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ASSESSMENT REPORT

Report No.: 29342IDT.002

REPORT ON: RF EXPOSURE ASSESSMENT OF THE F3507g ERICSSON MOBILE BROADBAND MODULE INSTALLED IN THE DELL STUDIO 1440 LAPTOP COMPUTER

Product	:	Ericsson Mobile Broadband Module
Trade Mark	:	Ericsson
Model	:	F3507g
FCC ID:	:	VV7-MBMF3507G-D
Manufacturer	:	Ericsson AB
Requested by	:	Ericsson AB
Host Platform	:	DELL STUDIO 1440
Standard(s)	:	OET Bulletin 65 Edition 97-01 August 1997 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 1999/519/EC Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 Vodafone requirements [1999/519/EC]

This test report includes 2 annexes and therefore, the total number of pages is 25.

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1. COMPETENCE 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, which is based on the information available at AT4 wireless at the time of performance of the evaluation.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under review and the results of such evaluation

2. GENERAL CONDITIONS

1. This report refers only to the item that has undergone the evaluation as described in Annex A of this report according to the information provided by the applicant.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

3. CHARACTERISTICS OF THE EVALUATION

3.1. SERVICES REQUESTED

RF exposure assessment of the F3507g Ericsson Mobile Broadband Module installed in the DELL STUDIO 1440 laptop computer according to:

Requirements	Frequency bands
OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC 47 CFR § 1.1307 - Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared. FCC 47 CFR § 1.1310 - Radiofrequency radiation exposure limits.	GSM 850, FDD V, PCS 1900, FDD II
1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)	E-GSM 900, DCS 1800, FDD I

Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)	FDD V, E-GSM 900, DCS 1800, FDD I
Vodafone requirements [1999/519/EC]	GSM 850, FDD V, E-GSM 900, DCS 1800, PCS 1900, FDD II, FDD I

3.2. REQUIREMENTS AND METHOD

The evaluation has been carried out according to the following documents and standards:

Requirements	Frequency bands
OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC 47 CFR § 1.1307 - Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared. FCC 47 CFR § 1.1310 - Radiofrequency radiation exposure limits.	GSM 850, FDD V, PCS 1900, FDD II
1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)	E-GSM 900, DCS 1800, FDD I
Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)	FDD V, E-GSM 900, DCS 1800, FDD I
Vodafone requirements [1999/519/EC]	GSM 850, FDD V, E-GSM 900, DCS 1800, PCS 1900, FDD II, FDD I

4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT

Identification data included in this section has been supplied by the client.

4.1. APPLICANT

Name / Company: Ericsson AB

V.A.T. Registration number: 556056-625801

Address: Lindholmspiren 11, SE-417 56 Goteborg

Country: Sweden

Telephone: +46 31 747 0000 **Fax:** +46 31 747 6033

4.2. REPRESENTATIVE

Name: Pelle Hellberg

Address: Lindholmspiren 11, SE-417 56 Goteborg

Country: Sweden

Telephone: +46 31 747 0000 **Fax:** +46 31 747 6033

4.3. IDENTIFICATION OF ITEM/ITEMS EVALUATED

Product: Ericsson Mobile Broadband Module

Trade mark: Ericsson **Model:** F3507g **FCC ID:** VV7-MBMF3507G-D

Manufacturer: Ericsson AB

Country of manufacture: China

Host platform: DELL STUDIO 1440

Description: 850/900/1800/1900/2100 MHz GSM/GPRS Class10/EDGE/HSDPA/HSUPA/WCDMA Release 6 Module installed in a DELL STUDIO 1440 Laptop.

5. EVALUATION RESULTS

Abbreviations used in the VERDICT column of the following tables are:

C Compliant with requirements

NC Not Compliant with requirements

NA Not Applicable

NE Not Evaluated

5.1. RESULTS FOR ITEM EVALUATED TRANSMITTING ALONE

DOCUMENT/STANDARD	VERDICT			
	NA	C	NC	NE
OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC 47 CFR § 1.1307 - Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared. FCC 47 CFR § 1.1310 - Radiofrequency radiation exposure limits.		C		
1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)		C		
Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)		C		
Vodafone requirements [1999/519/EC]		C		

5.2. RESULTS FOR ITEM EVALUATED TRANSMITTING SIMULTANEOUSLY WITH OTHER CO-LOCATED TRANSMITTERS

DOCUMENT/STANDARD	VERDICT			
	NA	C	NC	NE
OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC 47 CFR § 1.1307 - Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared. FCC 47 CFR § 1.1310 - Radiofrequency radiation exposure limits.		C		
1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)		C		
Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)		C		
Vodafone requirements [1999/519/EC]		C		

6. REMARKS AND COMMENTS

GSM and GPRS modes have been evaluated together because both modes share the same power class and modulation scheme in the uplink.

WCDMA and HSDPA modes have been evaluated together because HSDPA is an improved mode of operation only for Downlink (equipment reception), but using the normal WCDMA mode for the Uplink (equipment transmission).

7. SUMMARY

Considering the results of the performed analysis and evaluation, stated in annexes A and B, the item under evaluation is **IN COMPLIANCE** with the specifications listed in section 3.1 "SERVICES REQUESTED".

