T E S T R E P O R T
No.: 17-1-0221001T25a

According to:
FCC Regulations
Part 1.1310
Part 2.1091

ISED-Regulations
RSS-102, Issue 5

for

ACTIA Nordic AB

Telematic Device
ACUII-06

FCC: 2AGKKACUII-06H2
ISED: 20839-ACUII06H2

Laboratory Accreditation and Listings		
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01 Accredited EMC-Test Laboratory	Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-20013, C-20009, T-20006, G-20013
Wi Fi ALLIANCE AUTHORIZED RF LABORATORY	ctia Authorized™ Test Lab Lab Code: 20011130-00	FEDERAL COMMUNICATIONS COMMISSION FC USA MRA US-EU 0003
accredited according to DIN EN ISO/IEC 17025		

CETECOM GmbH
Laboratory Radio Communications & Electromagnetic Compatibility
Im Teelbruch 116 • 45219 Essen • Germany
Registered in Essen, Germany, Reg. No.: HRB Essen 8984
Tel.: + 49 (0) 20 54 / 95 19-954 • Fax: + 49 (0) 20 54 / 95 19-964
E-mail: info@cetecom.com • Internet: www.cetecom.com

Laboratory Accreditation and Listings

Table of contents

Table of annex

	Total pages
Annex 1: Separate document applicant's document "TR6-0744-15-3-1b_sign"	25
Annex 2: Separate document applicant's document "RE 17-1-02210 ACUII-06 re-design MPE"	01
Annex 3: Separate document applicant's document "Volvo_MAM_Data Sheet_2016_04_22"	14
Annex 4: Separate document applicant's document "6001_80040_Antenna path loss_1.2"	01
Annex 5: Separate document applicant's document "6001_60057 ACUII-05 / ACUII-06 backup Antenna Specification"	04
Annex 6: Separate document applicant's document "Murata_WLAN_MPE.pdf"	05

The listed attachments are an integral part of this report.

1. Summary of test results

The test results apply exclusively to the test samples as presented in this Report. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests.
In order to verify the compliance with applicable rules, a representative configuration consisting of the main EUT and necessary representative auxiliary equipment was chosen by the applicant.

The MPE assessment report is performed for all wireless technologies usable in the EU and supported from the EUT.
Following tests have been performed to show compliance with applicable FCC Part 2.1091 and FCC Part 1.1310 of the FCC CFR 47 Rules and Canadian RSS-102, Issue 5.

1.1. Summary of tests results

RF-Exposure Evaluation (separation distance user to RF-radiating element greater 20cm)								
Test cases	**Port**	**References & Limits**				**EUT set-up**	**EUT op. mode**	**Result**
		FCC Standard	Test Limit	RSS Standard	Test Limit			
Radio frequency radiation exposure Requirements	Cabinet	§1.1310 §2.1091 §2.1093	RF-Field Strength Limits: FCC: "general population/ uncontrolled" environment	RSS-102, Issue 5	Chapter 4 Table 4	1-2	1-11	Pass

Remark: Calculations based on Test Reports mentioned in Annex 1 to 5.

1.2. Attestation:

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge and belief to Industry Canada standards. All requirements as shown in above table are met in accordance with enumerated standards.

Digital unterschrieben von Niels Jeß
DN: cn=Niels Jeß, o=CETECOM GmbH, ou=Branch Duesseldorf, email=niels.jess@cetecom.com, c=DE
Datum: 2018.10.11 23:18:36 +02'00'

Dipl.-Ing. Niels Jeß
Responsible for test section

Digital signiert von: Marc Schäfers
Datum: 2018.10.11 14:51:49 +01'00'

M.Schäfers
Responsible for test report

2. Administrative Data

2.1. Identification of the testing laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Responsible for testing laboratory:	Dipl.-Ing. Rachid Acharkaoui
Deputy:	Dipl.-Ing. Niels Jeß

2.2. Test location

2.2.1. Test laboratory "CTC"

Company name:	see chapter 2.1. Identification of the testing laboratory

2.3. Organizational items

Responsible for test report:	M. Schäfers
Receipt of EUT:	--
Date(s) of test:	--
Date of report:	2018-10-11

2.4. Applicant's details

Applicant's name:	ACTIA Nordic AB
Address:	Hammarbacken 4a, 3 tr SE-19149 SOLLENTUNA Sweden
Contact person:	Mr. Nicklas Andersson

2.5. Manufacturer's details

Manufacturer's name:	please see applicant's details
Address:	please see applicant's details

3. Equipment under test (EUT)

3.1. Summary of product description

FCC ID:	2AGKKACUII-06H2	
Product name	ACUII-06	
Exposure category	☒ General population/uncontrolled environment ☐ Occupational exposure/controlled environment	
Output power	☐ Conducted ☐ ERP ☒ EIRP ☐ Peak ☒ Source-based time-averaging	
Antenna gain	details refer to Annex 2 & Annex 4	
Technology	☐ MIMO	☐ 2T2R ☐ 3T3R ☐ 4T4R
	☒ non-MIMO	☒ 1T1R ☐ 1T2R ☐ 2T1R
Evaluation type	☐ Standalone ☒ Simultaneous transmission	
Evaluation distance	☒ 20 cm	
	☐ XXX cm	declares by manufacturer
EUT type	☐ Production Unit ☒ Pre-Production Unit ☐ Engineering Unit	
Device type	☐ Mobile device ☒ Fixed device	
Refer rules	☒ CFR 47 FCC Part 2.1091 ☒ CFR 47 FCC Part 1.1310 ☒ KDB 447497 D01v06 October 23, 2015 ☒ KDB 865664 D01v01r02 October 23, 2015	

3.2. EUT Technologies

Wireless Technologies	Frequency bands	Operation mode
☒WLAN	☒2.4GHz ☒5GHz	normal operation mode
☒LTE	☒Band 2 ☒Band 4 ☒Band 5 ☒Band 17	normal operation mode
☒WCDMA	☒Band II ☒Band IV ☒Band V	normal operation mode
☒GSM	☒GSM 850 ☒GSM 1900	normal operation mode

3.3. EUT: Type, S/N etc. and short descriptions used in this test report

Short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	Telematic Device	ACUII-06	30207090	H2	14

*) EUT short description is used to simplify the identification of the EUT in this test report.

3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	External Antenna 434-WLAN-GNSS-Tel	VCC Part. No. 31438104 Kathrein Part. No. 52510568 MARKED original: 50751423	#1	434MHZ WLAN GNSS TEL 08/2015 V4.6 434MHz	--

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

3.5. EUT set-ups

EUT set-up no.*)	Combination of EUT and AE	Remarks
set. 1	EUT A	only theoretical calculation
set. 2	EUT A + AE1	only theoretical calculation

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

3.6. EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	GPRS 850 TCH mode	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). USF_Duty CYCLE set to 100%, coding scheme CS1 for GMSK modulation, slot 2,3,4,5 active. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 2	E-GPRS 850 TCH mode	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 27 dBm (power class 4; power control level 5). USF_Duty CYCLE set to 100%, coding scheme MCS5 for 8-PSK modulation, slot 2,3,4,5 active. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 3	GPRS 1900 TCH mode	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). USF_Duty CYCLE set to 100%, coding scheme CS1 for GMSK modulation, slot 2,3,4,5 active. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link
op. 4	E-GPRS 1900 TCH mode	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 26 dBm (power class 1; power control level 0). USF_Duty CYCLE set to 100%, coding scheme MCS-5 for 8-PSK modulation, slot 2,3,4,5 active, uplink gamma: 5 (26 dBm). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 5	W-CDMA FDD-Mode Band II 12.2 kbps RMC	A communication link is established between the mobile station (UE) and the test simulator. The transmitter is operated on its maximum rated output power class: 24dBm. The test frequencies(UARFCN range: low/mid/high) selected according 3GPP TS 34.121-1. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link according Table E5.1/Table E5.1A as described in 3GPP TS34.121, Annex E.
op. 6	W-CDMA FDD-Mode Band IV 12.2 kbps RMC	
op. 7	W-CDMA FDD-Mode Band V 12.2 kbps RMC	

op. 8	LTE FDD-Mode Band 2	A communication link is established between the mobile station (UE) and the test simulator. The transmitter is operated on its maximum rated output power class 3: 23dBm. The test frequencies((UARFCN range: low/mid/high)) selected according 3GPP TS 36.508. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link according 3GPP described in 3GPP TS 34.521-1.
op. 9	LTE FDD-Mode Band 4	
op. 10	LTE FDD-Mode Band 5	
op. 11	LTE FDD-Mode Band 17	

*) EUT operating mode no. is used to simplify the test report.

