





Test Report



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

Report No	ER0779-1
Client	Shooter's Touch
Address	25 Rolling Lane Weston MA 02493
Phone	781-354-3354
Items tested	Swish Hoop
FCC ID	2AQMMSHNSM01
IC ID	24124-SHNSM01
FRN	0026446617
Equipment Type	Digital Transmission System
Equipment Code	DTS
Emission Designator	1M79F1D
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	1/25/2017 -2/6/2017
Results	As detailed within this report
Prepared by	 Zachary Johnson - Test Engineer
Authorized by	 Jason Haley - Sr. EMC Engineer
Issue Date	9/13/2018
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 29 of this report.

Curtis-Straus LLC 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.



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



Contents

Contents.....	2
Summary.....	3
Test Methodology.....	4
Product Tested - Configuration Documentation.....	5
Statement of Conformity.....	6
Modifications Required for Compliance.....	6
Test Results.....	7
<i>Bandwidth</i>	7
<i>Peak Power</i>	10
<i>Band Edge Measurements (Conducted and Radiated)</i>	12
<i>Duty-Cycle Correction Factor</i>	15
Radiated Spurious Emissions.....	17
<i>Conducted Spurious Emissions</i>	22
Power Spectral Density.....	24
<i>Occupied Bandwidth</i>	26
Measurement Uncertainty.....	28
Conditions of Testing.....	29

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

The Swish Hoop operates in the 2402MHz-2480MHz frequency range and has a PCB trace antenna with 0dBi peak gain. It is powered by 3V battery only.

We found that the product met the above requirements without modification. Test sample was received in good condition.



Test Methodology

All testing was performed according to the following rules/procedures/documents;
 CFR Title 47 FCC Part 15.247, RSS-247 Issue 2, RSS-Gen Issue 5, FCC KDB 558074 D01
 DTS Measurement Guidance v03r05 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity.

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

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

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:	R0779		
Company:	Shooters Touch LLC		
Company Address:	25 Rolling Lane		
	Weston, MA, 02493		
Contact:	Steven Gordon		
	MN	PN	SN
EUT:	SHNSM01-B1		
EUT Description:	Bluetooth		
EUT Max Frequency:	16 MHz		
EUT Min Frequency:	0.032 MHz		
	MN	SN	
EUT Components			
SHNSM01			
Software Operating Mode Description:			
Used DTM software to control channels			
Performance Criteria:			
Maintains Bluetooth connection.<10% PER.			



Statement of Conformity

The Swish Hoop has been found to conform to the following parts of 47 CFR and RSS 210 as detailed below:

RSS-GEN	RSP-100	RSS 210	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 antenna.
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	EUT meets the AC Line conducted emissions requirements of this section.
			15.247	The unit complies with the requirements of 15.247
		RSS 210		The unit complies with the requirements of RSS-210
6.6				Occupied Bandwidth measurements were made.

Modifications Required for Compliance

None



Test Results

Bandwidth

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

MEASUREMENTS / RESULTS

6dB Bandwidth				
Date: 7/10/2017		Company: Shooter's Touch LLC		Work Order: R0779
Engineer: Zac Johnson		EUT: Swish Hoop		Operating Voltage/Frequency: 3V DC
Temp: 24.1°C		Humidity: 44%		Pressure: 1009mBar
Frequency Range: 2402-2480 MHz			Measurement Type: Conducted	
Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V04				
Notes:				
Frequency (MHz)	Reading (kHz)	6dB Bandwidth		
		Limit (kHz)	Margin (kHz)	Result (Pass/Fail)
2402	811.2	≥500	311	Pass
2440	790.1	≥500	290	Pass
2480	766.5	≥500	267	Pass
Test Site: EMC-3		Cable: 2286 Cbl		Attenuator: 2121 Pad
Analyzer: 1118470 SA		Copyright Curtis-Straus LLC 2000		

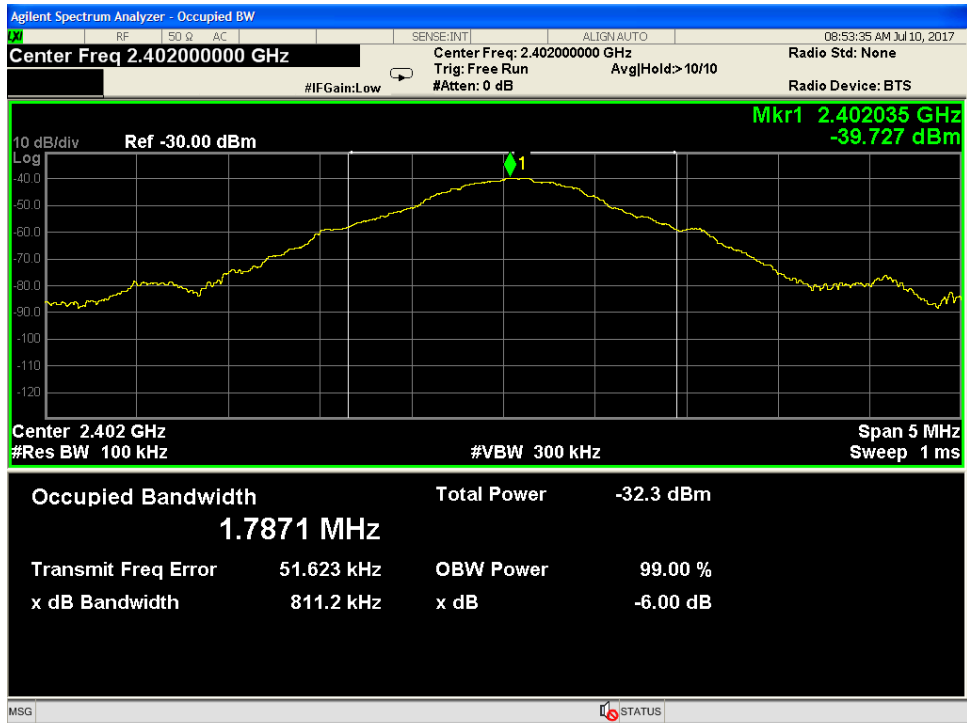
Rev. 6/24/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118470)	9KHz-26.5GHz	N9010A-526;M	AT	MY51170093	1118470	I	1/3/2018	1/3/2017
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
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#2077		HTC-1	HDE		2077	II	3/23/2018	3/23/2017
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2286	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021030		II	1/27/2018	1/27/2017

