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June 14, 2017

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

**Re: Astronics AeroSat Corporation – Section 1.65 Submission,
Updated Modification Application Information
File No. SES-MFS-20170319-00302, Call Sign E140087**

Dear Ms. Dortch:

After consultation with the Commission staff, Astronics AeroSat Corporation (“Astronics AeroSat”), pursuant to Section 1.65 of the Commission’s Rules, 47 C.F.R. § 1.65, seeks to update certain operational characteristics submitted in connection with the above-referenced earth station aboard aircraft (“ESAA”) blanket license modification application.

First, in the modification application, Astronics AeroSat included information suggesting the HR6400 ESAA terminal operations with the Galaxy 16 satellite would be at an off-axis EIRP spectral density (“ESD”) level that slightly exceeds the routine off-axis ESD mask set forth in Section 25.227(a)(1)(i) of the Commission’s rules. This information, which is associated with the 4.8 MHz carrier only, is erroneous. In Attachment 1, Astronics AeroSat provides updated maximum EIRP (Item E48) and EIRP density per carrier (Item E49) values for the 4.8 MHz carrier to ensure compliance with the ESAA licensing mask. Astronics AeroSat also provides an updated link budget reflecting compliant Galaxy 16 operations in Attachment 2.

Second, Astronics AeroSat seeks to revise the Schedule B, Items E52/53 (“Frequency Coordination”) for HR6400 terminal operations with IS-33E at the 60° E orbital location. Specifically, the receive frequencies for IS-33E at 60° E should be limited to the 10950-11200 MHz band and the 11450-11700 MHz band consistent with the FCC authorization for IS-33E.¹

Third, Astronics AeroSat seeks to update the transmit antenna gain (Item E41) and total input power (Item E38) values for the HR129 ESAA terminal. To operate the HR129 terminal with a maximum EIRP of 42.5 dBW, Astronics AeroSat is adjusting the HR129 transmit gain value to 31.36 dBi at 14.250 GHz (Item E41) and reducing the total input power at the antenna flange to 10.21 watts (Item E38) to better reflect the operating characteristics of the terminal. In Attachment 3, Astronics AeroSat provides an updated radiation hazard study reflecting these adjusted operational parameters.

¹ See File No. SAT-LOA-20150327-00016, Call Sign S2939.

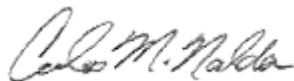
Fourth, Astronics AeroSat clarifies certain information relating to the off-axis EIRP spectral density (“ESD”) plots previously provided for the HR129 and HR6400 ESAA terminals.² In this application, Astronics AeroSat seeks a minor increase in the maximum EIRP level of the HR129 terminal from 41.9 dBW to 42.5 dBW. Astronics AeroSat confirms that this marginal EIRP increase will have no material impact on its ESAA operations, the HR129 terminal will remain well below the Commission’s off-axis ESD masks and the performance characteristics depicted in the previously provided HR129 off-axis ESD plots are representative of Astronics AeroSat’s ongoing commercial operations.

Regarding the HR6400 off-axis ESD plots, Astronics AeroSat acknowledges that the plots were submitted to the Commission prior to the adoption of the revised Section 25.227(a)(1) of the Commission’s rules, which eliminated the “wings” from the off-axis ESD masks and “flattened” the masks for the off-axis range from 19.1°-180°. As demonstrated in the attached table (Attachment 4), which was provided with the original blanket license application, the HR6400 remains below the off-axis ESD masks for all angular ranges and there will continue to be no exceedance of the relevant off-axis ESD levels. Accordingly, the existing HR6400 plots are representative of Astronics AeroSat’s ESAA operations and otherwise consistent with the Commission’s “flattened” off-axis EIRP mask in Section 25.227(a)(1).

Finally, Astronics AeroSat hereby withdraws its waiver request to permit ESAA operations with the AsiaSat-7 satellite in the 12.25-12.75 GHz band.³ Although originally requested out of an abundance of caution, no waiver is necessary because Astronics AeroSat will accept authority to operate in this band on a non-interference and unprotected basis.

Please do not hesitate to contact me with any questions regarding this matter.

Respectfully submitted,



Carlos M. Nalda
Principal
LMI Advisors

cc (w/ att.): Paul Blais
Cindy Spiers
Trang Nguyen

² See File No. SES-LIC-20140902-00688, Call Sign E140087 at Technical Appendix (providing off-axis ESD plots for the HR6400 terminal) and File No. SES-MFS-20161003-00823, Call Sign E140087 at Technical Appendix (providing off-axis ESD plots for the HR129 terminal).

³ See File No. SES-MFS-20170319-00302, Call Sign E140087, Narrative, Section II.B.

Attachment 1
Astronics AeroSat Corporation
File No. SES-MFS-20170319-00302, Call Sign E140087

Updated Schedule B Information (HR6400)

Emission Designator (Item E47): 4M80G7D

Max. EIRP (Item E48): 45.0 dBW

Max. EIRP Density Per Carrier (Item E49): 14.99 dBW/4KHz

Updated Schedule B Information (HR129)

Max. Input Power (Item E38): 10.21 W

Transmit Gain (Item E41): 31.36 dBi @ 14.250 GHz

Attachment 2

Astronics AeroSat Corporation

File No. SES-MFS-20170319-00302, Call Sign E140087

Updated HR6400 Link Budget

Forward Link Budget

FliteStream Terminal

Antenna Type	HR6400
Rx Lat. (North +)	26.9 degree
Rx Lng. (East +)	-81.8 degree
G/T	12.13 dB/K

Satellite

Name	G-16
Sat. Lng. (East +)	-99 degree

Hub Earth Station

Name	Brewster
Tx Lat. (North +)	33.663 degree
Tx Lng. (East +)	-84.226 degree
Max EIRP	80.096 dBW

Signal

FEC Decoder	DVB-S2
Modulation	8PSK
Total bits per symbol	3
Spreading Factor	1
Code Rate	0.667
Overhead	0.940
Channel Factor	1.2
Spectral Efficiency	1.880 bps/Hz
Data Rate	56400.000 kb/s
Information Rate (Data + Overhead)	60000 kb/s
Symbol Rate	30000 ksp/s
Signal or Noise Bandwidth	30 MHz
Channel Spacing Occupied Bandwidth	36 MHz
C/N Threshold	7.4 dB

Uplink

Uplink Freq.	14.38 GHz
Output Backoff	3.6 dB
EIRP Spectral Density	37.746 dBW/4kHz
Tx Range	37224.017 km
FS Loss	207.013 dB
Pointing Loss	0
Weather	4
Radome	0
Satellite G/T	4.9 dB/K
Uplink C/No	99.0 dB-Hz
Uplink C/(No+Io)	98.5 dB-Hz

Satellite

SFD	-86.9 dBW/m2
Small Signal Gain	2
Output Backoff	1 dB

Downlink

Downlink Freq.	12.08 GHz
Beampeak EIRP	52.3 dBW
Sat. EIRP	51.3 dBW
DL PSD Limit	13 dBW/4kHz
DL PSD @ Beam Peak	12.5 dBW/4kHz
Carrier EIRP @ Beam Peak	51.3 dBW
Carrier EIRP	50.3 dBW
Rx Range	36879.6 km
FS Loss	205.4 dB
Pointing Loss, Lpnt	0.1 dB
Atmosphere / Weather Loss, La	0 dB
Radome, Lr	0 dB
DownLink C/No	85.5 dB-Hz
Downlink C/(No+Io)	84.6 dB-Hz

End-to-End

Composite C/No+Io	84.4 dB-Hz
Implementation Loss	1 dB
End to End C/N+I with Imp Loss	8.7 dB-Hz
Link Margin	1.3 dB

Return Link Budget

FliteStream Terminal

Antenna Type	HR6400
Tx Lat. (North +)	26.9 degree
Tx Lng. (East +)	-81.8 degree
Max EIRP	45.10 dBW

Satellite

Name	G-16
Sat. Lng. (East +)	-99 degree

Hub Earth Station

Name	Brewster
Rx Lat. (North +)	33.663 degree
Rx Lng. (East +)	-84.226 degree
G/T	33.397 dB/K

