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Report On

FCC Testing of the Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22 (WCDMA)

COMMERCIAL-IN-CONFIDENCE
FCC ID: APYHRO00192

Document 75920802 Report 11 Issue 1 June 2013

Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22 (WCDMA)

Document 75920802 Report 11 Issue 1

June 2013

PREPARED FOR

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Mark Jenkins
Authorised Signatory

DATED

27 June 2013

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 2 and FCC CFR 47 Part 22. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler M Russell

UKAS TESTING 0141

Product Service

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22 (WCDMA)

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS to the requirements of FCC CFR 47 Part 2 and FCC CFR 47 Part 22.

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)	SHL22
Serial Number(s)	IMEI 004401114764596 IMEI 004401114764513 IMEI 004401114764224
Number of Samples Tested	3
Test Specification/Issue/Date	FCC CFR 47 Part 2 (2012) FCC CFR 47 Part 22 (2012)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9676 30 April 2013
Start of Test	23 May 2013
Finish of Test	10 June 2013
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.4: 2009

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22 (WCDMA) is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	Pt 2	Pt 22			
WCDMA FDD V					
2.1	-	22.913 (a)	Effective Radiated Power	Pass	
2.2	2.1046	22.913 (a)	Maximum Peak Output Power - Conducted	Pass	
2.3	-	22.917	Emission Limitations for Cellular Equipment	Pass	
2.4	2.1051	22.917 (a)	Conducted Spurious Emissions	Pass	
2.5	2.1049 (h)	22.917 (b)	Occupied Bandwidth	Pass	
2.6	2.1047 (d)	-	Modulation Characteristics	-	Customer Declaration
2.7	2.1055	22.355	Frequency Stability	Pass	

1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the “04D_Model Description APYHRO00192.pdf” Model Description Form.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE (B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, 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 a 4.0 V DC supply.

FCC Accreditation
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 SHL22 Dual-band CDMA (BC0, BC6) & Quad-band GSM
(GSM850/GSM900/DCS1800/PCS1900) & Dual-band UMTS (FDDI, FDDV) & Tri-band LTE
(B1, B11, B18) multi mode cellular phone with Bluetooth, WLAN, NFC (FeliCa) and GPS
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 22 (WCDMA)

2.1 EFFECTIVE RADIATED POWER

2.1.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.913 (a)

2.1.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764596 - Modification State 0

2.1.3 Date of Test

4 June 2013

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

Measurements of the fundamental from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The fundamental frequency was maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. A peak detector was used with the trace set to max hold. The maximum result was recorded.

The EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result (ERP) was determined by a calculation using the signal generator level, antenna gain and cable loss.

The measurements were performed at a 3m distance unless otherwise stated.

2.1.6 Environmental Conditions

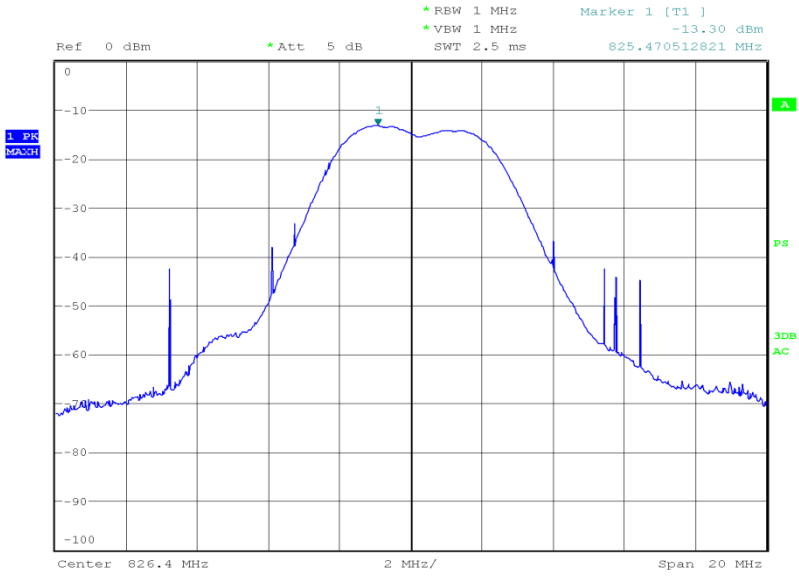
Ambient Temperature	19.9°C
Relative Humidity	39.0%

Product Service

2.1.7 Test Results

826.60 MHz

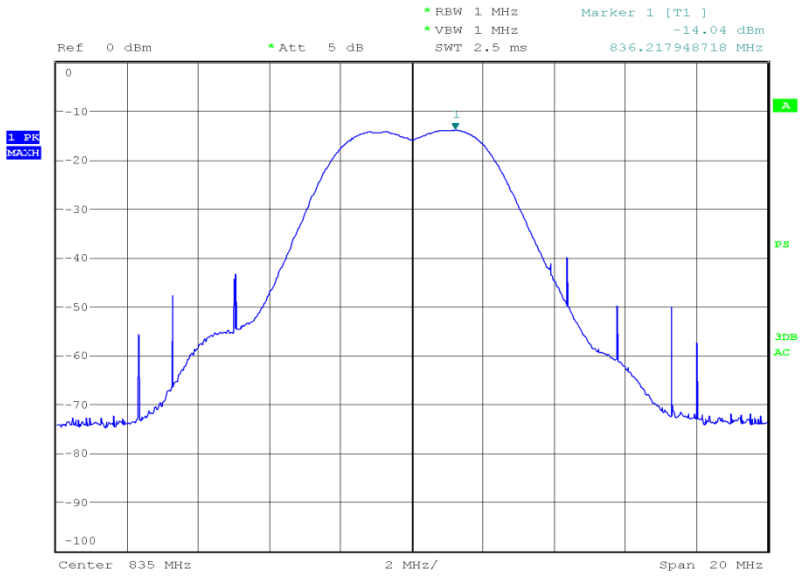
Result (dBm)	Result (W)
20.91	0.123



Product Service

835.00 MHz

Result (dBm)	Result (W)
20.31	0.107

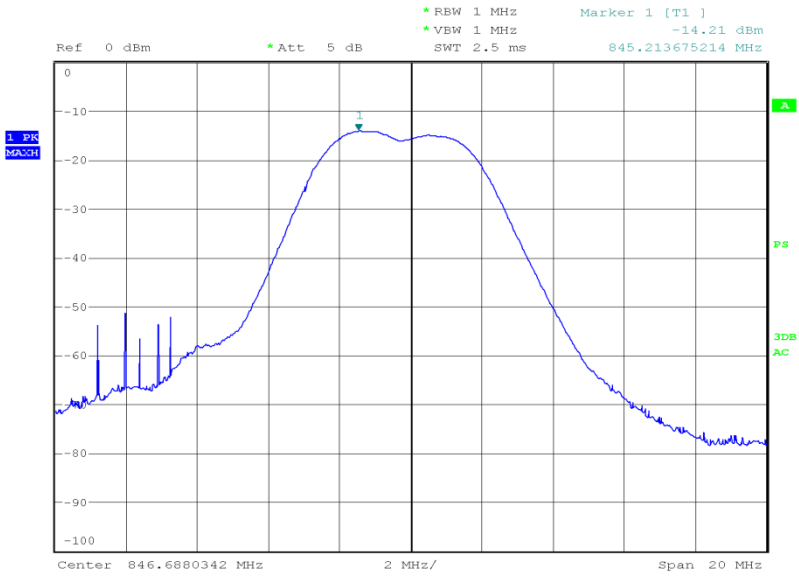


Date: 4.JUN.2013 18:51:16

Product Service

846.40 MHz

Result (dBm)	Result (W)
19.98	0.995



Limit Clause

Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

2.2 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.2.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 22, Clause 22.913 (a)

2.2.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764513 - Modification State 0

2.2.3 Date of Test

23 May 2013

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

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals.

