

RF Exposure Test Report

Report No.: SA191002E02 R3

FCC ID: JNZF00007

Test Model: F00007

Received Date: Oct. 02, 2019

Test Date: Oct. 05 to Nov. 19, 2019

Issued Date: Jan. 20, 2020

Applicant: LOGITECH FAR EAST LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Taiwan

**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA191002E02	Original release.	Dec. 03, 2019
SA191002E02 R1	Revised the charging mode and standby mode data.	Jan. 13, 2020
SA191002E02 R2	Revised the calculation result.	Jan. 17, 2020
SA191002E02 R3	Revised the calculation result.	Jan. 20, 2020

1 Certificate of Conformity

Product: Powered 3-in-1 Dock

Brand: Logitech

Test Model: F00007

Sample Status: ENGINEERING SAMPLE

Applicant: LOGITECH FAR EAST LTD.

Test Date: Oct. 05 to Nov. 19, 2019

Standards: FCC Part 2 (Section 2.1091)

FCC Part 1 (Section 1.1307(c) and (d), Section 1.1310)

KDB 680106 D01 RF Exposure Wireless Charging v03

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :

Vivian Huang

Vivian Huang / Specialist

, **Date:** Jan. 20, 2020

Approved by :

Clark Lin

Clark Lin / Technical Manager

, **Date:** Jan. 20, 2020

2 General Information

2.1 General Description of EUT

Product	Powered 3-in-1 Dock
Test Model	F00007
Sample Status	ENGINEERING SAMPLE
Rating	DC 19V from power adapter
Operating Frequency	127.795 kHz / 326.5 kHz
Antenna Type	Coil Antenna
Field Strength	127.795 kHz: 9.86 dBuV/m 326.5 kHz: -17.41 dBuV/m
Dimensions	117.4*235.91*101 mm
Accessory Device	Adapter x1
Data Cable Supplied	NA
Maximum Power Output from the Charging Coil	Stand: 10W Pad: 10W Apple Watch Charger: 5W

Note:

1. The EUT may have a lot of colors for marketing requirement.
2. The EUT could be supplied with a power adapter as the following table:

Adapter No.	Brand	Model No.	Spec.	Color
1	logi	AD2105320	Input: 100-240V, 1.2A, 50/60Hz Output: 19V, 2.64A DC cable: 1.5 m	Black
2	logi	AD2105320	Input: 100-240V, 1.2A, 50/60Hz Output: 19V, 2.64A DC cable: 1.5 m	White

Note: From the above adapters, **Adapter 1** was selected as representative adapter for the test and its data was recorded in this report.

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3 RF Exposure

3.1 Description of Support Units

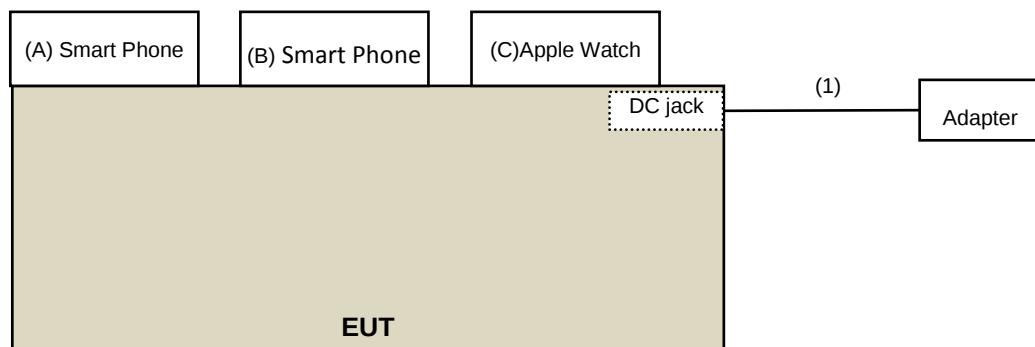
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	SmartPhone	Apple	A1897	NA	NA	Supplied by client
B.	SmartPhone	Apple	A2101	NA	NA	Supplied by client
C.	Apple Watch	Apple	A1977	FHLYJ7QEKDH3	NA	Supplied by client

