FCC and Industry Canada Testing of the EDTracker Ltd Dongle, Model: EDTracker Wireless Dongle In accordance with FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

Product Service

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Prepared for: EDTracker Ltd
16 Woodhurst Lane
Wokingham
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RG41 1JQ
UNITED KINGDOM

FCC ID: 2AKV8-000002
IC: 22431-000002

COMMERCIAL-IN-CONFIDENCE

Date: June 2017
Document Number: 75938172-05 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	21 June 2017	
Authorised Signatory	Matthew Russell	21 June 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	21 June 2017	
Testing	Dan Ralley	21 June 2017	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be in compliance with FCC 47 CFR Part 15C: 2015, Industry Canada RSS-210: Issue 09 (08-2016) and Industry Canada RSS-GEN: Issue 04 (11-2014).

TÜV SÜD Product Service
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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	21 June 2017

Table 1

1.2 Introduction

Applicant	EDTracker Ltd
Manufacturer	EDTracker Ltd
Model Number(s)	EDTracker Wireless Dongle
Serial Number(s)	#001
Hardware Version(s)	1.0
Software Version(s)	1.0
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 15C: 2015 Industry Canada RSS-210: Issue 09 (08-2016) Industry Canada RSS-GEN: Issue 04 (11-2014)
Test Plan/Issue/Date	Not Applicable
Order Number Date	PO-0033 07-March-2017
Date of Receipt of EUT	13-March-2017
Start of Test	15-March-2017
Finish of Test	21-March-2017
Name of Engineer(s)	Graeme Lawler and Dan Ralley
Related Document(s)	ANSI C63.10 (2013)

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and Industry Canada RSS-210 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 15C	RSS-210	RSS-GEN			
Configuration: Wireless Dongle - 2.4 GHz SRD						
2.1	15.249 (a)	B.10 (a)	-	Field Strength of Fundamental	Pass	ANSI C63.10
2.2	15.249 (a)	B.10 (b)	-	Authorised Band Edges	Pass	ANSI C63.10
2.3	15.249 (a)(d)	B.10	-	Field Strength of Emissions	Pass	ANSI C63.10
2.4	15.249 (b)(2)	-	6.11	Frequency Tolerance Under Temperature Variations	Pass	ANSI C63.10

Table 2

1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	EDTracker Wireless Dongle
Part Number	EDTDGL001
Hardware Version	1.0
Software Version	1.0
FCC ID (if applicable)	2AKV8-000002
Industry Canada ID (if applicable)	22431-000002
Technical Description (Please provide a brief description of the intended use of the equipment)	Computer peripheral for motion tracking of user's head

Types of Modulations used by the Equipment	
☐	FHSS
☒	Other forms of modulation
In case of FHSS Modulation	
In case of non-Adaptive Frequency Hopping equipment:	
	Number of Hopping Frequencies:
In case of Adaptive Frequency Hopping Equipment:	
	Maximum number of Hopping Frequencies:
	Minimum number of Hopping Frequencies:
Dwell Time:	
Adaptive / non-adaptive equipment:	
☒	non-adaptive Equipment
☐	adaptive Equipment without the possibility to switch to a non-adaptive mode
☐	adaptive Equipment which can also operate in a non-adaptive mode
In case of adaptive equipment:	
The maximum Channel Occupancy Time implemented by the equipment: ms	
☐	The equipment has implemented an LBT based DAA mechanism
In case of equipment using modulation different from FHSS:	
☐	The equipment is Frame Based equipment
☐	The equipment is Load Based equipment
☐	The equipment can switch dynamically between Frame Based and Load Based equipment
The CCA time implemented by the equipment: µs	
☐	The equipment has implemented an non-LBT based DAA mechanism
☐	The equipment can operate in more than one adaptive mode

In case of non-adaptive Equipment:		
The maximum RF Output Power (e.i.r.p.): -6 dBm		
The maximum (corresponding) Duty Cycle: 20 %		
Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):		
The worst case operational mode for each of the following tests:		
RF Output Power: -6 dBm (verify with test results)		
Power Spectral Density: verify with test results		
Duty cycle, Tx-Sequence, Tx-gap: 20%, 20ms, 80ms		
Accumulated Transmit Time, Frequency Occupation & Hopping Sequence (only for FHSS equipment):		
Hopping Frequency Separation (only for FHSS equipment):		
Medium Utilisation: see test results		
Adaptivity & Receiver Blocking: see test results		
Nominal Channel Bandwidth: 1 MHz		
Transmitter unwanted emissions in the OOB domain: see test results		
Transmitter unwanted emissions in the spurious domain: see test results		
Receiver spurious emissions: see test results		
The different transmit operating modes (tick all that apply):		
☒	Operating mode 1: Single Antenna Equipment	
	☒	Equipment with only 1 antenna
	☐	Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
	☐	Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
☐	Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming	
	☐	Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5
NOTE: Add more lines if more channel bandwidths are supported.		
☐	Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming	
	☐	Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4
	☐	High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5
NOTE: Add more lines if more channel bandwidths are supported.		

In case of Smart Antenna Systems:
The number of Receive chains:
The number of Transmit chains:
☐ symmetrical power distribution
☐ asymmetrical power distribution
In case of beam forming, the maximum (additional) beam forming gain: dB
NOTE: The additional beam forming gain does not include the basic gain of a single antenna.
Operating Frequency Range(s) of the equipment:
Operating Frequency Range 1: 2403 MHz to 2481 MHz
Operating Frequency Range 2: MHz to MHz
Operating Frequency Range 3: MHz to MHz
NOTE: Add more lines if more Frequency Ranges are supported.
Nominal Channel Bandwidth(s):
Nominal Channel Bandwidth1: 1 MHz
Nominal Channel Bandwidth2: MHz
Nominal Channel Bandwidth3: MHz
Nominal Channel Bandwidth4: MHz
Nominal Channel Bandwidth5: MHz
NOTE: Add more lines if more channel bandwidths are supported.
Type of Equipment (stand-alone, combined, plug-in radio device, etc.):
☒ Stand-alone
☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
☐ Plug-in radio device (Equipment intended for a variety of host systems)
☐ Other
The normal and extreme operating conditions that apply to the equipment:
Normal operating conditions (if applicable):
Operating temperature: -40 to 85 °C
Other (please specify if applicable):
Extreme operating conditions:
Operating temperature range: Minimum °C to Maximum °C
Other (please specify if applicable): Minimum °C to Maximum °C
Details provided are for the:
☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig

The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:			
Antenna Type:			
☒ Integral Antenna (information to be provided in case of conducted measurements)			
Antenna Gain: -0.5 typical dBi			
If applicable, additional beamforming gain (excluding basic antenna gain): dB			
☐ Temporary RF connector provided			
☒ No temporary RF connector provided			
☐ Dedicated Antennas (equipment with antenna connector)			
☐ Single power level with corresponding antenna(s)			
☐ Multiple power settings and corresponding antenna(s)			
Number of different Power Levels:			
Power Level 1: dBm			
Power Level 2: dBm			
Power Level 3: dBm			
NOTE 1: Add more lines in case the equipment has more power levels.			
NOTE 2: These power levels are conducted power levels (at antenna connector).			
For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable			
Power Level 1: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			
Power Level 2: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			
Power Level 3: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			

