CLAIMS

1. A method for wireless communications by a user equipment (UE), comprising:

receiving a first one or more reference signals (RSs) on a first radio frequency band;

sending a request, in response to the first one or more RSs on the first radio frequency band, for a second one or more RSs on a second radio frequency band; and

initiating a beam failure recovery procedure for a second radio frequency band based, at least in part, on the second one or more RSs received on the second radio frequency band.

2. The method of claim 1, further comprising:

measuring the first one or more RSs on the first radio frequency band; and

performing beam failure detection (BFD) for the second radio frequency band based, at least in part, on one or more measurements of the first one or more RSs on the first radio frequency band.

3. The method of claim 2, wherein performing BFD for the second radio frequency band comprises:

estimating one or more channel parameters of the second radio frequency band using a machine learning (ML) algorithm with the one or more measurements of the first one or more RSs on the first radio frequency band as input; and

comparing the estimated one or more channel parameters of the second radio frequency band to a BFD threshold for the second radio frequency band.

4. The method of claim 3, wherein performing BFD for the second radio frequency band comprises:

detecting beam failure for the second radio frequency band when the estimated one or more channel parameters of the second radio frequency band are below the BFD threshold for the second radio frequency band for at or above a threshold number of measurement instances.

5. The method of claim 3, wherein:

the requesting the second one or more RSs on the second radio frequency band comprises requesting the second one or more RSs on the second radio frequency band when the estimated

one or more channel parameters of the second radio frequency band are within a predefined margin of the BFD threshold for the second radio frequency band; and

the performing the BFD for the second radio frequency band comprises:

measuring the second one or more RSs on the second radio frequency band; and

comparing one or more measurements of the second one or more RSs on the second radio frequency band to the BFD threshold for the second radio frequency band.

6. The method of claim 5, wherein the requesting the second one or more RSs on the second radio frequency band comprises requesting a base station (BS) to transmit one or more on-demand beam BFD RSs on the second radio frequency band.

7. The method of claim 2, wherein the one or more measurements on the first radio frequency band comprises one or more reference signal receive power (RSRP) measurements, one or more positioning measurements, one or more raw channel measurements, one or more channel impulse response (CIR) measurements, one or more angle of departure (AoD) measurements, one or more delay measurements, or a combination thereof.

8. The method of claim 3, wherein the estimated one or more channel parameters comprises estimated one or more reference signal receive power (RSRP) values.

9. The method of claim 1, wherein the first radio frequency band is in a sub-6 GHz radio frequency range and the second radio frequency band is in a millimeter wave (mmW) radio frequency range.

10. A method for wireless communications by a base station (BS), comprising:

outputting a first one or more reference signals (RSs) to a user equipment (UE) on a first radio frequency band;

obtaining a request from the UE, in response to the first one or more RSs on the first radio frequency band, to send a second one or more RSs on a second radio frequency band;

outputting the second one or more RSs to the UE on the second radio frequency band; and

obtaining a beam failure recovery request message from the UE in response to the second

one or more RSs.

11. The method of claim 10, wherein the first radio frequency band is in a sub-6 GHz radio frequency range and the second radio frequency band is in a millimeter wave (mmW) radio frequency range.

12. The method of claim 10, wherein receiving the request from the UE to send the second one or more RSs on the second radio frequency band comprises receiving the request on a physical uplink control channel (PUCCH).

13. The method of claim 10, wherein receiving the request from the UE to send the second one or more RSs on the second radio frequency band comprises receiving a request, from the UE, to transmit one or more on-demand beam failure detection (BFD) RSs on the second radio frequency band.

14. An apparatus for wireless communications, comprising:

a memory; and

at least one processor coupled with the memory, the memory and processor configured to:

receive a first one or more reference signals (RSs) on a first radio frequency band;

send a request, in response to the first one or more RSs on the first radio frequency band, for a second one or more RSs on a second radio frequency band; and

initiate a beam failure recovery procedure for a second radio frequency band based, at least in part, on the one or more RSs received on the second radio frequency band.

15. The apparatus of claim 14, wherein the memory and processor are further configured to:

measure the one or more RSs on the first radio frequency band; and

perform beam failure detection (BFD) for the second radio frequency band based, at least in part, on one or more measurements of the first one or more RSs on the first radio frequency band.

16. The apparatus of claim 15, wherein the memory and processor are further configured to:

estimate one or more channel parameters of the second radio frequency band using a machine learning (ML) algorithm with the one or more measurements of the first one or more RSs on the first radio frequency band as input; and

compare the estimated one or more channel parameters of the second radio frequency band to a BFD threshold for the second radio frequency band.

17. The apparatus of claim 16, wherein the memory and processor are configured to:

detect beam failure for the second radio frequency band when the estimated one or more channel parameters of the second radio frequency band are below the BFD threshold for the second radio frequency band for at or above a threshold number of measurement instances.

18. The apparatus of claim 16, wherein the memory and processor are configured to:

request the second one or more RSs on the second radio frequency band when the estimated one or more channel parameters of the second radio frequency band are within a predefined margin of the BFD threshold for the second radio frequency band;

measure the second one or more RSs on the second radio frequency band; and

compare one or more measurements of the second one or more RSs on the second radio frequency band to the BFD threshold for the second radio frequency band.

19. The apparatus of claim 18, wherein the memory and processor are configured to request a base station (BS) to transmit one or more on-demand BFD RSs on the second radio frequency band.

20. The apparatus of claim 16, wherein the estimated one or more channel parameters comprises estimated one or more reference signal receive power (RSRP) values.

21. The apparatus of claim 15, wherein the one or more measurements on the first radio frequency band comprises one or more reference signal receive power (RSRP) measurements, one or more positioning measurements, one or more raw channel measurements, one or more channel impulse response (CIR) measurements, one or more angle of departure (AoD) measurements, one or more delay measurements, or a combination thereof.

22. The apparatus of claim 14, wherein the first radio frequency band is in a sub-6 GHz radio frequency range and the second radio frequency band is in a millimeter wave (mmW) radio frequency range.

23. An apparatus for wireless communications, comprising:

a memory; and

at least one processor coupled with the memory, the memory and processor configured to:

output a first one or more reference signals (RSs) to a user equipment (UE) on a first radio frequency band;

obtain a request from the UE, in response to the first one or more RSs on the first radio frequency band, to send a second one or more RSs on a second radio frequency band;

output the second one or more RSs to the UE on the second radio frequency band; and

obtain a beam failure recovery request message from the UE in response to the second one or more RSs.

24. The apparatus of claim 23, wherein the first radio frequency band is in a sub-6 GHz radio frequency range and the second radio frequency band is in a millimeter wave (mmW) radio frequency range.

25. The apparatus of claim 23, wherein the memory and processor are configured to receive the request on a physical uplink control channel (PUCCH).

26. The apparatus of claim 23, wherein the memory and processor are configured to receive a request, from the UE, to transmit one or more on-demand beam failure detection (BFD) RSs on the second radio frequency band.