NORTHWEST EMC

Boston Scientific Corporation

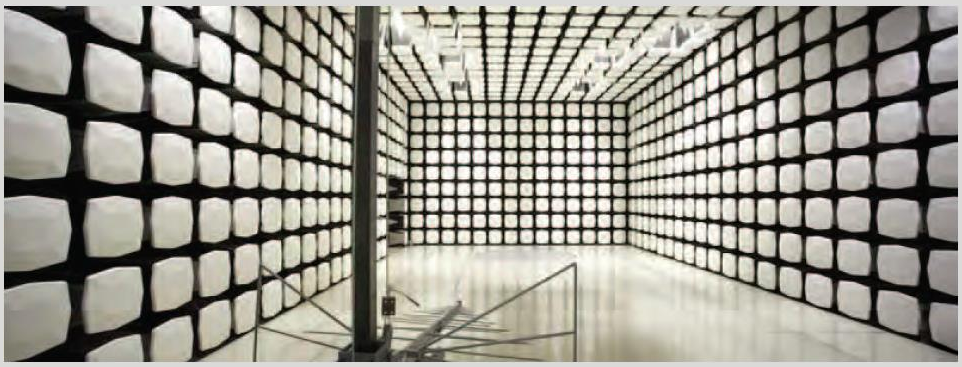
Model 3300

FCC 15.207:2016

FCC 15.209:2016

Inductive Radio

Report # BSTN0677



NVLAP TESTING

NVLAP Lab Code: 200881-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: October 13, 2016
Boston Scientific Corporation
Model: 3300

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2016	ANSI C63.10:2013
FCC 15.209:2016	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.4	Field Strength of Fundamental	Yes	Pass	
6.4, 6.5	Spurious Radiated Emissions	Yes	Pass	

Deviations from Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2016.7.25

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Validated by the European Commission as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

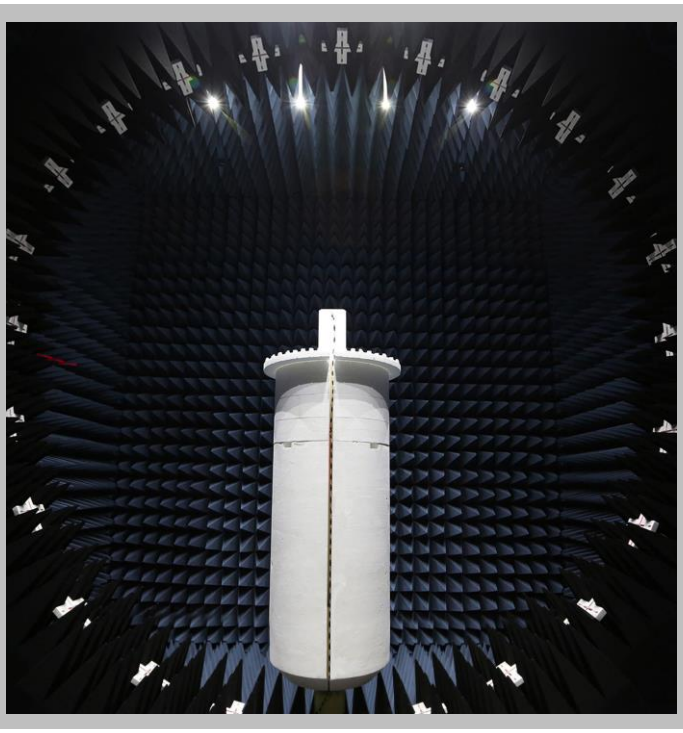
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

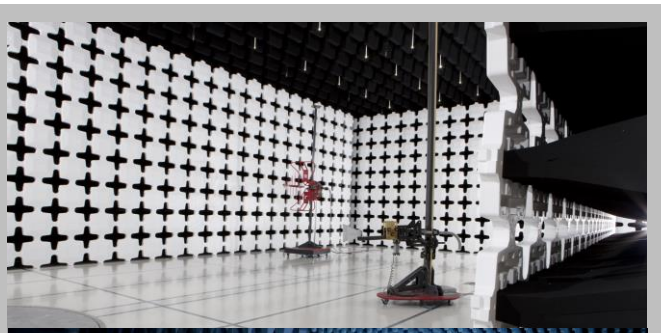
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

