

# CommScope

FlexWave Prism AWS3 MIMO HDM FCC 27:2017 MIMO Cellular Repeater Radio

Report # TECO0042





NVLAP Lab Code: 200881-0

# **CERTIFICATE OF TEST**



Last Date of Test: May 24, 2017 CommScope Model: FlexWave Prism AWS3 MIMO HDM

# **Radio Equipment Testing**

### **Standards**

Specification	Method
FCC 27:2017	ANSI/TIA/EIA-603-D-2010

### **Results**

Method Clause	Test Description	Applied	Results	Comments
2.2.1	Equivalent Isotropic Radiated Power (EIRP)	Yes	Pass	
2.2.1	Peak To Average Ratio	Yes	Pass	
2.2.2	Frequency Stability	Yes	Pass	
2.2.3	Emissions Bandwidth	Yes	Pass	
2.2.12	Spurious Radiated Emissions	Yes	Pass	
2.2.13	Spurious Conducted Emissions	Yes	Pass	
2.2.13	Band Edge Compliance	Yes	Pass	
2.2.13	Intermodulation	Yes	Pass	

### **Deviations From Test Standards**

None

Approved By:

Kyle Holgate, 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.

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# **REVISION HISTORY**



Revision Number	Description	Date	Page Number
00	None		

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# ACCREDITATIONS AND AUTHORIZATIONS



### **United States**

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

#### Canada

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

### **European Union**

**European Commission** – Validated by the European Commission as a Notified Body under the R&TTE Directive. Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

#### Australia/New Zealand

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

### Korea

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

### Japan

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

#### **Taiwan**

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

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

### Singapore

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

#### Israel

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

### Hong Kong

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

### **Vietnam**

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

### SCOPE

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

http://portlandcustomer.element.com/ts/scope/scope.htm http://gsi.nist.gov/global/docs/cabs/designations.html

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# **FACILITIES**







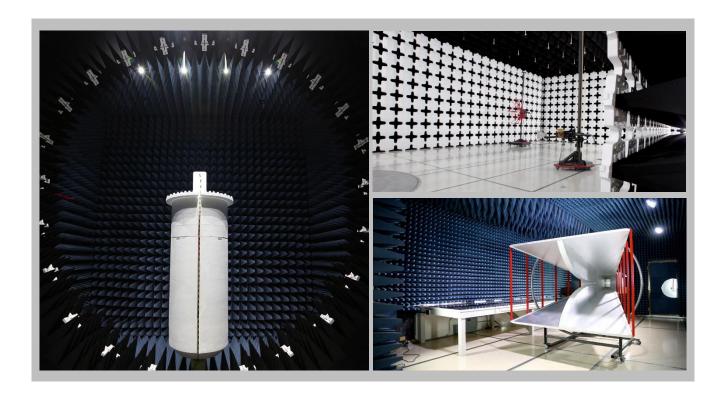
California
Labs OC01-13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136 New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214 Oregon
Labs EV01-12
22975 NW Evergreen Pkwy
Hillsboro, OR 97124
(503) 844-4066

**Texas**Labs TX01-09
3801 E Plano Pkwy
Plano, TX 75074
(469) 304-5255

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19201 120<sup>th</sup> Ave NE
Bothell, WA 98011
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Irvine, CA 92618 (949) 861-8918	Brooklyn Park, MN 55445 (612)-638-5136	Elbridge, NY 13060 (315) 554-8214	Hillsboro, OR 97124 (503) 844-4066	Plano, TX 75074 (469) 304-5255	Bothell, WA 98011 (425)984-6600		
	NVLAP						
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0		
	Innovation, Science and Economic Development Canada						
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1		
		BS	MI				
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R		
		VC	CI				
A-0029	A-0109	N/A	A-0108	A-0201	A-0110		
	Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA						
US0158	US0175	N/A	US0017	US0191	US0157		



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# **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.

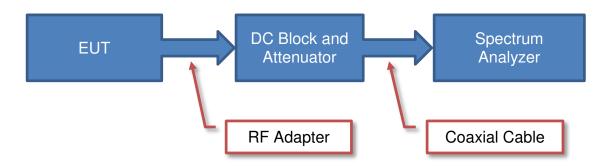
<u>Test</u>	+ MU	<u>- MU</u>
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)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

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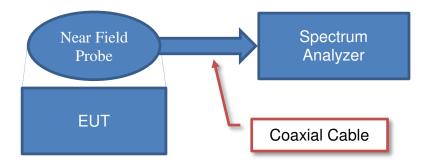
# **Test Setup Block Diagrams**



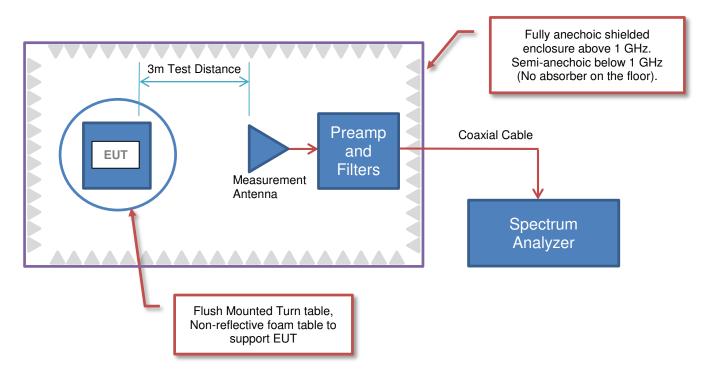
### **Antenna Port Conducted Measurements**



### **Near Field Test Fixture Measurements**



### **Spurious Radiated Emissions**



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# PRODUCT DESCRIPTION



### **Client and Equipment Under Test (EUT) Information**

Company Name:	CommScope	
Address:	501 Shenandoah Drive	
City, State, Zip:	Shakopee, MN 55379	
Test Requested By:	Joshua Wittman	
Model:	FlexWave Prism AWS3 MIMO HDM	
First Date of Test:	May 22, 2017	
Last Date of Test:	May 24, 2017	
Receipt Date of Samples:	May 22, 2017	
Equipment Design Stage:	Production	
<b>Equipment Condition:</b>	No Damage	
Purchase Authorization:	Verified	

### Information Provided by the Party Requesting the Test

### **Functional Description of the EUT:**

20W MIMO Cellular RF Repeater/Industrial Booster. This RF module is part of a RF Repeater/Industrial Booster remote unit. It amplifies RF in the DownLink path for 2110-2180 MHz.

### **Testing Objective:**

To demonstrate compliance of the Cellular repeater requirements of FCC 27L: 2017.

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# **CONFIGURATIONS**



# Configuration TECO0042- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
AWS3 MIMO RF Module	CommScope	7761388-00-11	459644002

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Attenuator 1	Inmet Corporation	2N75W-30-296	None		
Attenuator 2	Aeroflex / Weinschel	57-30-43	QY541		

Remote Equipment Outside of Test Setup Boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Signal Generator 1	Aeroflex	IFR 3413	341007/003		
Signal Generator 2	Aeroflex	IFR 3413	341006/056		
48V DC Power Supply	TDK-Lambda	SWS300A-48	3LR-140Y11-0106HO411		
Laptop	Lenovo	T510	431436U		
Power Supply (Laptop)	Lenovo	92P1156	11S92P1156Z1ZDXN8A81AZ		
I/O Control Device	CommScope/ADC Telecommunications	1673542-21	MR222P8C		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Mains Cable (Laptop)	No	1.8m	No	AC Mains	Power Supply (Laptop)
DC Power Cable (Laptop)	No	1.8m	Yes	Power Supply (Laptop)	Laptop
DC Power Cable (I/O Control Device)	No	2.8m	Yes	48V DC Power Supply	I/O Control Device
Fiber Optic Cable	No	>3.0m	No	I/O Control Device	AWS3 MIMO RF Module
AC Mains Cable (AWS3 MIMO RF Module)	No	5.0m	No	AWS3 MIMO RF Module	AC Mains
Output Cable 1	No	1.5m	No	AWS3 MIMO RF Module	Attenuator 1
Output Cable 2	No	0.9m	No	AWS3 MIMO RF Module	Attenuator 2
Ethernet Cable	No	1.0m	No	I/O Control Device	Laptop
Coaxial Cable 1	No	1.8m	No	Signal Generator 1	I/O Control Device
Coaxial Cable 2	No	1.8m	No	Signal Generator 2	I/O Control Device
AC Mains Cable (Signal Generator 1)	No	1.8m	No	Signal Generator 1	AC Mains
AC Mains Cable (Signal Generator 2)	No	1.8m	No	Signal Generator 2	AC Mains

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# **CONFIGURATIONS**



# **Configuration TECO0042-2**

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
AWS3 MIMO RF Module	CommScope	7761388-00-11	459644002

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Attenuator 1	Inmet Corporation	2N75W-30-296	None		
Attenuator 2	Aeroflex	48-30-34	RCU		

Remote Equipment Out	side of Test Setup Bound	ary	
Description	Manufacturer	Model/Part Number	Serial Number
Signal Generator 1	Aeroflex	IFR 3413	341007/003
Signal Generator 2	Aeroflex	IFR 3413	341006/056
48V DC Power Supply	TDK-Lambda	SWS300A-48	3LR-140Y11-0106HO411
Laptop	Lenovo	T510	431436U
Power Supply (Laptop)	Lenovo	92P1156	11S92P1156Z1ZDXN8A81AZ
I/O Control Device	CommScope/ADC Telecommunications	1673542-21	MR222P8C

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Mains Cable (Laptop)	No	1.8m	No	AC Mains	Power Supply (Laptop)
DC Power Cable (Laptop)	No	1.8m	Yes	Power Supply (Laptop)	Laptop
DC Power Cable (I/O Control Device)	No	2.8m	Yes	48V DC Power Supply	I/O Control Device
Fiber Optic Cable	No	>3.0m	No	I/O Control Device	AWS3 MIMO RF Module
AC Mains Cable (AWS3 MIMO RF Module)	No	5.0m	No	AWS3 MIMO RF Module	AC Mains
Output Cable 1	No	1.5m	No	AWS3 MIMO RF Module	Attenuator 1
Output Cable 2	No	0.9m	No	AWS3 MIMO RF Module	Attenuator 2
Ethernet Cable	No	1.0m	No	I/O Control Device	Laptop
Coaxial Cable 1	No	1.8m	No	Signal Generator 1	I/O Control Device
Coaxial Cable 2	No	1.8m	No	Signal Generator 2	I/O Control Device
AC Mains Cable (Signal Generator 1)	No	1.8m	No	Signal Generator 1	AC Mains
AC Mains Cable (Signal Generator 2)	No	1.8m	No	Signal Generator 2	AC Mains

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# **MODIFICATIONS**



# **Equipment Modifications**

Item	Date	Test	Modification	Note	Disposition of EUT
1	5/22/2017	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	5/23/2017	Equivalent Isotropic Radiated Power (EIRP)	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	5/24/2017	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.
4	5/24/2017	Emissions 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	5/24/2017	Peak To Average Ratio	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	5/24/2017	Spurious 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.
7	5/23/2017	Band Edge Compliance	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	5/24/2017	Intermodulation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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XMit 2017.02.08

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 - Power	ETS Lindgren	7002-006	SRE	7/21/2016	7/21/2017
Meter - Power	ETS Lindgren	7002-006	SRA	3/20/2017	3/20/2018
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and an RF Power Sensor. The spectrum analyzer and signal generator were used to generate an offset for the cables and attenuators. An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

The RF output power was measured with the EUT set to the modes called out in the datasheet. The power measurement was made using a direct connection between the RF output of the EUT and an RF Power Sensor which only measures across the high time of the burst of the carrier.

The observed duty cycle was noted but not needed to calculate the EIRP.

EIRP = Max Measured Power + Antenna gain (dBi)

The measurements from Port 1 and Port 2 were summed to determine the total average power in EIRP.

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	FlexWave Prism AWS3 I	MIMO HDM							
Serial Number:	459644002						Date:	05/23/17	
Customer:	CommScope						Temperature:	22.3 °C	
Attendees:	Josh Wittman						Humidity:	42.7% RH	
Project:	None						Barometric Pres.:	1013 mbar	
Tested by:	Dustin Sparks		Power:	110VAC/60Hz			Job Site:	MN08	
TEST SPECIFICATION	ONS			Test Method					
FCC 27:2017				ANSI/TIA/EIA-603-	D-2010				
COMMENTS									
Antenna gain is ass	sumed to be 0 - per custo	mer, the antenna gain will be	reevaluated during installat	tion. System is rate	ed at 20W (+43 dBm)	per port. Limit is	s 1640W (62.2 dBm).	. A linear summati	on was performe
		the measured pulses did not					,		
			33						
DEVIATIONS FROM	I TEST STANDARD								
DEVIATIONS FROM None	I TEST STANDARD								
None	1 TEST STANDARD		A 11 C	) 2	_				
	TEST STANDARD		Dusting	Spals	-				
None	TEST STANDARD	Signature	Dusting	-(					
None	TEST STANDARD	Signature	Avg Cond Pwr	Avg Cond Pwr	Duty	Antenna	Pwr Summed	Limit	
None Configuration #	1	Signature		-(		Antenna Gain (dBi)	Pwr Summed EIRP (dBm)	Limit (dBm)	Results
Configuration #	1 5 MHz) WCDMA	Signature	Avg Cond Pwr Sens 1(dBm) 43.27	Avg Cond Pwr Sens 2(dBm) 43.1	Duty		EIRP (dBm) 46.2	(dBm) 62.2	Results Pass
Configuration #	1 5 MHz) WCDMA	Signature	Avg Cond Pwr Sens 1(dBm)	Avg Cond Pwr Sens 2(dBm)	Duty Cycle (%)	Gain (dBi)	EIRP (dBm)	(dBm)	
None Configuration #  Low Channel (2112.5 Mid Channel (2145 M	1 5 MHz) WCDMA HHz) WCDMA	Signature	Avg Cond Pwr Sens 1(dBm) 43.27	Avg Cond Pwr Sens 2(dBm) 43.1	Duty Cycle (%)	Gain (dBi)	EIRP (dBm) 46.2	(dBm) 62.2	Pass
None Configuration #  Low Channel (2112.5) Wid Channel (2145 N High Channel (2177.4)	1 5 MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35	Avg Cond Pwr Sens 2(dBm) 43.1 43.19	Duty Cycle (%) 100 100	Gain (dBi)	EIRP (dBm) 46.2 46.3	(dBm) 62.2 62.2	Pass Pass
None	1 5 MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.03	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07	Duty Cycle (%) 100 100 100	Gain (dBi)	46.2 46.3 46.1	(dBm) 62.2 62.2 62.2	Pass Pass Pass
None Configuration #  Low Channel (2112.5  Mid Channel (2145 M  Ligh Channel (2115 N  Mid Channel (2115 N  Mid Channel (2145 M	1 5 MHz) WCDMA 4Hz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz 4Hz) LTE 10MHz	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.03 43.12	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07 43.07	Duty Cycle (%) 100 100 100 99.228	Gain (dBi)	46.2 46.3 46.1 See Summary	(dBm) 62.2 62.2 62.2 N/A	Pass Pass Pass N/A
None Configuration #  Low Channel (2112.5 Mid Channel (2177.1 Low Channel (2115)	1 5 MHz) WCDMA HHz) WCDMA 5 MHz) WCDMA WHz) LTE 10MHz MHz) LTE 10MHz MHz) LTE 10MHz	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.03 43.12 43.47	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07 43.07 43.32	Duty Cycle (%) 100 100 100 99.228 99.44	Gain (dBi)	46.2 46.3 46.1 See Summary See Summary	(dBm) 62.2 62.2 62.2 N/A N/A	Pass Pass Pass N/A N/A
None Configuration #  Low Channel (2112.5  Mid Channel (2145 N  High Channel (21545 N  High Channel (2155 N  High Channel (21575)	1 5 MHz) WCDMA HHz) WCDMA 5 MHz) WCDMA WHz) LTE 10MHz MHz) LTE 10MHz MHz) LTE 10MHz	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.05 43.12 43.47 43.33	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07 43.07 43.32 43.45	Duty Cycle (%) 100 100 100 99.228 99.44 100	Gain (dBi)  0 0 0 0 0 0 0 0	46.2 46.3 46.1 See Summary See Summary See Summary	(dBm) 62.2 62.2 62.2 N/A N/A N/A	Pass Pass Pass N/A N/A
Configuration #  Low Channel (2112.5 Mid Channel (2145 Migh Channel (2175 Mid Channel (2115 Mid Channel (2115 Mid Channel (2145 Mid Channel (2175 Linear Sum of the Po	1 5 MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz MHz) LTE 10MHz MHz) LTE 10MHz wer (LTE 10MHz)	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.03 43.12 43.47 43.33 Avg Cond Pwr	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07 43.07 43.32 43.45 Avg Cond Pwr	Duty Cycle (%) 100 100 100 99.228 99.44 100 Power Summed	Gain (dBi)  0 0 0 0 0 0 0 Antenna	46.2 46.3 46.1 See Summary See Summary See Summary Pwr Summed	(dBm) 62.2 62.2 62.2 N/A N/A N/A Limit	Pass Pass Pass N/A N/A
None Configuration #  Low Channel (2112.5  Mid Channel (2145 N  High Channel (21545 N  High Channel (2155 N  High Channel (21575)	1 5 MHz) WCDMA HHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz	Signature	Avg Cond Pwr Sens 1(dBm) 43.27 43.35 43.03 43.12 43.47 43.33 Avg Cond Pwr Sens 1 (mW)	Avg Cond Pwr Sens 2(dBm) 43.1 43.19 43.07 43.07 43.32 43.45 Avg Cond Pwr Sens 2 (mW)	Duty Cycle (%) 100 100 100 99.228 99.44 100 Power Summed (mW)	Gain (dBi)  0 0 0 0 0 0 0 Antenna	EIRP (dBm) 46.2 46.3 46.1 See Summary See Summary See Summary Pwr Summed EIRP (dBm)	(dBm) 62.2 62.2 62.2 N/A N/A N/A Limit (dBm)	Pass Pass Pass N/A N/A N/A Results

