



CERTIFICATION TEST REPORT

Report Number: 2013 03232163 FCC

Project Number: 10228553

Nex Number: 232163

Applicant: DEXCOM, INC.
6340 SEQUENCE DRIVE
San Diego, CA, 92121

Equipment Under Test (EUT): DEXCOM SHARE CRADLE

Model: MT22006

FCC ID: PH29006

In Accordance With: FCC Part 15 Subpart C, 15.249

Tested By: Nemko USA Inc.
2210 Faraday Avenue, Suite 150
Carlsbad, CA 92008

Date: MARCH 21, 2013

Total Number of Pages: 22

1 Applicant Affirmation

Shawn S Larvenz, representing DexCom, Inc. hereby affirms:

- a) That he/she has reviewed and concurs that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;
- b) That the device in this test report will be representative of production units;
- c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.
- d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.

Shawn Larvenz



Printed name of official

Signature of official

6340 Sequence Drive
Address

March 21, 2013
Date

858-875-5303
Telephone number

slarvenz@dexcom.com
Email address of official

NOTE—This affirmation must be signed by the responsible party before it is submitted to a regulatory body for approval.

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Section1: Summary of Test Results

General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C and IC RSS-210. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made in a 10m semi-anechoic chamber. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

Apparatus Assessed:	Dexcom Share Cradle
Model:	MT22006
Specification:	FCC Part 15 Subpart C, 15.249
Date Received in Laboratory:	March 11, 2013
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None





1.1 Report Release History

REVISION	DATE	COMMENTS
-	March 21, 2013	Prepared By: Mark Phillips
-	March 21, 2013	Initial Release: Alan Laudani


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Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:  Date: March 21, 2013
Mark Phillips, EMC Test Engineer



Alan Laudani, Test Report Verificator



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Section 2: Equipment Under Test

2.1 Product Identification

The Equipment Under Test was identified as follows:

DEVICE	MANUFACTURER MODEL # SERIAL #	POWER CABLE
EUT - Dexcom Share Cradle	DexCom, Inc. Model: MT22006 Serial #: PCB 209	90cm, USB, Type A to MicroB connectors
EUT – Power Supply	Switching AC/DC Power Adapter Model: GEO61-DA-0510 Serial #: None	Wall Mount, 2 prong Plug
EUT – Power Supply	UE Model: UE05WCP-050100SPA Serial #: None	Wall Mount, 2 prong Plug
Support - Receiver	DexCom, Inc. Model: G4 Serial #: SM24800776	Internal Battery
Support - iPod	Apple Model: iPod Touch 5 Serial #: C3RJQT8XF4K4	Internal Battery

CONNECTION	I/O CABLE
EUT to Power Supply	90cm, USB, Type A to MicroB connectors



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2.2 Theory of Operation

The Share Cradle is a Docking Charging Station system. Its function is to provide charging for the DexCom G4 continuous glucose monitoring receiver. It also transmits data over a Bluetooth connection to a Bluetooth device. The Share Cradle has no software. Since this is *Bluetooth Low Energy*, it will meet the requirements of 15.249.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.3 Technical Specifications of the EUT

Manufacturer:	DexCom, Inc.
Operating Frequency:	2402.0 MHz to 2480.0 MHz in the 2400-2483.5 MHz Band
Number of Operating Frequencies:	40
Rated Field Strength:	0.166 mV/m @ 3 meters
Modulation:	GFSK
Antenna Type:	Trace on PCB, 0dBi gain (typ)
Antenna Connector:	None
Power Source:	120 VAC Wall Mount





Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

3.2 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	18-23 °C
Humidity range	40-60%

3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
E1026	9kHz to 7GHz EMI Receiver	Rohde & Schwarz	ESCI 7	100800	6/7//12	6/7//13
E1020	Two Line V-Network	Rohde & Schwarz	ENV216	101044	4/6/2012	*4/30/2013
110	Antenna, LPA	Electrometrics	LPA-25	1217	4/1/2011	4/1/2013
128	Antenna, Bicon	A.H. Systems	3104	2882	3/21/2011	3/21/2013
133	Antenna, loop	Electro-Metrics	ALR-25M	678	7/18/2011	7/18/2013
752	Antenna, DRWG	EMCO	3115	4943	1/3/2013	1/3/2014
811	Multimeter	Fluke Corp	111	78130057	2/20/2013	2/20/2014
901	Pre-Amplifier	Sonoma	310N	130607	10/15/2012	10/15/2013
911	Spectrum Analyzer	Agilent	E4440A	US41421266	10/15/2012	10/15/2013
1029	Preamplifier	A.H. Systems, Inc.	PAM-0118	343	1/21/2013	1/21/2014
E1035	Variac (Variable Transformer) 3KVA	Shanghai China	TDGC	N/A	NCR	NCR

*** Calibration extended for the LISN no. E1020, verification done.**

Registration of the 10m Semi-anechoic chamber is on file with the Federal Communications Commission and with Industry Canada under Site Number 2040B-3.





Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

No Tests were deleted from this assessment.

4.5 Additional Observations

There were no additional observations made during this assessment.



Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: §15.249

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant

Y Yes: Mandatory i.e. the apparatus shall conform to these tests.

