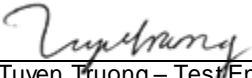





Test Report



Bureau Veritas Consumer Products Services, Inc.

Report No	ER2107-2 Issue 2
Client	Onset Computer Corporation Jim Corrigan
Address	470 MacArthur Blvd. Bourne, MA 02532
Phone	(508) 743-3195
Items tested	MX2201/2
FCC ID	WXF-ONST4
IC ID	7936A-ONST4
FRN	0009380064
Equipment Type	Digital Transmission System
Equipment Code	DTS
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	July 12 to 19, 2017
Results	As detailed within this report
Prepared by	 Tuyen Truong – Test Engineer
Authorized by	 Anna Vancheva - EMC Engineer
Issue Date	<u>8/10/2020</u>
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.

Bureau Veritas Consumer Products Services, Inc. is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



Bureau Veritas Consumer Products Services, Inc.
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Form Final Report REV 12-07-15



Summary

This test report supports an application for certification of a transmitter operating pursuant to: CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2.

“MX2201/2” is a Bluetooth Low Energy transmitter operating in the 2402 MHz to 2480 MHz frequency range.

Antenna Type: Internal surface mount chip

Gain: 1.3dBi

We found that the product met the above requirements without modification.

Test samples were received in good condition.

Data tables may contain Curtis-Straus LLC.

Curtis-Straus LLC. a wholly owned subsidiary of Bureau Veritas was merged into its parent company in 2019.

Issue No.	Reason for change	Date Issued
1	Original release	7/29/2020
2	Updating Standard revisions	8/10/2020



Test Methodology

All testing was performed according to the following rules/procedures/documents;
CFR 47 FCC Part 15.247, RSS-247 Issue 2, RSS-Gen Issue 5, FCC KDB 558074 D01 DTS
Measurement Guidance v05r02 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. The device antenna could not be maximized separately.

RF measurements were performed at the antenna port. 3 channels were tested as follows:

- Low Channel - 2402MHz
- Mid Channel - 2440MHz
- High Channel - 2480MHz

EUT operating voltage is 3VDC from battery.

The following bandwidths were used during radiated spurious emissions testing.

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

Product Tested - Configuration Documentation

EUT Configuration										
Work Order:	R2107									
Company:	Onset Computer Corporation									
Company Address:	470 MacArthur Blvd. Bourne, MA, 02532									
Contact:	Jim Corrigan									
	MN			PN			SN			
EUT:	MX2201/2			--			Sample 1 (Conducted at antenna port testing)			
	MX2201/2			--			Sample 2 (Radiated testing)			
EUT Description:	Wireless Transmitter									
EUT Tx Frequency:	2402-2480 MHz									
	MN			SN						
Support Equipment	Laptop			--						
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
sense	other	0	0	other	Yes	No		in	no	Setup Only
Software Operating Mode Description:										
Firmware Version 0.34. EUT is set to transmit on Channel 2402, 2440 and 2480 MHz respectively.										



Statement of Conformity

The EUT has been found to conform to the following parts of FCC 15.247 and RSS 247 as detailed below:

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.4			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	5		15.19	The label is shown in the label exhibit.
	7		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3.2			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1			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.
6.8			15.203	The antenna for this device is a permanently installed PCB antenna with a 1.3dBi gain.
8.10			15.205 15.209	The fundamental is not in a Restricted band and the 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 the EUT operating voltage is 3VDC from battery.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.7				Occupied Bandwidth measurements were made.

Modifications Required for Compliance

No modifications required for compliance

Test Results

Bandwidth

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

MEASUREMENTS / RESULTS

6dB Bandwidth					
Date: 8/10/2020		Company: Onset		Work Order: R2107	
Engineer: Zac Johnson		EUT: MX2201/2		Operating Voltage/Frequency: 3V Battery	
Temp: 23.7°C		Humidity: 52%		Pressure: 1007mBar	
Frequency Range: 2402-2480 MHz			Measurement Type: Conducted		
Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V05r02					
Notes:					
Frequency (MHz)	Reading (kHz)	6dB Bandwidth			
		Limit (kHz)	Margin (kHz)	Result (Pass/Fail)	
2402	708.2	≥500	208	Pass	
2440	707.8	≥500	208	Pass	
2480	712.5	≥500	213	Pass	
Test Site: EMC-5		Cable: 2288 cbl		Attenuator: 2121 Pad	
Analyzer: 1118470 SA		Copyright Curtis-Straus LLC 2000			

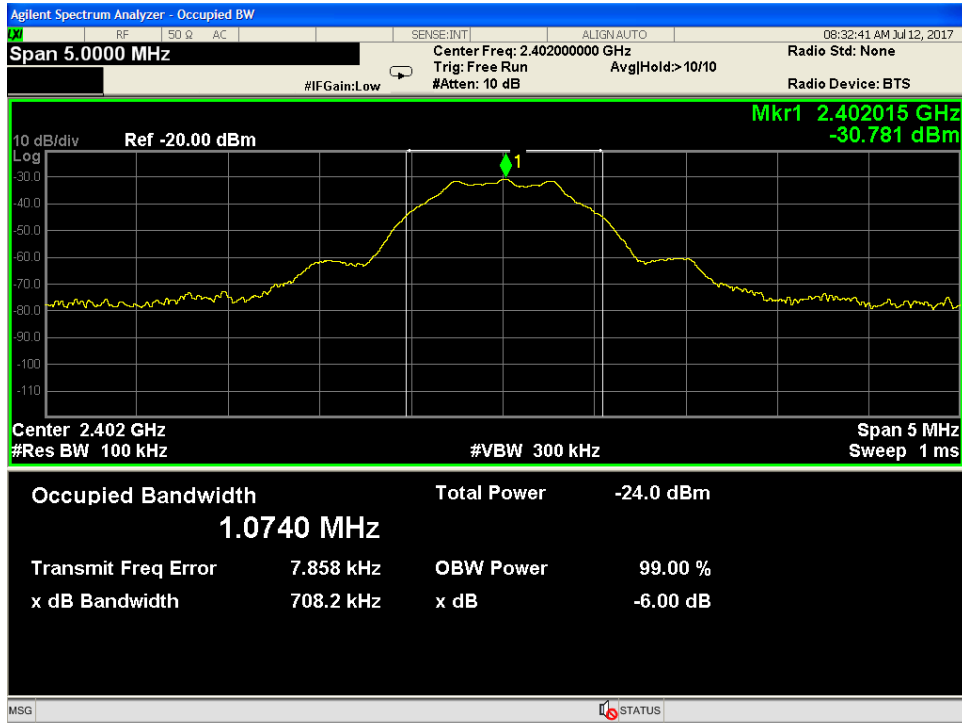
Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2017
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2288	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/27/2018	1/27/2017

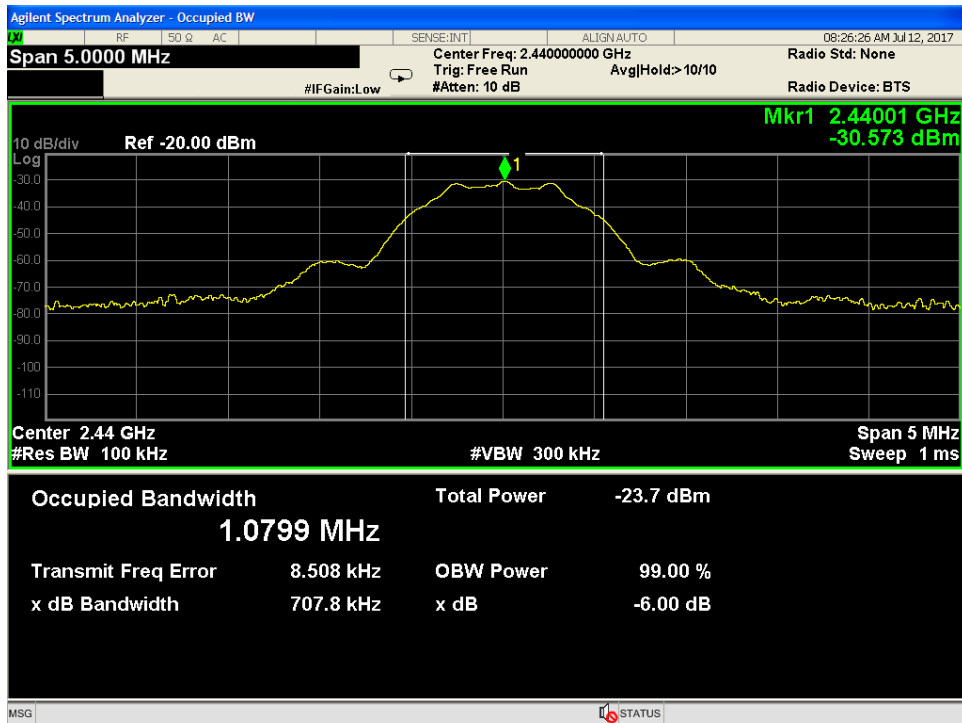
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



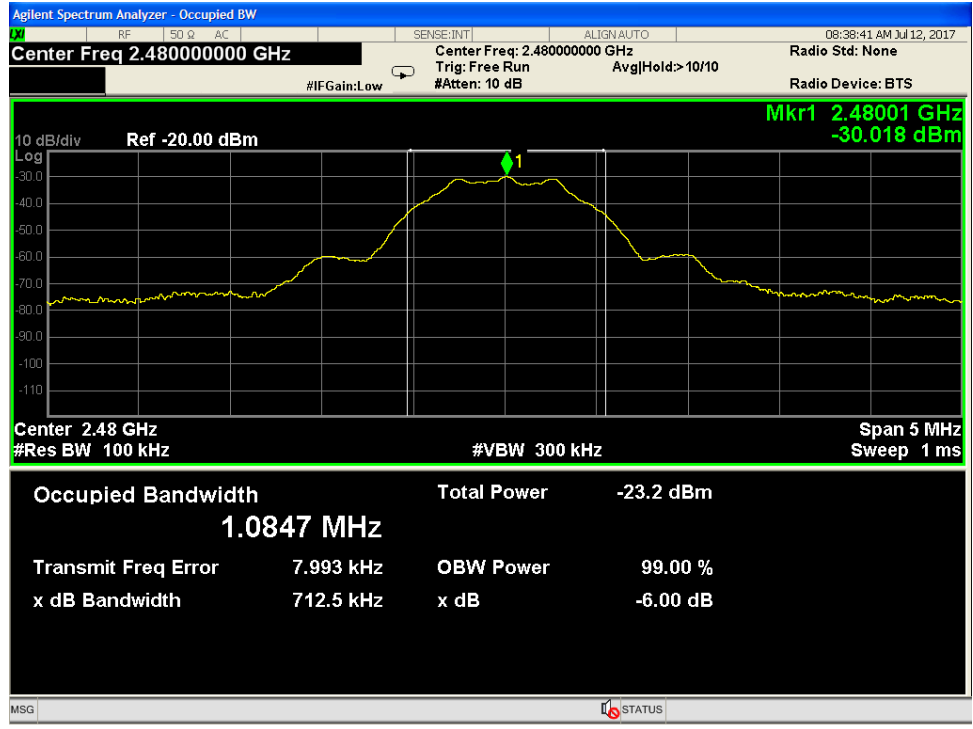
PLOTS



Low Channel 6 dB Bandwidth



Middle Channel 6 dB Bandwidth



High Channel 6 dB Bandwidth

Peak Output Power

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

MEASUREMENTS / RESULTS

Peak Output Power							
Date: 7/12/2017		Company: Onset Computer Corporation			Work Order: R2107		
Engineer: Zac Johnson		EUT: MX2201/2		Operating Voltage/Frequency: 3V Battery			
Temp: 23.7°C		Humidity: 52%		Pressure: 1007mBar			
Frequency Range: 2402-2480 MHz				Measurement Type: Conducted			
Notes:							
Frequency	Peak Reading	Cable Loss	Attenuator Loss	Peak Output Power	Limit	Margin	Result
(MHz)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(Pass/Fail)
2402	-30.75	0.32	30.00	-0.43	30.0	-30.43	Pass
2440	-30.25	0.32	30.00	0.07	30.0	-29.93	Pass
2480	-30.10	0.32	30.00	0.22	30.0	-29.78	Pass
Test Site: EMC-5		Cable: 2288 cbl		Attenuator: 2121 Pad			
Analyzer: 1118470 SA							
Peak Output Power (dBm) = Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)							

