

RF EXPOSURE REPORT

OF

Applicant: CALAMP WIRELESS NETWORKS CORPORATION
2200 Faraday Ave, Suite 220, Carlsbad, CA 92008

Product Name: LMU5541 Broadband Router/Tracker

Brand Name: CalAmp

Model No.: LMU5541LW

Model Difference: N/A

Report Number: ER/2019/C0118

FCC ID: APV-5541LW

IC: 5843C-5541LW

FCC Rule Part Part 2.1091

IC Rule: RSS-102 issue 5 Mar. 19, 2015

Issue Date: Feb. 04, 2020

We hereby certify that:

The above equipment was verified by SGS Taiwan Ltd. The evaluation in this report is in compliance with the above rule(s).

The results of this report relate only to the sample identified in this report.

John Teh

Approved By: _____
Yeh John / Asst. Manager



Testing Laboratory
0513

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

Revision History

| Report Number | Revision | Description | Issue Date | Remark |
|---------------|----------|-------------|---------------|-------------------------|
| ER/2019/C0118 | Rev.00 | Original. | Feb. 04, 2020 | Revised By: Stefanie Yu |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

Table of Contents

| | | |
|----------|--|-----------|
| 1 | DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) | 4 |
| 1.1 | GENERAL: | 4 |
| 1.2 | ANTENNA INFORMATION: | 5 |
| 1.3 | RATED POWER | 6 |
| 2 | FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE) | 10 |
| 2.1 | FCC STANDARD APPLICABLE..... | 10 |
| 2.2 | ISED STANDARD APPLICABLE..... | 11 |
| 2.3 | POWER DENSITY CALCULATION (WORST CASE) | 12 |
| 2.4 | COLLOCATED POWER DENSITY CALCULATION..... | 12 |
| 2.5 | MAXIMUM ALLOWABLE GAIN | 13 |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 General:

| | | |
|-------------------|--|--|
| Product Name: | LMU5541 Broadband Router/Tracker | |
| Brand Name: | CalAmp | |
| Model No.: | LMU5541LW | |
| Model Difference: | N/A | |
| Hardware Version: | Rev E | |
| Software Version: | LMU,166 V4.1a | |
| Power Supply: | 12Vdc from Car Battery & 3.7Vdc from Rechargeable Li-ion Battery | |
| | Battery: | Model No.: GSP633248, Supplier: N/A |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

1.2 Antenna Information:

1.2.1 BT / WLAN

| Antenna Type | Supplier | Antenna Part No. | Freq. (MHz) | Peak Antenna Gain (dBi) |
|--------------|----------|------------------|-------------|-------------------------|
| PIFA | TAOGLAS | MA284.LBIC.001 | 2.4GHz | -2.21 |

1.2.2 WLAN 5GHz

| Antenna Type | Supplier | Antenna Part No. | Frequency (MHz) | Peak Antenna Gain (dBi) |
|--------------|----------|------------------|-----------------|-------------------------|
| PIFA | TAOGLAS | MA284.LBIC.001 | 5725~5850 | -2.07 |

1.2.3 WWAN

| Antenna Type | Antenna Part No. |
|--------------|------------------|
| PIFA | MA284.LBIC.001 |

| Operating Frequency (MHz) | Peak Antenna Gain (dBi) | |
|---------------------------|-------------------------|------|
| GSM / GPRS / EDGE 850 | 824.2 ~ 848.8 | 3.35 |
| GSM / GPRS / EDGE 1900 | 1850.2 ~ 1909.8 | 4.63 |
| WCDMA / HSPA Band 2 | 1852.4 ~ 1907.6 | 4.63 |
| WCDMA / HSPA Band 4 | 1712.4 ~ 1752.6 | 4.69 |
| WCDMA / HSPA Band 5 | 826.4 ~ 846.6 | 3.35 |
| LTE-Band 2 | 1850.7 ~ 1909.3 | 4.63 |
| LTE-Band 4 | 1710.7 ~ 1754.3 | 4.69 |
| LTE-Band 5 | 824.7 ~ 848.3 | 3.35 |
| LTE-Band 7 | 2502.5 ~ 2567.5 | 4.22 |
| LTE-Band 12 | 699.7 ~ 715.3 | 2.98 |
| LTE-Band 13 | 779.5 ~ 784.5 | 2.98 |
| LTE-Band 25 | 1850.7 ~ 1914.3 | 4.63 |
| LTE-Band 26 | 824.7 ~ 848.3 | 3.35 |
| LTE-Band 26 Part 90 | 814.7 ~ 823.3 | 3.35 |
| LTE-Band 38 | 2572.5 ~ 2617.5 | 4.22 |
| LTE-Band 41 | 2498.5 ~ 2687.5 | 4.22 |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

