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# Report On

FCC Testing of the  
Sharp SHF32 Quad-band GSM (850/900/1800/1900) & Dual-band  
UMTS (FDDI, FDDV) & Dual-band LTE (B1, B26) multi mode cellular  
phone with Bluetooth, WLAN, SRD(FeliCa) and GPS  
In accordance with FCC 47 CFR Part 15B

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FCC ID: APYHRO00224

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June 2015



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**DATED**

19 June 2015

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**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);

G Lawler





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**CONTENTS**

<b>Section</b>	<b>Page No</b>
<b>1</b>	<b>REPORT SUMMARY ..... 3</b>
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
<b>2</b>	<b>TEST DETAILS ..... 7</b>
2.1	AC Line Conducted Emissions ..... 8
2.2	Radiated Emissions ..... 11
<b>3</b>	<b>TEST EQUIPMENT USED ..... 15</b>
3.1	Test Equipment Used ..... 16
3.2	Measurement Uncertainty ..... 17
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 18</b>
4.1	Accreditation, Disclaimers and Copyright ..... 19



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## **SECTION 1**

### **REPORT SUMMARY**

FCC Testing of the  
Sharp SHF32 Quad-band GSM (850/900/1800/1900) & Dual-band UMTS (FDDI, FDDV) &  
Dual-band LTE (B1, B26) multi mode cellular phone with Bluetooth, WLAN, SRD(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 SHF32 Quad-band GSM (850/900/1800/1900) & Dual-band UMTS (FDDI, FDDV) & Dual-band LTE (B1, B26) multi mode cellular phone with Bluetooth, WLAN, SRD(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)	SHF32
Serial Number(s)	IMEI 004401115362564
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	10534
Date	17 April 2015
Start of Test	26 May 2015
Finish of Test	9 June 2015
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2009)



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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	Specification 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 SHF32 Model Description Form.

### 1.4 PRODUCT INFORMATION

#### 1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHF32 Quad-band GSM (850/900/1800/1900) & Dual-band UMTS (FDDI, FDDV) & Dual-band LTE (B1, B26) multi mode cellular phone with Bluetooth, WLAN, SRD(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 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 SHF32 Quad-band GSM (850/900/1800/1900) & Dual-band UMTS (FDDI, FDDV) &  
Dual-band LTE (B1, B26) multi mode cellular phone with Bluetooth, WLAN, SRD(FeliCa) and  
GPS  
In accordance with FCC 47 CFR Part 15B



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## 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

