



Information to Customer

**Smart Modem**

Manufactured by Sercomm

## **Environmental Declaration**

### **Support documentation**

**The present document is providing backup information to statements 1 to 5 reported in the Environmental Declaration of SMART MODEM Sercomm of TIM.**

The energy consumption of the product has been optimized following objectives, operation states and target values defined by the European Code of Conduct on Broadband Equipment, signed by Telecom Italia:

1. in ON state, the mean power consumption is less than 12 Watts
2. in LOW POWER state, the mean power consumption is less than 6,5 Watts
3. Considering an yearly duty cycle, the energy consumption per product is reduced by 18,7% in comparison to the targets of the European Code of Conduct
4. The product is compliant to requirements on power consumption requirements for the “off” and “networked standby” states as defined by the European Regulation n. 801/2013 on Ecodesign
5. The power supply energy efficiency is high ( more than 87%)

# 1 Measurements of power consumption in low and full power (statements 1 and 2)

The Environmental Declaration of TIM SMART MODEM states that, in its use phase, the full (ON state) power consumption of the product is less than 12 Watts while in low power state the power consumption is less than 6,5 Watts.

Reference document Telecom Italia Labs (valid also for sections 2, 3 and 4) detailing the energy efficiency tests (SW version AGSOT\_1.0.0\_015C):

TETSVEI1600022. Verifiche di “Efficienza Energetica” eseguite sull’  
AG COMBO VD625 di Sercomm , nella versione FW  
AGSOT\_1.0.0\_015C.

## 1.1 Summary of results

The equipment, in Full VoIP configuration and with firmware version “AGSOT\_1.0.0\_015C” is compliant to the EU Code of Conduct on Energy Consumption of Broadband Equipment ver. 5 - Tier 2015-2016.

It is to be noted that the Code of Conduct is defining challenging objectives that can be reached on a voluntary basis. The non-compliance to the idle state is not constituting any violation of european directives, and indicates the improvements needs when the equipment is performing a limited set of actions.

## 1.2 Uncertainty of measurements

Uncertainty of measurements depends on uncertainty of test equipment. Tests have been performed following the methodology described by EN 50564 , Section 4.4

## 1.3 Test equipment

Instrument	Mftr.	Model	CSELT Ref.
Power Analyzer	YOKOGAWA	WT3000	S2532
AC Source	CHROMA	6215	200012811
Anemometer	TESTO	410-2	S2533
Thermo-hygrograph	Extech Instruments	42280	S2699

## 1.4 Requested requirement

The EU “Code of Conduct on Energy Consumption of Broadband Equipment” v5 defines two applicability periods; the TIM specification OETVSPWH1500033 produced in 2015 asks for compliance to the Code of Conduct with reference to the most restrictive values, corresponding to the second applicability period (2015-2016).

EUT Operation state	Power Target: CoC v5 Tier 2015-2016
	[W]
Idle state	7,9
On state	14,5

## 1.5 Details on measurements

The SMART MODEM manufactured by Sercomm, in Full VoIP configuration and with firmware version "AGSOT\_1.0.0\_015C" is compliant to the EU Code of Conduct on Energy Consumption of Broadband Equipment ver. 5 - Tier 2015-2016:

- Idle State (with low power led mode active): in comparison to the CoC target of 7,9 W the equipment consumption is 6,442±0,040 W, with approx. 1,4 W of margin.
- On State (with low power led mode active): in comparison to the CoC target of 19.40 W the equipment consumption is 11.918 ± 0.096 W, with approx.. 2,5 W of margin.

State	Power [W]	Power Target: CoC v5 Tier 2015-2016	Result
Idle State	6,442±0,040	7,9	Pass
On State	11.918 ± 0.096	14,5	Pass

In the following, measurements and related configurations corresponding to the most critical energy operational state for VDSL WAN (17a profile) are reported.

### EN 50564 Test Report

EN 50564:2011 compliance

*Appliance (equipment) Details*  
 <Details of manufacture marked on the product>  
 Name of device: AGCOMBO  
 DSL version: AGPvF03Ru\_d26a  
 Serial Number: A15078NU00000058  
 Firmware version: AGSOT\_1.0.0\_015C  
 Bootloader Version: 1.02.0  
 Hardware Type & Version: 001

Item	Appliance	Equipment
Brand	Sercomm	YOKOGAWA
Model	VD025	780202-11-SV
Type	AGCOMBO	Firmware Ver.F8.11
Serial Number	A15078NU00000058	0
Rated voltage / frequency	230 V / 50 Hz	-
Voltage Range	-	300V
Current Range	-	200mA

*Test Parameters*  
 <Information and documentation on the instrumentation>  
 Power Accuracy: +/- 40 mW

Item	Data
Name of mode	CEI No. 801/2013 & CoC BBE V.5
Mode category	Other
Cycle period	30.05.00
THD (Upper Limit)	0.120 % (2.000 %)
Crest Factor (Range)	1.416 - 1.417 (1.34 - 1.49)
Ambient temperature	22.5 degree
Other Ambient conditions	Air speed: < 0.5 m/s
Test voltage / frequency	230.155 V / 49.999 Hz

