Test Report

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

Report No	ES0819-1
Client	Onset Computer Corporation
Address	470 MacArthur Blvd. Bourne, MA 02532
Phone	508-743-3195
Items tested	MX2501
FCC ID	WXF-ONST7
IC	7936A-ONST7
FRN	0009380064
Equipment Type	Digital Transmission System
Equipment Code	DTS
Emission Designator	1M07F1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	Apr 9,18 and 19, 2018
Results	As detailed within this report
Prepared by	Zachary Johnson – Test Engineer
Authorized by	Yunus Faziloglu – Sr. EMC Engineer
Issue Date	6/1/2018
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 27 of this report.

Contents

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

MX2501 is a Bluetooth Low Energy transmitter operating in the 2402 MHz to 2480 MHz frequency range.

Antenna Type: PCB Mounted Chip

Gain: 1.3dBi Peak

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

Test samples were received in good condition.

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 4, FCC KDB 558074 D01 DTS Measurement Guidance v04 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. Three channels were tested as follows:

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

EUT operating voltage is 1.5VDC from a single AA battery.

The following bandwidths were used during radiated spurious emissions testing.

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

Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	S0819		
Company:	Onset Computer Corporation		
Company Address:	470 MacArthur Blvd.		
	Bourne, MA, 02532		
Contact:	Jim Corrigan		
	MN	**PN**	**SN**
EUT:	MX2501	WXF	20350299
EUT Description:	pH meter with Bluetooth		
EUT Max Frequency:	2480 MHz		
EUT Min Frequency:	0.032768 MHz		
Support Equipment	**MN**	**SN**	
Apple iPad			
Software Operating Mode Description:			
EUT continuously logs pH of solution in a sample vial and communicates to support tablet/computer via Bluetooth.			
Performance Criteria:			
EUT continuously logs pH of solution in a sample vial. The reading must remain within 0.1pH of the reference solution, which is 4.0pH.			

Clock Frequencies

Clock Frequencies	
frequencies (MHz)	2480, 32, 0.032768

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
6.3			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.
	3.2		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, 6.5			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	The antenna for this device is a permanently installed PCB mounted chip antenna with 1.3dBi peak 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 1.5VDC from battery.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.6				Occupied Bandwidth measurements were made.

Modifications Required for Compliance

No modifications required for compliance

Test Results

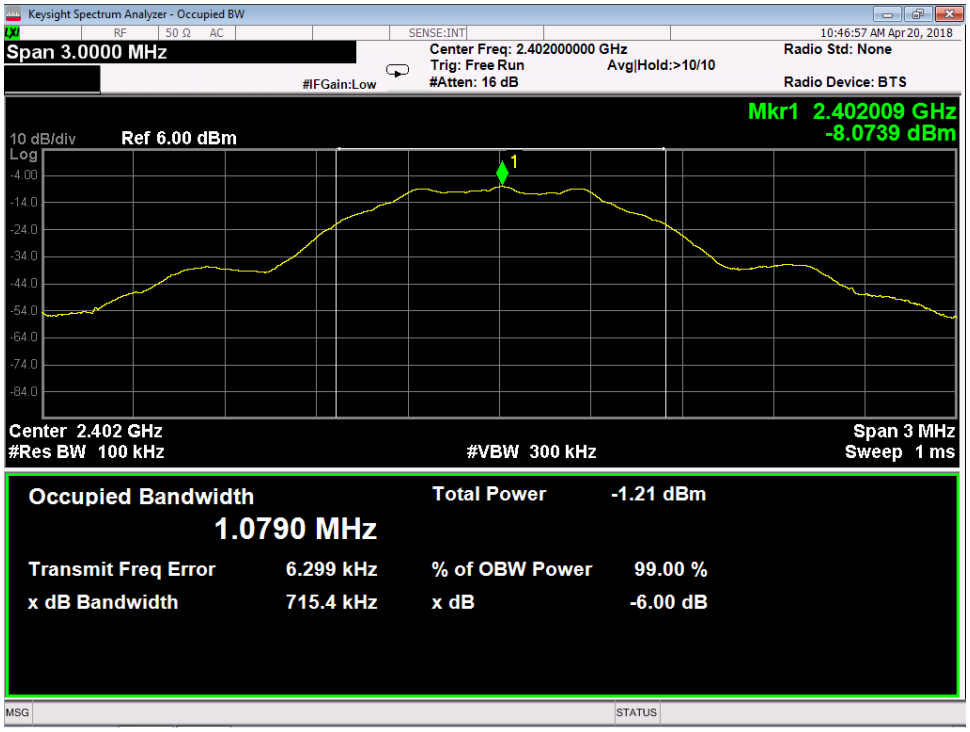
Bandwidth

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

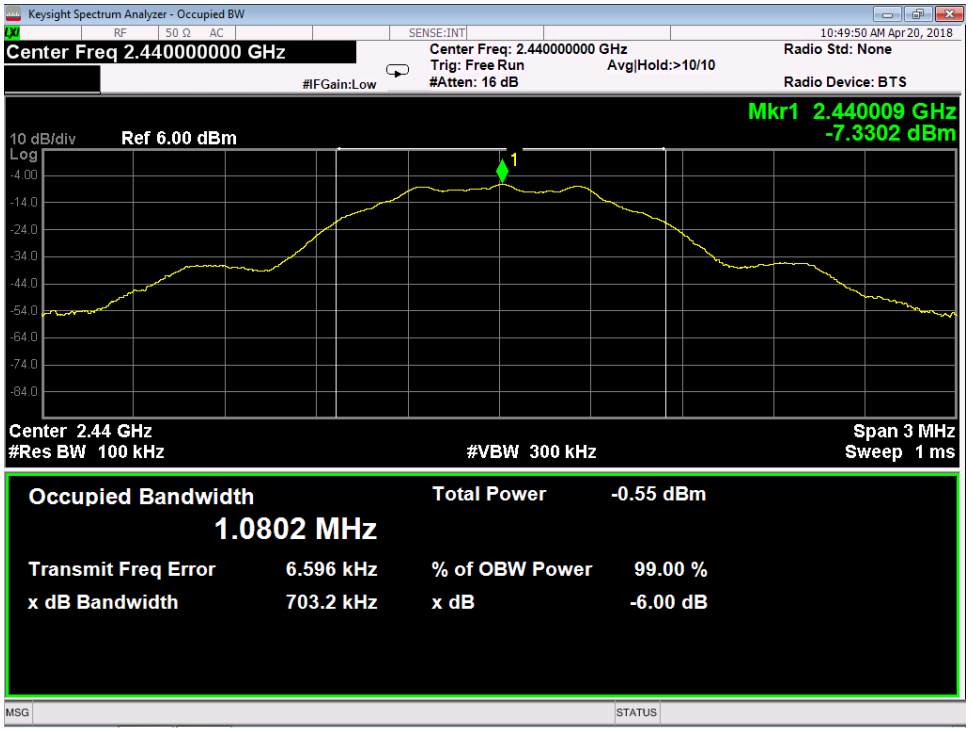
MEASUREMENTS / RESULTS

6dB Bandwidth					
Date: 4/9/2018	**Company:** Onset			**Work Order:** S0819	
Engineer: Zac Johnson	**EUT:** MX2501			**Operating Voltage/Frequency:** 1.5V DC	
Temp: 20.5°C	**Humidity:** 32%	**Pressure:** 998mBar			
Frequency Range: 2402-2480 MHz	**Measurement Type:** Conducted				
	Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V04				
Notes:					
		6dB Bandwidth			
Frequency (MHz)	Reading (kHz)	Limit (kHz)	Margin (kHz)	Result (Pass/Fail)	
2402	715.4	≥500	215	Pass	
2440	703.2	≥500	203	Pass	
2480	699.0	≥500	199	Pass	
Test Site: CEMI-1	**Cable:** 2288 Cbl	**Attenuator:** None			
Analyzer: 1118473 SA					