N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1 Test Results

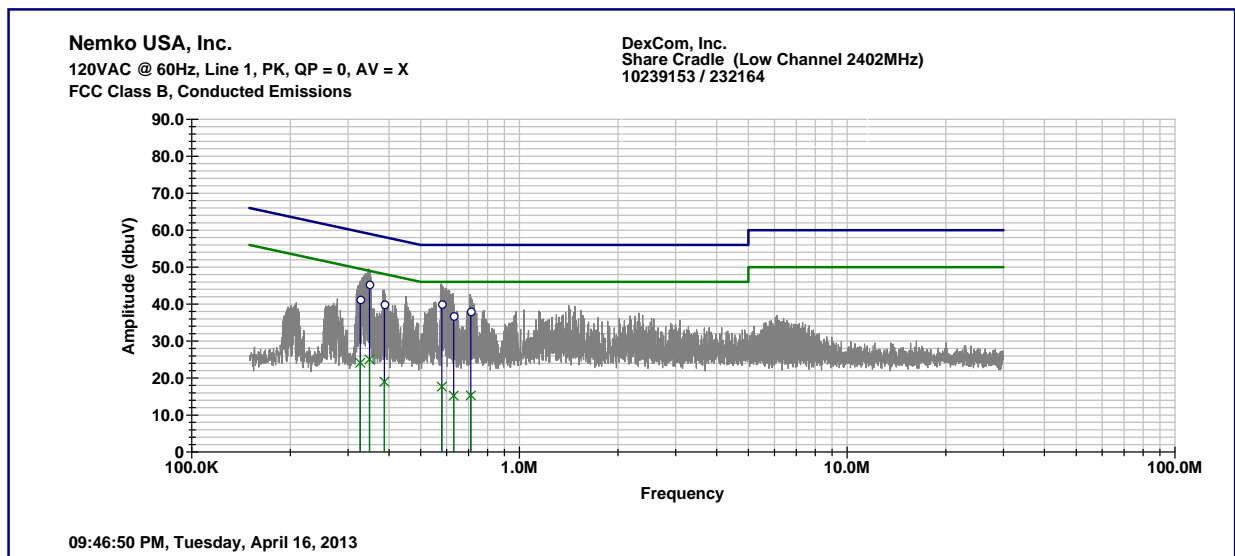
Part 15C	Test Description	Required	Result
15.207(a)	Conducted Emission Limit	Y	Pass
15.215(c)	20 dB Bandwidth	Y	Pass
15.249(a)	Field Strength of Emissions	Y	Pass



Appendix A: Test Results

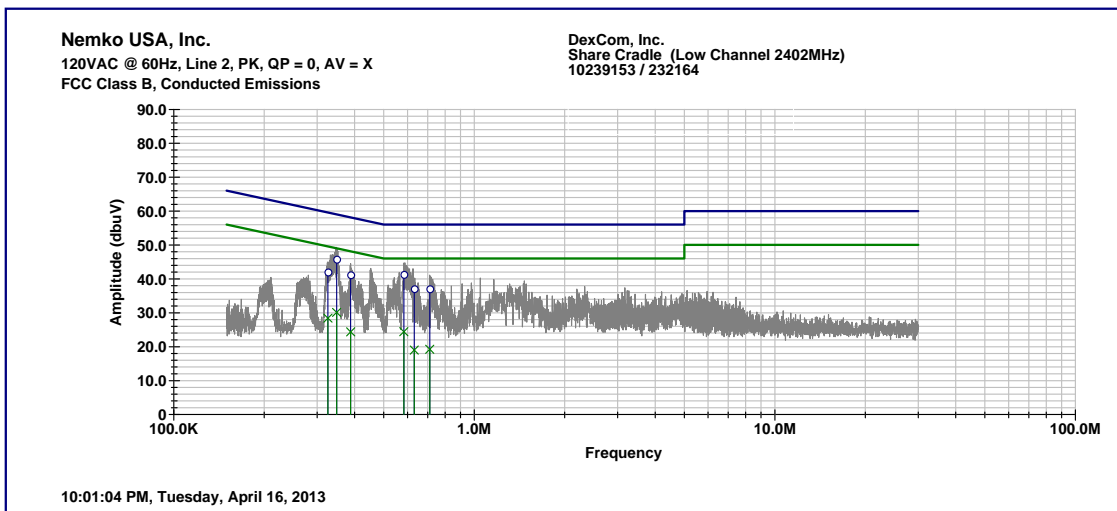
Conducted Emissions

Client	DexCom, Inc.	Temperature	22	°C
Nex #	232163	Relative Humidity	43	%
EUT Name	Dexcom Share Cradle			
EUT Model	MT22006	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15C	Test Engineer	Mark Phillips	
Basic Standard	Sec. 15.207 Transmit RSS-Gen 7.2.4	Date of test	4-17-2013	
Test Parameters	Peak RBW: 100kHz VBW: 100kHz Quasi-Peak: RBW 9kHz, VBW 30 kHz Average: RBW 9kHz, VBW 30 kHz Quasi-Peak Limit Blue Line, Average Limit Green Line			



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
326.807	41.2	24.1	59.5	49.5	-18.3	-25.4
348.699	45.3	25.0	59.0	49.0	-13.7	-24.0
387.429	39.9	19.0	58.1	48.1	-18.2	-29.1
580.060	40.0	17.7	56.0	46.0	-16.0	-28.3
630.336	36.8	15.2	56.0	46.0	-19.2	-30.8
710.607	38.0	15.3	56.0	46.0	-18.0	-30.7