Signal

Waveform	iDirect
Modulation	QPSK
Bits per symbol	2
Spreading Factor	1
Code Rate	0.500
Overhead Rate	0.830
Channel Factor	1.2
Spectral Efficiency	0.830 bps/Hz
Data Rate	3320 kb/s
Information Rate (Data + Overhead)	4000 kb/s
Symbol Rate	4000 ks/s
Chip Rate (Noise Bandwidth)	4000 kHz
Occupied Bandwidth	4800 kHz
C/N Threshold	3.6 dB

Uplink

Uplink Freq.	14.34 GHz
Back-off	0.1 dB
EIRP Spectral Density	15.0 dBW/4kHz
Tx Range	36879.6 km
FS Loss	206.9 dB
Pointing Loss, Lpnt	0.09 dB
Atmosphere / Weather Loss, La	0 dB
Radome, Lr	0 dB
Satellite G/T	4.9 dB/K
Uplink C/No	71.5 dB-Hz
Uplink C/No+Io	70.9 dB-Hz

Satellite

SFD @ terminal	-89 dBW/m2
Small Signal Gain	2.5 dB
Output Backoff	23.8 dB

Downlink

Downlink Freq.	12.04 GHz
Beampeak EIRP	52.3 dBW
Sat. EIRP	51.3 dBW
DL PSD Limit	13 dBW/4kHz
Downlink PSD @ Beam Peak	-3.6 dBW/4kHz
Carrier Beam Peak EIRP	26.4 dBW
Carrier EIRP	25.4 dBW
Rx Range	37224.0 km
FS Loss	205.5 dB
Pointing Loss, Lpnt	0 dB
Atmosphere / Weather Loss, La	4.3 dB
Radome, Lr	0 dB
DownLink C/No	77.6 dB-Hz
Downlink C/No+io	77.0 dB-Hz

End-to-End

Composite C/No+Io	70.0 dB-Hz
Implementation Loss	0 dB
Composite C/N+I w/imp loss	3.9 dB
Link Margin	0.3 dB

Attachment 3

Astronics AeroSat Corporation

File No. SES-MFS-20170319-00302, Call Sign E140087

Updated HR129 Radiation Hazard Study

IV. FCC RF Hazard Compliance Analysis

In connection with a license application by Astronics AeroSat Corp. for operation of a 0.29 Meter Ku-band aircraft remote antenna, the following assessment is provided of compliance with the FCC limits for maximum permissible exposure (MPE) to RF fields.

Based on the mathematical analyses described herein, the potential RF exposure levels in the areas of possible interest for antenna operation can be considered in compliance with the applicable FCC limits for controlled or occupational exposure (access to the earth station antenna is restricted to trained personnel) and for protection of the general population. The proposed operation is therefore in compliance with the FCC regulations and exposure limits.

The sections that follow provide the analysis and conclusions regarding compliance.

1 Operational Data

The relevant data for the subject operation is summarized as follows:

Transmitting Frequency Band:	14.0 – 14.5 GHz
Antenna Manufacturer / Model:	Astronics Aerosat / HR 129
Antenna Type:	Horn with Lens
Antenna Dimension:	0.29 meters (diameter) (11.4 inches)
Antenna Efficiency:	73.3 %
Net Power Input to Antenna (at flange):	10.21 Watts
Antenna Height AGL:	7.5 meters (24.6 feet)

2 Applicable MPE Limits

The MPE limits are described in the FCC Rules and Regulations. For the frequency range of interest here, the applicable limit for acceptable, continuous exposure of the general population is 1.0 milliwatt per square centimeter (mW/cm²), and for “controlled” occupational exposure, it is 5.0 mW/cm². As is the case for all antennas in the Astronics AeroSat aircraft network, access to the antenna is restricted to trained personnel, and thus the latter limit is generally applicable. However, it is possible that untrained members of the general population could be within certain distances from the aircraft. Therefore, the MPE limit for the general population has also been examined.

3 FCC Formulas and Calculations

FCC Bulletin OET 65 provides standardized formulas for calculating the power density in the areas of interest here. Using the formulas from Bulletin OET 65, we report the exposure levels (1) directly in front of the antenna, (2) in the main beam at the transition from near to far field, and (3) farther away but still in the main beam where the MPE limit is met for both controlled and general population exposure; and (4) to the side of the antenna. Each area of interest will be addressed below and the results of the calculations are given.

3.1 Potential exposure level directly in front of the antenna

The worst-case possible exposure occurs right at the surface (aperture) of the antenna. According to Bulletin OET 65, the applicable formula for power density, **S**, at the antenna surface is as follows:

$$S = 4 * P / A$$

Where: **P** represents the antenna input power; and,
A is the surface area of the antenna.

In this case, with 10.21 Watts antenna of input power at the flange, an antenna diameter of 0.29 m (11.4 inches), the power density at the antenna surface is 62.01 mW/cm², which exceeds the 5.0 mW/cm² MPE limit for controlled access. However, there is no way to approach this close to the antenna when the aircraft is in flight. Furthermore, the antenna will be switched off completely (i.e. unpowered) when a technician needs to perform work in this area (which is more than 24 feet above ground level). Standard RF safety procedures will be applied and the power to the antenna will be removed during the period of the work.

The formula for near-field, on-axis power density, directly in front of the antenna is as follows:

$$S = 16 * \Gamma * P / (\pi * D^2)$$

Where: **P** represents the antenna input power;
 Γ represents the antenna illumination efficiency; and,
D is the antenna diameter.

In this case, when we apply an illumination efficiency of 73.3 %, the result of the calculation is 45.26 mW/cm², which exceeds the occupational MPE limit. This is the exposure level directly in front of the antenna at a distance of 1 m. For the reasons stated above, there is no way for a technician or the general public to approach this close to the antenna while it is transmitting.

We can calculate the distance at which the antenna emissions would meet the MPE limits for controlled access and for the general population using the following formula:

$$R_{MPE} = ((G * P) / (4 * \pi * MPE))^{1/2}$$

Where: **G** represents the Gain of the antenna;
P represents the antenna input power: and,
MPE represents the maximum permissible exposure limit.

The results of the analysis show that the MPE for controlled access are met at 10.522 m (34.522 feet) directly in front of the antenna. The MPE for the general population is met at 4.706 m (15.439 feet) directly in front of the antenna.

The results of this calculation are also used in the analysis of potential exposure to the immediate side of the antenna, which is addressed in the subsection that follows.

3.2 Potential exposure level to the side of the antenna

The near-field power density drops off dramatically outside the imaginary cylinder extending from the surface along the axis of the main beam of an aperture antenna. According to Bulletin OET 65, if the point of interest is at least one antenna diameter removed from the center of the main beam, the power density at that point would be at least a factor of 100 lower (20 dB) than the value calculated for the equivalent distance in the main beam.

In this particular case, the antenna is mounted 7.5 m (29 feet) above the ground. Therefore, the closest that ground personnel and passengers could approach an operational antenna would be at the very least 26 antenna diameters below the main beam.

The previous calculation of the power density immediately in the near field in front of the antenna) resulted in a value of 45.26 mW/cm². Using the analysis provided in Bulletin OET 65, standing more than 26 antenna diameters off axis would decrease the exposure level by at least 34 dB to where the power density on the ground below the tail mounted antenna was less than 1.8 % of the MPE for the general population. It is highly unlikely that the general population would ever be permitted to approach the tail of an operational aircraft that closely. Even so, the exposure level at that distance complies with the MPE requirements. At any greater distance (such as boarding the aircraft), the exposure level would be lower still.

4 Compliance Conclusion

Astronics AeroSat will observe standard safety precautions with respect to operations and maintenance of the HR129 antenna, including powering the antenna off in advance of maintenance activities. In addition, given the location of the antenna on the top of the T-tail of business jets, there is no possibility that members of the general public will be located in regions where MPE values may be exceeded.

