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EVALUATION REPORT FOR

FCC 47CFR Part 2.1093 (10-1-09 Edition)

IC RSS-102 Issue 4 (2010-03)

Radiofrequency radiation exposure evaluation: portable devices.

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

Report No.:	34141RRF.001
Approved by (name / position & signature)	A. Llamas / RF Lab Manager
Issue date	2011-10-11

Alejandro Llamas Rodríguez
Firmado digitalmente por Alejandro Llamas Rodríguez
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Identification of item evaluated	Mobile Broadband Module
Trademark	Ericsson
Model and/or type reference	F5521gw
Serial number	-
Other identification of the product	FCC ID: VV7-MBMF5521GW1 / IC: 287AG-MBMF5521GW1
Features	QUAD BAND 850/900/1800/1900 GSM/GPRS/EGPRS class 10, WCDMA Bands I/II/V/VI/VIII HSDPA Cat. 14 HSUPA Cat. 6 MiniPCIe Full Size Wireless WAN module
Description	WWAN Module: MiniPCI Full Size Wireless WAN module Ericsson F5521gw Antenna Type: Yageo 6036B0091604 and 6036B0091504 Host platform: P17G-P17G001

Applicant	Ericsson AB
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Manufacturer	Same as applicant

Evaluation requested

General Requirements
FCC 47 CFR Part 2.1093 (10-1-09 Edition). Radiofrequency radiation exposure evaluation: portable devices.
FCC OET Bulletin 65, Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields".
IC RSS-102 Issue 4 (2010-03). Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).
Simultaneous transmission evaluation
FCC OET KDB 447498 – Mobile and Portable Device, RF Exposure Procedures and Equipment Authorization Policies (November 2009). Paragraph 4) b) iii)

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Competences and guarantees

AT4 wireless is a testing laboratory competent to carry out the evaluation described in this report.

AT4 wireless guarantees the reliability of the data presented in this report.

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Documents used

Documents undergoing used for the evaluation has been provided by: **The applicant**.

Title	Description	Issue date
Test Report no.: 1108FS16	SAR EVALUATION REPORT for Ericsson Broadband Module, model F5521gw	2011-08-15
REPORT NO.: SA110420C29	SAR TEST REPORT (15.247) for Broadcom 802.11agn WLAN PCI-E Minicard, model BCM943228HM4L	2011-07-21
REPORT NO.: SA110420C29-1	SAR TEST REPORT (15.407) for Broadcom 802.11agn WLAN PCI-E Minicard, model BCM943228HM4L	2011-07-07
REPORT NO.: SA110420C30	SAR TEST REPORT for Broadcom 802.11g/Draft 802.11n WLAN PCI-E Minicard, model BCM94313HMG2L	2011-07-05
NIE: 33436RRF.003	TEST REPORT for ireless module Intel® Centrino® Ultimate-N 6300, model 633ANHMW	2011-07-13
NIE: 33436RRF.004	TEST REPORT for ireless module Intel® Centrino® Advance-N 6205, model 62205ANHMW	2011-07-06

Summary

Considering the results of the evaluation according to the requirements of the FCC 47CFR Part 2.1093 (10-1-09 Edition) regarding the simultaneous transmission, the items under evaluation are **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Evaluation Report apply only to the particular item under evaluation established in page 1 of this document.

Remarks and comments

1: This document is just an evaluation report based on the standalone testing performed for each transmitter described, so no additional measurement were done. Please refer to the original reports to check the testing details.

ANNEX A: Evaluation description

1. Application Standard

The Federal Communications Commission (FCC) sets the limits for General Population / Uncontrolled exposure to radio frequency electromagnetic fields for transmitting devices designed to be used within 20 centimetres of the user body under *FCC 47 CFR Part 2.1093 - "Radiofrequency radiation exposure evaluation: portable devices", paragraph (d)(2)*.

Specific requirements and procedure for SAR assessment are describe under *FCC OET Bulletin 65, Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields"*, and all the FCC OET Knowledge Database documents referred at the beginning of this document.