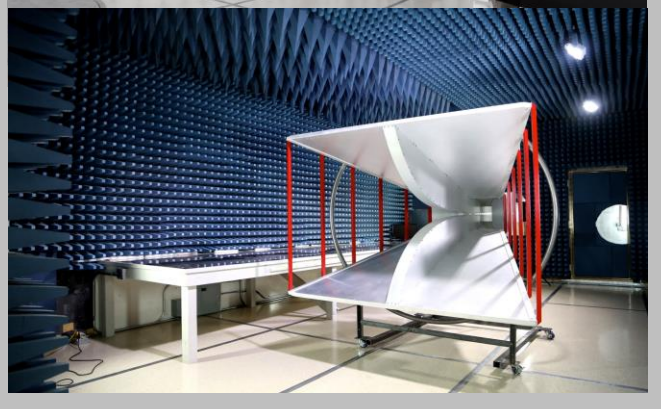
FACILITIES

NORTHWEST EMC
REV 2016.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157



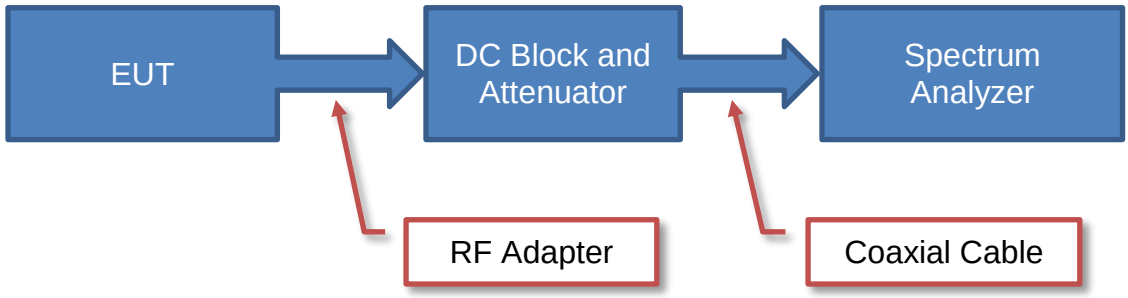




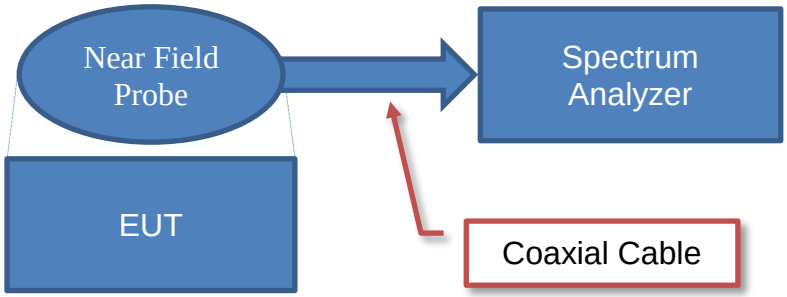
Test Setup Block Diagrams

NORTHWEST EMC
REV 2016.10.04

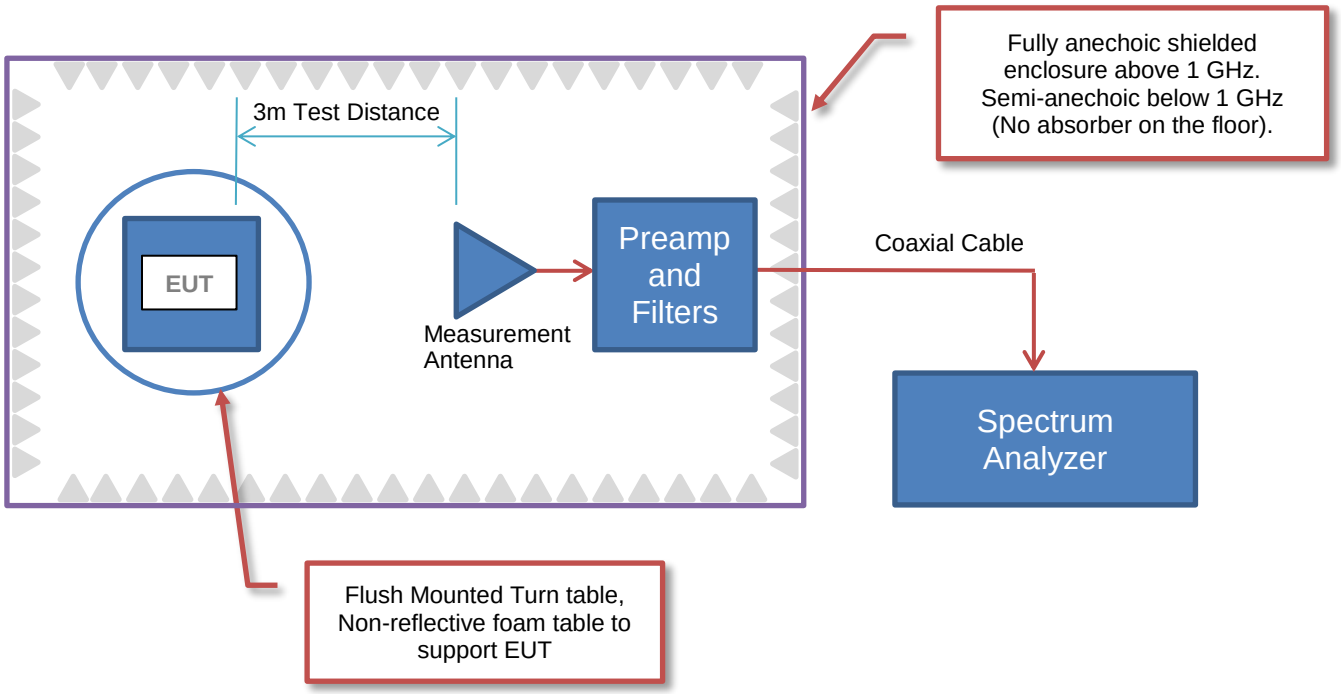
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Boston Scientific Corporation
Address:	4100 Hamline Avenue North
City, State, Zip:	St. Paul, MN 55112-5798
Test Requested By:	Pete Musto
Model:	Model 3300
First Date of Test:	October 12, 2016
Last Date of Test:	October 12, 2016
Receipt Date of Samples:	October 10, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The Boston Scientific Model 3300 Latitude Programmer (PRM) is a device that is used to interrogate and program Boston Scientific PGs and defibrillators. PG specific software applications are loaded into the PRM and communicate with the implanted device. The telemetry communications allow the physician the ability to program the PG or query the PG for historical data or operating parameters. The PRM allows other external instruments or equipment to be connected, including printers, network connections, external display monitors, USB data storage devices, and cellular adapters. The PRM also provides a Pacing Systems Analyzer for implant lead evaluation and diagnostics.

