



Global Product Certification  
EMC-EMF Safety Approvals

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## RADIO REPORT FOR CERTIFICATION



### 47 CFR PART 15 SUBPART C

**CLIENT:** GALLAGHER GROUP LTD.  
**DEVICE UNDER TEST / PMN:** WEIGH SCALE AND READER  
**MODEL NUMBER / HVIN:** TWR5  
**FCC ID:** M5VG02606

**REPORT NUMBER:** M171220-1aR1  
(Replacement for report number M171220-1a)  
**DATE OF ISSUE:** 31 August 2018



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## RADIO REPORT CERTIFICATE OF COMPLIANCE


**Device under Test / PMN:** Weigh Scale and Reader  
**Model Number / HVIN:** TWR5  
**Manufacturer:** Gallagher Group Ltd.

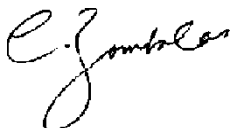
**Tested for:** Gallagher Group Ltd.  
**Address:** 181 Kahikatea Drive, Melville, Hamilton, 3026, New Zealand  
**Phone:** +64 7 838 9800  
**Contact:** Menardo Lazaro  
**Email:** menardo.lazaro@gallagher.com

**Standards:** **47 CFR Part 15 – Radio Frequency Devices**  
**Subpart C – Intentional Radiators**

**Test Dates:** 8 January to 21 February 2018  
**Issue Date:** 31 August 2018  
**Issued by:** **EMC TECHNOLOGIES PTY. LTD.,**  
176 Harrick Road, Keilor Park, VIC 3042, Australia.  
Phone: +61 3 9365 1000, Web: www.emctech.com.au

**Attestation:** *I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing*

**Test Officer:**   
**William Alam**

**Authorised Signatory:**   
**Chris Zombolas**  
**Technical Director**  
**EMC Technologies Pty Ltd**

**RADIO REPORT FOR CERTIFICATION  
to  
47 CFR Part 15 Subpart C**

**1.0 INTRODUCTION**

Radio tests were performed on the TWR5 Weigh Scale and Reader in accordance with the applicable requirements of 47 CFR, Part 15 Subpart C for a transmitter operating at 134 kHz.

**1.1 Test Procedure**

Radio measurements were performed in accordance with the appropriate procedures of ANSI C63.10: 2013.

The measurement instrumentation conformed to the requirements of ANSI C63.2: 2009.

**1.2 Summary of 47 CFR Part 15 Subpart C Results**

FCC	Test Performed	Results
15.203	Antenna requirement	Complied
15.205	Restricted bands of operation	Complied
15.207	Conducted limits	Complied
15.209	Radiated emissions limits; general requirements	Complied
2.1049	Occupied Bandwidth	163 Hz

## 2.0 GENERAL INFORMATION

(Information supplied by the Client)

### 2.1 Equipment Under Test (EUT) - Transmitter Details

Radio:	RFID
Frequency Band:	134.0 kHz
Frequency Range:	134.0 kHz
Modulation:	AM
Emission Designator:	K1D
Antenna type and gain:	Type 1: 600 x 400 mm Small Panel, inductive loop Type 2: 1300 x 600 mm Large Panel, inductive loop

### 2.2 EUT - Host Details

Device under Test / PMN:	Weigh Scale and Reader
Model Number / HVIN:	TWR5
Serial Number:	1745175111
Manufacturer:	Gallagher Group Ltd
Power Supply:	12 VDC via power supply
Highest Frequency:	600 MHz

### 2.3 Test Configuration

Testing was performed with the RFID set to continuously transmit a modulated signal.

### 2.4 Modifications by EMC Technologies

No modifications were performed.

## 2.5 Test Facility

### 2.5.1 General

EMC Technologies Pty Ltd has also been accredited as a Conformity Assessment Body (CAB) by Australian Communications and Media Authority (ACMA) under the APECTEL MRA and is designated to perform compliance testing on equipment subject to Declaration of Conformity (DoC) and Certification under Parts 15 and 18 of the FCC Commission's rules – **Registration Number 494713 & Designation number AU0001.**

EMC Technologies indoor open area test site (iOATS) have been accepted by Industry Canada for the performance of radiated measurements in accordance with RSS-Gen, Issue 8 - **Industry Canada iOATS number - IC 3569B**


Measurements in this report were performed at EMC Technologies' laboratory in Keilor Park, Victoria Australia.

### 2.5.2 NATA Accreditation

EMC Technologies is accredited in Australia by the National Association of Testing Authorities (NATA). All testing in this report has been conducted in accordance with EMC Technologies' scope of NATA accreditation.

NATA is the Australian National laboratory accreditation body and has accredited EMC Technologies to IEC/ISO17025. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires documented test procedures, continued calibration of measurement equipment, traceable to the National Standard at the National Measurements Institute (NMI) and an internal quality system to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A<sup>2</sup>LA).

The current full scope of accreditation can be found on the NATA website: [www.nata.com.au](http://www.nata.com.au)

 The table contains two logos side-by-side. On the left is the ILAC-MRA logo, which consists of a circular emblem with radiating lines and the text "ilac-MRA" below it. On the right is the NATA logo, which is a stylized orange diamond shape with the text "NATA" in blue below it. Below the NATA logo is the text "Accreditation No.5292". Accreditation No.5292	<p>Accredited for compliance with ISO/IEC 17025 - Testing.</p> <p>The results of tests, calibration and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.</p> <p><b>This document shall not be reproduced except in full, with the exception of the Certificate of Compliance on Page 3</b></p>
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## 2.6 Test Equipment Calibration

Measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Agilent Technologies (Australia) Pty Ltd or the National Measurement Institute (NMI) or in-house. All equipment calibration is traceable to Australian national standards at the National Measurements Institute.

Equipment Type	Make/Model/Serial Number	Last Cal. dd/mm/yyyy	Due Date dd/mm/yyyy	Cal. Interval
Chamber	Frankonia SAC-10-2 (R-139)	22/03/2017	22/03/2018	1 Year, *1
EMI Receiver	R&S ESW26, 2 Hz – 26.5 GHz Sn: 101306 (R-143)	31/03/2017	31/03/2018	1 Year, *2
	R&S ESCI, 9kHz – 3GHz Sn: 100011 (R-028)	13/06/2017	13/06/2018	1 Year, *2
Antennas	EMCO 6502 Active Loop 9 kHz – 30 MHz Sn. 9311-2801 (A-231)	20/07/2015	20/07/2018	3 Year, *2
	SUNOL JB6 Biconilog 30 – 6000 MHz Sn. A012312 (A-363)	26/05/2016	26/05/2018	2 Year, *2
	EMCO 3115 Double Ridge Horn 1 – 18 GHz Sn: 8908-3282 (A-004)	15/07/2016	15/07/2019	3 Year, *1
Cables	Room 12 inbuilt cable Panel 1 to 10 m (C-422)	31/05/2017	31/05/2018	1 Year, *1
	Room 12 inbuilt cable Panel 1 to 3 m (C-421)	31/05/2017	31/05/2018	1 Year, *1
	Room 12 Antenna cable (C-437)	31/05/2017	31/05/2018	1 Year, *1
	Sucoflex 104 Huber & Suhner 18 GHz, 5 m cable (C-337)	31/05/2017	31/05/2018	1 Year, *1
	BNC cable 4 m (C-399)	04/01/2018	04/01/2019	1 Year, *1
	N-type Cable 30m (C-219)	25/10/2017	25/10/2018	1 Year, *1
LISN	EMCO 3810/2NM LISN Sn: 9607-1505 (L-019)	05/01/2017	05/01/2019	2 Year, *1
Limiter	Hewlett Packard 11947A Limiter Transient Sn: 3107A02888 (L-017)	18/07/2017	18/07/2018	1 Year, *1

Note \*1. Internal NATA calibration.

Note \*2. External NATA / A2LA calibration



### 3.0 TEST RESULTS

#### 3.1 §15.203 Antenna Requirement

The connector for the antenna was a unique type ensuring that only the intended antennas could be used.



#### 3.2 §15.207 Conducted Limits

##### 3.2.1 Test Procedure

The arrangement specified in ANSI C63.10: 2013 was adhered to for the conducted EMI measurements. The EUT was placed in the RF screened enclosure and a CISPR EMI Receiver as defined in ANSI C63.2: 2009 was used to perform the measurements.

The EMI Receiver was operated under program control using the Max-Hold function and automatic frequency scanning, measurement and data logging techniques. The specified 0.15 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured.

##### 3.2.2 Peak Maximising Procedure

The various operating modes of the system were investigated. For each of the sub-ranges, the EMI receiver was set to continuous scan with the Peak detector set to Max-Hold mode. The Quasi-Peak detector and the Average detector were then invoked to measure the actual Quasi-Peak and Average level of the most significant peaks, which were detected.

##### 3.2.3 Calculation of Voltage Levels

The voltage levels were automatically measured in software and compared to the test limit. The method of calculation was as follows:

$$V_{EMI} = V_{RX} + L$$

Where:  $V_{EMI}$  = The Measured EMI voltage in dBμV to be compared to the limit.

$V_{RX}$  = The Voltage in dBμV read directly at the EMI receiver.

$L$  = The insertion loss in dB of the LISN, cables and transient Limiter.

