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ASSESSMENT REPORT

Report No.:
31912IDT.001

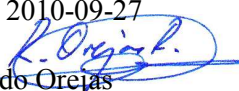
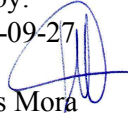
REPORT ON:

RF EXPOSURE ASSESSMENT OF THE F3307 ERICSSON MOBILE BROADBAND MODULE INSTALLED IN GENERIC HOST PLATFORMS COVERING 7 DIFFERENT COLLOCATION SCENARIOS.

Product	: Ericsson Mobile Broadband Module
Trade Mark	: Ericsson
Model	: F3307
FCC ID:	: VV7-MBMF3307S
Manufacturer	: Ericsson AB
Requested by	: Ericsson AB
Host Platform	: Generic host platforms covering 7 different collocation scenarios
Standard(s)	: OET Bulletin 65 Edition 97-01 August 1997 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 RSS-102 Issue 4 – March 2010 EN 62311:2008 / 1999/519/EC Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003 ARPANSA RPS No. 3 AS 2772.2-1998:Radiofrequency radiation – Part 2 Vodafone requirements [1999/519/EC]

This test report includes 2 annexes and therefore, the total number of pages is 36.

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Date: 2010-09-27	Issued by: Date: 2010-09-27  Ricardo Orejas Worldwide Compliance Engineer	Approved by: Date: 2010-09-27  Juan Carlos Mora Technical Manager Laboratories Division	Page: 1 of 36
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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 F3307 Ericsson Mobile Broadband Module installed in generic host platforms covering 7 different collocation scenarios 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. RSS-102 Issue 4 - March 2010	GSM 850, PCS 1900
EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) 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) AS 2772.2-1998: Radiofrequency radiation - Part 2: Principles and methods of measurement - 300 kHz to 100 GHz	E-GSM 900, DCS 1800, FDD I
Vodafone requirements [1999/519/EC]	GSM 850, E-GSM 900, DCS 1800, PCS 1900, 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. RSS-102 Issue 4 - March 2010	GSM 850, PCS 1900
EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) 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) AS 2772.2-1998: Radiofrequency radiation - Part 2: Principles and methods of measurement - 300 kHz to 100 GHz	E-GSM 900, DCS 1800, FDD I
Vodafone requirements [1999/519/EC]	GSM 850, E-GSM 900, DCS 1800, PCS 1900, 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: SE 556056625801

Address: Lindholmspiren 11, SE-417 56 Goteborg

Country: Sweden

Telephone: +46 10 712 0000

Fax: +46 10 712 6033

4.2. REPRESENTATIVE

Name: Jonas Rinman

Address: Lindholmspiren 11, SE-417 56 Goteborg

Country: Sweden

Telephone: +46 10 712 0000

Fax: +46 10 712 6033

4.3. IDENTIFICATION OF ITEM/ITEMS EVALUATED

Product: Ericsson Mobile Broadband Module

Trade mark: Ericsson **Model:** F3307

FCC ID: VV7-MBMF33072

IC: 287AG-MBMF33072

Manufacturer: Ericsson AB

Country of manufacture: China

Host platform: Generic host platforms covering 7 different collocation scenarios

Description: 2G (GSM/GPRS/EDGE Class 10: 850/900/1800/1900 MHz) and 3G (HSDPA/HSUPA/WCDMA Release 6: FDD I) module installed in generic host platforms covering 7 different collocation scenarios.

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

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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. RSS-102 Issue 4 - March 2010		C		
EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) 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) AS 2772.2-1998: Radiofrequency radiation - Part 2: Principles and methods of measurement - 300 kHz to 100 GHz		C		
Vodafone requirements [1999/519/EC]		C		

5.2. RESULTS FOR ITEM EVALUATED TRANSMITTING SIMULTANEOUSLY WITH OTHER COLLOCATED 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. RSS-102 Issue 4 - March 2010		C		
EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) 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	C
ARPANSA RPS No. 3 – Maximum Exposure Levels to Radiofrequency Fields (3 kHz to 300 GHz)	
AS 2772.2-1998: Radiofrequency radiation - Part 2: Principles and methods of measurement - 300 kHz to 100 GHz	
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.

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ANNEX A

HOST PLATFORMS ANALYSIS

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A.1. SCENARIO 1

Scenario 1 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a Bluetooth transmitter (F3307 antenna-to-Bluetooth antenna distance < 20 cm) which is also in mobile exposure conditions. Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

Bluetooth transmitter:

Type of equipment : Bluetooth¹
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

