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Report On

FCC Testing of the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B26) multi mode cellular phone with Bluetooth, WLAN, SRD (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00215

Document 75928270 Report 14 Issue 1 January 2015

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REPORT ON

FCC Testing of the
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Document 75928270 Report 14 Issue 1

January 2015

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DATED 14 January 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 CFR 47 Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

J Tuckwell G Lawler

Product Service

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B26) multi mode cellular phone with Bluetooth, WLAN, SRD (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15B

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B26) multi mode cellular phone with Bluetooth, WLAN, SRD (FeliCa) 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
Serial Number(s)	IMEI 004401115348993
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2013)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10330 20 October 2014
Start of Test	18 December 2014
Finish of Test	11 January 2015
Name of Engineer(s)	J Tuckwell G Lawler
Related Document(s)	ANSI C63.4 (2014)

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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
2.2	15.109	Radiated Emissions	Pass	ANSI C63.4

1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the Model Description Form, reference FCC ID: APYHRO00215.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, 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 were made during testing.

1.7 MODIFICATION RECORD

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

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B26) multi mode cellular phone with Bluetooth, WLAN, SRD (FeliCa) and GPS
In accordance with FCC CFR 47 Part 15B

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

S/N: IMEI 004401115348993 - Modification State 0

2.1.3 Date of Test

19 December 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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane. A vertical reference ground plane was situated 40 cm from the EUT and bonded to the horizontal reference ground plane.

The EUT was powered by a Line Impedance Stabilization Network (LISN), whereby emissions measurements of the current-carrying conductors were made through this LISN. The LISN was bonded to the horizontal reference ground plane with a separation distance greater than 80 cm from the EUT. A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

A preliminary emissions scan was conducted for each current-carrying conductor of the EUT, using a peak detector over a frequency range of 150 kHz to 30 MHz. At least six of the greatest peak emissions, frequency positions were selected from each preliminary emissions scan for further evaluation as final measuring points.

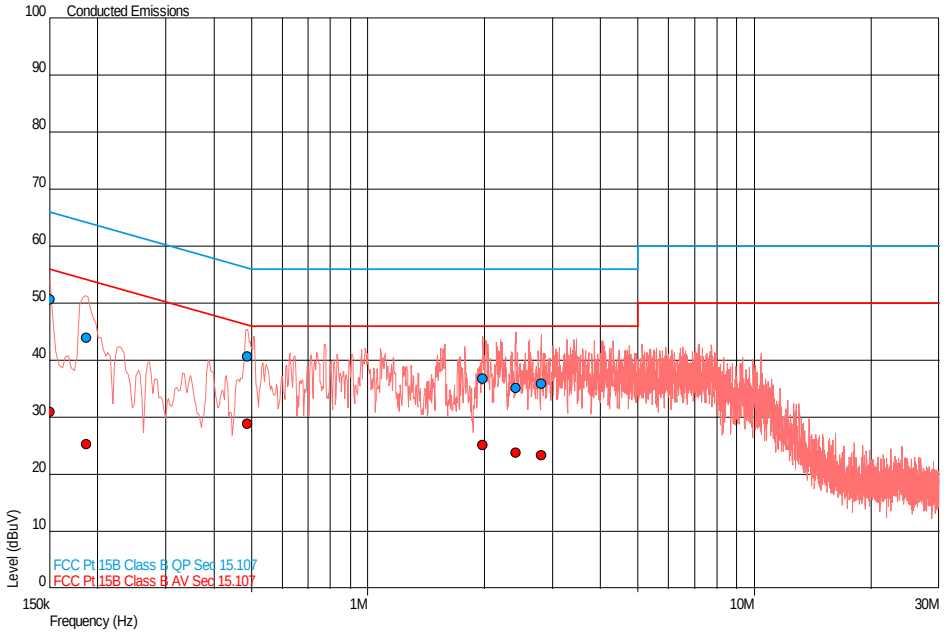
Final measurement points were measured using quasi-peak and average detectors. All final measurements were assessed against the emission limits in Clause 15.107 of FCC CFR 47 FCC Part 15.