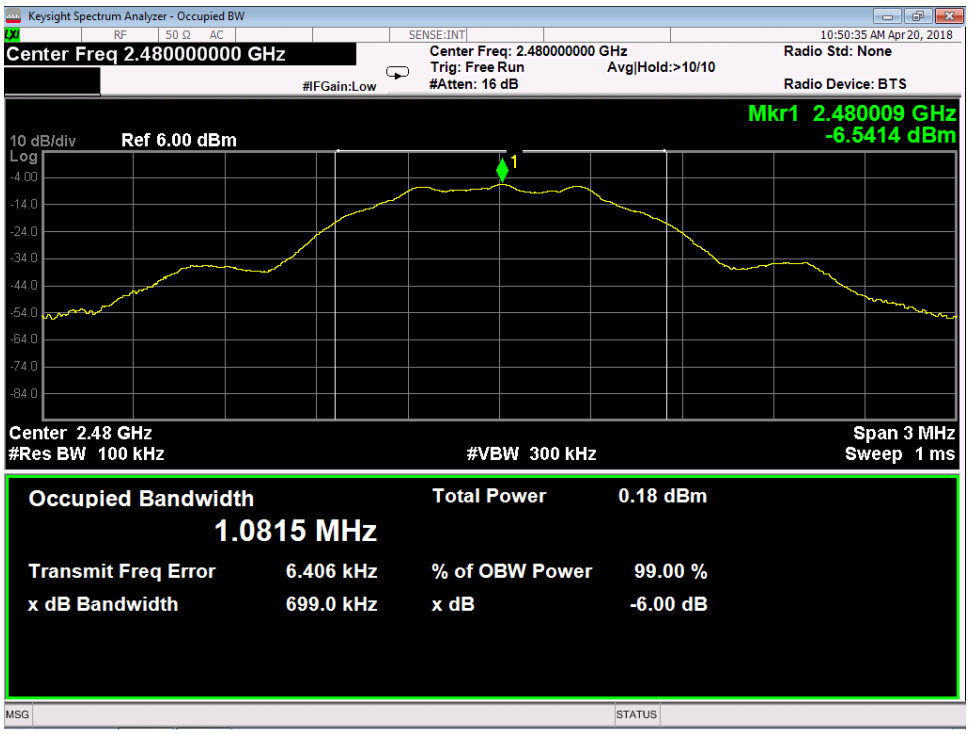
PLOTS:



6dB Bandwidth – Low Channel



6dB Bandwidth – Mid Channel



6dB Bandwidth – High Channel

Peak Output Power

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

MEASUREMENTS / RESULTS

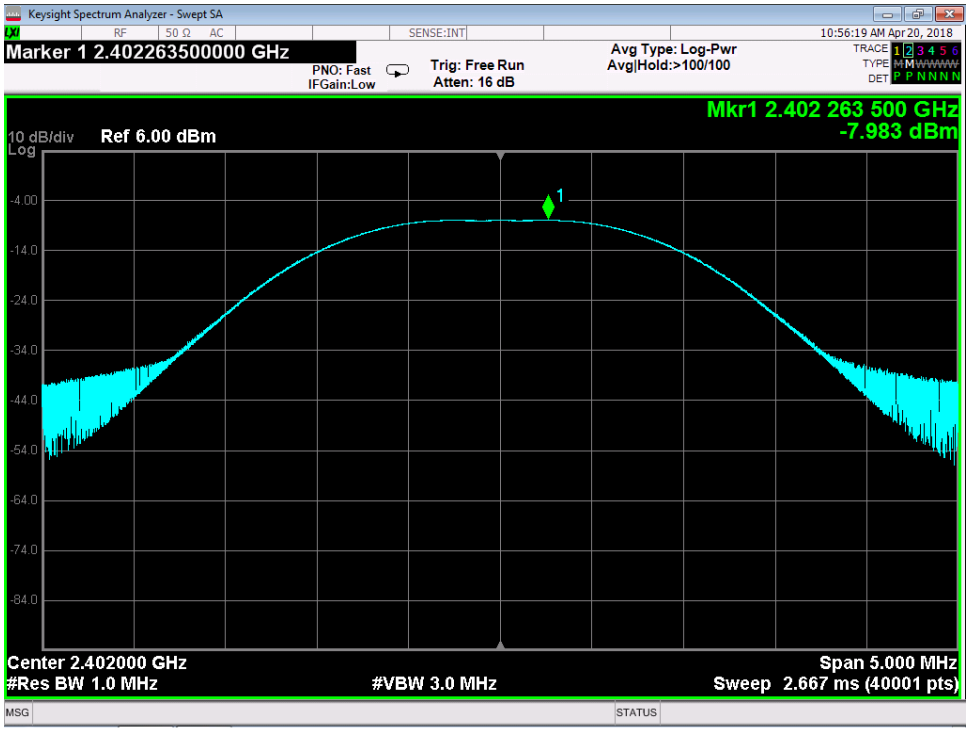
Peak Output Power

Date: 4/9/2018 **Company:** Onset **Work Order:** S0819
Engineer: Zac Johnson **EUT:** MX2501 **Operating Voltage/Frequency:** 1.5V DC
Temp: 20.5°C **Humidity:** 32% **Pressure:** 998mBar
Frequency Range: 2402-2480 MHz **Measurement Type:** Conducted
Notes:

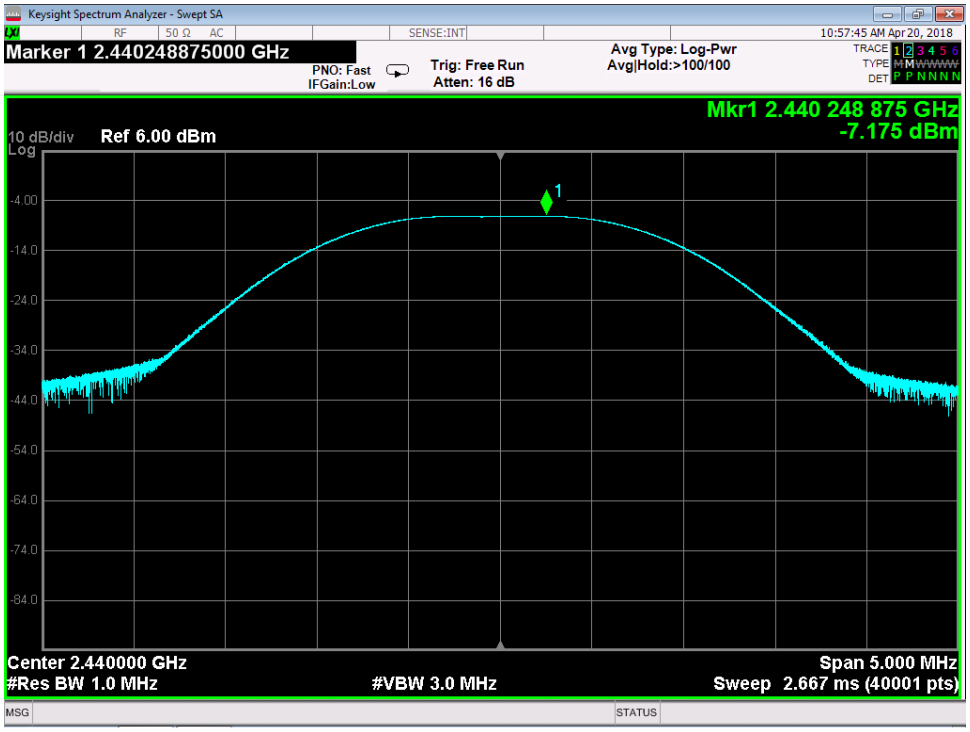
Frequency (MHz)	Peak Reading (dBm)	Cable Loss (dB)	Attenuator Loss (dB)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)
2402	-7.98	0.43	0.00	-7.55	30.0	-37.55	Pass
2440	-7.18	0.43	0.00	-6.75	30.0	-36.75	Pass
2480	-6.45	0.43	0.00	-6.02	30.0	-36.02	Pass