Testing Objective:
To demonstrate compliance of the inductive portion of the device to FCC Part 15.209 specifications for both Legacy and High Speed Versions.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration BSTN0677- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Inductive Telemetry Wand	Boston Scientific Corporation	6395	117

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Latitude Vision Programmer	Boston Scientific Corporation	3300	097
Latitude Vision Stand	Boston Scientific Corporation	6755	None
External Antenna	Boston Scientific Corporation	3203	None
USB Cellular Adapter	Boston Scientific Corporation	6295	085
AC/DC Adapter	GlobTek, Inc	GTM41133-9016-1.0-T3A	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable (Programmer)	No	1.8m	No	Latitude Vision Programmer	AC/DC Adapter
Inductive Telemetry Wand Cable	Yes	3m	No	Latitude Vision Programmer	Unterminated
ECG Cable	Yes	3.5m	No	Latitude Vision Programmer	Unterminated
Non Disposable PSA x2	Yes	2.5m	Yes	Latitude Vision Programmer	Unterminated
USB Cable	Yes	15 cm	Yes	Latitude Vision Programmer	USB Cellular Adapter
USB Cable (x2)	Yes	2m	Yes	Latitude Vision Programmer	Unterminated
AC Cable (DC Power Supply)	No	1.8m	No	AC/DC Adapter	AC Mains
2.3/1.0 External Ant Cable	Yes	3m	No	Latitude Vision Programmer	External Antenna
Ethernet Cable	No	1.5m	No	Latitude Vision Programmer	Unterminated
DisplayPort Cable (Unterminated)	Yes	1.9m	Yes	Latitude Vision Programmer	Unterminated

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/12/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	10/12/2016	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	10/12/2016	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

WTD.2016.05.18

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically, those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	6/14/2016	6/14/2017
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK	MNCA	1/29/2016	1/29/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/21/2016	3/21/2017

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

BSTN0677-1

MODES INVESTIGATED

Mode 10.
Mode 11.

POWERLINE CONDUCTED EMISSIONS

EUT:	Model 3300	Work Order:	BSTN0677
Serial Number:	SN 097	Date:	10/12/2016
Customer:	Boston Scientific Corporation	Temperature:	22.5°C
Attendees:	Larry Canady	Relative Humidity:	38.5%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	BSTN0677-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	1	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Legacy inductive transmit. Transmit frequency is 75kHz, data taken represents worst case emissions generated by transmitter.

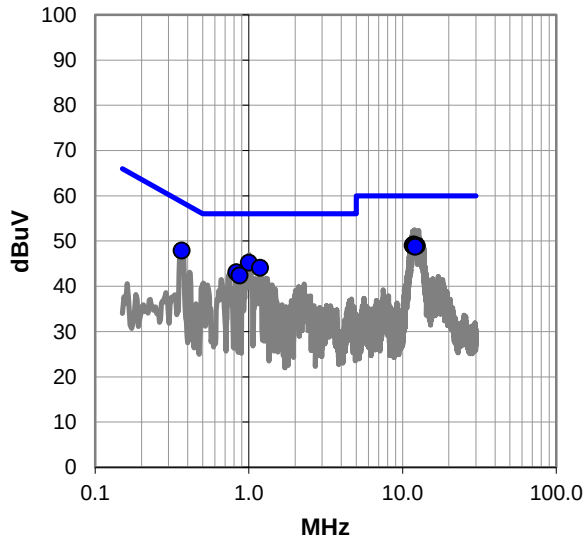
EUT OPERATING MODES

Mode 11.

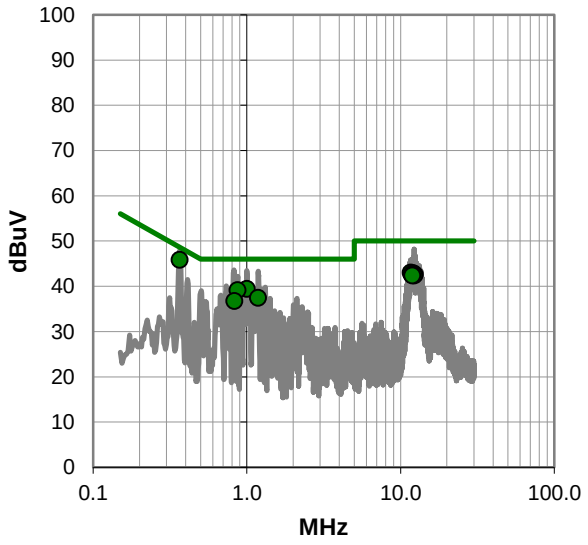
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #1

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.365	27.7	20.2	47.9	58.6	-10.7
1.003	25.1	20.1	45.2	56.0	-10.8
11.794	28.4	20.8	49.2	60.0	-10.8
11.647	28.3	20.7	49.0	60.0	-11.0
12.274	28.1	20.8	48.9	60.0	-11.1
12.405	28.1	20.8	48.9	60.0	-11.1
11.949	28.0	20.8	48.8	60.0	-11.2
12.098	27.9	20.8	48.7	60.0	-11.3
1.184	24.0	20.1	44.1	56.0	-11.9
0.830	23.0	20.1	43.1	56.0	-12.9
0.871	22.3	20.1	42.4	56.0	-13.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.365	25.6	20.2	45.8	48.6	-2.8
1.003	19.3	20.1	39.4	46.0	-6.6
0.871	19.0	20.1	39.1	46.0	-6.9
11.647	22.3	20.7	43.0	50.0	-7.0
12.098	22.1	20.8	42.9	50.0	-7.1
12.405	21.8	20.8	42.6	50.0	-7.4
11.794	21.8	20.8	42.6	50.0	-7.4
12.274	21.6	20.8	42.4	50.0	-7.6
11.949	21.6	20.8	42.4	50.0	-7.6
1.184	17.3	20.1	37.4	46.0	-8.6
0.830	16.6	20.1	36.7	46.0	-9.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

EUT:	Model 3300	Work Order:	BSTN0677
Serial Number:	SN 097	Date:	10/12/2016
Customer:	Boston Scientific Corporation	Temperature:	22.5°C
Attendees:	Larry Canady	Relative Humidity:	38.5%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	BSTN0677-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Legacy inductive transmit. Transmit frequency is 75kHz, data taken represents worst case emissions generated by transmitter.

