RADIO TEST REPORT

FOR

Schneider Electric

ON

METSEWT4141 & METSEWT4122

DOCUMENT NO. TRA-022263-W-US3

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TRaC Wireless Test Report	**:** TRA-022263-W-US3
Applicant	**:** Schneider Electric
Apparatus	**:** METSEWT4141 & METSEWT4122 VHF
Specification(s)	**:** CFR47 Part 90.217
Purpose of Test	**: Certification**
FCCID	**:** 2ADGA-WT4100
IC Certification Number	**:** 12449A-WT4100
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Section 1: Introduction

1.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on samples submitted to the Laboratory.

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1.4 Apparatus Assessed

The following apparatus was assessed between the 22/08/14 and 9/10/14:

METSEWT4141 VHF

The METSEWT4141 VHF series of devices counts pulses from any pulsed output including electricity, water and gas meters. Once installed, the METSEWT4141 will transmit consumption data as well as tamper and battery information via radio at regular intervals. The apparatus is designed to transmit at 153.1 MHz with a carrier power below 120 mW to allow exemption from the full 47CFR Part 90 technical requirements.

Testing was performed on four separate examples of the product range containing identical radio modules and as such having Identical FCC ID numbers.

Testing was limited to Maximum Radiated Carrier Power and Transmitter Spurious Emissions Radiated to support an application for a Class II permissive change.

1.5 Test Result Summary

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

The statements relating to compliance with the standards below apply ONLY as qualified in the notes and deviations stated in sections 1.6 to 1.7 of this test report.

Full details of test results are contained within Appendix A. The following table summarises the results of the assessment.

Test Type	Regulation	Measurement standard	Result
Maximum Radiated Output Power	Title 47 of the CFR: Part 90.217	ASNI/TIA-603-C-2004	Pass
Transmitter Spurious Emissions Radiated	Title 47 of the CFR: Part 2.1051	ASNI/TIA-603-C-2004	Pass

Abbreviations used in the above table:

ANSI C 63.10:2009 and ASNI/TIA-603-C-2004 is outside the scope of the laboratories UKAS accreditation.

CFR : Code of Federal Regulations
REFE : Radiated Electric Field Emissions
ANSI : American National Standards Institution
PLCE : Power Line Conducted Emissions

1.6 Notes Relating To The Assessment

With regard to this assessment, the following points should be noted:

The results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 1.7 of this test report (Deviations from Test Standards).

For emissions testing, throughout this test report, “Pass” indicates that the results for the sample as tested were below the specified limit (refer also to Section 2, Measurement Uncertainty).

Where relevant, the apparatus was only assessed using the monitoring methods and susceptibility criteria defined in this report.

All testing was performed under the following environmental conditions:

Temperature	: 17 to 23 °C
Humidity	: 45 to 75 %
Barometric Pressure	: 86 to 106 kPa

All dates used in this report are in the format dd/mm/yy.

This assessment has been performed in accordance with the requirements of ISO/IEC 17025.

1.7 Deviations from Test Standards

Testing was limited to Maximum Radiated Carrier Power and Transmitter Spurious Emissions Radiated to support an application for a Class II permissive change.

Section 2: Measurement Uncertainty

2.1 Measurement Uncertainty Values

For the test data recorded the following measurement uncertainty was calculated:

Test type	Quantity	Quantity frequency range	Uncertainty
Radiated electric field emissions 3m alternative test site Effective Radiated Power 3m alternative test site	Amplitude	30MHz to 300MHz Horizontal	±4.6dB
		30MHz to 300MHz Vertical	±5.1dB
		300MHz to 1000MHz Horizontal	±5.2dB
		300MHz to 1000MHz Vertical	±5.5dB
		1GHz to 26.5GHz Horizontal and Vertical	±4.1dB
Conducted emissions		N/A	±0.9 dB
Absolute RF power (via antenna connector)		N/A	±0.9 dB
PSD		N/A	±0.9 dB
Frequency Range	Frequency	dc to 26.5GHz	$1.0x10^{-7}$ (0.1ppm)
Temperature		N/A	±1.0°C
Humidity		N/A	±2.0 %

Section 3: Modifications

3.1 Modifications Performed During Assessment

No modifications were performed during the assessment

Section 4 **General Test Procedures**

4.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are checked first by preview scans. Preview scans for all spectrum and modulation characteristics are checked, using a peak detector and where applicable worst case determined for function, operation, orientation etc for both vertical and horizontal polarisations

If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.10 are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed, (see EUT setup photographs for more detail).

For devices with intentional emissions below 30 MHz, a shielded loop antenna is used as the test antenna. It is placed at a 1 meter receive height and appropriate low frequency magnetic field extrapolation to the regulatory limit distance is employed. The EUT is rotated through 360˚in the azimuth.

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. Emissions above 1 GHz are characterized using standard gain horn antennas. Pre-amplifiers and filters are used where required. Care is taken to ensure that test receiver resolution bandwidth, video bandwidth and detector type(s) meet the regulatory requirements.

For both horizontal and vertical polarizations, the EUT is then rotated through 360˚ in azimuth until the highest emission is detected. At the previously determined azimuth the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected, this maximum value is recorded.

Where regulations allow for direct measurement of field strength, power values measured on the test receiver / analyzer are converted to dBuV/m at the regulatory distance, using:

$$FS = PR + AF + CL - PA + KG + DC - CF \text{ (dBuV/m)}$$

Where:

PR is the power recorded on receiver / spectrum analyzer (dBuV),
AF is the test antenna factor in dB/m,
CL is the cable loss in dB,
PA is the pre-amplifier gain dB (when applicable),
DC is duty correction factor (when applicable) in dB, and
CF is a distance correction (employed only for measurements at alternate distance to limit) in dB.

This field strength value is then compared with the regulatory limit.

If effective radiated power (ERP) or effective isotropic radiated power (EIRP) is required, it is computed as per ANSI C63.10

$$P = \frac{(Ed)^2}{30G}$$

Where

P is the power, in W
E is the measured peak field strength, in V/m
d is the distance at which the measurement was made, in m
G is the numeric gain of the radiating element

If the gain of the radiating element is not known, then either the effective radiated power (ERP) or the effective isotropic radiated power (EIRP) may be calculated from the measured peak field strength, by using either G = 1.64 or G = 1, respectively.

4.2 AC Powerline Conducted Emissions Test Setup and Procedures

AC Powerline Conducted Emissions from the EUT are checked first by preview scans with Peak and average detectors covering both live and neutral lines. A spectrum analyser is used to determine if any periodic emissions are present. Preview scans are performed in standby or receive mode if the device is subject to these requirements. For transmit mode of operation the device is set to one of the following modes.

- Transmitting operating at full power (single mode device)
- Transmitting at freq / modulation that gives highest output power (multi mode device)
- Transmitter operating in normal TX mode (e.g. FHSS, TDMA etc)

Formal measurements using the correct detector(s) and bandwidth are made on frequencies identified from the preview scans.

Battery Power devices are not subject to power line conducted emissions measurements when it is powered solely by its internal battery.

4.3 Antenna Port Conducted Emissions

Antenna port conducted emissions can include, but are not limited to, Carrier power, Power Spectral Density, Occupied bandwidth and spurious emission.

Spurious Emissions from the EUT are checked first by preview scans. Preview scans for all spectrum and modulation characteristics are checked to identify frequencies to perform formal measurements on.

Formal measurements are made on frequencies identified from the preview scans and fundamental emission(s). Measurements are made using the correct instrumentation (inc. power meter, receiver, spectrum analyser) that operate with the required detector(s) and bandwidth.

Care is taken to ensure the measurement instrument is not overloaded by the presence of the transmitted signal by use of external attenuation and filtering where required.

Measured levels are corrected for cables, attenuators, and filters. If applicable, for the specific measurement, antenna gain is also taken into account.

4.4 Power Supply Variation

Tests at extreme supply voltages are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report.

In the case the EUT is designed for operation from a lead-acid battery power source, the extreme test voltages are evaluated between 90% and 130% of the nominal battery voltage declared by the manufacturer.

For float charge applications using gel-cell type batteries, extreme test voltages are evaluated between 85% and 115% of the nominal battery voltage declared.

For all battery operated equipment, worst case intentional and spurious emissions are re-checked employing a new (fully charged) battery.

4.5 Thermal Variation

Tests at extreme temperatures are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report.

Tests are performed at the upper and lower extremes as required and typically at 10˚ steps between.

Before any temperature measurements are made, the equipment is allowed to reach a thermal balance in the test chamber.

4.6 Time Domain Measurements

Time domain measurements are made for (but not limited to) use in duty cycle correction, to ensure compliance with time restrictions on certain types of devices.

