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# Report On

Limited FCC Testing of the  
Sharp CDMA SHI14 Dual Band CDMA (800 MHz, BC0 and 1900 MHz,  
BC6) Cellular Phone with Bluetooth, WLAN, FeliCa and GPS  
In accordance with FCC CFR 47 Part 15B

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FCC ID: APYHRO00163

Document 75915808 Report 04 Issue 1

December 2011



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**REPORT ON**

Limited FCC Testing of the  
Sharp CDMA SH114 Dual Band CDMA (800 MHz, BC0 and 1900  
MHz, BC6) Cellular Phone with Bluetooth, WLAN, FeliCa and GPS  
In accordance with FCC CFR 47 Part 15B

Document 75915808 Report 04 Issue 1

December 2011

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**DATED**

08 December 2011

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**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





## CONTENTS

Section	Page No
<b>1</b>	<b>REPORT SUMMARY ..... 3</b>
1.1	Introduction ..... 4
1.2	Brief Summary of Results ..... 5
1.3	Application Form ..... 6
1.4	Product Information ..... 11
1.5	Test Conditions ..... 11
1.6	Deviations from the Standard ..... 11
1.7	Modification Record ..... 11
<b>2</b>	<b>TEST DETAILS ..... 12</b>
2.1	AC Line Conducted Emissions ..... 13
2.2	Radiated Emissions ..... 16
<b>3</b>	<b>TEST EQUIPMENT USED ..... 19</b>
3.1	Test Equipment Used ..... 20
3.2	Measurement Uncertainty ..... 21
<b>4</b>	<b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 22</b>
4.1	Accreditation, Disclaimers and Copyright ..... 23



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## **SECTION 1**

### **REPORT SUMMARY**

Limited FCC Testing of the  
Sharp CDMA SHI14 Dual Band CDMA (800 MHz, BC0 and 1900 MHz, 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 Limited FCC Testing of the Sharp CDMA SHI14 Dual Band CDMA (800 MHz, BC0 and 1900 MHz, BC6) Cellular Phone with Bluetooth, WLAN, FeliCa and GPS to the requirements of FCC CFR 47 Part 15B.

Objective	To perform Limited 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 SHI14
Serial Number(s)	SSHFS002184
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2010)
Incoming Release Date	Application Form 24 October 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	8857 07 November 2011
Start of Test	12 November 2011
Finish of Test	14 November 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**

EQUIPMENT DESCRIPTION	
Model Name/Number	CDMA SHI14
Part Number	
FCC ID (if applicable)	APYHRO00163
Industry Canada ID (if applicable)	
Technical Description (Please provide a brief description of the intended use of the equipment)	Dual-Band CDMA(800MHz_BC0, 1900MHz_BC6) Cellular Phone with Bluetooth, W-LAN, FeliCa and GPS receiver.

EXTREME TEMPERATURE RANGE over which the equipment is to be type tested	
<input type="checkbox"/> -20°C to +55°C	
<input checked="" type="checkbox"/> Other (2)	
<input type="checkbox"/> Not applicable (no extreme temperature testing required)	
Extreme temperature range for the host(s):	-20C to +60C

- (2) The equipment shall be tested over the following temperature ranges :
- a) 0°C to +35°C for equipment for indoor use only, or intended for used in areas where the temperature is controlled within this range.
  - b) Over the extremes of the temperature range(s) of the declared host equipment(s) in case of plug-in radio devices.

