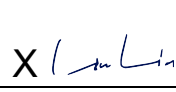


Prüfbericht-Nr.: <i>Test report no.:</i>	CN24NRC2 003	Auftrags-Nr.: <i>Order no.:</i>	168494332	Seite 1 von 31 Page 1 of 31
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2024-07-15	
Auftraggeber: <i>Client:</i>	SHENZHEN DNS INDUSTRIES CO., LTD. 23/F Building A, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian, Shenzhen, China			
Prüfgegenstand: <i>Test item:</i>	3-in-1 Wireless charger			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	HJ3320			
Auftrags-Inhalt: <i>Order content:</i>	Test Report			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 2.1093 KDB 680106 D01 Wireless Power Transfer v04			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2024-08-14	Please refer to Photo Document		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003790007-016			
Prüfzeitraum: <i>Testing period:</i>	2024-08-16 - 2024-09-06			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	 Hardy Suo		genehmigt von: <i>authorized by:</i>	 Lin Lin
Datum: <i>Date:</i>	2024-09-06		Ausstellungsdatum: <i>Issue date:</i>	2024-09-06
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert
Sonstiges / <i>Other:</i>	FCC ID: ZBC-HJ3320			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: <i>* Legend:</i>	P(ass) = entspricht o.g. Prüfgrundlage(n) P(ass) = passed a.m. test specification(s) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) F(ail) = failed a.m. test specification(s) N/A = nicht anwendbar N/A = not applicable N/T = nicht getestet N/T = not tested			
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

Address: No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

FCC Test Site Number: CN1260

ISED Test Lab CAB identifier:CN0078

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

EMF					
Equip. No.	Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
9050046	Electric and Magnetic Field Analyzer	Narda	EHP200A	180ZX20517	21.09.2024

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty
Magnetic Field Emissions (A/m)	1.5dB
Electric Field Emissions (V/m)	1.5dB

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Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

TÜV Rheinland (Shenzhen) Co., Ltd. test facility located at No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a 3-in-1 wireless charger, it supports wireless charging function.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT		Value
Kind of Equipment:		3-in-1 Wireless charger
Type Designation:		HJ3320
FCC ID:		ZBC-HJ3320
Operating Temperature Range:		0°C to +35°C
Rated Input		5.0V=3.0A, 9.0V=3.0A
Rated Output:		Output 1: 5.0W/7.5W/15.0W (for Phone) Output 2: 5.0W (for Apple Watch) Output 3: 5.0W (for AirPods) Total Output: 25.0W MAX
Test Voltage:		AC 120V, 60Hz
Technical Specification of WPT		
Output 1 (Coil 1)	Frequency Range:	110.5kHz to 205kHz 360kHz
	Type of Modulation:	ASK, FSK
	Antenna Type:	Coil antenna
	Antenna Number:	1
	Wireless output power:	110.5kHz to 205kHz: 5W, 7.5W 360kHz: 15W
Output 2 (Coil 2)	Frequency Range:	326.5kHz 1.778MHz
	Type of Modulation:	FSK
	Antenna Type:	Coil antenna
	Antenna Number:	1
	Wireless output power:	326.5kHz: 2.5W 1.778MHz: 5W
Output 3 (Coil 3)	Frequency Range:	110.5kHz to 205kHz
	Type of Modulation:	ASK
	Antenna Type:	Coil antenna
	Antenna Number:	1
	Wireless output power:	110.5kHz to 205kHz: 5W

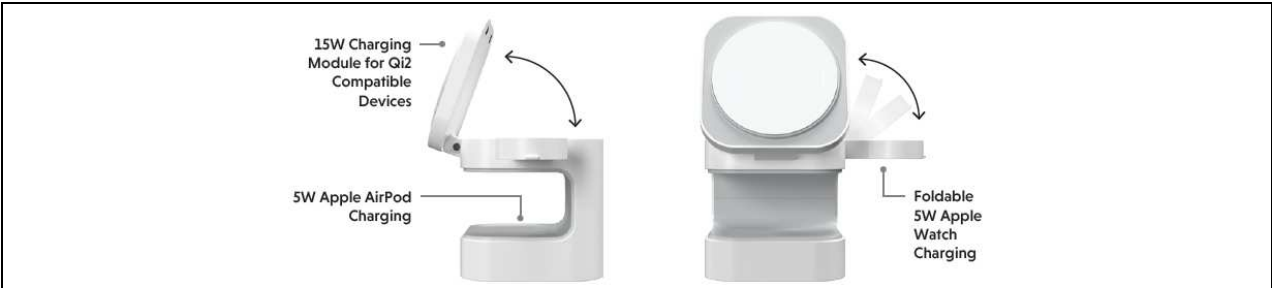
3.3 Operation Modes

Operating Mode	Description of Mode
1	On, Operating/Device removal/standby @ 110.5-205kHz for Phone / AirPods, 5W max
2	On, Operating/Device removal/standby @ 110.5-205kHz for Phone, 7.5W max
3	On, Operating/Device removal/standby @ 360kHz for Phone, 15W max
4	On, Operating/Device removal/standby @ 326.5kHz for Apple Watch, 2.5W max
5	On, Operating/Device removal/standby @ 1.778MHz for Apple Watch, 5W max
6	On, Operating @ 110.5-205kHz for Phone, 5W max & Operating @ 326.5kHz for Apple Watch, 2.5W max & Operating @ 110.5-205kHz for AirPods, 5W max
7	On, Operating @ 110.5-205kHz for Phone, 5W max & Operating @ 1.778MHz for Apple Watch, 5W max & Operating @ 110.5-205kHz for AirPods, 5W max
8	On, Operating @ 110.5-205kHz for Phone, 7.5W max & Operating @ 326.5kHz for Apple Watch, 2.5W max & On, Operating @ 110.5-205kHz for AirPods, 5W max
9	On, Operating @ 110.5-205kHz for Phone, 7.5W max & Operating @ 1.778MHz for Apple Watch, 5W max & Operating @ 110.5-205kHz for AirPods, 5W max
10	On, Operating @ 360kHz for Phone, 15W max & Operating @ 326.5kHz for Apple Watch, 2.5W max & Operating @ 110.5-205kHz for AirPods, 5W max
11	On, Operating @ 360kHz for Phone, 15W max & Operating @ 1.778MHz for Apple Watch, 5W max & Operating @ 110.5-205kHz for AirPods, 5W max

Test Item	Description of Mode
E-field	1/2/3/4/5/6/7/8/9/10/11
H-field	1/2/3/4/5/6/7/8/9/10/11

3.4 Coil Description

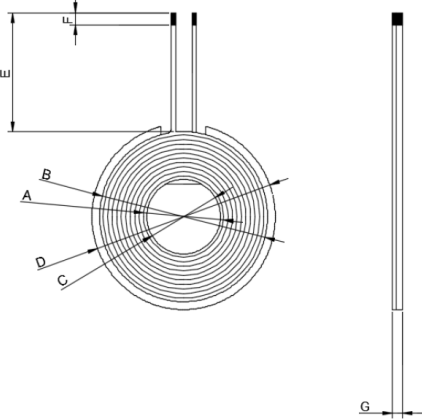
Configuration	Mode	Description
1	Coil 1, Coil 2 and Coil 3 Standby (Flatbed Position)	EUT Alone powered by AC/DC adapter
2	Coil 1 Operating (Flatbed Position) (@110.5kHz-205kHz, ~10%, 20~50%, and >75%, Power Charging)	EUT powered by AC/DC Adapter & Wireless Charging to WPT Client
3	Coil 1 Operating (Flatbed Position) (@360kHz, ~10%, 20~50%, and >75%, Power Charging)	EUT powered by AC/DC Adapter & Wireless Charging to WPT Client
4	Coil 2 Operating (Flatbed Position) (@326.5kHz, ~10%, 20~50%, and >75%, Power Charging)	EUT powered by AC/DC Adapter & Wireless Charging to WPT Client
5	Coil 2 Operating (Flatbed Position) (@1.778MHz, ~10%, 20~50%, and >75%, Power Charging)	EUT powered by AC/DC Adapter & Wireless Charging to WPT Client
6	Coil 3 Operating (Flatbed Position) (@110.5kHz-205kHz, ~10%, 20~50%, and >75%, Power Charging)	EUT powered by AC/DC Adapter & Wireless Charging to WPT Client



