Test Report

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

Report No	ES2971-1
Client	Slingmax Technologies, LLC
Address	205 Bridgewater Rd. P.O. Box 2423 Aston, PA 19014
Phone	610-485-8500
Items tested	Common Base Station
FCC ID	2APZM-BASE1
IC	23959-BASE1
FRN	0027571686
Equipment Type	Part 15 Spread Spectrum Transmitter
Equipment Code	DSS
FCC/IC Rule Parts	CFR Title 47 FCC 15.247, ISED Canada RSS-247 Issue 2
Test Dates	October 24, 2018 to January 29, 2019
Results	As detailed within this report
Prepared by	Arik Zwirner – Test Engineer
Authorized by	Yunus Faziloglu – Sr. Engineer
Issue Date	3/28/19
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 38 of this report.

Curtis-Straus LLC is accredited to ISO/IEC 17025 by A2LA for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation. See our scope of accreditation at the end of this test report. Any opinions or interpretations expressed in this report are outside the scope of our A2LA accreditation as A2LA only accredits testing.

Testing Cert. No. 1627-01

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

Summary

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

The Common Base Station is a frequency hopping transmitter that operates in the frequency range 902.175 – 927.775MHz. It is powered by DC power from USB port.

Following antenna was supplied for testing,

Manufacturer	Model	Type	Gain (dBi)
Nearson, Inc.	S152AH-915S	External whip	2dBi

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

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	March 29, 2019

Test Methodology

All the testing was performed according to the following rules/procedures/documents;

CFR Title 47 FCC 15.247, ISED Canada RSS-247 Issue 2, RSS-Gen Issue 5 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around three orthogonal planes as well as varying the test antenna's height and polarity. Worst case orientation was found to be in flat (X) position and all radiated emissions tests were performed in this orientation unless otherwise specified in the data tables. External swivel antenna of the EUT was maximized separately.

Conducted emissions testing at the antenna port was performed.
3 channels were tested as follows:

Low channel = 902.175 MHz

Middle channel = 914.975 MHz

High channel = 927.775 MHz

For AC line conducted emissions a 50Ω/50µH LISN was used.

Following bandwidths were used during radiated spurious and AC line conducted emissions tests.

Frequency	RBW	VBW
150kHz – 30MHz	9kHz	30kHz
30MHz – 1GHz	120kHz	1MHz
1GHz – 10GHz	1MHz	3MHz

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Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	S2971		
Company:	Slingmax Technologies, LLC		
Company Address:	205 Bridgewater Rd. P.O. Box 2423		
	Aston, PA, 19014		
Contact:	Gregory Dâ€™Elia		
	MN	**PN**	**SN**
EUT:	Common Base Station		Test Sample 1
EUT Description:	902-928MHz band radio		
EUT Max Frequency:	928 MHz		

Support Equipment	**MN**	**SN**
Dell laptop computer		

Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
USB	USB	1	1	USB	Yes	No	2	in	yes	

Software Operating Mode Description:

Frequency hopping transmitter in the 902-928MHz band. Client supplied software to change channels and enable-disable hopping.

Clock Frequencies	
frequencies (MHz)	928

Modifications Required for Compliance

None.

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Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.4			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	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.
3.2			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
6.8			15.203	The antenna for this device is external whip with 2dBi 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	The unit complies with the requirements of 15.207
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.7				Occupied Bandwidth measurements were made.

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Test Results

20dB Bandwidth and 99% Occupied Bandwidth

REQUIREMENT

15.247(a)(1)(i): The maximum allowed 20dB bandwidth of the hopping channel is 500kHz
RSS-247 Issue 2 Section 5.1: The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

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 6.7]

MEASUREMENTS / RESULTS

99% Occupied Bandwidth

Date: 29-Jan-19 **Company:** Slingmax Technologies, LLC **Work Order:** S2971
Engineer: AKZ **EUT:** Common Base Station **Operating Voltage/Frequency:** 3.6V DC
Temp: 21°C **Humidity:** 32% **Pressure:** 1012mBar
Frequency Range: 902-928MHz **Measurement Type:** Conducted
Measurement Method: RSS-Gen Issue 5 Section 6.7
Notes:

Frequency (MHz)	99% OBW (KHz)
902.175	71.445
914.975	71.764
927.775	71.631

Test Site: EMC-5 **Cable:** N/A **Attenuator:** Asset# 2121
Analyzer: 118472 SA

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20dB Bandwidth

Date: 29-Jan-19 **Company:** Slingmax Technologies, LLC **Work Order:** S2971
Engineer: AKZ **EUT:** Common Base Station **Operating Voltage/Frequency:** 3.6V DC
Temp: 21°C **Humidity:** 32% **Pressure:** 1012mBar
Frequency Range: 902-928 MHz **Measurement Type:** Conducted
Measurement Method: ANSI C63.10-2013
Notes:

Frequency (MHz)	Reading (kHz)	20dB Bandwidth Limit		
		Limit (kHz)	Margin (kHz)	Result (Pass/Fail)
902.175	79.00	≤500	-421	Pass
914.975	79.03	≤500	-421	Pass
927.775	78.83	≤500	-421	Pass

Test Site: CEMI-1 **Cable:** N/A **Attenuator:** Asset# 2121
Analyzer: 1168255

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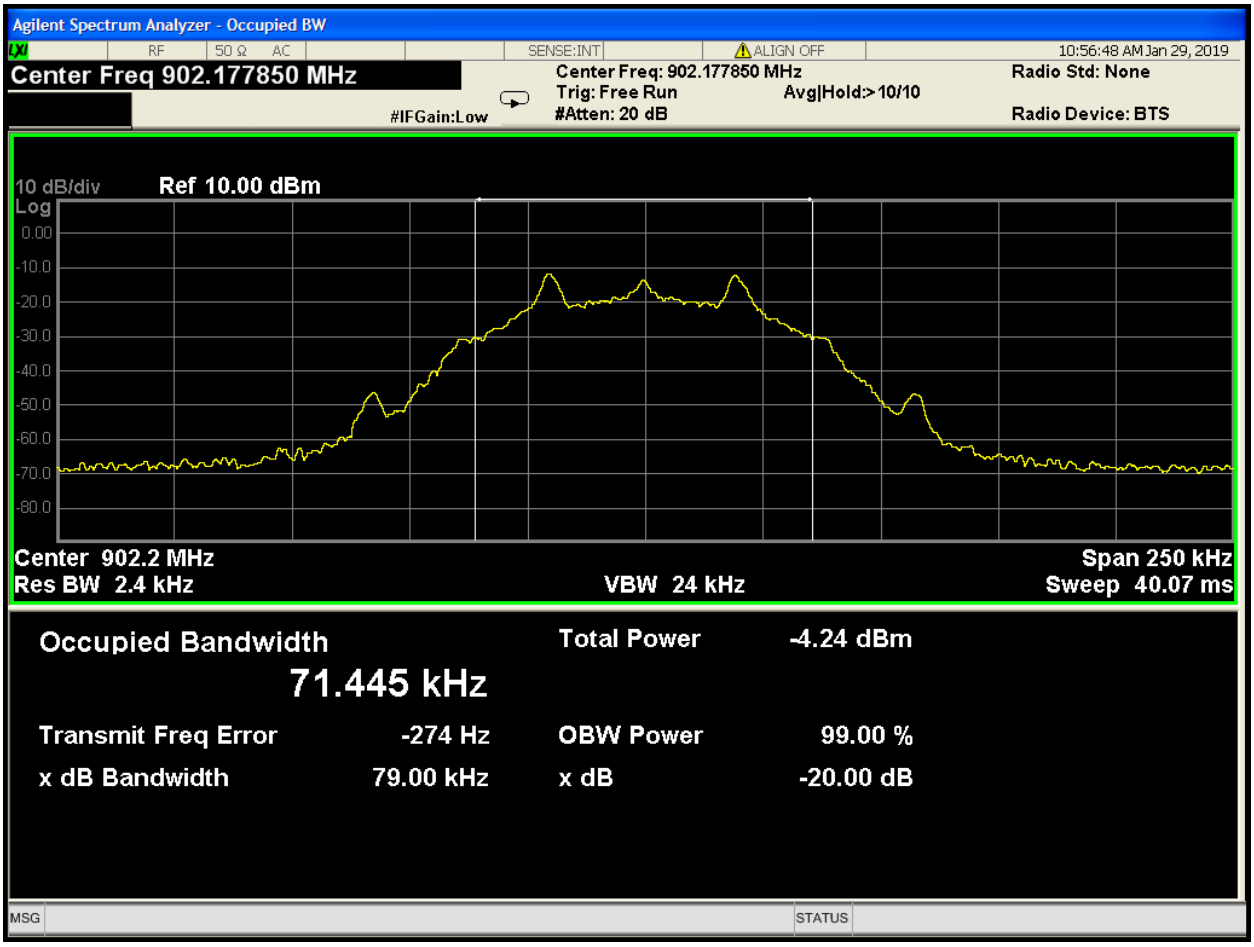
PLOTS



Low Channel

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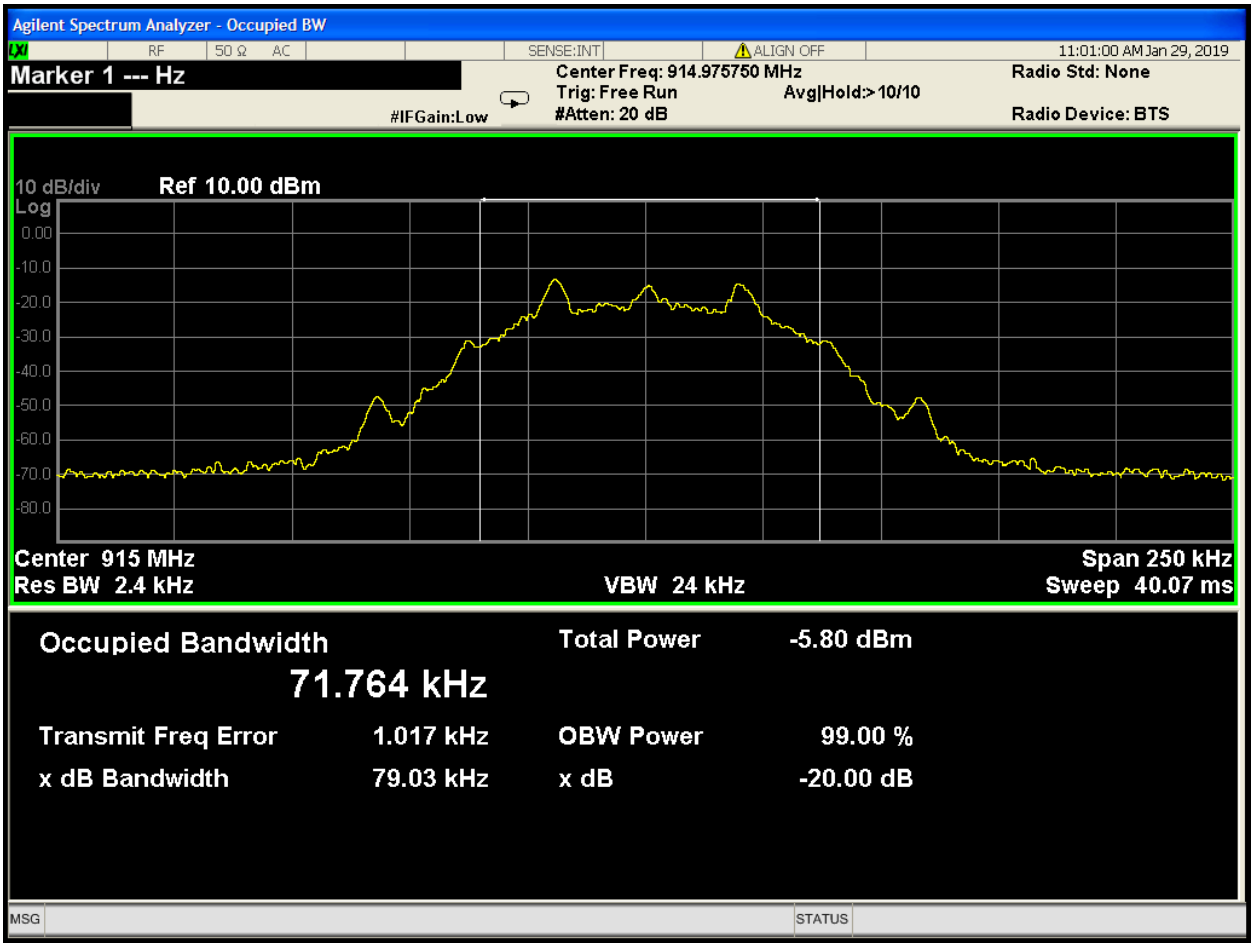