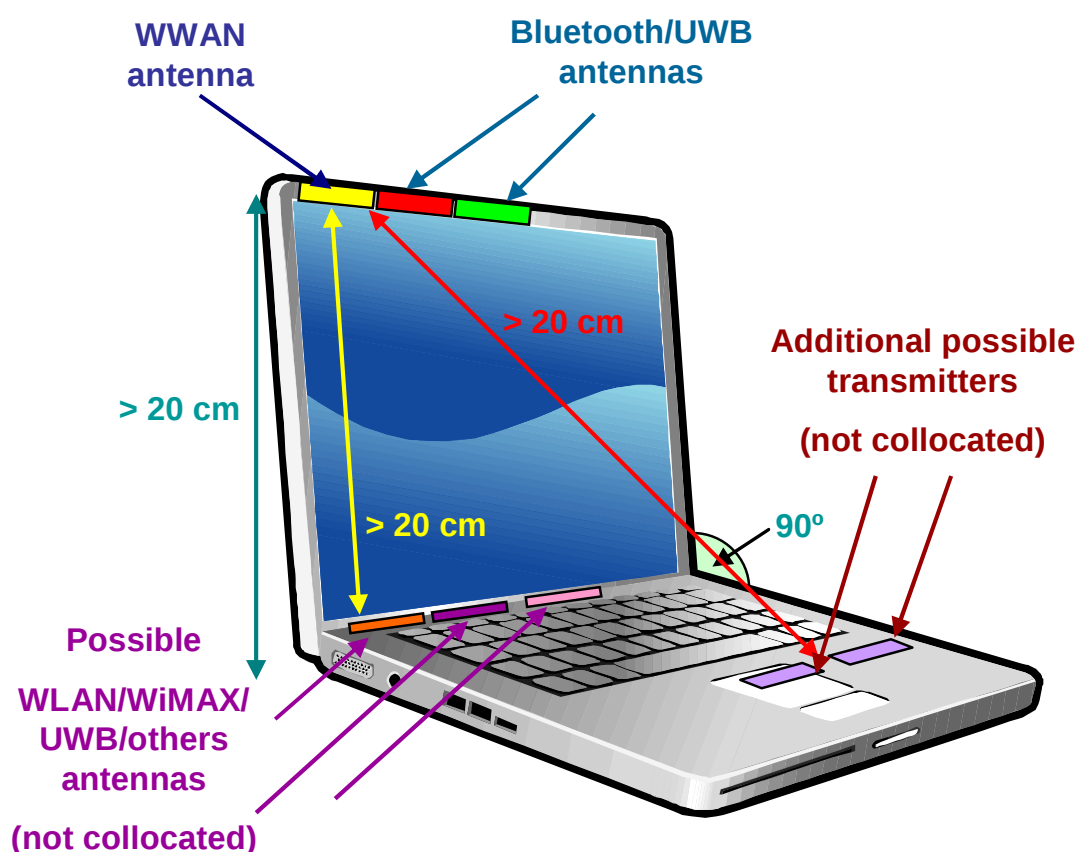
Scenario 1			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
Bluetooth	100	76%	76,43

¹ It could be also Bluetooth + UWB transmitter)
 UWB contribution does not need to be considered.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Bluetooth EIRP: 100 mW
 - o Any Bluetooth (or Bluetooth + UWB) transmitter with EIRP below 100 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.2. SCENARIO 2

Scenario 2 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WLAN transmitter (F3307 antenna-to-WLAN antenna distance < 20 cm) which is also in mobile exposure conditions.

WLAN transmitter may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

WLAN transmitter:

Type of equipment : WLAN²
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

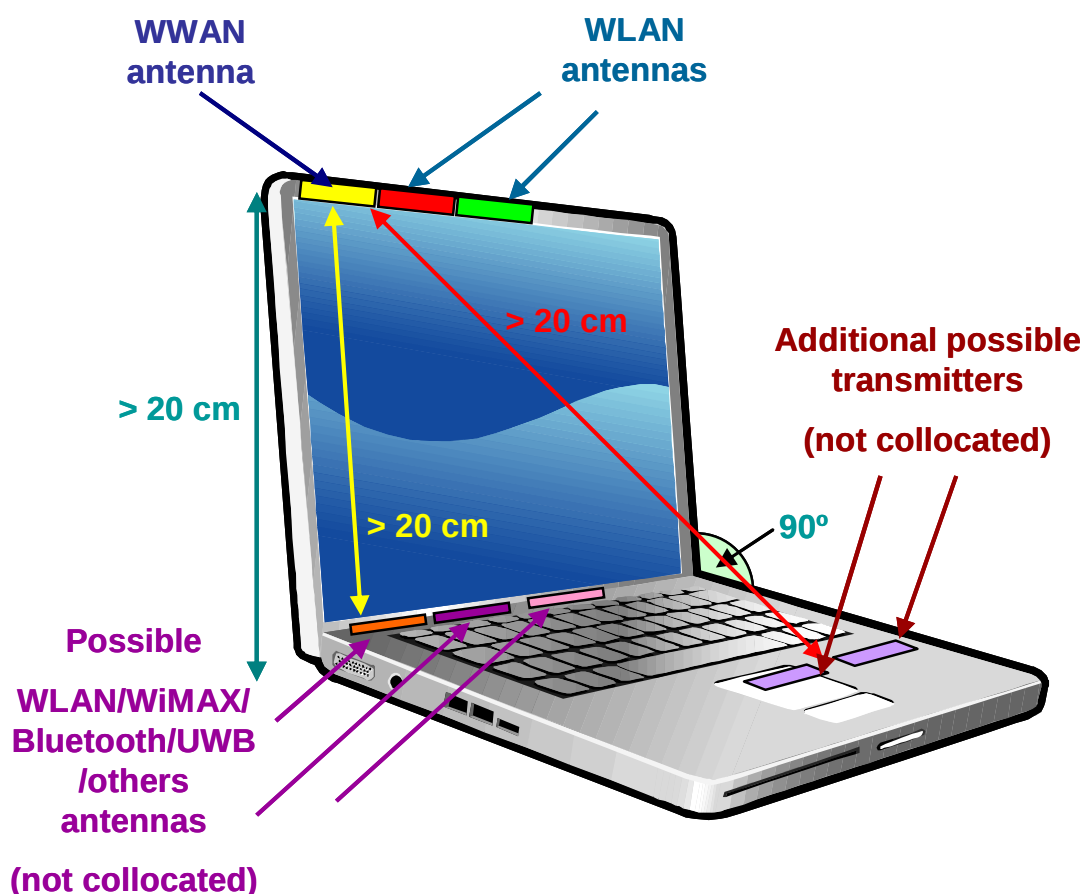
Scenario 3			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WLAN	2000	100%	2000,00

