



Supra, A Division of UTCFS

TRAC-Lid BT SMART

FCC 15.247:2014

Bluetooth BR and EDR portion of the radio

Report #: SUPR0114



Report Prepared By Northwest EMC Inc.

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

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

Last Date of Test: March 24, 2014
 Supra, A Division of UTCFS
 Model: TRAC-Lid BT SMART

Test Description	Specification	Test Method	Pass/Fail
Duty Cycle	FCC 15.247:2014	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2014	ANSI C63.10:2009	Pass
Occupied Bandwidth	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
Channel Separation	FCC 15.247:2014	ANSI C63.10:2009	Pass
Number of Hopping Channels	FCC 15.247:2014	ANSI C63.10:2009	Pass
Dwell Time	FCC 15.247:2014	ANSI C63.10:2009	Pass
Band Edge Compliance – Hopping Mode	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

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

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

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.

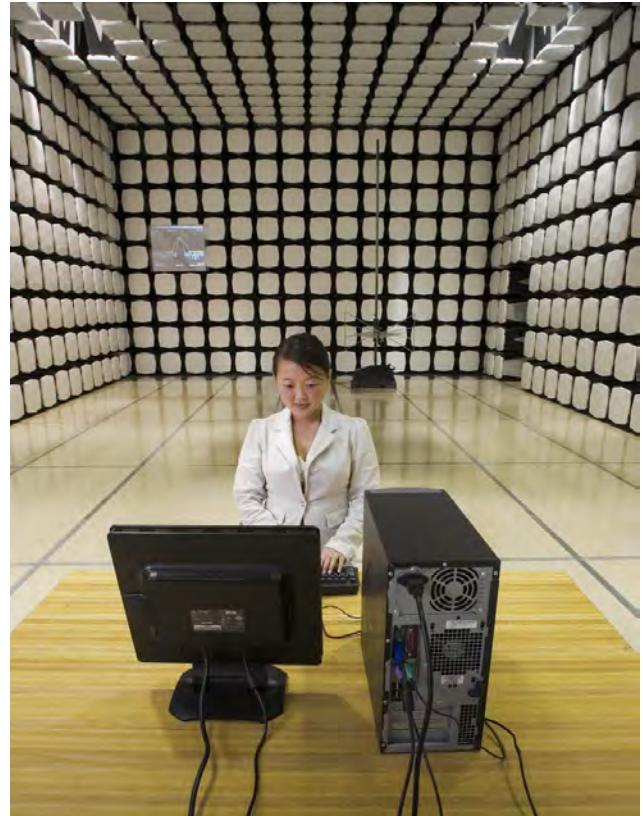
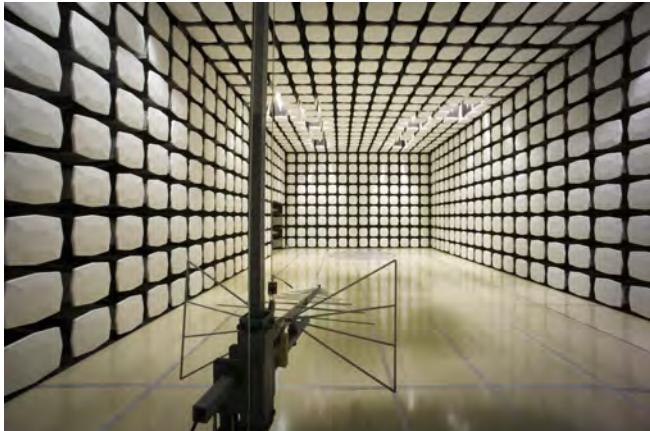
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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

FACILITIES



Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Minnesota Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Washington Labs NC01-05, SU02, SU07 19201 120 th 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 24, 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 BR and EDR 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, A Division of UTCFS	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, A Division of UTCFS	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.

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	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.
2	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.
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	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.
5	3/1/2014	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.
6	3/10/2014	Channel Separation	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.
7	3/10/2014	Number of Hopping Channels	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.
8	3/10/2014	Band Edge Compliance – Hopping Mode	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.
9	3/24/2014	Dwell Time	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

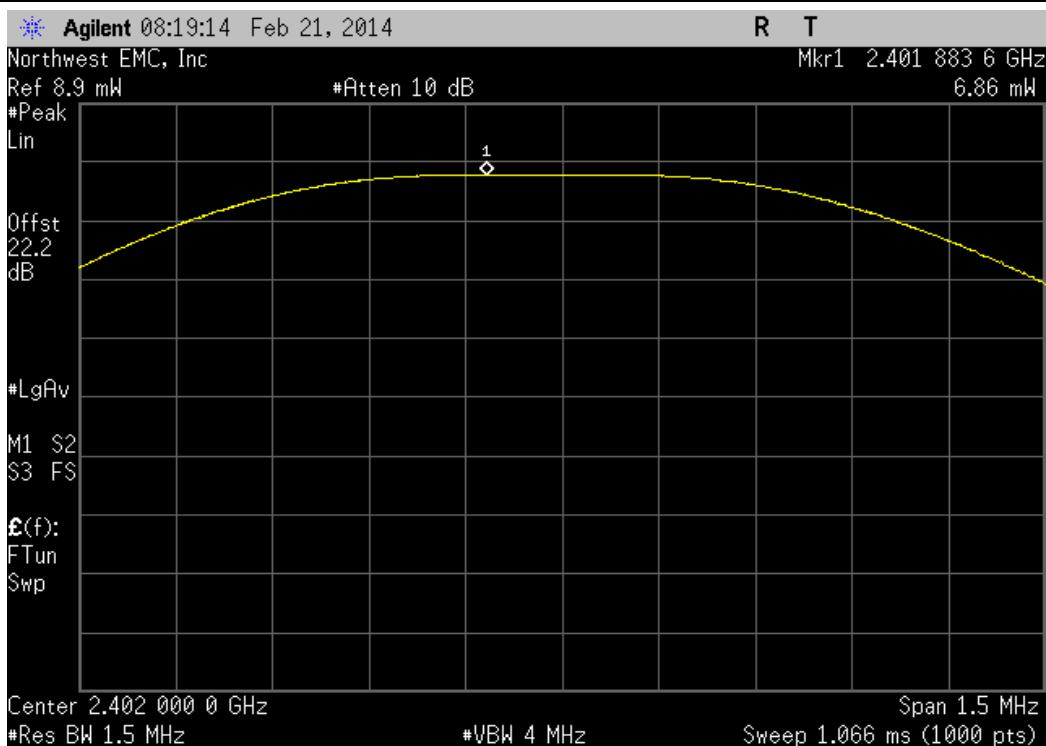
TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

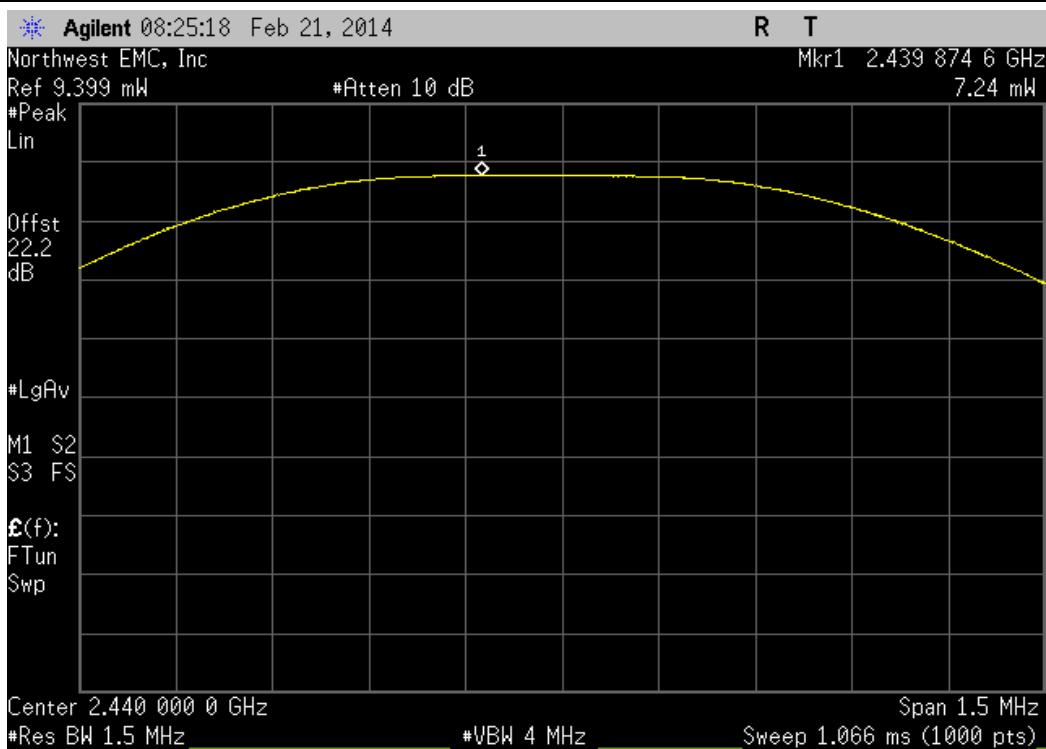
De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +27dBm.

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				
FCC 15.247:2014		Test Method: ANSI C63.10:2009		
COMMENTS				
Modes of operation tested were client provided.				
DEVIATIONS FROM TEST STANDARD				
Configuration #	1	Signature: 		
		Value	Limit	Result
DH5, GFSK				
Low Channel, 2402 MHz		6.858 mW	< 125 mW	Pass
Mid Channel, 2440 MHz		7.238 mW	< 125 mW	Pass
High Channel, 2480 MHz		7.382 mW	< 125 mW	Pass
2DH5, pi/4-DQPSK				
Low Channel, 2402 MHz		7.015 mW	< 125 mW	Pass
Mid Channel, 2440 MHz		7.391 mW	< 125 mW	Pass
High Channel, 2480 MHz		7.497 mW	< 125 mW	Pass
3DH5, 8-DPSK				
Low Channel, 2402 MHz		8.339 mW	< 125 mW	Pass
Mid Channel, 2440 MHz		8.794 mW	< 125 mW	Pass
High Channel, 2480 MHz		8.952 mW	< 125 mW	Pass

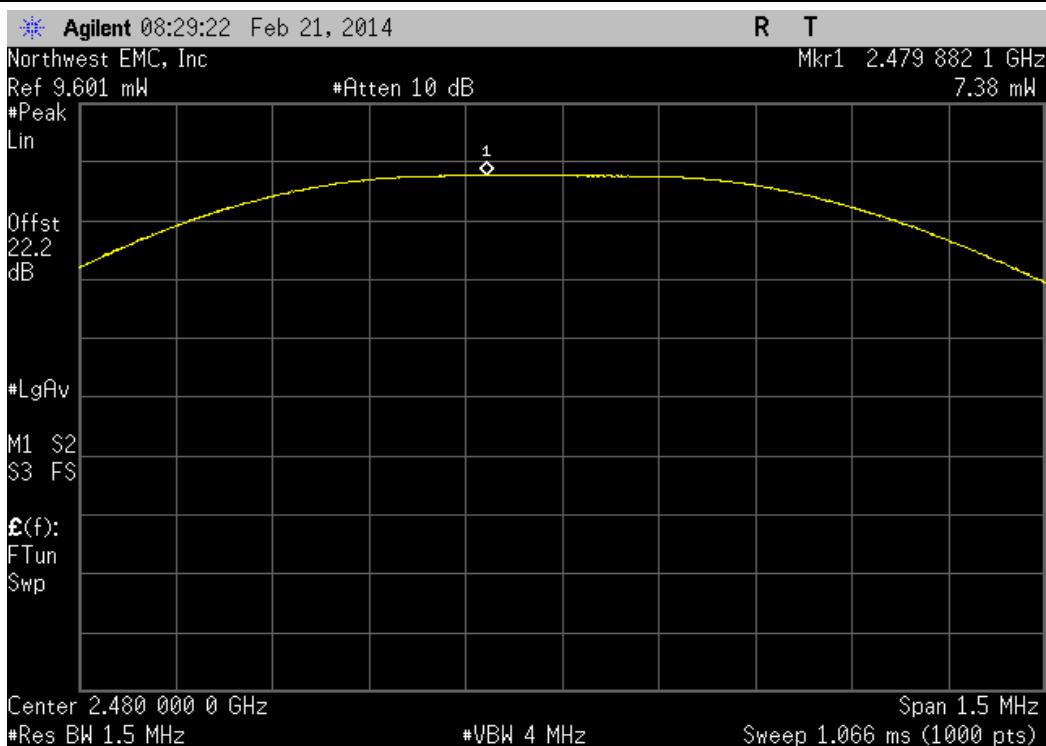
DH5, GFSK, Low Channel, 2402 MHz					
		Value	Limit	Result	
		6.858 mW	< 125 mW	Pass	



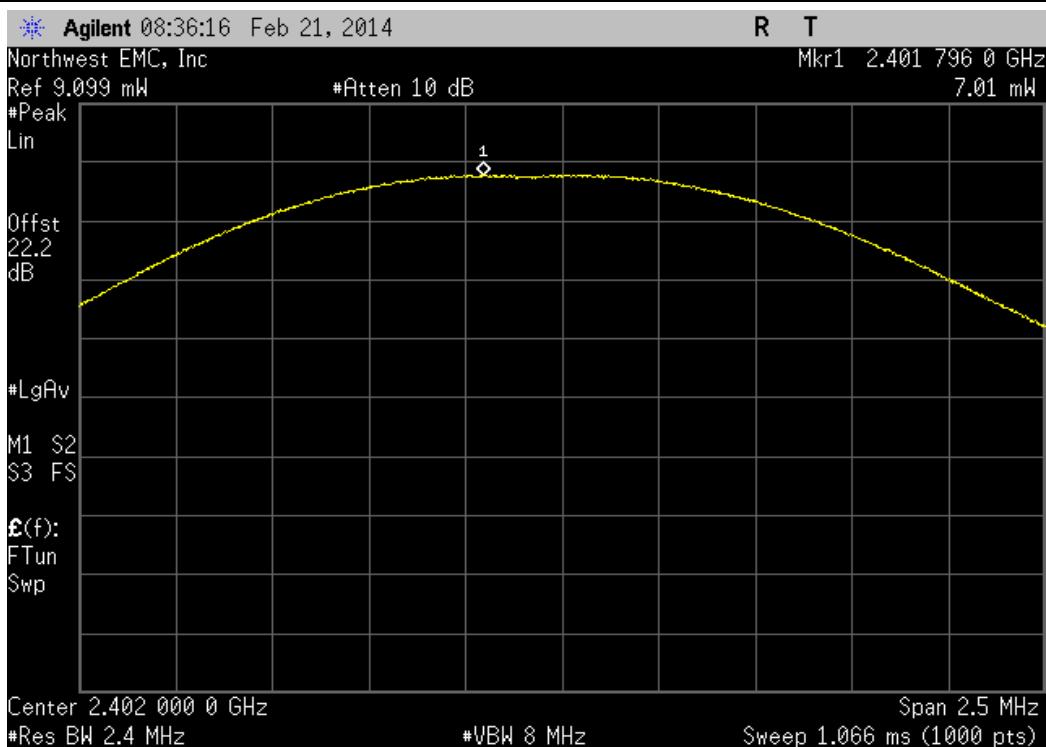
DH5, GFSK, Mid Channel, 2440 MHz					
		Value	Limit	Result	
		7.238 mW	< 125 mW	Pass	



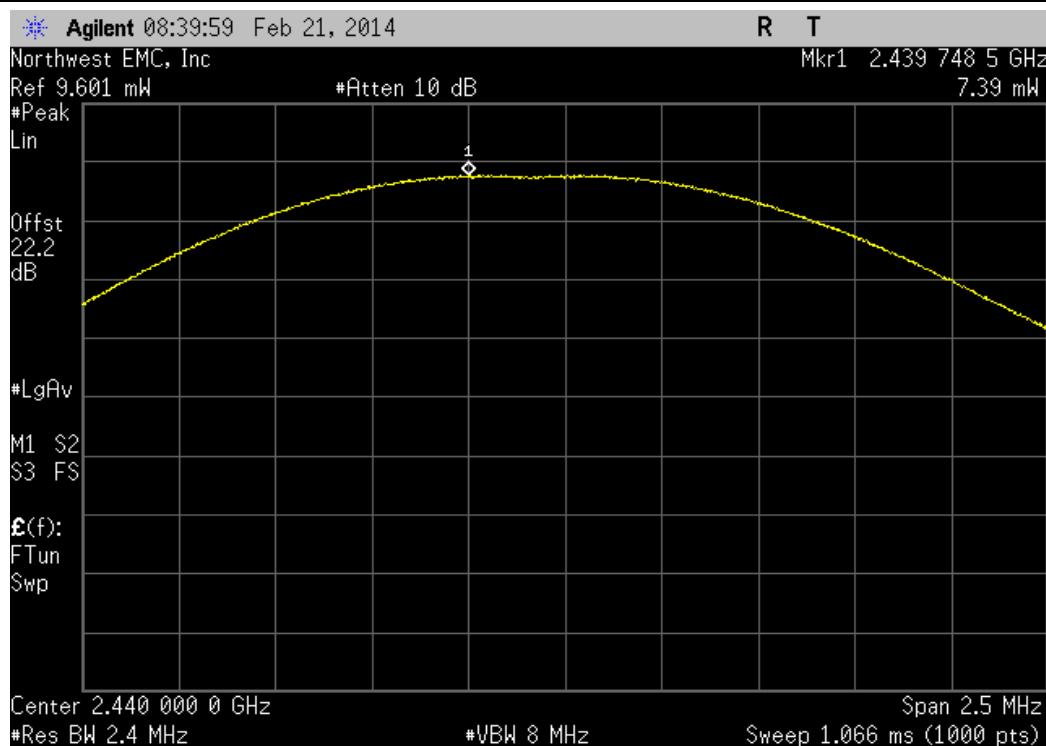
DH5, GFSK, High Channel, 2480 MHz			
	Value	Limit	Result
	7.382 mW	< 125 mW	Pass



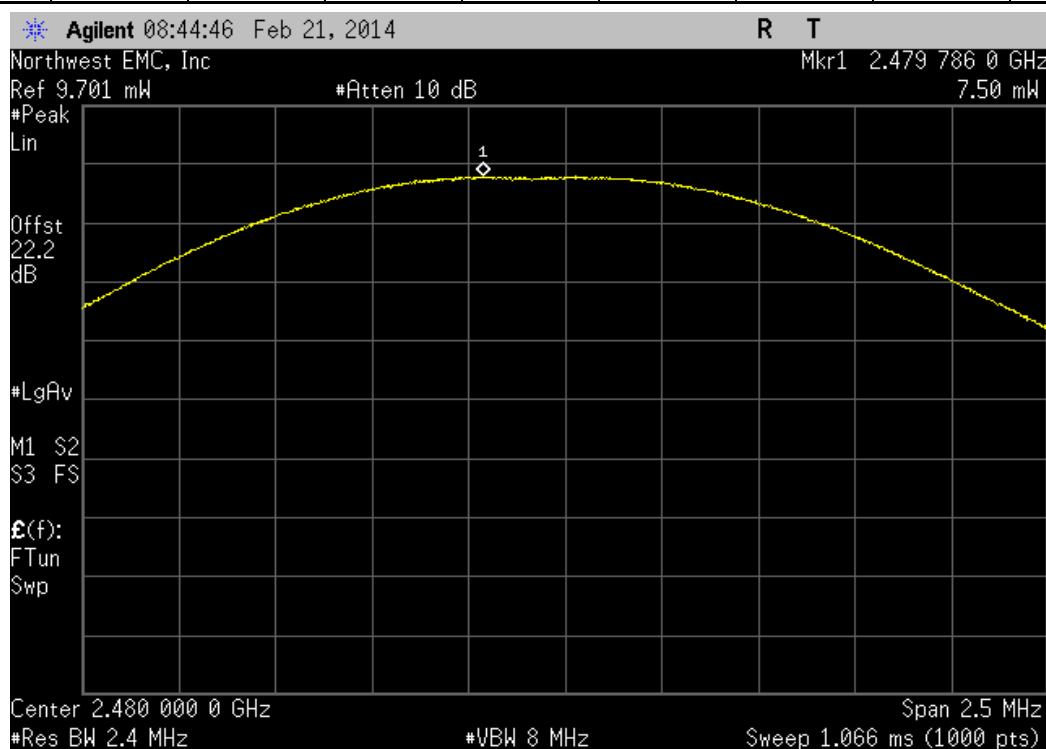
2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	7.015 mW	< 125 mW	Pass



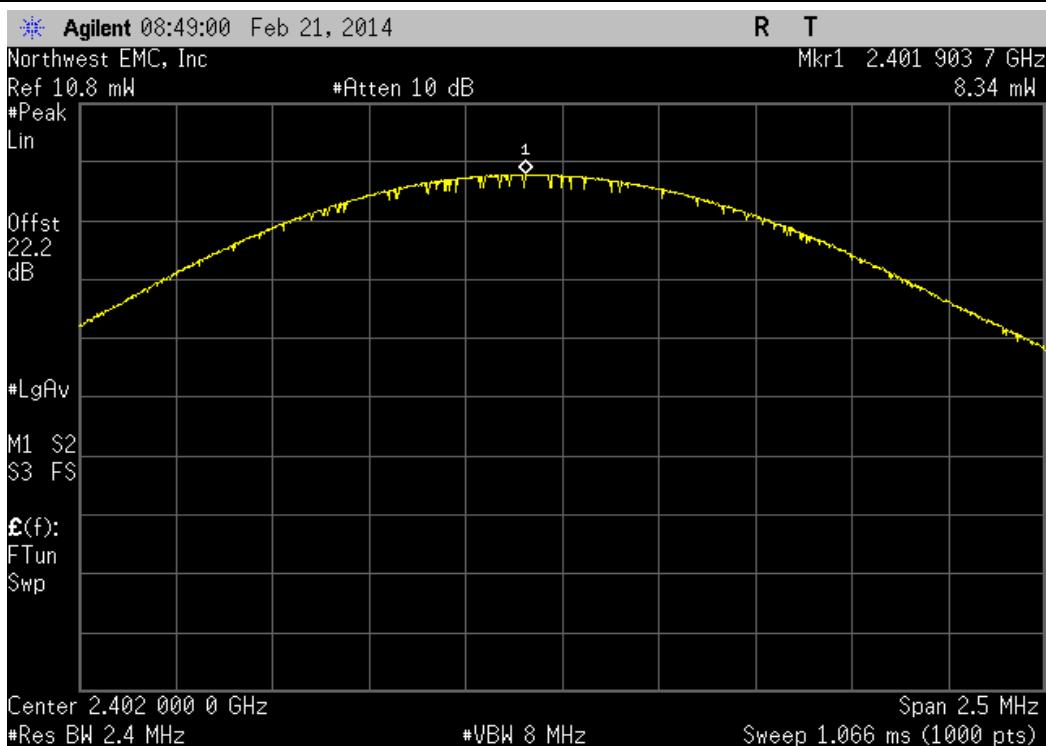
2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz					
			Value	Limit	Result
			7.391 mW	< 125 mW	Pass



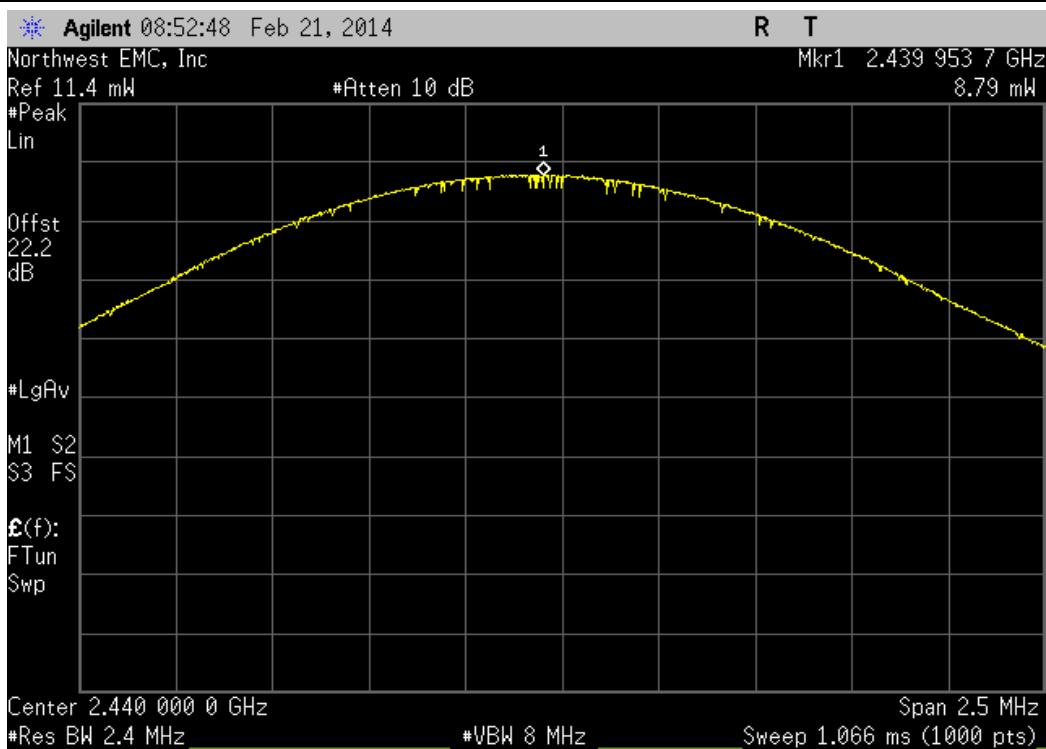
2DH5, pi/4-DQPSK, High Channel, 2480 MHz					
			Value	Limit	Result
			7.497 mW	< 125 mW	Pass



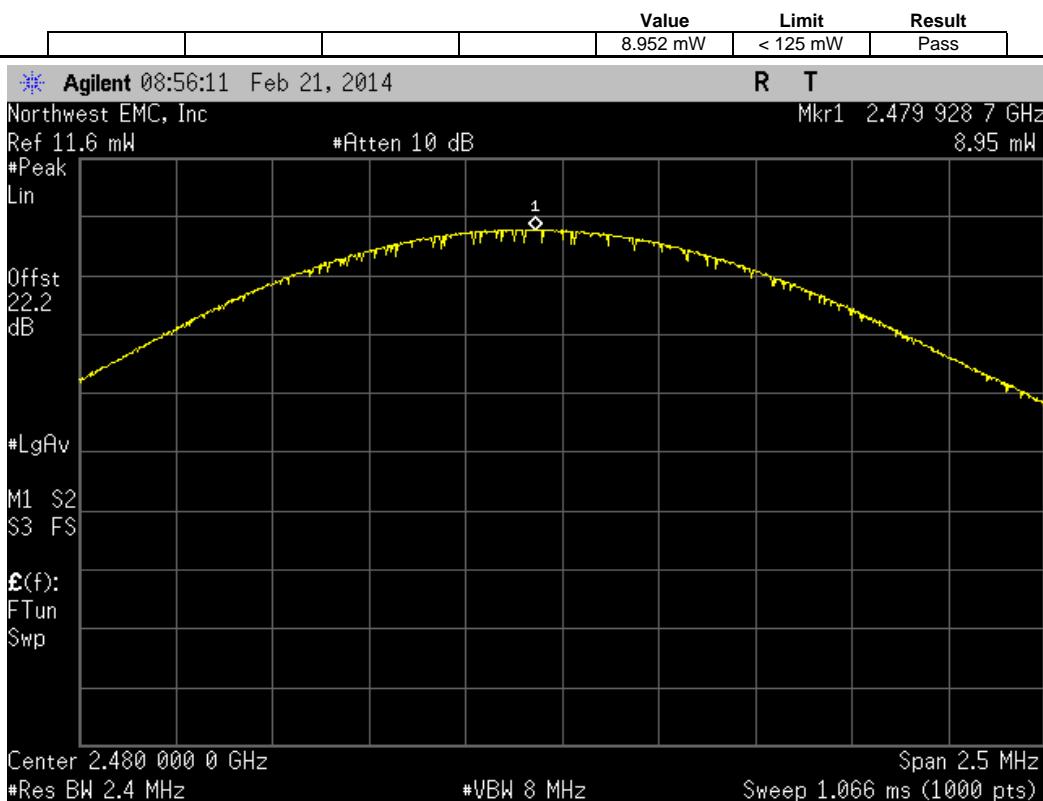
3DH5, 8-DPSK, Low Channel, 2402 MHz					
		Value	Limit	Result	
		8.339 mW	< 125 mW	Pass	



3DH5, 8-DPSK, Mid Channel, 2440 MHz					
		Value	Limit	Result	
		8.794 mW	< 125 mW	Pass	



3DH5, 8-DPSK, High Channel, 2480 MHz



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.