4. Measurements

4.1. Radio Frequency Exposure Evaluation §2.1091

4.1.1. Test location and equipment (for reference numbers please see chapter 'List of test equipment')

test location	☒ CETECOM Essen (Chapter. 2.2.1)	☐ Please see Chapter. 2.2.2	☐ Please see Chapter. 2.2.3
	For Evaluation instruments are not needed. Results are determined by calculation based on applicants delivered Tune-Up procedure.		

4.1.2. Requirements

FCC: §1.1310	*The criteria used for the evaluation of human exposure to radio frequency radiation is table 1 according FCC §1.1310 and table chapter 4.2 of RSS-102 standard and it is subject for evaluation of the RF exposure prior to equipment authorization.* *As the mobile equipment is authorized under Part 22 (Subpart H) and Part 24 of the FCC Rules, it is subject for evaluation of the RF exposure prior to equipment authorization.*
FCC § 2.1091	*Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, ''Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.''* *For purposes of these requirements mobile devices are defined by the FCC as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between radiating structures and the body of the user or nearby persons. These devices are normally evaluated for exposure potential with relation to the MPE limits given in Table 1 of Appendix A.*

4.1.2.1. Valid for FCC

Table 1: LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)				
Frequency range [MHz)	Electric field strength [V/m]	Magnetic field strength [A/m]	Power density [mW/cm²]	Averaging time [minutes]
30 - 300	61.4	0.163	1.0	6
300 - 1500	-		f/300	6
1500 - 100,000	-		5	6
(B) Limits for General Population / Uncontrolled Exposure				
0.3 – 1.34	614	1.63	*(100)	30
1.34 – 30	824/f	2.19/f	*(180/f²)	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f/1500	30
1500 – 100,0	-	-	1.0	30

f=frequency in MHz
*Plane-wave equivalent power density

NOTE1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. These limits apply to amateur station licensees and members of their immediate household as discussed in the text.

NOTE2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. As discussed in the text, these limits apply to neighbours living near amateur radio stations.

4.1.3 General Limits:

FCC: §1.1307	*Cellular Radiotelephone Service (subpart H of part 22)* *Non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 1000 W ERP (1640 W EIRP)*
FCC §1.1307	*Personal Communications Services (part 24)* *Broadband PCS (subpart E): non-building-mounted antennas: height above ground level to lowest point of antenna < 10 m and total power of all channels > 2000 W ERP (3280 W EIRP)*
FCC §1.1310	*LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)* *Table 1(B) Limits for General Population/Uncontrolled Exposure* *300–1500 MHz: f/1500 mW/cm²* *1500–100,000 MHz: 1.0 mW/cm²*
FCC §2.1091	*Subject to routine evaluation is required when the device operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.*
FCC §24.232	*(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT.* *b) Mobile/portable stations are limited to 2 watts e.i.r.p. peak power, …*
FCC §22.913	*(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.*
FCC §27.50 (C)(10)	*(10) Portable stations (hand-held devices) are limited to 3 watts ERP; and*
FCC §27.50(d)	*(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band are limited to 1 watt EIRP.*
KDBs	*No. 447498 D01 v06*

4.2. Requirements and limits for RSS Standard

RSS-102, Issue 5	**2.5 Exemption Limits for Routine Evaluation** All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2. **If the equipment under test (EUT) meets the requirements of sections 2.5.1 or 2.5.2, applicants are only required to submit a properly signed declaration of compliance (see Annex C)**. The information contained in the RF exposure technical brief may be limited to the value(s) of the maximum output power, the information that demonstrates how the maximum output power of the transmitter was derived and the rationale for the separation distances applied (see Table 1), which must be based on the most conservative exposure condition for the applicable module or host platform test procedure requirements.
	2.5.2 Exemption Limits for Routine Evaluation — RF Exposure Evaluation RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows: • below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance); • at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz; • at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance); • **at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;** • at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance). In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.
	2.6 User Manual Requirements The applicant is responsible for providing proper instructions to the user of the radio device, and any usage restrictions, including limits of exposure durations. The user manual shall provide installation and operation instructions, as well as any special usage conditions (e.g. proper accessory required, including the proper orientation of the device in the accessory, maximum antenna gain in the case of detachable antenna), in order to ensure compliance with SAR and/or RF field strength limits. For instance, compliance distance shall be clearly stated in the user manual. The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

4.3. MPE Calculation method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

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

$$G_{NUMERIC} = \frac{S * 4\pi R^2}{P}$$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the centre of radiation of the antenna

4.4. Evaluation Method

4.4.1. Standalone

Valid for WLAN 2.4GHz:
• The peak power was checked on 3 frequencies (lowest/middle/highest) within the 2.4GHz band
• Only worst case 2.4GHz W-LAN mode considered

Valid for WLAN 5GHz Mode:
• The peak power was checked on 4 frequencies (U-NII-1/2A/2C/3) within the 5GHz band.
• Only worst case 5GHz W-LAN mode considered

Valid for GPRS/E-GPRS Mode:
• Average burst power (slot power) was considered for (E)GPRS operating mode. Max. slot number in uplink were used according the equipment class as stated by the applicant.

Valid for LTE and WCDMA Mode:
• The peak power was checked on 3 frequencies (lowest/middle/highest).
• No duty-cycle correction factor is applicable.

If a specific antenna gain is stated by the applicant all results are based thereof.
Please find in the following tables the calculations based on Annex 1 to 5.

4.5. Results for fixed and mobile

4.5.1. Results for FCC Standard

4.5.1.1. Results for lower operational band: LTE Band 5 and LTE Band 12, GSM850 and FDD Band 5 (External Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Calculated maximum EIRP (declared+ Tune-up+ antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
GSM/GPRS (Avg. Burst Power)	824,2	31,0	0,5	4,8	2,6	33,7	50%	2,344	1172	0,5495	0,2332	**0,3163**	0,4244	0,4244
	837	31,0	0,5	4,8	2,6	33,7		2,344	1172	0,5580	0,2332	**0,3248**	0,4179	
	848,8	31,0	0,5	4,8	2,6	33,7		2,344	1172	0,5659	0,2332	**0,3327**	0,4121	
EDGE (Avg. Burst Power)	824,2	27,0	0,5	4,8	2,6	29,7	50%	0,933	467	0,5495	0,0928	**0,4566**	0,1690	0,1690
	837	27,0	0,5	4,8	2,6	29,7		0,933	467	0,5580	0,0928	**0,4652**	0,1664	
	848,8	27,0	0,5	4,8	2,6	29,7		0,933	467	0,5659	0,0928	**0,4730**	0,1641	
WCDMA FDD Band 5 (RMS-Value)	826,4	24,0	0,5	4,8	2,6	26,7	100%	0,468	468	0,5509	0,0931	**0,4579**	0,1689	0,1689
	836,4	24,0	0,5	4,8	2,6	26,7		0,468	468	0,5576	0,0931	**0,4645**	0,1669	
	846,6	24,0	0,5	4,8	2,6	26,7		0,468	468	0,5644	0,0931	**0,4713**	0,1649	
LTE Band 17 (QPSK, #RB=1, RMS-Value)	706,5	23,0	0,5	4,8	2,6	25,7	100%	0,372	372	0,4710	0,0739	**0,3971**	0,1569	0,1569
	710	23,0	0,5	4,8	2,6	25,7		0,372	372	0,4733	0,0739	**0,3994**	0,1562	
	713,5	23,0	0,5	4,8	2,6	25,7		0,372	372	0,4757	0,0739	**0,4018**	0,1554	
LTE Band 17 (16QAM, #RB=1, RMS-Value)	706,5	23,0	0,5	4,8	2,6	25,7	100%	0,372	372	0,4710	0,0739	**0,3971**	0,1569	0,1569
	710	23,0	0,5	4,8	2,6	25,7		0,372	372	0,4733	0,0739	**0,3994**	0,1562	
	713,5	23,0	0,5	4,8	2,6	25,7		0,372	372	0,4757	0,0739	**0,4018**	0,1554	
LTE Band 5 (QPSK, #RB=1, RMS-Value)	824,7	23,0	0,5	4,8	2,6	25,7	100%	0,372	372	0,5498	0,0739	**0,4759**	0,1344	0,1344
	836,5	23,0	0,5	4,8	2,6	25,7		0,372	372	0,5577	0,0739	**0,4838**	0,1325	
	848,3	23,0	0,5	4,8	2,6	25,7		0,372	372	0,5655	0,0739	**0,4916**	0,1307	
LTE Band 5 (16QAM, #RB=1, RMS-Value)	824,7	23,0	0,5	4,8	2,6	25,7	100%	0,372	372	0,5498	0,0739	**0,4759**	0,1344	0,1344
	836,5	23,0	0,5	4,8	2,6	25,7		0,372	372	0,5577	0,0739	**0,4838**	0,1325	
	848,3	23,0	0,5	4,8	2,6	25,7		0,372	372	0,5655	0,0739	**0,4916**	0,1307	