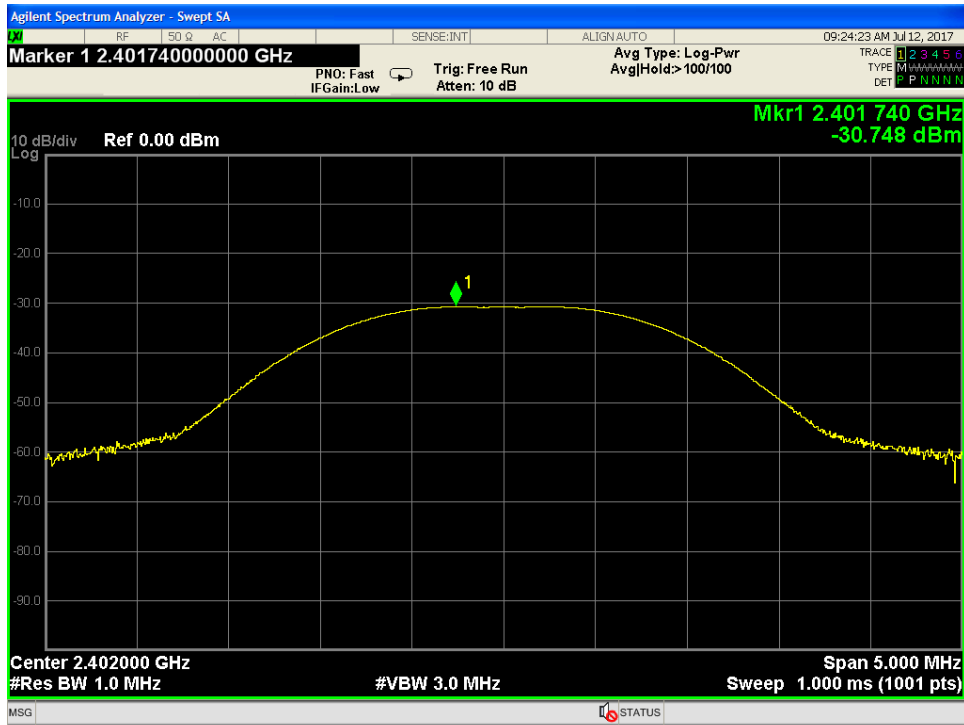
Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2017
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2288	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/27/2018	1/27/2017

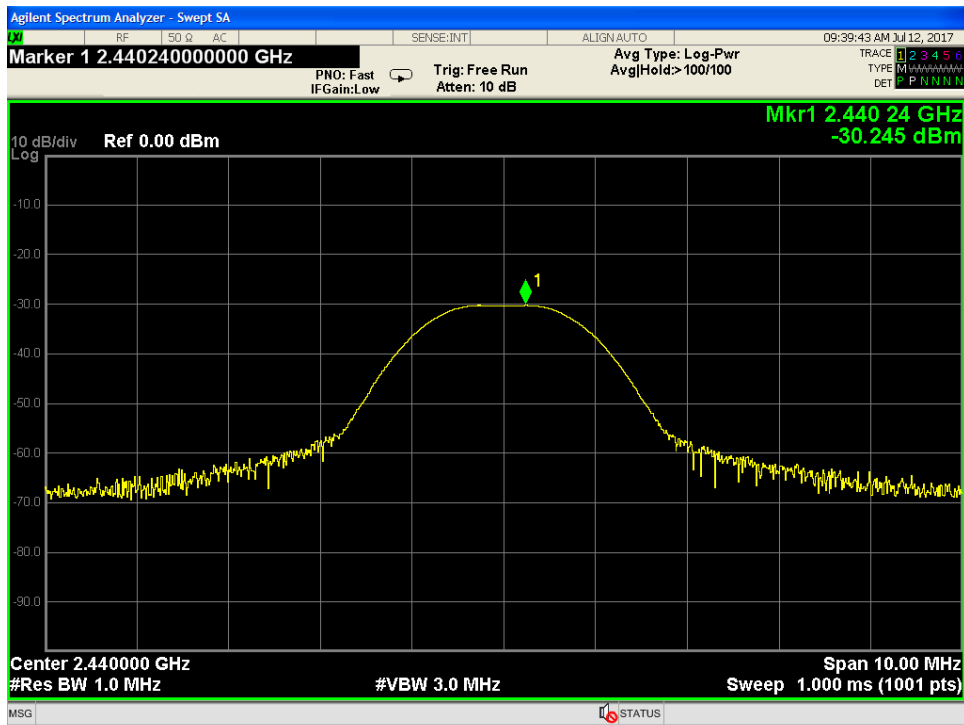
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



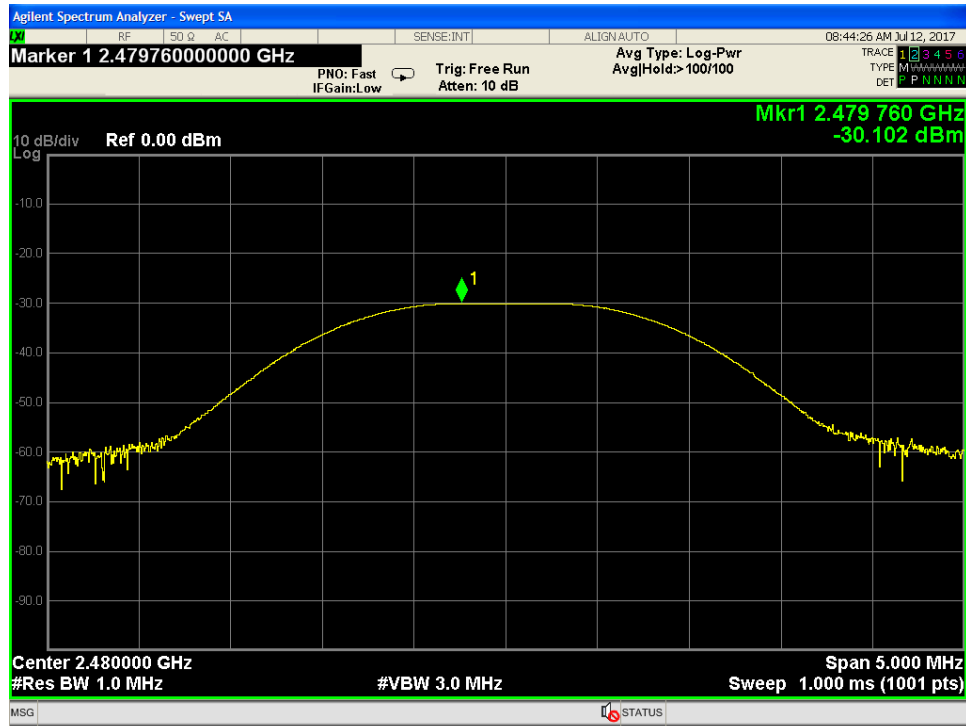
PLOTS



Low Channel Peak Output Power



Middle Channel Peak Output Power



High Channel Peak Output Power

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)]

MEASUREMENTS / RESULTS

Radiated Band Edge

Radiated Emissions Table - Band Edge														
Date: 18-Jul-17				Company: Onset Computer Corporation				Work Order: R2107						
Engineer: Zac Johnson				EUT Desc: MX2201/2				EUT Operating Voltage/Frequency: 3V DC						
Temp: 25.2°C				Humidity: 25%				Pressure: 48%				Battery		
Frequency Range: 2310-2500MHz								Measurement Distance: 3 m						
Notes:												EUT Max Freq: 2480MHz		
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
H	2373.0	21.4	1.4	0.0	32.1	3.4	56.9	36.9	74.0	-17.1	Pass	54.0	-17.1	Pass
H	2390.0	18.2	-1.8	0.0	32.2	3.4	53.8	33.8	74.0	-20.2	Pass	54.0	-20.2	Pass
H	2483.5	17.5	-2.5	0.0	32.4	3.5	53.4	33.4	74.0	-20.6	Pass	54.0	-20.6	Pass
H	2489.9	20.8	0.8	0.0	32.4	3.5	56.7	36.7	74.0	-17.3	Pass	54.0	-17.3	Pass
Table Result: Pass by -17.1 dB														
Worst Freq: 2373.0 MHz														
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: ---		
Analyzer: 1170725 SA				Preamp: none				Antenna: Blue Horn				Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.188 Copyright Curtis-Straus LLC 2000														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018	12/21/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2081	HTC-1	HDE		2081	II	3/23/2018	3/23/2017	
Cables	Range	Mfr	Cat	Calibration Due	Calibrated on			
Asset #2052	9kHz - 18GHz	Florida RF	II	3/5/2018	3/5/2017			
Asset #2053	9kHz - 18GHz	Florida RF	II	10/30/2017	10/30/2016			