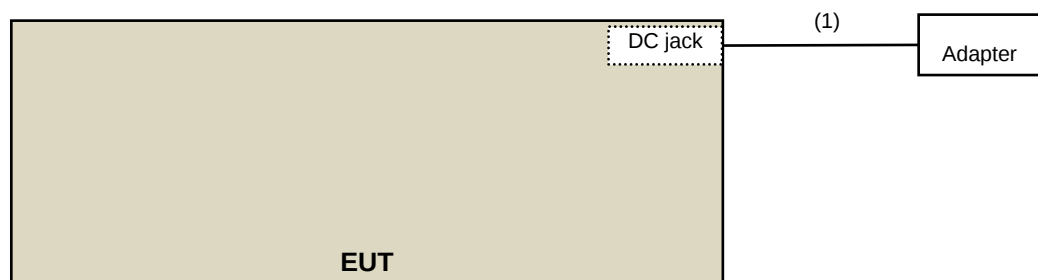
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client

3.1.1 Configuration of System under Test

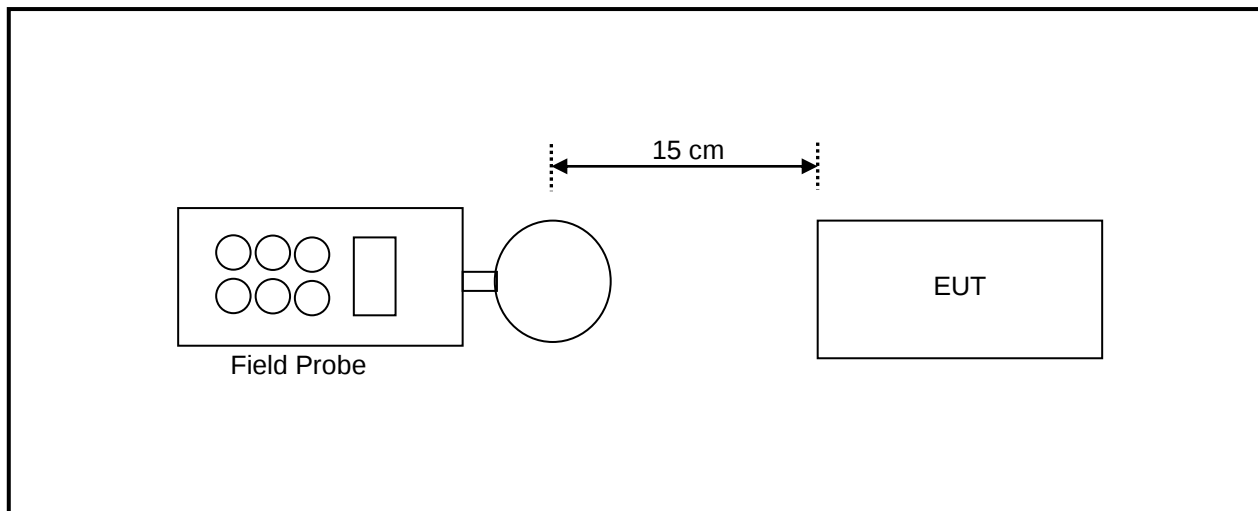
Charging Mode:



Standby Mode:



3.2 Test Setup



Note: Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device.

3.3 Test Instruments

Description	Brand	Model No.	Frequency Range	Calibrated Date	Calibrated Until
Magnetic Field Meter	NARDA	ELT-400	1Hz – 400kHz	Apr. 12, 2018	Apr. 11, 2020
Magnetic Probe	NARDA	M-0294	1Hz – 400kHz	Apr. 12, 2018	Apr. 11, 2020
Electric Field Meter	COMBINOVA	EFM 200	5Hz – 400kHz	Dec. 6, 2017	Dec. 5, 2019
E-Field Probe	NARDA	EF-0391	100kHz – 3GHz	Mar. 28, 2018	Mar. 27, 2020

- NOTE:** 1. The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

3.4 Limits for Maximum Permissible Exposure (MPE)

§ 1.1310 The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency(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	*(900/f 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	*(180/f ²)	30
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

