



Starkey Laboratories, Inc.

The Dash Pro Right

FCC 15.247:2017

Bluetooth Radio

Report # STAK0082.1



NVLAP Lab Code: 200881-0

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CERTIFICATE OF TEST

Last Date of Test: March 8, 2017
Starkey Laboratories, Inc.
Model: The Dash Pro Right

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2017	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC - Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	
7.8.2	Carrier Frequency Separation	Yes	Pass	
7.8.3	Number of Hopping Frequencies	Yes	Pass	
7.8.4	Dwell Time	Yes	Pass	
7.8.5	Output Power	Yes	Pass	
7.8.6	Band Edge Compliance	Yes	Pass	
7.8.6	Band Edge Compliance - Hopping Mode	Yes	Pass	
7.8.7	Occupied Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Dean Ghizzone, General Manager

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

REVISION HISTORY



Revision Number		Description	Date	Page Number
00		None		

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 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

For details on the Scopes of our Accreditations, please visit:

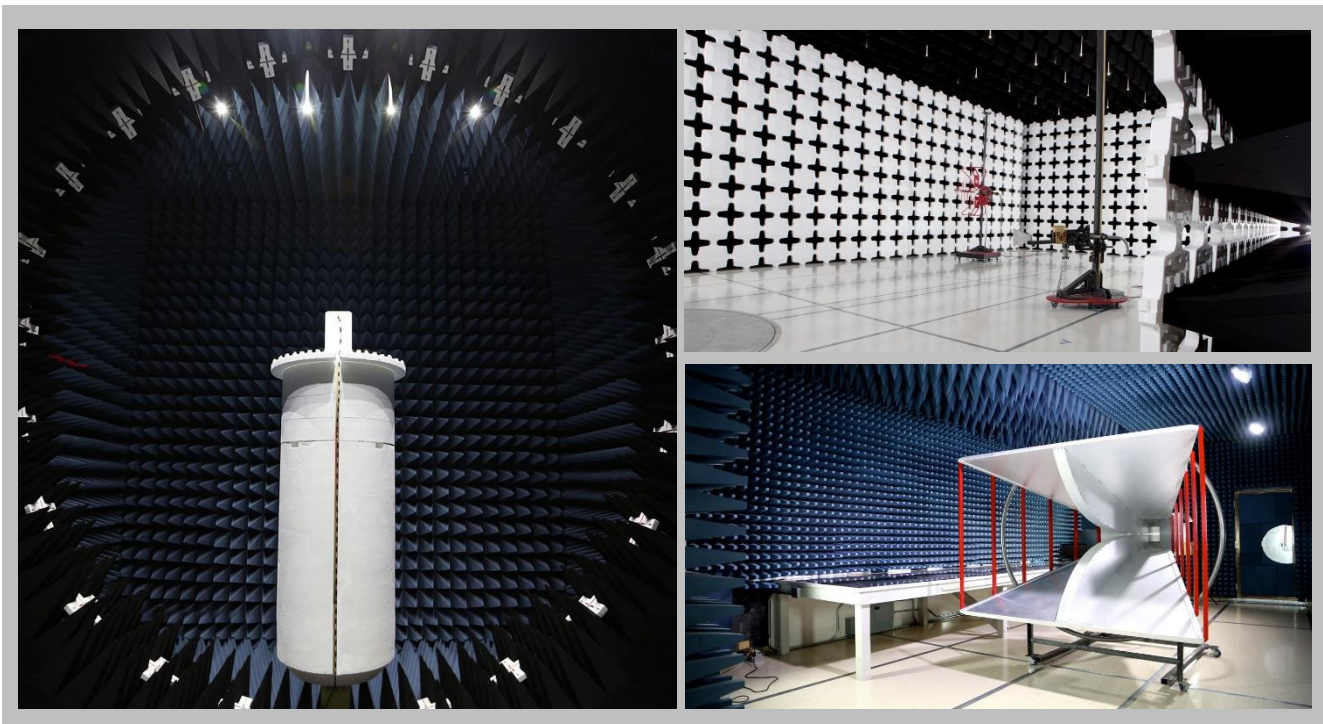
<http://portlandcustomer.element.com/ts/scope/scope.htm>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

FACILITIES



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



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.

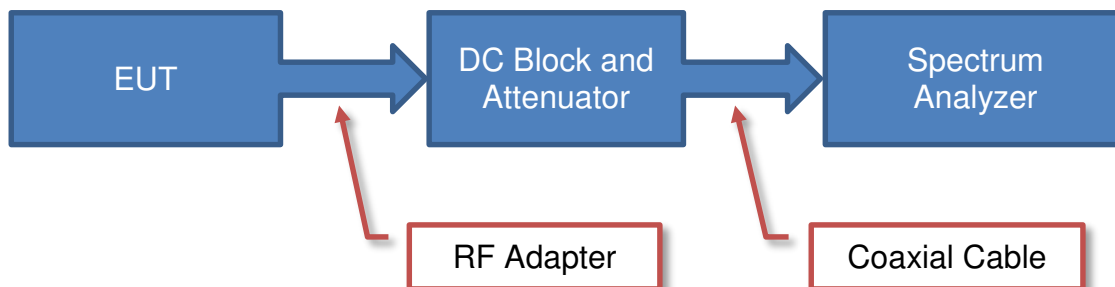
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

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

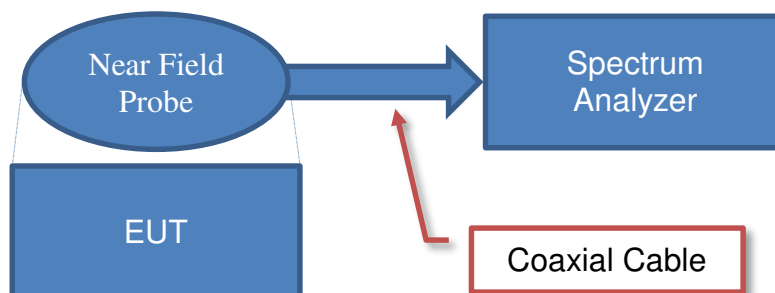
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

Test Setup Block Diagrams

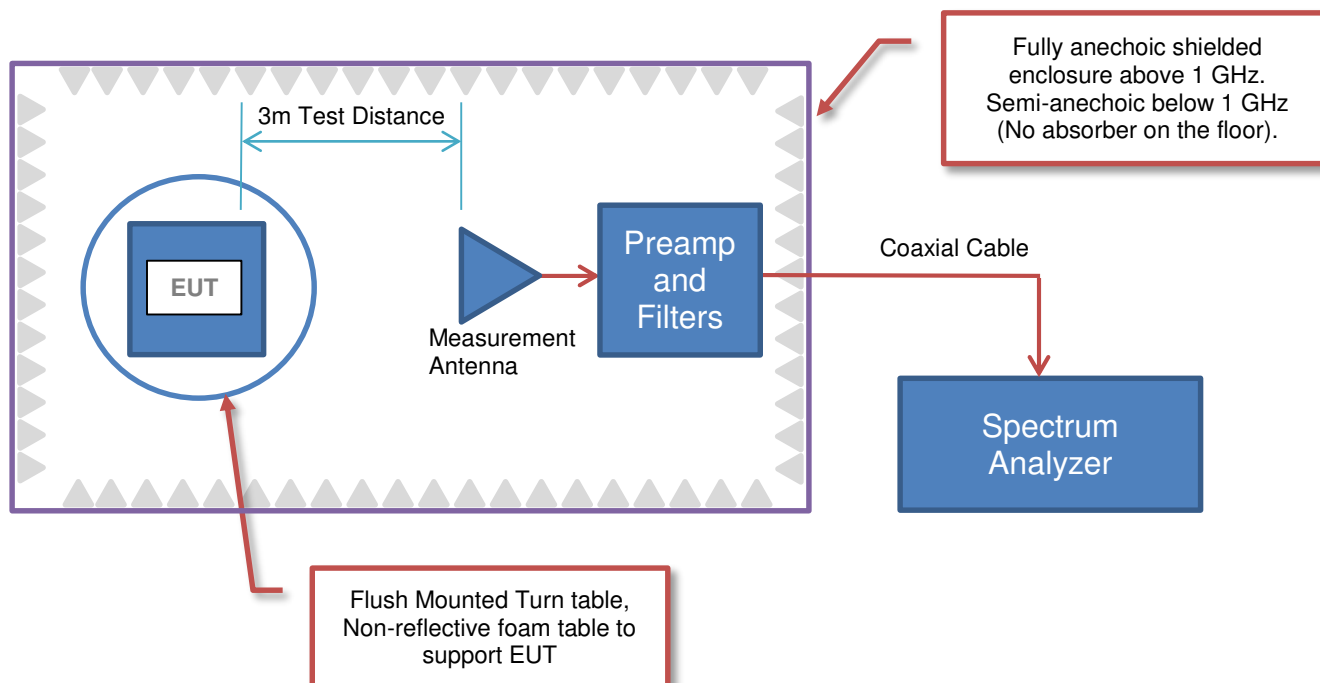
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave. SO.
City, State, Zip:	Eden Prairie, MN 55344
Test Requested By:	Bill Mitchell
Model:	The Dash Pro Right
First Date of Test:	March 6, 2017
Last Date of Test:	March 8, 2017
Receipt Date of Samples:	March 6, 2017
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Earphone containing both a 10.6 MHz NFMI radio and a 2.4 GHz Bluetooth Radio utilizing both Bluetooth Classic (BR/EDR) and Bluetooth Low Energy. The BT classic mode does not utilize the 8DPSK Modulation (3-DH5) mode.

Testing Objective:

To demonstrate compliance of the Bluetooth FHSS radio to FCC 15.247 requirements.

CONFIGURATIONS



Configuration STAK0082- 3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Earphones and Charging Dock	Starkey Laboratories, Inc.	The Dash Pro Right	FCC-1

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Bluetooth Testing Unit	Rohde & Schwarz	1153.9000K35	1153.9000K35-100787-gH

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	No	.17m	No	Wireless Earphones and Charging Dock	Unterminated
AC Mains Cable (Bluetooth Testing Unit)	No	1.8m	No	AC Mains	Bluetooth Testing Unit

Configuration STAK0082- 6

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Wireless Earphones	Starkey Laboratories, Inc.	The Dash Pro Right	FCC-1C

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
USB Board	CSR	CNS10020V5A	361972
Laptop 1	Lenovo	T460p	PF0MVAWB
AC Adapter (Laptop 1)	Lenovo	ADLX90NCC2A	11S45N0251Z1ZS9C65BJ57

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial Cable	No	.30m	No	Wireless Earphones	USB Board
USB Cable	No	1.3m	Yes	USB Board	Laptop 1
AC Mains Cable 1	No	1.0m	No	AC Adapter (Laptop 1)	AC Mains
DC Cable 1	No	1.8m	Yes	AC Adapter (Laptop 1)	Laptop 1

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/6/2017	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	3/8/2017	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	3/8/2017	Carrier Frequency Separation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
4	3/8/2017	Number of Hopping Frequencies	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	3/8/2017	Dwell Time	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	3/8/2017	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	3/8/2017	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
8	3/8/2017	Band Edge Compliance – Hopping Mode	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
9	3/8/2017	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	3/8/2017	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.01.26

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

MODES OF OPERATION

Transmitting low channel (2402 MHz), mid channel (2440 MHz), and high channel (2480 MHz); DH5 and 2DH5 data rates

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

STAK0082 - 3

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
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	9/22/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	9/23/2016	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	9/23/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2/14/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2/14/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2/14/2017	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/1/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/1/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/6/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/15/2016	12 mo
Cable	Northwest EMC	18-26GHz Standard Gain Horn Cable	MNP	9/15/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 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 antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

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

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

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

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

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

SPURIOUS RADIATED EMISSIONS



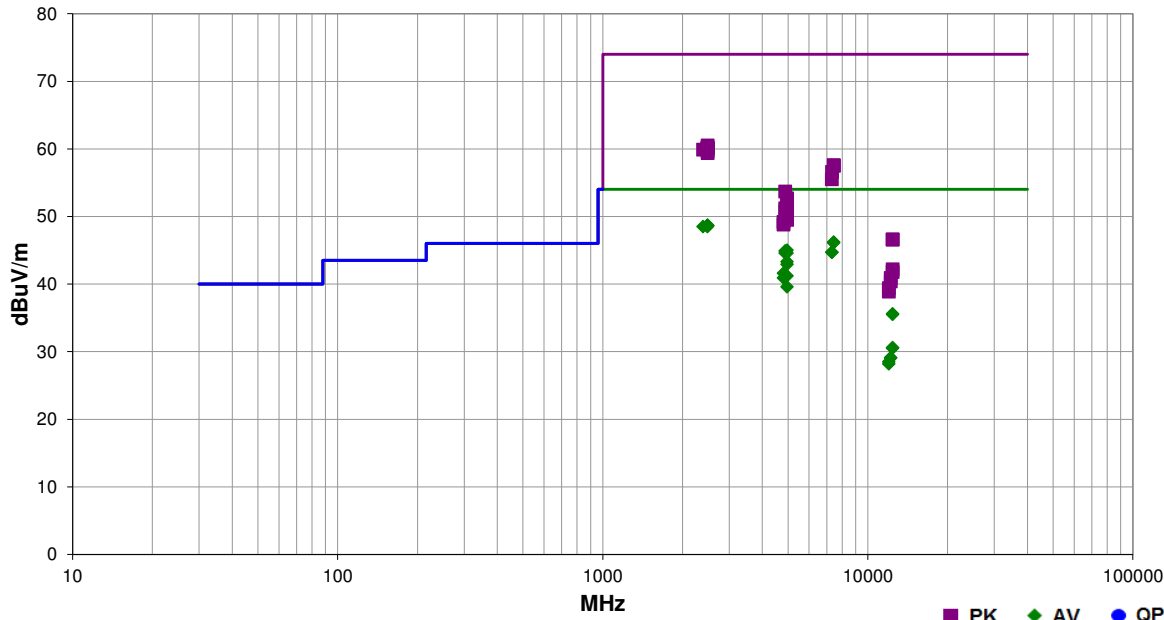
EmiRS 2017.01.25

PSA-ESCI 2017.01.26

Work Order:	STAK0082	Date:	03/06/17	
Project:	None	Temperature:	21.9 °C	
Job Site:	MN05	Humidity:	38.5% RH	
Serial Number:	FCC-1	Barometric Pres.:	1000 mbar	
EUT:	The Dash Pro Right			
Configuration:	3			
Customer:	Starkey Laboratories, Inc.			
Attendees:	Michael Thompson			
EUT Power:	Battery			
Operating Mode:	Transmitting Bluetooth - low channel (2402 MHz), mid channel (2440 MHz), and high channel (2480 MHz); DH5 and 2DH5 data rates.			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 15.247:2017	ANSI C63.10:2013

Run #	54	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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■ PK ◆ AV ● QP

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
4882.025	42.9	6.7	1.0	58.1	3.0	0.0	Vert	AV	0.0	49.6	54.0	-4.4	Mid ch, DH5, EUT vert
2484.750	31.2	-2.5	1.1	300.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	High ch, DH5, EUT on side
2487.925	31.2	-2.5	1.0	321.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High ch, DH5, EUT on side
2487.208	31.1	-2.5	1.0	33.1	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	High ch, DH5, EUT vert
2487.567	31.1	-2.5	1.0	347.9	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	High ch, DH5, EUT vert
2485.583	31.1	-2.5	1.0	146.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	High ch, DH5, EUT horz
2484.542	31.1	-2.5	1.0	73.1	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	High ch, DH5, EUT horz
2483.742	31.0	-2.5	1.0	340.9	3.0	20.0	Horz	AV	0.0	48.5	54.0	-5.5	High ch, 2DH5, EUT on side
2388.767	30.8	-2.3	2.1	0.0	3.0	20.0	Horz	AV	0.0	48.5	54.0	-5.5	Low ch, DH5, EUT on side
7439.275	31.2	15.0	1.2	173.1	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	High ch, 2DH5, EUT on side
7440.733	31.1	15.0	1.0	196.1	3.0	0.0	Vert	AV	0.0	46.1	54.0	-7.9	High ch, 2DH5, EUT vert
4959.733	38.2	6.8	1.0	72.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	High ch, 2DH5, EUT vert
4881.733	38.2	6.7	1.0	28.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	Mid ch, 2DH5, EUT vert
7317.642	29.6	15.1	1.0	353.0	3.0	0.0	Horz	AV	0.0	44.7	54.0	-9.3	Mid ch, 2DH5, EUT on side
7320.842	29.6	15.1	1.0	252.0	3.0	0.0	Vert	AV	0.0	44.7	54.0	-9.3	Mid ch, 2DH5, EUT vert
4959.750	37.8	6.8	2.2	36.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	High ch, 2DH5, EUT on side
4881.775	37.9	6.7	2.3	27.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	Mid ch, 2DH5, EUT on side
4959.775	36.5	6.8	2.9	297.0	3.0	0.0	Horz	AV	0.0	43.3	54.0	-10.7	High ch, 2DH5, EUT vert
4959.742	36.1	6.8	2.2	253.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1	High ch, 2DH5, EUT horz
4803.750	35.0	6.6	1.0	358.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	Low ch, 2DH5, EUT 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
4959.650	34.4	6.8	1.0	360.0	3.0	0.0	Horz	AV	0.0	41.2	54.0	-12.8	High ch, 2DH5, EUT horz
4803.758	34.3	6.6	1.0	5.1	3.0	0.0	Vert	AV	0.0	40.9	54.0	-13.1	Low ch, 2DH5, EUT vert
2484.792	43.0	-2.5	1.0	33.1	3.0	20.0	Horz	PK	0.0	60.5	74.0	-13.5	High ch, DH5, EUT vert
2484.283	42.7	-2.5	1.0	340.9	3.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	High ch, 2DH5, EUT on side
2485.483	42.6	-2.5	1.0	347.9	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	High ch, DH5, EUT vert
2488.050	42.6	-2.5	1.0	146.0	3.0	20.0	Horz	PK	0.0	60.1	74.0	-13.9	High ch, DH5, EUT horz
2485.467	42.6	-2.5	1.0	321.0	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	High ch, DH5, EUT on side
2388.608	42.2	-2.3	2.1	0.0	3.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	Low ch, DH5, EUT on side
2485.725	42.2	-2.5	1.0	73.1	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	High ch, DH5, EUT horz
4959.667	32.8	6.8	1.0	107.0	3.0	0.0	Vert	AV	0.0	39.6	54.0	-14.4	High ch, 2DH5, EUT on side
2484.200	41.9	-2.5	1.1	300.0	3.0	20.0	Horz	PK	0.0	59.4	74.0	-14.6	High ch, DH5, EUT on side
7439.150	42.6	15.0	1.2	173.1	3.0	0.0	Horz	PK	0.0	57.6	74.0	-16.4	High ch, 2DH5, EUT on side
7441.858	42.5	15.0	1.0	196.1	3.0	0.0	Vert	PK	0.0	57.5	74.0	-16.5	High ch, 2DH5, EUT vert
7322.100	41.6	15.0	1.0	353.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	Mid ch, 2DH5, EUT on side
12402.230	29.5	6.1	1.0	272.9	3.0	0.0	Vert	AV	0.0	35.6	54.0	-18.4	High ch, 2DH5, EUT vert
12402.080	29.4	6.1	1.0	199.1	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5	High ch, 2DH5, EUT on side
7318.358	40.4	15.1	1.0	252.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	Mid ch, 2DH5, EUT vert
4882.033	47.0	6.7	1.0	58.1	3.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	Mid ch, DH5, EUT vert
4959.492	45.9	6.8	1.0	72.0	3.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	High ch, 2DH5, EUT vert
4960.317	45.3	6.8	2.2	36.0	3.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	High ch, 2DH5, EUT on side
4881.692	44.5	6.7	1.0	28.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Mid ch, 2DH5, EUT vert
4959.758	44.3	6.8	2.2	253.0	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	High ch, 2DH5, EUT horz
4959.842	44.3	6.8	2.9	297.0	3.0	0.0	Horz	PK	0.0	51.1	74.0	-22.9	High ch, 2DH5, EUT vert
4882.492	44.1	6.7	2.3	27.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	Mid ch, 2DH5, EUT on side
12399.510	29.7	0.9	1.0	190.0	3.0	0.0	Vert	AV	0.0	30.6	54.0	-23.4	High ch, 2DH5, EUT vert
12397.810	29.6	0.9	1.6	274.0	3.0	0.0	Horz	AV	0.0	30.5	54.0	-23.5	High ch, 2DH5, EUT on side
4959.467	43.4	6.8	1.0	360.0	3.0	0.0	Horz	PK	0.0	50.2	74.0	-23.8	High ch, 2DH5, EUT horz
4959.683	42.7	6.8	1.0	107.0	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	High ch, 2DH5, EUT on side
4803.700	42.6	6.6	1.0	358.0	3.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	Low ch, 2DH5, EUT on side
12202.480	29.1	0.0	1.0	135.0	3.0	0.0	Vert	AV	0.0	29.1	54.0	-24.9	Mid ch, 2DH5, EUT vert
12197.600	29.1	0.0	1.0	360.0	3.0	0.0	Horz	AV	0.0	29.1	54.0	-24.9	Mid ch, 2DH5, EUT on side
4803.667	42.2	6.6	1.0	5.1	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	Low ch, 2DH5, EUT vert
12007.880	29.5	-1.0	1.0	77.1	3.0	0.0	Vert	AV	0.0	28.5	54.0	-25.5	Low ch, 2DH5, EUT vert
12007.880	29.2	-1.0	2.4	91.1	3.0	0.0	Horz	AV	0.0	28.2	54.0	-25.8	Low ch, 2DH5, EUT on side
12401.140	40.5	6.1	1.0	199.1	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	High ch, 2DH5, EUT on side
12402.020	40.5	6.1	1.0	272.9	3.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	High ch, 2DH5, EUT vert
12399.160	41.3	0.9	1.0	190.0	3.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	High ch, 2DH5, EUT vert
12399.560	40.9	0.9	1.6	274.0	3.0	0.0	Horz	PK	0.0	41.8	74.0	-32.2	High ch, 2DH5, EUT on side
12202.250	40.9	0.0	1.0	135.0	3.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	Mid ch, 2DH5, EUT vert
12198.410	40.4	0.0	1.0	360.0	3.0	0.0	Horz	PK	0.0	40.4	74.0	-33.6	Mid ch, 2DH5, EUT on side
12008.680	40.4	-1.0	1.0	77.1	3.0	0.0	Vert	PK	0.0	39.4	74.0	-34.6	Low ch, 2DH5, EUT vert
12007.720	39.9	-1.0	2.4	91.1	3.0	0.0	Horz	PK	0.0	38.9	74.0	-35.1	Low ch, 2DH5, EUT on side