3.5 Coil Specifications

Coil 1 – 15W

Turns: 11
Layer: 1

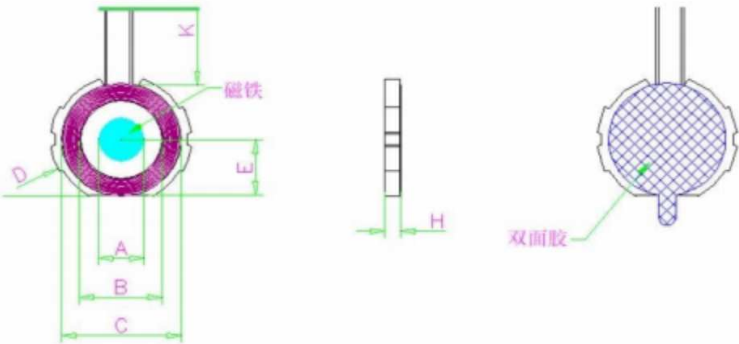


Unit: mm

A	B	C	D	E	F	G
20.5±0.5	39±1	19.5±0.3	42.5±0.5	8±1	4±1.5	2.05±0.1

Coil 2 – 5W

Turns: 12
Layer: 1

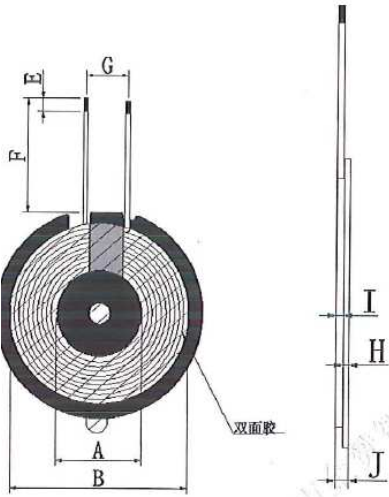


Unit: mm

A	B	C	D	E	K	H
7.6±1.0	14.5± 1.0	20.7± 1.0	25.0± 1.0	9.7± 1.0	8.0±2.0	2.8±0.3

Coil 3 – 5W

Turns: 10
Layer: 1



Unit: mm

A	B	C	D	E	F	G	H	I	J
20.5±0.5	43±1	5.3±0.5	49±1	3±1	30±2	8	1.0±0.1	2 max.	3 max.

3.6 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.7 Submitted Documents

- Application Form
- Block Diagram
- ID Label and Location Info
- User Manual
- Schematics
- Operation Description

4 Radio Frequency Exposure Compliance

4.1 Test Procedures According to the Technical Standards

Standard Section	Test Item	Judgment
FCC CFR 47 part1, 1.1310 KDB 680106 D01 Wireless Power Transfer v04	Electric Field Strength (E) (V/m)	PASS
	Magnetic Field Strength (H) (A/m)	PASS

4.2 Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180 / f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1	30

Note 1: f = frequency in MHz ; *Plane-wave equivalent power density.

Note 2: For the applicable limit, see FCC 1.1310, KDB 680106 D01 Wireless Power Transfer v04.

Note 3: Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

4.3 Test result

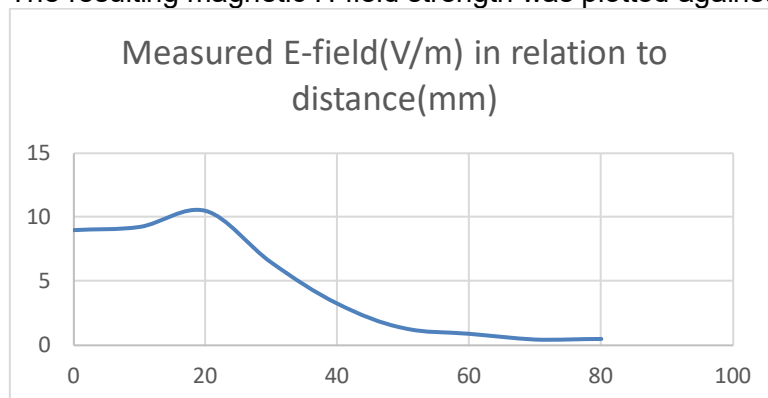
4.3.1 General Description

The Probe parameters as below:

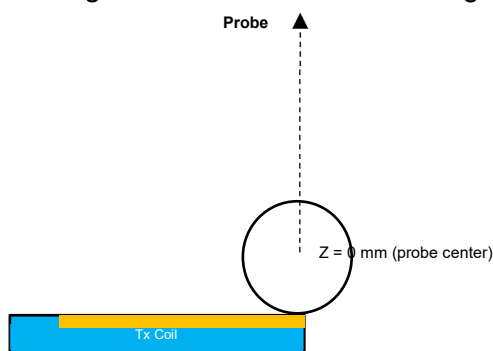
Probe: EHP200A	Probe Center to edge	46mm
	E-field Sensor Dp	52mm
	H-field Sensor Dp	76mm
	1.7Dp E-field	88mm
	1.7Dp H-field	129mm

E-field and H-field Test Procedures:

1. The grid of 10mm by 10mm is used as the size between the EUT and the probe when measurement
2. The probe is used to measure the E-field and H-field from the EUT
3. Measurements are made perpendicular to the XY plane
4. Locate the MFS in the XY plane; take coil 1 for example
5. These initial measurements are made at Z = 70 mm from the surface of the XY plane when 1.7Dp E-field=88mm, and 1.7Dp H-field=129mm of the probe
6. The resulting magnetic H-field strength was plotted against the distance in below figure:



7. The maximum E-field strength (10.48V/m) on this plot occurs at 20 mm from the center of the coil
8. The probe must therefore be placed at 20 mm from the center of the coil to gather electric or magnetic values when measuring along the Z-axis



9. Repeat the step1~8 to confirm the maximum H-field strength
10. Test was performed on operating mode with client device, 10%, 50%, 90% battery status of client device, here the worst-case status data are shown

4.3.2 Test Result for Coil 1, 110.5-205kHz for Phone, 7.5W max

Data Collecting Process

Operating, Device removal and standby modes use the same test method, only the power of the test load is changed. The data only reflects the worst mode EUT+Mobile Phone (battery status: <20%).

Test Distance (mm)	E-Field (V/m): EUT + Mobile Phone (Battery Status: <20%)	H-Field (A/m): EUT + Mobile Phone (Battery Status: <20%)
70	2.954	0.091
80	2.718	0.080
90	2.429	0.071
100	2.104	0.065
110	1.869	0.059
120	1.627	0.051
130	1.421	0.036
140	1.287	0.033
150	1.184	0.030
160	0.983	0.028
170	0.952	0.022
180	0.894	0.019
190	0.838	0.016
200	0.757	0.016

Performing Curve-fitting

Four (4) regression techniques were used to validate their model errors.

Model 1: Quadratic Regression

Model 2: Cubic Regression

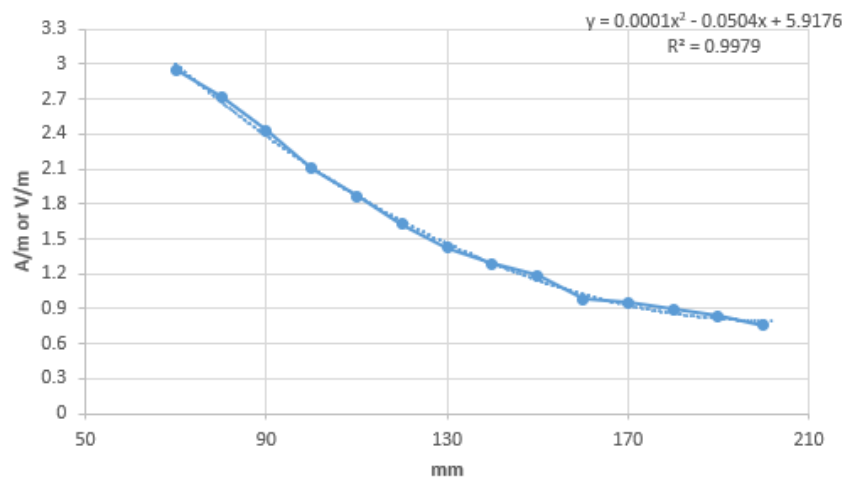
Model 3: Quartic Regression

The Data Analysis package included in MS Excel was used to perform the regression analyses.

