

FCC and Industry Canada Testing of the
 Guestkey Ltd
 3 channel 7A PSU. Model: GKPS1000-4001
 Control Module. Model: GKMC1000-4001
 Mifare Power Injector. Model: N/A
 Switching power supply. Model: 6323
 Mifare Key reader. Model: GKMR1000-4001
 Mifare Key reader. Model: GKMS1000-4001
 Switching power supply. Model: FW7556M
 In accordance with FCC 47 CFR Part 15B and Industry
 Canada RSS-GEN



Product Service

Choose certainty.
 Add value.

Prepared for: Guestkey Ltd
 Summerleys Road
 Princes Risborough
 Buckinghamshire
 HP27 9BS
 UNITED KINGDOM

FCC ID: 2AOGK-MR1000-4001
 IC: 23419-MR1000-4001

COMMERCIAL-IN-CONFIDENCE

Date: January 2018
 Document Number: 75940778-01 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Natalie Bennett	04 January 2018	
Authorised Signatory	Matthew Russell	04 January 2018	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service 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 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	04 January 2018	

CC 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 15B: 2016 and Industry Canada RSS-GEN: Issue 4, November 2014.



DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD Product Service with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD Product Service. No part of this document may be reproduced without the prior written approval of TÜV SÜD Product Service. © 2018 TÜV SÜD Product Service.

ACCREDITATION

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation. Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

TÜV SÜD Product Service
 is a trading name of TÜV SÜD Ltd
 Registered in Scotland at East Kilbride,
 Glasgow G75 0QF, United Kingdom
 Registered number: SC215164

TÜV SÜD Ltd is a
 TÜV SÜD Group Company

Phone: +44 (0) 1489 558100
 Fax: +44 (0) 1489 558101
www.tuv-sud.co.uk

TÜV SÜD Product Service
 Octagon House
 Concorde Way
 Fareham
 Hampshire PO15 5RL
 United Kingdom



Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Application Form	4
1.5	Product Information	6
1.6	Deviations from the Standard.....	6
1.7	EUT Modification Record	6
1.8	Test Location.....	7
2	Test Details	8
2.1	AC Power Line Conducted Emissions	8
2.2	Radiated Emissions.....	14
3	Measurement Uncertainty	19



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 January 2018

Table 1

1.2 Introduction

Applicant	Guestkey Ltd
Manufacturer	Guestkey Ltd
Model Number(s)	1) GKPS1000-4001 2) GKMC1000-4001 3) N/A 4) Mascot 6323 5) GKMR1000-4001 6) GKMS1000-4001 7) FW7556M
Serial Number(s)	1) Not serialised (75940778-TSR0003) 2) 02804 3) Not serialised (75940778-TSR0006) 4) C39071391418 5) Not serialised (75940778-TSR0018) 6) Not serialised (75940778-TSR0019) 7) Not serialised (75940778-TSR0020)
Hardware Version(s)	REV 1
Software Version(s)	REV 1
Number of Samples Tested	7
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016 Industry Canada RSS-GEN: Issue 4, November 2014
Order Number	PO1711-102
Date	03-November-2017
Date of Receipt of EUT	07-November-2017, 21-November-2017 and 04-December-2017
Start of Test	22-November-2017
Finish of Test	12-December-2017
Name of Engineer(s)	Graeme Lawler
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 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15B	RSS-GEN			
Configuration and Mode: MiFare Key Reader - Idle					
2.1	15.107	8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.4
2.2	15.109	7.1	Radiated Emissions	Pass	ANSI C63.4
Configuration and Mode: 3 Channel 7A PSU - Powered On					
2.1	15.107	8.8	AC Power Line Conducted Emissions	Pass	ANSI C63.4
Configuration and Mode: Fully Monitored Locking Control System - Idle					
2.2	15.109	7.1	Radiated Emissions	Pass	ANSI C63.4

Table 2



1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	42mm Mifare/Optical Key Reader
Part Number	GKMR1000-4001 (R011001-001 & R011002-001)
Hardware Version	REV 1
Software Version	REV 1
FCC ID (if applicable)	2AOGK-MR1000-4001
Industry Canada ID (if applicable)	23419-MR1000-4001
Technical Description (Please provide a brief description of the intended use of the equipment)	Identification of Guestkey Optical Keys and Mifare RFID tags

INTENTIONAL RADIATORS									
Technology	Frequency Band (MHz)	Conducted Declared Output Power (dBm)	Antenna Gain (dBi)	Supported Bandwidth (s) (MHz)	Modulation Scheme(s)	ITU Emission Designator	Test Channels (MHz)		
							Bottom	Middle	Top
RFID	13.56	250 nW			ASK		13.56		

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	27.12 MHz

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
External DC	Nominal Voltage		Maximum Current
	24 V		0.2 A
Battery	Nominal Voltage		Battery Operating End Point Voltage
	4.2 V		3.6 V
Can EUT transmit whilst being charged?			Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

EXTREME CONDITIONS			
Maximum temperature	+40.0 °C	Minimum temperature	0 °C



Ancillaries
Please list all ancillaries which will be used with the device.