The EUT supports WCDMA and was tested in this mode of operation.

2.2.6 Environmental Conditions

Ambient Temperature	23.4°C
Relative Humidity	27.3%

2.2.7 Test Results

4.0 V DC Supply

826.60 MHz

Mode	Result (dBm)	Result (W)
WCDMA	27.34	0.542

835.00 MHz

Mode	Result (dBm)	Result (W)
WCDMA	27.02	0.504

846.40 MHz

Mode	Result (dBm)	Result (W)
WCDMA	27.25	0.531

Limit Clause

Mobile – 7 W or 38.45 dBm
Base Stations – 500 W or 57 dBm

2.3 EMISSION LIMITATIONS FOR CELLULAR EQUIPMENT

2.3.1 Specification Reference

FCC CFR 47 Part 22, Clause 22.917

2.3.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764596 - Modification State 0

2.3.3 Date of Test

4 June 2013

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The EUT was set to transmit on maximum power with modulation. The EUT was tested on bottom, middle and top channels at maximum power.

For any emissions found the EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result was determined by a calculation using the signal generator level, antenna gain and cable loss.

The measurements were performed at a 3m distance unless otherwise stated.

2.3.6 Environmental Conditions

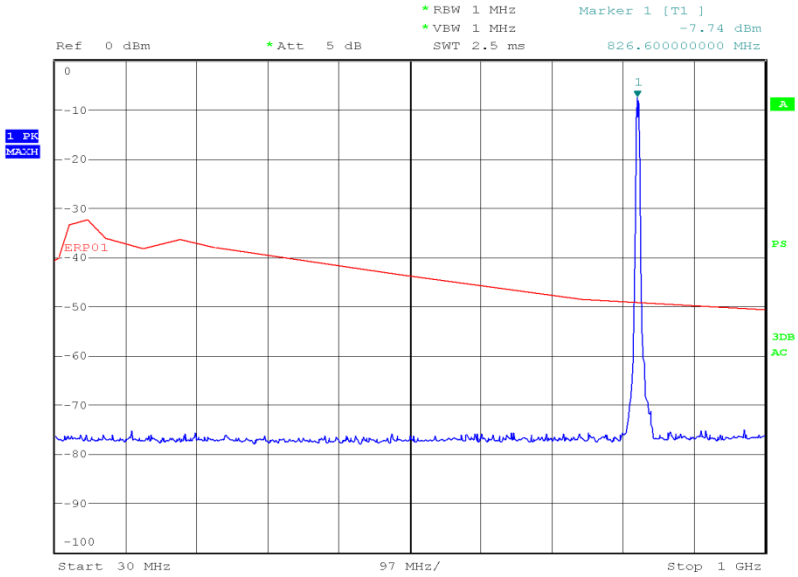
Ambient Temperature	19.9°C
Relative Humidity	39.0%

Product Service

2.3.7 Test Results

826.60 MHz

30 MHz to 1 GHz



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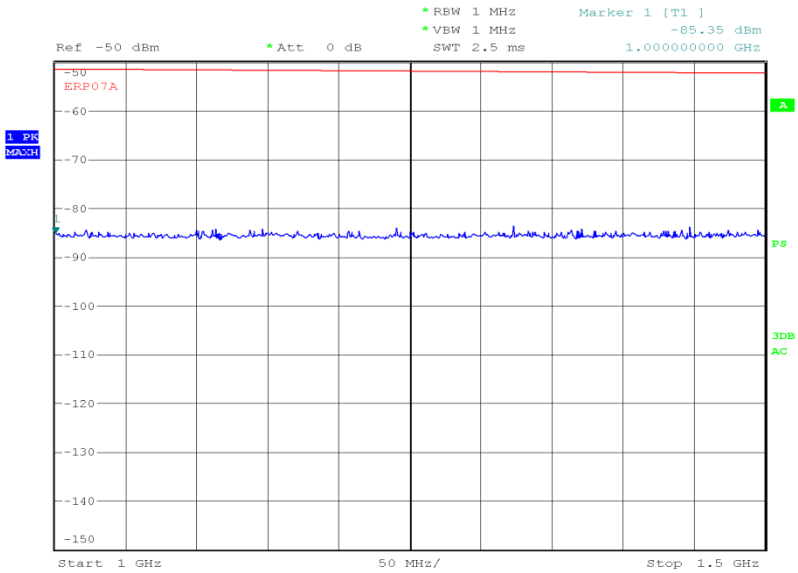
1 GHz to 1.5GHz



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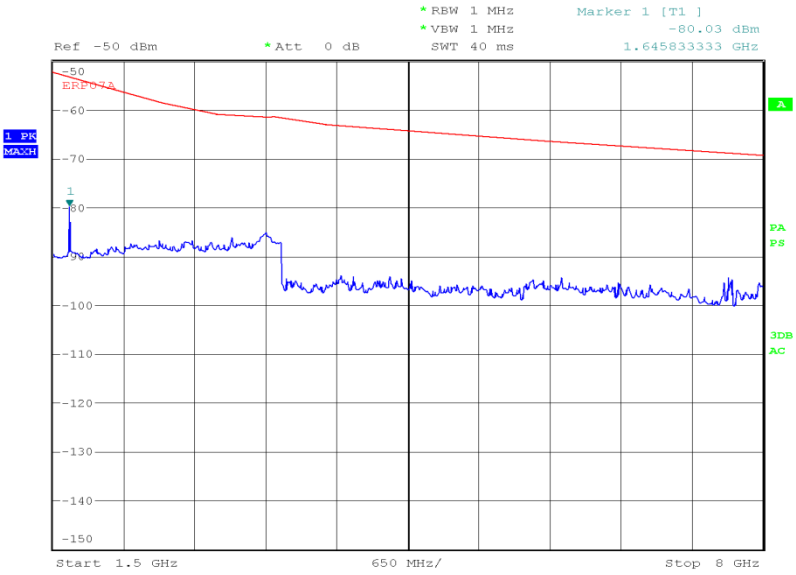
Product Service

1.5 GHz to 8 GHz



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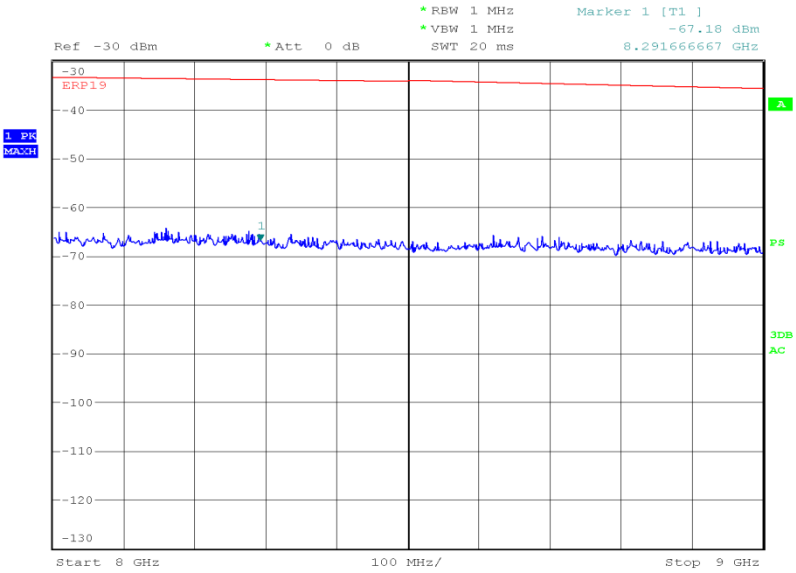
8 GHz to 9 GHz



