Report on the FCC and IC Testing of:

SureFlap Ltd
Microchip Pet Feeder, Model: MPF001

In accordance with FCC 47 CFR Part 15C, Industry Canada RSS-310 and ISEDC RSS-GEN

Prepared for: SureFlap Ltd
7 The Irwin Centre, Scotland Road
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Add value.
Inspire trust.

FCC ID: XO9-MPF001-002 IC: 8906A-MPF01002

COMMERCIAL-IN-CONFIDENCE

Document Number: 75946241-05 | Issue: 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Ryan Henley	Sales Manager – RF and Telecom	Authorised Signatory	07 November 2019

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 15C, Industry Canada RSS-310 and ISEDC RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Anthony Hubbard	Test Engineer	Testing	07 November 2019

FCC Accreditation 90987 Octagon House, Fareham Test Laboratory	Industry Canada Accreditation IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C: 2018, Industry Canada RSS-310: Issue 04 (2015-07) and ISEDC RSS-GEN: Issue 5 A1 (2019-03) 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	07 November 2019

Table 1

1.2 Introduction

Applicant	SureFlap Ltd
Manufacturer	SureFlap Ltd
Model Number(s)	MPF001
Serial Number(s)	Pilot 1-0000201
Hardware Version(s)	01440-DA_01 General Assembly (_01: revision 01)
Software Version(s)	Firmware 01532_FF (but special version for TUV SUD testing)
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2018 Industry Canada RSS-310: Issue 04 (2015-07)) ISEDC RSS-GEN: Issue 5 A1 (2019-03)
Order Number	3060
Date	10-June-2019
Date of Receipt of EUT	05-July-2019
Start of Test	12-July-2019
Finish of Test	28-July-2019
Name of Engineer(s)	Anthony Hubbard
Related Document(s)	ANSI C63.10 (2013)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and Industry Canada RSS-310 and ISEDC RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-310	RSS-GEN			
Configuration and Mode: 126 kHz - RFID Transceiver Operating						
2.1	-	2.6	6.12	Transmitter Output Power	Pass	ANSI C63.10 (2013)
2.2	15.209	2.6	6.13	Transmitter Unwanted Emissions	Pass	ANSI C63.10 (2013)
Configuration and Mode: 133 kHz - RFID Transceiver Operating						
2.1	-	2.6	6.12	Transmitter Output Power	Pass	ANSI C63.10 (2013)
2.2	15.209	2.6	6.13	Transmitter Unwanted Emissions	Pass	ANSI C63.10 (2013)

Table 2

1.4 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment)*	Pet Feeder which allows the conditional access to food based on the animal RFID tags. It is intended for use in a domestic environment. (Usually situated on the floor in a kitchen.
Manufacturer:	SureFlap Ltd
Model:	Microchip Pet Feeder
Part Number:	MPF001
Hardware Version:	01440-DA_01 General Assembly (_01: revision 01))
Software Version:	Firmware 01532_FF (but special version for TUV SUD testing)
FCC ID (if applicable)	XO9-MPF001-002
IC ID (if applicable)	8906A-MPF01002

Intentional Radiators

Technology	RF ID	RF ID
Frequency Band (MHz)	0.126	0.133
Conducted Declared Output Power (dBm)	39.3 dB(µA/m) Field strength at 10 m (for class equipment with integral antenna)	39.3 dB(µA/m) Field strength at 10 m (for class equipment with integral antenna)
Antenna Gain (dBi)	N/A	N/A
Supported Bandwidth(s) (MHz)	0	0
Modulation Scheme(s)	N/A	N/A
ITU Emission Designator	126H0NX	133H0NX
Bottom Frequency (MHz)	0.126	0.133
Middle Frequency (MHz)	N/A	N/A
Top Frequency (MHz)	0.126	0.133

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	32 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	0 Hz
Class A Digital Device (Use in commercial, industrial or business environment) ☐ Class B Digital Device (Use in residential environment only) ☒	

AC Power Source

AC supply frequency: No AC supply (Hz)	
No AC supply V	Max current: No AC supply A
Single Phase ☐ Three Phase ☐	

DC Power Source

Nominal voltage: Click to edit V
Extreme upper voltage: Click to edit V
Extreme lower voltage: Click to edit V
Max current: Click to edit. A

Battery Power Source

Voltage: 6.0 V
End-point voltage: 4.5 V *(Point at which the battery will terminate)*
Alkaline ☒ Leclanche ☐ Lithium ☐ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*
Other ☐ Please detail: Click to edit

Charging

Can the EUT transmit whilst being charged	Yes ☐ No ☐

Temperature

Minimum temperature: 0 °C	Maximum temperature: 35 °C

Antenna Characteristics

Antenna connector ☐ State impedance Click to edit Ohm
Temporary antenna connector ☐ State impedance Click to edit Ohm
Integral antenna ☒ Type loop Antenna State impedance N/A dBi
External antenna ☐ Type Click to edit State impedance Click to edit dBi

Ancillaries (if applicable)

Manufacturer: Click to edit	Part Number: Click to edit
Model: Click to edit	Country of Origin: Click to edit

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

Name: Nick Hill
Position held: Managing Director
Date: 25/07/19

1.5 Product Information

1.5.1 Technical Description

Pet Feeder which allows the conditional access to food based on the animal RFID tags. It is intended for use in a domestic environment. (Usually situated on the floor in a kitchen.)

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
Serial Number: Pilot 1-0000201			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

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: 126 kHz - RFID Transceiver Operating		
Transmitter Output Power	Anthony Hubbard	UKAS
Transmitter Unwanted Emissions	Anthony Hubbard	UKAS
Configuration and Mode: 133 kHz - RFID Transceiver Operating		
Transmitter Output Power	Anthony Hubbard	UKAS
Transmitter Unwanted Emissions	Anthony Hubbard	UKAS

Table 4

Office Address:

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

2 Test Details

2.1 Transmitter Output Power

2.1.1 Specification Reference

Industry Canada RSS-310, Clause 2.6
ISEDC RSS-GEN, Clause 6.12

2.1.2 Equipment Under Test and Modification State

MPF001, S/N: Pilot 1-0000201 - Modification State 0

2.1.3 Date of Test

12-July-2019

2.1.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5 and ISEDC RSS-GEN, clause 6.12.

A CISPR Average detector was used for these measurements.

