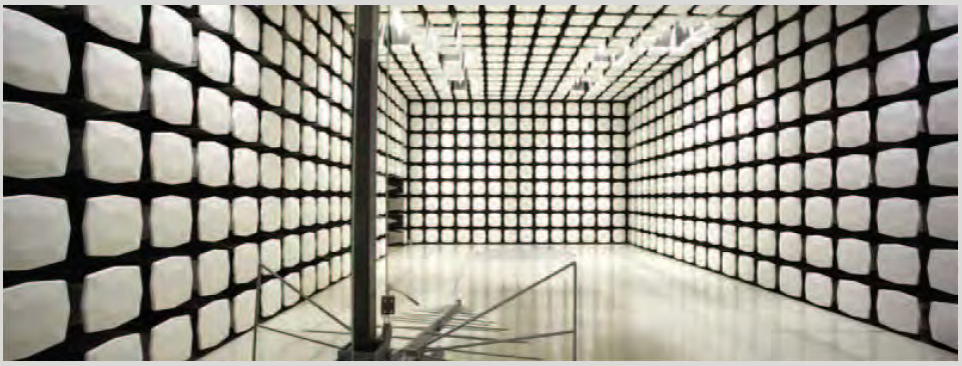
Supra, A Division of UTCFS

TRAC-Lid BT SMART

FCC 15.247:2013

Bluetooth LE portion of the radio

Report #: SUPR0114.1



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

WTD 12.5.23

Last Date of Test: March 01, 2014
Supra, A Division of UTCFS
Model: TRAC-Lid BT SMART

Emissions

Test Description	Specification	Test Method	Pass/Fail
Output Power	FCC 15.247:2014	ANSI C63.10:2009	Pass
Occupied Bandwidth	FCC 15.247:2014	ANSI C63.10:2009	Pass
Power Spectral Density	FCC 15.247:2014	ANSI C63.10:2009	Pass
Spurious Conducted Emissions	FCC 15.247:2014	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2014	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2014	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

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. This Report may only be duplicated in its entirety. 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.

REVISION HISTORY

REV 2012.08.02

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

NORTHWEST EMC

REV 2012.05.24

ACCREDITATIONS AND AUTHORIZATIONS

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 Guide 65 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

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and 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

KCC / 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.

Hong Kong

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

Vietnam

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

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards.

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

MEASUREMENT UNCERTAINTY

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 16-4-1 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.

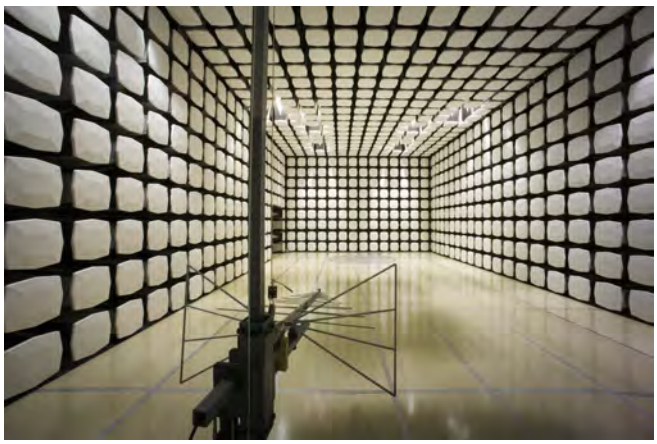
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70	-2.70

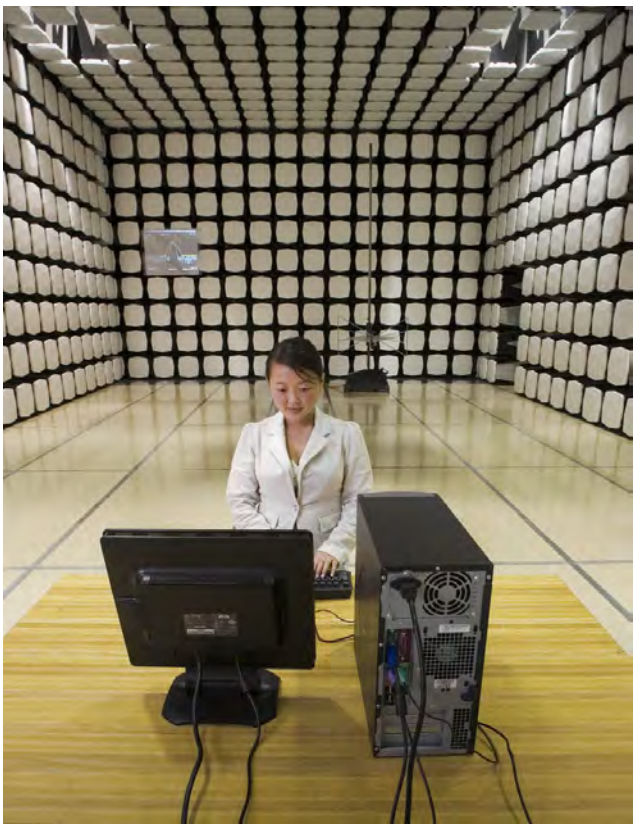
NORTHWEST EMC

REV 2013.06.28

FACILITIES

Oregon	California	New York	Minnesota	Washington
Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Supra, A Division of UTCFS
Address:	4001 Fairview Industrial Drive SE
City, State, Zip:	Salem, OR 97302-0167
Test Requested By:	Dean Sinn
Model:	TRAC-Lid BT SMART
First Date of Test:	February 24, 2014
Last Date of Test:	March 01, 2014
Receipt Date of Samples:	February 17, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Bluetooth 4.0 radio.

Testing Objective:
To demonstrate compliance of the Bluetooth LE portion of the radio to FCC 15.247 requirements.

CONFIGURATIONS

Configuration SUPR0114- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ASSY, TRAC-Lid BT SMART	Supra	TRAC-Lid BT SMART	0019

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Battery for PCA (1Batt)	Varta	Varta CR2/3AH	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter	LEI	410905OO3CT	None
AC/DC Power Adapter	Dell	AA22850	CN-0T2357-16291-44L-046F
Laptop	Dell	Latitude E6410	7V0DTM1
Mouse	Lenovo	M-U0025-O	HS421HD16E1
Programming Station	Supra	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1m	No	AC Main	AC/DC adapter
DC Power Cable	PA	1.5m	PA	AC/DC adapter	Laptop
Mouse USB cable	PA	1.6m	PA	Mouse	Laptop
Serial to USB	Yes	1m	No	Programming Station	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Configuration SUPR0114- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ASSY, TRAC-Lid BT SMART	Supra	TRAC-Lid BT SMART	41007123

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Adapter	LEI	410905OO3CT	None
AC/DC Power Adapter	Dell	AA22850	CN-0T2357-16291-44L-046F
Laptop	Dell	Latitude E6410	7V0DTM1
Mouse	Lenovo	M-U0025-O	HS421HD16E1
Programming Station	Supra	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1m	No	AC Main	AC/DC adapter
DC Power Cable	PA	1.5m	PA	AC/DC adapter	Laptop
Mouse USB cable	PA	1.6m	PA	Mouse	Laptop
Serial to USB	Yes	1m	No	Programming Station	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2/24/2014	Band Edge Compliance	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	2/24/2014	Occupied Bandwidth	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	2/24/2014	Output Power	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.
4	2/24/2014	Power Spectral Density	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.
5	2/24/2014	Spurious 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.
6	3/1/2014	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

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.

TEST DESCRIPTION

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

OUTPUT POWER

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Method Option 1 found in KDB 558074 DTS D01 Measurement Section 8.1.1 was used because the RBW on the analyzer was greater than the Emission Bandwidth of the radio.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

EUT:	TRAC-Lid BT SMART			**Work Order:**	SUPR0114
Serial Number:	0019			**Date:**	02/24/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	21.1°C
Attendees:	None			**Humidity:**	32%
Project:	TRAC			**Barometric Pres.:**	1015
Tested by:	Jared Ison, Brandon Hobbs	**Power:**	Internal Battery, 3VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

Mode of operation tested were client provided.

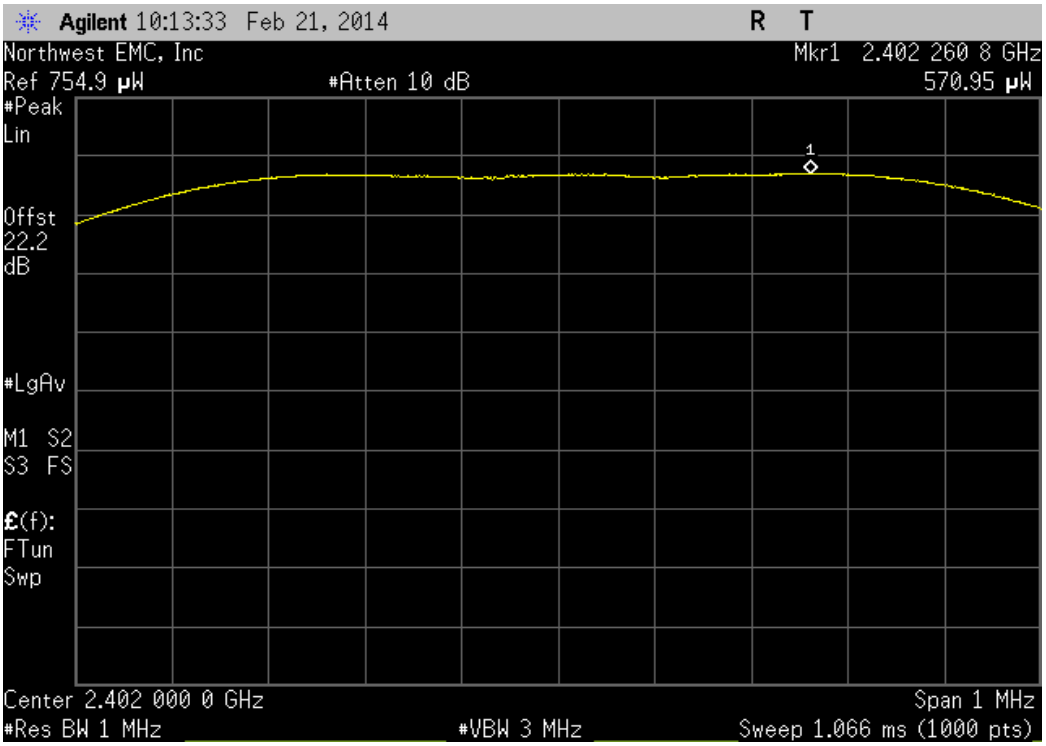
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature 

		Value	Limit	Result
BLE - Advertising				
	Low Channel, 2402 MHz	570.953 uW	< 1 W	Pass
	Mid Channel, 2426 MHz	599.515 uW	< 1 W	Pass
	High Channel, 2480 MHz	585.464 uW	< 1 W	Pass
BLE - Data				
	Low Channel, 2404 MHz	566.37 uW	< 1 W	Pass
	Mid Channel, 2442 MHz	585.868 uW	< 1 W	Pass
	High Channel, 2478 MHz	588.708 uW	< 1 W	Pass

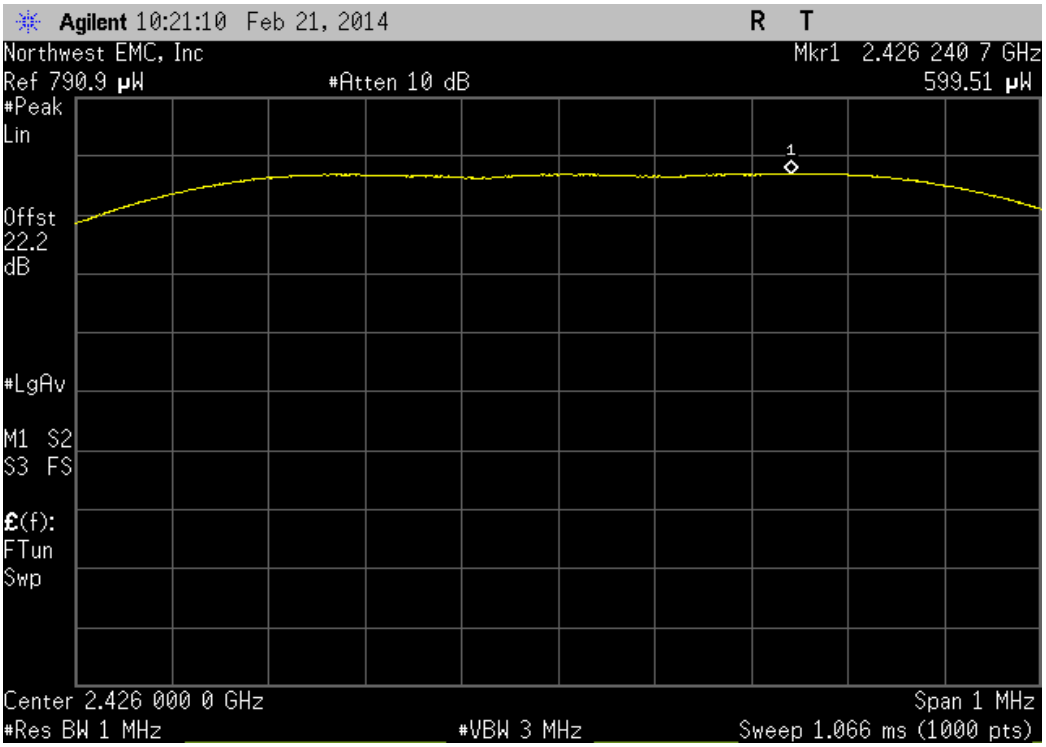
BLE - Advertising, Low Channel, 2402 MHz

				Value	Limit	Result
				570.953 uW	< 1 W	Pass



BLE - Advertising, Mid Channel, 2426 MHz

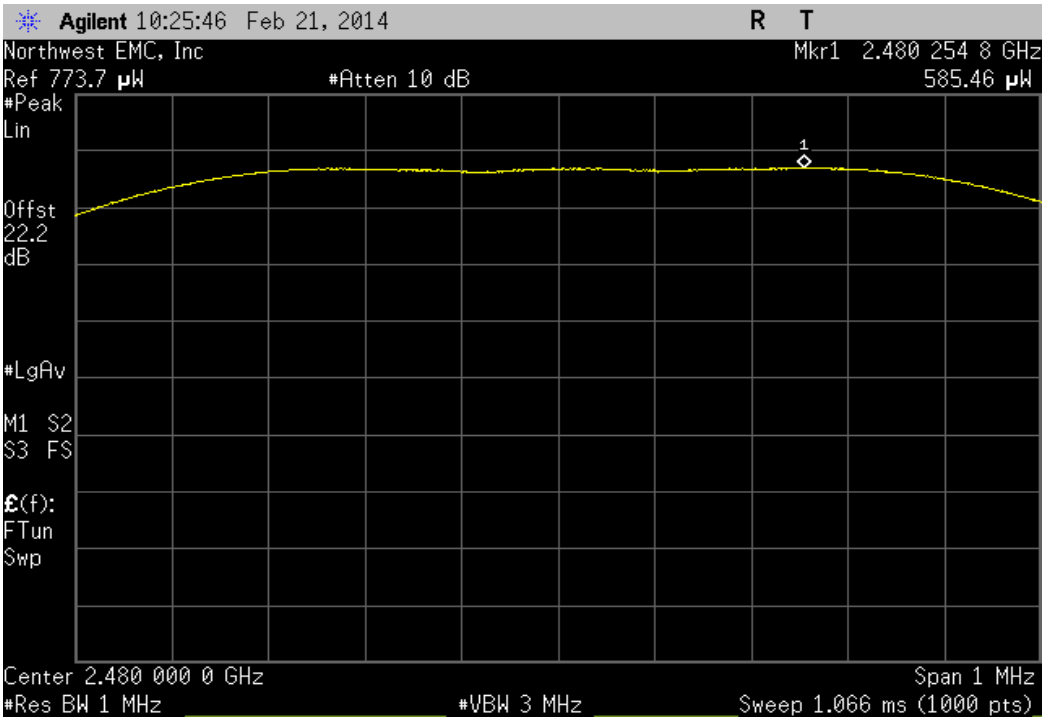
				Value	Limit	Result
				599.515 uW	< 1 W	Pass