If measurements of a transmitter's on time are required these are performed with a spectrum analyser in the time domain or with an oscilloscope and RF detector. If time on a specific frequency is required (e.g. FHSS timing) the measurement can only be made with a spectrum analyser.

The triggering, timescale and amplitude settings are adjusted according to the signal to be measured on a case by case basis.

For devices with sharp rise/fall times measurements are made between RF reaching full power (T_{on}) and RF dropping to the measurement instrument noise floor (T_{off}). For longer rise times measurements are made for T_{on} and T_{off} at the RF level required by the occupied bandwidth measurement (e.g. 6 dB, 20 dB etc).

Appendix A: Formal Emission Test Results

Abbreviations used in the tables in this appendix:

Spec	: Specification
Mod	: Modification
EUT	: Equipment Under Test
SE	: Support Equipment
L	: Live Power Line
N	: Neutral Power Line
E	: Earth Power Line
Pk	: Peak Detector
QP	: Quasi-Peak Detector
Av	: Average Detector
CDN	: Coupling & decoupling network

ALSR	: Absorber Lined Screened Room
OATS	: Open Area Test Site
ATS	: Alternative Test Site
Ref	: Reference
Freq	: Frequency
MD	: Measurement Distance
SD	: Spec Distance
Pol	: Polarisation
H	: Horizontal Polarisation
V	: Vertical Polarisation

A1 Maximum Radiated Output Power (Effective Radiated Power)

The assessment method used was a radiated measurement at normal test conditions.
The following test site was used for final measurements as specified by the standard tested to:

3m open area test site : [ ] 3m alternative test site : [X]

The effect of the EUT set-up on the measurements is summarised in note (b) below.

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S15
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	1 and 2

Ref No.	Freq (MHz)	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1.	153.103	10.0	20.8	10.4	Pass

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S18
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	3 and 4

Ref No.	Freq (MHz)	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1.	153.103	10.2	20.8	10.4	Pass

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S58
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	5 and 6

Ref No.	Freq (MHz)	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1.	153.103	9.8	20.8	-11.0	Pass

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S59
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	7 and 8

Ref No.	Freq (MHz)	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1.	153.103	10.1	20.8	-10.7	Pass

The frequency listed in the above tables corresponds to the peak emission measured and does not necessarily correspond with the specified carrier frequency for devices employing frequency or phase shift keying techniques. Radiated carrier power tests are carried out at nominal test conditions only for equipment having an integral antenna

Limits:

In accordance with Title 47 of the CFR: Part 90.217 the effective radiated power shall not exceed 120mW (20.8dBm).

Notes:

(a) The levels may have been rounded for display purposes.

(b) The following table summarises the effect of the EUT operating mode, internal configuration and arrangement of cables / samples on the measured emission levels :

	See (i)	See (ii)	See (iii)	See (iv)
Effect of EUT operating mode on emission levels		✓		
Effect of EUT internal configuration on emission levels		✓		
Effect of Position of EUT cables & samples on emission levels	✓			

(i) Parameter defined by standard and / or single possible, refer to Appendix D
(ii) Parameter defined by client and / or single possible, refer to Appendix D
(iii) Parameter had a negligible effect on emission levels, refer to Appendix D
(iv) Worst case determined by initial measurement, refer to Appendix D

A2 Radiated Transmitter Spurious Emissions

The assessment method used was a radiated measurement at normal test conditions. Preliminary scans were performed using a peak detector with the RBW = 100kHz below 1 GHz and 1 MHz above. This test applies to all spurious emissions and harmonics emissions

The following test site was used for final measurements as specified by the standard tested to:

3m open area test site : ☐ 3m alternative test site : ☒

The effect of the EUT set-up on the measurements is summarised in note (b) below.

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217(b)
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S15
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	1 and 2

The worst-case radiated emission measurements for spurious emissions and harmonics are listed below:

TX 153.1MHz						
Ref No.	Freq (MHz)	Det.	Result (dBµV/m)	Spec. Limit (dBµV/m)	Margin (dB)	Summary
1.	No emissions were detected within 20dB of the specification limit					

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217(b)
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S18
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	3 and 4

The worst-case radiated emission measurements for spurious emissions and harmonics are listed below:

TX 153.1MHz						
Ref No.	Freq (MHz)	Det.	Result (dBµV/m)	Spec. Limit (dBµV/m)	Margin (dB)	Summary
1.	No emissions were detected within 20dB of the specification limit					

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217(b)
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S58
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	5 and 6

The worst-case radiated emission measurements for spurious emissions and harmonics are listed below:

TX 153.1MHz						
Ref No.	Freq (MHz)	Det.	Result (dBµV/m)	Spec. Limit (dBµV/m)	Margin (dB)	Summary
1.	No emissions were detected within 20dB of the specification limit					

Test Details: Maximum output power was verified with the EUT transmitting	
Regulation	Title 47 of the CFR: Part 90.217(b)
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S59
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	23°C
Photographs (Appendix E)	7 and 8

The worst-case radiated emission measurements for spurious emissions and harmonics are listed below:

TX 153.1MHz						
Ref No.	Freq (MHz)	Det.	Result (dBµV/m)	Spec. Limit (dBµV/m)	Margin (dB)	Summary
1.	No emissions were detected within 20dB of the specification limit					

Limits

In accordance with Title 47 of the CFR: Part 90.217 the radiated transmitter spurious emissions limit was determined relative to the maximum measured effective radiated power as at normal test conditions.

The limit in 100 kHz RBW = (Measured radiated carrier power -30dB)

Where:

Sample No	Channel Frequency (MHz)	Measured ERP Carrier Field Strength dBµV/m)	Measured Carrier Field Strength – 30dB	Emission Limit (dBm)
S15	153.103	117.6	117.6 – 30	87.6
S18	153.103	117.0	117.0 – 30	87.0

Notes:

(a) The levels may have been rounded for display purposes.

(b) The following table summarises the effect of the EUT operating mode, internal configuration and arrangement of cables / samples on the measured emission levels :

	See (i)	See (ii)	See (iii)	See (iv)
Effect of EUT operating mode on emission levels		✓		
Effect of EUT internal configuration on emission levels		✓		
Effect of Position of EUT cables & samples on emission levels	✓			

(i) Parameter defined by standard and / or single possible, refer to Appendix D
(ii) Parameter defined by client and / or single possible, refer to Appendix D
(iii) Parameter had a negligible effect on emission levels, refer to Appendix D
(iv) Worst case determined by initial measurement, refer to Appendix D

Appendix B: Supporting Graphical Data

This appendix contains graphical data obtained during testing.

Notes:

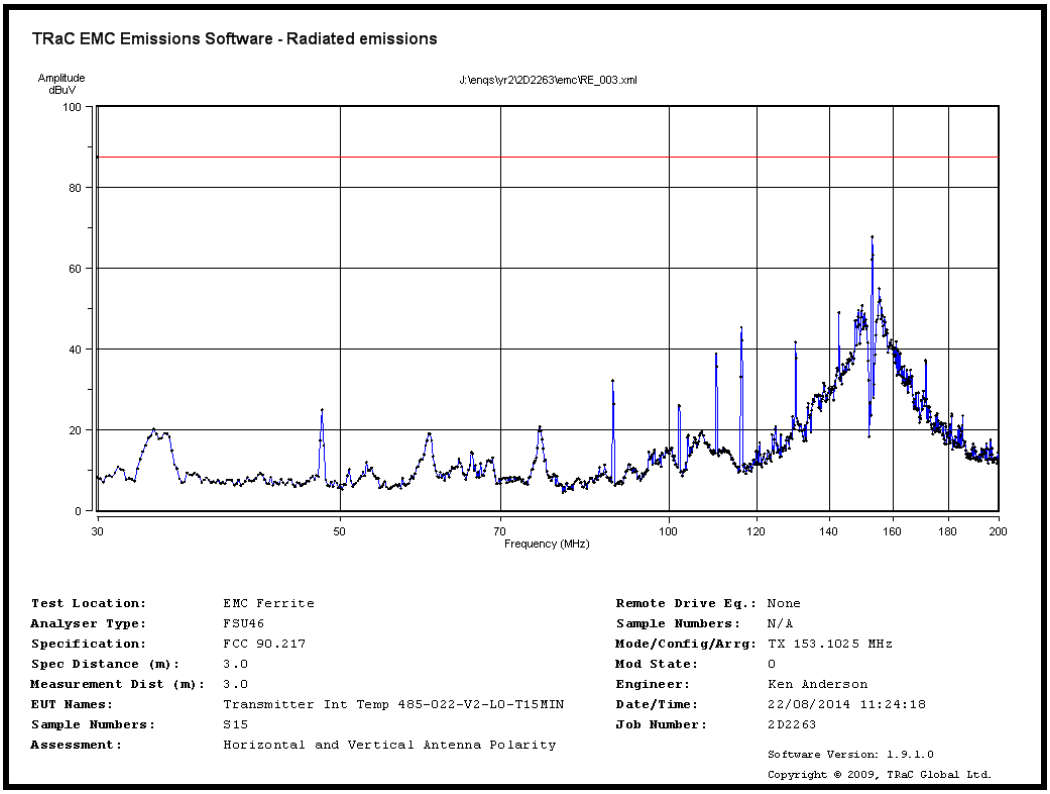
(a) The radiated electric field emissions and conducted emissions graphical data in this appendix is preview data. For details of formal results, refer to Appendix A and Appendix B.

