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EMC COMPLIANCE REPORT
In accordance with:

ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-52 V1.2.1 (2021-01)

Gallagher Group Ltd

eS1 Cellular

eShepherd Neckband

REPORT: E2401-1729-3 Rev1
DATE: April, 2025

WORLD RECOGNISED ACCREDITATION

Accreditation Number: 18553
Accredited for compliance with ISO/IEC 17025 - Testing

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Certificate of Compliance

EMC Bayswater Test Report: E2401-1729-3 Rev1
Issue Date: April, 2025

Product:	eShepherd Neckband
Model:	eS1 Cellular
Part No:	G04081
Serial:	2350119059
Variant:	G040811

The above-listed model with part no. G04081 was tested by EMC Bayswater Pty Ltd as a representative sample and the results and conclusions within this report do not necessarily reflect compliance for other variants. Please refer to section 5 of this report for variant information and the customer variant declaration.

Customer Details:
Mr. Hayden Goble
Gallagher Group Ltd
181 Kahikatea Drive, Melville,
Hamilton 3206
New Zealand

Phone No: +64 800 731 500
e-mail: Hayden.goble@gallagher.com

Test Specification(s):
ETSI EN 301 489-1 V2.2.3 (2019-11)
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-52 V1.2.1 (2021-01)
Electromagnetic Compatibility and Radio spectrum Matters (ERM).
Electromagnetic compatibility (EMC) standard for radio equipment; Part 17; Specific conditions for Broadband Data Transmission Systems.

Results Summary:

Radiated Emission	(EN55032)	***Complied (Class B)***
Conducted Emission at AC Mains Ports	(EN55032)	***N/A[1]***
Wired Network Port Conducted Emissions	(EN55032)	***N/A[2]***
Electrostatic Discharge (ESD)	(EN 61000-4-2)	***Complied***
Radio frequency electromagnetic Field	(EN 61000-4-3)	***Complied***
Fast transients, common mode	(EN 61000-4-4)	***N/A[1 & 3]***
Surges	(EN 61000-4-5)	***N/A[1 & 3]***
Radio frequency, common mode	(EN 61000-4-6)	***N/A[1 & 3]***
Voltage Dips and Interruptions	(EN 61000-4-11)	***N/A[1]***
Harmonic Current Emissions	(EN 61000-3-2)	***N/A[1]***
Voltage fluctuations and flicker	(EN 61000-3-3)	***N/A[1]***

Note 1 *The EUT is a battery powered device and does not connect to an AC mains supply during use*
Note 2 *The EUT has no analogue/digital data ports intended for connection to a wired network port*
Note 3 *The EUT has no signal/control ports of any kind*

Test Date(s): 15th to the 22nd of January, 2024

Test House (Issued By):
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The Gallagher Group Ltd eS1 Cellular eShepherd Neckband, complied with the applicable requirements of ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01) .

Prepared & tested by:	Tested by:	Approved by:	
Hon Sang Kong (EMC Test Engineer)	Adnan Zaman (EMC Test Engineer)	Neville Liyanapatabendige (Manager)	09/04/2025 16:18 Date

EMC Compliance Report
for
Gallagher Group Ltd

Contents

1. Introduction

Electromagnetic Compatibility (EMC) tests were performed on a Gallagher Group Ltd, eS1 Cellular, eShepherd Neckband in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01).

2. Test Report Revision History

ISSUE	DATE	Description	AUTHORISED BY
E2401-1729-3	05-04-2024	Original	Neville Liyanapatabendige (Manager)
E2401-1729-3 Rev1	09-04-2025	Customer requested to include G040811 variant.	Neville Liyanapatabendige (Manager)

3. Report Information

EMC Bayswater Pty Ltd reports apply only to the specific samples tested under the stated test conditions. All samples tested were in good operating condition throughout the entire test program unless otherwise stated. EMC Bayswater Pty Ltd does not in any way guarantee the later performance of the product/equipment. It is the manufacturer's responsibility to ensure that additional production units of the tested model are manufactured with identical electrical and mechanical components. EMC Bayswater Pty Ltd shall have no liability for any deductions, inference or generalisations drawn by the clients or others from EMC Bayswater Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Bayswater Pty Ltd. This report shall not be reproduced except in full (with the exception of the certificate on page 2) without the written approval of EMC Bayswater Pty Ltd. This document may be altered or revised by EMC Bayswater Pty Ltd personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by EMC Bayswater Pty Ltd will nullify the document.

4. Summary of Results

The EUT complied with the applicable industrial electromagnetic environment immunity requirements & Class B emission requirements of ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01). Worst-case emissions are tabled as follows:

Test	Class / Limit(s)	Result
Radiated Emission (Horizontal antenna polarisation)	EN 55032, Class B	Complied with quasi-peak limit by 14.1dB
		Complied with peak limit by 30.1dB
		Complied with average limit by 23.3dB
Radiated Emission (Vertical antenna polarisation)	EN 55032, Class B	Complied with quasi-peak limit by 12.1dB
		Complied with peak limit by 33.7dB
		Complied with average limit by 24.3dB

Table 1: Summary of test results – Emissions testing

Test	Performance (Pass/Fail) Criteria	Result
Electrostatic Discharge (ESD)	Performance Criteria for continuous phenomena	Complied
Electromagnetic Field	Performance Criteria for transient phenomena	Complied

Table 2: Summary of test results – Immunity testing

5. Product Sample, Configuration & Modifications

5.1. Product Sample Details

The EUT (Equipment Under Test), as supplied by the client, is described as follows:

Product:	eShepherd Neckband	
Model No:	eS1 Cellular	
Part No:	G04081	
Serial No:	2350119059	
Variant:	G040811*	
	**The customer (Gallagher Group Ltd) declared testing of one model as a worst case representative sample and declared that to be the model with part no. G04081 (refer to Appendix D of this report for the customer declaration of worst-case variant used for testing). Please note other than the unit(s) listed as a) "Product" and b) "Model", no other products/models or variant(s) were tested.*	
Firmware:	6.x.xxx	
Software:	N/A	
Power Specifications:	Battery Powered LiFePO4, 3.2V, 12000mAH	
Dimensions:	210mm (L) x 90mm (W) x 350mm (H)	
Weight:	2.7 kg / 5.9lbs (including chains)	
EUT Type:	Tested as table-top	
Transmitter details:	Description:	RF TXRX MODULE CELL/NAV 5G SMD
	Type:	SARA-R510s-01B
	Frequencies:	600MHz, 700MHz, 750MHz, 800MHz, 850MHz, 900MHz, 1.7GHz, 1.8GHz, 1.9GHz, 2.1GHz
	Max power:	23dBm
	Antenna:	PCB type antenna
	FCC ID:	XPYUBX19KM01
	IC:	8595A-UBX19KM01

(Customer supplied product information)

5.2. Product description

The EUT (Equipment Under Test) has been described by the customer as follows:

"Neckband is located around the neck of a farm animal, typically beef cattle. It determines its location by GPS/GNSS and compares it to programmed 'virtual fences'. If the animal attempts to cross a virtual fence the product first issues an audible warning. If the animal continues moving in the wrong direction the product applies an aversive electrical stimulus (series of HV pulses). It periodically transmits status via cellular network and receives an acknowledgement and optional additional information."

(Customer supplied product description information)

The highest internal clock frequency of the device declared by the customer is 1.575GHz.

The customer stated that the EUT was to be tested in accordance with the following:

Emissions testing
Class B equipment limits for emission tests as per customer request.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

The following or similar warning shall be included in the instructions for use for Class A equipment:

Warning: Class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

(Refer to photographs in Appendix B for views of the EUT and the Bluetooth module)

5.3. Support Equipment

Support Equipment 1:	Description:	Laptop
	Manufacturer:	DELL
	Model No:	Latitude 7420
	Serial No:	Not stated
Support Equipment 2:	Description:	Power supply
	Manufacturer:	TENMA
	Model No:	72-10480
	Serial No:	202108070789
Support Equipment 3:	Description:	1k Ohms Resistive Load
	Manufacturer:	NA
	Model No:	NA
	Serial No:	NA

5.4. Product operating modes

The customer described the products normal operation modes as the following:

“The animal is near a virtual fence, and the product remains active, monitors position and animal movement, and applies audio and aversive stimulus pulses as required. The product transmits status through cellular network to our backend at >10min intervals (programmed time slots) typically every 10 minutes. The backend sends an acknowledgement and optionally additional information such as new virtual fence information or operating parameters.”

(Customer supplied product operating mode information)

5.5. Product operating mode for testing

Refer to section 5.4.

5.6. EUT Configuration

The EUT was either configured by the customer or configured using the customer's instructions:

"Emission Testing: Product was put into receive-only mode. A repeating sequence of audio and pulse events at approx. 2 second intervals represented accelerated normal operation for purpose of measurement position scanning (turntable etc). Product would continuously try to acquire GPS fix and solar charge is simulated by connecting power supply to solar inputs via wire.

Immunity Testing: Product was tested in Idle mode and Transmit mode.
In Idle mode, the product established connection over the air with CMW500 communication tester operating in Band 28. The product was set to idle mode (not transmitting) and observed for any unintentional transmission or loss of connection.

In Transmit mode, the product established connection over the air with CMW500 communication tester operating in Band28. The product was on continuous transmit mode and Bit Error Rate (BER) was monitored on the CMW500.

The product does not normally have any cable connections. For testing a serial cable was connected from the product to a PC running a control program (Bandchat). The cable was fitted with numerous ferrites close to the product so as not to affect measurements."

(Customer supplied product configuration information)

ESD test: The pulse function of the EUT was disabled during the ESD testing. All other EUT functions were operational. The pulse function was checked after the test.

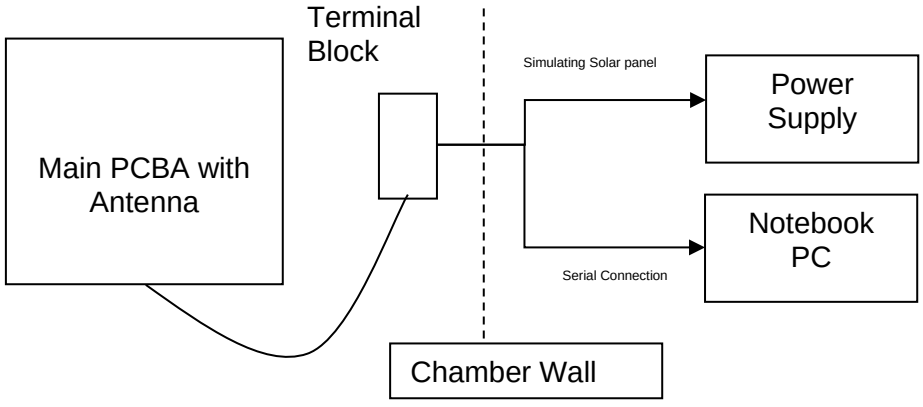

Figure 1: Customer supplied block diagram of EUT test configuration.

