

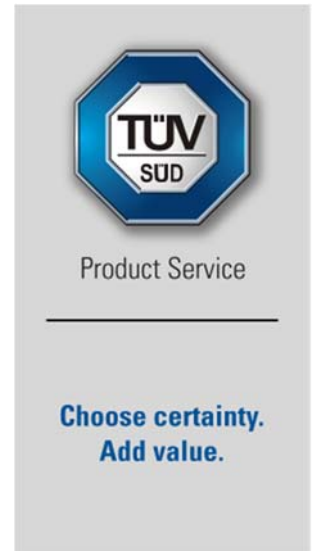
FCC Testing of the
ACR Electronics Inc
SAR LINK, Model: SOS 300
In accordance with FCC 47 CFR Part 15B

Prepared for: ACR Electronics Inc
Ravenswood Road
Fort Lauderdale
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FCC ID: B66ACR-SOS-300

COMMERCIAL-IN-CONFIDENCE

Date: July 2017
Document Number: 75934560-02 | Issue: 01



RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Sarah Jones	21 July 2017	
Authorised Signatory	Andy Lawson	21 July 2017	

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. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Jack Tuckwell	21 July 2017	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be in compliance with FCC 47 CFR Part 15B: 2016.

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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	21 July 2017

Table 1

1.2 Introduction

Applicant	ACR Electronics Inc
Manufacturer	ACR Electronics Inc
Model Number(s)	SOS 300
Serial Number(s)	#1761
Hardware Version(s)	F
Software Version(s)	C
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016
Order Number	38944
Date	06-April-2016
Date of Receipt of EUT	25-May-2017
Start of Test	25-May-2017
Finish of Test	25-May-2017
Name of Engineer(s)	Jack Tuckwell
Related Document(s)	ANSI 63.4: 2014



Product Service

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: AC Powered - 110 V AC Charging				
2.1	15.107	Conducted Disturbance at Mains Terminals	Pass	ANSI 63.4
2.2	15.109	Radiated Disturbance	Pass	ANSI 63.4

Table 2



Product Service

1.4 Declaration of Build Status

MAIN EUT			
MANUFACTURING DESCRIPTION	Beacon Manufacturer		
MANUFACTURER	ACR Electronics, Inc.		
MODEL NAME/NUMBER	SARLink SOS-300		
PART NUMBER	A3-06-2918-1 and A3-06-2918-2		
SERIAL NUMBER			
HARDWARE VERSION	F		
SOFTWARE VERSION	C		
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	406.040 MHz, 1616 - 1626.5 MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	1575.42 MHz, 1616 - 1626.5 MHz		
COUNTRY OF ORIGIN	U.S.A.		
INTERMEDIATE FREQUENCIES			
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	16K0G1D, 41K7Q7D		
MODULATION TYPES: (i.e. GMSK, QPSK)	BPSK (For PLB) QPSK (for Iridium)		
HIGHEST INTERNALLY GENERATED FREQUENCY	1626.5 MHz		
OUTPUT POWER (W or dBm)	5 Watt		
FCC ID	B66ACR-SOS-300		
INDUSTRY CANADA ID			
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Intended use as a PLB, distress beacon, with Iridium communication ability.		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	CR-123A, 2/3A, 3 cells	A1-13-0130	
MANUFACTURER	Panasonic	MOLICEL	
TYPE	LiMnO2, non rechargeable	LI-ION, RECHARGEABLE 3.7V	
PART NUMBER	A3-06-2770	A1-13-0130	
VOLTAGE	9 VDC	3.7 VDC	
COUNTRY OF ORIGIN	U.S.A.		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
COUNTRY OF ORIGIN			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

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

Name: Dan Stankovic
Date: 07/11/2017

Position held: Director of Certification and Test

1.5 Product Information

1.5.1 Technical Description

The Equipment Under Test (EUT) was an ACR Electronics Inc, SAR LINK. Model: SOS 300.

The primary function of the EUT is as a 406 MHz transmitter.

