

Report on EMC Testing of:

Qi-Technologies GmbH EMF Modulation Unit, Model: Qi-Home Cell

Prepared for: Qi-Technologies GmbH
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SIGNATURE

Handwritten signature of Andy Lawson in black ink.

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Andy Lawson	Senior Engineer	Authorised Signatory	05 December 2019

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

EXECUTIVE SUMMARY

A sample of this product was tested for pre-compliance for the tests detailed in section 1.3.

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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

The report will be a factual results-based test report and will only re-produce test results. We will not give any opinions in the test results in regard to the effectiveness of the device in a real world situation.

Issue	Description of Change	Date of Issue
1	First Issue	05 December 2019

Table 1

1.2 Introduction

Applicant	Qi-Technologies GmbH
Manufacturer	Qi-Technologies GmbH
Model Number(s)	Qi-Home Cell
Serial Number(s)	HCZ19-06-02-17
Hardware Version(s)	February 2019
Software Version(s)	Not Applicable
Number of Samples Tested	1
Test Specification/Issue/Date	Not Applicable
Order Number	91403399
Date	04-October-2019
Date of Receipt of EUT	22-October-2019
Start of Test	24-October-2019
Finish of Test	25-October-2019
Name of Engineer(s)	Colin McKean



1.3 Brief Summary of Results

A brief summary of the tests carried out for pre-compliance are shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Standalone				
2.1	Not Applicable	Shielding Effectiveness Testing of Qi-Home Cell	N/A	

Table 2



1.4 Declaration of Build Status

MAIN EUT	
MANUFACTURING DESCRIPTION	EMF Modulation Unit
MANUFACTURER	Qi-Technologies
MODEL NAME/NUMBER	Qi-Home Cell
PART NUMBER	
SERIAL NUMBER	HCZ 19 02 06 17
HARDWARE VERSION	February 2019
SOFTWARE VERSION	n/a
PSU VOLTAGE/FREQUENCY/CURRENT	n/a
HIGHEST INTERNALLY GENERATED / USED FREQUENCY	5.0 GHz
FCC ID (if applicable)	
INDUSTRY CANADA ID (if applicable)	
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	EMF modulation unit interacts with ambient EM environment
COUNTRY OF ORIGIN	Germany
RF CHARACTERISTICS (if applicable)	
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	824,0 – 849,0 MHz; 876,0 – 915,0 MHz; 1710,0 – 1910,0 MHz; 2,400 – 2,485 MHz; 5725 – 5875 MHz
RECEIVER FREQUENCY OPERATING RANGE (MHz)	824,0 – 849,0 MHz; 876,0 – 915,0 MHz; 1710,0 – 1910,0 MHz; 2,400 – 2,485 MHz; 5725 – 5875 MHz
INTERMEDIATE FREQUENCIES	
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	300KGXW, 22M0G1D, 16M5D1D, 33M1D1D
MODULATION TYPES: (i.e. GMSK, QPSK)	GSM 850, 900, 1800, 1900, 802.11
OUTPUT POWER (W or dBm)	~ 1 W
SEPARATE BATTERY/POWER SUPPLY (if applicable)	
MANUFACTURING DESCRIPTION	
MANUFACTURER	
TYPE	
PART NUMBER	
PSU VOLTAGE/FREQUENCY/CURRENT	
COUNTRY OF ORIGIN	
MODULES (if applicable)	
MANUFACTURING DESCRIPTION	
MANUFACTURER	
TYPE	
POWER	
FCC ID	
INDUSTRY CANADA ID	
EMISSION DESIGNATOR	



DHSS/FHSS/COMBINED OR OTHER			
COUNTRY OF ORIGIN			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

I hereby declare that the information supplied is correct and complete.

Name: Hagen Thiers
Position held: CEO
Date 03/10/2019

1.5 Product Information

1.5.1 Technical Description

The Equipment Under Test (EUT) was a Qi Technologies GmbH, Model: Qi-Home cell.

The primary function of the EUT is a portable device that gives a level of protection against non-ionising radiation.

A full description and detailed product specification details are available from the manufacturer.



Figure 1 – Front Face



Figure 2 – Top Face

1.5.2 Test Configuration

Configuration	Description
Standalone	The EUT was a standalone unpowered device placed on a non-conductive table in a semi-anechoic chamber.