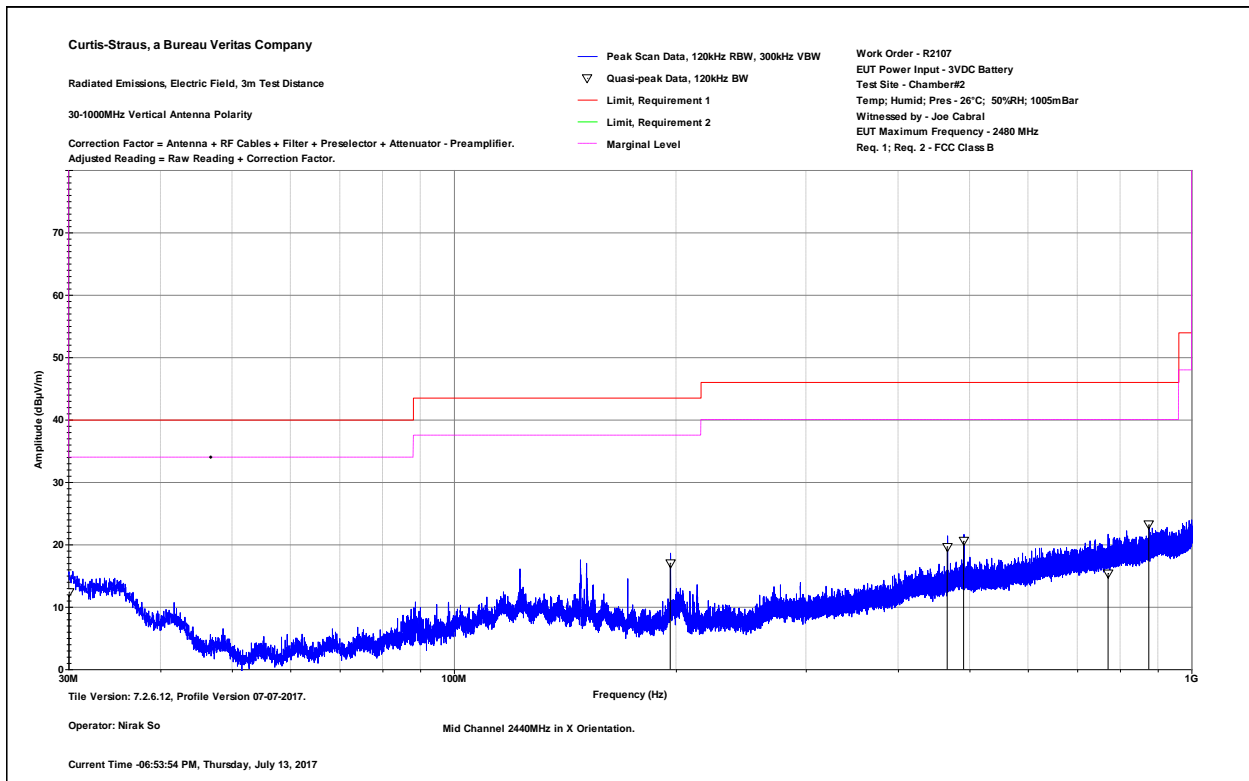
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Radiated Spurious 30 to 25 GHz

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 3m Distance 30-1000MHz Horizontal Tabular Data Operator: Nirak So Note: All 3 orientations of EUT were investigated; only the worst case recorded	Work Order - R2107 EUT Power Input - 3VDC Battery Test Site - Chamber#2 Temp; Humid; Pres - 26°C; 50%RH; 1005mBar Witnessed by - Joe Cabral EUT Maximum Frequency - 2480 MHz Req. 1; Req. 2 - FCC Class B
--	---

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB
30.006	27.4	-14.7	12.6	40	-27.4	PASS	125	309	
466.365	42.6	-16.7	25.9	46	-20.2	PASS	146	205	-20.2
613.567	32.5	-14.3	18.2	46	-27.8	PASS	254	160	
750.061	31.2	-11.7	19.5	46	-26.5	PASS	147	243	
875.102	31.2	-9.6	21.7	46	-24.4	PASS	175	196	
883.653	32.8	-9.3	23.5	46	-22.5	PASS	246	20	

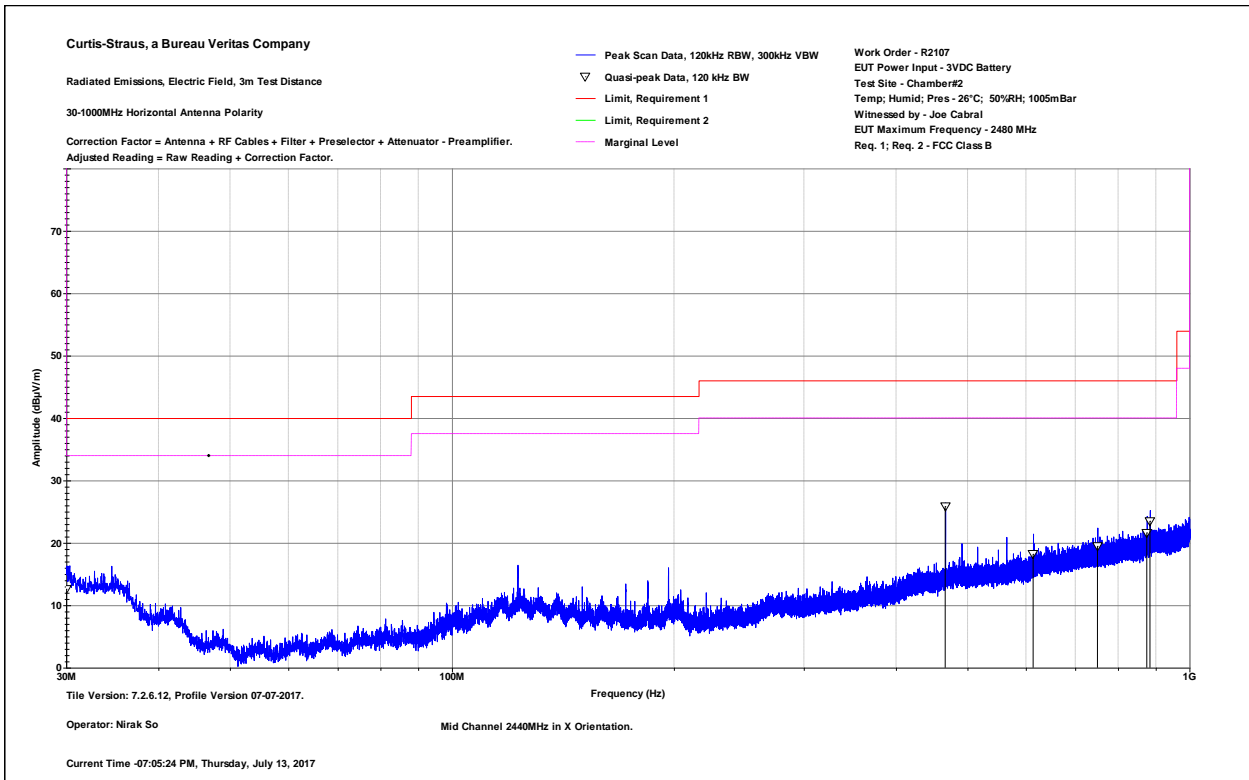


Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 30-1000MHz Vertical Tabular Data
 Operator: Nirak So

Work Order - R2107
 EUT Power Input - 3VDC Battery
 Test Site - Chamber#2
 Temp; Humid; Pres - 26°C; 50%RH; 1005mBar
 Witnessed by - Joe Cabral
 EUT Maximum Frequency - 2480 MHz
 Req. 1; Req. 2 - FCC Class B

Note: All 3 orientations of EUT were investigated; only the worst case recorded

Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB
30.076	27.2	-14.8	12.4	40	-27.6	PASS	105	303	
196.382	39.9	-22.8	17	43.5	-26.5	PASS	105	290	
466.325	36.4	-16.7	19.7	46	-26.3	PASS	225	35	
490.894	36.8	-16.3	20.6	46	-25.5	PASS	197	99	
770.497	26.8	-11.4	15.4	46	-30.6	PASS	209	295	
875.092	32.8	-9.6	23.2	46	-22.8	PASS	160	205	-22.8



Rev. 7/3/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/21/2018	12/21/2016
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2310 PA	1-1000MHz	PAM-103	COM-POWER	441174	2310	II	2/4/2018	2/4/2017
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/12/2017	8/12/2015
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2078	HTC-1	HDE		2078	II	3/23/2018	3/23/2017	
Cables	Range	Mfr	Cat	Calibration Due	Calibrated on			
Asset #1522	9kHz - 18GHz	Florida RF	II	2/11/2018	2/11/2017			
Asset #2052	9kHz - 18GHz	Florida RF	II	3/5/2018	3/5/2017			
Asset #2053	9kHz - 18GHz	Florida RF	II	10/30/3017	10/30/2016			

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

Radiated Emissions Table														
Date: 18-Jul-17			Company: Onset Computer Corporation				Work Order: R2107							
Engineer: Zac Johnson			EUT Desc: MX2201/2				EUT Operating Voltage/Frequency: 3V DC							
Temp: 24.8°C			Humidity: 48%				Pressure: 1012mBar							
Frequency Range: 1-6GHz						Measurement Distance: 3 m								
Notes: No Emissions Found,												EUT Max Freq: 2480MHz		
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
No Emissions Found														
Table Result: Pass by --- dB												Worst Freq: --- MHz		
Test Site: EMI Chamber 2			Cable 1: Asset #2052			Cable 2: Asset #2053			Cable 3: ---					
Analyzer: 1170725 SA			Preamp: none			Antenna: Blue Horn			Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.188												Copyright Curtis-Straus LLC 2000		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Radiated Emissions Table														
Date: 18-Jul-17			Company: Onset Computer Corporation				Work Order: R2107							
Engineer: Zac Johnson			EUT Desc: MX2201/2				EUT Operating Voltage/Frequency: 3V DC							
Temp: 24.8°C			Humidity: 48%				Pressure: 1012mBar							
Frequency Range: 6-18GHz						Measurement Distance: 1 m								
Notes:												EUT Max Freq: 2480MHz		
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
Mid Channel H	7320.0	26.6	6.6	0.0	36.2	6.2	69.0	49.0	83.5	-14.5	Pass	63.5	-14.5	Pass
Low Channel H	7205.0	23.8	3.8	0.0	36.1	6.2	66.1	46.1	83.5	-17.4	Pass	63.5	-17.4	Pass
High Channel H	7440.0	27.6	7.6	0.0	36.2	6.1	69.9	49.9	83.5	-13.6	Pass	63.5	-13.6	Pass
Table Result: Pass by -13.6 dB												Worst Freq: 7440.0 MHz		
Test Site: EMI Chamber 2			Cable 1: Asset #2052			Cable 2: Asset #2053			Cable 3: ---					
Analyzer: Rental SA#2			Preamp: none			Antenna: Blue Horn			Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.188												Copyright Curtis-Straus LLC 2000		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														



Rev. 7/26/2017

Spectrum Analyzers / Receivers /Preselectors Rental MXE EMI Receiver(1170725)	Range 20Hz-26.5GHz	MN N9038A	Mfr Agilent	SN MY51210151	Asset 1170725	Cat I	Calibration Due 12/22/2017	Calibrated on 12/22/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Antennas Blue Horn	Range 1-18Ghz	MN 3117	Mfr ETS	SN 157647	Asset 1861	Cat I	Calibration Due 2/14/2019	Calibrated on 2/14/2017
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2052 Asset #2053	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/5/2018 10/30/3017	Calibrated on 3/5/2017 10/30/2016