The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:	
Details provided are for the:	
☒ stand-alone equipment	
☐ combined (or host) equipment	
☐ test jig	
Supply Voltage ☐ AC mains State AC voltage V	
☒ DC State DC voltage 5 V	
In case of DC, indicate the type of power source	
☐ Internal Power Supply	
☐ External Power Supply or AC/DC adapter	
☐ Battery	
☒ Other: USB connection to PC	
Describe the test modes available which can facilitate testing:	
1. Normal operation 2. RX only 3. High-duty (not indicative of real-world use) 4. Centre-carrier transmitter test (low-level RF chipset implementation only - does not pass application traffic)	
The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3] IEEE 802.15.4™ [i.4], proprietary, etc.):	
2.4GHz ISM (proprietary Nordic GFSK modulation)	
If applicable, the statistical analysis referred in clause 5.4.1 q)	
To be provided as separate attachment	
If applicable, the statistical analysis referred in clause 5.4.1 r)	
To be provided as separate attachment	
Geo-location capability supported by the equipment:	
☐ Yes	
☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.	
☒ No	
Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or 4.3.2.11.3)	
The standard criteria of 10% PER (packet error rate) is acceptable	
Combination for testing (see clause 5.3.2.3 of EN 300 328 V21.1)	
From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 5.4.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment. Unless otherwise specified in ETSI EN 300 328, this power setting is to be used for testing against the requirements of ETSI EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also ETS EN 300 328, clause 5.3.2.3	
Highest overall e.i.r.p. value: dBm	
Corresponding Antenna assembly gain: dBi	Antenna Assembly #:
Corresponding conducted power setting: dBm (also the power level to be used for testing)	Listed as Power Setting #:
Additional information provided by the applicant	
Modulation	
ITU Class(es) of emission: 2K56 G1D	
Can the transmitter operate unmodulated? ☐ Yes ☒ No	

Duty Cycle	
The transmitter is intended for:	
☐	Continuous duty
☒	Intermittent duty
☒	Continuous operation possible for testing purposes
About the UUT	
☒	The equipment submitted are representative production models
☐	If not, the equipment submitted are pre-production models?
☐	If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested
☐	If not, supply full details
☐	The equipment submitted is CE marked
Additional items and/or supporting equipment provided	
☐	Spare batteries (e.g. for portable equipment)
☐	Battery charging device
☐	External Power Supply or AC/DC adapter
☐	Test Jig or interface box
☐	RF test fixture (for equipment with integrated antennas)
☐	Host System
	Manufacturer
	Model
	Model Name
☐	Combined equipment
	Manufacturer
	Model
	Model Name
☒	User Manual
☐	Technical documentation (Handbook and circuit diagrams)

I hereby declare that that the information supplied is correct and complete.

Name: Daniel Howell Position held: Directpr
Date: 27/02/2017

1.5 Product Information

1.5.1 Technical Description

Computer peripheral for motion tracking of user's head.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: #001			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration: Wireless Dongle - 2.4 GHz SRD		
Authorised Band Edges	Graeme Lawler	UKAS
Field Strength of Fundamental	Graeme Lawler	UKAS
Field Strength of Emissions	Graeme Lawler	UKAS
Frequency Tolerance Under Temperature Variations	Dan Ralley	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Field Strength of Fundamental

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (a)
Industry Canada RSS-210, Clause B.10(a)

