MAY 2017

FCC & ISED CANADA CERTIFICATION TEST REPORT

for the

SOLOSHOT3 Tag

FCC ID: 2ALGWRJSS3T

ISED ID: 22498-RJSS3T

REPORT# 14970-01 REV 1

Prepared for:

SOLOSHOT, Inc.

520 S El Camino Real, Suite 816

San Mateo, CA 94402

Prepared By:

Washington Laboratories, Ltd.

7560 Lindbergh Drive

Gaithersburg, Maryland 20879

Testing Certificate AT-1448

FCC & ISED Canada Certification Test Report

for the

SOLOSHOT, Inc.

SOLOSHOT3 Tag

FCC ID: 2ALGWRJSS3T

ISED ID: 22498-RJSS3T

May 8, 2017

Re-issued May 23, 2017

WLL REPORT# 14970-01 REV 1

Prepared by:

Michael Violette, P.E.
Test Engineer

Reviewed by:

Steven D. Koster
President

ABSTRACT

Revision History	Description of Change	Date
Rev 0	Initial Release	May 8, 2017
Rev 1	Edited per ACB Comments and Client model name change	May 23, 2017

TABLE OF CONTENTS

LIST OF TABLES

1 INTRODUCTION

1.1 COMPLIANCE STATEMENT

This report has been prepared on behalf of SOLOSHOT, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for an Intentional Radiator under Part 15.249 (10/2014) of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy and under RSS-210 issue 9, 12/2016 of Innovation, Science and Economic Development Canada (ISED). This Certification Test Report documents the test configuration and test results for the SOLOSHOT, Inc. SOLOSHOT3 Tag.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory.

The SOLOSHOT, Inc. SOLOSHOT3 Tag complies with the limits for a Digital Transmission System (DTS) Transmitter device under FCC Part 15.249 and Innovation, Science and Economic Development Canada (ISED) RSS-210.

1.2 CONTRACT INFORMATION

Customer:	SOLOSHOT, Inc.
Address	520 S El Camino Real, Suite 816
	San Mateo, CA 94402
Purchase Order Number:	Per MV
Quotation Number:	69996

1.3 TEST DATES

Testing was performed on the following date(s): 3/10/2017-3/16/2017

1.4 TEST AND SUPPORT PERSONNEL

Washington Laboratories, LTD	Mike Violette
Customer Representative	Alex Sammons

ABBREVIATIONS

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	Amperes
b/s	**b**its per **s**econd
BW	**B**and**W**idth
CE	**C**onducted **E**mission
cm	**C**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FM	**F**requency **M**odulation
G	**g**iga – prefix for 10^9 multiplier
Hz	**H**ertz
IF	**I**ntermediate **F**requency
k	**k**ilo – prefix for 10^3 multiplier
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
M	**M**ega – prefix for 10^6 multiplier
m	**M**eter
µ	**m**icro – prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
QP	**Q**uasi-**P**eak
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
V	**V**olt

2 EQUIPMENT UNDER TEST

2.1 EUT IDENTIFICATION & DESCRIPTION

The Soloshot SOLOSHOT3 Tag is used with the Soloshot Base (FCC ID: 2ALGWRJSS3B, ISED ID: 2498RJSS3B) which integrated with an HD camera. The SOLOSHOT3 Tag sends a pulsed signal to the Base unit that receives the signal and uses the signal to keep the camera pointing at the SOLOSHOT3 Tag. In this way, a moving subject can automatically be followed and videoed.

Table 1: Device Summary

Item	SOLOSHOT3 Tag
Manufacturer:	SOLOSHOT, Inc.
FCC ID:	2ALGWRJSS3T
ISED ID:	22498-RJSS3T
Model:	SOLOSHOT3 Tag
Serial Number of Unit Tested	N/A
FCC Rule Parts:	§15.249
Innovation, Science and Economic Development Canada:	RSS-210
Frequency Range:	2410-2480MHz
Maximum Field Strength:	107.8dBuV/m (peak), 74.2dBuV/m (average)
Modulation:	802.15.4
Occupied Bandwidth:	2.387 MHz
Keying:	Automatic, continuous
Type of Information:	Data
Number of Channels:	15
Power Output Level	Fixed
Antenna Connector	Internal, not accessible to user
Antenna Type	Embedded Single-Band Antenna, WAG-M-LA-00-015
Interface Cables:	Interface to Soloshot Base via on-board connector

Maximum Data Rate	N/A
Power Source & Voltage:	Internal battery charged by Soloshot base

2.2 TEST CONFIGURATION

The SOLOSHOT3 Tag was placed on a non-conductive table and oriented in three orthogonal positions for the radiated field strength levels.

2.3 TESTING ALGORITHM

The SOLOSHOT3 Tag was tested by configuring the various channels for measurement of the RF parameters.

The SOLOSHOT3 Tag was set to transmit a beacon signal at the three channels (2410MHz, 2440MHz and 2480 MHz). The beacon signals were paused at the set channel and the radiated field strength measurements were collected.

2.4 TEST LOCATION

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The ISED Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ANAB under Certificate AT-1448 as an independent FCC test laboratory.

2.5 MEASUREMENTS

2.5.1 References

ANSI C63.2-2016 Specifications for Electromagnetic Noise and Field Strength Instrumentation in the Frequency Range 9 kHz to 40 GHz

ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

ANSI C63.4-2014 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

2.6 MEASUREMENT UNCERTAINTY

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2 A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

Where u_c = standard uncertainty

a, b, c,.. = individual uncertainty elements

$Div_{a,\ b,\ c}$ = the individual uncertainty element divisor based on the probability distribution

Divisor = 1.732 for rectangular distribution

Divisor = 2 for normal distribution

Divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

Where U = expanded uncertainty

k = coverage factor

k ≤ 2 for 95% coverage (ANSI/NCSL Z540-2 Annex G)

u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 2 below.

Table 2: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	±4.55 dB

3 TEST EQUIPMENT

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Table 3: Test Equipment List

Test Name:	**Conducted Emissions**	Test Date:	**March 6, 2017**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
125	SOLAR - 8028-50-TS-24-BNC	LISN	**2/16/2018**
126	SOLAR - 8028-50-TS-24-BNC	LISN	**2/16/2018**
823	AGILENT - N9010A	EXA SPECTRUM ANALYZER	**12/21/2017**
Test Name:	**Radiated Emissions**	Test Date:	**March 6 2017**
Asset #	**Manufacturer/Model**	**Description**	**Cal. Due**
4	ARA - DRG-118/A	ANTENNA DRG 1-18GHZ	**12/14/2018**
66	B&Z (HP) - BZ-01002650-401545-282525	HF PRE-AMPLIFIER 1-26.5GHZ (MODIFIED)	**2/14/2018**
823	AGILENT - N9010A	EXA SPECTRUM ANALYZER	**12/21/2017**
382	SUNOL SCIENCES CORPORATION - JB1	ANTENNA BICONLOG	**8/31/2017**
626	ARA - DRG-118/A	ANTENNA HORN	**4/7/2018**
210	NARDA - V638	HORN STANDARD GAIN	**CNR**
453	AH SYSTEMS - PAM1840	PRE-AMPLIFIER 18GHZ-40 GHZ	**5/13/2018**
280	ITC - 21C-3A1	WAVEGUIDE 3.45-11.0GHZ	**8/1/2017**
281	ITC - 21A-3A1	WAVEGUIDE 4.51-10.0GHZ	**8/1/2017**
282	ITC - 21X-3A1	WAVEGUIDE 6.8-15GHZ	**10/22/2017**

4 Test Results

4.1 Duty Cycle Correction

Measurements may be adjusted where pulsed RF is utilized to find the average level associated with a quantity. This calculation is applied to limits for pulsed licensed and unlicensed devices.