(b) The time and date on the plots do not necessarily equate to the time of the test.

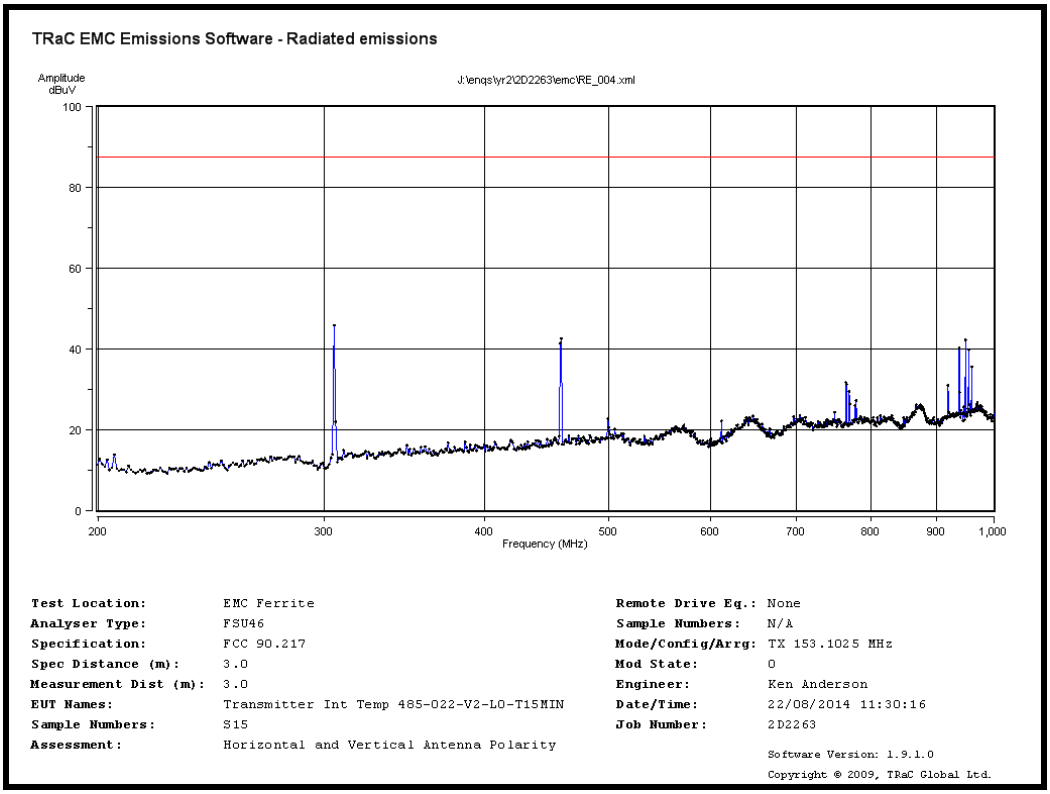
(c) Where relevant, on power line conducted emission plots, the limit displayed is the average limit, which is stricter than the quasi peak limit.

(d) Appendix C details the numbering system used to identify the sample and its modification state.

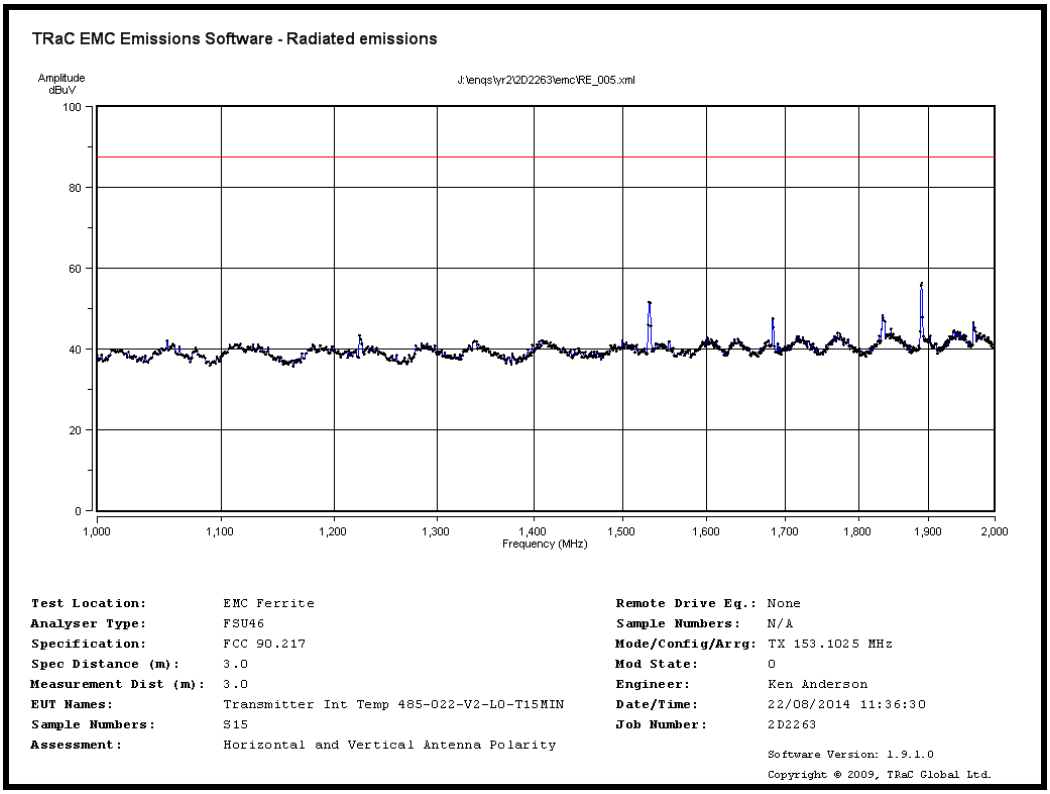
(e) The plots presented in this appendix may not be a complete record of the measurements performed, but are a representative sample, relative to the final assessment.



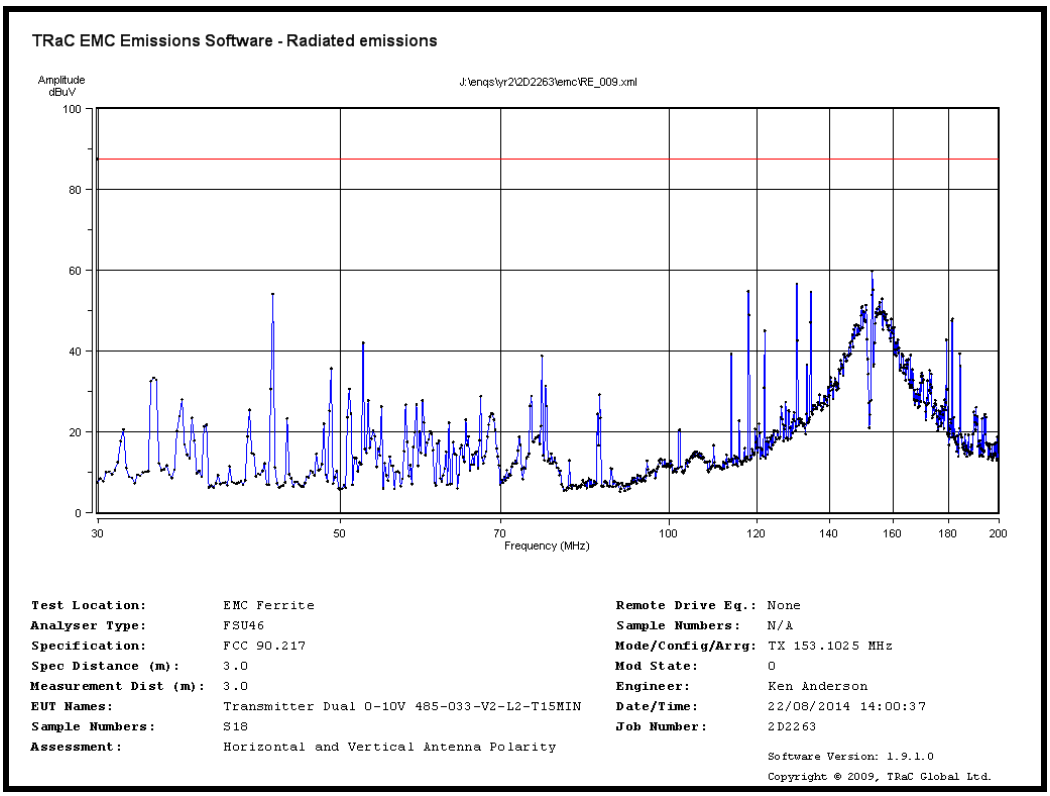
S15 TX 153.1MHz Radiated spurious emissions 30 MHz to 200 MHz



