Report Ref: 21E9046-1a Page 1 of 15 **Compliance Engineering Ireland Ltd** Clonross Lane, Derrockstown, Dunshaughlin Co. Meath, Ireland A85 XN59 Ph +353 1 8017000 , 8256722 www.cei.ie

Project Num 21E9406-1a Quotation Q21-0402-1 **Prepared For** ABB Ltd **Company Address** Clonshaugh Business & Technology Park, Dublin, D17 A662 Contact **Brendan Collins Contact Email** brendan.collins@ie.abb.com Prepared By Compliance Engineering Ireland Test Lab Address Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath, Ireland **Tested By** Joy Dalayap / Michael Kirby Test Report By Michael Kirby FCC Test Firm Registration 409640 IC Site Registration IE0001 16<sup>th</sup> Sept 2021 Date EUT Description Sensor with Bluetooth Low Energy FCC ID 2A2UMFA2101 Authorised by Paul Reilly Jal Ru Authorised Signature:

Compliance Engineering

**RELAND LTD** 

ISO 17025

JAB

DETAILED IN SCOPE REG NO.088

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## **TEST SUMMARY**

The equipment complies with the requirements according to the following standards.

FCC 15.247 Section	RSS-247 Section	TEST PARAMETERS	Test Result
15.247 (a)2	RSS-247 5.2a	6dB bandwidth	Pass
15.247 (e)	RSS-247 5.2b	Power Spectral Density	Pass
15.247 (b)3	RSS-247 5.4d	Output power Conducted	Pass
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Pass
15.205 15.209	RSS Gen 8.9 RSS Gen 8.10	Radiated Spurious Emissions	Pass
	RSS Gen 6.7	99% bandwidth	Pass

RSS 247-2 (Feb 2017) RSS Gen Issue5 Amd 2 (Feb 2021)

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF COMPLIANCE ENGINEERING IRELAND LTD

## Exhibit A – Technical Report

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# 1.0 EUT Description

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Туре:	Sensor with Bluetooth Low Energy
Type of radio:	Stand-alone
Transmitter Type:	Bluetooth Low Energy
Operating Frequency Range(s):	2.402 GHz - 2.480GHz
Number of Channels:	39
Antenna:	Integral
Power configuration:	12 v DC
Ports:	None
Classification:	DTS
BLE Antenna Type :	Pcb printed antenna
BLE Antenna Gain Max:	2.4 dBi
BLE Antenna Impedance:	50 ohms
Test Standards:	15.247 RSS-247
Test Methodology:	Measurements performed according to the
	procedures in ANSI C63.10-2013
	KDB 558074 V5 R02

The EUT was a /sensor with BLE connectivity

Appendix C

**Radiated Spurious Emissions** 

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Receiver	Spectru	n 🗴			
	RBW 100 kHz		100 ms		
Input 1 AC 🖷		Preamp	ON	Step TD Scan	
Scan O1Pk	Max				
				100 MHz	
90 dBµV					
80 dBµV					
70 dBµV					
60 dBµV					
50 dBµV			1		
40 dBµV					
30 dBµV					
20 dBµV		and the second			manunder
10 dBµV		~~~~	monen	wonderstand man man	1 Martin
					TF
Start 30.0 M	IHz			Sto	p 300.0 MHz

Fig C1 High Channel Radiated Emissions 30MHz -300MHz Vertical 3metres

Receiver	Spectrur	n 🗴		
	RBW 100 kHz	MT	100 ms	s 871_3mx
Input 1 AC 🖷	Att 0 dB	Preamp	ON	I Step TD Scan
Scan 🔾 1Pk I	Max			
				100 MHz
90 dBµV				
80 dBµV				
70 dвµV				
60 dBµV				
50 dBµV				
40 dBµV				
30 dBµV				
20 dBµV				Marine and a second
10 dBµV	manne	mon	nduranten	muniter and the manual and the second and the second secon
				TF
Start 30.0 M				Stop 300.0 MHz
	Fig C2 Hig	jh Channe	I Radiate	ted Emissions 30MHz -300MHz Horizontal 3metres