TYPE OF ANTENNA	
<input checked="" type="checkbox"/> Integral	
Temporary RF connector provided:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Antenna connector	
<input type="checkbox"/> Number of antenna assembly(ies) submitted	
Gain of the antenna intended for normal use:	
0 dBi for assembly identified as Bluetooth	
0 dBi for assembly identified as WLAN	
dBi for assembly identified as	
dBi for assembly identified as	
dBi for assembly identified as	

TRANSMITTER TECHNICAL CHARACTERISTICS		
TRANSMITTER OPERATING FREQUENCY RANGE(S)		
	FCC and/or Industry Canada	EU
Bluetooth	2402 to 2480 MHz	2402 to 2480 MHz
WLAN	2412 to 2462 MHz	2412 to 2472 MHz
FCC and/or Industry Canada (only)		
Highest Internally Generated Frequency 1401.6 MHz		



SPREAD SPECTRUM PARAMETERS			
<input checked="" type="checkbox"/> <b>Bluetooth</b>			
FHSS: Channel <input checked="" type="checkbox"/> 79 Other	EDR <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
<b>Medium Access Protocol (Customer Declaration)</b>			
"We have implemented Bluetooth protocol which satisfies the medium access protocol requirement of EN 300 328".			
<input checked="" type="checkbox"/> <b>WLAN</b>			
IEEE 802.11(b) – DSSS <input checked="" type="checkbox"/>			
IEEE 802.11(g) – OFDM <input checked="" type="checkbox"/>			
IEEE 802.11(n) – OFDM <input checked="" type="checkbox"/>			
Supported Spatial Streams		2.4 GHz	5GHz
	Transmitter (Tx)	Yes	No
	Receiver (Rx)	Yes	No
GI (Guard Interval)	<input checked="" type="checkbox"/> 800 ns	<input type="checkbox"/> 400 ns	
Band Width	<input checked="" type="checkbox"/> 20 MHz	<input type="checkbox"/> 40 MHz	
<input type="checkbox"/> <b>Other Technology</b>			
Direct Sequence	<input type="checkbox"/>	Frequency Hopping	<input type="checkbox"/>
		Combined	<input type="checkbox"/>
		Other	
DSSS	Chip Sequence Length	bit	
	Spectrum Width	MHz	
FHSS	Total Number of Hops		
	Dwell Time	ms	
	Bandwidth Per Hop	MHz	
	Maximum Separation of Hops	MHz for ETSI EN 300 328	
Other			
<b>Medium Access Protocol (Customer Declaration)</b>			
"We have implemented IEEE 802.11 (b/g/n) protocol which satisfies the medium access protocol requirement of EN 300 328".			



<b>TRANSMITTER POWER CHARACTERISTICS</b>			
<b>Bluetooth</b>			
Maximum Rated Transmitter Output			
Effective radiated power (for equipment with antenna connector)	0.0025	W	
Effective radiated power (for equipment with integral antenna)	0.0025	W	
Minimum Rated Transmitter Output			
Effective radiated power (for equipment with antenna connector)	0.00025	W	
Effective radiated power (for equipment with integral antenna)	0.00025	W	
Is transmitter intended for :			
Continuous duty	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/> No
Intermittent duty	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
If intermittent state DUTY CYCLE			
Transmitter ON	seconds	Transmitter OFF	minutes
Is continuous operation possible for testing purposes?			
	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/> No
Is transmitter output power variable:			
	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
State during the test:			
Transmitter duty cycle	Tx on	Seconds	Tx Off
Duty cycle (Tx on /(Tx on +Tx off))	%		Seconds
<input type="checkbox"/> Continuously variable	<input type="checkbox"/> Stepped		
dB per step			
<b>WLAN</b>			
Maximum Rated Transmitter Output			
Effective radiated power (for equipment with antenna connector)	0.065(b/0.025(g.n	W	
Effective radiated power (for equipment with integral antenna)	0.065(b/0.025(g/n	W	
Minimum Rated Transmitter Output			
Effective radiated power (for equipment with antenna connector)			W
Effective radiated power (for equipment with integral antenna)			W
Is transmitter intended for :			
Continuous duty	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/> No
Intermittent duty	<input type="checkbox"/>	Yes	<input type="checkbox"/> No
If intermittent state DUTY CYCLE			
Transmitter ON	seconds	Transmitter OFF	minutes
Is continuous operation possible for testing purposes?			
	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/> No
Is transmitter output power variable:			
	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
State during the test:			
Transmitter duty cycle	Tx on	Seconds	Tx Off
Duty cycle (Tx on /(Tx on +Tx off))	%		Seconds
<input type="checkbox"/> Continuously variable	<input type="checkbox"/> Stepped		
dB per step			