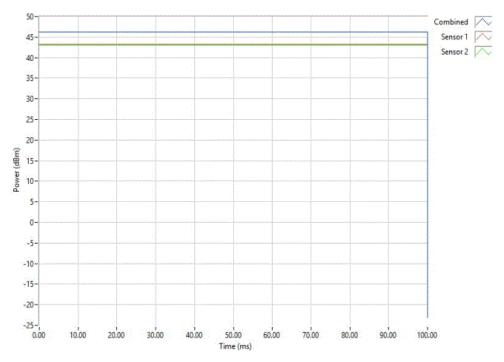
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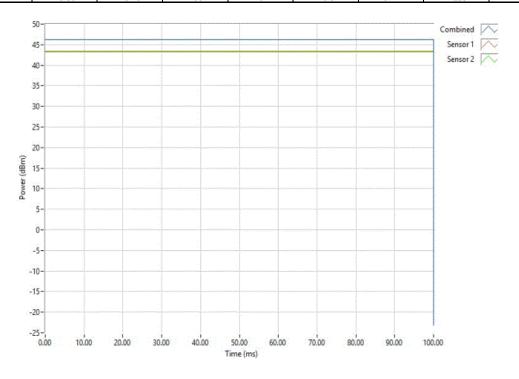
TbtTx 2017.01.27

Low Channel (2112.5 MHz) WCDMA Avg Cond Pwr Avg Cond Pwr Duty Antenna Pwr Summed Limit 
 Sens 1(dBm)
 Sens 2(dBm)

 43.27
 43.1
 EIRP (dBm) Cycle (%) Gain (dBi) (dBm) Results 100 46.2 62.2 Pass



			Mid Cha	nnel (2145 MHz)	WCDMA		
Α\	g Cond Pwr	Avg Cond Pwr	Duty	Antenna	Pwr Summed	Limit	
_ <u>S</u>	ens 1(dBm)	Sens 2(dBm)	Cycle (%)	Gain (dBi)	EIRP (dBm)	(dBm)	Results
	43.35	43.19	100	0	46.3	62.2	Pass

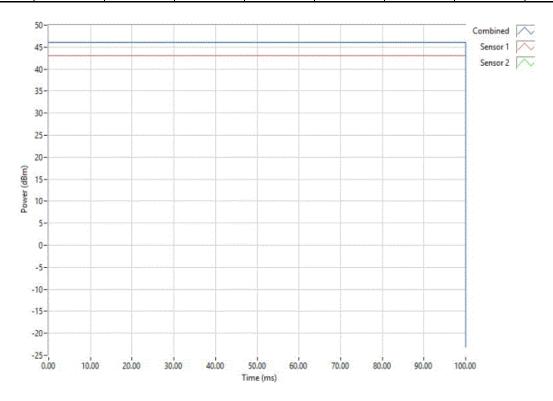


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TbtTx 2017.01.27 XMit 2017.02.08

		High Char	nnel (2177.5 MHz	z) WCDMA		
Avg Cond Pwr	Avg Cond Pwr	Duty	Antenna	Pwr Summed	Limit	
Sens 1(dBm)	Sens 2(dBm)	Cycle (%)	Gain (dBi)	EIRP (dBm)	(dBm)	Results
43.03	43.07	100	^	46.1	62.2	Pass

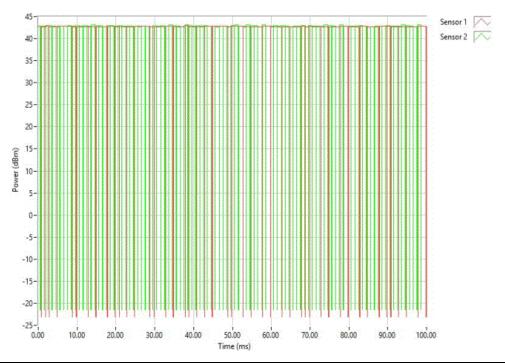


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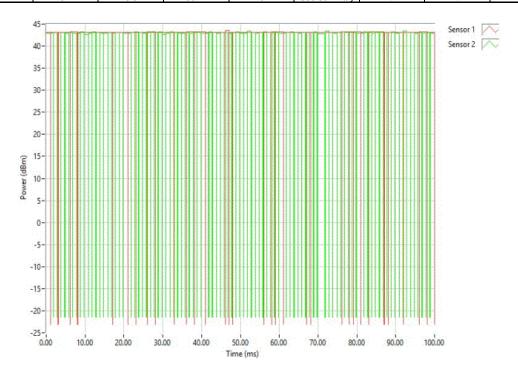


TbtTx 2017.01.27

		Low Chan	nel (2115 MHz) L	TE 10MHz		
Avg Cond Pwr Sens 1(dBm)	Avg Cond Pwr Sens 2(dBm)	Duty Cvcle (%)	Antenna Gain (dBi)	Pwr Summed EIRP (dBm)	Limit (dBm)	Results
Ochs I(abili)	OCIIS Z(GDIII)	Oycic (70)	Gain (GDI)	Eirii (abiii)	(abiii)	
43.12	43.07	99.228	0	See Summary	N/A	N/A



			Mid Chan	nel (2145 MHz) l	TE 10MHz		
	Avg Cond Pwr	Avg Cond Pwr	Duty	Antenna	Pwr Summed	Limit	
	Sens 1(dBm)	Sens 2(dBm)	Cycle (%)	Gain (dBi)	EIRP (dBm)	(dBm)	Results
•	43.47	43.32	99.44	0	See Summary	N/A	N/A

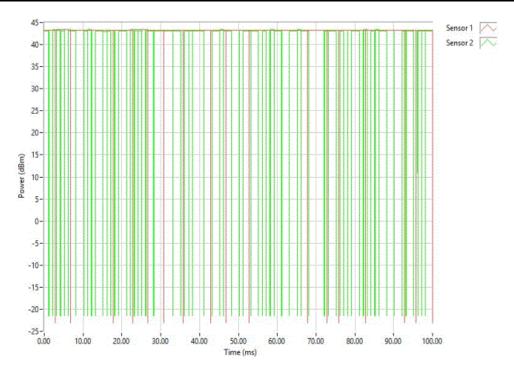


Report No. TECO0042



TbtTx 2017.01.27

High Channel (2175 MHz) LTE 10MHz Avg Cond Pwr Avg Cond Pwr Duty Antenna Pwr Summed Limit Sens 1(dBm) 43.33 Sens 2(dBm) Cycle (%) Gain (dBi) EIRP (dBm) (dBm) Results 100 N/A N/A



Report No. TECO0042 17/83

### PEAK TO AVERAGE RATIO



XMit 2017.02.08

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
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Ratio was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

The spectrum analyzer settings were as follows:

Span set to encompass the entire emission bandwidth, centered on the transmit channel.

The largest difference between the following two screen captures/traces was calculated:

▶1st Screen Capture/Trace: Peak detector and trace max-hold.

>2nd Screen Capture/Trace: The same procedure and settings as was used for conducted Output Power.

Report No. TECO0042 18/83

# **PEAK TO AVERAGE RATIO**



					TbtTx 2017.01.27	
EUT: Flex	xWave Prism AWS3 MIMO	HDM		Work Order:	TECO0042	
Serial Number: 4596	644002				05/24/17	
Customer: Com	nmScope			Temperature:	21.6 °C	
Attendees: Josh	h Wittman			Humidity:	47.3% RH	
Project: Non	1е			Barometric Pres.:	1008 mbar	
Tested by: Dus	stin Sparks		Power: 110VAC/60Hz	Job Site:	MN08	
TEST SPECIFICATIONS	3		Test Method			
FCC 27:2017			ANSI/TIA/EIA-603-D-2010			
COMMENTS			<u> </u>			
DEVIATIONS FROM TES	ormed on port 2 unless oth	nerwise noted.				
None	ST STANDARD					
	ST STANDARD  2	Signature	Tustin Sparls			
		Signature	TustínSparlo	Value (dB)	Limit < (dB)	Results
Configuration #		Signature	Tustin Sparls			Results
Configuration # WCDMA	2	Signature	Tustin Spards			Results Pass
None Configuration #  WCDMA Mid LTE 10MHz		Signature	TudinSparls	(dB)	< (dB)	

Report No. TECO0042 19/83

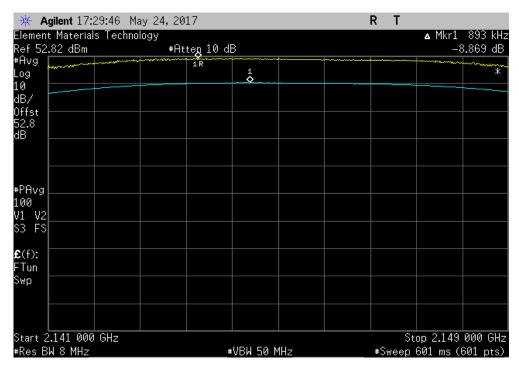
# **PEAK TO AVERAGE RATIO**



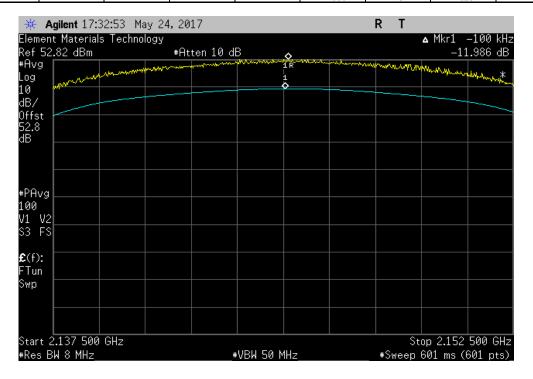
WCDMA, Mid Channel, 2145 MHz

Value Limit
(dB) < (dB) Results

8.869 13 Pass



	LTE 10M	Hz, Mid Channel,	2145 MHz		
			Value	Limit	
			(dB)	< (dB)	Results
			11.986	13	Pass



Report No. TECO0042 20/83



XMit 2017.02.08

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**

1201 20011 1112111					
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Meter - Multimeter	Fluke	117	MLS	1/23/2017	1/23/2020
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-32-3.5-	TBF	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUB	11/3/2014	11/3/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

#### **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into 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.

Per the requirements of FCC Part 27.54:

"The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation."

No specific limits are provided in either FCC 27.54, 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 1ppm will still allow the radio to be operating within the band.

Report No. TECO0042 21/83



EUT: FlexWave Prism AWS3 MIMO HDM Serial Number: 459644002 Work Order: TECO0042 Date: 05/24/17 Customer: CommScope Temperature: 21.5 °C Humidity: 47% RH Barometric Pres.: 1008 mba Josh Wittman Project: None Tested by: Dustin Sparks
TEST SPECIFICATIONS Power: 120VAC/60Hz Test Method Job Site: MN08 ANSI/TIA/EIA-603-D-2010 COMMENTS Antenna gain is assumed to be 0 - per customer, the antenna gain will be reevaluated during installation. System is rated at 20W (+43 dBm) per port. Port 2 was determined to have the worst case output power and all tests were performed on port 2 unless otherwise noted. DEVIATIONS FROM TEST STANDARD DustinSparls Configuration # 2 Signature Measured Value (MHz) Assigned Value (MHz) Results (ppm) (ppm) 2112.5 MHz 2112.500027 2112.5 0.013 Pass 2115 MHz 2115.000047 2115.0 0.022 Pass 2145 MHz 2145 000043 2145.0 0.020 Pass 2175 MHz 2175.000036 2175.0 0.017 Pass 2177.5 MHz 2177.500038 2177.5 0.017 Pass +40°C 2112.500011 2115.000025 2112.5 2115.0 0.005 0.012 2112.5 MHz Pass Pass 2145 MHz 2145 000009 2145 0 0.004 Pass 2175 MHz 2175.0 Pass 2175.000019 0.009 2177.5 MHz 2177.500021 2177.5 0.010 Pass +30°C 2112 5 MHz 2112 500044 21125 0.021 Pass 2115 MHz 2115.000046 2115.0 0.022 Pass 2145 MHz 2145.000043 2145.0 0.020 Pass 2175 MHz 2175.000003 2175.0 0.001 Pass 2177.5 MHz 2177.500038 2177.5 0.017 Pass +20°C 2112.5 MHz 2112 500044 2112.5 0.021 Pass 2115 MHz 2115.000042 2115.0 0.020 Pass 2145 MHz 2145.000043 2145.0 0.020 Pass 2175 MHz 2175.000053 2175.0 0.024 Pass 2177 5 MHz 2177 500038 2177.5 0.017 Pass +10°C 2112.5 MHz 2112.500027 2112.5 0.013 Pass 2115 MHz 2115.000046 2115.0 0.022 Pass 2145 MHz 2145.000043 2145.0 0.020 Pass 2175.0 2175 MHz 2175.000052 0.024 Pass 2177 5 MHz 2177 500038 2177.5 0.017 Pass 0°C 2112.5 MHz 2112.500044 2112.5 0.021 Pass 2115.000046 2115.0 0.022 Pass 2145 MHz 2145 000043 2145 0 0.020 Pass 2175 MHz 2175.000053 2175.0 0.024 Pass 2177.5 MHz 2177.500038 2177.5 0.017 Pass -10°C 2112.5 2115.0 2112.5 MHz 2112.500044 0.021 Pass 2115 MHz 2115.000042 0.020 Pass 2145 MHz 2145 00001 2145 0 0.005 Pass 0.017 Pass 2175.000036 2175.0 2177.5 MHz 2177.500055 2177.5 0.025 Pass -20°C 2112 5 MHz 2112 500044 21125 0.021 Pass Pass 2115.000042 2115.0 0.020 2145 MHz 2145.000009 2145.0 0.004 Pass 2175 MHz 2175.000036 2175.0 0.017 Pass 2177.5 MHz 2177.500038 2177.5 0.017 Pass -30°C 2112 5 MHz 2112 500044 2112.5 0.021 Pass 2115 MHz 2115.000046 2115.0 0.022 Pass 2145 MHz 2145.000043 2145.0 0.020 Pass 2175 MHz 2175.000036 2175.0 0.017 Pass 2177 5 MHz 2177 500038 2177.5 0.017 Pass Normal Voltage 2112.5 2115.0 0.021 0.012 2112.5 MHz 2112.500044 Pass 2115 MHz 2115.000025 Pass 2145.0 2175.0 2145 MHz 2145.000043 0.020 Pass 2175 MHz Pass 2175.000053 0.024 2177 5 MHz 2177.500055 2177.5 0.025 Pass Extreme Voltage (102VAC/60Hz) 2112.5 MHz 2112.500044 2112.5 0.021 Pass 2115 MHz 2115.000042 2115.0 Pass 0.020 2145 MHz 2145 000043 2145 0 0.020 Pass 2175 MHz 2175.000036 2175.0 0.017 Pass 2177 5 MHz 2177.500038 2177.5 0.017 Pass Extreme Voltage (138VAC/60Hz) 2112.5 MHz 2115 MHz 2112.5 2115.0 0.021 0.020 2112.500044 Pass 2115.000042 Pass 2145 MHz 2145 000043 2145.0 0.020 Pass 2175 MHz 2175.000036 2175.0 Pass 0.017 2177.5 MHz 2177.500038 2177.5 0.017 Pass

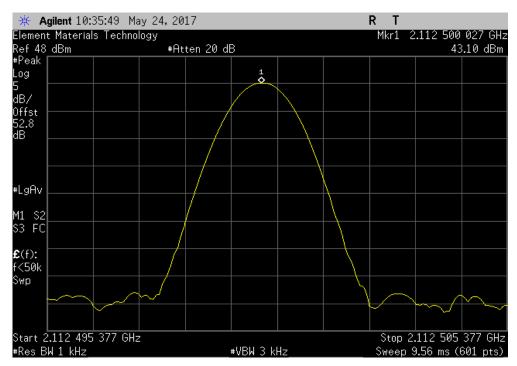
Report No. TECO0042 22/83



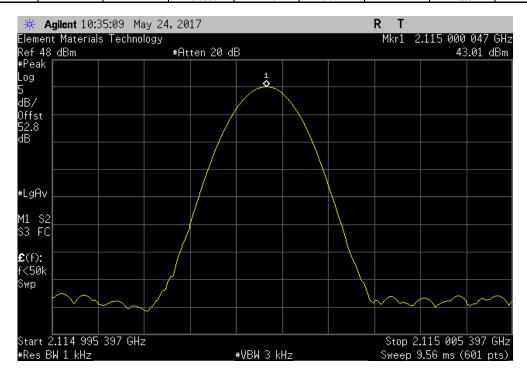
TbtTx 2017.01.27

+50°C, 2112.5 MHz

| Measured Assigned Error Limit | Value (MHz) | Value (MHz) | (ppm) | Results | (ppm) | 2112.500027 | 2112.5 | 0.013 | 1 | Pass | (ppm) | (



