EVALUATION OF AUTOMATIC CLASS III DESIGNATION FOR
Dexcom G6 Continuous Glucose Monitoring System

DECISION SUMMARY

A. DEN Number:

DEN170088

B. Purpose for Submission:

De Novo request for evaluation of automatic class III designation for the Dexcom G6 Continuous Glucose Monitoring System

C. Measurand:

Glucose in Interstitial Fluid

D. Type of Test:

Quantitative, amperometric assay (Glucose Oxidase)

E. Applicant:

Dexcom, Inc.

F. Proprietary and Established Names:

G6 Continuous Glucose Monitoring System

G. Regulatory Information:

1. Regulation: 21 CFR 862.1355
2. Classification: Class II
3. Product code: QBJ
4. Panel: Chemistry (75)

H. Indications for Use:

1. Indications for Use:
   The Dexcom G6 Continuous Glucose Monitoring System (Dexcom G6 System) is a real time, continuous glucose monitoring device indicated for the management of diabetes in

persons age 2 years and older.

The Dexcom G6 System is intended to replace fingerstick blood glucose testing for diabetes treatment decisions. Interpretation of the Dexcom G6 System results should be based on the glucose trends and several sequential readings over time. The Dexcom G6 System also aids in the detection of episodes of hyperglycemia and hypoglycemia, facilitating both acute and long-term therapy adjustments.

The Dexcom G6 System is also intended to autonomously communicate with digitally connected devices, including automated insulin dosing (AID) systems. The Dexcom G6 System can be used alone or in conjunction with these digitally connected medical devices for the purpose of managing diabetes.

2. Special conditions for use statement(s):
   - This device is for prescription use only.
   - Remove the Dexcom G6 sensor, transmitter, and receiver before Magnetic Resonance Imaging (MRI), Computed Tomography (CT) scan, or high-frequency electrical heat (diathermy) treatment. The magnetic fields and heat could damage the components of the Dexcom G6 System, which may cause it to display inaccurate blood glucose readings or may prevent alerts.
   - This device is not intended for pregnant women, people on dialysis, or critically ill patients.
   - When wearing the device, ask for hand-wanding or full-body pat-down and visual inspection instead of going through the Advanced Imaging Technology (AIT) body scanner. Also avoid putting any part of the device through baggage x-ray machine.
   - The device should not be used to make diabetes treatment decisions when
     - The user has not used the iCGM before or is unfamiliar with the Dexcom G6 System. (It may take days, weeks or months for a user to gain confidence in using the iCGM to make treatment decisions.)
     - The user's symptoms do not match the glucose values displayed by the device.
     - The device does not show a glucose value or a trend arrow.
     - During the first two hours of sensor warm-up period, the user should use a blood glucose meter to make treatment decisions.
     - The user's glucose is rising or falling rapidly.
   - Users should consult their healthcare practitioner and the user guide to understand how to make treatment decisions using this device.
   - The low and high glucose alerts should be set based on recommendations from a healthcare practitioner.
   - Although standard dosing of acetaminophen (1000 mg per every 6 hours) does not appear to cause significant bias, higher supra-therapeutic levels of acetaminophen

have shown significant positive bias.

- The user should adhere to the calibration instructions and schedule for either the sensor code calibration or manual calibration options.
- Users should adhere to the instructions for sensor insertion site; Adult users should only use the abdomen and pediatric users should only use the buttock or abdomen. Sensor performance has not been evaluated in other insertion sites and may differ from expected iCGM performance.
- Change your insertion site so it is at least 3 inches from the previous insertion site. Using the same site too often may cause irritation or scarring.
- Do not insert your sensor over irritated skin, tattoos, near waistband, bones, or scarring and near places that are easily bumped, pushed or laid on while sleeping.
- Clean and dry your hands and the sensor insertion area before inserting the sensor to avoid infection. Follow the cleaning instructions indicated in the user manual.
- If a sensor wire breaks or detaches from the sensor, it could remain under the user's skin. The user should contact their healthcare practitioner if this occurs.
- Do not use a damaged or cracked transmitter or receiver as this could cause injuries from electrical shocks and may impact the performance of the iCGM.
- The transmitter is reusable. However, the transmitter should not be shared to avoid transmission of bloodborne illnesses and to ensure that the glucose readings, reports, alarms/alerts are correct.
- Components of the device are not compatible with previous generations of the device. Only use transmitters, receivers, and sensors from this system together.
- The transmitter must remain within 20 feet of the receiver with no obstacles between them to ensure that the user will receive glucose values, important alerts and alarms.
- When using the smart device as a receiver, the user should follow the user manual instructions to ensure that all glucose values, important alarms and alerts can be seen and heard. Do not use headphones will using the smart device as a receiver. The app must always be running in the background of the smart device to ensure the user receives glucose values, alarms and alerts.
- Before updating the smart device hardware or operating system, verify the compatibility of the updated hardware/software with the device system.
- Store your sensors only between 36° F and 86° F. Do not store sensors in the freezer.
- Do not use sensors if they are expired or if sensor package is damaged.
- Do not submerge the receiver in water.

4. <u>Special instrument requirements:</u>
   Not applicable.

I. Device Description:

The Dexcom G6 System in an integrated continuous glucose monitoring system (iCGM) that provides continuous glucose readings which are updated every 5 minutes providing glucose levels, trends, and alerts. The System consists of three main components: a sensor, a Bluetooth Low Energy (BLE) transmitter and a BLE enabled display device (receiver and/or mobile application). The user can view glucose data on the receiver or on the G6 CGM App (i.e., a mobile medical application) running on a compatible mobile device, or on both simultaneously.

The system provides alerts and alarms which warn the user of low or impending low and high or impending high glucose levels. The user may determine their treatment based on the glucose values provided by the system.

G6 CGM SENSOR

The sensor component is a sterile device that consists of the sensor applicator, plastic base ("transmitter holder"), and sensor probe. The applicator is a single use, disposable unit that contains an introducer needle holding the sensor probe. The applicator deploys the needle and inserts the sensor under the skin. The needle is retracted back into the applicator after insertion. The sensor probe continuously measures glucose concentration in interstitial fluid and can be worn for up to 10 days.

The sensor may be worn in the abdomen for adults, and both the abdomen and buttock for children ages 2-17 years old. Sensor comes with a calibration code that the user enters into the system upon initializing a new sensor. Once the code is applied, the user does not need to calibrate the system throughout the entirety of the sensor lifetime, which is 10 days. However, the user has the option to manually calibrate the system using self-measurements from a blood glucose meter in addition to entering the calibration code. Alternatively, if the user chooses not to enter the calibration code, he or she must manually calibrate the sensor by entering two fingerstick blood glucose values during start up and every 24 hours thereafter.

G6 CGM TRANSMITTER

The G6 CGM Transmitter is a miniature radio transmitter that incorporates data processing functionality. The transmitter contains a Bluetooth radio transceiver for communication with a compatible display device (i.e., receiver and/or smart device). The transmitter attaches to the sensor and can be re-used for multiple sensing sessions up to three months.

G6 CGM RECEIVER

The G6 CGM Receiver is small hand-held device that wirelessly receives glucose information from the transmitter every five minutes and includes a touchscreen display. The

receiver displays the current glucose reading and glucose trends to the user. It alerts the user when glucose levels are outside of a target zone and when other important system conditions occur.

DEXCOM G6 System MOBILE APP
The G6 CGM App for iOS and G6 CGM App for Android provides an alternative display device to the receiver for users with a compatible, BLE-enabled smart device and behaves similarly to the receiver. The G6 CGM App is compatible with certain iOS, Android and Smart Device watches. A link to a list of compatible devices is included in the instructions for use.

The Dexcom G6 System is an interoperable connected device that can communicate glucose readings and other information wirelessly and securely to and from interoperable electronic interfaces; including compatible AID systems. The G6 CGM system is designed to communicate with interoperable devices in several ways, such as described below:

- Wireless communication from the transmitter directly to an interoperable device communicating through the same protocol.
- The app communicates to another app on a single mobile platform.
- The app communicates through the cloud to another software device.

