Radio Test Report

for

Widex A/S

on

Dream Fashion Power (D-FA P)

Document No: TRA-022250-W-US-1

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Radio Test Report	: TRA-022250-W-US-1
Applicant	: Widex A/S
Apparatus	: Dream Fashion Power (D-FA P)
Specification(s)	: CFR47 Part 15 (c) & RSS-210
Purpose of Test	: Certification
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Contents

Section 1: Introduction

1.1 General

This report contains an assessment of an apparatus 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:

Widex A/S
Nymoellevej 6
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Denmark

1.3 Manufacturer

As Above

1.4 Apparatus Assessed

The following apparatus was assessed between: 10/09/14 and 12/09/14

Dream Fashion Power (D-FA P)

The above equipment was a hearing aid containing radio circuitry operating at 10.6 MHz

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
Spurious Emissions Radiated <1000MHz	Title 47 of the CFR: Part 15 Subpart (c) 15.209	ANSI C63.10	Pass
Spurious Emissions Radiated >1000MHz	Title 47 of the CFR: Part 15 Subpart (c)	ANSI C63.10	N/A
AC Power conducted emissions	Title 47 of the CFR: Part 15 Subpart (c) 15.207	ANSI C63.10	N/A
Intentional Emission Frequency	Title 47 of the CFR: Part 15 Subpart (c) 15.209	ANSI C63.10	Pass
Intentional Emission Field Strength:	Title 47 of the CFR: Part 15 Subpart (c) 15. 209	ANSI C63.10	Pass
Intentional Emission Band Occupancy	Title 47 of the CFR: Part 15 Subpart (c) 15.215	ANSI C63.10	Pass
Intentional Emission ERP (mW)	Title 47 of the CFR: Part 15 Subpart (c)	ANSI C63.10	N/A
Unintentional Radiated Spurious Emissions	Title 47 of the CFR: Part 15 Subpart (b) 15.109	ANSI C63.10	Pass
Antenna Arrangements Integral:	Title 47 of the CFR: Part 15 Subpart (c) 15.203	-	Pass
Antenna Arrangements External Connector	Title 47 of the CFR: Part 15 Subpart (c) 15.204	-	-
Restricted Bands	Title 47 of the CFR: Part 15 Subpart (c) 15.205	-	-
Maximum Frequency Of Search	Title 47 of the CFR: Part 15 Subpart (c) 15.33	-	-
Extrapolation Factor	Title 47 of the CFR: Part 15 Subpart (c) 15.31(f)	-	-

Abbreviations used in the above table:

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

Due to the low level of the signal, any measurements at frequencies < 30MHz were made a distance of 1m.

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	1.0×10^{-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 Transmitter Intentional Emission Radiated

Test Details:	
Regulation	Title 47 of the CFR: Part15 Subpart (c) 15.209(b)(1)
Measurement standard	ANSI C63.10:2009
EUT sample number	S37
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs (Appendix F)	Photograph 1

FREQ. (MHz)	MEASUREMENT DISTANCE Meters	MEASUREMENT Rx. READING (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)
10.395	1.0	45.4	59.1	0.21
Limit value @ fc		30 µV/m		
Band occupancy @ -20 dBc		f lower	f higher	
		10.274 MHz	10.936 MHz	
		662 kHz		

Notes:
1 Results quoted are extrapolated as indicated
2 Receiver detector @ fc = Quasi Peak 10 kHz
3 When battery powered the EUT was powered with new batteries
4 Extrapolation 1 - 30 Meters 59.1 dB as per 15.31(f)
5 Due to the low level of the signal, measurements at a distance greater than 1 meter could not be made.
6 All measurement below 30MHz made with loop antenna

Test Method:
1 As per Radio – Noise Emissions, ANSI C63.10
2 Measuring distances 1m
3 EUT 0.8 metre above ground plane
4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded

A2 Radiated Electric Field Emissions

Preliminary scans were performed using a peak detector with the RBW = 100 kHz. The radiated electric field emission test applies to all spurious emissions and harmonics emissions. The maximum permitted field strength is listed in Section 15.209. The EUT was set to transmit as required.

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

3m open area test site :		1m (at frequencies < 30MHz) and 3m (at frequencies ≥ 30MHz) 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 15.209
Measurement standard	ANSI C63.10:2009
Frequency range	9kHz – 1000MHz
EUT sample number	S38
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs (Appendix F)	Photographs 1

The worst case radiated emission measurements for spurious emissions and harmonics that fall within the restricted bands 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 (µV/m)**	**LIMIT (µV/m)**
1.	No Significant Emissions Within 20 dB of the limit								

The worst measured noise floor level was 21.6 dBµV/m at 1000 MHz.

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

A3 Unintentional Radiated Emissions

Preliminary scans were performed using a peak detector with the RBW = 100 kHz. The radiated electric field 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 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 :		1m (at frequencies < 30MHz) and 3m (at frequencies ≥ 30MHz) 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	9kHz – 1000MHz
EUT sample number	S40
Modification state	0
SE in test environment	None
SE isolated from EUT	None
EUT set up	Refer to Appendix C
Photographs (Appendix F)	Photographs 1

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 (µV/m)	LIMIT (µV/m)
1	No Significant Emissions Within 20 dB of the limit								

The worst measured noise floor level was 21.6 dBµV/m at 1000 MHz.

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 15.109 for all emissions:

Frequency of emission (MHz)	Field strength μV/m	Measurement Distance m	Field strength dBμV/m
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

Appendix B: Supporting Graphical Data

This appendix contains graphical data obtained during testing.

