

# Report on RF Attenuation Testing of:

## Qi-Technologies GmbH EMF Modulation Unit, Model: Qi-Shield

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Add value.  
Inspire trust.

### COMMERCIAL-IN-CONFIDENCE

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#### SIGNATURE

| NAME        | JOB TITLE       | RESPONSIBLE FOR      | ISSUE DATE        |
|-------------|-----------------|----------------------|-------------------|
| Andy Lawson | Senior Engineer | Authorised Signatory | 04 September 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 the RF Attenuation level that utilising it provided to no specific specification or accreditation.

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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.

| Issue | Description of Change | Date of Issue     |
|-------|-----------------------|-------------------|
| 1     | First Issue           | 04 September 2019 |

**Table 1**

## 1.2 Introduction

|                               |                      |
|-------------------------------|----------------------|
| Applicant                     | Qi-Technologies GmbH |
| Manufacturer                  | Qi-Technologies GmbH |
| Model Number(s)               | Qi-Shield            |
| Serial Number(s)              | S19 01 01 11         |
| Hardware Version(s)           | January 2019         |
| Software Version(s)           | Not Applicable       |
| Number of Samples Tested      | 1                    |
| Test Specification/Issue/Date | Not Applicable       |
| Order Number                  | Signed QAF's         |
| Date                          | 25-July-2019         |
| Date of Receipt of EUT        | 06-August-2019       |
| Start of Test                 | 09-August-2019       |
| Finish of Test                | 09-August-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       | Radiated Attenuation Measurements of Qi-Shield | N/A    |                        |

**Table 2**



### 1.4 Declaration of Build Status

| MAIN EUT   |  |
|--|--|
| MANUFACTURING DESCRIPTION  | EMF Modulation Unit  |
| MANUFACTURER   | Qi-Technologies  |
| MODEL NAME/NUMBER  | Qi Shield  |
| PART NUMBER  |  |
| SERIAL NUMBER  | S19 01 01 11   |
| HARDWARE VERSION   | January 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<br>(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):<br>(i.e. G1D, GXW)                                       | 300KGXW, 22M0G1D, 16M5D1D, 33M1D1D   |
| MODULATION TYPES:<br>(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  |  |



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

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

Name: Hagen Thiers

Position held: CEO of Qi-Technologies GmbH

Date 06/08/2019

## 1.5 Product Information

### 1.5.1 Technical Description

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

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: S19 01 01 11 |   |                        |                          |
| 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 |                     |                |
| Radiated Attenuation Measurements  | 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-Shield, S/N: S19 01 01 11 – Modification State 0

#### 2.1.3 Date of Test

09-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 calibration was carried out across the frequency band, 2419.0 MHz to 2468.4 MHz, using a sine wave narrowband signal (without device) using a small (relative to product size) source antenna.

A Field Probe 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.

The Qi-Shield was placed in the two positions shown on the diagram and the V/m readings measured.

Distance between Qi-Shield and recipient (empfänger) 1.5 m

Distance between Position 1 (red) and sender 15 cm

Distance between Position 2 (blue) and sender 30 cm

Distance between Position 1 (red) and recipient 1.5 m

Distance between Position 2 (blue) and recipient 1.5 m

Placement height of the receiver/sender 80 cm

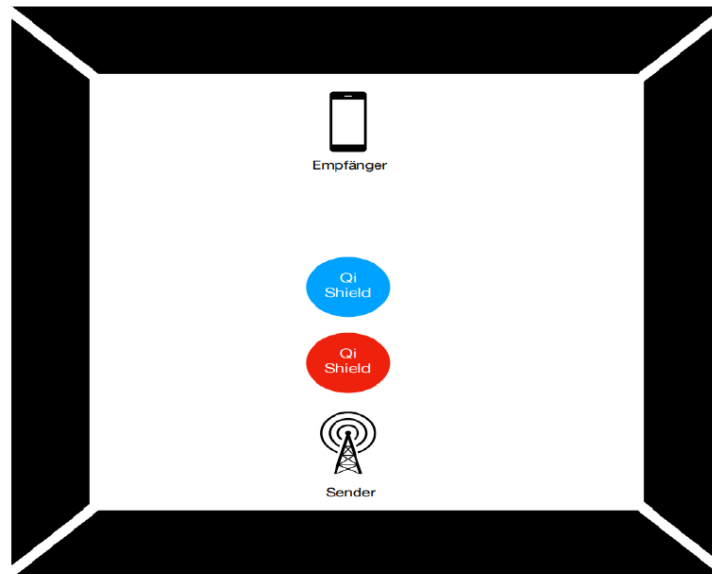


Figure 3 – Test Setup

### 2.1.5 Environmental Conditions

Ambient Temperature 20.0 °C  
Relative Humidity 46.0 %

### 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.

The figure shown below is of the calibrated level and the field strength measured at each of the test positions from the Test Method.

