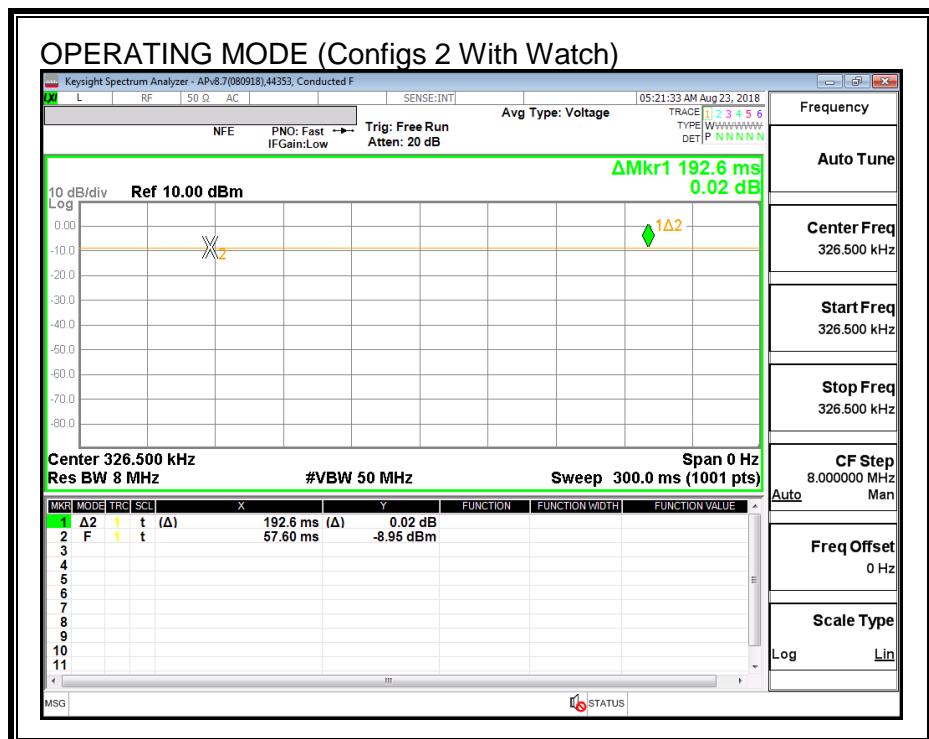
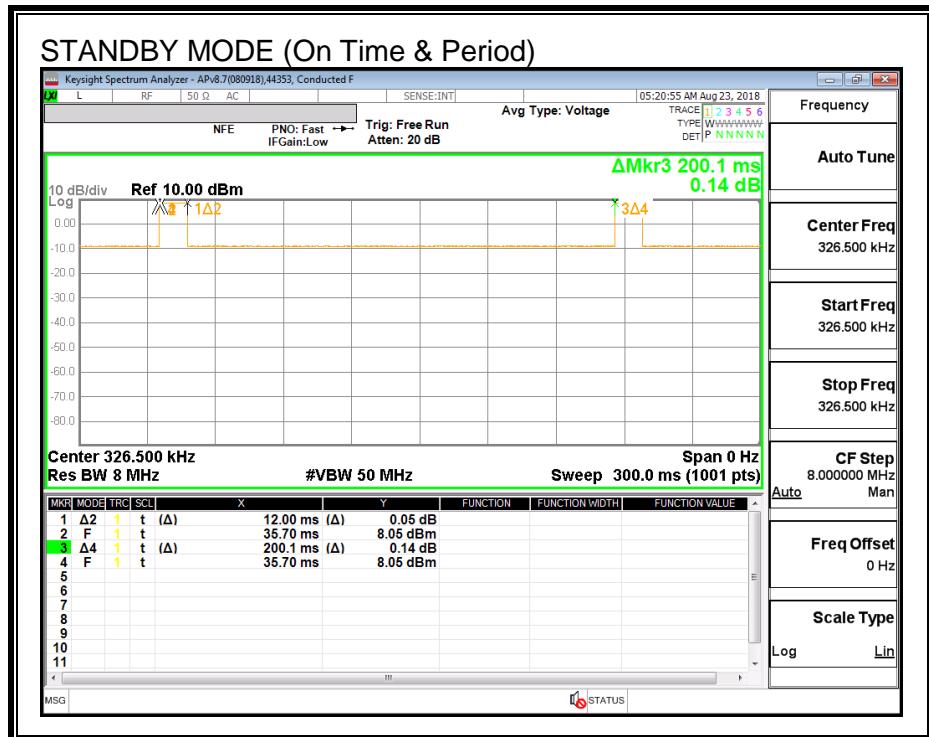
None; for reporting purposes only.