*Measured data for each mode as applicable*  
 <Any notes regarding the operation>  
 - VDSL Idle State:  
 Central functions: not processing user traffic  
 VDSL(17a) WAN interfaces: idle (link established but not user traffic transmission)  
 LAN Eth ports: ports not connected but with Eth. link detection active  
 2.4GHz WiFi: Beacon on, but no user traffic transmitted, no client associated.  
 5GHz WiFi: Beacon on, but no user traffic transmitted, no client associated.  
 FXS: 1 phone connected on-hook; other ports without phone  
 FXO: no active call, incoming call detection enabled  
 USB: No devices connected, detection devices active

*Measured data*

Item	Data
Measurement period	00.11.40 (LR Stable)
Power variation	6.905 %
Max Power Value	7.005 W
Last Power Value	6.356 W
Accumulated energy	1.253 Wh
Average Power	6.442 W

*Test and laboratory details*  
 <Applicant name and address>  
 O ET SV E  
 <Laboratory name and address>  
 STO PSM - PWRITTE  
 <Approver>  
 Federico Ballesto

Item	Data
Test report No./reference	PJV AG VD025 Sercomm
Date of test	07 / 03 / 2016 14:48

**Figure 3 - Idle State Report**

### EN 50564 Test Report

EN 50564:2011 compliance

*Appliance (equipment) Details*  
 <Details of manufacture marked on the product>  
 Name of device: AGCOMBO  
 DSL version: AGPvF03Ru\_d26a  
 Serial Number: A15078NU00000058  
 Firmware version: AGSOT\_1.0.0\_015C  
 Bootloader Version: 1.02.0  
 Hardware Type & Version: 001

Item	Appliance	Equipment
Brand	Sercomm	YOKOGAWA
Model	VD025	780202-11-SV
Type	AGCOMBO	Firmware Ver.F8.11
Serial Number	A15078NU00000058	0
Rated voltage / frequency	230 V / 50 Hz	-
Voltage Range	-	300V
Current Range	-	200mA

*Test Parameters*  
 <Information and documentation on the instrumentation>  
 Power Accuracy: +/- 95 mW

Item	Data
Name of mode	CoC of BBE V.5
Mode category	Active mode
Cycle period	30.05.00
THD (Upper Limit)	0.124 % (2.000 %)
Crest Factor (Range)	1.416 - 1.417 (1.34 - 1.49)
Ambient temperature	22.5 degree
Other Ambient conditions	Air speed: < 0.5 m/s
Test voltage / frequency	230.140 V / 50.000 Hz

*Measured data for each mode as applicable*  
 <Any notes regarding the operation>  
 - On State (VDSL):  
 Central functions: Processing user traffic present on the WAN and LAN interfaces  
 WAN interfaces: VDSL2 (17a) active (link established and passing user traffic)  
 G Eth LAN Eth ports: All ports active, link established with 10Mbps in Up&Down stream per port  
 WiFi 2.4GHz: Beacon on, with user traffic @ 10Mbps in Up&Down stream  
 WiFi 5GHz: Beacon on, with user traffic @ 10Mbps in Up&Down stream  
 FXS: 1 phone connected, off-hook, 1 active call; other ports without phone  
 USB: No devices connected, detection devices active

*Measured data*

Item	Data
Measurement period	00.11.26 (LR Stable)
Power variation	14.100 %
Max Power Value	13.080 W
Last Power Value	11.775 W
Accumulated energy	12.213 Wh
Average Power	11.918 W

*Test and laboratory details*  
 <Applicant name and address>  
 O ET SV E  
 <Laboratory name and address>  
 STO PSM - PWRITTE  
 <Approver>  
 Federico Ballesto

Item	Data
Test report No./reference	PJV AG VD025 Sercomm
Date of test	07 / 03 / 2016 09:30

**Figure 4 - On State Report**

## 2 Reduction of energy consumption with reference to the Code of Conduct (statement 3)

The Environmental Declaration of TIM SMART MODEM states that, in its use phase, the product, the energy consumption in the duty cycle and the related CO<sub>2</sub> equivalent emissions are reduced by about 18%. In the following, the detailed calculation is reported.

### 2.1 Summary of energy consumption

In the following, the target energy consumption values of Code of Conduct are reported, together with the new values measured for the TIM SMART MODEM.

Product	Full power energy yearly consumption (kWh)
CoC v5 – Tier 2015-2016	78,84
MODEM FIBRA Release: AGSOT_1.0.0_015C	64,09

The “duty cycle” is the energy consumption derived from the power consumption in the two mentioned operational states (low power and full power), referred to 365 days of operation. Following the ETNO document “Green benchmark: requirements for the reference boards”, <http://www.etno.be/LinkClick.aspx?fileticket=czK6zj6x8yg%3d&tabid=2260>) the energy consumption referred to the single year is derived from a weighted sum of the power consumption of the two main operational states, depending on the type and frequency of the home networking services used. The table illustrates the result of the duty cycle calculation in kWh for the single product for the ON state only, corresponding to 4 hours of operation per day.