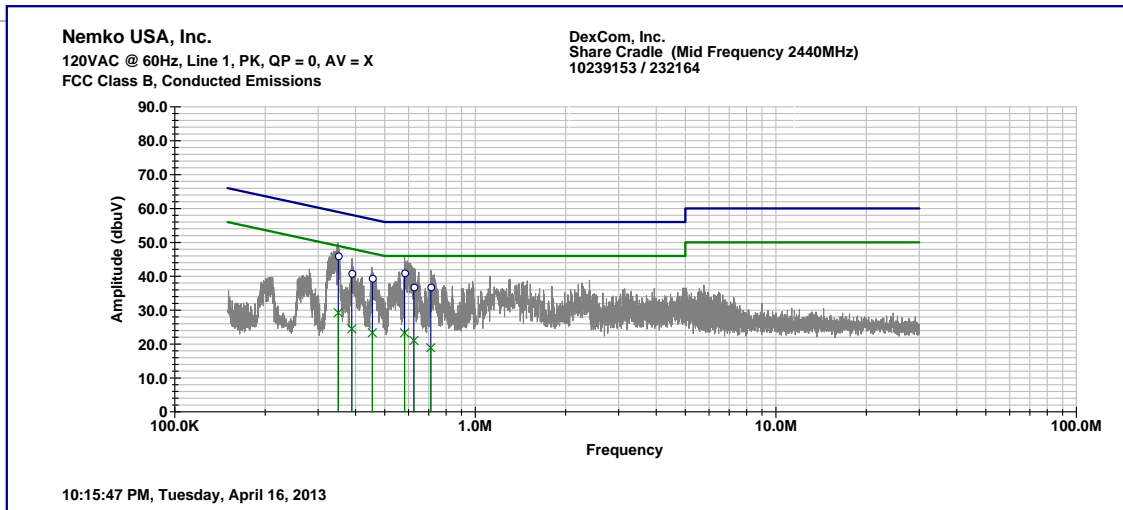
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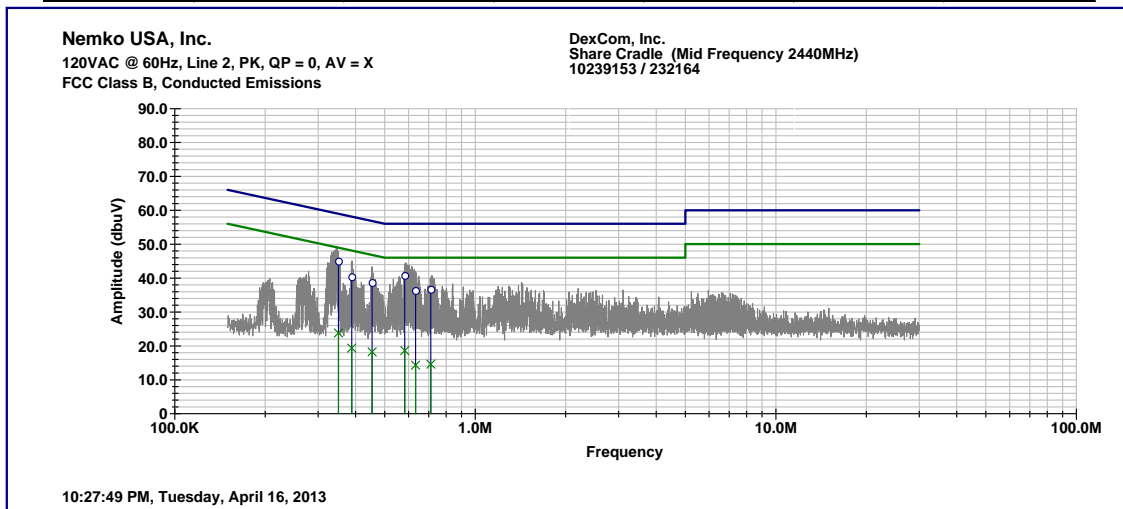
Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
325.886	42.0	28.4	59.6	49.6	-17.6	-21.2
348.639	45.8	30.1	59.0	49.0	-13.2	-18.9
387.895	41.2	24.3	58.1	48.1	-16.9	-23.8
583.163	41.3	24.4	56.0	46.0	-14.7	-21.6
631.570	37.1	19.0	56.0	46.0	-18.9	-27.0
711.229	37.1	19.2	56.0	46.0	-18.9	-26.8



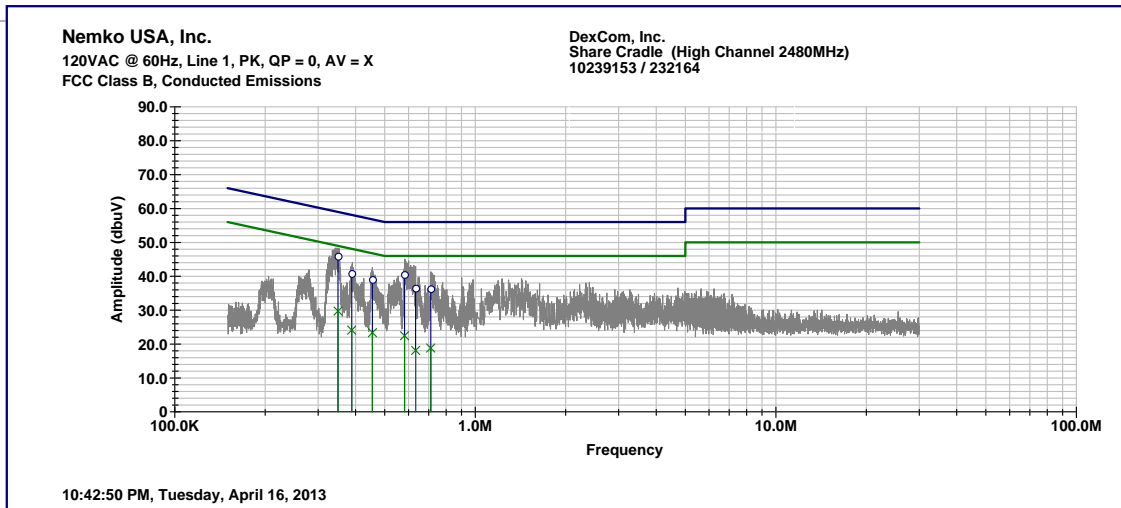
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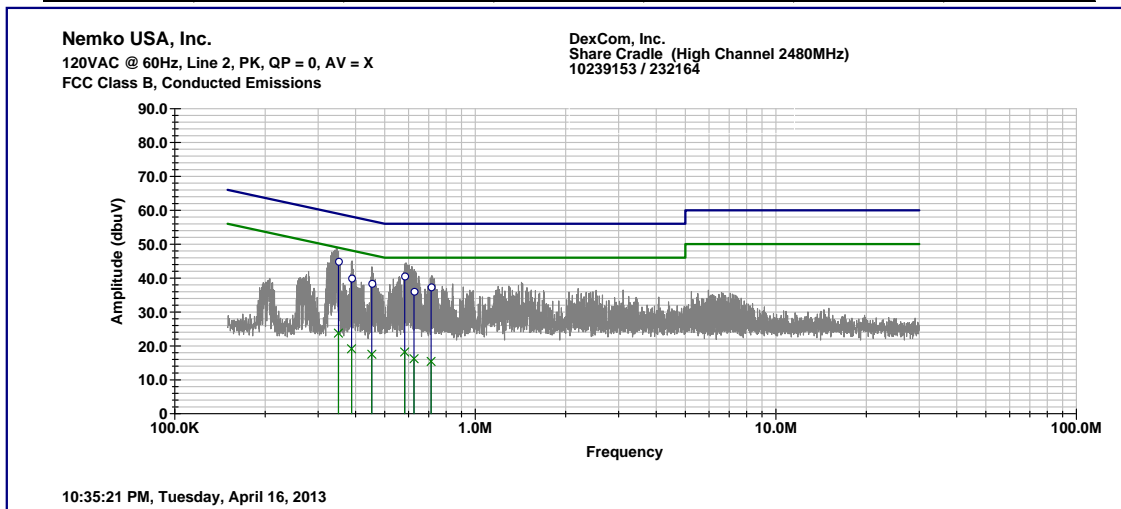
Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
350.319	46	29.2	59.0	49.0	-13.0	-19.8
388.375	40.9	24.5	58.1	48.1	-17.2	-23.6
454.551	39.4	23.3	56.8	46.8	-17.4	-23.5
582.089	41.0	23.3	56.0	46.0	-15.0	-22.7
624.809	36.8	21.0	56.0	46.0	-19.2	-25.0
711.429	36.8	18.9	56.0	46.0	-19.2	-27.1