Notes:

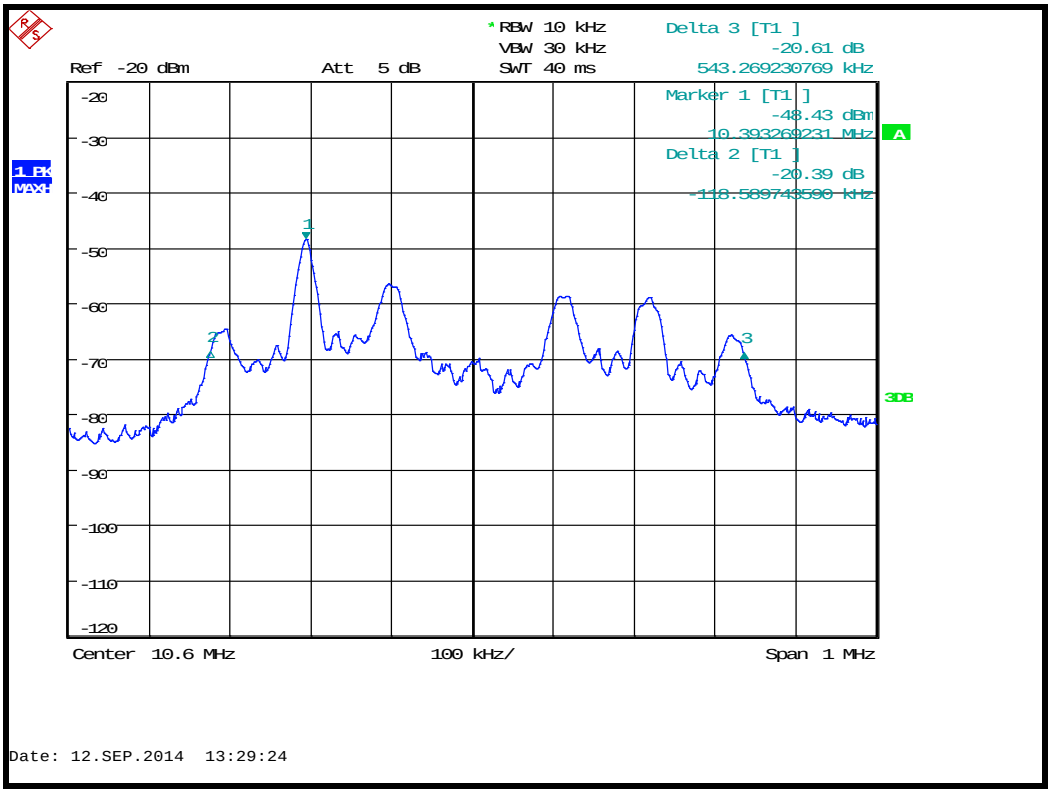
(a) The radiated electric field emissions and conducted emissions graphical data in this appendix is preview data. For details of formal results, refer to Appendix A and Appendix B.

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

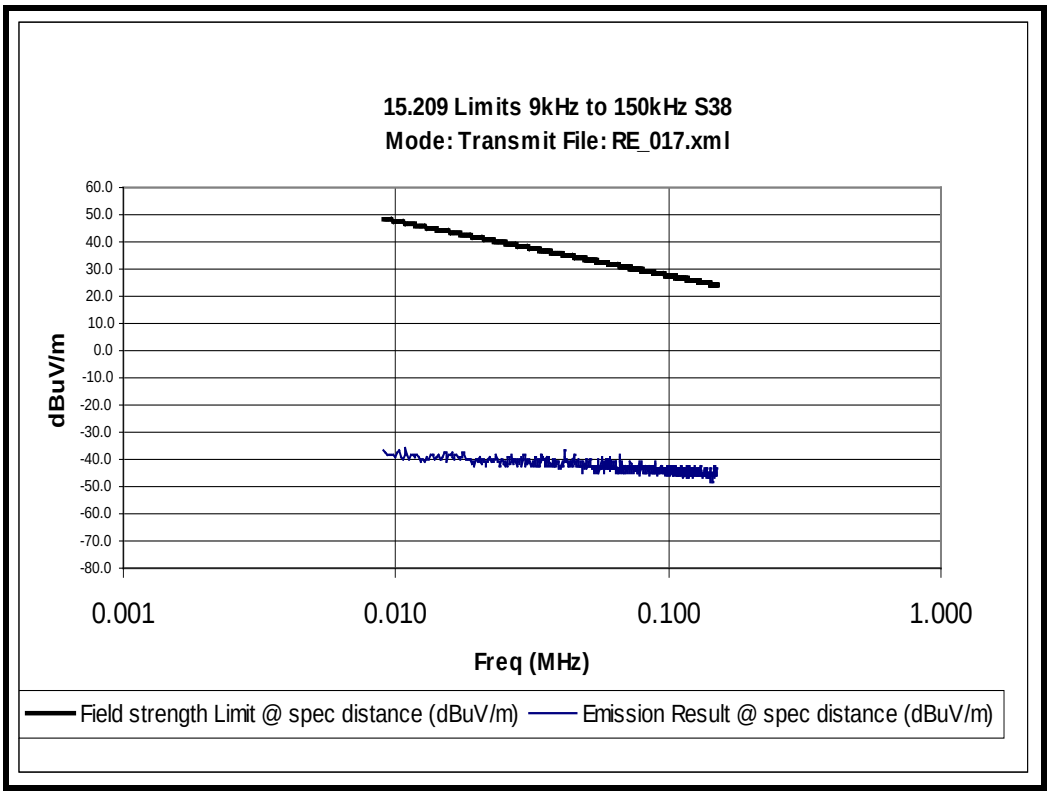
(c) Where relevant, on power line conducted emission plots, the limit displayed is the average limit, which is stricter than the quasi peak limit.

