FCC Test Report

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

In accordance with FCC 47 CFR Part 15B

Prepared for: Qi-Technologies GmbH
Bahnhofstrasse 16
02625 Bautzen
Germany
02625
UNITED KINGDOM

FCC ID: Not Applicable

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Document 75947152-03 Issue 02

SIGNATURE			
AJ Lawson.			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Andy Lawson	Senior Engineer	Authorised Signatory	28 January 2020

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

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Colin McKean	28 January 2020	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2018 for the tests detailed in section 1.3.

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Contents

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	05 December 2019
2	Document number mistake rectified. Changed from 01 to 03	28 January 2020

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	FCC 47 CFR Part 15B: 2018
Order Number Date	Pro Forma Invoice 27-September-2019
Date of Receipt of EUT	01-October-2019
Start of Test	08-November-2019
Finish of Test	08-November-2019
Name of Engineer(s)	Colin McKean
Related Document(s)	ANSI C63.4: 2014

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Unpowered - Idle				
2.1	15.109	Radiated Disturbance	Pass	ANSI C63.4: 2014

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, EMF Modulation Unit, Model: Qi-Home Cell.

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

1.5.2 Test Configuration

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

Table 3

1.5.3 Modes of Operation

Mode	Description
Idle	The EUT has no mode of operation.

Table 4

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 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
Model: Qi-Home Cell: Serial Number: HCZ19-06-02-17			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 5

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Unpowered - Idle		
Radiated Disturbance	Colin McKean	UKAS

Table 6

Office Address:

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

2 Test Details

2.1 Radiated Disturbance

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

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

08-November-2019

2.1.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8m above a reference ground plane.

For an EUT which could reasonable be used in multiple planes, pre-scans were performed with the EUT orientated in X, Y and Z planes with reference to the ground plane.

A pre-scan of the EUT emissions profile was made at a 3m distance while varying the antenna-to-EUT azimuth and polarisation using a peak detector.

Using a list of the highest emissions detected during the pre-scan along with their bearing and associated antenna polarisation, the EUT was formally measured using a Quasi-Peak, Peak or CISPR Average detector as appropriate.

The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

2.1.5 Example Calculation

Below 1 GHz:

Quasi-Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Quasi-Peak level (dBµV/m) - Limit (dBµV/m)

Above 1 GHz:

CISPR Average level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = CISPR Average level (dBµV/m) - Limit (dBµV/m)

Peak level (dBµV/m) = Receiver level (dBµV) + Correction Factor (dB)
Margin (dB) = Peak level (dBµV/m) - Limit (dBµV/m)