Test Site: CEMI-1 **Cable:** 2288 Cbl **Attenuator:** None
Analyzer: 1118473 SA
Peak Output Power (dBm)= Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)

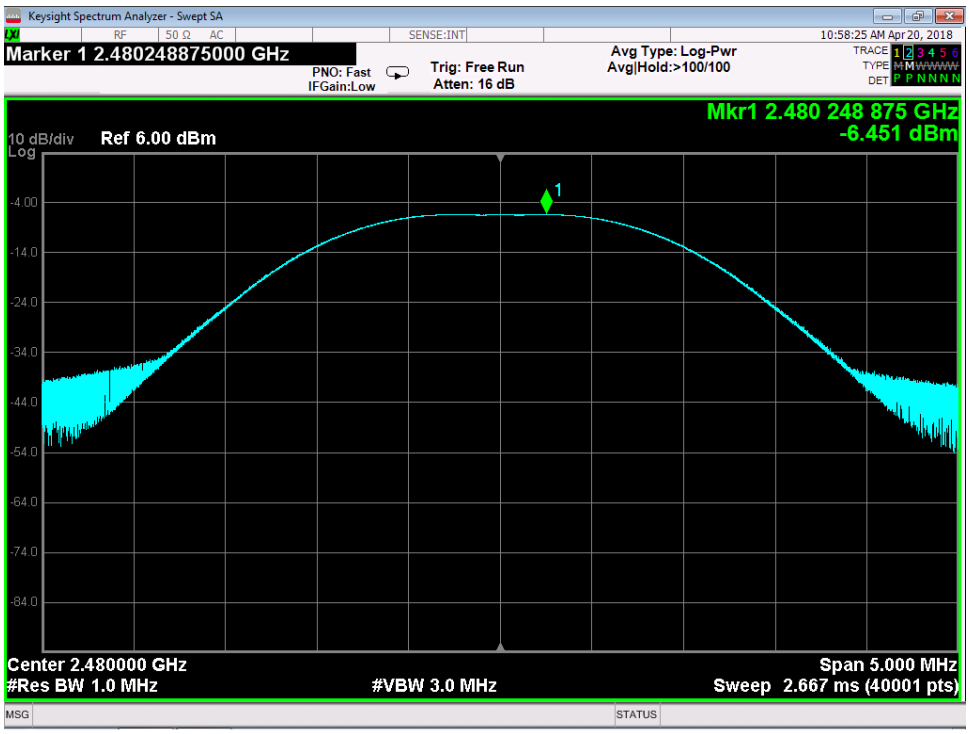
PLOTS



Peak Output Power – Low Channel



Peak Output Power – Mid Channel



Peak Output Power – High Channel

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)]

EUT was tested in worst case laying down orientation. Channels 0, 19, and 39 were tested for radiated emissions. Channels 0 and 39 were tested for band edges.

MEASUREMENTS / RESULTS

Radiated Band Edges

Date: 18-Apr-18 **Company:** Onset **Work Order:** S0819
Engineer: AKZ **EUT Operating Voltage/Frequency:** battery
Temp: 23°C **Humidity:** 23% **Pressure:** 996mbar
Frequency Range: Band Edges **Measurement Distance:** 3 m
Notes: Peak measurements compared to average limit

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	Limit	Margin	Result
Band Edges:			---	---	---	---	---	---	---
	2483.5	37.0	25.3	28.2	3.1	43.0	54	***-11.0***	***Pass***
	2400.0	37.0	25.5	28.0	3.2	42.7	54	***-11.3***	***Pass***

Test Site: EMI Chamber 1 **Cable 1:** Asset #2480 **Cable 2:** Asset #2456
Analyzer: 1168255 **Preamp:** Asset #2443 **Antenna:** Orange Horn
CSsoft Radiated Emissions Calculator v 1.017.203

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

Rev. 4/17/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1168255)	20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	8/15/2018	8/15/2017

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016

Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2443 PA	9KHz-6GHz	BBV9744	SCWARZBECK	63	2443	I	2/5/2019	2/5/2018

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	10/13/2018	10/13/2016

Meteorological Meters/Chambers		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#2084		HTC-1	HDE		2084	II	3/22/2019	3/22/2018

Cables	Range	Mfr	Cat	Calibration Due	Calibrated on
Asset #2456	9KHz-18GHz	MegaPhase	II	10/29/2018	10/29/2017
Asset #2480	9KHz-18GHz	MegaPhase	II	10/29/2018	10/29/2017

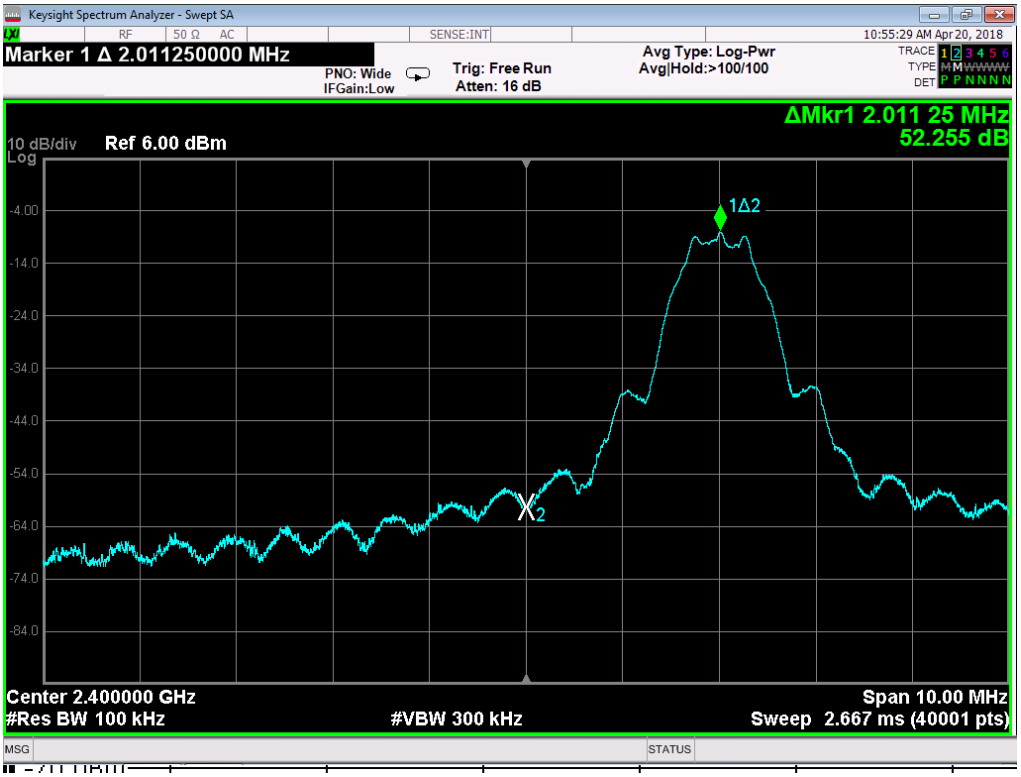
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Conducted Bandedge