Besides the standalone evaluation for each transmitter integrated in a final host, the FCC requires to consider all possible combinations of simultaneous transmission configurations for all transmitters and antennas of the final host computer.

For a tablet computer, the actual simultaneous transmission SAR measurement could be avoided if the FCC exclusion requirements stated at *FCC OET KDB 447498 – Mobile and Portable Device, RF Exposure Procedures and Equipment Authorization Policies (November 2009), Paragraph 4) b) iii)* are met.

2. Exclusion requirements

As stated at *FCC OET KDB 447498 – Mobile and Portable Device, RF Exposure Procedures and Equipment Authorization Policies (November 2009), Paragraph 4) b) iii), iii),* for each edge positioned closest to the user, simultaneous transmission SAR evaluation is not required when the simultaneous transmitting antennas along that edge are:

(1) located < 5 cm from the edge and the sum of the stand-alone 1-g SAR is < the SAR limit for these antennas or the SAR to peak location separation ratios are < 0.3 for all antenna pairs.

(2) located ≥ 5 cm from the edge and the simultaneous transmission SAR exclusion procedures for laptop computers in KDB 616217 are applicable.

3. Host and integrated transmitters description

The transmitters covered by this evaluation are:

- Cellular_Tx1: Ericsson Mobile Broadband Module, model F5521gw. QUAD BAND 850/900/1800/1900 GSM/GPRS/EGPRS class 10, WCDMA Bands I/II/V/VI/VIII HSDPA Cat. 14 HSUPA Cat. 6 transmitter with 2 antenna ports. FCC ID: VV7-MBMF5521GW1 / IC: 287AG-MBMF5521GW1.
- WLAN_Tx1: Broadcom 802.11agn WLAN PCI-E Minicard, model BCM943228HM4L. 802.11a/b/g/n20/n40 transmitter with 2 antenna ports. FCC ID: QDS-BRCM1054 / IC: 4324A-BRCM1054.
- WLAN_Tx2: Broadcom 802.11g/Draft 802.11n WLAN PCI-E Minicard, model BCM94313HMG2L. 802.11b/g/n20 transmitter with 2 antenna ports. FCC ID: QDS-BRCM1050 / IC: 4324A-BRCM1050.
- WLAN_Tx3: Intel® Centrino® Ultimate-N 6300, model 633ANHMW. 802.11a/b/g/n20/n40 transmitter with 3 antenna ports. FCC ID: E2K633ANH / IC: 1514B-633ANH.

- WLAN_Tx4: Intel® Centrino® Advance-N 6205, model 62205ANHMW. 802.11a/b/g/n20/n40 transmitter with 2 antenna ports. FCC ID: PD962205ANHU / IC: 1000M-62205ANHU.

The host integrating the transmitters under this evaluation is a tablet computer (P17G-P17G001), with the antennas located in the upper edge of the screen.

4. Simultaneous transmission evaluation details

The results referred in the *ANNEX B: Evaluation results* are the obtained from the stand-alone evaluation for each transmitter, taken from the test reports described above.

Due to the host design, only the Cellular_Tx1 is capable of transmit simultaneously with one of the other WLAN transmitter at a time. Therefore, the evaluation has been done for each combination between the Cellular_Tx1 and one WLAN transmitter.

Also, the evaluation does not consider the SAR results for the Secondary Landscape configuration (upper edge of the screen containing the antennas placed in direct contact with the phantom) because this desktop orientation has been disabled by the manufacturer for the Cellular_Tx1.

Additionally to the transmitters described in this report, any other transmitter with an average output power less than $60/f_{(GHz)}$ mW could be integrated in the host tablet described and could transmit simultaneously without any additional SAR evaluation, due to the testing exclusions stated at *FCC OET KDB 447498 – Mobile and Portable Device, RF Exposure Procedures and Equipment Authorization Policies (November 2009), Paragraph 4) b).*

5. Test Positions of device relative to body

As describe at the referenced test reports, the tablet device was tested in three different positions, as stated at:

- Lapheld: with the base in direct contact with the phantom, with the display folded on top of the keyboard section.
- Secondary Portrait: right edge of the display in direct contact with the phantom, with the display folded on top of the keyboard section.
- Secondary Landscape: upper edge of the display in direct contact with the phantom, with the display folded on top of the keyboard section.