OUTPUT POWER

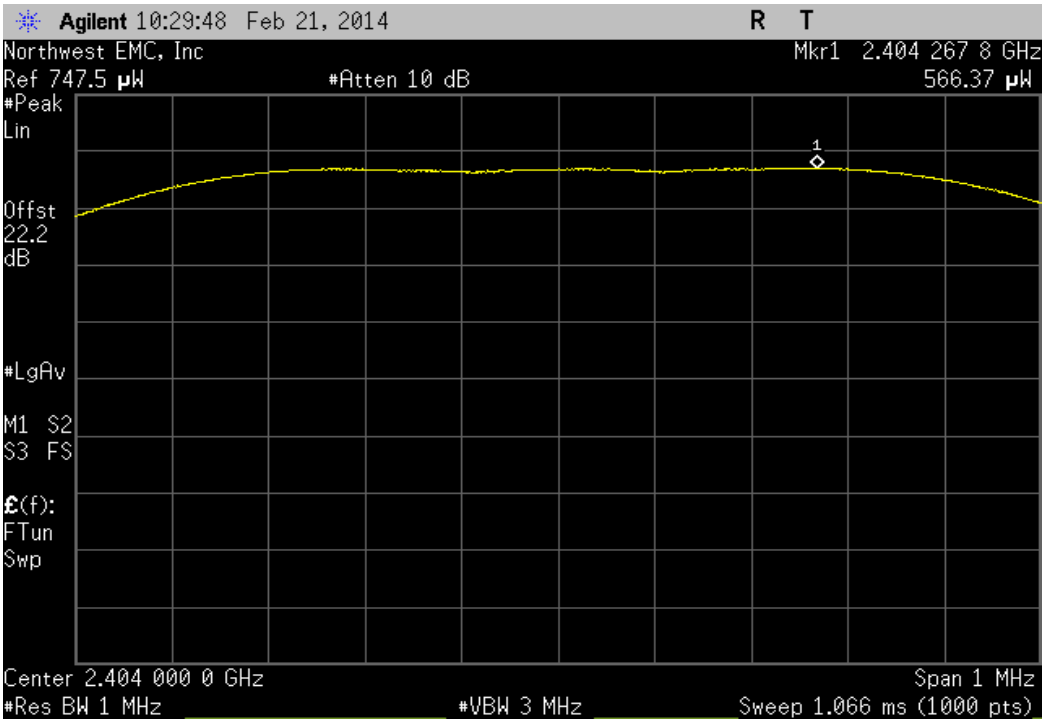
BLE - Advertising, High Channel, 2480 MHz

				Value	Limit	Result
				585.464 uW	< 1 W	Pass



BLE - Data, Low Channel, 2404 MHz

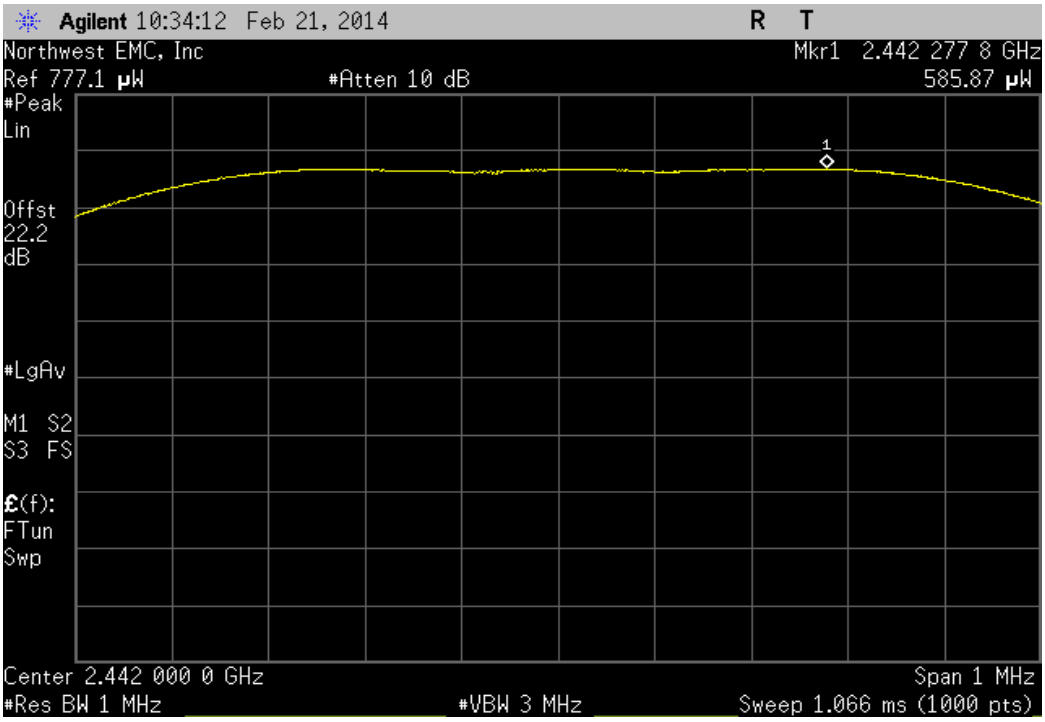
				Value	Limit	Result
				566.37 uW	< 1 W	Pass



OUTPUT POWER

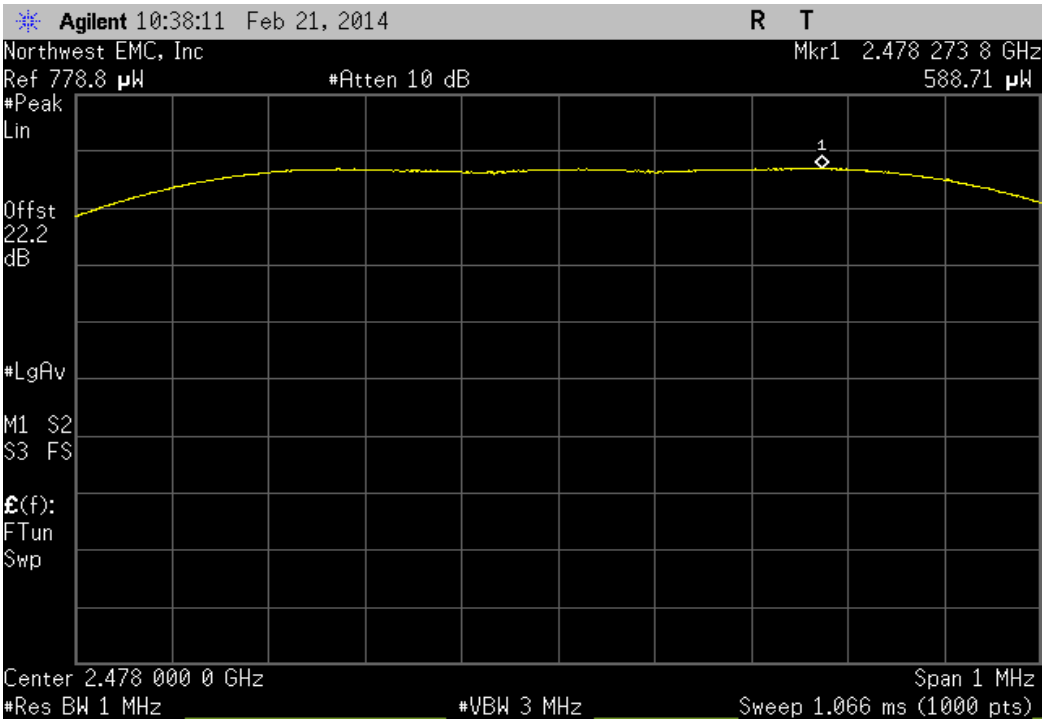
BLE - Data, Mid Channel, 2442 MHz

				Value	Limit	Result
				585.868 uW	< 1 W	Pass



BLE - Data, High Channel, 2478 MHz

				Value	Limit	Result
				588.708 uW	< 1 W	Pass



OCCUPIED BANDWIDTH

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36

TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

OCCUPIED BANDWIDTH

EUT:	TRAC-Lid BT SMART			**Work Order:**	SUPR0114
Serial Number:	0019			**Date:**	02/24/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	21.1°C
Attendees:	None			**Humidity:**	32%
Project:	TRAC			**Barometric Pres.:**	1015
Tested by:	Jared Ison, Brandon Hobbs	**Power:**	Internal Battery, 3VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

Mode of operation tested were client provided.

DEVIATIONS FROM TEST STANDARD

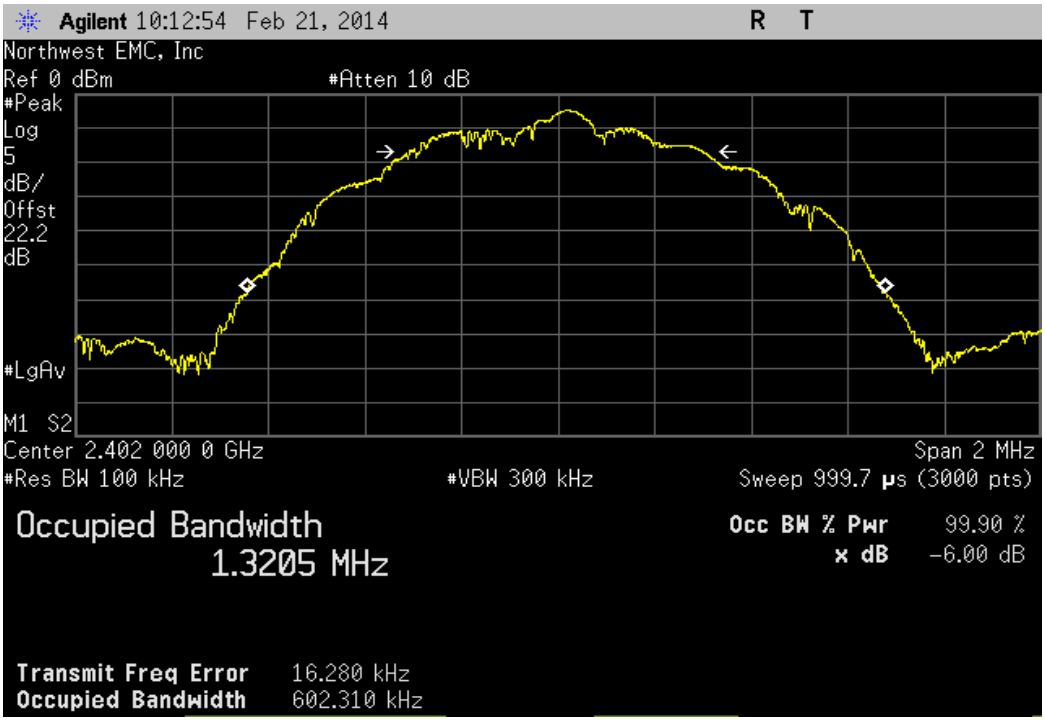
Configuration #	1	Signature

		Value	Limit	Result
BLE - Advertising				
	Low Channel, 2402 MHz	602.31 kHz	≥ 500 kHz	Pass
	Mid Channel, 2426 MHz	603.91 kHz	≥ 500 kHz	Pass
	High Channel, 2480 MHz	610.498 kHz	≥ 500 kHz	Pass
BLE - Data				
	Low Channel, 2404 MHz	602.522 kHz	≥ 500 kHz	Pass
	Mid Channel, 2442 MHz	607.3 kHz	≥ 500 kHz	Pass
	High Channel, 2478 MHz	600.572 kHz	≥ 500 kHz	Pass

OCCUPIED BANDWIDTH

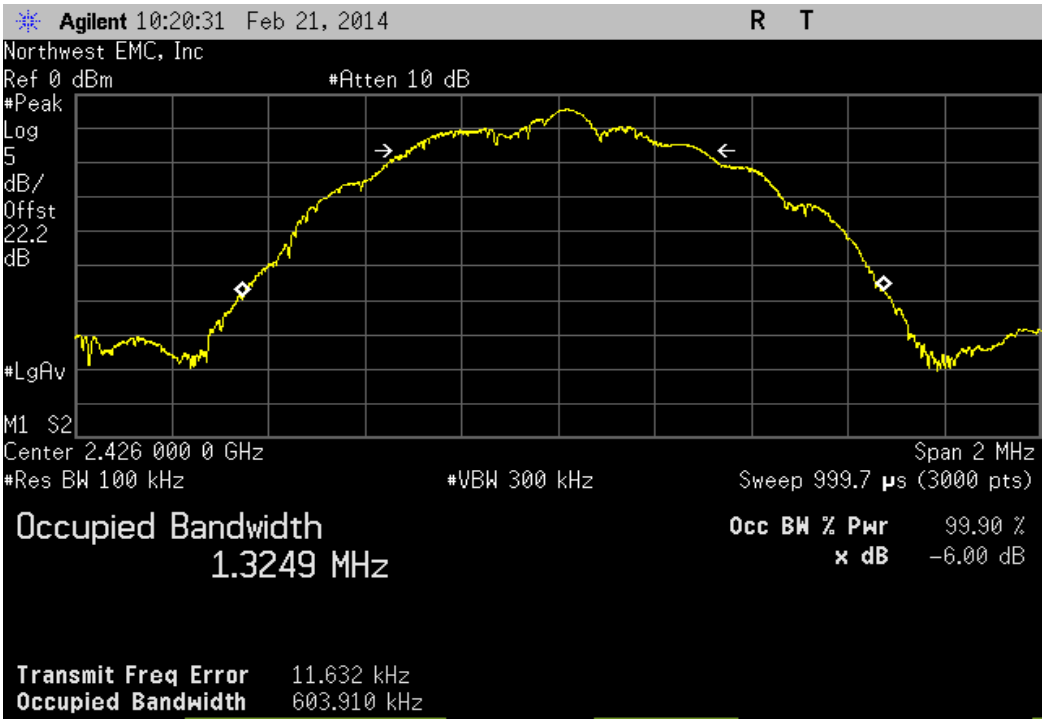
BLE - Advertising, Low Channel, 2402 MHz

				Value	Limit	Result
				602.31 kHz	≥ 500 kHz	Pass



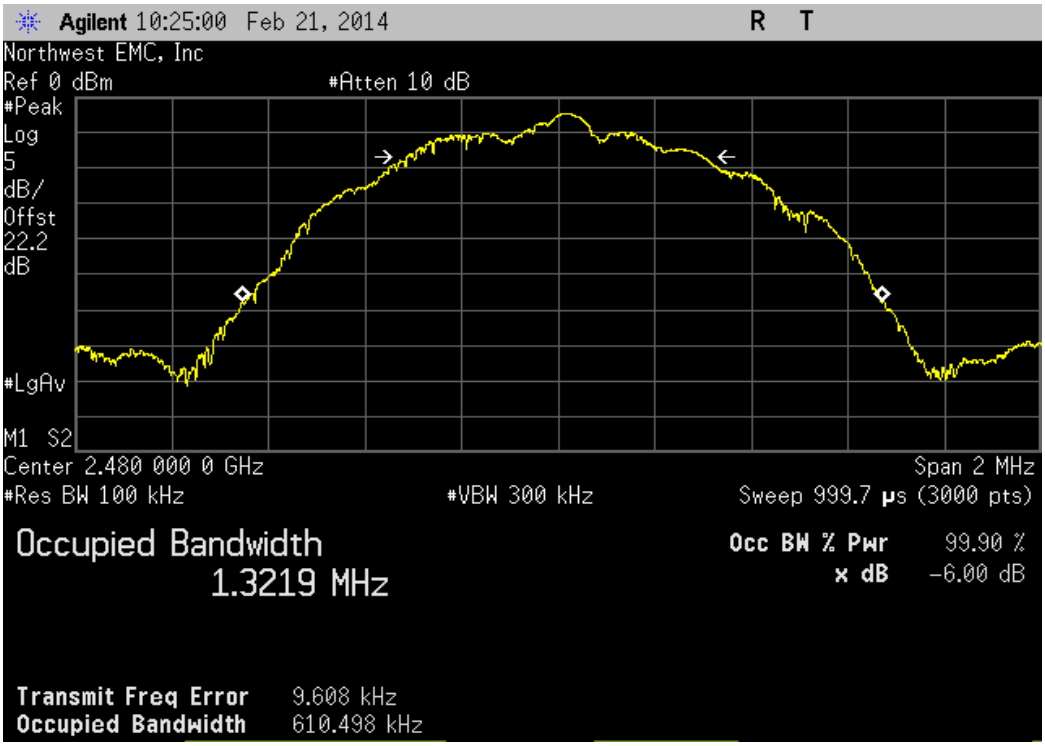
BLE - Advertising, Mid Channel, 2426 MHz

				Value	Limit	Result
				603.91 kHz	≥ 500 kHz	Pass



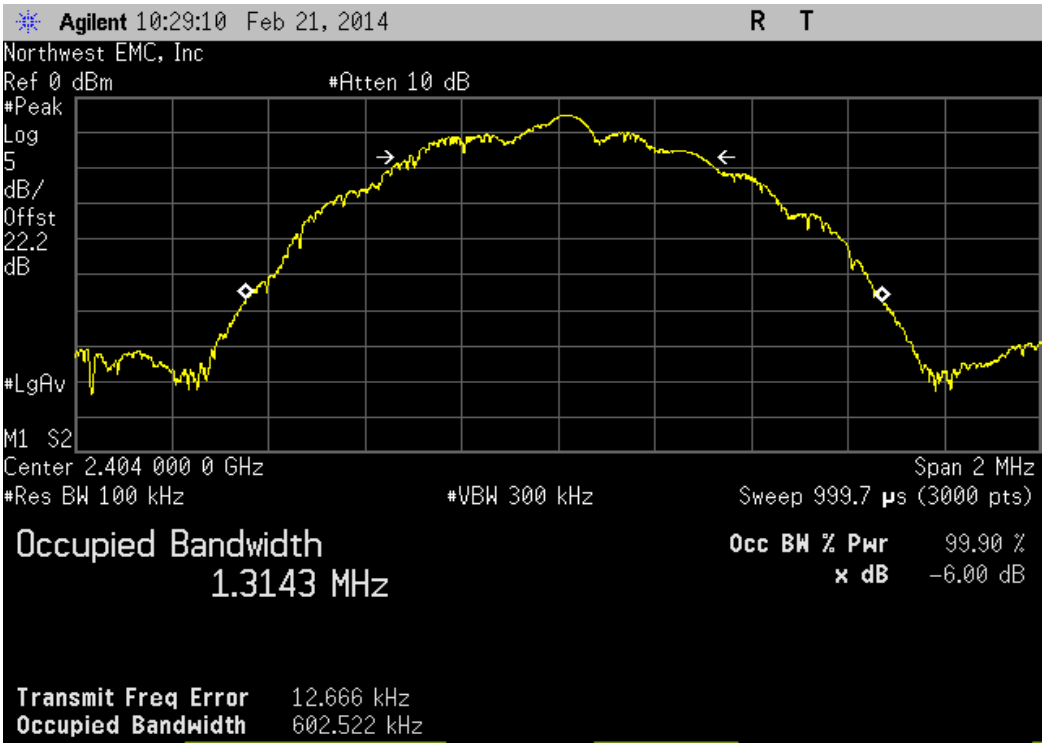
BLE - Advertising, High Channel, 2480 MHz

