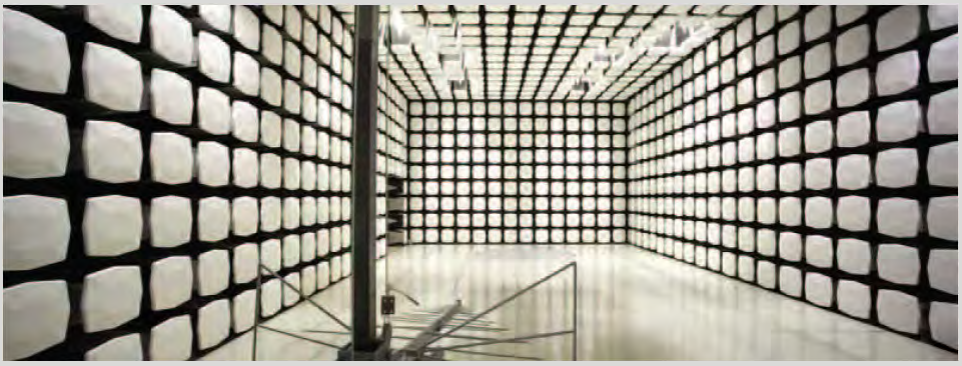
Supra, A Division of UTCFS

Supra eKEY Fob

FCC 15.247:2014 FHSS

Report #: SUPR0120.1



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: May 8, 2014
Supra, A Division of UTCFS
Model: Supra eKEY Fob

Test Description	Specification	Test Method	Pass/Fail
Occupied Bandwidth	FCC 15.247:2014	ANSI C63.10:2009	Pass
Output Power	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
Band Edge Compliance - Hopping Mode	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
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.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

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.

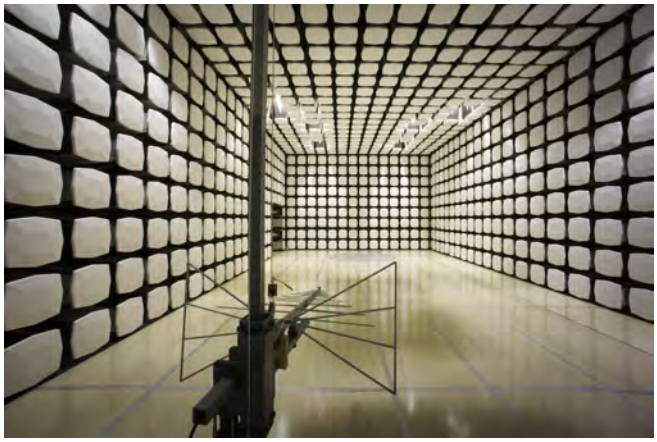
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70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

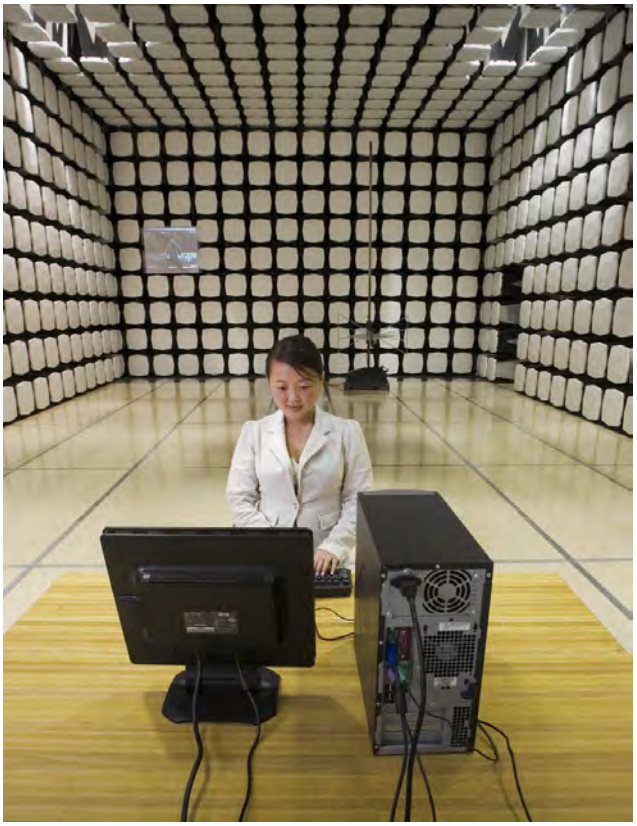
NORTHWEST EMC

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	2834F-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

WTD 12.5.23

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:	Supra eKEY Fob
First Date of Test:	May 01, 2014
Last Date of Test:	May 08, 2014
Receipt Date of Samples:	May 01, 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):
The Supra eKEY Fob is a device used to translate the Bluetooth signal from your eKEY enabled smartphone to an infrared signal that can be recognized by an iBox, iBox BT and iBox BT LE.

Testing Objective:
To demonstrate compliance to FCC 15.247 requirements for the FHSS portion.

CONFIGURATIONS

Configuration SUPR0120- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Fob	Supra, A Division of UTCFS	Supra eKEY Fob	0161

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Extended Battery 3v Lithium	Varta Microbattery	Varta CR2/3AH	None

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	5/1/2014	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.
2	5/8/2014	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	5/8/2014	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	5/8/2014	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	5/8/2014	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.
6	5/8/2014	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.
7	5/8/2014	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.
8	5/8/2014	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.
9	5/8/2014	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.

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
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	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	3/28/2014	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

OCCUPIED BANDWIDTH

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**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
DH5, GFSK				
	Low Channel	897.188 kHz	< 1.5 MHz	Pass
	Mid Channel	890.318 kHz	< 1.5 MHz	Pass
	High Channel	884.128 kHz	< 1.5 MHz	Pass
2DH5, pi/4-DQPSK				
	Low Channel	1.375 MHz	< 1.5 MHz	Pass
	Mid Channel	1.371 MHz	< 1.5 MHz	Pass
	High Channel	1.373 MHz	< 1.5 MHz	Pass
3DH5, 8-DPSK				
	Low Channel	1.354 MHz	< 1.5 MHz	Pass
	Mid Channel	1.353 MHz	< 1.5 MHz	Pass
	High Channel	1.356 MHz	< 1.5 MHz	Pass

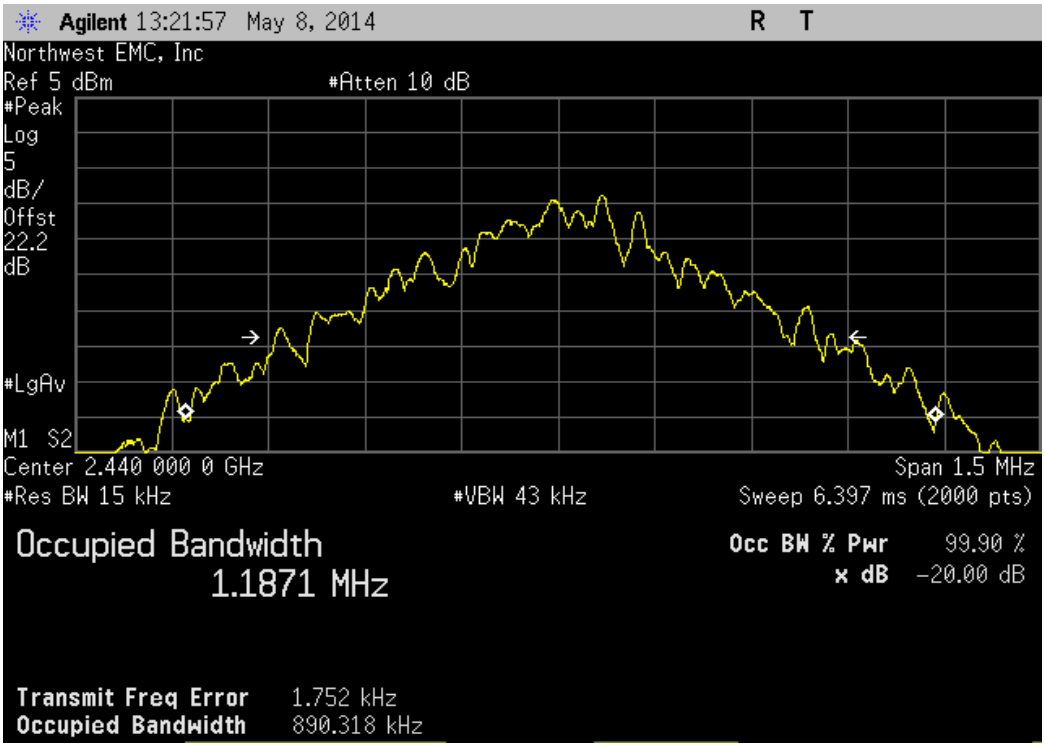
OCCUPIED BANDWIDTH

DH5, GFSK, Low Channel

Value	Limit	Result
897.188 kHz	< 1.5 MHz	Pass

DH5, GFSK, Mid Channel

Value	Limit	Result
890.318 kHz	< 1.5 MHz	Pass



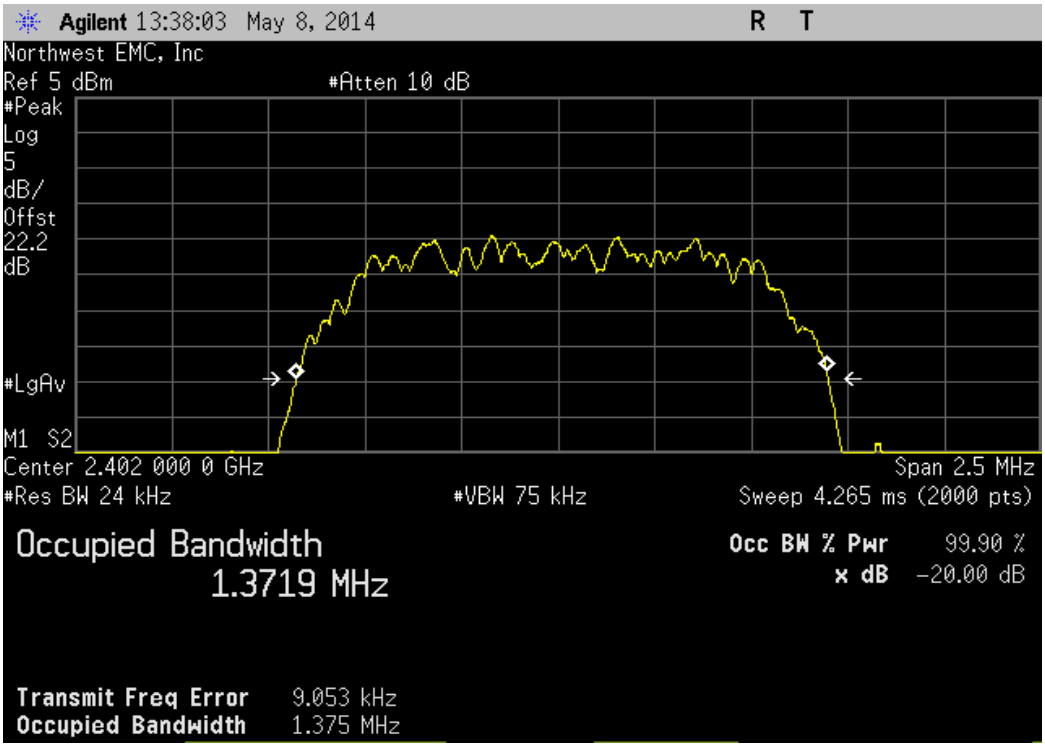
OCCUPIED BANDWIDTH

DH5, GFSK, High Channel

				Value	Limit	Result
				884.128 kHz	< 1.5 MHz	Pass

2DH5, pi/4-DQPSK, Low Channel

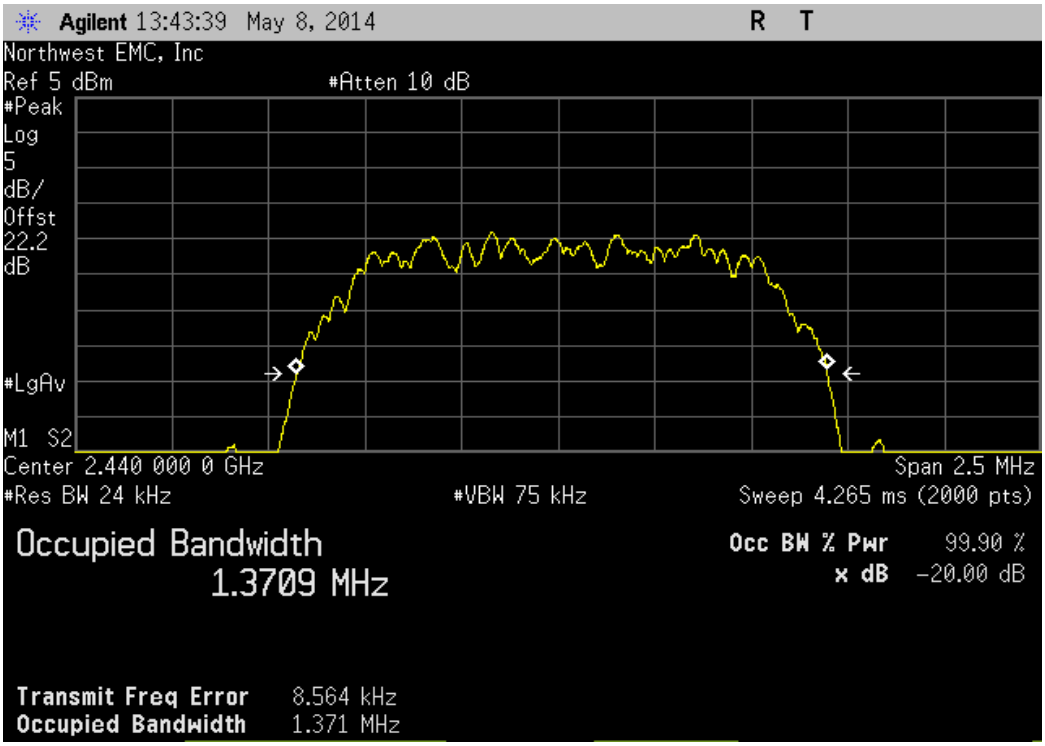
				Value	Limit	Result
				1.375 MHz	< 1.5 MHz	Pass



OCCUPIED BANDWIDTH

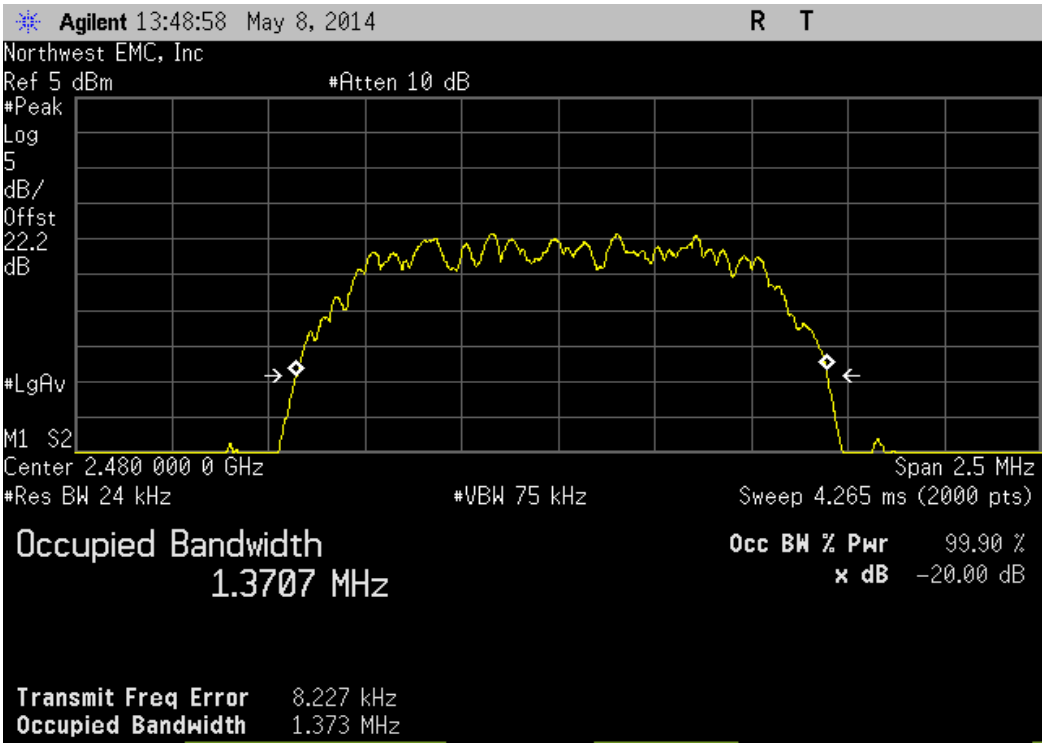
2DH5, pi/4-DQPSK, Mid Channel

				Value	Limit	Result
				1.371 MHz	< 1.5 MHz	Pass



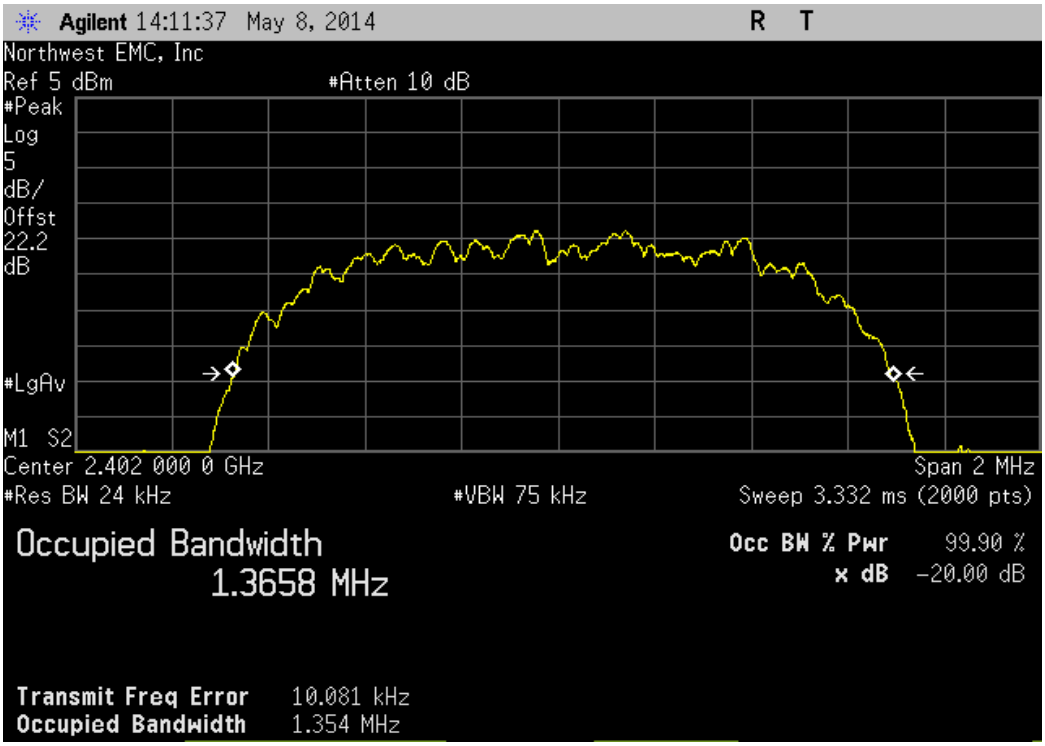
2DH5, pi/4-DQPSK, High Channel

				Value	Limit	Result
				1.373 MHz	< 1.5 MHz	Pass



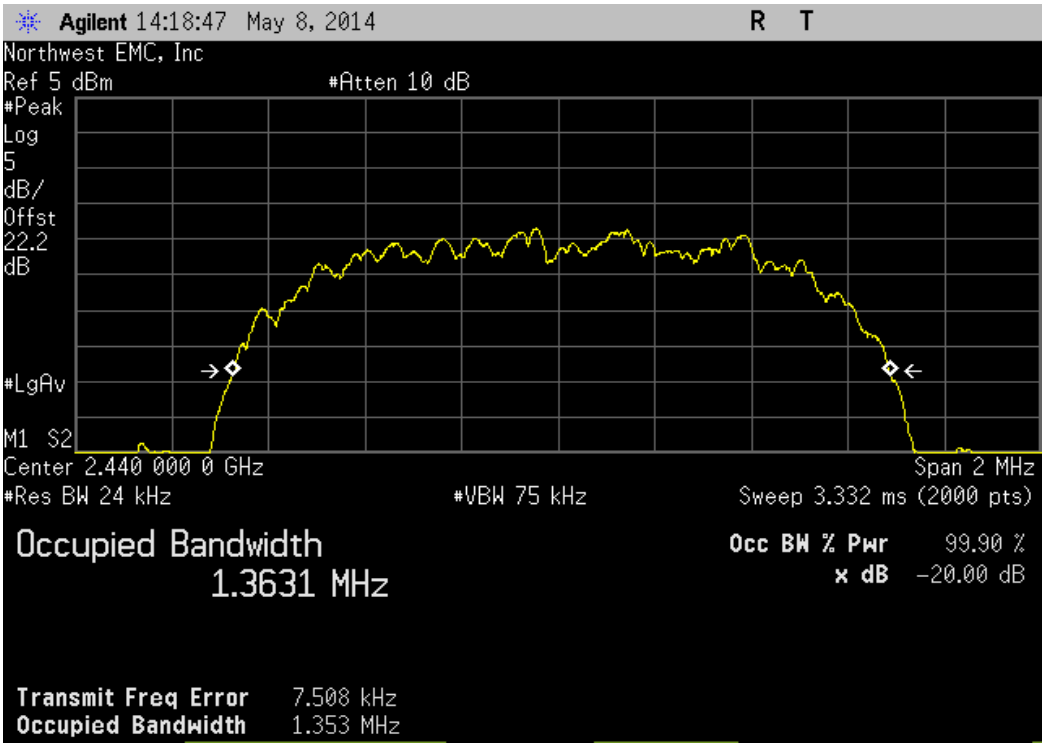
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				1.354 MHz	< 1.5 MHz	Pass



