FCC PART 15, SUBPART C
IC RSS-247, ISSUE 1, MAY 2015

TEST AND MEASUREMENT REPORT

For

AirDog SIA

A. Briana Street 9A-2,

Riga LV-1001, Latvia

FCC ID: 2AF4R-BT10
IC: 20698-BT10

Report Type:	**Product Type:**
CIIPC Report	Bluetooth Module

Prepared By:	Jin Yang Test Engineer
Report Number:	R1508282-247 Rev A
Report Date:	2015-11-20
Reviewed By:	Bo Li RF Lead

Bay Area Compliance Laboratories Corp.
1274 Anvilwood Avenue,
Sunnyvale, CA 94089, USA
Tel: (408) 732-9162
Fax: (408) 732-9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1508282-247	Initial	2015-11-11
1	R1508282-247 Rev A	Update admin information	2015-11-20

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *AirDog SIA* and their product model: BT10, FCC ID: 2AF4R-BT10; IC: 20698-BT10 or the "EUT" as referred to in this report. The EUT is a Bluetooth Module.

1.2 Mechanical Description of EUT

The EUT measures approximately 15.29(L) x 28.71(W) x 2.5(H) mm and weighs approximately 1.5g.

The test data gathered are from typical production sample, serial number: R1508282-2 assigned by BACL.

1.3 Objective

This report is prepared on behalf of *AirDog SIA,* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission's rules and IC RSS-247 Issue 1, MAY 2015.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-247 rules for Output Power, Antenna Requirements and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

Class II Permissive Change based on following reasons:

1. Remove the 20cm distance from the grant; establish portable operation.
2. Change the antenna type
3. Implementing the BT module into AL10 host

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v03r03: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:
1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminares and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.10-2013, ANSI C63.4-2014, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v03r03.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test utilities used are *BlueSuite 2.5 and nrfgoStudio* provided by *AirDog, Inc.*, the software was verified by *Jin Yang* to comply with the standard requirements being tested against.

2.3 Equipment Modifications

N/A

2.4 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude E6410

2.5 EUT Internal Configuration Details

Manufacturer/Product Type	Model/Rev.	Crystals(MHz)
Airdog (AD): Flight Controller	AIRFMU06	24 MHz
AD: Long Range Bluetooth modem	Laird BT740-SC	-
AD: Bluetooth Low Energy modem	Laird BL600-SA	-
AD: Gimbal controller	AIRBGC05	8 MHz
AD: Electronic speed controller	Sunrise BLHELI-Multi-20A-OPTO	16 MHz

2.6 Support Equipment

Manufacturer	Description	Model
CSR	SPI adapter	DEV-PC-1309C
CSR	USB-SPI converter	1324

2.7 Power Supply and Line Filters

N/A

2.8 Interface Ports and Cabling

Cable Description	Length (m)	To	From
USB Cable	< 1m	Laptop	USB-SPI converter
WLAN Cable	< 1m	USB-SPI converter	SPI converter

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Results
FCC §15.203 IC RSS-Gen §8.3	Antenna Requirement	Compliant
FCC §15.247(i) IC RSS-102	RF Exposure	Compliant
FCC §15.205 IC RSS-Gen §8.10	Restricted Bands	Compliant
FCC §15.209, §15.247 (d) IC RSS-247 §5.5 IC RSS-Gen §8.9	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(1)(iii) IC RSS-247 §5.1	Number of Hopping Frequency	N/A[1]
FCC §15.247(a)(1) IC RSS-247 §5.1	20dB and Occupied Bandwidth	N/A[1]
FCC §15.247(a)(1) IC RSS-247 §5.1	Channel Separation	N/A[1]
FCC §15.247(a)(1)(iii) IC RSS-247 §5.1	Number of Dwell Time	N/A[1]
FCC §15.247(b)(3) IC RSS-247 §5.4	Output Power	N/A[1]

[1]: Please refer to original certification. Share data with original application report results (FCC ID: SQGBT700, IC: 3147A-BT700)

4 FCC §15.203 & IC RSS-Gen §8.3 – Antenna Requirements

4.1 Applicable Standards

According to FCC §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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to IC RSS-Gen §8.3: Transmitter Antenna

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. [9] When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

4.2 Antenna Description

Antenna Type	Antenna Gain (dBi)
Helical antenna, omnidirectional	1.5

5 FCC §15.247(i) & IC RSS-102 – RF Exposure

5.1 Applicable Standards

According to FCC §15.247(i), §1.1307(b), §2.1093 and KDB 447498, For portable device, 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,

Where
- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation31
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

According to IC RSS-102 Issue 5 section 2.5.1:

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

5.2 SAR Exemption Evaluation

Time based averaged output power calculation:

The EUT data rate is 9600 bps and the unit transfers 1200 bytes per second, based on the Bluetooth specification, We know there are 800 slots per second, each slot is from 1.25ms frame (=1 S/1.25 mS). So to send 1200 bytes per second, need to transmit 1.5 bytes per second (=1200/800). This is a slow data rate, so assume Bluetooth baseband would decide to use DM1 packet. DM1 maximum packet payload duration is 366 us (17 bytes DM1 maximum packet payload) per slot. Therefore TX could be ON for 29.3% of the time (=0.366 ms/1.25 ms). Hence average TX power estimated to be 29.3 mW (= 100 mW x 0.293). DM1 has maximum 17 bytes payload byte per slot, which means a data rate of 108800 bits per second (=800 slots per second x 17 bytes x 8 bits per byte). This is inefficient as to send customers data rate of 9600 bits per second (that is 1200 bytes per second) using DM1 packets, we need to send only send 1.5 bytes every 11.3 slot (=17 bytes/1.5 bytes). 1.5 bytes/17 bytes = 0.088 which is 32.29 µs. TX could be ON for 2.58% of the time (=0.03229 ms/1.25 ms). Hence average TX power estimated to be 2.58 mW (= 100 mW x 0.0258).

