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

In the Matter of	)	
	)	
Application of Midtown Radio	)	File No. BNPL-20131115ABH
for New Low Power FM Station in	)	Facility ID No. 196604
Sacramento, California	)	

To: Audio Division, Media Bureau

PETITION TO DENY, OR IN THE ALTERNATIVE, REQUEST FOR LICENSE CONDITION

Pursuant to Section 73.3584 of the Commission's Rules,[1] Results Radio of Sacramento Licensee, LLC ("Results"), licensee of KMJE(FM), Placerville, California ("KMJE"), respectfully requests that the Commission deny the captioned application of Midtown Radio ("Midtown") for a new low power FM ("LPFM") construction permit. Grant of Midtown's application at its specified location would cause co-channel interference to KMJE's signal, resulting in potential loss of service to more than one million people in the Sacramento area, including many listeners within KMJE's 70 dBu contour. Results has determined that an alternative facility for Midtown's proposed LPFM station would avoid this interference and the resulting loss of service while greatly increasing Midtown's coverage. If the Commission nevertheless grants Midtown's application, Results requests in the alternative that a condition be placed on Midtown's construction permit requiring Midtown to notify Results in writing one week before the LPFM station commences on-air operations, so that Results can prepare to monitor the interference and to conduct measurements of its extent.

[1] 47 C.F.R. § 73.3584(a).

BACKGROUND

KMJE, which broadcasts on Channel 221 (92.1 MHz), provides service to approximately 2,723,673 people in the greater Sacramento area.[2] The full-service station has been broadcasting for approximately 20 years. KMJE provides listeners with popular music programming as well as coverage of a range of issues of local interest to the community, as documented in the station's quarterly issues and programs reports. Midtown's application, FCC File No. BNPL-20131115ABH, requests authorization for a new LPFM station in Sacramento that also would operate on Channel 221.

DISCUSSION

I. Midtown's Proposed LPFM Station Will Interfere with KMJE's Signal Within KMJE's 70 dBu Contour, Causing More Than One Million People to Lose Service.

LPFM service on the frequency and at the location specified in Midtown's application will cause co-channel interference to reception of KMJE's signal—including within KMJE's 70 dBu contour—and is predicted to cause a loss of service to more than one million people.

The low power FM radio service is a secondary service. The statute authorizing LPFM service demonstrates the clear intent of Congress that LPFM stations be considered secondary to full-power FM stations, stating that "when licensing new FM translator stations, FM booster stations, and low-power FM stations," the Commission "shall ensure that" such stations "remain equal in status and *secondary to existing and modified full-service FM stations*."[3] The Commission has acknowledged this secondary status in its orders implementing this legislation,

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[2] KMJE's population served has been calculated using the Longley-Rice methodology described in the Engineering Statement, for the reasons described therein and in Section I below.

[3] Local Community Radio Act of 2010, Pub. L. No. 111-371, § 5, 124 Stat. 4072, 4073 (2011) (emphasis added).

noting that "LPFM service remains secondary" to full power stations and that "an LPFM applicant must protect a full power station digital signal."[4]

Although the Commission occasionally grants waivers of second- and third-adjacent channel spacing requirements, it was never intended that LPFM stations be permitted to cause co-channel interference to full-power FM stations. For that reason, the Commission "will not allow an operating LPFM station to cause interference within a commercial or NCE FM station's 3.16 mV/m (70 dBu) contour."[5] Although the Commission typically relies on minimum spacing requirements to achieve the policy of not allowing new LPFM stations to cause interference to full-power FM stations, spacing requirements alone are inadequate to prevent interference in this case, because KMJE's 70 dBu contour extends farther than a simplified model would predict. Accordingly, the Audio Division should not issue a construction permit for a proposed new LPFM facility that would cause widespread interference to reception of the signal of KMJE, a full-service FM station.

Although Midtown's application satisfies the spacing requirements of Section 73.807 of the Commission's Rules,[6] its signal would nevertheless cause interference to listeners within KMJE's 70 dBu contour, as demonstrated in the Engineering Statement attached to this Petition. Analysis of KMJE's signal using a point-to-point Longley-Rice study shows that KMJE places a 70 dBu contour over much of the Sacramento area, and that it places a 71.9 dBu signal at Midtown's proposed transmitter site. The Commission's Rules generally endorse prediction of

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[4] *See Creation of a Low Power Radio Service*, Fifth Order on Reconsideration and Sixth Report and Order, 27 FCC Rcd 15402, 15447 n.293 (2012).

[5] *Creation of Low Power Radio Service*, Report and Order, 15 FCC Rcd 2205, 2232 (2000).

[6] 47 C.F.R. § 73.807.

coverage using alternative models (such as Longley-Rice) in cases of "unusual terrain,"[7] such as the terrain between KMJE's transmitter and Midtown's proposed transmitter site. Indeed, the Audio Division specifically approved of the use of the Longley-Rice methodology to calculate KMJE's 70 dBu contour when it confirmed that KMJE could locate its main studio in Sacramento, only 5.6 km north of Midtown's proposed transmitter site.[8] Given the Commission's policy of avoiding interference by LPFM stations within a full-service FM station's 70 dBu contour,[9] and given that the proposed Midtown LPFM facility would cause interference within KMJE's 70 dBu contour, the Audio Division should deny the application.

II. Grant of the Proposed Construction Permit Would Disserve the Public Interest.

Even if the proposed secondary LPFM station did not cause interference within KMJE's 70 dBu contour, it nevertheless would cause over a million people to lose reception of KMJE's signal.[10] The fundamental principle that guides the Commission's decisions generally and that underlies the LPFM rules specifically is promotion of the public interest.[11] It would not be in the public interest to allow a secondary LPFM applicant to build a station that would cause interference resulting in a predicted loss of service to over one million listeners of a full-service station such as KMJE.

