

Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

RF TEST REPORT

Report: FCC_IC RF_SL13092701-GEO-003_Rev 1.0 **Supersedes**: FCC_IC RF_SL13092701-GEO-003

Applicant: Geospace Technologies CorporationProduct name: Geospace Seismic RecorderModel: GCX3Test standard: FCC 15.209; 15.247(d); IC RSS 247Test method: ANSI C63.10 - 2013, 558074 D01 DTS Meas Guidance V03r03FCC ID: WAOGCX3IC ID: 7733S-GCX3Date of test: 11/20/2015Issue date: 03/21/2016Test result: PASSEquipment complied with the specifications:IC uppert did not comply with the specifications:In this test report is issued under the authority of:

Gary Chou

N. Malber C

Full Name:Gary ChouFull Name:Nima MolaeiTitle:Test EngineerTitle:Engineer ReviewerThis test reportmay be reproduced in full only.Test result presented in this test report is applicable to the tested sample only.

ISSUED BY: SIEMIC Laboratories 775 Montague Expressway, Milpitas, CA 95035 USA





Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

| Accountations for componintly assessment | | | |
|--|------------------------|-----------------------------------|--|
| Country/Region | Accreditation Body | Scope | |
| USA | FCC, A2LA | EMC, RF/Wireless, Telecom | |
| Canada | IC, A2LA, NIST | EMC, RF/Wireless, Telecom | |
| Taiwan | BSMI, NCC, NIST | EMC, RF, Telecom, Safety | |
| Hong Kong | OFTA, NIST | RF/Wireless, Telecom | |
| Australia | NATA, NIST | EMC, RF, Telecom, Safety | |
| Korea | KCC/RRA, NIST | EMI, EMS, RF, Telecom, Safety | |
| Japan | VCCI, JATE, TELEC, RFT | EMI, RF/Wireless, Telecom | |
| Mexico | NOM, COFETEL, Caniety | Safety, EMC, RF/Wireless, Telecom | |
| Europe | A2LA, NIST | EMC, RF, Telecom, Safety | |
| Israel | MOC, NIST | EMC, RF, Telecom, Safety | |
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Accreditations for conformity assessment

Accreditations for conformity assessment

| Country/Region | Accreditation Body | Scope |
|----------------|--------------------|-----------------------|
| USA | FCC TCB, NIST | EMC, RF, Telecom |
| Canada | IC FCB, NIST | EMC, RF, Telecom |
| Singapore | iDA, NIST | EMC, RF, Telecom |
| EU | NB | EMC & R&TTE Directive |
| Japan | MIC (RCB 208) | RF, Telecom |
| Hong Kong | OFTA (US002) | RF, Telecom |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Table of Contents

| 1. Report revision history | 4 |
|--|---|
| 2. Executive summary | 4 |
| 3. Customer information | 4 |
| 4. Test site information | 4 |
| 5. Modification | 4 |
| 6. EUT Information | 5 |
| 6.1. EUT Description | 5 |
| 6.2. Radio description | 6 |
| 6.3. EUT Power level setting | 6 |
| 6.4. EUT Photos External | 7 |
| 7. Supporting equipment / Software / Cabling information | 8 |
| 7.1. Support equipment | 8 |
| 7.2. Cabling description | 9 |
| 7.3. Test software description1 | 0 |
| 8. Test summary1 | 1 |
| 9. Measurement uncertainty | 2 |
| 10. Measurements, Examination and Derived results | 3 |
| Conducted Emission Test Results | 4 |
| Conducted Emission Test Results1 | 6 |
| 10.2. 6dB Bandwidth and 99% Occupied Bandwidth1 | 8 |
| 10.3. Output power2 | 1 |
| 10.4. Band edge2 | 3 |
| 10.5. Peak spectral density2 | 5 |
| 10.6. Radiated spurious emissions in restricted band2 | 8 |
| 10.7. Radiated spurious emissions below 1GHz | 0 |
| 10.8. Radiated spurious emissions between 1GHz-25GHz | 3 |
| 11. Annex A Test Instruments | 6 |
| 12. Annex B SIEMIC Accreditation | 7 |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

1. Report revision history

| Report No. | Report Version | Description | Issue Date |
|--------------------------------------|-----------------------|--------------------------------------|------------|
| FCC_IC RF_SL13092701-GEO-003 | Original | None | 12/21/2015 |
| FCC_IC RF_SL13092701-GEO-003_Rev 1.0 | Rev 1.0 | Updated radiated emission (Below 1G) | 03/21/2016 |
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2. Executive summary

The purpose of this test program was to demonstrate compliance of following product:

| Company: | Geospace Technologies |
|----------|---------------------------|
| Product: | Geospace Seismic Recorder |
| Model: | GCX3 |

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3. Customer information

| Applicant name: | Geospace Technologies Corporation | |
|-----------------------|--------------------------------------|---|
| Applicant address: | 7007 Pine Drive, Huston, TX 77040 US | A |
| Manufacturer name: | Geospace Technologies Corporation | |
| Manufacturer address: | 7007 Pine Drive, Huston, TX 77040 US | A |

4. Test site information

Lab performing tests: SIEMIC Laboratories Lab address: 775 Montague Expressway, Milpitas, CA 95035 FCC test site no.: 881796 IC test site no.: 4842D-2 VCCI test site no.: A0133

5. Modification



Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

| Index | ltem | Description | Note |
|-------|------|-------------|------|
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6. EUT Information

6.1. EUT Description

| Product Name | Geospace Seismic Recorder |
|---------------------------|---|
| Model No. | GCX3 |
| Trade Name | Geospace |
| Serial No. | 00000157 |
| Host Model No. | N/A |
| Input Power | 18.25 VDC |
| Power Adapter Manu/Model | Manual:TOTAL POWER INTERNATIONAL.INC/ Model :HEBA48-S182026 |
| Power Adapter SN | 0701 |
| Date of EUT received | 11/20/2015 |
| Equipment Class/ Category | DTS |
| Port/Connectors | DC Input |
| Product Hardware Version | N/A |
| Product Software Version | N/A |
| Radio Hardware Version | N/A |
| Radio Software Version | GsrTester 1.2.2.60 |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

