SPACEX

October 2, 2024

BY ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, N.E.
Washington, DC 20554

Re: GN Docket No. 23-65 and IB Docket No. 22-271; Call Sign WW9XPI, File Nos. 2479-EX-ST-2023, 0519-EX-ST-2024, 0661-EX-ST-2024

Dear Ms. Dortch:

SpaceX and T-Mobile stand poised to bring Supplemental Coverage from Space ("SCS") that will keep Americans connected beyond existing terrestrial networks, particularly whenever and wherever natural disasters occur. In an effort to slow or block this new service for Americans, Omnispace provided deficient answers to questions the Commission asked about its service. Critically, Omnispace's reliance on a seriously flawed report prepared by a pay-for-play firm that specializes in attacking SpaceX—RKF Engineering—further exposes Omnispace's meritless, obstructionist tactics. As SpaceX's attached analysis illustrates, Omnispace and RKF make blatant errors that significantly overestimate interference to Omnispace's hypothetical mobile satellite service ("MSS") system in low-Earth orbit ("LEO"). Most seriously, RKF attempts to attribute interference to SpaceX's system by ignoring the overwhelming interference that Omnispace's satellites, if they were ever launched, would receive from in-band and out-of-band terrestrial mobile operations throughout North and South America. In other words, Omnispace's uplink transmissions would be drowned out by terrestrial signals, rendering SpaceX's operations inconsequential. Omnispace's attempt to block SpaceX based on unfounded claims of interference is at the expense of American first responders and consumers that would rely on SpaceX's system to deliver unprecedented and life-saving services.

The Commission asked Omnispace several questions about its system measurements, characteristics, operations, and alleged proof of harmful interference from SpaceX. In response, Omnispace deflected. For instance, when the Commission questioned Omnispace about its prior Monte Carlo analysis and its actual antenna patterns, which Omnispace admitted do not exist, Omnispace instead points to studies it paid RKF to create. But RKF's co-channel and adjacent channel studies make the following key errors, among others.

- RKF makes incorrect assumptions about SpaceX's system, including its antenna pattern, out-of-band emissions, beam placement methodology, and power levels.
- Once again, RKF uses physically impossible assumptions to model Omnispace's antenna pattern and efficiency.
- RKF and Omnispace knowingly neglect their own past studies of extremely high terrestrial interference into Omnispace's putative MSS operations.

- RKF provides no indication that it will respect international power flux density limits in Canada, which impacts its expected in-band interference profile.

The Commission should dismiss Omnispace's unsubstantiated claims of expected interference from SpaceX to its hypothetical MSS system. These claims serve no purpose other than hindering critical technology advancements and obstructing the delivery of essential SCS services to American consumers and first responders. By recognizing the lack of credible evidence behind Omnispace's assertions, the Commission can prioritize genuine efforts to advance its Space Agenda.

Sincerely,

/s/ Jayson L. Cohen

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Director, Satellite Policy

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Attachment - SpaceX Response to Omnispace August 30, 2024 Ex Parte

SPACEX

SPACEX RESPONSE TO OMNISPACE AUGUST 30, 2024 EX PARTE

I. EXECUTIVE SUMMARY

Omnispace was unable to answer the Commission's straightforward questions about its own hypothetical low-Earth orbit ("LEO") mobile satellite service ("MSS") system and alleged interference to SpaceX. Instead, Omnispace relies on a seriously flawed set of studies by RKF Engineering. The RKF report claims to show that SpaceX satellite transmissions in the PCS G block downlink (1990-1995 MHz) would cause potentially harmful uplink interference into Omnispace's hypothetical MSS LEO satellites. RKF produced a contour map that Omnispace suggests shows interference high enough to prevent ground locations in the future from communicating with hypothetical Omnispace satellites positioned over North America and a portion of northern South America.

