FCC PART 74, SUBPART H

TEST REPORT

For

Lectrosonics, Inc

581 Laser Rd NE
Rio Rancho NM 87124

Model: SMWB-B1, SMDWB-B1
FCC ID: DBZSMWBB1

Report Type:	**Product Type:**
Original Report	Wireless Microphone Transmitter

Test Engineer:	David Hsu
Report Number:	RTWU170504002-00
Report Date:	2017-08-11
Reviewed By:	Jerry Chang

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REVISION HISTORY

Revision	Report Number	Description	Issue Date
0	RTWU170504002-00	Original Report	2017-06-27
1	RTWU170504002-00	Updated page 4, 22, 29 & 30	2017-08-01
2	RTWU170504002-00	Updated page 15	2017-08-11

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1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Lectrosonics, Inc 581 Laser Rd NE Rio Rancho NM 87124
Manufacturer:	Lectrosonics, Inc 581 Laser Rd NE Rio Rancho NM 87124
Product:	Wireless Microphone Transmitter
Model:	SMWB-B1, SMDWB-B1
Operating Frequency:	537.600-607.9 MHz; 614.1- 614.375 MHz
Rate Voltage:	SMWB-B1: DC 1.5V for battery. SMDWB-B1: DC 1.5V for battery.
Date of Test:	May. 04, 2017 ~ May. 15, 2017

**All measurement and test data in this report was gathered from production sample serial number: 170504002 (Assigned by BACL, Taiwan) The EUT supplied by the applicant was received on 2017-05-04.*

1.2 Objective

The report is prepared on behalf of *Lectrosonics, Inc.* in accordance with Part 74, Subparts H of the Federal Communications Commission rules.

The objective is to determine compliance with Part 74 of the FCC Rules, limits for RF output power, Modulation characteristics, Emission bandwidth, Feld strength of spurious radiation and Frequency stability for license-exempt, low-power radio apparatus operating in the television bands.

1.3 Related Submittal(s)/Grant(s)

No related submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted in accordance with TIA 603-D Land Mobile FM or PM Communications Equipment Measurement and Performance Standards. ANSI C63.10-2013, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9kHz to 40GHz.

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on the 70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Test site at Bay Area Compliance Laboratories Corp. (Taiwan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 431084. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

The EUT was configured for testing according to TIA 603-D and ANSI C63.10-2013 Standards.

2.2 Equipment Modifications

Conducted antenna port was enabled by adding additional RF cable from SMA.

2.3 Support Equipment List and Details

Description	Manufacturer	Model Number	S/N
N/A	N/A	N/A	N/A

2.4 External Cable List and Details

Cable Description	Length (m)	From	To
N/A	N/A	N/A	N/A

3 Summary of Test Results

FCC Rules	Description of Test	Results
FCC §2.1093,	RF Exposure	Compliant*
FCC §74.861(e)(1),	RF output power	Compliant
FCC §74.861(e)(3),	Modulation characteristics	Compliant
FCC §74.861(e)(5)(6),	Emission bandwidth & Emission Mask	Compliant
FCC §74.861(e)(6),	Spurious radiation at the antenna port	Compliant
FCC §74.861(e)(6),	Field strength of spurious radiation	Compliant
FCC §74.861(e)(4),	Frequency stability	Compliant

Compliant*: please refer to the SAR report number R1704197-SAR.

4 FCC §74.861(e)(1) - RF Output Power

4.1 Applicable Standard

According to FCC §74.861 (e) (1): the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

(i) 54-72, 76-88, and 174-216 MHz bands—50 mW
(ii) 470-608 and 614-698 MHz bands—250 mW

4.2 Test Procedure

Connect the EUT to spectrum analyzer and set the spectrum analyzer as following:

- Center frequency: channel frequency under test
- RBW: 1 MHz
- VBW: 3 MHz
- Detector mode: peak
- Span: 1 MHz

Max hold the trace and record the peak value once the trace stabilized.

4.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2016/11/10	2017/11/9
Cable	WOKEN	SFL402	00100A1F6A192S	2017/2/22	2018/2/21

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

4.4 Test Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

The testing was performed by David Hsu on 2016-05-05.

4.5 Test Results

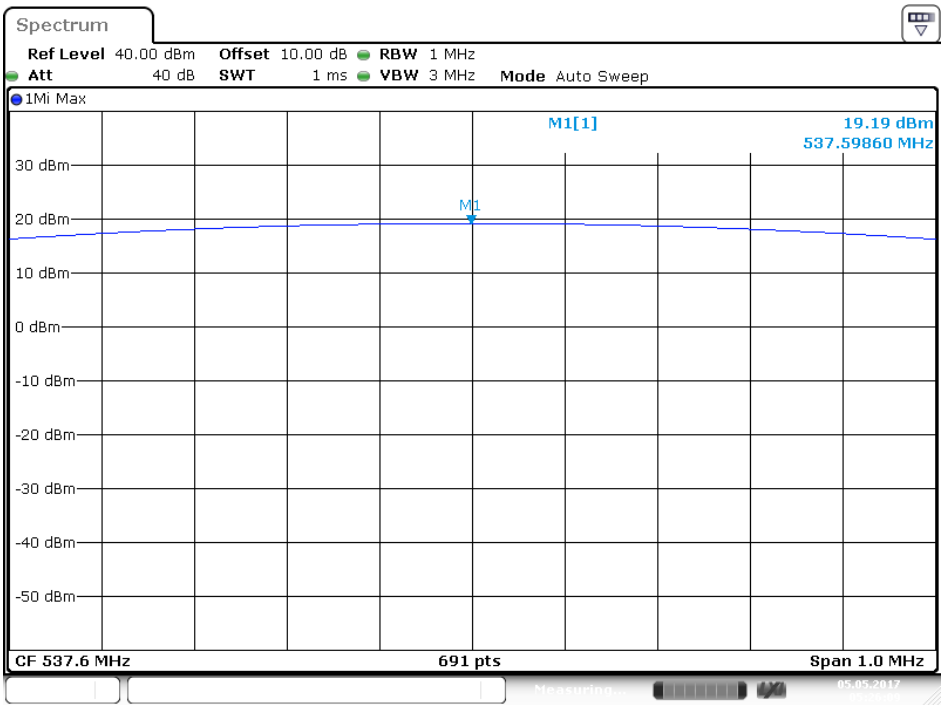
Conducted Power

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limits (dBm)	Margin (dB)	Rated Power (mW/dBm)
Low	537.6	19.19	24	-4.81	100/20
		13.91	24	-10.09	25/14
Middle	576	19.54	24	-4.46	100/20
		13.61	24	-10.39	25/14
High	614.3	20.05	24	-3.95	100/20
		13.6	24	-10.4	25/14