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
350.756	45.0	23.8	58.9	48.9	-13.9	-25.1
388.159	40.4	19.3	58.1	48.1	-17.7	-28.8
453.811	38.6	18.2	56.8	46.8	-18.2	-28.6
582.858	40.8	18.6	56.0	46.0	-15.2	-27.4
632.881	36.3	14.3	56.0	46.0	-19.7	-31.7
711.535	36.7	14.6	56.0	46.0	-19.3	-31.4



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
349.547	45.9	29.7	59.0	49.0	-13.1	-19.3
388.188	40.8	24.1	58.1	48.1	-17.3	-24.0
455.092	39.0	23.4	56.8	46.8	-17.8	-23.4
581.577	40.5	22.4	56.0	46.0	-15.5	-23.6
633.279	36.5	18.1	56.0	46.0	-19.5	-27.9
711.220	36.3	18.8	56.0	46.0	-19.7	-27.2



Frequency (kHz)	Measured		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
350.643	45.0	23.8	58.9	48.9	-13.9	-25.1
387.740	40.0	19.1	58.1	48.1	-18.1	-29.0
452.670	38.4	17.5	56.8	46.8	-18.4	-29.3
582.159	40.6	18.2	56.0	46.0	-15.4	-27.8
625.744	36.1	16.2	56.0	46.0	-19.9	-29.8
713.254	37.4	15.4	56.0	46.0	-18.6	-30.6



Section 15.215(c) – Occupied Bandwidth

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

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Test Conditions:

Sample Number:	MT22006	Temperature:	22°C
Date:	3-12-2013	Humidity:	43%
Modification State:	Low, Mid and High Channel	Tester:	Mark Phillips
		Laboratory:	Nemko

Test Results:

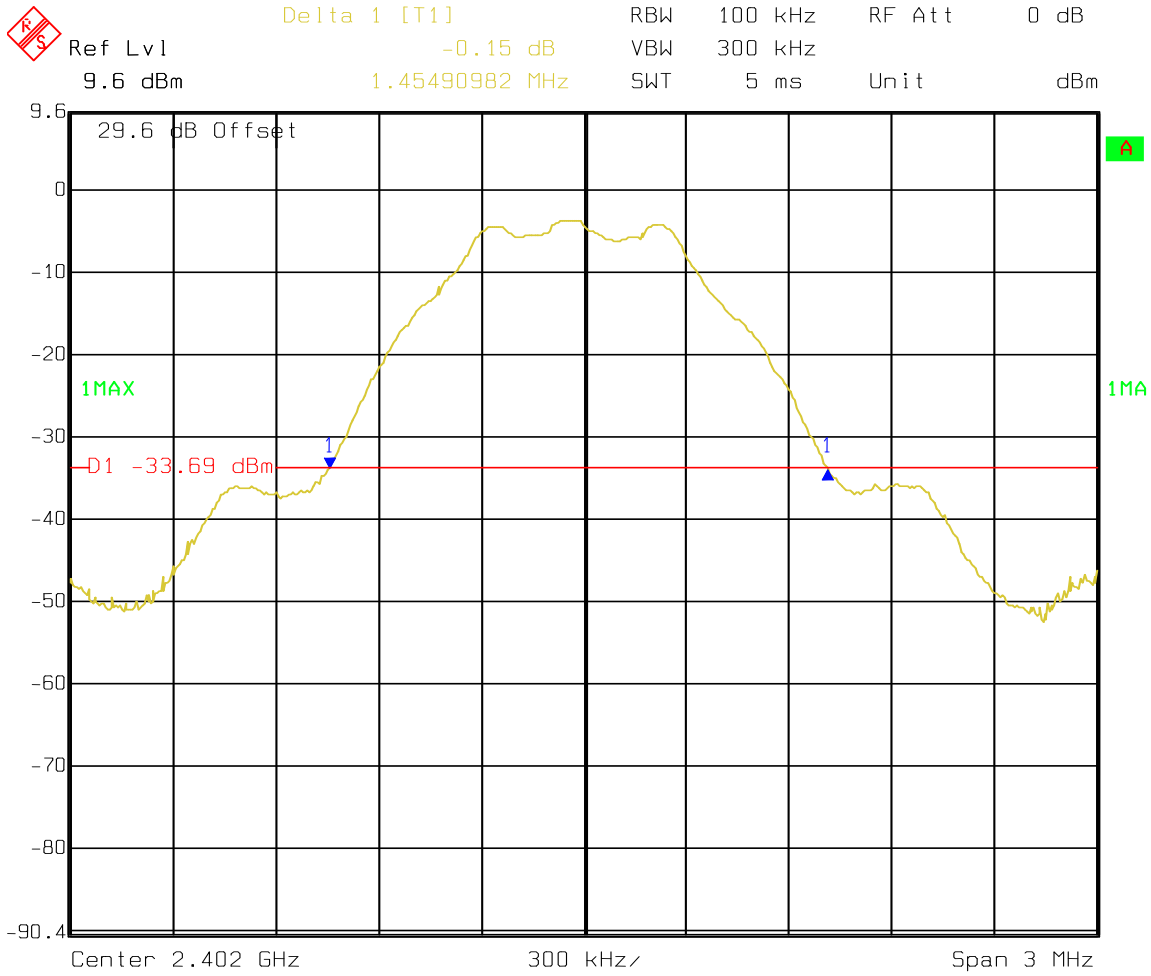
See attached plots

Additional Observations:

- Span is wide enough to capture the channel transmission
- RBW is 1% of the span or worst case
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- A peak output max hold reading was taken; a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.
- Observed maximum occupied BW is 1.93 MHz (20dB BW High Channel).
- $2402 \text{ MHz} - 1.45/2 \text{ MHz} = 2401.275 \text{ MHz}$ (within the frequency band)
- $2480 \text{ MHz} + 1.93/2 \text{ MHz} = 2480.965 \text{ MHz}$ (within the frequency band)

Frequencies	20 dB Bandwidth
2402 MHz	1.45 MHz
2440 MHz	1.52 MHz
2480 MHz	1.93 MHz





Date: 12.MAR.2013 19:29:50

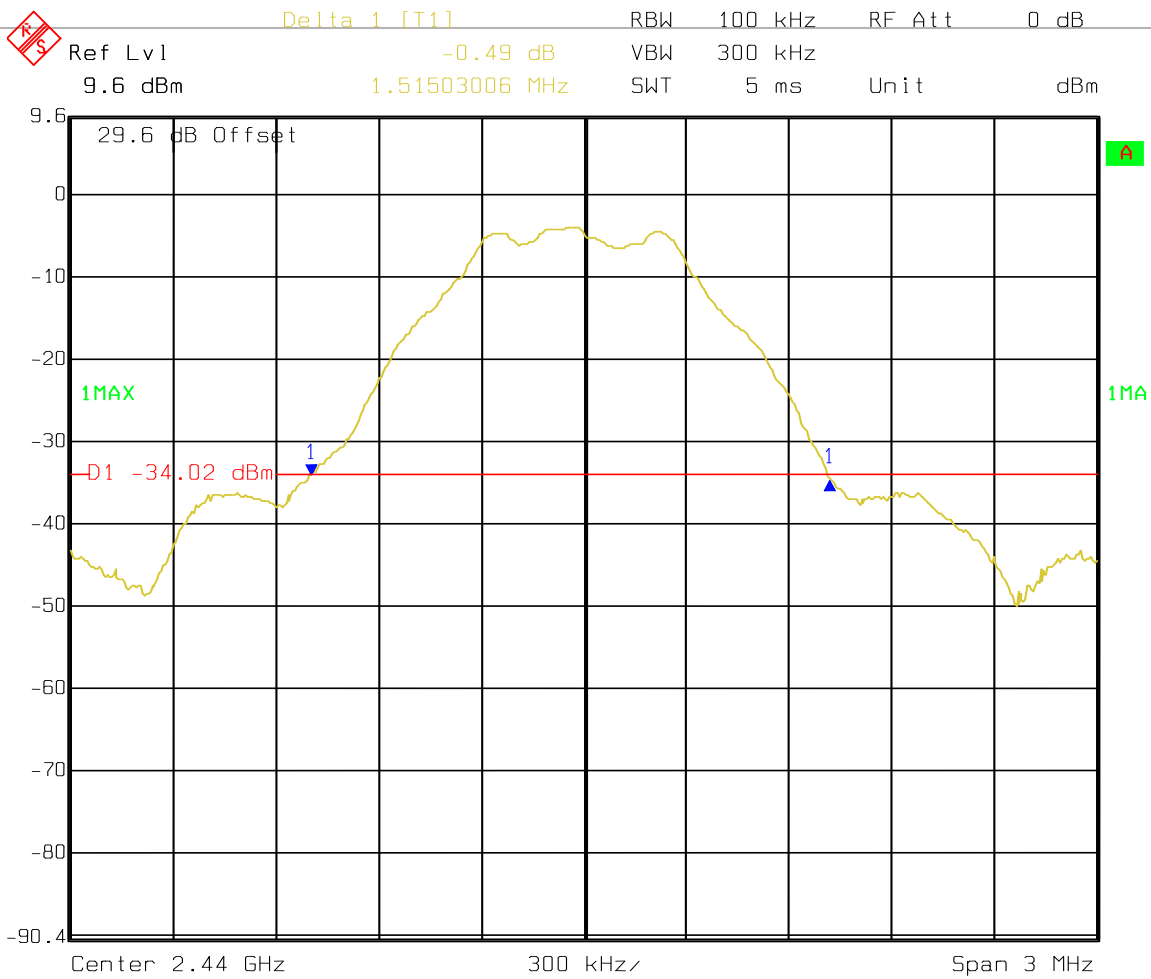
Low Channel (2402MHz) 20dB Occupied Bandwidth is 1.45 MHz