Standard measurement techniques for unlicensed intentional radiators under 47CFR Part 15, call for duty cycle measurements compared to a 100 millisecond period

Duty cycle correction = on time/100 milliseconds

The EUT under normal operating conditions has 2.1ms on time per 200ms, however the calculations require a calculation over a 100 ms window. Therefore the maximum duty cycle correction is calculated as follows:

Duty Cycle correction = 20*log (2.1/100) = -33.6dB

The following Figures show the plots of the modulated carrier. The spectrum analyzer was set to Zero Span and the video triggered to collect the pulse train of the modulation. Calculations of the duty cycle correction factor were obtained from the worst-case transmission burst.

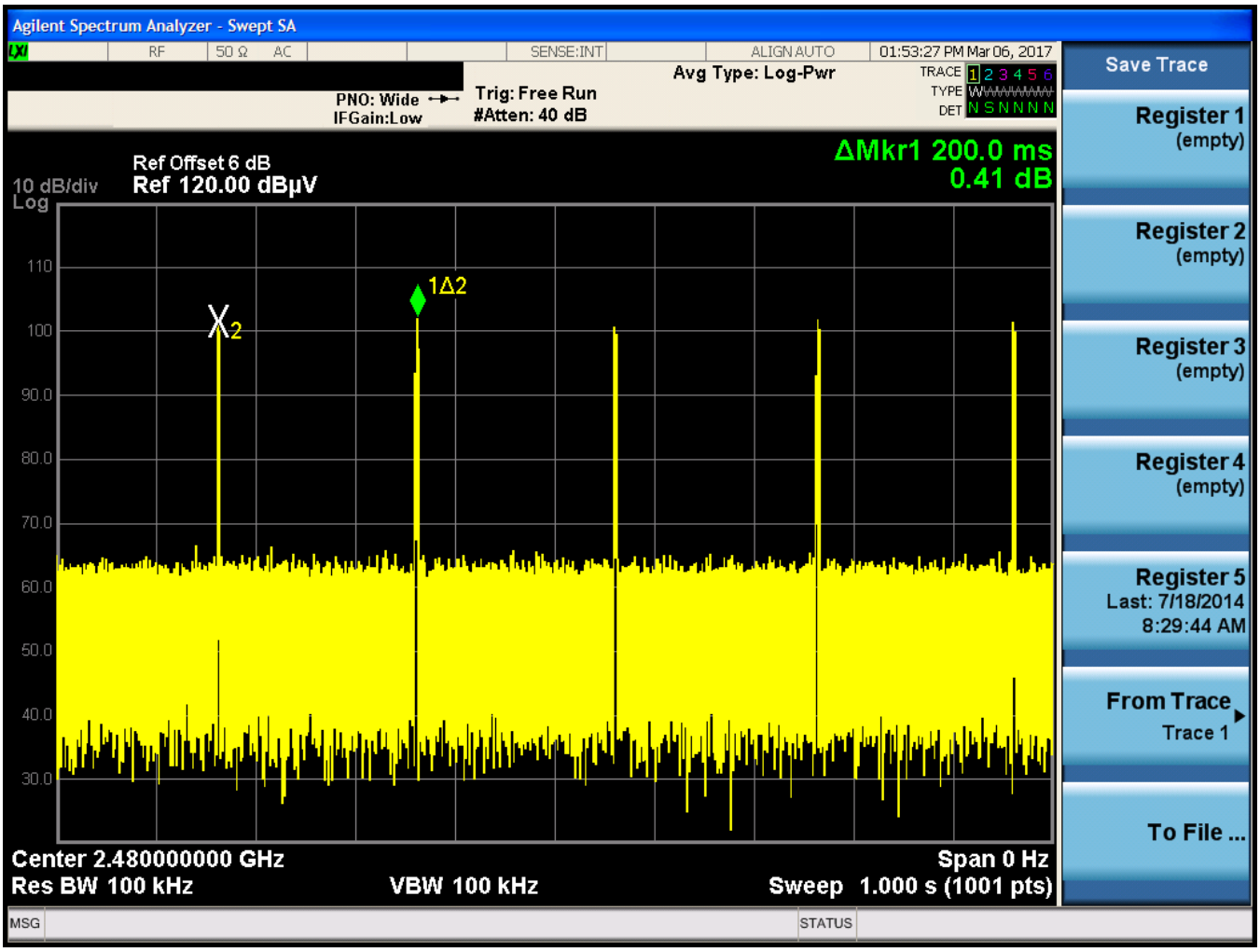

Figure 1: Duty Cycle (Single Burst)

