RADIO TEST REPORT

FOR

SCOPE COMMUNICATIONS UK LTD

ON

10mW MPA PENDANT Alarm Transmitter

DOCUMENT NO. TRA-009315-W-US1

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TRaC Wireless Test Report	**:** TRA-009315-W-US1
Applicant	**:** Scope Communications UK Ltd
Apparatus	**:** 10mW MPA Pendant Alarm Transmitter
Specification(s)	**:** CFR47 Part 90.217
Purpose of Test	**: Certification**
FCCID	**: JRNUSAPENLINK**
Authorised by	**:** 
	: Radio Product Manager
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Authorised Copy Number	**:** *PDF*

Total number of pages: 43

Contents

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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1.2 Tests Requested By

This testing in this report was requested by :

Scope Communications UK Ltd
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Devon
TQ9 5AL

1.3 Manufacturer

As above.

1.4 Apparatus Assessed

The following apparatus was assessed between 3rd – 8th December 2012:

MPA Pendant Alarm Transmitter Mk3

The apparatus is a pendant transmitter for use with an alarm system. The apparatus is designed to transmit between 430 MHz and 470 MHz with a carrier power below 120 mW to allow exemption from the full 47CFR Part 90 technical requirements.

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 (ERP)	Title 47 of the CFR: Part 2.1051	ASNI/TIA-603-C-2004	Pass
Unintentional Radiated Spurious Emissions (REFE)	Title 47 of the CFR: Part 15 Subpart (b) 15.109	ANSI C63.10:2009	Pass
AC Power conducted emissions	Title 47 of the CFR: Part 15 Subpart (c) 15.207	ANSI C63.10:2009	N/A
Occupied bandwidth/ Frequency Stability	Title 47 of the CFR: Part 90.217 (b).	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

There were no deviations from the standards tested to.

Section 2: Measurement Uncertainty

2.1 Measurement Uncertainty Values

For the test data recorded in accordance with note (iii) of Section 2.1 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	3.611kHz

Section 3: Modifications

3.1 Modifications Performed During Assessment

No modifications were performed during the assessment

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	S16
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	29°C
Photographs (Appendix E)	1 to 3

Ref No.	Freq (MHz)	Det.	Angle. Deg	Height (cm)	Pol.	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1	430.000	Pk	179	100	V	7.8	20.8	-13.0	Pass
2	450.000	Pk	183	100	V	7.5	20.8	-13.3	Pass
3	470.000	Pk	186	100	V	7.7	20.8	-13.1	Pass

The frequency listed in the above table 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 (ERP)

The assessment method used was a radiated measurement at normal test conditions. Please refer to section A1 for Effective Radiated Power (Transmitter Carrier Power e.r.p). Preliminary scans were performed using a peak detector with the RBW = 100kHz. The effective radiated power emission 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 : [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(b)
Measurement standard	ASNI/TIA-603-C-2004
Application	Cabinet and Antenna
EUT sample number	S16
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Temperature	29°C
Photographs (Appendix E)	1 to 3

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

ERP TX 430MHz						
Ref No.	Freq (MHz)	Det.	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
1	1290.035	Pk	-29.9	-22.2	-7.7	Pass
2	1719.918	Pk	-26.4	-22.2	-4.2	Pass
3	2579.932	Pk	-27.9	-22.2	-5.7	Pass
4	3010.053	Pk	-32.5	-22.2	-10.3	Pass
5	3869.878	Pk	-35.7	-22.2	-13.5	Pass

No further emissions were detected within 10dB of the specification limit

ERP TX 450MHz						
Ref No.	Freq (MHz)	Det.	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
6	1350.022	Pk	-36.3	-22.5	-13.8	Pass
7	2249.987	Pk	-35.6	-22.5	-13.1	Pass
8	2699.996	Pk	-35.0	-22.5	-12.5	Pass
9	3149.978	Pk	-29.8	-22.5	-7.3	Pass
10	4050.030	Pk	-40.1	-22.5	-17.6	Pass

No further emissions were detected within 10dB of the specification limit

ERP TX 470MHz						
Ref No.	Freq (MHz)	Det.	Result (dBm)	Spec. Limit (dBm)	Margin (dB)	Summary
11	1409.971	Pk	-30.4	-22.3	-8.1	Pass
12	1880.128	Pk	-42.7	-22.3	-20.4	Pass
13	2350.010	Pk	-33.2	-22.3	-10.9	Pass
14	2820.004	Pk	-37.5	-22.3	-15.2	Pass
15	3290.019	Pk	-41.5	-22.3	-19.2	Pass

No further emissions were detected within 10dB 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:

Channel Frequency (MHz)	Measured ERP Carrier (dBm)	Measured ERP Carrier – 30dB	Emission Limit (dBm)
430.0	7.8	7.8-30	-22.2
450.0	7.5	7.5-30	-22.5
470.0	7.7	7.7-30	-22.3

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

A3 Unintentional Radiated Emissions (Electric Field Strength)

Preliminary scans were performed using a peak detector with the RBW = 100kHz. The radiated electric filed emission test applies to all spurious emissions on directly related to the transmitter. The maximum permitted field strength is listed in Section 15.109. The EUT was set to operate in a transmit standby / receive mode.

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 (c) below.

Test Details:	
Regulation	Title 47 of the CFR, Part 15 Subpart (c) Clause 15.109
Measurement standard	ANSI C63.10:2009
Frequency range	30MHz to 5GHz
EUT sample number	S16
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs (Appendix E)	1 to 3

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

Ref No.	FREQ. (MHz)	MEAS Rx (dBµV)	CABLE LOSS (dB)	ANT FACT. (dB/m)	PRE AMP (dB)	FIELD ST'GH (dBµV/m)	EXTRAP FACT (dB)	FIELD ST'GH (dBµV/m)	LIMIT (dBµV/m)
1.	32.207	46.2	0.7	12.5	31.6	27.8	0	27.8	40.0
2.	123.130	35.4	1.8	11.5	31.5	17.2	0	17.2	43.5

No further Significant Emissions Within 10dB of Limit.

Notes:

1 Any testing performed below 30 MHz was performed using a magnetic loop antenna in accordance with ANSI C63.10: section 4.5, Table 1 For emissions below 30MHz the cable losses are assumed to be negligible.
2 In accordance with 15.35(b), above 1 GHz, emissions measured using a peak detector shall not exceed a level 20 dB above the average limit.
3 Testing was performed with the EUT orientated in three orthogonal planes and the maximum emissions level recorded. In addition, the EUT antenna was varied within its range of motion in order to maximise emissions.
4 For Frequencies below 1 GHz, RBW = 120 kHz, testing was performed with CISPR16 compliant test receiver with QP detector. Above 1 GHz tests were performed using a spectrum analyser using the following settings:

Peak	RBW=VBW= 1MHz
Average	RBW=VBW= 1MHz

The upper and lower frequency of the measurement range was decided according to 47 CFR Part 15:2008 Clause 15.33(a) and 15.33(a)(1).

