

TEST REPORT

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Report No.: 25040695HKG-001

Balco Brands Pty Ltd.

**Application For Certification
(Original Grant)****FCC ID: 2BNW2-DY220514**

Transmitter - 433.92MHz Remote Device of Door/Window Sensor Alarm

Prepared and Checked by:**Approved by:**

Signed on File

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Assistant Manager
Date: May 29, 2025

TEST REPORT

GENERAL INFORMATION

Grantee:	Balco Brands Pty Ltd.
Grantee Address:	C/ Siemens Building, Ground Floor, 885 Mountain Hwy Bayswater, VIC 3153, Australia.
Brand Name:	EASY HOME
Model:	DY220514
Type of EUT:	Transmitter
Description of EUT:	DOOR & WINDOW ALARM REMOTE
FCC ID:	2BNW2-DY220514
Date of Sample Submitted:	April 18, 2025
Date of Test:	April 18, 2025 to April 22, 2025
Report No.:	25040695HKG-001
Report Date:	May 29, 2025
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

TEST REPORT**SUMMARY OF TEST RESULT**

Test Specification	Reference	Results
Transmitter Power Line Conducted Emissions	15.207	Not Applicable
Radiated Emission	15.231, 15.209	Complied
Timing		
Bandwidth		
Radiated Emission in Restricted Bands	15.205	Complied

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2023 Edition

Note:

1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT), is a 433.92MHz Transmitter for a Remote Device of Door/Window Sensor Alarm. The sample supplied operated on a single channel, 433.92MHz. The EUT is powered by 1 x 3.0V CR2032 Lithium Cell.

Antenna Type: Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is a single application for certification of a transmitter.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

1.4 Test Facility

The 3m Chamber used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been placed on file with the FCC.

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2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The device was powered by DC 3.0V (1 x 3.0V CR2032 Lithium Cell).

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044.

2.5 Support Equipment List and Description

Not Applicable

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3.0 EMISSION RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

AG = Amplifier Gain in dB

AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain.

An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RR = $RA - AG - AV$ in $\text{dB}\mu\text{V}$

LF = $CF + AF$ in dB

Assume a receiver reading of 52.0 $\text{dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29.0 dB and average factor of 5.0 dB are subtracted, giving a field strength of 27.0 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

RA = 52.0 $\text{dB}\mu\text{V}/\text{m}$

AF = 7.4 dB

RR = 18.0 $\text{dB}\mu\text{V}$

CF = 1.6 dB

LF = 9.0 dB

AG = 29.0 dB

AV = 5.0 dB

FS = $RR + LF$

FS = $18 + 9 = 27 \text{ dB}\mu\text{V}/\text{m}$

Level in $\mu\text{V}/\text{m}$ = Common Antilogarithm $[(27 \text{ dB}\mu\text{V}/\text{m})/20] = 22.4 \mu\text{V}/\text{m}$

TEST REPORT**3.2 Radiated Emission Configuration Photograph**

The worst case in radiated emission was found at 433.92 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 0.9 dB

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RADIATED EMISSIONS

Model: DY220514
 Date of Test: April 18, 2025
 Worst-Case Operating Mode: Transmitting

Table 1
Pursuant to FCC Part 15 Section 15.231 Requirement

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	433.920	80.5	16	15.4	79.9	80.8	-0.9
V	867.840	31.9	16	31.0	46.9	60.8	-13.9
V	1301.760	55.8	33	26.1	48.9	54.0	-5.1
H	1735.680	57.5	33	27.2	51.7	60.8	-9.1
V	2169.600	55.3	33	29.4	51.7	60.8	-9.1
V	2603.520	46.1	33	30.4	43.5	60.8	-17.3
V	3037.440	45.0	33	31.9	43.9	60.8	-16.9
H	3471.360	45.2	33	31.9	44.1	60.8	-16.7
V	3905.280	47.6	33	33.3	47.9	54.0	-6.1
V	4339.200	46.9	33	34.8	48.7	54.0	-5.3
H	4773.120	44.4	33	34.9	46.3	54.0	-7.7

NOTES:

1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emissions above 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ± 5.3 dB at a level of confidence of 95%.