J. Standard/Guidance Documents Referenced:

1. ISO 10993-1:2009/AC:2010; Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process
2. ISO 10993-3:2009; Biological Evaluation of Medical Devices – Part 3: Tests For Genotoxicity, Carcinogenicity and Reproductive Toxicity
3. ISO 10993-5:2009; Biological Evaluation of Medical Devices – Part 5: Tests for in vitro Cytotoxicity
4. ISO 10993-6:2016; Biological Evaluation of Medical Devices – Part 6: Tests for Local Effects after Implantation
5. ISO 10993-10:2013; Biological evaluation of Medical Devices – Part 10: Tests for Irritation and Skin Sensitization
6. ISO 10993-11; 2009; Biological Evaluation of Medical Devices – Part 11: Test for Systemic Toxicity
7. ISO 11137-1:2006/A1:2013; Sterilization of Health Care Products – Radiation – Part 1: Requirements for Development, Validation and Routine Control of a Sterilization Process for Medical Devices
8. ISO 11607-1:2014; Packaging for Terminally Sterilized Medical Devices – Part 1: Requirements for Material, Sterile Barrier Systems, and Packaging Systems
9. ISO 11607-2:2006/A1:2014; Packaging for Terminally Sterilized Medical Devices – Part 2: Validation Requirements for Forming, Sealing and Assembly Processes
10. ISO 11737-1:2006/AC:2009; Sterilization of Medical Devices – Microbiological

Methods – Part 1: Determination of a Population of Microorganisms on Products

11. ISO 11737-2:2009; Sterilization of Medical Devices – Microbiological Methods – Part 2: Tests of Sterility Performed in the Definition, Validation and Maintenance of a Sterilization Process
12. ISO 23908:2013; Sharps Injury Protection. Requirements and Test Methods. Sharps Protection Features for Single-Use Hypodermic Needles, Introducers for Catheters and Needles Used for Blood Sampling
13. ISO 14971:2012; Medical Devices – Application of Risk Management to Medical Devices
14. ISO 11137-3:2006; Sterilization of Health Care Products – Radiation – Part 3 – Guidance on Dosimetric Aspects
15. ISO 7010:2012; Graphical Symbols – Safety Colors and Safety Signs – Registered Safety Signs
16. ISO 15223-1:2012; Medical Devices – Symbols to be Used with Medical Device Labels, Labeling and Information to be Supplied – Part 1: General Requirements
17. ISO 15197:2013(E); In vitro diagnostic systems – Requirements for blood glucose monitoring systems for self-testing in managing diabetes mellitus
18. ISO/TS 13004:2015; Sterilization of health care products – Radiation – Substantiation of selected sterilization dose: Method $VDmax^{SD}$
19. EN 62304:2006/AC:2008; Medical device software – Software life cycle processes
20. EN 62304:2006/AC:2015; Medical device software – Software life cycle processes
21. BS EN 62366:2015; Medical devices – Application of usability engineering to medical devices
22. EN 60529:1991/A2:2013; Degrees of protection provided by enclosures (IP code)
23. BS EN 60529:1992 +A2:2013; Degrees of protection provided by enclosures (IP code)
24. EN 55011:2009 + A1:2010; Industrial, scientific and medical equipment. Radio-frequency disturbance characteristics. Limits and methods of measurement
25. EN 980:2008Symbols for use in the labelling of medical devices
26. EN 60601-1:2006/A1:2013; Medical electrical equipment – Part 1: General requirements for basic safety and essential performance
27. EN 60601-1-2:2014; Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic compatibility – Requirements and tests
28. EN 55011:2016; Industrial, scientific and medical (ISM) equipment – Radio Frequency disturbance characteristics - Limits and methods of measurement
29. EN 60601-1-6:2013; Medical Electrical Equipment – Part 1-6: General Requirements for basic safety and essential performance – Collateral standard: Usability
30. IEC 60601-1-11:2015; Medical electrical equipment – Part 1-11: General requirements

for basic safety and essential performance – Collateral standard: Requirements for medical electrical equipment and medical electrical systems used in home healthcare environment

31. ANSI/AAMI ES60601-1:2005/(R)2012 and A1:2012, C1:2009/(R)2012 and A2:2010/(R)2012; Medical electrical equipment – Part 1: General requirements for basic safety and essential performance
32. ASTM D4169-14; Standard practice for performance testing of shipping containers and systems
33. ASTM F2096-11; Standard test method for detecting gross leaks in packaging by internal pressurization
34. ASTM F88/F88M-15; Standard test method for seal strength of flexible barrier materials
35. ASTM F203-08; Standard practice for marking medical devices and other items for safety in the magnetic resonance environment
36. ANSI/AAMI/IEC 60601-1-8:2006 & A1:2012, IEC 60601-1:2006/A1:2013; MEDICAL ELECTRICAL EQUIPMENT – Part 1-8: General requirements for basic safety and essential performance – Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems
37. IEC 60417-DB-12M:2002; Graphical symbols for use on equipment
38. IEC 60601-1-2:2014; Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic disturbances – Requirements and tests
39. IEC 61000-4-2:2008; Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test
40. IEC 61000-4-3:2010; Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
41. IEC 61000-4-4:2012; Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst Immunity test
42. IEC 61000-4-5:2014; Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
43. IEC 61000-4-6:2013; Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency field
44. IEC 61000-4-8:2009; Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
45. IEC 60086-4:2014; Primary batteries – Part 4: Safety of lithium batteries
46. IEC 61000-4-11:2004; Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests

47. IEC 62133 Edition 2.0:2012; (Battery Cell) Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
48. IEC 60601-1-11:2015; Medical electrical equipment, Part 1-11: General requirements for basic safety and essential performance – Collateral standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment
49. CISPR 11: 2015+AMD1:2016; Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
50. USP Chapter <151>; Pyrogen Test
51. USP Chapter <161>; Transfusion and infusion assemblies and similar medical devices – Bacterial Endotoxin and Pyrogen Tests
52. RTCA/DO-160G; Environmental Conditions and Test Procedures for Airborne Equipment, Section 20 Category T and Section 21 Category M
53. FCC: Part 15 (2016); Radio Frequency Devices, Conducted Limits, Section 15.207 and Section 15.247
54. FAA AC No. 91.21-1C; Use of Portable Electronic Devices Aboard Aircraft
55. UL 1642 Fifth Edition, Revision, March 15, 2012; Standard for Safety, Lithium Batteries
56. ANSI/HIBC 2.4 – 2013; Supplier Labeling Standard

K. Test Principle:

The Dexcom G6 System detects glucose levels from the fluid just beneath the skin (interstitial fluid). The sensor probe continuously measures glucose concentration in the interstitial fluid via an enzymatic electrochemical reaction using glucose oxidase. The enzyme, glucose oxidase, catalyzes the oxidation of glucose and produces hydrogen peroxide. The production of hydrogen peroxide generates an electrical current that is proportionate to the interstitial glucose concentration. The transmitter converts the signal using an algorithm to a glucose value read in mg/dL, which is then transmitted to the receiver for the user to see and use accordingly.

L. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Reproducibility/Precision

iCGM performance was evaluated in clinical studies described in Section L(3) below. A subset of randomly-selected subjects (n=67) wore two devices concurrently (blinded and unblinded iCGM Systems) at the same sensor insertion site (abdomen or buttock) to evaluate the device precision. A table of the sensor and site distribution is provided below. A total of (b) (4) CGM-CGM matched pairs (match within the same

individual subject) contributed to the analysis. Mean absolute relative difference (between the 2 concurrently worn devices) was 9.6%; and mean coefficient of variation (CV) was 8.4%.

The following table shows that the agreement of readings from the two sensors for each insertion site. It should be noted that only the pediatric population may use both the abdomen and buttocks insertion sites. For adults (18+ years old) on abdomen, absolute relative difference (ARD) between the two Systems was 8.9% with CV of 7.9%. For pediatrics (2-5 years old) on upper buttocks, paired ARD was 5.2% with CV of 4.8%.

Another subset of randomly-selected (b) (4) to evaluate agreement of device measurements between different sensor insertion sites.

Precision by Insertion Site

	Adults (18+ YO) - Abdomen	Pediatrics (6-17 YO) - Abdomen	Pediatrics (6-17 YO) – Upper Buttocks	Pediatrics (2-5 YO) – Upper Buttocks	(b) (4)
CGM-CGM Matched Pairs (n)	23,019	1,255	12,230	2,638	
Number of Subjects	34	3	25	5	
Paired Absolute Difference (mg/dL)	14.0	14.5	16.4	9.4	
Paired Absolute Relative Difference (%)	8.9	9.4	10.7	5.2	
Coefficient of Variation (%)	7.9	7.6	8.5	4.8	

b. *Linearity/assay reportable range:*

The reportable range for the G6 CGM is 40 to 400 mg/dL. Data supporting this claimed measurement range was generated in the clinical study described in Section

L(3) below.

c. Traceability, Stability, Expected values (controls, calibrators, or methods):

The G6 CGM sensor has a storage shelf-life of (b) (4) and testing is on-going. Shelf life was evaluated at 32^0-86^0 F and 10-90% relative humidity.

The G6 CGM Transmitter has sufficient battery life to function for 3 months as intended following its maximum storage time of (b) (4) Shelf life was evaluated at 32^0-113^0 F and 10-95% relative humidity.

d. Detection limit

If a glucose measurement is less than 40 mg/dL, the result is displayed by the system as 'Lo'. If a glucose measurement exceeds 400 mg/dL, result is displayed as 'Hi'. Data supporting this claimed measurement range was generated in the clinical study described in Section L(3) below.

e. Analytical specificity:

Certain endogenous and exogenous substances in the interstitial fluid may interfere with iCGM measurements. The types of potential interference and the extent of bias are dependent on the test principle of the particular iCGM technology. For this technology, acetaminophen has previously been shown to present significant interference in earlier generations of similar Dexcom Systems approved under the product code MDS (e.g., Dexcom G4 (P120005) and G5 (P120005/S033) Systems) and has been contraindicated in those types of CGM systems.

acetaminophen Formal testing was conducted with both acetaminophen dose response bench testing and clinical validation. During clinical testing, all medications for which the subject was using or had used over the course of the study along with frequency of use were recorded. Both studies did not include exclusion criteria based on medications or vitamin use.

The G6 CGM sensor was designed to reduce interference from acetaminophen. A clinical study was performed to evaluate acetaminophen interference for the G6 CGM System. It is a prospective, multi-center, single-arm study that enrolled 70 subjects at 4 sites. The study was designed to evaluate the effectiveness of the G6 CGM sensor in blocking the interference of acetaminophen on iCGM readings in adult subjects (18 or older) with diabetes mellitus.