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

Radiated Emissions Table																	
Date: 18-Jul-17				Company: Onset Computer Corporation				Work Order: R2107									
Engineer: Zac Johnson				EUT Desc: MX2201/2				EUT Operating Voltage/Frequency: 3V DC Battery									
Temp: 24.8°C				Humidity: 48%				Pressure: 1012mBar									
Frequency Range: 18-25GHz						Measurement Distance: 0.1 m											
Notes: No Emissions Found																	
EUT Max Freq: 2480MHz																	
Antenna	Polarization	Frequency	Peak Reading	Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Reading	Adjusted Reading	Adjusted Reading (BRP)	---			FCC Class B High Frequency			
(H/V)	(MHz)	(dBuV)	(dBuV)	(dB)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBm)	Limit	Margin	Result	Limit	Margin	Result	
											(dBuV/m)	(dB)	(Pass/Fail)	(dBm)	(dB)	(Pass/Fail)	
No Emissions Found												---	---	---	-30.0		Pass
Table Result: Pass by dB												Worst Freq: MHz					
Test Site: Chamber 2				Cable 1: 2286 cbl				Cable 2: ---				Cable 3: ---					
Analyzer: Gold SA				Preamp: White				Antenna: 18-26.5GHz Horn				Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.179												Copyright Curtis-Straus LLC 2000					
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																	

Rev. 7/26/2017

Spectrum Analyzers / Receivers /Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 2/28/2018	Calibrated on 2/28/2017
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Preamps/Couplers Attenuators / Filters HF (Yellow)	Range 18-26.5GHz	MN AFS4-18002650-60-8P-4	Mfr CS	SN 467559	Asset 1266	Cat II	Calibration Due 9/16/2017	Calibrated on 9/16/2016
Antennas HF (White) Horn	Range 18-26.5GHz	MN 801-WLM	Mfr Waveline	SN 758	Asset 758	Cat III	Calibration Due Verify before Use	Calibrated on date of test
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2285	Range 9kHz-2GHz		Mfr Pasternack			Cat II	Calibration Due 1/27/2018	Calibrated on 1/27/2017

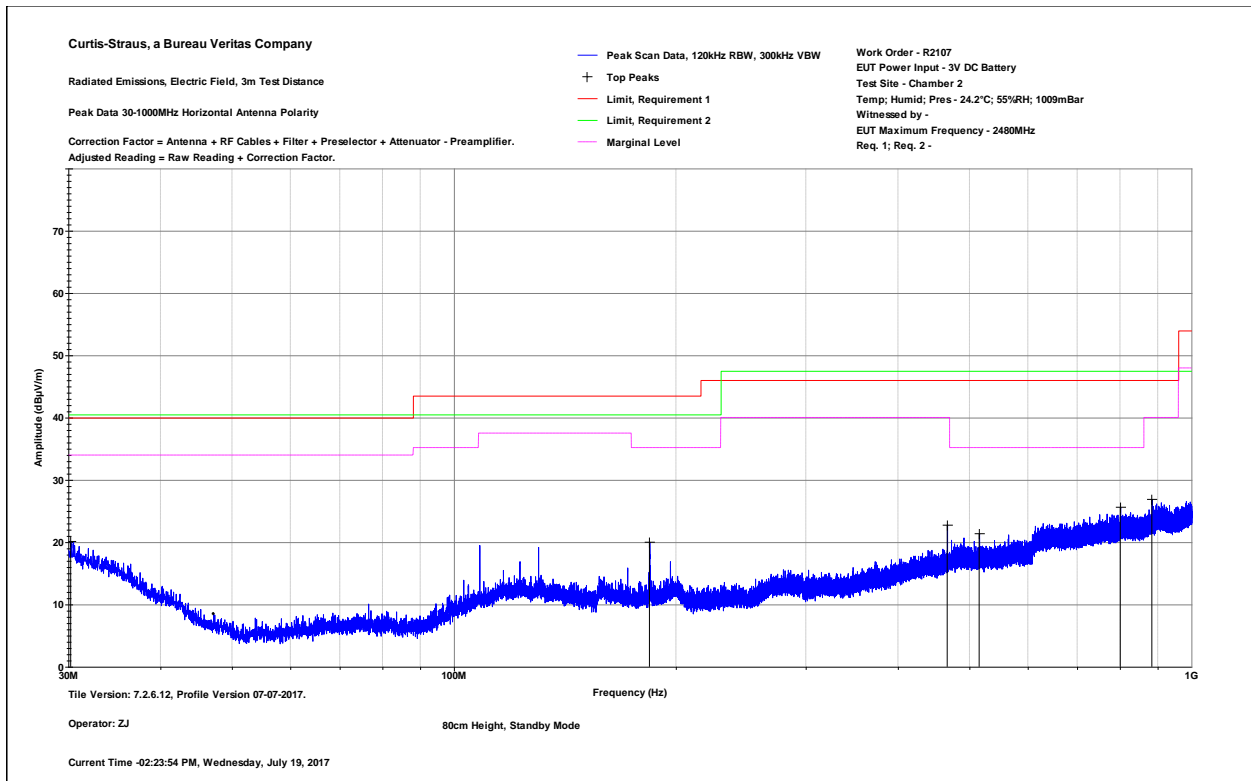
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Standby Mode

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Operator: ZJ Standby Mode 80cm Height	Work Order - R2107 EUT Power Input - 3V DC Battery Test Site - Chamber 2 Temp; Humid; Pres - 24.2°C; 55%RH; 1009mBar EUT Maximum Frequency - 2480MHz
---	--

Frequency	Peak Reading	Correction Factor	Adjusted Peak Amplitude	Req 1 Limit	Req 1 Margin	Req 1 Test Results	Req 2 Limit	Req 2 Margin	Req 2 Test Results	Antenna Height	EUT Azimuth	Worst Margin Req 1	Worst Margin Req 2
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
30.218	24	-3.9	20.1	40	-19.9	PASS	40.5	-179.9	PASS	200	45		
184.109	33.2	-13.2	20	43.5	-23.5	PASS	40.5	-180	PASS	150	180		
466.403	29.6	-6.9	22.8	46	-23.2	PASS	47.5	-177.2	PASS	150	135		
515.461	27.6	-6.3	21.3	46	-24.7	PASS	47.5	-178.7	PASS	100	225		
800.811	27.9	-2.3	25.6	46	-20.4	PASS	47.5	-174.4	PASS	200	135		
883.649	28.1	-1.2	26.9	46	-19.1	PASS	47.5	-173.1	PASS	250	225	-19.1	-173.1



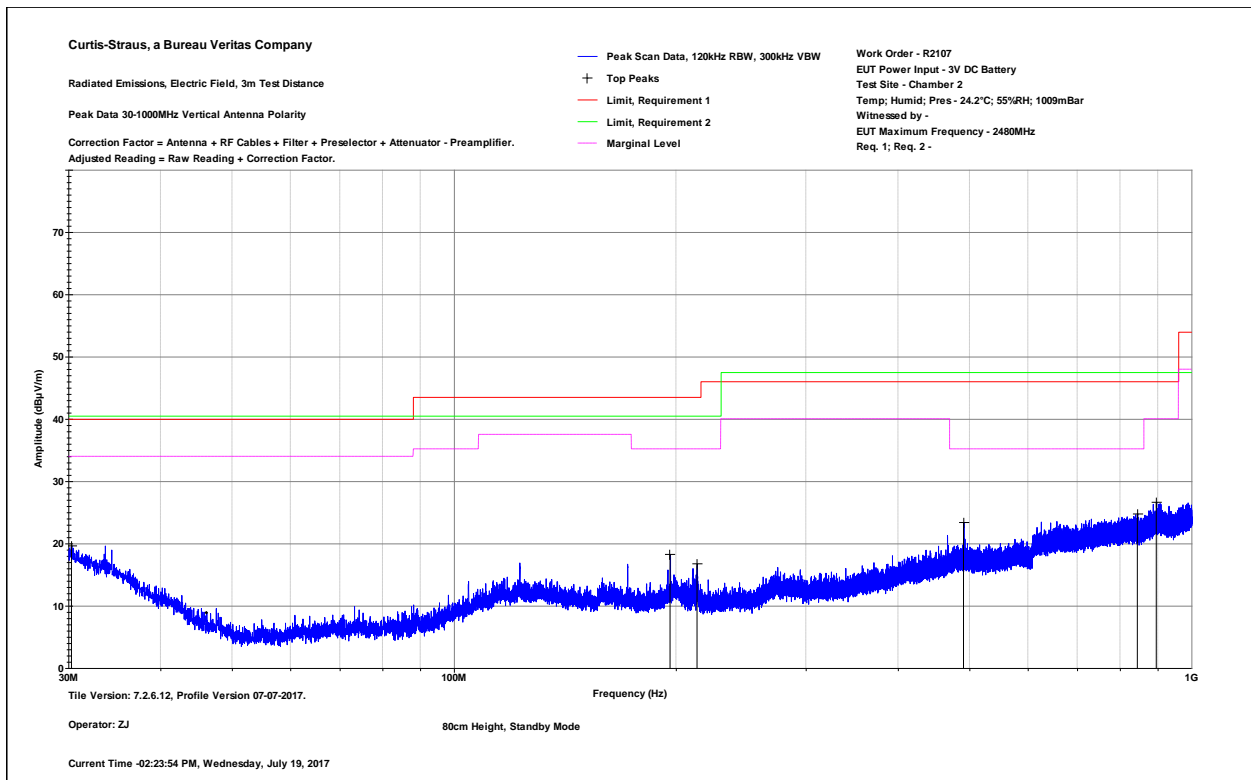
Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 Top Peaks Vertical 30-1000MHz
 Operator: ZJ

Work Order - R2107
 EUT Power Input - 3V DC Battery
 Test Site - Chamber 2
 Temp; Humid; Pres - 24.2°C; 55%RH; 1009mBar

80cm Height Standby Mode

EUT Maximum Frequency - 2480MHz

Frequency	Peak Reading	Correction Factor	Adjusted Peak Amplitude	Req 1 Limit	Req 1 Margin	Req 1 Test Results	Req 2 Limit	Req 2 Margin	Req 2 Test Results	Antenna Height	Turntable Azimuth	Worst Margin Req 1 Limit	Worst Margin Req 2 Limit
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
30.291	23.6	-3.9	19.7	40	-29	PASS	40.5	-19	PASS	100	135	-29	-19
196.379	30.3	-12	18.2	43.5	-45.3	PASS	40.5	-35.3	PASS	100	0		
213.597	30.6	-13.9	16.7	43.5	-47.6	PASS	40.5	-37.6	PASS	100	135		
490.896	29.7	-6.3	23.4	46	-45.7	PASS	47.5	-35.7	PASS	200	315		
844.533	26.9	-2.1	24.8	46	-34.9	PASS	47.5	-24.9	PASS	150	135		
895.943	27.3	-0.6	26.7	46	-33.5	PASS	47.5	-23.5	PASS	150	90		



Rev. 7/3/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/21/2018	12/21/2016
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2310 PA	1-1000MHz	PAM-103	COM-POWER	441174	2310	II	2/4/2018	2/4/2017
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/12/2017	8/12/2015
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2078	HTC-1	HDE		2078	II	3/23/2018	3/23/2017	
Cables	Range	Mfr	Cat	Calibration Due	Calibrated on			
Asset #1522	9kHz - 18GHz	Florida RF	II	2/11/2018	2/11/2017			
Asset #2052	9kHz - 18GHz	Florida RF	II	3/5/2018	3/5/2017			
Asset #2053	9kHz - 18GHz	Florida RF	II	10/30/2017	10/30/2016			