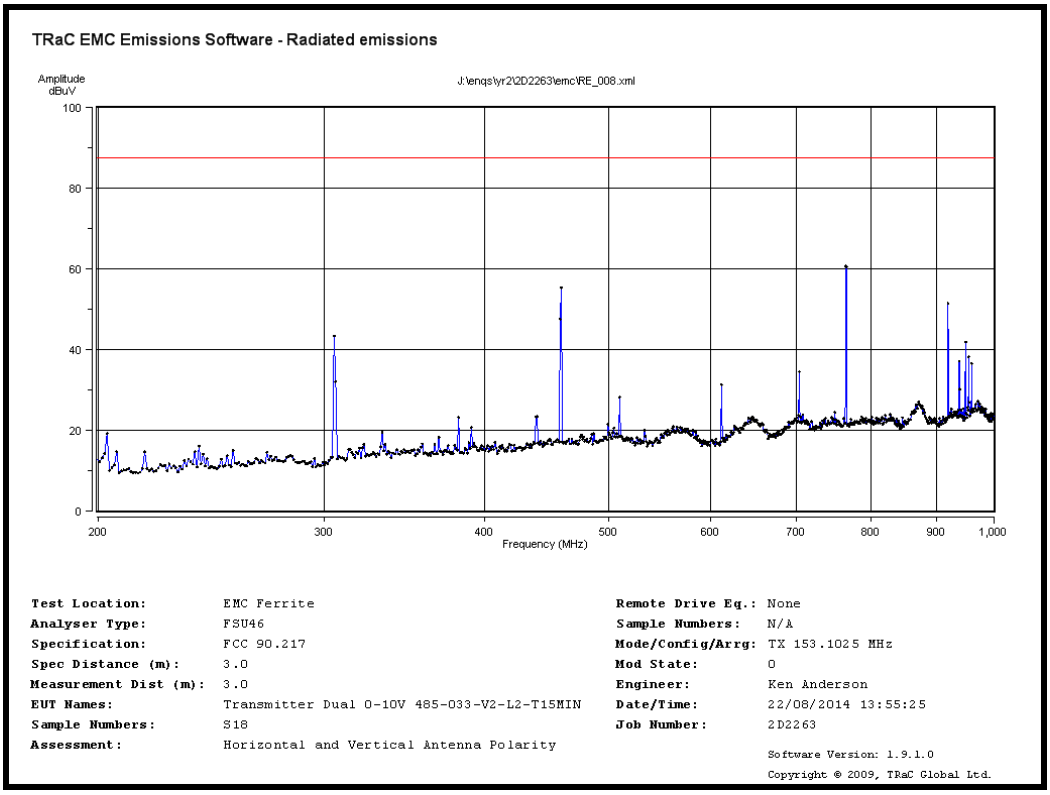
S15 TX 153.1MHz Radiated spurious emissions 200 MHz to 1000 MHz



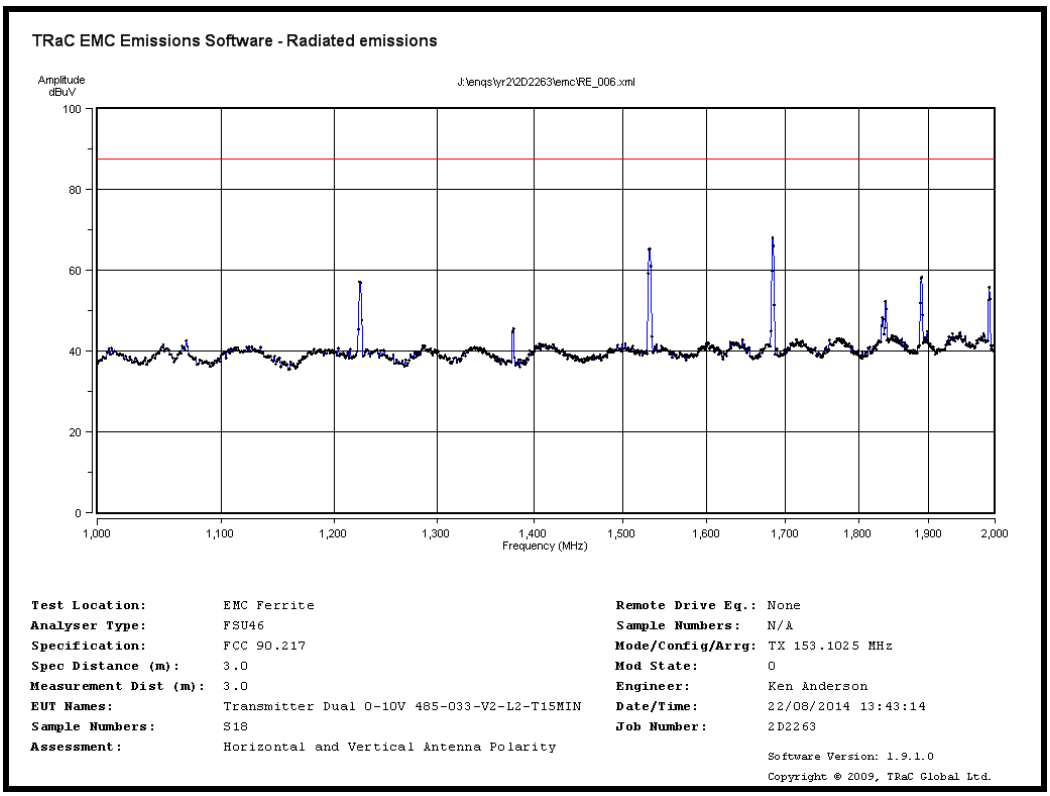
S15 TX 153.1MHz Radiated spurious emissions 1GHz to 2GHz



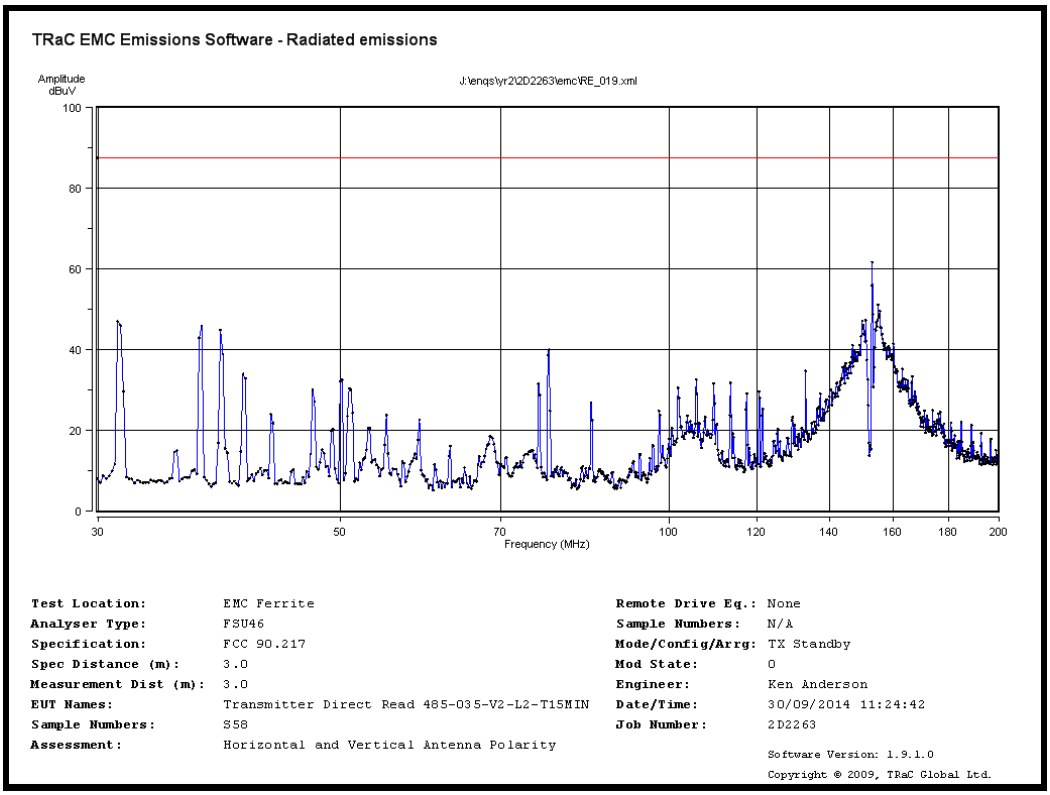
S18 TX 153.1MHz Radiated spurious emissions 30 MHz to 200 MHz