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<b>TRANSMITTER POWER SOURCE (3)</b>			
<input checked="" type="checkbox"/> Common power source for transmitter and receiver			
<input type="checkbox"/> AC mains	State voltage		
AC supply frequency (Hz)	VAC	Max Current	Hz
<input type="checkbox"/> Single phase	<input type="checkbox"/> Three phase		
And / Or			
<input type="checkbox"/> External DC supply			
Nominal voltage	Max Current		A
Extreme upper voltage	Extreme lower voltage		
Battery			
<input type="checkbox"/> Nickel Cadmium			
<input type="checkbox"/> Lead acid (Vehicle regulated)			
<input type="checkbox"/> Alkaline			
<input checked="" type="checkbox"/> Lithium			
<input type="checkbox"/> Other Details :			
4.0	Volts nominal.		
End point voltage as quoted by equipment manufacturer		3.7	V

(3) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

<b>AUTOMATIC EQUIPMENT SWITCH OFF</b>	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
<input checked="" type="checkbox"/> Applies	3.4 V cut-off voltage
<input type="checkbox"/> Does not apply	



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RECEIVER POWER SOURCE (4)				
<input type="checkbox"/> AC mains		State voltage		
AC supply frequency	(Hz)	VAC	Max Current	Hz
<input type="checkbox"/> Single phase		<input type="checkbox"/> Three phase		
And / Or				
<input type="checkbox"/> External DC supply				
Nominal voltage		Max Current		A
Extreme upper voltage		Extreme lower voltage		
Battery				
<input type="checkbox"/> Nickel Cadmium				
<input type="checkbox"/> Lead acid (Vehicle regulated)				
<input type="checkbox"/> Alkaline				
<input type="checkbox"/> Lithium				
<input type="checkbox"/> Other Details :				
	Volts nominal.			
End point voltage as quoted by equipment manufacturer				V

(4) If a transmitter and receiver use the same power source, this should be declared. In such cases only the box for the transmitter power source should be filled in.

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
<input type="checkbox"/> Applies	V cut-off voltage
<input type="checkbox"/> Does not apply	

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: 24 October 2011



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## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Sharp CDMA SHI14 Dual Band CDMA (800 MHz, BC0 and 1900 MHz, 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 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**

Limited FCC Testing of the  
Sharp CDMA SHI14 Dual Band CDMA (800 MHz, BC0 and 1900 MHz, BC6) Cellular Phone  
with Bluetooth, WLAN, FeliCa and GPS  
In accordance with FCC CFR 47 Part 15B



