

国际呼吁 在地面和外空 停止使用 5G

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呼吁联合国、世界卫生组织、欧盟、欧洲理事会和各国政府，

以下签名的科学家、医生环境组织和其他人士来自（ ），我们急切地要求停止 5G 即第五代无线网络的普及，包括来自外空卫星的 5G。相比于已经存在的通讯网络 2G、3G 和 4G，5G 将会大大地增加无线频率辐射的强度。无线频率辐射已经被证明对人类和环境有害。5G 的普及是在拿人类和环境做实验，用国际法来衡量这是在犯罪。

执行摘要

在各国政府的支持下，世界范围内的电信公司将在接下来的两年内堂而皇之地推出每五代无线网络系统(5G)。众所周知，他们的这一行动将在全世界范围内引发前所未有的社会变化，我们将会拥有“智能”住所，“智能”商务，“智能”高速公路，“智能”城市和自动驾驶汽车。事实上几乎我们所拥有和购买的所有东西，冰箱、洗衣机、奶瓶用纸板、毛刷和婴儿用的尿布，都将被装上天线和芯片，通过无线信号接入互联网。所有生活在地球上的人无论他们身处何处，无论是在热带雨林、大洋的中间和南极，都能马上用某种设备接入超高速、低延迟的无线网络。

但是大部份人不知道的是上述行动一旦成为现实，将会在全世界范围内引发前所未有的环境变化。计划中的无线射频传输器的密度大到令人无法想象。除了数以百万计的新的 5G 基站和太空中 20,000 新的卫星，据估计大约有 2000 亿个传输目标，将会在 2020 年前成为互联网的一部份，几年后这一数字将会达到 10000 亿。频率较低的、速度较慢的商业用 5G 已经于 2018 年年中被部署在卡塔尔、芬兰和爱沙尼亚。极高频的 5G 计划将于 2018 年年底开始被首次部署。

尽管受到了大量的否认，无线电频率辐射对人体有害的证据是无可辩驳的。越来越多关于病人的临床证据、关于对 DNA、动植物的细胞和器官系统损害的证据、流行病学中关于现代文明病如癌症、心脏病和糖尿病的证据在很大程度上都是由于电磁污染引起的，这方面的文献研究超过了 10,000 份。

如果电信行业计划中的 5G 网络成为现实，那么在一天 24 小时、一年 365 天当中，地球上没有一只鸟、一只昆虫、一株植物能够逃脱电磁辐射，而这种电磁辐射的强度要比现在的强上几十倍、几百倍，地球上的生物将无处可逃。这些 5G 的计划将会给人类和地球上所有的生态系统带来严重的、不可逆转的和永久的伤害。

根据伦理要求和国际条约，必须立即采取措施保护人类和自然环境。

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(备注：参考文献以[链接](#)和尾注的形式提供。)

5G 将会使人类在不情愿的情况下无可逃避地暴露于无线辐射之中

以地面为基础的 5G

为了满足物联网传输大数据的要求，当 5G 网络全面部署的时候将使用在固体材料中很难传播的毫米波。这就要求全世界的[城市地区每隔 100 米](#)¹就安装一个基站做为载波体。而以前的无线技术只要求在一片广大的区域安装一个天线传输信号就够了，5G 的基站和 5G 的设备要求在“[相控天线阵](#)”^{2,3}中布置多重天线，这些天线共同工作以传输集中的、可转向的类似激光束的能够相互追踪的信号。

每个 5G 电话将包含无数个微小的天线，这些天线将一起工作，追踪和瞄准从最近的手机信号塔发射出来的一束狭窄的电子束。美国联邦通信委员会的[规定](#)⁴允许这些电子束的有效功率高达 20 瓦特，这个强度是当前允许手机接受电子束功率的 10 多倍。

每一个 5G 的基站都将安装成百上千个天线，这些天线将在其服务范围内针对所有的手机和设备发射多重类似激光的电子束。这项技术被称为“多点输入和多点输出”或者 MIMO。联邦通信委员会允许 5G 基站的[电子束有效发射功率大到每 100 频谱 30000 瓦特](#)，相当于每千兆赫频谱 300000 瓦特，这超过了当前基站被允许的发射功率好几百倍。

外空基地 5G

至少有 5 家公司⁵建议通过 20000 个位于太空的近轨道和中轨道卫星提供 5G 信号服务，这样做的结果会使地球被一层强大的、集中的和可改变方向的电子信号束所包裹。每个卫星都将从布置于相控天线阵的几千个天线中用[高达 500 万瓦特](#)⁶的有效辐射功率发射毫米波。虽然从卫星中发射的能量到达地面时要比基于地面的天线发射的能量弱，但它的发射范围遍及地球的每个角落，这是其它的信号发射器所做不到的，而且除了地球上的物联网 5G 信号发射器所发射出的辐射之外，又多了一种来自于太空的辐射。更为重要的是，发射信号的卫星位于地球的磁气圈，这会对大气的电性质产生巨大的影响。[对地球电磁环境的改变对人类的威胁超过了来自基于地面的天线所发出的辐射对人类的威胁](#)。

无线电频率的不良影响已经被证明

即使在 5G 的概念被提出之前，就有[许多国际知名的科学家提出了请愿和呼吁](#)⁷，其中包括有超过 3000 名物理学家签名的[弗莱堡呼吁书](#)，呼吁中止无线技术的扩张和停建新的基站。⁸

2015 年，[来自 41 个国家的 215 个科学家](#)对联合国和世界卫生组织发出了警告⁹。他们表示：“近年来已经数不清的科学出版物表明电磁场会对生物体产生不良影响，其安全标准远远低于大多数的国际标准和国际指南”。超过 10000 个同行评议的科学研究证明了来自无线射频辐射^{10,11}对人体的伤害。这些伤害包括：

- [改变心脏节律](#)¹²
- [改变新陈代谢](#)¹⁴
- [改变基因表达](#)¹³

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- [癌症](#)¹⁵
- [心血管疾病](#)¹⁶
- [改变干细胞的发育](#)¹⁷
- [认知损害](#)¹⁸
- [DNA 的损害](#)¹⁹
- [对总体幸福感的影响](#)²⁰
- [增加自由基](#)²¹
- [学习和记忆能力的损害](#)²²
- [影响精子的功能和质量](#)²³
- [流产](#)²⁴
- [神经损伤](#)²⁵
- [肥胖和糖尿病](#)²⁶
- [氧化应激](#)²⁷

对孩子的影响包括[自闭症](#)²⁸，[注意缺陷多动障碍](#)^{29,30}和[哮喘](#)³¹。

电磁辐射除了会给人类带来伤害，还有大量的证明表明会给各种植物、[野生动物](#)^{32,33}和实验室里的动物带来伤害，包括：

- [蚂蚁](#)³⁴
- [鸟类](#)^{35,36}
- [森林](#)³⁷
- [青蛙](#)³⁸
- [果蝇](#)³⁹
- [蜜蜂](#)⁴⁰
- [昆虫](#)⁴¹
- [哺乳动物](#)⁴²
- [家鼠](#)^{43,44}
- [植物](#)⁴⁵
- [田鼠](#)⁴⁶
- [树木](#)⁴⁷

对[微生物](#)的伤害⁴⁸也有报导。

2011 年国际卫生组织癌症研究部得出结论，频率为 30kHz - 300GHz 的无线电磁辐射可能会对人体有致癌作用，[被定为二级致癌物](#)⁴⁹。然而，最新的证据表明，通过最近对手机使用和患脑癌风险的研究，[证明无线电辐射对人类具有致癌作用](#)⁵⁰，应该被定为和烟草和石棉一样被定为一级致癌物。