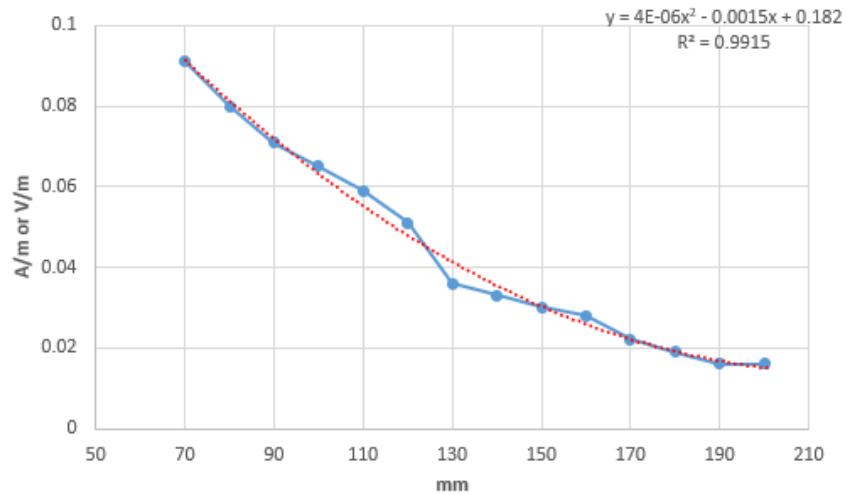
Operating mode (Battery Status: <20%)-Worst case

Model 1: Quadratic Regression

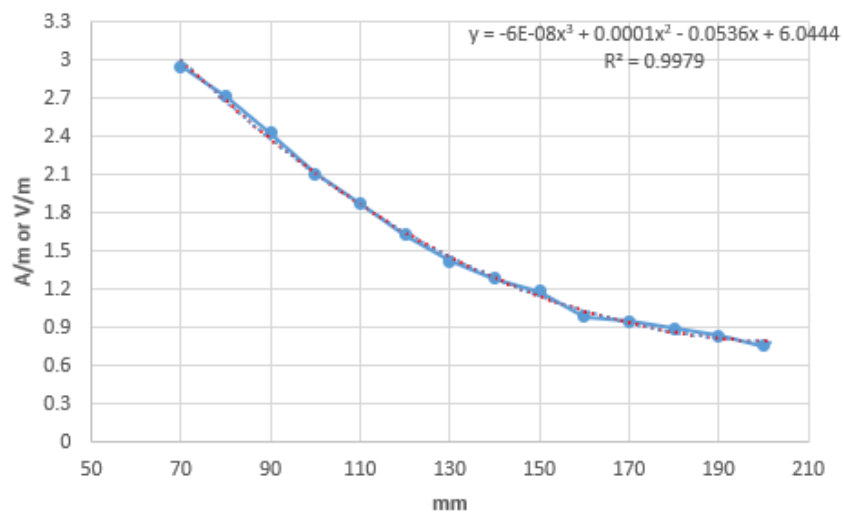
E-Field



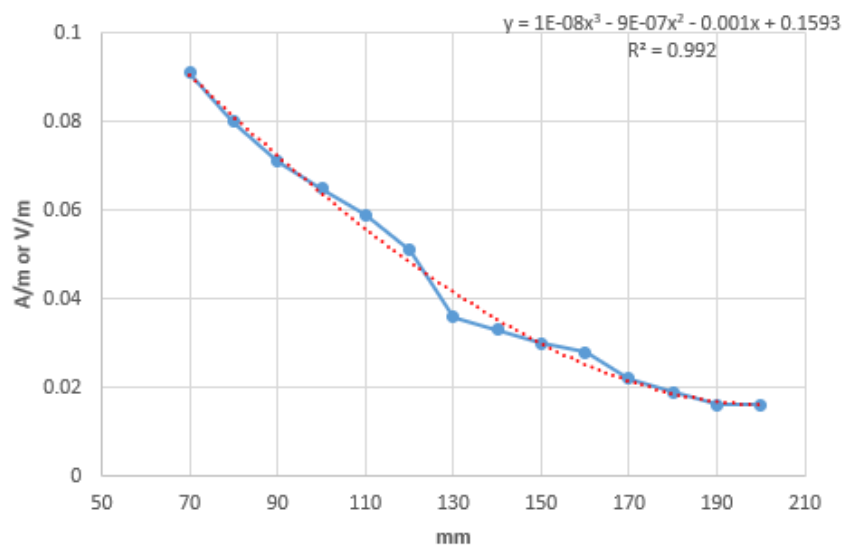
H-Field



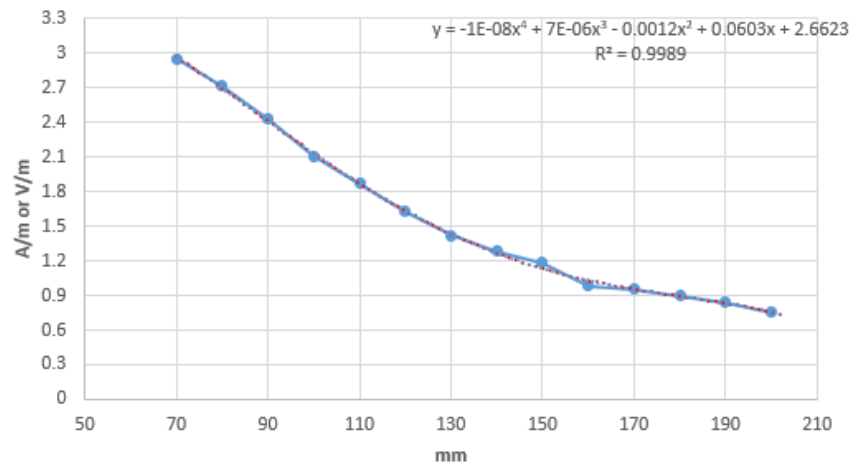
Model 2: Cubic Regression
E-Field



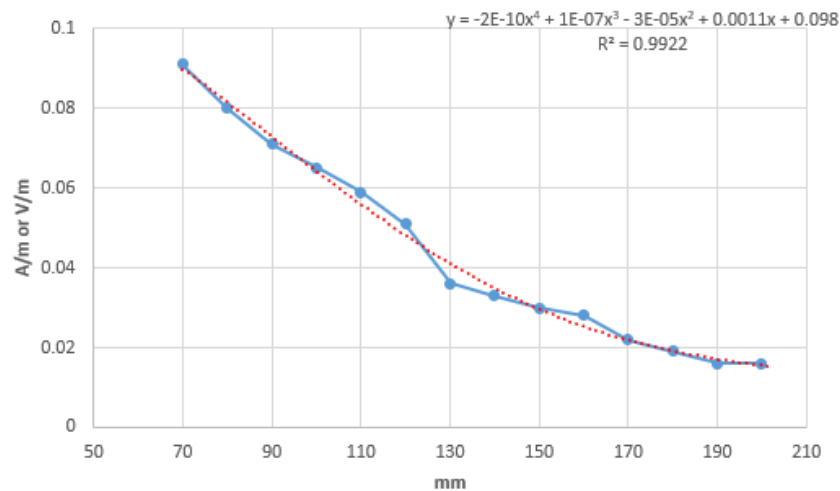
H-Field



Model 3: Quartic Regression
E-Field



H-Field



Analyzing Results

E-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.999	0.999	0.999
R Square	0.998	0.998	0.999
Adjusted R Square	0.998	0.997	0.998
Standard Error (S)	0.036	0.038	0.029
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (V/m)	5.918	6.044	2.662
Limit (V/m)	614	614	614
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

H-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.996	0.996	0.996
R Square	0.991	0.992	0.992
Adjusted R Square	0.990	0.990	0.989
Standard Error (S)	0.003	0.003	0.003
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (A/m)	0.182	0.159	0.098
Limit (A/m)	1.63	1.63	1.63
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

4.3.3 Test Result for Coil 1, 360kHz for Phone, 15W max

Data Collecting Process

Operating, Device removal and standby modes use the same test method, only the power of the test load is changed. The data only reflects the worst mode EUT+Mobile Phone (battery status: <20%).

Test Distance (mm)	E-Field (V/m):	H-Field (A/m):
	EUT + Mobile Phone (Battery Status: <20%)	EUT + Mobile Phone (Battery Status: <20%)
70	2.317	0.054
80	2.061	0.052
90	1.681	0.051
100	1.296	0.049
110	1.064	0.044
120	0.985	0.041
130	0.939	0.038
140	0.819	0.036
150	0.756	0.033
160	0.708	0.030
170	0.663	0.028
180	0.608	0.027
190	0.549	0.023
200	0.463	0.018

Performing Curve-fitting

Four (4) regression techniques were used to validate their model errors.

