Testing Tomorrow's Technology

Application

For

Part 2, Subpart J, Paragraph 2.907 Equipment Authorization of Certification for an Intentional Radiator per Part 15, Subpart C, paragraphs 15.207, 15.209 and Part 15, Subpart F, paragraph 15.509

And

Industry Canada, RSS-220 Issue 1, March 2009 Devices Using Ultra-Wideband (UWB) Technology

For the

Flat Earth, Inc.

Model: SDS-X3

FCC ID: 2AEJO-PGC2661184
IC:20216-PGC2661184

UST Project: 15-0173
Issue Date: July 23, 2015

Total Pages in This Report: 31

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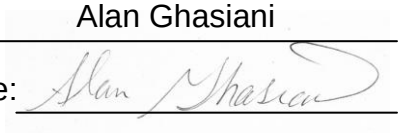
I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name: 

Title: Compliance Engineer – President

Date July 23, 2015

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MEASUREMENT TECHNICAL REPORT

COMPANY NAME: Flat Earth, Inc.

MODEL: SDS-X3

FCC ID: 2AEJO-PGC2661184

IC: 20216-PGC2661184

DATE: July 23, 2015

This report concerns (check one): Original grant [X]
Class II change

Equipment type: UWB Transmitter, GPR device

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until: _____N/A_____
date
agrees to notify the Commission by N/A
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
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1 General Information

1.1 Purpose of this Report

This report is prepared as a means of conveying test results and information concerning the suitability of this exact product for public distribution according to the FCC Rules and Regulations Part 15, Section 509 and IC RSS 220, Section 6.2, Issue 1.

1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on June 25, 2015 in good operating condition.

1.3 Product Description

The Equipment Under Test (EUT) is the Flat Earth, Inc. Model SDS-X3, also know by the marketing names of SNOdar and SWEdar. The EUT is a low power snow depth measurement sensor installed statically at a monitoring site (Base-station) or on a snow cat and/or snowmobile for mobile measurement. The EUT is DC powered and also features Bluetooth connectivity using an approved KC WIREFREE Bluetooth radio, FCC ID: S22BTMODULE-CL2/IC: 8193A-BTMODULECL2. The EUT is installed close to the ground at sites located in remote locations and points toward the ground for environmental data collection.

Frequency of operation: 959 Mhz to 2395 MHz
Center Frequency: 1677 MHz
Number of channels: 1 ch
Antenna Type: Bowtie Planar Outrigger Antenna
Antenna Gain: 0.5 to 6.0 dBi

1.4 Configuration of Tested System

The Test Sample was tested per *ANSI C63.10:2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (2013)* and per FCC Part 15 Subpart F.

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs are provided in separate Appendices.

1.5 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC. Its designation number is 186022. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 9900A-1.

1.6 Related Submittals

The EUT is subject to the following FCC authorizations:

a) Certification under section 15.509 as a transmitter.
b) Verification under 15.101 as a digital device and receiver.

The Verification requirement shares many common report elements with the Certification report. Therefore, though this report is mostly intended to provide data for the Certification process, the Verification authorization report (part 15.107 and 15.109) for the EUT is included herein.

Table 1. EUT and Peripherals

PERIPHERAL MANUFACTURER.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Flat Earth, Inc.	SDS-X3	Engineering Sample	Contains: FCC ID: S22BTMODULE-CL2 IC: 8193A-BTMODULECL2 Pending: FCC ID: 2AEJO-PGC2661184 IC: 20216-PGC2661184	1 m U D 1 m SD (x2)
Antenna See antenna details	--	--	--	--
Laptop computer	Dell	Various	Various	1.5 m U P

U= Unshielded
S= Shielded
P= Power
D= Data

2 Tests and Measurements

2.1 Test Equipment

The table below lists test equipment used to evaluate this product. Model numbers, serial numbers and their calibration status are indicated.

Table 2. Test Instruments

TEST INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	1/6/2015
SPECTRUM ANALYZER	E4407B	AGILENT	US41442935	1/28/2015
LOOP ANTENNA	SAS-200/562	A.H. Systems	142	9/12/2013 2 yr.
BICONICAL ANTENNA	3110B	EMCO	9306-1708	11/24/2014 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9110-3236	11/19/2014 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9305-3600	7/1/2014 2 yr.
HORN ANTENNA	SAS-571	A.H. Systems	605	7/23/2013 2 yr.
HORN ANTENNA	3116	EMO	9505-2255	1/27/2015 2 yr.
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00480	12/5/2014
PRE-AMPLIFIER	8477E	HEWLETT-PACKARD	1145A00307	11/21/2014
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	12/4/2014

Note: The calibration interval of the above test instruments are 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.2 Modifications to EUT Hardware

No physical modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 15, Subpart F Intentional Radiator Limits for the transmitter portion of the EUT.

2.3 Frequency Range of Radiated Measurements (Part 15.33, 15.521(h))

2.3.1 Intentional Radiator

The spectrum shall be investigated for the intentional radiator from the lowest RF signal generated in the EUT, without going below 9 kHz to the 5th harmonic of the peak level of fundamental frequency generated or 40 GHz, whichever is the lowest.

The highest frequency used to determine the frequency range over which measurements are made shall be based on the center frequency (fc). If the center frequency is less than 10 GHz there is no requirement to measure beyond 40 GHz.

2.4 Measurement Detector Function and Bandwidth (CFR 15.35)

The radiated and conducted emissions limits shown herein are based on the following:

FCC Part 15.207, 15.209, 15.509

2.4.1 Detector Function and Associated Bandwidth

On frequencies below 1000 MHz, the limits herein are based upon measurement equipment employing a CISPR Quasi-peak detector function and related measurement bandwidths (i.e. 9 kHz from 150 kHz to 30 MHz and 120 kHz from 30 MHz to 1000 MHz). Alternatively, measurements may be made with equipment employing a peak detector function as long as the same bandwidths specified for the Quasi-peak device are used.

2.4.2 Corresponding Peak and Average Requirements

Above 1000 MHz, radiated limits are based on measuring instrumentation employing an average detector function. When average radiated emissions are specified there is also a corresponding Peak requirement, as measured using a peak detector, of 20 dB greater than the average limit. For all measurements above 1000 MHz the Resolution Bandwidth shall be at least 1 MHz.