ANTENNA CHARACTERISTICS		
<input type="checkbox"/> Antenna connector	State impedance	Ohm
<input type="checkbox"/> Temporary antenna connector	State impedance	Ohm
<input checked="" type="checkbox"/> Integral antenna	Type	
<input type="checkbox"/> External antenna	Type	

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

Name: Tony Marsden
Position held: Director

Date: 04 January 2018



1.5 Product Information

1.5.1 Technical Description

Identification of Guestkey Optical Keys and Mifare RFID tags.

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: Not serialised (75940778-TSR0003)			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: 02804			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: Not serialised (75940778-TSR0006)			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: C39071391418			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: Not serialised (75940778-TSR0018)			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: Not serialised (75940778-TSR0019)			
0	As supplied by the customer	Not Applicable	Not Applicable
Serial Number: Not serialised (75940778-TSR0020)			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3



Product Service

1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: MiFare Key Reader - Idle		
AC Power Line Conducted Emissions	Graeme Lawler	UKAS
Radiated Emissions	Graeme Lawler	UKAS
Configuration and Mode: Fully Monitored Locking Control System - Idle		
Radiated Emissions	Graeme Lawler	UKAS
Configuration and Mode: 3 Channel 7A PSU - Powered On		
AC Power Line Conducted Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

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



2 Test Details

2.1 AC Power Line Conducted Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107
Industry Canada RSS-GEN, Clause 8.8

2.1.2 Equipment Under Test and Modification State

MiFare Key Reader – Idle

6323, S/N: C39071391418 - Modification State 0
GKMR1000-4001, S/N: Not serialised (75940778-TSR0018) - Modification State 0
GKMS1000-4001, S/N: Not serialised (75940778-TSR0019) - Modification State 0

3 Channel 7A PSU - Powered On

GKPS1000-4001, S/N: Not serialised (75940778-TSR0003) - Modification State 0
GKMC1000-4001, S/N: 02804 - Modification State 0
N/A, S/N: Not serialised (75940778-TSR0006) - Modification State 0
GKMR1000-4001, S/N: Not serialised (75940778-TSR0018) - Modification State 0

2.1.3 Date of Test

22-November-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 7.

2.1.5 Environmental Conditions

Ambient Temperature	19.7 °C
Relative Humidity	47.0 %



2.1.6 Test Results

MiFare Key Reader - Idle

Applied supply voltage: 60 Hz
 Applied supply frequency: 120 V AC

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.167	60.7	79.0	-18.3	41.1	66.0	-24.9
0.196	57.6	79.0	-21.4	38.9	66.0	-27.1
0.220	55.7	79.0	-23.3	36.4	66.0	-29.6
0.242	52.1	79.0	-26.9	33.9	66.0	-32.1
24.076	45.8	73.0	-27.2	38.2	60.0	-21.8
24.265	46.0	73.0	-27.0	38.5	60.0	-21.5