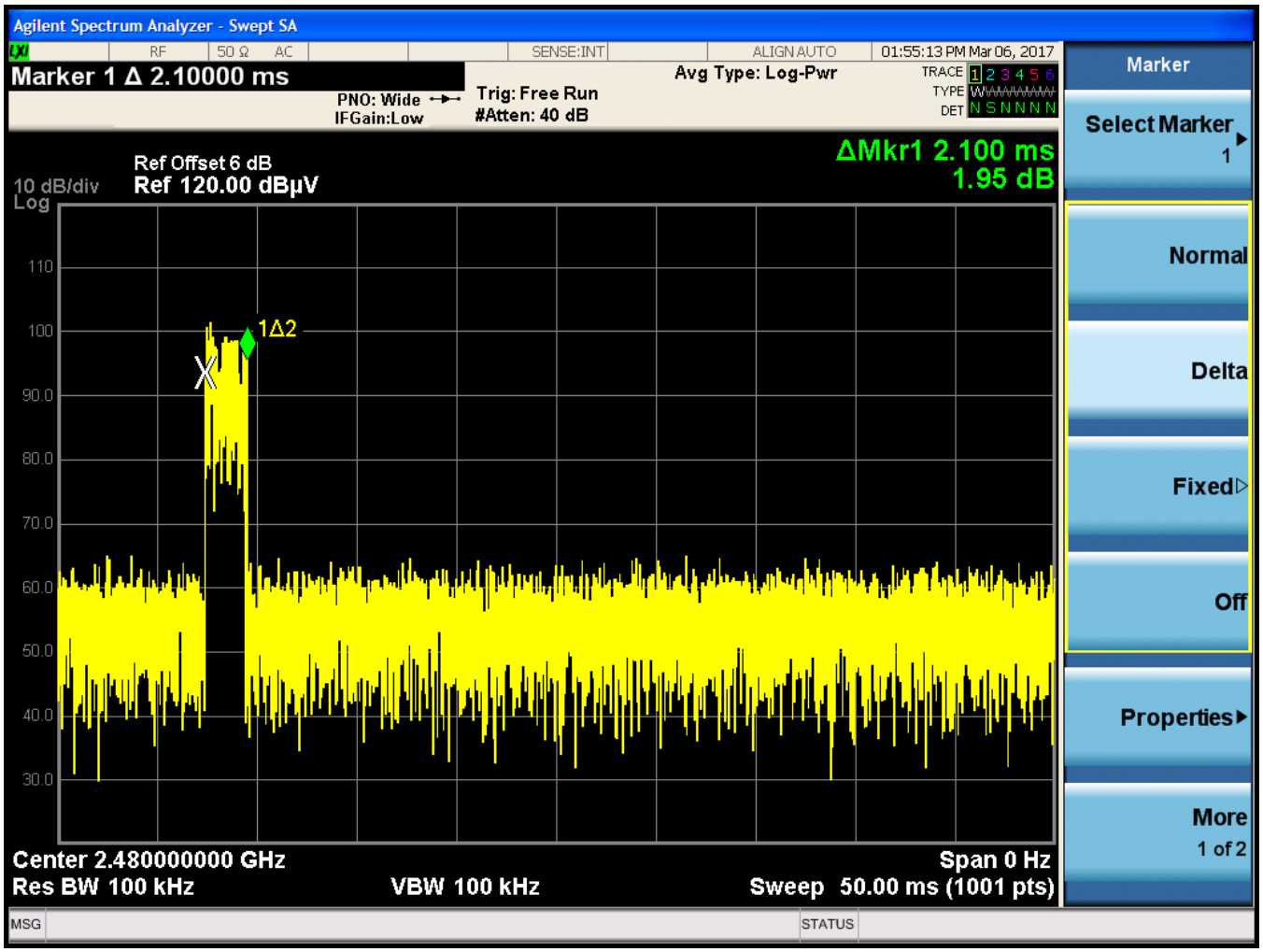

Figure 2: Duty Cycle (TX on time)

4.2 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer. Table 4 provides a summary of the Occupied Bandwidth Results.

Table 4: Occupied Bandwidth Results

Frequency MHz	Bandwidth MHz	Limit	Pass/Fail
2410	2.1	N/A	Pass
2440	2.4	N/A	Pass
2480	2.25	N/A	Pass

At full modulation, the occupied bandwidth was measured as shown:

