

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Amendment of Parts 1, 2, 15, 90 and 95 of the Commission's Rules to Permit Radar Services in the 76-81 GHz Band)	ET Docket No. 15-26
)	
Amendment of Part 15 of the Commission's Rules to Permit the Operation of Vehicular Radar Services in the 77-78 GHz Band)	RM-11666
)	
Amendment of Sections 15.35 and 15.253 of the Commission's Rules Regarding Operation of Radar Systems in the 76-77 GHz Band)	ET Docket No. 11-90
)	RM-11555
)	
Amendment of Section 15.253 of the Commission's Rules to Permit Fixed Use of Radar in the 76-77 GHz Band)	ET Docket No. 10-28
)	

Navtech Radar Ltd Reply Comments on Proceeding Number 15-26, FCC15-16 Notice of Proposed Rulemaking (NPRM) and Reconsideration Order for the band of 76-81 GHz Band.

Navtech Radar Ltd submits these reply comments in response to those submitted by other third parties with respect to the publication of FCC 15-16.

Navtech Radar Ltd Response

1. Opposition to the introduction and authorisation for fixed radar in the 76-77GHz band and 77-81GHz band is delivered only from the automotive industry and their associated bodies. Their combined statement recommends that the FCC do not allow any new fixed services in the 76-81GHz because of concerns raised by groups relating to possible interference to automotive radar. Once more, other than the opinion of the automotive group and their associated bodies, there is no evidence that there is a serious risk of interference or that it could not be mitigated or dealt with by the various manufacturers on all sides. The only reference to any interference case is the refuted MOSARIM report, which is discussed and dealt with in the NPRM¹. The Automotive Safety Council, The Former Strategic Automotive Radar Frequency Allocation Group (SARA) and The Alliance of Automobile Manufacturers, Inc. all rely on a suggested conclusion that automotive radar and fixed radar are incompatible, which although the FCC acknowledges, *it does not agree* with that conclusion. Consequently, Navtech Radar respectfully but strongly recommends that the FCC should discount any references, comments or arguments based on the MOSARIM report. Navtech Radar have already responded to the

¹ See NPRM at ¶ 53

MOSARIM report in their petition to the FCC² and do not accept these arguments as a sound base for this NPRM decision. We do not intend to discuss these further herein.

2. The wider commenting group also references the European “CEPT” study that is currently underway as a collaborative activity, in which Navtech Radar are involved. The commission should be aware however, that this study is designed to evaluate whether there is any evidence of significant interference between the technologies. It should be made clear that this study is evaluating interactions from fixed radar to automotive radar, but also from automotive radar to fixed radars and between automotive radar to automotive radar. The last two scenarios the automotive group failed to acknowledge in their comment submissions. Further to this, clarification should also be given to the nature of the “CEPT” program. The study is not designed to result in an exclusion or acceptance of any of these technologies from the band of 76-77GHz. The EC decision³ has already been made and is clear in authorising both fixed and automotive uses and therefore the output from the study may be guidelines on how to best continue to share the band. Any guidelines would feed into a future release of the appropriate European harmonised standard. The Automotive industry seek to delay any decision on fixed infrastructure radar until the conclusion of the CEPT study, whilst allowing automotive use throughout the entire 76-81GHz band immediately without the input of this or further studies. This is inconsistent. Navtech Radar are surprised at this stance and the balance of these arguments that appear to put the burden of proving compatibility on the other industries. The automotive industry should note that the FCC has not yet approved the 77-81GHz band for sole automotive use and therefore should not attempt to relieve themselves of any burden of compatibility issues with other technologies, incumbent or otherwise. If the argument of the automotive group is to delay the decision on fixed radar until the conclusion of the “CEPT” study, then the logical and consistent approach would be to delay all decisions on the 76-81GHz band, until all parties who have expressed an interest in operating in that band are satisfied of complete compatibility in all scenarios of use. However, Navtech Radar believe this will not best serve the public interest and their safety, or promote the shared usage of the band in a timely manner.
3. The Automotive group have referenced field experience of over 20 years without documented cases of harmful interference being caused to other services. This is good evidence and Navtech Radar would refer the commission once more to the practical field experience detailed in the Navtech Radar comments submission⁴. This document cites over 40 Million vehicles passing a typical multi-fixed radar installation in the Hindhead tunnel, UK as well as further multi-radar scale installations in Sweden and Norway without documented cases of harmful interference being caused to other services. Further to this the Highways Agency in the UK have recently installed a 25+ radar system along a stretch of the M25 London Orbital – the busiest Highway in the UK and one of the busiest in Europe. This evidence should be a significant factor in the FCC decision process in that band sharing has been shown to work around the world over a significant period of time.
4. After reading the submitted comments in detail there is no further evidence that indicates incompatibility. Navtech Radar still strongly believe the likelihood of interference is no greater