2.1.5 Environmental Conditions

Ambient Temperature	18.8 °C
Relative Humidity	62.1 %

2.1.6 Test Results

126 kHz - RFID Transceiver Operating

Measurement Distance (m)	Measured Field Strength (dBµV/m)		Measured Field Strength (µV/m)	
	Peak	Average	Peak	Average
3	120.35	114.11	1041118.11	507574.74
30	65.6	61.43	1905.46	1541.7

Table 5 - Field Strength Result at Measurement Distance

FCC Part 15.209 requires that measurements be made at a distance of 300 m. The near field boundary was established as being 379.15, (47.77 / 125.993), using the formula specified in ANSI C63.10 Clause 6.4.4.1.

As the specification measurement distance of 300 m is within the near field boundary, only an extrapolation in the near field has been calculated:

Using the formula from ANSI C63.10, Clause 6.4.4.7:
Extrapolated Field Strength = Field Strength Max – N * log (d_{LIMIT} / D_{MEAS})

Where N is the value in dB/decade of distance determined using 6.4.4.4 or 6.4.4.5. The value of N used was as follows:

N_{PEAK} = -54.75 dB
$N_{AVERAGE}$ = -52.68 dB

Frequency (kHz)	Field Strength (dBµV at 300 m)		Limit (dBµV at 300 m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
125.993	10.85	13.08	45.60	25.60	-34.75	-12.52

Table 6 - Extrapolated Field Strength Result at Limit Distance

FCC 15.209 and ISEDC RSS-GEN, Limit Clause 8.9

Peak limit = Average limit + 20dB
2400/126 = 19.05 µV/m = 25.60 dBµV/m

133 kHz - RFID Transceiver Operating

Measurement Distance (m)	Measured Field Strength (dBµV/m)		Measured Field Strength (µV/m)	
	Peak	Average	Peak	Average
3	119.86	111.46	984011.11	374110.59
30	69.85	61.43	3108.14	1178.96

Table 7 - Field Strength Result at Measurement Distance

FCC Part 15.209 requires that measurements be made at a distance of 300 m. The near field boundary was established as being 379.15, (47.77 / 125.993), using the formula specified in ANSI C63.10 Clause 6.4.4.1.

As the specification measurement distance of 300 m is within the near field boundary, only an extrapolation in the near field has been calculated:

Using the formula from ANSI C63.10, Clause 6.4.4.7:
Extrapolated Field Strength = Field Strength Max – N * log (d_{LIMIT} / D_{MEAS})

Where N is the value in dB/decade of distance determined using 6.4.4.4 or 6.4.4.5. The value of N used was as follows:

N_{PEAK} = -50.01 dB
$N_{AVERAGE}$ = -50.03 dB

Frequency (kHz)	Field Strength (dBµV at 300 m)		Limit (dBµV at 300 m)		Margin (dB)	
	Peak	Average	Peak	Average	Peak	Average
132.788	9.82	11.4	45.14	25.14	35.32	-13.74

Table 8 - Extrapolated Field Strength Result at Limit Distance

FCC 15.209 and ISEDC RSS-GEN, Limit Clause 8.9

Peak limit = Average limit + 20dB
2400/133 = 18.07 µV/m = 25.14 dBµV/m

2.1.7 Test Location and Test Equipment Used

This test was carried out in Octagon House Open Area Test Site,

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	11-Jan-2021
Hygromer	Rotronic	A1	2677	12	20-Feb-2020
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	17-Dec-2019

Table 9

TU - Traceability Unscheduled

2.2 Transmitter Unwanted Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.209
Industry Canada RSS-310, Clause 2.6
ISEDC RSS-GEN, Clause 6.13

2.2.2 Equipment Under Test and Modification State

MPF001, S/N: Pilot 1-0000201 - Modification State 0

2.2.3 Date of Test

12-July-2019 to 28-July-2019

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5. and Industry Canada RSS-GEN clause 6.13.

Measurements were made at a distance of 3 m. The limit lines shown on the plot were extrapolated from either 300 m or 30 m to the measurement distance of 3 m in accordance with ANSI C63.10 Clause 6.4.4.2.

For any emissions detected within 10 dB of the limit, a final measurement was made and recorded in the table below. The detector used for these measurements was a quasi-peak detector except for emissions within the bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where a CISPR average detector was used.

2.2.5 Environmental Conditions

Ambient Temperature	19.4 - 22.4 °C
Relative Humidity	62.7 - 68.8 %

2.2.6 Test Results

126 kHz - RFID Transceiver Operating

Frequency (MHz)	Results at Measurement Distance			Results at Limit Distance		
	Level (µV/m)	Distance	Detector	Level (µV/m)	Distance	Detector
0.25232	6324.12	3 m	CISPR Average Detector	1.00	30 m	CISPR Average Detector
0.25232	12260.27	3 m	Peak	1.94	30 m	Peak
0.33788	3885.97	3 m	CISPR Average Detector	0.83	30 m	CISPR Average Detector
0.33788	9278.97	3 m	Peak	1.97	30 m	Peak
0.50400	3126.08	3 m	Quasi-Peak Detector	0.31	30 m	Quasi-Peak Detector
0.62984	1291.22	3 m	Quasi-Peak Detector	0.13	30 m	Quasi-Peak Detector
0.75608	1303.17	3 m	Quasi-Peak Detector	0.13	30 m	Quasi-Peak Detector

