

SZEMC-TRF-01 Rev. A/1 Report No.: SZCR231100373003

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# RF EXPOSURE EVALUATION REPORT

**Application No.:** SZCR2311003730AT

Applicant: Telit Communications S.p.A.

**Address of Applicant:** Via Stazione di Prosecco 5/b, Sgonico - Trieste 34010 Italy

Manufacturer: Telit Communications S.p.A.

Address of Manufacturer: Via Stazione di Prosecco 5/b, Sgonico - Trieste 34010 Italy

**Factory:** Fushan Technology Vietnam

Address of Factory: No. 8, Road 6, VSIP Bac Ninh, Phu Chan, Tu Son, Bac Ninh, Vietnam

**Equipment Under Test (EUT):** 

**EUT Name:** Scout Model No.: Scout 3.0 Trade Mark: Chorus FCC ID: RI7SCTV3

FCC Rules 47 CFR §2.1091 Standard(s):

KDB 447498 D04 interim General RF Exposure Guidance v01

2023-11-20 **Date of Receipt:** 

Date of Evaluation: 2024-01-09 to 2024-03-11

Date of Issue: 2024-03-12

**Evaluation Result:** Pass\*

Ceny. Ku Kenv Xu **EMC Laboratory Manager** 



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<sup>\*</sup> In the configuration evaluated, the EUT complied with the standards specified above.



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|         | Revision Record |            |          |          |  |  |  |  |
|---------|-----------------|------------|----------|----------|--|--|--|--|
| Version | Chapter         | Date       | Modifier | Remark   |  |  |  |  |
| 01      |                 | 2024-03-12 |          | Original |  |  |  |  |
|         |                 |            |          |          |  |  |  |  |
|         |                 |            |          |          |  |  |  |  |

| Authorized for issue by: |                              |  |  |
|--------------------------|------------------------------|--|--|
|                          | Charle Doi                   |  |  |
|                          | Charlie Dai/Project Engineer |  |  |
|                          | Exic Fu                      |  |  |
|                          | Eric Fu/Reviewer             |  |  |



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### 3 General Information

3.1 General Description of E.U.T.

| · • • • • • • • • • • • • • • • • • • • |                   |  |  |  |  |  |
|---|-------------------|--|--|--|--|--|
|   | ☐ Portable device |  |  |  |  |  |
| Product Type:                           | ⊠ Mobile device   |  |  |  |  |  |
|   | ☐ Fixed device    |  |  |  |  |  |