The clinical study included a single session to evaluate the G6 CGM System in blocking the interference of acetaminophen as measured by iCGM performance. Subjects wore two iCGM systems, the G6 system and the G4 CGM (P120005), on the abdomen for approximately 5 days. Subjects participated in one clinic session on day 4 or 5 after sensor insertion. A single 1,000 mg dose of acetaminophen was orally

administered to the subject during the clinic session. Both a laboratory-based blood glucose measurement method (Yellow Springs Instrument 2300 STAT plus Glucose analyzer) and fingerstick blood glucose testing using a blood glucose meter were performed at regular intervals before and after acetaminophen ingestion.

The interference effect on the iCGM system was evaluated by comparing the bias in the glucose values from the iCGM systems after administration of 1000 mg of acetaminophen to glucose values prior to acetaminophen dosing. Bias was calculated by taking the difference in glucose measurements between iCGM and laboratory blood glucose values. A G4 CGM sensor was used as a comparator for establishing the time from acetaminophen dose to a maximum bias and the duration of bias in the interstitial fluid.

Study data indicates that a single dose of 1000 mg does not introduce significant interference to the device. The accuracy and percentage agreement of the Dexcom G6 System Sensor and the laboratory comparator method are described in the tables below. The mean absolute relative difference (MARD) increased 1% (7% pre-dose vs. 8%
post-dose). The sensor values within %15/15mg/dL of laboratory comparator method values decreased by 3%, and the sensor values within %20/20 mg/dL to %40/40 mg/dL within laboratory comparator method values did not change.

Accuracy of the sensor 60 minutes before and after acetaminophen intake compared to laboratory comparator method

60-minute Window	**# of Pairs**	**Mean Bias**	**Mean Absolute Difference**	**Mean Relative Difference**	**Mean Absolute Relative Difference**
Pre-dose	446	+6	10	+4%	7%
Post-dose	389	+9	11	+7%	8%

Percentage agreement of the sensor and laboratory comparator method 60 minutes before and after acetaminophen intake

60-minute Window	**# of Pairs**	**%15/15 mg/L within comparator method values**	**%20/20 mg/dL within comparator method**	**%30/30 mg/dL within comparator method**	**%40/40 mg/dL within comparator method**
Pre-dose	446	91%	96%	100%	100%
Post-dose	389	87%	96%	100%	100%

In addition, an outlier analysis was conducted to determine whether there was any observational relationship that existed between medication or vitamin use and G6 sensor performance. An outlier condition of percent of values within %20/20 mg/dL of laboratory comparator method value accuracy rate of ≤35% was selected to

evaluate the relationship between concomitant medications and low sensor accuracy. This acceptance criteria was based on the distribution of the %20/20 mg/dL accuracy rate across all subject participants within the clinical accuracy studies (n=324).

Based on the results of the clinical evaluation, the following statements have been placed in the device labeling:

- "With the Dexcom G6 System, you can take a standard acetaminophen dose and still use the Dexcom G6 System readings. Taking higher than recommended doses of acetaminophen (e.g. > 1 gram every 6 hours in adults) may affect the Dexcom G6 System reading and make them look higher than they really are."

- "A clinical study including 65 adults was performed to demonstrate acetaminophen does not significantly interfere with iCGM readings. The difference in biases of the Dexcom G6 System was measured inreference to the laboratory comparator before and after 1 gram acetaminophen intake. This difference was defined as the maximum interference effect (MIE) defined as the maximum bias post-dose subtracted by the mean baseline bias. The mean MIE of the C6 sensor was 5.2 mg/dL (max bias post dose – max bias pre-dose using laboratory comparator reference) and was statistically significantly lower than the performance goal of 10 mg/dL (one-sided upper 95% CI of 6.4 mg/dL, $p < 0.001$).

  Higher concentrations of acetaminophen were tested in bench studies. According to the bench testing, acetaminophen concentrations of up to ~2 mg/dl (physiologic concentrations with standard dosing) demonstrated no clinically significant changes in glucose measurements (i.e. < 10 mg/dl or < 10% bias). However, acetaminophen concentrations of 6.5 mg/dl demonstrated up to 22 mg/dl glucose measurement bias and acetaminophen concentrations at 20 mg/dl demonstrated up to 70 mg/dl glucose measurement bias (in a glucose concentration of 60 mg/dl). Therefore, although standard dosing of acetaminophen with physiologic concentrations up to ~2 mg/dl does not appear to cause significant bias, higher supra-therapeutic levels appears to lead to clinically significant bias. Therefore, although the contraindication to acetaminophen may be acceptable for standard dosing, higher supra-therapeutic (> ~2-3 times therapeutic levels) levels of acetaminophen has shown significant bias."

2. Comparison studies:

   a. Method comparison with predicate device:

   Not applicable.

   b. Matrix comparison:

Not applicable. Interstitial fluid is the only indicated matrix.

3. Clinical studies:

Two clinical studies were conducted to support the accuracy performance of the device:

Study Name	Patient Population	Study Objective
Effectiveness and Safety of the Dexcom™ G6 Continuous Glucose Monitoring System (**Study 1**)	2 years and older Type 1 or Type 2 Diabetes Enrolled: n=304 Completed: n=262	Pivotal study to evaluate effectiveness and safety of the G6 Continuous Glucose Monitoring System compared to a laboratory blood glucose measurement method in Type 1 and Type 2 diabetic subjects aged 2 years and older.
Effectiveness and Safety of the Dexcom™ G6 Continuous Glucose Monitoring System with an Automated Applicator (**Study 2**)	6 years and older Type 1 or Type 2 Diabetes Enrolled: n=76 Completed: n=62	Sub-Study to demonstrate comparability of the performance of the Dexcom G6 System with Automated Sensor Applicator (auto-applicator) to the performance of the Dexcom G6 System observed in the pivotal study referenced above which used a manual applicator.

Study 1 and Study 2 have different sensor applicator mechanisms and the applicator configuration in Study 2 will be the marketed version of the device. Dexcom conducted Study 2 to demonstrate comparable performance of the two device configurations. Results of these two studies are presented below together.

To demonstrate the accuracy performance of the Dexcom G6 System, two prospective clinical studies were conducted at 11 centers across the United States. The studies included both adult (18 years and older) and pediatric (2 to 17 years) participants. The studies enrolled a total of 380 adult (18 years and older) and pediatric (2 to 17 years) participants with 99% having Type 1 diabetes mellitus and 1% having insulin-using Type 2 diabetes mellitus. A total of 324 subjects completed the studies.

Participants wore either one or two sensors for up to 10 days. A subset of participants

wore two sensors for the precision study to compare variability of readings between sensors (see Section L(1)(a) above). Adult participants wore their Dexcom G6 System (s) in the abdomen only; pediatric subjects had the choice of either abdomen or upper buttocks. Clinic session(s) took place on Day 1, Day 4-5, Day 7, and/or Day 10. Depending on the participant's age, they participated in either 1, 2 or 3 clinic sessions of varying duration.

In Study 1, under close observation by the study investigator staff, the glucose levels of study participants 13 years and older were deliberately manipulated per a protocol to raise or lower blood glucose levels to assess performance over the range that iCGM measures glucose (40-400 mg/dl). In Study 2, participants managed their glucose as they normally do; glucose was not deliberately manipulated.

- Adult subjects: Two or three 12-hour clinic sessions compared to laboratory blood glucose comparator method.
- Pediatrics 13-17 years: One 12 hour clinic session compared to laboratory blood glucose comparator method with glucose manipulation.
- Pediatrics 6-12 years: One 6 hour clinic session compared to laboratory blood glucose comparator method but no glucose manipulation.
- Pediatrics 2-5 years: One 4 hour clinic session compared to blood glucose meter comparator method.

Accuracy of the Dexcom G6 System was evaluated by comparing iCGM values obtained at the same or similar time points to the comparator methods. In the studies below, the absolute differences in mg/dL of values compared to the of the comparator method were calculated for all values below 70 mg/dL. For all values 70 mg/dL and above, percentage differences compared to the comparator method were calculated.

