

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR240400151405

Page: 1 of 15

RF EXPOSURE EVALUATION REPORT

Application No.: SZCR2404001514AT
Applicant: Quetel Wireless Solutions Company Limited
Address of Applicant: Building 5, Shanghai Business Park Phaselll (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233 China
Manufacturer: Quetel Wireless Solutions Company Limited
Address of Manufacturer: Building 5, Shanghai Business Park Phaselll (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233 China

Equipment Under Test (EUT):
EUT Name: 5G RedCap Sub-6 GHz Module
Model No.: RG255C-GL
Trade Mark: QUECTEL
FCC ID: XMR2024RG255CGL
Standard(s) : FCC Rules 47 CFR §2.1091
 KDB 447498 D04 interim General RF Exposure Guidance v01

Date of Receipt: 2024-04-24
Date of Evaluation: 2024-05-12 to 2024-06-15
Date of Issue: 2024-06-19


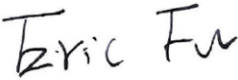
Evaluation Result:	Pass*
---------------------------	--------------

* In the configuration evaluated, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager



Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024-06-19		Original

Authorized for issue by:			
			
		Leo Lai/Project Engineer	
			
		Eric Fu/Reviewer	



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

2 Contents

	Page
1 Cover Page	1
2 Contents	3
3 General Information	4
3.1 General Description of E.U.T.	4
3.2 Details of E.U.T.	4
3.3 Separation Distance	8
3.4 Test Location	9
3.5 Test Facility	9
3.6 Deviation from Standards	9
3.7 Abnormalities from Standard Conditions	9
4 FCC Radiofrequency radiation exposure limits	10
4.1 Blanket 1 mW Blanket Exemption	10
4.2 MPE-based Exemption	10
4.3 SAR-based Exemption	11
5 Measurement and Calculation	14
5.1 Maximum transmit power	14
5.2 RF Exposure Calculation	15



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

3 General Information

3.1 General Description of E.U.T.

Product Type:	<input type="checkbox"/> Portable device
	<input checked="" type="checkbox"/> Mobile device
	<input type="checkbox"/> Fixed device

3.2 Details of E.U.T.

Power supply:	Power from the Mainboard: Mainboard Power by DC 5V 2A from DC Port. Adapter model: P12F050200 Input: 100-240V~50/60Hz, 0.3A Output: DC 5V2A
Cable Loss (for RF conducted test):	1dB

Characteristics	Description		
Radio System Type	<input checked="" type="checkbox"/> LTE		
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM		
Supported Frequency Range	Band	TX	RX
	LTE Band 2	1850 to 1910 MHz	1930 to 1990 MHz
	LTE Band 4	1710 to 1755 MHz	2110 to 2155 MHz
	LTE Band 5	824 to 849 MHz	869 to 894 MHz
	LTE Band 7	2500 to 2570 MHz	2620 to 2690 MHz
	LTE Band 12	699 to 716 MHz	729 to 746 MHz
	LTE Band 13	777 to 787 MHz	746 to 756 MHz
	LTE Band 14	788 to 798 MHz	758 to 768 MHz
	LTE Band 17	704 to 716 MHz	734 to 746 MHz
	LTE Band 25	1850 to 1915MHz	1930 to 1995 MHz
	LTE Band 26 (814 to 824 MHz)	814 to 824MHz	859 to 869 MHz
	LTE Band 26 (824 to 849 MHz)	824 to 849 MHz	869 to 894 MHz
	LTE Band 30	2305 to 2315 MHz	2350 to 2360 MHz
LTE Band 38	2570 to 2620 MHz	2570 to 2620 MHz	



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
 中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

