Report On

FCC Testing of the Sharp Quad-band LTE (B1/B3/B17/B26), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, and GPS
In accordance with FCC 47 CFR Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00238

Document 75934711 Report 12 Issue 2 **June 2016**

Product Service

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REPORT ON

FCC Testing of the Sharp Quad-band LTE (B1/B3/B17/B26), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, and GPS
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Document 75934711 Report 12 Issue 2

June 2016

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DATED 28 June 2016

This report has been up-issued to Issue 2 to amend the configuration description.

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

UKAS TESTING 0141

Product Service

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SECTION 1

REPORT SUMMARY

FCC Testing of the
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In accordance with FCC 47 CFR Part 15B

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1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp Quad-band LTE (B1/B3/B17/B26), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, 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
Serial Number(s)	IMEI 004401115813616
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B (2015)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10829 31 May 2016
Start of Test	13 June 2016
Finish of Test	14 June 2016
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2014)

Product Service

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 Android location services enabled				
2.1	15.107	AC Line Conducted Emissions	Pass	
2.2	15.109	Radiated Emissions	Pass	

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1.3 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00238 Rev 4.0 document.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp Quad-band LTE (B1/B3/B17/B26), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, 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.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp Quad-band LTE (B1/B3/B17/B26), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, 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

S/N: IMEI004401115813616 - Modification State 0

2.1.3 Date of Test

14 June 2016

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	18.9°C
Relative Humidity	64.0%

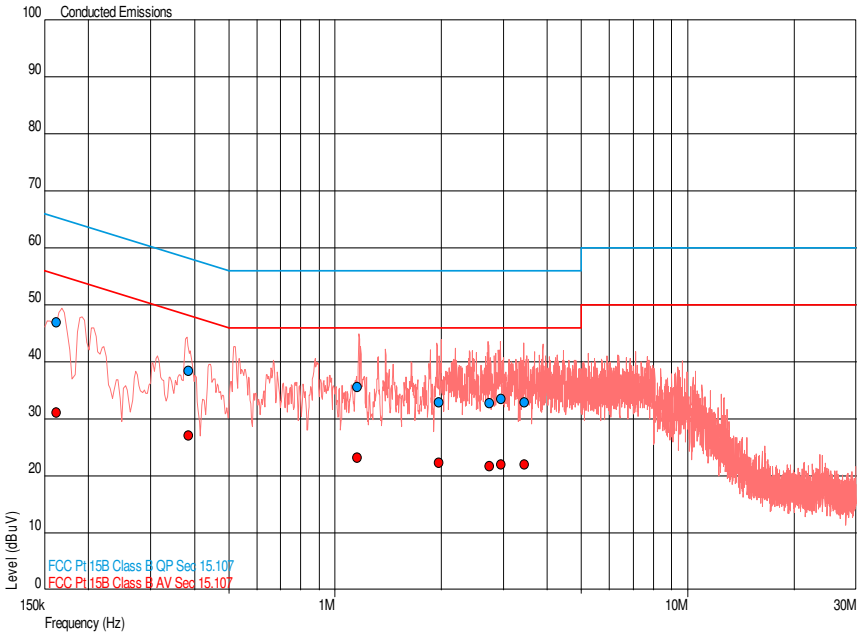
Product Service

2.1.7 Test Results

AC powered/USB with Android location services enabled, Live Line Results

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (µV/m)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.163	46.9	65.3	-18.4	31.1	55.3	-24.3
0.384	38.5	58.2	-19.7	27.0	48.2	-21.2
1.154	35.6	56.0	-20.4	23.3	46.0	-22.7
1.969	33.0	56.0	-23.0	22.3	46.0	-23.7
2.745	32.8	56.0	-23.2	21.8	46.0	-24.2
2.955	33.5	56.0	-22.5	22.0	46.0	-24.0
3.438	32.8	56.0	-23.2	22.0	46.0	-24.0