RKF's report contains numerous fatal errors that undermine the validity and credibility of the results, including incorrect technical assumptions, impossible physics, a disregard of relevant information about SpaceX's system, and deliberate blindness to terrestrial sources of extremely harmful interference that RKF and Omnispace themselves have stressed previously. RKF makes serious errors both in its in-band interference work and its adjacent band work, rendering its study entirely unreliable to support Omnispace's opposition to SpaceX's direct-to-cell application. RKF's errors include the following.

- Incorrect assumptions about SpaceX's operations and antenna characteristics, such as:
    - Inaccurate methodologies to maintain constant in-band power flux density (PFD) on the ground
    - An overly conservative transmission antenna pattern with unrealistically high sidelobe gain

  - A reductionist beam placement methodology
  - Inaccurate modeling of out-of-band (OOB) emissions
- An overly sensitive representation of Omnispace's own hypothetical antenna characteristics, in particular:
  - An overly conservative receive antenna pattern with unrealistically high sidelobe gain
  - Impossibly high antenna efficiency
- Failing to respect international PFD limits in Canada
- Applying an incorrect boundary between territorial and international waters
- Failing to consider overwhelming terrestrial interference sources both in-band and out of band

RKF's glaring errors shatter any purported reliability of its interference analysis and conclusions. Like Omnispace's earlier attempts, this latest analysis also falls flat after even surface-level technical scrutiny, let alone close review.

II. INTRODUCTION

On August 30, 2024, Omnispace directly answered only one of six questions that the Commission posed relating to its claims of potential interference, instead providing answers meant to obfuscate the true interference environment.[1] Instead of answering the Commission's questions, Omnispace points the Commission to a flawed study conducted by RKF.[2] SpaceX illustrates below that Omnispace and RKF not only present a distorted view of interference potentially caused

[1] Letter from Amit Saluja to Ira Keltz, ELS File No. 0519-EX-ST-2024, GN Docket No. 23-65, IB Docket No. 22-271, at 1-3 (August 30, 2024) ("Omnispace August 30 Letter") (attaching "Assessment of Interference to Authorized S Band Satellite Systems' Uplink Created by SpaceX's Non-conforming Use of the 1990-1995 MHz Band as Satellite Downlink" (August 2024) ("August RKF Report")).

[2] August RKF Report.

by SpaceX's direct-to-cellular operations but also completely disregard the very high levels of harmful interference to any future putative Omnispace MSS operations from terrestrial mobile base stations in North and South America. Remarkably, Omnispace itself stressed the impact of such terrestrial interference at the ITU,[3] but in direct response to the Commission's questions, it attempts to play down the effect of terrestrial interference on its hypothetical service, which dwarfs any alleged interference from SpaceX.

III. SPACEX'S RESPONSE TO OMNISPACE

A. Omnispace's Responses to the Commission's Questions Illustrate It Cannot Justify Its Claims of Harmful Interference from SpaceX

In response to Omnispace's May 17, 2024 filing regarding its claim of harmful interference that SpaceX is allegedly causing to Omnispace's primary MSS operations in the 1990-1995 MHz frequency band,[4] the Commission asked Omnispace to answer the six questions below.[5]

- **Question 1:** What is the noise floor in Omnispace's current service area?
    a. How does that compare to the noise floor measured over Asia?
    b. Is the noise floor higher in the service area than in the area in the U.S. where the measurements were performed?
- **Question 2:** Does Omnispace view terrestrial mobile operations in the U.S. as a source of harmful interference and how do operational stations in that service affect its measurements?
- **Question 3:** What does Omnispace's signal look like when Omnispace is carrying traffic, particularly over South America? Please provide spectrum analyzer plots, preferably with the same reference bandwidth as requested by the question below. What is your C/N ratio

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[3] ITU Report on the Meeting of Working Party 4C, Document 4C/343, Annex 8 "Coexistence and compatibility study between the terrestrial component and the satellite component of IMT in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in different countries," at 17-18 (Setup 11), 270 (June 18, 2018) ("ITU Terrestrial Interference Study"); *see also* ITU Report on the Meeting of Working Party 4C, Document 4C/400, Appendix 7 "Coexistence and compatibility study between the terrestrial component and the satellite component of IMT in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in different countries - Updates to the working document towards a preliminary draft new [Recommendation or Report] TU-R M.[MSS&IMT-ADVANCED SHARING]," at 294 (June 18, 2018).

