



# TEST REPORT

**Test Report No. :** UL-RPT-RP11456397JD18G

**Manufacturer** : Neeo AG  
**Model No.** : 6336-BRAIN  
**FCC ID** : 2AKK7-BR633601  
**Technology** : Z-Wave  
**Test Standard(s)** : FCC Parts 15.209(a) & 15.249

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 1.0.

**Date of Issue:** 13 April 2017

**Checked by:**

Ian Watch  
Senior Engineer, Radio Laboratory

**Company Signatory:**

Sarah Williams  
Senior Engineer, Radio Laboratory  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
performed in accordance with its terms  
of accreditation.

---

## UL VS LTD

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG, UK  
Telephone: +44 (0)1256 312000  
Facsimile: +44 (0)1256 312001

This page has been left intentionally blank.

**Table of Contents**

<b>1. Customer Information.....</b>	<b>4</b>
<b>2. Summary of Testing.....</b>	<b>5</b>
2.1. General Information	5
2.2. Summary of Test Results	5
2.3. Methods and Procedures	5
2.4. Deviations from the Test Specification	5
<b>3. Equipment Under Test (EUT) .....</b>	<b>6</b>
3.1. Identification of Equipment Under Test (EUT)	6
3.2. Description of EUT	6
3.3. Modifications Incorporated in the EUT	6
3.4. Additional Information Related to Testing	6
3.5. Support Equipment	7
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>8</b>
4.1. Operating Modes	8
4.2. Configuration and Peripherals	8
4.3. Power Settings	8
<b>5. Measurements, Examinations and Derived Results.....</b>	<b>9</b>
5.1. General Comments	9
5.2. Test Results	10
5.2.1. Transmitter Fundamental Field Strength	10
5.2.2. Transmitter 20 dB Bandwidth	12
5.2.3. Transmitter Radiated Emissions	15
5.2.4. Transmitter Band Edge Radiated Emissions	23
<b>6. Measurement Uncertainty .....</b>	<b>26</b>
<b>7. Report Revision History .....</b>	<b>27</b>

**1. Customer Information**







<b>Company Name:</b>	Neeo AG
<b>Address:</b>	Ritterquai 8 4500 Solothurn Switzerland

## **2. Summary of Testing**

### **2.1. General Information**

<b>Specification Reference:</b>	47CFR15.249
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.249
<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) – Section 15.209
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	03 January 2017 to 12 April 2017

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>Measurement</b>	<b>Result</b>
Part 15.249(a)(e)	Transmitter Fundamental Field Strength	
Part 2.1049	Transmitter 20 dB Bandwidth	
Part 15.249(a)(d)(e) / 15.209(a)	Transmitter Radiated Emissions	
Part 15.249(d) / 15.209(a)	Transmitter Band Edge Radiated Emissions	
<b>Key to Results</b>  = Complied  = Did not comply		

### **2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

### **2.4. Deviations from the Test Specification**

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	Neeo
<b>Model Name or Number:</b>	6336-BRAIN
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Radiated sample</i> )
<b>Hardware Version:</b>	Hardware Rev. 5
<b>Software Version:</b>	0.23.0
<b>FCC ID:</b>	2AKK7-BR633601

<b>Brand Name:</b>	Neeo
<b>Model Name or Number:</b>	6336-BRAIN
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Conducted sample with RF port</i> )
<b>Hardware Version:</b>	Hardware Rev. 5
<b>Software Version:</b>	0.23.0
<b>FCC ID:</b>	2AKK7-BR633601

#### **3.2. Description of EUT**

The Equipment Under Test was a base station for home automation. It contains Z-Wave, *Bluetooth* BR/EDR/LE, IEEE 802.15.4 and WLAN transceivers. It is powered from an AC/DC adaptor.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

#### **3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	Z-Wave	
<b>Power Supply Requirement:</b>	Nominal	5.2 VDC
<b>Type of Unit:</b>	Transceiver	
<b>Modulation:</b>	FSK & GFSK	
<b>Data Rates:</b>	908.42 MHz: 9.4 kbps	
	908.4 MHz: 40 kbps	
	916.0 MHz: 100 kbps	
<b>Transmit Frequency Range:</b>	902 MHz to 928 MHz	
<b>Transmit Channel Tested:</b>	<b>Channel ID</b>	<b>Channel Frequency (MHz)</b>
	1	908.42
	2	908.4
	3	916.0

### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Laptop PC
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	E5400
<b>Serial Number:</b>	01160

<b>Description:</b>	USB to TTL Serial Cable. Length 1.8 metres
<b>Brand Name:</b>	FTDI Chip
<b>Model Name or Number:</b>	TTL-232R-3V3-AJ
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	AC/DC Adaptor
<b>Brand Name:</b>	Liteon
<b>Model Name or Number:</b>	PA-1100-25
<b>Serial Number:</b>	KPO1003005 6088111EPE03