Table 10 - Emissions Results - 9 kHz to 30 MHz

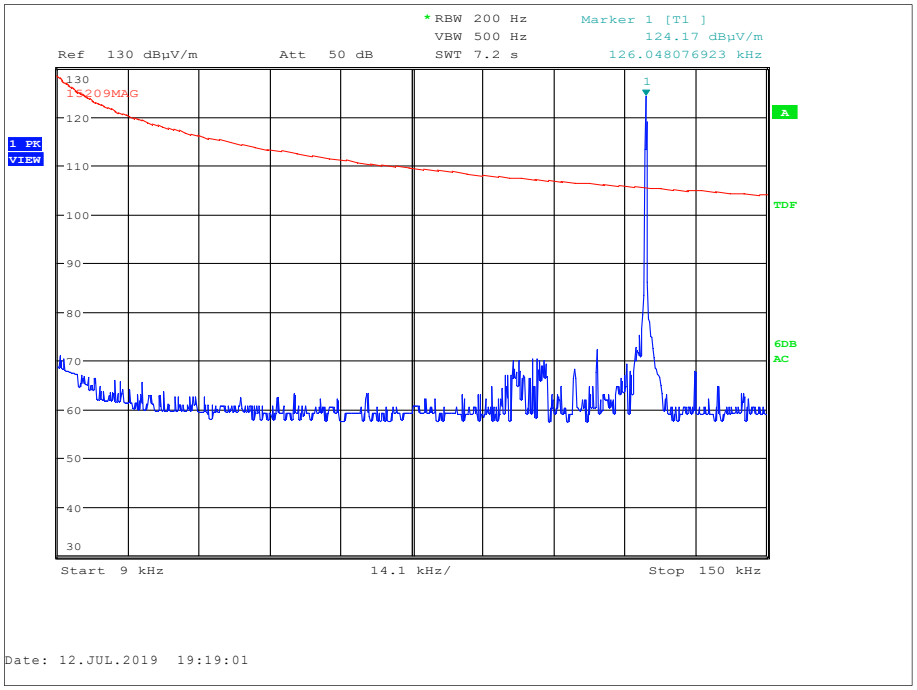

Figure 1 - 9 kHz to 150 kHz, Face On

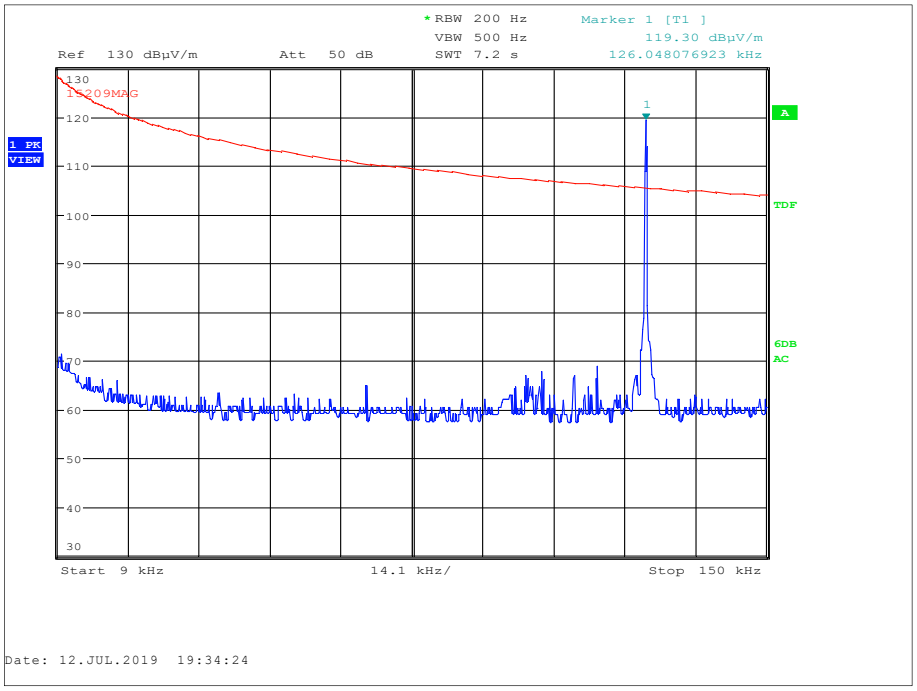

Figure 2 - 9 kHz to 150 kHz, Edge On

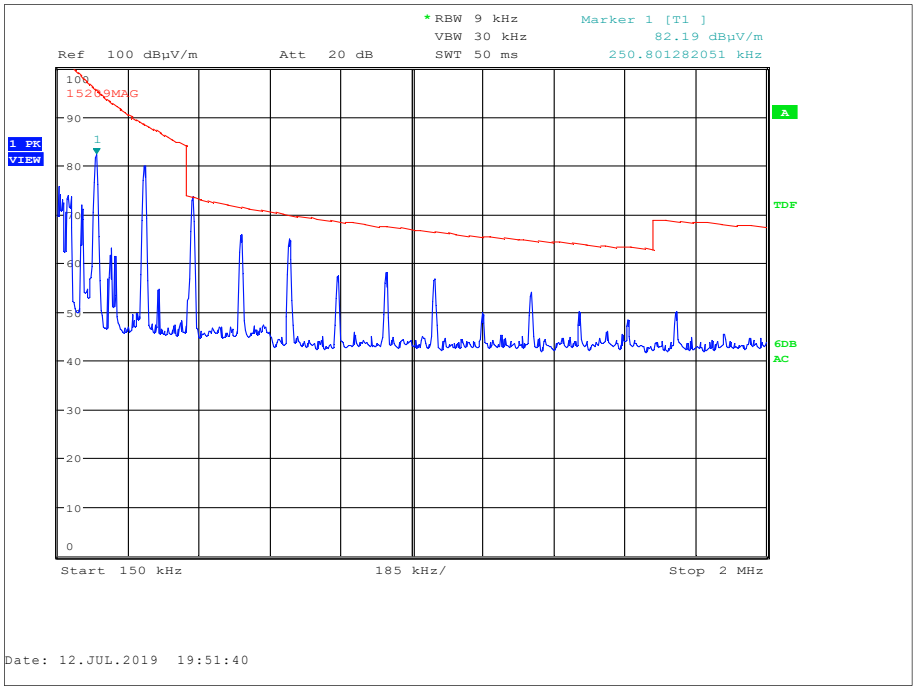

Figure 3 - 150 kHz to 2 MHz, Face On

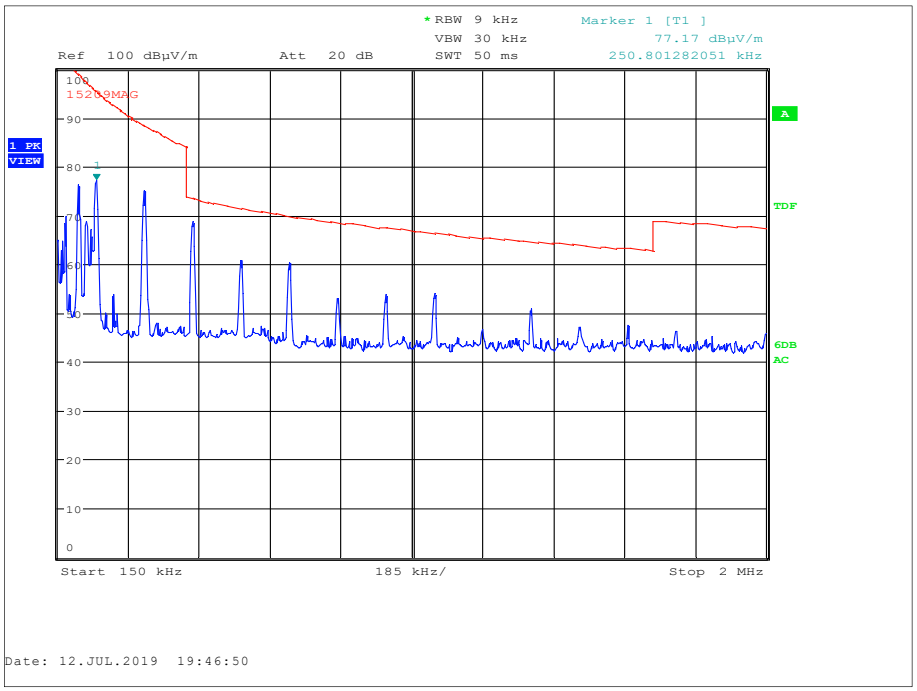

Figure 4 - 150 kHz to 2 MHz, Edge On

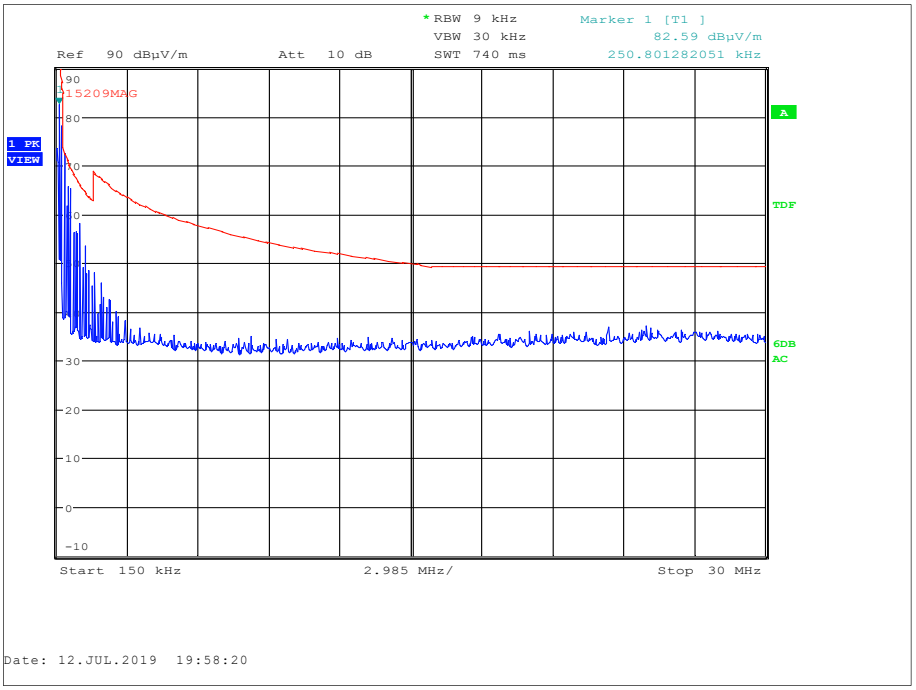

Figure 5 - 150 kHz to 30 MHz, Face On

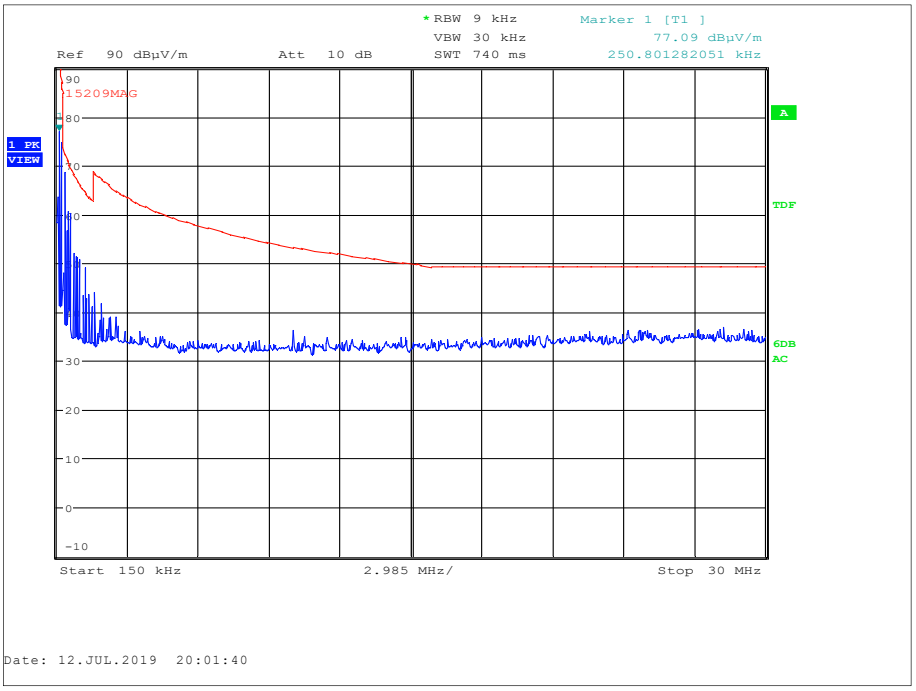