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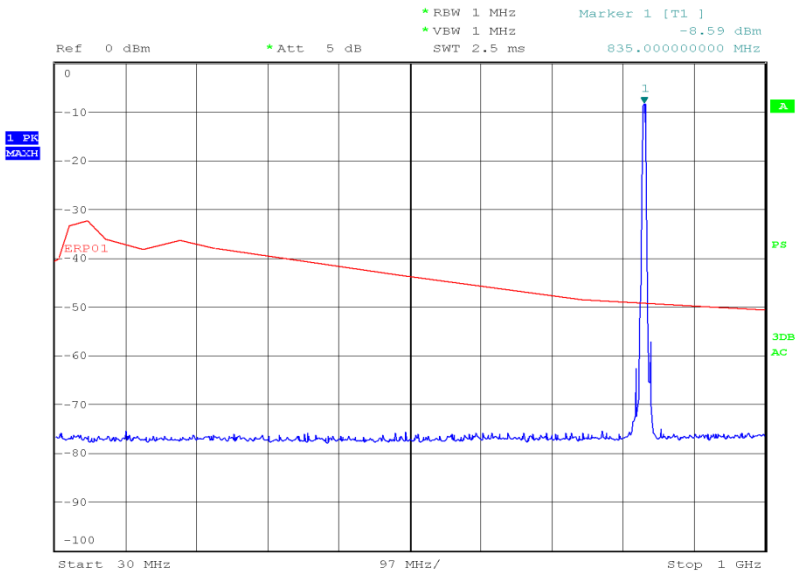
Product Service

835.00 MHz

30 MHz to 1 GHz



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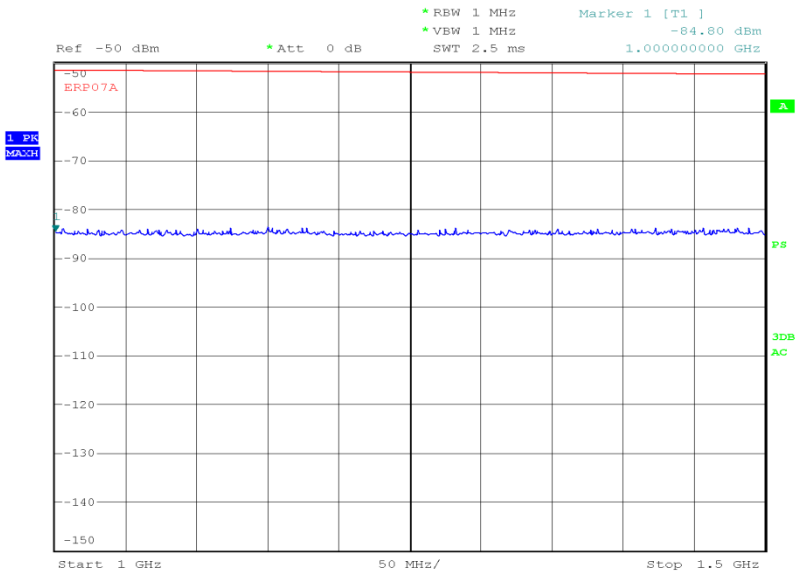
1 GHz to 1.5GHz



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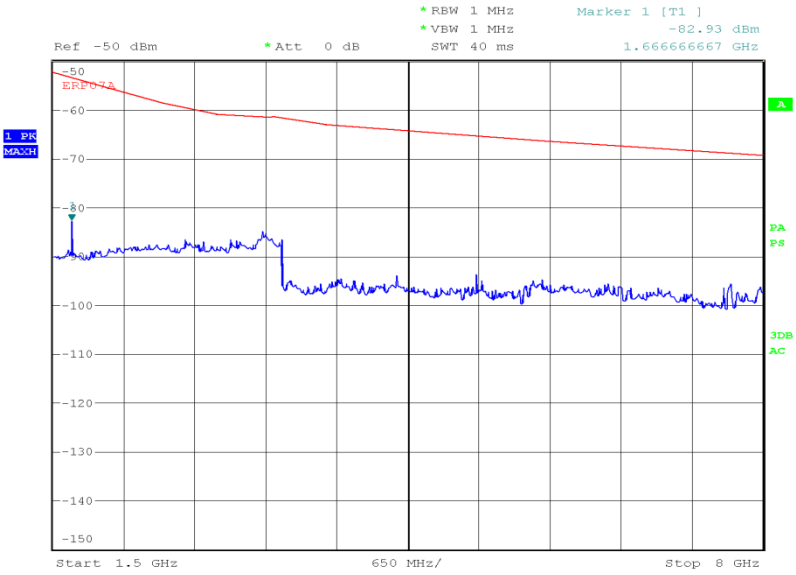
Product Service

1.5 GHz to 8 GHz



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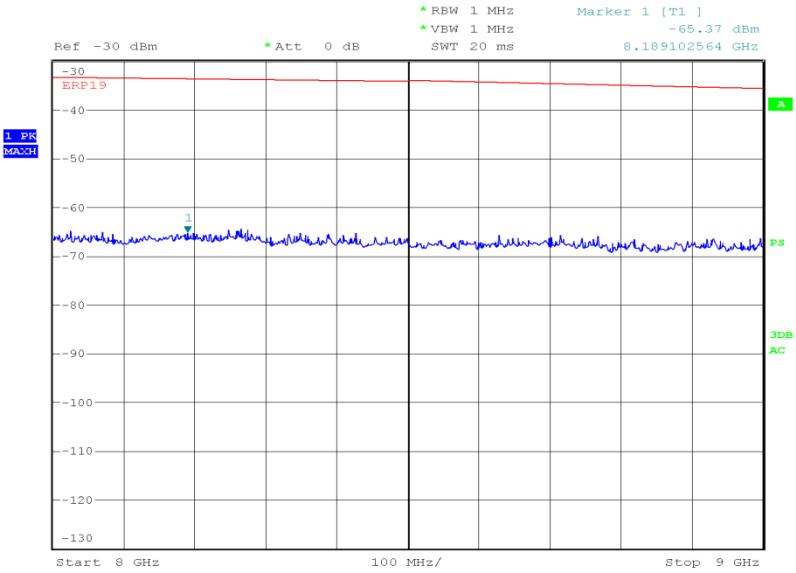
8 GHz to 9 GHz