SAR Exemption for FCC:

According to the formula: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0,

(2.58/5)*(√2.480) = 0.812 which is less than 3.0 therefore, this unit is exempted from SAR testing.

SAR Exemption for IC:

Based on RSS-102 table 1, at separation distance of ≤5mm, the exemption limit is 4 mW, the unit transmitting power is 2.58 mW which is 4.12 dBm, the antenna gain is 1.5 dBi, so the EIRP power is 5.62 dBm (3.65 mW) which is less than 4 mW, therefore this unit is exempted from SAR testing.

6 FCC §15.209, §15.247(d) & IC RSS-247 §5.5, RSS-Gen §8.9 – Spurious Radiated Emissions

6.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) and RSS-Gen except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC §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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

As per IC RSS-Gen 8.9,

> Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 or Table 5 below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 4 – General Field Strength Limits for Licence-Exempt Transmitters at Frequencies Above 30 MHz

Frequency (MHz)	Field Strength (µv/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960*	500

* Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

Note: Transmitting devices are not permitted in restricted frequency bands unless stated otherwise in the specific RSS.

As per IC RSS-247 §5.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

6.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15 Subpart C and IC RSS-247 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

6.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all Installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

6.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2015-06-18	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2015-07-11	2 year
EMCO	Horn Antenna	3115	9511-4627	2015-01-15	1 year
Agilent	Pre-amplifier	8447D	2944A10187	2015-03-20	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	2015-03-05	1 year
-	SMA cable	-	C0002	Each time[1]	N/A
IW Microwave	High Frequency Cable	DC-1438	SPS-2303-3840-SPS	2015-05-29	1 year
Hewlett-Packard	5 ft N-type RF cable	-	1268	2015-05-15	1 year
Hewlett	Pre-amplifier	8449B	3008A01978	2015-03-11	1year

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.

Statement of Traceability: BACL *attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

6.6 Test Environmental Conditions

Temperature:	22º C
Relative Humidity:	42 %
ATM Pressure:	102.7 kPa

The testing was performed by Jin Yang on 2015-09-28 in 5m chamber 3.

6.7 Summary of Test Results

According to the data hereinafter, the EUT complied with FCC Title 47, Part 15C and IC RSS-247 standard's radiated emissions limits, and had the worst margin of:

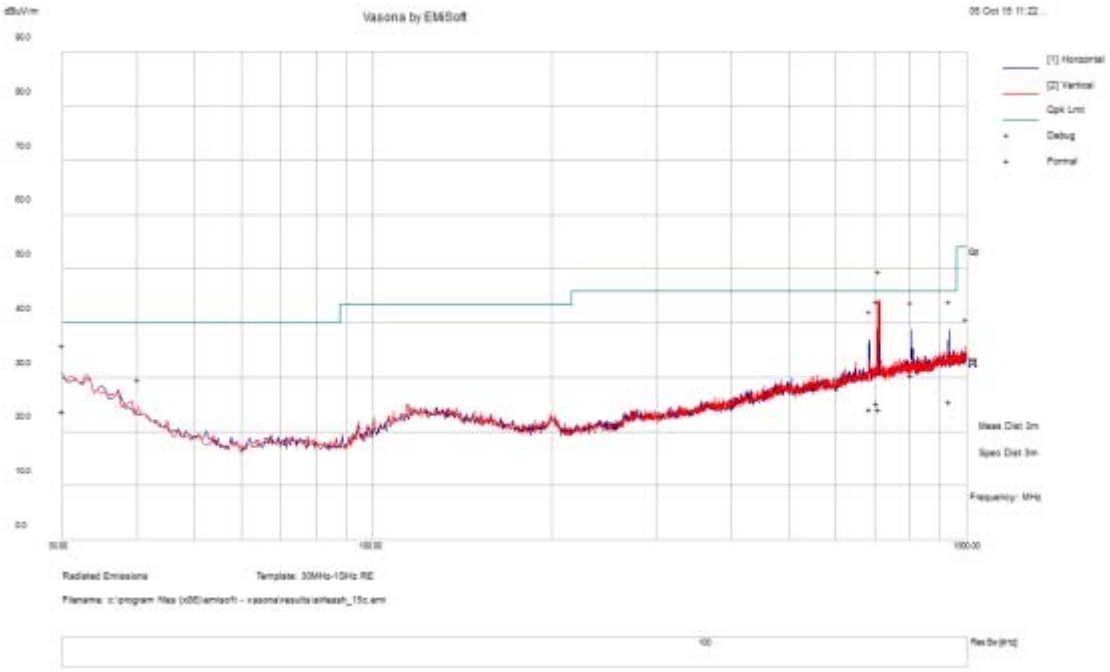
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel**
-7.61	2483.5	Vertical	High