2.5 EUT Antenna Requirements (CFR 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. Only the antenna(s) listed in Table 4 will be used with this module.

Table 3. Allowed Antenna(s)

REPORT REFERENCE	MANUFACTURER	TYPE OF ANTENNA	MODEL	GAIN dB_i	TYPE OF CONNECTOR
Antenna	Flat Earth	Planar Bowtie	Outrigger X-3	0.5 to 6.0 dBi	Reverse sex SMA

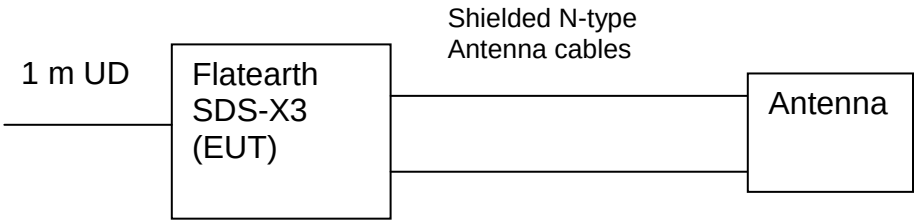


Figure 1. Block Diagram of Test Configuration

2.6 Restricted Bands of Operation (Part 15.205)

Only spurious emissions can fall in the frequency bands of CFR 15.205. The field strength of these spurious cannot exceed the limits of 15.209. Radiated harmonics and other Spurious are examined for this requirement see paragraph 2.1

2.7 Intentional Radiator, Power Line Conducted Emissions (CFR 15.207)

The EUT is battery powered. The EUT is indirectly connected the AC mains for testing purposes only. During normal operation the EUT is battery powered and will not be operated while directly or indirectly connected to the AC mains. This test was not applicable.

2.8 Intentional Radiator, Radiated Emissions (CFR 15.509 (f), 15.521 (g))

UWB devices where the highest radiated emission, $\mathbf{f_M}$ (The frequency at which the highest radiated emission occurs), is above 960 MHz have a limit on the peak level of the emission within a 50 MHz bandwidth of 0 dBm EIRP. A different RBW was used, therefore the peak emissions limit was adjusted per CFR 15.521 (g). The limit was also converted to peak field strength at 3 meters.

The antenna was positioned as it would be in normal operation and the fundamental emission was maximized to ensure the maximum reading and measured with the receiving antenna in both horizontal and vertical position. Below is the measured peak radiated emission at 3 meters.

RBW used: 3 MHz

Peak EIRP Limit	=	20 log (RBW/50) dBM EIRP
	=	20 log(3/50) dBm EIRP
	=	-24.44 dBm EIRP
Peak Field Strength Limit	=	-24.44 dBm EIRP +95.2
	=	70.76 dBuV/m

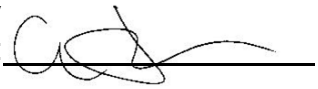
Table 4.Peak Intentional Radiated Emissions (CFR 15.509 (f))

Frequency (MHz)	Distance / Polarization	Raw Test Data (dBuV)	Correction Factors (dB/m)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1143.60	3.0m./HORZ	77.83	-11.51	66.32	70.76	4.4
1463.75	3.0m./VERT	72.14	-10.14	62.00	70.75	8.8

Sample Calculation at 1143.60 MHz:

Raw Test Data	77.83	dBuV
+Correction Factors	-11.51	dB/m
Results	66.32	dBuV/m

Test Date: July 14, 2015

Tested By
Signature:  Name: Carrie Ingram

2.8.1 Pulse Repetition Frequency

The device employs pulse modulation and has a repetition rate of 5 kHz. The pulse signal has been verified below.

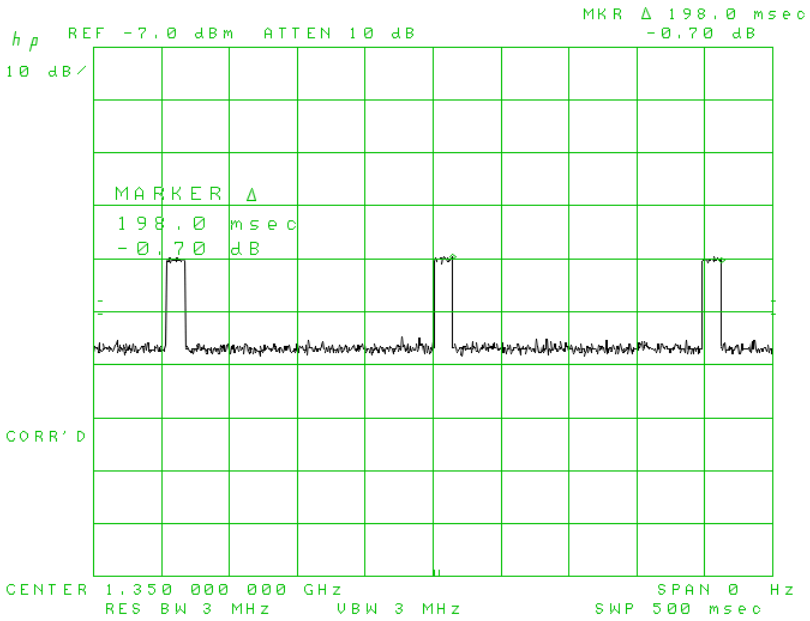


Figure 2. Pulse Repetition Frequency

Period= 198 mSec
Frequency= 1/seconds= 1/0.198 secs = 5.05 kHz

Pulse Rate: 5.0 kHz

2.9 UWB bandwidth (CFR 15.509 (a), 15.521(e))

The bandwidth of an imaging system under 15.509 must by below 10.6 GHz. The bandwidth is defined by the frequencies -10 dB from the maximum emissions found in section 2.10 of this test report. If multiple bandwidths occur, then the maximum bandwidth is used.

The bandwidth was determined from a radiated measurement using the designated antenna with which EUT will operate in the final product. The RBW was set to 1 MHz or higher. The receiving antenna's height was repeatedly varied from 1 m to 4 m and the polarity was adjusted several times. The turn table on which the EUT was placed was also rotated several times. This ensured that the true bandwidth of the EUT was measured. Below is the measured UWB bandwidth with the receiving antenna horizontal and vertical. Both polarities met the 10.6 GHz limit.