Based on the result of the analysis with regard to the potential exposure levels in all respects – directly in front of the antenna, to the side of the antenna, and at ground level – and taking into account the access restrictions for both trained and un-trained persons and standard safety procedures, we conclude that the operation of the Astronics AeroSat 0.29 meter Ku-band antenna as a tail-mounted aircraft antenna satisfies the MPE compliance requirements in the FCC regulations.

Report prepared by

Frank Blanda
Astronics AeroSat Corporation

Attachment 4

Astronics AeroSat Corporation

File No. SES-MFS-20170319-00302, Call Sign E140087

HR6400 Off-Axis EIRP Spectral Density Tables

II. Antenna Gain and Off-Axis EIRP Compliance Table

	Antenna Gain						FCC Masks				EIRP (dBW/4 kHz)				
Off-Axis Angle Deg.	0 Skew 14 GHz E Co-Pol	0 Skew 14.25 GHz E Co-Pol	0 Skew 14.5 GHz E Co-Pol	0 Skew 14 GHz H Co-Pol	0 Skew 14.25 GHz H Co-Pol	0 Skew 14.5 GHz H Co-Pol	W/n 3° of GSO Arc	All Other Dir.	0 Skew 14 GHz E Co-Pol	0 Skew 14.25 GHz E Co-Pol	0 Skew 14.5 GHz E Co-Pol	0 Skew 14 GHz H Co-Pol	0 Skew 14.25 GHz H Co-Pol	0 Skew 14.5 GHz H Co-Pol	Complies with Mask
-180	-42.661	-47.209	-53.358	50.243	-50.8	-42.747	-14	-14	-58.961	-63.509	-69.658	-66.543	-67.1	-59.047	Y
-175	-45.568	-50.858	-57.023	47.166	-46.964	-55.013	-14	-14	-61.868	-67.158	-73.323	-63.466	-63.264	-71.313	Y
-170	-46.24	-58.938	-45.125	-48.29	-58.017	-49.923	-14	-14	-62.54	-75.238	-61.425	-64.59	-74.317	-66.223	Y
-165	-39.661	-42.045	-41.089	47.161	-56.179	-55.357	-14	-14	-55.961	-58.345	-57.389	-63.461	-72.479	-71.657	Y
-160	-38.03	-36.98	-52.32	48.758	-50.494	-51.809	-14	-14	-54.33	-53.28	-68.62	-65.058	-66.794	-68.109	Y
-155	-47.53	-36.647	-32.507	53.351	-62.886	-47.404	-14	-14	-63.83	-52.947	-48.807	-69.651	-79.186	-63.704	Y
-150	-25.682	-28.2	-24.583	38.388	-34.122	-39.215	-14	-14	-41.982	-44.5	-40.883	-54.688	-50.422	-55.515	Y
-145	-30.533	-40.289	-29.87	54.162	-49.338	-47.518	-14	-14	-46.833	-56.589	-46.17	-70.462	-65.638	-63.818	Y
-140	-35.38	-32.605	-33.479	41.042	-51.609	-42.071	-14	-14	-51.68	-48.905	-49.779	-57.342	-67.909	-58.371	Y
-135	-31.017	-49.121	-28.723	37.847	-48.332	-44.816	-14	-14	-47.317	-65.421	-45.023	-54.147	-64.632	-61.116	Y
-130	-33.696	-34.446	-29.383	39.358	-38.502	-37.52	-14	-14	-49.996	-50.746	-45.683	-55.658	-54.802	-53.82	Y
-125	-37.657	-35.257	-50.898	44.807	-50.497	-44.891	-14	-14	-53.957	-51.557	-67.198	-61.107	-66.797	-61.191	Y
-120	-37.507	-36.304	-28.432	-42.77	-45.736	-42.494	-14	-14	-53.807	-52.604	-44.732	-59.07	-62.036	-58.794	Y
-115	-25.74	-36.735	-26.541	44.249	-45.032	-39.296	-14	-14	-42.04	-53.035	-42.841	-60.549	-61.332	-55.596	Y

-110	-30.925	-41.712	-24.863	38.698	-	-57.419	-38.072	-14	-14	-47.225	-58.012	-41.163	-54.998	-73.719	-54.372	Y
-105	-32.628	-39.169	-21.265	41.353	-	-43.773	-34.848	-14	-14	-48.928	-55.469	-37.565	-57.653	-60.073	-51.148	Y
-100	-32.525	-27.253	-24.022	39.734	-	-37.337	-35.053	-14	-14	-48.825	-43.553	-40.322	-56.034	-53.637	-51.353	Y
-95	-38.897	-30.992	-25.447	43.612	-	-37.677	-31.562	-14	-14	-55.197	-47.292	-41.747	-59.912	-53.977	-47.862	Y
-90	-24.128	-33.739	-27.041	59.189	-	-32.492	-35.058	-14	-14	-40.428	-50.039	-43.341	-75.489	-48.792	-51.358	Y
-85	-17.284	-24.37	-22.448	-32.27	-	-34.557	-38.999	-24	-24	-33.584	-40.67	-38.748	-48.57	-50.857	-55.299	Y
-80	-18.759	-22.404	-13.462	25.315	-	-37.209	-24.408	-24	-24	-35.059	-38.704	-29.762	-41.615	-53.509	-40.708	Y
-75	-20.65	-23.865	-18.128	25.988	-	-34.113	-32.089	-24	-24	-36.95	-40.165	-34.428	-42.288	-50.413	-48.389	Y
-70	-21.758	-22.004	-11.797	21.121	-	-29.572	-19.104	-24	-24	-38.058	-38.304	-28.097	-37.421	-45.872	-35.404	Y
-65	-22.774	-16.349	-14.211	20.291	-	-20.768	-12.956	-24	-24	-39.074	-32.649	-30.511	-36.591	-37.068	-29.256	Y
-60	-28.289	-12.291	-14.454	17.819	-	-20.411	-14.523	-24	-24	-44.589	-28.591	-30.754	-34.119	-36.711	-30.823	Y
-55	-13.875	-17.63	-14.631	12.979	-	-15.184	-26.543	-24	-24	-30.175	-33.93	-30.931	-29.279	-31.484	-42.843	Y
-50	-23.161	-12.877	-9.723	15.575	-	-15.034	-28.566	-24	-24	-39.461	-29.177	-26.023	-31.875	-31.334	-44.866	Y
-45	-17.547	-13.715	-19.638	24.689	-	-14.49	-15.301	-23.33	23.33	-33.847	-30.015	-35.938	-40.989	-30.79	-31.601	Y
-40	-15.119	-16.653	-9.355	13.729	-	-17.936	-27.144	-22.05	22.05	-31.419	-32.953	-25.655	-30.029	-34.236	-43.444	Y
-35	-10.067	-21.797	-13.662	-14.74	-	-16.22	-11.557	-20.60	20.60	-26.367	-38.097	-29.962	-31.04	-32.52	-27.857	Y
-30	-9.737	-28.839	-13.818	15.084	-	-20.895	-13.585	-18.93	18.93	-26.037	-45.139	-30.118	-31.384	-37.195	-29.885	Y
-25	-18.341	-15.299	-13.728	15.847	-	-24.156	-8.467	-16.95	16.95	-34.641	-31.599	-30.028	-32.147	-40.456	-24.767	Y