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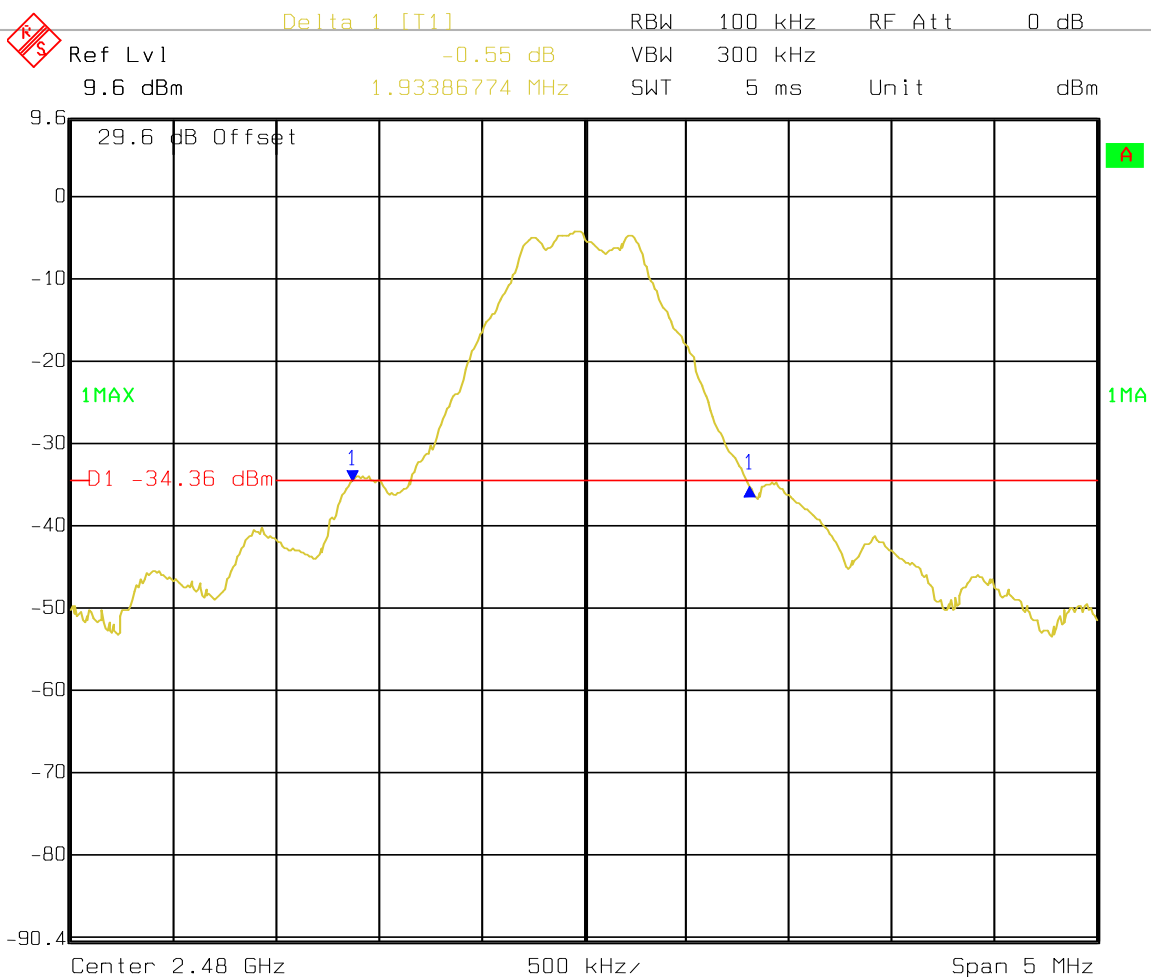
FCC ID: PH29006



Date: 12.MAR.2013 19:31:36

Mid Channel (2440 MHz) 20dB Occupied Bandwidth is 1.52 MHz

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Date: 12.MAR.2013 19:35:18

High Channel (2480 MHz) 20dB Occupied Bandwidth is 1.93 MHz

Section 15.249(a) – Field Strength of Emissions

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

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Test Conditions:

Sample Number:	MT22006	Temperature:	20°C
Date:	3/11/2013	Humidity:	42%
Modification State:	Low, Mid and High Channel	Tester:	Mark Phillips
		Laboratory:	10m Chamber

Test Results: See attached plots and table, EUT Complies

Additional Observations:

- The power supply was varied +/- 15% of nominal during assessment, no variance of output power was observed.
- All measurements were performed using a peak detector, Max Hold
- RBW is 1MHz while VBW is 3MHz.
- Spectrum was investigated up to 24.70GHz
- There are no emissions found after the second harmonic
- Average data are calculated from Peak measurements plus Duty Cycle Correction Factor (DCCF).
- There were no emissions found other than the fundamental and the second harmonic.
- All other emissions were found to be more than 20dB below the limit and have not been reported per FCC rule 15.31(o).

