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Report On

FCC Testing of the
Sharp CDMA SHI11 Tri-Band CDMA (BC0/BC3, BC6) Cellular Phone
with Bluetooth, WLAN, FeliCa and GPS
In accordance with FCC CFR 47 Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: APYHRO00149

Document 75913699 Report 05 Issue 1

June 2011



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COMMERCIAL-IN-CONFIDENCE

REPORT ON

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PREPARED FOR

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PREPARED BY

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Authorised Signatory

DATED

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

Test Engineer(s);

G Lawler





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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp CDMA SHI11 Tri-Band CDMA (BC0/BC3, BC6) Cellular Phone with Bluetooth, WLAN,
FeliCa and GPS
In accordance with FCC CFR 47 Part 15B



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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 SHI11 Tri-Band CDMA (BC0/BC3, BC6) Cellular Phone with Bluetooth, WLAN, 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 Communication Compliance Ltd
Model Number(s)	CDMA SHI11
Serial Number(s)	SSHFL000937
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2010)
Incoming Release Date	Application Form 10 June 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	8528 10 May 2011
Start of Test	29 May 2011
Finish of Test	29 May 2011
Name of Engineer(s)	G Lawler



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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				
2.1	15.107	AC Line Conducted Emissions	Pass	
2.2	15.109	Radiated Emissions	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 - CDMA	
<u>Equipment designator:</u>	
Model name/number	CDMA SHI11
Identification number	APYHRO00149
<u>Supply Voltage:</u>	
<input type="checkbox"/> AC mains	State AC voltage V and AC frequency Hz
<input type="checkbox"/> DC (external)	State DC voltage V and DC current A
<input checked="" type="checkbox"/> DC (internal)	State DC voltage 3.7 V and Battery type Li-ion
<u>Frequency characteristics:</u>	
Frequency range	824.7 MHz to 848.31 MHz
Channel spacing (if channelized)	
<u>Designated test frequencies:</u>	
Bottom: 824.7 MHz	Middle: 836.52 MHz
Top: 848.31 MHz	
<u>Power characteristics:</u>	
Maximum transmitter power	24 dBm
Minimum transmitter power (if variable) W
<input checked="" type="checkbox"/> Continuous transmission	
<input type="checkbox"/> Intermittent transmission	State duty cycle
If intermittent, can transmitter be set to continuous transmit test mode? Y/N	
<u>Antenna characteristics:</u>	
<input checked="" type="checkbox"/> Antenna connector	State impedance 50 ohm
<input type="checkbox"/> Temporary antenna connector	State impedance ohm
<input type="checkbox"/> Integral antenna	State gain dBi
<u>Modulation characteristics:</u>	
<input type="checkbox"/> Amplitude	<input type="checkbox"/> Other
<input type="checkbox"/> Frequency	Details:
<input checked="" type="checkbox"/> Phase	
Can the transmitter operate un-modulated?	N
ITU Class of emission:	



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<u>Extreme conditions:</u>			
Maximum temperature	+60 °C	Minimum temperature	-20 °C
Maximum supply voltage	4.0 V	Minimum supply voltage	3.7 V

EQUIPMENT INFORMATION - Bluetooth			
<u>Equipment designator:</u>			
Model name/number	CDMA SHI11	Identification number	APYHRO00149
<u>Supply Voltage:</u>			
<input type="checkbox"/>	AC mains	State AC voltage V	and AC frequency Hz
<input type="checkbox"/>	DC (external)	State DC voltage V	and DC current A
<input checked="" type="checkbox"/>	DC (internal)	State DC voltage 3.7 V	and Battery type Li-ion
<u>Frequency characteristics:</u>			
Frequency range	2402 MHz to 2480 MHz	Channel spacing	1MHz (if channelized)
Designated test frequencies:	Bottom: 2402 MHz Middle: 2440 MHz	Top:	2480 MHz
<u>Power characteristics:</u>			
Maximum transmitter power	6 dBm	Minimum transmitter power W (if variable)
<input checked="" type="checkbox"/>	Continuous transmission		
<input type="checkbox"/>	Intermittent transmission	State duty cycle	
	If intermittent, can transmitter be set to continuous transmit test mode?		Y/N
<u>Antenna characteristics:</u>			
<input type="checkbox"/>	Antenna connector	State impedance	ohm
<input checked="" type="checkbox"/>	Temporary antenna connector	State impedance	50 ohm
<input type="checkbox"/>	Integral antenna	State gain	2.14 dBi
<u>Modulation characteristics:</u>			
<input type="checkbox"/>	Amplitude	<input type="checkbox"/>	Other
<input checked="" type="checkbox"/>	Frequency	Details:
<input checked="" type="checkbox"/>	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