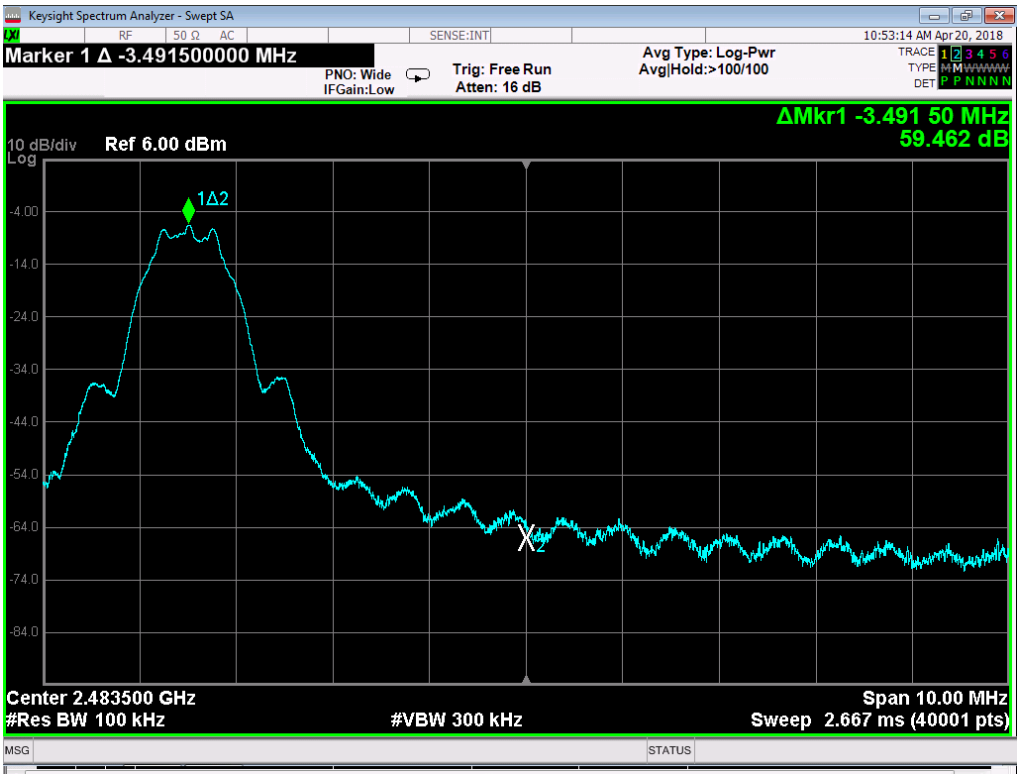
Date: 4/9/2018 **Company:** Onset **Work Order:** S0819
Engineer: Zac Johnson **EUT:** MX2501 **Operating Voltage/Frequency:** 1.5V DC
Temp: 20.5°C **Humidity:** 32% **Pressure:** 998mBar
Frequency Range: 2402-2480 MHz **Measurement Type:** Conducted
Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V04
Notes:

	Deltas to Peak (dB)	Limit (dB)	Limit (Pass/Fail)
Low Bandedge	52.255	≥ 20	Pass
High Bandedge	59.462	≥ 20	Pass

Test Site: CEMI-1 **Cable:** 2288 Cbl **Attenuator:** None
Analyzer: 1118473 SA



Conducted Band Edge - Low



Conducted Band Edge - High

Radiated Spurious Emissions

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Vertical Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 11:13:18 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
104.472	26	-10.7	15.3	43.5	-28.2	PASS		43.5	-28.2	PASS		222	250
200.076	23.4	-9.8	13.6	43.5	-29.9	PASS		43.5	-29.9	PASS		175	155
701.774	26.4	-0.6	25.9	46	-20.1	PASS	-20.1	46	-20.1	PASS	-20.1	216	160
702.694	23.6	-0.6	23.1	46	-22.9	PASS		46	-22.9	PASS		175	204
843.138	22.4	1.6	24	46	-22	PASS		46	-22	PASS		175	144
937.441	22.2	3	25.3	46	-20.7	PASS		46	-20.7	PASS		105	155

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 11:13:18 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
104.489	26.2	-10.7	15.5	43.5	-28	PASS		43.5	-28	PASS		101	227
184.123	28.8	-11.2	17.5	43.5	-26	PASS		43.5	-26	PASS		158	295
199.401	23.3	-9.8	13.5	43.5	-30	PASS		43.5	-30	PASS		265	160
700.241	22.9	-0.5	22.3	46	-23.7	PASS		46	-23.7	PASS		235	20
700.264	22.9	-0.5	22.4	46	-23.6	PASS		46	-23.6	PASS		262	247
834.054	22.4	1.6	24	46	-22	PASS	-22	46	-22	PASS	-22	199	79

30-1000MHz Low Channel

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

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 03:06:32 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
820.232	27	1.2	28.3	46	-17.7	PASS	-17.7	46	-17.8	PASS	-17.8	373	148

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: AKZ
Notes:

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 03:06:32 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
819.367	30.9	1.2	32.1	46	-13.9	PASS	-13.9	46	-13.9	PASS	-13.9	257	360

30-1000MHz Mid Channel

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

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23deg.C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 04:39:29 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
820.931	22.8	1.3	24.1	46	-21.9	PASS	-21.9	46	-22	PASS	-22	270	340

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
30-1000MHz Horizontal Data
Operator: AKZ
Notes:

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23deg.C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 04:39:29 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_209 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Lim2: FCC_pt15_109_Class_B (dBµV/m)	Margin to Lim2 (dB)	Test Results Lim2 (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
701.646	23.1	-0.6	22.4	46	-23.6	PASS		46	-23.6	PASS		229	197
821.31	22.8	1.3	24	46	-22	PASS	-22	46	-22	PASS	-22	382	247

30-1000MHz High Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Vertical Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 06:46:42 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109 _ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109 _ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
4804.2	39.6	36.6	12.2	51.9	74	-22.1	PASS	-22.1	48.8	54	-5.2	PASS	-5.2	181	41
5262.4	34.9	25.1	13.2	48.1	74	-25.9	PASS		38.2	54	-15.7	PASS		115	252
5276.5	33.1	25.1	13.3	46.4	74	-27.6	PASS		38.4	54	-15.6	PASS		197	125
5288	32.7	25.6	13.4	46.1	74	-27.9	PASS		39	54	-15	PASS		217	138
5441.7	33.4	25	14.1	47.5	74	-26.5	PASS		39.2	54	-14.8	PASS		225	283
5770.4	33.6	25.1	14.4	48	74	-26	PASS		39.5	54	-14.5	PASS		125	135