2.1.6 Environmental Conditions

Ambient Temperature	21.0°C
Relative Humidity	39.0%

2.1.7 Test Results

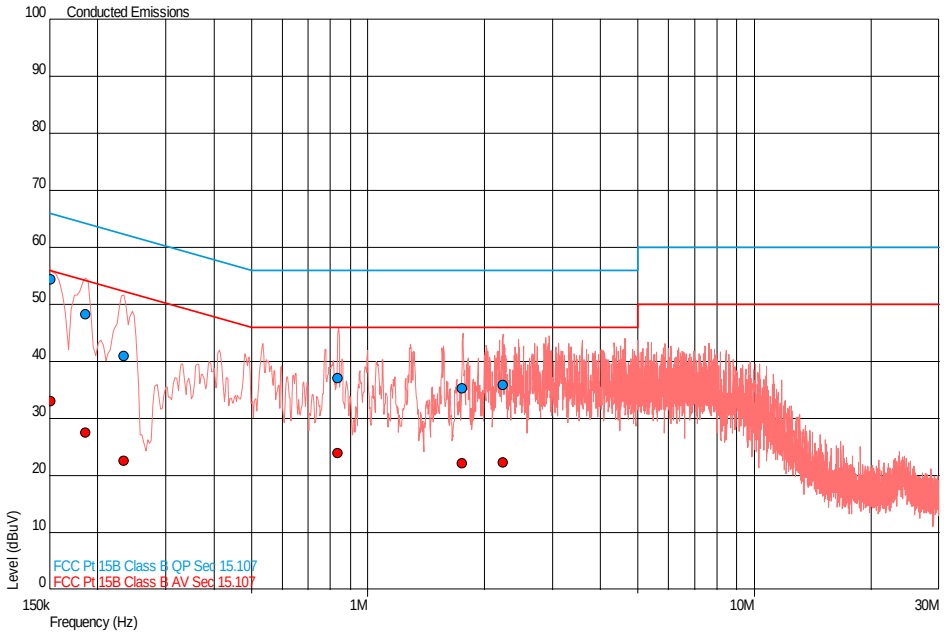
Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	50.7	66.0	-15.3	31.0	56.0	-25.0
0.187	44.0	64.2	-20.2	25.3	54.2	-28.9
0.488	40.7	56.2	-15.5	28.9	46.2	-17.3
1.983	36.7	56.0	-19.3	25.2	46.0	-20.8
2.414	35.1	56.0	-20.9	23.8	46.0	-22.2
2.810	35.9	56.0	-20.1	23.4	46.0	-22.6

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.151	54.4	66.0	-11.5	33.1	56.0	-22.9
0.186	48.2	64.2	-16.0	27.5	54.2	-26.7
0.234	41.0	62.3	-21.3	22.6	52.3	-29.7
0.836	37.1	56.0	-18.9	24.0	46.0	-22.0
1.754	35.4	56.0	-20.6	22.1	46.0	-23.9
2.235	35.9	56.0	-20.1	22.3	46.0	-23.7

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

S/N: IMEI 004401115348993 - Modification State 0

2.2.3 Date of Test

18 December 2014 & 11 January 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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane. The EUT was set upon a non-conducting platform during testing.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 13 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 13 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 30 kHz.

Product Service

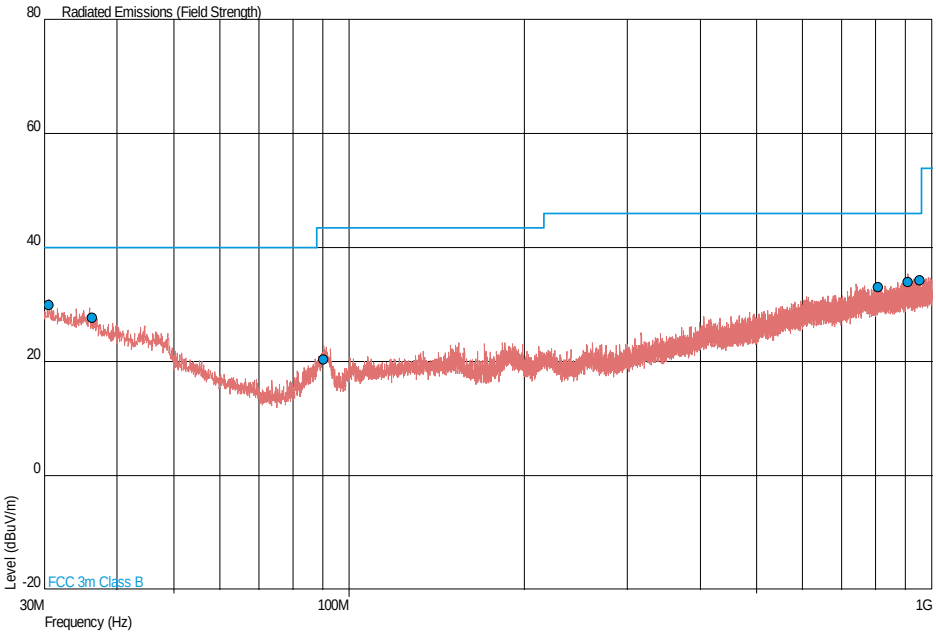
All final measurements were assessed against the Class B emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15B.