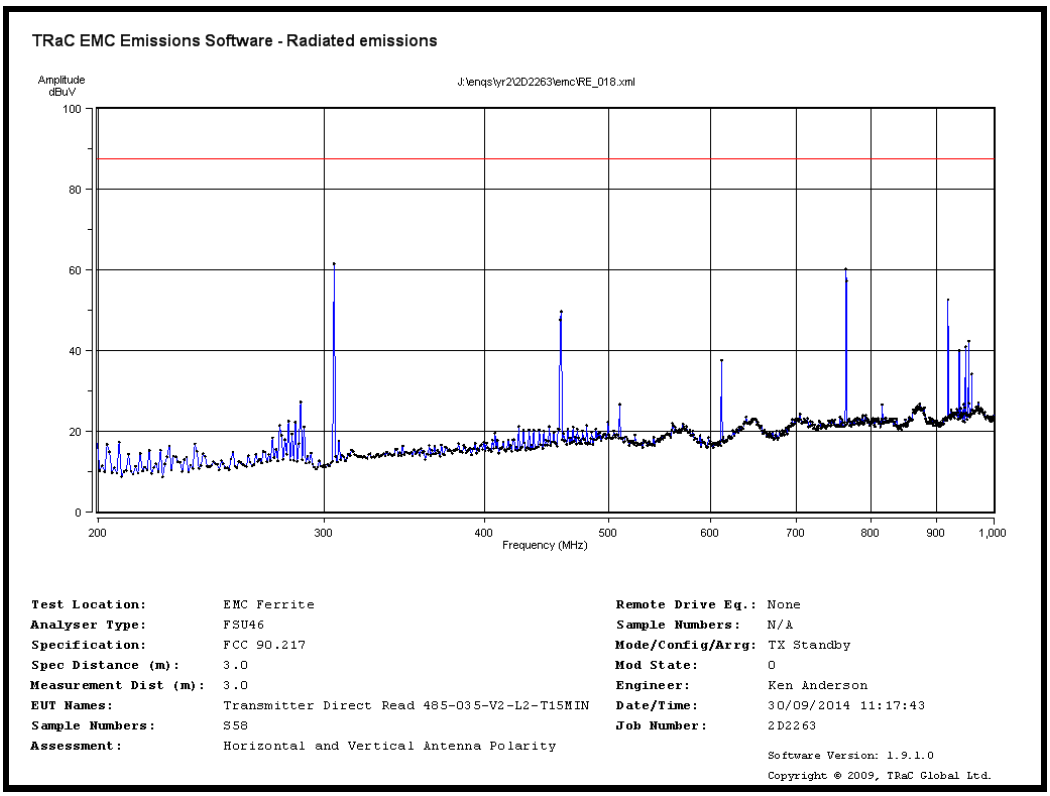
S18 TX 153.1MHz Radiated spurious emissions 200 MHz to 1000 MHz



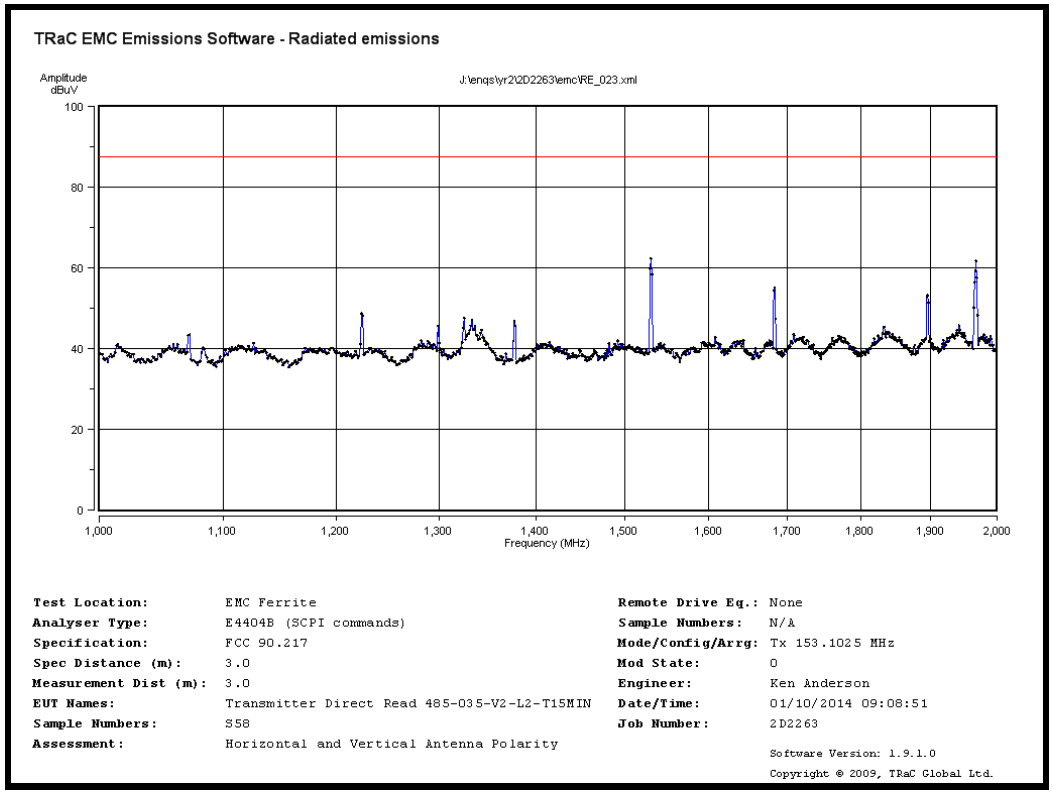
S18 TX 153.1MHz Radiated spurious emissions 1GHz to 2GHz



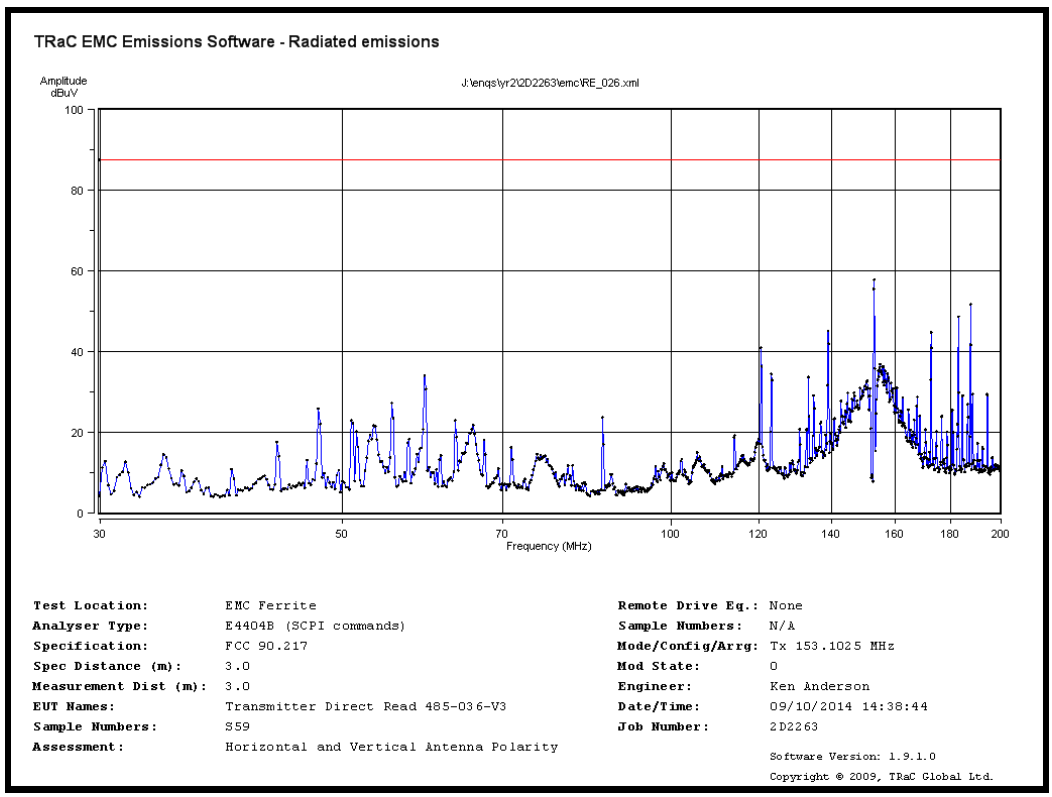
S58 TX 153.1MHz Radiated spurious emissions 30 MHz to 200 MHz