Radiated emission limits 47 CFR Part 15: Clause 15.209 for all emissions:

Frequency of emission (MHz)	Field strength μV/m	Measurement Distance m	Field strength dBμV/m
0.009-0.490	2400/F(kHz)	300	67.6/F (kHz)
0.490-1.705	24000/F(kHz)	30	87.6/F (kHz
1.705-30	30	30	29.5
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
Above 960	500	3	54.0

(a) Where results have been measured at one distance, and a signal level displayed at another, the results have been extrapolated using the following formula:

$$\text{Extrapolation}\,(\text{dB}) = 20\log_{10}\left(\frac{\text{measurement distance}}{\text{specification distance}}\right)$$

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

(c) 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

A4 Power Line Conducted Emissions

The EUT is a battery powered device. No assessment to the Title 47 of the CFR Part 15 Subpart (c) clause 15.207 has been made.

A5 Occupied Bandwidth

Test Details:	
Regulation	Title 47 of the CFR: Part 90.217(b)
Measurement standard	Title 47 of the CFR: Part 2.1049
EUT sample number	S18
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C

Measurements were made on the EUT at points 30 dB down from the peak carrier emission with the EUT transmitting at the lowest, middle and highest channels in turn.

Frequency Of Operation and Channel Test Conditions		Measured FL (MHz)	Measured FU (MHz)	Limit FL (MHz)	Limit FU (MHz)	Verdict
430MHz V_{nom}	-30°C	429.98733	430.00900	429.97500	430.02500	Pass
	-20°C	429.98750	430.01025	429.97500	430.02500	Pass
	-10°C	429.98942	430.01217	429.97500	430.02500	Pass
	0°C	429.98958	430.01150	429.97500	430.02500	Pass
	+10°C	429.98950	430.01192	429.97500	430.02500	Pass
	+20°C	429.98883	430.01125	429.97500	430.02500	Pass
	+30°C	429.98892	430.01058	429.97500	430.02500	Pass
	+40°C	429.98858	430.01000	429.97500	430.02500	Pass
	+50°C	429.98783	430.00967	429.97500	430.02500	Pass

Frequency Of Operation and Channel Test Conditions		Measured FL (MHz)	Measured FU (MHz)	Limit FL (MHz)	Limit FU (MHz)	Verdict
450MHz V_{nom}	-30°C	449.98400	450.00933	449.97500	450.02500	Pass
	-20°C	449.98767	450.01067	449.97500	450.02500	Pass
	-10°C	449.98900	450.01142	449.97500	450.02500	Pass
	0°C	449.98958	450.01142	449.97500	450.02500	Pass
	+10°C	449.98950	450.01192	449.97500	450.02500	Pass
	+20°C	449.98967	450.01150	449.97500	450.02500	Pass
	+30°C	449.98850	450.01067	449.97500	450.02500	Pass
	+40°C	449.98867	450.00958	449.97500	450.02500	Pass
	+50°C	449.98800	450.00967	449.97500	450.02500	Pass

Frequency Of Operation and Channel Test Conditions		Measured FL (MHz)	Measured FU (MHz)	Limit FL (MHz)	Limit FU (MHz)	Verdict
470MHz V_{nom}	-30°C	469.984	470.00817	469.07500	470.02500	Pass
	-20°C	469.98758	470.01125	469.07500	470.02500	Pass
	-10°C	469.98900	470.01167	469.07500	470.02500	Pass
	0°C	469.98925	470.01200	469.07500	470.02500	Pass
	+10°C	469.98958	470.01200	469.07500	470.02500	Pass
	+20°C	469.98950	470.01125	469.07500	470.02500	Pass
	+30°C	469.98858	470.01083	469.07500	470.02500	Pass
	+40°C	469.98800	470.01025	469.07500	470.02500	Pass
	+50°C	469.98700	470.00967	469.07500	470.02500	Pass

Frequency Of Operation and Channel Test Conditions		Measured Frequency (MHz)	Drift (MHz)	Verdict
430MHz $temp_{nom}$ +20°C	-30°C	429.998165	0.001875	Pass
	-20°C	429.998875	0.001165	Pass
	-10°C	430.000795	-0.000755	Pass
	0°C	430.00054	-0.0005	Pass
	+10°C	430.00071	-0.00067	Pass
	+20°C	430.00004	0	Pass
	+30°C	429.99975	0.00029	Pass
	+40°C	429.99929	0.00075	Pass
	+50°C	429.99875	0.00129	Pass

Frequency Of Operation and Channel Test Conditions		Measured Frequency (MHz)	Drift (MHz)	Verdict
450MHz $temp_{nom}$ +20°C	-30°C	449.996665	0.00392	Pass
	-20°C	449.99917	0.001415	Pass
	-10°C	450.00021	0.000375	Pass
	0°C	450.0005	8.5E-05	Pass
	+10°C	450.00071	-0.000125	Pass
	+20°C	450.000585	0	Pass
	+30°C	449.999585	0.001	Pass
	+40°C	449.999125	0.00146	Pass
	+50°C	449.998835	0.00175	Pass

Frequency Of Operation and Channel Test Conditions		Measured Frequency (MHz)	Drift (MHz)	Verdict
470MHz $temp_{nom}$ +20°C	-30°C	469.996085	0.00429	Pass
	-20°C	469.999415	0.00096	Pass
	-10°C	470.000335	4E-05	Pass
	0°C	470.000625	-0.00025	Pass
	+10°C	470.00079	-0.000415	Pass
	+20°C	470.000375	0	Pass
	+30°C	469.999705	0.00067	Pass
	+40°C	469.999125	0.00125	Pass
	+50°C	469.998335	0.00204	Pass

Limits

In accordance with Title 47 of the CFR: Part 90.217 (b) For equipment designed to operate with a 12.5 kHz channel bandwidth, the sum of the bandwidth occupied by the emitted signal plus the bandwidth required for frequency stability shall be adjusted so that any emission appearing on a frequency 25 kHz or more removed from the assigned frequency is attenuated at least 30 dB below the unmodulated carrier.

Appendix B: Supporting Graphical Data

This appendix contains graphical data obtained during testing.

Notes:

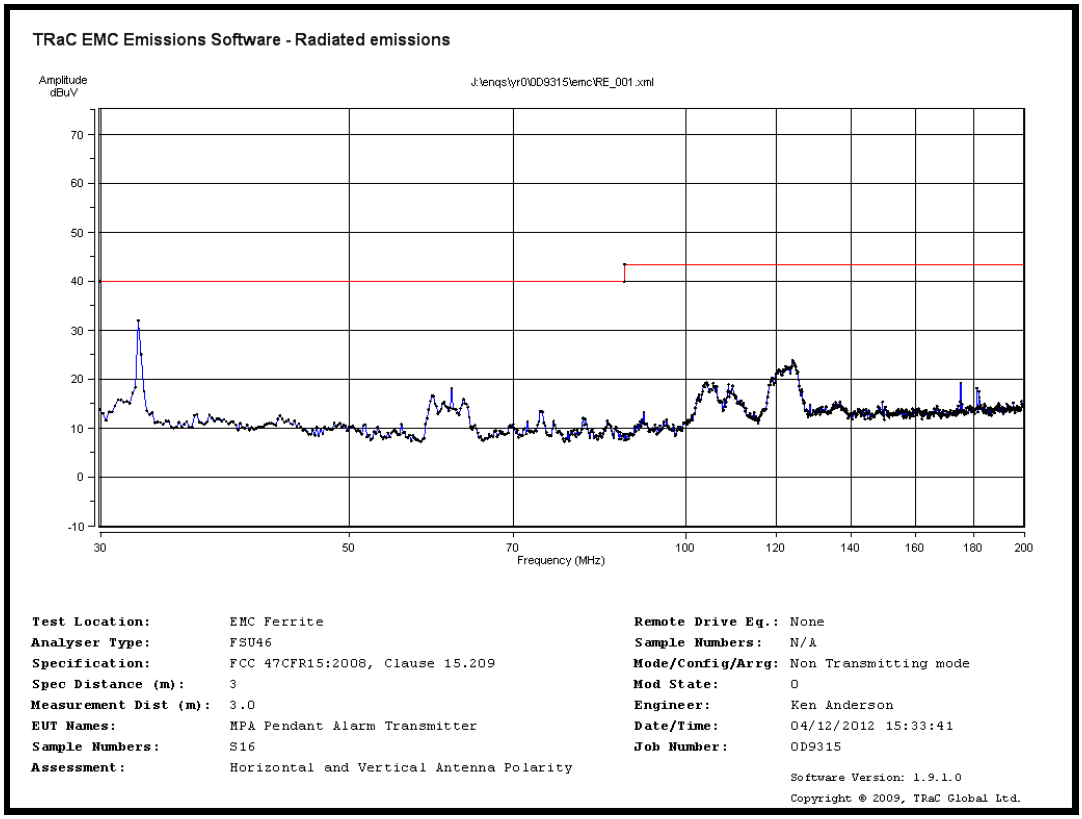
(a) The radiated electric field emissions and conducted emissions graphical data in this appendix is preview data. For details of formal results, refer to Appendix A and Appendix B.

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

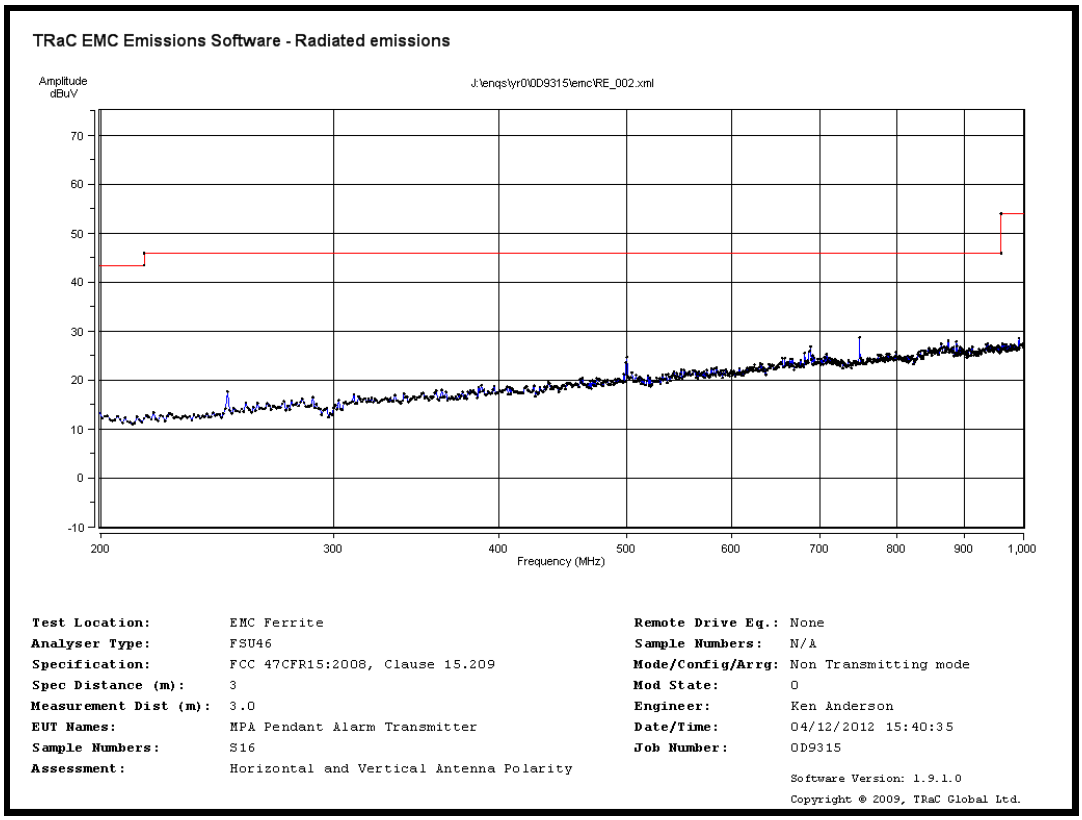
(c) Where relevant, on power line conducted emission plots, the limit displayed is the average limit, which is stricter than the quasi peak limit.

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

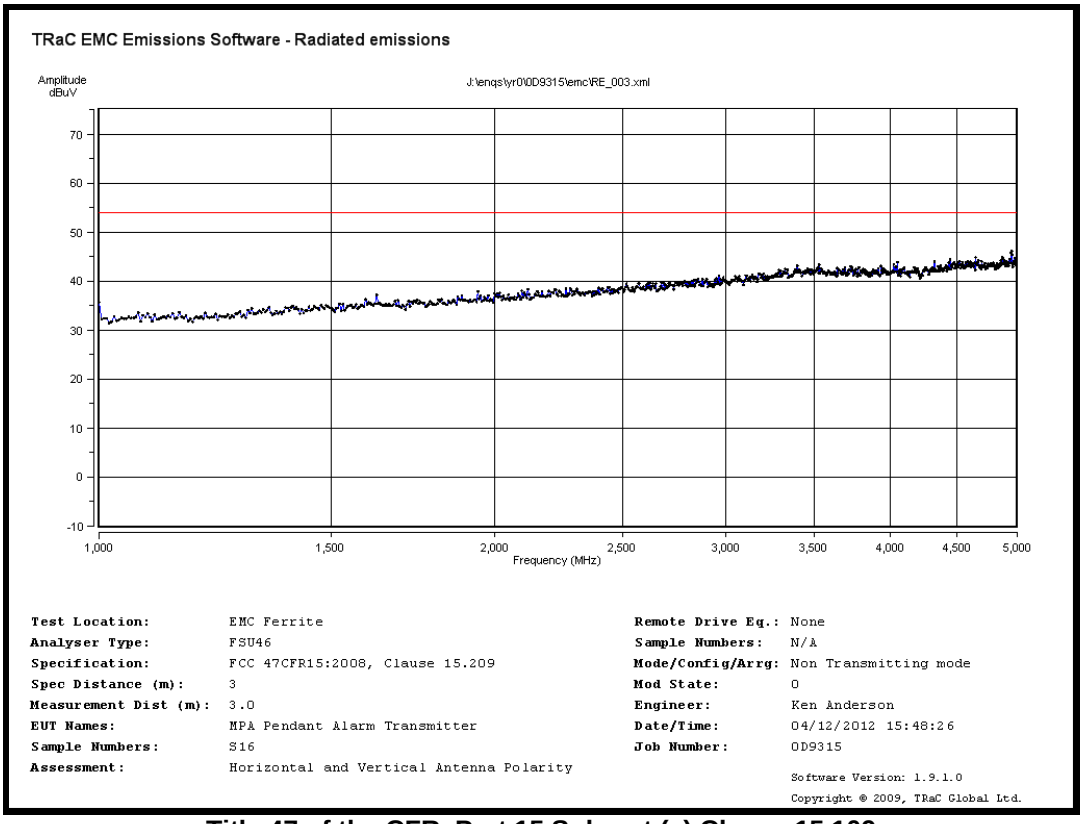
(e) The plots presented in this appendix may not be a complete record of the measurements performed, but are a representative sample, relative to the final assessment.