Emissions are contained within 959 MHz to 2.395 GHz which is below 10.6 GHz.

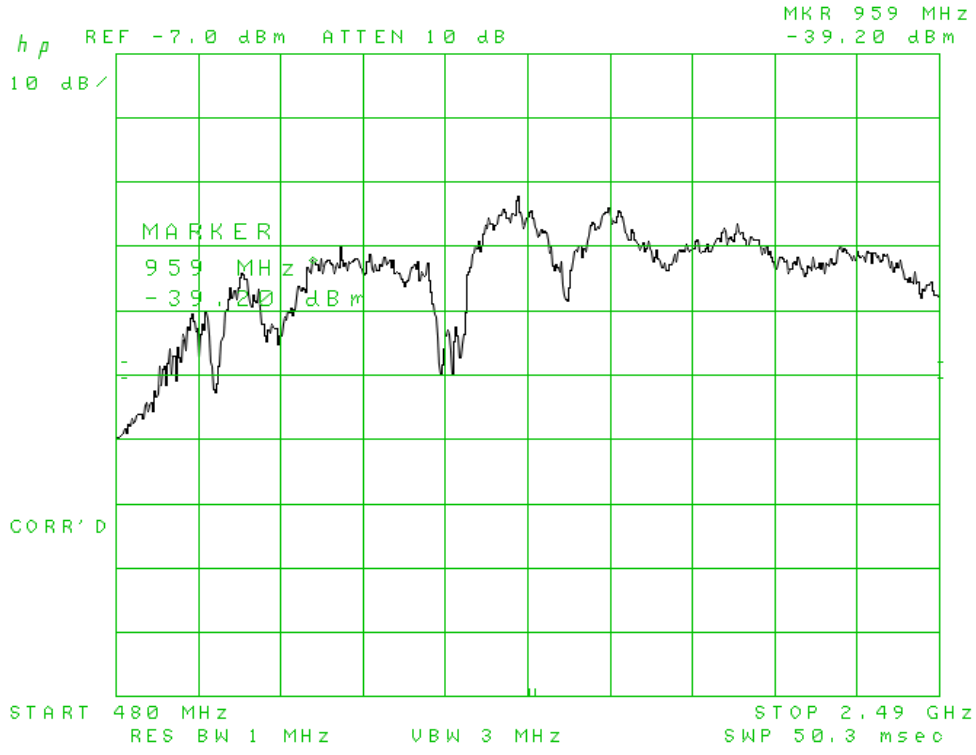


Figure 3. UWB 10 dB Bandwidth

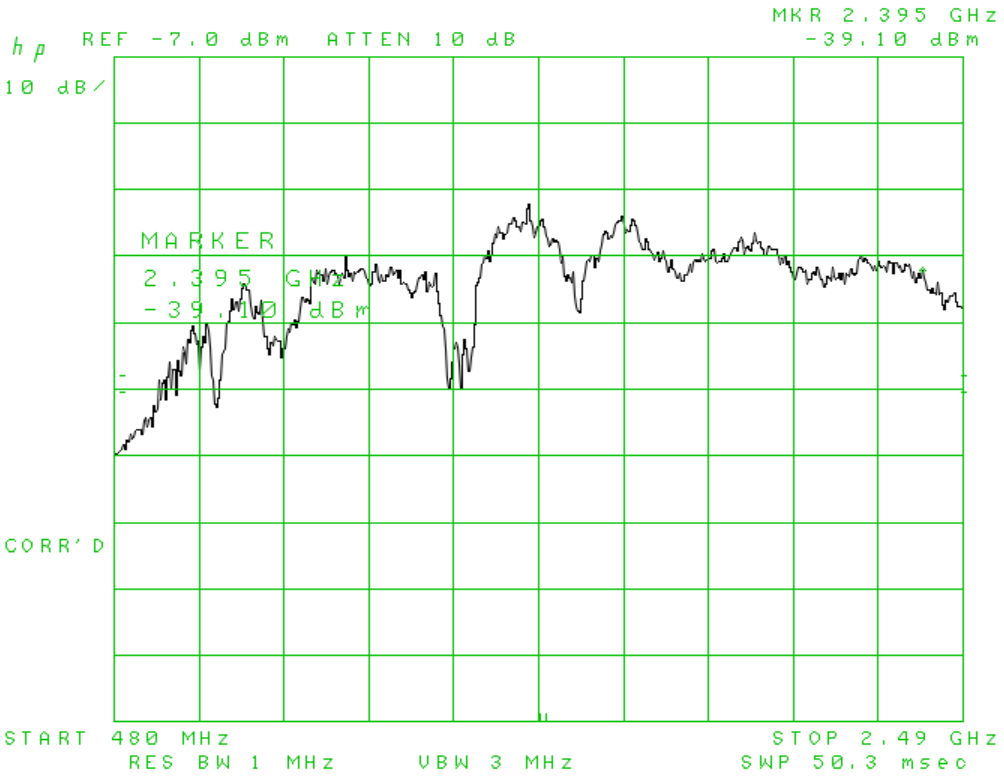


Figure 4. UWB 10 dB bandwidth

Note: EUT meets the fractional bandwidth requirements of 15.503 (d). The EUT has a fractional bandwidth of > 0.20 when calculated using the formula referenced in 15.503 (c). 2(Fh-Fl)/(Fh+Fl)= 2(2.1 GHz)/(2.3GHz) = 1.8, > 0.20.

2.10 99% Occupied Bandwidth (RSS-Gen, 6.6)

The screen shot below is the 99% occupied bandwidth of the EUT.