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



Figure 1 - General View

1.5.2 EUT Port/Cable Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Powered - 110 V AC Charging				
Line 1	0.8m	Power	AC Mains	No
Neutral	0.8m	Power	AC Mains	No

Table 3

1.5.3 Test Configuration

Configuration	Description
AC Powered - 110 V AC	The EUT was powered from an ac power adapter

Table 4

1.5.4 Modes of Operation

Mode	Description
Charging	The EUT was idle and charging

Table 5

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: #1761			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 6

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: AC Powered - 110 V AC Charging		
Conducted Disturbance at Mains Terminals	Jack Tuckwell	UKAS
Radiated Disturbance	Jack Tuckwell	UKAS

Table 7

Office Address:

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

2 Test Details

2.1 Conducted Disturbance at Mains Terminals

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107

2.1.2 Equipment Under Test and Modification State

SOS 300 S/N: #1761 - Modification State 0

2.1.3 Date of Test

25-May-2017

2.1.4 Test Method

The EUT was placed on a non-conductive table 0.8m above a reference ground plane and 0.4m from a vertical coupling plane.

All power was connected to the EUT through an Artificial Mains Network (AMN). Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. The AMN was placed 0.8m from the boundary of the EUT and bonded to the reference ground plane.

2.1.5 Environmental Conditions

Ambient Temperature 21.0°C
Relative Humidity 43 %

2.1.6 Specification Limits

Required Specification Limits (Class B)			
Line Under Test	Frequency Range (MHz)	Quasi-peak (dBμV)	Average (dBμV)
AC Power Port	0.15 to 0.5	66 to 56*	56 to 46*
	0.5 to 5	56	46
	5 to 30	60	50
Supplementary information: *Decreases with the logarithm of the frequency.			

Table 8

2.1.7 Test Results

Results for Configuration and Mode: AC Powered - 110 V AC Charging.

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

Detailed results are shown below.

Line Under Test: Neutral

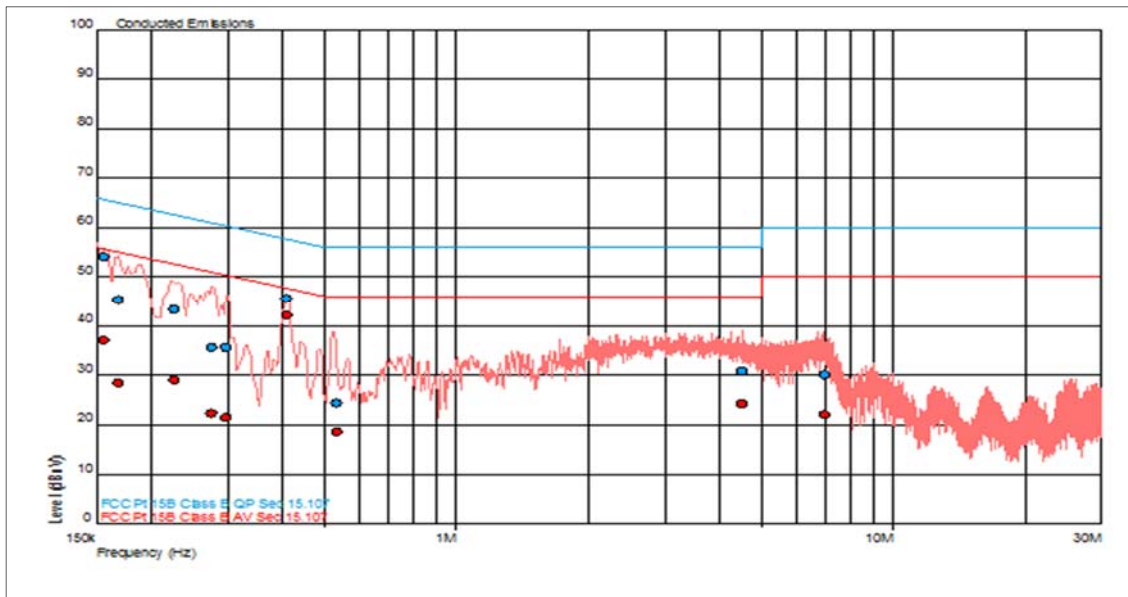


Figure 2 - Graphical Results - Neutral

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.156	54.1	65.7	-11.6	37.1	55.7	-18.5
0.168	45.2	65.0	-19.8	28.4	55.0	-26.6
0.226	43.4	62.6	-19.2	29.1	52.6	-23.5
0.276	35.6	60.9	-25.4	22.3	50.9	-28.6
0.297	35.5	60.3	-24.8	21.4	50.3	-28.9
0.408	45.6	57.7	-12.1	42.1	47.7	-5.6
0.532	24.4	56.0	-31.6	18.6	46.0	-27.4
4.510	30.8	56.0	-25.2	24.2	46.0	-21.8
6.964	30.1	60.0	-29.9	22.0	50.0	-28.0