Model 1: Quadratic Regression

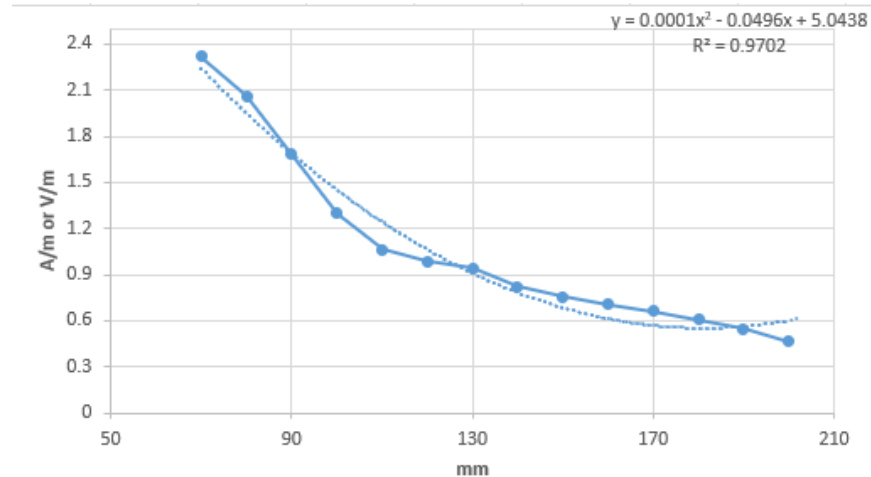
Model 2: Cubic Regression

Model 3: Quartic Regression

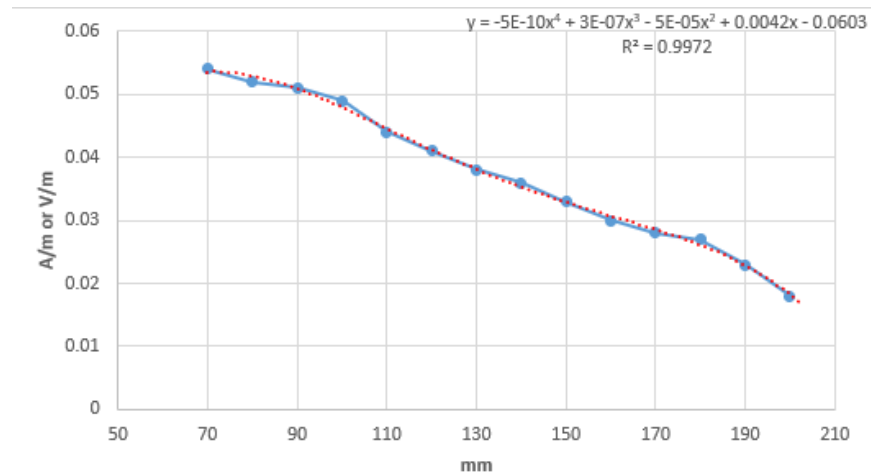
The Data Analysis package included in MS Excel was used to perform the regression analyses.

Operating mode (Battery Status: <20%)-Worst case

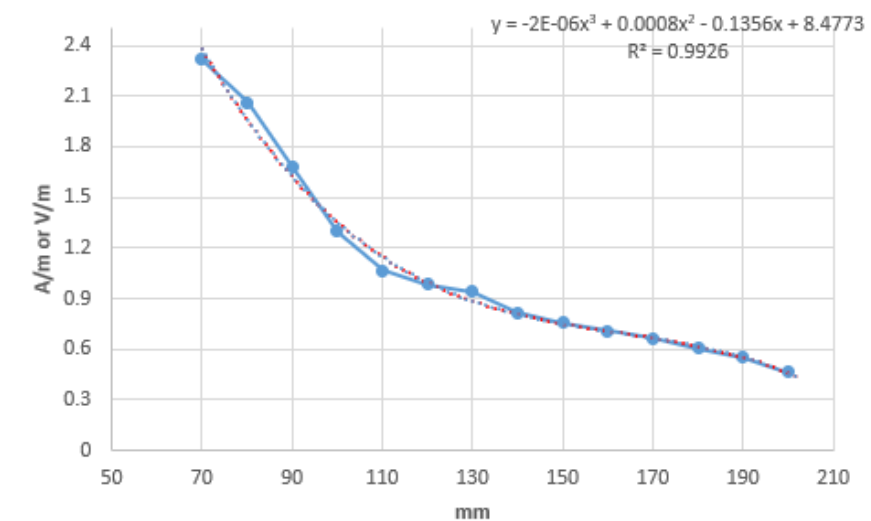
Model 1: Quadratic Regression E-Field



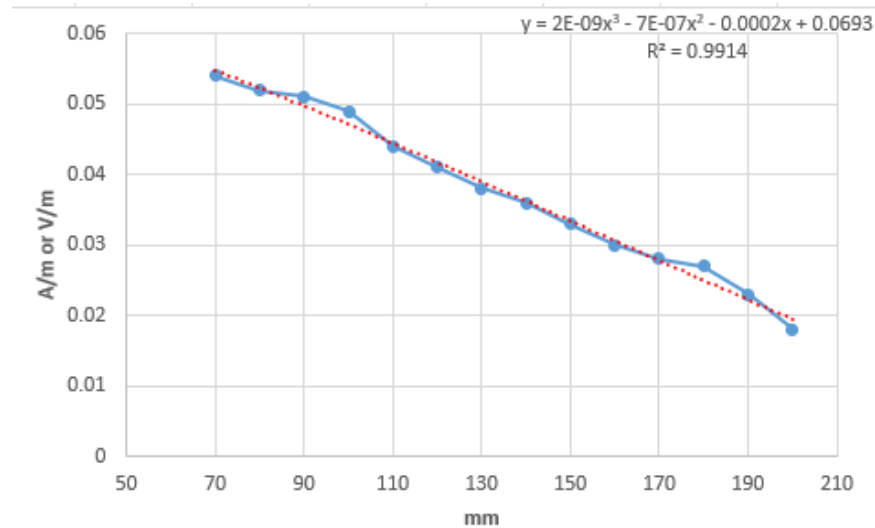
H-Field



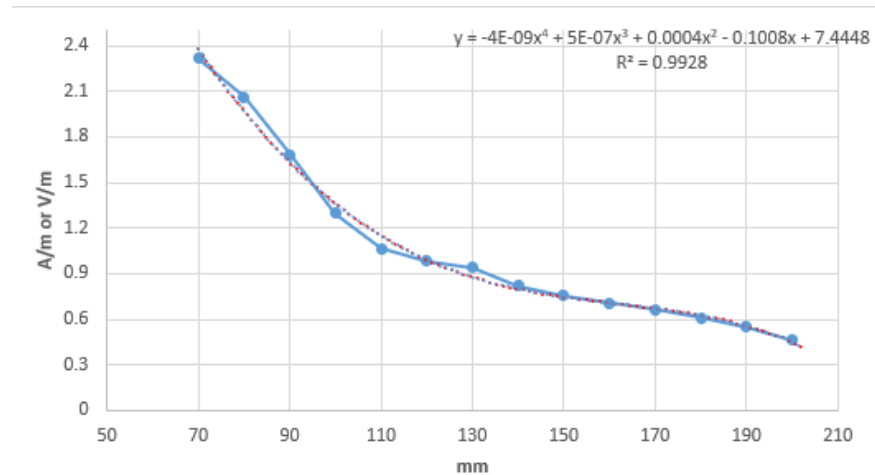
Model 2: Cubic Regression E-Field



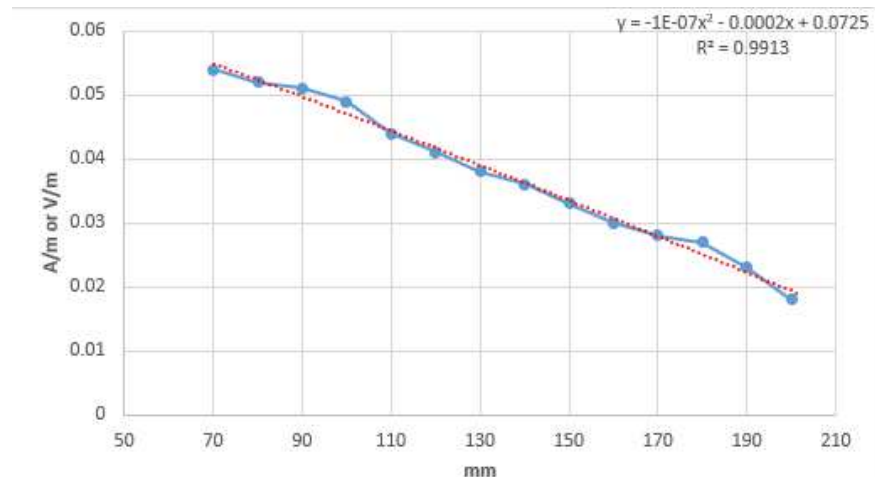
H-Field



Model 3: Quartic Regression
E-Field



H-Field



Analyzing Results
E-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.985	0.996	0.996
R Square	0.970	0.993	0.993
Adjusted R Square	0.965	0.990	0.990
Standard Error (S)	0.108	0.056	0.059
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (V/m)	5.044	8.477	7.445
Limit (V/m)	614	614	614
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

H-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.999	0.996	0.996
R Square	0.997	0.991	0.991
Adjusted R Square	0.996	0.989	0.990
Standard Error (S)	0.001	0.001	0.001
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (A/m)	0.060	0.069	0.073
Limit (A/m)	1.63	1.63	1.63
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

4.3.4 Test Result for Coil 2, 326.5kHz for Apple Watch, 2.5W max

Data Collecting Process

Operating, Device removal and standby modes use the same test method, only the power of the test load is changed. The data only reflects the worst mode EUT+Mobile Phone (battery status: <20%).

