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Report On

FCC Testing of the
Sharp CDMA SHI13, Tri Band CDMA (BC0, BC3 and BC6) Cellular
Phone with Bluetooth, WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00158

Document 75914914 Report 10 Issue 1

September 2011



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REPORT ON

FCC Testing of the
Sharp CDMA SH113, Tri Band CDMA (BC0, BC3 and BC6) Cellular
Phone with Bluetooth, WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C

Document 75914914 Report 10 Issue 1

September 2011

PREPARED FOR

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PREPARED BY

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Authorised Signatory

DATED

27 September 2011

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 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

B Airs





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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp CDMA SHI13, Tri Band CDMA (BC0, BC3 and BC6) Cellular Phone with Bluetooth,
WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp CDMA SHI13, Tri Band CDMA (BC0, BC3 and BC6) Cellular Phone with Bluetooth, WLAN, FeliCa and GPSTo the requirements of FCC CFR 47 Part 15C.

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)	CDMA SHI13
Serial Number(s)	SSHFN000872
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2010)
Incoming Release Date	Application Form 10 August 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	8723 05 September 2011
Start of Test	19 September 2011
Finish of Test	22 September 2011
Name of Engineer(s)	G Lawler B Airs
Related Document(s)	ANSI C63.10: 2009



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
FeliCa				
2.1	15.225 (a)(b)(c)(d)	Field Strength of any Emission	Pass	
2.2	15.225, 15.215 (c)	Occupied Bandwidth	Pass	
2.3	15.225 (e)	Frequency Stability Under Temperature Variations	Pass	



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1.3 APPLICATION FORM

APPLICANT'S DETAILS			
COMPANY NAME :		Sharp Telecommunications of Europe Ltd	
ADDRESS :		Azure House, Bagshot Road Bracknell, Berkshire RG12 7QY	
NAME FOR CONTACT PURPOSES : Ken Newman			
TELEPHONE NO: 01344 301 883	FAX NO:	01344 300 293	
		E-MAIL: ken.newman@sharp.eu	

EQUIPMENT INFORMATION			
<u>Equipment designator:</u>			
Model name/number	CDMA SHI13	Identification number	APYHRO00158
<u>Supply Voltage:</u>			
☐	AC mains	State AC voltage V	and AC frequency Hz
☐	DC (external)	State DC voltage V	and DC current A
☒	DC (internal)	State DC voltage ...3.7 V	and Battery type...Li-Ion.
<u>Frequency characteristics:</u>			
Frequency range	13.56MHz to 13.56MHz	Channel spacing	(if channelized)
Designated test frequencies:			
Bottom: MHz	Middle: MHz	Top:MHz	
<u>Power characteristics:</u>			
Maximum transmitter power	W	Minimum transmitter power	 W
		(if variable)	
☒	Continuous transmission		
☐	Intermittent transmission	State duty cycle	
If intermittent, can transmitter be set to continuous transmit test mode? Y/N			
<u>Antenna characteristics:</u>			
☐	Antenna connector	State impedanceohm	
☐	Temporary antenna connector	State impedance ohm	
☒	Integral antenna	State gain 0 dBi	
<u>Modulation characteristics:</u>			
☒	Amplitude	☐	Other
☐	Frequency	Details:	
☐	Phase		
Can the transmitter operate un-modulated?		N	
ITU Class of emission:			
<u>Extreme conditions:</u>			
Maximum temperature	60 °C	Minimum temperature	-20 °C
Maximum supply voltage	4.0 V	Minimum supply voltage	3.7 V

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature : *Yasuhiro Kawauchi*

Name : Yasuhiro Kawauchi
Position held : Manager
Date : 10 August 2011



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHI13, Tri Band CDMA (BC0, BC3 and BC6) Cellular Phone with Bluetooth, WLAN & 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.