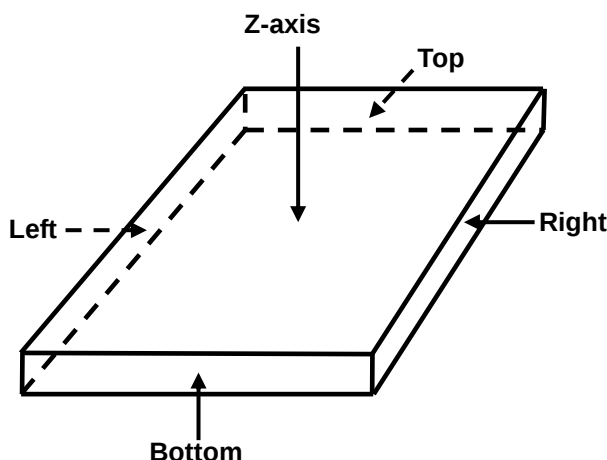
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply 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.

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The aggregate H-field strengths at 15 cm surrounding the device and above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

3.5 Test Point Description



4 Measurement Result of Maximum E/H-Field

Stand Coil

Charging mode with iPhone and battery 10% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	1.0500	1.1500	1.2700	1.0300	1.4200
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-612.9500	-612.8500	-612.7300	-612.9700	-612.5800
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-305.9500	-305.8500	-305.7300	-305.9700	-305.5800

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0840	0.0910	0.0890	0.0790	0.0960
Max E-field (A/m)	0.0672	0.0728	0.0712	0.0632	0.0768
Limit (V/m)	1.63	1.63	1.63	1.63	1.63
Margin (V/m)	-1.5628	-1.5572	-1.5588	-1.5668	-1.5532
50 % Limit (V/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (V/m)	-0.7478	-0.7422	-0.7438	-0.7518	-0.7382

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with iPhone and battery 50% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.8500	0.9400	1.0800	0.8200	1.1400
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.1500	-613.0600	-612.9200	-613.1800	-612.8600
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.1500	-306.0600	-305.9200	-306.1800	-305.8600

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0640	0.0790	0.0680	0.0660	0.0810
Max H-field (A/m)	0.0512	0.0632	0.0544	0.0528	0.0648
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5788	-1.5668	-1.5756	-1.5772	-1.5652
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7638	-0.7518	-0.7606	-0.7622	-0.7502

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with iPhone and battery 90% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.6300	0.7100	0.8500	0.5900	0.9200
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.3700	-613.2900	-613.1500	-613.4100	-613.0800
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.3700	-306.2900	-306.1500	-306.4100	-306.0800

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0480	0.0650	0.0550	0.0510	0.0680
Max H-field (A/m)	0.0384	0.0520	0.0440	0.0408	0.0544
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5916	-1.5780	-1.5860	-1.5892	-1.5756
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7766	-0.7630	-0.7710	-0.7742	-0.7606

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Lay Coil

Charging mode with iPhone and battery 10% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	1.0200	0.9700	0.9900	1.0000	1.1600
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-612.9800	-613.0300	-613.0100	-613.0000	-612.8400
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-305.9800	-306.0300	-306.0100	-306.0000	-305.8400

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.1220	0.1000	0.0970	0.1060	0.1360
Max E-field (A/m)	0.0976	0.0800	0.0776	0.0848	0.1088
Limit (V/m)	1.63	1.63	1.63	1.63	1.63
Margin (V/m)	-1.5324	-1.5500	-1.5524	-1.5452	-1.5212
50 % Limit (V/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (V/m)	-0.7174	-0.7350	-0.7374	-0.7302	-0.7062

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with iPhone and battery 50% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.8200	0.7200	0.7200	0.7500	0.9400
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.1800	-613.2800	-613.2800	-613.2500	-613.0600
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.1800	-306.2800	-306.2800	-306.2500	-306.0600

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.1120	0.0880	0.0800	0.0950	0.1160
Max H-field (A/m)	0.0896	0.0704	0.0640	0.0760	0.0928
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5404	-1.5596	-1.5660	-1.5540	-1.5372
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7254	-0.7446	-0.7510	-0.7390	-0.7222

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with iPhone and battery 90% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.6200	0.5100	0.4900	0.5000	0.7200
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.3800	-613.4900	-613.5100	-613.5000	-613.2800
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.3800	-306.4900	-306.5100	-306.5000	-306.2800