² It could be also WLAN/WiMAX combo transmitter where WLAN and WiMAX transmitters do not transmit simultaneously.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WLAN EIRP: 2000 mW
 - o Any WLAN transmitter with EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.3. SCENARIO 3

Scenario 3 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WLAN transmitter and a Bluetooth transmitter (F3307 antenna-to-WLAN/Bluetooth antenna distance < 20 cm) which are also in mobile exposure conditions.

WLAN transmitter may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

WLAN transmitter:

Type of equipment : WLAN³
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

Scenario 3			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WLAN	2000	100%	2000,00

³ It could be also WLAN/WiMAX combo transmitter where WLAN and WiMAX transmitters do not transmit simultaneously.

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Bluetooth transmitter:

Type of equipment : Bluetooth⁴
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

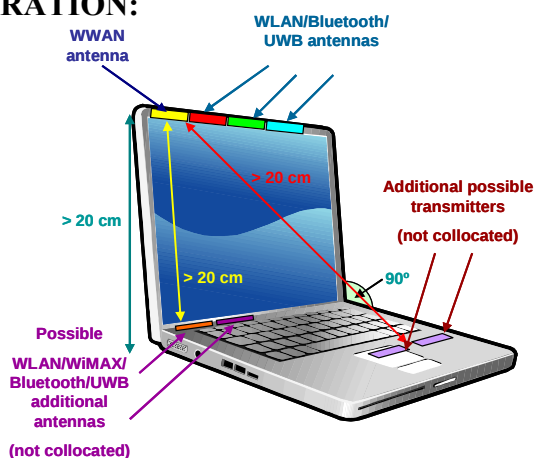
Scenario 3			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
Bluetooth	100	76%	76,43

⁴ It could be also Bluetooth + UWB transmitter)
 UWB contribution does not need to be considered.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WLAN EIRP: 2000 mW
 - o Any WLAN transmitter with EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Bluetooth EIRP: 100 mW
 - o Any Bluetooth (or Bluetooth + UWB) transmitter with EIRP below 100 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.4. SCENARIO 4

Scenario 4 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WiMAX transmitter (F3307 antenna-to-WiMAX antenna distance < 20 cm) which is also in mobile exposure conditions.

WiMAX transmitter may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

WiMAX transmitter:

Type of equipment : WiMAX⁵
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

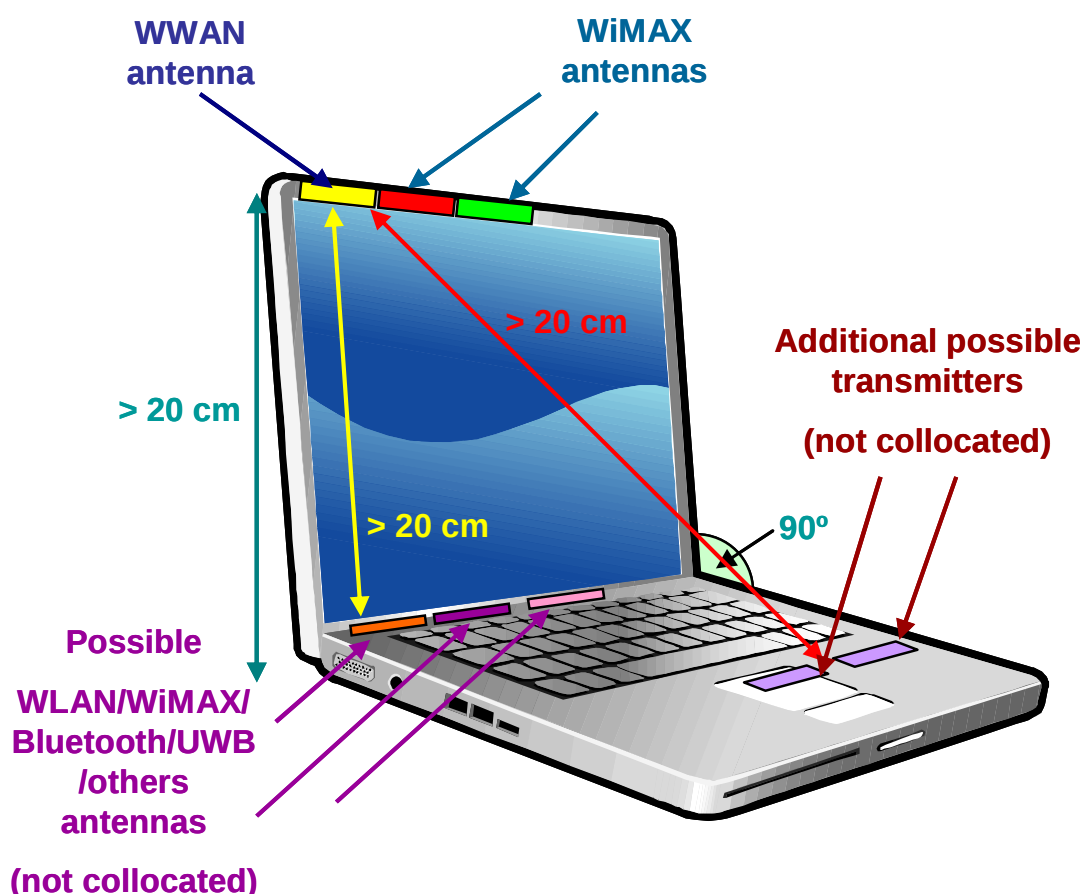
Scenario 4			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WiMAX	2000	100%	2000,00