大多数当代的无线信号都是脉冲调制的。高频的载波和低频的脉动都会对人体产生伤害⁵¹。

5G 卫星的部署必须被禁止

在我们居住的地球上，电离层和低层大气是我们的居住范围，这个范围已经形成了适应人类^{52,53}、鸟类⁵⁴、仓鼠⁵⁵和蜘蛛^{56,57}生存的[生物节律](#)，这个范围是由地球的自然电磁环境⁵⁸所控制的，所有生物的幸福都依赖于这个环境的稳定性，其中包括了[大气中的电性质](#)^{59,60,61,62}。[Cherry](#)在一篇具有开创性精神的论文⁶³中解释了 [Schumann 共振态](#)⁶⁴的重要性以及为什么电脑层的改变血压和褪黑激素的水平，诱发癌症、生殖系统、心血管系统和神经系统的疾病和导致死亡。

我们的电磁环境中的各种因素已经因为从电力线中发出的辐射而产生了改变。[电力线的谐波辐射](#)⁶⁵到达地球的电离层和磁气圈，在那里由于[波粒子的交互作用](#)^{66,67}而被放大。1985 年，Robert O. Becker 博士警告电力线的谐波辐射已经改变了磁气圈的结构，这种作用

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的持续扩大“对地球上生命的生育能力产生了威胁”⁶⁸。在电离层和磁气圈部署数以万计的卫星将发出强度以百万瓦特计的调制信号，这些信号的频率也以百万计，它们对我们的电磁环境产生的改变是我们人类无法适应的⁶⁹。

一些[非正式的观测](#)提供的证据表明了大约 100 颗卫星对人类和动物产生的严重影响，这些卫星自从 1998 年以来就从低轨道提供 2G 和 3G 手机信号服务，要理解这些严重影响，光考虑处于地面的低水平辐射是不够的，还必须了解其它科学学科的相关知识，包括大气物理学的知识和针灸学的知识^{70,71,72,73}，如果再增加 20000 颗 5G 卫星，将会加重[地球的电磁环境](#)^{74,75}污染，并且[改变 Schumann 共振态](#)⁷⁶，地球上的所有生命都不能幸免，这种影响是全球性的和极具破坏性的。

5G 从数量和质量上都与 4G 不同

有些人错误地认为人体可以承受[几十至几百倍](#)的毫米波长，这是因为他们认为人体内[充满了同质的液体，外面是一层壳](#)^{77,78}的缘故。那种认为毫米波不会穿透人体的错误设想是因为彻底忽略了神经⁷⁹、血管^{80,81}和其它与电传导有关的结构，这些结构可以将由辐射产生的电流带到身体的内部^{82,83,84}。此外，还有一种潜在的严重错误是相控天线阵不是普通的天线。当一种普通的电磁场进入人体，会导致人体电荷移动和电流的流动。但是当极短的电磁脉冲进入人体，另外一件事情就会发生：那些移动的电荷就会变成小天线，重新发射出电磁场，并把它送到身体的内部。这些重新被发射的波被称为 [Brillouin 前体](#)⁸⁵。当波长的强度和位相[变化快到一定](#)⁸⁶时它们会变得很明显，而 5G 波长的强度和位相变化都很快。

此外，浅度的辐射穿透本身就会对眼睛和身体的大部份器官、皮肤以及一些很小的生物带来伤害。最近发表的相关同行评议研究预测了 5G 辐射会对人体的[皮肤产生灼伤](#)⁸⁷而且会被[昆虫以谐振的方式吸收](#)⁸⁸，吸收量将会是当前手机使用的毫米波辐射吸收量的 100 多倍。自从 1989 年以来，即使在自然保护区⁸⁹，[飞行类昆虫的数量都已经下降了 75-80%](#)，5G 辐射会使全世界范围内的昆虫数量灾难性地下降。[1986 年 study by Om Gandhi](#) 在一项研究中警告：毫米波会被角膜大量地吸收，一般只有几毫米厚的衣服会以共振的方式增加皮肤对辐射的能量吸收⁹⁰。2018 年，Russell 又重新回顾了已知的毫米波对皮肤、眼睛（包括白内障）、心率、免疫系统以及 DNA 影响。

规则的制定者们故意否认电磁辐射有害的科学证据

在发展 5G 过程中的利益相关者是相关的产业和政府部门，尽管国际上众多研究电磁场的科学家已经发表了数以千计的同行研究著作，说明了其对人体、动物、昆虫、植物和环境会带来严重的影响，但这些著作都被拒绝接纳。目前的安全标准不安全的原因在于那些制定标准的部门[考虑得更多的是利益](#)，因为他们与通讯行业之间关系紧密，关于公众可以承受多少非电离辐射的具体标准本应该被公平地制定，而电气公司破坏了这一公正性⁹¹。Emeritus Martin L. Pall 教授在他的[文献回顾](#)⁹²中对上述的利益关系进行了阐述，并列举了那些被拒绝接纳的重要研究著作的名单。

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关于热效应的假说已经过时 – 需要制定新的安全标准

当前关于人体被灼伤是电磁场唯一会造成的伤害这一安全指导原则[已经过时](#)。正如 Markov 和 Grigoriev [所阐述的](#)，“目前的标准没有把非电离辐射对环境所造成的污染考虑进去”⁹³。已经有数百名科学家，其中有一些在呼吁书上签了名，他们已经证明[除了灼伤之外](#)，远低于国际安全强度标准的⁹⁴辐射都会给人类带来急性和慢性的疾病和伤害（非热能效应）。即使是接近零功率标准的辐射都会对人体引发生物效应。功率为 0.02 皮瓦（百万兆分之一瓦特）每平方厘米或者更低的电磁辐射都会[引起大肠杆菌](#)⁹⁴和[鼠类](#)⁹⁵ [改变脑电图在人类](#)⁹⁶，[刺激豆类植物的生长](#)⁹⁷，刺激鸡的排卵⁹⁸。

为了防止热效应对人体的伤害，必须考虑减少人体暴露在电磁辐射当中的时间。5G 将会使每个人都同步地、持续地暴露在传输器的辐射之中，一刻没有停歇。[需要根据辐射的累积效应制定新的安全标准](#)，而不是仅仅根据功率等级，还应该考虑频率、频宽、调制、波形、脉冲宽度和其它在生物学上来说是重要的特性。天线只能设置在特定的，经公众认可的区域。为了保护人类，天线必须设置在远离人们生活和工作地方，也不能设置在人们经常行走的通道附近。为了保护野生动物，天线也不能设置在野生动物保护区，只能以最少的数量设置在地球上偏远的区域。为了保护全人类，商业用卫星的数量必须受到限制，并且不能使用近地轨道和中地轨道卫星，相控天线阵在地球上和太空里都不能使用。

无线电频率辐射对从体具有急性和慢性的作用

无线电频率对人体的作用可以立刻出现，也可以是一种长期的作用。癌症和心脏病就是一种长期作用的例子。[心脏节律的改变](#)⁹⁹和[大脑功能的改变](#)¹⁰⁰就是立刻出现的作用的例子。在前苏联出现过一种[无线电波病](#)¹⁰¹，也被称为[电磁波过敏症](#)¹⁰²，这种病可以是急性的也可以是慢性的。Karl Hecht 教授出版了一部著作，[详细记述了这些症状](#)，他的著作中的资料来源于 1500 多份俄罗斯的科学论文和他自己在德国诊治 1000 多个病人的病历资料，这些资料中的客观症状包括睡眠障碍、异常血压和心率、消化功能不良、脱发、耳鸣和皮疹，主观症状包括头昏、恶心、头疼、记忆力丧失、注意力不集中、疲劳、感冒症状和心前区疼痛¹⁰³。