PROCEDURE

Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
Standby (Config 1)	12.00	200.10	0.06	6.00%	12.22
Operating(Config 2)	100.00	100.00	1.00	100.00%	0.00



7. MAXIMUM PERMISSIBLE RF EXPOSURE

7.1. FCC LIMITS AND SUMMARY

7.1.1. FCC LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

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	*(900f 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	*(180f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: 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.

NOTE 2 TO TABLE 1: 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 can not exercise control over their exposure.

7.1.2. FCC SUMMARY OF RESULTS

RESULTS

ID:	38602	Date:	8/14/18
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FCC RF EXPOSURE SUMMARY OF RESULTS

A1923, A1385, 0.3m CABLE USB-A AND MODEL A1976 WATCH

Electric Field Result			Magnetic Field Result		
FCC RF Exposure Limit	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit	Maximum Average (A/m)	Percentage (%)
614	0.388	0.06%	1.63	0.022	1.35%

A1923, A1385, 1m CABLE, USB-A AND MODEL A1976 WATCH

Electric Field Result			Magnetic Field Result		
FCC RF Exposure Limit	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit	Maximum Average (A/m)	Percentage (%)
614	0.401	0.07%	1.63	0.021	1.29%

A1923, A1385, 2m CABLE USB-A AND MODEL A1976 WATCH

Electric Field Result			Magnetic Field Result		
FCC RF Exposure Limit	Maximum Average (V/m)	Percentage (%)	FCC RF Exposure Limit	Maximum Average (A/m)	Percentage (%)
614	0.388	0.06%	1.63	0.018	1.10%

7.2. TEST RESULTS

7.2.1. FCC RF EXPOSURE

E- FIELD AND H- FIELD MEASUREMENTS

Note: Peak measurements were performed. RMS values were calculated from the peak measurement. Please refer to the formula for calculating the RMS values: [Field Strength x $\sqrt{\text{Duty Cycle}}$].

A1923, A1385, 0.3m CABLE USB-A AND MODEL A1976 WATCH

FCC RF Exposure Result														
Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)		Electric Field Reading (V/m)			Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)					
			FCC	Location	Peak	Duty Cycle %	FCC Average		FCC	Location	FCC Average			
				S1	0.380		0.023			S1	0.017			
1	Standby	15 cm surrounding the device (S1 - S4) and 20 cm above the top surface of the EUT		S2	0.380		0.023			S2	0.017			
				S3	0.388		0.023			S3	0.017			
				S4	0.388		0.023			S4	0.017			
				Top	0.388		0.023			Top	0.020			
				Max	0.388		0.024			Max	0.022			
	Operating Real Product (Power <10% Charging)		614	S1	0.371		0.371			S1	0.017			
				S2	0.354		0.354			S2	0.017			
				S3	0.371		0.371			S3	0.020			
				S4	0.353		0.353			S4	0.018			
				Top	0.370		0.370			Top	0.017			
2	Operating Real Product (Power ~ 20% - 50% Charging)	15 cm surrounding the device (S1 - S4) and 20 cm above the top surface of the EUT		Max	0.380		0.380			Max	0.022			
				S1	0.388		0.388			S1	0.017			
				S2	0.371		0.371			S2	0.017			
				S3	0.371		0.371			S3	0.016			
				S4	0.371		0.371			S4	0.017			
	Operating Real Product (Power >90% Charging)			Top	0.371		0.371			Top	0.017			
				Max	0.388		0.388			Max	0.018			
				S1	0.316		0.316			S1	0.016			
				S2	0.263		0.263			S2	0.015			
				S3	0.273		0.273			S3	0.014			
				S4	0.294		0.294			S4	0.015			
				Top	0.294		0.294			Top	0.014			
				Max	0.344		0.344			Max	0.016			

