



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Report No EQ1288-1

Client Onset Computer Corporation

Address 470 MacArthur Blvd.

Bourne, MA 02532

Phone 508-743-3195

Items tested InTemp™ CX500 Series Temperature Logger (Model: CX503)

FCC ID WXF-ONST2 7936A-ONST2

Equipment Type Digital Transmission System

Equipment Code DTS Emission Designator 1M03F1D

FCC/IC Rule Parts 47 CFR 15.247, RSS-247 Issue 1

Test Dates June 2 to 3, 2016

Results As detailed within this report

Prepared by

Tuyen A. Truongy – Test Engineer

Authorized by

Yunus Faziloglu - Sr. EMC Engineer

Issue Date

10/10/2016

Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Conditions of Issue

This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 36 of this report.



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Form Final Report REV 7-20-07 (DW)



Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247 and RSS-247. The product is the "InTemp™ CX500 Series Temperature Logger (Model: CX503)". It is a digitally modulated transmitter that operates in the 2402 to 2480 MHz frequency range. Product was set up and tested with on board PCB trace antenna with -2.0dBi gain.

We found that the product met the above requirements without modification. The test samples were received in good condition.

Issue No.

Reason for change Original Release Date Issued October 10, 2016





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### Test Methodology

All testing was performed according to the following rules/procedures/documents; CFR 47 Part 15.247, RSS-247 Issue 1, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS Measurement Guidance v03r05 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity. EUT has an internal antenna that cannot be maximized separately.

RF measurements, as required by the rule section, were performed at the antenna port. 3 channels were tested as follows:

2402 MHz: Low Channel (#0)
2440 MHz: Mid Channel (#19)
2480 MHz: High Channel (#39)

The EUT operating voltage is 3Vdc (Lithium battery). No AC Line conducted testing required.

Testing in this report also represents the following additional models. Each of these models contain and utilize the same mechanical housing, electrical hardware, firmware and software. The only difference between these models is how many times and for how long the end user is allowed to launch and store data on the device.

	Model	Description
Tested	CX503	InTemp™ CX Series Temperature Logger with 365 day logging and multiple deployments use
Additional	CX501	InTemp™ CX Series Temperature Logger with 15 day logging and single deployment use
Additional	CX502	InTemp™ CX Series Temperature Logger with 90 day logging and single deployment use
Additional	MX100	HOBO™ MX Series Temperature Logger with 365 day logging and multiple deployments use

The following bandwidths were used during radiated spurious and line conducted emissions testing.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-25GHz	1MHz	3MHz



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# **Product Tested - Configuration Documentation**

					EUT C	onfiguration										
Work (	Order:	Q1288														
Com	pany:	Onset C	omputer Co	rporation												
Company Ad	dress:	470 Mag	cArthur Blv	d.												
		Bourne,	MA, 02532	!												
Co	ntact:	Jim Cor	rigan													
			MN DN SN													
			MN         PN         SN           CX503          10947326 (used for conducted testing the state of the s													
	EUT:			CX503					`	<i>U</i> //						
				CX503			1094				947325 (used for radiated testing),					
EUT Descri	•	•		Series Temperatu	re Logger											
EUT Max Frequ		16 MHz														
EUT Min Frequ	•	0.03276														
EUT TX Frequ	uency:	2402 - 2	2480 MHz													
C				MN	NT.				SN							
Support Equipment Dell Laptop				Latitude					15770	`						
Бен Еарюр				Latitude	E0440				13//(	,						
Port Label	Port	Туре	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment					
Serial	RS-22	32	1	0 Only use for							Only use for configuration					
Software Operating I	Mode Do	escription	1:													
EUT is set to transmit				1 2480 MHz resp	ectively. In RX	mode, EUT doe	es not transmit.									



# Statement of Conformity

The CX500 has been found to conform to the following parts of 47 CFR and as detailed below:

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that
				varies the output power to operate in violation of the
				regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction
				manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the
				measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this
				section, unless noted in specific rule section under
				which the equipment operates.
8.1			15.35	The EUT emissions were measured using the
				measurement detector and bandwidth specified in
				this section, unless noted in specific rule section
				under which the equipment operates.
8.3			15.203	EUT employs a permanently PCB trace -2dBi
				connected antenna.
8.10			15.205	The fundamental is not in a Restricted band and the
			15.209	spurious and harmonic emissions in the Restricted
				bands comply with the general emission limits of
				15.209 or RSS-Gen as applicable
8.8			15.207	Not applicable since EUT is battery power.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.6				Occupied Bandwidth measurements were made.





## **Test Results**

### **DTS Bandwidth**

Limit: The minimum 6 dB bandwidth shall be at least 500 kHz. [15.247(a)(2)]

### **MEASUREMENTS / RESULTS**

Date: 02-Jun-16	Company: Onset Comput	ter Corporation		١	Nork Order:	Q1288
Engineer: Tuyen Truong	EUT Desc: Transportation	Logger	EUT Operating \	Voltage/	Frequency:	3Vdc (batter
Temp: 21°C	Humidity: 46%	Pressure: 1009mBar				
Frequency F	Range: 2402 to 2480 MHz					
Notes:						
			t e			
					6dB BW	
Frequency		Reading	- 1	Lim it	6dB BW Margin	Result
Frequency (MHz)		Reading (KHz)		Limit (KHz)		Result (Pass/Fail)
		-	(		Margin	
(MHz)		(KHz)	( ≥	(KHz)	Margin (KHz)	(Pass/Fail

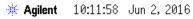
Rev. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		1	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Nonarch Instrument:	4000060	2160	- 1	3/7/2017	3/7/2016



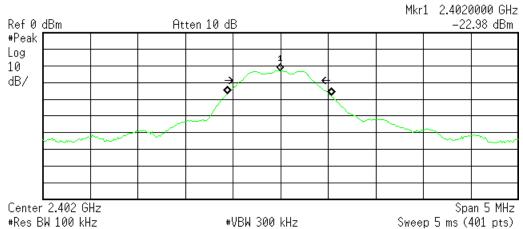


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### PLOT(s)



R T



Occupied Bandwidth 1.0991 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB

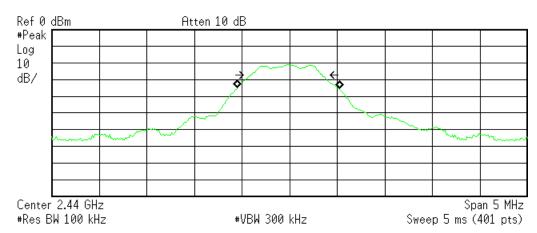
R T

Transmit Freq Error -15.629 kHz x dB Bandwidth 758.202 kHz

C:temp.gif file saved

### 2402 MHz - 6dB Bandwidth

\* Agilent 10:45:20 Jun 2, 2016



Occupied Bandwidth 1.0730 MHz

Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error -16.481 kHz x dB Bandwidth 739.710 kHz

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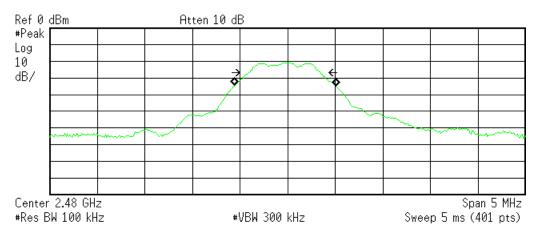
2440 MHz - 6dB Bandwidth