Please refer to the following table and plots for specific test result details

6.8 Radiated Emissions Test Results

1) 30 MHz – 1 GHz

Worst-case:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (PK/QP/Ave.)
711.444	24.17	251	V	35	46	-21.83	QP
705.324	25.32	100	V	123	46	-20.68	QP
932.6535	25.62	127	H	339	46	-20.38	QP
806.3418	30.51	100	H	92	46	-15.49	QP
685.4405	24.3	267	H	89	46	-21.7	QP
30.00362	23.81	246	H	56	40	-16.19	QP

2) 1–25 GHz, Measured at 3 meters

GFSK

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz, measured at 3 meters											
2402	67.43	209	210	V	28.38	5.21	-	101.02	-	-	Peak
2402	63.74	65	172	H	28.388	5.21	-	97.338	-	-	Peak
2402	66.76	209	210	V	28.38	5.21	-	100.35	-	-	Ave
2402	62.93	65	172	H	28.388	5.21	-	96.528	-	-	Ave
2390	26.54	209	210	V	28.38	5.21	-	60.13	74	-13.87	Peak
2390	26.85	65	172	H	28.388	5.21	-	60.448	74	-13.552	Peak
2390	12.7	209	210	V	28.38	5.21	-	46.29	54	-7.71	Ave
2390	12.48	65	172	H	28.388	5.21	-	46.078	54	-7.922	Ave
4804	55.07	14	141	V	33.119	5.34	33.72	59.809	74	-14.191	Peak
4804	57.73	80	165	H	33.182	5.34	33.72	62.532	74	-11.468	Peak
4804	37.29	14	141	V	33.119	5.34	33.72	42.029	54	-11.971	Ave
4804	38.15	80	165	H	33.182	5.34	33.72	42.952	54	-11.048	Ave
7206	48.39	0	124	V	37.444	6.33	33.93	58.234	74	-15.766	Peak
7206	48.49	353	140	H	37.442	6.33	33.93	58.332	74	-15.668	Peak
7206	33.05	0	124	V	37.444	6.33	33.93	42.894	54	-11.106	Ave
7206	32.64	353	140	H	37.442	6.33	33.93	42.482	54	-11.518	Ave
9608	45.69	322	108	V	38.83	9.57	34.2	59.89	74	-14.11	Peak
9608	42.37	127	102	H	38.834	9.57	34.2	56.574	74	-17.426	Peak
9608	29.56	322	108	V	38.83	9.57	34.2	43.76	54	-10.24	Ave
9608	27.17	127	102	H	38.834	9.57	34.2	41.374	54	-12.626	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	66.12	242	136	V	28.38	5.21	-	99.71	-	-	Peak
2441	64.26	226	248	H	28.388	5.21	-	97.858	-	-	Peak
2441	65.21	242	136	V	28.38	5.21	-	98.8	-	-	Ave
2441	63.56	226	248	H	28.388	5.21	-	97.158	-	-	Ave
4882	53.40	60	164	V	33.321	5.34	33.75	58.31	74	-15.69	Peak
4882	56.52	233	1117	H	33.354	5.34	33.75	61.46	74	-12.54	Peak
4882	36.25	60	164	V	33.321	5.34	33.75	41.16	54	-12.84	Ave
4882	37.00	233	117	H	33.354	5.34	33.75	41.94	54	-12.06	Ave
7323	47.68	308	103	V	37.324	6.27	33.93	57.34	74	-16.66	Peak
7323	49.51	343	105	H	37.356	6.27	33.93	59.21	74	-14.79	Peak
7323	32.14	308	103	V	37.324	6.27	33.93	41.80	54	-12.20	Ave
7323	33.53	343	105	H	37.356	6.27	33.93	43.23	54	-10.77	Ave
9764	43.74	345	113	V	38.922	9.44	34.31	57.79	74	-16.21	Peak
9764	43.55	42	100	H	38.913	9.44	34.31	57.59	74	-16.41	Peak
9764	28.83	345	113	V	38.922	9.44	34.31	42.88	54	-11.12	Ave
9764	28.23	42	100	H	38.913	9.44	34.31	42.27	54	-11.73	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz, measured at 3 meters											
2480	66.31	266	116	V	28.55	5.21	-	100.07	-	-	Peak
2480	64.88	235	203	H	28.595	5.21	-	98.685	-	-	Peak
2480	65.46	266	116	V	28.55	5.21	-	99.22	-	-	Ave
2480	63.96	235	203	H	28.595	5.21	-	97.765	-	-	Ave
2483.5	26.55	266	116	V	28.55	5.21	-	60.31	74	-13.69	Peak
2483.5	26.89	235	203	H	28.595	5.21	-	60.695	74	-13.305	Peak
2483.5	12.36	266	116	V	28.55	5.21	-	46.12	54	-7.88	Ave
2483.5	12.34	235	203	H	28.595	5.21	-	46.145	54	-7.855	Ave
4960	56.41	45	160	V	33.531	5.25	33.73	61.46	74	-12.54	Peak
4960	58.09	231	177	H	33.556	5.25	33.73	63.17	74	-10.83	Peak
4960	36.99	45	160	V	33.531	5.25	33.73	42.04	54	-11.96	Ave
4960	37.59	231	177	H	33.556	5.25	33.73	42.67	54	-11.33	Ave
7440	51.39	294	114	V	37.242	6.27	33.99	60.91	74	-13.09	Peak
7440	52.10	337	122	H	37.238	6.27	33.99	61.62	74	-12.38	Peak
7440	34.53	294	114	V	37.242	6.27	33.99	44.05	54	-9.95	Ave
7440	34.99	337	122	H	37.238	6.27	33.99	44.51	54	-9.49	Ave
9920	44.10	0	100	V	39.036	9.71	34.39	58.46	74	-15.54	Peak
9920	42.95	0	100	H	39.052	9.71	34.39	57.32	74	-16.68	Peak
9920	28.91	0	100	V	39.036	9.71	34.39	43.27	54	-10.73	Ave
9920	29.08	0	100	H	39.052	9.71	34.39	43.45	54	-10.55	Ave

