

PCTEST ENGINEERING LABORATORY, INC.

6660-B Dobbin Road, Columbia, MD 21045 USA Tel. 410.290.6652 / Fax 410.290.6554 http://www.pctestlab.com



## MEASUREMENT REPORT FCC Part 15B Verification

#### Manufacturer Name & Address:

Sony Ericsson Mobile Communications AB Nya Vattentornet Lund Sweden 22188

#### Date of Testing:

August 24, 2010 **Test Site/Location:** PCTEST Lab, Columbia, MD, USA **Test Report Serial No.:** 0Y1008111355-R1.PY7

TRADE NAME:	SONY ERICSSON	
MODEL:	HS-ADC	
U.S. RESPONSIBLE PARTY	Sony Ericsson Mobile Communications AB	
Address:	Nya Vattentornet	
	Lund	
	Sweden 22188	
	Travel Adapter used with CDMA SOORE share	
EUT Type:	Travel Adapter used with CDMA SO005 phone	
Model:	HS-ADC	
FCC Rule Part(s):	FCC Part 15 Subpart B, Part 2 (Verification)	

FCC Classification: FCC Class B Digital Device

Test Procedure: ANSI C63.4-2003

The device bearing the FCC Identifier specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 (See Test Report). The results shown herein are also deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003. These measurements were performed with no deviation from the standards. Test results reported herein relate only to the item(s) tested.

I authorize and attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

NVLAP accreditation does not constitute any product endorsement by NVLAP or any agency of the United States Government. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

\* This revised test report (S/N: 0Y1008111355-R1.PY7) supersedes and replaces the previously issued test report on the same subject EUT for the same type of testing as indicated. Please discard or destroy the previously issued test report (S/N: 0Y1008111355.PY7) and dispose of it accordingly.

Randy Ortanez President



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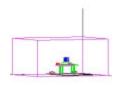


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# **MEASUREMENT REPORT** FCC Part 15B – Unintentional Radiators



## § 2.1033 General Information

APPLICANT:	Sony Ericsson Mobile Communications AB			
APPLICANT ADDRESS:	Nya Vattentornet			
	Lund, Sweden 2218	8		
TEST SITE:	PCTEST ENGINEE	RING LABORA	TORY, INC.	
TEST SITE ADDRESS:	6660-B Dobbin Roa	6660-B Dobbin Road, Columbia, MD 21045 USA		
FCC RULE PART(S):	FCC Part 15 Subpart B, Part 2 (Verification)			
MODEL:	HS-ADC			
EUT TYPE:	Travel Adapter used	d with CDMA So	O005 phone	
Test Device Serial No.:	N/A	Production	Pre-Production	Engineering
FCC CLASSIFICATION:	FCC Class B Digita	I Device		
DATE(S) OF TEST:	August 24, 2010			

#### Test Methodology

Both conducted and radiated measurements were taken using the methods and procedures described in ANSI C63.4-2003. Radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Test Facility / NVLAP Accreditation

# Conducted and radiated tests were performed at PCTEST Engineering Lab in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451A-1).
- PCTEST Lab is accredited by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) in EMC, Telecommunication, and FCC for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. (NVLAP Lab code: 100431-0).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451A-1) test laboratory with the site description on file at Industry Canada.

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# 1.0 INTRODUCTION

## 1.1 Scope

Measurement and determination of dectromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

## 1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity are, the Baltimore-Washington Internt'I (BWI) airport, the city of Baltimore and the Washington, DC area. (see Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are  $39^{\circ}$  11'15" N latitude and  $76^{\circ}$  49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 27, 2006.

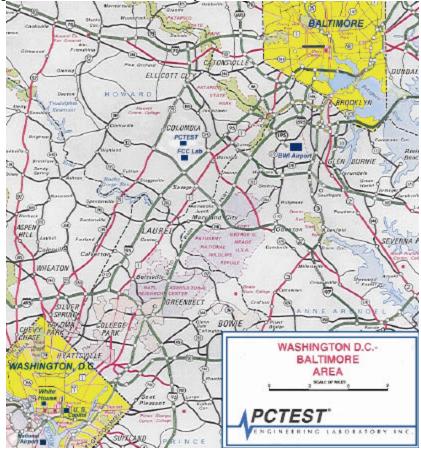


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Sony Ericsson Travel Adapter Model: HS-ADC**. The test data contained in this report pertains only to the emissions due to the digital circuitry of the EUT.