The following tables present the data from the clinical studies:

Percent and Point Accuracy by iCGM Glucose Range: Adults (N=159)

iCGM Glucose Range	**Matched Pairs (N)**	**Percent Within 15 mg/dL (95% LB)**	**Percent Within 40 mg/dL (95% LB)**	**Percent Within 15% (95% LB)**	**Percent Within 40% (95% LB)**	**Mean Bias (mg/dL) (95% UB)**
<70 mg/dL	1,920	88.5 (85.4)	99.3 (98.6)	----	----	-1.8 (-0.5)
70-180 mg/dL	9,453	----	----	74.1 (71.4)	99.3 (99.1)	-2.8 (-1.1)
>180 mg/dL	7,956	----	----	85.5 (82.8)	99.9 (99.9)	-7.0 (-3.9)

*95% LB is the lower bound of the confidence interval and 95% UB is the upper bound of the confidence interval

Percent and Point Accuracy by iCGM Glucose Range: Pediatrics (N=165)

iCGM Glucose Range	Matched Pairs (N)	Percent Within 15 mg/dL (95% LB)	Percent Within 40 mg/dL (95% LB)	Percent Within 15% (95% LB)	Percent Within 40% (95% LB)	Mean Bias (mg/dL) (95% UB)
<70 mg/dL	352	76.1 (67.5)	93.8 (88.8)	----	----	-9.5 (-5.5)
70-180 mg/dL	3,142	----	----	80.0 (76.6)	99.5 (99.2)	-0.3 (1.4)
>180 mg/dL	2,276	----	----	85.8 (81.7)	99.9 (99.8)	2.9 (6.5)

*95% LB is the lower bound of the confidence interval and 95% UB is the upper bound of the confidence interval

Percent and Point Accuracy by Comparator Glucose Range: Adults (N=159)

Comparator Glucose Range	Matched Pairs (N)	Percent Within 15 mg/dL (95% LB)	Percent Within 40 mg/dL (95% LB)	Percent Within 15% (95% LB)	Percent Within 40% (95% LB)	Mean Bias (mg/dL) (95% UB)
<70 mg/dL	2,266	88.7 (86.3)	99.9 (99.6)			4.5 (5.5)
70-180 mg/dL	8,713			76.8 (74.3)	99.6 (99.4)	-0.8 (0.8)
>180 mg/dL	8,350			83.2 (80.1)	99.8 (99.7)	-10.5 (-7.5)

*95% LB is the lower bound of the confidence interval and 95% UB is the upper bound of the confidence interval

Percent and Point Accuracy by Comparator Glucose Range: Pediatrics (N=165)

Comparator Glucose Range	Matched Pairs (N)	Percent Within 15 mg/dL (95% LB)	Percent Within 40 mg/dL (95% LB)	Percent Within 15% (95% LB)	Percent Within 40% (95% LB)	Mean Bias (mg/dL) (95% UB)
<70 mg/dL	356	87.4 (82.7)	100.0 (100.0)			3.1 (4.8)
70-180 mg/dL	3,099			79.9 (76.5)	99.8 (97.9)	1.7 (3.4)
>180 mg/dL	2,317			85.0 (80.2)	99.9 (99.7)	-1.8 (2.1)

*95% LB is the lower bound of the confidence interval and 95% UB is the upper bound of the confidence interval

Percent of values within 20% of comparator method were calculated across the measuring range overall, and for pediatric and adult populations.

Percent of iCGM values within 20% of reference blood glucose

iCGM Glucose Range	Matched Pairs (N)	Percent within 20% (95% LB)
Overall (40-400 mg/dL)	25,101	89.9 (88.7)
Adults (18 years and up)	19,329	89.5 (88.2)
Pediatrics (6-17 years old)	5,772	91.0 (88.7)
Pediatrics (2-5 years old)*	82	92.7 (86.6)

* Subjects 2-6 years old were compared to an SMBG reference
*95% LB is the lower bound of the confidence interval

Percent of values within 15%/15 mg/dL, 20%/20 mg/dL, and 40%/40 mg/dL stratified by glucose ranges of <54, 54-69, 70-180, 181-250, and >250 mg/dL for iCGM and laboratory comparator were also provided for abdominal insertion site in adult subjects, and both buttock and abdominal insertion site in pediatric populations. For pediatric subjects ages 6 and under, values were compared to SMBG.

Dexcom G6 System Accuracy to Comparator (comp) within iCGM Glucose Ranges (Adults; n=159)

iCGM Glucose Range [1] (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	383	84.3	90.6	98.4	----	----	----	-6.9	13.8
54-69	1,537	89.6	95.1	99.5	----	----	----	-0.5	11.5
70-180	9,453	----	----	----	74.1	86.8	99.3	-2.8	10.9
181-250	4,093	----	----	----	80.2	92.1	99.9	-10.0	9.3
>250	3,863	----	----	----	91.1	97.7	100.0	-3.8	7.1

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within iCGM Glucose Ranges (Pediatrics; n=165)

iCGM Glucose Range [1] (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	90	48.9	62.2	85.6				-20.0	26.0
54-69	262	85.5	88.5	96.6				-5.9	13.3
70-180	3,144				80.0	90.8	99.5	-0.3	9.7
181-250	1,360				83.4	93.5	99.9	-1.2	8.9
>250	916				89.3	95.9	99.9	9.2	7.4

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within iCGM Glucose Ranges (Pediatrics, Abdomen; n=99)

iCGM Glucose Range [1] (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	60	40.0	51.7	80.0				-24.1	28.9
54-69	177	87.0	88.1	96.0				-6.3	13.4
70-180	1,910				80.6	91.0	99.5	-1.1	9.7
181-250	775				81.9	95.0	100.0	-2.3	9.1
>250	574				89.2	96.5	99.8	8.0	7.5

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within iCGM Glucose Ranges (Pediatrics, Buttocks; n=66)

iCGM Glucose Range [1] (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	30	66.7	83.3	96.7				-11.7	20.1
54-69	85	82.4	89.4	97.6				-5.2	13.2
70-180	1,234				78.9	90.4	99.4	0.9	9.7
181-250	585				85.3	91.6	99.8	0.1	8.5
>250	342				89.5	94.7	100.0	11.1	7.3

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within Comparator Glucose Ranges (Adults; n=159)

Glucose Range (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	483	88.2	95.9	99.8				6.0	15.8
54-69	1,783	88.8	96.1	99.9				4.0	12.4
70-180	8,713				76.8	89.0	99.6	-0.8	10.3
181-250	3,940				83.0	92.7	99.8	-7.2	8.8
>250	4,410				83.4	93.3	99.8	-13.5	8.6

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within Comparator Glucose Ranges (Pediatrics; n=165)

Glucose Range (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	47	95.7	100.0	100.0				5.0	11.8
54-69	309	86.1	95.1	100.0				2.8	13.7
70-180	3,099				79.9	90.4	98.8	1.7	9.8
181-250	1,401				84.9	93.3	99.8	-0.8	9.0
>250	916				85.2	94.0	100.0	-3.3	8.0

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within Comparator Glucose Ranges (Pediatrics, Abdomen; n=99)

Glucose Range (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	28	100.0	100.0	100.0				4.2	11.3
54-69	201	90.0	96.0	100.0				3.0	12.8
70-180	1,904				79.3	89.5	98.5	0.4	10.2
181-250	761				84.9	94.9	99.6	-1.4	9.1
>250	602				85.4	95.8	100.0	-3.9	8.1

[1]CGM readings are within 40-400 mg/dL, inclusive.

Dexcom G6 System Accuracy to Comparator (comp) within Comparator Glucose Ranges (Pediatrics, Buttocks; n=66)

Glucose Range (mg/dL)	Number of paired iCGM-comp	Percent within 15 mg/dL	Percent within 20 mg/dL	Percent within 40 mg/dL	Percent within 15%	Percent within 20%	Percent within 40%	Mean bias (mg/dL)	MARD (%)
<54	19	89.5	100.0	100.0				6.2	12.6
54-69	108	78.7	93.5	100.0				2.4	15.2
70-180	1,195				80.8	92.0	99.2	3.8	9.3
181-250	640				84.8	91.4	100.0	-0.1	8.8
>250	314				84.7	90.4	100.0	-2.1	7.8

[1]CGM readings are within 40-400 mg/dL, inclusive.

Concurrence of iCGM values compared to the comparator method across the entire measuring range was also evaluated. iCGM glucose ranges of <40, 40-60, 61-80, 81-120, 121-160, 161-200, 201-250, 251-300, 301-350, 351-400, and >400 mg/dL were evaluated against comparator glucose ranges and percent of iCGM values within those ranges were reported.

Concurrence of Dexcom G6 System Readings and Comparator Values by iCGM Glucose Range (Adults; n=159)

iCGM Glucose Range [1] (mg/dL)	Comparator Glucose Values (mg/dL)											
	<40	40-60	61-80	81-120	121-160	161-200	201-250	251-300	301-350	351-400	>400	Total
<40	13.5%	56.7%	24.0%	3.8%	1.9%	.	.	.	.	.	.	104
40-60	1.2%	67.8%	27.9%	2.7%	0.2%	0.1%	.	.	.	.	.	917
61-80	0.1%	21.3%	61.4%	16.9%	0.3%	0.1%	.	.	.	.	.	2,275
81-120	.	0.4%	13.6%	70.3%	15.1%	0.6%	0.0%	.	.	.	.	3,782
121-160	.	.	0.0%	14.2%	64.3%	20.1%	1.3%	0.0%	0.0%	.	.	3,026
161-200	.	.	.	0.1%	14.5%	56.7%	26.9%	1.5%	0.2%	0.0%	.	2,597
201-250	.	.	.	.	0.2%	12.1%	59.4%	25.4%	2.9%	0.0%	.	2,869
251-300	.	.	.	.	.	0.1%	13.7%	59.1%	25.3%	1.9%	.	2,268
301-350	.	.	.	.	.	.	0.2%	22.3%	63.4%	13.7%	0.5%	1,212
351-400	.	.	.	.	.	.	.	0.8%	43.9%	52.5%	2.9%	383
>400	.	.	.	.	.	.	.	.	5.9%	76.5%	17.6%	34