² See, Navtech Radar Petition for Partial Reconsideration, filed Sept 2012

³ ECC Decision 2013/752/EU

⁴ See Navtech Radar Submission, ¶3

between fixed radar to automotive radar than between automotive to automotive radar. Neither is there meaningful explanation from any of the comments as to why they believe the systems are not and could not be made compatible. As stated in the Navtech Radar original comments, all applications suggested by the NPRM will use the same band, same power levels and same FMCW modulation principles. If a range of automotive radar manufacturers can co-exist there are no sound scientific reasons that this cannot be extended to other users, technologies or applications in the band. There is also no suggestion of collaborative working with the fixed radar community, nor is there acknowledgement that automotive radars may be a source of interference to fixed radars. It appears that other incumbent users of the band are also not satisfied with the automotive industries claim of non-interference with other band users. Comments claim there are no interference issues between the automotive radar and Radio Astronomy group M.2057, but this is disputed by the RAS⁵, driven by the Kitty Peak study.

5. Robert Bosch claim that Navtech Radar have shown nothing at all by way of compatibility showings⁶. On the contrary, Navtech Radar has provided and had published an ETSI Technical Report⁷. This document studies interference from fixed radar to other incumbent services in Europe. One of the conclusions of this technical report is that the SEAMCAT simulation indicates that the probability of a scanning infrastructure radar interfering with an automotive radar is less than that of an automotive radar interfering with another automotive radar. This has been in the public domain since June 2014. To Navtech Radars knowledge this has not been refuted at this time. Further to this Robert Bosch⁸ states that fixed traffic safety radars would be mounted at close to or at the same elevations as automotive radars. It should be made clear however that the typical mounting height for a fixed radar for traffic monitoring is between 4-5m from the road surface well away from the elevation of an automotive radar which is at a maximum height of 1.5m⁹ from the road surface.
6. Delphi has provided comments¹⁰ expressing concern regarding the placement of fixed staring radar at tunnel entrances and bridges. Navtech Radar would like to alleviate that concern by re-iterating that Navtech Radar's road based systems do not have a fixed staring beam but scan through a full 360 degrees with a pencil beam, usually at a high rotation rate of 4Hz with a short ramp time of <1ms, therefore further reducing the likely hood of interference and time that each system would illuminate each other. Navtech Radar has a number of radar installed at tunnel entrances and bridges around the world including the Bolte Bridge in Melbourne, Australia (daily traffic volume of 50,000 vehicles) and have been operating without reports of any harmful interference. Delphi go on to state that they believe two vehicles in adjacent lanes travelling in opposite directions are unlikely to interfere as the radar beam is directed along the outside edge of the opposite lane. Radar beam shapes will be naturally divergent from the point of source and over the operating range of the radar will naturally illuminate adjacent lanes and therefore this argument is not a sound basis for concluding interference is unlikely.

⁵ Comments of National Radio Astronomy Observatory, on NPRM FCC15-16 ¶7

⁶ See Robert Bosch LLC comments submission, page 14, footnote 24.