2.1.2 Equipment Under Test and Modification State

EDTracker Wireless Dongle, S/N: #001 - Modification State 0

2.1.3 Date of Test

20-March-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3 and 6.6

2.1.5 Environmental Conditions

Ambient Temperature	19.4 °C
Relative Humidity	43.0 %

2.1.6 Test Results

Wireless Dongle - 2.4 GHz SRD

Frequency (MHz)	Field Strength (dBµv/m)
2403	93.21
2442	92.77
2481	90.81

Table 5 - 2403 MHz

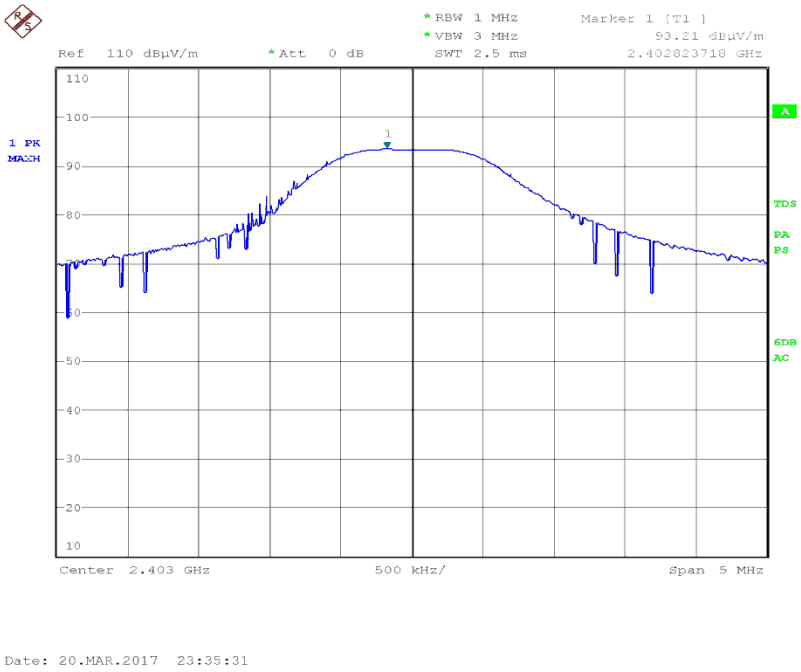

Figure 1 - 2403 MHz

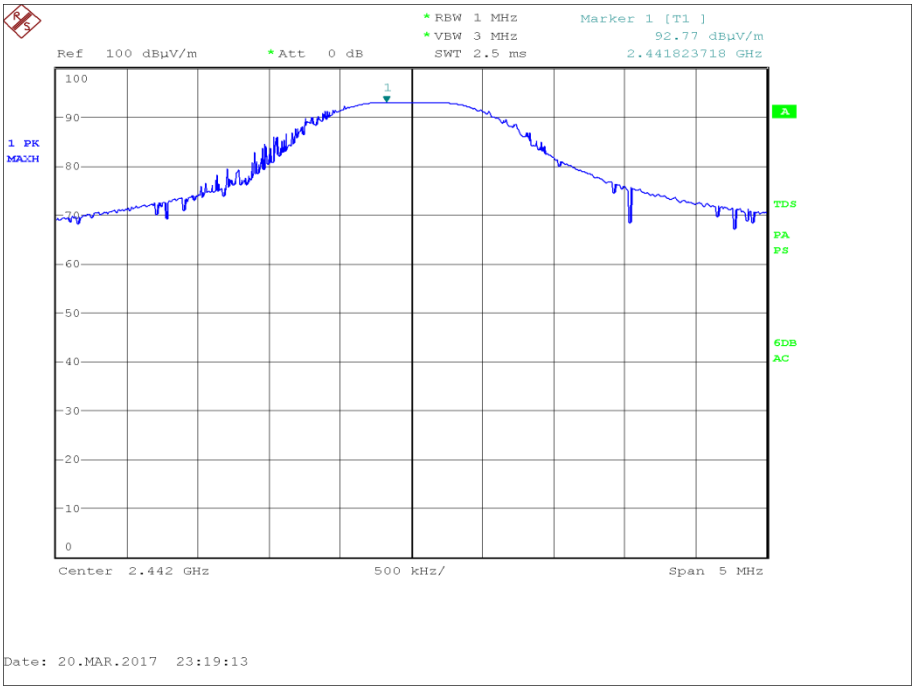

Figure 2 - 2442 MHz

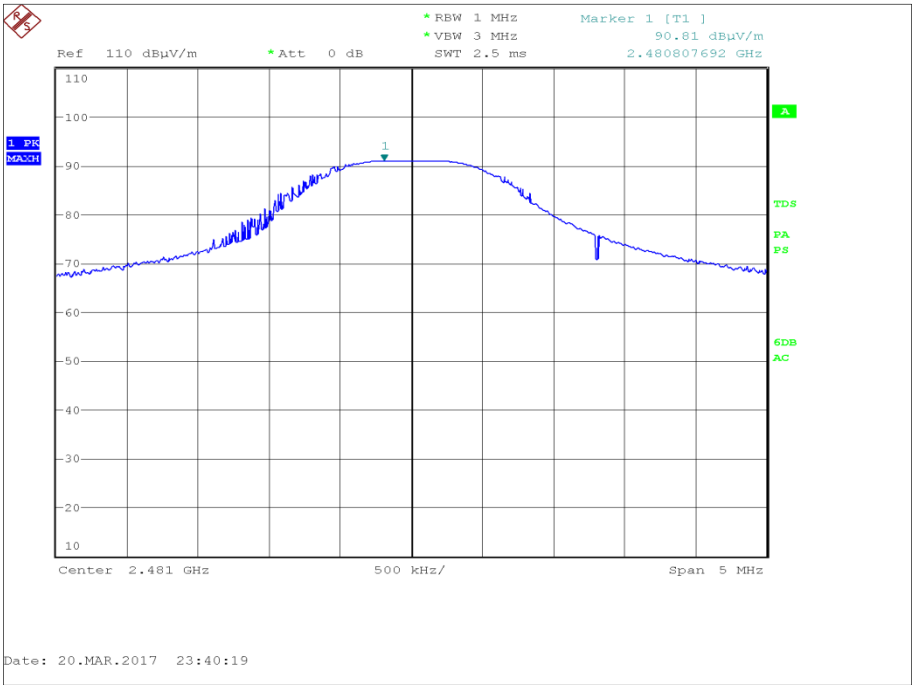

Figure 3 - 2481 MHz

FCC 47 CFR Part 15, Limit Clause 15.249 (a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)
902 to 928	50
2400 to 2483.5	50
5725 to 5875	50
24000 to 24250	250

Table 6

FCC 47 CFR Part 15, Limit Clause 15.35 (b)

The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Industry Canada RSS-210, Limit Clause B.10 (a)

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	O/P Mon
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 7

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.2 Authorised Band Edges