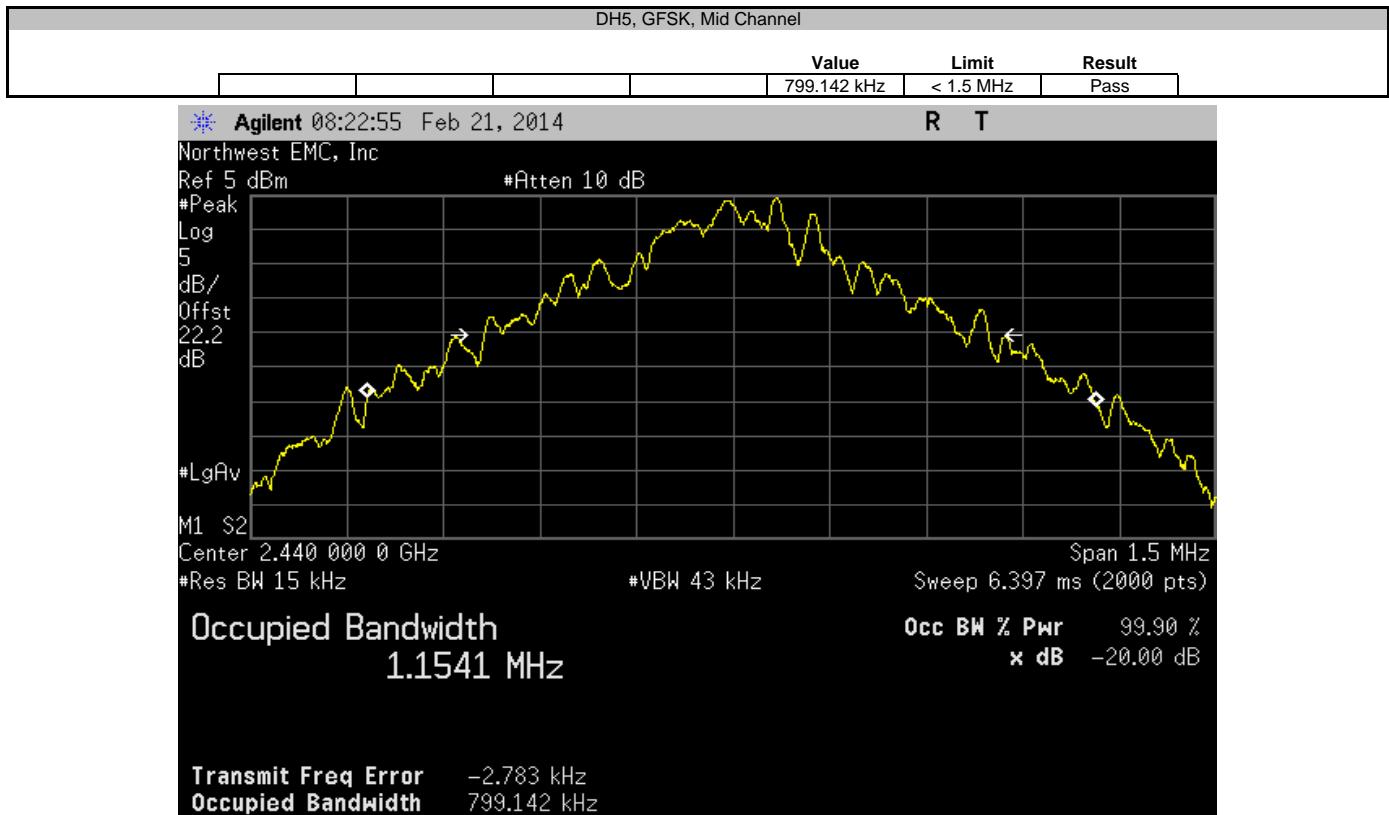
TEST EQUIPMENT

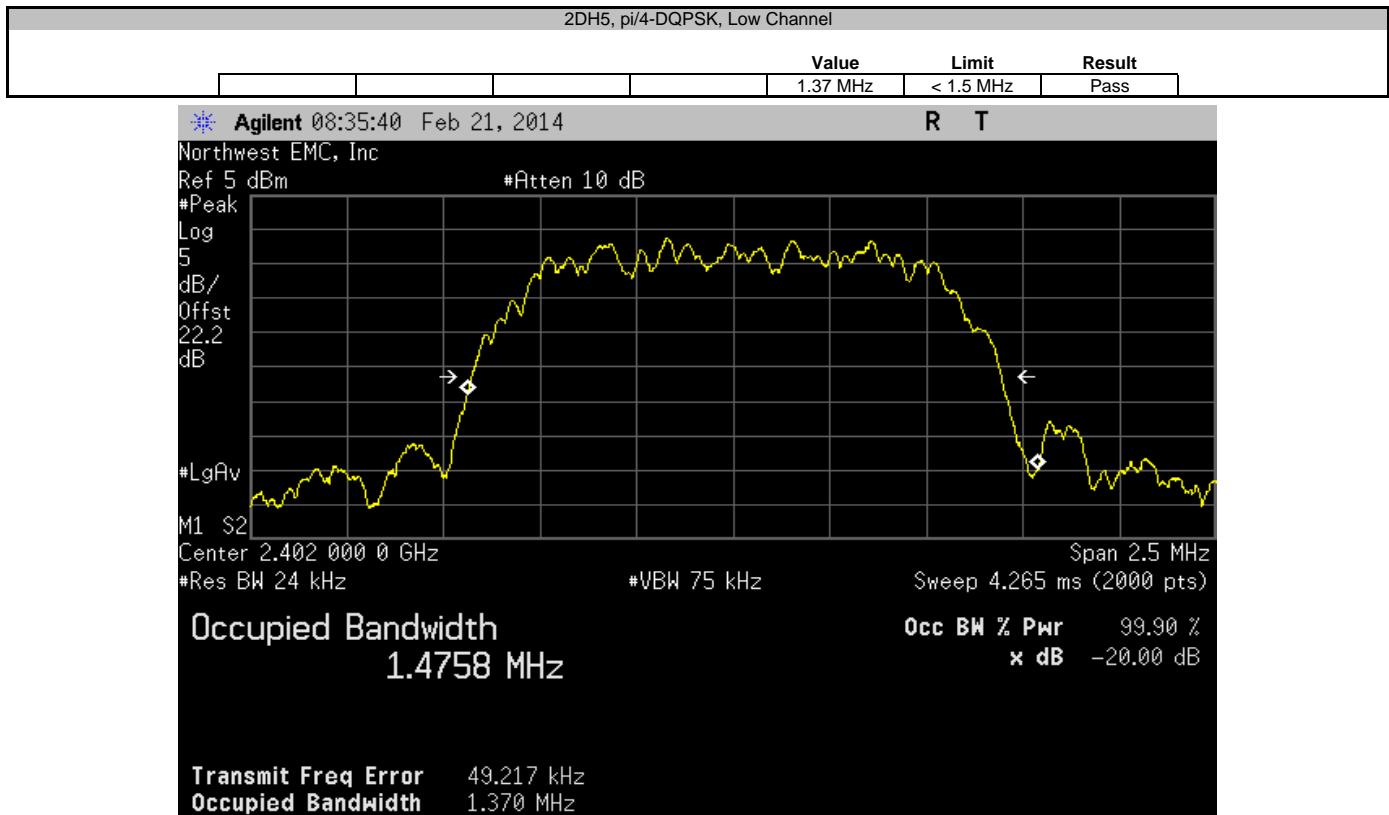
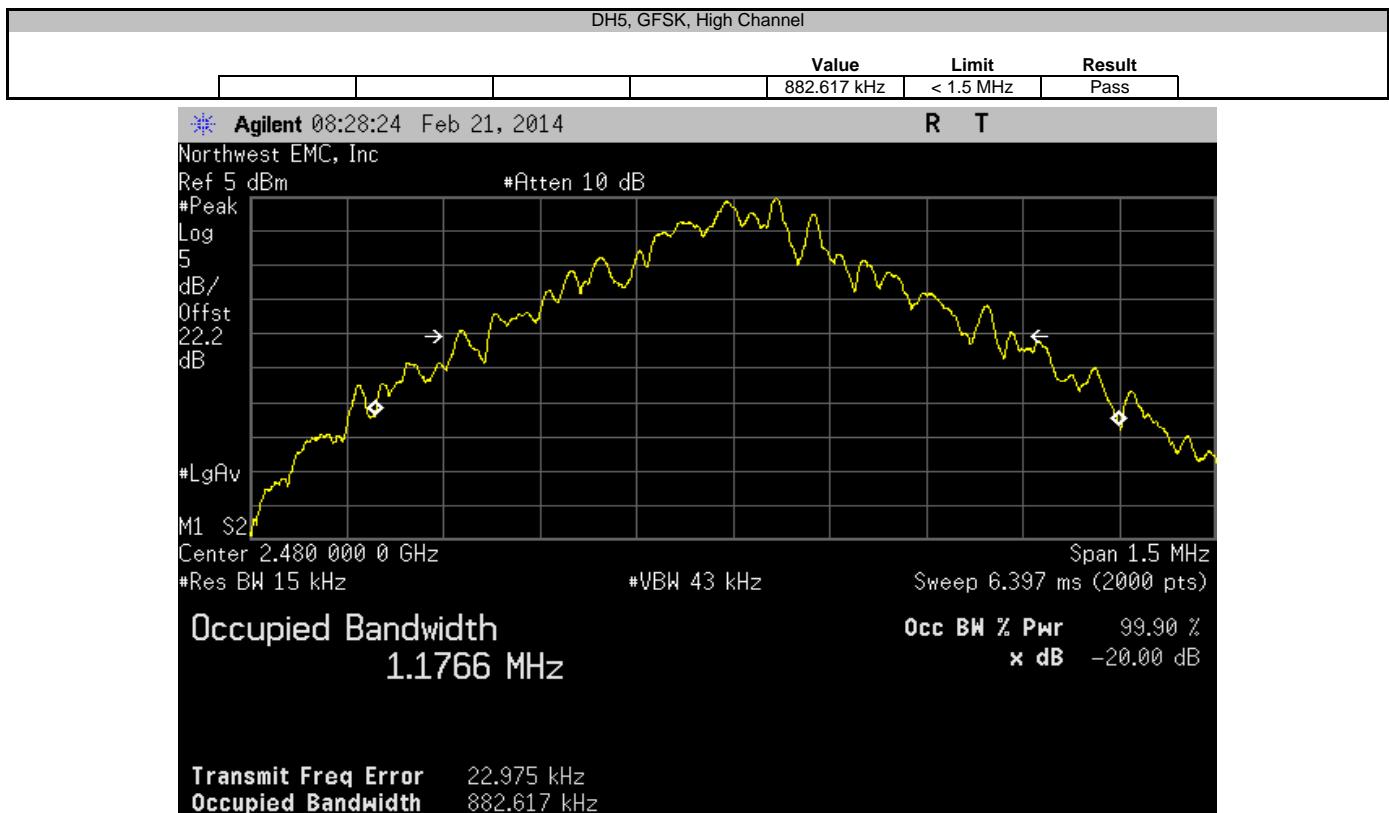
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	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

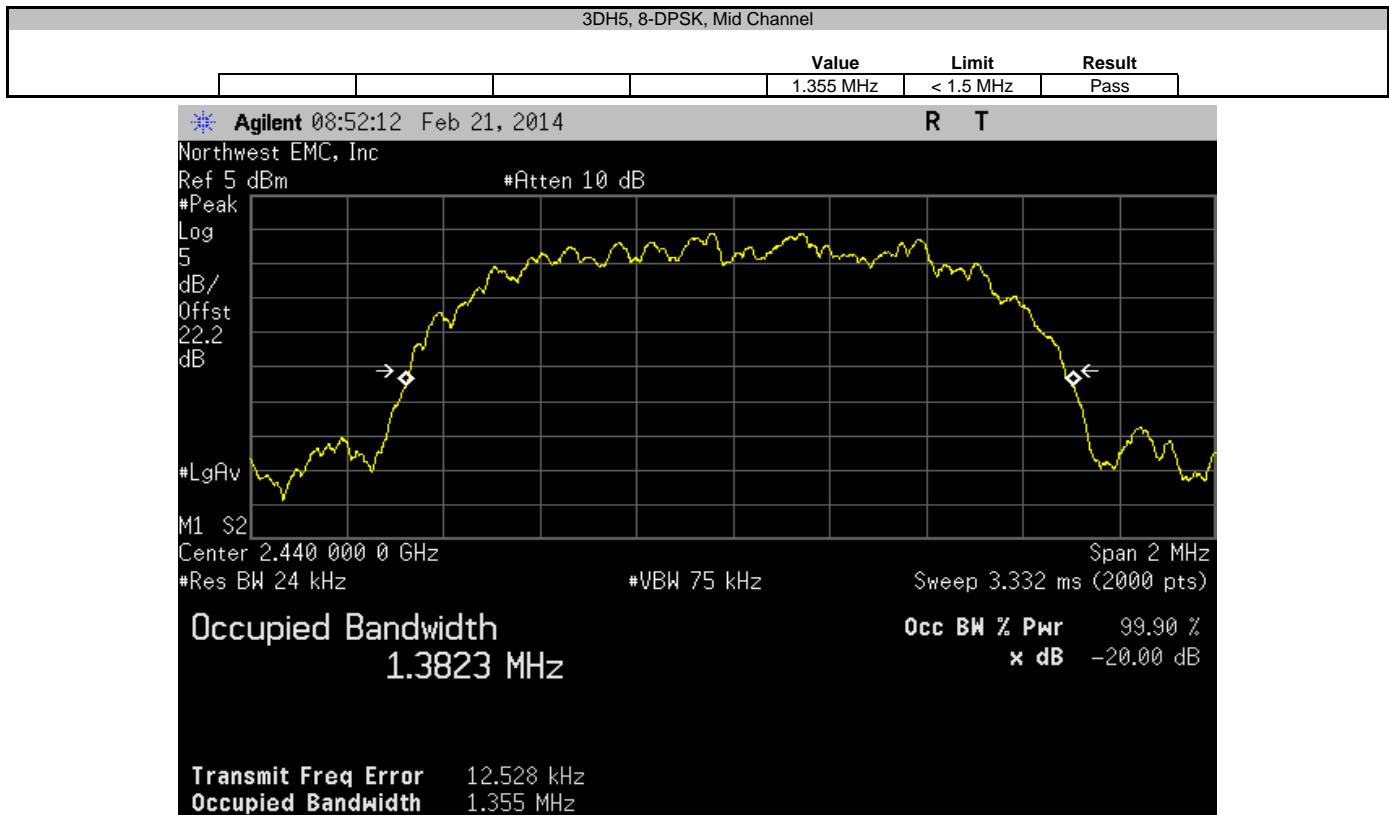
The occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

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				
FCC 15.247:2014		Test Method: ANSI C63.10:2009		
COMMENTS				
Mode of operation tested were client provided.				
DEVIATIONS FROM TEST STANDARD				
Configuration #	1	Signature: 		
		Value	Limit	Result
DH5, GFSK				
Low Channel, 2402 MHz		799.454 kHz	< 1.5 MHz	Pass
Mid Channel, 2440 MHz		799.142 kHz	< 1.5 MHz	Pass
High Channel, 2480 MHz		882.617 kHz	< 1.5 MHz	Pass
2DH5, pi/4-DQPSK				
Low Channel, 2402 MHz		1.37 MHz	< 1.5 MHz	Pass
Mid Channel, 2440 MHz		1.374 MHz	< 1.5 MHz	Pass
High Channel, 2480 MHz		1.366 MHz	< 1.5 MHz	Pass
3DH5, 8-DPSK				
Low Channel, 2402 MHz		1.358 MHz	< 1.5 MHz	Pass
Mid Channel, 2440 MHz		1.355 MHz	< 1.5 MHz	Pass
High Channel, 2480 MHz		1.356 MHz	< 1.5 MHz	Pass











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.

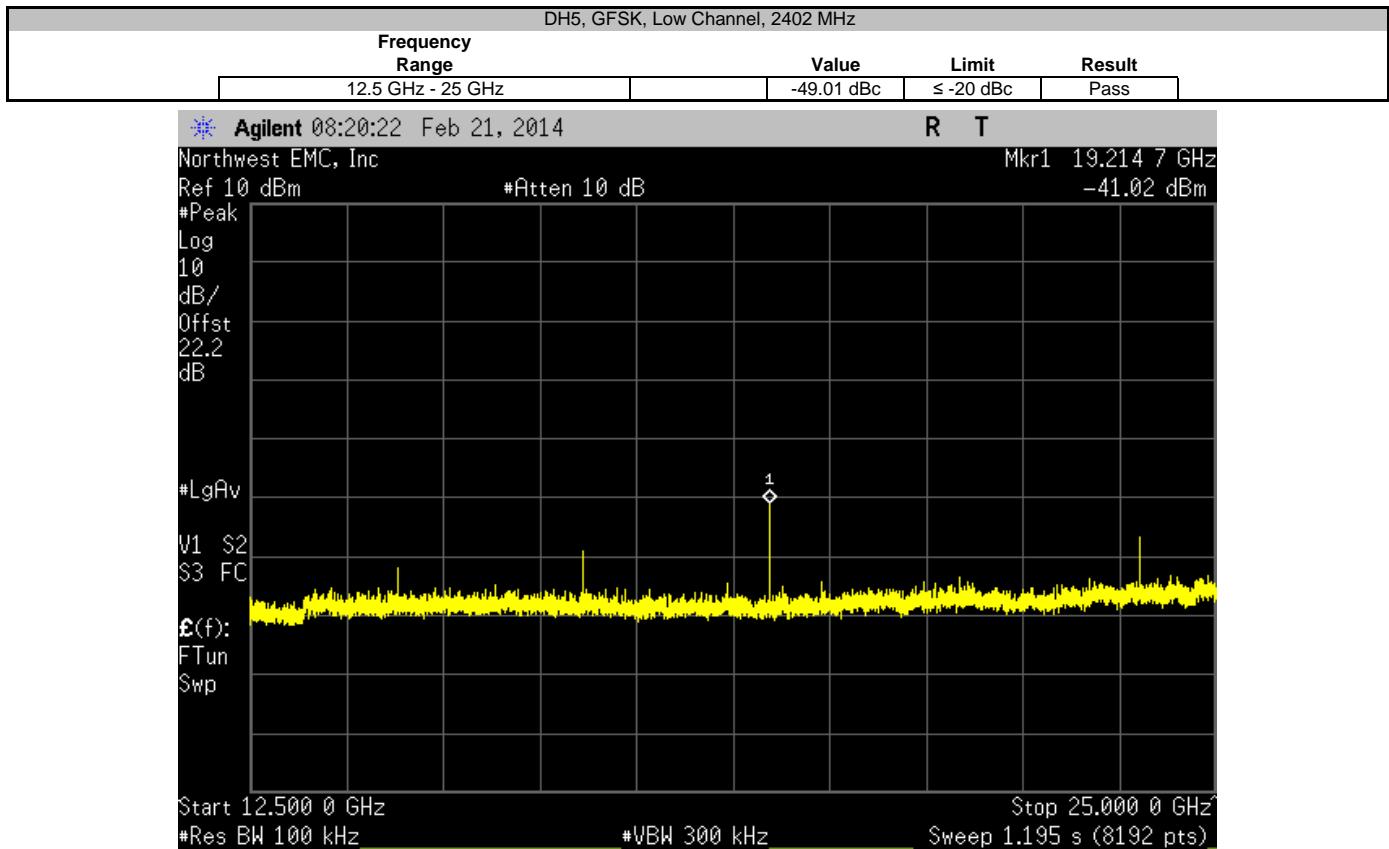
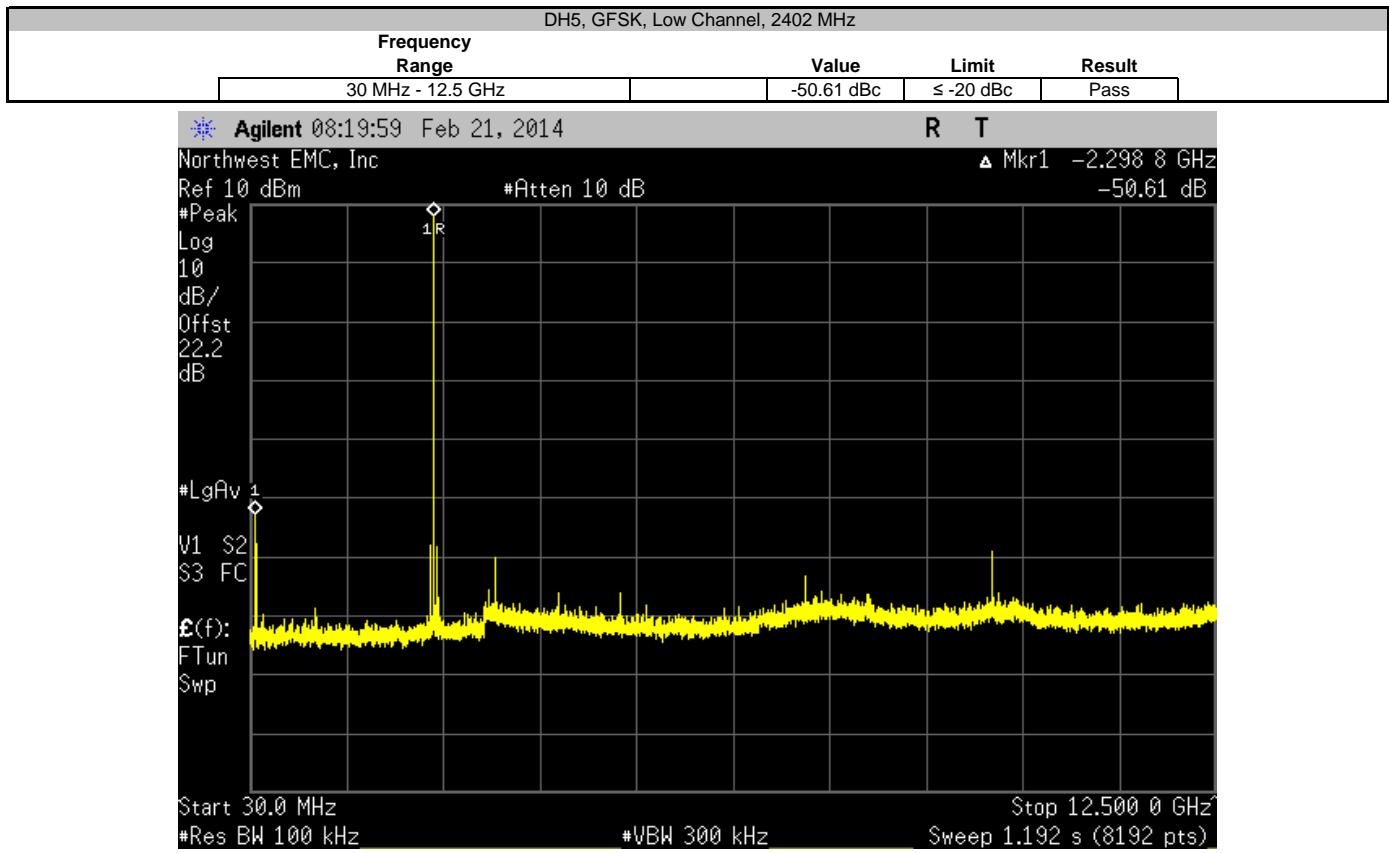
TEST EQUIPMENT