Mid Channel

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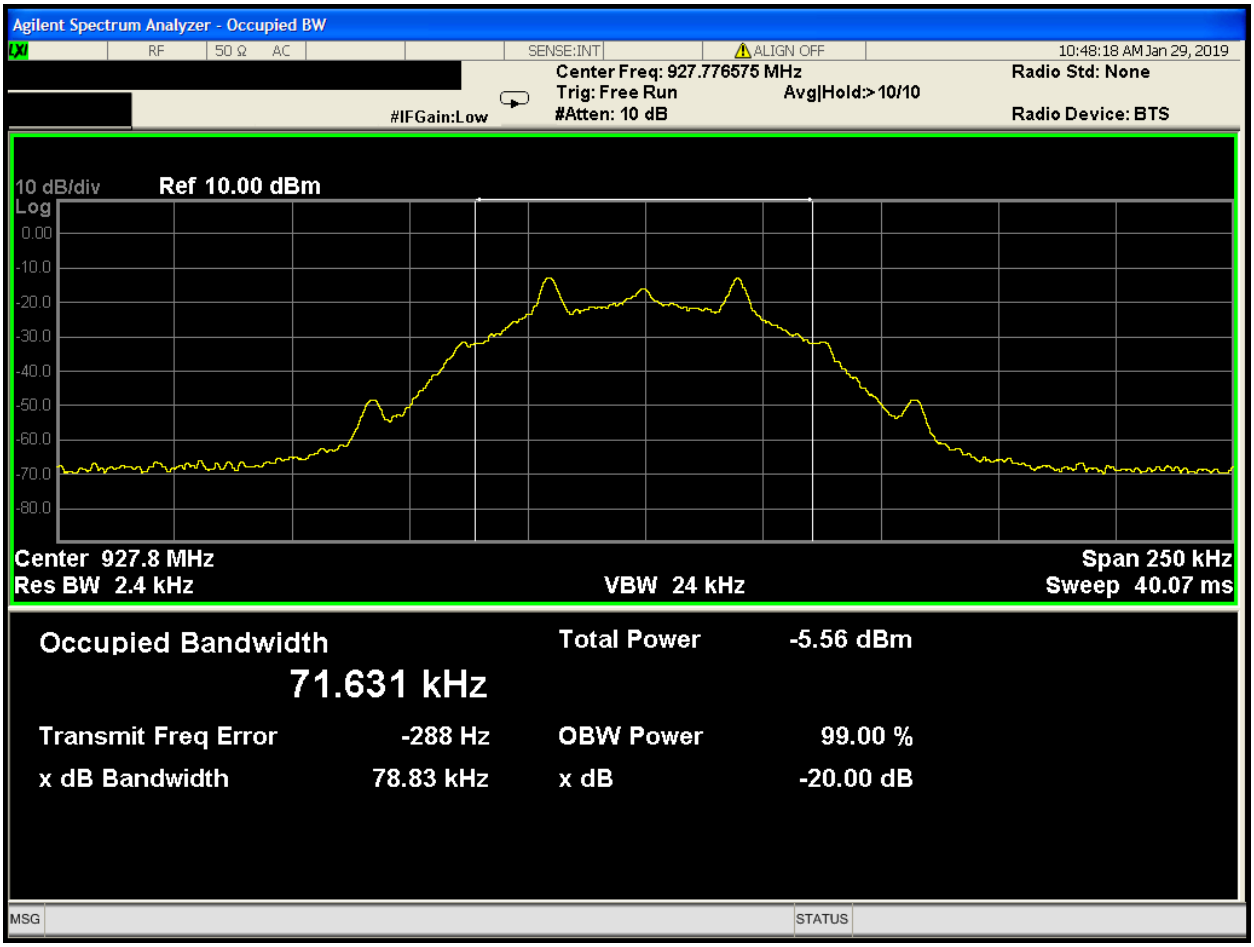

High Channel

Note: Plots above show both 20dB Bandwidth and 99% OBW measurement data

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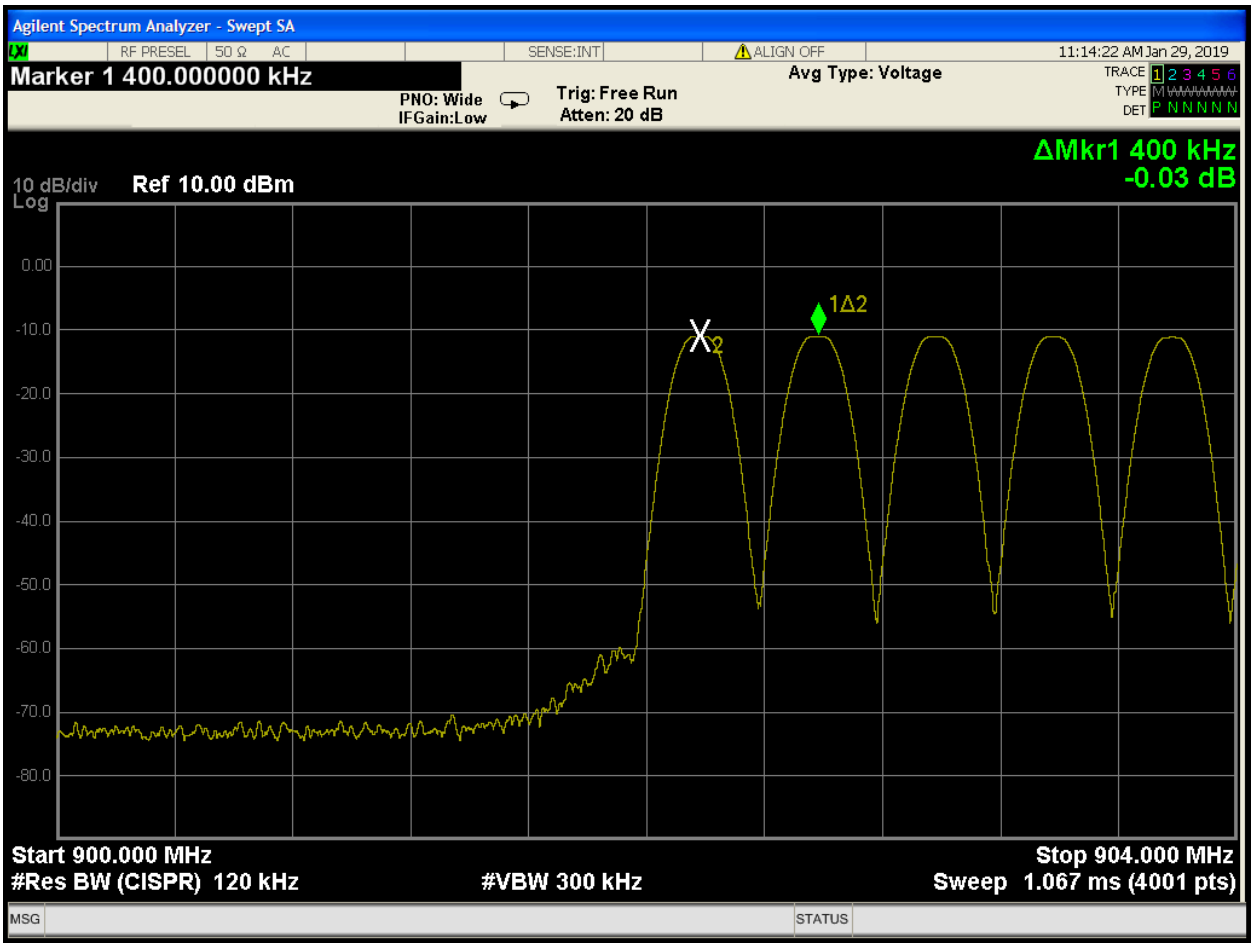
Channel Separation

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. [15.247 (a) (1)]

MEASUREMENTS / RESULTS

Channels are spaced by 400kHz as seen in the following plots. This is higher than both 25kHz and the 20dB bandwidth of the product.