AC powered/USB with Android location services enabled, Live Line Plot

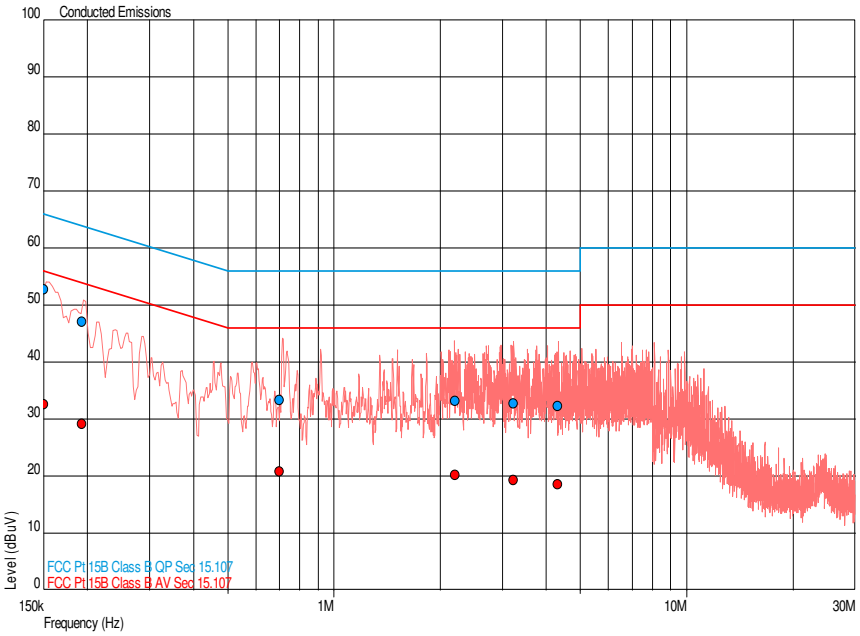


Product Service

AC powered/USB with Android location services enabled, Neutral Line Results

Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (µV/m)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.151	52.8	66.0	-13.2	32.6	56.0	-23.3
0.193	47.0	63.9	-16.9	29.2	53.9	-24.7
0.702	33.4	56.0	-22.6	20.8	46.0	-25.2
2.208	33.3	56.0	-22.7	20.3	46.0	-25.7
3.225	32.8	56.0	-23.2	19.3	46.0	-26.7
4.298	32.3	56.0	-23.7	18.5	46.0	-27.5

AC powered/USB with Android location services enabled, 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.

Product Service

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

S/N: IMEI004401115813616 - Modification State 0

2.2.3 Date of Test

13 June 2016 & 14 June 2016

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	18.9 - 19.6°C
Relative Humidity	64.0 - 65.0%

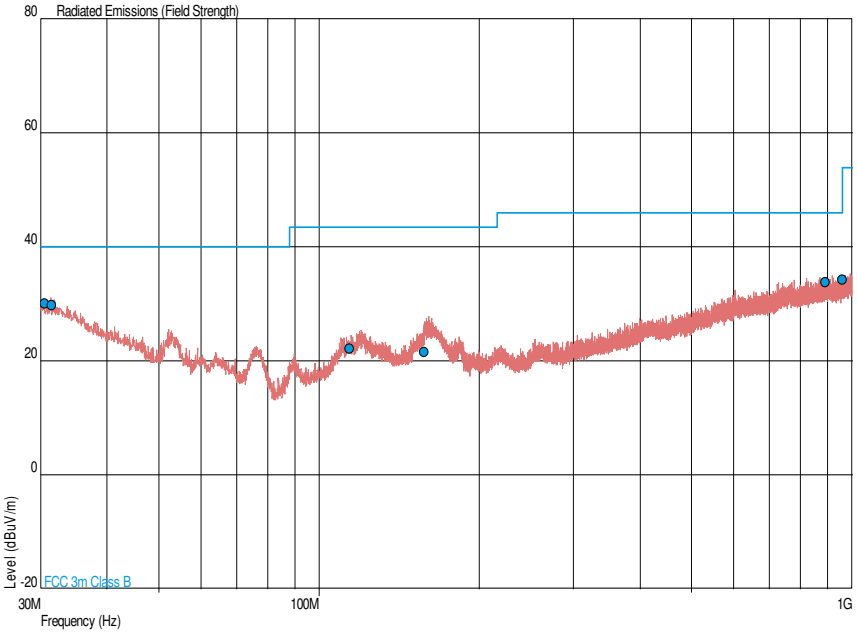
Product Service

2.2.7 Test Results

AC powered/USB with Android location services enabled, 30 MHz to 1 GHz Results

Frequency (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Level (µV/m)	Quasi-Peak Margin (dµV/m)	Quasi-Peak Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.580	30.0	31.6	-10.0	-68.4	271	1.90	Vertical
31.544	29.8	30.9	-10.2	-69.1	8	1.58	Vertical
114.203	22.2	12.9	-21.3	-137.1	15	3.78	Vertical
157.173	21.6	12.0	-21.9	-138.0	78	1.00	Vertical
890.886	33.8	49.0	-12.2	-151.0	334	3.23	Vertical
960.000	34.2	51.3	-11.8	-148.7	0	1.00	Vertical