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[7] *See* 47 C.F.R § 73.313(e).

[8] *See KXCL-FM Request for Confirmation of Compliance with 47 C.F.R. § 73.1125*, Letter of Rodolfo F. Bonacci (July 21, 2006) (attachment to Engineering Statement).

[9] *See Creation of Low Power Radio Service, supra* note 5, at 2232.

[10] See Engineering Statement at 2 ("The interference is predicted to affect 1,002,583 persons who would otherwise receive at least a 60 dBu signal from KMJE").

[11] *See* 47 U.S.C. §§ 307(a), 309(a) (2012) (requiring consideration of the public interest in the Commission's licensing and application decisions); *Creation of Low Power Radio Service, supra* note 5, at 2260 (noting that the creation of LPFM service was warranted by "the advancement of the public interest").

In addition to preventing over one million people from receiving KMJE's signal, Midtown's proposed LPFM station would itself be severely limited by the presence of KMJE on the same frequency. Engineering projections suggest that only about 8,000 people would receive interference-free service from Midtown's station. Allowing more than one million people to lose service from KMJE so that 8,000 people may receive Midtown's LPFM signal would be fundamentally at odds with the Commission's goal of promoting the public interest,[12] particularly in light of the Commission's general preference for avoiding undue disruption of existing service.[13]

III. An Alternative for Midtown's Facilities Is Available.

Results commissioned its consulting engineer to explore the availability of alternative facilities for Midtown's proposed new LPFM station. As detailed in the Engineering Statement, there is an alternative channel that would allow Midtown to commence operations at its proposed transmitter site without causing the interference and potential loss of service that would otherwise result from transmission of the LPFM signal using the frequency specified in Midtown's application. Channel 295L1 (106.9 MHz) is available for use by Midtown at its proposed transmitter site, subject to receipt of a second-adjacent channel waiver, and use of this alternative channel would not require use of a directional antenna.[14] Most importantly,

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[12] Secondary LPFM stations are not entitled to interference protection from full-service stations. *See Application of Vermont Agency of Transportation*, Memorandum Opinion and Order, 26 FCC Rcd 14471, 14473 n.20 (2011).

[13] *See FCC v. Nat'l Citizens Comm. for Broad.*, 436 U.S. 775, 782 (1978) (noting that "the Commission has given considerable weight to a policy of avoiding undue disruption of existing service" in its licensing and renewal decisions).

[14] Under the Commission's Rules, directional antennas generally may not be used to provide LPFM service. *See* 47 C.F.R. § 73.816(b). As noted in the Engineering Statement, a waiver of the short-spacing with respect to the station operating on the second-adjacent channel would be (continued...)

Midtown's use of Channel 295L1 would provide better coverage, allowing its LPFM signal to reach approximately 366,750 people (compared to approximately 8,000 people who would receive interference-free service if the LPFM station is permitted to operate on Channel 221).[15]

IV. In the Alternative, a Condition Should Be Placed on Midtown's Construction Permit Requiring Midtown to Notify Results Prior to Commencing Operations.

If Midtown's application is granted, the co-channel interference its secondary LPFM signal will cause is predicted to result in a widespread loss of service to KMJE's listeners in the Sacramento area. Accordingly, the Audio Division should deny Midtown's application. Results requests, however, that if the Audio Division grants Midtown's application, it impose a condition on the construction permit requiring Midtown to provide Results with one week's written notice before the LPFM station commences on-air operations. Such notice would allow Results to prepare to monitor and measure the extent of the interference.

CONCLUSION

Grant of Midtown's application at its current frequency and location would cause interference with KMJE's signal within its 70 dBu contour and would disserve the public interest by potentially causing more than one million people to lose service. Results has found an alternative channel for Midtown's facilities, however, that would allow Midtown to greatly increase its coverage and to commence operations without causing widespread interference to

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warranted in light of the fact that "there is no population in the interference area" and "the interference area would not reach ground level."

[15] Although the Commission's Rules would prevent Midtown from amending its application to specify Channel 295L1 at the current time, *see id.* § 73.871, the Commission may waive its Rules at any time "for good cause shown." *Id.* § 1.3. Allowing Midtown's LPFM station to serve 366,750 people rather than 8,000 people and preventing loss of KMJE's service to over one million people would constitute good cause supporting the grant of a limited waiver in this instance. In the alternative, the Commission could reserve Channel 295L1 for Midtown to ensure its availability for a future construction permit modification application filed by Midtown.

KMJE. For these reasons, the Commission should deny the captioned application. If the Commission nevertheless grants the application, Results requests that a condition be placed on Midtown's construction permit requiring advance notice to Results before commencement of the LPFM station's operations.

Respectfully submitted,

RESULTS RADIO OF SACRAMENTO LICENSEE LLC

By: _____

Mace J. Rosenstein
Eve R. Pogoriler

COVINGTON & BURLING LLP
1201 Pennsylvania Avenue NW
Washington, DC 20004
(202) 662-6000
mrosenstein@cov.com

Its Attorneys

January 9, 2014

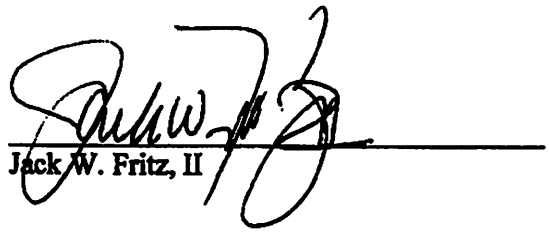
Declaration of Jack W. Fritz, II

I, Jack W. Fritz, II, hereby declare under penalty of perjury that:

1. I am the President & CEO of Results Radio of Sacramento Licensee, LLC.

2. The facts contained in the foregoing Petition to Deny are true and correct, to the best of my knowledge, information, and belief.