3DH5, 8-DPSK, Mid Channel

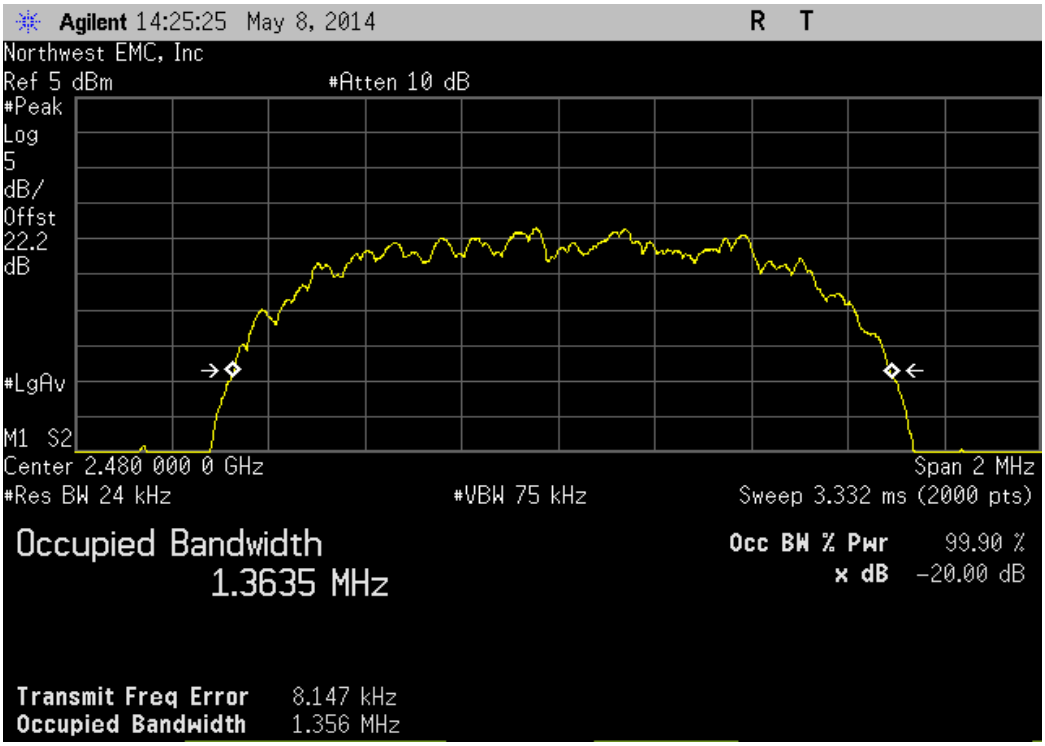
				Value	Limit	Result
				1.353 MHz	< 1.5 MHz	Pass



OCCUPIED BANDWIDTH

3DH5, 8-DPSK, High Channel

				Value	Limit	Result
				1.356 MHz	< 1.5 MHz	Pass



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
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	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	3/28/2014	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

OUTPUT POWER

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**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

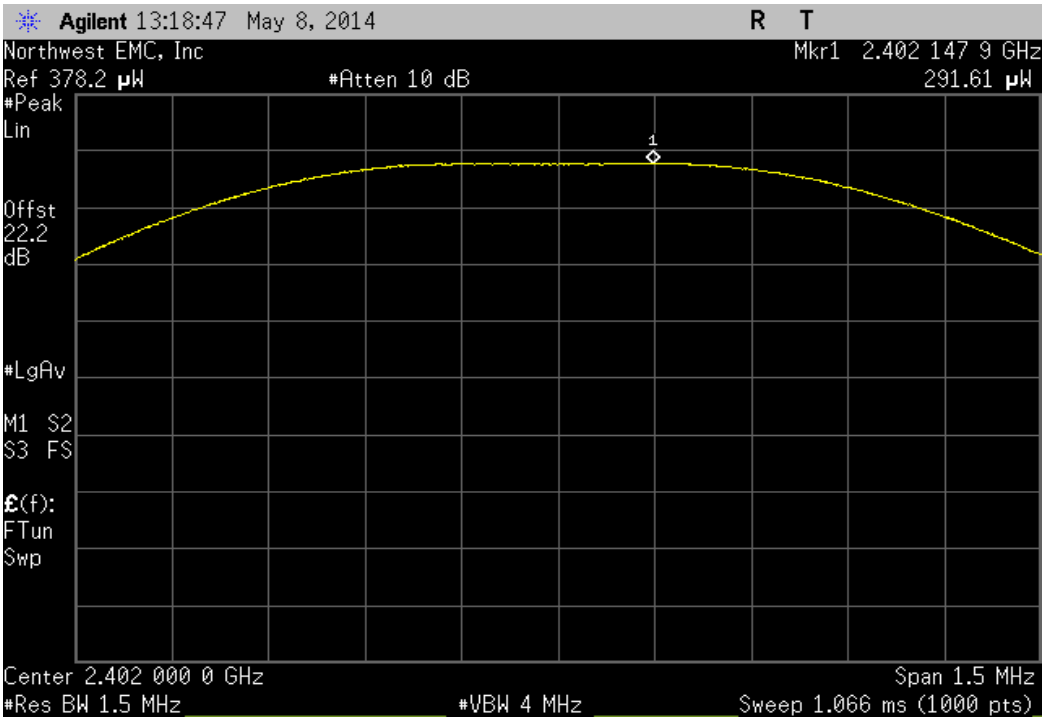
Configuration #	1	*Signature*

		Value	Limit	Result
DH5, GFSK				
	Low Channel	291.608 uW	< 125 mW	Pass
	Mid Channel	322.775 uW	< 125 mW	Pass
	High Channel	321.514 uW	< 125 mW	Pass
2DH5, pi/4-DQPSK				
	Low Channel	316.155 uW	< 125 mW	Pass
	Mid Channel	350.671 uW	< 125 mW	Pass
	High Channel	348.578 uW	< 125 mW	Pass
3DH5, 8-DPSK				
	Low Channel	368.044 uW	< 125 mW	Pass
	Mid Channel	405.229 uW	< 125 mW	Pass
	High Channel	402.995 uW	< 125 mW	Pass

OUTPUT POWER

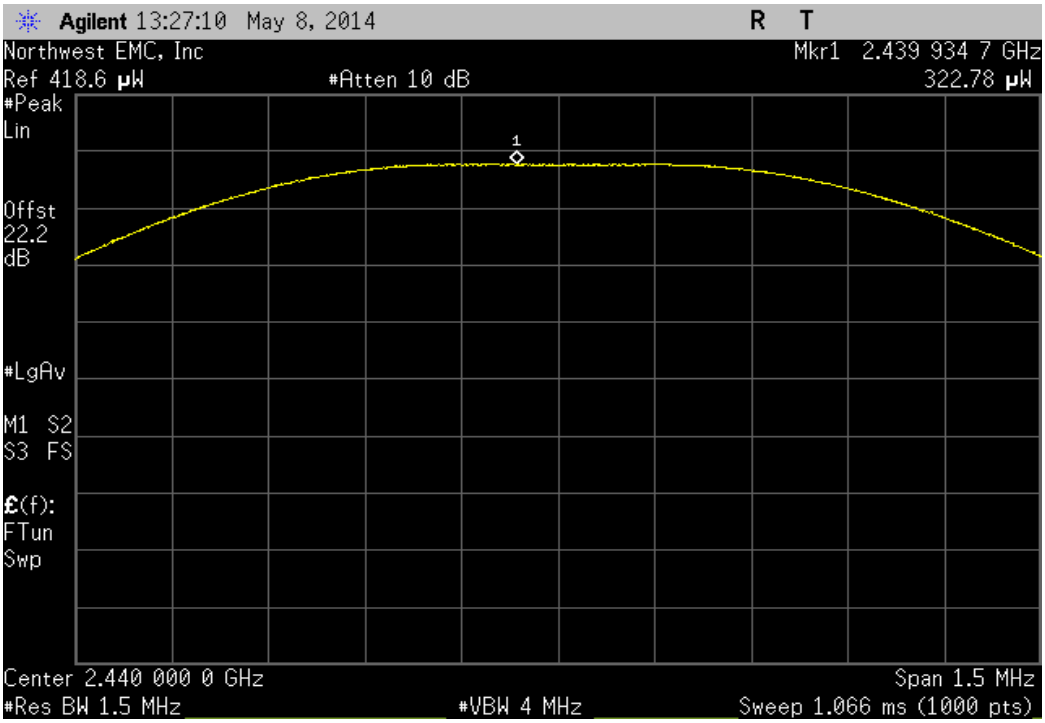
DH5, GFSK, Low Channel

				Value	Limit	Result
				291.608 uW	< 125 mW	Pass



DH5, GFSK, Mid Channel

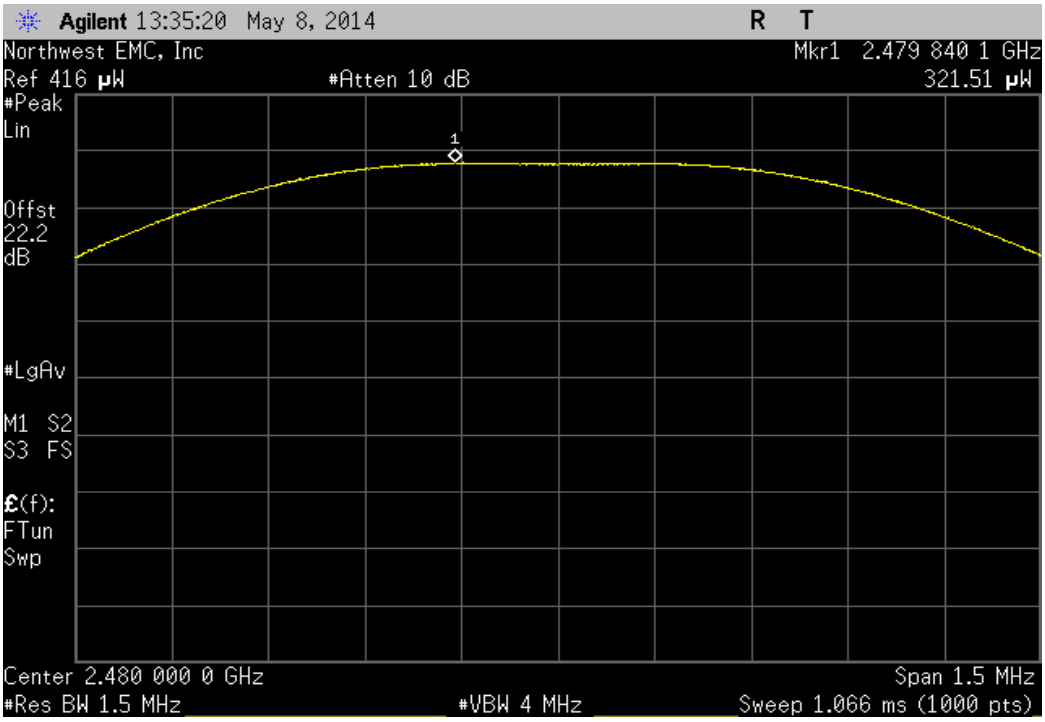
				Value	Limit	Result
				322.775 uW	< 125 mW	Pass



OUTPUT POWER

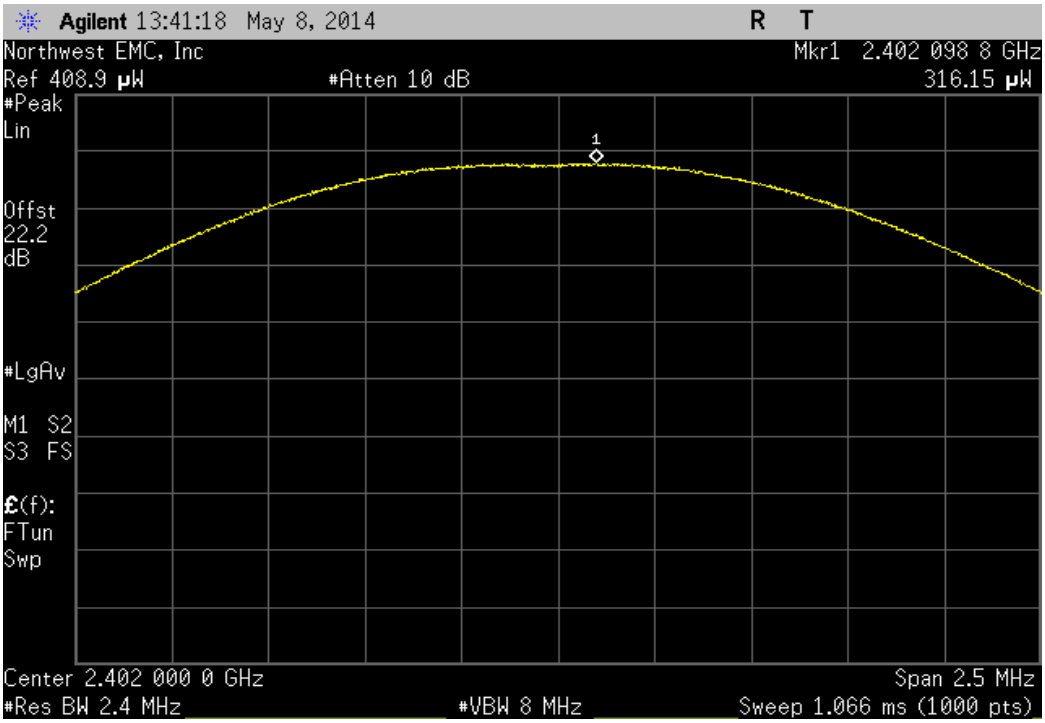
DH5, GFSK, High Channel

Value	Limit	Result
321.514 uW	< 125 mW	Pass



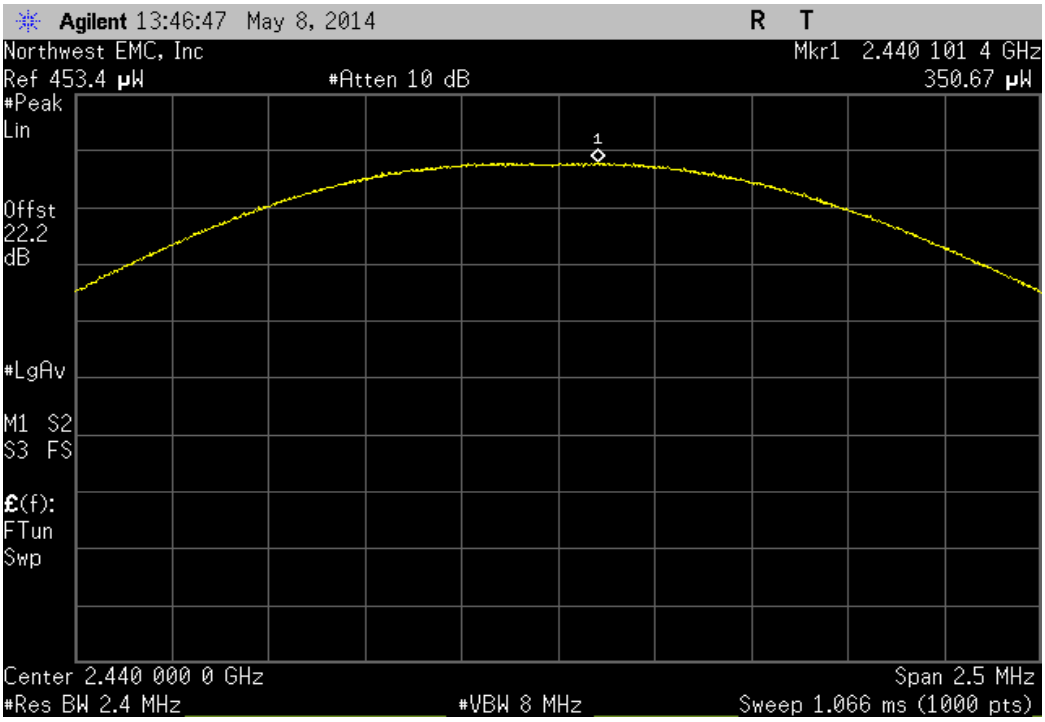
2DH5, pi/4-DQPSK, Low Channel

Value	Limit	Result
316.155 uW	< 125 mW	Pass

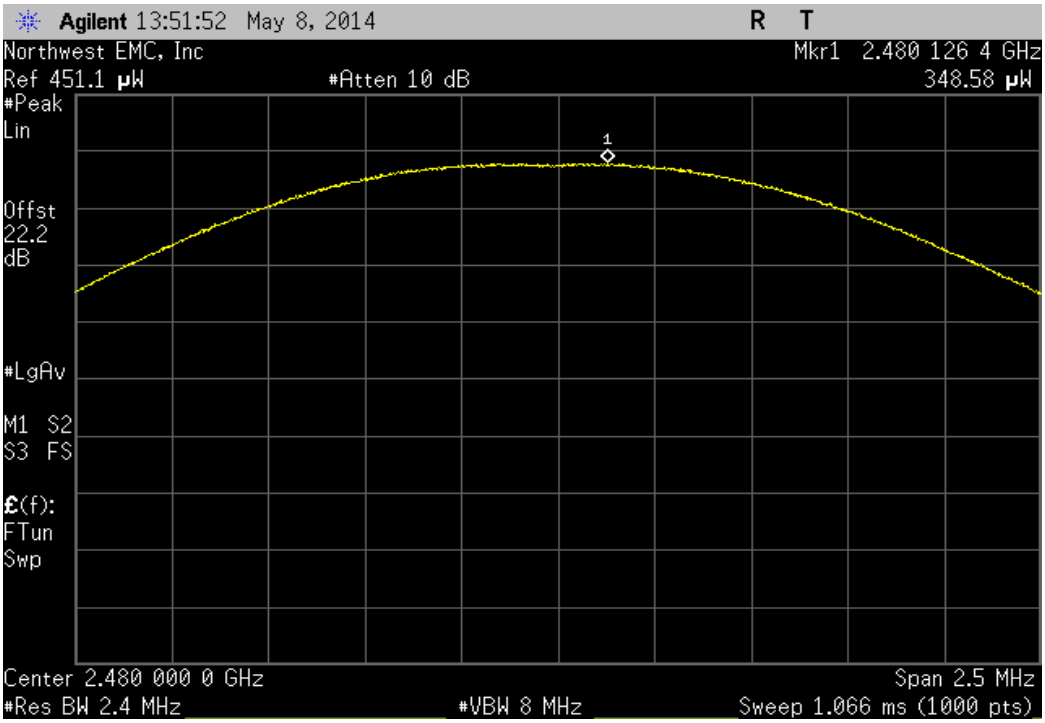


OUTPUT POWER

2DH5, pi/4-DQPSK, Mid Channel							
					Value	Limit	Result
					350.671 uW	< 125 mW	Pass