[4] Letter from Mindel De La Torre to Marlene H. Dortch, ELS File Nos. 2479-EX-ST-2023, 0519-EX-ST-2024, and 0661-EX-ST-2024, GN Docket No. 23-65, IB Docket No. 22-271 (May 17, 2024) (attaching "Recap of January 7, 2024 interference from the first batch of SpaceX satellites into Omnispace F2 satellite" (May 2024) ("Omnispace May Study")).

[5] Omnispace August 30 Letter at 1-3.

when you are carrying traffic (actual, average or typical expected received levels) and what is the measured noise floor during this scenario without the Starlink received noise floor increase, what is the measured C/N ratio of your traffic with that increase factored in?

- **Question 4:** The FCC would like to see measurements, including an active Omnispace signal, as SpaceX's satellites pass overhead where Omnispace is providing service, both with and without active SpaceX transmissions.
- **Question 5:** What are the inputs and assumptions used for the Monte Carlo analysis?
- **Question 6:** What are the actual Omnispace antenna patterns (especially at relevant sidelobe angles) and the actual SpaceX antenna patterns used in the interference analyses and power calculations.

Omnispace's responses to these questions are deficient and misleading. As an initial matter, rather than answer Question 1 and provide the requested noise floors over Asia and the United States, as well as in Omnispace's current service areas, Omnispace evades answering by pointing to its flawed interference study from May 2024.[6] That older study, however, does not answer the Commission's question either, merely providing a few snapshots of an alleged increase in Omnispace's F2 satellite's noise floor that is in medium-Earth orbit (MEO). Notably, the Commission already had Omnispace's May study when it posed Question 1 about the noise floor. Moreover, SpaceX already emphasized that Omnispace has not provided any evidence of its simulated or real service, much less service interruption, using its sporadic measurements on its MEO satellite and oversimplified assumptions.[7] SpaceX established that Omnispace had failed to provide any of the information and parameters necessary to evaluate its claim of interference in its May study, such as antenna parameters, service territories, specific satellite locations, and the regularity and duration of any supposed threshold exceedances. At bottom, Commission Question 1 about Omnispace's noise floor remains unanswered.

Omnispace also fails to answer Commission Question 2 about how terrestrial operations in

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6 Omnispace May Study.

7 Letter from David Goldman to Marlene H. Dortch, ELS File No. 0519-EX-ST-2024; GN Docket No. 23-65, IB Docket No. 22-271 (May 23, 2024).

the PCS G block in the United States impact *Omnispace's measurements*. Because Omnispace has no actual system on which to perform measurements, Omnispace instead relies on the flawed August RKF Report. And remarkably, the August RKF Report ignores entirely the harmful interference that terrestrial mobile networks would cause to Omnispace's paper system despite Omnispace's claim that Starlink would "substantially and materially worsen the interference conditions Omnispace faces outside the United States" when combined with terrestrial interference sources.[8] By ignoring interference from terrestrial operations in the band, Omnispace and RKF have conveniently ignored their *own* study that was filed at the ITU through the administration of Papua New Guinea several years ago. In that ITU study, Omnispace showed that the terrestrial interference into its LEO satellites would be worse than and extend as far as the interference it claims it would experience from Starlink, effectively rendering any interference from SpaceX satellites a small blip in comparison.[9] Understanding the overwhelming interference caused by terrestrial mobile base stations to Omnispace is critical to understand SpaceX's small relative impact.

When asked to provide operational measurements and signals in response to Commission Questions 3 and 4, Omnispace has no answers. Instead, Omnispace confirms its system is hypothetical, readily admitting that it *intends* to reach its unspecified *first phase* operations only in 2026.[10] Apparently Omnispace is unable to provide even high-level information about its satellite constellation and orbital parameters with which to better understand the expected interference environment in view of its attempt to shut down SpaceX's revolutionary supplemental coverage from space.