				Value	Limit	Result
				610.498 kHz	≥ 500 kHz	Pass



BLE - Data, Low Channel, 2404 MHz

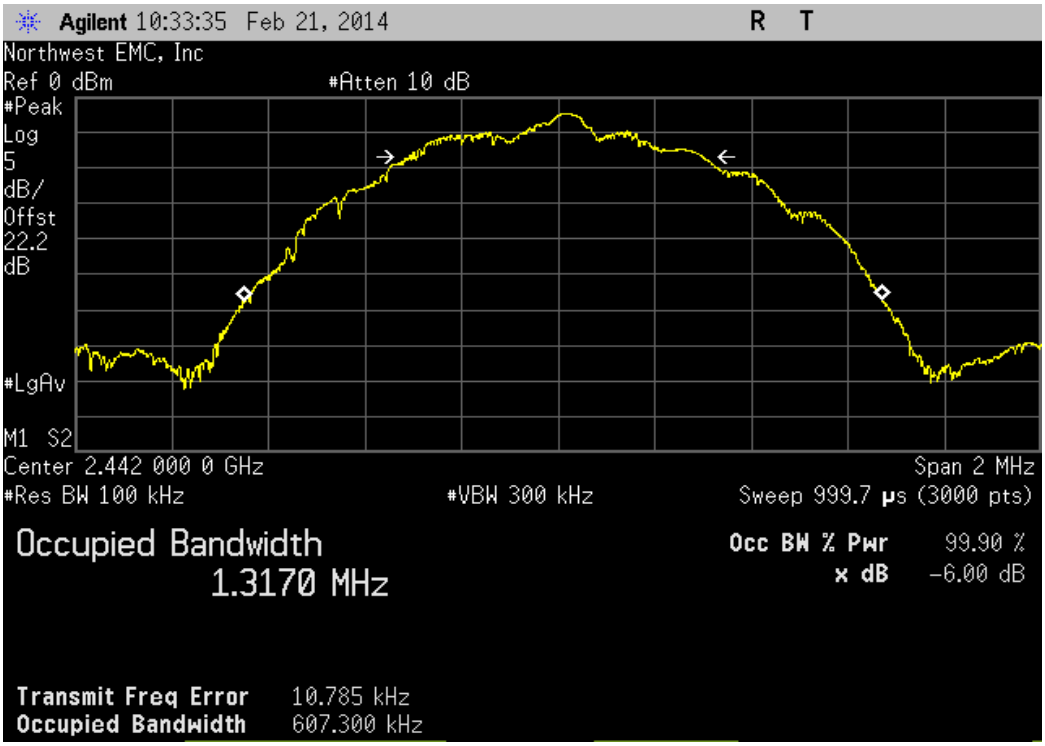
				Value	Limit	Result
				602.522 kHz	≥ 500 kHz	Pass



OCCUPIED BANDWIDTH

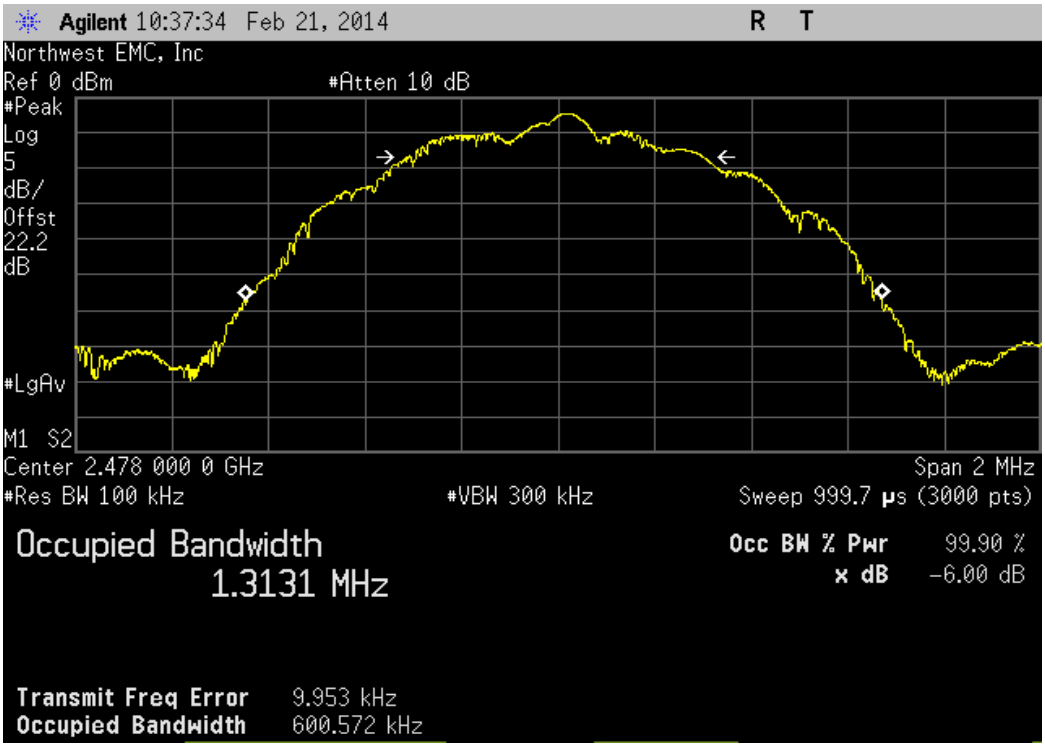
BLE - Data, Mid Channel, 2442 MHz

				Value	Limit	Result
				607.3 kHz	≥ 500 kHz	Pass



BLE - Data, High Channel, 2478 MHz

				Value	Limit	Result
				600.572 kHz	≥ 500 kHz	Pass



POWER SPECTRAL DENSITY

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24

TEST DESCRIPTION

The maximum power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available.

Per the procedure outlined in FCC KDB 558074 D01 DTS Measurement Section 5.3.1, the spectrum analyzer was used as follows:

- RBW = 100 kHz
- VBW = 300 kHz
- Detector = Peak (to match method used for power measurement)
- Trace = Max hold

The observed power level is then scaled to an equivalent value in 3 kHz by adding a Bandwidth Correction Factor (BWCF) where:

BWCF = 10*LOG (3 kHz / 100 kHz) = -15.2 dB

POWER SPECTRAL DENSITY

EUT:	TRAC-Lid BT SMART			**Work Order:**	SUPR0114
Serial Number:	0019			**Date:**	02/24/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	21.1°C
Attendees:	None			**Humidity:**	32%
Project:	TRAC			**Barometric Pres.:**	1015
Tested by:	Jared Ison, Brandon Hobbs	**Power:**	Internal Battery, 3VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

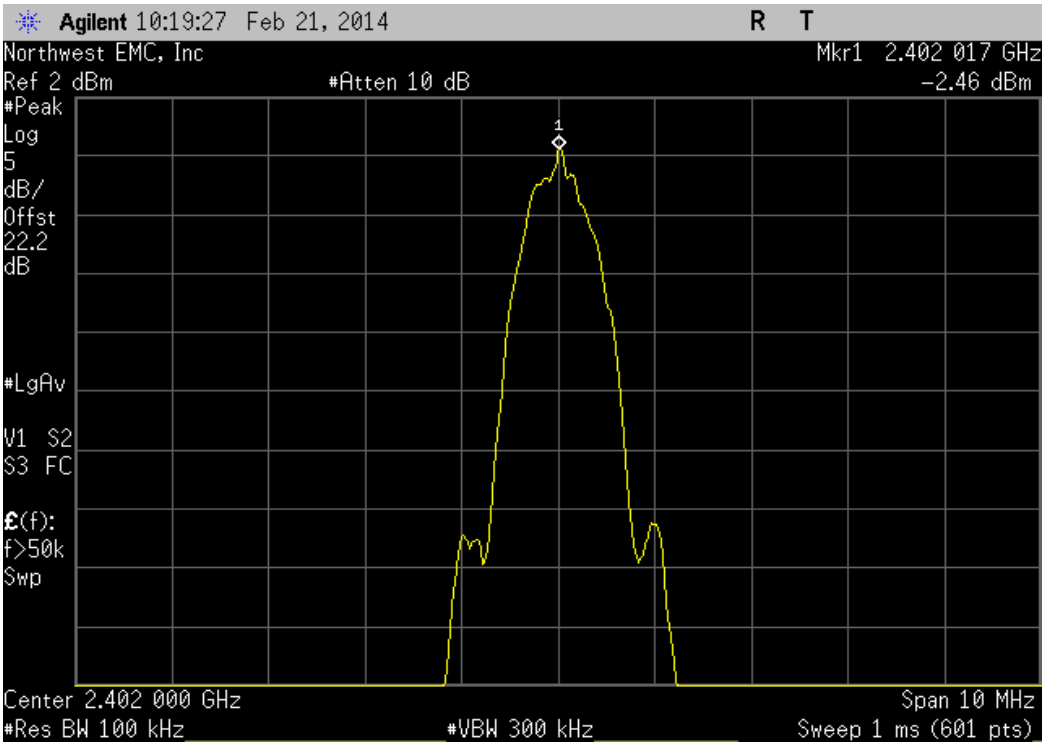
Mode of operation tested were client provided.

DEVIATIONS FROM TEST STANDARD

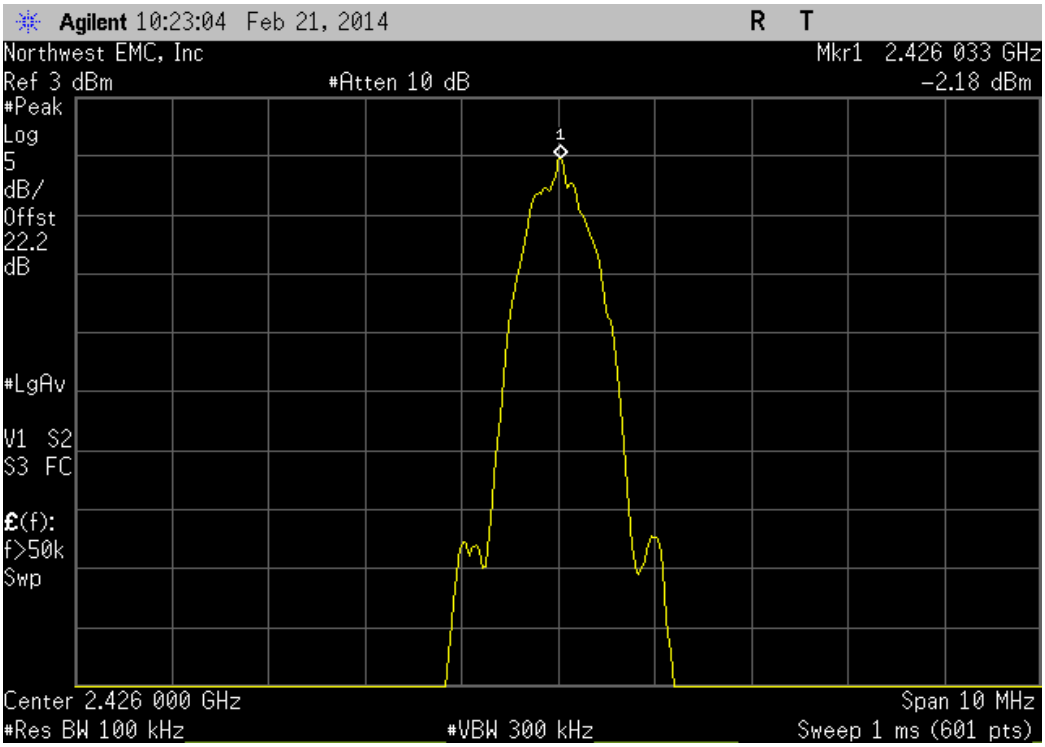
Configuration #	1	Signature

	Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
BLE - Advertising					
Low Channel, 2402 MHz	-2.458	-15.2	-17.658	8	Pass
Mid Channel, 2426 MHz	-2.179	-15.2	-17.379	8	Pass
High Channel, 2480 MHz	-2.263	-15.2	-17.463	8	Pass
BLE - Data					
Low Channel, 2404 MHz	-2.428	-15.2	-17.628	8	Pass
Mid Channel, 2442 MHz	-2.277	-15.2	-17.477	8	Pass
High Channel, 2478 MHz	-2.23	-15.2	-17.43	8	Pass

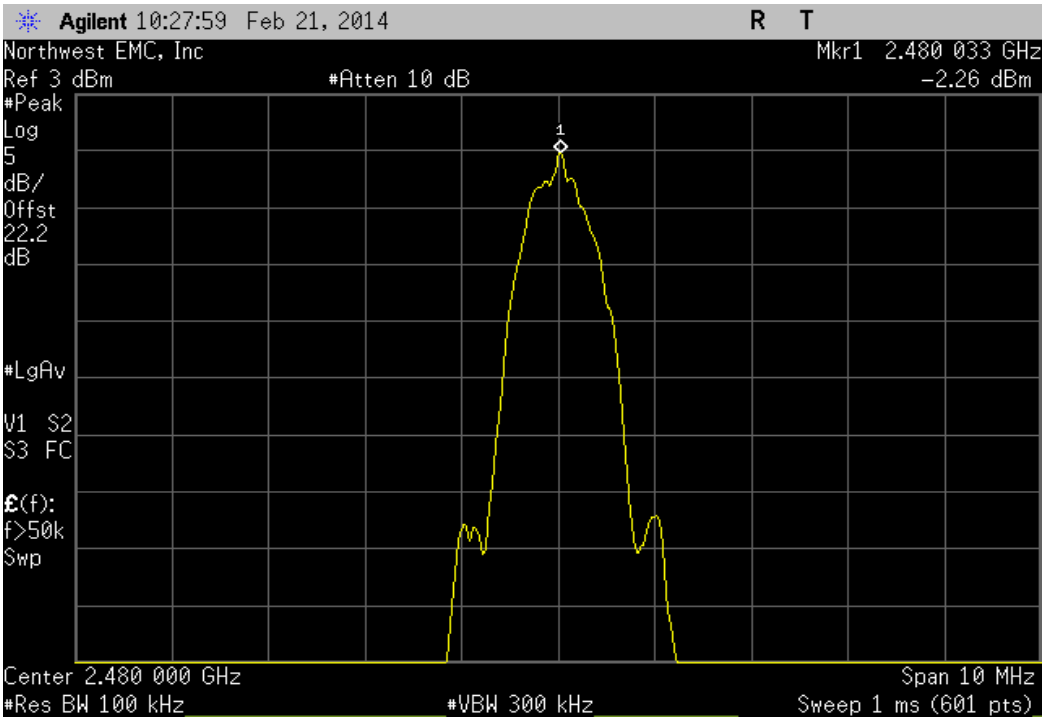
BLE - Advertising, Low Channel, 2402 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.458	-15.2	-17.658	8	Pass



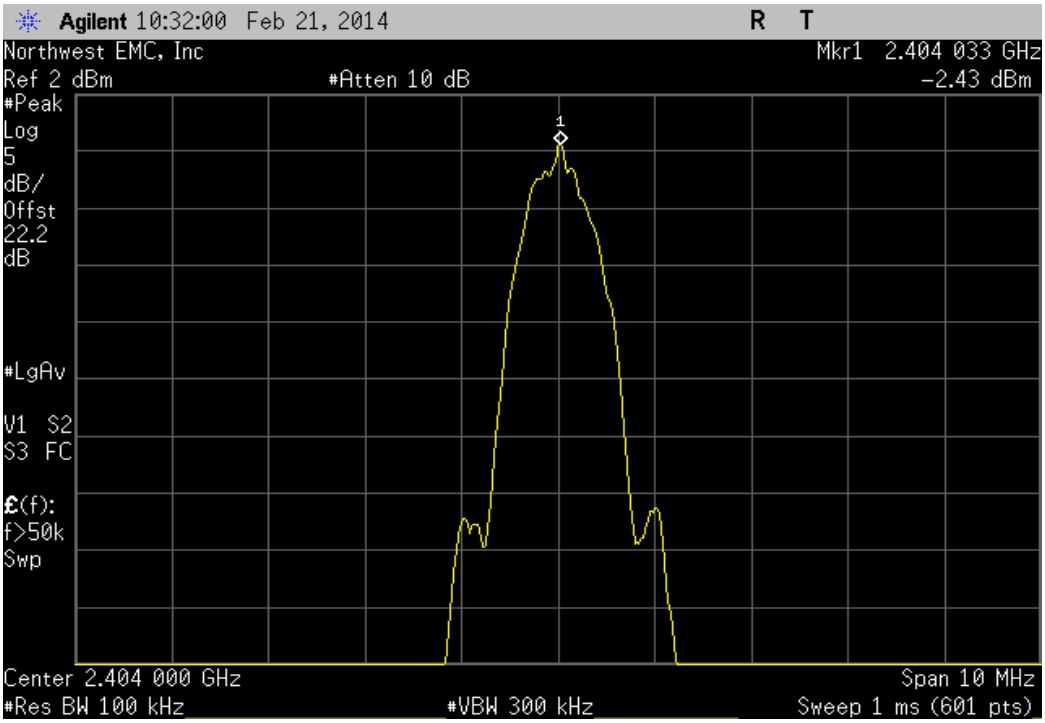
BLE - Advertising, Mid Channel, 2426 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.179	-15.2	-17.379	8	Pass



