From: **Wilson, Dan** <Dan.Wilson@t-mobile.com>
Date: Wed, Jun 5, 2019 at 2:30 PM
Subject: Re: Spectrum Coordination between Loon and T-Mo
To: bwojtowi@loon.com <bwojtowi@loon.com>
Cc: Bashir, Shahzad <Shahzad.Bashir6@t-mobile.com>, Julie Kearney <juliekearney@loon.com>, Sharkey, Steve <Steve.Sharkey@t-mobile.com>, Padua, Percy <Percy.Padua@t-mobile.com>

Ben, we are ok for your testing on the island of Lanai, HI. We don't have specific requirements for you at this time but this could change over the next year. Please proceed and we will get back to you as our network expands. Please also let us know when you plan to start testing and a general testing schedule going forward.

Dan Wilson
Sr. Mgr, Spectrum Engineering
T-Mobile USA
m:425.829.0063

From: Ben Wojtowicz <bwojtowi@loon.com>
Sent: Friday, May 31, 2019 8:07:05 AM
To: Wilson, Dan
Cc: Bashir, Shahzad; Julie Kearney; Sharkey, Steve; Padua, Percy
Subject: Re: Spectrum Coordination between Loon and T-Mo

[External]

Thanks Dan!

On Fri, May 31, 2019 at 8:03 AM Wilson, Dan <Dan.Wilson@t-mobile.com> wrote:

Thank You Ben for your response. We will coordinate this with our market team and they can help us with the locations guidelines. If they have concerns they may ask for limited testing during the network busy hours. We'll get back to you next week and can have a call if necessary.

Dan Wilson

Sr. Manager, Spectrum Engineering

m : 425-829-0063

From: Ben Wojtowicz <bwojtowi@loon.com>
Sent: Thursday, May 30, 2019 5:27 PM
To: Bashir, Shahzad <Shahzad.Bashir6@T-Mobile.com>
Cc: Julie Kearney <juliekearney@loon.com>; Sharkey, Steve <Steve.Sharkey@T-Mobile.com>; Padua, Percy <Percy.Padua@T-Mobile.com>; Wilson, Dan <Dan.Wilson@T-Mobile.com>
Subject: Re: Spectrum Coordination between Loon and T-Mo

[External]

Hi Shahzad,

Here are the answers to your questions:

- We will likely be doing several different tests that will include single UE tests and simultaneous UE tests. However, during the simultaneous tests, we will likely not use more than 2 or 3 UEs at the same time.

- We will likely have a few different tests sites, each with a few UEs available for testing.

- We will likely only perform stationary tests, but we may also perform some limited mobile tests (likely while driving).

- We have flexibility on where the UEs are placed and can likely accommodate "keep out" areas if they can be identified.

- We have some flexibility on the times at which the testing will occur. But I don't think we can restrict to testing only at night.

- Our plan will be to use off the shelf UEs (likely Google Pixels) and their OOBE specs will be adherent to the 3GPP specifications.

Thanks,

Ben

On Wed, May 29, 2019 at 4:41 PM Bashir, Shahzad <Shahzad.Bashir6@t-mobile.com> wrote:

Hi Ben,

Looks like there is some risk of co-channel interference into our DL. A few questions:

- How many test UEs will be used simultaneously?
- Will they all be at the same location?
- Will the UEs be stationary or mobile?
- Can the UEs be located away from populated areas or do the test cases require them to be among population?
- Can the testing be scheduled in off-peak hours? e.g. at night
- Can you share the OOBE specs for the UEs?

regards

Shahzad Bashir

Spectrum Engineering

(425) 233 1219

From: Ben Wojtowicz <bwojtowi@loon.com>
Sent: Wednesday, May 29, 2019 10:54 AM
To: Wilson, Dan <Dan.Wilson@T-Mobile.com>
Cc: Julie Kearney <juliekearney@loon.com>; Sharkey, Steve <Steve.Sharkey@T-Mobile.com>; Padua, Percy <Percy.Padua@T-Mobile.com>; Bashir, Shahzad <Shahzad.Bashir6@T-Mobile.com>
Subject: Re: Spectrum Coordination between Loon and T-Mo

[External]

Hi Dan,

We will typically be using only 8PRBs. However, we can't guarantee the frequency location where these PRBs will be scheduled. In addition, we will use standard PUCCH scheduling. Both of these lead to us having energy in all portions of the 10MHz. However, this will be infrequently in time and frequency.