DUTY CYCLE



XMI 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

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.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE



TbTx 2017.01.27 XMt 2017.01.26

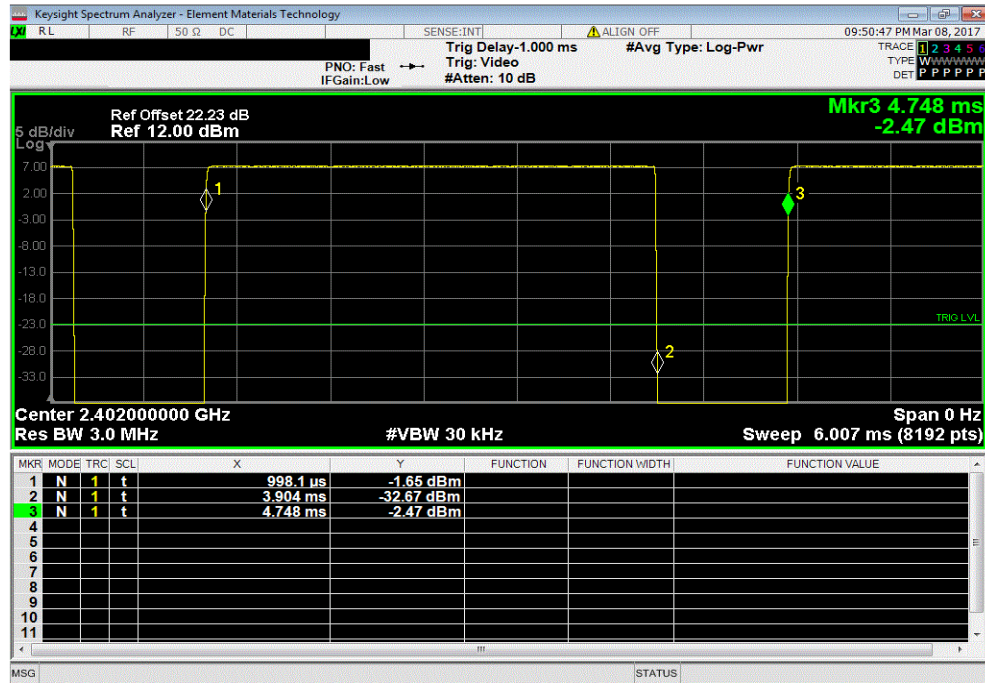
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.4% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks		Power: 110VAC/60Hz	
Job Site: MN08			
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Pulse Width	Period
		Number of Pulses	Value (%)
		Limit (%)	Results
DH5, GFSK			
	Low Channel	2.906 ms	3.75 ms
	Low Channel	N/A	N/A
	Mid Channel	2.907 ms	3.75 ms
	Mid Channel	N/A	N/A
	High Channel	2.907 ms	3.75 ms
	High Channel	N/A	N/A
2DH5, pi/4-DQPSK			
	Low Channel	2.917 ms	3.75 ms
	Low Channel	N/A	N/A
	Mid Channel	2.917 ms	3.75 ms
	Mid Channel	N/A	N/A
	High Channel	2.917 ms	3.75 ms
	High Channel	N/A	N/A

DUTY CYCLE

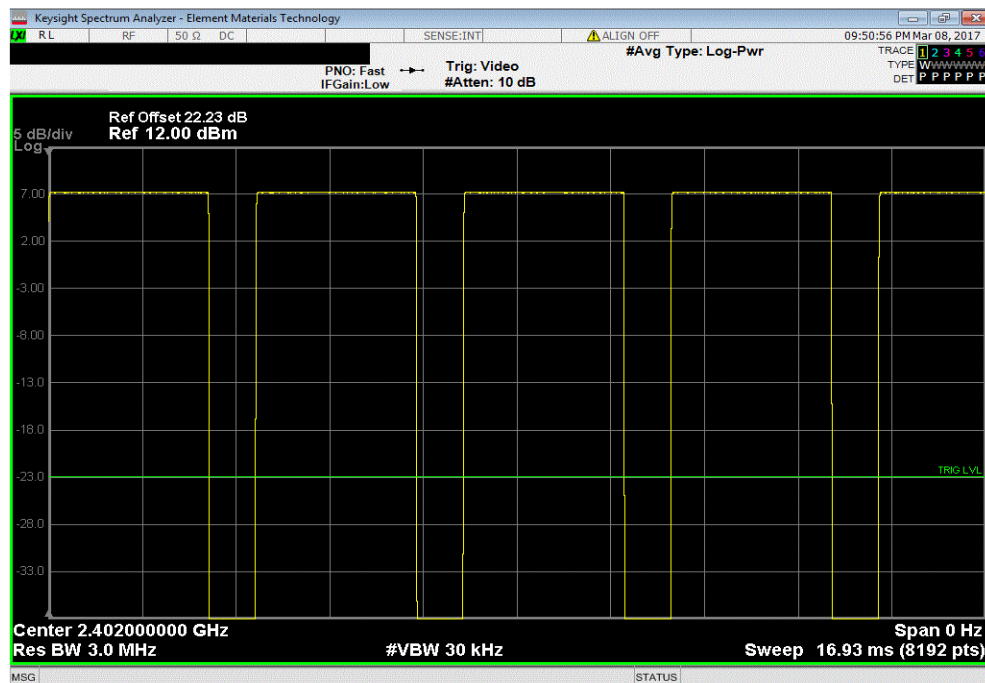


TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, Low Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.906 ms	3.75 ms	1	77.5	N/A	N/A	



DH5, GFSK, Low Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

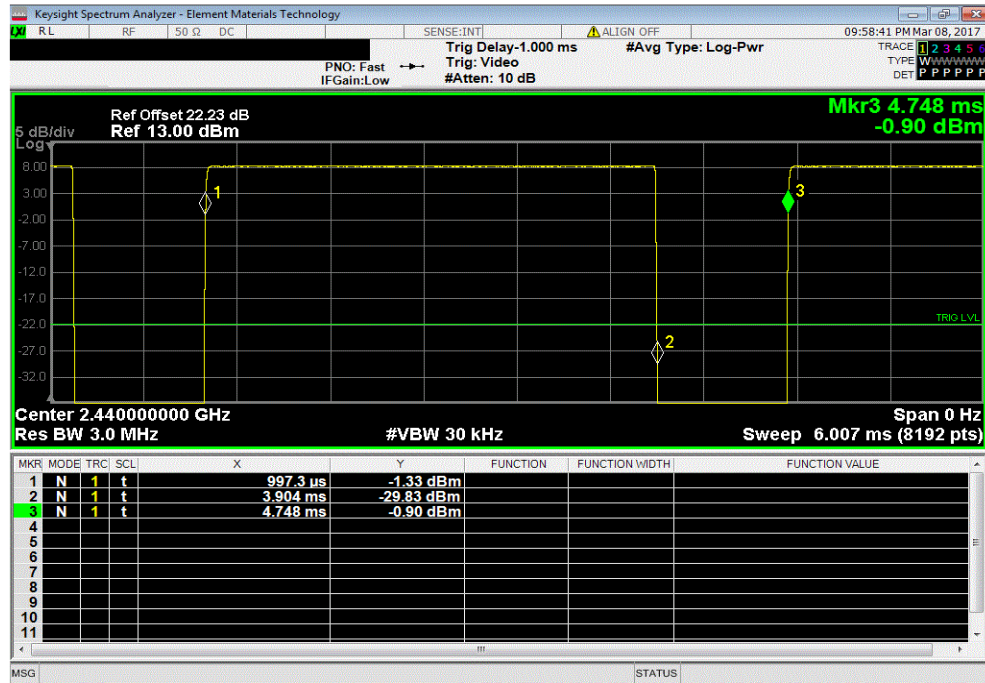


DUTY CYCLE

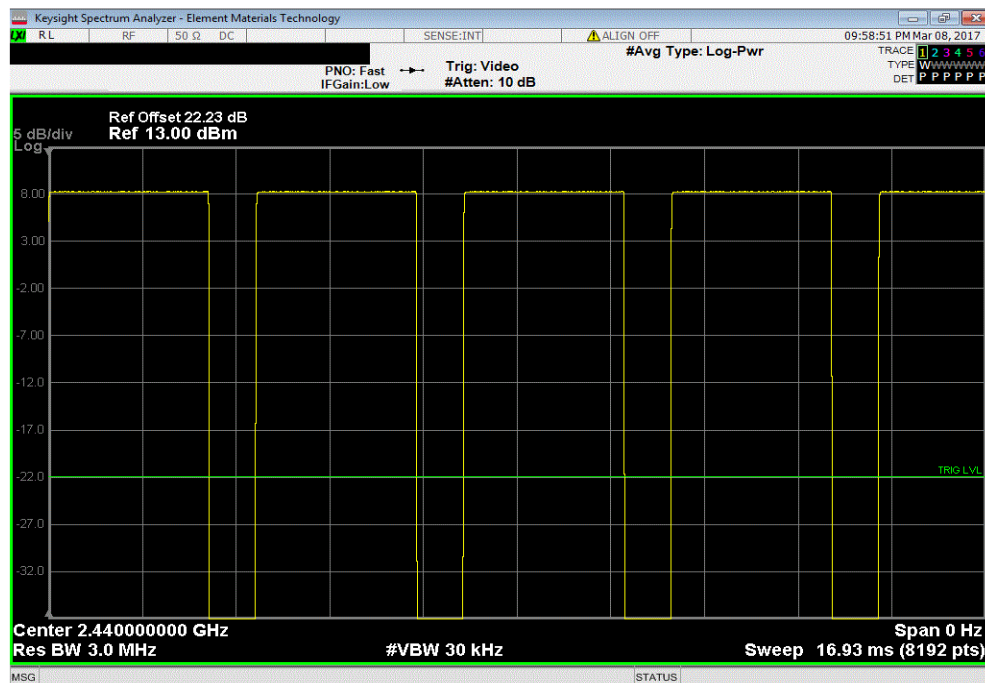


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DH5, GFSK, Mid Channel						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.907 ms	3.75 ms	1	77.5	N/A	N/A



DH5, GFSK, Mid Channel						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

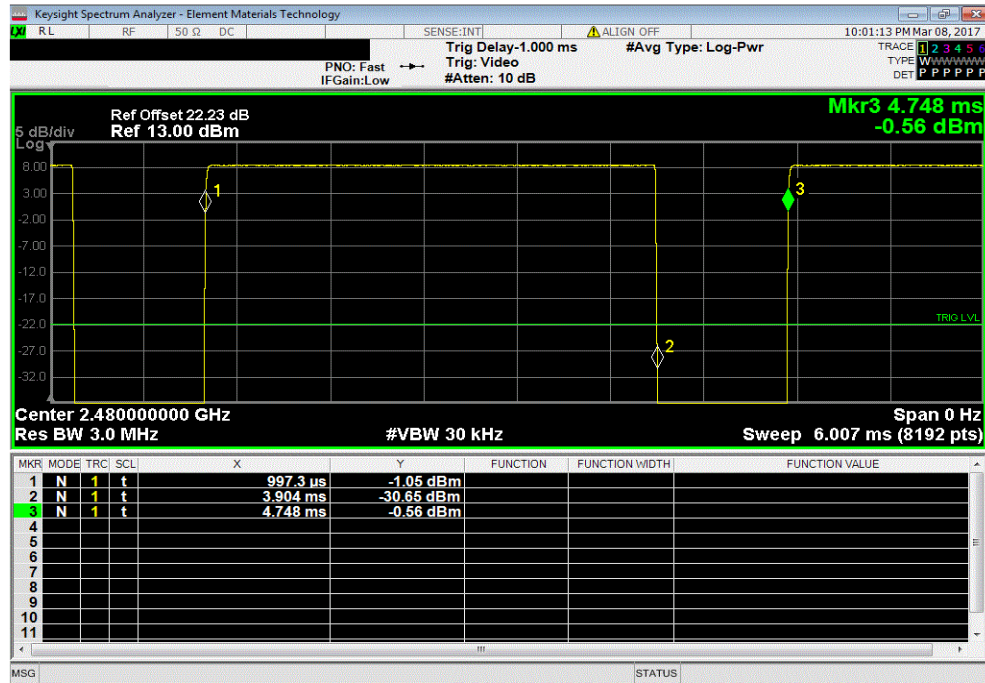


DUTY CYCLE

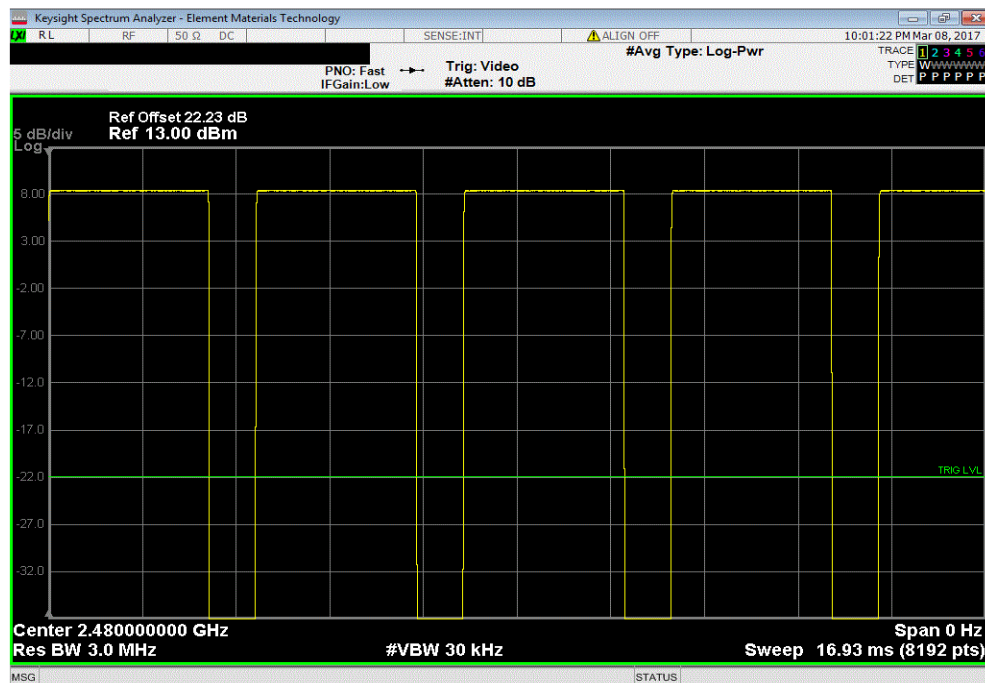


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DH5, GFSK, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.907 ms	3.75 ms	1	77.5	N/A	N/A	



DH5, GFSK, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

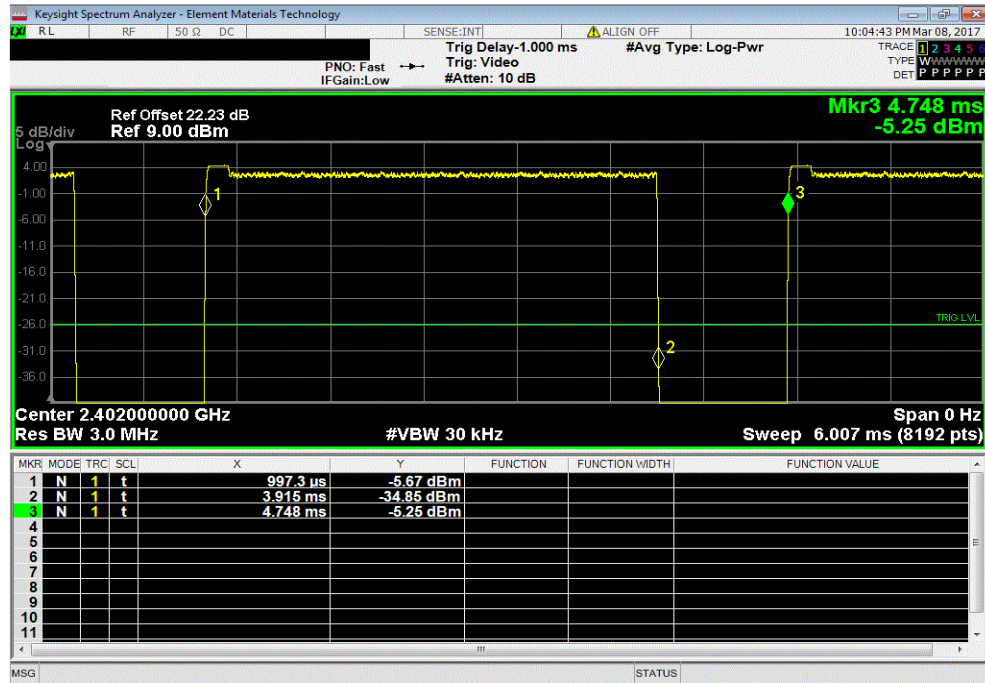


DUTY CYCLE

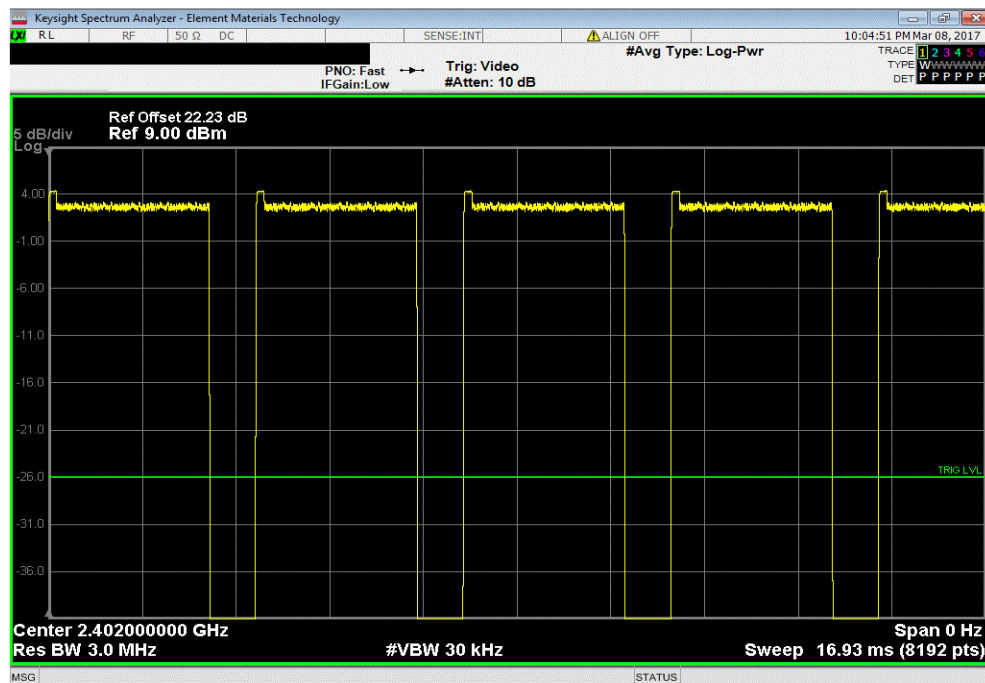


TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, Low Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.917 ms	3.75 ms	1	77.8	N/A	N/A	