Maximum calculated MPE value:		
Lowest MPE-Limit in Frequency-Band:	**0,4665**	**[mW/cm^2]**
Highest MPE value in frequency-band:	**0,2332**	**[mW/cm^2]**
Lowest margin to limit in frequency band:	**0,3163**	**[mW/cm^2]**

4.5.1.2. Results for upper operational band: FDD Band 4 and LTE Band 4 (External Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Calculated maximum EIRP (declared+ Tune-up+ antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2	MPE-Value (mW/cm^2)	Margin to limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-CDMA Band 4 (RMS-Value)	1712,4	24,0	0,5	4,4	4,2	24,7	100%	0,2951	295,1	1,0000	0,0587	0,9413	0,058712	0,0587124
	1740,0	24,0	0,5	4,4	4,2	24,7		0,2951	295,1	1,0000	0,0587	0,9413	0,058712	
	1752,6	24,0	0,5	4,4	4,2	24,7		0,2951	295,1	1,0000	0,0587	0,9413	0,058712	
LTE Band 4 (QPSK, #1RB, RMS-Value)	1710,7	23,0	0,5	4,4	4,2	23,7	100%	0,2344	234,4	1,0000	0,0466	0,9534	0,046637	0,0466370
	1732,5	23,0	0,5	4,4	4,2	23,7		0,2344	234,4	1,0000	0,0466	0,9534	0,046637	
	1754,3	23,0	0,5	4,4	4,2	23,7		0,2344	234,4	1,0000	0,0466	0,9534	0,046637	
LTE Band 4 (16QAM, #1RB, RMS-Value)	1710,7	23,0	0,5	4,4	4,2	23,7	100%	0,2344	234,4	1,0000	0,0466	0,9534	0,046637	0,0466370
	1732,5	23,0	0,5	4,4	4,2	23,7		0,2344	234,4	1,0000	0,0466	0,9534	0,046637	
	1754,3	23,0	0,5	4,4	4,2	23,7		0,2344	234,4	1,0000	0,0466	0,9534	0,046637	

Maximum calculated MPE value:		
Lowest MPE-Limit in frequency-band:	1,0000	[mW/cm^2]
Highest MPE value in frequency-band:	0,0587	[mW/cm^2]
Lowest margin to limit in frequency-band:	0,94	[mW/cm^2]

4.5.1.3. Results for upper operational band: FDD Band 2, LTE Band 2 and GSM1900 (External Antenna)

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manfacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Declared maximum EIRP (Measured+ Tune-up+ Antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to limit: (W/m^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
GSM/GPRS (AV Burst Power)	1850,2	28,0	0,50	5,1	5,0	28,6	50%	0,724	362	1,0000	0,0721	0,9279	0,072061	0,0720610
	1880,0	28,0	0,50	5,1	5,0	28,6		0,724	362	1,0000	0,0721	0,9279	0,072061	
	1909,8	28,0	0,50	0,1	5,0	23,6		0,229	115	1,0000	0,0228	0,9772	0,022788	
EDGE (AV Burst Power)	1850,2	26,0	0,50	5,1	5,0	26,6	50%	0,457	229	1,0000	0,0455	0,9545	0,045467	0,0454674
	1880,0	26,0	0,50	5,1	5,0	26,6		0,457	229	1,0000	0,0455	0,9545	0,045467	
	1909,8	26,0	0,50	5,1	5,0	26,6		0,457	229	1,0000	0,0455	0,9545	0,045467	
W-CDMA FDD Band 2 (RMS-Value)	1852,4	24,0	0,50	5,1	5,0	24,6	100%	0,288	288	1,0000	0,0574	0,9426	0,057376	0,0573760
	1880,0	24,0	0,50	5,1	5,0	24,6		0,288	288	1,0000	0,0574	0,9426	0,057376	
	1907,6	24,0	0,50	5,1	5,0	24,6		0,288	288	1,0000	0,0574	0,9426	0,057376	
LTE Band 2 (QPSK, #1RB, RMS-Value)	1850,7	23,0	0,50	5,1	5,0	23,6	100%	0,229	229	1,0000	0,0456	0,9544	0,045575	0,0455754
	1880,0	23,0	0,50	5,1	5,0	23,6		0,229	229	1,0000	0,0456	0,9544	0,045575	
	1909,3	23,0	0,50	5,1	5,0	23,6		0,229	229	1,0000	0,0456	0,9544	0,045575	
LTE Band 2 (16QAM, #1RB, RMS-Value)	1850,7	23,0	0,50	5,1	5,0	23,6	100%	0,229	229	1,0000	0,0456	0,9544	0,045575	0,0455754
	1880,0	23,0	0,50	5,1	5,0	23,6		0,229	229	1,0000	0,0456	0,9544	0,045575	
	1909,3	23,0	0,50	5,1	5,0	23,6		0,229	229	1,0000	0,0456	0,9544	0,045575	

Maximum calculated MPE value:		
Lowest MPE-Limit in frequency-band:	1,0000	[mW/cm^2]
Highest MPE value in frequency-band:	0,0721	[mW/cm^2]
Margin to limit in frequency-band:	0,9279	[mW/cm^2]

4.5.1.4. Results for WLAN 2.4GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manfacturer (dB)	Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	Declared maximum EIRP (Measured+ Tune-up) (dBm)	Duty cycle %	Declared Maximum conducted output power (W)	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to Limit:	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-LAN 2.4GHz	2412,0	21,57	0,5	7,40	5,60	23,87	100%	0,2438	243,8	1,0000	0,0485	0,9515	0,048499	0,0484987
	2437,0	21,57	0,5	7,40	5,60	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	
	2462,0	21,57	0,5	7,40	5,60	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	

Maximum calculated MPE value:		
Lowest MPE-Limit:	1,0000	[mW/cm^2]
Highest MPE value:	0,0485	[mW/cm^2]
Lowest Margin to limit:	0,9515	[mW/cm^2]

4.5.1.5. Results for WLAN 5GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE-Value (mW/cm^2)	MPE-Value (mW/cm^2)	Margin (mW/cm^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	0,0062
	5200,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
	5240,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
W-LAN 5GHz (20MHZ BW)	5260,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	0,0057
	5280,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
	5320,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
W-LAN 5GHz (20MHZ BW)	5500,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	0,0054
	5580,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
	5700,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
W-LAN 5GHz (20MHZ BW)	5745,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	0,0058
	5785,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	
	5825,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	

Maximum calculated MPE value:		
5GHz		
Lowest MPE-Limit:	1,0000	[W/m^2]
Highest MPE-value:	0,0062	[W/m^2]
Margin to limit	0,9938	[W/m^2]

4.5.1.6. MPE results for co-location (External Antenna)

		GSM/G-PRS/ E-GPRS Band-850	W-CDMA Band 5	LTE- Band 5	LTE Band 17	W-CDMA Band 4	LTE Band 4	GSM/GPRS/ E-GPRS Band 1900	W-CDMA Band 2	LTE Band 2
	Ratio of MPE-Value/Limit	0,424383801	0,168900562	0,134439042	0,156931179	0,058712442	0,04663695	0,072060977	0,057375984	0,045575364
W-LAN 2.4GHz	0,048498705	0,472882506	0,217399267	0,182937747	0,205429884	0,10721115	0,095135656	0,120559683	0,105874689	0,094074069
W-LAN 5GHz	0,00616212	0,430545921	0,175062682	0,140601162	0,163093299	0,06487456	0,05279907	0,078223097	0,063538104	0,051737484
Maximum-Value		0,472882506								