-20	-8.745	-13.149	-7.637	-8.609	-8.213	-7.147	-14.53	-	14.53	-25.045	-29.449	-23.937	-24.909	-24.513	-23.447	Y
-15	-11.091	-6.608	-1.185	-1.648	0.12	-0.654	-11.40	-	11.40	-27.391	-22.908	-17.485	-17.948	-16.18	-16.954	Y
-10	0.361	-0.901	-2.328	-2.256	-0.881	-2.964	-7.00	-7.00	-15.939	-17.201	-18.628	-18.556	-17.181	-19.264	Y	Y
-9.9	1.266	0.168	-1.469	-1.512	-0.621	-2.117	-6.89	-6.89	-15.034	-16.132	-17.769	-17.812	-16.921	-18.417	Y	Y
-9.8	1.944	1.051	-0.774	-0.75	-0.282	-1.238	-6.78	-6.78	-14.356	-15.249	-17.074	-17.05	-16.582	-17.538	Y	Y
-9.7	2.423	1.765	-0.235	-0.051	0.085	-0.411	-6.67	-6.67	-13.877	-14.535	-16.535	-16.351	-16.215	-16.711	Y	Y
-9.6	2.72	2.321	0.151	0.537	0.431	0.316	-6.56	-6.56	-13.58	-13.979	-16.149	-15.763	-15.869	-15.984	Y	Y
-9.5	2.842	2.728	0.387	0.991	0.719	0.919	-6.44	-6.44	-13.458	-13.572	-15.913	-15.309	-15.581	-15.381	Y	Y
-9.4	2.79	2.989	0.468	1.297	0.917	1.385	-6.33	-6.33	-13.51	-13.311	-15.832	-15.003	-15.383	-14.915	Y	Y
-9.3	2.557	3.104	0.386	1.448	1.004	1.706	-6.21	-6.21	-13.743	-13.196	-15.914	-14.852	-15.296	-14.594	Y	Y
-9.2	2.129	3.068	0.131	1.435	0.96	1.876	-6	-6.09	-14.171	-13.232	-16.169	-14.865	-15.34	-14.424	Y	Y
-9.1	1.48	2.874	-0.317	1.25	0.767	1.888	-6	-5.98	-14.82	-13.426	-16.617	-15.05	-15.533	-14.412	Y	Y
-9	0.568	2.509	-0.984	0.881	0.407	1.734	-6	-5.86	-15.732	-13.791	-17.284	-15.419	-15.893	-14.566	Y	Y
-8.9	-0.678	1.95	-1.906	0.315	-0.142	1.4	-6	-5.73	-16.978	-14.35	-18.206	-15.985	-16.442	-14.9	Y	Y
-8.8	-2.38	1.167	-3.126	-0.463	-0.903	0.865	-6	-5.61	-18.68	-15.133	-19.426	-16.763	-17.203	-15.435	Y	Y
-8.7	-4.78	0.111	-4.685	-1.459	-1.902	0.104	-6	-5.49	-21.08	-16.189	-20.985	-17.759	-18.202	-16.196	Y	Y
-8.6	-8.459	-1.291	-6.53	-2.646	-3.15	-0.921	-6	-5.36	-24.759	-17.591	-22.83	-18.946	-19.45	-17.221	Y	Y
-8.5	-15.562	-3.153	-8.21	-3.894	-4.594	-2.252	-6	-5.24	-31.862	-19.453	-24.51	-20.194	-20.894	-18.552	Y	Y
-8.4	-25.705	-5.636	-8.502	-4.847	-5.978	-3.92	-6	-5.11	-42.005	-21.936	-24.802	-21.147	-22.278	-20.22	Y	Y
-8.3	-11.27	-8.784	-6.901	-4.964	-6.661	-5.84	-6	-4.98	-27.57	-25.084	-23.201	-21.264	-22.961	-22.14	Y	Y
-8.2	-6.144	-11.062	-4.612	-4.062	-6.044	-7.468	-6	-4.85	-22.444	-27.362	-20.912	-20.362	-22.344	-23.768	Y	Y
-8.1	-3.023	-9.151	-2.475	-2.583	-4.472	-7.58	-6	-4.71	-19.323	-25.451	-18.775	-18.883	-20.772	-23.88	Y	Y
-8	-0.839	-5.77	-0.674	-1.017	-2.674	-5.956	-6	-4.58	-17.139	-22.07	-16.974	-17.317	-18.974	-22.256	Y	Y
-7.9	0.778	-2.992	0.803	0.404	-1.026	-3.813	-6	-4.44	-15.522	-19.292	-15.497	-15.896	-17.326	-20.113	Y	Y
-7.8	1.999	-0.869	2.001	1.61	0.372	-1.865	-6	-4.30	-14.301	-17.169	-14.299	-14.69	-15.928	-18.165	Y	Y
-7.7	2.916	0.764	2.96	2.594	1.517	-0.26	-6	-4.16	-13.384	-15.536	-13.34	-13.706	-14.783	-16.56	Y	Y
-7.6	3.583	2.026	3.71	3.366	2.427	1.02	-6	-4.02	-12.717	-14.274	-12.59	-12.934	-13.873	-15.28	Y	Y
-7.5	4.03	2.993	4.27	3.938	3.121	2.015	-6	-3.88	-12.27	-13.307	-12.03	-12.362	-13.179	-14.285	Y	Y

-7.4	4.272	3.712	4.654	4.316	3.614	2.759	-6	-3.73	-12.028	-12.588	-11.646	-11.984	-12.686	-13.541	Y
-7.3	4.316	4.212	4.868	4.505	3.915	3.274	-6	-3.58	-11.984	-12.088	-11.432	-11.795	-12.385	-13.026	Y
-7.2	4.159	4.511	4.915	4.5	4.025	3.574	-6	-3.43	-12.141	-11.789	-11.385	-11.8	-12.275	-12.726	Y
-7.1	3.788	4.615	4.792	4.292	3.939	3.663	-6	-3.28	-12.512	-11.685	-11.508	-12.008	-12.361	-12.637	Y
-7	3.176	4.523	4.493	3.858	3.643	3.534	-6.13	-3.13	-13.124	-11.777	-11.807	-12.442	-12.657	-12.766	Y
-6.9	2.283	4.223	4.006	3.167	3.115	3.172	-5.97	-2.97	-14.017	-12.077	-12.294	-13.133	-13.185	-13.128	Y
-6.8	1.041	3.693	3.32	2.163	2.316	2.545	-5.81	-2.81	-15.259	-12.607	-12.98	-14.137	-13.984	-13.755	Y
-6.7	-0.659	2.897	2.424	0.761	1.184	1.601	-5.65	-2.65	-16.959	-13.403	-13.876	-15.539	-15.116	-14.699	Y
-6.6	-2.978	1.773	1.331	-1.177	-0.377	0.251	-5.49	-2.49	-19.278	-14.527	-14.969	-17.477	-16.677	-16.049	Y
-6.5	-6.018	0.215	0.119	-3.83	-2.513	-1.661	-5.32	-2.32	-22.318	-16.085	-16.181	-20.13	-18.813	-17.961	Y
-6.4	-8.582	-1.966	-0.967	-7.015	-5.357	-4.415	-5.15	-2.15	-24.882	-18.266	-17.267	-23.315	-21.657	-20.715	Y
-6.3	-6.993	-5.125	-1.451	-7.859	-8.205	-8.371	-4.98	-1.98	-23.293	-21.425	-17.751	-24.159	-24.505	-24.671	Y
-6.2	-3.456	-9.686	-0.949	-4.644	-7.589	-11.276	-4.81	-1.81	-19.756	-25.986	-17.249	-20.944	-23.889	-27.576	Y
-6.1	-0.486	-11.531	0.33	-1.218	-4.183	-7.461	-4.63	-1.63	-16.786	-27.831	-15.97	-17.518	-20.483	-23.761	Y
-6	1.798	-6.647	1.873	1.457	-1.087	-3.225	-4.45	-1.45	-14.502	-22.947	-14.427	-14.843	-17.387	-19.525	Y
-5.9	3.568	-2.591	3.353	3.52	1.31	-0.169	-4.27	-1.27	-12.732	-18.891	-12.947	-12.78	-14.99	-16.469	Y
-5.8	4.954	0.254	4.646	5.135	3.161	2.083	-4.09	-1.09	-11.346	-16.046	-11.654	-11.165	-13.139	-14.217	Y
-5.7	6.036	2.342	5.723	6.408	4.601	3.796	-3.90	-0.90	-10.264	-13.958	-10.577	-9.892	-11.699	-12.504	Y
-5.6	6.867	3.923	6.587	7.407	5.72	5.115	-3.70	-0.70	-9.433	-12.377	-9.713	-8.893	-10.58	-11.185	Y
-5.5	7.477	5.132	7.247	8.172	6.572	6.124	-3.51	-0.51	-8.823	-11.168	-9.053	-8.128	-9.728	-10.176	Y
-5.4	7.887	6.045	7.712	8.73	7.19	6.874	-3.31	-0.31	-8.413	-10.255	-8.588	-7.57	-9.11	-9.426	Y
-5.3	8.104	6.71	7.983	9.097	7.595	7.392	-3.11	-0.11	-8.196	-9.59	-8.317	-7.203	-8.705	-8.908	Y
-5.2	8.128	7.151	8.059	9.28	7.794	7.694	-2.90	0.10	-8.172	-9.149	-8.241	-7.02	-8.506	-8.606	Y
-5.1	7.95	7.381	7.928	9.277	7.787	7.782	-2.69	0.31	-8.35	-8.919	-8.372	-7.023	-8.513	-8.518	Y
-5	7.55	7.404	7.569	9.081	7.562	7.649	-2.47	0.53	-8.75	-8.896	-8.731	-7.219	-8.738	-8.651	Y
-4.9	6.893	7.211	6.948	8.677	7.099	7.274	-2.25	0.75	-9.407	-9.089	-9.352	-7.623	-9.201	-9.026	Y
-4.8	5.92	6.782	6.009	8.04	6.361	6.619	-2.03	0.97	-10.38	-9.518	-10.291	-8.26	-9.939	-9.681	Y
-4.7	4.53	6.08	4.661	7.133	5.293	5.62	-1.80	1.20	-11.77	-10.22	-11.639	-9.167	-11.007	-10.68	Y
-4.6	2.527	5.044	2.762	5.909	3.816	4.16	-1.57	1.43	-13.773	-11.256	-13.538	-10.391	-12.484	-12.14	Y
-4.5	-0.512	3.565	0.138	4.323	1.852	2.023	-1.33	1.67	-16.812	-12.735	-16.162	-11.977	-14.448	-14.277	Y