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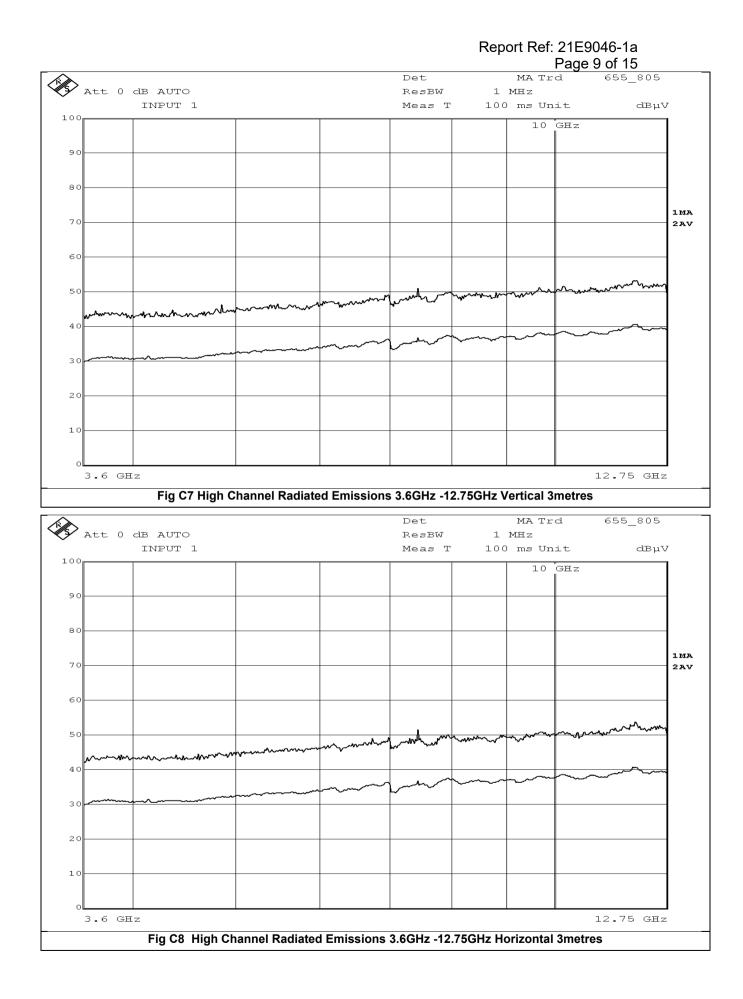
Receiver	Spectrun	n 🙁				
I	RBW 100 kHz	MT 100 ms	60	9_3mx		
		Preamp ON	Step TD Scan			
Scan O1Pk M	ax					
	i i					
90 dBµV	1					
	1			1		
80 dBµV			1			
70 dBµV						
60 dBµV			1			
50 dBµV			1			
40 dBµV	Î.					1
40 ubμv						
						- manund
30 dBµV			um and a second second second	, the	monormal	where we want it
		and the short	a many month the march	and a start and a start		
20 dBµV	mannan	Carlo and C				
10 dBµV			1			
	<u>i</u>				l l	Eten 1 0 CUp
Start 300.0 MI		ligh Channal Dadi	ated Emissions 300		utical 2matric	Stop 1.0 GHz

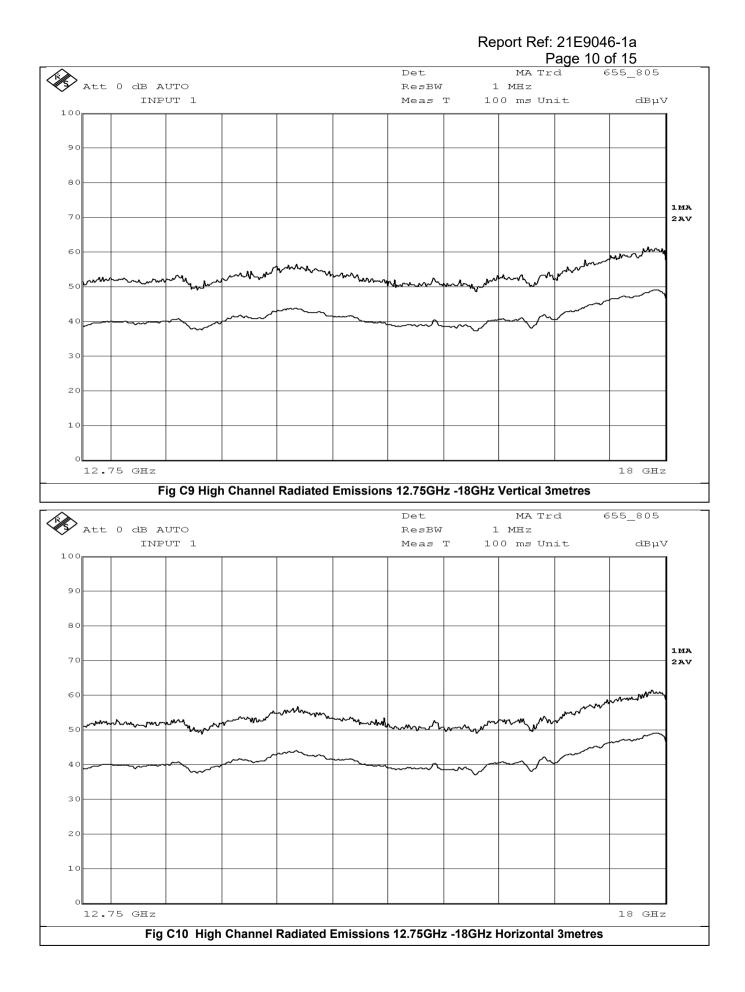
Receiver	Spectrun	n 🗴						
	<b>W</b> 100 kHz		100 ms		)9_3mx			
Input 1 AC 🖷 Att	0 dB	Preamp	ON	Step TD Scan				
Scan 😑 1Pk Max				- <u>.</u>		·		
	1 1 1					1		
90 dBµV	1							
90 ивру	1					1		
	1							
80 dBµV					1			
	1					1		
70 dBµV	1					1		
	1					1		
60 dBµV						1		
	1					1		
50 dBµV				1	1	1		
	1					1		
40 dBµV						1		
in and in the	1					1		
30 dBµV	1				1	1		and more man
00 dbp.	1			and the second s	man month	ashow housed	a farment of the second	
20 dBuy/		- making m	man man	restrict monthly marked and		1		
20 dBµV	www.cum					1		
	1					1		
10 dBµV	1					1		
	1					1		TF
Start 300.0 MHz	1			L.	L.		Stop	1.0 GHz
Fig C4 High Channel Radiated Emissions 300MHz -1GHz Horizontal 3metres								