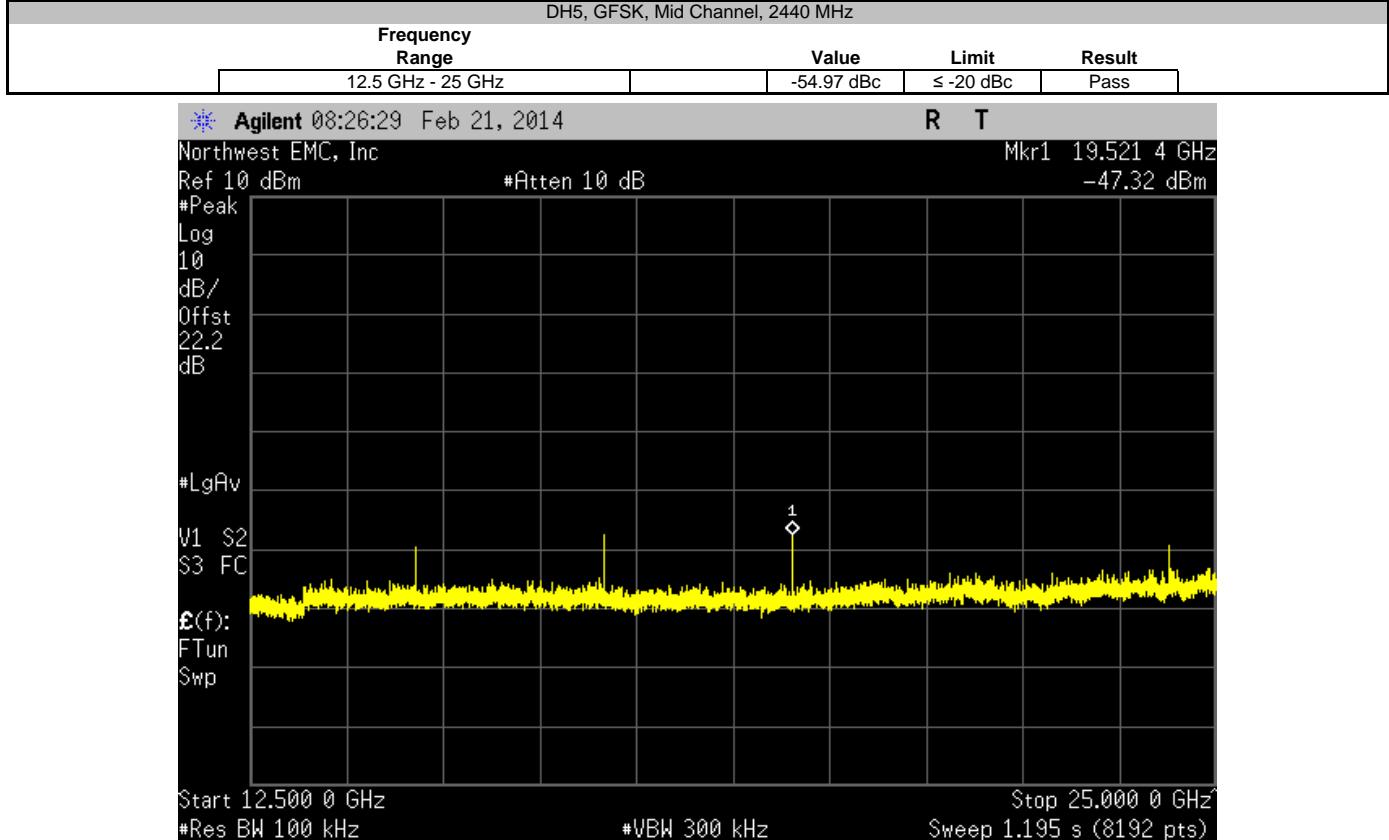
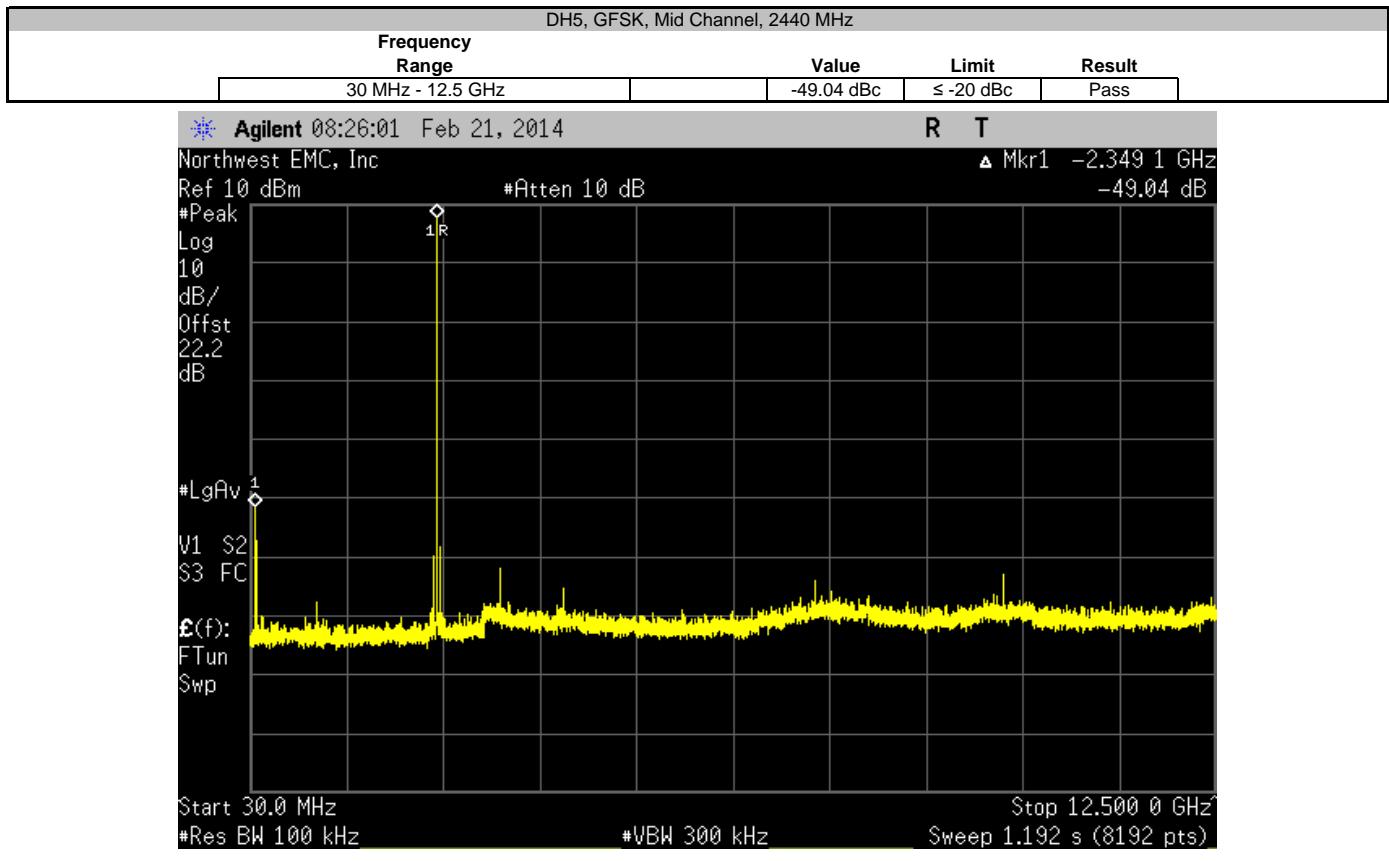
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/30/2013	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Attenuator, 6dB	S.M. Electronics	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

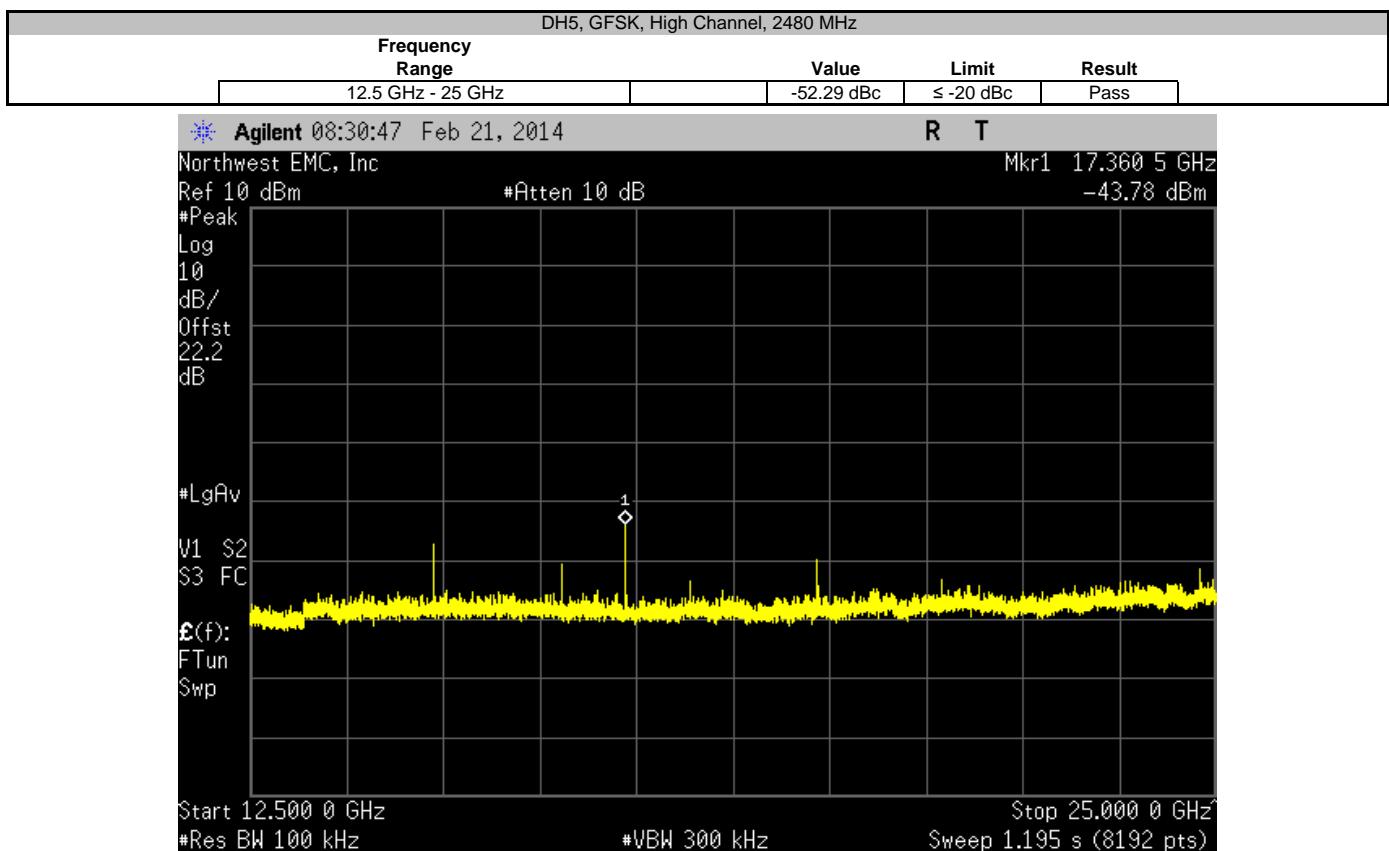
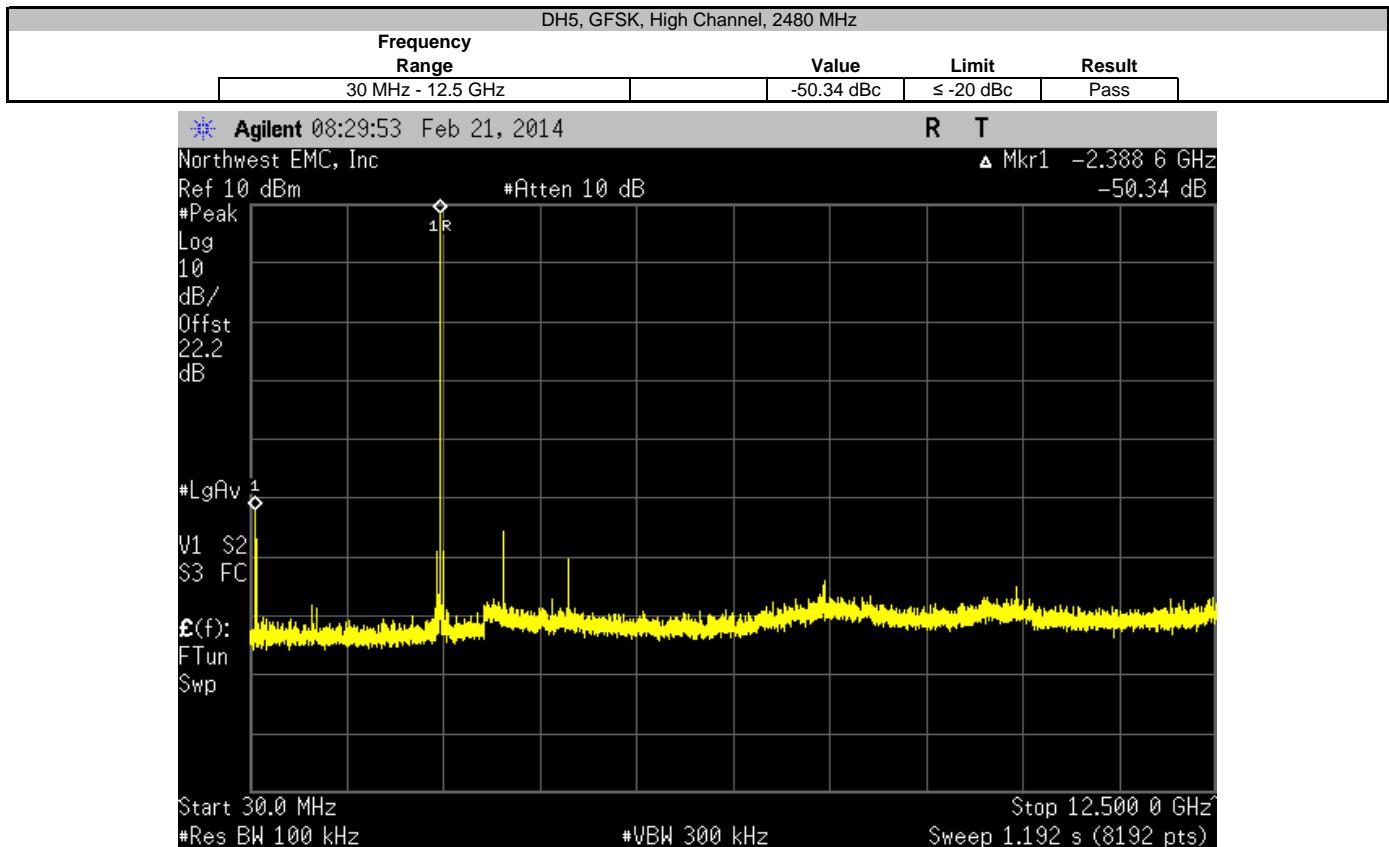
TEST DESCRIPTION

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 in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

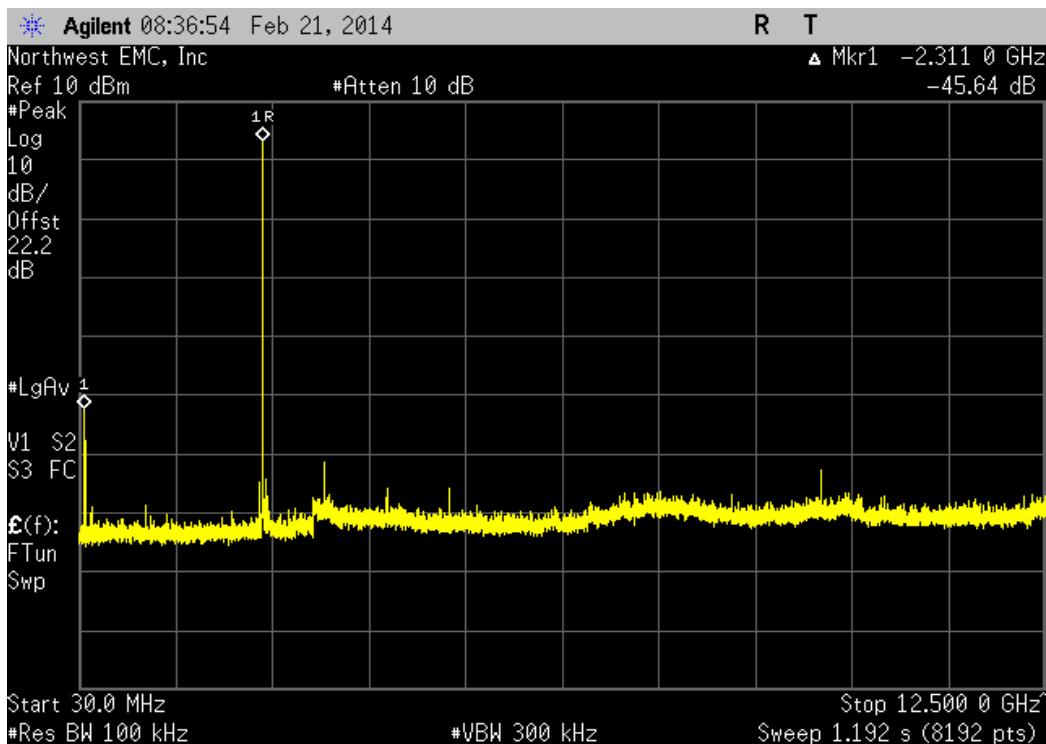
EUT: TRAC-Lid BT SMART		Work Order: SUPR0114			
Serial Number: 0019		Date: 02/24/14			
Customer: Supra, A Division of UTCFS		Temperature: 21.1°C			
Attendees: None		Humidity: 32%			
Project: TRAC		Barometric Pres.: 1015			
Tested by: Jared Ison, Brandon Hobbs		Power: Internal Battery, 3VDC		Job Site: EV06	
TEST SPECIFICATIONS					
FCC 15.247:2014		Test Method: ANSI C63.10:2009			
COMMENTS					
Mode of operation tested were					
DEVIATIONS FROM TEST STANDARD					
Configuration #	1	Signature			
		Frequency Range	Value	Limit	
DH5, GFSK				Result	
Low Channel, 2402 MHz		30 MHz - 12.5 GHz	-50.61 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz		12.5 GHz - 25 GHz	-49.01 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		30 MHz - 12.5 GHz	-49.04 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		12.5 GHz - 25 GHz	-54.97 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		30 MHz - 12.5 GHz	-50.34 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		12.5 GHz - 25 GHz	-52.29 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK				Result	
Low Channel, 2402 MHz		30 MHz - 12.5 GHz	-45.64 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz		12.5 GHz - 25 GHz	-48.28 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		30 MHz - 12.5 GHz	-45.82 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		12.5 GHz - 25 GHz	-54 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		30 MHz - 12.5 GHz	-45.83 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		12.5 GHz - 25 GHz	-51.98 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				Result	
Low Channel, 2402 MHz		30 MHz - 12.5 GHz	-45.39 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz		12.5 GHz - 25 GHz	-47.59 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		30 MHz - 12.5 GHz	-47.07 dBc	≤ -20 dBc	Pass
Mid Channel, 2440 MHz		12.5 GHz - 25 GHz	-53.22 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		30 MHz - 12.5 GHz	-45.84 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		12.5 GHz - 25 GHz	-53.98 dBc	≤ -20 dBc	Pass



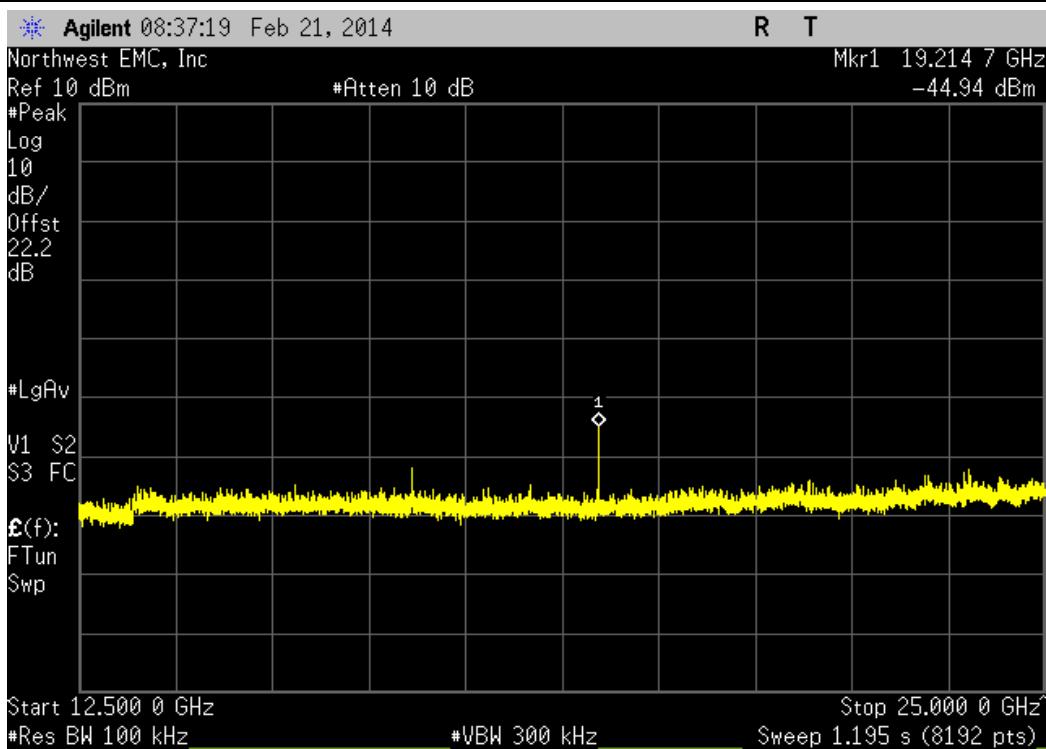




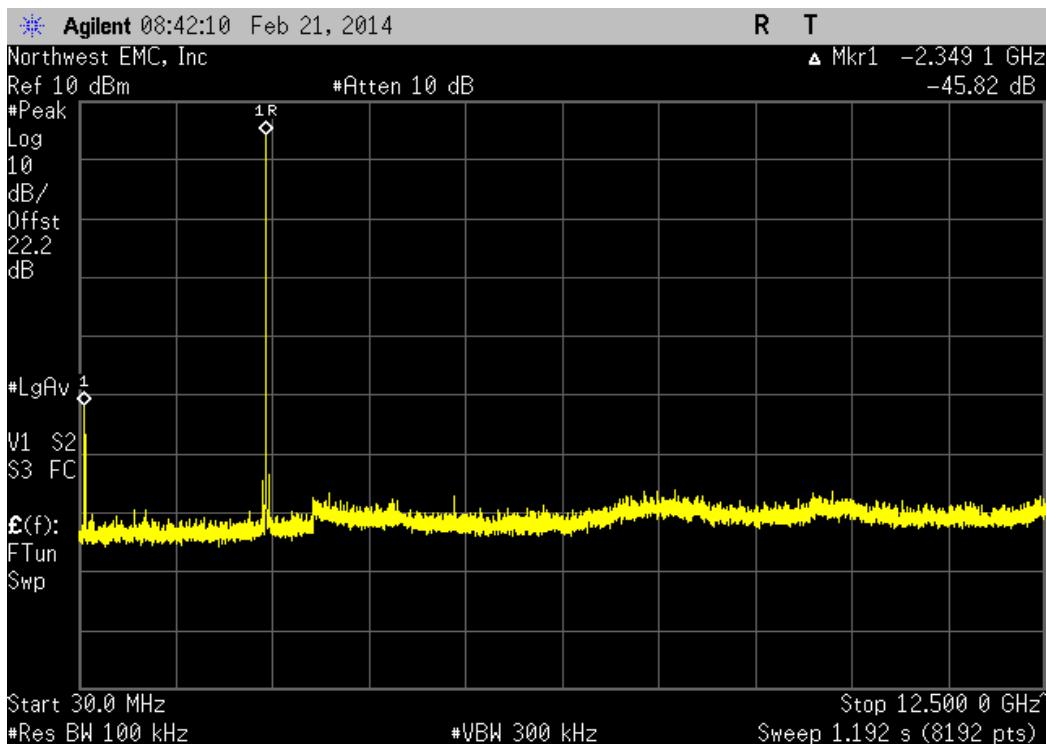
2DH5, pi/4-DQPSK, Low Channel, 2402 MHz				
Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-45.64 dBc	≤ -20 dBc	Pass