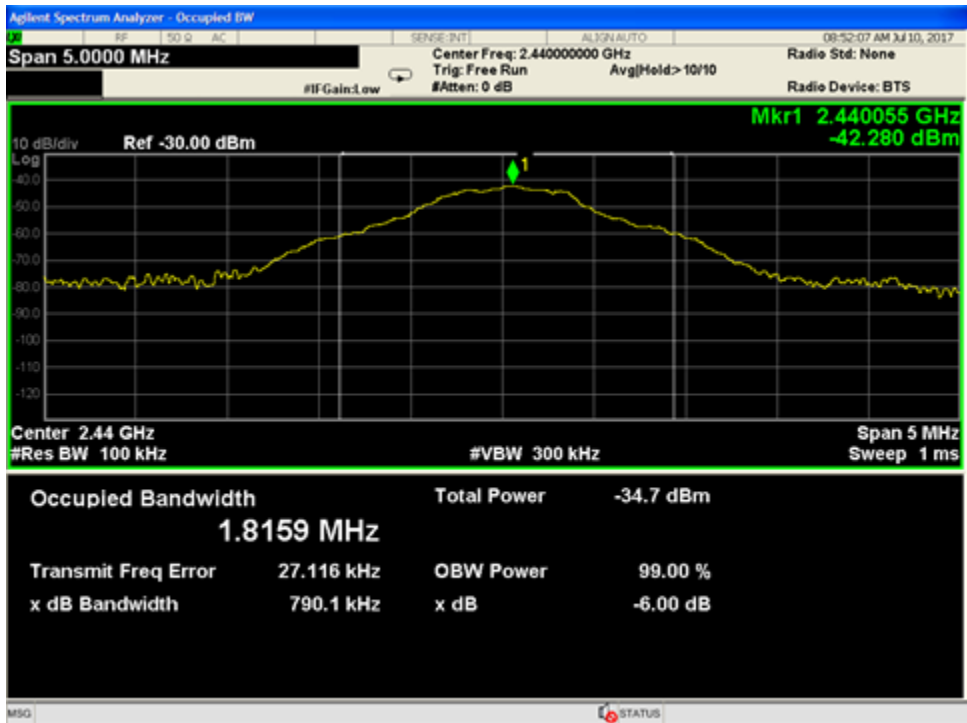
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