Concurrence of Dexcom G6 System Readings and Comparator Values by iCGM Glucose Range (Pediatrics; n=165)

iCGM Glucose Range [1] (mg/dL)	Comparator Glucose Range (mg/dL)											
	<40	40- 60	61- 80	81- 120	121- 160	161- 200	201- 250	251- 300	301- 350	351- 400	>400	Total
<40	2.9%	22.9%	28.6%	42 9%	2.9%	.	.	.	.	.	.	35
40- 60	0.6%	37.9%	43.5%	13.7%	3.7%	0.6%	.	.	.	.	.	161
61- 80	.	11.5%	65.8%	20.4%	1.9%	0.4%	.	.	.	.	.	485
81- 120	.	0.2%	12.5%	76 3%	10.5%	0.6%	.	.	.	.	.	1,282
121- 160	.	.	.	13.6%	71.9%	13.6%	0.9%	.	.	.	.	1,013
161- 200	.	.	.	0.2%	18.6%	59.4%	20.2%	1.6%	.	.	.	1,087
201- 250	.	.	.	.	0.1%	19.2%	63.8%	15.7%	1.2%	.	.	828
251- 300	.	.	.	.	.	0.2%	28.1%	59.6%	11.8%	0.4%	.	544
301- 350	.	.	.	.	.	.	1.0%	32.8%	56.4%	9.8%	.	287
351- 400	.	.	.	.	.	.	.	5.9%	52.9%	38.8%	2.4%	85
>400	.	.	.	.	.	.	.	.	5.0%	55.0%	40.0%	20

Concurrence of Dexcom G6 System Readings and Comparator Values by Comparator Glucose Range (Adults, n=159)

iCGM glucose range[1] (mg/dL)	Comparator Glucose Range (mg/dL)										
	<40	40- 60	61- 80	81- 120	121- 160	161- 200	201- 250	251- 300	301- 350	351- 400	>400
<40	51.9%	5.0%	1.1%	0.1%	0.1%	.	.	.	.	.	.
40- 60	40.7%	52.7%	11.7%	0.7%	0.1%	0.0%	.	.	.	.	.
61- 80	7.4%	41.0%	63.7%	11.0%	0.2%	0.1%	.	.	.	.	.
81- 120	.	1.3%	23.4%	75.8%	19.7%	1.0%	0.0%	.	.	.	.
121- 160	.	.	0.0%	12.2%	66.9%	24.8%	1.4%	0.0%	0.1%	.	.
161- 200	.	.	.	0.1%	13.0%	59 9%	25.3%	1.7%	0.4%	0.2%	.
201- 250	.	.	.	.	0.2%	14.1%	61.9%	30.6%	5.1%	0.2%	.
251- 300	.	.	.	.	.	0.1%	11.3%	56.2%	35.9%	9.6%	.
301- 350	.	.	.	.	.	.	0.1%	11.3%	48.0%	38.0%	26.1%
351- 400	.	.	.	.	.	.	.	0.1%	10.5%	46.0%	47.8%
>400	.	.	.	.	.	.	.	.	0.1%	5.9%	26.1%
Total	27	1,180	2,191	3,503	2,910	2,457	2,755	2,383	1,601	437	23

Concurrence of Dexcom G6 System Readings and Comparator Values by Comparator Glucose Range (Pediatrics; n=165)

iCGM glucose range (mg/dL)	Comparator Glucose Range (mg/dL)										
	<40	40- 60	61- 80	81- 120	121- 160	161- 200	201- 250	251- 300	301- 350	351- 400	>400
<40	50.0%	6.3%	1.8%	1.2%	0.1%	.	.	.	.	.	.
40- 60	50.0%	48.0%	12.5%	1.8%	0.6%	0.1%	.	.	.	.	.
61- 80	.	44.1%	57.1%	7.9%	0.8%	0.2%	.	.	.	.	.
81- 120	.	1.6%	28.6%	78.0%	12.4%	0.8%	.	.	.	.	.
121- 160	.	.	.	11.0%	67.3%	14 5%	1.0%	.	.	.	.
161- 200	.	.	.	0.2%	18.7%	67.6%	24.1%	3.0%	.	.	.
201- 250	.	.	.	.	0.1%	16.6%	57.8%	22.8%	3.5%	.	.
251- 300	.	.	.	.	.	0.1%	16.8%	56.8%	22.7%	2.7%	.
301- 350	.	.	.	.	.	.	0.3%	16.5%	57.4%	37.8%	.
351- 400	.	.	.	.	.	.	.	0.9%	16.0%	44.6%	20.0%
>400	.	.	.	.	.	.	.	.	0.4%	14.9%	80.0%
Total	2	127	559	1,254	1,081	955	913	570	282	74	10

Trend Accuracy

Trend accuracy describes the accuracy of the sensor during times of rapidly changing glucose and are characterized by slopes, such as from >2 mg/dL to <-2 mg/dL. Trend accuracy was assessed by the concurrence rate of the glucose rate of change (changes in mg/dL of glucose per minute) determined by the iCGM values and the corresponding comparator values for each iCGM-comparator measured pairs (typically collected once every 15 minutes).

Trend Accuracy (Adults; n=159)

iCGM Rate Range (mg/dL/min)	Comparator Rate Range (mg/dL/min)						iCGM-comparator Pairs (n)
	<-2	[-2,-1)	[-1,-0)	[0,1]	(1,2]	>2	
<-2	53.3%	35.0%	9.9%	1.5%	0.0%	0.2%	463
[-2,-1)	7.4%	56.9%	32.5%	2.9%	0.3%	0.0%	2,077
[-1,0)	0.4%	9.5%	76.9%	12.5%	0.6%	0.1%	7,986
[0,1]	0.1%	1.0%	26.2%	60.6%	10.6%	1.6%	5,199
(1,2]	0.0%	0.4%	3.1%	26.8%	52.9%	16.8%	1,734
>2	0.1%	0.1%	0.8%	5.6%	22.1%	71.3%	1,367

Trend Accuracy (Pediatrics; n=165)

iCGM Rate Range (mg/dL/min)	Comparator Rate Range (mg/dL/min)						iCGM-comparator Pairs (n)
	<-2	[-2,-1)	[-1,-0)	[0,1]	(1,2]	>2	
<-2	47.9%	37.0%	12.8%	1.9%	0.0%	0.5%	211
[-2,-1)	6.6%	55.5%	33.8%	3.4%	0.6%	0.1%	686
[-1,0)	0.5%	8.9%	73.7%	15.8%	1.0%	0.0%	2,048
[0,1]	0.0%	0.8%	25.5%	62.9%	10.0%	0.8%	1,666
(1,2]	0.0%	0.4%	4.4%	35.9%	48.0%	11.4%	546
>2	0.0%	0.5%	1.7%	7.1%	23.6%	67.1%	423

Agreement When iCGM Reads "LOW" or "HIGH"

The Dexcom G6 System reports glucose readings between 40 and 400 mg/dL. When the system determines the glucose reading is below 40 mg/dL, it displays "LOW" in the Receiver or Mobile Application Status Box. When the system determines that the glucose level is above 400 mg/dL, it displays "HIGH" in the Receiver or Mobile Application Status Box. Because the System does not display glucose values below

40 mg/dL or above 400 mg/dL, the comparisons to the actual blood glucose levels (as determined by the laboratory comparator analyzer) when the iCGM value is classified as "LOW" or "HIGH" is evaluated separately, and the cumulative percentages when laboratory comparator values were less than certain glucose levels (for "LOW"), and when laboratory comparator values were greater than certain glucose levels (for "HIGH") are presented in the table below.

Distribution of Reference Values when CGM Readings are 'Low' or 'High'

iCGM Readings	iCGM-comparator Pairs	Comparator (mg/dL)					Total
		< 55	< 60	< 70	< 80	≥ 80	
"LOW"	n	65	80	95	117	22	139
	Cumulative Percent	47%	58%	68%	84%	16%	

iCGM Readings	iCGM-comparator Pairs	Comparator (mg/dL)					Total
		> 340	> 320	> 280	> 250	≤ 250	
"HIGH"	n	53	53	54	54	0	54
	Cumulative Percent	98%	98%	100%	100%	0%	

Alert performance:

The Hypoglycemic Alert Rate shows how often the alert is right or wrong. The True Notification Rate is the % of time the device alarmed when the blood glucose level was at or below the alert setting within 15 minutes before or after the device alarmed (as confirmed by the comparator method). The False Notification Rate is the % of time the device alarmed when the blood glucose level was above the alert setting within 15 minutes before or after the device alarmed. The Correct Detection Rate is the % of time the device alarmed when the blood glucose level was at or below the alert setting within 15 minutes before or after the hypoglycemic event. The Missed Detection Rate is the % of time the device did not alarm when the blood glucose level was at or below the alert setting within 15 minutes before and after the hypoglycemic event.