	LTE Band 41	2496 to 2690MHz		2496 to 2690MHz	
	LTE Band 42	3450 to 3550 MHz		3450 to 3550 MHz	
	LTE Band 42_ Part96	3550 to 3600 MHz		3550 to 3600 MHz	
	LTE Band 43	3700 to 3800 MHz		3700 to 3800 MHz	
	LTE Band 43_ Part96	3600 to 3700 MHz		3600 to 3700 MHz	
	LTE Band 48	3550 to 3700 MHz		3550 to 3700 MHz	
	LTE Band 66	1710 to 1780 MHz		2110 to 2200 MHz	
	LTE Band 70	1695 to 1710 MHz		1995 to 2020 MHz	
	LTE Band 71	663 to 698 MHz		617 to 652 MHz	
Supported Channel Bandwidth	LTE Band 2	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
		<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz		
	LTE Band 4	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
		<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz		
	LTE Band 5	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
	LTE Band 7	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	LTE Band 12	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
	LTE Band 13	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	LTE Band 14	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	LTE Band 17	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	LTE Band 25	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
		<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz		
	LTE Band 26(814-824)	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
	LTE Band 26(824-849)	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz
		<input checked="" type="checkbox"/> 15 MHz			
	LTE Band30	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	LTE Band38	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	LTE Band41	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	LTE Band42	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	LTE Band43	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
LTE Band48	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	
LTE Band66	<input checked="" type="checkbox"/> 1.4 MHz	<input checked="" type="checkbox"/> 3 MHz	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	
	<input checked="" type="checkbox"/> 15MHz	<input checked="" type="checkbox"/> 20MHz			
LTE Band70	<input checked="" type="checkbox"/> 5MHz	<input checked="" type="checkbox"/> 10MHz	<input checked="" type="checkbox"/> 15MHz		



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR240400151405

Page: 6 of 15

	LTE Band71	<input checked="" type="checkbox"/> 5MHz	<input checked="" type="checkbox"/> 10MHz	<input checked="" type="checkbox"/> 15MHz	<input checked="" type="checkbox"/> 20MHz
--	------------	--	---	---	---

Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated																					
HPUE Power Class:	Class 3 Class 2: LTE Band 38, 41, 42, 43																					
Antenna Gain:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">B2: 1.8dBi</td> <td style="width: 33%;">B17: -0.5dBi</td> <td style="width: 33%;">B43: -7.10dBi</td> </tr> <tr> <td>B4: 1.2dBi</td> <td>B25: 1.8dBi</td> <td>B48: -6.12dBi</td> </tr> <tr> <td>B5: 0.3dBi</td> <td>B26: 0.3dBi</td> <td>B66: 1.5dBi</td> </tr> <tr> <td>B7: 1.4dBi</td> <td>B30: -5.7dBi</td> <td>B70: 1.1dBi</td> </tr> <tr> <td>B12: -0.5dBi</td> <td>B38: 1.4dBi</td> <td>B71: -0.9dBi</td> </tr> <tr> <td>B13: -0.7dBi</td> <td>B41: 1.4dBi</td> <td></td> </tr> <tr> <td>B14: -0.5dBi</td> <td>B42: -2.01dBi</td> <td></td> </tr> </table> <p>Note: The antenna gain are derived from the gain information report provided by the manufacturer.</p>	B2: 1.8dBi	B17: -0.5dBi	B43: -7.10dBi	B4: 1.2dBi	B25: 1.8dBi	B48: -6.12dBi	B5: 0.3dBi	B26: 0.3dBi	B66: 1.5dBi	B7: 1.4dBi	B30: -5.7dBi	B70: 1.1dBi	B12: -0.5dBi	B38: 1.4dBi	B71: -0.9dBi	B13: -0.7dBi	B41: 1.4dBi		B14: -0.5dBi	B42: -2.01dBi	
B2: 1.8dBi	B17: -0.5dBi	B43: -7.10dBi																				
B4: 1.2dBi	B25: 1.8dBi	B48: -6.12dBi																				
B5: 0.3dBi	B26: 0.3dBi	B66: 1.5dBi																				
B7: 1.4dBi	B30: -5.7dBi	B70: 1.1dBi																				
B12: -0.5dBi	B38: 1.4dBi	B71: -0.9dBi																				
B13: -0.7dBi	B41: 1.4dBi																					
B14: -0.5dBi	B42: -2.01dBi																					