<b>Description:</b>	HDMI Cable. Length 3 metres
<b>Brand Name:</b>	Not marked or stated
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	Now TV Box for HDMI Termination
<b>Brand Name:</b>	Sky
<b>Model Name or Number:</b>	2400SK
<b>Serial Number:</b>	1MM4DE006281

<b>Description:</b>	Infra-Red Sensor
<b>Brand Name:</b>	Neeo
<b>Model Name or Number:</b>	Not marked or stated
<b>Serial Number:</b>	Not marked or stated

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Transmitting at maximum power with a modulated signal on channel 1, 2 or 3 as required, using the supported data rates.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- A Laptop PC with an open source terminal application Tera Term V4.83 was used to place the EUT into test mode. The procedure to set up and control the EUT was supplied by the customer in a document titled 'userManual-Radio.pdf' dated 12/12/2016. The power for each channel was set in accordance with the power settings as supplied by the customer.
- The EUT was powered from an AC/DC Adaptor. The input was connected to a 120 VAC 60 Hz single phase supply.
- Radiated spurious emissions were performed with the EUT in the worst case position for radiated spurious emissions. Tests were performed with the EUT connected to the AC/DC Adaptor and USB cable. All other ports were terminated with suitable terminations.
- The radiated sample was used for radiated spurious emissions tests.
- The conducted sample was used for all other tests.

### **4.3. Power Settings**

The table below shows the EUT power settings used during testing for each data rate.

Channel ID	Frequency (MHz)	Data Rate (kbps)	Power setting
1	908.42	9.6	25
2	908.4	40	25
3	916.0	100	18



## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## 5.2. Test Results

### 5.2.1. Transmitter Fundamental Field Strength

#### Test Summary:

Test Engineer:	David Doyle	Test Date:	12 April 2017
Test Sample Serial Number:	Not marked or stated ( <i>Radiated sample</i> )		

FCC Reference:	Part 15.249(a)
Test Method Used:	ANSI C63.10 Section 6.5

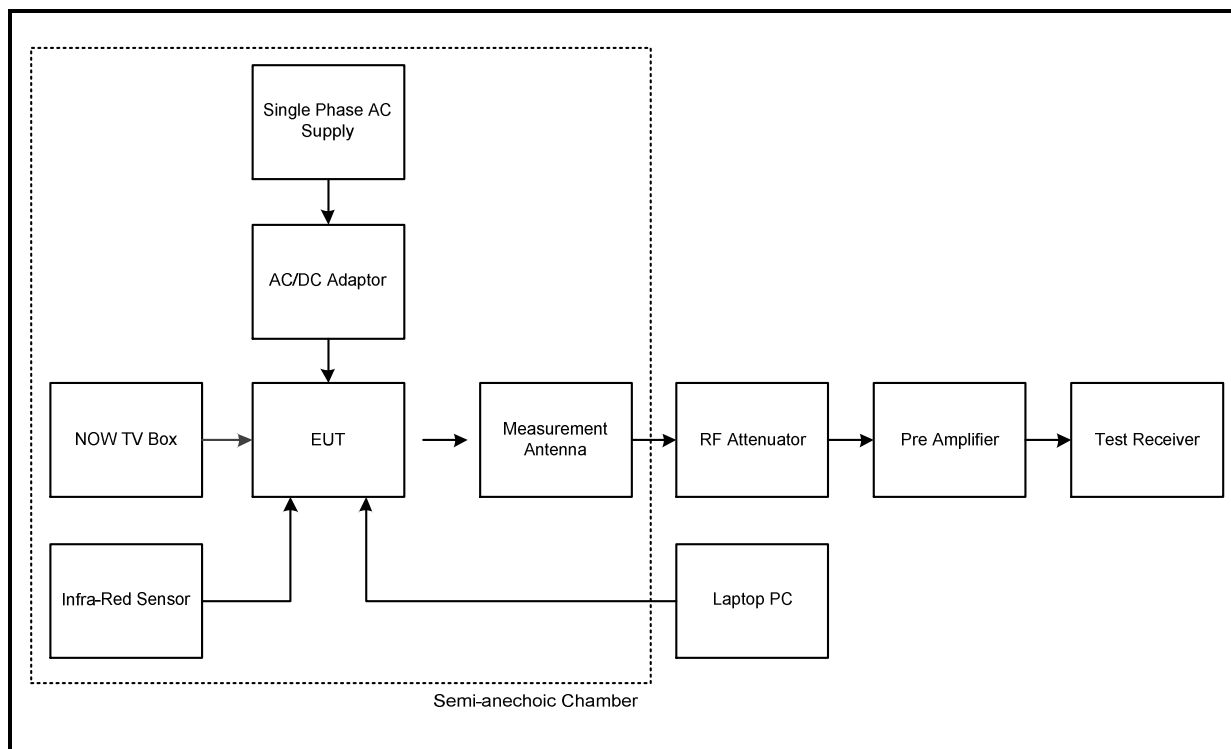
#### Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	39