Port	Cable type	Cable Brand	Cable Model	Length	Termination
Serial debug port (for test access only, not part of normal configuration)	Short 3-wire non shielded patch cable from PCB to outside of product.	Generic	Ribbon cable	50mm	2x8 pin 1.27mm pitch header
(As above)	DC extension cable from above patch cable to power supply simulating Solar input.	Generic	Shielded multi-core	9m	Power supply
	Serial extension cable from above patch cable to control PC – fitted with multiple ferrites				USB-to-Serial adapter at PC end

Table 3: List of ports and associated cables/terminations used for testing.

5.7. Modifications

EMC Bayswater Pty Ltd did not modify the EUT.

5.8. Monitoring

Serial terminal port was monitored using PC application (Bandchat) for messages indication abnormal events eg: unexpected reboot, failed to deliver audio or pulse, attempt to acquire GPS, battery data and solar charging. Repeatable audible warning sound generated from the EUT was also monitored during testing. The cellular comms were monitored with CMW500 for any unintentional transmission during idle mode and BER in percentage during transmit mode of operation.

6. Test Facility & Equipment

6.1. Test Facility

Radiated emissions measurements were taken in the indoor Open Area Test Site (iOATS) facility at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, Australia.

All other tests were performed inside an anechoic chamber or a standard shielded enclosure, where applicable, at EMC Bayswater Pty Ltd, located at 18/88 Merrindale Drive, Croydon South, Victoria, 3136, Australia.

6.2. Test Equipment

Refer to Appendix A for the measurement instrument list.

7. Referenced Standards

ETSI EN 301 489-1 V2.2.3 (2019-11)
Electromagnetic Compatibility (EMC) standard for radio equipment and services – Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-52 V1.2.1 (2021-01)
Electromagnetic Compatibility (EMC) standard for radio equipment and services – Part 52: Specific conditions for Cellular Communication User Equipment (UE) radio and ancillary equipment; Harmonised Standard for ElectroMagnetic Compatibility

IEC 61000-4-2: 2009
Electromagnetic Compatibility – Part 4-2. Testing and measurement techniques
Section 2. Electrostatic discharge immunity test.

IEC 61000-4-3: 2006 + A1: 2008 + A2: 2010
Electromagnetic Compatibility – Part 4. Testing and measurement techniques
Section 3. Radiated, radio frequency, electromagnetic field immunity test.

EN 55032: 2015 + A11: 2020
Electromagnetic compatibility of multimedia equipment – Emissions requirements.

CISPR 16-1-4: 2010 + A1: 2012
Specification for radio disturbance and immunity measuring apparatus and methods Part 1.4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances.

CISPR 16-1-4: 2019
Specification for radio disturbance and immunity measuring apparatus and methods Part 1.4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances.

CISPR 16-4-2: 2011 + A1: 2014 + A2: 2018
Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements

8. Referenced Documents

None.

9. Performance (Pass/Fail) Criteria

Performance criteria in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11):

Performance criteria for continuous phenomena

During the test, the equipment shall:
• continue to operate as intended;
• not unintentionally transmit;
• not unintentionally change its operating state;
• not unintentionally change critical stored data.

Performance criteria for transient phenomena

For all ports and transient phenomena with the exception described below, the following applies:

• The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data.

• After application of the transient phenomena, the equipment shall operate as intended.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

• For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

• For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Additional performance criteria testing in accordance to clause 6.2 of ETSI EN 301 489-52 V1.2.1 (2021-01):

Performance criteria for continuous phenomena applied to Transmitters (CT)
A communication link shall be established at the start of the test, and maintained during the test, clauses 4.1 and 4.2.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

Performance criteria for Transient phenomena applied to the Transmitters (TT)
A communications link shall be established at the start of the test, clauses 4.1 and 4.2.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance in traffic mode, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

CDMA Direct Spread (E-UTRA) Performance Criteria
In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in ETSI TS 136 101 [9] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in ETSI TS 136 101 [9] during the test sequence.

Reference to clauses in ETSI EN 301 489-1 [1]	**Special product-related conditions, additional to or modifying the test conditions in ETSI EN 301 489-1 [1], clause 9**
9.2 Radio frequency electromagnetic field 9.2.2 Test method	When using the max hold detector method (see annex B) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied. The test shall be repeated with the equipment in the idle mode of operation and the exclusion band shall not be used during this test.
9.5 Radio frequency, common mode	When using the max hold detector method (see annex B) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied.
9.6.3 Performance criteria	During tests with pulses 3a and 3b, the performance criteria TT shall apply, see clause 6.2.
9.7.3 Performance criteria. Voltage dips and interruptions	For a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms the performance criteria TT or CR specified in clauses 6.2 or 6.3 shall apply as appropriate.

10. Radiated Emissions

10.1. Test Procedure

Radiated Emissions were measured 3 metres away from the EUT in the iOATS (indoor Open Area Test Site) facility, which is a CISPR 16-1-4 compliant semi-anechoic chamber with ground plane. The EUT was placed on a non-conductive table, at a height of 0.8m above the ground plane.

In the frequency range of 30MHz to 1GHz, a Biconilog antenna was used. For both horizontal and vertical antenna polarizations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The measuring antenna was positioned at 4 different fixed height positions and the turntable slowly rotated. The peak preview measurements were performed with a resolution bandwidth of 120kHz and a video bandwidth of 300kHz. Peak emissions that exceeded the limit or were close to the applicable limit were investigated further. The frequency of each emissions was then accurately determined. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees and varying the height of the antenna between 1 and 4 metres to find the worst-case emission arrangement. Quasi peak measurements were then performed using a measuring time of no less than 15 seconds. The final quasi-peak measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 120kHz.

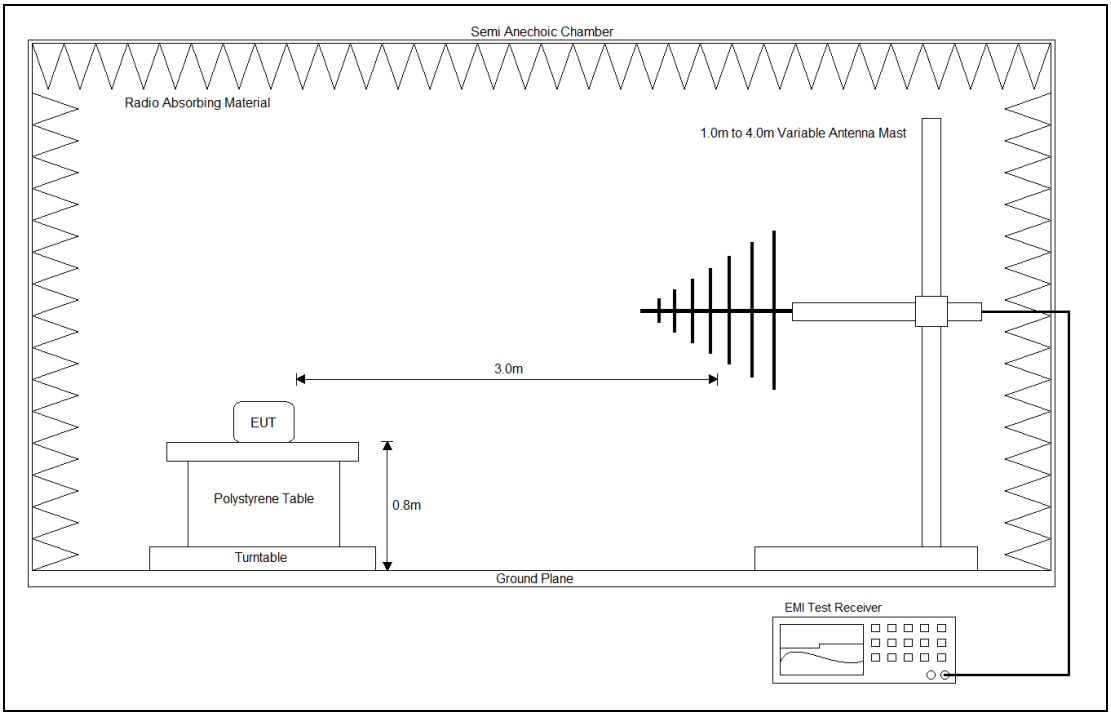

Figure 2: Radiated emissions test setup – 30MHz to 1GHz

In the frequency range 1GHz to 6GHz a Horn antenna was used and an area of 3m x 3m was covered between the antenna and the EUT using RF absorbing material with a rated attenuation more than 20dB over the frequency range. The height of the horn antenna was varied when required in accordance with CISPR 16-2-3, section 7.6.6 requirements depending upon the EUT dimensions to ensure illumination of the EUT and the turntable slowly rotated to maximise the emissions. For both horizontal and vertical antenna polarizations, the Peak and Average preview measurements were performed with a resolution bandwidth of 1MHz and a video bandwidth of 3MHz. Peak and average emissions that exceeded the applicable limit or were close to the applicable limit were investigated further. Each emission of interest was then in-turn maximised by using the turntable to rotate the EUT through 360 degrees and the antenna height varied (if applicable) to find the worst-case emission arrangement. Peak and CISPR Average measurements were then performed using a measuring time of no less than 15 seconds. The final peak and CISPR Average measurements were performed using a receiver bandwidth of 6dB and a resolution bandwidth of 1MHz.