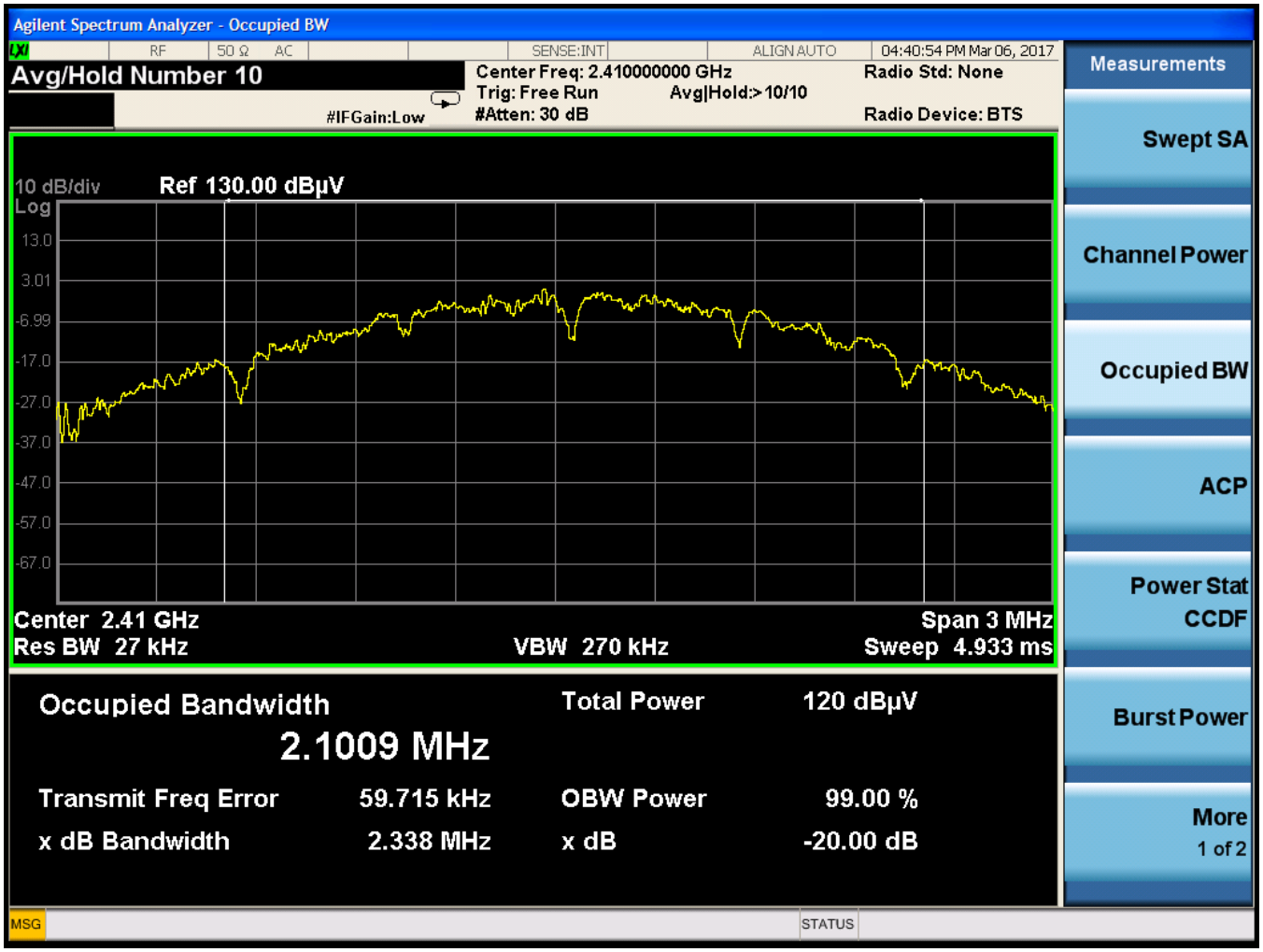

Figure 3: Occupied Bandwidth LC

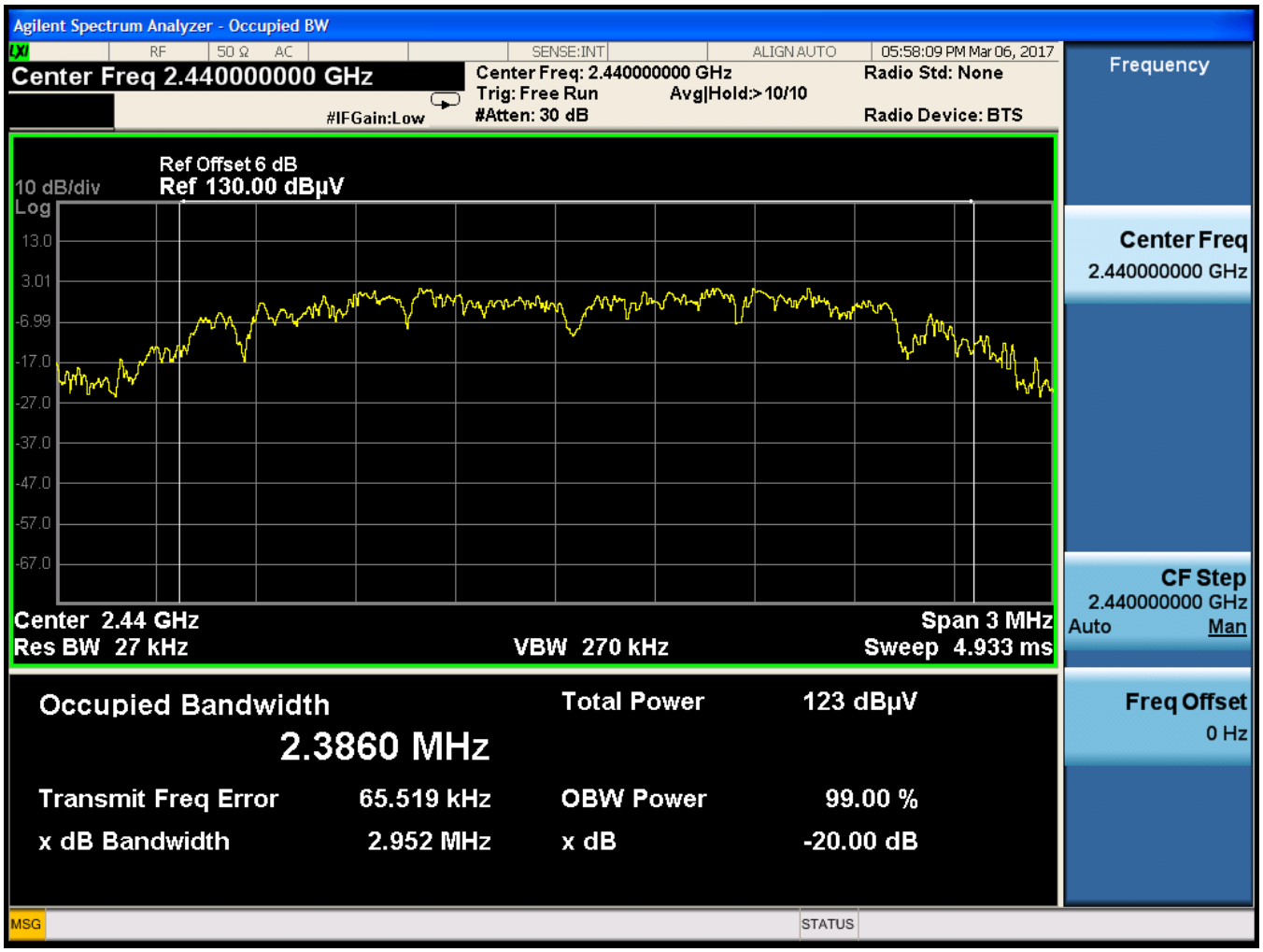

Figure 4: Occupied Bandwidth MC

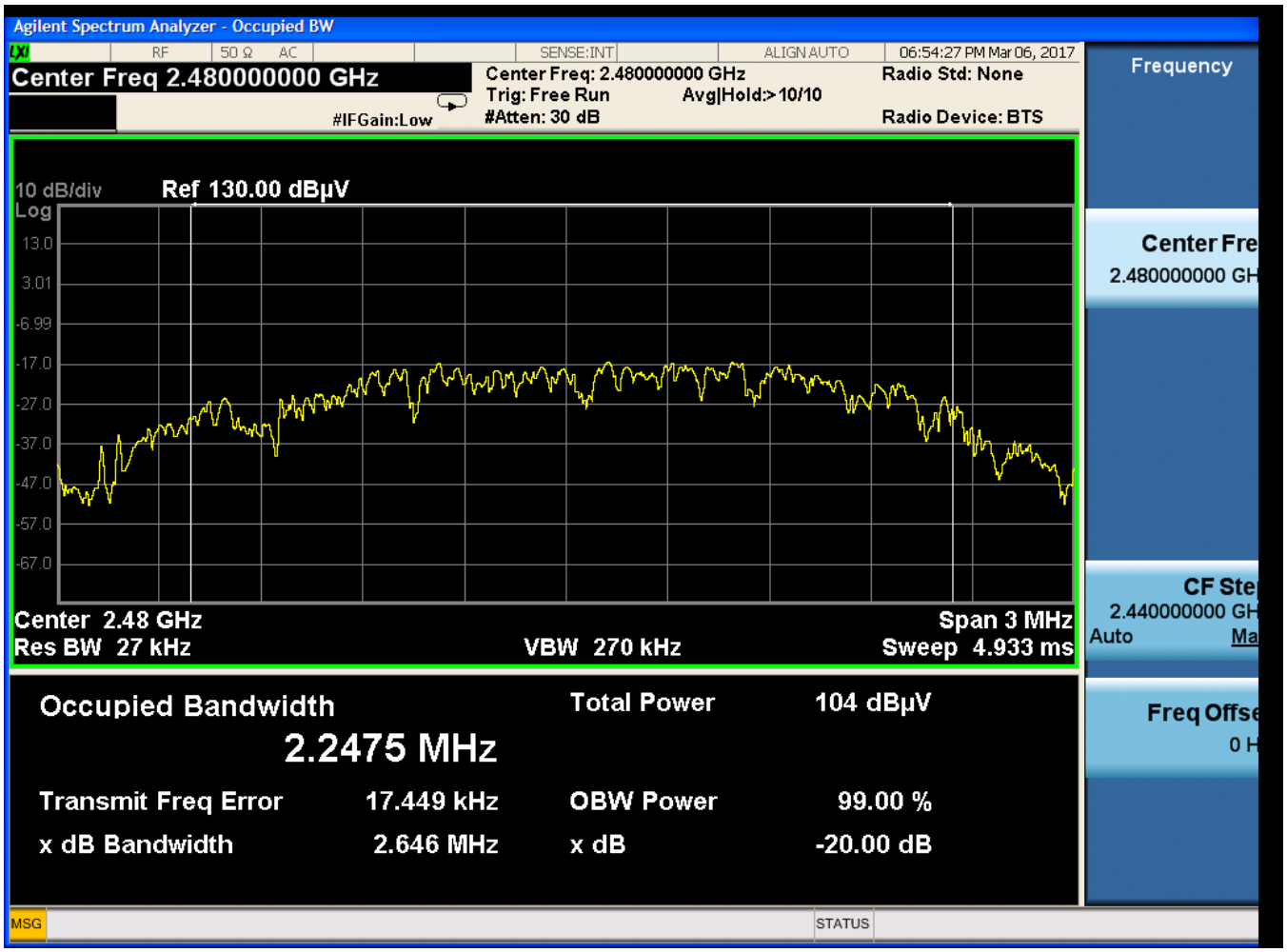

Figure 5: Occupied Bandwidth HC

4.3 Conducted Emissions

4.3.1 Requirements

Test Arrangement: The SOLOSHOT3 Tag is charged via the Soloshot base. The conducted emissions were performed on the base connected to the AC mains via a LISN.

Compliance Standard: FCC Part 15 (10/2014), Class B

FCC Compliance Limits		
Frequency	Quasi-peak	Average
0.15-0.5MHz	66 to 56dBµV	56 to 46dBµV
0.5 to 5MHz	56dBµV	46dBµV
0.5-30MHz	60dBµV	50dBµV

4.3.2 Test Procedure Summary

The requirements of FCC Part 15B and ICES-003 call for the EUT to be placed on an 80 cm high 1 X 1.5 m non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 mH Line Impedance Stabilization Network bonded to a 3 X 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power was supplied to the peripherals through a second LISN. The peripherals were placed on the table in accordance with ANSI C63.4-2014. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak, peak, or average as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth. For average measurements the post-detector filter was set to 10 Hz.

At frequencies where quasi-peak or peak measurements comply with the average limit, no average measurements need be performed.

4.3.3 Measurement Method

All emission measurements herein were performed according to the referenced standard. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

4.3.4 Conducted Data Reduction and Reporting

To convert the raw spectrum analyzer conducted data into a form that can be compared with the limits, it is necessary to account for various calibration factors that are supplied with the LISNs and other measurement accessories. These factors are included into the LISN correction factor (LISN corr.) column of the table and in the cable factor (Cable Loss) column of the table. The

LISN correction (in dB) and the Cable Loss (in dB) is algebraically added to the raw Spectrum Analyzer Voltage in dBµV to obtain the Conducted RF Electric Voltage in dBµV. This level is then compared to the limit.

Example:

Spectrum Analyzer Voltage:	VdBµV
LISN Correction Factor:	LISN Correction dB
