

Proposal for 5.8 GHz towards NFAP 2016

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Table of Contents

| | |
|--|----------|
| 1. Background | 3 |
| 2. Spectrum Allocation in 5 GHz Worldwide | 3 |
| 2.1 USA | 3 |
| 2.2 International Telecommunication Union (ITU) | 3 |
| 2.3 Proposal..... | 4 |
| 3. Changes suggested in India Remarks in NFAP | 4 |
| 3.1 IND 68..... | 4 |
| 3.2 IND69..... | 4 |
| 3.3 IND71..... | 4 |
| 4. References | 5 |

1. Background

Recently, we have observed a significant deployment of Wireless Local Area Network (WLAN) (popularly called WiFi) in 2.4 and 5 GHz worldwide. Even in India, WiFi Hotspots have registered an impressive growth both in terms of indoor and outdoor deployment. This large scale proliferation can be attributed to unlicensed nature of WiFi spectrum.

WiFi systems are based on IEEE 802.11 standard [1]. IEEE 802.11 has evolved from 802.11a to 802.11b, 802.11g and 802.11n and the latest very high throughput WiFi standard as 802.11ac. IEEE 802.11n works in both 2.4 and 5 GHz spectrum bands and achieves throughput of 300 Mbps in 20 MHz and 600 Mbps in 40 MHz. In May 2007, IEEE formed a study group to develop Very High Throughput technology. The work on IEEE 802.11ac in 5 GHz standard began in 2008. The standard was approved in 2014. The enhancements suggested as part of 802.11ac support 20, 40, 80 and 160 MHz bandwidth and can achieve Gigabit throughput.

In the Indian context, both 2.4 GHz and 5 GHz WiFi deployments are extremely important for public WiFi hotspots and Rural WiFi for providing broadband connectivity. Moreover, unlicensed point to point WiFi links are also important for providing connectivity to villages from Gram Panchayats and enterprise connectivity in urban areas. It is an important technology element for realizing the objectives of "Broadband for All" under Honorable Prime Minister's Digital India vision. To achieve these objectives, it is therefore imperative that adequate amount of spectrum be made available for unlicensed operation of WiFi for both indoor and outdoor applications.

2. Spectrum Allocation in 5 GHz Worldwide

2.1 USA

Recognizing the importance of allocating more spectrum for unlicensed operation of 5 GHz WiFi standard, Federal Communications Commission (FCC) of United States of America (USA) made following important changes in 5 GHz band [2]-

1. Removed indoor-only restrictions and permitted higher power levels in 5.15-5.25 GHz. FCC studies indicate no interference to Fixed Satellite Service and Aeronautical Radio navigation which are designated as primary services in this band.
2. Extended unlicensed operation from 5.725-5.825 to 5.725-5.85 GHz for both indoor and outdoor restrictions with higher power.
3. Modified certain technical parameters for unlicensed operation in 5.25-5.35 GHz and 5.47-5.725 GHz.

2.2 International Telecommunication Union (ITU)

In World Radiocommunications Conference 2015 (WRC-15), in Resolution 239 [3], ITU has recognized that minimum spectrum need for Wireless Access System (WAS)/Radio Local

Area Network (RLAN) in the 5 GHz frequency range in the year 2018 is estimated at 880 MHz.

2.3 Proposal

Considering the necessity of more spectrum for IEEE 802.11ac WiFi systems and its role in broadband wireless in our country to realize the vision of "Digital India", we propose that WiFi operations in 5.15-5.25 GHz may be considered for both outdoor and indoor access point with maximum transmit power of 1W and antenna gain of 6 dBi. Accordingly, the following changes are suggested in India Remarks of NFAP 2011 [4].

3. Changes suggested in India Remarks in NFAP

3.1 IND 68

Use of low power equipments for Wireless Access Systems including Radio Local Area Networks (RLAN), in the frequency band 5.150-5.250 GHz using a maximum transmit power of 1W and antenna gain of 6 dBi (mean Effective Isotropic Radiated Power(EIRP) of 4 W) ~~200 mW~~ and a maximum mean Effective Isotropic Radiated Power density of ~~10~~ 50 mW/MHz in any 1 MHz bandwidth may be considered for outdoor applications also on the basis of non-interference, non-protection, non-exclusiveness and exempted from licensing requirements.

3.2 IND69

Requirement of indoor and outdoor Wireless Access Systems including RLAN may be considered in the frequency band 5570-5725 MHz, with a mean EIRP of 4 W ~~1W~~ and a maximum mean EIRP density of 50 mW/ MHz in any 1MHz band on a ~~case-by-case basis on non-protection, non-interference and non-exclusiveness basis and exempted from licensing requirements.~~

3.3 IND71

Use of low power Wireless Access Systems including RLAN and Dedicated Short Range Communications (DSRC) for Intelligent Transport Networks may be considered in the frequency band 5.725 to 5.825 GHz using a maximum transmitter output power of 1 Watt (4 Watts Effective Radiated Power) with spectrum spread of 10 MHz or higher on non interference non protection and non exclusive basis and exempted from licensing requirements.

New India Remarks proposed therefore are-

IND 68

Use of low power equipments for Wireless Access Systems including Radio Local Area Networks (RLAN), in the frequency band 5.150-5.250 GHz using a maximum transmit power of 1W and antenna gain of 6 dBi (mean Effective Isotropic Radiated Power of 4 W) and a maximum mean Effective Isotropic Radiated Power density of 50 mW/MHz in any 1 MHz bandwidth may be considered for outdoor applications also on the basis of non-interference, non-protection, non-exclusiveness and exempted from licensing requirements.

IND69

Requirement of indoor and outdoor Wireless Access Systems including RLAN may be considered in the frequency band 5570-5725 MHz, with a mean EIRP of 4W and a maximum mean EIRP density of 50 mW/ MHz in any 1MHz band on non-protection, non-interference and non-exclusiveness basis and exempted from licensing requirements.

IND71

Use of low power Wireless Access Systems including RLAN and Dedicated Short Range Communications (DSRC) for Intelligent Transport Networks may be considered in the frequency band 5.725 to 5.825 GHz using a maximum transmitter output power of 1 Watt (4 Watts Effective Radiated Power) with spectrum spread of 10 MHz or higher on non interference non protection and non exclusive basis and exempted from licensing requirements.

4. References

- [1] <https://standards.ieee.org/about/get/802/802.11.html>
- [2] https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-30A1.pdf
- [3] Resolution 239, World Radio Communication Conference (WRC-15), Geneva, Switzerland.
- [4] National Frequency Allocation Plan-2011, Wireless planning and Co-ordination (WPC).