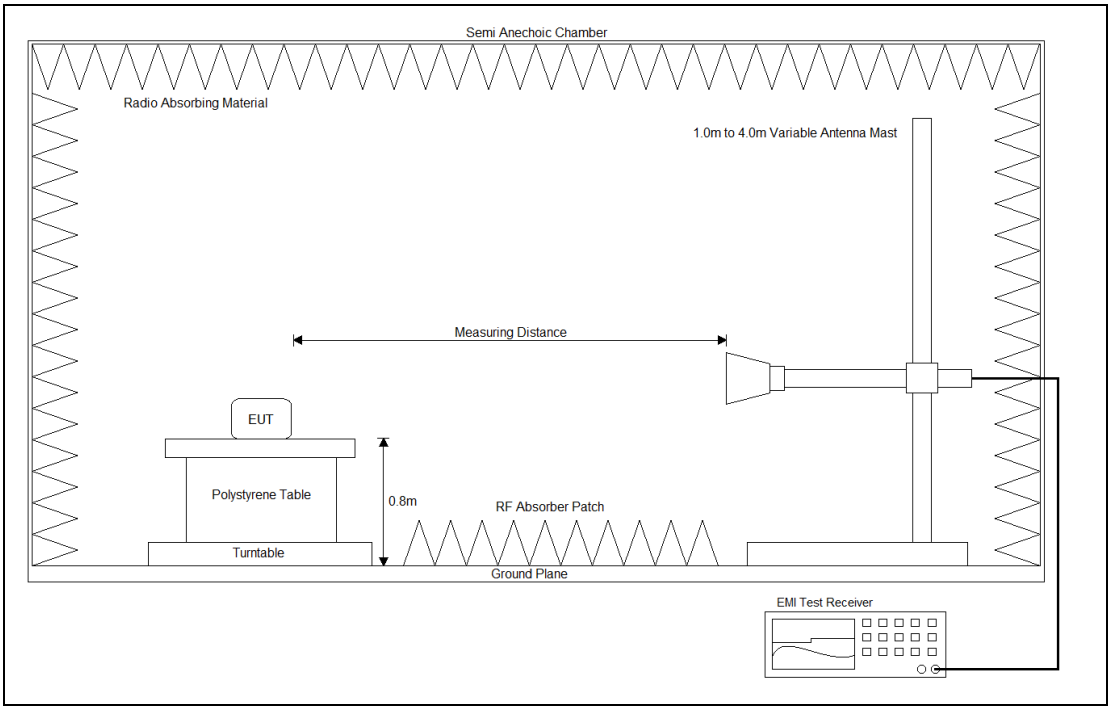

Figure 3: Radiated emissions test setup – 1GHz to 6GHz

Frequency	Antenna	Measuring	Illumination (m) known as
1 to 2	55.00	3	3.12
2 to 4	50.00	3	2.80
4 to 6	34.00	3	1.83

*Table 4: The dimension of the line tangent to the EUT formed by θ3dB beamwidth of the measuring antenna at the measurement distance d (EUT illumination) as per *CISPR 16-2-3, section 7.6.6.*

Plots of the accumulated measurement data for both horizontal and vertical antenna polarizations, including all transducer and other measuring system correction factors were produced using commercially available compliant software (as listed in the test equipment list of this report).

(Refer to photographs 1 & 2 in Appendix B for views of the test configuration)

10.2. Limits

Frequency Range (MHz)	Limits (dBµV/m)
	Quasi-Peak
30 to 230	40
230 to 1000	47
NOTE The lower limit shall apply at the transition frequency.	

Table 5: Class B Radiated Emissions at a measuring distance of 3m (30MHz to 1GHz)

Frequency Range (MHz)	Limits (dBµV/m)	
	Peak	Average
1000 to 3000	70	50
3000 to 6000	74	54
NOTE The lower limit shall apply at the transition frequency.		

Table 6: Class B Radiated Emissions at a measuring distance of 3m (1GHz to 6GHz)

10.3. Test Results

Radiated Emissions measurements are tabulated below. For below 1GHz measurements, Quasi-peak measurements were performed at spot frequencies where the peak emission was close to, or exceeded the applicable limit line. For above 1GHz measurements, Peak or CISPR Average measurements were performed at spot frequencies where the peak or average emission was close to, or exceeded the applicable limit line.

(Refer to graphs 1 to 4 in Appendix C)

Frequency (MHz)	Result Quasi-peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Delta limit (dB)
31.116	25.8	40.0	-14.2
36.742	21.0	40.0	-19.0
144.072	17.8	40.0	-22.2
803.478	31.1	47.0	-15.9
891.166	31.8	47.0	-15.2
977.011	32.9	47.0	**-14.1***

**Worst-case emission*

Table 7: Radiated Disturbance - Horizontal Antenna Polarisation - 30MHz to 1GHz

Peak Measurements				Average Measurements			
Frequency (MHz)	**Result (dBµV/m)**	**Limit (dBµV/m)**	**Delta Limit (dB)**	**Frequency (MHz)**	**Result (dBµV/m)**	**Limit (dBµV/m)**	**Delta Limit (dB)**
1495.820	34.4	70.0	-35.6	2023.620	22.3	50.0	-27.7
2648.920	38.0	70.0	-32.0	2672.580	24.2	50.0	-25.8
5833.440	43.9	74.0	**-30.1***	5929.440	30.7	54.0	**-23.3***

**Worst-case emissions*

Table 8: Radiated Emissions – Horizontal Antenna Polarisation (1GHz to 6GHz)

Frequency (MHz)	Result Quasi-peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Delta limit (dB)
31.455	25.6	40.0	-14.4
38.245	27.4	40.0	-12.6
39.021	27.9	40.0	**-12.1***
39.797	26.0	40.0	-14.0
45.666	17.6	40.0	-22.4
729.904	29.8	47.0	-17.2
872.930	31.7	47.0	-15.3

**Worst-case emissions*

Table 9: Radiated Emissions – Vertical Antenna Polarisation (30MHz to 1GHz)

Peak Measurements				Average Measurements			
Frequency (MHz)	**Result (dBµV/m)**	**Limit (dBµV/m)**	**Delta Limit (dB)**	**Frequency (MHz)**	**Result (dBµV/m)**	**Limit (dBµV/m)**	**Delta Limit (dB)**
1985.660	36.2	70.0	-33.8	2688.960	24.0	50.0	-26.0
2366.560	36.3	70.0	**-33.7***	2980.940	25.1	50.0	-24.9
3032.420	38.7	74.0	-35.3	5020.080	29.7	54.0	**-24.3***

**Worst-case emissions*

Table 10: Radiated Emissions – Vertical Antenna Polarisation – 1GHz to 6GHz

The measurement uncertainty was calculated as follows:

Measurement frequency range	Calculated measurement uncertainty
30MHz to 1GHz	±4.65dB
1GHz to 6GHz	±4.83dB

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%. The referenced uncertainty standard specifies that determination of compliance shall be based on measurements without taking into account measurement uncertainty. However, the measurement uncertainty shall appear in the test report.

Climatic Conditions	
Temperature:	22.2 to 22.8ºC
Humidity:	55 to 56%
Atmospheric pressure:	1017.2 to 1020.4hPa

Table 11: Climatic conditions

Calculation: The above results are based upon the following calculation:

$$E = V_{QP/PK/AV} + AF - G_{Amp} + L_C$$

Where:

E	=	E-field in dBµV/m
$V_{QP/PK/AV}$	=	Measured Voltage (Quasi Peak, Peak or Average) in dBµV
AF	=	Antenna Factor in dB(/m)
L_C	=	Cable and attenuator Loss in dB
G_{Amp}	=	Pre Amplifier Voltage Gain in dB

Example calculation:

$E = V_{QP} + AF - G_{Amp} + L_C$
$E = 30dB\mu V + 12dB/m - 0dB + 2.3dB$
$E = 44.3\ dB\mu V/m$

Notes: Radiated Emissions measurements were below the Class B limit.

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

If the highest frequency of the internal sources of the EUT is above 1GHz, the measurement shall be made up to 5 times the highest frequency or 6GHz, whichever is less.

The highest frequency of the EUT as specified by the customer is 1.575GHz as such measurements up to 6GHz were taken.

Assessment: The EUT complied with the specified Class B Electromagnetic Radiation Disturbance requirements of ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-52 V1.2.1 (2021-01).

11. Electrostatic Discharge (EN 61000-4-2)

11.1. Requirements

The EUT must comply with performance criterion B & TT/TR of ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01)

11.2. Test Procedure

TABLETOP EQUIPMENT

A Horizontal Coupling Plane (HCP), 1.6m x 0.8m was placed on top of a wooden table 0.8m high, standing on the ground reference plane. The EUT and cables were isolated from the coupling plane by an insulating film 0.5mm thick.

- Tabletop or floor standing equipment was placed at a distance of 1 metre from the enclosure walls or any metallic structure other than the ground reference plane.
- Both contact and air discharge were applied (as applicable) to:
  - all faces and access points of the EUT
  - the Horizontal Coupling Plane (HCP)
  - the Vertical Coupling Plane (VCP)
- All coupling planes were connected to the ground reference plane via a strap with a 470kΩ resistor located at each end.
- Contact discharges were applied to all conductive surfaces and to the coupling planes. Air discharges were applied only to the insulating surfaces.
- Discharges applied to the HCP and VCP were applied on each side of the EUT. Discharges made to the HCP were applied 0.1m from the EUT. Discharges made to the VCP were applied to the centre of one vertical edge of the coupling plane. The VCP (0.5m x 0.5m), was placed parallel to and positioned 0.1m from the EUT.
- At least 10 single discharges were applied in both positive and negative polarities.
- The applied test level was ±4kV for direct and indirect contact discharges and ±8kV for air discharges.

(Refer to photographs 3 to 7 of Appendix B for views of the test configuration)

11.3. Discharge Points

Indirect contact discharges were applied to the Horizontal Coupling Plane (HCP) at the following positions:

- Front, Rear, Right- and Left-hand sides of EUT.

Indirect contact discharges were applied to the Vertical Coupling Plane (VCP) with the EUT at the following positions:

- Front, Rear, Right- and Left-hand sides of EUT.