NOTE: The results presented in this report apply only to the particular item under evaluation established in section "4.3. IDENTIFICATION OF ITEM/ITEMS EVALUATED" of this document, as presented for evaluation by the applicant.

ANNEX A

HOST PLATFORM ANALYSIS

Report No: 29342IDT.002

A.1. INTRODUCTION

DELL STUDIO 1440 is a 14" widescreen laptop computer which can be fitted with the following transmitters:

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment	: Ericsson Mobile Broadband Module
Trade mark	: Ericsson
Model	: F3507g
FCC ID	: VV7-MBMF3507G-D

ADDITIONAL/SECONDARY TRANSMITTERS:

Bluetooth/UWB transmitter:

Type of equipment	: Bluetooth 2.0 + EDR
Trade mark	: Dell
Model	: Wireless 365
FCC ID	: QDS-BRCM1033

WLAN transmitters:

Type of equipment	: 802.11bg WLAN transmitter
Trade mark	: Dell
Model	: Wireless 1397
FCC ID	: QDS-BRCM1030

Type of equipment	: 802.11abgn WLAN transmitter
Trade mark	: Dell
Model	: Wireless 1510
FCC ID	: QDS-BRCM1031

Type of equipment	: 802.11abgn WLAN transmitter
Trade mark	: Dell
Model	: Wireless 1515
FCC ID	: PPD-AR5BHB92

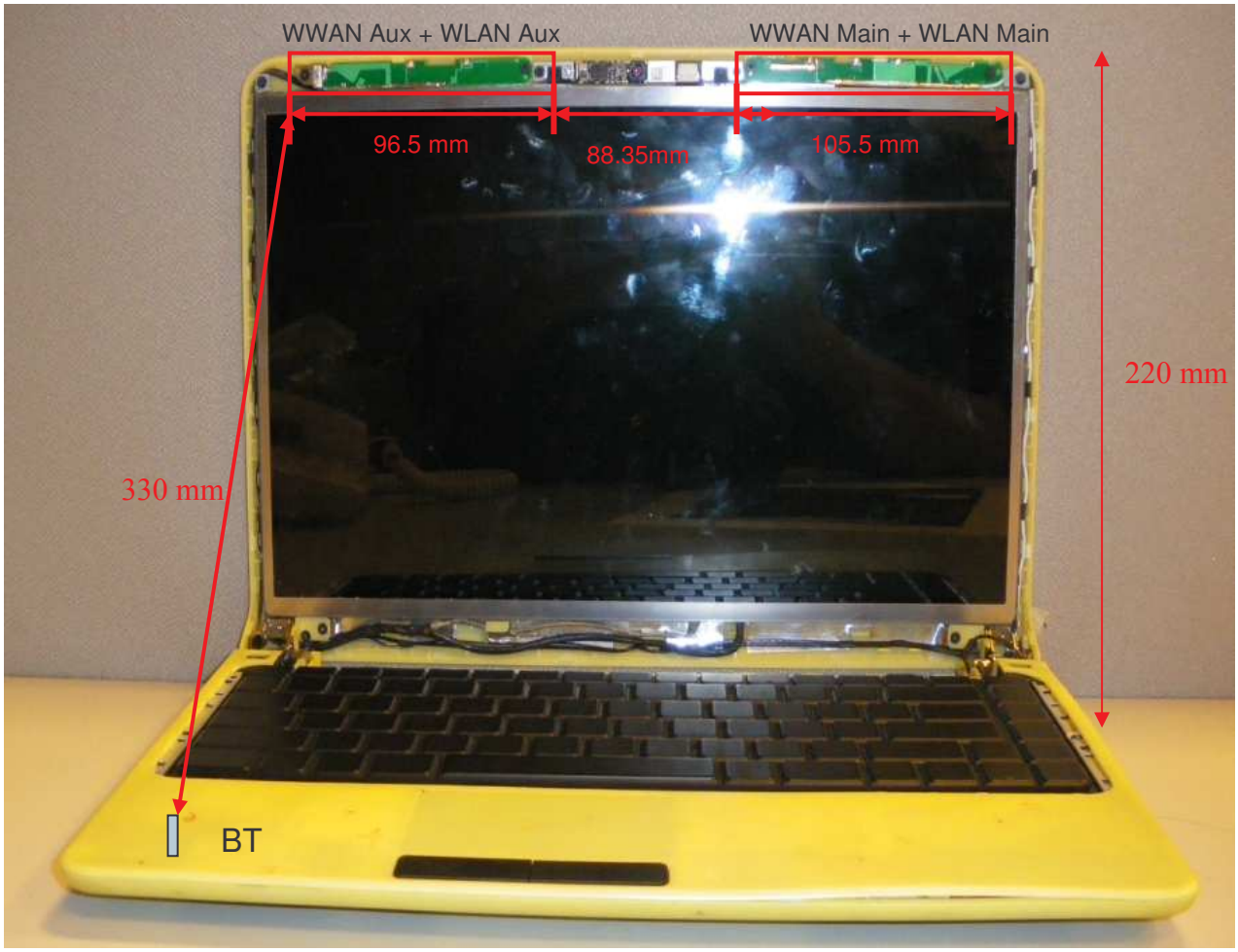
NOTE: - Only one of the listed above WLAN transmitters can be installed in the DELL STUDIO 1440 laptop computer at one time.