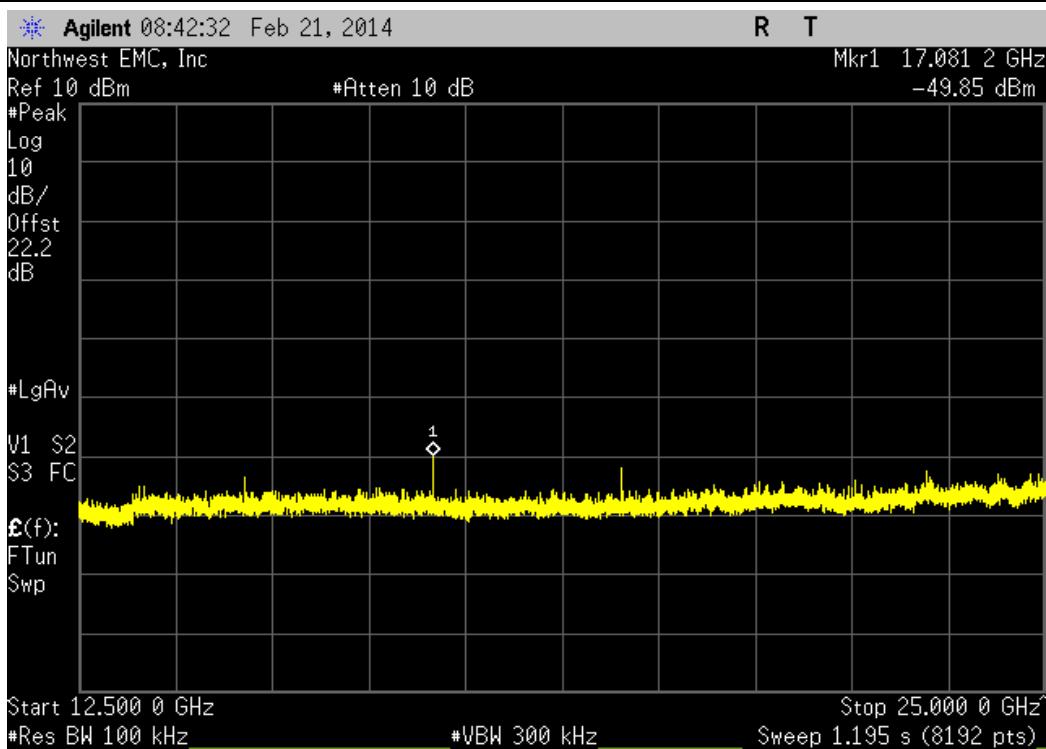
2DH5, pi/4-DQPSK, Low Channel, 2402 MHz				
Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-48.28 dBc	≤ -20 dBc	Pass



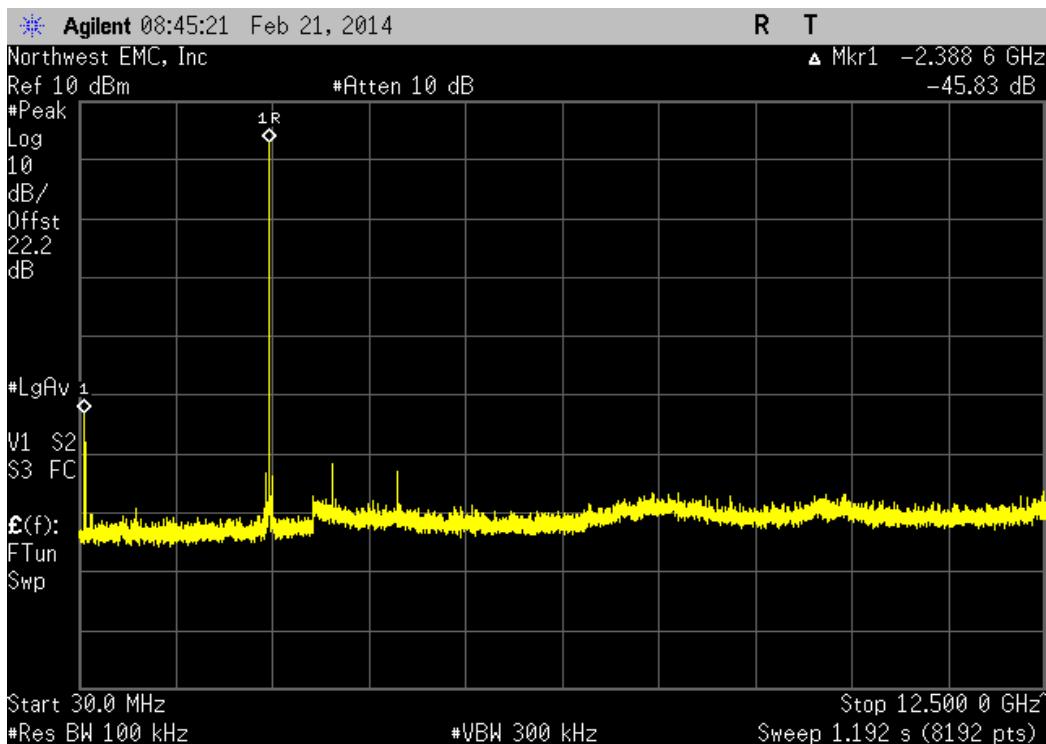
2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz				
Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-45.82 dBc	≤ -20 dBc	Pass



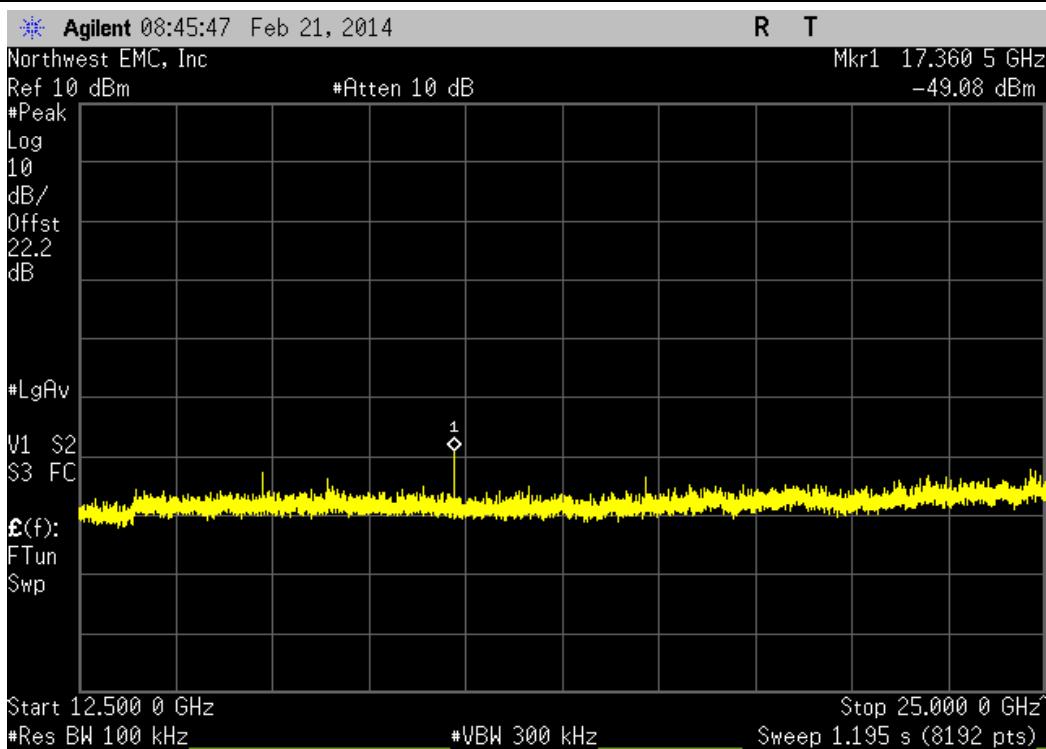
2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz				
Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-54 dBc	≤ -20 dBc	Pass

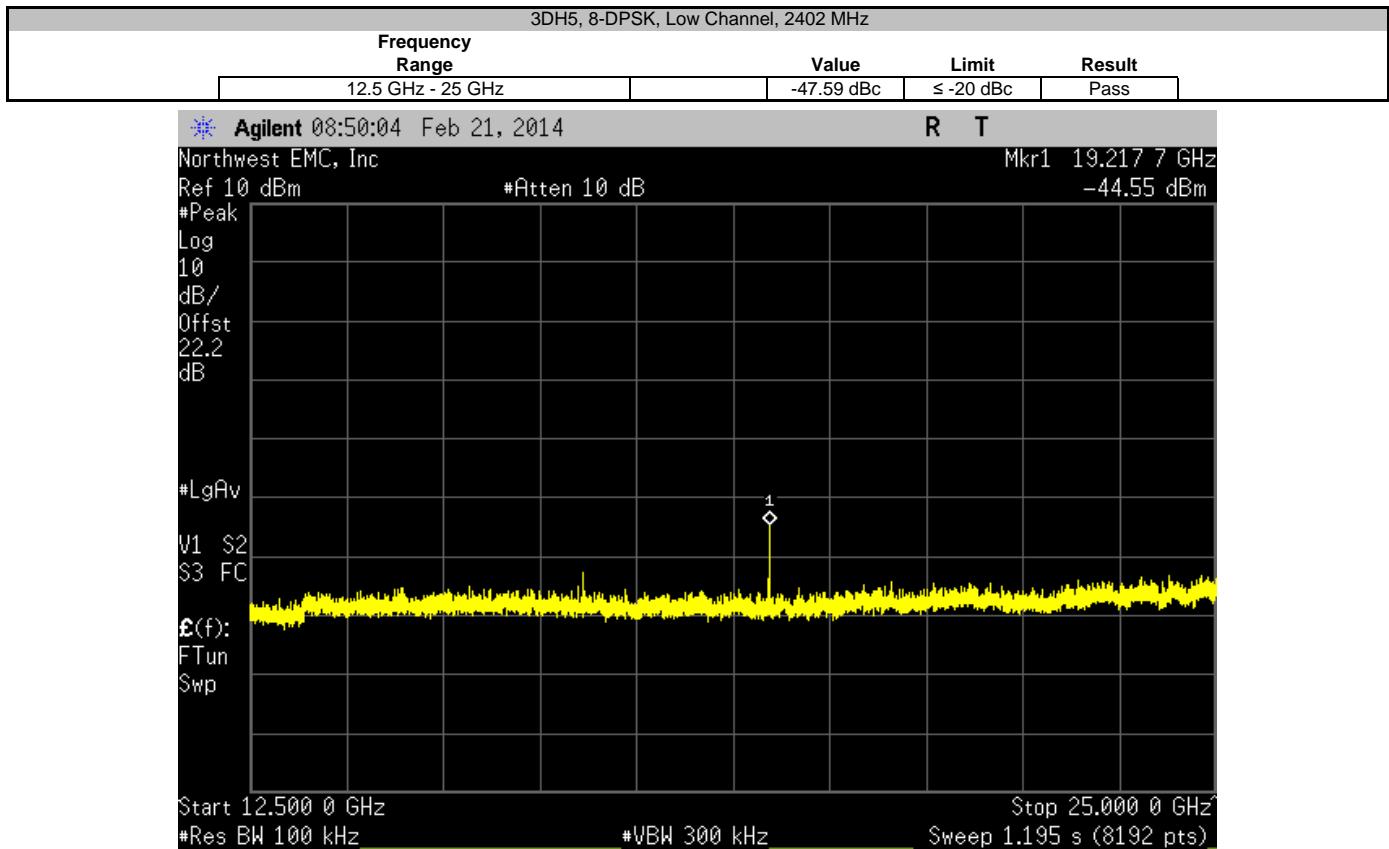
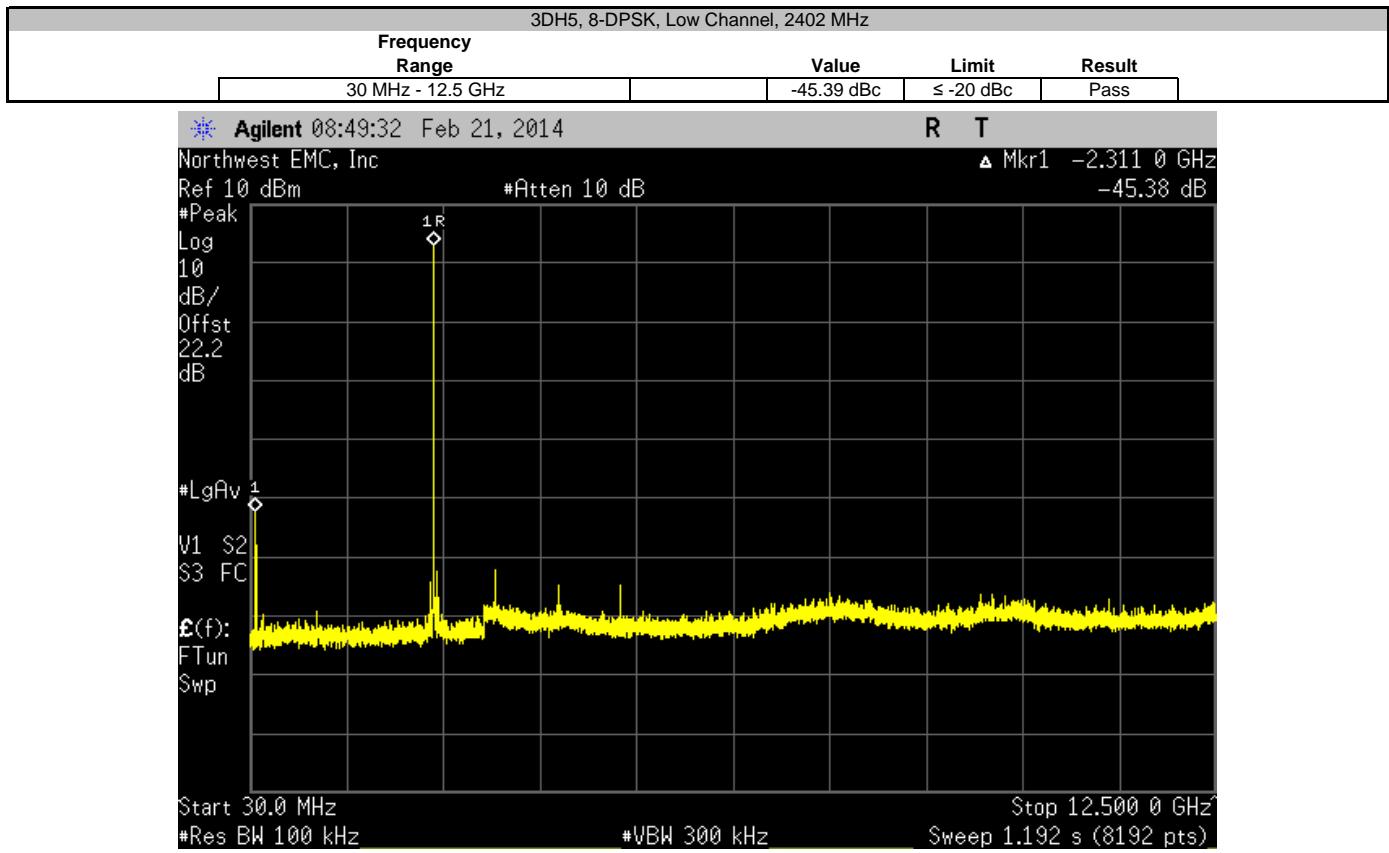


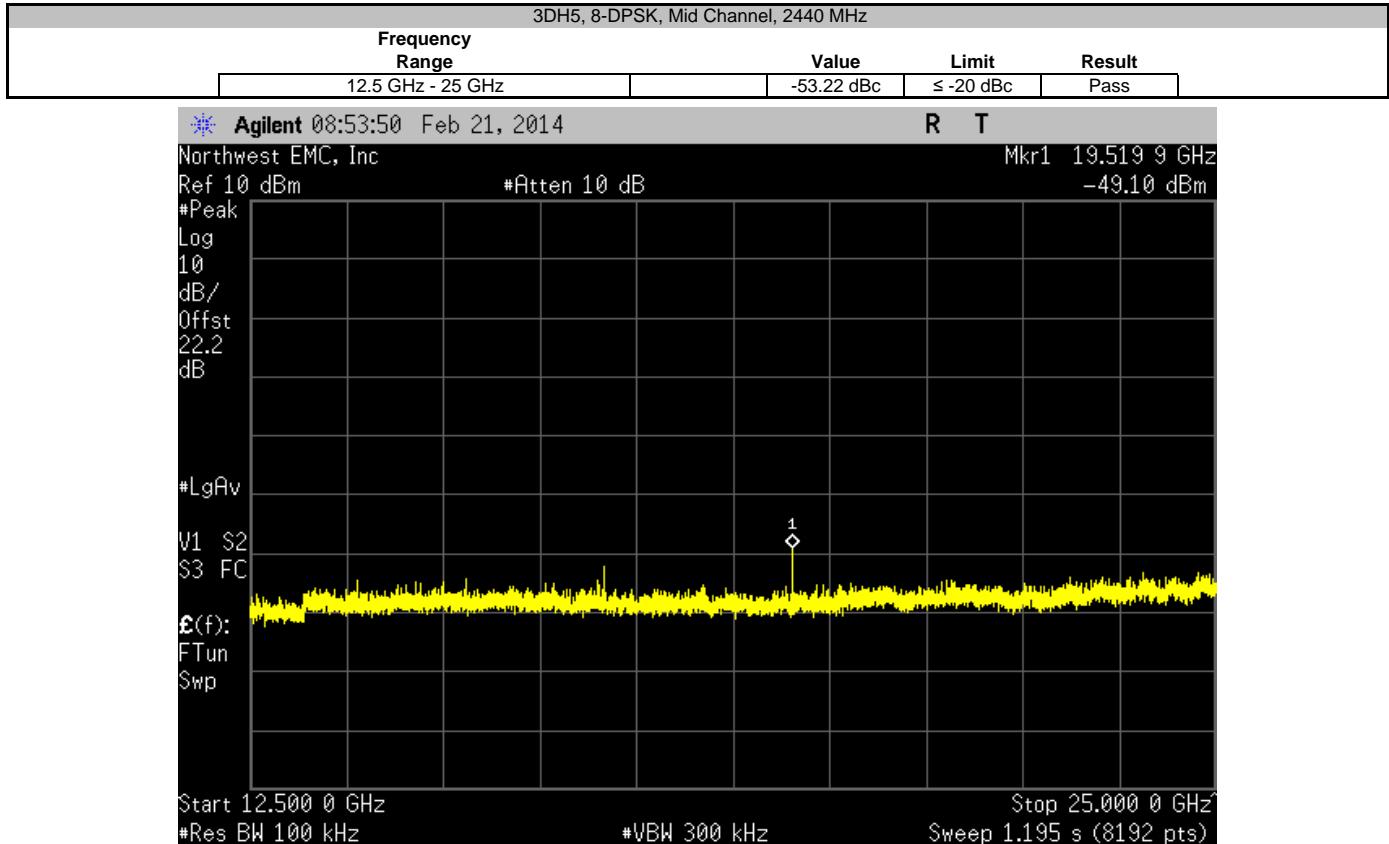
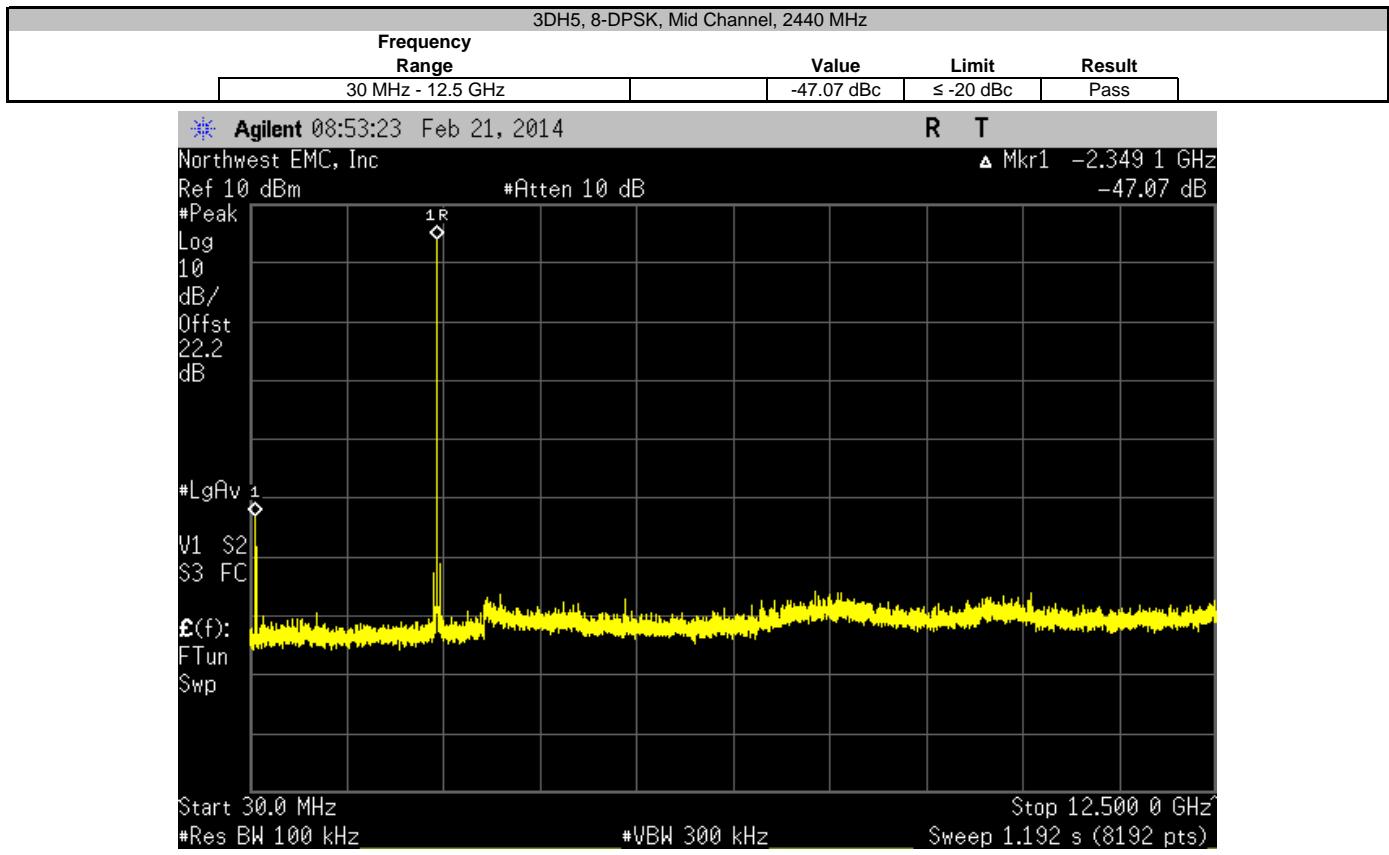
2DH5, pi/4-DQPSK, High Channel, 2480 MHz				
Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-45.83 dBc	≤ -20 dBc	Pass