SHF32 S/N: IMEI 004401115362564 - Modification State 0

### 2.1.3 Date of Test

9 June 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	20.6°C
Relative Humidity	32.0%

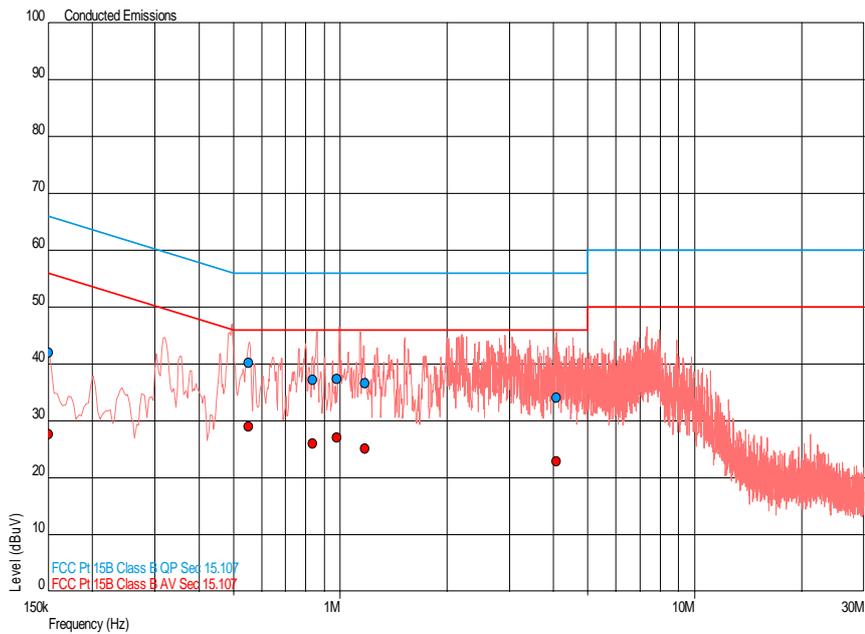


2.1.7 Test Results

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	42.1	66.0	-23.9	27.7	56.0	-28.3
0.551	40.3	56.0	-15.7	29.0	46.0	-17.0
0.836	37.3	56.0	-18.7	26.1	46.0	-19.9
0.976	37.4	56.0	-18.6	27.1	46.0	-18.9
1.172	36.7	56.0	-19.3	25.1	46.0	-20.9
4.066	34.1	56.0	-21.9	22.9	46.0	-23.1

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

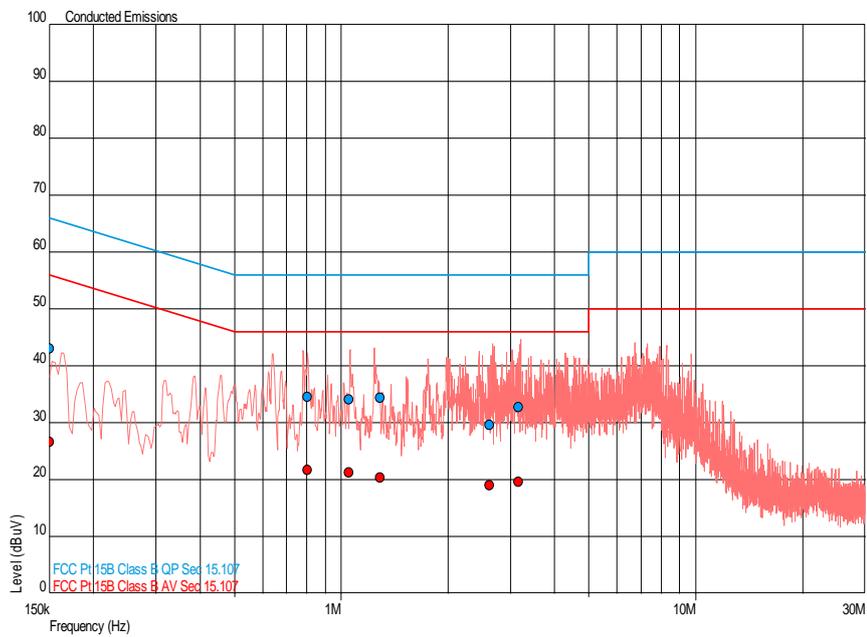




AC Powered/USB with GPS Rx Operational, Neutral Line Results

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	43.0	66.0	-23.0	26.6	56.0	-29.4
0.801	34.5	56.0	-21.5	21.7	46.0	-24.3
1.051	34.1	56.0	-21.9	21.3	46.0	-24.7
1.284	34.3	56.0	-21.7	20.4	46.0	-25.6
2.622	29.7	56.0	-26.3	19.0	46.0	-27.0
3.163	32.7	56.0	-23.3	19.6	46.0	-26.4

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

SHF32 S/N: IMEI 004401115362564 - Modification State 0

### 2.2.3 Date of Test

26 May 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

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	21.0°C
Relative Humidity	37.0%



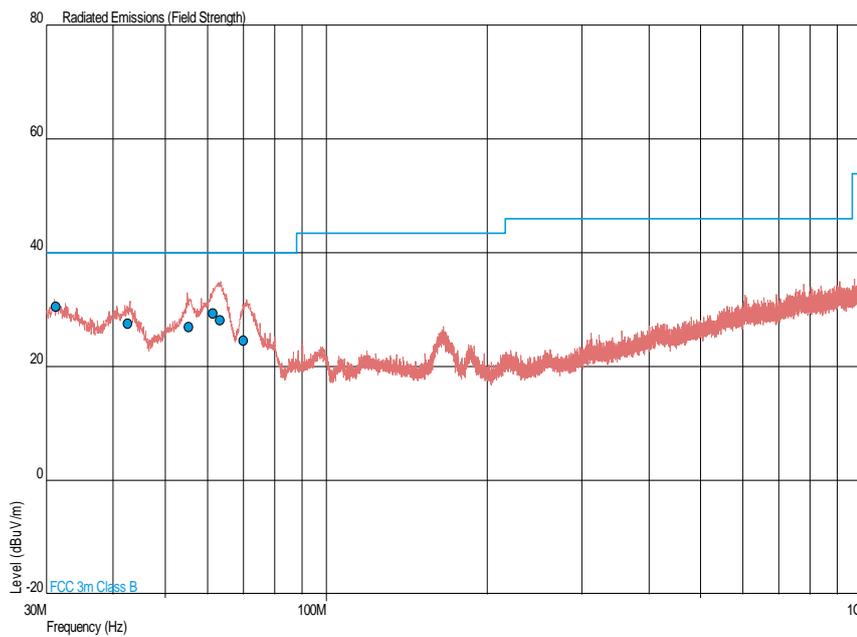
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2.2.7 Test Results