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

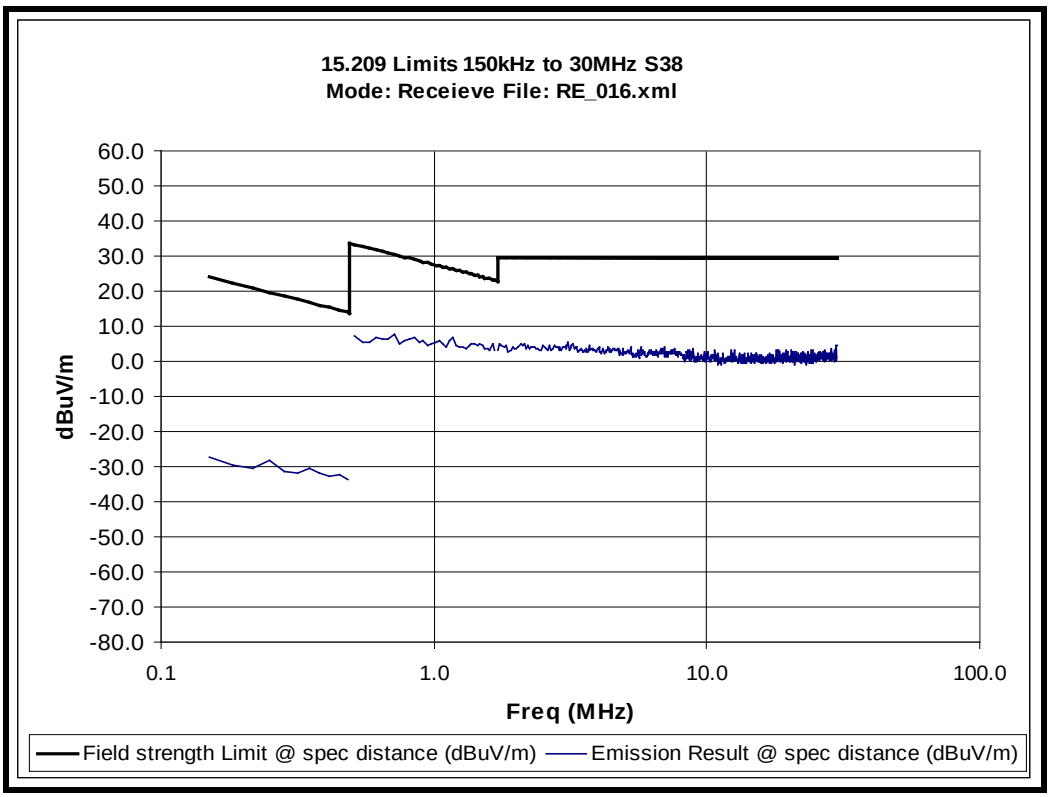
(e) The plots presented in this appendix may not be a complete record of the measurements performed, but are a representative sample, relative to the final assessment.