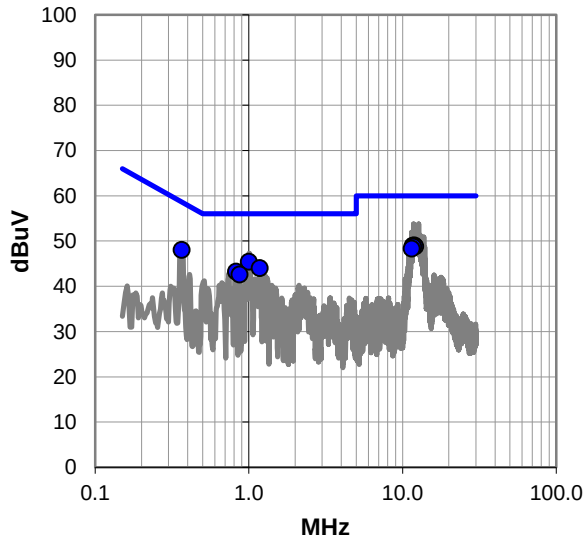
EUT OPERATING MODES

Mode 11.

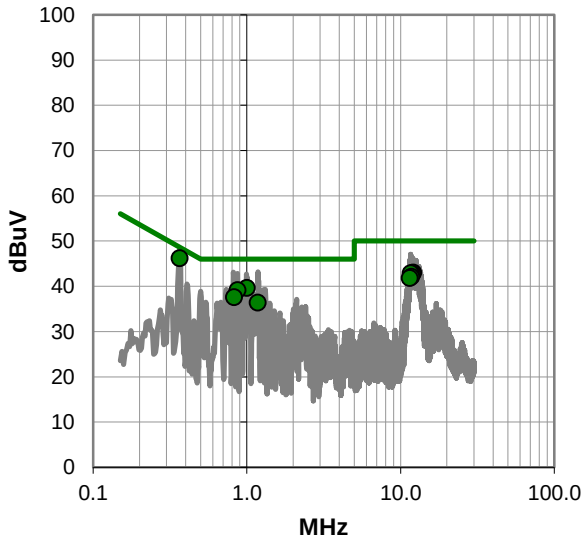
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.365	27.8	20.2	48.0	58.6	-10.6
1.002	25.3	20.1	45.4	56.0	-10.6
11.942	28.2	20.8	49.0	60.0	-11.0
11.639	28.2	20.7	48.9	60.0	-11.1
12.094	28.0	20.8	48.8	60.0	-11.2
11.773	27.9	20.8	48.7	60.0	-11.3
11.509	27.6	20.7	48.3	60.0	-11.7
1.181	23.9	20.1	44.0	56.0	-12.0
0.828	23.1	20.1	43.2	56.0	-12.8
0.870	22.5	20.1	42.6	56.0	-13.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.365	26.0	20.2	46.2	48.6	-2.4
1.002	19.5	20.1	39.6	46.0	-6.4
0.870	19.0	20.1	39.1	46.0	-6.9
12.094	22.2	20.8	43.0	50.0	-7.0
11.942	22.1	20.8	42.9	50.0	-7.1
11.639	22.2	20.7	42.9	50.0	-7.1
11.773	21.3	20.8	42.1	50.0	-7.9
11.509	21.1	20.7	41.8	50.0	-8.2
0.828	17.5	20.1	37.6	46.0	-8.4
1.181	16.3	20.1	36.4	46.0	-9.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

EUT:	Model 3300	Work Order:	BSTN0677
Serial Number:	SN 097	Date:	10/12/2016
Customer:	Boston Scientific Corporation	Temperature:	22.5°C
Attendees:	Larry Canady	Relative Humidity:	38.5%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	BSTN0677-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

High speed inductive transmit. Transmit frequency is 60kHz, data taken represents worst case emissions generated by transmitter.

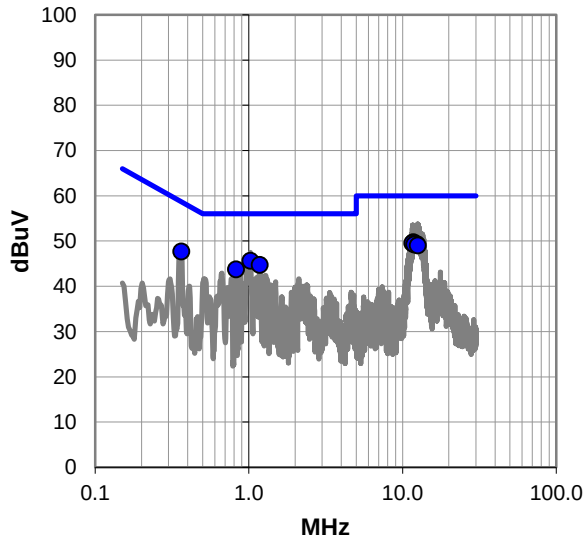
EUT OPERATING MODES

Mode 10.