Figure 6 - 150 kHz to 30 MHz, Edge On

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
33.000	28.4	40.0	-11.6	Q-Peak	dBuv/m	26	100	Horizontal
192.012	32.5	43.5	-11.0	Q-Peak	dBuv/m	9	100	Horizontal

Table 11 - Emissions Results - 30 MHz to 1 GHz

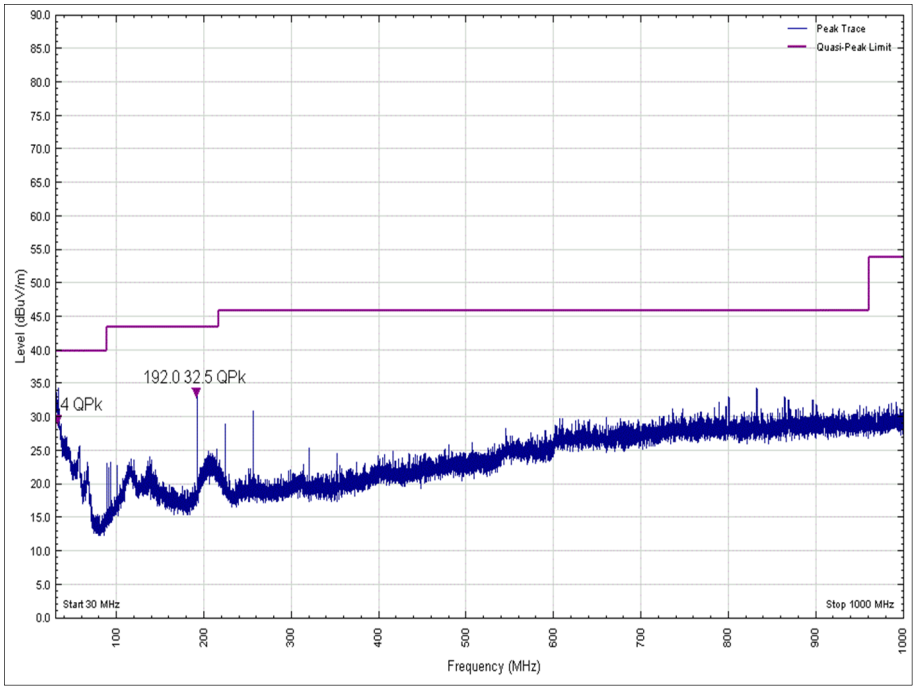

Figure 7 - 30 MHz to 1 GHz - Horizontal

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
32.958	31.4	40.0	-8.6	Q-Peak	dBuv/m	82	100	Vertical
66.638	28.0	40.0	-12.0	Q-Peak	dBuv/m	49	100	Vertical