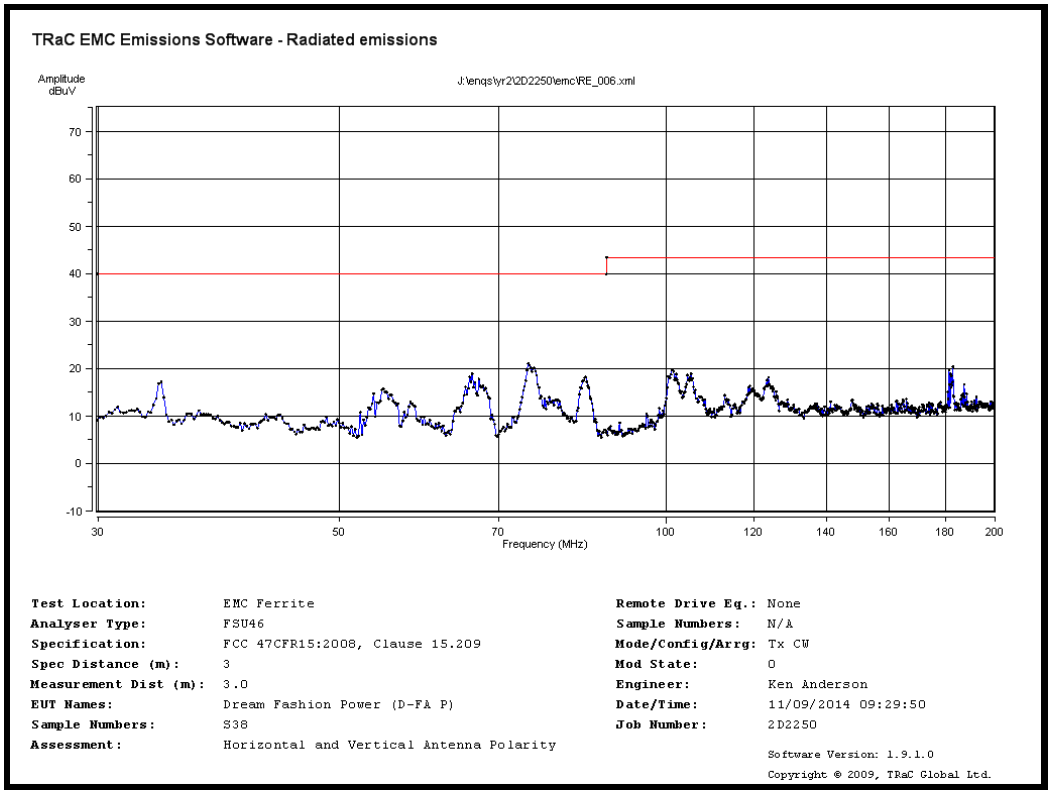
20dB Bandwidth



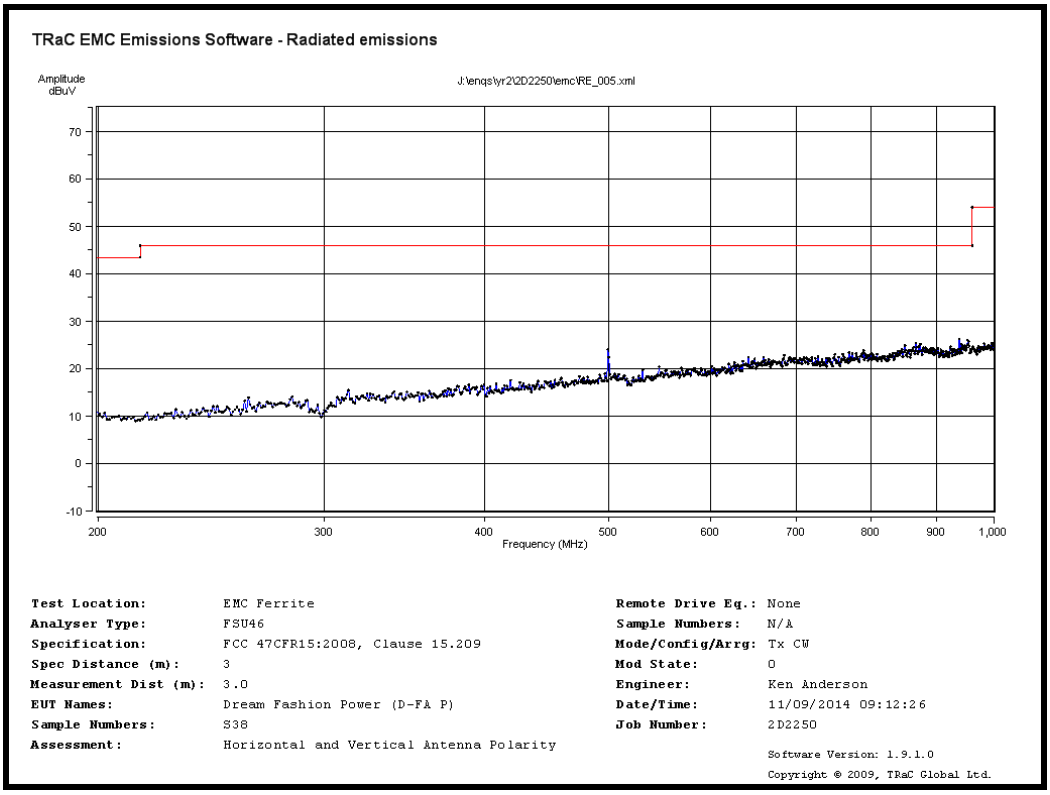
Radiated spurious emissions 9kHz to 150 kHz



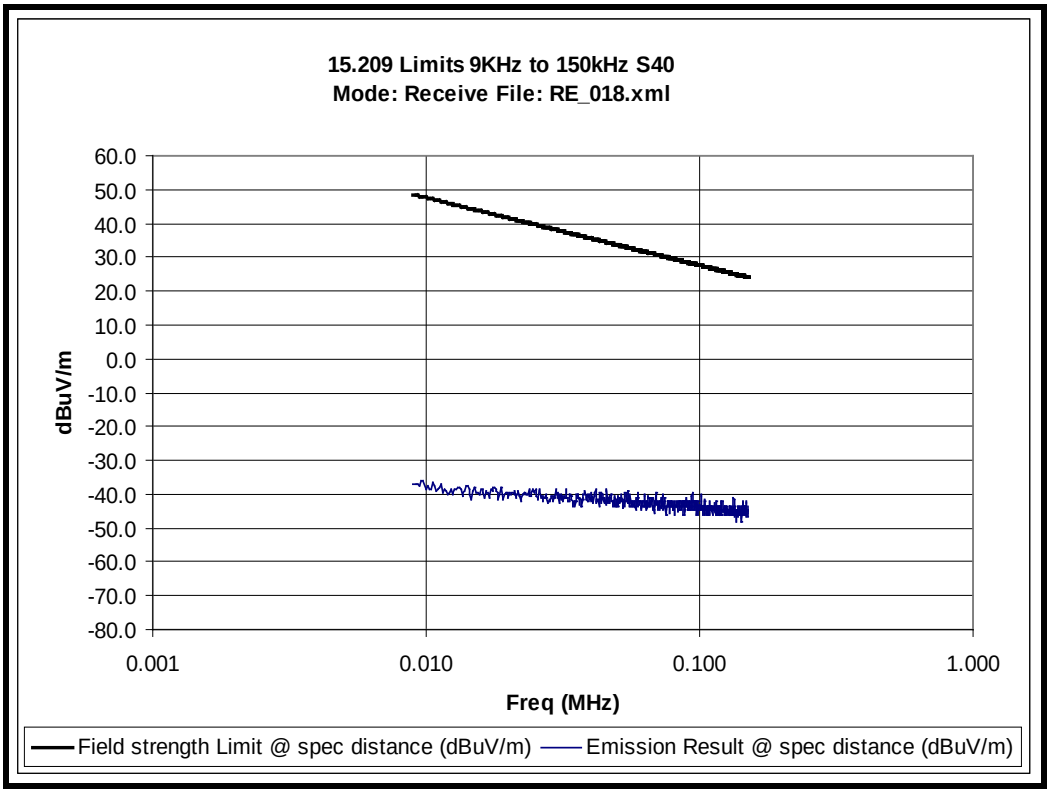
Radiated spurious emissions 150 kHz to 30MHz