2.2.6 Environmental Conditions

Ambient Temperature	20.5 - 21.8°C
Relative Humidity	25.0 - 44.0%

2.2.7 Test Results

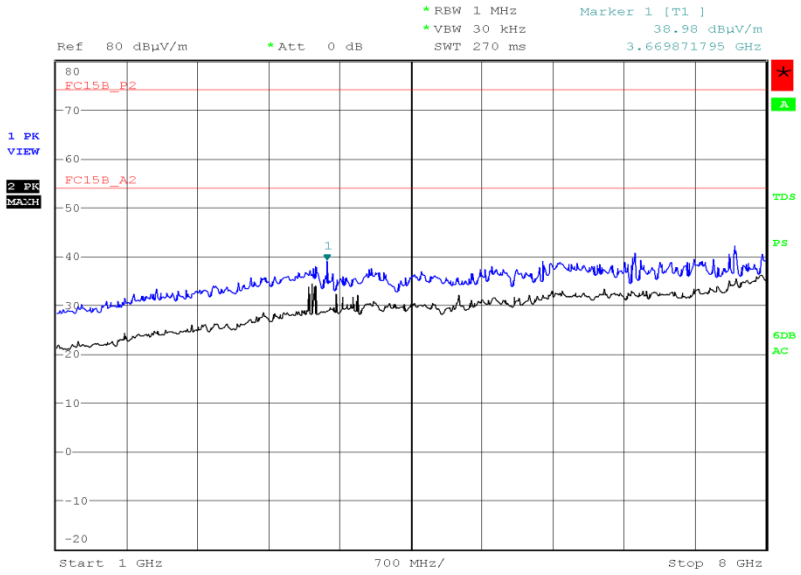
30 MHz to 1 GHz



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
30.570	30.0	31.6	40.0	100	-10.0	-68.4	102	1.00	Vertical
36.329	27.7	24.3	40.0	100	-12.3	-75.7	68	1.00	Vertical
90.537	20.4	10.5	43.5	150	-23.1	-139.5	96	1.00	Vertical
806.695	33.1	45.2	46.0	200	-12.9	-154.8	270	1.00	Horizontal
909.349	33.9	49.5	46.0	200	-12.1	-150.5	86	1.00	Horizontal
954.040	34.2	51.3	46.0	200	-11.8	-148.7	116	1.00	Vertical

Product Service

1 GHz to 8 GHz



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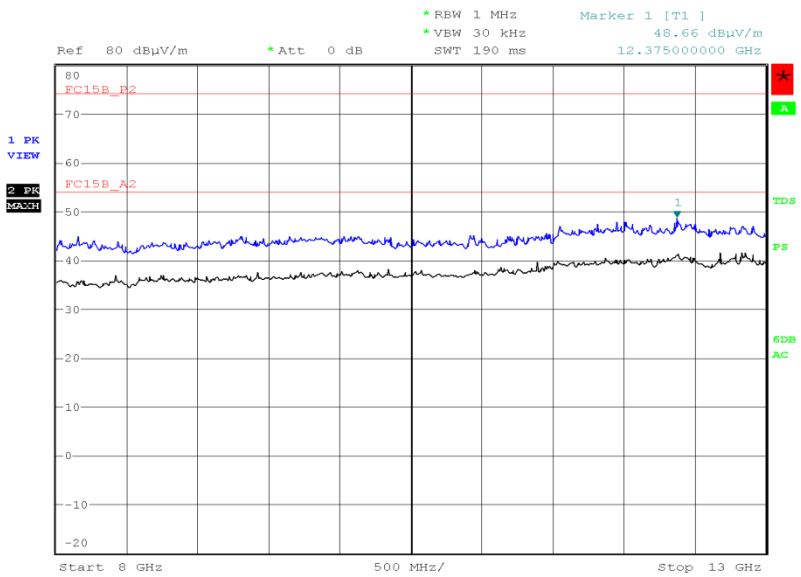
8 GHz to 13 GHz



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Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

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	28-Mar-2015
Screened Room (5)	Rainford	Rainford	1545	24	06-Jan-2017
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
Section 2.2- Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Pre-Amplifier	Phase One	PS04-0086	1533	12	23-Dec-2015
Screened Room (5)	Rainford	Rainford	1545	24	06-Jan-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	28-Feb-2015
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
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-2015

TU – Traceability Unscheduled

Product Service

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

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).