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (a)
Industry Canada RSS-210, Clause B.10 (b)

2.2.2 Equipment Under Test and Modification State

EDTracker Wireless Dongle, S/N: #001 - Modification State 0

2.2.3 Date of Test

21-March-2017

2.2.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3 and 6.6.

2.2.5 Environmental Conditions

Ambient Temperature	18.8 °C
Relative Humidity	33.0 %

2.2.6 Test Results

Wireless Dongle - 2.4 GHz SRD

Measured Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
2400.0	68.08	34.10

Table 8 – 2403 MHz - Authorised Band Edge Results

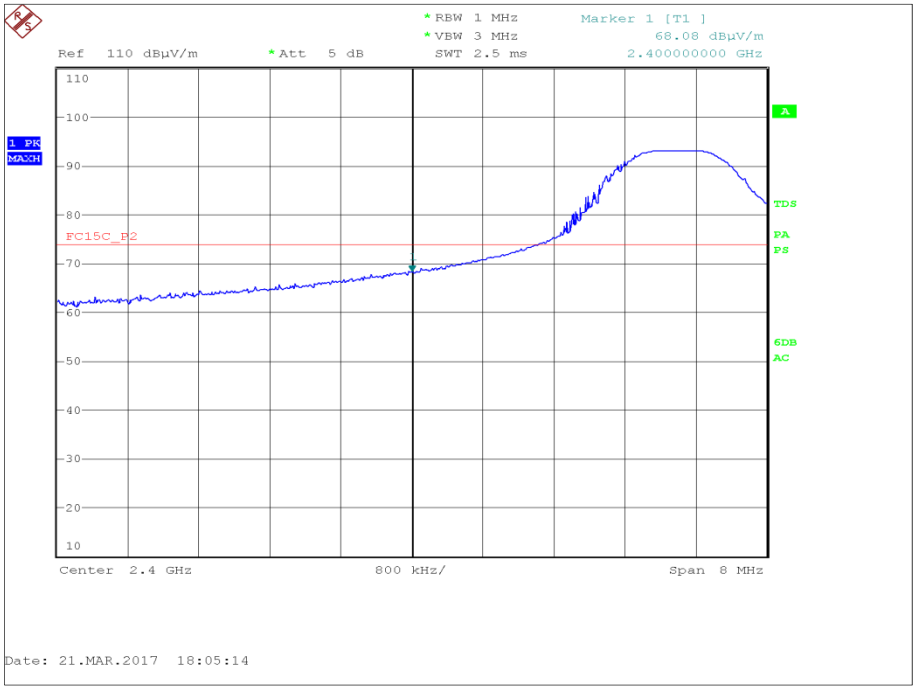

Figure 4 - 2403 MHz, Measured Frequency 2400 MHz

Measured Frequency (MHz)	Peak Level (dBµV/m)	Average Level (dBµV/m)
2483.5	68.67	34.69

Table 9 – 2481 MHz - Authorised Band Edge Results

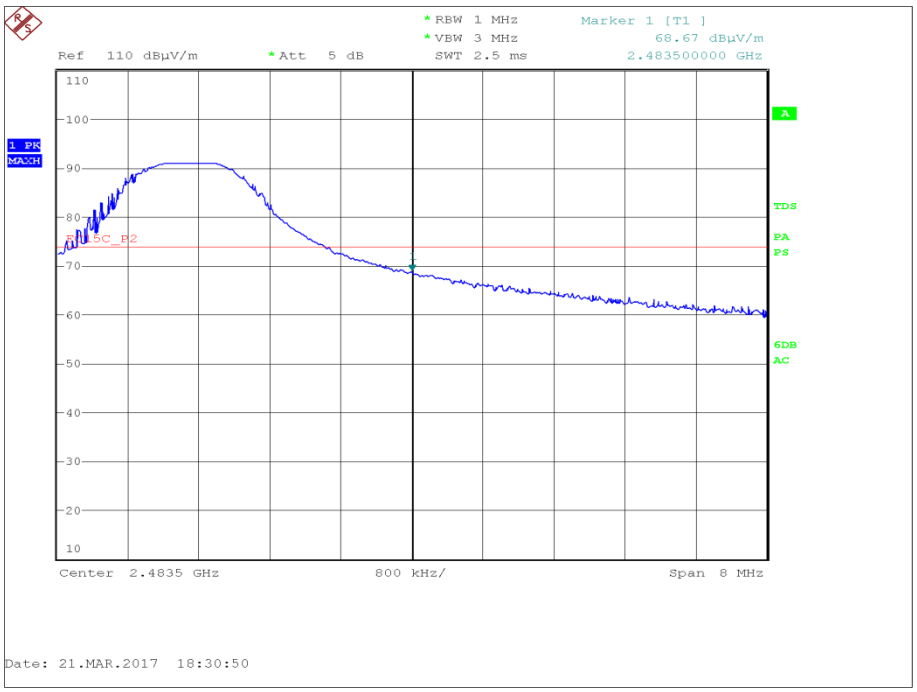

Figure 5 - 2481 MHz, Measured Frequency 2483.5 MHz

The customer has declared an operational duty cycle of 2%. To obtain the average level, a duty cycle correction factor was subtracted from the peak level in accordance with ANSI C63.10 clause 7.5.

