



**RADIO EQUIPMENT DIRECTIVE 2014/53/EU
ASSESSMENT & COMPLIANCE RATIONALE**

DOCUMENT NO. RA2863COM1-REDA

Product Name: **4G Pro Door Entry Unit**

Manufacturer: **Commтел Ltd**

Address: **Kingfisher House,
Northwood Park,
Gatwick Road,
Crawley.
RH10 9XN.**

1 ARTICLE 3, 1(A) HEALTH & SAFETY

The RE Directive 2014/53/EU requires all radio equipment to be constructed so as to ensure the protection of health and safety of persons and of domestic animals and the protection of property, including the objectives with respect to safety requirements set out in Directive 2014/35/EU, but with no voltage limit applying.

1.1 Electrical Safety

The 4G Pro Door Entry Unit underwent inspection and limited testing by Technology International (Europe) Ltd against the Principal Elements of the Safety Objectives (PESOs) set out in the Low Voltage Directive 2014/35/EU.

The following points were assessed:

- The main external AC Power Supply (Stontronics Switching Power Supply T6261ST – 6A-151DE12) is approved to EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 and is provided with a Declaration of Conformity to the Low Voltage Directive (2014/35/EU).
- An alternate external AC Power Supply (Ideal Power Switching Power Supply 23SW-00xxxxxxx-S10) is approved to EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 and is provided with a Declaration of Conformity to the Low Voltage Directive (2014/35/EU).

Relevant specification sheets and Declarations of Conformity have been included under **Section D**.

- The main cellular keypad intercom unit (Hardware revision 2, Firmware revision V11.108, I/O board hardware revision 4) was subjected to an assessment under the auspices of EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 by Technology International (Europe) Ltd. While some notes regarding User Manual, User Guide Statements and Marking / Labelling were observed, the unit was found to broadly comply with the clauses assessed. The report reference TR2863-2A1.COM, dated 20th June 2019 can be found in **Section D**.

1.2 RF Exposure

The Commtel 4G Pro Door Entry Unit uses an intentionally radiating device for Cellular Communications which will expose operators to electromagnetic fields. However, the on-board transmitter is not used in close proximity of the operator (less than 0.2m). Therefore, no overall assessment of SAR is deemed necessary, but a minimum recommended antenna separation distance for users is required.

In consideration of the individual intentional radiators:

- The Commtel 4G Pro uses a SIMCom SIM7600E cellular module. A test report has been provided by the manufacturer against the requirements of EN62311:2008 - Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz). Unilab Report UL15820170831CE034-8, dated 23rd November 2017 refers. Using the measured Gain Parameters of the reference antenna used in each of the operating bands (varying between 0.03dBi and 3.52dBi) an average EIRP is calculated, which gives a minimum separation distance of 9.08cm. The relevant report is contained in **Section D**.
- As the antenna supplied with the Commtel 4G Pro (an IoT IW-EP211-002) has an average gain of 2.5dBi across all bands, its performance is not dissimilar to the reference antenna used for the minimum separation calculation, and therefore the calculated value remains appropriate when considering the basic restrictions and reference levels specified in Annex II of Council Recommendation 1999/519/EC.

2 ARTICLE 3, 1(B) EMC

The RE Directive requires that radio equipment be constructed so as to ensure an adequate level of electromagnetic compatibility as set out in Directive 2014/30/EU; therefore, the conformity routes defined in the EMC Directive can be used to show compliance with the EMC essential requirements of the RE Directive 2014/53/EU,

2.1 Electromagnetic Compliance

Partial EMC testing was carried out on a representative configuration of our 4G Pro Door Entry Unit in an ISO/IEC 17025 accredited EMC testing laboratory. This partial testing, together with evidence of compliance of the individual product components is being used to demonstrate compliance with the essential requirements under Article 3. 1. (b) of the of the Radio Equipment Directive 2014/53/EU based on our internal production control procedures. This assessment includes a rationale that justifies our choice of data and explains why this demonstrates compliance based on the following:

- 1) The intended electromagnetic environment in which the 4G Pro Door Entry Unit will be used;
- 2) The Harmonised Standards applicable to the 4G Pro Door Entry Unit;
- 3) A review of the EMC Test Report and results;
- 4) A review of individual component certifications;
- 5) Details of the quality system in operation at Commtel Ltd including the procedures that ensure the 4G Pro Door Entry Unit will be manufactured to a standard that will ensure continued compliance with the EU Directive on EMC.