Executed on January 9, 2014.



Jack W. Fritz, II

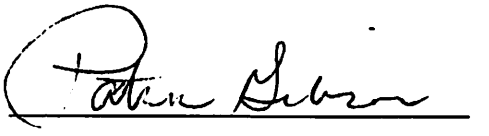
Certificate of Service

I, Patricia Gibson, hereby certify that on this 9th day of January 2014, I caused copies of the foregoing Petition to Deny to be delivered via first-class prepaid mail to the following:

Peter Doyle, Chief*
Audio Division, Media Bureau
Federal Communications Commission
445 12th Street SW, Room 2-C866
Washington, DC 20554

Anneliese Kaufman
916 22nd Street #6
Sacramento, CA 95816
President of Midtown Radio

* Via electronic mail



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(1925-2011)

Engineering Statement
Petition to Deny Filed Against BNPL-20131115ABH
New LPFM Station on Channel 221L1 at Sacramento, California
December 2013

This Engineering Statement has been prepared on behalf of Results Radio of Sacramento Licensee, LLC ("Results"), licensee of FM station KMJE on Channel 221A at Placerville, California, in support of a Petition to Deny filed against an application BNPL-20131115ABH ("The Application") by Midtown Radio ("Midtown") for a new LPFM station on Channel 221L1 at Sacramento, California.

KMJE has been licensed since 2006 to operate from a transmitter site off Grizzly Flat Road with 6 kW ERP at 100 meters HAAT, 963 meters above mean sea level. From this location, the station enjoys excellent line-of-sight conditions to the northern portion of the Central Valley, and specifically to the Top 50 radio market of Sacramento and its suburbs. The KMJE transmitter site and community of license are located in El Dorado County, which is a part of the Sacramento metro market.

KMJE places a 70 dBu or greater signal into much of the Sacramento area. Indeed, by letter dated July 21 2006 the Commission granted KMJE authority to operate from a main studio located at 298 Commerce Circle in Sacramento, having confirmed that this main studio location was encompassed by the 70 dBu field strength contour of the station's licensed facilities.

Even prior to the 2006 move to the Grizzly Flat Road site, KMJE provided a competitive signal into the Sacramento market from its transmitter site at Fruit Ridge (see FCC File No. BLH-20031202ACK).

Despite KMJE's long-standing history of service to the Sacramento market, Midtown has proposed to construct its Sacramento LPFM station on Channel 221L1, cochannel with KMJE, having apparently failed to conduct even a minimum of research into the viability of that channel by tuning a radio to 92.1 MHz at their proposed main studio location.

In this particular case, even though The Application satisfies the LPFM spacing rules in §73.807 of the Commission's Rules, operation of Midtown's proposed facility would result in widespread destructive interference to reception of KMJE. This would be cochannel interference, for which there would be no viable engineering solution. Likewise, the LPFM station would also be subject to significant received cochannel interference which would severely limit the practical utility of the LPFM station.

Longley-Rice Study

A study of the predicted interference to reception of KMJE has been performed using Longley-Rice methodology. While evaluation using Longley-Rice methodology is not explicitly accommodated in the LPFM allocation rules in Part 73, Subpart G, the methodology is well-known and well-understood among consulting broadcast engineers and at the Commission. The study results are included in this Engineering Statement in order to graphically illustrate the widespread interference which operation of the Sacramento LPFM can reasonably be expected to cause to reception of KMJE.

On the attached map Exhibit 1, areas which are shaded either red or green are predicted to receive a signal strength of at least 60 dBu from KMJE. Areas shaded green are <u>not</u> predicted to be subject to interference from the Sacramento LPFM, using a D/U signal ratio of 20 dB for cochannel operation. Areas shaded red <u>are</u> predicted to be subject to interference from the Sacramento LPFM. The interference is predicted to affect 1,002,583 persons who would otherwise receive at least a 60 dBu signal from KMJE.[1]

[1] Population figures are based on 2010 Census block centroid data.

On the attached map Exhibit 2, areas which are shaded either red or green are predicted to receive a signal strength of at least 60 dBu from the Sacramento LPFM. Areas shaded green are not predicted to be subject to interference from KMJE, using a D/U signal ratio of 20 dB for cochannel operation. Areas shaded red are predicted to be subject to interference from KMJE. Only 8,132 persons are predicted to receive interference-free service from the Sacramento LPFM, and the LPFM station's effective service radius would be only 1 kilometer.

There is simply no public interest benefit in a proposal by which 1,000,000 people would lose existing reception service, so that 8,000 people can gain a new service.

Protection of KMJE 70 dBu Service Area

In the July 21 2006 letter[2] granting KMJE authority to operate its main studio at 298 Commerce Circle in Sacramento (NL 38-35-59 x WL 121-27-40), the Commission stated that the Office of Engineering and Technology ("OET") had "confirmed that the proposed main studio location is encompassed by the 70 dBu field strength contour of the facilities specified in [KMJE]'s license."

Significantly, that main studio location is only 5.6 km north of Midtown's proposed transmitter site, and both locations (i.e. the KMJE main studio and Midtown's proposed transmitter site) are 72 kilometers from the KMJE transmitter site.