2.1.6 Example Test Setup Diagram

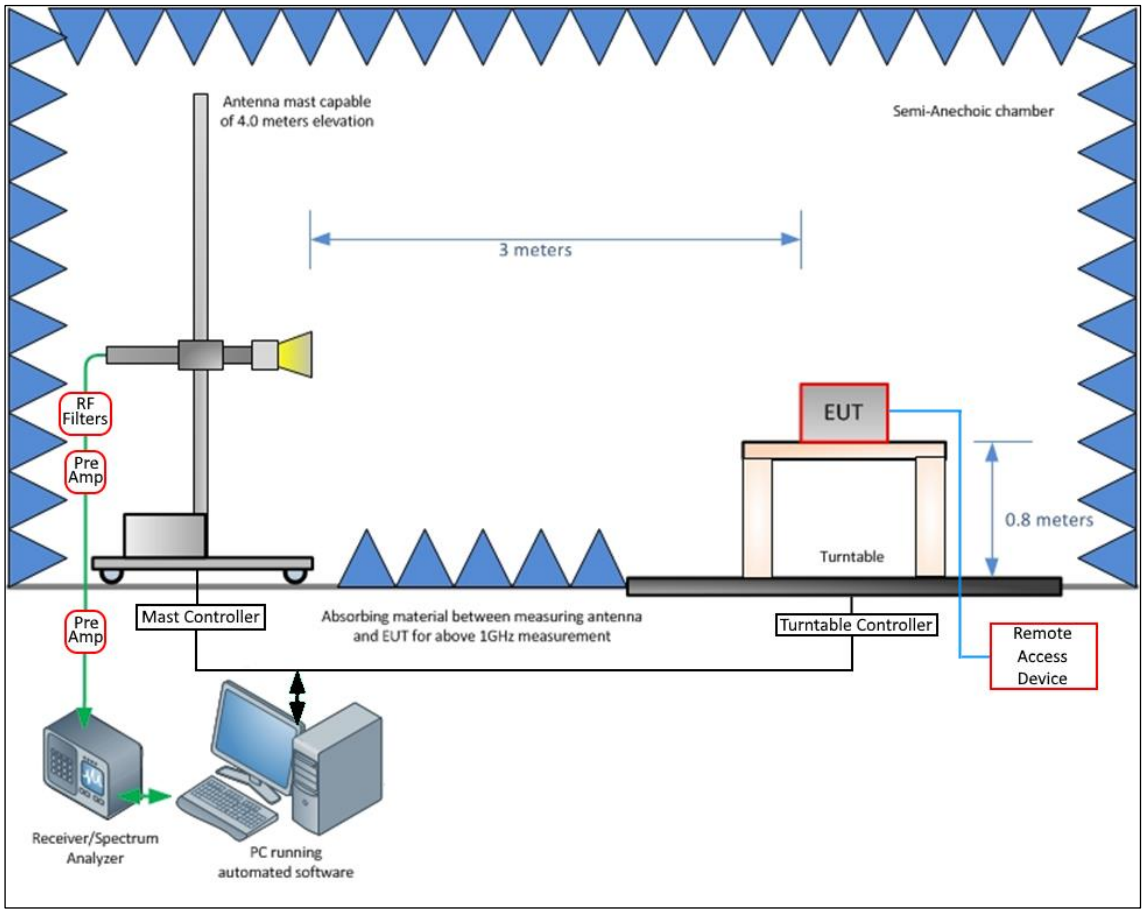

Figure 1 - Radiated Disturbance Example Test Setup

2.1.7 Environmental Conditions

Ambient Temperature	20.0 °C
Relative Humidity	46.0 %

2.1.8 Specification Limits

Required Specification Limits, Field Strength (Class B @ 3m)		
Frequency Range (MHz)	(µV/m)	(dBµV/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54
Supplementary information: Quasi-peak detector to be used for measurements below 1 GHz CISPR Average detector to be used for measurements above 1 GHz Peak test limit above 1 GHz is 20 dB higher than the CISPR Average test limit.		

Table 7

2.1.9 Test Results

Results for Configuration and Mode: Unpowered Idle.

The test was performed in accordance with the Class B limits.

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

Detailed results are shown below.

Highest frequency generated or used within the EUT: Not Applicable
Which necessitates an upper frequency test limit of: 40 GHz