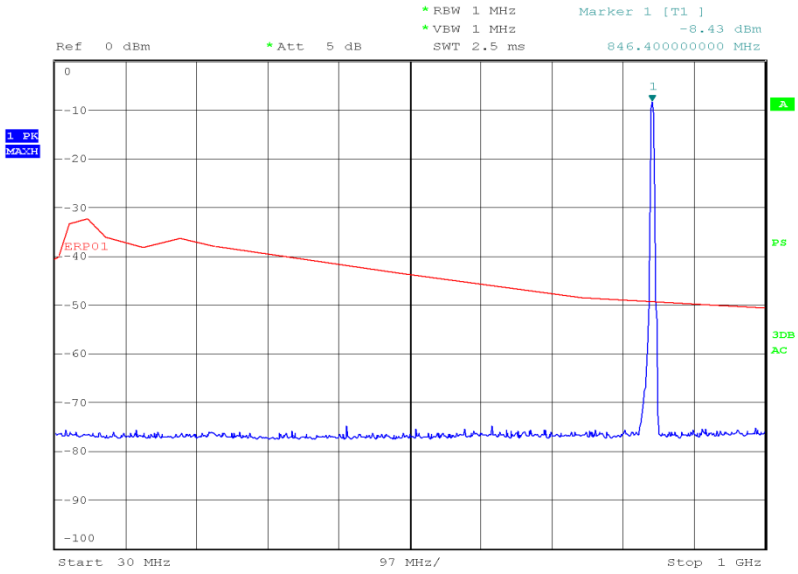


Date: 4.JUN.2013 20:36:41

Product Service

846.40 MHz

30 MHz to 1 GHz



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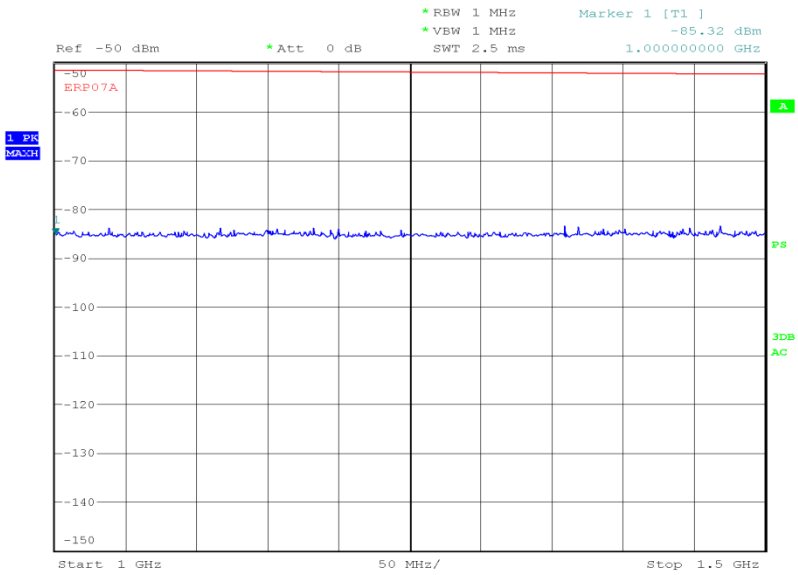
1 GHz to 1.5GHz



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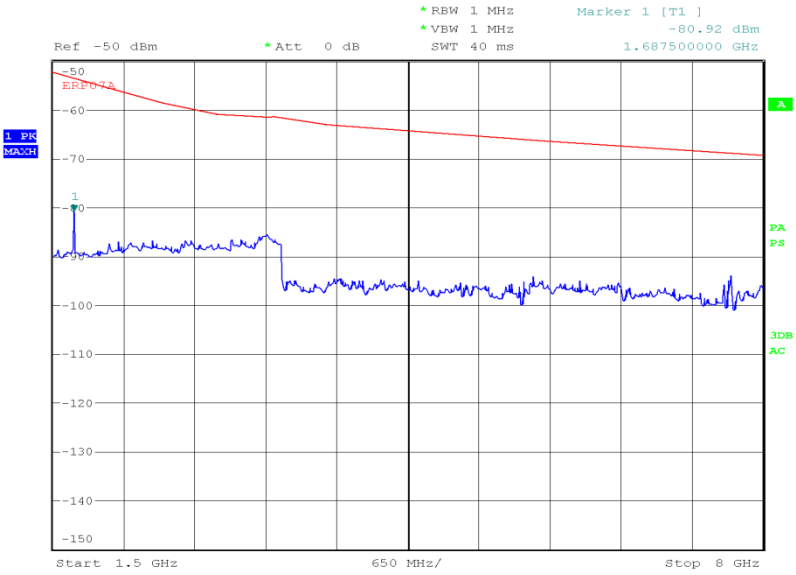
Product Service

1.5 GHz to 8 GHz



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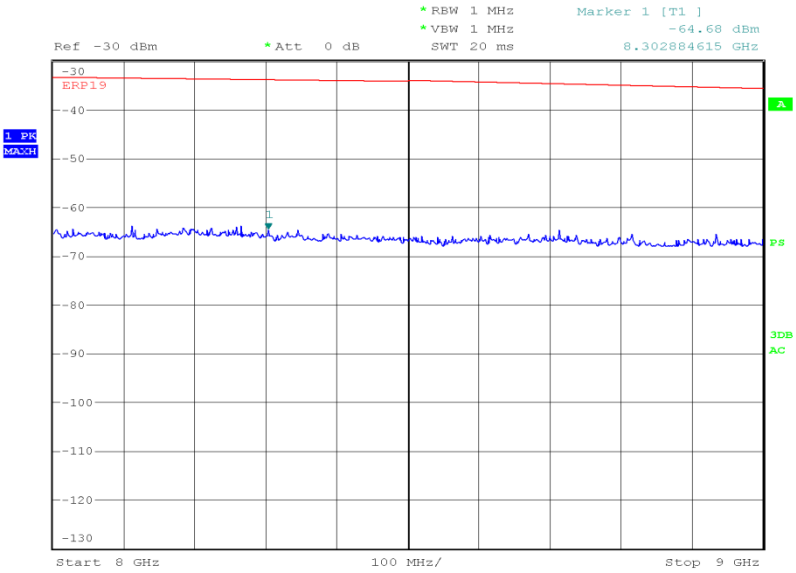
8 GHz to 9 GHz



Date: 4.JUN.2013 20:39:22

Limit Clause

43+10log(P) or -13 dBm

2.4 CONDUCTED SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 22, Clause 22.917 (a)

2.4.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764224 - Modification State 0

2.4.3 Date of Test

6 June 2013

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to the 10th harmonic. The EUT was set to transmit on full power with modulation. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz and 3 MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to max hold.

From 9 kHz to 4 GHz, an attenuator was used. For measuring the range 1.5 GHz to 9 GHz an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement bands were used as reference level offsets to ensure worst case.

2.4.6 Environmental Conditions

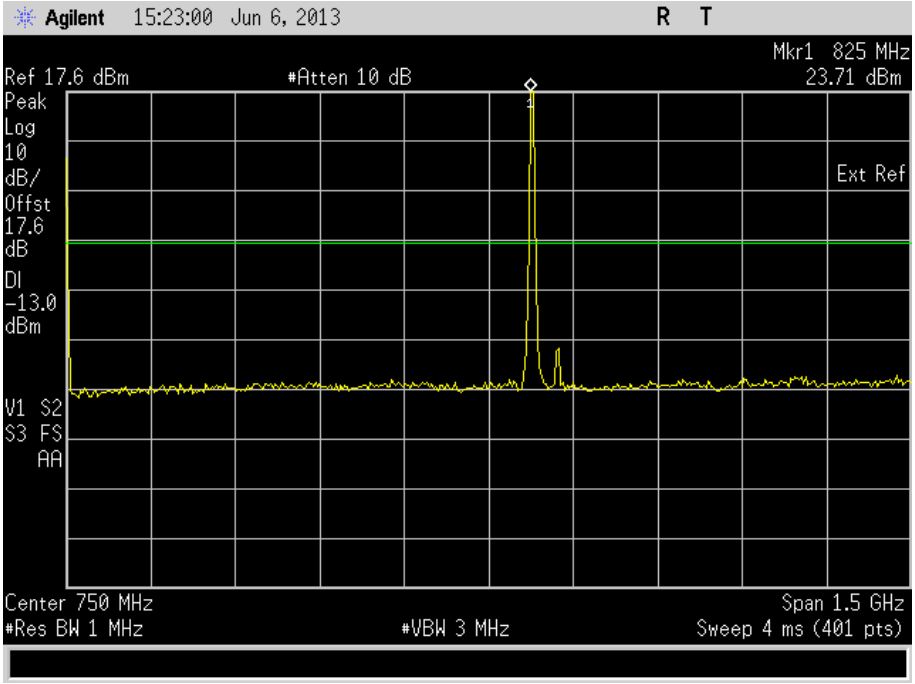
Ambient Temperature	22.2°C
Relative Humidity	45.9%