Manufacturer / Model	FCC ID	Description
Sony Ericsson / Model: HS-ADC	N/A	Travel Adapter used with CDMA SO005 phone

Table 2-1. EUT Equipment Description

	Voltage (AC/DC) [Volts]	Operating Frequency [Hz]	Current [mA]
Input Power	100-240 VAC	50-60	100
Output Power	5 VDC		600

Table 2-2. EUT Input/Output Power

### 2.2 Operation Mode

The Sony Ericsson Travel Adapter Model: HS-ADC was connected via interface port. For more information please see Section 7.0 for test data and Sections 9.0 and 10.0 for the test setup photographs.

#### 2.3 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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# 3.0 DESCRIPTION OF TEST

## 3.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) was used in the measurement of radiated and conducted emissions from the **Sony Ericsson Travel Adapter Model: HS-ADC.** 

Deviation from measurement procedure.....None

# 3.2 Conducted Emissions



Figure 3-1. Shielded Enclosure Line-Conducted Test Facility

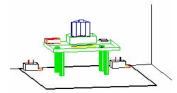


Figure 3-2. Line Conducted Emission Test Set-Up

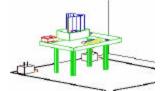


Figure 3-3. Wooden Table & Bonded LISNs

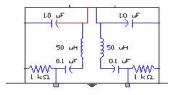


Figure 3-4. LISN Schematic Diagram The line-conducted facility is located inside a 16'x20'x10' shielded enclosure, manufactured by Ray Proof Series 81 (see Figure 3-1). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the sidewall of the shielded room see Figure 3-2). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50µH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see Figure 3-3). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filter (100dB 14Hz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of 1/2". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the Solar LISN. The LISN schematic diagram is shown (see Figure 3-4). All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz - 20GHz) PSG Signal Generator.

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### 3.3 Radiated Emissions

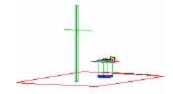


Figure 3-5. 3-Meter Test Site

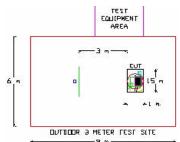


Figure 3-6. Dimensions of Outdoor Test Site

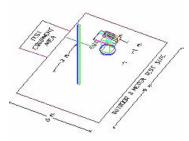


Figure 3-7. Turntable and System Setup

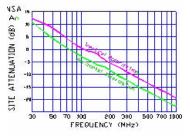


Figure 3-8. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, and turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using a bi-conical antenna and from 200 to 1000 MHz using a log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts<sup>TM</sup> Dipole antennas or horn antennas (*see Figure 3-5*). The test equipment was placed on a wooden and plastic bench situated on a 1.5m x 2m area adjacent to the measurement area (*see Figure 3-6*). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. Above 1GHz the detector function was set to average mode (RBW = 1MHz, VBW = 10Hz).

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 3-7). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz - 20GHz) PSG Signal Generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 3-8.

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# 4.0 SAMPLE CALCULATIONS

# 4.1 Conducted Emission Measurement Sample Calculation

#### @ 20.3 MHz

Class B limit	= 60.0 dBmV (Quasi-peak limit)
Reading	= - 57.8 dBm (calibrated quasi-peak level)
Convert to $db\mu V$	= $-57.8 + 107 = 49.2 \text{ dB}\mu\text{V}$
Margin	= 49.2 - 60.0 = - 10.8 dB = 10.8 dB below limit

# 4.2 Radiated Emission Measurement Sample Calculation

#### @ 66.7 MHz

Class B limit	= 100 mV/m = 40.0 dBmV/m
Reading	= - 76.0 dBm (calibrated level)
Convert to $db\mu V$	= $-76.0 + 107 = 31.0 \text{ dB}\mu\text{V}$
Antenna Factor + Cable Loss	= 5.8 dB/m
Total	= 36.8 dBµV/m
Margin	= 36.8 - 40.0 = -3.2 dB
	= 3.2 dB below limit