2DH5, pi/4-DQPSK, Low Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

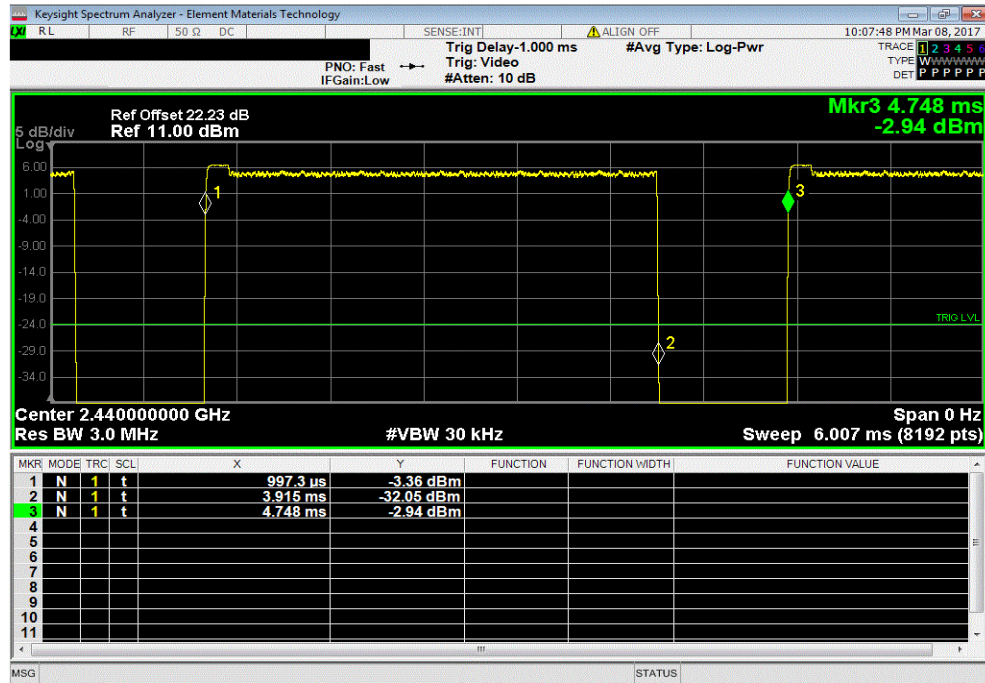


DUTY CYCLE

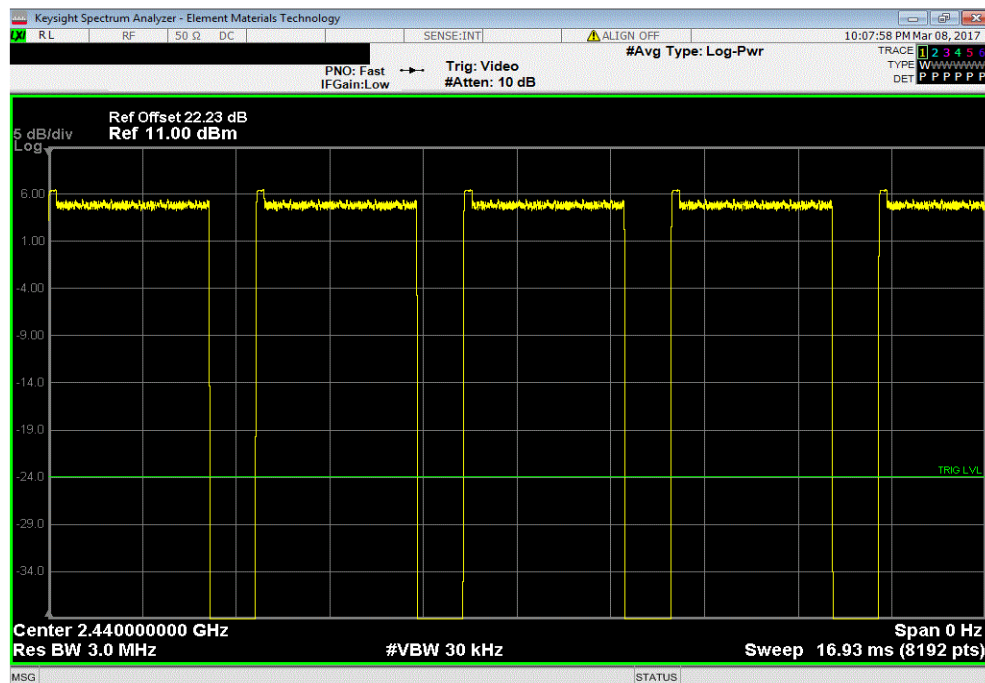


TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, Mid Channel						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.917 ms	3.75 ms	1	77.8	N/A	N/A



2DH5, pi/4-DQPSK, Mid Channel						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

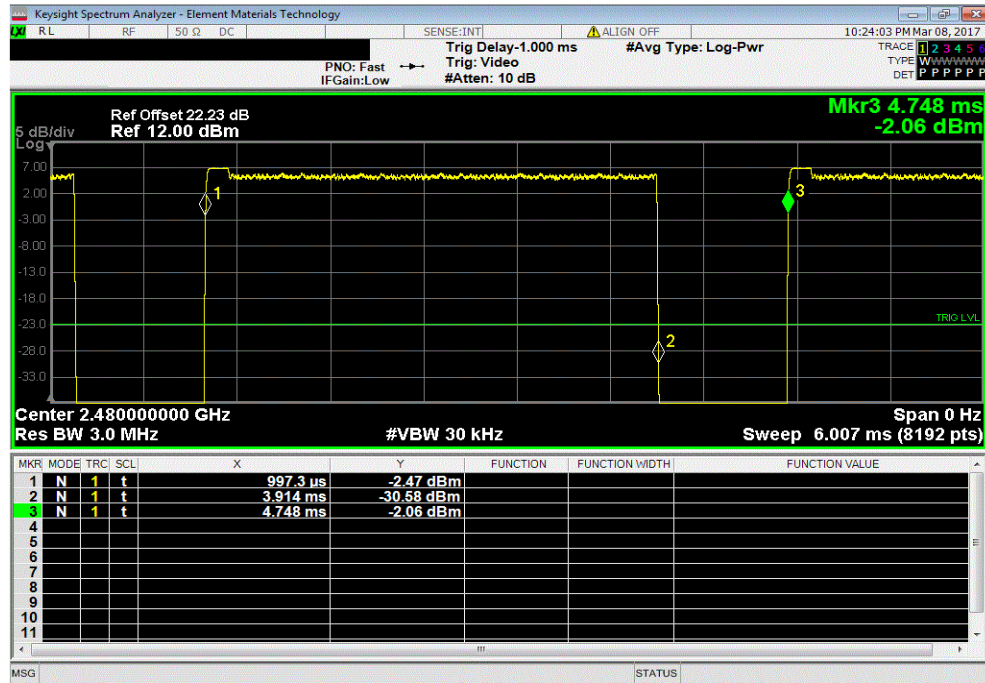


DUTY CYCLE

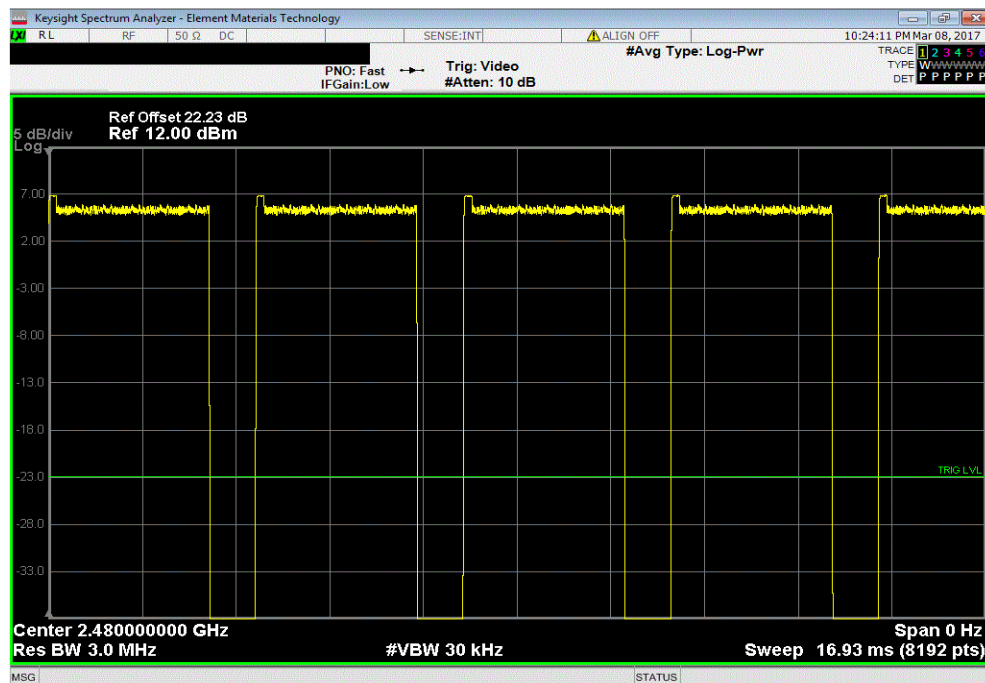


TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
2.917 ms	3.75 ms	1	77.8	N/A	N/A	



2DH5, pi/4-DQPSK, High Channel						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



CARRIER FREQUENCY SEPARATION



XMR 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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.

CARRIER FREQUENCY SEPARATION



TbTx 2017.01.27 XMt 2017.01.28

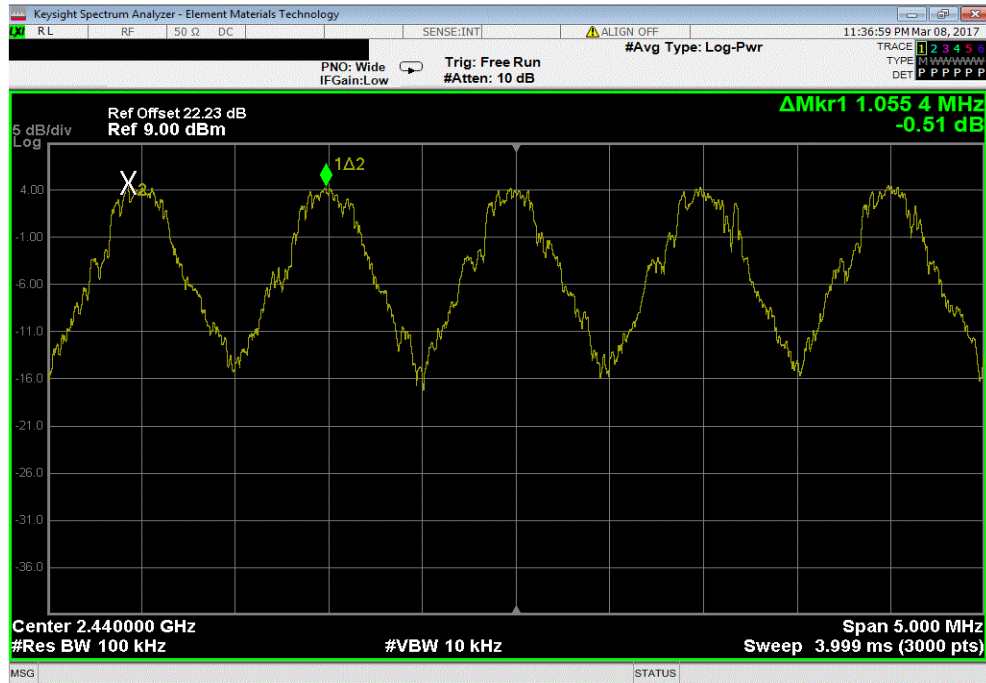
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C	
Attendees: Michael Thompson		Humidity: 18.5% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Value	Limit (≥)
Hopping Mode		1.1 MHz	1 MHz
			Results
			Pass

CARRIER FREQUENCY SEPARATION



TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode						
				Value	Limit (≥)	Results
				1.1 MHz	1 MHz	Pass



NUMBER OF HOPPING FREQUENCIES



XMH 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

NUMBER OF HOPPING FREQUENCIES



TbTx 2017.01.27 XMt 2017.01.28

EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C	
Attendees: Michael Thompson		Humidity: 18.6% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Number of Channels	Limit
Hopping Mode		79	≥ 15
			Results
			Pass

Hopping Mode							
					Number of Channels	Limit ≥	Results
					79	15	Pass



DWELL TIME



XMI 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. 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



TbTx 2017.01.27 XMis 2017.01.26

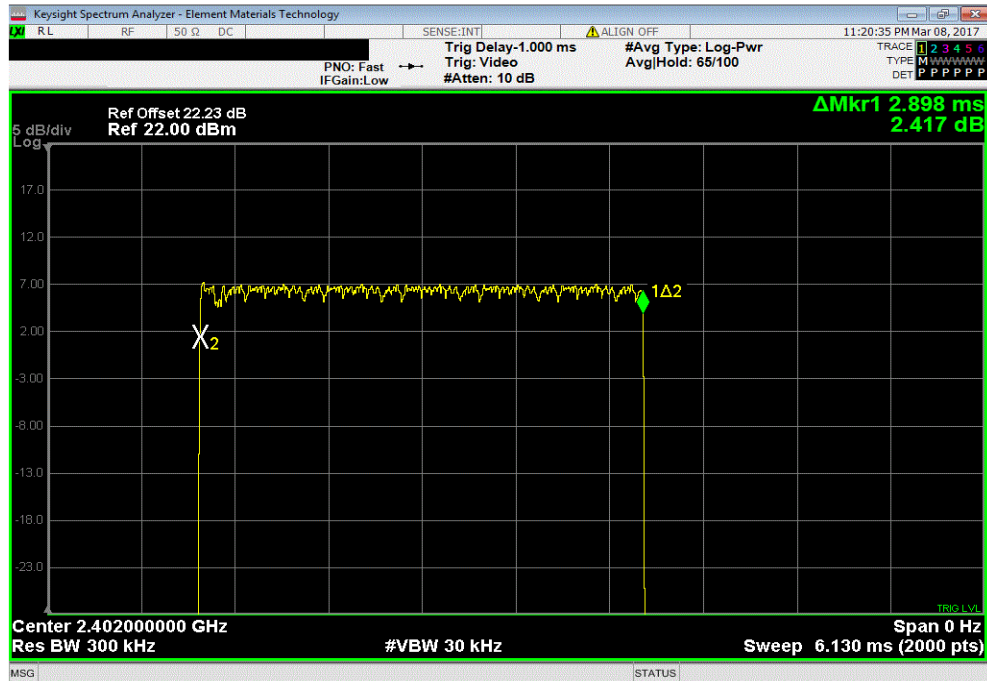
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.5% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks		Power: 110VAC/60Hz	
Job Site: MN08			
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Pulse Width (ms)	Number of Pulses
		Average No. of Pulses	Scale Factor
		On Time (ms) During 31.6 s	Limit (ms)
			Results
Hopping Mode			
DH5, GFSK			
	Low Channel, 2402 MHz	2.898	N/A
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	2.898	N/A
	High Channel, 2480 MHz	2.901	N/A
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	2.901	N/A
2DH5, pi/4-DQPSK			
	Low Channel, 2402 MHz	2.91	N/A
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	N/A	22
	Low Channel, 2402 MHz	2.91	N/A
	High Channel, 2480 MHz	2.913	N/A
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	N/A	22
	High Channel, 2480 MHz	2.913	N/A

DWELL TIME

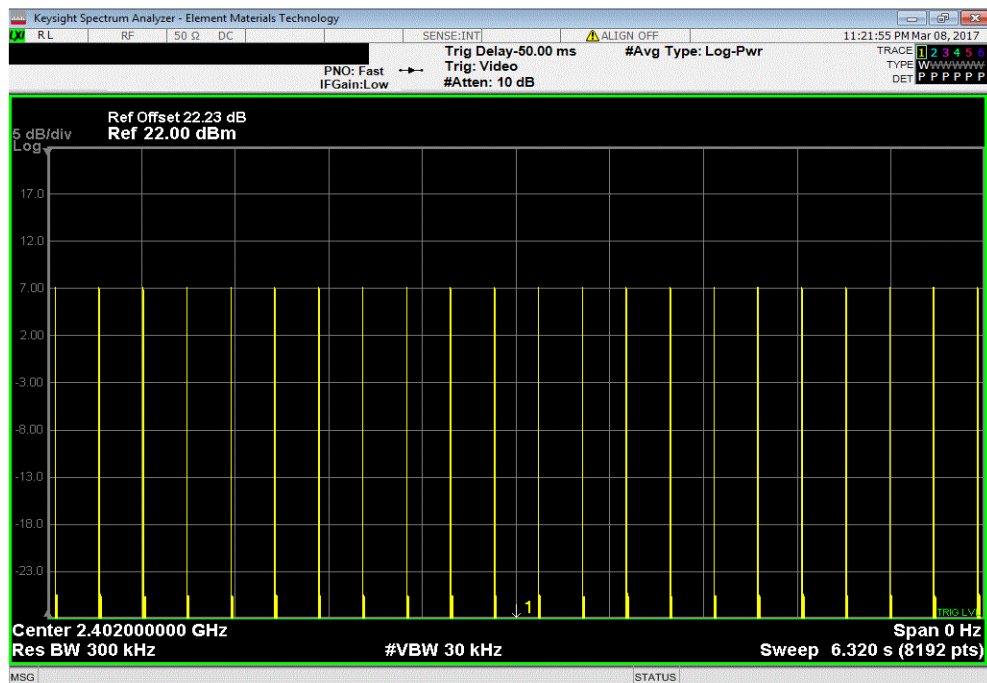


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.898	N/A	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

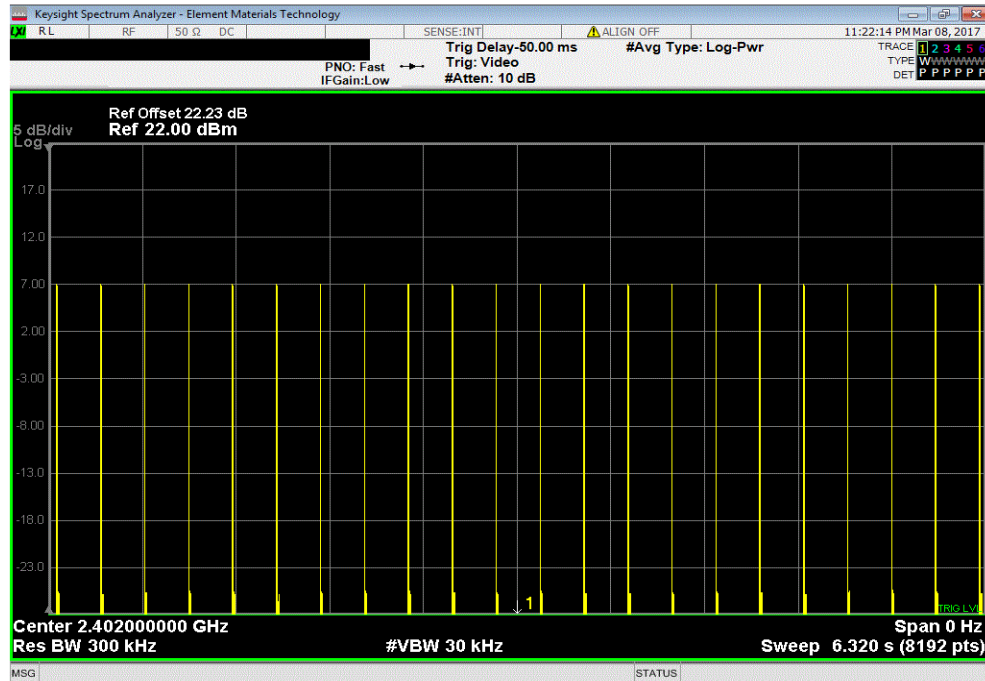


DWELL TIME

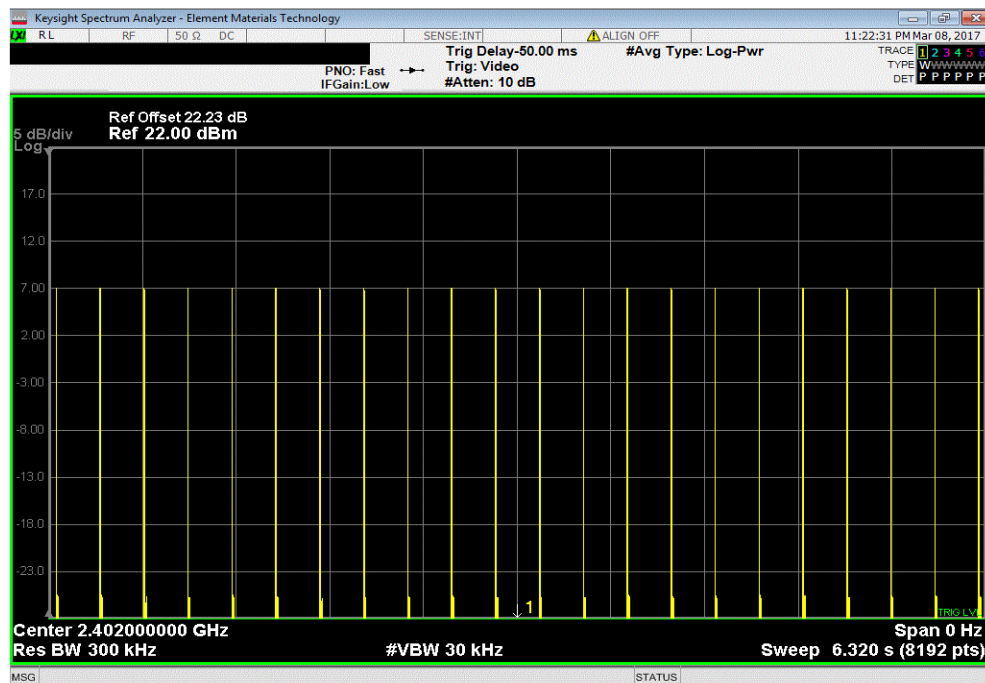


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

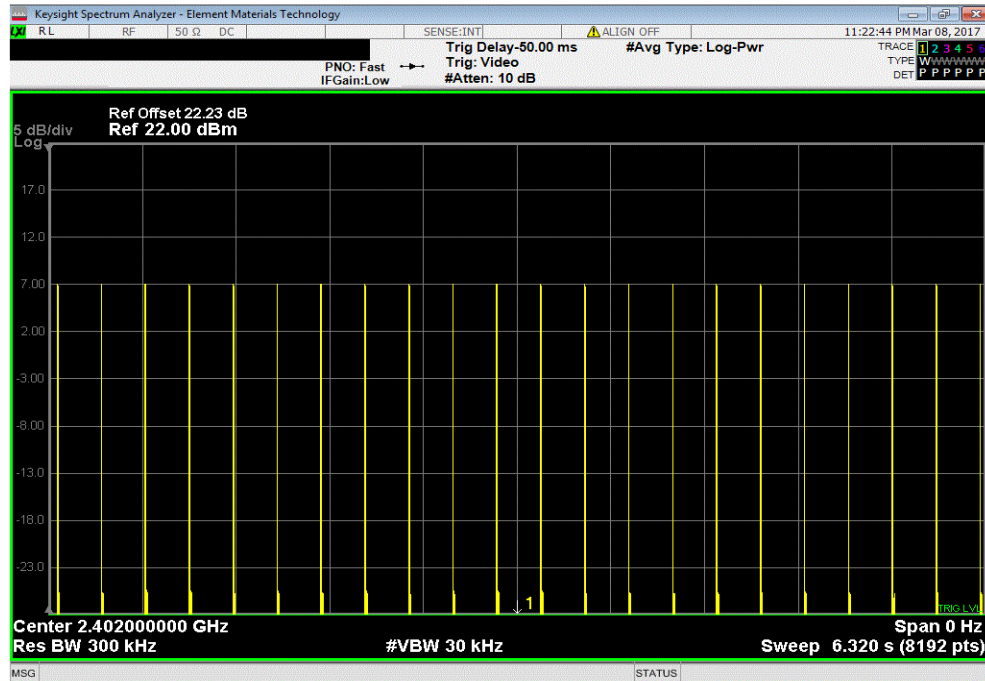


DWELL TIME



TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.898	N/A	22	5	318.78	400	Pass