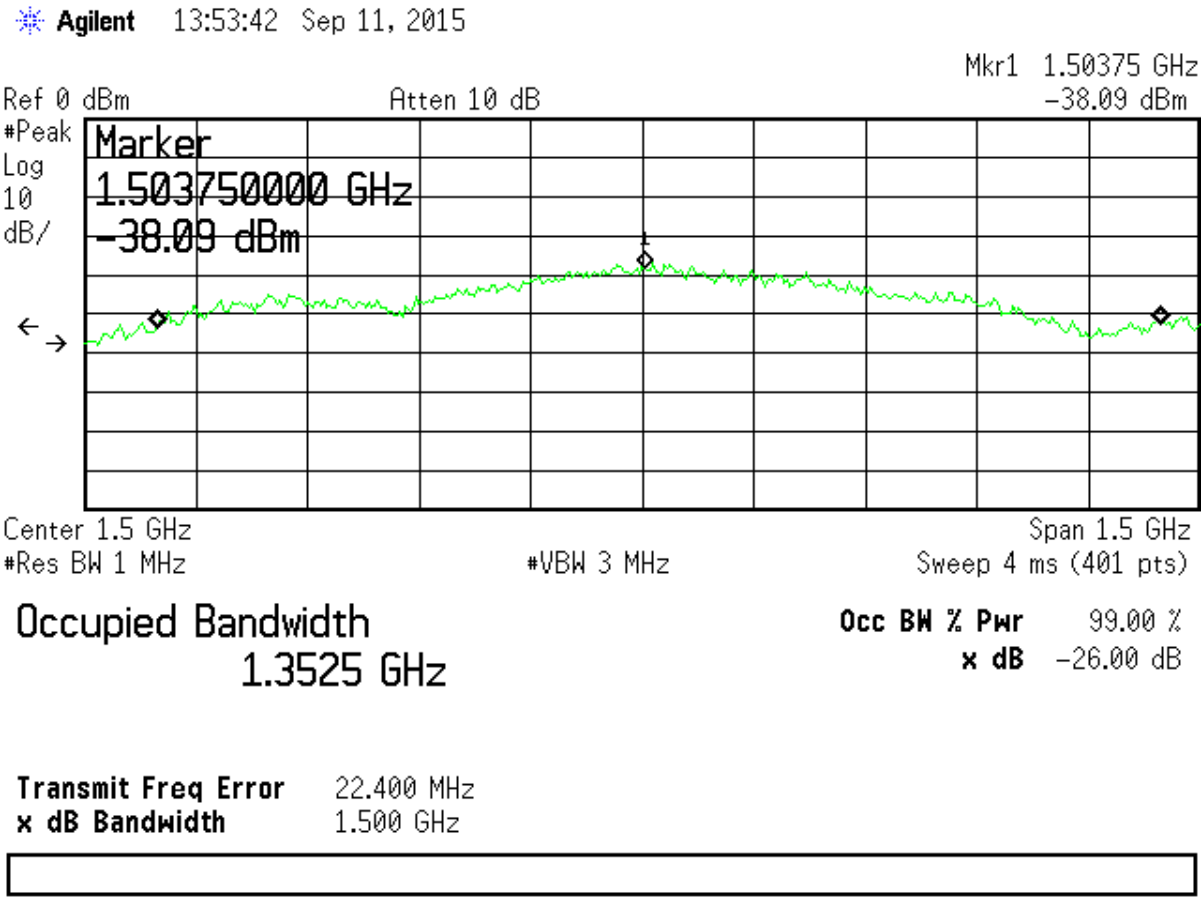


Figure 5. 99% Occupied Bandwidth

2.11 UWB Purpose, Part 90 License, and Coordination (CFR 15.509 (b))

The EUT, operating under CFR 15.509, is limited to GPR and wall imaging systems operating for or associated with law enforcement, fire fighting, emergency rescue, scientific research, commercial mining, or construction. The Parties operating this equipment will be eligible for licensing under the provisions of Part 90 of this chapter, and the operation of this equipment will be coordinated, as detailed in CFR 15.525.

2.12 Remote Switch (CFR 15.509 (c))

A GPR that is designed to operate while being hand-held or a wall-imaging system must contain a manually operated switch or a remote switch that causes the transmitter to cease operation within 10 seconds of being released.

Since the EUT is not hand-held, and is not a wall-imaging system, it is exempt from this requirement.

2.13 Radiated emissions at or below 960 MHz (CFR 15.509 (d), 15.209))

The radiated emissions at or below 960 MHz from the transmitter shall not exceed the emissions levels in CFR 15.209. Furthermore the emissions due to the digital circuitry of the EUT must also comply with the limits for 15.209.

The worst-case radiated emission for the EUT in the range of 30 MHz to 960 MHz was 0.7 dB below the limit at 950.04 MHz. All other radiated emissions were at least 5.2 dB below the CFR 15.209 limits. This data can be found in the table below.

Table 5. Radiated Emissions Test Data Below 960 MHz

30 MHz to 960 MHz							
Test: Radiated Emissions				**Client:** Flat Earth, Inc.			
Project: 15-0173				**Model:** SDS-X3			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**QP Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or QP**
48.04	38.91	-16.55	22.36	40.0	3m./HORZ	17.6	**QP**
84.03	45.30	-17.10	28.20	40.0	3m./HORZ	11.8	**QP**
112.98	48.70	-14.84	33.86	43.5	3m./HORZ	9.6	**QP**
117.90	51.23	-14.45	36.78	43.5	3m./HORZ	6.7	**QP**
121.33	51.60	-14.12	37.48	43.5	3m./HORZ	6.0	**PK**
150.03	42.85	-12.54	30.31	43.5	3m./HORZ	13.2	**QP**
165.02	42.11	-12.21	29.90	43.5	3m./HORZ	13.6	**QP**
176.36	44.52	-11.68	32.84	43.5	3m./HORZ	10.7	**QP**
190.01	42.34	-10.38	31.96	43.5	3m./HORZ	11.5	**QP**
215.80	37.10	-6.80	30.30	43.5	3m./HORZ	13.2	**PK**
249.80	29.00	-5.68	23.32	46.0	3m./HORZ	22.7	**QP**
267.40	33.30	-4.37	28.93	46.0	3m./HORZ	17.1	**QP**
349.90	41.20	-2.77	38.43	46.0	3m./HORZ	7.6	**PK**
358.10	37.50	-2.83	34.67	46.0	3m./HORZ	11.3	**PK**
606.06	28.20	2.84	31.04	46.0	3m./HORZ	15.0	**QP**
700.10	38.30	5.22	43.52	46.0	3m./HORZ	2.5	**QP**
787.16	29.30	6.60	35.90	46.0	3m./HORZ	10.1	**QP**
950.04	34.50	10.83	45.33	46.0	3m./HORZ	0.7	**QP**
957.10	29.88	10.97	40.85	46.0	3m./HORZ	5.2	**QP**
52.31	50.11	-16.57	33.54	40.0	3m./VERT	6.5	**QP**
83.24	48.51	-17.02	31.49	40.0	3m./VERT	8.5	**QP**
112.79	50.03	-14.74	35.29	43.5	3m./VERT	8.2	**QP**
154.14	42.35	-12.12	30.23	43.5	3m./VERT	13.3	**QP**
160.59	46.98	-11.35	35.63	43.5	3m./VERT	7.9	**QP**
171.54	40.13	-10.92	29.21	43.5	3m./VERT	14.3	**QP**
700.00	34.80	4.72	39.52	46.0	3m./VERT	6.5	**QP**
950.04	32.40	9.93	42.33	46.0	3m./VERT	3.7	**QP**
955.60	25.70	9.87	35.57	46.0	3m./VERT	10.4	**QP**