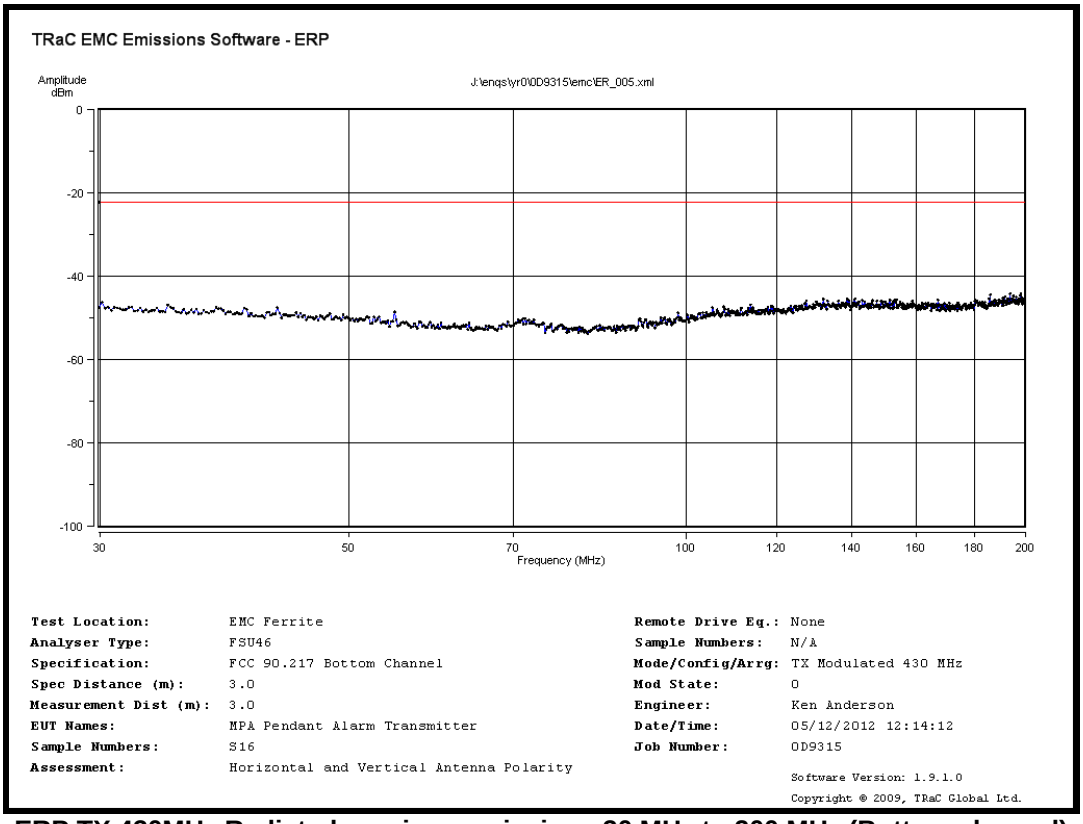
Title 47 of the CFR, Part 15 Subpart (c) Clause 15.109
Radiated spurious emissions 30 MHz to 200MHz



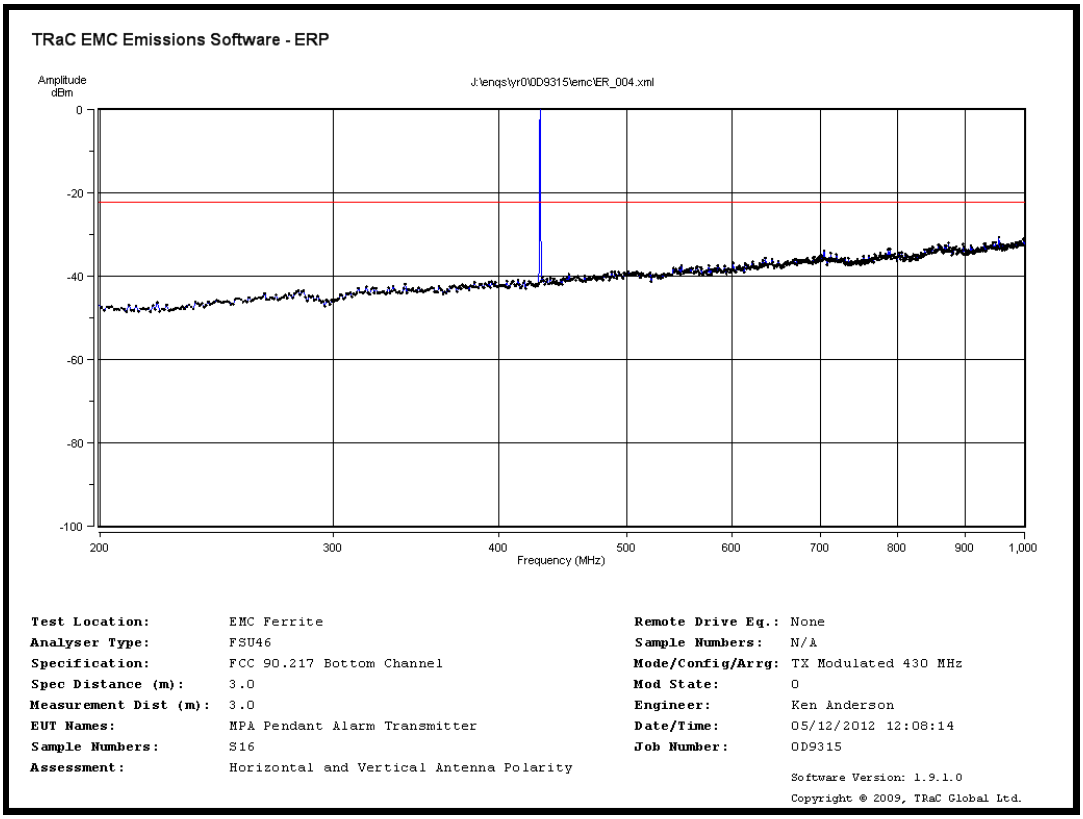
Title 47 of the CFR, Part 15 Subpart (c) Clause 15.109
Radiated spurious emissions 200 MHz to 1GHz