Direct contact discharges were applied to the following points (Test points 1 to 16):

- Screws and chain

Direct air discharges were applied to the following points (Test points A to J):

- Enclosure and insulated parts

(Refer to photographs 8 to 14 of Appendix B for views of the discharge locations)

11.4.Test Results

The Electrostatic Discharge test results are detailed below:

Application	ESD Voltage	Observation	Results
HCP	±2.0 kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		
VCP	±2.0kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		

Table 12: Electrostatic Discharge – Indirect discharge – LTE Traffic Mode

Application	ESD Voltage	Observation	Results
HCP	±2.0 kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		
VCP	±2.0kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		

Table 13: Electrostatic Discharge – Indirect discharge – LTE Idle Mode

Discharge Location	ESD Voltage	Observation	Result
1 to 16	±2.0kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		Complied, Criterion B & TT/TR

Table 14: Electrostatic Discharges – Contact discharge – LTE Traffic Mode

Discharge Location	ESD Voltage	Observation	Result
1 to 16	±2.0kV	No fault or loss of function detected	Complied, Criterion B & TT/TR
	±4.0 kV		Complied, Criterion B & TT/TR

Table 15: Electrostatic Discharges – Contact discharge – LTE Idle Mode

Discharge Location	ESD Voltage	Observation	Result
A to J	±2.0kV	Due to the build of the EUT discharges were not possible	*Complied, Criterion B & TT/TR*
	±4.0kV		*Complied, Criterion B & TT/TR*
	±8.0kV		*Complied, Criterion B & TT/TR*

Table 16: Electrostatic Discharges – Air discharge– LTE Traffic Mode

Discharge Location	ESD Voltage	Observation	Result
A to J	±2.0kV	Due to the build of the EUT discharges were not possible	*Complied, Criterion B & TT/TR*
	±4.0kV		*Complied, Criterion B & TT/TR*
	±8.0kV		*Complied, Criterion B & TT/TR*

Table 17: Electrostatic Discharges – Air discharge– LTE Idle Mode

The measurement uncertainty for the Electrostatic Discharge (ESD) voltage was calculated at ±1.2% per EN 61000-4-2. The measurement uncertainty for the Electrostatic Discharge (ESD) current was calculated at ±8.1% per EN 61000-4-2. The measurement uncertainty for the Electrostatic Discharge (ESD) rise time of the current was calculated at ±14.2% per EN 61000-4-2. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	22.4 to 22.8°C
Humidity:	48.3%
Atmospheric pressure:	1016.4hPa

Table 18: Climatic conditions

Notes: No fault or loss of function was detected during ESD testing.

Assessment: The EUT complied with the ESD requirements of ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01) performance criteria for criteria for transient phenomena.

12. Electromagnetic Field (EN 61000-4-3)

12.1. Requirements

The EUT must comply with performance criterion A and CT/CR.

12.2. Test Procedure

Prior to testing, a sixteen-point 3V/m uniform CW electric field in the frequency range of 80MHz to 1GHz was calibrated at 2.3 metres from the tip of the Bi-Conilog transmitting antenna using an orthogonal electric field probe. A sixteen-point 3V/m CW electric field in the frequency range of 1GHz to 6GHz was calibrated at 3 metres from the front of transmitting horn antenna using an orthogonal electric field probe.

During the calibration the signal generator drive level to the amplifier was adjusted to achieve the required electric field strength as measured by the electric field probe. The required electric field was the CW level plus the AM modulation envelope of 80% i.e. 1.8 times the CW level. The forward power to the antenna, required to achieve the desired CW plus the AM modulation envelope electric field strength, was recorded using immunity software and stored as a look up table. The sixteen-point uniform calibration was performed in both horizontal and vertical transmit antenna polarisations. After the sixteen-point uniform calibration was completed the amplifier linearity verification was performed. The CW drive level to the amplifier was adjusted to the required level as determined by the sixteen-point calibration (CW level x 1.8) and then reduced by 5.1dB. The forward power was measured to ensure a corresponding reduction i.e. 5.1dB and no less than 3.1dB thus ensuring the amplifier was not saturated, this was repeated at each frequency. Spurious and harmonics emissions verification was then performed by removing the sixteen-point uniform calibration probe fixture and probe and substituting with a suitable receive antenna positioned directly in front and at the same height and antenna polarity as the transmitting antenna. The CW drive level to the amplifier was adjusted to the required level as determined by the sixteen-point calibration (CW level x 1.8) at each frequency. Using the receive antenna and a spectrum analyser/EMI receiver (including all correction factors for the receive antenna and cables) the spurious emissions and up to the 3rd harmonic of the fundamental were measured they were more than 6dB below the fundamental.

The EUT was positioned on a non-conductive table, 0.8m above the reference ground plane at the distance of specified previously from the transmitting antenna. All wiring to the EUT was left exposed to the electromagnetic field for a distance of 1m. All wiring less than or equal to 3m was bundled low-inductively to a 1m length. All wiring greater than 3m had RF ferrite beads placed 1m along the wiring.

The frequency ranges of 80MHz to 1.0GHz, 1.0GHz to 3.0GHz and 3.0GHz to 6.0GHz were swept incrementally using 1% step sizes, with the drive level to the amplifier adjusted accordingly to achieve the forward power level recorded in the electric field lookup table at each frequency interval when the CW drive level was achieved modulation (80% AM @ 1kHz) was applied with a dwell time of 3 seconds per frequency step. Both horizontal and vertical antenna polarizations were used to radiate the EUT in turn, on the front, left and right faces.

(Refer to photographs 15 to 19 in Appendix B for views of the test configuration)

12.3.Test Results

Field Level (V/m)	Antenna Polarisation	Frequency (MHz)	Observation	Results
3	Vertical	80-1000	See Note 1,2	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR
3	Horizontal	80-1000	See Note 3,4	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR

Table 19: Electromagnetic Field (Amplitude modulated) – LTE Traffic mode – Front Side

Field Level (V/m)	Antenna Polarisation	Frequency (MHz)	Observation	Results
3	Vertical	80-1000	See Note 5	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR
3	Horizontal	80-1000	See Note 6	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR

Table 20: Electromagnetic Field (Amplitude modulated) – LTE Traffic mode – Left Side

Field Level (V/m)	Antenna Polarisation	Frequency (MHz)	Observation	Results
3	Vertical	80-1000	No fault or loss of function	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR
3	Horizontal	80-1000	No fault or loss of function	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR

Table 21: Electromagnetic Field (Amplitude modulated) – LTE Traffic mode – Right Side

Field Level (V/m)	Antenna Polarisation	Frequency (MHz)	Observation	Results
3	Vertical	80-1000	No fault or loss of function	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR
3	Horizontal	80-1000	No fault or loss of function	Complied, Criterion A & CT/CR
3		1000-3000	No fault or loss of function	Complied, Criterion A & CT/CR
3		3000-6000	No fault or loss of function	Complied, Criterion A & CT/CR

Table 22: Electromagnetic Field (Amplitude modulated) – LTE Idle mode – Front, Left and Right Sides

The measurement uncertainty for the re-establishment of the calibrated uniformed field for Electromagnetic Fields testing was calculated at ±3.32dB between 80MHz to 1GHz and ±3.58dB between 3GHz and 6GHz per EN 61000-4-3. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of *k=2* which gives a level of confidence of approximately 95%.

Climatic Conditions	
Temperature:	21.1 to 22.5°C
Humidity:	49 to 52%
Atmospheric pressure:	1006.0 to 1011.6hPa

Table 23: Climatic conditions

Notes:

For the Electromagnetic Field immunity measurement, the base station was set to band 28 to determine the traffic mode throughput level and ideal mode communication.

The applicable exclusion band for the EUT's Bluetooth as specified by EN ETSI 301 489-52 clause 4.3.

The exclusion band for immunity testing of equipment operating in the band 28 shall be:

Uplink = 703MHz – 748MHz

- *lower limit of exclusion band = lowest allocated band edge frequency -25 MHz, i.e. 678 MHz.*
- *upper limit of exclusion band = highest allocated band edge frequency +25 MHz, i.e. 773 MHz.*

Downlink = 758MHz – 803MHz

- *lower limit of exclusion band = lowest allocated band edge frequency -20 MHz, i.e. 738 MHz.*
- *upper limit of exclusion band = highest allocated band edge frequency +20 MHz, i.e. 823 MHz.*

Note 1: When 3V/m RF field was applied to the Front side of the EUT in the frequency range of 157MHz to 158MHz (Vertical antenna polarization) the LTE connection was dropped. The loss of function was not repeatable.

Note 2: When 3V/m RF field was applied to the Front side of the EUT in the frequency range of 195MHz to 199MHz (Vertical antenna polarization) the data throughput of the EUT failed 3% (i.e. 97% of the maximum data throughput). The EUT self-recovered thus complied the ETSI EN 301 489-52 requirements.

Note 3: When 3V/m RF field was applied to the Front side of the EUT in the frequency range of 195MHz to 197MHz (Horizontal antenna polarization) the data throughput of the EUT failed 1% (i.e. 99% of the maximum data throughput). The EUT self-recovered thus complied the ETSI EN 301 489-52 requirements.

Note 4: When 3V/m RF field was applied to the Front side of the EUT in the frequency range of 363MHz (Horizontal antenna polarization) the LTE connection was dropped. The loss of function was not repeatable.

Note 5: When 3V/m RF field was applied to the Left side of the EUT during the frequency at 714.155MHz, with Vertical antenna polarization, The LTE communication dropped at traffic mode. which are within the exclusion band and are not subject to test or assessment.

Note 6: When 3V/m RF field was applied to the Front side of the EUT in the frequency range of 195MHz to 197MHz (Horizontal antenna polarization) the data throughput of the EUT failed 5% (i.e. 95% of the maximum data throughput). The EUT self-recovered thus complied the ETSI EN 301 489-52 requirements.

The test shall normally be performed with the generating antenna facing each side of the EUT. When equipment can be used in different orientations (i.e. vertical or horizontal) all sides shall be exposed to the field during the test. When technically justified, some EUTs can be tested by exposing fewer faces to the generating antenna. In other cases, as determined for example by the type and size of EUT or the frequencies of test, more than four azimuths may need to be exposed.

The customer declared the EUT to be exposed to the Electromagnetic Field on three sides of the product (front, left and right).

As per EN 61000-4-3 a technical rationale of testing fewer sides than the specified in the standard can be used to reduce the sides for testing. A technical rationale for the reduced faces exposed was declared by the customer.

"Due to the physical size of the EUT, a reduced number of sides exposed during radiated Electromagnetic Field testing shall be used. The sides tested are expected to be the worst-case sides with respect to immunity related functions of the EUT".

Assessment: The EUT complied with the Electromagnetic Field requirements of ETSI EN 301 489-1 V2.2.3 (2019-11) and ETSI EN 301 489-52 V1.2.1 (2021-01) performance criterion for continuous phenomena.