4.5.2.1. Results for lower operational band: LTE Band 5 and LTE Band 12, GSM850 and FDD Band 5 (Backup Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Calculated maximum EIRP (declared+ Tune-up+ antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
GSM/GPRS (Avg. Burst Power)	824,2	31	0,5	-2,9	0,0	28,6	50%	0,724	362	0,5495	0,0721	0,4774	0,1311	0,1311
	837	31	0,5	-2,9	0,0	28,6		0,724	362	0,5580	0,0721	0,4859	0,1291	
	848,8	31	0,5	-2,9	0,0	28,6		0,724	362	0,5659	0,0721	0,4938	0,1273	
EDGE (Avg. Burst Power)	824,2	27	0,5	-2,9	0,0	24,6	50%	0,288	144	0,5495	0,0287	0,5208	0,0522	0,0522
	837	27	0,5	-2,9	0,0	24,6		0,288	144	0,5580	0,0287	0,5293	0,0514	
	848,8	27	0,5	-2,9	0,0	24,6		0,288	144	0,5659	0,0287	0,5372	0,0507	
WCDMA FDD Band 5 (RMS-Value)	826,4	24	0,5	-2,9	0,0	21,6	100%	0,145	145	0,5509	0,0288	0,5222	0,0522	0,0522
	836,4	24	0,5	-2,9	0,0	21,6		0,145	145	0,5576	0,0288	0,5288	0,0516	
	846,6	24	0,5	-2,9	0,0	21,6		0,145	145	0,5644	0,0288	0,5356	0,0509	
LTE Band 17 (QPSK, #RB=1, RMS-Value)	706,5	23	0,5	-2,9	0,0	20,6	100%	0,115	115	0,4710	0,0228	0,4482	0,0485	0,0485
	710	23	0,5	-2,9	0,0	20,6		0,115	115	0,4733	0,0228	0,4505	0,0483	
	713,5	23	0,5	-2,9	0,0	20,6		0,115	115	0,4757	0,0228	0,4528	0,0480	
LTE Band 17 (16QAM, #RB=1, RMS-Value)	706,5	23	0,5	-2,9	0,0	20,6	100%	0,115	115	0,4710	0,0228	0,4482	0,0485	0,0485
	710	23	0,5	-2,9	0,0	20,6		0,115	115	0,4733	0,0228	0,4505	0,0483	
	713,5	23	0,5	-2,9	0,0	20,6		0,115	115	0,4757	0,0228	0,4528	0,0480	
LTE Band 5 (QPSK, #RB=1, RMS-Value)	824,7	23	0,5	-2,9	0,0	20,6	100%	0,115	115	0,5498	0,0228	0,5270	0,0415	0,0415
	836,5	23	0,5	-2,9	0,0	20,6		0,115	115	0,5577	0,0228	0,5348	0,0410	
	848,3	23	0,5	-2,9	0,0	20,6		0,115	115	0,5655	0,0228	0,5427	0,0404	
LTE Band 5 (16QAM, #RB=1, RMS-Value)	824,7	23	0,5	-2,9	0,0	20,6	100%	0,115	115	0,5498	0,0228	0,5270	0,0415	0,0415
	836,5	23	0,5	-2,9	0,0	20,6		0,115	115	0,5577	0,0228	0,5348	0,0410	
	848,3	23	0,5	-2,9	0,0	20,6		0,115	115	0,5655	0,0228	0,5427	0,0404	

Maximum calculated MPE value:		
Lowest MPE-Limit in Frequency-Band:	0,4665	[mW/cm^2]
Highest MPE value in frequency-band:	0,0721	[mW/cm^2]
Lowest margin to limit in frequency band:	0,4482	[mW/cm^2]

4.5.2.2. Results for upper operational band: FDD Band 4 and LTE Band 4 (Backup Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Calculated maximum EIRP (declared+ Tune-up+ antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2	MPE-Value (mW/cm^2)	Margin to limit: (mW/cm^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-CDMA Band 4 (RMS-Value)	1712,4	24,0	0,5	2,5	0,0	27	100%	0,5012	501,2	1,0000	0,0997	0,9003	0,099708	0,0997080
	1740,0	24,0	0,5	2,5	0,0	27		0,5012	501,2	1,0000	0,0997	0,9003	0,099708	
	1752,6	24,0	0,5	2,5	0,0	27		0,5012	501,2	1,0000	0,0997	0,9003	0,099708	
LTE Band 4 (QPSK, #1RB, RMS-Value)	1710,7	23,0	0,5	2,5	0,0	26	100%	0,3981	398,1	1,0000	0,0792	0,9208	0,079201	0,0792009
	1732,5	23,0	0,5	2,5	0,0	26		0,3981	398,1	1,0000	0,0792	0,9208	0,079201	
	1754,3	23,0	0,5	2,5	0,0	26		0,3981	398,1	1,0000	0,0792	0,9208	0,079201	
LTE Band 4 (16QAM, #1RB, RMS-Value)	1710,7	23,0	0,5	2,5	0,0	26	100%	0,3981	398,1	1,0000	0,0792	0,9208	0,079201	0,0792009
	1732,5	23,0	0,5	2,5	0,0	26		0,3981	398,1	1,0000	0,0792	0,9208	0,079201	
	1754,3	23,0	0,5	2,5	0,0	26		0,3981	398,1	1,0000	0,0792	0,9208	0,079201	

Maximum calculated MPE value:		
Lowest MPE-Limit in frequency-band:	1,0000	[mW/cm^2]
Highest MPE value in frequency-band:	0,0997	[mW/cm^2]
Lowest margin to limit in frequency-band:	0,90	[mW/cm^2]

4.5.2.3. Results for upper operational band: FDD Band 2, LTE Band 2 and GSM1900 (Backup Antenna)

Operation Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manfacturer (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Declared maximum EIRP (Measured+ Tune-up+ Antenna Gain) (dBm)	Duty cycle %	Declared Maximum EIRP (W)	Equivalent EIRP (maximum EIRP x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to limit: (W/m^2)	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
GSM/GPRS (AV Burst Power)	1850,2	28,0	0,50	2,5	0,0	31	50%	1,259	629	1,0000	0,1252	0,8748	0,125228	0,1252276
	1880,0	28,0	0,50	2,5	0,0	31		1,259	629	1,0000	0,1252	0,8748	0,125228	
	1909,8	28,0	0,50	2,5	0,0	31		1,259	629	1,0000	0,1252	0,8748	0,125228	
EDGE (AV Burst Power)	1850,2	26,0	0,50	2,5	0,0	29	50%	0,794	397	1,0000	0,0790	0,9210	0,079013	0,0790133
	1880,0	26,0	0,50	2,5	0,0	29		0,794	397	1,0000	0,0790	0,9210	0,079013	
	1909,8	26,0	0,50	2,5	0,0	29		0,794	397	1,0000	0,0790	0,9210	0,079013	
W-CDMA FDD Band 2 (RMS-Value)	1852,4	24,0	0,50	2,5	0,0	27	100%	0,501	501	1,0000	0,0997	0,9003	0,099708	0,0997080
	1880,0	24,0	0,50	2,5	0,0	27		0,501	501	1,0000	0,0997	0,9003	0,099708	
	1907,6	24,0	0,50	2,5	0,0	27		0,501	501	1,0000	0,0997	0,9003	0,099708	
LTE Band 2 (QPSK, #1RB, RMS-Value)	1850,7	23,0	0,50	2,5	0,0	26	100%	0,398	398	1,0000	0,0792	0,9208	0,079201	0,0792009
	1880,0	23,0	0,50	2,5	0,0	26		0,398	398	1,0000	0,0792	0,9208	0,079201	
	1909,3	23,0	0,50	2,5	0,0	26		0,398	398	1,0000	0,0792	0,9208	0,079201	
LTE Band 2 (16QAM, #1RB, RMS-Value)	1850,7	23,0	0,50	2,5	0,0	26	100%	0,398	398	1,0000	0,0792	0,9208	0,079201	0,0792009
	1880,0	23,0	0,50	2,5	0,0	26		0,398	398	1,0000	0,0792	0,9208	0,079201	
	1909,3	23,0	0,50	2,5	0,0	26		0,398	398	1,0000	0,0792	0,9208	0,079201	