Duty correction (dB) = 20log (0.2) = -33.98dB

FCC 47 CFR Part 15, Limit Clause 15.249 (d)

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.

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	50
88 to 216	50
216 to 960	50
Above 960	250

Table 10

Industry Canada RSS-210, Limit Clause B.10 (b)

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

Industry Canada RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	50
88 to 216	50
216 to 960	50
Above 960	250

Table 11

2.2.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	O/P Mon

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 12

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.3 Field Strength of Emissions

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (a)(d)
Industry Canada RSS-210, Clause B.10

2.3.2 Equipment Under Test and Modification State

EDTracker Wireless Dongle, S/N: #001 - Modification State 0

2.3.3 Date of Test

21-March-2017

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

2.3.5 Environmental Conditions

Ambient Temperature	18.8 °C
Relative Humidity	33.0 %

2.3.6 Test Results

Wireless Dongle - 2.4 GHz SRD

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.494	30.5	40.0	-9.5	360	1.00	Vertical
35.996	28.2	40.0	-11.8	0	1.00	Vertical
107.993	29.2	43.5	-14.3	360	1.00	Vertical
119.996	24.0	43.5	-19.5	119	1.00	Vertical
299.954	24.0	46.0	-22.0	360	1.00	Vertical
444.016	28.3	46.0	-17.7	215	2.59	Vertical
539.976	29.0	46.0	-17.0	322	1.00	Vertical

Table 13 - 2403 MHz - 30 MHz to 1 GHz

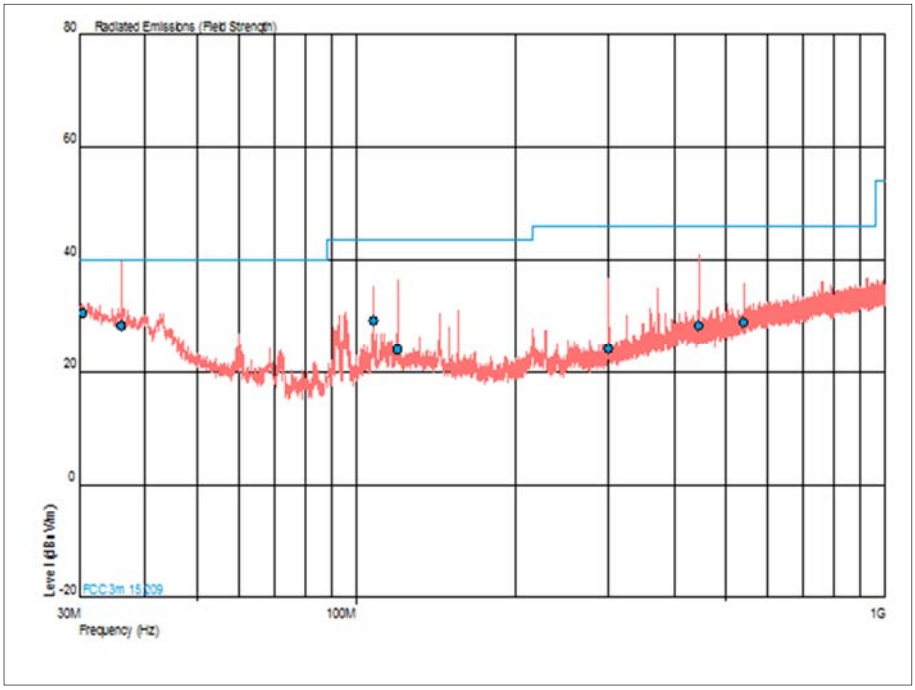

Figure 6 - 2403 MHz - 30 MHz to 1 GHz

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 14 – 2403 MHz - 1 GHz to 25 GHz

*No emissions were detected within 10 dB of the limit.