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SECTION 2

TEST DETAILS

FCC Testing of the
Sharp CDMA SHI13, Tri Band CDMA (BC0, BC3 and BC6) Cellular Phone with Bluetooth,
WLAN & FeliCa and GPS
In accordance with FCC CFR 47 Part 15C



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2.1 FIELD STRENGTH OF ANY EMISSION**2.1.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.225 (a)(b)(c)(d)

2.1.2 Equipment Under Test and Modification State

CDMA SHI13 S/N: SSHFN000872 - Modification State 0

2.1.3 Date of Test

19 September 2011

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 EUT was placed on a remotely controlled turntable within a semi-anechoic chamber. Measurements of the carrier frequency from the EUT were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

2.1.6 Environmental Conditions

Ambient Temperature	21.4°C
Relative Humidity	54.0%

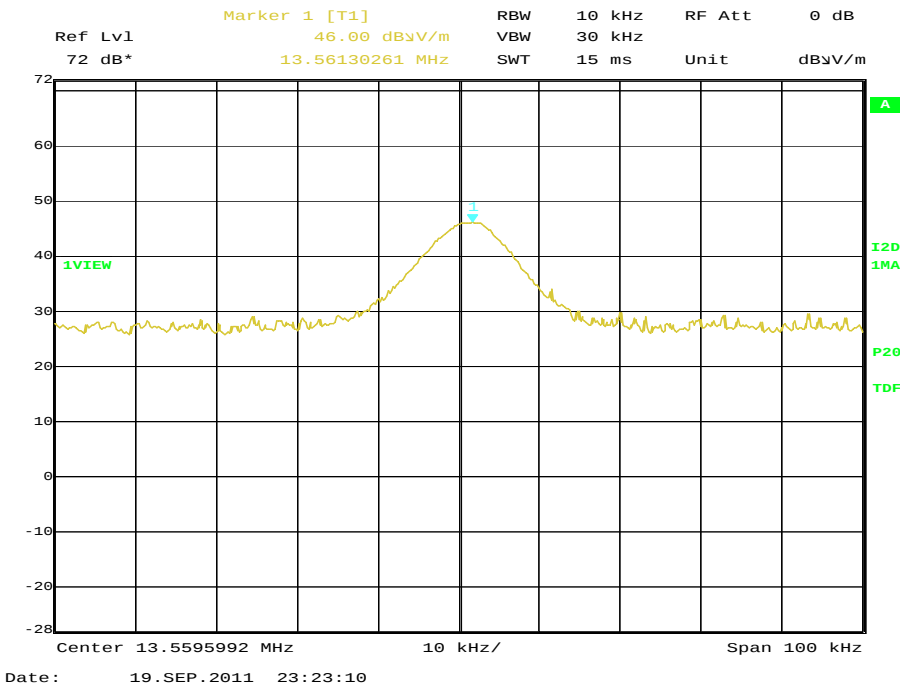


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2.1.7 Test Results

4.0 V D C Supply

Carrier

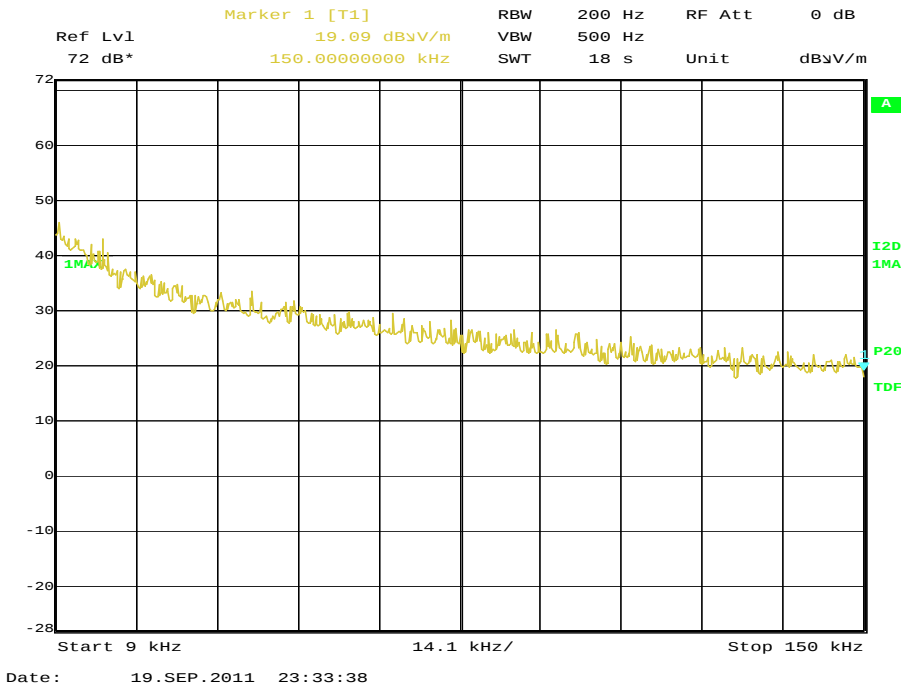


Frequency (MHz)	QP Level (dBμV/m) at 3m	QP Level (μV/m) at 3m	QP Limit (dBμV/m) at 30m	QP Limit (μV/m) at 30m	Angle (deg)	Height (m)	Polarity
13.56	46.20	204.17	84.0	15848.9	343	1.5	Face On