13. Conclusion

The Gallagher Group Ltd, eS1 Cellular, eShepherd Neckband complied with the applicable requirements of ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-52 V1.2.1 (2021-01).

Appendix A – Test Equipment

Inv.	Equipment	Make	Model No	Serial No	Calibration	
					Due	Type
Radiated Emission - 30MHz to 1000MHz						
1217	ANALYSER, EMI Receiver	Rohde & Schwarz	ESU40	100182	Jun-24	E
0932	CONTROLLER, Position	Sunol Sciences	SC104V-3	081006-1	N/A	V
0933	TURNTABLE	Sunol Sciences	SM46C	081006-2	N/A	V
0934	MAST, Antenna	Sunol Sciences	TLT2	081006-5	N/A	V
0935	ANTENNA, Biconilog	Sunol Sciences	JB5	A071106	May-25	E
0718	ATTENUATOR, 6dB	JFW	50FPE-006	-	Jan-25	I
0989	CABLE, Coax, Sucoflex 104A	Huber+Suhner	44454/4A	C357	Jan-25	I
1145	CABLE, Coax, Sucoflex 104PA	Huber + Suhner	84279564	MY056/4PA	Jan-25	I
1155	Hygrometer, Temp, Humidity	DigiTech	QM7312	-	Jul-25	I
0666	Enclosure, Semi-Anechoic, No 1	RFI Industries	S800 iOATS	1229	Aug-25	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.53.0	N/A	N/A
Radiated Emissions – 1GHz to 6GHz						
1217	ANALYSER, EMI Receiver	Rohde & Schwarz	ESU40	100182	Jun-24	E
0932	CONTROLLER, Position	Sunol Sciences	SC104V-3	081006-1	N/A	V
0933	TURNTABLE	Sunol Sciences	SM46C	081006-2	N/A	V
0934	MAST, Antenna	Sunol Sciences	TLT2	081006-5	N/A	V
0633	ANTENNA, Double Ridge Horn	EMCO	3115	9712-5369	Aug-24	I
0559	PRE-AMP, Microwave, 18GHz	Miteq	AFS8	605305	Apr-24	I
0989	CABLE, Coax, Sucoflex 104A	Huber+Suhner	44454/4A	C357	Jan-25	I
1145	CABLE, Coax, Sucoflex 104PA	Huber + Suhner	84279564	MY056/4PA	Jan-25	I
1238	CABLE, Coax, Sucoflex 126 E	Huber + Suhner	10422876	8000495/126E	Jan-25	I
1155	Hygrometer, Temp, Humidity	DigiTech	QM7312	-	Jul-25	I
0666	Enclosure, Semi-Anechoic, No 1	RFI Industries	S800 iOATS	1229	Aug-25	I
SW007	EMC Measurement Software	Rohde & Schwarz	EMC 32	Version 8.54.0	N/A	N/A
Electrostatic Discharge						
0730	GENERATOR, ESD System	EMC Partner	ESD3000	150	Jan-25	E
1293	Hygrometer, Temp, Humidity	Thomas Scientific	1235C97	221636757	Jul-24	V
0174	ENCLOSURE, Shielded, No.4	RFI Industries	S100	652	N/A	V

V: Verification of operation against an internal reference
I: Internal calibration against a traceable standard
E: External calibration by a NATA or MRA equivalent endorsed facility
N/A: Not Applicable

Equipment list continued on the following page

Inv	Equipment	Make	Model No	Serial No	Calibration	
					Due	Type
Electromagnetic Field – 80MHz to 6GHz						
1276	Generator, Signal, RF	Keysight Tech. Inc	N5183A	MY50140891	Apr-24	I
0723	Attenuator, 10dB	JFW	50FPE-010	723	Aug-24	I
0728	Attenuator, 20dB	JFW	50FPE-020		Dec-24	I
1269	Amplifier, RF, power	TESEQ|AMETEK	CBA1G-150D	1092342	N/A	V
1136	Coupler, Coax, Bi-directional	Werlatone	05571	11662	Jan-25	I
0737	Meter, RF Power, Dual	Agilent	E4419B	MY45100325	Feb-27	E
0740	Sensor, RF Power	Agilent	E9304A	MY41496556	Feb-27	E
A-145	Antenna, Biconilog	EMCO	3143	1026	N/A	V
1284	Meter, Field Strength	Narda	NBM-520	D-2502	Oct-24	E
1147	Cable, Coax, Sucoflex 104PA	Huber + Suhner	84287045	MY057/4PA	Jan-25	I
1207	CABLE, Coax, Sucoflex 126 E	huber+ Suhner	85072828	MY979/26E	Jan-25	I
1212	Cable, Coax, Sucoflex 126 E	Huber + Suhner	85072828	MY978/26EA	Jan-25	I
1235	Cable, Coax, Sucoflex 126 E	Huber + Suhner	85072830	MY952/26EA	Jan-25	I
1248	Hygrometer, Temp, Humidity	Thomas Scientific	6066N53	181037404	Dec-24	I
1270	Amplifier, RF, power	TESEQ|AMETEK	CBA6G-030D	1092343	N/A	V
0600	Coupler, Coax, Bi-directional	Narda	3022	10096	May-24	I
1005	Coupler, Coax, Bi-directional	Hewlett Packard	772D	2839A00568	Jul-26	I
0942	Attenuator, 20dB	JFW	50FPE-020		May-25	I
0944	Attenuator, 20dB	JFW	50FPE-020		May-25	I
0714	Attenuator, 20dB	JFW	50HF-020N		Jan-25	I
0716	Attenuator, 20dB	JFW	50HF-020N		Jan-25	I
0209	Antenna, Double Ridge Horn	EMCO	3115	9210-3945	Aug-24	I
1208	Cable, Coax, Sucoflex 126 E	Huber+ Suhner	85072830	MY955/26EA	Jan-25	I
1211	Cable, Coax, Sucoflex 126 E	Huber + Suhner	85072828	MY980/26EA	Jan-25	I
1213	Cable, Coax, Sucoflex 126 E	Huber + Suhner	85072830	MY947/26EA	Jan-25	I
0667	Enclosure, Semi-Anechoic, No 3	RFI Industries	S800	1201	N/A	V
SW008	EMC Immunity Software	Amplifier Research	EMC Ware	Version 6.0.11	N/A	N/A

V: Verification of operation against an internal reference
I: Internal calibration against a traceable standard
E: External calibration by a NATA or MRA equivalent endorsed facility
N/A: Not Applicable

Appendix B – Photographs

Number	Photograph Description
1	Radiated Emission – 30MHz to 1GHz
2	Radiated Emission – 1GHz to 6GHz
3	Electrostatic Discharge – Test configuration
4	Electrostatic Discharge – Test configuration - HCP
5	Electrostatic Discharge – Test configuration - VCP
6	Electrostatic Discharge – Test configuration – Direct Contact discharge
7	Electrostatic Discharge – Test configuration – Direct Air discharge
8	Electrostatic Discharge – Test points
9	
10	
11	
12	
13	
14	
15	Radio Frequency Electromagnetic Field – Test configuration – Front side
16	Radio Frequency Electromagnetic Field – Test configuration – Left side
17	Radio Frequency Electromagnetic Field – Test configuration – Right side
18	Radio Frequency Electromagnetic Field – Test configuration
19	
20	EUT External Views
21	
22	
23	
24	
25	
26	
27	
28	
29	EUT Internal Views
30	
31	
32	
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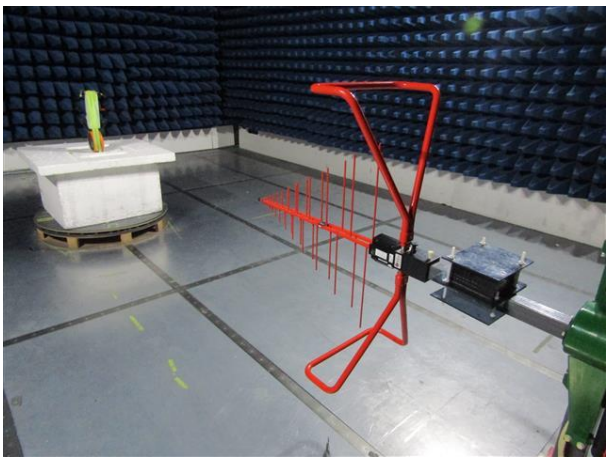
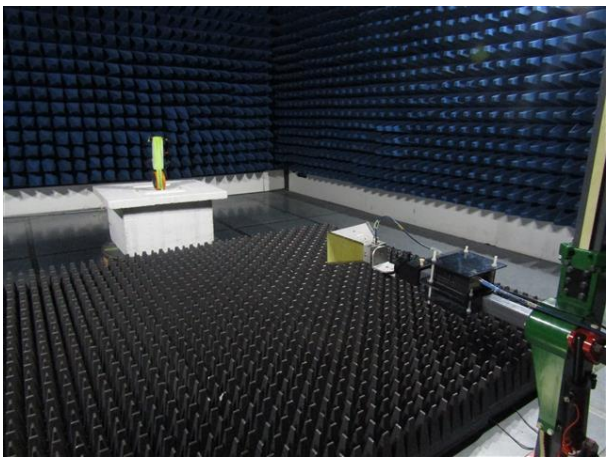
43	
44	
45	

Photograph list continued on the following page

Number	Photograph Description
46	Support Equipment – 1k Ohms Resistive Load
47	Support Equipment – Laptop
48	
49	Support Equipment – Power Supply
50	



Photograph 1



Photograph 2

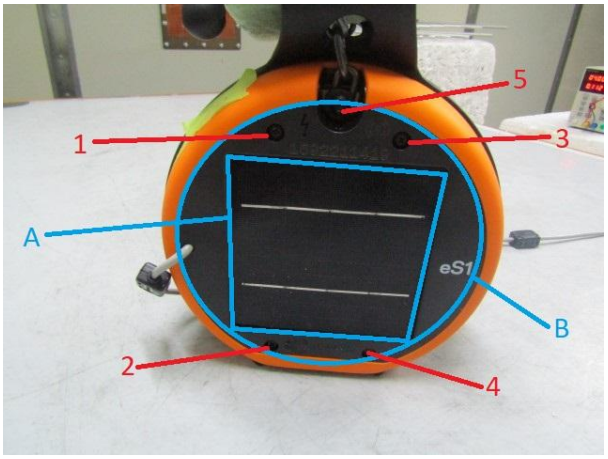
Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7