AC powered/USB with Android location services enabled, 30 MHz to 1 GHz Plot

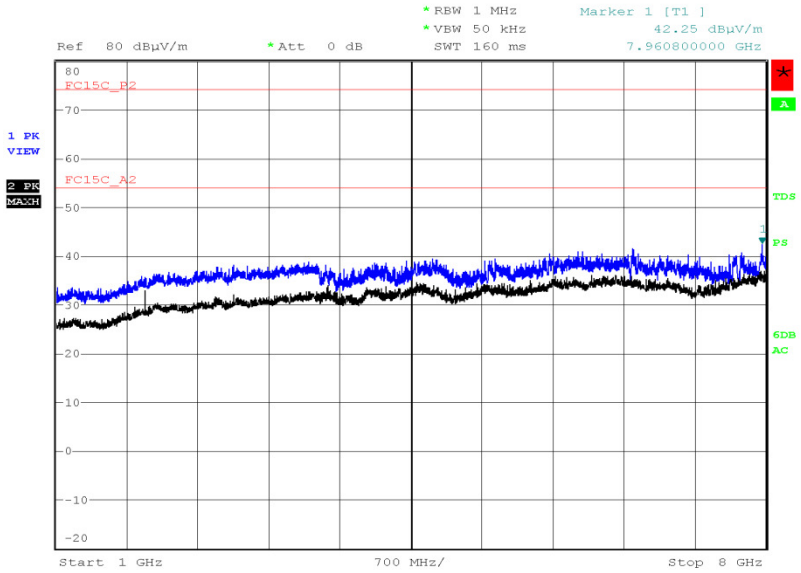


AC powered/USB with Android location services enabled, 1 GHz to 13 GHz Results

Frequency (MHz)	Average Level (dBµV/m)	Peak Level (dBµV/m)	Average Level (µV/m)	Peak Level (µV/m)	Angle (deg)	Height (m)	Polarisation
*							

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

AC powered/USB with Android location services enabled, 1 GHz to 8 GHz Plot



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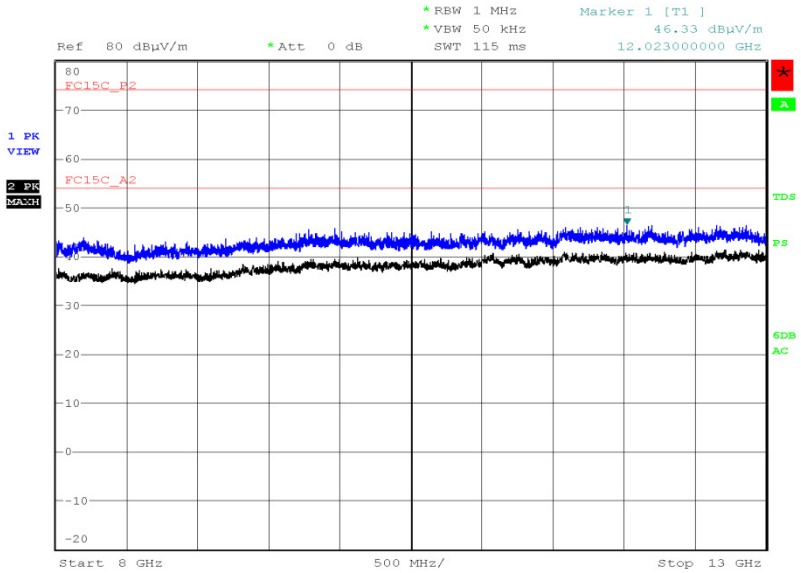
AC powered/USB with Android location services enabled, 8 GHz to 13 GHz Plot



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FCC 47 CFR Part 15, Limit Clause 15.109

Class B

Frequency of Emission (MHz)	Field Strength (µV/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

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					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	11-Feb-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Transient Limiter	Hewlett Packard	11947A	2377	12	16-Feb-2017
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	27-Apr-2017
Section 2.2 - Radiated Emissions					
Pre-Amplifier	Phase One	PS04-0086	1533	12	30-Jul-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
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	6-Oct-2016
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	27-Apr-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016

TU – Traceability Unscheduled

Product Service

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

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

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).