⁷ http://www.etsi.org/deliver/etsi_tr/103100_103199/103148/01.01.01_60/tr_103148v010101p.pdf

⁸ See Robert Bosch LLC comments submission, page 14, footnote 25.

⁹ See Robert Bosch LLC comments submission, ¶23

¹⁰ See Delphi Automotive Systems Comments, Fixed Radar, page 3.

7. For FOD radars the automotive group suggest these applications remain licensed so that other band users might know where they are located and respond accordingly. There is absolutely no discussion further to this on what the appropriate response may be and what mitigation they may implement. The radar operators in this case will be everyday vehicle drivers who will have little or no knowledge of such things. Navtech Radar propose this suggestion be dismissed and FOD be moved to part 95 as per the commission's proposal.
8. Navtech Radar would like to refer the Automotive Safety Council, automotive group and associated bodies and the FCC to the main application of the fixed roadside radar and the safety benefits this can bring to all road users, including the most vulnerable, being pedestrians and cyclists as well as vehicle users (with or without automotive radars fitted). This safety enhancement is provided 24 hours a day, 365 days a year and in all weather conditions, which serves the wider public interest and safety as described in the Navtech Radar initial comments. These views are also supported by key users in Europe as previously described¹¹. Navtech Radar has expressed a desire to utilise an additional 1GHz band between 77-78GHz to allow for future enhancements and developments to improve their systems further which could significantly increase detection performance of the vulnerable road users in cluttered urban environments.
9. Navtech Radar strongly supports the commission for its pursuit of band sharing for the greater public interest. Having read all of the comments, it is believed the automotive industry are attempting to keep the 76-81GHz band as closed as possible to other users, in particular fixed radars. Navtech Radar do not agree with the case put forward to do so, which is based on disputed and incomplete evidence. Navtech Radar would therefore encourage urgency to the decisions presented in the NPRM based on a market need for safety and security applications that can be well served and met from shared band usage, that includes fixed radar systems. It should be re-iterated that the desire to operate in this band is not just pushed from commercial organisations such as Navtech Radar but from government organisations such as the Minnesota Department of Transportation¹², who have recently been granted a license by the FCC to operate a Navtech Radar system, roadside.

Summary

- Navtech Radar does not recognize the objections to fixed radar based on the MOSARIM report and respectfully suggests that the commission discounts any arguments based on this report as the commission does not agree with its conclusion.
- The "CEPT" study is not designed to allow or deny either fixed or automotive radar in the 76-77GHz band but designed to provide test data to inform future engineering developments that enhance band sharing.
- Navtech Radar have seen no further evidence from any of the comments that would justify delaying the introduction of fixed radars to the band as requested. Both the automotive group

¹¹ See http://www.vtt.fi/files/news/2013/12_13092013/session3_p10_case_sweden.pdf and http://www.its-norway.no/ikbViewer/Content/881726/08%20Jensen_Multiconsult.pdf

¹² See Navtech Radar Submission, Page 2, & <http://www.traffictechnologytoday.com/news.php?NewsID=68127>

and Navtech Radar cite “field” experience of long term operational sharing data in order to strengthen the case for band sharing and compatibility.

- Navtech Radar have provided source material to a study into compatibility in the 76-77GHz band which is referenced above. In addition Navtech Radar have provided further details to help alleviate the concerns of Delphi Automotive Systems about fixed radars on bridges and tunnels. Navtech Radar systems are 360 degree 4Hz rotation pencil beam scanning radars reducing the likelihood of any interference and minimizing the time that the automotive and fixed radars would be illuminating each other.
- It has been re-iterated that the fixed radar systems that Navtech Radar would like to make available in the 76-77GHz band (and 76-78GHz band) provide functions that serve the interest of US citizens and their safety.
- Navtech Radar fully supports the commission’s efforts to open the 76-81GHz band and encourage band sharing for the wider public interest.

These reply comments are respectfully submitted this day 20th April 2015.

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