

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS, AMERICA, INC.,

Petitioners

v.

FOUR BATONS WIRELESS, LLC,

Patent Owner

Case IPR2025-00496

U.S. Patent No. 8,798,006

Petition for *Inter Partes* Review of

U.S. Patent No. 8,798,006

TABLE OF CONTENTS

PETITIONERS’ EXHIBIT LIST	vii
LISTING OF CHALLENGED CLAIMS.....	1
I. INTRODUCTION	5
II. GROUNDS FOR STANDING.....	5
III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED	5
IV. OVERVIEW OF THE <i>'006Pat</i>	6
A. Specification.....	6
B. Prosecution History	8
V. OVERVIEW OF THE PRIOR ART	10
A. <i>Guo</i>	10
B. <i>Neave</i>	14
VI. LEVEL OF ORDINARY SKILL IN THE ART.....	16
VII. CLAIM CONSTRUCTION	17
VIII. DETAILED EXPLANATION OF GROUNDS.....	17
A. Ground 1: <i>Guo</i> in combination with <i>Neave</i> Renders Obvious Claims 1-13, 16.....	17
1. Claim 1	17
a. 1[pre]: “Method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having	

	multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:”	17
b.	1[a]	18
	(i) “a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks”	18
	(ii) “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface”	21
	(iii) “using path quality metrics that are independent of how the QoI is measured,”	23
	(iv) “...whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,”	26
c.	1[b]: “said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests,”	27
	(i) Motivation to combine <i>Guo</i> and <i>Neave</i>	27
	(ii) Teachings in <i>Guo-Neave</i> Combination	31
d.	1[c]: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and”	32
e.	1[d]: “said mobile device selecting one of said interfaces based on said comparing.”	32
2.	Claim 2	33

a.	2[pre]: “A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:”	33
b.	2[a]	33
	(i) “a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks”	33
	(ii) “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface”	33
	(iii) “using path quality metrics that are independent of how the QoI is measured,”	33
	(iv) “whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,”	34
c.	2[b]: “said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method,”	34
d.	2[c]: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and”	37
e.	2[d]: “said mobile device selecting one of said interfaces based on said comparing.”	37
3.	Claim 3	37
a.	3[pre]: “A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:”	37

b.	3[a]	37
	(i) “a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks”	37
	(ii) “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface”	37
	(iii) “using path quality metrics that are independent of how the QoI is measured,”	38
c.	3[b]: “said method including said mobile device comparing path qualities based on sequential two sample tests,”	38
d.	3[c]: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and”	38
e.	3[d]: “said mobile device selecting one of said interfaces based on said comparing.”	38
4.	Claim 4: “The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.”	39
5.	Claim 5: “The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.”	42
6.	Claim 6: “The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.”	42

7.	Claim 7: “The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples.”	44
8.	Claim 8: “The method of claim 7, wherein said method is nonparametric, works for unequal sample sizes, and is performed on-line.”	45
9.	Claim 9: “The method of claim 7, wherein said method employs a Rosenbaum test.”	46
10.	Claim 10: “The method of claim 9, wherein a test statistic T_R includes a total number of a second interface’s data points which have a value larger than a largest value in a first interface’s data points.”	48
11.	Claim 11: “The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(a, n_1, n_2)$, calculated using the distribution of T_R .”	49
12.	Claim 12: “The method of claim 7, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.”	51
13.	Claim 13: “The method of claim 12, further including repeating the test for a new observation or a new batch of observations.”	53
14.	Claim 16: “The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.”	53
IX.	SECONDARY CONSIDERATIONS	54
X.	THE DISCRETIONARY FACTORS FAVOR INSTITUTING TRIAL	54

A.	35 U.S.C. § 314(a).....	54
1.	Stay.....	55
2.	Trial Date	55
3.	Diligence/Investment	57
4.	Overlap.....	57
5.	Parties.....	58
6.	Other Considerations	58
B.	35 U.S.C. §325(d).....	58
XI.	MANDATORY NOTICES UNDER 37 C.F.R. §42.8.....	60
A.	Real Parties-in-Interest	60
1.	Related Matters	60
B.	Lead and Backup Counsel.....	61
C.	Service Information	62
D.	Power of Attorney	62
XII.	FEES	62

PETITIONERS' EXHIBIT LIST

Ex. No.	Description
1001	U.S. Patent 8,798,006 (“’006Pat”)
1002	Declaration of Dr. Sumit Roy (“Roy”)
1003	Curriculum Vitae of Dr. Sumit Roy
1004	File History of U.S. Patent 8,798,006
1005	U.S. Patent Application Publication 2004/0170191 (“Guo”)
1006	H.R. Neave, P.L. Worthington, DISTRIBUTION-FREE TESTS (“Neave”)
1007	F. Hargrave, HARGRAVE’S COMMUNICATIONS DICTIONARY (2001)
1008	IEEE 100: THE AUTHORITATIVE DICTIONARY OF IEEE STANDARDS TERMS (7 th Ed., 2000)
1009	B.R. Fay, JMASM4: CRITICAL VALUES FOR FOUR NONPARAMETRIC AND/OR DISTRIBUTION-FREE TESTS OF LOCATION FOR TWO INDEPENDENT SAMPLES
1010	J. Geier, WIRELESS NETWORKS FIRST-STEP (1 st Ed., 2004)
1011	C. K. Toh, AD HOC MOBILE WIRELESS NETWORKS: PROTOCOLS AND SYSTEMS (1 st Ed., 2001)
1012	M. Stemm, <i>Vertical Handoffs in Wireless Overlay Networks</i> , MOBILE NETWORKS & APPLICATIONS 3, 334-50 (1998)
1013	U.S. Patent Application Publication 2002/0061748
1014	U.S. Patent Application Publication 2002/0167931
1015	U.S. Patent 6,728,208
1016	L. Benetazzo, C. Narduzzi, P.A. Pegoraro, R. Tittoto, <i>A Passive Measurement Tool for Monitoring Wireless Packet Network</i>

Ex. No.	Description
	<i>Performances</i> , IMTC INSTRUMENTATION & MEASUREMENT, 407-12 (2004)
1017	Docket Control Order from <i>Four Batons Wireless, LLC v. Samsung Electronics Co., LTD, et al.</i> , No. 2:24-cv-0284-JRG (ECF 035) (E.D. Tex. Aug. 26, 2024)
1018	Cover Pleading of Plaintiff Four Batons Wireless, LLC's Disclosures Pursuant to Local Patent Rules 3-1 and 3-2, Dated July 25, 2024
1019	Declaration of J. Ann Munford

LISTING OF CHALLENGED CLAIMS

Claim 1	
1[pre]	Method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:
1[a]	a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how the QoI is measured, whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,
1[b]	said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests,
1[c]	said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and
1[d]	said mobile device selecting one of said interfaces based on said comparing.
Claim 2	
2[pre]	A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:
2[a]	a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous network using path quality metrics that are independent of how the QoI is measured, whether measured by a

	path through a wireless network alone or a path through both a wireless network and through a wired network,
2[b]	said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method,
2[c]	said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and
2[d]	said mobile device selecting one of said interfaces based on said comparing.
Claim 3	
3[pre]	A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:
3[a]	a mobile device comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface, of said mobile device that connect to heterogeneous networks using path quality metrics that are independent of how a QoI is measured,
3[b]	said method including said mobile device comparing path qualities based on sequential two sample tests,
3[c]	said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and
3[d]	said mobile device selecting one of said interfaces based on said comparing.
Claim 4	
4	The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.
Claim 5	

5	The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.
Claim 6	
6	The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.
Claim 7	
7	The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples.
Claim 8	
8	The method of claim 7, wherein said method is nonparametric, works for unequal sample sizes, and is performed on-line.
Claim 9	
9	The method of claim 7, wherein said method employs a Rosenbaum test.
Claim 10	
10	The method of claim 9, wherein a test statistic T_R includes a total number of a second interface's data points which have a value larger than a largest value in a first interface's data points.
Claim 11	
11	The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(a, n_1, n_2)$, calculated using the distribution of T_R .
Claim 12	

12	The method of claim 7, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.
Claim 13	
13	The method of claim 12, further including repeating the test for a new observation or a new batch of observations.
Claim 16	
16	The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., (“Petitioners”) request *inter partes* review (“IPR”) of claims 1-13 and 16 (“Challenged Claims”) of U.S. Patent No. 8,798,006 (“’006Pat”).

II. GROUNDS FOR STANDING

Petitioners certify that the ’006Pat is available for IPR, and that Petitioners are not estopped from requesting IPR to challenge the claims on the grounds herein.

III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Petitioners respectfully request review and cancellation under 35 U.S.C. §311 of the Challenged Claims in view of:¹

Ground	Claims	Basis
1	1-13, 16	§103: <i>Guo + Neave</i>

As shown below, each reference pre-dates the ’006Pat’s purported priority date (March 17, 2005), but Petitioners do not concede that this priority date is correct and reserve the right to dispute it.

¹ Petitioners do not concede that any Challenged Claims satisfy other requirements for patentability that cannot be raised in IPR, including 35 U.S.C. §§101 and 112.

Reference	Date	Pre-AIA Prior Art at Least Under
US 2004/0170191 (“ <i>Guo</i> ”) (EX1005)	02/28/2003 (filing date) 9/2/2004 (publication date)	§102 (a), (e)
H.R. Neave, P.L. Worthington, DISTRIBUTION-FREE TESTS (“ <i>Neave</i> ”) (EX1006)	9/21/1989 (public availability date)	§102(b)

IV. OVERVIEW OF THE *'006Pat*

A. Specification

The *'006Pat* is directed to a method mobile devices can use to compare the quality of different types of wireless network interfaces (e.g., cellular, Wi-Fi), so that the device may determine whether to switch interfaces to improve communication. According to the *'006Pat*, mobile devices, such as cellular and wireless telephones, can access various types of wireless networks, including Wireless Local Area Networks (WLANs) (e.g., Bluetooth, IEEE 802.11, HomeRF), General Packet Radio Service (GPRS), 3G cellular networks, 2.5G cellular networks, and Global System for Mobile Communications (GSM) networks. *'006Pat*, 1:61-3:10. Some mobile devices, which the patent refers to as “Multiple Interface Devices” (MIDs), have two or more network interfaces, “such as a

Bluetooth interface and an 802.11 interface, thus allowing the MID to participate on two separate networks ...” *Id.*, 2:55-61.

The *'006Pat* purports to improve on prior art techniques for comparing qualities of interfaces (QoIs), which the patent critiques as being “based on a very narrow set of criteria such as radio signal strength or signal to noise ratios.” *'006Pat*, 3:54-56. According to the patent, these prior techniques are “limit[ed]” when it comes to comparing different types of wireless (i.e., “heterogeneous”) interfaces, such as cellular networks and WLANs. *Id.*, 3:56-58, 9:55-57.

Accordingly, the *'006Pat* describes a method that mobile devices can use to compare QoI over heterogeneous networks. *'006Pat*, 5:35-38. This method comprises comparing “the qualities of multiple interfaces [(i.e., QoIs)] using path quality metrics that are independent of how the QoI is measured,” *Id.*, 5:38-40, i.e., “whether it is measured by the path through the radio network alone or by an end-to-end path that includes both a path in the radio network and a path through a wired network.” *Id.*, 11:43-48. Exemplary measurements include round-trip available bandwidth, unidirectional available bandwidth, and end-to-end delay. *Id.*, 5:5-12.

