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Report On

FCC Testing of the Sharp SHT22 Dual-band CDMA (BC0, BC6), Tri-band LTE (B1, B11, B18). Dual mode Tablet PC with Bluetooth, WLAN, SRD(NFC) and GPS

In accordance with FCC CFR 47 Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00200

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February 2014



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DATED

04 February 2014

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 CFR 47 Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

T Guy





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CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Product Technical Description 6
1.4	Product Information 6
1.5	Test Conditions 6
1.6	Deviations from the Standard 6
1.7	Modification Record 6
2	TEST DETAILS 7
2.1	AC Line Conducted Emissions 8
2.2	Radiated Emissions 11
3	TEST EQUIPMENT USED 15
3.1	Test Equipment Used 16
3.2	Measurement Uncertainty 17
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 18
4.1	Accreditation, Disclaimers and Copyright 19



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHT22 Dual-band CDMA (BC0, BC6), Tri-band LTE (B1, B11, B18). Dual mode Tablet
PC with Bluetooth, WLAN, SRD(NFC) and GPS
In accordance with FCC CFR 47 Part 15B



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp SHT22 Dual-band CDMA (BC0, BC6), Tri-band LTE (B1, B11, B18). Dual mode Tablet PC with Bluetooth, WLAN, SRD(NFC) and GPS to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	SHT22
Serial Number(s)	IMEI 004401115013308
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2012)
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	9947
Date	18 December 2013
Start of Test	17 January 2014
Finish of Test	21 January 2014
Name of Engineer(s)	G Lawler T Guy
Related Documents	ANSI C63.4 (2003)



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1.2 BRIEF SUMMARY OF RESULTS

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

Section	Spec Clause	Test Description	Result	Comments/Base Standard
AC Powered/USB with GPS Rx Operational				
2.1	15.107	AC Line Conducted Emissions	Pass	ANSI C63.4 (2003)
2.2	15.109	Radiated Emissions	Pass	ANSI C63.4 (2003)



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1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the SHT22 Model Description Form.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHT22 Dual-band CDMA (BC0, BC6), Tri-band LTE (B1, B11, B18). Dual mode Tablet PC with Bluetooth, WLAN, SRD(NFC) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 4.0 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



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SECTION 2

TEST DETAILS

FCC Testing of the
Sharp SHT22 Dual-band CDMA (BC0, BC6), Tri-band LTE (B1, B11, B18). Dual mode Tablet
PC with Bluetooth, WLAN, SRD(NFC) and GPS
In accordance with FCC CFR 47 Part 15B