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**\* Agilent** 10:59:26 Jun 2, 2016

R T



Occupied Bandwidth 1.0738 MHz 0cc BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error -22.122 kHz x dB Bandwidth 751.959 kHz

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2480 MHz - 6dB Bandwidth



# **Output Power**

Limit: 1 Watt Conducted Output Power [15.247(b)(3)]

Per 558074 D01 DTS Measurement Guidance v03r05 Section 9.1.1 (Maximum Peak Conducted Output Power)

### **MEASUREMENTS / RESULTS**

Date: 02-Jun-16		Company	: Onset Compute	r Corporation		V	Vork Order:	Q1288
Engineer: Tuyen Truong	J	EUT Desc	: Transportation I	_ogger	EUT C	perating Voltage/	Frequency:	3Vdc (batte
Temp: 21°C		Humidity	: 46%	Pressure: 1009mBar				
Frequ	uency Range	: 2402 to 24	480 MHz					
Notes:								
							FCC 15.24	7
Frequency (MHz)	Reading (dBm)		Attenuation (dB)	Fir	nal Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fa
2402	-22.11		19.86	ľ	-2.25	30.0	-32.25	Pass
2440	-20.37		19.86	ľ	-0.51	30.0	-30.51	Pass
2480	-20.03		19.86		-0.17	30.0	-30.17	Pass
Table Result:	Pass	by	-30.17 dB			Worst Freq:	2480.0	MHz

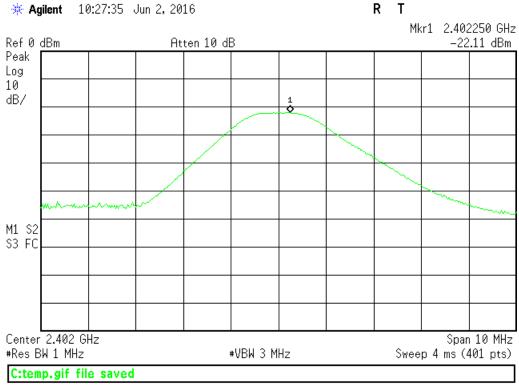
Rev. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		- 1	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Nonarch Instrument:	4000060	2160	- 1	3/7/2017	3/7/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

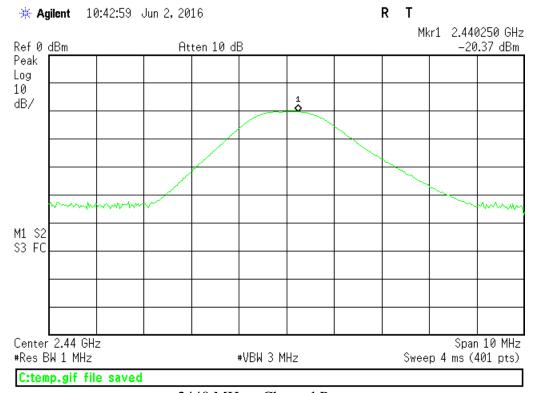


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### **PLOTS**



2402 MHz - Channel Power



2440 MHz – Channel Power



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R T **\* Agilent** 10:55:04 Jun 2, 2016 Mkr1 2.480175 GHz -20.03 dBm Ref 0 dBm Atten 10 dB Peak Log 10 dB/ M1 S2 S3 FC Center 2.48 GHz Span 10 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 4 ms (401 pts)

2480 MHz – Channel Power

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# **Radiated Spurious Emissions**

#### **LIMITS**

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). [15.247(d)]

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) and worst case emissions observed in X orientation. All the results below are for the worst case orientation only.

### **MEASUREMENTS / RESULTS**

### **Radiated Band Edge**

Date:	03-Jun-16			Company:	Onset Con	nputer Co	rporation					V	ork Order:	Q1288
Engineer:	Tuyen Truong			EUT Desc:	Transporta	tion Logg	er				<b>EUT Operat</b>	ing Voltage/	Frequency:	3Vdc (battery)
Temp:	22.2°C			Humidity:	48%			Pressure:	1004mBar					
		Freque	ncy Range:	Upper Ban	d Edge						Measureme	nt Distance:	3 m	
Notes:	DCCF is -16.6	idB									EU	Max Freq:	16 MHz	
											E	UT TX Freq:	2402 to 2480	MHz
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	FCC 15.209	High Frequ	ency - Peak	FCC 15.209	High Frequ	ency - Avera
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Lim it (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
h	2483.5	42.71	26.1	20.2	32.4	3.6	58.5	41.9	74.0	-15.5	Pass	54.0	-12.1	Pass
Table	e Result:		Pass	by	-12.1	dB					We	orst Freq:	2483.5	MHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #20	52				Cable 2:	Asset #1507		Cable 3:	
	Gold				Asset #15						tenna: Blue Horn Preselector:			

Rev. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	8/6/2016	8/6/2015
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/8/2017	2/8/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	I	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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### **Spurious Radiated Emissions**

Radiated Emissions Table

Date: 02-Jun-16 Company: Onset Computer Corporation Work Order: Q1288

Engineer: Nirak So EUT Desc: CX500 EUT Operating Voltage/Frequency: Battery

Temp: 23°C Humidity: 40% Pressure: 1005mBar

Frequency Range: 30 to 1000MHz Measurement Distance: 3 m

Notes: All 3 channels were investigated; only worst case was recorded (High Channel, 2480 MHz)

EUT Max Freq: 16MHz

FUT Ty Freq: 2402 to 2480 MHz

							Lot 1x freq. 2402 to 2400 Williz								
			B		0-1-1-	Adhartad				FCC 15.209					
Antenna Polarization	Frequency	Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Reading			Limit	Margin	Result				
(H/V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)			(dBµV/m)	(dB)	(Pass/Fail)				
V	33.86	30.9	25.2	18.8	0.4	24.9			40.0	-15.1	Pass				
h	39.7	31.8	25.2	14.3	0.4	21.3			40.0	-18.7	Pass				
V	47.6	33.9	25.2	9.4	0.4	18.5			40.0	-21.5	Pass				
V	89.4	37.5	25.3	7.7	0.7	20.6			43.5	-22.9	Pass				
V	154.3	35.6	25.1	12.5	1.0	24.0			43.5	-19.5	Pass				
h	413.0	21.2	25.5	16.2	1.6	13.5			46.0	-32.5	Pass				
h	568.0	22.2	25.2	18.7	1.6	17.3			46.0	-28.7	Pass				
h	832.0	25.0	25.0	21.8	2.3	24.1			46.0	-21.9	Pass				

Table Result: Pass by -15.1 dB Worst Freq: 33.86 MHz

Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: ---

Analyzer: Gold Preamp: Blue-Blk Antenna: Red-Black Preselector: --CSsoft Radiated Emissions Calculator v 1.017.162 Antenna: Red-Black Preselector: --Copyright Curtis-Straus LLC 200