Please refer to the following plots for detailed test results

100mW Power Setting:

Low Channel



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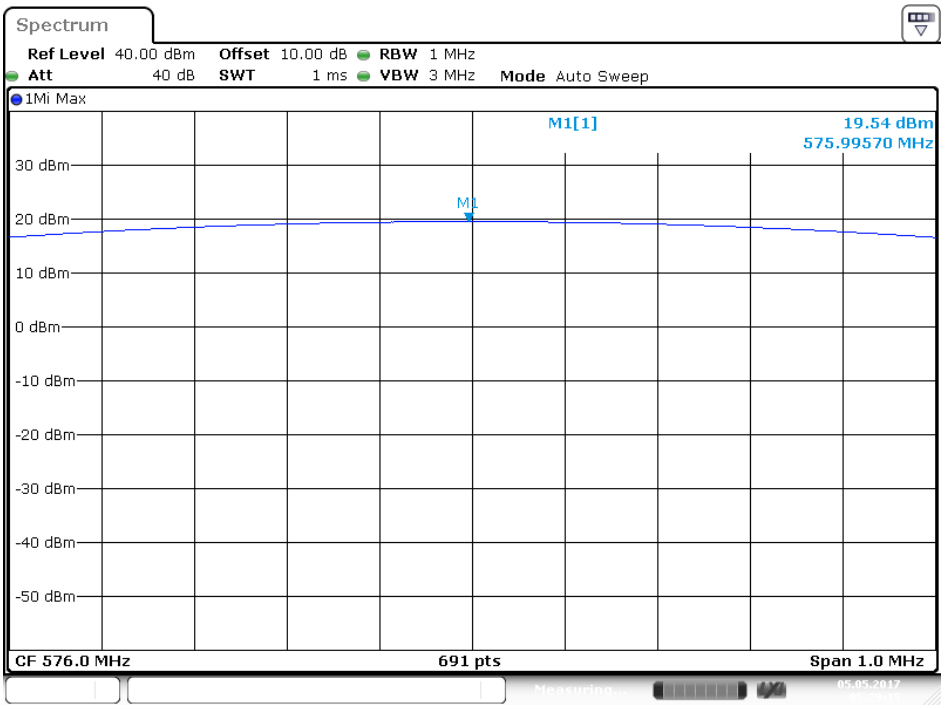
Middle Channel



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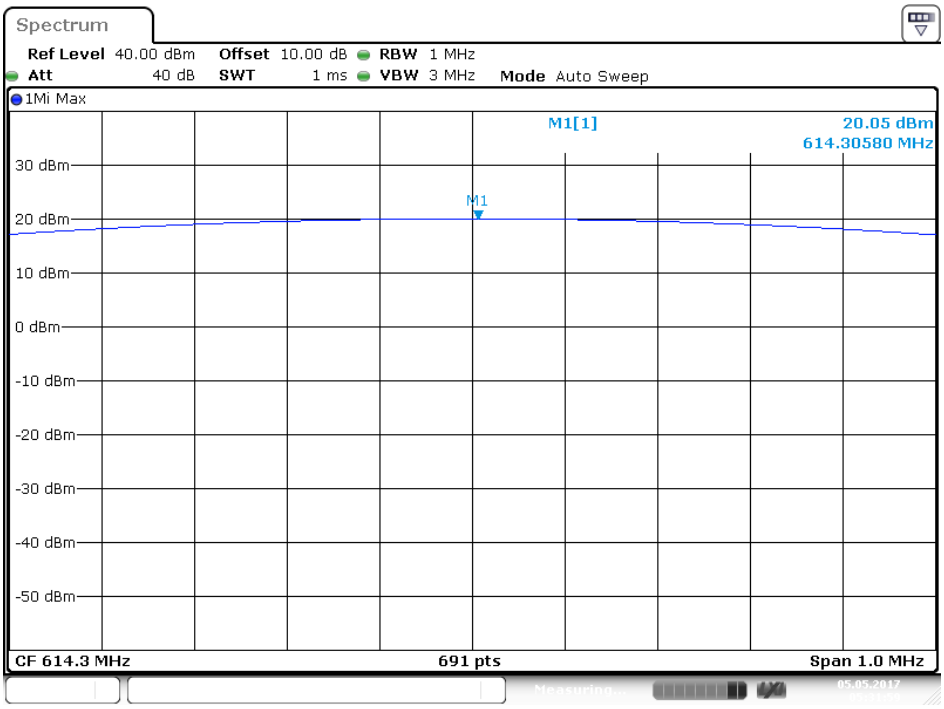
High Channel



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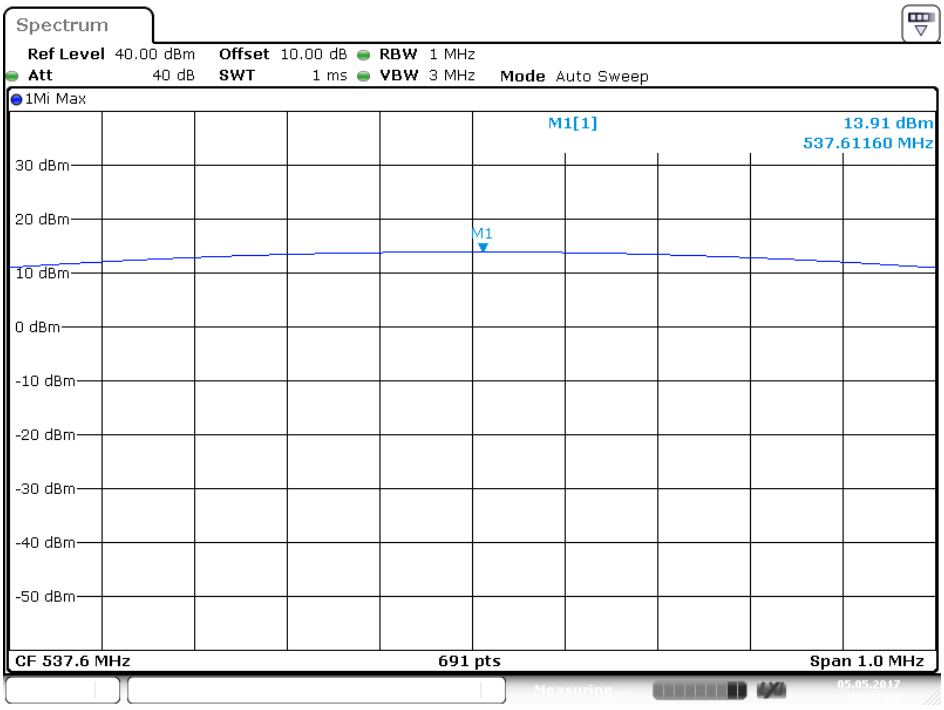
25mW Power Setting:

Low Channel



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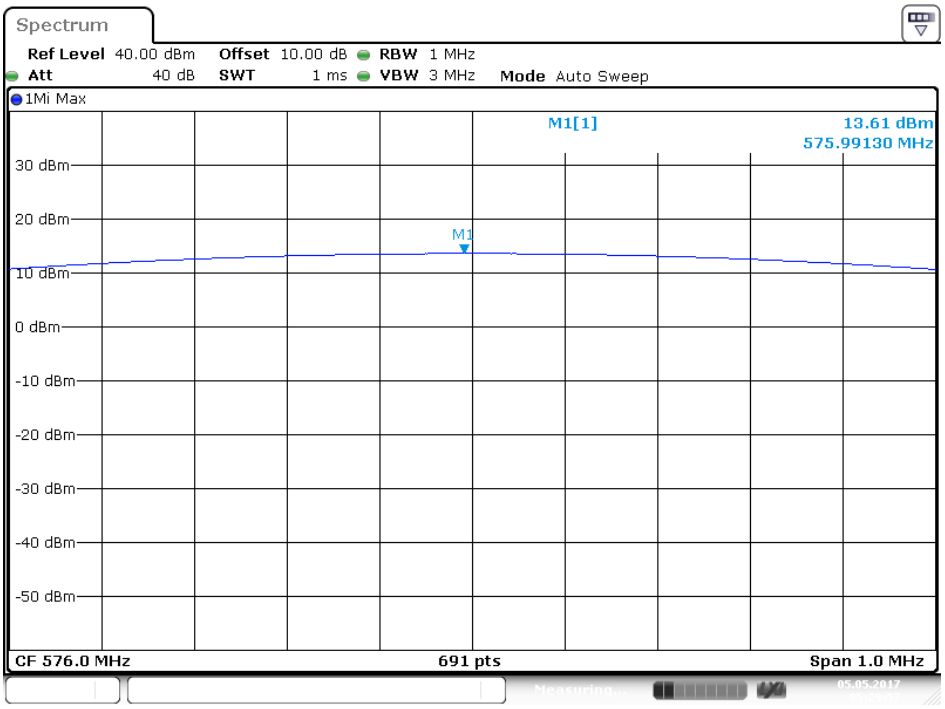

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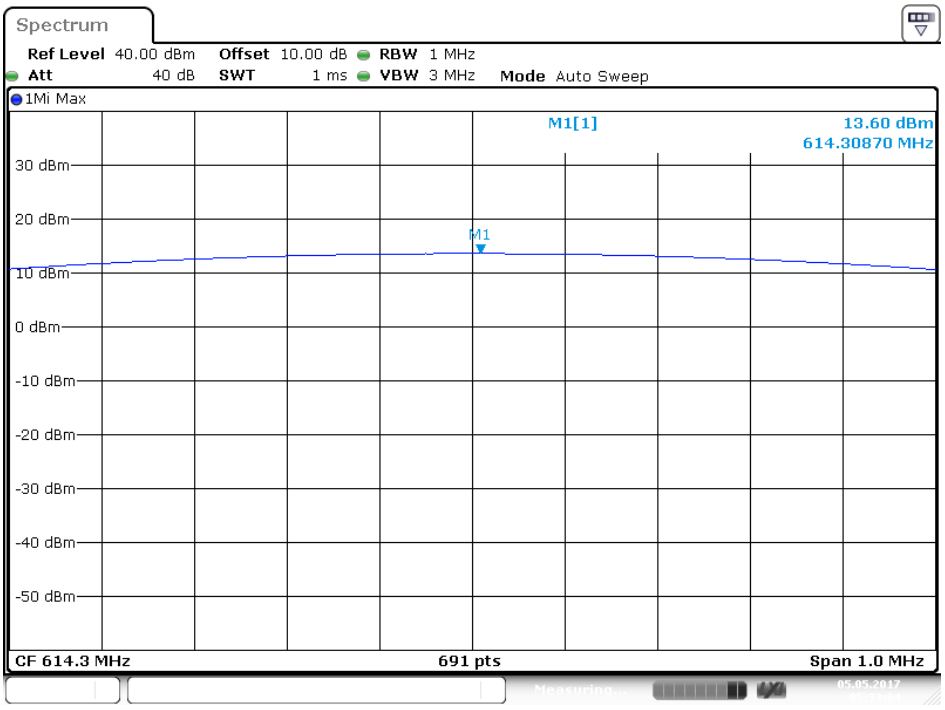


Date: 5.MAY.2017 05:33:05

5 FCC 74.861(e)(3) - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC §74.861 (e) (3):

Any form of modulation may be used. A maximum deviation of ±75 kHz is permitted when frequency modulation is employed.

5.2 Test Procedure

According to ANSI/TIA-603-D 2010 section 2.2.3, modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviation in excess of a rated system deviation.

Connect the modulation analyzer to EUT and EUT to test receiver. Apply a 1000 Hz modulating signal to the transmitter from the modulation analyzer, and adjust the level to obtain 60% of full rated system deviation.

Increase the level from the modulation analyzer by 5dB in one step, record the deviation obtained from the receiver.

Decrease the level from the modulation analyzer by 5dB in one step, record the deviation obtained from the receiver.

With the level from the modulation analyzer held constant at each level, vary frequency from 300 Hz to 15000 Hz. Record the deviation.