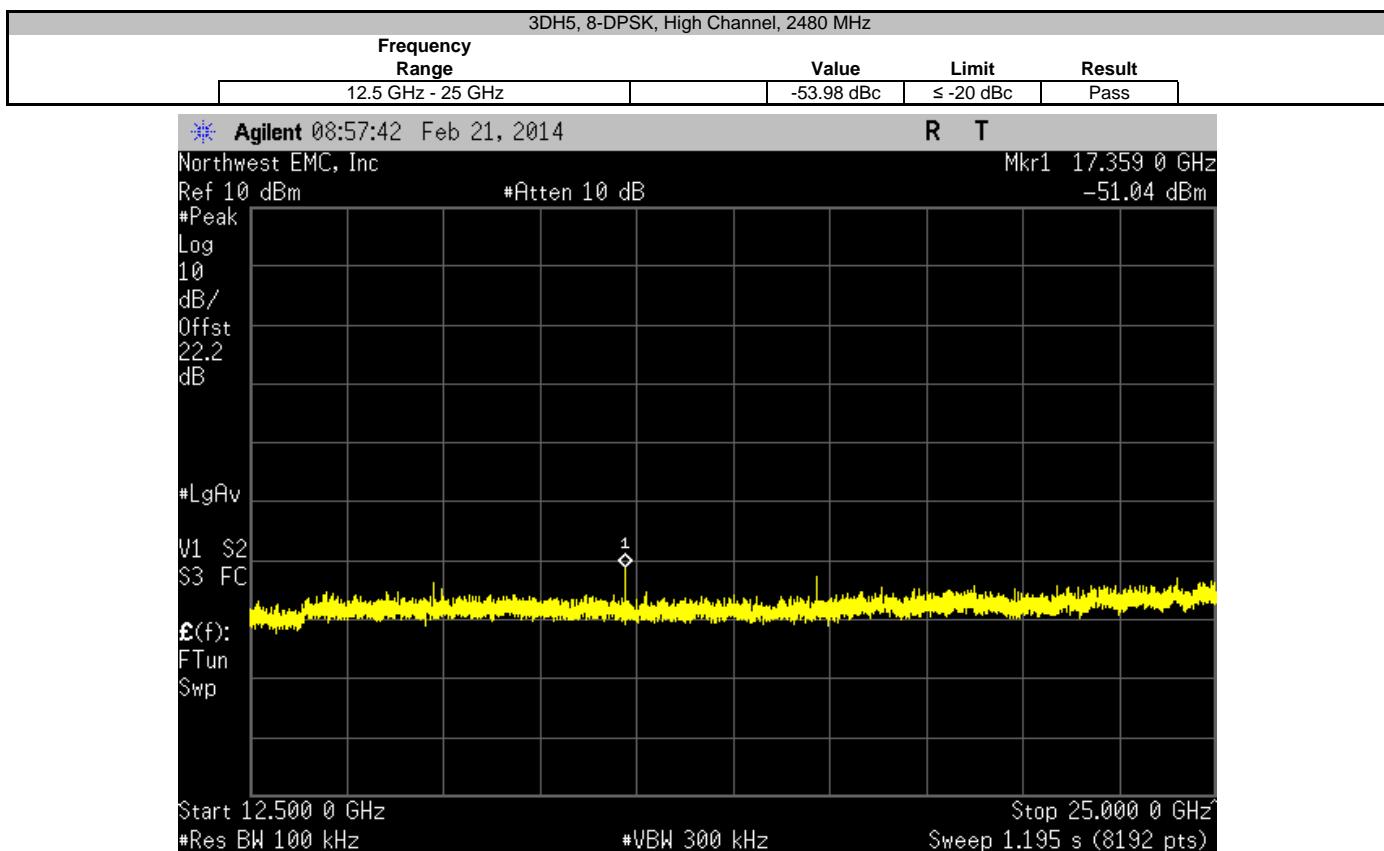
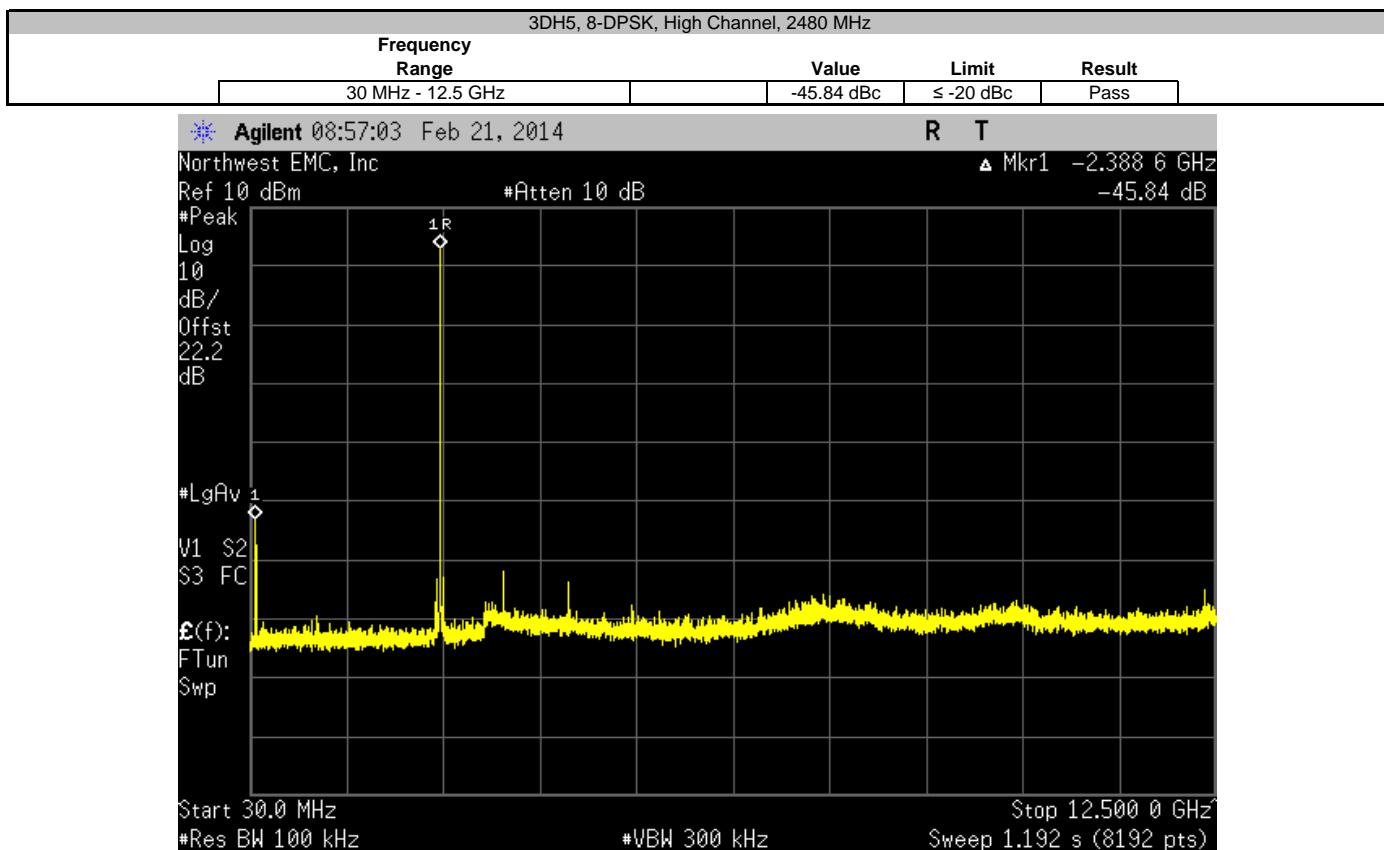


2DH5, pi/4-DQPSK, High Channel, 2480 MHz				
Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-51.98 dBc	≤ -20 dBc	Pass









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

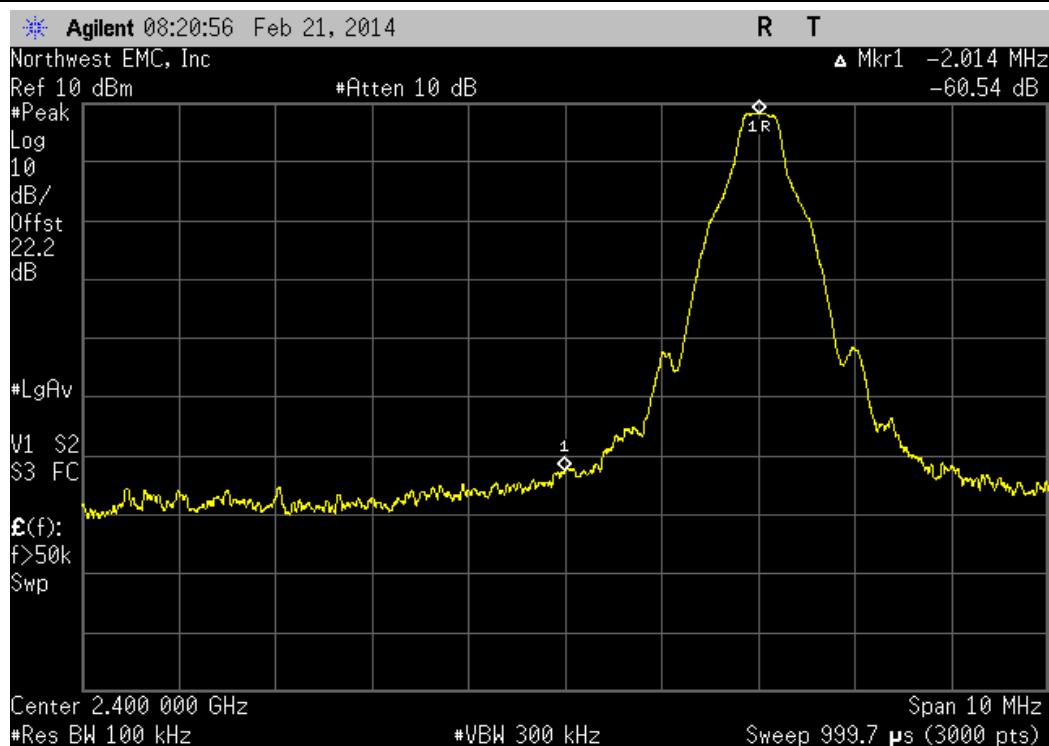
TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low 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 in a no hop mode. The channels closest to the band edges were selected.

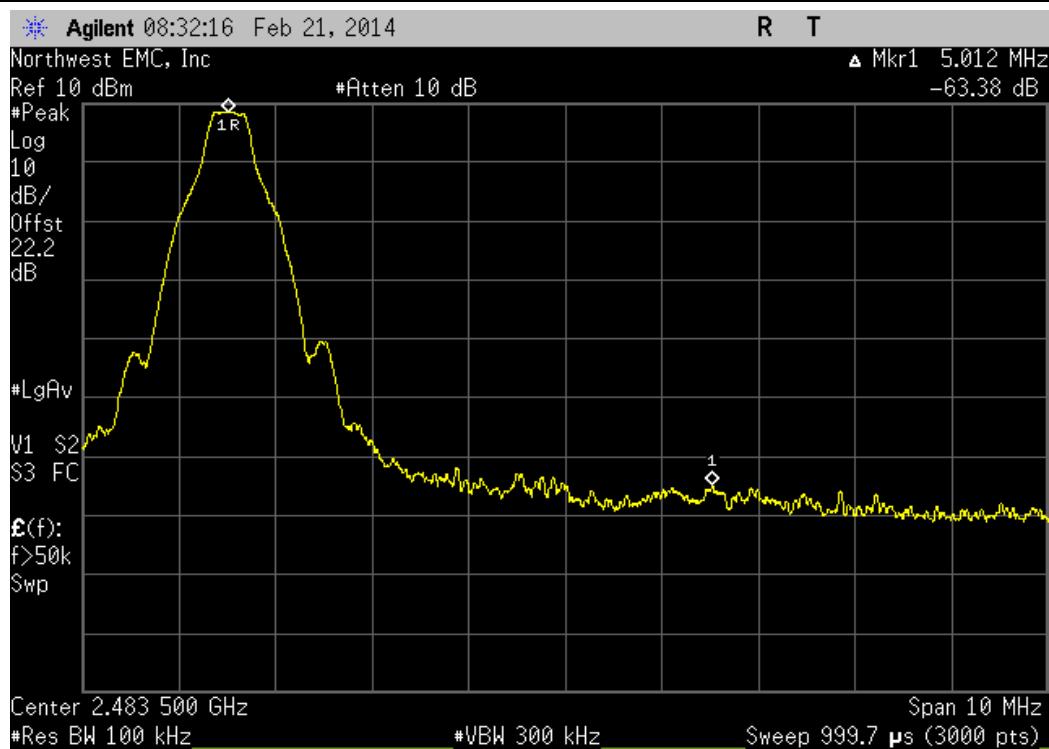
The spectrum was scanned below the lower band edge and above the higher band edge.

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				
FCC 15.247:2014		Test Method: ANSI C63.10:2009		
COMMENTS				
Mode of operation tested were client provided.				
DEVIATIONS FROM TEST STANDARD				
Configuration #	1	Signature: 		
		Value	Limit	Result
DH5, GFSK				
Low Channel		-60.54 dBc	≤ -20 dBc	Pass
High Channel		-63.38 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK				
Low Channel		-46.88 dBc	≤ -20 dBc	Pass
High Channel		-54.24 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
Low Channel		-44.12 dBc	≤ -20 dBc	Pass
High Channel		-53.2 dBc	≤ -20 dBc	Pass

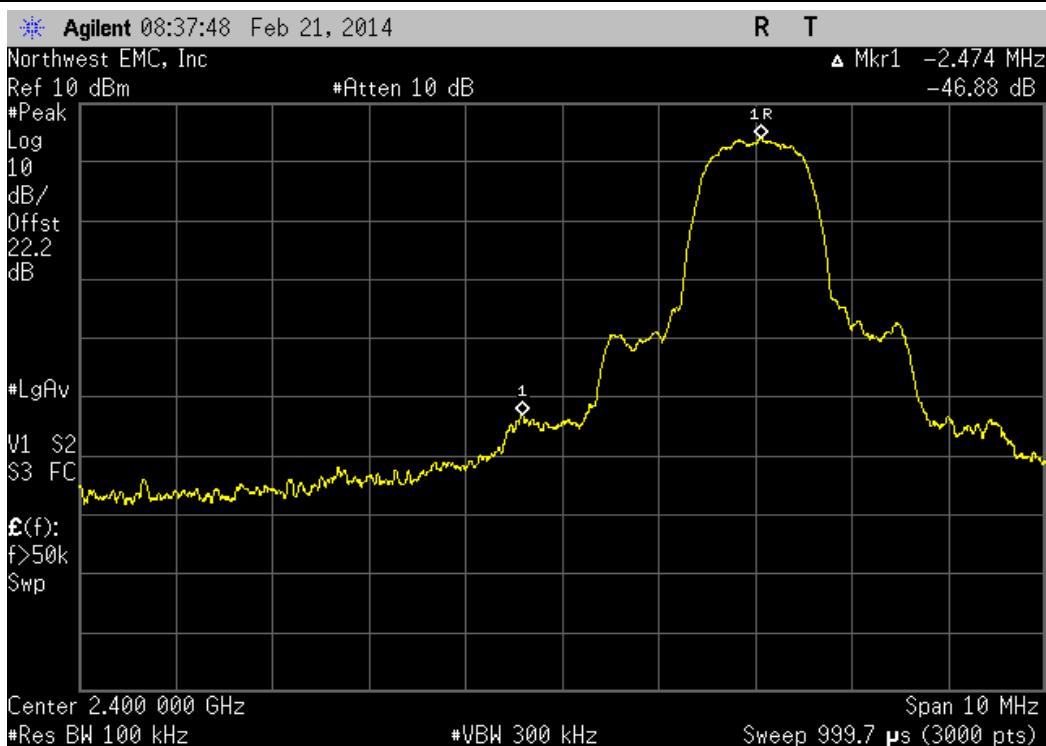
DH5, GFSK, Low Channel			
	Value	Limit	Result
	-60.54 dBc	≤ -20 dBc	Pass



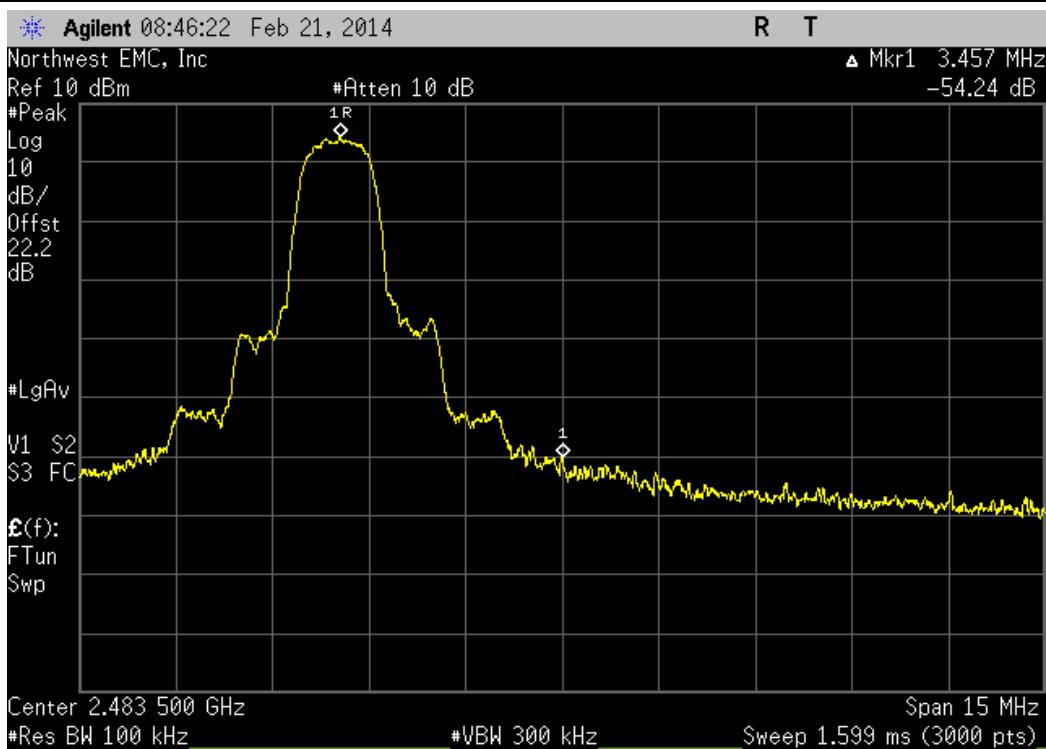
DH5, GFSK, High Channel			
	Value	Limit	Result
	-63.38 dBc	≤ -20 dBc	Pass



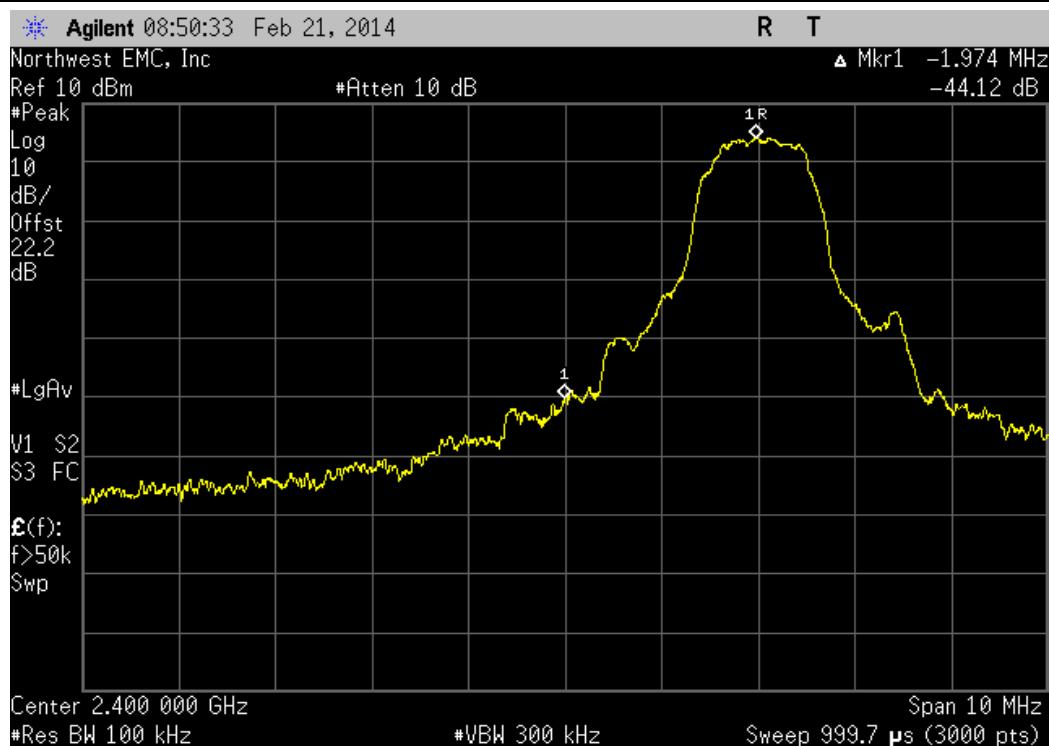
2DH5, pi/4-DQPSK, Low Channel			
	Value	Limit	Result
	-46.88 dBc	≤ -20 dBc	Pass



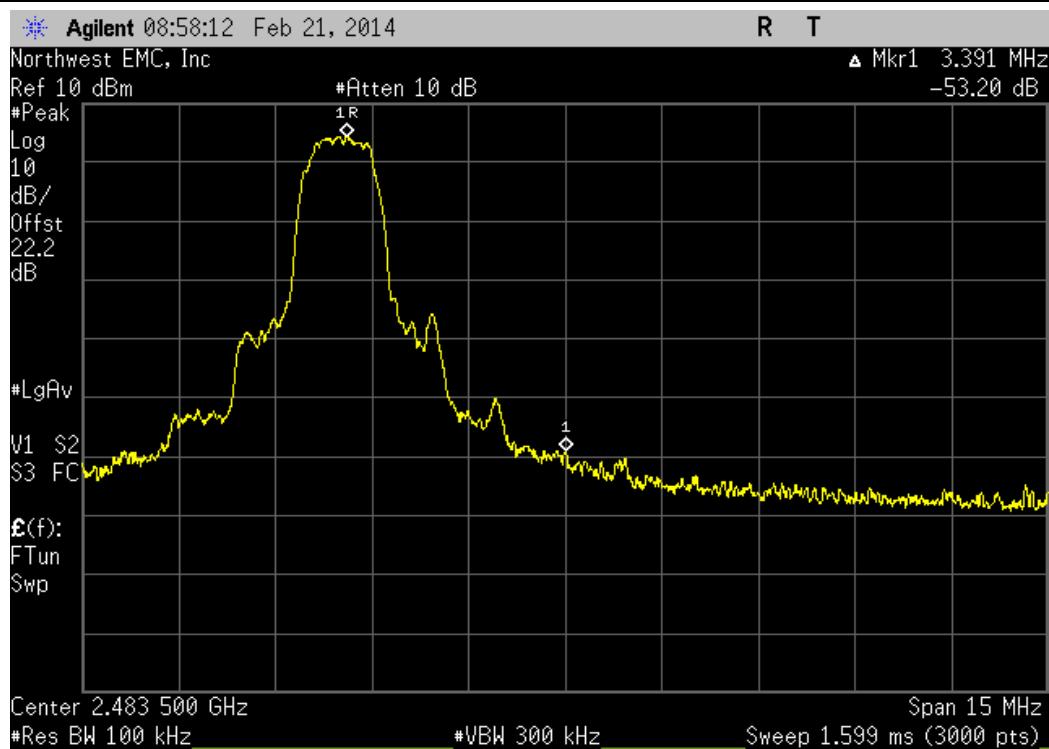
2DH5, pi/4-DQPSK, High Channel			
	Value	Limit	Result
	-54.24 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, Low Channel			
	Value	Limit	Result
	-44.12 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel			
	Value	Limit	Result
	-53.2 dBc	≤ -20 dBc	Pass



CHANNEL SEPARATION

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 channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

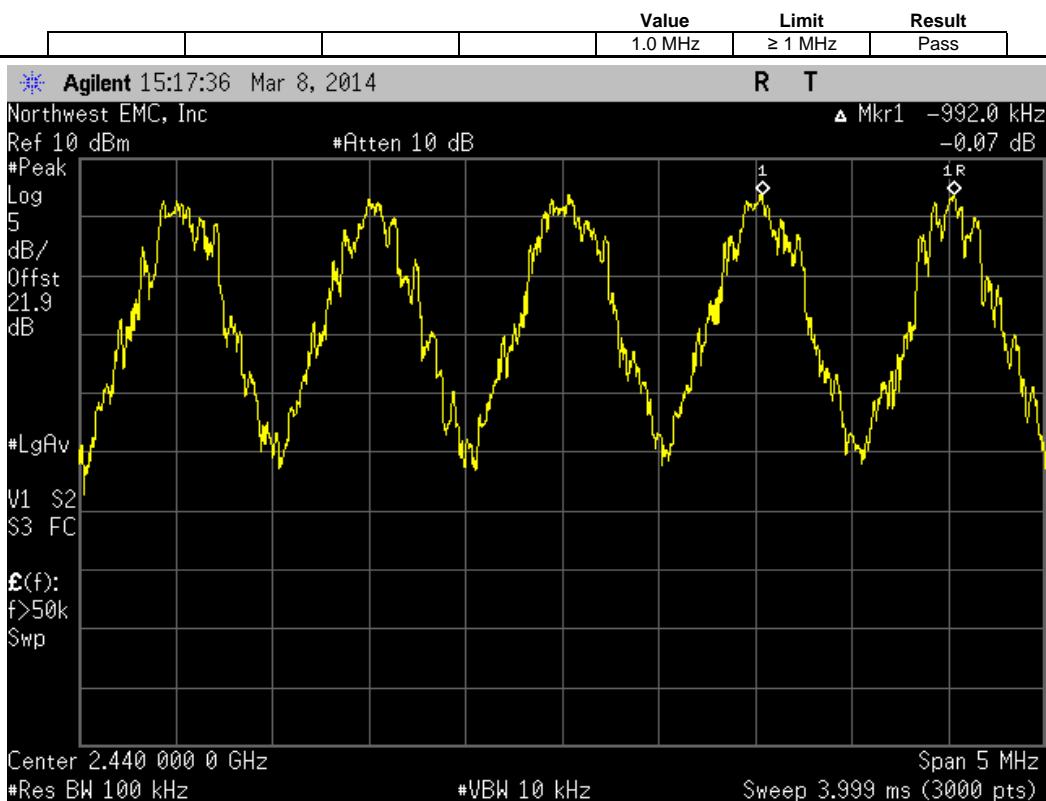


CHANNEL SEPARATION

XMit 2013.08.15
PsaTx 2013.10.23

EUT: TRAC-Lid BT SMART	Work Order: SUPR0114		
Serial Number: 41007123	Date: 03/10/14		
Customer: Supra, A Division of UTCFS	Temperature: 22°C		
Attendees: None	Humidity: 40%		
Project: TRAC	Barometric Pres.: 1018		
Tested by: Jared Ison, Rod Peloquin	Job Site: EV06		
Power: Internal Battery, 3VDC			
TEST SPECIFICATIONS			
FCC 15.247:2014	Test Method: ANSI C63.10:2009		
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
Configuration #	1		
Signature			
	Value	Limit	Result
Hopping Mode	DH5, GFSK	1.0 MHz	≥ 1 MHz
	Mid Channel, 2440 MHz		Pass

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz



NUMBER OF HOPPING CHANNELS

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.