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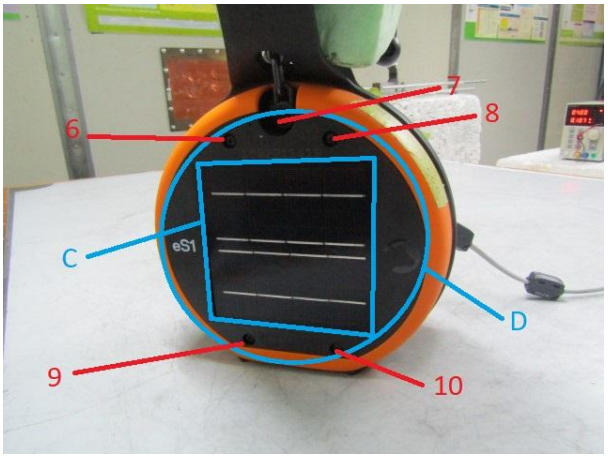
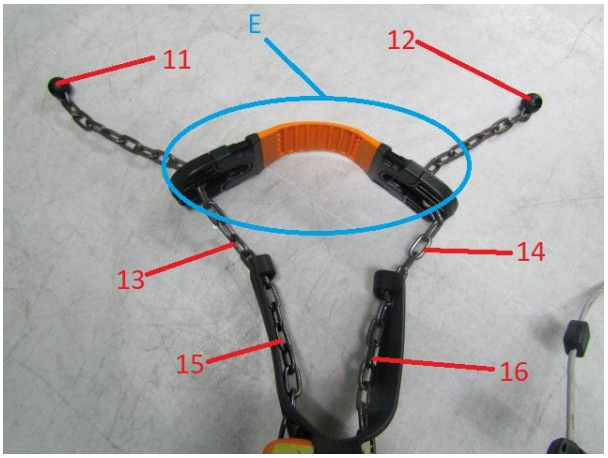


Photograph 9



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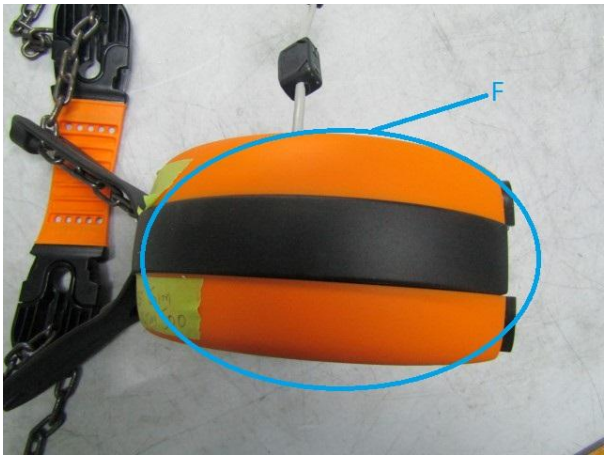
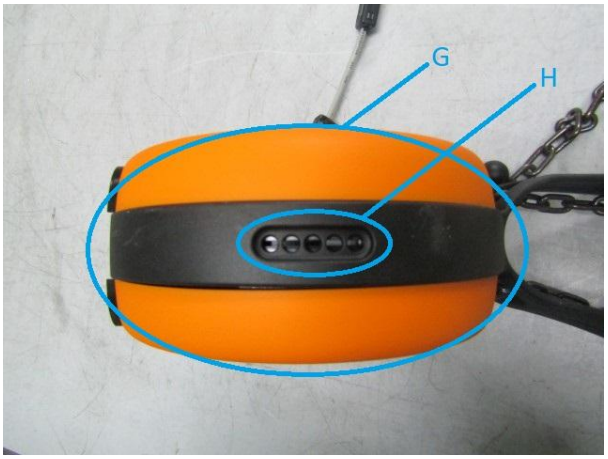
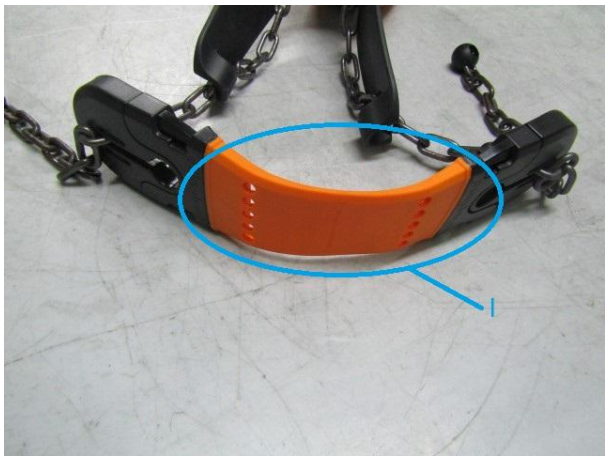


Photograph 11

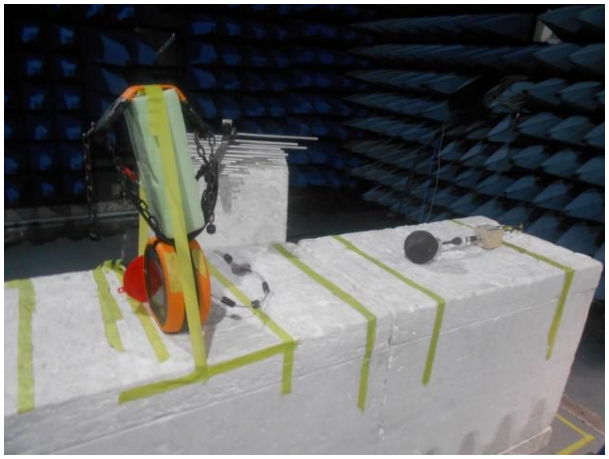


Photograph 12



Photograph 13

Photograph 14



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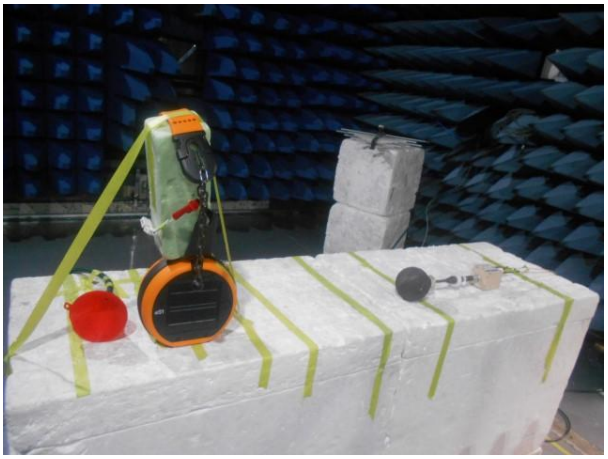
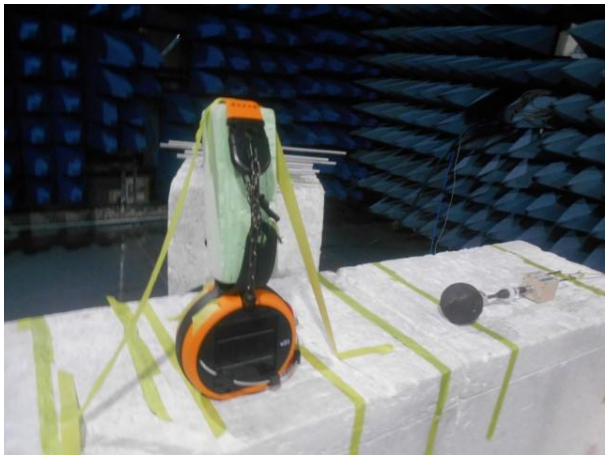


Photograph 16



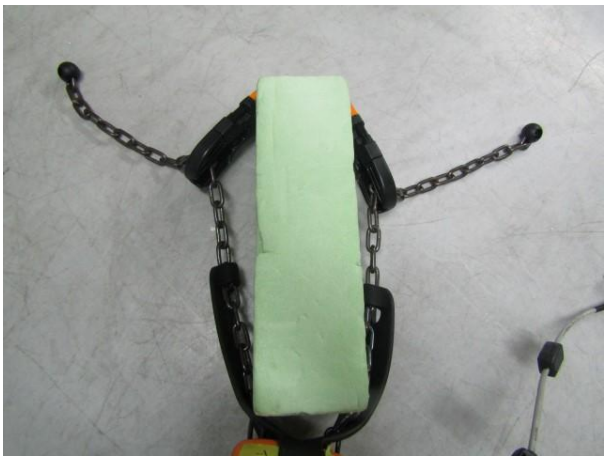
Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21