Product Service

2.4.7 Test Results

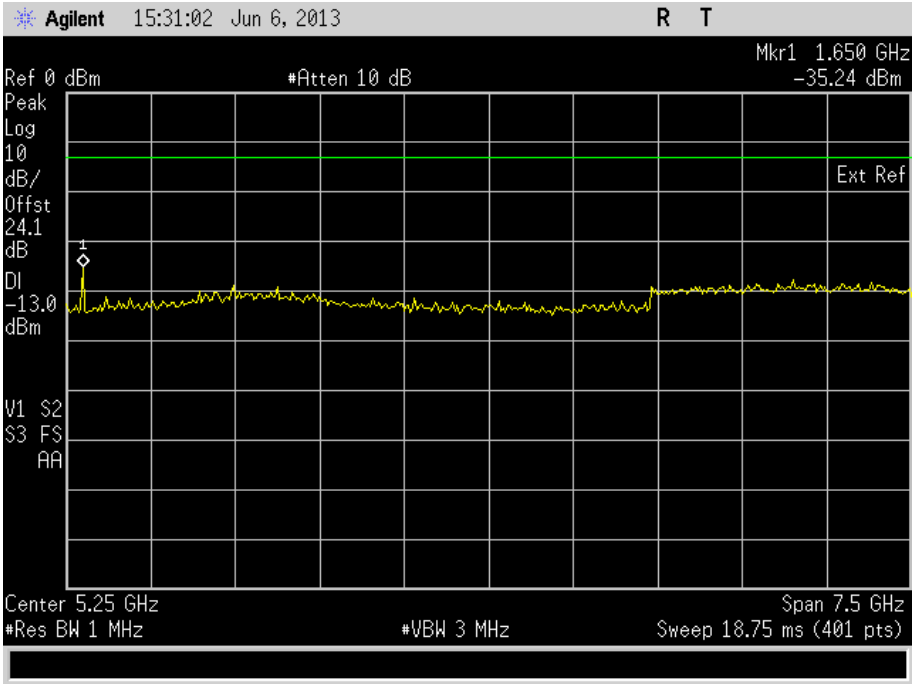
826.60 MHz

9 kHz to 1.5 GHz



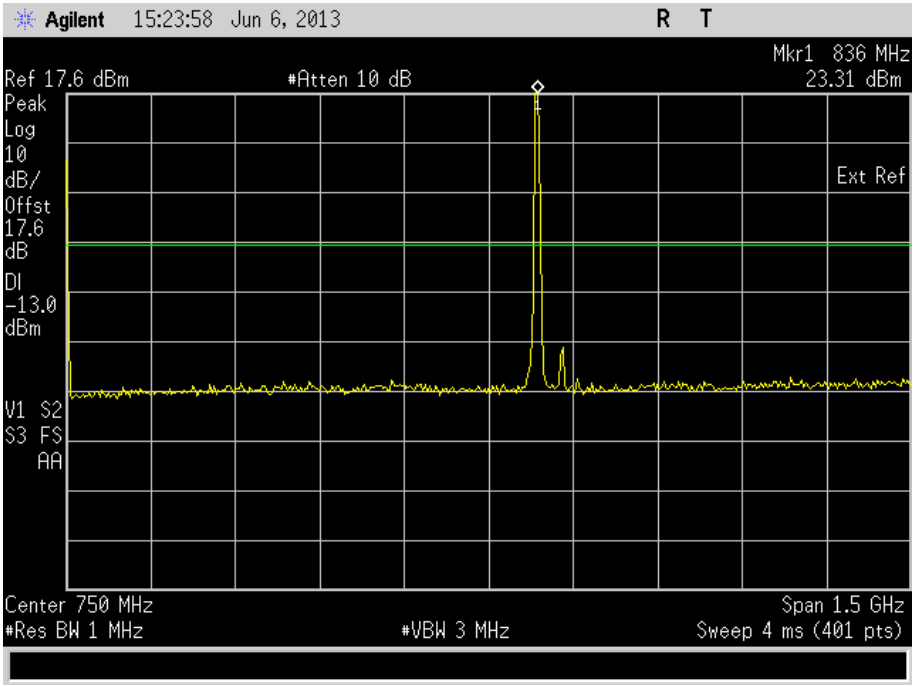
Product Service

1.5 GHz to 9 GHz



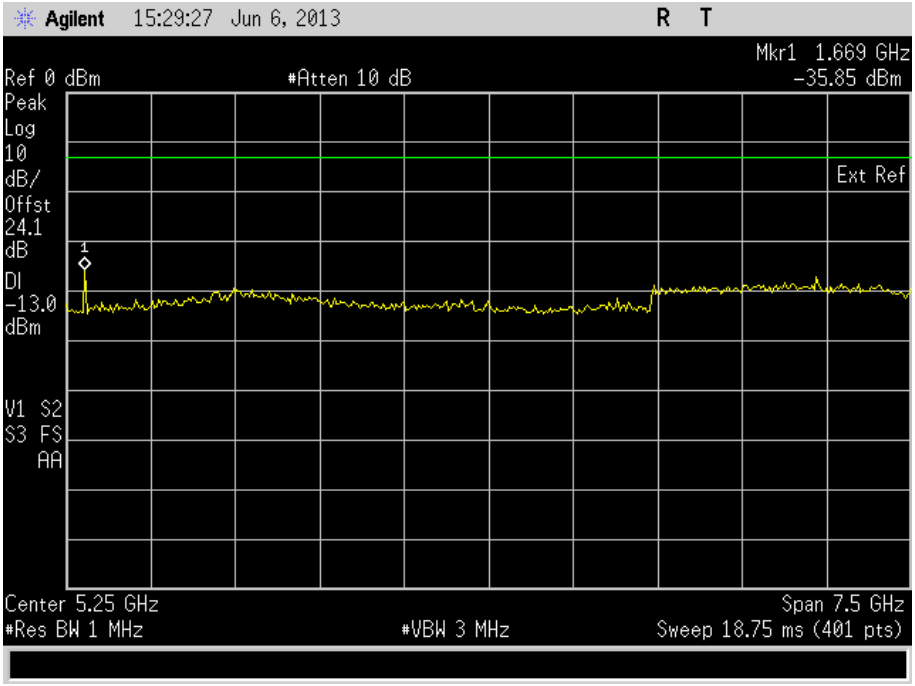
835.00 MHz

9 kHz to 1.5 GHz



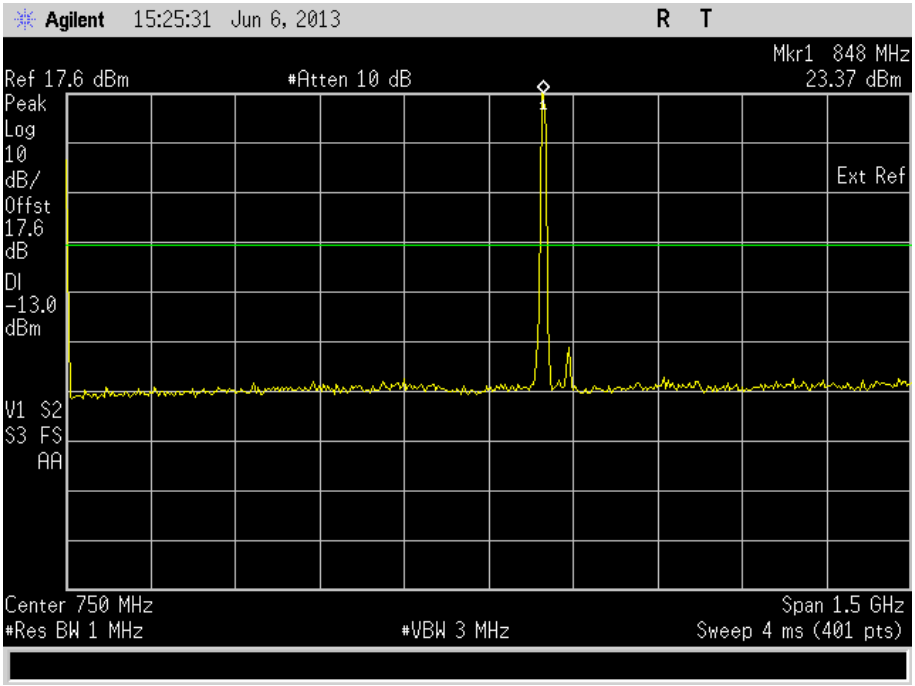
Product Service

1.5 GHz to 9 GHz



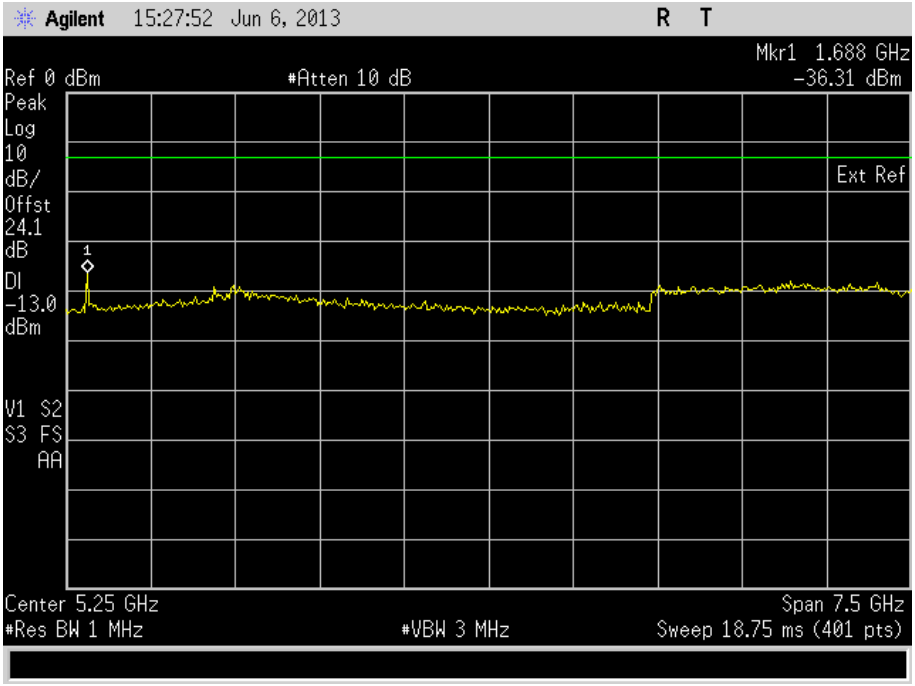
846.40 MHz

9 kHz to 1.5 GHz



Product Service

1.5 GHz to 9 GHz



Limit Clause

43+10log(P) or -13 dBm

2.5 OCCUPIED BANDWIDTH

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1049 (h)
FCC CFR 47 Part 22, Clause 22.917 (b)

2.5.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764224 - Modification State 0

2.5.3 Date of Test

6 June 2013

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

The EUT was transmitting at maximum power, with modulation. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following pages shows the resultant display from the Spectrum Analyser.