Table 5 - Live Line Emissions Results

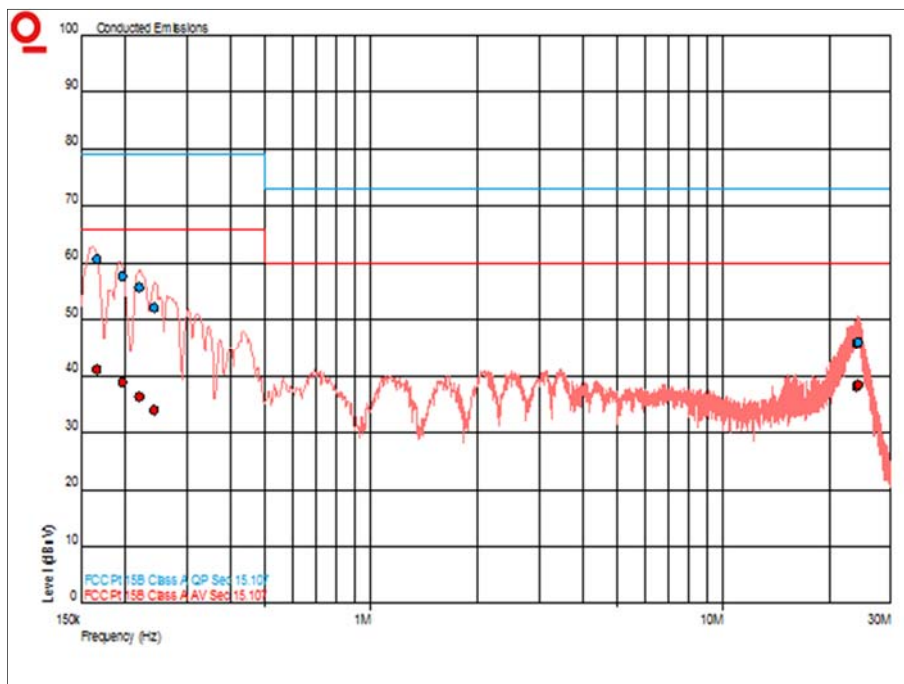


Figure 1 - Live Line - 150 kHz to 30 MHz



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	63.2	79.0	-15.8	40.2	66.0	-25.8
0.167	63.3	79.0	-15.7	42.7	66.0	-23.3
0.196	60.4	79.0	-18.6	40.7	66.0	-25.3
0.255	53.3	79.0	-25.7	36.1	66.0	-29.9
24.272	45.6	73.0	-27.4	37.6	60.0	-22.4
24.414	45.6	73.0	-27.4	37.3	60.0	-22.7

Table 6 - Neutral Line Emissions Results

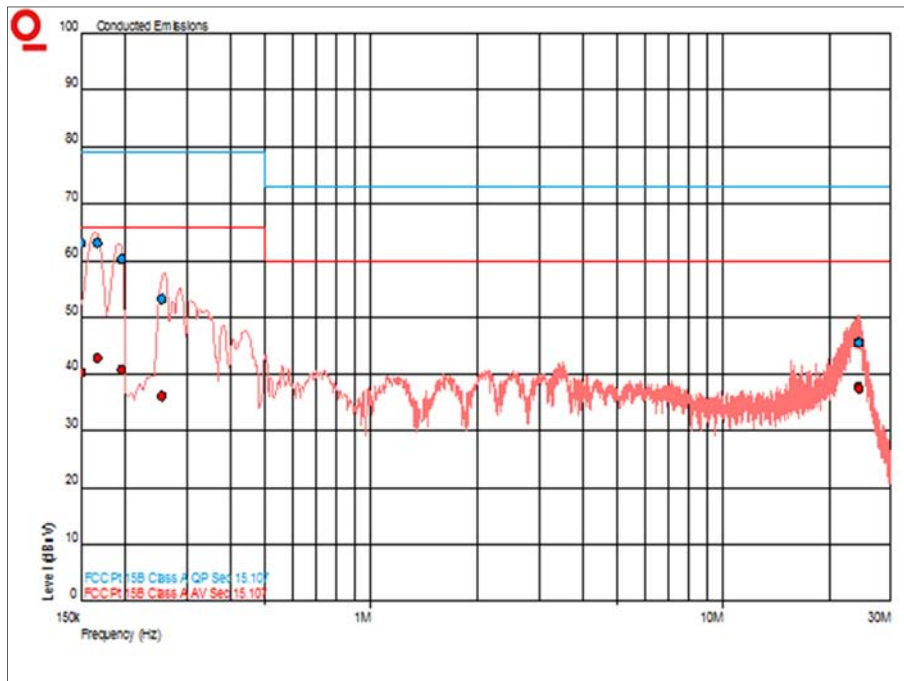


Figure 2 - Neutral Line - 150 kHz to 30 MHz

FCC 47 CFR Part 15, Limit Clause 15.107 and RSS-GEN, Limit Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 7

*Decreases with the logarithm of the frequency.