Maximum calculated MPE value:		
Lowest MPE-Limit in frequency-band:	1,0000	[mW/cm^2]
Highest MPE value in frequency-band:	0,1252	[mW/cm^2]
Margin to limit in frequency-band:	0,8748	[mW/cm^2]

4.5.2.4. Results for WLAN 2.4GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manfacturer (dB)	Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	Declared maximum EIRP (Measured+ Tune-up) (dBm)	Duty cycle %	Declared Maximum conducted output power (W)	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to Limit:	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-LAN or Bluetooth or Zigbee 2.4GHz	2412,0	21,57	0,5	7,4	5,6	23,87	100%	0,2438	243,8	1,0000	0,0485	0,9515	0,048499	0,0484987
	2437,0	21,57	0,5	7,4	5,6	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	
	2462,0	21,57	0,5	7,4	5,6	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	

Maximum calculated MPE value:		
Lowest MPE-Limit:	1,0000	[mW/cm^2]
Highest MPE value:	0,0485	[mW/cm^2]
Lowest Margin to limit:	0,9515	[mW/cm^2]

4.5.2.5. Results for WLAN 5GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE-Value (mW/cm^2)	MPE-Value (mW/cm^2)	Margin (mW/cm^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	0,0062
	5200,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
	5240,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
W-LAN 5GHz (20MHZ BW)	5260,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	0,0057
	5280,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
	5320,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
W-LAN 5GHz (20MHZ BW)	5500,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	0,0054
	5580,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
	5700,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
W-LAN 5GHz (20MHZ BW)	5745,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	0,0058
	5785,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	
	5825,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	

Maximum calculated MPE value:		
5GHz		
Lowest MPE-Limit:	1,0000	[W/m^2]
Highest MPE-value:	0,0062	[W/m^2]
Margin to limit	0,9938	[W/m^2]

4.5.2.6. MPE results for co-location (Backup Antenna)

		GSM/G-PRS/ E-GPRS Band-850	W-CDMA Band 5	LTE- Band 5	LTE Band 17	W-CDMA Band 4	LTE Band 4	GSM/GPRS/ E-GPRS Band 1900	W-CDMA Band 2	LTE Band 2
	Ratio of MPE-Value/Limit	0,131147132	0,052195264	0,041545636	0,048496371	0,099708032	0,079200905	0,125227626	0,099708032	0,079200905
W-LAN 2.4GHz	0,048498705	0,179645837	0,100693969	0,090044341	0,096995076	0,14820674	0,12769961	0,173726332	0,148206737	0,12769961
W-LAN 5GHz	0,00616212	0,137309252	0,058357383	0,047707756	0,05465849	0,10587015	0,085363025	0,131389746	0,105870152	0,085363025
Maximum-Value		0,179645837								

4.5.3. Results for RSS Standard

4.5.3.1. Results for lower operational band: LTE Band 5 and LTE Band 12, GSM850 and FDD Band 5 (External Antenna)

Operating Mode	Channel frequency (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer's tune-up info (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Power: (EIRP) (dBm)	Duty-Cycle %	Maximum delivered power: (EIRP) (W)	Power incl. Duty-Cyle: (EIRP) (W)	MPE Limit accord. Table 4 (EIRP-Limit) (W/m^2)	MPE-Value (EIRP refered) (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
GSM/GPRS (Avg. Burst Power)	824,2	31,0	0,5	4,8	2,6	33,7	50%	2,3442	1,1721	2,5760	2,3318	0,2442	0,9052	0,905207
	837,0	31,0	0,5	4,8	2,6	33,7	50%	2,3442	1,1721	2,6033	2,3318	0,2715	0,8957	
	848,8	31,0	0,5	4,8	2,6	33,7	50%	2,3442	1,1721	2,6283	2,3318	0,2965	0,8872	
EDGE (Avg. Burst Power)	824,2	27,0	0,5	4,8	2,6	29,7	50%	0,9333	0,4666	2,5760	0,9283	1,6477	0,3604	
	837,0	27,0	0,5	4,8	2,6	29,7	50%	0,9333	0,4666	2,6033	0,9283	1,6750	0,3566	
	848,8	27,0	0,5	4,8	2,6	29,7	50%	0,9333	0,4666	2,6283	0,9283	1,7000	0,3532	
WCDMA FDD Band 5 (RMS-Value)	826,4	24,0	0,5	4,8	2,6	26,7	100%	0,4677	0,4677	2,5807	0,9305	1,6502	0,360568	0,360568
	837,0	24,0	0,5	4,8	2,6	26,7	100%	0,4677	0,4677	2,6033	0,9305	1,6728	0,357441	
	846,6	24,0	0,5	4,8	2,6	26,7	100%	0,4677	0,4677	2,6237	0,9305	1,6932	0,354666	
LTE Band 5 (QPSK, #RB=1, RMS-Value)	824,7	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,5771	0,7391	1,8380	0,286812	0,286812
	836,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,6022	0,7391	1,8631	0,284041	
	848,3	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,6273	0,7391	1,8881	0,281335	
LTE Band 5 (16QAM, #RB=1, RMS-Value)	824,7	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,5771	0,7391	1,8380	0,286812	
	836,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,6022	0,7391	1,8631	0,284041	
	848,3	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,6273	0,7391	1,8881	0,281335	
LTE Band 17 (QPSK, #RB=1, RMS-Value)	706,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3186	0,7391	1,5794	0,318795	0,318795
	710,0	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3264	0,7391	1,5873	0,317720	
	713,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3342	0,7391	1,5951	0,316654	
LTE Band 17 (16QAM, #RB=1, RMS-Value)	706,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3186	0,7391	1,5794	0,318795	
	710,0	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3264	0,7391	1,5873	0,317720	
	713,5	23,0	0,5	4,8	2,6	25,7	100%	0,3715	0,3715	2,3342	0,7391	1,5951	0,316654	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	2,3186	[W/m^2]
Highest MPE value within frequency-band:	2,3318	[W/m^2]
Lowest margin to limit within frequency-band:	0,2442	[W/m^2]

4.5.3.2. Results for upper operational band: FDD Band 4 and LTE Band 4 (External Antenna)

Operating Mode	Channel frequency (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manfacturer's tune-up info (dB)	Antenna Gain (dBi)	Path Loss module to ext. antenna connector according manufacturer (dB)	Maximum delivered EIRP power: (dBm)	Maximum delivered EIRP-power: (W)	Duty-Cycle (%)	Maximum delivered EIRP-power incl. Duty-Cyle: (W)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
FDD Band 4 (RMC 99)	1712,4	24,0	0,5	4,4	4,2	24,7	0,295	100%	0,2951209	4,2460	0,5871	3,6589	0,138276647	0,138276647
	1732,5	24,0	0,5	4,4	4,2	24,7	0,295		0,2951209	4,2800	0,5871	3,6929	0,137178280	
	1752,6	24,0	0,5	4,4	4,2	24,7	0,295		0,2951209	4,3139	0,5871	3,7268	0,136101157	
LTE Band 4 (QPSK, #1RB RMS-Value)	1710,7	23,0	0,5	4,4	4,2	23,7	0,234	100%	0,2344229	4,2431	0,4664	3,7768	0,109911626	0,109911626
	1732,5	23,0	0,5	4,4	4,2	23,7	0,234		0,2344229	4,2800	0,4664	3,8136	0,108964581	
	1754,3	23,0	0,5	4,4	4,2	23,7	0,234		0,2344229	4,3167	0,4664	3,8504	0,108037386	
LTE Band 4 (16QAM, #1RB RMS-Value)	1710,7	23,0	0,5	4,4	4,2	23,7	0,234	100%	0,2344229	4,2431	0,4664	3,7768	0,109911626	
	1732,5	23,0	0,5	4,4	4,2	23,7	0,234		0,2344229	4,2800	0,4664	3,8136	0,108964581	
	1754,3	23,0	0,5	4,4	4,2	23,7	0,234		0,2344229	4,3167	0,4664	3,8504	0,108037386	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	4,2431	[W/cm^2]
Highest MPE value within frequency-band:	0,5871	[W/cm^2]
Lowest margin to limit within frequency-band:	3,6589	[W/cm^2]