QPSK

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz, measured at 3 meters											
2402	65.93	241	135	V	28.38	5.21	-	99.52	-	-	Peak
2402	62.96	235	208	H	28.388	5.21	-	96.558	-	-	Peak
2402	64.88	241	135	V	28.38	5.21	-	98.47	-	-	Ave
2402	62.07	235	208	H	28.388	5.21	-	95.668	-	-	Ave
2390	27.08	241	135	V	28.38	5.21	-	60.67	74	-13.33	Peak
2390	26.41	235	208	H	28.388	5.21	-	60.008	74	-13.992	Peak
2390	12.08	241	135	V	28.38	5.21	-	45.67	54	-8.33	Ave
2390	12.1	235	208	H	28.388	5.21	-	45.698	54	-8.302	Ave
4804	55.01	34	138	V	33.119	5.34	33.72	59.749	74	-14.251	Peak
4804	56.87	69	103	H	33.182	5.34	33.72	61.672	74	-12.328	Peak
4804	35.22	34	138	V	33.119	5.34	33.72	39.959	54	-14.041	Ave
4804	36.58	69	103	H	33.182	5.34	33.72	41.382	54	-12.618	Ave
7206	45.75	302	103	V	37.444	6.33	33.93	55.594	74	-18.406	Peak
7206	46.92	57	139	H	37.442	6.33	33.93	56.762	74	-17.238	Peak
7206	29.68	302	103	V	37.444	6.33	33.93	39.524	54	-14.476	Ave
7206	31.05	57	139	H	37.442	6.33	33.93	40.892	54	-13.108	Ave
9608	39.07	338	125	V	38.83	9.57	34.2	53.27	74	-20.73	Peak
9608	39.62	22	114	H	38.834	9.57	34.2	53.824	74	-20.176	Peak
9608	23	338	125	V	38.83	9.57	34.2	37.2	54	-16.8	Ave
9608	23.49	22	114	H	38.834	9.57	34.2	37.694	54	-16.306	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	64.98	240	151	V	28.38	5.21	-	98.57	-	-	Peak
2441	63.73	236	205	H	28.388	5.21	-	97.328	-	-	Peak
2441	63.88	240	151	V	28.38	5.21	-	97.47	-	-	Ave
2441	62.01	236	205	H	28.388	5.21	-	95.608	-	-	Ave
4882	53.79	8	100	V	33.321	5.34	33.75	58.70	74	-15.30	Peak
4882	56.94	81	146	H	33.354	5.34	33.75	61.88	74	-12.12	Peak
4882	34.72	8	100	V	33.321	5.34	33.75	39.63	54	-14.37	Ave
4882	36.00	81	146	H	33.354	5.34	33.75	40.94	54	-13.06	Ave
7323	46.14	238	148	V	37.324	6.27	33.93	55.80	74	-18.20	Peak
7323	48.14	347	104	H	37.356	6.27	33.93	57.84	74	-16.16	Peak
7323	30.79	238	148	V	37.324	6.27	33.93	40.45	54	-13.55	Ave
7323	32.26	347	104	H	37.356	6.27	33.93	41.96	54	-12.04	Ave
9764	42.57	337	100	V	38.922	9.44	34.31	56.62	74	-17.38	Peak
9764	42.08	0	100	H	38.913	9.44	34.31	56.12	74	-17.88	Peak
9764	26.85	337	100	V	38.922	9.44	34.31	40.90	54	-13.10	Ave
9764	26.87	0	100	H	38.913	9.44	34.31	40.91	54	-13.09	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz, measured at 3 meters											
2480	65.12	243	152	V	28.55	5.21	-	98.88	-	-	Peak
2480	63.05	341	193	H	28.595	5.21	-	96.855	-	-	Peak
2480	64.4	243	152	V	28.55	5.21	-	98.16	-	-	Ave
2480	62.01	341	193	H	28.595	5.21	-	95.815	-	-	Ave
2483.5	27.06	243	152	V	28.55	5.21	-	60.82	74	-13.18	Peak
2483.5	26.68	341	193	H	28.595	5.21	-	60.485	74	-13.515	Peak
2483.5	12.61	243	152	V	28.55	5.21	-	46.37	54	-7.63	Ave
2483.5	12.52	341	193	H	28.595	5.21	-	46.325	54	-7.675	Ave
4960	50.09	351	139	V	33.531	5.25	33.73	55.14	74	-18.86	Peak
4960	55.41	70	141	H	33.556	5.25	33.73	60.49	74	-13.51	Peak
4960	33.54	351	139	V	33.531	5.25	33.73	38.59	54	-15.41	Ave
4960	36.19	70	141	H	33.556	5.25	33.73	41.27	54	-12.73	Ave
7440	48.70	285	119	V	37.242	6.27	33.99	58.22	74	-15.78	Peak
7440	50.04	0	130	H	37.238	6.27	33.99	59.56	74	-14.44	Peak
7440	32.50	285	119	V	37.242	6.27	33.99	42.02	54	-11.98	Ave
7440	32.82	0	130	H	37.238	6.27	33.99	42.34	54	-11.66	Ave
9920	44.47	0	100	V	39.036	9.71	34.39	58.83	74	-15.17	Peak
9920	44.19	0	100	H	39.052	9.71	34.39	58.56	74	-15.44	Peak
9920	28.91	0	100	V	39.036	9.71	34.39	43.27	54	-10.73	Ave
9920	29.02	0	100	H	39.052	9.71	34.39	43.39	54	-10.61	Ave