Plots



Low End of the Band

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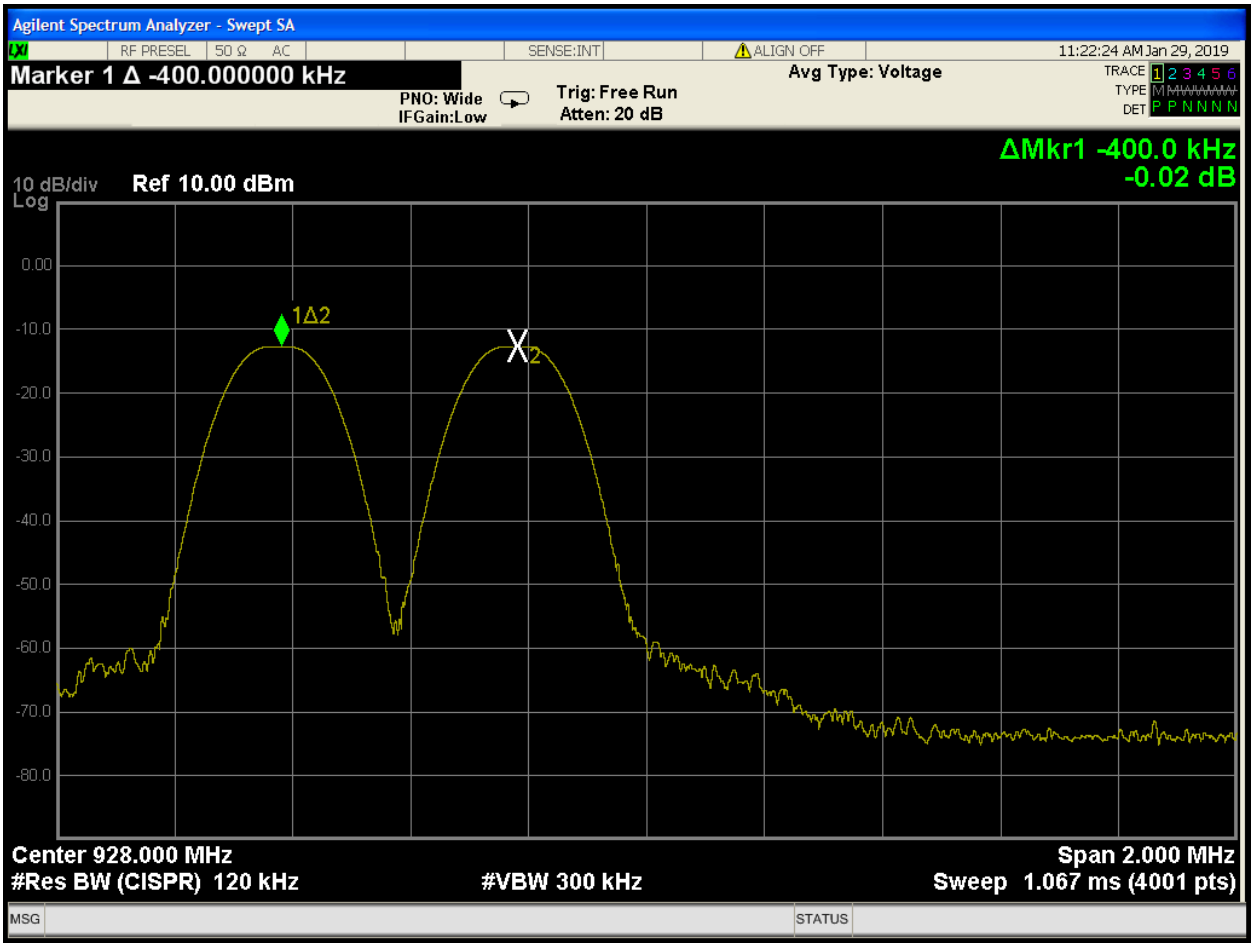

High End of the Band

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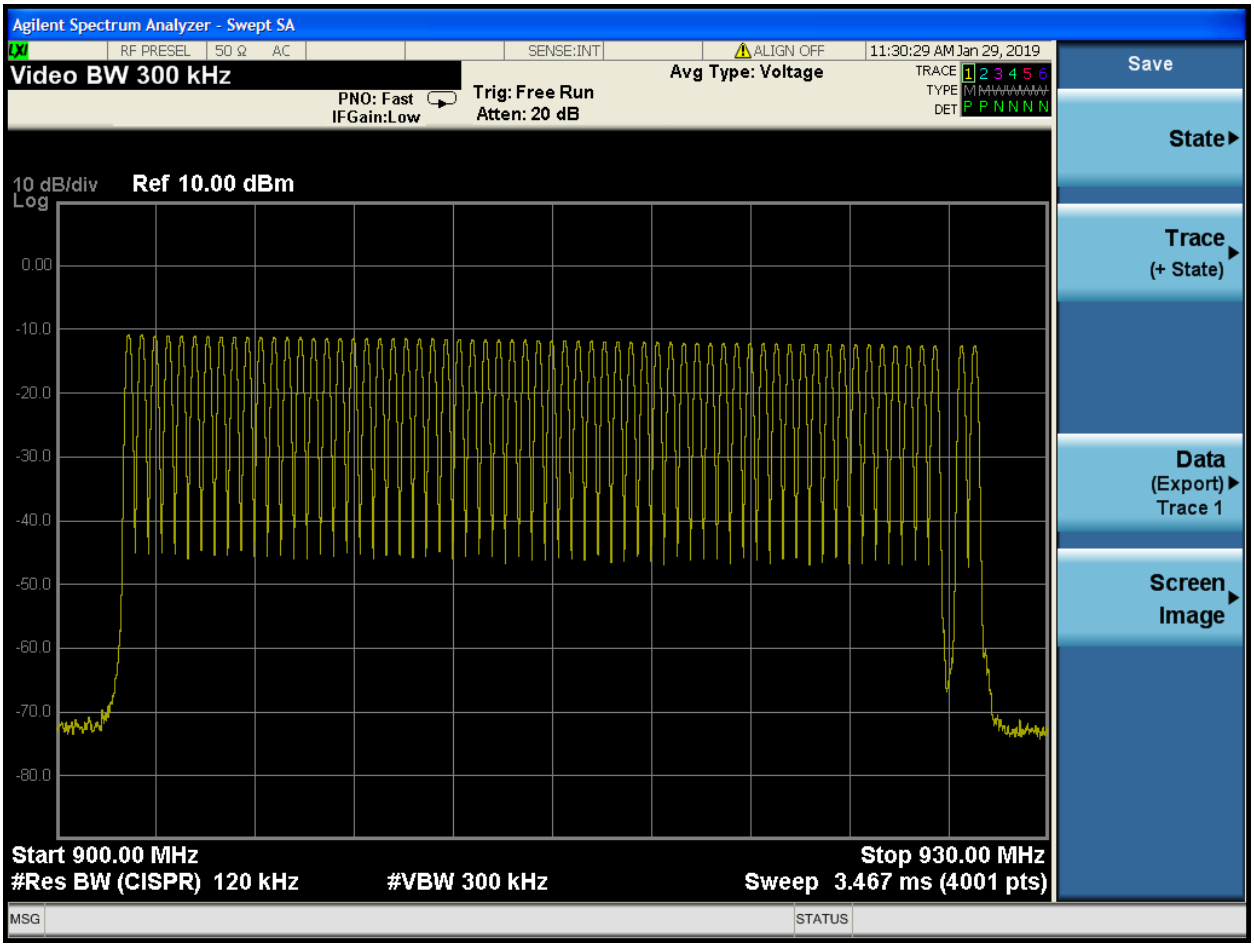
Number of Channels

For frequency hopping systems operating in the 902-928MHz band: if the 20dB bandwidth of the hopping channel is less than 250kHz, the system shall use at least 50 hopping frequencies [15.247 (a) (1) (i)]

MEASUREMENTS / RESULTS

PLOTS



64 Channels

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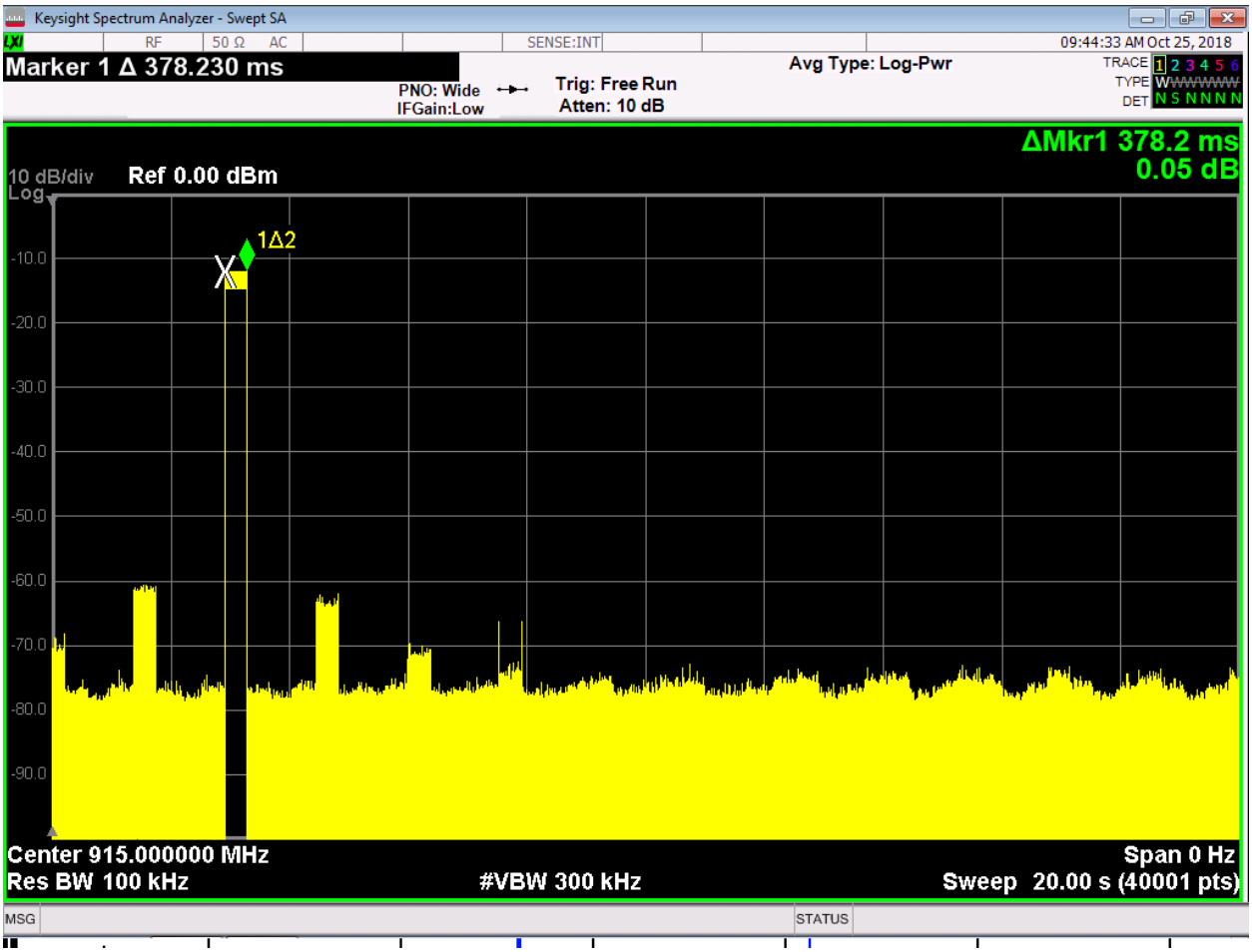
Dwell Time

For frequency hopping systems operating in the 902-928MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz …the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

[15.247 (a) (1) (i)]