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8 Omnispace August 30 Letter at 2.

9 ITU Terrestrial Interference Study at 17-18 (Setup 11), 270.

10 Omnispace August 30 Letter at 3.

The Commission's final two questions, Questions 5 and 6, ask Omnispace to provide the inputs and assumptions it used for its Monte Carlo analysis, as well as the assumed Omnispace and SpaceX antenna patterns. In response, Omnispace again merely points to its attached August RKF Report.[11] Among numerous errors, that report claims interference using Recommendation ITU-R S.1528-0 recommends 1.3 as the antenna patterns for both Omnispace as receiver and SpaceX as transmitter, but these patterns have impossibly unrealistic high sidelobe gain levels. As the following sections describe in detail, RKF's fatal errors completely undermine its claim that SpaceX satellite antenna sidelobe emissions would cause interference when received in Omnispace's satellite antenna sidelobes.

B. RKF's Alleged Interference Study is Fatally Flawed

SpaceX analyzed the August RKF Report to understand Omnispace's bold claim to the Commission, based on that work, that SpaceX would cause harmful interference to Omnispace's hypothetical LEO MSS system. SpaceX found that RKF's analysis, which nominally covers both in-band and adjacent band interference from SpaceX, falls far short of reliability and accuracy due to an overwhelming number of incorrect assumptions and methodologies as well as knowing disregard of terrestrial interference sources. The error-riddled August RKF Report does not show that SpaceX's operations will cause Omnispace harmful interference.

1. RKF's Assumptions and Methodology are Wrong and Unreliable

a. RKF's Assumptions about SpaceX's Satellites are Wrong and Contribute to its Significant Overestimation of Interference

RKF made numerous unsupported and incorrect assumptions about SpaceX's direct-to-cellular satellites and satellite operations. RKF contemplates two distinct methods, both

[11] *Id.*

wrong, regarding how SpaceX's satellites maintain a constant PFD on the ground. Both of these methods overestimate the expected interference by effectively creating wider beams than is representative of SpaceX's satellite beams.[12] In its "baseline" method, RKF assumes that SpaceX satellites would dynamically adjust their antenna gains by turning off outer antenna elements in their arrays while keeping transmitter powers constant. This does not occur. In its "alternative" method, RKF instead assumes that a SpaceX satellite antenna can somehow jump between four discrete gain steps while also adjusting transmitter power to maintain the constant PFD on the ground. Apparently, in fabricating this alternative method, RKF relied on discrete gain values that SpaceX provided to the Commission in SpaceX's Application. But these different values simply identify a number of different satellite antennas that SpaceX *could* build; these different gain values do not apply to a single satellite antenna.[13]

Adding to its errors, RKF elects to use an overly conservative reference antenna pattern, Recommendation ITU-R S.1528-0 recommends 1.3 ("the S.1528 1.3 Antenna"), to represent SpaceX's satellite antenna transmitter pattern. It claims that while this "recommendation was developed for fixed satellite service, there is no reason to think that mobile satellite antennas would be any different."[14] This assumption, however, does not apply to SpaceX's direct-to-cellular satellites. It is well known that the S.1528 1.3 Antenna has impossibly high gain sidelobes, meaning choice of that pattern greatly inflates the expected interference to Omnispace from SpaceX. This error is very likely one of the largest contributing factors to the inaccuracy of the August RKF Report. In contrast, as SpaceX recently told the Commission, Recommendation

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[12] August RKF Report at 4-5.

[13] Application for Modification of Authorization for the SpaceX Gen2 NGSO Satellite System to Add a Direct-to-Cellular System, Schedule S Parameters, ICFS File No. SAT-MOD-20230207-00021 ("SpaceX Application").

[14] August RKF Report at 7.