6.2. Radio description

| Radio Type | ZIGBEE | | |
|------------------------|--------------------|--|--|
| Operating Frequency | 2405MHz-2480MHz | | |
| Modulation | DSSS | | |
| Channel Spacing | 5MHz | | |
| Antenna Type | Internal F Antenna | | |
| Antenna Gain | 3.3dBi | | |
| Antenna Connector Type | N/A | | |

6.3. EUT Power level setting

| Mode | Frequency (MHz) | Power setting |
|--------|-----------------|---------------|
| ZIGBEE | 2405 | Default |
| ZIGBEE | 2440 | Default |
| ZIGBEE | 2480 | Default |





Applicant: Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

6.4. EUT Photos | External







EUT Bottom View



EUT Front View



EUT Left View



EUT Rear View



EUT Right View

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

7. Supporting equipment / Software / Cabling information

7.1. Support equipment

| Item | Supporting Equipment Description | Model | Serial Number | Manufacturer | Note |
|------|----------------------------------|--------|------------------|--------------|------|
| 1 | Handheld Computer | ALGIZ7 | OBX KIT 1010A | Geospace | - |
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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

7.2. Cabling description

| ltem | Conne | ection Start | Connec | tion Stop | Length / shielding Info | | Note |
|--------------------------|-------|--------------|----------|------------------|-------------------------|------------|------|
| | From | I/O Port | То | I/O Port | Length (m) | Shielding | |
| POWER WITH DATA CABLE | EUT | Power input | Handheld | Ethernet Port | 1.5m | Unshielded | - |
| | | | | | | | |
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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

7.3. Test software description

| Test Item | Software | Description |
|----------------------|--------------------|---|
| Conducted RF Testing | GsrTester 1.2.2.60 | Set the EUT to different channel under RF |
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Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

8. Test summary

| Test Item | Т | est standard | | Pass / Fail | |
|------------------------------|-----|---|-----|-----------------------|--------|
| Restricted Band of Operation | FCC | 15.205 | FCC | ANSI C63.10:2013 | ⊠ Pass |
| | IC | C RSS Gen 8.10 IC 558074 D01 DTS Meas Guidance v03r03 | | □ N/A | |
| AC Conducted Emissions | FCC | 15.207(a) | FCC | ANSI C63.10:2013 | 🗷 Pass |
| | IC | RSS Gen 8.8 | IC | RSS Gen Issue 4: 2014 | □ N/A |

DTS band Requirement

| Te | st Item | | Test standard Test Method/Procedure | | Test Method/Procedure | Pass / Fail | | | | |
|--|---|-----------|-------------------------------------|-----------|---|-----------------|--|--|--|--|
| 99% Occu | pied Bandwidth | IC | RSS Gen 6.6 | IC | RSS Gen Issue 4: 2014 | I Pass □ N/A | | | | |
| 6dB Bandwidth | | FCC IC | 15.247(a)(2) RSS247 (5.2.1) | FCC IC | 558074 D01 DTS Meas Guidance v03r03 | ⊠ Pass □ N/A | | | | |
| Band Edge and Radiated Spurious Emissions | | FCC IC | 15.247(d) RSS247 (5.5) | FCC | ANSI C63.10:2013 558074 D01 DTS Meas Guidance v03r03 | ⊠ Pass □ N/A | | | | |
| Output Power | | FCC IC | 15.247(b) RSS247 (5.4.4) | FCC IC | 558074 D01 DTS Meas Guidance v03r03 | ⊠ Pass □ N/A | | | | |
| Receiver Sp | Receiver Spurious Emissions | | RSS Gen (4.8) | IC | RSS Gen Issue 4: 2014 | □ Pass ⊠ N/A | | | | |
| Antenna | Gain > 6 dBi | FCC IC | 15.247(e) - | FCC | - | □ Pass ⊠ N/A | | | | |
| Power Sp | pectral Density | FCC IC | 15.247(e) RSS247 (5.2.2) | FCC IC | 558074 D01 DTS Meas Guidance v03r03 | ⊠ Pass □ N/A | | | | |
| RF Exposure requirement | | FCC IC | 15.247(i) RSS Gen(5.5) | FCC IC | - RSS Gen Issue 4: 2014 | □ Pass ⊠ N/A | | | | |
| Remark | Image: | | | | | | | | | |



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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

9. Measurement uncertainty

| Emissions | | | | | | | | | |
|---|--------------------|---|-------------------|--|--|--|--|--|--|
| Test Item | Frequency Range | Description | Uncertainty | | | | | | |
| Band Edge and Radiated Spurious Emissions | 30MHz – 1GHz | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/- 4.5dB | | | | | | |
| Band Edge and Radiated Spurious Emissions | 1GHz – 40GHz | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +4.3dB/-4.1dB | | | | | | |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

10. Measurements, Examination and Derived results

10.1. Conducted Emissions

Conducted Emission Limit

| Freq | luency ra | anges | Limit (dBuV) | | | | | |
|-------------------------------|--|---|---|---|------------------------|--|--|--|
| | (MHz) | | QP | Ave | erage | | | |
| (| 0.15 ~ 0 | .5 | 66 – 56 | | - 46 | | | |
| | | 16 | | | | | | |
| | 5 ~ 30 | / | 60 | ť | 50 | | | |
| Spec | Item | Requirement | | | Applicable | | | |
| 47CFR§15.207, RSS210(A8.1) | a) | For Low-power rad utility (AC) power lin power line on any f not exceed the limit impedance stabiliza between the freque | For Low-power radio-frequency devices that is designed to be connected to the public tility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line mpedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges. | | | | | |
| Test Setup | | 40cm LISN Note: 1. Sr 2. Br an | EUT But Horizontal Ground Reference upport units were connected to second oth of LISNs (AMN) are 80 cm from EUT a nd other metal planes | Test Receive ence Plane LISN. nd at least 80 cm from of | er er ther units | | | |
| Procedure | The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. The power supply for the EUT was fed through a 50Ω/50µH EUT LISN, connected to filtered mains. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. All other supporting equipment was powered separately from another main supply. | | | | | | | |
| Remark | EUT te | sted with Handheld co | omputer and Battery Pack. | | | | | |
| Result | 🗷 Pas | s 🗆 🗆 Fail | | | | | | |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Conducted Emission Test Results



| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|--------------------|---------------|-----------------------|-----------------|-----------------|---------------------|------|-----------------|----------------|---------------|
| 0.50 | 35.66 | 10.01 | 0.68 | 46.35 | Quasi Peak | Line | 56.00 | -9.65 | Pass |
| 0.52 | 33.27 | 10.01 | 0.67 | 43.96 | Quasi Peak | Line | 56.00 | -12.04 | Pass |
| 0.42 | 25.67 | 10.01 | 0.74 | 36.41 | Quasi Peak | Line | 57.52 | -21.11 | Pass |
| 0.57 | 23.62 | 10.01 | 0.65 | 34.28 | Quasi Peak | Line | 56.00 | -21.72 | Pass |
| 1.32 | 20.81 | 10.02 | 0.57 | 31.39 | Quasi Peak | Line | 56.00 | -24.61 | Pass |
| 2.06 | 20.33 | 10.02 | 0.55 | 30.91 | Quasi Peak | Line | 56.00 | -25.09 | Pass |



Applicant: Report:

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

| 0.50 | 26.55 | 10.01 | 0.68 | 37.24 | Average | Line | 46.00 | -8.76 | Pass |
|------|-------|-------|------|-------|---------|------|-------|--------|------|
| 0.52 | 23.93 | 10.01 | 0.67 | 34.61 | Average | Line | 46.00 | -11.39 | Pass |
| 0.42 | 20.46 | 10.01 | 0.74 | 31.21 | Average | Line | 47.52 | -16.31 | Pass |
| 0.57 | 14.05 | 10.01 | 0.65 | 24.71 | Average | Line | 46.00 | -21.29 | Pass |
| 1.32 | 11.68 | 10.02 | 0.57 | 22.26 | Average | Line | 46.00 | -23.74 | Pass |
| 2.06 | 12.71 | 10.02 | 0.55 | 23.29 | Average | Line | 46.00 | -22.71 | Pass |

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Conducted Emission Test Results



| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|--------------------|---------------|-----------------------|-----------------|-----------------|---------------------|---------|-----------------|----------------|---------------|
| 0.52 | 35.42 | 10.01 | 0.67 | 46.10 | Quasi Peak | Neutral | 56.00 | -9.90 | Pass |
| 0.50 | 37.32 | 10.01 | 0.68 | 48.01 | Quasi Peak | Neutral | 56.00 | -7.99 | Pass |
| 0.45 | 25.01 | 10.01 | 0.71 | 35.73 | Quasi Peak | Neutral | 56.83 | -21.10 | Pass |
| 0.59 | 24.29 | 10.01 | 0.64 | 34.95 | Quasi Peak | Neutral | 56.00 | -21.05 | Pass |
| 0.74 | 22.14 | 10.01 | 0.61 | 32.75 | Quasi Peak | Neutral | 56.00 | -23.25 | Pass |
| 1.64 | 22.75 | 10.02 | 0.56 | 33.33 | Quasi Peak | Neutral | 56.00 | -22.67 | Pass |



Applicant: Report:

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

| 0.52 | 22.92 | 10.01 | 0.67 | 33.60 | Average | Neutral | 46.00 | -12.40 | Pass |
|------|-------|-------|------|-------|---------|---------|-------|--------|------|
| 0.50 | 28.27 | 10.01 | 0.68 | 38.95 | Average | Neutral | 46.00 | -7.05 | Pass |
| 0.45 | 17.83 | 10.01 | 0.71 | 28.55 | Average | Neutral | 46.83 | -18.28 | Pass |
| 0.59 | 14.54 | 10.01 | 0.64 | 25.20 | Average | Neutral | 46.00 | -20.80 | Pass |
| 0.74 | 13.23 | 10.01 | 0.61 | 23.85 | Average | Neutral | 46.00 | -22.15 | Pass |
| 1.64 | 13.76 | 10.02 | 0.56 | 24.34 | Average | Neutral | 46.00 | -21.66 | Pass |

Note: The results above show only the worst case.

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

10.2. 6dB Bandwidth and 99% Occupied Bandwidth

Requirement(s):

| Spec | Item | Requirement | | Applicable | | | | | | |
|-------------------|---|-------------------|---------------------|------------------------------------|-------------|--|--|--|--|--|
| §FCC-15.247 | a)(2) | 6dB BW≥500KHz; | | | X | | | | | |
| §RSS-247 | 5.2(1) | 6dB BW≥500KHz; | | | \boxtimes | | | | | |
| §RSS-Gen | 6.6 | 99% OBW For FCC r | eference only; Requ | ired by IC | | | | | | |
| Test Setup | EUT Spectrum Analyzer | | | | | | | | | |
| Test Procedure | Test 558074 D01 DTS Meas Guidance v03r03, 8.1 DTS bandwidth 6dB Emission bandwidth measurement procedure: - - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 3 x RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 99% Occupied bandwidth measurement procedure - Allow the trace to stabilize. - Use the spectrum analyzer built-in measurement function to determine the 99% OBW. - Set RBW = close to 1% of the selected span as is - Set VBW = 3 x RBW - Detector = Peak - Trace mode = max hold - Set RBW = close to 1% of the selected span as is | | | | | | | | | |
| Test Date | 11/20/20 |)15 | Environmental | Temperature: Relative Humidity: | 25 40% | | | | | |
| | - | | condition | Atmospheric | 1010PA | | | | | |
| Remark | N/A | | | | | | | | | |
| Result | 🛛 Pass | 🗆 Fail | | | | | | | | |



Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|--------------------|---------------------|---------|------|----------|-------|----------|-------|
| 6 dB DTS Bandwidth | 100KHz | 3 x RBW | >EBW | РК | Auto | Max hold | - |
| 99% OBW | 1% of selected span | 3 x RBW | >EBW | РК | Auto | Max hold | - |

| Test Data | 🛛 Yes (See below) | □ N/A |
|-----------|-------------------|-------|
| Test Plot | ⊠ Yes (See below) | D N/A |

6dB Bandwidth measurement result

| Туре | Freq (MHz) | СН | Result (MHz) | Limit | Result |
|--------|------------|------|--------------|-------|--------|
| 6dB BW | 2405 | Low | 1.582 | ≥0.5 | Pass |
| 6dB BW | 2440 | Mid | 1.614 | ≥0.5 | Pass |
| 6dB BW | 2480 | High | 1.655 | ≥0.5 | Pass |

99% Occupied Bandwidth

| Туре | Freq (MHz) | СН | Result (MHz) |
|---------|------------|------|--------------|
| 99% OBW | 2405 | Low | 2.5579 |
| 99% OBW | 2440 | Mid | 2.5065 |
| 99% OBW | 2480 | High | 2.6235 |



Applicant: Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

6dB Bandwidth AND 99% Occupied Bandwidth test plots



99% BW TX-Zigbee 2405

| Keysight Spectrum Analyzer - Occupied BW | | | | | - 4 2 |
|--|-------------------------------|--|--|--|-------------------------------|
| RL 16 50 0 AC Center Freq 2.480000000 | GHZ Cente #FGain:Low #Atte | SENSE INT A rr Freq: 2.48000000 GHz Free Run Avg[Hold> n: 30 dB | JGN AUTO 12:41:17 Radio Sta 10/10 Radio De | AM Nov21, 2015 d: None vice: BTS | Frequency |
| 0 dB/div Ref 20.00 dBm | | | · · · · · | | Center Freq 2.48000000 GHz |
| 10 10 00 | | | | nunnyn | |
| enter 2.48 GHz Res BW 100 kHz | | VBW 300 kHz | Sj Sw | oan 3 MHz eep 1 ms | CF Step 300.000 kHz |
| Occupied Bandwidt | h 6235 MHz | Total Power | 7.86 dBm | A. | to Man Freq Offset |
| Transmit Freq Error x dB Bandwidth | 59.079 kHz 1.655 MHz | % of OBW Power x dB | r 99.00 % -6.00 dB | | 0 Hz |
| | | | OTATION | | |

99% BW TX-Zigbee 2480

99% BW TX-Zigbee 2440



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10.3. Output power

Requirement(s):

| Spec | Item | Requirement | | | Applicable | | | | | |
|------------------|---|---|--|--|--|--|--|--|--|--|
| | a) | FHSS in 2400-2483.5MI | Hz with \geq 75 channels | : ≤1 Watt | | | | | | |
| | b) | FHSS in 5725-5850MHz | z: ≤1 Watt | | | | | | | |
| § 15.247 | c) | For all other FHSS in the | e 2400-2483.5MHz ba | nd: ≤0.125 Watt. | | | | | | |
| § RSS-247 | d) | FHSS in 902-928MHz w | with \geq 50 channels: \leq 1 | Watt | | | | | | |
| | e) | FHSS in 902-928MHz w | /ith ≥ 25 & <50 channe | els: ≤0.25 Watt | | | | | | |
| | f) | DSSS in 902-928MHz, 2 | 2400-2483.5MHz, 572 | 5-5850MHz: ≤1 Watt | | | | | | |
| Test Setup | | Spectrum Analyzer | | | | | | | | |
| Test Procedure | 558074 <u>Measur</u> a) As ar wideba satisfie 1) The 2) At al 3) The factor of b) If the describ c) Mea of the t d) Adju | D01 DTS Meas Guidance v03r0 ement using a Power Meter (PM n alternative to spectrum ana and RF power meter with a th d. EUT is configured to transmit I times when the EUT is trans integration period of the pow of five. e transmitter does not transmited in Section 6.0. sure the average power of th rransmitter. st the measurement in dBm | 3, 9.2.3.1) alyzer or EMI receiver me eermocouple detector or continuously, or to tran smitting, it shall be trans ver meter exceeds the re nit continuously, measur e transmitter. This meas by adding 10log (1/x), w | equivalent if all of the conditions equivalent if all of the conditions smit with a constant duty factor. nitting at its maximum power co petition period of the transmitte e the duty cycle (x) of the transm urement is an average over both here x is the duty cycle to the me | y be performed using a s listed below are ntrol level. d signal by at least a hitter output signal as the on and off periods asurement result. | | | | | |
| | 11/20 | /2015 | Environmental | Temperature: | 25 | | | | | |
| Test Date | 11/20 | /2015 | condition | Relative Humidity: | 40% | | | | | |
| | | | | Atmospheric | 1010PA | | | | | |
| Remark | N/A | | | | | | | | | |
| Result | ⊠ Pa | ss 🛛 Fail | | | | | | | | |
| Test Data 🛛 🖂 Ye | S | □ N/A | | | | | | | | |
| Test Plot 🛛 Ye | est Plot \Box Yes (See below) \boxtimes N/A | | | | | | | | | |



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Output power measurement result

| Test mode | Freq (MHz) | СН | Conducted Power | Limit (dBm) | Result |
|-----------|------------|------|-----------------|-------------|--------|
| ZIGBEE | 2405 | Low | 1.133 | 30 | Pass |
| ZIGBEE | 2440 | Mid | 1.328 | 30 | Pass |
| ZIGBEE | 2480 | High | 1.645 | 30 | Pass |