EQUIPMENT INFORMATION - WLAN			
<u>Equipment designator:</u>			
Model name/number	CDMA SH11	Identification number	APYHRO00149
<u>Supply Voltage:</u>			
<input type="checkbox"/>	AC mains	State AC voltage V	and AC frequency Hz
<input type="checkbox"/>	DC (external)	State DC voltage V	and DC current A
<input checked="" type="checkbox"/>	DC (internal)	State DC voltage 3.7 V	and Battery type Li-ion
<u>Frequency characteristics:</u>			
Frequency range	2412 MHz to 2462 MHz	Channel spacing	(if channelized)
<u>Designated test frequencies:</u>			
Bottom: 2412 MHz	Middle: 2437 MHz	Top: 2462 MHz	
<u>Power characteristics:</u>			
Maximum transmitter power	17.3 dBm	Minimum transmitter power W (if variable)
<input checked="" type="checkbox"/>	Continuous transmission		
<input type="checkbox"/>	Intermittent transmission	State duty cycle	
	If intermittent, can transmitter be set to continuous transmit test mode? Y/N		
<u>Antenna characteristics:</u>			
<input type="checkbox"/>	Antenna connector	State impedance	ohm
<input checked="" type="checkbox"/>	Temporary antenna connector	State impedance 50 ohm	
<input type="checkbox"/>	Integral antenna	State gain 2.14 dBi	
<u>Modulation characteristics:</u>			
<input type="checkbox"/>	Amplitude	<input type="checkbox"/>	Other
<input type="checkbox"/>	Frequency	Details:	
<input checked="" type="checkbox"/>	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



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHI11 Tri-Band CDMA (BC0/BC3, 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.

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1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards 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
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In accordance with FCC CFR 47 Part 15B



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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

