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Report On

FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 15B

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FCC ID: APYHRO00218

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May 2015



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REPORT ON

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DATED

22 May 2015

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.

Test Engineer(s);

T Guy

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V),
Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with
Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 15B



1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS to the requirements of FCC 47 CFR 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)	SHV32
Serial Number(s)	IMEI 004401115407500
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B (2014)
Disposal	Held Pending Disposal
Reference Number	Not Applicable
Date	Not Applicable
Order Number	10477
Date	02 March 2015
Start of Test	17 April 2015
Finish of Test	25 April 2015
Name of Engineer(s)	T Guy
Related Document(s)	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 47 CFR 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	
2.2	15.109	Radiated Emissions	Pass	



1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the SHV32 Model Description Form.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V) , Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) 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 4.0 V DC supplied from the battery with the AC/DC Adapter connected and in a charging state.

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.
Modification 1 - ANSI C63.2-2003 reference revised.



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SECTION 2

TEST DETAILS

FCC Testing of the
Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V),
Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with
Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 15B



Product Service

2.1 AC LINE CONDUCTED EMISSIONS**2.1.1 Specification Reference**

FCC 47 CFR Part 15B, Clause 15.107

2.1.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115407500 - Modification State 0

2.1.3 Date of Test

25 April 2015

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

Remarks

A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.107.

2.1.6 Environmental Conditions

Ambient Temperature	20.5°C
Relative Humidity	33.0%

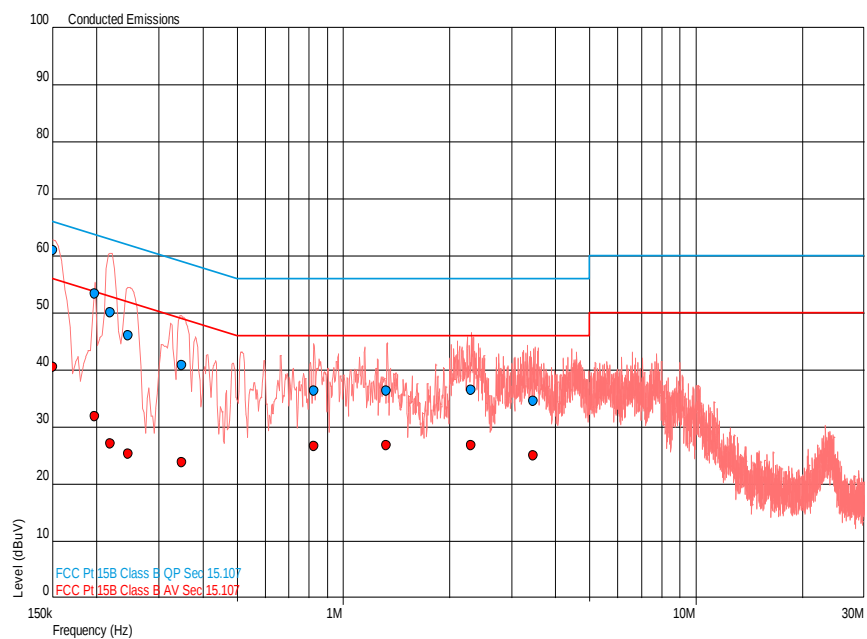


2.1.7 Test Results

AC Powered/USB with GPS Rx Operational, Live Line Results

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	61.0	66.0	-5.0	40.5	56.0	-15.5
0.198	53.4	63.7	-10.3	31.8	53.7	-21.9
0.219	50.0	62.9	-12.9	27.1	52.9	-25.7
0.246	46.1	61.9	-15.8	25.3	51.9	-26.6
0.349	40.8	59.0	-18.2	23.8	49.0	-25.2
0.825	36.3	56.0	-19.7	26.6	46.0	-19.4
1.329	36.4	56.0	-19.6	26.8	46.0	-19.2
2.305	36.4	56.0	-19.6	26.7	46.0	-19.3