This comparison is performed “concurrently in real time during use of a current interface.” *'006Pat*, Cls. 1-3. Based on the results of this comparison, the mobile device determines whether to remain on its current interface or switch to an

alternative interface. *Id.*, 10:29-39, Cls. 1-3. The independent claims of the '006*Pat* differ as to the required characteristics of the test that compares the interfaces. *Compare, e.g., id.*, Cl. 2 (“performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method”) *with* Cl. 3 (“comparing path qualities based on sequential two sample tests”). The '006*Pat* discloses the claimed statistical comparisons in significant part by incorporating prior art references, such as *Neave*, that describe the tests in detail. *See, e.g., '006Pat*, 17:30-32 (“One simple procedure, which possesses (approximately) properties 1, 2 and 3 is Rosenbaum’s test (see Reference (9] incorporated above).”).

B. Prosecution History

The application that issued as the '006*Pat* was filed on December 20, 2010 and claimed the benefit of U.S. Application No. 11/209,331, filed on August 23, 2005, which claims priority to U.S. Provisional Application No. 60/662,749, filed on March 17, 2005.²

On December 7, 2012, the examiner issued a non-final office action rejecting all claims as directed to non-statutory subject matter and claims 1-10 and 14-16 as obvious over U.S. 2005/0002379 in view of the admitted prior art. EX1005, 82.

² For purposes of this petition, Petitioners assume the priority date is March 17, 2005.

On May 7, 2013, the applicant submitted an amendment that amended all independent claims to add, *inter alia*, the expression: “a mobile device ... including at least one cellular radio interface and at least one wireless local area network interface.” *Id.*, 110–15. The applicant further argued that proposed combinations under §103(a) did not render obvious all elements of the challenged claims and that they were improper as including references not “within the art.” *Id.*, 116–23.

On September 13, 2013, the examiner issued a final office action maintaining all grounds for rejection in the non-final office action. EX1005, 130–38.

On March 13, 2014, the applicant submitted a request for continued examination, amending all independent claims to require: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and said mobile device selecting one of said interfaces based on said comparing.” EX1005, 159–68. The applicant asserted that, in view of these amendments, each of the examiner’s rejections had been traversed. *Id.*, 169–78. On April 2, 2014, the examiner issued a notice of allowance. *Id.*, 184. Note that the Examiner did not state reasons for allowance, and did not explicitly allow the claims because the background references, such as *Neave*, were not “within the art,” as the applicant argued, and never indicated that *Neave* could not be combined with the examiner’s asserted primary reference, US 2005/0002379

(“Bye”).

V. OVERVIEW OF THE PRIOR ART

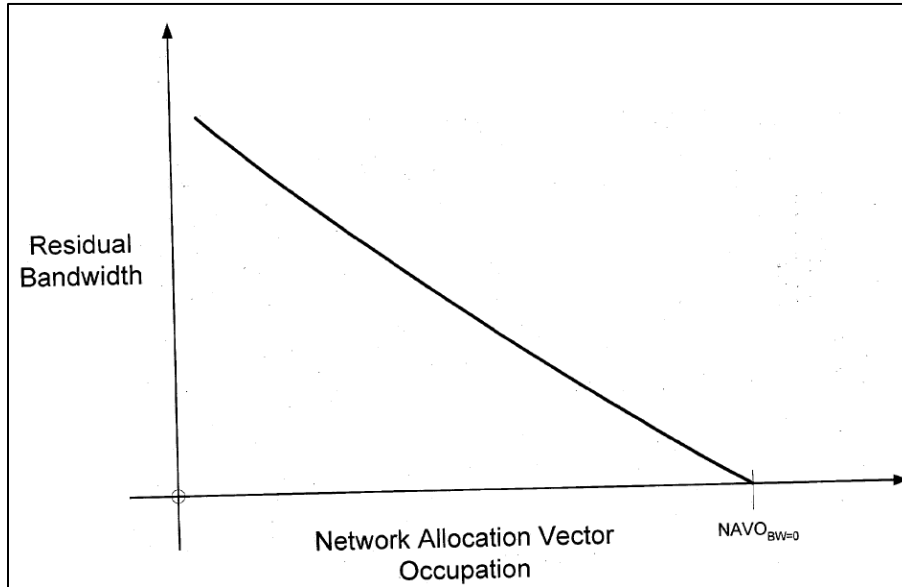
Prior art reference *Guo* is analogous to the *'006Pat* because it is within the same field of endeavor as the *'006Pat* and reasonably pertinent to one or more problems addressed by the *'006Pat*. *Roy* ¶70. *Guo*, like the *'006Pat*, is directed to comparing mobile devices' wireless interfaces to determine which interface provides the highest quality of service. *Id.*, ¶70. *Neave* is a general-purpose statistics text that has wide applicability, including to engineering. *Id.*, ¶70; *see also Neave*, Preface. *Neave* is directed to methods for comparing two samples, including quality-related data, to determine which sample corresponds to the better alternative. *Roy*, ¶70.

A. *Guo*

Guo is directed to a system and method for handing off a device between different types of wireless networks (“vertical handoff”). *Guo*, Abstract. According to *Guo*, a challenge in deciding whether to initiate vertical handoff is that signal strengths in different types of networks are often not directly comparable. *Id.*, ¶[0008].

Guo discloses two approaches for addressing this. In the first, a mobile device samples a network allocation vector – information provided by the access point indicating the network's transmission time. *Guo*, ¶¶[0061] - [0063]. The device uses

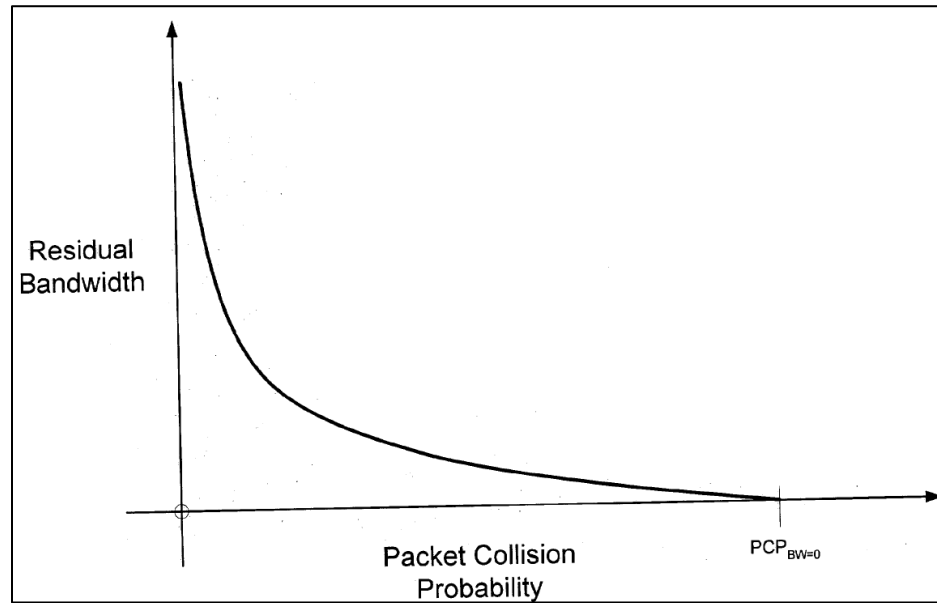
these samples to calculate a network allocation vector occupation – the proportion of time that the network allocation vector is busy. *Id.*, ¶[0062]. The device then uses the allocation vector occupation to calculate a wireless network quality of service (QoS) measure such as residual bandwidth. *Id.*, Cl. 1, FIG. 5, ¶¶[0064] - [0067]. Figure 5, depicted below, shows an exemplary mapping from network allocation vector occupation to residual bandwidth. *Id.* ¶[0019].



Guo, FIG. 5

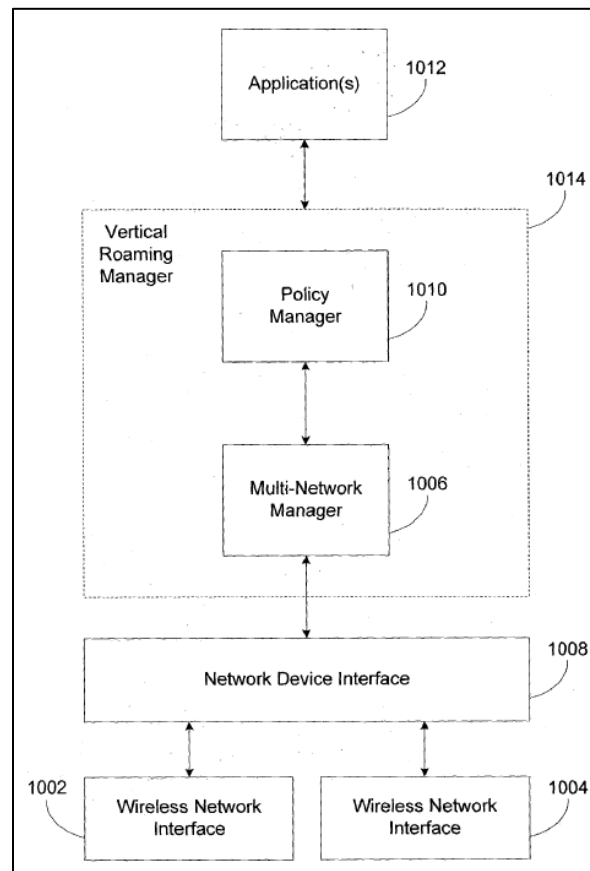
In the second approach, the device transmits probing packets into the wireless network at a fixed rate for a period of time. *Guo*, ¶[0069], Cl. 14. As transmission collision may cause data packet loss in wireless networks, the device uses the proportion of packets not acknowledged as received by the access point to estimate the packet collision probability. *Id.*, ¶¶[0068] - [0069]. The device then uses the

packet collision probability to calculate a wireless network QoS measure such as residual bandwidth, as depicted in Figure 6. *Id.*, Cl. 14, FIG. 6, ¶[0072]. Figure 6, depicted below, shows an exemplary mapping from packet collision probability to residual bandwidth. *Id.* ¶[0020].



Guo, FIG. 6

Regardless of how the QoS (in the examples above, residual bandwidth) is estimated, *Guo*'s mobile device compares QoS measurements between different networks to determine whether to remain on the device's current network or handoff to an alternative network. *Guo*, ¶[0104], Cls. 8, 22. Network types discussed in *Guo* include wireless wide area networks (WWAN), wireless local area networks (WLAN), General Packet Radio Service (GPRS), and IEEE 802.11. *Guo*, ¶[0006], Cls. 9-11, 23-25.



Guo, FIG 10.

Figure 10, reproduced above, depicts an exemplary device, with first and second wireless network interfaces 1002 and 1004. *Guo*, ¶[0086]. *Guo* notes that “architectures suitable for incorporating aspects of [*Guo*] may include more than two wireless network interfaces.” *Id.*, Common network device interface 1008 connects wireless interfaces 1002 and 1004 with vertical roaming manager 1014. *Id.*, ¶¶[0087], [0093]. Vertical roaming manager 1014 comprises a multi-network manager 1006 that transmits QoS statistics to the policy manager 1010, which makes handoff decisions. *Id.*, ¶[0091].