2.5.6 Environmental Conditions

Ambient Temperature	23.4°C
Relative Humidity	27.3%

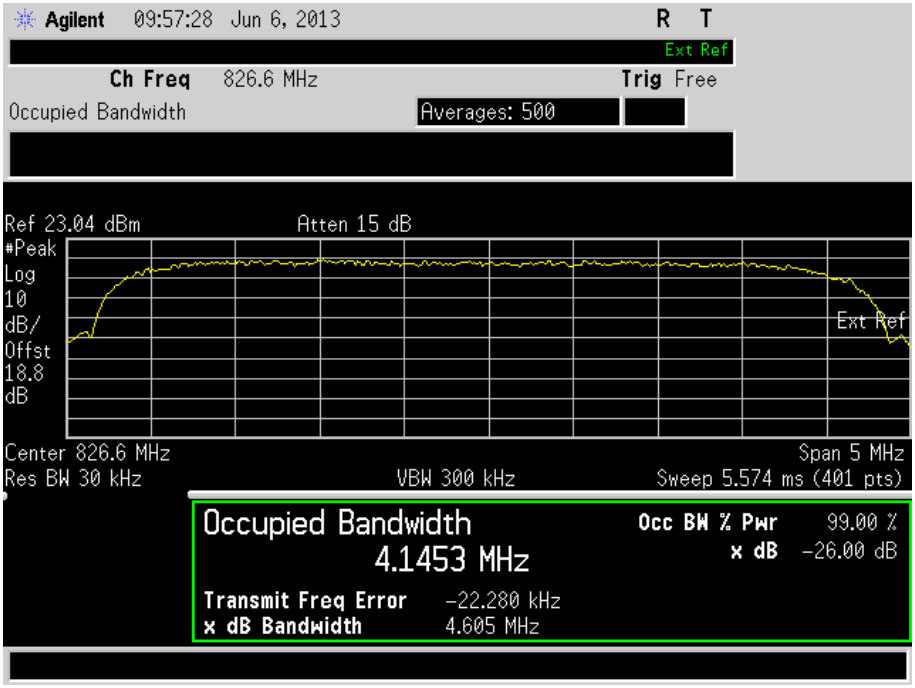
Product Service

2.5.7 Test Results

4.0 V DC Supply

826.60 MHz

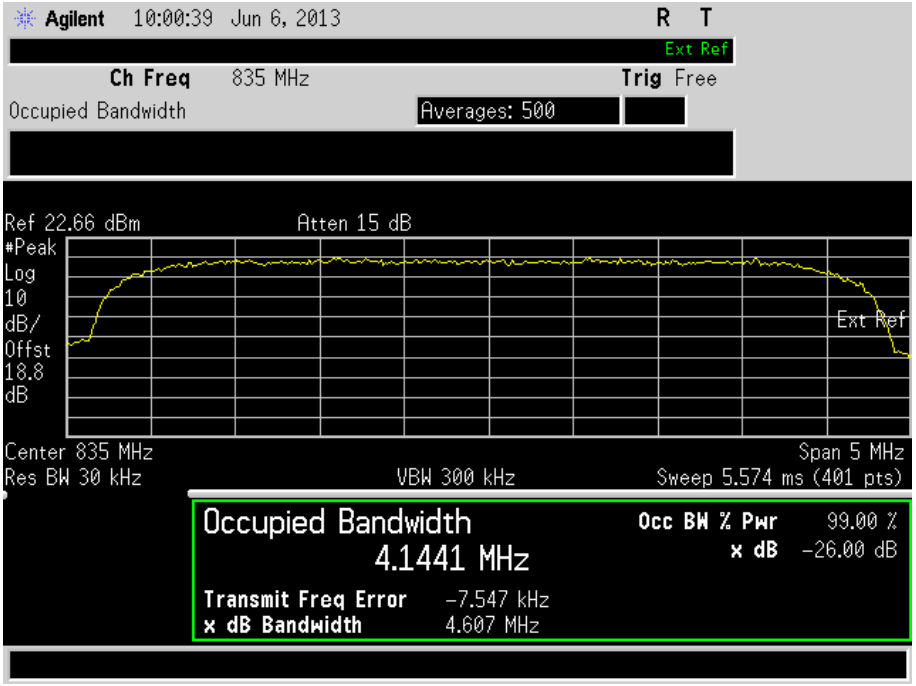
Mode	Occupied Bandwidth (kHz)
WCDMA	4145.319



Product Service

835.00 MHz

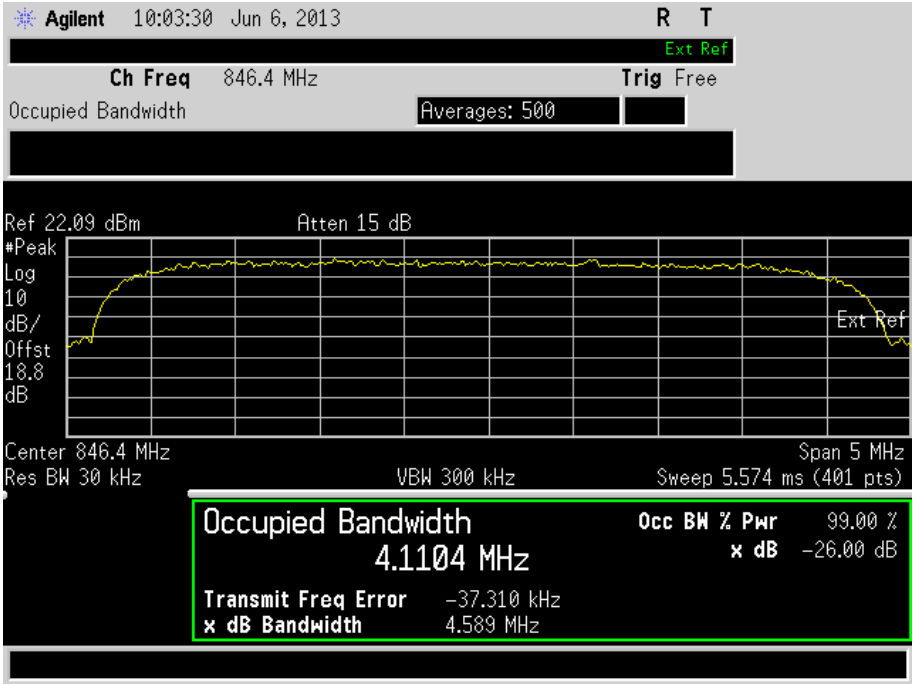
Mode	Occupied Bandwidth (kHz)
WCDMA	4144.061



Product Service

846.40 MHz

Mode	Occupied Bandwidth (kHz)
WCDMA	4110.397



Limit Clause

The occupied bandwidth, that is the frequency bandwidth such that, below is lower and above is upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

2.6 MODULATION CHARACTERISTICS

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047 (d)

2.6.2 Equipment Under Test

SHL22

2.6.3 Test Results

Customer Description

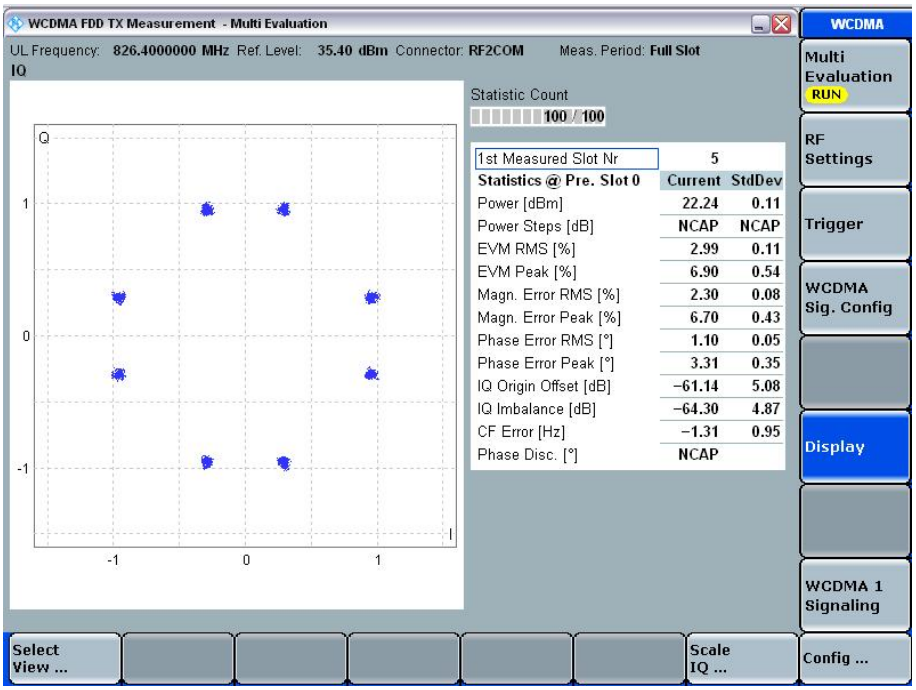
For the period of test the EUT met the requirements of FCC CFR 47 Part 2 for Modulation Characteristics.

The test results are shown below.