A.2. ANTENNAS INFORMATION

Antennas locations and distances:

Antenna	Antenna location	Maximum antenna gain (dBi)	Antenna to user distance (mm)	Antenna to WWAN Tx antenna distance (mm)
WWAN MAIN	Top right corner of the display	2,15	220	-
WLAN MAIN	Top right corner of the display	3	220	< 200
WLAN AUX	Top left corner of the display	3	220	< 200
Bluetooth antenna	Below keyboard	3	< 200	> 200

Diagram of the WWAN, WLAN and Bluetooth transmitters' antennas locations:



CONCLUSIONS:

- WLAN transmitter is in co-location condition in relation to the WWAN transmitter, Ericsson F3507g, (WWAN antenna to WLAN antennas distance < 20 cm). WLAN contribution has to be considered when evaluating the exposure to electromagnetic fields due to the F3507g Ericsson Mobile Broadband Module installed in the DELL STUDIO 1440 laptop computer.
- Bluetooth transmitter is NOT in co-location condition in relation to the WWAN transmitter, Ericsson F3507g, (WWAN antenna to Bluetooth antenna distance > 20 cm). Bluetooth contribution does NOT need to be considered when evaluating the exposure to electromagnetic fields due to the F3507g Ericsson Mobile Broadband Module installed in the DELL STUDIO 1440 laptop computer.
- WWAN transmitter, Ericsson F3507g, WLAN transmitters are in mobile exposure conditions (antenna to user distance > 20 cm).

NOTE: For this report an evaluation distance of 22 cm has been considered to calculate the exposure to electromagnetic fields.

A.3. TRANSMITTERS SPECIFICATIONS

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
Trade mark : Ericsson
Model : F3507g
FCC ID : VV7-MBMF3507G-D
Output power : See table

Frequency Band	Mode	Frequency range (MHz)	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty Cycle	Equivalent conducted output power (mW)	Maximum antenna gain (dBi)	Maximum antenna gain (numerical)	EIRP (mW)
GSM 850	GSM/GPRS	824,2 - 848,8	33,00	1995,26	25%	498,82	2,15	1,64	818,35
	EDGE	824,2 - 848,8	31,00	1258,93	25%	314,73	2,15	1,64	516,35
FDD V	WCDMA/HSDPA	826,4 - 846,6	23,62	230,14	100%	230,14	2,15	1,64	377,57
	HSUPA	826,4 - 846,6	23,08	203,24	100%	203,24	2,15	1,64	333,43
E-GSM 900	GSM/GPRS	880,2 - 914,8	33,99	2506,11	25%	626,53	2,15	1,64	1027,87
	EDGE	880,2 - 914,8	27,00	501,19	25%	125,30	2,15	1,64	205,56
DCS 1800	GSM/GPRS	1710,2 - 1784,8	32,54	1794,73	25%	448,68	2,15	1,64	736,11
	EDGE	1710,2 - 1784,8	26,10	407,38	25%	101,85	2,15	1,64	167,09
PCS 1900	GSM/GPRS	1850,2 - 1909,8	29,30	851,14	25%	212,78	2,15	1,64	349,09
	EDGE	1850,2 - 1909,8	28,70	741,31	25%	185,33	2,15	1,64	304,05
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	23,00	199,53	100%	199,53	2,15	1,64	327,34
	HSUPA	1852,4 - 1907,6	22,80	190,55	100%	190,55	2,15	1,64	312,61
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	22,40	173,78	100%	173,78	2,15	1,64	285,10
	HSUPA	1922,4 - 1977,6	22,10	162,18	100%	162,18	2,15	1,64	266,07

ADDITIONAL/SECONDARY TRANSMITTERS:

WLAN transmitters:

Type of equipment : 802.11bg WLAN transmitter
Trade mark : Dell
Model : Wireless 1397
FCC ID : QDS-BRCM1030
Output power : See table

Model name	FCC ID	Frequency range (MHz)	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty Cycle	Equivalent conducted output power (mW)	Maximum antenna gain (dBi)	Maximum antenna gain (numerical)	EIRP (mW)
Dell Wireless 1397	QDS-BRCM1030	2400 - 2483,5	23,05	202,00	100%	202,00	3,00	2,00	403,04

Type of equipment : 802.11abgn WLAN transmitter
Trade mark : Dell
Model : Wireless 1510
FCC ID : QDS-BRCM1031
Output power : See table

Model name	FCC ID	Frequency range (MHz)	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty Cycle	Equivalent conducted output power (mW)	Maximum antenna gain (dBi)	Maximum antenna gain (numerical)	EIRP (mW)
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	22,01	159	100%	159,00	3,00	2,00	317,25
		5150,0 - 5350,0	18,69	74	100%	74,00	3,00	2,00	147,65
		5470,0 - 5725,0	20,29	107	100%	107,00	3,00	2,00	213,49
		5725,0 - 5850,0	19,91	98	100%	98,00	3,00	2,00	195,54