Sample Calculation at 48.04 MHz:

Magnitude of Measured Frequency	38.91	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-16.55	dB/m
Corrected Result	22.36	dBuV/m

Test Date: July 7,8,25, 2015
Tested by
Signature: _____ Name: Carrie Ingram

2.14 Radiated Emissions above 960 MHz (CFR 15.509 (d), 15.521(d,g,h))

The radiated emissions above 960 MHz from the transmitter shall comply with the AVG limits in Table 5 when measured using a resolution bandwidth of 1 MHz. The following are the worst case emissions with the receiving antenna in both horizontal and vertical polarities. The emissions were maximized using a Peak Detector, and the final measurement was taken using an Average Detector.

Table 6. Radiated Emissions above 960 MHz, CFR 15.509 (d), 15.521(g)

Frequency Range (MHz)	EIRP Limit (dBm)	Field Strength Limit at 3 meters (dBuV/m)
960 -1610	-65.3	29.9
1610 – 1990	-53.3	41.9
1990 – 3100	-51.3	43.9
3100 - 10600	-41.3	53.9
Above 10600	-51.3	43.9

The worst-case radiated emission for the EUT in the range above 960 MHz was 2.4 dB below the limit at 1566.13 MHz All other radiated emissions were at least 2.7 dB below the CFR 15.509 limits. This data can be found in the table below.

Table 7. Radiated Emissions from Transmitter Test Data Above 960 MHz

Above 960 MHz							
Test: Radiated Emissions				**Client:** Flat Earth, Inc.			
Project: 15-0173				**Model:** SDS-X3			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
1494.14	34.79	-8.04	26.75	29.9	3.0m./VERT	3.1	AVG
1803.44	34.45	-5.38	29.07	42.0	3.0m./VERT	12.9	AVG
2375.70	32.97	-2.34	30.63	44.0	3.0m./VERT	13.4	AVG
2803.07	38.01	-0.37	37.64	44.0	3.0m./VERT	6.4	AVG
2219.50	32.85	-3.52	29.33	44.0	3.0m./VERT	14.7	AVG
1176.10	36.29	-10.60	25.69	29.9	3.0m./VERT	4.2	AVG
3136.70	32.55	2.41	34.96	53.9	3.0m./VERT	18.9	AVG
9499.98	30.03	12.86	42.89	53.9	3.0m./VERT	11.0	AVG
1566.13	35.30	-7.68	27.62	30.0	3.0m./HORZ	2.4	AVG
1612.90	35.44	-7.19	28.25	42.0	3.0m./HORZ	13.8	AVG
1672.90	35.27	-7.24	28.03	42.0	3.0m./HORZ	14.0	AVG
2089.90	33.87	-3.97	29.90	44.0	3.0m./HORZ	14.1	AVG
2583.90	32.67	-2.65	30.02	44.0	3.0m./HORZ	14.0	AVG
2658.80	33.93	-2.21	31.72	44.0	3.0m./HORZ	12.3	AVG
2164.80	33.17	-3.84	29.33	44.0	3.0m./HORZ	14.7	AVG
3138.00	30.20	-0.45	29.75	54.0	3.0m./HORZ	24.2	AVG
3750.80	30.94	2.04	32.98	54.0	3.0m./HORZ	21.0	AVG
9662.00	30.21	10.04	40.25	44.0	3.0m./HORZ	3.7	AVG
10886.00	29.06	12.21	41.27	44.0	3.0m./HORZ	2.7	AVG
1494.14	34.79	-8.04	26.75	29.9	3.0m./VERT	3.1	AVG
1803.44	34.45	-5.38	29.07	42.0	3.0m./VERT	12.9	AVG
2375.70	32.97	-2.34	30.63	44.0	3.0m./VERT	13.4	AVG
2803.07	38.01	-0.37	37.64	44.0	3.0m./VERT	6.4	AVG
2219.50	32.85	-3.52	29.33	44.0	3.0m./VERT	14.7	AVG

Sample Calculation at 1491.14 MHz:

Magnitude of Measured Frequency	34.79	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-8.04	dB/m
Corrected Result	26.75	dBuV/m

Test Date: July 14, 15, 23, 2015
Tested by
Signature: _____ Name: Carrie Ingram

2.15 Radiated Emissions in the GPS band (CFR 15.509 (e), 15.521(g))

In addition the radiated emissions limits from CFR 15.509 (d), the transmitter shall not exceed the following average limits, in Table 8 when measured using a resolution bandwidth of no less than 1 kHz.

Table 8. Radiated Emissions in the GPS band (CFR 15.509 (e), 15.221(g))

Frequency Range (MHz)	EIRP Limit (dBm)	Field Strength Limit at 3 meters (dBuV/m)
1164-1240	-75.3	19.9
1559-1610	-75.3	19.9

In each of these bands, the emissions from the transmitter were maximized using a larger bandwidth and the peak detector, then the resolution bandwidth was decreased and the final measurement was taken using the average detector. The worse case emissions are seen below.