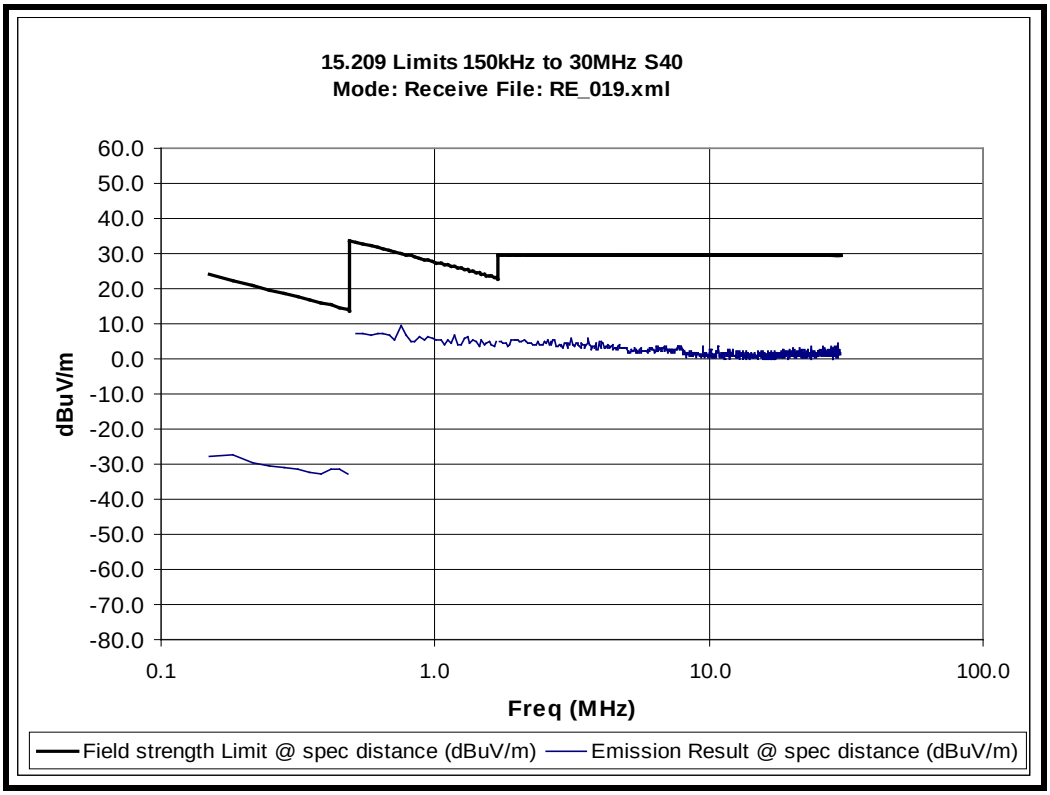
Radiated spurious emissions 30MHz to 200MHz



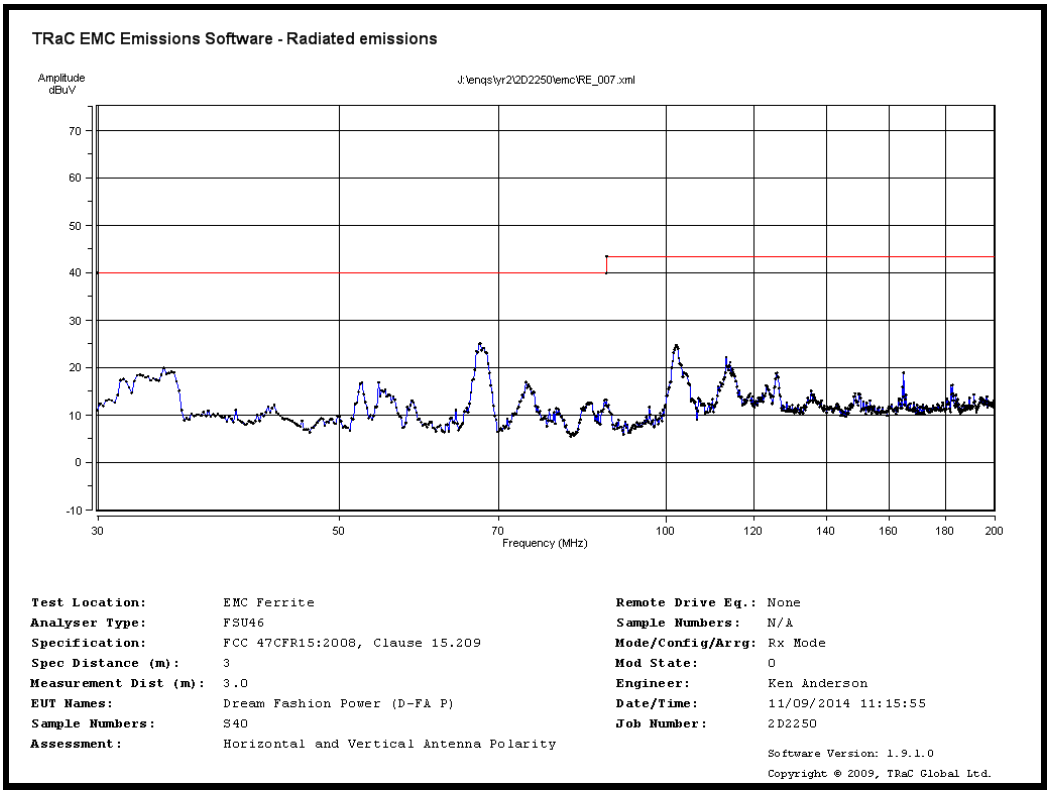
Radiated spurious emissions 200MHz to 1GHz