⁵ It could be also WLAN/WiMAX combo transmitter where WLAN and WiMAX transmitters do not transmit simultaneously.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WiMAX EIRP: 2000 mW
 - o Any WiMAX transmitter with EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.5. SCENARIO 5

Scenario 5 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WiMAX transmitter and a Bluetooth transmitter (F3307 antenna-to-WiMAX/Bluetooth antenna distance < 20 cm) which are also in mobile exposure conditions.

WiMAX transmitter may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

WiMAX transmitter:

Type of equipment : WiMAX⁶
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

Scenario 5			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WiMAX	2000	100%	2000,00

⁶ It could be also WLAN/WiMAX combo transmitter where WLAN and WiMAX transmitters do not transmit simultaneously.

Bluetooth transmitter:

Type of equipment : Bluetooth⁷
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

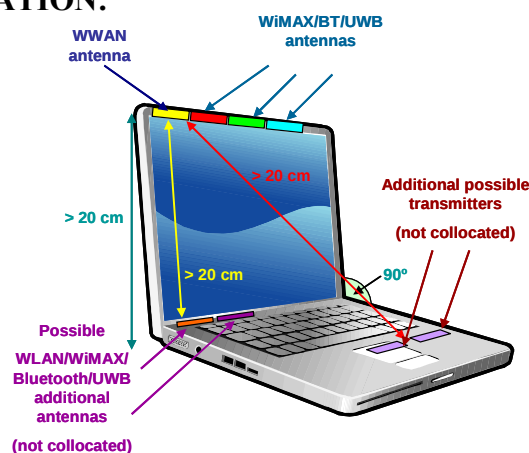
Scenario 5			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
Bluetooth	100	76%	76,43

⁷ It could be also Bluetooth + UWB transmitter)
 UWB contribution does not need to be considered.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WiMAX EIRP: 2000 mW
 - o Any WiMAX transmitter with EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Bluetooth EIRP: 100 mW
 - o Any Bluetooth (or Bluetooth + UWB) transmitter with EIRP below 100 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.6. SCENARIO 6

Scenario 6 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WLAN transmitter and a WiMAX transmitter (F3307 antenna-to-WLAN/WiMAX antenna distance < 20 cm) which are also in mobile exposure conditions.

WLAN/WiMAX transmitters may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

ADDITIONAL/SECONDARY TRANSMITTERS:

WLAN/WiMAX transmitter:

Type of equipment : WLAN / WiMAX
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

Scenario 6			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WLAN / WiMAX	2000 ⁸	100%	2000,00

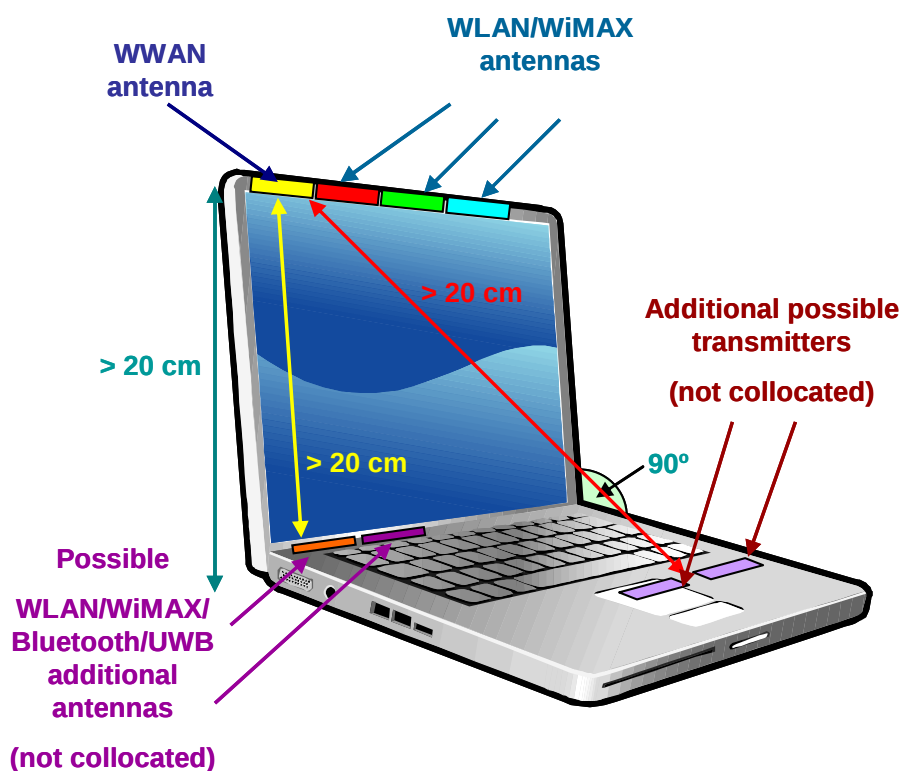
⁸ Aggregated EIRP of WLAN and WiMAX transmitters