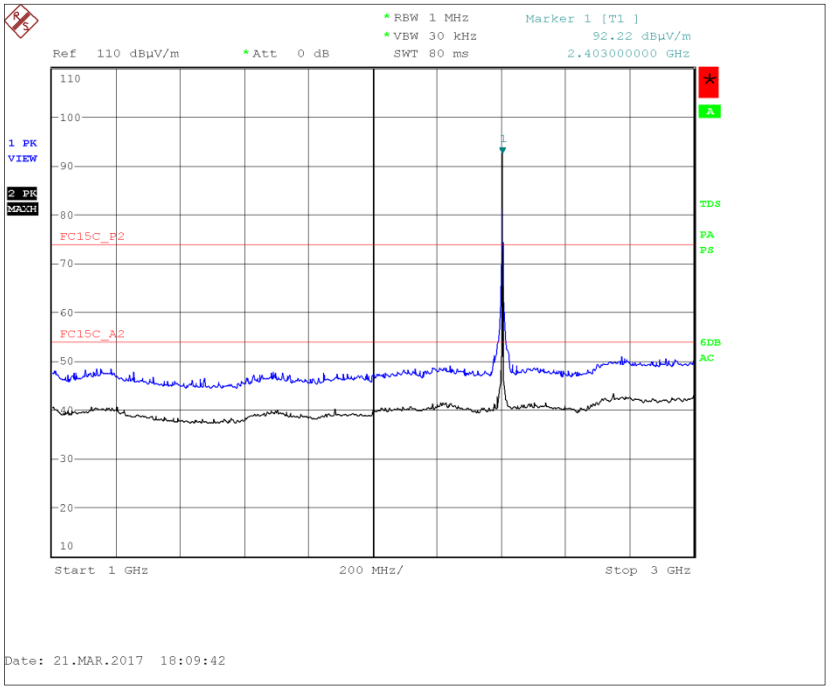

Figure 7– 2403 MHz - 1 GHz to 3 GHz

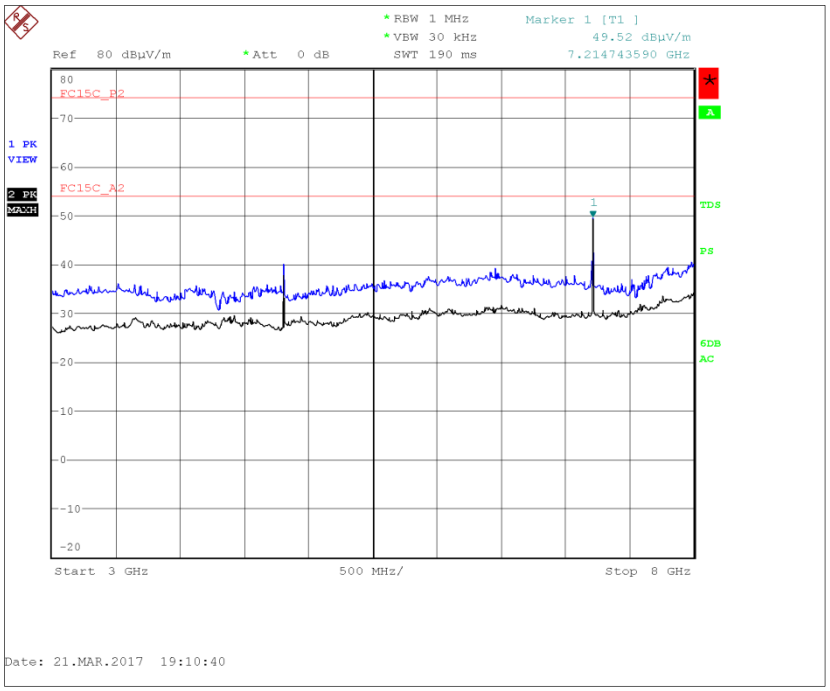

Figure 8 – 2403 MHz - 3 GHz to 8 GHz

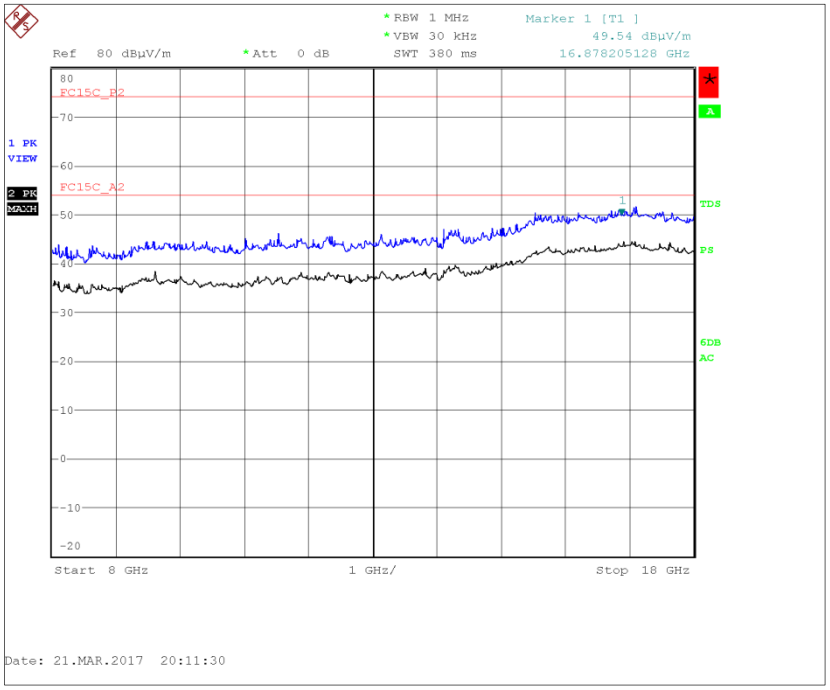

Figure 9 – 2403 MHz - 8 GHz to 18 GHz

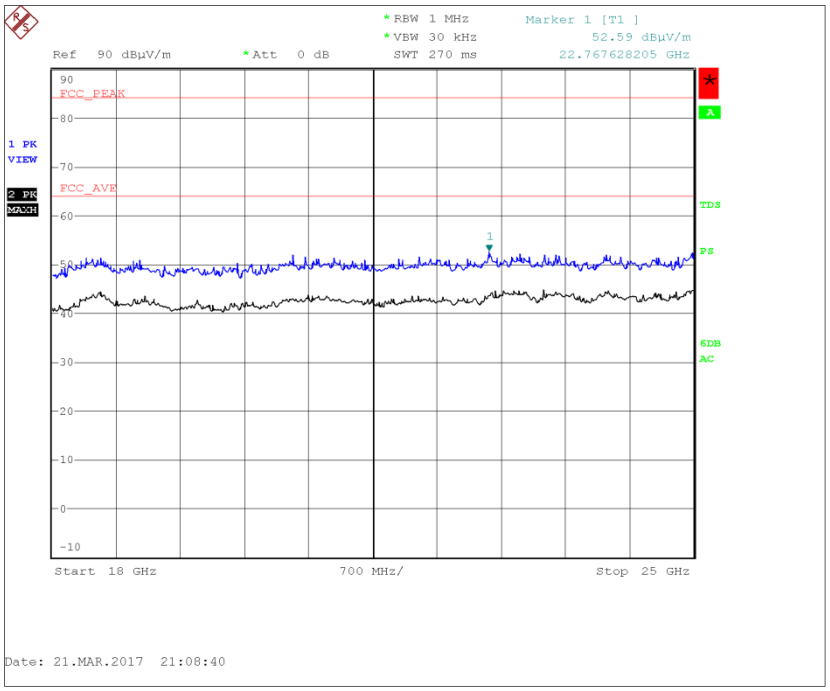

Figure 10 – 2403 MHz - 18 GHz to 25 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
36.000	28.6	40.0	-11.4	132	1.00	Vertical
72.013	25.3	40.0	-14.7	173	1.00	Vertical
83.976	21.4	40.0	-18.6	125	1.00	Vertical
96.003	31.0	43.5	-12.5	360	1.00	Vertical
108.016	29.2	43.5	-14.3	122	1.00	Vertical
360.026	26.7	46.0	-19.3	360	1.00	Vertical

Table 15 - 2442 MHz - 30 MHz to 1 GHz

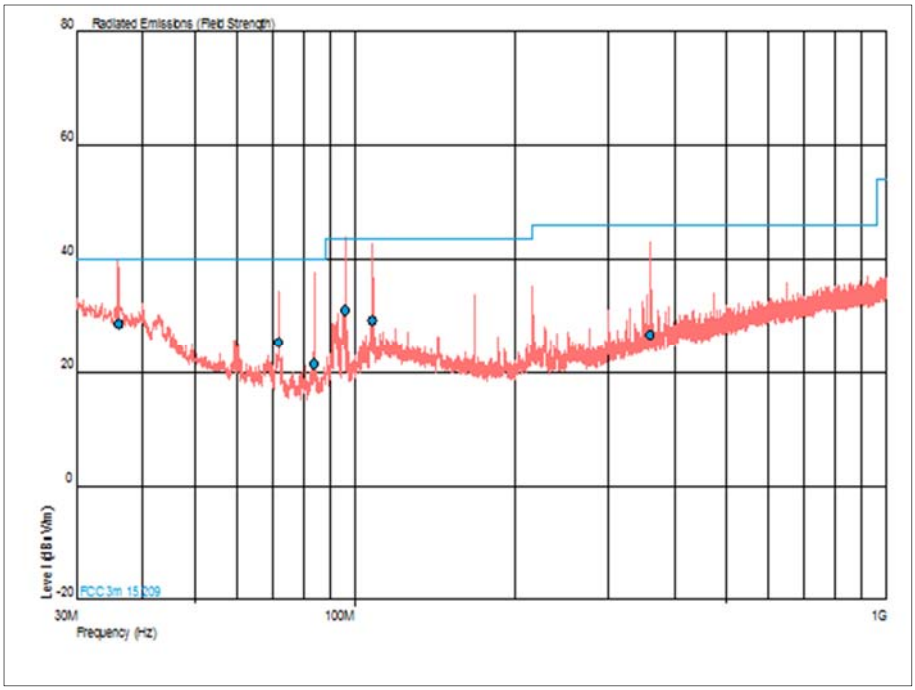

Figure 11 - 2442 MHz - 30 MHz to 1 GHz

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 16 - 2442 MHz - 1 GHz to 25 GHz

*No emissions were detected within 10 dB of the limit.