From the table it is possible to calculate that the max. Energy consumption reduction is equal to **18,7%**.

As already said, release modifications can cause small variations of the energy consumption; the FW release evolutions will be continuously monitored by TIM labs to check if they will significantly affect the energy efficiency of the product and could require modifications of the Environmental Declaration.

### 3 Compliance to EU Regulation n. 801/2013 (statement 4)

#### 3.1 Uncertainty of measurements

Uncertainty of measurements depends on uncertainty of test equipment.

As far as accuracy of measurements is concerned, requirements included in EN 50564, section 4.4, have been considered.

#### 3.2 Test equipment

Instrument	Mftr.	Model	CSELT Ref.
Power Analyzer	YOKOGAWA	WT3000	S2532
AC Source	CHROMA	6215	200012811
Anemometer	TESTO	410-2	S2533
Thermo-hygrograph	Extech Instruments	42280	S2699

#### 3.3 Requested requirement

The EU Regulation N. 801/2013 establishes ecodesign requirements related to standby and off mode, and networked standby, electric power consumption for the placing on the market of electrical and electronic household and office equipment. A number of targets are defined corresponding to the rows of the following table, where the basic results of the tests are also reported:

Ecodesign requirements	Notes	Result
2a) Power consumption in 'off mode': power consumption of equipment in any off-mode condition shall not exceed 0,50 W	Power consumption (52 ± 4) mW	Pass
2b) stand-by mode energy consumption: power consumption in 'standby mode(s)': The power consumption of equipment in any condition providing only a reactivation function, or providing only a reactivation function and a mere indication of enabled reactivation function, shall not exceed 0,50 W.	N.A.	N.A.
2c) Availability of off mode and/or standby mode: eEquipment shall, except where this is inappropriate for the intended use, provide off mode and/or standby mode, and/or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.	"Off Mode" availability (see 2a)	Pass
2d) Power management: equipment shall, unless inappropriate for the intended use, offer a power management function or a similar function. When equipment is not providing the main function, and other energyusing product(s) are not dependent on its functions, the power management function shall switch equipment after the shortest possible period of time appropriate for the intended use of theequipment, automatically into: — standby mode, or	The equipment is a HiNA product ("networked equipment with high network availability")	N.A.

<p>— off mode, or</p> <p>— another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.</p>		
<p>3a) Possibility of deactivating wireless network connection(s): any networked equipment that can be connected to a wireless network shall offer the user the possibility to deactivate the wireless network connection(s). This requirement does not apply to products which rely on a single wireless network connection for intended use and have no wired network connection.</p>	<p>WiFi can be disabled via Web GUI.</p>	<p>Pass</p>
<p>3b) Power management for networked equipment: equipment shall, unless inappropriate for the intended use, offer a power management function or a similar function. When equipment is not providing a main function, and other energy-using product(s) are not dependent on its functions, the power management function shall switch equipment after the shortest possible period of time appropriate for the intended use of the equipment, automatically into a condition having networked standby</p>	<p>“Idle State VDSL2(17a)”</p> <p>“If the power consumption in idle or on modes is below the required power limits, this may be considered a condition of networked standby”</p>	<p>Pass</p>
<p>3c) Networked equipment that has one or more standby modes shall comply with the requirements for these standby mode(s) when all network ports are deactivated.</p>	<p>“Note that there is no requirement to deactivate all network ports”</p>	<p>N.A.</p>
<p>3d) Networked equipment other than HiNA equipment shall comply with the provisions under 2(d) when all network ports are deactivated.</p>	<p>The equipment is a HiNA product</p>	<p>N.A.</p>
<p>3e) Power consumption in a condition providing networked standby: the power consumption of HiNA equipment or equipment with HiNA functionality in a condition providing networked standby into which the equipment is switched by the power management function, or a similar function shall not exceed 12,00 W.</p>	<p>Power consumption (6.442 ± 0.040) W</p>	<p>Pass</p>

### 3.4 Results of the measurement

The detailed test report follows:

## EN 50564 Test Report

EN 50564:2011 compliance

### Appliance (equipment) Details

<Details of manufacture marked on the product>

Name of device: AGCCOMBO  
 DSL version: A2pw9F039u.d28a  
 Serial Number: A15078NU000000058  
 Firmware version: AGSOT\_1.0.0\_015C  
 Bootloader Version: 1.02.0  
 Hardware Type & Version: 001

Item	Appliance	Equipment
Brand	Sercomm	YOKOGAWA
Model	VD565	760302-11-SV
Type	AGCCOMBO	Firmware Ver.F8.11
Serial Number	A15078NU000000058	0
Rated voltage / frequency	230 V / 50 Hz	-
Voltage Range	-	300V
Current Range	-	200mA