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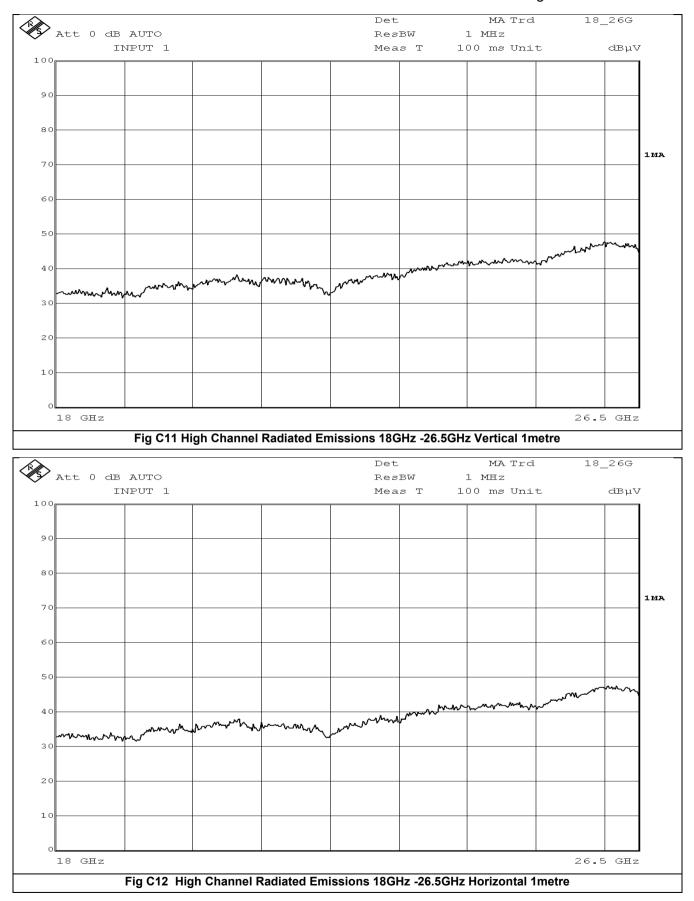
Receiver Spectrum 4 🗴	E
RBW 1 MHz MT 5 ms 655Rx	
Input 1 AC 🖷 Att 0 dB Preamp ON Step TD Scan	
Scan O1Pk Max	:
90 dBµV	1
80 dBµV	
70 dвµv	
60 dBµV	
50 dBµV	
40 dBuV	wanter a marting
AD dByV	1
and the first of the second	
30 dвµV	
20 dBµV	
10 dBµV	
Start 1.0 GHz	: TF Stop 3.6 GHz
Fig C5 High Channel Radiated Emissions 1GHz -3.6GHz Vertical 3metres	