Table 12 - Emissions Results - 30 MHz to 1 GHz

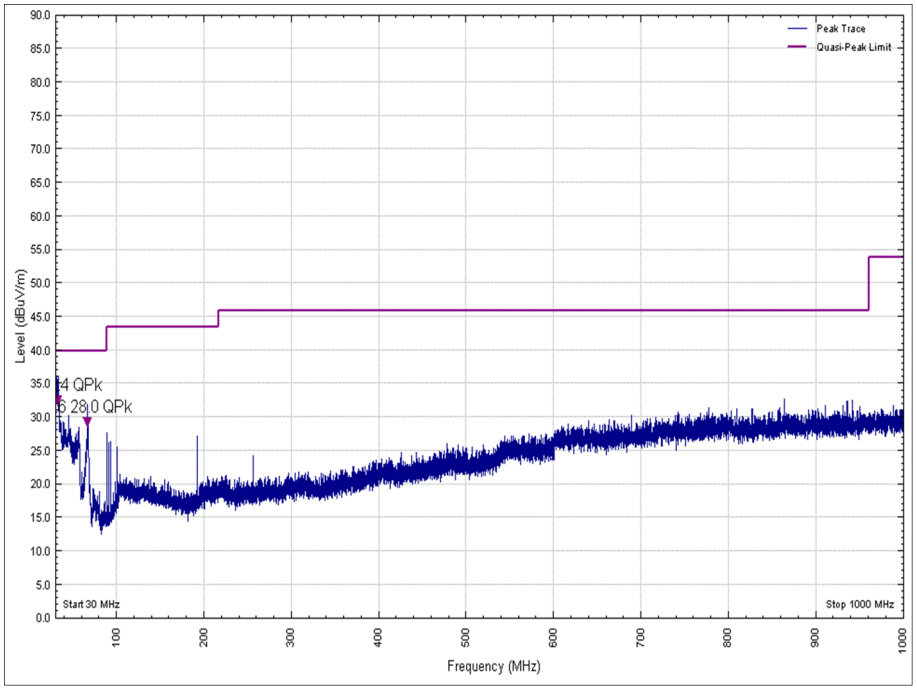

Figure 8 - 30 MHz to 1 GHz - Vertical

133 kHz - RFID Transceiver Operating

Frequency (MHz)	Results at Measurement Distance			Results at Limit Distance		
	Level (µV/m)	Distance	Detector	Level (µV/m)	Distance	Detector
0.26554	7550.92	3 m	CISPR Average Detector	1.26	30 m	CISPR Average Detector
0.26554	18407.72	3 m	Peak	3.07	30 m	Peak
0.39839	4226.69	3 m	CISPR Average Detector	1.06	30 m	CISPR Average Detector
0.39839	10197.65	3 m	Peak	2.55	30 m	Peak
0.53116	3322.77	3 m	Quasi-Peak Detector	0.33	30 m	Quasi-Peak Detector
0.66392	1216.19	3 m	Quasi-Peak Detector	0.12	30 m	Quasi-Peak Detector
0.79648	1059.25	3 m	Quasi-Peak Detector	0.11	30 m	Quasi-Peak Detector