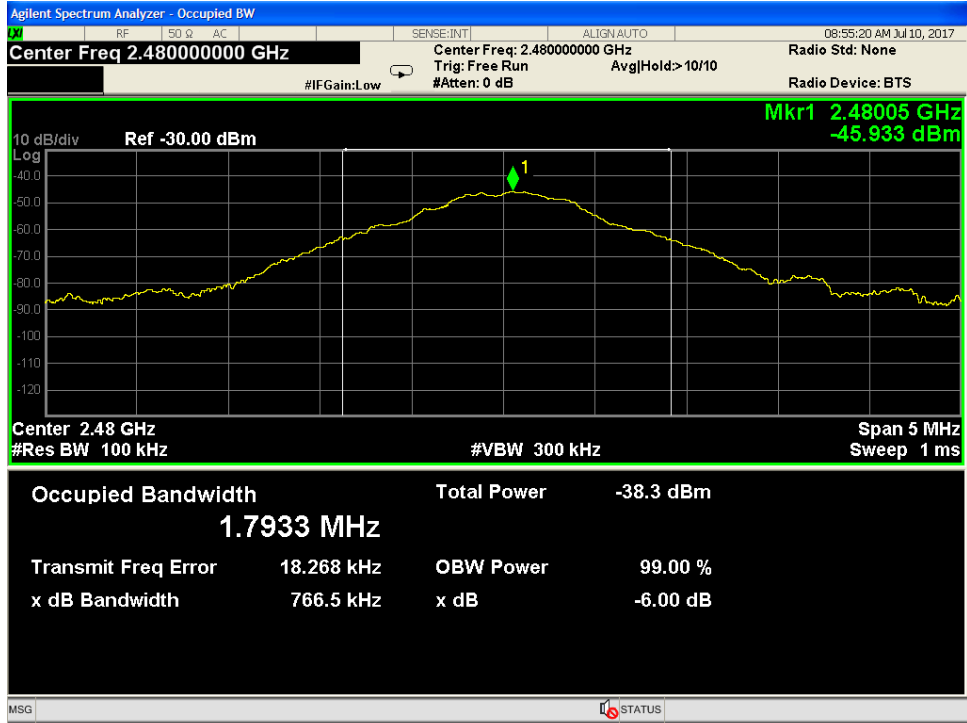
PLOTS



Low Channel Bandwidth



Middle Channel Bandwidth



High Channel Bandwidth

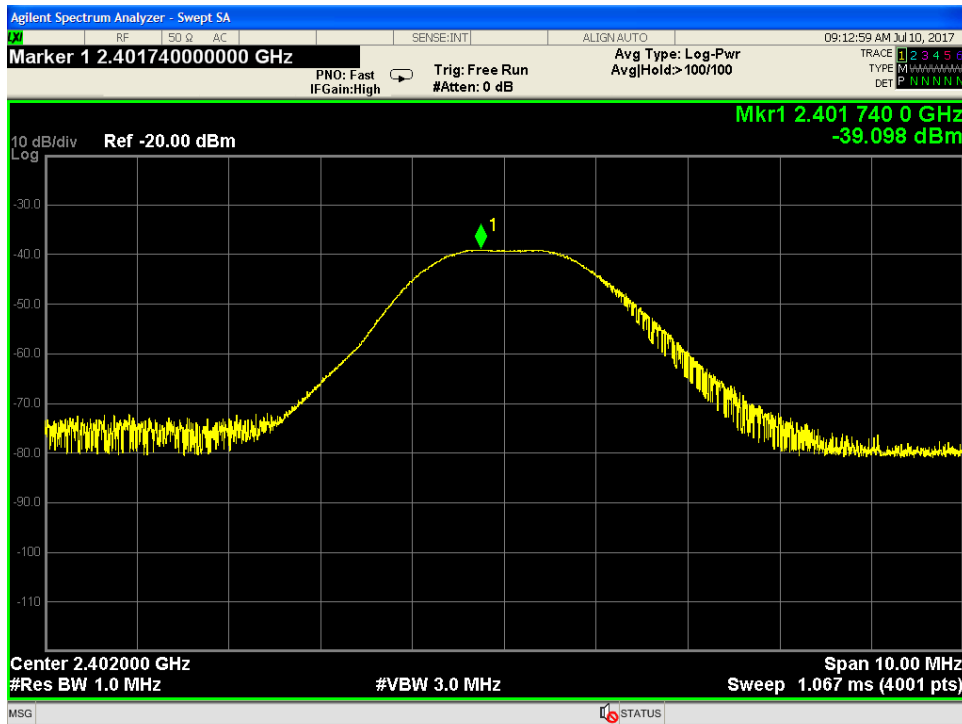
Peak Power

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

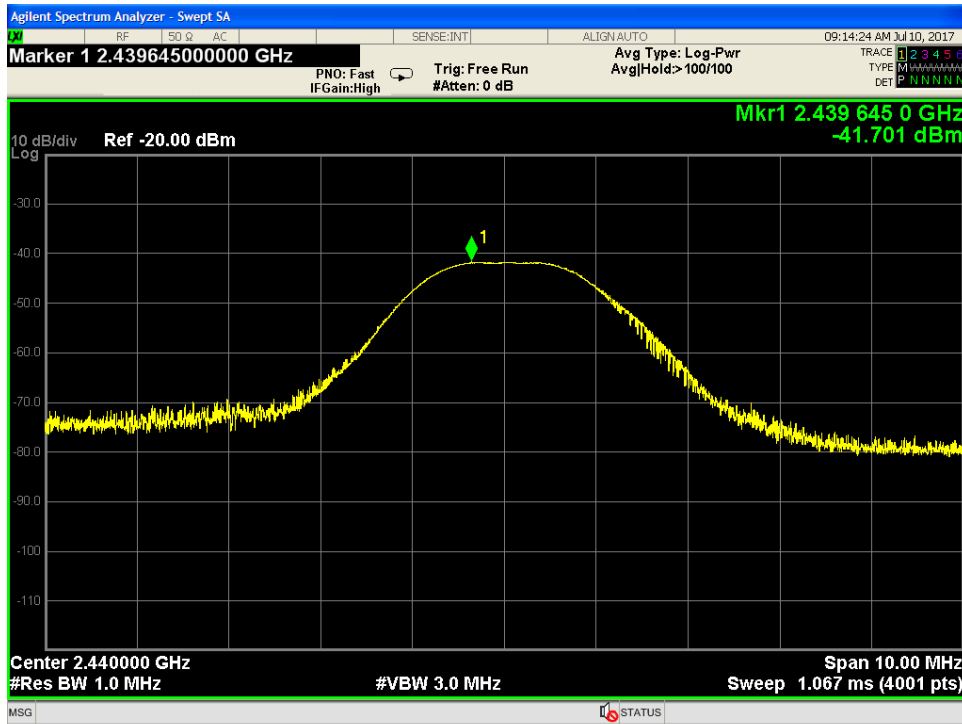
MEASUREMENTS / RESULTS

Peak Output Power							
Date: 7/10/2017		Company: Shooter's Touch LLC			Work Order: R0779		
Engineer: Zac Johnson		EUT: Swish Hoop			Operating Voltage/Frequency: 3V DC		
Temp: 24.1°C		Humidity: 44%		Pressure: 1009mBar			
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	-39.10	0.40	30.00	-8.70	30.0	-38.70	Pass
2440	-41.70	0.40	30.00	-11.30	30.0	-41.30	Pass
2480	-44.30	0.40	30.00	-13.90	30.0	-43.90	Pass
Test Site: EMC-3		Cable: 2286 Cbl		Attenuator: 2121 Pad			
Analyzer: 1118470 SA							
Peak Output Power (dBm) = Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)							

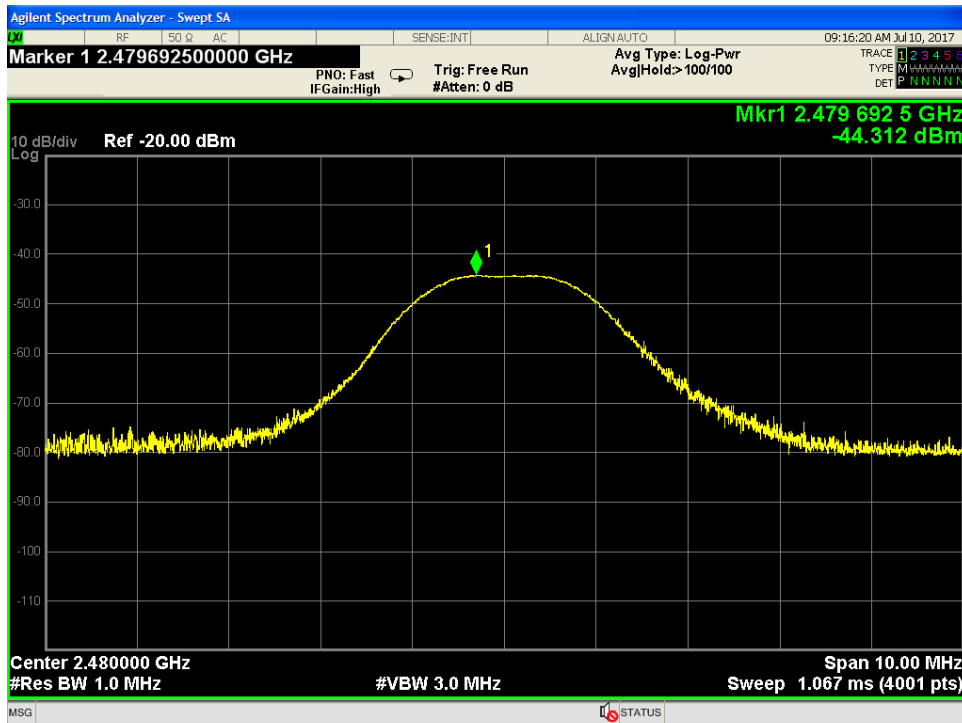
PLOTS



Low Channel Peak Output Power



Middle Channel Peak Output Power



High Channel Peak Output Power



Band Edge Measurements (Conducted and Radiated)

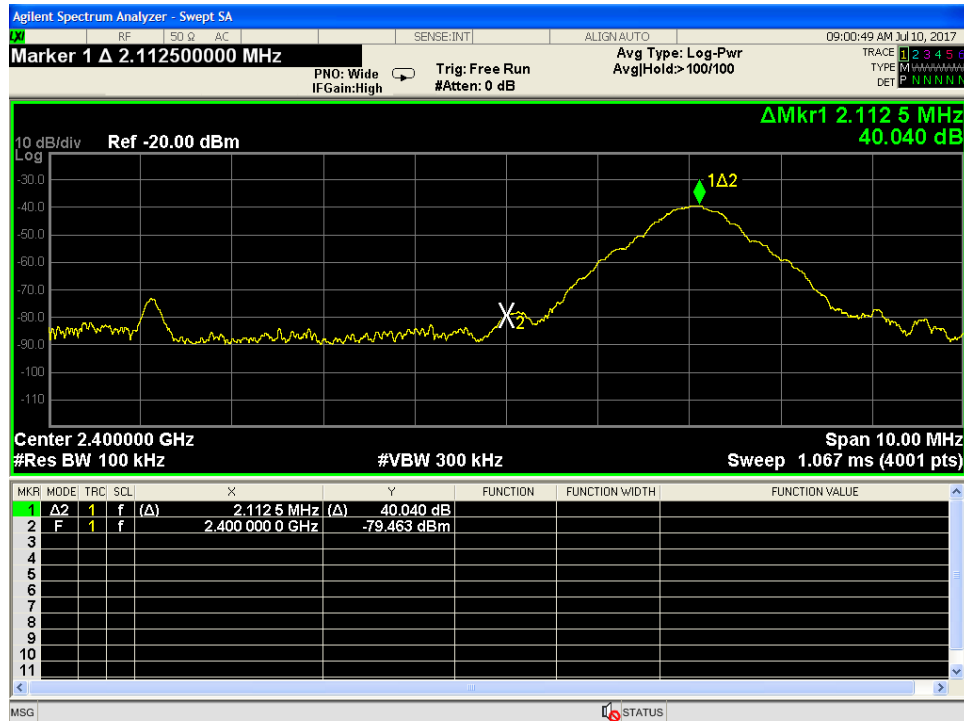
Limits: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). [15.247(d)]

MEASUREMENTS / RESULTS

Conducted:

Conducted Bandedge					
Date: 7/10/2017	Company: Shooter's Touch LLC	Work Order: R0779			
Engineer: Zac Johnson	EUT: Swish Hoop	Operating Voltage/Frequency: 3V DC			
Temp: 24.1°C	Humidity: 44%	Pressure: 1009mBar			
Frequency Range: 2402-2480 MHz		Measurement Type: Conducted		Measurement Method: FCC KDB 558074 D01 DTS Meas Guidance V04	
Notes:					
	Bandedge (dBm)	Fundamental (dBm)	Delta to Peak (dB)	Limit (dB) (Pass/Fail)	
Low Bandedge	-79.5	-39.5	40.0	≥ 20	Pass
High Bandedge	-90.0	-45.4	44.6	≥ 20	Pass
Test Site: EMC-3	Cable: 2286 Cbl	Attenuator: 2121 Pad			
Analyzer: 1118470 SA					Copyright Curtis-Straus LLC 2000

PLOTS



Low Band Edge





High Band Edge



Radiated:

Radiated Emissions Table															
Date: 27-Jun-17					Company: Shooters Touch LLC					Work Order: R0779					
Engineer: Chris Hamel					EUT Desc: Swish Hoop					EUT Operating Voltage/Frequency: 3.3V DC					
Temp: 25.1°C					Humidity: 39%					Pressure: 1008					
Frequency Range: 1-6GHz										Measurement Distance: 3 m					
Notes: Worst case orientation Y. Band Edge										EUT Max Freq:					
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	2390.0	26.4	5.9	0.0	28.0	3.2	57.6	37.1	74.0	-16.4	Pass	54.0	-16.9	Pass	
H	2366.7	27.0	5.7	0.0	28.0	3.2	58.2	36.9	74.0	-15.8	Pass	54.0	-17.1	Pass	
H	2311.4	25.6	5.3	0.0	27.9	3.2	56.7	36.4	74.0	-17.3	Pass	54.0	-17.6	Pass	
H	2488.1	26.18	5.8	0.0	28.3	3.2	57.7	37.3	74.0	-16.3	Pass	54.0	-16.7	Pass	
H	2483.5	24.91	5.6	0.0	28.2	3.2	56.3	37.0	74.0	-17.7	Pass	54.0	-17.0	Pass	
Table Result: Pass by -15.8 dB										Worst Freq: 2366.7 MHz					
Test Site: EMI Chamber 1					Cable 1: Asset #2051					Cable 2: Asset #2054			Cable 3: ---		
Analyzer: 2093					Preamp: none					Antenna: Orange Horn			Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.188															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															
Copyright Curtis-Straus LLC 2000															

Rev. 6/24/2017

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	8/9/2017	8/9/2016
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1		719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
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		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
TH A#2084		HTC-1	HDE	2084	2084	II	3/23/2018	3/23/2017	
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
Cables		Range	Mfr	Asset	Cat	Calibration Due	Calibrated on		
Asset #2051		9kHz - 18GHz	Florida RF	1685	II	3/5/2018	3/5/2017		
Asset #2054		9kHz - 18GHz	Florida RF	390	II	10/30/2017	10/30/2016		

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



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
 One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