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Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz, measured at 3 meters											
2402	65.24	244	126	V	28.38	5.21	-	98.83	-	-	Peak
2402	64.34	252	209	H	28.388	5.21	-	97.938	-	-	Peak
2402	64.1	244	126	V	28.38	5.21	-	97.69	-	-	Ave
2402	63.46	252	209	H	28.388	5.21	-	97.058	-	-	Ave
2390	26.74	244	126	V	28.38	5.21	-	60.33	74	-13.67	Peak
2390	26.55	252	209	H	28.388	5.21	-	60.148	74	-13.852	Peak
2390	12.03	244	126	V	28.38	5.21	-	45.62	54	-8.38	Ave
2390	12.05	252	209	H	28.388	5.21	-	45.648	54	-8.352	Ave
4804	54.11	35	117	V	33.119	5.34	33.72	58.849	74	-15.151	Peak
4804	57.21	83	120	H	33.182	5.34	33.72	62.012	74	-11.988	Peak
4804	35.13	35	117	V	33.119	5.34	33.72	39.869	54	-14.131	Ave
4804	36.32	83	120	H	33.182	5.34	33.72	41.122	54	-12.878	Ave
7206	46.18	299	107	V	37.444	6.33	33.93	56.024	74	-17.976	Peak
7206	47.6	75	115	H	37.442	6.33	33.93	57.442	74	-16.558	Peak
7206	30.33	299	107	V	37.444	6.33	33.93	40.174	54	-13.826	Ave
7206	31.57	75	115	H	37.442	6.33	33.93	41.412	54	-12.588	Ave
9608	40.01	120	106	V	38.83	9.57	34.2	54.21	74	-19.79	Peak
9608	41.12	324	100	H	38.834	9.57	34.2	55.324	74	-18.676	Peak
9608	27.68	120	106	V	38.83	9.57	34.2	41.88	54	-12.12	Ave
9608	28.11	324	100	H	38.834	9.57	34.2	42.314	54	-11.686	Ave
Middle Channel 2441 MHz, measured at 3 meters											
2441	65.58	282	120	V	28.38	5.21	-	99.17	-	-	Peak
2441	64.3	218	200	H	28.388	5.21	-	97.898	-	-	Peak
2441	64.67	282	120	V	28.38	5.21	-	98.26	-	-	Ave
2441	62.67	218	200	H	28.388	5.21	-	96.268	-	-	Ave
4882	52.57	21	100	V	33.321	5.34	33.75	57.48	74	-16.52	Peak
4882	57.76	69	162	H	33.354	5.34	33.75	62.70	74	-11.30	Peak
4882	34.93	21	100	V	33.321	5.34	33.75	39.84	54	-14.16	Ave
4882	36.53	69	162	H	33.354	5.34	33.75	41.47	54	-12.53	Ave
7323	46.13	323	107	V	37.324	6.27	33.93	55.79	74	-18.21	Peak
7323	47.60	60	100	H	37.356	6.27	33.93	57.30	74	-16.70	Peak
7323	30.21	323	107	V	37.324	6.27	33.93	39.87	54	-14.13	Ave
7323	31.59	60	100	H	37.356	6.27	33.93	41.29	54	-12.71	Ave
9764	40.71	0	100	V	38.922	9.44	34.31	54.76	74	-19.24	Peak
9764	40.82	0	100	H	38.913	9.44	34.31	54.86	74	-19.14	Peak
9764	27.45	0	100	V	38.922	9.44	34.31	41.50	54	-12.50	Ave
9764	27.67	0	100	H	38.913	9.44	34.31	41.71	54	-12.29	Ave