CDMA SH111 S/N: SSHFL000937 - Modification State 0

2.1.3 Date of Test

29 May 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 is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

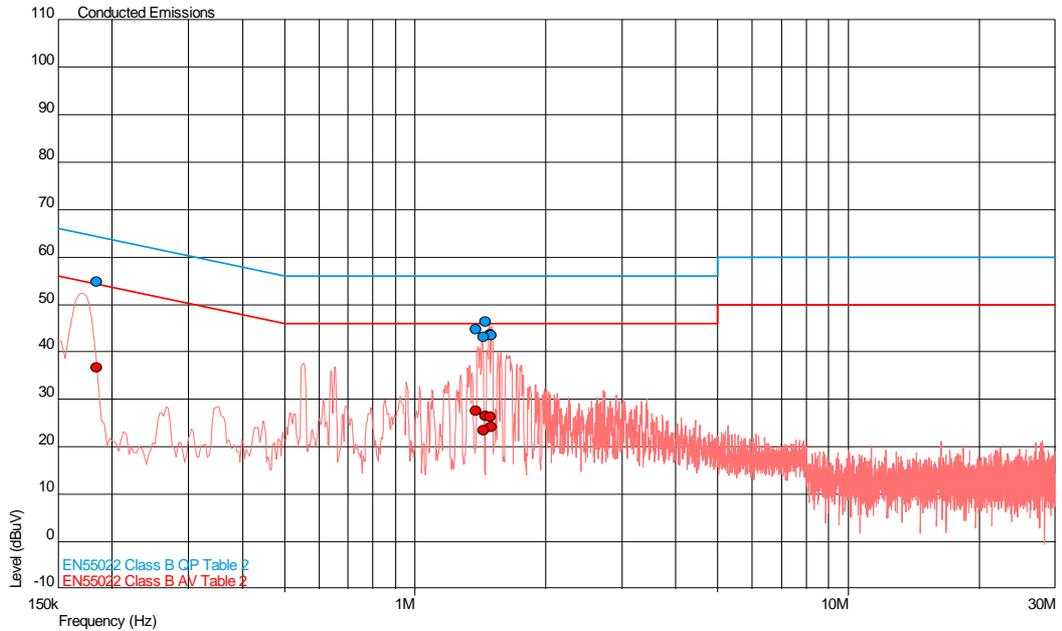
2.1.6 Environmental Conditions

Ambient Temperature	20.8°C
Relative Humidity	44.0%



2.1.7 Test Results

Live Line

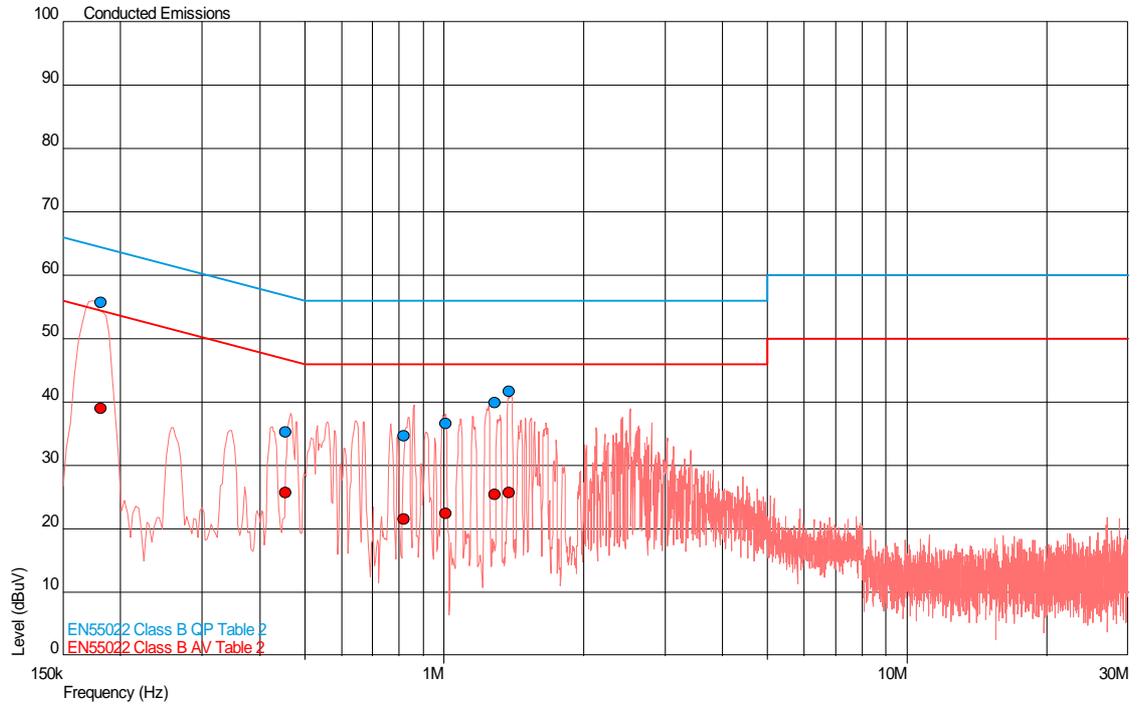


Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.184	54.7	64.3	-9.6	36.7	54.3	-17.6
1.382	44.6	56.0	-11.4	27.4	46.0	-18.6
1.439	43.2	56.0	-12.8	23.4	46.0	-22.6
1.453	46.4	56.0	-9.6	26.5	46.0	-19.5
1.488	43.7	56.0	-12.3	26.3	46.0	-19.7
1.499	43.5	56.0	-12.5	24.1	46.0	-21.9



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Neutral Line



Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.181	55.7	64.4	-8.7	39.0	54.4	-15.4
0.456	35.3	56.8	-21.5	25.7	46.8	-21.0
0.820	34.7	56.0	-21.3	21.6	46.0	-24.4
1.010	36.6	56.0	-19.4	22.4	46.0	-23.6
1.290	39.9	56.0	-16.1	25.5	46.0	-20.5
1.381	41.7	56.0	-14.3	25.8	46.0	-20.2



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

CDMA SH111 S/N: SSHFL000937 - Modification State 0

2.2.3 Date of Test

29 May 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

A preliminary profile of the Spurious Radiated Emissions is obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using a peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

2.2.6 Environmental Conditions

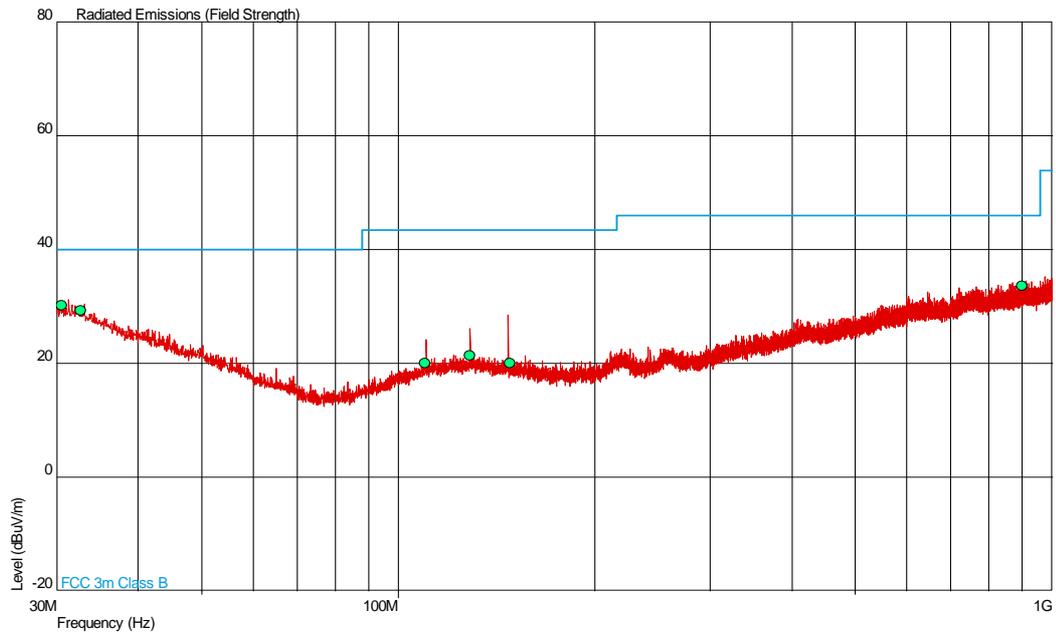
Ambient Temperature	20.8°C
Relative Humidity	44.0%