[2016 版欧洲电磁场安全指南](#)指出，当人们每天持续地暴露在越来越强的电磁场中，就会患上电磁敏感症，减少和防止人体暴露在电磁场对于恢复这类病人的健康是必须的措施¹⁰⁴。电磁敏感症不应该被看成是一种疾病，而是一种由于有害环境导致的对人体的伤害，越来越多的人正在受到这种伤害，现在估计全世界大概有 1 亿人正在受到这种伤害^{105,106}，一旦 5G 全面普及，[全世界所有的人都要受到伤害](#)¹⁰⁷。

2015 年，在布鲁塞尔发表的[电磁敏感症和多种化学物质敏感症的国际科学研究](#)一文中，作者警告：“不采取行动只会让社会付出更多的代价，这不是一个好的选择。我们应该共同认识到电磁波对公众健康的严重威胁，立即采取有效的防护措施，以正确地应对这种世界范围的流行病。”¹⁰⁸

世界各国政府没有尽到照顾自己的人民的责任

世界各国政府忙于普及 5G，同时鼓励无限制地使用外层空间，欧盟、美国政府和其它各国政府正采取的措施会形成一个“无障碍”的监管环境¹⁰⁹，[它们禁止地方政府实施环境](#)

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[保护法律](#)¹¹⁰，只考虑它们自己的利益和用低成本部署 5G，它们去除了当地的规划程序和各種对电磁场辐射释放和聚焦的具体限制¹¹¹。

各国政府还[颁布法律](#)，使无线通信设施拥有宽带信息路通行权¹¹²。目前大多数的无线通信设施都被安装在远离住户和企业用房的地方。而 5G 要求这些设施被安装在不到 100 米远的地方，所以它们将会被直接安装在住户和企业用房前的人行道上，安装在包括抱着孩子的母亲在内的行人的头顶上。

5G 的普及不需要进行公告，也不需要举行听证会，就算举行了听证会，并且有 100 个科学家对 5G 的危害进行举证，那也没有用，因为[法律不会承认这些科学家的举证](#)。比如说美国的法律就禁止地方政府根据无线频率辐射对环境的影响来制定无线技术的管理规定¹¹³，法院会否决那些关于手机信号塔设置的管理规定，因为大多数的公众证言都是关于健康的¹¹⁴。保险公司不会为电磁场造成的风险承保¹¹⁵，对地面上和来自外空的 5G 信号给人体和财产造成的伤害到底如何追责没有任何清楚的规定¹¹⁶。

由于缺乏通用的关于在外层空间进行活动的法律制度，因此在这些进行活动不需要承担责任，尽管地球上的大陆、大气层和海洋已经由于这些活动的进行而处于危险之中。

国际协议遭到违反

孩子和注意义务

联合国大会[儿童权利公约](#)规定：“各国应该保证孩子的幸福得到保障，保护和照顾他们。”（第 3 条）“保证孩子的生存和发展。”（第 6 条）“采取适当的措施与疾病战斗，同时把环境污染的危险和风险考虑在内。”（第 24 条(c)）

纽伦堡法典(1949)对人体实验做出了相关规定，其中也包括有关还没有进行上市前安全性试验的 5G 部署，它会使人类暴露于一种新的、更强的无线电频率辐射之中。“取得受试人的同意是进行试验的必要条件”（条款 1）。而人类将在不情愿的情况下暴露于 5G 之中。“如果有任何原因可能会出现致死、致残等后果，就不应该进行该试验”（条款 5）。有超过 10000 多项科学研究的发现和几百个有着 [成百上千会员的国际组织](#)的发言为证，这些会员已经受到辐射的伤害，由于他们的住家附近安装了无线电信设施，他们不得不搬离，这些就是“相信辐射会致死和致残的先天真理”。

向公众告知电磁场情况的义务

在 [2012 年国际电信联盟召开的世界电信标准化大会](#)上，提出有必要告知公众人体暴露于电磁场之中的潜在危害，并且邀请大会的成员国采取适当的措施以保证各国遵守相关的国际法规，防止电磁场的辐射对人体健康造成不良影响。

[欧洲环境与健康行动计划中期回顾 2004-2010 \(2008\)](#)：“欧洲议会指出，原先制定的对电磁场辐射的公共区域进行限制的标准已经过时，制定这些标准时没有考虑到信息和通信技术的发展，没有考虑到欧洲环境署发表的有关建议和已经被接受的更严格的排放标准，比如，

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比利时、意大利和奥地利就已经接受了这些标准，也没有针对弱势人群采取措施，比如孕妇、新生儿和孩子。

[2011 年欧洲委员会的 1815 号决议](#): “采取所有合理的措施减少人类暴露于电磁场辐射中的机会，特别是从手机中发出的无线电频率，特别要注意减少孩子和年轻人暴露于电磁辐射中的机会。”

环境

[联合国人类环境会议宣言 \(1972\)](#): “排放如此量如此大、浓度如此高的有毒物质超出了环境的承受能力，必须停止排放，以保证不对生态系统产生严重的和不可逆的破坏。” (原则 6)。

[世界自然宪章\(1982\)](#): “应该避免可能对自然产生不可逆破坏的行动，那些负面影响还没有完全被人类了解的行动不应该再继续下去。” (条款 11)。

[《关于环境与发展的里约宣言》\(1992\)](#): “各国负责任确保在它们的管辖和控制范围内的活动不会对其它国家和地区造成违反当地法律的破坏行为。” (原则 2)

联合国[可持续发展问题世界首脑](#) (2002) ([中文报告](#)): “... ..制订更有效的国家和地区政策，以应对环境给人类健康造成的威胁;” (第 54 段 (k))

[非洲自然与自然资源保护大会\(2017\)](#): “有关各方应该采取所有适当的措施最大程度的防止、减缓和消除对环境的有害作用，特别是来自于辐射、有毒和其它危险的物质和废物的有害作用。” (条款 13)

健康和人权

[世界人权宣言](#) (1949): “每个人都有生存、自由和获得安全的权力。” (条款 3)

联合国大会对[妇女、儿童和青少年健康的全球战略\(2016-2030\)](#) 制定下如下目标: 将环境转变成有利于人类生存的环境，减少产妇和新生儿的死亡率，保障人类的健康和幸福，减少由于环境污染引起的死亡和疾病。

外空

[外层空间协议](#) (1967) 要求合理应用外层空间，避免有害的污染和给地球带来不利的变化。(条款 9)

[联合国对外层空间可持续发展的指导方针\(2018\)](#): “各国和国际组织应该在发射卫星、近轨道卫星操作和卫星重返外空时控制可能给人类、财产、公共健康和环境的风险” (指导原则 2.2)

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世界各国政府正在拿地球上的生命赌博

阿尔伯特·爱因斯坦有一句名言“上帝不会赌博”¹¹⁷。可是为了在地球和外层空间普及 5G，这种毫米波技术以前是军事上用作能量武器和人群控制¹¹⁸的，各国政府正不顾一切地拿地球上的生命的未来进行赌博。

拒绝接受和应用相关的经权威部门认可的科学知识在伦理上是不能被接受的。目前的研究表明 5G—特别是基于外层空间的 5G—违反了众多已经被纳入国际协议的原则。

我们向联合国、世界卫生组织、欧盟、欧洲委员会和各国政府发出呼吁，

(a) 立即采取措施，在地球上和外层空间停止部署 5G，这样才能保护全人类，特别是那些胎儿、婴儿、孩子、青少年和孕妇，同时也才能保护环境；

(b) 遵照 联合国关于儿童权利的公约 和 欧洲委员会的 1815 号决议，向全体公民，包括老师和医生告知来自无线频率辐射对成人和儿童健康产生的风险，告诉他们为什么和怎样避开无线通讯和基站，特别是那些托儿所、学校、医院、住家和工作场所附近的基站；