Table 9

Line Under Test: Live

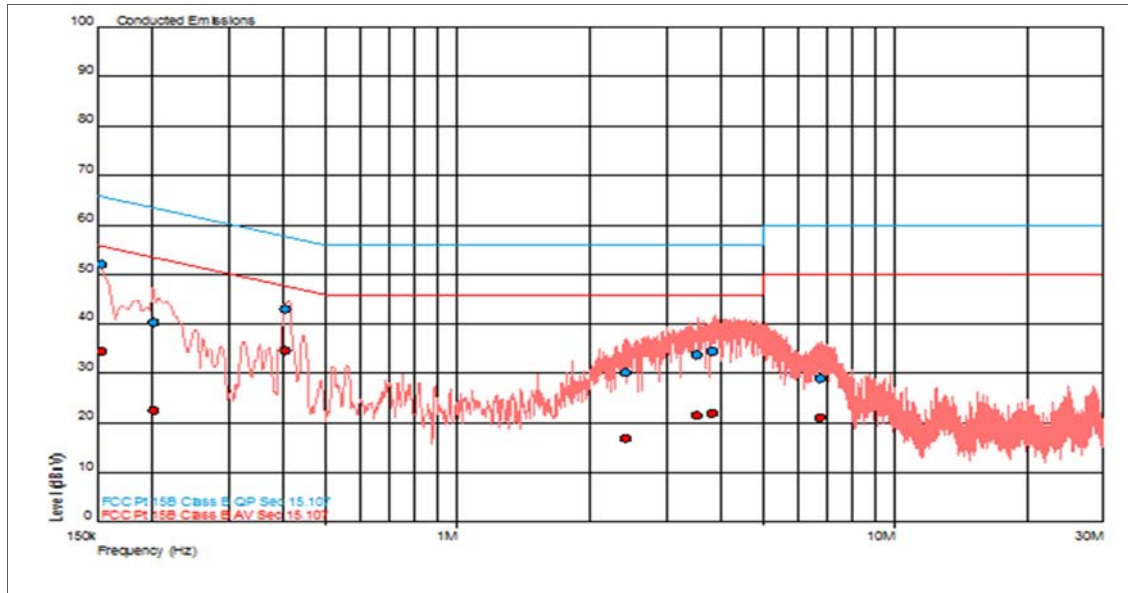


Figure 3 - Graphical Results - Line 1

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.153	52.1	65.8	-13.7	34.4	55.8	-21.4
0.202	40.2	63.5	-23.3	22.5	53.5	-31.0
0.406	42.9	57.7	-14.8	34.6	47.7	-13.2
2.422	30.1	56.0	-25.9	16.8	46.0	-29.2
3.538	33.7	56.0	-22.3	21.3	46.0	-24.7
3.834	34.3	56.0	-21.7	21.9	46.0	-24.1
6.753	28.9	60.0	-31.1	21.0	50.0	-29.0

Table 10



Figure 4 - Test Setup

2.1.8 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
3 Phase Artificial Mains Network (LISN)	Rohde & Schwarz	ESH2-Z5	16	12	13-Feb-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Transient Limiter	Hewlett Packard	11947A	2377	12	16-Feb-2018
Compliance 5 Emissions	Schaffner	C5e Software	3275	-	Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017

Table 11

2.2 Radiated Disturbance

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

SOS 300 S/N: #1761 - Modification State 0

2.2.3 Date of Test

25-May-2017

2.2.4 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< support 0.1m above a reference ground plane.

A prescan of the EUT emissions profile was made while varying the antenna to the EUT azimuth and antenna to the EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected and their bearing and associated antenna polarisation, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximised by adjusting the antenna height, polarisation and turntable azimuth, in accordance with the specification.

2.2.5 Environmental Conditions

Ambient Temperature 21.2 °C
Relative Humidity 43.0 %

2.2.6 Specification Limits

Required Specification Limits, Field Strength (Class B @ 3m)		
Frequency Range (MHz)	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
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 < 1GHz Average detector to be used for measurements > 1GHz		

Table 12

2.2.7 Test Results

Results for Configuration and Mode: AC Powered - 110 V AC Charging.