Cable Correction Factor:	Cable Loss dB
RF Electric Voltage Level:	EdBuV = V dBµV + LISN Correction dB + Cable Loss dB

4.3.5 Results Summary

The system complied with the emission requirements throughout the test.

Test Date(s): 3/6/2017

Test Engineer/Technician: Mike Violette

4.3.6 Areas of Concern

None

4.3.7 Test Data

Table 5 provides the test results for phase and neutral line power line conducted emissions. Charging power the unit is provided by the Base.

Table 5: Conducted Emissions Limits

NEUTRAL

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.180	44.0	31.0	10.2	0.3	54.4	41.4	64.5	54.5	-10.1	-13.1
0.326	31.4	12.5	10.2	0.3	41.8	22.9	59.6	49.6	-17.7	-26.6
1.00	35.0	12.8	10.3	0.3	45.6	23.4	56.0	46.0	-10.4	-22.6
1.600	34.8	17.2	10.2	0.3	45.3	27.7	56.0	46.0	-10.7	-18.3
5.00	33.3	19.9	10.7	0.2	44.2	30.8	60.0	50.0	-15.8	-19.2
10.00	33.3	19.5	11.1	0.1	44.5	30.7	60.0	50.0	-15.5	-19.3
29.900	25.5	16.0	12.0	1.3	38.8	29.3	60.0	50.0	-21.2	-20.7

PHASE

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.180	42.4	28.3	10.2	0.1	52.7	38.6	64.5	54.5	-11.8	-15.9
0.326	33.9	15.3	10.2	0.2	44.3	25.7	59.6	49.6	-15.3	-23.9
1.00	38.8	24.5	10.3	0.2	49.3	35.0	56.0	46.0	-6.7	-11.0
1.600	35.1	19.9	10.2	0.3	45.6	30.4	56.0	46.0	-10.4	-15.6
5.00	34.1	20.2	10.7	0.2	45.0	31.1	60.0	50.0	-15.0	-18.9
10.00	33.7	19.2	11.1	0.2	45.0	30.5	60.0	50.0	-15.0	-19.5
29.900	29.4	15.7	12.0	1.5	42.9	29.2	60.0	50.0	-17.1	-20.8

4.4 Radiated Emissions: (FCC Part §2.1053)

The EUT must comply with the radiated emission limits of 15.249(a). The limits are as shown in the following table.

Table 6: Radiated Emissions Limits

Fundamental Frequency	Field Strength of Fundamental (µV/m)	Field Strength of Harmonics (µV/m)
902 – 928 MHz	50,000	500
2400 – 2483.5 MHz	50,000	500
5725 – 5875 MHz	50,000	500
24.0 – 24.25 GHz	250,000	2500

4.4.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured. Readings below 1000MHz were performed using a Quasi-Peak Detector function. Average readings were calculated based on the peak reading minus the Duty Cycle correction.

The unit was examined in three orthogonal axes.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	120kHz	>100 kHz
>1000 MHz	1 MHz	1MHz (Peak)

Emissions were measured to the 10th harmonic of the transmit frequency. Worst-case emission levels are reported.