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	ı	1/13/2017	1/13/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/22/2017	Calibrated on 3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/27/2016	12/27/2015
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	- 1	2/9/2017	2/9/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	- 1	4/28/2017	4/28/2016
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
	_		Mfr			Cat	Calibration Due	Calibrated on
Cables	Range		IVIII			Cat	Cambration Due	Calibrated on
Cables Asset #1507	Range 9kHz - 18GHz		Florida RF			ll l	2/14/2017	2/14/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standards

Radiated	Emissio	ons Tab	ole											
Date:	02-Jun-16			Company:	Onset Con	nputer Co	rporation					1	Work Order:	Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operat</b>	ing Voltage	/Frequency:	Battery
Temp:	23°C			Humidity:	40%			Pressure:	1005mBar					
		Freque	ncy Range:	1 to 6GHz							Measureme	nt Distance:	3 m	
Notes:	TX on Channe	I#0 Low (240	D2MHz)								EU <sup>-</sup>	Γ Max Freq:	16MHz	
											E	UT Tx Freq:	2402 to 2480	) MHz
									FCC 15.209	High Freque	ency - Peak	FCC 15.	209 High Fre	quency -
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted					Average	
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
V	1711.0	30.44	21.1	18.9	29.9	3.2	44.6	35.3	74.0	-29.4	Pass	54.0	-18.7	Pass
v	1906.7	35.2	20.2	18.9	31.2	3.3	50.8	35.8	74.0	-23.2	Pass	54.0	-18.2	Pass
v	2850.0	36.1	24.3	20.0	33.0	3.7	52.8	41.0	74.0	-21.2	Pass	54.0	-13.0	Pass
v	2367.37	33.1	23.4	19.9	32.3	3.5	49.0	39.3	74.0	-25.0	Pass	54.0	-14.7	Pass
h	2394.0	34.2	21.2	19.9	32.3	3.5	50.1	37.1	74.0	-23.9	Pass	54.0	-16.9	Pass

Table Result: Pass by -13.0 dB Worst Freq: 2850.0 MHz

Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: --Analyzer: Gold Preamp: Asset #1517 Antenna: Blue Horn Preselector: --CSosft Radiated Emissions Calculator v 1.017.162
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor





**Radiated Emissions Table** Company: Onset Computer Corporation Date: 02-Jun-16 Work Order: Q1288 Engineer: Nirak So EUT Desc: CX500 EUT Operating Voltage/Frequency: Battery **Temp:** 23°C Humidity: 40% Pressure: 1005mBar Frequency Range: 6 to 18GHz Measurement Distance: 1 m Notes: DCCF = -16.6dB EUT Max Freq: 16MHz TX on Channel#0 Low (2402MHz) EUT Tx Freq: 2402 to 2480 MHz CC 15.209 High Frequency FCC 15.209 High Frequency Adiusted Adjusted Average Polarization Frequency Reading Reading Factor Factor Factor Peak Reading Avg Reading Limit Margin Result Limit Margin Result (H/V) (MHz) (dBµV) (dBµV) dBµV/m (Pass/Fail 7206.0 41.5 35.9 6.6 83.5 63.5 -12.7 7206.0 41.9 25.3 16.6 35.9 6.6 67.8 51.2 83.5 -15.7Pass 63.5 -12.3 Pass Table Result: **Pass** -12.3 dB Worst Freq: 7206.0 MHz Test Site: EMI Chamber 2 Cable 1: Asset #205 Cable 2: Asset #150 Cable 3: Preselector: ---Analyzer: Gold Preamp: Asset #1517 Antenna: Blue Horn Ssoft Radiated Emissions Calculator v 1.017.162 Copyright Curtis-Straus LLC 20

Spectrum Analyzers / Receivers / Preselectors Range 100Hz-26.5 GHz MN Mfr SN Cat **Calibration Due** Calibrated on E4407B MY45113816 Agilent 1284 1/13/2017 1/13/2016 Radiated Emissions Sites FCC Code IC Code VCCI Code Range 1-18GHz Cat Calibration Due Calibrated on EMI Chamber 2 A-0015 4/29/2017 Preamps/Couplers Attenuators / Filters MN Calibration Due Calibrated on Range Mfr SN Asset Cat 1517 HF Preamp N/A 1517 Antennas Range MN Mfr **Calibration Due** Calibrated on SN Asset Cat 157647 1861 Meteorological Meters MN Mfr Calibration Due Calibrated on SN Cat Weather Clock (Pressure Only) BA928 Oregon Scientific C3166-1 831 4/28/2017 4/28/2016 TH A#2081 HDE Ш 4/5/2017 4/5/2016 HTC-1 2081 Calibrated on Cables Range Mfr Cat Calibration Due Asset #1507 9kHz - 18GHz Florida RF 2/14/2017 2/14/2016 Asset #2052 9kHz - 18GHz Florida RF 3/2/2017 3/2/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Date:	02-Jun-16			Company:	Onset Con	nputer Co	orporation					V	Vork Order:	Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operat</b>	ing Voltage/	Frequency:	Battery
Temp:	23°C			Humidity:	40%			Pressure:	1005mBar					
		Freque	ncy Range:	18 to 25GH	Ηz						Measureme	nt Distance:	0.1 m	
Notes:	DCCF = -16.6	6dB									EU	Max Freq:	16MHz	
	TX on Channe	I#0 Low (240	2MHz)								E	UT Tx Freq:	2402 to 2480	) MHz
									FCC 15.209	High Frequ	ency - Peak	FCC 15.2	209 High Fre	equency -
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted				Average		
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
٧	19210.0	59.2	42.6	40.9	40.3	6.0	64.6	48.0	103.5	-38.9	Pass	83.5	-35.5	Pass
Table	e Result:		Pass	by	-35.5	dB					Wo	orst Freq:	19210.0	MHz
Test Site:	EMI Chamber	2		Cable 1:						Cable 2:	EMIR-HIGH-	07	Cable 3:	
Analyzer:	Gold			Preamp:	18-26.5GH	z				Antenna:	18-26.5GHz	Horn F	reselector:	
	d Emissions C		v 1.017.162											

Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	<b>MN</b> E4407B	<b>Mfr</b> Agilent	<b>SN</b> MY45113816	Asset 1284	Cat 	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz			4/29/2017	4/29/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	<b>SN</b>	Asset	Cat	Calibration Due	Calibrated on 3/8/2016
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	3/8/2017	
Antennas	Range	<b>MN</b>	<b>M</b> fr	<b>SN</b>	Asset	Cat	Calibration Due	Calibrated on date of test
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		<b>MN</b> BA928 HTC-1	<b>Mfr</b> Oregon Scientific HDE	<b>SN</b> C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2017 4/5/2017	Calibrated on 4/28/2016 4/5/2016
<b>Cables</b> REMI-High-07	Range 1 - 26.5GHz	TRU-21B0707-120	<b>Mfr</b> TRU			Cat II	Calibration Due 8/7/2016	Calibrated on 8/7/2015