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 2480 MHz, measured at 3 meters											
2480	64.46	308	101	V	28.55	5.21	-	98.22	-	-	Peak
2480	62.79	340	197	H	28.595	5.21	-	96.595	-	-	Peak
2480	63.48	308	101	V	28.55	5.21	-	97.24	-	-	Ave
2480	61.9	340	197	H	28.595	5.21	-	95.705	-	-	Ave
2483.5	27.62	308	101	V	28.55	5.21	-	61.38	74	-12.62	Peak
2483.5	26.7	340	197	H	28.595	5.21	-	60.505	74	-13.495	Peak
2483.5	12.63	308	101	V	28.55	5.21	-	46.39	54	-7.61	Ave
2483.5	12.54	340	197	H	28.595	5.21	-	46.345	54	-7.655	Ave
4960	51.79	205	113	V	33.531	5.25	33.73	56.84	74	-17.16	Peak
4960	54.35	79	162	H	33.556	5.25	33.73	59.43	74	-14.57	Peak
4960	34.17	205	113	V	33.531	5.25	33.73	39.22	54	-14.78	Ave
4960	35.17	79	162	H	33.556	5.25	33.73	40.25	54	-13.75	Ave
7440	48.49	295	112	V	37.242	6.27	33.99	58.01	74	-15.99	Peak
7440	49.59	348	100	H	37.238	6.27	33.99	59.11	74	-14.89	Peak
7440	32.10	295	112	V	37.242	6.27	33.99	41.62	54	-12.38	Ave
7440	32.94	348	100	H	37.238	6.27	33.99	42.46	54	-11.54	Ave
9920	43.00	0	100	V	39.036	9.71	34.39	57.36	74	-16.64	Peak
9920	43.42	0	100	H	39.052	9.71	34.39	57.79	74	-16.21	Peak
9920	28.59	0	100	V	39.036	9.71	34.39	42.95	54	-11.05	Ave
9920	28.51	0	100	H	39.052	9.71	34.39	42.88	54	-11.12	Ave

7 Exhibit A – FCC & IC Equipment Labeling Requirements

7.1 FCC ID Label Requirements

As per FCC §2.925,

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

As per FCC §15.19,

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified above is required to be affixed only to the main control unit. If the EUT is integrated within another device then a label affixed to the host shall also state, "Contains FCC ID: XXXXXX"

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

7.2 IC Label Requirements

As per IC RSS-Gen §2.1, the certification number shall appear as follows:

IC: XXXXXX-YYYYYYYY

Where:

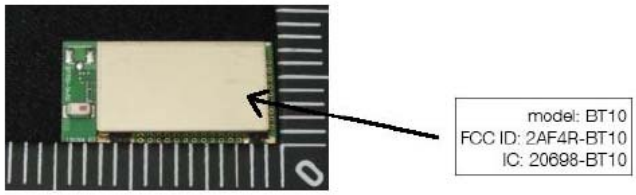
- "XXXXXX-YYYYYYYY" is the certification number
- "XXXXXX" is the Certificate Holder Number (CHN), made of at most 6 alphanumeric characters (A-Z, 0-9), assigned by Industry Canada; and
- "YYYYYYYY" is the Unique Product Number (UPN), made of at most 11 alphanumeric characters (A-Z, 0-9) assigned by the applicant.
- Note 1: The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.
- Note 2: Note 1 shall be conspicuously placed in the equipment user manual.
- Note 3: Permitted alphanumeric characters used in the CHN and UPN are limited to capital letters (A-Z) and digits (0-9). Other characters, such as "#", "/" or "-", shall not be used.

As per RSS-Gen §2.1 Equipment Labeling:

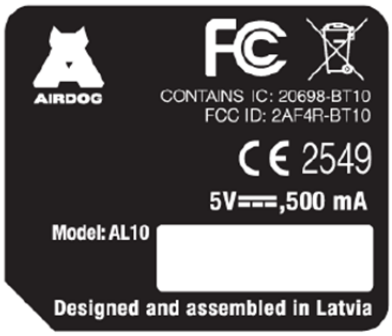
Equipment subject to certification under the applicable RSS, shall be permanently labeled on each item, or as an inseparable combination. The label must contain the following information for full compliance:
(a) the certification number, prefixed by the term "IC:";
(b) the manufacturer's name, trade name or brand name; and
(c) a model name or number.
Equipment for which a certificate has been issued is not considered certified if it is not properly labeled.
The information on the Canadian label can be combined with the manufacturer's other labeling requirements.
If the device size is too small to put a label, the label can be included in the user's manual, upon agreement with Industry Canada.