Also, as describe at the referenced test reports, all the test positions of device relative to body were measured placing the device in direct contact with the phantom surface, so the requirements mentioned at *RSS-102 Supplementary Procedures (SPR)-001 - SAR TESTING REQUIREMENTS WITH REGARD TO BYSTANDERS FOR LAPTOP TYPE COMPUTERS WITH ANTENNAS BUILT-IN ON DISPLAY SCREEN (LAPTOP MODE/TABLET MODE)* are covered.

ANNEX B: Evaluation results

1. Cellular_Tx1 + WLAN_Tx1

These SAR results have been taken from:

- Cellular_Tx1: Ericsson F5521gw report no. 1108FS16.
- WLAN_Tx1: Broadcom BCM943228HM4L reports no. SA110420C29 and SA110420C29-1.

Secondary Portrait position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	251 (848.8 MHz)	Main	1.320	1.482	1.6
WLAN_Tx1	802.11g	2.4 GHz	6 (2437 MHz)	Aux	0.162		

Lapheld position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	128 (824.2 MHz)	Main	0.511	1.004	1.6
WLAN_Tx1	802.11a	5.2 GHz	52 (5260 MHz)	Main	0.493		

Result: Compliant with the exclusion requirements.

2. Cellular_Tx1 + WLAN_Tx2

These SAR results have been taken from:

- Cellular_Tx1: Ericsson F5521gw report no. 1108FS16.
- WLAN_Tx2: Broadcom BCM943228HM4L report no. SA110420C30.

Secondary Portrait position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	251 (848.8 MHz)	Main	1.320	1.482	1.6
WLAN_Tx2	802.11g	2.4 GHz	6 (2437 MHz)	Aux	0.162		

Lapheld position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	128 (824.2 MHz)	Main	0.511	0.619	1.6
WLAN_Tx2	802.11g	2.4 GHz	6 (2437 MHz)	Main	0.108		

Result: Compliant with the exclusion requirements.

3. Cellular_Tx1 + WLAN_Tx3

These SAR results have been taken from:

- Cellular_Tx1: Ericsson F5521gw report no. 1108FS16.
- WLAN_Tx3: Intel 633ANHMW report no. 33436RRF.003.

Secondary Portrait position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	251 (848.8 MHz)	Main	1.320	1.407	1.6
WLAN_Tx3	802.11n40	2.4 GHz	6 (2437 MHz)	Aux	0.087		

Lapheld position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	128 (824.2 MHz)	Main	0.511	0.961	1.6
WLAN_Tx3	802.11n40	5.6 GHz	102 (5510 MHz)	Aux	0.450		

Result: Compliant with the exclusion requirements.

4. Cellular_Tx1 + WLAN_Tx4

These SAR results have been taken from:

- Cellular_Tx1: Ericsson F5521gw report no. 1108FS16.
- WLAN_Tx4: Intel 62205ANHMW report no. 33436RRF.004.

Secondary Portrait position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	251 (848.8 MHz)	Main	1.320	1.407	1.6
WLAN_Tx4	802.11n40	2.4 GHz	6 (2437 MHz)	Aux	0.087		

Lapheld position:

Transmitter	Mode	Band	Channel (Frequency)	Antenna	Max. SAR averaged over 1g (W/kg)	$\sum SAR_i$ 1g (W/Kg)	SAR limit 1g (W/Kg)
Cellular_Tx1	GPRS (2 Uplink slots)	850 MHz	128 (824.2 MHz)	Main	0.511	1.158	1.6
WLAN_Tx4	802.11n40	5.6 GHz	134 (5670 MHz)	Aux	0.647		

Result: Compliant with the exclusion requirements.