### Test Parameters

<Information and documentation on the instrumentation>

Power Accuracy: +/- 4 mW

Item	Data
Name of mode	(CE) No. 801/2013
Mode category	Low power mode (Off mode)
Cycle period	00:05:00
THD	0.121 % (2.000 %)
Crest Factor (Range)	1.415 - 1.415 (1.34 - 1.49)
Ambient temperature	22.5 degree
Other Ambient conditions	Air speed: < 0.5 m/s
Test voltage / frequency	230.191 V / 50.000 Hz

### Measured data, for each mode as applicable

<Any notes regarding the operation>  
 --- Off Mode ---

### Measured data

Item	Data
Measurement period	00:10:00 (LR Stable)
Power variation	4.379 %
Max Power Value	0.054 W
Last Power Value	0.052 W
Accumulated energy	0.009 Wh
Average Power	0.052 W

### Test and laboratory details

<Applicant name and address>  
 O.ET.SV.EL  
 <Laboratory name and address>  
 STO PSM - PWR/ITE  
 <Approver>  
 Federico Balleisio

Item	Data
Test report No./reference	PVVY AG VD025, Sercomm
Date of test	07 / 03 / 2010 14:10

Figura 1 - Consumo di energia in «modo spento»

## EN 50564 Test Report

EN 50564:2011 compliance

### Appliance (equipment) Details

<Details of manufacture marked on the product>

Name of device: AGCCOMBO  
 DSL version: A2pw9F039u.d28a  
 Serial Number: A15078NU000000058  
 Firmware version: AGSOT\_1.0.0\_015C  
 Bootloader Version: 1.02.0  
 Hardware Type & Version: 001

Item	Appliance	Equipment
Brand	Sercomm	YOKOGAWA
Model	VD565	760302-11-SV
Type	AGCCOMBO	Firmware Ver.F8.11
Serial Number	A15078NU000000058	0
Rated voltage / frequency	230 V / 50 Hz	-
Voltage Range	-	300V
Current Range	-	200mA

### Test Parameters

<Information and documentation on the instrumentation>

Power Accuracy: +/- 40 mW

Item	Data
Name of mode	(CE) No. 801/2013 & CoC EEE V.5
Mode category	Other
Cycle period	00:05:00
THD	0.120 % (2.000 %)
Crest Factor (Range)	1.416 - 1.416 (1.34 - 1.40)
Ambient temperature	22.5 degree
Other Ambient conditions	Air speed: < 0.5 m/s
Test voltage / frequency	230.196 V / 49.999 Hz

### Measured data, for each mode as applicable

<Any notes regarding the operation>  
 - VDSL Idle State:

Central functions: not processing user traffic  
 VDSL(17a) WAN interfaces: idle (link established but not user traffic transmission)  
 LAN Eth. ports: ports not connected but with Eth. link detection active  
 2.4GHz WiFi: Beacon on, but no user traffic transmitted, no client associated  
 802.11n WiFi: Beacon on, but no user traffic transmitted, no client associated  
 FXS: 1 phone connected on-hook, other ports without phone  
 FXO: no active call, incoming call detection enabled  
 USB: No devices connected, detection devices active

### Measured data

Item	Data
Measurement period	00:11:40 (LR Stable)
Power variation	0.606 %
Max Power Value	7.006 W
Last Power Value	6.566 W
Accumulated energy	1.269 Wh
Average Power	6.442 W

### Test and laboratory details

<Applicant name and address>  
 O.ET.SV.EL  
 <Laboratory name and address>  
 STO PSM - PWR/ITE  
 <Approver>  
 Federico Balleisio

Item	Data
Test report No./reference	PVVY AG VD025, Sercomm
Date of test	07 / 03 / 2010 14:48

Figura 2 - Consumo di energia in una condizione che consente lo stand-by in rete

## 4 Compliance to Regulation N. 278/2009 on power supply energy efficiency (statement 5)

### 4.1 Uncertainty of measurements

Uncertainty of measurements depends on uncertainty of test equipment.

As far as accuracy of measurements is concerned, requirements included in EN 50564, section 4.4, have been considered.

### 4.2 Test equipment

Instrument	Mftr.	Model	CSELT Ref.
Power Analyzer	YOKOGAWA	WT3000	S2532
AC Source	CHROMA	6215	200012811
AC/DC Electronic Load	Keithley	228A	96A73
Anemometer	TESTO	410-2	S2533
Thermo-hygrograph	Extech Instruments	42280	S2699

### 4.3 Requested requirement

The EU Regulation 278/2009/CE defines specifications of the ecodesign and energy efficiency of power supplies both in no load and active mode conditions, being the modem power supply able to provide up to  $P_o=24W$ .

Limits are:

- Offload power consumption cannot exceed 0,30 W
- In active mode the mean efficiency cannot exceed 82,2 %

### 4.4 Measured result

The equipment under test is compliant to EU Regulation 278/2009/CE with the following details:

- No load power consumption is equal to  $52\pm 4$  mW, 248 mW less than the maximum limit ( $\leq 300$ mW);
- The Energy efficiency calculated as average of four points (efficiency at 25 %, 50 %, 75 % and 100 % of the nameplate output current) is above of the minimum target required of about 5.3 percentage points; the average efficiency is 87.5%.