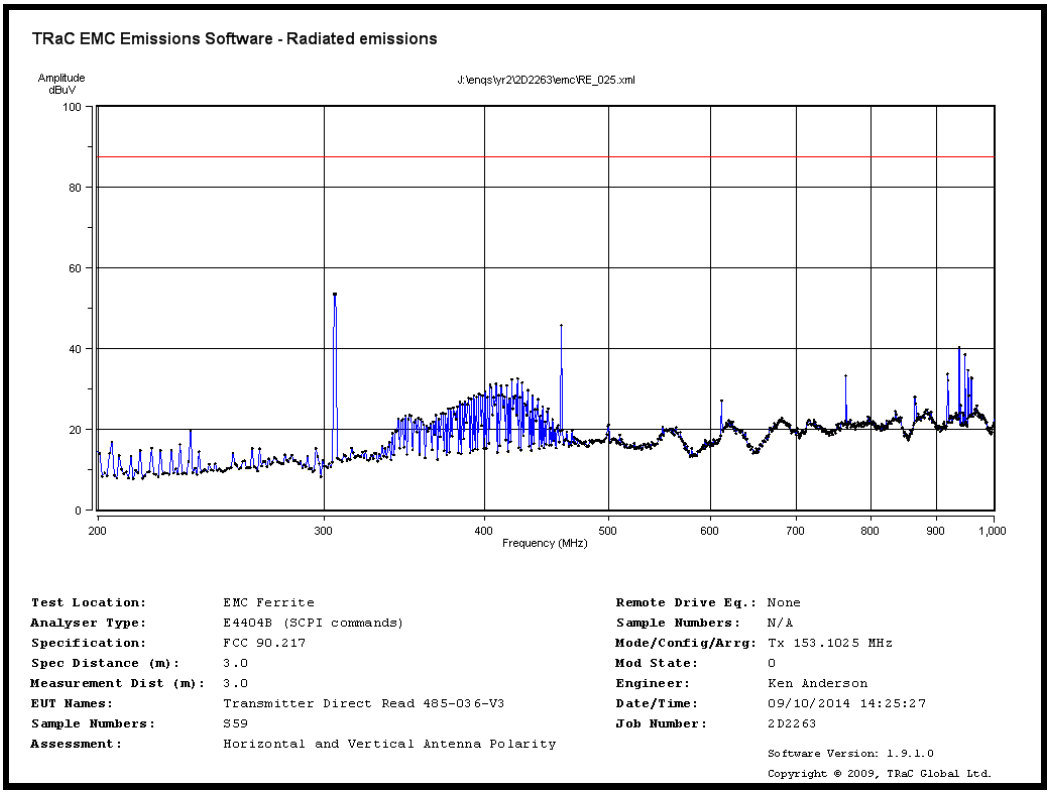
S58 TX 153.1MHz Radiated spurious emissions 200 MHz to 1000 MHz



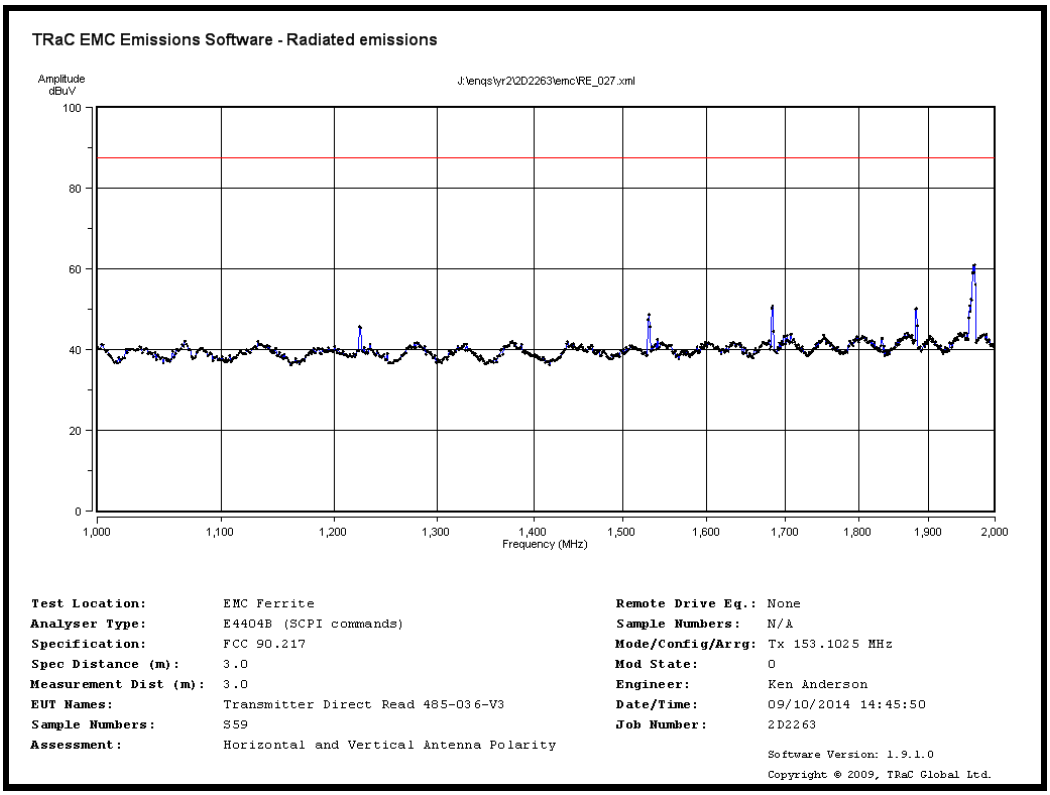
S58 TX 153.1MHz Radiated spurious emissions 1GHz to 2GHz



S59 TX 153.1MHz Radiated spurious emissions 30 MHz to 200 MHz



S59 TX 153.1MHz Radiated spurious emissions 200 MHz to 1000 MHz



S59 TX 153.1MHz Radiated spurious emissions 1GHz to 2GHz

Appendix C: Additional Test and Sample Details

This appendix contains details of:

1. The samples submitted for testing.
2. Details of EUT operating mode(s)
3. Details of EUT configuration(s) (see below).
4. EUT arrangement (see below).

Throughout testing, the following numbering system is used to identify the sample and it's modification state:

Sample No: Sxx Mod w

where:

xx = sample number eg. S01
w = modification number eg. Mod 2

The following terminology is used throughout the test report:

Support Equipment (SE) is any additional equipment required to exercise the EUT in the applicable operating mode. Where relevant SE is divided into two categories:

SE in test environment: The SE is positioned in the test environment and is not isolated from the EUT (e.g. on the table top during REFE testing).

SE isolated from the EUT: The SE is isolated via filtering from the EUT. (e.g. equipment placed externally to the ALSR during REFE testing).

EUT configuration refers to the internal set-up of the EUT. It may include for example:

Positioning of cards in a chassis.
Setting of any internal switches.
Circuit board jumper settings.
Alternative internal power supplies.

Where no change in EUT configuration is **possible**, the configuration is described as “single possible configuration”.

EUT arrangement refers to the termination of EUT ports / connection of support equipment, and where relevant, the relative positioning of samples (EUT and SE) in the test environment.

For further details of the test procedures and general test set ups used during testing please refer to the related document "EMC Test Methods - An Overview", which can be supplied by TRaC Global upon request.

C1) Test samples

The following samples of the apparatus were submitted by the client for testing :

Sample No.	Description	Identification
S15	Int Temp Transmitter 485 022 V2 L0 T 15MIN	METSEWT4141
S18	Dual 0-10V Transmitter 485 033 V2 L2 T 15MIN	METSEWT4122
S58	Transmitter 485-035 V2 L2 T 15MIN	600002
S59	Transmitter 485-036 V3	600006

C2) EUT Operating Mode During Testing.

During testing, the EUT was exercised as described in the following table :

Test	Description of Operating Mode
All tests detailed in this report	EUT transmitting FSK modulation on 153.1025 MHz

C3) EUT Configuration Information.

The EUT was submitted for testing in one single possible configuration.