Type of equipment : 802.11abgn WLAN transmitter
Trade mark : Dell
Model : Wireless 1515
FCC ID : PPD-AR5BHB92
Output power : See table

Model name	FCC ID	Frequency range (MHz)	Maximum conducted output power (dBm)	Maximum conducted output power (mW)	Duty Cycle	Equivalent conducted output power (mW)	Maximum antenna gain (dBi)	Maximum antenna gain (numerical)	EIRP (mW)
Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	29,58	907,21	100%	907,21	3,00	2,00	1810,12
		5150,0 - 5350,0	23,68	233,12	100%	233,12	3,00	2,00	465,14
		5470,0 - 5725,0	23,58	227,80	100%	227,80	3,00	2,00	454,52
		5725,0 - 5850,0	29,85	965,15	100%	965,15	3,00	2,00	1925,73

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 11 of this report.

ANNEX B

RF EXPOSURE ASSESSMENT

Report No: 29342IDT.002

B.1. MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS

B.1.1. FCC LIMITS

Normative documents:

- OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
- FCC 47 CFR § 1.1307 - Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
- FCC 47 CFR § 1.1310 - Radiofrequency radiation exposure limits.1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Reference levels:

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

Frequency Range (MHz)	Power density ($\frac{W}{m^2}$)	Averaging time (minutes)
300 – 1500	$\frac{f(MHz)}{1500}$	30
1500 – 100.000	1.0	30

MPE limits:

- Main/Primary transmitter (F3507g Ericsson Mobile Broadband Module):

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (MHz)	MPE limit (S_{eq}) ($\frac{mW}{cm^2}$)
GSM 850	GSM/GPRS	824,2 - 848,8	824,20	0,5495
	EDGE	824,2 - 848,8	824,20	0,5495
FDD V	WCDMA/HSDPA	826,4 - 846,6	826,40	0,5509
	HSUPA	826,4 - 846,6	826,40	0,5509
PCS 1900	GSM/GPRS	1850,2 - 1909,8	1850,20	1,0000
	EDGE	1850,2 - 1909,8	1850,20	1,0000
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	1852,40	1,0000
	HSUPA	1852,4 - 1907,6	1852,40	1,0000

- Additional/Secondary transmitters: All the transmission frequencies for WLAN and Bluetooth modules are above 1.5 GHz, so that the MPE limit is 1 mW/cm^2 .

B.1.2. EUROPEAN UNION MPE LIMITS

Normative document:

- 1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Reference levels:

The table below is excerpted from Table 2 of 1999/519/EC, titled "Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)":

Frequency range	E-field strength $(\frac{V}{m})$	H-field strength $(\frac{A}{m})$	B-field (µT)	Equivalent plane wave power density S_{eq} $(\frac{W}{m^2})$
400 - 2000 MHz	$1{,}375 \cdot f(MHz)^{1/2}$	$0{,}0037 \cdot f(MHz)^{1/2}$	$0{,}0046 \cdot f(MHz)^{1/2}$	$\frac{f(MHz)}{200}$
2 - 300 GHz	61	0,16	0,2	10

MPE limits:

- Main/Primary transmitter (F3507g Ericsson Mobile Broadband Module):

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (MHz)	MPE limit (S_{eq}) $(\frac{mW}{cm^2})$
E-GSM 900	GSM/GPRS	880,2 - 914,8	880,20	0,4401
	EDGE	880,2 - 914,8	880,20	0,4401
DCS 1800	GSM/GPRS	1710,2 - 1784,8	1710,20	0,8551
	EDGE	1710,2 - 1784,8	1710,20	0,8551
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	1922,40	0,9612
	HSUPA	1922,4 - 1977,6	1922,40	0,9612

- Additional/Secondary transmitters: All the transmission frequencies for WLAN and Bluetooth modules are above 2 GHz, so that the MPE limit is 1 mW/cm^2 .

B.1.3. AUSTRALIA MPE LIMITS

Normative documents:

- Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003
- ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)

Reference levels:

The table below is excerpted from Table 7 of ARPANSA RPS No. 3, titled "Reference levels for time averaged exposure to RMS electric and magnetic fields (unperturbed rms values)":

Exposure category	Frequency range	E-field strength ($\frac{V}{m}$ rms)	H-field strength ($\frac{A}{m}$ rms)	Equivalent plane wave power density S_{eq} ($\frac{W}{m^2}$)	Equivalent plane wave power density S_{eq} ($\frac{mW}{cm^2}$)
General public	400 MHz - 2 GHz	$1{,}37 \cdot f(MHz)^{1/2}$	$0{,}00364 \cdot f(MHz)^{1/2}$	$\frac{f(MHz)}{200}$	$\frac{f(MHz)}{2000}$
General public	2 - 300 GHz	61	0,16	10	1

MPE limits:

- Main/Primary transmitter (F3507g Ericsson Mobile Broadband Module):

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (MHz)	MPE limit (S_{eq}) ($\frac{mW}{cm^2}$)
FDD V	WCDMA/HSDPA	826,4 - 846,6	826,40	0,4132
	HSUPA	826,4 - 846,6	826,40	0,4132
E-GSM 900	GSM/GPRS	880,2 - 914,8	880,20	0,4401
	EDGE	880,2 - 914,8	880,20	0,4401
DCS 1800	GSM/GPRS	1710,2 - 1784,8	1710,20	0,8551
	EDGE	1710,2 - 1784,8	1710,20	0,8551
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	1922,40	0,9612
	HSUPA	1922,4 - 1977,6	1922,40	0,9612

- Additional/Secondary transmitters: All the transmission frequencies for WLAN and Bluetooth modules are above 2 GHz, so that the MPE limit is 1 mW/cm^2 .