Given the nearly-identical line-of-sight conditions between the KMJE transmitter site and both locations, it is axiomatic that KMJE places at least a 70 dBu signal at Midtown's proposed transmitter site. Indeed, a point-to-point Longley-Rice study of the path from the KMJE transmitter site to the LPFM transmitter site shows that KMJE places a 71.9 dBu signal at that location. A plot of this path study is included at Exhibit 3. Additionally, Exhibit 1 depicts the location of the KMJE Longley-Rice 70 dBu contour, which extends beyond the LPFM transmitter site.

§73.809(a)-(a)(1) of the Commission's LPFM rules states that:

[2] See the attached Exhibit 4.

> (a) If a full service commercial or NCE FM facility application is filed subsequent to the filing of an LPFM station facility application, such full service station is protected against any condition of interference to the direct reception of its signal that is caused by such LPFM station operating on the same channel or first-adjacent channel provided that the interference is predicted to occur and actually occurs within:
>
> (1) The 3.16 mV/m (70 dBu) contour of such full service station;

While that particular rule was designed to provide interference protection to a full-power station which was modified subsequent to the filing of an LPFM station application, a corresponding level of interference protection must be provided in the instant case, where the Commission has already ruled that KMJE provides a 70 dBu contour to the LPFM station's service area, and where the LPFM station would cause interference to a significant area and population within that 70 dBu contour.

Alternative LPFM Channel

An alternative channel has been identified which Midtown could utilize at its proposed transmitter site. The spacing study attached at Exhibit 5 demonstrates that Channel 295L1 can be utilized at Midtown's proposed tower site and antenna height, provided that a second-adjacent channel waiver is secured with respect to KBZC 293B Sacramento.

An LPFM operation on alternative Channel 295L1 would be short-spaced to second-adjacent channel station KBZC on Channel 293B at Sacramento. The proposed LPFM transmitter site is located within the 54 dBu protected contour of KBZC, 33.32 km from the KBZC transmitter site at a bearing of 252 degrees True. However, given the KBZC antenna's 230 meter HAAT and 50 kW ERP along this radial, KBZC places a 73.4 dBu contour at the LPFM transmitter site. The corresponding interfering contour from the LPFM is 73.4 + 40 = 123.4 dBu. Given that the transmitting antenna will be installed at a height of 22 meters above ground, and taking into consideration the vertical plane pattern of a Shively 6812B-2-SS half-wave-spaced antenna, the

Free Space calculations included at Exhibit 5 demonstrate that the interference area would not reach ground level. Similar results could be achieved with other antenna models.

These calculations demonstrate that Midtown could, consistent with §73.807(e)(1) of the Commission's Rules, request waiver of the second-adjacent channel spacing requirement to KBZC since there is no population in the interference area.

Statement of Engineer

This Engineering Statement has been prepared by me or under my direct supervision. I am a Partner in the firm of Hatfield & Dawson Consulting Engineers, and am registered as a Professional Engineer in the State of Washington. I hereby declare that the facts set out in the foregoing Engineering Statement, except those of which official notice may be taken, are true and correct.

Signed this 27th day of December, 2013

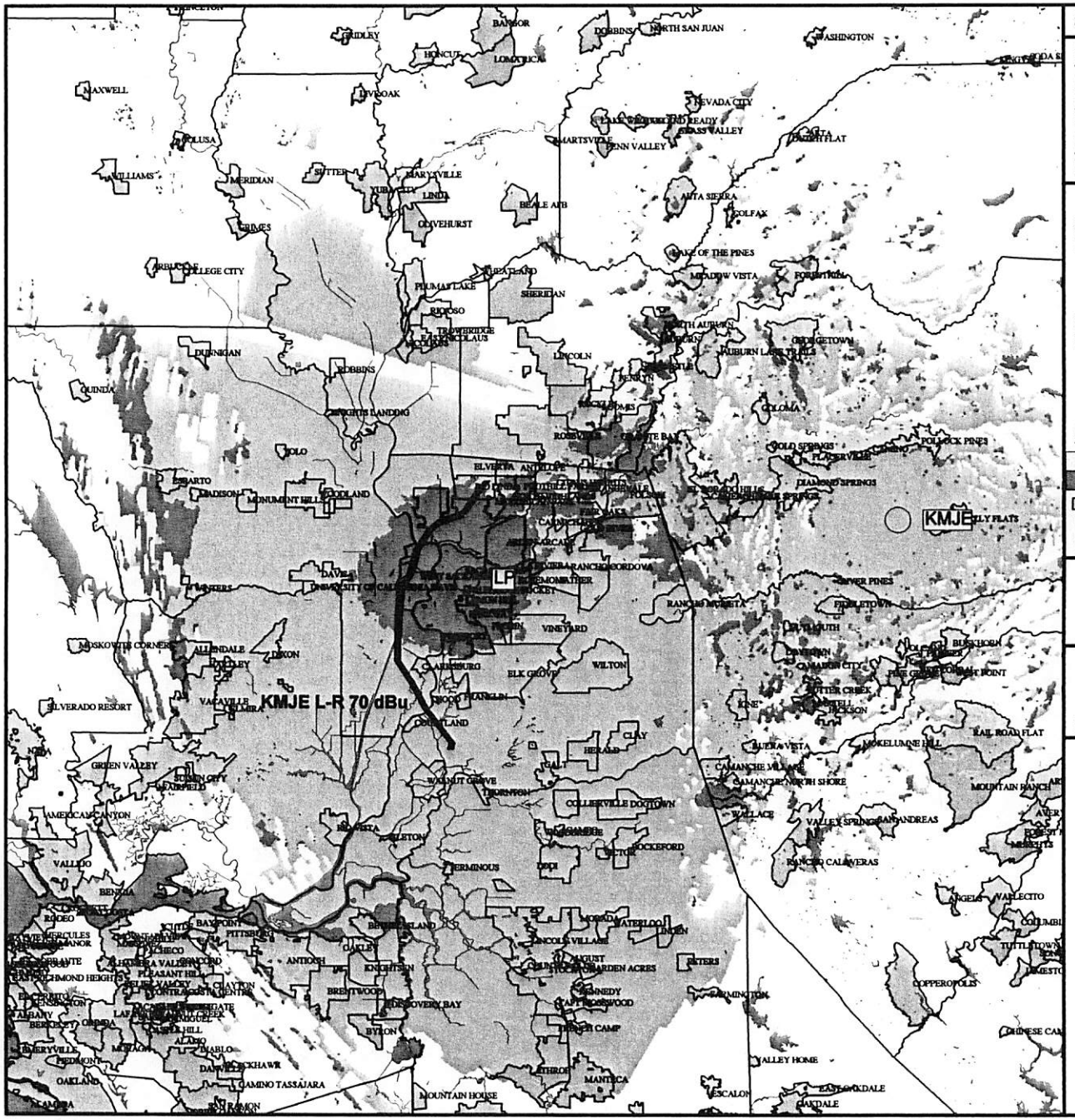
Erik C. Swanson, P.E.