MEASUREMENTS / RESULTS

Plots



Single Hop = 378.2ms

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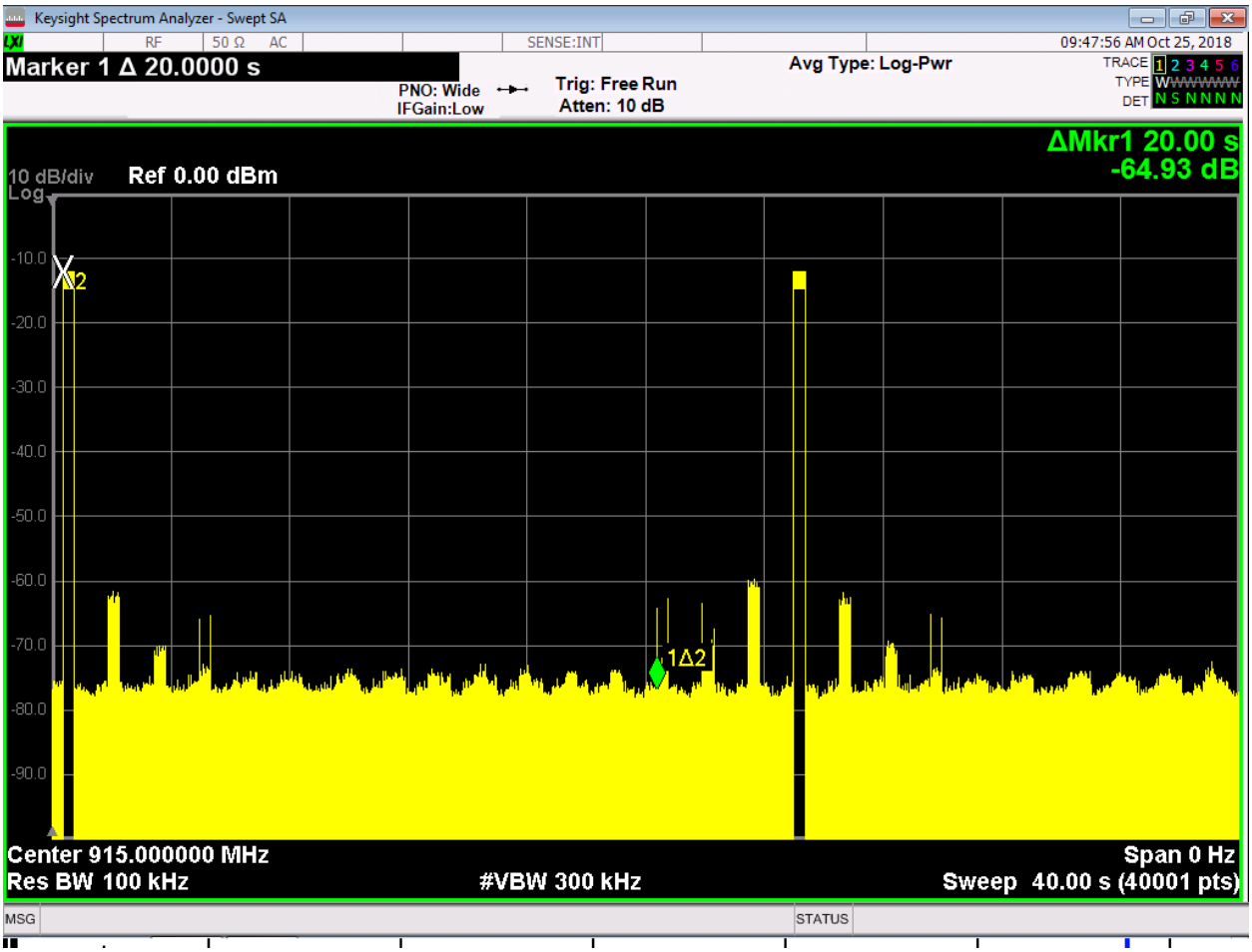

1 hop within 20.0s

Dwell time in a 20sec period = 378.2ms
Limit (maximum) = 400ms
Result: Pass

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Peak Output Power

LIMIT

Conducted Output Power: 1 Watt [15.247(b) (2)]

MEASUREMENTS / RESULTS

Peak Output Power

Date: 29-Jan-19 **Company:** Slingmax Technologies, LLC **Work Order:** S2971
Engineer: AKZ **EUT:** Common Base Station **Operating Voltage/Frequency:** 3.6V DC
Temp: 21°C **Humidity:** 32% **Pressure:** 1012mBar
Frequency Range: 902-928 MHz **Measurement Type:** Conducted
Measurement Method: ANSI C63.10-2013
Notes: No cable is used between the EUT and the attenuator.

Frequency (MHz)	Peak Reading (dBm)	Cable Loss (dB)	Attenuator Loss (dB)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fail)
902.175	-11.080	0.00	29.4	18.320	30.0	-11.680	Pass
914.975	-11.939	0.00	29.4	17.461	30.0	-12.539	Pass
927.775	-12.774	0.00	29.4	16.626	30.0	-13.374	Pass

Test Site: CEMI-1 **Cable:** None **Attenuator:** Asset# 2121
Analyzer: 1168255
Peak Output Power (dBm)= Peak Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dB)

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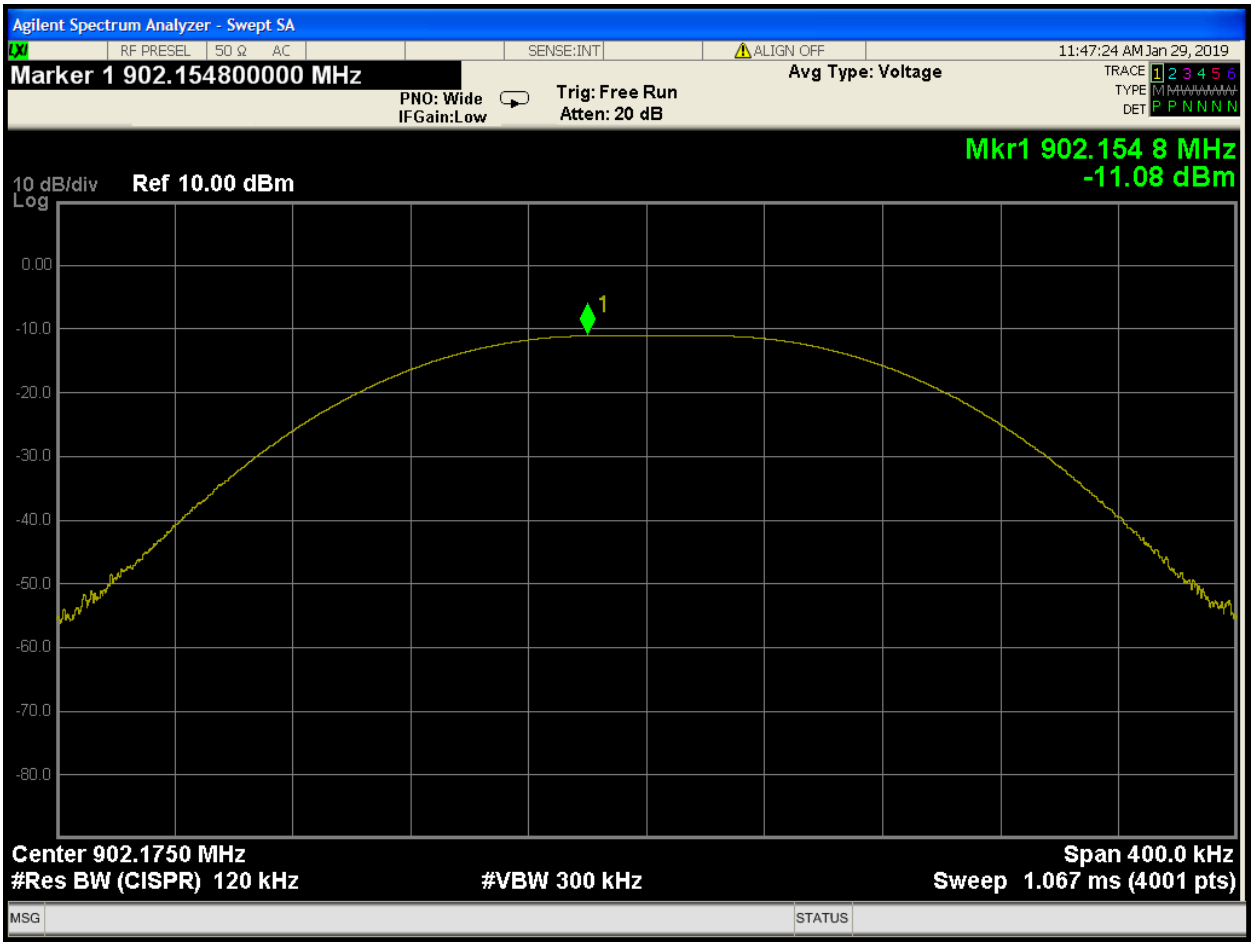
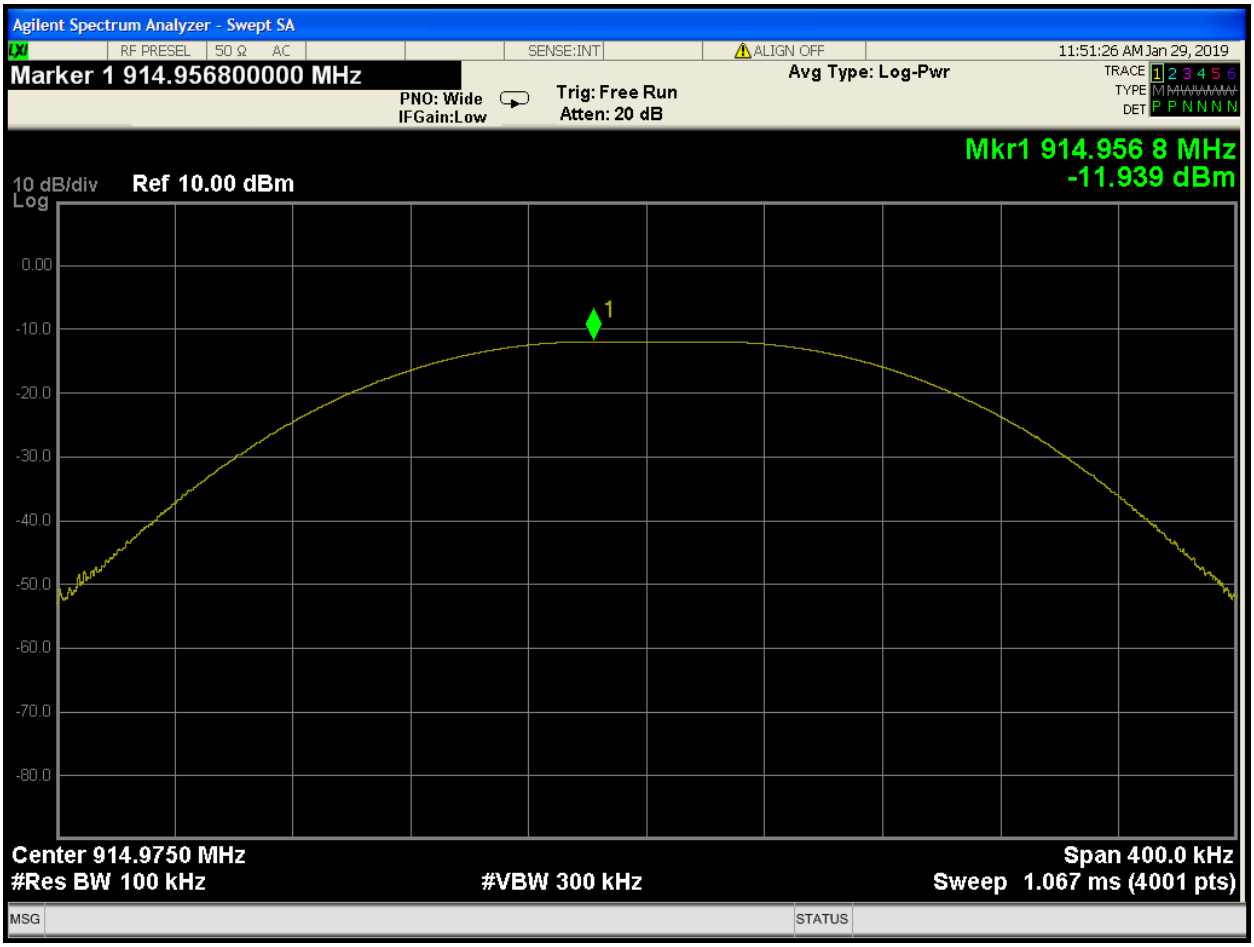
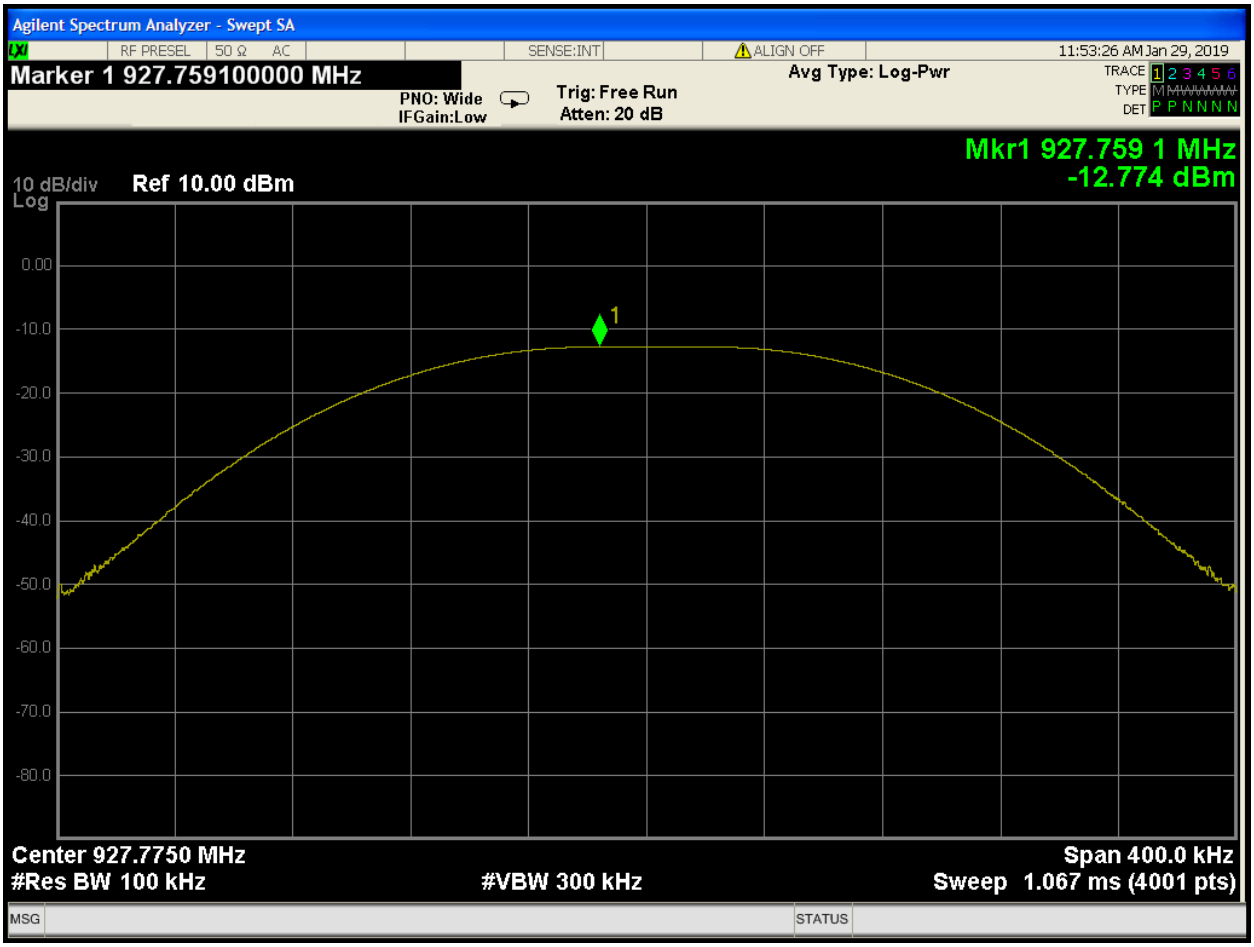
PLOTS