##### 3.2.4 Plotting of Conducted Emission Measurement Data

The measurement data pertaining to each frequency sub-range were concatenated to form a single graph of (peak) amplitude versus frequency. This was performed for both Active and Neutral lines and the composite graph was subsequently plotted. A list of the highest relevant peaks and the respective Quasi-Peak and Average values were also plotted on the graph.

##### 3.2.5 Test Climatic Conditions

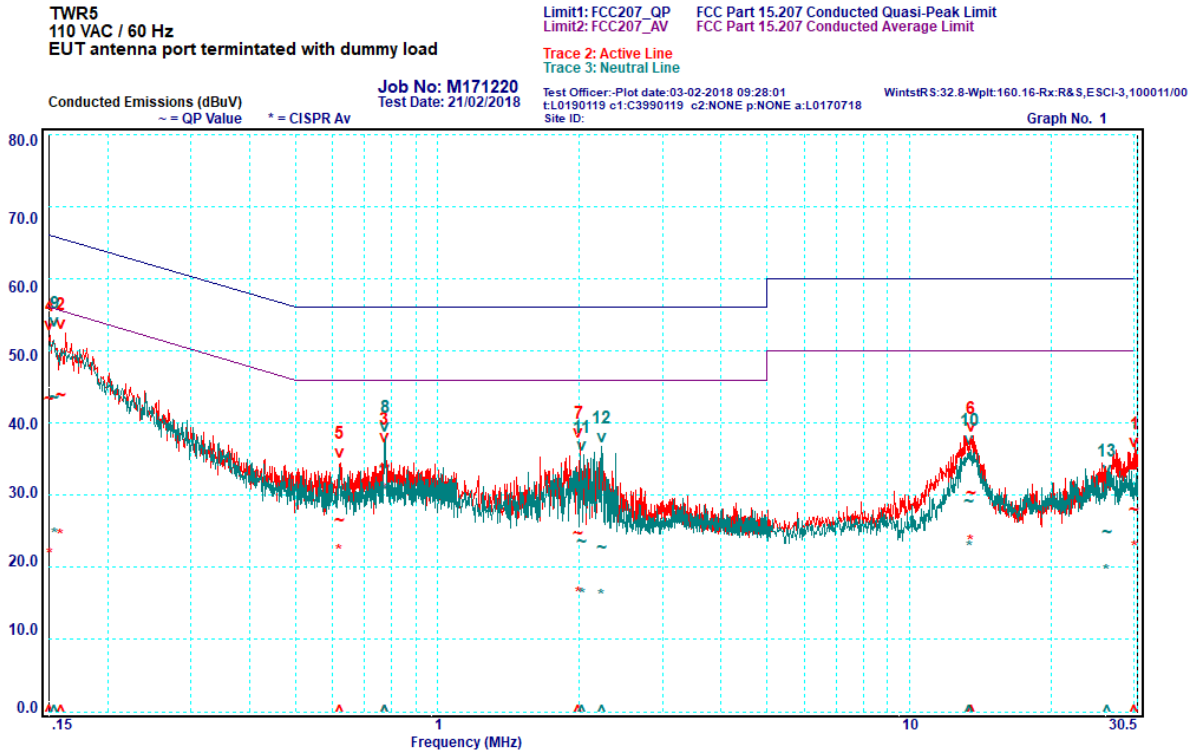
Shielded Room Temperature: 23°C

Relative Humidity: 52%



### 3.2.6 Conclusion

The sample complied with the applicable spurious emissions of §15.207. Refer to the following graphs for the results.



Peak	Frequency [MHz]	Line	Quasi-Peak			Average		
			Level [dBμV]	Limit [dBμV]	Margin [±dB]	Level [dBμV]	Limit [dBμV]	Margin [±dB]
1	0.160	Active	43.8	65.5	-21.7	24.3	55.5	-31.2
2	0.774	Active	34.0	56	-22.0	30.7	46	-15.3
3	0.151	Active	43.2	66	-22.8	21.7	56	-34.3
4	0.622	Active	26.4	56	-29.6	22.2	46	-23.8
5	13.56	Active	30.2	60	-29.8	23.5	50	-26.5
6	1.994	Active	24.7	56	-31.3	16.3	46	-29.7
7	0.775	Active	33.9	56	-22.1	30.4	46	-15.6
8	0.155	Neutral	43.5	65.7	-22.2	24.4	55.7	-31.3
9	13.45	Neutral	29.1	60	-30.9	22.7	50	-27.3
10	2.032	Neutral	23.4	56	-32.6	16.1	46	-29.9
11	2.231	Neutral	22.6	56	-33.4	15.9	46	-30.1
12	26.27	Neutral	24.9	60	-35.1	19.4	50	-30.6

### 3.4 §15.205 Restricted Bands of Operation

The restricted band limits were applied across the applicable spectrum and therefore complied with the restricted band requirements.

### 3.5 §15.209 Radiated emission limits; general requirements

#### 3.5.1 Fundamental emission

Testing was performed in an open test site at a distance of 10 and 30 metres. Different configurations of EUT and antenna polarization were investigated to produce highest emission EIRP and the EUT was set to transmit in continuous transmission mode.

##### Antenna Type 1 Results:

Freq. (kHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Distance (metres)
134.0	104.2	85.0	19.2	10
134.0	78.4	65.0	13.4	30
134.0	24.3	25.0	-0.7	300

Freq. (kHz)	Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Distance (metres)
134.0	111.0	105.0	6.0	10
134.0	85.7	85.0	0.7	30
134.0	31.1	45.0	-13.9	300

##### Antenna Type 2 Results:

Freq. (kHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Distance (metres)
134.0	103.9	85.0	18.9	10
134.0	78.8	65.0	13.8	30
134.0	24.3	25.0	-0.7	300

Freq. (kHz)	Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Distance (metres)
134.0	110.6	105.0	5.6	10
134.0	85.9	85.0	0.9	30
134.0	31.1	45.0	-14.3	300

Calculation of extrapolation factor from measurement made at two distances:

10 m to 30 m rolloff = 25.6 dB

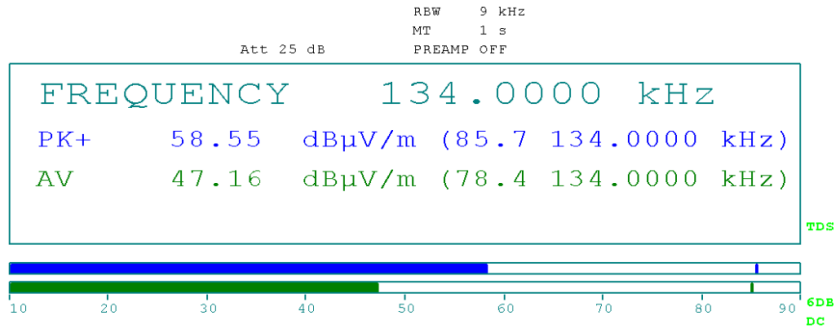
10 m to 30 m = 0.477 decade

10 m to 300 m = 1.477 decade

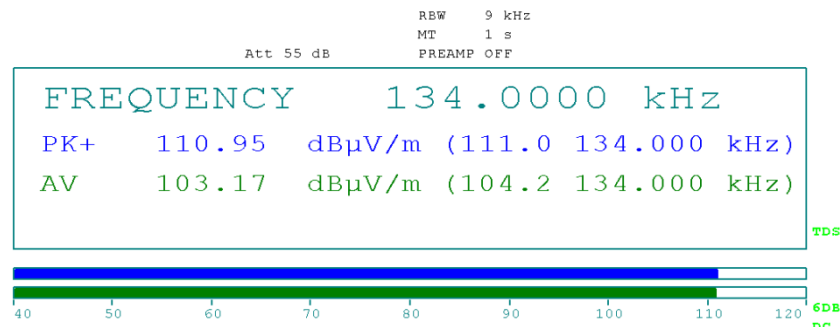
Extrapolation factor = 53.67 dB/decade

10m to 300m correction factor = 53.67 dB/decade x 1.477 decade = 79.27 dB

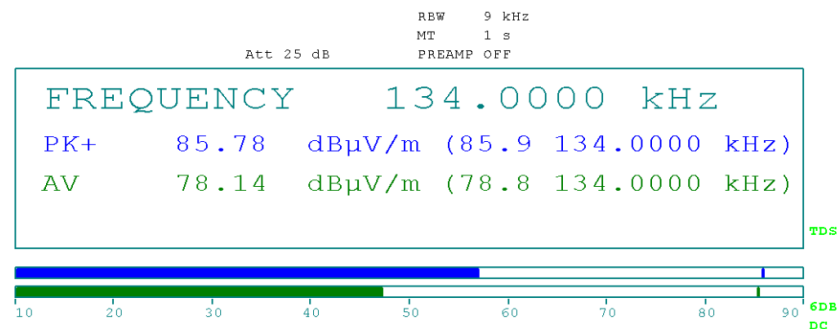
Add 79.27 dB to convert 10 m measurement value to 300 m measurement value.