(c) 赞成使用有线通讯而不是无线通讯；

(d) 禁止无线通信行业通过它的游说组织 劝说官员做出决定允许进一步扩大地面和外空的 5G 无线频率辐射的范围；

(e) 立即选定位持真正中立态度的研究电磁场和健康问题的科学家组成独立的专家组，这些科学家不能受电信行业的影响¹¹⁹，让这些科学家制定新的关于无线频率辐射的标准，在他们制定这些标准时不能只根据辐射的功率，还要考虑辐射的累加效应，不能只考虑辐射对人体的热效应，也不能只考虑辐射对人体的作用；

(f) 在没有电信行业影响的前题下，立即选定科学家组成专家组，这些科学家必须具备电磁场、健康、生物学、大气物理方面的专业知识，让这些科学家制定一套全面的管理制度，以确保在利用外层空间的时候人类和环境的安全不受影响，同时还要考虑到无线频率辐射、发射火箭时排出的气体、黑烟、外空碎片以及它们对 臭氧层¹²⁰的影响、全球变暖¹²¹、对大气层和地球上生命的保护，基于地面和外层空间的技术都必须具有针对成人、孩子、动物和植物的可持续性¹²²。

请您回复给下记呼吁管理员。

请详细说明您将采取哪些措施来保护全球人口免受射频辐射照射，特别是 5G 辐射。

此呼吁文和您的答复将在 www.5gSpaceAppeal.org 网上公开发布。

敬稟，

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参考文献

- ¹ De Grasse M. AT&T outlines 5G network architecture. RCR Wireless News, Oct. 20, 2016. <https://www.rcrwireless.com/20161020/network-infrastructure/att-outlines-5g-network-architecture-tag4>. Accessed July 9, 2018.
- ² Hong W, Jiang ZH, Yu C, et al. Multibeam antenna technologies for 5G wireless communications. *IEEE Tr Ant Prop.* 2017;65(12):6231-6249. doi: 10.1109/TAP.2017.2712819.
- ³ Chou H-T. Design Methodology for the Multi-Beam Phased Array of Antennas with Relatively Arbitrary Coverage Sector. Conference paper: 2017 11th European Conference on Antennas and Propagation; Paris, France. doi: 10.23919/EuCAP.2017.7928095.
- ⁴ 47 CFR § 30.202 – Power limits.
- ⁵ [SpaceX](#), [WorldVu](#), [Boeing](#), [Telesat Canada](#) and [Iridium](#).
- ⁶ Federal Communications Commission. *Pending Application for Satellite Space and Earth Station Authorization. Schedule S, Technical Report*. Dated April 2016, filed March 1, 2017.
- ⁷ Governments and organizations that ban or warn against wireless technology. Cellular Phone Task Force website. www.cellphonetaskforce.org/governments-and-organizations-that-ban-or-warn-against-wireless-technology/. Accessed June 10, 2018. Continually updated.
- ⁸ The International Doctors' Appeal (Freiburger Appeal). <http://freiburger-appell-2012.info/en/home.php?lang=EN>. Published in 2012. Accessed June 10, 2018.
- ⁹ International appeal: scientists call for protection from non-ionizing electromagnetic field exposure. International EMF Scientist Appeal website. <https://emfscientist.org/index.php/emf-scientist-appeal>. Published May 11, 2015. Accessed June 10, 2018. As of March 2018, 237 EMF scientists from 41 nations had signed the Appeal.
- ¹⁰ Glaser Z. Cumulated index to the bibliography of reported biological phenomena ('effects') and clinical manifestations attributed to microwave and radio-frequency radiation: report, supplements (no. 1-9). BEMS newsletter (B-1 through B-464), 1971-1981. <http://www.cellphonetaskforce.org/wp-content/uploads/2018/06/Zory-Glasers-index.pdf>. Accessed June 26, 2018. Report and 9 supplements issued by Naval Medical Research Institute, Bethesda, MD; Research Division, Bureau of Medicine & Surgery, Dept. of the Navy, Washington, DC; Electromagnetic Radiation Project Office, Naval Medical Research & Development Command, Bethesda, MD; Naval Surface Weapons Center, Dahlgren, VA; and National Institute for Occupational Safety and Health, Rockville, MD. Index by Julie Moore and Associates, Riverside, CA, 1984. Lt. Zorach Glaser, PhD, catalogued 5,083 studies, books and conference reports for the US Navy through 1981.
- ¹¹ Sage C, Carpenter D., eds. *BioInitiative Report: A Rationale for a Biologically-Based Public Exposure Standard for Electromagnetic Radiation*. Sage Associates; 2012. www.bioinitiative.org. Accessed June 10, 2018. The 1,470-page *BioInitiative Report*, authored by an international group of 29 experts, has reviewed more than 1,800 new studies and is continually updated.
- ¹² Grigoriev Y. Bioeffects of modulated electromagnetic fields in the acute experiments (results of Russian researches). *Annu Russ Natl Comm Non-Ionising Radiat Protect*. 2004:16-73. <http://bemri.org/publications/biological-effects-of-non-ionizing-radiation/78-grigoriev-bioeffects07/file.html>. Accessed June 17, 2018.
- ¹³ Obajuluwa AO, Akinyemi AJ, Afolabi OB, et al. Exposure to radio-frequency electromagnetic waves alters acetylcholinesterase gene expression, exploratory and motor coordination-linked behaviour in male rats. *Toxicol Rep*. 2017;4:530-534. <https://www.sciencedirect.com/science/article/pii/S221475001730063X/pdf?md5=0af5af76124b1f89f6d23c90c5c7764f&pid=1-s2.0-S221475001730063X-main.pdf>. Accessed June 17, 2018.
- ¹⁴ Volkow ND, Tomasi D, Wang G-J, et al. Effects of cell phone radiofrequency signal exposure on brain glucose metabolism. *JAMA*. 2012;305(8):808-813. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3184892>. Accessed June 17, 2018.