Frequency Range of Test: 30 MHz to 1 GHz

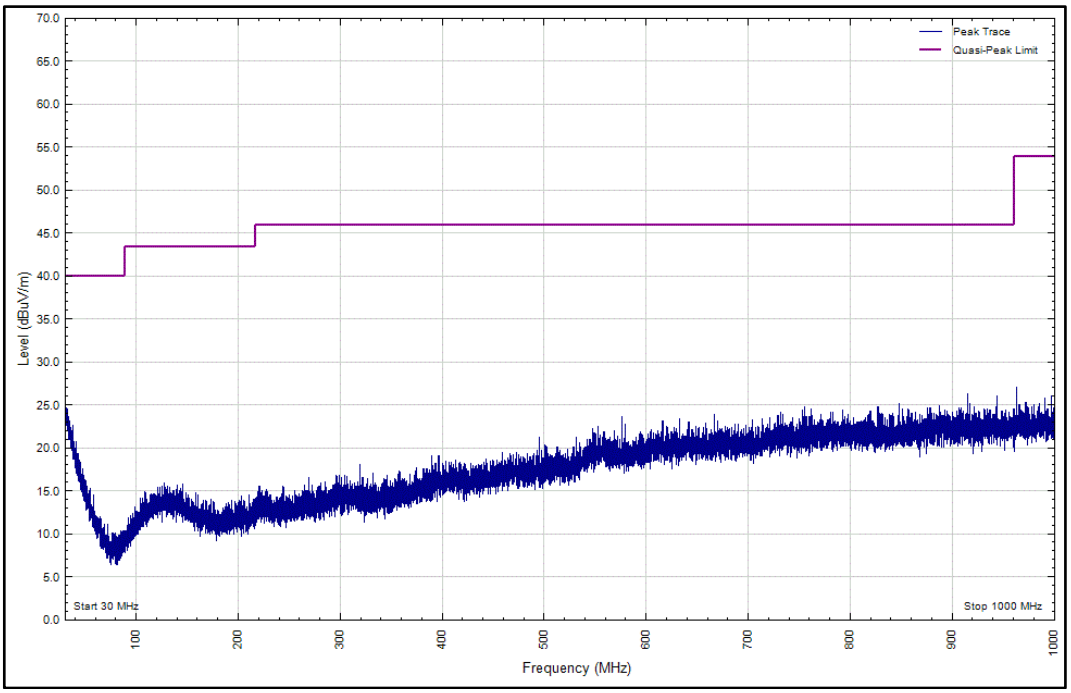

Figure 2 - Graphical Results - Vertical Polarity

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 8

*No measurements were made as all peak emissions seen were greater than 10 dB below the test limit.

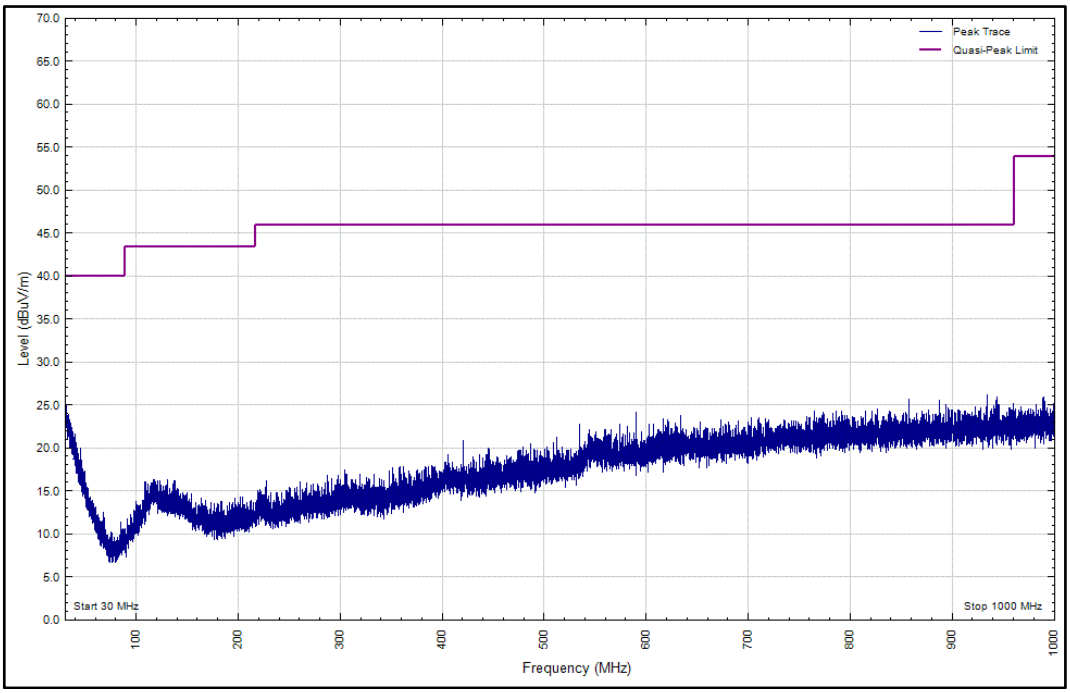

Figure 3 - Graphical Results - Horizontal Polarity

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 9

*No measurements were made as all peak emissions seen were greater than 10 dB below the test limit.