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Date:	02-Jun-16			Company:	Onset Con	nputer Co	rporation					1	Nork Order	: Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operati</b>	ng Voltage	Frequency:	: Battery
Temp:	23°C			Humidity:	40%			Pressure:	: 1005mBar					
		Freque	ncy Range:	1 to 6GHz							Measuremen	t Distance:	3 m	
Notes:	TX on Channe	#19 Mid (24	40MHz)								EUT	Max Freq:	16MHz	
											EU	JT Tx Freq:	2402 to 248	0 MHz
									FCC 15.209	High Frequ	ency - Peak	FCC 15.	209 High Fr	
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted					Average	
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fai
No e	missions found								<u> </u>		<u> </u>			1
Table	Result:		Pass	by		dB					Wo	rst Freq:		MHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #205	52				Cable 2:	Asset #1507		Cable 3	
Analyzer:	Gold			Preamp:	Asset #15'	17				Antenna:	Blue Horn		Preselector	
Ssoft Radiate	d Emissions C	alculator	v 1.017.162										Copyright Curt	tis-Straus LLC
liusted Readi	ng = Reading	Preamp Fa	ctor + Anten	na Factor +	Cable Fac	tor								

Radiated	l Emissio	ons Tab	ole											
Date:	02-Jun-16			Company:	Onset Con	nputer Co	orporation					V	Nork Order:	Q1288
Engineer:	Nirak So			EUT Desc:	CX500						EUT Operati	ing Voltage/	Frequency:	Battery
Temp:	23°C			Humidity:	. 40%			Pressure:	: 1005mBar					
		Freque	ency Range:	6 to 18GH:	z						Measuremen	nt Distance:	1 m	
Notes:	DCCF = -16.6										EUT	Max Freq:	16MHz	
	TX on Channe	l#19 Mid (24	i40MHz)								El	JT Tx Freq:	2402 to 2480	) MHz
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	FCC 15.209	High Frequ	ency - Peak	FCC 15.:	209 High Fre Average	equency -
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
v h	7320.0 7320.0	41.95 43.63	25.4 27.0	17.0 17.0	35.9 35.9	6.7 6.7	67.6 69.2	51.0 52.6	83.5 83.5	-15.9 -14.3	Pass Pass	63.5 63.5	-12.6 -10.9	Pass Pass
Table	Table Result: Pass by -10.9 dB										Wo	orst Freq:	7320.0	MHz
Test Site: Analyzer:	EMI Chamber Gold	2			: Asset #205 : Asset #15						: Asset #1507 : Blue Horn		Cable 3: Preselector:	

Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: --Analyzer: Gold Preamp: Asset #1517 Antenna: Blue Horn Preselector: --Cosoft Radiated Emissions Calculator v1.017.162 Cable Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors Calibrated on Range 100Hz-26.5 GHz MN Mfr Calibration Due SN Asset Cat E4407B MY45113816 1284 Agilent Radiated Emissions Sites FCC Code IC Code VCCI Code Calibrated on Range Cat Calibration Due EMI Chamber 2 A-0015 1-18GHz 4/29/2017 4/29/2015 Preamps/Couplers Attenuators / Filters Calibration Due Calibrated on Range 1517 HF Preamp 1-20GHz CS N/A 1517 8/6/2016 8/6/2015 Calibration Due Calibrated on Antennas Range Blue Horn 1-18Ghz 3117 ETS 157647 1861 2/8/2017 2/8/2015 **Meteorological Meters** MN Mfr SN Cat **Calibration Due** Calibrated on Weather Clock (Pressure Only) BA928 Oregon Scientific C3166-1 831 4/28/2017 4/28/2016 TH A#2081 HTC-1 HDE 2081 Ш 4/5/2017 4/5/2016 Cables Range Mfr Cat Calibration Due Calibrated on 2/14/2016 3/2/2016 Asset #1507 9kHz - 18GHz Florida RF 2/14/2017 Asset #2052 9kHz - 18GHz Florida RF 3/2/2017

Table	e Result:		Pass	by	-28.4	dB					Wo	rst Freq:	19520.0	MHz
٧	19520.0	66.78	50.2	41.4	40.3	6.0	71.7	55.1	103.5	-31.8	Pass	83.5	-28.4	Pass
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	FCC 15.209	High Freque	ency - Peak	FCC 15.	209 High Fre Average	equency -
Notes:	DCCF = -16.6 TX on Channe		40MHz)								El		2402 to 2480	
Notes	DOOF 40.0	•	ncy Range:	18 to 25GI	łz						Measuremer		******	
Temp:	23°C			Humidity:				Pressure:	: 1005mBar					
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operati</b>	ng Voltage	Frequency:	Battery
Date:	02-Jun-16			Company:	Onset Con	nputer Co	rporation					1	Nork Order:	Q1288





Rev. 5/18/2016 MN Cat I Spectrum Analyzers / Receivers / Preselectors Range Mfr SN Calibration Due Calibrated on Asset 100Hz-26.5 GHz E4407B Agilent MY45113816 1284 1/13/2017 Radiated Emissions Sites FCC Code IC Code VCCI Code Cat Calibration Due Calibrated on Range EMI Chamber 2 719150 2762A-7 A-0015 1-18GHz 4/29/2017 4/29/2015 Preamps/Couplers Attenuators / Filters Range Calibrated on HF (Yellow) 18-26.5GHz AFS4-18002650-60-8P-4 CS 467559 1266 Ш 3/8/2017 3/8/2016 Antennas MN Mfr SN Cat **Calibration Due** Calibrated on HF (White) Horn 18-26.5GHz 801-WLM Waveline 758 758 Ш Verify before Use date of test **MN** BA928 Asset 831 Calibrated on 4/28/2016 Meteorological Meters Mfr SN Cat Calibration Due Weather Clock (Pressure Only) Oregon Scientific C3166-1 4/28/2017 TH A#2081 HTC-1 HDE 2081 4/5/2017 4/5/2016 Calibrated on Cables Range Cat Calibration Due REMI-High-07 1 - 26.5GHz TRU-21B0707-120 TRU 8/7/2016 8/7/2015

Date:	02-Jun-16			Company:	Onset Con	nputer Co	orporation					V	Vork Order:	Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT</b> Operati	ng Voltage/	Frequency:	Battery
Temp:	23°C			Humidity:	40%			Pressure:	1005mBar					
		Freque	ncy Range:	1 to 6GHz							Measuremen	nt Distance:	3 m	
Notes:	TX on Channe	l#39 High (2	480MHz)									Max Freq: JT Tx Freq:		∩ MHz
Antenna							Adjusted	Adjusted	FCC 15.209	High Freque	ency - Peak		209 High Fro Average	
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Lim it (dBµV/m)	Margin (dB)	Result (Pass/Fail)
h	1962.5	31.2	23.9	19.0	31.6	3.4	47.2	39.9	74.0	-26.8	Pass	54.0	-14.1	Pass
Tabl	e Result:		Pass	by	-14.1	dB					Wo	rst Freq:	1962.5	MHz
Test Site:	Test Site: EMI Chamber 2 Analyzer: Gold				Asset #205 Asset #15						Asset #1507 Blue Horn	F	Cable 3:	
Test Site:											F			