7.3 FCC ID & IC Label Contents and Location

BT10 Module Label



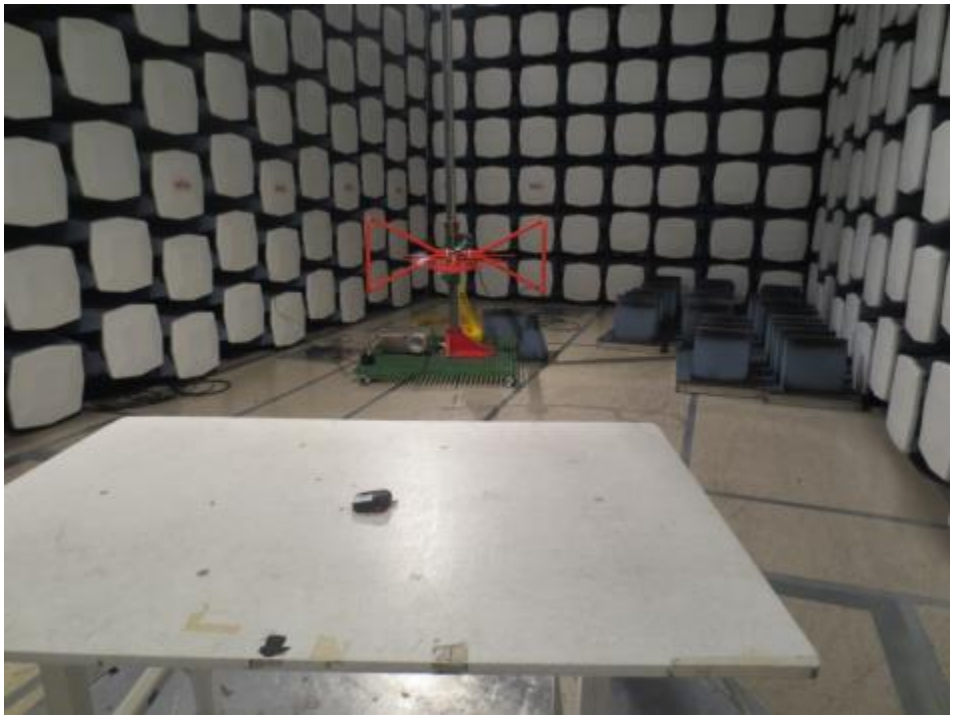
Host Label



Host Label Location

8 Exhibit B – Test Setup Photographs

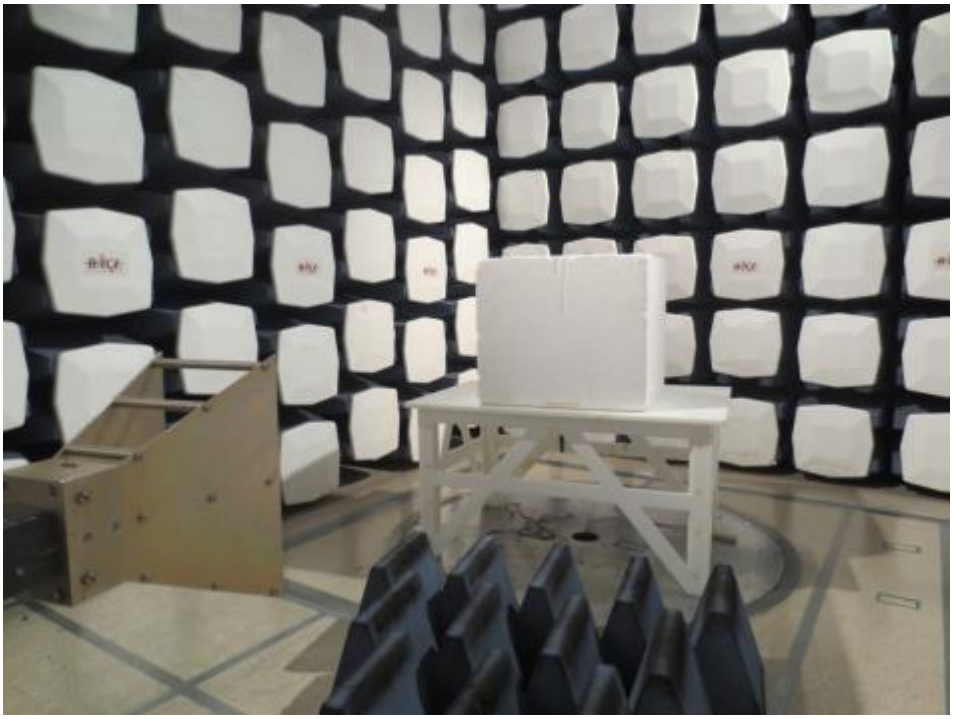
8.1 Radiated Emission below 1 GHz Front View



8.2 Radiated Emission below 1 GHz Rear View

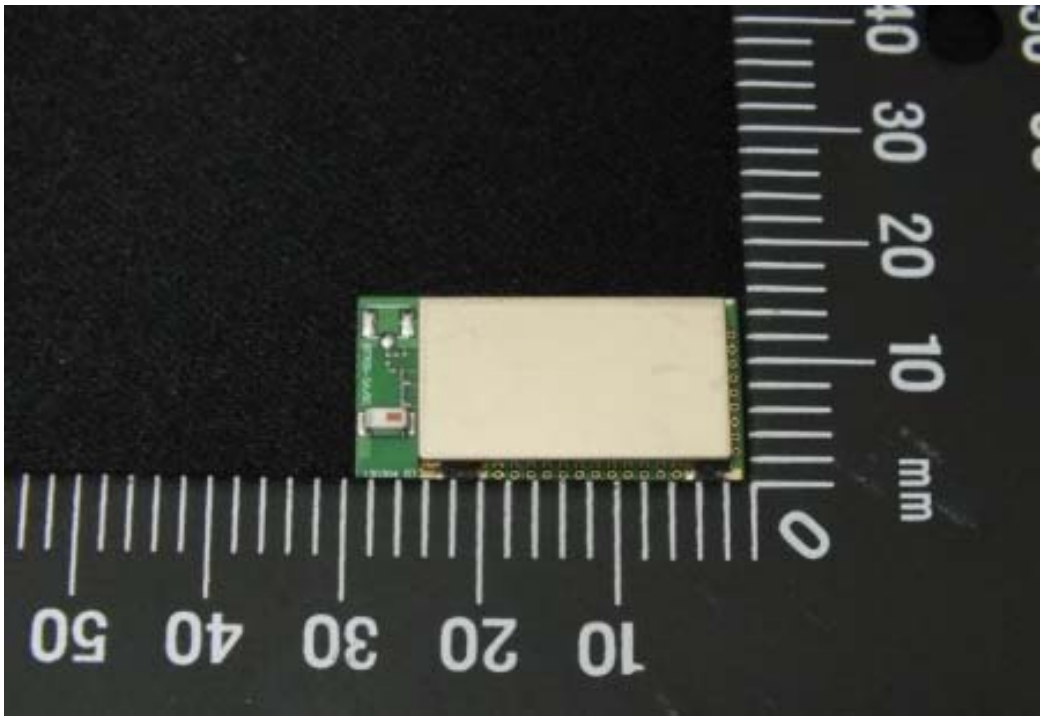
8.3 Radiated Emission above 1 GHz Front View