3 Channel 7A PSU - Powered On

Applied supply voltage: 60 Hz
 Applied supply frequency: 120 V AC

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.213	41.8	79.0	-37.2	38.1	66.0	-27.9
23.334	42.4	73.0	-30.6	34.1	60.0	-25.9
23.598	47.3	73.0	-25.7	39.1	60.0	-20.9
23.729	47.4	73.0	-25.6	39.0	60.0	-21.0
23.860	45.4	73.0	-27.6	36.2	60.0	-23.8
23.992	44.0	73.0	-29.0	34.8	60.0	-25.2

Table 8 - Live Line Emissions Results

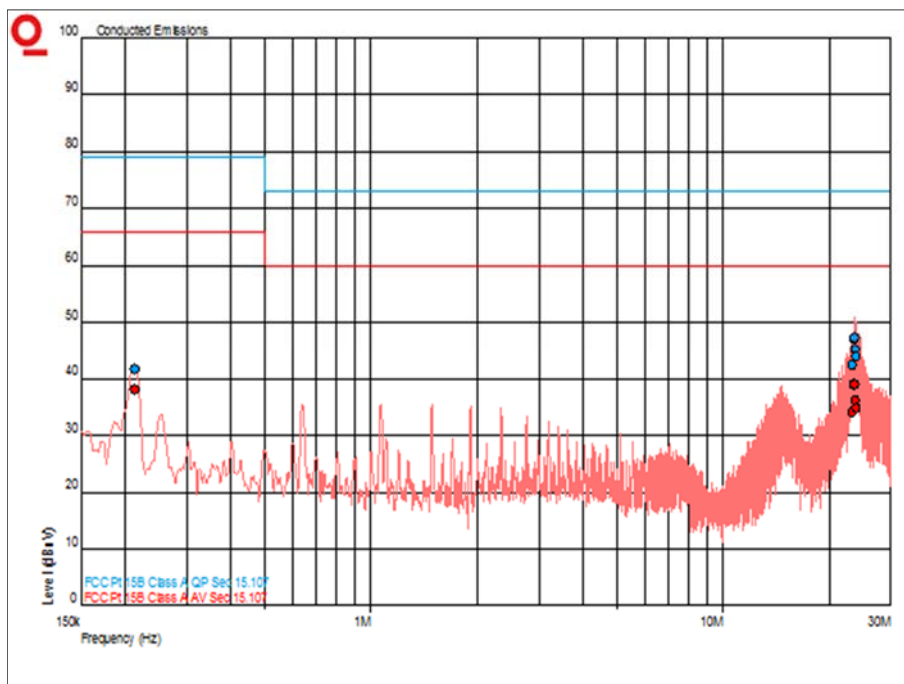


Figure 3 - Live Line - 150 kHz to 30 MHz



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.213	42.9	79.0	-36.1	39.2	66.0	-26.8
14.573	36.4	73.0	-36.6	26.9	60.0	-33.1
23.222	44.3	73.0	-28.7	35.1	60.0	-24.9
23.470	47.0	73.0	-26.0	38.6	60.0	-21.4
24.617	43.4	73.0	-29.6	36.4	60.0	-23.6
25.513	39.9	73.0	-33.1	31.1	60.0	-28.9

Table 9 - Neutral Line Emissions Results

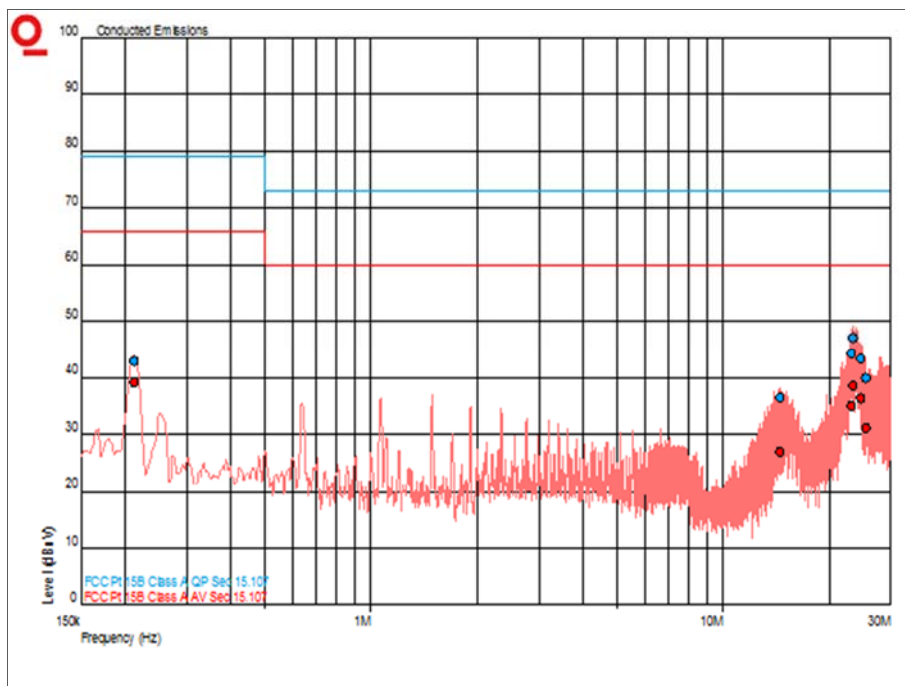


Figure 4 - Neutral Line - 150 kHz to 30 MHz

FCC 47 CFR Part 15, Limit Clause 15.107 and RSS-GEN, Limit Clause 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Table 10

*Decreases with the logarithm of the frequency.