Date:	02-Jun-16			Company:	Onset Con	nputer Co	rporation					V	Vork Order:	Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operat</b>	ing Voltage/	Frequency:	Battery
Temp:	23°C			Humidity:	40%			Pressure:	1005mBar					
		Freque	ncy Range:	6 to 18GH	z						Measureme	nt Distance:	1 m	
Notes:	DCCF = -16.6	6dB									EU	Max Freq:	16MHz	
	TX on Channe	1#39 High (2-	480MHz)								E	UT Tx Freq:	2402 to 248	0 MHz
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	FCC 15.209	High Frequ	ency - Peak	FCC 15.2	209 High Fre Average	equency -
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fa
h v	7440.0 7440.0	42.3 41.1	25.7 24.5	17.2 17.2	36.0 36.0	6.7 6.7	67.8 66.6	51.2 50.0	83.5 83.5	-15.7 -16.9	Pass Pass	63.5 63.5	-12.3 -13.5	Pass Pass
Table	e Result:		Pass	by	-12.3	dB					We	orst Freq:	7440.0	MHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #205	52				Cable 2:	Asset #1507		Cable 3:	
	Gold			D	Asset #15	-				Andrews -	Blue Horn		reselector:	





Calibrated on 2/14/2016 3/2/2016

Rev. 5/18/2016 MN Spectrum Analyzers / Receivers / Preselectors Mfr SN Cat Calibration Due Calibrated on Range Asset 100Hz-26.5 GHz E4407B Agilent MY45113816 1284 1/13/2017 1/13/2016 Radiated Emissions Sites FCC Code IC Code VCCI Code Cat Calibration Due Calibrated on Range EMI Chamber 2 719150 2762A-7 A-0015 1-18GHz 4/29/2017 4/29/2015 Preamps/Couplers Attenuators / Filters Range Calibration Due Calibrated on 1517 HF Preamp 1-20GHz CS CS N/A 1517 II 8/6/2016 8/6/2015 Range MN Mfr SN Calibration Due Calibrated on 1-18Ghz Blue Horn 3117 ETS 157647 1861 2/8/2017 2/8/2015 Asset 831 Calibrated on 4/28/2016 Meteorological Meters MN Mfr SN Cat Calibration Due Weather Clock (Pressure Only) Oregon Scientific BA928 C3166-1 4/28/2017 TH A#2081 HTC-1 HDE 2081 4/5/2017 4/5/2016

Mfr

Florida RF

Florida RF

Cat

Calibration Due

2/14/2017

3/2/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Range

9kHz - 18GHz

9kHz - 18GHz

Cables

Asset #1507

Asset #2052

Date:	02-Jun-16			Company:	Onset Con	nputer Co	orporation	·				1	Vork Order:	: Q1288
Engineer:	Nirak So			EUT Desc:	CX500						<b>EUT Operati</b>	ng Voltage/	Frequency:	Battery
Temp:	23°C			Humidity:	40%			Pressure:	: 1005mBar					
		Freque	ncy Range:	18 to 25GH	Ηz						Measuremer	nt Distance:	0.1 m	
Notes:	DCCF = -16.6	6dB									EUT	Max Freq:	16MHz	
	TX on Channe	l#39 High (2	480MHz)								El	JT Tx Freq:	2402 to 248	0 MHz
									FCC 15.209	High Frequ	ency - Peak	FCC 15.	209 High Fro	equency -
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted					Average	
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
٧	19840.0	55.6	39.0	41.5	40.3	6.0	60.4	43.8	103.5	-43.1	Pass	83.5	-39.7	Pass
Table	e Result:		Pass	by	-39.7	dB					Wo	rst Freq:	19840.0	MHz
	EMI Chamber	2		Cable 1:						Cable 2:	EMIR-HIGH-0	)7	Cable 3:	
Test Site:	Analyzer: Gold Preamp: 18-26.5GHz										18-26.5GHz I		reselector:	

Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	<b>MN</b> E4407B	<b>Mfr</b> Agilent	<b>SN</b> MY45113816	Asset 1284	Cat	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	<b>SN</b>	Asset	Cat	Calibration Due	Calibrated on 3/8/2016
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	3/8/2017	
Antennas	Range	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	Asset	Cat	Calibration Due	Calibrated on date of test
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		<b>MN</b> BA928 HTC-1	Mfr Oregon Scientific HDE	<b>SN</b> C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2017 4/5/2017	Calibrated on 4/28/2016 4/5/2016
<b>Cables</b> REMI-High-07	Range 1 - 26.5GHz	TRU-21B0707-120	<b>M</b> fr TRU			Cat II	Calibration Due 8/7/2016	Calibrated on 8/7/2015





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3/2/2016

Work Order: Q1288

Radiated Emissions Table

Temp: 22.2°C

Date: 03-Jun-16 Company: Onset Computer Corporation Engineer: Tuyen Truong EUT Desc: Transportation Logger (CX500)

Humidity: 48% Pressure: 1004mBar EUT Operating Voltage/Frequency: 3Vdc (battery)

Measurement Distance: 3 m Frequency Range: 25 to 1000 MHz

EUT Max Freq: 16 MHz Notes: RX mode

	101111000								
							EUT TX Freq:		
Antenna			Preamp	Antenna	Cable	Adjusted		FCC 15.20	9
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)
٧	34.86	33.4	25.2	17.9	0.4	26.5	40.0	-13.5	Pass
V	43.16	31.4	25.2	11.9	0.4	18.5	40.0	-21.5	Pass
v	83.6	36.2	25.3	7.7	0.6	19.2	40.0	-20.8	Pass
v	98.85	33.5	25.2	10.0	0.7	19.0	43.5	-24.5	Pass
h	151.3	29.9	25.2	12.5	1.0	18.2	43.5	-25.3	Pass
V	154.8	35.1	25.1	12.5	1.0	23.5	43.5	-20.0	Pass
V	398.0	32.4	25.2	15.5	1.6	24.3	46.0	-21.7	Pass
V	431.4	31.5	25.4	16.6	1.7	24.4	46.0	-21.6	Pass
v	616.5	32.2	24.8	19.1	2.0	28.5	46.0	-17.5	Pass
v	728.0	30.9	24.8	20.5	2.1	28.7	46.0	-17.3	Pass

Table Result: Pass Worst Freq: 34.86 MHz by -13.5 dB

Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: Analyzer: Gold Antenna: Red-Black Preamp: Blue-Blk Preselector: ---

CSsoft Radiated Emissions Calculator v 1.017.162 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Asset #2052

Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors MN Mfr Calibration Due Calibrated on Range SN Asset Cat 100Hz-26.5 GHz E4407B MY45113816 1284 1/13/2017 1/13/2016 Agilent Radiated Emissions Sites FCC Code IC Code VCCI Code Range Cat Calibration Due Calibrated on EMI Chamber 2 30-1000MHz 3/22/2017 3/22/2015 719150 2762A-7 A-0015 Ш Preamps/Couplers Attenuators / Filters Range MN Mfr SN Asset Cat Calibration Due Calibrated on 0.009-2000MHz ZFL-1000-LN Blue-Black CS N/A 800 Ш 12/27/2016 12/27/2015 Antennas Range MN Mfr SN Cat **Calibration Due** Calibrated on Red-Black Bilog 30-2000MHz JB1 Sunol A091604-2 1106 2/9/2017 2/9/2015 Meteorological Meters MN Mfr SN Cat **Calibration Due** Calibrated on Asset TH A#2081 HTC-1 HDE 2081 4/5/2017 4/5/2016 4000060 Barometric A#2160 5396-0321 Monarch Instruments 2160 3/7/2017 3/7/2016 Cables Range Mfr Cat **Calibration Due** Calibrated on Asset #1507 9kHz - 18GHz Florida RF 2/14/2017 2/14/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