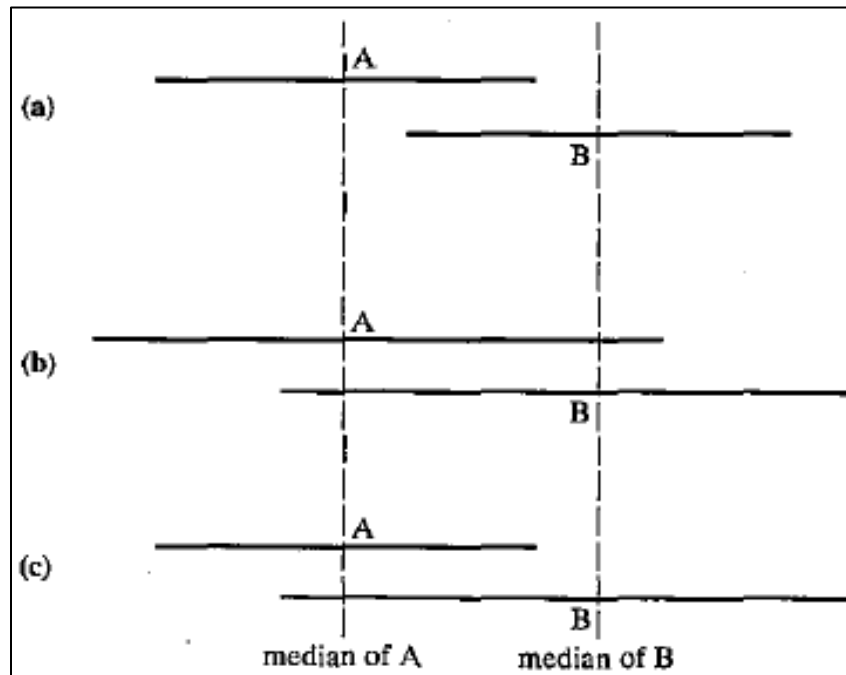
B. *Neave*

Neave describes distribution-free (“non-parametric”) statistical tests, which “make no detailed assumptions” about the distribution underlying the data. *Neave*, pp. 67, 348. *Neave* states that its teachings are applicable to “a wide range of disciplines,” including engineering. *Id.*, Preface. For the disclosed tests, *Neave* provides “[a]ll the necessary statistical background material.” *Id.*, (“[N]o previous knowledge is required.”). Note that *Neave* is identified in the ’006Pat as a “background reference” showing “background technologies related to comparing qualities of interfaces...” ’006Pat, 4:13-14, 4:41-42.

Among others, *Neave* discloses two-sample tests, which discern differences in location (e.g., average) between two datasets, even where the underlying distributions vary beyond their means (e.g., in spread). *Neave* 143-44. Two-sample tests are useful for comparing datasets corresponding to different sources to discern differences between the sources (e.g., which corresponds to better performance?). *See, e.g., id.*, pp. 146-47 (example application on battery performance data).

One such two-sample test *Neave* discloses is the “one-sided version of Rosenbaum’s test” (hereinafter “Rosenbaum’s test”), which *Neave* teaches is “very effective” in situations in which the distribution underlying the samples varies by more than just average and is “quick-and-easy” to implement. *Neave*, pp 143-49. For

example, Rosenbaum's test performs well where the two samples vary in spread as well as location, as depicted in Figure 7.1, reproduced below:



Neave, FIG. 7.1

Whereas other two-sample statistical tests, such as the Mann-Whitney and Tukey tests, may perform adequately in scenario (a), they are more likely to have difficulty quickly discerning the relative locations of the distributions underlying the samples in scenarios (b) and (c). *See Neave, 144–45.* In these cases, Rosenbaum's test, which looks to the length of the “extreme run” of one sample (number of values exceeding the other sample's maximum value), is likely the more powerful test for accurately discerning differences in location.

Rosenbaum's test considers two datasets, ‘A’ and ‘B’, to determine whether

null-hypothesis H_0 ('A' and 'B' are equal on average) should be rejected in favor of alternative hypothesis H_1 ('A' is larger than 'B' on average). *Id.*, pp. 146-48.

In Rosenbaum's test, test statistic R is the "length of the extreme run ... at the right-hand end of the letter sequence." *Id.*, p. 146. "Identify the largest observation in each sample. Then if the largest overall observation is from A, R is the number of 'A's greater than the largest B" (otherwise, H_0 is preserved, and the test concludes). *Id.*, pp. 146-48. Test statistic R is then compared to a critical value C determined based on the datasets' sizes and significance level α_1 (a measure of whether to error in favor of preserving or rejecting H_0). *Id.*, pp. 147, 383-86 (tables for determining C). Where $R \geq C$, null hypothesis H_0 is rejected in favor of alternative hypothesis H_1 , and 'A' is larger than 'B' on average. *Id.*, pp. 147-48. Otherwise, the H_0 is preserved. *Id.* Where many samples are considered ($n_1, n_2 \rightarrow \infty$) and proportion p of samples are from dataset 'A,' Neave discloses that the probability, assuming H_0 , of $R \geq h$ (selected value) approaches p^h . *Id.*, pp. 148-49. This expression may be used to determine critical value C for large sample sizes. *Id.*

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") at the time of the '006Pat's priority date would have had at least a Bachelor's of Science Degree (or equivalent) in an academic area emphasizing electrical engineering, computer engineering, or a

related technical field, coursework in statistics, applied math, or quantitative network analysis, and about two years of research or professional experience in mobile communications or a related field. *Roy* ¶¶18-19. A greater amount of education could compensate for fewer years of work experience, and vice versa. *Id.*

VII. CLAIM CONSTRUCTION

Petitioners are unaware of any “prior claim construction determination” related to the ’006*Pat.* See 37 C.F.R. §42.100(b). Petitioners believe that no constructions of the claims are necessary to resolve the unpatentability issues in this Petition.

VIII. DETAILED EXPLANATION OF GROUNDS

A. Ground 1: *Guo* in combination with *Neave* Renders Obvious Claims 1-13, 16.

1. Claim 1

- a. 1[pre]: “Method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:”

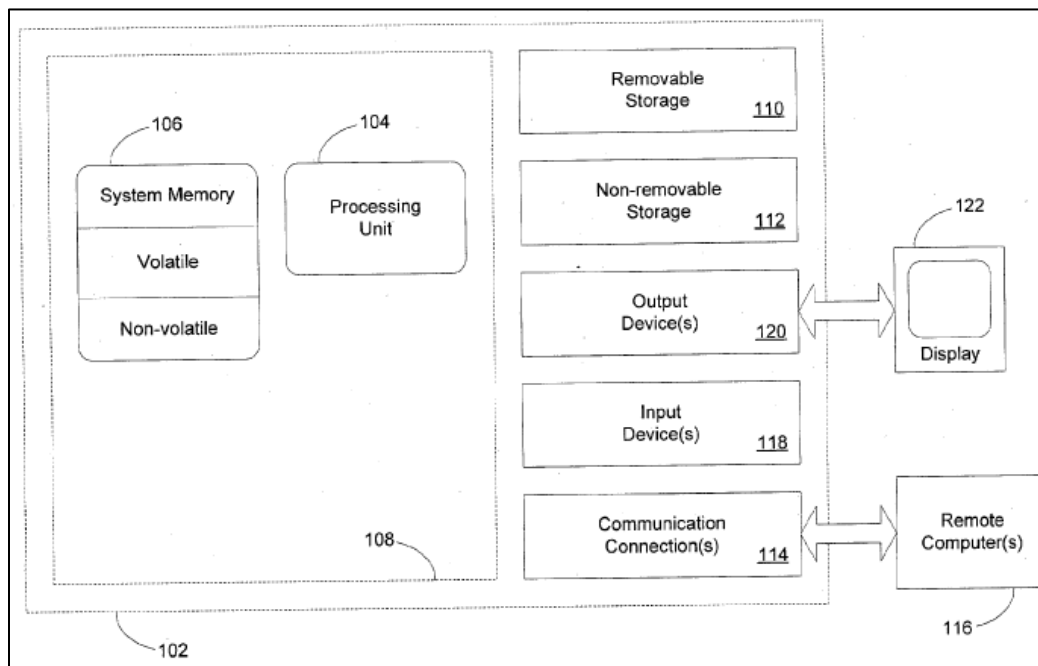
To the extent that the preamble is limiting, *Guo* teaches a “[m]ethod for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks.” As explained in §VIII.A.1.b(i), *Guo* teaches “a mobile device

... [having] multiple interfaces ... that connect to heterogeneous networks.” As further explained in §VIII.A.1.b(ii), *Guo* teaches “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface.”

b. 1[a]

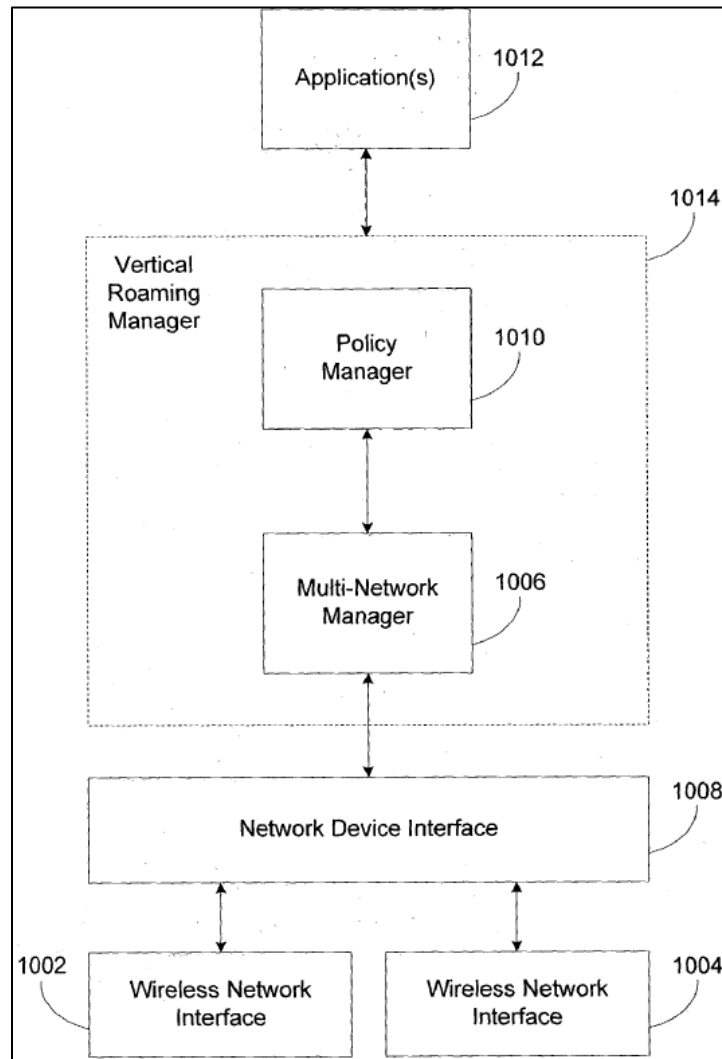
(i) “a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks”

Guo teaches this feature. *Roy*, ¶97. This element requires “a mobile device.” *Guo* discloses a “mobile computing device 102,” as shown in Figure 1, depicted below. *Guo*, ¶[0035]. POSITAs would have understood that mobile computing device 102 corresponds to the ‘006*Pat*’s “mobile device.” *Roy*, ¶97.