B.1.4. VODAFONE MPE LIMITS

Normative document:

- 1999/519/EC Council Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Reference levels:

The table below is excerpted from Table 2 of 1999/519/EC, titled "Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)":

Exposure category	Frequency range	E-field strength ($\frac{V}{m}$ rms)	H-field strength ($\frac{A}{m}$ rms)	Equivalent plane wave power density S_{eq} ($\frac{W}{m^2}$)	Equivalent plane wave power density S_{eq} ($\frac{mW}{cm^2}$)
General public	400 MHz - 2 GHz	$1{,}37 \cdot f(MHz)^{1/2}$	$0{,}00364 \cdot f(MHz)^{1/2}$	$\frac{f(MHz)}{200}$	$\frac{f(MHz)}{2000}$
General public	2 - 300 GHz	61	0,16	10	1

MPE limits:

- Main/Primary transmitter (F3507g Ericsson Mobile Broadband Module):

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (MHz)	MPE limit (S_{Lim}) ($\frac{mW}{cm^2}$)
GSM 850	GSM/GPRS	824,2 - 848,8	824,20	0,4121
	EDGE	824,2 - 848,8	824,20	0,4121
FDD V	WCDMA/HSDPA	826,4 - 846,6	826,40	0,4132
	HSUPA	826,4 - 846,6	826,40	0,4132
E-GSM 900	GSM/GPRS	880,2 - 914,8	880,20	0,4401
	EDGE	880,2 - 914,8	880,20	0,4401
DCS 1800	GSM/GPRS	1710,2 - 1784,8	1710,20	0,8551
	EDGE	1710,2 - 1784,8	1710,20	0,8551
PCS 1900	GSM/GPRS	1850,2 - 1909,8	1850,20	0,9251
	EDGE	1850,2 - 1909,8	1850,20	0,9251
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	1852,40	0,9262
	HSUPA	1852,4 - 1907,6	1852,40	0,9262
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	1922,40	0,9612
	HSUPA	1922,4 - 1977,6	1922,40	0,9612

- Additional/Secondary transmitters: All the transmission frequencies for WLAN and Bluetooth modules are above 2 GHz, so that the MPE limit is 1 mW/cm^2 .

B.2. RF EXPOSURE ASSESSMENT – INDIVIDUAL TRANSMITTERS

B.2.1. INTRODUCTION

Calculations to predict power density levels in the far-field of the antenna are made by use of the following equation:

$$S = \frac{P \cdot G}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

B.2.2. RF EXPOSURE ASSESSMENT FOR F3507g ERICSSON MOBILE BROADBAND MODULE INSTALLED IN DELL STUDIO 1440 LAPTOP COMPUTER

FCC REQUIREMENTS

Frequency Band	Mode	Frequency Range (MHz)	EIRP (mW)	Evaluation distance (R) (cm)	Power Density (S_{eq}) $S=\frac{P\cdot G}{4\pi R^2}=\frac{EIRP}{4\pi R^2}$ $\left(\frac{mW}{cm^2}\right)$	MPE limit (S_{Lim}) $(\frac{mW}{cm^2})$	COMPLIANCE ($S_{eq} < S_{Lim}$) $(\frac{mW}{cm^2})$
GSM 850	GSM/GPRS	824,2 - 848,8	818,35	22,00	0,1346	0,5495	**COMPLIANT**
	EDGE	824,2 - 848,8	516,35	22,00	0,0849	0,5495	**COMPLIANT**
FDD V	WCDMA/HSDPA	826,4 - 846,6	377,57	22,00	0,0621	0,5509	**COMPLIANT**
	HSUPA	826,4 - 846,6	333,43	22,00	0,0548	0,5509	**COMPLIANT**
PCS 1900	GSM/GPRS	1850,2 - 1909,8	349,09	22,00	0,0574	1,0000	**COMPLIANT**
	EDGE	1850,2 - 1909,8	304,05	22,00	0,0500	1,0000	**COMPLIANT**
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	327,34	22,00	0,0538	1,0000	**COMPLIANT**
	HSUPA	1852,4 - 1907,6	312,61	22,00	0,0514	1,0000	**COMPLIANT**

