



# element<sup>®</sup>

**Kwikbit, Inc.**

**M4-2000**

**FCC 15.407:2017**

**Wideband UNII Radio**

**Report # MAX40004**



NVLAP Lab Code: 200881-0



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# CERTIFICATE OF TEST

Last Date of Test: November 16, 2017  
Kwikbit, Inc.  
Model: M4-2000

## Radio Equipment Testing

### Standards

Specification	Method
FCC 15.407:2017	ANSI C63.10:2013, KDB 789033, KDB 662911

### Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 12.7	Spurious Radiated Emissions	Yes	Pass	
6.5 6.6, 12.7	Spurious Radiated Emissions – Intermodulation	Yes	Pass	
6.8	Frequency Stability	Yes	Pass	
12.2	Duty Cycle	Yes	N/A	Characterization of radio operation.
12.3.2.4	Maximum Conducted Output Power	Yes	Pass	
12.4.1	Emission Bandwidth	Yes	Pass	Applies to the 5.2 GHz band.
12.4.2	Occupied Bandwidth	Yes	Pass	Applies to the 5.8 GHz band.
12.4.2	Band Edge	Yes	Pass	
12.5	Maximum Power Spectral Density	Yes	Pass	
KDB 789033 -H	Measurement of Emission at Elevation Angle Higher Than 30 Degrees From Horizon	No	N/A	Not required per 15.407 (a)(1)(iii) for outdoor Point-to-point devices.

### Deviations From Test Standards

None

### Approved By:

Matt Nuernberg, Operations Manager

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

# REVISION HISTORY



2017.1.25

Revision Number	Description	Date	Page Number
00	None		

# ACCREDITATIONS AND AUTHORIZATIONS



2017.6.12

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## United States

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**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

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## Canada

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**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.

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## European Union

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**European Commission** – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## Taiwan

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**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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

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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>

# 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.

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

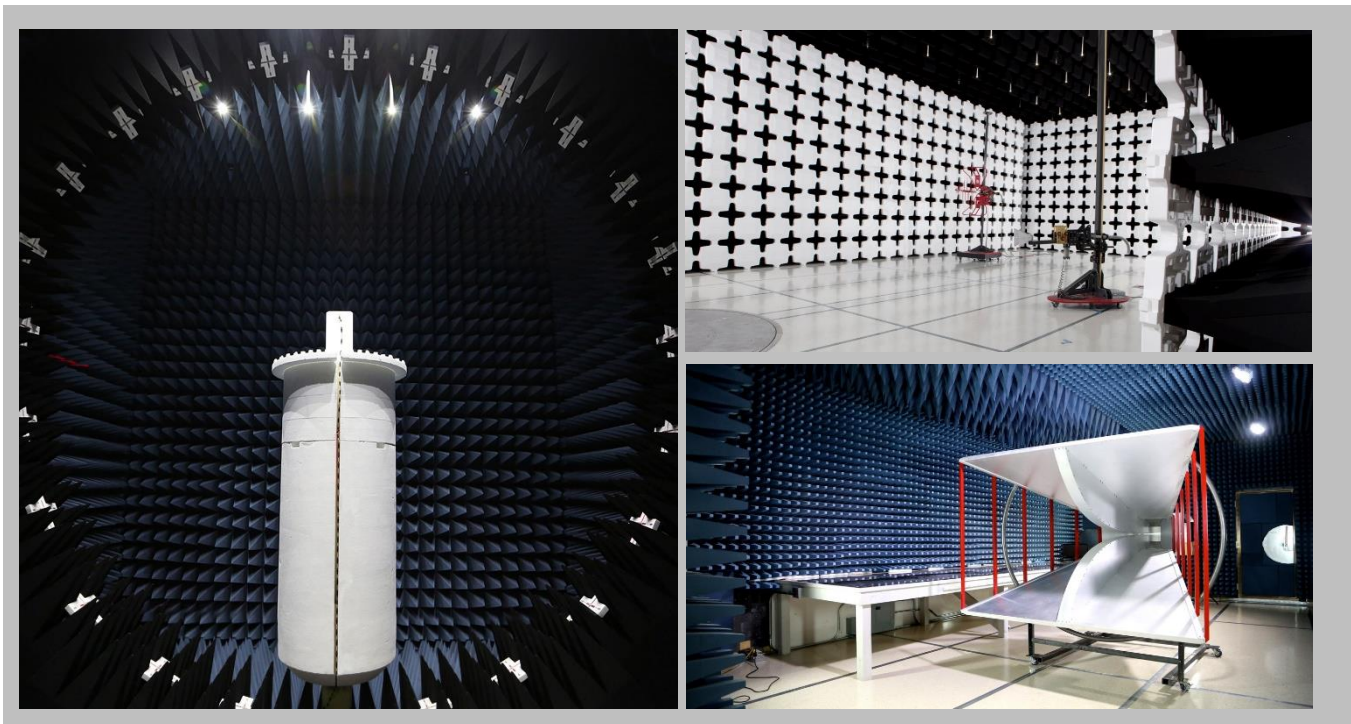
# FACILITIES



2017.9.15

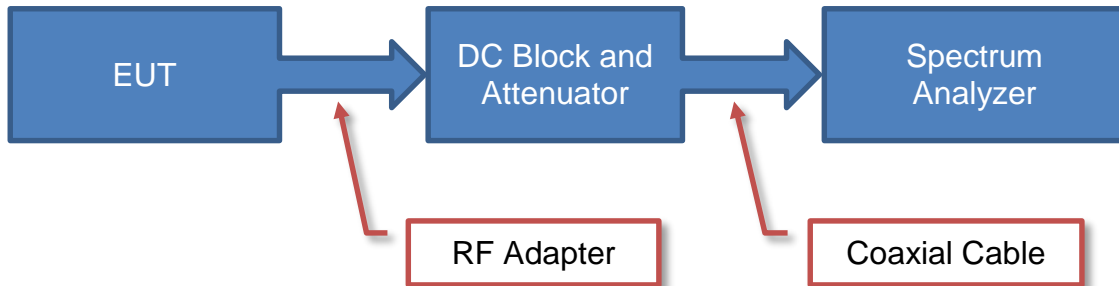


<b>California</b> Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>NVLAP</b>					
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
<b>Innovation, Science and Economic Development Canada</b>					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157

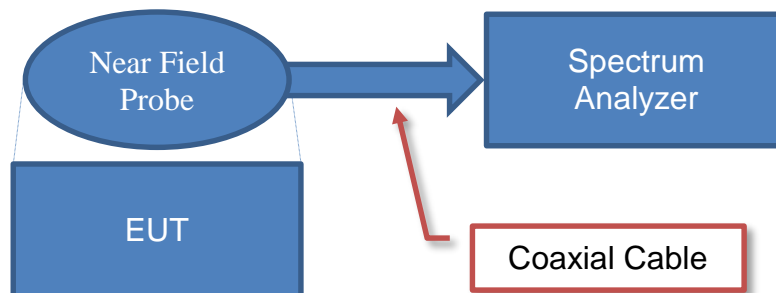


# Test Setup Block Diagrams

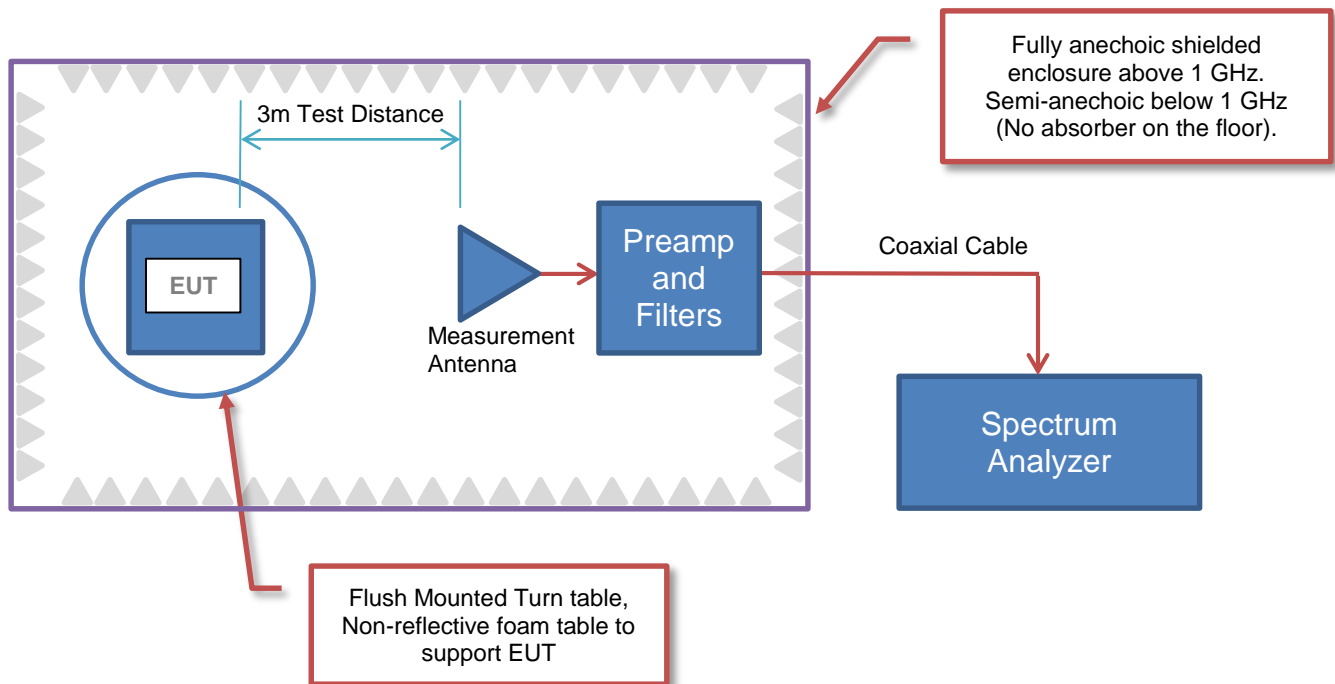
## Antenna Port Conducted Measurements



## Near Field Test Fixture Measurements



## Spurious Radiated Emissions





# PRODUCT DESCRIPTION

## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Kwikbit, Inc.
<b>Address:</b>	7801 E Bush Lake Rd Suite 300
<b>City, State, Zip:</b>	Minneapolis, MN 55439
<b>Test Requested By:</b>	Tim Blom
<b>Model:</b>	M4-2000
<b>First Date of Test:</b>	August 15, 2017
<b>Last Date of Test:</b>	November 16, 2017
<b>Receipt Date of Samples:</b>	August 14, 2017
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage
<b>Purchase Authorization:</b>	Verified

## Information Provided by the Party Requesting the Test

### Functional Description of the EUT:

The M4-2000 is a Non-Line-of-Sight (NLoS), wireless, point-to-point backhaul solution designed and optimized to serve street-level small cells. The M4-2000 contains two radio modules with two RF channels each (vertical and horizontal polarization). Each radio channel can operate up to 24 dBm of RF power. The product contains an integrated dual polarization patch antenna with ~20 dBi of gain. Power is supplied to the device thru a power over Ethernet (PoE) midspan.

### Testing Objective:

To demonstrate compliance of the radio under FCC 15.407 for operation in the 5.2 GHz and 5.8 GHz band(s).



# CONFIGURATIONS



## Configuration MAX40002- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
M4-2000	Kwikbit, Inc.	M4-2000	47

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Netgear 8-Port Switch	Netgear	ProSafe GS108 v2	1DR1853MO1644
Power Supply (Netgear 8-Port Switch)	Netgear	332-10066-01	0946
Power Over Ethernet Supply	PowerDsine	PD-9501G0/AC-NA	N12346532A00294
TP-Link 8 Port Switch	TP-Link	TL-SG108E	2159A76005432
Power Supply (TP-Link 8-Port Switch)	TP-Link	T090085-2B1	None
Netgear 5-Port Switch	Netgear	ProSafe GS105 v4	2N113934010B4
Power Supply (Netgear 5-Port Switch)	OEM	ADS0128-W 120100	0385RD1244871120
Surge Protector	Wiremold	77000N	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	Latitude E6410	HFVC0P1
Power Supply (Laptop)	Dell	FA90PS0-00	CN-0GX808-73245-840-2837

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Ethernet Cable (D/P)	No	>3.0m	No	M4-2000	Power Over Ethernet Supply
AC Cable (Power Over Ethernet Supply)	No	2.5m	No	Power Over Ethernet Supply	AC Mains
Ethernet Cable (M/P)	No	>3.0m	No	M4-2000	Netgear 5-Port Switch
DC Power Cable (Netgear 8-Port Switch)	No	1.5m	No	Netgear 8-Port Switch	Power Supply (Netgear 8-Port Switch)
DC Power Cable (TP-Link 8-Port Switch)	No	1.7m	No	TP-Link 8 Port Switch	Power Supply (TP-Link 8-Port Switch)
DC Power Cable (Netgear 5-Port Switch)	No	1.5m	No	Netgear 5-Port Switch	Power Supply (Netgear 5-Port Switch)
AC Power Cable (Surge Protector)	No	1.6m	No	Surge Protector	AC Mains
AC Power Cable (Laptop)	No	0.9m	No	AC Mains	Power Supply (Laptop)
DC Power Cable (Laptop)	No	2.0m	Yes	Power Supply (Laptop)	Laptop
Ethernet Cable	Yes	2.0m	No	Power Over Ethernet Supply	TP-Link 8 Port Switch
Ethernet Cable (D)	No	>3.0m	No	M4-2000	Netgear 8-Port Switch

# CONFIGURATIONS



## Configuration MAX40003- 1

<b>EUT</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
M4-2000	Kwikbit, Inc.	M4-2000	33

<b>Peripherals in test setup boundary</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Netgear 5-Port Switch	Netgear	ProSafe GS105 v4	2N113934010B4
Netgear 8-Port Switch	Netgear	ProSafe GS108 v2	1DR1853MO1644
Power Over Ethernet Supply	PowerDsine	9601G	N13446610000025A00
Power Supply (Netgear 5-Port Switch)	OEM	ADS0128-W 120100	0385RD1244871120
Power Supply (Netgear 8-Port Switch)	Netgear	332-10066-01	0946
Power Supply (TP-Link 8-Port Switch)	TP-Link	T090085-2B1	None
TP-Link 8-Port Switch	TP-Link	TL-SG108E	2159A76005432

<b>Remote Equipment Outside of Test Setup Boundary</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Laptop	Dell	Latitude E6410	HFVC0P1
Power Supply (Laptop)	Dell	FA90PS0-00	CN-0GX808-73245-840-2837
Surge Protector	Wiremold	77000N	None

# CONFIGURATIONS



<b>Cables</b>					
<b>Cable Type</b>	<b>Shield</b>	<b>Length (m)</b>	<b>Ferrite</b>	<b>Connection 1</b>	<b>Connection 2</b>
AC Cable (Power Over Ethernet Supply)	No	2.5m	No	AC Mains	Power Over Ethernet Supply
AC Power Cable (Laptop)	No	0.9m	No	AC Mains	Power Supply (Laptop)
AC Power Cable (Surge Protector)	No	1.6m	No	AC Mains	Surge Protector
DC Power Cable (Laptop)	No	2.0m	Yes	Power Supply (Laptop)	Laptop
DC Power Cable (Netgear 5-Port Switch)	No	1.5m	No	Power Supply (Netgear 5-Port Switch)	Netgear 5-Port Switch
DC Power Cable (Netgear 8-Port Switch)	No	1.5m	No	Power Supply (Netgear 8-Port Switch)	Netgear 8-Port Switch
DC Power Cable (TP-Link 8-Port Switch)	No	1.7m	No	Power Supply (TP-Link 8-Port Switch)	TP-Link 8-Port Switch
Ethernet Cable	Yes	2.0m	No	Power Over Ethernet Supply	TP-Link 8 Port Switch
Ethernet Cable (D/P)	No	>3.0m	No	M4-2000	Power Over Ethernet Supply
Ethernet Cable (M/P)	No	>3.0m	No	M4-2000	Netgear 5-Port Switch
Ethernet Cable (D)	No	>3.0m	No	M4-2000	Netgear 8-Port Switch
Ethernet Cable	No	>3.0m	No	Netgear 8-Port Switch	LAN
Ethernet Cable	No	2.0m	No	LAN	Laptop

# CONFIGURATIONS



## Configuration MAX40003- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
M4-2000	Kwikbit, Inc.	M4-2000	33

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	Latitude E6410	HFVC0P1
Netgear 5-Port Switch	Netgear	ProSafe GS105 v4	2N113934010B4
Netgear 8-Port Switch	Netgear	ProSafe GS108 v2	1DR1853MO1644
Power Over Ethernet Supply	PowerDsine	9601G	N13446610000025A00
Power Supply (Laptop)	Dell	FA90PS0-00	CN-0GX808-73245-840-2837
Power Supply (Netgear 5-Port Switch)	OEM	ADS0128-W 120100	0385RD1244871120
Power Supply (Netgear 8-Port Switch)	Netgear	332-10066-01	0946
Power Supply (TP-Link 8-Port Switch)	TP-Link	T090085-2B1	None
Surge Protector	Wiremold	77000N	None
TP-Link 8-Port Switch	TP-Link	TL-SG108E	2159A76005432

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable (Power Over Ethernet Supply)	No	2.5m	No	AC Mains	Power Over Ethernet Supply
AC Power Cable (Laptop)	No	0.9m	No	AC Mains	Power Supply (Laptop)
AC Power Cable (Surge Protector)	No	1.6m	No	AC Mains	Surge Protector
Ethernet Cable	No	2.0m	No	Laptop	Netgear 8-Port Switch
DC Power Cable (Laptop)	No	2.0m	Yes	Power Supply (Laptop)	Laptop
DC Power Cable (Netgear 5-Port Switch)	No	1.5m	No	Power Supply (Netgear 5-Port Switch)	Netgear 5-Port Switch
DC Power Cable (Netgear 8-Port Switch)	No	1.5m	No	Power Supply (Netgear 8-Port Switch)	Netgear 8-Port Switch
DC Power Cable (TP-Link 8-Port Switch)	No	1.7m	No	Power Supply (TP-Link 8-Port Switch)	TP-Link 8-Port Switch
Ethernet Cable	Yes	2.0m	No	Power Over Ethernet Supply	TP-Link 8 Port Switch
Ethernet Cable (D/P)	No	>3.0m	No	M4-2000	Power Over Ethernet Supply
Ethernet Cable (M/P)	No	>3.0m	No	M4-2000	Netgear 5-Port Switch
Ethernet Cable (D)	No	>3.0m	No	M4-2000	Netgear 8-Port Switch

# MODIFICATIONS



## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/15/2017	Powerline Conducted 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	10/12/2017	Spurious Radiated Emissions - Intermodulation	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	10/16/2017	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.
4	10/20/2017	Emission 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.
5	10/23/2017	Maximum Conducted 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.
6	10/24//2017	Maximum Power Spectral Density	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	10/24/2017	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	11/26/2017	Band Edge	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

# POWERLINE CONDUCTED EMISSIONS



## TEST DESCRIPTION

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

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	6/4/2017	6/4/2018
Cable - Conducted Cable Assembly	Element	MNC, HGN, TYK	MNCA	1/27/2017	1/27/2018
LISN	Solar Electronics	9252-50-R-24-BNC	LIQ	10/26/2016	10/26/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIO	10/26/2016	10/26/2017

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

## CONFIGURATIONS INVESTIGATED

MAX40002-2

## MODES INVESTIGATED

Transmit operation mode, Radio 1 and 2 @5200MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.  
Transmit operation mode, Radio 1 and 2 @5785MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.

# POWERLINE CONDUCTED EMISSIONS



EUT:	M4-2000	Work Order:	MAX40002
Serial Number:	33	Date:	08/15/2017
Customer:	Kwikbit, Inc.	Temperature:	22.8°C
Attendees:	Tim Blom	Relative Humidity:	55.6%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MAX40002-2

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2016	ANSI C63.10:2013, KDB 789033, KDB 905462

## TEST PARAMETERS

Run #:	10	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

None

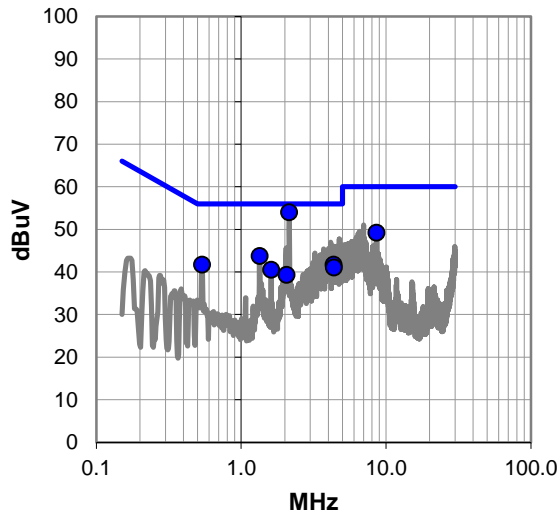
## EUT OPERATING MODES

Transmit operation mode, Radio 1 and 2 @5200MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.

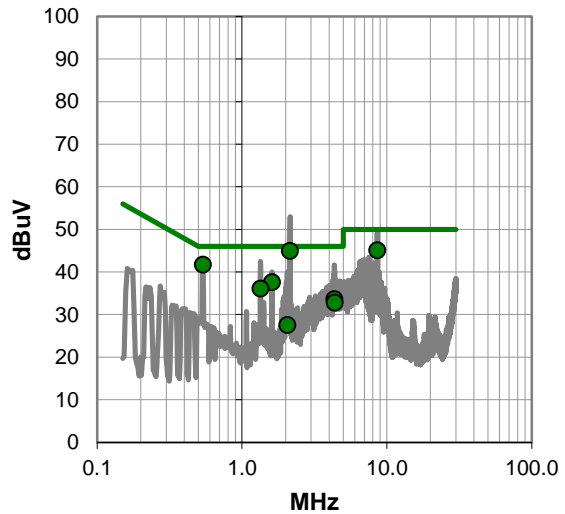
## DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #10

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.149	33.6	20.4	54.0	56.0	-2.0
8.597	28.5	20.7	49.2	60.0	-10.8
1.343	23.4	20.3	43.7	56.0	-12.3
4.343	21.3	20.4	41.7	56.0	-14.3
0.537	21.4	20.3	41.7	56.0	-14.3
4.379	20.6	20.4	41.0	56.0	-15.0
1.612	20.2	20.3	40.5	56.0	-15.5
2.060	19.0	20.3	39.3	56.0	-16.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.149	24.5	20.4	44.9	46.0	-1.1
0.537	21.4	20.3	41.7	46.0	-4.3
8.597	24.4	20.7	45.1	50.0	-4.9
1.612	17.3	20.3	37.6	46.0	-8.4
1.343	15.8	20.3	36.1	46.0	-9.9
4.343	13.2	20.4	33.6	46.0	-12.4
4.379	12.4	20.4	32.8	46.0	-13.2
2.060	7.2	20.3	27.5	46.0	-18.5

## CONCLUSION

Pass

Tested By



# POWERLINE CONDUCTED EMISSIONS



EUT:	M4-2000	Work Order:	MAX40002
Serial Number:	33	Date:	08/15/2017
Customer:	Kwikbit, Inc.	Temperature:	22.8°C
Attendees:	Tim Blom	Relative Humidity:	55.6%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MAX40002-2

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2016	ANSI C63.10:2013, KDB 789033, KDB 905462

## TEST PARAMETERS

Run #:	11	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

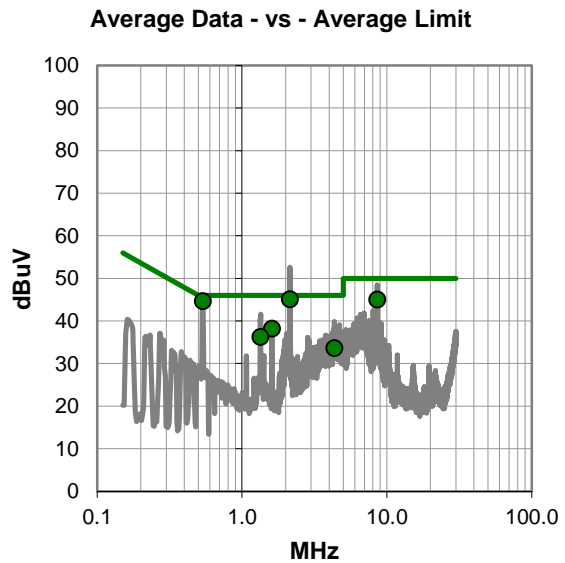
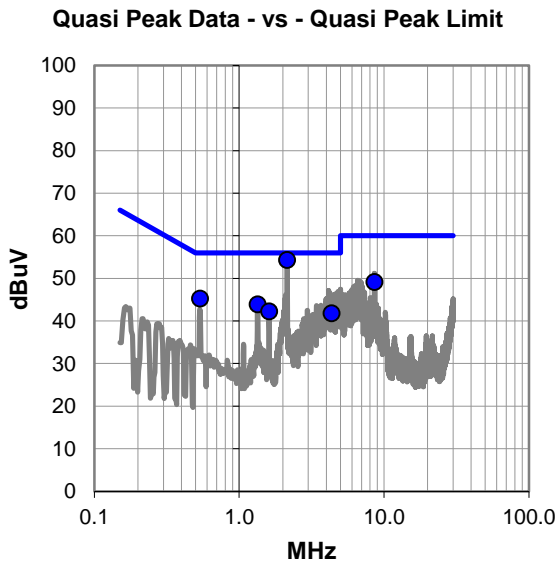
None

## EUT OPERATING MODES

Transmit operation mode, Radio 1 and 2 @5200MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.