Exhibit 1

Longley-Rice Interference Study

LPFM into KMJE

Hatfield & Dawson Consulting Engineers



SIGNAL™: Sacramento 221L1

Prop. model 1: Longley-Rice v1.2.2
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): none
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KMJE
N38°38'10.00" W120°38'14.00" 929.0 m
KMJE Tx.Ht.AGL: 34.0 m Total ERPd: 7.78 dBkW
Model: 1 Isotropic-horizontal/0.0° 92.1000 MHz

Site: LP
N38°33'00.00" W121°27'16.00" 9.0 m
LP Tx.Ht.AGL: 22.0 m Total ERPd: -10.00 dBkW
Model: 2 Isotropic-horizontal/0.0° 92.1000 MHz

C/I ratio Primary Group TXs to Second Group TXs

>	20.0 dB	Predicted Int-Free
<	20.0 dB	Predicted Interference

Display threshold level: -54.3 dBmW
RX Antenna - Type: ISOTROPIC
Height: 9.1 m AGL Gain: 0.00 dBd

KILOMETERS
-25 0 25

Exhibit 1: Interference to KMJE

Hatfield & Dawson

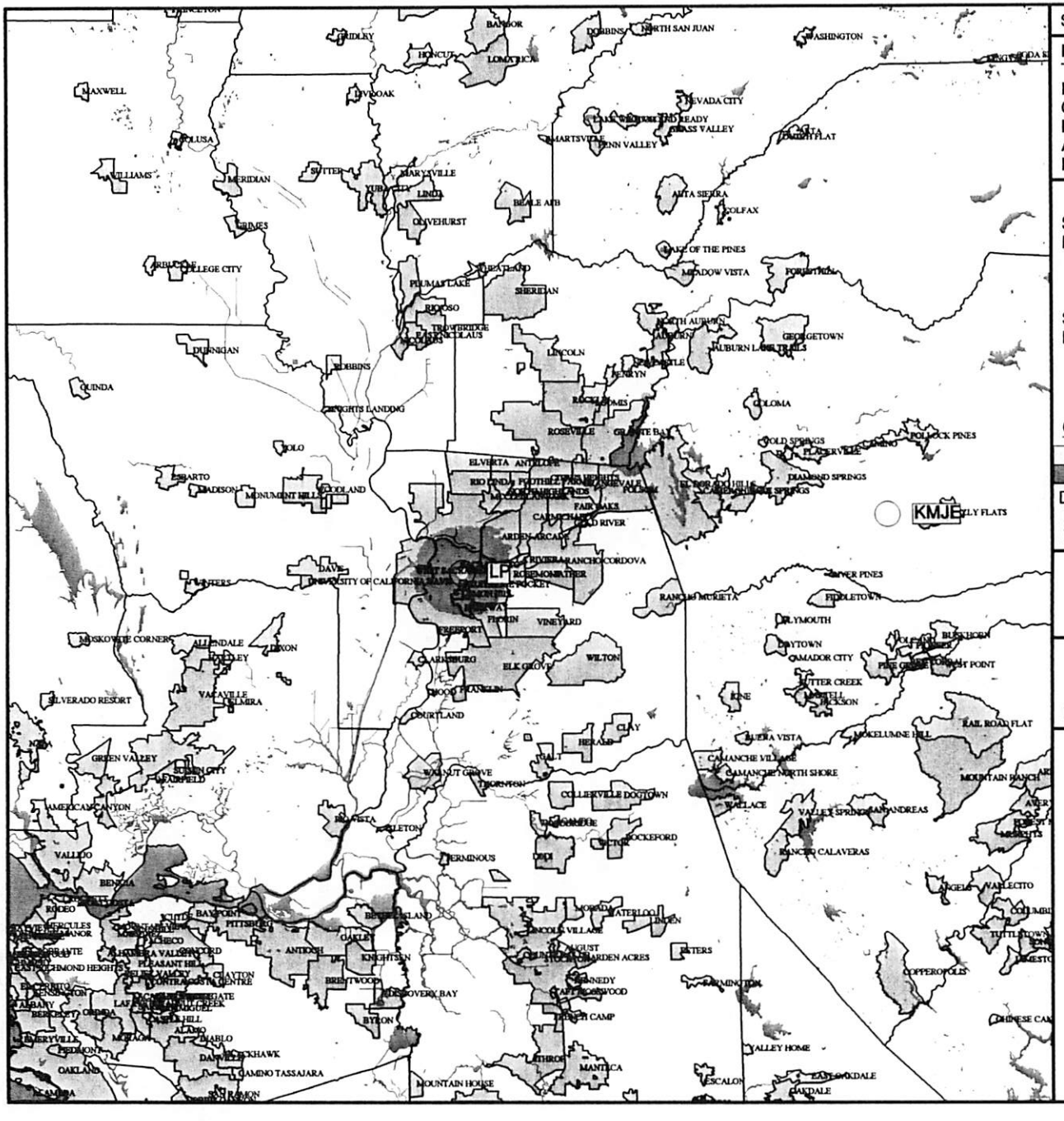
Exhibit Dec 2013

Exhibit 2

Longley-Rice Interference Study

KMJE into LPFM

Hatfield & Dawson Consulting Engineers



SIGNAL™: Sacramento 221L1

Prop. model 1: Longley-Rice v1.2.2