Test Distance (mm)	E-Field (V/m):	H-Field (A/m):
	EUT + Watch (Battery Status: <20%)	EUT + Watch (Battery Status: <20%)
70	1.438	0.056
80	1.289	0.054
90	1.091	0.051
100	0.864	0.049
110	0.823	0.046
120	0.797	0.042
130	0.746	0.039
140	0.686	0.035
150	0.628	0.031
160	0.579	0.029
170	0.549	0.026
180	0.507	0.023
190	0.466	0.019
200	0.438	0.016

Performing Curve-fitting

Four (4) regression techniques were used to validate their model errors.

Model 1: Quadratic Regression

Model 2: Cubic Regression

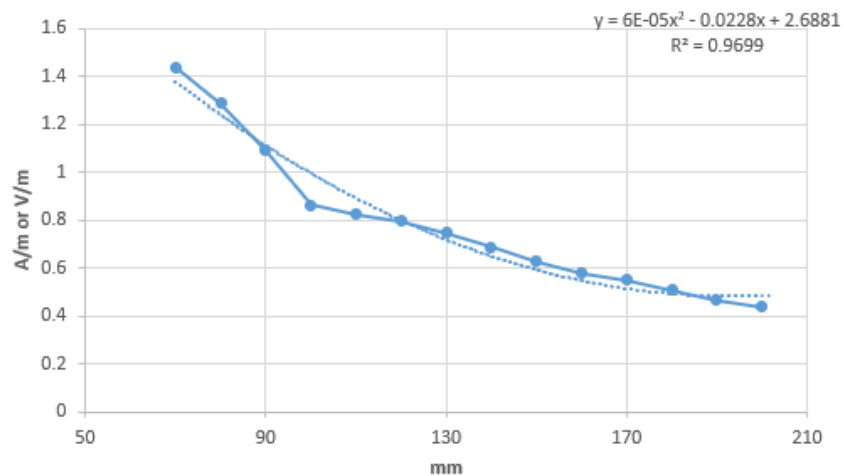
Model 3: Quartic Regression

The Data Analysis package included in MS Excel was used to perform the regression analyses.

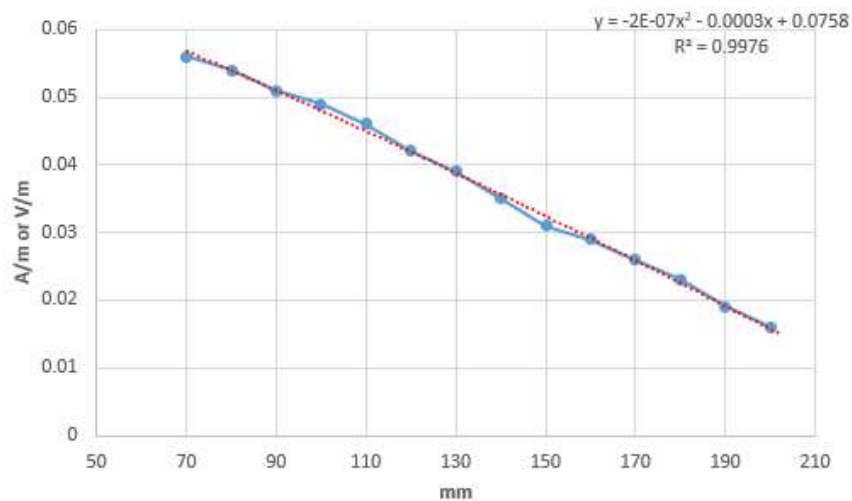
Operating mode (Battery Status: <20%)-Worst case