C4) List of EUT Ports

The tables below describe the termination of EUT ports:

Sample : S15
Tests : Radiated

Port	Description of Cable Attached	Cable length	Equipment Connected
The EUT is battery powered with no external ports			

Sample : S18
Tests : Radiated

Port	Description of Cable Attached	Cable length	Equipment Connected
Signal	4 core signal cable	2m	Unterminated

Sample : S58
Tests : Radiated

Port	Description of Cable Attached	Cable length	Equipment Connected
Signal	4 core signal cable	2m	Unterminated

Sample : S59
Tests : Radiated

Port	Description of Cable Attached	Cable length	Equipment Connected
Signal	4 core signal cable	2m	Unterminated

C5 Details of Equipment Used

For Radiated spurious emissions and carrier power (e.r.p) 25MHz to 1GHz

RFG No	Type	Description	Manufacturer	Date Calibrated	Cal Due
REF886	Lab 16	Large Anechoic Chamber	TRaC	10/05/14	10/05/15
REF910	FSU46	Spectrum analyser	R & S	13/03/14	13/03/15
095	3109	Biconical Antenna	EMCO	09/05/13	09/05/15
191	3146	Log Periodic Antenna	EMCO	09/05/13	09/05/15
RFG453	-	HF RF coaxial cable	UTIFLEX	03/07/14	03/07/15
REF881	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF882	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF884	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF885	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF919	219-8004-4000 0311	Type K Male to Type K Male Cable 4.0m	Teledyne Reynolds	04/07/14	04/07/15
REF883	-	HF RF coaxial cable 3.0m	Teledyne Reynolds	06/06/14	06/06/15
REF845	PSG E8257D	Analogue Signal Generator	Hewlett Packard	11/04/14	11/04/15

Radiated spurious emissions 1GHz to 2GHz

RFG No	Type	Description	Manufacturer	Date Calibrated	Cal Due
REF886	Lab 16	Large Anechoic Chamber	TRaC	10/05/14	10/05/15
REF910	FSU46	Spectrum analyser	R & S	13/03/14	13/03/15
129	3115	Horn Antennas	EMCO	14/09/13	14/09/15
913	HP8449B	Microwave Pre-Amp (1-26.5GHz)	HP	31/01/14	31/01/15
RFG453	-	HF RF coaxial cable	UTIFLEX	03/07/14	03/07/15
REF881	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF882	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF884	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF885	-	HF RF coaxial cable	Teledyne Reynolds	06/06/14	06/06/15
REF919	219-8004-4000 0311	Type K Male to Type K Male Cable 4.0m	Teledyne Reynolds	04/07/14	04/07/15
REF883	-	HF RF coaxial cable 3.0m	Teledyne Reynolds	06/06/14	06/06/15
REF845	PSG E8257D	Analogue Signal Generator	Agilent	11/04/14	11/04/15

Appendix D: Additional Information

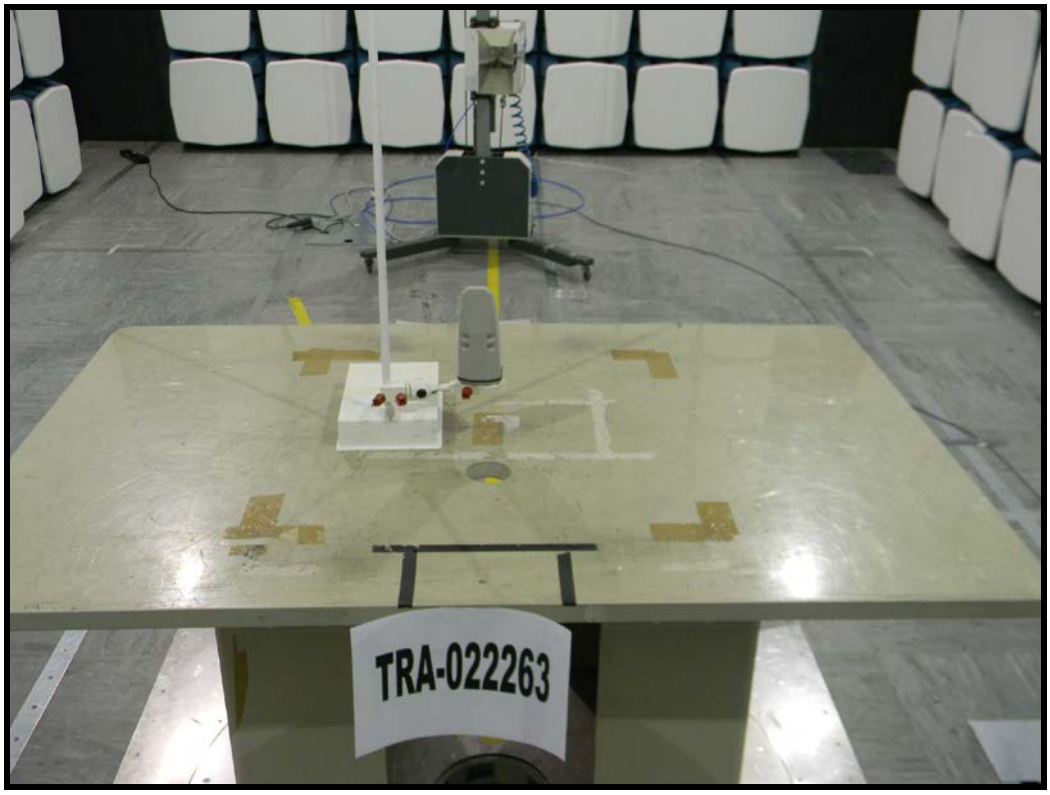
No additional information is included within this test report.

Appendix E: Photographs and Figures

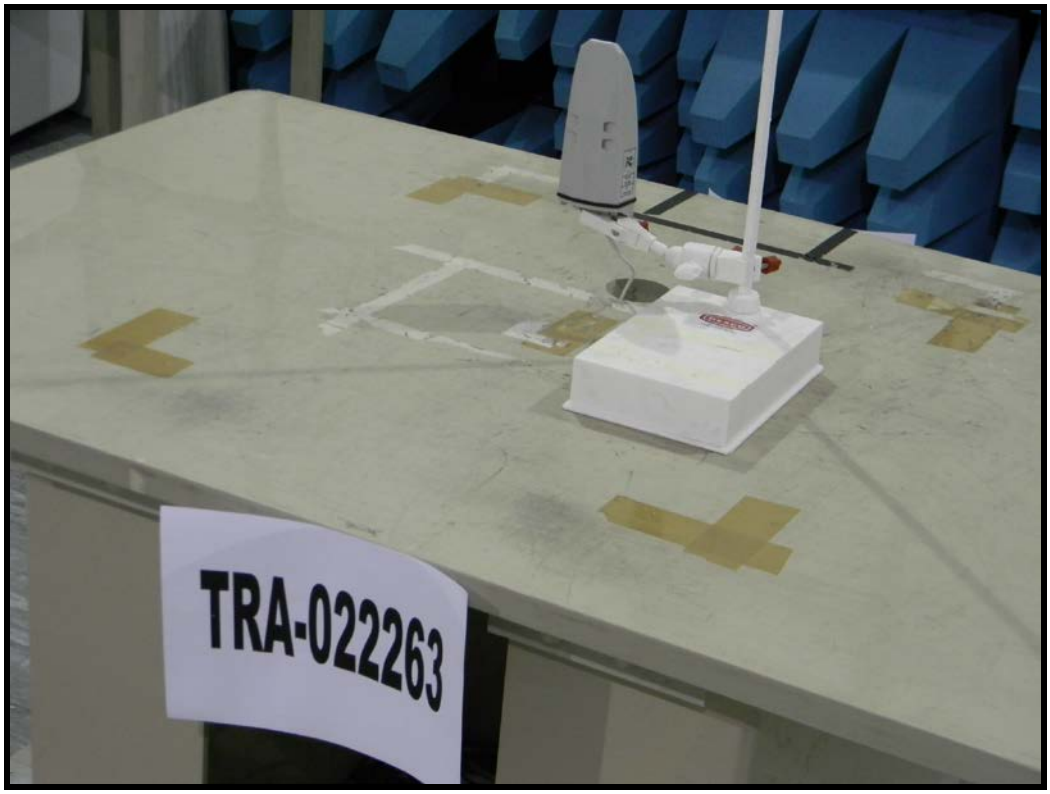
The following photographs were taken of the test samples:

1. Radiated electric field emissions: Front view S15.
2. Radiated electric field emissions: Rear view S15.
3. Radiated electric field emissions: Front view S18.
4. Radiated electric field emissions: Rear view S18.
5. Radiated electric field emissions: Front view S58.
6. Radiated electric field emissions: Rear view S58.
7. Radiated electric field emissions: Front view S59.
8. Radiated electric field emissions: Rear view S59.