Hypoglycemic Alert and Detection Rate Evaluations (Adults, n=159[1])

Alert Setting	Hypo Events (n)	Correct Detection Rate (%)	Missed Detection Rate (%)	Hypo Alerts (n)	True Notification Rate (%)	False Notification Rate (%)
55 mg/dL	642	63.9%	36.1%	1,408	66.6%	33.4%
60 mg/dL	1,158	74.1%	25.9%	2,370	74.6%	25.4%
70 mg/dL	2,365	86.0%	14.0%	5,079	85.5%	14.5%
80 mg/dL	3,372	92.7%	7.3%	8,187	89.1%	10.9%
90 mg/dL	4,287	94.6%	5.4%	11,147	9.4%	10.6%

[1] All subjects were considered in the analysis; however, not all subjects experienced hypo event

Hypoglycemic Alert and Detection Rate Evaluations (Pediatrics, n=165[1])

Alert Setting	Hypo Events (n)	Correct Detection Rate (%)	Missed Detection Rate (%)	Hypo Alerts (n)	True Notification Rate (%)	False Notification Rate (%)
55 mg/dL	66	68.2	31.8	358	31.6%	68.4
60 mg/dL	119	73.1	26.9	521	44.1%	55.9
70 mg/dL	369	81.6	18.4	1,054	68.0%	32.0
80 mg/dL	671	88.1	11.9	1,794	80.5%	19.5
90 mg/dL	1,030	92.8	7.2	2,746	86.3%	13.7

[1] All subjects were considered in the analysis; however, not all subjects experienced hypo event

The Hyperglycemic Alert Rate shows how often the alert is right or wrong. The True Notification Rate is the % of time the device alarmed when the blood glucose level was at or above the alert setting within 15 minutes before or after the device alarmed. The False Notification Rate is the % of time the device alarmed when the blood glucose level was below the alert setting within 15 minutes before or after the device alarmed. The Correct Detection Rate is the % of time the device alarmed when the blood glucose level was at

or above the alert setting within 15 minutes before or after the hyperglycemic event. The Missed Detection Rate is the % of time the device did not alarm when the blood glucose level was at or above the alert setting within 15 minutes before and after the hyperglycemic event.

Hyperglycemic Alert and Detection Rate Evaluations (Adults; n=157)

Alert Setting	**Hyper Events (n)**	**Correct Detection Rate (%)**	**Missed Detection Rate (%)**	**Hyper Alerts (n)**	**True Notification Rate (%)97.5%**	**False Notification Rate (%)**
120 mg/dL	12,664	97.6	2.4	37,061	97.5%	2.5
140 mg/dL	11,175	96.8	3.2	32,148	97.2%	2.8
180 mg/dL	8,455	95.2	4.8	23,424	96.6%	3.4
200 mg/dL	7,265	93.6	6.4	19,586	96.0%	4.0
220 mg/dL	6,143	91.2	8.8	15,689	95.6%	4.4
240 mg/dL	5,007	88.7	11.3	12,279	94.6%	5.4
300 mg/dL	2,095	74.8	25.2	4,211	85.9%	14.1

Hyperglycemic Alert and Detection Rate Evaluations (Pediatric; n=165)

Alert Setting	Hyper Events (n)	Correct Detection Rate (%)	Missed Detection Rate (%)	Hyper Alerts (n)	True Notification Rate (%)	False Notification Rate (%)
120 mg/dL	3,930	97.8	2.2	11,683	97.3%	2.7
140 mg/dL	3,388	97.7	2.3	10,113	96.2%	3.8
180 mg/dL	2,366	94.7	5.3	6,821	93.4%	6.6
200 mg/dL	1,874	91.2	8.8	5,190	93.3%	6.7
220 mg/dL	1,453	91.7	8.3	4,096	90.4%	9.6
240 mg/dL	1,093	90.2	9.8	3,068	86.9%	13.1
300 mg/dL	374	84.8	15.2	1,010	77.2%	22.8

Sensor Stability:

Sensor stability describes the performance over the sensor lifetime. Sensors can be worn for up to 10 days. Performance was estimated by calculating the percentage of Dexcom G6 System readings within 15 mg/dL or 15% (15/15%), 20 mg/dL or 20% (20/20%), and 40 mg/dL or 40% (40/40%) of the laboratory comparator values at the beginning (Day 1, 2), middle (Day 4, 5), and end (Day 7, 10) of the Dexcom G6 System lifecycle. The mean of the absolute relative differences were evaluated over the 10-day life of the sensor within the measuring range.

Sensor Stability Relative to Comparator (Accuracy Over Time)

Wear Period	Number of paired iCGM-comparator	MARD (%)	Percent within 15/15% (%)	Percent within 20/20% (%)	Percent within 40/40% (%)
Beginning	8,863	10.7	77.6	89.0	99.6
Middle	7,732	9.2	84.1	94.4	99.8
End	8,506	9.6	82.6	92.0	99.5

Sensor Life:

A total of 374 sensors were evaluated to determine the percentage of sensors that lasted through the 10 day sensor life. Eighty-four percent (84%) of the sensors lasted through the end of the entire wear period (e.g., Day 10) (see Figure 1). Among the 374 sensors evaluated, 36 sensors (9.6%) had "early sensor shut-off" where the sensor algorithm would have detected sensors that did not function as intended and shut them off.

Sensor Survival Rate by Wear Day (Adults, n=164)

Wear Day	Number of Sensors	Survival Rate (%)
1	162	99.4%
2	160	98.8%
3	158	98.8%
4	155	98.8%
5	154	98.1%
6	154	98.1%
7	150	96.8%
8	146	96.2%
9	144	94.9%
10	139	93.5%

Sensor Survival Rate by; Wear Day (Pediatrics, n=210)

Wear Day	Number of Sensors	Survival Rate (%)
1	206	99.0%
2	204	99.0%
3	196	97.1%
4	193	95.6%
5	184	91.1%
6	175	88.6%
7	164	85.5%
8	157	83.4%
9	146	79.2%
10	142	76.8%

The capture rate characterizes the reliability of the communication between components of the system. The Dexcom G6 System provides a sensor glucose reading every 5 minutes, or up to 288 readings per day. The percentage of readings expected to be received from the system over the sensor life was evaluated from 374 sensors and is 98.6%. More than 97% of the sensors captured readings at least 90% of the time. The table below describes the percent of readings received throughout the life span of the sensor (capture rate).

Reading Capture Rate by Wear Day

Wear Day	Number of Sensors	Capture Rate (%)
1	374	97.6
2	368	98.6
3	364	98.7
4	354	98.6
5	348	98.5
6	338	98.5
7	329	98.2
8	314	97.8
9	303	97.0
10	290	96.4

Human Factors:

Human factors and usability of the device were evaluated to determine whether the user interface design and labeling would impact the performance of the device. Specific use scenarios and tasks the user would have to carry out correctly in order to use the device safely were identified. All critical tasks for which a use error could lead to high severity harm and the subject device user interface was evaluated. The compiled data provided assessment that use-related risks have been addressed and that further risk reduction is not necessary. Representative use for all critical tasks in the Dexcom G6 System which included but was not limited to interactions around calibration, detection of sensor placement, alerts, training, and labeling were evaluated. An analysis of hazards and risks was conducted on the Dexcom G6 System to determine safety risks associated with use of the system. The testing was carried out according to the FDA Guidance titled *Applying Human Factors and Usability Engineering to Medical Devices,* dated February 3, 2016, and IEC 60601-1-11:2015 titled *Medical Electrical Equipment- General requirements for basic safety and essential performance*.

4. Expected Values

   Not applicable.

M. Instrument Name:

Dexcom G6 Continuous Glucose Monitoring System

N. System Description:

1. Modes of Operation:

   Does the applicant's device contain the ability to transmit data to a computer, webserver, or mobile device? Yes _X__ or No _____.

   Does the applicant's device transmit data to a computer, webserver, or mobile device using wireless transmission: Yes __X__or No _____.

2. Software:

   FDA has reviewed applicant's Hazard Analysis and software development processes for this line of product types:

   Yes ___X_____ or No _____

2. Specimen Identification:

   Not Applicable

3. Specimen Sampling and Handling:

Not Applicable

4. Calibration:

   Though the Dexcom G6 System does not require user calibration, users of the Dexcom G6 System have the option to calibrate the device manually (e.g., in situations where users do not have to use the calibration code). Therefore, a calibration stability evaluation was completed to demonstrate that the system could be calibrated manually without impact to system performance. Subjects were instructed to calibrate their CGM devices according to the explicit system requirements. Beginning two hours after sensor insertion, calibration prompts were provided on the receiver twice the first day and every 24 hours for the remainder of the study. To demonstrate the performance of the System over a calibration cycle, the CGM-laboratory comparator percentage agreement was evaluated in 4-hour increments after calibration. Results were similar to the results obtained using the factory calibration codes.

5. Quality Control:

   Not Applicable

O. Other Supportive Instrument Performance Characteristics Data Not Covered In the "Performance Characteristics" Section above:

Biocompatibility:
Biocompatibility testing was performed on the sterile components of the Dexcom G6 System (sensor, transmitter, and applicator system) using the guidelines described in ISO 10993-1 *Biological Evaluation of Medical Devices – Part 1: Evaluation and Testing*.