1.3 Rated Power

1.3.1 2.4GHz

| Mode | Freq. Range (MHz) | Channels | Modulation Technology | Max Output Power (dBm) | Antenna Gain (dBi) | EIRP (dBm) | Worst Case |
|------------------|-------------------|---|------------------------------|------------------------|--------------------|--------------|------------|
| BR+EDR | 2402-2480 | 79 | GFSK + $\pi/4$ DQPSK + 8DPSK | -1.39 | -2.21 | -3.60 | |
| BLE | 2402-2480 | 40 | GFSK | -3.40 | | -5.61 | |
| 802.11b/g/n | 2412-2462 | 11 | DSSS & OFDM | 13.85 | | 11.64 | V |
| Modulation type: | | CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM | | | | | |

1.3.2 WLAN 5GHz:

| 802.11 | Freq. Range (MHz) | Max. Output Power (dBm) | Antenna Gain (dBi) | EIRP (dBm) | Worst Case |
|-----------------|-------------------|-----------------------------------|--------------------|--------------|------------|
| a | 5725~5850 | 13.97 | -2.07 | 11.90 | V |
| n/ac_20 | 5725~5850 | 11.97 | -2.07 | 9.90 | |
| n/ac_40 | 5725~5850 | 11.94 | -2.07 | 9.87 | |
| ac_80 | 5725~5850 | 8.68 | -2.07 | 6.61 | |
| Modulation type | | 64QAM, 16QAM, QPSK, BPSK for OFDM | | | |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

1.3.3 WCDMA / LTE:

| Operating Frequency (MHz) | | | | Max. Output Power include tolerance (dBm) | Antenna Gain (dBi) | EIRP / ERP (dBm) |
|---------------------------|--------|---|--------|---|--------------------|------------------|
| GSM / GPRS / EDGE 850 | 824.2 | ~ | 848.8 | 26.25 | 3.35 | 29.60 |
| GSM / GPRS / EDGE 1900 | 1850.2 | ~ | 1909.8 | 26.25 | 4.63 | 30.88 |
| WCDMA / HSPA Band 2 | 1852.4 | ~ | 1907.6 | 25.00 | 4.63 | 29.63 |
| WCDMA / HSPA Band 4 | 1712.4 | ~ | 1752.6 | 25.00 | 4.69 | 29.69 |
| WCDMA / HSPA Band 5 | 826.4 | ~ | 846.6 | 25.00 | 3.35 | 28.35 |
| LTE-Band 2 | 1850.7 | ~ | 1909.3 | 25.00 | 4.63 | 29.63 |
| LTE-Band 4 | 1710.7 | ~ | 1754.3 | 25.00 | 4.69 | 29.69 |
| LTE-Band 5 | 824.7 | ~ | 848.3 | 25.00 | 3.35 | 28.35 |
| LTE-Band 7 | 2502.5 | ~ | 2567.5 | 25.00 | 4.22 | 29.22 |
| LTE-Band 12 | 699.7 | ~ | 715.3 | 25.00 | 2.98 | 27.98 |
| LTE-Band 13 | 779.5 | ~ | 784.5 | 25.00 | 2.98 | 27.98 |
| LTE-Band 25 | 1850.7 | ~ | 1914.3 | 25.00 | 4.63 | 29.63 |
| LTE-Band 26 | 824.7 | ~ | 848.3 | 25.00 | 3.35 | 28.35 |
| LTE-Band 26 Part 90 | 814.7 | ~ | 823.3 | 25.00 | 3.35 | 28.35 |
| LTE-Band 38 | 2572.5 | ~ | 2617.5 | 25.00 | 4.22 | 29.22 |
| LTE-Band 41 | 2498.5 | ~ | 2687.5 | 25.00 | 4.22 | 29.22 |