			+50°C, 2115 MH;	7		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2115.000047	2115	0.022	1	Pass



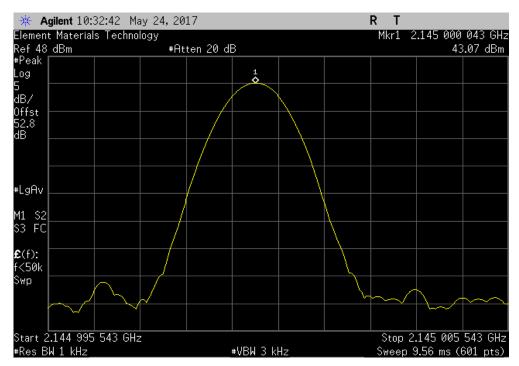
Report No. TECO0042 23/83



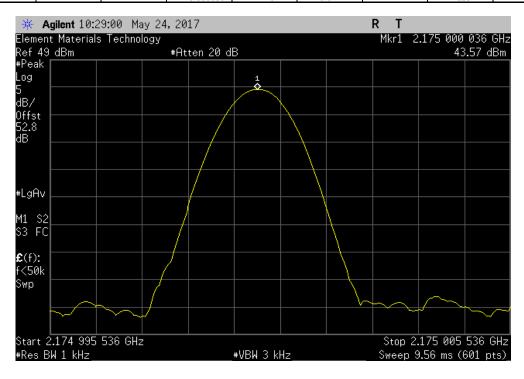
TbtTx 2017.01.27

+50°C, 2145 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results | 2145.000043 | 2145 | 0.020 | 1 | Pass |



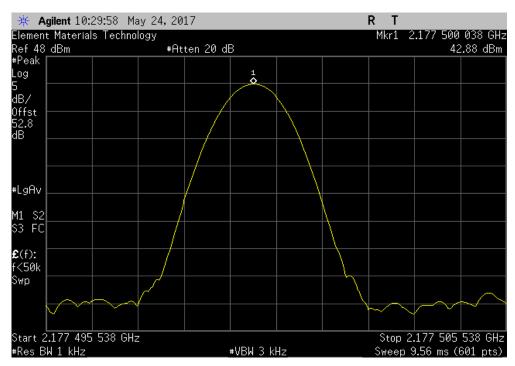
			+50°C, 2175 MHz	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2175.000036	2175	0.017	1	Pass



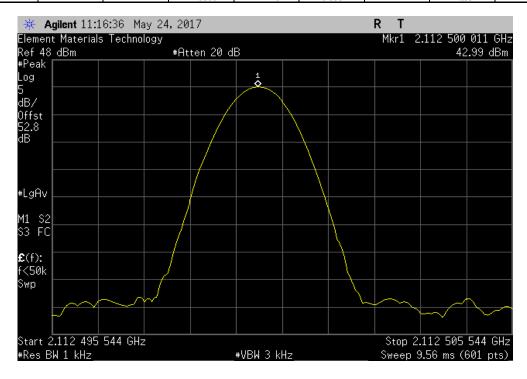
Report No. TECO0042 24/83



TbtTx 2017.01.27



		+	40°C, 2112.5 MF	łz		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2112.500011	2112.5	0.005	1	Pass



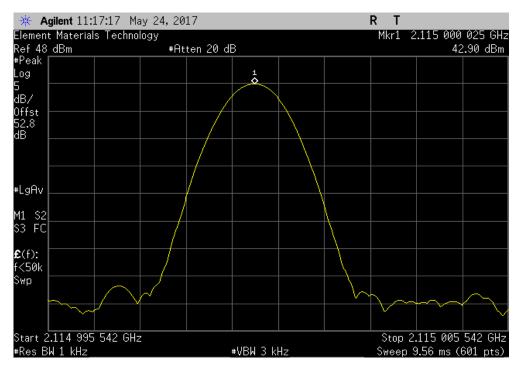
Report No. TECO0042 25/83



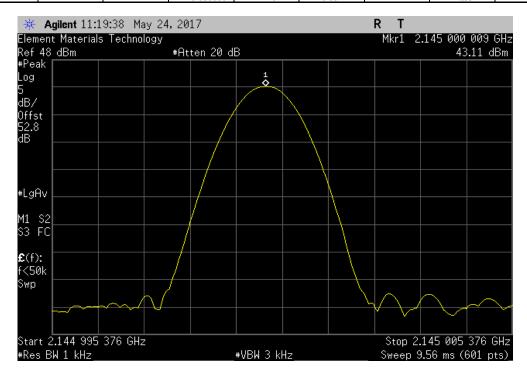
TbtTx 2017.01.27

+40°C, 2115 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2115.000025 | 2115 | 0.012 | 1 | Pass |



			+40°C, 2145 MH	7		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2145.000009	2145	0.004	1	Pass



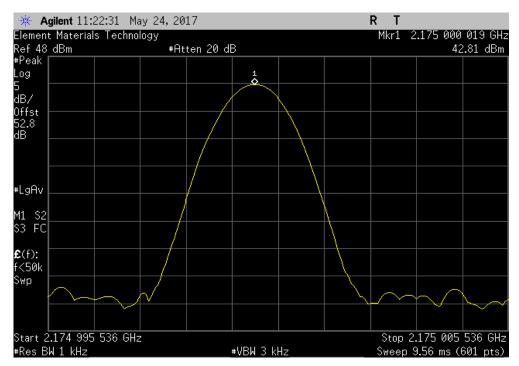
Report No. TECO0042 26/83



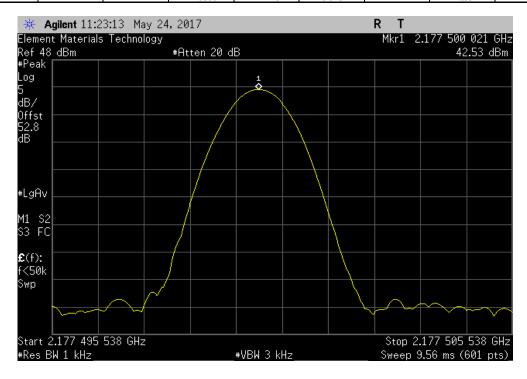
TbtTx 2017.01.27

+40°C, 2175 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2175.000019 | 2175 | 0.009 | 1 | Pass



		+	40°C, 2177.5 MF	lz		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2177.500021	2177.5	0.010	1	Pass



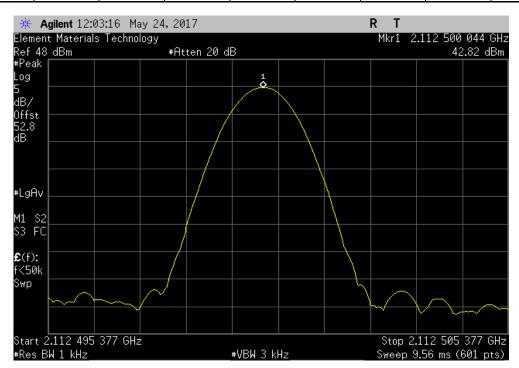
Report No. TECO0042 27/83



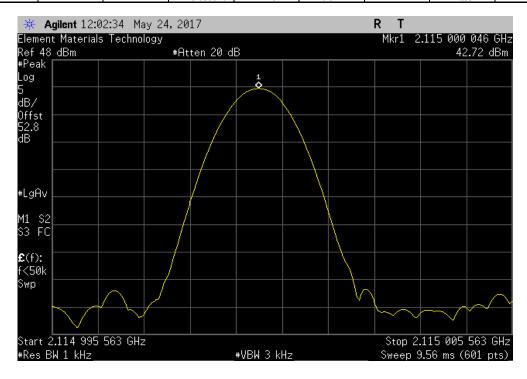
TbtTx 2017.01.27

+30°C, 2112.5 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2112.500044 | 2112.5 | 0.021 | 1 | Pass



			+30°C, 2115 MHz	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2115.000046	2115	0.022	1	Pass



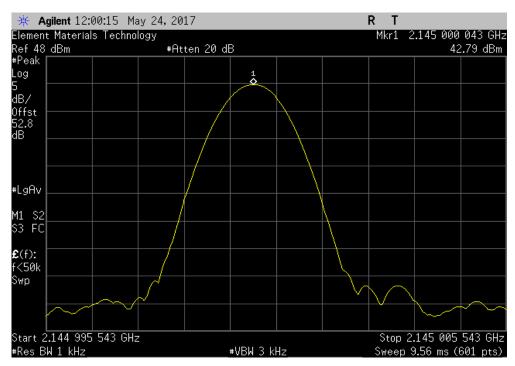
Report No. TECO0042 28/83



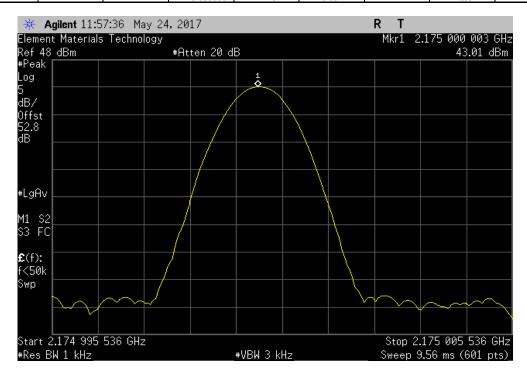
TbtTx 2017.01.27

+30°C, 2145 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2145.000043 | 2145 | 0.020 | 1 | Pass



		+30°C, 2175 MHz	Z		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2175.000003	2175	0.001	1	Pass

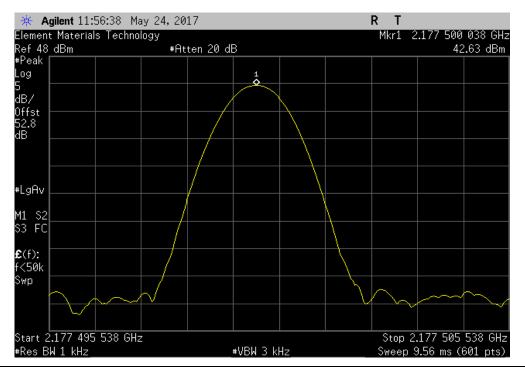


Report No. TECO0042 29/83

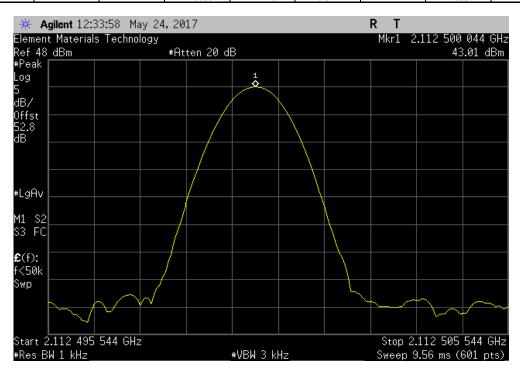


TbtTx 2017.01.27

	+	30°C, 2177.5 MH	z		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2177.500038	2177.5	0.017	1	Pass



	+	-20°C, 2112.5 MF	·lz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2112.500044	2112.5	0.021	1	Pass



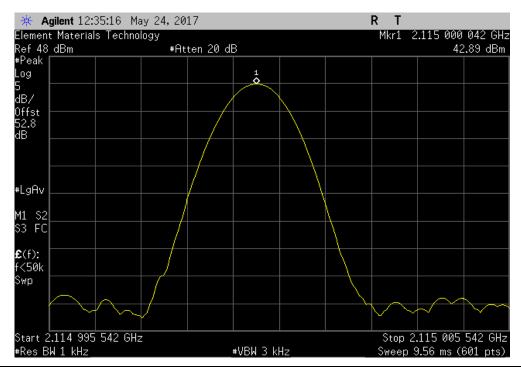
Report No. TECO0042 30/83



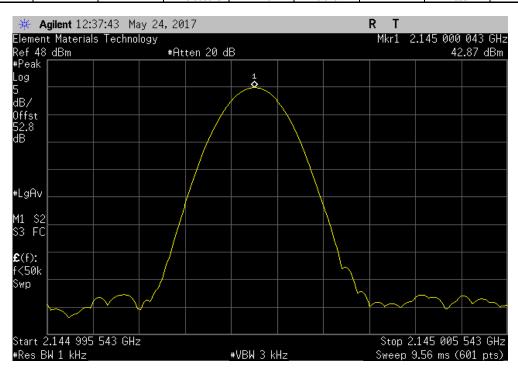
TbtTx 2017.01.27

+20°C, 2115 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2115.000042 | 2115 | 0.020 | 1 | Pass



		+20°C, 2145 MH	Z		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass



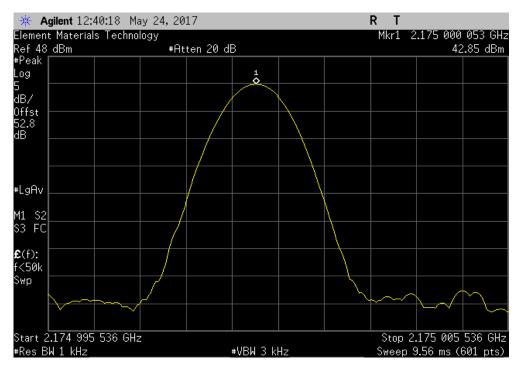
Report No. TECO0042 31/83



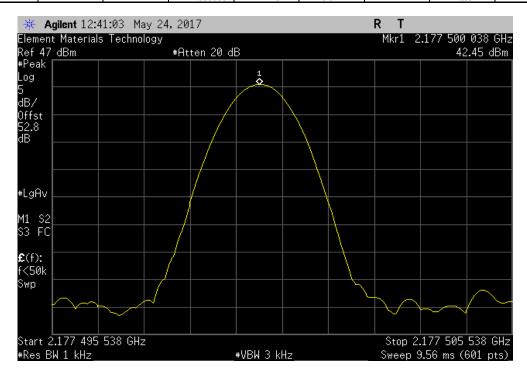
TbtTx 2017.01.27

+20°C, 2175 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results | 2175.000053 | 2175 | 0.024 | 1 | Pass |



		+	20°C, 2177.5 MF	łz		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
1		2177.500038	2177.5	0.017	1	Pass



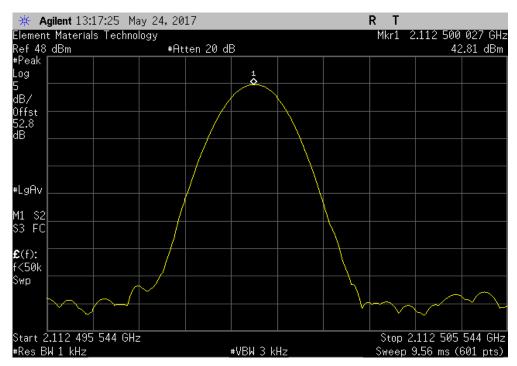
Report No. TECO0042 32/83



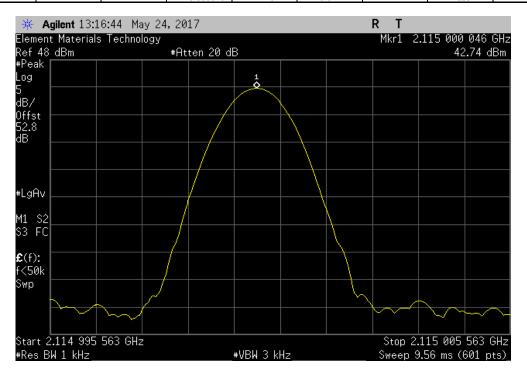
TbtTx 2017.01.27

+10°C, 2112.5 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2112.500027 | 2112.5 | 0.013 | 1 | Pass



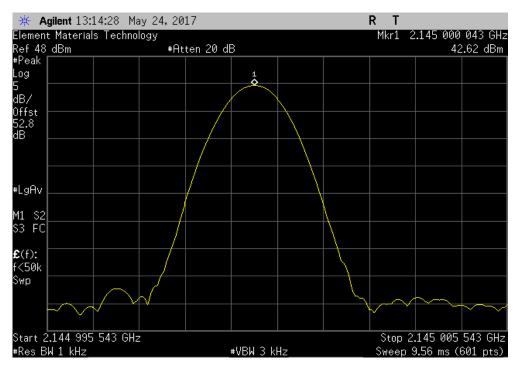
			+10°C, 2115 MH	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2115.000046	2115	0.022	1	Pass