Table 9. Worst Case Radiated Emissions Test Data In The GPS Bands

1164 – 1240 MHz and 1559- 1610 MHz							
Test: Radiated Emissions				**Client:** Flat Earth, Inc.			
Project: 15-0173				**Model:** SDS-X3			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or AVG**
1199.90	7.26	-10.48	-3.23	20.0	3.0m./VERT	23.2	AVG
1577.23	4.53	-8.06	-3.54	20.0	3.0m./VERT	23.5	AVG
1179.20	5.96	-9.79	28.25	20.0	3.0m./HORZ	23.8	AVG
1600.00	4.50	-6.85	-2.35	20.0	3.0m./HORZ	22.3	AVG

Sample Calculation at 11990.90 MHz:

Magnitude of Measured Frequency	7.26	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-10.48	dB/m
Corrected Result	-3.23	dBuV/m

Test Date: July 14,15, 2015
Tested by
Signature: _____ Name: Carrie Ingram

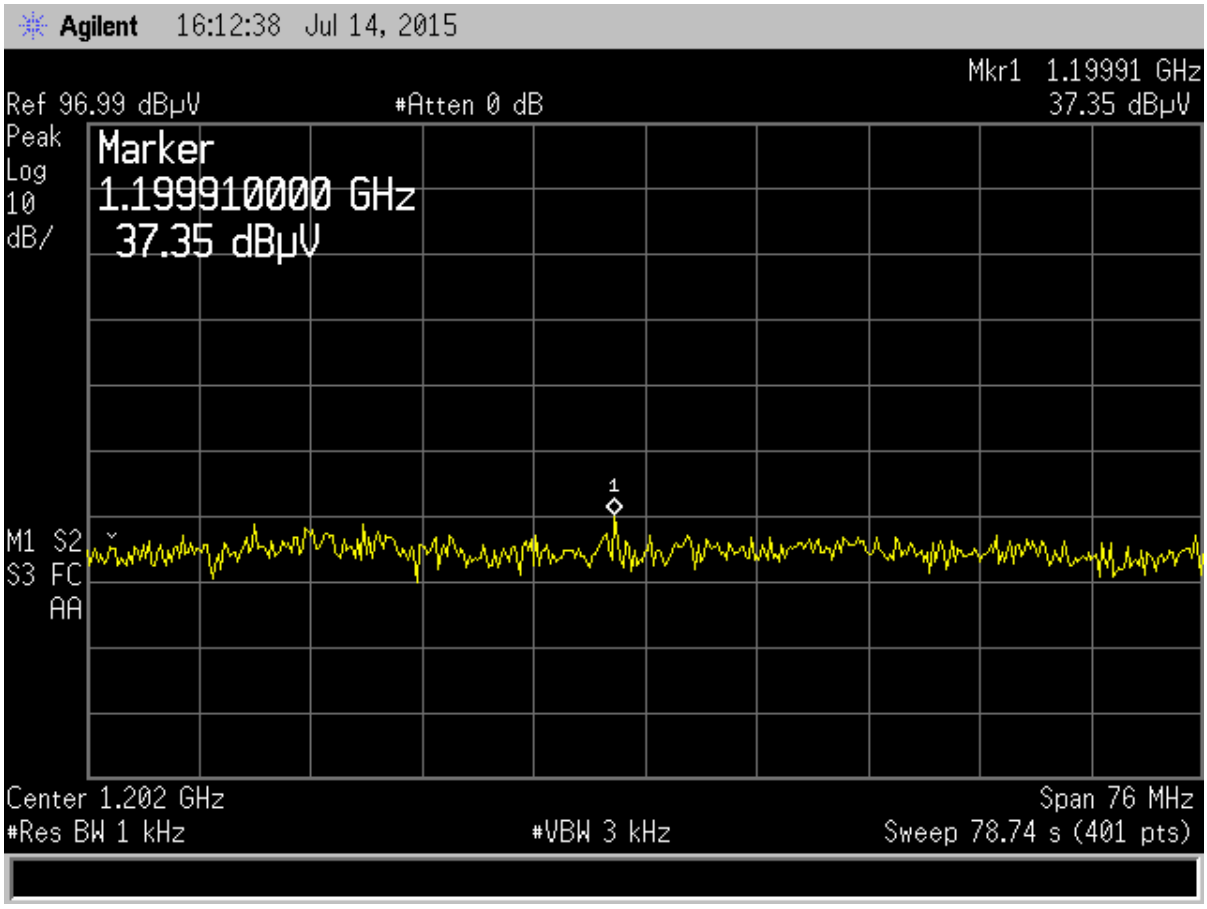


Figure 6. Peak Emissions 1164 – 1240 MHz Vertical

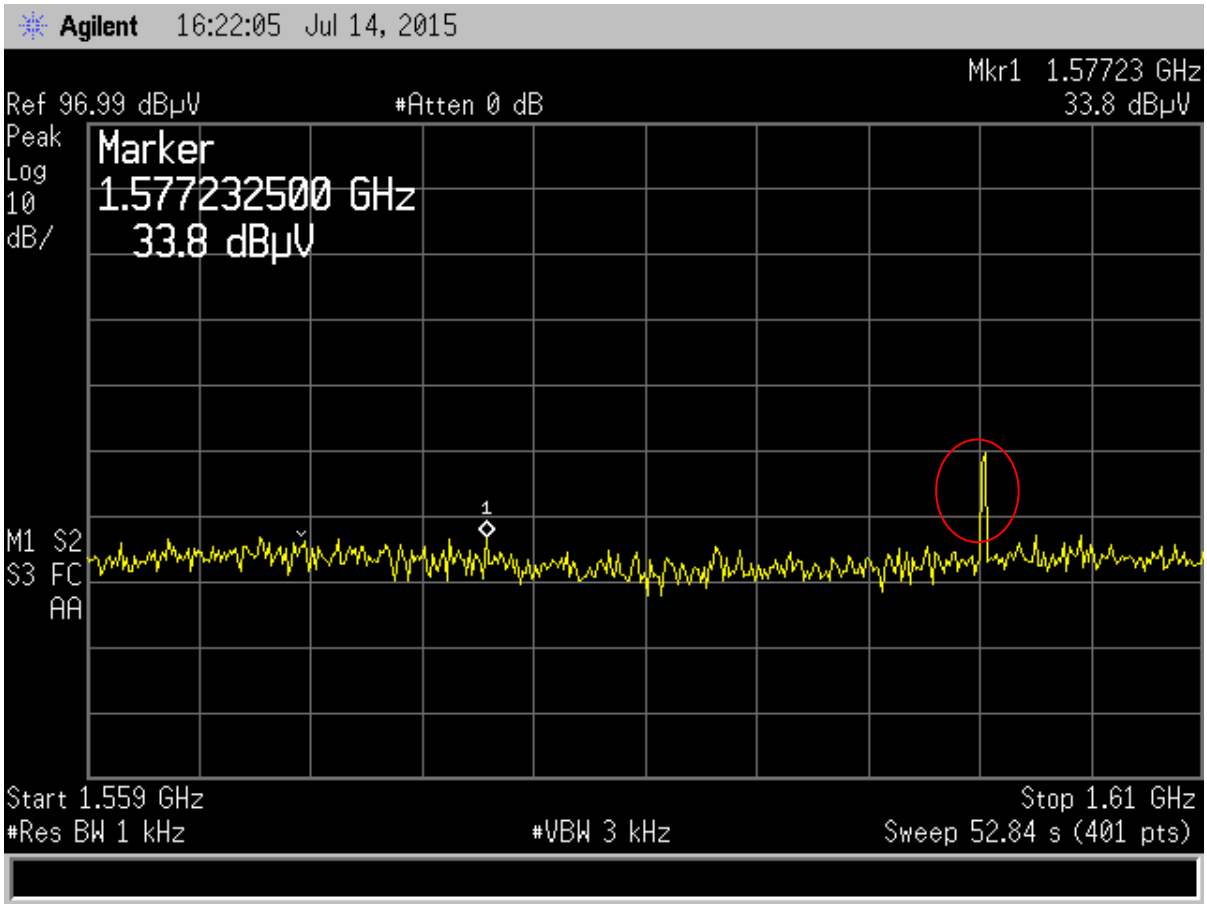


Figure 7. Peak Emissions 1559- 1610 MHz Vertical

Note: The circled emission was verified to be from the Digital Device and not the transmitter. See Section 2.15 of this test report and CFR 15.521 (c).