# Note:

Level [dBµV] =	20 log 10 (Level [µV/m])
Level [dB $\mu$ V] =	Level [dBm] + 107

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	No.166	(1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167	(100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Agilent	11713A	Attenuation/Switch Driver	12/2/2009	Annual	12/2/2010	3439A02645
Agilent	8447D	Broadband Amplifier	N/A		N/A	1937A03348
Agilent	8447D	Broadband Amplifier	N/A		N/A	2443A01900
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	12/2/2009	Annual	12/2/2010	3008A00985
Agilent	85650A	Quasi-Peak Adapter	12/2/2009	Annual	12/2/2010	3303A01872
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	12/2/2009	Annual	12/2/2010	3638A08713
Agilent	E4407B	ESA Spectrum Analyzer	9/28/2009	Annual	9/28/2010	US39210313
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	10/1/2009	Annual	10/1/2010	US42510244
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/25/2009	Biennial	3/25/2011	MY45470194
Emco	6502	Active Loop Antenna (10k - 30 MHz)	5/15/2009	Biennial	5/15/2011	267
Emco	3816/2	LISN	9/8/2008	Biennial	9/8/2010	9707-1077
Emco	3816/2	LISN	9/8/2008	Biennial	9/8/2010	9707-1079
Pasternack	PE7000-6	6 dB Attenuator	N/A		N/A	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/17/2009	Biennial	7/17/2011	A051107

Table 5-1. Annual Test Equipment Calibration Schedule

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# 6.0 ENVIRONMENTAL CONDITIONS

The temperature is controlled within range of  $15^{\circ}$ C to  $35^{\circ}$ C.

The relative humidity is controlled within range of 10% to 75%.

The atmospheric pressure is controlled within the range 86-106kPa (860-1060mbar).

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# 7.0 TEST DATA

# 7.1 Summary

Test Date(s):

August 24, 2010

Test Engineer:

Baron Chan

FCC Part 15 Section	Description	Result
15.107	Conducted Emissions	PASS
15.109	Radiated Emissions	PASS

#### Table 7-1. Summary of Test Results

Frequency [MHz]	Field Strength Limit [dB <b>nl/</b> /m]
30 – 88	100
88 – 216	150
216 – 960	200
> 960	500

Table 7-2. 3-Meter Radiated Limits (Section 15.109)

## Sample Calculation:

• Field Strength Level  $[dB\mu V/m]$  = Analyzer Level [dBm] + 107 + AFCL [dB]

#### Notes:

AFCL = Antenna Factor [dB] + Cable Loss [dB]

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Frequency [MHz]	Level [dBm]	AFCL [dB]	Pol [H/V]	Height [m]	Azimuth [degrees]	Field Strength [dB <b>ml/</b> /m]	Limit [dB <b>mi/</b> /m]	Margin [dB]
42.10	-102.54	13.05	Н	1.5	40	17.51	40.00	-22.49
49.40	-97.53	9.42	V	1.4	50	18.89	40.00	-21.11
185.20	-102.19	13.80	V	1.3	110	18.61	43.52	-24.91
355.00	-100.47	16.64	V	1.4	170	23.17	46.02	-22.85
422.90	-104.02	18.08	н	1.3	0	21.06	46.02	-24.96
784.20	-104.14	23.42	V	1.3	300	26.27	46.02	-19.75

# 7.2 Radiated Measurement Data §15.109; RSS-Gen (6(a))

Table 7-3. Radiated Measurements at 3-meters

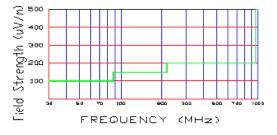


Figure 7-1. 3 Meter Limits

### NOTES:

1. All modes of operation were investigated and the worst-case emissions are reported.

2. Radiated Emissions were measured from 30MHz – 2000MHz.

3. The radiated limits are shown on Figure 7-1. Above 960MHz the limit is  $500\mu$ V/m.

1. All readings are calibrated by Agilent E8257D (250kHz – 20GHz) PSG Signal Generator with accuracy traceable to the National Institute of Standards and Technology (NIST).