Model 1: Quadratic Regression

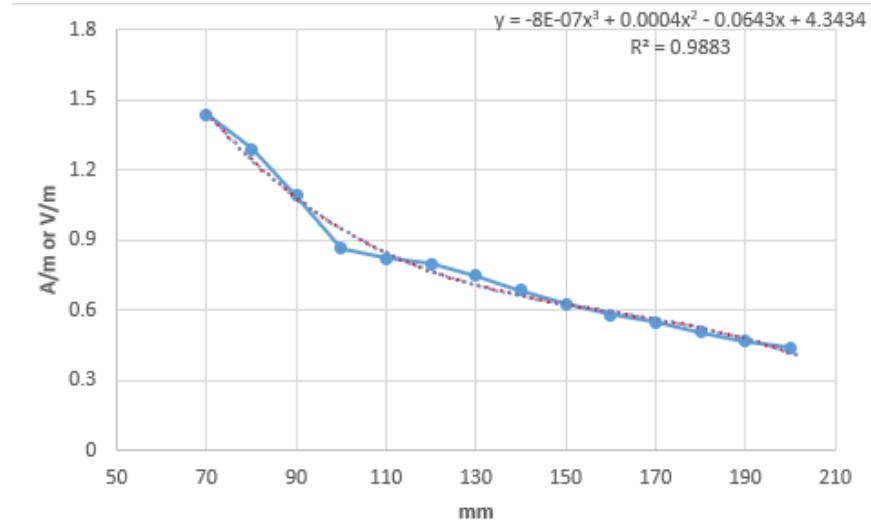
E-Field



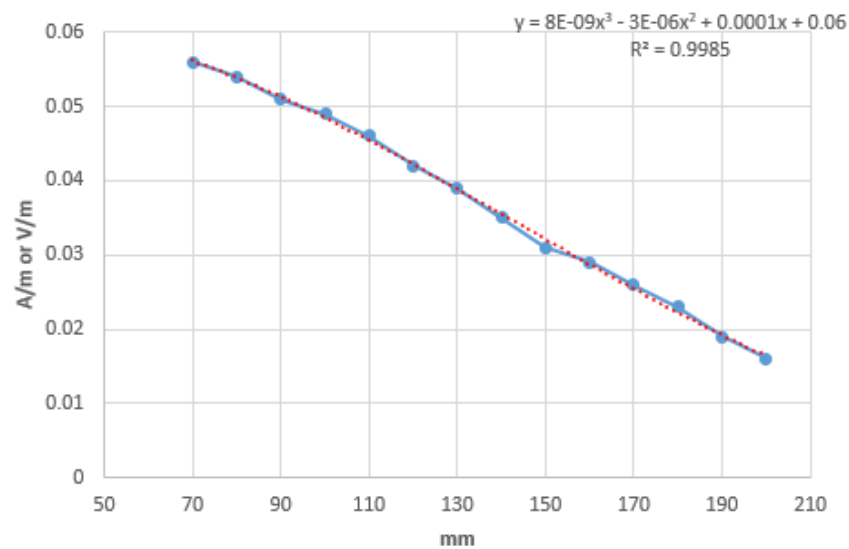
H-Field



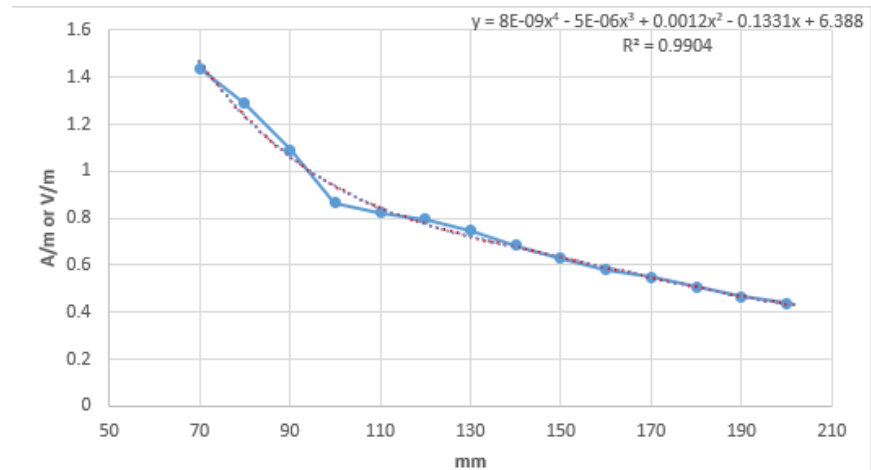
Model 2: Cubic Regression
E-Field

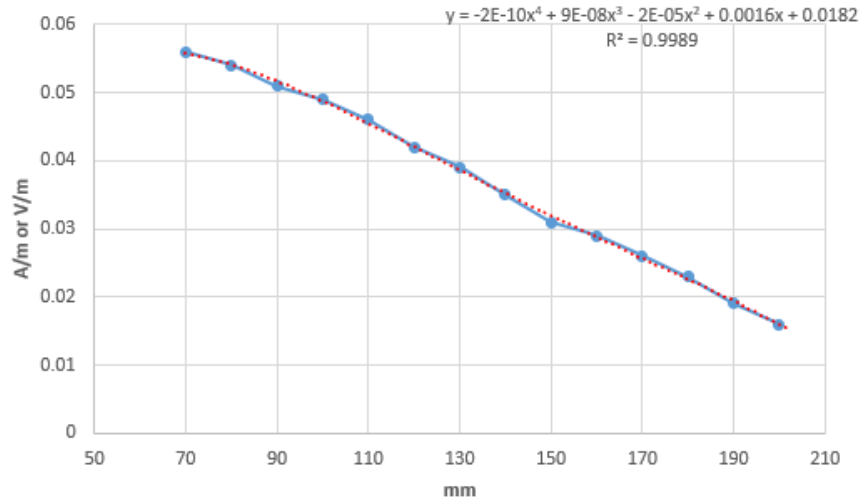


H-Field



Model 3: Quartic Regression
E-Field



H-Field

Analyzing Results
E-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.985	0.994	0.995
R Square	0.970	0.988	0.990
Adjusted R Square	0.964	0.985	0.986
Standard Error (S)	0.058	0.038	0.036
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (V/m)	2.688	4.343	6.388
Limit (V/m)	614	614	614
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

H-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.999	0.999	0.999
R Square	0.998	0.998	0.999
Adjusted R Square	0.997	0.998	0.998
Standard Error (S)	0.001	0.001	0.001
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (A/m)	0.076	0.060	0.018
Limit (A/m)	1.63	1.63	1.63
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

4.3.5 Test Result for Coil 2, 1.778MHz for Apple Watch, 5W max

Data Collecting Process

Operating, Device removal and standby modes use the same test method, only the power of the test load is changed. The data only reflects the worst mode EUT+Mobile Phone (battery status: <20%).

Test Distance (mm)	E-Field (V/m):	H-Field (A/m):
	EUT + Watch (Battery Status: <20%)	EUT + Watch (Battery Status: <20%)
70	1.378	0.049
80	1.262	0.046
90	1.019	0.043
100	0.871	0.039
110	0.827	0.034
120	0.783	0.031
130	0.739	0.029
140	0.691	0.026
150	0.641	0.025
160	0.618	0.021
170	0.574	0.018
180	0.534	0.016
190	0.482	0.016
200	0.436	0.015

Performing Curve-fitting

Four (4) regression techniques were used to validate their model errors.

Model 1: Quadratic Regression

Model 2: Cubic Regression

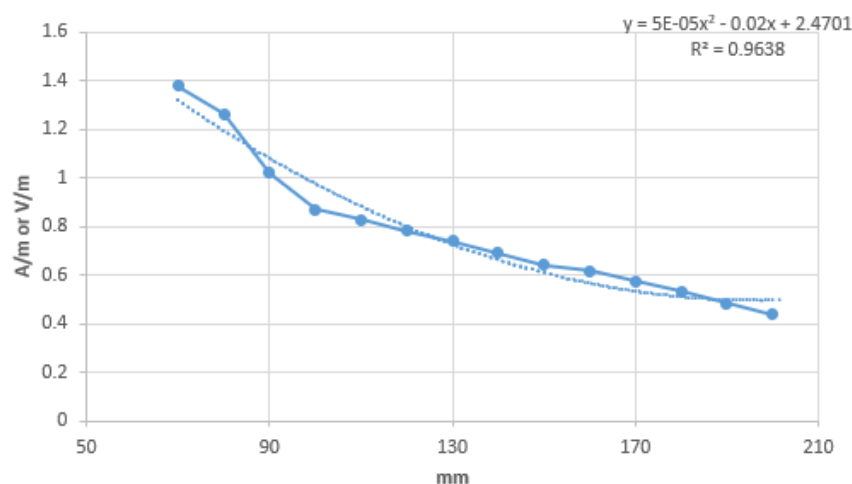
Model 3: Quartic Regression

The Data Analysis package included in MS Excel was used to perform the regression analyses.

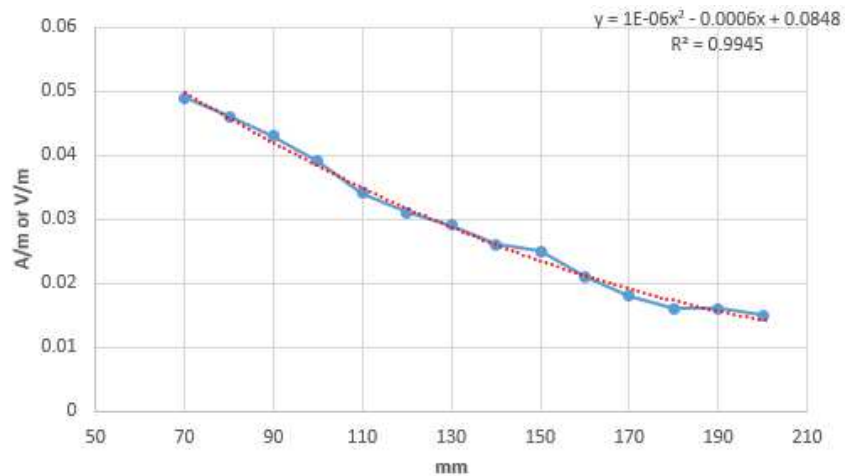
Operating mode (Battery Status: <20%)-Worst case