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 06:46:42 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109 _ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109 _ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1669.3	37.1	29.6	5.7	42.8	74	-31.2	PASS		35.2	54	-18.7	PASS		275	331
1865.4	36.9	30.1	8.2	45.1	74	-28.9	PASS		38.3	54	-15.7	PASS		175	189
2162.6	33.4	25.1	11.5	44.9	74	-29.1	PASS		36.6	54	-17.4	PASS		101	277
2905.1	34.1	24.7	12.6	46.8	74	-27.2	PASS		37.3	54	-16.7	PASS		108	204
4803.9	40.9	37	12.2	53.1	74	-20.9	PASS	-20.9	49.2	54	-4.8	PASS	-4.8	117	314
5264.1	33	24.7	13.2	46.2	74	-27.8	PASS		37.9	54	-16.1	PASS		281	46

1-6GHz Low Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 1-6GHz
Operator: AKZ
Notes:

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 11:43:04 AM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1713.13	36.1	3.7	39.9	74	-34.1	PASS		54	-14.1	PASS		200	14
2130	33.3	8.1	41.4	74	-32.6	PASS		54	-12.6	PASS		300	180
4880	37.2	11.7	48.9	74	-25.1	PASS		54	-5.1	PASS		200	55
5267.25	35.7	12.6	48.4	74	-25.6	PASS		54	-5.6	PASS		300	141
5739.13	38.6	12.8	51.5	74	-22.5	PASS	-22.5	54	-2.5	PASS	-2.5	300	161
5761.38	36.4	12.8	49.2	74	-24.8	PASS		54	-4.8	PASS		200	315

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: AKZ
Notes:
0

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 11:43:04 AM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2152.6	33.5	25.1	8.1	41.6	74	-32.4	PASS		33.2	54	-20.8	PASS		285	154
4879.9	39	36.1	11.7	50.7	74	-23.3	PASS	-23.3	47.7	54	-6.3	PASS	-6.3	125	285
5270	32.2	24.3	12.6	44.8	74	-29.2	PASS		37	54	-17	PASS		100	276
5748	34.9	25.1	12.8	47.7	74	-26.3	PASS		37.9	54	-16.1	PASS		196	151

1-6GHz Mid Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
Top Peaks Vertical 1-6GHz
Operator: AKZ
Notes:

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 11:05:58 AM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2129.75	32.9	8.1	41	74	-33	PASS		54	-13	PASS		300	303
5749.25	38.8	12.8	51.7	74	-22.3	PASS	-22.3	54	-2.3	PASS	-2.3	200	55
5761	36.9	12.8	49.7	74	-24.3	PASS		54	-4.3	PASS		200	14

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 3m Distance
1-6GHz Horizontal Data
Operator: AKZ
Notes:

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar

EUT Maximum Frequency - 2480MHz

Data Taken at 11:05:58 AM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_209_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_209_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2140	33.9	25.1	8.1	42	74	-32	PASS		33.1	54	-20.9	PASS		125	124
4960.5	39.5	29.7	12	51.5	74	-22.5	PASS	-22.5	41.7	54	-12.3	PASS	-12.3	125	271
5579.1	34.1	24.8	12.5	46.6	74	-27.4	PASS		37.4	54	-16.6	PASS		211	296
5750	33.3	25.1	12.8	46.2	74	-27.8	PASS		37.9	54	-16.1	PASS		186	320
5772.1	33.5	24.6	12.8	46.3	74	-27.7	PASS		37.4	54	-16.6	PASS		285	204
5801.1	34.8	24.5	12.6	47.4	74	-26.6	PASS		37.1	54	-16.9	PASS		275	104

1-6GHz High Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 08:33:41 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109 _ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109 _ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7205.2	46.5	37.6	6.9	53.4	83.5	-30.1	PASS		44.5	63.5	-19	PASS		120	136
16528.2	39.7	30.9	16.5	56.2	83.5	-27.3	PASS		47.4	63.5	-16.1	PASS		200	280
17950.2	39.9	31.4	18.9	58.8	83.5	-24.7	PASS	-24.7	50.3	63.5	-13.2	PASS	-13.2	200	244

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: ZJ
Notes:
Low Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 08:33:41 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109_ ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109 _ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7206.6	46.4	34.6	6.9	53.3	83.5	-30.2	PASS		41.5	63.5	-22	PASS		125	246
17956.7	40.7	31.4	19	59.7	83.5	-23.8	PASS	-23.8	50.4	63.5	-13.1	PASS	-13.1	140	125

6-18GHz Low Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: AKZ
Notes:
0

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 09:02:25 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_ 209_Peak (dBuV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7319.8	47.7	45.2	7.9	55.6	83.5	-27.9	PASS		53.1	63.5	-10.4	PASS	-10.4	200	217
13448.9	38.9	31.3	17.5	56.4	83.5	-27.1	PASS	-27.1	48.8	63.5	-14.7	PASS		101	213

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: AKZ
Notes:
0

Work Order - S0819
EUT Power Input - battery
Test Site - CH-1
Conditions - 23°C; 23%RH; 996mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 08:52:06 PM, Wednesday, April 18, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_ 209_Peak (dBuV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7319.9	49.2	46.3	7.9	57.1	83.5	-26.4	PASS		54.2	63.5	-9.3	PASS		122	113
8864.8	40.5	31.3	9.1	49.6	83.5	-33.9	PASS		40.4	63.5	-23.1	PASS		100	103
13548.5	40.6	31.2	17.1	57.7	83.5	-25.8	PASS		48.3	63.5	-15.2	PASS		122	75
17991.7	40.1	31.6	24.9	65	83.5	-18.5	PASS	-18.5	56.5	63.5	-7	PASS	-7	200	253

6-18GHz Mid Channel

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Horizontal Data
Operator: ZJ
Notes:
High Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 09:00:54 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7440.8	48.1	36.4	6.5	54.6	83.5	-28.9	PASS		42.9	63.5	-20.6	PASS		162	238
17077.7	39.7	31.5	17.6	57.3	83.5	-26.2	PASS	-26.2	49.1	63.5	-14.4	PASS	-14.4	125	243

Curtis Straus - a Bureau Veritas Company
Radiated Emissions Electric Field 1m Distance
6-18GHz Vertical Data
Operator: ZJ
Notes:
High Channel

Work Order - S0819
EUT Power Input - 1.5V DC
Test Site - CH-2
Conditions - 20.5°C; 32%RH; 998mBar
0
EUT Maximum Frequency - 2480MHz

Data Taken at 08:54:33 PM, Thursday, April 19, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_109_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7440.8	46.6	37.8	6.5	53.2	83.5	-30.3	PASS		44.4	63.5	-19.1	PASS		135	125
17978.2	41.4	31.3	19.1	60.5	83.5	-23	PASS	-23	50.4	63.5	-13.1	PASS	-13.1	100	21

6-18GHz High Channel

Radiated Emissions Table

Date: 19-Apr-18 **Company:** Onset **Work Order:** S0819
Engineer: Zac Johnson **EUT Desc:** MX2501 **EUT Operating Voltage/Frequency:** Battery
Temp: 20.5°c **Humidity:** 32% **Pressure:** 998mBar
Frequency Range: 18-25GHz **Measurement Distance:** 0.1 m
Notes: Low, mid, and high channels tested **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 Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
H/V	No Emissions Found			---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by --- dB ***Worst Freq:*** --- MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2323 **Cable 2:** --- **Cable 3:** ---
Analyzer: Gold **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.203 Copyright Curtis-Straus LLC 2000
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