2.1.7 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
Transient Limiter	Hewlett Packard	11947A	15	12	30-May-2018
LISN (1 Phase)	Chase	MN 2050	336	12	07-Apr-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Hygrometer	Rotronic	HYGROPALM 1	2338	12	24-Oct-2018
Digital Multimeter	Iso-tech	IDM-101	2895	12	20-Jul-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018

Table 11



2.2 Radiated Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
Industry Canada RSS-GEN, Clause 7.

2.2.2 Equipment Under Test and Modification State

MiFare Key Reader – Idle

GKMR1000-4001, S/N: Not serialised (75940778-TSR0018) - Modification State 0
GKMS1000-4001, S/N: Not serialised (75940778-TSR0019) - Modification State 0
FW7556M, S/N: Not serialised (75940778-TSR0020) - Modification State 0

Fully Monitored Locking Control System - Idle

GKPS1000-4001, S/N: Not serialised (75940778-TSR0003) - Modification State 0
GKMC1000-4001, S/N: 02804 - Modification State 0
N/A, S/N: Not serialised (75940778-TSR0006) - Modification State 0
GKMR1000-4001, S/N: Not serialised (75940778-TSR0018) - Modification State 0

2.2.3 Date of Test

22-November-2017

2.2.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 8.

2.2.5 Environmental Conditions

Ambient Temperature	19.7 °C
Relative Humidity	47.0 %



2.2.6 Test Results

MiFare Key Reader - Idle

Highest frequency generated or used within the EUT: 27.12 MHz

Upper frequency test limit: 1 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
31.139	19.3	39.1	-19.8	360	1.00	Horizontal
145.078	10.4	43.5	-33.1	23	1.00	Horizontal
273.562	26.8	46.4	-19.6	57	1.00	Vertical
275.308	28.1	46.4	-18.3	238	1.00	Horizontal
624.990	33.4	46.4	-13.0	144	1.00	Vertical
625.030	32.8	46.4	-13.6	201	1.00	Horizontal
750.016	28.3	46.4	-18.1	188	1.00	Vertical
875.022	32.6	46.4	-13.8	237	1.31	Vertical