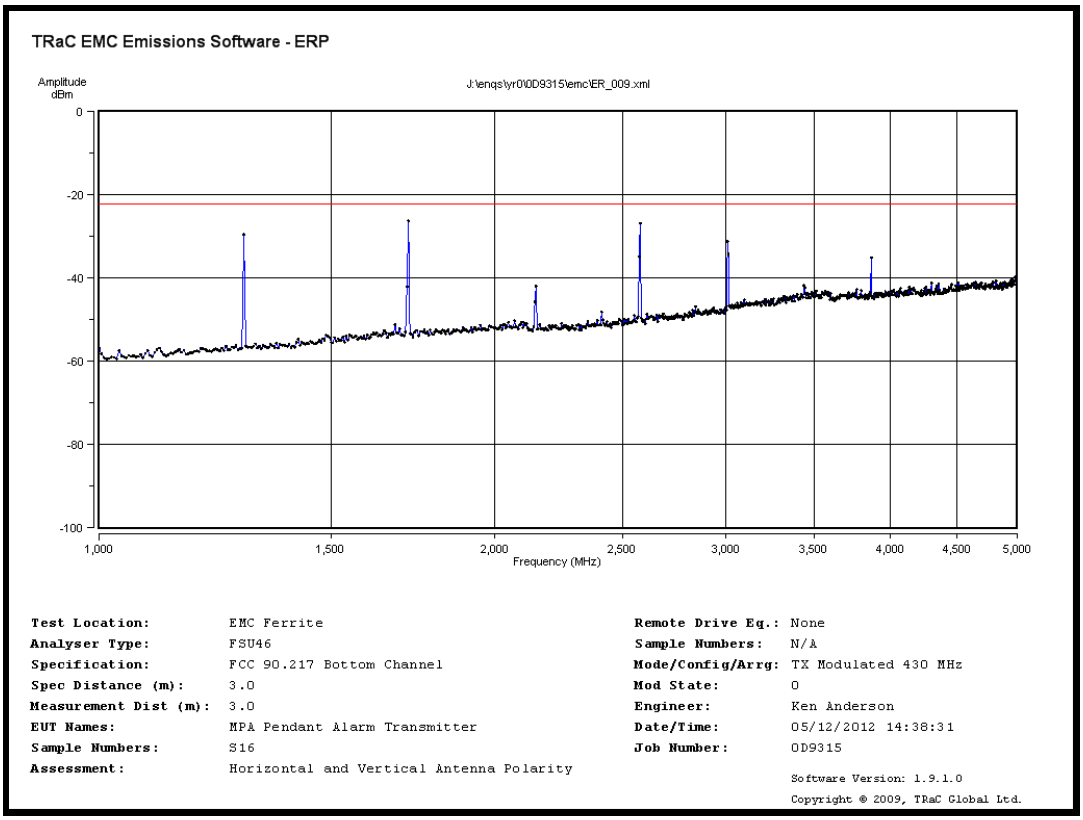
Title 47 of the CFR, Part 15 Subpart (c) Clause 15.109
Radiated spurious emissions 1 GHz to 5 GHz



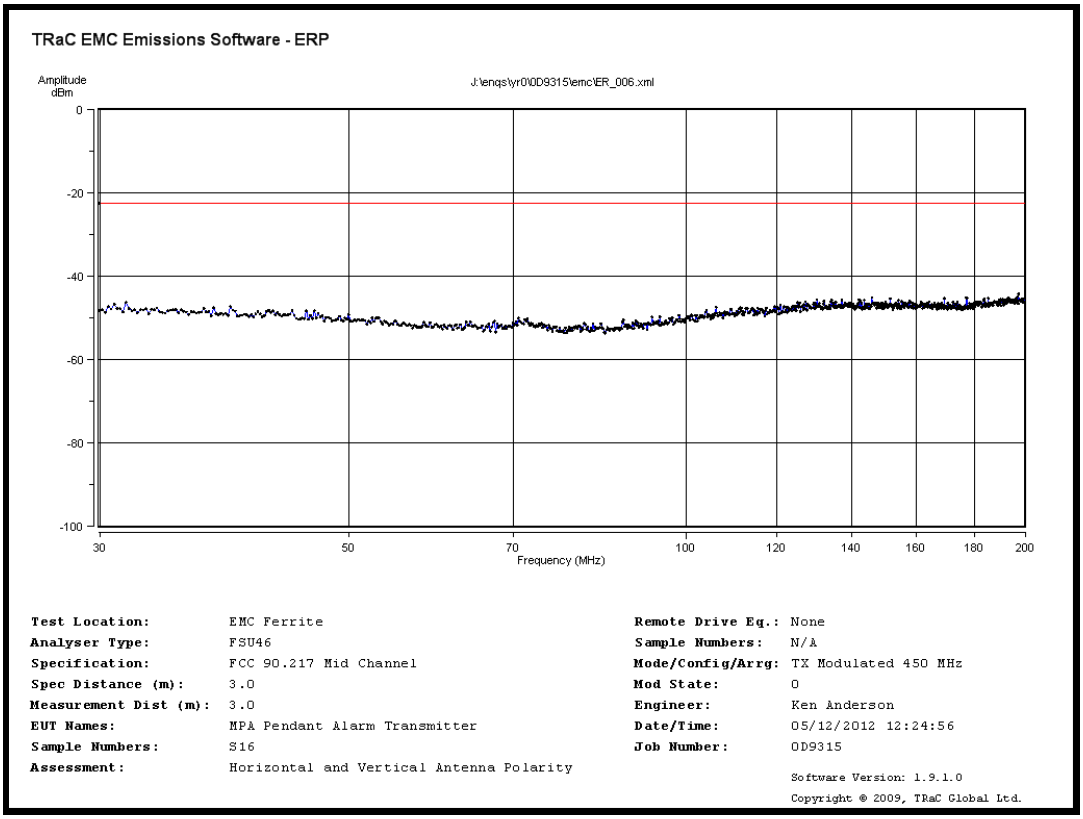
ERP TX 430MHz Radiated spurious emissions 30 MHz to 200 MHz (Bottom channel)



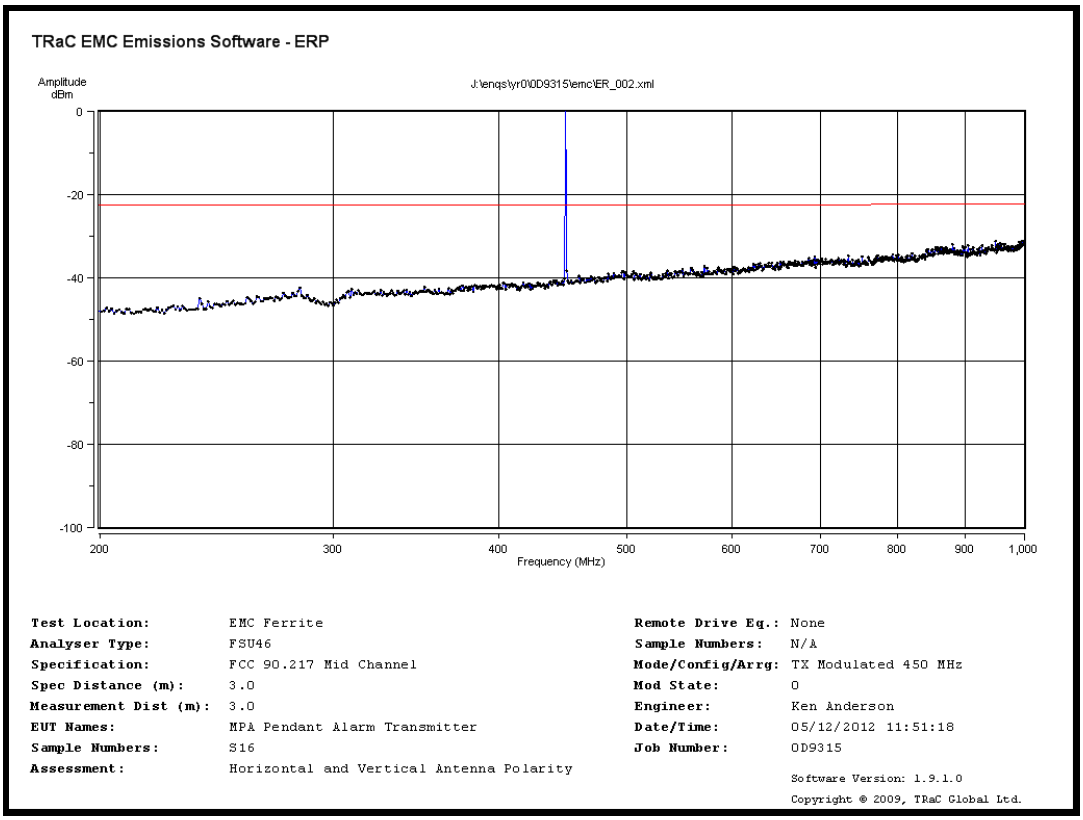
ERP TX 430MHz Radiated spurious emissions 200 MHz to 1 GHz (Bottom channel)