Table 13 - Emissions Results - 9 kHz to 30 MHz

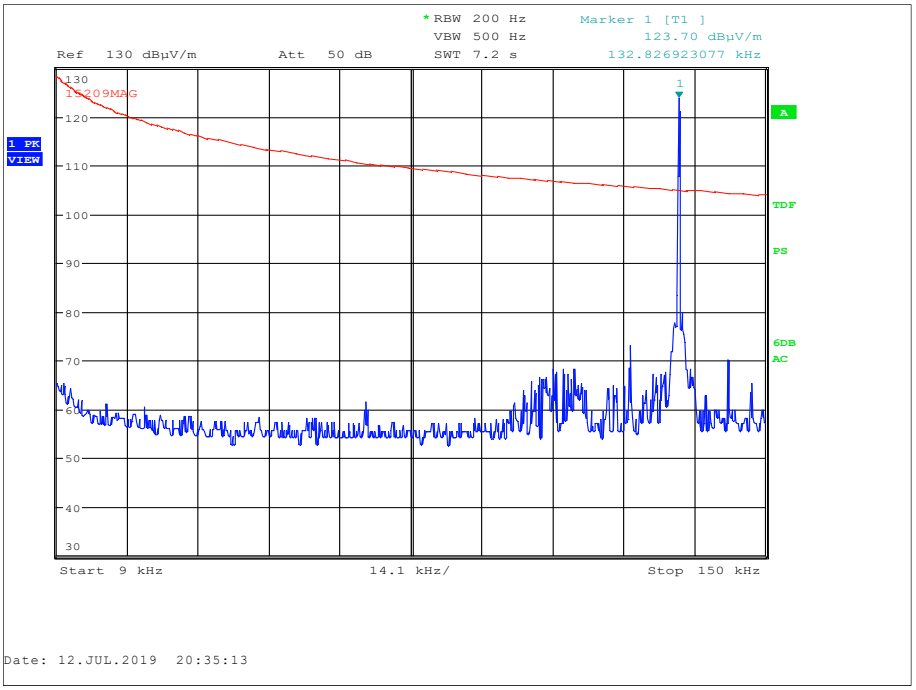

Figure 9 - 9 kHz to 150 kHz, Face On

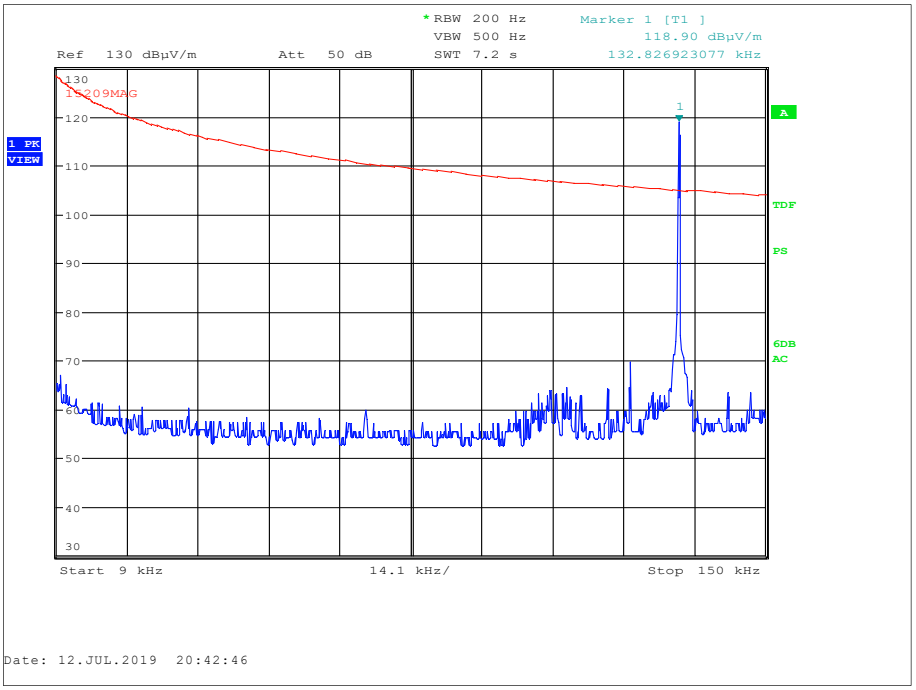

Figure 10 - 9 kHz to 150 kHz, Edge On

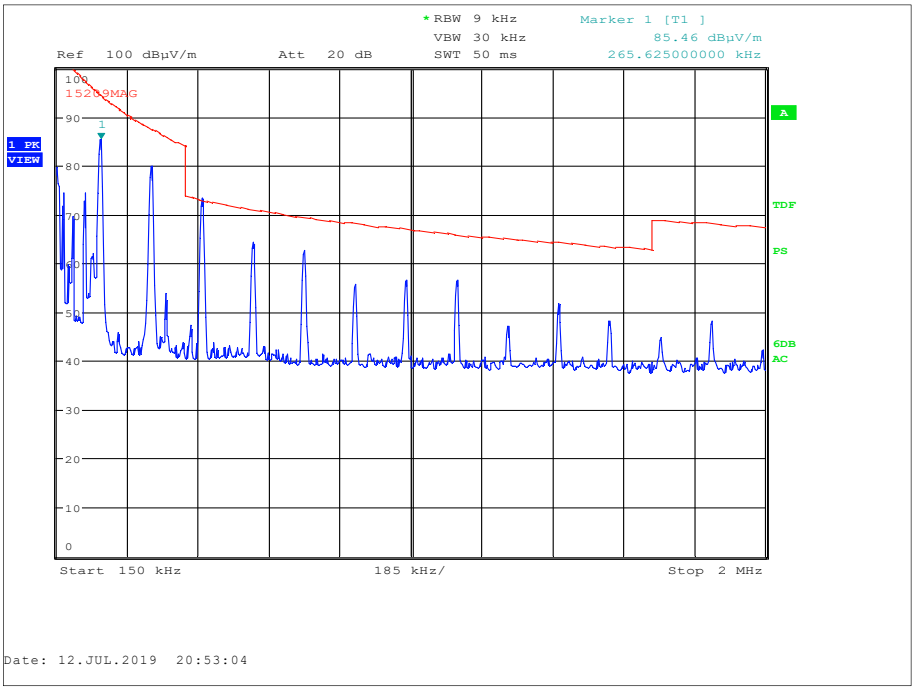

Figure 11 - 150 kHz to 2 MHz, Face On

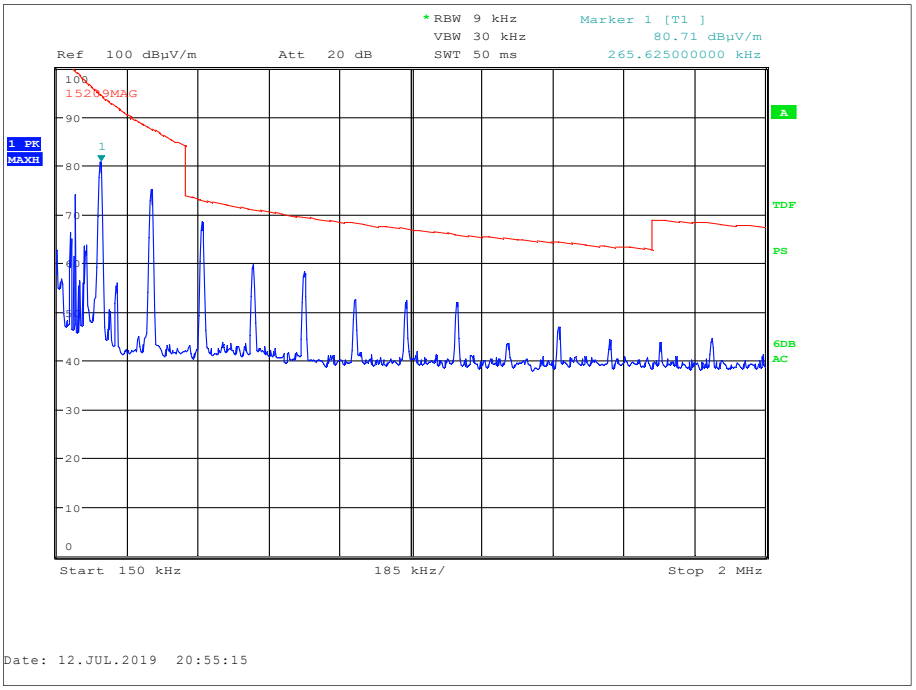

Figure 12 - 150 kHz to 2 MHz, Edge On

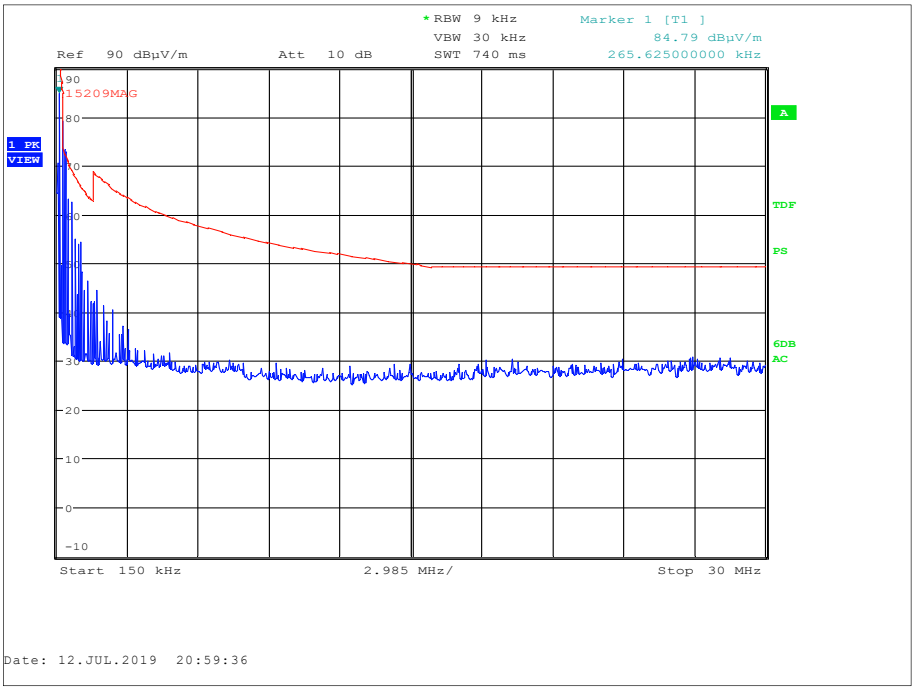

Figure 13 - 150 kHz to 30 MHz, Face On

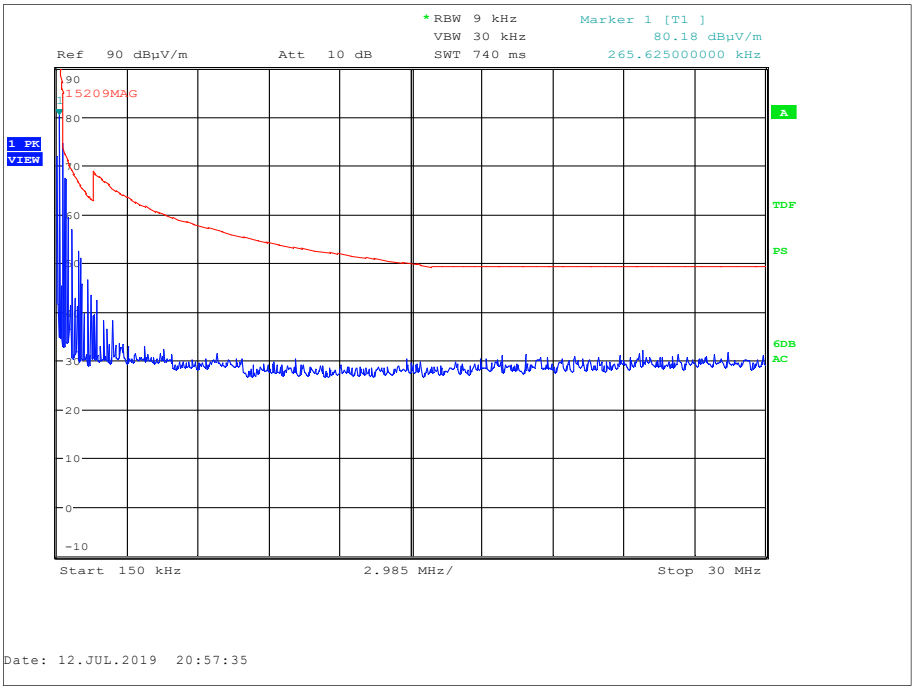