Characteristics	Description		
Radio System Type	<input checked="" type="checkbox"/> SA <input type="checkbox"/> NSA		
Modulation Type	DFT-s-Pi/2-BPSK, DFT-s-QPSK, DFT-s-16QAM, DFT-s-64QAM, DFT-s-256QAM, CP-QPSK, CP-16QAM, CP-64QAM, CP-256QAM		
Supported Frequency Range	Band	TX	RX
	NR Band n2	1850 to 1910 MHz	1930 to 1990 MHz
	NR Band n5	824 to 849 MHz	869 to 894 MHz
	NR Band n7	2500 to 2570 MHz	2620 to 2690 MHz
	NR Band n12	699 to 716 MHz	729 to 746 MHz
	NR Band n13	777 to 787 MHz	746 to 756 MHz
	NR Band n14	788 to 798 MHz	758 to 768 MHz
	NR Band n25	1850 to 1915MHz	1930 to 1995 MHz
	NR Band n26 (814 to 824 MHz)	814 to 824MHz	859 to 869 MHz
	NR Band n26 (824 to 849 MHz)	824 to 849 MHz	869 to 894 MHz
	NR Band n30	2305 to 2315 MHz	2350 to 2360 MHz
	NR Band n38	2570 to 2620 MHz	2570 to 2620 MHz
	NR Band n41	2496 to 2690 MHz	2496 to 2690 MHz



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
 中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

	NR Band n66	1710 to 1780 MHz	2110 to 2200 MHz		
	NR Band n70	1695 to 1710 MHz	1995 to 2020 MHz		
	NR Band n71	663 to 698 MHz	617 to 652 MHz		
	NR Band n77	3700 to 3980 MHz	3700 to 3980 MHz		
		3450 to 3550 MHz	3450 to 3550 MHz		
	NR Band n78	3700 to 3800 MHz	3700 to 3800 MHz		
3450 to 3550 MHz		3450 to 3550 MHz			
Supported Channel Bandwidth	NR Band n2	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	NR Band n5	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	NR Band n7	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	NR Band n12	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	
	NR Band n13	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	NR Band n14	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	NR Band n25	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	NR Band n26 (814 to 824 MHz)	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
	NR Band n26 (824 to 849 MHz)	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
	NR Band n30	SCS 15kHz:			
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz		
NR Band n38	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz		
NR Band n41	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz		
NR Band n66	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

	NR Band n70	SCS 15kHz:																								
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz																						
	NR Band n71	SCS 15kHz:																								
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz																					
	NR Band n77	SCS 30kHz																								
		<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz																						
	NR Band n78	SCS 30kHz																								
		<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz																						
HPUE Power Class:	Class 3 Class 2: NR Band 38, 41, 77, 78																									
Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated																									
Antenna Gain:	<table border="0"> <tr> <td>n2: 1.8dBi</td> <td>n26: 0.3dBi</td> <td>n71: -0.9dBi</td> </tr> <tr> <td>n5: 0.3dBi</td> <td>n30: -5.7dBi</td> <td>n77: -0.64dBi</td> </tr> <tr> <td>n7: 1.4dBi</td> <td>n38: 1.4dBi</td> <td>n78: -0.64dBi</td> </tr> <tr> <td>n12: -0.5dBi</td> <td>n41: 1.4dBi</td> <td></td> </tr> <tr> <td>n13: -0.7dBi</td> <td>n66: 1.5dBi</td> <td></td> </tr> <tr> <td>n14: -0.5dBi</td> <td>n70: 1.1dBi</td> <td></td> </tr> <tr> <td>n25: 1.8dBi</td> <td></td> <td></td> </tr> </table>					n2: 1.8dBi	n26: 0.3dBi	n71: -0.9dBi	n5: 0.3dBi	n30: -5.7dBi	n77: -0.64dBi	n7: 1.4dBi	n38: 1.4dBi	n78: -0.64dBi	n12: -0.5dBi	n41: 1.4dBi		n13: -0.7dBi	n66: 1.5dBi		n14: -0.5dBi	n70: 1.1dBi		n25: 1.8dBi		
n2: 1.8dBi	n26: 0.3dBi	n71: -0.9dBi																								
n5: 0.3dBi	n30: -5.7dBi	n77: -0.64dBi																								
n7: 1.4dBi	n38: 1.4dBi	n78: -0.64dBi																								
n12: -0.5dBi	n41: 1.4dBi																									
n13: -0.7dBi	n66: 1.5dBi																									
n14: -0.5dBi	n70: 1.1dBi																									
n25: 1.8dBi																										

3.3 Separation Distance

Minimum test separation distance:	20cm
<p>Remark: This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.</p>	



3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

3.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

3.6 Deviation from Standards

None

3.7 Abnormalities from Standard Conditions

None



4 FCC Radiofrequency radiation exposure limits

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

4.1 Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of §1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1-mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph §1.1307(b)(3)(ii)(A).