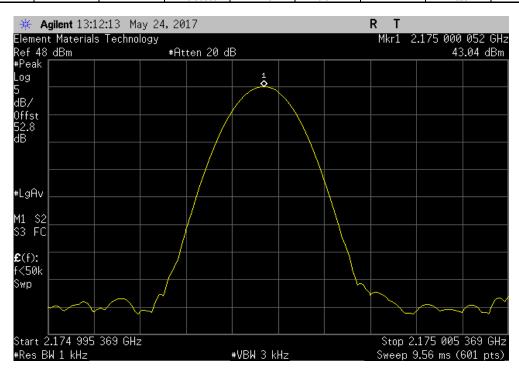
Report No. TECO0042 33/83



TbtTx 2017.01.27



			+10°C, 2175 MH	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2175.000052	2175	0.024	1	Pass



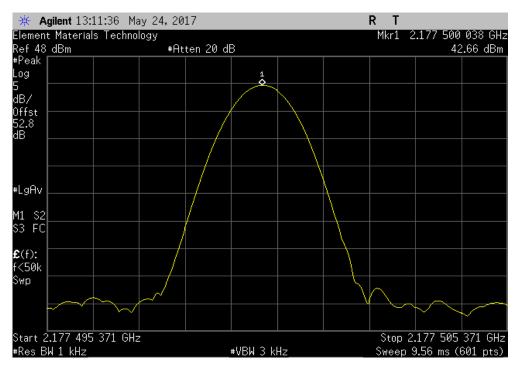
Report No. TECO0042 34/83



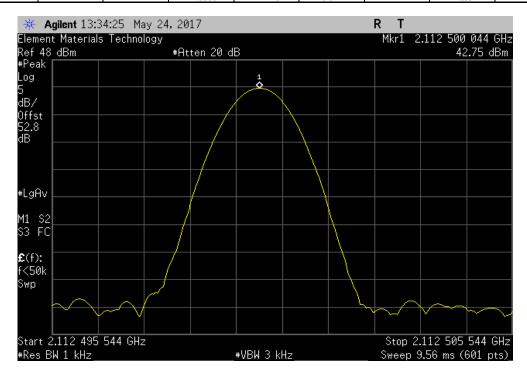
TbtTx 2017.01.27

+10°C, 2177.5 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) Results | 2177.500038 | 2177.5 | 0.017 | 1 | Pass |



			0°C, 2112.5 MHz			
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2112.500044	2112.5	0.021	1	Pass



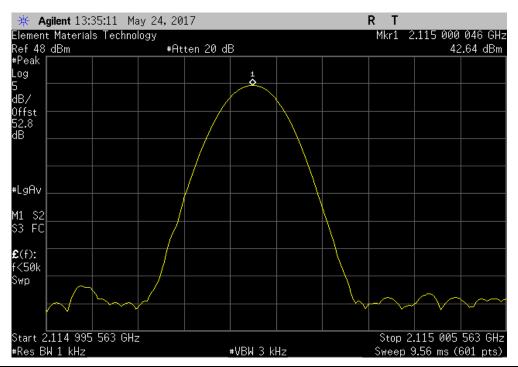
Report No. TECO0042 35/83



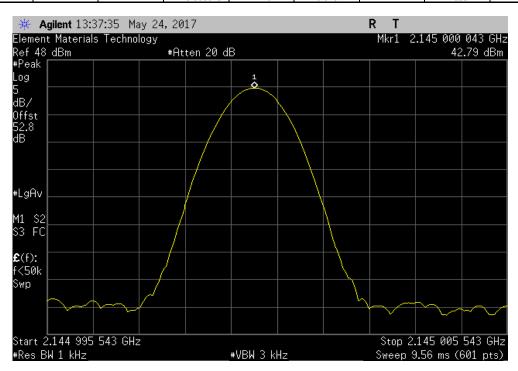
TbtTx 2017.01.27

0°C, 2115 MHz

Measured	Assigned	Error	Limit	
Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
2115.000046	2115	0.022	1	Pass



		0°C, 2145 MHz			
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass



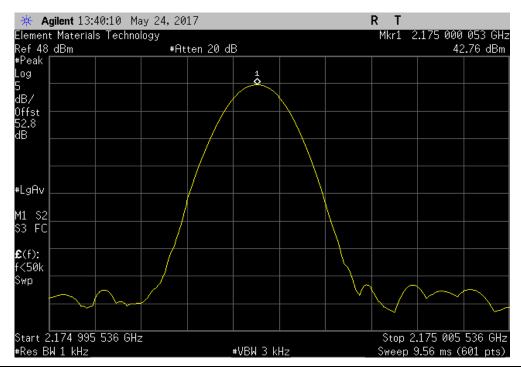
Report No. TECO0042 36/83



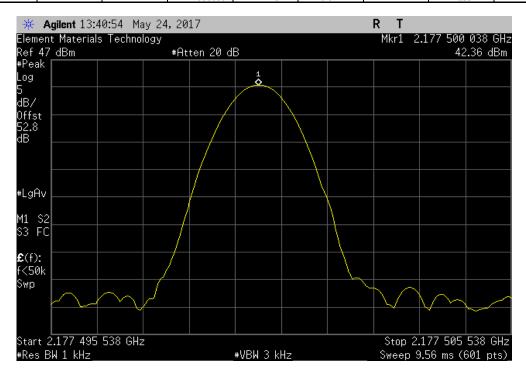
TbtTx 2017.01.27

0°C, 2175 MHz

| Measured | Assigned | Error | Limit |
| Value (MHz) | Value (MHz) | (ppm) | (ppm) | Results |
| 2175.000053 | 2175 | 0.024 | 1 | Pass



		0°C, 2177.5 MHz	Z		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2177.500038	2177.5	0.017	1	Pass



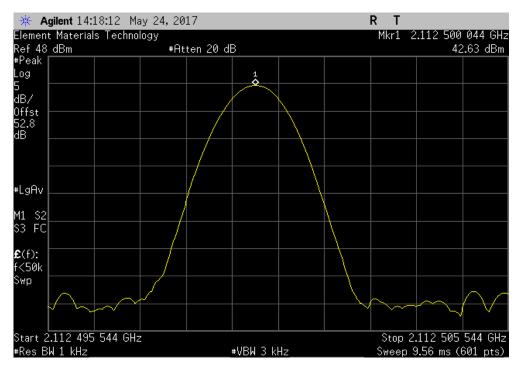
Report No. TECO0042 37/83



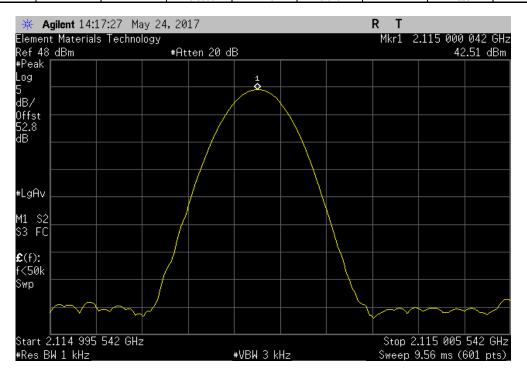
TbtTx 2017.01.27

-10°C, 2112.5 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) Results | 2112.500044 | 2112.5 | 0.021 | 1 | Pass |



			-10°C, 2115 MHz			
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2115.000042	2115	0.020	1	Pass



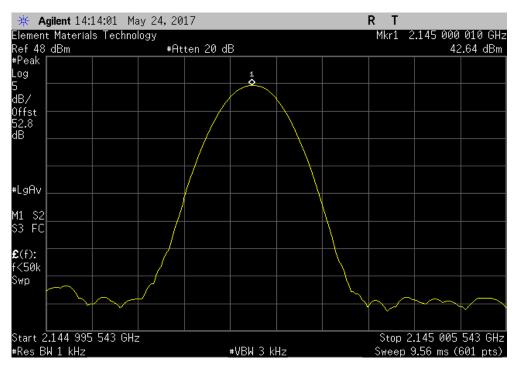
Report No. TECO0042 38/83



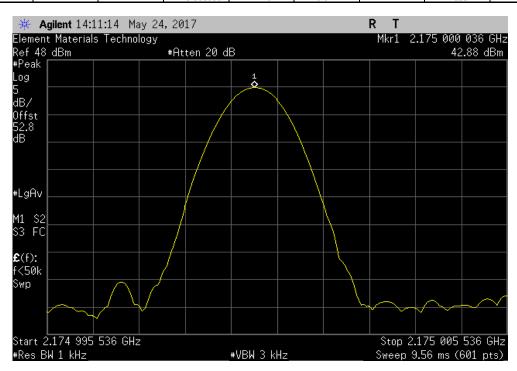
TbtTx 2017.01.27

-10°C, 2145 MHz

| Measured Assigned Error Limit | Value (MHz) Value (MHz) (ppm) (ppm) | Results |
| 2145.00001 | 2145 | 0.005 | 1 | Pass |



		-10°C, 2175 MHz			
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2175.000036	2175	0.017	1	Pass



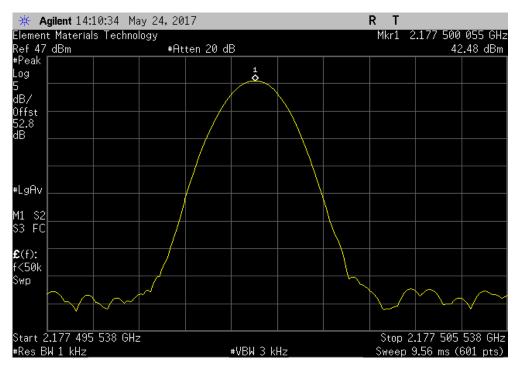
Report No. TECO0042 39/83



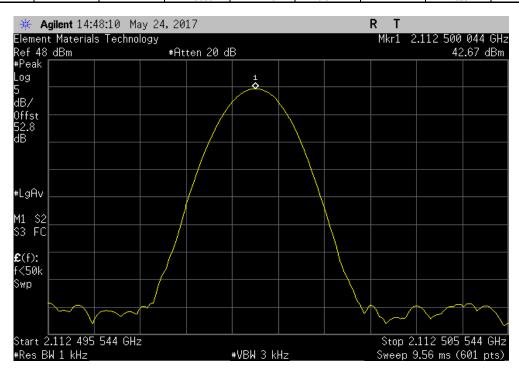
TbtTx 2017.01.27

-10°C, 2177.5 MHz

| Measured Assigned Error Limit | Value (MHz) | Value (MHz) | (ppm) | Results | (ppm) | Pass |



		-:	20°C, 2112.5 MH	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2112.500044	2112.5	0.021	1	Pass

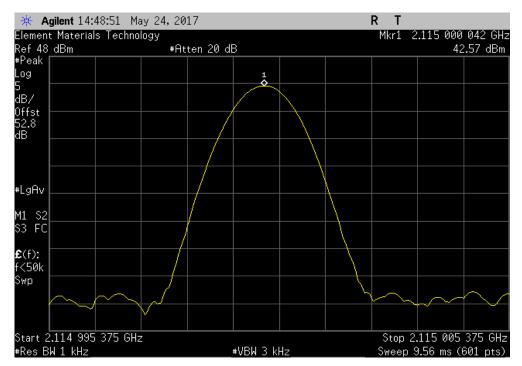


Report No. TECO0042 40/83

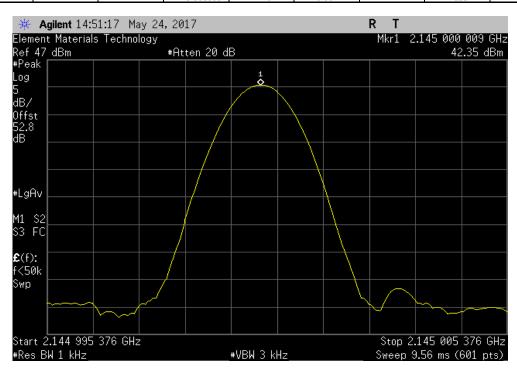


TbtTx 2017.01.27

		-20°C, 2115 MHz	2		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2115.000042	2115	0.020	1	Pass



			-20°C, 2145 MHz	1		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
1		2145.000009	2145	0.004	1	Pass

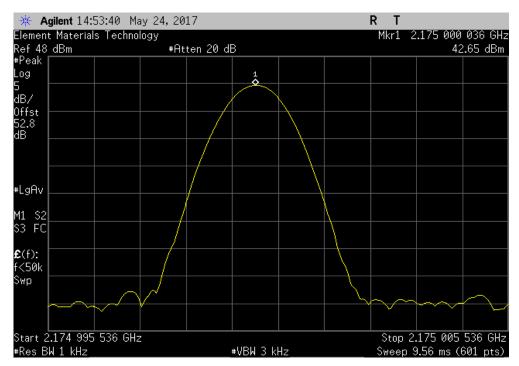


Report No. TECO0042 41/83

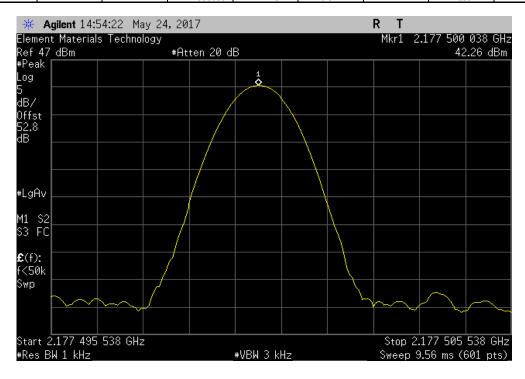


TbtTx 2017.01.27

		-20°C, 2175 MHz			
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2175.000036	2175	0.017	1	Pass



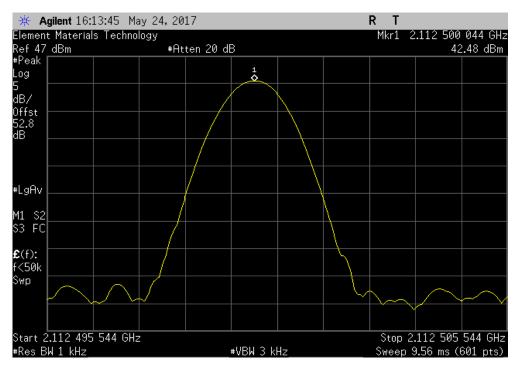
		-;	20°C, 2177.5 MH	Z		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2177.500038	2177.5	0.017	1	Pass



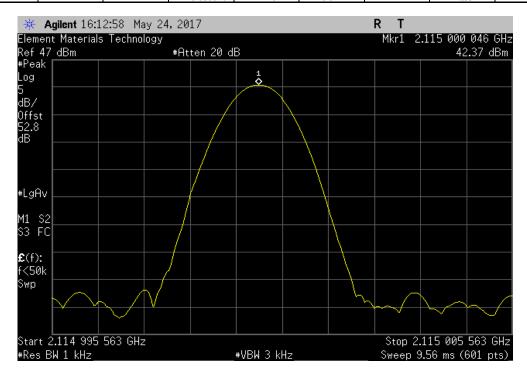
Report No. TECO0042 42/83



TbtTx 2017.01.27



			-30°C, 2115 MHz	1		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2115.000046	2115	0.022	1	Pass

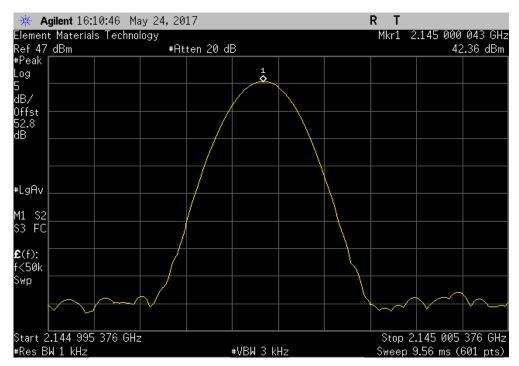


Report No. TECO0042 43/83

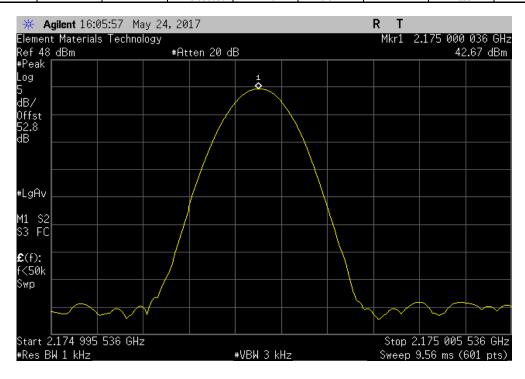


TbtTx 2017.01.27

		-30°C, 2145 MHz	2		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass



		-30°C, 2175 MHz	1		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2175.000036	2175	0.017	1	Pass