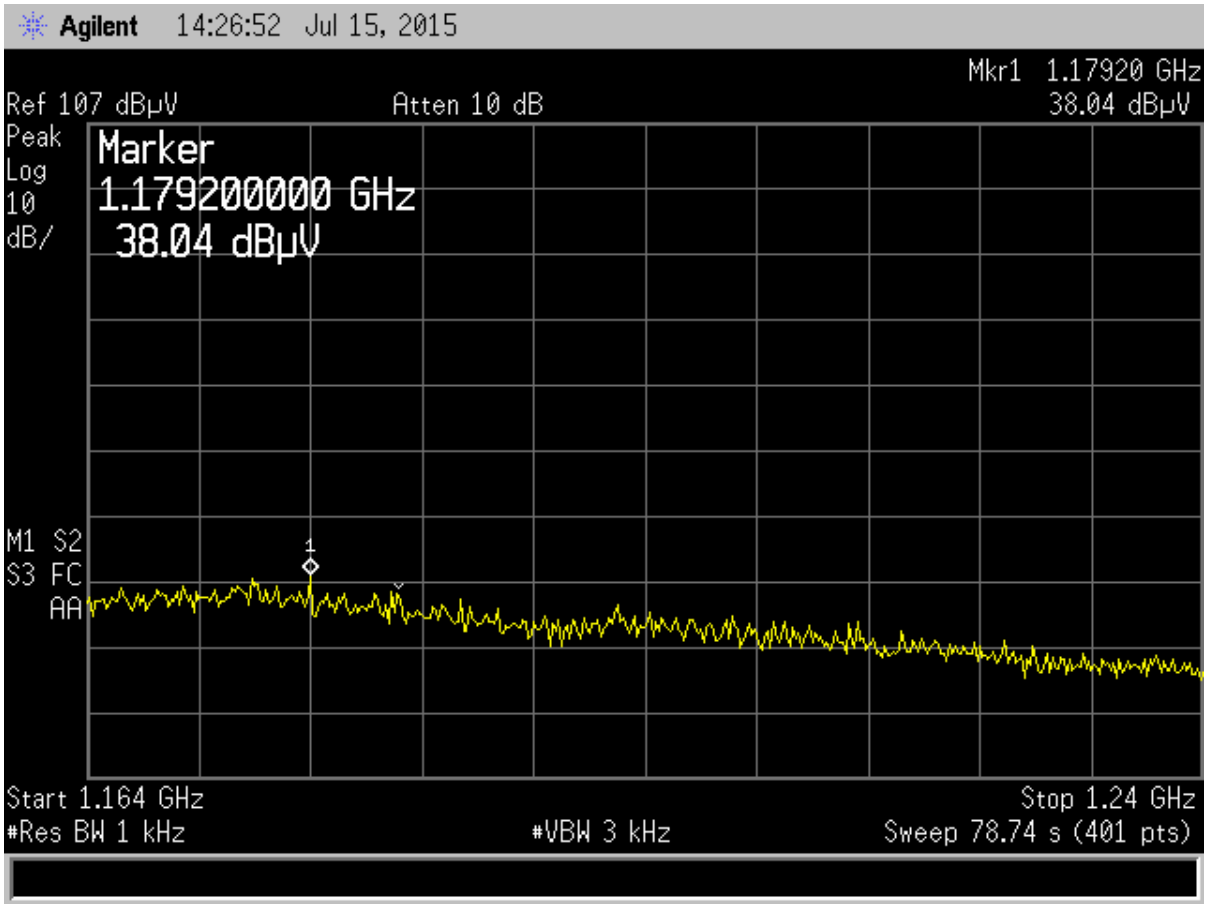


Figure 8. Peak Emissions 1164 – 1240 MHz Horizontal

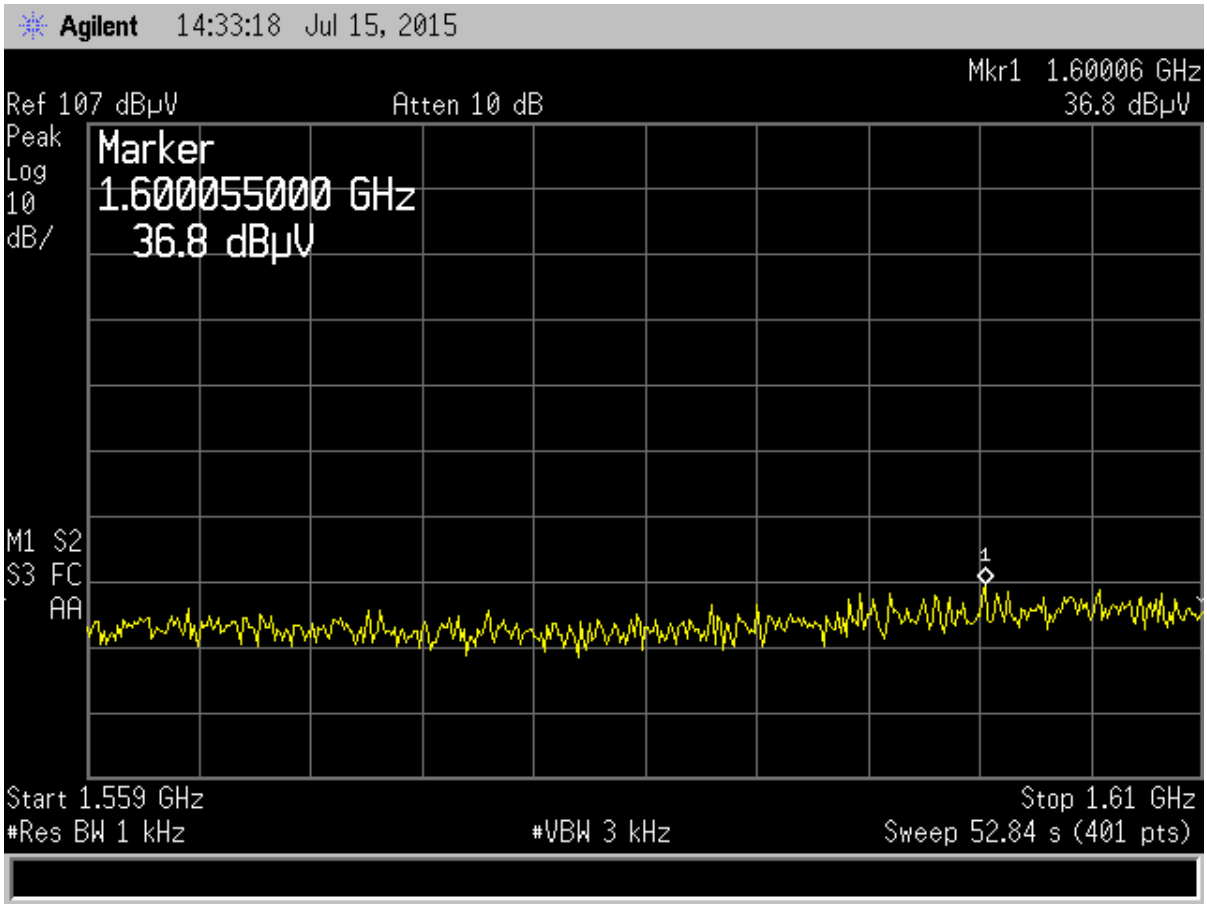


Figure 9. Peak Emissions 1559- 1610 MHz Horizontal

2.16 Unintentional Radiator, Radiated Emissions (CFR 15.209, 15.521 (c))

Any radiated emissions determined to be coming from the digital circuitry of the EUT and not the transmitter, were tested to make sure that they met the limits of 15.209.

Additionally the EUT was evaluated for co-location emissions coming from the EUT while both the UWB radio and the Bluetooth radio were ON and actively transmitting as they would in normal operation.

Radiated emissions disturbance Measurements were performed with an instrument having peak, quasi-peak, and average detectors over the frequency range of 30 MHz to 10 GHz. Measurements of the radiated emissions were made with the receiver antenna at a distance of 3 m from the boundary of the test unit.

The test antenna was varied from 1 m to 4 m in height while watching the analyzers' display for the maximum magnitude of the signal at the test frequency. The antenna polarization (horizontal or vertical) and test sample azimuth were varied during the measurements to find the maximum field strength readings to record.

The worst-case radiated emission in the range of 30 MHz to 10 GHz was 7.2 dB below the limit at 2122.00 MHz. This signal is found in Table 9. All other radiated emissions were 13.5 dB or more below the limit.

NOTE: The test data provided in this section is to support the Verification and co-location requirement for the digital apparatus and the radios within.

Table 10. Unintentional Radiator, Peak Radiated Emissions (CFR 15.209), 30 MHz to 10 GHz

30 MHz to 10 GHz with 15.209 Limits							
Test: Radiated Emissions				**Client:** Flat Earth, Inc.			