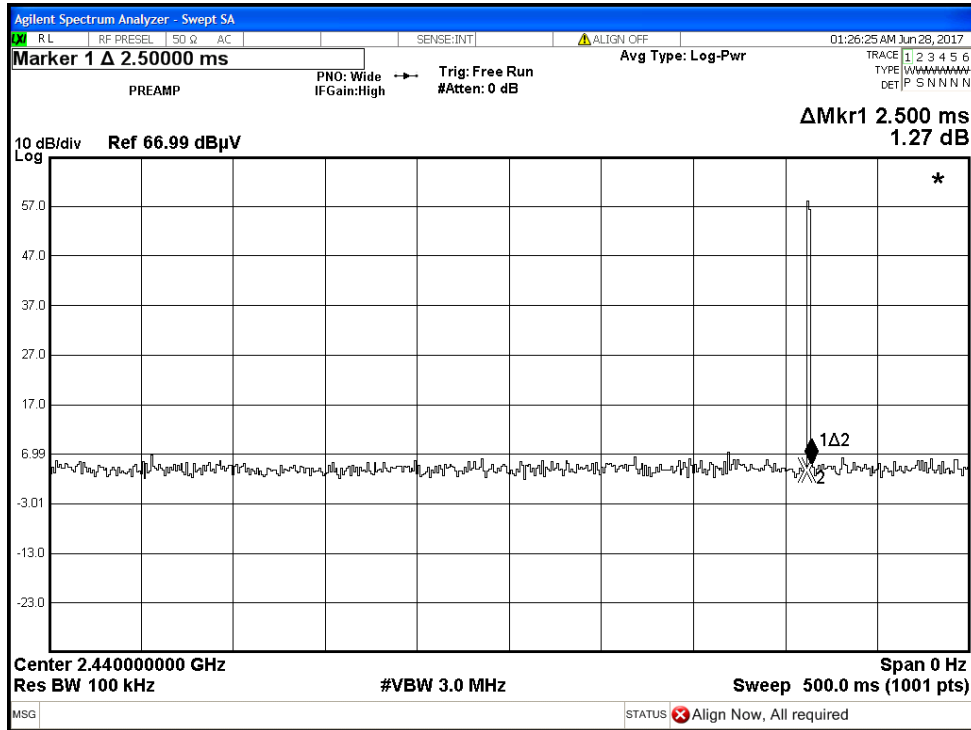
Duty-Cycle Correction Factor

Single Pulse: 2.5ms

Time between pulses: 36.90s

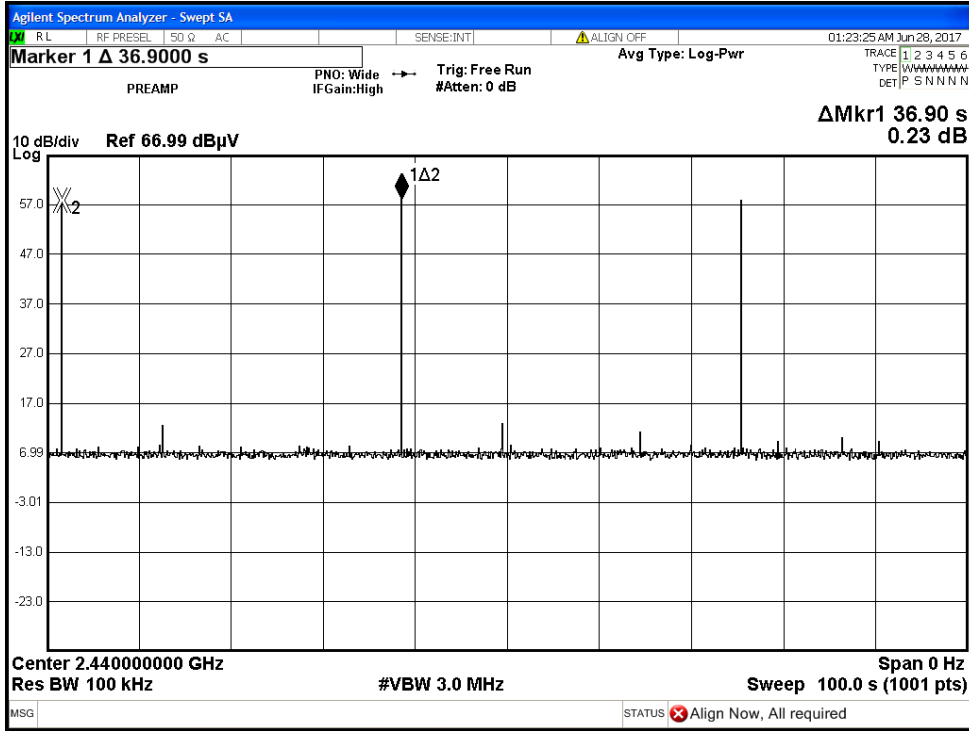
$$0.0025/36.9 = 0.00677\%$$

DCCF = 20dB



Single pulse





Pulse Train

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

Curtis Straus - a Bureau Veritas Company					Work Order - R0779							
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 3VDC							
30-1000MHz Tabular Data					Test Site - Chamber 1							
Operator: YF					Temp; Humid; Pres - 24.4°C; 37RH; 1009Bar							
Center Channel 2440MHz												
EUT in Y-axis					EUT Maximum Frequency - 2480MHz							
All emissions more than 20dB below the limit.												
Horizontal												
Frequency	QP Reading	Preamplifier Gain	Antenna Factor	Cable Loss	QP Amplitude	Limit Req. 1	Margin Req. 1	Results Req. 1	Antenna Height	Turntable Azimuth	Worst Margin Limit 1	
MHz	dBµV	dB	dB/m	dB	dBµV/m	dBµV/m	dB	pass/fail	centimeters	degrees	dB	
30.856	19.6	25.8	20.6	0.4	14.8	40	-25.2	PASS	225	205	-25.2	
200.062	21.3	25.9	12.3	1	8.7	43.5	-34.9	PASS	124	139		
925.157	21.1	26.1	22.6	2	19.7	46	-26.4	PASS	125	178		
Vertical												
Frequency	QP Reading	Preamplifier Gain	Antenna Factor	Cable Loss	QP Amplitude	Limit Req. 1	Margin Req. 1	Results Req. 1	Antenna Height	Turntable Azimuth	Worst Margin Limit 1	
MHz	dBµV	dB	dB/m	dB	dBµV/m	dBµV/m	dB	pass/fail	centimeters	degrees	dB	
30.845	19.6	25.8	20.7	0.4	14.8	40	-25.2	PASS	124	202	-25.2	
121.002	20	25.9	14.3	0.6	9	43.5	-34.5	PASS	207	209		
156.873	21.2	25.9	12.1	0.7	8.1	43.5	-35.5	PASS	198	157		
498.555	20.5	25.9	17.9	1.6	14.1	46	-32	PASS	125	42		
933.407	21.1	26.1	22.7	2	19.7	46	-26.4	PASS	126	13		

30-1000MHz

Rev. 6/24/2017									
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	8/9/2017	8/9/2016
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
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
Green		0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/19/2017	9/19/2016
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Brown Bilog		30-2000MHz	JB1	Sunol	A0032406	1218	I	1/13/2019	1/13/2017
Meteorological Meters			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2084			HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051		9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054		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.



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
 One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



Curtis Straus - a Bureau Veritas Company															Work Order - R0779			
Radiated Emissions Electric Field 3m Distance															EUT Power Input - 3VDC			
1-6GHz															Test Site - CH1			
Operator: CCH															Temp; Humid; Pres - 25.1°C; 38%RH; 1008mBar			
EUT in Y-axis															EUT Maximum Frequency - 2480MHz			
20dB DCCF applied to harmonics for average readings																		
Low Channel (2402MHz)																		
Horizontal																		
Frequency	Raw Peak Reading	DCCF	Raw Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	Turntable Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBμV	dB	dBμV	dB	dB/m	dB	dBμV/m	dBμV/m	dBμV/m	dB	Pass/Fail	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB	dB
2308.6	19.9	0	11.4	0	27.9	3.2	51	42.4	74	-23	PASS	54	-11.5	PASS	104	175		
2365.8	20.8	0	11.5	0	28	3.2	51.9	42.7	74	-22	PASS	54	-11.3	PASS	125	17		
4804.5	21.1	-20	1.1	0	33	4.8	58.8	38.8	74	-15.2	PASS	54	-15.2	PASS	207	71	-15.2	
5902.4	17.5	0	9.3	0	34	5.9	57.5	49.3	74	-16.5	PASS	54	-4.7	PASS	188	69		-4.7
Vertical																		
Frequency	Raw Peak Reading	DCCF	Raw Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	Turntable Azimuth	Worst Peak Margin	Worst Average Margin
No emissions found																		

1GHz-6GHz Low

Curtis Straus - a Bureau Veritas Company															Work Order - R0779			
Radiated Emissions Electric Field 3m Distance															EUT Power Input - 3VDC			
1-6GHz															Test Site - CH1			
Operator: CCH															Temp; Humid; Pres - 25.1°C; 38%RH; 1008mBar			
Mid Channel (2440MHz)															EUT Maximum Frequency - 2480MHz			
EUT in Y-axis																		
Horizontal																		
Frequency	Raw Peak Reading	Raw Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	Turntable Azimuth	Worst Peak Margin	Worst Average Margin	
MHz	dBμV	dBμV	dB	dB/m	dB	dBμV/m	dBμV/m	dBμV/m	dB	Pass/Fail	dBμV/m	dB	Pass/Fail	centimeters	degrees	dB	dB	
3589.8	20.9	12	0	31.5	4	56.4	47.4	74	-17.6	PASS	54	-6.6	PASS	125	266			
5687.3	18	9	0	33.8	6.2	58	49.1	74	-16	PASS	54	-4.9	PASS	290	186	-16	-4.9	
Vertical																		
Frequency	Raw Peak Reading	Raw Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	Turntable Azimuth	Worst Peak Margin	Worst Average Margin	
No emissions found																		

1GHz-6GHz Mid



Curtis Straus - a Bureau Veritas Company						Work Order - R0779			
Radiated Emissions Electric Field 3m Distance						EUT Power Input - 3VDC			
1-6GHz						Test Site - CH1			
Operator: CCH						Temp; Humid; Pres - 25.1°C; 38%RH; 1008mBar			
High Channel (2480MHz)						EUT Maximum Frequency - 2480MHz			
EUT in Y-axis. Peak emissions meet average limits.									
Vertical									
Frequency	Raw Peak Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Reading	Average Limit	Delta to Average Limit	Test Result	Worst Margin
MHz	dBµV	dB	dB/m	dB	dBµV/m	dBµV/m	dB	Pass/Fail	dB
2557	17.9	0	28.6	3.3	49.7	54	-4.2	PASS	
3534.75	14.8	0	31.3	3.9	50	54	-4	PASS	
5945.38	12.6	0	34.1	5.9	52.5	54	-1.4	PASS	-1.4
Horizontal									
Frequency	Raw Peak Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Reading	Average Limit	Delta to Average Limit	Test Result	Worst Margin
MHz	dBµV	dB	dB/m	dB	dBµV/m	dBµV/m	dB	Pass/Fail	dB
2556.5	16.9	0	28.6	3.3	48.7	54	-5.2	PASS	
3598.25	14.4	0	31.5	4	49.9	54	-4.1	PASS	
5633.88	12	0	33.8	6	51.8	54	-2.2	PASS	-2.2

1GHz-6GHz High

Rev. 6/24/2017									
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	8/9/2017	8/9/2016
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1		719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
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			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2084			HTC-1	HDE	2084	2084	II	3/23/2018	3/23/2017
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
Cables		Range	Mfr				Cat	Calibration Due	Calibrated on
Asset #2051		9kHz - 18GHz	Florida RF				II	3/5/2018	3/5/2017
Asset #2054		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.									