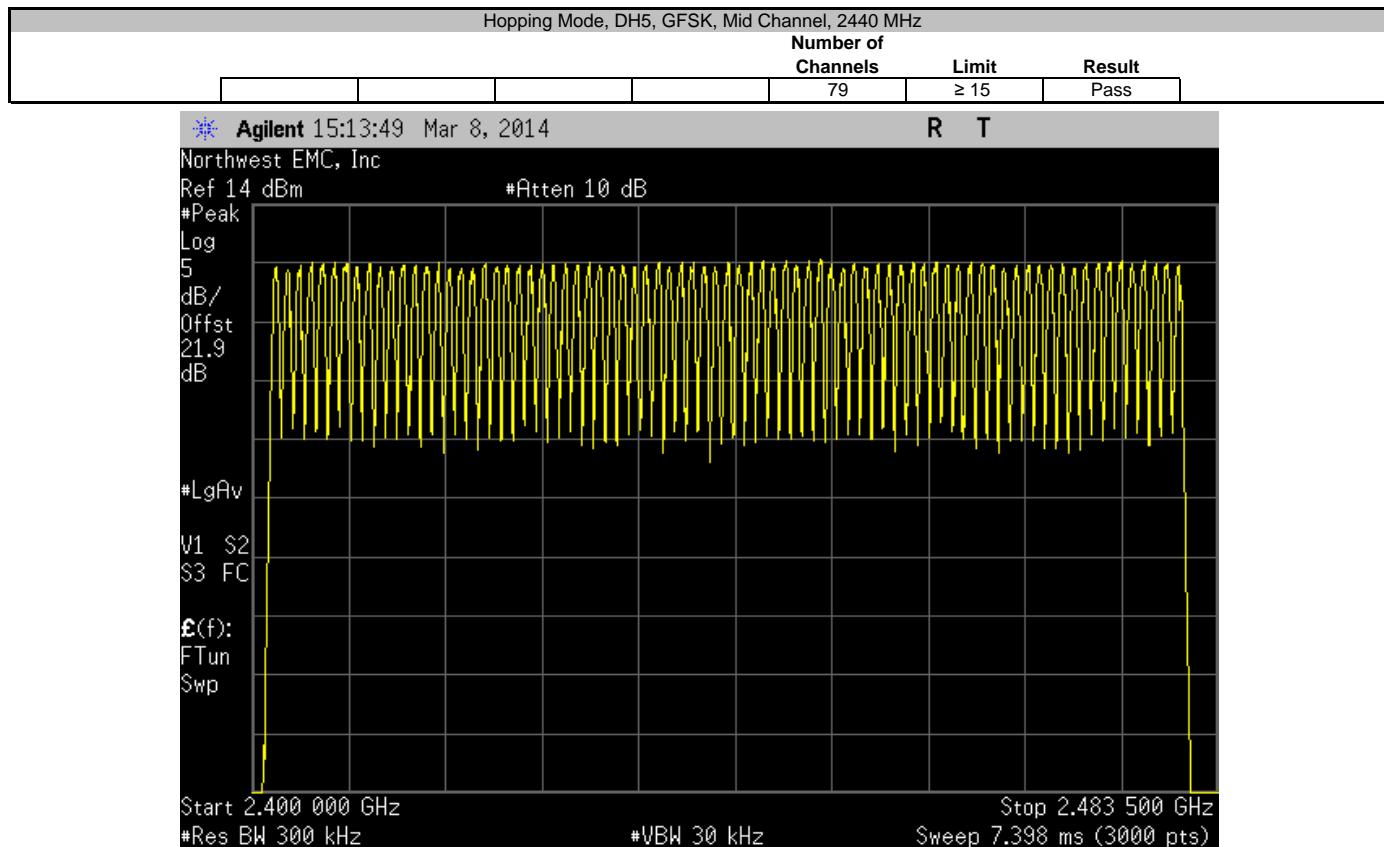
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	5/16/2013	12
Spectrum Analyzer	Agilent	E4440	AFE	11/4/2013	24
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 number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

EUT: TRAC-Lid BT SMART		Work Order: SUPR0114
Serial Number: 41007123		Date: 03/10/14
Customer: Supra, A Division of UTCFS		Temperature: 21°C
Attendees: None		Humidity: 40%
Project: TRAC		Barometric Pres.: 1018
Tested by: Jared Ison, Rod Peloquin	Power: Internal Battery, 3VDC	Job Site: EV06
TEST SPECIFICATIONS		
FCC 15.247:2014		Test Method: ANSI C63.10:2009
COMMENTS		
Modes of operation tested were client provided.		
DEVIATIONS FROM TEST STANDARD		
Configuration #	1	Signature: 
		Number of Channels
Hopping Mode: DH5, GFSK		Limit: ≥ 15
Mid Channel, 2440 MHz		Result: Pass
		79



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
RF Vector Signal Generator	Agilent	V2920A	TIH	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 average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

The dwell time limit is based on the Number of Hopping Channels * 400 mS. For Bluetooth this would be 79 Channels * 400mS = 31.6 Sec.

On Time During 31.6 Sec = Pulse Width * Average Number of Pulses * Scale Factor

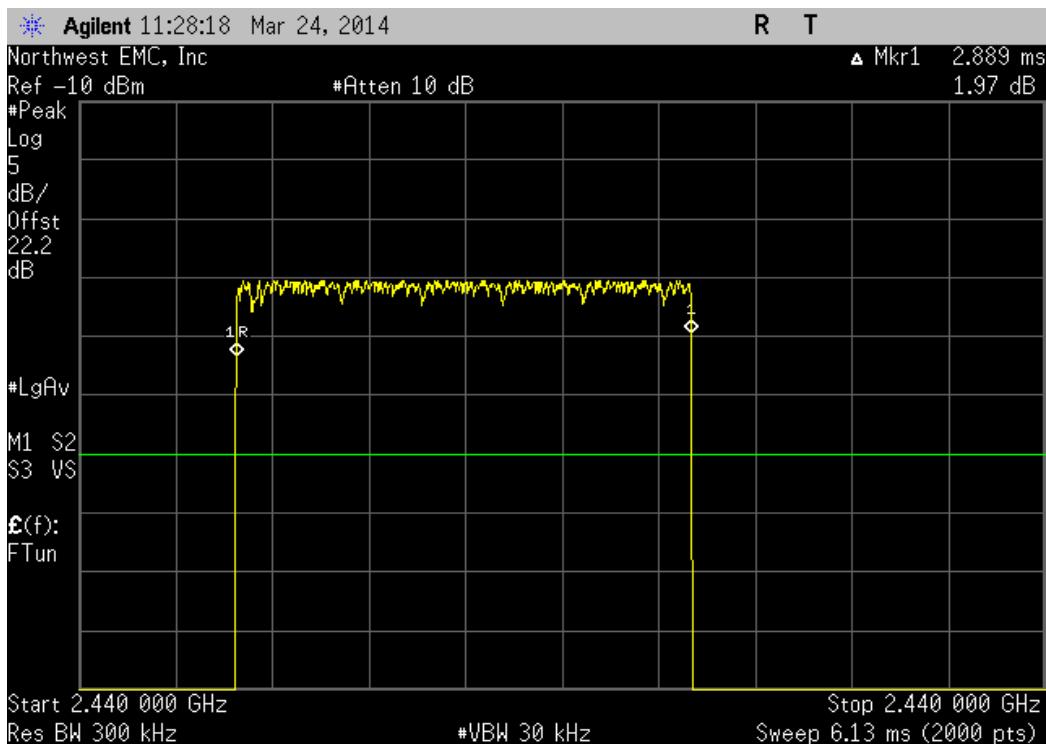
➤Average Number of Pulses is based on 4 samples.

➤Scale Factor = 31.6 Sec / Screen Capture Sweep Time = 31.6 Sec / 6.32 Sec = 5

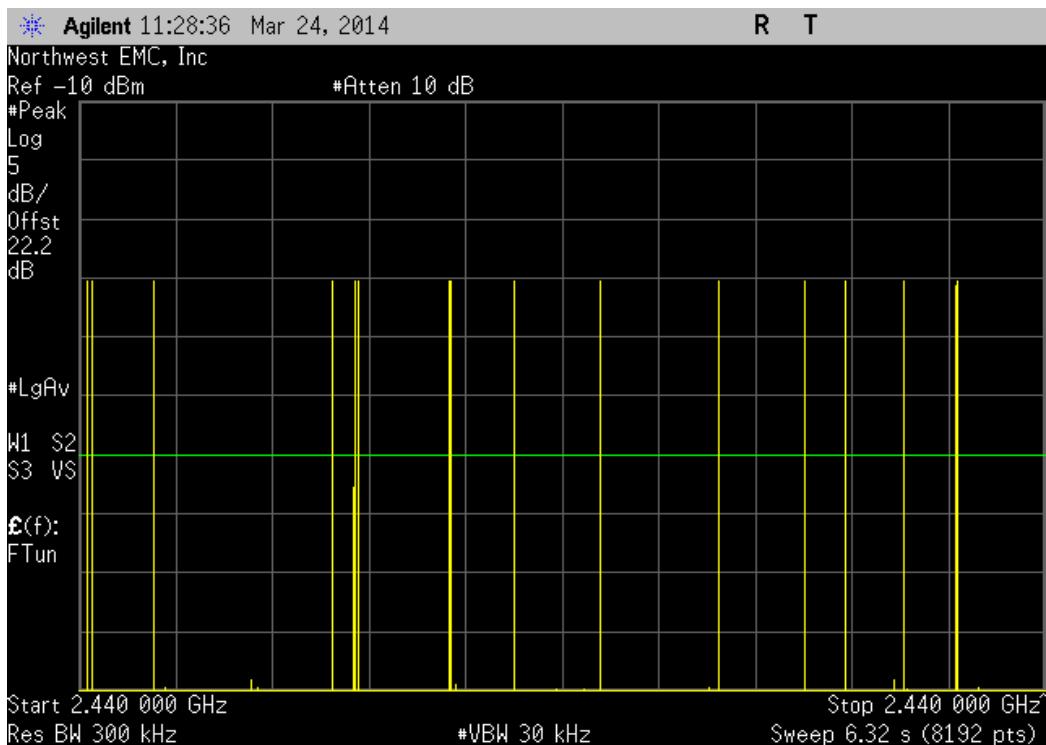
DWELL TIME

EUT: TRAC-Lid BT SMART			Work Order: SUPR0114						
Serial Number: 0019			Date: 03/24/14						
Customer: Supra, A Division of UTCFS			Temperature: 22°C						
Attendees: None			Humidity: 35%						
Project: TRAC			Barometric Pres.: 1018						
Tested by: Jared Ison, Rod Peloquin		Power: Internal Battery, 3VDC	Job Site: EV06						
TEST SPECIFICATIONS			Test Method						
FCC 15.247:2014			ANSI C63.10:2009						
COMMENTS									
EUT set to hopping mode.									
DEVIATIONS FROM TEST STANDARD									
Configuration #	1	Signature	<i>Riley le Relays</i>						
Hopping Mode			Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
DH5, GFSK			2.889	N/A	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	14	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	14	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	20	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	17	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		2.889	N/A	16.25	5	234.73	400	Pass
2DH5, pi/4-DQPSK			2.711	N/A	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	24	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	28	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	24	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	17	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		2.711	N/A	23.25	5	315.15	400	Pass
3DH5, 8-DPSK			2.895	N/A	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	18	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	29	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	32	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		N/A	18	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz		2.895	N/A	24.25	5	351.02	400	Pass

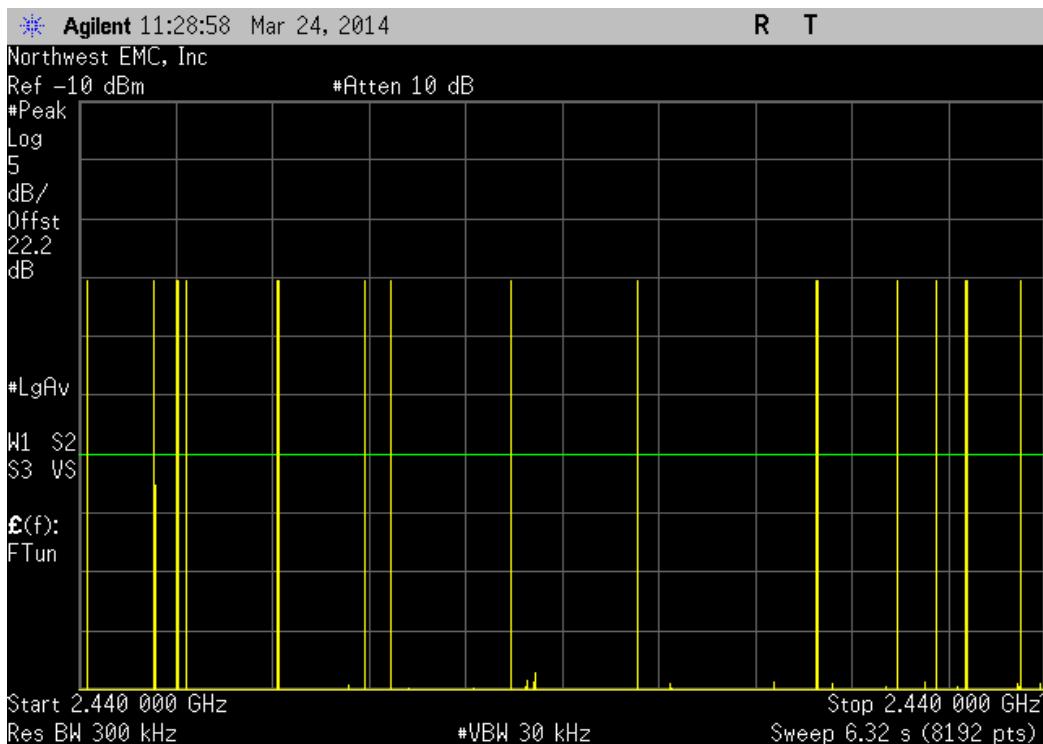
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.889	N/A	N/A	N/A	N/A	N/A	N/A



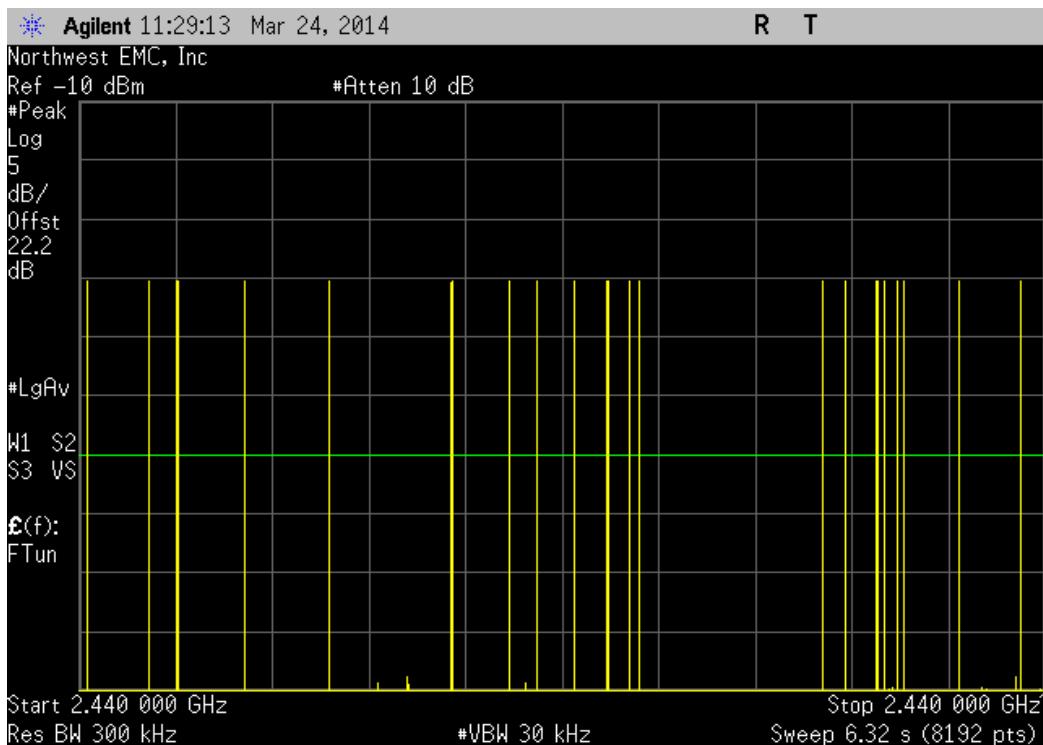
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	14	N/A	N/A	N/A	N/A	N/A



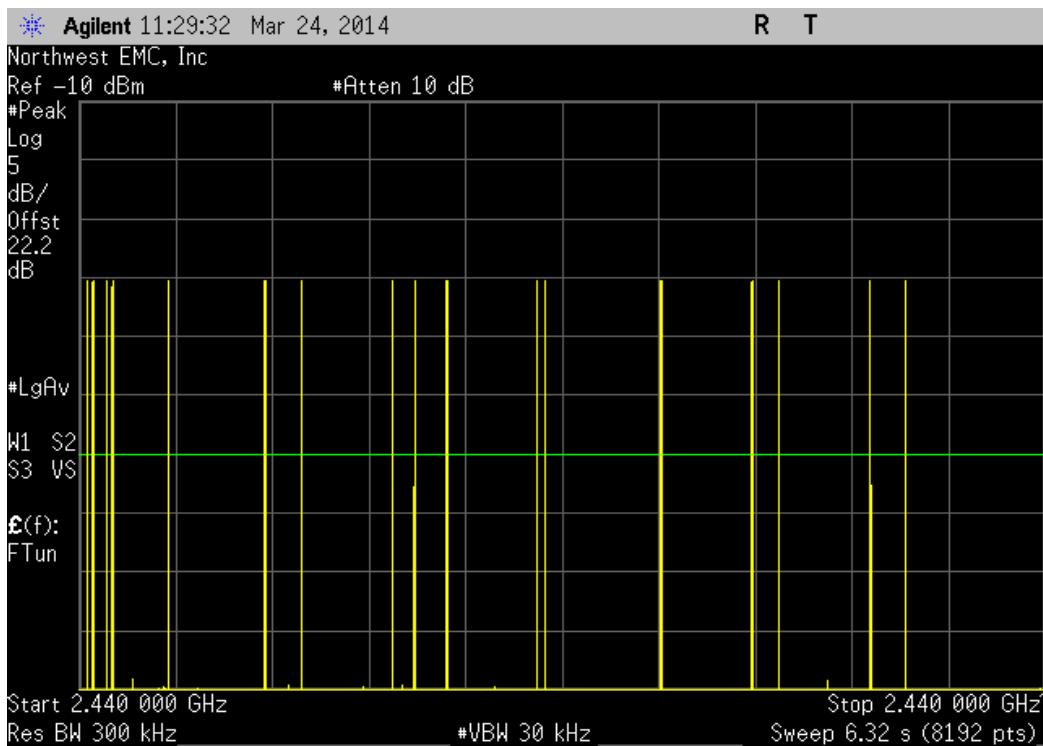
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	14	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	20	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	17	N/A	N/A	N/A	N/A	N/A

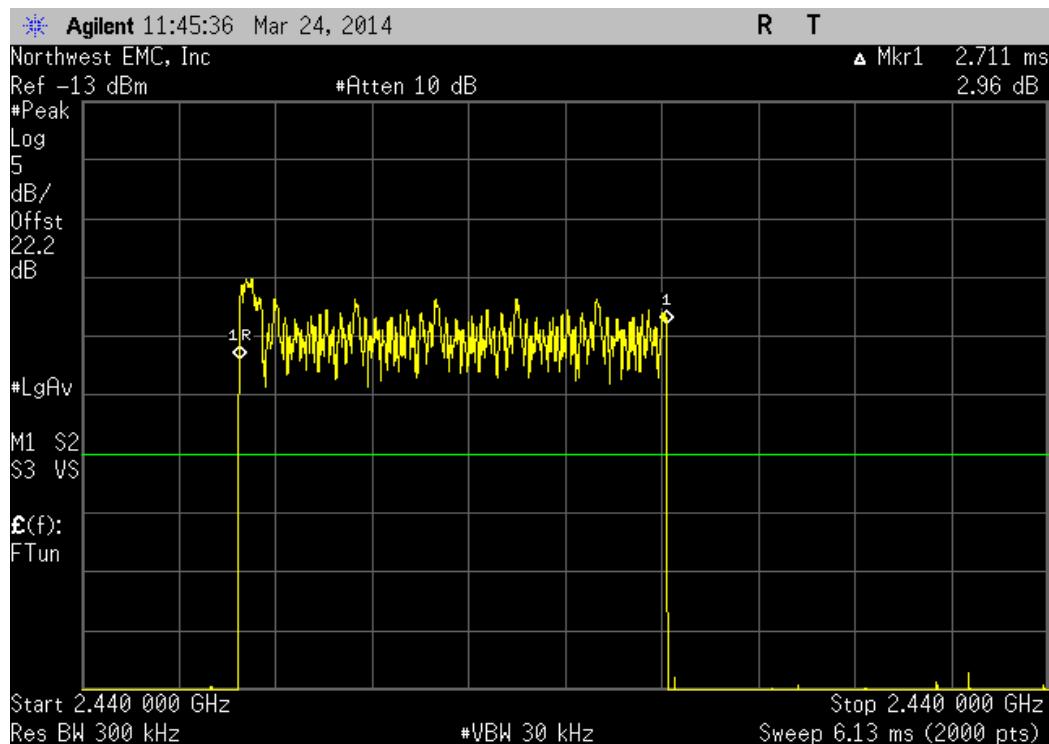


Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.889	N/A	16.25	5	234.73	400	Pass

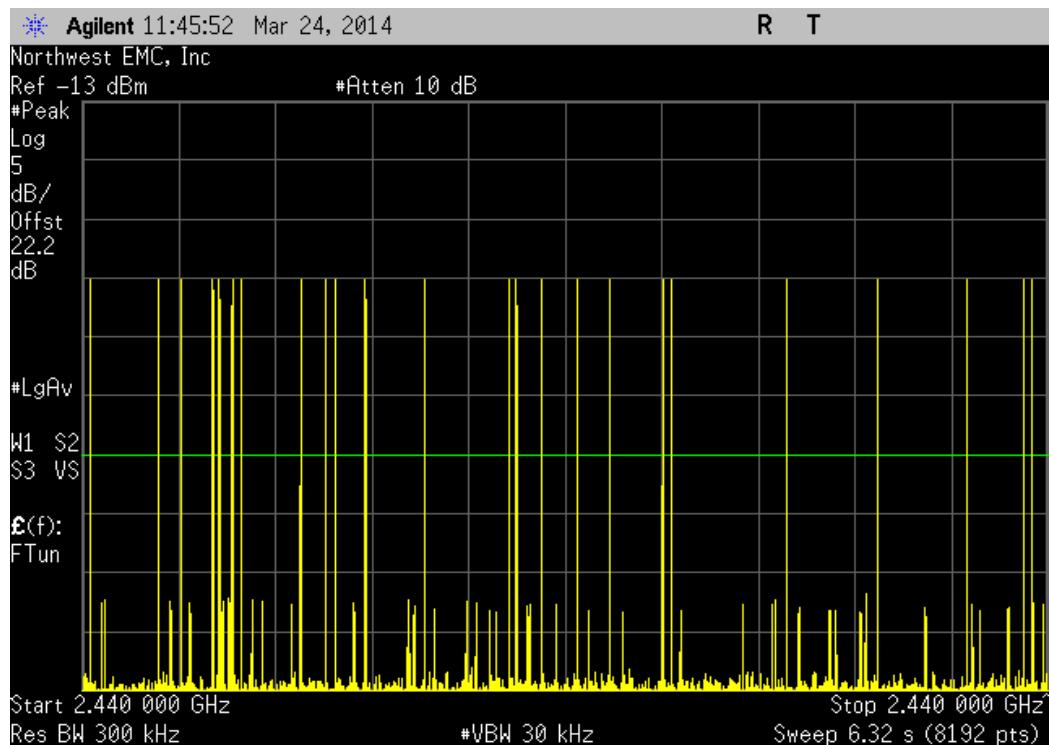
Calculation Only

No Screen Capture Required

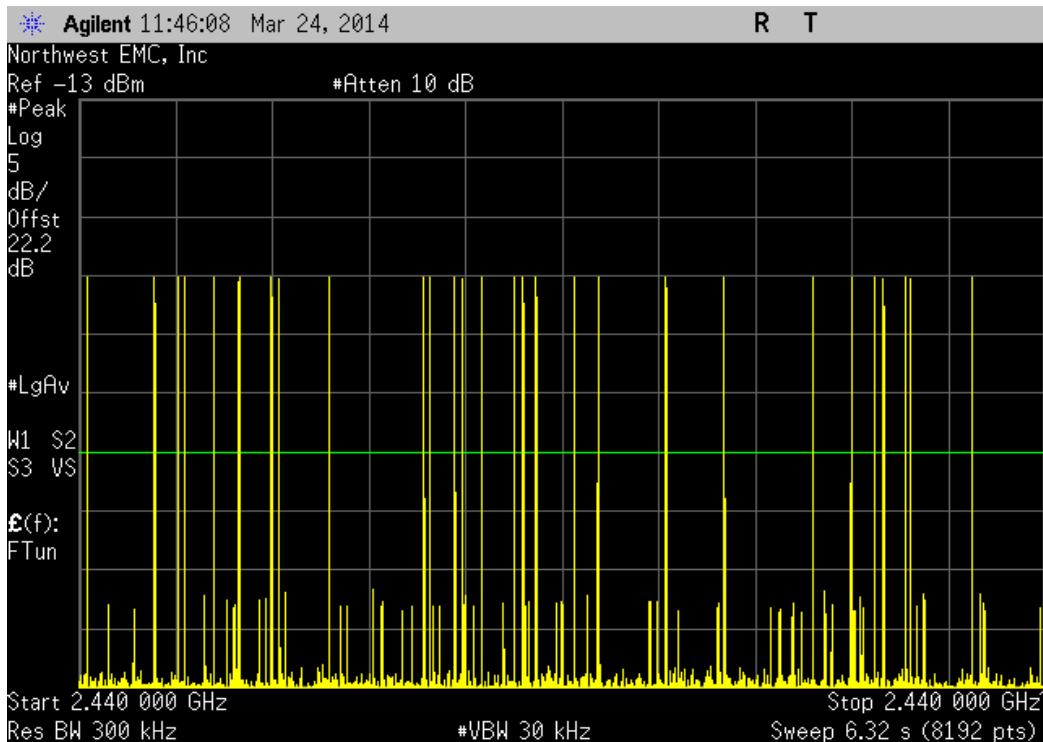
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.711	N/A	N/A	N/A	N/A	N/A	N/A