## DEVIATIONS FROM TEST STANDARD

None



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #11

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.148	33.9	20.4	54.3	56.0	-1.7
0.537	24.9	20.3	45.2	56.0	-10.8
8.591	28.4	20.7	49.1	60.0	-10.9
1.343	23.6	20.3	43.9	56.0	-12.1
1.610	21.9	20.3	42.2	56.0	-13.8
4.344	21.4	20.4	41.8	56.0	-14.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.148	24.7	20.4	45.1	46.0	-0.9
0.537	24.3	20.3	44.6	46.0	-1.4
8.591	24.3	20.7	45.0	50.0	-5.0
1.610	17.9	20.3	38.2	46.0	-7.8
1.343	15.9	20.3	36.2	46.0	-9.8
4.344	13.2	20.4	33.6	46.0	-12.4

## CONCLUSION

Pass

Tested By

# POWERLINE CONDUCTED EMISSIONS



EUT:	M4-2000	Work Order:	MAX40002
Serial Number:	33	Date:	08/15/2017
Customer:	Kwikbit, Inc.	Temperature:	22.8°C
Attendees:	Tim Blom	Relative Humidity:	55.6%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MAX40002-2

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2016	ANSI C63.10:2013, KDB 789033, KDB 905462

## TEST PARAMETERS

Run #:	14	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

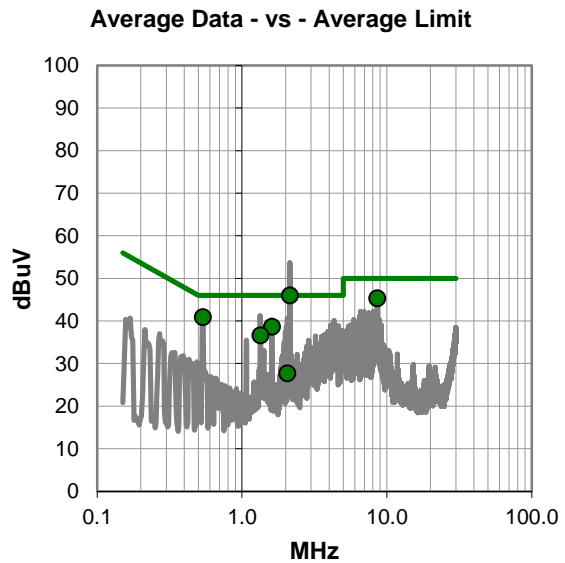
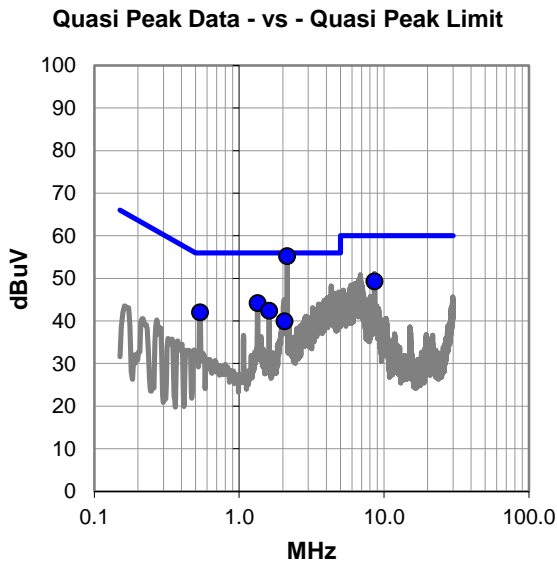
None

## EUT OPERATING MODES

Transmit operation mode, Radio 1 and 2 @5785MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.

## DEVIATIONS FROM TEST STANDARD

None



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #14

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.146	34.8	20.4	55.2	56.0	-0.8
8.585	28.6	20.7	49.3	60.0	-10.7
1.342	23.9	20.3	44.2	56.0	-11.8
1.609	22.1	20.3	42.4	56.0	-13.6
0.537	21.7	20.3	42.0	56.0	-14.0
2.063	19.6	20.3	39.9	56.0	-16.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.146	25.6	20.4	46.0	46.0	0.0
8.585	24.6	20.7	45.3	50.0	-4.7
0.537	20.6	20.3	40.9	46.0	-5.1
1.609	18.3	20.3	38.6	46.0	-7.4
1.342	16.3	20.3	36.6	46.0	-9.4
2.063	7.4	20.3	27.7	46.0	-18.3

## CONCLUSION

Pass

Tested By

# POWERLINE CONDUCTED EMISSIONS



EUT:	M4-2000	Work Order:	MAX40002
Serial Number:	33	Date:	08/15/2017
Customer:	Kwikbit, Inc.	Temperature:	22.8°C
Attendees:	Tim Blom	Relative Humidity:	55.6%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Kyle McMullan	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	MAX40002-2

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.407:2016	ANSI C63.10:2013, KDB 789033, KDB 905462

## TEST PARAMETERS

Run #:	15	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

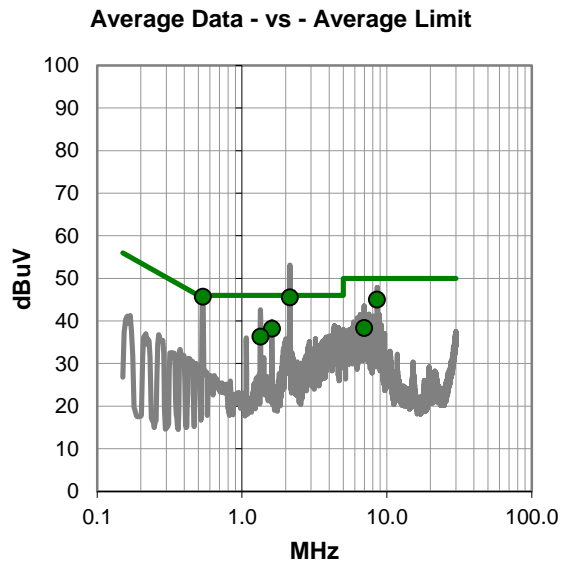
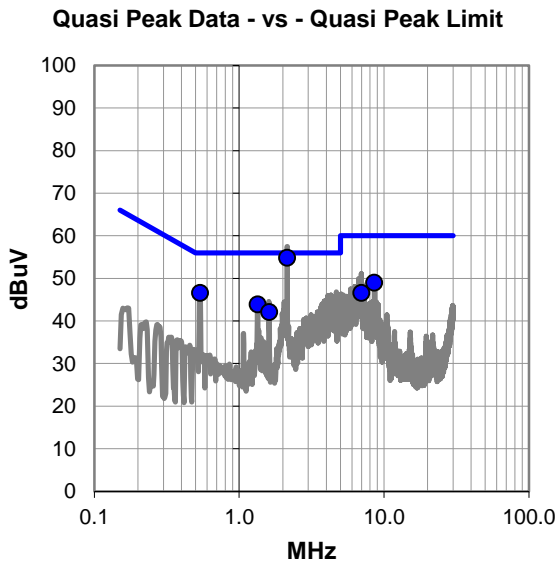
None

## EUT OPERATING MODES

Transmit operation mode, Radio 1 and 2 @5785MHz. 20MHz channel bandwidth, 200Mbit. All CAT6 cables connected.

## DEVIATIONS FROM TEST STANDARD

None



# POWERLINE CONDUCTED EMISSIONS



## RESULTS - Run #15

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.146	34.4	20.4	54.8	56.0	-1.2
0.537	26.3	20.3	46.6	56.0	-9.4
8.581	28.3	20.7	49.0	60.0	-11.0
1.340	23.6	20.3	43.9	56.0	-12.1
6.971	26.1	20.5	46.6	60.0	-13.4
1.609	21.8	20.3	42.1	56.0	-13.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.537	25.4	20.3	45.7	46.0	-0.3
2.146	25.1	20.4	45.5	46.0	-0.5
8.581	24.3	20.7	45.0	50.0	-5.0
1.609	17.9	20.3	38.2	46.0	-7.8
1.340	16.0	20.3	36.3	46.0	-9.7
6.971	17.8	20.5	38.3	50.0	-11.7

## CONCLUSION

Pass

Tested By

# SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.06.01

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 802.11 - channel 36 (5160 MHz) with 10 and 20 MHz channel bandwidths; channel 38 (5190 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.

Transmitting 802.11 - channel 147 (5735 MHz) and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 147 (5735 MHz) and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 151 (5755 MHz) and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.

Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 32 (5160 MHz), channel 40 (5200 MHz), channel 48 (5240 MHz), channel 147 (5735 MHz), channel 158 (5785 MHz), and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 38 (5190 MHz), channel 46 (5230 MHz), channel 151 (5755 MHz), channel 159 (5795 MHz), and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.

Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth. 4-QAM modulation type.

## POWER SETTINGS INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

MAX40003 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40000 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	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50705	LFH	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50704	LFH	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50703	LFG	9/20/2017	12 mo
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNO	6/12/2017	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIB	8/25/2016	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
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/12/2017	12 mo
Antenna	AH Systems	SAS-588	AJO	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Cable	Northwest EMC	TTBJ141-KMKM-72	MNQ	9/12/2017	12 mo
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVN	9/12/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/12/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 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
Receiver	Rohde & Schwarz	ESR7	ARI	6/4/2017	12 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/6/2017	12 mo

## MEASUREMENT BANDWIDTHS

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

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies in each operational band 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.

Some measurements at the edges of the allowable band may also have been made using the integration method detailed in section 12.7.4.4.3 of ANSI C63.10. These will be denoted in the individual comments for each data point.



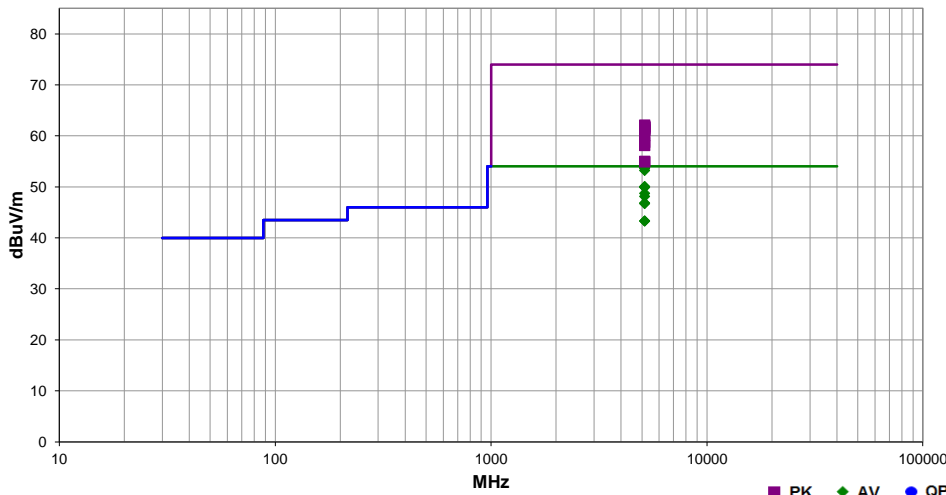
# SPURIOUS RADIATED EMISSIONS



<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<small>EmRS 2017.09.18.1</small>	<small>PSA/ESCI 2017.06.01</small>
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C		
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH		
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	<b>Tested by:</b>	Dustin Sparks
<b>EUT:</b>	M4-2000				
<b>Configuration:</b>	1				
<b>Customer:</b>	Kwikbit, Inc.				
<b>Attendees:</b>	Tim Blom				
<b>EUT Power:</b>	110VAC/60Hz				
<b>Operating Mode:</b>	Transmitting 802.11 - channel 36 (5160 MHz) with 10 and 20 MHz channel bandwidths; channel 38 (5190 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.				
<b>Deviations:</b>	None				
<b>Comments:</b>	Emissions initially characterized using radio 1, worst case emissions repeated using radio 2 (see comments).				

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.407:2017	ANSI C63.10:2013

<b>Run #</b>	22	<b>Test Distance (m)</b>	1	<b>Antenna Height(s)</b>	1(m)	<b>Results</b>	Pass
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Freq (MHz)	Calculated 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
5149.500	27.8	35.6	1.7	286.9	1.0	0.0	Horz	AV	-9.5	53.9	54.0	-0.1	Ch 38, 5190 MHz, 16-QAM, EUT on side, 40 MHz BW, integrated
5149.500	27.6	35.6	1.7	286.9	1.0	0.0	Horz	AV	-9.5	53.7	54.0	-0.3	Ch 36, 5160 MHz, 4-QAM, EUT on side, 20 MHz BW, integrated
5149.500	27.5	35.6	1.7	286.9	1.0	0.0	Horz	AV	-9.5	53.6	54.0	-0.4	Ch 38, 5190 MHz, 4-QAM, EUT on side, 40 MHz BW, integrated
5149.500	27.1	35.6	1.7	285.5	1.0	0.0	Horz	AV	-9.5	53.2	54.0	-0.8	Ch 38, 5190 MHz, 16-QAM, EUT on side, 40 MHz BW, radio 2, integrated
5147.500	23.9	35.6	1.7	284.2	1.0	0.0	Horz	AV	-9.5	50.0	54.0	-4.0	Ch 36, 5160 MHz, 16-QAM, EUT on side, 10 MHz BW
5147.500	23.9	35.6	1.7	284.2	1.0	0.0	Horz	AV	-9.5	50.0	54.0	-4.0	Ch 36, 5160 MHz, 64-QAM, EUT on side, 10 MHz BW
5147.500	23.9	35.6	1.7	284.2	1.0	0.0	Horz	AV	-9.5	50.0	54.0	-4.0	Ch 36, 5160 MHz, 256-QAM, EUT on side, 10 MHz BW
5147.500	23.8	35.6	1.7	284.2	1.0	0.0	Horz	AV	-9.5	49.9	54.0	-4.1	Ch 36, 5160 MHz, 1024-QAM, EUT on side, 10 MHz BW
5147.500	22.6	35.6	1.7	280.2	1.0	0.0	Horz	AV	-9.5	48.7	54.0	-5.3	Ch 36, 5160 MHz, 4-QAM, EUT on side, 10 MHz BW
5147.500	22.0	35.6	1.7	281.9	1.0	0.0	Vert	AV	-9.5	48.1	54.0	-5.9	Ch 36, 5160 MHz, 4-QAM, EUT on side, 10 MHz BW
5147.500	20.7	35.6	1.7	277.9	1.0	0.0	Horz	AV	-9.5	46.8	54.0	-7.2	Ch 36, 5160 MHz, 4-QAM, EUT vert, 10 MHz BW
5147.500	20.6	35.6	1.7	278.3	1.0	0.0	Vert	AV	-9.5	46.7	54.0	-7.3	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW
5147.500	17.3	35.6	1.7	65.1	1.0	0.0	Vert	AV	-9.5	43.3	54.0	-10.7	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW
5147.500	17.2	35.6	1.7	194.0	1.0	0.0	Horz	AV	-9.5	43.3	54.0	-10.7	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW
5149.500	36.0	35.6	1.7	286.9	1.0	0.0	Horz	PK	-9.5	62.1	74.0	-11.9	Ch 38, 5190 MHz, 16-QAM, EUT on side, 40 MHz BW, integrated
5149.500	35.7	35.6	1.7	286.9	1.0	0.0	Horz	PK	-9.5	61.8	74.0	-12.2	Ch 36, 5160 MHz, 4-QAM, EUT on side, 20 MHz BW, integrated
5149.500	35.7	35.6	1.7	286.9	1.0	0.0	Horz	PK	-9.5	61.8	74.0	-12.2	Ch 38, 5190 MHz, 4-QAM, EUT on side, 40 MHz BW, integrated
5147.500	35.6	35.6	1.7	284.2	1.0	0.0	Horz	PK	-9.5	61.7	74.0	-12.3	Ch 36, 5160 MHz, 16-QAM, EUT on side, 10 MHz BW
5147.500	35.6	35.6	1.7	284.2	1.0	0.0	Horz	PK	-9.5	61.7	74.0	-12.3	Ch 36, 5160 MHz, 64-QAM, EUT on side, 10 MHz BW
5147.500	35.3	35.6	1.7	284.2	1.0	0.0	Horz	PK	-9.5	61.4	74.0	-12.6	Ch 36, 5160 MHz, 1024-QAM, EUT on side, 10 MHz BW
5149.500	35.2	35.6	1.7	285.5	1.0	0.0	Horz	PK	-9.5	61.3	74.0	-12.7	Ch 38, 5190 MHz, 16-QAM, EUT on side, 40 MHz BW, radio 2, integrated
5147.500	35.0	35.6	1.7	284.2	1.0	0.0	Horz	PK	-9.5	61.1	74.0	-12.9	Ch 36, 5160 MHz, 256-QAM, EUT on side, 10 MHz BW
5147.500	34.8	35.6	1.7	280.2	1.0	0.0	Horz	PK	-9.5	60.9	74.0	-13.1	Ch 36, 5160 MHz, 4-QAM, EUT on side, 10 MHz BW
5147.500	33.9	35.6	1.7	281.9	1.0	0.0	Vert	PK	-9.5	60.0	74.0	-14.0	Ch 36, 5160 MHz, 4-QAM, EUT on side, 10 MHz BW
5147.500	32.6	35.6	1.7	277.9	1.0	0.0	Horz	PK	-9.5	58.7	74.0	-15.3	Ch 36, 5160 MHz, 4-QAM, EUT vert, 10 MHz BW
5147.500	32.0	35.6	1.7	278.3	1.0	0.0	Vert	PK	-9.5	58.1	74.0	-15.9	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW
5147.500	28.9	35.6	1.7	194.0	1.0	0.0	Horz	PK	-9.5	55.0	74.0	-19.0	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW
5147.500	28.8	35.6	1.7	65.1	1.0	0.0	Vert	PK	-9.5	54.9	74.0	-19.1	Ch 36, 5160 MHz, 4-QAM, EUT horz, 10 MHz BW

# SPURIOUS RADIATED EMISSIONS

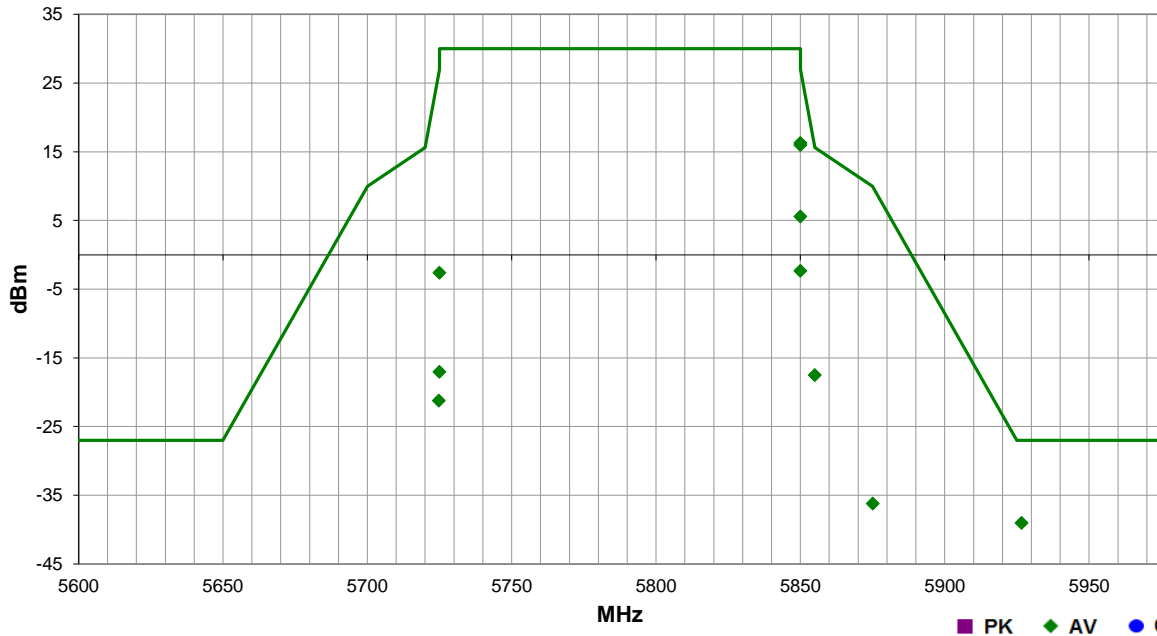


EmiR5 2017.09.18.1 PSA-ESCI2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	<b>Tested by:</b> Dustin Sparks
<b>EUT:</b>	M4-2000			
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	Tim Blom			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 147 (5735 MHz) and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 147 (5735 MHz) and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 151 (5755 MHz) and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Emissions initially characterized using radio 1, worst case emissions repeated using radio 2 (see comments).			

Test Specifications	Test Method
FCC 15.407:2017	ANSI C63.10:2013

Run #	23	Test Distance (m)	1	Antenna Height(s)	1(m)	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
5850.004	1.7	286.0	Horz	AV	4.24E-02	16.3	27.0	-10.7	Ch 169, 5845 MHz, 16-QAM, EUT on side, 10 MHz BW
5850.004	1.7	286.0	Horz	AV	3.95E-02	16.0	27.0	-11.0	Ch 169, 5845 MHz, 16-QAM, EUT on side, 10 MHz BW, radio 2
5850.004	1.7	286.0	Horz	AV	3.61E-03	5.6	27.0	-21.4	Ch 166, 5830 MHz, 16-QAM, EUT on side, 40 MHz BW
5850.004	1.7	286.0	Horz	AV	5.85E-04	-2.3	27.0	-29.3	Ch 168, 5840 MHz, 16-QAM, EUT on side, 20 MHz BW
5724.996	1.7	286.9	Horz	AV	5.46E-04	-2.6	27.0	-29.6	Ch 147, 5735 MHz, 16-QAM, EUT on side, 20 MHz BW
5724.988	1.7	286.9	Horz	AV	1.98E-05	-17.0	27.0	-44.0	Ch 147, 5735 MHz, 16-QAM, EUT on side, 10 MHz BW
5855.004	1.7	286.0	Horz	AV	1.77E-05	-17.5	15.6	-33.1	Ch 169, 5845 MHz, 16-QAM, EUT on side, 10 MHz BW
5724.813	1.7	286.9	Horz	AV	7.54E-06	-21.2	26.6	-47.8	Ch 151, 5755 MHz, 16-QAM, EUT on side, 40 MHz BW
5875.079	1.7	286.0	Horz	AV	2.38E-07	-36.2	9.9	-46.2	Ch 169, 5845 MHz, 16-QAM, EUT on side, 10 MHz BW
5926.610	1.7	286.0	Horz	AV	1.25E-07	-39.0	-27.0	-12.0	Ch 169, 5845 MHz, 16-QAM, EUT on side, 10 MHz BW

# SPURIOUS RADIATED EMISSIONS

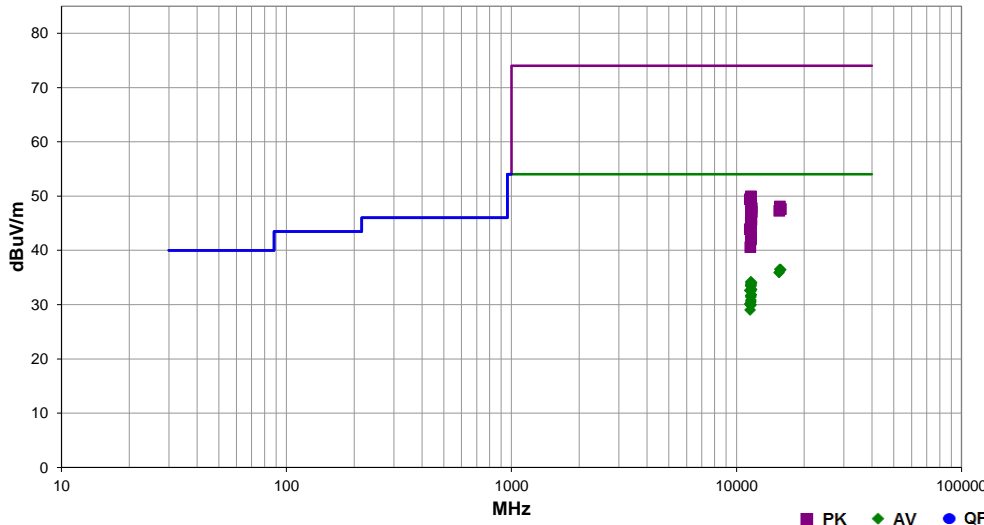


Emit5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	MAX40003	Date:	10/16/17
Project:	None	Temperature:	21.4 °C
Job Site:	MN05	Humidity:	35.5% RH
Serial Number:	33	Barometric Pres.:	1026 mbar
EUT:			M4-2000
Configuration:	1		
Customer:	Kwikbit, Inc.		
Attendees:	Tim Blom		
EUT Power:	110VAC/60Hz		
Operating Mode:	Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 32 (5160 MHz), channel 40 (5200 MHz), channel 48 (5240 MHz), channel 147 (5735 MHz), channel 158 (5785 MHz), and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 38 (5190 MHz), channel 46 (5230 MHz), channel 151 (5755 MHz), channel 159 (5795 MHz), and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types.		
Deviations:	None		
Comments:	Emissions initially characterized using radio 1, worst case emissions repeated using radio 2 (see comments).		