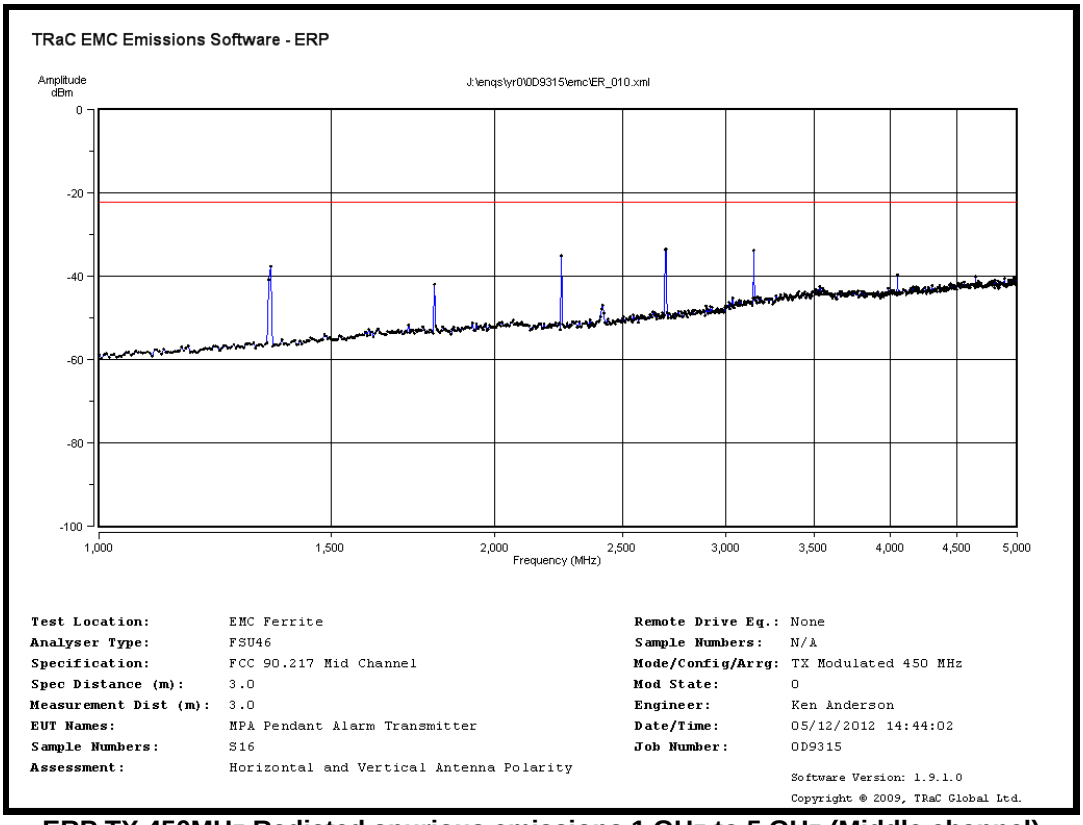
ERP TX 430MHz Radiated spurious emissions 1 GHz to 5 GHz (Bottom channel)



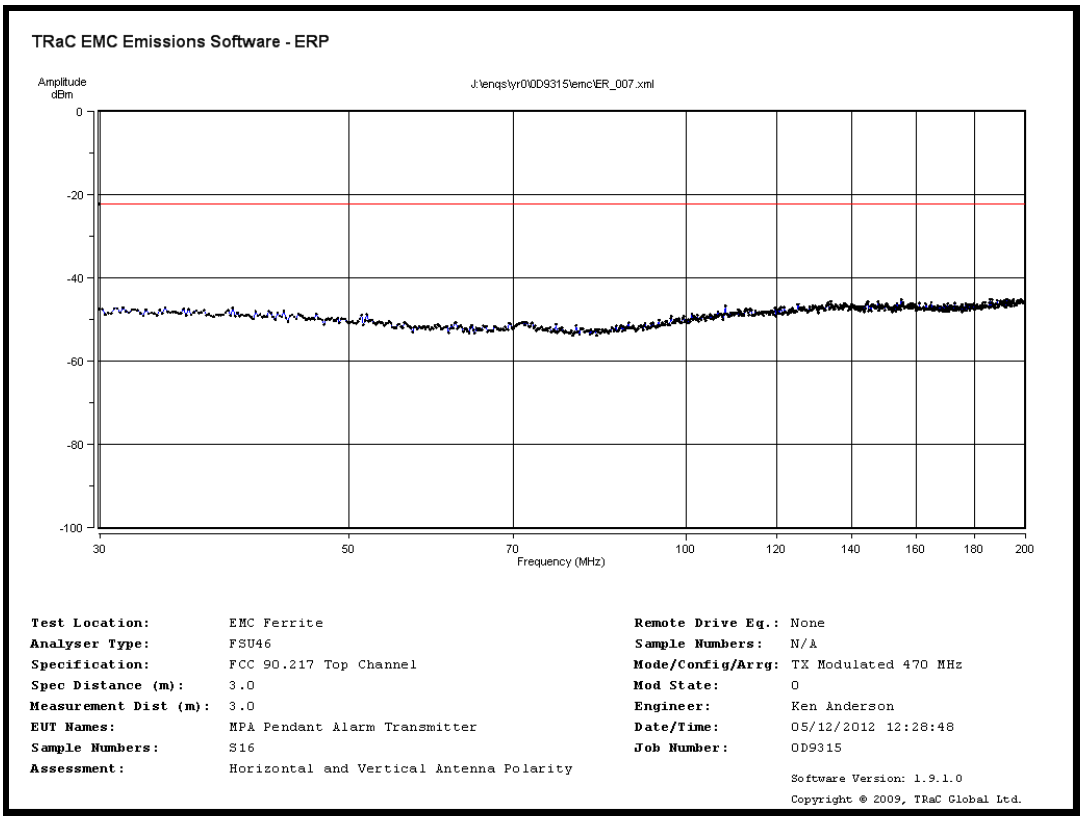
ERP TX 450MHz Radiated spurious emissions 30 MHz to 200 MHz (Middle channel)