The sensor was tested as an implant device that is tissue/bone contacting for permanent contact whose multiple use or contact exceeds 30 days. The following tests were conducted:

- Cytotoxicity
- Sensitization
- Irritation or intracutaneous reactivity
- Systemic toxicity
- Subacute/Subchronic toxicity
- Genotoxicity
- Implantation

The sensor pod is a surface device with skin contact and permanent patient contact duration (>30 days) due to repeated/continuous use. The following tests were conducted:

- Cytotoxicity
- Sensitization
- Irritation or Intracutaneous reactivity

The Dexcom G6 System applicator needle was defined as an external communicating device

with indirect blood path contact and limited patient contact duration (<24 hours). Per the guidelines of ISO 10993-1, the following tests were conducted:

- Cytotoxicity
- Sensitization
- Irritation or intracutaneous reactivity
- Pyrogenicity

The applicator also consists of patient contacting outer components defined by ISO 10993-1 and FDA's Guidance for Industry and Food and Drug Administration Staff (2016), Use of International Standard ISO-10993, Biological Evaluation of Medical Devices Part 1 guidelines as a surface device with skin contact. Tests for this device included the following:

- Cytotoxicity
- Sensitization
- Irritation or Intracutaneous reactivity

The outer patient contacting portions of the Transmitter are EP30HVSP Gray Epoxy and ≥99.8% pure Palladium contacts. The following biocompatibility testing was performed:

- Cytotoxicity
- Irritation or Intracutaneous Reactivity
- Sensitization

Per ISO 10993-1 and Guidance for Industry and Food and Drug Administration Staff (2016), Use of International Standard ISO-10993, Biological Evaluation of Medical Devices Part 1guidelines, the following biocompatibility testing was completed:

- Cytotoxicity
- Irritation or Intracutaneous Reactivity
- Sensitization

Testing was reviewed and determined to be adequate to support safe biocompatibility of the device as all testing met the acceptance criteria and was deemed a pass result.

Sterility:

Sterility testing was performed on patient contacting components of the system (sensor, transmitter, and applicator system). An assessment of the bioburden recover, total product bioburden determination, verification dose determination, verification does experiment/sterility, bacteriostasis/fungistasis, dose mapping, cleaning and disinfection testing, and packaging testing results were provided and determined to be adequate to support the sterility of the patient contacting components of the device as all testing met the acceptance criteria and was deemed a pass result.

Mechanical Engineering:

Product design specifications, sensor and applicator performance, receiver performance, transmitter performance, packaging testing, and shelf life and storage testing were provided to support sound mechanical function of the device. This information was reviewed and found adequate as all testing met the acceptance criteria and was deemed a pass result.

Electromagnetic Compatibility and Wireless:

Electromagnetic Compatibility protocols and testing results were provided. Testing was conducted according to IEC 60601-1-2 and demonstrated compliance with IEC 60601-1-2. Testing was also performed in accordance with the RTCA DO-160 standard for personal electronic devices used on commercial aircraft that is referenced in the IEC 60601-1-2:2014 standard. The EMC related labeling in the Dexcom G6 System User manual follows the specifications in the IEC standard with all pertinent warnings present. Protocols and results for EMC and wireless coexistence testing were provided for the following information. The information was complete and adequate to support safe use of the device.

- The Dexcom G6 System Transmitter and Dexcom G6 System Receiver underwent electromagnetic compatibility (EMC) and electromagnetic immunity (EMI) testing and both demonstrated compliance with IEC 60601-1-2:2014.

- The Dexcom G6 System Receiver and charger were exposed to electrostatic events (i.e., static electricity discharges from operators directly and from personnel to adjacent objects) in accordance with IEC 6100-4-2 Edition. Electrostatic discharge testing was performed at ±2, 4, 6, and 8 kV for contact discharge and at ±2, 4, 8, and 15 kV for air discharge. The Dexcom G6 System Receiver and charger met the performance requirements for the ESD Immunity Test.

- Testing was performed to determine compliance with Federal Communications Commission (FCC) standards. The Dexcom G6 System successfully demonstrated compliance with FCC Part 15 Subpart C §15.247 (2016) and FCC Part 15 Subpart B (2016).

- The Dexcom G6 System demonstrated compliance with airworthiness requirements per the Federal Aviation Administration (FAA) Advisory Circular RTCA/DO-160 Edition G section 21, Category M (RF Emission specification) and Section 20, Category T (Radio Frequency (RF) Susceptibility specification) as required by FAA.

- The Dexcom G6 System Transmitter and Dexcom G6 System Receiver successfully demonstrated compliance with the Bluetooth Low Energy Radio Frequency Physical Layer (RF PHY) Test Specification.

- The Dexcom G6 System underwent coexistence testing in the presence of common RF interfering devices that are likely to be encountered by users in a home environment. A representative set of devices known to operate in the same frequency band (2.4 GHz) was selected. The test results showed that the Dexcom G6 System could tolerate interference generated by these RF interfering devices and still meet the target performance criteria.

- In addition to coexistence testing, the performance of the Dexcom G6 System was evaluated with typical security and logistical systems (e.g., RFID). The test results showed that the Dexcom G6 System could tolerate interference generated by typical security and logistical systems and still meet the target performance criteria.

- Conducted emissions and radiated emissions testing for the Dexcom G6 System was performed in accordance with IEC/EN 60601-1-2:2014 and CISPR 11. The Dexcom G6 System demonstrated that maximum emissions did not exceed the limits established for residential or home use (Class B).

Electrical Safety:
The basic safety and essential performance of the Dexcom G6 System Transmitter and the Dexcom G6 System Receiver was evaluated to IEC 60601-1:2012, IEC 60601-1-8:2006/A1:2012, and IEC 60601-1-11:2015. The devices under test included the Dexcom G6 System Transmitter and Dexcom G6 System Receiver, and both demonstrated compliance with the requirements of IEC 60601-1:2012, IEC 60601-1-8:2006/A1:2012, and IEC 60601-1-11:2015.

Testing was performed to verify the performance of the Dexcom G6 System Sensor and automatic Applicator to ensure that both met their predetermined design specifications. The results demonstrated that the Dexcom G6 System Sensor and automatic Applicator met the applicable requirements per product specifications.

Risk management procedures were specified and adequate.

Environmental Testing:
Testing on the Dexcom G6 System was performed per per EN ISO 11607-1, EN ISO 11607-2, IEC 60601-1, ASTM D4169-14, and ASTMD4332-13 to ensure the device specifications for operating temperature, operating humidity, operating pressure, impact resistance, vibration resistance, shock resistance, drop resistance, and storage conditions were met.

Shelf-Life Stability:
Shelf-life testing was performed to evaluate the stability of Dexcom G6 System Sensors under real time anticipated storage conditions and supported its useful life to be up to 3 months. In addition, Dexcom G6 System Transmitters were tested to ensure that the Dexcom G6 System Transmitter has sufficient battery life to function as intended following its maximum storage time of 8 months. The test results for the Dexcom G6 System Sensor and the Dexcom G6 System Transmitter met specifications.

Packaging Integrity/Shipping Integrity:
Dexcom G6 System Receiver Kits, Dexcom G6 System Transmitter kits, and Dexcom G6 System Sensor Kits were tested in accordance with EN SIO 11607-1, EN ISO 11607-2, ASTM D4169-14, and ASTM D4332-13 guidelines. All samples passed the testing requirements of all distribution tests.

Interoperability:
A plan and approach for interoperability were provided according to the FDA Guidance *"Design Considerations and Pre-market Submission Recommendations for Interoperable Medical Devices - Guidance for Industry and Food and Drug Administration Staff"* and determined to be adequate to support and clearly specify expectations, requirements, and

interface specifications to potential interoperable devices. In addition, their plan covered their approach to working with connected device companies regarding contractual approaches, interfaces for data communication and exchange, and post-market reporting procedures and responsibilities (e.g., who is responsible for investigating and reporting complaints, malfunctions, and adverse events).

Cyber Security:

The following information was provided for the device:

- Risk Management
  - A model describing the assets, threats, vulnerabilities, and controls related to the device system was provided reviewed. Cyber security parameters were identified for each asset and included the transmitter, receiver, and smart device applications. Traceability was provided and adequate. Risk management was acceptable.
- Planning for Continuing Support
  - A plan for continuing to keep the device secure was provided and found to be complete and adequate.
- Plan for Malware-Free Shipping
  - A plan to ensure the device is shipped without Malware was provided and found to be complete and adequate.

Contact Resistance:

Dexcom G6 System Sensors and Dexcom G6 System Transmitters were tested in an environmental chamber at 95% relative humidity and 37 ºC for 240 hours to evaluate the maximum change in contact resistance during a 240-hour period. All samples demonstrated a contact resistance change less than the predetermined acceptance criteria indicating that the electrical integrity of the transmitter contacts are maintained.

P. Proposed Labeling:

The labeling is sufficient and satisfies the requirements of 21 CFR Parts 801 and 809, and the special controls for this type of device.

Q. Patient Perspectives

Patient perspectives considered for the Dexcom G6 Continuous Glucose Monitoring System include information provided directly to the Agency by patients in written statements and also obtained through discussion with patients at public forums regarding their experience with continuous glucose monitoring system devices in general. iCGM devices will allow patients to have more choice in the sensor that works best for their body and their care. In addition, iCGM availability will facilitate agile technology development that will ultimately provide innovative diabetes diagnostics and therapies to patients more quickly.