Calculation Only

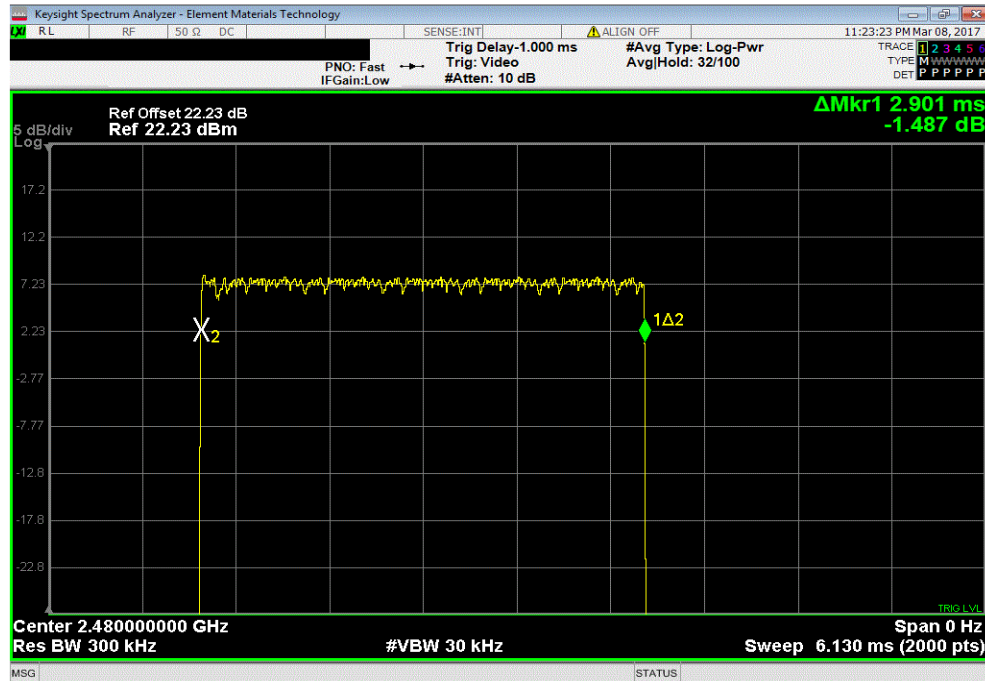
No Screen Capture Required

DWELL TIME

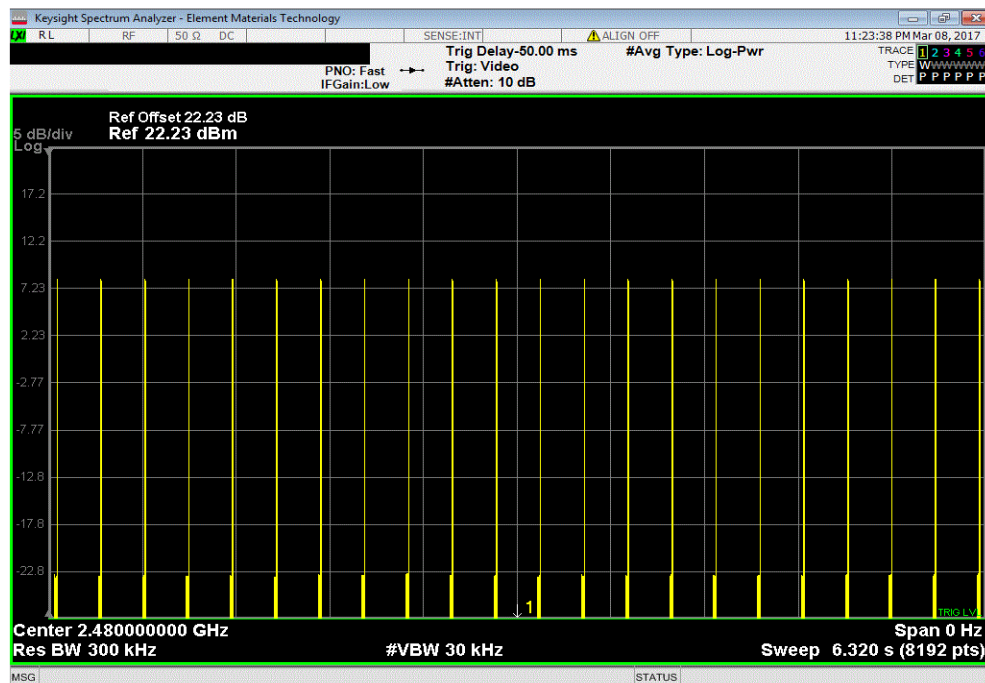


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.901	N/A	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

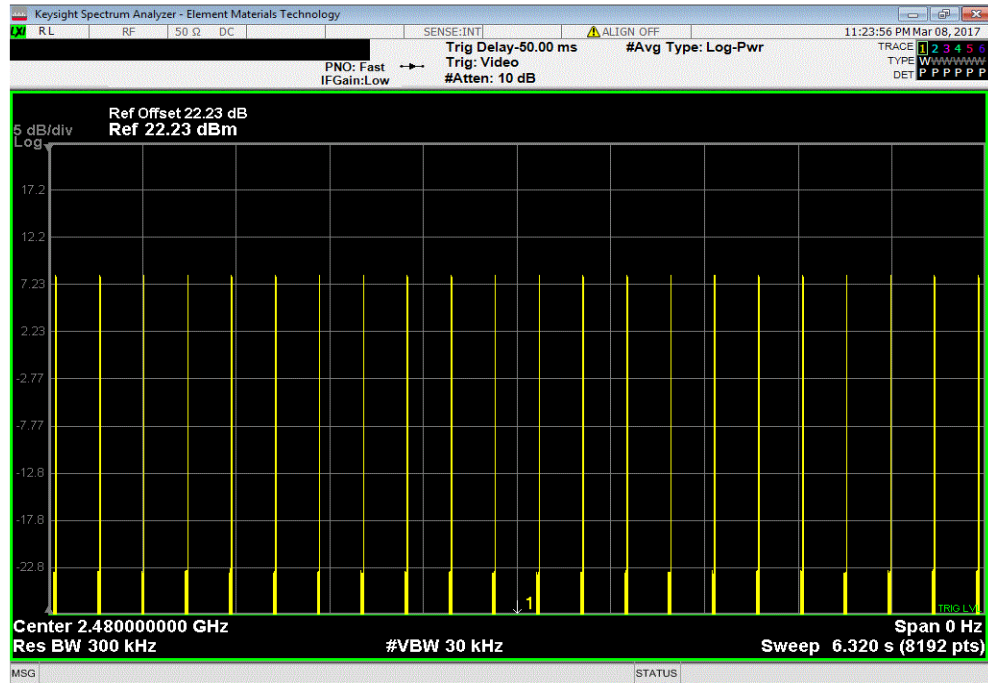


DWELL TIME

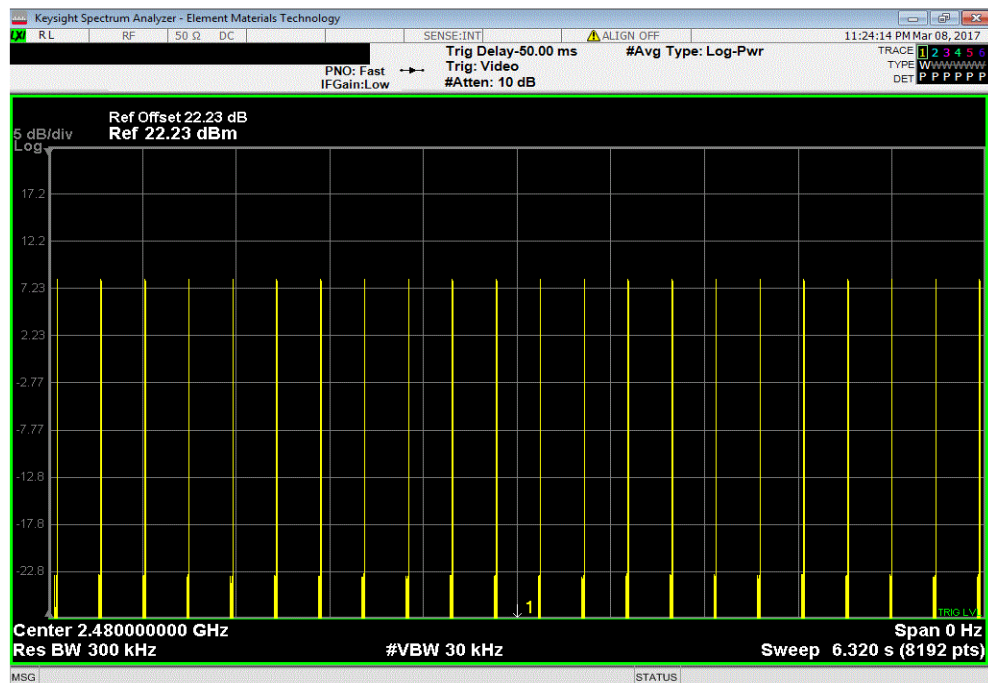


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

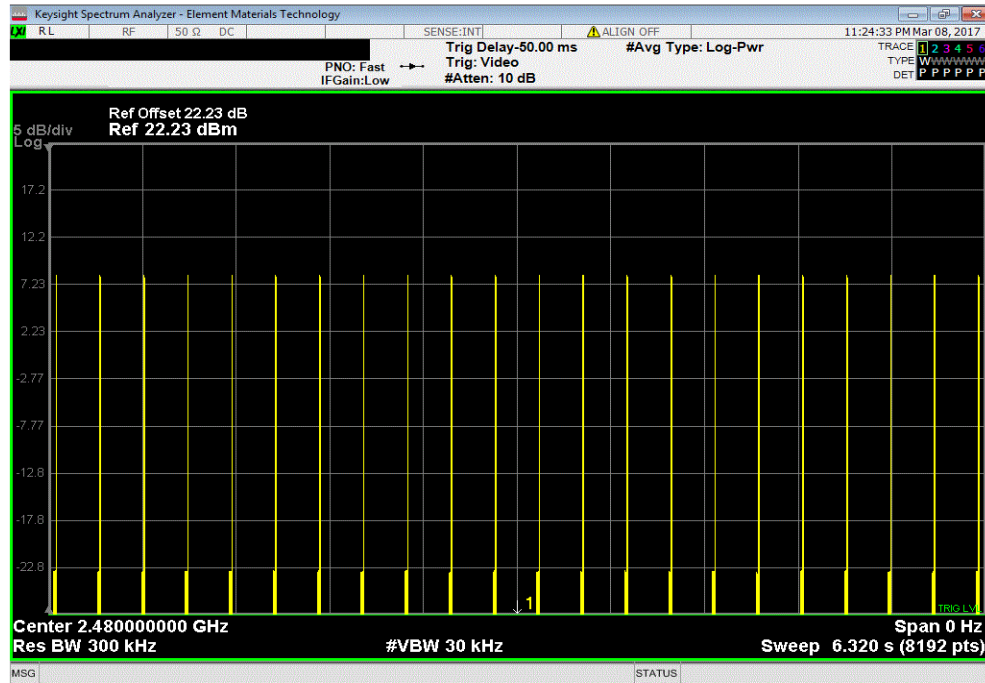


DWELL TIME



TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.901	N/A	22	5	319.11	400	Pass

Calculation Only

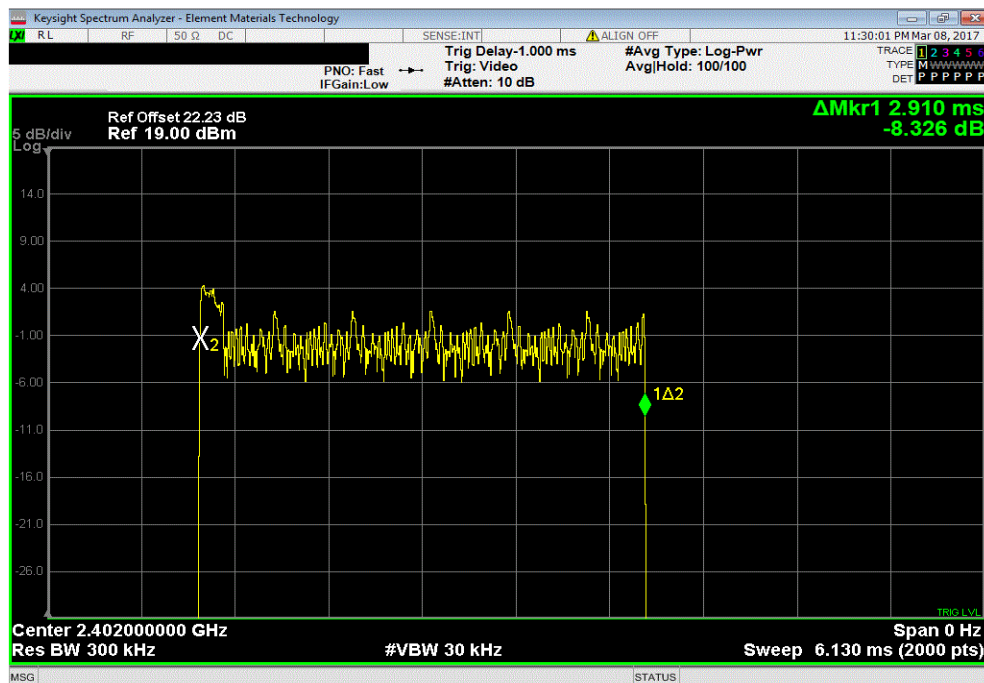
No Screen Capture Required

DWELL TIME

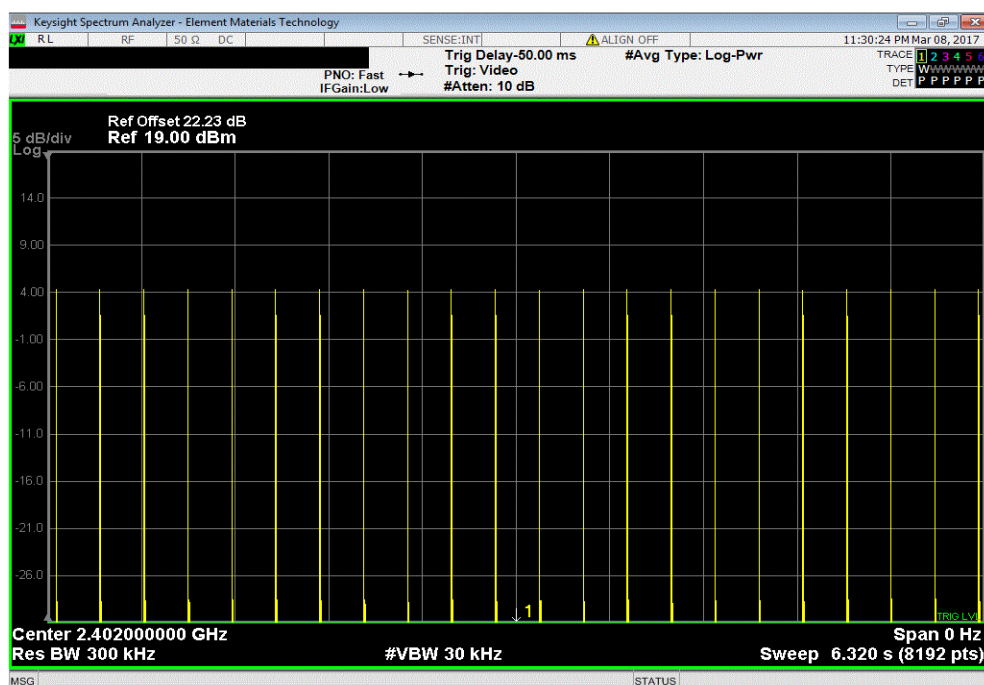


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.91	N/A	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