Test Specifications	Test Method
FCC 15.407:2017	ANSI C63.10:2013

Run #	83	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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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
15582.990	27.2	9.3	1.0	143.0	3.0	0.0	Horz	AV	0.0	36.5	54.0	-17.5	Ch 39, 5195 MHz, 4-QAM, 10 MHz BW, EUT on side
15737.410	27.5	8.9	1.0	232.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Ch 49, 5245 MHz, 4-QAM, 10 MHz BW, EUT on side
15477.680	26.9	9.0	1.0	125.0	3.0	0.0	Horz	AV	0.0	35.9	54.0	-18.1	Ch 36, 5160 MHz, 4-QAM, 10 MHz BW, EUT on side
11590.090	35.4	-1.2	1.0	336.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side
11589.880	35.2	-1.2	1.1	61.0	3.0	0.0	Horz	AV	0.0	34.0	54.0	-20.0	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT vert
11692.110	36.2	-2.2	1.8	350.0	3.0	0.0	Horz	AV	0.0	34.0	54.0	-20.0	Ch 169, 5845 MHz, 4-QAM, 10 MHz BW, EUT on side
11589.990	34.9	-1.2	2.7	337.9	3.0	0.0	Horz	AV	0.0	33.7	54.0	-20.3	Ch 159, 5795 MHz, 16-QAM, 10 MHz BW, EUT on side
11589.860	34.8	-1.2	2.7	337.9	3.0	0.0	Horz	AV	0.0	33.6	54.0	-20.4	Ch 159, 5795 MHz, 64-QAM, 10 MHz BW, EUT on side
11590.200	34.7	-1.2	2.7	337.9	3.0	0.0	Horz	AV	0.0	33.5	54.0	-20.5	Ch 159, 5795 MHz, 1024-QAM, 10 MHz BW, EUT on side
11590.430	34.6	-1.2	2.7	337.9	3.0	0.0	Horz	AV	0.0	33.4	54.0	-20.6	Ch 159, 5795 MHz, 256-QAM, 10 MHz BW, EUT on side
11679.890	34.9	-2.1	2.0	343.9	3.0	0.0	Horz	AV	0.0	32.8	54.0	-21.2	Ch 168, 5840 MHz, 4-QAM, 20 MHz BW, EUT on side
11470.010	35.1	-2.5	2.2	354.0	3.0	0.0	Horz	AV	0.0	32.6	54.0	-21.4	Ch 147, 5735 MHz, 4-QAM, 10 MHz BW, EUT on side
11590.050	33.7	-1.2	1.0	2.0	3.0	0.0	Vert	AV	0.0	32.5	54.0	-21.5	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT vert
11660.210	33.6	-1.8	2.7	336.0	3.0	0.0	Horz	AV	0.0	31.8	54.0	-22.2	Ch 166, 5830 MHz, 4-QAM, 40 MHz BW, EUT on side
11569.840	33.1	-1.5	1.0	336.9	3.0	0.0	Horz	AV	0.0	31.6	54.0	-22.4	Ch 157, 5785 MHz, 4-QAM, 20 MHz BW, EUT on side
11589.880	32.6	-1.2	2.6	337.9	3.0	0.0	Horz	AV	0.0	31.4	54.0	-22.6	Ch 159, 5795 MHz, 4-QAM, 40 MHz BW, EUT on side
11589.880	32.0	-1.2	1.8	339.0	3.0	0.0	Vert	AV	0.0	30.8	54.0	-23.2	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side
11590.230	31.7	-1.2	1.1	122.0	3.0	0.0	Vert	AV	0.0	30.5	54.0	-23.5	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT horz
11469.990	32.6	-2.5	1.9	339.0	3.0	0.0	Horz	AV	0.0	30.1	54.0	-23.9	Ch 147, 5735 MHz, 4-QAM, 20 MHz BW, EUT on side
11589.790	31.2	-1.2	1.1	27.0	3.0	0.0	Horz	AV	0.0	30.0	54.0	-24.0	Ch 159, 5795 MHz, 1024-QAM, 10 MHz BW, EUT on side, radio 2
11590.380	31.1	-1.2	1.0	176.0	3.0	0.0	Horz	AV	0.0	29.9	54.0	-24.1	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT horz
11591.210	51.1	-1.2	2.7	337.9	3.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	Ch 159, 5795 MHz, 16-QAM, 10 MHz BW, EUT on side
11589.860	51.1	-1.2	2.7	337.9	3.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	Ch 159, 5795 MHz, 64-QAM, 10 MHz BW, EUT on side
11469.790	51.9	-2.5	2.2	354.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	Ch 147, 5735 MHz, 4-QAM, 10 MHz BW, EUT on side
11507.930	31.4	-2.4	1.0	23.1	3.0	0.0	Horz	AV	0.0	29.0	54.0	-25.0	Ch 151, 5755 MHz, 4-QAM, 40 MHz BW, EUT on side
11588.760	49.8	-1.2	1.0	336.0	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side
11589.820	49.8	-1.2	2.7	337.9	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	Ch 159, 5795 MHz, 256-QAM, 10 MHz BW, EUT on side
11589.580	49.6	-1.2	2.7	337.9	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Ch 159, 5795 MHz, 1024-QAM, 10 MHz BW, EUT on side
11590.100	49.5	-1.2	1.1	61.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT vert
15587.460	38.8	9.3	1.0	143.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Ch 39, 5195 MHz, 4-QAM, 10 MHz BW, EUT on side
11689.960	50.0	-2.2	1.8	350.0	3.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	Ch 169, 5845 MHz, 4-QAM, 10 MHz BW, EUT on side
15734.620	38.7	8.9	1.0	232.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Ch 49, 5245 MHz, 4-QAM, 10 MHz BW, 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
15480.940	38.2	9.1	1.0	125.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Ch 36, 5160 MHz, 4-QAM, 10 MHz BW, EUT on side
11680.080	49.2	-2.1	2.0	343.9	3.0	0.0	Horz	PK	0.0	47.1	74.0	-26.9	Ch 168, 5840 MHz, 4-QAM, 20 MHz BW, EUT on side
11589.820	47.4	-1.2	1.0	2.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT vert
11660.130	47.4	-1.8	2.7	336.0	3.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	Ch 166, 5830 MHz, 4-QAM, 40 MHz BW, EUT on side
11569.990	46.7	-1.5	1.0	336.9	3.0	0.0	Horz	PK	0.0	45.2	74.0	-28.8	Ch 157, 5785 MHz, 4-QAM, 20 MHz BW, EUT on side
11590.030	45.2	-1.2	1.8	339.0	3.0	0.0	Vert	PK	0.0	44.0	74.0	-30.0	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side
11469.890	46.4	-2.5	1.9	339.0	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	Ch 147, 5735 MHz, 4-QAM, 20 MHz BW, EUT on side
11589.850	44.9	-1.2	2.6	337.9	3.0	0.0	Horz	PK	0.0	43.7	74.0	-30.3	Ch 159, 5795 MHz, 4-QAM, 40 MHz BW, EUT on side
11588.200	43.6	-1.2	1.1	122.0	3.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT horz
11588.690	43.4	-1.2	1.0	176.0	3.0	0.0	Horz	PK	0.0	42.2	74.0	-31.8	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT horz
11590.080	43.2	-1.2	1.1	27.0	3.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side, radio 2
11510.730	43.0	-2.4	1.0	23.1	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4	Ch 151, 5755 MHz, 4-QAM, 40 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS

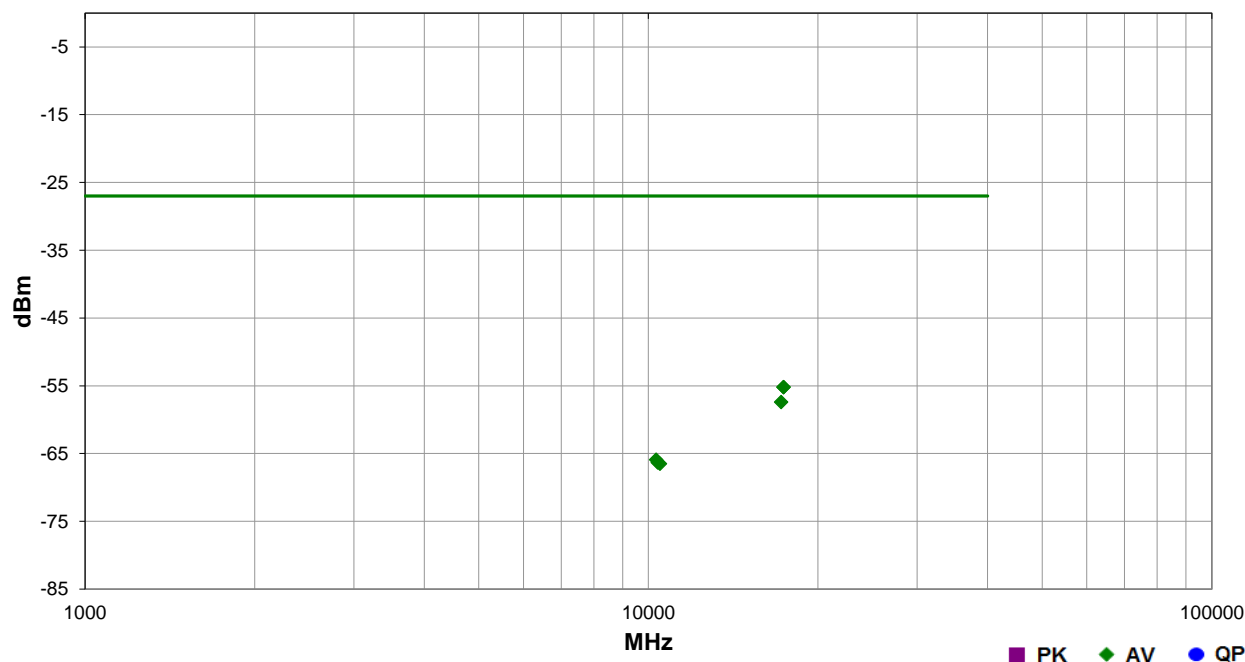


EmiRS 2017.07.11 PSA-ESCI 2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/16/17	
<b>Project:</b>	None	<b>Temperature:</b>	21.4 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	35.5% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1026 mbar	<b>Tested by:</b> Dustin Sparks
<b>EUT:</b>	M4-2000			
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	Tim Blom			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth. 4-QAM modulation type.			
<b>Deviations:</b>	None			
<b>Comments:</b>	EUT on side			

<b>Test Specifications</b>	FCC 15.407:2017	<b>Test Method</b>	ANSI C63.10:2013
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<b>Run #</b>	85	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1 to 4(m)	<b>Results</b>	Pass
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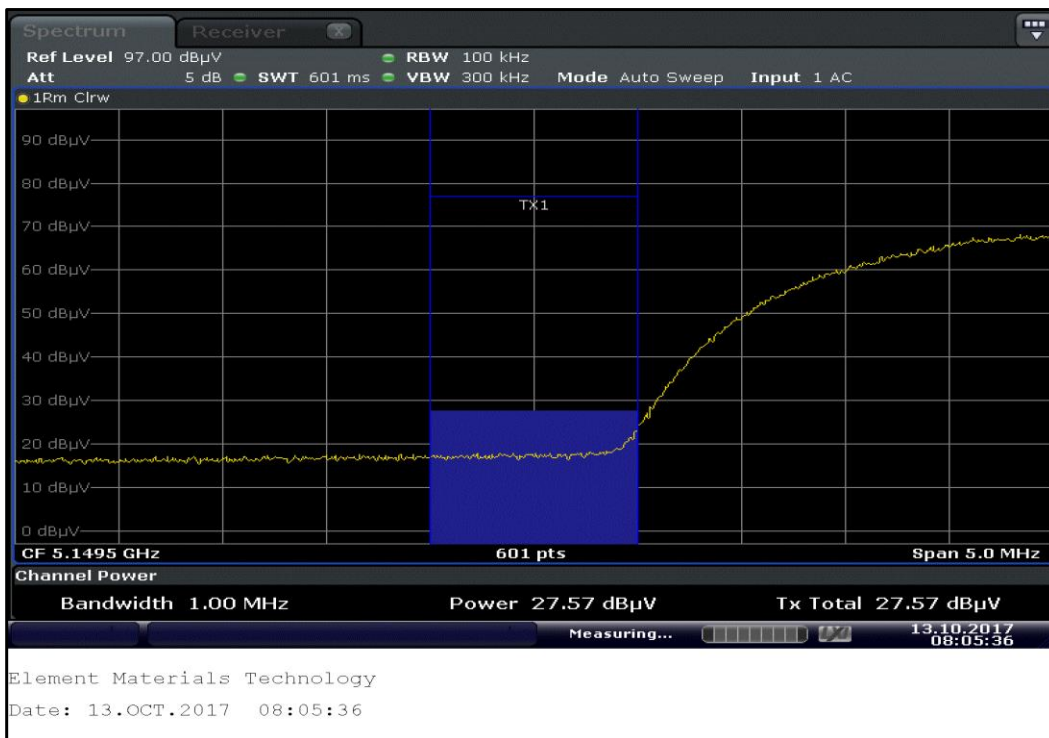
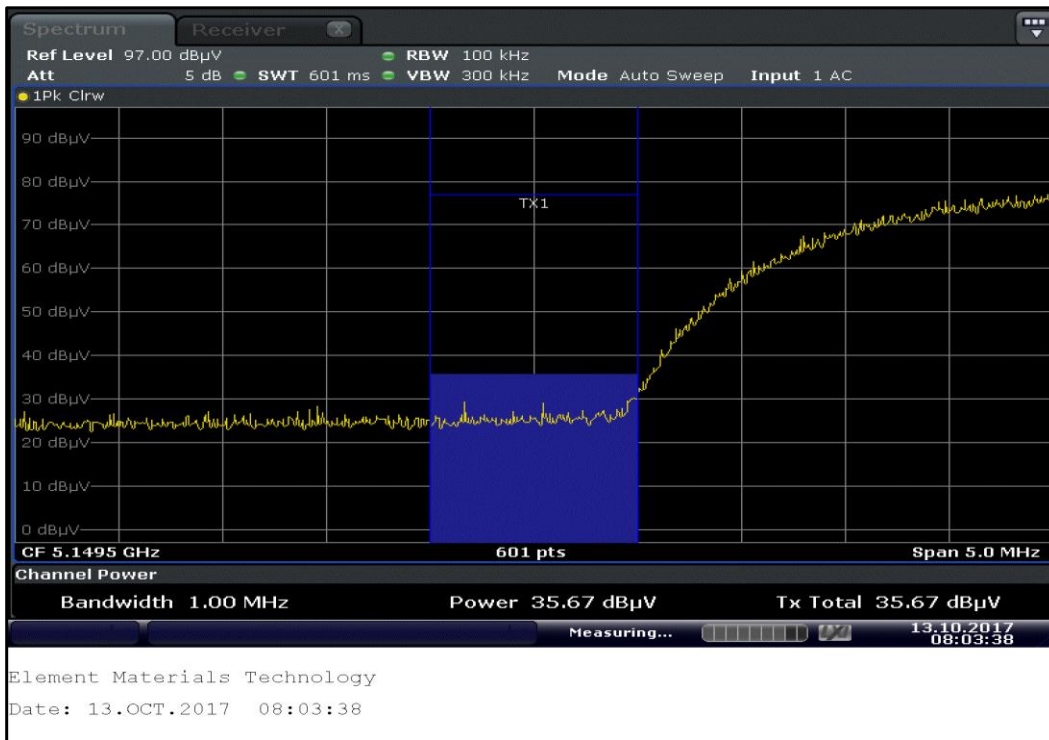


Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
17383.190	1.0	127.1	Horz	AV	3.00E-09	-55.2	-27.0	-28.2	Ch 159, 5795 MHz, 4-QAM, 10 MHz BW, EUT on side
17382.880	1.2	74.0	Horz	AV	3.00E-09	-55.2	-27.0	-28.2	Ch 169, 5845 MHz, 4-QAM, 10 MHz BW, EUT on side
17202.880	1.0	66.1	Horz	AV	1.81E-09	-57.4	-27.0	-30.4	Ch 147, 5735 MHz, 4-QAM, 10 MHz BW, EUT on side
10321.840	1.0	183.0	Horz	AV	2.55E-10	-65.9	-27.0	-38.9	Ch 32, 5160 MHz, 4-QAM, 10 MHz BW, EUT on side
10389.980	1.0	211.0	Horz	AV	2.33E-10	-66.3	-27.0	-39.3	Ch 39, 5195 MHz, 4-QAM, 10 MHz BW, EUT on side
10490.680	1.0	154.0	Horz	AV	2.22E-10	-66.5	-27.0	-39.5	Ch 49, 5245 MHz, 4-QAM, 10 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.06.01



# SPURIOUS RADIATED EMISSIONS - INTERMODULATION



PSA-ESCI 2017.06.01

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 802.11 - channel 36 (5160 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), and channel 169 (5845 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.

Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), and channel 49 (5245 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.

Transmitting 802.11 - channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 147 (5735 MHz), channel 157 (5785 MHz), and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 151 (5755 MHz), channel 159 (5795 MHz), and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types. Radio 1 and radio 2 transmitting simultaneously.

## POWER SETTINGS INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

MAX40003 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40 GHz
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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	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50705	LFI	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50704	LFH	9/20/2017	12 mo
Filter - Band Pass/Notch	Micro-Tronics	BRC50703	LFG	9/20/2017	12 mo
Cable	Element	TTBJ141-KMKM-72	MNQ	9/12/2017	12 mo
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/12/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVN	9/12/2017	12 mo
Antenna	AH Systems	SAS-588	AJO	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	0 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIB	8/25/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/12/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2/14/2017	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 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
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/6/2017	12 mo
Receiver	Rohde & Schwarz	ESR7	ARI	6/4/2017	12 mo

## MEASUREMENT BANDWIDTHS

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

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured to transmit two channels simultaneously, either from the same UNII band or one from each of the two available UNII bands.

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 purpose of the test is to insure that no additional signals are created by having multiple carriers in the passband of the EUT. 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 test receiver was used to take the individual measurements in order to provide enough dynamic range while closer to the transmit bands. A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity during the pre-scans.

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.



# SPURIOUS RADIATED EMISSIONS - INTERMODULATION

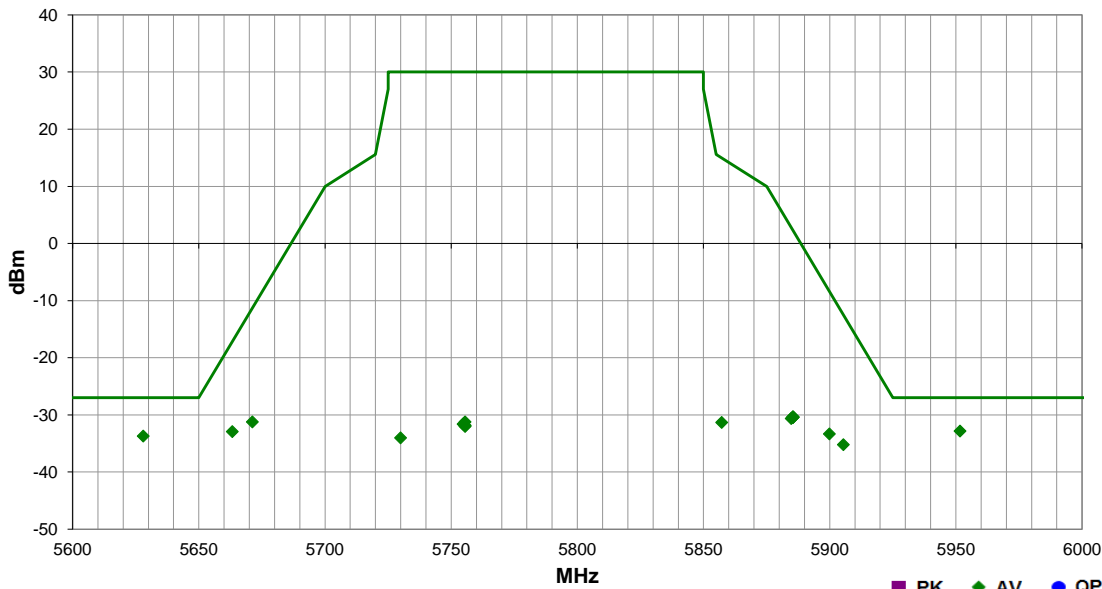


EmiR5 2017.09.18.1 PSA-ESCI 2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<i>Dustin Sparks</i>
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	
<b>EUT:</b>	M4-2000			
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 147 (5735 MHz), channel 159 (5795 MHz), and channel 169 (5845 MHz) with 10 MHz channel bandwidth; channel 147 (5735 MHz), channel 157 (5785 MHz), and channel 168 (5840 MHz) with 20 MHz channel bandwidth; channel 151 (5755 MHz), channel 159 (5795 MHz), and channel 166 (5830 MHz) with 40 MHz channel bandwidth. 4-QAM, 16-QAM, 64-QAM, 256-QAM, and 1024-QAM modulation types. Radio 1 and radio 2 transmitting simultaneously.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Intermodulation products - see comments for more details. Channels in the comments are formatted as (Radio 1 channel) / (Radio 2 channel).			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.407:2017	ANSI C63.10:2013

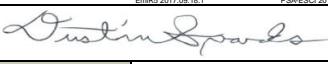
<b>Run #</b>	25	<b>Test Distance (m)</b>	1	<b>Antenna Height(s)</b>	1(m)	<b>Results</b>	Pass
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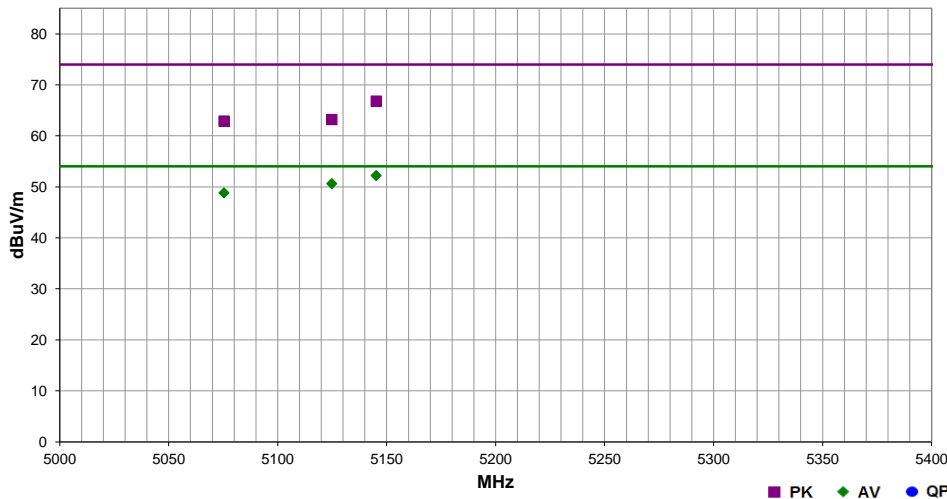
Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
5885.510	1.7	286.2	Horz	AV	9.27E-07	-30.3	2.2	-32.5	Ch 169 (5845 MHz)/Ch 159 (5795 MHz), 4-QAM, 10 MHz BW, EUT on side
5885.510	1.7	286.2	Horz	AV	9.06E-07	-30.4	2.2	-32.6	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 4-QAM, 10 MHz BW, EUT on side
5885.510	1.7	286.2	Horz	AV	9.06E-07	-30.4	2.2	-32.6	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 64-QAM, 10 MHz BW, EUT on side
5885.510	1.7	286.2	Horz	AV	9.06E-07	-30.4	2.2	-32.6	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 256-QAM, 10 MHz BW, EUT on side
5885.510	1.7	286.2	Horz	AV	9.06E-07	-30.4	2.2	-32.6	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 1024-QAM, 10 MHz BW, EUT on side
5884.800	1.7	286.0	Horz	AV	8.65E-07	-30.6	2.7	-33.4	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT on side
5857.240	1.7	286.0	Horz	AV	7.36E-07	-31.3	15.0	-46.3	Ch 147 (5735 MHz)/Ch 159 (5795 MHz), 16-QAM, 10 MHz BW, EUT on side
5671.250	1.7	286.0	Horz	AV	7.54E-07	-31.2	-11.2	-20.0	Ch 147 (5735 MHz)/Ch 159 (5795 MHz), 16-QAM, 10 MHz BW, EUT on side
5755.530	1.7	282.4	Vert	AV	7.54E-07	-31.2	30.0	-61.2	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT vert
5754.780	1.7	286.2	Horz	AV	6.87E-07	-31.6	30.0	-61.6	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 4-QAM, 10 MHz BW, EUT on side
5755.530	1.7	282.9	Horz	AV	6.56E-07	-31.8	30.0	-61.8	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT vert
5755.530	1.7	286.0	Horz	AV	6.41E-07	-31.9	30.0	-61.9	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT on side
5755.530	1.7	283.2	Vert	AV	6.27E-07	-32.0	30.0	-62.0	Ch 159 (5795 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT on side
5951.690	1.7	286.0	Horz	AV	5.21E-07	-32.8	-27.0	-5.8	Ch 147 (5735 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT on side
5663.270	1.7	286.2	Horz	AV	5.09E-07	-32.9	-17.1	-15.8	Ch 151 (5755 MHz)/Ch 166 (5830 MHz), 16-QAM, 40 MHz BW, EUT on side
5899.930	1.7	286.2	Horz	AV	4.65E-07	-33.3	-8.5	-24.8	Ch 157 (5785 MHz)/Ch 168 (5840 MHz), 16-QAM, 20 MHz BW, EUT on side
5627.990	1.7	286.0	Horz	AV	4.24E-07	-33.7	-27.0	-6.7	Ch 147 (5735 MHz)/Ch 169 (5845 MHz), 16-QAM, 10 MHz BW, EUT on side
5730.000	1.7	286.2	Horz	AV	3.95E-07	-34.0	30.0	-64.0	Ch 157 (5785 MHz)/Ch 168 (5840 MHz), 16-QAM, 20 MHz BW, EUT on side
5905.460	1.7	286.2	Horz	AV	3.00E-07	-35.2	-12.6	-22.7	Ch 151 (5755 MHz)/Ch 166 (5830 MHz), 16-QAM, 40 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS - INTERMODULATION



<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<small>EmRS 2017.09.18.1      PSA-ESCI 2017.06.01</small> 
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	
<b>EUT:</b>	M4-2000	<b>Tested by:</b> Dustin Sparks		
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), and channel 49 (5245 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Intermodulation products - see comments for more details. Channels in the comments are formatted as (Radio 1 channel) / (Radio 2 channel).			