-4.4	-5.804	1.442	-2.88	2.428	-0.472	-1.251	-1.09	1.91	-22.104	-14.858	-19.18	-13.872	-16.772	-17.551	Y
-4.3	-15.269	-1.746	-3.054	0.736	-1.909	-6.541	-0.84	2.16	-31.569	-18.046	-19.354	-15.564	-18.209	-22.841	Y
-4.2	-5.418	-6.875	0.455	0.618	-0.455	-8.325	-0.58	2.42	-21.718	-23.175	-15.845	-15.682	-16.755	-24.625	Y
-4.1	0.417	-10.19	3.922	2.461	2.466	-1.937	-0.32	2.68	-15.883	-26.49	-12.378	-13.839	-13.834	-18.237	Y
-4	3.97	-3.904	6.649	4.883	5.176	2.501	-0.05	2.95	-12.33	-20.204	-9.651	-11.417	-11.124	-13.799	Y
-3.9	6.477	0.684	8.795	7.083	7.398	5.553	0.22	3.22	-9.823	-15.616	-7.505	-9.217	-8.902	-10.747	Y
-3.8	8.37	3.756	10.515	8.921	9.195	7.816	0.51	3.51	-7.93	-12.544	-5.785	-7.379	-7.105	-8.484	Y
-3.7	9.843	5.978	11.911	10.426	10.654	9.569	0.79	3.79	-6.457	-10.322	-4.389	-5.874	-5.646	-6.731	Y
-3.6	11.001	7.652	13.048	11.649	11.837	10.954	1.09	4.09	-5.299	-8.648	-3.252	-4.651	-4.463	-5.346	Y
-3.5	11.902	8.93	13.968	12.63	12.788	12.051	1.40	4.40	-4.398	-7.37	-2.332	-3.67	-3.512	-4.249	Y
-3.4	12.582	9.894	14.695	13.399	13.534	12.91	1.71	4.71	-3.718	-6.406	-1.605	-2.901	-2.766	-3.39	Y
-3.3	13.059	10.588	15.248	13.973	14.093	13.557	2.04	5.04	-3.241	-5.712	-1.052	-2.327	-2.207	-2.743	Y
-3.2	13.342	11.037	15.634	14.363	14.474	14.009	2.37	5.37	-2.958	-5.263	-0.666	-1.937	-1.826	-2.291	Y
-3.1	13.429	11.247	15.855	14.572	14.679	14.272	2.72	5.72	-2.871	-5.053	-0.445	-1.728	-1.621	-2.028	Y
-3	13.308	11.208	15.907	14.593	14.702	14.342	3.07	6.07	-2.992	-5.092	-0.393	-1.707	-1.598	-1.958	Y
-2.9	12.956	10.893	15.779	14.414	14.53	14.206	3.44		-3.344	-5.407	-0.521	-1.886	-1.77	-2.094	Y
-2.8	12.33	10.249	15.45	14.009	14.137	13.84	3.82		-3.97	-6.051	-0.85	-2.291	-2.163	-2.46	Y
-2.7	11.357	9.177	14.885	13.335	13.482	13.2	4.22		-4.943	-7.123	-1.415	-2.965	-2.818	-3.1	Y
-2.6	9.909	7.483	14.029	12.324	12.498	12.21	4.63		-6.391	-8.817	-2.271	-3.976	-3.802	-4.09	Y
-2.5	7.738	4.731	12.785	10.859	11.071	10.733	5.05		-8.562	-11.569	-3.515	-5.441	-5.229	-5.567	Y
-2.4	4.318	-0.422	10.977	8.737	8.998	8.492	5.49		-11.982	-16.722	-5.323	-7.563	-7.302	-7.808	Y
-2.3	-1.101	-13.631	8.229	5.642	5.928	4.794	5.96		-17.401	-29.931	-8.071	-10.658	-10.372	-11.506	Y
-2.2	-0.289	0.441	3.566	2.005	1.881	-3.018	6.44		-16.589	-15.859	-12.734	-14.295	-14.419	-19.318	Y
-2.1	6.023	6.888	-4.352	3.288	2.337	-3.867	6.94		-10.277	-9.412	-20.652	-13.012	-13.963	-20.167	Y
-2	10.334	10.857	2.907	7.938	7.281	5.661	7.47		-5.966	-5.443	-13.393	-8.362	-9.019	-10.639	Y
-1.9	13.446	13.763	9.049	11.686	11.253	10.505	8.03		-2.854	-2.537	-7.251	-4.614	-5.047	-5.795	Y
-1.8	15.869	16.063	12.908	14.55	14.237	13.787	8.62		-0.431	-0.237	-3.392	-1.75	-2.063	-2.513	Y
-1.7	17.846	17.966	15.711	16.829	16.589	16.279	9.24		1.546	1.666	-0.589	0.529	0.289	-0.021	Y
-1.6	19.509	19.581	17.907	18.708	18.515	18.286	9.90		3.209	3.281	1.607	2.408	2.215	1.986	Y
-1.5	20.933	20.976	19.703	20.293	20.135	19.958	10.60		4.633	4.676	3.403	3.993	3.835	3.658	Y