18-25GHz All Channels

Rev. 4/17/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/16/2018	11/16/2017
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
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018	12/21/2016
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2444 PA	9KHz-6GHz	BBV9744	SCWARZBECK	67	2444	I	2/5/2019	2/5/2018
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/19/2018	11/19/2017
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	2/28/2019	2/28/2017
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017
Meteorological Meters/Chambers		**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#2077		HTC-1	HDE		2077	II	3/22/2019	3/22/2018
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2458	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017
Asset #2459	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017
Asset #2466	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017

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

30MHz-18GHz

Rev. 4/17/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/19/2019	3/19/2018
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	10/16/2018	10/16/2017
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test
Meteorological Meters/Chambers		**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#2080		HTC-1	HDE		2080	II	3/22/2019	3/22/2018
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2323	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	8/19/2018	8/19/2017

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

18-25GHz

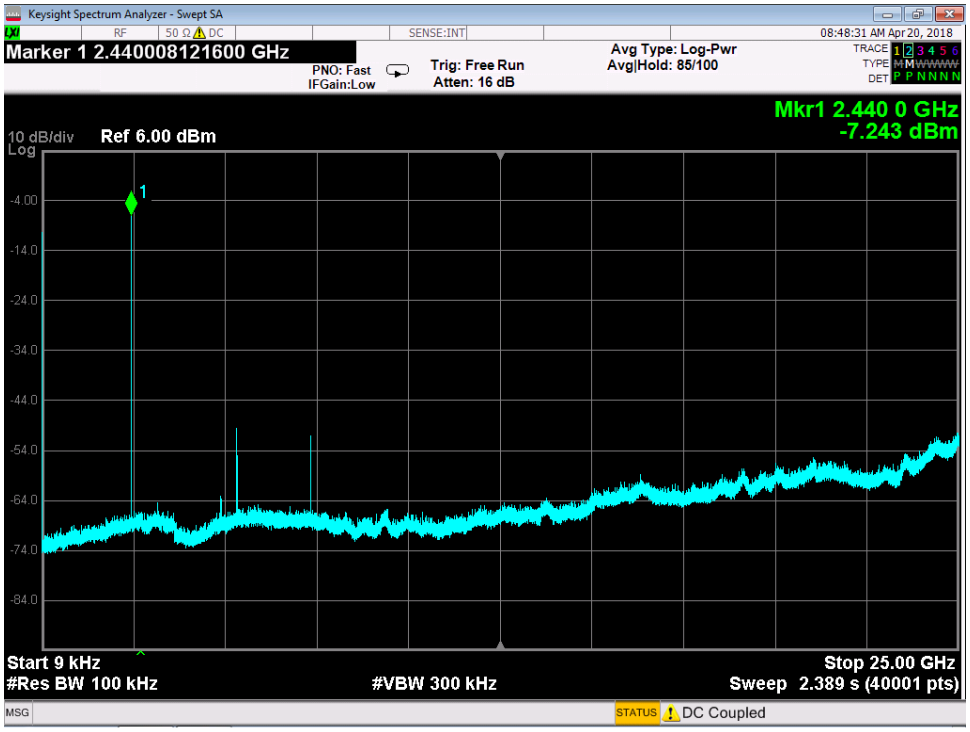
Conducted Spurious Emissions

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)]