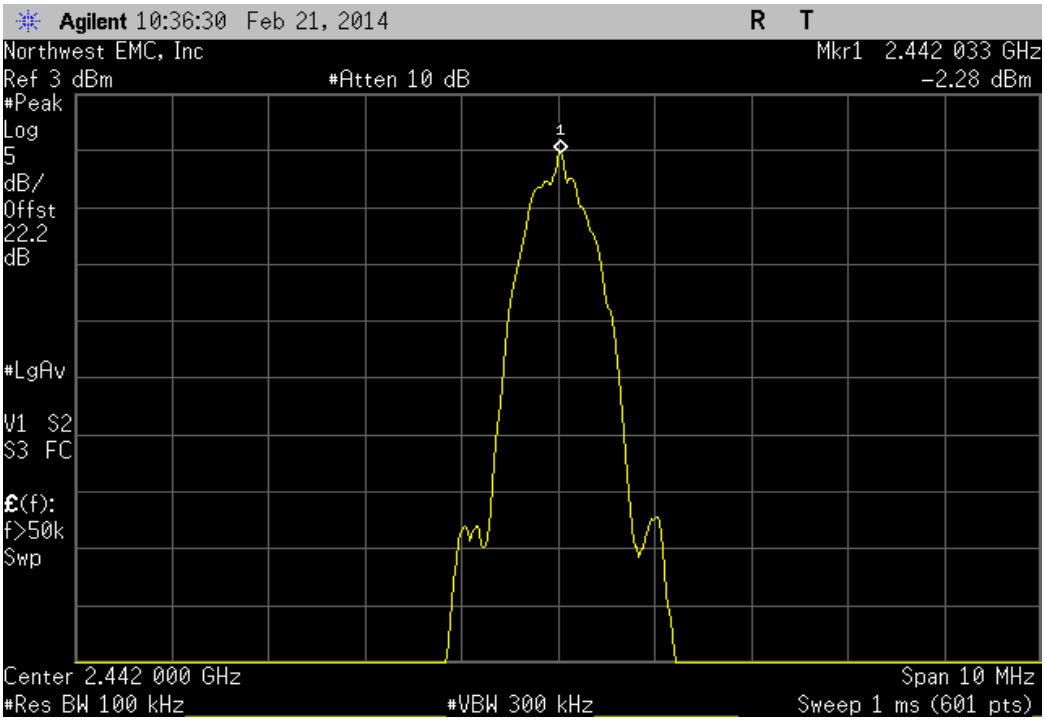
BLE - Advertising, High Channel, 2480 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.263	-15.2	-17.463	8	Pass



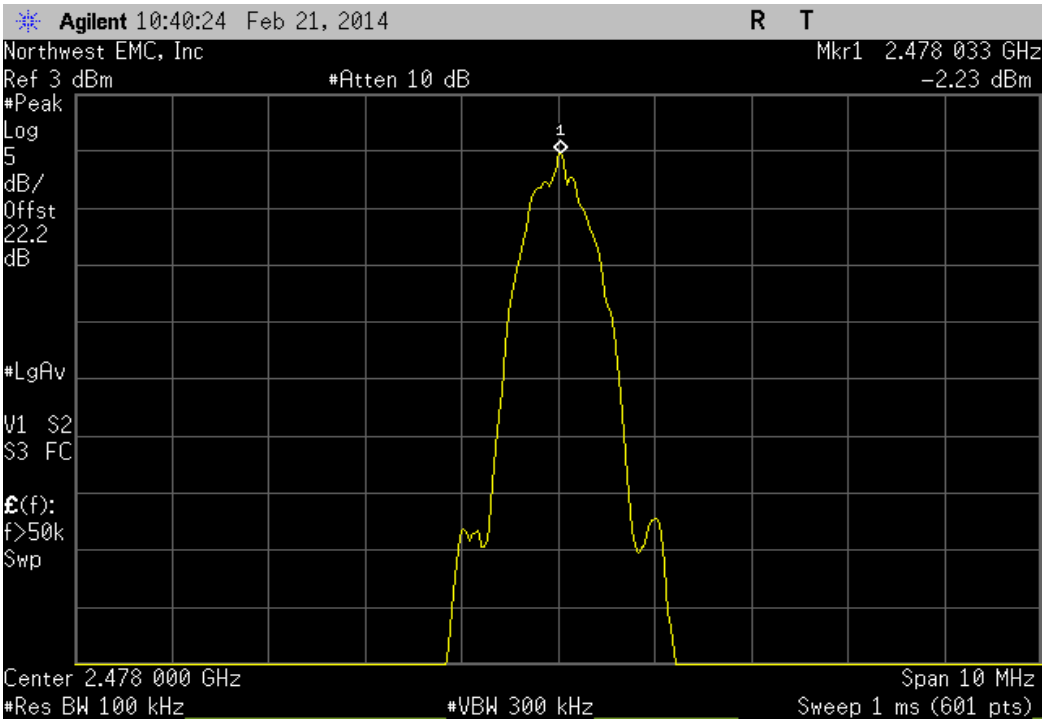
BLE - Data, Low Channel, 2404 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.428	-15.2	-17.628	8	Pass



BLE - Data, Mid Channel, 2442 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.277	-15.2	-17.477	8	Pass



BLE - Data, High Channel, 2478 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Result
		-2.23	-15.2	-17.43	8	Pass



TRANSMITTER SPURIOUS CONDUCTED EMISSIONS

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

TRANSMITTER SPURIOUS CONDUCTED EMISSIONS

EUT:	TRAC-Lid BT SMART			**Work Order:**	SUPR0114
Serial Number:	0019			**Date:**	02/24/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	21.1°C
Attendees:	None			**Humidity:**	32%
Project:	TRAC			**Barometric Pres.:**	1015
Tested by:	Jared Ison, Brandon Hobbs	**Power:**	Internal Battery, 3VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

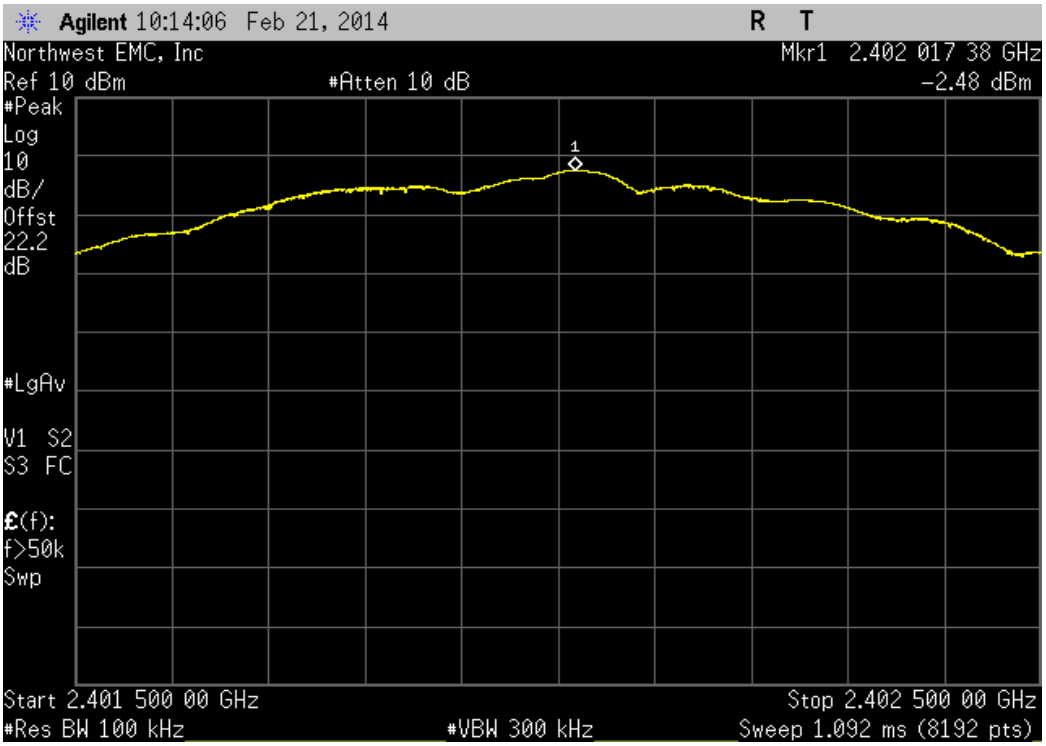
Mode of operation tested were client provided.

DEVIATIONS FROM TEST STANDARD

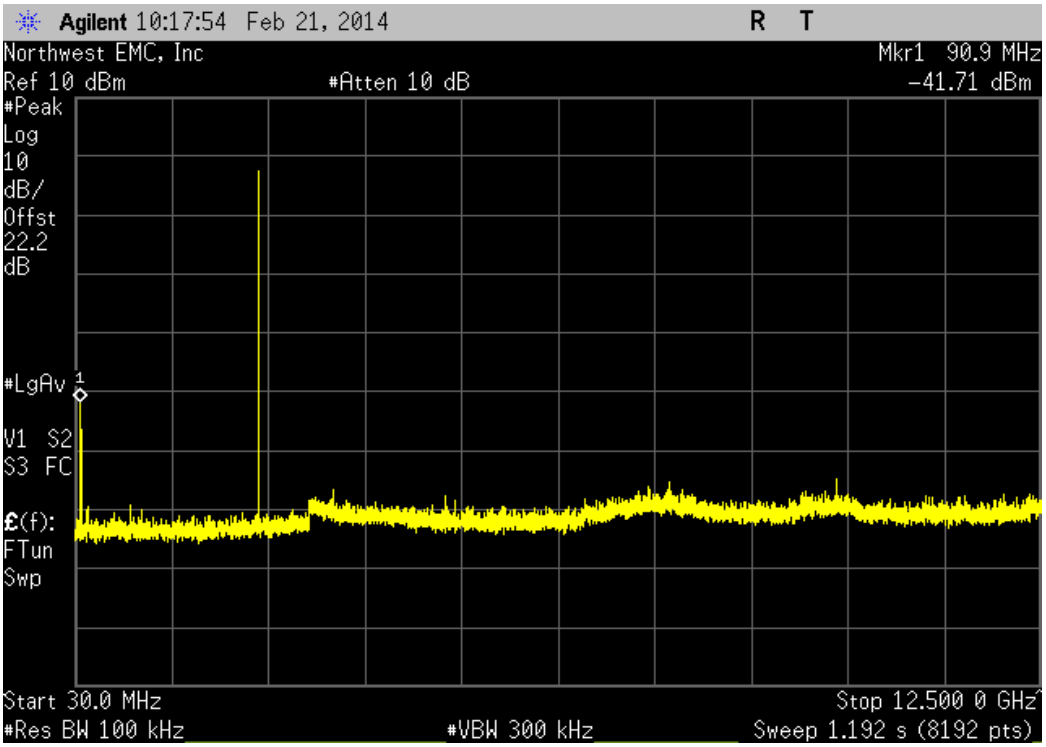
Configuration #	1	*Signature*

		Frequency Range	Value	Limit	Result
BLE - Advertising					
	Low Channel, 2402 MHz	Fundamental	N/A	N/A	N/A
	Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-39.23 dBc	≤ -20 dBc	Pass
	Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-48.45 dBc	≤ -20 dBc	Pass
	Mid Channel, 2426 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel, 2426 MHz	30 MHz - 12.5 GHz	-40.26 dBc	≤ -20 dBc	Pass
	Mid Channel, 2426 MHz	12.5 GHz - 25 GHz	-46.17 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	Fundamental	N/A	N/A	N/A
	High Channel, 2480 MHz	30 MHz - 12.5 GHz	-40.31 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	12.5 GHz - 25 GHz	-46.55 dBc	≤ -20 dBc	Pass
BLE - Data					
	Low Channel, 2404 MHz	Fundamental	N/A	N/A	N/A
	Low Channel, 2404 MHz	30 MHz - 12.5 GHz	-39.67 dBc	≤ -20 dBc	Pass
	Low Channel, 2404 MHz	12.5 GHz - 25 GHz	-48.69 dBc	≤ -20 dBc	Pass
	Mid Channel, 2442 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	-40.4 dBc	≤ -20 dBc	Pass
	Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	-47.88 dBc	≤ -20 dBc	Pass
	High Channel, 2478 MHz	Fundamental	N/A	N/A	N/A
	High Channel, 2478 MHz	30 MHz - 12.5 GHz	-39.86 dBc	≤ -20 dBc	Pass
	High Channel, 2478 MHz	12.5 GHz - 25 GHz	-45.29 dBc	≤ -20 dBc	Pass

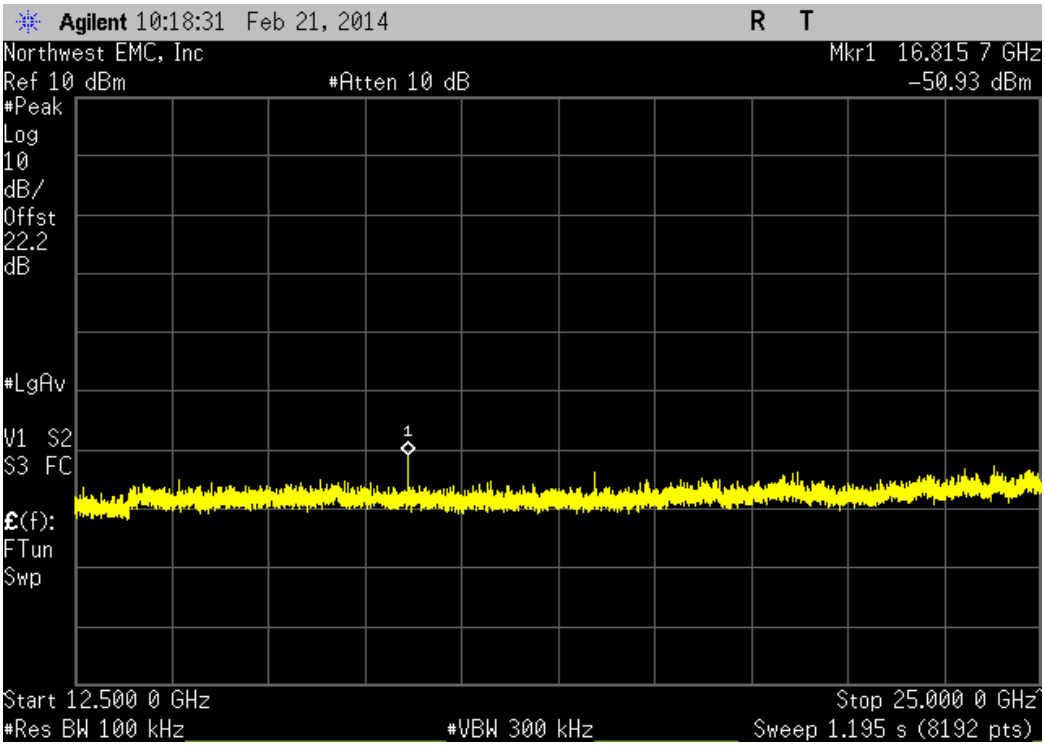
BLE - Advertising, Low Channel, 2402 MHz						
	Frequency Range			Value	Limit	Result
	Fundamental			N/A	N/A	N/A