-1.4	22.17	22.194	21.213	21.654	21.521	21.381			5.87	5.894	4.913	5.354	5.221	5.081	Y
-1.3	23.252	23.265	22.502	22.833	22.721	22.609			6.952	6.965	6.202	6.533	6.421	6.309	Y
-1.2	24.203	24.21	23.616	23.862	23.767	23.677			7.903	7.91	7.316	7.562	7.467	7.377	Y
-1.1	25.04	25.043	24.582	24.764	24.682	24.61			8.74	8.743	8.282	8.464	8.382	8.31	Y
-1	25.776	25.778	25.422	25.553	25.484	25.426			9.476	9.478	9.122	9.253	9.184	9.126	Y
-0.9	26.422	26.424	26.152	26.242	26.184	26.138			10.122	10.124	9.852	9.942	9.884	9.838	Y
-0.8	26.984	26.987	26.784	26.842	26.792	26.757			10.684	10.687	10.484	10.542	10.492	10.457	Y
-0.7	27.469	27.473	27.325	27.358	27.317	27.29			11.169	11.173	11.025	11.058	11.017	10.99	Y
-0.6	27.882	27.887	27.782	27.797	27.764	27.744			11.582	11.587	11.482	11.497	11.464	11.444	Y
-0.5	28.226	28.231	28.162	28.163	28.137	28.123			11.926	11.931	11.862	11.863	11.837	11.823	Y
-0.4	28.505	28.51	28.468	28.46	28.44	28.431			12.205	12.21	12.168	12.16	12.14	12.131	Y
-0.3	28.72	28.725	28.703	28.691	28.676	28.671			12.42	12.425	12.403	12.391	12.376	12.371	Y
-0.2	28.874	28.878	28.869	28.857	28.847	28.845			12.574	12.578	12.569	12.557	12.547	12.545	Y
-0.1	28.967	28.969	28.967	28.959	28.955	28.954			12.667	12.669	12.667	12.659	12.655	12.654	Y
0	29	29	29	29	29	29			12.7	12.7	12.7	12.7	12.7	12.7	Y
0.1	28.974	28.97	28.966	28.978	28.982	28.982			12.674	12.67	12.666	12.678	12.682	12.682	Y
0.2	28.888	28.88	28.865	28.894	28.903	28.902			12.588	12.58	12.565	12.594	12.603	12.602	Y
0.3	28.742	28.728	28.697	28.747	28.76	28.757			12.442	12.428	12.397	12.447	12.46	12.457	Y
0.4	28.534	28.514	28.459	28.536	28.553	28.547			12.234	12.214	12.159	12.236	12.253	12.247	Y
0.5	28.262	28.235	28.15	28.26	28.28	28.27			11.962	11.935	11.85	11.96	11.98	11.97	Y
0.6	27.926	27.891	27.766	27.915	27.94	27.923			11.626	11.591	11.466	11.615	11.64	11.623	Y
0.7	27.521	27.477	27.303	27.498	27.527	27.504			11.221	11.177	11.003	11.198	11.227	11.204	Y
0.8	27.043	26.991	26.756	27.006	27.04	27.008			10.743	10.691	10.456	10.706	10.74	10.708	Y
0.9	26.49	26.427	26.116	26.434	26.473	26.429			10.19	10.127	9.816	10.134	10.173	10.129	Y
1	25.853	25.78	25.376	25.773	25.819	25.761			9.553	9.48	9.076	9.473	9.519	9.461	Y
1.1	25.126	25.043	24.522	25.017	25.069	24.994			8.826	8.743	8.222	8.717	8.769	8.694	Y
1.2	24.3	24.207	23.538	24.153	24.215	24.118			8	7.907	7.238	7.853	7.915	7.818	Y
1.3	23.361	23.258	22.403	23.167	23.24	23.117			7.061	6.958	6.103	6.867	6.94	6.817	Y
1.4	22.294	22.182	21.083	22.04	22.127	21.969			5.994	5.882	4.783	5.74	5.827	5.669	Y
1.5	21.077	20.956	19.533	20.745	20.85	20.645	10.60		4.777	4.656	3.233	4.445	4.55	4.345	Y

1.6	19.679	19.551	17.68	19.242	19.372	19.102	9.90		3.379	3.251	1.38	2.942	3.072	2.802	Y
1.7	18.057	17.922	15.402	17.475	17.638	17.275	9.24		1.757	1.622	-0.898	1.175	1.338	0.975	Y
1.8	16.149	16.001	12.474	15.352	15.565	15.053	8.62		-0.151	-0.299	-3.826	-0.948	-0.735	-1.247	Y
1.9	13.862	13.676	8.418	12.726	13.012	12.232	8.03		-2.438	-2.624	-7.882	-3.574	-3.288	-4.068	Y
2	11.063	10.738	2.253	9.348	9.737	8.377	7.47		-5.237	-5.562	-14.047	-6.952	-6.563	-7.923	Y
2.1	7.664	6.748	-0.413	4.963	5.408	2.281	6.94		-8.636	-9.552	-16.713	-11.337	-10.892	-14.019	Y
2.2	4.373	0.603	5.55	1.638	1.248	-5.91	6.44		-11.927	-15.697	-10.75	-14.662	-15.052	-22.21	Y
2.3	4.201	-5.36	9.374	4.253	3.205	2.173	5.96		-12.099	-21.66	-6.926	-12.047	-13.095	-14.127	Y
2.4	6.703	1.325	11.79	7.67	6.869	6.953	5.49		-9.597	-14.975	-4.51	-8.63	-9.431	-9.347	Y
2.5	9.078	5.571	13.422	10.073	9.451	9.7	5.05		-7.222	-10.729	-2.878	-6.227	-6.849	-6.6	Y
2.6	10.84	8.058	14.555	11.725	11.207	11.47	4.63		-5.46	-8.242	-1.745	-4.575	-5.093	-4.83	Y
2.7	12.097	9.632	15.331	12.865	12.411	12.654	4.22		-4.203	-6.668	-0.969	-3.435	-3.889	-3.646	Y
2.8	12.969	10.639	15.832	13.632	13.219	13.436	3.82		-3.331	-5.661	-0.468	-2.668	-3.081	-2.864	Y
2.9	13.541	11.242	16.106	14.11	13.724	13.913	3.44		-2.759	-5.058	-0.194	-2.19	-2.576	-2.387	Y
3	13.864	11.531	16.183	14.346	13.979	14.139	3.07	6.07	-2.436	-4.769	-0.117	-1.954	-2.321	-2.161	Y
3.1	13.973	11.551	16.08	14.371	14.017	14.148	2.72	5.72	-2.327	-4.749	-0.22	-1.929	-2.283	-2.152	Y
3.2	13.886	11.329	15.805	14.2	13.856	13.957	2.37	5.37	-2.414	-4.971	-0.495	-2.1	-2.444	-2.343	Y
3.3	13.615	10.871	15.36	13.841	13.503	13.571	2.04	5.04	-2.685	-5.429	-0.94	-2.459	-2.797	-2.729	Y
3.4	13.159	10.169	14.739	13.291	12.958	12.989	1.71	4.71	-3.141	-6.131	-1.561	-3.009	-3.342	-3.311	Y
3.5	12.512	9.201	13.93	12.539	12.21	12.198	1.40	4.40	-3.788	-7.099	-2.37	-3.761	-4.09	-4.102	Y
3.6	11.658	7.918	12.91	11.565	11.238	11.171	1.09	4.09	-4.642	-8.382	-3.39	-4.735	-5.062	-5.129	Y
3.7	10.567	6.237	11.648	10.332	10.01	9.867	0.79	3.79	-5.733	-10.063	-4.652	-5.968	-6.29	-6.433	Y
3.8	9.19	4.002	10.093	8.787	8.472	8.211	0.51	3.51	-7.11	-12.298	-6.207	-7.513	-7.828	-8.089	Y
3.9	7.446	0.888	8.173	6.846	6.542	6.076	0.22	3.22	-8.854	-15.412	-8.127	-9.454	-9.758	-10.224	Y
4	5.188	-3.89	5.804	4.394	4.109	3.211	-0.05	2.95	-11.112	-20.19	-10.496	-11.906	-12.191	-13.089	Y
4.1	2.128	-11.588	2.997	1.372	1.113	-0.936	-0.32	2.68	-14.172	-27.888	-13.303	-14.928	-15.187	-17.236	Y
4.2	-2.374	-7.519	0.46	-1.523	-1.802	-7.526	-0.58	2.42	-18.674	-23.819	-15.84	-17.823	-18.102	-23.826	Y
4.3	-9.1	-1.798	0.309	-1.579	-2.018	-8.403	-0.84	2.16	-25.4	-18.098	-15.991	-17.879	-18.318	-24.703	Y
4.4	-6.947	1.534	2.407	0.944	0.417	-2.181	-1.09	1.91	-23.247	-14.766	-13.893	-15.356	-15.883	-18.481	Y
4.5	-1.438	3.714	4.678	3.447	2.904	1.544	-1.33	1.67	-17.738	-12.586	-11.622	-12.853	-13.396	-14.756	Y