POP Low


Agilent Spectrum Analyzer - Swept SA
RF PRESEL
50 Ω AC
SENSE:INT
ALIGN OFF
11:51:26 AM Jan 29, 2019
Marker 1 914.956800000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE
DET P P N N N N
Mkr1 914.956 8 MHz
-11.939 dBm
10 dB/div
Log
Ref 10.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1
Center 914.9750 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 400.0 kHz
Sweep 1.067 ms (4001 pts)
MSG
STATUS

POP Mid



POP High

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Conducted Bandedges

All band edges must be more than 20dB below the fundamental.

Conducted Bandedge

Date: 29-Jan-19 **Company:** Slingmax Technologies, LLC **Work Order:** S2971
Engineer: AKZ **EUT:** Common Base Station **Operating Voltage/Frequency:** 3.6V DC
Temp: 21°C **Humidity:** 32% **Pressure:** 1012mBar
Frequency Range: 902-928 MHz **Measurement Type:** Conducted
Measurement Method: ANSI C63.10-2013
Notes:

	Delta to Peak (dBm)	Limit (dB)	Limit (Pass/Fail)
Low Bandedge	31.55	≥ 20	Pass
High Bandedge	42.96	≥ 20	Pass
Low Bandedge Hopping	31.54	≥ 20	Pass
High Bandedge Hopping	45.97	≥ 20	Pass

Test Site: CEMI-1 **Cable:** N/A **Attenuator:** Asset# 2121
Analyzer: 1168255

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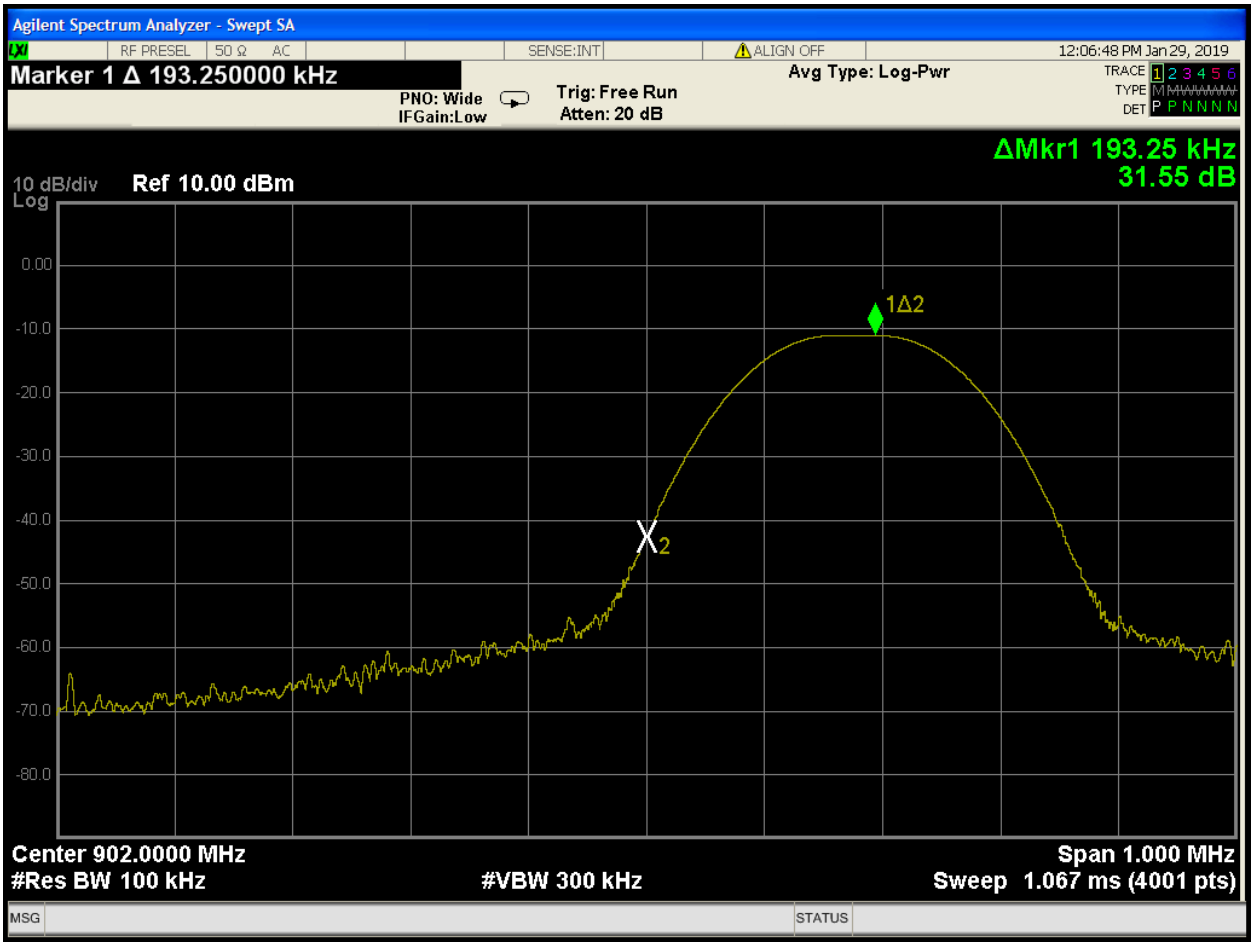
PLOTS



Low BE Non-hopping

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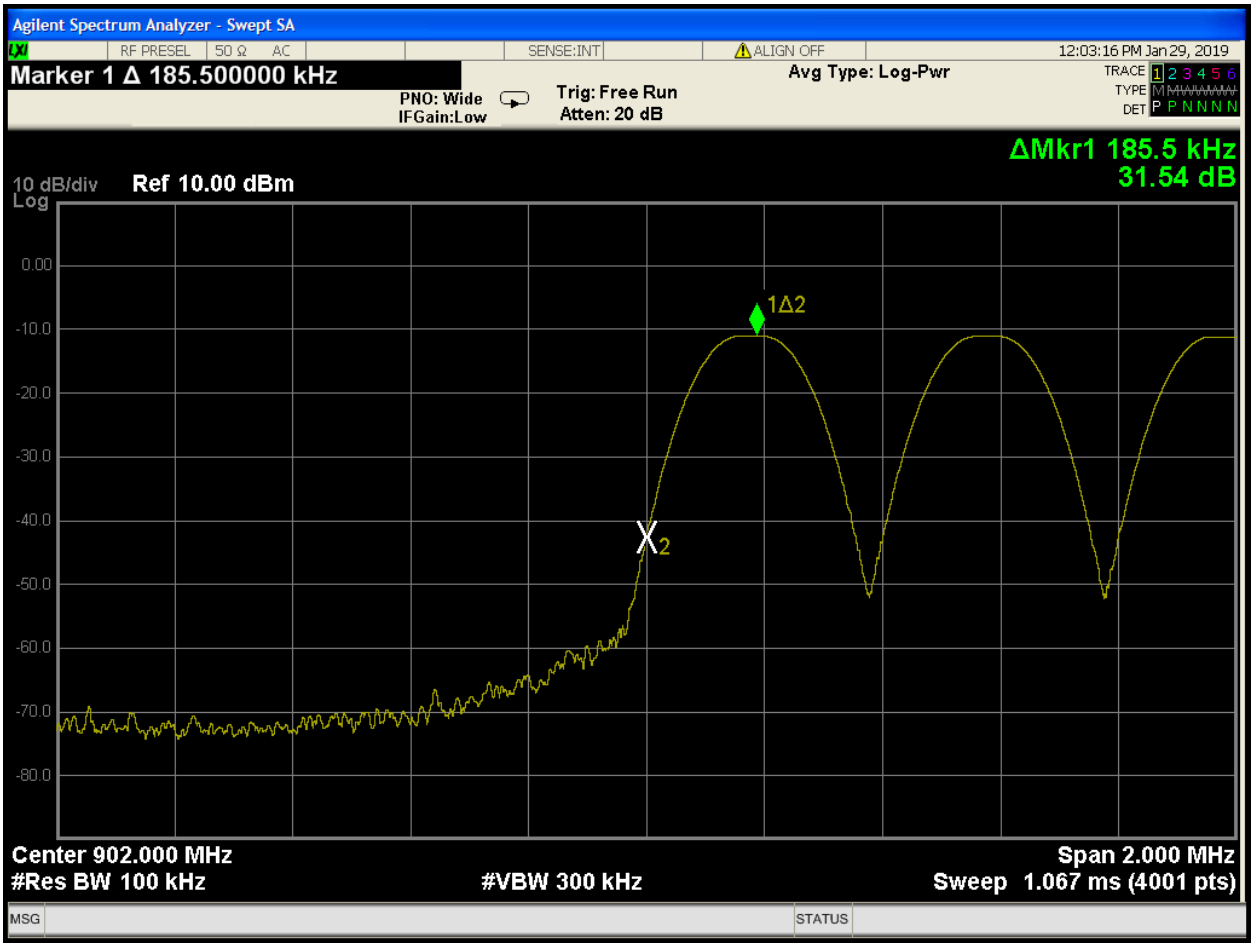