5.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2016/11/10	2017/11/9
RF Communication test set	HP Agilent	8920A	3325U00859	2016/6/7	2017/6/6
Attenuator	MINI-CIRCUITS	BW-S10W5+	------	2017/3/16	2018/3/15
Cable	WOKEN	SFL402	S02-160323-07	2017/2/22	2018/2/21

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

5.4 Test Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

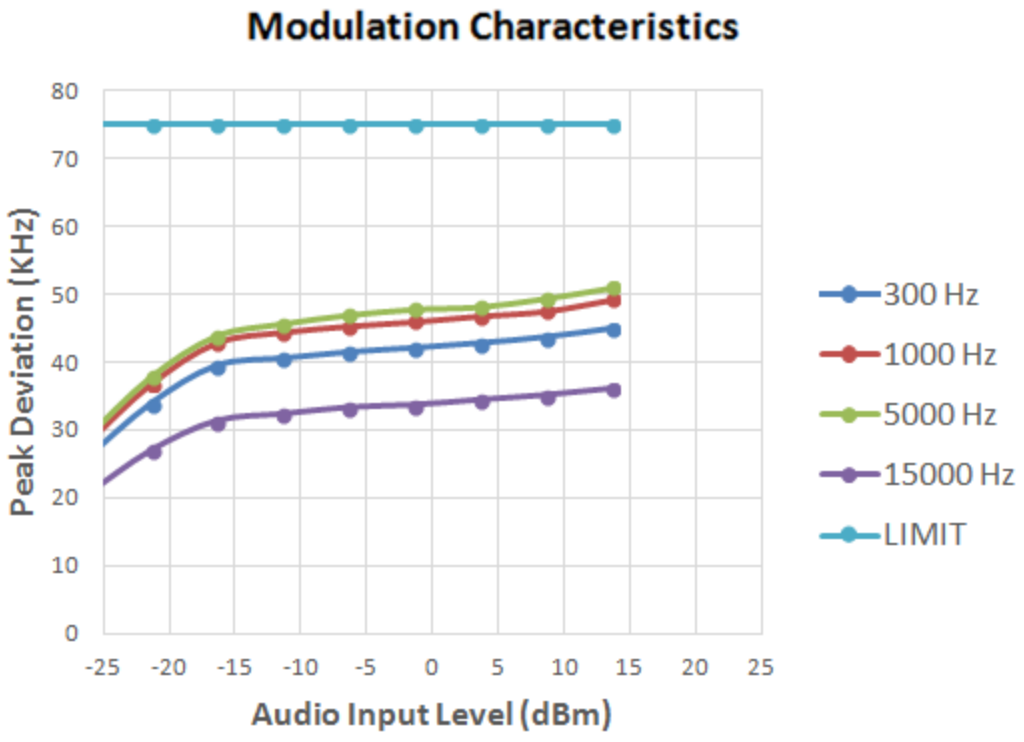
The testing was performed by David. Hsu on 2017-05-12.

Test Result: Compliance. Please refer to the following tables and plots.

5.5 Test Results

Modulation Limiting
Carrier Frequency: 576 MHz

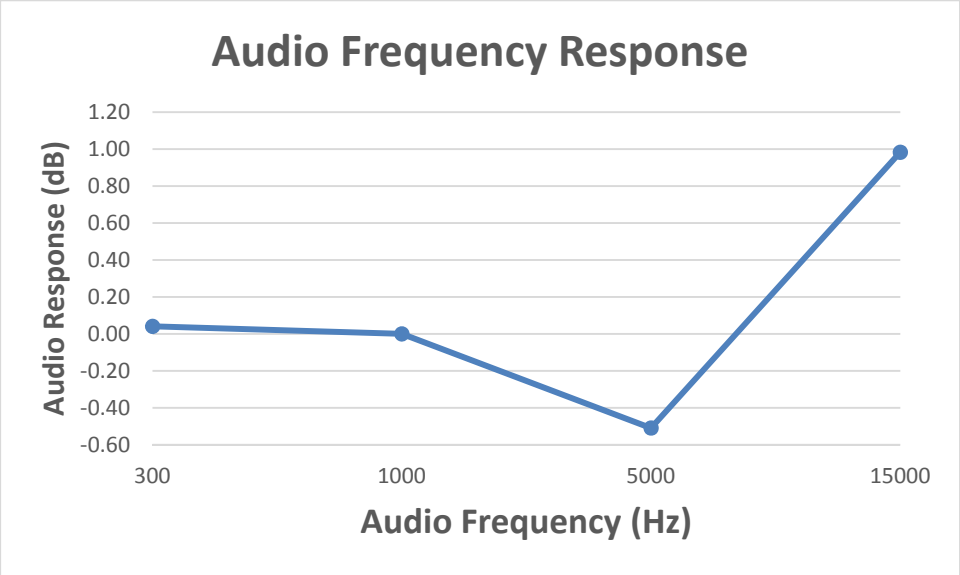
AF Level (dBm)	AF Frequency (Hz)/Peak Deviation (kHz)				Limit (kHz)
	300 Hz	1000 Hz	5000 Hz	15000 Hz	
13.6	44.81	49.11	50.86	36.07	±75
8.6	43.56	47.43	49.3	35.13	±75
3.6	42.66	46.73	48.05	34.43	±75
-1.4	41.96	45.88	47.7	33.7	±75
-6.4	41.32	45.23	46.85	33.32	±75
-11.4	40.43	44.32	45.55	32.36	±75
-16.4	39.33	42.74	43.75	31.34	±75
-21.4	33.69	36.61	37.62	26.97	±75
-26.4	25.4	27.58	28.43	20.33	±75



Audio Frequency Response
Carrier Frequency: 576 MHz

AF Frequency (Hz)	AF Level (uV)	AF Response (dB)
300	44.81	0.04
1000	45.23	0.00
5000	50.86	-0.51
15000	36.07	0.98

Note: AF Response = 10*log (AF Level of 1 kHz/AF Level)



6 FCC § 74.861(e) (5) (6) – OCCUPIED BANDWIDTH & EMISSION MASK

6.1 Applicable Standard

According to FCC §74.861 (e) (5) (6):The operating bandwidth shall not exceed 200 kHz.
The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

6.2 Test Procedure

According to TIA-603-D the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3×RBW