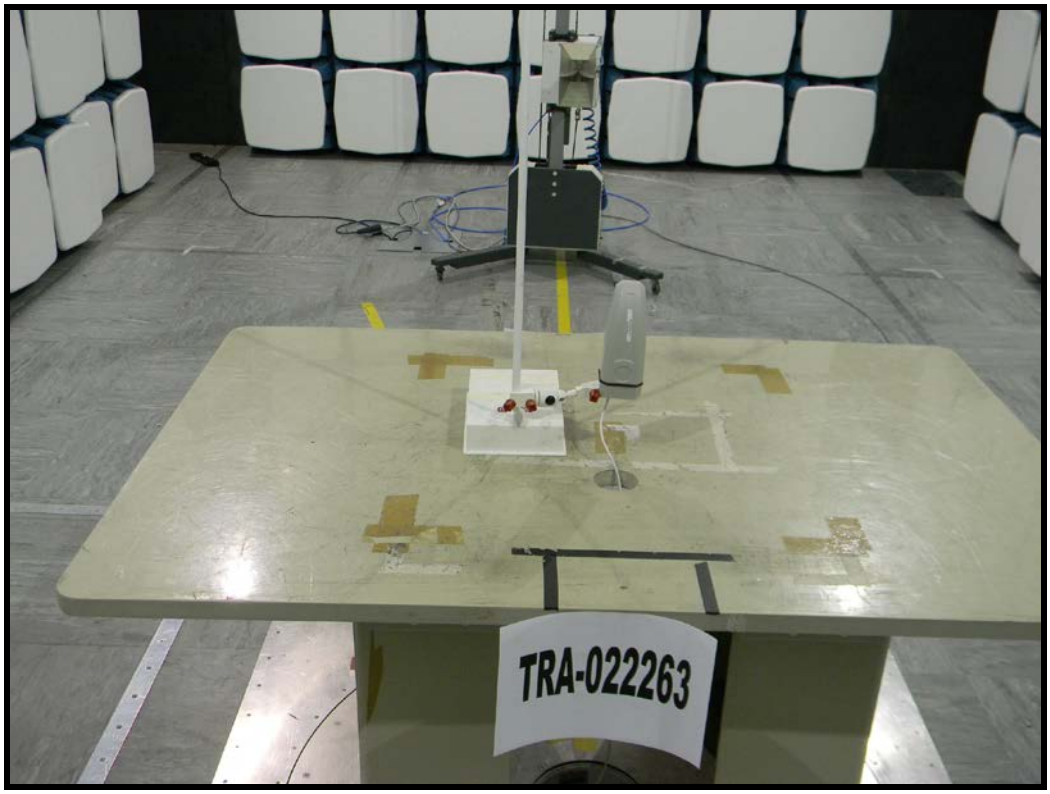
Photograph 1



Photograph 2

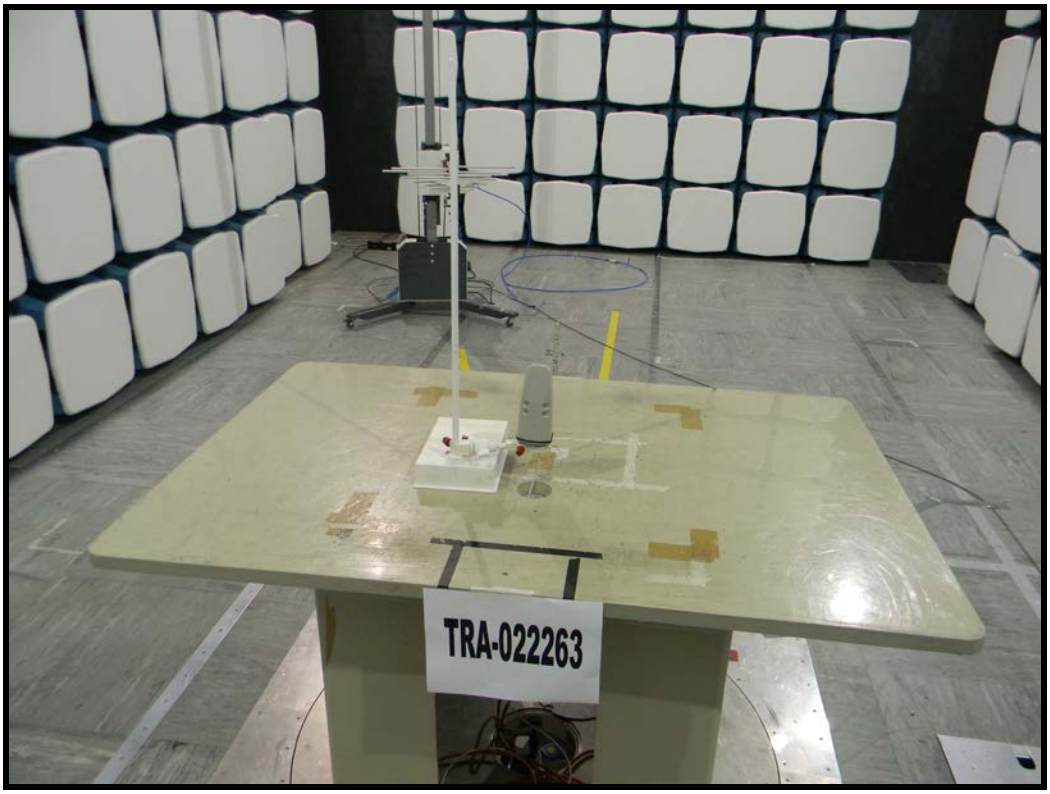


Photograph 3



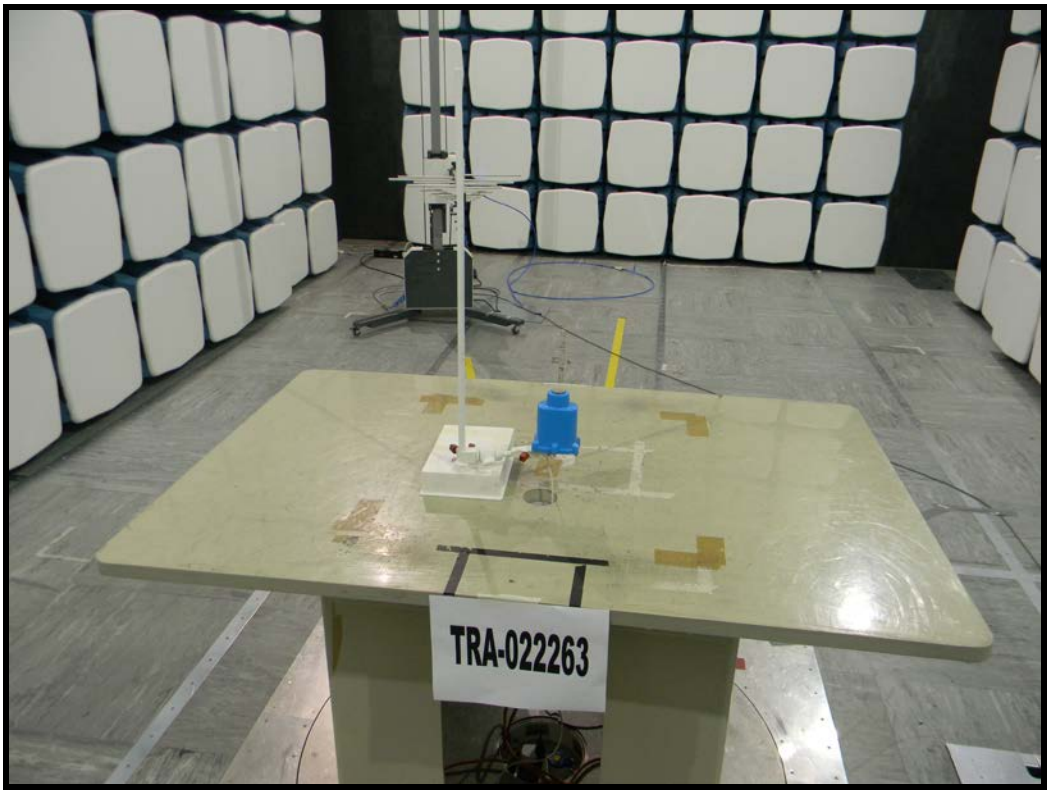
Photograph 4

Photograph 5



Photograph 6

Photograph 7



Photograph 8

Appendix F: **FCC To Industry Canada Comparison**

Test description

The EUT testing was carried out to FCC 47CFR Part 90.217 for maximum Radiated output power and Spurious Emissions Radiated..

Standards Comparison

RSS-119 Section 5.10 Transmitter with output power not exceeding 120mW is equivalent to FCC CFR47 Part 90.217

Both call for emission to be attenuated by the same requirement at the same frequency offsets.

In both the device is exempted from Spectrum Masks and Transient Power measurements

Test Type	Regulation		Measurement standard	Result
	RSS-119	Title 47 of the CFR		
Maximum Radiated Output Power	Section 5.10	Part 90.217	ANSI/TIA-603-C-2004	Pass
Spurious Emissions Radiated	Section 5.10	Part 2.1053	ANSI/TIA-603-C-2004	Pass

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