



Product Service

**Choose certainty.
Add value.**

Report On

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE
(B11, B18). Dual mode Media Tablet with Bluetooth, WLAN,
NFC(Type-A/ B) and GPS
In accordance with FCC CFR 47 Part 15C (FeliCa)

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00179

Document 75919259 Report 08 Issue 1

November 2012



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

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE
(B11, B18). Dual mode Media Tablet with Bluetooth, WLAN,
NFC(Type-A/ B) and GPS
In accordance with FCC CFR 47 Part 15C (FeliCa)

Document 75919259 Report 08 Issue 1

November 2012

PREPARED FOR

Sharp Communication Compliance Ltd
Azure House
Bagshot Road
Bracknell
Berkshire
RG12 7QY

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Ryan Henley
Authorised Signatory

DATED

09 November 2012

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

M Russell





Product Service

CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Application Form 6
1.4	Product Information 7
1.5	Test Conditions 7
1.6	Deviations from the Standard 7
1.7	Modification Record 7
2	TEST DETAILS 8
2.1	Field Strength of any Emission 9
2.2	Occupied Bandwidth 13
2.3	Frequency Stability Under Temperature Variations 15
3	TEST EQUIPMENT USED 17
3.1	Test Equipment Used 18
3.2	Measurement Uncertainty 19
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 20
4.1	Accreditation, Disclaimers and Copyright 21



Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode
Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS
In accordance with FCC CFR 47 Part 15C (FeliCa)



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS to 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 SHT21
Serial Number(s)	IMEI 004401114403799 IMEI 004401114403617
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2011)
Incoming Release Date	Application Form 11 September 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9385 24 October 2012
Start of Test	23 October 2012
Finish of Test	31 October 2012
Name of Engineer(s)	G Lawler M Russell
Related Document(s)	ANSI C63.10: 2009



Product Service

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	



Product Service

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 SHT21	Identification number	APYHRO00179
<u>Supply Voltage:</u>			
[]	AC mains	State AC voltage V	and AC frequency Hz
[]	DC (external)	State DC voltage V	and DC current A
[X]	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 powerW	Minimum transmitter power W
[X]	Continuous transmission (Type-B)	(if variable)	
[X]	Intermittent transmission (Type-A)	State duty cycle	
	If intermittent, can transmitter be set to continuous transmit test mode? Y/N		
<u>Antenna characteristics:</u>			
[]	Antenna connector	State impedance	ohm
[]	Temporary antenna connector	State impedance	ohm
[X]	Integral antenna	State gain	0 dBi
<u>Modulation characteristics:</u>			
[X]	Amplitude (Type-A:100%, Type-B:10%)	[]	Other
[]	Frequency	Details:	
[]	Phase		
Can the transmitter operate un-modulated?		N	
ITU Class of emission:			
<u>Extreme conditions:</u>			
Maximum temperature	55 °C	Minimum temperature	-10 °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 : 
 Name : Mototsugu Moroi
 Position held : Manager
 Date : 11 September 2012



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) 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 CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode
Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS
In accordance with FCC CFR 47 Part 15C (FeliCa)



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 SHT21 S/N: IMEI 004401114403799 - Modification State 0

2.1.3 Date of Test

23 October 2012 & 31 October 2012

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	21.7 - 22.2°C
Relative Humidity	36.0 - 49.0%