PWR -Zigbee 2440



PWR-Zigbee 2480



Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

10.4. Band edge

Requirement(s):

| Spec | Item | Requirement | | | | Applicable | | | |
|-----------------------|---------------------------------|--|---|--|--|--|--|--|--|
| § 15.247 § RSS-247 | d) | For non-restricted band, in band in which the spread sp radiator is operating, the ra- intentional radiator shall be kHz bandwidth within the ba desired power, determined to be used. Attenuation belo is not required 20 dB down | any 100 kHz pectrum or di dio frequency at least 20 d and that cont by the mease ow the gener 30 dB down | bandwi gitally n / power B or 30 ains the uremen al limits | dth outside the frequency nodulated intentional that is produced by the dB below that in the 100 e highest level of the t method on output power specified in § 15.209 (a) | \boxtimes | | | |
| Test Setup | | Spectrum Analyzer | | | | | | | |
| Test Procedure | 558074 Band E - - - | D01 DTS Meas Guidance vi dge measurement procedure Set the EUT to maximum p Band edge emissions mus authorized band as a meas conducted output power pr Change modulation and ch Measured and record the r | 03r03 2 bower setting t be at least 3 sured. The att rocedure is us hannel bandw esults in the t | and ena 0 dB do enuatio ed. idth the est repo | able the EUT transmit contin own from the highest emission n shall be 30 dB instead of 2 n repeat step 1 to 2. | uously. on level within the 20 dB when RMS | | | |
| Test Date | 11/20/2 | 015 | Environm conditio | ental on | Temperature: Relative Humidity: | 25 40% | | | |
| Remark | N/A | | | | Atmospheric Pressure: | TUTUMba | | | |
| Result | ⊠ Pa | ss 🛛 🗆 Fail | | | | | | | |

Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|-----------|--------------|----------|---------|----------|-------|---------------|-------|
| Band Edge | 100KHz | ≥3 x RBW | 135 MHz | RMS | Auto | Trace average | - |
| | | | | | | | |
| Test Data | ⊠ Yes | | □ N/A | | | | |
| Test Plot | ⊠ Yes (See b | pelow) | I N/A | | | | |

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

| 🚺 Keysight Spectrum Analyzer - Swept SA | | | | - 6 🕰 | 🗱 Keysight Spectrum Analyzer - Swept SA | | | | |
|--|---|---|---|-------------------------------------|--|--|--|---|-------------------------------------|
| RL RF SO Ω AC Center Freq 2.400000000 GHz PNO: PNO: IFGair IFGair IFGair | Mide Trig: Free Run A #Atten: 30 dB | ALIGN AUTO 12 Ng Type: Log-Pwr vg Hold:>100/100 | 2:35:02 AM Nov 21, 2015 TRACE 2 3 4 5 6 TYPE MUNITUM DET PPPPP | Frequency | Center Freq 2.483500000 | GHz PNO: Wide Trig: Free Run #Atten: 30 dB | Aug Type: Log-Pwr Avg Hold:>100/100 | 12:41:27 AM Nov 21, 2015 TRACE 1 2 3 4 5 6 TYPE MWWWWWW DET PPPPPP | Frequency |
| Ref Offset 1 dB 10 dB/div Ref 20.00 dBm | | Mkr2 2 | .400 00 GHz -43.181 dBm | Auto Tune | Ref Offset 1 dB 10 dB/div Ref 20.00 dBm | | Mkr2 | 2.483 50 GHz -35.104 dBm | Auto Tune |
| 10.0 0.00 -10.0 | | | لأسهر | Center Freq 2.40000000 GHz | 10.0 -10.0 | 04- | | | Center Freq 2.483500000 GHz |
| -20.0 | 2 | www.www.www | 5WM-2245.000 | Start Freq 2.395000000 GHz | -30.0 | ¹ Marine 2 | man and a market | -31.52 dBm | Start Freq 2.478500000 GHz |
| -50.0 May 10 may | | | | Stop Freq 2.405000000 GHz | -50.0 -70.0 | | | n - on Manual | Stop Freq 2.488500000 GHz |
| Center 2.400000 GHz #Res BW 100 kHz | VBW 300 kHz | Sweep 1.000 | pan 10.00 MHz 0 ms (1001 pts) | CF Step 1.000000 MHz Auto Man | Center 2.483500 GHz #Res BW 100 kHz | VBW 300 kHz | Sweep 1.0 | Span 10.00 MHz 00 ms (1001 pts) | CF Step 1.000000 MHz Auto Man |
| MRR MODE TRC: SCL X 1 N 1 f 2.404 82 G 2 N 1 f 2.404 00 G 3 4 5 5 | Y FUNCTION 3Hz -2.449 dBm 3Hz -43.181 dBm | FUNCTION WIDTH | FUNCTION VALUE | Freq Offset 0 Hz | MSR MODE TRC SCL X 1 N 1 f 2.4 2 N 1 f 2.4 3 4 5 | Y 30 51 GHz -1.519 dBm 33 50 GHz -35.104 dBm | FUNCTION FUNCTION WIDTH | FUNCTION VALUE | Freq Offset 0 Hz |
| 6 7 8 9 10 | | | | | 6 7 8 9 10 | | | | |
| MSG | | STATUS | | | K [| 17 | STATUS | | |
| | | | _ | | | | | | |