Guo, FIG. 1

This element also requires “multiple interfaces.” Figure 10, depicted below, discloses an exemplary software architecture:

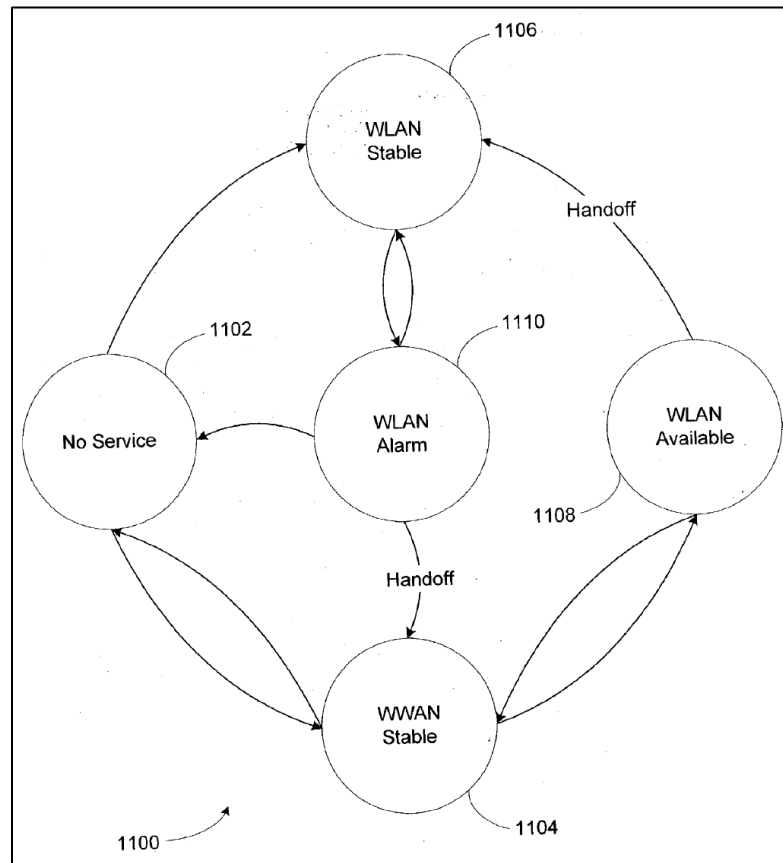


Guo, FIG. 10

Guo’s software architecture includes wireless network interfaces 1002 and 1003, *see also Guo*, ¶[0086], which POSITAs would have understood correspond to the ’006*Pat*’s “multiple interfaces.” *Roy*, ¶99.

This element further requires that the recited “multiple interfaces” “connect

to heterogeneous networks.” *Guo*’s Fig. 11 is a state diagram showing its vertical handoff decision process:



Guo, FIG. 11

In the WLAN Available state 1108, service is available from both a WLAN and WWAN. *Guo*, ¶[0104]. As explained in §IV.A, the '006*Pat* discloses that cellular networks (also referred to as “cellular radio interfaces”) and WLANs constitute “heterogeneous” networks. POSITAs would have understood that *Guo*’s WWAN network corresponds to a “cellular network,” as that term is used in '006*Pat*, and that *Guo*’s WLAN corresponds to a “WLAN,” as that term is used in the

'006Pat. Roy, ¶102. For example, *Guo* discloses some of the same WWAN network types as the '006Pat discloses correspond to cellular radio interfaces. Compare *Guo* ¶[0006] (disclosing GPRS and CDMA as exemplary WWAN interfaces) with '006Pat, 13:55-61 (disclosing GPRS, cdma2000, and WCDMA as exemplary cellular radio interfaces). Likewise, *Guo* discloses some of the same WLAN network types as the '006Pat discloses correspond to local area network interfaces. Compare *Guo* ¶[0006] (disclosing IEEE 802.11 as an exemplary WLAN interface) with '006Pat, 13:55-61 (disclosing IEEE 802.11 as an exemplary local area network interface). Indeed, in certain passages, the '006Pat refers to the wireless access to local area networks as “WLAN,” see, e.g., '006Pat, 2:11-13, the same term as used in the *Guo* to refer to the same class of networks.

(ii) “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface”

Guo teaches this feature. Roy, ¶104. This element requires that “the qualities of multiple interfaces” be compared “in substantially real-time.” *Guo*’s multi-network manager 1006 “continuously monitors” wireless network interfaces 1002, 1004. *Guo*, ¶¶[0086] - [0088]. In *Guo*’s WLAN Available state 1108, multi-network manager 1008 periodically “(e.g., every 10 seconds)” provides policy manager 1010

the WLAN's current QoS statistics. *Id.*, ¶[0104]. “If the Policy Manager component 1010 determines that the WLAN will provide a higher quality of wireless network service, for example, the estimated residual bandwidth in the WLAN is higher than the communications bandwidth currently being experienced in the WWAN, then the Policy Manager component 1010 sends a Handoff Now command to the Multi-Network Manager component 1006 to initiate entry into the WLAN.” *Id.* POSITAs would have understood that the policy manager 1010's periodic decision as to whether to remain on the WWAN or handoff to the WLAN corresponds to the '006Pat's claimed “comparing in substantially real-time the qualities of multiple interfaces.” *Roy*, ¶104. Note that POSITAs would have understood that *Guo*'s “quality of service” metrics correspond to the '006Pat's “quality of interface” metrics, as discussed in §VIII.A.1.b(iii).

POSITAs would have understood that *Guo*'s comparison is performed in substantially real-time. *Roy*, ¶105. During prosecution, the applicant for the '006Pat explained that, for the comparison to be real time, it must be performed while the device is communicating on a current interface. EX1004, 174 (“Bye does plainly teach away from any such real time comparison because Bye only contemplates switching once a current interface cannot support communications.”); *see also id.* (“[T]he Bye reference does **not** teach ... a comparison of heterogeneous interfaces

in real time (e.g., concurrently during use of the current network) ...”) (emphasis in original). This meaning of the term “real time” is consistent with relevant entries in communications and electronics dictionaries that POSITAs would have consulted. *See Roy*, ¶107; *see also* EX1007, p. 430 (“**real time** Pertaining to ... The computation of control information during the time of an actual process so that the results may be used to direct the process.”); EX1008, p. 933 (similar).

POSITAs would have understood that *Guo*’s comparison is performed while *Guo*’s mobile device communicates on the WWAN. *Roy*, ¶108, *Guo*, ¶[0104] (“In the WLAN Available state 1108, ... the [WWAN] is the current wireless network service provider.”); *id.* (consulting “the communications bandwidth currently being experienced in the WWAN”).

The claim further requires that the multiple interfaces “include[] at least one cellular radio interface and at least one wireless local area network interface.” As explained in §VIII.A.1.b(i), POSITAs would have understood that *Guo*’s WWAN corresponds to the claimed “cellular radio interface” and that *Guo*’s WLAN corresponds to the claimed “wireless local area network interface.”

(iii) “using path quality metrics that are independent of how the QoI is measured,”

Guo teaches this feature. *Roy*, ¶111. POSITAs would have understood that the

term “path quality metric” refers to a measure of a network path that is indicative of a network’s performance. *Id.*; *See also* ’006Pat, 8:57-60 (“The preferred embodiments described herein solve existing problems in the art based on a unique understanding of computer networks, performance measurements, statistics and more.”). POSITAs would have further understood that the term “path” as used in the ’006Pat (including in the phrase “path quality metric”) is not limited in terms of the number of path steps and may refer to any end-to-end network path, regardless of whether the path consists of a direct connection or of multiple steps. *Roy*, ¶112. Even if the term was limited to multi-step paths, a POSITA would have recognized that the exemplary WLAN and WWAN network types disclosed in *Guo* are typically implemented as wireless networks containing multi-step paths. *Id.*

As described in §V.A, *Guo* discloses the measurement and comparison of “residual bandwidth.” POSITAs would have understood that residual bandwidth is a measure of a network path that is indicative of the network’s performance. POSITAs would have understood that residual bandwidth on a network path quantifies that path’s capacity to handle additional network traffic. *Roy*, ¶113.

POSITAs would have understood that the ’006Pat uses the term “path quality metrics that are independent of how the QoI is measured” to refer to metrics that are comparable, even where they may be measured in multiple ways. *See, e.g.* ’006Pat,

5:5-13 (disclosing measurement of “round-trip available bandwidth” and “unidirectional available bandwidth”), 11:43-48 (disclosing measurement of measurement “by the path through the radio network alone or by an end-to-end path that includes both a path in the radio network and a path through a wired network.”). Specifically, the *'006Patent* discloses “available bandwidth,” or “unused, spare capacity,” as one such path quality metric. *Id.* 6:20-26, 11:63-65 (“[A]vailable bandwidth of a link is the unused, ‘spare’ capacity of the link ...”)

POSITAs would have understood that *Guo* discloses “using path quality metrics that are independent of how the QoI is measured.” *Roy*, ¶115. *Guo* discloses the measurement and comparison of “residual bandwidth,” including multiple ways to measure residual bandwidth. As described in §V.A, *Guo* teaches estimating residual bandwidth by measuring the packet collision probability by transmitting probing data packets. *See also Guo*, ¶¶[0068] - [0069], Cl. 14. As also described in §V.A, *Guo* also teaches estimating residual bandwidth by calculating the network allocation vector occupation using the network’s advertised transmission times. *See also id.*, ¶¶[0060] - [0064], Cl. 1. When disclosing the comparison of network QoS statistics such as residual bandwidth, *see, e.g. id.*, ¶[0104], *Guo* does not differentiate between QoS statistics depending on which method was used to estimate the statistic (“how the QoI was measured”).

POSITAs would have understood that the *Guo*'s disclosed QoS metrics correspond to some of the same QoI metrics disclosed in the '*006Pat* as being “path quality metrics that are independent of how the QoI is measured.” *Roy*, ¶115. For example, *Guo*'s “residual bandwidth” corresponds to the '*006Pat*'s “available bandwidth.” *Id.*, ¶116 (“Whether measured by the collision probability method or allocation vector occupancy method, residual bandwidth is measure of the networks unused, or spare, capacity.”); '*006Pat*, 11:63-65 (“[A]vailable bandwidth of a link is the unused, ‘spare’ capacity of the link ...”). *Guo* further discloses “transmission delay,” one of the same metrics disclosed as compatible with the '*006Pat*. *Guo*, ¶¶[0011] - [0012], [0059], '*006Pat*, 5:5-12 (disclosing use of “end-to-end delay”); *see also Roy*, ¶116.

- (iv) **“...whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,”**

Guo teaches this feature. *Roy*, ¶118. This element requires that the QoI be “measured by a path through a wireless network alone *or* a path through both a wireless network and through a wired network,” emphasis added). Because the claim uses the word “or,” the prior art need only disclose one of these two alternatives. *See, e.g., Ex Parte James Edward Pitkow*, Appeal 2011-001894, at 4 (Nov. 20, 2013)

(finding that “to meet the recited alternative language in the disputed limitations, it suffices that the prior art relied upon teaches” one of the two alternatives).