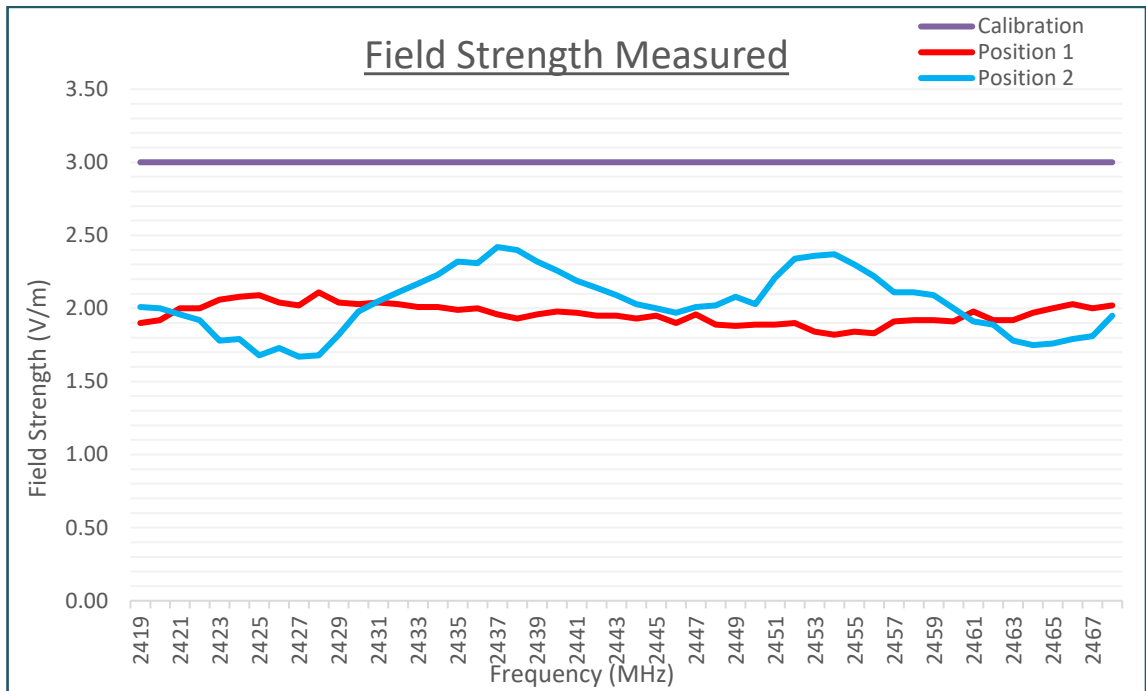


Figure 4 – Field Strength



The figure shown below is of the calculated attenuation achieved at each of the test positions from section 2 and 3 of the Test Method.