Time: 50.0% Loc.: 50.0%
Prediction Confidence Margin: 0.0dB
Climate: Continental Temperate
Land use (clutter): none
Atmospheric Abs.: none
K Factor: 1.333

Sites

Site: KMJE
N38°38'10.00" W120°38'14.00" 929.0 m
KMJE Tx.Ht.AGL: 34.0 m Total ERPd: 7.78 dBkW
Model: 2 Isotropic-horizontal/0.0° 92.1000 MHz

Site: LP
N38°33'00.00" W121°27'16.00" 9.0 m
LP Tx.Ht.AGL: 22.0 m Total ERPd: -10.00 dBkW
Model: 1 Isotropic-horizontal/0.0° 92.1000 MHz

C/I ratio Primary Group TXs to Second Group TXs

>	20.0 dB	Predicted Int-Free
<	20.0 dB	Predicted Interference

Display threshold level: -54.3 dBmW
RX Antenna - Type: ISOTROPIC
Height: 9.1 m AGL Gain: 0.00 dBd

KILOMETERS

-25 0 25

Exhibit 2: Interference to LPFM

Hatfield & Dawson

Exhibit Dec 2013

Exhibit 3

Longley-Rice path study from KMJE transmitter site to Sacramento LPFM transmitter site.

-42.34 dBmW is equal to 71.9 dBu at 92.1 MHz.

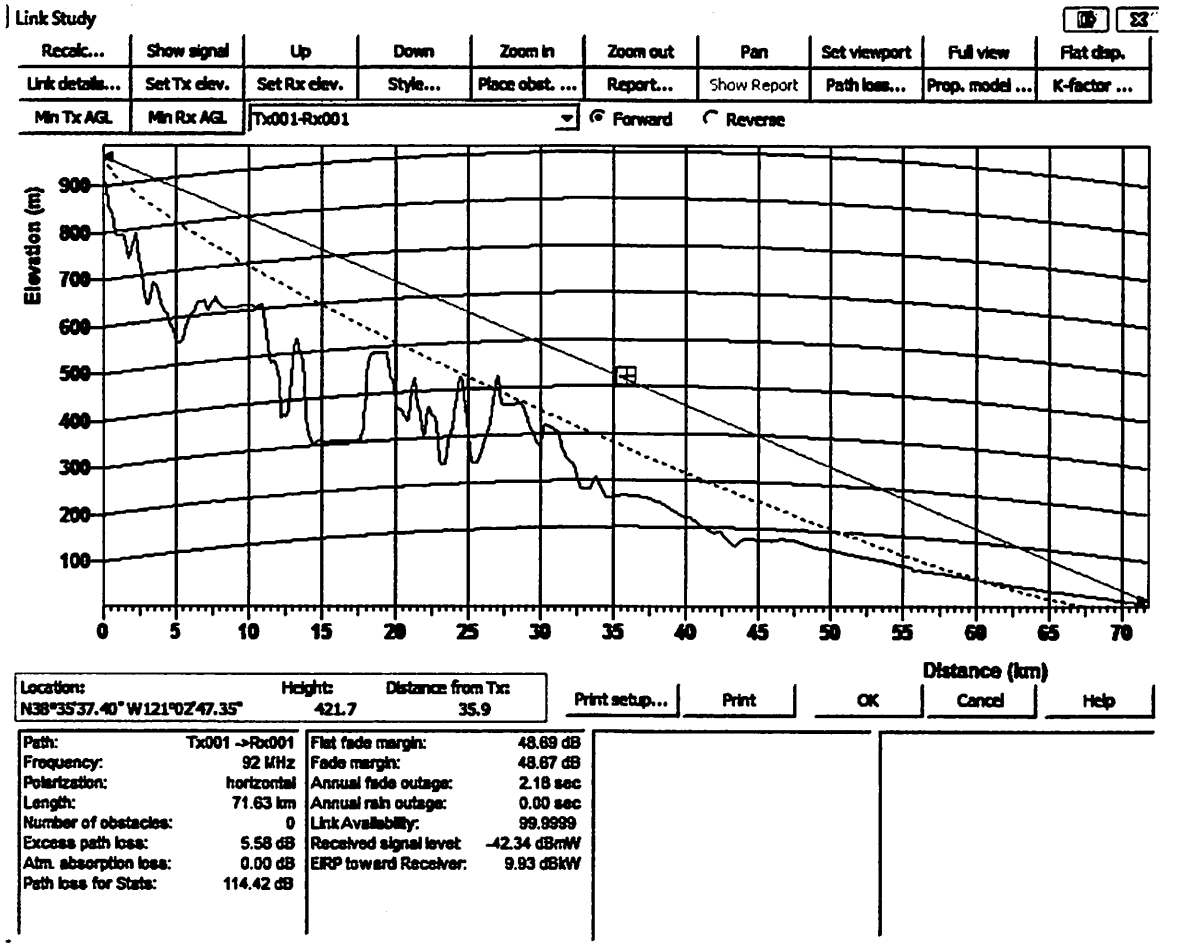


Exhibit 4

Commission letter granting KMJE authority for a main studio location at 298 Commerce Circle in Sacramento