Emissions were also scanned from 30 MHz to 10X fundamental and compared with the 15.209 limits. **No detectable emissions were found aside from harmonics of the transmit frequency shown in the following table.**

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level): V dBµV

Antenna Factor (Ant Corr): AFdB/m

Cable Loss Correction (Cable Corr): CCdB

Duty Cycle Correction (Average) DCCdB

Amplifier Gain: GdB

Electric Field (Corr Level): EdBµV/m = VdBµV + AFdB/m + CCdB + DCCdB - GdB

Table 7: Radiated Emission Test Data (Fundamental)

Low Channel

NOTE: All Measurements > 1GHz are made at a distance of 3m

Position	Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak or Average
X	2410.0	V	0.0	1.0	123.0	-17.5	105.5	114.0	-8.5	Peak
X	2410.0	H	0.0	1.0	124.50	-17.5	107.0	114.0	-7.0	Peak
X	2410.0	V	0.0	1.0	123.0	-51.1*	71.9	94.0	-22.1	AVG
X	2410.0	H	0.0	1.0	124.50	-51.1*	73.4	94.0	-20.6	AVG
X	2483.50	V	0.0	1.0	57.0	-16.8	40.2	54.0	-13.8	AVG
X	2483.50	H	0.0	1.0	57.0	-16.8	40.2	54.0	-13.8	AVG
X	2480.0	V	0.0	1.0	56.30	-16.9	39.4	54.0	-14.6	AVG
X	2480.0	H	0.0	1.0	55.30	-16.9	38.4	54.0	-15.6	AVG
X	2400.0	V	0.0	1.0	56.0	-17.6	38.4	54.0	-15.6	AVG
X	2400.0	H	0.0	1.0	56.60	-17.6	39.0	54.0	-15.0	AVG
X	4820.0	V	0.0	1.0	59.0	-8.7	50.3	54.0	-3.7	AVG
X	4820.0	H	0.0	1.0	58.30	-8.7	49.6	54.0	-4.4	AVG
X	7230.0	V	0.0	1.0	43.0	-2.1	40.9	54.0	-13.1	AVG
X	7230.0	H	0.0	1.0	41.0	-2.1	38.9	54.0	-15.1	AVG
X	9640.0	V	0.0	1.0	42.70	2.4	45.1	54.0	-8.9	AVG

X	9640.0	H	0.0	1.0	40.70	2.4	43.1	54.0	-10.9	AVG
X	12050.0	V	0.0	1.0	40.50	5.1	45.6	54.0	-8.4	AVG
X	12050.0	H	0.0	1.0	41.20	5.1	46.3	54.0	-7.7	AVG
X	14460.0	V	0.0	1.0	37.0	13.2	50.2	54.0	-3.8	AVG
X	14460.0	H	0.0	1.0	34.20	13.2	47.4	54.0	-6.6	AVG
X	16870.0	V	0.0	1.0	35.0	13.4	48.4	54.0	-5.6	AVG
X	16870.0	H	0.0	0.0	34.70	13.4	48.1	54.0	-5.9	AVG
Y	2410.0	V	0.0	0.0	119.70	-17.5	102.2	114.0	-11.8	Peak
Y	2410.0	H	0.0	0.0	122.60	-17.5	105.1	114.0	-8.9	Peak
Y	2410.0	V	0.0	0.0	119.70	-51.1*	68.6	94.0	-25.4	AVG
Y	2410.0	H	0.0	0.0	122.60	-51.1*	71.5	94.0	-22.5	AVG
Y	2483.50	V	0.0	0.0	56.60	-16.8	39.8	54.0	-14.2	AVG
Y	2483.50	H	0.0	0.0	55.20	-16.8	38.4	54.0	-15.6	AVG
Y	2400.0	V	0.0	0.0	56.60	-17.6	39.0	54.0	-15.0	AVG
Y	2400.0	H	0.0	0.0	56.0	-17.6	38.4	54.0	-15.6	AVG
Y	4820.0	V	0.0	0.0	57.50	-8.7	48.8	54.0	-5.2	AVG
Y	4820.0	H	0.0	0.0	56.0	-8.7	47.3	54.0	-6.7	AVG
Y	7230.0	V	0.0	0.0	42.20	-2.1	40.1	54.0	-13.9	AVG
Y	7230.0	H	0.0	0.0	47.10	-2.1	45.0	54.0	-9.0	AVG
Y	9640.0	V	0.0	0.0	40.40	2.4	42.8	54.0	-11.2	AVG
Y	9640.0	H	0.0	0.0	41.0	2.4	43.4	54.0	-10.6	AVG
Y	12050.0	V	0.0	0.0	41.10	5.1	46.2	54.0	-7.8	AVG
Y	12050.0	H	0.0	0.0	41.60	5.1	46.7	54.0	-7.3	AVG
Y	14460.0	V	0.0	0.0	36.30	13.2	49.5	54.0	-4.5	AVG
Y	14460.0	H	0.0	0.0	36.20	13.2	49.4	54.0	-4.6	AVG
Y	16870.0	V	0.0	0.0	35.20	13.4	48.6	54.0	-5.4	AVG
Y	16870.0	H	0.0	0.0	36.0	13.4	49.4	54.0	-4.6	AVG
Z	2410.0	V	0.0	0.0	121.0	-17.5	103.5	114.0	-10.5	Peak
Z	2410.0	H	0.0	0.0	124.20	-17.5	106.7	114.0	-7.3	Peak
Z	2410.0	V	0.0	0.0	121.0	-51.1*	69.9	94.0	-24.1	AVG
Z	2410.0	H	0.0	0.0	124.20	-51.1*	73.1	94.0	-20.9	AVG

Z	2483.50	V	0.0	0.0	55.30	-16.8	38.5	54.0	-15.5	AVG
Z	2483.50	H	0.0	0.0	54.90	-16.8	38.1	54.0	-15.9	AVG
Z	2400.0	V	0.0	0.0	55.70	-17.6	38.1	54.0	-15.9	AVG
Z	2400.0	H	0.0	0.0	57.0	-17.6	39.4	54.0	-14.6	AVG
Z	4820.0	V	0.0	0.0	57.60	-8.7	48.9	54.0	-5.1	AVG
Z	4820.0	H	0.0	0.0	57.20	-8.7	48.5	54.0	-5.5	AVG
Z	7230.0	V	0.0	0.0	43.0	-2.1	40.9	54.0	-13.1	AVG
Z	7230.0	H	0.0	0.0	42.50	-2.1	40.4	54.0	-13.6	AVG
Z	9640.0	V	0.0	0.0	39.30	2.4	41.7	54.0	-12.3	AVG
Z	9640.0	H	0.0	0.0	39.90	2.4	42.3	54.0	-11.7	AVG
Z	12050.0	V	0.0	0.0	40.60	5.1	45.7	54.0	-8.3	AVG
Z	12050.0	H	0.0	0.0	41.80	5.1	46.9	54.0	-7.1	AVG
Z	14460.0	V	0.0	0.0	35.50	13.2	48.7	54.0	-5.3	AVG
Z	14460.0	H	0.0	0.0	35.20	13.2	48.4	54.0	-5.6	AVG
Z	16870.0	V	0.0	0.0	36.20	13.4	49.6	54.0	-4.4	AVG
Z	16870.0	H	0.0	0.0	36.10	15.6	51.7	54.0	-2.3	AVG