Photograph 22

Photograph 23

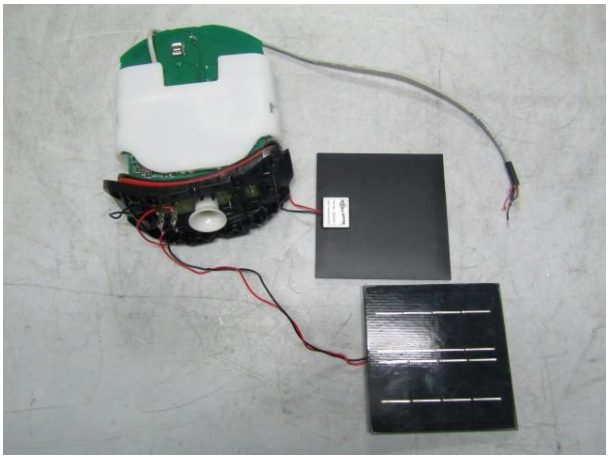
Photograph 24

Photograph 25

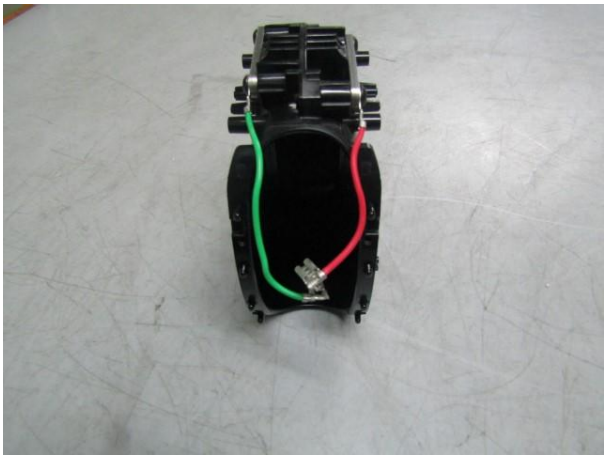
Photograph 26

Photograph 27

Photograph 28



Photograph 29



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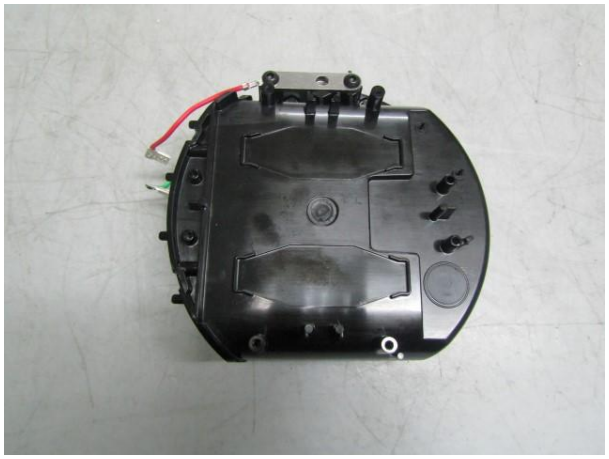
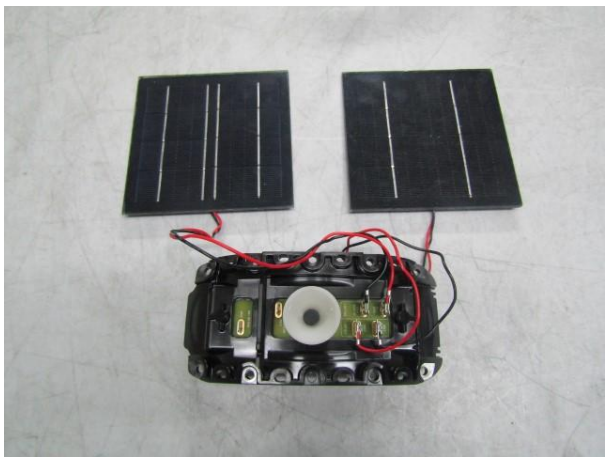


Photograph 31

Photograph 32

Photograph 33

Photograph 34



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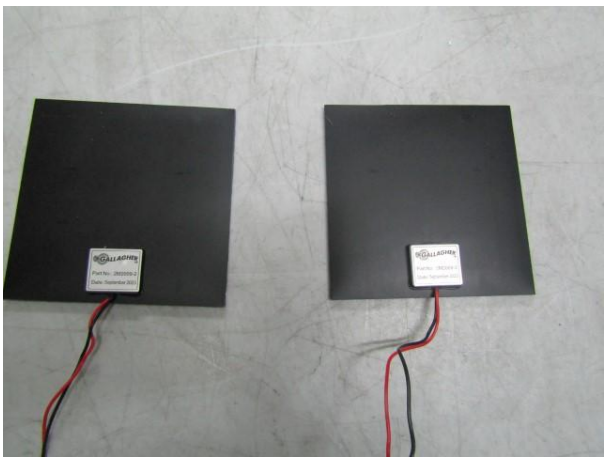

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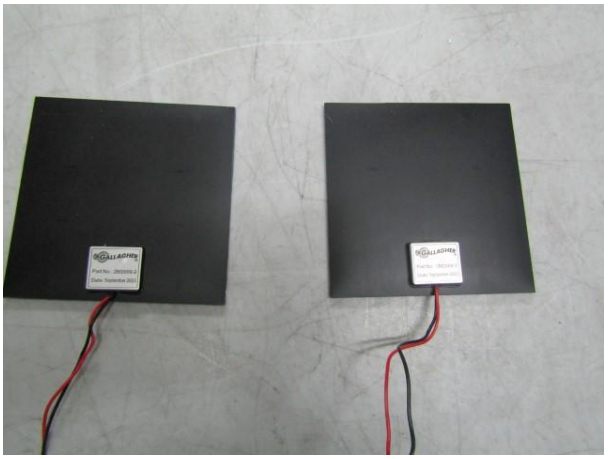
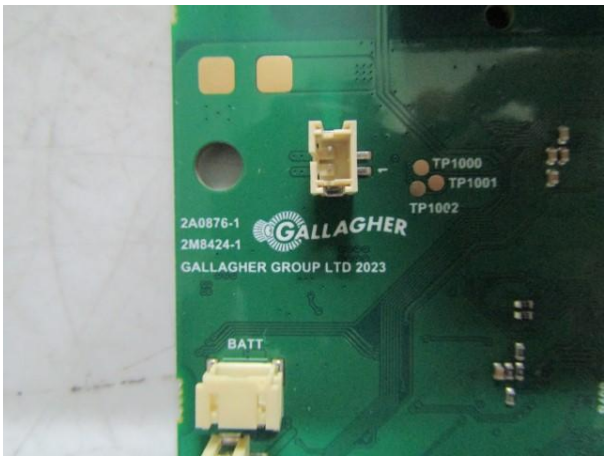


Photograph 37

Photograph 38



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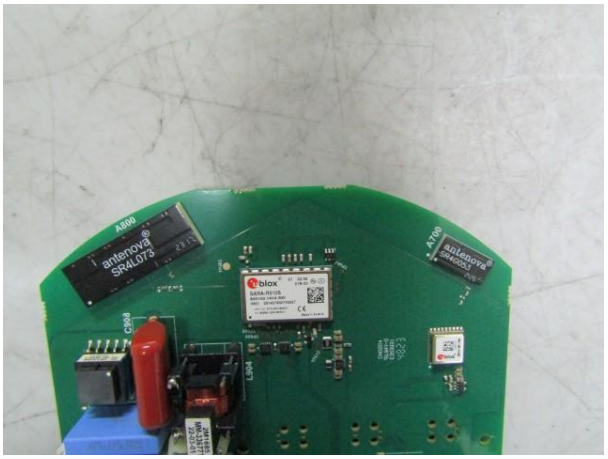
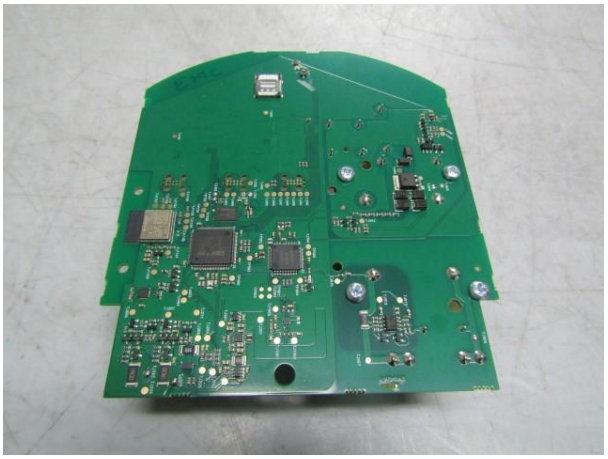


Photograph 40

Photograph 41

Photograph 42



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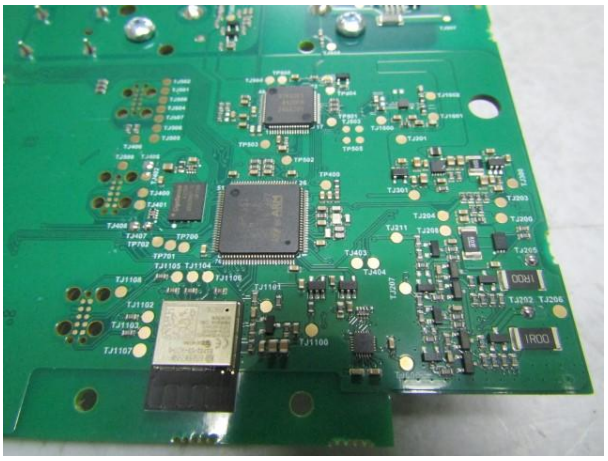

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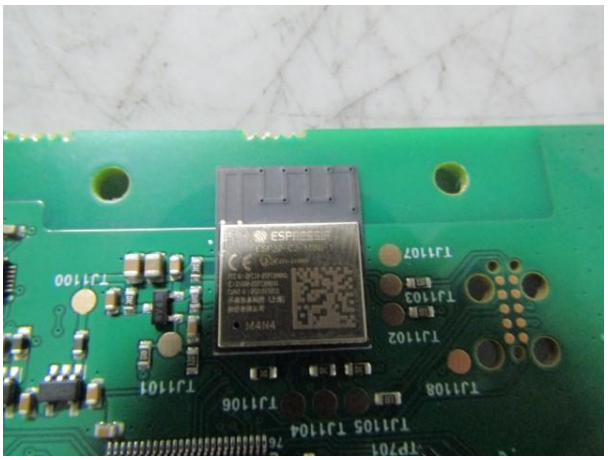

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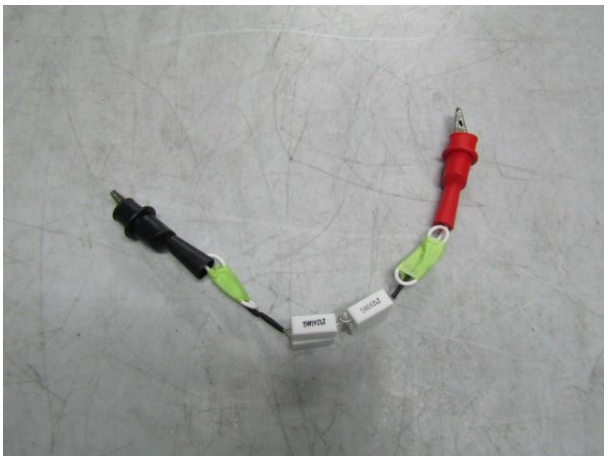

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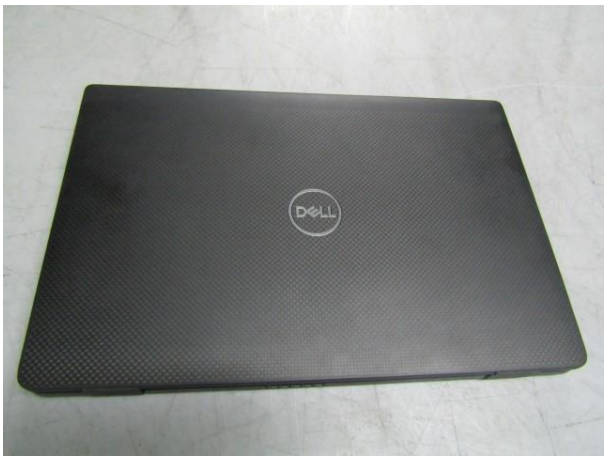