国际呼吁：在地面和外空停止使用 5G

- ¹⁵ Hardell L, Carlberg C. Mobile phones, cordless phones and the risk for brain tumors. *Int J Oncol*. 2009;35(1):5-17. <https://www.spandidos-publications.com/ijo/35/1/5/download>. Accessed June 17, 2018.
- ¹⁶ Bandara P, Weller S. Cardiovascular disease: Time to identify emerging environmental risk factors. *Eur J Prev Cardiol*. 2017;24(17):1819-1823. <http://journals.sagepub.com/doi/10.1177/2047487317734898>. Accessed June 17, 2018.
- ¹⁷ Eghlidospour M, Ghanbari A, Mortazavi S, Azari H. Effects of radiofrequency exposure emitted from a GSM mobile phone on proliferation, differentiation, and apoptosis of neural stem cells. *Anat Cell Biol*. 2017;50(2):115-123. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5509895>. Accessed June 17, 2018.
- ¹⁸ Deshmukh P et al. Cognitive impairment and neurogenotoxic effects in rats exposed to low-intensity microwave radiation. *Int J Toxicol*. 2015;34(3):284-290. doi: 10.1177/1091581815574348.
- ¹⁹ Zothansiam, Zosangzuali M, Lalramdinpui M, Jagetia GC. Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations. *Electromag Biol Med*. 2017;36(3):295-305. doi: 10.1080/15368378.2017.1350584.
- ²⁰ Zwamborn A, Vossen S, van Leersum B, Ouwers M, Mäkel W. Effects of Global Communication system radio-frequency fields on Well Being and Cognitive Functions of human subjects with and without subjective complaints. TNO Report FEL-03-C148. The Hague: TNO Physics and Electronics Laboratory; 2003. http://www.milieugezondheid.be/dossiers/gsm/TNO_rapport_Nederland_sept_2003.pdf. Accessed June 16, 2018.
- ²¹ Havas M. When theory and observation collide: Can non-ionizing radiation cause cancer? *Environ Pollut*. 2017;221:501-505. doi: 10.1016/j.envpol.2016.10.018.
- ²² Narayanan SN, Kumar RS, Potu BK, Nayak S, Mailankot M. Spatial memory performance of Wistar rats exposed to mobile phone. *Clinics*. 2009;64(3):231-234. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2666459>. Accessed June 17, 2018.
- ²³ Houston BJ, Nixon B, King BV, De Iuliis GN, Aitken RJ. The effects of radiofrequency electromagnetic radiation on sperm function. *Reproduction*. 2016;152(6):R263-R266. <http://www.reproduction-online.org/content/152/6/R263.long>. Accessed June 17, 2018.
- ²⁴ Han J, Cao Z, Liu X, Zhang W, Zhang S. Effect of early pregnancy electromagnetic field exposure on embryo growth ceasing. Wei Sheng Yan Jiu. 2010;39(3):349-52 (in Chinese). <https://www.ncbi.nlm.nih.gov/pubmed/20568468>.
- ²⁵ Salford LG, Brun AE, Eberhardt JL, Malmgren L, Persson BRR. Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones. *Environ Health Perspect*. 2003;111(7):881-883. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241519/pdf/ehp0111-000881.pdf>. Accessed June 17, 2018.
- ²⁶ Milham S. Evidence that dirty electricity is causing the worldwide epidemics of obesity and diabetes. *Electromagn Biol Med*. 2014;33(1):75-78. doi: 10.3109/15368378.2013.783853.
- ²⁷ Yakymenko I, Tsybulin O, Sidorik E, Henshel D, Kyrylenko O, Kyrylenko S. Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagn Biol Med*. 2016;35(2):186-202. doi: 10.3109/15368378.2015.1043557.
- ²⁸ Herbert M, Sage C. Findings in autism (ASD) consistent with electromagnetic fields (EMF) and radiofrequency radiation (RFR). In: Sage C, Carpenter D., eds. *BioInitiative Report: A Rationale for a Biologically-Based Public Exposure Standard for Electromagnetic Radiation*. Sec. 20. Sage Associates; 2012. http://www.bioinitiative.org/report/wp-content/uploads/pdfs/sec20_2012_Findings_in_Autism.pdf. Accessed June 29, 2018.
- ²⁹ Divan HA, Kheifets L, Obel C, Olsen J. Prenatal and postnatal exposure to cell phone use and behavioral problems in children. *Epidemiology* 2008;19: 523-529. http://www.wifiinschools.com/uploads/3/0/4/2/3042232/divan_08_prenatal_postnatal_cell_phone_use.pdf. Accessed June 29, 2018.
- ³⁰ Divan HA, Kheifets L, Obel C, Olsen J. Cell phone use and behavioural problems in young children. *J Epidemiol Community Health*. 2010;66(6):524-529. doi: 10.1136/jech.2010.115402. Accessed July 16, 2018.

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- ³¹ Li D-K, Chen H, Odouli R. Maternal exposure to magnetic fields during pregnancy in relation to the risk of asthma in offspring. *Arch Pediatr Adolesc Med.* 2011;165(10):945-950.
<https://jamanetwork.com/journals/jamapediatrics/fullarticle/1107612>. Accessed June 29, 2018.
- ³² Warnke U. *Bees, Birds and Mankind: Destroying Nature by 'Electrosmog.'* Competence Initiative for the Protection of Humanity, Environment and Democracy; 2009. www.naturalscience.org/wp-content/uploads/2015/01/kompetenzinitiative-ev_study_bees-birds-and-mankind_04-08_english.pdf. Accessed June 10, 2018.
- ³³ Balmori A. Electromagnetic pollution from phone masts. Effects on wildlife. *Pathophysiology.* 2009;16:191-199. doi:10.1016/j.pathophys.2009.01.007. Accessed June 10, 2018.
- ³⁴ Cammaerts MC, Johansson O. Ants can be used as bio-indicators to reveal biological effects of electromagnetic waves from some wireless apparatus. *Electromagn Biol Med.* 2014;33(4):282-288. doi: 10.3109/15368378.2013.817336.
- ³⁵ Broomhall M. *Report detailing the exodus of species from the Mt. Nardi area of the Nightcap National Park World Heritage Area during a 15-year period (2000-2015).* Report for the United Nations Educational Scientific and Cultural Organization (UNESCO). <https://ehtrust.org/wp-content/uploads/Mt-Nardi-Wildlife-Report-to-UNESCO-FINAL.pdf>. Accessed June 17, 2018.
- ³⁶ Kordas D. *Birds and Trees of Northern Greece: Changes since the Advent of 4G Wireless.* 2017. <https://einarflydal.files.wordpress.com/2017/08/kordas-birds-and-trees-of-northern-greece-2017-final.pdf>. Accessed June 29, 2018.
- ³⁷ Waldmann-Selsam C, Balmori-de la Puente A, Breunig H, Balmori A. Radiofrequency radiation injures trees around mobile phone base stations. *Sci Total Environ.* 2016;572:554-569. doi: 10.1016/j.scitotenv.2016.08.045.
- ³⁸ Balmori A. Mobile phone mast effects on common frog (*Rana temporaria*) tadpoles: The city turned into a laboratory. *Electromagn Biol Med.* 2010(1-2):31-35. doi: 10.3109/15368371003685363.
- ³⁹ Margaritis LH, Manta AK, Kokkaliaris KD, et al. *Drosophila* oogenesis as a bio-marker responding to EMF sources. *Electromagn Biol Med.* 2014;33(3):165-189. doi: 10.3109/15368378.2013.800102.
- ⁴⁰ Kumar NR, Sangwan S, Badotra P. Exposure to cell phone radiations produces biochemical changes in worker honey bees. *Toxicol Int.* 2011;18(1):70-72.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3052591>. Accessed June 17, 2018.
- ⁴¹ Balmori A. Efectos de las radiaciones electromagnéticas de la telefonía móvil sobre los insectos. *Ecosistemas.* 2006;15(1):87-95. <https://www.revistaecosistemas.net/index.php/ecosistemas/articulo/download/520/495>. Accessed June 17, 2018.
- ⁴² Balmori A. The incidence of electromagnetic pollution on wild mammals: A new “poison” with a slow effect on nature? *Environmentalist.* 2010;30(1):90-97. doi: 10.1007/s10669-009-9248-y
- ⁴³ Magras IN, Xenos TD. RF radiation-induced changes in the prenatal development of mice. *Bioelectromagnetics* 1997;18(6):455-461.
http://collectiveactionquebec.com/uploads/8/0/9/7/80976394/exhibit_r-62_magras_mice_study.pdf. Accessed June 17, 2018.
- ⁴⁴ Otitoloju AA, Osunkalu VO, Oduware R, et al. Haematological effects of radiofrequency radiation from GSM base stations on four successive generations (F1 – F4) of albino mice, *Mus Musculus*. *J Environ Occup Sci.* 2012;1(1):17-22. <https://www.ejmanager.com/mnstemp/62/62-1332160631.pdf?t=1532966199>. Accessed July 30, 2018.
- ⁴⁵ Magone I. The effect of electromagnetic radiation from the Skrunda Radio Location Station on *Spirodela polyrhiza* (L.) Schleiden cultures. *Sci Total Environ.* 1996;180(1):75-80. doi: 0048-9697(95)04922-3.
- ⁴⁶ Nittby H, Brun A, Strömblad S, et al. Nonthermal GSM RF and ELF EMF effects upon rat BBB permeability. *Environmentalist.* 2011;31(2):140-148. doi: 10.1007/s10669-011-9307-z.
- ⁴⁷ Haggerty K. Adverse influence of radio frequency background on trembling aspen seedlings: Preliminary observations. *International Journal of Forestry Research.* 2010; Article ID 836278.
<http://downloads.hindawi.com/journals/ijfr/2010/836278.pdf>. Accessed June 17, 2018.