2405 MHz Band Edge

2480MHz Band Edge



FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

10.5. Peak spectral density

Requirement(s):

| Spec | Item | Requirement | | | | Applicable |
|-------------------|--|--|--|---|--|-------------------------------|
| § 15.247 | e) | DSSS: ≤8dBm/3KHz | | | | X |
| § RSS-247 | f) | DSSS in hybrid sys with FF | l turned off: ≤ | 8dBm/ | 3KHz | |
| Test Setup | | Spect Analy | rum zer | | EUT | |
| Test Procedure | 558074 <u>Peak s</u> - - - - - - - - - - - - - | D01 DTS Meas Guidance v <u>pectral density measurement</u> a) Set analyzer center free b) Set the span to 1.5 time c) Set the RBW to: 3 kHz d) Set the VBW ≥ 3 x RBV e) Detector = peak. f) Sweep time = auto coup g) Trace mode = max hold h) Allow trace to fully stab i) Use the peak marker fun j) If measured value exceed | 03r03, 10.2 M t procedure quency to DT es the DTS ba ≤ RBW ≤ 100 M. ble. d. d. d. d. d. d. d. d. d. d. d. d. d. | Nethod S chan andwid) kHz. rmine t ice RB | PEAK PSD-1 nel center frequency. th. he maximum amplitude leve <i>N</i> (no less than 3 kHz) and | el within the RBW. repeat. |
| Test Date | 11/20/2 | 015 | Environme conditio | ental on | Temperature: Relative Humidity: Atmospheric Pressure: | 25 40 1010 Pa |
| Remark | N/A | | | | | |
| Result | ⊠ Pa | ss 🗆 Fail | | | | |

Equipment Setting

| TEST | RBW | VBW | SPAN | ١ | [| Detector | SWEEP | Trace | NOTES |
|-----------|---------|-------------|----------|----|---|----------|-------|----------------|-------|
| PSD | 3KHz | ≥3x RBW | 1.5x DTS | BW | | PEAK | Auto | Trace POS Peak | - |
| | | | | | | | | | |
| Test Data | a 🛛 Yes | | □ N/A | ١ | | | | | |
| Test Plot | t 🛛 Yes | (See below) | □ N/A | | | | | | |
| | | | | | | | | | |



Report:

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

PSD measurement results

| Test mode | Freq (MHz) | СН | Conducted Power (dBm/3KHz) | Limit (dBm/3KHz) | Result |
|-----------|------------|------|-------------------------------|---------------------|--------|
| ZIGBEE | 2405 | Low | -11.240 | 8 | Pass |
| ZIGBEE | 2440 | Mid | -11.291 | 8 | Pass |
| ZIGBEE | 2480 | High | -12.085 | 8 | Pass |



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Test plots

2405MHz PSD

2480MHz PSD

2440MHz PSD

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10.6. Radiated spurious emissions in restricted band

Requirement(s):

| Spec | Item | Requirement | | | Applicable | | | | | | |
|-------------------------------|-------------------------------|--|---|--|---------------------------------------|--|--|--|--|--|--|
| 47CFR§15.247(d), § RSS-247 | a) | | | | | | | | | | |
| | b) | or restricted band, emis limits specified in 15.20 | ssion must also com 9 | ply with the radiated emission | \boxtimes | | | | | | |
| Test Setup | | Semi Anechoic Chamber Radio Absorbing Material | | | | | | | | | |
| Test Procedure | 1. 2. 3. 4. | The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. An average measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. | | | | | | | | | |
| Test Date | 011/20/ | 2015 | Environmental | Temperature: Relative Humidity: | 25 40 | | | | | | |
| | | | condition | Atmospheric Pressure: | 1010 PA | | | | | | |
| Remark | The EL results there is | IT was scanned up to 25 show only the worst case n't outstanding emission | GHz. Both horizonta e. Radiated measure found at the edge o | I and vertical polarities were investig ment was measured with antenna po f restricted frequency, within x dB ma | ated. The ort terminated, irgin | | | | | | |
| Result | ⊠ Pa | ss 🗆 Fail | | | | | | | | | |

Applicant: Report:

t: Geospace Technologies Corporation

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Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|-------------------------------|------|------|---------------|----------|-------|----------|-----------------|
| Radiated Spurious Emission | 1MHz | 3MHz | 1GHz - 25 GHz | Peak | Auto | Max hold | PK Measurement |
| Radiated Spurious Emission | 1MHz | 10Hz | 1GHz - 25 GHz | Peak | Auto | Max hold | Ave Measurement |

Test Data 🗆 Yes 🛛 N/A

Test Plot 🛛 Yes (See below) 💭 🗆 N/A

Restricted band measurement plots

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10.7. Radiated spurious emissions below 1GHz

Requirement(s):

| Spec | Item | Requirement | Applicable | | | | | | |
|------------------------------|---------------------|---|---|--|--|--|--|--|--|
| 47CFR§15.247(d) § RSS-247 | a) | a) Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges a) Frequency range (MHz) Field Strength (uV/m) 30 - 88 100 88 - 216 216 960 200 Above 960 500 Above 960 500 | | | | | | | |
| Test Setup | | Radio Absorbing Material | a a a a a a a a a a a a a a a a a a a | | | | | | |
| Procedure | 1. 2. 3. 4 | The EUT was switched on and allowed to warm up to its normal operating condition The test was carried out at the selected frequency points obtained from the EUT cha Maximization of the emissions, was carried out by rotating the EUT, changing the ar polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission lew rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emissis c. Finally, the antenna height was adjusted to the height that gave the maxir A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequenc measured. | aracterisation. ntenna vel over a full on. num emission. y points were | | | | | | |
| Remark | The E results | UT was scanned up to 1GHz. Both horizontal and vertical polarities were inversion only the worst case. | stigated. The | | | | | | |
| Result | ⊠ Pa | ss 🗆 Fail | | | | | | | |

Applicant: Report:

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| Test Data | ⊠ Yes | □ N/A |
|-----------|-------------------|-------|
| Test Plot | ⊠ Yes (See below) | □ N/A |

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Radiated emission test results (below 1GHz)

| Test specification: | Radiated Emissions | | | |
|------------------------------|--------------------|------|---------|-----------------|
| Environmental Conditions: | Temp(°C): | 25 | | 🛛 Pass |
| | Humidity (%): | 58 | | |
| | Atmospheric(mbar): | 1010 | Result: | 🗆 Fail |
| Mains Power: | 12V AC, 50MHz | | | |
| Tested by: | Gary Chou | | | |
| Test Date: | 03/20/2016 | | | |
| Remarks: | TX MODE 2440 MHz | | | • |
| dBuV/m | | | | 22 Mai 10 22.24 |