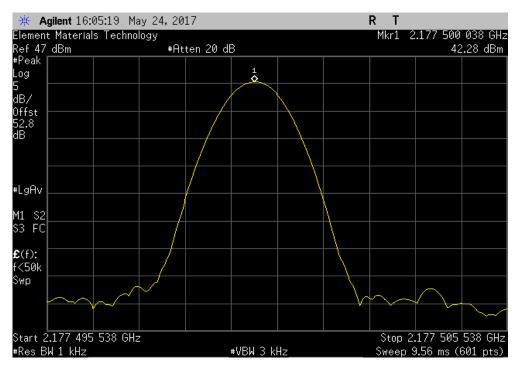
Report No. TECO0042 44/83



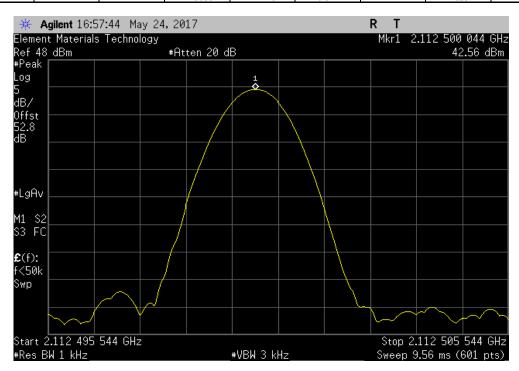
TbtTx 2017.01.27

-30°C, 2177.5 MHz

| Measured | Assigned | Error | Limit |
| Value (MHz) | Value (MHz) | (ppm) | (ppm) | Results |
| 2177.500038 | 2177.5 | 0.017 | 1 | Pass



	Norma	al Voltage, 2112.	5 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2112.500044	2112.5	0.021	1	Pass

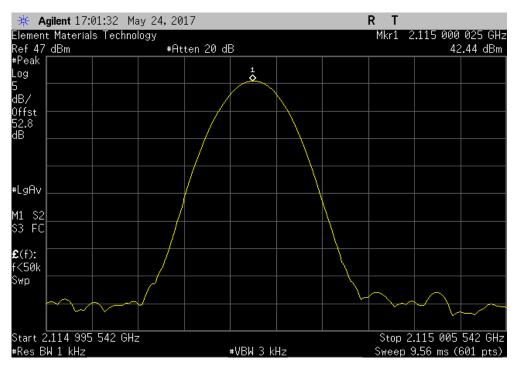


Report No. TECO0042 45/83

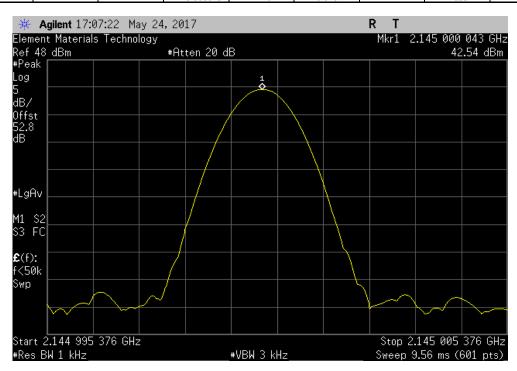


TbtTx 2017.01.27

| Normal Voltage, 2115 MHz
| Measured Assigned Error Limit
| Value (MHz) Value (MHz) (ppm) (ppm) Results
| 2115.000025 2115 0.012 1 Pass



	Norm	nal Voltage, 2145	MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass

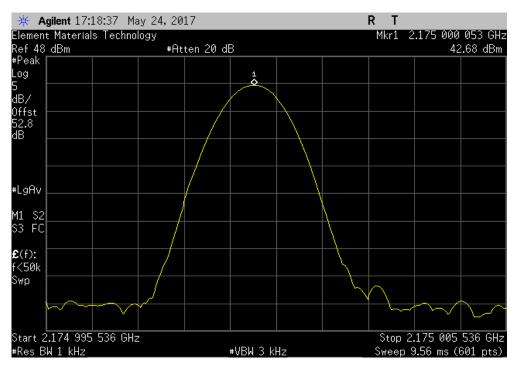


Report No. TECO0042 46/83

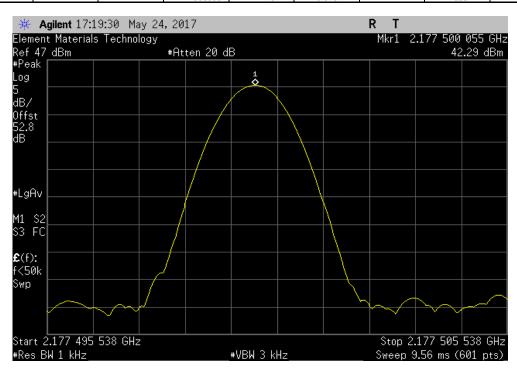


TbtTx 2017.01.27

| Normal Voltage, 2175 MHz
| Measured Assigned Error Limit |
| Value (MHz) Value (MHz) (ppm) (ppm) Results |
| 2175.000053 2175 0.024 1 Pass



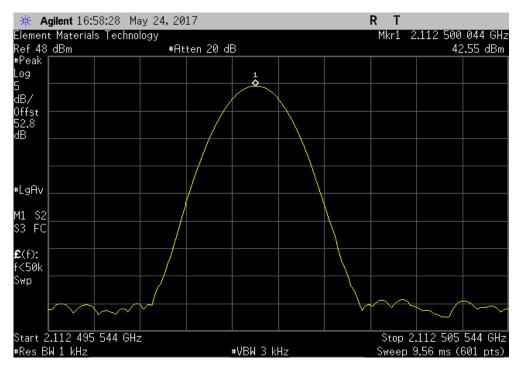
	Norma	al Voltage, 2177.	5 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2177.500055	2177.5	0.025	1	Pass



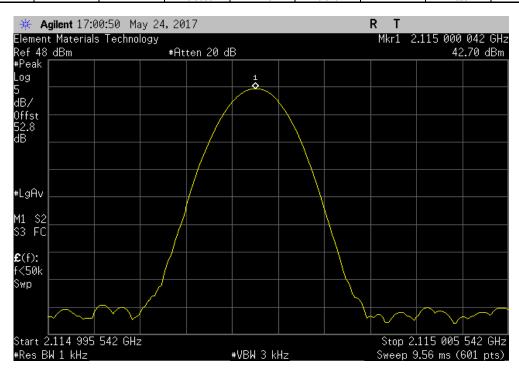
Report No. TECO0042 47/83



TbtTx 2017.01.27



	Extreme Volta	age (102VAC/60F	łz), 2115 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2115.000042	2115	0.020	1	Pass

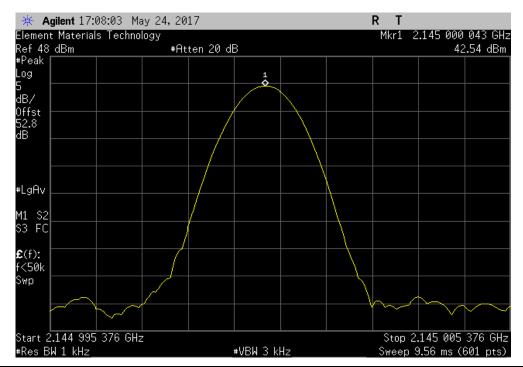


Report No. TECO0042 48/83

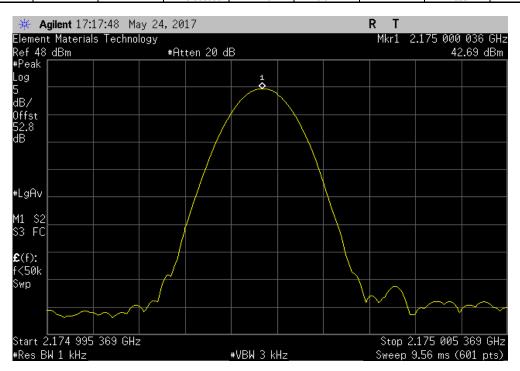


TbtTx 2017.01.27

	Extreme Volta	age (102VAC/60F	lz), 2145 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass



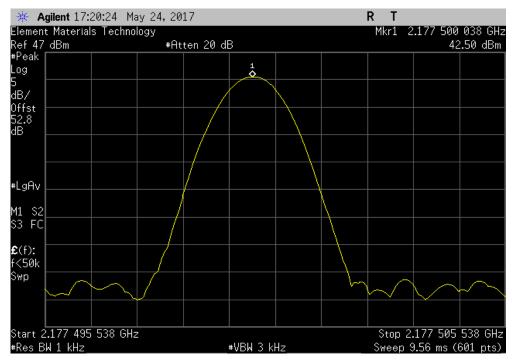
	Extreme Volta	age (102VAC/60F	Hz), 2175 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2175.000036	2175	0.017	1	Pass



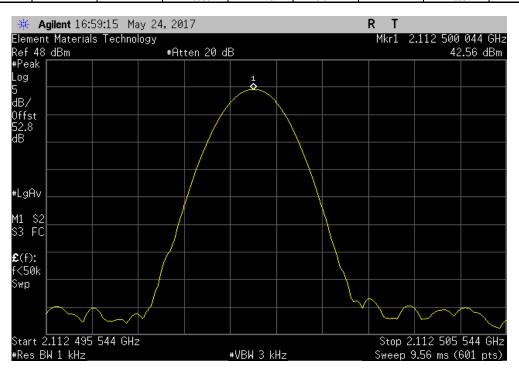
Report No. TECO0042 49/83



TbtTx 2017.01.27



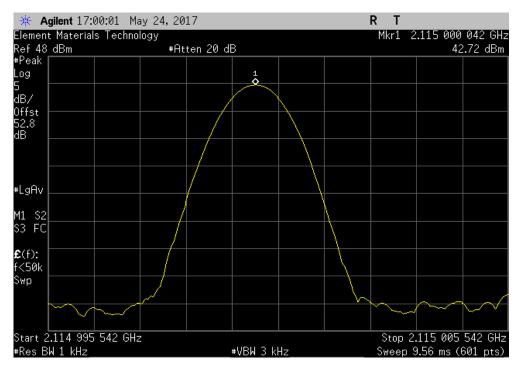
		Extreme Voltaç	ge (138VAC/60H	z), 2112.5 MHz		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
i		2112.500044	2112.5	0.021	1	Pass



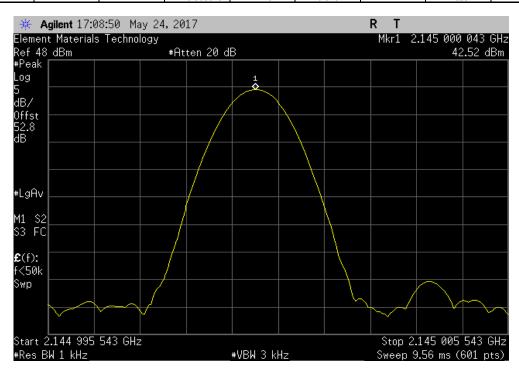
Report No. TECO0042 50/83



TbtTx 2017.01.27



	Extreme Volta	ige (138VAC/60F	łz), 2145 MHz		
	Measured	Assigned	Error	Limit	
	Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
	2145.000043	2145	0.020	1	Pass



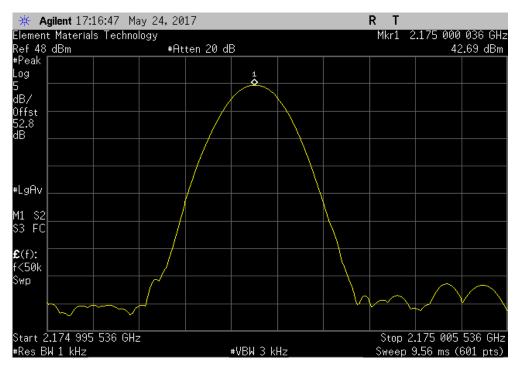
Report No. TECO0042 51/83



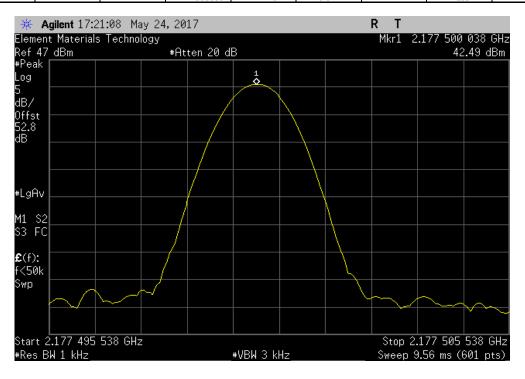
TbtTx 2017.01.27

Extreme Voltage (138VAC/60Hz), 2175 MHz

| Measured Assigned Error Limit | Value (MHz) (ppm) (ppm) Results |
| 2175.000036 2175 0.017 1 Pass



		Extreme Voltaç	ge (138VAC/60H	z), 2177.5 MHz		
		Measured	Assigned	Error	Limit	
		Value (MHz)	Value (MHz)	(ppm)	(ppm)	Results
İ		2177.500038	2177.5	0.017	1	Pass



Report No. TECO0042 52/83



XMit 2017.02.08

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
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

## **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

The spectrum analyzer settings were as follows:

> RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).

>VBW= > RBW

>A peak detector was used

➤Trace max hold.

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 26 dB emission bandwidth.

There is no required limit to be met in the rule part for this test. The purpose of the test is to both report the results and to utilize the emission bandwidth for setting the channel power integration bandwidth during conducted output power testing.

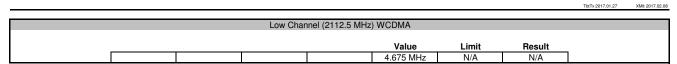
Report No. TECO0042

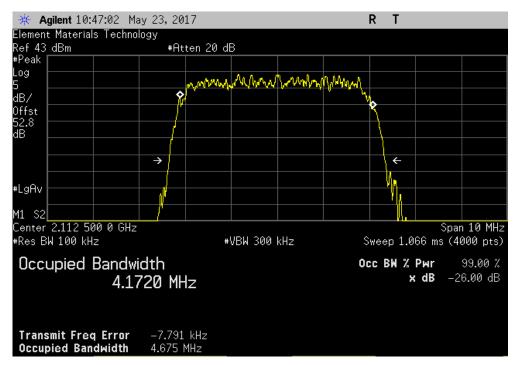


						TbtTx 2017.01.27	XMit 2017
	xWave Prism AWS3 MIMO	HDM			Work Order:		
Serial Number: 459						05/24/17	
Customer: Cor	nmScope				Temperature:	21.6 °C	
Attendees: Jos	h Wittman				Humidity:	46.4% RH	
Project: Nor	ne				Barometric Pres.:	1008 mbar	
Tested by: Dus	stin Sparks		Power	110VAC/60Hz	Job Site:	MN08	
ST SPECIFICATIONS	3			Test Method			
C 27:2017				ANSI/TIA/EIA-603-D-2010			
OMMENTS							
			reevaluated during installa	tion. System is rated at 20W (+43 di	3m) per port. Port 2 was determined to	nave tne worst cas	se output powe
id all tests were perfo	rmed on port 2 unless other	erwise noted.					
EVIATIONS FROM TE	CT CTANDARD						
one	STSTANDARD						
Jile			6				
onfiguration #	2		29.0	Spards			
ogaration #	-	Signature	Charma	Spares			
	<b>_</b>	Olgitature					
					Value	Limit	Result
w Channel (2112.5 MF	lz) WCDMA				4.675 MHz	N/A	N/A
d Channel (2145 MHz)	WCDMA				4.659 MHz	N/A	N/A
d Channel (2145 MHz)	WCDMA, Input Signal				4.23 MHz	N/A	N/A
gh Channel (2177.5 M	Hz) WCDMA				4.667 MHz	N/A	N/A
w Channel (2115 MHz	) LTE 10 MHz				9.46 MHz	N/A	N/A
d Channel (2145 MHz)					9.484 MHz	N/A	N/A
d Channel (2145 MHz)	LTE 10 MHz, Input Signal				8.99 MHz	N/A	N/A
gh Channel (2175 MH;	z) LTE 10 MHz, Input Signal				9.466 MHz	N/A	N/A

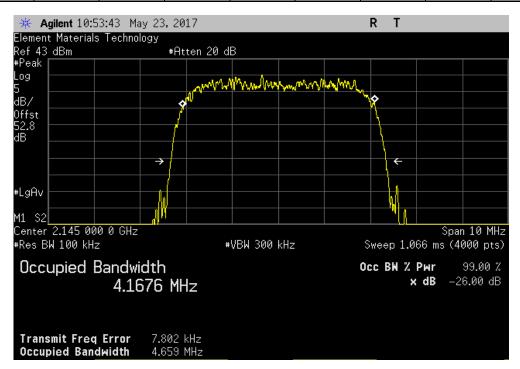
Report No. TECO0042 54/83







	Mid Cha	nnel (2145 MHz)	WCDMA		
			Value	Limit	Result
			4.659 MHz	N/A	N/A



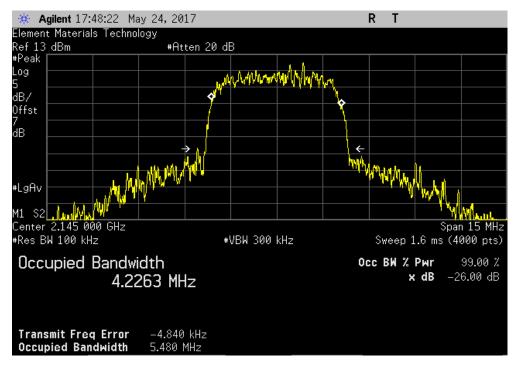
Report No. TECO0042 55/83



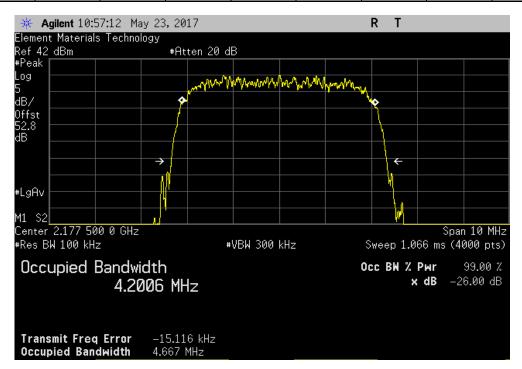
Mid Channel (2145 MHz) WCDMA, Input Signal