Table 12 - 30 MHz to 1 GHz

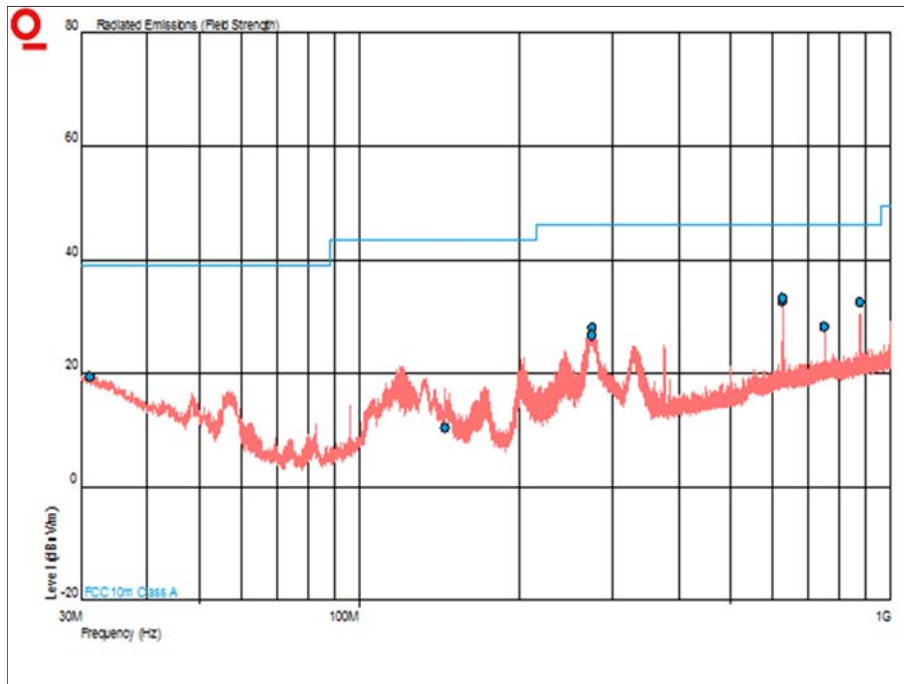


Figure 5 - 30 MHz to 1 GHz - Horizontal and Vertical



Product Service

FCC 47 CFR Part 15, Limit Clause 15.109 and RSS-GEN, Limit Clause 7.1.2

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)
30 to 88	90.0	39.1
88 to 216	150.0	43.5
216 to 960	210.0	46.4
Above 960	300.0	49.5



Fully Monitored Locking Control System - Idle

Highest frequency generated or used within the EUT: 27.12 MHz

Upper frequency test limit: 1 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
43.249	23.1	39.1	-16.0	14	1.00	Vertical
49.222	29.5	39.1	-9.6	346	1.00	Vertical
53.563	25.0	39.1	-14.1	0	1.00	Vertical
87.650	33.2	39.1	-5.9	189	3.63	Horizontal
88.211	30.0	43.5	-13.5	142	2.51	Vertical
110.816	26.9	43.5	-16.6	27	1.00	Vertical
123.051	30.4	43.5	-13.1	360	1.00	Vertical

Table 13 - 30 MHz to 1 GHz

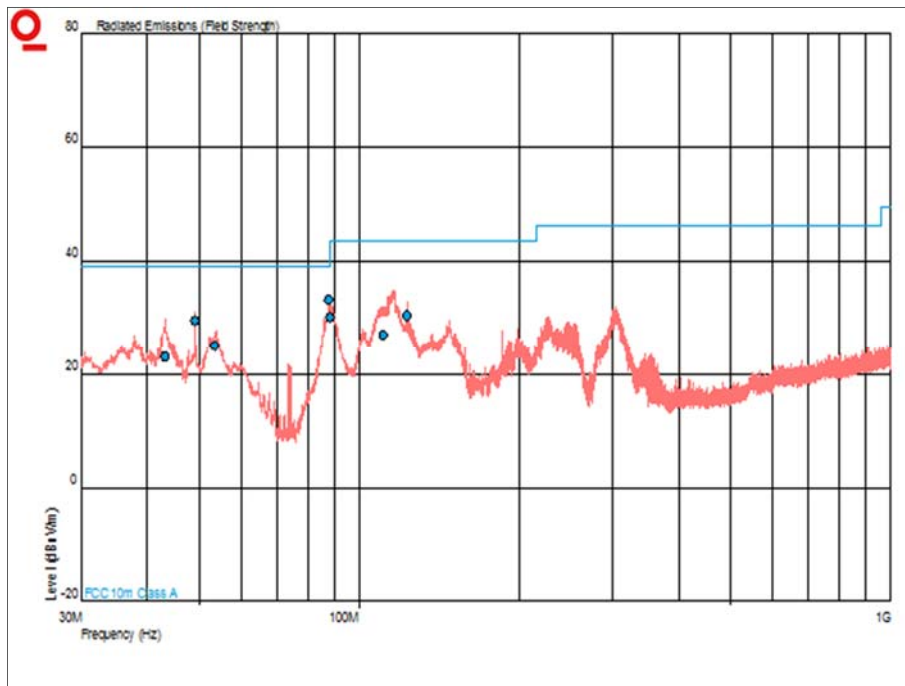


Figure 6 - 30 MHz to 1 GHz - Horizontal and Vertical



FCC 47 CFR Part 15, Limit Clause 15.109 and RSS-GEN, Limit Clause 7.1.2

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)
30 to 88	90.0	39.1
88 to 216	150.0	43.5
216 to 960	210.0	46.4
Above 960	300.0	49.5

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
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	HYGROPALM 1	2338	12	24-Oct-2018
Digital Multimeter	Iso-tech	IDM-101	2895	12	20-Jul-2018
Comb Generator	Schaffner	RSG1000	3034	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Nov-2018
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur GmbH	NCD	3917	-	TU
Cable (Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4526	6	22-May-2018

Table 14

TU - Traceability Unscheduled



3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
AC Power Line Conducted Emissions	150 kHz to 30 MHz, LISN, ± 3.7 dB
Radiated Emissions	30 MHz to 1 GHz: ± 5.2 dB
	1 GHz to 40 GHz: ± 6.3 dB

Table 15