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

Detailed results are shown below.

Highest frequency generated or used within the EUT: 1626.5MHz
Which necessitates an upper frequency test limit of: 8.2 GHz

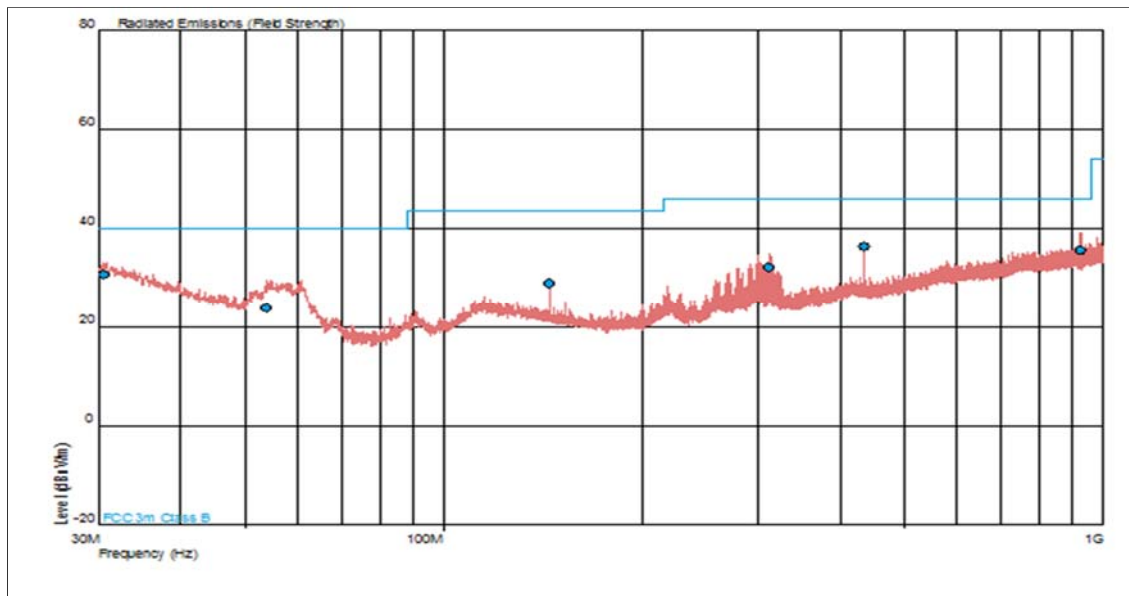


Figure 5 - Graphical Results - 30 MHz to 1 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.534	30.6	40.0	-9.4	359	1.00	Vertical
53.855	23.9	40.0	-16.1	110	1.00	Vertical
144.698	28.9	43.5	-14.6	119	1.00	Vertical
310.836	32.1	46.0	-13.9	13	1.00	Horizontal
434.206	36.3	46.0	-9.7	26	1.08	Vertical
923.491	35.6	46.0	-10.4	86	1.00	Vertical