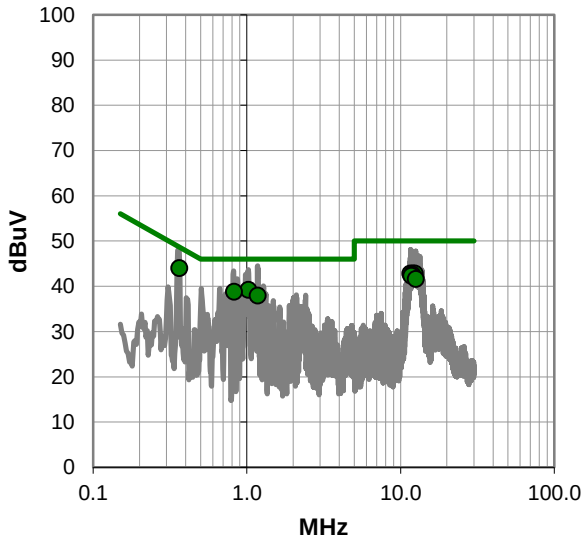
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.746	28.9	20.8	49.7	60.0	-10.3
1.024	25.5	20.1	45.6	56.0	-10.4
11.621	28.8	20.7	49.5	60.0	-10.5
12.061	28.5	20.8	49.3	60.0	-10.7
12.374	28.5	20.8	49.3	60.0	-10.7
11.939	28.4	20.8	49.2	60.0	-10.8
0.364	27.5	20.2	47.7	58.6	-10.9
12.569	28.1	20.9	49.0	60.0	-11.0
1.176	24.6	20.1	44.7	56.0	-11.3
0.825	23.6	20.1	43.7	56.0	-12.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.364	23.8	20.2	44.0	48.6	-4.6
1.024	19.1	20.1	39.2	46.0	-6.8
11.621	22.1	20.7	42.8	50.0	-7.2
0.825	18.7	20.1	38.8	46.0	-7.2
12.061	22.0	20.8	42.8	50.0	-7.2
12.374	22.0	20.8	42.8	50.0	-7.2
11.939	21.8	20.8	42.6	50.0	-7.4
11.746	21.5	20.8	42.3	50.0	-7.7
1.176	17.8	20.1	37.9	46.0	-8.1
12.569	20.7	20.9	41.6	50.0	-8.4

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

EUT:	Model 3300	Work Order:	BSTN0677
Serial Number:	SN 097	Date:	10/12/2016
Customer:	Boston Scientific Corporation	Temperature:	22.5°C
Attendees:	Larry Canady	Relative Humidity:	38.5%
Customer Project:	None	Bar. Pressure:	1024 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	BSTN0677-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

High speed inductive transmit. Transmit frequency is 60kHz, data taken represents worst case emissions generated by transmitter.

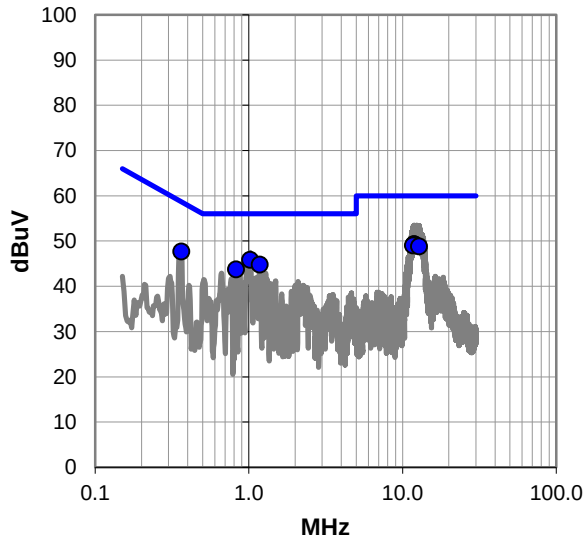
EUT OPERATING MODES

Mode 10.

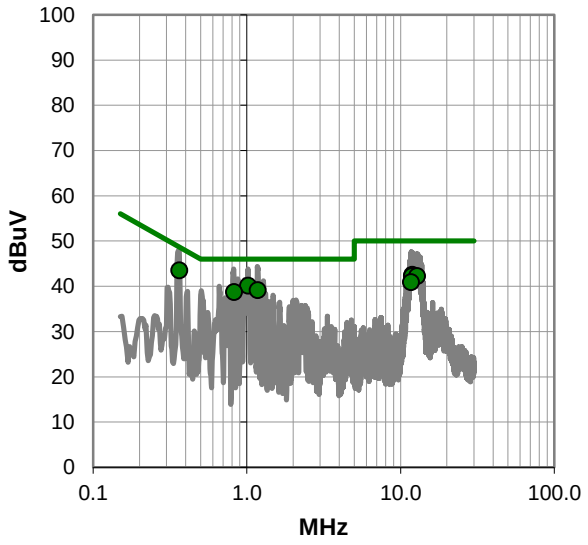
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.022	25.7	20.1	45.8	56.0	-10.2
11.889	28.5	20.8	49.3	60.0	-10.7
11.938	28.4	20.8	49.2	60.0	-10.8
0.364	27.5	20.2	47.7	58.6	-10.9
11.714	28.2	20.8	49.0	60.0	-11.0
1.176	24.7	20.1	44.8	56.0	-11.2
12.810	27.9	20.9	48.8	60.0	-11.2
0.824	23.6	20.1	43.7	56.0	-12.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.364	23.3	20.2	43.5	48.6	-5.1
1.022	20.0	20.1	40.1	46.0	-5.9
1.176	19.0	20.1	39.1	46.0	-6.9
0.824	18.6	20.1	38.7	46.0	-7.3
11.938	21.7	20.8	42.5	50.0	-7.5
11.889	21.4	20.8	42.2	50.0	-7.8
12.810	21.3	20.9	42.2	50.0	-7.8
11.714	20.1	20.8	40.9	50.0	-9.1

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

PSA-ESCI 2016.07.22

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting high speed inductive (mode 10) at 60kHz and legacy inductive (mode 11) at 75kHz.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

BSTN0677 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	30 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Cable	ESM Cable Corp.	MN04 Horn Cables	MNE	2/26/2016	12 mo
Antenna	ETS Lindgren	6502	AOB	4/28/2015	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	6/17/2016	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

Per ANSI C63.10 sections 6.4.4.1 and 6.4.4.2, the emissions from the EUT were maximized by rotating the EUT on the turntable. Also, the EUT and/or associated antenna was positioned in 3 orthogonal planes. A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity per section 4.5.1. The center of the loop antenna was maintained at 1m above the ground plane during the testing.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

If there are no detectable emissions above the noise floor, the data included will show noise floor measurements for reference only.