Frequency Range of Test: 1 GHz to 40 GHz

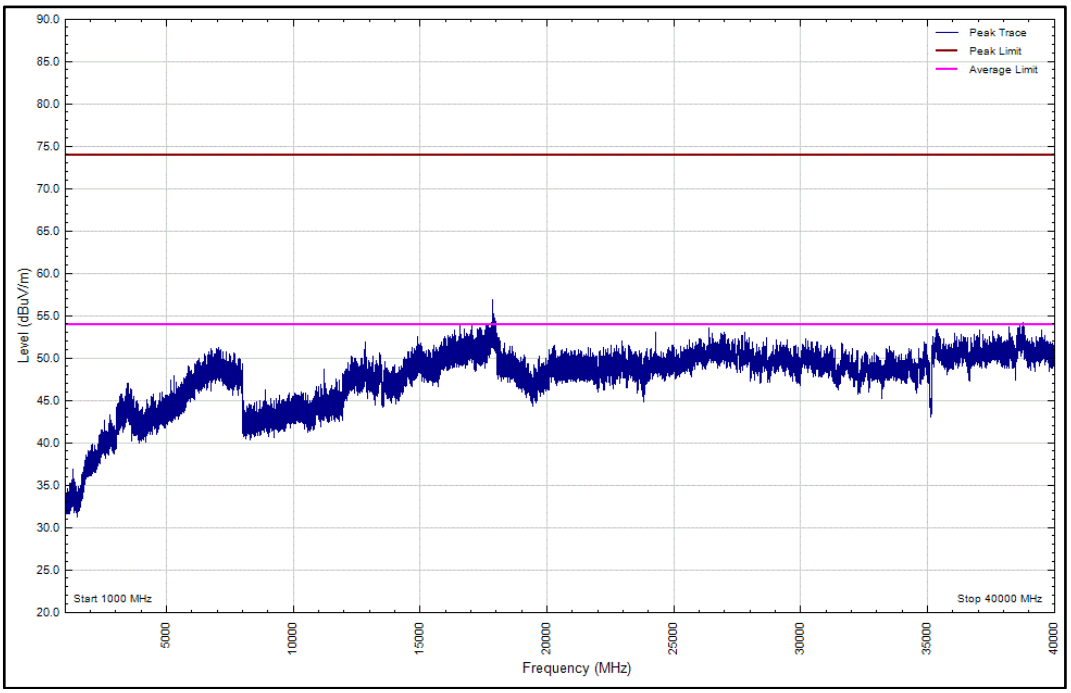

Figure 4 - Graphical Results - Vertical Polarity – Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 10

*No measurements were made as all peak emissions seen were greater than 10 dB below the upper peak test limit.