Curtis Straus - a Bureau Veritas Company														Work Order - R0779				
Radiated Emissions Electric Field 1m Distance														EUT Power Input - 3VDC				
6-18GHz Tabular Data														Test Site - Chamber 1				
Operator: YF														Temp; Humid; Pres - 24.4°C; 37%RH; 1009mBar				
EUT in Y-axis														EUT Maximum Frequency - 2480MHz				
20dB DCCF applied to harmonics. No other emissions detected.																		
Antenna Polarity	Frequency	Raw Peak Reading	Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
H/V	MHz	dBµV	dBµV	dB	dB	dB	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
Low Channel 2402MHz																		
H	7206	12.5	-7.5	0	37.2	7.1	56.8	36.8	83.5	-26.7	PASS	63.5	-26.7	PASS	150	158	-26.7	-26.7
V	7206	13.4	-6.6	0	37.2	7.1	57.7	48.9	83.5	-25.8	PASS	63.5	-25.8	PASS	185	212	-25.8	-25.8
Center Channel 2440MHz																		
H	7320	15.1	-4.9	0	37.6	7.1	59.7	39.7	83.5	-23.8	PASS	63.5	-23.8	PASS	186	0	-23.8	-23.8
V	7320	9.8	-10.2	0	37.6	7.1	54.4	34.4	83.5	-29.1	PASS	63.5	-29.1	PASS	100	47	-29.1	-29.1
High Channel 2480MHz																		
H	7440	14	-6	0	37.5	7.2	58.8	38.8	83.5	-24.7	PASS	63.5	-24.7	PASS	175	8	-24.7	-24.7
V	7440	8.7	-11.3	0	37.5	7.2	53.5	33.5	83.5	-30	PASS	63.5	-30	PASS	100	90	-30	-30

6GHz-18GHz

Rev. 6/24/2017									
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	8/9/2017	8/9/2016
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1		719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
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			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2084			HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2051		9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054		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: 28-Jun-17			Company: Shooters Touch LLC					Work Order: R0779						
Engineer: YF			EUT Desc: Model: SHNSM01					EUT Operating Voltage/Frequency: 3VDC						
Temp: 25.1C			Humidity: 38%					Pressure: 1008mbar						
Frequency Range: 18-25GHz							Measurement Distance: 0.1m							
Notes: Center channel (2440MHz)							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: --- by --- dB Worst Freq: --- MHz														
Test Site: EMI Chamber 1			Cable 1: EMIR-HIGH-07					Cable 2: ---			Cable 3: ---			
Analyzer: Gold			Preamp: 18-26.5GHz					Antenna: 18-26.5GHz Horn			Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.168 Copyright Curtis-Straus LLC 2000														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

18GHz-25GHz

Rev. 6/24/2017

Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/28/2018	2/28/2017
Chambers and Stripline		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 1		DRS2014X8LH	ETS	J1173 - 0002A	1685	II	See RFI Systems	See RFI Systems
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
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	9/16/2017	9/16/2016
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
REMI-High-07	1 - 26.5GHz	TRU-21B0707-120	TRU			II	8/14/2017	8/14/2016
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
TH A#2084	HTC-1	HDE	2084	2084	II	3/23/2018	3/23/2017	
Weather Clock (Pressure Only)	BA928	igon Scienl	C3166-1	831	I	4/28/2018	4/28/2016	

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



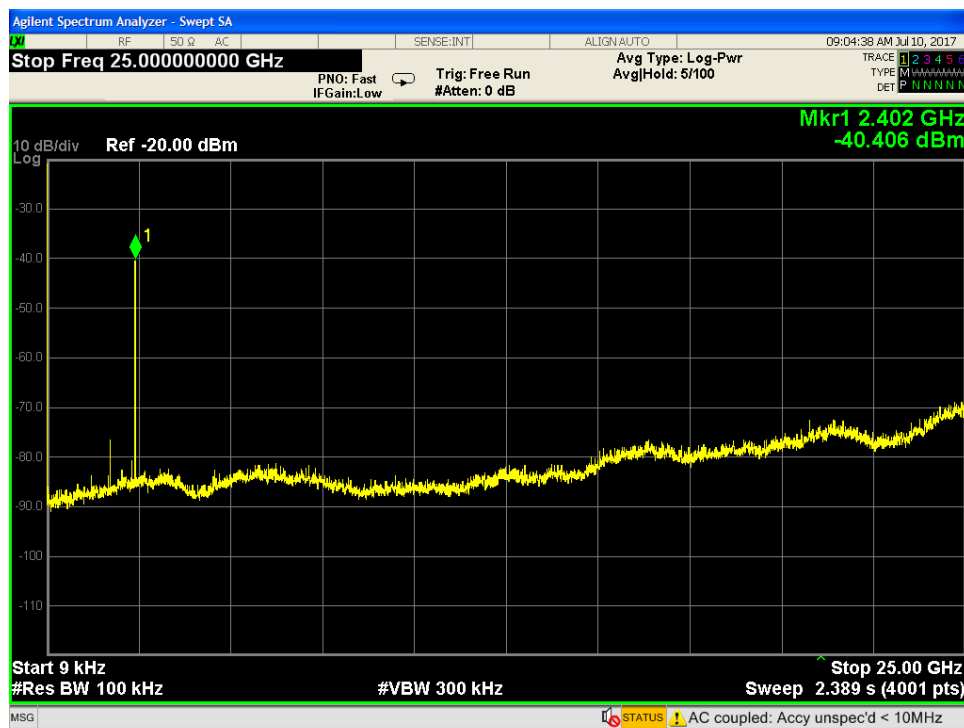
Conducted Spurious Emissions

Limits: In any 100kHz 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.

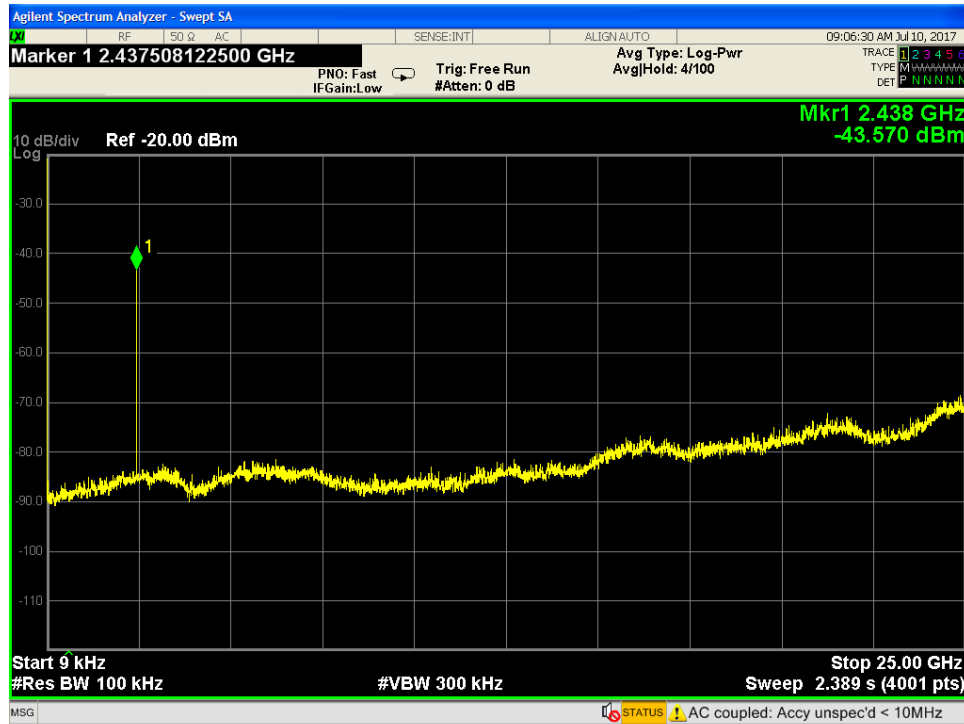
[15.247(d)]