Photograph 47

Photograph 48

Photograph 49

Photograph 50

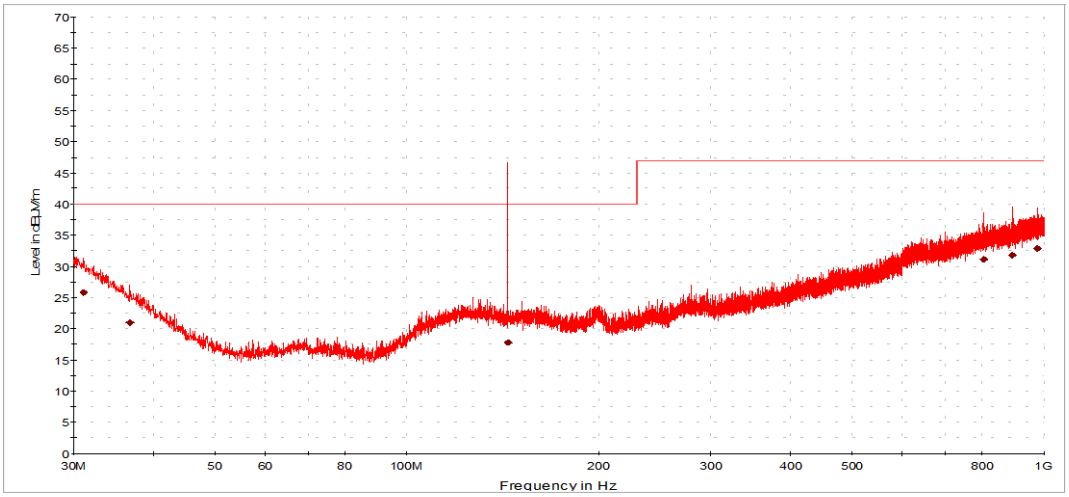
Appendix C – Measurement Graphs

No.	Test	Graph Description
1	Radiated Emissions	Horizontal Antenna Polarisation (30MHz to 1GHz)
2		Vertical Antenna Polarisation (30MHz to 1GHz)
3		Horizontal Antenna Polarisation (1GHz to 6GHz)
4		Vertical Antenna Polarisation (1GHz to 6GHz)

EMC Bayswater Pty. Ltd.

EN 55032 Radiated Emissions
Gallagher Group Ltd - eS1 Cellular - eShepherd Neckband
Horizontal Antenna Polarisation – 30MHz to 1GHz

Job Number: E2401-1729-3 Rev1
Test Engineer: AZ

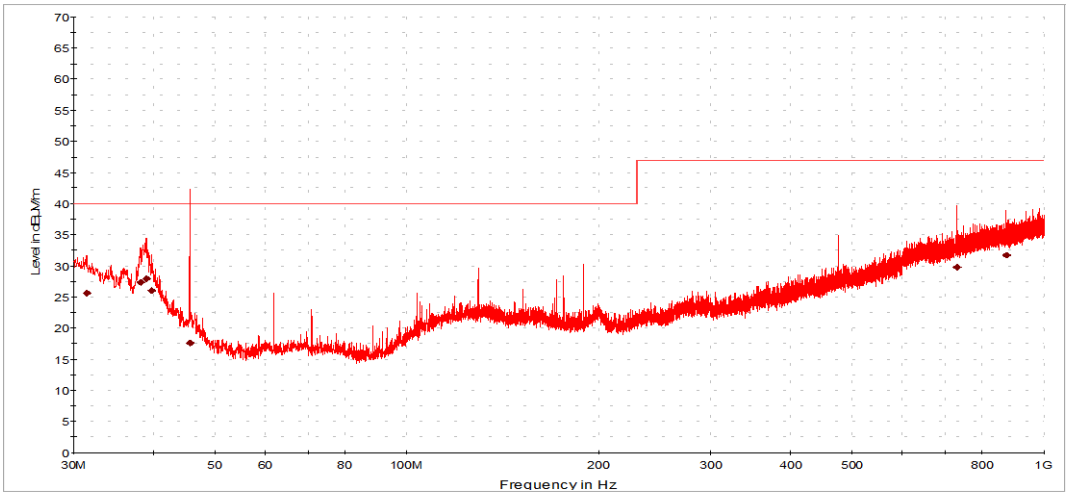


Graph 1

EMC Bayswater Pty. Ltd.

EN 55032 Radiated Emissions
Gallagher Group Ltd - eS1 Cellular - eShepherd Neckband
Vertical Antenna Polarisation – 30MHz to 1GHz

Job Number: E2401-1729-3 Rev1
Test Engineer: AZ

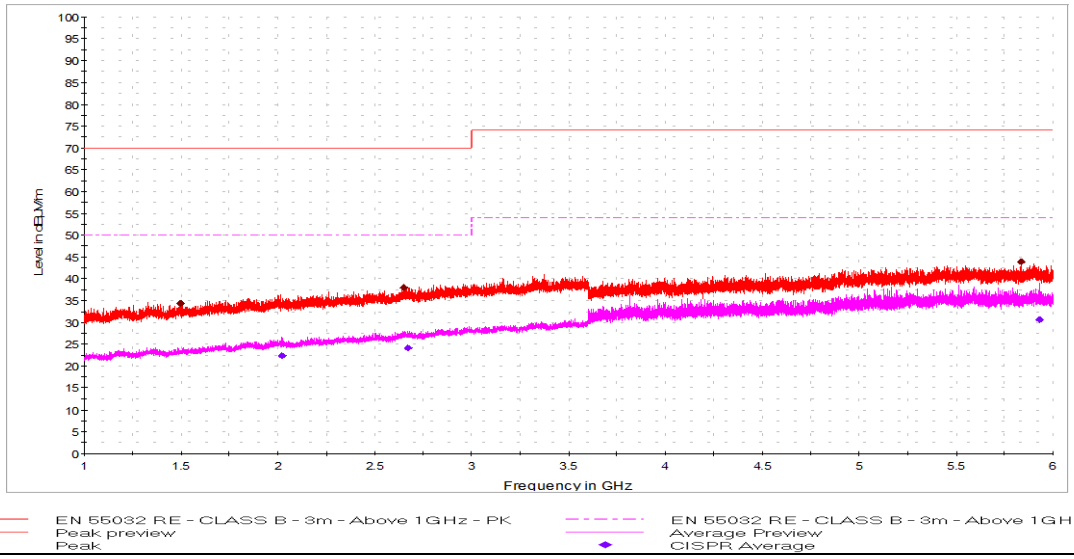


Graph 2

EMC Bayswater Pty Ltd

EN 55032 Radiated Emissions
Gallagher Group Ltd - eS1 Cellular - eShepherd Neckband
Horizontal Antenna Polarisation – 1GHz to 6GHz

Job Number: E2401-1729-3 Rev1
Test Engineer: AZ

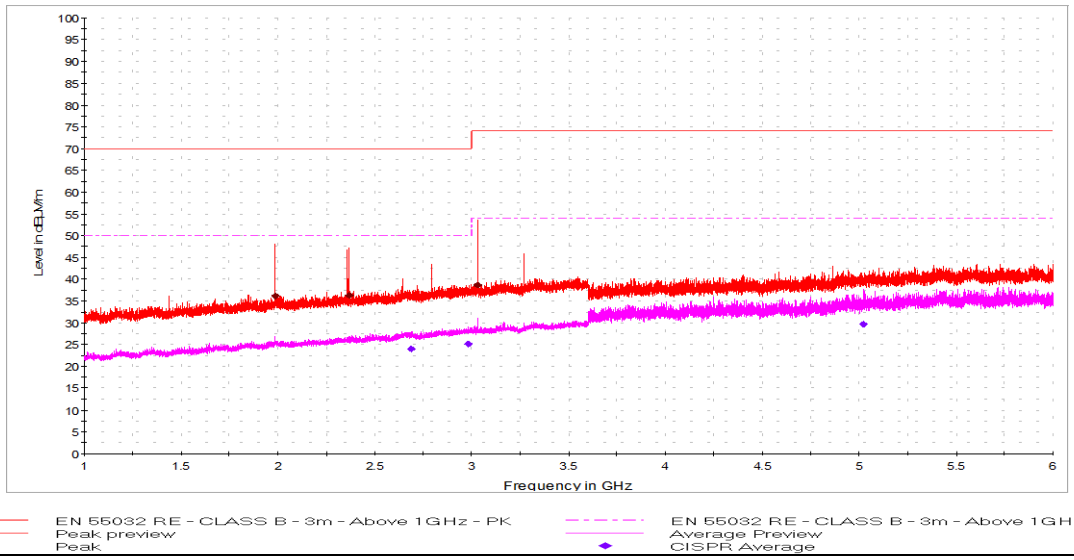


Graph 3

EMC Bayswater Pty Ltd

EN 55032 Radiated Emissions
Gallagher Group Ltd - eS1 Cellular - eShepherd Neckband
Vertical Antenna Polarisation – 1GHz to 6GHz

Job Number: E2401-1729-3 Rev1
Test Engineer: AZ



Graph 4

Appendix D – Customer Declaration of Product Variant

Docusign Envelope ID: 7D6D13A0-8B76-4E6D-BD91-BD5D6AE39A32

Gallagher Group Ltd
181 Kahikatea Drive
Hamilton 3206
New Zealand
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F +64 7 838 9801
www.gallagher.com
IRDN 024 824 357

Date: 12th February 2025

Declaration of Product Variations

We Gallagher Group Ltd
of 181 Kahikatea Drive, Melville, Hamilton 3206, New Zealand

hereby declare that:

Equipment eShepherd Neckband

Model number G04081

to be the worst case variant used for EMC testing of a product range consisting of other variants along with the justification declared in the table below. Gallagher Group Ltd accepts all responsibility for any adverse effects with respect to the EMC performance of the variant products listed in the table with regards to the performance observed whilst testing the declared worst case model.

Model tested	Variants models	Justification
G04081	G040811	G040811 uses different network provider SIM card in the product with exact same hardware as G04081

Signed by:
Hayden Goble
3F954F68E3A34C9...

Signed by: .....
Name: Hayden Goble
Position: Head of eShepherd
Date signed: 12th February 2025

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