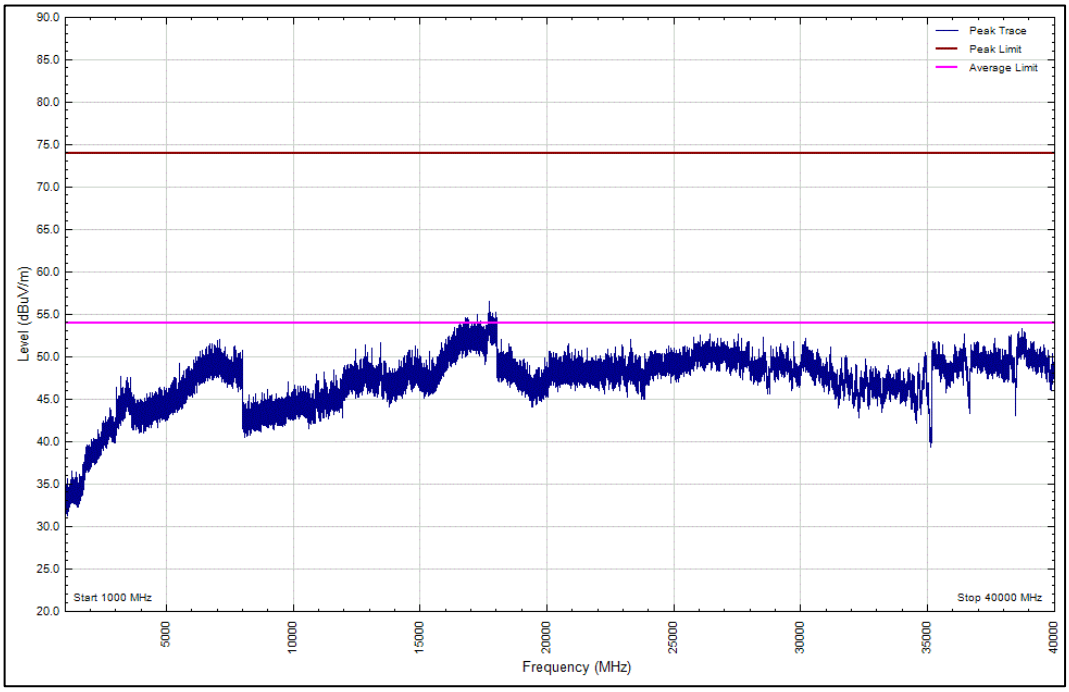

Figure 5 - Graphical Results - Horizontal Polarity – Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 11

*No measurements were made as all peak emissions seen were greater than 10 dB below the upper peak test limit.