R. Identified Risks to Health and Mitigations Measures

Identified Risks to Health	Mitigations Measures
Clinical action based on falsely high or falsely low inaccurate glucose values or inaccurate alerts may lead to inappropriate treatment decisions.	General Controls and special controls (1), (2), (3), (4), (5), (6), and (7)
Clinical action in pediatric patients based on falsely high or falsely low inaccurate values or inaccurate alerts due to poorer or different iCGM performance in pediatric populations.	General Controls and special controls (1), (2), (3), (4), (5), (6), and (7)
The inability to make appropriate treatment decisions when glucose values are unavailable due to sensor signal drop-out or loss of communication with digitally connected devices.	General Controls and special controls (1)(vii), (2), (3), (6), and (7)
Patient harm due to insecure transmission of data.	General Controls and special control (2)
Use of an iCGM as part of another digitally connected medical device system, such as an AID system, when the iCGM has inadequate analytical or clinical performance to support the intended use of the digitally connected device.	General Controls and special controls (2), (6), and (7)

S. Benefit/Risk Analysis

This device is intended replace fingerstick glucose to track and trend interstitial glucose levels as estimates of blood glucose excursions and can be integrated as part of other digitally connected medical devices, including AID systems.

The benefits of this iCGM device include:

- Functions not feasible using traditional blood glucose monitoring. Traditional blood glucose meters only provide information about discrete, intermittent blood glucose levels and therefore are unable to provide information regarding patterns of glycemic excursions throughout the day and night when patients may be unable to test their blood glucose. An adjustable threshold and predictive glucose alert at 55 mg/dL are intended to warn patients that they need to take action to prevent a hypoglycemic or hyperglycemic event. Real-time knowledge of whether blood glucose is increasing or decreasing adds information unavailable by traditional discrete monitoring. This information regarding direction and rate of change can alert users that they need to take action to prevent hypoglycemia or hyperglycemia. This is especially helpful for individuals with hypoglycemia unawareness (these individuals may develop severe hypoglycemia with loss of consciousness, seizures, or rarely death without the normal warning symptoms), or during the night when subjects may have prolonged hypoglycemia that does not waken them which could proceed to severe hypoglycemia if not treated in time. Traditional blood glucose monitoring is not able to capture these potentially dangerous episodes of asymptomatic hypoglycemia.
- Accurate and reliable measurement of glucose. The Dexcom G6 System has demonstrated accurate point and trend accuracy. In addition, this device has no interference from acetaminophen at standard doses, and can be used for a relative

long wear period (10 days). The device is factory calibrated which ensures continued accuracy without influence from potentially erroneous SMBG calibrations.

- Connectivity to secondary display devices with the Dexcom Share software. This allows users to send glucose information to others in real time. This feature presents potential benefits for users, such as young children who may share real-time glucose data with caretakers.
- The ability to be securely and reliably integrate into compatible devices, such as AID systems.

The risks of this iCGM device include:

- Clinical action based on falsely high or falsely low inaccurate iCGM glucose values or inaccurate alerts may lead to inappropriate treatment decisions. Therapy decisions based on falsely high or falsely low inaccurate iCGM results may increase risk of severe dysglycemia due to undetected or mistreated low or high blood sugar.
- Clinical action in pediatric patients based on falsely high or falsely low inaccurate iCGM values or inaccurate alerts due to poorer or different iCGM performance in pediatric populations. Treatment decisions based on falsely high or falsely low iCGM values may increase risk of severe dysglycemiadue to undetected or mistreated low or high blood sugar.
- The inability to make appropriate treatment decisions when iCGM glucose values are unavailable due to sensor signal drop-out or loss of communication with digitally connected devices. Clinical inaction may result in increased risk of severe dysglycemia when blood glucose values are acutely low or high.
- Patient harm due to insecure transmission of iCGM data.
- Use of an iCGM as part of another digitally connected medical device system, such as an AID system, when the iCGM has inadequate analytical or clinical performance to support the intended use of the digitally connected device.

The sponsor has demonstrated that the probable benefits of the Dexcom G6 System outweigh the probable risks in light of the special controls for this type of device (iCGMs) and in combination with the general controls. These special controls are intended to provide reasonable assurance of the safety and effectiveness of the device in the hands of the intended users, adequate controls for secure and reliable inter-device communication, manufacturing controls to assure all released devices maintain adequate performance to mitigate the risks identified above, and adequate transparency to allow the community to understand expected sensor performance.

T. Conclusion

The information provided in this *de novo* submission is sufficient to classify this device into class II under regulation 21 CFR 862.1355. FDA believes that special controls, along with the applicable general controls, provide reasonable assurance of the safety and effectiveness of this device type. The device is classified under the following:

Product Code: QBJ
Device Type: Integrated continuous glucose monitoring system.

Class: II (special controls)
Regulation: 21 CFR 862.1355

(a) *Identification*. An integrated continuous glucose monitoring system (iCGM) is intended to automatically measure glucose in bodily fluids continuously or frequently for a specified period of time. iCGM systems are designed to reliably and securely transmit glucose measurement data to digitally connected devices, including automated insulin dosing systems, and are intended to be used alone or in conjunction with these digitally connected medical devices for the purpose of managing a disease or condition related to glycemic control.

(b) *Classification.* Class II (special controls). Integrated continuous glucose monitoring systems must comply with the following special controls:

In combination with the general controls of the FD&C Act, an Integrated continuous glucose monitoring system is subject to the following special controls:

(1) Design verification and validation must include the following:

(i) Robust clinical data demonstrating the accuracy of the device in the intended use population.

(ii) The clinical data must include a comparison between iCGM values, and blood glucose values in specimens collected in parallel that are measured on an FDA-accepted laboratory-based glucose measurement method that is precise and accurate, and that is traceable to a higher order (e.g., an internationally recognized reference material and/or method).

(iii) The clinical data must be obtained from a clinical study designed to fully represent the performance of the device throughout the intended use population and throughout the measuring range of the device.

(iv) Clinical study results must demonstrate consistent analytical and clinical performance throughout the sensor wear period.

(v) Clinical study results in the adult population must meet the following performance requirements:

(A) For all iCGM measurements less than 70 mg/dL, the percentage of iCGM measurements within +/-15 mg/dL of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 85%.

(B) For all iCGM measurements from 70-180 mg/dL, the percentage of iCGM measurements within +/-15% of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 70%.

(C) For all iCGM measurements greater than 180 mg/dL, the percentage of iCGM measurements within +/-15% of the corresponding blood glucose value must be

calculated, and the lower one-sided 95% confidence bound must exceed 80%.

(D) For all iCGM measurements less than 70 mg/dL, the percentage of iCGM measurements within +/-40 mg/dL of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 98%.

(E) For all iCGM measurements from 70-180 mg/dL, the percentage of iCGM measurements within +/-40% of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 99%.

(F) For all iCGM measurements greater than180 mg/dL, the percentage of iCGM measurements within +/-40% of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 99%.

(G) Throughout the device measuring range, the percentage of iCGM measurements within +/- 20 % of the corresponding blood glucose value must be calculated, and the lower one-sided 95% confidence bound must exceed 87%.

(H) When iCGM values are less than 70 mg/dL, no corresponding blood glucose value shall read above 180 mg/dL.

(I) When iCGM values are greater than 180 mg/dL, no corresponding blood glucose value shall read less than 70 mg/dL.

(J) There shall be no more than 1% of iCGM measurements that indicate a positive glucose rate of change greater than 1 mg/dL/min when the corresponding true negative glucose rate of change is less than -2 mg/dL/min as determined by the corresponding blood glucose measurements.

(K) There shall be no more than 1% of iCGM measurements that indicate a negative glucose rate of change less than -1 mg/dL/min when the corresponding true positive glucose rate of change is greater than 2 mg/dL/min as determined by the corresponding blood glucose measurements.

(vi) Data demonstrating similar accuracy and rate of change performance of the iCGM in the pediatric population as compared to that in the adult population, or alternatively a clinical and/or technical justification for why pediatric data are not needed, must be provided and determined by FDA to be acceptable and appropriate.

(vii) Data must demonstrate that throughout the claimed sensor life, the device does not allow clinically significant gaps in sensor data availability that would prevent any digitally connected devices from achieving their intended use.

(2) Design verification and validation must include a detailed strategy to ensure secure and reliable means of iCGM data transmission to provide real-time glucose readings at clinically meaningful time intervals to devices intended to receive the iCGM glucose data.

(3) Design verification and validation must include adequate controls established during manufacturing and at product release to ensure the released product meets the performance specifications as defined in paragraphs (1) and (2) of this section.

(4) The device must demonstrate clinically acceptable performance in the presence of clinically relevant levels of potential interfering substances that are reasonably present in the intended use population, including but not limited to endogenous substances and metabolites, foods, dietary supplements, and medications.

(5) The device must include appropriate measures to ensure that disposable sensors cannot be used beyond its claimed sensor wear period.

(6) Design verification and validation must include results obtained through a usability study that demonstrates that the intended user can use the device safely and obtain the expected glucose measurement accuracy.

(7) Your 809.10(b) labeling must include a separate description of the following sensor performance data observed in the clinical study performed in conformance with paragraph (1) for each intended use population, in addition to separate sensor performance data for each different iCGM insertion or use sites (e.g., abdomen, arm, buttock):

(i) A description of the accuracy in the following blood glucose concentration ranges: less than 54 mg/dL, 54-70 mg/dL, 70-180 mg/dL, 180-250 mg/dL, and greater than 250 mg/dL.

(ii) A description of the accuracy of positive and negative rate of change data.

(iii) A description of the frequency and duration of gaps in sensor data.

(iv) A description of the true, false, missed, and correct alert rates and a description of the available glucose concentration alert settings if applicable.

(v) A description of the observed duration of iCGM life for the device.