4.5.3.3. Results for upper operational band: FDD Band 2, LTE Band 2 and GSM1900 (External Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer's tune-up info (dB)	Antenna Gain (dBi)	Path Loss module to ext. antenna connector according manufacturer (dB)	Maximum delivered antenna power: (dBm)	Duty-Cycle	Maximum delivered power to Antenna: (W)	Maximum delivered power to Antenna incl. Duty-Cyle: (W)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
GSM/GPRS (PK-Burst value)	1850,2	28,0	0,5	5,1	5,0	28,6	50%	0,7244	0,3622	4,4766	0,7206	3,7560	0,16097091	0,1609709
	1880,0	28,0	0,5	5,1	5,0	28,6		0,7244	0,3622	4,5258	0,7206	3,8052	0,15922277	
	1909,8	28,0	0,5	5,1	5,0	28,6		0,7244	0,3622	4,5747	0,7206	3,8541	0,15752066	
EDGE (PK-Burst value)	1850,2	26,0	0,5	5,1	5,0	26,6	50%	0,4571	0,2285	4,4766	0,4547	4,0220	0,10156578	
	1880,0	26,0	0,5	5,1	5,0	26,6		0,4571	0,2285	4,5258	0,4547	4,0711	0,10046278	
	1909,8	26,0	0,5	5,1	5,0	26,6		0,4571	0,2285	4,5747	0,4547	4,1200	0,09938882	
W-CDMA FDD Band 2 (RMS-Value)	1852,4	24,0	0,5	5,1	5,0	24,6	100%	0,2884	0,2884	4,4803	0,5738	3,9065	0,12806330	0,1280633
	1880,0	24,0	0,5	5,1	5,0	24,6		0,2884	0,2884	4,5258	0,5738	3,9520	0,12677545	
	1907,6	24,0	0,5	5,1	5,0	24,6		0,2884	0,2884	4,5711	0,5738	3,9973	0,12551904	
LTE Band 2 (QPSK, #1RB, RMS-Value)	1850,7	23,0	0,5	5,1	5,0	23,6	100%	0,2291	0,2291	4,4775	0,4558	4,0217	0,10178815	0,1017881
	1880,0	23,0	0,5	5,1	5,0	23,6		0,2291	0,2291	4,5258	0,4558	4,0700	0,10070132	
	1909,3	23,0	0,5	5,1	5,0	23,6		0,2291	0,2291	4,5739	0,4558	4,1181	0,09964264	
LTE Band 2 (16QAM, #1RB, RMS-Value)	1850,7	23,0	0,5	5,1	5,0	23,6	100%	0,2291	0,2291	4,4775	0,4558	4,0217	0,10178815	
	1880,0	23,0	0,5	5,1	5,0	23,6		0,2291	0,2291	4,5258	0,4558	4,0700	0,10070132	
	1909,3	23,0	0,5	5,1	5,0	23,6		0,2291	0,2291	4,5739	0,4558	4,1181	0,09964264	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	4,4766	[W/m^2]
Highest MPE value within frequency-band:	0,7206	[W/m^2]
Lowest margin to limit within frequency-band:	3,7560	[W/m^2]

4.5.3.4. Results for WLAN 2.4GHz

Operation Mode	Frequency on channel (MHz)	Declared measured conducted output power (dBm)	Max. positive tolerance according manfacturer's tune-up info (dB)	Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	Calculated maximum EIRP (declared+ Tune-up+ antenna Gain+ path loss) (dBm)	Duty-Cycle	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (W)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
WLAN 2.4GHz	2412,0	21,57	0,50	7,40	5,60	23,87	100%	0,2438	0,244	5,3660	0,4850	4,8810	0,09038	0,09038
	2437,0	21,57	0,50	7,40	5,60	23,87	100%	0,2438	0,244	5,4040	0,4850	4,9190	0,08975	
	2462,0	21,57	0,50	7,40	5,60	23,87	100%	0,2438	0,244	5,4418	0,4850	4,9568	0,08912	

Maximum calculated MPE value:		
	2.4GHz Band	
Lowest MPE-Limit:	5,3660	[W/m^2]
Highest MPE value:	0,4850	[W/m^2]
Lowest margin to limit	4,8810	[W/m^2]

4.5.3.5. Results for WLAN 5GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	13,51	0,5	8,30	7,40	14,91	100%	0,031	30,97	9,0471	0,0616	8,9855	0,0068	0,0068
	5200,0	13,51	0,5	8,30	7,40	14,91	100%	0,031	30,97	9,0709	0,0616	9,0093	0,0068	
	5240,0	13,51	0,5	8,30	7,40	14,91	100%	0,031	30,97	9,1186	0,0616	9,0569	0,0068	
W-LAN 5GHz (20MHZ BW)	5260,0	13,17	0,5	8,30	7,40	14,57	100%	0,029	28,64	9,1423	0,0570	9,0854	0,0062	0,0062
	5280,0	13,17	0,5	8,30	7,40	14,57	100%	0,029	28,64	9,1661	0,0570	9,1091	0,0062	
	5320,0	13,17	0,5	8,30	7,40	14,57	100%	0,029	28,64	9,2135	0,0570	9,1565	0,0062	
W-LAN 5GHz (20MHZ BW)	5500,0	12,94	0,5	8,30	7,40	14,34	100%	0,027	27,16	9,4254	0,0540	9,3713	0,0057	0,0057
	5580,0	12,94	0,5	8,30	7,40	14,34	100%	0,027	27,16	9,5189	0,0540	9,4648	0,0057	
	5700,0	12,94	0,5	8,30	7,40	14,34	100%	0,027	27,16	9,6583	0,0540	9,6043	0,0056	
W-LAN 5GHz (20MHZ BW)	5745,0	13,21	0,5	8,30	7,40	14,61	100%	0,029	28,91	9,7103	0,0575	9,6528	0,0059	0,0059
	5785,0	13,21	0,5	8,30	7,40	14,61	100%	0,029	28,91	9,7565	0,0575	9,6990	0,0059	
	5825,0	13,21	0,5	8,30	7,40	14,61	100%	0,029	28,91	9,8025	0,0575	9,7450	0,0059	

Maximum calculated MPE value:		
5GHz		
Lowest MPE-Limit:	9,0471	[W/m^2]
Highest MPE-value:	0,0616	[W/m^2]
Margin to limit	8,9855	[W/m^2]

4.5.3.6. MPE results for co-location (External Antenna)

		GSM/ G-PRS/ E-GPRS Band-850	W-CDMA Band 5	LTE- Band 5	LTE Band 17	FDD Band 4	LTE Band 4	GSM/GPRS/ E-GPRS Band 1900	W-CDMA Band 2	LTE Band 2
	Ratio of MPE-Value/Limit	0,905207127	0,360567675	0,286812426	0,31879492	0,138276647	0,109911626	0,160970913	0,128063304	0,101788147
W-LAN 2.4GHz	0,090381178	0,99558831	0,45094885	0,377193604	0,409176098	0,228657825	0,200292804	0,25135209	0,21844448	0,19216932
W-LAN 5GHz	0,00681117	0,9120183	0,36737884	0,293623596	0,325606089	0,145087816	0,116722796	0,16778208	0,13487447	0,10859932
Maximum-Value		0,9955883								