国际呼吁：在地面和外空停止使用 5G

- ⁴⁸ Taheri M, Mortazavi SM, Moradi M, et al. Evaluation of the effect of radiofrequency radiation emitted from Wi-Fi router and mobile phone simulator on the antibacterial susceptibility of pathogenic bacteria *Listeria monocytogenes* and *Escherichia coli*. *Dose Response*. 2017;15(1):1559325816688527. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5298474>. Accessed June 18, 2018.
- ⁴⁹ International Agency for Research on Cancer. Non-ionizing radiation, part 2: radiofrequency electromagnetic fields. In: *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*. Vol 102. Lyon, France: WHO Press; 2013. <http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf>. Accessed July 2, 2018.
- ⁵⁰ Carlberg M, Hardell L. Evaluation of mobile phone and cordless phone use and glioma risk using the Bradford Hill viewpoints from 1965 on association and causation. *Biomed Res Int*. 2017;9218486. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5376454>. Accessed June 17, 2018.
- ⁵¹ Blackman CF. Evidence for disruption by the modulating signal. In: Sage C, Carpenter D., eds. *BioInitiative Report: A Rationale for a Biologically-Based Public Exposure Standard for Electromagnetic Radiation*. Sec. 15. Sage Associates; 2012. http://www.bioinitiative.org/report/wp-content/uploads/pdfs/sec15_2007_Modulation_Blackman.pdf. Accessed June 19, 2018.
- ⁵² Wever R. Human circadian rhythms under the influence of weak electric fields and the different aspects of these studies. *Int J Biometeorol*. 1973;17(3):227-232. www.vitatec.com/docs/referenz-umgebungsstrahlung/wever-1973.pdf. Accessed June 10, 2018.
- ⁵³ Wever R. ELF-effects on human circadian rhythms. In: *ELF and VLF Electromagnetic Field Effects*. (Persinger M, ed.) New York: Plenum; 1974:101-144.
- ⁵⁴ Engels S, Schneider N-L, Lefeldt N, et al. Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird. *Nature*. 2014;509:353-356. doi:10.1038/nature13290.
- ⁵⁵ Ludwig W, Mecke R. Wirkung künstlicher Atmosphärischer auf Säuger. *Archiv für Meteorologie, Geophysik und Bioklimatologie Serie B (Archives for Meteorology Geophysics and Bioclimatology Series B Theoretical and Applied Climatology)*. 1968;16(2-3):251-261. doi:10.1007/BF02243273.
- ⁵⁶ Morley EL, Robert D. Electric fields elicit ballooning in spiders. *Current Biology*. 2018;28:1-7. [https://www.cell.com/current-biology/pdf/S0960-9822\(18\)30693-6.pdf](https://www.cell.com/current-biology/pdf/S0960-9822(18)30693-6.pdf). Accessed July 14, 2018.
- ⁵⁷ Weber J. *Die Spinnen sind Deuter des kommenden Wetters (Spiders Are Predictors of the Coming Weather)*. 1800; Landshut, Germany. "The electrical material works always in the atmosphere; no season can retard its action. Its effects on the weather are almost undisputed; spiders sense it, and alter their behaviour accordingly."
- ⁵⁸ Williams ER. The global electrical circuit: a review. *Atmos Res*. 2009;91(2):140-152. doi:10.1016/j.atmosres.2008.05.018.
- ⁵⁹ König H. Biological effects of extremely low frequency electrical phenomena in the atmosphere. *J Interdiscipl Cycle Res*. 2(3):317-323. www.tandfonline.com/doi/abs/10.1080/09291017109359276. Accessed June 10, 2018.
- ⁶⁰ Sulman F. *The Effect of Air Ionization, Electric Fields, Atmospherics, and Other Electric Phenomena On Man and Animal*. American lecture series. Vol 1029. Springfield, Ill: Thomas; 1980.
- ⁶¹ König HL, Krüger, AP, Lang S, Sönning, W. *Biologic Effects of Environmental Electromagnetism*. New York: Springer-Verlag; 1981. doi: 10.1007/978-1-4612-5859-9.
- ⁶² Sazanov A, Sazanov A, Sergeenko N, Ionova V, Varakin Y. Influence of near earth electromagnetic resonances on human cerebrovascular system in time of heliogeophysical disturbances. *Progress in Electromagnetics Research Symposium*. August 2013:1661-1665.
- ⁶³ Cherry N. Schumann resonances, a plausible biophysical mechanism for the human health effects of solar/geomagnetic activity. *Natural Hazards*. 2002;26(3):279-331. doi:10.1023/A:1015637127504.
- ⁶⁴ Polk C. Schumann resonances. In Volland H, ed. *CRC Handbook of Atmospherics*. Vol. 1. Boca Raton, Fla: CRC Press; 1982:111-178. <https://archive.org/stream/in.ernet.dli.2015.132044/2015.132044.Crc-Handbook-Of-Atmospherics-Vol-1#page/n115/mode/2up/search/polk>. Accessed June 18, 2018.
- ⁶⁵ Park C, Helliwell R. Magnetospheric effects of power line radiation. *Science*. 1978;200(4343):727-730. doi:10.1126/science.200.4343.727.