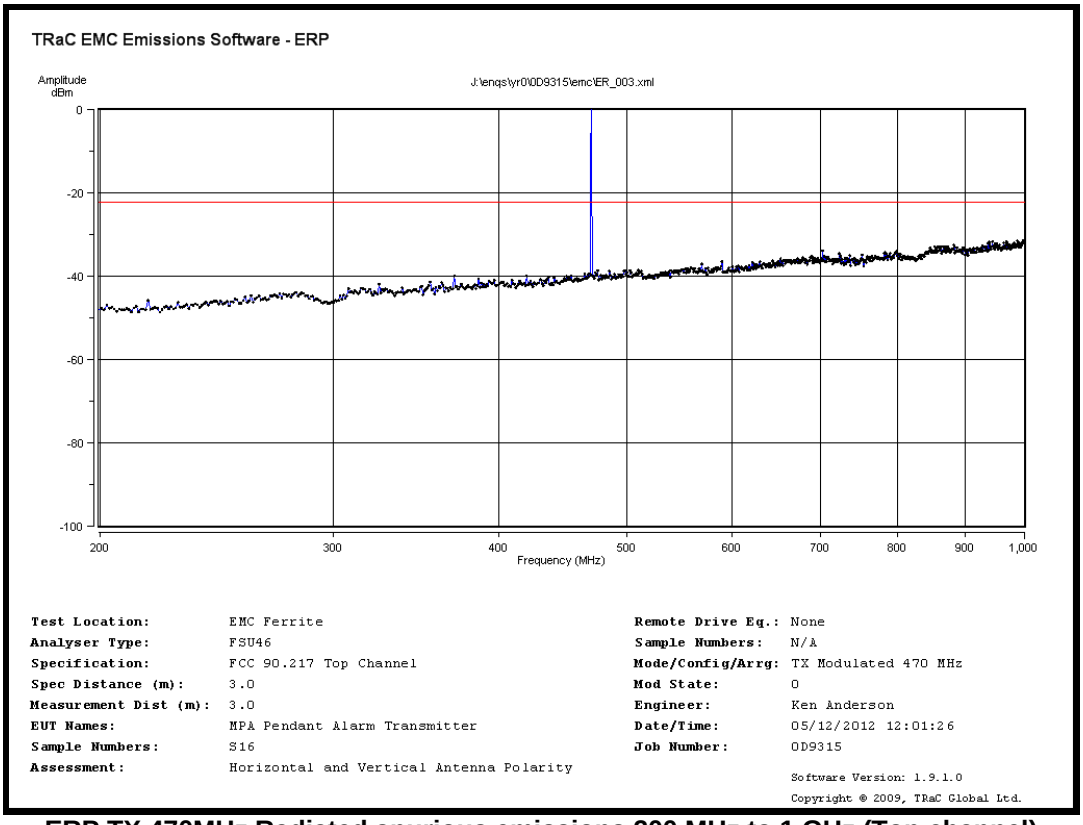
ERP TX 450MHz Radiated spurious emissions 200 MHz to 1 GHz (Middle channel)



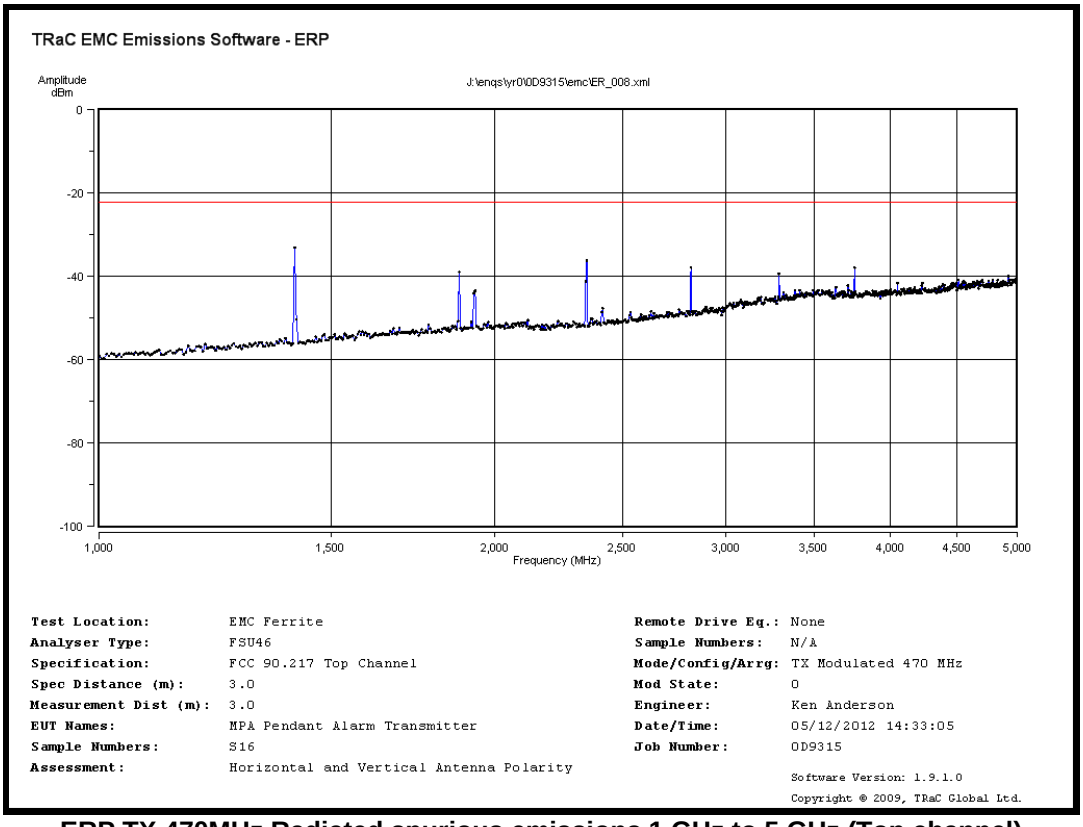
ERP TX 450MHz Radiated spurious emissions 1 GHz to 5 GHz (Middle channel)



ERP TX 470MHz Radiated spurious emissions 30 MHz to 200 MHz (Top channel)



ERP TX 470MHz Radiated spurious emissions 200 MHz to 1 GHz (Top channel)



ERP TX 470MHz Radiated spurious emissions 1 GHz to 5 GHz (Top channel)

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
S16	MPA Pendant Alarm MK3 Transmitter Radiated Sample	MPA-01
S18	MPA Pendant Alarm MK3 Transmitter Conducted Sample	MPA-03

C2) EUT Operating Mode During Testing.

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

Test	Description of Operating Mode
All tests detailed in this report except receiver radiated (ERP) spurious emissions	EUT transmitting FSK modulation on 430MHz, 450 MHz and 470MHz

Test	Description of Operating Mode:
Receiver radiated (ERP) spurious emissions	EUT active but non-transmitting.

C3) EUT Configuration Information.