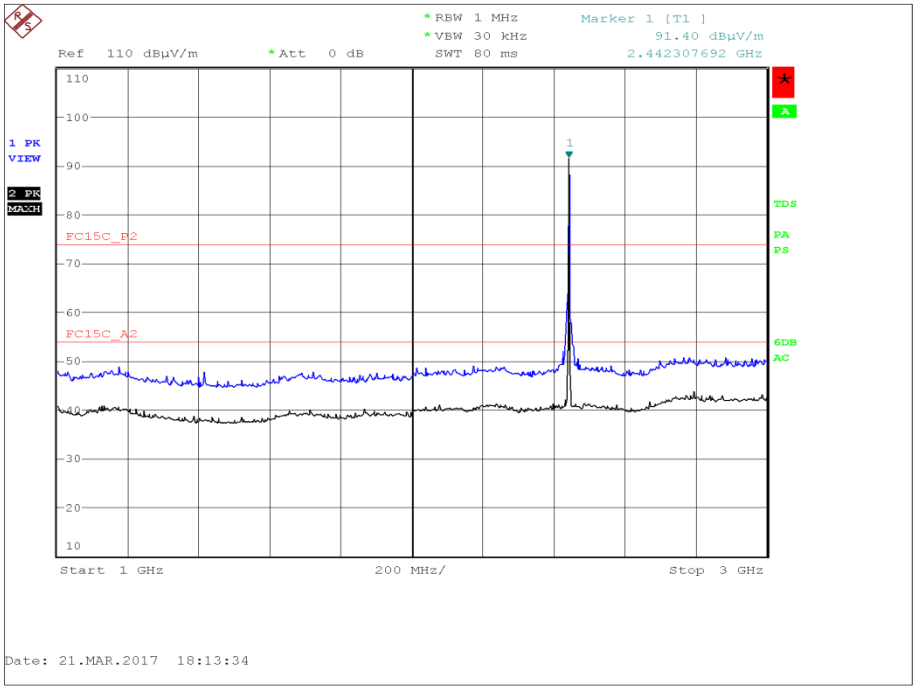

Figure 12- 2442 MHz - 1 GHz to 3 GHz

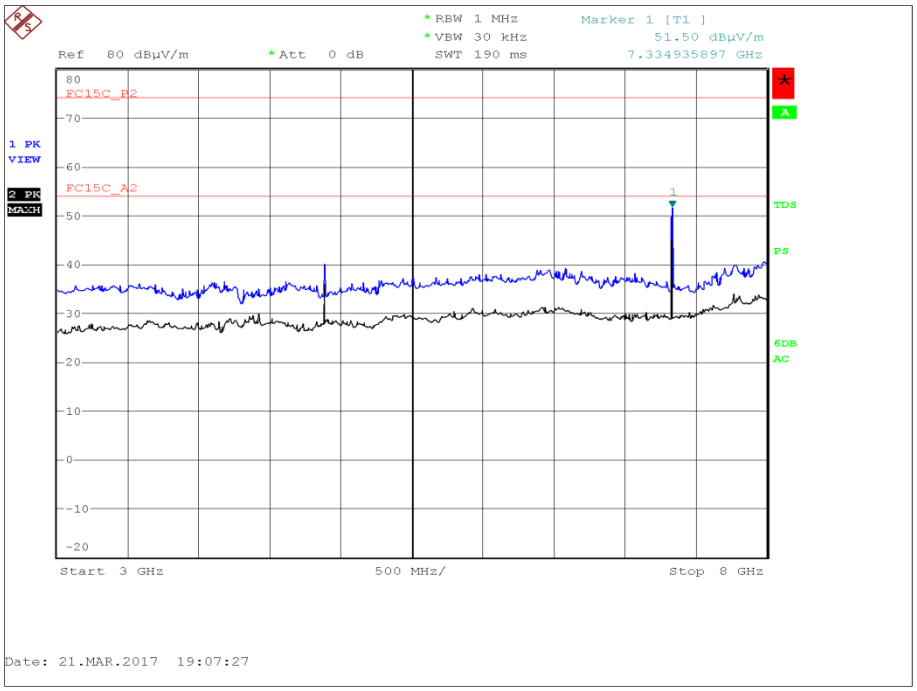

Figure 13 - 2442 MHz - 3 GHz to 8 GHz

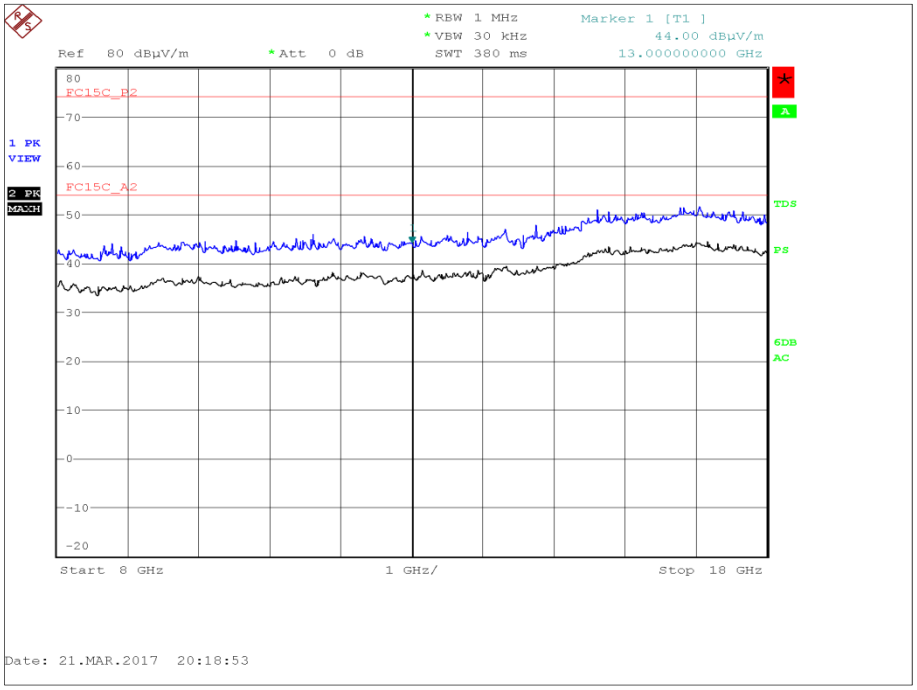

Figure 14 - 2442 MHz - 8 GHz to 18 GHz

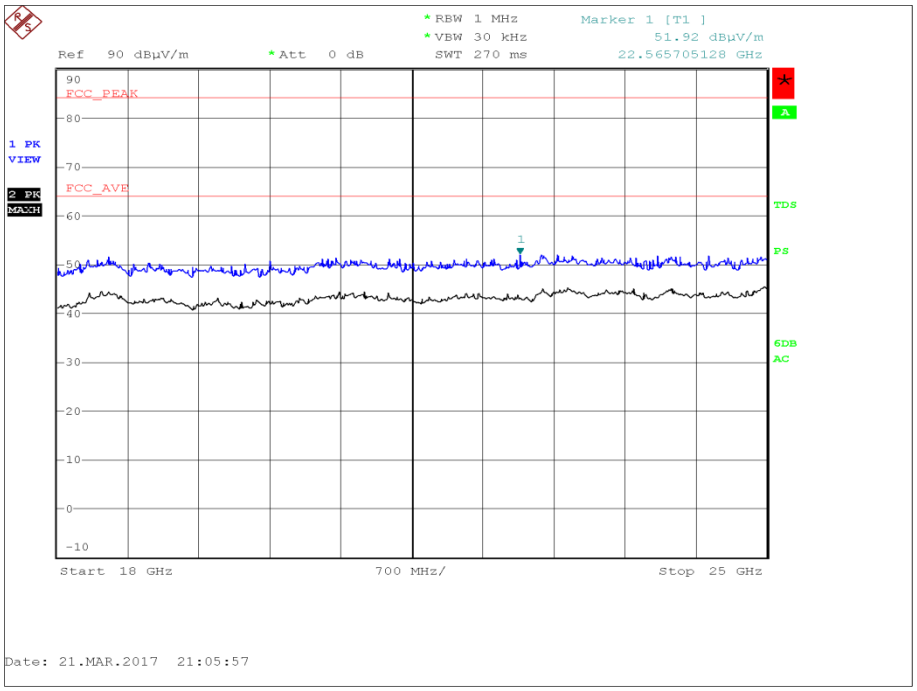

Figure 15 - 2442 MHz - 18 GHz to 25 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.230	30.7	40.0	-9.3	360	1.00	Vertical
59.506	22.4	40.0	-17.6	329	1.00	Vertical
107.305	25.5	43.5	-18.0	73	1.00	Vertical
114.040	21.9	43.5	-21.6	121	1.00	Vertical
299.971	25.3	46.0	-20.7	279	1.00	Vertical
503.999	29.0	46.0	-17.0	305	1.00	Vertical

Table 17 - 2481 MHz - 30 MHz to 1 GHz

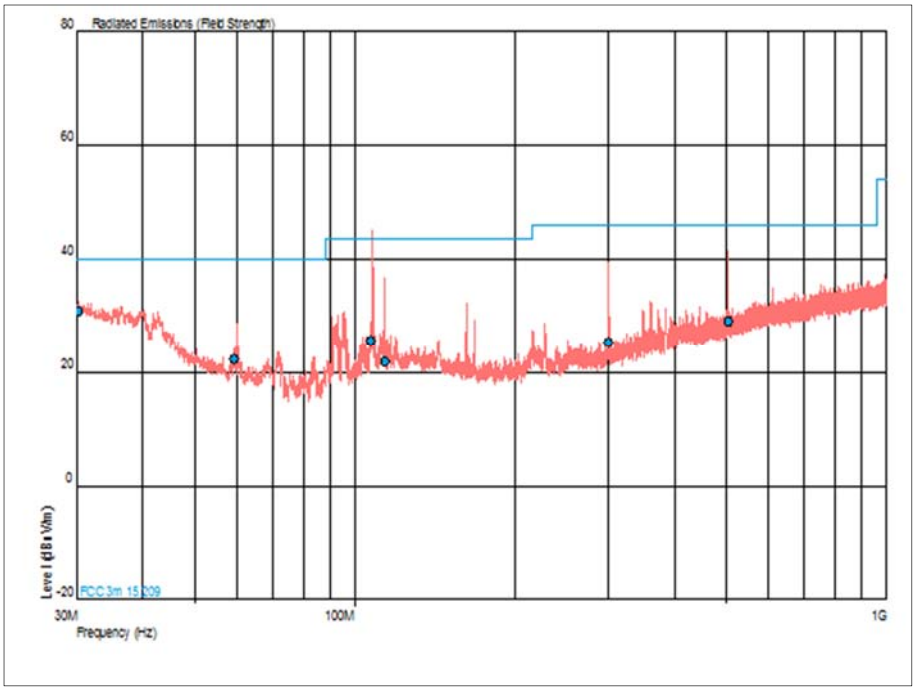

Figure 16 - 2481 MHz - 30 MHz to 1 GHz

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

Table 18 - 2481 MHz – 1 GHz to 25 GHz

*No emissions were detected within 10 dB of the limit.