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

4.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table B.1—Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²

Subscripts L and H are low and high; λ is wavelength.
From §1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

The table applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are



based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in §1.1310 is necessary if the ERP of the device is greater than ERP_{20cm} in Formula (B.1) [repeated from §2.1091(c)(1); also in §1.1307(b)(1)(i)(B)].

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad \text{(B.1)}$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

Limit calculation			
Frequency range	Frequency(MHz)	$R(\lambda/2\pi)$ (m)	Threshold ERP(W)
300~1500MHz	915	0.0522	0.032
1500~100000MHz	2480	0.0193	0.007

4.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.



The SAR-based exemption formula of §1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

Example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance(mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Limit calculation				
Frequency range(GHz)	Frequency(GHz)	X	Distance(cm)	Pth (mW)
0.3~1.5	0.915	1.474	0.5	8.133
1.5~6	2.48	1.905	0.5	2.717



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

5 Measurement and Calculation

5.1 Maximum transmit power

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
LTE Band 2	1850.7	1.80	25.00	26.80	33.00	0.0952	1.0000	8.00	12.01	8.00	Pass
LTE Band 4	1710.7	1.20	25.00	26.20	30.00	0.0829	1.0000	5.00	12.01	5.00	Pass
LTE Band 5	824.7	0.30	25.00	23.15	38.45	0.0674	0.5498	15.60	9.41	9.41	Pass
LTE Band 7	2502.5	1.40	25.00	26.40	33.00	0.0868	1.0000	8.00	12.01	8.00	Pass
LTE Band 12	699.7	-0.50	25.00	22.35	34.77	0.0561	0.4665	11.92	8.70	8.70	Pass
LTE Band 13	779.5	-0.70	25.00	22.15	34.77	0.0535	0.5197	11.92	9.16	9.16	Pass
LTE Band 14	790.5	-0.50	25.00	22.35	34.77	0.0561	0.5270	11.92	9.23	9.23	Pass
LTE Band 17	706.5	-0.50	25.00	22.35	34.77	0.0561	0.4710	11.92	8.74	8.74	Pass
LTE Band 25	1850.7	1.80	25.00	26.80	33.00	0.0952	1.0000	8.00	12.01	8.00	Pass
LTE Band 26 (814-824)	814.7	0.30	25.00	23.15	NA	0.0674	0.5431	NA	9.36	9.36	Pass
LTE Band 26 (824-849)	824.7	0.30	25.00	23.15	38.45	0.0674	0.5498	15.60	9.41	9.41	Pass
LTE Band 30	2307.5	-5.70	24.00	18.30	23.98	0.0135	1.0000	-0.02	13.01	-0.02	Pass
LTE Band 38	2572.5	1.40	28.00	29.40	33.00	0.1733	1.0000	5.00	9.01	5.00	Pass
LTE Band 41	2498.5	1.40	28.00	29.40	33.00	0.1733	1.0000	5.00	9.01	5.00	Pass
LTE Band 42	3452.5	-2.01	28.00	25.99	30.00	0.0790	1.0000	2.00	9.01	2.00	Pass
LTE Band 42 Part96	3552.5	-6.12	28.00	21.88	23.00	0.0307	1.0000	-5.00	9.01	-5.00	Pass
LTE Band 43	3702.5	-7.10	28.00	20.90	30.00	0.0245	1.0000	2.00	9.01	2.00	Pass
LTE Band 43 Part96	3602.5	-6.12	28.00	21.88	23.00	0.0307	1.0000	-5.00	9.01	-5.00	Pass
LTE Band 48	3552.5	-6.12	25.00	18.88	23.00	0.0154	1.0000	-2.00	12.01	-2.00	Pass
LTE Band 66	1710.7	1.50	25.00	26.50	30.00	0.0889	1.0000	5.00	12.01	5.00	Pass
LTE Band 70	1697.5	1.10	25.00	26.10	30.00	0.0810	1.0000	5.00	12.01	5.00	Pass
LTE Band 71	665.5	-0.90	25.00	21.95	34.77	0.0511	0.4437	11.92	8.48	8.48	Pass