Table 3

1.6 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: HCZ19-06-02-17			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4



1.7 Test Location

TÜV SÜD conducted the following pre-compliance tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Standalone		
Shielding Effectiveness Testing	Colin McKean	Not Accredited

Table 5

Office Address:
Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom



2 Test Details

2.1 Radiated Attenuation Measurements

2.1.1 Specification Reference

Not Applicable, Clause Not Applicable

2.1.2 Equipment Under Test and Modification State

Qi-Home Cell, S/N: HCZ19-06-02-17 – Modification State 0

2.1.3 Date of Test

24-August and 25-August-2019

2.1.4 Test Method

The equipment under test was placed on a 0.8 m high non-conductive table in a semi anechoic chamber with Radar Absorbent Material (RAM) placed on the chamber floor between the RF Source and Rx antenna to minimise reflections from the chamber floor.

The chamber details are:

Internal Dimensions: Length = 6.0m, Width = 3.3m, Height = 4.3m

Access Door: Width = 1.8m, Height = 2.02m

Construction: Modular Steel

RAM: Fully lined with Anechoic material with the exception of the floor which is lined with ferrite tiles.

A receive antenna was placed in the line of sight to the source antenna and signal generator measuring the incident field in V/m at distances shown below in figure 3.

A calibration was carried out across different frequency bands as shown in the table 6 below, using a sine wave narrowband signal (without device) using a small (relative to product size) source antenna.

Frequency Band	Frequency Range (MHz)
GSM-850	824.2 to 893.8
GSM-900	880 to 960
DCS-1800	1710.2 to 1879.8
PCS-1900	1850.2 to 1989.8

Table 6

The Qi-Home Cell was placed in positions 2 as shown in figure 3 below and the V/m readings measured.

Graphs were produced showing the measured difference in field strength with the EUT in position 2 and the attenuation achieved for each of the frequency bands.

Table numbers 7 to 10 are converted measurements of the measured difference in V/m to W/m²

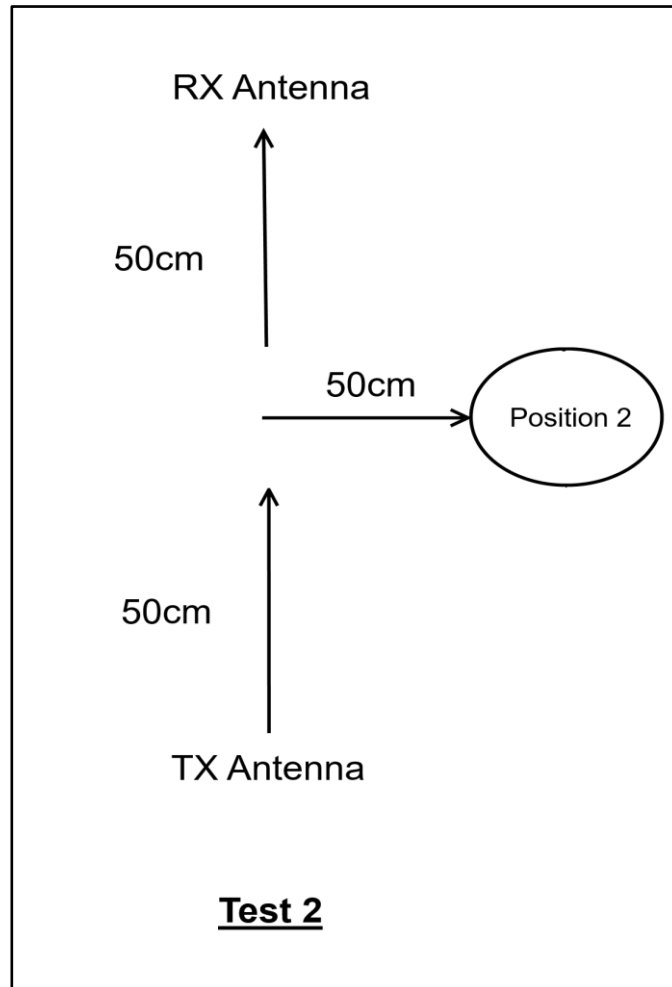


Figure 3 – Test Setup

2.1.5 Environmental Conditions

Ambient Temperature	21.0 °C
Relative Humidity	52.0 %

2.1.6 Test Results

Results for Configuration and Mode: Standalone

Performance assessment of the EUT made during this test: Declaration.

Detailed results are shown below.

Guide to test results:

- Figures 4, 6, 8 and 10 show a field strength comparison between the EUT not present and the EUT present.
- Figures 5, 7, 9, and 11 show the difference between EUT present and EUT not present in dBs of attenuation.