2.2 Intended Electromagnetic Environment

The 4G Pro Door Entry Unit is designed to be used outdoors on domestic, commercial or industrial environment where there is the possibility of other industrial equipment operating in the same vicinity and off the same power network; handheld radios, mobile phones and base stations may also be present.

2.2.1 Residential Use

The 4G Pro Door Entry Unit is commercial in design but it is conceivable that it could be used in a Residential Environment; a statement to this effect is included in the Installation and Operation Manual.

2.3 Test Standards Applied

The harmonised standards relevant to this type of electrical and electronic equipment is the product standard ETSI EN 301 489 for Radio Equipment and Services Part 1: Common Technical Requirements; Harmonised Standard covering the Essential Requirements of article 3.1b of Directive 2014/53/EU. In addition, Part 52 covers specific conditions for Cellular Communication and also covers the Essential Requirements of article 3.1b of Directive 2014/53/EU.

The emissions are defined by EN55032, Table A2 and A3 for Class A equipment.

The immunity requirements are individually specified but utilise the IEC61000-4-X series of test methods.

2.4 EMC Test Results

The following EMC tests have been carried out on the 4G Pro Door Entry Unit (Hardware revision 2, Firmware revision V11.108, I/O board hardware revision 4) by Compliance Engineering Ireland, an ISO17025 accredited EMC test laboratory; a copy of the EMC Test Report 19E8039-1, dated 5th June 2019 has been included under **Section E**.

The 4G Pro Door Entry Unit, tested as an integrated finished unit, met the following EMC tests:

- EN55032, Radiated Emissions 30MHz-1GHz, Class A

For the following immunity aspects, tests were performed on the 4G Pro as an integrated, finished unit to the levels shown:

- EN61000-4-2 ESD ± 2 & ± 4 kV Contact discharge, ± 2 , ± 4 & 8kV Air discharge.
- EN61000-4-3 Radiated field 3V/m, 80% AM, 80MHz – 6GHz.
- EN61000-4-4 EFT/BURST ± 0.5 kV to the antenna cable.
- EN61000-4-6 Conducted RF 3 Vrms, 80% AM, 150kHz-80MHz.
- EN61000-4-8 Power frequency magnetic field 50Hz, 30A/m.

For the following emissions & immunity aspects, use is being made of the component approvals as supplied by the OEMs, to the standards shown:

- The main external AC Power Supply (Stontronics Switching Power Supply T6261ST – 6A-151DE12) is declared as compliant to EN61204-3:2000, Class B – Low Voltage Power Supplies, DC output, Part 3: Electromagnetic Compatibility, EN55022:2010+AC:2011, Class B – Limits and methods of measurement of radio disturbance characteristics of information technology equipment and also EN55024:2010, Information technology equipment – Immunity characteristics – Limits and methods of measurement. In addition, the unit is also declared as compliant to EN61000-3-2:2014 for Harmonics, in addition to EN 61000-3-3:2013 Voltage fluctuations and Flicker. Finally, the unit is provided with a Declaration of Conformity to the EMC Directive (2014/30/EU).
- An alternate external AC Power Supply (Ideal Power Switching Power Supply 23SW-00xxxxxxx-S10) is declared as compliant with EN55032:2012+AC:2013 Electromagnetic compatibility of multimedia equipment, to EN60950-1:2006+A11:2009+ A1:2010+A12:2011+A2:2013, EN55022:2010+AC:2011, Class B – Limits and methods of measurement of radio disturbance characteristics of information technology equipment and also EN55024:2010+A1:2015, Information technology equipment – Immunity characteristics – Limits and methods of measurement. In addition, the unit is also declared as compliant to EN61000-3-2:2014 for Harmonics, in addition to EN 61000-3-3:2013 Voltage fluctuations and Flicker. Finally, the unit is provided with a Declaration of Conformity to the EMC Directive (2014/30/EU).