4.6	1.904	5.221	6.499	5.374	4.826	3.916	-1.57	1.43	-14.396	-11.079	-9.801	-10.926	-11.474	-12.384	Y
4.7	4.094	6.275	7.877	6.801	6.247	5.526	-1.80	1.20	-12.206	-10.025	-8.423	-9.499	-10.053	-10.774	Y
4.8	5.607	6.99	8.895	7.84	7.277	6.637	-2.03	0.97	-10.693	-9.31	-7.405	-8.46	-9.023	-9.663	Y
4.9	6.665	7.428	9.626	8.573	7.997	7.385	-2.25	0.75	-9.635	-8.872	-6.674	-7.727	-8.303	-8.915	Y
5	7.384	7.63	10.116	9.051	8.461	7.843	-2.47	0.53	-8.916	-8.67	-6.184	-7.249	-7.839	-8.457	Y
5.1	7.832	7.615	10.4	9.31	8.701	8.057	-2.69	0.31	-8.468	-8.685	-5.9	-6.99	-7.599	-8.243	Y
5.2	8.049	7.391	10.499	9.37	8.739	8.05	-2.90	0.10	-8.251	-8.909	-5.801	-6.93	-7.561	-8.25	Y
5.3	8.055	6.958	10.429	9.241	8.586	7.836	-3.11	-0.11	-8.245	-9.342	-5.871	-7.059	-7.714	-8.464	Y
5.4	7.863	6.304	10.195	8.929	8.245	7.415	-3.31	-0.31	-8.437	-9.996	-6.105	-7.371	-8.055	-8.885	Y
5.5	7.473	5.404	9.802	8.429	7.711	6.78	-3.51	-0.51	-8.827	-10.896	-6.498	-7.871	-8.589	-9.52	Y
5.6	6.877	4.217	9.246	7.729	6.972	5.912	-3.70	-0.70	-9.423	-12.083	-7.054	-8.571	-9.328	-10.388	Y
5.7	6.055	2.675	8.523	6.809	6.003	4.778	-3.90	-0.90	-10.245	-13.625	-7.777	-9.491	-10.297	-11.522	Y
5.8	4.974	0.667	7.62	5.634	4.769	3.326	-4.09	-1.09	-11.326	-15.633	-8.68	-10.666	-11.531	-12.974	Y
5.9	3.575	-1.977	6.522	4.153	3.212	1.473	-4.27	-1.27	-12.725	-18.277	-9.778	-12.147	-13.088	-14.827	Y
6	1.761	-5.399	5.211	2.284	1.245	-0.898	-4.45	-1.45	-14.539	-21.699	-11.089	-14.016	-15.055	-17.198	Y
6.1	-0.649	-8.466	3.671	-0.084	-1.247	-3.878	-4.63	-1.63	-16.949	-24.766	-12.629	-16.384	-17.547	-20.178	Y
6.2	-4.003	-7.195	1.907	-3.032	-4.293	-6.926	-4.81	-1.81	-20.303	-23.495	-14.393	-19.332	-20.593	-23.226	Y
6.3	-8.936	-3.856	0.009	-6.039	-7.008	-7.314	-4.98	-1.98	-25.236	-20.156	-16.291	-22.339	-23.308	-23.614	Y
6.4	-12.908	-1.143	-1.719	-6.54	-6.663	-4.779	-5.15	-2.15	-29.208	-17.443	-18.019	-22.84	-22.963	-21.079	Y
6.5	-8.183	0.85	-2.672	-4.146	-4.081	-2.168	-5.32	-2.32	-24.483	-15.45	-18.972	-20.446	-20.381	-18.468	Y
6.6	-3.979	2.312	-2.47	-1.588	-1.655	-0.163	-5.49	-2.49	-20.279	-13.988	-18.77	-17.888	-17.955	-16.463	Y
6.7	-1.218	3.381	-1.52	0.398	0.193	1.312	-5.65	-2.65	-17.518	-12.919	-17.82	-15.902	-16.107	-14.988	Y
6.8	0.689	4.142	-0.423	1.863	1.55	2.377	-5.81	-2.81	-15.611	-12.158	-16.723	-14.437	-14.75	-13.923	Y
6.9	2.047	4.646	0.519	2.924	2.525	3.119	-5.97	-2.97	-14.253	-11.654	-15.781	-13.376	-13.775	-13.181	Y
7	3.013	4.926	1.216	3.663	3.193	3.592	-6.13	-3.13	-13.287	-11.374	-15.084	-12.637	-13.107	-12.708	Y
7.1	3.674	5.002	1.656	4.135	3.605	3.832	-6	-3.28	-12.626	-11.298	-14.644	-12.165	-12.695	-12.468	Y
7.2	4.083	4.882	1.846	4.375	3.791	3.859	-6	-3.43	-12.217	-11.418	-14.454	-11.925	-12.509	-12.441	Y
7.3	4.27	4.566	1.794	4.404	3.771	3.684	-6	-3.58	-12.03	-11.734	-14.506	-11.896	-12.529	-12.616	Y
7.4	4.251	4.045	1.499	4.231	3.555	3.311	-6	-3.73	-12.049	-12.255	-14.801	-12.069	-12.745	-12.989	Y
7.5	4.033	3.299	0.95	3.86	3.146	2.732	-6	-3.88	-12.267	-13.001	-15.35	-12.44	-13.154	-13.568	Y

7.6	3.611	2.295	0.123	3.285	2.541	1.936	-6	-4.02	-12.689	-14.005	-16.177	-13.015	-13.759	-14.364	Y
7.7	2.973	0.975	-1.025	2.493	1.73	0.899	-6	-4.16	-13.327	-15.325	-17.325	-13.807	-14.57	-15.401	Y
7.8	2.091	-0.756	-2.562	1.46	0.704	-0.411	-6	-4.30	-14.209	-17.056	-18.862	-14.84	-15.596	-16.711	Y
7.9	0.92	-3.067	-4.583	0.157	-0.544	-2.032	-6	-4.44	-15.38	-19.367	-20.883	-16.143	-16.844	-18.332	Y
8	-0.616	-6.261	-7.158	-1.45	-1.996	-3.986	-6	-4.58	-16.916	-22.561	-23.458	-17.75	-18.296	-20.286	Y
8.1	-2.654	-10.701	-9.861	-3.364	-3.554	-6.173	-6	-4.71	-18.954	-27.001	-26.161	-19.664	-19.854	-22.473	Y
8.2	-5.451	-13.404	-10.48	-5.435	-4.934	-8.041	-6	-4.85	-21.751	-29.704	-26.78	-21.735	-21.234	-24.341	Y
8.3	-9.52	-9.391	-8.164	-7.026	-5.625	-8.429	-6	-4.98	-25.82	-25.691	-24.464	-23.326	-21.925	-24.729	Y
8.4	-15.013	-5.508	-5.428	-7.092	-5.306	-7.172	-6	-5.11	-31.313	-21.808	-21.728	-23.392	-21.606	-23.472	Y
8.5	-13.463	-2.798	-3.195	-5.733	-4.284	-5.419	-6	-5.24	-29.763	-19.098	-19.495	-22.033	-20.584	-21.719	Y
8.6	-8.394	-0.853	-1.467	-4.009	-3.073	-3.852	-6	-5.36	-24.694	-17.153	-17.767	-20.309	-19.373	-20.152	Y
8.7	-5.002	0.583	-0.138	-2.477	-1.963	-2.618	-6	-5.49	-21.302	-15.717	-16.438	-18.777	-18.263	-18.918	Y
8.8	-2.681	1.651	0.879	-1.258	-1.055	-1.708	-6	-5.61	-18.981	-14.649	-15.421	-17.558	-17.355	-18.008	Y
8.9	-1.017	2.435	1.642	-0.341	-0.365	-1.082	-6	-5.73	-17.317	-13.865	-14.658	-16.641	-16.665	-17.382	Y
9	0.199	2.987	2.191	0.308	0.114	-0.71	-6	-5.86	-16.101	-13.313	-14.109	-15.992	-16.186	-17.01	Y
9.1	1.082	3.339	2.553	0.719	0.396	-0.569	-6	-5.98	-15.218	-12.961	-13.747	-15.581	-15.904	-16.869	Y
9.2	1.698	3.512	2.748	0.912	0.495	-0.644	-6	-6.09	-14.602	-12.788	-13.552	-15.388	-15.805	-16.944	Y
9.3	2.086	3.518	2.788	0.902	0.42	-0.928	-6.21	-6.21	-14.214	-12.782	-13.512	-15.398	-15.88	-17.228	Y
9.4	2.269	3.365	2.679	0.696	0.183	-1.419	-6.33	-6.33	-14.031	-12.935	-13.621	-15.604	-16.117	-17.719	Y
9.5	2.261	3.051	2.424	0.295	-0.204	-2.116	-6.44	-6.44	-14.039	-13.249	-13.876	-16.005	-16.504	-18.416	Y
9.6	2.063	2.574	2.025	-0.299	-0.724	-3.013	-6.56	-6.56	-14.237	-13.726	-14.275	-16.599	-17.024	-19.313	Y
9.7	1.671	1.923	1.475	-1.085	-1.344	-4.077	-6.67	-6.67	-14.629	-14.377	-14.825	-17.385	-17.644	-20.377	Y
9.8	1.07	1.08	0.768	-2.045	-2.005	-5.209	-6.78	-6.78	-15.23	-15.22	-15.532	-18.345	-18.305	-21.509	Y
9.9	0.231	0.018	-0.112	-3.122	-2.61	-6.179	-6.89	-6.89	-16.069	-16.282	-16.412	-19.422	-18.91	-22.479	Y
10	-0.893	-1.304	-1.183	-4.166	-3.024	-6.623	-7.00	-7.00	-17.193	-17.604	-17.483	-20.466	-19.324	-22.923	Y
15	-11.1	-7.737	-1.138	-3.427	-1.741	-1.513	-11.40	-	-27.4	-24.037	-17.438	-19.727	-18.041	-17.813	Y
20	-10.695	-8.998	-8.939	-8.774	-10.764	-16.763	-14.53	-	-26.995	-25.298	-25.239	-25.074	-27.064	-33.063	Y
25	-16.51	-11.424	-11.009	-	-12.65	-8.206	-16.95	-	-32.81	-27.724	-27.309	-27.799	-28.95	-24.506	Y