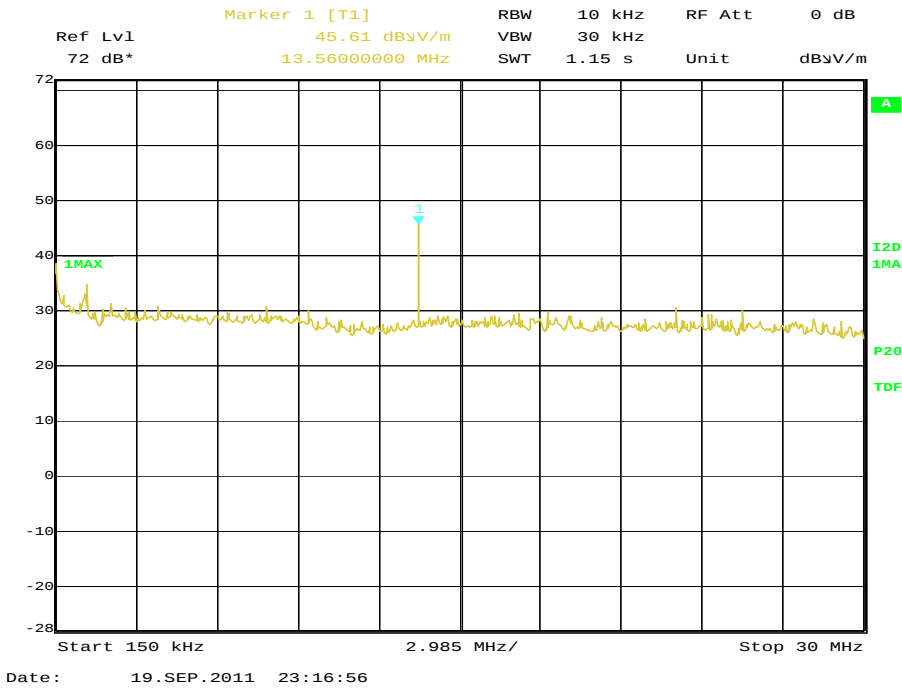


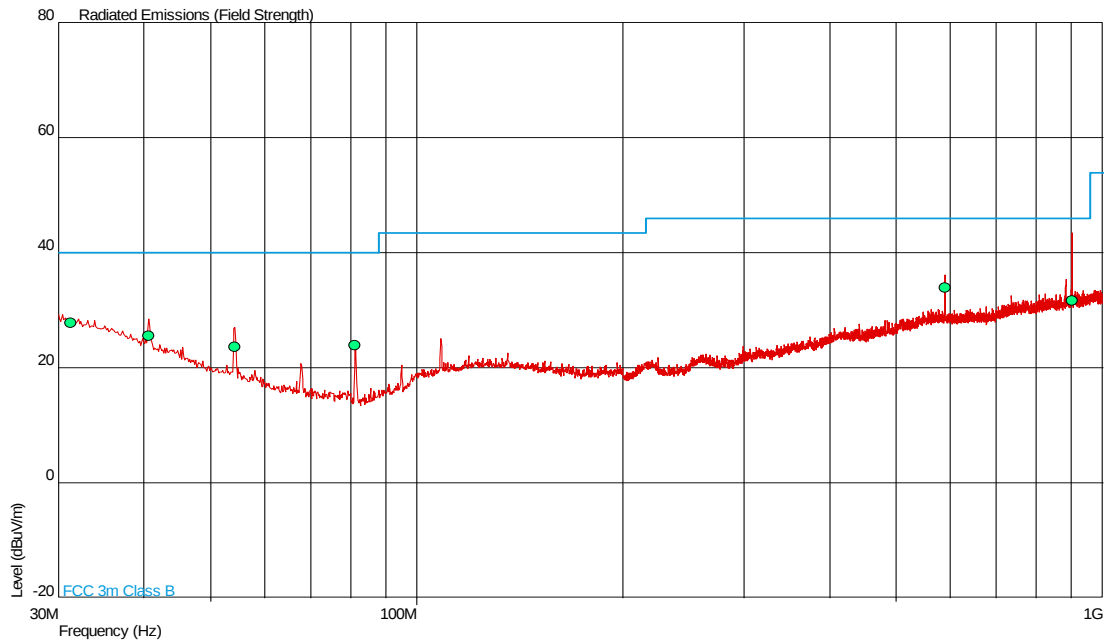
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9 kHz to 150 kHz



150 kHz to 30 MHz



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
31.272	27.8	24.5	40.0	100	-12.2	75.5	289	1.08	Horizontal
40.715	25.6	19.1	40.0	100	-14.4	80.9	213	1.00	Vertical
54.275	23.7	15.3	40.0	100	-16.3	84.7	143	1.15	Vertical
81.340	24.0	15.8	40.0	100	-16.0	84.2	210	1.00	Vertical
588.827	33.9	49.5	46.0	200	-12.1	150.5	341	1.00	Vertical
902.550	31.7	38.5	46.0	200	-14.3	161.5	0	1.00	Vertical



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2.2 OCCUPIED BANDWIDTH

2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.225, 15.215 (c)

2.2.2 Equipment Under Test and Modification State

CDMA SHI13 S/N: SSHFN000872 - Modification State 0

2.2.3 Date of Test

22 September 2011

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 applied in accordance with the test method requirements of FCC CFR 47 Part 15C and ANSI C63.10.

The EUT was transmitting at maximum power, at all data rates via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The peak point of the trace was measured and the markers positioned to give the -20dBc points of the displayed spectrum. The test was performed with an unmodulated carrier.