EUROPEAN UNION REQUIREMENTS

Frequency Band	Mode	Frequency Range (MHz)	EIRP (mW)	Evaluation distance (R) (cm)	Power Density (S_{eq}) $S=\frac{P\cdot G}{4\pi R^2}=\frac{EIRP}{4\pi R^2}$ $\left(\frac{mW}{cm^2}\right)$	MPE limit (S_{Lim}) $(\frac{mW}{cm^2})$	COMPLIANCE ($S_{eq} < S_{Lim}$) $(\frac{mW}{cm^2})$
E-GSM 900	GSM/GPRS	880,2 - 914,8	1027,87	22,00	0,1690	0,4401	**COMPLIANT**
	EDGE	880,2 - 914,8	205,56	22,00	0,0338	0,4401	**COMPLIANT**
DCS 1800	GSM/GPRS	1710,2 - 1784,8	736,11	22,00	0,1210	0,8551	**COMPLIANT**
	EDGE	1710,2 - 1784,8	167,09	22,00	0,0275	0,8551	**COMPLIANT**
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	285,10	22,00	0,0469	0,9612	**COMPLIANT**
	HSUPA	1922,4 - 1977,6	266,07	22,00	0,0437	0,9612	**COMPLIANT**

AUSTRALIA REQUIREMENTS

Frequency Band	Mode	Frequency Range (MHz)	EIRP (mW)	Evaluation distance (R) (cm)	Power Density (S_{eq}) $S=\frac{P\cdot G}{4\pi R^2}=\frac{EIRP}{4\pi R^2}$ $\left(\frac{mW}{cm^2}\right)$	MPE limit (S_{Lim}) $(\frac{mW}{cm^2})$	COMPLIANCE ($S_{eq} < S_{Lim}$) $(\frac{mW}{cm^2})$
FDD V	WCDMA/HSDPA	826,4 - 846,6	377,57	22,00	0,0621	0,4132	**COMPLIANT**
	HSUPA	826,4 - 846,6	333,43	22,00	0,0548	0,4132	**COMPLIANT**
E-GSM 900	GSM/GPRS	880,2 - 914,8	1027,87	22,00	0,1690	0,4401	**COMPLIANT**
	EDGE	880,2 - 914,8	205,56	22,00	0,0338	0,4401	**COMPLIANT**
DCS 1800	GSM/GPRS	1710,2 - 1784,8	736,11	22,00	0,1210	0,8551	**COMPLIANT**
	EDGE	1710,2 - 1784,8	167,09	22,00	0,0275	0,8551	**COMPLIANT**
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	285,10	22,00	0,0469	0,9612	**COMPLIANT**
	HSUPA	1922,4 - 1977,6	266,07	22,00	0,0437	0,9612	**COMPLIANT**

VODAFONE REQUIREMENTS

Frequency Band	Mode	Frequency Range (MHz)	EIRP (mW)	Evaluation distance (R) (cm)	Power Density (S_{eq}) $S = \frac{P \cdot G}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$ $\left(\frac{mW}{cm^2}\right)$	MPE limit (S_{Lim}) $(\frac{mW}{cm^2})$	COMPLIANCE ($S_{eq} < S_{Lim}$) $(\frac{mW}{cm^2})$
GSM 850	GSM/GPRS	824,2 - 848,8	818,35	22,00	0,1346	0,4121	**COMPLIANT**
	EDGE	824,2 - 848,8	516,35	22,00	0,0849	0,4121	**COMPLIANT**
FDD V	WCDMA/HSDPA	826,4 - 846,6	377,57	22,00	0,0621	0,4132	**COMPLIANT**
	HSUPA	826,4 - 846,6	333,43	22,00	0,0548	0,4132	**COMPLIANT**
E-GSM 900	GSM/GPRS	880,2 - 914,8	1027,87	22,00	0,1690	0,4401	**COMPLIANT**
	EDGE	880,2 - 914,8	205,56	22,00	0,0338	0,4401	**COMPLIANT**
DCS 1800	GSM/GPRS	1710,2 - 1784,8	736,11	22,00	0,1210	0,8551	**COMPLIANT**
	EDGE	1710,2 - 1784,8	167,09	22,00	0,0275	0,8551	**COMPLIANT**
PCS 1900	GSM/GPRS	1850,2 - 1909,8	349,09	22,00	0,0574	0,9251	**COMPLIANT**
	EDGE	1850,2 - 1909,8	304,05	22,00	0,0500	0,9251	**COMPLIANT**
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	327,34	22,00	0,0538	0,9262	**COMPLIANT**
	HSUPA	1852,4 - 1907,6	312,61	22,00	0,0514	0,9262	**COMPLIANT**
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	285,10	22,00	0,0469	0,9612	**COMPLIANT**
	HSUPA	1922,4 - 1977,6	266,07	22,00	0,0437	0,9612	**COMPLIANT**