ITU-R S.1528-0 recommends 1.4 serves as a reasonable proxy for SpaceX's average direct-to-cellular antenna pattern for purposes of interference studies.[15]

RKF also incorrectly models additional features of SpaceX's direct-to-cellular operations that inflate the simulated interference. RKF takes a highly reductionist approach that does not consider any statistical factors such as activity factor and duty cycle that play an important role in coexistence studies. For example, RKF assumes that each SpaceX satellite would always place 43 beams on the ground in the United States at maximum power if the satellite is in view of the United States above a 30° minimum elevation angle.[16] But if SpaceX deploys 7500 direct-to-cellular satellites, the average number of beams per satellite would be lower than RKF assumes. Generally, the number of beams that each satellite places onto the Earth decreases as the number of satellites in the sky increases because each satellite would need to cover less area on the ground. This effect means that the sidelobe emissions from each satellite decreases as the satellite constellation size increases. Also, if SpaceX deploys 7500 direct-to-cellular satellites globally that can operate in the 1990-1995 MHz range when transmitting to the United States, at any moment in time, many of the satellites in view of the United States would be offshore and likely would not place beams at all if another closer satellite could provide better coverage and service. If such far offshore satellites were to place beams in the United States, they would use far fewer beams than the satellites over the United States. RKF considers none of these topological factors that would reduce the expected interference.

[15] Letter from David Goldman to Marlene H. Dortch, ICFS File No. SAT-MOD-20230207-00021 *et al.*, GN Docket No. 23-135 (Sept. 18, 2024).

[16] August RKF Report at 9.

b. RKF's Omnispace Antenna Pattern Assumption Dramatically Overstates Interference

In response to Commission Question 6 concerning "actual Omnispace antenna patterns (especially at relevant sidelobe angles)," Omnispace merely points to the August RKF Report, but RKF provides no actual Omnispace antenna pattern or realistic estimate of Omnispace's antenna gain at relevant sidelobe angles as the Commission requested. Because Omnispace's system is entirely hypothetical, neither Omnispace nor RKF can answer this critical question of receive antenna sidelobe gain. Instead, as it did for SpaceX, RKF improperly models Omnispace's satellite receiving antenna as the S.1528-0 1.3 Antenna, but this time with an entirely unphysical 36 dBi peak gain with 100% efficiency.[17] Not only does RKF use a receive antenna pattern with unrealistically high sidelobe gain, it also assumes Omnispace's receive antenna has perfect efficiency. Typical antenna efficiency is 60%. As a result, all else equal, this impossible antenna would receive almost twice the interference as a real antenna just due to the 100% efficiency assumption. Omnispace is content to severely overstate the interference SpaceX would cause by endorsing RKF's flawed use of an unphysical receive antenna model for Omnispace's hypothetical LEO satellites instead of using a realistic satellite receive pattern.

c. Omnispace and RKF Ignore Their Own Prior Study of Devastating Terrestrial Interference to Omnispace from Mobile Base Stations

Commission Question 2 probes the impact of terrestrial base stations in the United States on Omnispace's measurements and as a source of harmful interference. Instead of ensuring that their analysis includes terrestrial interference, Omnispace and RKF ignore the extremely high noise floor that terrestrial interference creates. Incredibly, they disregard their own earlier study, filed at the ITU, that shows the dramatic impact of terrestrial interference into Omnispace's

[17] *Id.* at 8.

satellites.[18] This interference would overshadow much, if not all, of any alleged impact from SpaceX. By isolating the effect of SpaceX interference into Omnispace without considering the greater and more serious interference of existing terrestrial operations, the August RKF Report significantly overstates any alleged interference that SpaceX would cause to Omnispace in the future and undermines RKF's credibility.

2. RKF's In-Band Results Overstate Interference

In its in-band interference analysis, RKF presents several plots showing the alleged interference from SpaceX in the form of a grid of pixels, each of which represents the potential position of an Omnispace satellite.[19] The plots indicate that the harmful interference would extend into South America, the United Kingdom, and even Japan in some cases. Despite the numerous flaws and incorrect assumptions described above that, if corrected, should curb any interference fears, RKF makes additional errors that further overestimate interference.