Sample Computation (Radiated Emissions Data Sheet):

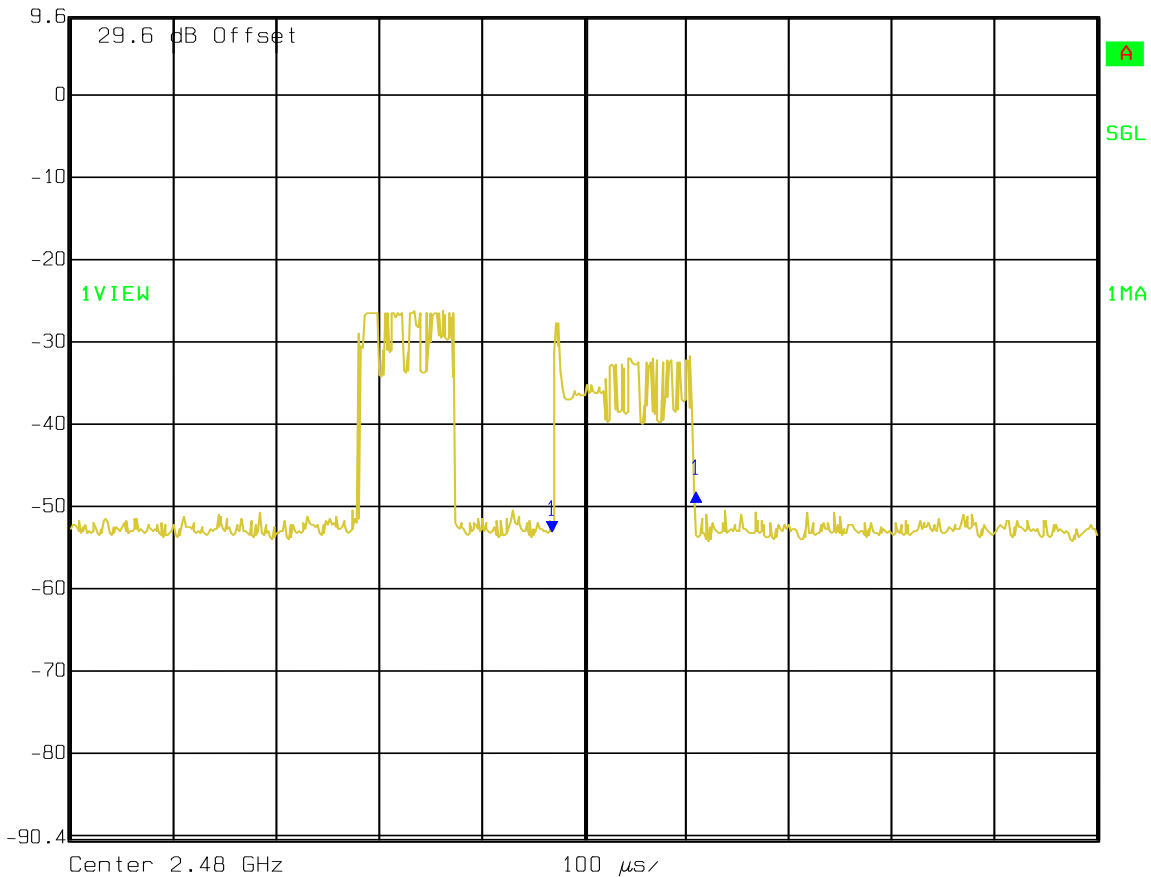
Correction factor @ 2402MHz = 37.4 dBµV/m
 = Antenna factor + Cable loss – Preamp gain = 28.5 + 8.9 – 0

Corrected reading = Max. reading + Correction factor
 = 60.3 + 37.4 = 97.7 dBµV/m Peak

Average = Peak + DCCF = 97.7 dBµV/m Peak -53.3 dB= 44.4 dBµV/m
 $10^{((44.4-120)/20)} = 0.000166 \text{ V/m}$

Duty Cycle Correction Factor Calculation

	Delta 1 [T1]	RBW	1 MHz	RF Att	0 dB
	Ref Lvl	4.81 dB	VBW	3 MHz	
	9.6 dBm	140.280561 μ s	SWT	1 ms	Unit dBm