## Details of the no load measurement

### EN 50564 Test Report

EN 50564:2011 compliance

#### Appliance(equipment) Details

<Product description>

External power supply

<Details of manufacture marked on the product>

AC/DC Switching Power Supply for AG Combo VD626 Serecomm  
Input: 100-240 Vac / 50-60 Hz / 700 mA  
Output: 12 Vdc / 2 A / 24 W  
Efficiency Lev.: VI  
DC Output Cord: 150 cm

Item	Appliance	Equipment
Brand	APD Inc.	YOKOGAWA
Model	WA-24Q12FG	760302-11-SV
Type	AC/DC Switching Power Supply	Firmware Ver.F8.11
Serial Number	Y13390000000	0
Rated voltage / frequency	230 V / 50 Hz	-
Voltage Range	-	300V
Current Range	-	20mA

#### Test Parameters

<Information and documentation on the instrumentation>

Power Accuracy: +/- 4 mW

Item	Data
Name of mode	(CE) No. 278/2009
Mode category	Other
Cycle period	00:05:00
THD *(Upper Limit)	0.121 % (2.000 %)
Crest Factor *(Range)	1.415 - 1.415 (1.34 - 1.40)
Ambient temperature	22.5 degree
Other Ambient conditions	Air speed: < 0.5 m/s
Test voltage / frequency	230.188 V / 50.000 Hz

#### Measured data, for each mode as applicable

<Any notes regarding the operation>  
— No Load —

#### Measured data

Item	Data
Measurement period	00:10:00 (LR Stable)
Power variation	4.152 %
Max Power Value	0.053 W
Last Power Value	0.051 W
Accumulated energy	0.009 Wh
Average Power	0.052 W

#### Test and laboratory details

<Applicant name and address>  
O.E.T.S.V.EI  
<Laboratory name and address>  
STO PSM - PWRVITE  
<Approver>  
Federico Balleisio

Item	Data
Test report No./reference	PVVV AG VD626 Serecomm
Date of test	07 / 03 / 2018 09:57

## Details of the active mode efficiency

	100 % of Nameplate Current	75 % of Nameplate Current	50 % of Nameplate Current	25 % of Nameplate Current	Average
<b>DC Output Current (A)</b>	1.995	1.495	1.001	0.500	
<b>DC Output Voltage (V)</b>	11.707	11.842	11.978	12.111	
<b>DC Output Power (W)</b>	23.358	17.709	11.988	6.056	
<b>AC Input Voltage rms (V)</b>	230.037	230.076	230.114	230.151	
<b>AC Input Current rms (A)</b>	0.283	0.223	0.161	0.090	
<b>AC Input Power (W)</b>	27.087	20.256	13.607	6.857	
<b>Voltage THD (%) to H49</b>	0.198	0.175	0.154	0.133	0.165
<b>Current THD (%) to H49</b>	207.149	220.344	234.662	241.750	225.976
<b>AC Input Frequency (Hz)</b>	50.000	49.999	50.000	50.000	50.000
<b>Power Consumed by UUT (W)</b>	3.729	2.547	1.619	0.801	
<b>Power Factor</b>	0.416	0.394	0.368	0.330	
<b>Calculated Efficiency (%)</b>	86.232	87.422	88.101	88.317	87.518
<b>Required Efficiency (%)</b>					82.222

Energy efficiency target for active mode: 82.221739 (%)

Measured Level: 87.518000 (%)



Information to customer

**SMART MODEM**

Manufactured by Sercomm

## **Environmental Declaration**

### **Support documentation**

**The present document is providing backup information to statements 6 to 9 reported in the Environmental Declaration of SMART MODEM Sercomm of TIM.**

Telecom Italia adopted some ecodesign criteria to optimize the life cycle management of the product:

6. Material used for the product's case is homogeneous, recyclable, and halogen-free
7. The weight of plastic used for the product's case has been minimized and it has been designed in terms of number of parts and screws/snap fits so that disassembling time have been optimized
8. The cardboard used for the product's package is not plasticized and 100% recyclable
9. Plastics included in the package have been minimized and are made by recyclable materials

# Environmental Declaration

<b>Product Name</b>	<b>AG BHS Combo VD625</b>
<b>Product Sercomm PN</b>	<b>0BNU0500P71</b>

## Summary

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## **1 PURPOSE**

This document reports information about packaging and housing of the Smart Modem aka AG BHS Combo product (Sercomm PN 0BNU0500P71)

## **2 PRODUCT INFORMATION**

The product has a plastic housing of 280,00gr; the plastic material is homogeneous ABS without flame retardant additive.

The plastic case is composed by 2 main parts (front and rear panel) plus the top USB port cover and the number of screws is 3.

The packaging doesn't contain recycle material but all those packaging can be recycled.