Project: 15-0173				**Model:** SDS-X3			
Frequency (MHz)	**Test Data (dBuv)**	**AF+CA-AMP (dB/m)**	**Results (dBuV/m)**	**AVG Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector PK, or QP**
For spurious emissions recorded below 960 MHz see Table 5 above.							
1600.00	47.23	-6.75	40.48	54.0	3.0m./VERT	13.5	**AVG**
2122.00	50.08	-3.23	46.85	54.0	3.0m./VERT	7.2	**AVG**

Note: the Bluetooth radio was ON and operating in a normal mode during radiated emissions testing. The emissions levels from the co-located radios did not exceed the limits as presented herein.

Tested from 30 MHz to 10 GHz

SAMPLE CALCULATION at 1600.00 MHz:

Magnitude of Measured Frequency	47.23	dBuV
+ Cable Loss+ LISN Loss	-6.75	dB
=Corrected Result	40.48	dBuV
Limit	54.00	dBuV
-Corrected Result	40.48	dBuV
Margin	13.52	dB

Test Date: July 14, 15, 2015
Tested By
Signature: _____ Name: Carrie Ingram

2.17 Unintentional Radiator, Powerline Emissions (CFR 15.207, 15.521 (j))

This EUT will not have access to the AC Main power line; therefore this requirement is not applicable.

2.18 Measurement Uncertainty

The measurement uncertainties given were calculated using the method detailed in CISPR 16-4. A coverage factor of k=2 was used to give a level of confidence of approximately 95%.

2.18.1 Conducted Emissions Measurement Uncertainty

Measurement Uncertainty (within a 95% confidence level) for this test is ± 2.78 dB.

This test is not applicable.

2.18.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.39 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.18 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.21dB.

The data listed in this test report does not have sufficient margin to negate the effects of uncertainty. Therefore, the EUT conditionally meets this requirement.