<b>Test Specifications</b>	FCC 15.407:2017	<b>Test Method</b>	ANSI C63.10:2013
<b>Run #</b>	26	<b>Test Distance (m)</b>	1
<b>Antenna Height(s)</b>	1(m)		<b>Results</b>
			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
5145.200	26.1	35.6	1.7	286.2	1.0	0.0	Horz	AV	-9.5	52.2	54.0	-1.8	Ch 39 (5195 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side
5124.820	24.6	35.6	1.7	286.2	1.0	0.0	Horz	AV	-9.5	50.6	54.0	-3.4	Ch 32 (5160 MHz)/Ch 39 (5195 MHz), 4-QAM, 10 MHz BW, EUT on side
5075.320	22.7	35.6	1.7	286.2	1.0	0.0	Horz	AV	-9.5	48.8	54.0	-5.2	Ch 32 (5160 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side
5145.200	40.7	35.6	1.7	286.2	1.0	0.0	Horz	PK	-9.5	66.8	74.0	-7.2	Ch 39 (5195 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side
5124.820	37.1	35.6	1.7	286.2	1.0	0.0	Horz	PK	-9.5	63.2	74.0	-10.8	Ch 32 (5160 MHz)/Ch 39 (5195 MHz), 4-QAM, 10 MHz BW, EUT on side
5075.320	36.8	35.6	1.7	286.2	1.0	0.0	Horz	PK	-9.5	62.9	74.0	-11.1	Ch 32 (5160 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS - INTERMODULATION



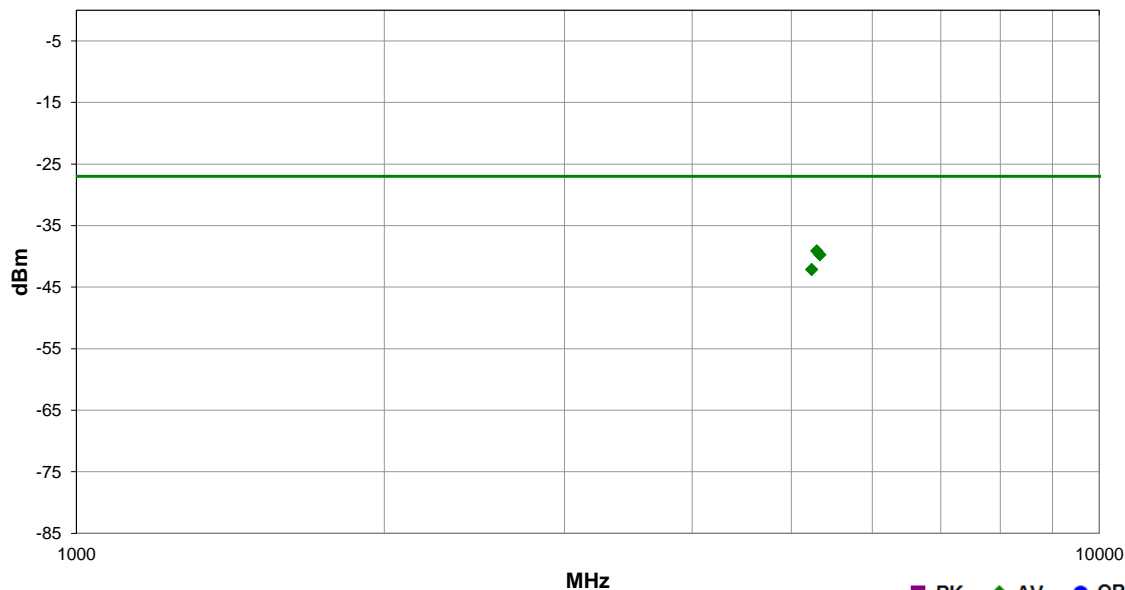
EmRS 2017.09.18.1

PSA-ESCI 2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<i>Dustin Sparks</i>
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	
<b>EUT:</b>	M4-2000			
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 32 (5160 MHz), channel 39 (5195 MHz), and channel 49 (5245 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Intermodulation products - see comments for more details. Channels in the comments are formatted as (Radio 1 channel) / (Radio 2 channel).			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.407:2017	ANSI C63.10:2013

<b>Run #</b>	26	<b>Test Distance (m)</b>	1	<b>Antenna Height(s)</b>	1(m)	<b>Results</b>	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
5294.950	1.7	286.2	Horz	AV	1.22E-07	-39.1	-27.0	-12.1	Ch 39 (5195 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side
5331.860	1.7	286.2	Horz	AV	1.06E-07	-39.7	-27.0	-12.7	Ch 32 (5160 MHz)/Ch 49 (5245 MHz), 4-QAM, 10 MHz BW, EUT on side
5234.220	1.7	286.2	Horz	AV	6.13E-08	-42.1	-27.0	-15.1	Ch 32 (5160 MHz)/Ch 39 (5195 MHz), 4-QAM, 10 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS - INTERMODULATION

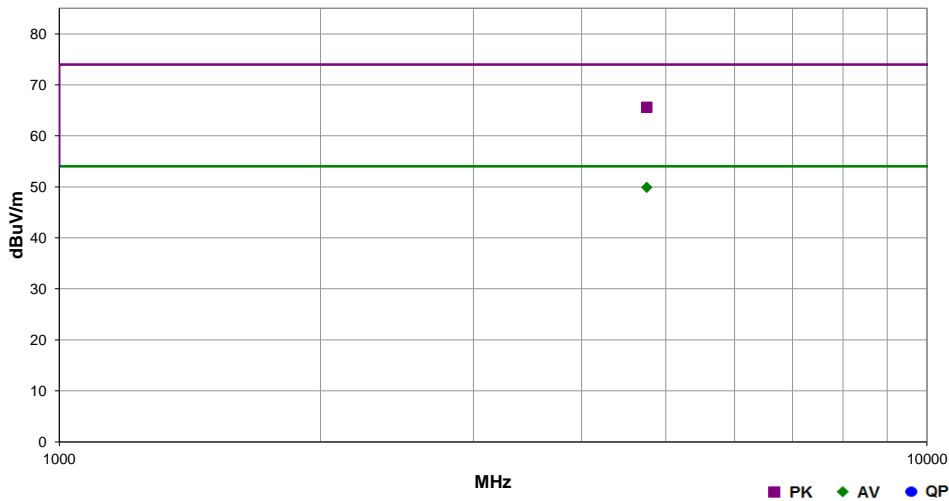


EmRS 2017.09.18.1 PSA/ESCI 2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<i>Dustin Sparks</i>	
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C		
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH		
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar		<b>Tested by:</b> Dustin Sparks
<b>EUT:</b>	M4-2000				
<b>Configuration:</b>	1				
<b>Customer:</b>	Kwikbit, Inc.				
<b>Attendees:</b>	None				
<b>EUT Power:</b>	110VAC/60Hz				
<b>Operating Mode:</b>	Transmitting 802.11 - channel 36 (5160 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), and channel 169 (5845 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.				
<b>Deviations:</b>	None				
<b>Comments:</b>	Intermodulation products - see comments for more details. Channels in the comments are formatted as (Radio 1 channel) / (Radio 2 channel).				

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.407:2017	ANSI C63.10:2013

<b>Run #</b>	28	<b>Test Distance (m)</b>	1	<b>Antenna Height(s)</b>	1 to 4(m)	<b>Results</b>	Pass
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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
4755.000	24.2	35.2	1.7	286.2	1.0	0.0	Horz	AV	-9.5	49.9	54.0	-4.1	Ch 49 (5245 MHz)/Ch 147 (5735 MHz), 4-QAM, 10 MHz BW, EUT on side
4755.000	39.9	35.2	1.7	286.2	1.0	0.0	Horz	PK	-9.5	65.6	74.0	-8.4	Ch 49 (5245 MHz)/Ch 147 (5735 MHz), 4-QAM, 10 MHz BW, EUT on side

# SPURIOUS RADIATED EMISSIONS - INTERMODULATION



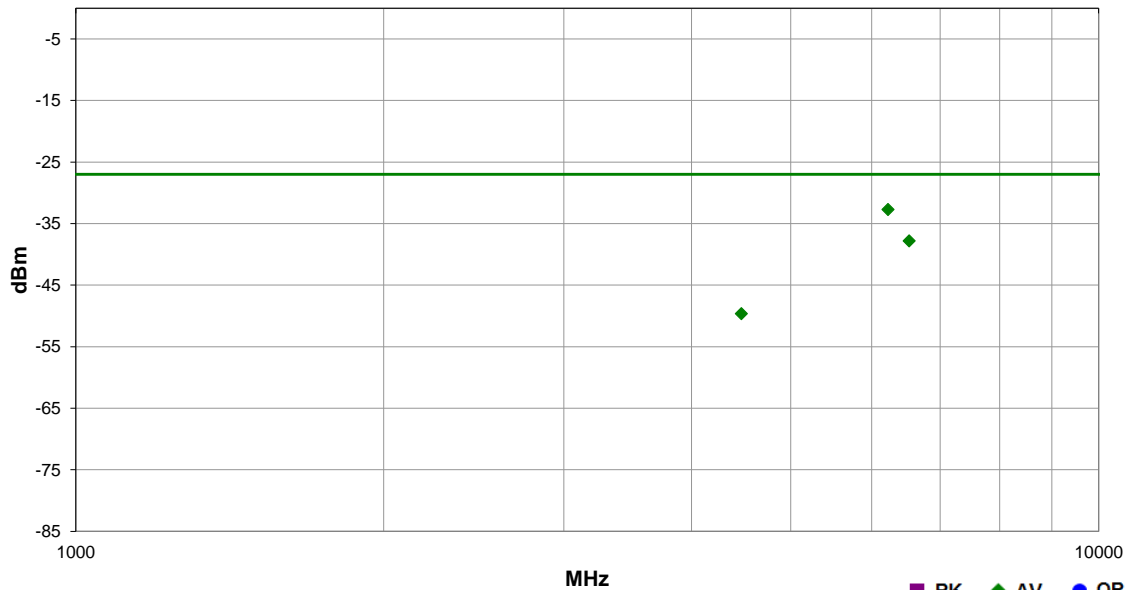
EmRS 2017.09.18.1

PSA-ESCI 2017.06.01

<b>Work Order:</b>	MAX40003	<b>Date:</b>	10/12/17	<i>Justin Sparks</i>
<b>Project:</b>	None	<b>Temperature:</b>	22.2 °C	
<b>Job Site:</b>	MN05	<b>Humidity:</b>	41.7% RH	
<b>Serial Number:</b>	33	<b>Barometric Pres.:</b>	1022 mbar	
<b>EUT:</b>	M4-2000			
<b>Configuration:</b>	1			
<b>Customer:</b>	Kwikbit, Inc.			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Transmitting 802.11 - channel 36 (5160 MHz), channel 49 (5245 MHz), channel 147 (5735 MHz), and channel 169 (5845 MHz). 4-QAM modulation type. Radio 1 and radio 2 transmitting simultaneously.			
<b>Deviations:</b>	None			
<b>Comments:</b>	Intermodulation products - see comments for more details. Channels in the comments are formatted as (Radio 1 channel) / (Radio 2 channel).			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 15.407:2017	ANSI C63.10:2013

<b>Run #</b>	28	<b>Test Distance (m)</b>	1	<b>Antenna Height(s)</b>	1 to 4(m)	<b>Results</b>	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
6225.000	1.7	286.2	Horz	AV	5.33E-07	-32.7	-27.0	-5.7	Ch 49 (5245 MHz)/Ch 147 (5735 MHz), 4-QAM, 10 MHz BW, EUT on side
6530.000	1.7	286.2	Horz	AV	1.65E-07	-37.8	-27.0	-10.8	Ch 32 (5160 MHz)/Ch 169 (5845 MHz), 4-QAM, 10 MHz BW, EUT on side
4475.000	1.7	286.2	Horz	AV	1.09E-08	-49.6	-27.0	-22.6	Ch 32 (5160 MHz)/Ch 169 (5845 MHz), 10 MHz BW, EUT on side

# FREQUENCY STABILITY



XMH 2017.09.21

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
Meter - Multimeter	Fluke	117	MLS	23-Jan-17	23-Jan-20
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-32-3.5-SCT/AC	TBF	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUB	3-Nov-14	3-Nov-17
Generator - Signal	Agilent	N5183A	TIK	29-Sep-17	29-Sep-20
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	11-Sep-17	11-Sep-18
Attenuator	Fairview Microwave	SA18S5W-20	RFX	12-Jun-17	12-Jun-18
Block - DC	Fairview Microwave	SD3379	AMI	12-Sep-17	12-Sep-18
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	16-Mar-17	16-Mar-18

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. Testing was done with an absence of modulation in a CW mode of operation.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Where a ppm limit applies:  $\text{ppm} = (\text{Measured Frequency} / \text{Measured Nominal Frequency} - 1) * 1,000,000$

Per the requirements of FCC 15.407:

“Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user’s manual.”

No specific limits are provided in either FCC 15.407, the product specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to be operating within the band.

# FREQUENCY STABILITY



TbTx 2017.09.26 XMI 2017.09.21

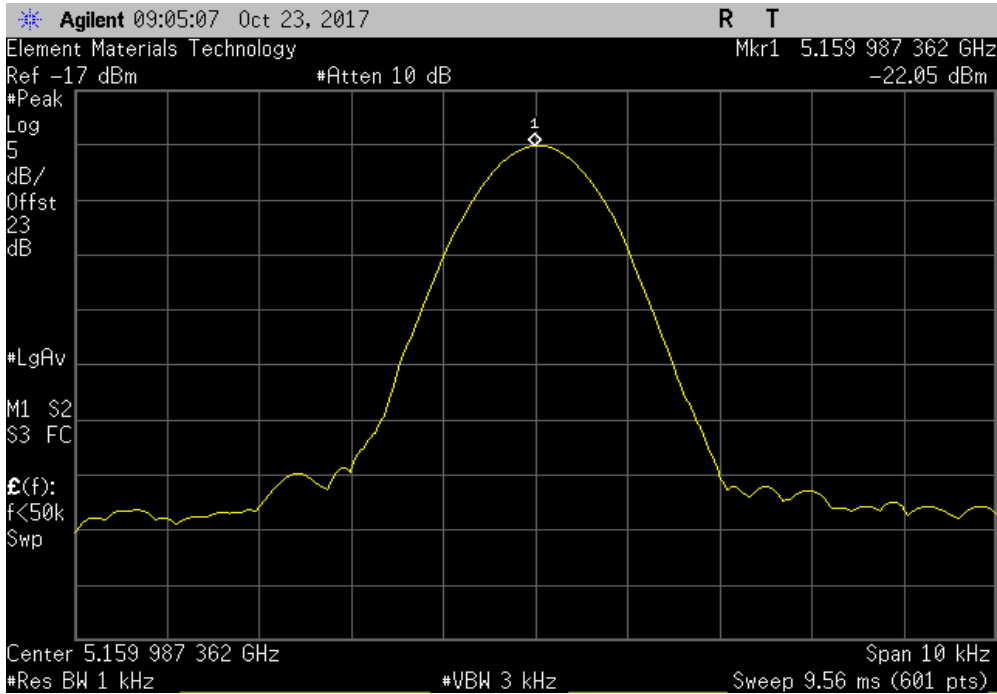
EUT: M4-2000		Work Order: MAX40003				
Serial Number: 33		Date: 24-Oct-17				
Customer: Kwikbit, Inc.		Temperature: 21.3 °C				
Attendees: None		Humidity: 36.4% RH				
Project: None		Barometric Pres.: 1014 mbar				
Tested by: Dustin Sparks		Power: 110VAC/60Hz				
TEST SPECIFICATIONS		Job Site: MN08				
FCC 15.407:2017		Test Method				
		ANSI C63.10:2013				
COMMENTS						
All measurements taken on port RF0 of radio 1.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2	Signature <i>Dustin Sparks</i>				
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
5150 MHz - 5250 MHz - Low Channel, 5160 MHz						
	Voltage: 115%	5159.987362	5160	2.5	100	Pass
	Voltage: 100%	5159.98777	5160	2.4	100	Pass
	Voltage: 85%	5159.987403	5160	2.4	100	Pass
	Temperature: +50°	5159.984576	5160	3	100	Pass
	Temperature: +40°	5159.985312	5160	2.9	100	Pass
	Temperature: +30°	5159.9913	5160	1.7	100	Pass
	Temperature: +20°	5159.99997	5160	0	100	Pass
	Temperature: +10°	5159.987286	5160	2.5	100	Pass
	Temperature: 0°	5159.990007	5160	1.9	100	Pass
	Temperature: -10°	5159.991568	5160	1.6	100	Pass
	Temperature: -20°	5159.990587	5160	1.8	100	Pass
	Temperature: -30°	5159.988449	5160	2.2	100	Pass
5150 MHz - 5250 MHz - High Channel, 5245 MHz						
	Voltage: 115%	5244.987207	5245	2.4	100	Pass
	Voltage: 100%	5244.987238	5245	2.4	100	Pass
	Voltage: 85%	5244.987253	5245	2.4	100	Pass
	Temperature: +50°	5244.984305	5245	3	100	Pass
	Temperature: +40°	5244.985053	5245	2.9	100	Pass
	Temperature: +30°	5244.991234	5245	1.7	100	Pass
	Temperature: +20°	5244.999809	5245	0	100	Pass
	Temperature: +10°	5244.987141	5245	2.5	100	Pass
	Temperature: 0°	5244.989786	5245	2	100	Pass
	Temperature: -10°	5244.991437	5245	1.6	100	Pass
	Temperature: -20°	5244.990457	5245	1.8	100	Pass
	Temperature: -30°	5244.98828	5245	2.2	100	Pass
5725 MHz - 5850 MHz - Low Channel, 5735 MHz						
	Voltage: 115%	5734.986209	5735	2.4	100	Pass
	Voltage: 100%	5734.986191	5735	2.4	100	Pass
	Voltage: 85%	5734.98617	5735	2.4	100	Pass
	Temperature: +50°	5734.982817	5735	3	100	Pass
	Temperature: +40°	5734.98364	5735	2.9	100	Pass
	Temperature: +30°	5734.990357	5735	1.7	100	Pass
	Temperature: +20°	5734.999862	5735	0	100	Pass
	Temperature: +10°	5734.985922	5735	2.5	100	Pass
	Temperature: 0°	5734.988872	5735	1.9	100	Pass
	Temperature: -10°	5734.990715	5735	1.6	100	Pass
	Temperature: -20°	5734.989526	5735	1.8	100	Pass
	Temperature: -30°	5734.987206	5735	2.2	100	Pass
5725 MHz - 5850 MHz - High Channel, 5845 MHz						
	Voltage: 115%	5844.985953	5845	2.4	100	Pass
	Voltage: 100%	5844.985873	5845	2.4	100	Pass
	Voltage: 85%	5844.985888	5845	2.4	100	Pass
	Temperature: +50°	5844.982443	5845	3	100	Pass
	Temperature: +40°	5844.983323	5845	2.9	100	Pass
	Temperature: +30°	5844.990196	5845	1.7	100	Pass
	Temperature: +20°	5845.000206	5845	0	100	Pass
	Temperature: +10°	5844.985646	5845	2.5	100	Pass
	Temperature: 0°	5844.98858	5845	2	100	Pass
	Temperature: -10°	5844.990464	5845	1.6	100	Pass
	Temperature: -20°	5844.989287	5845	1.8	100	Pass
	Temperature: -30°	5844.986977	5845	2.2	100	Pass

# FREQUENCY STABILITY

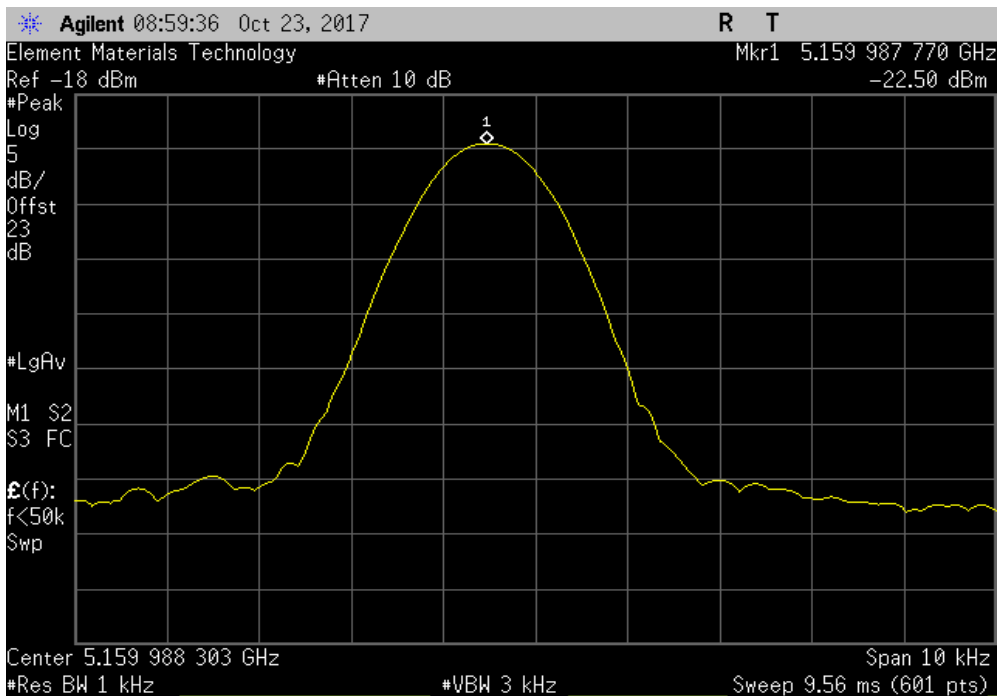


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5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Voltage: 115%					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
5159.987362	5160	2.5	100	Pass	



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Voltage: 100%					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
5159.98777	5160	2.4	100	Pass	



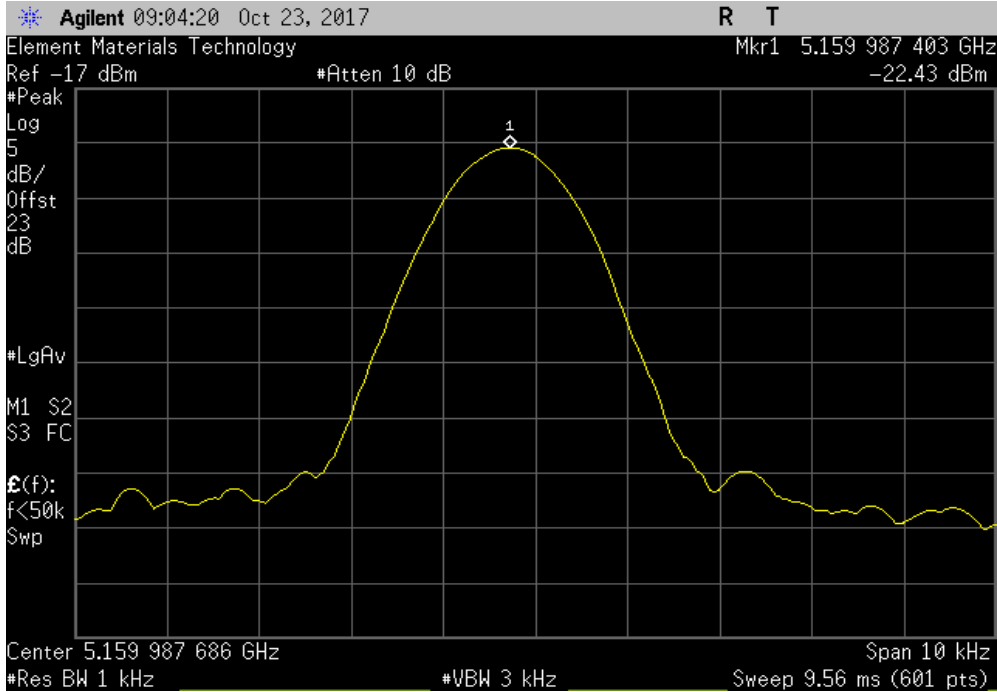


# FREQUENCY STABILITY

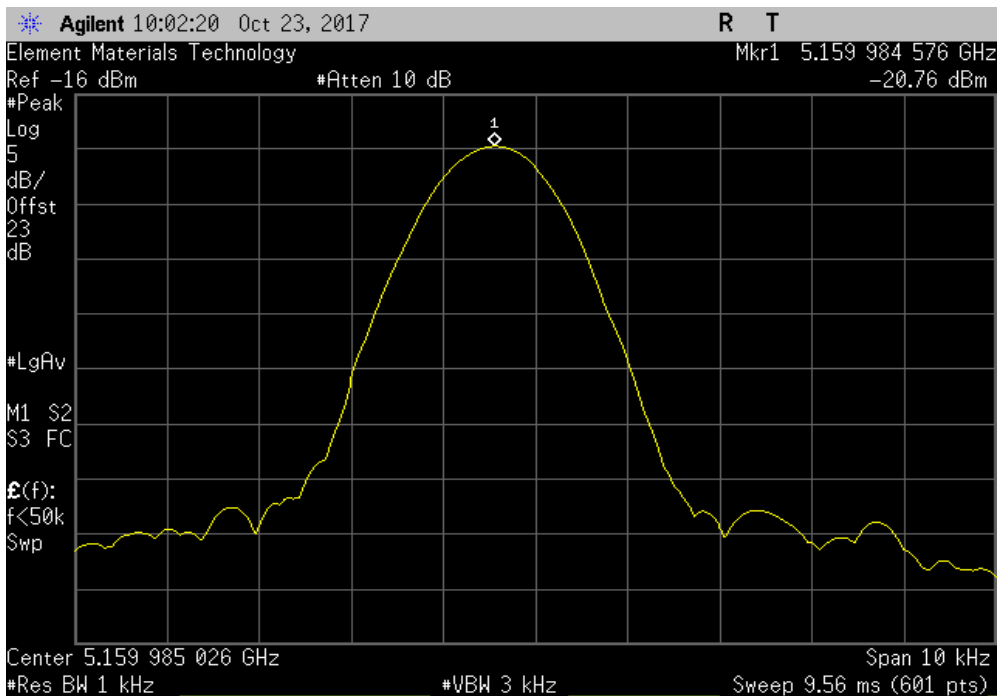


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Voltage: 85%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.987403	5160	2.4	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: +50°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.984576	5160	3	100	Pass