#### 3.2 Details of E.U.T.

| Power supply: Lithium-ion rechargeable battery (DC 3.7V 5400mAh) which can be charged from Type-C port.  Cable(s): N/A  For BLE:  Operation Frequency: 2402MHz to 2480MHz  Bluetooth Version: V5.2 LE  Modulation Type: GFSK  Data Rate: 1Mbps, 2Mbps  Number of Channels: 40  Channels: 2.6dBi  For LTE:  Operation Frequency Band: LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66  Frequency Band: LTE NB-IoT Band 2/4/5/8/12/13/14/17/25/26/66  Modulation Type: QPSK, 16QAM  LTE Power Class: Level 3  Antenna Type: PCB Antenna  Antenna Gain: B2/25: 4.4dBi  B12/13/14/17: 2.6dBi  Antenna Gain: B8: 2.7dBi  B4/66: 4.4dBi  B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation S02.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM,  | 3.2   | 2 Details of E.U.T.    |   |  |  |  |  |
|--|-------|------------------------|---|--|--|--|--|
| For BLE:  Operation Frequency: 2402MHz to 2480MHz  Bluetooth Version: V5.2 LE  Modulation Type: GFSK  Data Rate: 1Mbps, 2Mbps  Number of Channels: 40  Channel Spacing: 2MHz  Antenna Type: PCB Antenna Antenna Gain: 2.6dBi  For LTE:  Operation Frequency Band: LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66  LTE NB-IoT Band 2/4/5/8/12/13/17/25/26/66  Modulation Type: QPSK, 16QAM  LTE Power Class: Level 3  Antenna Type: PCB Antenna  B2/25: 4.4dBi B12/13/14/17: 2.6dBi  B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Power supply:          |   |  |  |  |  |
| Operation Frequency:         2402MHz to 2480MHz           Bluetooth Version:         V5.2 LE           Modulation Type:         GFSK           Data Rate:         1Mbps, 2Mbps           Number of Channels:         40           Channel Spacing:         2MHz           Antenna Type:         PCB Antenna           Antenna Gain:         2.6dBi           For LTE:         Operation Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi         B12/13/14/17: 2.6dBi           B3: 2.7dBi         B4/66: 4.4dBi           B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz |       | Cable(s):              | N/A   |  |  |  |  |
| Bluetooth Version: V5.2 LE   | For E | BLE:                   |   |  |  |  |  |
| Modulation Type:         GFSK           Data Rate:         1Mbps, 2Mbps           Number of Channels:         40           Channel Spacing:         2MHz           Antenna Type:         PCB Antenna           Antenna Gain:         2.6dBi           For LTE:           Operation Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi         B12/13/14/17: 2.6dBi           B3: 2.7dBi         B4/66: 4.4dBi           B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       |                        | 2402MHz to 2480MHz  |  |  |  |  |
| Data Rate:         1Mbps, 2Mbps           Number of Channels:         40           Channel Spacing:         2MHz           Antenna Type:         PCB Antenna           Antenna Gain:         2.6dBi           For LTE:         Operation Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi B12/13/14/17: 2.6dBi         B3/21/13/14/17: 2.6dBi           Antenna Gain:         B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   |       | Bluetooth Version:     | V5.2 LE   |  |  |  |  |
| Number of Channels:         40           Channel Spacing:         2MHz           Antenna Type:         PCB Antenna           Antenna Gain:         2.6dBi           For LTE:           Operation Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi         B12/13/14/17: 2.6dBi           Antenna Gain:         B8: 2.7dBi           B4/66: 4.4dBi         B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Modulation Type:       | GFSK  |  |  |  |  |
| Channels:         40           Channel Spacing:         2MHz           Antenna Type:         PCB Antenna           Antenna Gain:         2.6dBi           For LTE:           Operation         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Frequency Band:         LTE NB-IoT Band 2/4/5/8/12/13/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi         B12/13/14/17: 2.6dBi           B4/66: 4.4dBi         B4/66: 4.4dBi           B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:           Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   |       | Data Rate:             | 1Mbps, 2Mbps  |  |  |  |  |
| Antenna Type: PCB Antenna Antenna Gain: 2.6dBi  For LTE:  Operation Frequency Band: LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66  Modulation Type: QPSK, 16QAM  LTE Power Class: Level 3  Antenna Type: PCB Antenna  B2/25: 4.4dBi B12/13/14/17: 2.6dBi B8: 2.7dBi B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   |       |                        | 40  |  |  |  |  |
| Antenna Gain: 2.6dBi  For LTE:  Operation  |       | Channel Spacing:       | 2MHz  |  |  |  |  |
| For LTE:           Operation Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi B12/13/14/17: 2.6dBi         B12/13/14/17: 2.6dBi           Antenna Gain:         B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:           Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Antenna Type:          | PCB Antenna   |  |  |  |  |
| Operation<br>Frequency Band:         LTE Cat-M1 Band 2/4/5/8/12/13/14/17/25/26/66<br>LTE NB-IoT Band 2/4/5/8/12/13/17/25/26/66           Modulation Type:         QPSK, 16QAM           LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi<br>B12/13/14/17: 2.6dBi         B12/13/14/17: 2.6dBi           Antenna Gain:         B8: 2.7dBi<br>B4/66: 4.4dBi<br>B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:           Operation<br>Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Antenna Gain:          | 2.6dBi  |  |  |  |  |
| Frequency Band: LTE NB-IoT Band 2/4/5/8/12/13/17/25/26/66  Modulation Type: QPSK, 16QAM  LTE Power Class: Level 3  Antenna Type: PCB Antenna  B2/25: 4.4dBi  B12/13/14/17: 2.6dBi  B8: 2.7dBi  B4/66: 4.4dBi  B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   | For L | .TE:                   |   |  |  |  |  |
| LTE Power Class:         Level 3           Antenna Type:         PCB Antenna           B2/25: 4.4dBi         B12/13/14/17: 2.6dBi           B12/13/14/17: 2.6dBi         B8: 2.7dBi           B4/66: 4.4dBi         B5/B26: 2.6dBi           Based on Module certification (FCC ID: 2ANPO00NRF9160)           For 2.4G WIFI:         Operation Frequency:         802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | •                      |   |  |  |  |  |
| Antenna Type: PCB Antenna  B2/25: 4.4dBi B12/13/14/17: 2.6dBi B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Modulation Type:       | QPSK, 16QAM   |  |  |  |  |
| B2/25: 4.4dBi B12/13/14/17: 2.6dBi B8: 2.7dBi B4/66: 4.4dBi B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | LTE Power Class:       | Level 3   |  |  |  |  |
| Antenna Gain:  B12/13/14/17: 2.6dBi  B8: 2.7dBi  B4/66: 4.4dBi  B5/B26: 2.6dBi   Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   |       | Antenna Type:          | PCB Antenna   |  |  |  |  |
| Antenna Gain:  B8: 2.7dBi  B4/66: 4.4dBi  B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       |                        | B2/25: 4.4dBi   |  |  |  |  |
| B4/66: 4.4dBi B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       |                        | B12/13/14/17: 2.6dBi                                      |  |  |  |  |
| B5/B26: 2.6dBi  Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       | Antenna Gain:          | B8: 2.7dBi  |  |  |  |  |
| Based on Module certification (FCC ID: 2ANPO00NRF9160)  For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       |                        | B4/66: 4.4dBi   |  |  |  |  |
| For 2.4G WIFI:  Operation Frequency:  802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz  |       |                        | B5/B26: 2.6dBi  |  |  |  |  |
| Operation Frequency: 802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz   | Base  | ed on Module certifica | tion (FCC ID: 2ANPO00NRF9160)                             |  |  |  |  |
| Frequency: 2452MHz   | For 2 | 2.4G WIFI:             |   |  |  |  |  |
| Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM,   |       |                        |   |  |  |  |  |
|  |       | Modulation Type:       | 802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, |  |  |  |  |