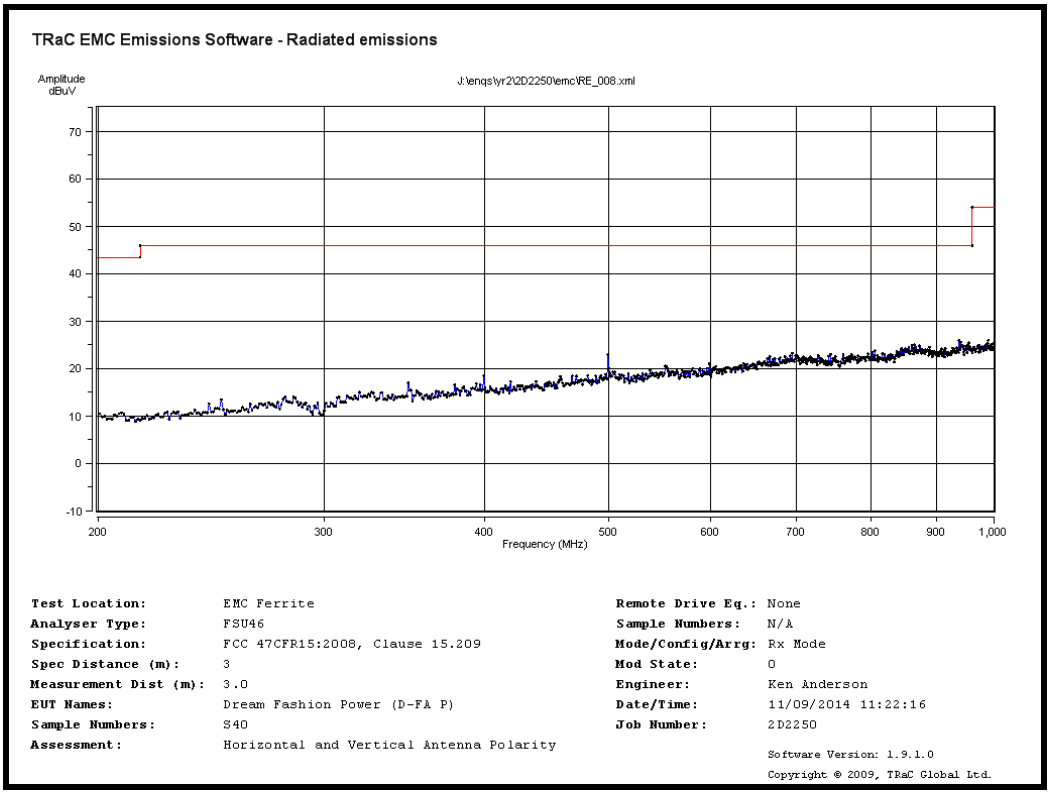
Unintentional Radiated spurious emissions 9kHz to 150 kHz



Unintentional Radiated spurious emissions 150 kHz to 30 MHz



Unintentional Radiated spurious emissions 30MHz to 200MHz



Unintentional Radiated spurious emissions 200MHz to 1GHz

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 e.g. S01
w = modification number e.g. 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 Telecoms & Radio upon request.

C1) Test samples

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

Sample No.	Description	Identification
S37	Dream Fashion Power (D-FA P) (Tx PRBS)	Serial No. 5005
S38	Dream Fashion Power (D-FA P) (Tx CW)	Serial No. 5000
S39	Dream Fashion Power (D-FA P) Normal (Master)	Serial No. 5001
S40	Dream Fashion Power (D-FA P) Normal (Slave)	Serial No. 5003

The following samples of apparatus were submitted by the client as host, support or drive equipment (auxiliary equipment):

Sample No.	Description	Identification
None		

The following samples of apparatus were supplied by TRaC Telecoms & Radio as support or drive equipment (auxiliary equipment):

Identification	Description
None	

C2) EUT Operating Mode during Testing

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

Test	Description of Operating Mode: Transmit
REFE: Radiated E-Field (Transmitter carrier output levels dBµV/m)	The EUT was transmitting continuously on maximum power using FSK (centre frequency 10.6MHz / Deviation ±200kHz) modulation and powered by a new battery.
REFE: Radiated Spurious emissions E-Field at frequencies below 30MHz (dBµV/m) (15.209)	
Radiated Spurious emissions (E-Field) at frequencies ≥ 30MHz (15.209)	
20dB Bandwidth of Emissions	
99% Emission Bandwidth	

Test	Description of Operating Mode: Receive
REFE: 15.109 Radiated Spurious Emissions E-field < 30MHz (Receive)	The EUT was placed in receive mode (non-transmitting) mode during the test and powered by a new battery.
REFE: 15.109 Radiated Spurious Emissions (E-Field) ≥ 30MHz (Receive)	

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 : S37, 38 and S40
Tests : All

Port	Description of Cable Attached	Cable length	Equipment Connected
DC Power Port	None	N/A	Zinc-Air 1.25Vdc Battery
Antenna Port	None	N/A	Integral

.