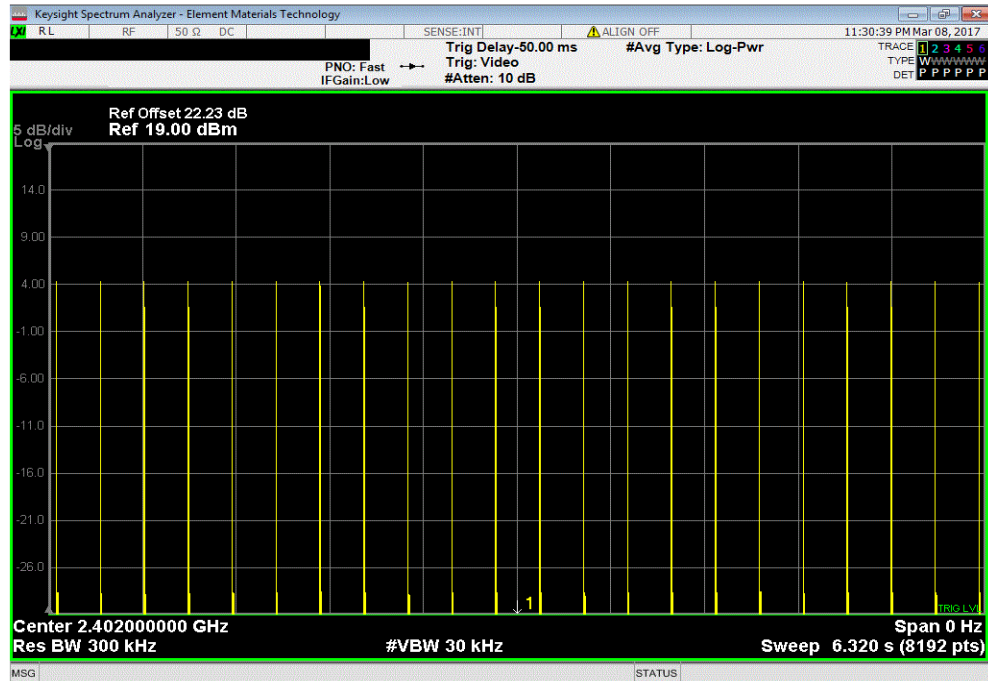


DWELL TIME

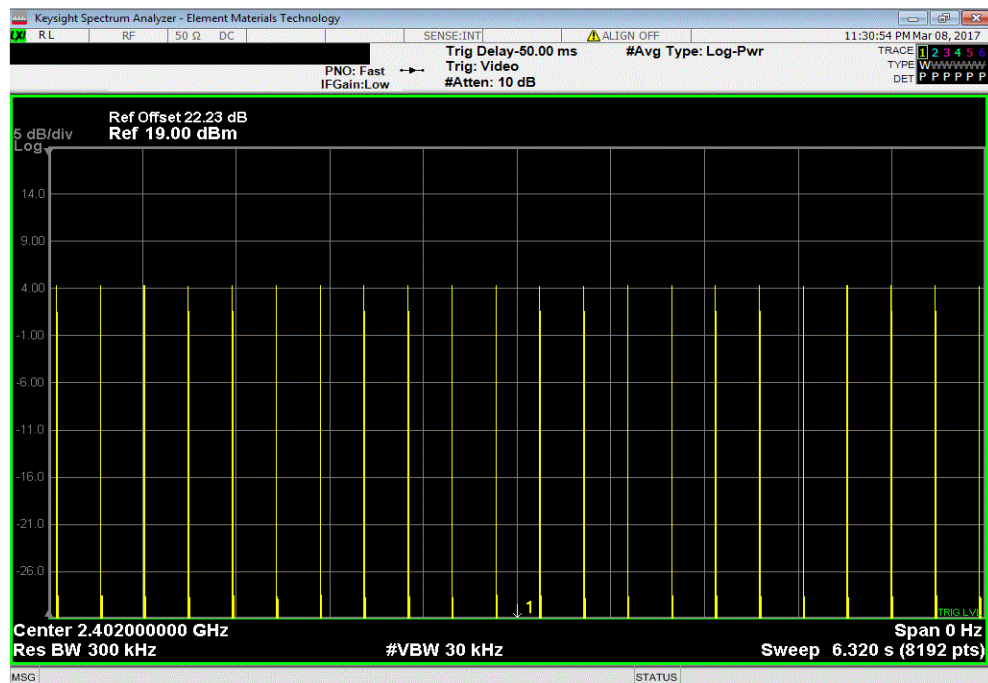


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

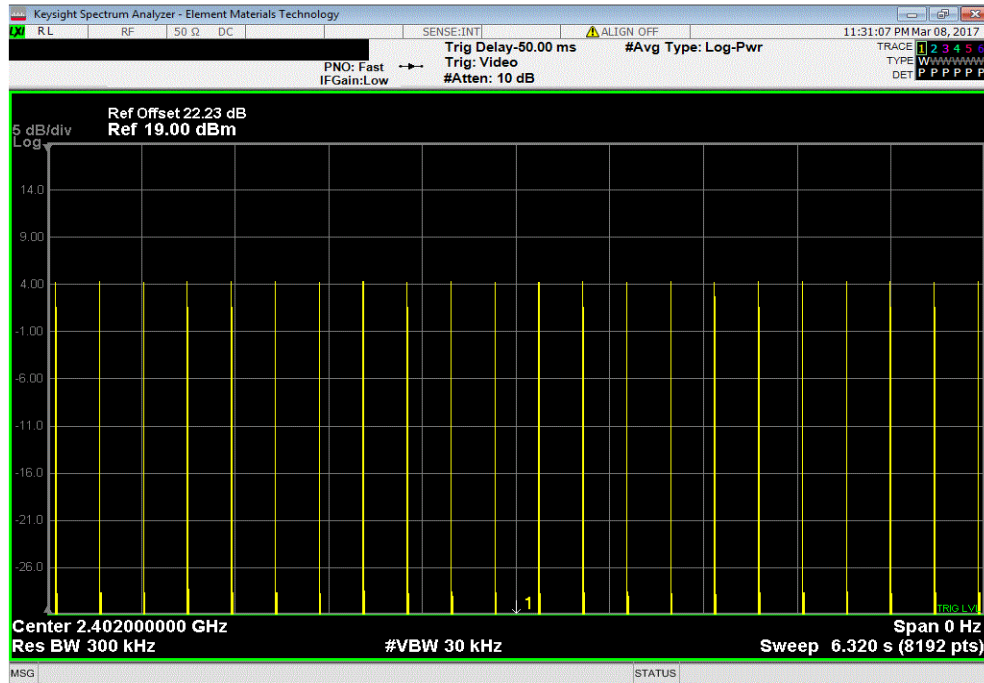


DWELL TIME



TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.91	N/A	22	5	320.1	400	Pass

Calculation Only

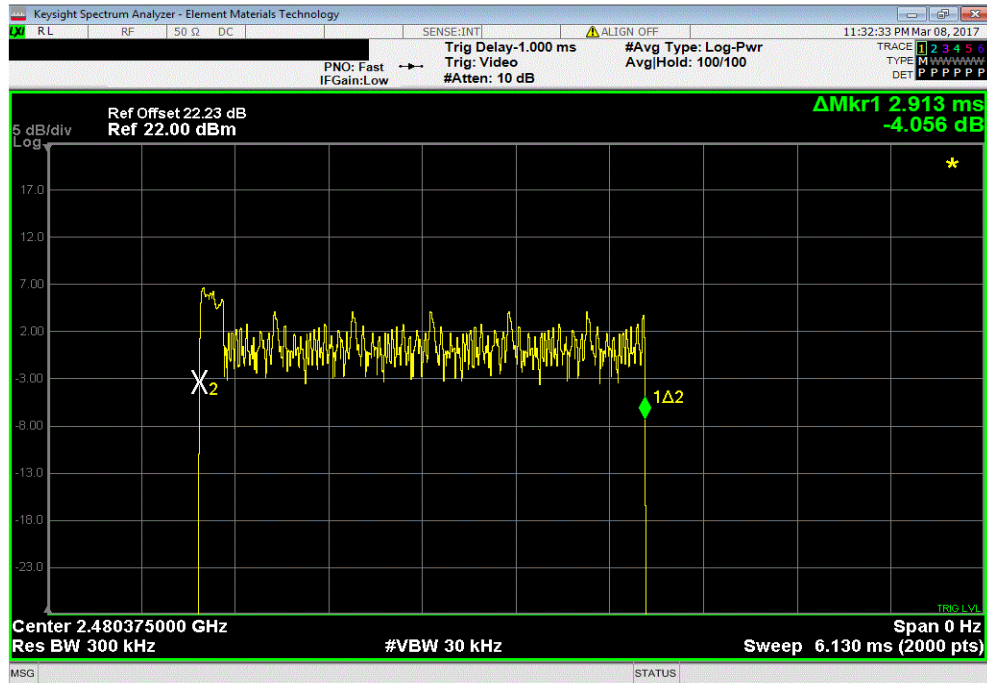
No Screen Capture Required

DWELL TIME

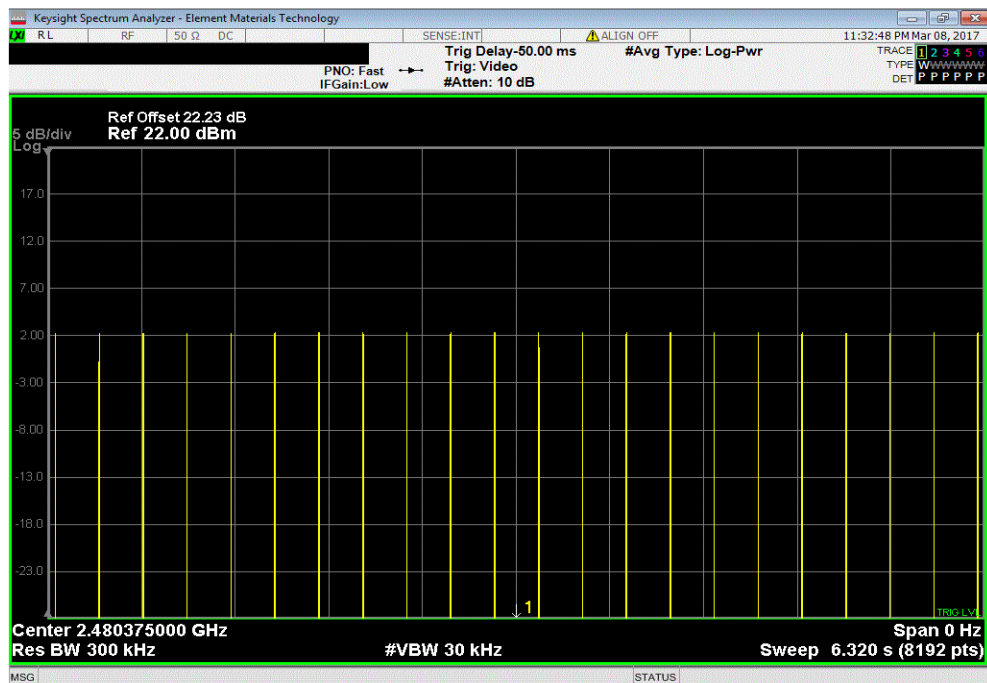


TbTx 2017.01.27 XMt 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.913	N/A	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

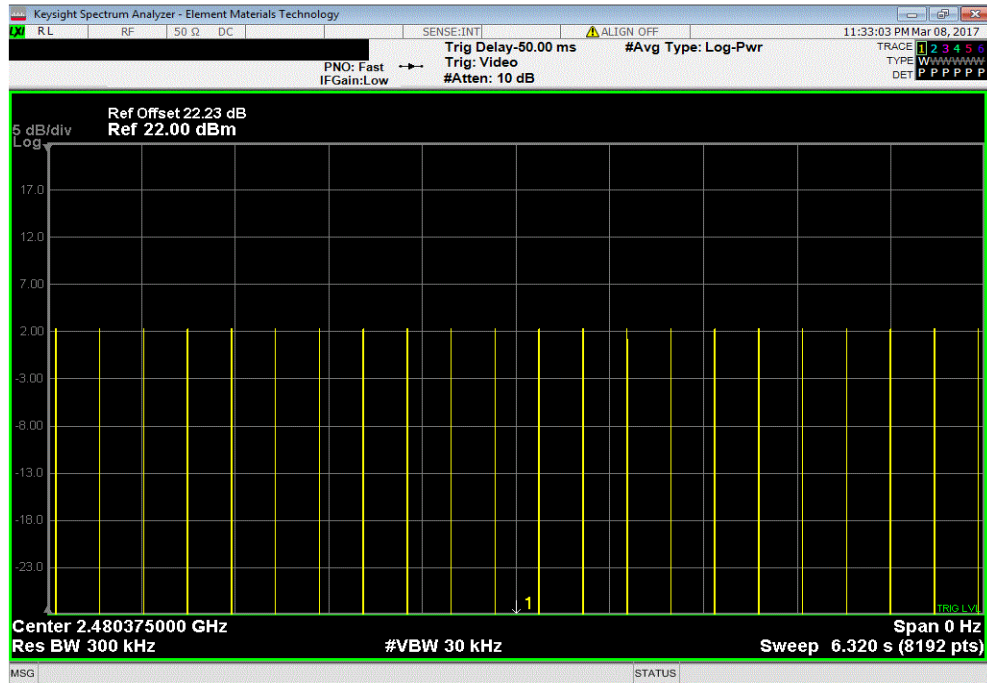


DWELL TIME

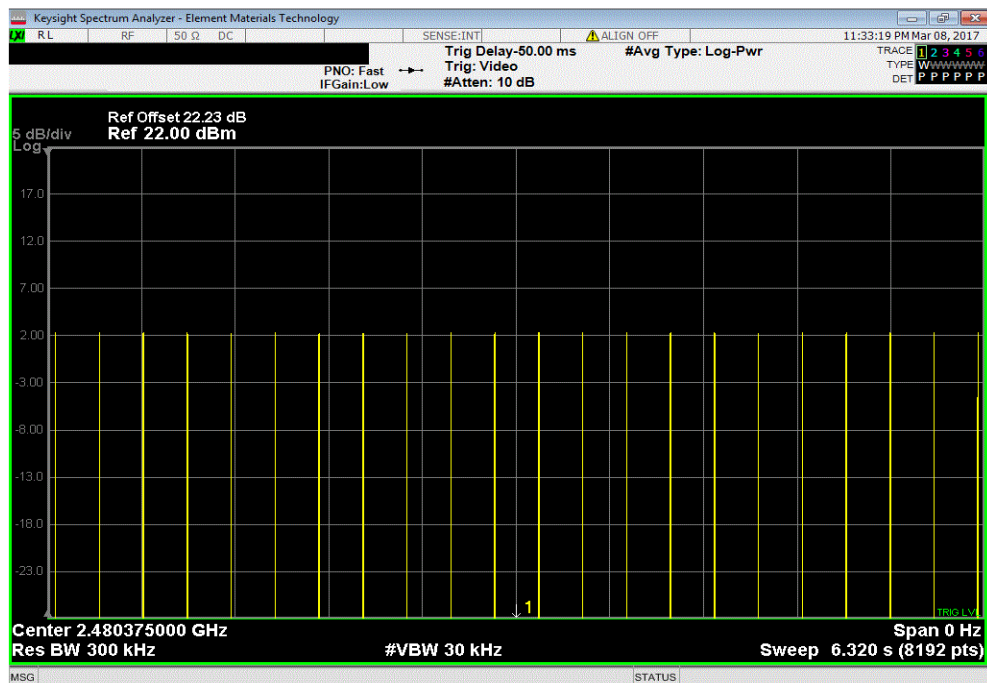


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A

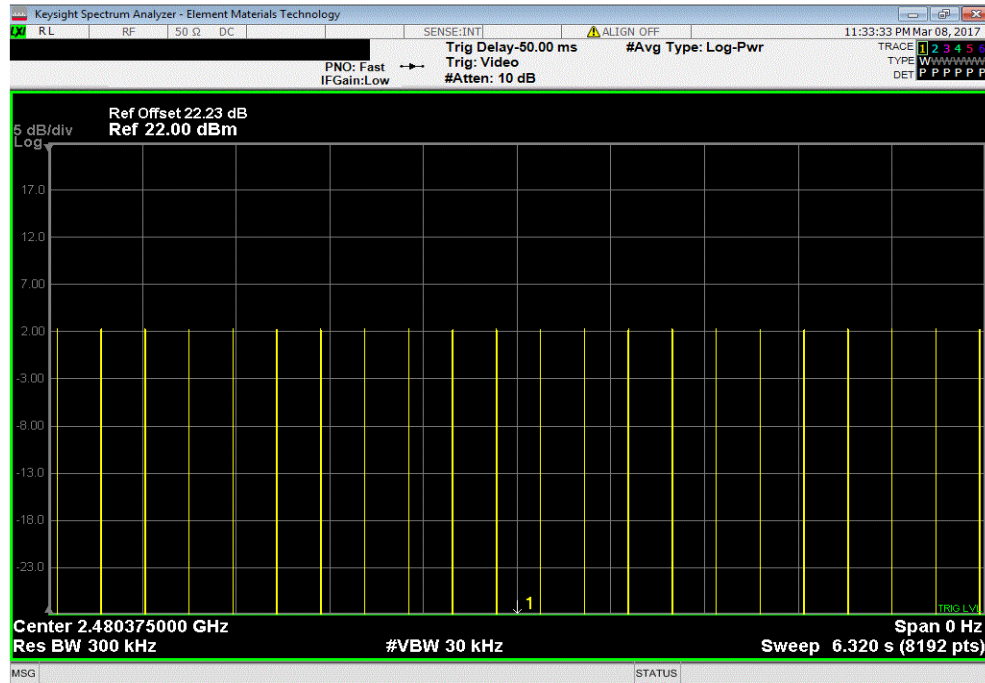


DWELL TIME



TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.913	N/A	22	5	320.43	400	Pass

Calculation Only

No Screen Capture Required

OUTPUT POWER



XMit 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

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

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +27dBm.

OUTPUT POWER



TbTx 2017.01.27 XMt 2017.01.28

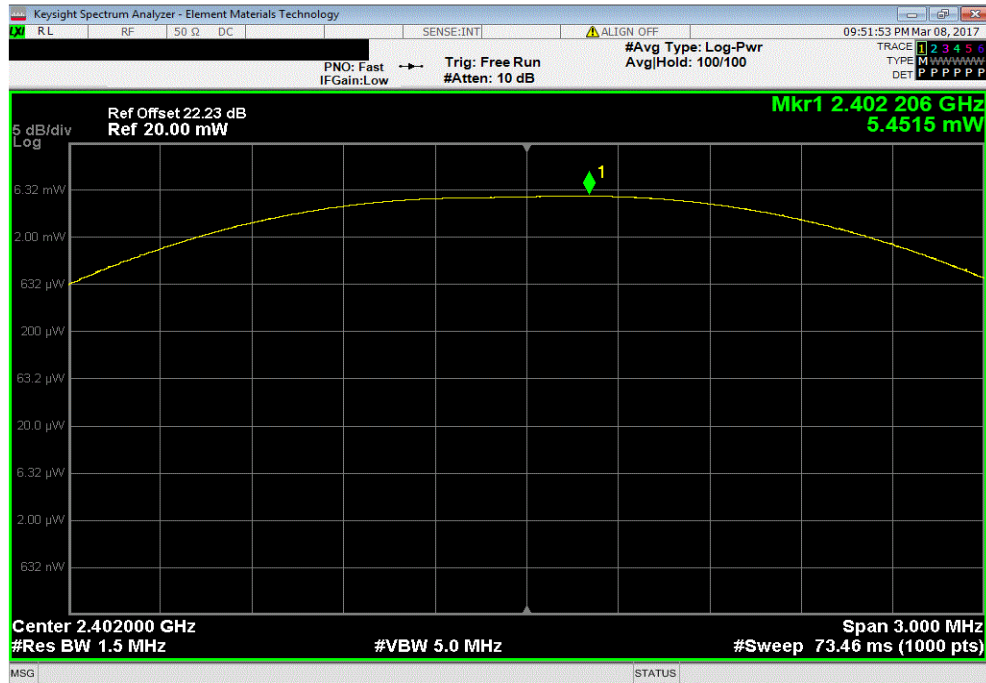
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.5% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Value	Limit (<) Result
DH5, GFSK			
	Low Channel	5.452 mW	125 mW Pass
	Mid Channel	6.872 mW	125 mW Pass
	High Channel	7.055 mW	125 mW Pass
2DH5, pi/4-DQPSK			
	Low Channel	3.763 mW	125 mW Pass
	Mid Channel	5.539 mW	125 mW Pass
	High Channel	5.963 mW	125 mW Pass

OUTPUT POWER

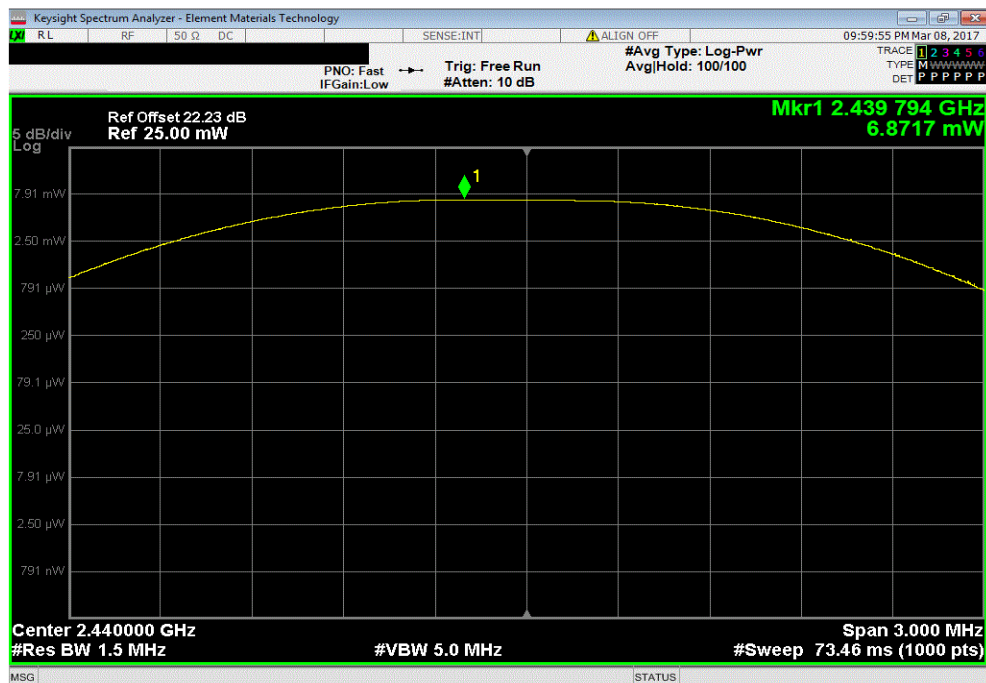


TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, Low Channel						
				Value	Limit (<)	Result
				5.452 mW	125 mW	Pass