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WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WLAN EIRP + WiMAX EIRP: 2000 mW
 - o Any WLAN transmitter and WiMAX transmitters with aggregated EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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A.7. SCENARIO 7

Scenario 6 covers a host device where the F3307 Ericsson Mobile Broadband Module is in mobile exposure conditions (antenna-to-user distance > 20 cm) and it is collocated with a WLAN transmitter a WiMAX transmitter and a Bluetooth transmitter (F3307 antenna-to-WLAN/WiMAX/Bluetooth antenna distance < 20 cm) which are also in mobile exposure conditions.

WLAN/WiMAX transmitters may have other antennas in portable exposure conditions but they are not collocated with F3307 Ericsson Mobile Broadband Module antenna.

Other transmitters may be installed in the same host platform but they are not collocated with F3307 Ericsson Mobile Broadband Module.

MAIN/PRIMARY TRANSMITTER:

WWAN transmitter:

Type of equipment : Ericsson Mobile Broadband Module
 Trade mark : Ericsson
 Model : F3307
 FCC ID : VV7-MBMF3307S
 Maximum antenna gain : Low bands: 3.42 dBi // High bands: 2.90 dBi
 Output power : See table below

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	33,41	2192,80	25%	548,20	3,42	2,20	1204,87
	EDGE	824,2 - 848,8	33,44	2208,00	25%	552,00	3,42	2,20	1213,22
E-GSM 900	GSM/GPRS	880,2 - 914,6	32,50	1778,28	25%	444,57	3,42	2,20	977,10
	EDGE	880,2 - 914,7	27,00	501,19	25%	125,30	3,42	2,20	275,38
DCS 1800	GSM/GPRS	1710,2 - 1784,8	29,30	851,14	25%	212,78	2,90	1,95	414,90
	EDGE	1710,2 - 1784,8	25,30	338,84	25%	84,71	2,90	1,95	165,17
PCS 1900	GSM/GPRS	1850,2 - 1909,8	30,06	1013,91	25%	253,48	2,90	1,95	494,24
	EDGE	1850,2 - 1909,8	30,12	1028,02	25%	257,00	2,90	1,95	501,12
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	22,69	185,65	100%	185,65	2,90	1,95	361,99
	HSUPA	1922,4 - 1977,6	23,00	199,34	100%	199,34	2,90	1,95	388,69

WLAN/WiMAX transmitter:

Type of equipment : WLAN / WiMAX
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

Scenario 6			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
WLAN / WiMAX	2000 ⁹	100%	2000,00

⁹ Aggregated EIRP of WLAN and WiMAX transmitters

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Bluetooth transmitter:

Type of equipment : Bluetooth¹⁰
 Trade mark : Any
 Model : Any
 FCC ID / IC : Any
 Output power : See table below

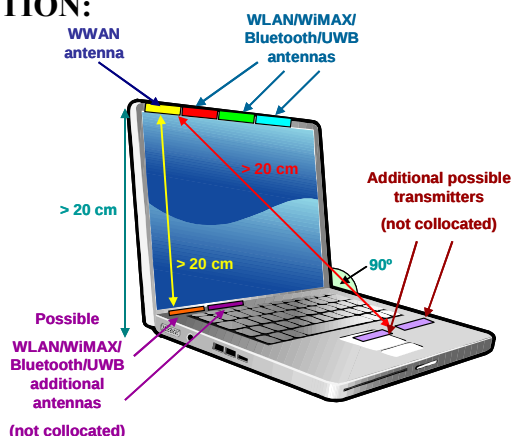
Scenario 5			
Type of transmitter	Maximum EIRP (mW)	Duty Cycle	EIRP (mW)
Bluetooth	100	76%	76,43

¹⁰ It could be also Bluetooth + UWB transmitter)
 UWB contribution does not need to be considered.

WORST CASE CONSIDERATIONS:

- Antenna-to-user distance: 20 cm.
 - o Any antenna-to-user distance > 20 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- F3307 antenna gains: Low bands: 3.42 dBi // High bands: 2.90 dBi
 - o Any antenna gains below the specified would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- WLAN EIRP + WiMAX EIRP: 2000 mW
 - o Any WLAN transmitter and WiMAX transmitters with aggregated EIRP below 2000 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Bluetooth EIRP: 100 mW
 - o Any Bluetooth (or Bluetooth + UWB) transmitter with EIRP below 100 mW would be covered by the analysis included in this report as far as it would provide better exposure conditions.
- Antenna-to-antenna distances: 0 cm
 - o Any antenna-to-antenna distance > 0 cm would be covered by the analysis included in this report as far as it would provide better exposure conditions.