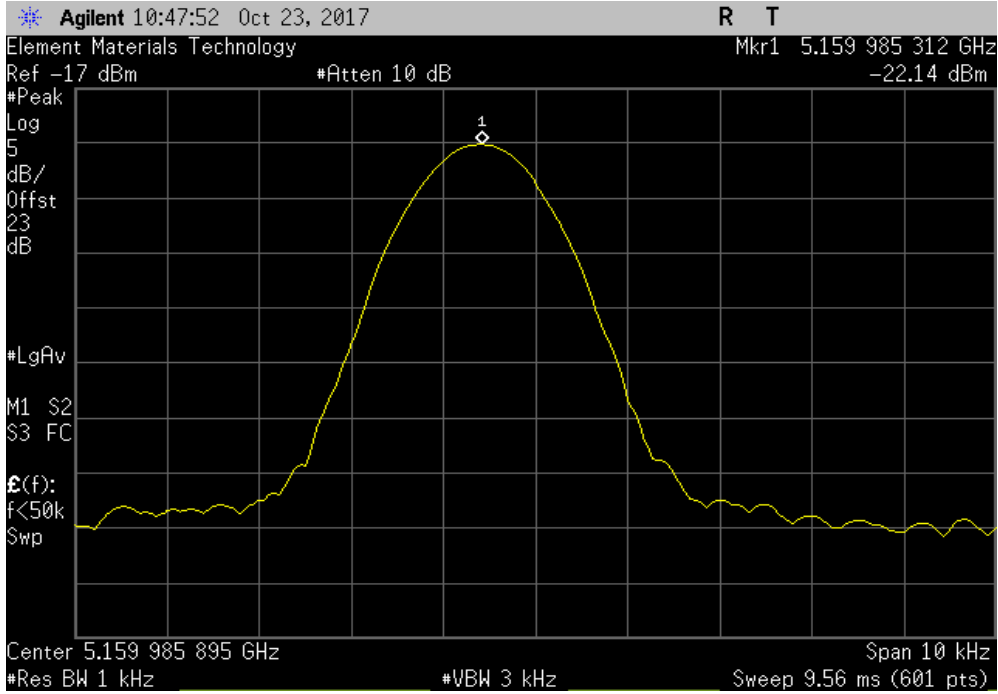


# FREQUENCY STABILITY

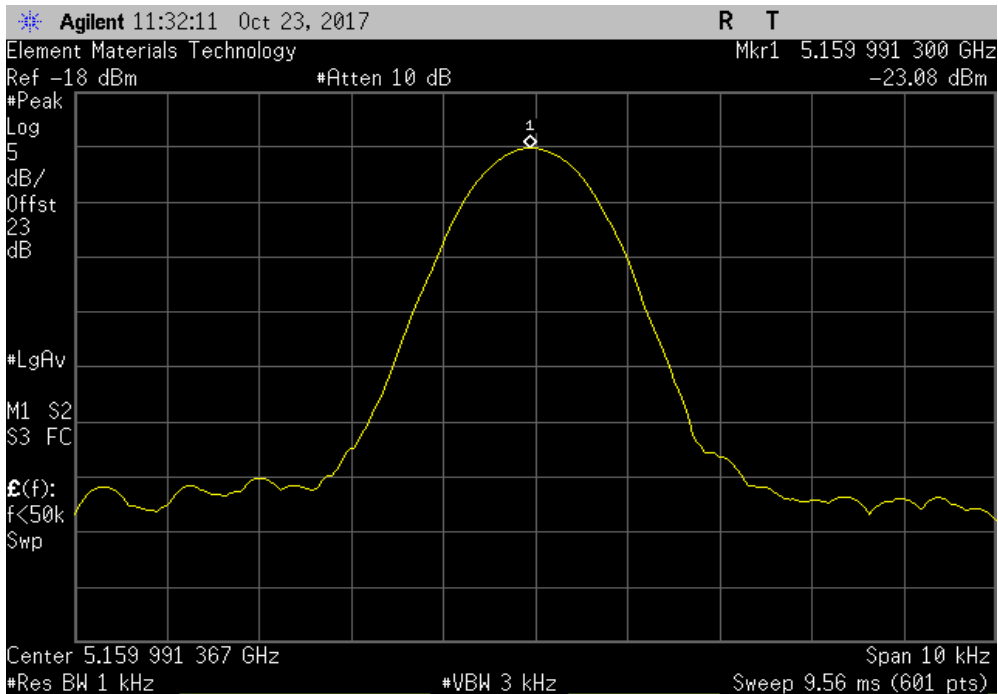


Tb1Tx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: +40°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.985312	5160	2.9	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: +30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.9913	5160	1.7	100	Pass

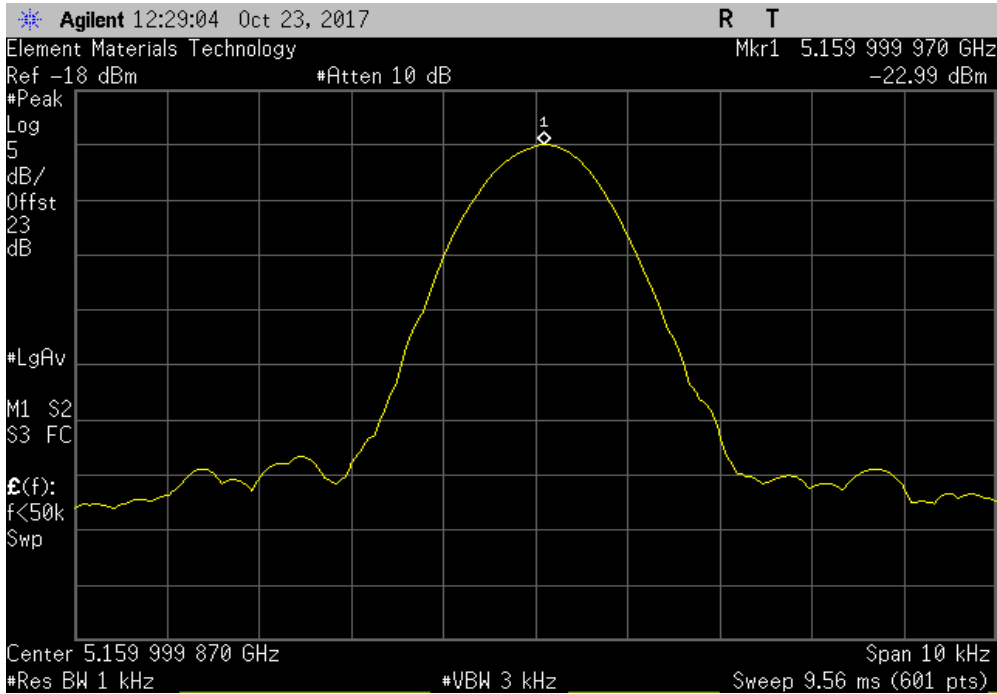


# FREQUENCY STABILITY

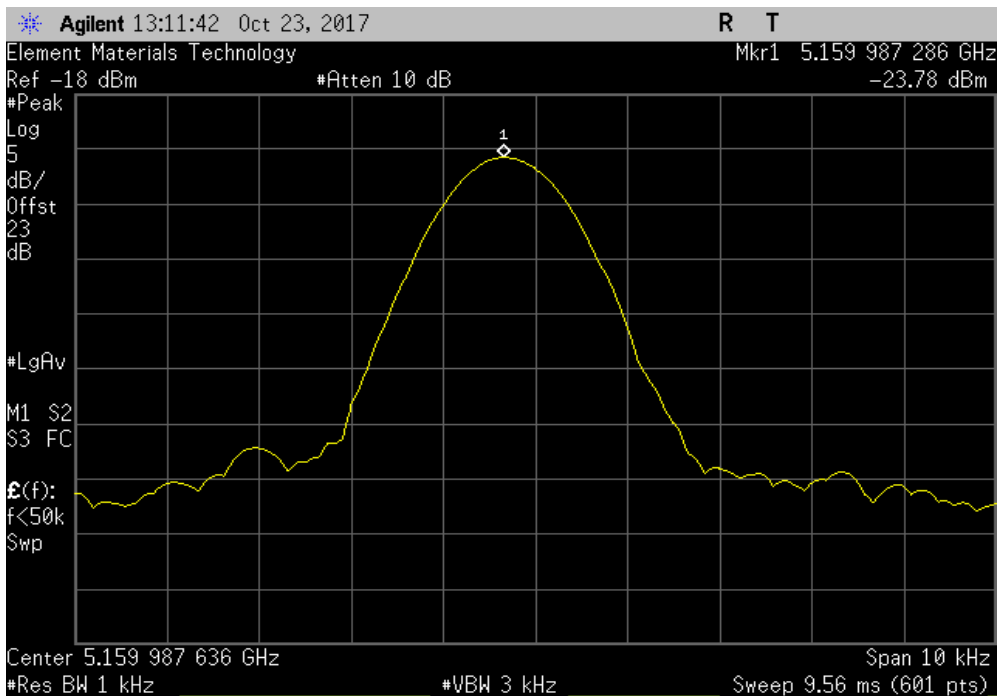


Tb1Tx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: +20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.99997	5160	0	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: +10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.987286	5160	2.5	100	Pass

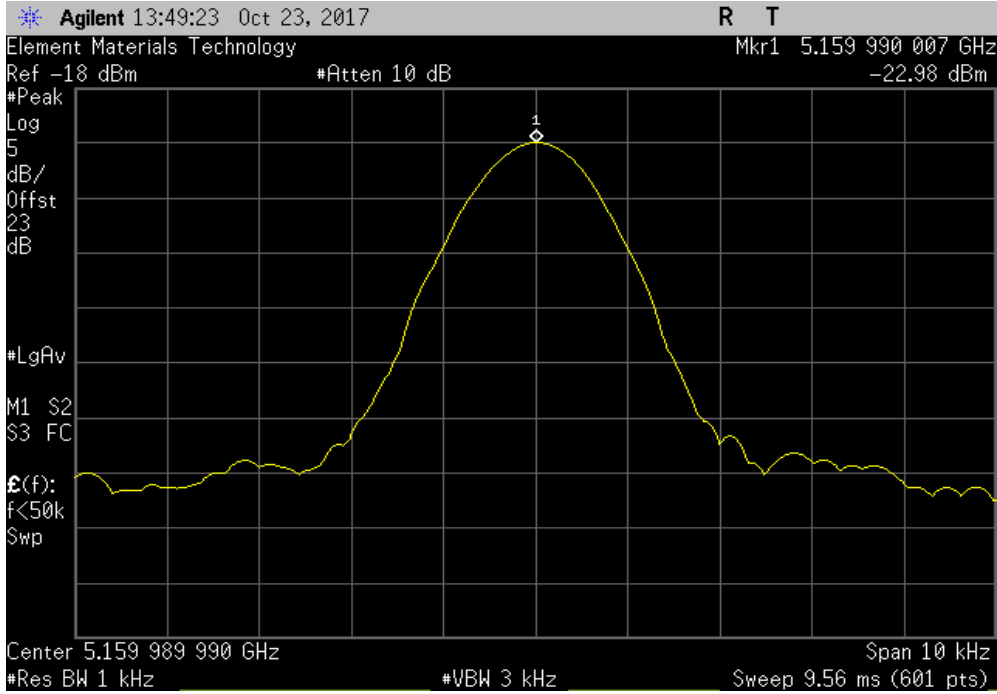


# FREQUENCY STABILITY

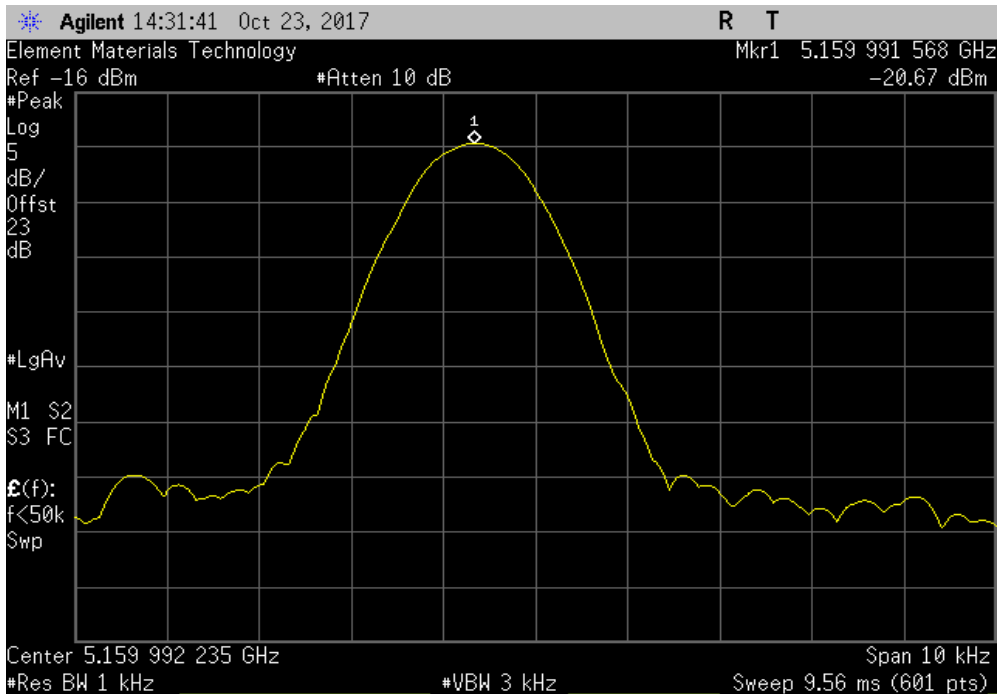


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: 0°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.990007	5160	1.9	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: -10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.991568	5160	1.6	100	Pass

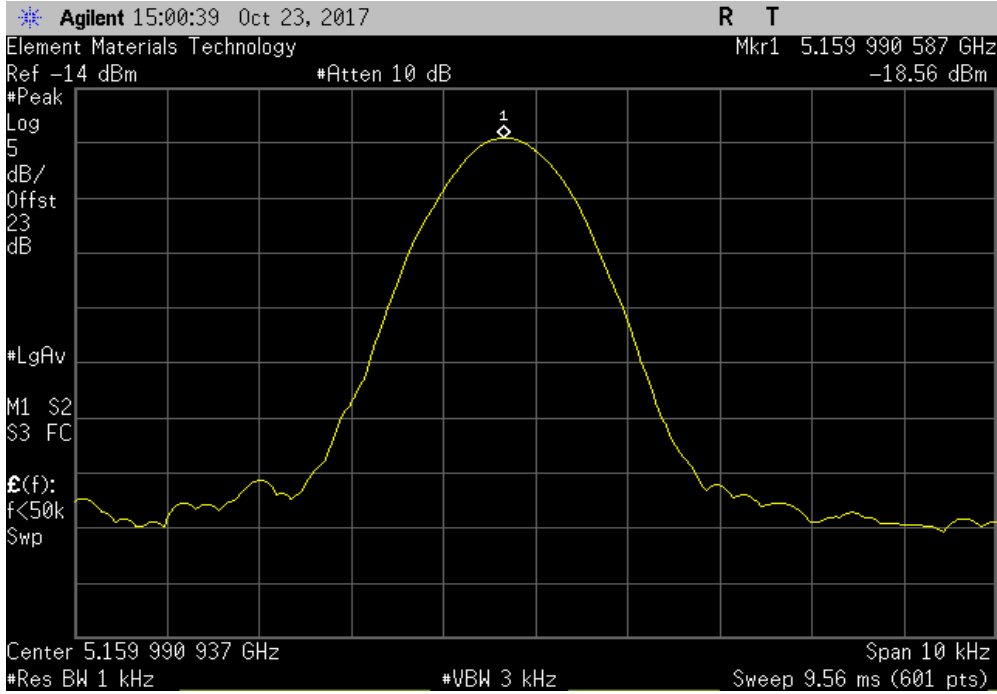


# FREQUENCY STABILITY

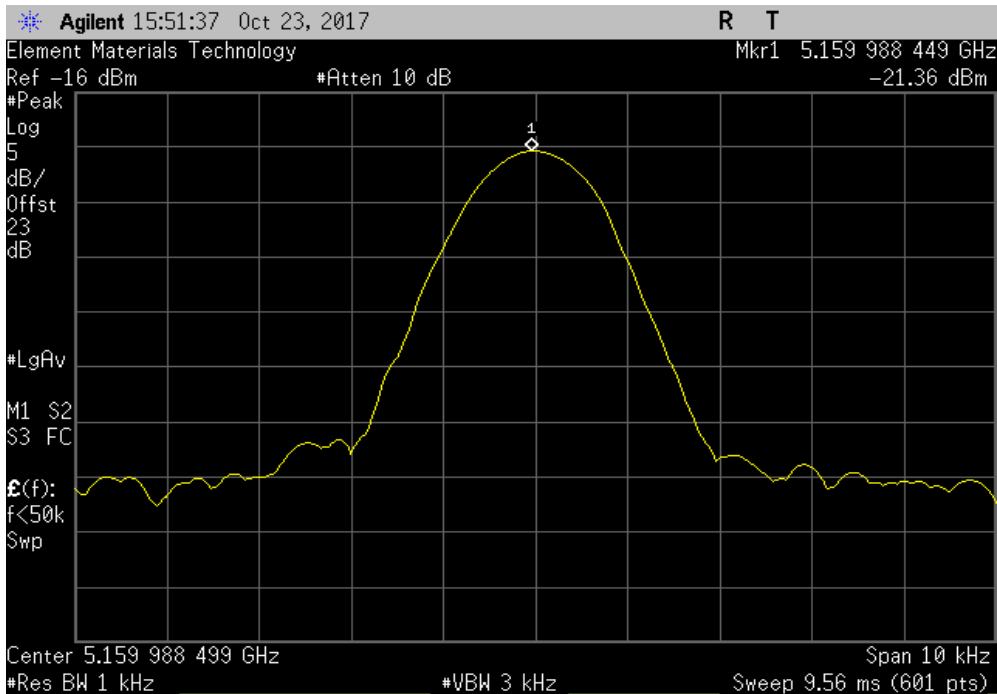


Tb1Tx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: -20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.990587	5160	1.8	100	Pass



5150 MHz - 5250 MHz - Low Channel, 5160 MHz, Temperature: -30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5159.988449	5160	2.2	100	Pass

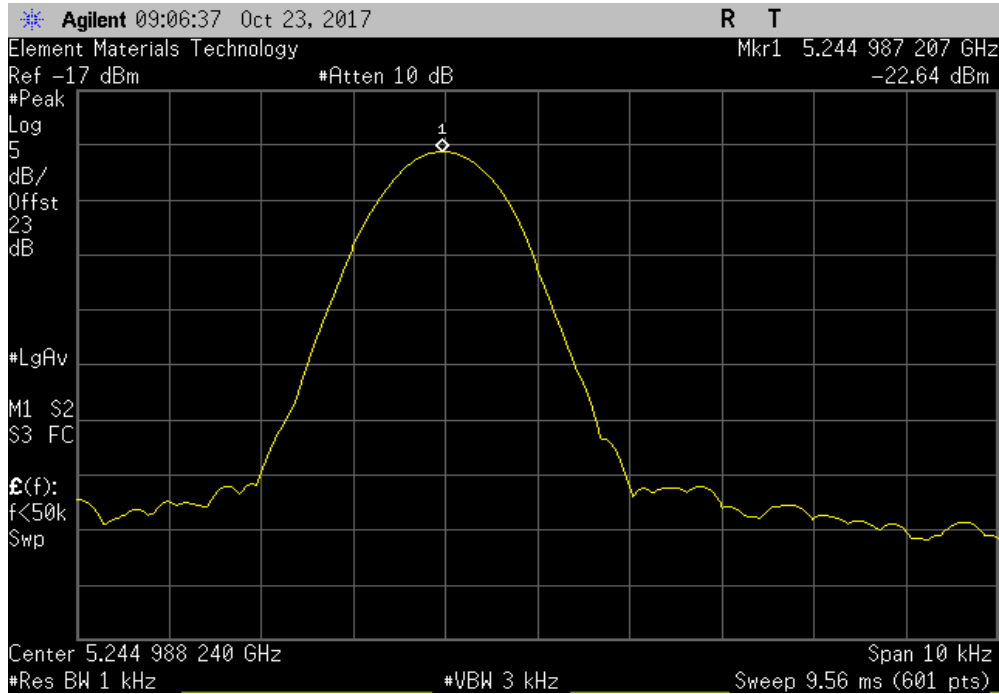


# FREQUENCY STABILITY

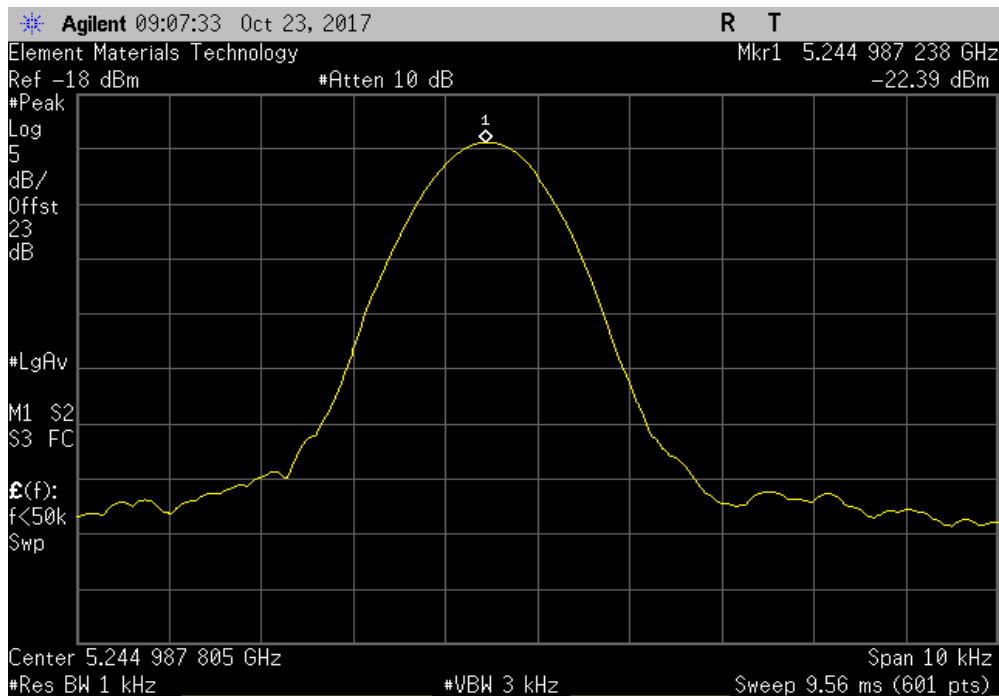


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Voltage: 115%					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
5244.987207	5245	2.4	100	Pass	



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Voltage: 100%					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
5244.987238	5245	2.4	100	Pass	