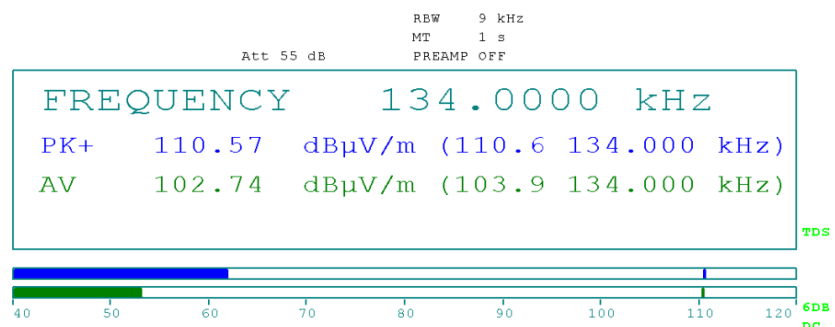
Antenna Type 1 30 metre measurement



Antenna Type 1 10 metre measurement



Antenna Type 2 30 metre measurement



Antenna Type 2 10 metre measurement



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### 3.5.2 Radiated Spurious Measurements

Radiated spurious emission measurements were performed in a semi-anechoic chamber compliant with ANSI C63.4: 2014.

The test frequency range was sub-divided into smaller bands with sufficient frequency resolution to permit reliable display and identification of emissions.

Frequency range [MHz]	Measurement Bandwidth [kHz]	Measurement Distance [m]	Antenna
0.009 to 0.150	0.2	10	0.6 metre loop antenna
0.150 to 30	9	10	
30 to 1000	120	10	Biconilog hybrid
1000 to 18 000	1000	3	Standard gain or broad band horns
18 000 to 40 000	1000	1	

The sample was slowly rotated with the spectrum analyser set to Max-Hold. This was performed for at least two antenna heights. When an emission was located, it was positively identified and its maximum level found by rotating the automated turntable and by varying the antenna height. Devices design for a fixed position were tested in that position, portable devices were tested in three orthogonal orientations.

The measurement data for each frequency range was corrected for cable losses, antenna factors and preamplifier gain. This process was performed for both horizontal and vertical antenna polarisations.

#### Calculation of field strength

The field strength was calculated automatically by the software using the pre-stored calibration data. The method of calculation is shown below:

$$E = V + AF - G + L$$

Where: E = Radiated Field Strength in dBμV/m.

V = EMI Receiver Voltage in dBμV/m.

AF = Antenna Factor in dB. (stored as a data array)

G = Preamplifier Gain in dB. (stored as a data array)

L = Cable loss in dB. (stored as a data array of Insertion Loss versus frequency)

#### Field strength conversion over distance

To convert a limit given at a certain distance to a limit at the measurement distance or vice-versa the following equation was applied:

$$E_x = 20 \times \log \left( \frac{d_y \times 10^{E_y/20}}{d_x} \right)$$

Where: E<sub>x</sub> = Electric field at x metres (dBμV/m)

E<sub>y</sub> = Electric field at y metres (dBμV/m)

d<sub>x</sub> = Measurement distance of x metres

d<sub>y</sub> = Measurement distance of y metres

### 3.5.3 Spurious Emission Limit

The EUT emissions were subjected to 15.209 limits over the 9 kHz to 30 MHz range and 15.109 Class A limit over the 30 MHz to 6 GHz range pursuant to 15.31(k) as the device was considered a Class A unintentional radiator.

### 3.5.4 Radiated Spurious Emission Results

#### Frequency Band: 9 kHz - 30 MHz

Measurements were made at a distance of 10 metres. The measurement of emissions between 9 kHz – 150 kHz were made with a resolution bandwidth (RBW) of 200 Hz and the video bandwidth (VBW) of 3 kHz, 150 kHz – 30 MHz were measured with the resolution bandwidth (RBW) of 9 kHz and the video bandwidth (VBW) of 30 kHz. Measurements were made with the loop antenna oriented perpendicular, parallel and ground-parallel with respect to the sample.

Limit 15.209 was applied over the full range, 9 kHz to 30 MHz.

Antenna Type 1: 600 x 400mm (9kHz – 30MHz)					
Frequency MHz	Polarisation	Measured Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin $\pm$ dB	Detector
0.536	Parallel	48.0	52.1	-4.1	QP
0.671	Parallel	45.3	50.2	-4.9	QP
0.401	Parallel	63.4	74.6	-11.2	AV
21.4	Ground - Parallel	20.7	39.5	-18.8	QP
0.403	Ground - Parallel	47.4	74.6	-27.2	AV
0.538	Perpendicular	44.7	52.1	-7.4	QP
0.669	Perpendicular	41.6	50.2	-8.6	QP
0.403	Perpendicular	58.9	74.6	-15.7	AV

Antenna Type 2: 1300 x 600mm (9kHz – 30MHz)					
Frequency MHz	Polarisation	Measured Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin $\pm$ dB	Detector
0.942	Perpendicular	46.3	47.2	-0.9	QP
0.538	Perpendicular	50.2	52.1	-1.9	QP
0.672	Perpendicular	47.5	50.2	-2.7	QP
1.075	Perpendicular	34.7	46.1	-11.4	QP
22.01	Perpendicular	25.7	39.5	-13.8	QP
0.403	Perpendicular	60.6	74.6	-14.0	AV
22.42	Perpendicular	24.8	39.5	-14.7	QP
0.268	Perpendicular	57.3	78.1	-20.8	AV
0.939	Parallel	43.1	47.3	-4.2	QP
0.671	Parallel	44.3	50.2	-5.9	QP
0.539	Parallel	45.9	52.1	-6.2	QP
1.075	Parallel	34.6	46.1	-11.5	QP
21.4	Parallel	24.9	39.5	-14.6	QP
0.403	Parallel	55.3	74.6	-19.3	AV
22.42	Ground-Parallel	29.0	39.5	-10.5	QP
0.521	Ground-Parallel	41.8	52.4	-10.6	QP
0.93	Ground-Parallel	36.2	47.3	-11.1	QP
0.403	Ground-Parallel	44.7	74.6	-29.9	AV

Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
9kHz - 30MHz Parallel

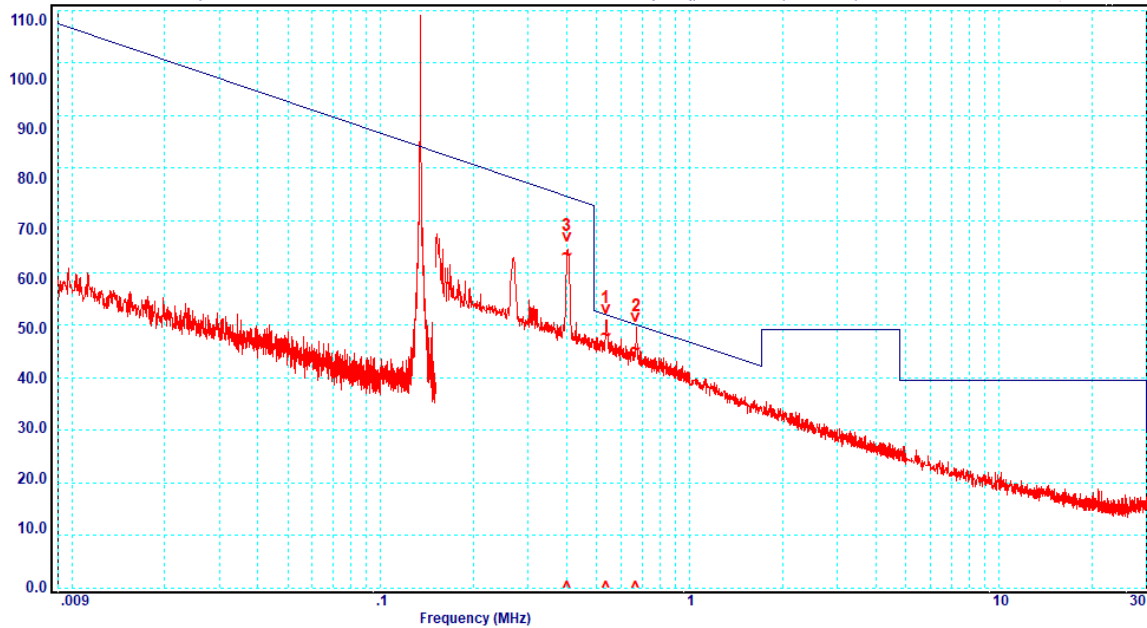
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 25/01/2018

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)

Trace 2: Parallel

Test Officer: William Alam-Plot date: 03-02-2018 10:33:04 WintstRS: 32.8-Wpl: 160.16-Rx: R&S,ESW-26,1328.4100  
tA3100820E c1: C4220518 c2: C4370518 p: NONE a: NONE  
Site ID: Room#12(IOT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 1 – 9kHz to 30MHz Parallel

Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
9kHz - 30MHz Ground\_Parallel