DH5, GFSK, Mid Channel						
				Value	Limit (<)	Result
				6.872 mW	125 mW	Pass

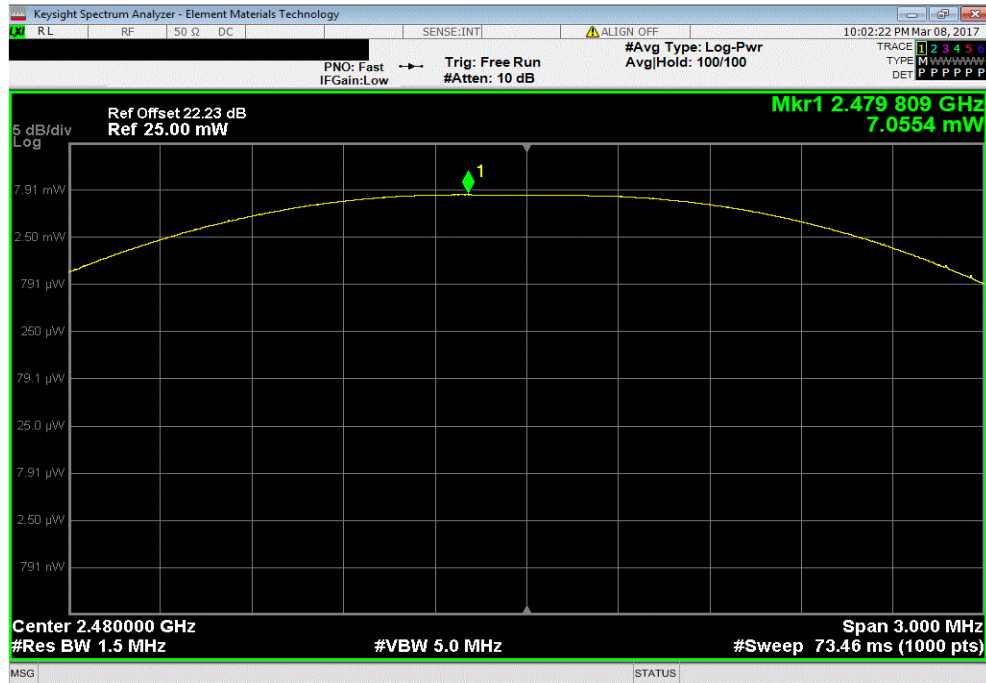


OUTPUT POWER

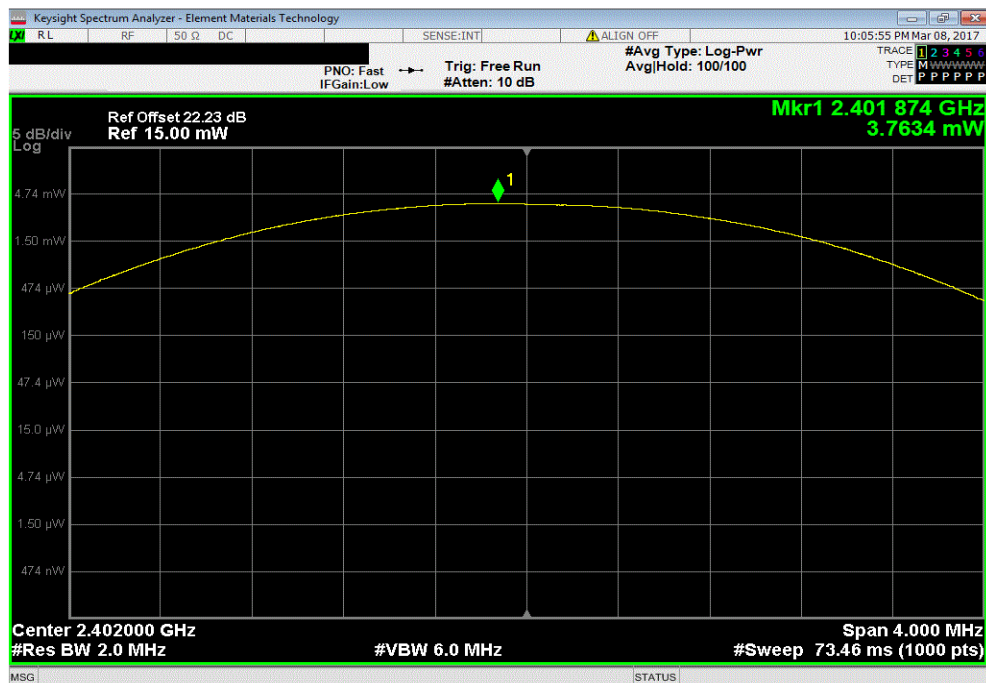


TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, High Channel						
				Value	Limit	Result
				7.055 mW	125 mW	Pass



2DH5, pi/4-DQPSK, Low Channel						
				Value	Limit	Result
				3.763 mW	125 mW	Pass

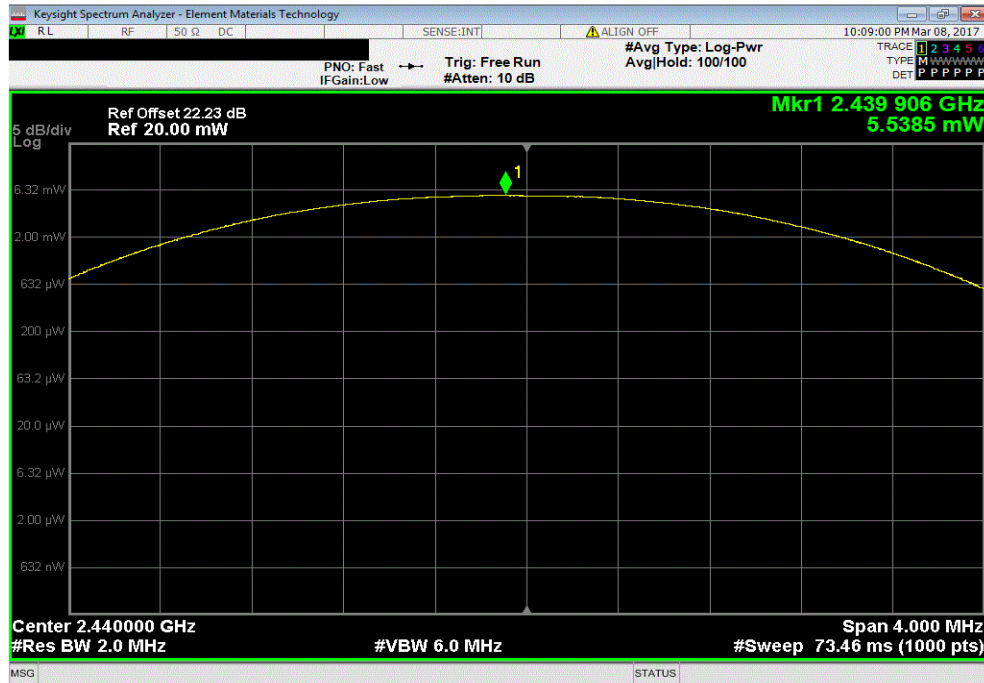


OUTPUT POWER

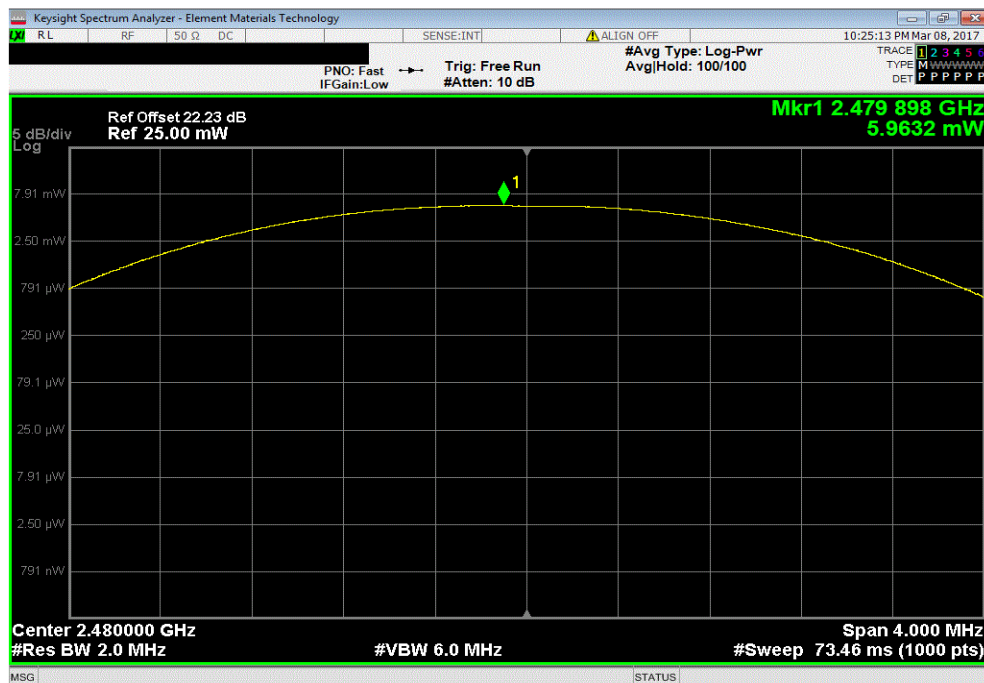


TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, Mid Channel						
				Value	Limit (<)	Result
				5.539 mW	125 mW	Pass



2DH5, pi/4-DQPSK, High Channel						
				Value	Limit (<)	Result
				5.963 mW	125 mW	Pass



BAND EDGE COMPLIANCE



XMI 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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 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



TbTx 2017.01.27 XMt 2017.01.28

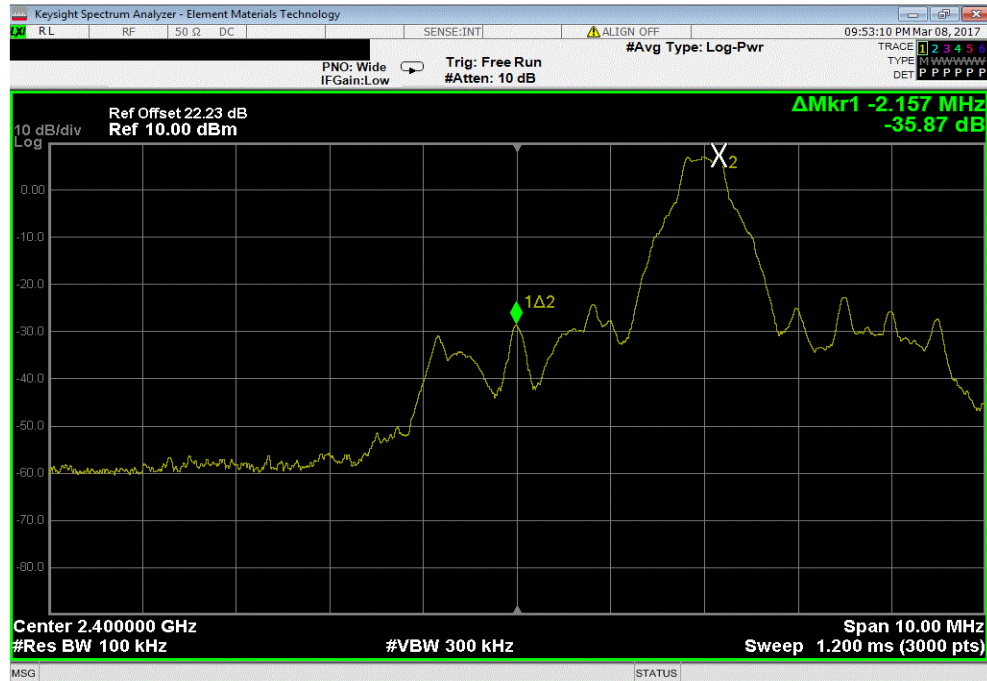
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.6% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2017		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Value (dBc)	Limit ≤ (dBc) Result
DH5, GFSK			
	Low Channel	-35.87	-20 Pass
	High Channel	-54.92	-20 Pass
2DH5, pi/4-DQPSK			
	Low Channel	-39.28	-20 Pass
	High Channel	-56.26	-20 Pass

BAND EDGE COMPLIANCE



TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, Low Channel						
				Value (dBc)	Limit ≤ (dBc)	Result
				-35.87	-20	Pass



DH5, GFSK, High Channel						
				Value (dBc)	Limit ≤ (dBc)	Result
				-54.92	-20	Pass

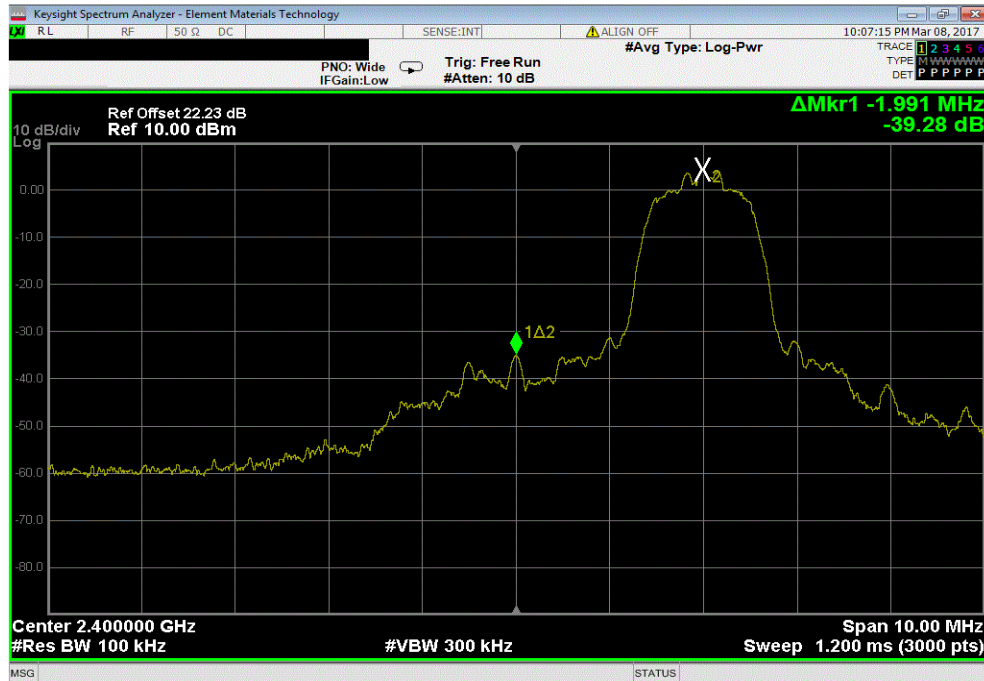


BAND EDGE COMPLIANCE



TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, Low Channel						
				Value (dBc)	Limit ≤ (dBc)	Result
				-39.28	-20	Pass



2DH5, pi/4-DQPSK, High Channel						
				Value (dBc)	Limit ≤ (dBc)	Result
				-56.26	-20	Pass



BAND EDGE COMPLIANCE - HOPPING MODE



XMIT 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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 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: The Dash Pro Right		Work Order: STAK0082		
Serial Number: FCC-1C		Date: 03/08/17		
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C		
Attendees: Michael Thompson		Humidity: 18.5% RH		
Project: None		Barometric Pres.: 1019 mbar		
Tested by: Dustin Sparks		Power: 110VAC/60Hz		
Job Site: MN08				
TEST SPECIFICATIONS		Test Method		
FCC 15.247:2017		ANSI C63.10:2013		
COMMENTS				
Powered by USB connection to laptop				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	6	Signature <i>Dustin Sparks</i>		
		Value (dBc)	Limit ≤ (dBc)	Result
Hopping Mode				
DH5, GFSK				
Low Channel, 2402 MHz		-52.95	-20	Pass
High Channel, 2480 MHz		-61.48	-20	Pass
2DH5, pi/4-DQPSK				
Low Channel, 2402 MHz		-42.7	-20	Pass
High Channel, 2480 MHz		-56.05	-20	Pass

BAND EDGE COMPLIANCE - HOPPING MODE

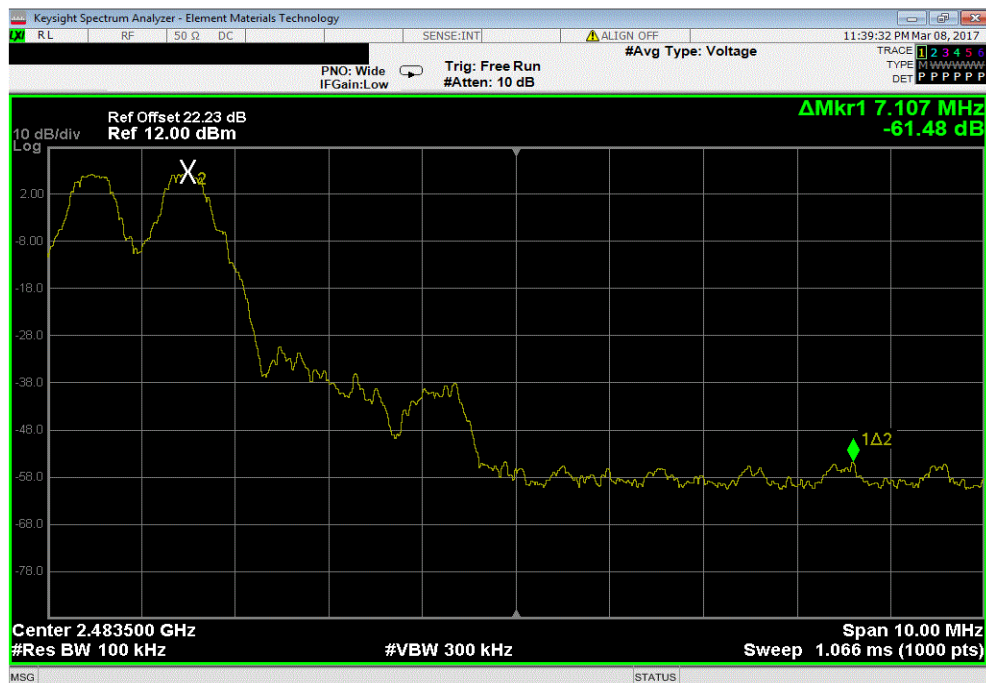


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-52.95	-20	Pass



Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-61.48	-20	Pass

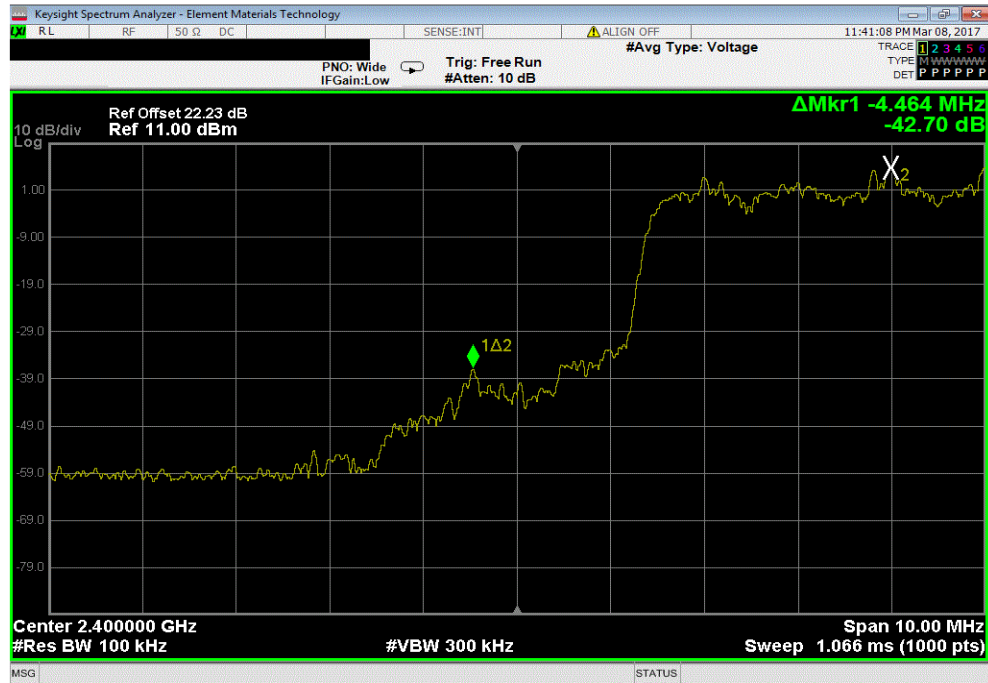


BAND EDGE COMPLIANCE - HOPPING MODE

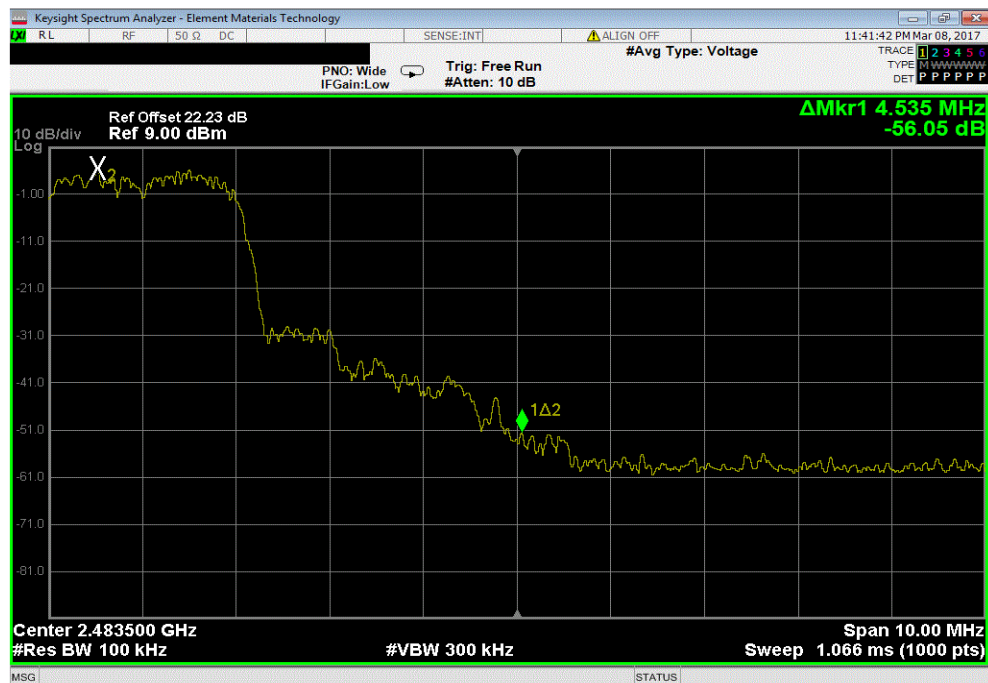


TbTx 2017.01.27 XMI 2017.01.28

Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-42.7	-20	Pass



Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-56.05	-20	Pass



OCCUPIED BANDWIDTH



XMR 2017.01.26

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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH



TbTx 2017.01.27 XMt 2017.01.28

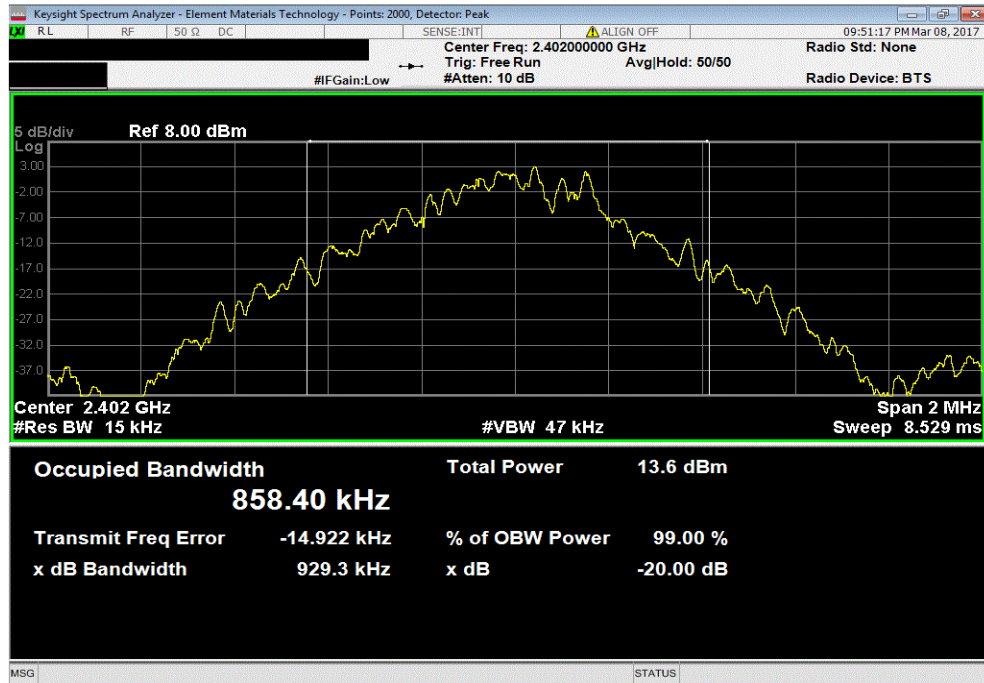
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.6% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2017		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Value	Limit (<) Result
DH5, GFSK			
	Low Channel	929.336 kHz	1.5 MHz Pass
	Mid Channel	924.053 kHz	1.5 MHz Pass
	High Channel	926.045 kHz	1.5 MHz Pass
2DH5, pi/4-DQPSK			
	Low Channel	1.234 MHz	1.5 MHz Pass
	Mid Channel	1.237 MHz	1.5 MHz Pass
	High Channel	1.239 MHz	1.5 MHz Pass

OCCUPIED BANDWIDTH

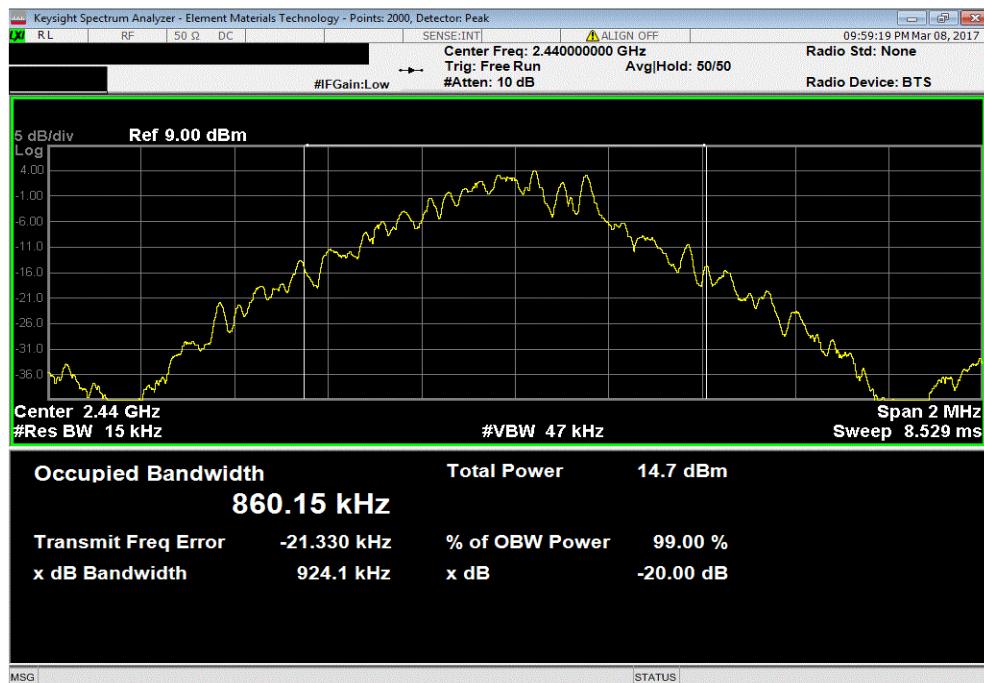


TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, Low Channel						
				Value	Limit (<)	Result
				929.336 kHz	1.5 MHz	Pass



DH5, GFSK, Mid Channel						
				Value	Limit (<)	Result
				924.053 kHz	1.5 MHz	Pass

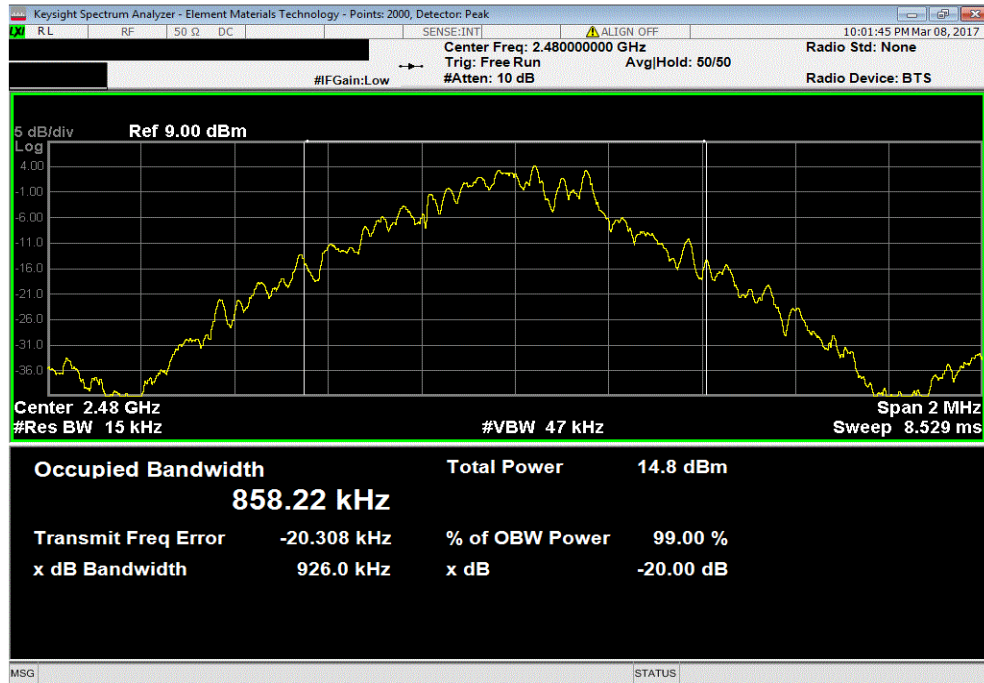


OCCUPIED BANDWIDTH

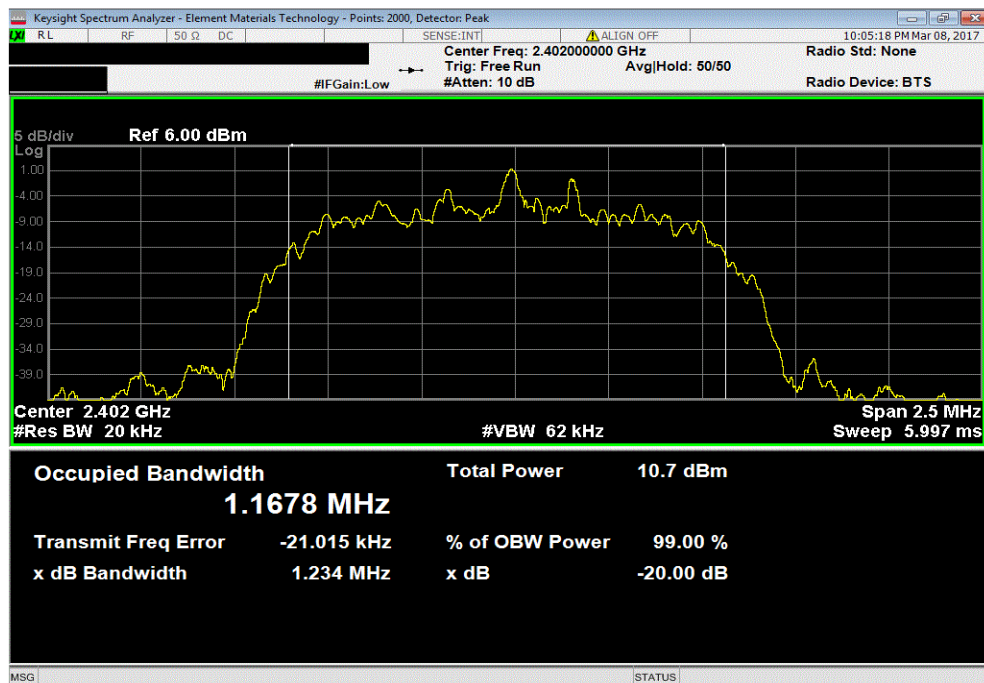


TbTx 2017.01.27 XMI 2017.01.28

DH5, GFSK, High Channel						
				Value	Limit (<)	Result
				926.045 kHz	1.5 MHz	Pass



2DH5, pi/4-DQPSK, Low Channel						
				Value	Limit (<)	Result
				1.234 MHz	1.5 MHz	Pass

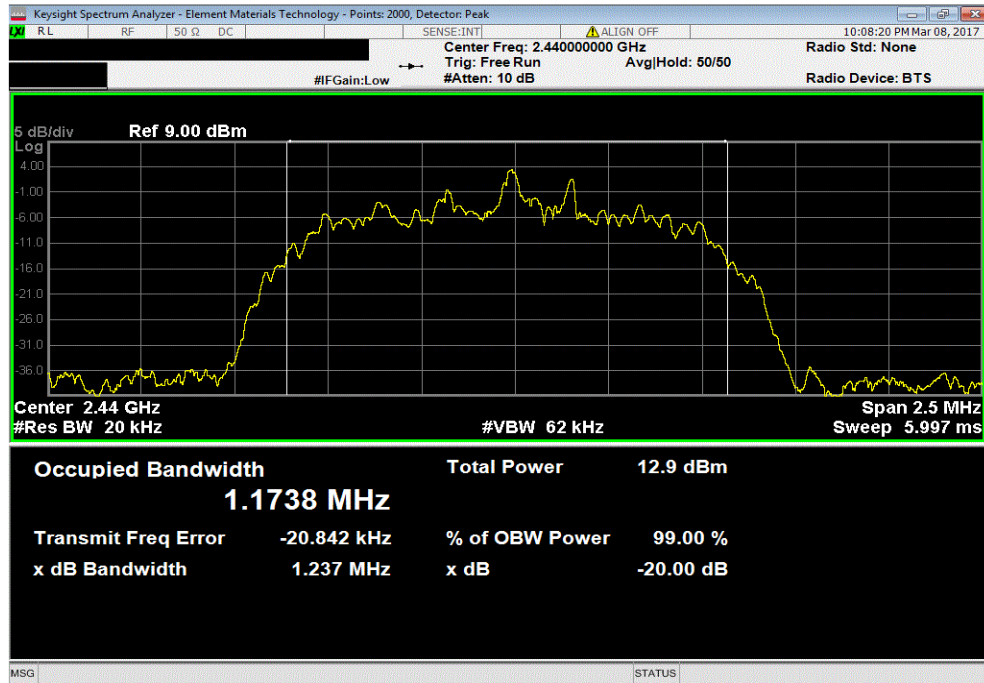


OCCUPIED BANDWIDTH

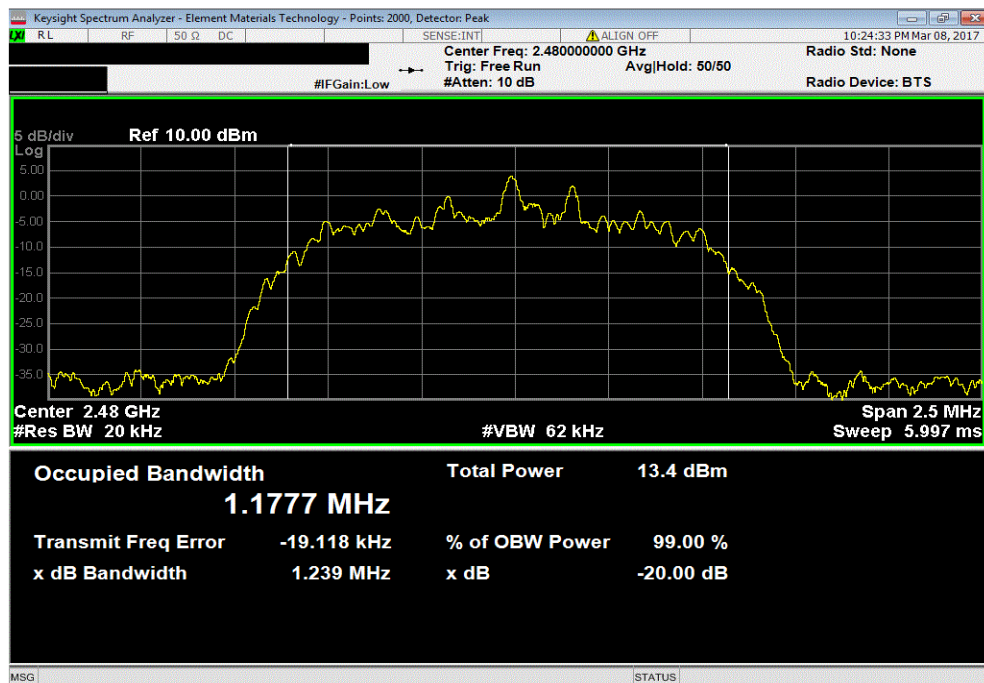


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2DH5, pi/4-DQPSK, Mid Channel						
				Value	Limit (<)	Result
				1.237 MHz	1.5 MHz	Pass



2DH5, pi/4-DQPSK, High Channel						
				Value	Limit (<)	Result
				1.239 MHz	1.5 MHz	Pass



SPURIOUS CONDUCTED EMISSIONS



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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.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	8/12/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	12/22/2016	12/22/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. 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



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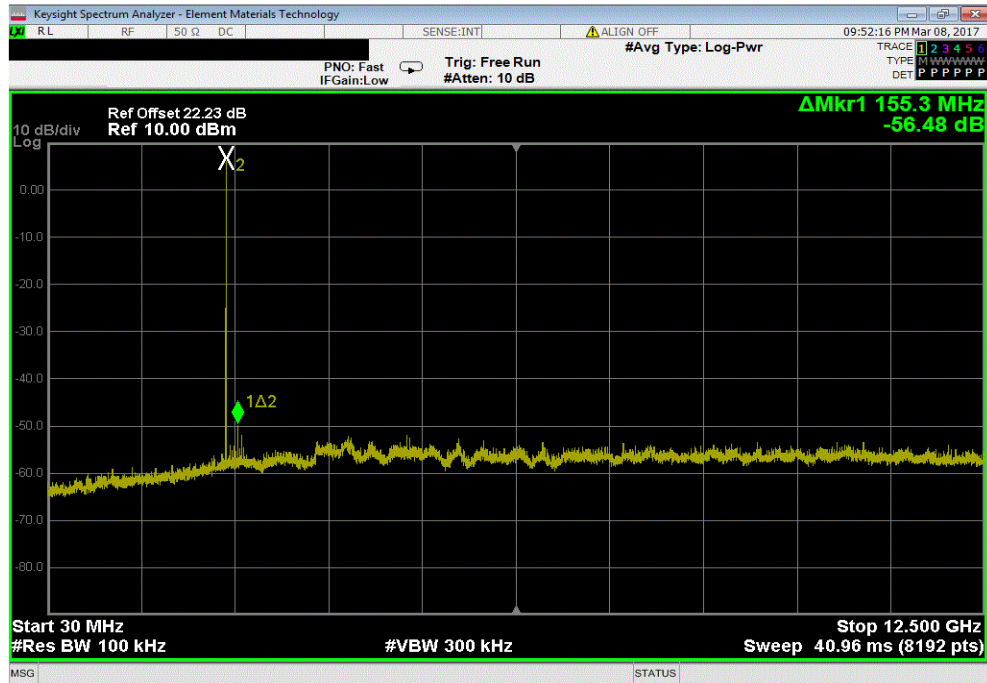
EUT: The Dash Pro Right		Work Order: STAK0082	
Serial Number: FCC-1C		Date: 03/08/17	
Customer: Starkey Laboratories, Inc.		Temperature: 22.8 °C	
Attendees: Michael Thompson		Humidity: 18.3% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Dustin Sparks		Power: 110VAC/60Hz	
Job Site: MN08			
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2017		ANSI C63.10:2013	
COMMENTS			
Powered by USB connection to laptop			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Dustin Sparks</i>	
		Frequency Range	Max Value (dBc)
			Limit ≤ (dBc)
			Result
DH5, GFSK			
	Low Channel	30 MHz - 12.5 GHz	-56.48
	Low Channel	12.5 GHz - 25 GHz	-56.07
	Mid Channel	30 MHz - 12.5 GHz	-58.47
	Mid Channel	12.5 GHz - 25 GHz	-57.08
	High Channel	30 MHz - 12.5 GHz	-59.4
	High Channel	12.5 GHz - 25 GHz	-56.53
2DH5, pi/4-DQPSK			
	Low Channel	30 MHz - 12.5 GHz	-55.31
	Low Channel	12.5 GHz - 25 GHz	-53.16
	Mid Channel	30 MHz - 12.5 GHz	-58.88
	Mid Channel	12.5 GHz - 25 GHz	-56.09
	High Channel	30 MHz - 12.5 GHz	-56.09
	High Channel	12.5 GHz - 25 GHz	-53.4

SPURIOUS CONDUCTED EMISSIONS

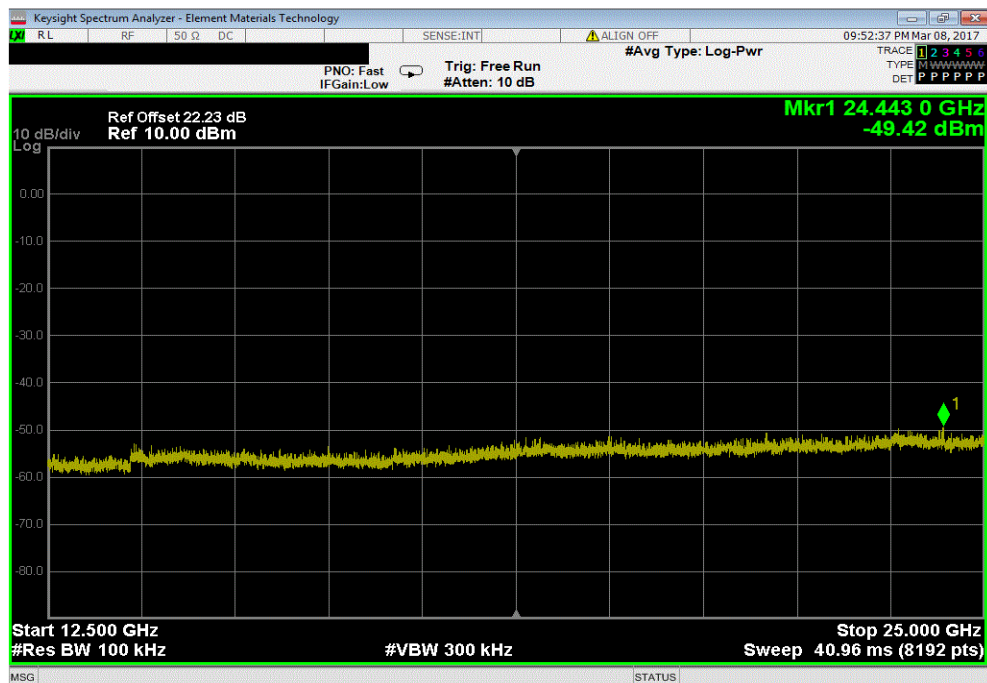


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DH5, GFSK, Low Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-56.48	-20	Pass	