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

Radiated Emissions Table															
Date: 19-Jul-17				Company: Onset Computer Corporation				Work Order: R2107							
Engineer: Zac Johnson				EUT Desc: MX2201 /2				EUT Operating Voltage/Frequency: 3V DC							
Temp: 24.2C				Humidity: 55%				Pressure: 1009mBar Battery							
Frequency Range: 1-6GHz							Measurement Distance: 3 m								
Notes: Also checked frequency range with 100KHz RBW to reduce noise floor, 1865MHz is only emission										EUT Max Freq: 2480MHz					
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBuV)	Average Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Avg Reading (dBuV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average			
									Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	
V	1865.0	48.2	28.2	37.4	31.0	3.8	45.6	25.6	74.0	-28.4	Pass	54.0	-28.4	Pass	
Table Result: Pass by -28.4 dB										Worst Freq: 1865.0 MHz					
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: Asset #1509			
Analyzer: Rental SA#2				Preamp: Asset #2111				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.188 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Radiated Emissions Table															
Date: 19-Jul-17				Company: Onset Computer Corporation				Work Order: R2107							
Engineer: Zac Johnson				EUT Desc: MX2201 /2				EUT Operating Voltage/Frequency: 3V DC							
Temp: 24.2C				Humidity: 55%				Pressure: 1009mBar Battery							
Frequency Range: 6-18GHz							Measurement Distance: 1 m								
Notes: Also checked frequency range with 100KHz RBW to reduce noise floor, no emissions were seen															
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	---			FCC 15.247					
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)			
No Emissions Found															
Table Result: Pass by --- dB										Worst Freq: --- MHz					
Test Site: EMI Chamber 2				Cable 1: Asset #2052				Cable 2: Asset #2053				Cable 3: Asset #1509			
Analyzer: Rental SA#2				Preamp: Asset #2111				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.188 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors SA #2 (1860)	Range 9kHz-26.5 GHz	MN E7405A	Mfr Agilent	SN MY45104916	Asset 1860	Cat I	Calibration Due 1/16/2018	Calibrated on 1/16/2017
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Preamps / Couplers Attenuators / Filters 2111 HF Preamp	Range 0.5-18GHz	MN PAM-118A	Mfr COM-POWER	SN 551063	Asset 2111	Cat II	Calibration Due 11/5/2017	Calibrated on 11/5/2016
Antennas Blue Horn	Range 1-18GHz	MN 3117	Mfr ETS	SN 157647	Asset 1861	Cat I	Calibration Due 2/14/2019	Calibrated on 2/14/2017
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2052 Asset #2053	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/5/2018 10/30/3017	Calibrated on 3/5/2017 10/30/2016

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

Radiated Emissions Table															
Date: 18-Jul-17				Company: Onset				Work Order: R2107							
Engineer: Zac Johnson				EUT Desc: MX2202				EUT Operating Voltage/Frequency: 3V DC							
Temp: 24.8				Humidity: 48%				Pressure: 1012							
Frequency Range: 18-25GHz								Measurement Distance: 0.1 m							
Notes: No Emissions Found, Center Channel															
EUT Max Freq: 2480MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBuV)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBuV/m)	Adjusted Reading (dBuV/m)	Adjusted Reading (ERP) (dBm)	FCC Class B High Frequency					
										Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)
No Emissions Found															
Table Result: Pass by dB Worst Freq: MHz															
Test Site: Chamber 2				Cable 1: 2286 cbl				Cable 2: ---				Cable 3: ---			
Analyzer: Gold SA				Preamp: White				Antenna: 18-26.5GHz Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.179												Copyright Curtis-Straus LLC 2000			
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

Rev. 7/16/2017

Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 2/28/2018	Calibrated on 2/28/2017
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Preamps / Couplers Attenuators / Filters HF (Yellow)	Range 18-26.5GHz	MN AFS4-18002650-60-8P-4	Mfr CS	SN 467559	Asset 1266	Cat II	Calibration Due 9/16/2017	Calibrated on 9/16/2016
Antennas HF (White) Horn	Range 18-26.5GHz	MN 801-WLM	Mfr Waveline	SN 758	Asset 758	Cat III	Calibration Due Verify before Use	Calibrated on date of test
Meteorological Meters Weather Clock (Pressure Only) TH A#2078		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2078	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2286	Range 9kHz-26.5GHz	Mfr FLC-1.5FT-SMSM+	Mfr Mini-Circuits	SN 16021030		Cat II	Calibration Due 1/27/2018	Calibrated on 1/27/2017



Duty Cycle Correction Factor

Limits:

Unless otherwise specified, e.g., §§15.255(b), and 15.256(l)(5), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

[15.35(c)]

MEASUREMENTS / RESULTS

Radiated Emissions Table - Duty Cycle Correction Factor											
Date: 18-Jul-17		Company: Onset Computer Corporation				Work Order: R2107					
Engineer: Zac Johnson		EUT Desc: MX2201 /2				EUT Operating Voltage/Frequency: 3V DC					
Temp: 24.2C		Humidity: 55%		Pressure: 1009mBar		Battery					
Frequency Range: Single Channel						Measurement Distance: 3 m					
Notes: Channel 2476 MHz						EUT Max Freq: 2480MHz					
Antenna Polarization (H/V)	Frequency (MHz)	On Time (ms)	Period (ms)	Duty Cycle Correction Factor							
N/A	2476.0	6.648	100.0	-23.546							
Table Result:				by		dB		Worst Freq:		MHz	
Test Site: EMI Chamber 2		Cable 1: Asset #2052		Cable 2: Asset #2053		Cable 3: Asset #1509					
Analyzer: Rental SA#2		Preamp: Asset #2111		Antenna: Blue Horn		Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.188				Copyright Curtis-Straus LLC 2000							
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor											

Note: Worst case assumed; 2 pulses clusters in 100ms window. Each pulse cluster consists of 2 individual pulses (1.662ms)

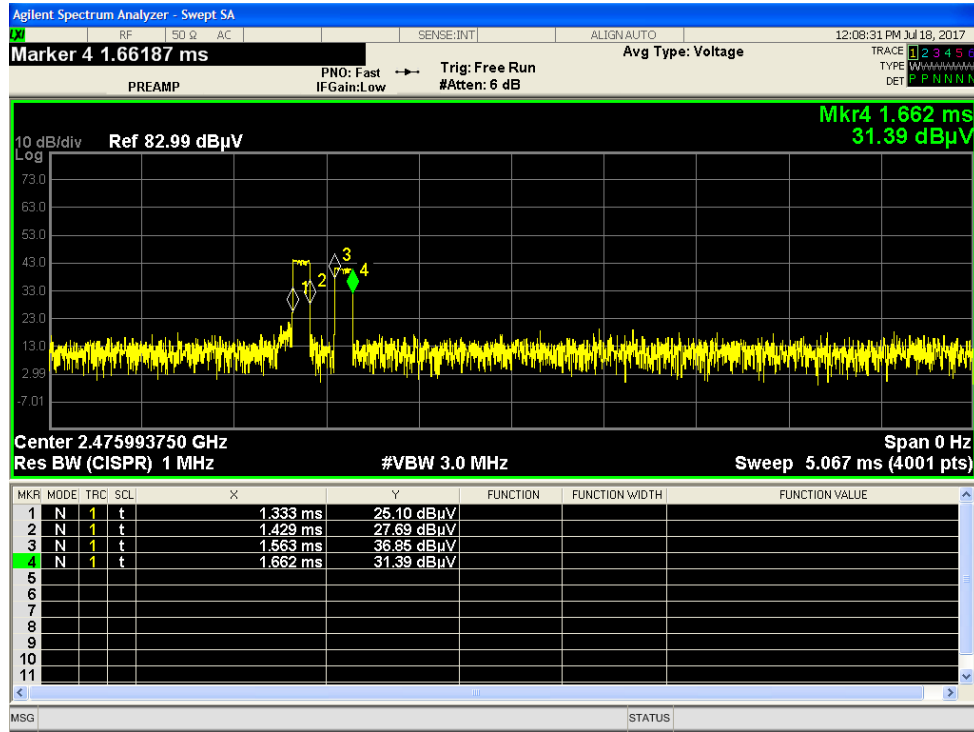
Rev. 7/26/2017

Equipment	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers/Preselectors SA #2 (1860)	9kHz-26.5 GHz	E7405A	Agilent	MY45104916	1860	I	1/16/2018	1/16/2017
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 1-18GHz	Asset 1686	Cat I	Calibration Due 12/21/2018	Calibrated on 12/21/2016
Preamps /Couplers Attenuators / Filters 2111 HF Preamp	Range 0.5-18GHz	MN PAM-118A	Mfr COM-POWER	SN 551063	Asset 2111	Cat II	Calibration Due 11/5/2017	Calibrated on 11/5/2016
Antennas Blue Horn	Range 1-18Ghz	MN 3117	Mfr ETS	SN 157647	Asset 1861	Cat I	Calibration Due 2/14/2019	Calibrated on 2/14/2017
Meteorological Meters Weather Clock (Pressure Only) TH A#2081		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2081	Cat I II	Calibration Due 4/28/2018 3/23/2018	Calibrated on 4/28/2016 3/23/2017
Cables Asset #2052 Asset #2053	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/5/2018 10/30/3017	Calibrated on 3/5/2017 10/30/2016

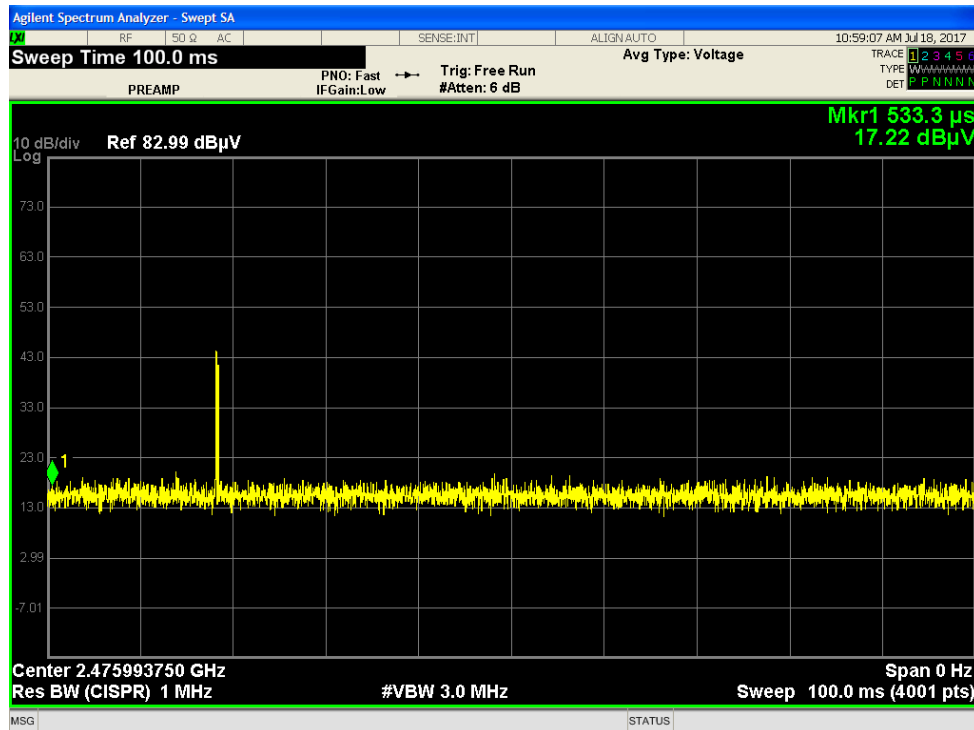
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



PLOTS



Single pulse



Period (milli-second window)

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.