Measurements using CISPR quasi-peak mode. Above 1GHz, peak detector function mode is used with a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

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<sup>2.</sup> AFCL = Antenna Factor and Cable Loss.



# 7.3 Line Conducted Measurement Data §15.107; RSS-Gen (7.2.2)

## **PCTEST Engineering Laboratory Inc.** Company : Sony Ericsson Mobile Communications AB Power Source : AC120V/60Hz Model Number : HS-ADC used with CDMA SO005 phone Tested Date : 08/24/2010 Standard : FCC Part 15B class B **Conducted Emission Measurement** 90.00 Line A Line B QP Limit Av Limit 80.00 70.00 Emission Level [dBµV] 60.00 50.00 40.00 30.00 20.00 10.00 0.00 -0.1000 1.0000 10.0000 100.0000 Frequency [MHz] Ver.1.1 ©PCTEST 2006.08

#### Plot 7-1. Line-Conducted Test Plot

#### Notes:

- 1. All Modes of operation were investigated and the worst-case emissions are reported.
- 2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.107 of the Title 47 CFR.
- 3. Line A = Phase; Line B = Neutral
- 4. Traces shown in plot are made using a peak detector.
- 5. Deviations to the Specifications: None.

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# Line Conducted Measurement Data (Cont'd) §15.107; RSS-Gen (7.2.2)

No.	Line	Frequency	Factor	QP	Limit	Margin	Average	Limit	Margin
		[MHz]	[dB]	[dBµV]	[dBµV]	[dB]	[dBµV]	[dBµV]	[dB]
1	А	0.188	7.98	51.28	64.07	-12.79	29.81	54.07	-24.26
2	А	1.161	7.32	30.73	56.00	-25.27	20.40	46.00	-25.60
3	Α	1.423	7.35	35.96	56.00	-20.04	22.03	46.00	-23.97
4	Α	1.467	7.35	36.19	56.00	-19.81	22.93	46.00	-23.07
5	А	1.551	7.36	35.54	56.00	-20.46	23.04	46.00	-22.96
6	А	1.600	7.36	37.24	56.00	-18.76	23.03	46.00	-22.97
7	Α	1.634	7.36	38.99	56.00	-17.01	21.92	46.00	-24.08
8	Α	1.811	7.38	40.94	56.00	-15.06	26.51	46.00	-19.49
9	А	1.904	7.38	41.49	56.00	-14.51	26.64	46.00	-19.36
10	А	1.951	7.39	39.44	56.00	-16.56	24.07	46.00	-21.93
11	В	0.151	8.17	50.60	65.77	-15.17	39.32	55.77	-16.45
12	В	0.763	7.37	37.71	56.00	-18.29	17.81	46.00	-28.19
13	В	0.892	7.34	31.89	56.00	-24.11	18.29	46.00	-27.71
14	В	1.132	7.32	36.95	56.00	-19.05	24.31	46.00	-21.69
15	В	1.387	7.34	25.13	56.00	-30.87	24.56	46.00	-21.44
16	В	1.872	7.38	31.55	56.00	-24.45	18.56	46.00	-27.44
17	В	1.927	7.39	34.74	56.00	-21.26	21.35	46.00	-24.65
18	В	2.230	7.40	39.06	56.00	-16.94	21.59	46.00	-24.41
19	В	2.513	7.42	32.03	56.00	-23.97	25.46	46.00	-20.54
20	В	3.123	7.45	37.61	56.00	-18.39	19.24	46.00	-26.76

Table 7-4. Line-Conducted Test Data

Notes:

- 1. All Modes of operation were investigated and the worst-case emissions are reported.
- 2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.107 of the Title 47 CFR.
- 3. Line A = Phase; Line B = Neutral
- 4. Traces shown in plot are made using a peak detector.
- 5. Deviations to the Specifications: None.

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# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Sony Ericsson Travel Adapter Model: HS-ADC** has been verified to comply with the requirements specified in Part 15 (§15.107 and §15.109) and Part 2 of the FCC Rules and Industry Canada Standard ICES-003.

Model: HS-ADC		FCC Pt. 15B VERIFICATION MEASUREMENT REPORT	Sony Ericeson	Reviewed by: Quality Manager
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