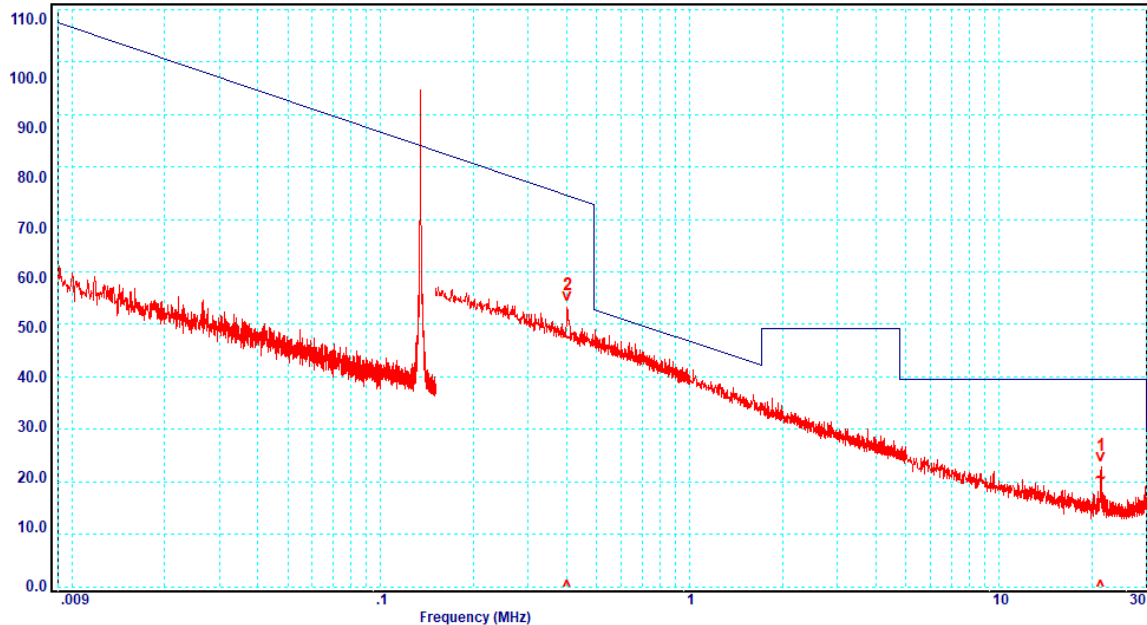
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 25/01/2018

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)

Trace 2: EUT on

Test Officer: William Alam-Plot date: 03-02-2018 10:47:13 WintstRS: 32.8-Wpl: 160.16-Rx: R&S,ESW-26,1328.4100  
tA3100820E c1: C4220518 c2: C4370518 p: NONE a: NONE  
Site ID: Room#12(IOT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 1 – 9kHz to 30MHz Perpendicular



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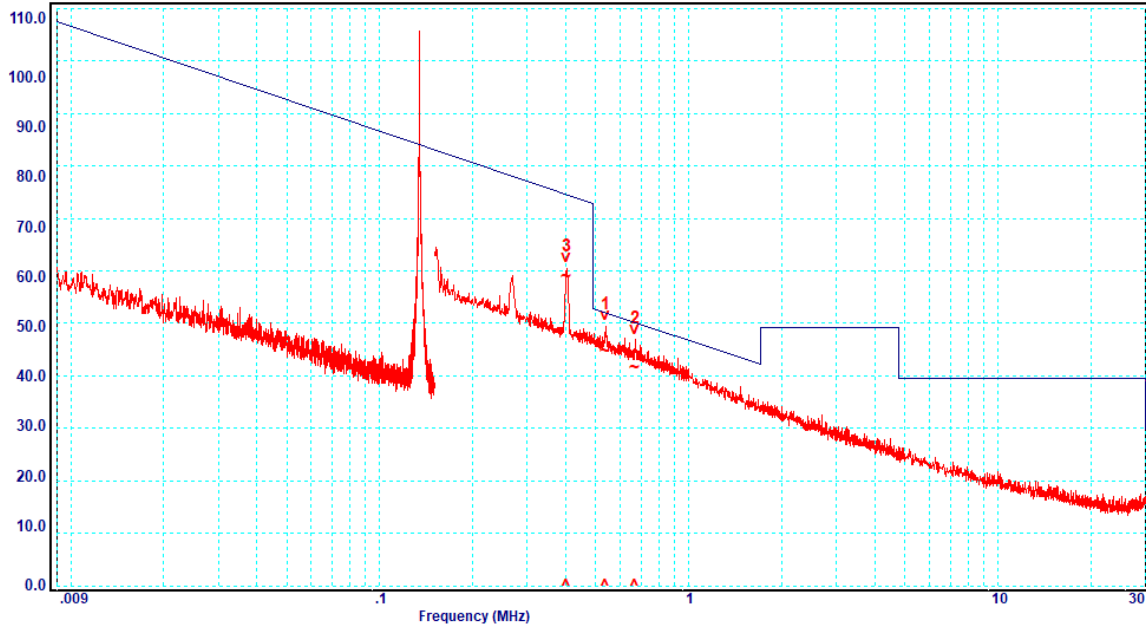
Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
9kHz - 30MHz Perpendicular

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 25/01/2018

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)  
Limit2: FCC-A10 FCC CLASS A 10M LIMITS  
Trace 2: EUT on

Test Officer: William Alam-Plot date: 03-02-2018 10:49:57 WintstRS:32.8-Wplt:160.16-Rx:R&S,ESW-26,1328.4100  
t:A3100820E c1:C4220518 c2:C4370518 p:NONE a:NONE  
Site ID: Room#12(IQAT5),176 Harrick Rd, Keilor Park,Vic



Antenna type 1 – 9kHz to 30MHz Ground-Parallel



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Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
9kHz-30MHz Perpendicular

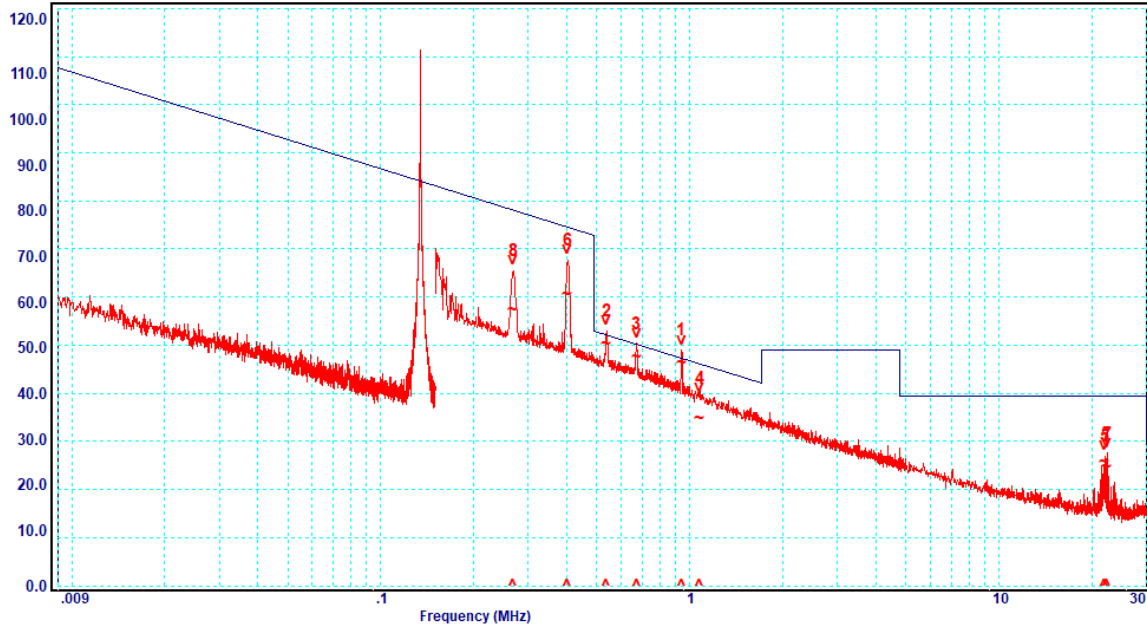
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)

Trace 2: EUT on

Test Officer: Matt Grimwood-Plot date: 03-02-2018 13:22:51 WintstRS: 32.8-Wpl: 160.16-Rx: R&S, ESR-7, 1316.3003K  
t: A3100820E c1: C4220518 c2: C4370518 p: NONE a: NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 2 – 9kHz to 30MHz Perpendicular

Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
9kHz-30MHz Parallel

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

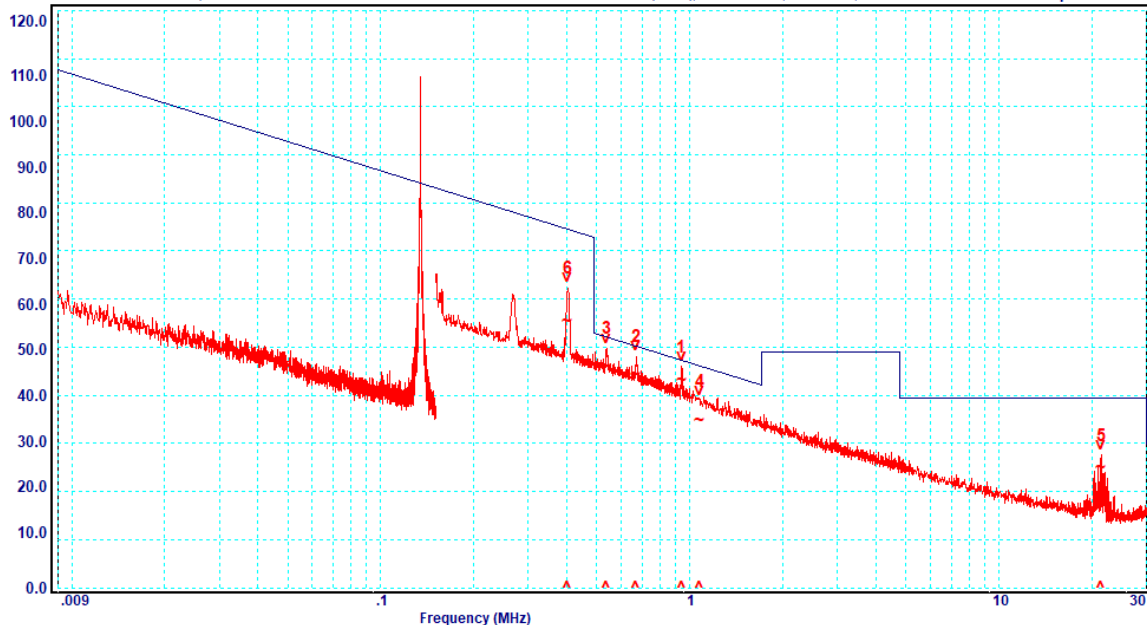
Job No: M171220  
Test Date: 12/01/2018

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)