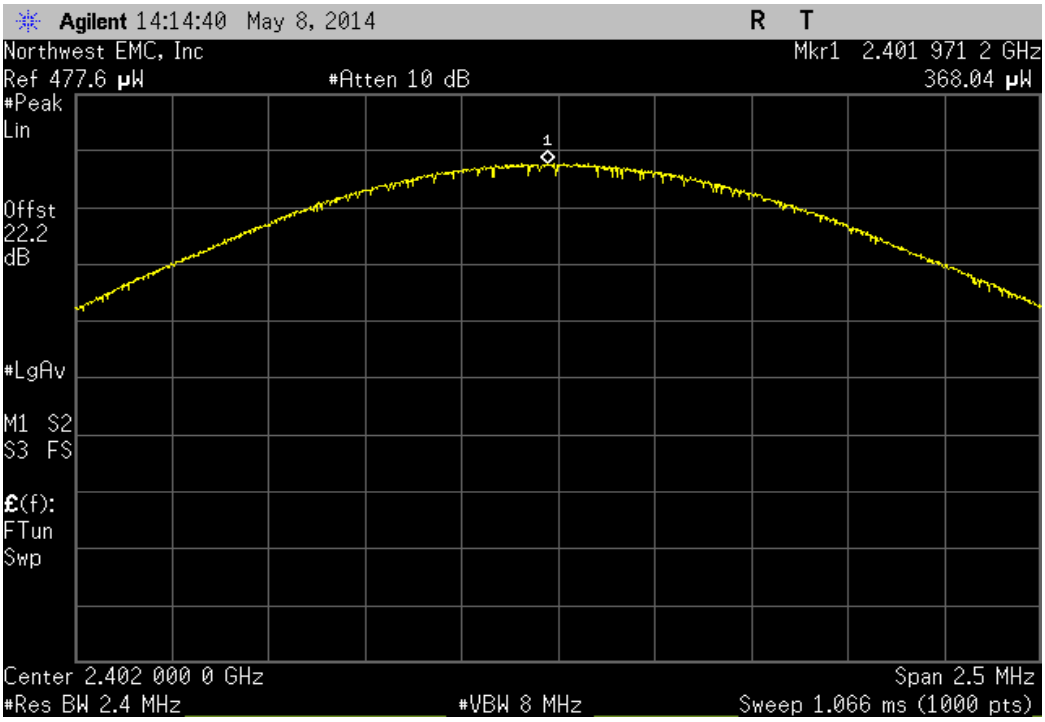


2DH5, pi/4-DQPSK, High Channel							
					Value	Limit	Result
					348.578 uW	< 125 mW	Pass

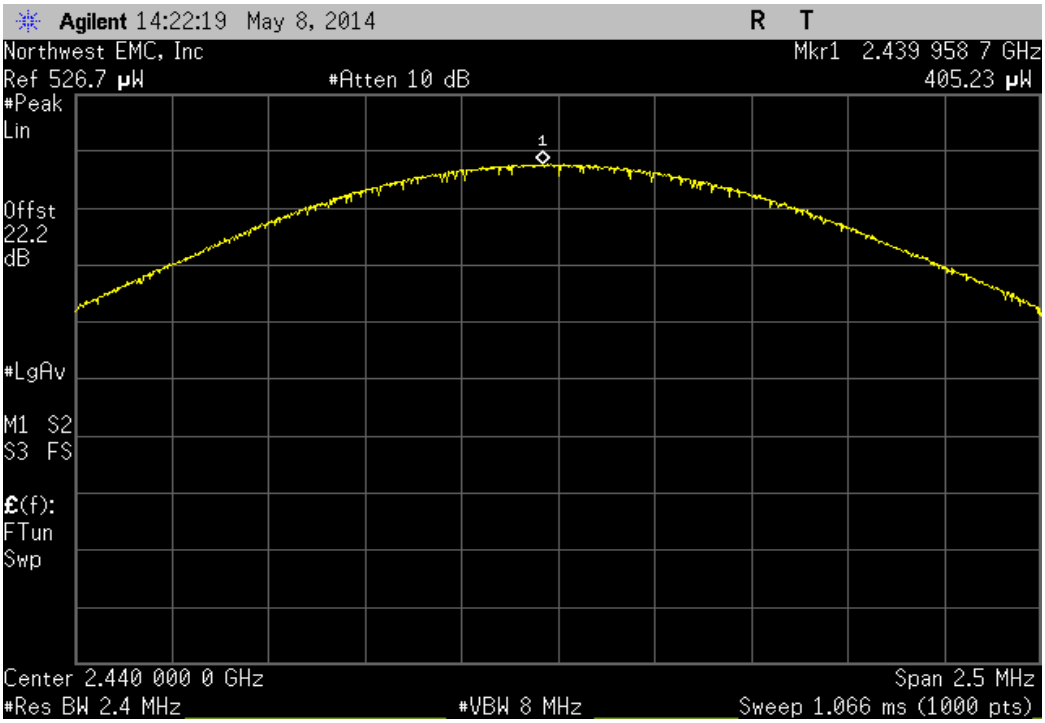


OUTPUT POWER

3DH5, 8-DPSK, Low Channel							
					Value	Limit	Result
					368.044 uW	< 125 mW	Pass

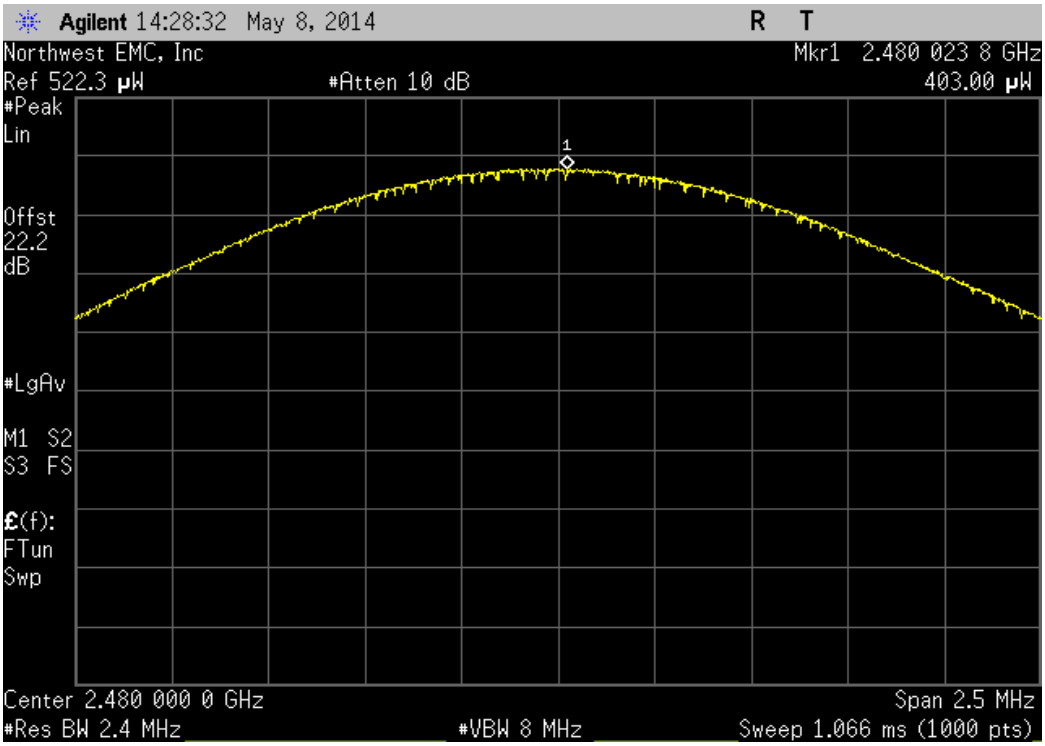


3DH5, 8-DPSK, Mid Channel							
					Value	Limit	Result
					405.229 uW	< 125 mW	Pass



OUTPUT POWER

3DH5, 8-DPSK, High Channel						
				Value	Limit	Result
				402.995 uW	< 125 mW	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
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	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
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

SPURIOUS CONDUCTED EMISSIONS

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**Job Site:**	EV06

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

COMMENTS

Mode of operation tested were client provided.

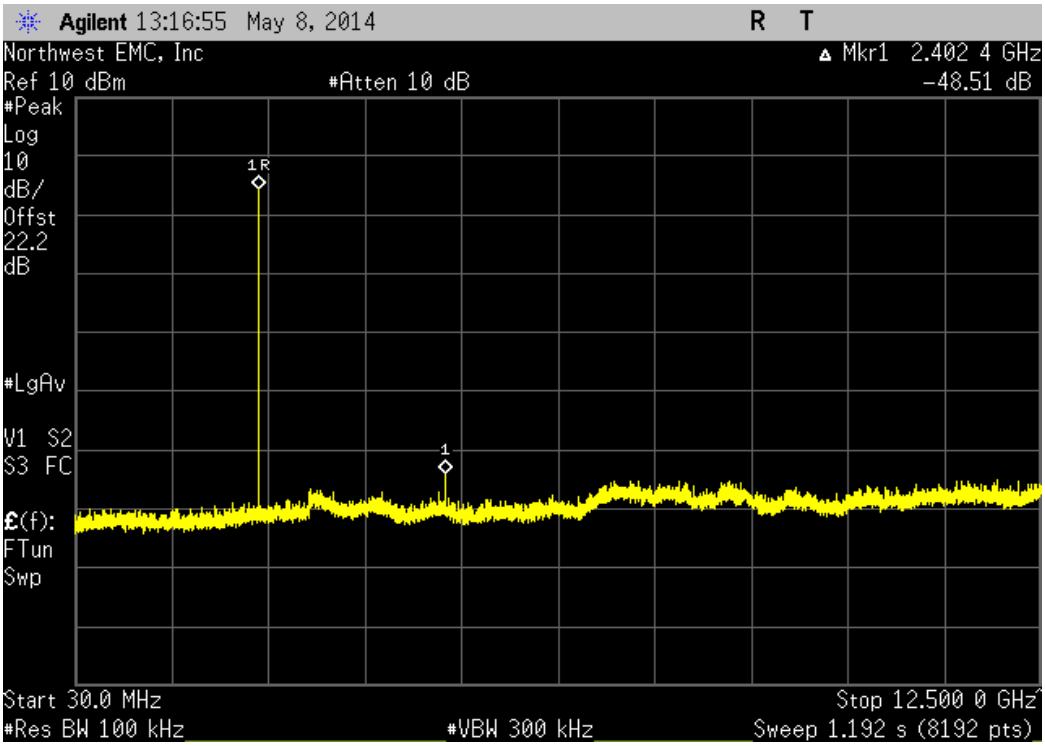
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

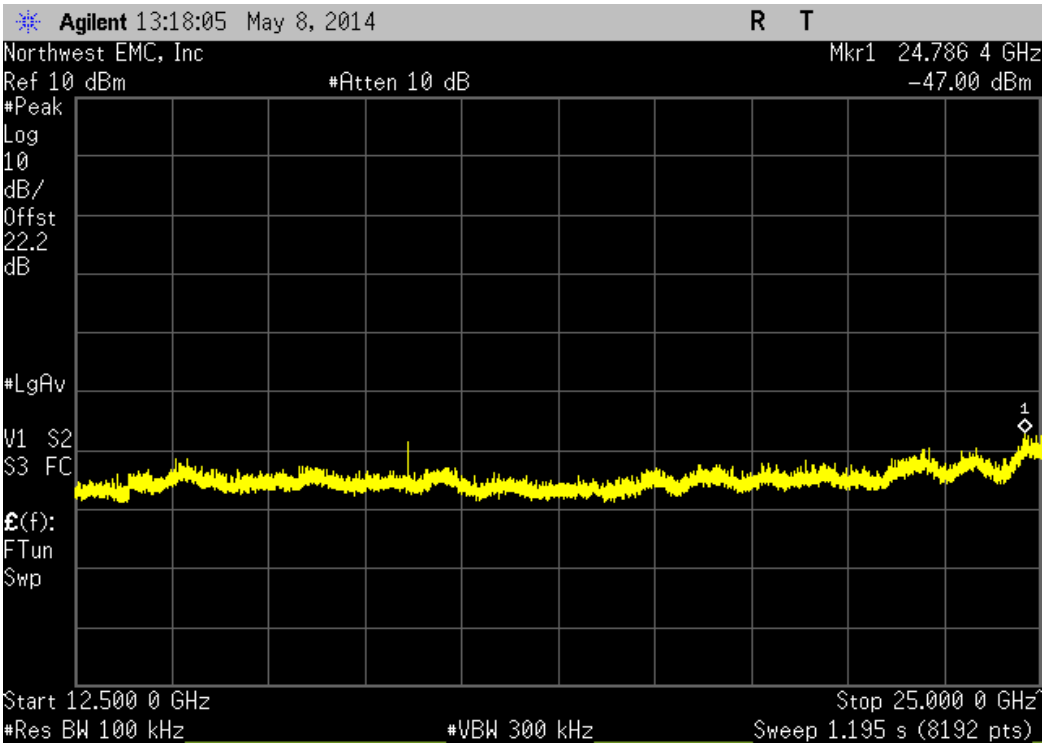
		Frequency Range	Value	Limit	Result
DH5, GFSK					
	Low Channel	30 MHz - 12.5 GHz	-48.51 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-41.44 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-49.37 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-41.25 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-49.67 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-42.27 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK					
	Low Channel	30 MHz - 12.5 GHz	-42.82 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-38.19 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-43.69 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-38.6 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-46.2 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-39.18 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK					
	Low Channel	30 MHz - 12.5 GHz	-43.09 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-38.59 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-44.63 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-38.81 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-45.73 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-38.16 dBc	≤ -20 dBc	Pass