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

C4) List of EUT Ports

The EUT was a battery powered device with no external ports

C5 Details of Equipment Used

For Radiated Measurements:

RFG No	Type	Description	Manufacturer	Date Calibrated
REF886	Lab 16	Large Anechoic Chamber	Rainford	27/07/12
095	3109	Bicon Antenna (30-200MHz)	Eaton	12/05/10
191	3146	Log Periodic Antenna (200-100MHz)	EMCO	12/05/10
REF880	HL050	Log-Perodic antenna (1-26.5GHz)	R & S	26/05/11
REF927	N10149	Pre-Amp	Sonoma	15/09/11
REF913	8449B	Pre-Amp (1 to 26.5GHz)	HP	09/01/12
REF909	FSU46	Spectrum Analyser	R & S	02/12/11
RFG452		HF RF coaxial cable	UTIFLEX	02/07/12
REF881		HF RF coaxial cable	Teledyne Reynolds	02/07/12
REF882		HF RF coaxial cable	Teledyne Reynolds	02/07/12
REF884		HF RF coaxial cable	Teledyne Reynolds	02/07/12
REF885		HF RF coaxial cable	Teledyne Reynolds	02/07/12
REF889	N	6dB PAD	Mini Circuits	28/09/11
REF859	9117	Bicon Antenna	VUBA	21/09/11
REF832		HF RF coaxial cable	Teledyne Reynolds	02/07/12
REF919	219-8004-4000 0311	Type K Male to Type K Male Cable 4.0m	Teledyne Reynolds	26/03/12
129	3115	Horn Antenna (1 to 18GHz)	EMCO	14/09/11
227	2024	Signal generator	Marconi	05/07/12
360	SMP22	Signal generator	R & S	24/04/11

For Conducted Measurements

RFG No	Type	Description	Manufacturer	Date Calibrated
REF835	PSA	Spectrum Analyser	Agilent	04/05/12
REF832	219-8004-2000 0608	HF RF coaxial cable	Teledyne Reynolds	02/07/12

Appendix D: Additional Information

No additional information is included within this test report.

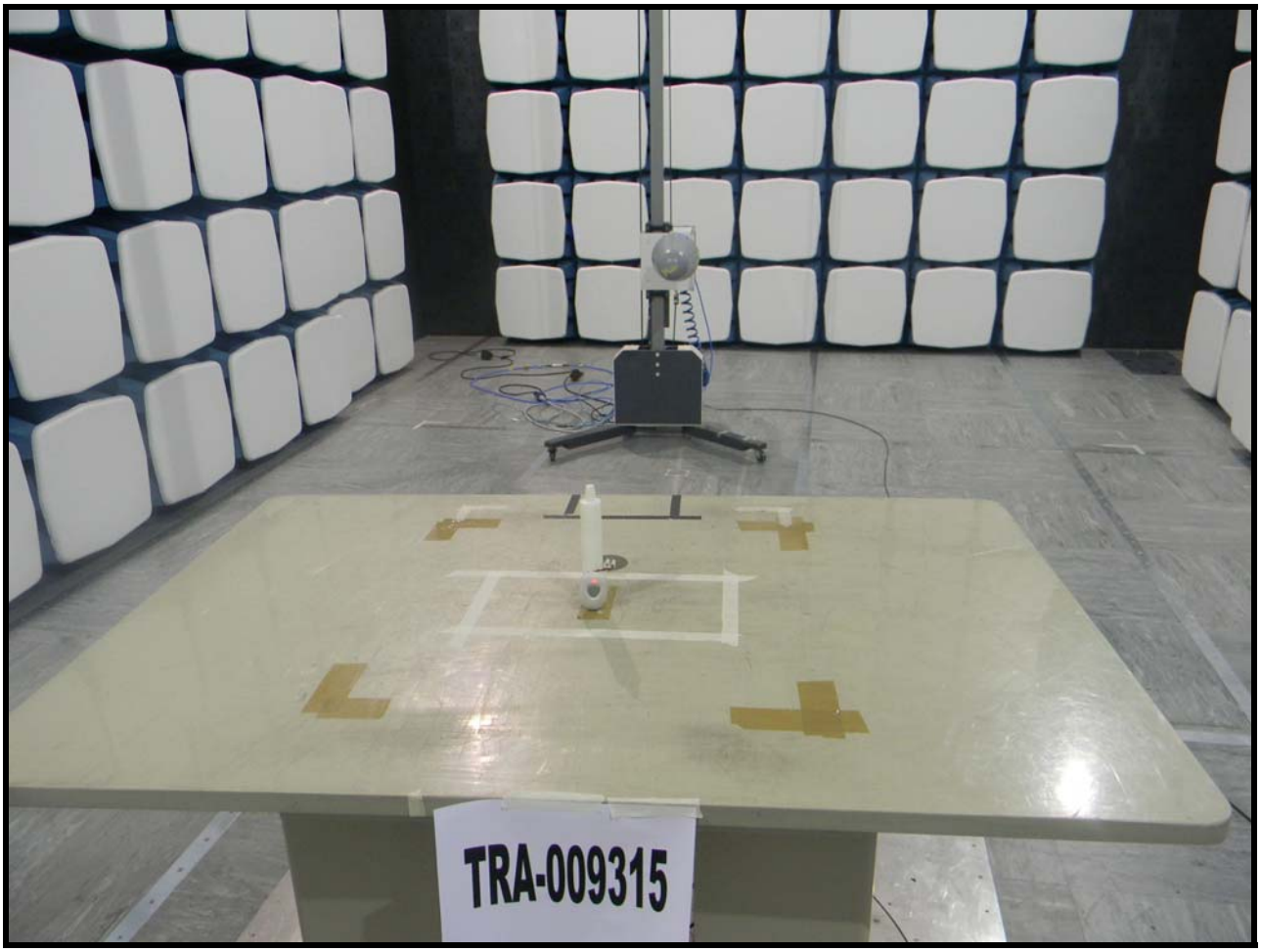
Appendix E: Photographs and Figures

The following photographs were taken of the test samples:

1. Radiated electric field emissions arrangement: Front view.
2. Radiated electric field emissions arrangement: Front view close up.
3. Radiated electric field emissions arrangement: Rear view close up.

Photograph 1

Photograph 2



Photograph 3

Appendix F: MPE Calculation

OET Bulletin No. 65, Supplement C 01-01

47 CFR §§1.1307 and 2.1091

2.1091 Radio frequency radiation exposure evaluation: mobile devices.

For purposes of these requirements mobile devices are defined by the FCC as transmitters designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimetres is normally maintained between radiating structures and the body of the user or nearby persons. These devices are normally evaluated for exposure potential with relation to the MPE limits. As the 20cm separation specified under FCC rules may not be achievable under normal operation of the EUT, an RF exposure calculation is needed to show the minimum distance required to be less than 1mW/cm^2 power density limit, as required under FCC rules.

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{EIRP}{4\pi R^2} \quad \text{re - arranged} \quad R = \sqrt{\frac{EIRP}{S\ 4\pi}}$$

where:

S = power density
R = distance to the centre of radiation of the antenna
EIRP = EUT Maximum power

Note:

The EIRP measurement was performed using a signal substitution method.

Result

Prediction Frequency (MHz)	Maximum EIRP (mW)	Power density limit (S) (mW/cm^2)	Distance (R) cm required to be less than 1mW/cm^2
430 MHz	6	1	1.9

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