GSM-850 Results

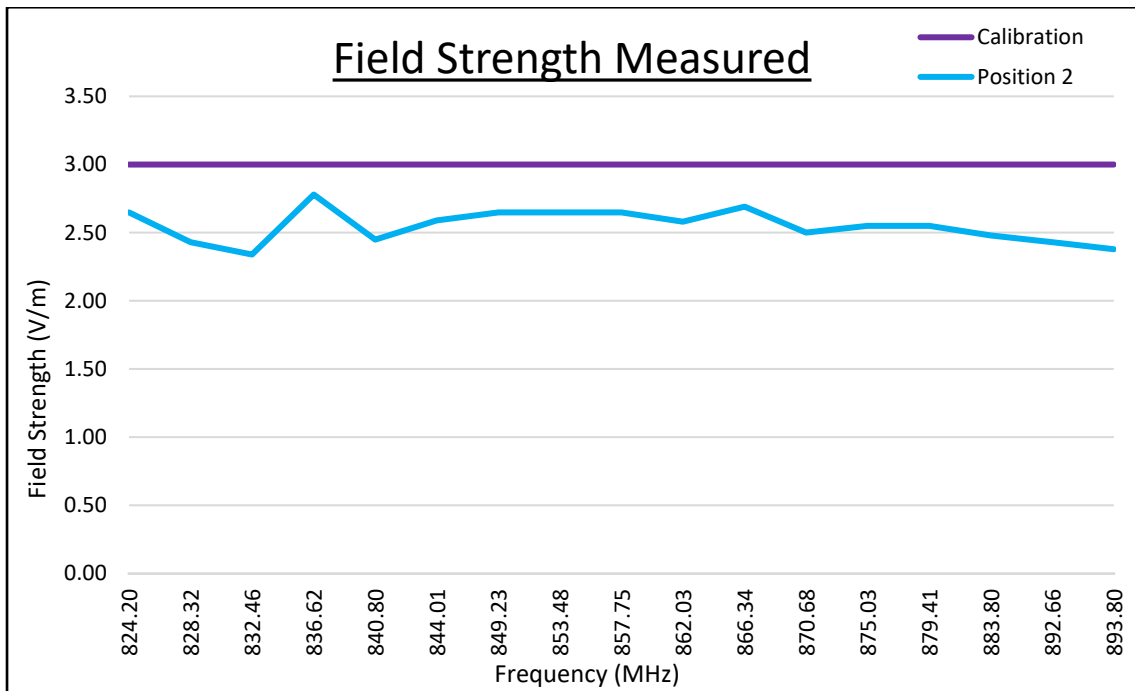


Figure 4 – Field Strength

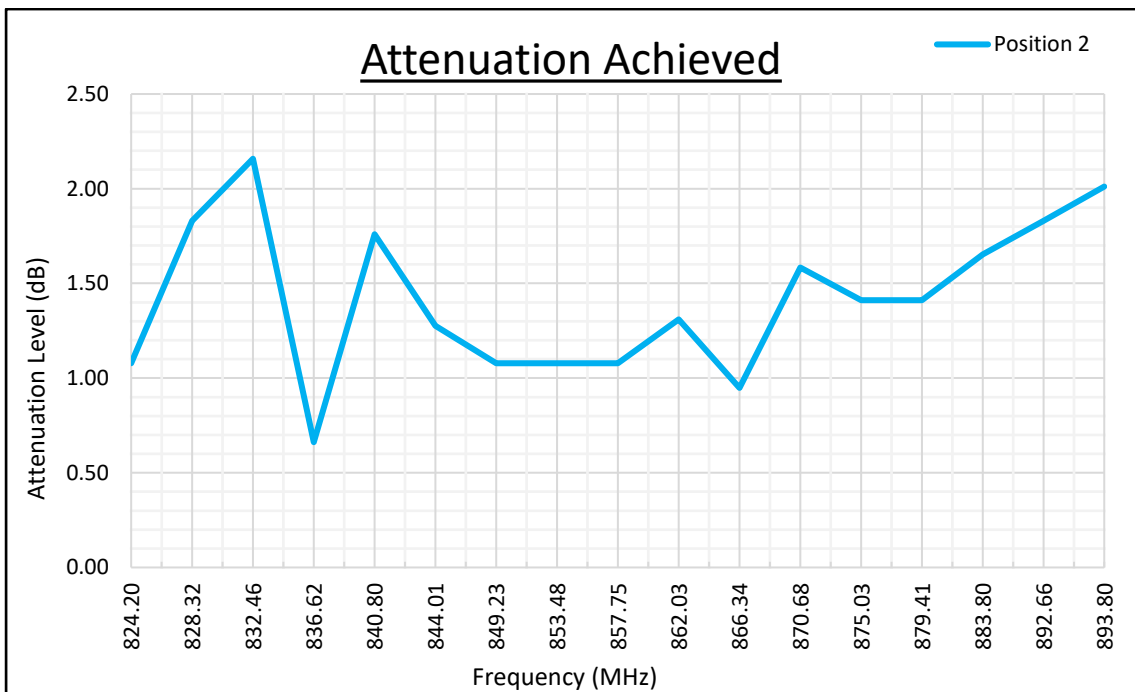


Figure 5 – Attenuation Achieved



GSM-900 Results

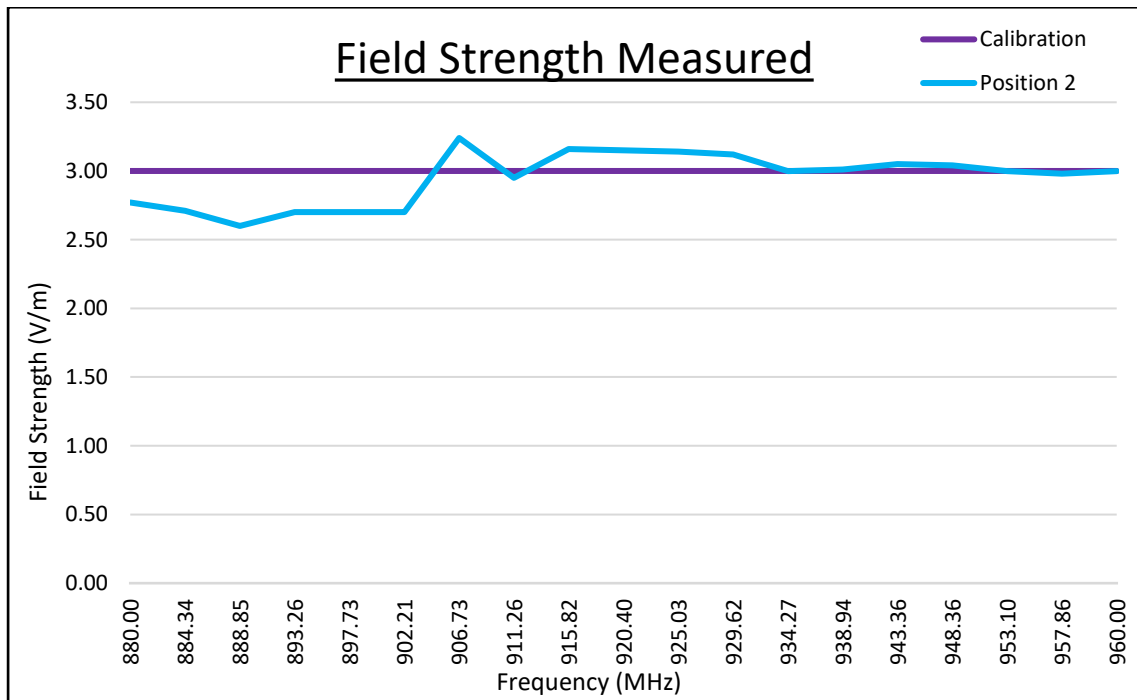


Figure 6 – Field Strength

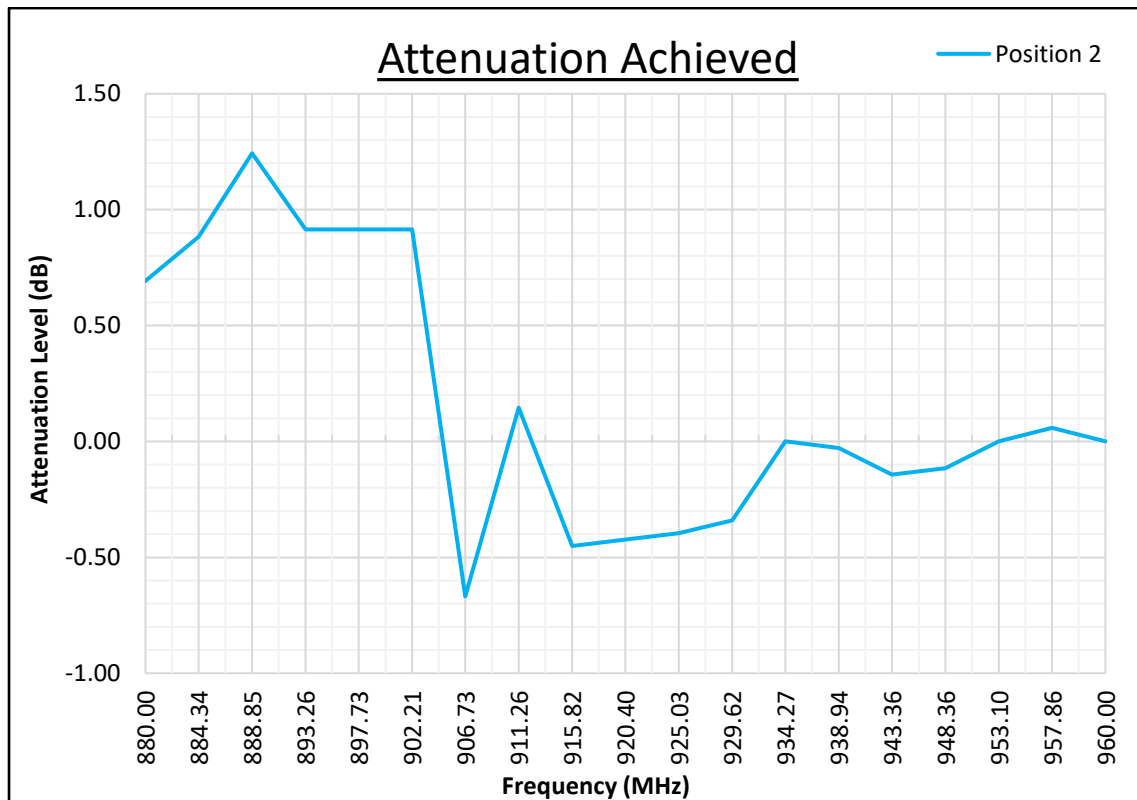


Figure 7 – Attenuation Achieved