MEASUREMENTS / RESULTS

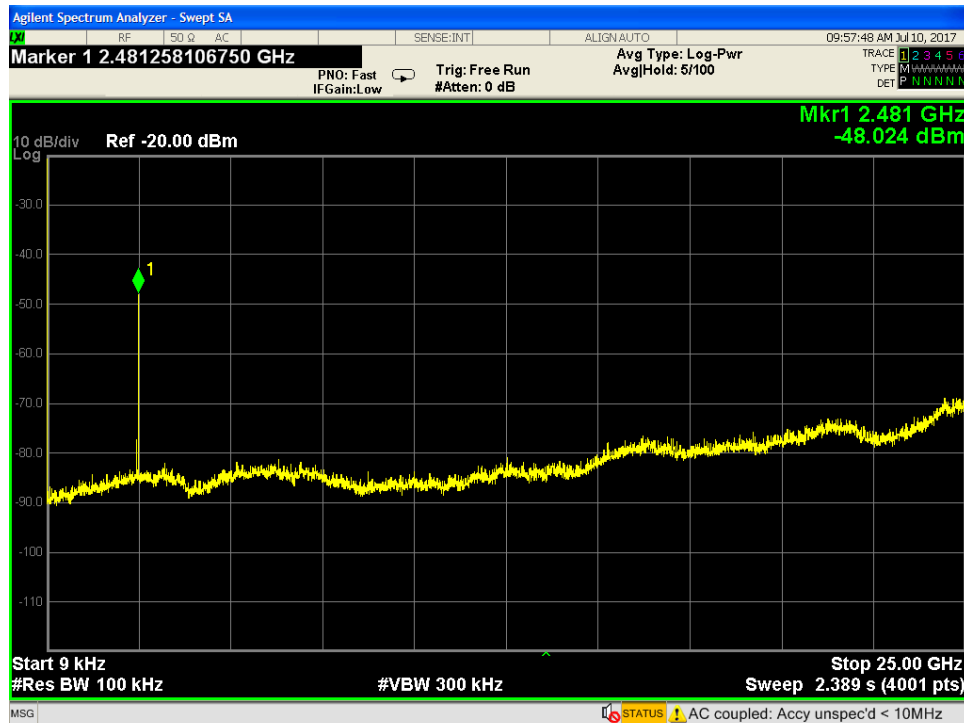
9kHz to 25GHz frequency range was investigated for 3 channels (low, middle and high) and no emissions within 20dB of their corresponding fundamentals were observed.



9kHz-25GHz Conducted Spurious (Low channel)



9kHz-25GHz Conducted Spurious (Mid channel)



9kHz-25GHz Conducted Spurious (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: 7/10/2017		Company: Shooter's Touch LLC			Work Order: R0779		
Engineer: Zac Johnson		EUT: Swish Hoop		Operating Voltage/Frequency: 3V DC			
Temp: 24.1°C		Humidity: 44%		Pressure: 1009mBar			
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	-51.30	0.40	30.00	-20.90	8.0	-28.90	Pass
2440	-53.60	0.40	30.00	-23.20	8.0	-31.20	Pass
2480	-58.30	0.40	30.00	-27.90	8.0	-35.90	Pass
Test Site: EMC-3		Cable: 2286 Cbl		Attenuator: 2121 Pad			
Analyzer: 1118470 SA							
PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)							