C5 Details of Equipment Used

Transmitter Carrier Field Strength and Spurious emissions <30 MHz

RFG No	Type	Description	Manufacturer	Date Calibrated	Calibration Due
REF886	Lab 16	Large Anechoic Chamber	TRaC	21/07/14	21/07/15
REF910	FSU46	Spectrum analyser	R & S	13/03/14	13/03/15
023	HFH-Z2	Loop Antenna	R & S	09/05/13	09/05/16
RFG453	-	HF RF coaxial cable	UTIFLEX	03/07/13	03/07/15
REF881	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF882	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF884	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF885	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15

Spurious emissions 30 MHz to 1GHz

RFG No	Type	Description	Manufacturer	Date Calibrated	Calibration Due
REF886	Lab 16	Large Anechoic Chamber	TRaC	21/07/14	21/07/15
REF910	FSU46	Spectrum analyser	R & S	13/03/14	13/03/15
095	3109	Biconical Antenna	EMCO	09/05/13	09/05/16
191	3146	Log Periodic Antenna	EMCO	09/05/13	09/05/16
RFG453	-	HF RF coaxial cable	UTIFLEX	03/07/13	03/07/15
REF881	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF882	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF884	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15
REF885	-	HF RF coaxial cable	Teledyne Reynolds	06/06/13	06/06/15

20 dB bandwidth

RFG No	Type	Description	Manufacturer	Date Calibrated	Calibration Due
REF910	FSU46	Spectrum analyser	R & S	13/03/14	13/03/15
REF919	219-8004-4000 0311	Type K Male to Type K Male Cable 4.0m	Teledyne Reynolds	04/07/14	04/07/16

Appendix D: Additional Information

This report contains no additional information

Appendix E: Calculation of the duty cycle correction factor

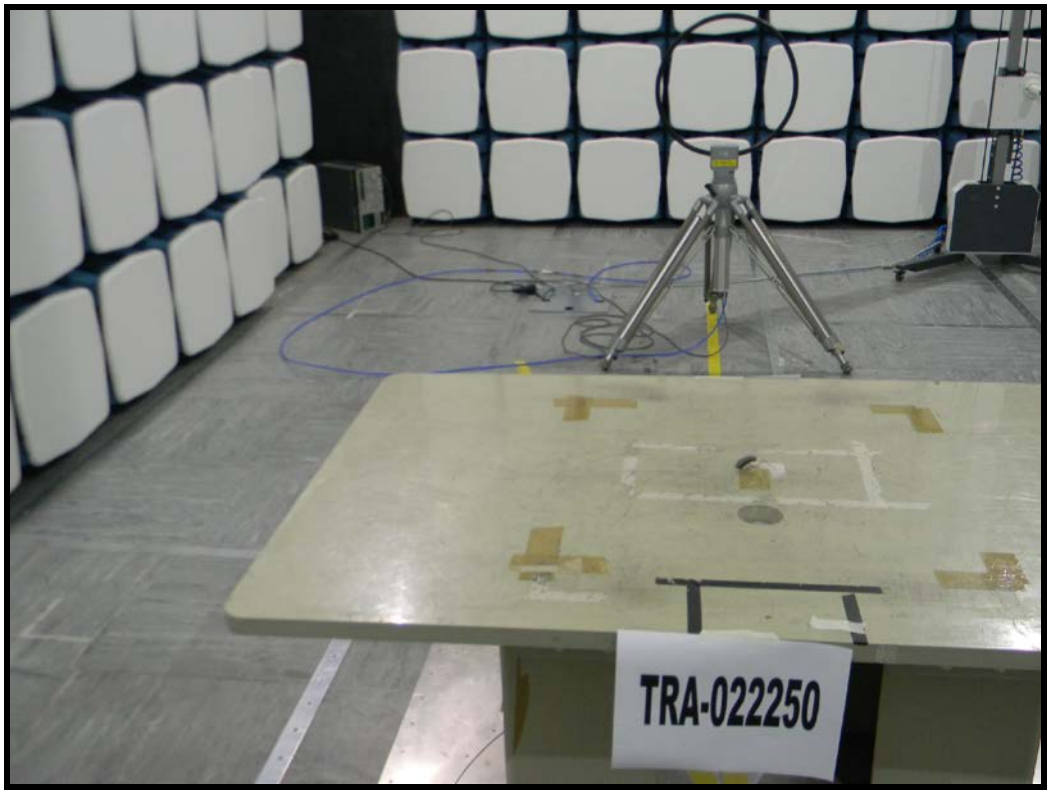
No average detector measurements were made during testing; therefore this calculation is not required

Appendix F: Photographs and Figures

The following photographs were taken of the test samples:

1. Radiated emissions arrangement – Front View
2. Radiated emissions arrangement – Rear View

Photograph 1



Photograph 2

Appendix G: **MPE Calculation**

KDB 447498

Section 4.3 General SAR test reduction and exclusion guidance

For Standalone SAR exclusion consideration, when the considering SAR exclusion Threshold requirement in KDB 447498 is satisfied standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.