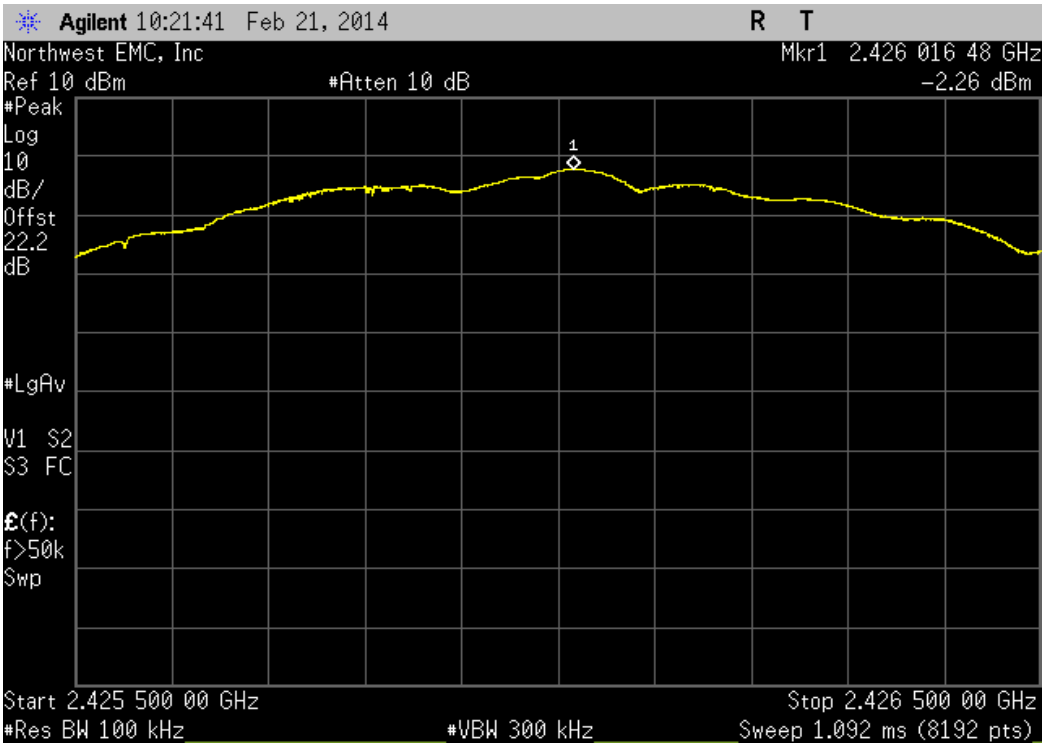
BLE - Advertising, Low Channel, 2402 MHz					
Frequency Range		Value	Limit	Result	
30 MHz - 12.5 GHz		-39.23 dBc	≤ -20 dBc	Pass	



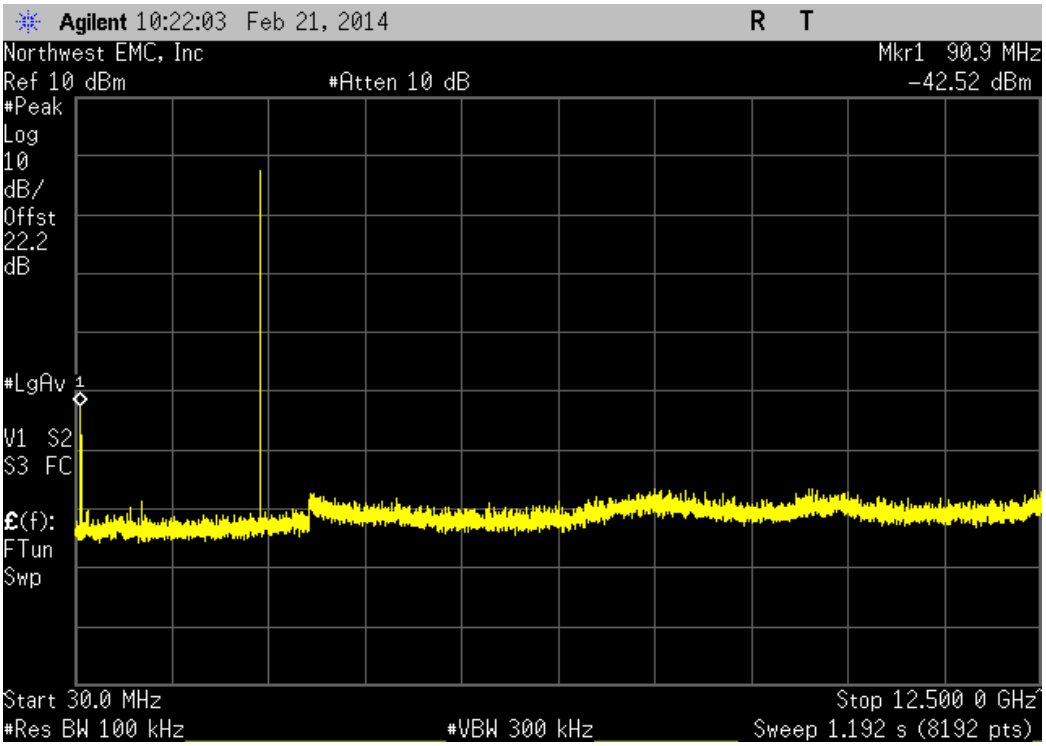
BLE - Advertising, Low Channel, 2402 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-48.45 dBc	≤ -20 dBc	Pass



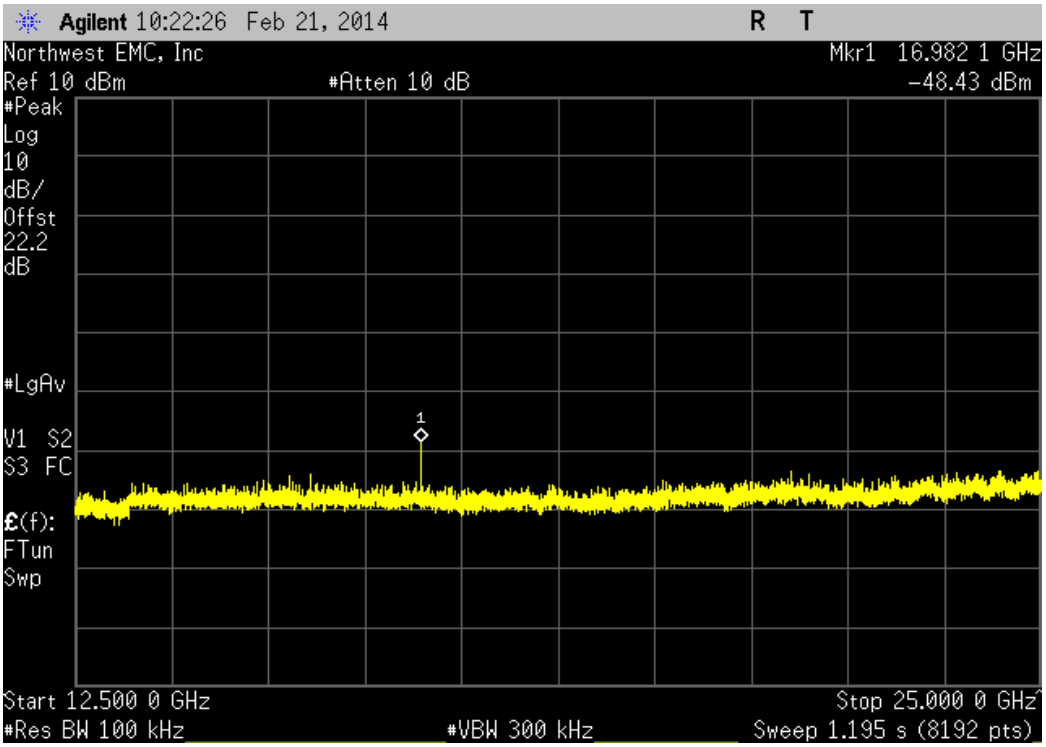
BLE - Advertising, Mid Channel, 2426 MHz						
	Frequency Range			**Value**	**Limit**	**Result**
	Fundamental			N/A	N/A	N/A



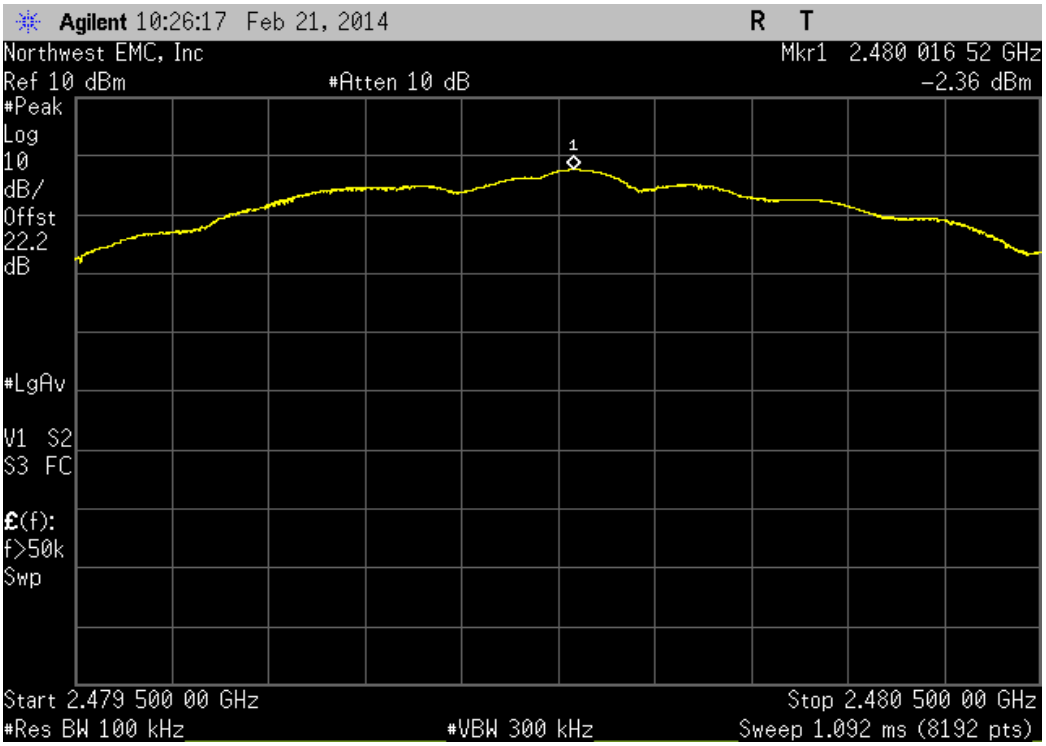
BLE - Advertising, Mid Channel, 2426 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-40.26 dBc	≤ -20 dBc	Pass



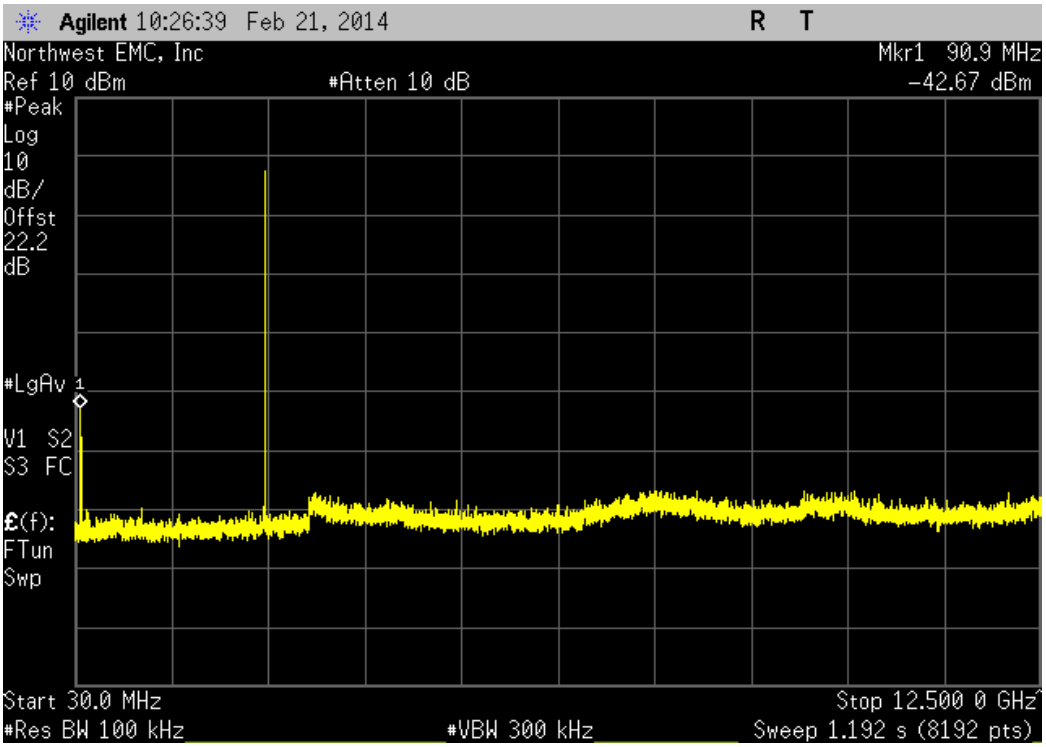
BLE - Advertising, Mid Channel, 2426 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-46.17 dBc	≤ -20 dBc	Pass



BLE - Advertising, High Channel, 2480 MHz						
	Frequency Range			Value	Limit	Result
	Fundamental			N/A	N/A	N/A

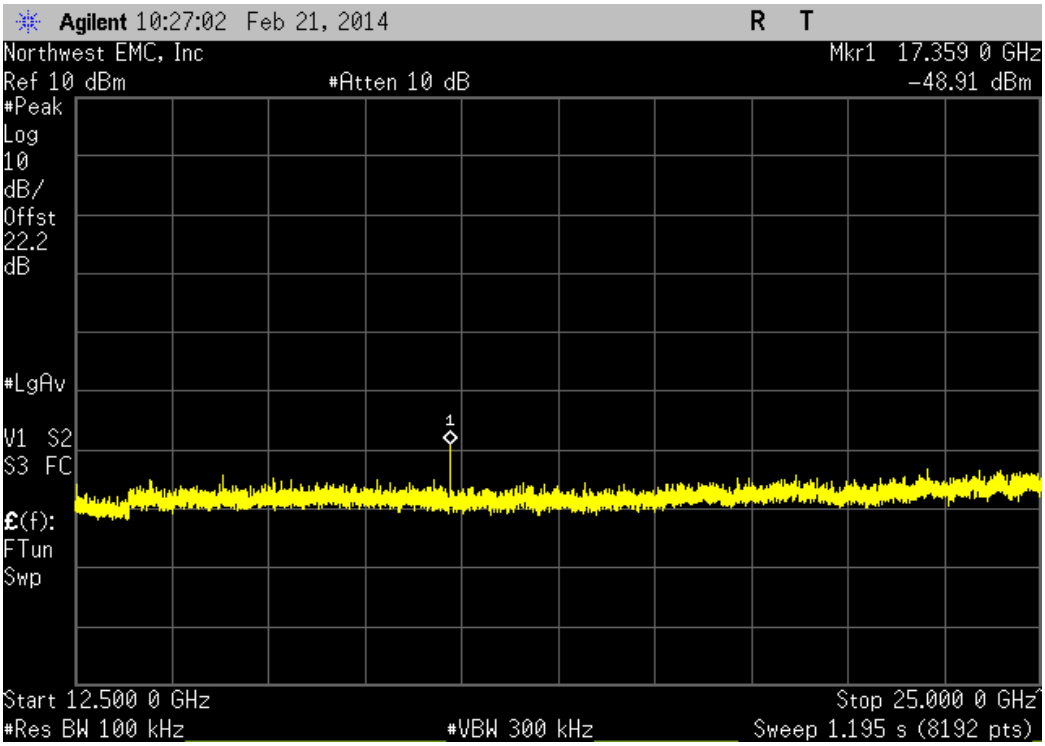


BLE - Advertising, High Channel, 2480 MHz					
Frequency Range		Value	Limit	Result	
30 MHz - 12.5 GHz		-40.31 dBc	≤ -20 dBc	Pass	



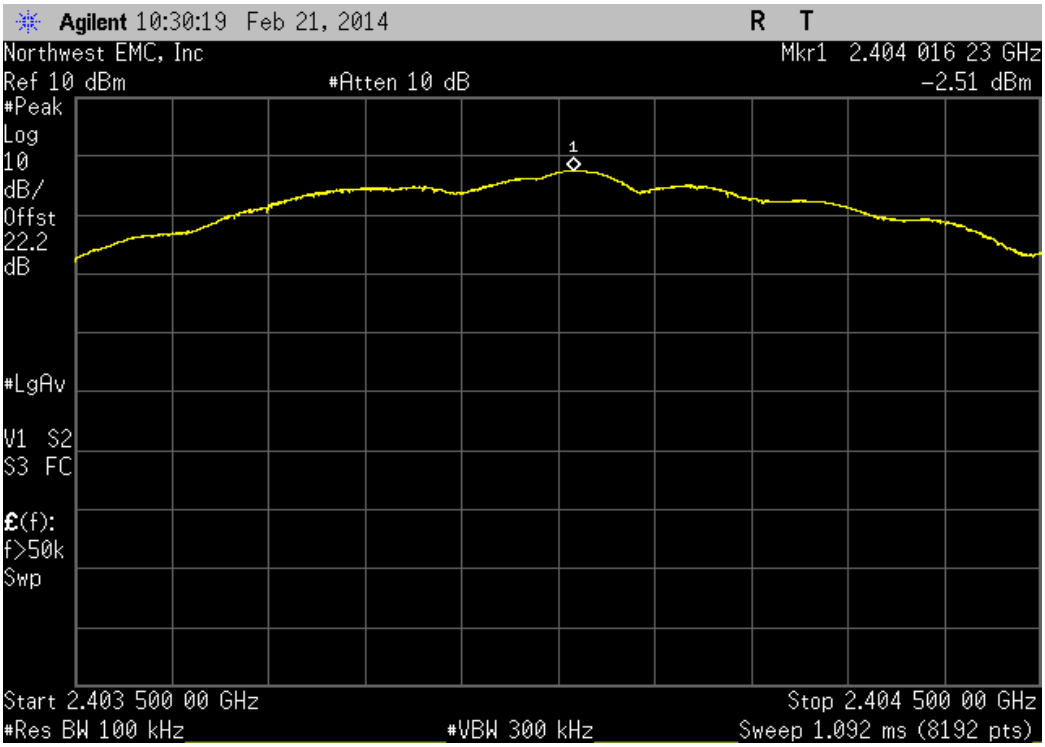
BLE - Advertising, High Channel, 2480 MHz

Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-46.55 dBc	≤ -20 dBc	Pass

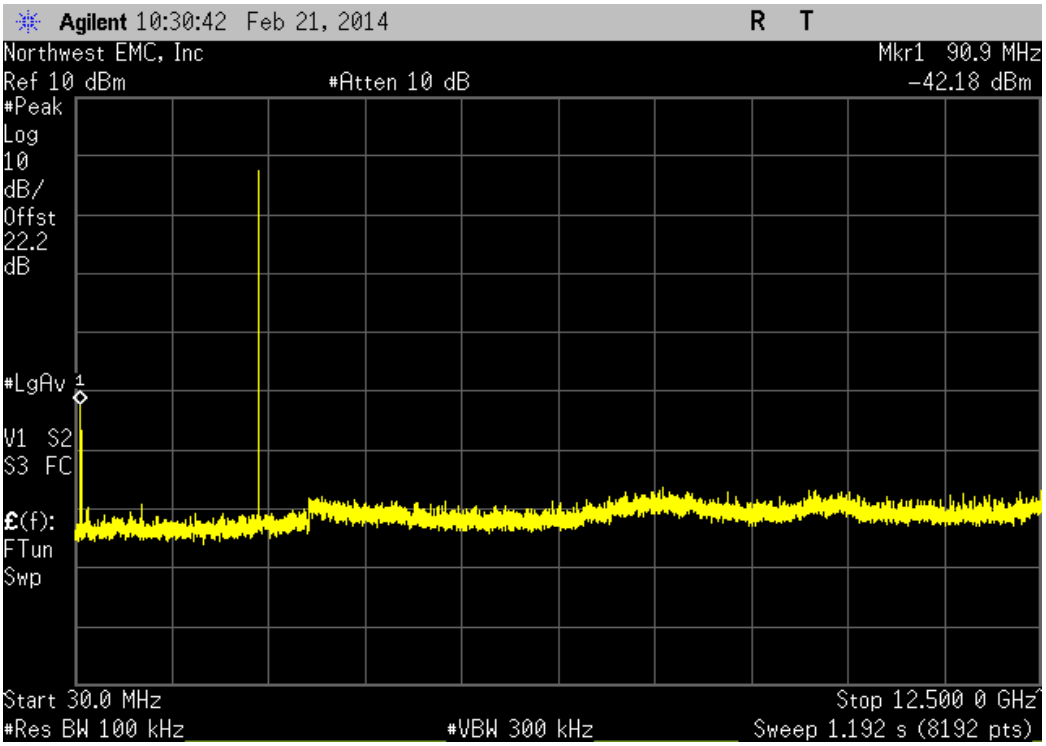


BLE - Data, Low Channel, 2404 MHz

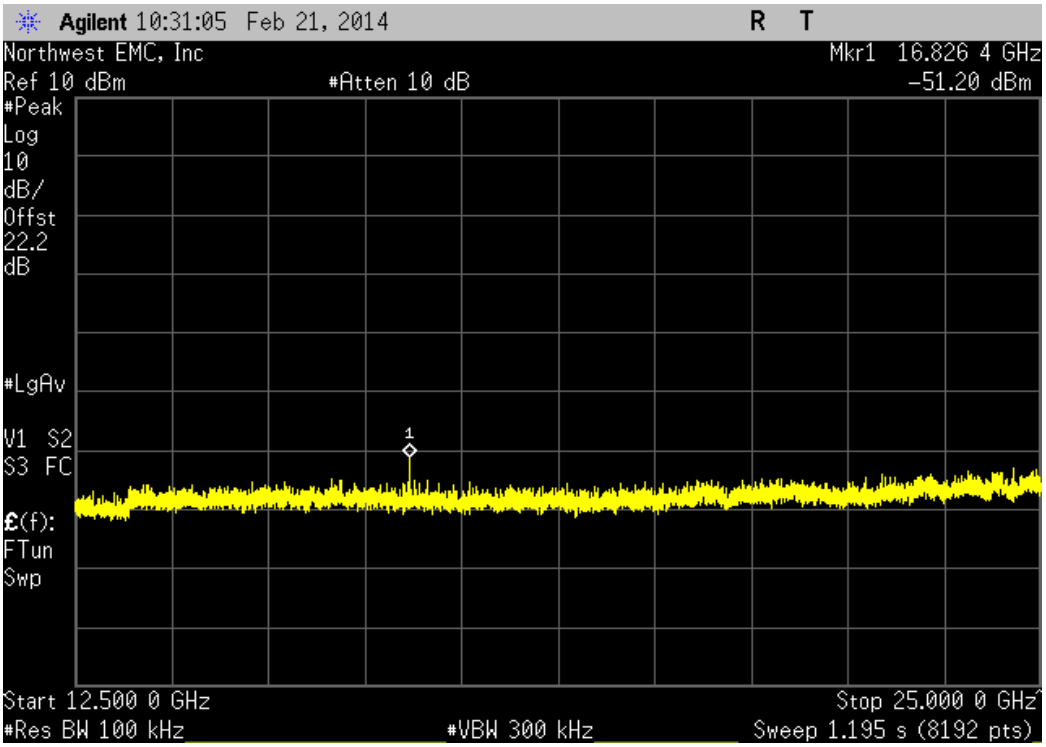
Frequency Range				Value	Limit	Result
	Fundamental			N/A	N/A	N/A



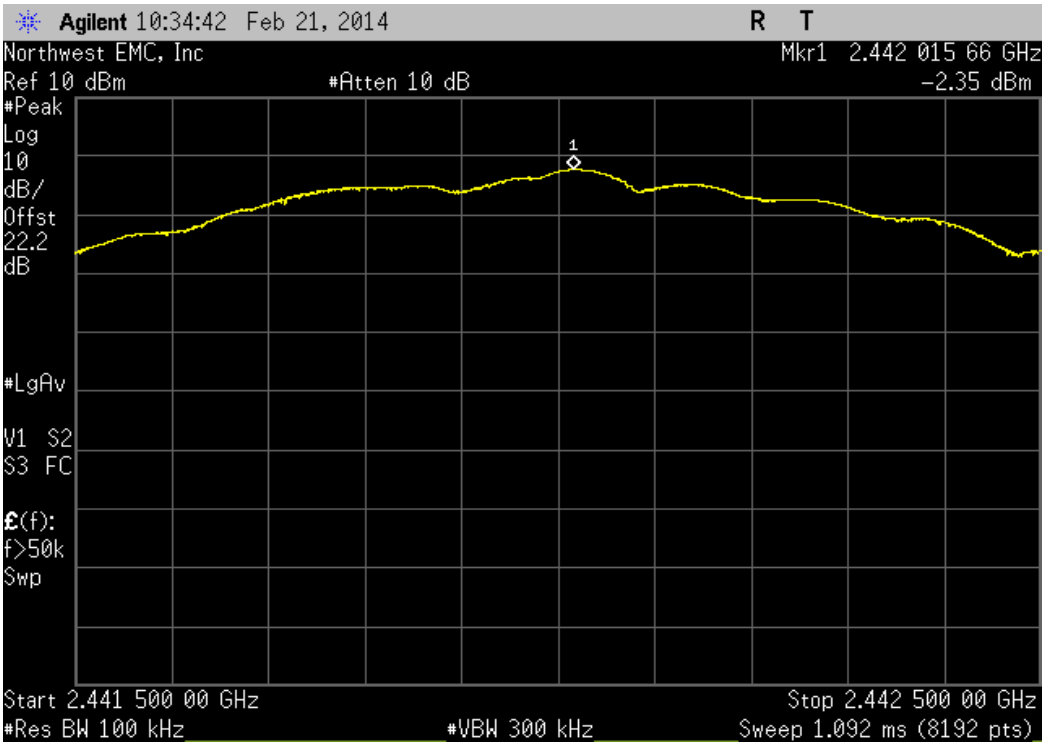
BLE - Data, Low Channel, 2404 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-39.67 dBc	≤ -20 dBc	Pass



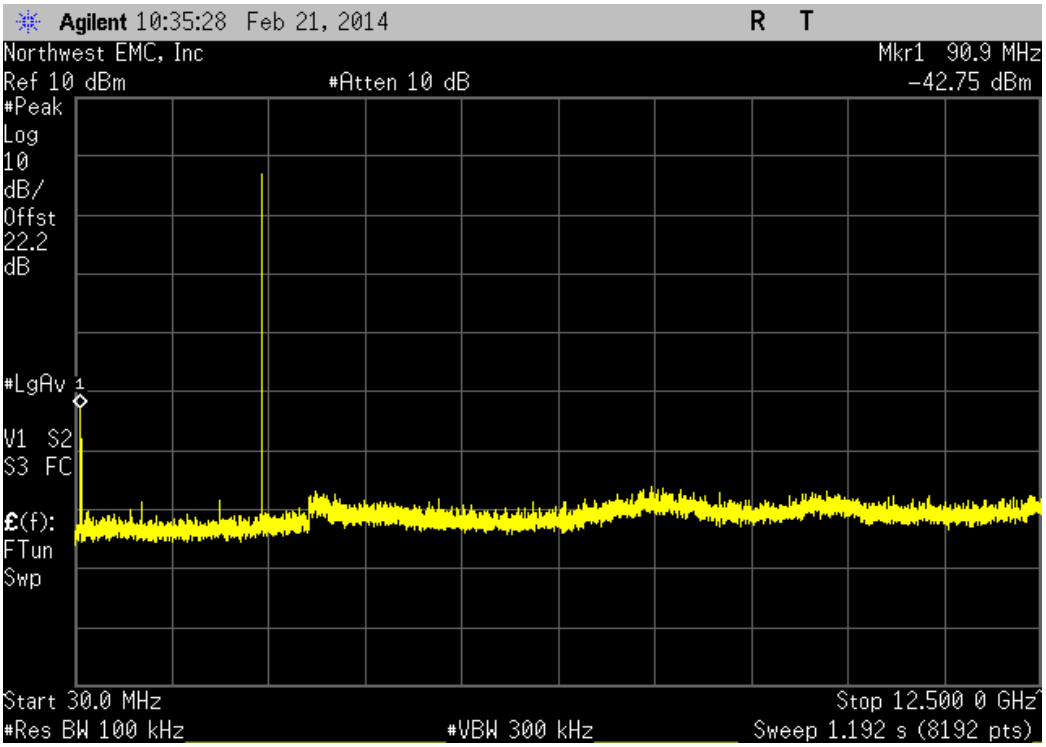
BLE - Data, Low Channel, 2404 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-48.69 dBc	≤ -20 dBc	Pass



BLE - Data, Mid Channel, 2442 MHz						
	Frequency Range			**Value**	**Limit**	**Result**
	Fundamental			N/A	N/A	N/A

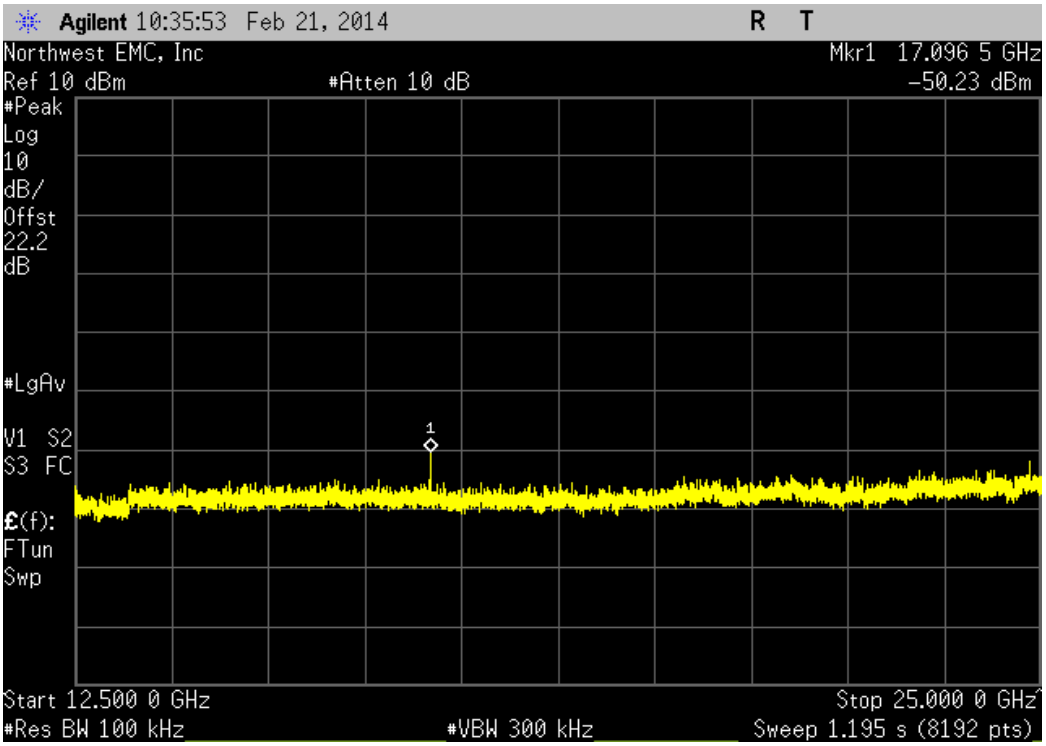


BLE - Data, Mid Channel, 2442 MHz					
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-40.4 dBc	≤ -20 dBc	Pass