Note: Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Us of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

6.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2016/11/10	2017/11/9
RF Communication test set	HP Agilent	8920A	3325U00859	2016/6/7	2017/6/6
Attenuator	MINI-CIRCUITS	BW-S10W5+	------	2017/3/16	2018/3/15
Cable	WOKEN	SFL402	S02-160323-07	2017/2/22	2018/2/21

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

6.4 Test Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

The testing was performed by David. Hsu on 2017-05-12

6.5 Test Results

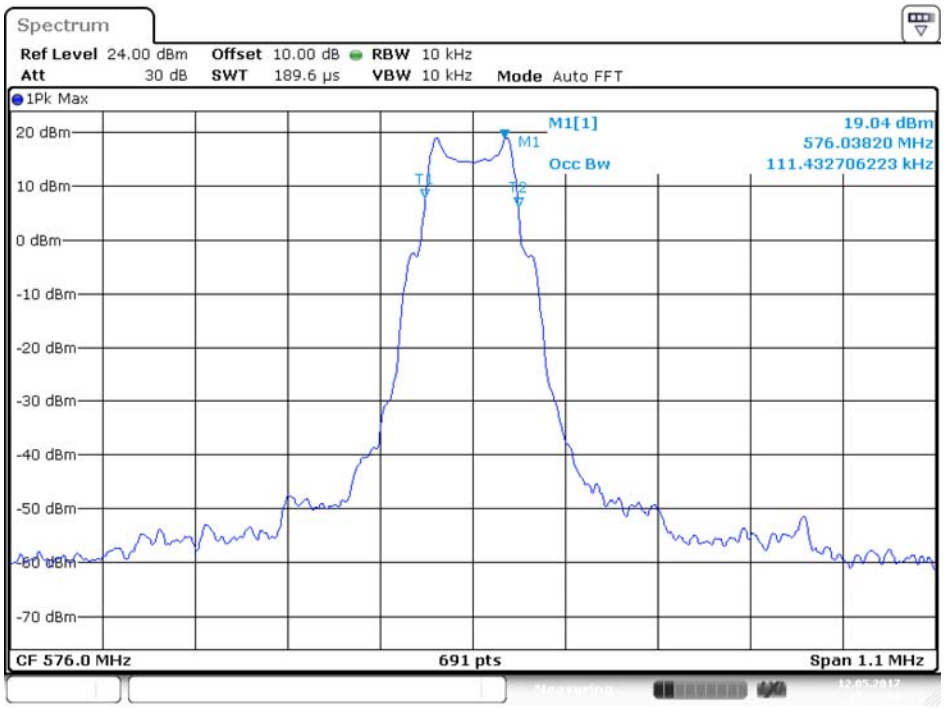
Test Mode: Transmitting

Center Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result	Power Setting
576	111.43	200	PASS	High (100 mW)
576	113.02	200	PASS	Low (25 mW)

Please refer to the following plots for detailed test results

100mW Power Setting:

99% Occupied Bandwidth



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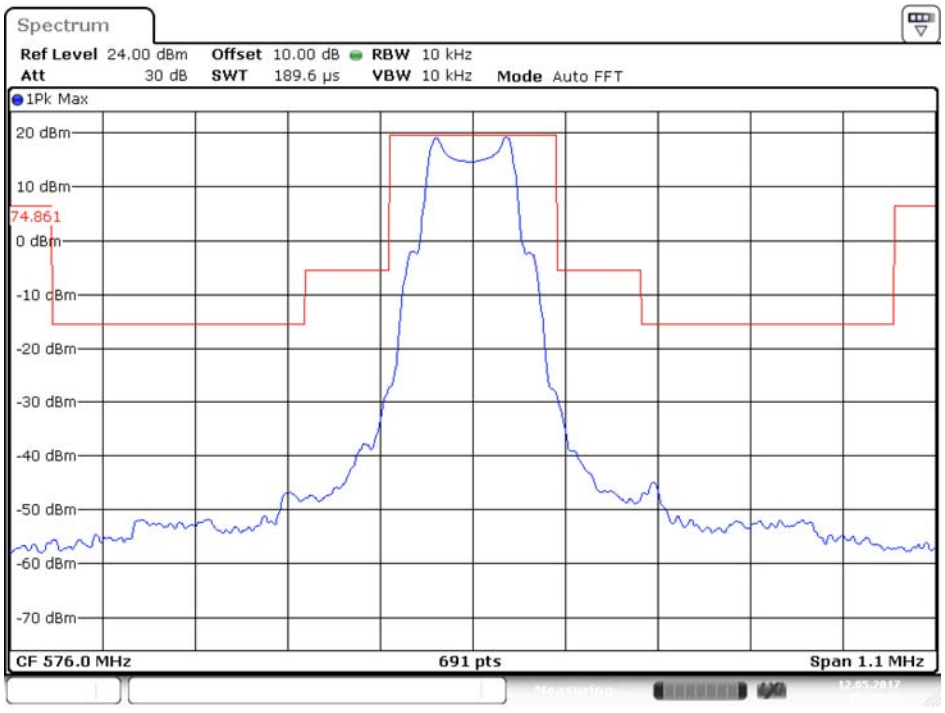
Emission Mask