Frequency Range of Test: 3 GHz to 40 GHz

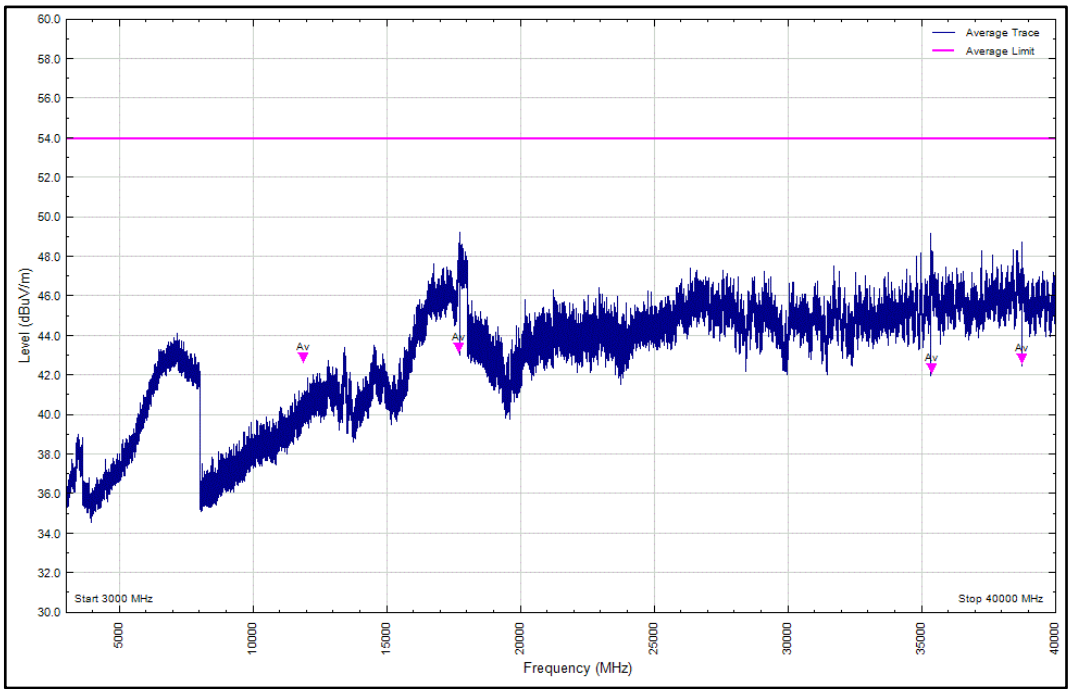

Figure 6 - Graphical Results - Vertical Polarity – Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
11891.440	42.5	54.0	-11.5	Average	281	100	Vertical	Front
17692.690	43.0	54.0	-11.0	Average	293	175	Vertical	Front
35393.280	42.0	54.0	-12.0	Average	63	100	Vertical	Front
38752.693	42.5	54.0	-11.5	Average	148	100	Vertical	Front

Table 12

No other measurements were made as all other peak emissions seen were greater than 10 dB below the test limit.

No measurements were made below 3 GHz using an average detector function as the peak values in the previous peak limit plots were below the average test limit by greater than 6 dB.

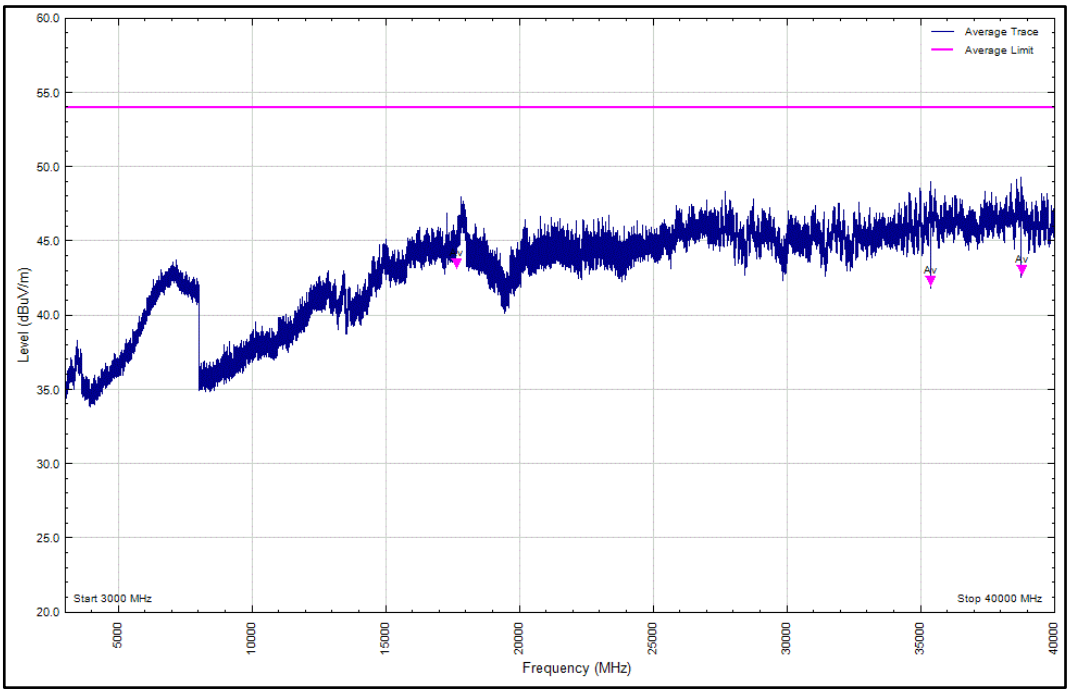

Figure 7 - Graphical Results - Horizontal Polarity – Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
17651.143	43.0	54.0	-11.1	Average	284	100	Horizontal	Front
35401.947	41.8	54.0	-12.2	Average	269	100	Horizontal	Front
38797.227	42.5	54.0	-11.5	Average	53	100	Horizontal	Front

Table 13

No other measurements were made as all other peak emissions seen were greater than 10 dB below the test limit

No measurements were made below 3 GHz using an average detector function as the peak values in the previous peak limit plots were below the average test limit by greater than 6 dB.