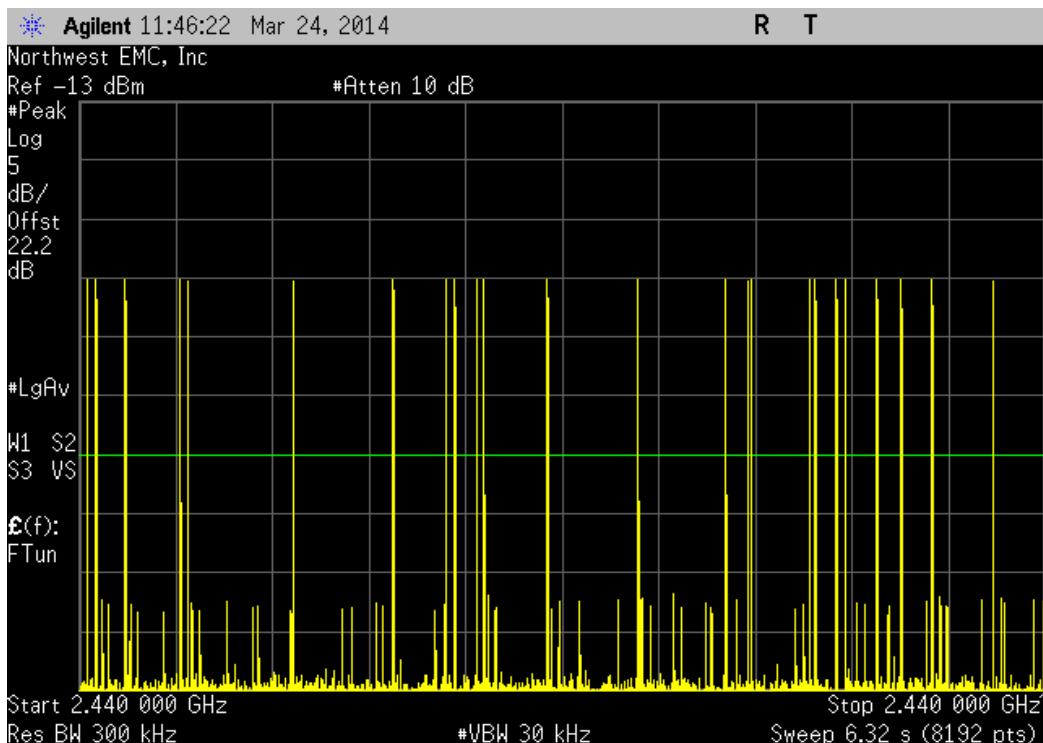
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	24	N/A	N/A	N/A	N/A	N/A



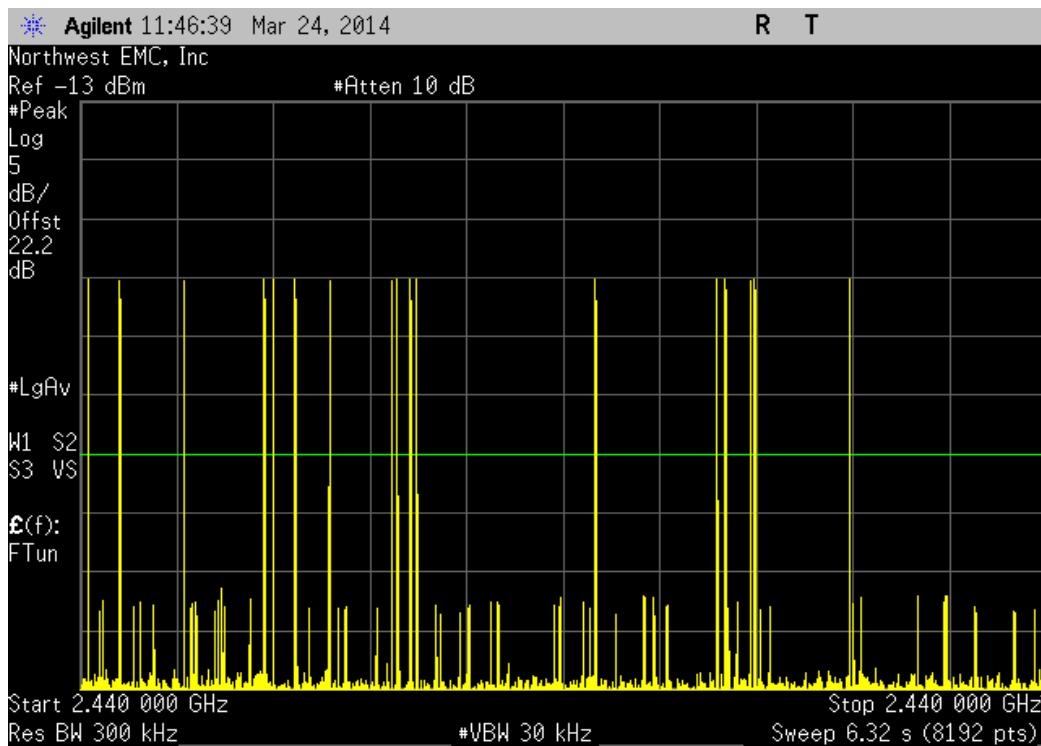
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	28	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	24	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	17	N/A	N/A	N/A	N/A	N/A

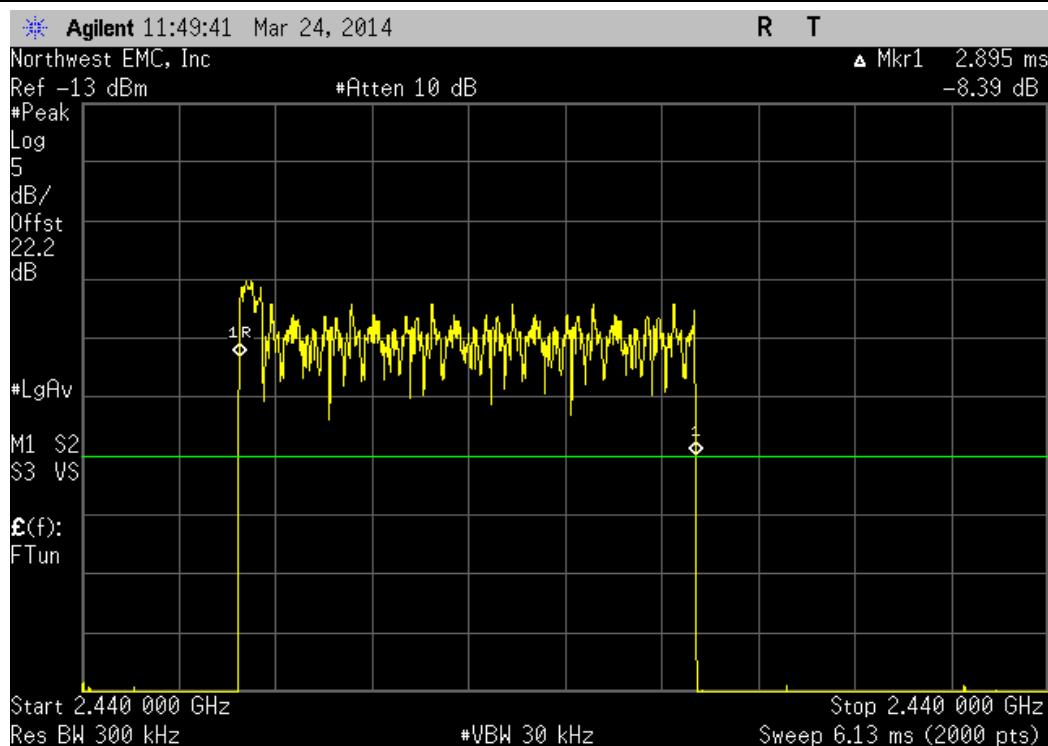


Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.711	N/A	23.25	5	315.15	400	Pass

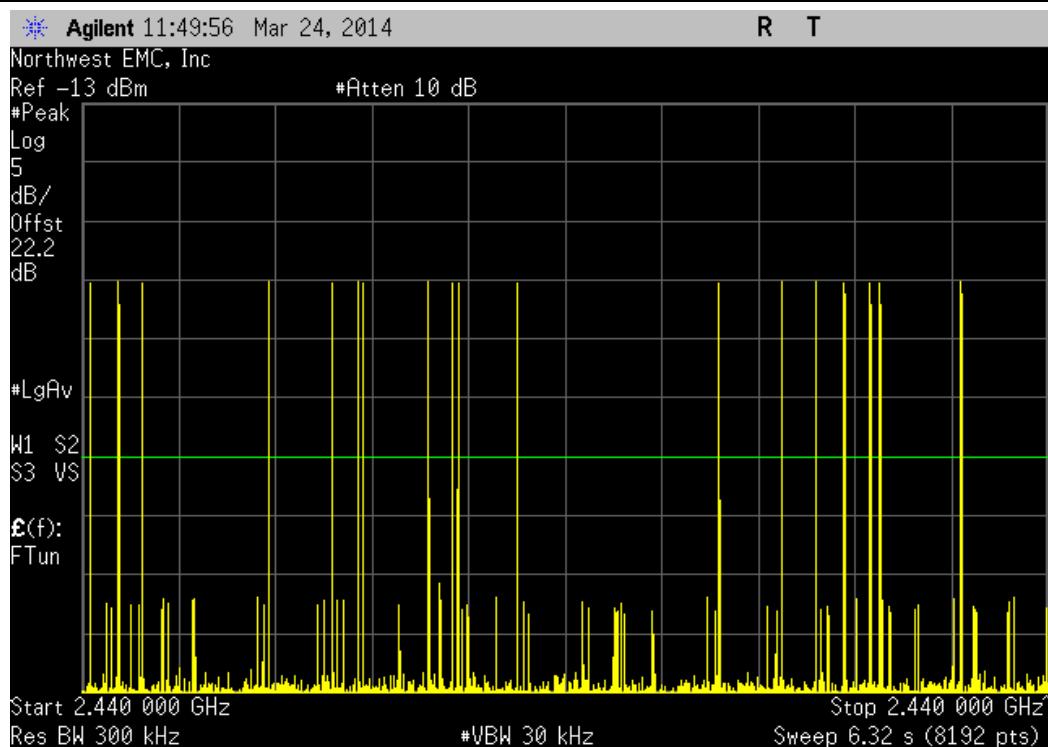
Calculation Only

No Screen Capture Required

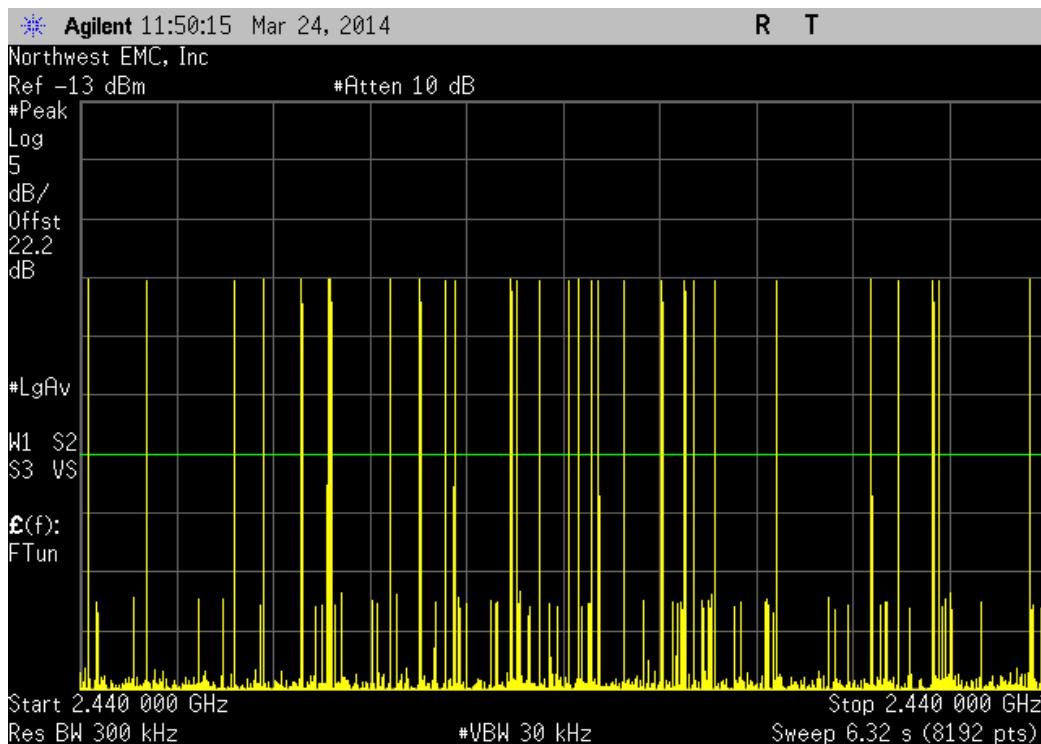
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.895	N/A	N/A	N/A	N/A	N/A	N/A



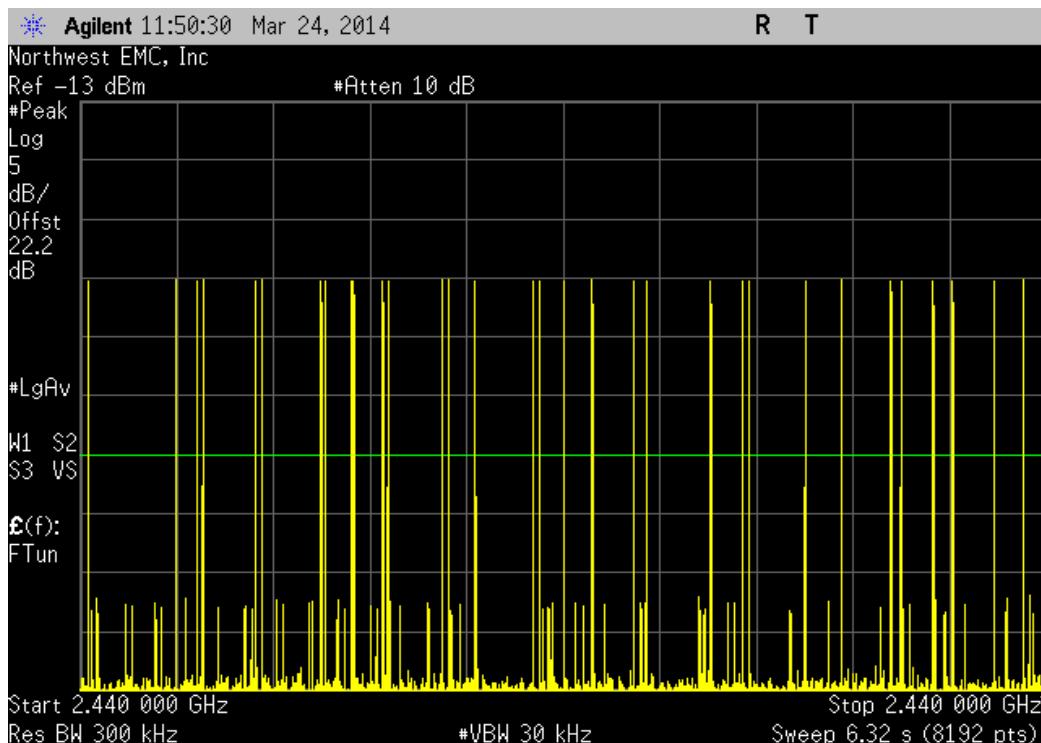
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	18	N/A	N/A	N/A	N/A	N/A



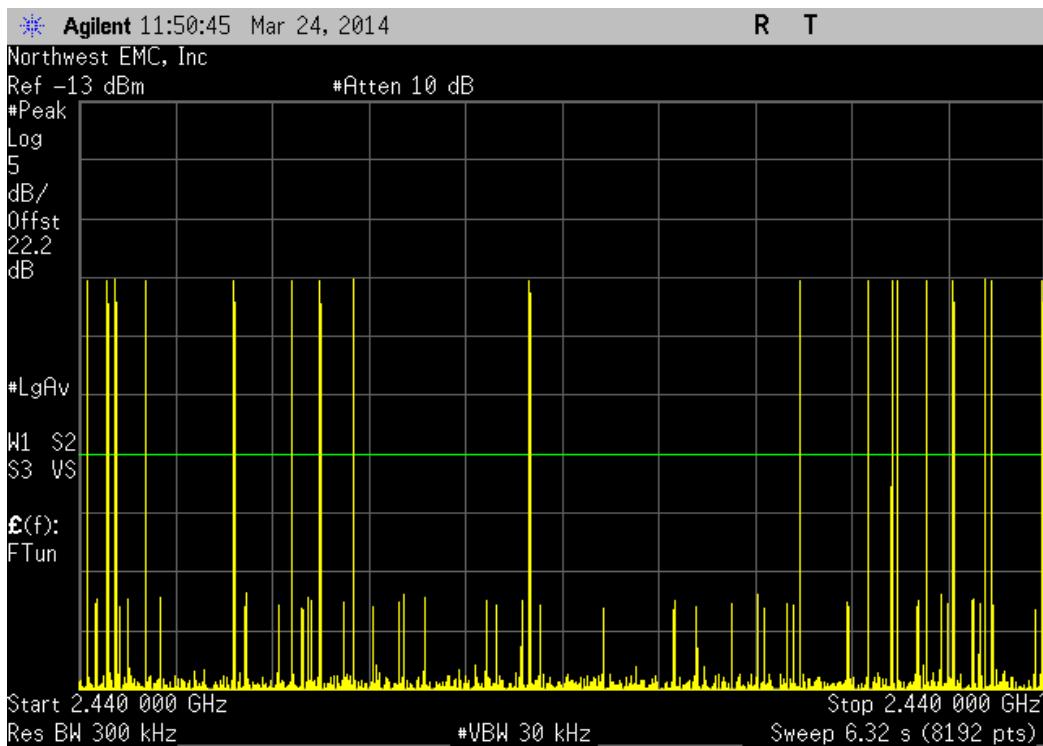
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	29	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	32	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	18	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.895	N/A	24.25	5	351.02	400	Pass

Calculation Only

No Screen Capture Required

BAND EDGE COMPLIANCE - HOPPING MODE

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

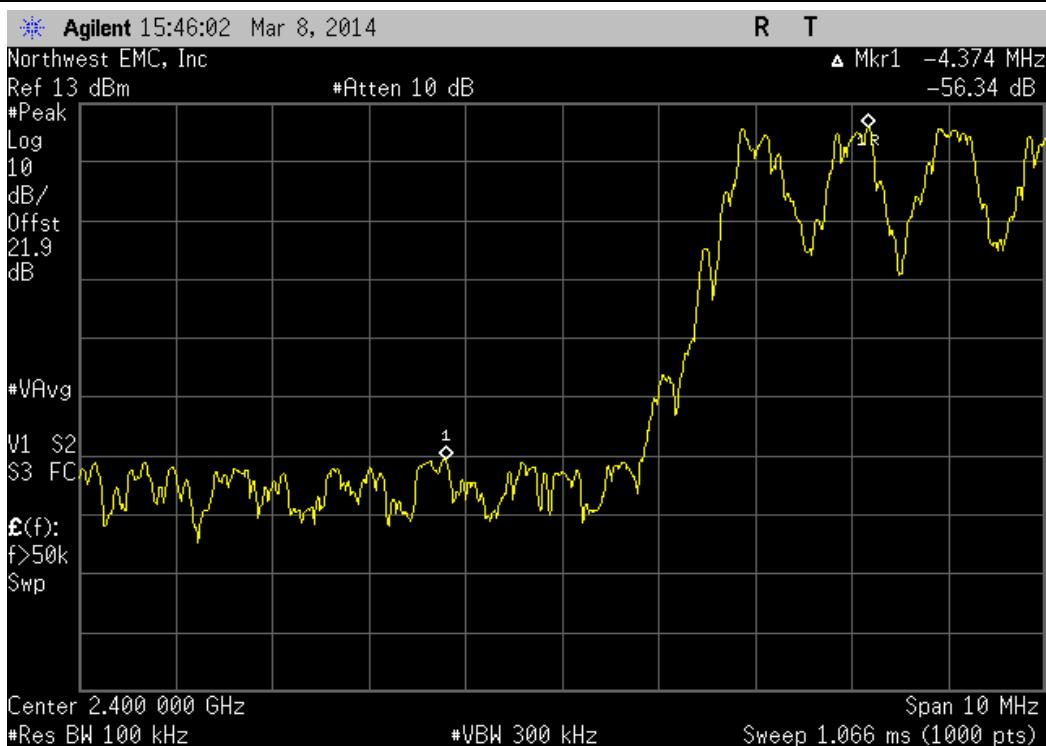
TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. 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.

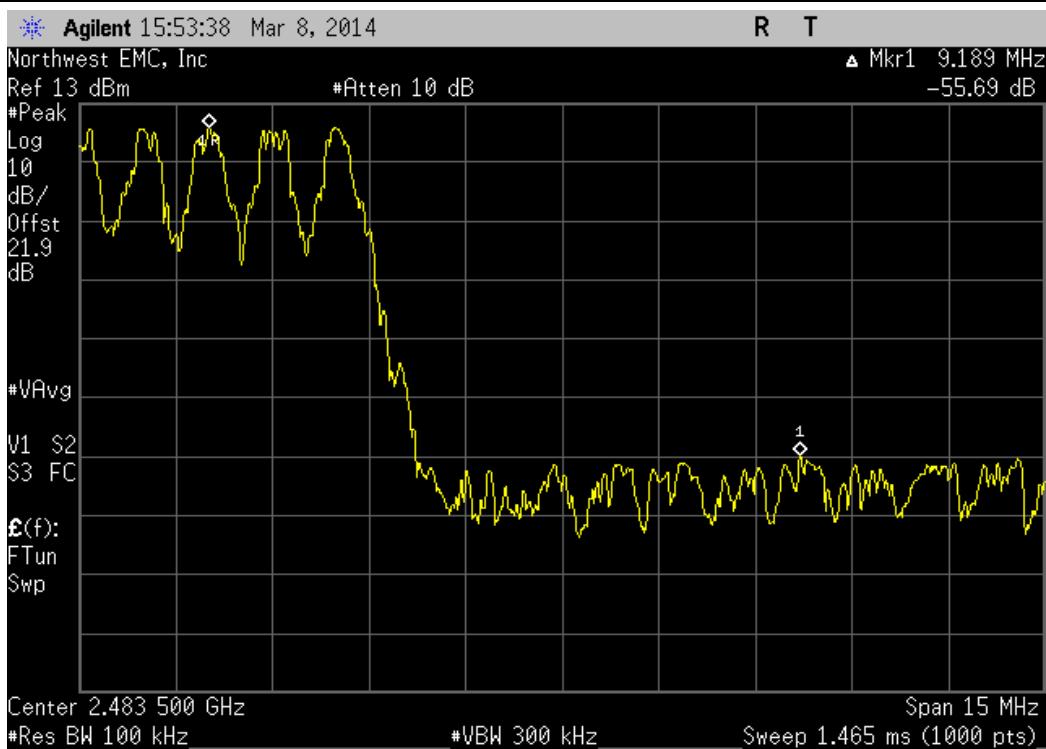
The spectrum was scanned below the lower band edge and above the higher band edge.