[15.247(d)]

MEASUREMENTS / RESULTS

Conducted Bandedge				
Date: 17-Jul	Company: Onset Computer Corporation	Work Order: R2107		
Engineer: Zac Johnson	EUT: MX2201/2	Operating Voltage/Frequency: 3V Battery		
Temp: 23.7°C	Humidity: 52%	Pressure: 1007mBar		
Frequency Range: 2402-2480 MHz		Measurement Type: Conducted		
Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V05r02				
Notes:				
	Bandedge (dBm)	Delta to Peak Limit (dB)		
Low Bandedge	-79.669	48.967	≥ 20	Pass
High Bandedge	-79.348	49.411	≥ 20	Pass
Test Site: EMC-5	Cable: 2288 cbl	Attenuator: 2121 Pad		
Analyzer: 1118470 SA Copyright Curtis-Straus LLC 2000				

Conducted Spurious Emissions				
Date: Jul 12 to 17, 2017	Company: Onset Computer Corporation	Work Order: R2107		
Engineer: Zac Johnson	EUT: MX2201/2	Operating Voltage/Frequency: 3V Battery		
Temp: 23.7°C	Humidity: 52%	Pressure: 1007mBar		
Frequency Range: 9 KHz to 25 GHz		Measurement Type: Conducted		
Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V05r02				
Notes:				
		FCC 15.247		
Spurious Emissions were investigated from 9KHz to 25 GHz on all 3 Channels (2402, 2440 and 2480 MHz) at the EUT antenna port. All emissions found were at noise floor levels; except the fundamental frequencies. Highest noise floor level was found around -60dB for the entire range, which is more than 10dB below the fundamental limit (see Plots attached right below for more details)				
Test Site: EMC-5	Cable: 2288 cbl	Attenuator: 2121 Pad		
Analyzer: 1118470 SA Copyright Curtis-Straus LLC 2000				

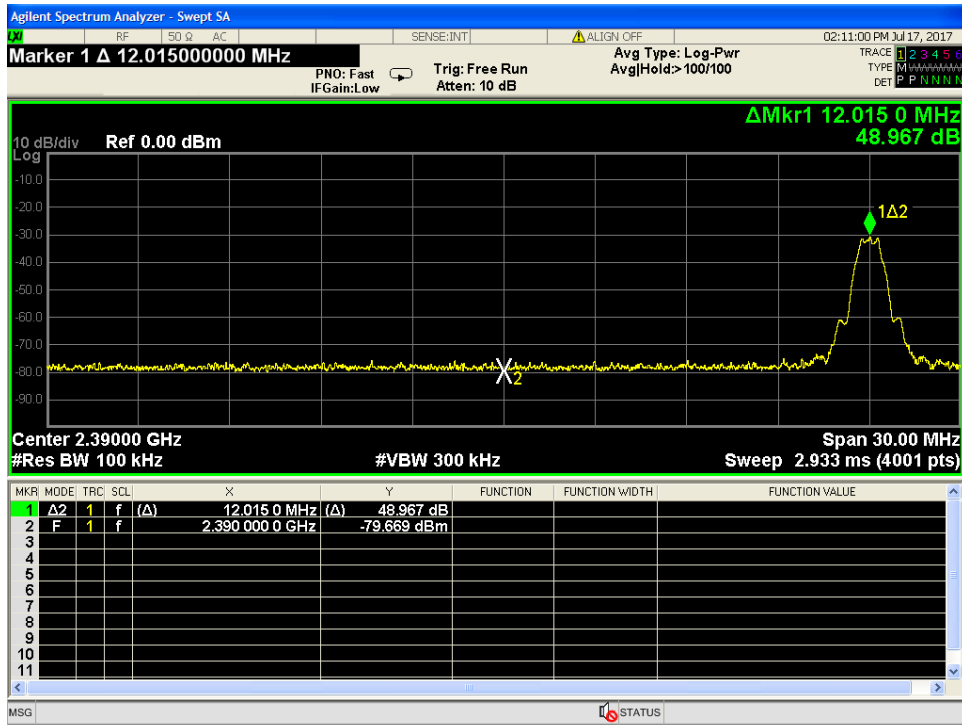
Rev. 7/26/2017

Equipment	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers / Preselectors Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps / Couplers Attenuators / Filters API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2017
Cables Asset #2288	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/27/2018	1/27/2017

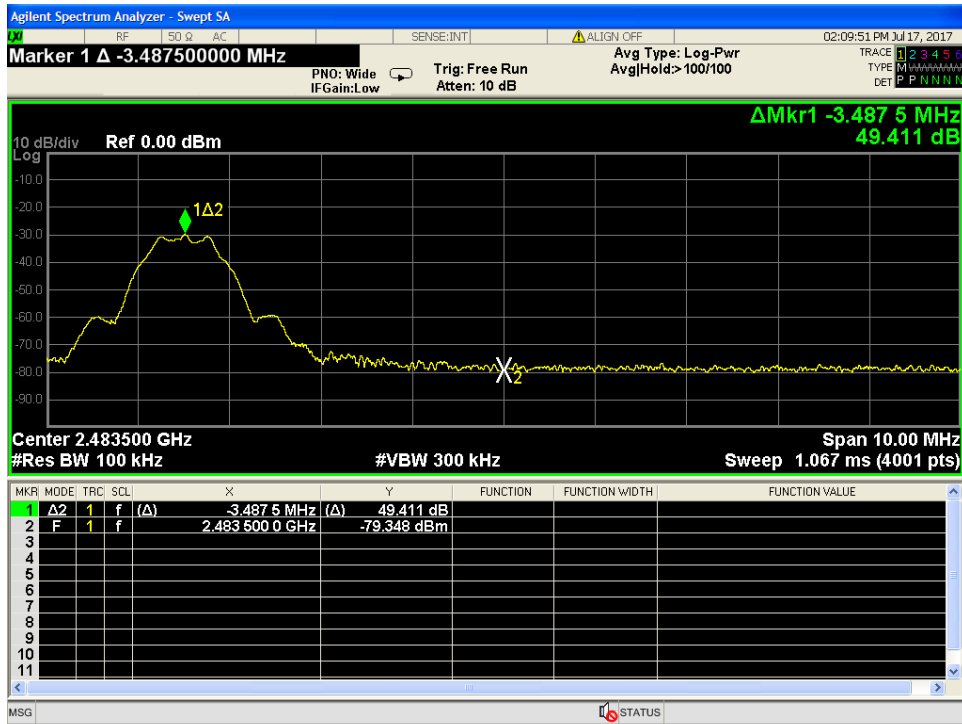
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



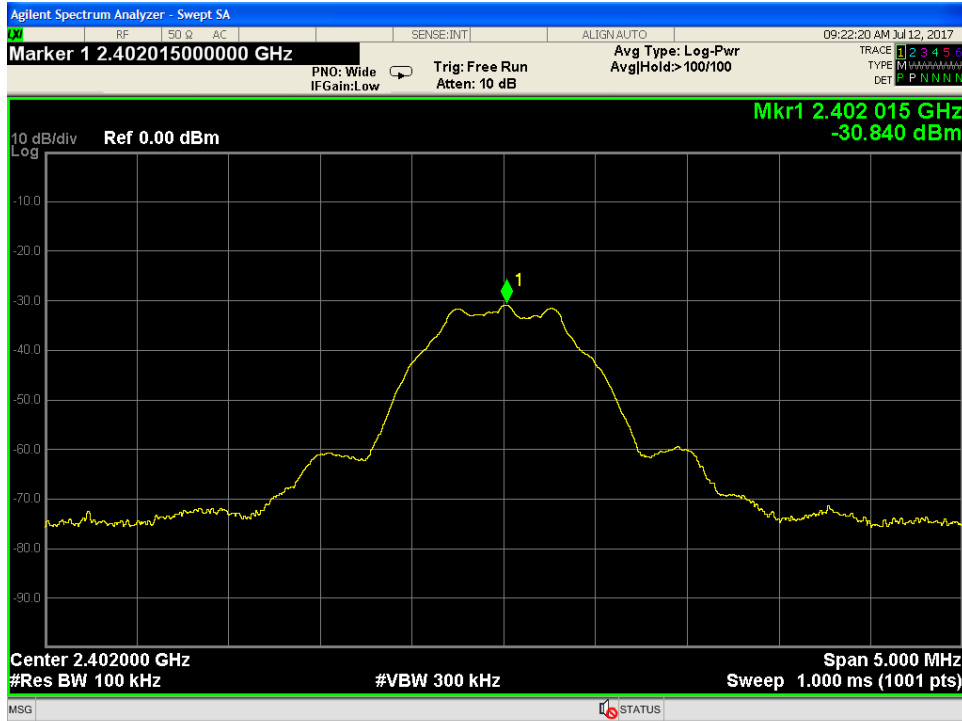
PLOTS



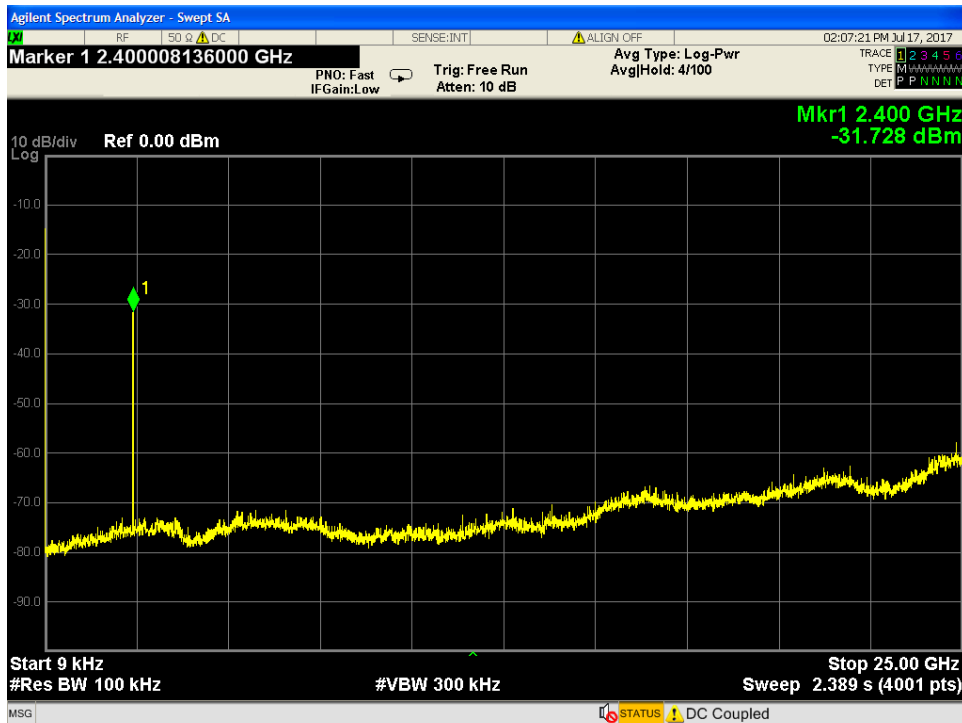
Conducted Low Band Edge – TX on Low Channel



