

**ALLEGED OUT-OF-SCOPE QUESTIONS
FROM DR. MITZENMACHER'S DEPOSITION¹ AND RELEVANCE TO DECLARATION**

Citations	Relevance to Mitzenmacher Declaration
25:12-27:24; 28:19-30:14; 32:12-35:24; 39:24-42:9; 44:24-45:10; 51:10-52:15; 55:16-63:6	Dr. Mitzenmacher opined that Luby's and MacKay's irregularity could be confined to parity bits, such that it would not lead to irregular use of information bits. <i>See</i> IPR2017-219 ² , Ex. 2004 ¶¶ 74-77, 84-85, 88; IPR2017-297, Ex. 2004 ¶¶ 73-78. These questions elicit testimony that Luby's and MacKay's irregularity do relate to irregular use of information bits. Systematic versions of both encoders were obvious and in systematic versions, the irregularity would relate to information bits.
45:11-51:9	Dr. Mitzenmacher offered opinions regarding obviousness. <i>See</i> IPR2017-210, Ex. 2004 ¶¶ 87-125. Questions aimed at assessing Dr. Mitzenmacher's level of experience with encoders relate to his qualifications for offering opinions on obviousness. Dr. Mitzenmacher also offered opinions regarding secondary considerations of non-obviousness. <i>See id.</i> , ¶¶ 126-129. In particular, Dr. Mitzenmacher opined that the DVB-S2 standard practiced the claims. <i>See id.</i> , ¶¶ 130-137. However, a communication standard such as DVB-S2 cannot practice the claims. Only an implementation of the standard, or standard compliant product, could practice the claims. Dr. Mitzenmacher's testimony regarding his experience with encoder implementations, and his failure to consider DVB-S2 implementations, was therefore relevant to his opinion about secondary considerations.
64:22-73:14; 74:19-78:18;	Dr. Mitzenmacher purported to distinguish Frey with reference to Figure 3 of the patents. <i>See</i> IPR2017-210, Ex. 2004 ¶¶ 76-

¹ Exhibit 1062 in IPR2017-00210, which corresponds with Exhibit 1262 in IPR2017-00219, Exhibit 1045 in IPR2017-00297 and Exhibit 2038 in IPR2017-00700, -00701, and -00728.

² Dr. Mitzenmacher's deposition was taken simultaneously for IPR2017-00210, -219, -297, -700, -701, and -728. Petitioner addresses these related cases herein because Caltech combines its arguments for all six cases in its motion.

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80:13-81:21; 82:3-86:7; 86:18-87:14; 88:24-89:10; 111:14-112:12	86. These questions and Exhibit 1044 relate to showing that (a) the claims are broader than Figure 3 and (b) Dr. Mitzenmacher had an overly narrow view of the scope of the claims.
131:12-135:5	Dr. Mitzenmacher purports to distinguish the prior art based on Figure 3 of the patents. <i>See</i> IPR2017-210, Ex. 2004 ¶¶ 76-86. These questions relate to establishing claim scope and showing that the claims are broader than Figure 3.
145:6-146:20; 147:2-155:16; 163:12-168:8; 401:14-404:2;	Dr. Mitzenmacher opined that modifying Divsalar to be irregular would have been difficult and a POSA would not have had an expectation of success. <i>See</i> IPR2017-219, Ex. 2004 ¶¶ 104-107, 115-125. These questions relate to the simplicity of modifying Divsalar to make it irregular and a POSA's expectation of success.
156:12-162:8; 163:12-168:8	Dr. Mitzenmacher opined on the Khandekar thesis. IPR2017-219, Ex. 2004 ¶¶ 108-114. These questions relate to that opinion.
181:3-192:10;	Dr. Mitzenmacher opined that modifying Divsalar in view of Luby would involve changing Divsalar's accumulator and that Divsalar cannot be made random without changing the accumulator. <i>See</i> IPR2017-219, Ex. 2004 ¶¶ 86-87, 112, 124. Also, like Divsalar, Ping has an accumulator. Dr. Mitzenmacher opined that, because of this accumulator, Ping is already irregular and a POSA would therefore have not used MacKay's irregularity in Ping. <i>See</i> IPR2017-297, Ex. 2004 ¶¶ 81-92. These questions about the accumulator relate to rebutting those opinions, showing the simplicity of the accumulator and that a POSA would have modified other parts of Divsalar's and Ping's code instead of the accumulator.
202:10-207:13	Dr. Mitzenmacher opined that modifying Divsalar in view of Luby would involve changing Divsalar's accumulator. <i>See</i> IPR2017-219, Ex. 2004 ¶¶ 86-87, 112, 124. These questions elicit testimony that undermines Dr. Mitzenmacher's opinion by showing that a POSA would have modified Divsalar's repeater instead.