FIELD STRENGTH OF FUNDAMENTAL

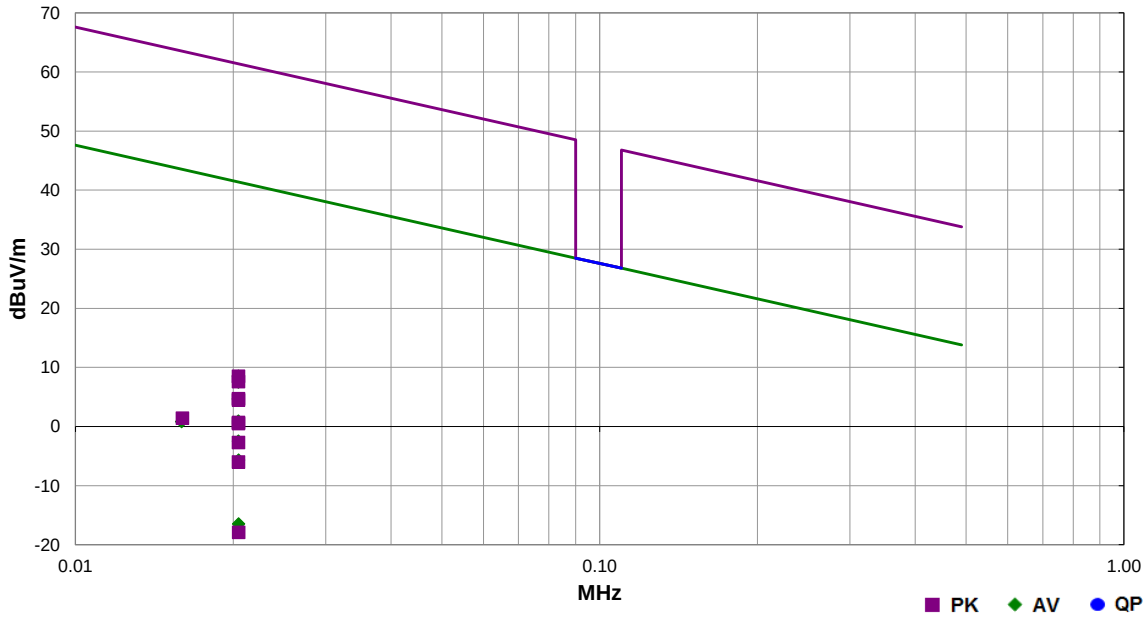
NORTHWEST EMC

PSA-ESCI 2016.07.22
EmiR5 2016.08.26

Work Order:	BSTN0677	**Date:**	10/12/16	Trevor Buls	
Project:	None	**Temperature:**	21.8 °C		
Job Site:	MN04	**Humidity:**	42.2% RH		
Serial Number:	SN 097	**Barometric Pres.:**	1023 mbar	**Tested by:**	Trevor Buls, Dustin Sparks, Kyle McMullan
EUT:	Model 3300				
Configuration:	1				
Customer:	Boston Scientific Corporation				
Attendees:	Larry Canady				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting high speed inductive (mode 10) at 60kHz and legacy inductive (mode 11) at 75kHz.				
Deviations:	None				
Comments:	Data taken represents worst case emissions generated by transmitter. See Appendix A for further description.				

Test Specifications	**Test Method**
FCC 15.209:2016	ANSI C63.10:2013

Run #	28	**Test Distance (m)**	3	**Antenna Height(s)**	1(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.020	73.7	14.8	1.0	10.0	3.0	0.0	Par to EUT	AV	-80.0	8.5	41.4	-32.9	EUT On Side, mode 10
0.020	72.7	14.8	1.0	13.0	3.0	0.0	Par to EUT	AV	-80.0	7.5	41.4	-33.9	EUT Vert, mode 10
0.020	69.9	14.8	1.0	85.0	3.0	0.0	Perp to Gnd	AV	-80.0	4.7	41.4	-36.7	EUT On Side, mode 10
0.020	69.8	14.8	1.0	289.0	3.0	0.0	Perp to Gnd	AV	-80.0	4.6	41.4	-36.8	EUT Vert, mode 10
0.020	66.1	14.8	1.0	13.0	3.0	0.0	Par to Gnd	AV	-80.0	0.9	41.4	-40.5	EUT On Side, mode 10
0.020	65.8	14.8	1.0	209.0	3.0	0.0	Par to Gnd	AV	-80.0	0.6	41.4	-40.8	EUT Vert, mode 10
0.016	64.3	16.5	1.0	32.0	3.0	0.0	Par to EUT	AV	-80.0	0.8	43.5	-42.7	EUT On Side, mode 11
0.020	62.7	14.8	1.0	41.0	3.0	0.0	Par to Gnd	AV	-80.0	-2.5	41.4	-43.9	EUT Horz, mode 10
0.020	59.5	14.8	1.0	139.0	3.0	0.0	Par to EUT	AV	-80.0	-5.7	41.4	-47.1	EUT Horz, mode 10
0.020	73.7	14.8	1.0	10.0	3.0	0.0	Par to EUT	PK	-80.0	8.5	61.4	-52.9	EUT On Side, mode 10
0.020	72.8	14.8	1.0	13.0	3.0	0.0	Par to EUT	PK	-80.0	7.6	61.4	-53.8	EUT Vert, mode 10
0.020	69.9	14.8	1.0	85.0	3.0	0.0	Perp to Gnd	PK	-80.0	4.7	61.4	-56.7	EUT On Side, mode 10
0.020	69.7	14.8	1.0	289.0	3.0	0.0	Perp to Gnd	PK	-80.0	4.5	61.4	-56.9	EUT Vert, mode 10
0.020	48.7	14.8	1.0	256.0	3.0	0.0	Perp to Gnd	AV	-80.0	-16.5	41.4	-57.9	EUT Horz, mode 10
0.020	65.9	14.8	1.0	13.0	3.0	0.0	Par to Gnd	PK	-80.0	0.7	61.4	-60.7	EUT On Side, mode 10
0.020	65.7	14.8	1.0	209.0	3.0	0.0	Par to Gnd	PK	-80.0	0.5	61.4	-60.9	EUT Vert, mode 10
0.016	64.9	16.5	1.0	32.0	3.0	0.0	Par to EUT	PK	-80.0	1.4	63.5	-62.1	EUT On Side, mode 11
0.020	62.5	14.8	1.0	41.0	3.0	0.0	Par to Gnd	PK	-80.0	-2.7	61.4	-64.1	EUT Horz, mode 10
0.020	59.2	14.8	1.0	139.0	3.0	0.0	Par to EUT	PK	-80.0	-6.0	61.4	-67.4	EUT Horz, mode 10
0.020	47.3	14.8	1.0	256.0	3.0	0.0	Perp to Gnd	PK	-80.0	-17.9	61.4	-79.3	EUT Horz, mode 10