Mid Channel

NOTE: All Measurements > 1GHz are made at a distance of 3m

Position	Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak or Average
X	2440.0	V	0.0	1.0	114.0	-17.2	96.8	114.0	-17.2	Peak
X	2440.0	H	0.0	1.0	116.0	-17.2	98.8	114.0	-15.2	Peak
X	2440.0	V	0.0	1.0	114.0	-50.8*	63.2	94.0	-30.8	AVG
X	2440.0	H	0.0	1.0	116.0	-50.8*	63.2	94.0	-30.8	AVG
X	2483.50	V	0.0	1.0	64.0	-16.8	47.2	54.0	-6.8	AVG
X	2483.50	H	0.0	1.0	57.0	-16.8	40.2	54.0	-13.8	AVG
X	2400.0	V	0.0	1.0	63.0	-17.6	45.4	54.0	-8.6	AVG
X	2400.0	H	0.0	1.0	57.2	-17.6	39.6	54.0	-14.4	AVG
X	4880.0	V	0.0	1.0	37.0	-8.5	28.5	54.0	-25.5	AVG
X	4880.0	H	0.0	1.0	58.3	-8.5	49.8	54.0	-4.2	AVG

X	7320.0	V	0.0	1.0	36.2	-2.1	34.1	54.0	-19.9	AVG
X	7320.0	H	0.0	1.0	43.4	-2.1	41.3	54.0	-12.7	AVG
X	9760.0	V	0.0	1.0	35.8	2.5	38.3	54.0	-15.7	AVG
X	9760.0	H	0.0	1.0	42.8	2.5	45.3	54.0	-8.7	AVG
X	12200.0	V	0.0	1.0	31.3	5.5	36.8	54.0	-17.2	AVG
X	12200.0	H	0.0	1.0	38.0	5.5	43.5	54.0	-10.5	AVG
X	14460.0	V	0.0	1.0	33.8	13.2	47.0	54.0	-7.0	AVG
X	14460.0	H	0.0	1.0	33.6	13.2	46.8	54.0	-7.2	AVG
X	17080.0	V	0.0	1.0	33.6	13.9	47.5	54.0	-6.5	AVG
X	17080.0	H	0.0	0.0	34.0	13.9	47.9	54.0	-6.1	AVG
Y	2440.0	V	0.0	0.0	125.0	-17.2	107.8	114.0	-6.2	Peak
Y	2440.0	H	0.0	0.0	123.0	-17.2	105.8	114.0	-8.2	Peak
Y	2440.0	V	0.0	0.0	125.0	-50.8*	74.2	94.0	-19.8	AVG
Y	2440.0	H	0.0	0.0	123.0	-50.8*	72.2	94.0	-21.8	AVG
Y	2483.50	V	0.0	0.0	56.0	-16.8	39.2	54.0	-14.8	AVG
Y	2483.50	H	0.0	0.0	55.80	-16.8	39.0	54.0	-15.0	AVG
Y	2400.0	V	0.0	0.0	55.0	-17.6	37.4	54.0	-16.6	AVG
Y	2400.0	H	0.0	0.0	54.80	-17.6	37.2	54.0	-16.8	AVG
Y	4880.0	V	0.0	0.0	55.50	-8.5	47.0	54.0	-7.0	AVG
Y	4880.0	H	0.0	0.0	57.50	-8.5	49.0	54.0	-5.0	AVG
Y	7320.0	V	0.0	0.0	35.60	-2.1	33.5	54.0	-20.5	AVG
Y	7320.0	H	0.0	0.0	36.20	-2.1	34.1	54.0	-19.9	AVG
Y	9760.0	V	0.0	0.0	35.30	2.5	37.8	54.0	-16.2	AVG
Y	9760.0	H	0.0	0.0	37.0	2.5	39.5	54.0	-14.5	AVG
Y	12200.0	V	0.0	0.0	31.30	5.5	36.8	54.0	-17.2	AVG
Y	12200.0	H	0.0	0.0	38.30	5.5	43.8	54.0	-10.2	AVG
Y	14460.0	V	0.0	0.0	34.0	13.2	47.2	54.0	-6.8	AVG
Y	14460.0	H	0.0	0.0	33.50	13.2	46.7	54.0	-7.3	AVG
Y	17080.0	V	0.0	0.0	34.50	13.9	48.4	54.0	-5.6	AVG
Y	17080.0	H	0.0	0.0	35.0	13.9	48.9	54.0	-5.1	AVG
Z	2440.0	H	0.0	0.0	124.40	-17.2	107.2	114.0	-6.8	Peak

Z	2440.0	V	0.0	0.0	122.20	-17.2	105.0	114.0	-9.0	Peak
Z	2440.0	H	0.0	0.0	124.40	-50.8*	73.6	94.0	-20.4	AVG
Z	2440.0	V	0.0	0.0	122.20	-50.8*	71.4	94.0	-22.6	AVG
Z	2483.50	H	0.0	0.0	55.10	-16.8	38.3	54.0	-15.7	AVG
Z	2483.50	V	0.0	0.0	55.20	-16.8	38.4	54.0	-15.6	AVG
Z	2400.0	H	0.0	0.0	54.0	-17.6	36.4	54.0	-17.6	AVG
Z	2400.0	V	0.0	0.0	49.0	-17.6	31.4	54.0	-22.6	AVG
Z	4880.0	H	0.0	0.0	55.0	-8.5	46.5	54.0	-7.5	AVG
Z	4880.0	V	0.0	0.0	54.20	-8.5	45.7	54.0	-8.3	AVG
Z	7320.0	H	0.0	0.0	38.50	-2.1	36.4	54.0	-17.6	AVG
Z	7320.0	V	0.0	0.0	38.30	-2.1	36.2	54.0	-17.8	AVG
Z	9760.0	H	0.0	0.0	43.0	2.5	45.5	54.0	-8.5	AVG
Z	9760.0	V	0.0	0.0	42.30	2.5	44.8	54.0	-9.2	AVG
Z	12200.0	H	0.0	0.0	37.0	5.5	42.5	54.0	-11.5	AVG
Z	12200.0	V	0.0	0.0	38.30	5.5	43.8	54.0	-10.2	AVG
Z	14460.0	H	0.0	0.0	34.50	13.2	47.7	54.0	-6.3	AVG
Z	14460.0	V	0.0	0.0	33.60	13.2	46.8	54.0	-7.2	AVG
Z	17080.0	H	0.0	0.0	34.40	13.9	48.3	54.0	-5.7	AVG
Z	17080.0	V	0.0	0.0	34.0	13.9	47.9	54.0	-6.1	AVG
Z	17360.0	H	0.0	0.0	35.0	17.3	52.3	54.0	-1.7	AVG