8.4 Radiated Emission above 1 GHz Rear View

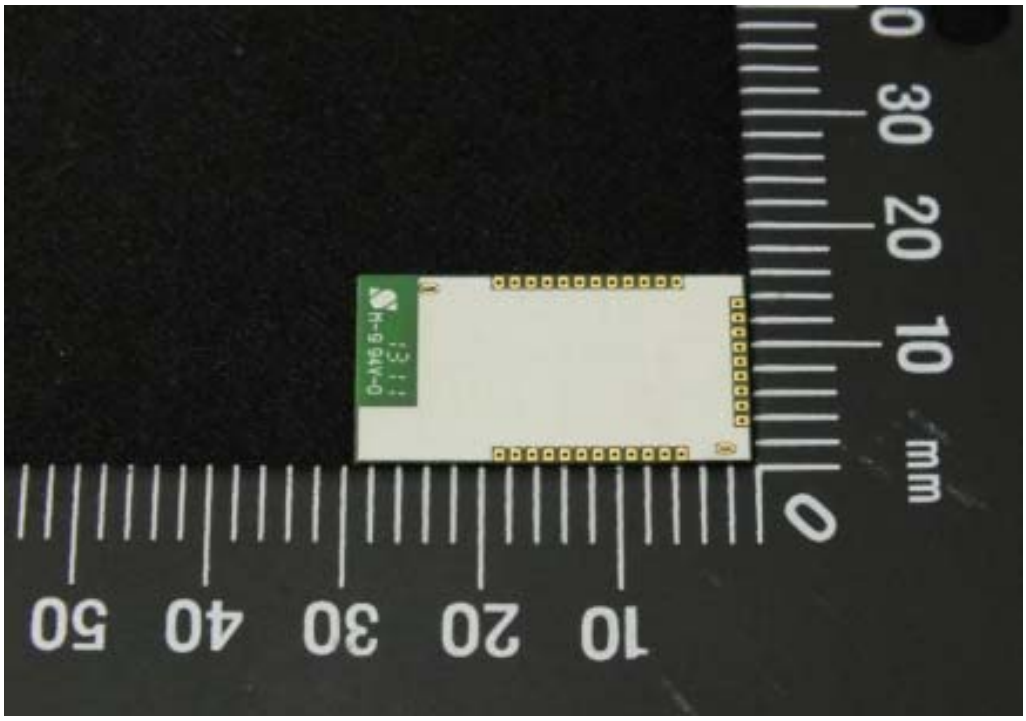


9 Exhibit C – EUT Photographs

9.1 EUT – Top View

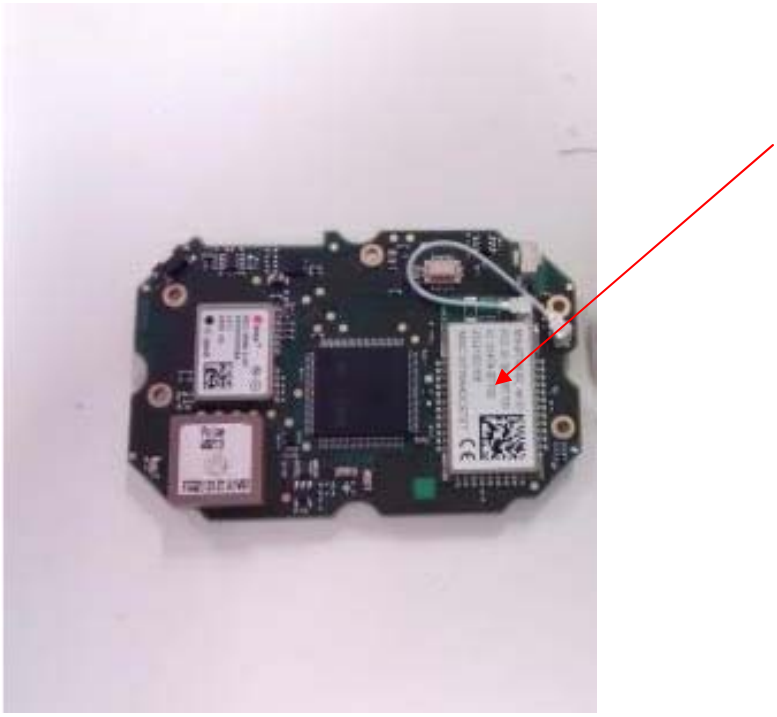


9.2 EUT – Bottom View



9.3 Host View

9.4 Module in Host View



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