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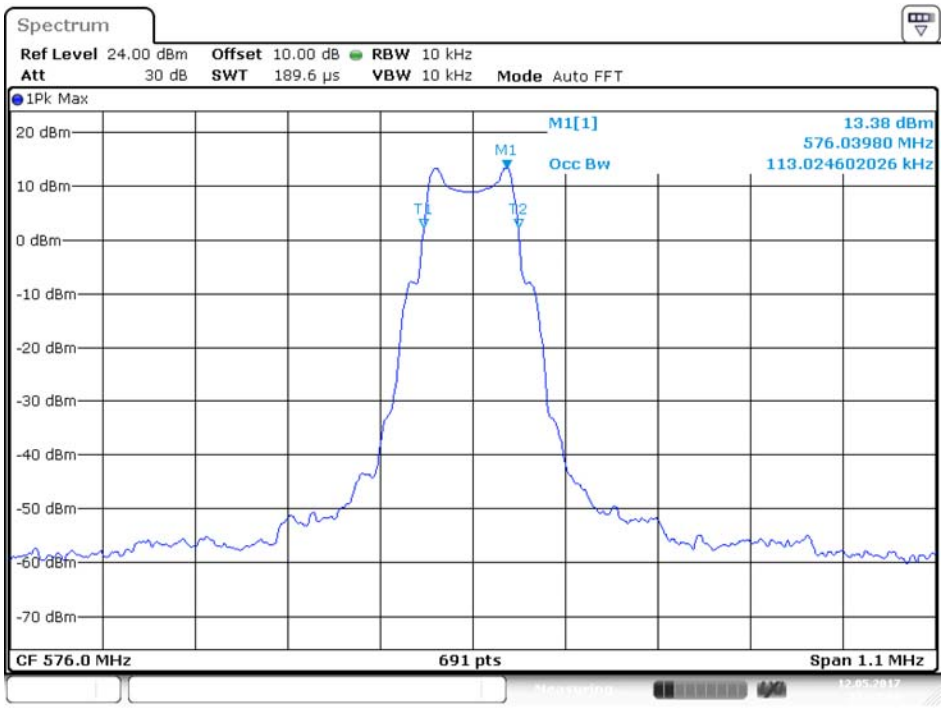
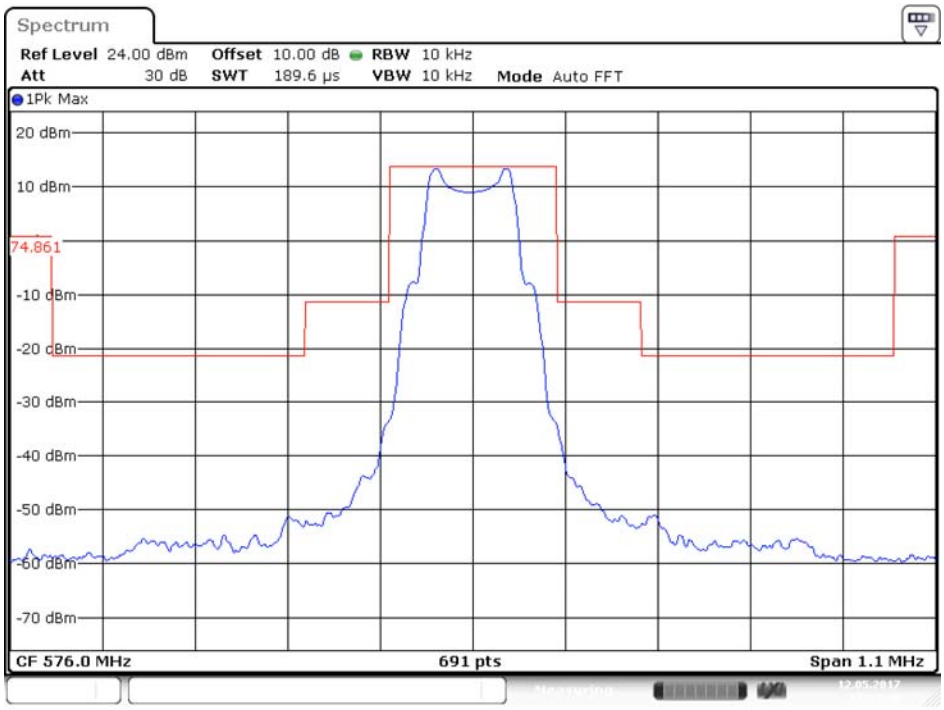
25mW Power Setting:

99% Occupied Bandwidth



Date: 12.MAY.2017 17:33:10

Emission Mask



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7 FCC § 74.861(e) (6) (iii) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

According to FCC §74.861 (e) (6) (iii):

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10log (mean output power in watts) dB.

7.2 Test Procedure

According to ANSI/TIA-603-D 2010 section 2.2.13, conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired. The method of measurement is as following:

- Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.
- Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.
- Adjust the spectrum analyzer for the following setting:
    1. Resolution bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
    2. Video bandwidth ≥ 3 times the resolution bandwidth.
    3. Sweep speed ≤ 2000 Hz per second
    4. Detector mode = mean or average power.
- Record the frequencies and level of spurious emissions.

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz, up to at least the frequency given in (a) and (b):

a) If the equipment operated below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency, as well as to those frequencies removed from the carrier by multiple of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

When limits are expressed in absolute terms, compliance with the emission limits shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth for emissions below 1000 MHz as an alternative to CISPR quasi-peak measurement, compliance with the emission limits can be demonstrated using

measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, compliance with the emission limits shall be demonstrated using an average detector with a minimum resolution bandwidth of 1 MHz.

7.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2016/11/10	2017/11/9
RF Communication test set	HP Agilent	8920A	3325U00859	2016/6/7	2017/6/6
Cable	WOKEN	SFL402	S02-160323-07	2017/2/22	2018/2/21

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

7.4 Test Environmental Conditions

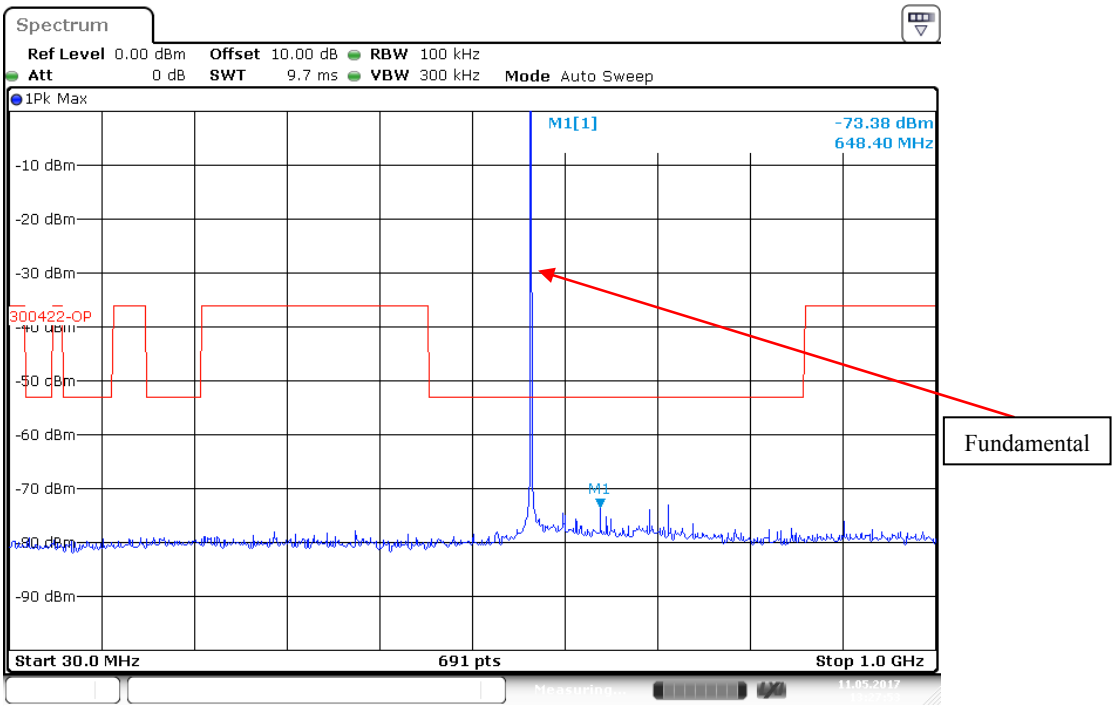
Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