## ANNEX

## Test Report

No. NGBEC1601166701

Date: 07 Apr 2016

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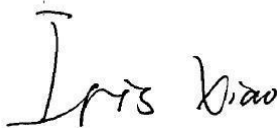
NINGBO LG YONGXING CHEMICAL CO., LTD

66, HAITIAN ROAD, HOUHAITANG INDUSTRY ZONE, ZHENHAI, NINGBO, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : PC/ABS Resin

SGS Job No. : NP16-001078 - NB  
Model No. : LUPOY GN5001RF-White  
Date of Sample Received : 31 Mar 2016  
Testing Period : 31 Mar 2016 - 07 Apr 2016  
Test Requested : Selected test(s) as requested by client.  
Test Method : Please refer to next page(s).  
Test Results : Please refer to next page(s).  
Conclusion : Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP) , Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) , and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of  
SGS-CSTC Standards Technical Services Co., Ltd. Ningbo Branch



Iris Xiao  
Approved Signatory



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SGS-CSTC Standards Technical Services Co., Ltd.  
Ningbo Branch Technical Laboratory

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# Test Report

No. NGBEC1601166701

Date: 07 Apr 2016

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Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	NGB16-011667.001	White solid grain

Remarks :

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected ( < MDL )
- (4) "-" = Not Regulated

**RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU**

- Test Method :
- (1) With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.
  - (2) With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.
  - (3) With reference to IEC 62321-4:2013, determination of Mercury by ICP-OES.
  - (4) With reference to IEC 62321:2008, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.
  - (5) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.
  - (6) With reference to EN 14372:2004, determination of phthalates by GC-MS.

<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1000	mg/kg	2	ND
Sum of PBBs	1000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND



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## Test Report

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<u>Test Item(s)</u>	<u>Limit</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND
Di-butyl Phthalate (DBP)	1000	mg/kg	30	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	30	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	1000	mg/kg	30	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	30	ND

### Notes :

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.

### Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

<u>Test Item(s)</u>	<u>Unit</u>	<u>MDL</u>	<u>001</u>
Chlorine (Cl)	mg/kg	50	ND
Bromine (Br)	mg/kg	50	ND



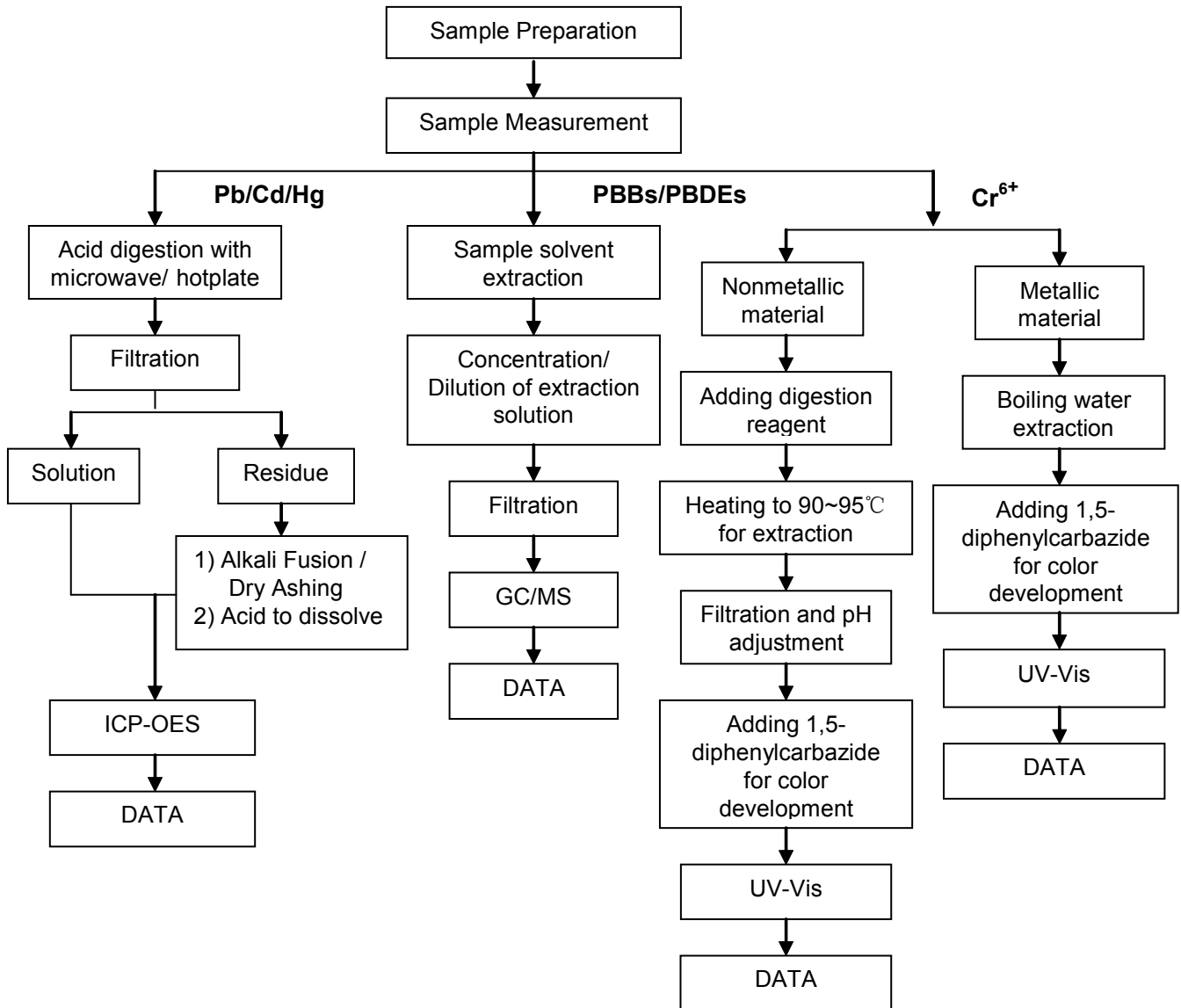
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RoHS Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> and PBBs/PBDEs test method excluded)