A1923, A1385, 1m CABLE, USB-A AND MODEL A1976 WATCH

FCC RF Exposure Result														
Configuration	Test Mode	Measuring Distance (cm)	Electric Field Limit (V/m)		Electric Field Reading (V/m)			Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)					
			FCC	Location	Peak	Duty Cycle %	FCC Average		FCC	Location	FCC Average			
				S1	0.388		0.023			S1	0.017			
1	Standby	15 cm surrounding the device (S1 - S4) and 20 cm above the top surface of the EUT	614	S2	0.388		0.023			S2	0.017			
				S3	0.388		0.023			S3	0.017			
				S4	0.397		0.024			S4	0.017			
				Top	0.397		0.024			Top	0.019			
				Max	0.401		0.024			Max	0.020			
	Operating Real Product (Power <10% Charging)			S1	0.388		0.388			S1	0.017			
				S2	0.388		0.388			S2	0.017			
				S3	0.397		0.397			S3	0.017			
				S4	0.388		0.388			S4	0.018			
				Top	0.397		0.397			Top	0.017			
2	Operating Real Product (Power ~ 20% - 50% Charging)	15 cm surrounding the device (S1 - S4) and 20 cm above the top surface of the EUT		Max	0.398		0.398			Max	0.018			
				S1	0.388		0.388			S1	0.017			
				S2	0.388		0.388			S2	0.018			
				S3	0.388		0.388			S3	0.017			
				S4	0.388		0.388			S4	0.020			
	Operating Real Product (Power >90% Charging)			Top	0.388		0.388			Top	0.018			
				Max	0.398		0.398			Max	0.021			
				S1	0.397		0.397			S1	0.018			
				S2	0.388		0.388			S2	0.017			
				S3	0.388		0.388			S3	0.018			
				S4	0.397		0.397			S4	0.018			
				Top	0.397		0.397			Top	0.018			
				Max	0.401		0.401			Max	0.018			

A1923, A1385, 2m CABLE USB-A AND MODEL A1976 WATCH

FCC RF Exposure Result		Measuring Distance (cm)	Electric Field Limit (V/m)	Electric Field Reading (V/m)				Magnetic Field Limit (A/m)	Magnetic Field Reading (A/m)				
Configuration	Test Mode			FCC	Location	Peak	Duty Cycle %		FCC	Location	Peak	Duty Cycle %	FCC Average
1	Standby		S1 0.334	0.020	S1 0.015	0.001	6	S2 0.316	0.019	S2 0.015	0.001	0.001	
2	Operating Real Product (Power <10% Charging)	15 cm surrounding the device (S1 - S4) and 20 cm above the top surface of the EUT	S3 0.316	0.019	S3 0.014	0.014	6	S4 0.326	0.020	S4 0.015	0.001	0.001	
			Top 0.328	0.020	Top 0.022	0.001	6	Max 0.354	0.021	Max 0.024	0.001	0.001	
			S1 0.291	0.291	S1 0.013	0.013	100	S2 0.245	0.245	S2 0.012	0.012	0.012	
			S3 0.245	0.245	S3 0.014	0.014	100	S4 0.245	0.245	S4 0.013	0.013	0.013	
			Top 0.268	0.268	Top 0.014	0.014	100	Max 0.316	0.316	Max 0.015	0.015	0.015	
	Operating Real Product (Power ~ 20% - 50% Charging)		S1 0.283	0.283	S1 0.014	0.014	100	S2 0.258	0.258	S2 0.013	0.013	0.013	
			S3 0.277	0.277	S3 0.014	0.014	100	S4 0.272	0.272	S4 0.014	0.014	0.014	
			Top 0.289	0.289	Top 0.014	0.014	100	Max 0.307	0.307	Max 0.016	0.016	0.016	
			S1 0.371	0.371	S1 0.015	0.015	100	S2 0.371	0.371	S2 0.016	0.016	0.016	
			S3 0.371	0.371	S3 0.016	0.016	100	S4 0.370	0.370	S4 0.017	0.017	0.017	
	Operating Real Product (Power >90% Charging)		Top 0.370	0.370	Top 0.015	0.015	100	Max 0.388	0.388	Max 0.018	0.018	0.018	