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|   | 16QAM, QPSK, BPSK)   |  |  |
|---|--|--|--|
| Number of<br>Channels:  | 802.11b/g/n(HT20):11;802.11n(HT40):7   |  |  |
| Channel Spacing:  | 5MHz   |  |  |
| Antenna Type:   | Ceramic Antenna  |  |  |
| Antenna Gain:   | 1.0dBi   |  |  |
| Based on Module certifica                                     | tion (FCC ID: RI7WE310G4)  |  |  |
| For 5G WIFI:  |  |  |  |
| Operation<br>Frequency/Numbe<br>r of channels<br>(20MHz):     | 5180-5240MHz (4 Channels); U-NII-2A: 5260-5320MHz (4 Channels); U-NII-2C: 5500-5700MHz (11 Channels); U-NII-3: 5745-5825MHz (5 Channels) |  |  |
| Operation<br>Frequency/Numbe<br>r of<br>channels/(40MHz)<br>: | 5190-5230MHz (2 Channels); U-NII-2A: 5270-5310MHz (2 Channels); U-NII-2C: 5510-5670MHz (5 Channels); U-NII-3: 5755-5795MHz (2 Channels)  |  |  |
| Modulation Type:  | OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)  |  |  |
| Channel Spacing:  | 802.11a/n 20: 20MHz; 802.11n 40: 40MHz;  |  |  |
| DFS Function:   | Slave without Radar detection  |  |  |
| TPC Function:   | Support TPC function   |  |  |
| Antenna Type:   | Ceramic Antenna  |  |  |
| Antenna Gain:   | 2.6dBi   |  |  |
| Based on Module certifica                                     | tion (FCC ID: RI7WE310G4)  |  |  |