ZIGBEE

| Frequency | Raw | Cable | AF (dB) | Level | Measurement | Pol | Hgt | Azt | Limit | Margin | Pass |
|-----------|-------|-------|---------|-------|-------------|-----|-----|-----|-------|--------|------|
| 31.59 | 42.76 | 0.84 | -17.08 | 26.51 | Quasi Max | V | 166 | 261 | 40 | -13.49 | Pass |
| 441.68 | 63.56 | 3.25 | -22.81 | 44 | Quasi Max | V | 108 | 67 | 46.02 | -2.02 | Pass |
| 486.07 | 56.76 | 3.42 | -21.6 | 38.59 | Quasi Max | V | 101 | 60 | 46.02 | -7.43 | Pass |
| 529.90 | 50.25 | 3.6 | -21.39 | 32.46 | Quasi Max | V | 102 | 15 | 46.02 | -13.56 | Pass |
| 349.98 | 53.45 | 2.89 | -24.86 | 31.49 | Quasi Max | V | 114 | 256 | 46.02 | -14.53 | Pass |
| 799.98 | 43.9 | 4.51 | -17.41 | 31.01 | Quasi Max | Н | 101 | 75 | 46.02 | -15.01 | Pass |

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

10.8. Radiated spurious emissions between 1GHz-25GHz

Requirement(s):

| Spec | Item | Requirement | Applicable | | | | | | |
|------------------------------|-------------------|--|------------|--|--|--|--|--|--|
| 47CFR§15.247(d) § RSS-247 | a) | For non-restricted band, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required 20 dB down 30 dB down | | | | | | | |
| | b) | or restricted band, emission must also comply with the radiated emission limits specified in 15.209 | | | | | | | |
| Test Setup | | Semi Anechoic Chamber Radio Absorbing Material Burger Strategy (Strategy (St | | | | | | | |
| Procedure | 1 2. 3 4 | The EUT was switched on and allowed to warm up to its normal operating condition The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EL changing the antenna polarization, and adjusting the antenna height in the following a. Vertical or horizontal polarisation (whichever gave the higher emission le full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emissis c. Finally, the antenna height was adjusted to the height that gave the maxi emission. A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency were measured. | | | | | | | |
| Remark | The E invest | UT was scanned up to 25GHz. Both horizontal and vertical polarities were igated. The results show only the worst case. | e | | | | | | |
| Result | ⊠ Pa | ass 🗌 Fail | | | | | | | |

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FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|----------------------------|------|------|---------------|----------|-------|----------|-----------------|
| Radiated Spurious Emission | 1MHz | 3MHz | 1GHz - 25 GHz | Peak | Auto | Max hold | PK Measurement |
| Radiated Spurious Emission | 1MHz | 10Hz | 1GHz - 25 GHz | Peak | Auto | Max hold | Ave Measurement |

Test Data 🛛 🖾 Yes

🗆 N/A

Test Plot ⊠ Yes (See below) □ N/A

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

Radiated emission test results (above 1GHz)

Above 1GHz-25GHz- ZIGBEE 2405MHz

| Frequency | Raw | Cable | AF (dB) | Level | Measurement | Pol | Hgt | Azt | Limit | Margin | Pass |
|-----------|-------|-------|---------|-------|-------------|-----|-----|-----|-------|--------|------|
| 4879.238 | 41.49 | 10.48 | 13.15 | 65.12 | Peak Max | Н | 171 | 55 | 74 | -8.88 | Pass |
| 4006.028 | 38.03 | 8.52 | 15.72 | 62.26 | Peak Max | Н | 124 | 292 | 74 | -11.74 | Pass |
| 4879.238 | 30.23 | 10.48 | 13.15 | 53.86 | Average Max | Н | 171 | 55 | 54 | -0.14 | Pass |
| 4006.028 | 25.59 | 8.52 | 15.72 | 49.83 | Average Max | Н | 124 | 292 | 54 | -4.17 | Pass |

Above 1GHz-25GHz- ZIGBEE 2440MHz

| Frequency | Raw | Cable | AF (dB) | Level | Measurement | Pol | Hgt | Azt | Limit | Margin | Pass |
|-----------|-------|-------|---------|-------|-------------|-----|-----|-----|-------|--------|------|
| 4878.80 | 39.49 | 10.48 | 13.15 | 63.12 | Peak Max | V | 130 | 45 | 74 | -10.88 | Pass |
| 6144.268 | 36.07 | 10.66 | 14.24 | 60.98 | Peak Max | V | 227 | 55 | 74 | -13.03 | Pass |
| 4878.80 | 26.59 | 10.48 | 13.15 | 50.22 | Average Max | V | 130 | 45 | 54 | -3.78 | Pass |
| 6144.268 | 24.80 | 10.66 | 14.24 | 49.7 | Average Max | V | 227 | 55 | 54 | -4.30 | Pass |

Above 1GHz-25GHz- ZIGBEE 2480MHz

| Frequency | Raw | Cable | AF (dB) | Level | Measurement | Pol | Hgt | Azt | Limit | Margin | Pass |
|-----------|-------|-------|---------|-------|-------------|-----|-----|-----|-------|--------|------|
| 4879.248 | 40.5 | 10.48 | 13.15 | 64.12 | Peak Max / | H/ | 164 | 49 | 74 | -9.88 | Pass |
| 4059.118 | 36.86 | 8.65 | 15.49 | 61 | Peak Max | Н | 201 | 96 | 74 | -13 | Pass |
| 4879.248 | 28.84 | 10.48 | 13.15 | 52.47 | Average Max | Н | 164 | 49 | 54 | -1.53 | Pass |
| 4059.118 | 25.66 | 8.65 | 15.49 | 49.8 | Average Max | Н | 201 | 96 | 54 | -4.2 | Pass |