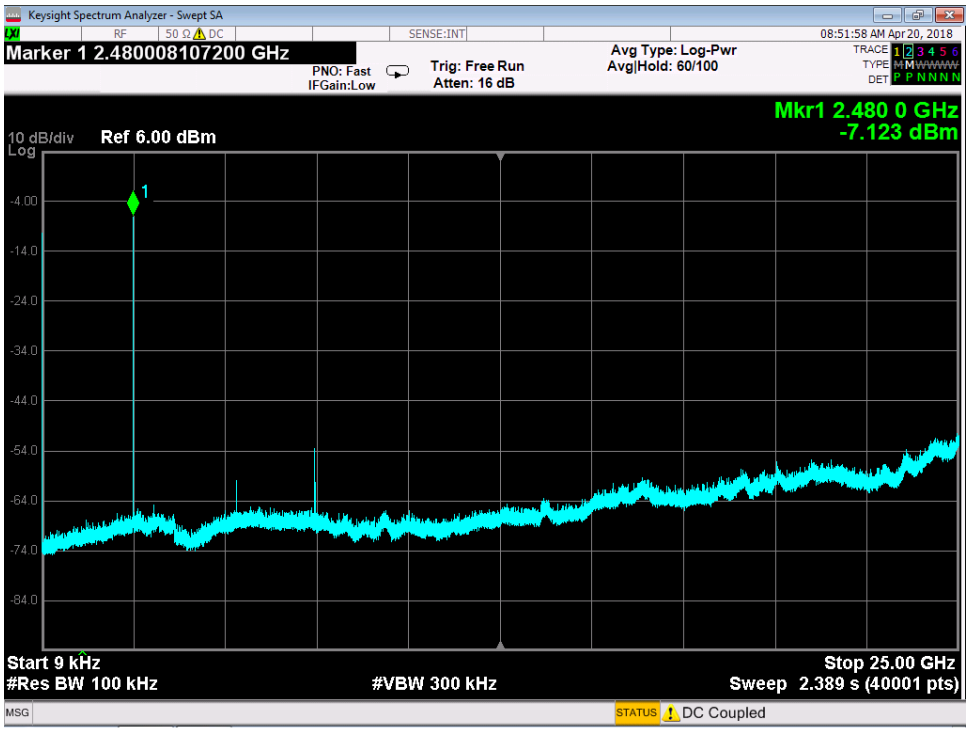
MEASUREMENTS / RESULTS

PLOTS

Conducted Spurious 9KHz to 25GHz Low Channel



Conducted Spurious 9KHz to 25GHz Mid Channel



Conducted Spurious 9KHz to 25GHz High Channel

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

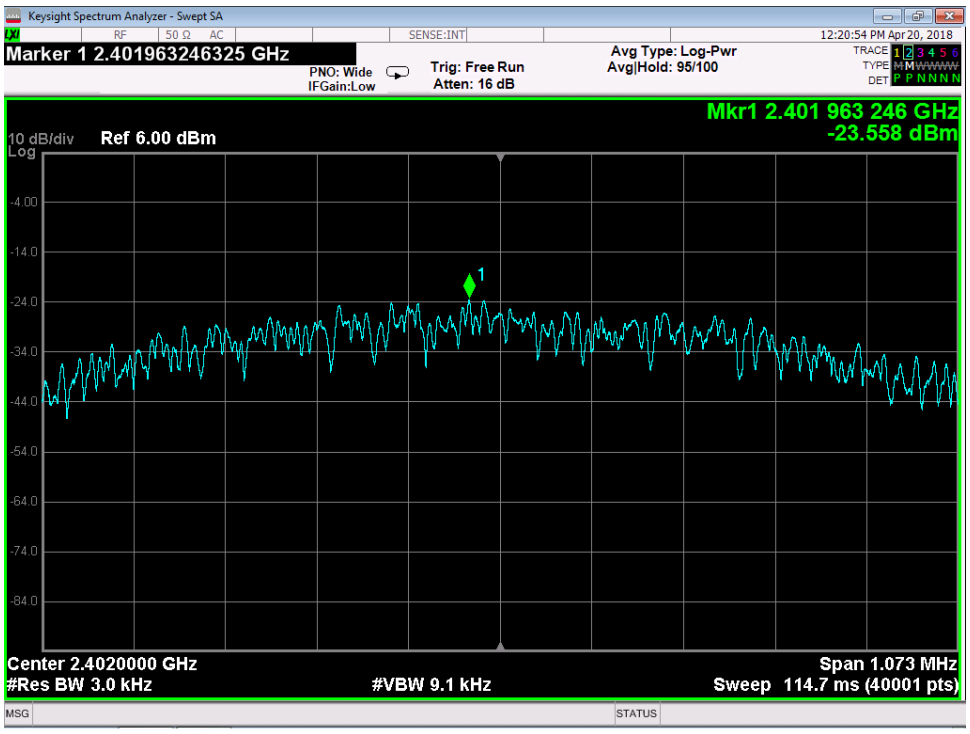
Peak Power Spectral Density

Date: 4/9/2018 **Company:** Onset **Work Order:** S0819
Engineer: Zac Johnson **EUT:** MX2501 **Operating Voltage/Frequency:** 1.5V DC
Temp: 20.5°C **Humidity:** 32% **Pressure:** 998mBar
Frequency Range: 2402-2480 MHz **Measurement Type:** Conducted
Notes:

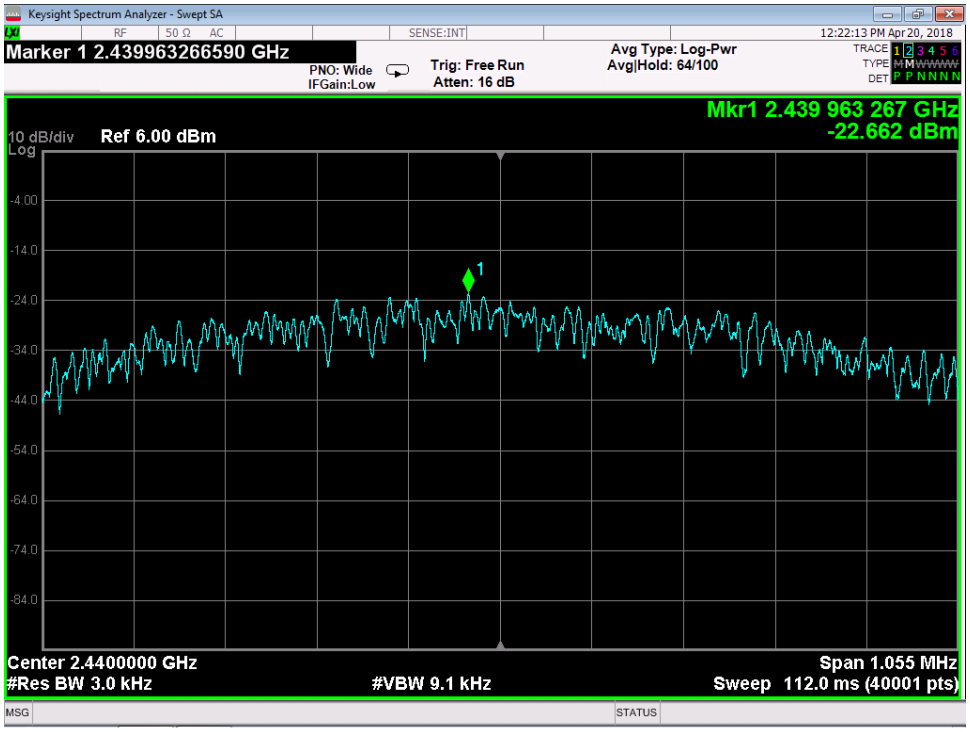
Frequency (MHz)	Peak Reading (dBm)	Cable Loss (dB)	Attenuator Loss (dB)	Peak PSD (dBm)	Limit (dBm)	Margin (dB)	Result
2402	-23.56	0.43	0	-23.13	8.0	-31.13	Pass
2440	-22.66	0.43	0	-22.23	8.0	-30.23	Pass
2480	-22.17	0.43	0	-21.74	8.0	-29.74	Pass

Test Site: CEMI-1 **Cable:** 2288 Cbl **Attenuator:** None
Analyzer: 1118473 SA
PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dBm)

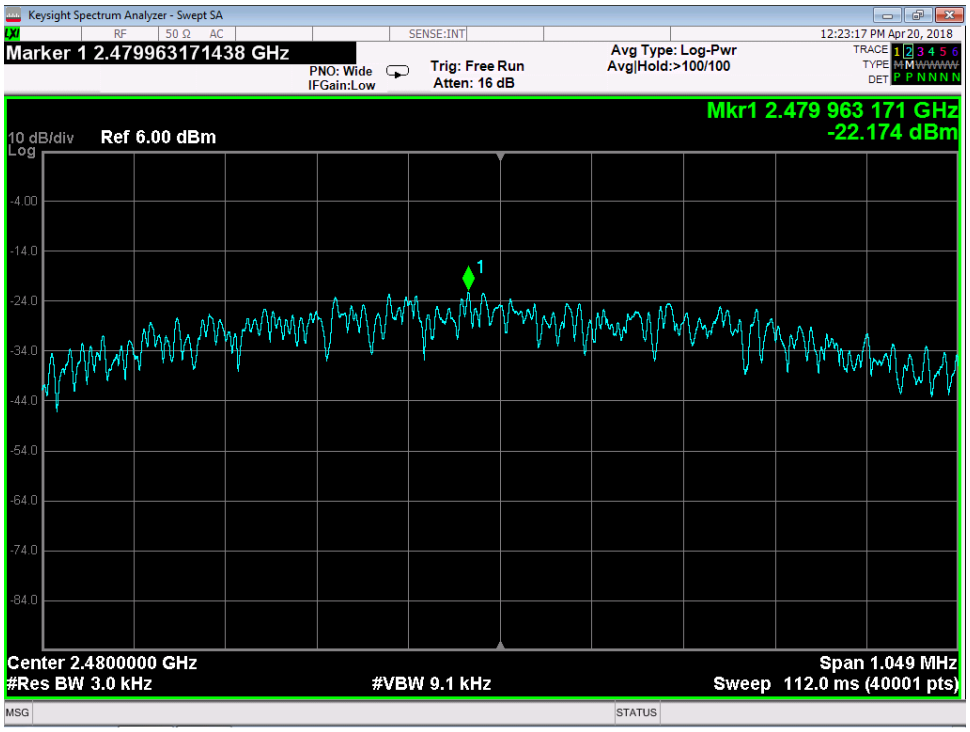
PLOTS



PSD – Low Channel



PSD – Mid Channel



PSD – High Channel

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 6.6]