国际呼吁: 在地面和外空停止使用 5G

- ⁶⁶ Bullough K, Kaiser TR, Strangeways HJ. Unintentional man-made modification effects in the magnetosphere. *J Atm Terr Phys*. 1985;47(12):1211-1223.
- ⁶⁷ Lurette JP, Park CG, Helliwell RA. The control of the magnetosphere by power line radiation. *J Geophys Res*. 1979;84:2657-2660.
- ⁶⁸ Becker RO, Selden G. *The Body Electric: Electromagnetism and the Foundation of Life*. New York: Morrow; 1985:325-326.
- ⁶⁹ Firstenberg A. Planetary Emergency. Cellular Phone Task Force website. www.cellphonetaskforce.org/planetary-emergency. Published 2018. Accessed June 10, 2018.
- ⁷⁰ Becker RO. The basic biological data transmission and control system influenced by electrical forces. *Ann NY Acad Sci*. 1974;238:236-241. doi: 10.1111/j.1749-6632.1974.tb26793.x.
- ⁷¹ Maxey ES, Beal JB. The electrophysiology of acupuncture; How terrestrial electric and magnetic fields influence air ion energy exchanges through acupuncture points. *International Journal of Biometeorology*. 1975;19(Supp. 1):124. doi:10.1007/BF01737335.
- ⁷² Ćosić I, Cvetković D, Fang Q, Jovanov E, Lazoura H. Human electrophysiological signal responses to ELF Schumann resonance and artificial electromagnetic fields. *FME Transactions*. 2006;34:93-103. <http://scindeks-clanci.ceon.rs/data/pdf/1450-8230/2006/1450-82300602093C.pdf>. Accessed July 18, 2018.
- ⁷³ Cohen M, Behrenbruch C, Ćosić I. Is there a link between acupuncture meridians, earth-ionosphere resonances and cerebral activity? Proceedings of the 2nd International Conference on Bioelectromagnetism, Melbourne, Australia. 1998:173-174. doi: 10.1109/ICBEM.1998.666451.
- ⁷⁴ Chevalier G, Mori K, Oschman JL. The effect of earthing (grounding) on human physiology. *European Biology and Bioelectromagnetics*. January 2006:600-621. <http://162.214.7.219/~earthio0/wp-content/uploads/2016/07/Effects-of-Earthing-on-Human-Physiology-Part-1.pdf>. Accessed June 10, 2018. "Highly significant EEG, EMG and BVP results demonstrate that restoring the natural electrical potential of the earth to the human body (earthing) rapidly affects human electrophysiological and physiological parameters. The extreme rapidity of these changes indicates a physical/bioelectrical mechanism rather than a biochemical change."
- ⁷⁵ Firstenberg A. Earth's Electric Envelope. In: *The Invisible Rainbow: A History of Electricity and Life*. Santa Fe, NM: AGB Press; 2017: 113-131.
- ⁷⁶ Cannon PS, Rycroft MJ. Schumann resonance frequency variations during sudden ionospheric disturbances. *J Atmos Sol Terr Phys*. 1982;44(2):201-206. doi:10.1016/0021-9169(82)90124-6.
- ⁷⁷ *Technical Report*. European Telecommunications Standards Institute; 2007:7. www.etsi.org/deliver/etsi_tr/125900_125999/125914/07.00.00_60/tr_125914v070000p.pdf. Accessed June 10, 2018. "The Specific Anthropomorphic Mannequin (SAM) is used for radiated performance measurements [and is] filled with tissue simulating liquid."
- ⁷⁸ Research on technology to evaluate compliance with RF protection guidelines. Electromagnetic Compatibility Laboratory, Tokyo. http://emc.nict.go.jp/bio/phantom/index_e.html. Accessed July 18, 2018. "SAR is measured by filling phantom liquid that has the same electrical properties as those of the human body in a container made in the shape of the human body, and scanning the inside using an SAR probe."
- ⁷⁹ Becker RO, Marino AA. *Electromagnetism and Life*. Albany: State University of New York Press; 1982:39. "The evidence seems to be quite conclusive that there are steady DC electric currents flowing outside of the neurones proper in the entire nervous system."
- ⁸⁰ Nordenström B. *Biologically Closed Electric Circuits*. Stockholm: Nordic Medical Publications; 1983.
- ⁸¹ Nordenström B. Impact of biologically closed electric circuits (BCEC) on structure and function. *Integr Physiol Behav Sci*. 1992;27(4):285-303. doi:10.1007/BF02691165.
- ⁸² Devyatkov ND, ed. *Non-Thermal Effects of Millimeter Radiation*. Moscow: USSR Acad. Sci.; 1981 (Russian).
- ⁸³ Devyatkov ND, Golant MB, Betskiy OV. *Millimeter Waves and Their Role in the Processes of Life*. (*Millimetrovye volny i ikh rol' v protsessakh zhiznedeyatel'nosti*). Moscow: Radio i svyaz' (Radio and Communication); 1991 (Russian).

国际呼吁: 在地面和外空停止使用 5G

- ⁸⁴ Betskii OV. Biological effects of low-intensity millimetre waves (Review). *Journal of Biomedical Electronics*. 2015(1):31-47. <http://www.radiotec.ru/article/15678>. Accessed July 31, 2018.
- ⁸⁵ Albanese R, Blaschak J, Medina R, Penn J. Ultrashort electromagnetic signals: Biophysical questions, safety issues and medical opportunities," *Aviat Space Environ Med*. 1994;65(5 Supp):A116-A120. www.dtic.mil/dtic/tr/fulltext/u2/a282990.pdf. Accessed June 18, 2018.
- ⁸⁶ Pepe D, Aluigi L, Zito D. Sub-100 ps monocycle pulses for 5G UWB communications. 10th European Conference on Antennas and Propagation (EuCAP). 2016;1-4. doi: [10.1109/EuCAP.2016.7481123](https://doi.org/10.1109/EuCAP.2016.7481123).
- ⁸⁷ Nasim I, Kim S. Human exposure to RF fields in 5G downlink. arXiv:1711.03683v1. <https://arxiv.org/pdf/1711.03683>. Accessed June 17, 2018.
- ⁸⁸ Thielens A, Bell D, Mortimore DB. Exposure of insects to radio-frequency electromagnetic fields from 2 to 120 GHz. *Nature/Scientific Reports*. 2018;8:3924. <https://www.nature.com/articles/s41598-018-22271-3.pdf>. Accessed June 17, 2018.
- ⁸⁹ Hallmann CA, Sorg M, Jongejans E. More than 75 percent decline over 27 years in total flying insect biomass in protected areas. *PLOS One*. 2017;12(10):e0185809. <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0185809&type=printable>. Accessed June 17, 2018.
- ⁹⁰ Gandhi O, Riaz A. Absorption of millimeter waves by human beings and its biological implications. *IEEE Trans Microw Theory Tech*. 1986;34(2):228-235. doi:10.1109/TMTT.1986.1133316.
- ⁹¹ Hardell L. World Health Organization, radiofrequency radiation and health - a hard nut to crack (review). *Int J Oncol*. 2017;51:405-413. doi:10.3892/ijo.2017.4046.
- ⁹² Pall M. 5G: Great risk for EU, U.S. and international health: Compelling evidence for eight distinct types of great harm caused by electromagnetic field (EMF) exposures and the mechanism that causes them. European Academy for Environmental Medicine. http://www.5gappeal.eu/wp-content/uploads/2018/06/pall_2018.pdf. Published May 2018. Accessed June 22, 2018.
- ⁹³ Markov M, Grigoriev Y. Wi-Fi technology: An uncontrolled global experiment on the health of mankind, *Electromagn Biol Med*. 2013;32(2):200-208. http://www.avaate.org/IMG/pdf/Wi-fi_Technology_-_An_Uncontrolled_Global_Experiment_on_the_Health_of_Mankind_-_Marko_Markov_Yuri_G._Grigoriev.pdf. Accessed June 23, 2018.
- ⁹⁴ Belyaev I, Alipov Y, Shcheglov V, Polunin V, Aizenberg O. Cooperative response of Escherichia coli cells to the resonance effect of millimeter waves at super low intensity. *Electromagn Biol Med*. 1994;13(1):53-66. doi:10.3109/15368379409030698.
- ⁹⁵ Belyaev I. Nonthermal biological effects of microwaves: Current knowledge, further perspective, and urgent needs. *Electromagn Biol Med*. 2005;24(3):375-403. doi:10.1080/15368370500381844.
- ⁹⁶ Bise W. Low power radio-frequency and microwave effects on human electroencephalogram and behavior. *Physiol Chem Phys*. 1978;10(5):387-398.
- ⁹⁷ Brauer I. Experimentelle Untersuchungen über die Wirkung von Meterwellen verschiedener Feldstärke auf das Teilungswachstum der Pflanzen. *Chromosoma*. 1950;3(1):483-509. doi:10.1007/BF00319492.
- ⁹⁸ Kondra P, Smith W, Hodgson G, Bragg D, Gavora J, Hamid M. Growth and reproduction of chickens subjected to microwave radiation. *Can J Anim Sci*. 1970;50(3):639-644. doi:10.4141/cjas70-087.
- ⁹⁹ Frey AH, Seifert E. Pulse modulated UHF energy illumination of the heart associated with change in heart rate. *Life Sciences*. 1968;7(10 Part 2):505-512. doi: 10.1016/0024-3205(68)90068-4.
- ¹⁰⁰ Mann K, Röschke J. Effects of pulsed high-frequency electromagnetic fields on human sleep. *Neuropsychobiology*. 1996;33(1):41-47. doi: 10.1159/000119247.
- ¹⁰¹ Tiagin NV. *Clinical aspects of exposure to microwave radiation*. Moscow: Meditsina; 1971 (Russian).
- ¹⁰² Tiagin NV. *Clinical aspects of exposure to microwave radiation*. Moscow: Meditsina; 1971 (Russian).
- ¹⁰³ Hecht K. *Health Implications of Long-term Exposure to Electrosmog*. Competence Initiative for the Protection of Humanity, the Environment and Democracy. 2016: 16, 42-46. http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/07/KI_Brochure-6_K_Hecht_web.pdf. Accessed June 20, 2018.