Low BE Hopping

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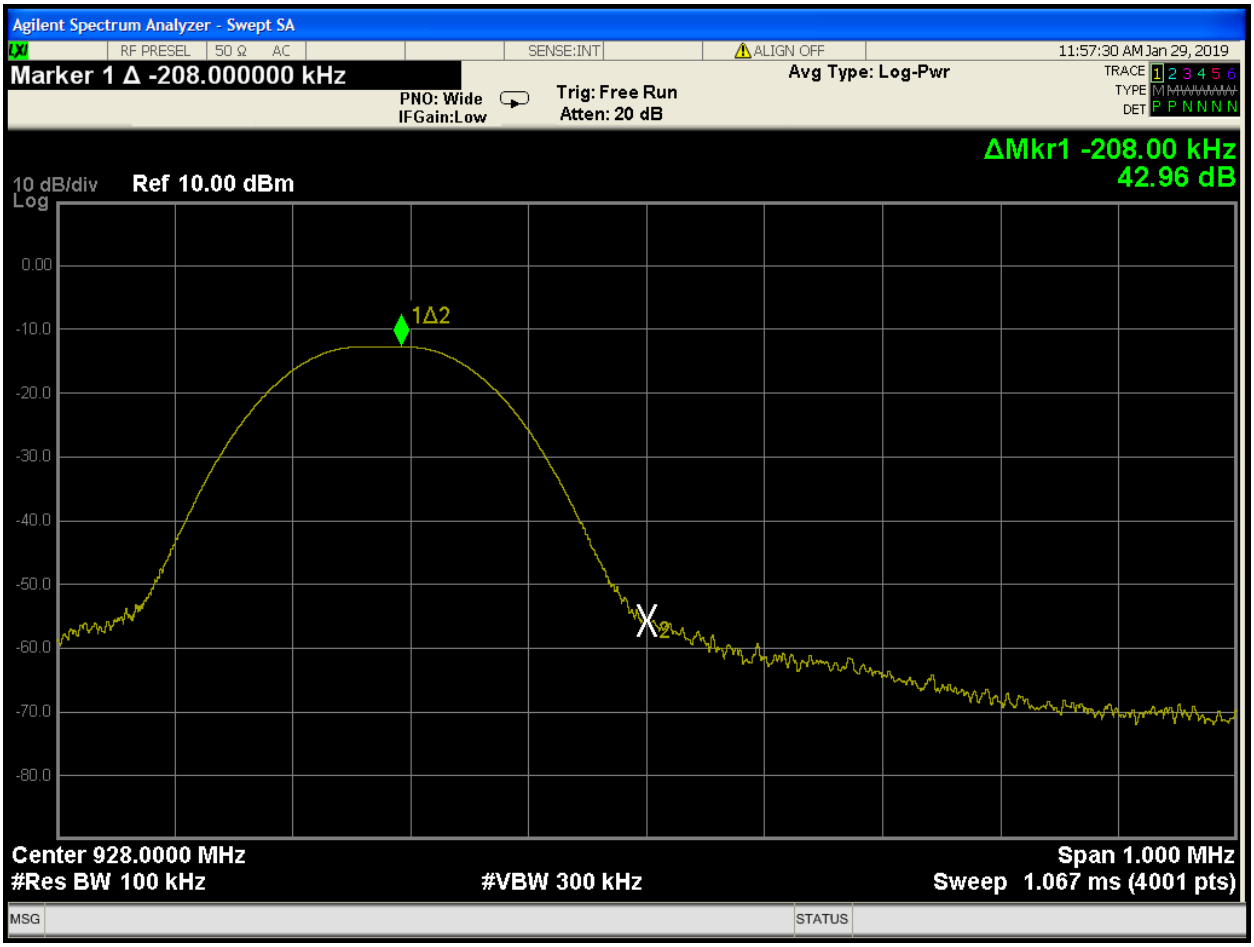
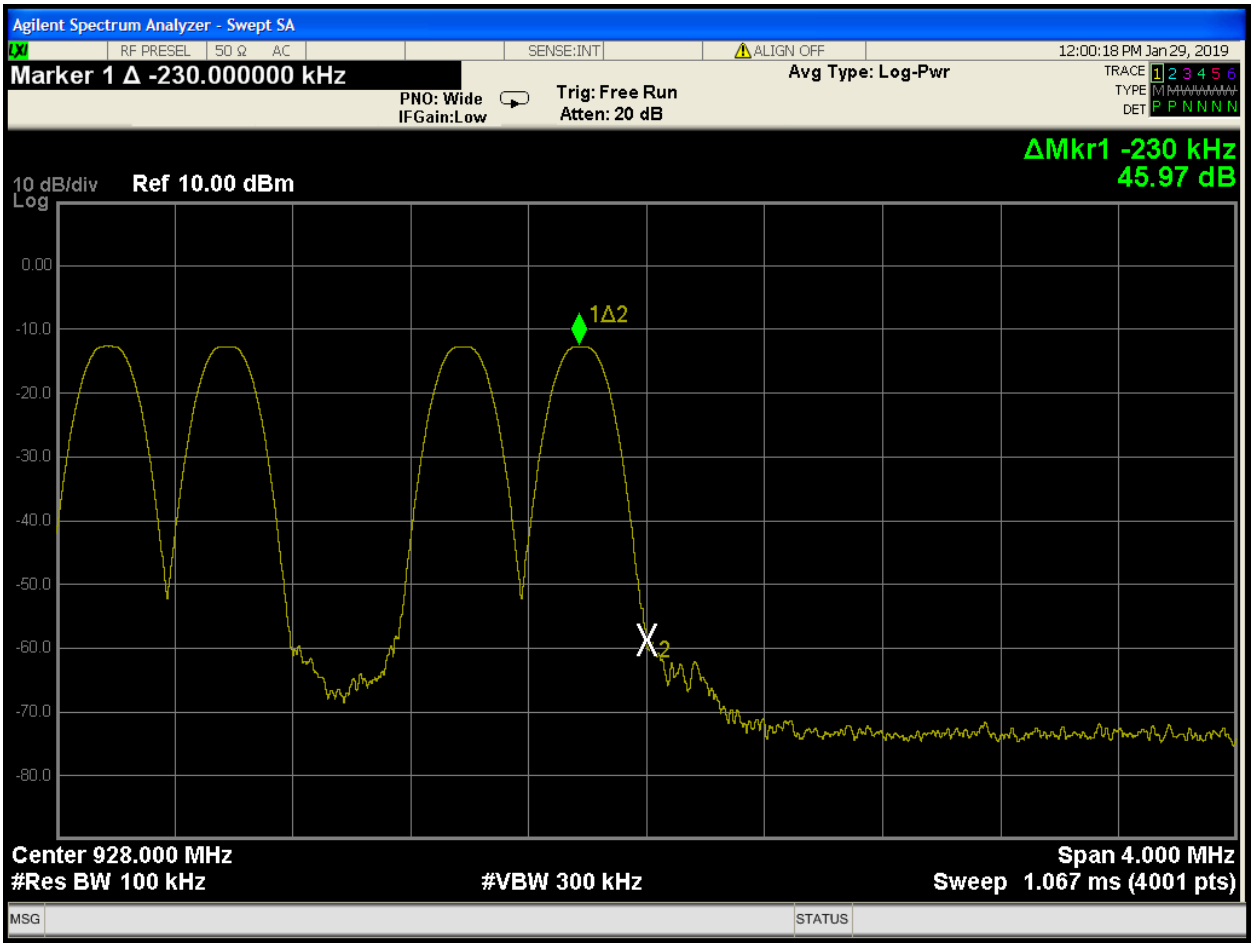


High BE Non-hopping



High BE Hopping

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Conducted Spurious

LIMITS

15.247(d) 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Conducted Spurious

Date: 10/24/2018 **Company:** I and I Sling **Work Order:** S2971
Engineer: Zac Johnson **EUT:** Common Base Station **Operating Voltage/Frequency:** 3.6V DC
Temp: 22.1°C **Humidity:** 33% **Pressure:** 1005mBar
Frequency Range: 9kHz-10GHz **Measurement Type:** Conducted
Measurement Method: ANSI C63.10-2013
Notes:

Channel	Fundamental Reading	Attenuator & Cable Factor	Adjusted Reading	2nd Harmonic Reading	Attenuator & Cable Factor	Adjusted Reading	Delta	Limit	Result
Low	-11.035	29.50	18.47	-32.384	29.83	-2.55	21.02	>20	Pass
Mid	-11.957	29.50	17.54	-32.743	29.83	-2.91	20.46	>20	Pass
High	-12.903	29.57	16.67	-34.512	29.83	-4.68	21.35	>20	Pass

Test Site: EMC-5 **Cable:** 2289 Cbl **Attenuator:** 2121 Pad
Analyzer: 118472 SA