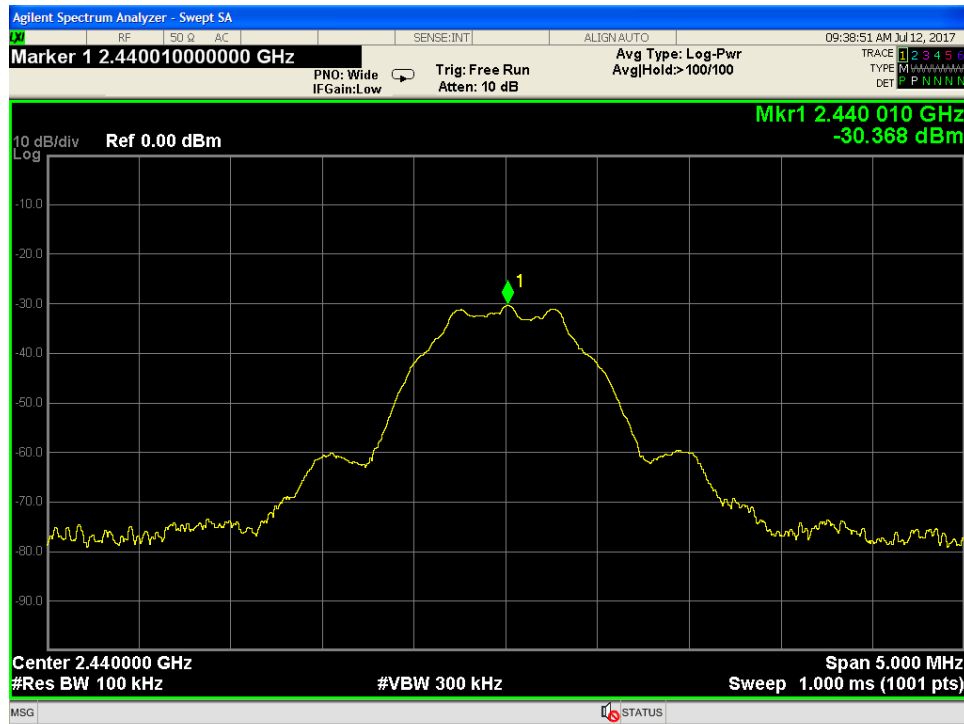
Conducted High Band Edge – TX on High Channel



Low Channel 9 KHz - 25GHz Conducted Spurious Reference



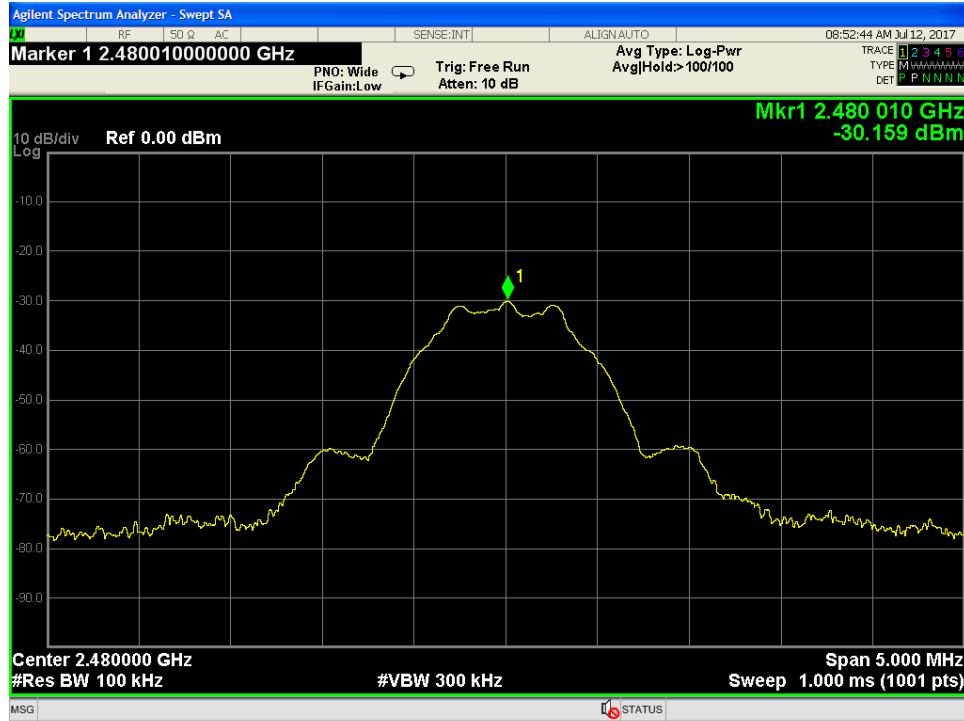
Low Channel 9 KHz -25GHz Conducted Spurious



Middle Channel 9 KHz-25GHz Conducted Spurious Reference



Middle Channel 9 KHz -25GHz Conducted Spurious



High Channel 9 KHz -25GHz Conducted Spurious Reference



High Channel 9 KHz -25GHz Conducted Spurious

Power Spectral Density

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

MEASUREMENTS / RESULTS

Peak Power Spectral Density							
Date: 7/12/2017		Company: Onset Computer Corporation			Work Order: R2107		
Engineer: Zac Johnson		EUT: MX2201/2		Operating Voltage/Frequency: 3V Battery			
Temp: 23.7°C		Humidity: 52%		Pressure: 1007mBar			
Frequency Range: 2402-2480 MHz				Measurement Type: Conducted			
Notes:							
Frequency (MHz)	Peak Reading (dBm)	Cable Loss (dB)	Attenuator Loss (dB)	Peak PSD (dBm)	Limit (dBm)	Margin (dB)	Result
2402	-46.32	0.32	30	-16.00	8.0	-24.00	Pass
2440	-45.81	0.32	30	-15.49	8.0	-23.49	Pass
2480	-45.71	0.32	30	-15.39	8.0	-23.39	Pass
Test Site: EMC-5		Cable: 2288 cbl		Attenuator: 2121 Pad			
Analyzer: 1118470 SA							
PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dBm)							

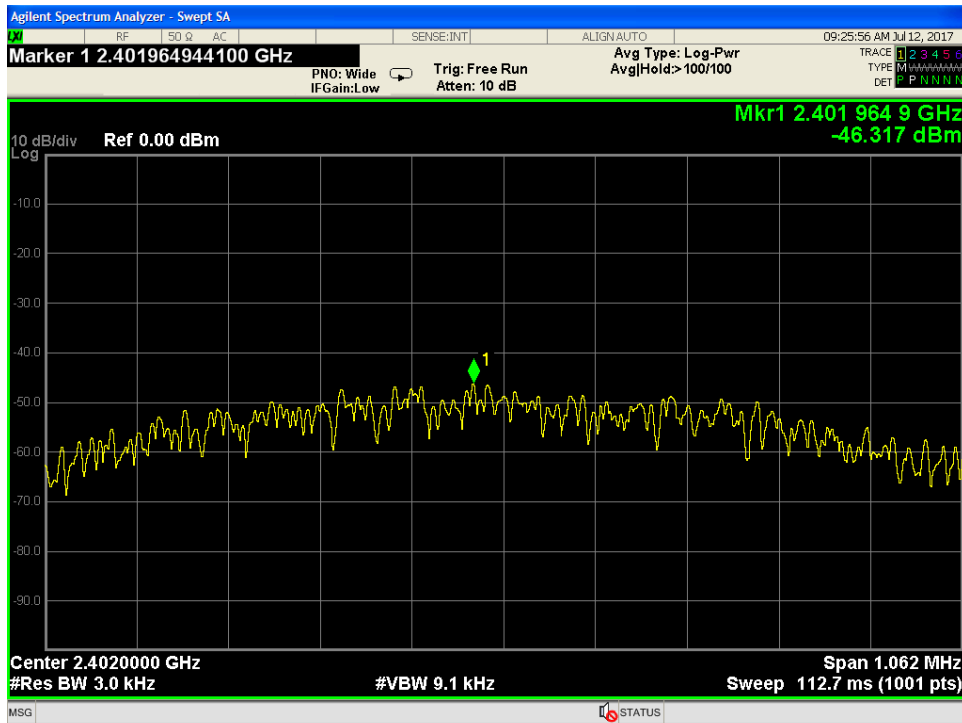
Rev. 7/26/2017

Equipment	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Spectrum Analyzers / Receivers / Preselectors Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps / Couplers Attenuators / Filters API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2017
Cables Asset #2288	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/27/2018	1/27/2017