Trace 2: EUT on

Test Officer: Matt Grimwood-Plot date: 03-02-2018 13:24:22 WintstRS: 32.8-Wpl: 160.16-Rx: R&S, ESR-7, 1316.3003K  
t: A3100820E c1: C4220518 c2: C4370518 p: NONE a: NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic

Graph No. 7



Antenna type 2 – 9kHz to 30MHz Parallel



Accreditation No.5292

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Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
9KHz - 30MHz Ground Parallel

Limit1: FCC15209-10 FCC 15.209 10m Limits (40dB/dec <4.76MHz< 20dB/dec)

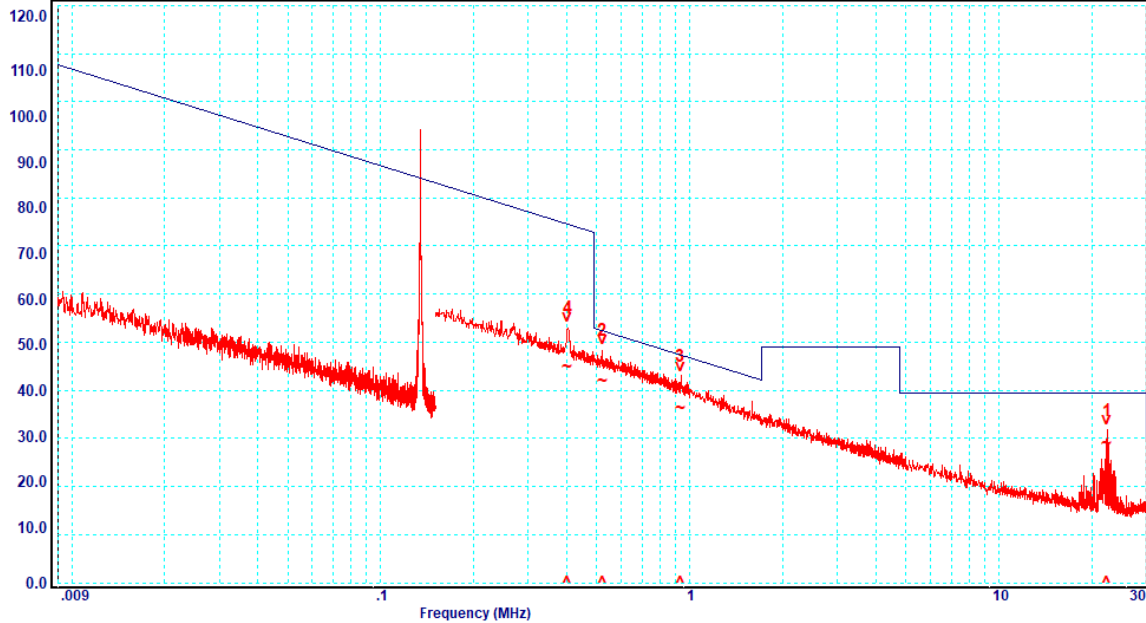
Trace 2: EUT on

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Test Officer: Matt Grimwood-Plot date: 03-02-2018 13:25:02 WintstRS:32.8-Wplt:160.16-Rx:R&S,ESR-7,1316.3003K  
t:A3100820E c1:C4220518 c2:C4370518 p:NONE a:NONE  
Site ID: Room#12(IOT5),176 Harrick Rd, Keilor Park,Vic

Graph No. 8



Antenna type 2 – 9kHz to 30MHz Ground-Parallel



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### Frequency Band: 30 - 1000 MHz

Measurements were made at a distance of 10 metres for antenna type 1 and 3 metres for antenna type 2. The measurements of emissions between 30 - 1000 MHz were made with a resolution bandwidth (RBW) of 120 kHz and the video bandwidth (VBW) of 300 kHz.

While digital emissions were evaluated according to 15.109 class A from 30-1000 MHz, transmitter related emissions were evaluated according to 15.209 up to 172 MHz i.e. the 10th harmonic of the highest frequency 17.1776 MHz used in the transmitter circuits. There were no emissions measured in relation to the transmitter circuits for Antenna type 1.

Antenna Type 2: 1300 x 600mm (30-1000MHz)				
Frequency MHz	Polarisation	Measured Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin $\pm$ dB
103.02	Horizontal	27.9	43.5	-15.6

The §15.109 Class A limits were applied for the digital emissions.

Antenna Type 1: 600 x 400mm (30-1000MHz)				
Frequency MHz	Polarisation	Measured Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin $\pm$ dB
100.98	Vertical	38.5	43.5	-5.0
115.51	Vertical	34.0	43.5	-9.5
639.42	Vertical	36.9	46.4	-9.5
107.26	Vertical	33.5	43.5	-10.0
168.29	Vertical	33.4	43.5	-10.1
437.46	Vertical	35.4	46.4	-11.0
168.29	Horizontal	31.6	43.5	-11.9
421.76	Horizontal	34.3	46.4	-12.1
90.77	Vertical	30.6	43.5	-12.9
229.26	Vertical	32.9	46.4	-13.5
50.87	Vertical	25.5	39.1	-13.6
773.67	Vertical	31.1	46.4	-15.3
100.95	Horizontal	28.2	43.5	-15.3
639.61	Horizontal	26.9	46.4	-19.5
224.81	Horizontal	26.7	46.4	-19.7
817.25	Horizontal	25.2	46.4	-21.2

Antenna Type 2: 1300 x 600mm (30-1000MHz)				
Frequency MHz	Polarisation	Measured Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin $\pm$ dB
316.80	Horizontal	45.5	56.9	-11.4
404.30	Horizontal	43.3	56.9	-13.6
100.95	Vertical	40.0	54.0	-14.0
315.15	Horizontal	42.1	56.9	-14.8
437.53	Vertical	42.1	56.9	-14.8
410.43	Horizontal	41.6	56.9	-15.3
437.41	Horizontal	41.6	56.9	-15.3
328.27	Horizontal	41.0	56.9	-15.9
706.39	Vertical	40.9	56.9	-16.0
453.82	Vertical	40.7	56.9	-16.2
100.94	Horizontal	37.3	54.0	-16.7
304.96	Horizontal	40.1	56.9	-16.8
90.87	Vertical	36.6	54.0	-17.4
115.68	Vertical	36.5	54.0	-17.5
639.25	Vertical	39.3	56.9	-17.6
168.26	Horizontal	36.2	54.0	-17.8
639.36	Horizontal	38.6	56.9	-18.3
285.85	Vertical	38.3	56.9	-18.6
279.72	Vertical	37.8	56.9	-19.1

806.22	Horizontal	36.5	56.9	-20.4
224.87	Vertical	35.8	56.9	-21.1
221.15	Vertical	35.6	56.9	-21.3
50.52	Vertical	27.6	49.6	-22.0
206.39	Horizontal	31.8	54.0	-22.2
195.68	Vertical	31.8	54.0	-22.2
105.62	Horizontal	31.6	54.0	-22.4
910.21	Vertical	30.1	56.9	-26.8
66.13	Vertical	21.8	49.6	-27.8

Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
30-1000MHz Vertical

Limit1: FCC-A10

FCC CLASS A 10M LIMITS

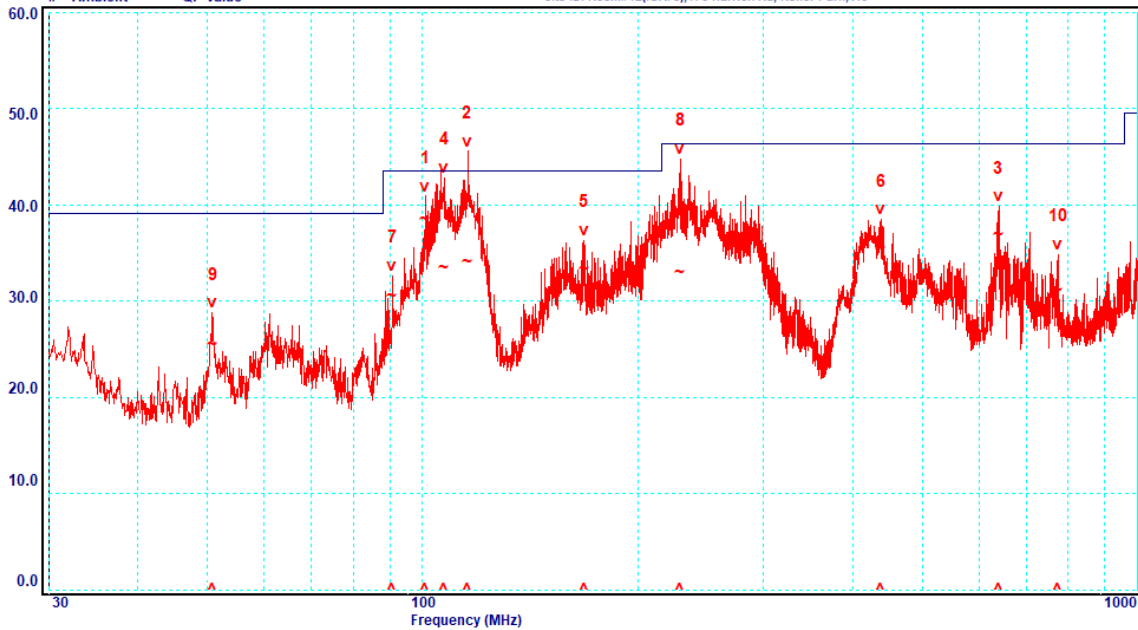
Trace 2: EUT on

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220

Test Date: 25/01/2018

Test Officer: William Alam-Plot date: 03-02-2018 13:28:40 WintstRS:32.8-Wplt:160.16-Rx:R&S,ESW-26,1328.4100  
t:A3630518 c1:C4370518 c2:C4220518 p:A0980818 a:NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 1 – 30MHz to 1000MHz Vertical

Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
30-1000MHz Horizontal

Limit1: FCC-A10

FCC CLASS A 10M LIMITS

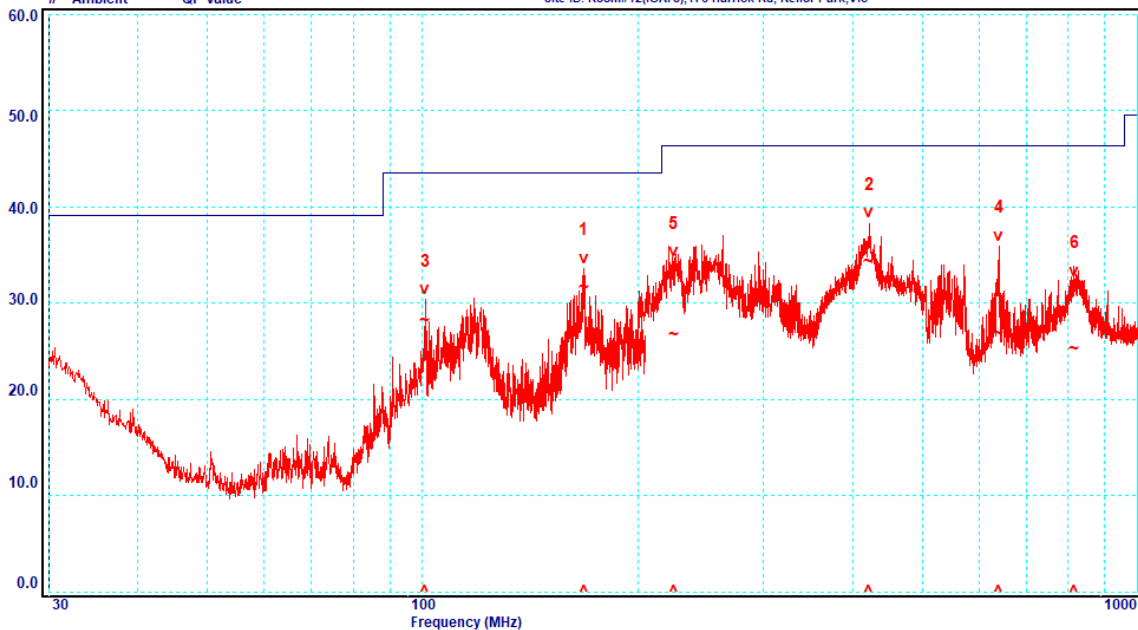
Trace 2: EUT on

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220

Test Date: 25/01/2018

Test Officer: William Alam-Plot date: 03-02-2018 13:31:16 WintstRS:32.8-Wplt:160.16-Rx:R&S,ESW-26,1328.4100  
t:A3630518 c1:C4370518 c2:C4220518 p:A0980818 a:NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 1 – 30MHz to 1000MHz Horizontal



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Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
30-1000MHz Vertical

Limit1: FCC-A3

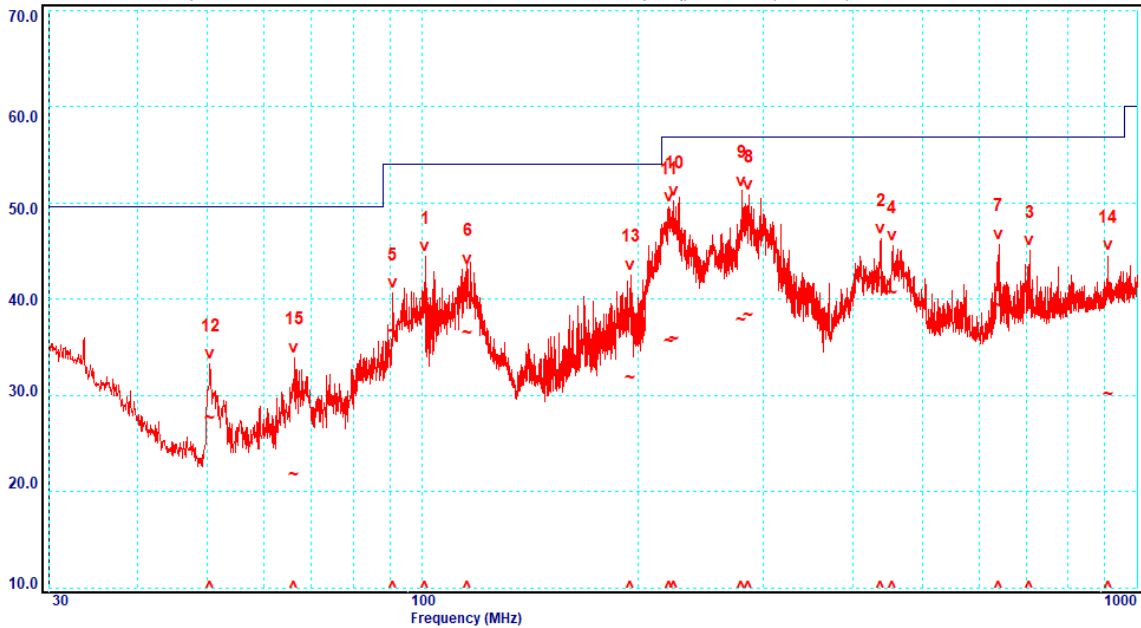
FCC 15.109 Class A 3 metre Quasi-Peak and Average Limits

Trace 2: EUT on

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Test Officer: Kevin Hansen-Plot date: 03-06-2018 09:58:04  
t:A3630518 c1:C4370518 c2:C4210518 p:NONE a:NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 2 – 30MHz to 1000MHz Vertical

Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
30-1000MHz Horizontal

Limit1: FCC-A3

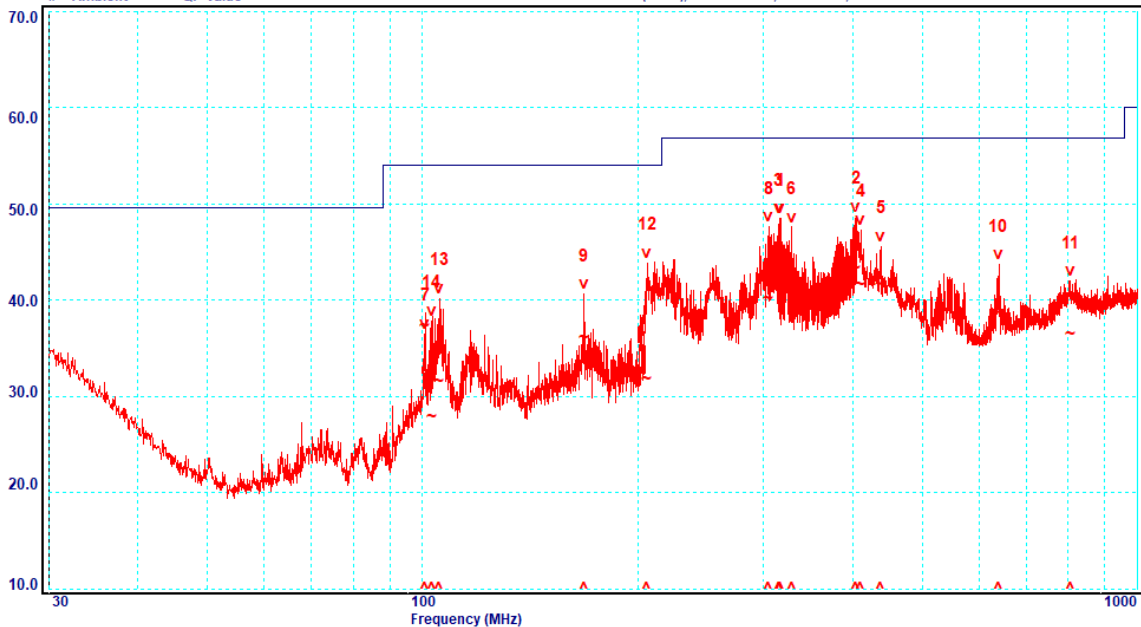
FCC 15.109 Class A 3 metre Quasi-Peak and Average Limits

Trace 2: EUT on

FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Test Officer: Kevin Hansen-Plot date: 03-06-2018 09:59:50  
t:A3630518 c1:C4370518 c2:C4210518 p:NONE a:NONE  
Site ID: Room#12(IQAT5), 176 Harrick Rd, Keilor Park, Vic



Antenna type 2 – 30MHz to 1000MHz Horizontal



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### Frequency Band: 1 000 – 6 000 MHz

Measurements to 6 GHz were made at a distance of 3 metres. The measurements were made with a resolution bandwidth (RBW) of 1000 kHz and the video bandwidth (VBW) of 1000 kHz.