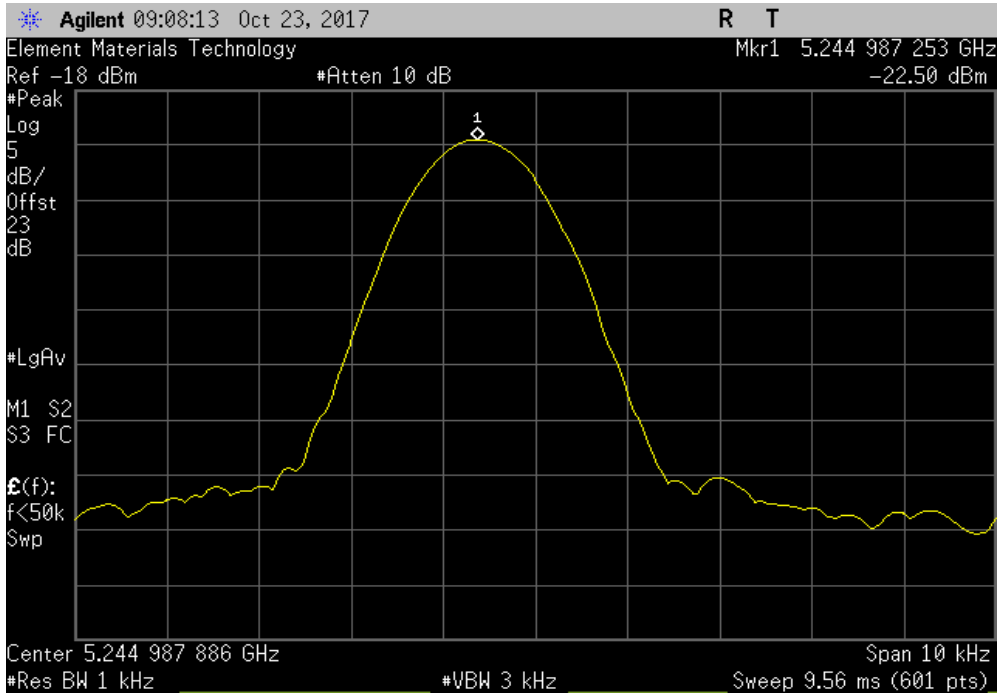


# FREQUENCY STABILITY

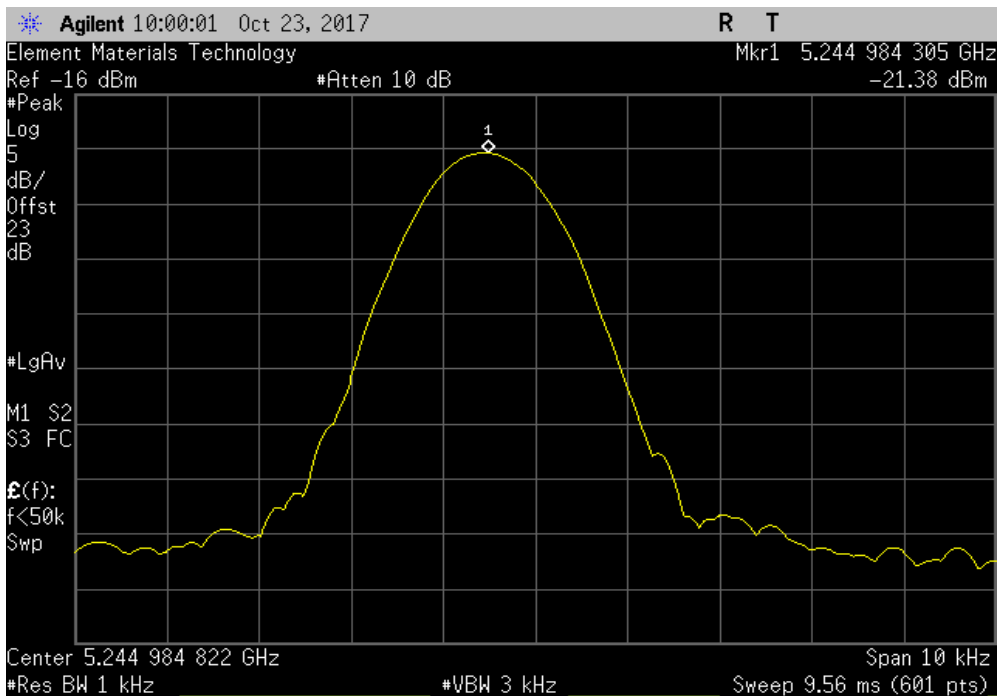


Tb1Tx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Voltage: 85%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.987253	5245	2.4	100	Pass



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: +50°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.984305	5245	3	100	Pass

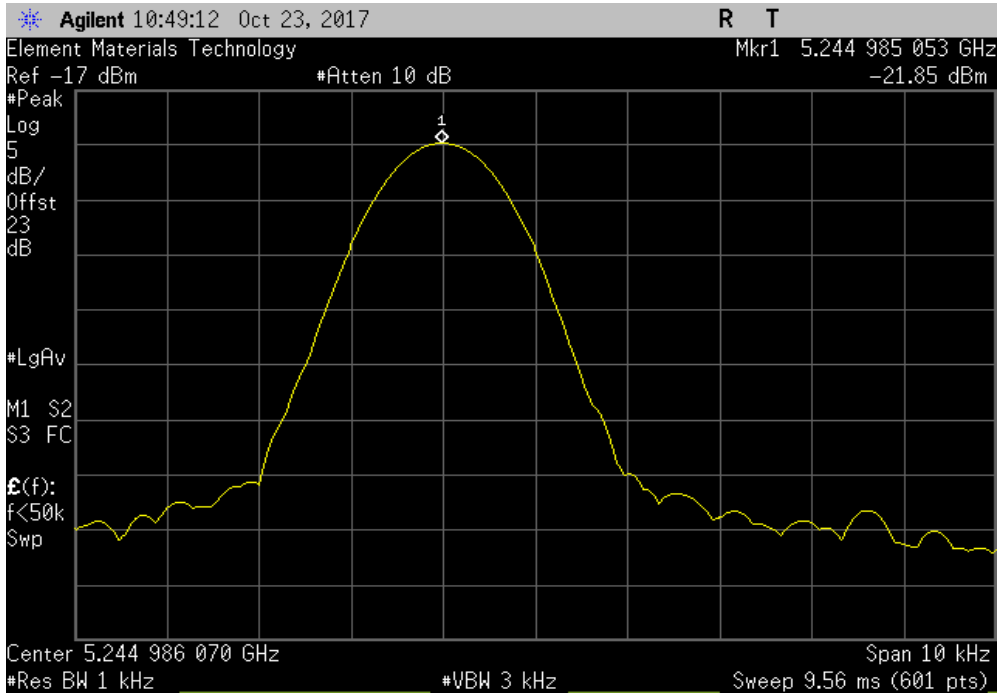


# FREQUENCY STABILITY

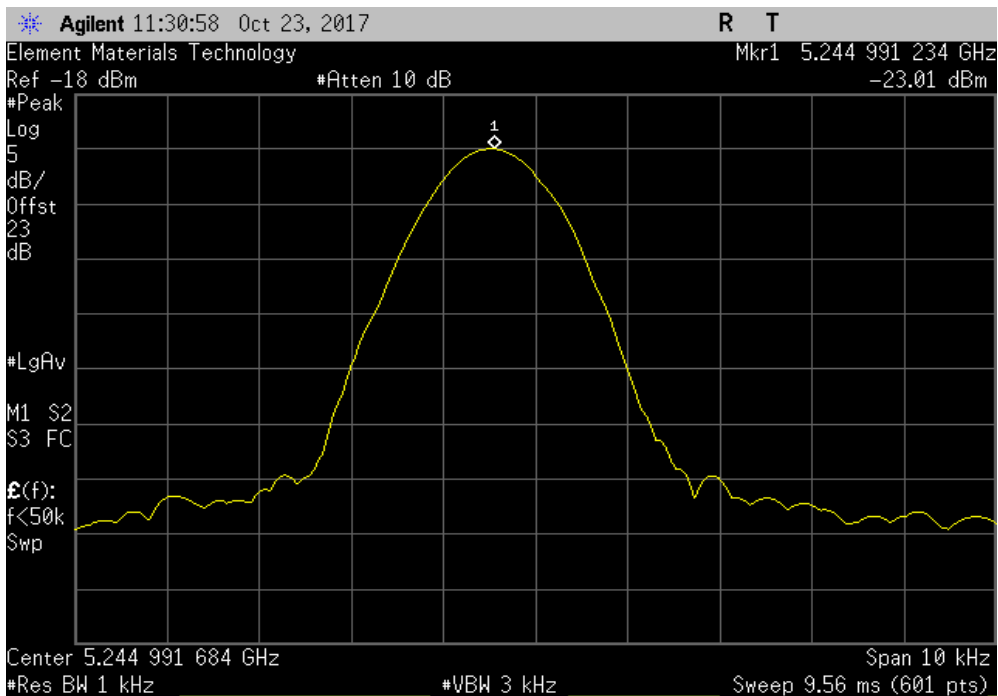


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: +40°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.985053	5245	2.9	100	Pass



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: +30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.991234	5245	1.7	100	Pass



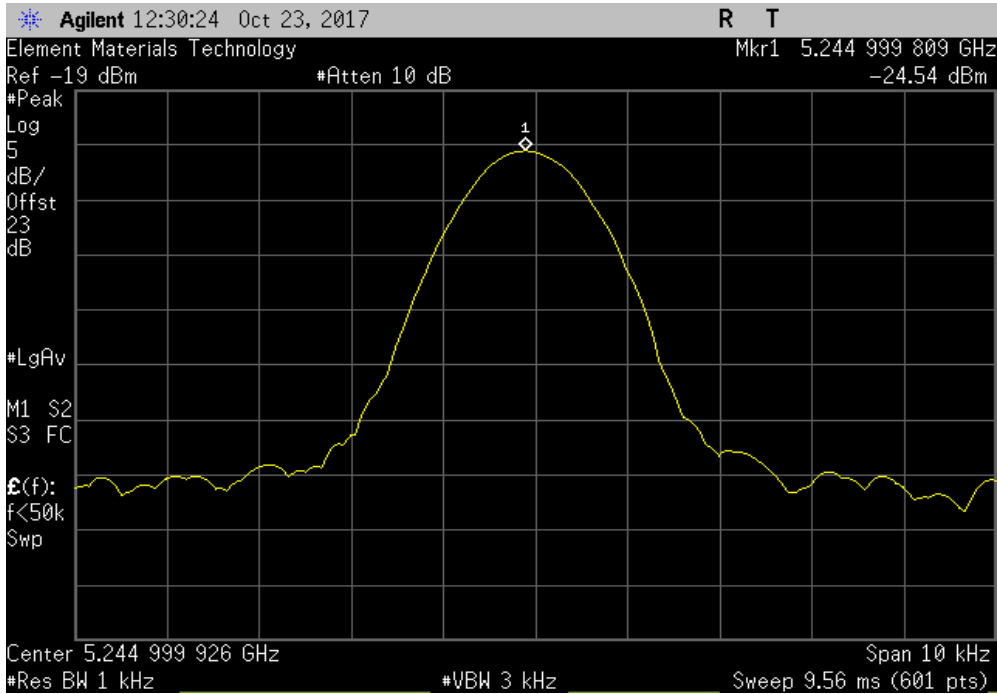


# FREQUENCY STABILITY

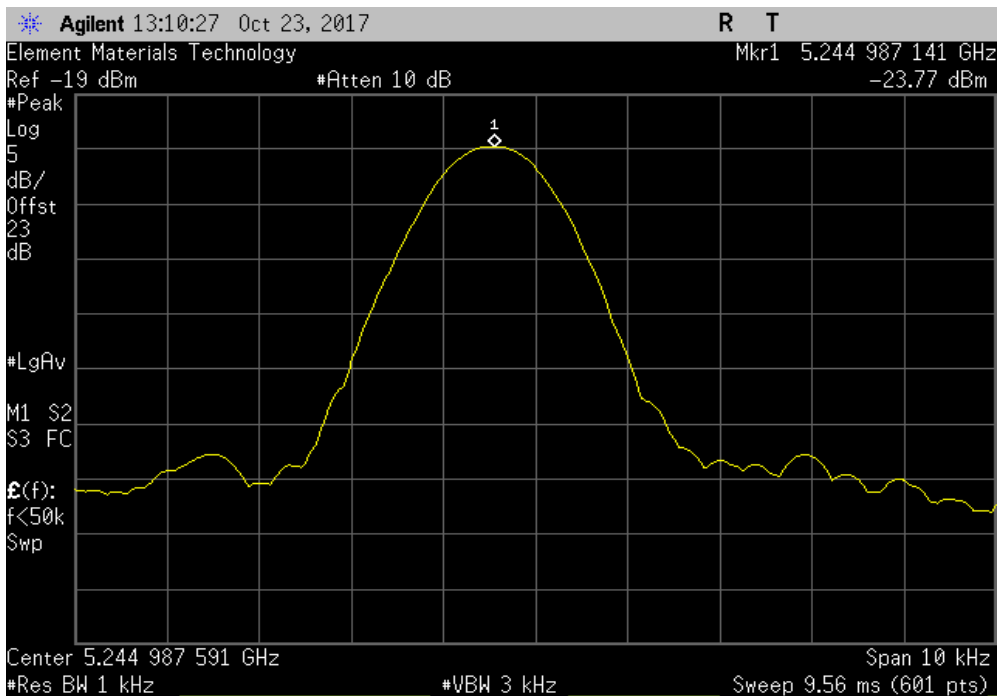


Tb1Tx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: +20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.999809	5245	0	100	Pass



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: +10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.987141	5245	2.5	100	Pass

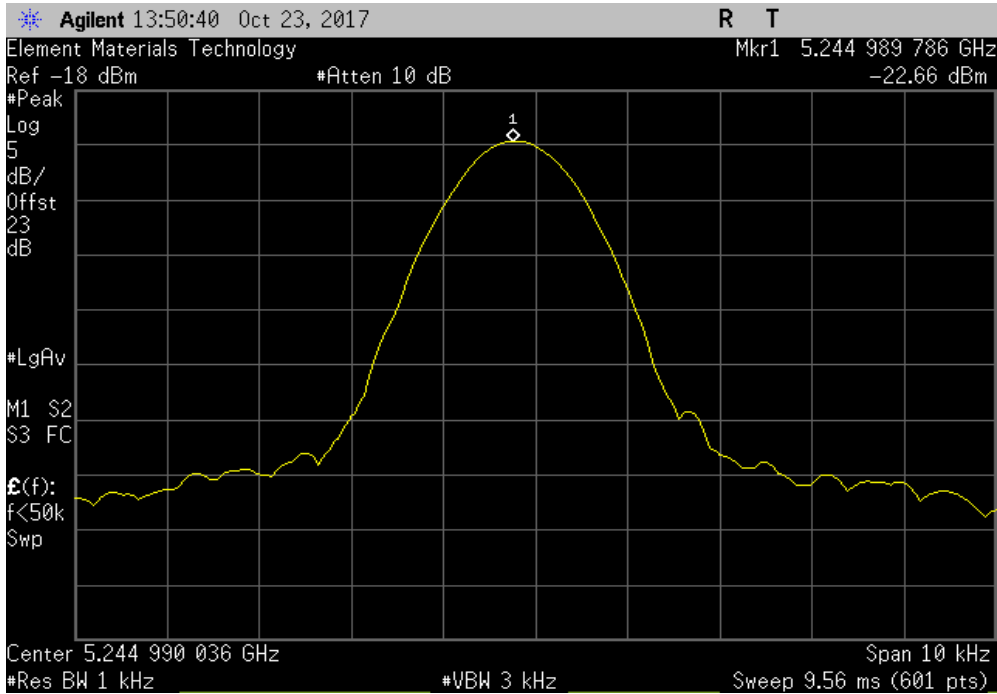


# FREQUENCY STABILITY

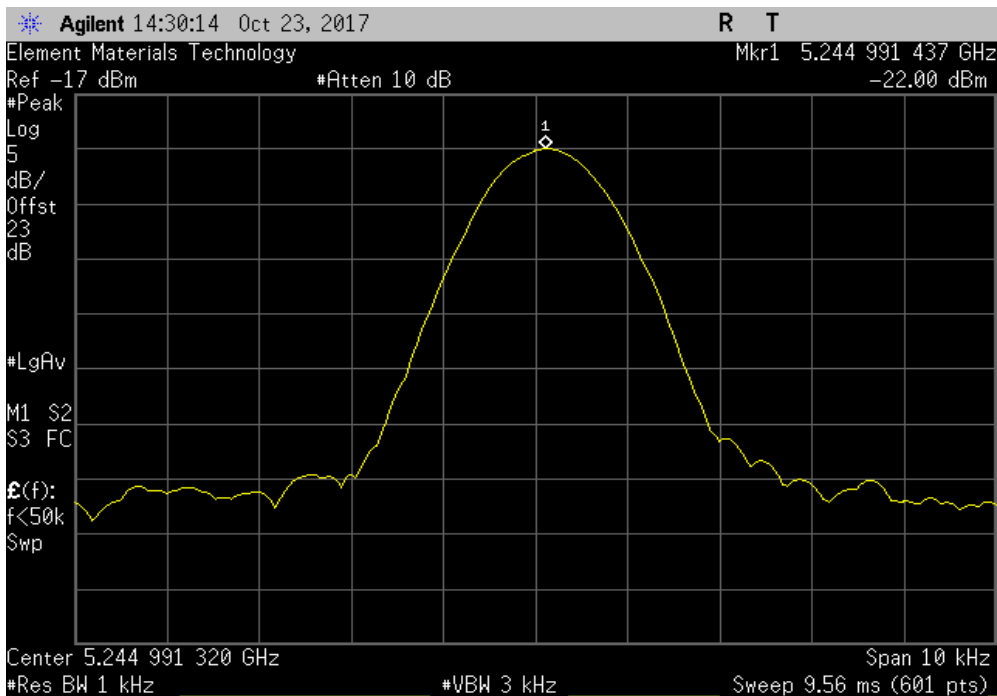


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: 0°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.989786	5245	2	100	Pass



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: -10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.991437	5245	1.6	100	Pass

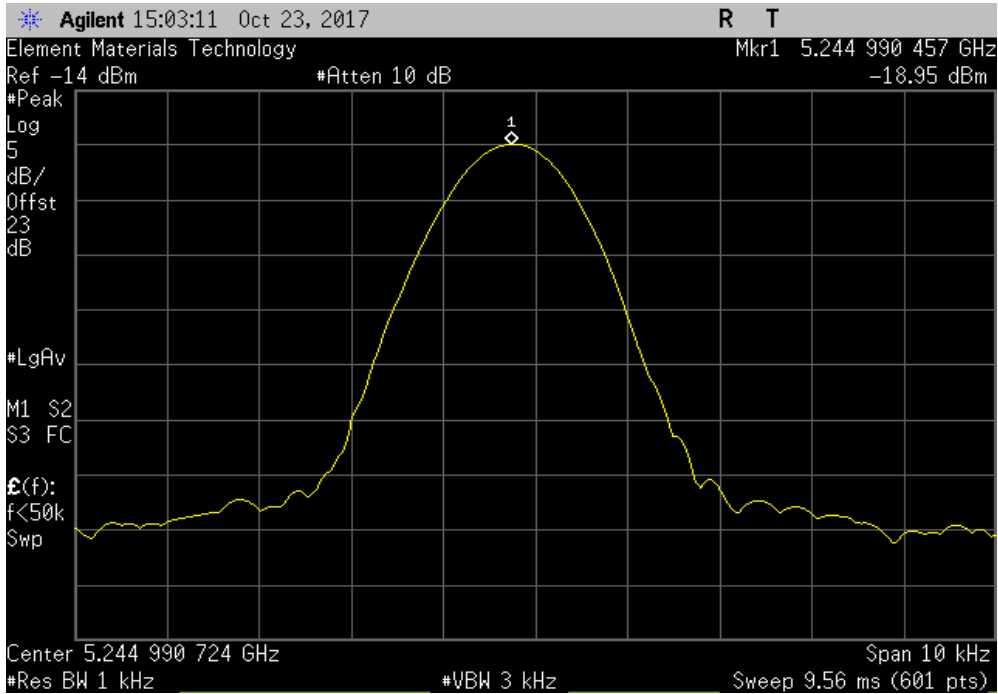


# FREQUENCY STABILITY

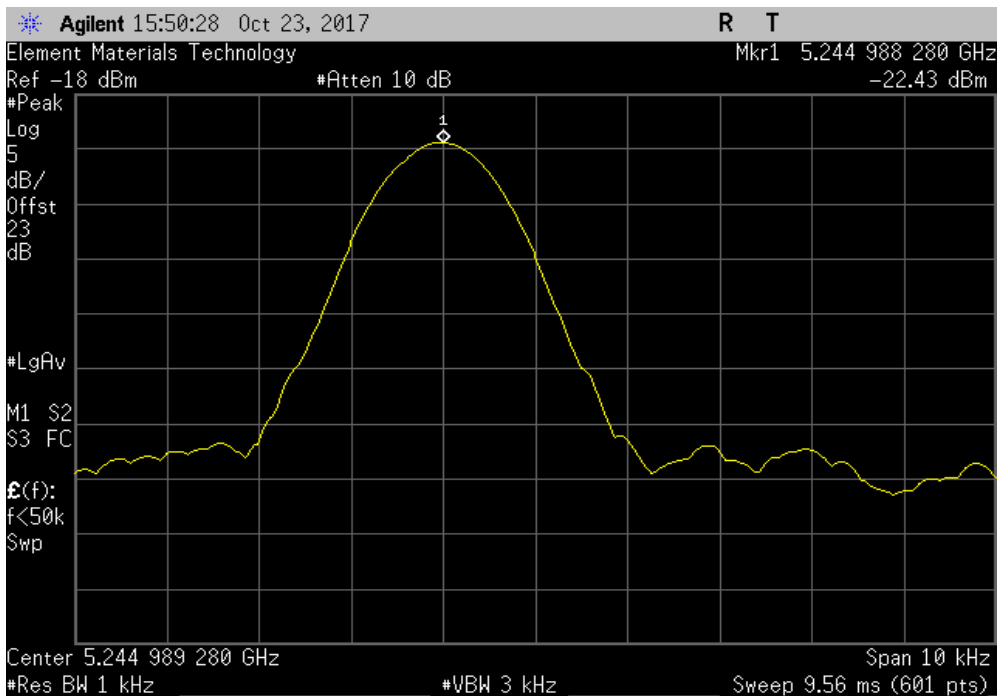


Tbftx 2017.09.26 XMI 2017.09.21

5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: -20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.990457	5245	1.8	100	Pass



5150 MHz - 5250 MHz - High Channel, 5245 MHz, Temperature: -30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5244.98828	5245	2.2	100	Pass

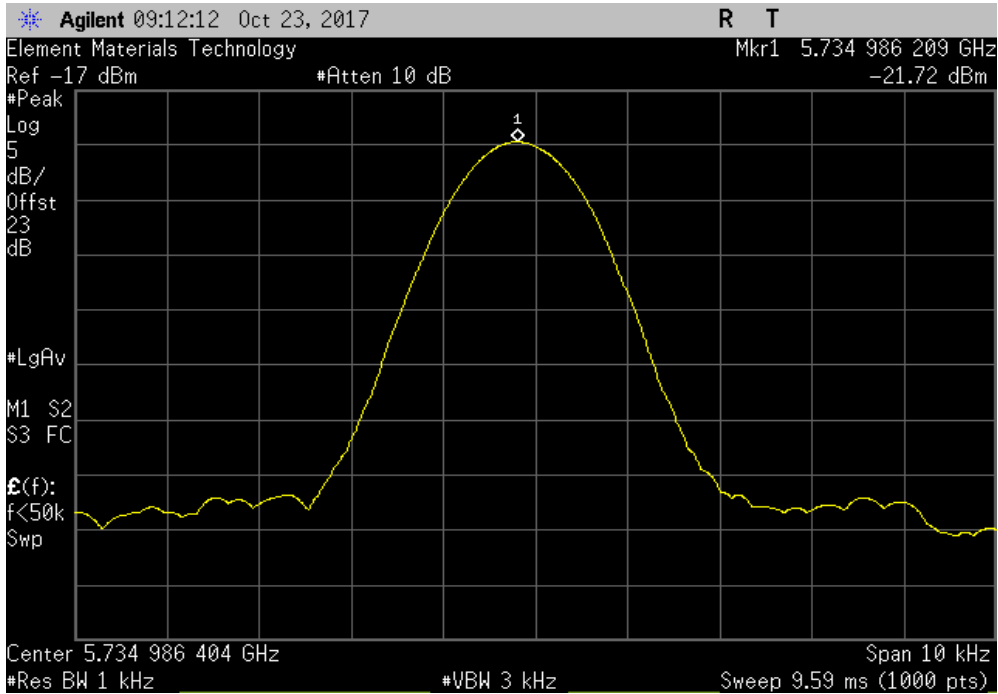


# FREQUENCY STABILITY

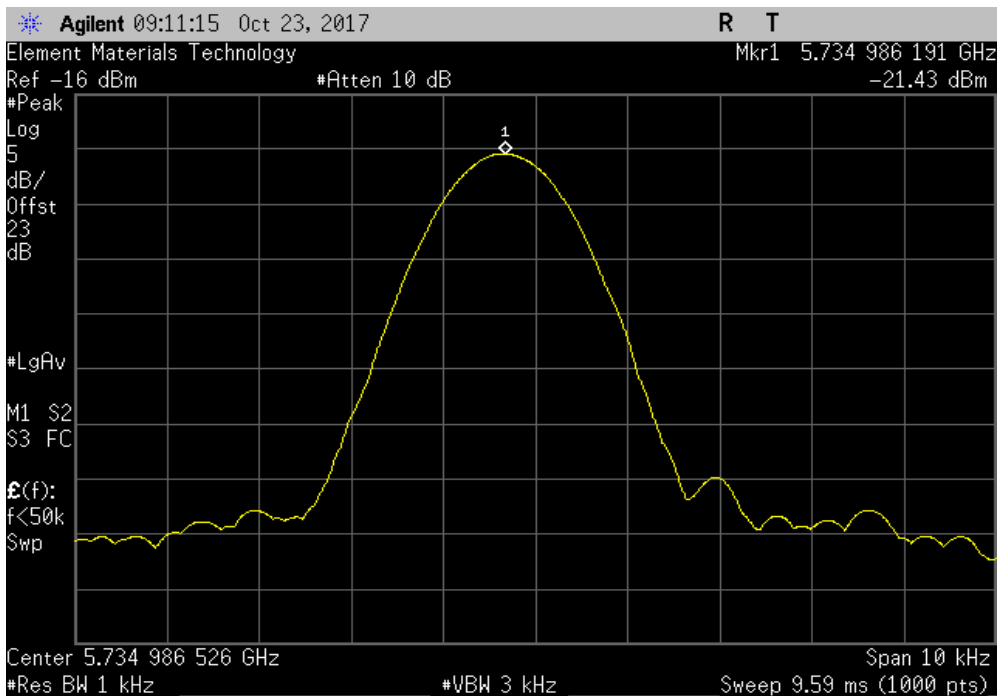


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Voltage: 115%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.986209	5735	2.4	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Voltage: 100%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.986191	5735	2.4	100	Pass