Value Limit Result

4.23 MHz N/A N/A



	High Char	nnel (2177.5 MHz	) WCDMA		
			Value	Limit	Result
			4.667 MHz	N/A	N/A



Report No. TECO0042 56/83

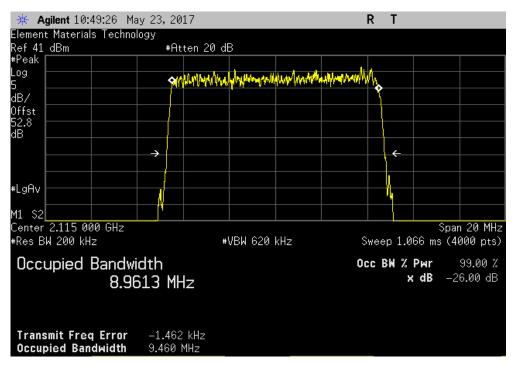


TbtTx 2017.01.27

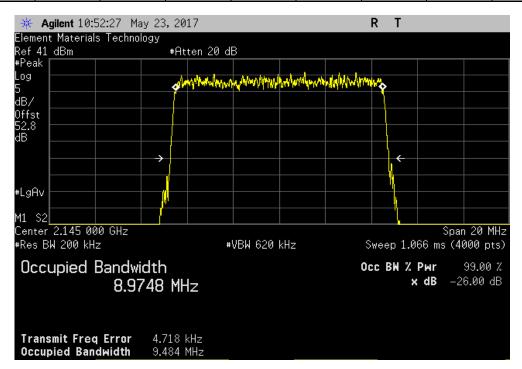
 Low Channel (2115 MHz) LTE 10 MHz

 Value
 Limit
 Result

 9.46 MHz
 N/A
 N/A



	Mid Chanr	nel (2145 MHz) L	ΓE 10 MHz		
			Value	Limit	Result
			9.484 MHz	N/A	N/A



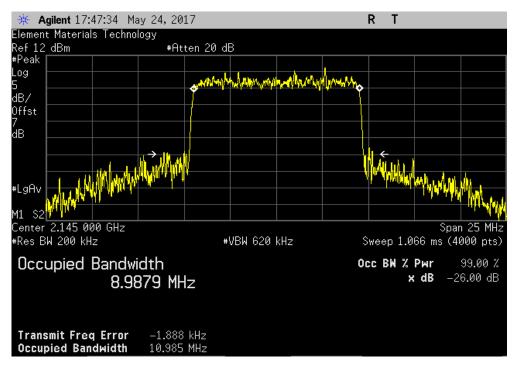
Report No. TECO0042 57/83



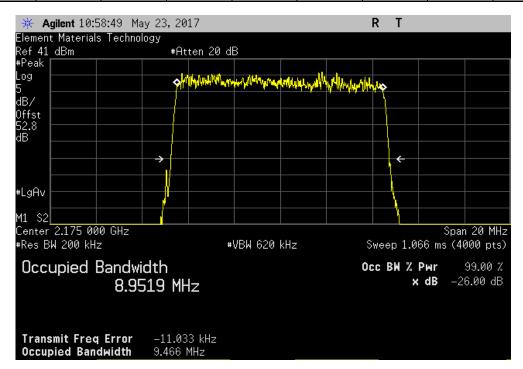
Mid Channel (2145 MHz) LTE 10 MHz, Input Signal

Value Limit Result

8.99 MHz N/A N/A



	High Channel (21	75 MHz) LTE 10	MHz, Input Signa	I	
			Value	Limit	Result
			9.466 MHz	N/A	N/A



Report No. TECO0042 58/83

## SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2017.01.26

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

### MODES OF OPERATION

Transmitting WCDMA, LTE 5MHz and LTE 10MHz - low channel (2112.5 MHz WCDMA/LTE 5MHz, 2115 MHz LTE 10MHz), mid channel (2145 MHz), and high channel (2177.5 MHz WCDMA/LTE 5MHz, 2175 MHz LTE 10MHz)

#### **POWER SETTINGS INVESTIGATED**

110VAC/60Hz

## **CONFIGURATIONS INVESTIGATED**

TECO0042 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency	26500 MHz
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### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

#### TEST FOLIPMENT

I LOT LOOK WILLIAM					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Generator - Signal	Agilent	N5182A	TIF	8/12/2014	36 mo
Power Sensor	Agilent	N8481A	SQN	8/15/2016	12 mo
Meter - Power	Agilent	N1913A	SQL	8/15/2016	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	9/23/2016	12 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/29/2016	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/1/2016	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/1/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	9/23/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	9/22/2016	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 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
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/1/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/15/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/6/2017	12 mo

### MEASUREMENT BANDWIDTHS

MEAGOTIEMENT DANDWIDTHO			
Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(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 EUT was tested with shielded terminations on the RF output ports instead of antennas.

For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated spurious emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. While scanning, 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. The turntable azimuth is varied to maximize the level of spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted.

The transmitter is then replaced with a  $\frac{1}{2}$  wave dipole that is successively tuned to each of the highest spurious emissions for emissions below 1 GHz, and a horn antenna for emissions above 1 GHz. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the antenna and its gain; the power (dBm) into an ideal  $\frac{1}{2}$  wave dipole antenna is determined for each radiated spurious emission.

Report No. TECO0042 59/83

# **SPURIOUS RADIATED EMISSIONS**



										EmiR5 2017.01.25		PSA-ESCI 2017.01.26
W	ork Order:				Date:	05/2		_	+ n/			2
	Project:				nperature:	22.1			ust	my	Dave	20
0	Job Site:				Humidity:	39.5%			Tantad bu.	D atia Caa	d. =	
Seria	al Number:	45964 FlexWave			tric Pres.:	1014	mbar		rested by:	Dustin Spa	rks .	
Con	figuration:		I IISIII AVV	JO IVIIIVIO I II	DIVI							
		CommScor	oe									
		Josh Wittm		/lcGraw								
E	UT Power:	110VAC/60										
Opera	ting Mode:									LTE 5MHz,		
•		None	id channel	(2145 MHz	), and high	channel (21	77.5 MHz	WCDMA/L	IE 5MHz, 2	2175 MHz L	IE 10MH	łz)
I	Deviations:	INOTIE										
		None										
(	Comments:											
Test Spec	cifications						Test Meth	od				
FCC 27:2		•					ANSI/TIA/I	EIA-603-D-2	2010			
Run #	ŧ 4	Test Dis	tance (m)	3	Antenna	Height(s)		1 to 4(m)		Results		Pass
0												
-10												
. •		-									-	
-20												
-30												
00												
_												
<b>ш</b> -40	+											
ס									1111			
-50												
-30												
-60	+											
-70												
-70												
-80												
	10		100			1000			10000			100000
						MHz				■ PK	◆ AV	<ul><li>QP</li></ul>
				Polarity/								
	Freq	Antenna Height	Azimuth	Transducer Type	Dotostor	EIRP	EIRP	Spec. Limit	Compared to Spec.		Comment	e
	(MHz)	(meters)	(degrees)	туре	Detector	(Watts)	(dBm)	(dBm)	Spec. (dB)		Johnnetti	
		0.1	200.2	Vast	DIZ	0.075.00	40.0	10.0	07.0	High sheers	LTE 10M	<b>⊔</b> -7
	6524.742 6531.425	3.1 1.0	289.0 116.1	Vert Horz	PK PK	9.27E-08 8.85E-08	-40.3 -40.5	-13.0 -13.0	-27.3 -27.5	High channel, High channel,		
	6462.533	1.2	134.1	Horz	PK	8.26E-08	-40.8	-13.0	-27.8	Mid channel,	WCDMA	
	6531.092	1.0 2.9	22.1 326.9	Vert	PK PK	7.89E-08	-41.0 -41.0	-13.0	-28.0 -28.0	High channel, High channel,		
	6527.342 6464.142	1.0	276.0	Horz Vert	PK	7.89E-08 7.71E-08	-41.0 -41.1	-13.0 -13.0	-28.0 -28.1	Mid channel,		14
	6336.000	3.9	272.9	Horz	PK	7.36E-08	-41.3	-13.0	-28.3	Low channel,	WCDMA	
	6339.125 4309.225	1.0 1.0	264.0 158.0	Vert Vert	PK PK	7.20E-08 2.38E-08	-41.4 -46.2	-13.0 -13.0	-28.4 -33.2	Low channel, Mid channel,		
	4309.225	1.0	214.1	Horz	PK	2.38E-08 2.28E-08	-46.2 -46.4	-13.0	-33.2	Mid channel,		
	4224.342	1.0	325.0	Vert	PK	2.03E-08	-46.9	-13.0	-33.9	Low channel,	WCDMA	
	4227.392 8617.658	1.0	66.1 268.0	Horz	PK	1.98E-08	-47.0 -54.3	-13.0 -13.0	-34.0 -41.3	Low channel, Mid channel,		
	8617.658 8621.458	1.0 1.0	268.0 119.1	Vert Horz	PK PK	3.69E-09 3.29E-09	-54.3 -54.8	-13.0 -13.0	-41.3 -41.8	Mid channel,		
	8447.508	1.0	72.0	Horz	PK	3.21E-09	-54.9	-13.0	-41.9	Low channel,	WCDMA	
	8711.825 9710.175	1.0	176.0	Horz	PK	3.21E-09	-54.9 55.1	-13.0	-41.9 42.1	High channel,		
	8710.175 8450.450	1.0 3.3	275.9 0.0	Vert Vert	PK PK	3.07E-09 2.93E-09	-55.1 -55.3	-13.0 -13.0	-42.1 -42.3	High channel, Low channel,		
										- ,		

Report No. TECO0042 60/83



XMit 2017.02.08

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
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

## **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. Analyzer plots utilizing a 1 MHz resolution bandwidth and no video filtering were made for each mode listed in the datasheet.

An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the FLIT

The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than or equal to the limit. Emissions close to the limit were re-measured using an RMS Average detector to match the method used during output power measurements.

Report No. TECO0042 61/83



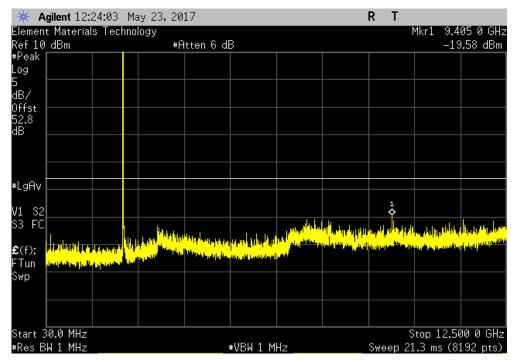
	FlexWave Prism AWS3 N	NIMO HDM				Work Order:		
Serial Number:	459644002					Date:	05/24/17	
	CommScope					Temperature:	21.9 °C	
	Josh Wittman					Humidity:		
Project:	None					<b>Barometric Pres.:</b>	1011 mbar	
Tested by:	Dustin Sparks		Power: 110VAC	/60Hz		Job Site:	MN08	
TEST SPECIFICATION	ONS		Test Me	thod				
CC 27:2017			ANSI/TI/	VEIA-603-D-2010				
COMMENTS								
ntenna gain is ass	sumed to be 0 - per custo	mer, the antenna gain will be reevalu	uated during installation, Sys	tem is rated at 20W (+43 dBm	n) per port, 3 dB co	rrection factor deri	ved from the formu	ıla 10log(n).
		letermined to have the worst case ou						, ,
nore in is the name	ber or ports. Fort 2 was a	ictermined to have the worst case of	atput power und un tests wer	c periorited on port 2 diffess	other wise notes.			
EVIATIONS FROM	I TEST STANDARD							
DEVIATIONS FROM None	I TEST STANDARD							
	I TEST STANDARD		<b>D</b>					
None	1 TEST STANDARD	×	Tankin &	2				
None		Signature	Tustingoa	20				
lone		Signature	Tusting participation of the second of the s	Max Value	Correction	Max Value	Limit	
lone		Signature	Frequency Range	Max Value (dBm)	Correction Factor (dB)	Max Value + CF (dBm)	Limit ≤ (dBm)	Result
one configuration #	2	Signature						Result Pass
one onfiguration # ow Channel (2112.5	2 5 MHz) WCDMA	Signature	Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	
one onfiguration #  ow Channel (2112.5 ow Channel (2112.5	2 5 MHz) WCDMA 5 MHz) WCDMA	Signature	Range 30 MHz - 12.5 GHz	(dBm) -19.58	Factor (dB)	+ CF (dBm) -16.58	≤ <b>(dBm)</b> -13	Pass
one onfiguration #  ow Channel (2112.5 ow Channel (2112.5 lid Channel (2145 M	2 5 MHz) WCDMA 5 MHz) WCDMA MHz) WCDMA	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz	(dBm) -19.58 -16.6	Factor (dB)	+ CF (dBm) -16.58 -13.6	≤ (dBm) -13 -13	Pass Pass
configuration #  ow Channel (2112.5 ow Channel (2112.5 did Channel (2145 N did Channel (2145 N	2 5 MHz) WCDMA MHz) WCDMA MHz) WCDMA MHz) WCDMA	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz	(dBm) -19.58 -16.6 -20.63	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63	≤ (dBm) -13 -13 -13	Pass Pass Pass
one onfiguration #  ow Channel (2112.5 ow Channel (2112.5 lid Channel (2145 N ligh Channel (2177.	2 5 MHz) WCDMA 5 MHz) WCDMA MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz	(dBm) -19.58 -16.6 -20.63 -17.07	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07	≤ (dBm) -13 -13 -13 -13	Pass Pass Pass Pass
one onfiguration # ow Channel (2112.5 ow Channel (2145 N lid Channel (2145 N lid Channel (21477. ligh Channel (2177.	2 5 MHz) WCDMA 5 MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA	Signature	Range  30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	(dBm) -19.58 -16.6 -20.63 -17.07 -20.07	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07 -17.07	≤(dBm) -13 -13 -13 -13 -13	Pass Pass Pass Pass Pass
ow Channel (2112.5 ow Channel (2112.5 ow Channel (2145 N did Channel (2145 N ligh Channel (2177. ow Channel (2177.	2 5 MHz) WCDMA MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 12.5 GHz - 22 GHz	(dBm) -19.58 -16.6 -20.63 -17.07 -20.07 -16.83	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07 -17.07 -13.83	≤ (dBm) -13 -13 -13 -13 -13 -13 -13	Pass Pass Pass Pass Pass Pass Pass
one onfiguration #  ow Channel (2112.5 ow Channel (2145 N igh Channel (2147.7 igh Channel (2115 N ow Channel (2115 N ow Channel (2115 N	2 5 MHz) WCDMA 5 MHz) WCDMA HHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA MHz) LTE 10MHz MHz) LTE 10MHz	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 15.5 GHz	(dBm) -19.58 -16.6 -20.63 -17.07 -20.07 -16.83 -20.31	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07 -17.07 -13.83 -17.31	≤ (dBm) -13 -13 -13 -13 -13 -13 -13	Pass Pass Pass Pass Pass Pass Pass Pass
configuration #  cow Channel (2112.5  ow Channel (2112.5  ow Channel (2145 N  did Channel (2145 N  digh Channel (2147 N  ow Channel (2115 N  did Channel (2115 N	2 5 MHz) WCDMA 5 MHz) WCDMA HHz) WCDMA HHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA 5 MHz) LTE 10MHz HHz) LTE 10MHz HHz) LTE 10MHz	Signature	Range  30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 12.5 GHz - 22 GHz	(dBm) -19.58 -16.6 -20.63 -17.07 -20.07 -16.83 -20.31 -16.4	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07 -17.07 -13.83 -17.31 -13.4	≤ (dBm) -13 -13 -13 -13 -13 -13 -13 -13 -13	Pass Pass Pass Pass Pass Pass Pass Pass
	2 5 MHz) WCDMA 5 MHz) WCDMA MHz) WCDMA MHz) WCDMA 5 MHz) WCDMA 5 MHz) WCDMA 5 MHz) LTE 10MHz MHz) LTE 10MHz MHz) LTE 10MHz MHz) LTE 10MHz	Signature	Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 20 MHz - 12.5 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz 30 MHz - 12.5 GHz 30 MHz - 12.5 GHz	(dBm) -19.58 -16.6 -20.63 -17.07 -20.07 -16.83 -20.31 -16.4 -19.97	Factor (dB)	+ CF (dBm) -16.58 -13.6 -17.63 -14.07 -17.07 -13.83 -17.31 -13.4 -16.97	≤ (dBm)  -13 -13 -13 -13 -13 -13 -13 -13 -13 -1	Pass Pass Pass Pass Pass Pass Pass Pass