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

11. Annex A | Test Instruments

| Instrument | Model | Serial # | Cal Date | Cal Cycle | Cal Due | In use |
|------------------------------------|----------|------------|------------|-----------|------------|-----------|
| Conducted Emissions | | | | | | |
| R & S Receiver | ESIB 40 | 100179 | 05/23/2015 | 1 Year | 05/23/2016 | |
| CHASE LISN | MN2050B | 1018 | 08/07/2015 | 1 Year | 08/07/2016 | V |
| Radiated Emissions | | | | | | |
| R & S Receiver | ESL6 | 100178 | 05/27/2015 | 1 Year | 05/27/2016 | |
| R & S Receiver | ESIB 40 | 100179 | 05/23/2015 | 1 Year | 05/23/2016 | K |
| ETS-Lingren Loop Antenna 🧹 | 6512 | 00049120 | 05/12/2015 | 1 Year | 05/12/2016 | |
| Bi-Log antenna (30MHz~2GHz) | JB1 | A030702 | 08/12/2015 | 1 Year | 08/12/2016 | • |
| Horn Antenna (1-26.5GHz) | 3115 | 10SL0059 | 04/26/2015 | 1 Year | 04/26/2016 | • |
| Pre-Amplifier | LPA-6-30 | 11140711 | 02/19/2015 | 1 Year | 02/19/2016 | < |
| Pre-Amplifier (1-26.5GHz) | 8449B | 3008A00715 | 05/30/2015 | 1 Year | 05/30/2016 | < |
| 3 Meters SAC | 3M | N/A | 08/08/2015 | 1 Year | 08/08/2016 | < |
| 10 Meters SAC | 10M | N/A | 09/05/2015 | 1 Year | 09/05/2016 | < |
| RF Conducted Measurement | | / | / | | | |
| Spectrum Analyzer | N9010A | 10SL0219 | 08/20/2015 | 1 Year | 08/20/2016 | > |
| R & S Receiver | ESIB 40 | 100179 | 05/23/2015 | 1 Year | 05/23/2016 | > |
| Test Equity Environment Chamber | 1007H | 61201 | 07/31/2015 | 1 Year | 07/31/2016 | |
| USB RF Power Sensor | 7002-006 | 10SL0190 | 09/03/2015 | 1 Year | 09/03/2016 | |

FCC_IC_ RF_SL13092701-GEO-003_Rev 1.0

12. Annex B | SIEMIC Accreditation

| Accreditations | Document | Scope / Remark | | | |
|---|----------|--|--|--|--|
| ISO 17025 (A2LA) | | Please see the documents for the detailed scope | | | |
| ISO Guide 65 (A2LA) | | Please see the documents for the detailed scope | | | |
| TCB Designation | | A1, A2, A3, A4, B1, B2, B3, B4, C | | | |
| FCC DoC Accreditation | R | FCC Declaration of Conformity Accreditation | | | |
| FCC Site Registration | Z | 3 meter site | | | |
| FCC Site Registration | R | 10 meter site | | | |
| IC Site Registration | | 3 meter site | | | |
| IC Site Registration | R | 10 meter site | | | |
| EU NB | | Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025 | | | |
| | A | Electromagnetic Compatibility: | | | |
| Singapore iDA CB(Certification Body) | 22 | Phase I, Phase II | | | |
| Vietnam MIC CAB Accreditation | A | Please see the document for the detailed scope | | | |
| Hong Kong OFCA | | (Phase II) OFCA Foreign Certification Body for Radio and Telecom | | | |
| | ~ | (Phase I) Conformity Assessment Body for Radio and Telecom | | | |
| Industry Canada CAB | ~ | Radio: Scope A – All Radio Standard Specification in Category I | | | |
| | ~ | Telecom: CS-03 Part I, II, V, VI, VII, VIII | | | |
| Japan Recognized | | Radio: A1. Terminal equipment for purpose of calling | | | |
| Certification Body | | Telecom: B1. Specified radio equipment specified in Article 38-2, | | | |
| Designation | | Paragraph 1, Item 1 of the Radio Law | | | |
| | A | EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI | | | |
| Korea CAB Accreditation | | KN22: Test Method for EMI | | | |
| | | EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EM. | | | |
| | | KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for | | | |
| | | FMS | | | |
| | | | | | |

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| | | Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, | | | | |
|-----------------|-----|---|--|--|--|--|
| | | RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL | | | | |
| | | Notice 2007-80, RRL Notice 2004-68 | | | | |
| | | Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice | | | | |
| | | 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL | | | | |
| | | Notice 2008-7 with attachment 4 | | | | |
| Taiwan NCC CAB | 7 | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, | | | | |
| Recognition | | PLMN01, PLMN08 | | | | |
| Taiwan BSMI CAB | A | CNS 13438 | | | | |
| Recognition | | | | | | |
| Japan VCCI | A | R-3083: Radiation 3 meter site | | | | |
| | | C-3421: Main Ports Conducted Interference Measurement | | | | |
| | | T-1597: Telecommunication Ports Conducted Interference | | | | |
| | | Measurement | | | | |
| | | EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 | | | | |
| | | Radio communications: AS/NZS 4281, AS/NZS 4268. AS/NZS 4280.1 | | | | |
| | | AS/NZS 4280.2. AS/NZS 4295. AS/NZS 4582. AS/NZS 4583. AS/NZS | | | | |
| Australia CAB | | 4769.1. AS/NZS 4769.2. AS/NZS 4770. AS/NZS 4771 | | | | |
| Recognition | | Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF | | | | |
| | | S004:06. AS/ACIF S006:01. AS/ACIF S016:01. AS/ACIF S031:01. | | | | |
| | | AS/ACIE \$038:01 AS/ACIE \$040:01 AS/ACIE \$041:05 AS/ACIE | | | | |
| | | S043 2:06 AS/ACIE S60950 1 | | | | |
| Australia NATA | Ð | | | | | |
| Recognition | 200 | | | | | |
| NELUZIIILIUII | | | | | | |
| | | | | | | |