Model 1: Quadratic Regression

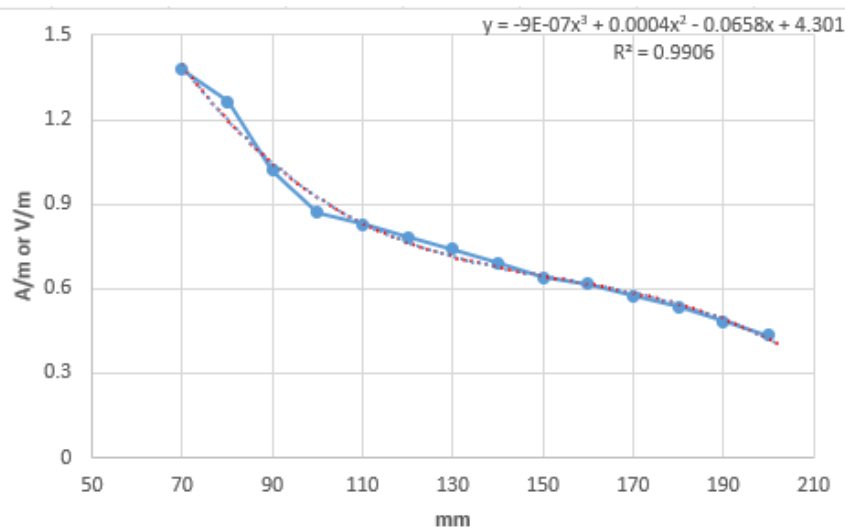
E-Field



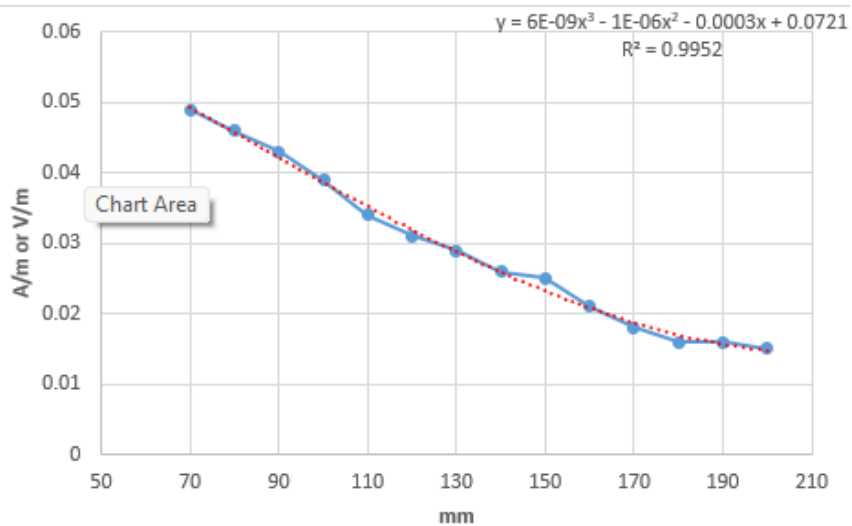
H-Field



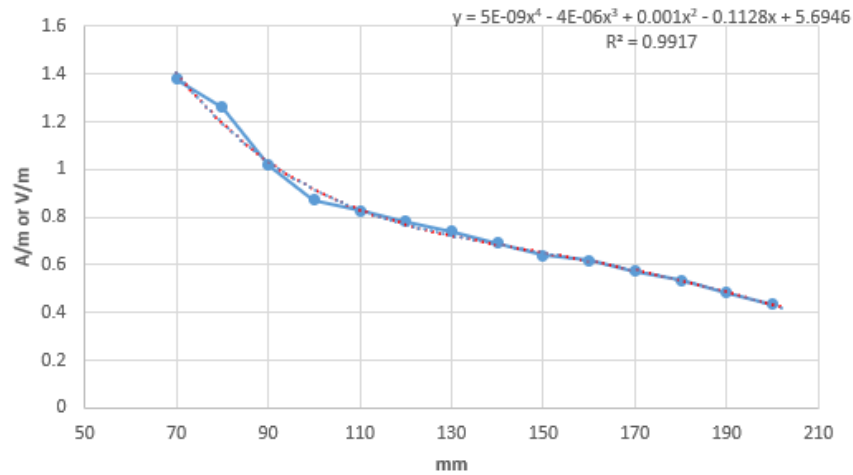
Model 2: Cubic Regression
E-Field



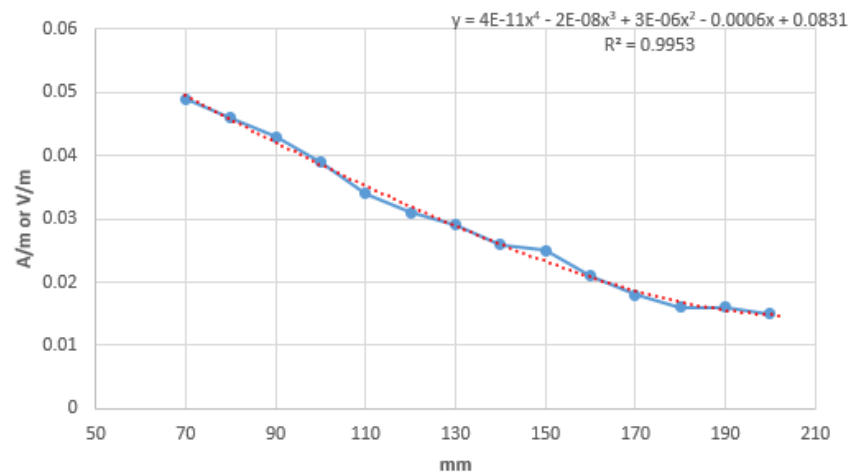
H-Field



Model 3: Quartic Regression
E-Field



H-Field



Analyzing Results

E-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.982	0.995	0.996
R Square	0.964	0.991	0.992
Adjusted R Square	0.957	0.988	0.988
Standard Error (S)	0.058	0.031	0.031
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (V/m)	2.470	4.301	5.695
Limit (V/m)	614	614	614
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

H-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.997	0.998	0.998
R Square	0.994	0.995	0.995
Adjusted R Square	0.993	0.994	0.993
Standard Error (S)	0.001	0.001	0.001
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (A/m)	0.085	0.072	0.083
Limit (A/m)	1.63	1.63	1.63
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

4.3.6 Test Result for Coil 3, 110.5-205kHz for AirPods, 5W max

Data Collecting Process

Operating, Device removal and standby modes use the same test method, only the power of the test load is changed. The data only reflects the worst mode EUT+Mobile Phone (battery status: <20%).

Test Distance (mm)	E-Field (V/m):	H-Field (A/m):
	EUT + AirPods (Battery Status: <20%)	EUT + AirPods (Battery Status: <20%)
70	1.655	0.053
80	1.256	0.051
90	1.183	0.049
100	0.982	0.046
110	0.929	0.041
120	0.879	0.038
130	0.815	0.034
140	0.764	0.031
150	0.696	0.029
160	0.649	0.024
170	0.608	0.023
180	0.572	0.022
190	0.524	0.019
200	0.463	0.017

Performing Curve-fitting

Four (4) regression techniques were used to validate their model errors.

Model 1: Quadratic Regression

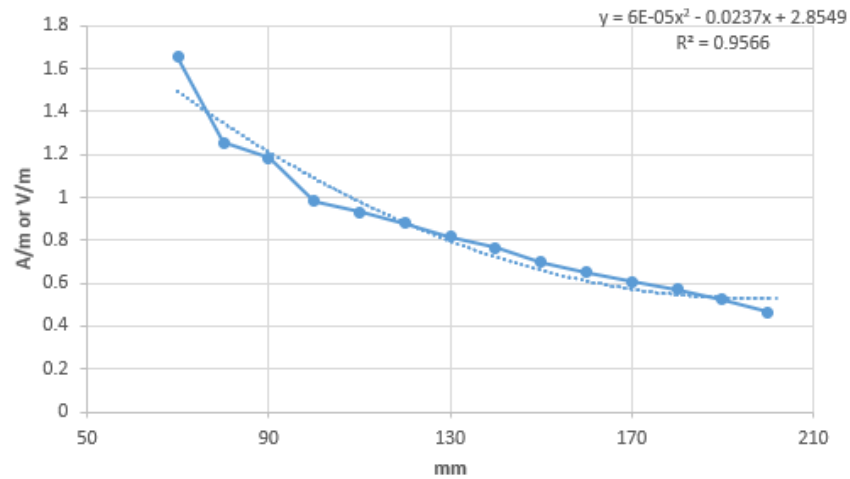
Model 2: Cubic Regression

Model 3: Quartic Regression

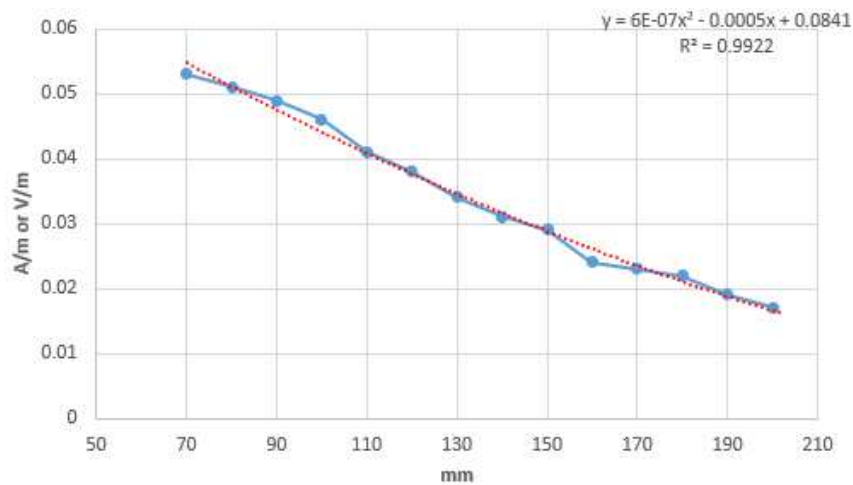
The Data Analysis package included in MS Excel was used to perform the regression analyses.