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Mode 10 or mode 11.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

BSTN0677 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	9 kHz	Stop Frequency	30 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna	ETS Lindgren	6502	AOB	4/28/2015	24 mo
Cable	ESM Cable Corp.	MN04 Horn Cables	MNE	2/26/2016	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	6/17/2016	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The center of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.4, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

SPURIOUS RADIATED EMISSIONS

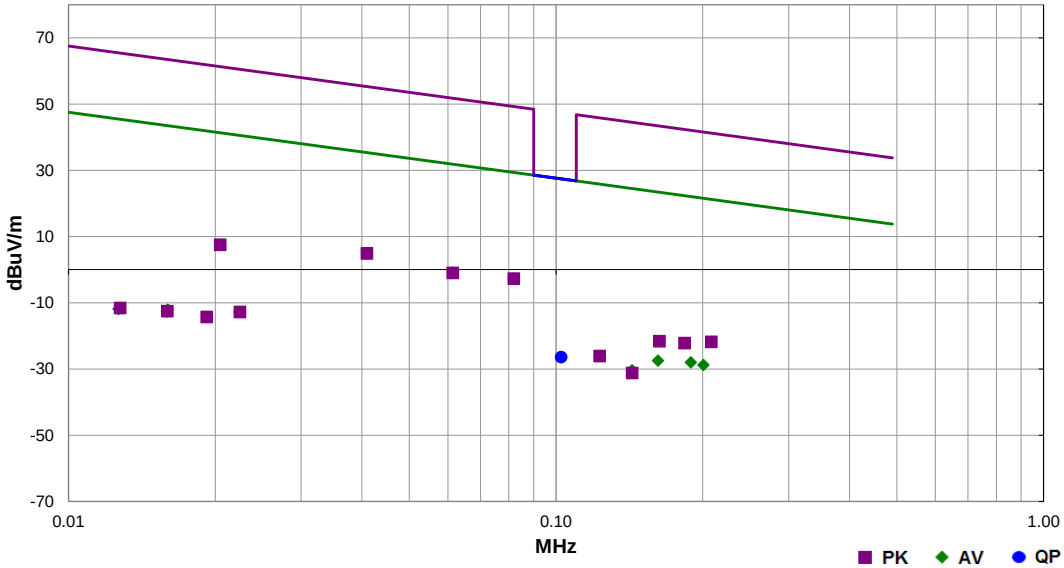
NORTHWEST EMC

PSA-ESCI 2016.07.22
EmiR5 2016.08.26

Work Order:	BSTN0677	**Date:**	10/12/16	Trevor Buls	
Project:	None	**Temperature:**	21.8 °C		
Job Site:	MN04	**Humidity:**	42.2% RH		
Serial Number:	SN 097	**Barometric Pres.:**	1023 mbar	**Tested by:**	Trevor Buls, Dustin Sparks, Kyle McMullan
EUT:	Model 3300				
Configuration:	1				
Customer:	Boston Scientific Corporation				
Attendees:	Larry Canady				
EUT Power:	110VAC/60Hz				
Operating Mode:	Mode 10 or mode 11.				
Deviations:	None				
Comments:	High speed inductive transmit, legacy inductive transmit. Transmit frequency is 60kHz and 75kHz respectively, data taken represents worst case emissions generated by transmitter. See Appendix A for further description.				