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

Frequency (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Level (µV/m)	Quasi-Peak Margin (dBµV/m)	Quasi-Peak Margin (µV/m)	Angle (°)	Height (m)	Polarisation
31.269	30.6	33.9	-9.4	-66.1	354	1.00	Vertical
42.613	27.5	23.7	-12.5	-76.3	150	1.00	Vertical
55.408	26.9	22.1	-13.1	-77.9	26	1.00	Vertical
61.362	29.3	29.2	-10.7	-70.8	360	1.04	Vertical
63.359	28.2	25.7	-11.8	-74.3	341	1.00	Vertical
70.109	24.6	17.0	-15.4	-83.0	19	1.00	Vertical

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

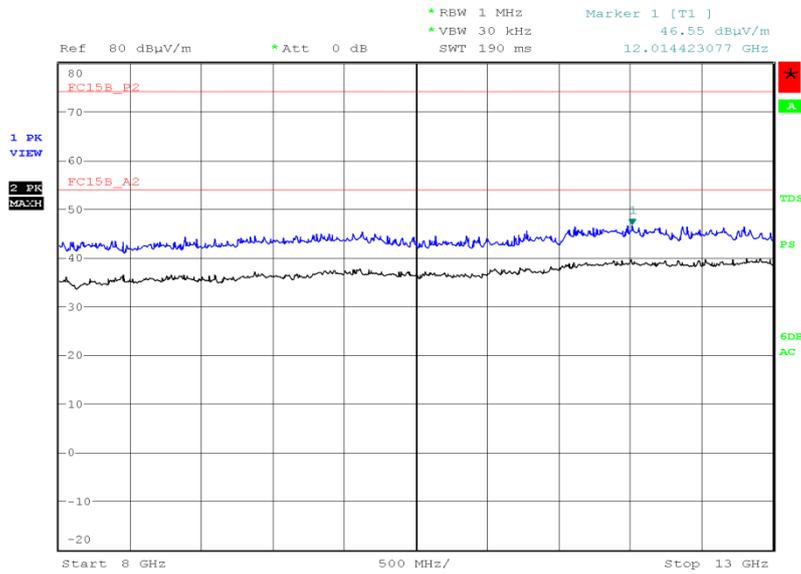






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AC Powered/USB with GPS Rx Operational, 8 GHz to 13 GHz Plot



Date: 26.MAY.2015 19:10:14

FCC 47 CFR Part 15, Limit Clause 15.109

Class 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
<b>Section 2.1 – AC Line Conducted Emissions</b>					
Transient Limiter	Hewlett Packard	11947A	15	12	16-Dec-2015
LISN (1 Phase)	Chase	MN 2050	336	12	1-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	24	26-Jun-2015
Multimeter	Iso-tech	IDM101	2418	12	26-Sep-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
<b>Section 2.2 - Radiated Emissions</b>					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	12	23-Dec-2015
Screened Room (5)	Rainford	Rainford	1545	24	26-Jun-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2418	12	26-Sep-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000- NPS	3791	-	TU
Tilt Antenna Mast	maturu GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturu GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2015
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000- KPS	4527	6	29-Jul-2015
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM- 00.50M	4528	6	29-Jul-2015

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	$\pm 3.2$ dB
Radiated Emissions	30 MHz to 1 GHz: $\pm 5.1$ dB 1 GHz to 40 GHz: $\pm 6.3$ 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 (Not UKAS Accredited).

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