Guo discloses that, in an IEEE 802.11 wireless network, the access point transmits the network allocation vector with advertised transmission times. *Guo*, ¶[0061]. POSITAs would have understood that a IEEE 802.11 network would constitute a wireless network alone, meeting this limitation. *Roy*, ¶119. *Guo* discloses that, in this context, the mobile device may calculate the network allocation vector occupation, *id.*, ¶[0062], which is thereafter used to calculate the network QoS measure (e.g., residual bandwidth). *Guo*, Claim 1, FIG. 5, ¶¶[0064] - [0067]. Thus, *Guo* discloses that QoI is “measured by a path through a wireless network alone,” meaning it discloses this element.

c. 1[b]: “said method including said mobile device comparing path quality as a quickest change detection problem for observations from a new interface or comparing path quality based on sequential two sample tests,”

(i) Motivation to combine *Guo* and *Neave*

POSITAs would have been motivated to combine *Guo*’s mobile device with *Neave*’s disclosure of Rosenbaum’s test. *Roy*, ¶121. In the WLAN Available state 1108, *Guo*’s policy manager 1010 receives periodic “(e.g., every 10 seconds)” QoS statistics from multi-network manager 1006 and compares QoS measurements from

the WWAN, the “current wireless network service provider,” with QoS estimates for the WLAN network. *Guo*, ¶[0104]. “If the Policy Manager component 1010 determines that the WLAN will provide a higher quality of wireless network service, for example, the estimated residual bandwidth in the WLAN is higher than the communications bandwidth currently being experienced in the WWAN, then the Policy Manager component 1010 sends a Handoff Now command to the Multi-Network Manager component 1006 to initiate entry into the WLAN.” *Id.* But, *Guo* does not explicitly state **how** policy manager 1010 compares the QoS data for the WWAN and WLAN to determine whether “the estimated residual bandwidth in the WLAN is higher than the communications bandwidth currently being experienced in the WWAN.” *Id.*

POSITAs would have understood that, where QoS measurements are collected “e.g., every 10 seconds,” that the comparison algorithm must be quick to identify handover opportunities, so as to limit the amount of time that *Guo*’s device spends determining whether to initiate vertical handoff. *Roy*, ¶122. POSITAs would have understood that reducing the time spent in the discovery phase would have been essential to timely initiating vertical handoff so as to minimize any disruptions in the device’s connectivity. *Id.* Moreover, POSITAs would have known that, in the wireless networking context, the distributions underlying the QoS data are unlikely

to be known in advance. *Id.* Thus, POSITAs would have been motivated to look to statistical tests that do not require any detailed assumptions about the distribution underlying the data – non-parametric statistical tests. *Id.*; *see also* EX1016, 409 (“To compare statistical samples . . . whose distribution is unknown non parametric tests are necessary.”).

To fill this need, POSITAs would have looked to *Neave*’s disclosure of well-known, non-parametric statistical methods of comparing two datasets, including Rosenbaum’s test. *Roy*, ¶123. *Neave*’s methods constitute a finite number of identified, predictable potential solutions to the problem of comparing two datasets where the underlying distributions are not known in advance to determine which sample corresponds to a better alternative, and POSITAs would have been motivated to pursue these known potential solutions with a reasonable expectation of success. *Id.*

POSITAs would have understood that the one-sided form of Rosenbaum’s test, which tests to determine whether one dataset corresponds to higher values on average than the other, *Neave*, p. 148, fits the problem of comparing interfaces in *Guo* to determine whether a second interface has higher estimated QoS values on average than the first interface. *Roy*, ¶124. POSITAs would have understood that a one-sided two-sample test, such as the one-sided form of Rosenbaum’s test, which

looks to differences in average value of the populations underlying two samples, can detect such differences quicker than methods that require first forming reliable estimates of the location (e.g., mean or median) of the populations underlying the two samples prior to making handoff decisions. *Id.*

POSITAs would have further understood that Rosenbaum's test is more effective than alternative tests, such as the Mann-Whitney and Tukey tests, where, as in the wireless networking environment, the underlying distributions vary both in spread and location. *Roy*, ¶125; *see also Neave*, 144 (“[T]he power of the Mann-Whitney and Tukey tests would have been reduced because of the change in spread.”). POSITAs would have understood that where, as here, detecting differences in location quickly (i.e., with a minimal number of observations) is essential, it would have been important to use the more effective statistical test in this context, Rosenbaum's test. *Id.*

POSITAs would have been motivated to apply Rosenbaum's test to *Guo*'s mobile device to determine whether the QoS dataset of the alternative interface (WLAN, dataset ‘A’ in *Neave*'s description) has higher values on average than the QoS dataset of the current interface (WWAN, dataset ‘B’). *Roy*, ¶126. POSITAs would have been motivated to use Rosenbaum's test as described in *Neave* since POSITAs would have understood that Rosenbaum's test is “quick,” “relatively

compact,” and “somewhat portable,” making it well-suited for application to real time comparisons, such as those claimed in the *'006Pat. Id.*; EX1009, p. 491.

(ii) Teachings in *Guo-Neave* Combination

The *Guo-Neave* combination teaches this feature. *Roy*, ¶128. As discussed, because this element recites to alternatives separated by the word “or,” the prior art need only disclose one of the two alternatives. *See, e.g., Ex Parte James Edward Pitkow*, Appeal 2011-001894, at 4 (Nov. 20, 2013).

POSITAs would have understood Rosenbaum’s test to constitute a “two-sample test.” *Roy*, ¶129. Rosenbaum’s test looks to two datasets (samples), ‘A’ and ‘B,’ and determines whether one sample’s values are larger than the other’s on average. Further Rosenbaum’s test is described in a section of the book titled “Tests involving two samples” (i.e., “two sample tests”). *Neave*, p. x. Indeed, the *'006Pat* refers to Rosenbaum’s test, as described in *Neave*, as an exemplary two-sample test. *'006Pat*, 19:21-26 (“The two-sample tests gave the following results. Listed in Table 1 below are the p-values for ... the Rosenbaum test ...”), 17:30-32 (“Rosenbaum’s test (see Reference [9] incorporated above).”), 4:41-42 (identifying “Reference [9]” as *Neave*).

POSITAs would have recognized that the *Guo-Neave* combination performs “sequential” two-sample tests. *Roy*, ¶130. In *Guo*’s WLAN Available state 1108,

Guo's multi-network manager 1106 "periodically (e.g., every 10 seconds)" transmits QoS statistics to policy manager 1010, *Guo*, ¶[0104], which then (i.e., "periodically," or "sequentially") determines whether "the WLAN will provide a higher quality of wireless network service" than the WWAN by use of Rosenbaum's test. *Id.* POSITAs would have understood that the described "periodic" use of Rosenbaum's test constitutes use of "sequential two sample tests." *Roy*, ¶130.

d. 1[c]: "said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and"

Guo teaches this feature. *Roy*, ¶132. As described in §VIII.A.1.b(ii), *Guo* teaches a mobile device "comparing in substantially real-time the qualities of multiple interfaces." As also explained in that section, the comparison occurs "while *Guo*'s mobile device communicates on the WWAN." POSITAs would have understood this comparison is performed "concurrently in real time during the use of a current interface. *Id.*

e. 1[d]: "said mobile device selecting one of said interfaces based on said comparing."

Guo teaches this feature, *Roy*, ¶134. As described in §VIII.A.1.b(ii), *Guo* teaches "comparing in substantially real-time the qualities of multiple interfaces." As also explained in that section, if the policy manager component 1010 determines that the WLAN will provide a higher QoS than currently experienced on the

WWAN, then the policy manager 1010 initiates a vertical handoff from the WWAN to the WLAN. *See also Guo*, ¶[0104]. POSITAs would have understood that the policy manager 1010's periodic decision as to whether to remain on the WWAN or handoff to the WLAN corresponds to the '006Pat's claimed "said mobile device selecting one of said interfaces based on said comparing." *Roy*, ¶134.

2. Claim 2

- a. 2[pre]: "A method for substantially real-time comparison of quality of interfaces (QoIs) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:"**

Guo teaches 2[pre] for the same reasons discussed in §VIII.A.2.a.

b. 2[a]

- (i) "a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks"**

Guo teaches 2[a](i) for the same reasons discussed in §VIII.A.2.b(i).

- (ii) "comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface"**

Guo teaches 2[a](ii) for the same reasons discussed in §VIII.A.1.b(ii).

- (iii) "using path quality metrics that are independent of how the QoI is measured,"**

Guo teaches 2[a](iii) for the same reasons discussed in §VIII.A.1.b(iii).

- (iv) **“whether measured by a path through a wireless network alone or a path through both a wireless network and through a wired network,”**

Guo teaches 2[a](iv) for the same reasons discussed in §VIII.A.1.b(iv).

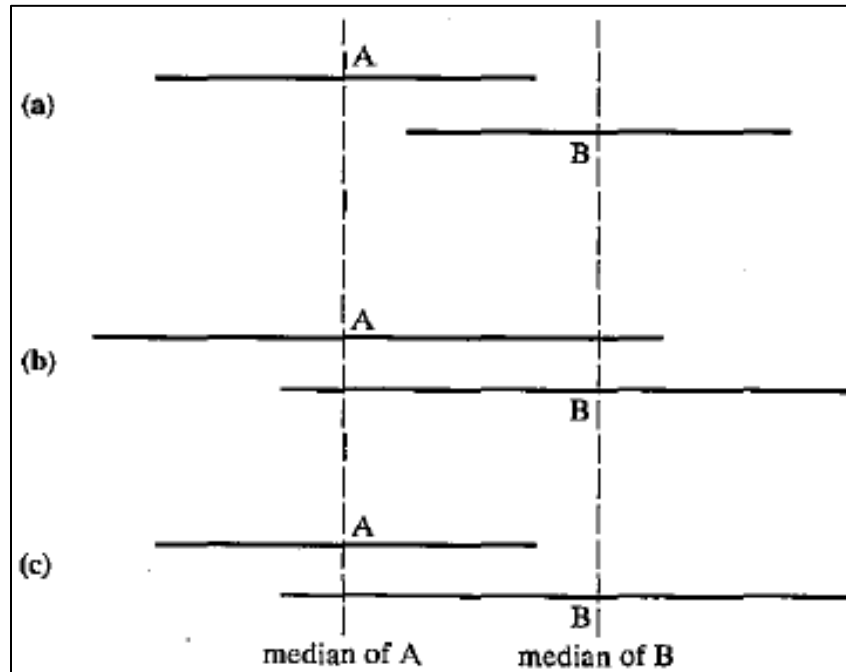
- c. 2[b]: **“said method including said mobile device performing a one-sample change point detection method or performing a non-parametric and on-line two-sample method,”**

The *Guo-Neave* combination teaches this feature. *Roy*, ¶146. As discussed, because this element recites to alternatives separated by the word “or,” the prior art need only disclose one of the two alternatives. *See, e.g., Ex Parte James Edward Pitkow*, Appeal 2011-001894, at 4 (Nov. 20, 2013).

As described in §VIII.A.1.c(i), POSITAs would have been motivated to implement *Guo*’s comparison of the WWAN, WLAN QoS datasets to determine whether “the estimated residual bandwidth in the WLAN is higher than the communications bandwidth currently being experienced in the WWAN,” *Guo*, ¶[0104], using Rosenbaum’s test. *Neave*, 144-49; *see also* §V.B (describing Rosenbaum’s test). As described in §VIII.A.1.c(i), POSITAs would have understood that Rosenbaum’s test is a “two-sample” method. *See also Roy*, ¶147.

POSITAs would have understood that Rosenbaum’s test, as described in *Neave*, is a “non-parametric” and “on-line” method. *Roy*, ¶148. As explained in the

'006Pat, a “non-parametric” test (a/k/a “distribution free” test, '006Pat, 7:34-39) is one in which “the precise statistical distribution of the quality indicator, e.g. available bandwidth,” is not known. *Id.*, 17:14-16. POSITAs would have understood that Rosenbaum’s test does not require knowledge of the precise statistical distribution of the quality indicator. *Roy*, ¶148. Rosenbaum’s test, for example, is designed to work with datasets with varying medians and spreads, as depicted in Figure 7.1, reproduced below.