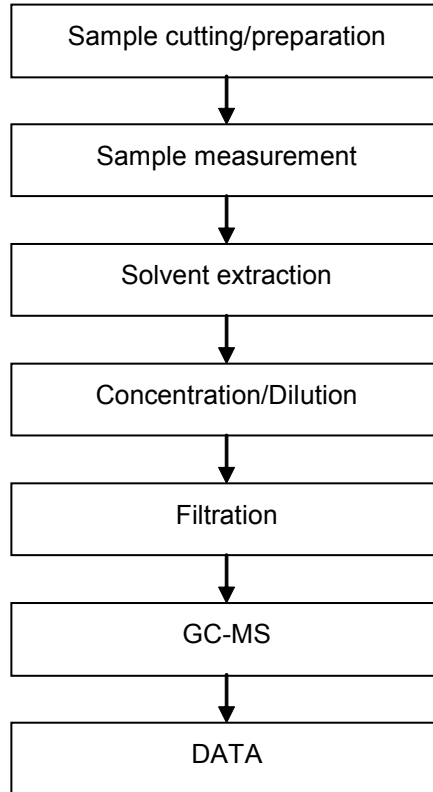


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Phthalates Testing Flow Chart



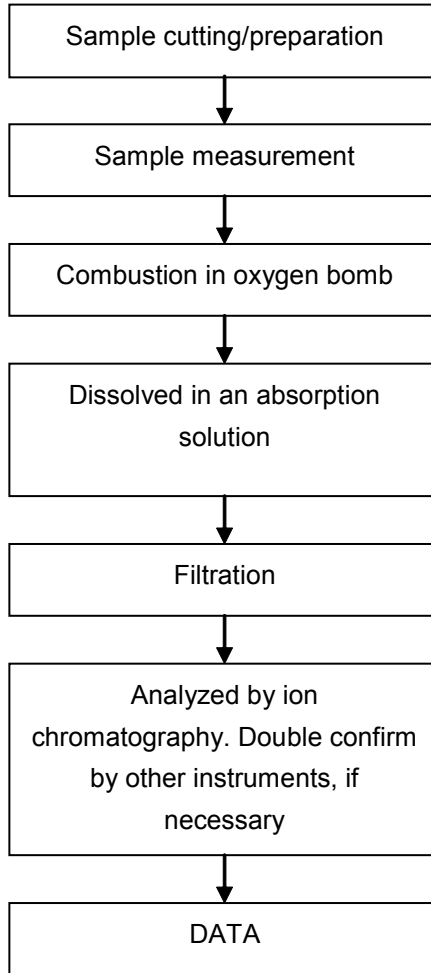
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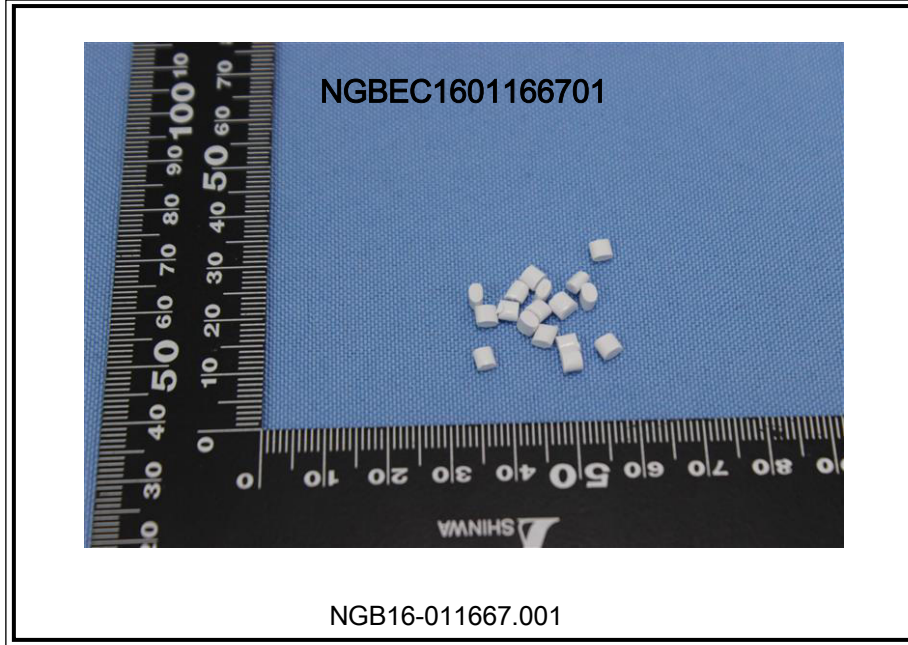
**Halogen Testing Flow Chart**