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0980	0.0720	0.0670	0.0780	0.1020
Max H-field (A/m)	0.0784	0.0576	0.0536	0.0624	0.0816
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5516	-1.5724	-1.5764	-1.5676	-1.5484
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7366	-0.7574	-0.7614	-0.7526	-0.7334

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Watch Coil

Charging mode with Apple watch and battery 10% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.8400	0.8500	0.7300	0.7300	0.9200
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.1600	-613.1500	-613.2700	-613.2700	-613.0800
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.1600	-306.1500	-306.2700	-306.2700	-306.0800

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0830	0.0790	0.0840	0.0800	0.5600
Max E-field (A/m)	0.0664	0.0632	0.0672	0.0640	0.4480
Limit (V/m)	1.63	1.63	1.63	1.63	1.63
Margin (V/m)	-1.5636	-1.5668	-1.5628	-1.5660	-1.1820
50 % Limit (V/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (V/m)	-0.7486	-0.7518	-0.7478	-0.7510	-0.3670

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with Apple watch and battery 50% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.6100	0.6800	0.5400	0.5200	0.6600
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.3900	-613.3200	-613.4600	-613.4800	-613.3400
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.3900	-306.3200	-306.4600	-306.4800	-306.3400

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0660	0.0670	0.0700	0.0620	0.5440
Max H-field (A/m)	0.0528	0.0536	0.0560	0.0496	0.4352
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5772	-1.5764	-1.5740	-1.5804	-1.1948
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7622	-0.7614	-0.7590	-0.7654	-0.3798

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Charging mode with Apple watch and battery 90% Charge

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.3600	0.4500	0.3300	0.3100	0.4200
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.6400	-613.5500	-613.6700	-613.6900	-613.5800
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.6400	-306.5500	-306.6700	-306.6900	-306.5800

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0530	0.0550	0.0560	0.0460	0.5300
Max H-field (A/m)	0.0424	0.0440	0.0448	0.0368	0.4240
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5876	-1.5860	-1.5852	-1.5932	-1.2060
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7726	-0.7710	-0.7702	-0.7782	-0.3910

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

Calculation result of Stand Coil+ Lay Coil + Watch Coil

Worst case E and H-fields from each individual coil (for all coils battery 10% charge state)

E-Field (15 cm)			
EUT Coils	Stand	Lay	Watch
Max E-field Strength (V/m)	1.42000	1.16000	0.92000
Limit	614	614	614
Ratio	0.00231	0.00189	0.00150
Total Ratio	0.00570		
Total of Ratio Limit	1.0		
Margin	-0.99430		

H-Field (15 cm)			
EUT Coils	Stand	Lay	Watch
Max H-field Strength (A/m)	0.07680	0.10880	0.44800
Limit	1.63	1.63	1.63
Ratio	0.04712	0.06675	0.27485
Total Ratio	0.38871		
Total of Ratio Limit	1.0		
Margin	-0.61129		

Conclusion:

Ratio of Max Field Strength = $(FS1 / LFS1) + (FS2 / LFS2) + \dots$ etc.

FS = Field Strength

LFS = Limit of Field Strength

Total Ratio = Sum of the ratios for each coil

Standby Mode

E-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max E-field (V/m)	0.3100	0.3100	0.3100	0.3200	0.3300
Limit (V/m)	614	614	614	614	614
Margin (V/m)	-613.6900	-613.6900	-613.6900	-613.6800	-613.6700
50 % Limit (V/m)	307	307	307	307	307
50 % Margin (V/m)	-306.6900	-306.6900	-306.6900	-306.6800	-306.6700

H-Field Measurement					
Distance	15cm				15cm
EUT Side	Left	Right	Top	Bottom	Z-axis
Max H-field (uT)	0.0610	0.0480	0.0990	0.0800	0.0860
Max H-field (A/m)	0.0488	0.0384	0.0792	0.0640	0.0688
Limit (A/m)	1.63	1.63	1.63	1.63	1.63
Margin (A/m)	-1.5812	-1.5916	-1.5508	-1.5660	-1.5612
50 % Limit (A/m)	0.815	0.815	0.815	0.815	0.815
50 % Margin (A/m)	-0.7662	-0.7766	-0.7358	-0.7510	-0.7462

Measurements were made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. The highest emission level was recorded.

5 Photographs of the Test Configuration

Please refer to the attached file (Test Setup Photo).

--- END ---