SAMPLE CONFIGURATION:



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ANNEX B

RF EXPOSURE ASSESSMENT

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B.1. MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS

B.1.1. FCC / IC 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)
- RSS-102 Issue 4 – March 2010

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 ($\frac{\text{mW}}{\text{cm}^2}$)	Averaging time (minutes)
300 – 1500	$\frac{f(\text{MHz})}{1500}$	30
1500 – 100.000	1.0	30

The table below is excerpted from item 4.2 of RSS-102 Issue 4, titled RF Field Strength Limits for Devices Used by the General Public:

Frequency Range (MHz)	Power density ($\frac{\text{W}}{\text{m}^2}$)	Averaging time (minutes)
300 – 1500	$f(\text{MHz}) / 150$	6
1500 – 100.000	10	6

MPE limits:

- Main/Primary transmitter (F3307 Ericsson Mobile Broadband Module):

Frequency Band	Mode	Frequency Range (MHz)	Reference frequency (MHz)	MPE limit (S_{eq}) ($\frac{\text{mW}}{\text{cm}^2}$)
GSM 850	GSM/GPRS	824,2 - 848,8	824,20	0,5495
	EDGE	824,2 - 848,8	824,20	0,5495
PCS 1900	GSM/GPRS	1850,2 - 1909,8	1850,20	1,0000
	EDGE	1850,2 - 1909,8	1850,20	1,0000

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

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B.1.2. EUROPEAN UNION MPE LIMITS

Normative document:

- EN 62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)
- 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 (F3307 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 collocated transmitter 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)
- AS 2772.2-1998: Radiofrequency radiation - Part 2: Principles and methods of measurement - 300 kHz to 100 GHz

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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 (F3307 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 collocated transmitter modules are above 2 GHz, so that the MPE limit is 1 mW/cm².

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)”:

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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 (F3307 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
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 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/cm².

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/cm²)

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)

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B.2.2. RF EXPOSURE ASSESSMENT FOR F3307 ERICSSON MOBILE BROADBAND MODULE INSTALLED IN GENERIC HOST PLATFORMS

FCC / IC 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}) $\left(\frac{mW}{cm^2}\right)$	COMPLIANCE ($S_{eq} < S_{Lim}$) $\left(\frac{mW}{cm^2}\right)$
GSM 850	GSM/GPRS	824,2 - 848,8	1204,87	20,00	0,2397	0,5495	COMPLIANT
	EDGE	824,2 - 848,8	1213,22	20,00	0,2414	0,5495	COMPLIANT
PCS 1900	GSM/GPRS	1850,2 - 1909,8	494,24	20,00	0,0983	1,0000	COMPLIANT
	EDGE	1850,2 - 1909,8	501,12	20,00	0,0997	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}) $\left(\frac{mW}{cm^2}\right)$	COMPLIANCE ($S_{eq} < S_{Lim}$) $\left(\frac{mW}{cm^2}\right)$
E-GSM 900	GSM/GPRS	880,2 - 914,6	977,10	20,00	0,1944	0,4401	COMPLIANT
	EDGE	880,2 - 914,7	275,38	20,00	0,0548	0,4401	COMPLIANT
DCS 1800	GSM/GPRS	1710,2 - 1784,8	414,90	20,00	0,0825	0,8551	COMPLIANT
	EDGE	1710,2 - 1784,8	165,17	20,00	0,0329	0,8551	COMPLIANT
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	361,99	20,00	0,0720	0,9612	COMPLIANT
	HSUPA	1922,4 - 1977,6	388,69	20,00	0,0773	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}) $\left(\frac{mW}{cm^2}\right)$	COMPLIANCE ($S_{eq} < S_{Lim}$) $\left(\frac{mW}{cm^2}\right)$
E-GSM 900	GSM/GPRS	880,2 - 914,6	977,10	20,00	0,1944	0,4401	COMPLIANT
	EDGE	880,2 - 914,7	275,38	20,00	0,0548	0,4401	COMPLIANT
DCS 1800	GSM/GPRS	1710,2 - 1784,8	414,90	20,00	0,0825	0,8551	COMPLIANT
	EDGE	1710,2 - 1784,8	165,17	20,00	0,0329	0,8551	COMPLIANT
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	361,99	20,00	0,0720	0,9612	COMPLIANT
	HSUPA	1922,4 - 1977,6	388,69	20,00	0,0773	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}) $\left(\frac{mW}{cm^2}\right)$	COMPLIANCE ($S_{eq} < S_{Lim}$) $\left(\frac{mW}{cm^2}\right)$
GSM 850	GSM/GPRS	824,2 - 848,8	1204,87	20	0,2397	0,4121	COMPLIANT
	EDGE	824,2 - 848,8	1213,22	20	0,2414	0,4121	COMPLIANT
E-GSM 900	GSM/GPRS	880,2 - 914,6	977,10	20	0,1944	0,4401	COMPLIANT
	EDGE	880,2 - 914,7	275,38	20	0,0548	0,4401	COMPLIANT
DCS 1800	GSM/GPRS	1710,2 - 1784,8	414,90	20	0,0825	0,8551	COMPLIANT
	EDGE	1710,2 - 1784,8	165,17	20	0,0329	0,8551	COMPLIANT
PCS 1900	GSM/GPRS	1850,2 - 1909,8	494,24	20	0,0983	0,9251	COMPLIANT
	EDGE	1850,2 - 1909,8	501,12	20	0,0997	0,9251	COMPLIANT
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	361,99	20	0,0720	0,9612	COMPLIANT
	HSUPA	1922,4 - 1977,6	388,69	20	0,0773	0,9612	COMPLIANT