SPURIOUS CONDUCTED EMISSIONS

DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-48.51 dBc	≤ -20 dBc	Pass

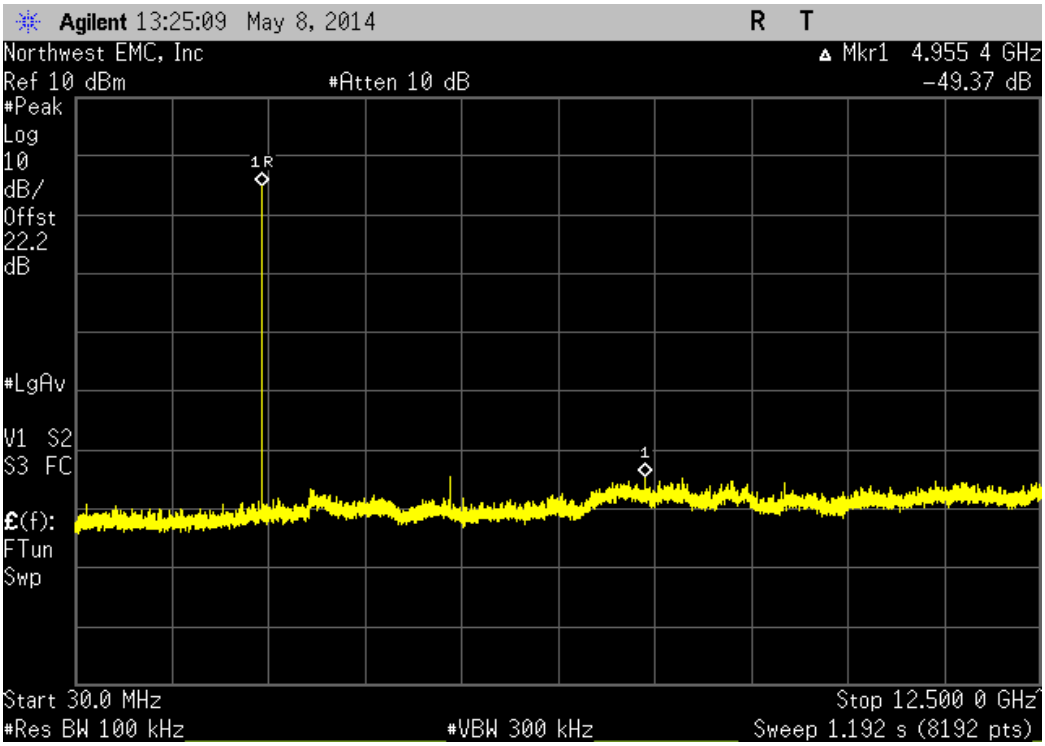


DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-41.44 dBc	≤ -20 dBc	Pass

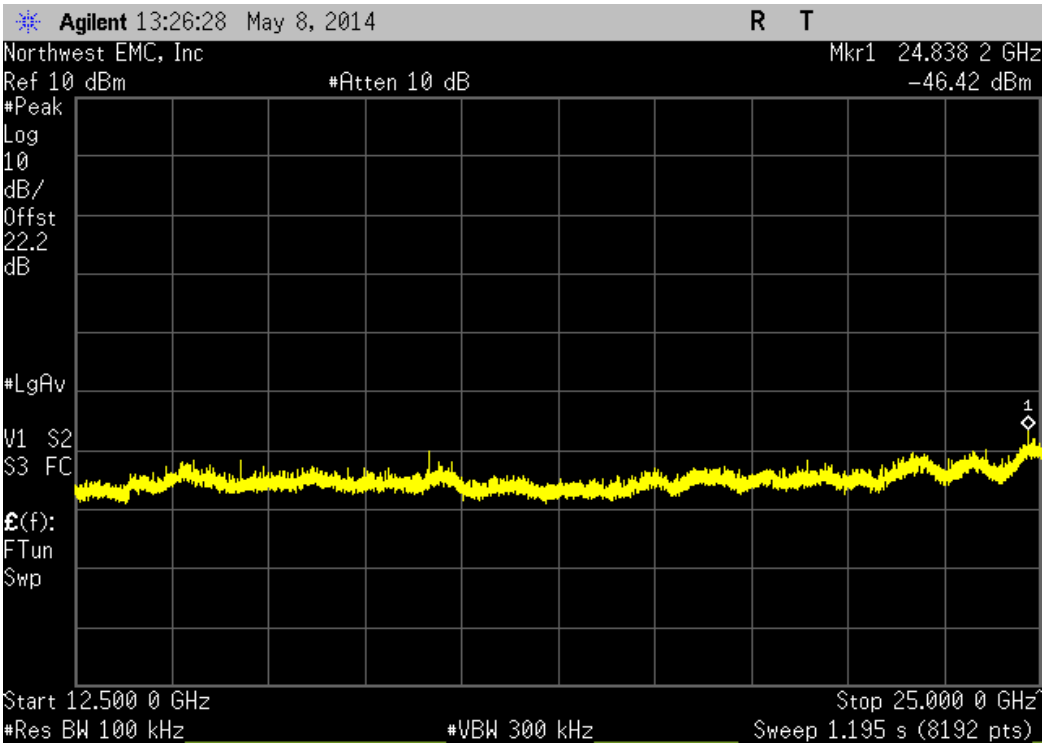


SPURIOUS CONDUCTED EMISSIONS

DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.37 dBc	≤ -20 dBc	Pass

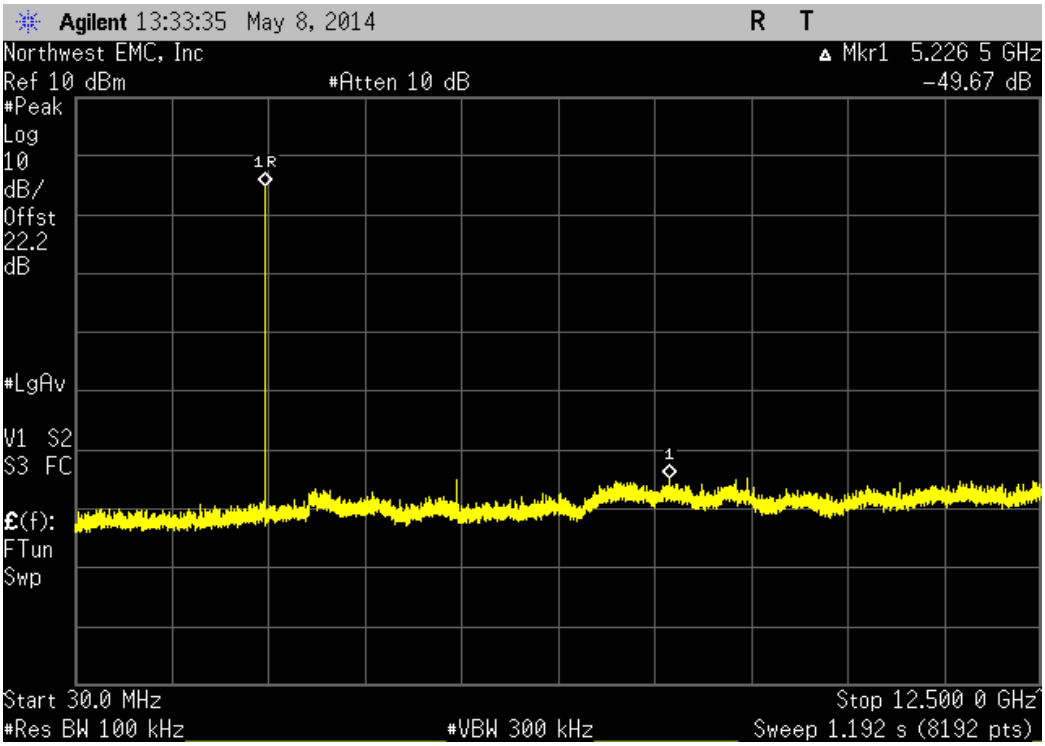


DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-41.25 dBc	≤ -20 dBc	Pass

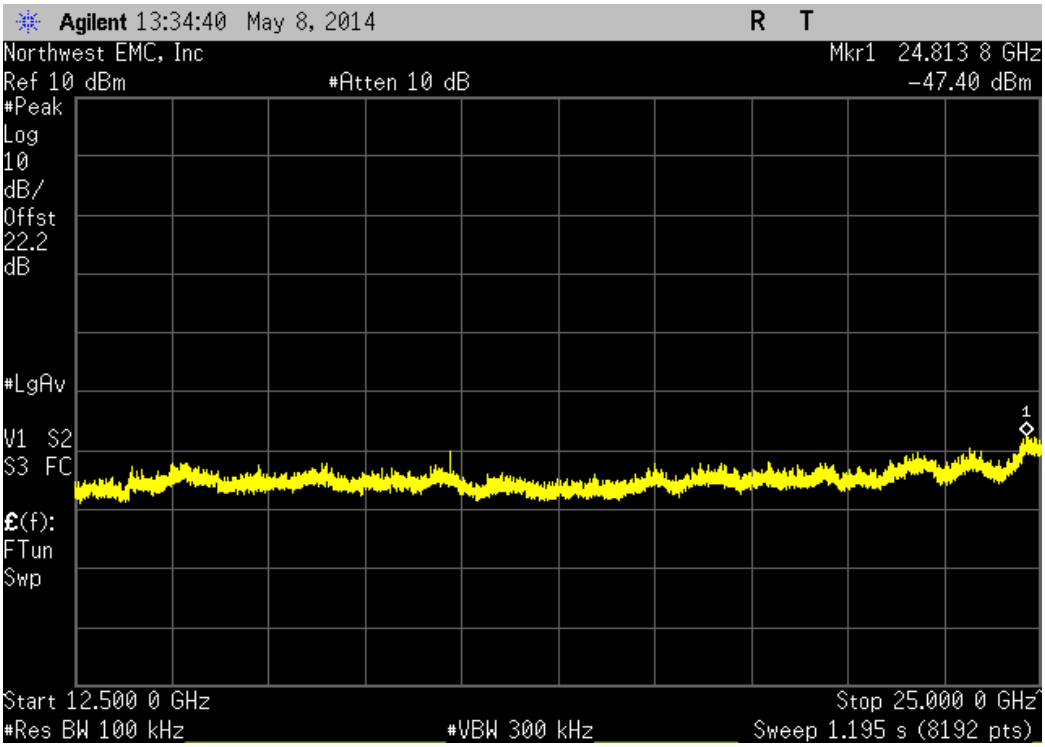


SPURIOUS CONDUCTED EMISSIONS

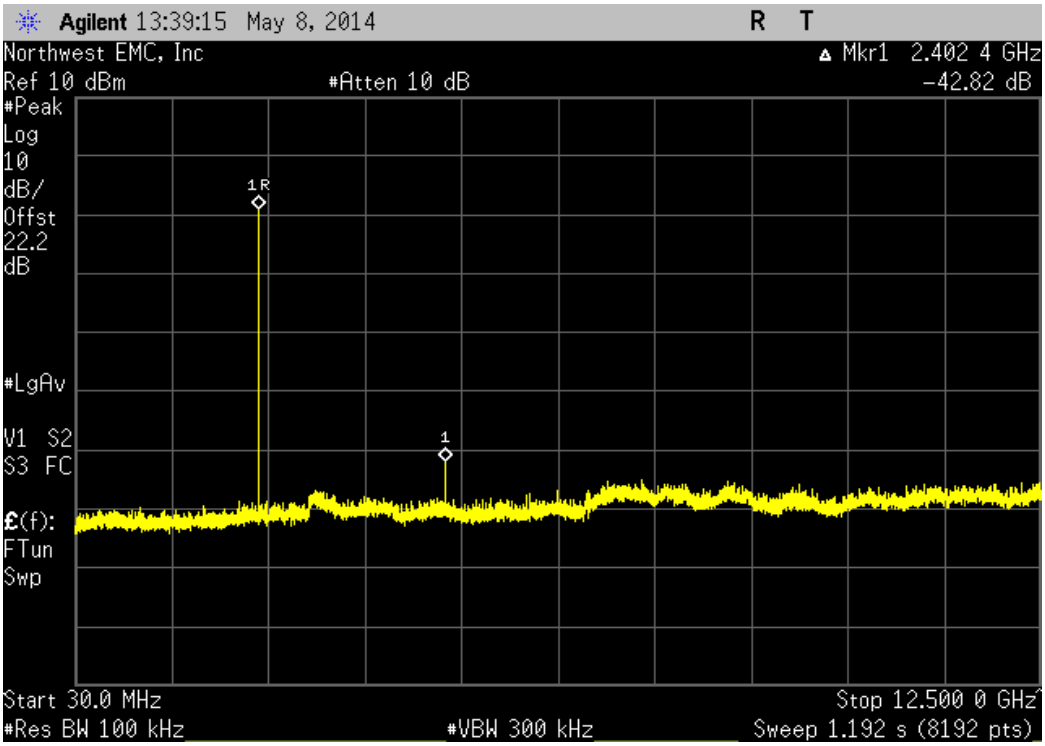
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.67 dBc	≤ -20 dBc	Pass



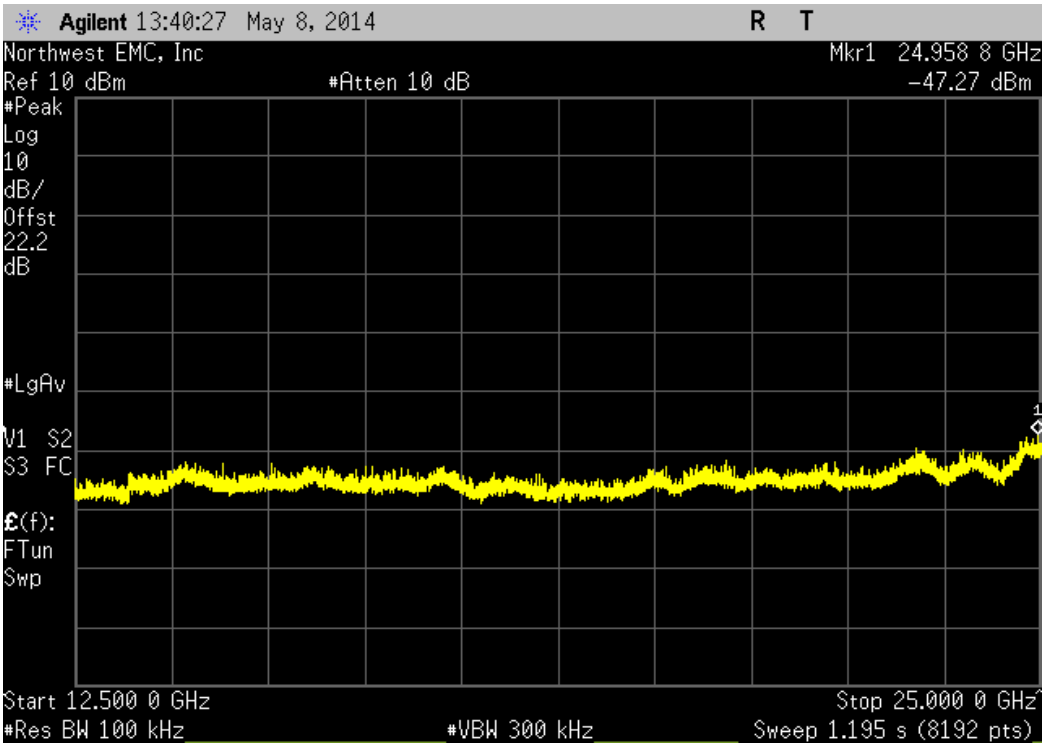
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-42.27 dBc	≤ -20 dBc	Pass



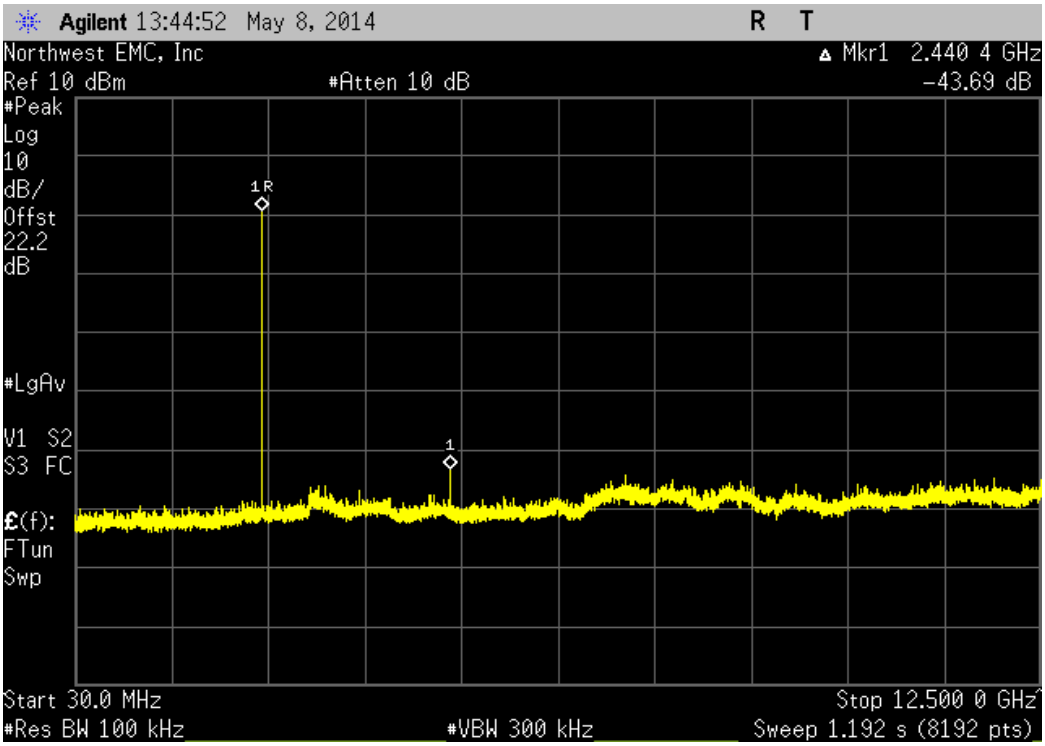
2DH5, pi/4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-42.82 dBc	≤ -20 dBc	Pass



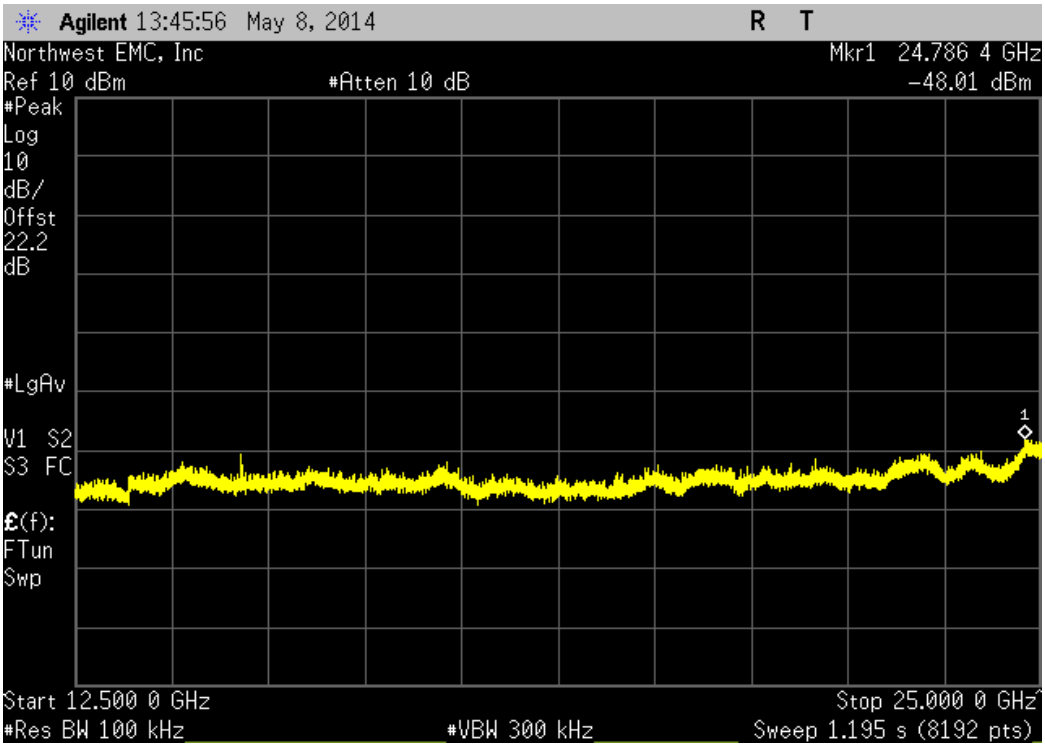
2DH5, pi/4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-38.19 dBc	≤ -20 dBc	Pass



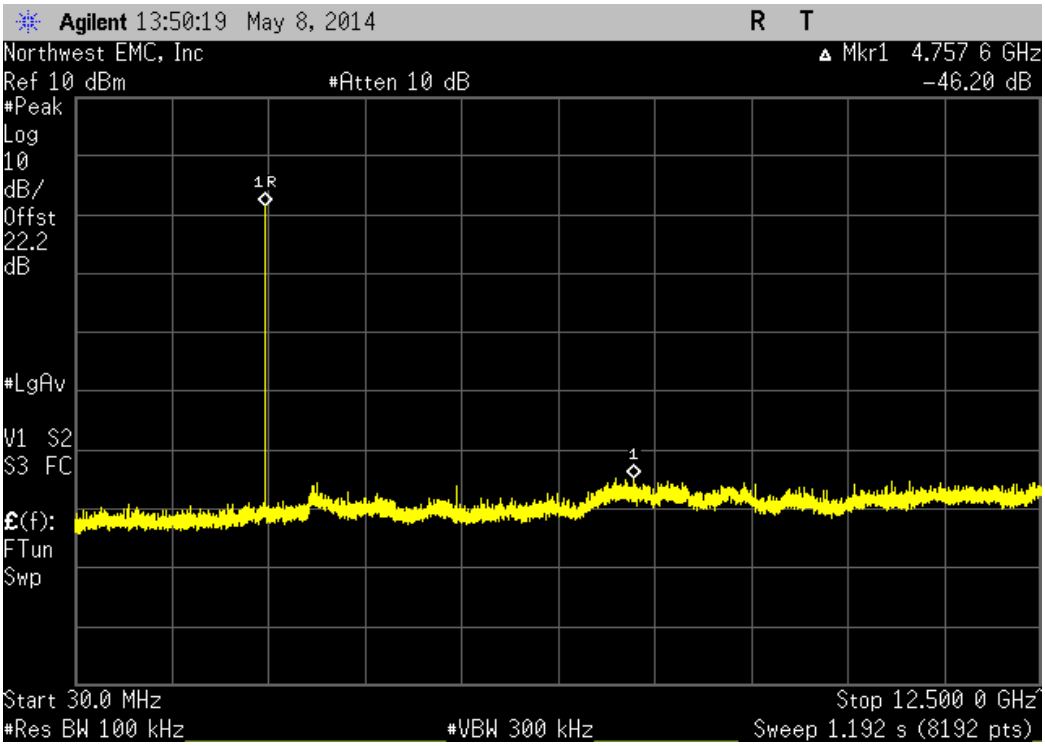
2DH5, pi/4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-43.69 dBc	≤ -20 dBc	Pass



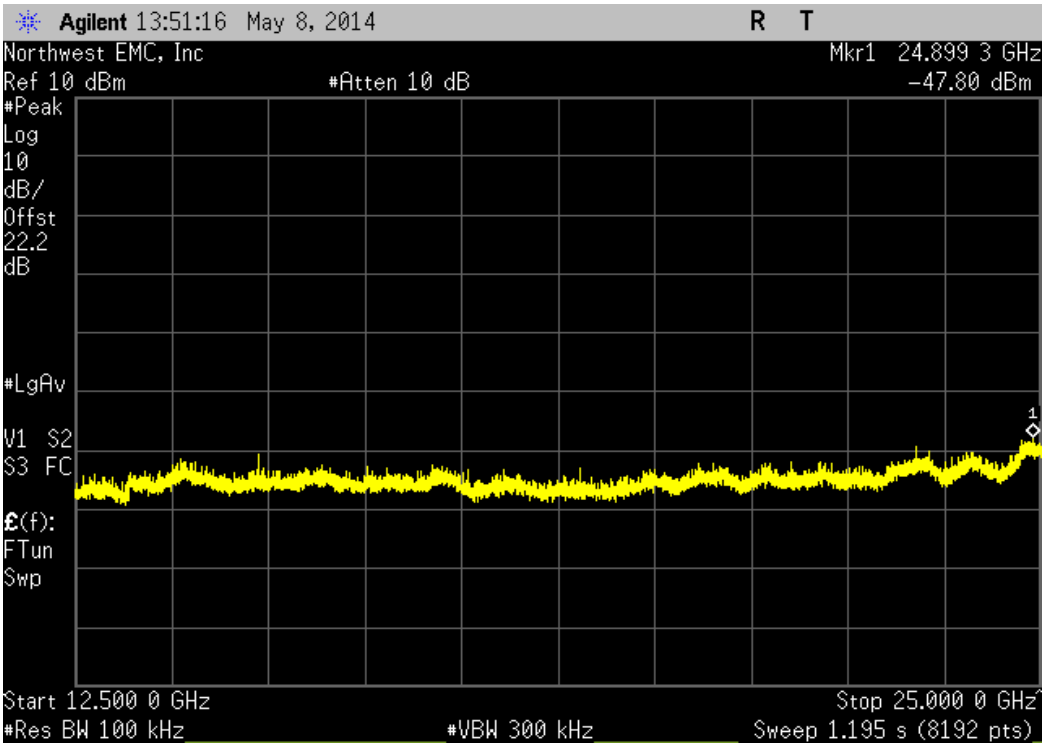
2DH5, pi/4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-38.6 dBc	≤ -20 dBc	Pass



2DH5, pi/4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.2 dBc	≤ -20 dBc	Pass

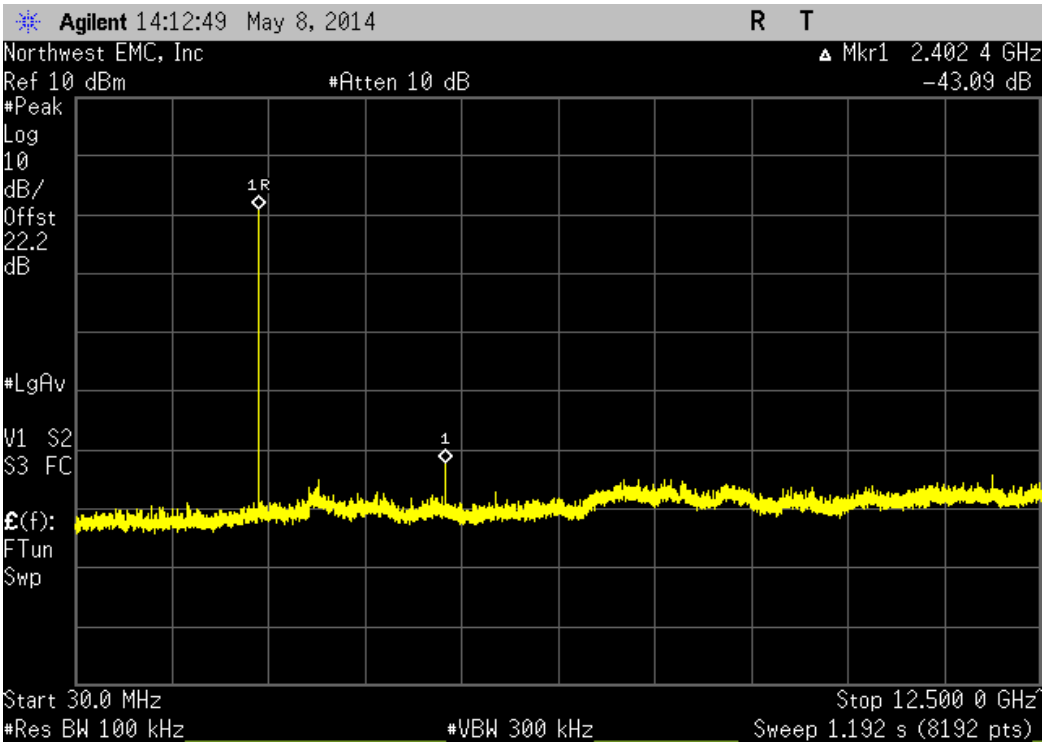


2DH5, pi/4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-39.18 dBc	≤ -20 dBc	Pass