FEDERAL COMMUNICATIONS COMMISSION
445 12th STREET SW
WASHINGTON DC 20554

JUL 2 1 2006

MEDIA BUREAU
AUDIO DIVISION
APPLICATION STATUS: (202) 418-2730
HOME PAGE: www.fcc.gov/mb/audio

PROCESSING ENGINEER: Rudy Bonacci
TELEPHONE: (202) 418-2722
FACSIMILE: (202) 418-1410
MAIL STOP: 1800B3
INTERNET ADDRESS: rodolfo.bonacci@fcc.gov

First Broadcasting Sacramento Licensing, LLC
750 North Saint Paul
10th Floor
Dallas, TX 75201

In re: KXCL(FM), Placerville, CA
Facility I.D. No.: 36028
Request for confirmation of compliance with
47 C.F.R. § 73.1125

Dear Licensee:

This refers to your attorney's letter requesting confirmation that KXCL's proposed main studio complies with 47 C.F.R. § 73.1125. The letter included a supplemental showing of technical statements and studies which use an alternate contour prediction methodology to demonstrate that the proposed main studio location is within the 70 dBu field strength contour for the facilities specified by KXCL(FM)'s license BLH-20031202ACK, as required by 47 C.F.R. § 73.1125. The proposed main studio is located at 298 Commerce Circle, Sacramento, California (38° 35' 59" N.L., 121° 27' 40" W.L.).

The engineering study which KXCL submitted calculated the desired field strength contours using the free space plus diffraction and Longley-Rice models, a variation of the irregular terrain model, permitted by 47 C.F.R. § 73.313(e) and (f). Your study indicates the distance to KXCL's authorized 70 dBu field strength contour exceeds the distance to the 70 dBu field strength contour as calculated using the F(50,50) propagation curves by approximately 62% (Longley-Rice), 70% (free space plus diffraction), along the azimuth from KXCL's transmitter location in the direction of the proposed main studio. Therefore, your engineering showing was referred to the Commission's Office of Engineering and Technology (OET) for a detailed propagation analysis.

By way of a Memorandum dated July 12, 2006, the OET confirmed that the proposed main studio location is encompassed by the 70 dBu field strength contour of the facilities specified in KXCL's license. Accordingly, we find that KXCL's proposed main studio location would be in compliance with 47 C.F.R. § 73.1125.

Sincerely,

Rodolfo F. Bonacci
Assistant Chief
Audio Division
Media Bureau

cc: Phil Marchesiello, Esq.

Exhibit 5

Spacing study for Channel 295L1 at Midtown's transmitter site
and supporting data for a second-adjacent channel waiver request

Hatfield & Dawson Consulting Engineers

FMSTUDY.EXE Copyright 2013, Hatfield & Dawson, LLC Version 1.82

SEARCH PARAMETERS FM Database Date: 131223
Page 1

Channel: 295L1 106.9 MHz
Latitude: 38 33 0
Longitude: 121 27 16
Safety Zone: 32 km
Job Title: SAC 295L1

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)		Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KBZC	SACRAMENTO		293B	50.000		38-38-30	72.0	33.32	67
LIC	CA	BLH-830216AD	106.5	125.0		121-05-25		-33.68	SHORT
KFRC-FM	SAN FRANCISCO		295B	80.000		37-51-04	229.9	119.84	112
LIC	CA	BMLH-50811ABJ	106.9	305.0		122-29-50		7.84	CLOSE
KFRCaux	SAN FRANCISCO		295B	3.000		37-51-03	229.9	119.86	0
LIC	CA	BXMLH-60719AAZ	106.9	294.0		122-29-50		0.00	AUX
KFRCaux	SAN FRANCISCO		295B	3.000		37-51-03	229.9	119.86	0
LIC	CA	BXLED-50505ACC	106.9	294.0		122-29-50		0.00	AUX
KRNO	INCLINE VILLAGE		295C	37.000		39-18-38	57.6	160.26	130
LIC	NV	BMLH-10806AAN	106.9	911.0		119-53-01		30.26	CLEAR
K296GB	NORTH HIGHLANDS		296D	0.019		38-40-21	38.2	17.34	15
LIC	CA	BLFT-01005ABH	107.1	99.0		121-19-51		2.34	CLEAR
K296GB	NORTH HIGHLANDS		296D	0.250		38-44-22	44.7	29.66	21
CP MOD	CA	BMPFT-30709ABB	107.1	151.0		121-12-51		8.66	CLEAR
K296EX	YUBA CITY		296D	0.010	DA	39-12-20	336.7	79.36	28
LIC	CA	BLFT-80805AAX	107.1	625.0		121-49-09		51.36	CLEAR
KLVS	LIVERMORE		297B	0.880		37-52-54	208.7	84.57	67
CP	CA	BPED-31118ARH	107.3	894.0		121-55-05	SS	17.57	CLEAR
KLVS	LIVERMORE		297B	8.100		37-49-17	199.5	85.76	67
LIC	CA	BLED-20628AAI	107.3	491.0		121-46-49		18.76	CLEAR

END OF FM SPACING STUDY FOR CHANNEL 295

Free Space Interference Area Calculator
Sacramento 295L1 Interference Zone to KBZC

Antenna Height: 22 meters AGL
Contour Level: 123.4 dBu equals 1.5 V/m
ERP in Watts: 100 Watts