9kHz - 18GHz

Date:	03-Jun-16		Company:	Onset Con	nputer Cor	poration				V	Vork Order:	Q1288	
Engineer:	Tuyen Truong	EUT Desc: Transporta			ition Logger (CX500)				<b>EUT Operat</b>	ing Voltage/	Frequency:	3Vdc (battery	
Temp:	22.2°C		Humidity:	48%		Pressure:	1004mBar						
	Freque	ncy Range:	1 to 18 GF	lz					Measureme	nt Distance:	1 m		
Notes:	RX mode	node EUT Max Freq: 16 MHz											
									E	UT TX Freq:	2402 to 2480	MHz	
Antenna			Preamp	Antenna	Cable	Adjusted				FCC 15.209			
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading	Limit	Margin	in Result Limit Margin Res				
(H/V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)	

Florida RF

No emssions found in this range

Table Result: --- MHz by --- dB Worst Frea:

Cable 1: Asset #2052 Analyzer: Gold Preamp: Asset #1517 Ssoft Radiated Emissions Calculator

v 1.017.162

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Facto

Cable 2: Asset #1507 Antenna: Blue Horn

Cable 3: -Preselector: ---

3/2/2017

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Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors Range MN Mfr SN Cat Calibration Due Calibrated on Asset 100Hz-26.5 GHz MY45113816 E4407B 1/13/2017 1/13/2016 Gold Agilent 1284 Radiated Emissions Sites FCC Code IC Code VCCI Code Range Cat **Calibration Due** Calibrated on EMI Chamber 2 719150 2762A-7 A-0015 1-18GHz 4/29/2017 4/29/2015 Preamps/Couplers Attenuators / Filters Mfr SN Cat **Calibration Due** Calibrated on Range Asset 1517 HF Preamp 1-20GHz CS CS N/A 1517 8/6/2016 8/6/2015 MN Mfr Antennas Range SN Cat Calibration Due Calibrated on Asset 1-18Ghz 3117 157647 1861 2/8/2017 2/8/2015 Blue Horn ETS **Meteorological Meters** MN Mfr SN Asset Cat Calibration Due Calibrated on TH A#2081 HTC-1 HDE 2081 4/5/2017 4/5/2016 Barometric A#2160 5396-0321 4000060 3/7/2017 3/7/2016 Monarch Instruments 2160 Range 9kHz - 18GHz Cables Mfr Cat **Calibration Due** Calibrated on Asset #1507 Florida RF 2/14/2017 2/14/2016 3/2/2016 Asset #2052 9kHz - 18GHz Florida RF 3/2/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

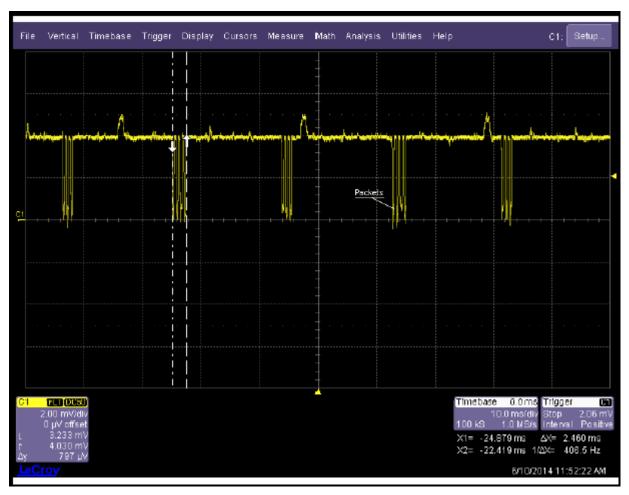
Date:	: 03-Jun-16			Company:	Onset Con	nputer Co	orporation					٧	Vork Order:	Q1288
Engineer:	Tuyen Truong			EUT Desc:	Transporta	tion Logg	ger (CX500)				<b>EUT Operati</b>	ing Voltage/	Frequency:	3Vdc (batter
Temp:	22.2°C			Humidity:	48%			Pressure:	1004mBar					
		Freque	ncy Range:	18 to 25 G	Hz						Measureme	nt Distance:	1 m	
Notes:	: RX mode											Г Max Freq: JT TX Freq:		) MHz
Antenna		Peak		Preamp	Antenna	Cable	Adjusted	Adjusted					FCC 15.20	
Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Reading (dBuV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBuV/m)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
emssions fo	ound in this rang	ge												
Tabl	e Result:			by		dB					Wo	orst Freq:		MHz
Analyzer:	ed Emissions C		v 1.017.162		18-26.5GH						EMIR-HIGH-0 18-26.5GHz		Cable 3: Preselector: Copyright Cu	

. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	- 1	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		1	4/29/2017	4/29/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	3/8/2017	3/8/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF (White) Hom	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	1	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016





# **Duty-Cycle Correction Factor**



5 packets can be seen in 100ms window above, but 6 packets are assumed for worst case. Each packet is 2.46ms long.

DCCF = 20\*log((6\*2.46)/100) = -16.6dB



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# **Conducted Spurious Emissions**

### **LIMITS**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth that contains the highest level of desired power based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB ... [15.247(d)]

### **MEASUREMENTS / RESULTS**

### **Conducted Band Edges**

	Company: Onset Compute	r Corporation	Work Order: Q1288
Engineer: Tuyen Truong	EUT Desc: Transportation L	ogger	EUT Operating Voltage/Frequency: 3Vdc (battery
Temp: 21°C	Humidity: 46%	Pressure: 1009mBar	
Frequency Rang	ge: 2402 to 2480 MHz		
Notes: Maximum Peak PSD	) in 100 KHz RBW		
Frequency	Reading	Attenuation	Adjusted Reading
	(dBm)	(dB)	(dBm)
(MHz)			

Date: 02-Jun-16		Company: Onset Compu	ter Corporation		١	Vork Order:	Q1288
Engineer: Tuyen Truong		EUT Desc: Transportation	Logger	EUT Op	erating Voltage/	Frequency:	3Vdc (batter
Temp: 21°C		Humidity: 46%	Pressure: 1009mBar				
Frequ	ency Range	: 2400 to 2483.5 MHz					
Notes: The Limit here	is set to -20	dB from the max in-band pe	eak PSD level in 100kHz RBW	Attenuation factor in	cluded or 19.86dB	)	
					FCC 15.247		
Frequency	Reading	Attenuation	Final Co	nducted Reading	Limit	Margin	Result
(MHz)		(dB)		(dBm)	(dBm)	(dB)	(Pass/Fa
2388.55	-59.36	19.86	L	-39.50	-20.98	-18.52	Pass
2390.00	-67.76	19.86		-47.90	-20.98	-26.92	Pass
2400.00	-62.11	19.86		-42.25	-20.98	-21.27	Pass
2483.50	-69.08	19.86		-49.22	-20.98	-28.24	Pass
2500.00	-69.69	19.86		-49.83	-20.98	-28.85	Pass
Table Result:	Pass	by -18.52 dB			Worst Freq:	2388.55	MHz