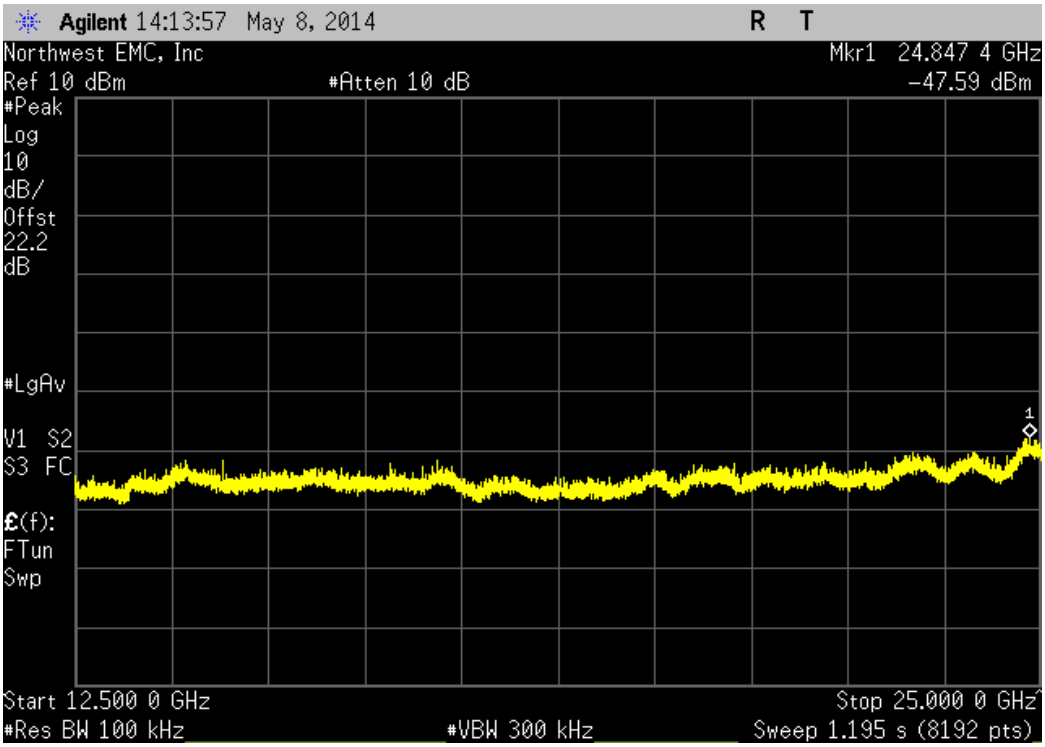


SPURIOUS CONDUCTED EMISSIONS

3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-43.09 dBc	≤ -20 dBc	Pass

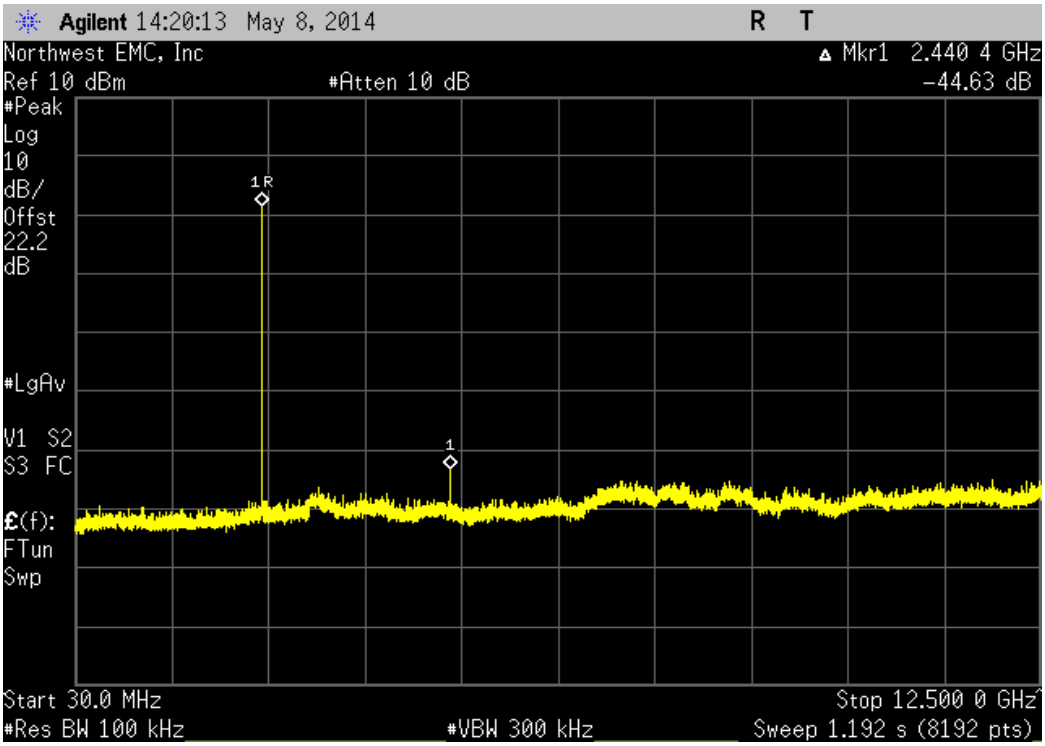


3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-38.59 dBc	≤ -20 dBc	Pass

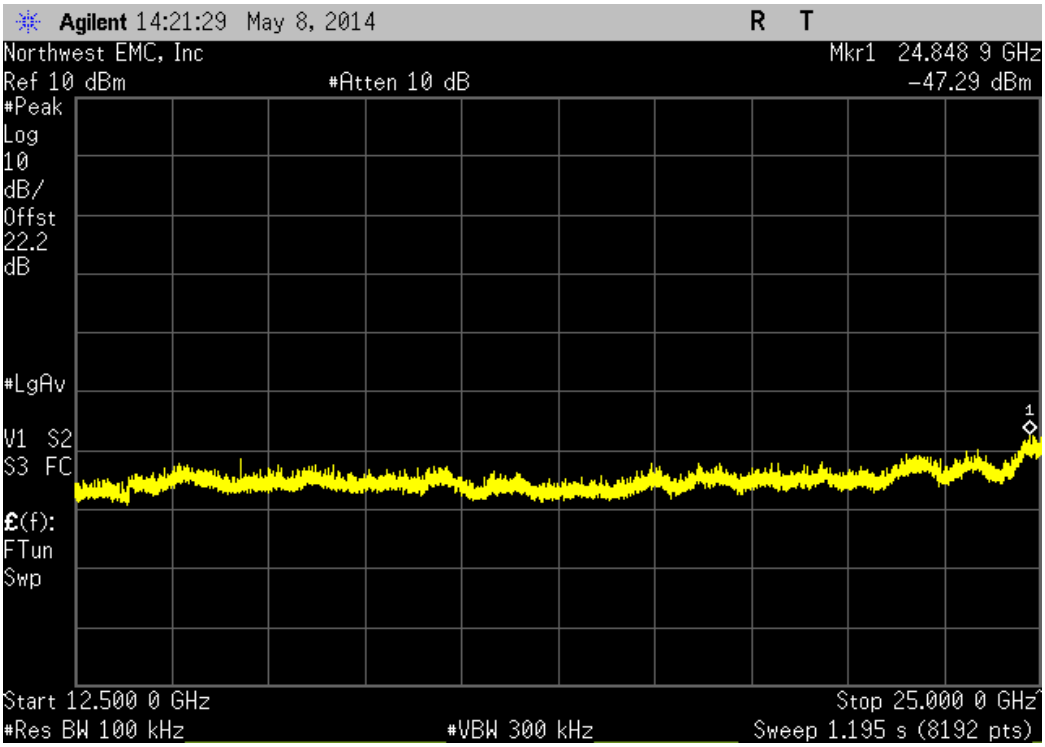


SPURIOUS CONDUCTED EMISSIONS

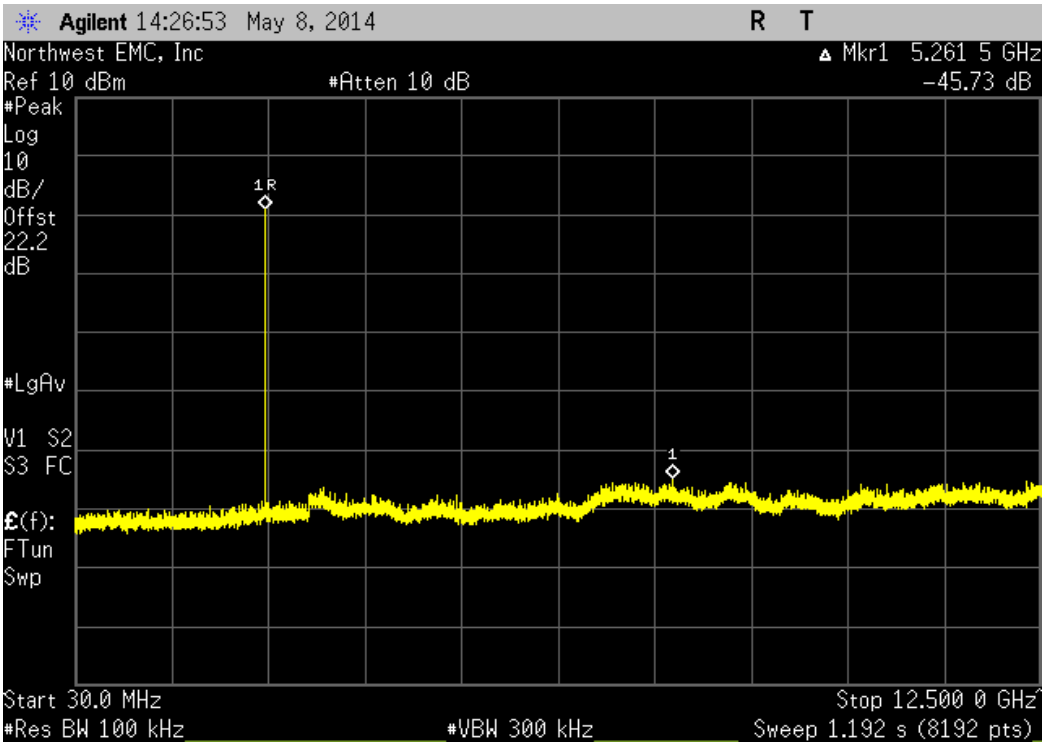
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-44.63 dBc	≤ -20 dBc	Pass



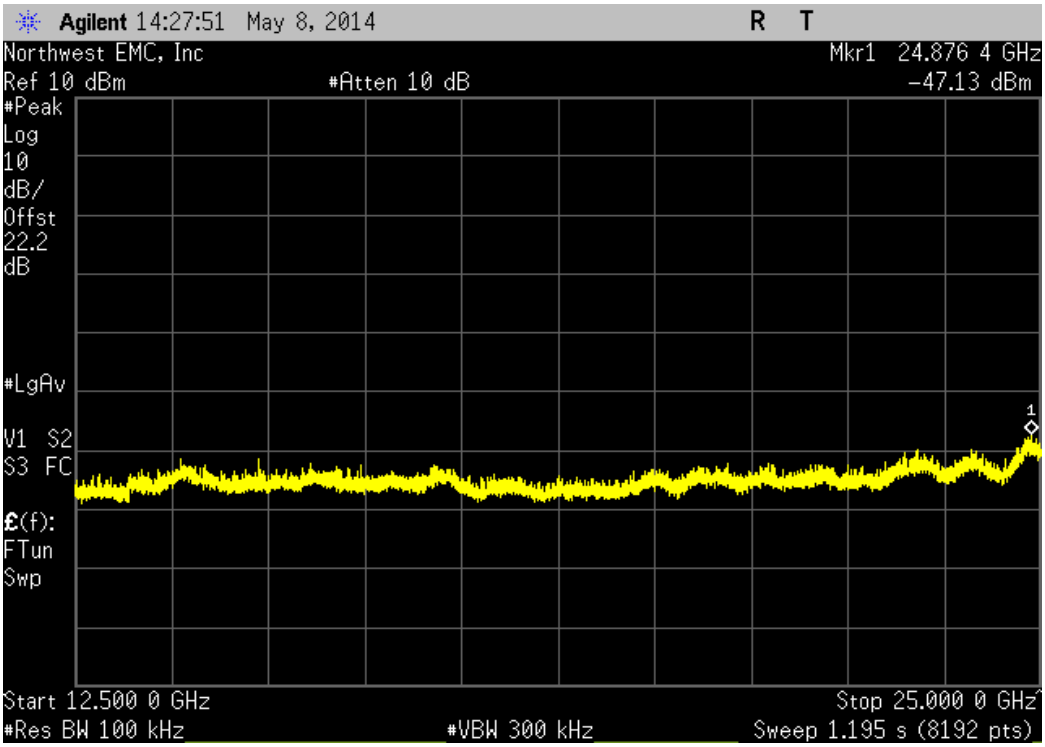
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-38.81 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-45.73 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-38.16 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
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	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	3/28/2014	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

BAND EDGE COMPLIANCE

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Internal Battery	**Job Site:**	EV06

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

COMMENTS

Modes of operation tested were client provided.

DEVIATIONS FROM TEST STANDARD

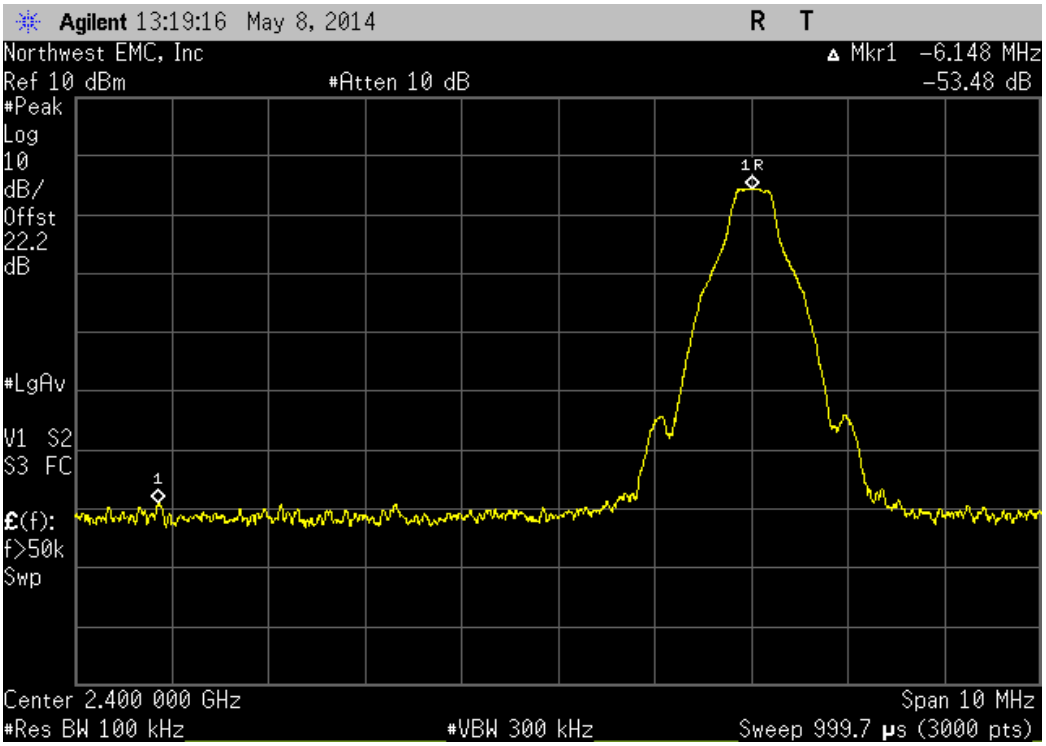
Configuration #	1	Signature

		Value	Limit	Result
DH5, GFSK				
	Low Channel	-53.48 dBc	≤ -20 dBc	Pass
	High Channel	-53.7 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK				
	Low Channel	-47.03 dBc	≤ -20 dBc	Pass
	High Channel	-49.58 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
	Low Channel	-46.66 dBc	≤ -20 dBc	Pass
	High Channel	-48.86 dBc	≤ -20 dBc	Pass