DH5, GFSK, Low Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.07	-20	Pass	

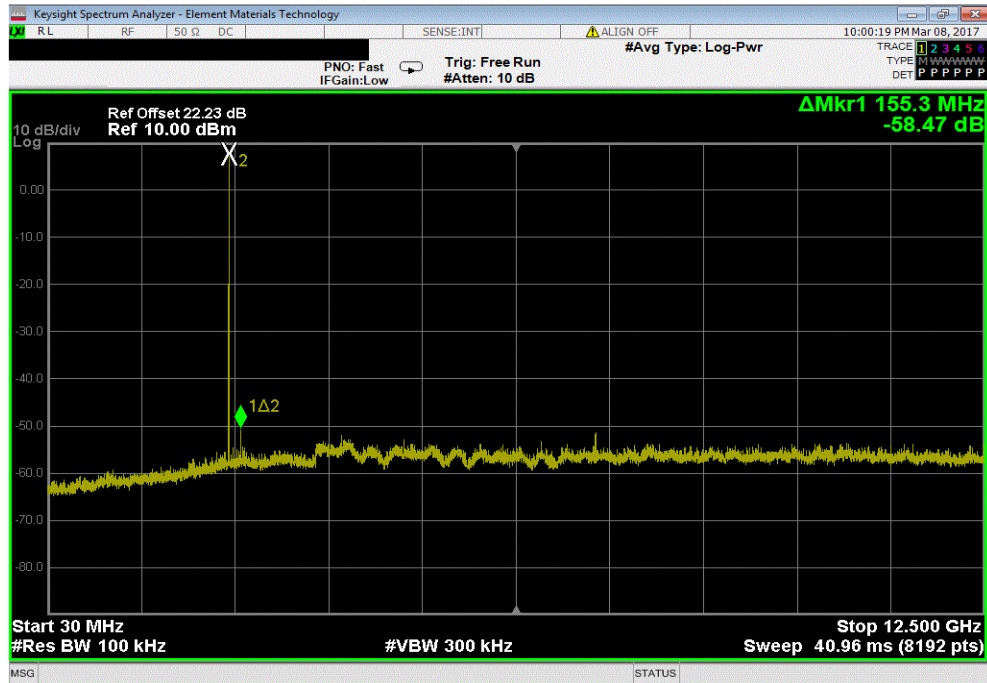


SPURIOUS CONDUCTED EMISSIONS

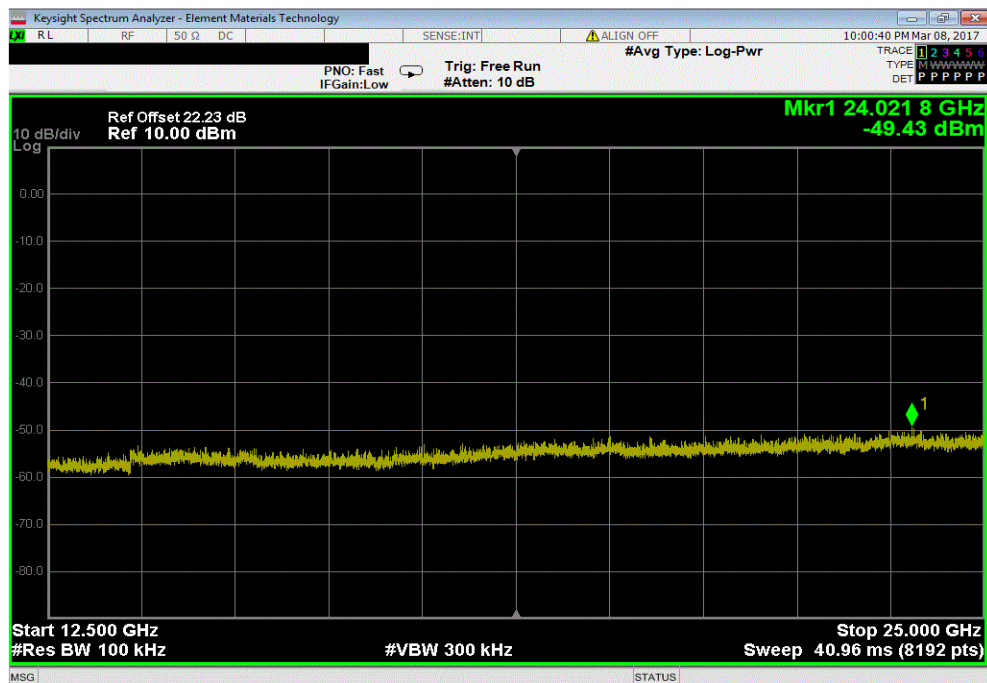


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DH5, GFSK, Mid Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-58.47	-20	Pass	



DH5, GFSK, Mid Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-57.08	-20	Pass	

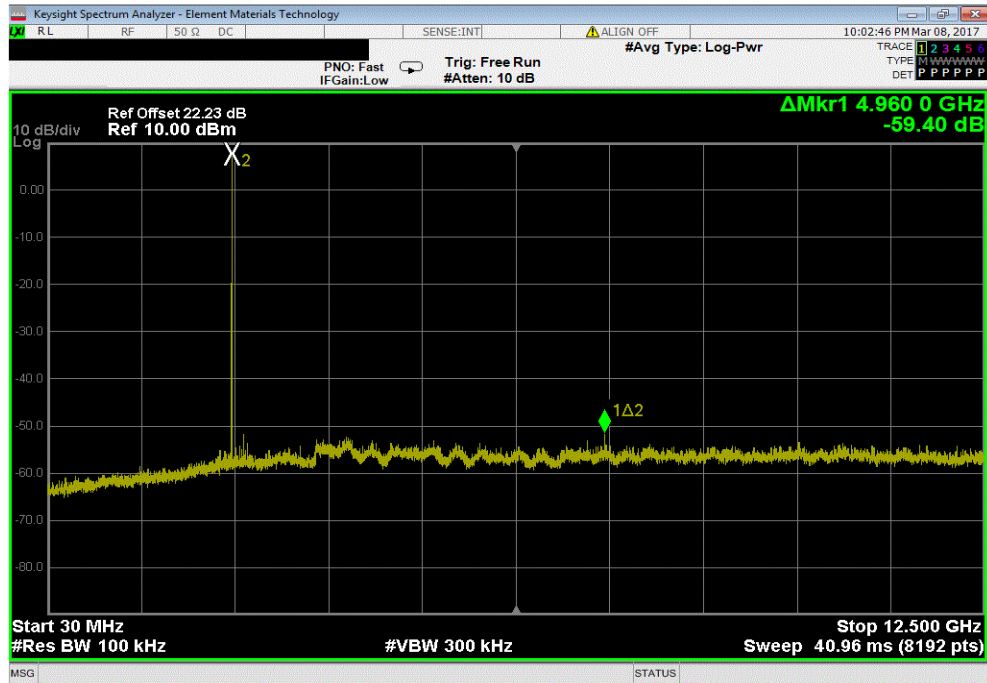


SPURIOUS CONDUCTED EMISSIONS

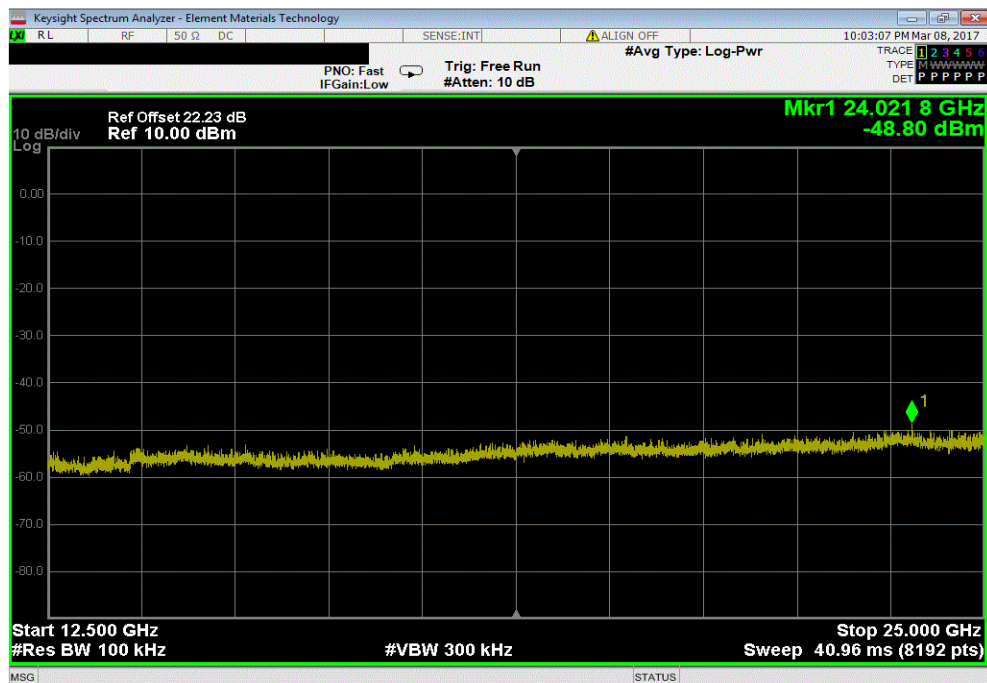


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DH5, GFSK, High Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-59.4	-20	Pass	



DH5, GFSK, High Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.53	-20	Pass	

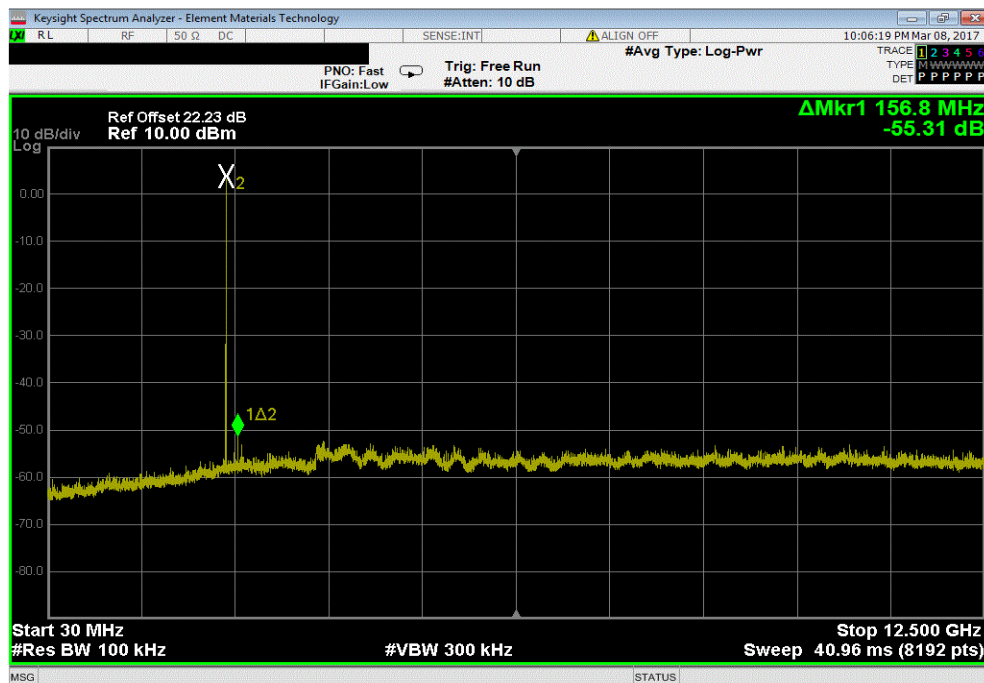


SPURIOUS CONDUCTED EMISSIONS

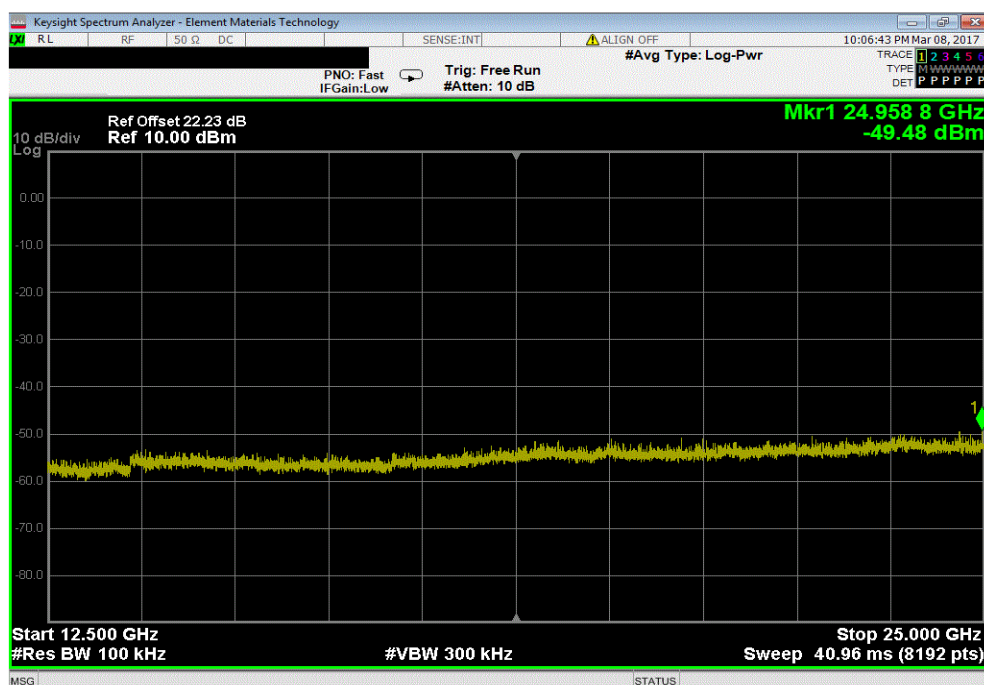


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2DH5, pi/4-DQPSK, Low Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-55.31	-20	Pass	



2DH5, pi/4-DQPSK, Low Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-53.16	-20	Pass	

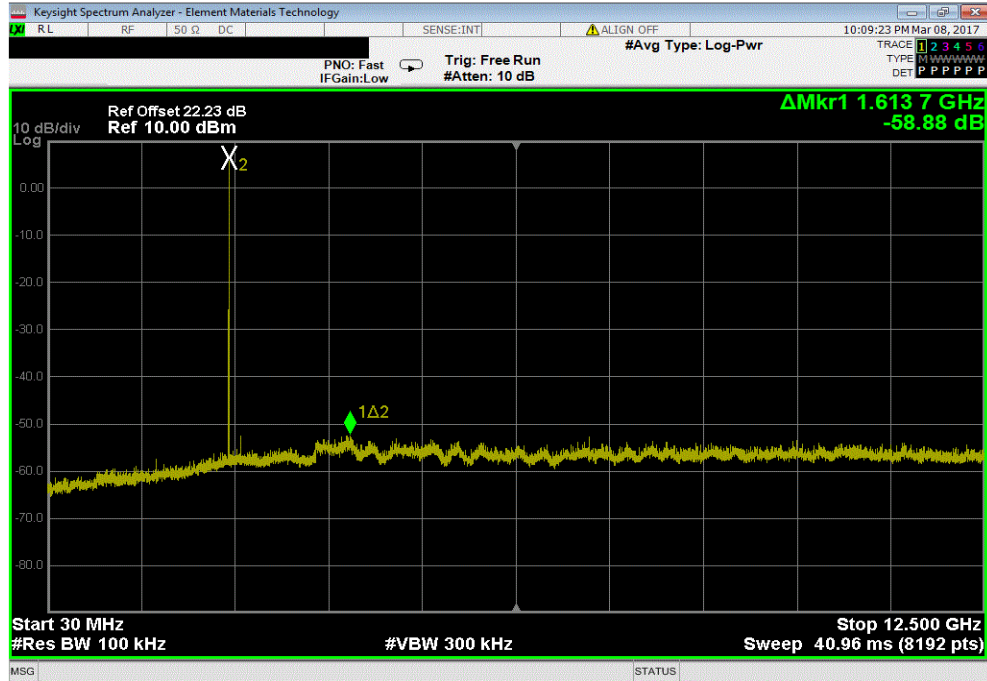


SPURIOUS CONDUCTED EMISSIONS

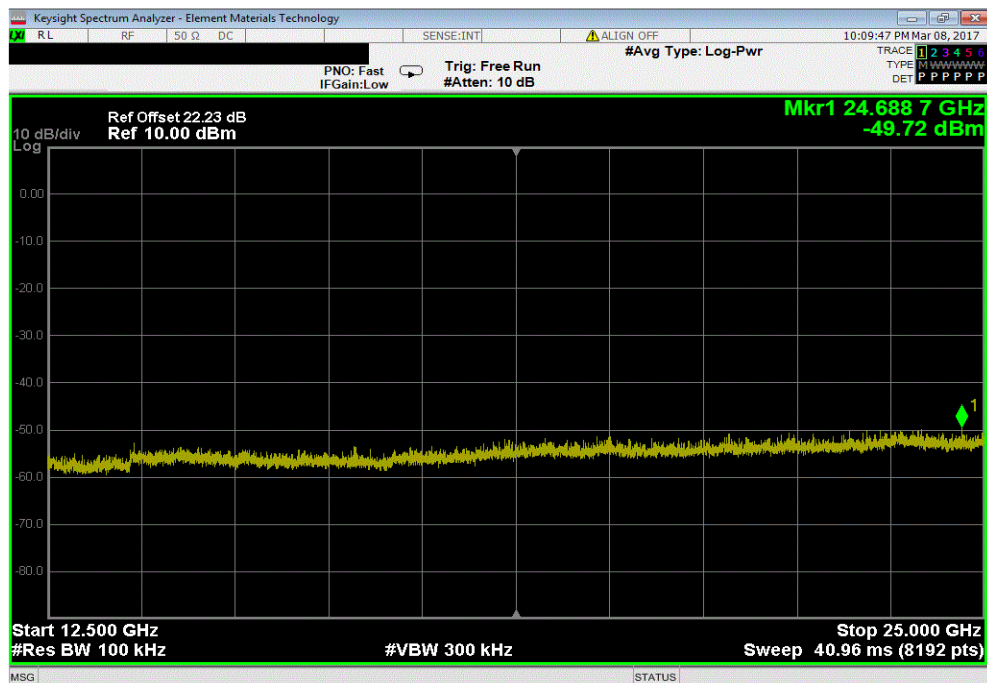


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2DH5, pi/4-DQPSK, Mid Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-58.88	-20	Pass	



2DH5, pi/4-DQPSK, Mid Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-56.09	-20	Pass	

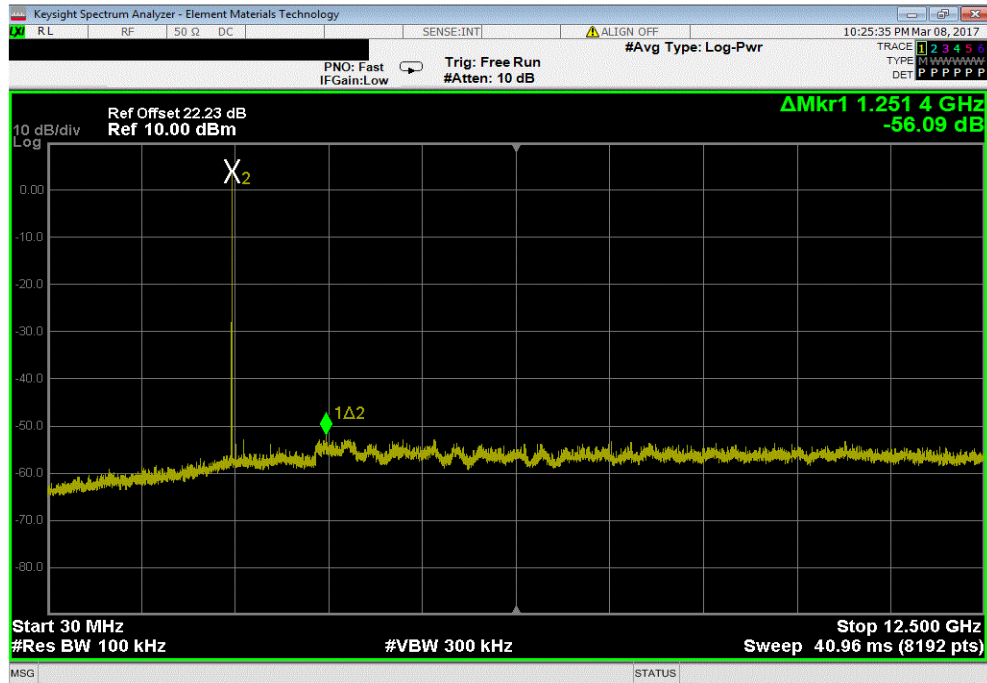


SPURIOUS CONDUCTED EMISSIONS



TbTx 2017.01.27 XMI 2017.01.28

2DH5, pi/4-DQPSK, High Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-56.09	-20	Pass	



2DH5, pi/4-DQPSK, High Channel				
Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-53.4	-20	Pass	