AC Powered/USB with GPS Rx Operational, Live Line Plot

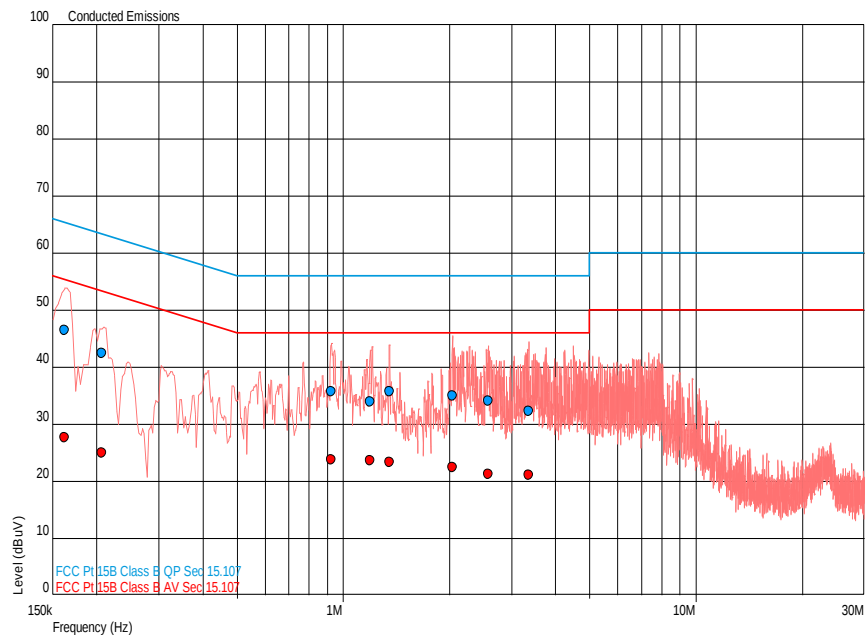




AC Powered/USB with GPS Rx Operational, Neutral Line Results

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.162	46.5	65.4	-18.9	27.7	55.4	-27.7
0.208	42.4	63.3	-20.9	25.0	53.3	-28.3
0.926	35.8	56.0	-20.2	23.8	46.0	-22.2
1.194	34.0	56.0	-22.0	23.7	46.0	-22.3
1.350	35.8	56.0	-20.2	23.4	46.0	-22.6
2.044	35.0	56.0	-21.0	22.5	46.0	-23.5
2.573	34.1	56.0	-21.9	21.3	46.0	-24.7
3.355	32.4	56.0	-23.6	21.1	46.0	-24.9

AC Powered/USB with GPS Rx Operational, Neutral Line Plot



FCC 47 CFR Part 15, Limit Clause 15.107

Class B

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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

*Decreases with the logarithm of the frequency.



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2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115407500 - Modification State 0

2.2.3 Date of Test

17 April 2015 & 19 April 2015

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

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

Remarks

When frequencies greater than 18 GHz were measured the EUT was positioned 1 m above the horizontal reference ground plane.

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.109.