A duty cycle of 0.25 is set in the output power of GSM 850 and 1900 for PD calculation.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

| FCC Worst case | | | | | | | |
|---------------------------|--------|---|--------|-------------------------|-------------------------------------|-------------|----------------|
| Operating Frequency (MHz) | | | | Operation Distance (cm) | Power Density (mW/cm ²) | Margin | FCC Worst Case |
| GSM / GPRS / EDGE 850 | 824.2 | ~ | 848.8 | 20 | 0.18 | 0.16 | |
| GSM / GPRS / EDGE 1900 | 1850.2 | ~ | 1909.8 | 20 | 0.24 | 0.22 | V |
| WCDMA / HSPA Band 2 | 1852.4 | ~ | 1907.6 | 20 | 0.18 | 0.16 | |
| WCDMA / HSPA Band 4 | 1712.4 | ~ | 1752.6 | 20 | 0.19 | 0.17 | |
| WCDMA / HSPA Band 5 | 826.4 | ~ | 846.6 | 20 | 0.14 | 0.12 | |
| LTE-Band 2 | 1850.7 | ~ | 1909.3 | 20 | 0.18 | 0.16 | |
| LTE-Band 4 | 1710.7 | ~ | 1754.3 | 20 | 0.19 | 0.17 | |
| LTE-Band 5 | 824.7 | ~ | 848.3 | 20 | 0.14 | 0.12 | |
| LTE-Band 7 | 2502.5 | ~ | 2567.5 | 20 | 0.17 | 0.15 | |
| LTE-Band 12 | 699.7 | ~ | 715.3 | 20 | 0.13 | 0.11 | |
| LTE-Band 13 | 779.5 | ~ | 784.5 | 20 | 0.13 | 0.11 | |
| LTE-Band 25 | 1850.7 | ~ | 1914.3 | 20 | 0.18 | 0.16 | |
| LTE-Band 26 | 824.7 | ~ | 848.3 | 20 | 0.14 | 0.12 | |
| LTE-Band 26 Part 90 | 814.7 | ~ | 823.3 | 20 | 0.14 | 0.12 | |
| LTE-Band 38 | 2572.5 | ~ | 2617.5 | 20 | 0.17 | 0.15 | |
| LTE-Band 41 | 2498.5 | ~ | 2687.5 | 20 | 0.17 | 0.15 | |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

| IC Worst case | | | | | | | |
|---------------------------|--------|---|--------|-------------------------|-----------------------------------|--------|---------------|
| Operating Frequency (MHz) | | | | Operation Distance (cm) | Power Density (W/m ²) | Margin | IC Worst Case |
| GSM / GPRS / EDGE 850 | 824.2 | ~ | 848.8 | 20 | 1.82 | -0.76 | V |
| GSM / GPRS / EDGE 1900 | 1850.2 | ~ | 1909.8 | 20 | 2.44 | -2.04 | |
| WCDMA/HSPA Band 2 | 1852.4 | ~ | 1907.6 | 20 | 1.83 | -2.65 | |
| WCDMA/HSPA Band 4 | 1712.4 | ~ | 1752.6 | 20 | 1.85 | -2.39 | |
| WCDMA/HSPA Band 5 | 826.4 | ~ | 846.6 | 20 | 1.36 | -1.22 | |
| LTE-Band 2 | 1850.7 | ~ | 1909.3 | 20 | 1.83 | -2.65 | |
| LTE-Band 4 | 1710.7 | ~ | 1754.3 | 20 | 1.85 | -2.39 | |
| LTE-Band 5 | 824.7 | ~ | 848.3 | 20 | 1.36 | -1.22 | |
| LTE-Band 7 | 2502.5 | ~ | 2567.5 | 20 | 1.66 | -3.84 | |
| LTE-Band 12 | 699.7 | ~ | 715.3 | 20 | 1.25 | -1.05 | |
| LTE-Band 13 | 779.5 | ~ | 784.5 | 20 | 1.25 | -1.23 | |
| LTE-Band 25 | 1850.7 | ~ | 1914.3 | 20 | 1.83 | -2.65 | |
| LTE-Band 26 | 824.7 | ~ | 848.3 | 20 | 1.36 | -1.22 | |
| LTE-Band 26 Part 90 | 814.7 | | 823.3 | 20 | 1.36 | -1.19 | |
| LTE-Band 38 | 2572.5 | ~ | 2617.5 | 20 | 1.66 | -3.94 | |
| LTE-Band 41 | 2498.5 | ~ | 2687.5 | 20 | 1.66 | -3.83 | |

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

2 FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE)

2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm ²) | Averaging Time (minute) |
|---|-------------------------------|-------------------------------|-------------------------------------|-------------------------|
| Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *(180/f ²) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | f/1500 | 30 |
| 1500-15000 | / | / | 1.0 | 30 |

f = frequency in MHz

* = Plane-wave equipment power density

Prediction of MPE limit at a given distance

$$S = PG / 4\pi R^2$$

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 center of radiation of the antenna

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

2.2 ISED Standard Applicable

This submittal(s) (test report) is intended to comply with RSS-102 issue 5 Radio frequency Radiation Exposure requirement.