TEST REPORT**RADIATED EMISSIONS**

Model: DY220514
Date of Test: April 18, 2025
Worst-Case Operating Mode: Transmitting

Table 2

Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	123.726	20.3	16	14.0	18.3	43.5	-25.2
H	216.968	16.9	16	17.0	17.9	46.0	-28.1
V	325.486	25.0	16	24.0	33.0	46.0	-13.0
V	420.425	21.6	16	25.0	30.6	46.0	-15.4
V	447.464	14.3	16	26.0	24.3	46.0	-21.7
H	681.719	14.1	16	29.0	27.1	46.0	-18.9

Notes: 1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. Measurement Uncertainty is ± 5.3 dB at a level of confidence of 95%.

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4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 PRODUCT LABELLING

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 INSTRUCTION MANUAL

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

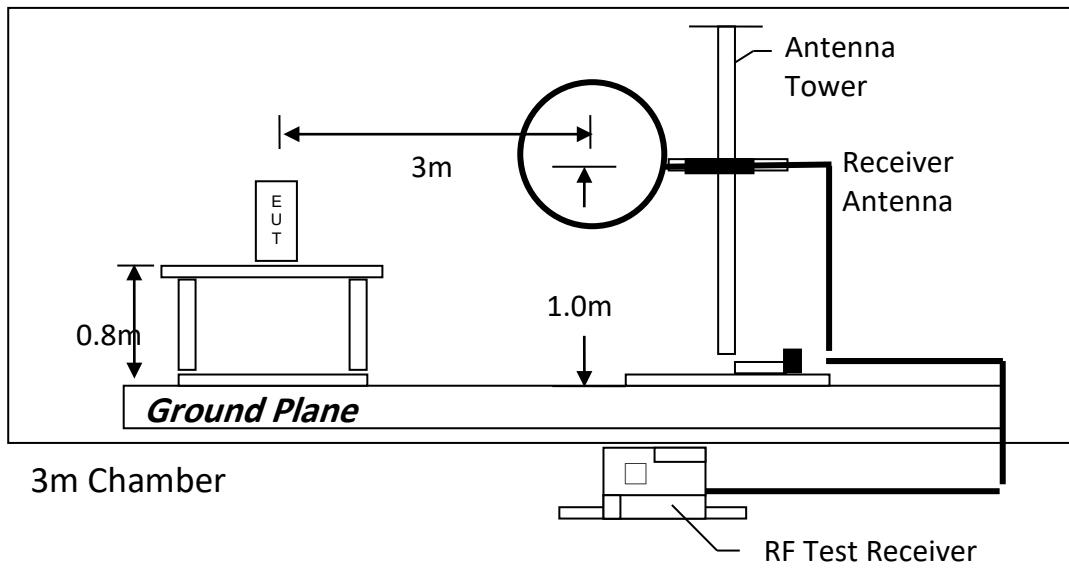
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

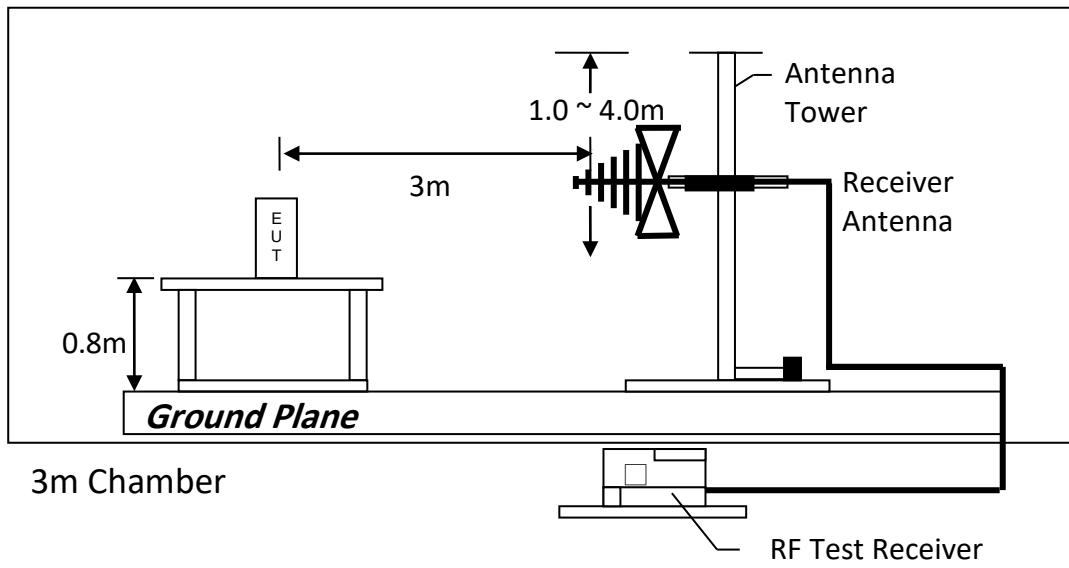
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8.1.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