Report No. TECO0042 62/83

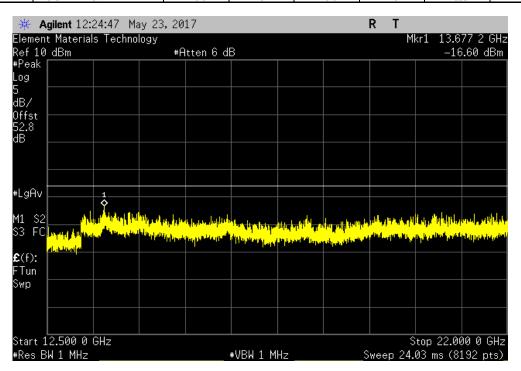


TbtTx 2017.01.27

	Low Char	nnel (2112.5 MHz)	) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-19.58	3	-16.58	-13	Pass



	Low Channel (2112.5 MHz) WCDMA						
Frequency	Max Value	Correction	Max Value	Limit			
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result		
12.5 GHz - 22 GHz	-16.6	3	-13.6	-13	Pass		

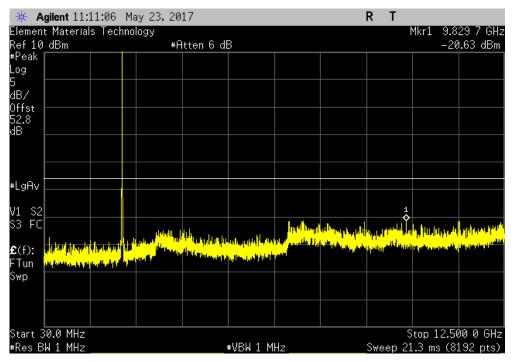


Report No. TECO0042 63/83

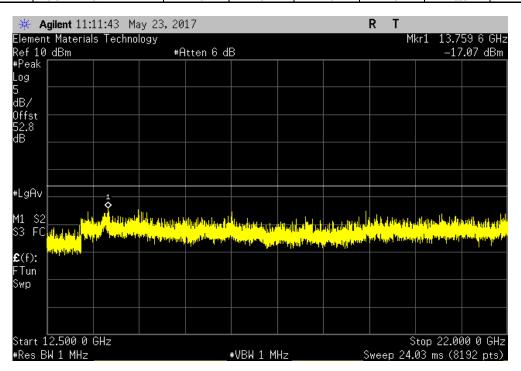


TbtTx 2017.01.27

	Mid Cha	nnel (2145 MHz)	WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.63	3	-17.63	-13	Pass



	Mid Channel (2145 MHz) WCDMA						
Frequency	Max Value	Correction	Max Value	Limit			
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result		
12.5 GHz - 22 GHz	-17.07	3	-14.07	-13	Pass		

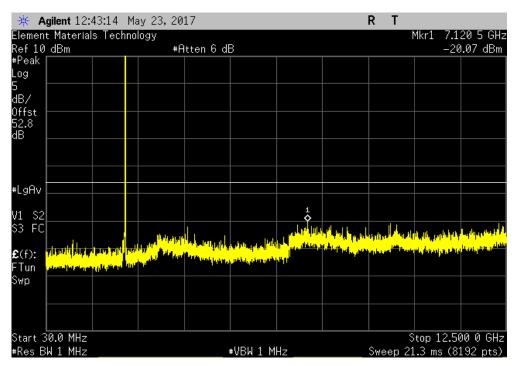


Report No. TECO0042 64/83

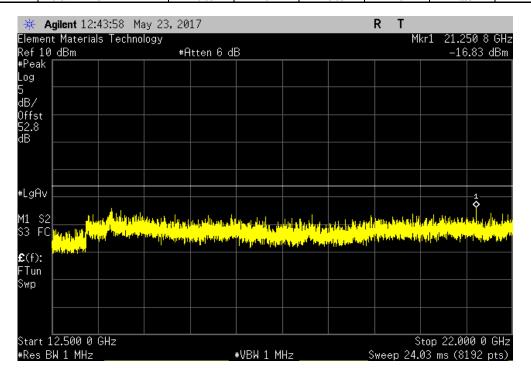


TbtTx 2017.01.27

	High Char	nnel (2177.5 MHz	) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.07	3	-17.07	-13	Pass



	High Channel (2177.5 MHz) WCDMA							
Frequency	Max Value	Correction	Max Value	Limit				
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result			
12.5 GHz - 22 GHz	-16.83	3	-13.83	-13	Pass			

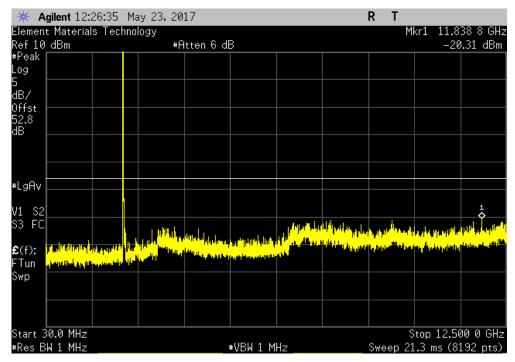


Report No. TECO0042 65/83

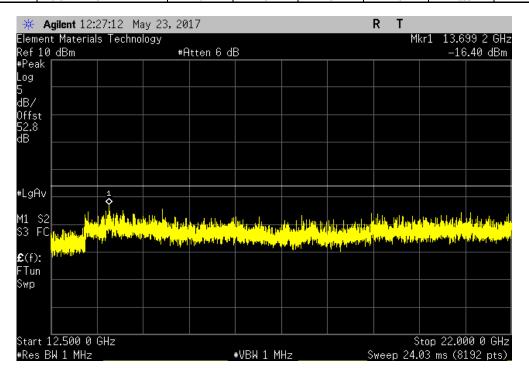


TbtTx 2017.01.27

	Low Chan	nel (2115 MHz) L	TE 10MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.31	3	-17.31	-13	Pass



	Low Channel (2115 MHz) LTE 10MHz						
Frequency	Max Value	Correction	Max Value	Limit			
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result		
12.5 GHz - 22 GHz	-16.4	3	-13.4	-13	Pass		

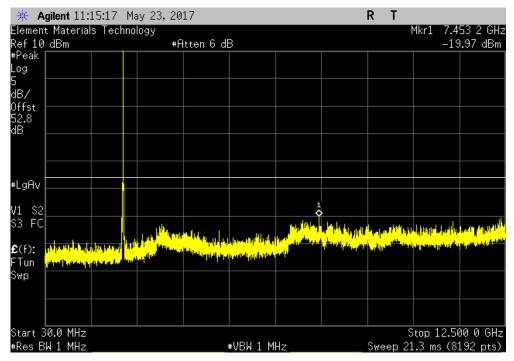


Report No. TECO0042 66/83

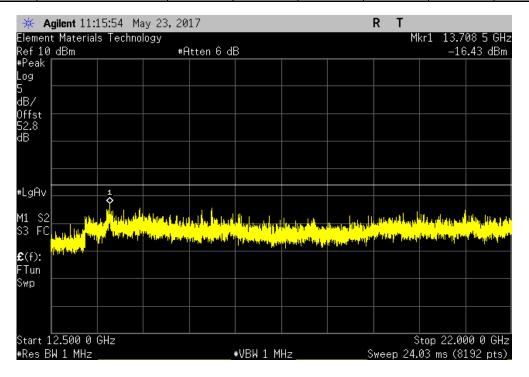


TbtTx 2017.01.27

Mid Channel (2145 MHz) LTE 10MHz						
Frequency	Max Value	Correction	Max Value	Limit		
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result	
30 MHz - 12.5 GHz	-19.97	3	-16.97	-13	Pass	



	Mid Channel (2145 MHz) LTE 10MHz					
Frequency	Max Value	Correction	Max Value	Limit		
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result	
12.5 GHz - 22 GHz	-16.43	3	-13.43	-13	Pass	

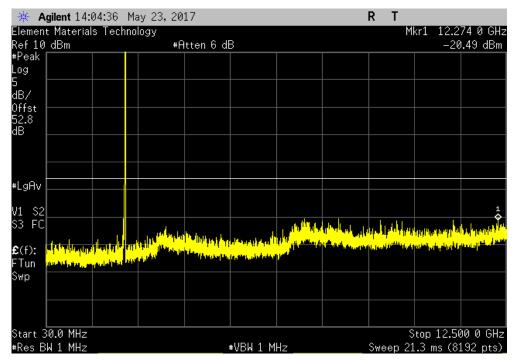


Report No. TECO0042 67/83

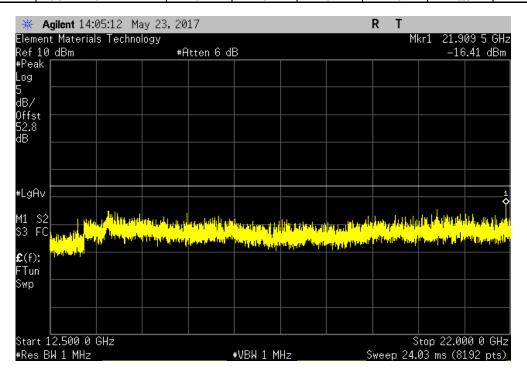


TbtTx 2017.01.27

	High Char	nnel (2175 MHz) L	TE 10MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.49	3	-17.49	-13	Pass



	High Channel (2175 MHz) LTE 10MHz						
Frequency	Max Value	Correction	Max Value	Limit			
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result		
12.5 GHz - 22 GHz	-16.41	3	-13.41	-13	Pass		



Report No. TECO0042 68/83



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

## **TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

## **TEST DESCRIPTION**

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge. The resolution bandwidth was set to approximately 1% of the measured emissions bandwidth within the first 1 MHz block adjacent to the transmit band. An average RMS detector was used to match the method used during Output Power. The screen capture shows the margin between the measured value and the limit at the band edge. Failing measurements were re-measured using the channel power integration method as called out in the standard.

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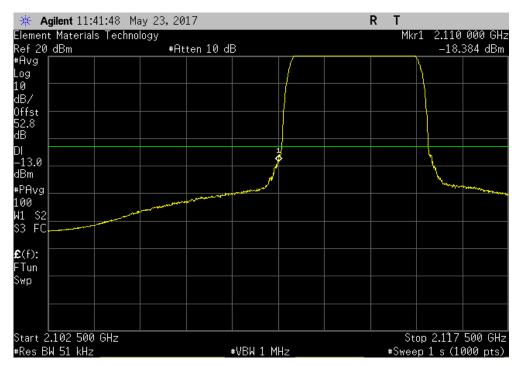
EUT: Flex	xWave Prism AWS3 MIMO HDM					Work Order:	TECO0042	
Serial Number: 4596	644002					Date:	05/23/17	
Customer: Con	nmScope					Temperature:	24.2 °C	
Attendees: Josi	h Wittman					Humidity:	40% RH	
Project: Non	ne					<b>Barometric Pres.:</b>	1012 mbar	
Tested by: Dus	stin Sparks		Power: 110VAC/60Hz			Job Site:	MN08	
TEST SPECIFICATIONS	3		Test Method					
FCC 27:2017			ANSI/TIA/EIA-603-D-2	010				
COMMENTS								
Antenna gain is assume			ated during installation. System is rated a tput power and all tests were performed			rrection factor deri	ved from the form	ula 10log(n),
Antenna gain is assume where n is the number of DEVIATIONS FROM TEST	of ports. Port 2 was determined to have					rrection factor deri	ved from the form	ula 10log(n),
Antenna gain is assume where n is the number of	of ports. Port 2 was determined to have ST STANDARD 2					rrection factor deri	ved from the form	ula 10log(n),
Antenna gain is assume where n is the number of DEVIATIONS FROM TES None	of ports. Port 2 was determined to have ST STANDARD 2	e the worst case out	tput power and all tests were performed			Value + CF	ved from the form  Limit (dBm)	ula 10log(n),
Antenna gain is assume where n is the number of DEVIATIONS FROM TESTONE Configuration #	of ports. Port 2 was determined to have ST STANDARD  2  Sig	e the worst case out	tput power and all tests were performed	on port 2 unles	s otherwise noted.  Correction	Value + CF	Limit	
Antenna gain is assume where n is the number of DEVIATIONS FROM TESTONE Configuration #	of ports. Port 2 was determined to have ST STANDARD  2  Sig Hz) WCDMA	e the worst case out	tput power and all tests were performed	Value (dBm)	s otherwise noted.  Correction	Value + CF (dBm)	Limit (dBm)	Result
Antenna gain is assume where n is the number of DEVIATIONS FROM TES None	of ports. Port 2 was determined to have ST STANDARD  2  Sig Hz) WCDMA Hz) WCDMA	e the worst case out	tput power and all tests were performed	Value (dBm)	s otherwise noted.  Correction	Value + CF (dBm) -15.37	Limit (dBm) -13	Result Pass

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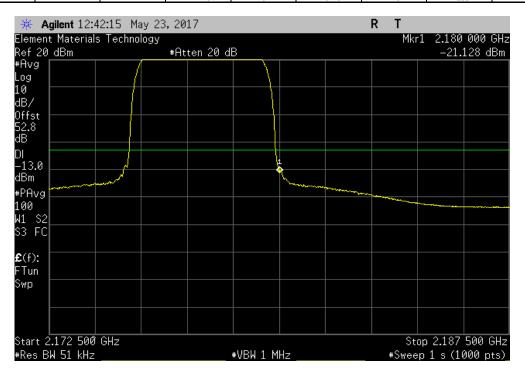


TbtTx 2017.01.27

Low Channel (2112.5 MHz) WCDMA								
			Value	Correction	Value + CF	Limit		
			(dBm)	Factor (dB)	(dBm)	(dBm)	Result	
			-18.37	3	-15.37	-13	Pass	



	High Char	nnel (2177.5 MHz	) WCDMA		
	Value	Correction	Value + CF	Limit	
	(dBm)	Factor (dB)	(dBm)	(dBm)	Result
	-21.15	3	-18.15	-13	Pass

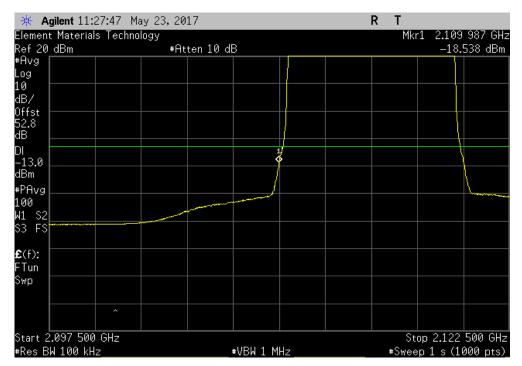


Report No. TECO0042 71/83

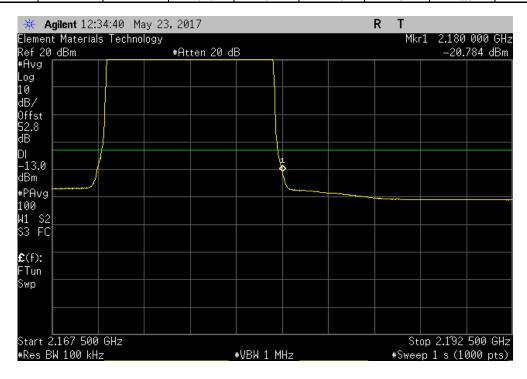


TbtTx 2017.01.27

	Low Chan	nel (2115 MHz) L	TE 10MHz		
	Value	Correction	Value + CF	Limit	
	(dBm)	Factor (dB)	(dBm)	(dBm)	Result
	-18.54	3	-15.54	-13	Pass



	High Chan	nel (2175 MHz) L	TE 10MHz		
	Value	Correction	Value + CF	Limit	
	(dBm)	Factor (dB)	(dBm)	(dBm)	Result
	-20.78	3	-17.78	-13	Pass



Report No. TECO0042 72/83



XMit 2017.02.08

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
Attenuator	Aeroflex	48-30-34	RCU	9/15/2016	9/15/2017
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAF	NCR	NCR
Power Divider/Combiner	Fairview Microwave	MP0208-2	IAE	NCR	NCR
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp	TTBJ141 KMKM-72	MNP	NCR	NCR
Attenuator	S.M. Electronics	SA26B-20	RFW	2/14/2017	2/14/2018
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/16/2017	3/16/2018

## **TEST DESCRIPTION**

Analyzer plots utilizing a 1MHz resolution bandwidth and no video filtering were made for each modulation type.

An RF signal generator was used to create the modulated signal(s) listed in the datasheets. These signals were input into the EUT.

The EUT was configured with an input of two CW pulses at the edges of the band and a modulated pulse in the band. The purpose of the test is to insure that no additional signals are creating by having multiple carriers in the passband of the EUT.

Analyzer plots utilizing a 1MHz resolution bandwidth and no video filtering were made for each modulation type.

The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than or equal to the spurious conducted emissions limits. Measurements close to the limit were re-measured using a RMS average detector.