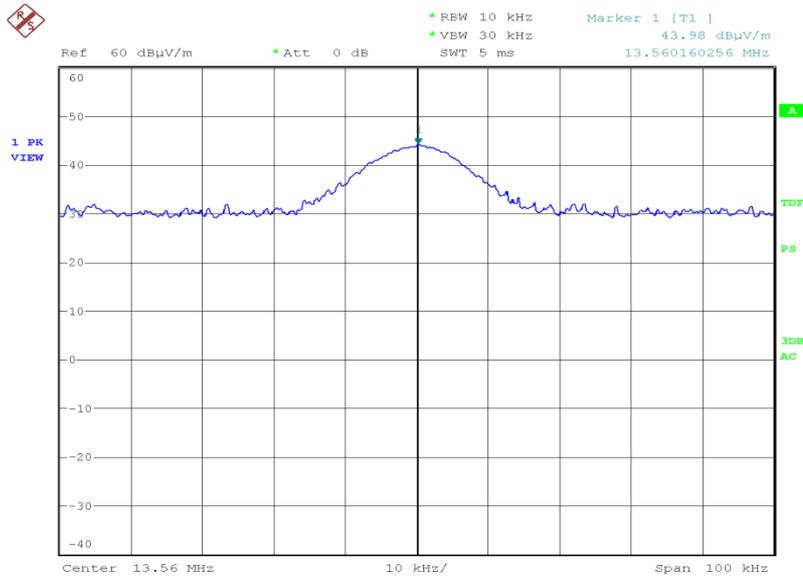


Product Service

2.1.7 Test Results

4.0 V DC Supply

Carrier



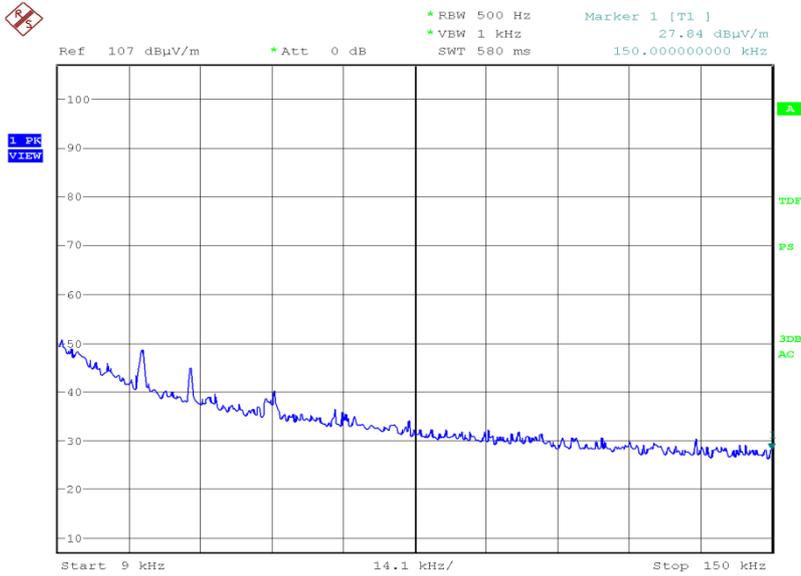
Date: 31.OCT.2012 18:55:18

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	43.43	148.42	84.0	15848.9	000	1.50	Face On



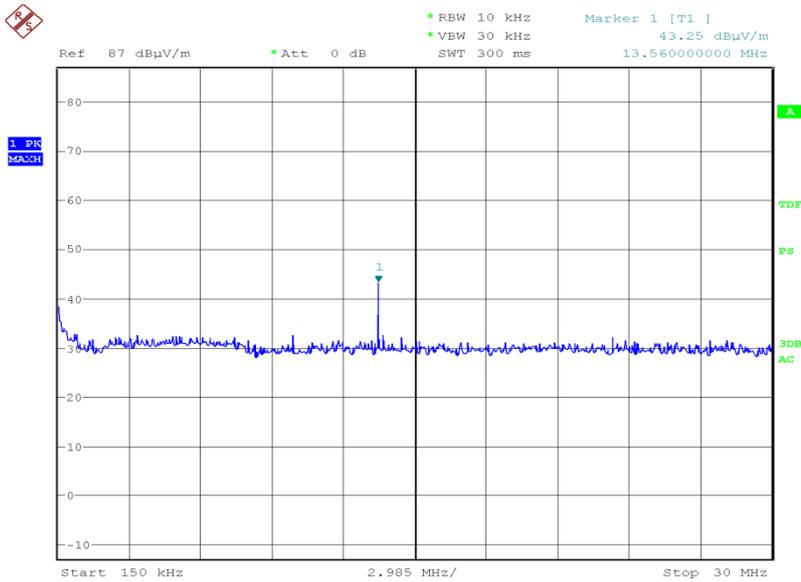
Product Service

9kHz to 150kHz



Date: 31.OCT.2012 18:40:49

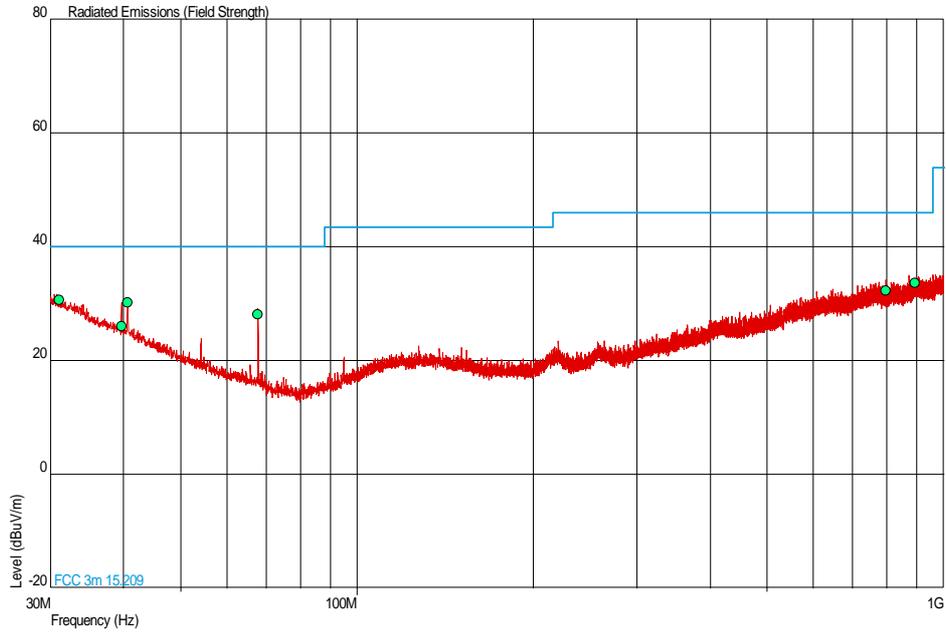
150kHz to 30MHz



Date: 31.OCT.2012 18:44:54



30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
31.124	30.7	34.3	40.0	100	-9.3	65.7	152	1.00	Vertical
39.684	26.1	20.2	40.0	100	-13.9	79.8	104	1.59	Vertical
40.661	30.3	32.7	40.0	100	-9.7	67.3	260	1.00	Vertical
67.789	28.1	25.4	40.0	100	-11.9	74.6	336	1.24	Vertical
798.457	32.4	41.7	46.0	200	-13.6	58.3	0	1.00	Vertical
894.385	33.7	48.4	46.0	200	-12.3	151.6	188	1.00	Horizontal