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#### 3.3 Separation Distance

| Minimum test se | paration distance: | 20cm |
|-----------------|--------------------|------|
|                 |                    |      |

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



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#### 3.4 Test Location

All tests were performed at:

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

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

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

No tests were sub-contracted.

#### 3.5 Test Facility

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

#### A2LA (Certificate No. 3816.01)

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

#### • VCCI (Member No. 1937)

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

#### • FCC -Designation Number: CN1336

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

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

#### • Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

#### 3.6 Deviation from Standards

None

#### 3.7 Abnormalities from Standard Conditions

None



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# 4 FCC Radiofrequency radiation exposure limits

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

### 4.1 Blanket 1 mW Blanket Exemption

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

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

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

### 4.2 MPE-based Exemption

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

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

| RF Sou | RF Source Frequency |                    |         | Minimum Distance |         |                                      |
|--------|---------------------|--------------------|---------|------------------|---------|--------------------------------------|
| f∟ MHz |                     | f <sub>H</sub> MHz | λ∟ / 2π | λ∟ / 2π          |         | W                                    |
| 0.3    | _                   | 1.34               | 159 m   | _                | 35.6 m  | 1,920 R <sup>2</sup>                 |
| 1.34   | _                   | 30                 | 35.6 m  | _                | 1.6 m   | 3,450 R <sup>2</sup> /f <sup>2</sup> |
| 30     | _                   | 300                | 1.6 m   | _                | 159 mm  | 3.83 R <sup>2</sup>                  |
| 300    | _                   | 1,500              | 159 mm  | _                | 31.8 mm | 0.0128 R <sup>2</sup> f              |
| 1,500  | _                   | 100,000            | 31.8 mm | _                | 0.5 mm  | 19.2R <sup>2</sup>                   |

Subscripts L and H are low and high; λ is wavelength.

From §1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

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



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

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

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

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

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

| Limit calculation |                |            |                  |  |  |
|-------------------|----------------|------------|------------------|--|--|
| Frequency range   | Frequency(MHz) | R(λ/2π)(m) | Threshold ERP(W) |  |  |
| 300~1500MHz       | 915            | 0.0522     | 0.032            |  |  |
| 1500~100000MHz    | 2480           | 0.0193     | 0.007            |  |  |

#### 4.3 SAR-based Exemption

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

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

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



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

The SAR-based exemption formula of  $\S1.1307(b)(3)(i)(B)$ , repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

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

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

where

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

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



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

#### Table B.2—Example Power Thresholds (mW)

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

| Limit calculation   |      |       |     |       |  |  |  |
|---|------|-------|-----|-------|--|--|--|
| Frequency range(GHz) Frequency(GHz) X Distance(cm) Pth (mW) |      |       |     |       |  |  |  |
| 0.3~1.5 <b>0.915</b> 1.474 <b>0.5 8.133</b>                 |      |       |     |       |  |  |  |
| 1.5~6   | 2.48 | 1.905 | 0.5 | 2.717 |  |  |  |



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# 5 Measurement and Calculation

### 5.1 Maximum transmit power

#### For BLE:

The Power Data is based on the RF Test Report SZCR231100373002.

Antenna Gain: 2.6dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency<br>(MHz) | Maximum EIRP [dBm] | Maximum EIRP (mW) |
|--------------------|--------------------|-------------------|
| 2480               | 8.42               | 6.95              |

#### For 2.4G WIFI:

The Power Data is based on the RF Test Report FR261411AC.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency<br>(MHz) | Maximum EIRP [dBm] | Maximum EIRP (mW) |
|--------------------|--------------------|-------------------|
| 2437               | 19.31              | 85.31             |

Note: Refer to report No. FR261411AC for EUT test Max Power Value.