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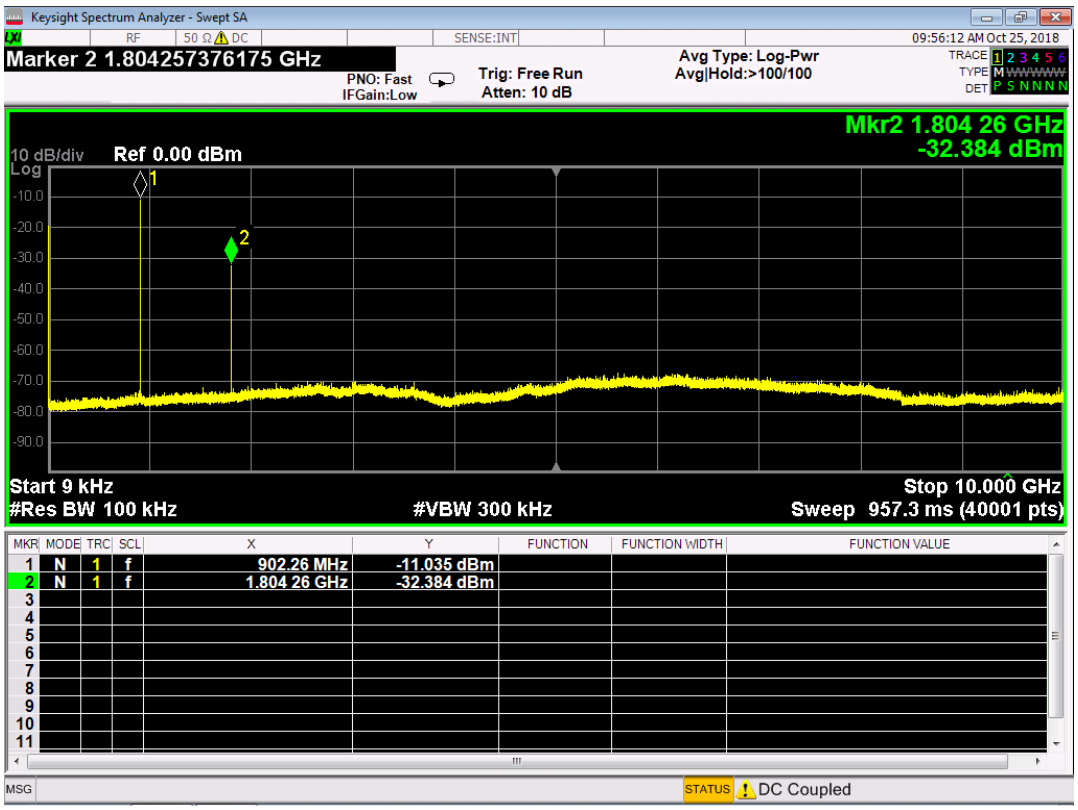
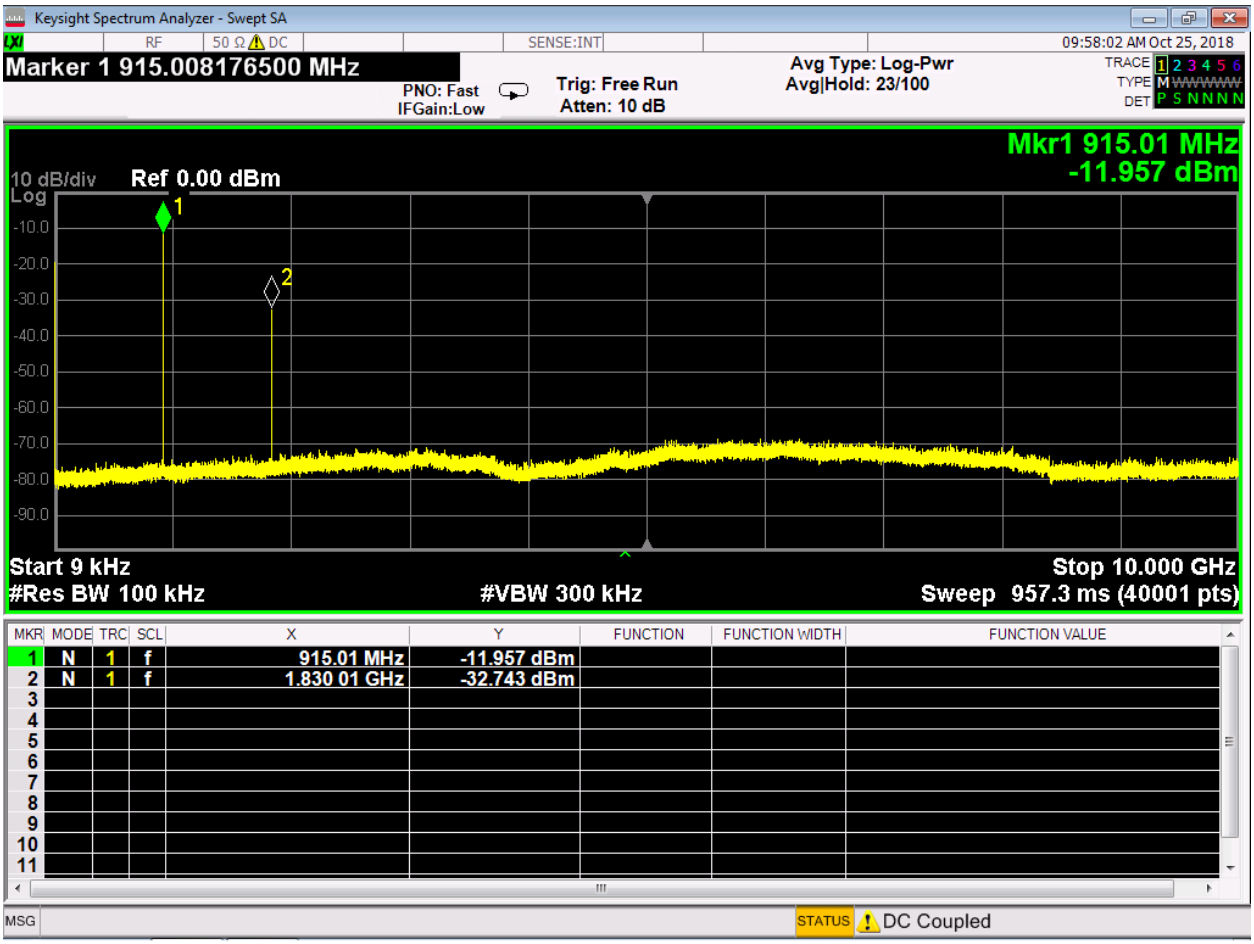


Low channel



Mid channel

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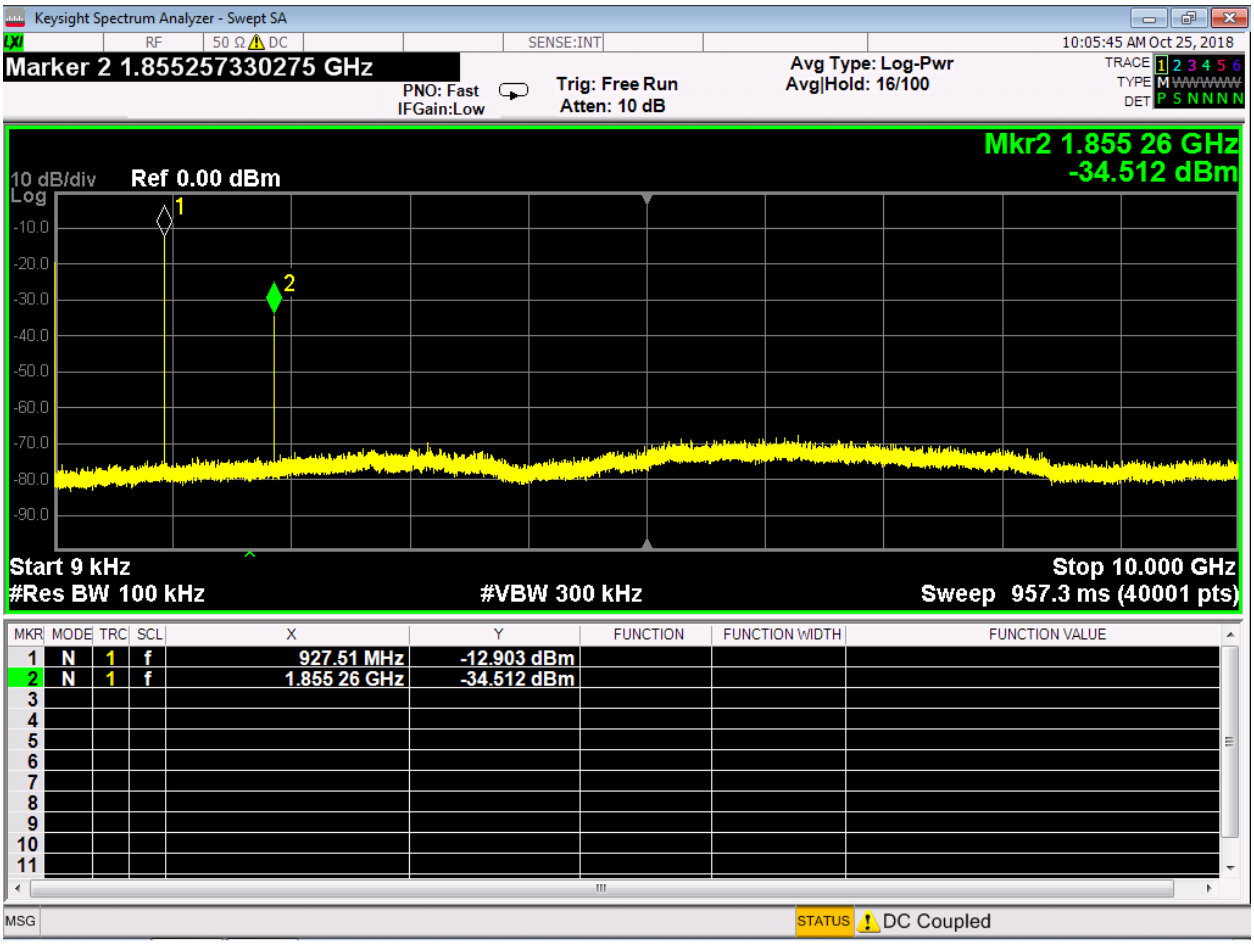

High channel

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Equipment used for the following tests:

20dB Bandwidth and 99% OBW
Channel Separation
Number of Hopping Channels
Dwell Time
Peak Output Power
Conducted Bandedges
Conducted Spurious Emissions

Rev. 10/23/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118472)	9KHz-26.5GHz	N9010A-526;K	AT	MY51170010	1118472	I	8/10/2019	8/10/2018
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	3/23/2019	3/23/2018
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
TH A#2086		HTC-1	HDE		2086	II	3/22/2019	3/22/2018
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2289	9KHz-26.5GHz	FLC-1.5FT-SMSM+	Mini-Circuits	16021039		II	1/29/2019	1/29/2018

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

Rev. 1/27/2019

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	8/23/2019	8/23/2018
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	3/23/2019	3/23/2018

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

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Radiated Spurious Emissions

LIMITS

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

MEASUREMENTS / RESULTS

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:15:11 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
30	25	-1.3	23.7	40	-16.3	PASS		200	180
74.038	33.2	-14.2	19	40	-21	PASS		100	225
811.335	27.9	1.8	29.7	46	-16.3	PASS		200	180
819.701	38.9	-6.7	32.2	46	-13.8	PASS	-13.8	150	225
821.035	40.3	-10.7	29.6	46	-16.4	PASS		100	180
822.175	39.1	-14.1	24.9	46	-21.1	PASS		100	180

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:15:11 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
30	24.3	-1.3	22.9	40	-17.1	PASS		150	315
135.318	27.1	-8.8	18.4	43.5	-25.1	PASS		200	270
772.196	28.3	1.3	29.6	46	-16.5	PASS		250	315
819.459	39.5	-5.9	33.6	46	-12.4	PASS	-12.4	150	225
821.035	40.8	-10.7	30.1	46	-15.9	PASS		150	45
822.272	35.9	-14.4	21.4	46	-24.6	PASS		250	180