## 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 SH114 S/N: SSHFS002184 - Modification State 0

### 2.1.3 Date of Test

14 November 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.

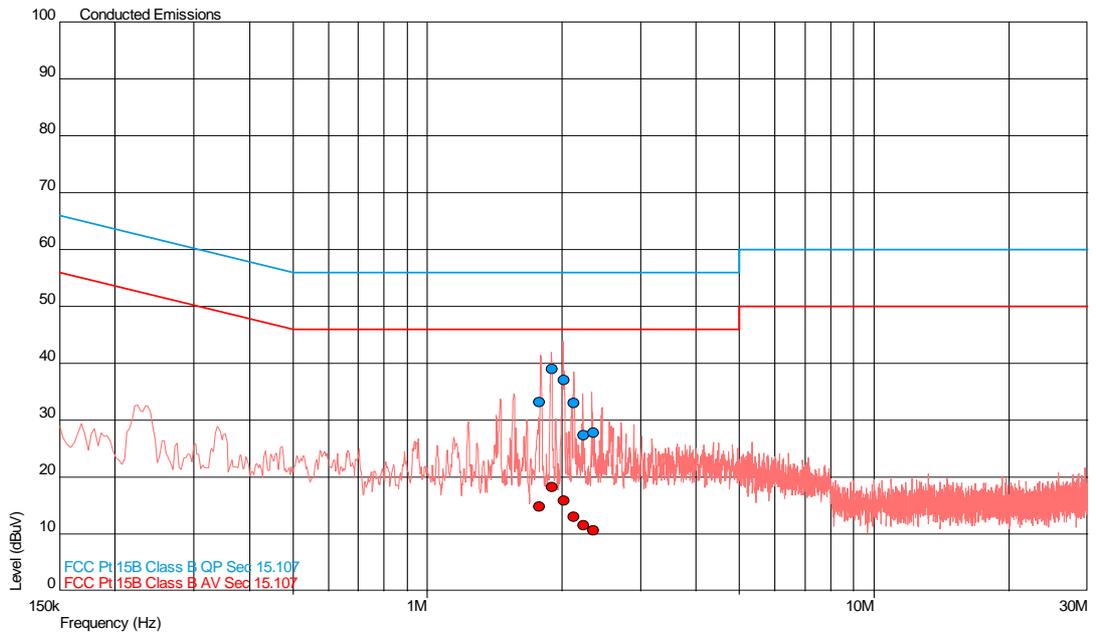
### 2.1.6 Environmental Conditions

Ambient Temperature	21.1°C
Relative Humidity	42.0%



2.1.7 Test Results

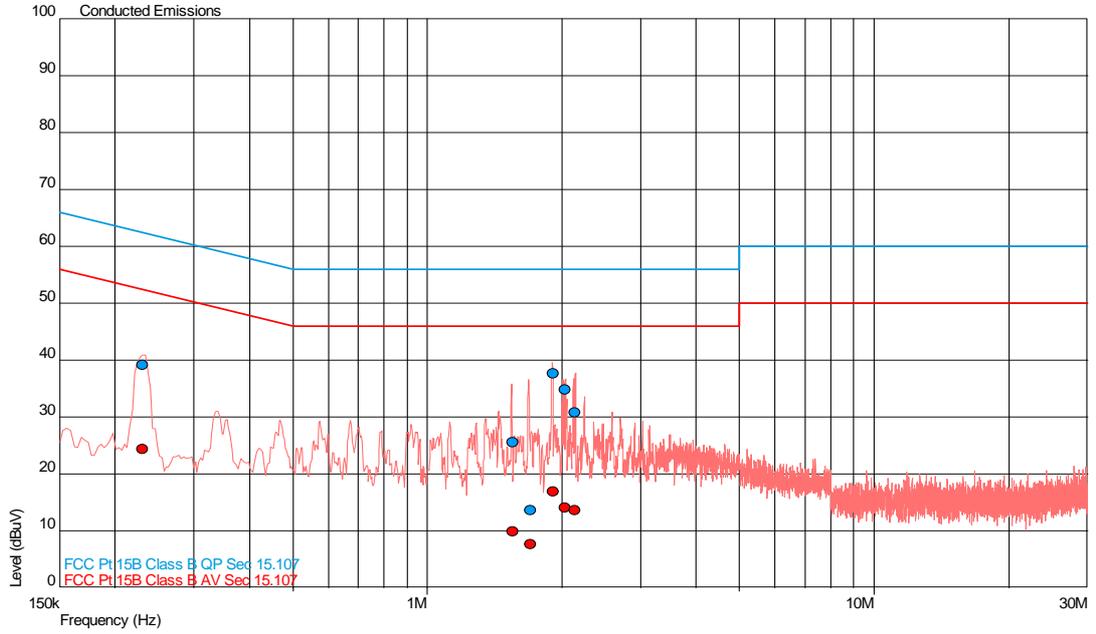
Live Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
1.779	33.2	56.0	-22.8	14.8	46.0	-31.2
1.904	39.0	56.0	-17.0	18.2	46.0	-27.8
2.023	37.1	56.0	-18.9	15.9	46.0	-30.1
2.125	33.0	56.0	-23.0	13.0	46.0	-33.0
2.236	27.3	56.0	-28.7	11.5	46.0	-34.5
2.352	27.9	56.0	-28.1	10.7	46.0	-35.3



Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.231	39.2	62.4	-23.3	24.4	52.4	-28.0
1.553	25.6	56.0	-30.4	9.9	46.0	-36.1
1.698	13.6	56.0	-42.4	7.7	46.0	-38.3
1.911	37.7	56.0	-18.3	17.0	46.0	-29.0
2.029	34.9	56.0	-21.1	14.1	46.0	-31.9
2.141	30.9	56.0	-25.1	13.6	46.0	-32.4



## 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 SH114 S/N: SSHFS002184 - Modification State 0

### 2.2.3 Date of Test

12 November 2011 & 14 November 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.

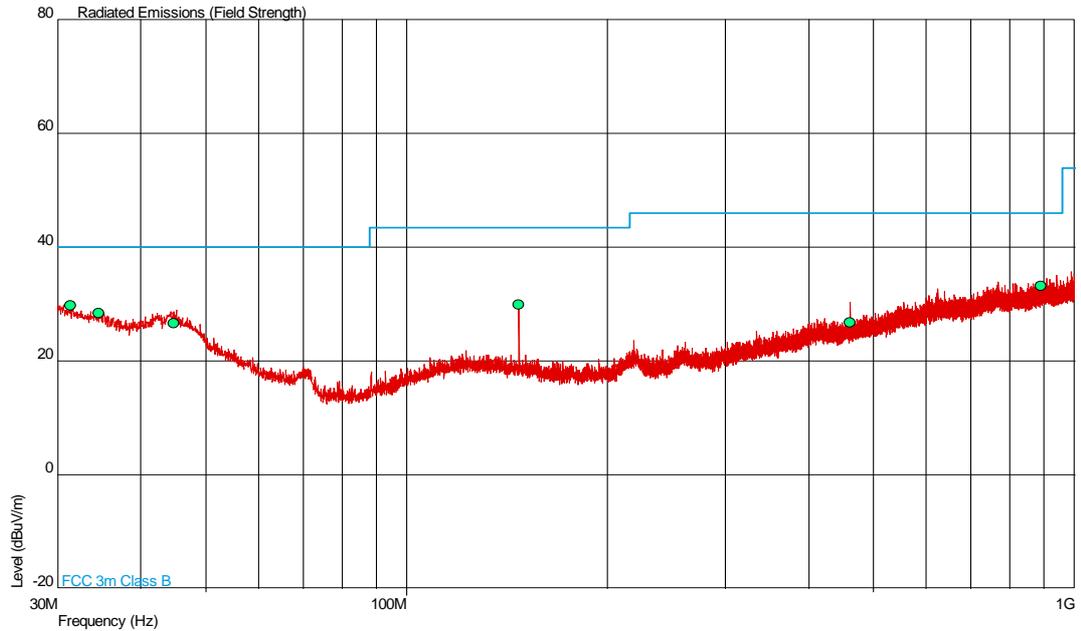
### 2.2.6 Environmental Conditions

Ambient Temperature	21.0 - 21.1°C
Relative Humidity	42.0 - 50.0%



2.2.7 Test Results

30 MHz to 1 GHz

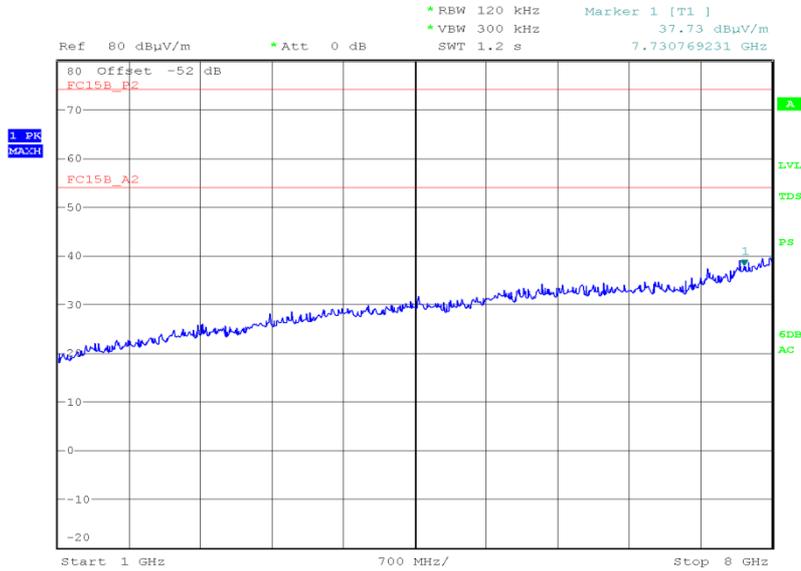


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
31.349	29.8	30.9	40.0	100	-10.2	69.1	172	1.00	Vertical
34.584	28.5	26.6	40.0	100	-11.5	73.4	287	1.00	Vertical
44.743	26.6	21.4	40.0	100	-13.4	78.6	270	1.00	Vertical
147.196	29.9	31.3	43.5	150	-13.6	118.7	242	1.00	Vertical
461.627	26.8	21.9	46.0	200	-19.2	178.1	32	1.37	Horizontal
891.937	33.2	45.7	46.0	200	-12.8	154.3	353	2.29	Vertical



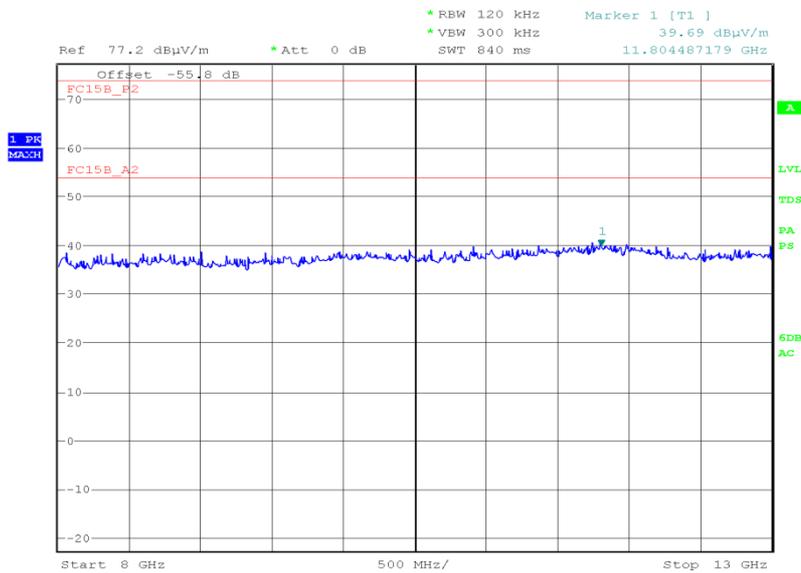
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1 GHz to 8 GHz



Date: 12.NOV.2011 19:56:57

8 GHz to 13 GHz



Date: 12.NOV.2011 20:10:12



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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
<b>Section 2.1- AC Line Conducted Emissions</b>					
3 phase LISN	Rohde & Schwarz	ESH2-Z5	323	12	10-Jan-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Transient Limiter	Hewlett Packard	11947A	2378	12	22-Jun-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
<b>Section 2.2- Radiated Emissions</b>					
Pre-Amplifier	Phase One	PS04-0086	1533	12	20-Sep-2012
Screened Room (5)	Rainford	Rainford	1545	36	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable Interface	Various	RH-253.6	1855	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	27-Apr-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	29-Sep-2012
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3703	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	26-Aug-2012
Tilt Antenna Mast	matur GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	matur 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: $\pm 5.1$ dB 1GHz to 40GHz: $\pm 6.3$ dB
AC Line Conducted Emissions	$\pm 3.2$ 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.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

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