#### For 5G WIFI:

The Power Data is based on the RF Test Report FR261411AN.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency<br>(MHz) | Maximum EIRP [dBm] | Maximum EIRP (mW) |
|--------------------|--------------------|-------------------|
| 5200               | 17.48              | 55.98             |

Note: Refer to report No. FR261411AN for EUT test Max Power Value.



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#### For LTE:

The Power Data is based on the module MPE Report: NIE: 72148RAN.001A3

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency (MHz)  Maximum EIRP [dBm] |      | Maximum EIRP (mW) |  |
|-------------------------------------|------|-------------------|--|
| Band 2/66                           | 28.4 | 691.83            |  |

Note: Refer to the module MPE Report: NIE: 72148RAN.001A3 for EUT Max Power Value.

#### 5.2 RF Exposure Calculation

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

#### For BLE:

The Max EIRP is 6.95mW.

|             | Evaluation method               | Exempt Limit(mW) | Verdict |
|-------------|---------------------------------|------------------|---------|
|             | Blanket 1 mW Blanket Exemption  | 1mW              | N/A     |
|             | MPE-based Exemption(ERP)        | 7mW(ERP)         | N/A     |
| $\boxtimes$ | SAR-based Exemption( $P_{th}$ ) | 3060mW           | Yes     |

#### For 2.4G WIFI:

The Max EIRP is 85.31mW.

| Evaluation method                 | Exempt Limit(mW) | Verdict |
|-----------------------------------|------------------|---------|
| Blanket 1 mW Blanket Exemption    | 1mW              | N/A     |
| MPE-based Exemption(ERP)          | 7mW(ERP)         | N/A     |
| SAR-based Exemption( <i>P</i> th) | 3060mW           | Yes     |



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#### For 5G WIFI:

The Max EIRP is 55.98mW.

|             | Evaluation method                     | Exempt Limit(mW) | Verdict |
|-------------|---------------------------------------|------------------|---------|
|             | Blanket 1 mW Blanket Exemption        | 1mW              | N/A     |
|             | MPE-based Exemption(ERP)              | 7mW(ERP)         | N/A     |
| $\boxtimes$ | SAR-based Exemption( $P_{	ext{th}}$ ) | 3060mW           | Yes     |

#### For LTE:

The Max EIRP is 691.83mW.

| Evaluation method                     | Exempt Limit(mW) | Verdict |
|---------------------------------------|------------------|---------|
| Blanket 1 mW Blanket Exemption        | 1mW              | N/A     |
| MPE-based Exemption(ERP)              | 7mW(ERP)         | N/A     |
| SAR-based Exemption( $P_{	ext{th}}$ ) | 3060mW           | Yes     |

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



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#### Exposure condition for simultaneous transmission operations

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a} \frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$
 (C. 1)

#### Remark:

a -number of fixed, mobile, or portable RF sources claiming exemption using the §1.1307(b)(3)(i)(B) formula for Pth, including existing exempt transmitters and those being added.

b -number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula for Threshold ERP, including existing exempt transmitters and those being added.

c -number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance.

Pi -the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

 $Pth, i \quad \text{-the exemption threshold power (Pth) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i.} \\$ 

ERPj -the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j. ERPth,j -exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least  $\lambda/2\pi$ , according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

Evaluated<sub>k</sub> -the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation.

Exposure Limit<sub>k</sub> -either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

The Max. sum of the ratios = 6.95mW/3060mW + 85.31mW/3060mW + 691.83mW/3060mW = 0.256 < 1

Therefore, the device is to qualify for simultaneous transmission SAR test exemption, the exemption report is in lieu of the SAR report.

-- End of the Report--



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