Receiver Spectrum 4 🗴	
RBW 1 MHz MT 5 ms 655Rx	
Input 1 AC 🖷 Att 0 dB Preamp ON Step TD Scan	
Scan O1Pk Max	
90 dBµV	
80 dBµV	
70 dBµV	
60 dBµV	
50 dBµV	
40 dBµV-	a har month wanter a horizon
10 dawn when the second and the seco	Course and an
WAY BBUY	
30 dBµV	
20 dBµV	
10 dBµV	
	TF
Start 1.0 GHz	Stop 3.6 GHz
Fig C6 High Channel Radiated Emissions 1GHz -3.6GHz Horizontal 3	metres





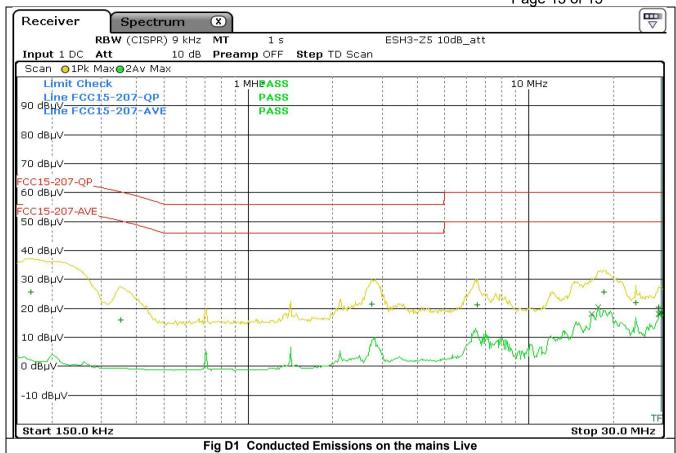
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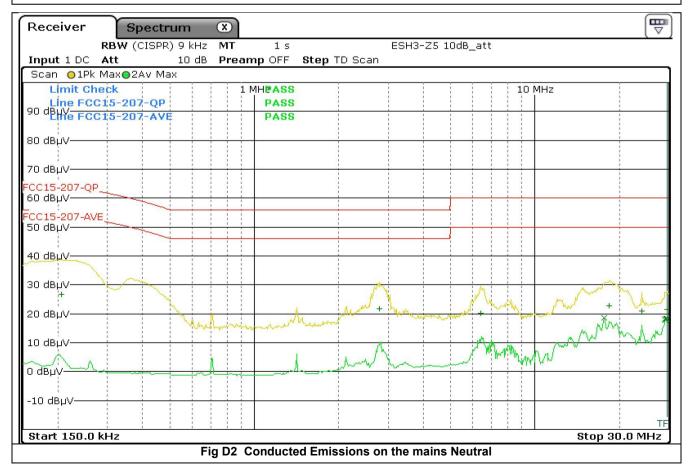


Appendix D

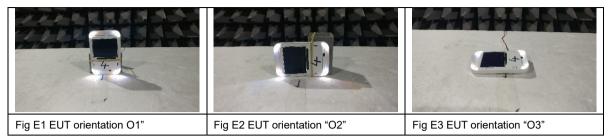
Conducted Emissions on the mains

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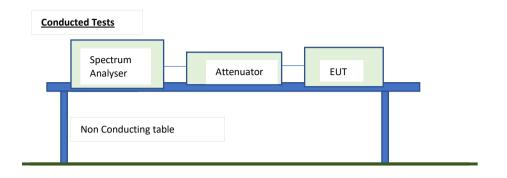


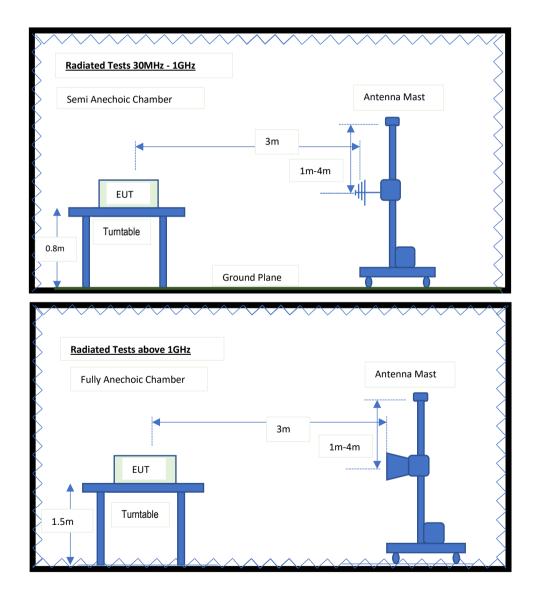
## Appendix E



Orientations for Radiated Emissions

#### Appendix F Block Diagrams of test set up





**End of Report**