30-1000MHz Low Channel

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:28:42 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
30.534	24.5	-1.8	22.8	40	-17.2	PASS		200	135
73.868	32.9	-14.2	18.7	40	-21.3	PASS		100	225
285.401	31.5	-8.6	22.8	46	-23.2	PASS		200	180
777.433	28.3	1.5	29.8	46	-16.2	PASS	-16.2	100	0
820.38	30	-8.7	21.2	46	-24.8	PASS		200	225
821.69	33.7	-12.7	21	46	-25	PASS		100	0

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:37:25 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
30.17	24.2	-1.5	22.8	40	-17.2	PASS		100	270
72.826	27.6	-14.2	13.3	40	-26.7	PASS		250	135
120.113	26.5	-8.7	17.8	43.5	-25.7	PASS		100	225
766.715	28.3	1.2	29.5	46	-16.5	PASS	-16.5	100	0

30-1000MHz Mid Channel

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:57:25 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
30.897	25.2	-2	23.2	40	-16.8	PASS		150	45
72.51	27.8	-14.3	13.5	40	-26.5	PASS		150	90
134.057	26.9	-8.7	18.2	43.5	-25.3	PASS		200	135
306.547	30.1	-8.4	21.7	46	-24.4	PASS		100	135
810.995	28.2	1.8	30	46	-16	PASS	-16	250	180

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

Work Order - S2971
EUT Power Input - 3.7
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 11:57:25 PM, Wednesday, October 24, 2018

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_109_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
30.267	24.6	-1.5	23.1	40	-16.9	PASS	-16.9	200	135
72.922	33.3	-14.2	19.1	40	-20.9	PASS		100	225
136.579	27	-8.9	18.1	43.5	-25.4	PASS		100	270
806.994	27.4	1.6	28.9	46	-17.1	PASS		200	315

30-1000MHz High Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 06:36:53 PM, Wednesday, October 24, 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)
2706.3	49.4	46.3	-0.5	49	74	-25	PASS	-25	45.8	54	-8.2	PASS	-8.2	175	189

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 06:36:53 PM, Wednesday, October 24, 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)
2706.5	49.3	44.2	-0.5	48.8	74	-25.2	PASS	-25.2	43.8	54	-10.2	PASS	-10.2	288	269

1-6GHz Low Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 07:37:13 PM, Wednesday, October 24, 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)
2745.1	49.8	47.9	-0.5	49.3	74	-24.7	PASS	-24.7	47.4	54	-6.6	PASS	-6.6	275	64

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 07:37:13 PM, Wednesday, October 24, 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)
2688.1	41	32.5	-0.4	40.6	74	-33.4	PASS	-33.4	32.1	54	-21.9	PASS	-21.9	275	177

1-6GHz Mid Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 08:43:04 PM, Wednesday, October 24, 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)
2782.8	49	47.1	-0.5	48.5	74	-25.5	PASS	-25.5	46.6	54	-7.4	PASS	-7.4	275	64

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 08:43:04 PM, Wednesday, October 24, 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)
2782.1	43.2	32.7	-0.5	42.7	74	-31.3	PASS	-31.3	32.2	54	-21.8	PASS	-21.8	207	119

1-6GHz High Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 10:39:08 PM, Wednesday, October 24, 2018

Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Pk Lim: FCC_pt15_109_ClassB_Peak	Margin to Peak Limit	Peak Limit Test Results	Peak Limit Worst Margin	Av Lim: FCC_pt15_109_ClassB_AVG	Margin to Avg Limit	Avg Limit Test Results	Avg Limit Worst Margin	Antenna Height	EUT Azimuth
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
6315.4	53.1	6	59.1	83.5	-24.4	PASS	-24.4	63.5	-4.4	PASS	-4.4	150	197
8119.4	46.2	7.3	53.5	83.5	-30	PASS		63.5	-10	PASS		150	197
9021.8	45.5	7.6	53.1	83.5	-30.4	PASS		63.5	-10.4	PASS		150	147
9924.2	45.8	9.3	55.1	83.5	-28.4	PASS		63.5	-8.4	PASS		150	122

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 10:39:08 PM, Wednesday, October 24, 2018

Frequency	Raw Peak Reading	Correction Factor	Adjusted Peak Amplitude	Pk Lim: FCC_pt15_109_ClassB_Peak	Margin to Peak Limit	Peak Limit Test Results	Peak Limit Worst Margin	Av Lim: FCC_pt15_109_ClassB_AVG	Margin to Avg Limit	Avg Limit Test Results	Avg Limit Worst Margin	Antenna Height	EUT Azimuth
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(dBµV/m)	(dB)	(Pass/Fail)	(dB)	(cm)	(degrees)
6315.2	48	6	54	83.5	-29.5	PASS	-29.5	63.5	-9.5	PASS	-9.5	150	172
8493.9	45	7.5	52.5	83.5	-31	PASS		63.5	-11	PASS		150	172
9551.7	44.6	9.2	53.8	83.5	-29.7	PASS		63.5	-9.7	PASS		125	292

6-10GHz Low Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 10:12:48 PM, Wednesday, October 24, 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)
6404.9	56	53.3	6.5	62.5	83.5	-21	PASS	-21	59.8	63.5	-3.7	PASS	-3.7	171	193

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 10:12:48 PM, Wednesday, October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109_Class B_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_109_ClassB_AVG (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
6404.6	53.7	6.5	60.2	83.5	-23.3	PASS	-23.3	63.5	-3.3	PASS	-3.3	125	217
9563.8	44.6	9.2	53.8	83.5	-29.7	PASS		63.5	-9.7	PASS		100	0

6-10GHz Mid Channel

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 09:40:22 PM, Wednesday, October 24, 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)
6493.1	53.5	51.7	6.4	59.9	83.5	-23.6	PASS	-23.6	58.1	63.5	-5.4	PASS	-5.4	167	189
7421.9	41.1	36.2	6.3	47.4	83.5	-36.1	PASS		42.5	63.5	-21	PASS		200	242
8348.2	41.6	34.5	7.7	49.3	83.5	-34.2	PASS		42.2	63.5	-21.3	PASS		200	199
9896.2	38.5	31	9.2	47.7	83.5	-35.8	PASS		40.1	63.5	-23.4	PASS		104	86

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

Work Order - S2971
EUT Power Input - 3.7V DC
Test Site - CH-1
Conditions - 22.1°C; 33%RH; 1005mBar

Data Taken at 09:40:22 PM, Wednesday, October 24, 2018

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_109_ClassB_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_109_ClassB_AVG (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
6493.1	50.5	6.4	56.9	83.5	-26.6	PASS	-26.6	63.5	-6.6	PASS	-6.6	150	224
9627.2	44.5	9.4	53.9	83.5	-29.6	PASS		63.5	-9.6	PASS		200	0

6-10GHz High Channel

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Rev. 10/24/2018

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	4/10/2019	4/10/2018

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
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
2130 BRF	9KHz-10GHz	BRM18770	Micro-Tronics	1	2130	II	1/10/2019	1/10/2018

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	5/15/2020	5/15/2018
TH A#2086		HTC-1	HDE		2086	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 #2466	9KHz-18GHz	MegaPhase	II	10/29/2018	10/29/2017
Asset #2480	9KHz-18GHz	MegaPhase	II	10/29/2018	10/29/2017

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AC Line Conducted Emissions

LIMITS

AC line conducted emissions must comply with the conducted emission limits specified in Section 15.207.

Data Tables:

Curtis Straus - a Bureau Veritas Company
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT Line tested: 120VAC/60Hz; Line 1

Work Order # - S2971
EUT Power Input - 120VAC/60Hz
Test Site - CEMI-2
Conditions: - 22°C; 34%RH; 1003mBar
Test Engineer - AKZ

Data Taken at 10:16:39 AM, Tuesday, December 04, 2018

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Margin to Avg Limit (dB)	Pk to Avg Limit Results (Pass/Fail)	Worst Margin (Avg Limit) (dB)
0.161	27.9	20	47.9	65.4	-17.5	PASS		55.4	-7.5	PASS	
0.201	23.8	19.9	43.7	63.5	-19.8	PASS		53.5	-9.8	PASS	
0.232	22.6	19.8	42.4	62.4	-20	PASS		52.4	-10	PASS	
0.294	23.2	19.8	43	60.4	-17.4	PASS	-17.4	50.4	-7.4	PASS	-7.4
0.421	16.7	19.8	36.5	57.4	-20.9	PASS		47.4	-10.9	PASS	
2.709	11.5	19.8	31.2	56	-24.8	PASS		46	-14.8	PASS	

Curtis Straus - a Bureau Veritas Company
Conducted Emissions per CISPR 16-2-1
Peak Detector Data
Notes:
EUT Line tested: 120VAC/60Hz; Line 2

Work Order # - S2971
EUT Power Input - 120VAC/60Hz
Test Site - CEMI-2
Conditions: - 22°C; 34%RH; 1003mBar
Test Engineer - AKZ

Data Taken at 10:28:50 AM, Tuesday, December 04, 2018

Frequency (MHz)	Raw Pk Reading (dBµV)	Correction Factor (dB)	Adjusted Pk Amplitude (dBµV)	QP Lim: Mains_FCC&CISPR_QP_Class_B (dBµV)	Margin to the QP Limit (dB)	Pk to QP Limit Results (Pass/Fail)	Worst Margin (QP Limit) (dB)	Av Lim: Mains_FCC&CISPR_Avg_Class_B (dBµV)	Margin to Avg Limit (dB)	Pk to Avg Limit Results (Pass/Fail)	Worst Margin (Avg Limit) (dB)
0.18	34	20	54.1	64.5	-10.4	PASS	-10.4	54.5	-0.4	PASS	-0.4
0.207	31.1	20	51.1	63.3	-12.2	PASS		53.3	-2.2	PASS	
0.24	29.5	19.8	49.3	62.1	-12.8	PASS		52.1	-2.8	PASS	
0.302	27.6	19.8	47.4	60.2	-12.8	PASS		50.2	-2.8	PASS	
0.347	22	19.8	41.8	59	-17.2	PASS		49	-7.2	PASS	
0.446	19.7	19.8	39.5	56.9	-17.4	PASS		46.9	-7.4	PASS	

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Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental EXA Signal Analyzer(1118473)	9KHz-26.5GHz	N9010A-526;N	AT	MY51170076	1118473	I	6/19/2019	6/19/2018
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
LISN Asset 1728	150kHz-30MHz	LI-150A	Com-Power	201084	1728	I	5/16/2019	5/16/2018
LISN Asset 1730	150kHz-30MHz	LI-150A	Com-Power	201090	1730	I	4/19/2019	4/19/2018
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 2	719150		A-0015			III	NA	N/A
Meteorological Meters/Chambers		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018
TH A#2082		HTC-1	HDE		2082	II	3/23/2019	3/23/2018
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-17	9kHz - 2GHz		C-S			II	11/5/2019	11/5/2018
20dB Attenuator-05	9kHz-2GHz	2	Aeroflex/Weinschel	BS9092		II	8/4/2019	8/4/2018

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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		

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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

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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.

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