2.2.6 Environmental Conditions

Ambient Temperature	19.7 - 19.9°C
Relative Humidity	30.1 - 32.6%

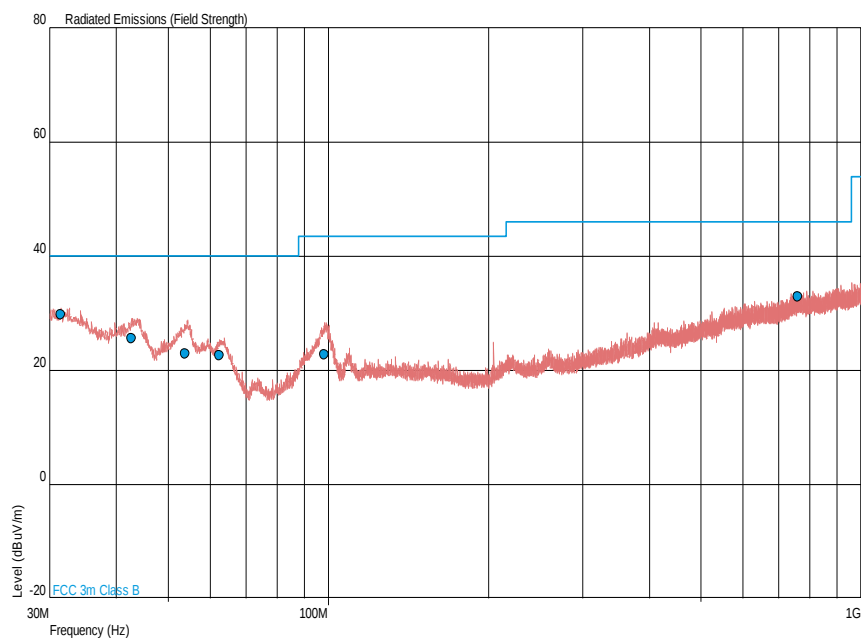


2.2.7 Test Results

AC Powered/USB with GPS Rx Operational, 30 MHz to 1 GHz Results

Frequency (MHz)	Quasi-Peak Level (dB μ V/m)	Quasi-Peak Level (μ V/m)	Quasi-Peak Margin (d μ V/m)	Quasi-Peak Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
31.500	29.8	-10.2	30.9	-69.1	7	1.00	Vertical
42.783	25.6	-14.4	19.1	-80.9	109	1.00	Vertical
53.949	23.0	-17.0	14.1	-85.9	360	1.00	Vertical
62.564	22.6	-17.4	13.5	-86.5	353	1.00	Vertical
98.434	22.7	-20.8	13.6	-136.4	229	1.25	Vertical
761.234	32.9	-13.1	44.2	-155.8	0	1.00	Horizontal

AC Powered/USB with GPS Rx Operational, 30 MHz to 1 GHz Plot



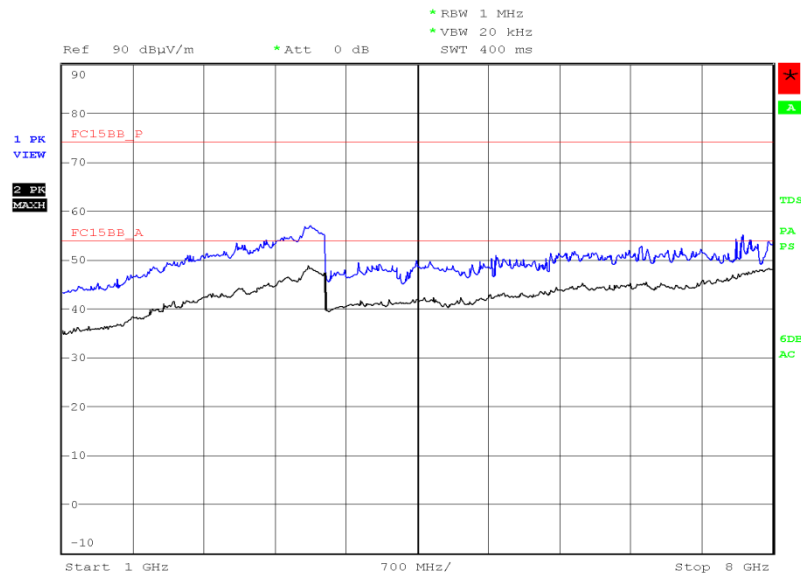
AC Powered/USB with GPS Rx Operational, 1 GHz to 30 GHz Results

Frequency (MHz)	Average Level (dB μ V/m)	Peak Level (dB μ V/m)	Average Level (μ V/m)	Peak Level (μ V/m)	Angle (deg)	Height (m)	Polarisation
*							

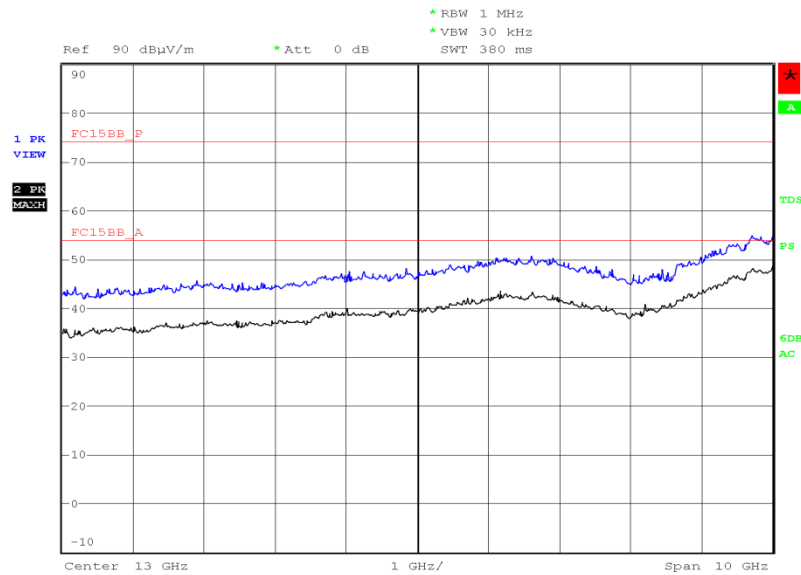
*No emissions were detected within 10 dB of the limit.