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## 1. EU RoHS 指令要求

EU RoHS Directive requirement

### 1.1. RoHS recase\_2011/65/EU

Items	物質名稱 Substance name	Case No (CE No.)	限值 Restriction (ppm)
1	鎘及其化合物 Cadmium (Cd) and it's compounds	Several	100
2	鉛及其化合物 Lead (Pb) and it's compounds	Several	1000
3	汞及其化合物 Mercury (Hg) and it's compounds	Several	1000
4	六價鉻及其化合物 Hexavalent-Chromium (Cr <sup>+6</sup> ) and it's compounds	Several	1000
5	聚溴聯苯 Poly Brominated Biphenyls (PBBs)	Several	1000
6	聚溴聯苯醚 Poly Brominated Diphenyl Ethers(PBDEs)	Several	1000

### 1.2. EU 2015/863

Items	物質名稱 Substance name	Case No/CE No.	限值 Restriction (ppm)
1	鄰苯二甲酸二(2-乙基己基)酯 (DEHP) Bis (2-ethylhexyl) phthalate (DEHP)	117-81-7 (204-211-0)	1000
2	鄰苯二甲酸丁酯苯甲酯 (BBP) Benzyl butyl phthalate (BBP)	85-68-7 (201-622-7)	1000
3	鄰苯二甲酸二丁酯 (DBP) Dibutyl phthalate (DBP)	84-74-2 (201-557-4)	1000
4	鄰苯二甲酸二異丁酯 (DIBP) Diisobutylphthalate (DIBP)	84-69-5 (115-96-8)	1000

## 2. REACH 限用物質

Restrictions for REACH Substances

供應商所交付至中磊電子之零件、半成品、組裝件或成品，均應符合 EU REACH 之要求。

Sercomm's suppliers shall comply with EU REACH requirements for registration and reporting. This applies to all products, assembly materials and component shipped to any Sercomm manufacturing site or location.

### 2.1. 供應商應依據 EU REACH 官網上所列之高關注物質 (SVHC) 列表，ECHA 官網連結：

[http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp).

Supplier shall monitor the official EU REACH Substance of Very High Concern (SVHC) list at the ECHA website: [http://echa.europa.eu/chem\\_data/authorisation\\_process/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp).



2.2. 供應商應揭露所交付之 Sercomm 之組件/零部件等所含有所有高關注物質 (SVHC) 之含量。  
Supplier shall notify Sercomm when an assembly material or component delivered to Sercomm contains an SVHC.

### 3. 無鹵 Restrictions for Halogen-free (依客戶需求 Depend on customer's requirement)

3.1. Substance name:

項目 Items	物質名稱 Substance name	Case No/CE No.	限值 Restriction (ppm)
1	溴(Br) Halogen-Bromine (Br)	7726-95-6	900
2	氯(Cl) Halogen-Chlorine (Cl)	7782-50-5	900
3	溴(Br)與氯(Cl)的總和	Several	1500

### 4. 產品包裝材料禁用環境管制物質 (僅包裝材料適用)

The banned and restricted substances of package material of product. (for package material use only)

4.1. 有關產品包裝材料除要符合上述「1~3 產品中禁限用的環境管制物質」的要求之外，也必需符合下表的環境管制物質規定。

The package material of product meet 「item 1~3 banned and restricted substances of package material of product」, in addition, it also needs follow below list requirement:

Items	物質名稱 Substance name	Case No/CE No.	限值(ppm) Restriction(ppm)
1	鎘 (Cd) 及鎘化合物 Cadmium and its compounds	Several	總和 Total ≤ 100
2	鉛 (Pb) 及鉛化合物 Lead and its compounds	Several	
3	汞 (Hg) 及汞化合物 Mercury and its compounds	Several	
4	六價鉻 (Cr <sup>+6</sup> ) 及其化合物 Hexavalent chromium and its compounds	Several	
5	聚氯乙烯及其混合物 Poly Vinyl Chloride (PVC) and PVC blends	Several	N.D.
6	五氯酚 Pentachlorophenol	87-86-5	N.D.
7	甲醛 (木製品, 例如木棧板) Formaldehyde (for wooden pallet only)	25214-70-4 (500-036-1)	N.D.

**5. 其它環境相關有害物質管控要求**

Requirement and Standard of others Hazardous Substances of controlled Environment-related substance.

## 5.1. 管制物質列表 Substances of controlled list:

Items	物質名稱 Substance name	Case No/CE No.	限值(ppm) Restriction(ppm)
1	黃磷、紅磷 Yellow Phosphorus, Red Phosphorus	7723-14-0	N.D.