Test Specifications	**Test Method**
FCC 15.209:2016	ANSI C63.10:2013

Run #	30	**Test Distance (m)**	3	**Antenna Height(s)**	1(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.041	71.8	13.1	1.0	19.0	3.0	0.0	Par to EUT	AV	-80.0	4.9	35.3	-30.4	EUT On Side, mode 10
0.082	65.3	12.0	1.0	15.0	3.0	0.0	Par to EUT	AV	-80.0	-2.7	29.3	-32.0	EUT On Side, mode 10
0.061	66.8	12.3	1.0	20.0	3.0	0.0	Par to EUT	AV	-80.0	-0.9	31.8	-32.7	EUT On Side, mode 10
0.020	72.7	14.8	1.0	26.0	3.0	0.0	Par to EUT	AV	-80.0	7.5	41.4	-33.9	EUT On Side, mode 10
0.189	40.5	11.5	1.0	343.0	3.0	0.0	Par to EUT	AV	-80.0	-28.0	22.1	-50.1	EUT On Side, mode 10
0.041	71.8	13.1	1.0	19.0	3.0	0.0	Par to EUT	PK	-80.0	4.9	55.3	-50.4	EUT On Side, mode 10
0.201	39.7	11.5	1.0	120.0	3.0	0.0	Par to EUT	AV	-80.0	-28.8	21.6	-50.4	EUT On Side, mode 10
0.162	41.0	11.5	1.0	50.0	3.0	0.0	Par to EUT	AV	-80.0	-27.5	23.4	-50.9	EUT On Side, mode 10
0.123	42.3	11.6	1.0	24.0	3.0	0.0	Par to EUT	AV	-80.0	-26.1	25.8	-51.9	EUT On Side, mode 10
0.082	65.3	12.0	1.0	15.0	3.0	0.0	Par to EUT	PK	-80.0	-2.7	49.3	-52.0	EUT On Side, mode 10
0.061	66.7	12.3	1.0	20.0	3.0	0.0	Par to EUT	PK	-80.0	-1.0	51.8	-52.8	EUT On Side, mode 10
0.022	52.5	14.7	1.0	88.0	3.0	0.0	Par to EUT	AV	-80.0	-12.8	40.6	-53.4	EUT On Side, mode 11
0.102	42.0	11.6	1.0	26.0	3.0	0.0	Par to EUT	QP	-80.0	-26.4	27.4	-53.8	EUT On Side, mode 10
0.020	72.7	14.8	1.0	26.0	3.0	0.0	Par to EUT	PK	-80.0	7.5	61.4	-53.9	EUT On Side, mode 10
0.143	38.0	11.6	1.0	158.0	3.0	0.0	Par to EUT	AV	-80.0	-30.4	24.5	-54.9	EUT On Side, mode 10
0.016	51.4	16.5	1.0	104.0	3.0	0.0	Par to EUT	AV	-80.0	-12.1	43.5	-55.6	EUT On Side, mode 11
0.016	50.8	16.5	1.0	8.0	3.0	0.0	Par to EUT	AV	-80.0	-12.7	43.5	-56.2	EUT On Side, mode 11
0.013	50.2	17.9	1.0	73.0	3.0	0.0	Par to EUT	AV	-80.0	-11.9	45.5	-57.4	EUT On Side, mode 11
0.208	46.7	11.5	1.0	120.0	3.0	0.0	Par to EUT	PK	-80.0	-21.8	41.2	-63.0	EUT On Side, mode 10
0.184	46.3	11.5	1.0	343.0	3.0	0.0	Par to EUT	PK	-80.0	-22.2	42.3	-64.5	EUT On Side, mode 10
0.163	46.9	11.5	1.0	50.0	3.0	0.0	Par to EUT	PK	-80.0	-21.6	43.4	-65.0	EUT On Side, mode 10
0.123	42.3	11.6	1.0	24.0	3.0	0.0	Par to EUT	PK	-80.0	-26.1	45.8	-71.9	EUT On Side, mode 10
0.022	52.5	14.7	1.0	88.0	3.0	0.0	Par to EUT	PK	-80.0	-12.8	60.6	-73.4	EUT On Side, mode 11
0.143	37.2	11.6	1.0	158.0	3.0	0.0	Par to EUT	PK	-80.0	-31.2	44.5	-75.7	EUT On Side, mode 10
0.016	51.0	16.5	1.0	104.0	3.0	0.0	Par to EUT	PK	-80.0	-12.5	63.5	-76.0	EUT On Side, mode 11
0.019	50.6	15.1	1.0	8.0	3.0	0.0	Par to EUT	PK	-80.0	-14.3	61.9	-76.2	EUT On Side, mode 11
0.013	50.6	17.8	1.0	73.0	3.0	0.0	Par to EUT	PK	-80.0	-11.6	65.5	-77.1	EUT On Side, mode 11

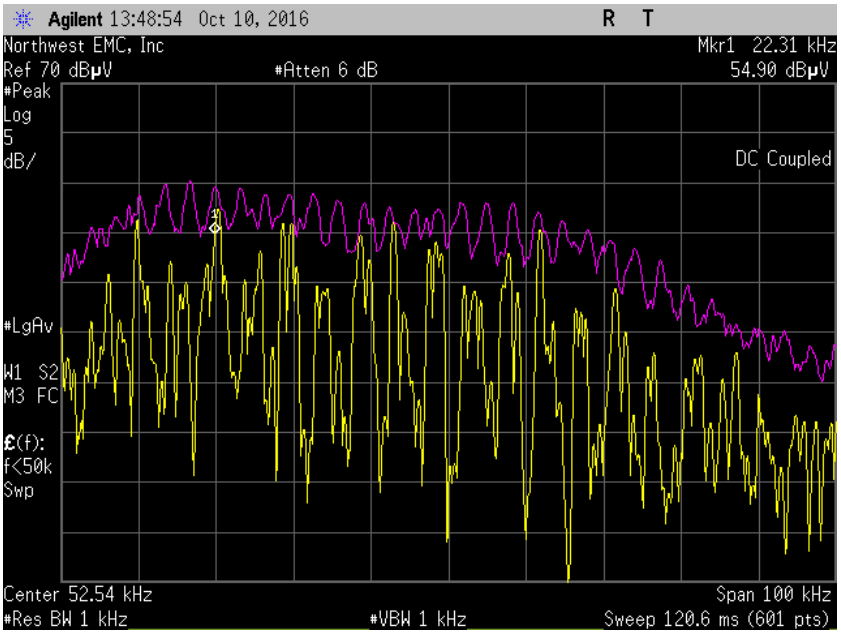
NORTHWEST EMC

APPENDIX A

BSTN0677 Support Information

Transmitter frequency information

Boston Scientific identifies the modes tested as High Speed Inductive (Mode 10) operating at 60 kHz and Legacy Inductive (Mode 11) operating at 75 kHz. The true transmission of both modes is over 100 kHz wide as shown in this screen capture.



For determining the maximum signals for final measurements, a pre-scan of the entire range was made and the highest point in the band from 9 kHz to 100 kHz was taken as the Fundamental signal. The same approach was made for harmonics, taking the highest points within a span.

Here is a sample evaluation pre-scan taken in peak mode showing the range from 9 kHz to 1 MHz.