EUT: TRAC-Lid BT SMART		Work Order: SUPR0114		
Serial Number: 41007123		Date: 03/10/14		
Customer: Supra, A Division of UTCFS		Temperature: 22°C		
Attendees: None		Humidity: 42%		
Project: TRAC		Barometric Pres.: 1019		
Tested by: Jared Ison, Rod Peloquin	Power: Internal Battery, 3VDC	Job Site: EV06		
TEST SPECIFICATIONS				
FCC 15.247:2014		Test Method: ANSI C63.10:2009		
COMMENTS				
Modes of operation were client provided.				
DEVIATIONS FROM TEST STANDARD				
Configuration #	1	Signature: 		
		Value	Limit	Result
Hopping Mode				
DH5, GFSK				
Low Channel, 2402 MHz		-56.34 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		-55.69 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK				
Low Channel, 2402 MHz		-57.13 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		-56.76 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
Low Channel, 2402 MHz		-52 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz		-56.18 dBc	≤ -20 dBc	Pass

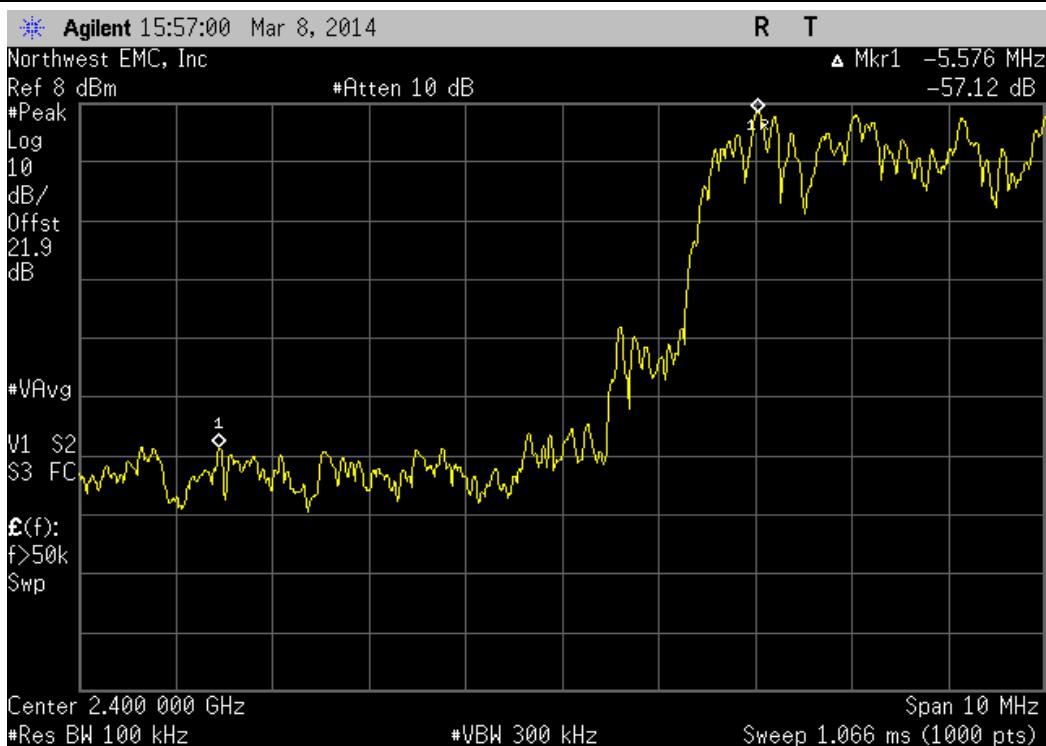
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz					
		Value	Limit	Result	
		-56.34 dBc	≤ -20 dBc	Pass	



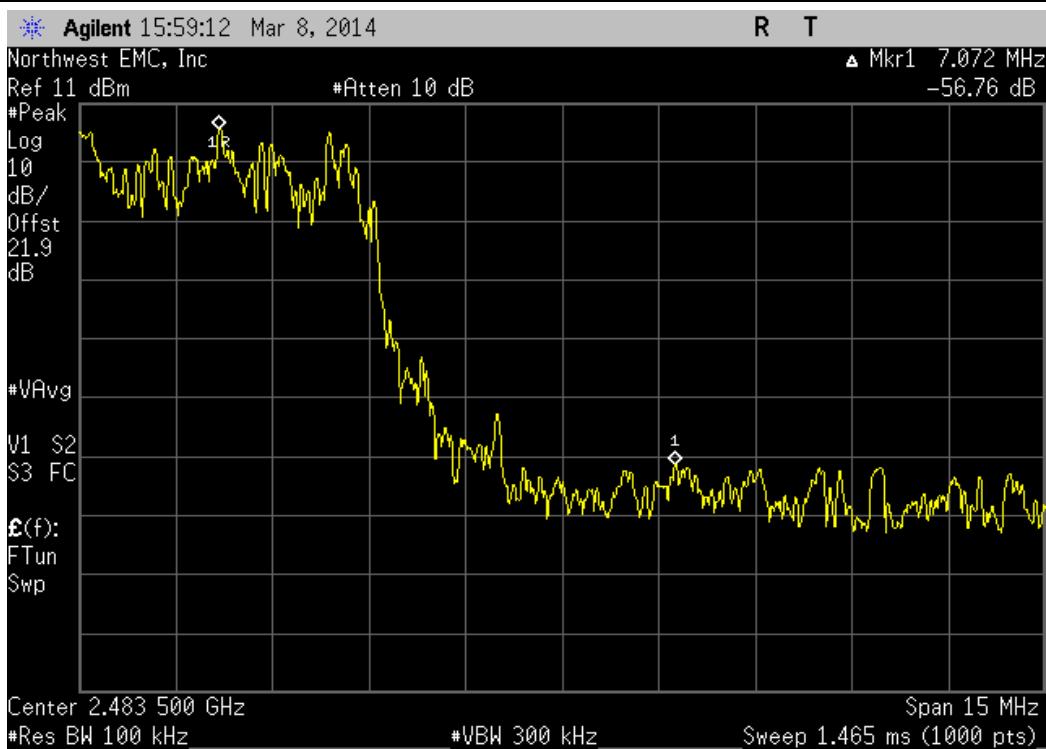
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz					
		Value	Limit	Result	
		-55.69 dBc	≤ -20 dBc	Pass	



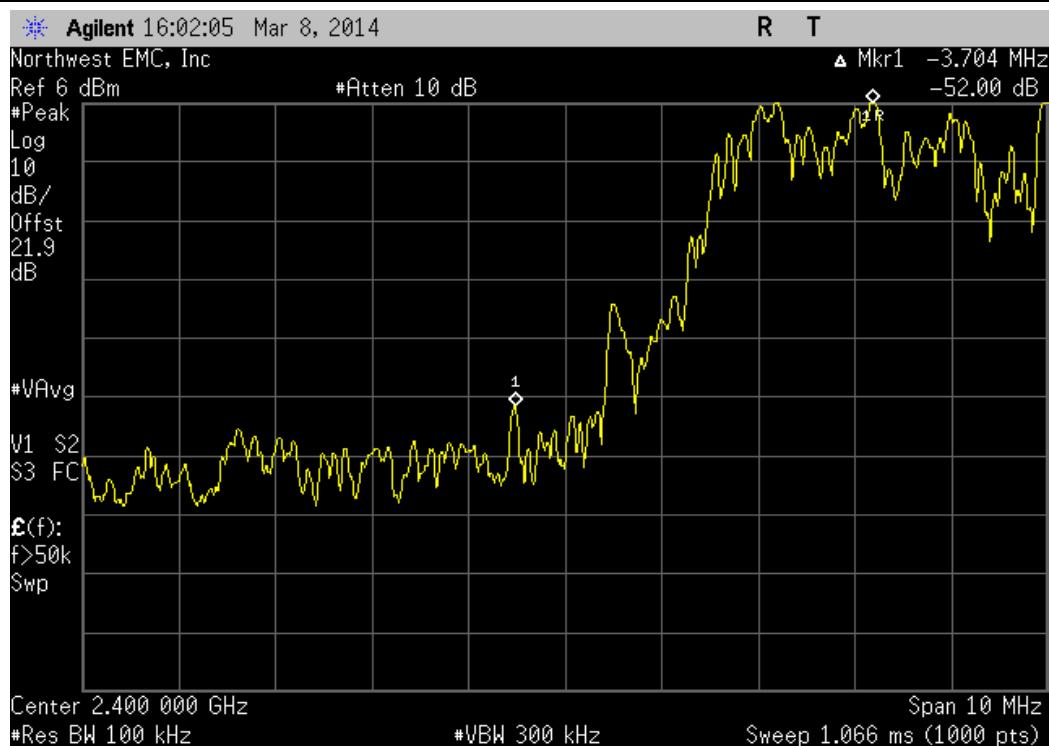
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-57.13 dBc	≤ -20 dBc	Pass



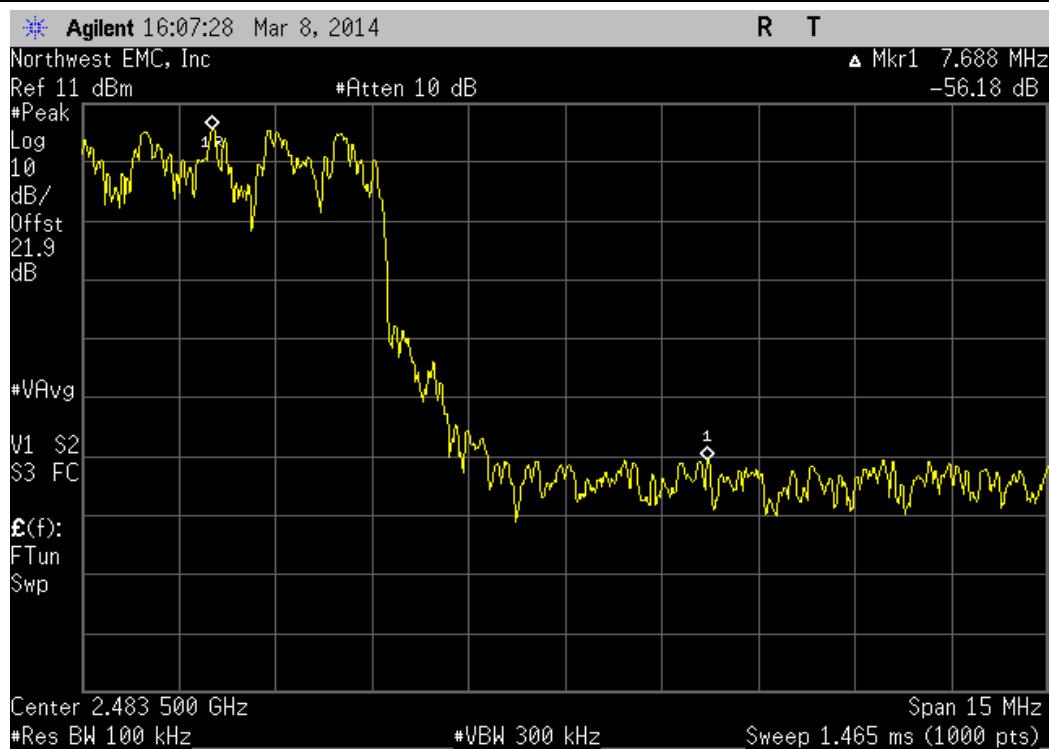
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-56.76 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-52 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-56.18 dBc	≤ -20 dBc	Pass



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.

OPERATING MODULATIONS

TX, BT BDR, 1DH5

TX, BT EDR, 2DH5

TX, BT EDR, 3DH5

OPERATING FREQUENCIES

TX, Low Ch. 2402 MHz

TX, Mid Ch. 2440 MHz

TX, High Ch. 2480 MHz

POWER SETTINGS INVESTIGATED

Internal Battery, 3VDC

CONFIGURATIONS INVESTIGATED

SUPR0114 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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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.	KMKG-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
Pre-Amplifier	Miteq	AMF-3D00100800-32-13P	AVF	8/30/2013	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
HP Filter	Micro-Tronics	HPM50111	HFO	7/6/2013	24 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
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

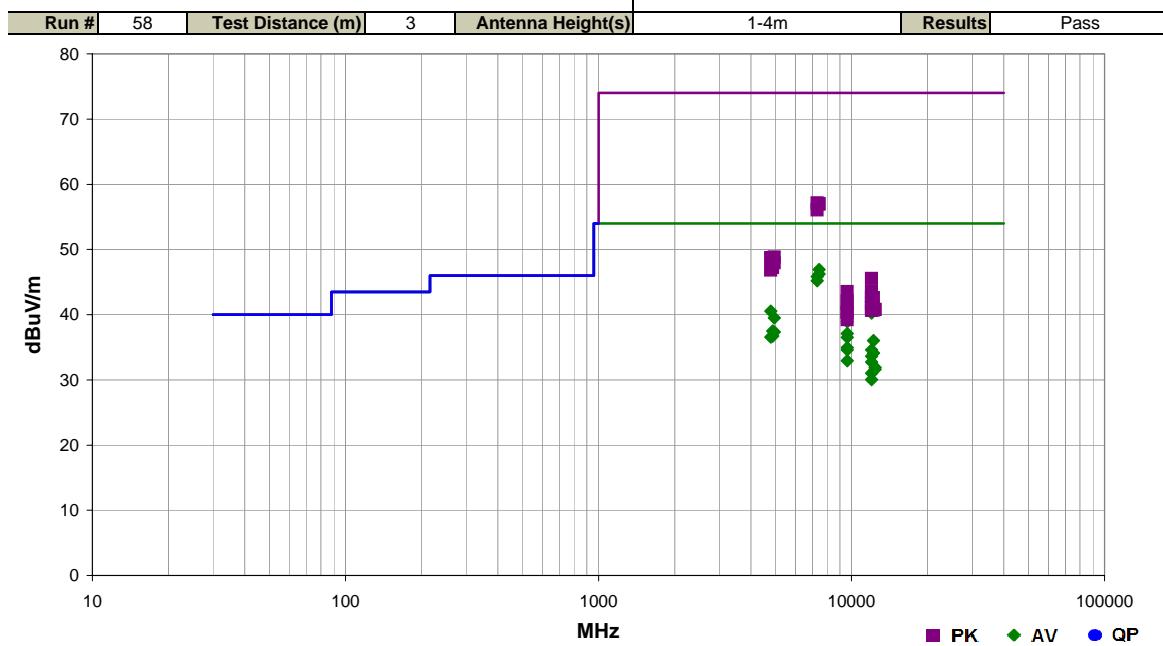
Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

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.

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	
EUT: TRAC-Lid BT SMART		Tested by: Jared Ison, Brandon Hobbs		
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

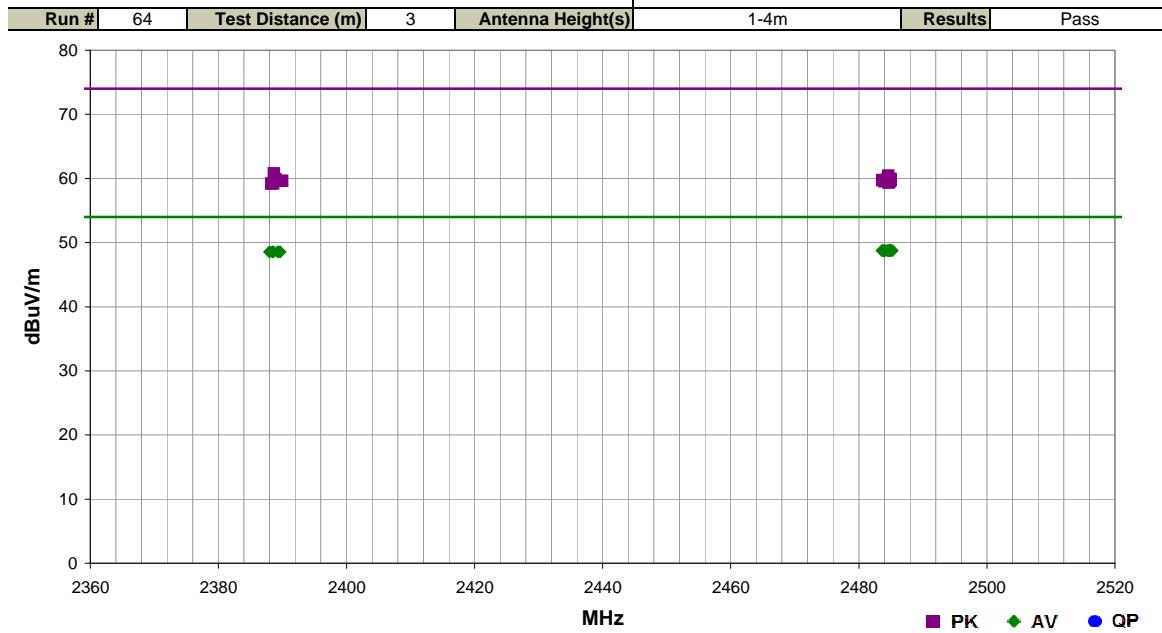


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7440.055	26.8	20.1	1.0	23.0	3.0	0.0	Horz	AV	0.0	46.9	54.0	-7.1	High Ch. 2480MHz, DH5, Vert
7440.055	26.1	20.1	1.0	214.0	3.0	0.0	Vert	AV	0.0	46.2	54.0	-7.8	High Ch. 2480MHz, DH5, Vert
7320.150	26.4	19.4	1.0	13.0	3.0	0.0	Horz	AV	0.0	45.8	54.0	-8.2	Mid Ch. 2440MHz, DH5, Vert
7318.705	25.8	19.4	1.0	59.0	3.0	0.0	Vert	AV	0.0	45.2	54.0	-8.8	Mid Ch. 2440MHz, DH5, On Side
4804.075	30.0	10.5	1.1	146.0	3.0	0.0	Horz	AV	0.0	40.5	54.0	-13.5	Low Ch. 2402MHz, DH5, Vert
12009.620	42.4	-2.2	1.0	238.0	3.0	0.0	Vert	AV	0.0	40.2	54.0	-13.8	Low Ch. 2402MHz, DH5, On Side
4960.025	28.0	11.5	1.5	159.0	3.0	0.0	Vert	AV	0.0	39.5	54.0	-14.5	High Ch. 2480MHz, DH5, Vert
9608.270	50.2	-11.3	1.3	218.0	3.0	0.0	Horz	AV	0.0	38.9	54.0	-15.1	Low Ch. 2402MHz, DH5, Vert
4879.990	26.5	11.0	1.0	314.0	3.0	0.0	Horz	AV	0.0	37.5	54.0	-16.5	Mid Ch. 2440MHz, DH5, Vert
4959.990	25.8	11.5	1.0	320.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	High Ch. 2480MHz, DH5, Vert
9608.280	48.4	-11.3	1.2	276.0	3.0	0.0	Vert	AV	0.0	37.1	54.0	-16.9	Low Ch. 2402MHz, DH5, On Side
7319.385	37.7	19.4	1.0	59.0	3.0	0.0	Vert	PK	0.0	57.1	74.0	-16.9	Mid Ch. 2440MHz, DH5, On Side
7440.090	36.9	20.1	1.0	23.0	3.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	High Ch. 2480MHz, DH5, Vert
7440.250	36.8	20.1	1.0	214.0	3.0	0.0	Vert	PK	0.0	56.9	74.0	-17.1	High Ch. 2480MHz, DH5, Vert
4879.970	25.7	11.0	2.8	1.0	3.0	0.0	Vert	AV	0.0	36.7	54.0	-17.3	Mid Ch. 2440MHz, DH5, On Side
4804.183	26.0	10.5	1.0	89.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	Low Ch. 2402MHz, DH5, On Side
9608.300	47.8	-11.3	1.4	165.0	3.0	0.0	Horz	AV	0.0	36.5	54.0	-17.5	Low Ch. 2402MHz, DH5, Horz
7320.515	36.6	19.4	1.0	13.0	3.0	0.0	Horz	PK	0.0	56.0	74.0	-18.0	Mid Ch. 2440MHz, DH5, Vert
12200.620	37.1	-1.1	1.1	232.0	3.0	0.0	Vert	AV	0.0	36.0	54.0	-18.0	Mid Ch. 2440MHz, DH5, On Side
9608.140	46.2	-11.3	1.2	214.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	Low Ch. 2402MHz, DH5, On Side
12009.630	36.8	-2.2	1.0	148.0	3.0	0.0	Horz	AV	0.0	34.6	54.0	-19.4	Low Ch. 2402MHz, DH5, Vert
9608.150	45.9	-11.3	1.0	155.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4	Low Ch. 2402MHz, DH5, Vert
12199.650	35.2	-1.1	1.1	245.0	3.0	0.0	Horz	AV	0.0	34.1	54.0	-19.9	Mid Ch. 2440MHz, DH5, Vert
12010.110	35.8	-2.2	1.1	162.0	3.0	0.0	Vert	AV	0.0	33.6	54.0	-20.4	Low Ch. 2402MHz, 3DH5, Vert
9608.150	44.2	-11.3	1.4	263.0	3.0	0.0	Vert	AV	0.0	32.9	54.0	-21.1	Low Ch. 2402MHz, DH5, Horz
12010.250	34.9	-2.2	1.0	48.0	3.0	0.0	Vert	AV	0.0	32.7	54.0	-21.3	Low Ch. 2402MHz, 3DH5, On Side
12399.550	32.8	-0.9	1.1	254.0	3.0	0.0	Vert	AV	0.0	31.9	54.0	-22.1	High Ch. 2480MHz, DH5, On Side

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
12399.570	32.5	-0.9	1.0	260.0	3.0	0.0	Horz	AV	0.0	31.6	54.0	-22.4	High Ch. 2480MHz, DH5, Vert
12009.480	33.2	-2.2	1.2	184.0	3.0	0.0	Horz	AV	0.0	31.0	54.0	-23.0	Low Ch. 2402MHz, 2DH5, Vert
12009.490	32.2	-2.2	1.0	41.0	3.0	0.0	Vert	AV	0.0	30.0	54.0	-24.0	Low Ch. 2402MHz, 2DH5, On Side
4959.625	37.3	11.5	1.5	159.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	High Ch. 2480MHz, DH5, Vert
4804.292	38.2	10.5	1.1	146.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	Low Ch. 2402MHz, DH5, Vert
4879.675	37.4	11.0	1.0	314.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Mid Ch. 2440MHz, DH5, Vert
4960.115	36.4	11.5	1.0	320.0	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	High Ch. 2480MHz, DH5, Vert
4880.610	36.2	11.0	2.8	1.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Mid Ch. 2440MHz, DH5, On Side
4802.408	36.3	10.5	1.0	89.0	3.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	Low Ch. 2402MHz, DH5, On Side
12009.410	47.7	-2.2	1.0	238.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	Low Ch. 2402MHz, DH5, On Side
12010.160	45.7	-2.2	1.1	162.0	3.0	0.0	Vert	PK	0.0	43.5	74.0	-30.5	Low Ch. 2402MHz, 3DH5, Vert
9608.640	54.8	-11.3	1.3	218.0	3.0	0.0	Horz	PK	0.0	43.5	74.0	-30.5	Low Ch. 2402MHz, DH5, Vert
12010.080	44.9	-2.2	1.0	48.0	3.0	0.0	Vert	PK	0.0	42.7	74.0	-31.3	Low Ch. 2402MHz, 3DH5, On Side
12199.370	43.7	-1.1	1.1	232.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	Mid Ch. 2440MHz, DH5, On Side
9608.765	53.4	-11.3	1.2	276.0	3.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	Low Ch. 2402MHz, DH5, On Side
12009.260	43.9	-2.2	1.0	148.0	3.0	0.0	Horz	PK	0.0	41.7	74.0	-32.3	Low Ch. 2402MHz, DH5, Vert
9608.800	52.9	-11.3	1.4	165.0	3.0	0.0	Horz	PK	0.0	41.6	74.0	-32.4	Low Ch. 2402MHz, DH5, Horz
12009.540	43.3	-2.2	1.2	184.0	3.0	0.0	Horz	PK	0.0	41.1	74.0	-32.9	Low Ch. 2402MHz, 2DH5, Vert
12399.150	41.7	-0.9	1.0	260.0	3.0	0.0	Horz	PK	0.0	40.8	74.0	-33.2	High Ch. 2480MHz, DH5, Vert
12399.330	41.7	-0.9	1.1	254.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	High Ch. 2480MHz, DH5, On Side
12199.430	41.8	-1.1	1.1	245.0	3.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	Mid Ch. 2440MHz, DH5, Vert
12010.550	42.8	-2.2	1.0	41.0	3.0	0.0	Vert	PK	0.0	40.6	74.0	-33.4	Low Ch. 2402MHz, 2DH5, On Side
9608.725	51.6	-11.3	1.0	155.0	3.0	0.0	Vert	PK	0.0	40.3	74.0	-33.7	Low Ch. 2402MHz, DH5, Vert
9608.645	51.6	-11.3	1.2	214.0	3.0	0.0	Horz	PK	0.0	40.3	74.0	-33.7	Low Ch. 2402MHz, DH5, On Side
9608.365	50.5	-11.3	1.4	263.0	3.0	0.0	Vert	PK	0.0	39.2	74.0	-34.8	Low Ch. 2402MHz, DH5, Horz

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	
EUT:	TRAC-Lid BT SMART	Tested by:	Jared Ison, Brandon Hobbs	
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



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
2484.887	26.2	2.7	1.0	151.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	High Ch. 2480MHz, DH5, Horz
2485.233	26.1	2.7	1.0	301.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, On Side
2484.950	26.1	2.7	1.0	51.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, 2DH5, On Side
2484.840	26.1	2.7	1.0	50.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, 2DH5, Horz
2484.570	26.1	2.7	1.0	28.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, On Side
2484.517	26.1	2.7	2.4	185.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, Vert
2484.113	26.1	2.7	4.0	340.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, 3DH5, Horz
2483.917	26.1	2.7	1.0	234.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, Horz
2483.763	26.1	2.7	3.6	117.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, Vert
2483.627	26.1	2.7	3.4	270.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, 3DH5, On Side
2388.003	26.3	2.3	1.0	267.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, DH5, On Side
2388.450	26.3	2.3	1.0	46.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, DH5, Horz
2388.570	26.3	2.3	1.1	200.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, 3DH5, Horz
2389.297	26.3	2.3	1.0	101.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, 2DH5, Horz
2389.647	26.3	2.3	1.0	68.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	Low Ch. 2402MHz, 3DH5, On Side
2388.667	38.5	2.3	1.0	68.0	3.0	20.0	Horz	PK	0.0	60.8	74.0	-13.2	Low Ch. 2402MHz, 3DH5, On Side
2484.620	37.8	2.7	1.0	151.0	3.0	20.0	Vert	PK	0.0	60.5	74.0	-13.5	High Ch. 2480MHz, DH5, Horz
2484.953	37.3	2.7	2.4	185.0	3.0	20.0	Horz	PK	0.0	60.0	74.0	-14.0	High Ch. 2480MHz, DH5, Vert
2484.547	37.3	2.7	1.0	28.0	3.0	20.0	Horz	PK	0.0	60.0	74.0	-14.0	High Ch. 2480MHz, DH5, On Side
2388.947	37.6	2.3	1.0	46.0	3.0	20.0	Vert	PK	0.0	59.9	74.0	-14.1	Low Ch. 2402MHz, DH5, Horz
2485.000	37.1	2.7	3.6	117.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	High Ch. 2480MHz, DH5, Vert
2484.883	37.1	2.7	1.0	51.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	High Ch. 2480MHz, 2DH5, On Side
2483.690	37.1	2.7	3.4	270.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	High Ch. 2480MHz, 3DH5, On Side
2389.967	37.4	2.3	1.0	267.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	Low Ch. 2402MHz, DH5, On Side
2484.177	37.0	2.7	1.0	50.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	High Ch. 2480MHz, 2DH5, Horz
2484.873	36.9	2.7	1.0	301.0	3.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	High Ch. 2480MHz, DH5, On Side
2484.033	36.9	2.7	1.0	234.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	High Ch. 2480MHz, DH5, Horz
2484.683	36.7	2.7	4.0	340.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	High Ch. 2480MHz, 3DH5, Horz

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
2388.583	37.0	2.3	1.0	101.0	3.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	Low Ch. 2402MHz, 2DH5, Horz
2388.283	36.9	2.3	1.1	200.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	Low Ch. 2402MHz, 3DH5, Horz