Product Service

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 SHT21 S/N: IMEI 004401114403617 - Modification State 0

2.2.3 Date of Test

29 October 2012

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	21.8°C
Relative Humidity	50.3%

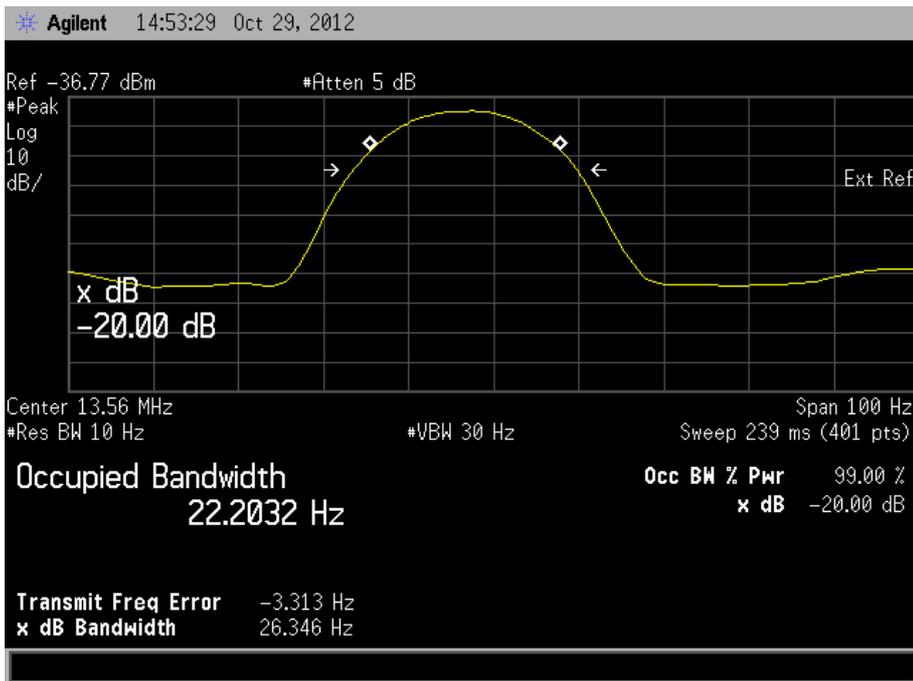


Product Service

2.2.7 Test Results

4.0 V DC Supply

Frequency (MHz)	20 dB Bandwidth (Hz)
13.56	26.346





Product Service

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 SHT21 S/N: IMEI 004401114403617 - Modification State 0

2.3.3 Date of Test

25 October 2012

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	20.6°C
Relative Humidity	56.8%



Product Service

2.3.7 Test Results

4.0 V DC Supply

RFID

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (%)
-20	13.56	0.001851032
-10	13.56	0.001939528
0	13.56	0.001563422
+10	13.56	0.001430678
+20	13.56	0.001386431
+20	13.56	0.001386431
+30	13.56	0.000545723
+40	13.56	0.000081120
+50	13.56	-0.000361357

Limit Clause

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



Product Service

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)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Antenna (Dish/Tripod/Adaptor, 1GHz-18GHz)	Rohde & Schwarz	AC-008	334	-	TU
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2013
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
Test Receiver	Rohde & Schwarz	ESIB40	1934	12	25-Oct-2012
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
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	16-Apr-2013
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	3633	24	14-Jun-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
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	-	TU
Section 2.2 - Occupied Bandwidth					
RF Coupler	TUV SUD Product Service	TUV	415	-	TU
Broadband Resistive Power Divider	Weinschel	1506A	601	12	2-Dec-2012
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	19-Jan-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	27-Jun-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	19-Nov-2012
Section 2.3 - Frequency Stability Under Temperature Variations					
RF Coupler	TUV SUD Product Service	TUV	415	-	TU
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Broadband Resistive Power Divider	Weinschel	1506A	601	12	2-Dec-2012
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	19-Jan-2013
Multimeter	Iso-tech	IDM101	2424	12	10-Sep-2013
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3173	12	23-Aug-2013
Hygrometer	Rotronic	I-1000	3220	12	13-Jun-2013
Vector Signal Generator	Rohde & Schwarz	SMU 200A	3493	12	19-Nov-2012

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
Frequency Stability Under Temperature Variations	± 3.54 Hz
Field Strength of any Emission	9 kHz to 1 GHz: ± 5.1 dB
Occupied Bandwidth	± 16.74 kHz



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

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).

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service

© 2012 TÜV SÜD Product Service