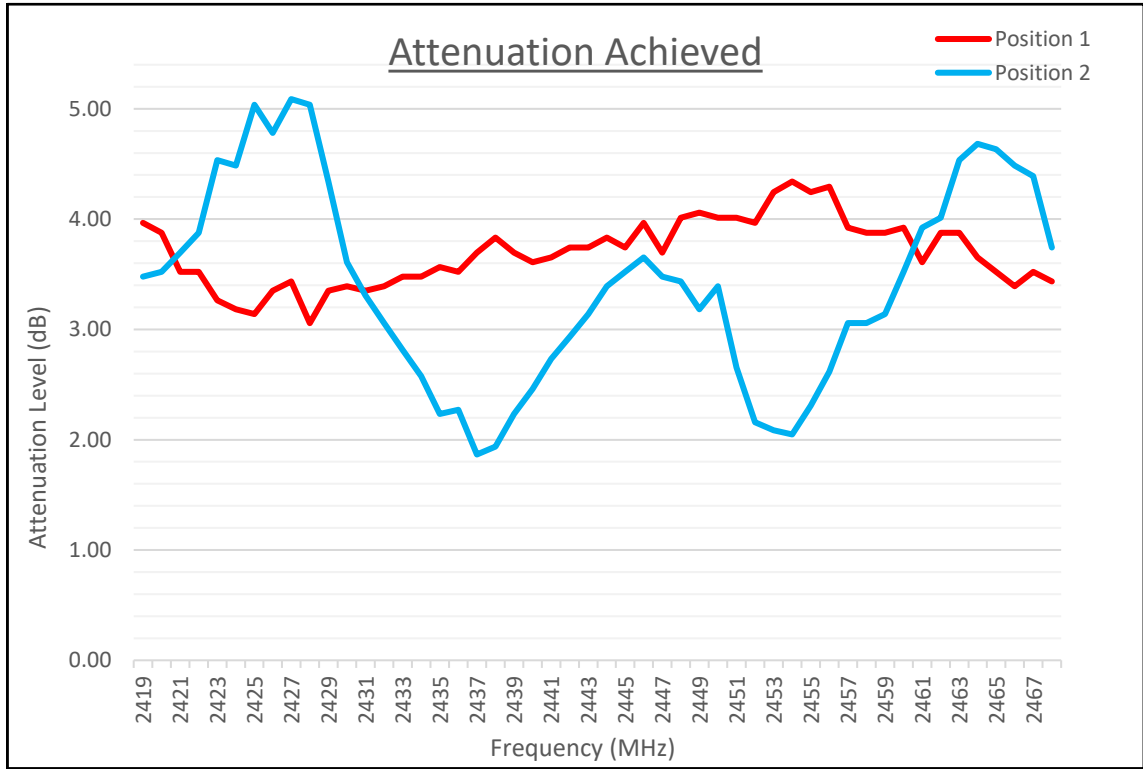


Figure 5 – Attenuation Achieved



The table below is the conversion to W/m<sup>2</sup> of the difference in field strength in each test positions of the measured field in section 2 and 3 of the Test Method.

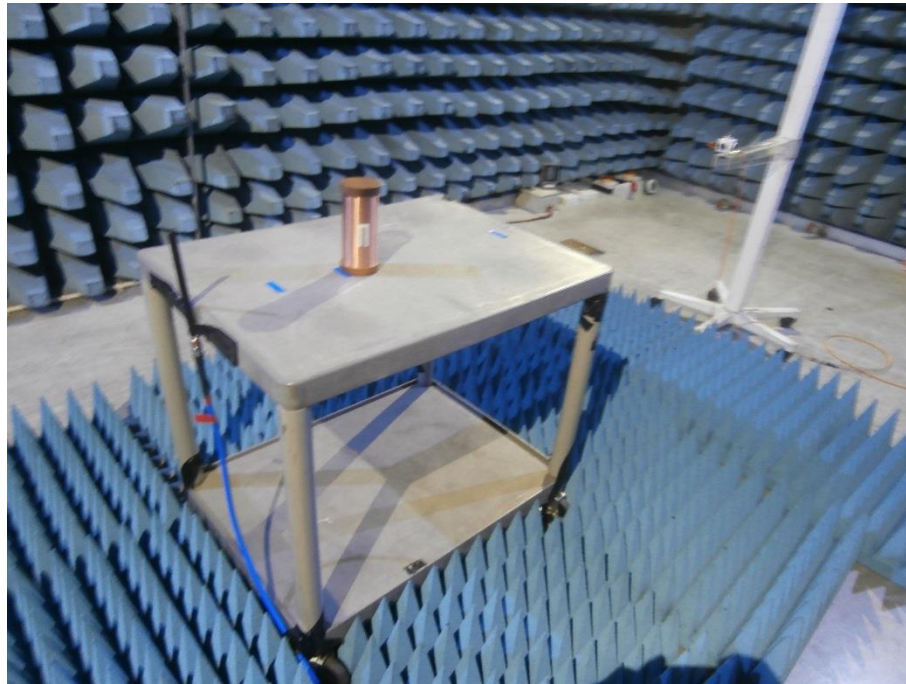
| Frequency (MHz) | Test Position 1                 |                     | Test Position 2                 |                     |
|-----------------|---------------------------------|---------------------|---------------------------------|---------------------|
|                 | Field Strength Difference (V/m) | (W/m <sup>2</sup> ) | Field Strength Difference (V/m) | (W/m <sup>2</sup> ) |
| 2419            | 1.10                            | 0.00321             | 0.99                            | 0.0026              |
| 2420            | 1.08                            | 0.003094            | 1.00                            | 0.002653            |
| 2421            | 1.00                            | 0.002653            | 1.04                            | 0.002869            |
| 2422            | 1.00                            | 0.002653            | 1.08                            | 0.003094            |
| 2423            | 0.94                            | 0.002344            | 1.22                            | 0.003948            |
| 2424            | 0.92                            | 0.002245            | 1.21                            | 0.003884            |
| 2425            | 0.91                            | 0.002197            | 1.32                            | 0.004622            |
| 2426            | 0.96                            | 0.002445            | 1.27                            | 0.004278            |
| 2427            | 0.98                            | 0.002547            | 1.33                            | 0.004692            |
| 2428            | 0.89                            | 0.002101            | 1.32                            | 0.004622            |
| 2429            | 0.96                            | 0.002445            | 1.18                            | 0.003693            |
| 2430            | 0.97                            | 0.002496            | 1.02                            | 0.00276             |
| 2431            | 0.96                            | 0.002445            | 0.95                            | 0.002394            |
| 2432            | 0.97                            | 0.002496            | 0.89                            | 0.002101            |
| 2433            | 0.99                            | 0.0026              | 0.83                            | 0.001827            |
| 2434            | 0.99                            | 0.0026              | 0.77                            | 0.001573            |
| 2435            | 1.01                            | 0.002706            | 0.68                            | 0.001227            |
| 2436            | 1.00                            | 0.002653            | 0.69                            | 0.001263            |
| 2437            | 1.04                            | 0.002869            | 0.58                            | 0.000892            |
| 2438            | 1.07                            | 0.003037            | 0.60                            | 0.000955            |
| 2439            | 1.04                            | 0.002869            | 0.68                            | 0.001227            |
| 2440            | 1.02                            | 0.00276             | 0.74                            | 0.001453            |
| 2441            | 1.03                            | 0.002814            | 0.81                            | 0.00174             |
| 2442            | 1.05                            | 0.002924            | 0.86                            | 0.001962            |
| 2443            | 1.05                            | 0.002924            | 0.91                            | 0.002197            |
| 2444            | 1.07                            | 0.003037            | 0.97                            | 0.002496            |
| 2445            | 1.05                            | 0.002924            | 1.00                            | 0.002653            |
| 2446            | 1.10                            | 0.00321             | 1.03                            | 0.002814            |
| 2447            | 1.04                            | 0.002869            | 0.99                            | 0.0026              |
| 2448            | 1.11                            | 0.003268            | 0.98                            | 0.002547            |
| 2449            | 1.12                            | 0.003327            | 0.92                            | 0.002245            |
| 2450            | 1.11                            | 0.003268            | 0.97                            | 0.002496            |
| 2451            | 1.11                            | 0.003268            | 0.79                            | 0.001655            |
| 2452            | 1.10                            | 0.00321             | 0.66                            | 0.001155            |
| 2453            | 1.16                            | 0.003569            | 0.64                            | 0.001086            |
| 2454            | 1.18                            | 0.003693            | 0.63                            | 0.001053            |