Maximum distance
to interfering contour is: 155.5 feet equals 47.4 meters

Antenna: 6812B-2-SS

Depression Angle (degrees)	Shively 6812B-2-SS Relative Field	Adjusted ERP (Watts)	Free Space Distance To 123.4 dBu Contour Along the depression angle	Horizontal Distance (meters)	Contour AGL (meters)	
-90	0.000	0.0	0.0 meters	0	22.0	(Straight down)
-89	0.000	0.0	0.0	0.0	22.0	
-88	0.000	0.0	0.0	0.0	22.0	
-87	0.000	0.0	0.0	0.0	22.0	
-86	0.000	0.0	0.0	0.0	22.0	
-85	0.001	0.0	0.0	0.0	22.0	
-84	0.001	0.0	0.0	0.0	22.0	
-83	0.002	0.0	0.1	0.0	21.9	
-82	0.002	0.0	0.1	0.0	21.9	
-81	0.003	0.0	0.2	0.0	21.8	
-80	0.005	0.0	0.2	0.0	21.8	
-79	0.006	0.0	0.3	0.1	21.7	
-78	0.008	0.0	0.4	0.1	21.6	
-77	0.010	0.0	0.5	0.1	21.6	
-76	0.012	0.0	0.6	0.1	21.4	
-75	0.015	0.0	0.7	0.2	21.3	
-74	0.018	0.0	0.8	0.2	21.2	
-73	0.021	0.0	1.0	0.3	21.0	
-72	0.025	0.1	1.2	0.4	20.9	
-71	0.029	0.1	1.4	0.5	20.7	
-70	0.034	0.1	1.6	0.5	20.5	
-69	0.039	0.2	1.8	0.7	20.3	
-68	0.045	0.2	2.1	0.8	20.0	
-67	0.051	0.3	2.4	0.9	19.8	

-66	0.057	0.3	2.7	1.1	19.5
-65	0.064	0.4	3.0	1.3	19.2
-64	0.072	0.5	3.4	1.5	18.9
-63	0.080	0.6	3.8	1.7	18.6
-62	0.089	0.8	4.2	2.0	18.3
-61	0.098	1.0	4.6	2.2	17.9
-60	0.108	1.2	5.1	2.5	17.6
-59	0.118	1.4	5.6	2.9	17.2
-58	0.129	1.7	6.1	3.2	16.8
-57	0.140	2.0	6.6	3.6	16.4
-56	0.152	2.3	7.2	4.0	16.0
-55	0.165	2.7	7.8	4.5	15.6
-54	0.178	3.2	8.4	4.9	15.2
-53	0.191	3.7	9.1	5.5	14.8
-52	0.205	4.2	9.7	6.0	14.3
-51	0.220	4.8	10.4	6.6	13.9
-50	0.235	5.5	11.1	7.2	13.5
-49	0.251	6.3	11.9	7.8	13.0
-48	0.267	7.1	12.7	8.5	12.6
-47	0.284	8.1	13.5	9.2	12.2
-46	0.301	9.1	14.3	9.9	11.7
-45	0.319	10.1	15.1	10.7	11.3
-44	0.337	11.3	15.9	11.5	10.9
-43	0.355	12.6	16.8	12.3	10.5
-42	0.374	14.0	17.7	13.2	10.1
-41	0.393	15.4	18.6	14.0	9.8
-40	0.412	17.0	19.5	15.0	9.4
-39	0.432	18.6	20.5	15.9	9.1
-38	0.452	20.4	21.4	16.9	8.8
-37	0.472	22.3	22.4	17.9	8.5
-36	0.492	24.2	23.3	18.9	8.3
-35	0.513	26.3	24.3	19.9	8.1
-34	0.533	28.4	25.3	21.0	7.9
-33	0.554	30.7	26.3	22.0	7.7
-32	0.575	33.0	27.2	23.1	7.6
-31	0.595	35.5	28.2	24.2	7.5
-30	0.616	37.9	29.2	25.3	7.4
-29	0.637	40.5	30.2	26.4	7.4
-28	0.657	43.2	31.1	27.5	7.4
-27	0.677	45.8	32.1	28.6	7.4
-26	0.697	48.6	33.0	29.7	7.5
-25	0.717	51.4	34.0	30.8	7.6
-24	0.736	54.2	34.9	31.9	7.8
-23	0.755	57.0	35.8	32.9	8.0
-22	0.774	59.9	36.7	34.0	8.3
-21	0.792	62.7	37.5	35.0	8.6

-20	0.809	65.5	38.4	36.0	8.9	
-19	0.826	68.3	39.2	37.0	9.2	
-18	0.843	71.1	40.0	38.0	9.7	
-17	0.859	73.8	40.7	38.9	10.1	
-16	0.874	76.4	41.4	39.8	10.6	
-15	0.888	78.9	42.1	40.7	11.1	
-14	0.902	81.4	42.8	41.5	11.7	
-13	0.915	83.8	43.4	42.3	12.2	
-12	0.927	86.0	44.0	43.0	12.9	
-11	0.939	88.1	44.5	43.7	13.5	
-10	0.949	90.1	45.0	44.3	14.2	
-9	0.959	91.9	45.4	44.9	14.9	
-8	0.967	93.5	45.8	45.4	15.6	
-7	0.975	95.0	46.2	45.9	16.4	
-6	0.981	96.3	46.5	46.3	17.1	
-5	0.987	97.4	46.8	46.6	17.9	
-4	0.992	98.3	47.0	46.9	18.7	
-3	0.995	99.1	47.2	47.1	19.5	
-2	0.998	99.6	47.3	47.3	20.3	
-1	0.999	99.9	47.4	47.4	21.2	
0	1.000	100.0	47.4	47.4	22.0	(Horizontal)