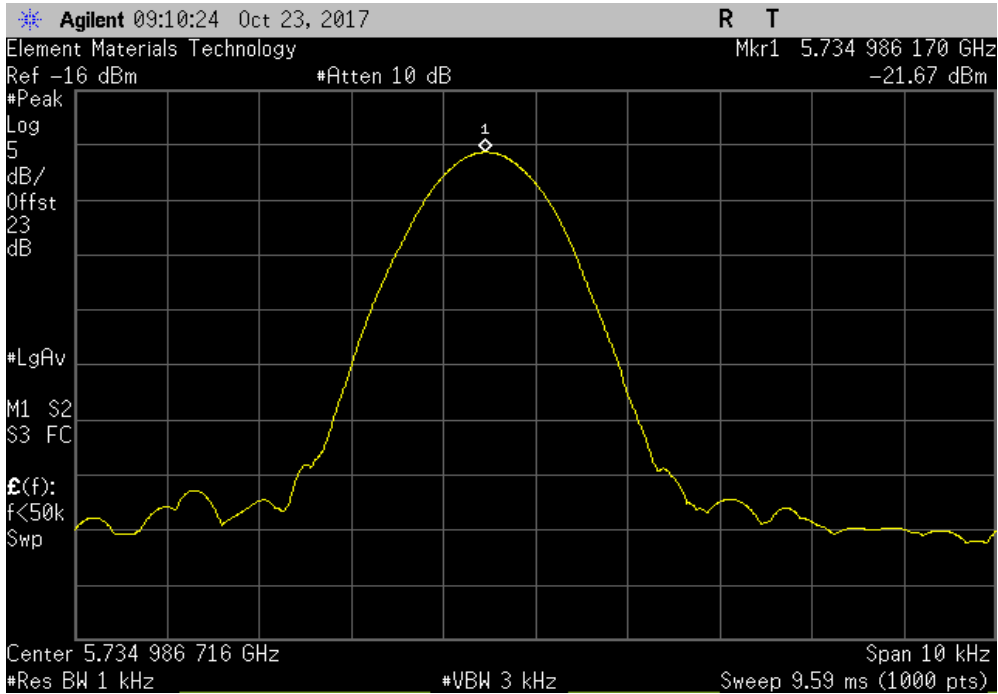


# FREQUENCY STABILITY

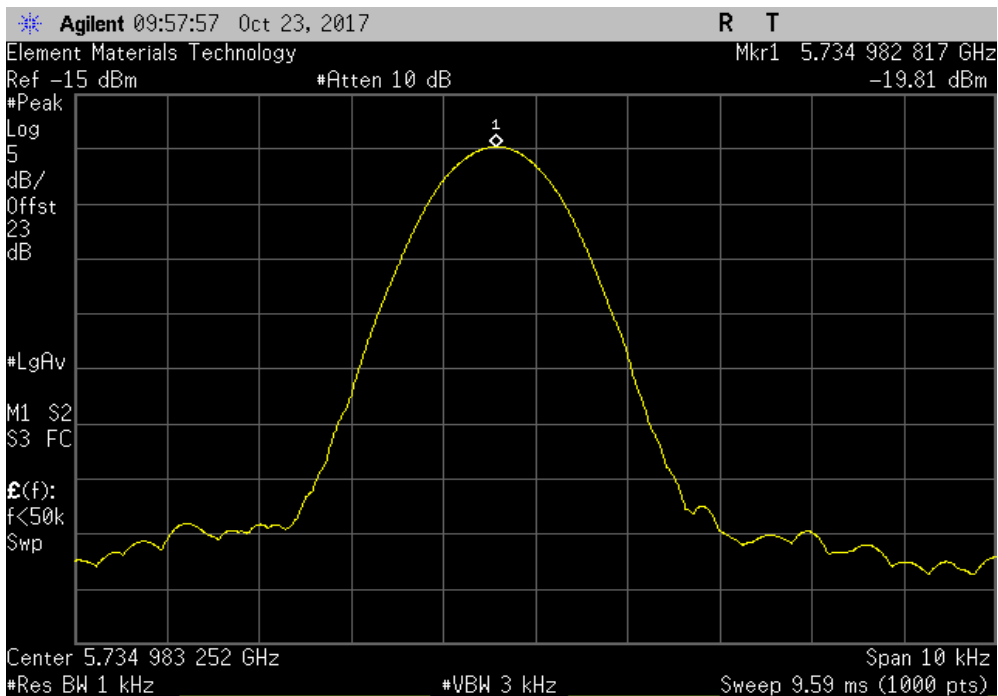


Tb1Tx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Voltage: 85%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.98617	5735	2.4	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: +50°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.982817	5735	3	100	Pass

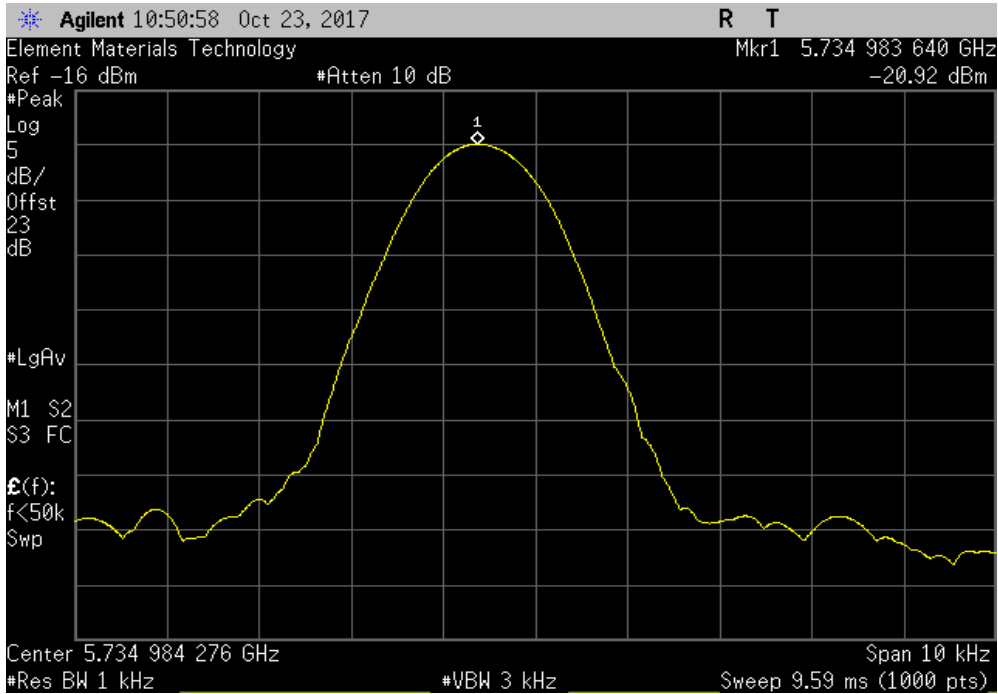


# FREQUENCY STABILITY

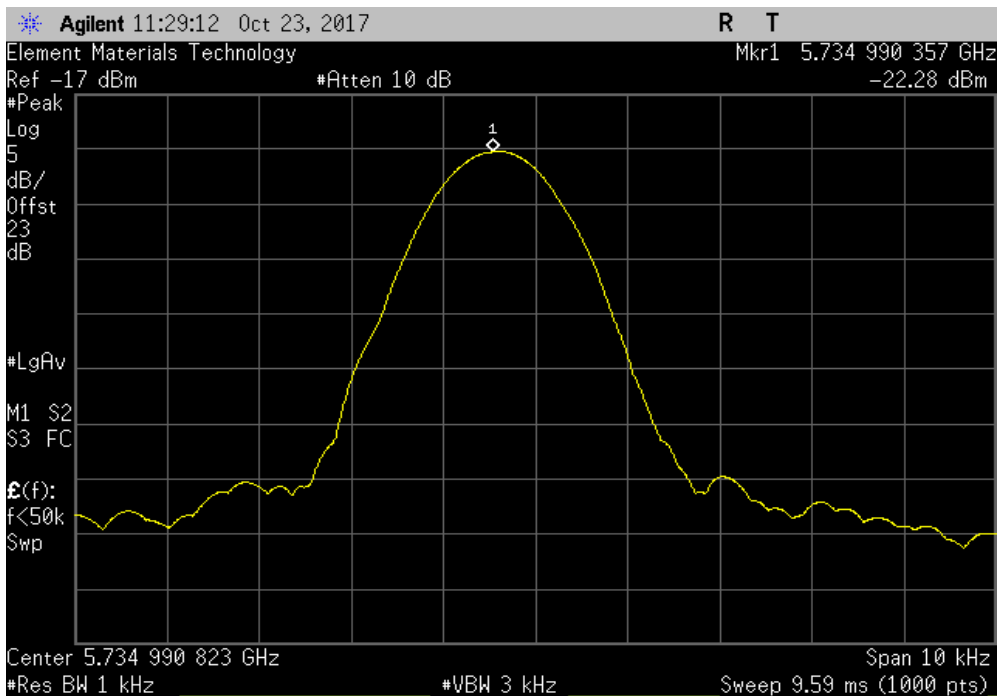


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: +40°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.98364	5735	2.9	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: +30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.990357	5735	1.7	100	Pass

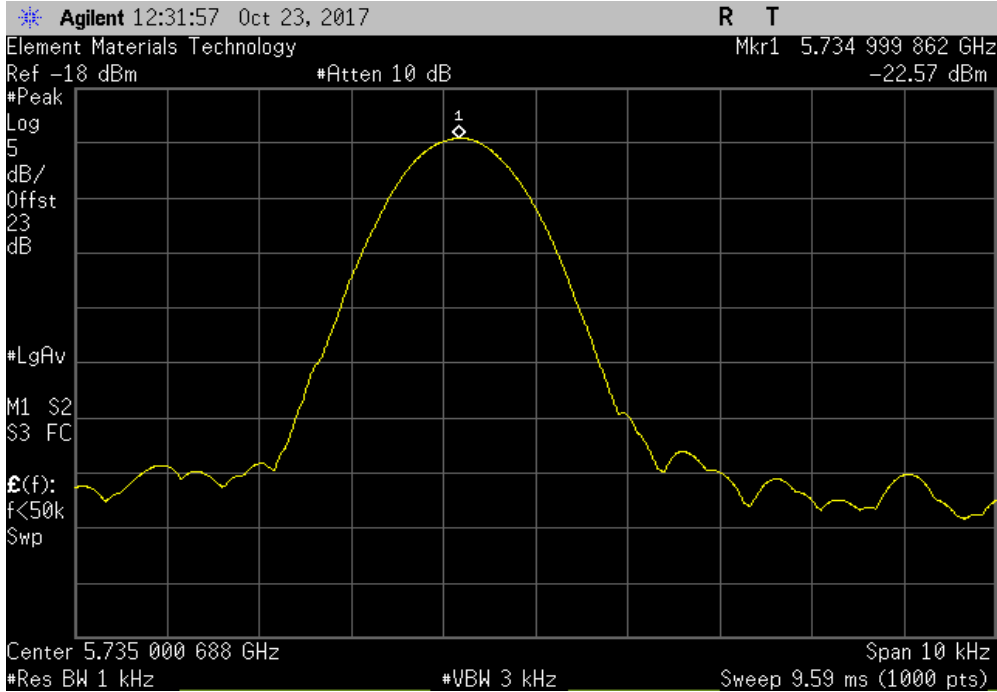


# FREQUENCY STABILITY

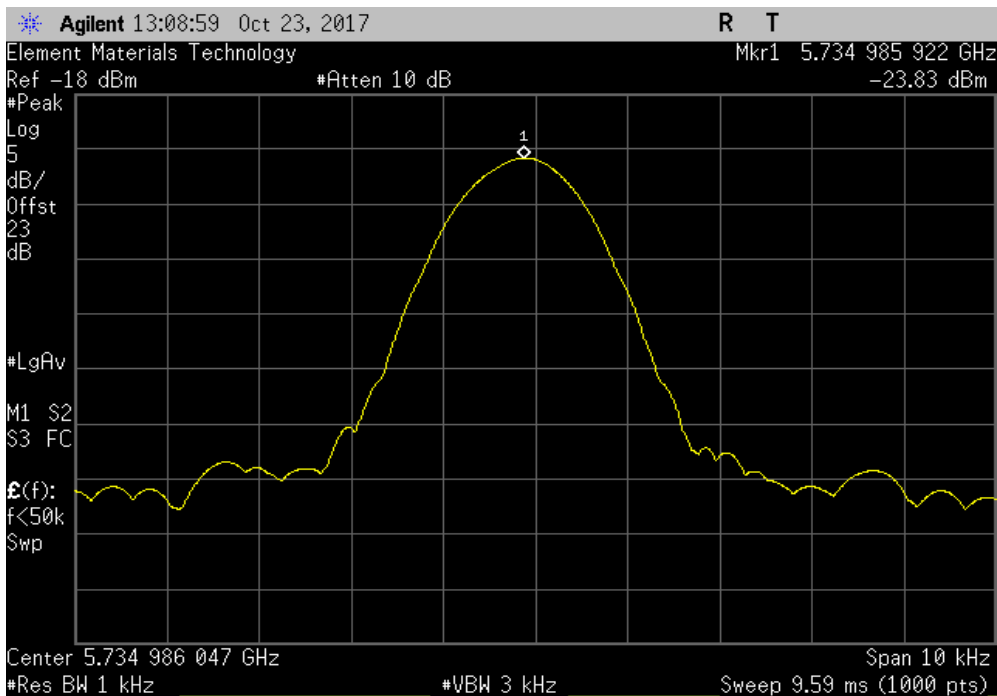


Tb1Tx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: +20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.999862	5735	0	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: +10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.985922	5735	2.5	100	Pass

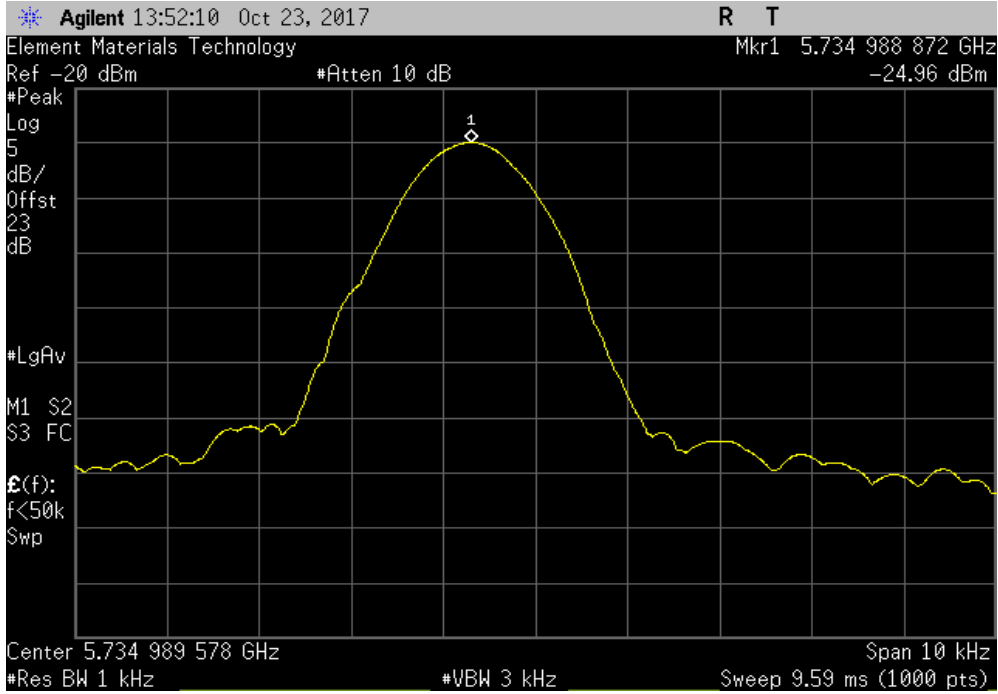


# FREQUENCY STABILITY

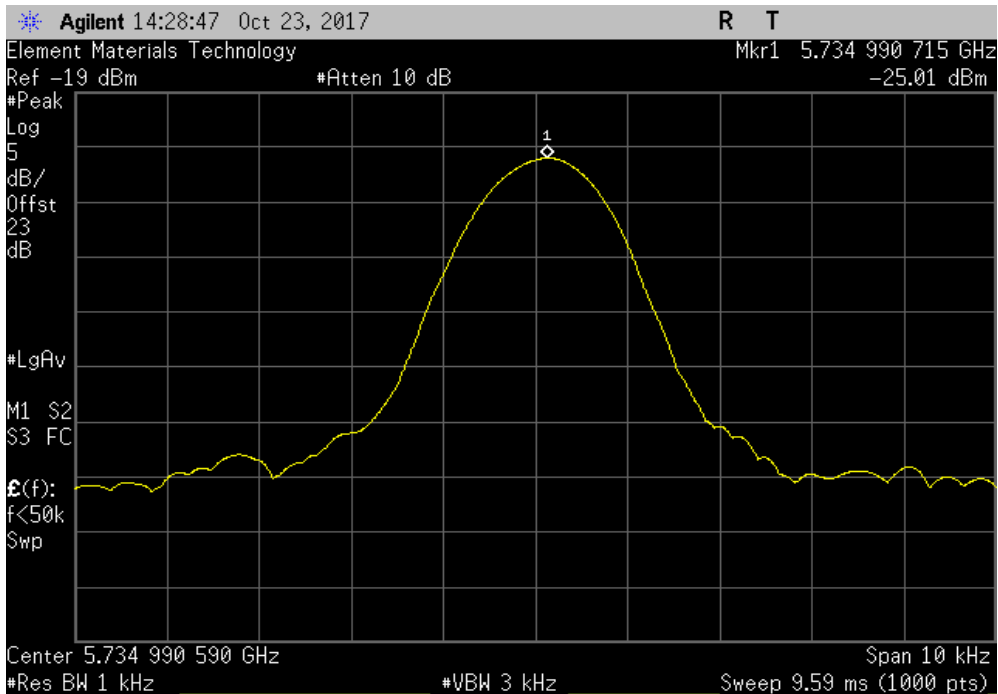


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: 0°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.988872	5735	1.9	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: -10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.990715	5735	1.6	100	Pass



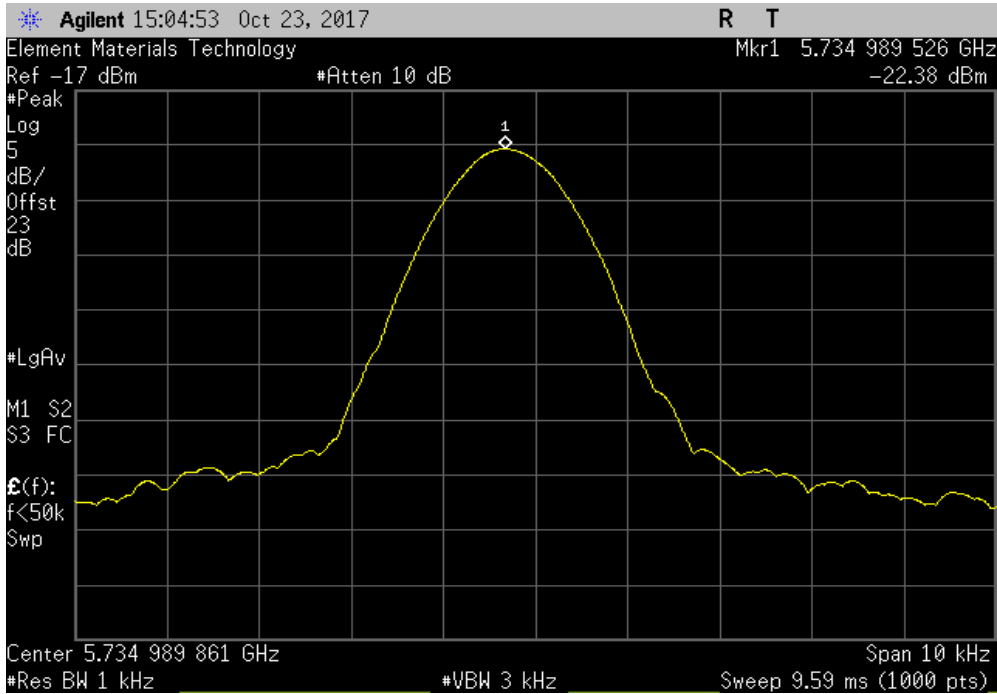


# FREQUENCY STABILITY

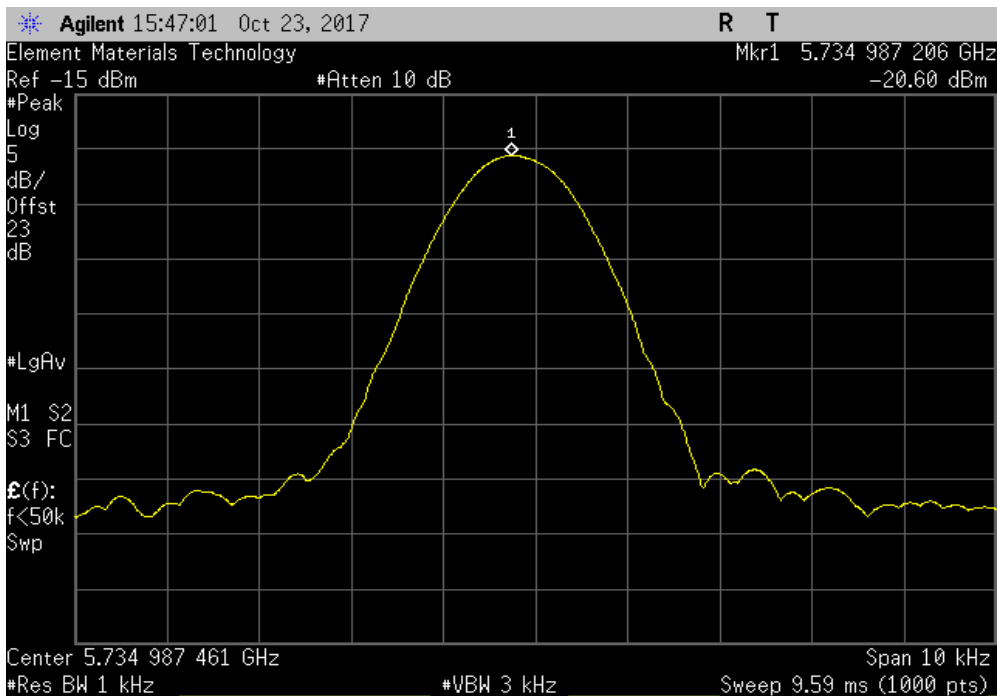


Tb1Tx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: -20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.989526	5735	1.8	100	Pass



5725 MHz - 5850 MHz - Low Channel, 5735 MHz, Temperature: -30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5734.987206	5735	2.2	100	Pass