Figure 14 - 150 kHz to 30 MHz, Edge On

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
32.419	27.0	40.0	-13.0	Q-Peak	dBuv/m	129	136	Horizontal
192.010	33.4	43.5	-10.1	Q-Peak	dBuv/m	214	110	Horizontal

Table 14 - Emissions Results - 30 MHz to 1 GHz

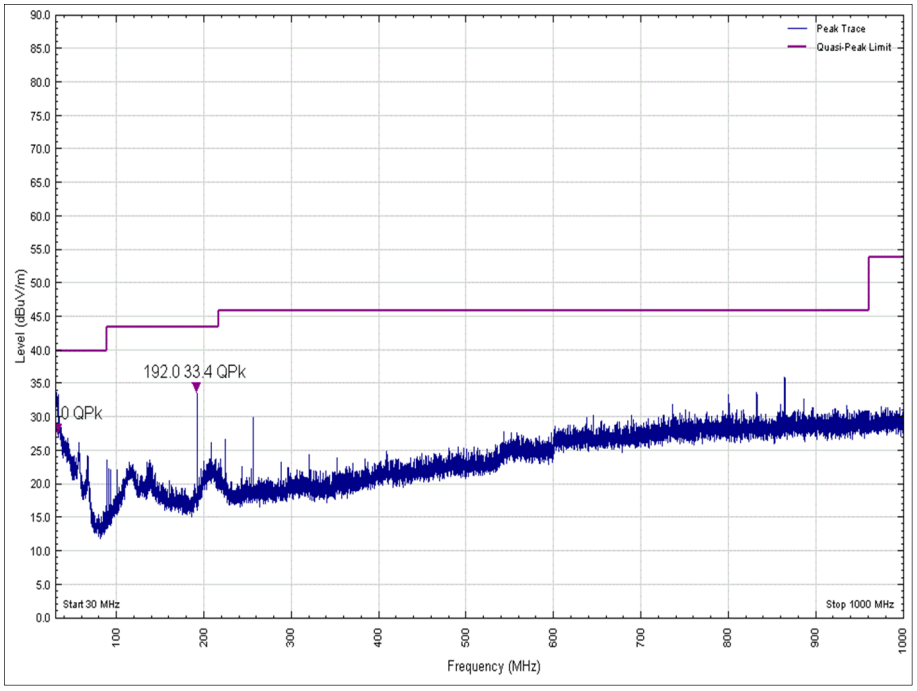

Figure 15 - 30 MHz to 1 GHz - Horizontal

Frequency (MHz)	Level	Limit	Margin	Detector	Unit	Angle (°)	Height (cm)	Polarisation
30.827	32.0	40.0	-8.0	Q-Peak	dBuv/m	177	102	Vertical
66.589	28.3	40.0	-11.7	Q-Peak	dBuv/m	0	100	Vertical