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Testing Cert. No. 1527-01

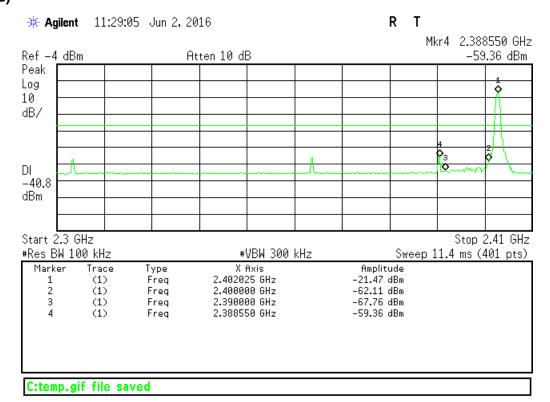
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Rev. 5/18/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	<b>MN</b> z E4407B	<b>Mfr</b> Agilent	<b>SN</b> MY45113816	Asset 1284	Cat I	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	<b>Range</b>	<b>MN</b>	<b>Mfr</b>	<b>SN</b>	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
<b>Meteorological Meters</b> TH A#2081 Barometric A#2160		MN HTC-1 5396-0321 /	<b>Mfr</b> HDE Ionarch Instrument:	<b>SN</b> 4000060	Asset 2081 2160	Cat II I	<b>Calibration Due</b> 4/5/2017 3/7/2017	Calibrated on 4/5/2016 3/7/2016

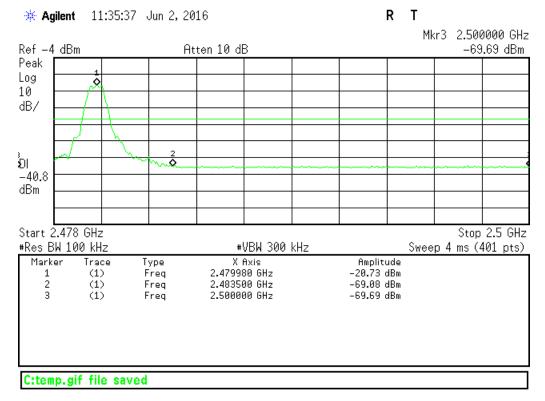




### Plot(s)



Lower Channel - Band Edge



Upper Channel - Band Edge



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Tables Carl No. 1527 of

### **Conducted Spurious Emission**

**Note:** 9 kHz - 25 GHz frequency range was investigated for all 3 channels (low, middle and high) at the EUT antenna port. Emissions listed below as well as the highest noise floor level was less than -40dBm for the entire frequency range, which is more than 20dB below the fundamental.

Engineer: Tuyen Truong EUT Desc: Transportation Logger EUT Operating Voltage/Frequency Temp: 21°C Humidity: 46% Pressure: 1009mBar Frequency Range: 2402 to 2480 MHz	y: 3Vdc (battery
Frequency Range: 2402 to 2480 MHz	
No. 10 to 10	
Notes: Maximum Peak PSD in 100 KHz RBW	
Frequency Reading Attenuation Adjusted Reading	
(MHz) (dBm) (dB) (dBm)	
2480 -20.840 19.86 -0.98	

Date: 02-Jun-16		Company: Onset Compu	ter Corporation		V	Vork Order:	Q1288
Engineer: Tuyen Truong		EUT Desc: Transportation	Logger	EUT Ope	erating Voltage/	Frequency:	3Vdc (batt
Temp: 21°C		Humidity: 46%	Pressure: 1009mBar				
Freque	ency Range	: 9KHz to 25000 MHz					
Notes: The Limit here	is set to -20d	dB from the max in-band pe	eak PSD level in 100kHz RBW (	Attenuation factor inc	luded or 19.86dB	)	
П		T .					
						FCC 15.247	,
Frequency	Reading	Attenuation	Final Cor	nducted Reading	Limit	Margin	Resu
	(dBm)	(dB)		(dBm)	(dBm)	(dB)	(Pass/F
(MHz)	V /					00.45	Pas
(MHz) 30.0	-70.51	19.38	[	-51.13	-20.98	-30.15	ras
	-70.51 -67.28	19.38 20.26	II <del>-</del>	-51.13 -47.02	-20.98 -20.98	-30.15 -26.04	
30.0							Pas

Date: 02-Jun-16		Company: Onset Compu	uter Corporation		V	ork Order:	Q1288
Engineer: Tuyen Truong		EUT Desc: Transportation	n Logger	EUT Ope	erating Voltage/	Frequency:	3Vdc (batte
Temp: 21°C		Humidity: 46%	Pressure: 1009mBar				
Freque	ency Range	: 9KHz to 25000 MHz					
Notes: The Limit here	is set to -20	dB from the max in-band p	eak PSD level in 100kHz RBW	(Attenuation factor inc	luded or 19.86dB)		
						,	
Frequency	Reading	Attenuation	n Final Co	onducted Reading	Limit	Margin	Result
(MHz)	(dBm)	(dB)		(dBm)	(dBm)	(dB)	(Pass/Fa
4880.0	-67.07	20.26		-46.81	-20.98	-25.83	Pass
	-70.45	19.38		-51.07	-20.98	-30.09	Pass
30.0	7 01 10						
30.0  Table Result:	Pass	by -25.83 dE	3		Worst Freq:	4880.0	MHZ





**Conducted Spurious Emission** Date: 02-Jun-16 Company: Onset Computer Corporation Work Order: Q1288 Engineer: Tuyen Truong EUT Desc: Transportation Logger EUT Operating Voltage/Frequency: 3Vdc (battery) Temp: 21°C Humidity: 46% Pressure: 1009mBar Frequency Range: 9KHz to 25000 MHz Notes: The Limit here is set to -20dB from the max in-band peak PSD level in 100kHz RBW (Attenuation factor included or 19.86dB) FCC 15.247 Frequency Reading Attenuation Final Conducted Reading Limit Margin Result (MHz) (dBm) (dB) (dBm) (dBm) (dB) (Pass/Fail) 4960.0 -67.53 20.26 -47.27 -20.98 -26.29 Pass 30.0 -70.44 19.38 -51.06 -20.98 -30.08 **Pass** Table Result: 4960.0 MHz Pass -26.29 dB Worst Freq:

Test Site: Chamber 2 Attenuation: Asset#791
Analyzer: SA#1328

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Rev. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	1	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		1	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	Ш	4/5/2017	4/5/2016
Barometric A#2160		5396-0321 /	Ionarch Instruments	4000060	2160	1	3/7/2017	3/7/2016





## **Power Spectral Density**

Limit: Power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. [15.247(e)]

Per 558074 D01 DTS Measurement Guidance v03r05 Section 10.2 (Peak PSD)