In order to protect mobile user equipment ("UE") that utilize the 2170 – 2200 MHz downlink range, RKF excludes Omnispace satellite antenna pointing directions that exceed the international PFD limit of -108.8 dBW/m^2/MHz[20] towards the United States in its analysis. However, RKF fails to consider that Omnispace must also protect the mobile UEs of the customers of Canadian operators, who also utilize the entire 2170 – 2200 MHz downlink range for terrestrial IMT connectivity throughout Canada. RKF should therefore exclude all Omnispace satellite pointing directions that exceed the -108.8 dBW/m^2/MHz international PFD limit towards Canada as well. Furthermore, RKF's assignment to Omnispace of "500 random pointing directions,

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[18] ITU Terrestrial Interference Study at 17-18 (Setup 11), 270.

[19] August RKF Report at 11-14.

[20] This is the coexistence power flux density per WRC-19 for satellite downlink transmissions in 2170-2200 MHz band to protect IMT UEs. ITU Resolution 212 (Rev. WRC-19), Annex § 2(e).

uniformly over the satellite field of view," excluding the United States and its territorial waters (which should also include Canada and its territorial waters), is a blind approach that suggests that Omnispace could and would place beams anywhere outside those regions without considering its own authorized coverage areas or self-interference constraints.[21] RKF's oversights, if modelled correctly in its analysis, would have a significant impact on the expected interference profile.

The August RKF Report also makes other relatively minor errors that indicate RKF's lack of rigor and credibility. For example, the appropriate border between international waters and territorial waters is 12 nautical miles, not 12 (regular) miles as RKF assumes.[22]

3. RKF's Adjacent Band Studies Overestimate Interference

The August RKF Report purports to analyze the expected adjacent channel interference from SpaceX's PCS G downlink into the rest of the MSS uplink channel, ranging from 1980 – 2010 MHz. In addition to the flawed assumptions detailed above that play a role in RKF overestimating the adjacent band interference, RKF's adjacent band analysis adds new errors.

RKF slants its studies of adjacent band interference by using partial information to achieve facially false conclusions. In its second study of adjacent band interference, RKF claims that SpaceX would cause unacceptable out-of-band ("OOB") interference into Omnispace satellites when they are flying over parts of Canada and Mexico.[23] RKF cites SpaceX's February 13, 2024 filing, which presents SpaceX's per-satellite OOB equivalent isotropic radiated power ("EIRP") density mask.[24] As an initial matter, in that filing, SpaceX stated that the assumptions used to

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21 August RKF Report at 9.

22 *Id.* at 9.

23 *Id.* at 16-18.

24 Letter from David Goldman to Marlene H. Dortch, ELS File No. 0519-EX-ST-2024; GN Docket No. 23-65, IB Docket No. 23-135 (February 13, 2024) ("SpaceX February 13 Filing") (attaching "Attachment A: Supplemental Out-of-Band Emissions Demonstration" ("SpaceX OOB Emissions Demonstration")).

arrive at the OOB EIRP density mask were conservative, including use of the maximum 5 MHz bandwidth per in-band beam and operating the satellite power amplifiers fully loaded. These assumptions maximize OOB emissions and hence overstate SpaceX's predicted interference into adjacent channels. As importantly, RKF uses only part of SpaceX's OOB EIRP mask information presented in the February 13 filing, deceptively assuming peak OOB EIRP in all directions and excluding the critical cosine loss factor as a function of off-axis angle. This factor, presented as a figure in the attachment to SpaceX's February 13 filing, indicates that OOB emissions decrease by up to 20 dB as the angle from nadir increases.[25] By failing to account for this cosine factor loss leading to significantly lower off-axis OOB emission, RKF significantly overestimates the expected adjacent channel interference, especially at large off-axis angles. Given that Omnispace is most concerned with SpaceX's satellite OOB emissions at off-axis angles, Omnispace's OOB interference concerns as reflected in its second adjacent band study are entirely unfounded.