The testing was performed by David. Hsu on 2017-05-11 to 2017-05-15
EUT operation mode: Transmitting

7.5 Test Results

100 mW Power Setting:

30MHz-1GHz



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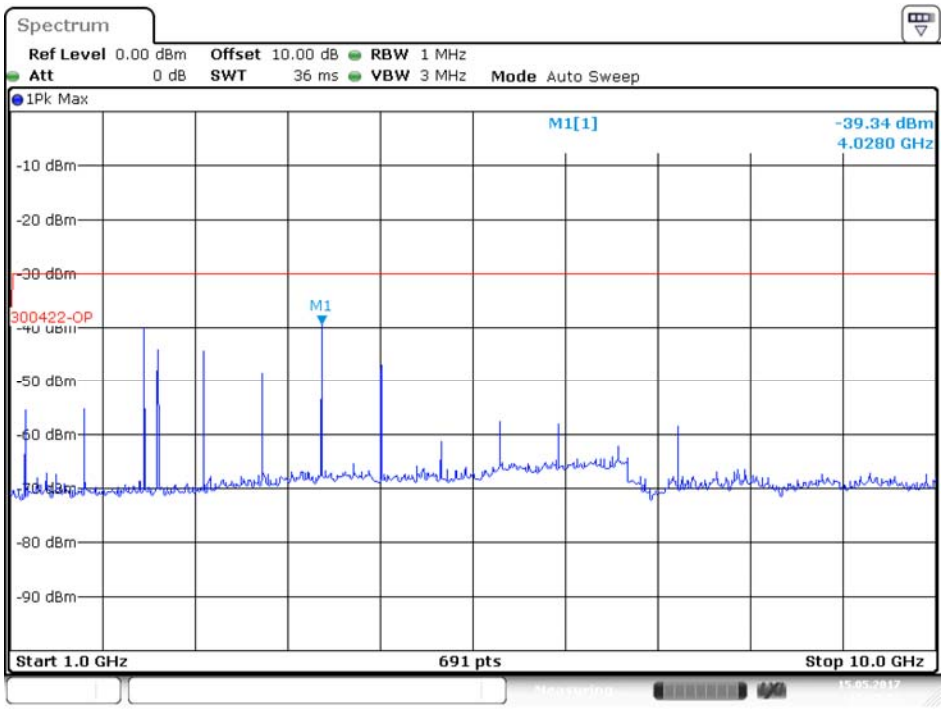
1GHz-10GHz



Date: 15.MAY.2017 15:15:58

Note: The limit line in above plots is based on EN 300 422 limit; however, FCC limit line is -13 dBm. Plots comply with both FCC requirements

8 FCC § 74.861(e) (6) (iii) - RADIATED SPURIOUS EMISSIONS

8.1 Applicable Standard

According to FCC §74.861 (e) (6) (iii):

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10log (mean output power in watts) dB.

8.2 Test Procedure

According to ANSI/TIA-603-D 2010 section 2.2.13, conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired. The method of measurement is as following:

- Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.
- Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.
- Adjust the spectrum analyzer for the following setting:
    5. Resolution bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
    6. Video bandwidth ≥ 3 times the resolution bandwidth.
    7. Sweep speed ≤ 2000 Hz per second
    8. Detector mode = mean or average power.
- Record the frequencies and level of spurious emissions.

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz, up to at least the frequency given in (a) and (b):

a) If the equipment operated below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency, as well as to those frequencies removed from the carrier by multiple of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

When limits are expressed in absolute terms, compliance with the emission limits shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth for emissions below 1000 MHz as an

alternative to CISPR quasi-peak measurement, compliance with the emission limits can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, compliance with the emission limits shall be demonstrated using an average detector with a minimum resolution bandwidth of 1 MHz

8.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Interval
Broadband Antenna	Sunol Sciences	JB6	A050115	2016/11/16	2017/11/15
Amplifier	Sonoma	310N	130602	2016/7/15	2017/7/14
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2016/11/3	2017/11/2
Mircoflex Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2016/11/2	2017/11/1
Mircoflex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2016/7/15	2017/7/14
Mircoflex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2016/11/29	2017/11/28
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	060772	N.C.R	N.C.R
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R
Horn Antenna	EMCO	3115	9311-4158	2016/5/10	2017/5/9
Preamplifier	EMEC	EM01G18G	060657	2016/12/13	2017/12/12
Spectrum Analyzer	Rohde & Schwarz	FSEK30	825084/006	2016/12/15	2017/12/14
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-80CM	160309-2	2017/1/18	2018/1/17
Mircoflex Cable	ROSNAL	K1K50-UP0264-K1K50-450CM	160309-1	2017/3/24	2018/3/23
Sweep Signal Generator	Agilent	83650B	3420A00581	2016/7/7	2017/7/6
Horn Antenna	EMCO	3115	2171	2016/7/19	2017/7/18
Bilog Antenna & 6 dB Attenuator	Sunol Sciences & EMEC	JB3 &EM-ATT18-6-NN	A061204 &ATT-06-001	2016/11/16	2017/11/15

8.4 Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

The testing was performed by David. Hsu on 2016-05-09

8.5 Test Data

Test Result: Compliance. Please refer to the following plots.