DSC-1800 Results

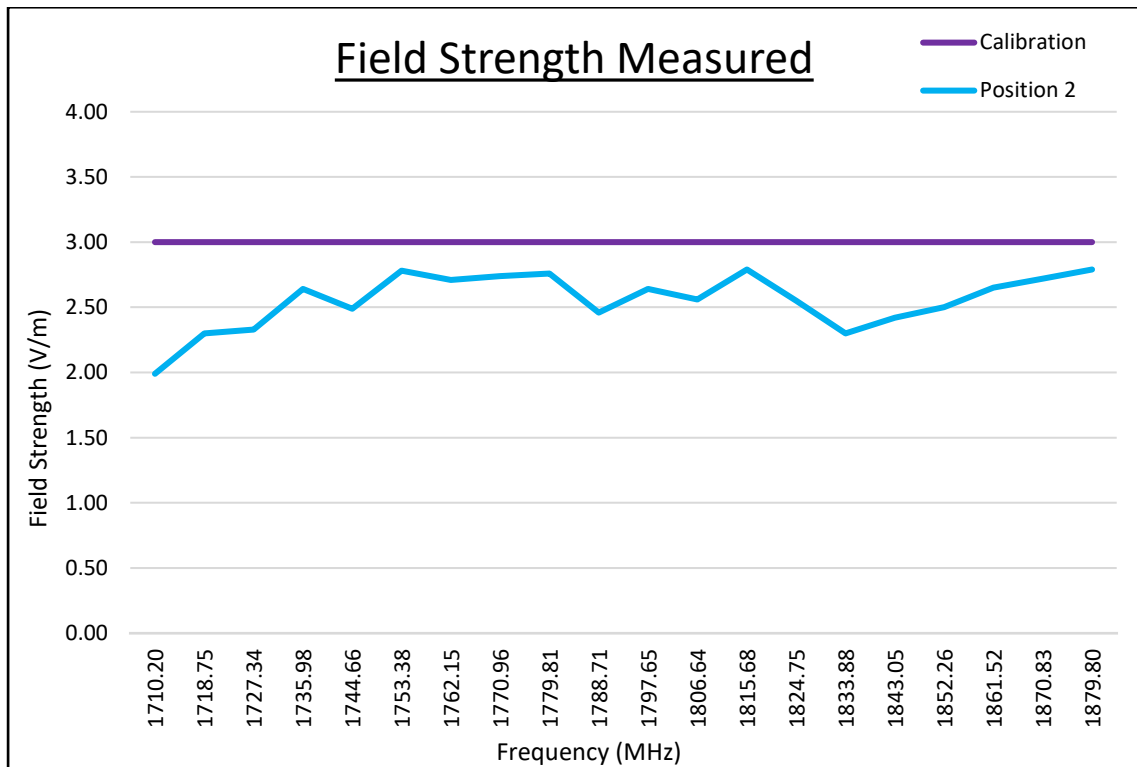


Figure 8 – Field Strength

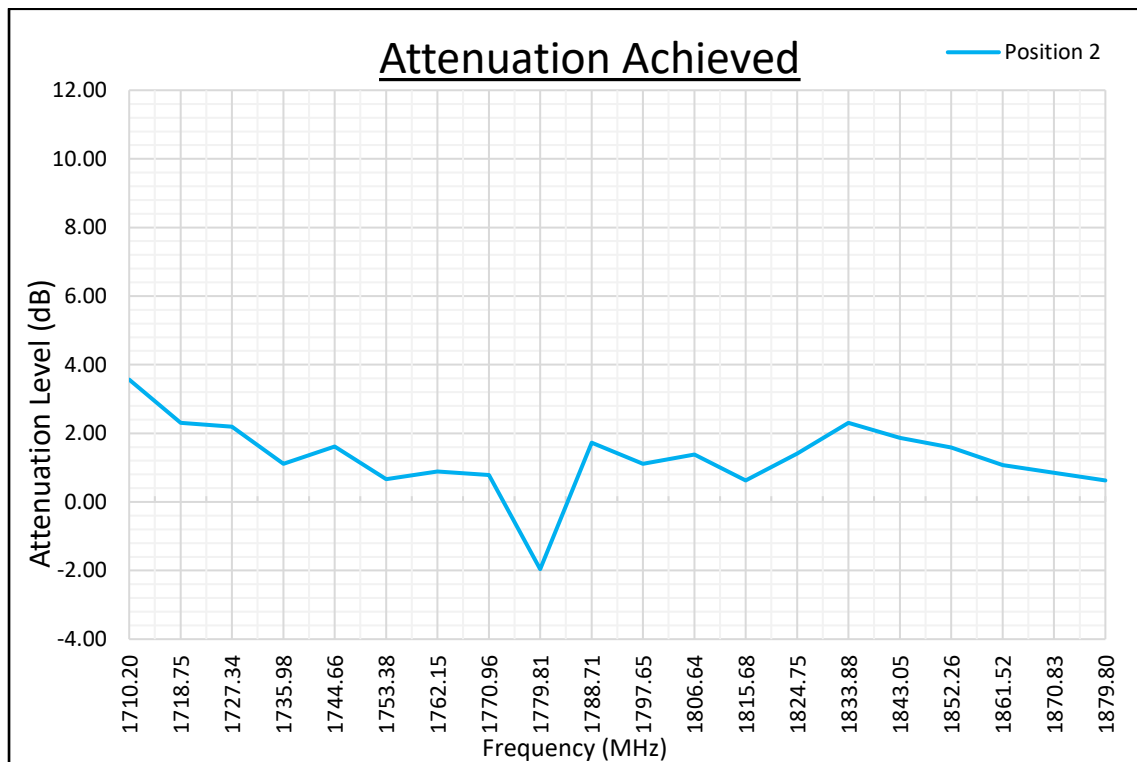


Figure 9 – Attenuation Achieved



DSC-1900 Results

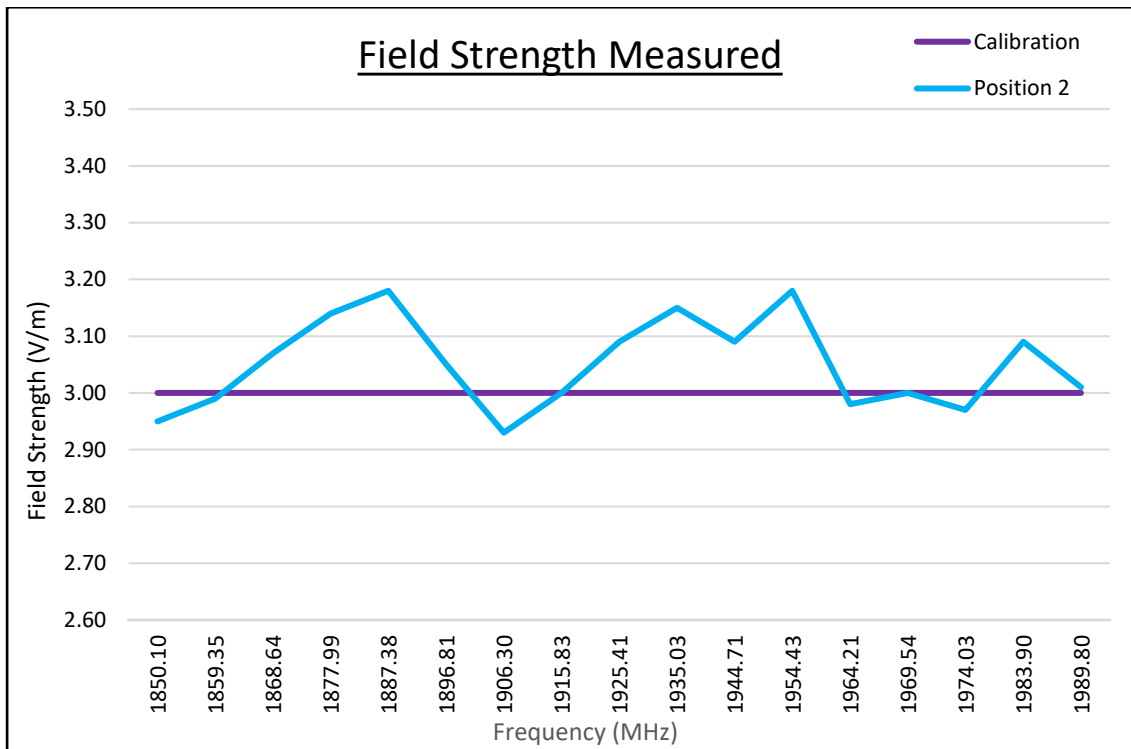


Figure 10 – Field Strength

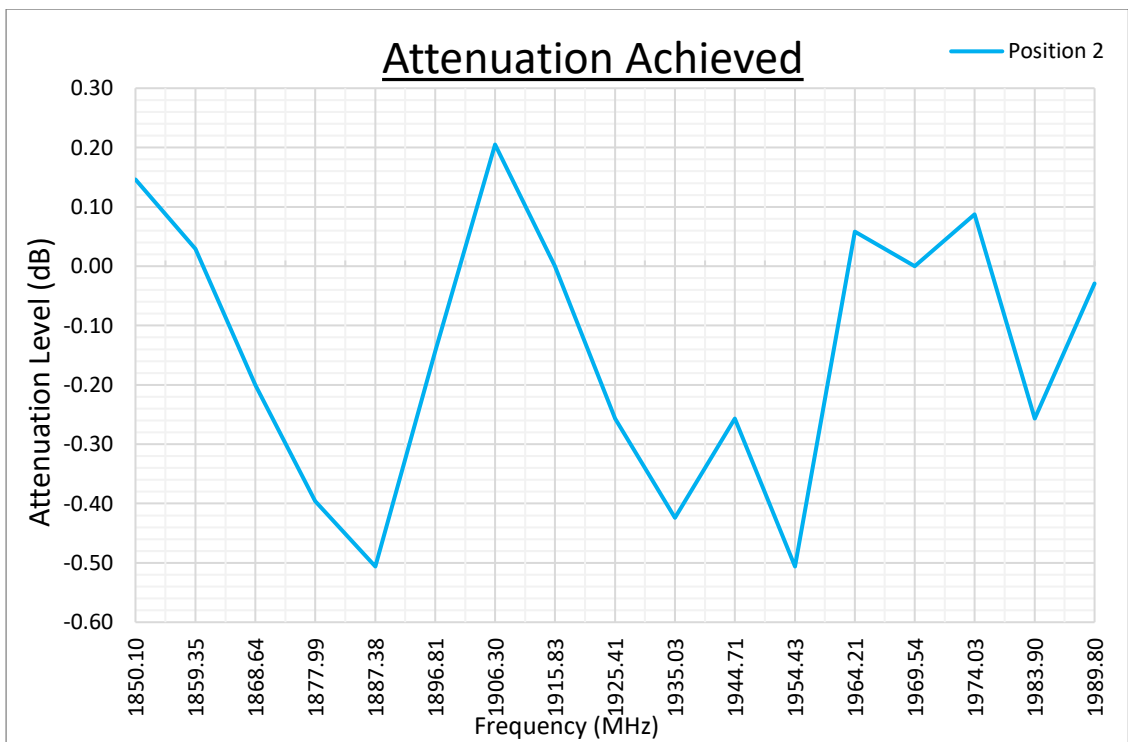


Figure 11 – Attenuation Achieved



The tables below detail the field strength difference with the EUT in place and includes a conversion to W/m^2 of this difference.

GSM-850

Frequency (MHz)	Test Position 2	
	Field Strength Difference (V/m)	(W/m^2)
824.20	-0.35	0.00308 Reduction in exposure
828.32	-0.57	0.00889 Reduction in exposure
832.46	-0.66	0.01235 Reduction in exposure
836.62	-0.22	0.00116 Reduction in exposure
840.80	-0.55	0.00821 Reduction in exposure
844.01	-0.41	0.00432 Reduction in exposure
849.23	-0.35	0.00308 Reduction in exposure
853.48	-0.35	0.00308 Reduction in exposure
857.75	-0.35	0.00308 Reduction in exposure
862.03	-0.42	0.00455 Reduction in exposure
866.34	-0.31	0.00238 Reduction in exposure
870.68	-0.50	0.00665 Reduction in exposure
875.03	-0.45	0.00529 Reduction in exposure
879.41	-0.45	0.00529 Reduction in exposure
883.80	-0.52	0.00725 Reduction in exposure
892.66	-0.57	0.00889 Reduction in exposure
893.80	-0.62	0.01073 Reduction in exposure