In the frequency range below 100 MHz and test separation distance ≤ 50mm, the SAR Test Exclusion Threshold will be determined as follows

SAR Exclusion Threshold

$$NT = \{ [(MP/TSD) * \sqrt{f_{GHz}}] + (TSD - 50mm) * f_{(MHz)}/150] \} * \{1 + Log [100 / f_{MHz}] \} * ^{½}$$

Where:

MP	=	Max Power of channel (mW) (inc tune up)
NT	=	Numeric Threshold (3mW for 1-g SAR and 7.5mW for 10-g SAR)
TSD	=	Min Test separation Distance (mm) = 50
f_{GHz}	=	Transmit frequency (or 100MHz if lower)
F_{MHz}	=	Transmit frequency

We can transpose this formula to allow us to find the maximum power of a channel allowed and compare this to the measured maximum power.

$$MP = \{ [(NT \times TSD) / \sqrt{f_{GHz}}] + (50 - 50) * [100/150] \} * \{1 + Log [100 / F_{MHz}] * {}^{1}/_{2}\}$$

$$MP = \{ [(3.0 \times 50) / \sqrt{0.1}] + (50 - 50) * [100/150] \} * \{1 + Log [100 / F_{MHz}] * {}^{1}/_{2}\}$$

$$MP = 474 * \{1 + Log [100 / 10.6] * {}^{1}/_{2}\}$$

$$MP = 468 \text{ mW}$$

The calculated output power is 1.28×10^{-9}mW (eirp) is less than the SAR Exclusion Threshold of 468mW, at 5mm test separation distance, for general population and uncontrolled exposure. Therefore standalone SAR evaluation for general population exposure conditions by measurement or numerical simulation is not required.

Prediction of MPE limit at a given distance

$$S = \frac{EIRP}{4\pi R^2} \quad \text{re-arranged } R = \sqrt{\frac{EIRP}{S4\pi}}$$

Where:

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

Note:

The EIRP value was calculated using the peak E Field measurement.

Result

Prediction Frequency (MHz)	Maximum EIRP (mW)	Power density limit (S) (mW/cm^2)	Distance (R) cm required to be less than 1.67 mW/cm^2
10.39	1.28×10^{-9}	1.67	7.8×10^{-6}

Appendix H: **Cross Reference FCC Part 15c to IC RSS 210**

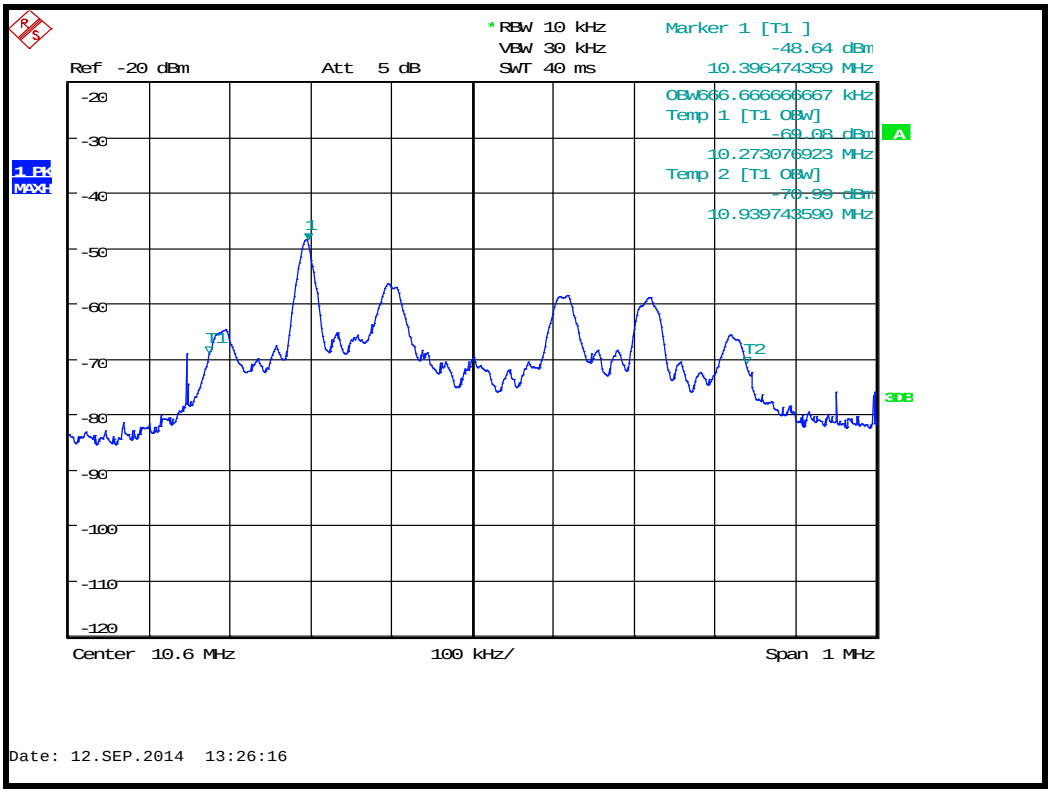
The testing of the Dream Fashion Power (D-FA P) was carried out to FCC 47CFR Part 15c and the results for this testing can be found in Appendix A of this report.

All measurements were carried out in accordance with ANSI C63.4, 'Methods of Measurements of RF Emissions from low voltage Electrical and Electronic Equipment in the Range 9kHz to 40GHz'.

The table below shows the applicable RSS-210 Issue 8/RSS-Gen Issue 3 parts and the corresponding FCC 47CFR Part 15 rules:

RSS-Gen/RSS-210	FCC 47CFR Part 15
RSS-210 Section 2.5	Part 15.109
RSS-Gen Section 7.2.5	Part 15.209

In addition below is a plot of the 99% emissions bandwidth, as stipulated in Section 4.6.1 of RSS-Gen Issue 3.



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