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Power (dBm)	EIRP(ERP) (dBm)	EIRP(ERP) Limit (dBm)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Gain according to EIRP(ERP) (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
NR Band n2	1852.5	1.80	25.00	26.80	33.00	0.0952	1.0000	8.00	12.01	8.00	Pass
NR Band n5	826.5	0.30	25.00	23.15	38.45	0.0674	0.5510	15.60	9.42	9.42	Pass
NR Band n7	2502.5	1.40	25.00	26.40	33.00	0.0868	1.0000	8.00	12.01	8.00	Pass
NR Band n12	701.5	-0.50	25.00	22.35	34.77	0.0561	0.4677	11.92	8.71	8.71	Pass
NR Band n13	779.5	-0.70	25.00	22.15	34.77	0.0535	0.5197	11.92	9.16	9.16	Pass
NR Band n14	790.5	-0.50	25.00	22.35	34.77	0.0561	0.5270	11.92	9.23	9.23	Pass
NR Band n25	1852.5	1.80	25.00	26.80	33.00	0.0952	1.0000	8.00	12.01	8.00	Pass
NR Band n26 (814-824)	816.5	0.30	25.00	23.15	NA	0.0674	0.5443	NA	9.37	9.37	Pass
NR Band n26 (824-849)	826.5	0.30	25.00	23.15	38.45	0.0674	0.5510	15.60	9.42	9.42	Pass
NR Band n30	2307.5	-5.70	24.00	18.30	23.98	0.0135	1.0000	-0.02	13.01	-0.02	Pass
NR Band n38	2580.0	1.40	28.00	29.40	33.00	0.1733	1.0000	5.00	9.01	5.00	Pass
NR Band n41	2506.02	1.40	28.00	29.40	33.00	0.1733	1.0000	5.00	9.01	5.00	Pass
NR Band n66	1712.5	1.50	25.00	26.50	30.00	0.0889	1.0000	5.00	12.01	5.00	Pass
NR Band n70	1697.5	1.10	25.00	26.10	30.00	0.0810	1.0000	5.00	12.01	5.00	Pass
NR Band n71	665.5	-0.90	25.00	21.95	34.77	0.0511	0.4437	11.92	8.48	8.48	Pass
NR Band n77 (3450-3550)	3460.02	-0.64	28.00	27.36	30.00	0.1083	1.0000	2.00	9.01	2.00	Pass
NR Band n77 (3700-3980)	3710.01	-0.64	28.00	27.36	30.00	0.1083	1.0000	2.00	9.01	2.00	Pass
NR Band n78 (3450-3550)	3710.01	-0.64	28.00	27.36	30.00	0.1083	1.0000	2.00	9.01	2.00	Pass
NR Band n78 (3700-3800)	3460.02	-0.64	28.00	27.36	30.00	0.1083	1.0000	2.00	9.01	2.00	Pass

Note: Refer to the Tune up procedure for EUT test Max Power Value.

The distance r calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <https://www.sgs.com/en/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
 中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

5.2 RF Exposure Calculation

Remark: we used the maximum power between the conducted power and ERP/EIRP to perform RF exposure exemption evaluation.

Standalone:

	Evaluation method	Exempt Limit(mW)	Verdict
<input type="checkbox"/>	Blanket 1 mW Blanket Exemption	1mW	N/A
<input type="checkbox"/>	MPE-based Exemption(ERP)	7mW(ERP)	N/A
<input checked="" type="checkbox"/>	SAR-based Exemption(P_{th})	3060	Yes

So, the device is to qualify for SAR test exemption, the exemption report is in lieu of the SAR report.

--End of the Report--