4.5.4.1. Results for lower operational band: LTE Band 5 and LTE Band 12, GSM850 and FDD Band 5 (Backup Antenna)

Operating Mode	Channel frequency (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer's tune-up info (dB)	Antenna Gain (dBi)	Ext. Path Loss to antenna (external cables) (dB)	Power: (EIRP) (dBm)	Duty-Cycle %	Maximum delivered power: (EIRP) (W)	Power incl. Duty-Cyle: (EIRP) (W)	MPE Limit accord. Table 4 (EIRP-Limit) (W/m^2)	MPE-Value (EIRP refered) (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
GSM/GPRS (Avg. Burst Power)	824,2	31,0	0,5	-2,9	0,0	28,6	50%	0,7244	0,3622	2,5760	0,7206	**1,8554**	0,2797	0,279736
	837,0	31,0	0,5	-2,9	0,0	28,6	50%	0,7244	0,3622	2,6033	0,7206	**1,8827**	0,2768	
	848,8	31,0	0,5	-2,9	0,0	28,6	50%	0,7244	0,3622	2,6283	0,7206	**1,9077**	0,2742	
EDGE (Avg. Burst Power)	824,2	27,0	0,5	-2,9	0,0	24,6	50%	0,2884	0,1442	2,5760	0,2869	**2,2892**	0,1114	
	837,0	27,0	0,5	-2,9	0,0	24,6	50%	0,2884	0,1442	2,6033	0,2869	**2,3164**	0,1102	
	848,8	27,0	0,5	-2,9	0,0	24,6	50%	0,2884	0,1442	2,6283	0,2869	**2,3415**	0,1091	
WCDMA FDD Band 5 (RMS-Value)	826,4	24,0	0,5	-2,9	0,0	21,6	100%	0,1445	0,1445	2,5807	0,2876	**2,2932**	0,111426	0,111426
	837,0	24,0	0,5	-2,9	0,0	21,6	100%	0,1445	0,1445	2,6033	0,2876	**2,3158**	0,110460	
	846,6	24,0	0,5	-2,9	0,0	21,6	100%	0,1445	0,1445	2,6237	0,2876	**2,3361**	0,109602	
LTE Band 5 (QPSK, #RB=1, RMS-Value)	824,7	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,5771	0,2284	**2,3487**	0,088634	0,088634
	836,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,6022	0,2284	**2,3738**	0,087777	
	848,3	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,6273	0,2284	**2,3989**	0,086941	
LTE Band 5 (16QAM, #RB=1, RMS-Value)	824,7	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,5771	0,2284	**2,3487**	0,088634	
	836,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,6022	0,2284	**2,3738**	0,087777	
	848,3	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,6273	0,2284	**2,3989**	0,086941	
LTE Band 17 (QPSK, #RB=1, RMS-Value)	706,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3186	0,2284	**2,0901**	0,098517	0,098517
	710,0	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3264	0,2284	**2,0980**	0,098185	
	713,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3342	0,2284	**2,1058**	0,097855	
LTE Band 17 (16QAM, #RB=1, RMS-Value)	706,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3186	0,2284	**2,0901**	0,098517	
	710,0	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3264	0,2284	**2,0980**	0,098185	
	713,5	23,0	0,5	-2,9	0,0	20,6	100%	0,1148	0,1148	2,3342	0,2284	**2,1058**	0,097855	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	**2,3186**	**[W/m^2]**
Highest MPE value within frequency-band:	**0,7206**	**[W/m^2]**
Lowest margin to limit within frequency-band:	**1,8554**	**[W/m^2]**

4.5.4.2. Results for upper operational band: FDD Band 4 and LTE Band 4 (Backup Antenna)

Operating Mode	Channel frequency (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manfacturer's tune-up info (dB)	Antenna Gain (dBi)	Path Loss module to ext. antenna connector according manufacturer (dB)	Maximum delivered EIRP power: (dBm)	Maximum delivered EIRP-power: (W)	Duty-Cycle (%)	Maximum delivered EIRP-power incl. Duty-Cyle: (W)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
FDD Band 4 (RMC 99)	1712,4	24,0	0,5	2,5	0,0	27,0	0,501	100%	0,5011872	4,2460	0,9971	3,2489	0,234827438	0,234827438
	1732,5	24,0	0,5	2,5	0,0	27,0	0,501		0,5011872	4,2800	0,9971	3,2829	0,232962143	
	1752,6	24,0	0,5	2,5	0,0	27,0	0,501		0,5011872	4,3139	0,9971	3,3168	0,231132925	
LTE Band 4 (QPSK, #1RB RMS-Value)	1710,7	23,0	0,5	2,5	0,0	26,0	0,398	100%	0,3981072	4,2431	0,7920	3,4511	0,186656721	0,186656721
	1732,5	23,0	0,5	2,5	0,0	26,0	0,398		0,3981072	4,2800	0,7920	3,4880	0,185048407	
	1754,3	23,0	0,5	2,5	0,0	26,0	0,398		0,3981072	4,3167	0,7920	3,5247	0,183473804	
LTE Band 4 (16QAM, #1RB RMS-Value)	1710,7	23,0	0,5	2,5	0,0	26,0	0,398	100%	0,3981072	4,2431	0,7920	3,4511	0,186656721	
	1732,5	23,0	0,5	2,5	0,0	26,0	0,398		0,3981072	4,2800	0,7920	3,4880	0,185048407	
	1754,3	23,0	0,5	2,5	0,0	26,0	0,398		0,3981072	4,3167	0,7920	3,5247	0,183473804	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	4,2431	[W/cm^2]
Highest MPE value within frequency-band:	0,9971	[W/cm^2]
Lowest margin to limit within frequency-band:	3,2489	[W/cm^2]

4.5.4.3. Results for upper operational band: FDD Band 2, LTE Band 2 and GSM1900 (Backup Antenna)

Operating Mode	Frequency on channel (MHz)	Declared maximum conducted output power (dBm)	Max. positive tolerance according manufacturer's tune-up info (dB)	Antenna Gain (dBi)	Path Loss module to ext. antenna connector according manufacturer (dB)	Maximum delivered antenna power: (dBm)	Duty-Cycle	Maximum delivered power to Antenna: (W)	Maximum delivered power to Antenna incl. Duty-Cyle: (W)	MPE Limit accord. Table 4 (W/m^2)	MPE-Value (W/m^2)	Margin (W/m^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
GSM/GPRS (PK-Burst value)	1850,2	28,0	0,5	2,5	0,0	31,0	50%	1,2589	0,6295	4,4766	1,2523	3,2244	0,27973539	0,2797354
	1880,0	28,0	0,5	2,5	0,0	31,0		1,2589	0,6295	4,5258	1,2523	3,2735	0,27669746	
	1909,8	28,0	0,5	2,5	0,0	31,0		1,2589	0,6295	4,5747	1,2523	3,3224	0,27373954	
EDGE (PK-Burst value)	1850,2	26,0	0,5	2,5	0,0	29,0	50%	0,7943	0,3972	4,4766	0,7901	3,6865	0,17650110	
	1880,0	26,0	0,5	2,5	0,0	29,0		0,7943	0,3972	4,5258	0,7901	3,7357	0,17458430	
	1909,8	26,0	0,5	2,5	0,0	29,0		0,7943	0,3972	4,5747	0,7901	3,7846	0,17271797	
W-CDMA FDD Band 2 (RMS-Value)	1852,4	24,0	0,5	2,5	0,0	27,0	100%	0,5012	0,5012	4,4803	0,9971	3,4832	0,22254852	0,2225485
	1880,0	24,0	0,5	2,5	0,0	27,0		0,5012	0,5012	4,5258	0,9971	3,5287	0,22031049	
	1907,6	24,0	0,5	2,5	0,0	27,0		0,5012	0,5012	4,5711	0,9971	3,5740	0,21812710	
LTE Band 2 (QPSK, #1RB, RMS-Value)	1850,7	23,0	0,5	2,5	0,0	26,0	100%	0,3981	0,3981	4,4775	0,7920	3,6855	0,17688753	0,1768875
	1880,0	23,0	0,5	2,5	0,0	26,0		0,3981	0,3981	4,5258	0,7920	3,7338	0,17499884	
	1909,3	23,0	0,5	2,5	0,0	26,0		0,3981	0,3981	4,5739	0,7920	3,7819	0,17315907	
LTE Band 2 (16QAM, #1RB, RMS-Value)	1850,7	23,0	0,5	2,5	0,0	26,0	100%	0,3981	0,3981	4,4775	0,7920	3,6855	0,17688753	
	1880,0	23,0	0,5	2,5	0,0	26,0		0,3981	0,3981	4,5258	0,7920	3,7338	0,17499884	
	1909,3	23,0	0,5	2,5	0,0	26,0		0,3981	0,3981	4,5739	0,7920	3,7819	0,17315907	

Maximum calculated MPE value:		
Lowest MPE-Limit within frequency-band:	4,4766	[W/m^2]
Highest MPE value within frequency-band:	1,2523	[W/m^2]
Lowest margin to limit within frequency-band:	3,2244	[W/m^2]

4.5.4.4. Results for WLAN 2.4GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manfacturer (dB)	Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	Declared maximum EIRP (Measured+ Tune-up) (dBm)	Duty cycle %	Declared Maximum conducted output power (W)	Equivalent conducted output power (output power x duty cycle) (mW)	MPE Limit accord. Table 1 (mW/cm^2)	MPE-Value (mW/cm^2)	Margin to Limit:	Fraction for Co-Location calculations	Max. Fraction-Value within Frequency-Band
W-LAN or Bluetooth or Zigbee 2.4GHz	2412,0	21,57	0,5	7,4	5,6	23,87	100%	0,2438	243,8	1,0000	0,0485	0,9515	0,048499	0,0484987
	2437,0	21,57	0,5	7,4	5,6	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	
	2462,0	21,57	0,5	7,4	5,6	23,87		0,2438	243,8	1,0000	0,0485	0,9515	0,048499	