Thanks,

Ben

On Wed, May 29, 2019 at 7:58 AM Wilson, Dan <Dan.Wilson@t-mobile.com> wrote:

Ben, is the 8 PRBs the most you will be using? So 720 kHz either side of 728 MHz? If so it appears we can avoid any co-channel scenarios. We will look at Lanai later today.

Dan Wilson

Sr. Mgr, Spectrum Engineering

T-Mobile USA

m:425.829.0063

From: Sharkey, Steve

Sent: Wednesday, May 29, 7:10 AM

Subject: RE: Spectrum Coordination between Loon and T-Mo

To: bwojtowi@loon.com, Julie Kearney, Wilson, Dan

Thanks. Adding Dan Wilson who will be looking at this today.

Steve Sharkey

Vice President, Government Affairs

Engineering and Technology Policy

T-Mobile

Cell – (410) 353-5244

From: Ben Wojtowicz <bwojtowi@loon.com>

Sent: Wednesday, May 29, 2019 10:03 AM

To: Julie Kearney <juliekearney@loon.com>

Cc: Sharkey, Steve <Steve.Sharkey@T-Mobile.com>

Subject: Re: Spectrum Coordination between Loon and T-Mo

[External]

Hi Steve,

One quick clarification, we are planning on operating B28 uplink centered at 728MHz (10MHz channel bandwidth). Therefor, the link budgets provided are UE (UL) to UE (DL). In addition, even though the eNodeB will be mounted to a HAPS and moving, we can control the UL transmission locations by selecting specific test sites on Lanai.

Thanks,

Ben

On Tue, May 28, 2019 at 10:29 PM Julie Kearney <juliekearney@loon.com> wrote:

Hello Steve!

Thank you, again, for working with us to assess any interference issues between Loon's proposed testing and T-Mobile. The details below should help with any interference assessment. I've added Ben Wojtowicz, Loon's LTE Software Engineer, who is leading this project. I've also attached Ben's Band 28 Uplink link budget, which should provide more assurance that the interference risk is very low. Please let Ben and me know if you need additional information. We greatly appreciate your assistance!

Center Frequency: 728MHz

Bandwidth: 10MHz

Area: Lanai, HI. We are mounting an eNodeB on a HAPS, so it will not be a fixed location on the ground.

Time: Q4 2019 and Q1/Q2 of 2020. Exact time is flexible and will be better known as we get closer to testing.

Warm regards,

Julie

Julie Kearney

Head of Regulatory Affairs, Loon

juliekearney@loon.com

+1 650.253.3417

www.loon.com

On Sat, May 25, 2019 at 6:07 PM Sharkey, Steve <Steve.Sharkey@t-mobile.com> wrote:

Hi Julie,

Nice to hear from you. Why don't you just send some of the details, including center frequency, bandwidth and proposed area and times of operation and we'll get the right technical folks involved. We've worked with Loon before, so they should be generally familiar.

Steve

Steve Sharkey

On May 25, 2019, at 6:11 PM, Julie Kearney <juliekearney@loon.com> wrote:

[External]

Hi Kathleen and Steve!

I hope you're both doing well. It was great to see you both in Barcelona, which feels like a million years ago (I know you can relate all too well)!

Loon is looking at some future, intermittent field testing in the 700 MHz/Band 28 spectrum in Lanai, HI. We're aware of T-Mobile's current position here. We would greatly appreciate the opportunity to coordinate with you so that we can file for an STA. I can put together the technical specs of what it is we're looking at, but want to make sure that I provide all of the info. you need. This is my first GO at this, so I'll happily accept any guidance on how you'd like to receive any info. and discuss any proposed specs.

Thanks so much!

Kind regards,

Julie

Julie Kearney

Head of Regulatory Affairs, Loon

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