Product Service

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.107

2.1.2 Equipment Under Test and Modification State

SHT22 S/N: IMEI 004401115013308 - Modification State 0

2.1.3 Date of Test

21 January 2014

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

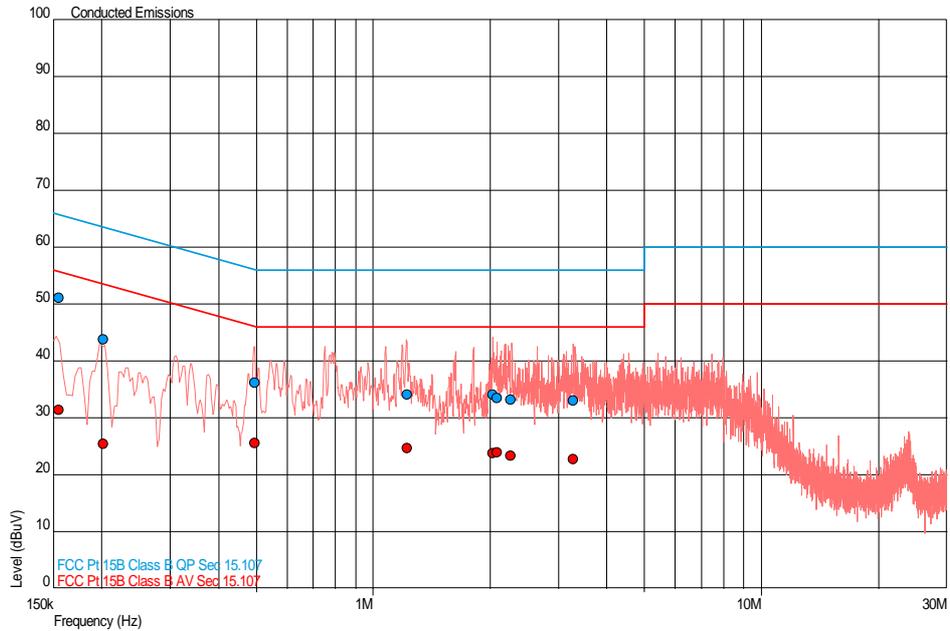
2.1.6 Environmental Conditions

Ambient Temperature	22.9°C
Relative Humidity	26.0%



2.1.7 Test Results

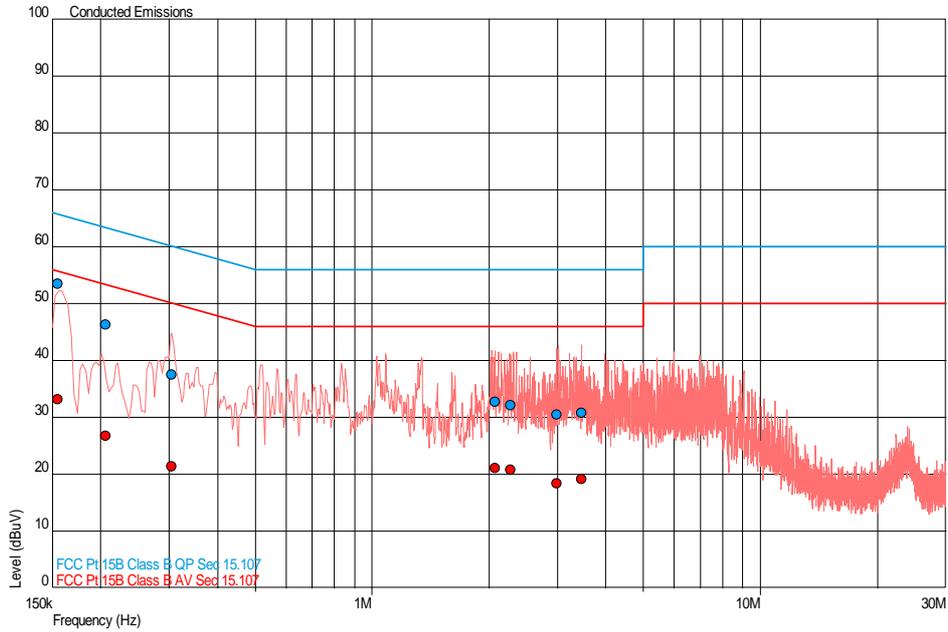
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.155	51.1	65.7	-14.7	31.4	55.7	-24.3
0.202	43.9	63.5	-19.7	25.4	53.5	-28.2
0.496	36.2	56.1	-19.8	25.6	46.1	-20.4
1.222	34.1	56.0	-21.9	24.7	46.0	-21.3
2.030	34.1	56.0	-21.9	23.8	46.0	-22.2
2.081	33.6	56.0	-22.4	23.9	46.0	-22.1
2.264	33.2	56.0	-22.8	23.4	46.0	-22.6
3.280	33.0	56.0	-23.0	22.7	46.0	-23.3



Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.155	53.5	65.7	-12.3	33.3	55.7	-22.5
0.206	46.3	63.3	-17.0	26.7	53.3	-26.6
0.305	37.5	60.1	-22.6	21.4	50.1	-28.7
2.076	32.8	56.0	-23.2	21.1	46.0	-24.9
2.269	32.2	56.0	-23.8	20.9	46.0	-25.1
2.987	30.5	56.0	-25.5	18.4	46.0	-27.6
3.463	30.8	56.0	-25.2	19.1	46.0	-26.9



2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

SHT22 S/N: IMEI 004401115013308 - Modification State 0

2.2.3 Date of Test

17 January 2014, 18 January 2014 & 19 January 2014

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions is obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using a peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