High Channel

NOTE: All Measurements > 1GHz are made at a distance of 3m

Position	Frequency (MHz)	Polarity (H/V)	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Peak or Average
X	2480.0	V	0.0	1.0	122.0	-16.9	105.1	114.0	-8.9	Peak
X	2480.0	H	0.0	1.0	123.0	-16.9	106.1	114.0	-7.9	Peak
X	2480.0	V	0.0	1.0	122.0	-50.5*	71.5	94.0	-22.5	AVG
X	2480.0	H	0.0	1.0	123.0	-50.5*	72.5	94.0	-21.5	AVG
X	2483.50	V	0.0	1.0	66.0	-16.8	49.2	54.0	-4.8	AVG

X	2483.50	H	0.0	1.0	65.0	-16.8	48.2	54.0	-5.8	AVG
X	2400.0	V	0.0	1.0	63.0	-17.6	45.4	54.0	-8.6	AVG
X	2400.0	V	0.0	1.0	62.5	-17.6	44.9	54.0	-9.1	AVG
X	4960.0	V	0.0	1.0	51.2	-8.3	42.9	54.0	-11.1	AVG
X	4960.0	H	0.0	1.0	51.8	-8.3	43.5	54.0	-10.5	AVG
X	7440.0	V	0.0	1.0	45.3	-2.1	43.2	54.0	-10.8	AVG
X	7440.0	H	0.0	1.0	49.0	-2.1	46.9	54.0	-7.1	AVG
X	9920.0	V	0.0	1.0	42.2	2.8	45.0	54.0	-9.0	AVG
X	9920.0	H	0.0	1.0	47.6	2.8	50.4	54.0	-3.6	AVG
X	12400.0	V	0.0	1.0	43.0	6.1	49.1	54.0	-4.9	AVG
X	12400.0	H	0.0	1.0	41.4	6.1	47.5	54.0	-6.5	AVG
X	14880.0	V	0.0	1.0	35.0	12.1	47.1	54.0	-6.9	AVG
X	14880.0	H	0.0	1.0	35.0	12.1	47.1	54.0	-6.9	AVG
X	17360.0	V	0.0	1.0	34.3	15.0	49.3	54.0	-4.7	AVG
X	17360.0	H	0.0	0.0	33.2	15.0	48.2	54.0	-5.8	AVG
Y	2480.0	V	0.0	0.0	121.30	-16.9	104.4	114.0	-9.6	Peak
Y	2480.0	H	0.0	0.0	123.70	-16.9	106.8	114.0	-7.2	Peak
Y	2480.0	V	0.0	0.0	121.30	-50.5*	70.8	94.0	-23.2	AVG
Y	2480.0	H	0.0	0.0	123.70	-50.5*	73.2	94.0	-20.8	AVG
Y	2483.50	V	0.0	0.0	65.80	-16.8	49.0	54.0	-5.0	AVG
Y	2483.50	H	0.0	0.0	0.0	-16.8	-16.8	54.0	-70.8	AVG
Y	2400.0	V	0.0	0.0	51.0	-17.6	33.4	54.0	-20.6	AVG
Y	2400.0	H	0.0	0.0	52.0	-17.6	34.4	54.0	-19.6	AVG
Y	4960.0	V	0.0	0.0	46.0	-8.3	37.7	54.0	-16.3	AVG
Y	4960.0	H	0.0	0.0	49.0	-8.3	40.7	54.0	-13.3	AVG
Y	7440.0	V	0.0	0.0	43.90	-2.1	41.8	54.0	-12.2	AVG
Y	7440.0	H	0.0	0.0	47.0	-2.1	44.9	54.0	-9.1	AVG
Y	9920.0	V	0.0	0.0	42.60	2.8	45.4	54.0	-8.6	AVG
Y	9920.0	H	0.0	0.0	44.0	2.8	46.8	54.0	-7.2	AVG
Y	12400.0	V	0.0	0.0	42.0	6.1	48.1	54.0	-5.9	AVG
Y	12400.0	H	0.0	0.0	41.0	6.1	47.1	54.0	-6.9	AVG
Y	14880.0	V	0.0	0.0	35.50	12.1	47.6	54.0	-6.4	AVG

Y	14880.0	H	0.0	0.0	37.0	12.1	49.1	54.0	-4.9	AVG
Y	17360.0	V	0.0	0.0	34.10	15.0	49.1	54.0	-4.9	AVG
Y	17360.0	H	0.0	0.0	33.70	15.0	48.7	54.0	-5.3	AVG
Z	2480.0	V	0.0	0.0	120.70	-16.9	103.8	114.0	-10.2	Peak
Z	2480.0	H	0.0	0.0	122.20	-16.9	105.3	114.0	-8.7	Peak
Z	2480.0	V	0.0	0.0	120.70	-50.5*	70.2	94.0	-23.8	Peak
Z	2480.0	H	0.0	0.0	122.20	-50.5*	71.7	94.0	-22.3	Peak
Z	2483.50	V	0.0	0.0	49.70	-16.8	32.9	54.0	-21.1	AVG
Z	2483.50	H	0.0	0.0	53.0	-16.8	36.2	54.0	-17.8	AVG
Z	2400.0	V	0.0	0.0	56.0	-17.6	38.4	54.0	-15.6	AVG
Z	2400.0	H	0.0	0.0	55.20	-17.6	37.6	54.0	-16.4	AVG
Z	4960.0	V	0.0	0.0	46.60	-8.3	38.3	54.0	-15.7	AVG
Z	4960.0	H	0.0	0.0	45.0	-8.3	36.7	54.0	-17.3	AVG
Z	7440.0	V	0.0	0.0	41.20	-2.1	39.1	54.0	-14.9	AVG
Z	7440.0	H	0.0	0.0	39.0	-2.1	36.9	54.0	-17.1	AVG
Z	9920.0	V	0.0	0.0	42.0	2.8	44.8	54.0	-9.2	AVG
Z	9920.0	H	0.0	0.0	40.10	2.8	42.9	54.0	-11.1	AVG
Z	12400.0	V	0.0	0.0	36.20	6.1	42.3	54.0	-11.7	AVG
Z	12400.0	H	0.0	0.0	39.0	6.1	45.1	54.0	-8.9	AVG
Z	14880.0	V	0.0	0.0	34.0	12.1	46.1	54.0	-7.9	AVG
Z	14880.0	H	0.0	0.0	35.20	12.1	47.3	54.0	-6.7	AVG
Z	17360.0	V	0.0	0.0	33.0	15.0	48.0	54.0	-6.0	AVG
Z	17360.0	H	0.0	0.0	34.2	17.3	53.5	54.0	-2.5	AVG

*Correction Factor includes antenna factor, cable loss, pre-amplifier gain and duty cycle correction factor of 33.6dB.

FCC Pt 15.249 (d) states “Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.”

For each of the modes above, the radiated field strength measurements were taken at the band edges of 2400 MHz and 2483.5 MHz. The emissions were found to be below the FCC § 15.209 radiated field strength limits. See the table above.