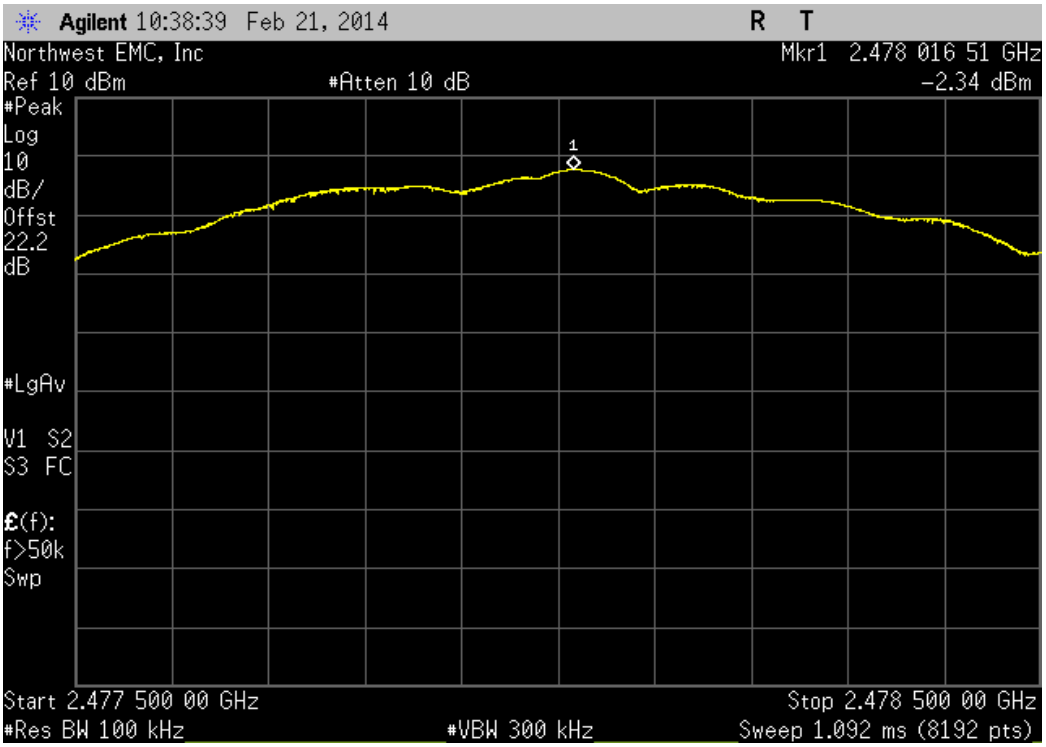
BLE - Data, Mid Channel, 2442 MHz

Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-47.88 dBc	≤ -20 dBc	Pass

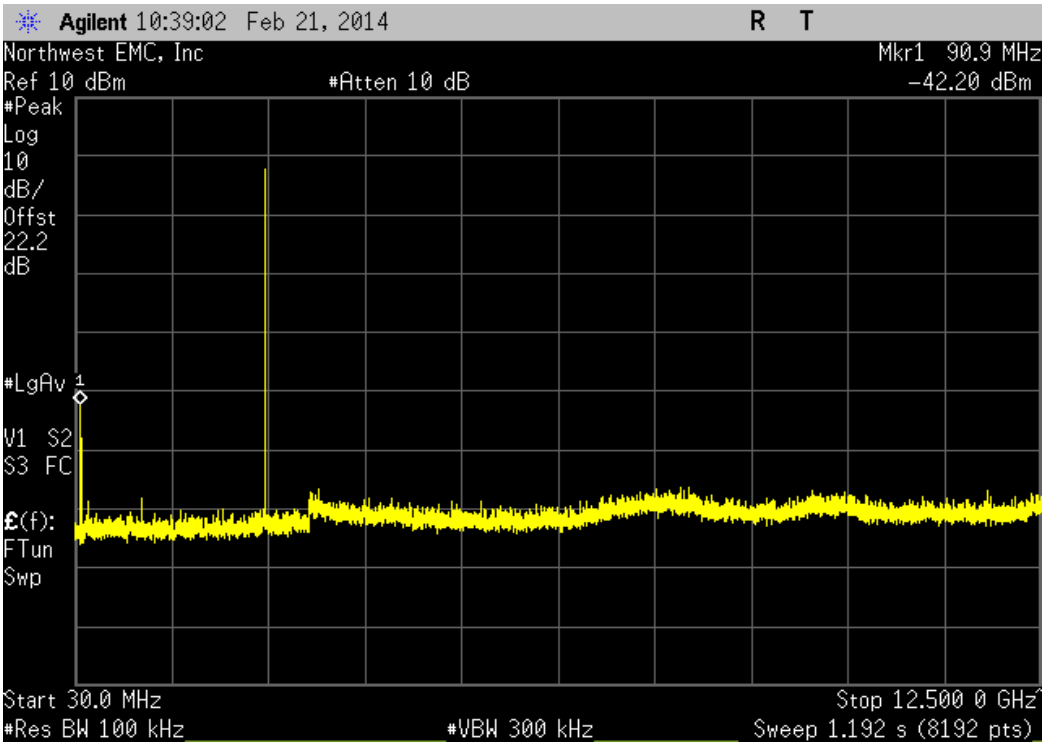


BLE - Data, High Channel, 2478 MHz

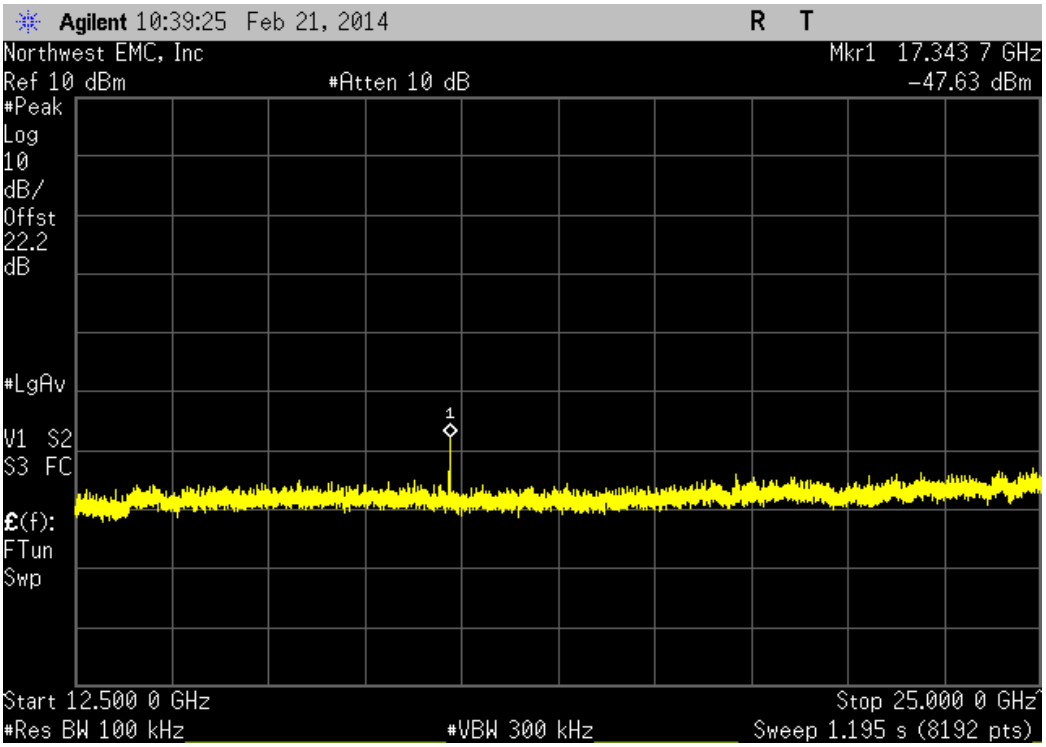
Frequency Range				Value	Limit	Result
	Fundamental			N/A	N/A	N/A



BLE - Data, High Channel, 2478 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-39.86 dBc	≤ -20 dBc	Pass



BLE - Data, High Channel, 2478 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-45.29 dBc	≤ -20 dBc	Pass



BAND EDGE COMPLIANCE

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0
Power Meter	Gigatronics	8651A	SPM	11/26/2013	24
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	36

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

EUT:	TRAC-Lid BT SMART			**Work Order:**	SUPR0114
Serial Number:	0019			**Date:**	02/24/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	21.1°C
Attendees:	None			**Humidity:**	32%
Project:	TRAC			**Barometric Pres.:**	1015
Tested by:	Jared Ison, Brandon Hobbs	**Power:**	Internal Battery, 3VDC	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009

COMMENTS

Mode of operation tested were client provided.

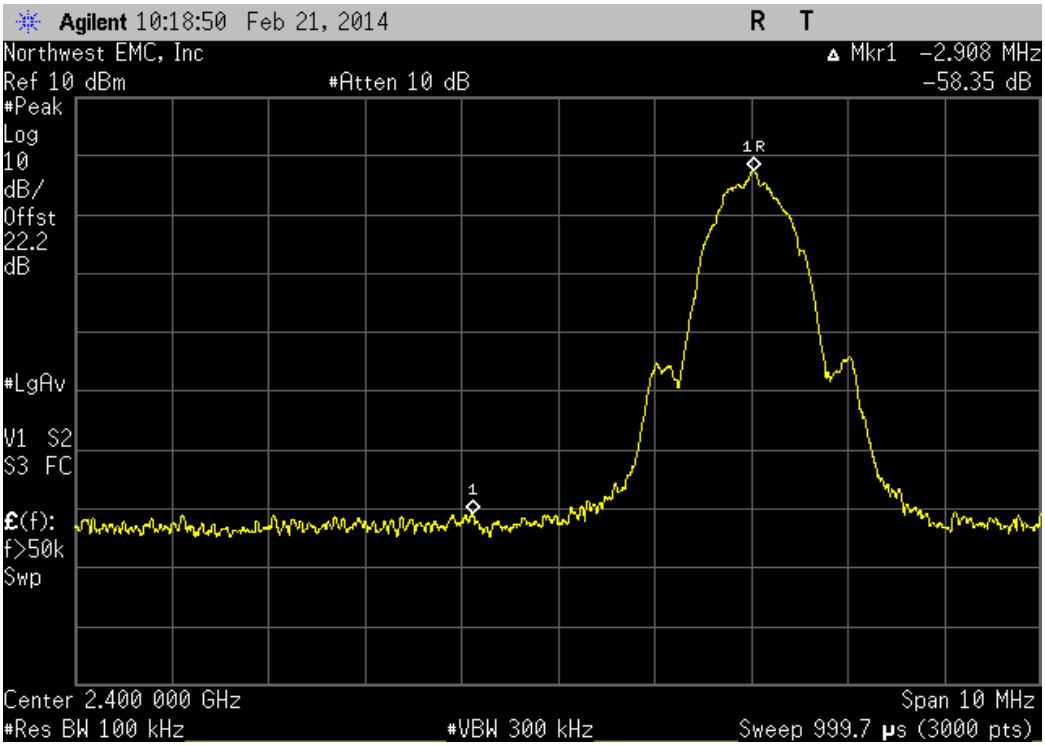
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

		Value	Limit	Result
BLE - Advertising				
	Low Channel, 2402 MHz	-58.35 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-57.49 dBc	≤ -20 dBc	Pass
BLE - Data				
	Low Channel, 2404 MHz	-55.3 dBc	≤ -20 dBc	Pass
	High Channel, 2478 MHz	-57.65 dBc	≤ -20 dBc	Pass

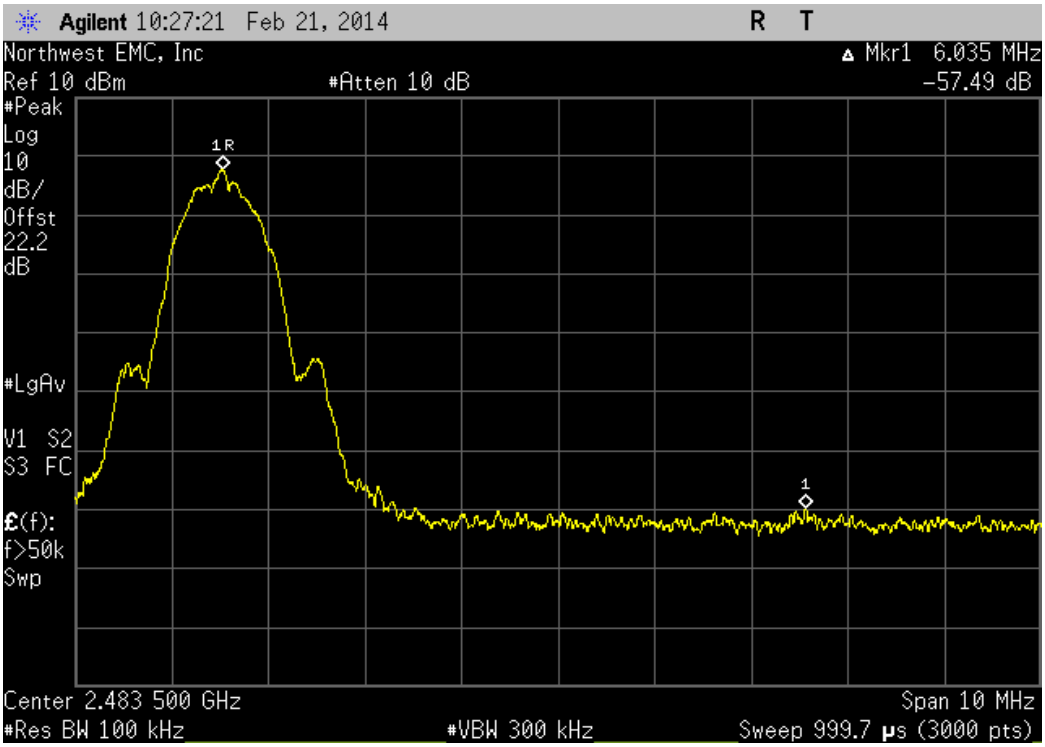
BLE - Advertising, Low Channel, 2402 MHz

				Value	Limit	Result
				-58.35 dBc	≤ -20 dBc	Pass



BLE - Advertising, High Channel, 2480 MHz

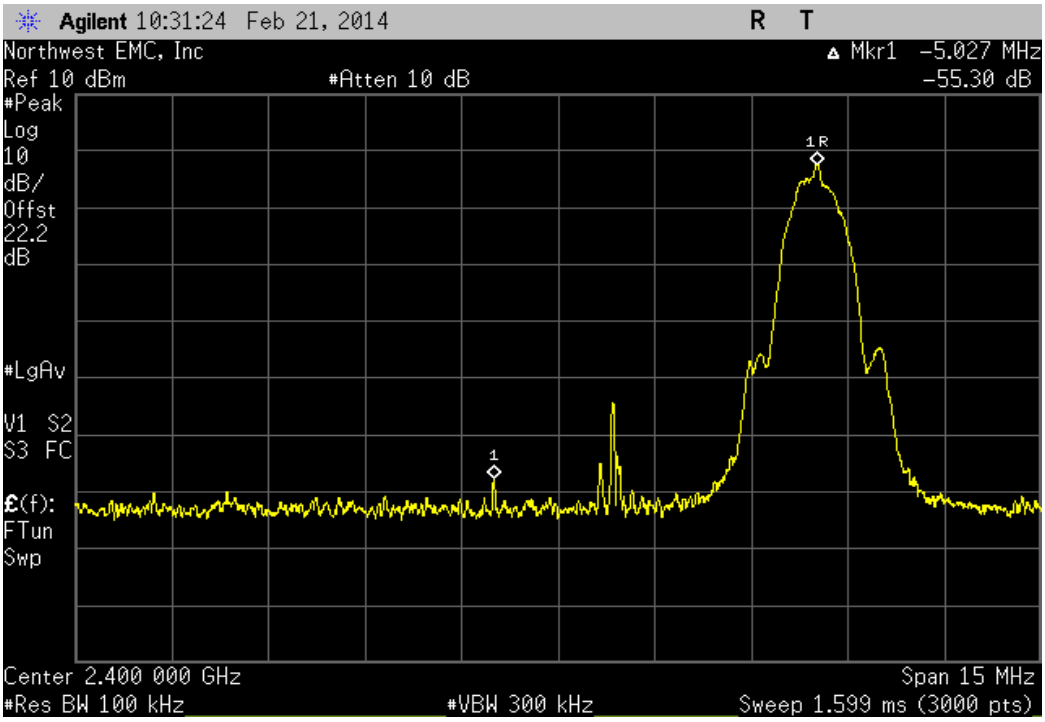
				Value	Limit	Result
				-57.49 dBc	≤ -20 dBc	Pass



BAND EDGE COMPLIANCE

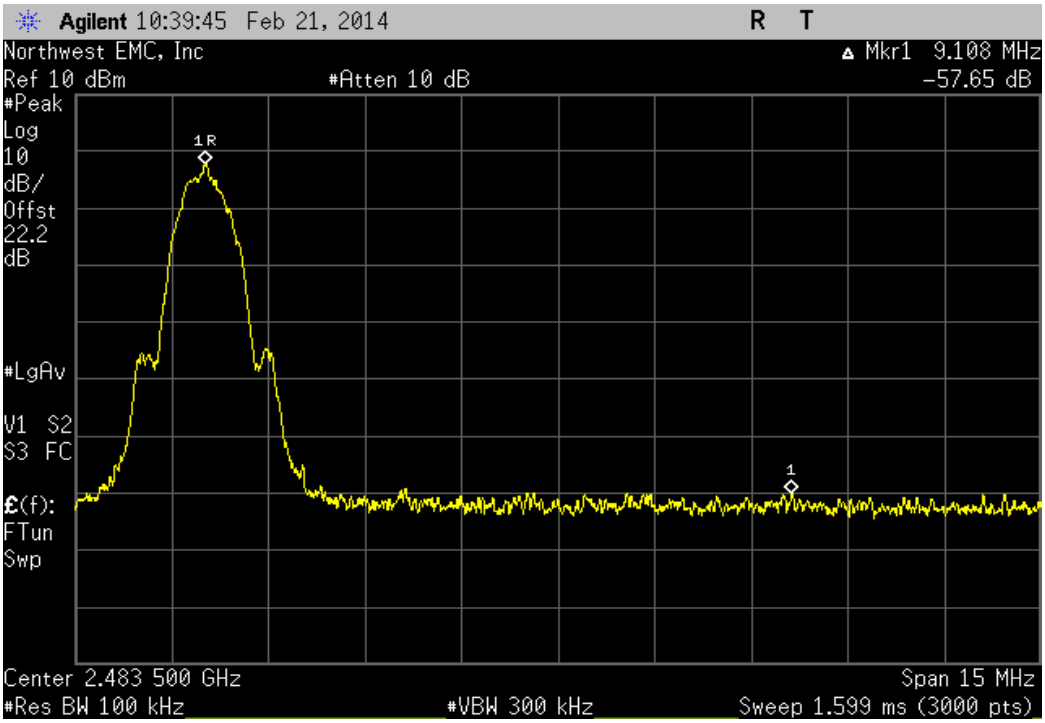
BLE - Data, Low Channel, 2404 MHz

				Value	Limit	Result
				-55.3 dBc	≤ -20 dBc	Pass



BLE - Data, High Channel, 2478 MHz

				Value	Limit	Result
				-57.65 dBc	≤ -20 dBc	Pass



SPURIOUS RADIATED EMISSIONS

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

Continuous TX, Low Ch. 2402 MHz, ADV
Continuous TX, Low Ch. 2404 MHz, DATA
Continuous TX, Mid Ch. 2426 MHz, ADV
Continuous TX, Mid Ch. 2442 MHz, DATA
Continuous TX, High Ch. 2478 MHz, DATA
Continuous TX, High Ch. 2480 MHz, ADV

POWER SETTINGS INVESTIGATED

Internal Battery, 3VDC

CONFIGURATIONS INVESTIGATED

SUPR0114 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 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.	KMKM-72	EVY	9/10/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/10/2013	12 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/18/2014	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/18/2014	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	2/18/2014	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	2/18/2014	12 mo
Antenna, Horn	ETS	3115	AIZ	1/27/2014	36 mo
HP Filter	Micro-Tronics	HPM50111	HFO	7/6/2013	24 mo
LP Filter	Micro-Tronics	LPM50004	LFD	7/6/2012	24 mo
Attenuator - 20dB, LF (30MHz - 1000MHz)	Coaxicom	3910-20	AXY	6/20/2013	12 mo
EV01 Cables	N/A	Bilog Cables	EVA	2/18/2014	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/18/2014	12 mo
Antenna, Biconilog	EMCO	3141	AXG	4/10/2012	36 mo
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24 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