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2.2.7 Test Results

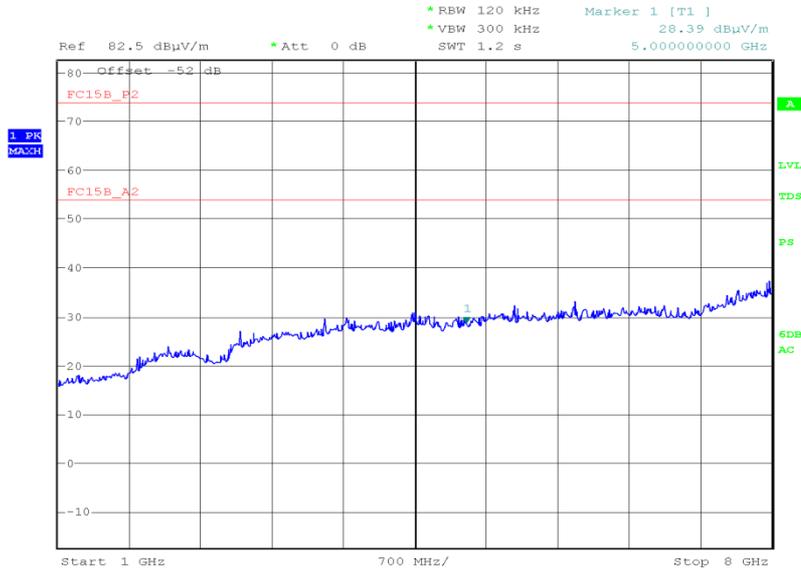
30 MHz to 1 GHz



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
30.534	30.2	32.4	40.0	100	-9.8	67.6	180	1.00	Vertical
32.716	29.4	29.5	40.0	100	-10.6	70.5	0	1.00	Horizontal
109.783	20.0	10.0	43.5	150	-23.5	140.0	270	1.00	Horizontal
128.698	21.4	11.7	43.5	150	-22.1	138.3	180	1.00	Vertical
147.917	20.0	10.0	43.5	150	-23.5	140.0	180	1.00	Vertical
898.926	33.6	47.9	46.0	200	-12.4	152.1	0	1.00	Horizontal

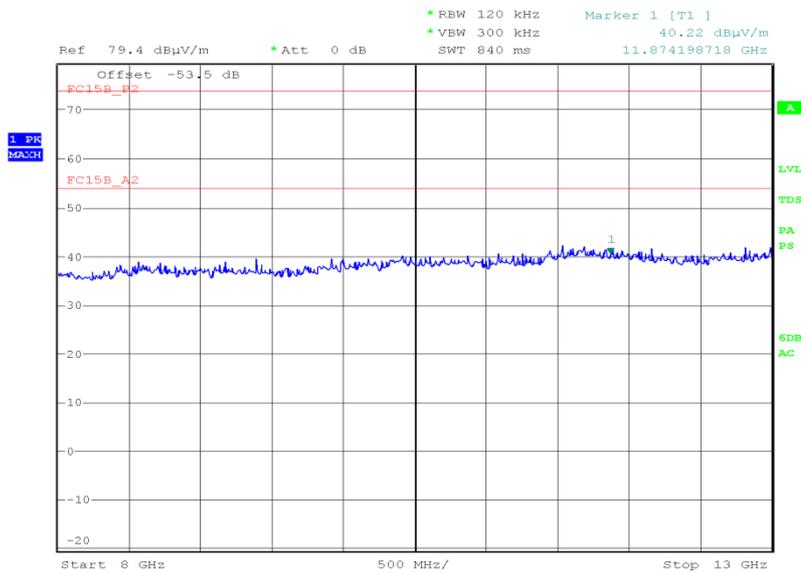


1 GHz to 8 GHz



Date: 29.MAY.2011 11:32:40

8 GHz to 13 GHz



Date: 29.MAY.2011 11:21:26



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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 - AC Line Conducted Emissions					
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2012
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Transient Limiter	Hewlett Packard	11947A	2378	12	22-Jun-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
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	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	15-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	12	2-Jul-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-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	10-Aug-2011
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

TU – Traceability Unscheduled



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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



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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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