MEASUREMENTS / RESULTS

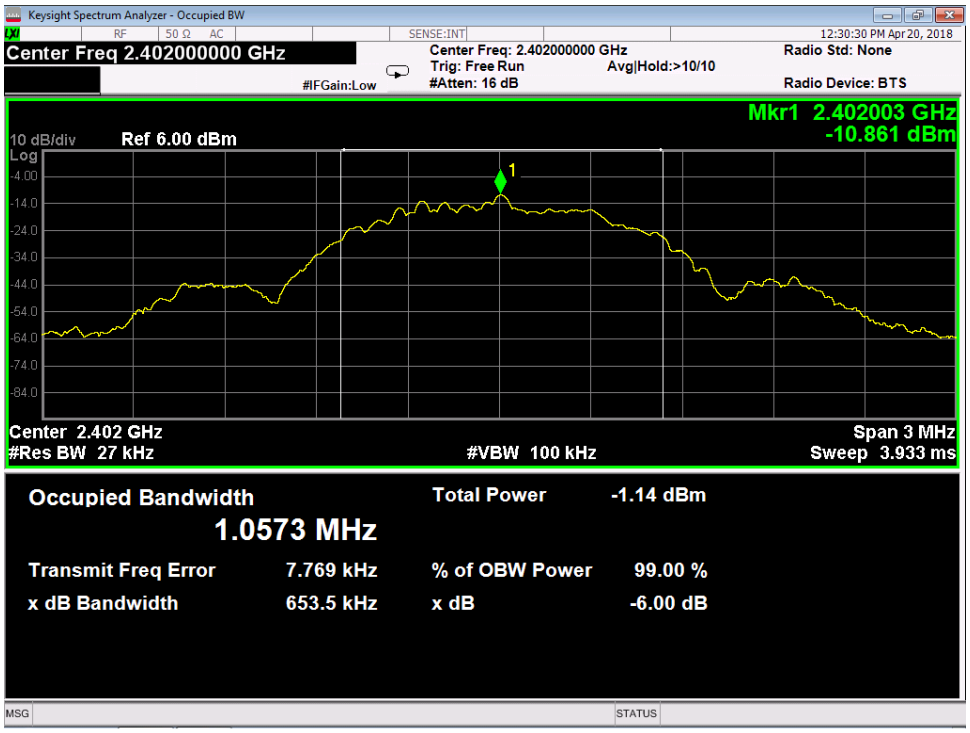
99% Occupied Bandwidth

Date: 4/9/2018	**Company:** Onset		**Work Order:** S0819
Engineer: Zac Johnson	**EUT:** MX2501		**Operating Voltage/Frequency:** 1.5V DC
Temp: 20.5°C	**Humidity:** 32%	**Pressure:** 998mBar	
Frequency Range: 2402-2480 MHz		**Measurement Type:** Conducted	
Notes:			

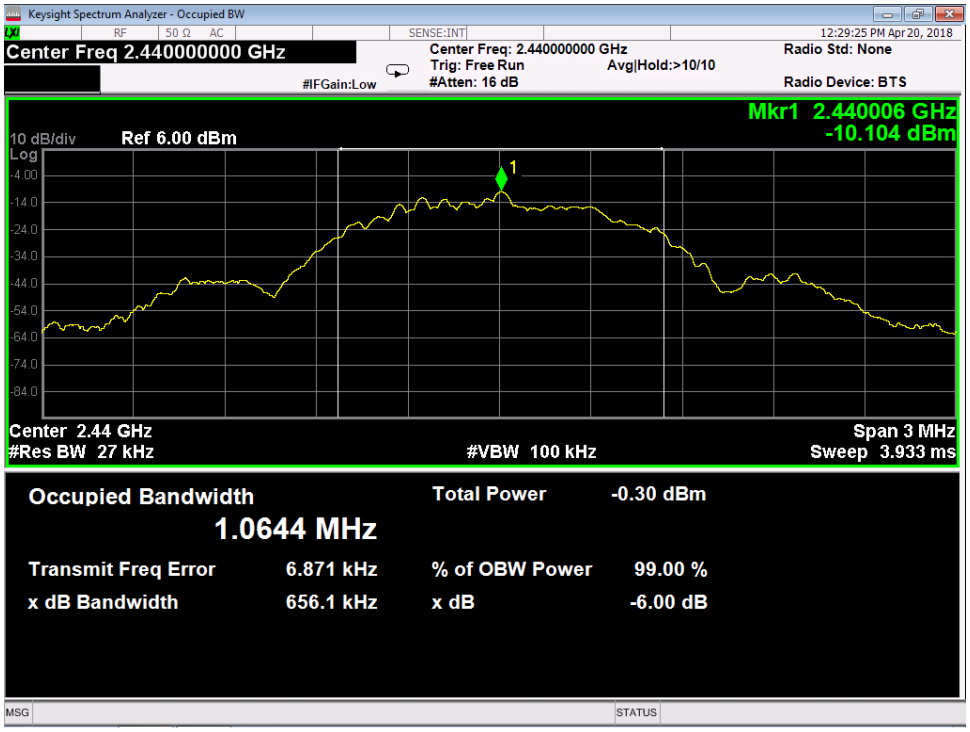
Frequency (MHz)	99% OBW (MHz)
2402	1.057
2440	1.064
2480	1.065

Test Site: CEMI-1 **Cable:** 2288 Cbl **Attenuator:** None
Analyzer: 1118473 SA

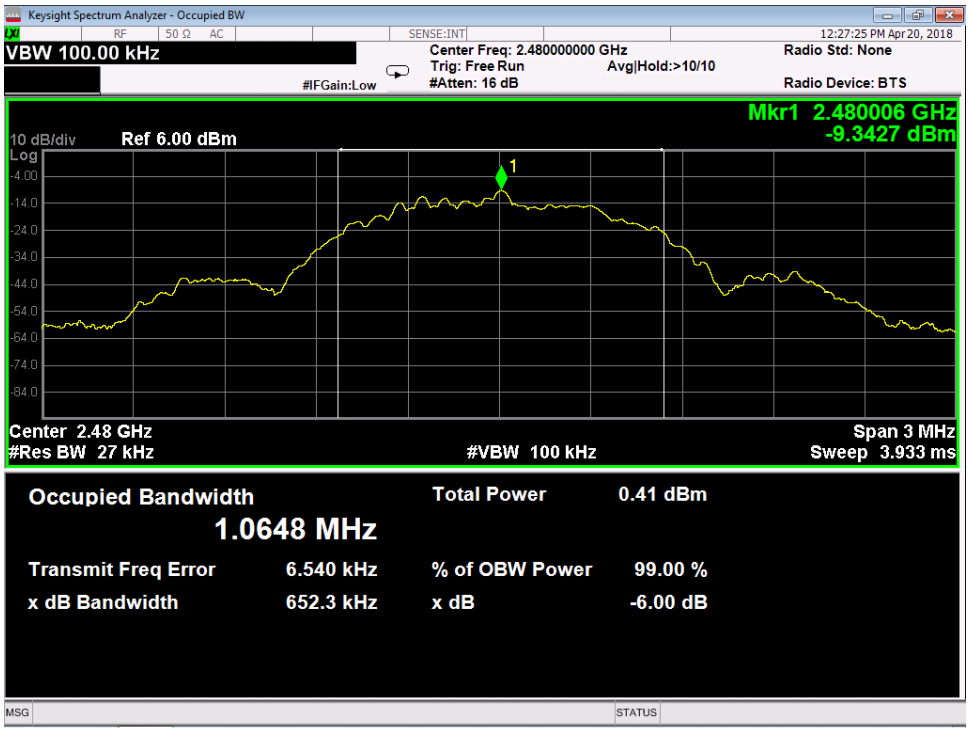
PLOTS:



99% Occupied Bandwidth Low Channel



99% Occupied Bandwidth Mid Channel



99% 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 CISPR	 5.6dB 4.6dB	 N/A 5.2dB (Ucispr)
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 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)	3.23×10^{-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 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. 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 Curtis-Straus may use to delegate the performance of work can be provided upon request.
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