B.2.3. RF EXPOSURE ASSESSMENT FOR SECONDARY TRANSMITTERS INSTALLED IN GENERIC HOST PLATFORMS

Model name	FCC ID	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}) $\left(\frac{mW}{cm^2}\right)$	COMPLIANCE ($S_{eq} < S_{Lim}$)
Scenario 1	Bluetooth	76,43	20,00	0,0152	1,0000	COMPLIANT
Scenario 2	WLAN	2000,00	20,00	0,3979	1,0000	COMPLIANT
Scenario 3	WLAN	2000,00	20,00	0,3979	1,0000	COMPLIANT
	Bluetooth	76,43	20,00	0,0152	1,0000	COMPLIANT
Scenario 4	WiMAX	2000,00	20,00	0,3979	1,0000	COMPLIANT
Scenario 5	WiMAX	2000,00	20,00	0,3979	1,0000	COMPLIANT
	Bluetooth	76,43	20,00	0,0152	1,0000	COMPLIANT
Scenario 6	WLAN	2000,00	20,00	0,3979	1,0000	COMPLIANT
	WiMAX				1,0000	COMPLIANT
Scenario 7	WLAN	2000,00	20,00	0,3979	1,0000	COMPLIANT
	WiMAX				1,0000	COMPLIANT
	Bluetooth	76,43	20,00	0,0152	1,0000	COMPLIANT

B.3. RF EXPOSURE ASSESSMENT – COLLOCATION 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:

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

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 / IC REQUIREMENTS

RELATIVE EXPOSURE FOR F3307 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	0,2397	0,5495	0,4362
	EDGE	824,2 - 848,8	0,2414	0,5495	0,4393
PCS 1900	GSM/GPRS	1850,2 - 1909,8	0,0983	1,0000	0,0983
	EDGE	1850,2 - 1909,8	0,0997	1,0000	0,0997

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

SCENARIO	Type of transmitter	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Scenario 1	Bluetooth	0,0152	1,0000	0,0152
Scenario 2	WLAN	0,3979	1,0000	0,3979
Scenario 3	WLAN	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 4	WiMAX	0,3979	1,0000	0,3979
Scenario 5	WiMAX	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 6	WLAN	0,3979	1,0000	0,3979
	WiMAX			

Scenario 7	WLAN	0,3979	1,0000	0,3979
	WiMAX			
	Bluetooth	0,0152	1,0000	0,0152

SIMULTANEOUS EXPOSURE

SCENARIO	Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}} < 1$
Scenario 1	Primary transmitter	Ericsson F3307	0,4393	0,4545	COMPLIANT
	Secondary transmitter	Bluetooth	0,0152		
Scenario 2	Primary transmitter	Ericsson F3307	0,4393	0,8372	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
Scenario 3	Primary transmitter	Ericsson F3307	0,4393	0,8524	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 4	Primary transmitter	Ericsson F3307	0,4393	0,8372	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
Scenario 5	Primary transmitter	Ericsson F3307	0,4393	0,8524	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 6	Primary transmitter	Ericsson F3307	0,4393	0,8372	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
Scenario 7	Primary transmitter	Ericsson F3307	0,4393	0,8524	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
	Secondary transmitter	Bluetooth	0,0152		

B.3.3. EUROPEAN UNION REQUIREMENTS

RELATIVE EXPOSURE FOR F3307 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 - 914,6	0,1944	0,4401	0,4417
	EDGE	880,2 - 914,7	0,0548	0,4401	0,1245
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,0825	0,8551	0,0965
	EDGE	1710,2 - 1784,8	0,0329	0,8551	0,0384
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	0,0720	0,9612	0,0749
	HSUPA	1922,4 - 1977,6	0,0773	0,9612	0,0804

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

SCENARIO	Type of transmitter	S_{eq}	S_{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Scenario 1	Bluetooth	0,0152	1,0000	0,0152
Scenario 2	WLAN	0,3979	1,0000	0,3979
Scenario 3	WLAN	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 4	WiMAX	0,3979	1,0000	0,3979
Scenario 5	WiMAX	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 6	WLAN	0,3979	1,0000	0,3979
	WiMAX			
Scenario 7	WLAN	0,3979	1,0000	0,3979
	WiMAX			
	Bluetooth	0,0152	1,0000	0,0152

SIMULTANEOUS EXPOSURE

SCENARIO	Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim_Pri}} + \sum \frac{S_{Sec}}{S_{Lim_Sec}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim_Pri}} + \sum \frac{S_{Sec}}{S_{Lim_Sec}} < 1$
Scenario 1	Primary transmitter	Ericsson F3307	0,4417	0,4569	COMPLIANT
	Secondary transmitter	Bluetooth	0,0152		