This is a Mobile device, the MPE is required.

Limits for Maximum Permissible Exposure (MPE)

| RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment) | | | | |
|---|----------------------------------|---|------------------------------------|---------------------------------|
| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field Strength (A/m rms) | Power Density (W/m ²) | Reference Period (minutes) |
| 0.003-10 | 83 | 90 | - | Instantaneous* |
| 0.1-10 | - | 0.73/ <i>f</i> | - | 6** |
| 1.1-10 | 87/ <i>f</i> ^{0.5} | - | - | 6** |
| 10-20 | 27.46 | 0.0728 | 2 | 6 |
| 20-48 | 58.07/ <i>f</i> ^{0.25} | 0.1540/ <i>f</i> ^{0.25} | 8.944/ <i>f</i> ^{0.5} | 6 |
| 48-300 | 22.06 | 0.05852 | 1.291 | 6 |
| 300-6000 | 3.142 <i>f</i> ^{0.3417} | 0.008335 <i>f</i> ^{0.3417} | 0.02619 <i>f</i> ^{0.6834} | 6 |
| 6000-15000 | 61.4 | 0.163 | 10 | 6 |
| 15000-150000 | 61.4 | 0.163 | 10 | 616000/ <i>f</i> ^{1.2} |
| 150000-300000 | 0.158 <i>f</i> ^{0.5} | 4.21 x 10 ⁻⁴ <i>f</i> ^{0.5} | 6.67 x 10 ⁻⁵ <i>f</i> | 616000/ <i>f</i> ^{1.2} |

F = frequency in MHz

* = Based on nerve stimulation (NS).

** = Based on specific absorption rate (SAR)

Maximum Permissible Exposure (MPE) Evaluation

Prediction of MPE limit at a given distance

$$S = PG / 4\pi R^2$$

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 center of radiation of the antenna

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

台灣檢驗科技股份有限公司 t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com

Member of SGS Group

2.3 Power Density Calculation (Worst Case)

| FCC | | | | | | | | ISED | | |
|----------------|----------------------------|-------------------------|-------------------------------|------------------------------|-------------------------------------|-----------------------------|-------------|------------------------------------|----------------------------|-------------|
| Operation Mode | Evaluation Frequency (MHz) | Operation Distance (cm) | Output Power ERP / EIRP (dBm) | Output Power ERP / EIRP (mW) | Power Density (mW/cm ²) | Limit (mW/cm ²) | Pass / Fail | Power Density (W/cm ²) | Limit (W/cm ²) | Pass / Fail |
| BT | 2402.00 | 20 | -3.60 | 0.44 | 0.0001 | 1.000 | Pass | 0.001 | 5.351 | Pass |
| WLAN | 5180.00 | 20 | 13.10 | 20.42 | 0.0041 | 1.000 | Pass | 0.041 | 9.047 | Pass |
| GSM 1900 | 1850.2 | 20 | 30.88 | 1224.62 | 0.2438 | 1.000 | Pass | 1.250 | 2.303 | Pass |
| GSM 850 | 824.2 | 20 | 29.60 | 912.01 | 0.1815 | 0.549 | Pass | 1.815 | 2.576 | Pass |

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

2.4 Collocated Power Density Calculation

| FCC | | | | |
|----------------|-------------------------------------|-----------------------------|-----------------------|-------------------------------------|
| Operation Mode | Power Density (mW/cm ²) | Limit (mW/cm ²) | Power Density / Limit | Σ (E- Power Density / Limit) |
| BT | 0.0001 | 1.000 | 0.0001 | 0.2749 |
| WLAN | 0.0041 | 1.000 | 0.0041 | |
| GSM 1900 | 0.2438 | 1.000 | 0.2680 | |

| ISED | | | | |
|----------------|-----------------------------------|---------------------------|-----------------------|-------------------------------------|
| Operation Mode | Power Density (W/m ²) | Limit (W/m ²) | Power Density / Limit | Σ (E- Power Density / Limit) |
| BT | 0.001 | 5.351 | 0.0002 | 0.7093 |
| WLAN | 0.041 | 9.047 | 0.0045 | |
| GSM 850 | 1.815 | 2.576 | 0.7047 | |