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

2.2.6 Environmental Conditions

Ambient Temperature	24.0°C
Relative Humidity	44.4%

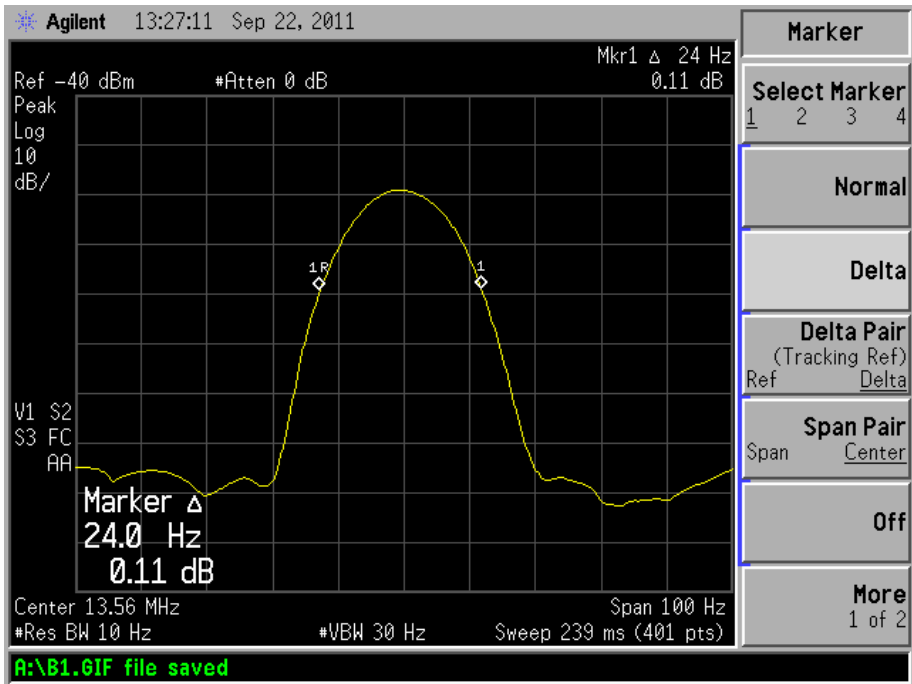


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2.2.7 Test Results

4.0 V D C Supply

Frequency (MHz)	20 dB Bandwidth (Hz)
13.56	24.0





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2.3 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.225 (e)

2.3.2 Equipment Under Test and Modification State

CDMA SHI13 S/N: SSHFN000872 - Modification State 0

2.3.3 Date of Test

22 September 2011

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

The EUT was set to transmit on maximum power with normal modulation. An frequency counter, was used to measure the frequency error. The temperature was adjusted between -20°C and +50°C in 10° steps as per 15.225 (e).

2.3.6 Environmental Conditions

Ambient Temperature	24.3°C
Relative Humidity	44.1%



2.3.7 Test Results

4.0 V D C Supply

RFID

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (%)
-20	13.56	0.0018
-10	13.56	0.0020
0	13.56	0.0020
+10	13.56	0.0020
+20	13.56	0.0016
+20	13.56	0.0016
+20	13.56	0.0016
+30	13.56	0.0014
+40	13.56	0.0009
+50	13.56	0.0004

Limit Clause

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.



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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 – Field Strength of any Emission					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	20-Sep-2012
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	20-Sep-2012
Pre-Amplifier	Phase One	PSO4-0087	1534	12	22-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Test Receiver	Rohde & Schwarz	ESIB26	2085	12	14-Dec-2011
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	5-Jul-2012
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	5-Jul-2012
Compliance 5 Emissions	Schaffner	C5e Software V.5.00.00	3275	-	N/A - Software
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	19-Sep-2011
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	14-Apr-2012
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	mature GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	mature GmbH	NCD	3917	-	TU