Neave, FIG. 7.1

Further, Rosenbaum’s test makes no assumption about the type of distribution underlying the data – it may be applied where the data is generated from various distributions, including, e.g., a Poisson distribution, an exponential distribution, a

gamma distribution, or an Erlang distribution. *Neave*, pp. 147-48. Thus, POSITAs would have understood that Rosenbaum's test is non-parametric. Indeed, the '006*Pat* identifies Rosenbaum's test as a "non-parametric" test. '006*Pat*, 17:14-33.

According to the '006*Pat*, an "on-line" method is "quick to compute, and essentially independent of the length of the available samples." *Id.*, 17:22-25 ("In particular, we do not want to keep around all past data values."). POSITAs would have understood that Rosenbaum's test is quick to compute and would not require the storage of all past values. Where a new value is received for dataset 'A' (corresponding to WLAN) and this value is less than the maximum value of dataset 'B' (WWAN), it need not be retained (it is not counted in test statistic *R*). Otherwise, the new value should be retained, but only until either a state change occurs (*see Guo*, FIG. 11) or a higher value is received for dataset 'B,' meaning *R* will no longer account for this value in 'A.' *See Neave*, p. 146 ("As with the previous quick tests, it is of course unnecessary to derive the complete letter sequence."). POSITAs would have understood that the rules for updating *R* in view of new values in 'A' and 'B' would be quick to compute, often consisting of a simple, conditional statement (i.e., how does the new value compare to the current maximum in 'B'?). *Roy*, ¶150. Thus, POSITAs would have understood that Rosenbaum's test is also an "on-line test." Indeed, the '006*Pat* identifies Rosenbaum's test as an "on-line" test. '006*Pat*, 17:14-

33.

- d. 2[c]: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and”**

Guo teaches 2[c] for the same reasons discussed in §VIII.A.1.d.

- e. 2[d]: “said mobile device selecting one of said interfaces based on said comparing.”**

Guo teaches 2[d] for the same reasons discussed in §VIII.A.1.e.

3. Claim 3

- a. 3[pre]: “A method for substantially real-time comparison of quality of interfaces (Qols) by mobile devices having multiple heterogeneous interfaces that communicate over heterogeneous wireless networks, comprising:”**

Guo teaches 2[pre] for the same reasons discussed in §VIII.A.1.a.

b. 3[a]

- (i) “a mobile device ... [having] multiple interfaces ... that connect to heterogeneous networks”**

Guo teaches 3[a](i) for the same reasons discussed in §VIII.A.1.b(i).

- (ii) “comparing in substantially real-time the qualities of multiple interfaces, including at least one cellular radio interface and at least one wireless local area network interface”**

Guo teaches 3[a](ii) for the same reasons discussed in §VIII.A.1.b(ii).

(iii) “using path quality metrics that are independent of how the QoI is measured,”

Guo teaches 3[a](iii) for the same reasons discussed in §VIII.A.1.b(iii).

c. 3[b]: “said method including said mobile device comparing path qualities based on sequential two sample tests,”

The *Guo-Neave* combination teaches 2[b] for the reasons discussed in §§VIII.A.1.b(i)-VIII.A.1.b(ii), which describe how the combination discloses “said method including said mobile device ... comparing path quality based on sequential two sample tests.”

POSITAs would have recognized that use of the singular/plural “quality”/“qualities” in 1[b] and 2[b] does not alter the claim scope. In both cases, the policy manager 1010 employs sequential two sample tests to compare two path quality datasets (corresponding to the WWAN and WLAN). *Roy*, ¶165.

d. 3[c]: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and”

Guo teaches 2[a](i) for the same reasons discussed in §VIII.A.1.d.

e. 3[d]: “said mobile device selecting one of said interfaces based on said comparing.”

Guo teaches 2[a](i) for the same reasons discussed in §VIII.A.1.e.

4. Claim 4: “The method of claim 3, further including the mobile device having limited knowledge of the quality of the current path.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶171. In describing the “two-sample statistical test[s],” the *'006Pat* explains what it means by “having limited knowledge of the quality of the current path”:

Suppose now that we do not have extensive knowledge of the quality of the current path. For example, we do not have sufficiently many measurements to have a reliable estimate of the mean quality of the current path and its variance, and we do not have matched observations.

'006Pat, 16:60-65.

POSITAs would have understood that Rosenbaum’s test, as incorporated into the *Guo-Neave* combination, would perform the claimed comparison between the WLAN and WWAN QoS datasets when it does not have sufficiently many measurements to have a reliable estimate of the mean quality of the current path and its variance. *Roy*, ¶172. When *Guo*’s device enters the WLAN Available state 1108, the multi-network manager *begins* to periodically collect and transmit to the policy manager QoS statistics pertaining to the WLAN and WWAN. *Guo*, FIG. 11, ¶0104. POSITAs would have recognized that, at this time, *Guo*’s mobile device would not have sufficiently many measurements to form a reliable estimate of either network’s QOS (mean or variance). Where QoS samples are collected “e.g., every 10 seconds,” *Id.*, ¶[0104], *Guo*’s device would potentially not have sufficiently many

measurements to form reliable measurements for an extended period of time. *Roy*, ¶173.

The *Guo-Neave* combination would, upon collecting initial measurements, compare the WLAN and WWAN by applying Rosenbaum's test to their respective QoS datasets, a test which detects *differences* in mean values. *Neave*, p. 143-46. POSITAs would have understood that, where reliable estimates of the mean QoS are available, such statistical methods would be unnecessary, as the device could subtract the means to more efficiently detect a difference in the means. *Roy*, ¶174. Indeed, the methods disclosed in *Neave*, including Rosenbaum's test, are non-parametric methods, meaning they require "no detailed assumptions" about the distribution underlying the data, including its mean or variance. *Neave*, pp. Cover, 67; *see also* '006Pat at 20:40-42 ("In the absence of prior knowledge of path quality over the current path, a simple non-parametric test provided good results.").

POSITAs would have understood that the *Guo-Neave* combination would not have matched observations, just as described in the '006Pat. *Roy*, ¶175. In the WLAN Available state 1108, multi-network manager would collect and transmit to policy manager 1010 WLAN QoS measurements. *Guo*, ¶0104. Policy manger 1010 would thereafter compare these estimates to the experienced QoS on the WWAN, but there is no disclosure that the WLAN and WWAN measurements would

correspond to one another on a one-to-one basis (i.e., be matched). *Id.* Indeed, POSITAs would have understood that *Guo*'s disclosed methods for estimating WLAN QoS may be very difficult to synchronize with regular WWAN QoS measurements. For example, where *Guo* calculates the network allocation vector occupation, it would need to wait to receive the network allocation vector from the network prior to forming its estimate. *Id.*, ¶¶[0061] - [0063]. Where *Guo* implements probing data packets, it would need to wait to receive packet acknowledgement information from the network or declare that the packets have gone unacknowledged. *Id.*, ¶¶[0069] - [0070]. POSITAs would have understood that, in both cases, the timing of WLAN estimate formation may be highly unpredictable, making it infeasible for the combination to produce matched observations. *Roy*, ¶176. Indeed, Rosenbaum's test, as incorporated into the *Guo-Neave* combination does not require that the WLAN and WWAN datasets even be of the same size, let alone matched. *Neave*, p. 146-47 (disclosing exemplary application of Rosenbaum's test with unequal dataset sizes). Moreover, if the WLAN and WWAN observations are only "matched" where the algorithm itself matches the observations to each other, POSITAs would have understood that Rosenbaum's test does not perform the required matching. *Id.* (exemplary application of Rosenbaum's test with unmatched observations).

5. Claim 5: “The method of claim 3, further including having insufficiently many measurements for an estimate of the mean quality of the current path and its variance and observations are not matched.”

The *Guo-Neave* combination teaches this feature for the reasons discussed in §VIII.A.4, which describes how the combination discloses not having “sufficiently many measurements to have a reliable estimate of the mean quality of the current path and its variance” and “not hav[ing] matched observations.”

POSITAs would have understood that there is no material difference between an insufficient number of measurements “for an estimate” and “to have a reliable estimate,” as the *'006Pat* uses those terms. *Roy*, ¶181. In both cases, more measurements would be required to form an estimate that may be relied upon. *Id.*; *see also '006Pat*, 16:67-17:03 (“However, suppose we do have several measurements for both paths. Then, we may use a two-sample statistical test [(i.e., Rosenbaum’s test)] to compare the quality of the two paths.”).

6. Claim 6: “The method of claim 5, further including without the mobile device knowing values for mean and median, performing a test of which interface has a higher mean or median.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶183. Claim 6 requires that the mobile device not know the values for the mean or median of the QoS measures of the WLAN or WWAN. As described in §V.A, *Guo* discloses methods

for *estimating* the residual bandwidth of the WLAN. Also, in the WLAN Available state 1108, *Guo*'s device assesses the "communications bandwidth currently being experienced in the WWAN." *Guo*, ¶[0104]. POSITAs would have understood that *Guo*'s disclosure of these methods would not be required if the mobile device knew values for the mean and median of the networks' QoS distributions: there would be no need to estimate residual bandwidth or monitor experienced residual bandwidth. *Roy*, ¶183.

POSITAs would have further understood that Rosenbaum's test, as incorporated into the *Guo-Neave* combination, does not *require* knowledge of the datasets' means or medians. *Roy*, ¶184. Rosenbaum's test requires only samples from datasets 'A' and 'B.' *See Neave*, pp. 146-47 (describing test statistic *R*). Indeed, when introducing two-sample (including Rosenbaum's) tests, the '006*Pat* characterizes them as applicable where the "exact values of the mean/median" are unknown. '006*Pat*, 17:3-5.

The claim requires that the mobile device perform "a test of which interface has a higher mean or median." Rosenbaum's test identifies differences in the datasets' "location" (mean or median) of two datasets where they may differ in both location and spread. *See Neave*, pp. 143-44, 10-11 (providing exemplary "locations").

The *'006Pat* admits that a device using Rosenbaum's test meets the additional limitations of claim 6, as claim 9, which depends on claim 6, further requires that "said method employ[] a Rosenbaum test." *'006Pat*, Claims 6, 7, 9.

7. Claim 7: "The method of claim 6, further including performing a test of the difference in average quality by testing for a difference in a location of samples."

The *Guo-Neave* combination teaches this feature. *Roy*, ¶188. In WLAN Available state 1108, policy manager 1010 periodically determines whether "the WLAN will provide a higher quality of wireless network service" than the WWAN. *Guo*, ¶[0104]. As shown in §VIII.A.1.c(i), the *Guo-Neave* combination would perform this step by applying Rosenbaum's test to the WLAN and WWAN datasets.

Claim 7 requires "performing a test of the difference in average quality by testing for a difference in a location of samples." As described in §V.B, Rosenbaum's test considers the WLAN and WWAN QoS ("Quality of Service") datasets and determines whether null hypothesis H_0 ('A' and 'B' are equal *on average*) should be rejected in favor of alternative hypothesis H_1 ('B' is larger than 'A' *on average*). *Neave*, pp. 146-47. POSITAs would have understood this to be "a test of the difference in average quality" of the WLAN and WWAN. *Roy*, ¶189. Further, POSITAs would have understood that a mean (average) is a "location" of a sample. *Id.*; *see also Neave*, pp. 10-11; *'006Pat*, 8:9-13 ("location (e.g., mean or

median)”).

The *'006Pat* admits that a device implementing Rosenbaum’s test meets the additional limitations of claim 7, as claim 9, which depends on claim 7, further requires that “said method employ[] a Rosenbaum test.” *'006Pat*, Claims 7, 9.