EUT was configured to high power setting,

Test mode: middle channel

SMWB-B1

Horizontal

Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant. Gain (dBd)/(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (°)	Remark
240.49	-89.05	2.11	5.78	-85.38	-13	-72.38	150	303	peak
1728	-58.89	3.73	8.25	-54.37	-13	-41.37	150	345	peak
2304	-46.31	4.35	9.03	-41.63	-13	-28.63	150	6	peak
2880	-52.78	4.83	9.2	-48.41	-13	-35.41	150	37	peak

Vertical

Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant. Gain (dBd)/(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (°)	Remark
360.77	-83.09	2.59	6.18	-79.5	-13	-66.5	150	197	peak
1728	-55.43	3.73	8.25	-50.91	-13	-37.91	150	1	peak
2304	-48.86	4.35	9.03	-44.18	-13	-31.18	150	355	peak

Note:
Result = SG Level - Cable loss + Antenna Gain
Margin = Result – Limit
The other emission levels were very low against the limit.
The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

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Horizontal

Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant. Gain (dBd)/(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (°)	Remark
176.47	-86.84	1.8	3.64	-85	-13	-72	150	270	peak
1728	-54.32	3.73	8.25	-49.8	-13	-36.8	150	356	peak
2304	-48.4	4.35	9.03	-43.72	-13	-30.72	150	25	peak
2880	-58.22	4.83	9.2	-53.85	-13	-40.85	150	31	peak

Vertical

Frequency (MHz)	S.G. (dBm)	Cable loss(dB)	Ant. Gain (dBd)/(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)	Height (cm)	Azimuth (°)	Remark
310.33	-83.99	2.41	5.94	-80.46	-13	-67.46	150	262	peak
1728	-61.07	3.73	8.25	-56.55	-13	-43.55	150	20	peak
2304	-49.14	4.35	9.03	-44.46	-13	-31.46	150	356	peak
2876	-56.63	4.83	9.2	-52.26	-13	-39.26	150	353	peak

Note:

Result = SG Level - Cable loss + Antenna Gain

Margin = Result – Limit

The other emission levels were very low against the limit.

The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

9 FCC § 74.861(e) (4) - FREQUENCY STABILITY

9.1 Applicable Standard

According to FCC §74.861 (e) (4):

The frequency tolerance of the transmitter shall be 0.005 percent

9.2 Test Procedure

According to ANSI/TIA-603-D 2010 section 2.2.2, the carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The measurement method is as following:

- Operate the equipment in standby conditions for 15 minutes before proceeding.
- Record the carrier frequency of the transmitter as MCF MHz.
- Calculate the ppm frequency error by the following:

$$\text{Ppm error} = (\text{MCF}/\text{ACF} - 1) * 10\text{^}6$$

Where

MCF is the Measured Carrier Frequency in MHz
ACF is the Assigned Carrier Frequency in MHz

- The value recorded above is the carrier frequency stability.

A hand-held device that is only capable of operating using internal batteries shall be tested using a new battery without any further requirement to vary the supply voltage. Alternatively, an external supply voltage can be used and set at the batter nominal voltage, and again at the battery operating end point voltage which must be specified by the equipment manufacturer.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency-determining circuit element shall be made subsequent to this initial set-up.

With the transmitter installed in an environment test chamber, the unmodulated carrier frequency shall be measured under the conditions specified below. A sufficient stabilization period at each temperature shall be used prior to each frequency measurement. The following temperatures and supply voltage ranges apply, unless specified otherwise in the applicable.

a) At temperature of -30°C, +20°C and +50°C, and at the manufacturer's rated supply voltage; and

b) At a temperature of +20°C and at ±15 percent of the manufacturer's rated supply voltage.

If the frequency stability limits are only met at a different temperature range than specified in (a), the frequency stability requirement will be deemed met if the transmitter is automatically inhibited from operating outside this different temperature range and the published equipment operating characteristics are revised to reflect this different temperature range.

If an unmodulated carrier is not available, the measurement method shall be described in the test report.

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2016/11/10	2017/11/9
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R
BACL	Temp & Humidity Chamber	BTH-150	30028	2016/12/9	2017/12/8
Topward	DC Power Supply	6603D	727374	NCR	NCR

9.4 Environmental Conditions

Temperature:	22 ℃
Relative Humidity:	50 %
ATM Pressure:	101.68 kPa

The testing was performed by David. Hsu on 2017-05-05

9.5 Test Data

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

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Varying temperature:

Temperature	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (%)	FCC Limit (%)
-20	575.99791	576	-0.0004%	0.005
-10	575.99784	576	-0.0004%	0.005
0	575.99766	576	-0.0004%	0.005
10	575.99755	576	-0.0004%	0.005
20	575.99743	576	-0.0004%	0.005
30	575.99721	576	-0.0005%	0.005
40	575.99722	576	-0.0005%	0.005
50	575.99711	576	-0.0005%	0.005

Varying supply voltage:

Temperature	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (%)	FCC Limit (%)
1.35 V at 20°C	575.99654	576	-0.0006%	0.005
1.5 V at 20°C	575.99764	576	-0.0004%	0.005
1.65 V at 20°C	575.99574	576	-0.0007%	0.005

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Varying temperature:

Temperature	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (%)	FCC Limit (%)
-20	575.99796	576	-0.0004%	0.005
-10	575.99781	576	-0.0004%	0.005
0	575.99762	576	-0.0004%	0.005
10	575.99757	576	-0.0004%	0.005
20	575.99748	576	-0.0004%	0.005
30	575.99723	576	-0.0005%	0.005
40	575.99727	576	-0.0005%	0.005
50	575.99716	576	-0.0005%	0.005

Varying supply voltage:

Temperature	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (%)	FCC Limit (%)
1.35 V at 20°C	575.99756	576	-0.0004%	0.005
1.5 V at 20°C	575.99752	576	-0.0004%	0.005
1.65 V at 20°C	575.99645	576	-0.0006%	0.005

10 Appendix A Test Setup Photograph

Please refer to the Test Setup Photos exhibit.

11 Appendix B - EUT External Photograph

Please refer to the EUT External Photos exhibit.

12 Appendix C - EUT Internal Photograph

Please refer to the EUT Internal Photos exhibit.

******* END OF REPORT *******