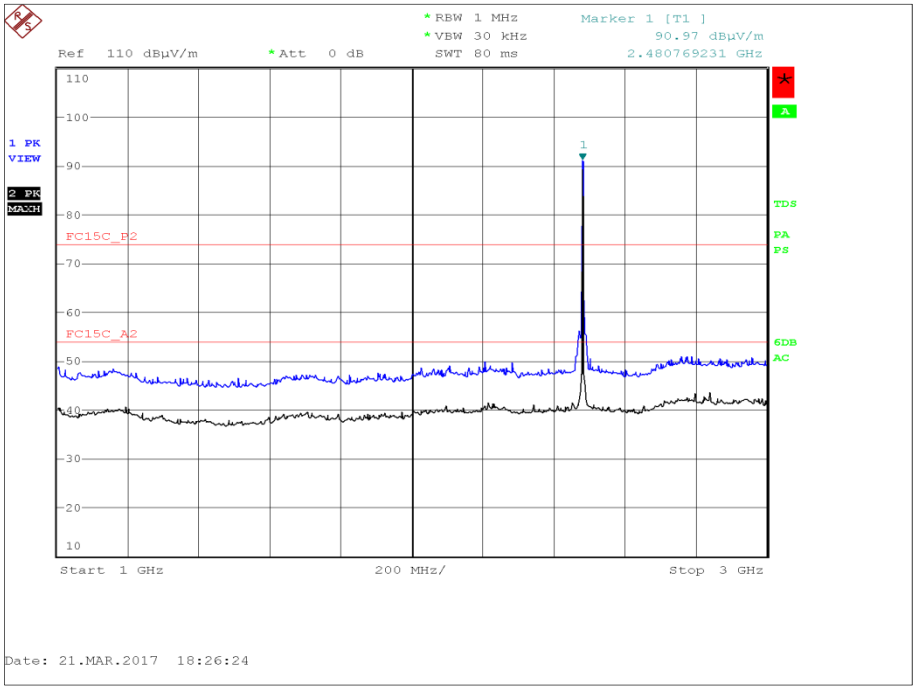

Figure 17 - 2481 MHz - 1 GHz to 3 GHz

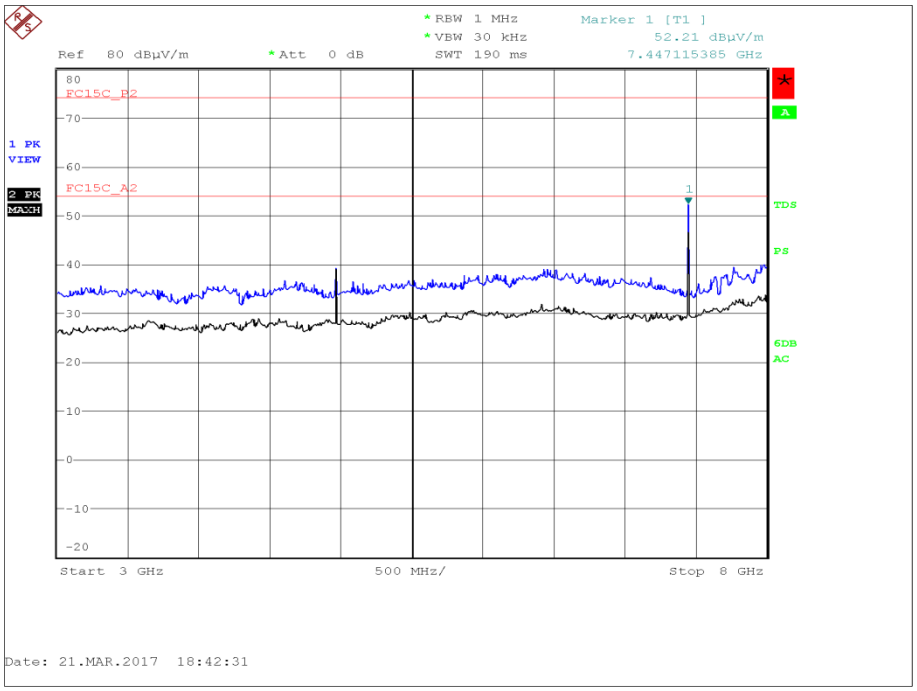

Figure 18- 2481 MHz - 3 GHz to 8 GHz

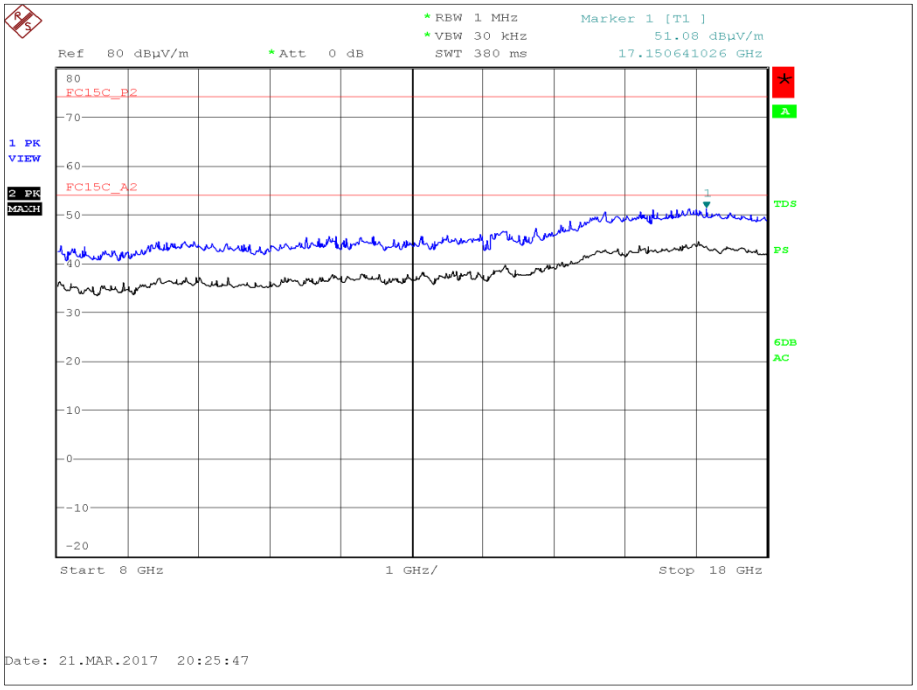

Figure 19 - 2481 MHz - 8 GHz to 18 GHz

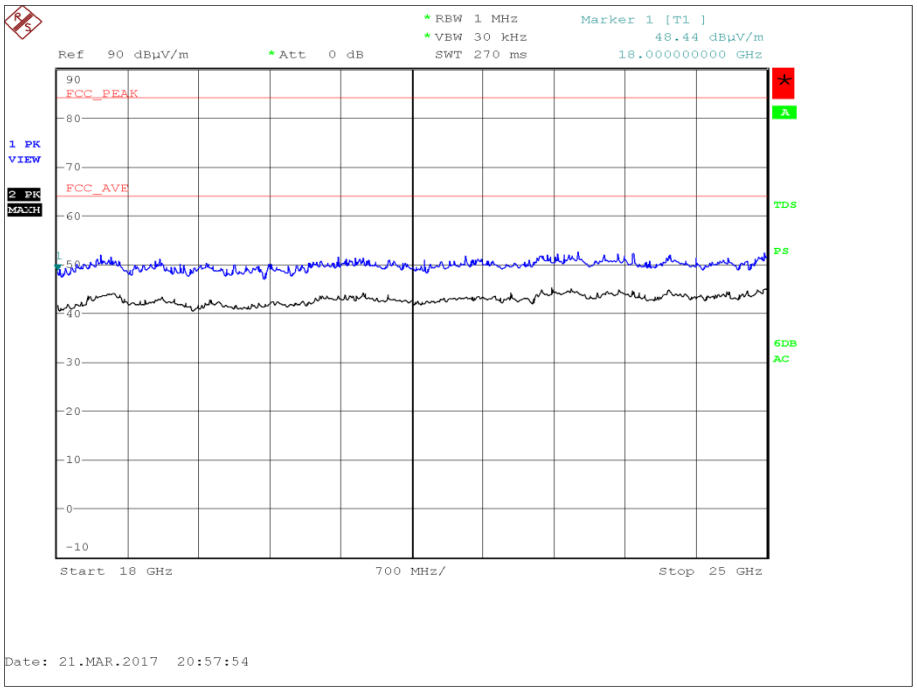

Figure 20 - 2481 MHz - 18 GHz to 25 GHz

FCC 47 CFR Part 15, Limit Clause 15.249 (d)

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.

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	50
88 to 216	50
216 to 960	50
Above 960	250

Table 19

Industry Canada RSS-210, Limit Clause B.10

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively.

The field strength limits shall be measured using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

Industry Canada RSS-GEN, Limit Clause 8.9

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 to 88	50
88 to 216	50
216 to 960	50
Above 960	250

Table 20

2.3.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	12-Feb-2018
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Pre-Amplifier	Phase One	PS04-0086	1533	12	29-Jul-2017

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Jan-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	-	O/P Mon
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	17-Oct-2017
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	23-Mar-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	O/P Mon
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	-	O/P Mon
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 21

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.4 Frequency Tolerance Under Temperature Variations

2.4.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.249 (b)(2)
Industry Canada RSS-GEN, Clause 6.11

2.4.2 Equipment Under Test and Modification State

EDTracker Wireless Dongle, S/N: #001 - Modification State 0

2.4.3 Date of Test

15-March-2017 to 16-March-2017

2.4.4 Test Method

The EUT was set to transmit on maximum power, constant carrier. The signal count marker function, of the spectrum analyser, was used to measure the frequency error. The temperature was adjusted between -20°C and +50°C in 10° steps as per 15.249 (b)(2).

2.4.5 Environmental Conditions

Ambient Temperature	23.2 °C
Relative Humidity	38.2 %

2.4.6 Test Results

Wireless Dongle - 2.4 GHz SRD

Temperature	Voltage	Frequency Deviation (%)
		2442 MHz
-20.0 °C	5 V DC	0.00043
-10.0 °C	5 V DC	0.00079
0 °C	5 V DC	0.00093
+10.0 °C	5 V DC	0.00094
+20.0 °C	5 V DC	0.00064
+30.0 °C	5 V DC	0.00077
+40.0 °C	5 V DC	0.000685
+50.0 °C	5 V DC	0.00096

Table 22

FCC 47 CFR Part 15, Limit Clause 15.249 (b)(2)

± 0.001%

Industry Canada RSS-GEN, Clause 6.8

None Specified

2.4.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Thermocouple Thermometer	Fluke	51	3174	12	22-Dec-2017
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	09-Sep-2017
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	26-Jan-2018
Combiner/Splitter	Weinschel	1506A	3877	12	30-Mar-2017
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	25-Oct-2017
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	14-Dec-2017
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	09-Sep-2017
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4510	12	26-May-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	06-Oct-2017

Table 23

O/P Mon – Output Monitored using calibrated equipment

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Authorised Band Edges	Conducted: ± 3.08 dB Radiated: 30 MHz to 1 GHz: ± 5.1 dB Radiated: 1 GHz to 40 GHz: ± 6.3 dB
Field Strength of Fundamental	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Field Strength of Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Frequency Tolerance Under Temperature Variations	± 3.54 Hz

Table 24