### **MEASUREMENTS / RESULTS**

Date: 02-Jun-16		Compa	ny: Onset Compute	er Corporation		Work Order: Q1288					
Engineer: Tuyen Truong		EUT De	sc: Transportation I	_ogger		1	EUT Ope	erating	Voltage/	Frequency	: 3Vdc (batter
Temp: 21°C		Humid	ity: 46%	Pressure:	1009mBar						
Freque	ency Range	e: 2402 to	2480 MHz								
Notes:											
										FCC 15.2	47
Frequency	Reading		Attenuation		Final	Conducted Read	ing	-	Limit	Margin	Result
(MHz)	(dBm)		(dB)			(dBm)			(dBm)	(dB)	(Pass/Fai
2402	-34.04		19.86			-14.18			8.0	-22.18	Pass
2440	-32.75		19.86		7	-12.89			8.0	-20.89	Pass
2480	-31.75		19.86			-11.89			8.0	-19.89	Pass
Table Result:	Pass	by	-19.89 dB					Wors	t Freq:	2480.0	) MHz
Test Site: Chamber 2 Analyzer: GOLD	F	Attenuati	on: Asset#791								
			•								
8/2016 Dectrum Analyzers / Receive	<i>-</i> .		Range	MN	Mfr	SN	Asset	Cat		tion Due	Calibrated

Rev. 5/18/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	<b>Calibration Due</b>	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Nonarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016

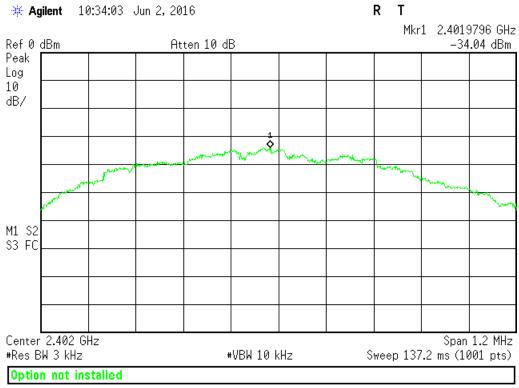
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



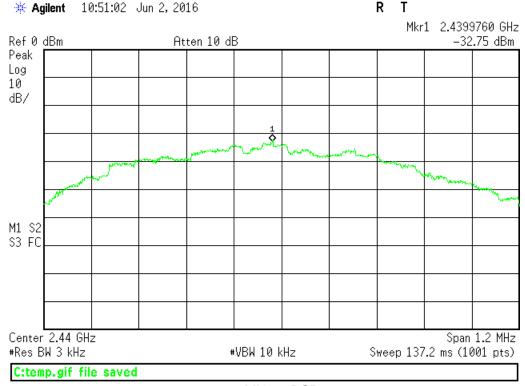
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Latino Cod No. 4827 01

### **PLOTS**



2402 MHz - PSD



2440 MHz - PSD



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Sweep 137.2 ms (1001 pts)

# Agilent 11:12:01 Jun 2, 2016 R T

Mkr1 2.4800036 GHz

Ref 0 dBm Atten 10 dB -31.75 dBm

Peak
Log
10 dB/

M1 \$2
\$3 FC

Center 2.48 GHz

Span 1.2 MHz

2480 MHz - PSD

#VBW 10 kHz

#Res BW 3 kHz

C:temp.gif file saved



# **AC Line Conducted Emissions LIMITS**

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

<sup>\*</sup>Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

### **MEASUREMENTS / RESULTS**

Not applicable since the Transportation Logger (M/N: CX500) was battery powered.





# **Occupied Bandwidth**

Requirement: When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. [RSS-GEN 6.6]

### **MEASUREMENTS / RESULTS**

Engineer: Tuyen Truong EUT Desc: Transportation Logger Pressure: 1009mBar  Frequency Range: 2402 to 2480 MHz  Notes:	Voltage/Frequency: 3Vdc (battery
Frequency Range: 2402 to 2480 MHz	
· · · ·	
Notes:	
Frequency Occupied Bandwidth Reading	
(MHz)	
2402 1034.6000	
2440 1030.7000	
2480 1033.6000	

Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	<b>MN</b> : E4407B	Mfr Agilent	<b>SN</b> MY45113816	Asset 1284	Cat I	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		- 1	4/29/2017	4/29/2015
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321 A	onarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016

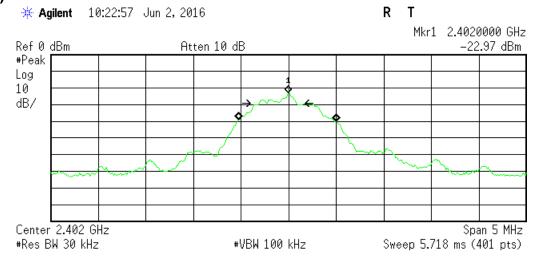
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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Tation Cord No. 4527 of

Plot(s)



Occupied Bandwidth 1.0346 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB

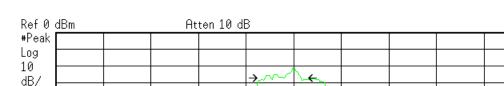
R T

Transmit Freq Error -13.010 kHz x dB Bandwidth 389.721 kHz

**\* Agilent** 10:48:24 Jun 2, 2016

C:temp.gif file saved

### 2402 MHz - Occupied Bandwidth



Center 2.44 GHz Span 5 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 5.718 ms (401 pts)

Occupied Bandwidth 1.0307 MHz

Occ BW % Pwr 99.00 % × dB -6.00 dB

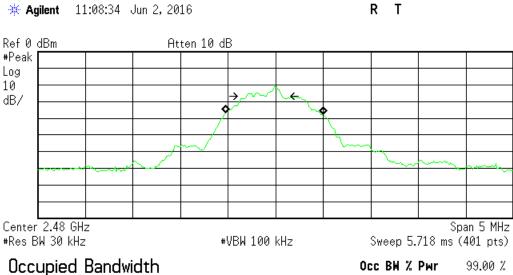
Transmit Freq Error -11.953 kHz x dB Bandwidth 381.229 kHz

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2440 MHz - Occupied Bandwidth







1.0336 MHz

Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error -13.596 kHz x dB Bandwidth 377.948 kHz

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2480 MHz - Occupied Bandwidth



Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz) NIST	5.6dB	N/A
CISPR Radiated Emissions (1-26.5GHz)	4.6dB 4.6dB	5.2dB (Ucispr) N/A
, , ,		N/A
Radiated Emissions (above 26.5GHz)	4.9dB	
Magnetic Radiated Emissions  Conducted Emissions	5.6dB	N/A
NIST CISPR	3.9dB 3.6dB	N/A 3.6dB (Ucispr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23 x 10 <sup>-8</sup>	1 x 10 <sup>-7</sup>
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:  • Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



### **Conditions Of Testing**

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless

- 1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
- 2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
- The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
   These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof
- 4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
- 5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "BUREAU VERITAS,"
  "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS", "MTL", "ACTS", "MTL-ACTS" and CURTIS-STRAUS
  (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
- 6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
- 7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
- 8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
- 9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
- 10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
- 11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein
- 12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
- 13. CLIÉNT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABÍLITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.
- 14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.



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15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREI INDER

(B)NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

- 16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.
- 17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request. Rev.160009121(2)\_#684340 v14CS