Operating mode (Battery Status: <20%)-Worst case

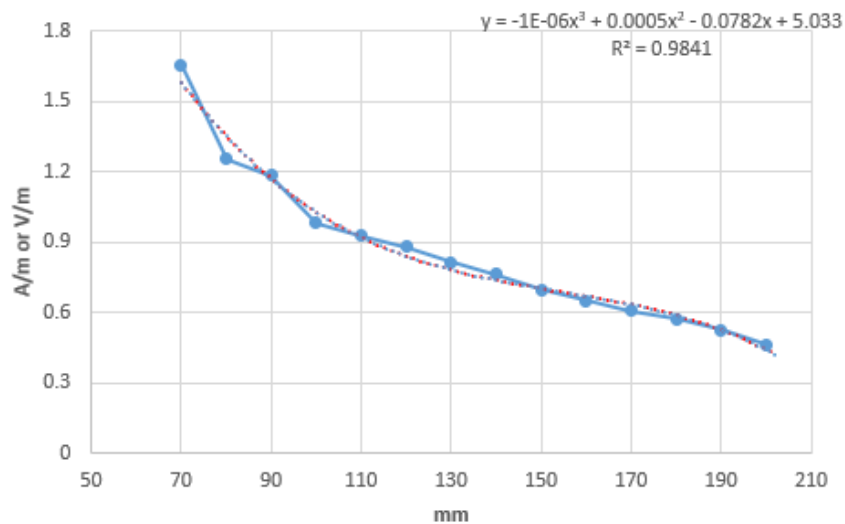
Model 1: Quadratic Regression
E-Field



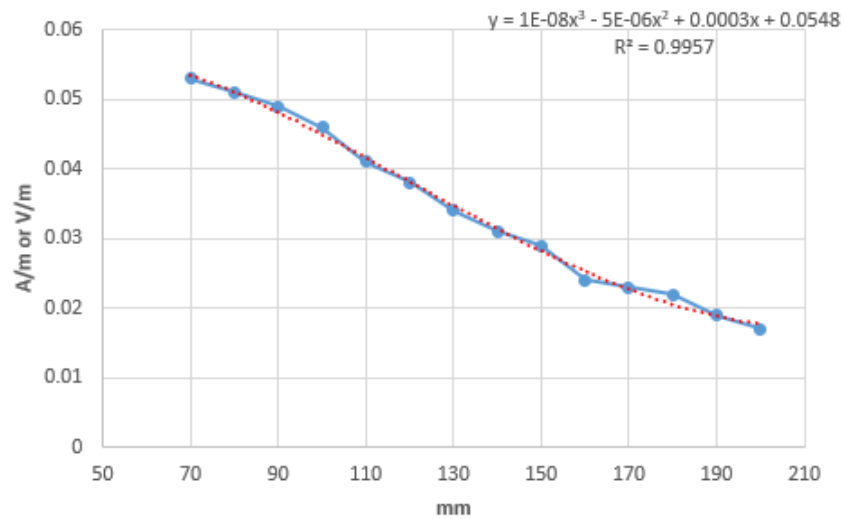
H-Field



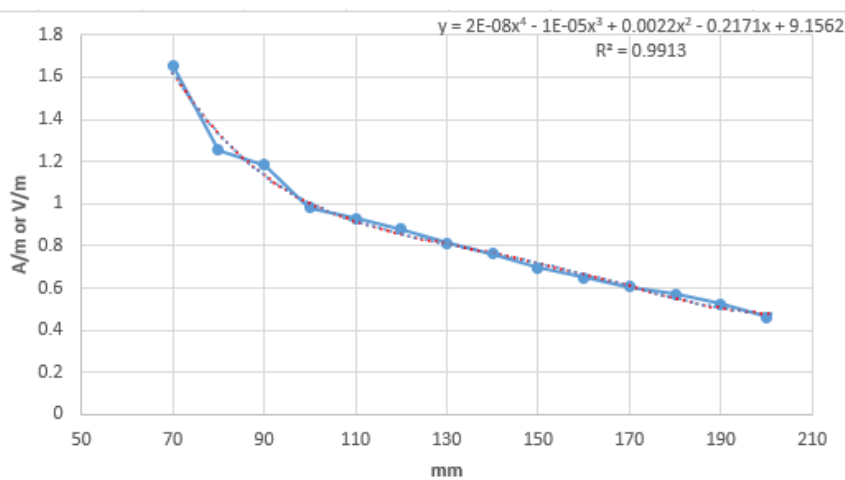
Model 2: Cubic Regression
E-Field



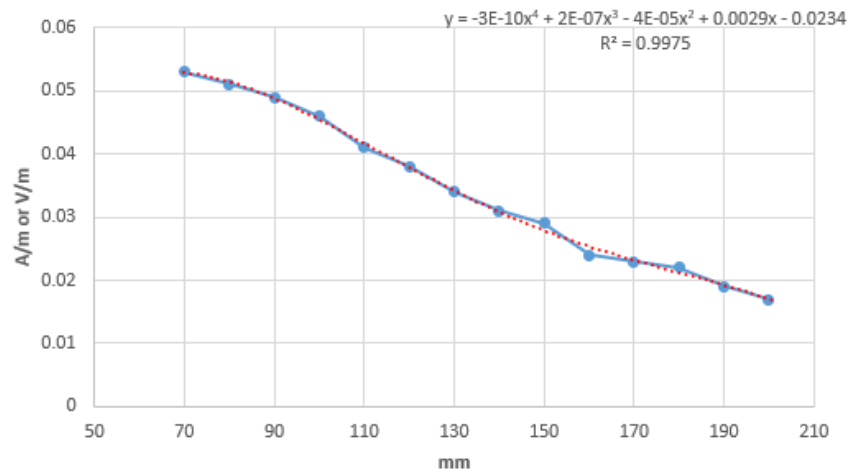
H-Field



Model 3: Quartic Regression
E-Field



H-Field



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Analyzing Results
E-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.978	0.992	0.996
R Square	0.957	0.984	0.991
Adjusted R Square	0.949	0.979	0.987
Standard Error (S)	0.075	0.047	0.037
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (V/m)	2.855	5.033	9.156
Limit (V/m)	614	614	614
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

H-Field

Parameter	Quadratic Regression	Cubic Regression	Quartic Regression
Multiple R	0.996	0.998	0.999
R Square	0.992	0.996	0.998
Adjusted R Square	0.991	0.994	0.996
Standard Error (S)	0.001	0.001	0.001
Number of data points used	14	14	14
Estimated magnetic field strength at touch position (A/m)	0.084	0.055	-0.023
Limit (A/m)	1.63	1.63	1.63
Result	Pass		

Note: The regression analysis utilized a confidence level of 95%, which is the minimum value that should be used by applicants, by using curve fitting techniques for modeling and calculation.

4.3.7 Test Result for Coil 1 + Coil 2 + Coil 3, 25W max

Max. E-Field and H-Field for each coil as below:

Operating Mode	Max. E-Field V/m	Limit-E-Field V/m	Max. H-Field A/m	Limit-H-Field A/m@SAR
Coil 1 110.5-205kHz	6.044	614	0.182	1.63
Coil 1 360kHz	8.477	614	0.073	1.63
Coil 2 326.5kHz	6.388	614	0.076	1.63
Coil 2 1.778MHz	5.695	614	0.085	1.63
Coil 3 110.5-205kHz	9.156	614	0.084	1.63

Sum E-Field:

Operating Mode	Max. E-Field V/m			Sum E-Field V/m	Limit-E-Field V/m	Result
	Coil 1	Coil 2	Coil 3			
Coil 1@110.5-205kHz + Coil 2@326.5kHz + Coil 3@110.5-205kHz	6.044	6.388	9.156	21.588	614	Pass
Coil 1@110.5-205kHz + Coil 2@1.778MHz + Coil 3@110.5-205kHz	6.044	5.695	9.156	20.895	614	Pass
Coil 1@360kHz + Coil 2@326.5kHz + Coil 3@110.5-205kHz	8.477	6.388	9.156	24.021	614	Pass
Coil 1@360kHz + Coil 2@1.778MHz + Coil 3@110.5-205kHz	8.477	5.695	9.156	23.328	614	Pass

Sum H-Field:

Operating Mode	Max. H-Field A/m			Sum H-Field A/m	Limit-H-Field A/m	Result
	Coil 1	Coil 2	Coil 3			
Coil 1@110.5-205kHz + Coil 2@326.5kHz + Coil 3@110.5-205kHz	0.182	0.076	0.084	0.342	1.63	Pass
Coil 1@110.5-205kHz + Coil 2@1.778MHz + Coil 3@110.5-205kHz	0.182	0.085	0.084	0.351	1.63	Pass
Coil 1@360kHz + Coil 2@326.5kHz + Coil 3@110.5-205kHz	0.073	0.076	0.084	0.233	1.63	Pass
Coil 1@360kHz + Coil 2@1.778MHz + Coil 3@110.5-205kHz	0.073	0.085	0.084	0.242	1.63	Pass

5 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

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