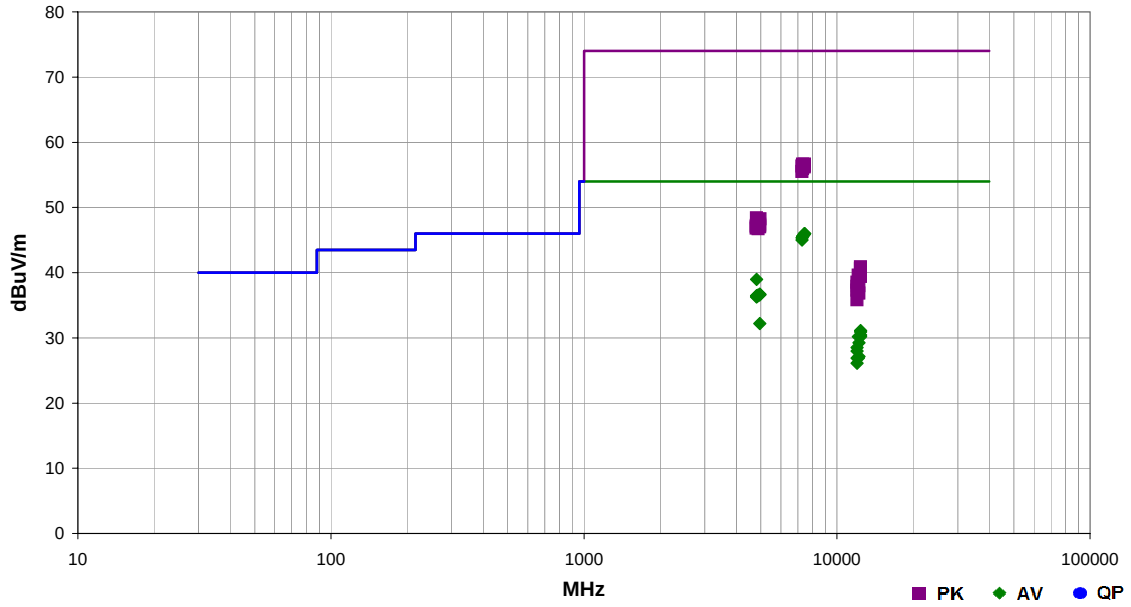
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	SUPR0114	**Date:**	03/01/14		
Project:	TRAC	**Temperature:**	21 °C		
Job Site:	EV01	**Humidity:**	32% RH		
Serial Number:	41007123	**Barometric Pres.:**	1005 mbar	**Tested by:**	Jared Ison, Brandon Hobbs
EUT:	TRAC-Lid BT SMART				
Configuration:	2				
Customer:	Supra, A Division of UTCFS				
Attendees:	None				
EUT Power:	Internal Battery, 3VDC				
Operating Mode:	Continuous Tx				
Deviations:	None				
Comments:	See comments below for EUT Channel, frequency and orientation.				

Test Specifications	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

Run #	59	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
7438.842	25.9	20.1	1.0	82.0	3.0	0.0	Vert	AV	0.0	46.0	54.0	-8.0	High Ch. 2480MHz, ADV, On Side
7437.558	25.9	20.1	1.0	313.0	3.0	0.0	Horz	AV	0.0	46.0	54.0	-8.0	High Ch. 2480MHz, ADV, Vert
7435.658	25.8	20.1	1.0	140.0	3.0	0.0	Horz	AV	0.0	45.9	54.0	-8.1	High Ch. 2478MHz, DATA, Vert
7433.558	25.8	20.1	1.6	273.0	3.0	0.0	Vert	AV	0.0	45.9	54.0	-8.1	High Ch. 2478MHz, DATA, On Side
7327.517	26.1	19.5	2.6	195.0	3.0	0.0	Vert	AV	0.0	45.6	54.0	-8.4	Mid Ch. 2442MHz, DATA, On Side
7326.808	26.1	19.5	1.0	4.0	3.0	0.0	Horz	AV	0.0	45.6	54.0	-8.4	Mid Ch. 2442MHz, DATA, Vert
7278.317	26.2	19.1	1.0	103.0	3.0	0.0	Horz	AV	0.0	45.3	54.0	-8.7	Mid Ch. 2426MHz, ADV, Vert
7278.700	25.9	19.1	1.0	58.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	Mid Ch. 2426MHz, ADV, On Side
4808.175	28.4	10.6	1.0	147.0	3.0	0.0	Horz	AV	0.0	39.0	54.0	-15.0	Low Ch. 2404MHz, DATA, Vert
4956.908	25.2	11.5	1.0	59.0	3.0	0.0	Horz	AV	0.0	36.7	54.0	-17.3	High Ch. 2478MHz, DATA, Vert
7325.592	37.2	19.5	2.6	195.0	3.0	0.0	Vert	PK	0.0	56.7	74.0	-17.3	Mid Ch. 2442MHz, DATA, On Side
4958.958	25.1	11.5	2.2	359.0	3.0	0.0	Horz	AV	0.0	36.6	54.0	-17.4	High Ch. 2480MHz, ADV, Vert
7440.700	36.5	20.1	1.0	313.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	High Ch. 2480MHz, ADV, Vert
4958.292	25.1	11.5	1.0	147.0	3.0	0.0	Vert	AV	0.0	36.6	54.0	-17.4	High Ch. 2478MHz, DATA, On Side
4853.035	25.7	10.8	1.0	145.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	Mid Ch. 2426MHz, ADV, On Side
4882.575	25.5	11.0	1.0	127.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	Mid Ch. 2442MHz, DATA, On Side
4881.733	25.5	11.0	2.6	347.0	3.0	0.0	Horz	AV	0.0	36.5	54.0	-17.5	Mid Ch. 2442MHz, DATA, Vert
4805.175	25.9	10.6	3.5	135.0	3.0	0.0	Horz	AV	0.0	36.5	54.0	-17.5	Low Ch. 2402MHz, ADV, Vert
7441.725	36.3	20.1	1.0	82.0	3.0	0.0	Vert	PK	0.0	56.4	74.0	-17.6	High Ch. 2480MHz, ADV, On Side
4851.217	25.6	10.8	1.0	112.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Mid Ch. 2426MHz, ADV, Vert
4808.405	25.8	10.6	1.0	328.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Low Ch. 2404MHz, DATA, On Side
7278.450	37.2	19.1	1.0	58.0	3.0	0.0	Vert	PK	0.0	56.3	74.0	-17.7	Mid Ch. 2426MHz, ADV, On Side
7434.683	36.2	20.1	1.0	140.0	3.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	High Ch. 2478MHz, DATA, Vert
4805.000	25.7	10.5	1.0	56.0	3.0	0.0	Vert	AV	0.0	36.2	54.0	-17.8	Low Ch. 2402MHz, ADV, On Side
7433.708	36.1	20.1	1.6	273.0	3.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	High Ch. 2478MHz, DATA, On Side
7323.533	36.5	19.4	1.0	4.0	3.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	Mid Ch. 2442MHz, DATA, Vert
7278.325	36.4	19.1	1.0	103.0	3.0	0.0	Horz	PK	0.0	55.5	74.0	-18.5	Mid Ch. 2426MHz, ADV, Vert

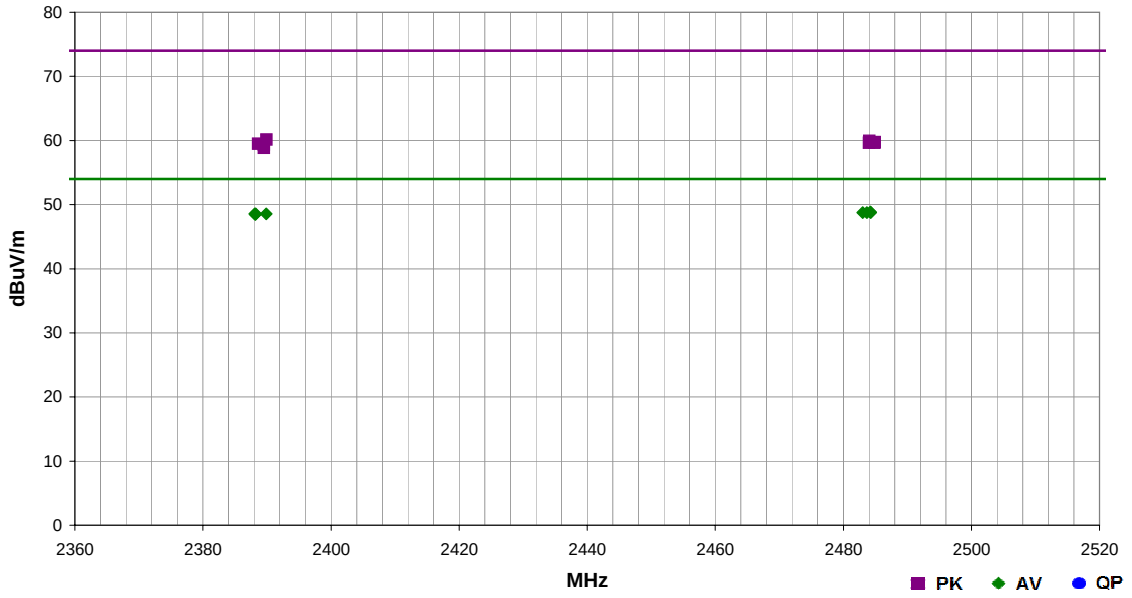
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4958.183	20.7	11.5	1.0	214.0	3.0	0.0	Vert	AV	0.0	32.2	54.0	-21.8	High Ch. 2480MHz, ADV, On Side
12398.970	32.0	-0.9	1.0	257.0	3.0	0.0	Vert	AV	0.0	31.1	54.0	-22.9	High Ch. 2480MHz, ADV, On Side
12399.030	31.8	-0.9	1.1	252.0	3.0	0.0	Horz	AV	0.0	30.9	54.0	-23.1	High Ch. 2480MHz, ADV, Vert
12389.020	31.3	-0.9	1.0	256.0	3.0	0.0	Vert	AV	0.0	30.4	54.0	-23.6	High Ch. 2478MHz, DATA, On Side
12391.320	31.1	-0.9	1.1	255.0	3.0	0.0	Horz	AV	0.0	30.2	54.0	-23.8	High Ch. 2478MHz, DATA, Vert
12128.890	31.7	-1.5	1.0	329.0	3.0	0.0	Vert	AV	0.0	30.2	54.0	-23.8	Mid Ch. 2426MHz, ADV, On Side
12209.110	30.3	-1.0	1.0	45.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	Mid Ch. 2442MHz, DATA, On Side
12008.980	30.7	-2.2	1.0	47.0	3.0	0.0	Vert	AV	0.0	28.5	54.0	-25.5	Low Ch. 2402MHz, ADV, On Side
4808.550	37.8	10.6	1.0	147.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Low Ch. 2404MHz, DATA, Vert
4960.725	36.7	11.5	1.0	214.0	3.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	High Ch. 2480MHz, ADV, On Side
12021.280	30.1	-2.1	1.0	43.0	3.0	0.0	Vert	AV	0.0	28.0	54.0	-26.0	Low Ch. 2404MHz, DATA, On Side
4955.375	35.9	11.5	1.0	59.0	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	High Ch. 2478MHz, DATA, Vert
4809.360	36.7	10.6	1.0	328.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Low Ch. 2404MHz, DATA, On Side
4957.258	35.7	11.5	1.0	147.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	High Ch. 2478MHz, DATA, On Side
12209.000	28.2	-1.0	1.1	308.0	3.0	0.0	Horz	AV	0.0	27.2	54.0	-26.8	Mid Ch. 2442MHz, DATA, Vert
4802.840	36.6	10.5	3.5	135.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Low Ch. 2402MHz, ADV, Vert
4852.945	36.3	10.8	1.0	145.0	3.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	Mid Ch. 2426MHz, ADV, On Side
4883.917	36.1	11.0	2.6	347.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Mid Ch. 2442MHz, DATA, Vert
4959.150	35.5	11.5	2.2	359.0	3.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	High Ch. 2480MHz, ADV, Vert
4850.033	36.1	10.8	1.0	112.0	3.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	Mid Ch. 2426MHz, ADV, Vert
12128.920	28.4	-1.5	1.0	148.0	3.0	0.0	Horz	AV	0.0	26.9	54.0	-27.1	Mid Ch. 2426MHz, ADV, Vert
12019.030	29.0	-2.1	1.3	183.0	3.0	0.0	Horz	AV	0.0	26.9	54.0	-27.1	Low Ch. 2404MHz, DATA, Vert
4803.720	36.3	10.5	1.0	56.0	3.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	Low Ch. 2402MHz, ADV, On Side
4882.725	35.7	11.0	1.0	127.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Mid Ch. 2442MHz, DATA, On Side
12008.920	28.3	-2.2	1.0	153.0	3.0	0.0	Horz	AV	0.0	26.1	54.0	-27.9	Low Ch. 2402MHz, ADV, Vert
12398.950	41.8	-0.9	1.1	252.0	3.0	0.0	Horz	PK	0.0	40.9	74.0	-33.1	High Ch. 2480MHz, ADV, Vert
12398.930	41.5	-0.9	1.0	257.0	3.0	0.0	Vert	PK	0.0	40.6	74.0	-33.4	High Ch. 2480MHz, ADV, On Side
12130.200	41.1	-1.5	1.0	329.0	3.0	0.0	Vert	PK	0.0	39.6	74.0	-34.4	Mid Ch. 2426MHz, ADV, On Side
12390.030	40.5	-0.9	1.0	256.0	3.0	0.0	Vert	PK	0.0	39.6	74.0	-34.4	High Ch. 2478MHz, DATA, On Side
12391.350	40.3	-0.9	1.1	255.0	3.0	0.0	Horz	PK	0.0	39.4	74.0	-34.6	High Ch. 2478MHz, DATA, Vert
12008.870	40.7	-2.2	1.0	47.0	3.0	0.0	Vert	PK	0.0	38.5	74.0	-35.5	Low Ch. 2402MHz, ADV, On Side
12211.270	39.0	-1.0	1.0	45.0	3.0	0.0	Vert	PK	0.0	38.0	74.0	-36.0	Mid Ch. 2442MHz, DATA, On Side
12019.300	40.0	-2.1	1.0	43.0	3.0	0.0	Vert	PK	0.0	37.9	74.0	-36.1	Low Ch. 2404MHz, DATA, On Side
12021.360	39.4	-2.1	1.3	183.0	3.0	0.0	Horz	PK	0.0	37.3	74.0	-36.7	Low Ch. 2404MHz, DATA, Vert
12129.680	38.4	-1.5	1.0	148.0	3.0	0.0	Horz	PK	0.0	36.9	74.0	-37.1	Mid Ch. 2426MHz, ADV, Vert
12208.940	37.9	-1.0	1.1	308.0	3.0	0.0	Horz	PK	0.0	36.9	74.0	-37.1	Mid Ch. 2442MHz, DATA, Vert
12008.830	38.0	-2.2	1.0	153.0	3.0	0.0	Horz	PK	0.0	35.8	74.0	-38.2	Low Ch. 2402MHz, ADV, Vert

SPURIOUS RADIATED EMISSIONS

Work Order:	SUPR0114	**Date:**	03/01/14		
Project:	TRAC	**Temperature:**	21 °C		
Job Site:	EV01	**Humidity:**	32% RH		
Serial Number:	41007123	**Barometric Pres.:**	1005 mbar	**Tested by:**	Jared Ison, Brandon Hobbs
EUT:	TRAC-Lid BT SMART				
Configuration:	2				
Customer:	Supra, A Division of UTCFS				
Attendees:	None				
EUT Power:	Internal Battery, 3VDC				
Operating Mode:	Continuous Tx				
Deviations:	None				
Comments:	See comments below for EUT Channel, frequency and orientation.				

Test Specifications	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

Run #	65	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
2484.237	26.2	2.7	1.7	153.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	High Ch. 2478MHz, DATA, Horz
2484.297	26.1	2.7	1.0	259.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2478MHz, DATA, On Side
2483.683	26.1	2.7	1.0	106.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, ADV, On Side
2483.037	26.1	2.6	1.0	156.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, ADV, Horz
2388.073	26.3	2.3	1.0	302.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, ADV, Horz
2388.253	26.3	2.3	2.9	232.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, ADV, On Side
2389.877	26.3	2.3	1.8	224.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	Low Ch. 2404MHz, DATA, On Side
2388.170	26.2	2.3	1.0	157.0	3.0	20.0	Vert	AV	0.0	48.5	54.0	-5.5	Low Ch. 2404MHz, DATA, Horz
2389.943	37.9	2.3	1.8	224.0	3.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	Low Ch. 2404MHz, DATA, On Side
2484.087	37.3	2.7	1.7	153.0	3.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	High Ch. 2478MHz, DATA, Horz
2484.937	37.1	2.7	1.0	259.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	High Ch. 2478MHz, DATA, On Side
2484.877	37.0	2.7	1.0	156.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	High Ch. 2480MHz, ADV, Horz
2484.033	37.0	2.7	1.0	106.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	High Ch. 2480MHz, ADV, On Side
2388.640	37.2	2.3	1.0	302.0	3.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	Low Ch. 2402MHz, ADV, Horz
2389.547	37.1	2.3	1.0	157.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	Low Ch. 2404MHz, DATA, Horz
2389.527	36.6	2.3	2.9	232.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	Low Ch. 2402MHz, ADV, On Side