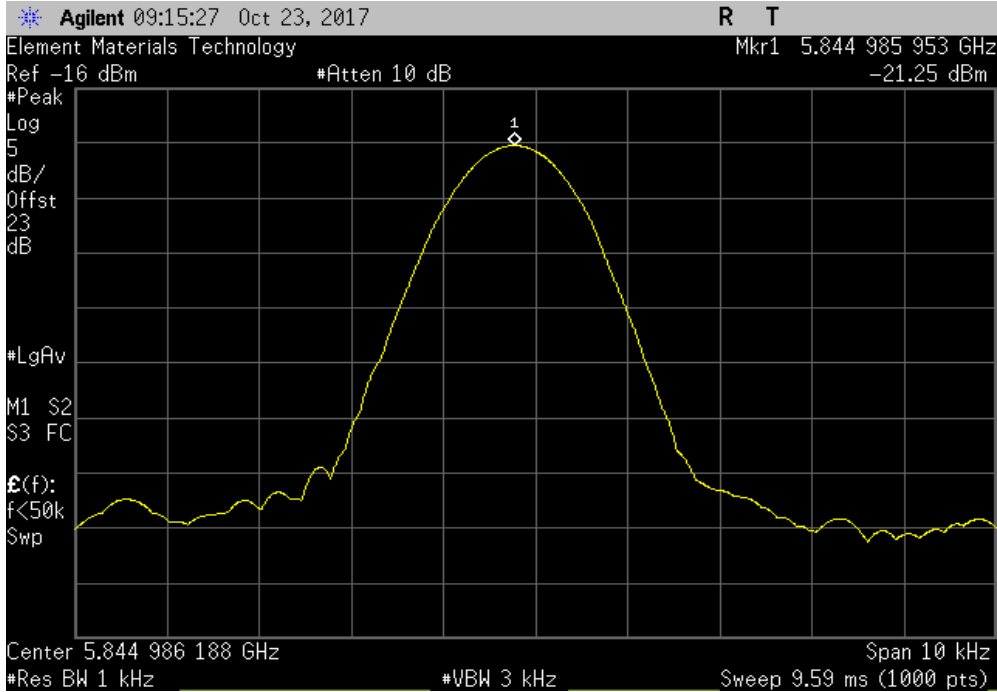


# FREQUENCY STABILITY

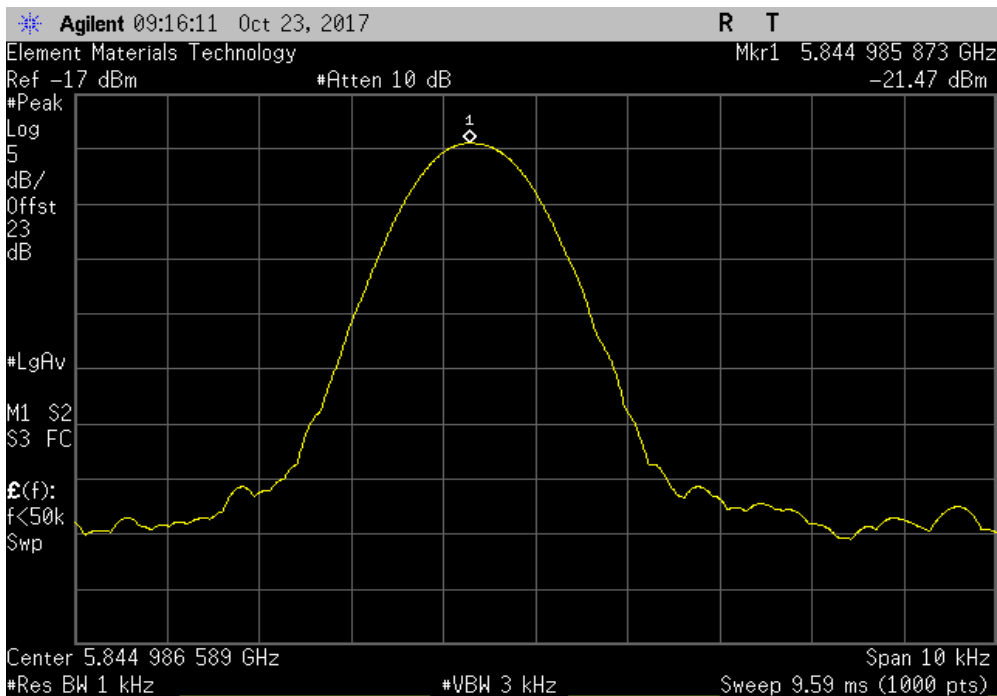


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Voltage: 115%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.985953	5845	2.4	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Voltage: 100%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.985873	5845	2.4	100	Pass

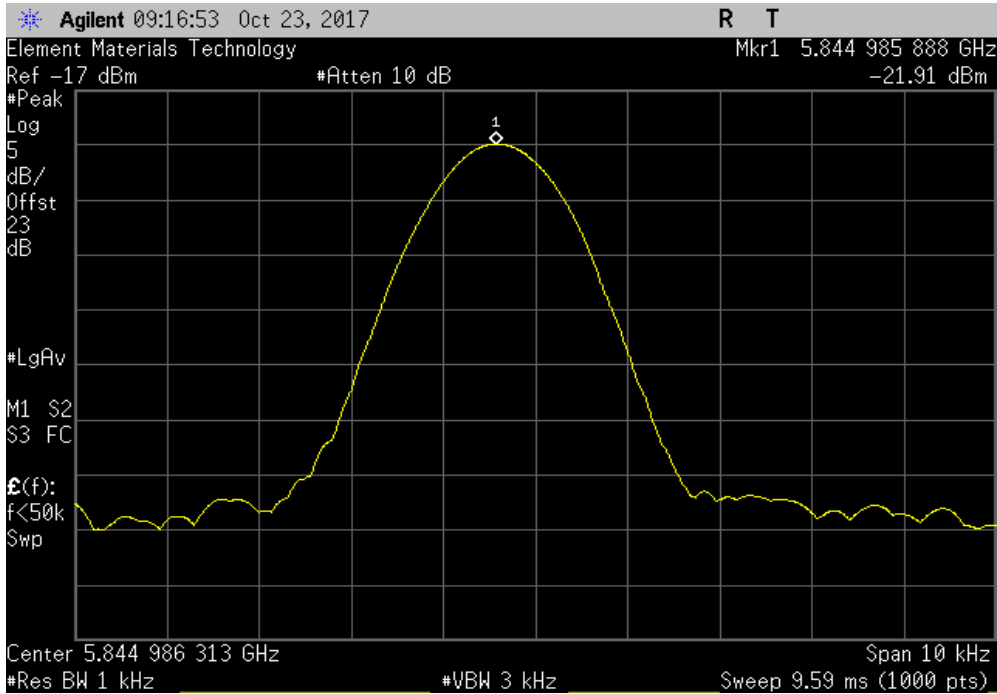


# FREQUENCY STABILITY

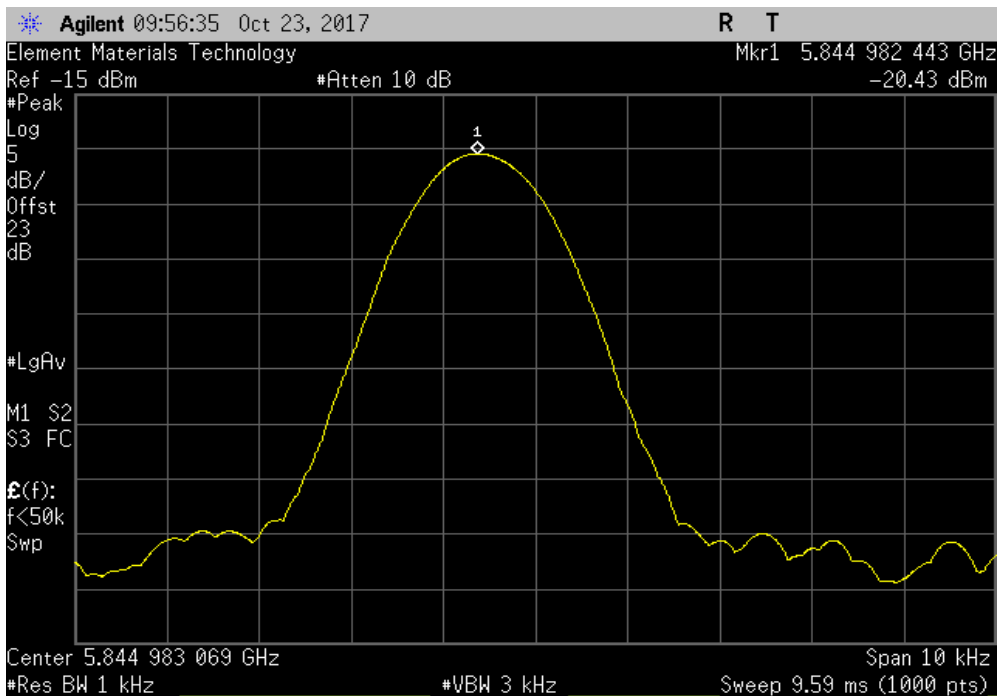


Tb1Tx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Voltage: 85%					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.985888	5845	2.4	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: +50°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.982443	5845	3	100	Pass

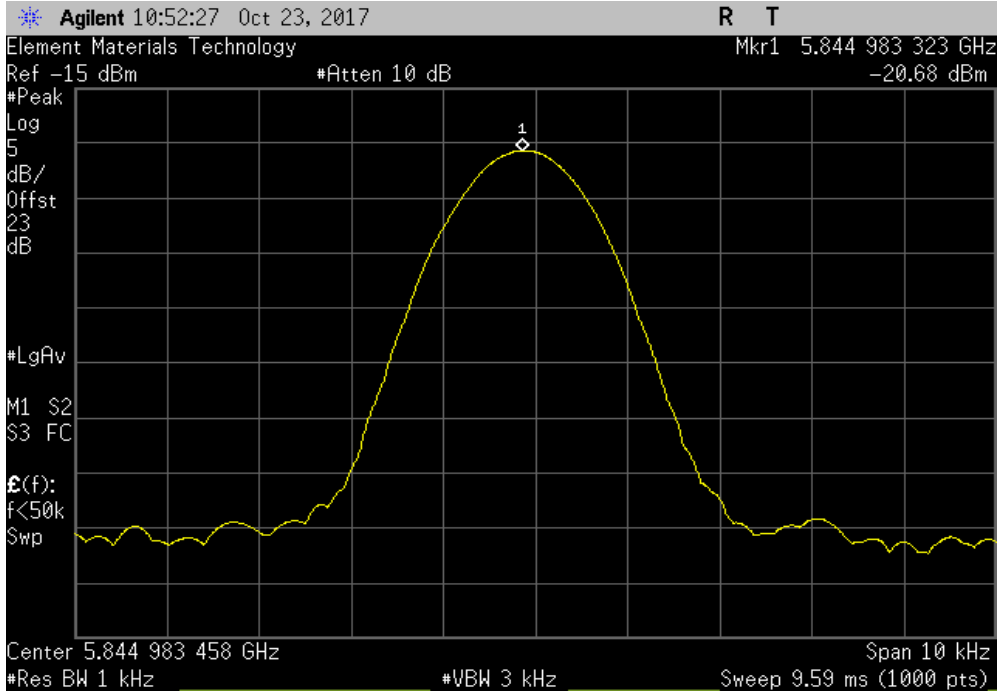


# FREQUENCY STABILITY

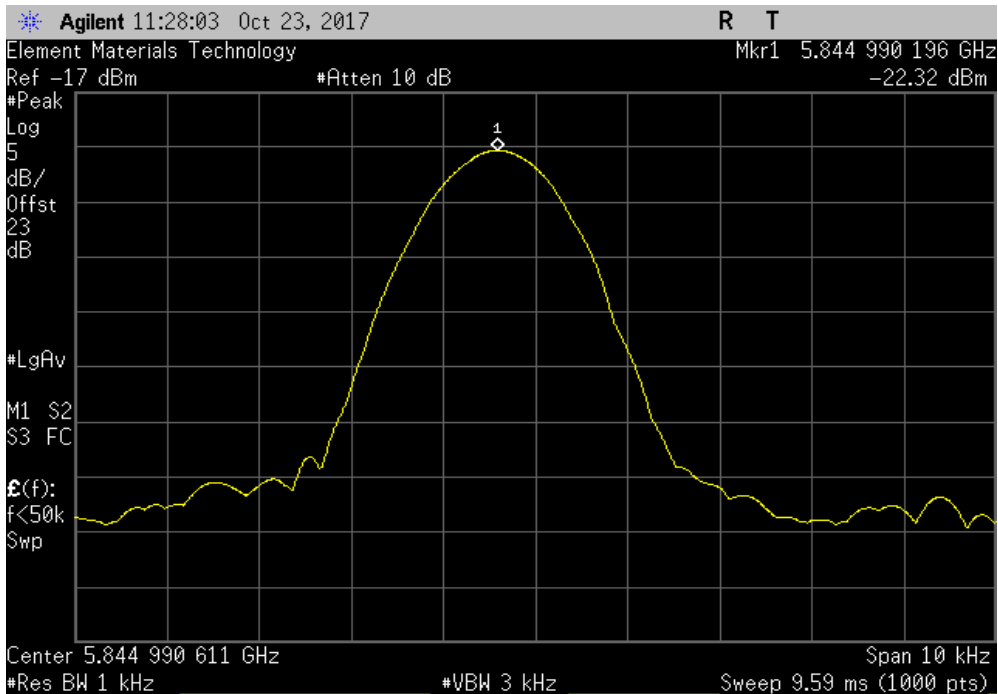


Tb1Tx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: +40°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.983323	5845	2.9	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: +30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.990196	5845	1.7	100	Pass

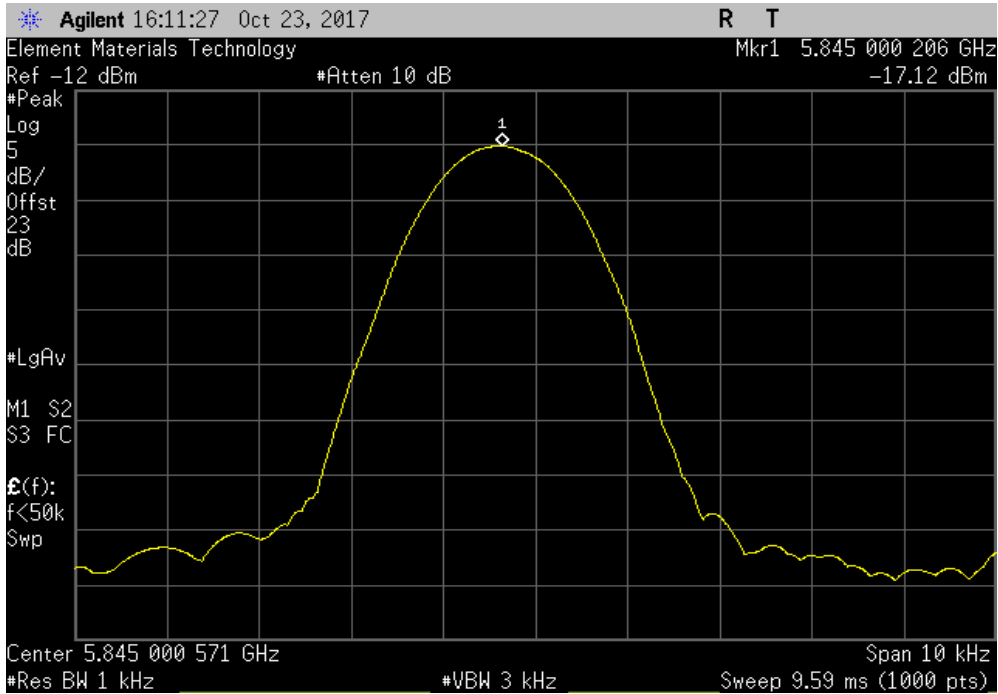


# FREQUENCY STABILITY

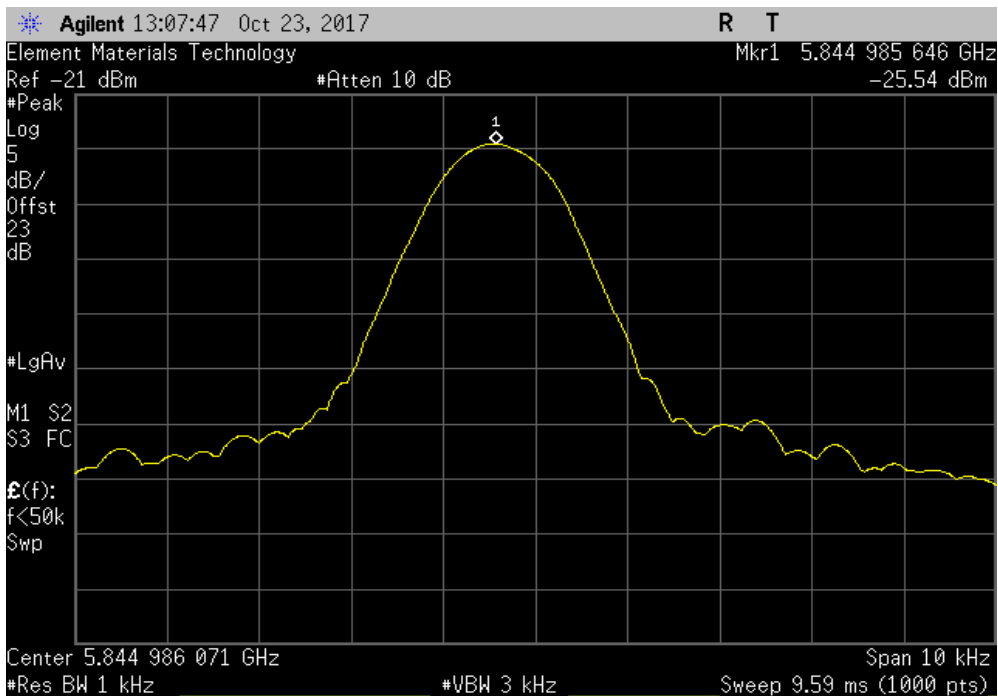


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: +20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5845.000206	5845	0	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: +10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.985646	5845	2.5	100	Pass

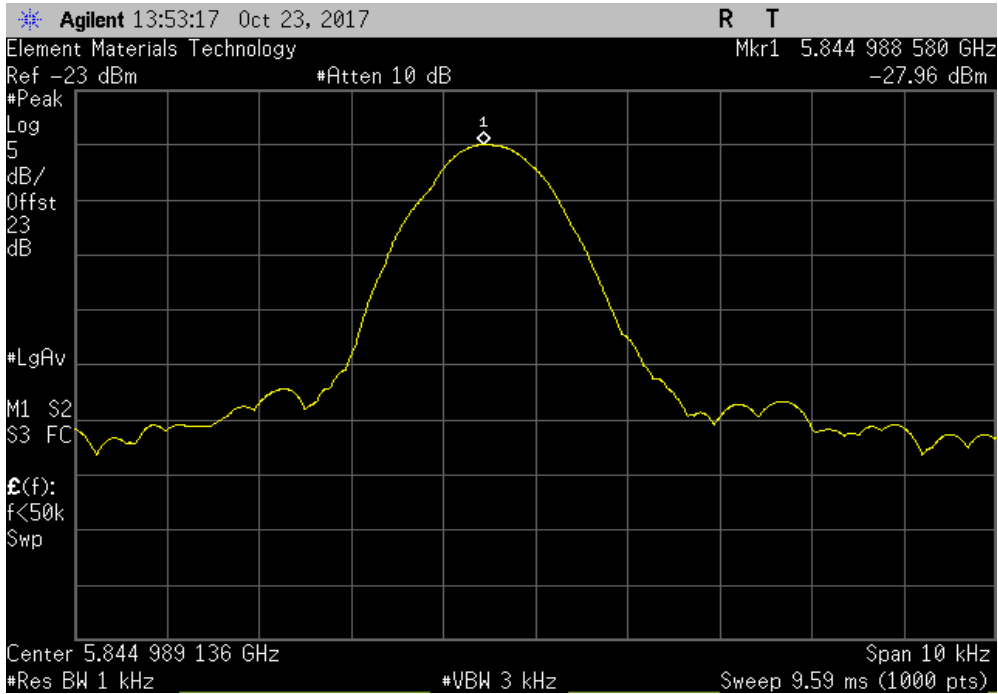


# FREQUENCY STABILITY

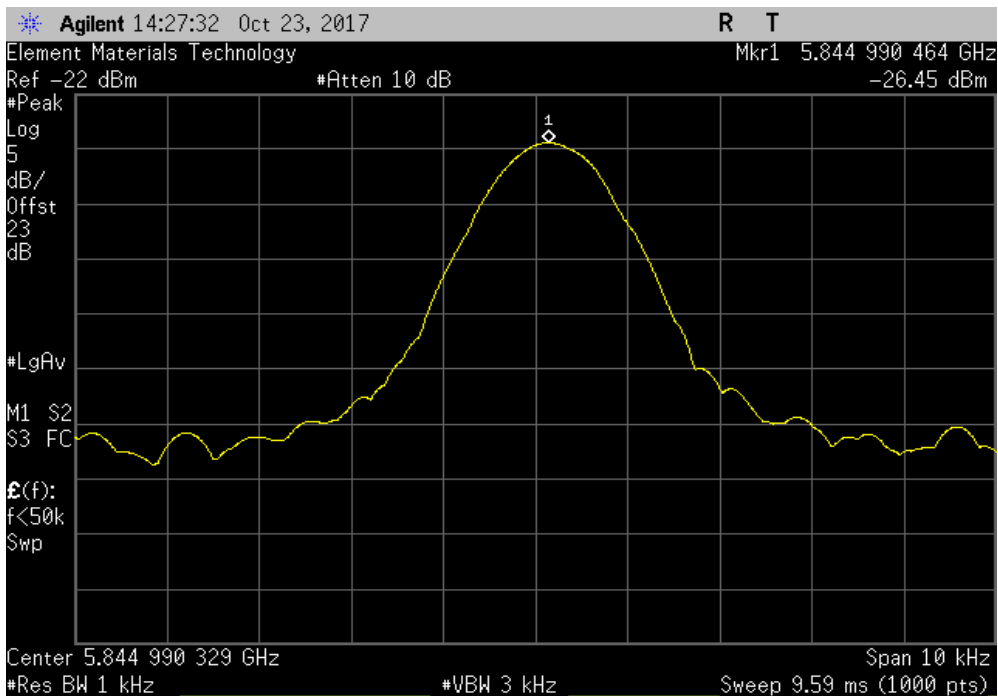


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: 0°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.98858	5845	2	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: -10°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.990464	5845	1.6	100	Pass

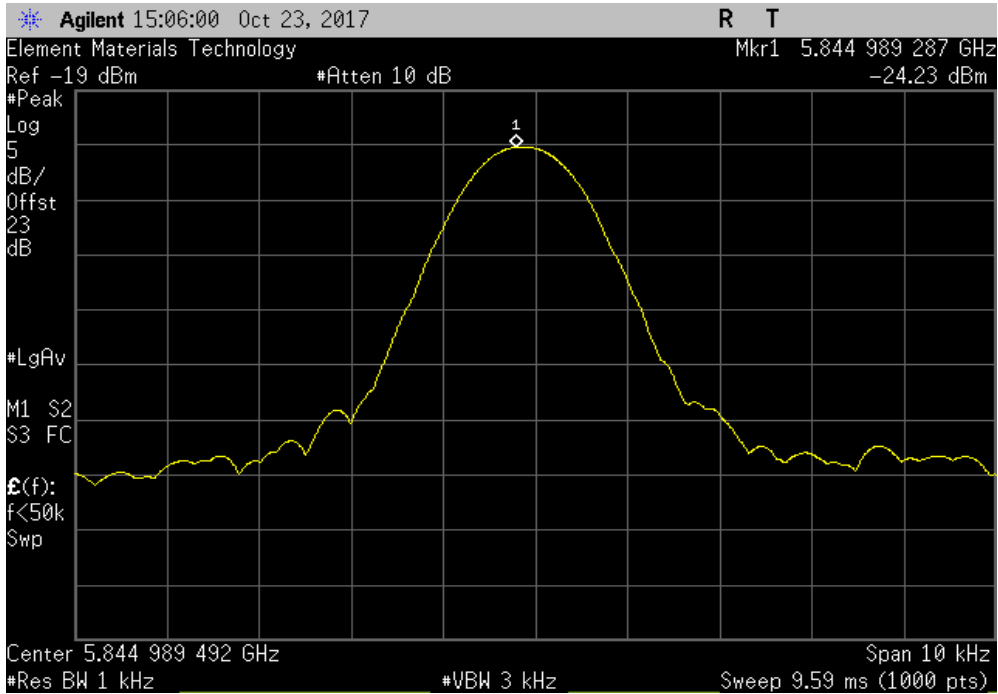


# FREQUENCY STABILITY

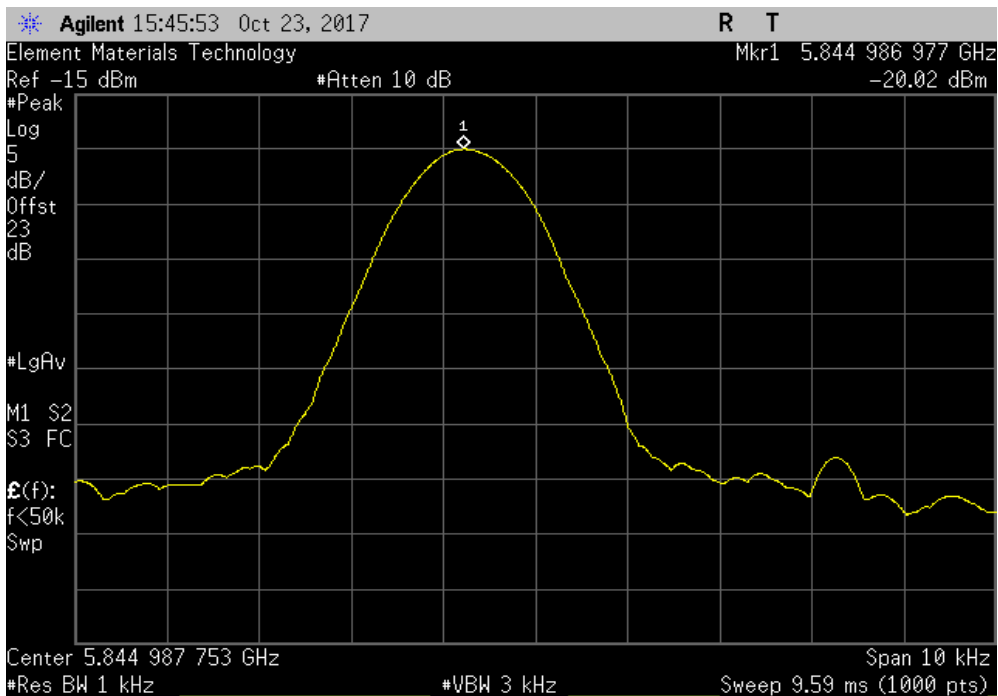


Tbftx 2017.09.26 XMI 2017.09.21

5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: -20°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.989287	5845	1.8	100	Pass



5725 MHz - 5850 MHz - High Channel, 5845 MHz, Temperature: -30°					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	5844.986977	5845	2.2	100	Pass



# DUTY CYCLE



## TEST DESCRIPTION

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The Duty Cycle (x) were 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.

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

The EUT operates at 100% Duty Cycle.