| Frequency (MHz) | Test Position 1                 |                     | Test Position 2                 |                     |
|-----------------|---------------------------------|---------------------|---------------------------------|---------------------|
|                 | Field Strength Difference (V/m) | (W/m <sup>2</sup> ) | Field Strength Difference (V/m) | (W/m <sup>2</sup> ) |
| 2455            | 1.16                            | 0.003569            | 0.70                            | 0.0013              |
| 2456            | 1.17                            | 0.003631            | 0.78                            | 0.001614            |
| 2457            | 1.09                            | 0.003151            | 0.89                            | 0.002101            |
| 2458            | 1.08                            | 0.003094            | 0.89                            | 0.002101            |
| 2459            | 1.08                            | 0.003094            | 0.91                            | 0.002197            |
| 2460            | 1.09                            | 0.003151            | 1.00                            | 0.002653            |
| 2461            | 1.02                            | 0.00276             | 1.09                            | 0.003151            |
| 2462            | 1.08                            | 0.003094            | 1.11                            | 0.003268            |
| 2463            | 1.08                            | 0.003094            | 1.22                            | 0.003948            |
| 2464            | 1.03                            | 0.002814            | 1.25                            | 0.004145            |
| 2465            | 1.00                            | 0.002653            | 1.24                            | 0.004079            |
| 2466            | 0.97                            | 0.002496            | 1.21                            | 0.003884            |
| 2467            | 1.00                            | 0.002653            | 1.19                            | 0.003756            |
| 2468            | 0.98                            | 0.002547            | 1.05                            | 0.002924            |

**Table 6**



**Figure 6 - Position 1**



**Figure 7 - 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 |
|-------------------------------------|------------------|-------------------------|-------|-----------------------------|-----------------|
| 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              |
| Laser Powered Electric Field Sensor | Dare Development | RadiSense VI - CTR1001A | 2148  | -                           | TU              |

**Table 7**

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.<br>(Measurement of uncertainty for Radiated Immunity provided as test setup is the same.) | ±2.0 dB                 |

**Table 8**

All measurement uncertainties have been calculated in accordance with CISPR guidelines.