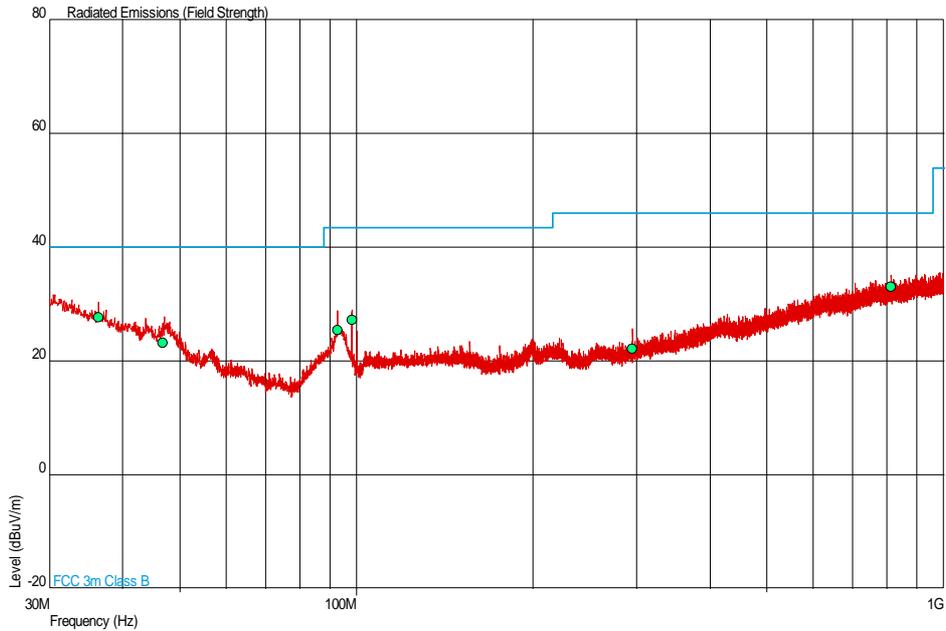
2.2.6 Environmental Conditions

Ambient Temperature	20.4 - 21.5°C
Relative Humidity	33.0 - 36.0%



2.2.7 Test Results

30 MHz to 1 GHz

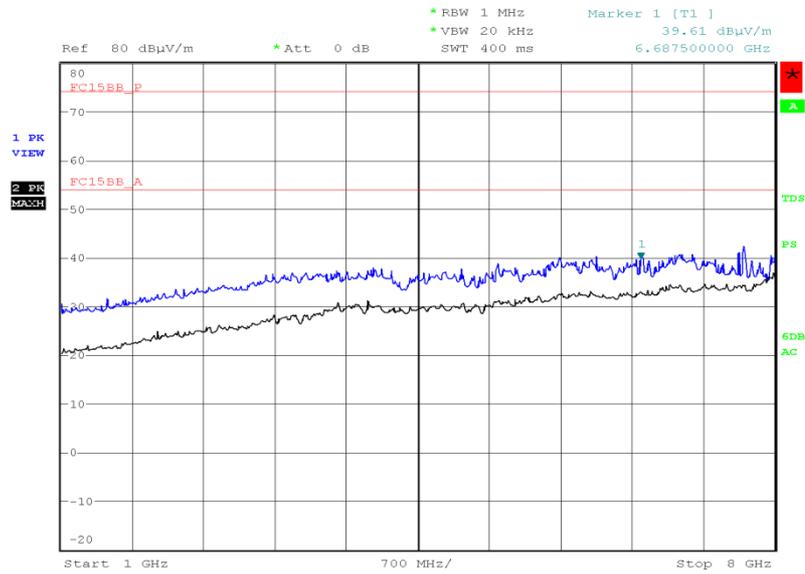


Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
36.387	27.7	24.3	40.0	100	-12.3	75.7	294	1.00	Vertical
46.785	23.2	14.5	40.0	100	-16.8	85.5	0	1.00	Vertical
92.899	25.5	18.8	43.5	150	-18.0	131.2	360	1.00	Vertical
98.200	27.3	23.2	43.5	150	-16.2	126.8	334	1.00	Vertical
295.445	22.1	12.7	46.0	200	-23.9	187.3	203	1.00	Horizontal
812.984	33.1	45.2	46.0	200	-12.9	154.8	159	1.00	Horizontal



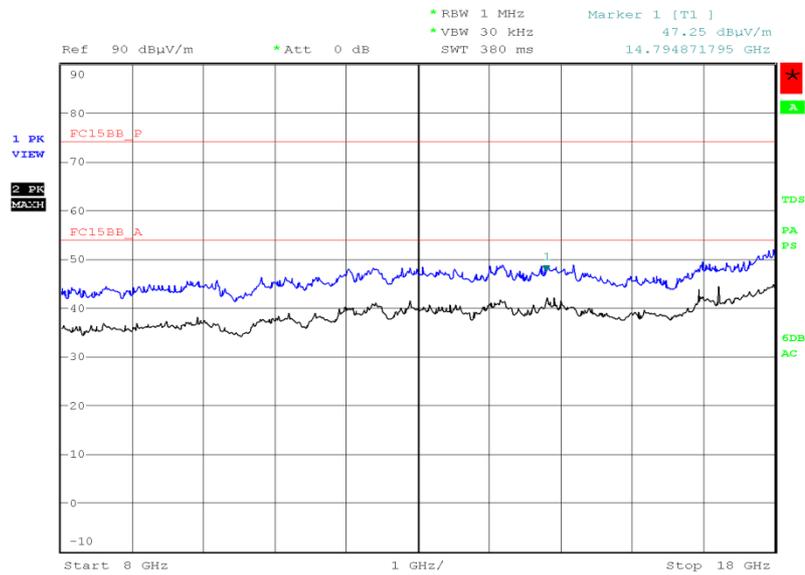
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1 GHz to 8 GHz