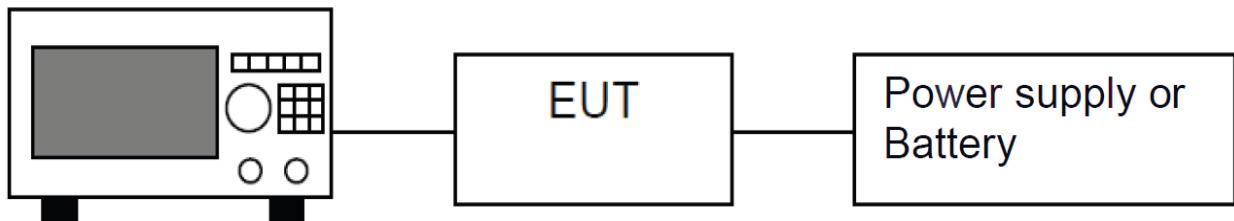
Test setup of radiated emissions up to 30MHz



Test setup of radiated emissions up to 1GHz

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8.2 Measured Bandwidth



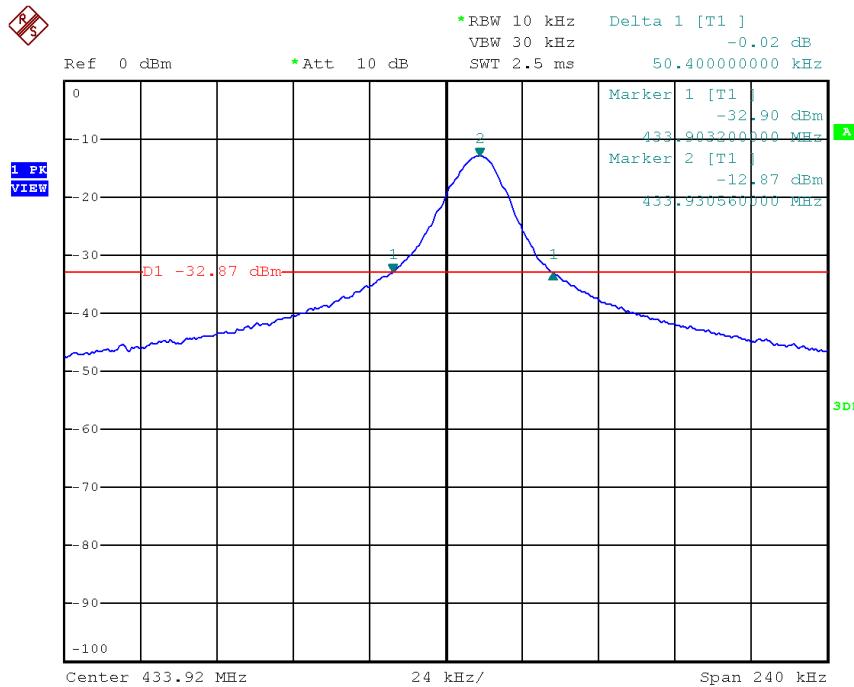
Spectrum Analyzer

Block diagram of Test setup

Occupied Bandwidth Results:

Frequency (MHz)	20dB Bandwidth (kHz)
433.92MHz	50.40

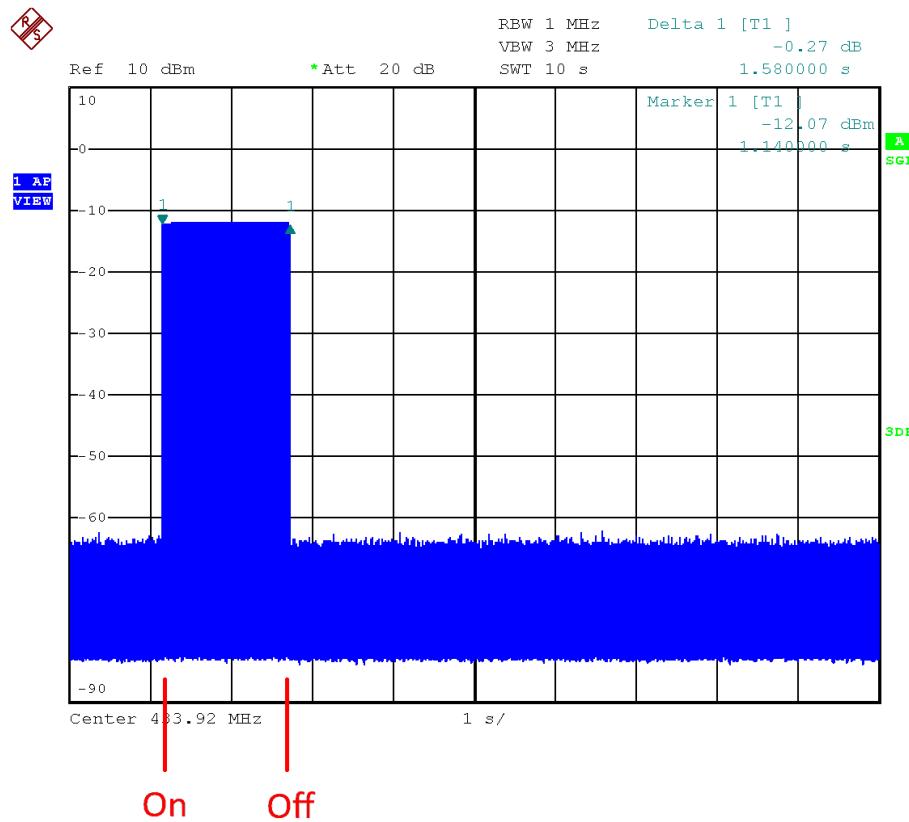
The worst case is shown as below



The plot shows the fundamental emission when modulated. From the plot, the bandwidth is observed to be 50.4kHz, at 20dBm where the bandwidth limit is 1084.8kHz. Therefore, the EUT meets the requirement of FCC Part 15 Section 15.231(c).

TEST REPORT**8.3 5-Second Transmission Requirement**

Pursuant to FCC Part 15 Section 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. The EUT meets the requirement. The 5-second transmission requirement is shown as below.



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9 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver (9kHz to 26.5GHz)	Biconical Antenna (30MHz to 300MHz)	Log Periodic Antenna
Registration No.	EW-3156	EW-3242	EW-3243
Manufacturer	ROHDE SCHWARZ	EMCO	EMCO
Model No.	ESR26	3110C	3148B
Calibration Date	January 31, 2024	July 30, 2024	July 30, 2024
Calibration Due Date	May 01, 2025	July 30, 2026	July 30, 2026

Equipment	Double Ridged Guide Antenna (1GHz - 18GHz)	Active Loop Antenna (H-field) (9kHz to 30MHz)	RF Preamplifier (9kHz to 6000MHz)
Registration No.	EW-0194	EW-3326	EW-3006b
Manufacturer	EMCO	EMCO	SCHWARZBECK
Model No.	3115	6502	BBV9718
Calibration Date	May 10, 2023	January 05, 2024	October 20, 2023
Calibration Due Date	May 10, 2025	July 05, 2025	April 20, 2025

Equipment	14m Double Shield RF Cable (9kHz - 6GHz)	RF Cable 14m (1GHz to 26.5GHz)	12 metre RF Cable (1-40)GHz
Registration No.	EW-2376	EW-2781	EW-2774
Manufacturer	RADIALL	GREATBILLION	GREATBILLION
Model No.	n m/br56/bnc m 14m	SMA m/SHF5MPU /SMA m ra14m,26G	SMA m-m ra 12m 40G outdoor
Calibration Date	September 19, 2023	January 16, 2024	January 16, 2024
Calibration Due Date	June 19, 2025	July 16, 2025	July 16, 2025

Equipment	Pyramidal Horn Antenna
Registration No.	EW-0905
Manufacturer	EMCO
Model No.	3160-09
Calibration Date	December 15, 2023
Calibration Due Date	June 15, 2025

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2) 5-Second Transmission Requirement & 20dB Bandwidth Measurement

Equipment	EMI Test Receiver (9kHz to 26.5GHz)
Registration No.	EW-3156
Manufacturer	ROHDE SCHWARZ
Model No.	ESR26
Calibration Date	January 31, 2024
Calibration Due Date	May 01, 2025

3) Control Software for Radiated Emission

Software Information	
Software Name	EMC32
Manufacturer	ROHDE SCHWARZ
Software version	10.50.40

END OF TEST REPORT