Table 15 - Emissions Results - 30 MHz to 1 GHz

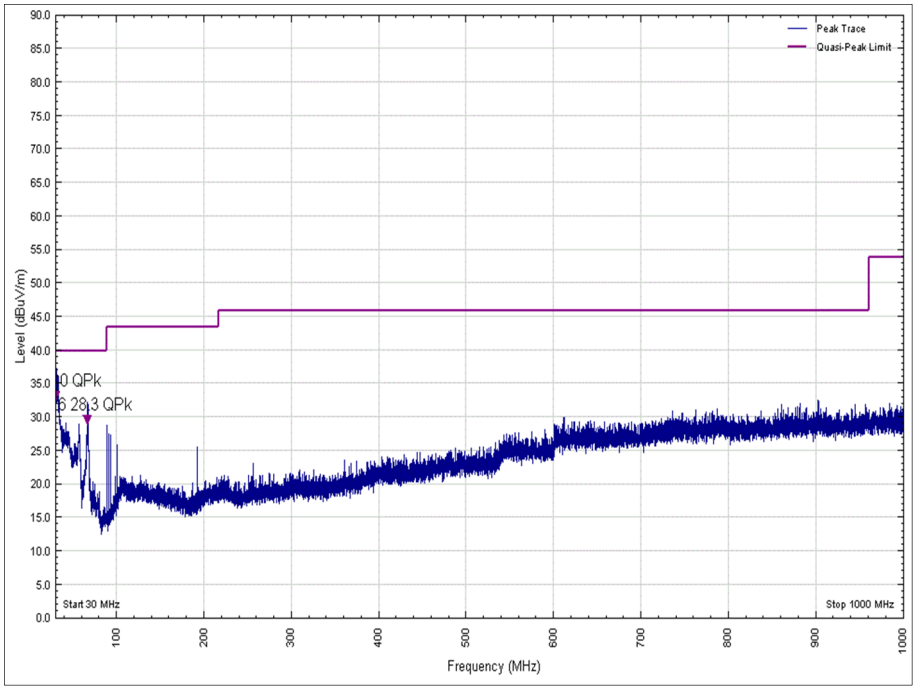

Figure 16 - 30 MHz to 1 GHz - Vertical

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	3

Table 16 - FCC Limit

ISEDC RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1705 to 30	30	30

Table 17 - IC Limit, Below 30 MHz

Frequency (MHz)	Field Strength (µV/m at 3 metres)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Table 18 - IC Limit, Above 30 MHz

2.2.7 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
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	08-Aug-2019
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
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
4dB Attenuator	Pasternack	PE7047-4	4935	24	28-Nov-2019
8m N-Type RF Cable	Teledyne	PR90-088-8MTR	5093	12	04-Oct-2019
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	11-Jan-2021

Table 19

TU - Traceability Unscheduled

3 Photographs

3.1 Test Setup Photographs

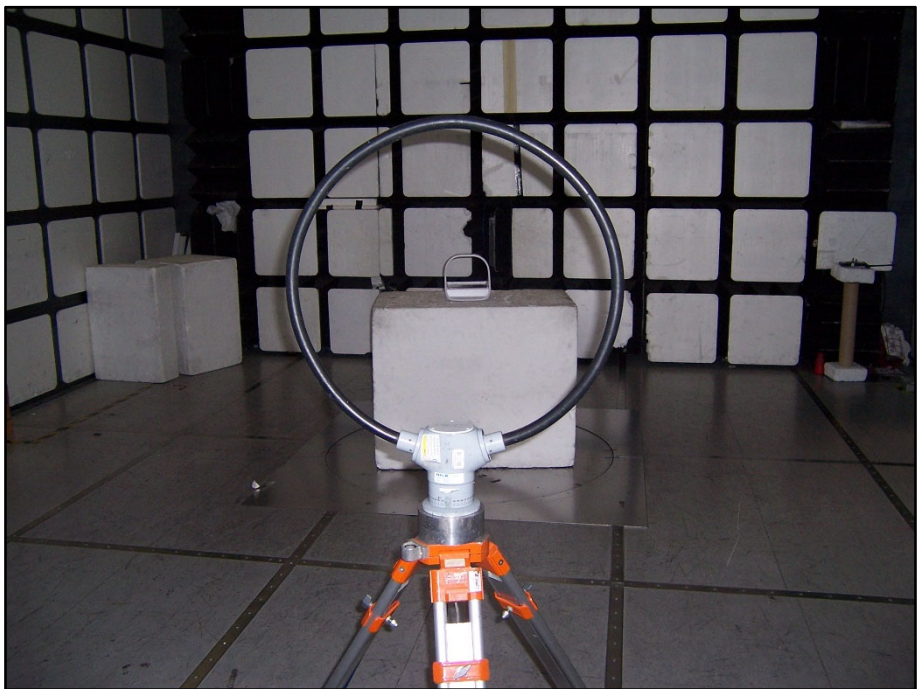

Figure 17 – 9 kHz to 30 MHz

Figure 18 – 9 kHz to 30 MHz

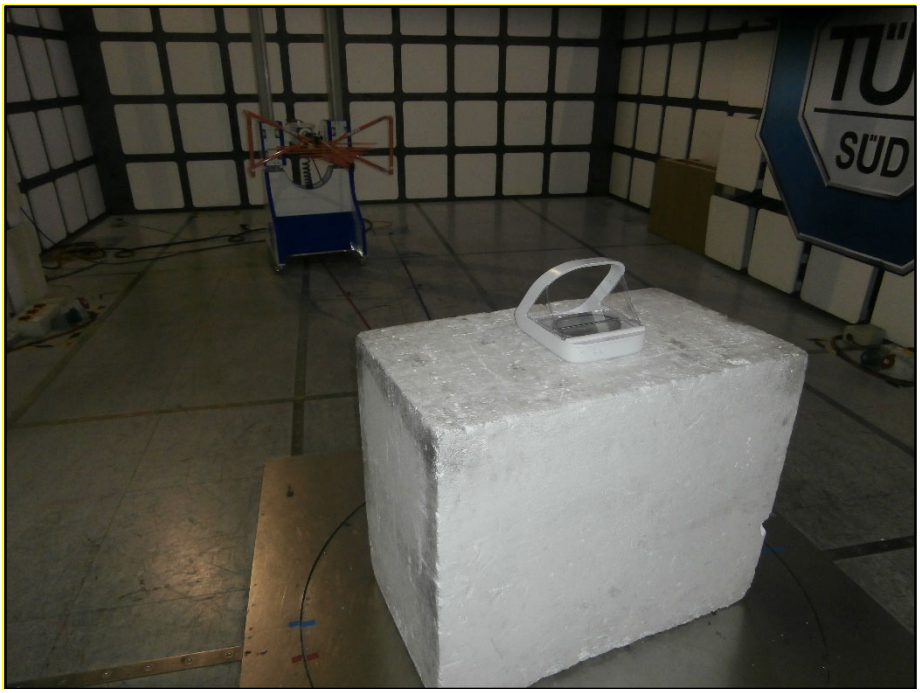

Figure 19 – 30 MHz to 1 GHz

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Transmitter Unwanted Emissions	9 kHz to 30 MHz: ± 3.4 dB 30 MHz to 1 GHz: ± 5.2 dB
Transmitter Output Power	Radiated: ± 5.2 dB Conducted: ± 0.96 dB

Table 20