Date: 18.JAN.2014 04:49:47

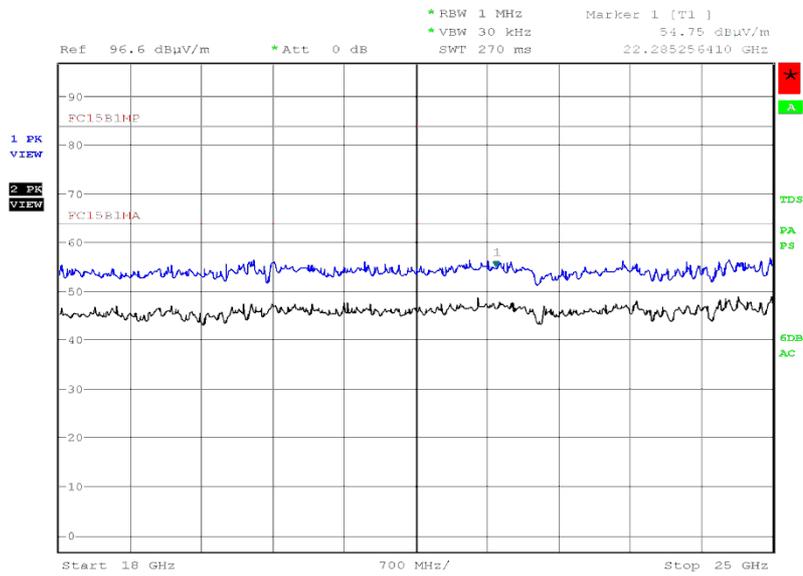
8 GHz to 18 GHz



Date: 19.JAN.2014 02:50:41

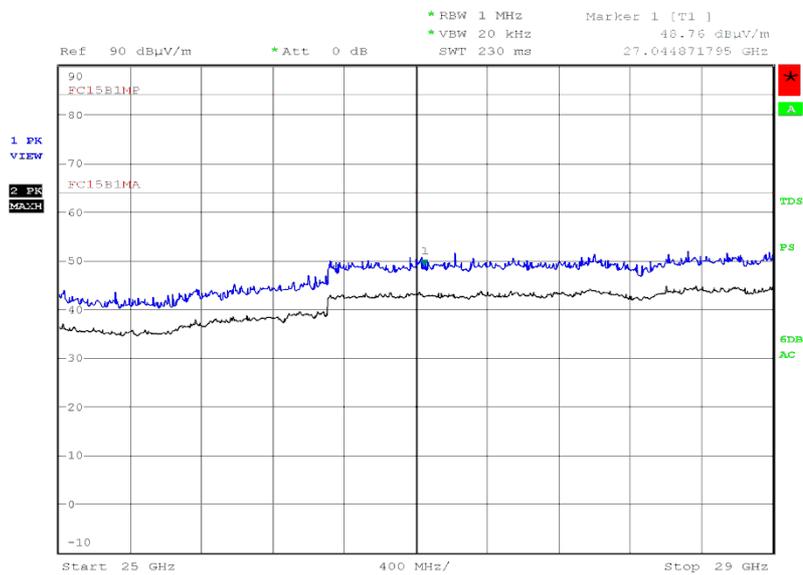


8 GHz to 25 GHz



Date: 19.JAN.2014 03:17:07

25 GHz to 29 GHz



Date: 23.JAN.2014 03:44:28

The limit of 74.0dBμV/m Peak (detector) and 54.0dBμV/m Average (10Hz VBW) was relaxed to 84dBμV/m and 64dBμV/m due to the measurement taking place at 1 metre from the EUT.



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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – AC Line Conducted Emissions					
LISN (1 Phase)	Chase	MN 2050	336	12	28-Mar-2014
Screened Room (5)	Rainford	Rainford	1545	36	25-Jan-2014
Transient Limiter	Hewlett Packard	11947A	2377	12	13-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2- Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	7-Nov-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Pre-Amplifier	Phase One	PSO4-0087	1534	12	30-Sep-2014
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	1-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014

TU – Traceability Unscheduled



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3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Radiated Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
AC Line Conducted Emissions	± 3.2 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

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
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