30	-14.586	-21.966	-12.124	-	20.389	-21.409	-16.525	-18.93	-	18.93	-30.886	-38.266	-28.424	-36.689	-37.709	-32.825	Y
35	-11.087	-15.064	-10.638	-14.6	-	-16.645	-18.088	-20.60	-	20.60	-27.387	-31.364	-26.938	-30.9	-32.945	-34.388	Y
40	-17.126	-18.698	-7.216	-	13.565	-16.819	-25.983	-22.05	-	22.05	-33.426	-34.998	-23.516	-29.865	-33.119	-42.283	Y
45	-20.882	-11.61	-14.816	-	25.372	-29.746	-23.659	-23.33	-	23.33	-37.182	-27.91	-31.116	-41.672	-46.046	-39.959	Y
50	-14.13	-15.717	-16.684	-	17.429	-14.951	-18.353	-24	-	-24	-30.43	-32.017	-32.984	-33.729	-31.251	-34.653	Y
55	-13.049	-20.848	-15.793	-	17.185	-20.275	-29.449	-24	-	-24	-29.349	-37.148	-32.093	-33.485	-36.575	-45.749	Y
60	-17.453	-20.172	-9.731	-	16.549	-22.274	-20.758	-24	-	-24	-33.753	-36.472	-26.031	-32.849	-38.574	-37.058	Y
65	-18.154	-18.084	-30.401	-	22.958	-30.342	-22.409	-24	-	-24	-34.454	-34.384	-46.701	-39.258	-46.642	-38.709	Y
70	-25.412	-27.028	-13.094	-	16.674	-25.858	-24.055	-24	-	-24	-41.712	-43.328	-29.394	-32.974	-42.158	-40.355	Y
75	-20.269	-22.914	-21.76	-	23.994	-27.371	-32.249	-24	-	-24	-36.569	-39.214	-38.06	-40.294	-43.671	-48.549	Y
80	-29.846	-24.205	-26.503	-	30.287	-33.915	-60.718	-24	-	-24	-46.146	-40.505	-42.803	-46.587	-50.215	-77.018	Y
85	-25.372	-29.563	-27.917	-	34.459	-40.389	-41.995	-24	-	-24	-41.672	-45.863	-44.217	-50.759	-56.689	-58.295	Y
90	-26.634	-24.979	-60.348	-	39.042	-48.349	-39.775	-14	-	-14	-42.934	-41.279	-76.648	-55.342	-64.649	-56.075	Y
95	-29.036	-29.608	-33.823	-	43.835	-46.11	-43.699	-14	-	-14	-45.336	-45.908	-50.123	-60.135	-62.41	-59.999	Y
100	-34.452	-25.379	-33.952	-41.1	-	-44.683	-38.94	-14	-	-14	-50.752	-41.679	-50.252	-57.4	-60.983	-55.24	Y
105	-27.236	-30.379	-27.278	-	51.307	-48.197	-42.654	-14	-	-14	-43.536	-46.679	-43.578	-67.607	-64.497	-58.954	Y
110	-34.935	-29.174	-31.021	-	55.893	-40.66	-36.515	-14	-	-14	-51.235	-45.474	-47.321	-72.193	-56.96	-52.815	Y
115	-32.902	-35.57	-25.499	-	53.399	-41.17	-35.96	-14	-	-14	-49.202	-51.87	-41.799	-69.699	-57.47	-52.26	Y

120	-35.902	-34.023	-25.31	50.609	-	-45.384	-37.884	-14	-14	-52.202	-50.323	-41.61	-66.909	-61.684	-54.184	Y
125	-31.034	-43.352	-31.243	48.063	-	-44.778	-35.134	-14	-14	-47.334	-59.652	-47.543	-64.363	-61.078	-51.434	Y
130	-30.813	-41.723	-31.252	42.055	-	-39.58	-44.931	-14	-14	-47.113	-58.023	-47.552	-58.355	-55.88	-61.231	Y
135	-32.269	-31.348	-37.449	47.971	-	-50.081	-37.3	-14	-14	-48.569	-47.648	-53.749	-64.271	-66.381	-53.6	Y
140	-46.81	-37.897	-34.277	46.252	-	-53.332	-41.326	-14	-14	-63.11	-54.197	-50.577	-62.552	-69.632	-57.626	Y
145	-30.795	-32.167	-33.994	54.988	-	-49.777	-52.179	-14	-14	-47.095	-48.467	-50.294	-71.288	-66.077	-68.479	Y
150	-24.136	-27.264	-25.85	35.579	-	-34.831	-39.392	-14	-14	-40.436	-43.564	-42.15	-51.879	-51.131	-55.692	Y
155	-33.862	-33.083	-34.647	56.227	-	-46.155	-43.631	-14	-14	-50.162	-49.383	-50.947	-72.527	-62.455	-59.931	Y
160	-33.895	-31.769	-35.576	47.715	-	-48.298	-53.555	-14	-14	-50.195	-48.069	-51.876	-64.015	-64.598	-69.855	Y
165	-36.735	-39.736	-43.033	-45.45	-	-57.869	-49.196	-14	-14	-53.035	-56.036	-59.333	-61.75	-74.169	-65.496	Y
170	-42.345	-58.856	-65.684	54.379	-	-50.537	-56.82	-14	-14	-58.645	-75.156	-81.984	-70.679	-66.837	-73.12	Y
175	-44.506	-51.473	-46.713	-53.66	-	-49.401	-55.78	-14	-14	-60.806	-67.773	-63.013	-69.96	-65.701	-72.08	Y
180	-42.66	-47.209	-53.358	50.244	-	-50.8	-42.747	-14	-14	-58.96	-63.509	-69.658	-66.544	-67.1	-59.047	Y