Note:

- Σ (E- Power Density / Limit): This is a summation of [(Power Density for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)].
- Considering the collocated transmitters, the aggregated (Power Density /limit) is smaller than 1, and MPE of collocated transmitters is compliant

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

2.5 Maximum Allowable Gain

FCC

| Operation Mode | Frequency (MHz) | Operation Distance (cm) | Conducted Average output power (dBm) | Max. output Power include tolerance (dBm) | Antenna Gain (dBi) | EIRP (ERP) Limit (dBm) | Max. output Power (mW) | Power Density (PD) (mW/cm ²) | Limit (mW/cm ²) | Allowable Gain according to EIRP (dBi) | Allowable Gain according to PD (dBi) | Max Allowable Gain (dBi) |
|------------------------|-----------------|-------------------------|--------------------------------------|---|--------------------|------------------------|------------------------|--|-----------------------------|--|--------------------------------------|--------------------------|
| GSM / GPRS / EDGE 850 | 824.2 | 20 | 24.05 | 26.25 | 6.38 | 38.45 | 1832.31 | 0.365 | 0.549 | 6.38 | 8.16 | 6.38 |
| GSM / GPRS / EDGE 1900 | 1850.2 | 20 | 21.95 | 26.25 | 3.79 | 33.00 | 1009.25 | 0.201 | 1.000 | 3.79 | 10.76 | 3.79 |
| WCDMA / HSPA Band 2 | 1852.4 | 20 | 22.58 | 25.00 | 10.42 | 33.00 | 3483.37 | 0.693 | 1.000 | 10.42 | 12.01 | 10.42 |
| WCDMA / HSPA Band 4 | 1712.4 | 20 | 22.77 | 25.00 | 7.23 | 30.00 | 1671.09 | 0.333 | 1.000 | 7.23 | 12.01 | 7.23 |
| WCDMA / HSPA Band 5 | 826.4 | 20 | 25.26 | 25.00 | 9.42 | 38.45 | 2767.89 | 0.551 | 0.551 | 13.19 | 9.42 | 9.42 |
| LTE-Band 2 | 1850.7 | 20 | 21.94 | 25.00 | 11.06 | 33.00 | 4036.45 | 0.803 | 1.000 | 11.06 | 12.01 | 11.06 |
| LTE-Band 4 | 1710.7 | 20 | 22.33 | 25.00 | 10.67 | 33.00 | 3689.78 | 0.734 | 1.000 | 10.67 | 12.01 | 10.67 |
| LTE-Band 5 | 824.7 | 20 | 22.66 | 25.00 | 9.41 | 38.45 | 2762.20 | 0.550 | 0.550 | 15.79 | 9.41 | 9.41 |
| LTE-Band 7 | 2502.5 | 20 | 22.54 | 25.00 | 10.46 | 33.00 | 3515.60 | 0.700 | 1.000 | 10.46 | 12.01 | 10.46 |
| LTE-Band 12 | 699.7 | 20 | 22.67 | 25.00 | 8.70 | 34.77 | 2343.53 | 0.466 | 0.466 | 12.10 | 8.70 | 8.70 |
| LTE-Band 13 | 779.5 | 20 | 22.27 | 25.00 | 9.17 | 34.77 | 2610.81 | 0.520 | 0.520 | 12.50 | 9.17 | 9.17 |
| LTE-Band 25 | 1850.7 | 20 | 22.73 | 25.00 | 10.27 | 33.00 | 3365.12 | 0.670 | 1.000 | 10.27 | 12.01 | 10.27 |
| LTE-Band 26 | 824.7 | 20 | 22.46 | 25.00 | 9.41 | 50.00 | 2762.20 | 0.550 | 0.550 | 27.54 | 9.41 | 9.41 |
| LTE-Band 26 Part 90 | 814.7 | 20 | 22.40 | 25.00 | 9.36 | 38.45 | 2728.70 | 0.543 | 0.543 | 16.05 | 9.36 | 9.36 |
| LTE-Band 38 | 2572.5 | 20 | 23.11 | 25.00 | 9.89 | 33.00 | 3083.19 | 0.614 | 1.000 | 9.89 | 12.01 | 9.89 |
| LTE-Band 41 | 2498.5 | 20 | 23.05 | 25.00 | 9.95 | 33.00 | 3126.08 | 0.622 | 1.000 | 9.95 | 12.01 | 9.95 |