8. Claim 8: “The method of claim 7, wherein said method is nonparametric, works for unequal sample sizes, and is performed on-line.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶192. In WLAN Available state 1108, policy manager 1010 periodically determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As discussed in §VIII.A.1.c(i), the combination would perform this by applying Rosenbaum’s test to the two WLAN and WWAN QoS datasets.

As discussed in §VIII.A.2.c, POSITAs would have understood that Rosenbaum’s test is “non-parametric” and “on-line.” POSITAs would have further understood that, as applied in the *Guo-Neave* combination, Rosenbaum’s test is “performed on-line.” *Roy*, ¶194. A test “performed on-line,” as claimed, “implies repetition of the test for every new observation or every new batch of observations.” *'006Pat*, 8:14-16, 18:20-22. In the WLAN Available state, the multi-network manager “periodically (e.g., every 10 seconds)” transmits current network QoS statistics to the policy manager 1010, *Guo*, ¶[0104], which thereafter (i.e.,

periodically) determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN by applying Rosenbaum’s test to the WLAN and WWAN QoS statistics. *Id.* POSITAs would have understood that this periodic test is performed for every new observation or batch of observations and would therefore have been “performed on-line.” *Roy*, ¶194.

The claim requires that Rosenbaum’s test, as applied in the *Guo-Neave* combination, would work for unequal sample sizes. Rosenbaum’s test does not require that the samples be the same size – the maximum value of one dataset is compared to the high-end extreme run of the other dataset, regardless of the datasets’ sizes. *Neave*, pp. 144-49. Indeed, *Neave*’s exemplary calculation compares dataset ‘A’ of size 6 with dataset ‘B’ of size 8. *Id.*, pp. 146-47; *see also id.*, pp. 383-86 (critical value tables for unequal samples sizes n_1, n_2).

9. Claim 9: “The method of claim 7, wherein said method employs a Rosenbaum test.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶197. In WLAN Available state 1108, policy manager 1010 periodically determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As shown in §VIII.A.1.c(i), the combination would perform this step by applying Rosenbaum’s to the WLAN and WWAN QoS datasets.

POSITAs would have understood that Rosenbaum's test, as applied in the *Guo-Neave* combination, is substantially identical to the test as described in the '006Pat. Roy, ¶198. As described in §V.B, Rosenbaum's test calculates R , the number of values in 'A' larger than the maximum value in 'B.' *Neave*, pp. 146-48. If $R \geq C$ (critical value based on the dataset size and the desired significance level), null hypothesis H_0 is rejected in favor of H_1 , and the test concludes that the WLAN has higher QoS on average than the WWAN. *Id.*, pp. 146-48, 383-86 (critical value table). Otherwise (and if the largest value is in 'B'), null hypothesis H_0 is maintained, and the test concludes that the WLAN and WWAN have equal QoS on average. *Id.*, pp. 146-48, 383-86.

This description of Rosenbaum's test is substantially identical to that in the '006Pat. '006Pat, 17:45-55 ("Rosenbaum's test statistic T_R involves the total number of B's data points, which have a value larger than the largest value in A."), 17:55-58 ("If the overall maximum is not from sample set B, then the test stops immediately, and the null-hypothesis H_0 is not rejected in favor of H_1 . Otherwise, H_0 is rejected in favor of H_1 if T_R is larger than a critical value $C(\alpha, n_1, n_2)$."), 17:56-18:09 (disclosing same formula as *Neave* for critical values for large sample sizes). Indeed, the '006Pat incorporates *Neave* in its disclosure of Rosenbaum's test. *Id.*, 17:26-32.

10. Claim 10: “The method of claim 9, wherein a test statistic T_R includes a total number of a second interface’s data points which have a value larger than a largest value in a first interface’s data points.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶201. In WLAN Available state 1108, policy manager 1010 periodically determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As shown in §VIII.A.1.c(i), the combination would perform this step by applying Rosenbaum’s test to the WLAN and WWAN datasets.

As described in §V.B, Rosenbaum’s test looks to test statistic R , which POSITAs would have understood corresponds to claimed test statistic T_R . *Roy*, ¶202. As described in §VIII.A.1.c(i), the *Guo-Neave* combination would apply Rosenbaum’s test, wherein the ‘A’ dataset corresponds to WLAN QoS (“second interface”) and the ‘B’ dataset corresponds to WWAN QoS (“first interface”). Test statistic R (“ T_R ”) is the number of values in ‘A’ (corresponding to the second interface’s) that are greater than the largest value in dataset ‘B’ (first interface). *Neave*, pp. 146-48 (“R is the number of ‘A’s greater than the largest B.”).

- 11. Claim 11: “The method of claim 10, wherein if an overall maximum is not from a sample set from the second interface, then the test stops, and a null-hypothesis H_0 is not rejected in favor of H_1 , and otherwise H_0 is rejected in favor of H_1 if T_R is larger than a value $C(a, n_1, n_2)$, calculated using the distribution of T_R .”**

The *Guo-Neave* combination teaches this feature. *Roy*, ¶204. In WLAN Available state 1108, policy manager 1010 periodically determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As shown in §VIII.A.1.c(i), the combination would perform this step by applying Rosenbaum’s to the WLAN and WWAN QoS datasets.

As described in §V.B, Rosenbaum’s test looks to test statistic R , which POSITAs would have understood corresponds to claimed test statistic T_R . *Roy*, ¶205. As described in §VIII.A.1.c(i), the *Guo-Neave* combination would apply Rosenbaum’s test to the WLAN (“second interface,” ‘A’) and WWAN (“first interface,” ‘B’) QoS statistics and calculate R (“ T_R ”), the number of ‘A’s greater than the maximum ‘B.’ *Neave*, pp. 146-48.

POSITAs would have understood that, where the largest value is from ‘B’ (“first interface”), then the “overall maximum is not from a sample set from the second interface.” *Roy*, ¶206. POSITAs would have understood that, in this case, $R = 0 < C$ and the test stops, maintaining null hypothesis H_0 (‘A’ and ‘B’ are equal on

average). *Id.*; see also *Neave* 146-48 (“But if the overall maximum is from B, the value of R is taken as 0 and we are unable to reject H_0 in favour of this H_1 .”), 383-86 (all critical values C greater than 0).

POSITAs would have understood that, “otherwise” (largest value is from ‘A,’ the “second interface”), $T_R > 0$ and the test proceeds. *Roy*, ¶207. POSITAs would have understood that, in this case, H_0 would be rejected in favor of H_1 (‘A’ is larger than ‘B’ on average) if $T_R \geq C(a, n_1, n_2)$. *Id.*; *Neave*, pp. 146-48.³

POSITAs would have understood that $C(a, n_1, n_2)$ is calculated using the distribution of T_R . *Roy*, ¶208. *Neave*’s critical values are determined using “knowledge of the null distribution of” the test statistic. *Neave*, p. 50 (the null distribution assumes H_0 is valid); see also, e.g., *id.*, pp. 148-49 (calculating critical values for Rosenbaum’s test using null distribution of test statistic R), 383-86 (table showing critical values derived from null distribution of R). POSITAs would have understood that, in the *Guo-Neave* combination, the critical value $C(\alpha, n_1, n_2)$ would

³ Claim 11 requires that the null hypothesis H_0 be rejected in favor of the alternative hypothesis H_1 where test statistic T_R is greater than critical value C , whereas Rosenbaum’s test, as disclosed in *Neave*, rejects H_0 in favor of H_1 where the test statistic is greater than *or equal to* the critical value. The *Guo-Neave* combination still teaches this limitation of claim 11, for claim 11 does not specify whether the H_0 should be rejected in favor of H_1 when the test statistic is equal to the critical value.

have been calculated using the distribution of test statistic R (“ T_R ”). *Roy*, ¶208.

12. Claim 12: “The method of claim 7, wherein the method is based on the length of a high-end extreme run of samples for a second interface or a low-end extreme run of samples for a first interface.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶210. The prior art need only disclose either of the two alternatives (“wherein the method is based on the length of a high-end extreme run of samples for a second interface *or* a low-end extreme run of samples for a first interface,” emphasis added).

POSITAs would have understood that the length of an “extreme run,” as used in the context of two-sample statistical tests, refers to the number of values in a first sample that lie either below the minimum value (a “low-end extreme run”) or above the maximum value (a “high-end extreme run”) of a second sample. *Roy*, ¶211; *see also Neave*, 120 (“[T]he test statistic T_y is simply defined as: the number of ‘A’s that are less than the smallest value in sample B plus the number of ‘B’s that are greater than the largest value in sample A” – “In other words, ... T_y is the sum of the lengths of the two extreme runs.”).

In WLAN Available state 1108, policy manager 1010 periodically determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As described in §VIII.A.1.c(i), the *Guo-Neave*

combination would perform this step with Rosenbaum's test as applied to the two datasets: 'A' corresponding to the WLAN interface and 'B' corresponding to the WWAN interface. As described in §VIII.A.10, 'A' corresponds to the claimed "second interface," and 'B' corresponds to the claimed "first interface."

POSITAs would have understood that Rosenbaum's test, as incorporated into the *Guo-Neave* combination, would be based on the length of a high-end extreme run of samples for a second interface. *Roy*, ¶213. As described in *Neave*, Rosenbaum's test statistic *R* "is the number of 'A's greater than the largest B." *Neave*, p. 146; *see also id.*, p. 145 ("Rosenbaum's test is ... based on the length of extreme runs in the letter sequence ..."). POSITAs would have understood that this test looks to the number of 'A' values that lie above the maximum value of 'B' and is therefore "based on the length of a high-end extreme run of samples" for dataset 'A,' which corresponds to QoS measurements from the second interface (WLAN). *Roy*, ¶213; *see also '006Pat*, 8:4-6 ("[T]he Rosenbaum test is based on the length of the high-end 'extreme run' of the samples in B ...").⁴

⁴ The '*006Pat* refers to the candidate alternative interface's QoI dataset as B, whereas *Neave* refers to the dataset being investigated for having higher values on average as 'A.' Accordingly, the '*006Pat*'s reference to B in the quoted excerpt corresponds to dataset 'A' in *Neave*.

13. Claim 13: “The method of claim 12, further including repeating the test for a new observation or a new batch of observations.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶215. In the WLAN Available state 1108, policy manager component 1010 “periodically (e.g., every 10 seconds)” determines whether “the WLAN will provide a higher quality of wireless network service” than the WWAN. *Guo*, ¶[0104]. As shown in §VIII.A.1.c(i), the *Guo-Neave* combination would perform this comparison with Rosenbaum’s test as applied to the two datasets (one each for the WLAN and WWAN). Each time that the policy manager 1010 performs this test, it will have been provided new QoS measurements for the WLAN from the multi-network manager 1006. *Id.* POSITAs would have understood that the new QoS measurements would constitute “a new observation or a new batch of observations.” *Roy*, ¶215. POSITAs would have further understood that, when the “periodic” decision as to whether the WLAN or WWAN will provide a higher quality of service would have been performed, it would have been repeated “for a new observation or a new batch of observations.” *Id.*

14. Claim 16: “The method of claim 3, further including performing the two sample test even when the mobile has more than two interfaces.”

The *Guo-Neave* combination teaches this feature. *Roy*, ¶216. Claim 16 does

not purport to require that the two-sample tests be performed with regard to each of the more than two interfaces: where the prior art discloses performing the two-sample test when the mobile device *has* more than two interfaces, it discloses this limitation.