BAND EDGE COMPLIANCE

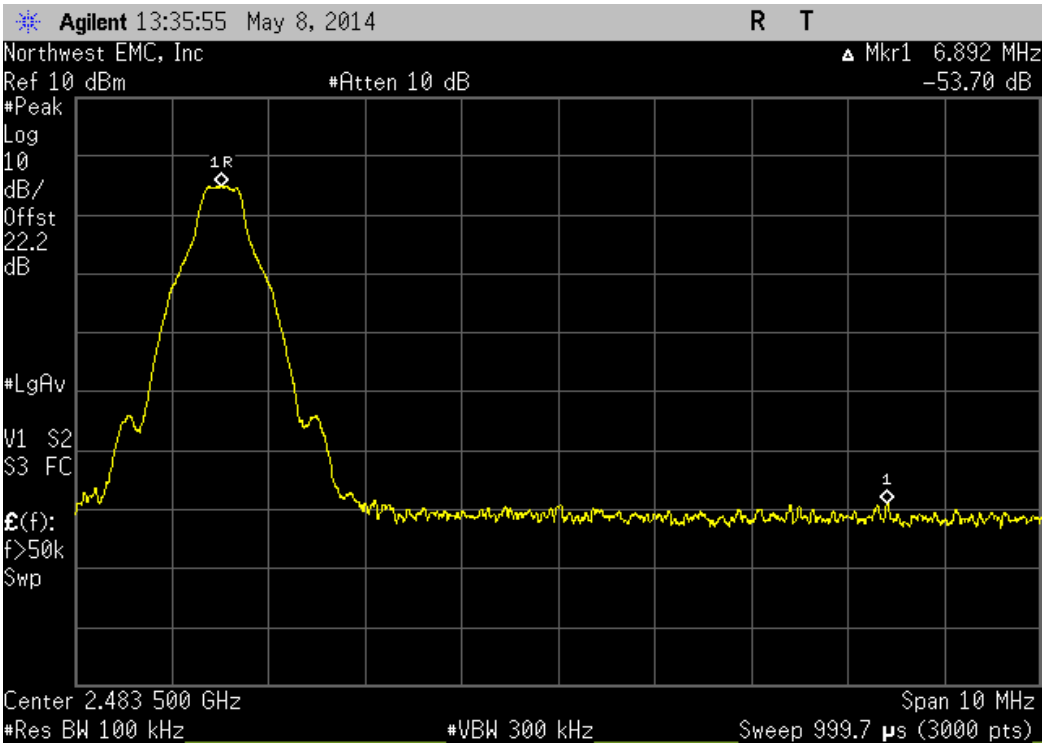
DH5, GFSK, Low Channel

				Value	Limit	Result
				-53.48 dBc	≤ -20 dBc	Pass



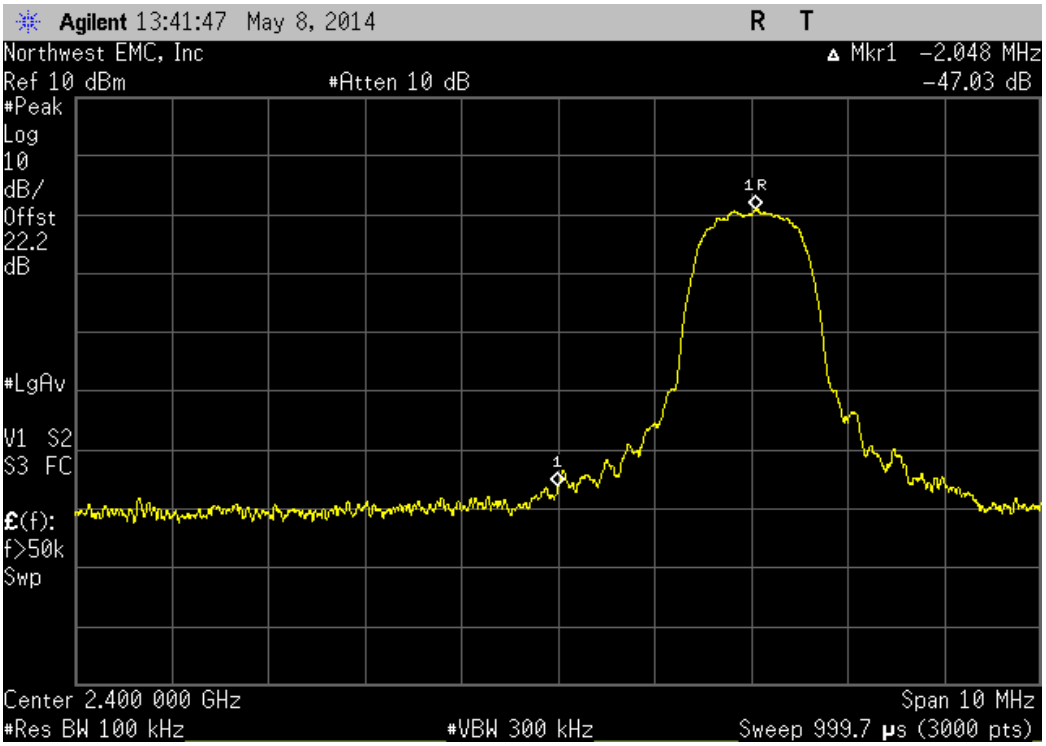
DH5, GFSK, High Channel

				Value	Limit	Result
				-53.7 dBc	≤ -20 dBc	Pass

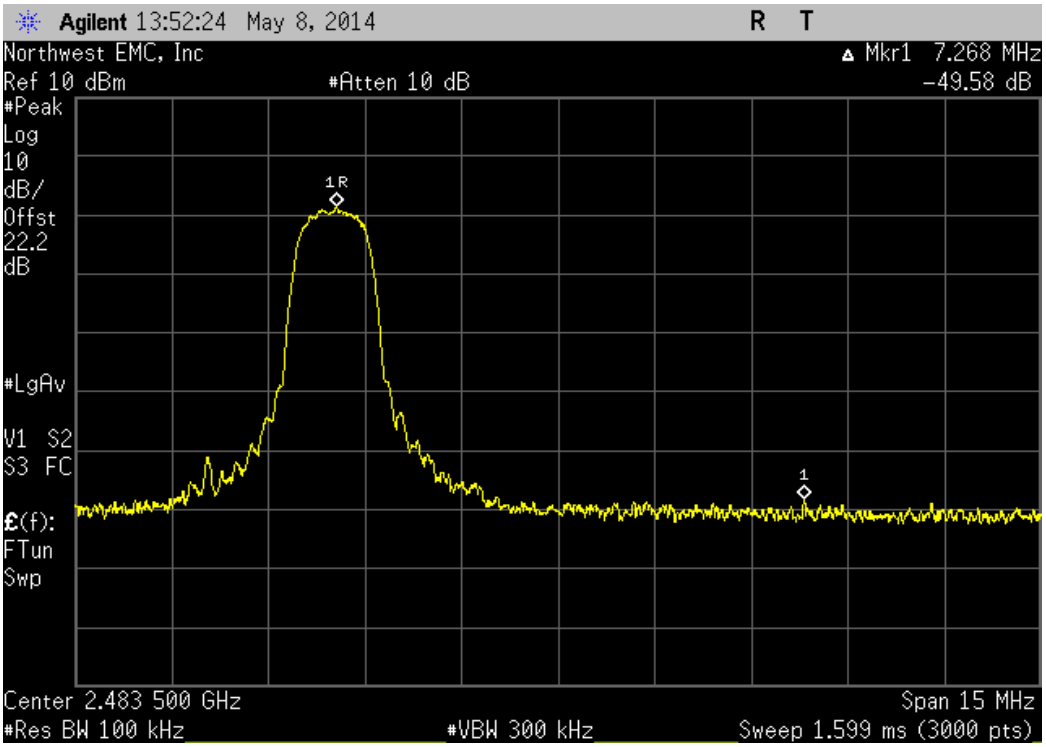


BAND EDGE COMPLIANCE

2DH5, pi/4-DQPSK, Low Channel							
					Value	Limit	Result
					-47.03 dBc	≤ -20 dBc	Pass

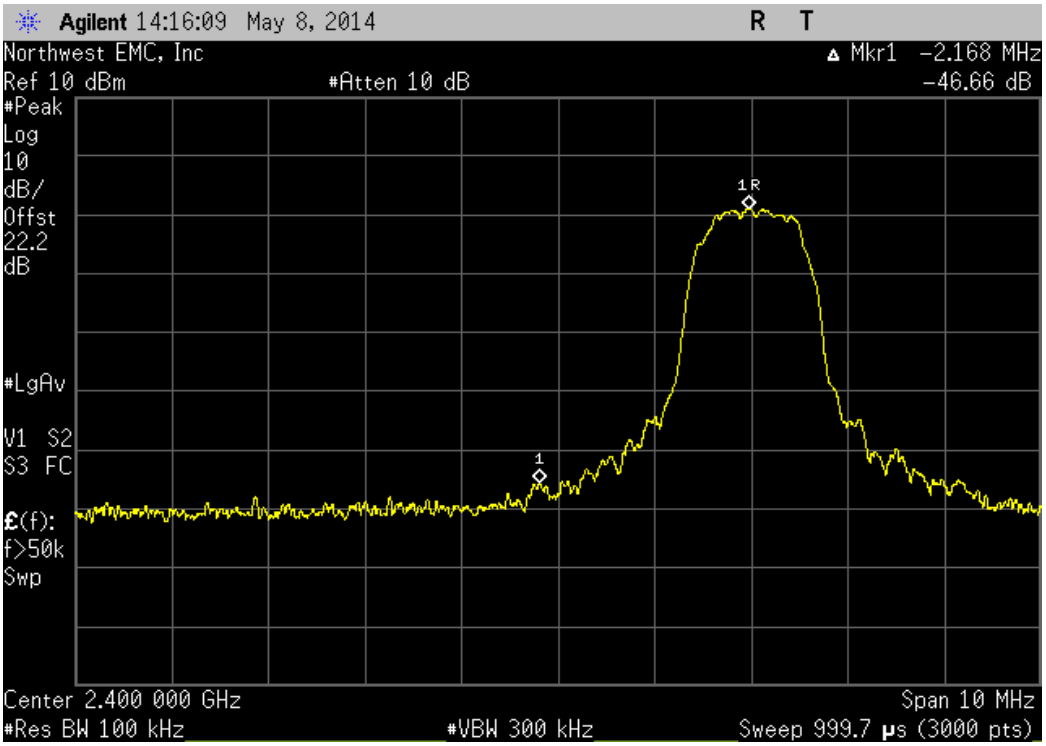


2DH5, pi/4-DQPSK, High Channel							
					Value	Limit	Result
					-49.58 dBc	≤ -20 dBc	Pass

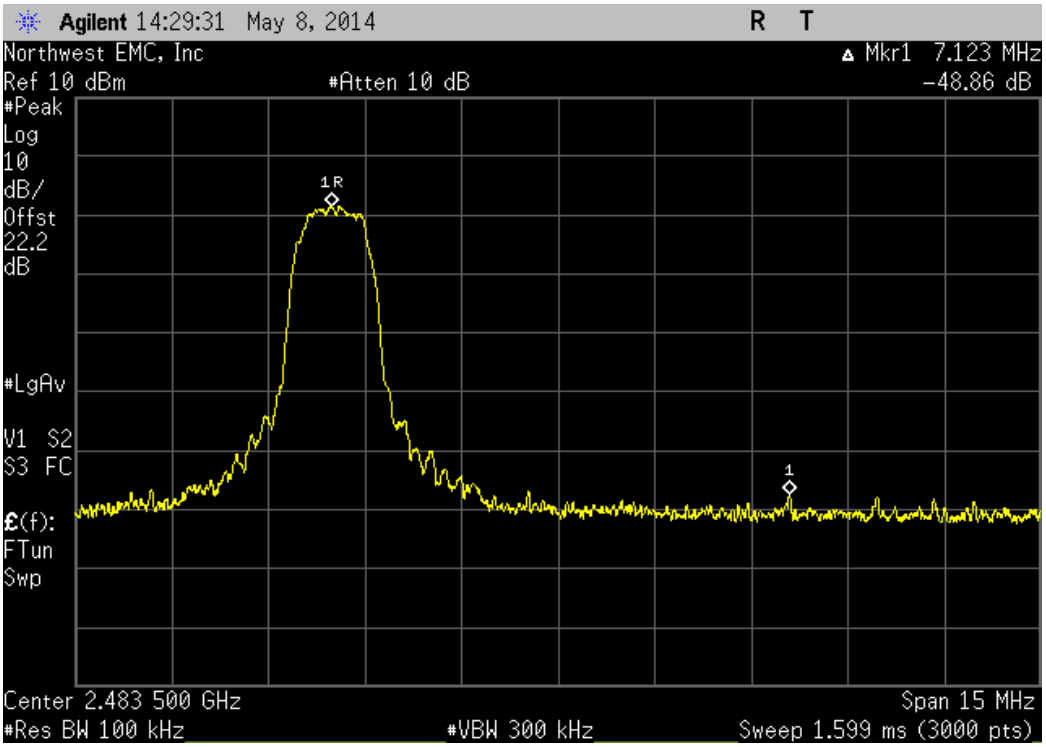


BAND EDGE COMPLIANCE

3DH5, 8-DPSK, Low Channel						
				Value	Limit	Result
				-46.66 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel						
				Value	Limit	Result
				-48.86 dBc	≤ -20 dBc	Pass



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
40GHz DC Block	Miteq	DCB4000	AMD	4/28/2014	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
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

BAND EDGE COMPLIANCE - HOPPING MODE

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**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

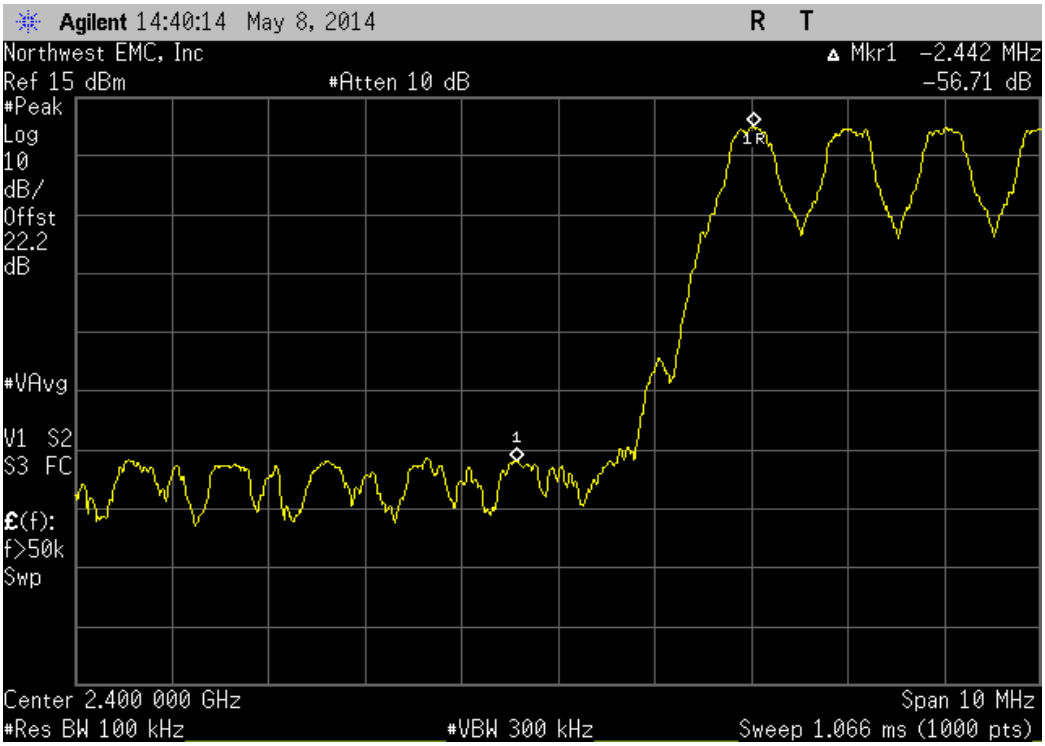
Configuration #	1	Signature

		Value	Limit	Result
Hopping Mode				
	DH5, GFSK			
	Low Channel, 2402 MHz	-56.71 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-56.38 dBc	≤ -20 dBc	Pass
	2DH5, pi/4-DQPSK			
	Low Channel, 2402 MHz	-52.71 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-57.25 dBc	≤ -20 dBc	Pass
	3DH5, 8-DPSK			
	Low Channel, 2402 MHz	-51.57 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-54.2 dBc	≤ -20 dBc	Pass

BAND EDGE COMPLIANCE - HOPPING MODE

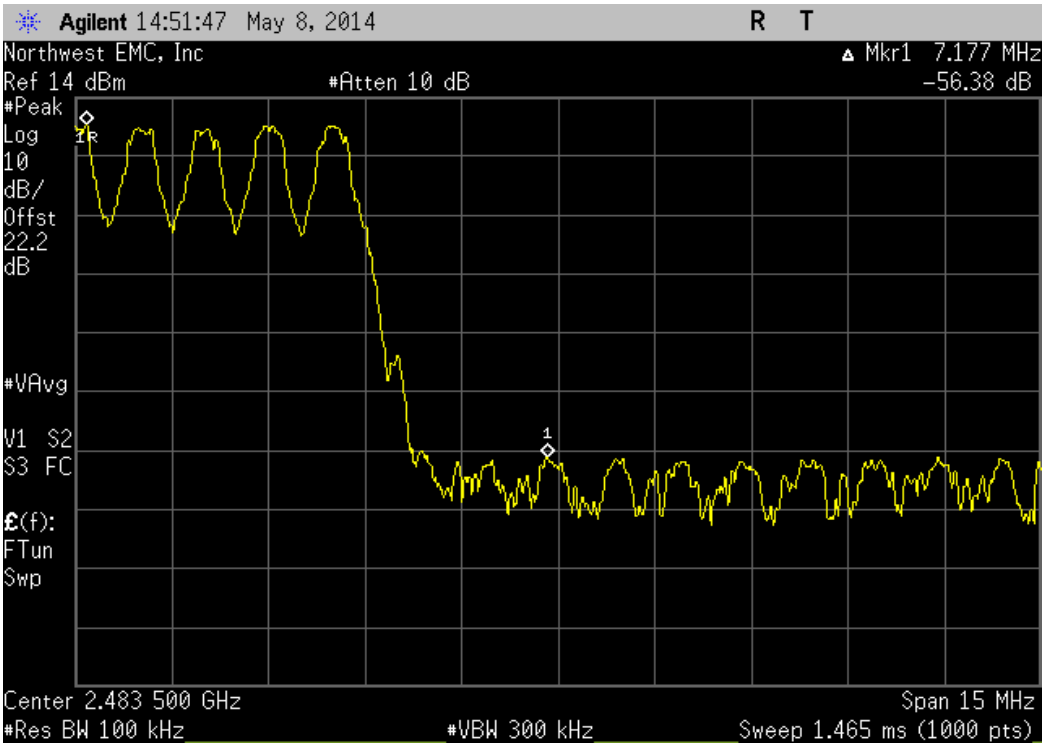
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz

				Value	Limit	Result
				-56.71 dBc	≤ -20 dBc	Pass



Hopping Mode, DH5, GFSK, High Channel, 2480 MHz

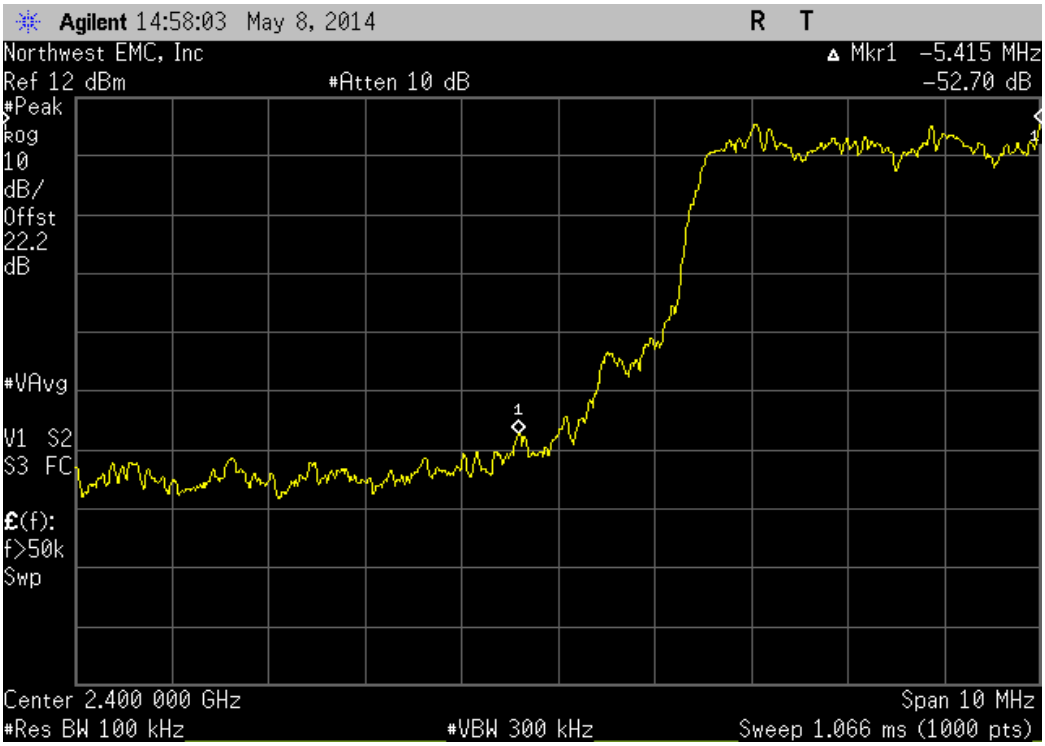
				Value	Limit	Result
				-56.38 dBc	≤ -20 dBc	Pass



BAND EDGE COMPLIANCE - HOPPING MODE

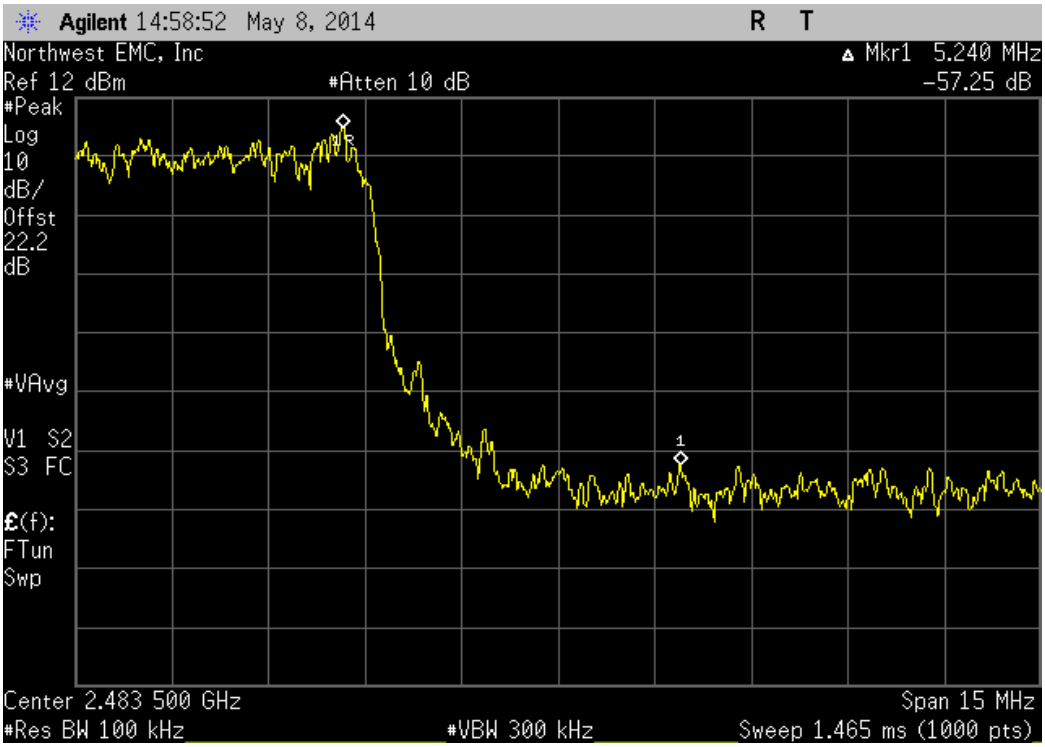
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz

				Value	Limit	Result
				-52.71 dBc	≤ -20 dBc	Pass



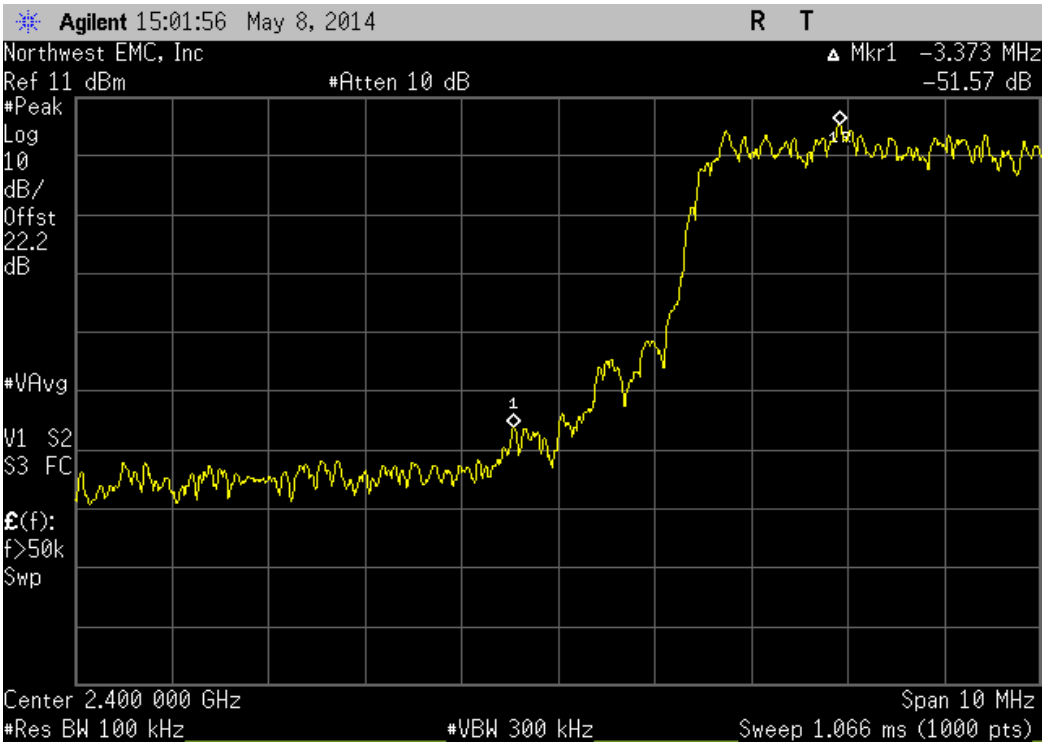
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz

				Value	Limit	Result
				-57.25 dBc	≤ -20 dBc	Pass

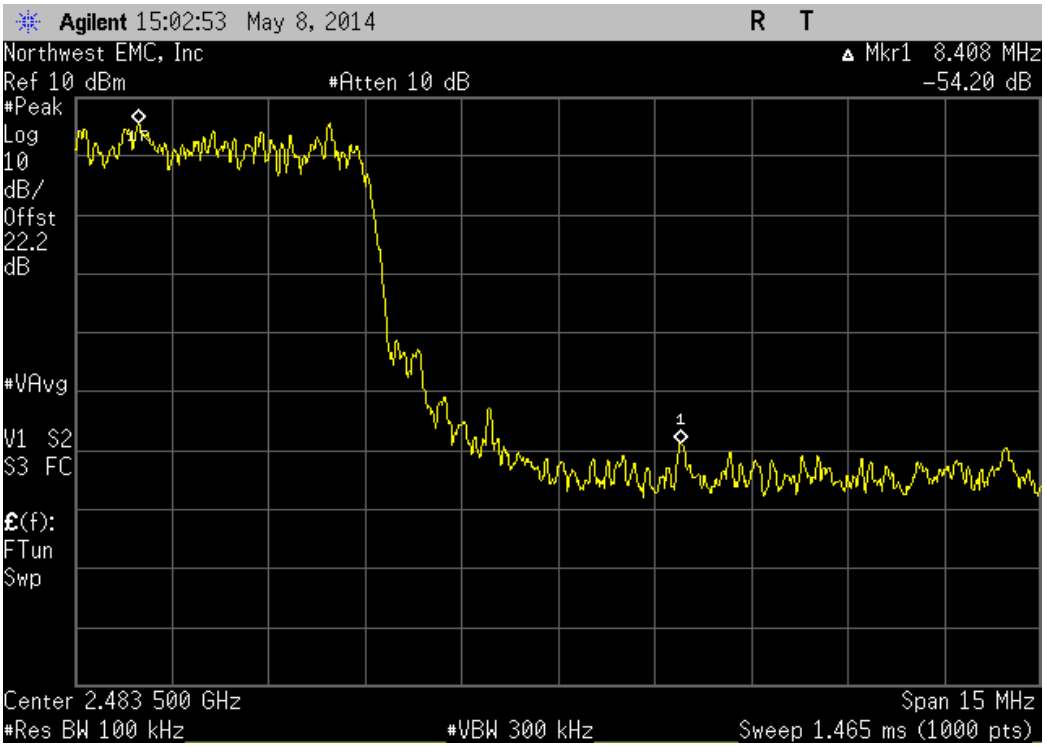


BAND EDGE COMPLIANCE - HOPPING MODE

Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Value	Limit	Result
				-51.57 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Value	Limit	Result
				-54.2 dBc	≤ -20 dBc	Pass



CHANNEL SPACING

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	4/28/2014	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	3/28/2014	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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 SPACING

EUT:	Supra eKEY Fob			Work Order:	SUPR0120
Serial Number:	0161			Date:	05/08/14
Customer:	Supra, A Division of UTCFS			Temperature:	22.2°C
Attendees:	None			Humidity:	43%
Project:	eKey Fob4			Barometric Pres.:	1006.7
Tested by:	Jared Ison	Power:	Battery	Job Site:	EV06

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

COMMENTS

Mode of operation tested were client provided.

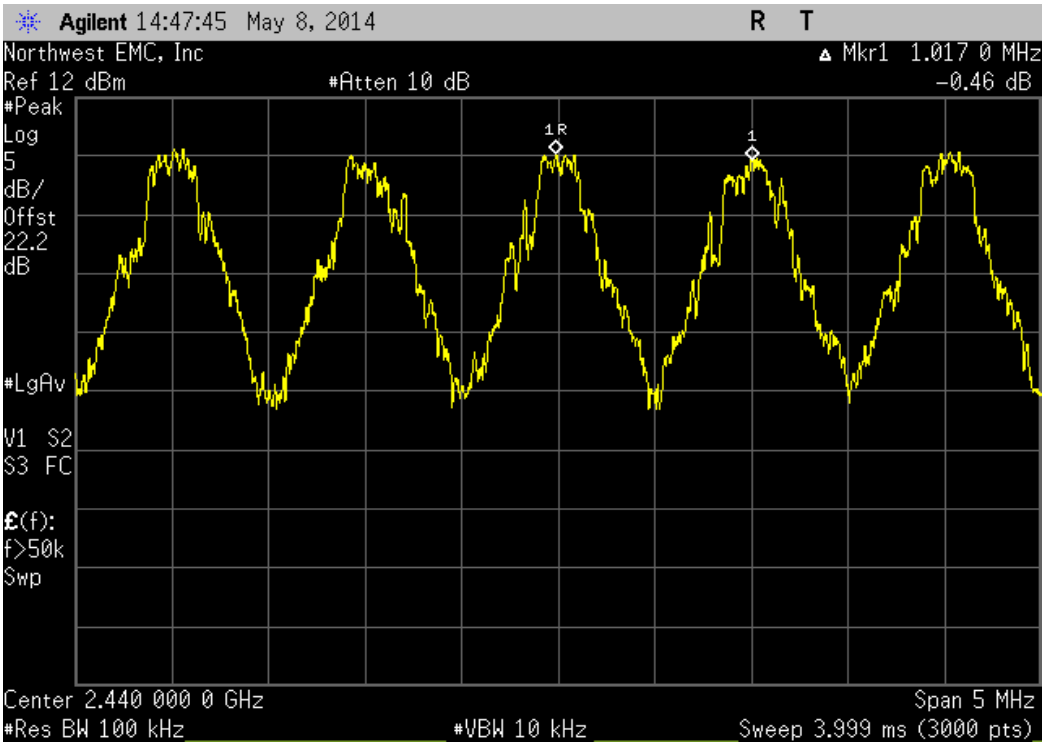
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

		Value	Limit	Result
Hopping Mode				
	DH5, GFSK			
	Mid Channel, 2440 MHz	1.0 MHz	≥ 1 MHz	Pass

CHANNEL SPACING

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Value	Limit	Result
				1.0 MHz	≥ 1 MHz	Pass



NUMBER OF HOPPING FREQUENCIES

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	4/28/2014	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
MXG Analog Signal Generator	Agilent	N5181A	TIG	3/28/2014	36
Attenuator, 6dB	S.M. Electronics	18N-06	AWN	2/3/2014	12
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	24

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.

NUMBER OF HOPPING FREQUENCIES

EUT:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**Job Site:**	EV06

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

COMMENTS

Mode of operation tested were client provided.

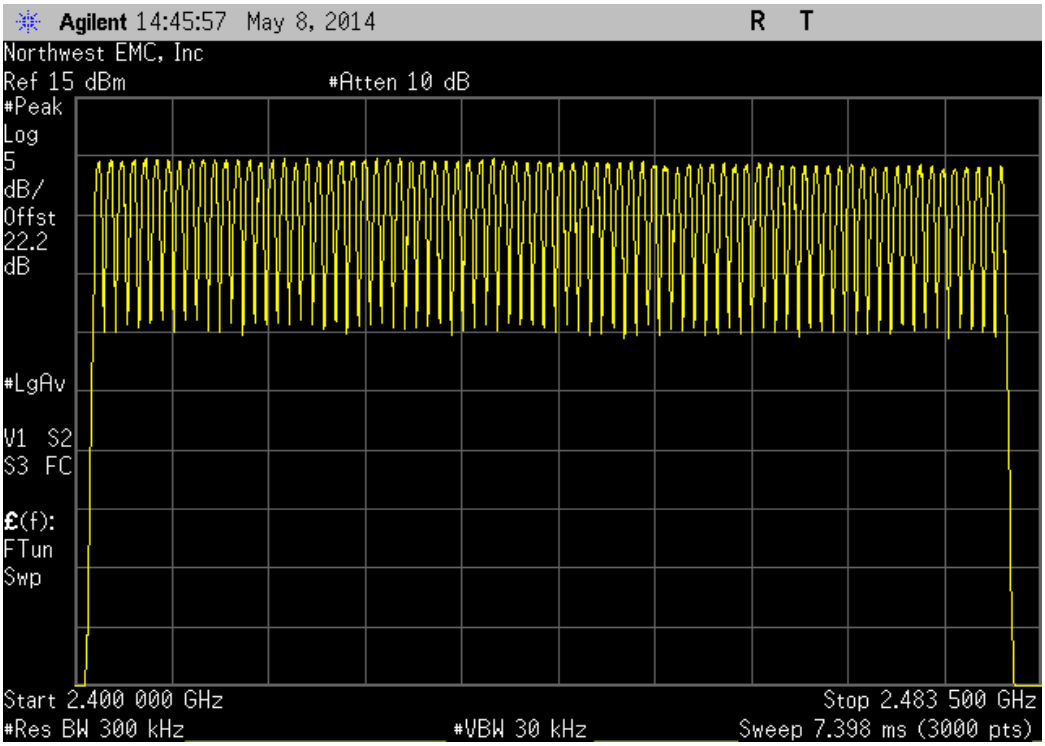
DEVIATIONS FROM TEST STANDARD

Configuration #	**1**	*Signature*

		Number of Channels	**Limit**	**Result**
Hopping Mode				
	DH5, GFSK			
	Mid Channel, 2440 MHz	79	≥ 15	Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Number of Channels	Limit	Result
				79	≥ 15	Pass



DWELL TIME

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	4/28/2014	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	3/28/2014	36
Power Sensor	Agilent	E9300H	SQO	4/29/2013	36
Power Meter	Agilent	N1913A	SQR	4/29/2013	36
Spectrum Analyzer	Agilent	E4446A	AAQ	1/21/2014	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:	Supra eKEY Fob			**Work Order:**	SUPR0120
Serial Number:	0161			**Date:**	05/08/14
Customer:	Supra, A Division of UTCFS			**Temperature:**	22.2°C
Attendees:	None			**Humidity:**	43%
Project:	eKey Fob4			**Barometric Pres.:**	1006.7
Tested by:	Jared Ison	**Power:**	Battery	**Job Site:**	EV06

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

COMMENTS

Mode of operation tested were client provided.

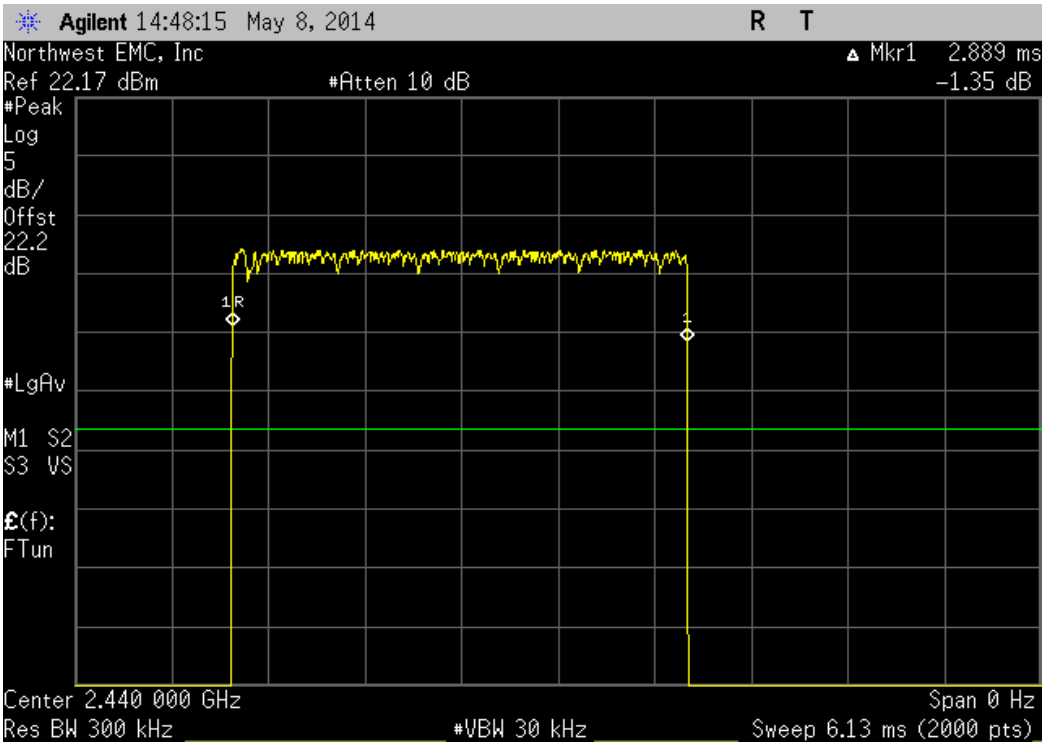
DEVIATIONS FROM TEST STANDARD

Configuration #	1	Signature

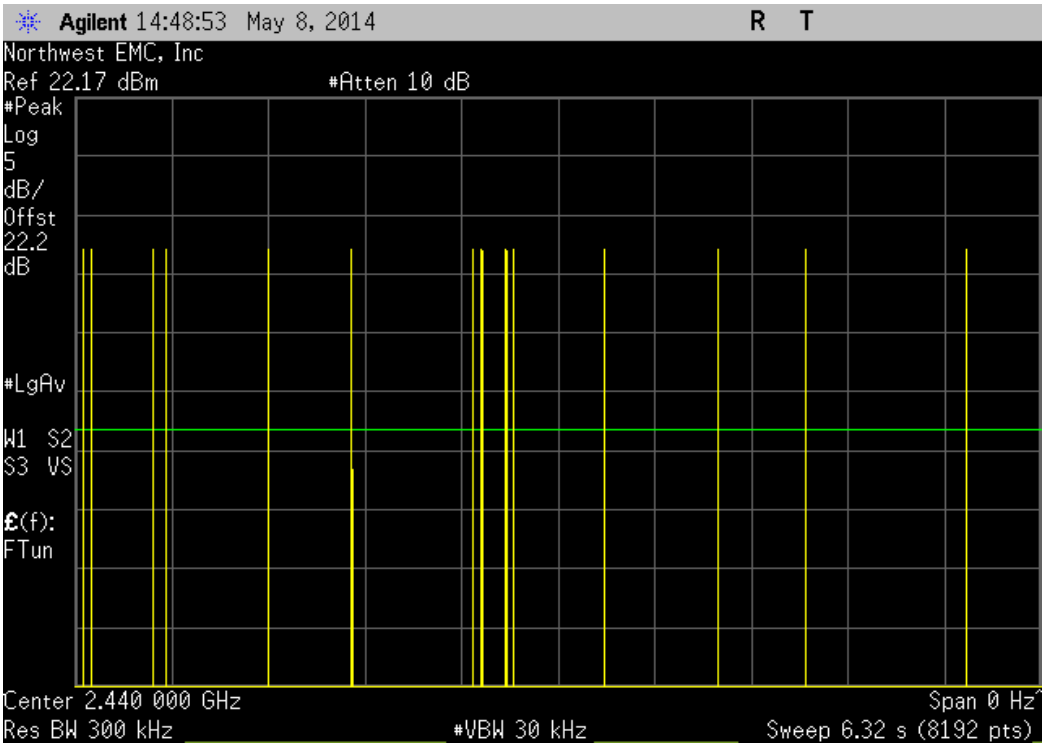
		Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
Hopping Mode								
	DH5, GFSK							
	Mid Channel, 2440 MHz	2.889	N/A	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz	N/A	14	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz	N/A	27	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz	N/A	26	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz	N/A	16	N/A	N/A	N/A	N/A	N/A
	Mid Channel, 2440 MHz	2.889	N/A	20.75	5	299.73	400	Pass

DWELL TIME

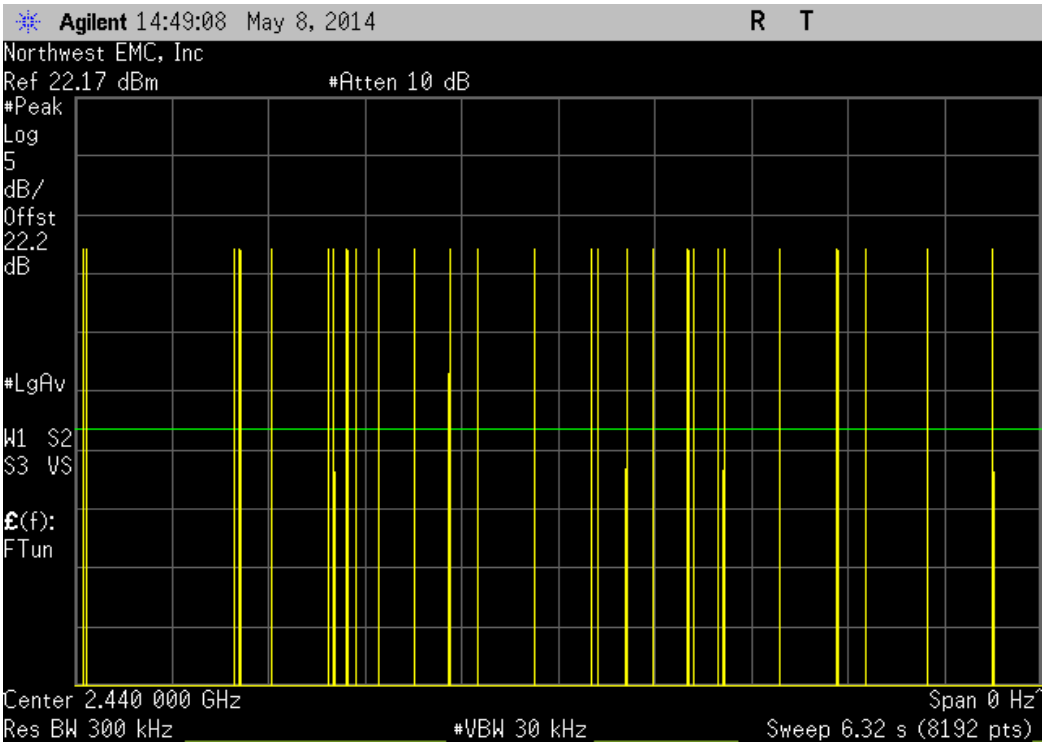
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.889	N/A	N/A	N/A	N/A	N/A	N/A