Table 13

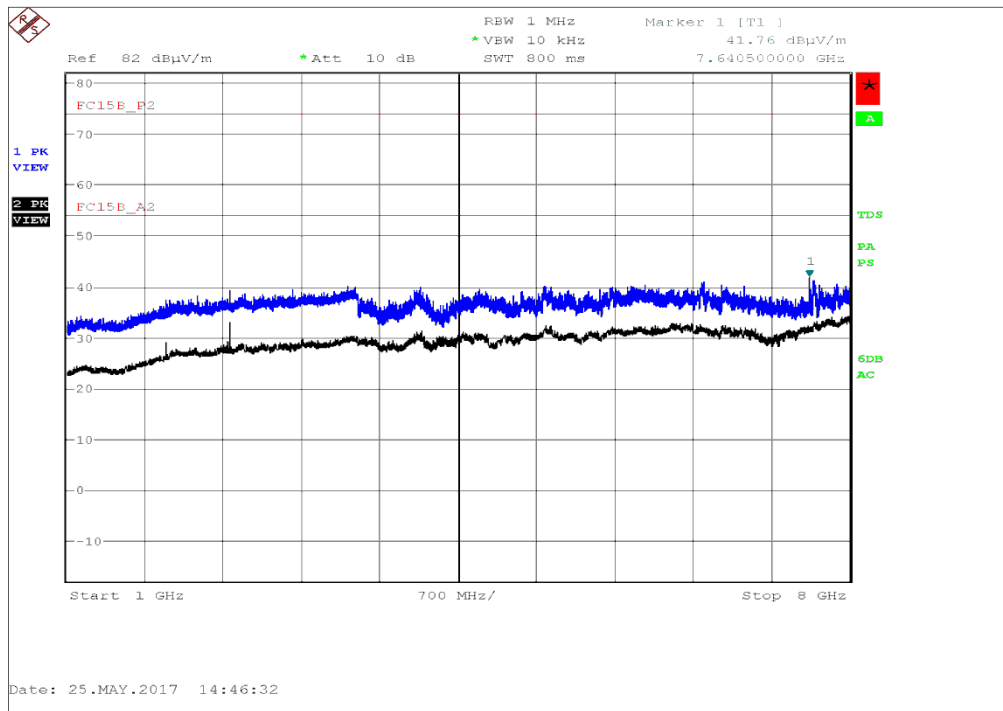


Figure 6 - Graphical Results - 1 GHz to 8 GHz

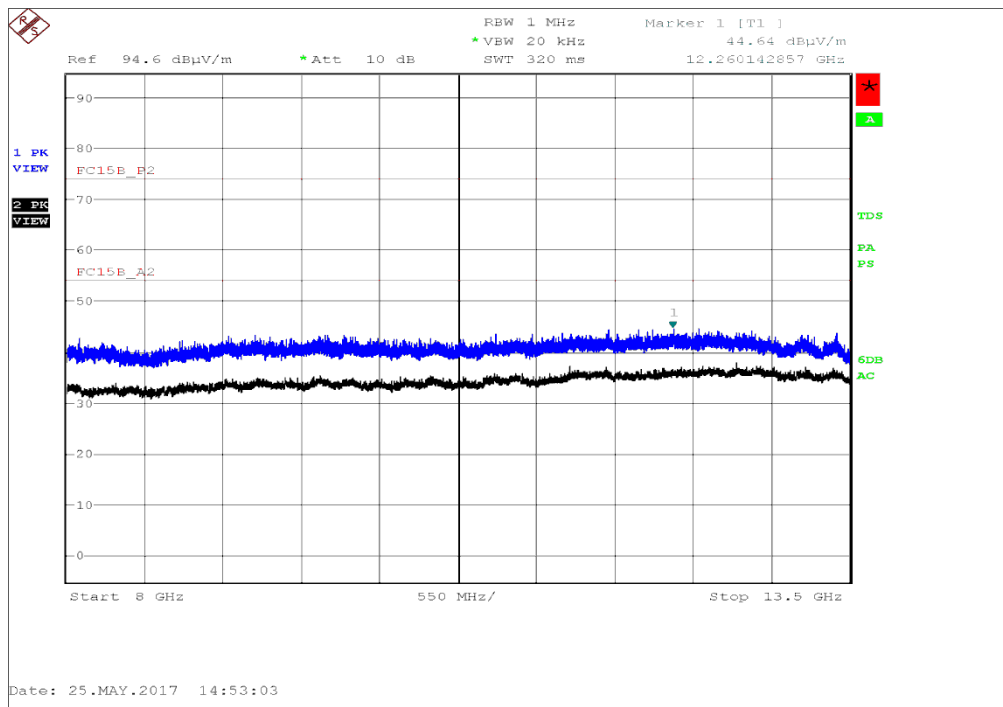


Figure 7 - Graphical Results - 8 GHz to 13.5 GHz

No formal measurements were made as all peak emissions seen were greater than 6dB below the average test limit.



Figure 8 - Test Setup - < 1 GHz setup



Figure 9 - Test Setup - > 1 GHz setup

2.2.8 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
Pre-Amplifier	Phase One	PS04-0086	1533	12	29-Jul-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Compliance 5 Emissions	Schaffner	C5e Software	3275		Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Mast Controller	matur GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	17-Oct-2017

Table 14

TU - Traceability Unscheduled

3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Conducted Disturbance at Mains Terminals	150 kHz to 30 MHz, LISN, ±3.7 dB
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 10⁶.