Table 7



GSM-950

Frequency (MHz)	Test Position 2	
	Field Strength Difference (V/m)	(W/m ²)
880.00	-0.23	0.00127 Reduction in exposure
884.34	-0.29	0.00207 Reduction in exposure
888.85	-0.40	0.00410 Reduction in exposure
893.26	-0.30	0.00222 Reduction in exposure
897.73	-0.30	0.00222 Reduction in exposure
902.21	-0.30	0.00222 Reduction in exposure
906.73	0.24	0.00119 Increase in exposure
911.26	-0.05	0.00006 Reduction in exposure
915.82	0.16	0.00054 Increase in exposure
920.40	0.15	0.00048 Increase in exposure
925.03	0.14	0.00042 Increase in exposure
929.62	0.12	0.00031 Increase in exposure
934.27	0.00	0.00000
938.94	0.00	0.00000
943.36	0.05	0.00005 Increase in exposure
948.36	0.04	0.00004 Increase in exposure
953.10	0.00	0.00000
957.86	-0.02	0.00001 Reduction in exposure
960.00	0.00	0.00000

Table 8



DSC1800

Frequency (MHz)	Test Position 2	
	Field Strength Difference (V/m)	(W/m ²)
1710.20	-1.01	0.03372 Reduction in exposure
1718.75	-0.70	0.01413 Reduction in exposure
1727.34	-0.67	0.01278 Reduction in exposure
1735.98	-0.36	0.00327 Reduction in exposure
1744.66	-0.51	0.00695 Reduction in exposure
1753.38	-0.22	0.00116 Reduction in exposure
1762.15	-0.29	0.00207 Reduction in exposure
1770.96	-0.26	0.00164 Reduction in exposure
1779.81	-0.24	0.00139 Reduction in exposure
1788.71	-0.54	0.00788 Reduction in exposure
1797.65	-0.36	0.00327 Reduction in exposure
1806.64	-0.44	0.00503 Reduction in exposure
1815.68	-0.21	0.00105 Reduction in exposure
1824.75	-0.45	0.00529 Reduction in exposure
1833.88	-0.70	0.01413 Reduction in exposure
1843.05	-0.58	0.00924 Reduction in exposure
1852.26	-0.50	0.00665 Reduction in exposure
1861.52	-0.35	0.00308 Reduction in exposure
1870.83	-0.28	0.00192 Reduction in exposure
1879.80	-0.21	0.00105 Reduction in exposure

Table 9

DSC1900

Frequency (MHz)	Test Position 2	
	Field Strength Difference (V/m)	(W/m ²)
1850.10	-0.05	0.00006 Reduction in exposure
1859.35	-0.01	0.00000 Reduction in exposure
1868.64	0.07	0.00011 Increase in exposure
1877.99	0.14	0.00042 Increase in exposure
1887.38	0.18	0.00068 Increase in exposure
1896.81	0.05	0.00005 Increase in exposure
1906.30	-0.07	0.00011 Reduction in exposure
1915.83	0.00	0.00000
1925.41	0.09	0.00017 Increase in exposure
1935.03	0.15	0.00048 Increase in exposure
1944.71	0.09	0.00017 Increase in exposure
1954.43	0.18	0.00068 Increase in exposure
1964.21	-0.02	0.00001 Reduction in exposure
1969.54	0.00	0.00000
1974.03	-0.03	0.00002 Reduction in exposure
1983.90	0.09	0.00017 Increase in exposure
1989.80	0.00	0.00000

Table 10



Figure 12 - Position 2



2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Double Ridge Guide, 1 GHz to 18 GHz)	EMCO	3115	235	-	TU
Screened Room (2)	Rainford	EMC Chamber 2	1542	-	TU
Signal Generator, 9kHz to 6GHz	Rohde & Schwarz	SMB 100A	3499	12	11-Jun-2020
Power Meter	Rohde & Schwarz	NRVD	1391	-	TU
Power Sensor (10MHz to 18GHz)	Rohde & Schwarz	NRV-Z1	2899	-	TU
CW TWT (1-2.5GHz)	Thorn	PTC6341	2069	-	TU
Amplifier (250W, 80MHz - 1GHz)	Amp Research	250W1000A	3029	-	TU
Laser Powered Electric Field Sensor	Dare Development	RadiSense VI - CTR1001A	2148	-	TU
Cable	Teledyne	PR90-088-2MTR	5196	12	06-Oct-2020
5 Meter Cable	Teledyne	PR90-088-5MTR	5205	12	06-Oct-2020

Table 11

TU - Traceability Unscheduled



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Attenuation Measurements. (Measurement of uncertainty for Radiated Immunity provided as test setup is the same.)	± 2.0 dB

Table 12

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2007, clause 4.4.3 and 4.5.1.