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AC Powered/USB with GPS Rx Operational, 1 GHz to 8 GHz Plot

Date: 17.APR.2015 04:06:23

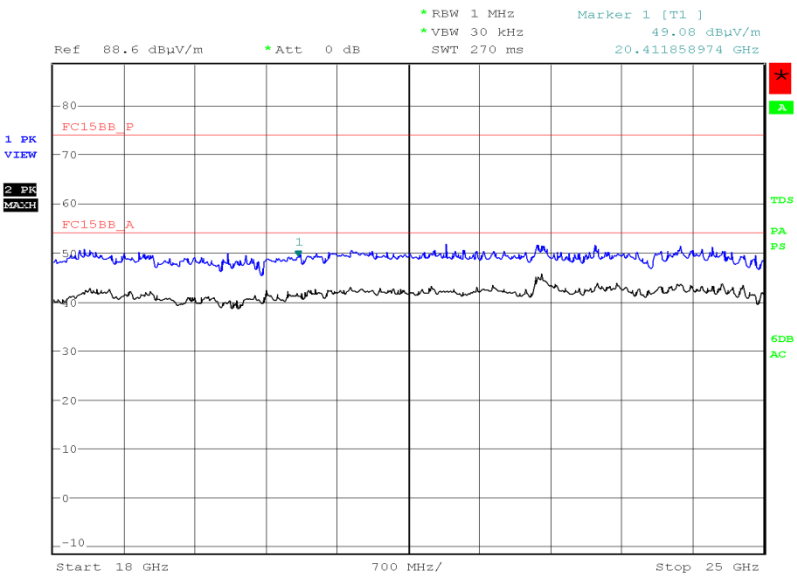
AC Powered/USB with GPS Rx Operational, 8 GHz to 18 GHz Plot

Date: 17.APR.2015 04:29:43



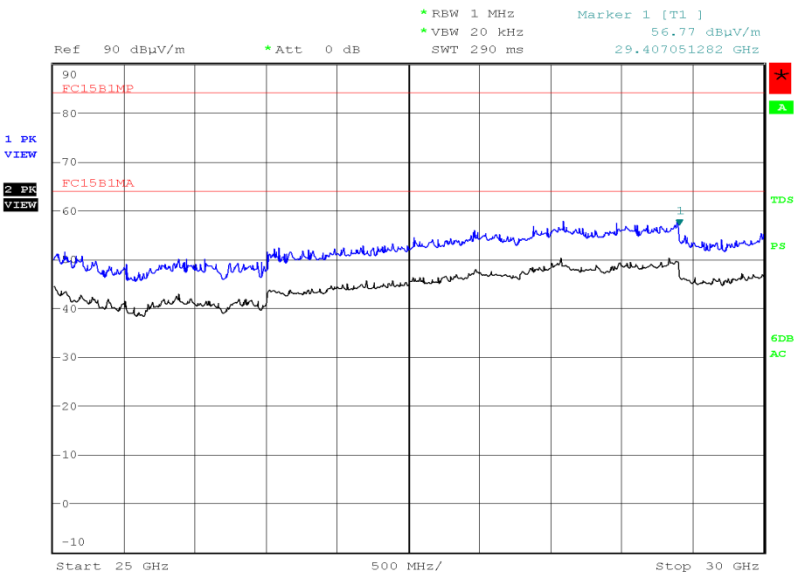
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AC Powered/USB with GPS Rx Operational, 18 GHz to 25 GHz Plot



Date: 19.APR.2015 05:26:18

AC Powered/USB with GPS Rx Operational, 25 GHz to 30 GHz Plot



Date: 19.APR.2015 05:42:25



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FCC 47 CFR Part 15, Limit Clause 15.109Class B

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500



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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					
Transient Limiter	Hewlett Packard	11947A	15	12	16-Dec-2015
LISN (1 Phase)	Chase	MN 2050	336	12	1-Apr-2016
EMC Chamber 5	Rainford	Screened Room (5)	1545	6	26-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
Section 2.2 - Radiated Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	26-Nov-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	23-Dec-2015
Pre-Amplifier	Phase One	PS04-0087	1534	12	23-Dec-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

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