Report No. TECO0042 73/83



EUT: FlexWave Prism AWS3 MIMO HDM Serial Number: 459644002 Work Order: TECO0042 Date: 05/24/17 Customer: CommScope Temperature: 21.6 °C Humidity: 43.6% RH Barometric Pres.: 1011 mbar Attendees: Josh Wittman Project: None
Tested by: Dustin Sparks
TEST SPECIFICATIONS Power: 110VAC/60Hz Test Method Job Site: MN08 ANSI/TIA/EIA-603-D-2010 COMMENTS Antenna gain is assumed to be 0 - per customer, the antenna gain will be reevaluated during installation. System is rated at 20W (+43 dBm) per port. 3 dB correction factor derived from the formula 10log(n), where n is the number of ports. Port 2 was determined to have the worst case output power and all tests were performed on port 2 unless otherwise noted. Measurements made outside of the Passband, but vithin the allowable band were made to show that all Intermodulation emissions were below the spurious limit. DEVIATIONS FROM TEST STANDARD Dusti sals Configuration # Signature Frequency Max Value Correction Max Value I imit Range 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz Result (dBm) Factor (dB) + CF (dBm) ≤ (dBm) Low Passband (2110-2145 MHz) WCDMA Low Passband (2110-2145 MHz) WCDMA Pass Pass -17.23 -14.23 -13 Low Passband (2110-2145 MHz) WCDMA Mid Passband (2130-2160 MHz) WCDMA Fundamental -21.76 -18.76 -13 30 MHz - 12.5 GHz -20.34 3 -17.34 -13 Pass 12.5 GHz - 22 GHz -16.81 -13.81 Fundamental -18.363 -15.36 -13 Pass High Passband (2145-2180 MHz) WCDMA High Passband (2145-2180 MHz) WCDMA 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz -20.11 -17.11 -13 -13 Pass -16.09 3 -13.09 Pass High Passband (2145-2180 MHz) WCDMA Low Passband (2110-2145 MHz) LTE 10 MHz Fundamental 30 MHz - 12.5 GHz 3 -16.6 -13 -13 Pass -20.31 -17.31 Pass Low Passband (2110-2145 MHz) LTE 10 MHz Low Passband (2110-2145 MHz) LTE 10 MHz 12.5 GHz - 22 GHz -17.44 -22.58 3 -14.44 -19.58 -13 -13 Pass Pass Fundamental Mid Passband (2130-2160 MHz) LTE 10 MHz Mid Passband (2130-2160 MHz) LTE 10 MHz 30 MHz - 12.5 GHz 12.5 GHz - 22 GHz -20.28 -17.28 -13 -13 -16.62 3 -13.62 Pass Mid Passband (2130-2160 MHz) LTE 10 MHz High Passband (2145-2180 MHz) LTE 10 MHz Fundamental -22.61 -19.61 30 MHz - 12.5 GHz Pass -19.873 -16.87 -13 High Passband (2145-2180 MHz) LTE 10 MHz High Passband (2145-2180 MHz) LTE 10 MHz 12.5 GHz - 22 GHz

-23.38

-20.38

-13

Pass

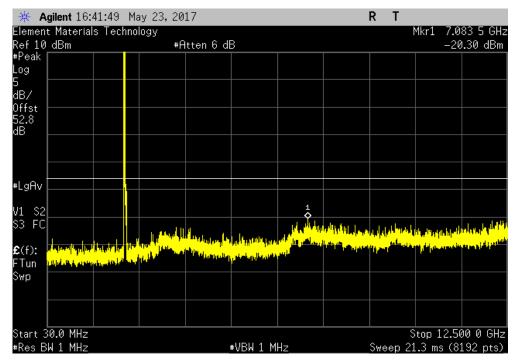
Fundamental

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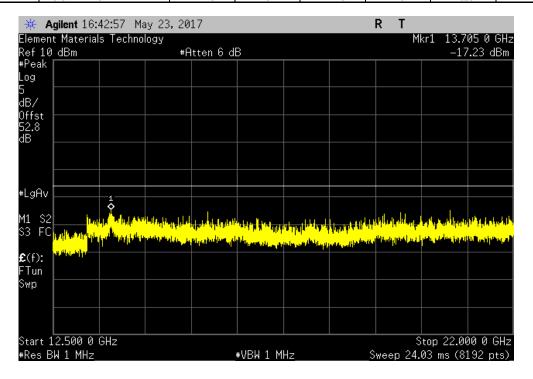


TbtTx 2017.01.27

	Low Passba	nd (2110-2145 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.3	3	-17.3	-13	Pass



	Low Passba	nd (2110-2145 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12.5 GHz - 22 GHz	-17.23	3	-14.23	-13	Pass

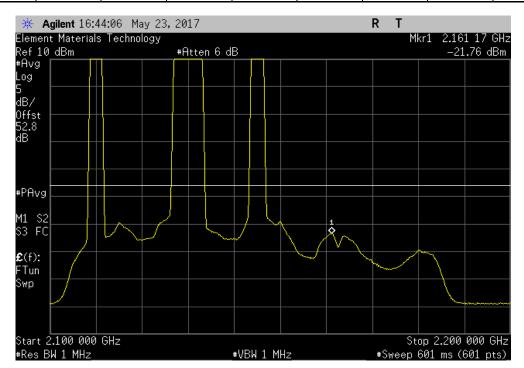


Report No. TECO0042 75/83

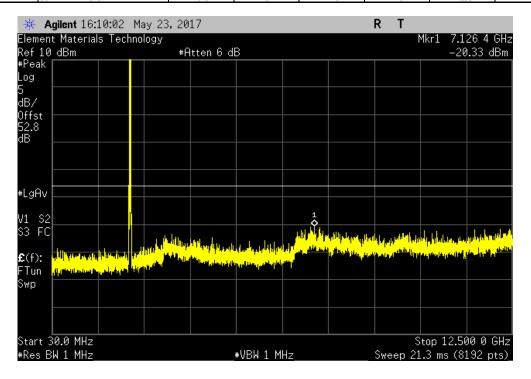


TbtTx 2017.01.27

	Low Passba	nd (2110-2145 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-21.76	3	-18.76	-13	Pass



	Mid Passbar	nd (2130-2160 MI	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.34	3	-17.34	-13	Pass

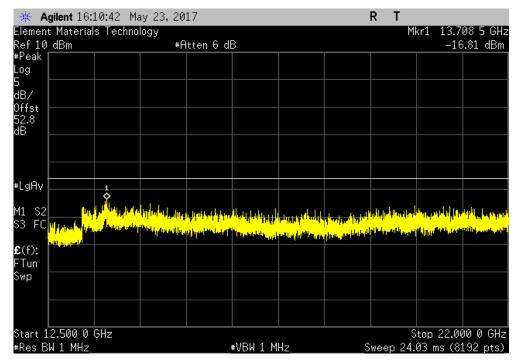


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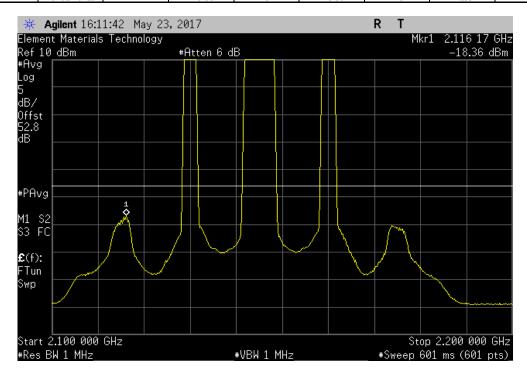


TbtTx 2017.01.27

	Mid Passba	nd (2130-2160 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12.5 GHz - 22 GHz	-16.81	3	-13.81	-13	Pass



	Mid Passba	nd (2130-2160 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-18.36	3	-15.36	-13	Pass

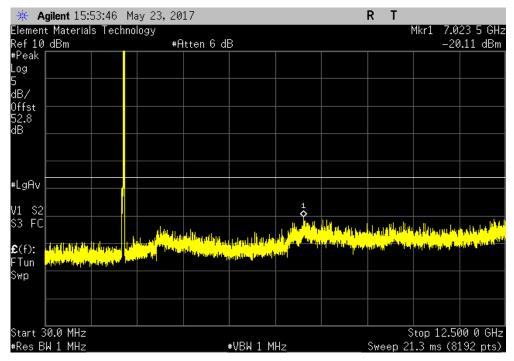


Report No. TECO0042 77/83

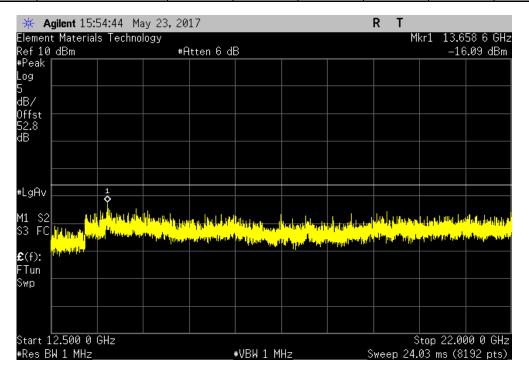


TbtTx 2017.01.27

	High Passba	ınd (2145-2180 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.11	3	-17.11	-13	Pass



	High Passba	nd (2145-2180 M	Hz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12.5 GHz - 22 GHz	-16.09	3	-13.09	-13	Pass

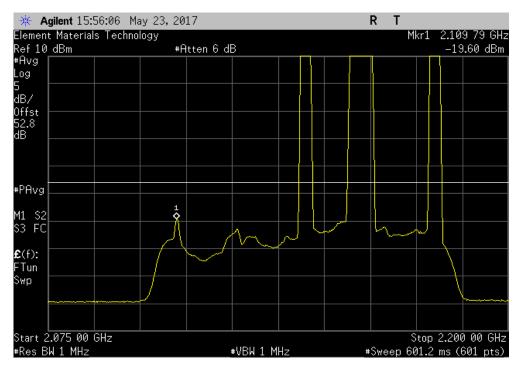


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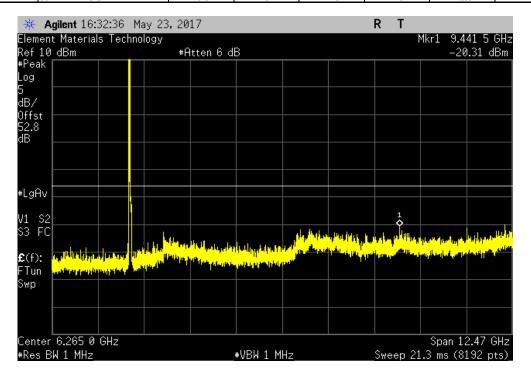


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	High Passha	nd (2145-2180 M	IHz) WCDMA		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-19.6	3	-16.6	-13	Pass



	Low Passband	l (2110-2145 MH	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-20.31	3	-17.31	-13	Pass

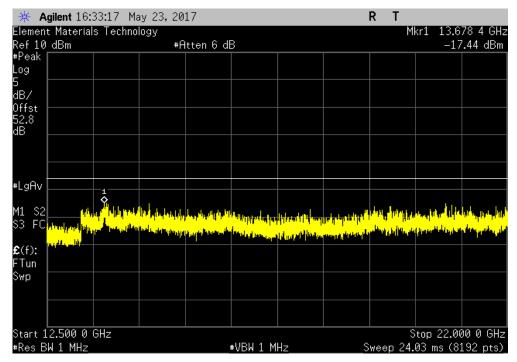


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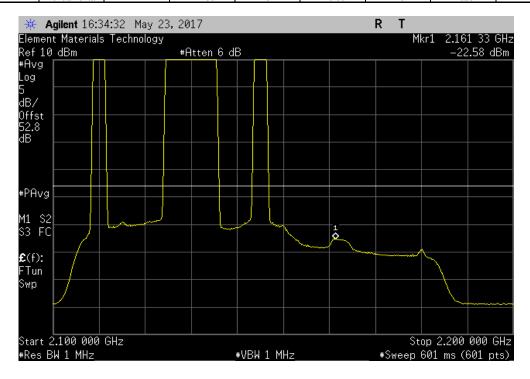


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	Low Passbane	d (2110-2145 MH	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12.5 GHz - 22 GHz	-17.44	3	-14.44	-13	Pass



	Low Passband	I (2110-2145 MH:	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-22.58	3	-19.58	-13	Pass

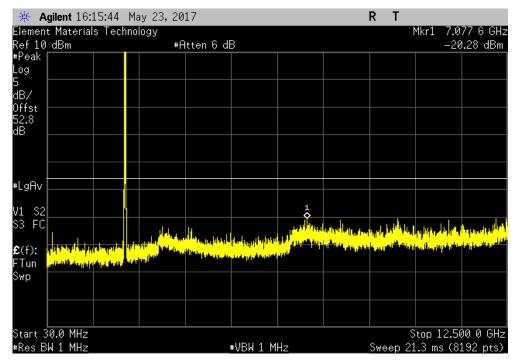


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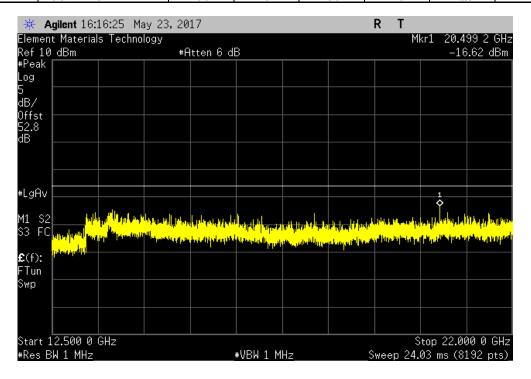


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	Mid Passband	(2130-2160 MHz	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12 5 GHz	-20.28	3	-17 28	-13	Pass



	Mid Passband	d (2130-2160 MH:	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12.5 GHz - 22 GHz	-16.62	3	-13.62	-13	Pass

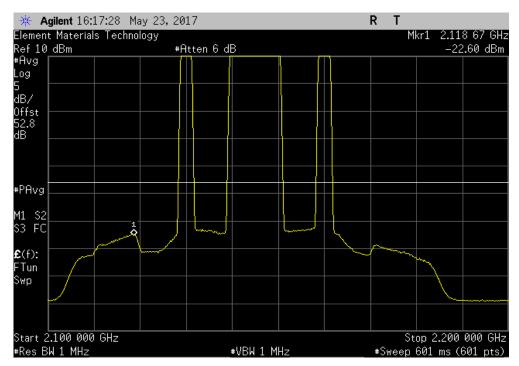


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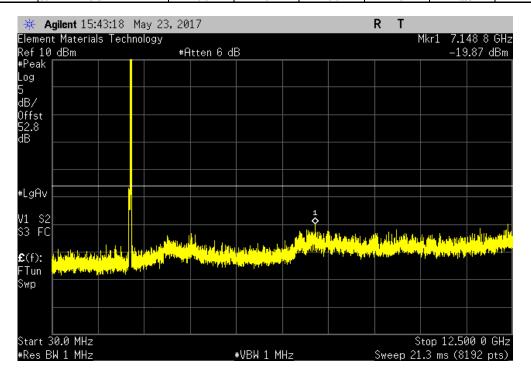


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	Mid Passband	I (2130-2160 MHz	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-22.61	3	-19.61	-13	Pass



	High Passband	d (2145-2180 MH	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
30 MHz - 12.5 GHz	-19.87	3	-16.87	-13	Pass

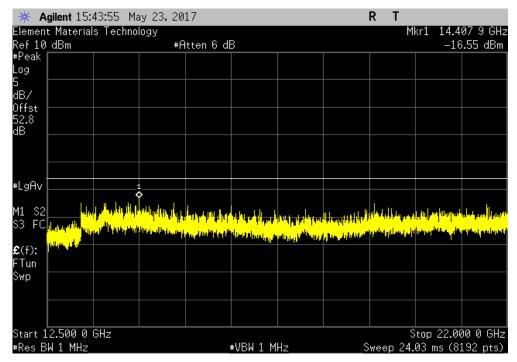


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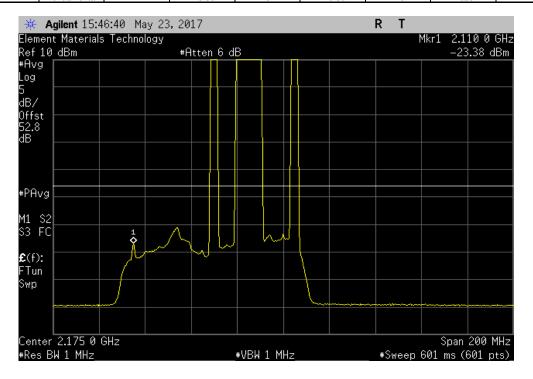


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	High Passband	d (2145-2180 MH	z) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
12 5 GHz - 22 GHz	-16 55	3	-13.55	-13	Pass



	High Passban	d (2145-2180 MH	lz) LTE 10 MHz		
Frequency	Max Value	Correction	Max Value	Limit	
Range	(dBm)	Factor (dB)	+ CF (dBm)	≤ (dBm)	Result
Fundamental	-23.38	3	-20.38	-13	Pass



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