B.2.3. RF EXPOSURE ASSESSMENT FOR SECONDARY TRANSMITTERS INSTALLED IN DELL STUDIO 1440 LAPTOP COMPUTER

Model name	FCC ID	Frequency range (MHz)	EIRP (mW)	Evaluation distance (cm)	Power Density (S_{eq}) $S = \frac{P \cdot G}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$ $\left(\frac{mW}{cm^2}\right)$	MPE limit (S_{Lim}) $(\frac{mW}{cm^2})$	COMPLIANCE ($S_{eq} < S_{Lim}$)
Dell Wireless 1397	QDS-BRCM1030	2400,0 - 2483,5	403,04	22,00	0,0663	1,0000	**COMPLIANT**
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	317,25	22,00	0,0522	1,0000	**COMPLIANT**
		5150,0 - 5350,0	147,65	22,00	0,0243	1,0000	**COMPLIANT**
		5470,0 - 5725,0	213,49	22,00	0,0351	1,0000	**COMPLIANT**
		5725,0 - 5850,0	195,54	22,00	0,0321	1,0000	**COMPLIANT**
Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	1810,12	22,00	0,2976	1,0000	**COMPLIANT**
		5150,0 - 5350,0	465,14	22,00	0,0765	1,0000	**COMPLIANT**
		5470,0 - 5725,0	454,52	22,00	0,0747	1,0000	**COMPLIANT**
		5725,0-5850,0	1925,73	22,00	0,3166	1,0000	**COMPLIANT**

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 11 of this report.

B.3. RF EXPOSURE ASSESSMENT – CO-LOCATION CONSIDERATIONS

B.3.1. INTRODUCTION

In situations where simultaneous exposure to fields of different equipment and frequencies occurs, the possibility that these exposures will be additive in their effects must be considered. Calculations based on this additivity are performed by the sum of relative exposure for each equipment according to the following compliance criteria:

$$\sum_{1}^{N} \frac{S_{eqn}}{S_{Limn}} = \frac{S_{eq1}}{S_{Lim1}} + \frac{S_{eq2}}{S_{Lim2}} + \ldots + \frac{S_{eqN}}{S_{LimN}} \leq 1$$

where:

S_{eq} is the power density of the electromagnetic field caused, at a given distance (evaluation distance), by a specific equipment transmitting at a defined frequency.

S_{Lim} is the MPE limit for the evaluated transmission frequency.

B.3.2. FCC REQUIREMENTS

RELATIVE EXPOSURE FOR F3507g ERICSSON BROADBAND MODULE

Frequency Band	Mode	Frequency Range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
GSM 850	GSM/GPRS	824,2 - 848,8	0,1346	0,5495	**0,2449**
	EDGE	824,2 - 848,8	0,0849	0,5495	0,1545
FDD V	WCDMA/HSDPA	826,4 - 846,6	0,0621	0,5509	0,1127
	HSUPA	826,4 - 846,6	0,0548	0,5509	0,0995
PCS 1900	GSM/GPRS	1850,2 - 1909,8	0,0574	1,0000	0,0574
	EDGE	1850,2 - 1909,8	0,0500	1,0000	0,0500
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	0,0538	1,0000	0,0538
	HSUPA	1852,4 - 1907,6	0,0514	1,0000	0,0514

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

Model name	FCC ID	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Dell Wireless 1397	QDS-BRCM1030	2400 - 2483,5	0,0663	1,0000	**0,0663**
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	0,0522	1,0000	**0,0522**
		5150,0 - 5350,0	0,0243	1,0000	0,0243
		5470,0 - 5725,0	0,0351	1,0000	0,0351
		5725,0 - 5850,0	0,0321	1,0000	0,0321
Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	0,2976	1,0000	0,2976
		5150,0 - 5350,0	0,0765	1,0000	0,0765
		5470,0 - 5725,0	0,0747	1,0000	0,0747
		5725,0-5850,0	0,3166	1,0000	**0,3166**

SIMULTANEOUS EXPOSURE

Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}} < 1$
Primary transmitter	Ericsson F3507g	**0,2449**	-	-
Secundary transmitter (WLAN)	Dell Wireless 1397	0,0663	0,3111	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1510	0,0522	0,2970	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1515	**0,3166**	**0,5615**	**COMPLIANT**

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 10 of this report.

B.3.3. EUROPEAN UNION REQUIREMENTS

RELATIVE EXPOSURE FOR F3507g ERICSSON BROADBAND MODULE

Frequency Band	Mode	Frequency Range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
E-GSM 900	GSM/GPRS	880,2 - 914,8	0,1690	0,4401	**0,3840**
	EDGE	880,2 - 914,8	0,0338	0,4401	0,0768
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,1210	0,8551	0,1415
	EDGE	1710,2 - 1784,8	0,0275	0,8551	0,0321
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	0,0469	0,9612	0,0488
	HSUPA	1922,4 - 1977,6	0,0437	0,9612	0,0455

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

Model name	FCC ID	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Dell Wireless 1397	QDS-BRCM1030	2400 - 2483,5	0,0663	1,0000	**0,0663**
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	0,0522	1,0000	**0,0522**
		5150,0 - 5350,0	0,0243	1,0000	0,0243
		5470,0 - 5725,0	0,0351	1,0000	0,0351
		5725,0 - 5850,0	0,0321	1,0000	0,0321

Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	0,2976	1,0000	0,2976
		5150,0 - 5350,0	0,0765	1,0000	0,0765
		5470,0 - 5725,0	0,0747	1,0000	0,0747
		5725,0-5850,0	0,3166	1,0000	**0,3166**

SIMULTANEOUS EXPOSURE

Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}} < 1$
Primary transmitter	Ericsson F3507g	**0,3840**	-	-
Secundary transmitter (WLAN)	Dell Wireless 1397	0,0663	0,4503	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1510	0,0522	0,4362	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1515	**0,3166**	**0,7006**	**COMPLIANT**

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 11 of this report.