The §15.109 Class A limits were applied.

Antenna Type 1: 600 x 400 mm (1-6 GHz)				
Frequency MHz	Polarisation	Measured Level dBµV/m	Limit dBµV/m	Margin ±dB
<b>Peak Detector</b>				
1234.10	Vertical	52.1	80	-27.9
1271.66	Horizontal	51.1	80	-28.9
3933.54	Horizontal	42.5	80	-37.5
3861.94	Vertical	41.4	80	-38.6
<b>Average Detector</b>				
2119.05	Horizontal	28.8	60	-31.2
3885.55	Vertical	26.6	60	-33.4
3912.93	Horizontal	26.6	60	-33.4
1244.95	Vertical	24.8	60	-35.2

Antenna Type 2: 1300 x 600 mm (1-6 GHz)				
Frequency MHz	Polarisation	Measured Level dBµV/m	Limit dBµV/m	Margin ±dB
<b>Peak Detector</b>				
1160.36	Horizontal	53.2	80	-26.8
1294.15	Vertical	50.4	80	-29.6
<b>Average Detector</b>				
1243.69	Horizontal	25.9	60	-34.1
1311.94	Vertical	25.0	60	-35.0



Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
1-6GHz Peak

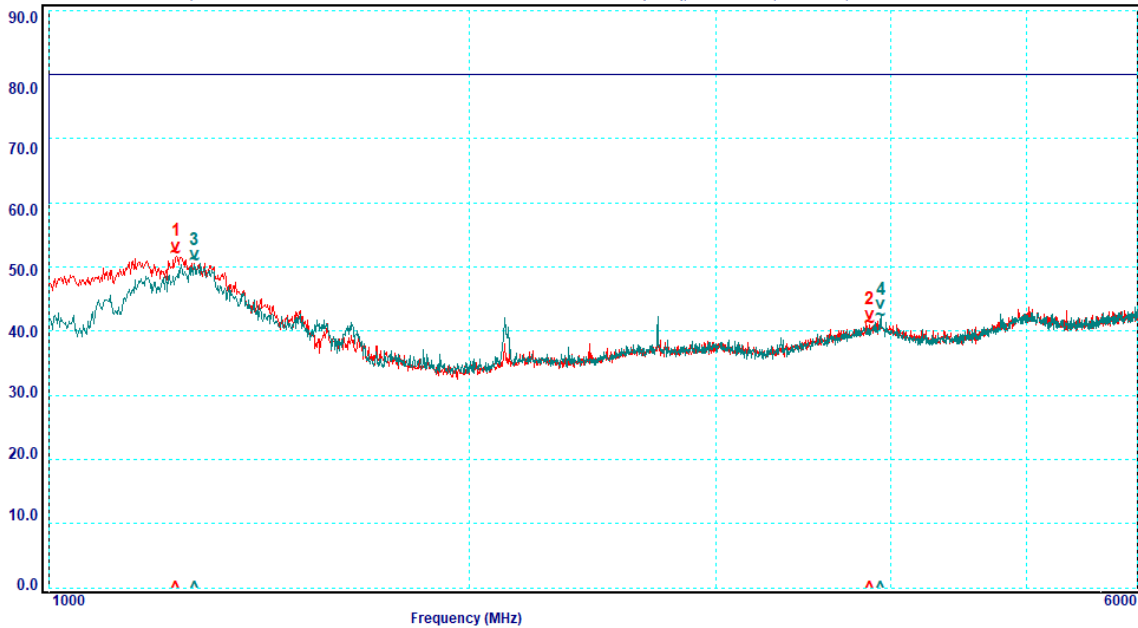
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 17/01/2018

Limit1: FCC-A3 Peak FCC 15.109 Class A 3 metre Quasi-Peak and Peak Limits

Trace 2: Vertical Emissions  
Trace 3: Horizontal Emissions

Test Officer: William Alam-Plot date: 03-02-2018 14:22:05 WintstRS:32.8-Wpl:160.16-Rx:R&S,ESW-26,1328.4100  
t:A0040719 c1:C4210518 c2:C4370518 p:A2880818 a:NONE  
Site ID: Room#12(IOATS),176 Harrick Rd, Keilor Park,Vic



Antenna type 1 – 1 GHz to 6 GHz Vertical and Horizontal (Peak)

Gallagher Group Ltd  
TWR5 - Weigh Scale with 600 x 400mm Antenna,  
Continuously Transmitting 134kHz (Battery at 100%)  
1-6GHz Average

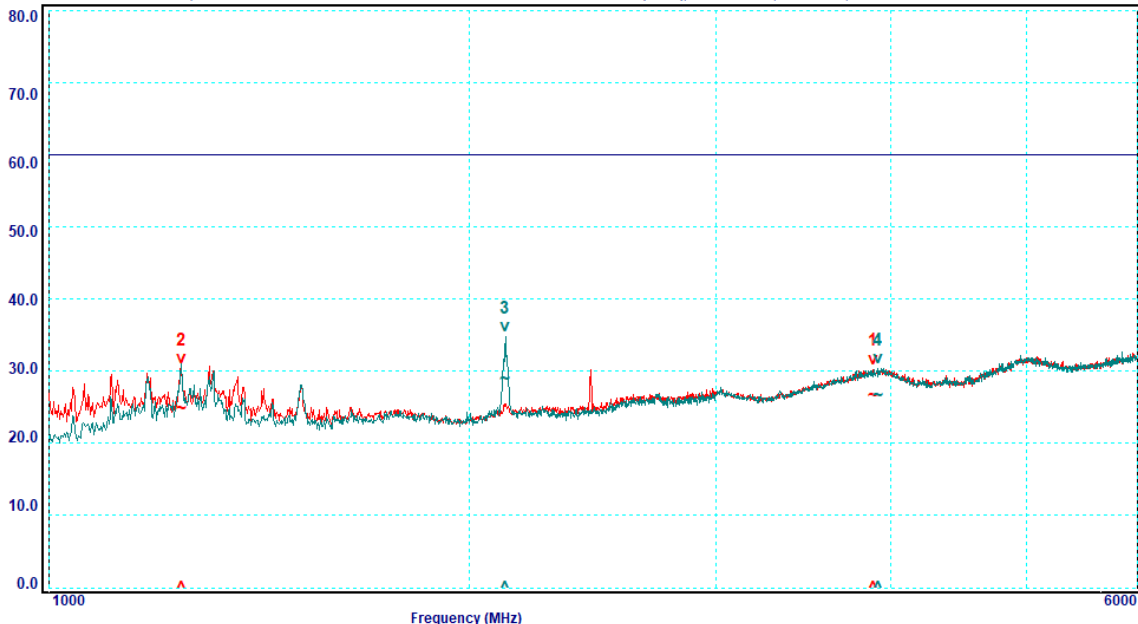
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 17/01/2018

Limit1: FCC-A3 FCC 15.109 Class A 3 metre Quasi-Peak and Average Limits

Trace 2: Vertical Emissions  
Trace 3: Horizontal Emissions

Test Officer: William Alam-Plot date: 03-02-2018 14:25:17 WintstRS:32.8-Wpl:160.16-Rx:R&S,ESW-26,1328.4100  
t:A0040719 c1:C4210518 c2:C4370518 p:A2880818 a:NONE  
Site ID: Room#12(IOATS),176 Harrick Rd, Keilor Park,Vic



Antenna type 1 – 1 GHz to 6 GHz Vertical and Horizontal (Average)



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Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
1-6GHz Peak

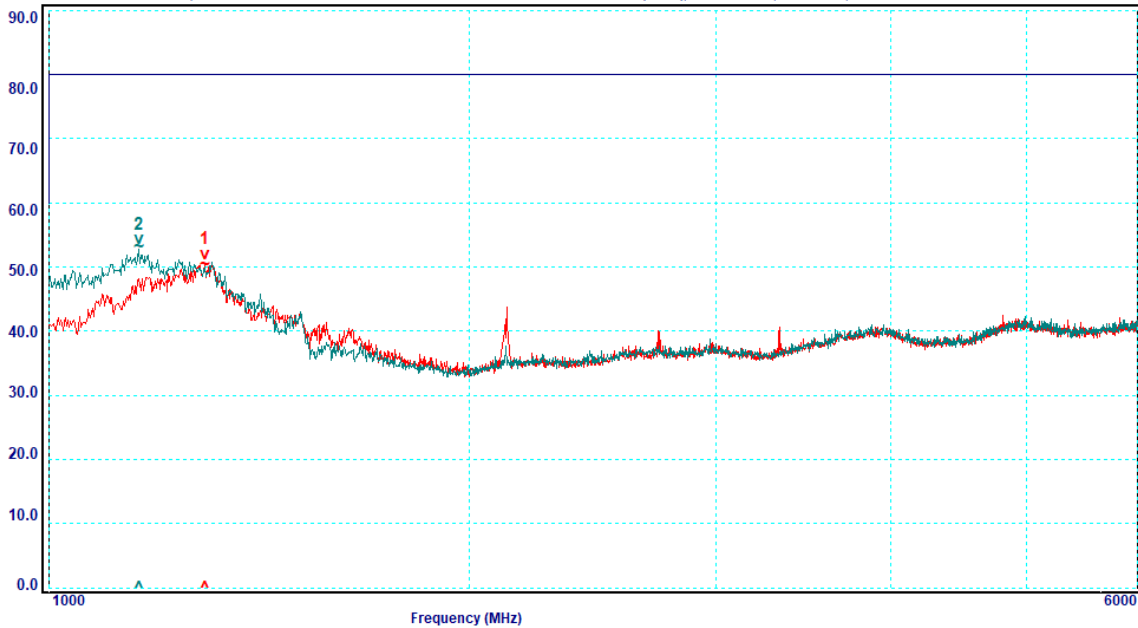
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Limit1: FCC-A3 Peak FCC 15.109 Class A 3 metre Quasi-Peak and Peak Limits