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	12	8-Jul-2012



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Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.2 - Occupied Bandwidth					
Signal Generator	Hewlett Packard	ESG4000A	61	12	18-May-2012
Multimeter	White Gold	WG022	190	12	26-Oct-2011
30V/5A Power Supply	Farnell	L30-5	191	-	O/P Mon
Broadband Resistive Power Divider	Weinschel	1506A	605	12	6-Sep-2012
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	13-Mar-2012
Multimeter	Iso-tech	IDM101	2419	12	14-Sep-2012
Power Supply Unit	Weir	460	2754	-	TU
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
Power Divider	Weinschel	1506A	3345	12	4-May-2012
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	6-Jun-2012
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2011
Power Meter	Rohde & Schwarz	NRP	3491	12	19-Apr-2012
Wideband Power Sensor, 50MHz - 18GHz	Rohde & Schwarz	NRP-Z81	3492	12	19-Apr-2012
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	23-Feb-2012
'3.5mm' - '3.5mm' RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3697	12	28-Jan-2012
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	24-Jun-2012
Section 2.3 - Frequency Stability Under Temperature Variations					
Multimeter	White Gold	WG022	190	12	26-Oct-2011
Temperature Chamber	Montford	2F3	467	-	O/P Mon
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	13-Mar-2012
Power Supply Unit	Weir	460	2754	-	TU
Thermocouple Thermometer	Fluke	51	3172	12	23-Jul-2012
Hygrometer	Rotronic	I-1000	3220	12	3-May-2012
ESA-E Series Spectrum Analyser	Agilent	E4402B	3348	12	6-Jun-2012

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



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3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Frequency Stability Under Temperature Variations	± 3.54 Hz
Field Strength of any Emission	30MHz to 1GHz: ± 5.1 dB
Occupied Bandwidth	± 16.74 kHz



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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.

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