ISED

| Operation Mode | Frequency (MHz) | Operation Distance (cm) | Conducted Average output power (dBm) | Max. output Power include tolerance (dBm) | Antenna Gain (dBi) | EIRP (ERP) Limit (dBm) | Max. output Power (mW) | Power Density (PD) (W/m ²) | Limit (W/m ²) | Allowable Gain according to EIRP (dBi) | Allowable Gain according to PD (dBi) | Max Allowable Gain (dBi) |
|------------------------|-----------------|-------------------------|--------------------------------------|---|--------------------|------------------------|------------------------|--|---------------------------|--|--------------------------------------|--------------------------|
| GSM / GPRS / EDGE 850 | 824.2 | 20 | 24.05 | 26.25 | 4.87 | 38.45 | 1294.20 | 2.576 | 2.576 | 6.38 | 4.87 | 4.87 |
| GSM / GPRS / EDGE 1900 | 1850.2 | 20 | 21.95 | 26.25 | 3.79 | 33.00 | 1009.25 | 2.009 | 4.477 | 3.79 | 7.27 | 3.79 |
| WCDMA / HSPA Band 2 | 1852.4 | 20 | 22.58 | 25.00 | 8.52 | 33.00 | 2250.89 | 4.480 | 4.480 | 10.42 | 8.52 | 8.52 |
| WCDMA / HSPA Band 4 | 1712.4 | 20 | 22.77 | 25.00 | 7.23 | 30.00 | 1671.09 | 3.326 | 4.246 | 7.23 | 8.29 | 7.23 |
| WCDMA / HSPA Band 5 | 826.4 | 20 | 25.26 | 25.00 | 6.13 | 38.45 | 1296.56 | 2.581 | 2.581 | 13.19 | 6.13 | 6.13 |
| LTE-Band 2 | 1850.7 | 20 | 21.94 | 25.00 | 8.52 | 33.00 | 2249.48 | 4.477 | 4.477 | 11.06 | 8.52 | 8.52 |
| LTE-Band 4 | 1710.7 | 20 | 22.33 | 25.00 | 8.29 | 33.00 | 2131.75 | 4.243 | 4.243 | 10.67 | 8.29 | 8.29 |
| LTE-Band 5 | 824.7 | 20 | 22.66 | 25.00 | 6.12 | 38.45 | 1294.74 | 2.577 | 2.577 | 15.79 | 6.12 | 6.12 |
| LTE-Band 7 | 2502.5 | 20 | 22.54 | 25.00 | 9.42 | 33.00 | 2764.61 | 5.503 | 5.503 | 10.46 | 9.42 | 9.42 |
| LTE-Band 12 | 699.7 | 20 | 22.67 | 25.00 | 5.63 | 34.77 | 1157.17 | 2.303 | 2.303 | 12.10 | 5.63 | 5.63 |
| LTE-Band 13 | 779.5 | 20 | 22.27 | 25.00 | 5.95 | 34.77 | 1245.81 | 2.480 | 2.480 | 12.50 | 5.95 | 5.95 |
| LTE-Band 25 | 1850.7 | 20 | 22.73 | 25.00 | 8.52 | 33.00 | 2249.48 | 4.477 | 4.477 | 10.27 | 8.52 | 8.52 |
| LTE-Band 26 | 824.7 | 20 | 22.46 | 25.00 | 6.12 | 50.00 | 1294.74 | 2.577 | 2.577 | 27.54 | 6.12 | 6.12 |
| LTE-Band 26 Part 90 | 814.7 | 20 | 22.40 | 25.00 | 6.09 | 38.45 | 1283.99 | 2.556 | 2.556 | 16.05 | 6.09 | 6.09 |
| LTE-Band 38 | 2572.5 | 20 | 23.11 | 25.00 | 9.50 | 33.00 | 2817.23 | 5.608 | 5.608 | 9.89 | 9.50 | 9.50 |
| LTE-Band 41 | 2498.5 | 20 | 23.05 | 25.00 | 9.41 | 33.00 | 2761.59 | 5.497 | 5.497 | 9.95 | 9.41 | 9.41 |

A duty cycle of 0.25 is set in the output power of GSM 850 and 1900 for PD calculation.
Refer to report ER/2019/C0117 for conducted average output power.

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

The calculation maximum power density was equal to or less than the required limits for general population exposure for FCC and RSS-102 provided that the antenna chosen has a gain of equal or lesser than which is shown in the above table.

~ End of Report ~

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. 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.

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號