Scenario 2	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
Scenario 3	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 4	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
Scenario 5	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 6	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
Scenario 7	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
	Secondary transmitter	Bluetooth	0,0152		

B.3.4. AUSTRALIA REQUIREMENTS

RELATIVE EXPOSURE FOR F3307 ERICSSON BROADBAND MODULE

Manufacturer	Model name	Frequency range (MHz)	S _{eq}	S _{Lim}	$\frac{S_{eq}}{S_{Lim}}$
E-GSM 900	GSM/GPRS	880,2 - 914,6	0,1944	0,4401	0,4417
	EDGE	880,2 - 914,7	0,0548	0,4401	0,1245
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,0825	0,8551	0,0965
	EDGE	1710,2 - 1784,8	0,0329	0,8551	0,0384
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	0,0720	0,9612	0,0749
	HSUPA	1922,4 - 1977,6	0,0773	0,9612	0,0804

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

SCENARIO	Type of transmitter	S _{eq}	S _{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Scenario 1	Bluetooth	0,0152	1,0000	0,0152
Scenario 2	WLAN	0,3979	1,0000	0,3979
Scenario 3	WLAN	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 4	WiMAX	0,3979	1,0000	0,3979

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Scenario 5	WiMAX	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 6	WLAN	0,3979	1,0000	0,3979
	WiMAX			
Scenario 7	WLAN	0,3979	1,0000	0,3979
	WiMAX			
	Bluetooth	0,0152	1,0000	0,0152

SIMULTANEOUS EXPOSURE

SCENARIO	Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}} < 1$
Scenario 1	Primary transmitter	Ericsson F3307	0,4417	0,4569	COMPLIANT
	Secondary transmitter	Bluetooth	0,0152		
Scenario 2	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
Scenario 3	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 4	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
Scenario 5	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 6	Primary transmitter	Ericsson F3307	0,4417	0,8396	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
Scenario 7	Primary transmitter	Ericsson F3307	0,4417	0,8548	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
	Secondary transmitter	Bluetooth	0,0152		

B.3.5. VODAFONE REQUIREMENTS

RELATIVE EXPOSURE FOR F3307 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	0,2397	0,4121	0,5817
	EDGE	824,2 - 848,8	0,2414	0,4121	0,5857
E-GSM 900	GSM/GPRS	880,2 - 914,6	0,1944	0,4401	0,4417
	EDGE	880,2 - 914,7	0,0548	0,4401	0,1245
DCS 1800	GSM/GPRS	1710,2 - 1784,8	0,0825	0,8551	0,0965
	EDGE	1710,2 - 1784,8	0,0329	0,8551	0,0384
PCS 1900	GSM/GPRS	1850,2 - 1909,8	0,0983	0,9251	0,1063
	EDGE	1850,2 - 1909,8	0,0997	0,9251	0,1078
FDD I	WCDMA / HSDPA	1922,4 - 1977,6	0,0720	0,9612	0,0749
	HSUPA	1922,4 - 1977,6	0,0773	0,9612	0,0804

RELATIVE EXPOSURE FOR SECONDARY TRANSMITTERS

SCENARIO	Type of transmitter	S _{eq}	S _{Lim}	$\frac{S_{eq}}{S_{Lim}}$
Scenario 1	Bluetooth	0,0152	1,0000	0,0152
Scenario 2	WLAN	0,3979	1,0000	0,3979
Scenario 3	WLAN	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 4	WiMAX	0,3979	1,0000	0,3979
Scenario 5	WiMAX	0,3979	1,0000	0,3979
	Bluetooth	0,0152	1,0000	0,0152
Scenario 6	WLAN	0,3979	1,0000	0,3979
	WiMAX			
Scenario 7	WLAN	0,3979	1,0000	0,3979
	WiMAX			
	Bluetooth			

SIMULTANEOUS EXPOSURE

SCENARIO	Equipment		Maximum $\frac{S_{eq}}{S_{Lim}}$	Maximum $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}}$	COMPLIANCE $\frac{S_{Pri}}{S_{Lim_Pri}} +$ $\sum \frac{S_{Sec}}{S_{Lim_Sec}} < 1$
Scenario 1	Primary transmitter	Ericsson F3307	0,5857	0,6009	COMPLIANT
	Secondary transmitter	Bluetooth	0,0152		
Scenario 2	Primary transmitter	Ericsson F3307	0,5857	0,9836	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
Scenario 3	Primary transmitter	Ericsson F3307	0,5857	0,9988	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 4	Primary transmitter	Ericsson F3307	0,5857	0,9836	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
Scenario 5	Primary transmitter	Ericsson F3307	0,5857	0,9988	COMPLIANT
	Secondary transmitter	WiMAX	0,3979		
	Secondary transmitter	Bluetooth	0,0152		
Scenario 6	Primary transmitter	Ericsson F3307	0,5857	0,9836	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
Scenario 7	Primary transmitter	Ericsson F3307	0,5857	0,9988	COMPLIANT
	Secondary transmitter	WLAN	0,3979		
	Secondary transmitter	WiMAX			
	Secondary transmitter	Bluetooth	0,0152		