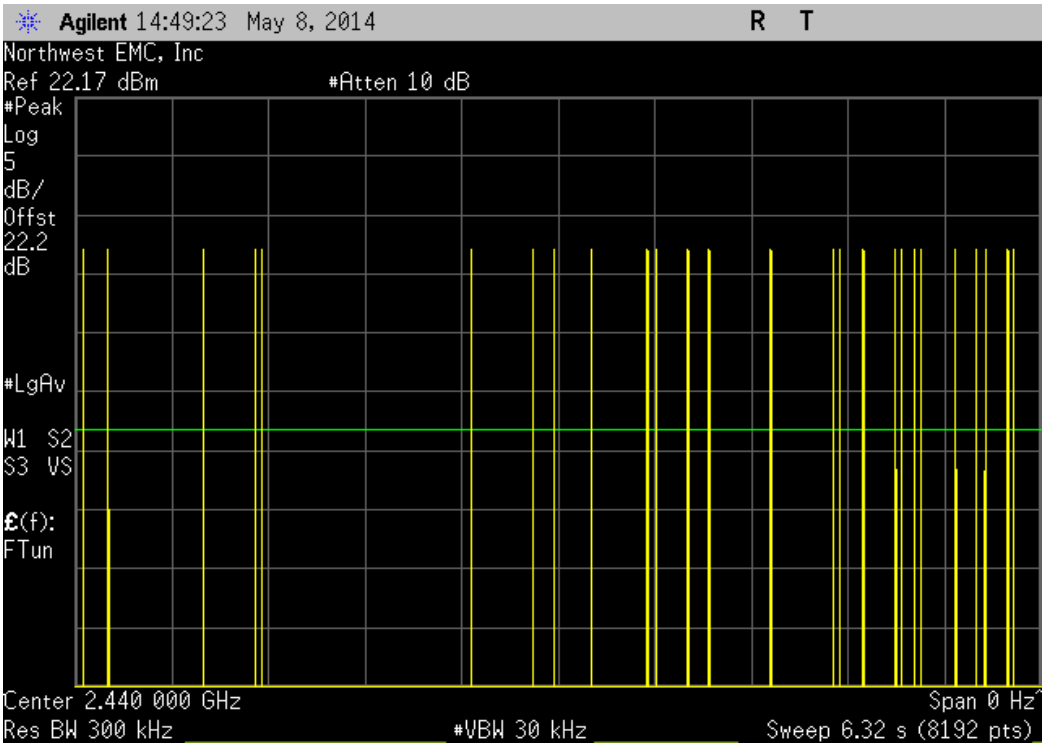
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	14	N/A	N/A	N/A	N/A	N/A



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	27	N/A	N/A	N/A	N/A	N/A

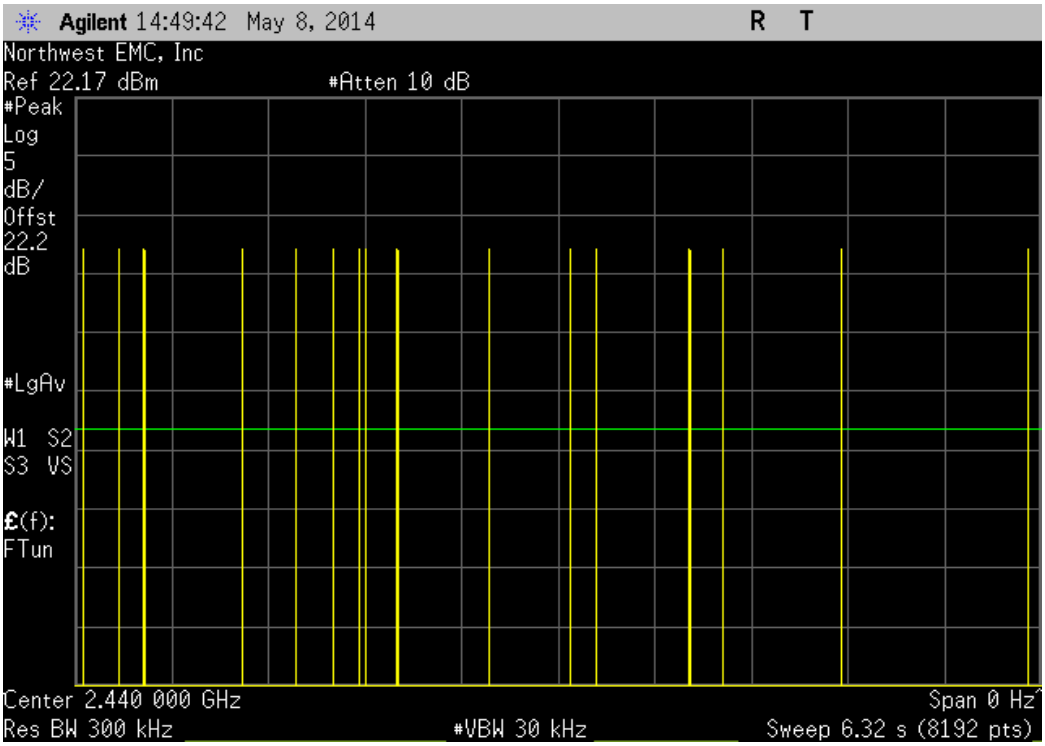


Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	26	N/A	N/A	N/A	N/A	N/A



DWELL TIME

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	16	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	20.75	5	299.73	400	Pass

Calculation Only

No Screen Capture Required

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.

CHANNELS OF OPERATION

Continous TX, Low Channel 2402 MHz
Continous TX, Mid Channel 2440 MHz
Continous TX, High Channel 2480 MHz

MODULATION OF OPERATION

DH5
2DH5
3DH5

POWER SETTINGS INVESTIGATED

Internal Battery

CONFIGURATIONS INVESTIGATED

SUPR0120 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26 GHz

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
LP Filter	Micro-Tronics	LPM50004	LFD	7/6/2012	24 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
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	E4440	AFE	11/4/2013	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

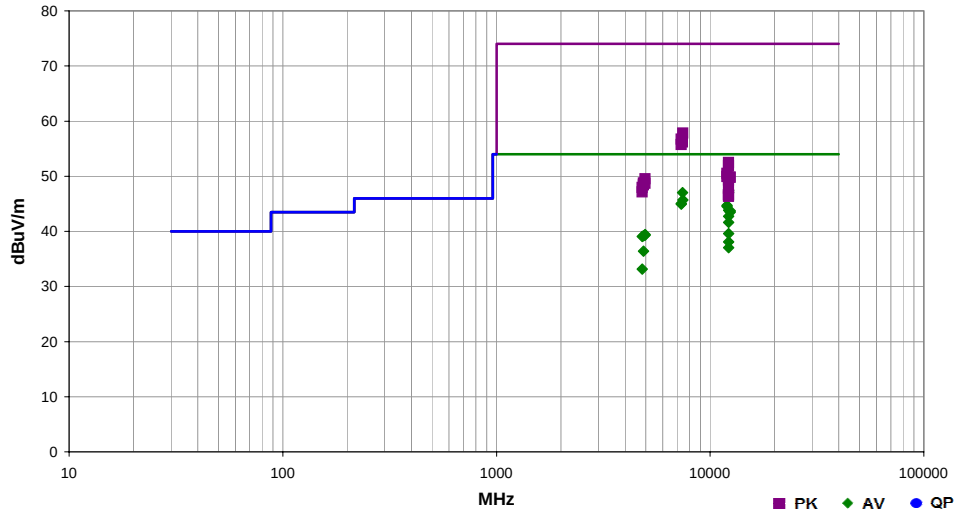
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify 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:	SUPR0120	**Date:**	05/01/14		
Project:	Supra eKEY Fob	**Temperature:**	23.8 °C		
Job Site:	EV01	**Humidity:**	37.7% RH		
Serial Number:	0161	**Barometric Pres.:**	1016 mbar	**Tested by:**	Jared Ison
EUT:	Supra eKEY Fob				
Configuration:	1				
Customer:	Supra, A Division of UTCFS				
Attendees:	None				
EUT Power:	Internal Battery				
Operating Mode:	Continous transmit, Bluetooth BDR/EDR.				
Deviations:	None				
Comments:	None				

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

Run #	12	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



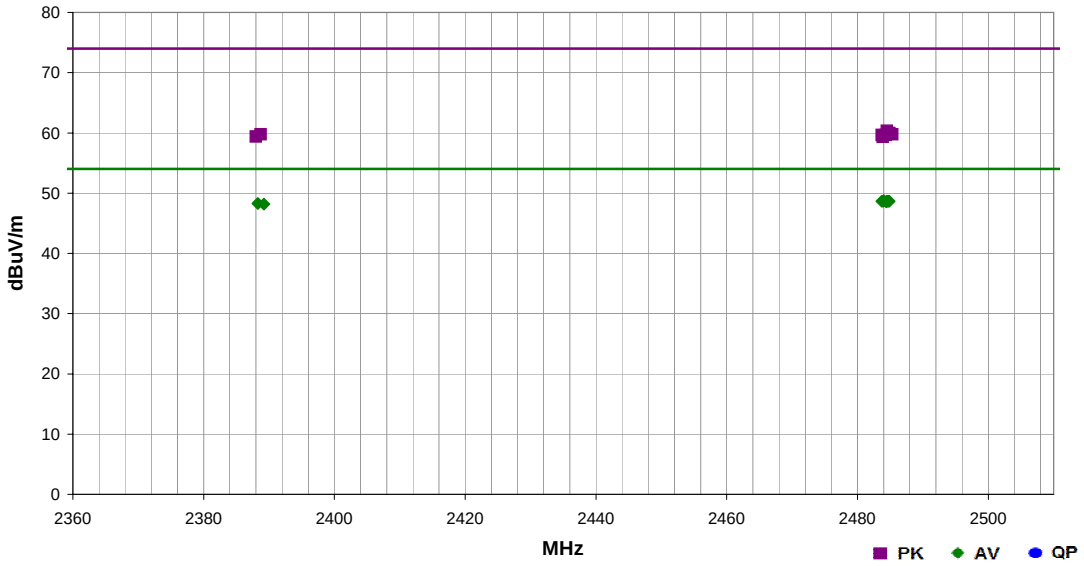
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12199.510	48.5	-1.1	1.1	73.0	3.0	0.0	Horz	AV	0.0	47.4	54.0	-6.6	Mid Ch. 2440MHz, DH5, EUT On Side
12199.520	48.2	-1.1	1.0	74.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9	Mid Ch. 2440MHz, DH5, EUT Vert
7440.140	26.9	20.1	1.0	175.0	3.0	0.0	Horz	AV	0.0	47.0	54.0	-7.0	High Ch. 2480MHz, DH5, EUT On Side
7440.205	25.6	20.1	1.0	329.0	3.0	0.0	Vert	AV	0.0	45.7	54.0	-8.3	High Ch. 2480MHz, DH5, EUT Vert
7319.885	25.6	19.4	1.4	236.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	Mid Ch. 2440MHz, DH5, EUT On Side
7320.105	25.5	19.4	2.4	96.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	Mid Ch. 2440MHz, DH5, EUT Vert
12009.470	46.9	-2.2	1.0	265.0	3.0	0.0	Vert	AV	0.0	44.7	54.0	-9.3	Low Ch. 2402MHz, DH5, EUT Vert
12010.640	46.7	-2.2	1.0	308.0	3.0	0.0	Horz	AV	0.0	44.5	54.0	-9.5	Low Ch. 2402MHz, DH5, EUT On Side
12199.480	44.9	-1.1	1.3	121.0	3.0	0.0	Vert	AV	0.0	43.8	54.0	-10.2	Mid Ch. 2440MHz, DH5, EUT Horz
12399.460	44.6	-0.9	1.1	268.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	High Ch. 2480MHz, DH5, EUT On Side
12399.540	44.4	-0.9	1.0	83.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	High Ch. 2480MHz, DH5, EUT Vert
12199.560	43.8	-1.1	1.0	123.0	3.0	0.0	Horz	AV	0.0	42.7	54.0	-11.3	Mid Ch. 2440MHz, DH5, EUT Vert
12199.480	42.7	-1.1	1.1	235.0	3.0	0.0	Vert	AV	0.0	41.6	54.0	-12.4	Mid Ch. 2440MHz, DH5, EUT On Side
12199.430	40.7	-1.1	1.6	183.0	3.0	0.0	Horz	AV	0.0	39.6	54.0	-14.4	Mid Ch. 2440MHz, DH5, EUT Horz
4959.980	27.9	11.5	1.0	300.0	3.0	0.0	Horz	AV	0.0	39.4	54.0	-14.6	High Ch. 2480MHz, DH5, EUT On Side
4959.965	27.8	11.5	1.2	360.0	3.0	0.0	Vert	AV	0.0	39.3	54.0	-14.7	High Ch. 2480MHz, DH5, EUT Vert
4880.117	28.2	11.0	1.0	297.0	3.0	0.0	Horz	AV	0.0	39.2	54.0	-14.8	Mid Ch. 2440MHz, DH5, EUT On Side
4803.983	28.5	10.5	1.4	37.0	3.0	0.0	Vert	AV	0.0	39.0	54.0	-15.0	Low Ch. 2402MHz, DH5, EUT Vert
12199.380	39.2	-1.1	1.2	290.0	3.0	0.0	Horz	AV	0.0	38.1	54.0	-15.9	Mid Ch. 2440MHz, 2DH5, EUT On Side
7440.200	37.7	20.1	1.0	175.0	3.0	0.0	Horz	PK	0.0	57.8	74.0	-16.2	High Ch. 2480MHz, DH5, EUT On Side
12200.350	38.1	-1.1	1.3	199.0	3.0	0.0	Horz	AV	0.0	37.0	54.0	-17.0	Mid Ch. 2440MHz, 3DH5, EUT On Side
7319.745	37.3	19.4	2.4	96.0	3.0	0.0	Vert	PK	0.0	56.7	74.0	-17.3	Mid Ch. 2440MHz, DH5, EUT Vert
4879.958	25.4	11.0	1.5	322.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Mid Ch. 2440MHz, DH5, EUT Vert
7439.920	36.1	20.1	1.0	329.0	3.0	0.0	Vert	PK	0.0	56.2	74.0	-17.8	High Ch. 2480MHz, DH5, EUT Vert
7319.975	36.3	19.4	1.4	236.0	3.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	Mid Ch. 2440MHz, DH5, EUT On Side
4804.008	22.6	10.5	1.6	90.0	3.0	0.0	Horz	AV	0.0	33.1	54.0	-20.9	Low Ch. 2402MHz, DH5, EUT On Side
12199.310	53.6	-1.1	1.1	73.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	Mid Ch. 2440MHz, DH5, EUT On Side
12200.960	53.0	-1.1	1.0	74.0	3.0	0.0	Vert	PK	0.0	51.9	74.0	-22.1	Mid Ch. 2440MHz, DH5, EUT Vert
12010.830	52.7	-2.2	1.0	265.0	3.0	0.0	Vert	PK	0.0	50.5	74.0	-23.5	Low Ch. 2402MHz, DH5, EUT Vert
12009.250	52.1	-2.2	1.0	308.0	3.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	Low Ch. 2402MHz, DH5, EUT On Side
12199.570	50.9	-1.1	1.3	121.0	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	Mid Ch. 2440MHz, DH5, EUT Horz
12399.320	50.7	-0.9	1.0	83.0	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	High Ch. 2480MHz, DH5, EUT Vert
12399.400	50.7	-0.9	1.1	268.0	3.0	0.0	Horz	PK	0.0	49.8	74.0	-24.2	High Ch. 2480MHz, DH5, EUT On Side
4959.655	38.0	11.5	1.2	360.0	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	High Ch. 2480MHz, DH5, EUT Vert
12199.490	50.4	-1.1	1.0	123.0	3.0	0.0	Horz	PK	0.0	49.3	74.0	-24.7	Mid Ch. 2440MHz, DH5, EUT Vert
4880.333	37.8	11.0	1.5	322.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	Mid Ch. 2440MHz, DH5, EUT Vert
4960.065	37.2	11.5	1.0	300.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	High Ch. 2480MHz, DH5, EUT On Side
4879.875	37.4	11.0	1.0	297.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Mid Ch. 2440MHz, DH5, EUT On Side
4803.192	37.4	10.5	1.4	37.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	Low Ch. 2402MHz, DH5, EUT Vert
12199.460	48.9	-1.1	1.1	235.0	3.0	0.0	Vert	PK	0.0	47.8	74.0	-26.2	Mid Ch. 2440MHz, DH5, EUT On Side
4804.550	36.6	10.5	1.6	90.0	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Low Ch. 2402MHz, DH5, EUT On Side
12199.390	47.7	-1.1	1.2	290.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Mid Ch. 2440MHz, 2DH5, EUT On Side
12199.230	47.7	-1.1	1.6	183.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Mid Ch. 2440MHz, DH5, EUT Horz
12199.820	47.4	-1.1	1.3	199.0	3.0	0.0	Horz	PK	0.0	46.3	74.0	-27.7	Mid Ch. 2440MHz, 3DH5, EUT On Side

SPURIOUS RADIATED EMISSIONS

Work Order:	SUPR0120	**Date:**	05/01/14		
Project:	Supra eKEY Fob	**Temperature:**	23.8 °C		
Job Site:	EV01	**Humidity:**	37.7% RH		
Serial Number:	0161	**Barometric Pres.:**	1016 mbar	**Tested by:**	Jared Ison
EUT:	Supra eKEY Fob				
Configuration:	1				
Customer:	Supra, A Division of UTCFS				
Attendees:	None				
EUT Power:	Internal Battery				
Operating Mode:	Continous transmit				
Deviations:	None				
Comments:	None				

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

Run #	16	**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
2483.993	26.1	2.7	1.4	15.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High Ch. 2480MHz, DH5, EUT Horz
2484.830	26.0	2.7	1.0	278.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, DH5, EUT On Side
2484.677	26.0	2.7	1.0	129.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, DH5, EUT On Side
2484.493	26.0	2.7	2.4	143.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, DH5, EUT Vert
2483.920	26.0	2.7	1.8	2.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, DH5, EUT Horz
2483.733	26.0	2.7	2.8	110.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	High Ch. 2480MHz, DH5, EUT Vert
2484.393	25.9	2.7	2.7	105.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	High Ch. 2480MHz, 2DH5, EUT Horz
2388.303	26.0	2.3	3.1	177.0	3.0	20.0	Vert	AV	0.0	48.3	54.0	-5.7	Low Ch. 2402MHz, DH5, EUT On Side
2389.203	25.9	2.3	1.0	252.0	3.0	20.0	Horz	AV	0.0	48.2	54.0	-5.8	Low Ch. 2402MHz, DH5, EUT On Side
2484.487	37.7	2.7	2.4	143.0	3.0	20.0	Vert	PK	0.0	60.4	74.0	-13.6	High Ch. 2480MHz, DH5, EUT Vert
2484.840	37.3	2.7	2.7	105.0	3.0	20.0	Horz	PK	0.0	60.0	74.0	-14.0	High Ch. 2480MHz, 2DH5, EUT Horz
2484.913	37.2	2.7	1.0	278.0	3.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	High Ch. 2480MHz, DH5, EUT On Side
2388.713	37.5	2.3	1.0	252.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	Low Ch. 2402MHz, DH5, EUT On Side
2485.337	37.1	2.7	1.8	2.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	High Ch. 2480MHz, DH5, EUT Horz
2484.367	37.0	2.7	1.4	15.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	High Ch. 2480MHz, DH5, EUT Horz
2483.730	37.0	2.7	2.8	110.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	High Ch. 2480MHz, DH5, EUT Vert
2388.003	37.1	2.3	3.1	177.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	Low Ch. 2402MHz, DH5, EUT On Side
2483.863	36.7	2.7	1.0	129.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	High Ch. 2480MHz, DH5, EUT On Side