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228:21-233:22	Dr. Mitzenmacher opined that Luby’s teachings regarding irregularity could be confined to parity bits, such that a POSA would not have understood that irregularity could be applied to information bits. <i>See</i> IPR2017-219, Ex. 2004 ¶¶ 74-77 (“[A] person of ordinary skill in the art would not have thought our ‘irregular bipartite graphs’ teaches anything about how the information bits are to be treated during generation of the codeword, whether through repetition or not.”), 84-85, 88. These questions relate to rebutting that opinion by showing that a POSA would have been motivated to make Luby’s information bits irregular, not just the parity bits.
259:5-265:13; 267:8-273:2; 276:21-278:2; 278:9-282:21; 283:14-21; 284:24 (the phrase “and 193Y”)	Dr. Mitzenmacher opined that MacKay’s irregularity could be confined to parity bits, such that it would not lead to irregular use of information bits. <i>See</i> IPR2017-297, Ex. 2004 ¶¶ 73-78. These questions relate to rebutting that opinion by showing that MacKay does teach irregular use of information bits.
404:16-407:2	Dr. Mitzenmacher purports to distinguish Frey based on the code rate, arguing that increasing repetition in Frey increases the size of the codeword. <i>See</i> IPR2017-210, Ex. 2004 ¶¶ 82-83. These questions relate to rebutting that argument by showing the patent discloses and claims encoders that would also increase the codeword in response to increasing repetition.
413:24-418:13	Dr. Mitzenmacher opined that a POSA would not have combined Divsalar and Luby. IPR2017-219, Section VIII. He also opined that Divsalar and Luby are different types of codes. <i>Id.</i> at ¶¶ 97, 101. These questions and Exs. 1046-1047 relate to rebutting that opinion by showing the similarity of Divsalar’s and Luby’s code.
418:14-424:14	Dr. Mitzenmacher opined that a POSA would not have combined Divsalar and Luby. IPR2017-219, Section VIII. He also opined that Divsalar and Luby are different types of codes. <i>Id.</i> at ¶¶ 97, 101. These questions and Exs. 1046-1047 relate to

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	rebutting that opinion by showing the similarity of Divsalar's and Luby's code.
424:15-431:24	Dr. Mitzenmacher opined that a POSA would not have combined Ping and MacKay. IPR2017-297, Section IX(C). These questions and Exs. 1048-1049 relate to rebutting that opinion by showing the similarity of Ping's and MacKay's code.
431:25-438:24	Dr. Mitzenmacher opined that a POSA would not have combined Ping and MacKay. IPR2017-297, Section IX(C). These questions and Exs. 1048-1049 relate to rebutting that opinion by showing the similarity of Ping's and MacKay's code.
445:11-446:12	Dr. Mitzenmacher offers opinions regarding WiFi standards. <i>See</i> IPR2017-00210, Ex. 2004 ¶ 120. In particular, Dr. Mitzenmacher opined that "Divsalar is already too slow for many practical applications, such as 802.11." These questions relate to Dr. Mitzenmacher's familiarity with the standard and its implementation.

**ALLEGED OUT-OF-SCOPE QUESTIONS
FROM DR. DIVSALAR'S DEPOSITION³ AND RELEVANCE TO DECLARATION**

Citations	Relevance to Dr. Divsalar Declaration
23:7-25:24	Dr. Divsalar opined that research on irregular LDPC codes was concerned with modifying traditional Gallager codes and a POSA would have no motivation to apply such a teaching to RA codes. <i>See</i> IPR2017-00210 ⁴ & IPR2017-00219, Ex. 2031 ¶ 10. Additionally, Dr. Divsalar's declaration attaches his CV,

³ Ex 1064 of IPR2017-00210, which corresponds with Exhibit 1264 in IPR2017-00219 and Exhibit 2039 in IPR2017-00700, -00701, and -00728.

⁴ Dr. Divsalar's deposition was taken simultaneously for IPR2017-00210, -219, -700, -701, and -728. Petitioner addresses these related cases herein because Caltech combines its arguments for all six cases in its motion.

Citations	Relevance to Dr. Divsalar Declaration
	which contends that he “[m]ade significant contribution to channel coding for deep space communications [and p]roposed new turbo codes and protograph-based LDPC codes to be used in future NASA missions. The proposed codes became CCSDS standard for space applications.” Ex. 2032 at 3. These questions relate to Dr. Divsalar’s background and knowledge of the CCSDS standard, on which he worked, and the focus of the LDPC codes research at that time in order to establish whether a POSA would have a motivation to modify RA codes.
29:1-36:18	Dr. Divsalar discussed submitting a paper entitled, “Coding Theorems for ‘Turbo-Like’ Codes,” in connection with the Allerton conference in 1998. <i>See</i> IPR2017-00210 & IPR2017-00219, Ex. 2031 ¶ 19. These questions relate to what “in connection with the Allerton conference” means.
48:20-49:19, 50:13-54-20	Dr. Divsalar offered opinions regarding potential combinations and modifications of RA codes based on his paper, “Coding Theorems for ‘Turbo-Like’ Codes.” <i>See</i> IPR2017-00210 & IPR2017-00219, Ex. 2031 ¶¶ 1, 27, 33-35. These questions relate to how data is partitioned based on Figure 3 in Dr. Divsalar’s paper, which displays an encoder for a repeat-accumulate code, and what a POSA would understand from interpreting this information.
56:12-58:2, 58:22-68:9, 69:8-18	Dr. Divsalar opined that it would not have been trivial or obvious to modify RA codes by making them “irregular” in order to arrive at IRA codes and that a POSA would not be motivated to make such a modification. <i>See</i> IPR2017-00210 & IPR2017-00219, Ex. 2031 ¶¶ 9 (“I do not believe it would have been trivial or obvious ... nor would a person of ordinary skill in the art be motivated to make such a modification.”), 33-35. These questions relate to refuting Dr. Divsalar’s opinion on whether it would have been trivial or obvious to modify RA codes to make them irregular.
77:23-78:23, 82:5-93:16	Dr. Divsalar testified that he was “aware the Tanner graphs could be used to represent LDPC codes [but] we did not consider Tanner graph representation useful or applicable to concatenated convolutional codes.” <i>See</i> IPR2017-00210 &

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