Figure 8 - Test Setup - 30 MHz to 1 GHz

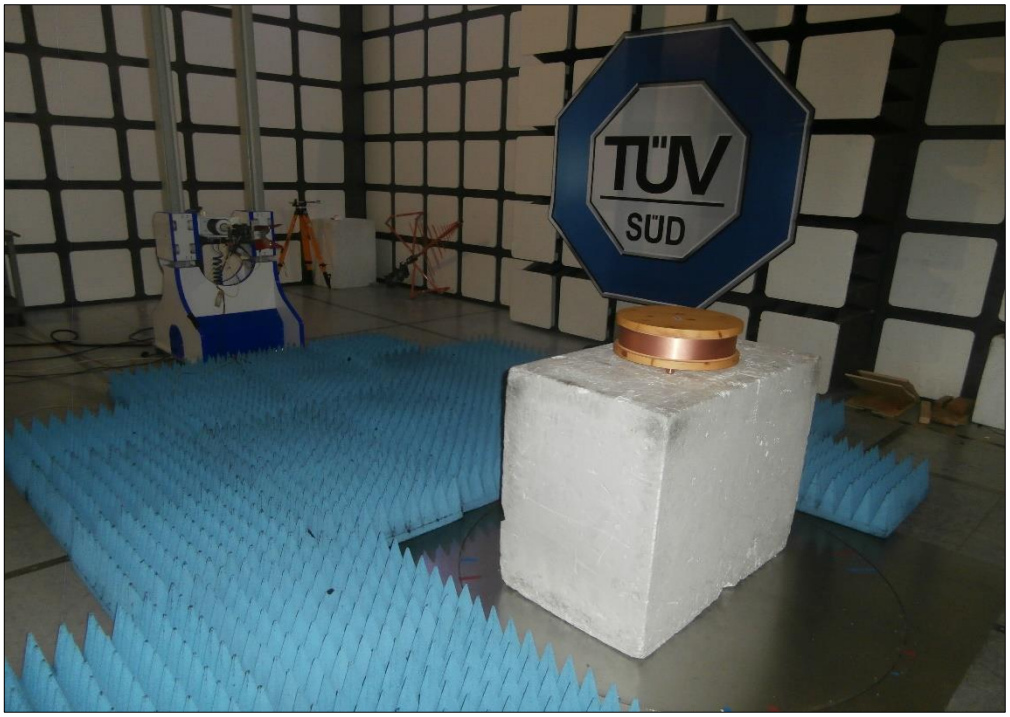

Figure 9 - Test Setup - 1 GHz to 18 GHz

Figure 10 - Test Setup - Above 18 GHz

2.1.10 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	02-May-2020
Low Noise Pre-Amplifier (1GHz to 10GHz)	Miteq Corp	AFS5-01001000-20-10P-5	1200	12	30-Nov-2019
Pre-Amplifier	Phase One	PS04-0086	1533	12	08-Feb-2020
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	05-Feb-2020
Screened Room (5)	Rainford	Rainford	1545	36	23-Jan-2021
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna with permanent attenuator (Bilog)	Chase	CBL6143	2904	24	30-Sep-2021
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	11-Dec-2019
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	05-Mar-2020
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
EmX Emissions Software	TUV SUD	EmX	5125	-	Software
1.5m 40GHz RF Cable	Scott Cables	KPS-1501-2000-KPS	5127	6	11-Dec-2019
Preamplifier (30dB 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	26-Mar-2020

Table 14

TU - Traceability Unscheduled

3 Incident Reports

No incidents reports were raised.

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Disturbance	30 MHz to 1 GHz, Bilog Antenna, ±5.2 dB 1 GHz to 40 GHz, Horn Antenna, ±6.3 dB

Table 15

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

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.