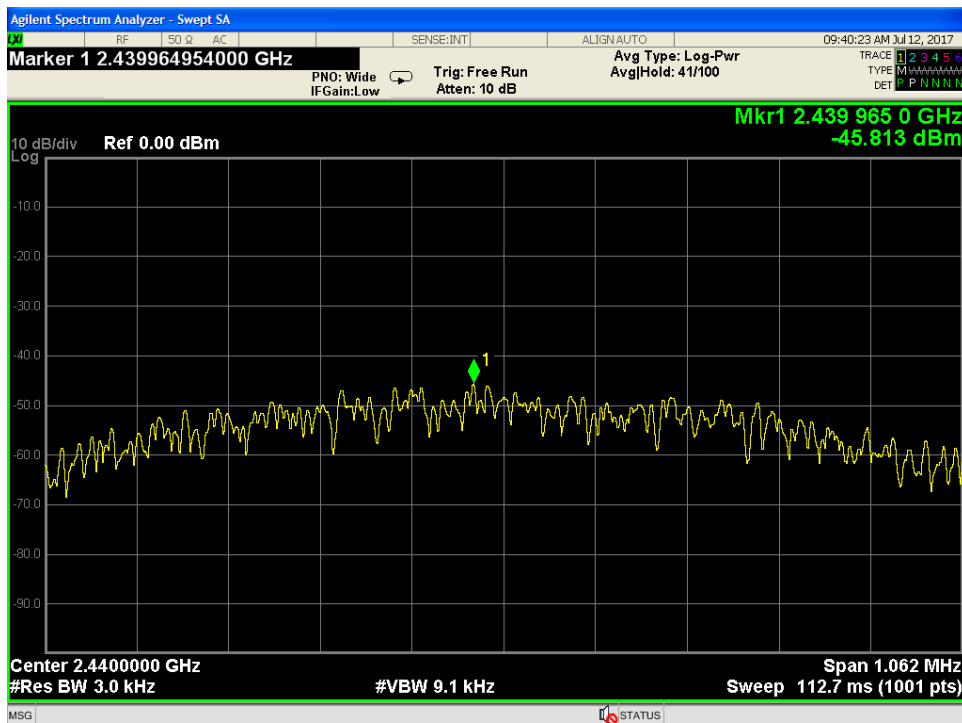
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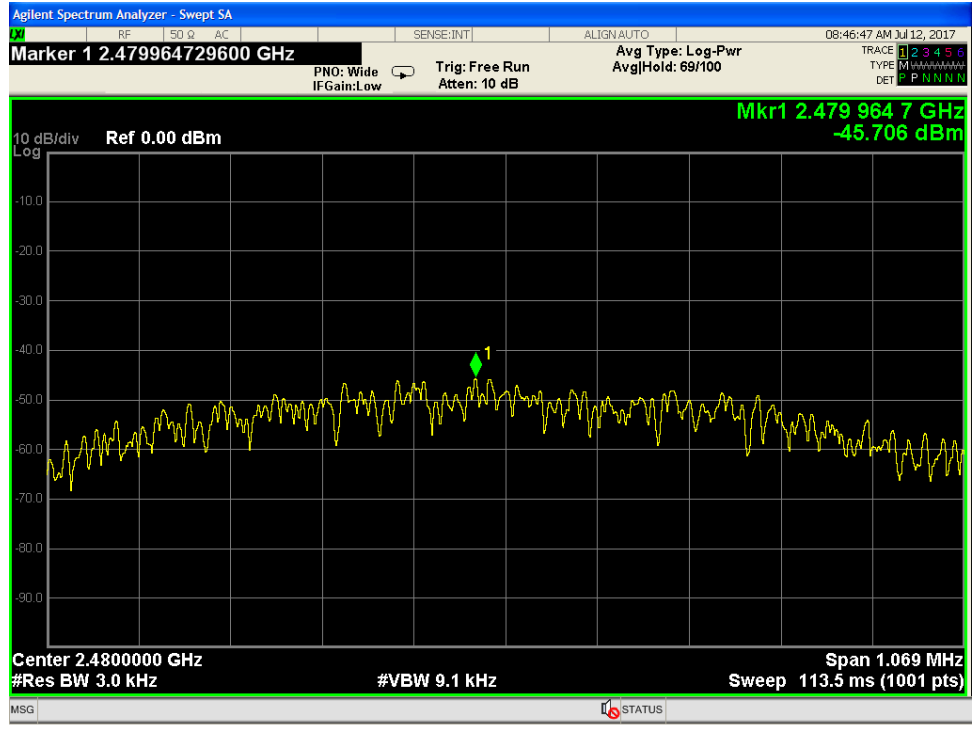
PLOTS



Low Channel Power Spectral Density



Middle Channel Power Spectral Density



High Channel Power Spectral Density

Occupied Bandwidth

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

[RSS-GEN 4.6.1]

MEASUREMENTS / RESULTS

99% Occupied Bandwidth			
Date: 7/12/2017	Company: Onset Computer Corporation	Work Order: R2107	
Engineer: Zac Johnson	EUT: MX2201/2	Operating Voltage/Frequency: 3V Battery	
Temp: 23.7°C	Humidity: 52%	Pressure: 1007mBar	
Frequency Range: 2402-2480 MHz		Measurement Type: Conducted	
Notes:			
Frequency (MHz)			99% OBW (MHz)
2402			1.0543
2440			1.0557
2480			1.0586
Test Site: EMC-5	Cable: 2288 cbl	Attenuator: 2121 Pad	
Analyzer: 1118470 SA			Copyright Curtis-Straus LLC 2000

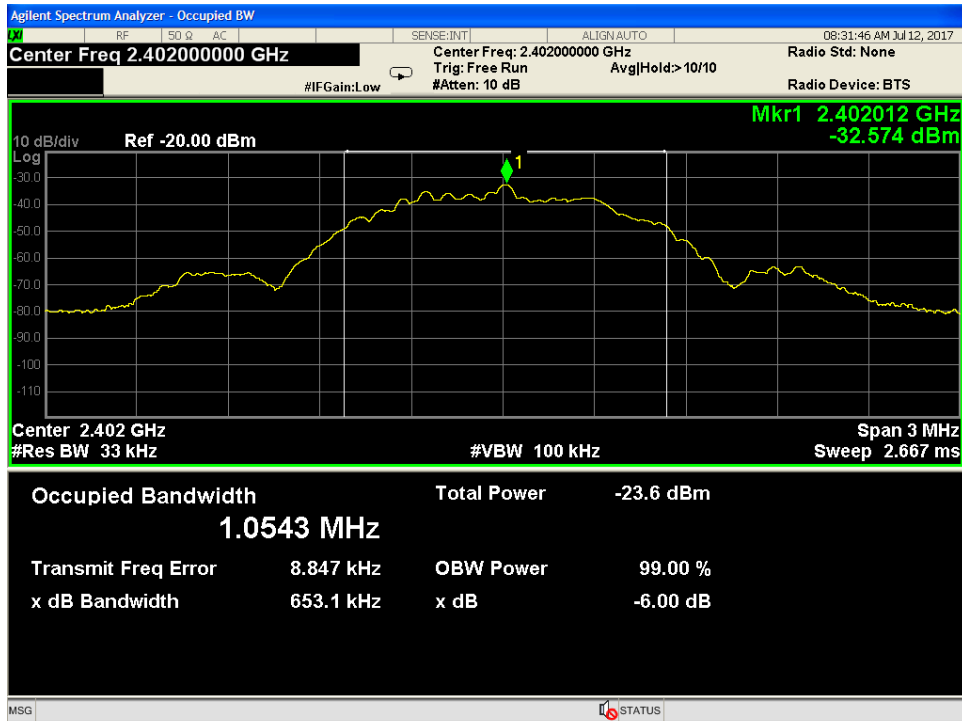
Rev. 7/26/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	7/25/2018	7/25/2017
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/22/2018	3/22/2017
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2288	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021029		II	1/27/2018	1/27/2017

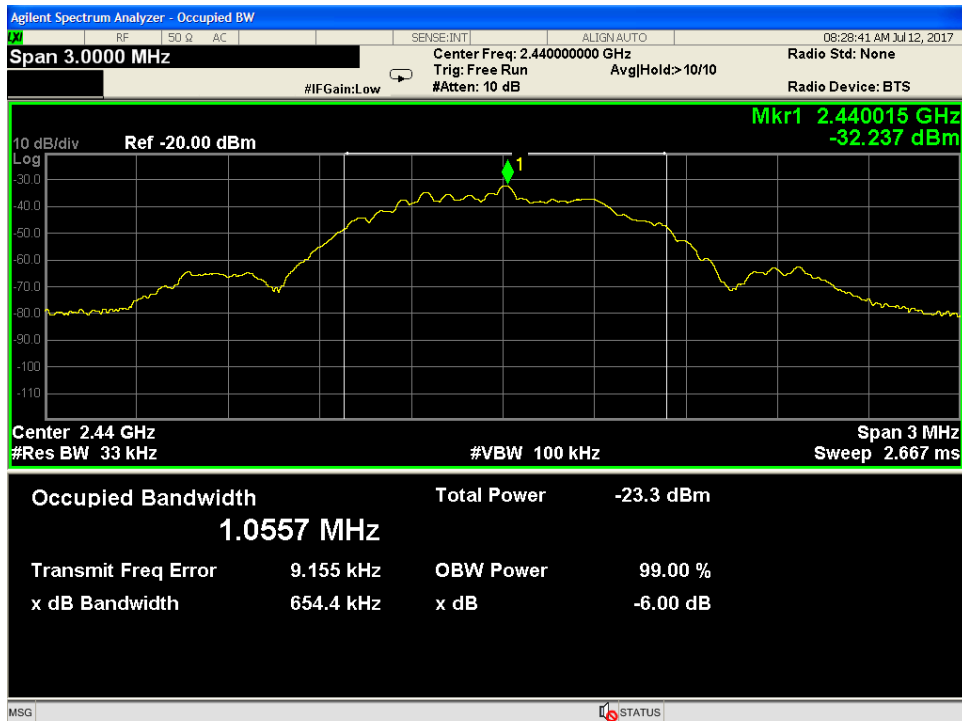
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



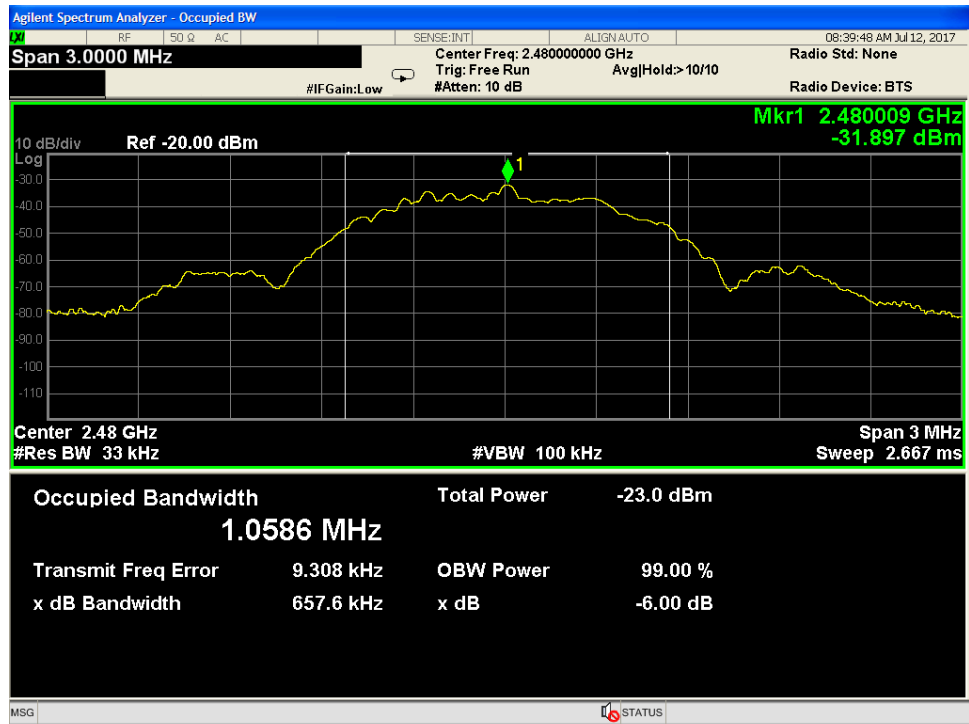
PLOTS



Occupied Bandwidth Low Channel



Occupied Bandwidth Middle Channel



Occupied Bandwidth High Channel

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	4.6dB	5.2dB (Ucisprr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucisprr)
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)	3.23×10^{-8}	1×10^{-7}
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 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.
3. 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.
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 disclaim 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 a 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 where 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. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY 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.



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 HEREUNDER.

(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 Bureau Veritas Consumer Products Services, Inc. may use to delegate the performance of work can be provided upon request.

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