As described in §VIII.A.1.c, *Guo* discloses a mobile device comparing path quality “based on sequential two sample tests.” *Guo* further discloses that “architectures suitable for incorporating aspects of the invention may include more than two wireless network interfaces.” *Guo*, ¶[0086].

IX. SECONDARY CONSIDERATIONS

There is no evidence in the '006*Pat*'s prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus of such alleged evidence to the Challenged Claims. *See generally* EX1004; *Roy*, ¶219. To the extent that Patent Owner asserts the existence of any secondary considerations in its responses, Petitioners reserve the right to address any such evidence.

X. THE DISCRETIONARY FACTORS FAVOR INSTITUTING TRIAL

A. 35 U.S.C. § 314(a)

To the extent the patent owner asks the Board to exercise its discretion to deny institution despite the strong invalidity showing on the merits, the Board should decline to do so because the weight of the factors articulated in *Apple Inc. v. Fintiv*,

Inc., IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential) favors institution.⁵

1. Stay

Factor 1 is neutral. Petitioners have not requested a stay but intend to do so. The PTAB has explained that it will not speculate on how any such motion would be resolved, before one is filed. *Google LLC v. Parus Holdings, Inc.*, IPR2020-00847, Paper 9 at 12 (PTAB Oct. 21, 2020).

2. Trial Date

The district court in the parallel litigation held a scheduling conference on July 18, 2024, and set jury selection for February 9, 2026, approximately 13 months away. EX1017, 1. Any comparison of a projected FWD date against the scheduled trial date is speculative. *See Dish Network LLC v. Broadband iTV, Inc.*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).

Setting that aside, this Petition is filed on January 29, 2025, so a FWD would

⁵ The *Fintiv* framework should not be followed because it is legally invalid as (1) exceeding the Director’s authority, (2) arbitrary and capricious, and (3) adopted without notice-and-comment rulemaking.

be expected by July 2026. Although this is approximately five months after the currently scheduled (speculative) trial date, this factor is not determinative or considered in isolation. *Facebook, Inc. v. USC IP P'Ship*, IPR2021-00034, Paper 13 at 11 (PTAB Apr. 13, 2021) (“[T]his factor is not considered in isolation, but holistically along with other factors”) (citation omitted). Moreover, the Board has instituted IPR and found, on similar facts, that this factor weighs only minimally in favor of denial. *See, e.g., Google LLC, et al. v. Multimodal Media LLC*, IPR2024-00056, Paper 9 at 8 (PTAB Apr. 12, 2024) (a period of about six months between trial and the expected FWD “weighs only marginally in favor” of denial); *NetNut Ltd. v. Bright Data Ltd.*, IPR2021-01492, Paper 12 at 9-16 (PTAB Mar. 21, 2022) (instituting IPR without stipulation and copending trial date six months before FWD); *Facebook*, IPR2021-00034, Paper 13 at 11 (a period of five months between trial and expected FWD “slightly favors denial”); *CoolIT Systems, Inc. v. Asetek Danmark A/S*, IPR2021-01195, Paper 10 at 11 (PTAB Dec. 28, 2021) (a period of five months between trial and expected FWD “weighs slightly in favor” of denial); *Equipmentsshare.com Inc. v. Ahern Rentals, Inc.*, IPR2021-00834, Paper 19 at 13 (PTAB Nov. 16, 2021) (a period of seven months between trial and expected FWD “weighs somewhat in favor” of denial).

3. Diligence/Investment

Factor 3 weighs strongly against discretionary denial. No substantive orders have been issued by the court in the underlying litigation, and investment in the parallel litigation will have remained low at the time of institution. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC*, IPR2021-00298, Paper 11 at 12-14 (PTAB May 19, 2021) (holding that this factor supports instituting IPR given the early stage of the district court proceedings, the lack of substantial discovery related to invalidity claims, and the petitioner's diligent filing of the petition after receiving preliminary infringement contentions). Assuming that a Decision on Institution is issued by July 2025, much work in district court will remain. The *Markman* hearing is scheduled for August 11, 2025, opening expert reports are due September 24, 2025, and dispositive motions are due November 3, 2025. EX1017, 3-4.

4. Overlap

Factor 4 weighs against discretionary denial. Petitioners challenge claims 1-13 and 16, whereas Patent Owner has alleged infringement of only claims 1-8 and 16. EX1018, 2. Accordingly, a material number of the challenged claims will not be addressed by the district court. *See, e.g., Precision Planting LLC v. Maschio Gaspardo S.p.A.*, IPR2024-00008, Paper 12 at 18 (PTAB Mar. 26, 2024) (holding that despite substantial overlap in issues between the IPR petition and parallel district

court action, the inclusion of claims in the petition not contested in court argues against discretionary denial due to incomplete overlap).

5. Parties

Petitioners and PO are also parties to the parallel litigation.

6. Other Considerations

Even if the *Fintiv* factors favor discretionary denial (which they do not), the merits are compelling here. The Office did not consider a wealth of prior art during prosecution that discloses and/or suggests the alleged invention.

Petitioners therefore respectfully submit that the *Fintiv* factors favor institution and that discretionary denial of this Petition would be neither appropriate nor equitable.

B. 35 U.S.C. §325(d)

The Board should not exercise its discretion under §325(d) to deny institution. *See Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8, at 17-18 (PTAB Dec. 15, 2017) (precedential) (listing non-exclusive factors).

First, in making this determination, the Board looks to “the similarities and material differences between the asserted art and the prior art involved during examination.” *Becton, Dickinson*, 17. As an initial matter, primary reference *Guo* was not considered during examination. Further, the examiner twice rejected claims

1-10 and 14-16 as obvious over *Bye* (US 2005/0002379) in view of the admitted prior art (APA), EX1004, 82-87, 130-38, and only allowed these claims to issue after the applicant amended the claims to add the limitations purportedly absent in *Bye*: “said mobile device performing said comparing of said multiple interfaces concurrently in real time during use of a current interface, and said mobile device selecting one of said interfaces based on said comparing.” *Id.*, 159-78, 184. As described in §§VIII.A.1.d, VIII.A.1.e, *Guo* discloses these limitations, which constitute significant material differences in the references.

Second, and relatedly, the examiner never considered the *Guo-Neave* combination asserted herein, and the Board has declined to exercise discretion to deny a petition under §325(d) where the evidence was insufficient to persuade the Board that the examiner considered the asserted combination. *See, e.g., Weber, Inc. v. Provisur Technologies, Inc.*, IPR2019-01467, Paper 7, at 4 (PTAB, Feb. 14, 2020).

Third, the Board looks to “the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art.” *Becton, Dickinson*, 17-18. During prosecution, the examiner rejected claims 1-10 and 14-16 as obvious over the prior art, EX1004, 82-87, 130-38, but Petitioners herein challenge claims 1-13 and 16, a non-coextensive set of claims, and under a combination grounded in materially different prior art, as described above.

Fourth, at no point during prosecution was the question as to whether *Neave* constituted teachings within the relevant art resolved in the applicant's favor. Although the applicant argued that "the alleged APA [e.g., *Neave*] does not provide any teaching or suggestion that such methods were applicable in the context of the present invention related to selection of network interfaces," EX1004, 117, the examiner did not find this argument to be persuasive and again rejected the same claims as obvious, noting: "Despite the Applicant's objections, the disclosure and well-known use of change-point detection are commonly known to be applicable for employment within the art communication networks." *Id.*, 135-36. As described above, only after the applicant amended all independent claims to include features purportedly not disclosed in *Bye* did the examiner allowed the application to issue. *Id.*, 159-78, 184.

XI. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Parties-in-Interest

Petitioners identify themselves as the real parties-in-interest.

1. Related Matters

To the best of Petitioners' knowledge, the '006*Pat* has only been involved in the following district court litigation: *Four Batons Wireless, LLC v. Samsung Electronics Co., Ltd. et al.*, 2:24-cv-00284-JRG (E.D. Tex.), filed April 26, 2024.

To the best of Petitioners' knowledge, the '006*Pat* has not been challenged in any other *inter partes* review or post-grant review prior to this proceeding.

B. Lead and Backup Counsel

Lead Counsel	Backup Counsel
Jeffrey A. Miller (Reg. No. 35,287) jeffrey.miller@apks.com Arnold & Porter Kaye Scholer LLP 3000 El Camino Real Five Palo Alto Square, Suite 500 Palo Alto, CA 94306-3807 Tel: 650-319-4500 Fax: 650-319-4700	Ali R. Sharifahmadian (Reg. No. 48,202) ali.sharifahmadian@arnoldporter.com Arnold & Porter Kaye Scholer LLP 601 Massachusetts Ave., NW Washington, DC 20001-3743 Tel: 202-942-5000 Fax: 202-942-5999 David A. Caine (Reg. No. 52,683) david.caine@arnoldporter.com Ryan R. Roberts (Reg. No. 82,877) ryan.roberts@arnoldporter.com Arnold & Porter Kaye Scholer LLP 3000 El Camino Real Five Palo Alto Square, Suite 500 Palo Alto, CA 94306-3807 Tel: 650-319-4500 Fax: 650-319-4700 Albert J. Boardman (Reg. No. 70,601) albert.boardman@arnoldporter.com Arnold & Porter Kaye Scholer LLP 250 West 55th Street New York, NY 10019-9710 Tel: 212-836-8135 Fax: 212-836-8689

C. Service Information

Please address all correspondence to lead and back-up counsel at the above addresses. Petitioners consent to electronic service by email at the following addresses:

jeffrey.miller@apks.com
ali.sharifahmadian@arnoldporter.com
david.caine@arnoldporter.com
ryan.roberts@arnoldporter.com
albert.boardman@arnoldporter.com
xSamsungFourBatonsAP@arnoldporter.com

D. Power of Attorney

A power of attorney is filed herewith according to 37 C.F.R. §42.10(b).

XII. FEES

Petitioners concurrently electronically submits the required fees for this Petition. The Board is authorized to charge Arnold & Porter Kaye Scholer LLP's deposit account, No. 50-2387, for any fee deficiency.

Date: January 29, 2025

Respectfully submitted,

/Jeffrey A. Miller/

Jeffrey A. Miller (Reg. No. 35,287)
Counsel for Petitioners

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 13,361 words, excluding those portions identified in 37 C.F.R. §42.24(a), as measured by the word-processing system used to prepare this paper.

/Jeffrey A. Miller/
Jeffrey A. Miller (Reg. No. 35,287)
Counsel for Petitioners

CERTIFICATE OF SERVICE

I certify that on January 29, 2025, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 8,798,006 and supporting exhibits to be served via overnight delivery on the Patent Owner at the following correspondence address of record as listed on PAIR:

ATTN: Stephen B. Parker (WPD)
Westerman, Hattori, Daniels & Adrian, LLP
8500 Leesburg Pike
SUITE 7500
Tysons, VA 22182

A courtesy copy was also sent via electronic mail to Patent Owner's litigation counsel listed below:

Allen Hernandez (ahernandez@susmangodfrey.com)
Joseph Grinstein (jgrinstein@susmangodfrey.com)
Rohit Nath (rnath@susmangodfrey.com)
Shawn Blackburn (sblackburn@susmangodfrey.com)
Meng Xi (mxi@susmangodfrey.com)
Corey Lipschutz (clipschutz@susmangodfrey.com)
Andrea Leigh Fair (andrea@millerfairhenry.com)

/Jeffrey A. Miller/

Jeffrey A. Miller (Reg. No. 35,287)
Counsel for Petitioners