Maximum calculated MPE value:		
Lowest MPE-Limit:	1,0000	[mW/cm^2]
Highest MPE value:	0,0485	[mW/cm^2]
Lowest Margin to limit:	0,9515	[mW/cm^2]

4.5.4.5. Results for WLAN 5GHz

Operation Mode	Frequency on channel (MHz)	Measured maximum conducted output power (dBm)	Max. positive tolerance according manufacturer 's tune-up info (dB)	Declared Antenna Gain (dBi)	Path Loss to ext. antenna connector according manufacturer (dB)	EIRP (dBm)	Duty cycle (%)	Maximum EIRP (W)	Equivalent EIRP (EIRP x duty cycle) (mW)	MPE-Value (mW/cm^2)	MPE-Value (mW/cm^2)	Margin (mW/cm^2)	Fraction for Co-location calculations	Maximum Fraction Value within Frequency band
W-LAN 5GHz (20MHZ BW)	5180,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	0,0062
	5200,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
	5240,0	13,51	0,50	8,30	7,40	14,91	100%	0,031	30,97	1,0000	0,00616	0,9938	0,0062	
W-LAN 5GHz (20MHZ BW)	5260,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	0,0057
	5280,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
	5320,0	13,17	0,50	8,30	7,40	14,57	100%	0,029	28,64	1,0000	0,00570	0,9943	0,0057	
W-LAN 5GHz (20MHZ BW)	5500,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	0,0054
	5580,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
	5700,0	12,94	0,50	8,30	7,40	14,34	100%	0,027	27,16	1,0000	0,00540	0,9946	0,0054	
W-LAN 5GHz (20MHZ BW)	5745,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	0,0058
	5785,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	
	5825,0	13,21	0,50	8,30	7,40	14,61	100%	0,029	28,91	1,0000	0,00575	0,9942	0,0058	

Maximum calculated MPE value:		
5GHz		
Lowest MPE-Limit:	1,0000	[W/m^2]
Highest MPE-value:	0,0062	[W/m^2]
Margin to limit	0,9938	[W/m^2]

4.5.4.6. MPE results for co-location (Backup Antenna)

		GSM/ G-PRS/ E-GPRS Band-850	W-CDMA Band 5	LTE- Band 5	LTE Band 17	FDD Band 4	LTE Band 4	GSM/GPRS/ E-GPRS Band 1900	W-CDMA Band 2	LTE Band 2
	Ratio of MPE-Value/Limit	0,279735745	0,111426064	0,088633513	0,098517048	0,234827438	0,186656721	0,279735386	0,222548516	0,176887526
W-LAN 2.4GHz	0,090381178	0,37011692	0,20180724	0,179014691	0,188898226	0,325208616	0,277037899	0,37011656	0,31292969	0,2672687
W-LAN 5GHz	0,00681117	0,28654691	0,11823723	0,095444683	0,105328218	0,241638607	0,193467891	0,28654656	0,22935969	0,1836987
Maximum-Value		0,3701169								

4.6. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

The measurement results comply with the ISED Limit per RSS-102, Issue 5 for the uncontrolled RF Exposure of mobile device.

4.7. Measurement uncertainties

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved.
For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it's contribution to the overall uncertainty according it's statistical distribution calculated.

Following table shows expectable uncertainties for each measurement type performed.

RF-Measurement	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%						Remarks
Conducted emissions (U_{CISPR})	CISPR 16-2-1	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dB 3.6 dB						-
Radiated emissions Enclosure	CISPR 16-2-3	30 MHz - 1 GHz 1 GHz - 18 GHz	4.2 dB 5.1 dB						E-Field
Disturbance power	CISPR 16-2-2	30 MHz - 300 MHz	-						-
Power Output radiated	-	30 MHz - 4 GHz	3.17 dB						Substitution method
Power Output conducted	-	Set-up No.	Cel-C1	Cel-C2	BT1	W1	W2		
		9 kHz - 12.75 GHz	N/A	0.60	--	--	--		-
		12.75 - 26.5GHz	N/A	0.82	--	--	--		
Conducted emissions on RF-port	-	9 kHz - 2.8 GHz	0.70	N/A	--	--	--		N/A - not applicable
		2.8 GHz - 12.75GHz	1.48	N/A	--	--	--		
		12.75 GHz - 18GHz	1.81	N/A	--	--	--		
		18 GHz - 26.5GHz	1.83	N/A	--	--	--		
Occupied bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
			1.0 dB						Power
Emission bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
	-		See above: 0.70 dB						Power
Frequency stability	-	9 kHz - 20 GHz	0.0636 ppm						-
Radiated emissions Enclosure	-	150 kHz - 30 MHz 30 MHz - 1 GHz 1 GHz - 20 GHz	5.0 dB 4.2 dB 3.17 dB						Magnetic field E-field Substitution

Table: measurement uncertainties, valid for conducted/radiated measurements

5. Abbreviations used in this report

The abbreviations	
ANSI	American National Standards Institute
AV , AVG, CAV	Average detector
EIRP	Equivalent isotropically radiated power, determined within a separate measurement
EGPRS	Enhanced General Packet Radio Service
EUT	Equipment Under Test
FCC	Federal Communications Commission, USA
IC	Industry Canada
n.a.	not applicable
Op-Mode	Operating mode of the equipment
PK	Peak
RBW	resolution bandwidth
RF	Radio frequency
RSS	Radio Standards Specification, Dokuments from Industry Canada
Rx	Receiver
TCH	Traffic channel
Tx	Transmitter
QP	Quasi peak detector
VBW	Video bandwidth
ERP	Effective radiated power

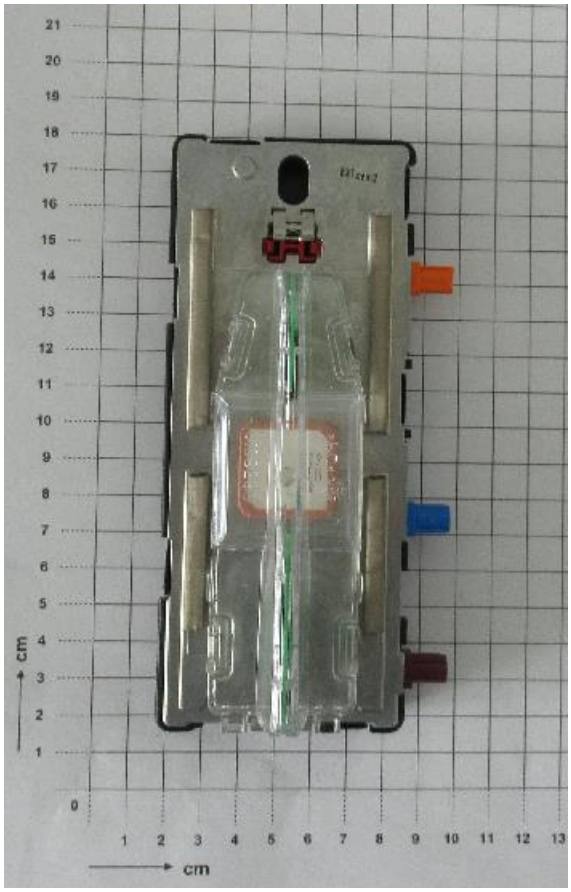
6. Accreditation details of CETECOM's laboratories and test sites

Ref.-No.	Accreditation Certificate	Valid for laboratory area or test site	Accreditation Body
-	D-PL-12047-01-01	All laboratories and test sites of CETECOM GmbH, Essen	DAkkS, Deutsche Akkreditierungsstelle GmbH
337 487 558 348 348	MRA US-EU 0003	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	FCC, Federal Communications Commission Laboratory Division, USA
337 487 550 558	3462D-1 3462D-2 3462D-2 3462D-3	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR)	IC, Industry Canada Certification and Engineering Bureau
487 550 348 348	R-2666 G-301 C-2914 T-1967	Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan
OATS = Open Area Test Site, SAR = Semi Anechoic Room, FAR = Fully Anechoic Room			

7. Photographs of the EUT's

Photograph 1: EUT A Top side

Photograph 2: AE1 Roof mounted Antenna top side



8. Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2018-10-11