B.3.4. AUSTRALIA REQUIREMENTS

RELATIVE EXPOSURE FOR F350g ERICSSON BROADBAND MODULE

Manufacturer	Model name	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
FDD V	WCDMA/HSDPA	826,4 - 846,6	0,0621	0,4132	0,1502
	HSUPA	826,4 - 846,6	0,0548	0,4132	0,1327
E-GSM 900	GSM/GPRS	880,2 - 914,8	0,1690	0,4401	**0,3840**
	EDGE	880,2 - 914,8	0,0338	0,4401	0,0768
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,1210	0,8551	0,1415
	EDGE	1710,2 - 1784,8	0,0275	0,8551	0,0321
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	0,0469	0,9612	0,0488
	HSUPA	1922,4 - 1977,6	0,0437	0,9612	0,0455

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

Model name	FCC ID	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Dell Wireless 1397	QDS-BRCM1030	2400 - 2483,5	0,0663	1,0000	**0,0663**
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	0,0522	1,0000	**0,0522**
		5150,0 - 5350,0	0,0243	1,0000	0,0243
		5470,0 - 5725,0	0,0351	1,0000	0,0351
		5725,0 - 5850,0	0,0321	1,0000	0,0321
Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	0,2976	1,0000	0,2976
		5150,0 - 5350,0	0,0765	1,0000	0,0765
		5470,0 - 5725,0	0,0747	1,0000	0,0747
		5725,0-5850,0	0,3166	1,0000	**0,3166**

SIMULTANEOUS EXPOSURE

Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}} < 1$
Primary transmitter	Ericsson F3507g	**0,3840**	-	-
Secundary transmitter (WLAN)	Dell Wireless 1397	0,0663	0,4503	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1510	0,0522	0,4362	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1515	**0,3166**	**0,7006**	**COMPLIANT**

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 11 of this report.

B.3.5. VODAFONE REQUIREMENTS

RELATIVE EXPOSURE FOR F350g ERICSSON BROADBAND MODULE

Manufacturer	Model name	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
GSM 850	GSM/GPRS	824,2 - 848,8	0,1346	0,4121	0,3265
	EDGE	824,2 - 848,8	0,0849	0,4121	0,2060
FDD V	WCDMA/HSDPA	826,4 - 846,6	0,0621	0,4132	0,1502
	HSUPA	826,4 - 846,6	0,0548	0,4132	0,1327
E-GSM 900	GSM/GPRS	880,2 - 914,8	0,1690	0,4401	**0,3840**
	EDGE	880,2 - 914,8	0,0338	0,4401	0,0768
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,1210	0,8551	0,1415
	EDGE	1710,2 - 1784,8	0,0275	0,8551	0,0321
PCS 1900	GSM/GPRS	1850,2 - 1909,8	0,0574	0,9251	0,0620
	EDGE	1850,2 - 1909,8	0,0500	0,9251	0,0540
FDD II	WCDMA/HSDPA	1852,4 - 1907,6	0,0538	0,9262	0,0581
	HSUPA	1852,4 - 1907,6	0,0514	0,9262	0,0555
FDD I	WCDMA/HSDPA	1922,4 - 1977,6	0,0469	0,9612	0,0488
	HSUPA	1922,4 - 1977,6	0,0437	0,9612	0,0455

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

Model name	FCC ID	Frequency range (MHz)	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Dell Wireless 1397	QDS-BRCM1030	2400 - 2483,5	0,0663	1,0000	**0,0663**
Dell Wireless 1510	QDS-BRCM1031	2400,0 - 2483,5	0,0522	1,0000	**0,0522**
		5150,0 - 5350,0	0,0243	1,0000	0,0243
		5470,0 - 5725,0	0,0351	1,0000	0,0351
		5725,0 - 5850,0	0,0321	1,0000	0,0321
Dell Wireless 1515	PPD-AR5BHB92	2400,0 - 2483,5	0,2976	1,0000	0,2976
		5150,0 - 5350,0	0,0765	1,0000	0,0765
		5470,0 - 5725,0	0,0747	1,0000	0,0747
		5725,0-5850,0	0,3166	1,0000	**0,3166**

SIMULTANEOUS EXPOSURE

Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim\_Pri}} + \frac{S_{Sec\_WLAN}}{S_{Lim\_Sec\_WLAN}} < 1$
Primary transmitter	Ericsson F3507g	**0,3840**	-	-
Secundary transmitter (WLAN)	Dell Wireless 1397	0,0663	0,4503	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1510	0,0522	0,4362	**COMPLIANT**
Secundary transmitter (WLAN)	Dell Wireless 1515	**0,3166**	**0,7006**	**COMPLIANT**

NOTE: Only co-located secondary transmitters has been considered according to the conclusions of chapter 2 of Annex A included in page 11 of this report.