国际呼吁：在地面和外空停止使用 5G

- ¹⁰⁴ Belyaev I, Dean A, Eger H, et al. EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. *Rev Environ Health*. 2016;31(3):363-397. doi:10.1515/reveh-2016-0011.
- ¹⁰⁵ Schreier N, Huss A, Rössli M. The prevalence of symptoms attributed to electromagnetic field exposure: A cross-sectional representative survey in Switzerland. *Soz Präventivmed*. 2006;51(4):202-209. doi:10.1007/s00038-006-5061-2. Accessed July 16, 2018.
- ¹⁰⁶ Schroeder E. Stakeholder-Perspektiven zur Novellierung der 26. BImSchV: Ergebnisse der bundesweiten Telefonumfrage im Auftrag des Bundesamtes für Strahlenschutz (Report on stakeholder perspectives on amending the 26th Federal Emission Control Ordinance: Results of the nationwide telephone survey ordered by the Federal Office for Radiation Protection). Schr/bba 04.02.26536.020. Munich, Germany. 2002 (German). https://www.bfs.de/SharedDocs/Downloads/BfS/DE/berichte/emf/befuerchtungen.pdf?__blob=publicationFile&v=3. Accessed July 19, 2018.
- ¹⁰⁷ Hallberg Ö, Oberfeld G. Letter to the editor: Will we all become electrosensitive? *Electromagn Biol Med*. 2006;25:189-191. https://www.criirem.org/wp-content/uploads/2006/03/ehs2006_hallbergoberfeld.pdf. Accessed June 22, 2018.
- ¹⁰⁸ Brussels International Scientific Declaration on Electromagnetic Hypersensitivity and Multiple Chemical Sensitivity. ECRI Institute. http://eceri-institute.org/fichiers/1441982765_Statement_EN_DEFINITIF.pdf. Published 2015. Accessed June 10, 2018.
- ¹⁰⁹ Removal of barriers to entry, 47 U.S.C. § 253. www.gpo.gov/fdsys/pkg/USCODE-2015-title47/pdf/USCODE-2015-title47-chap5-subchapII-partII-sec253.pdf; *5G For Europe: An Action Plan*. European Commission; 2016. http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17131. Accessed June 10, 2018.
- ¹¹⁰ Federal Register – Rules and Regulations. 47 CFR Part 1 [WT Docket No 17–79; FCC 18–30] [Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment](https://www.federalregister.gov/documents/2018/06/10/2018-11836/accelerating-wireless-broadband-deployment-by-removing-barriers-to-infrastructure-investment). 2018;83(86). Accessed June 10, 2018.
- ¹¹¹ *5G For Europe: An Action Plan*. European Commission; 2016. http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17131. Accessed June 10, 2018.
- ¹¹² PCIA – The Wireless Infrastructure Association. Model wireless telecommunications facility siting ordinance. 2012. https://wia.org/wpcontent/uploads/Advocacy_Docs/PCIA_Model_Zoning_Ordinance_June_2012.pdf. Accessed June 29, 2018.
- ¹¹³ Mobile services, 47 U.S.C. § 332(c)(7)(B)(iv). www.gpo.gov/fdsys/pkg/USCODE-2016-title47/pdf/USCODE-2016-title47-chap5-subchapIII-partI-sec332.pdf: “No state or local government or instrumentality thereof may regulate personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the [Federal Communications] Commission’s regulations concerning such emissions.” Courts have reversed regulatory decisions about cell tower placement simply because most of the public testimony was about health.
- ¹¹⁴ *Cellular Telephone Company v. Town of Oyster Bay*, 166 F.3d 490, 495 (2nd Cir. 1999). <https://openjurist.org/166/f3d/490/cellular-telephone-company-at-v-town-of-oyster-bay>. Accessed June 10, 2018.; *T-Mobile Northeast LLC v. Loudoun County Bd. of Sup’rs*, 903 F.Supp.2d 385, 407 (E.D.Va. 2012). <https://caselaw.findlaw.com/us-4th-circuit/1662394.html>. Accessed June 10, 2018.
- ¹¹⁵ Vogel G. A Coming Storm For Wireless? *TalkMarkets*. July 2017. www.talkmarkets.com/content/stocks--equities/a-coming-storm-for-wireless?post=143501&page=2. Accessed September 13, 2018.
- ¹¹⁶ Swiss Re: SONAR - New emerging risk insights. July 2014:22. http://media.swissre.com/documents/SONAR_2014.pdf. Accessed June 10, 2018. “[A]n increasing level of interconnectivity and the growing prevalence of digital steering and feedback systems also give rise to new vulnerabilities. These could involve cascading effects with multiple damages as well as long-lasting interruptions if the problems turned out to be complex and/or difficult to repair. Interconnectivity and permanent data generation give rise to concerns about data privacy, and exposure to electromagnetic fields may also increase.”
- ¹¹⁷ Albert Einstein, letter to Max Born, Dec. 4, 1926.

国际呼吁：在地面和外空停止使用 5G

¹¹⁸ Active Denial Technology. Non-Lethal Weapons Program. <https://jnlwp.defense.gov/Press-Room/Fact-Sheets/Article-View-Fact-sheets/Article/577989/active-denial-technology/>. Published May 11, 2016. Accessed June 10, 2018.

¹¹⁹ Conflicts of interest have frequently arisen in the past. For example, the [EU Commission \(2008/721/EC\)](#) appointed [industry-supportive members for SCENIHR](#) who submitted to the EU a [misleading SCENIHR report](#) on health risks, which gave the [telecommunications industry carte blanche to irradiate](#) EU citizens. The report is now quoted by radiation safety agencies in the EU. Another example is the US National Toxicology Program contracting with the IT'IS Foundation, which is [funded by the entire telecommunications industry](#), to design, build and monitor the exposure facility for a two-year, 25-million-US-dollar study of cell phones. It subsequently produced a [misleading report](#) that is now quoted by industry officials in the US.

¹²⁰ Ross M, Mills M, Toohey D. Potential climate impact of black carbon emitted by rockets. *Geophys Res Lett*. 2010;37:L24810. <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2010GL044548>. Accessed June 17, 2018.

¹²¹ Ross MN, Schaeffer PM. Radiative forcing caused by rocket engine emissions. *Earth's Future*. 2014;2:177-196. <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/2013EF000160>. Accessed June 17, 2018.

¹²² Callicott JB, Mumford K. Ecological sustainability as a conservation concept. *Conservation Biology*. 1997;11(1):32-40. https://www.sierraforestlegacy.org/Resources/Community/Sustainability/SY_CallicottMumford1997.pdf. Accessed June 20, 2018.