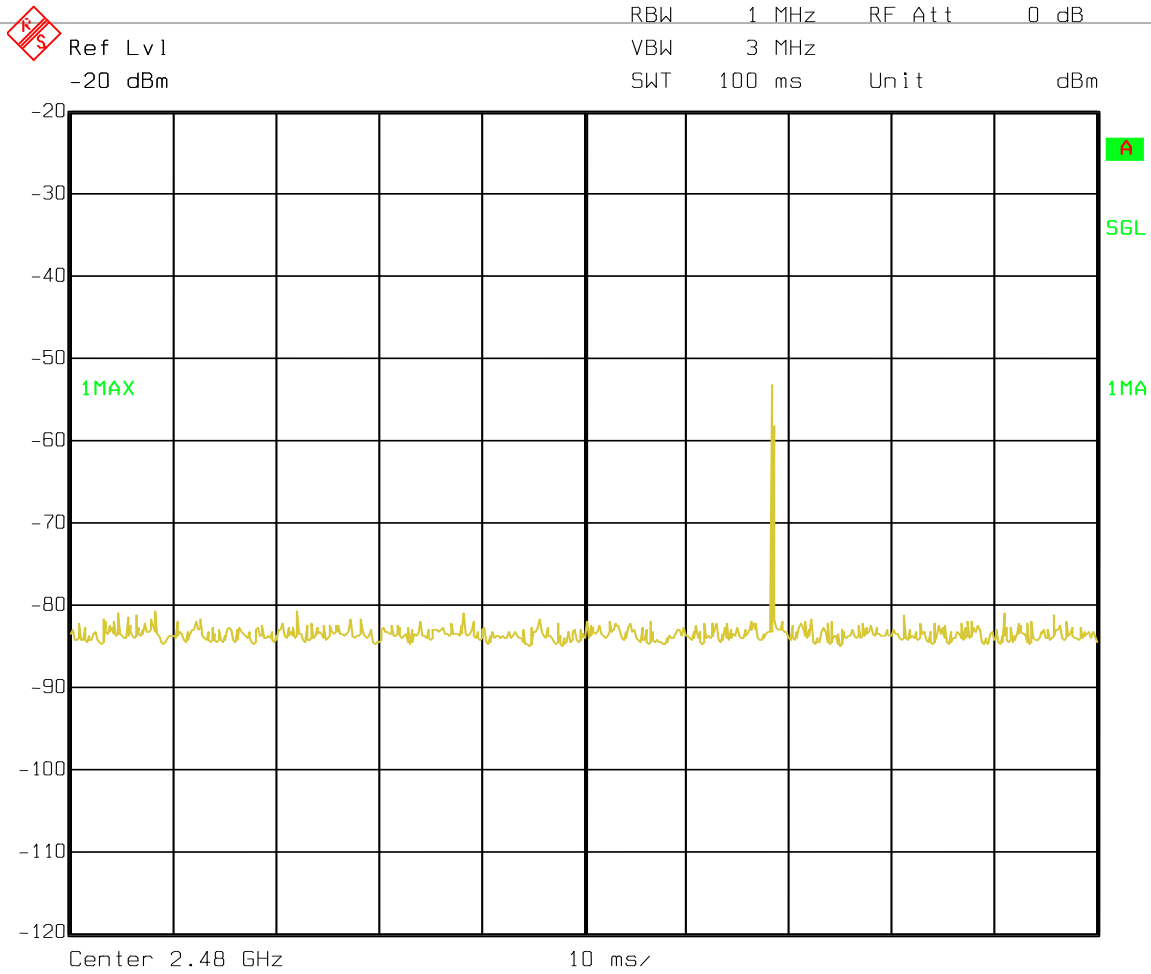


Date: 12.MAR.2013 19:18:39

Client claim:

The longest packet that the cradle can send is 27 bytes (216 bits). This is from the BTLE specification. The over the air transfer rate is 1Mbps (1 μ s / bit). This comes from the electrical specifications for the Nordic Semi nRF8001 chip, the RF chip we are using. Therefore, the worst case packet takes 216 μ s to transfer. Worst case transmit duty cycle is 216 μ s / 100mS = 0.216%

$$\begin{aligned} \text{DCCF} &= 20 \log (0.00216) \\ &= -53.3 \text{ dB} \end{aligned}$$



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Date: 11.APR.2013 21:36:01



Radiated Emissions Data

Job # :	10239153	Date :	3/11/2013	Page	1	of	1
NEX#:	232164	Time :	18:00				
		Staff :	MP				
Client Name :	Dexcom, Inc.	EUT Voltage :	120VAC				
EUT Name :	Dexcom Share Cradle	EUT Frequency :	60Hz				
EUT Model # :	MT22006	Phase:	1				
EUT Serial # :							
EUT Config. :	Transmitting						
Specification :	FCC Part 15 Subpart C, 15.249	Distance < 1000 MHz:	3 m				
Loop Ant. #:	133	Distance > 1000 MHz:	3 m				
Bicon Ant. #:	128						
Log Ant. #:	110_3m	Temp. (°C) :	20				
DRG Ant. #	529	Humidity (%) :	42				
Cable LF#:	SAC_10m	Spec Analyzer #:	911				
Cable HF#:	WCC	Analyzer Display #:	911				
Preamp LF#:	901	Quasi-Peak Detector #:	911				
Preamp HF#:	1029	Duty Cycle (%) :	0.216				

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average = Peak + Duty Cycle Factor	
DCF = 20 x log(duty cycle)	

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dBµV)	Corrected Reading (dBµV)	Spec. limit (dBµV)	CR/SL Diff. (dB)	Pass Fail	Comment
2402.000	60.3	51.7	P	164.0	100.0	60.3	97.7	114.0	-16.3	Pass	Low, Empty Cradle
2402.000	60.3	51.7	A	164.0	100.0	60.3	44.4	94.0	-49.6	Pass	
2402.000	59.7	52.0	P	162.0	117.0	59.7	97.1	114.0	-16.9	Pass	Receiver in Cradle
2402.000	59.7	52.0	A	162.0	117.0	59.7	43.8	94.0	-50.2	Pass	
2440.000	58.8	51.2	P	159.0	114.0	58.8	96.2	114.0	-17.8	Pass	Mid, Empty Cradle
2440.000	58.8	51.2	A	159.0	114.0	58.8	42.9	94.0	-51.1	Pass	
2440.000	58.3	49.2	P	132.0	100.0	58.3	95.7	114.0	-18.3	Pass	Receiver in Cradle
2440.000	58.3	49.2	A	132.0	100.0	58.3	42.4	94.0	-51.6	Pass	
2480.000	54.4	49.1	P	163.0	107.0	54.4	91.8	114.0	-22.2	Pass	High, Empty Cradle
2480.000	54.4	49.1	A	163.0	107.0	54.4	38.5	94.0	-55.5	Pass	
2480.000	53.5	50.3	P	125.0	112.0	53.5	90.9	114.0	-23.1	Pass	Receiver in Cradle
2480.000	53.5	50.3	A	125.0	112.0	53.5	37.6	94.0	-56.4	Pass	
4960.000	49.4	46.5	P	149.0	157.0	49.4	51.0	74.0	-23.0	Pass	2nd Harm Restricted
4960.000	39.9	37.7	A	149.0	157.0	39.9	-11.9	54.0	-65.9	Pass	
2400.000	24.1	14.4	P	133.0	100.0	24.1	61.5	74.0	-12.5	Pass	Lower Band Edge
2400.000	24.1	14.4	A	133.0	100.0	24.1	8.2	54.0	-45.8	Pass	
2483.500	16.0	13.9	P	147.0	100.0	16.0	53.4	74.0	-20.6	Pass	Upper Band Edge
2483.500	16.0	13.9	A	147.0	100.0	16.0	0.1	54.0	-53.9	Pass	