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- The SIMCom SIM7600E LTE/HSPA/GSM/GNSS module is provided with EMC test reports to ETSI EN301 489-1 V2.2.0 and specific requirements under EN301 489—52 V1.1.0. Test reports UL15820170831CE034-5 and UL15820170831CE034-6 dated 23rd November 2017 refer. The reports cover immunity aspects only to Radio Frequency Immunity EN61000-4-3 and ESD to EN61000-4-2. Spurious Emissions (performed as part of the radio test programme), 9kHz-12.75GHz are covered in test reports UL15820170831CE034-1 to 4 dated 23rd November 2017

The rationale for including the above information is that the emissions and immunity aspects of individual components making up the 4GPro will not be degraded by combining them into a system and therefore it is reasonable to argue that the emissions & immunity of the 4G Pro as an integrated, finished unit will meet the Essential Requirements of the EMC Directive 2014/30/EU and therefore Article 3.1b of the RED 2014/53/EU when assembled from the pre-approved components noted, in addition to the further EMC tests performed on the finished unit.

The relevant test reports are found in **Section E** of the Technical File.

3 ARTICLE 3.2 USE OF RADIO SPECTRUM

The RE Directive requires that Radio equipment be constructed to effectively use and support the efficient use of radio spectrum in order to avoid harmful interference.

The 4G Pro Door Entry Unit has LTE/WCDMA/GSM & GNSS connectivity. Each of these radio functions are implemented in a pre-approved radio module, which have already been certified to the RE Directive and specifically to the radio aspects on a standalone basis.

3.1 LTE/WCDMA/GSM/GNSS

The cellular radio module built-in to the 4G Pro mainboard contains functionality for Multi band LTE, dual band UMTS (WCDMA) and dual band GSM. The Data-sheet can be found in in **Section B**, with the Declaration of Conformity in **Section F**.

3.1.1 Frequency of operation

| Parameter | Min | Max |
|--------------------|-------------------------------|--|
| LTE | 791 MHz (Band 20 downlink) | 2690 MHz (Band 7 downlink) |
| UMTS / WCDMA | 880 MHz (Band VIII uplink) | 2170 MHz (Band I downlink) |
| GSM | 880 MHz (GSM 900 uplink) | 1880 MHz (GSM 1800 downlink) |
| GNSS (GPS/GLONASS) | 1575.42 MHz (GPS) | 1602 MHz +n x 0.5625 MHz (GLONASS) |

3.1.2 Standards Applied

The following harmonised standards have been used to show compliance with Article 3.2 of the RE Directive:

EN 301 511 V12.5.1 (2017-03) Global System for Mobile communications (GSM); Mobile Stations (MS) equipment; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU;

EN 301 908-1 V11.1.1 (2016-07) IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Introduction and common requirements;

EN 301 908-2 V11.1.1 (2016-07) IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE).

EN 301 908-13 V11.1.1 (2016-07) IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 13 Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

EN 303 413 V1.1.1 (2016-07) Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency bands; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

A copy of the SIMCom SIM7600E EU Declaration of Conformity and full Test Reports in addition to a Notified Body Certificate ATCB022081, Issue 1, dated 8th December 2017 attesting to compliance with the Essential Requirements of 2014/53/EU of the radio module are included under **Section F**.

Great care has been taken in the design and layout of the radio architecture to preserve the module's original performance and not introduce new harmonics or intermodulation products as a result of integration. In addition, the antenna supplied with the Commtel 4G Pro (an IoT IW-EP211-002) has an average gain of 2.5dBi across all bands, its performance is not dissimilar to the reference antenna used for the original radio tests, helping to preserve the integrity of the original conformity assessment and radio performance laboratory tests.

The rationale for including the above information is that the radio performance of the pre-approved radio module in the 4GPro will not be degraded by integrating into a system and therefore it is reasonable to argue that the radio performance of the 4G Pro as an integrated, finished unit will meet Article 3.2 of the RED 2014/53/EU when assembled.

4 QUALITY MANAGEMENT SYSTEM

Commтел Ltd does not have a fully audited Quality Management System meeting ISO 9001, however, we have an internal Quality Management System, covering documentation, design, manufacture, supply and service of products. Relevant manufacturing and Quality Assurance test documents are included in **Section H** of the Technical File.

5 COMPLIANCE JUSTIFICATION

Based on the results of the laboratory testing of the integrated finished apparatus in combination with component testing and Declarations of Conformity covering Article 3. 1(a), 3.1(b) and 3. 2 and the rationale provided in this RED Technical Assessment, it is hereby claimed that the 4G Pro Door Entry Unit defined in the accompanying Sections of this RED Technical File will meet the essential requirements of the Radio Equipment Directive 2014/53/EU in its normal working environment.

On behalf of Commтел Ltd

Signed:



Name:

Alan Smith

Date:

1st Aug 19