PLOTS

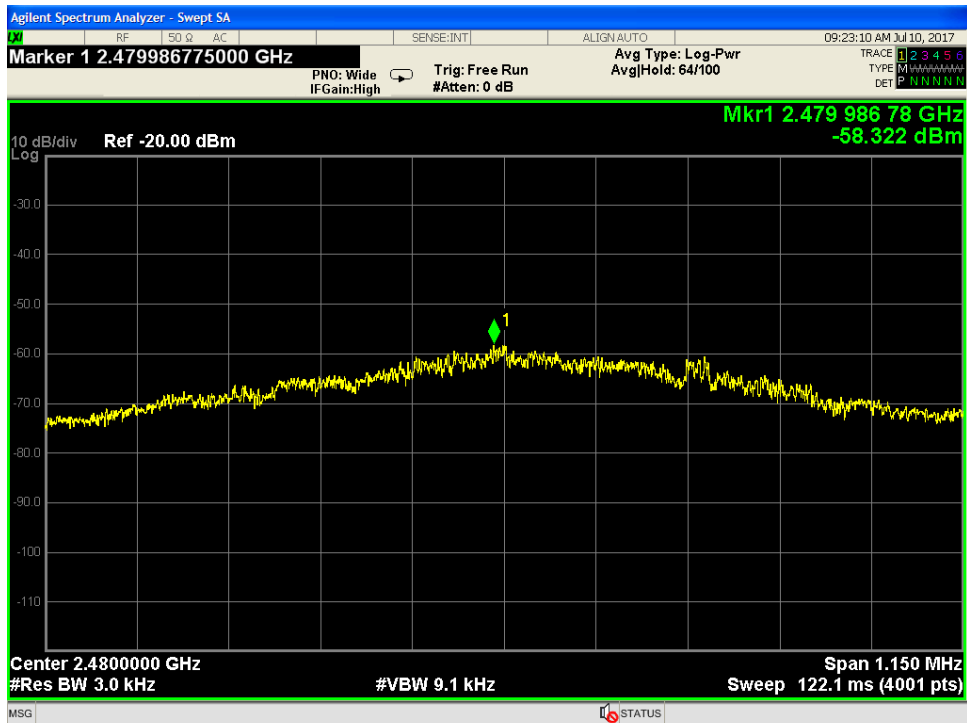


Low Channel PSD





Middle Channel PSD



High Channel PSD



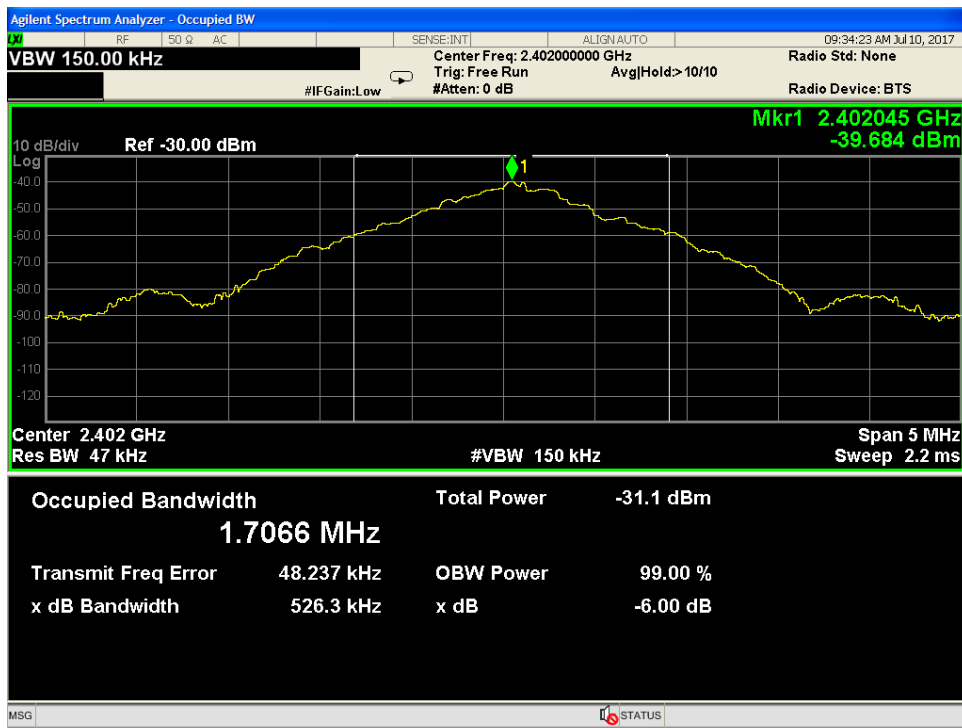
Occupied Bandwidth

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]

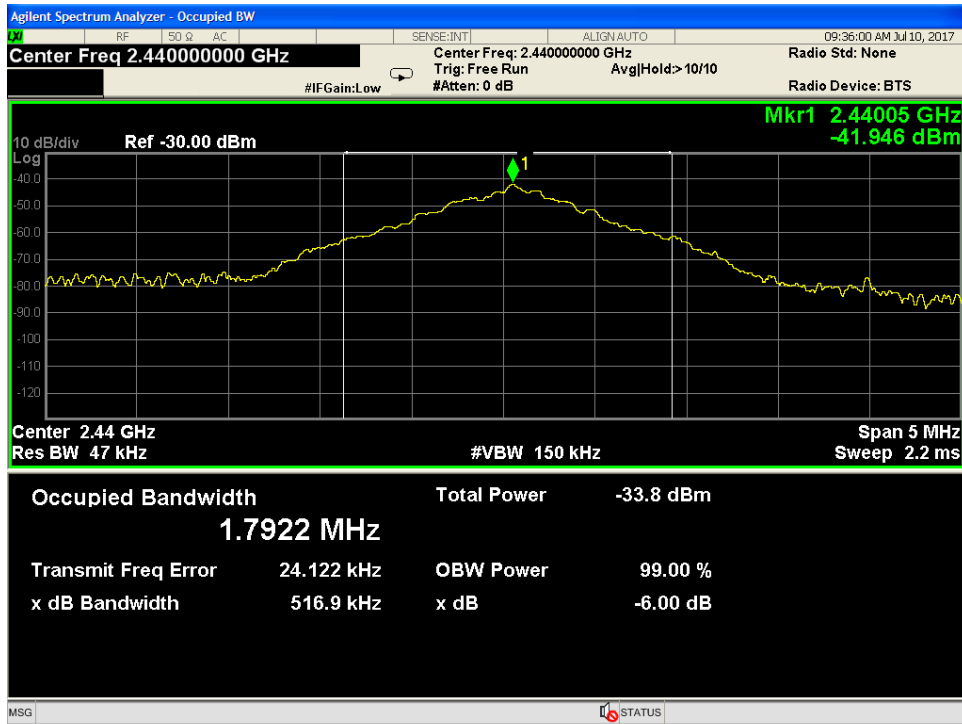
MEASUREMENTS / RESULTS

99% Occupied Bandwidth			
Date: 7/10/2017	Company: Shooter's Touch LLC	Work Order: R0779	
Engineer: Zac Johnson	EUT: Swish Hoop	Operating Voltage/Frequency: 3V DC	
Temp: 24.1°C	Humidity: 44%	Pressure: 1009mBar	
Frequency Range: 2402-2480 MHz		Measurement Type: Conducted	
Notes:			
Frequency (MHz)			99% OBW (MHz)
2402			1.7066
2440			1.7922
2480			1.7273
Test Site: EMC-3	Cable: 2286 Cbl	Attenuator: 2121 Pad	
Analyzer: 1118470 SA			Copyright Curtis-Straus LLC 2000

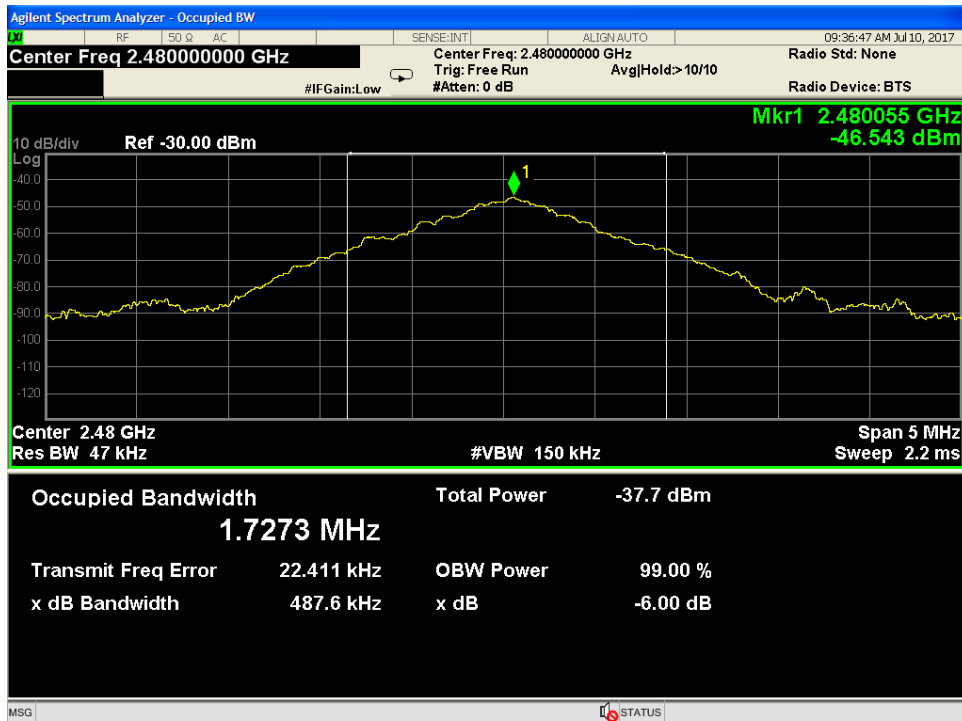
PLOTS



99% Occupied Bandwidth Low Channel



99% Occupied Bandwidth Middle 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	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%	5%
Adjacent channel power	0.3dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	1.9dB	3dB
Conducted emission of receivers	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 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.



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

One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



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.
Rev.160009121(2)_#684340 v14CS