4.0 V DC Supply

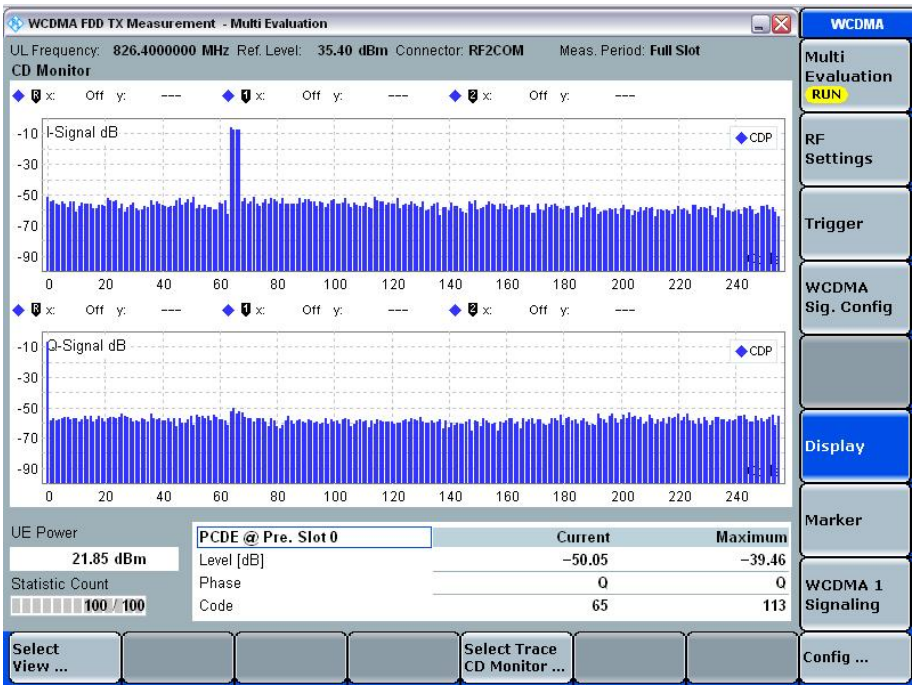
QPSK

Constellation Diagram

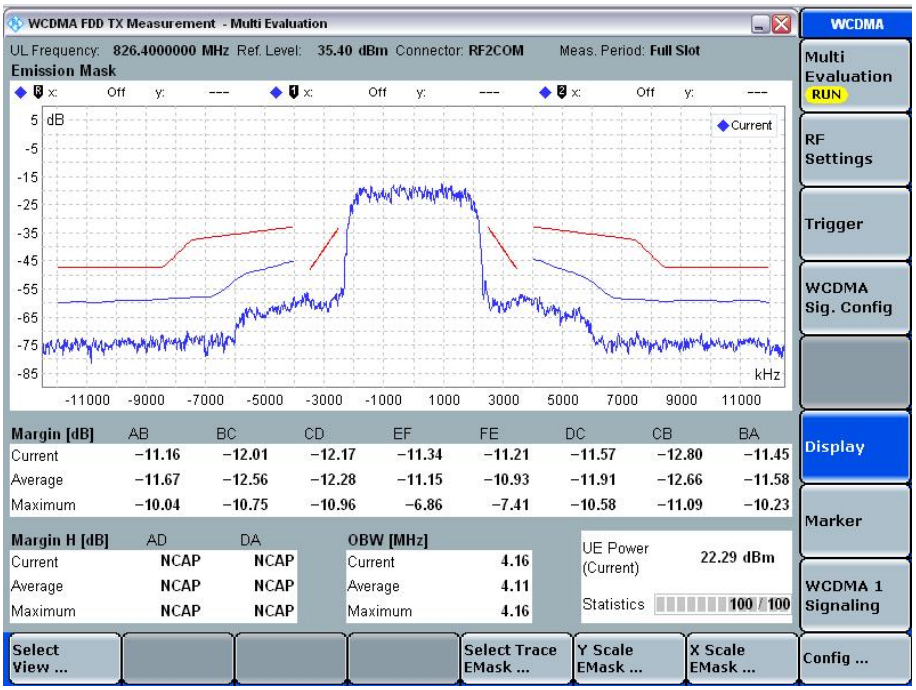


Product Service

I and Q Code Domain



Spectrum Emission Mask



Limit Clause

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

2.7 FREQUENCY STABILITY

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 22, Clause 22.355

2.7.2 Equipment Under Test and Modification State

SHL22 S/N: IMEI 004401114764224 - Modification State 0

2.7.3 Date of Test

10 June 2013

2.7.4 Test Equipment Used

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

2.7.5 Test Procedure

The EUT was set to transmit on maximum power with modulation. An FSQ Signal Analyser, was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between -30°C and +50°C in 10° steps as per 2.1055 and the frequency error was measured at each temperature.

2.7.6 Environmental Conditions

Ambient Temperature	20.8°C
Relative Humidity	37.1 - 38.1%

2.7.7 Test Results

Temperature Interval (ºC)	Mode	Modulation	Deviation (ppm)
-30	WCDMA	QPSK	-0.00599
-20	WCDMA	QPSK	-0.00719
-10	WCDMA	QPSK	-0.00479
0	WCDMA	QPSK	-0.01078
+10	WCDMA	QPSK	-0.00599
+20	WCDMA	QPSK	-0.00599
+30	WCDMA	QPSK	0.00719
+40	WCDMA	QPSK	0.00479
+50	WCDMA	QPSK	0.00599

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	-	-
929 to 960	1.5	-	-
2110 to 2220	10	-	-

Product Service

Under Voltage Variations

835.00 MHz

DC Voltage (V)	Mode	Modulation	Deviation (ppm)
4.0 V DC	WCDMA	QPSK	-0.00599
3.7 V DC	WCDMA	QPSK	-0.00719
4.0 V DC	WCDMA	QPSK	-0.00599

Limit Clause

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

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 - Effective Radiated Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	7-Aug-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	5-Apr-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
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
Section 2.2 - Maximum Peak Output Power - Conducted					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	24-Jul-2013
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	24-Jul-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2419	12	3-Oct-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Jun-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	17-Sep-2013
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4100	12	25-Oct-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	25-Oct-2013

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.3 - Emission Limitations for Cellular Equipment					
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	12	21-Dec-2013
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Load (50ohm, 30W)	JFW	50T-054	284	12	13-Jun-2013
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Pre-Amplifier	Phase One	PSO4-0087	1534	12	28-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	31-Jan-2014
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	10-Jul-2013
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	10-Jul-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	1-Feb-2014
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	25-Oct-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	15-Oct-2013
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
1 metre, SMA to SMA	Suhner	Sucoflex armoured cable	4048	-	O/P Mon
Section.2.4 - Conducted Spurious Emissions					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	24-Jul-2013
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2014
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2419	12	3-Oct-2013
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	1-Feb-2014
Test Receiver	Rohde & Schwarz	ESIB40	2941	12	23-Oct-2013
Attenuator (20dB, 2W)	Pasternack	PE 7004-20	2943	12	27-Mar-2014
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
Data Logger	Yokogawa	MV1024	3948	12	7-Jun-2013

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Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Occupied Bandwidth					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Attenuator 10dB/10W)	Trilithic	HFP-50N	454	12	24-Jul-2013
Attenuator: 6dB/10W	Trilithic	HFP-50N	476	12	24-Jul-2013
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Multimeter	Iso-tech	IDM101	2419	12	3-Oct-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Jun-2013
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
Combiner/Splitter	Weinschel	1506A	3878	12	19-Mar-2014
P-Series Power Meter	Agilent	N1911A	3980	12	17-Sep-2013
P-Series Power Meter	Agilent	N1911A	3981	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3982	12	17-Sep-2013
50 MHz-18 GHz Wideband Power Sensor	Agilent	N1921A	3983	12	17-Sep-2013
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4100	12	25-Oct-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4105	12	25-Oct-2013
Section 2.6 - Frequency Stability					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Multimeter	White Gold	WG022	190	12	30-Oct-2013
RF Coupler	TUV SUD Product Service	TÜV	415	-	TU
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
Power Supply Unit	Farnell	TSV-70	2043	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	30-Nov-2013
Attenuator (20dB, 2W)	Pasternack	PE 7004-20	2943	12	27-Mar-2014
Thermocouple Thermometer	Fluke	51	3172	12	30-Jul-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

Product Service

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Maximum Peak Output Power - Conducted	± 0.70 dB
Emission Limitations for Cellular Equipment	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Conducted Spurious Emissions	± 3.454 dB
Effective Radiated Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Occupied Bandwidth	± 16.74 kHz
Modulation Characteristics	-
Frequency Stability	± 46.70 Hz

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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