RKF's final two studies of out-of-band interference are simply wrong, grossly overestimating the adjacent channel interference by misconstruing how SpaceX's OOB emissions should be modeled. In its filing with the Commission, as discussed above, SpaceX submitted its OOB EIRP mask indicating that the maximum OOB emission per-satellite follows a pattern that is nearly isotropic and has cosine factor loss and suggested an aggregate OOB PFD of -113.5 dBW/m^2/MHz.[26] Despite RKF citing this OOB interference mask in its August study,[27] it then ignores it in its final two analyses of OOB interference. Instead, RKF incorrectly assumes that a SpaceX direct-to-cellular satellite emits an aggregate OOB PFD of -113.5 dBW/m^2/MHz *in*

[25] SpaceX OOB Emissions Demonstration at 4.

[26] Petition for Reconsideration of Space Exploration Holdings, LLC, GN Docket No. 23-135 and SB Docket No. 22-271, at 9 (May 30, 2024).

[27] SpaceX OOB Emissions Demonstration at 4.

the form of a single OOB beam.[28] RKF has no basis to make this single OOB beam assumption. To the contrary, SpaceX's OOB emission mask indicates that the OOB emission can never be modeled as a single beam as the emission pattern is nearly isotropic.[29] RKF then presents an erroneous calculation and erroneous OOB interference contour plots at pages 19 to 21 of its report by employing its incorrect single OOB beam assumption.[30]

Finally, despite their published studies on terrestrial interference and their mention of AT&T's broadband PCS spectrum in 1975 – 1990 MHz in the August RKF Report,[31] RKF and Omnispace disregard the large impact of this terrestrial interference in the adjacent band in all their interference studies. They are not just disregarding PCS terrestrial operations in the United States and Canada, but also Mexico, Puerto Rico, The Dominican Republic, Guatemala, Nicaragua, Panama, Colombia, Venezuela, Ecuador, Brazil, Peru, Bolivia, Paraguay, Uruguay, Argentina, and Chile. All of these countries in ITU Region 2 have terrestrial base station operations that will cause orders of magnitude greater interference to Omnispace in the 1975 – 1990 MHz band than SpaceX operating in the 1990 – 1995 MHz band. Those same base stations operating in the 1975 – 1990 MHz band in all of those countries will also cause interference into Omnispace operations in the adjacent PCS G block, representing another significant but unaccounted-for contribution to Omnispace's noise floor in the RKF in-band analysis discussed above.[32]

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[28] August RKF Report at 18-22.

[29] SpaceX OOB Emissions Demonstration at 4.

[30] In its erroneous calculation, RKF subtracts an *aggregate OOB* PFD of -113.5 dBW/m^2/MHz from the *per-beam in-band* PFD it used of -89 dBW/m2/MHz to arrive at a contrived OOB attenuation value of 24.5 dB. This number has no meaning as it wrongly assumes SpaceX's OOB emissions is in the form of a single beam. RKF then subtracts this contrived 24.5 dB value from the I/N values per pixel in its in-band contour plots and applies a lower I/N threshold of -20 dB, asserting that this is the OOB interference threshold that SpaceX must meet.

[31] August RKF Report at 18.

[32] *Id.* at 18-22; *supra* § III.B.1.c.

C. CONCLUSION

To better understand Omnispace's claims of harmful interference, the Commission requested additional information from Omnispace in the form of six questions. Omnispace's answers are plainly inadequate and inaccurate, relying heavily on RKF's studies of in-band and out-of-band interference that make error after error and significantly overestimate interference. As SpaceX has stressed above, Omnispace's overblown claims of harmful interference are purely based on its paper system for which it has provided scant information. Omnispace has no LEO operations and provides no LEO service in the 1990-1995 MHz band and admits it will not and cannot deploy and provide any service for years. In contrast, SpaceX's revolutionary direct-to-cellular satellite system will bring unprecedented connectivity to American first responders, stranded individuals, and others who find themselves with no other connectivity option. The Commission should disregard Omnispace's latest submission, including the error-riddled RKF study, and deny all of Omnispace's efforts to derail SpaceX's deployment and operation of its valuable direct-to-cellular service.