Trace 2: Vertical Emissions  
Trace 3: Horizontal Emissions

Test Officer: Matt Grimwood-Plot date: 03-02-2018 14:35:46 WintstRS:32.8-Wpl:160.16-Rx:R&S,ESR-7,1316.3003K  
t:A0040719 c1:C4210518 c2:C4370518 p:A2880818 a:NONE  
Site ID: Room#12(IQATS),176 Harrick Rd, Keilor Park,Vic



Antenna type 2 – 1 GHz to 6 GHz Vertical and Horizontal (Peak)

Gallagher Group Ltd  
TWR5 - Weigh Scale with 1300 x 600mm Antenna.  
Continuously Transmitting 134kHz (Battery at 100%)  
1-6GHz Average

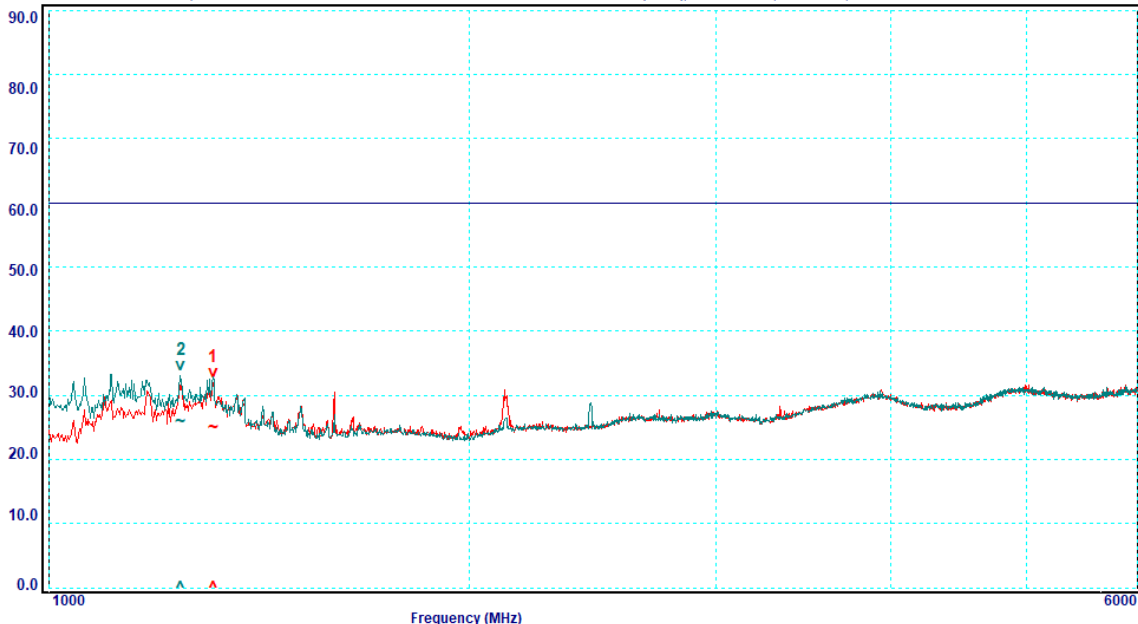
FCC  
Radiated Emissions (dBuV/m)  
# = Ambient ~ = QP Value

Job No: M171220  
Test Date: 12/01/2018

Limit1: FCC-A3 FCC 15.109 Class A 3 metre Quasi-Peak and Average Limits

Trace 2: Vertical Emissions  
Trace 3: Horizontal Emissions

Test Officer: Matt Grimwood-Plot date: 03-02-2018 14:37:26 WintstRS:32.8-Wpl:160.16-Rx:R&S,ESR-7,1316.3003K  
t:A0040719 c1:C4210518 c2:C4370518 p:A2880818 a:NONE  
Site ID: Room#12(IQATS),176 Harrick Rd, Keilor Park,Vic



Antenna type 2 – 1 GHz to 6 GHz Vertical and Horizontal (Average)



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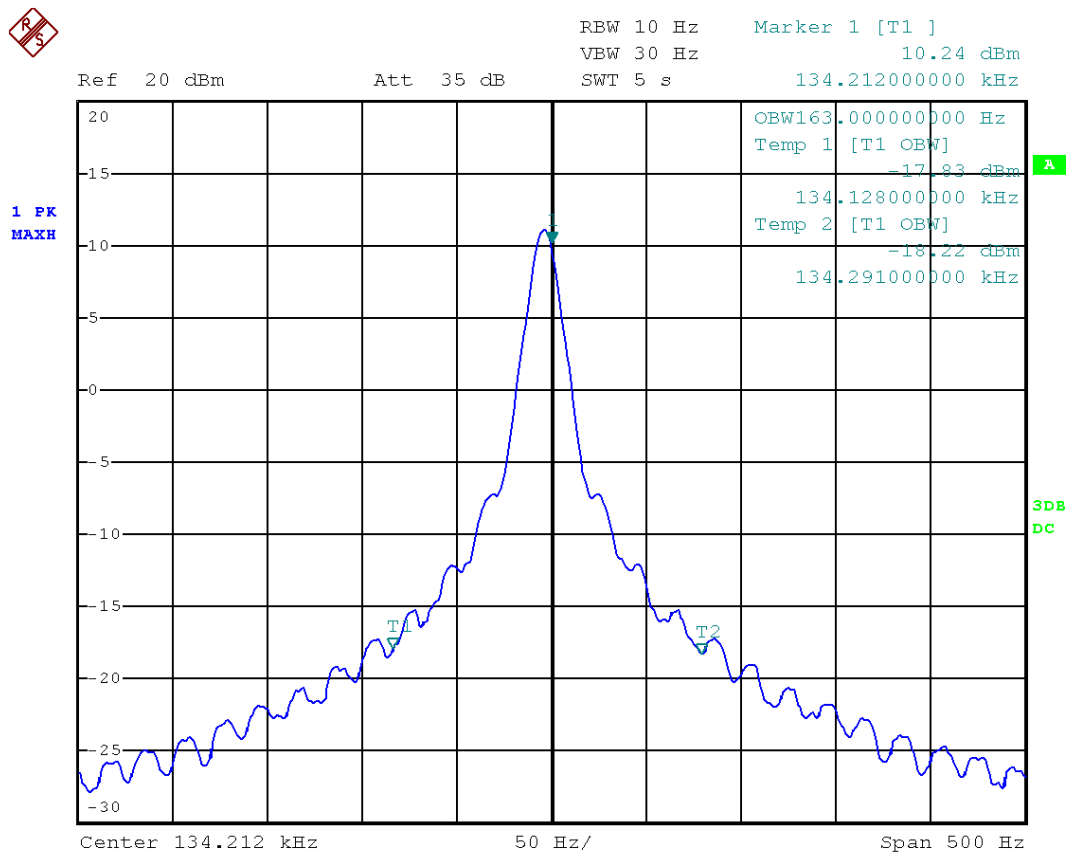
### 3.6 §1.1310 Maximum Permissible Exposure

The TWR5 complied with the applicable maximum permissible exposure levels. Refer to EMC Technologies report M171220-4.

### 3.8 §2.1049 Occupied bandwidth – 99% power

The bandwidth containing 99% power of the transmitted signal was measured using the procedure from ANSI C63.10 section 6.9.

Channel [kHz]	99% Bandwidth [kHz]	Low Frequency [kHz]	High Frequency [kHz]
134.0	0.163	134.128	134.291



99% Occupied Bandwidth

#### 4.0 COMPLIANCE STATEMENT

The Weigh Scale and Reader TWR5 tested on behalf of Gallagher Group Ltd **complied** with the requirements of 47 CFR, Part 15 Subpart C - Rules for Radio Frequency Devices (intentional radiators) for a transmitter operating at 134.0 kHz.

#### 5.0 MEASUREMENT UNCERTAINTY

EMC Technologies has evaluated the equipment and the methods used to perform the emissions testing. The estimated measurement uncertainties for emissions tests shown within this report are as follows:

<b>Conducted Emissions:</b>	9 kHz to 30 MHz	±3.2 dB
<b>Radiated Emissions:</b>	9 kHz to 30 MHz	±4.1 dB
	30 MHz to 300 MHz	±5.1 dB
	300 MHz to 1000 MHz	±4.7 dB
	1 GHz to 18 GHz	±4.6 dB

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.