#### Note(s):

1. The final measured value in the table below incorporates the calibrated antenna factor and cable loss.
2. Measurements were performed using a Quasi-Peak detector. The results were read directly from the test receiver and no result plots are shown in this section.

#### Test setup:



**Transmitter Fundamental Field Strength (continued)****Results: Quasi-Peak / 908.42 MHz / 9.4 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
908.42	Horizontal	87.2	94.0	6.8	Complied

**Results: Quasi-Peak / 908.4 MHz / 40 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
908.4	Horizontal	87.1	94.0	6.9	Complied

**Results: Quasi-Peak / 916 MHz / 100 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
916.0	Horizontal	82.5	94.0	11.5	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2014	Thermohygrometer	Testo	608-H1	45046246	10 Jun 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	07 Dec 2017	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046	31 May 2017	12
A2959	Antenna	Schwarzbeck	VULB 9163	9163-967	08 Sep 2017	12
G0543	Amplifier	Sonoma	310N	230801	09 Jun 2017	6
A1834	Attenuator	Hewlett Packard	8491B	10444	Calibrated before use	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	09 May 2017	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	11 Apr 2018	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	15 Apr 2018	24

**5.2.2. Transmitter 20 dB Bandwidth****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	11 April 2017
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Conducted sample with RF port</i> )		

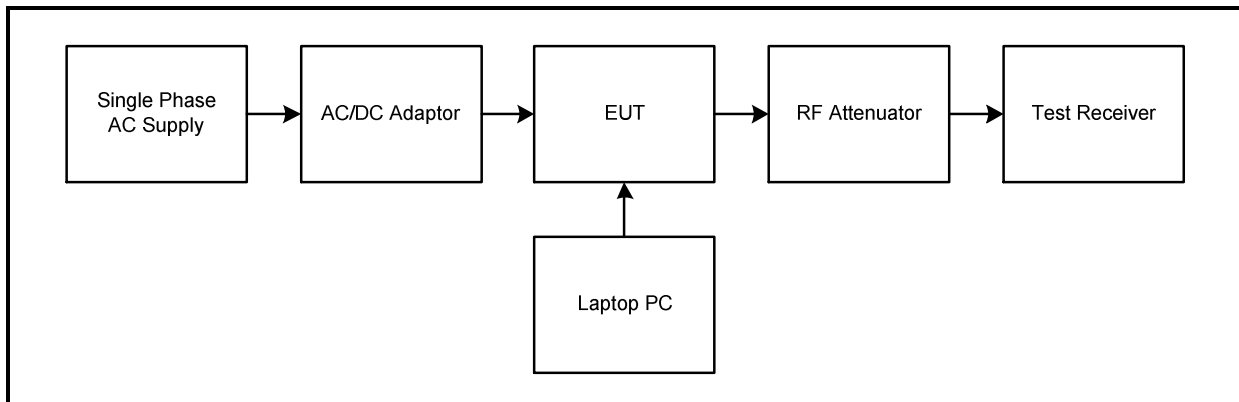
<b>FCC Reference:</b>	Part 2.1049
<b>Test Method Used:</b>	ANSI C63.10 Section 6.9.2

**Environmental Conditions:**

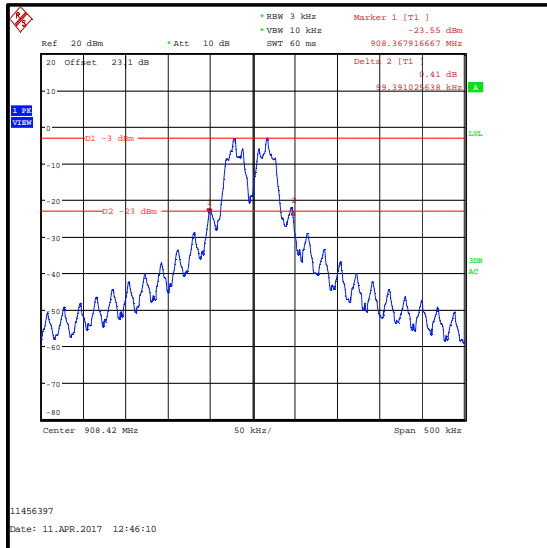
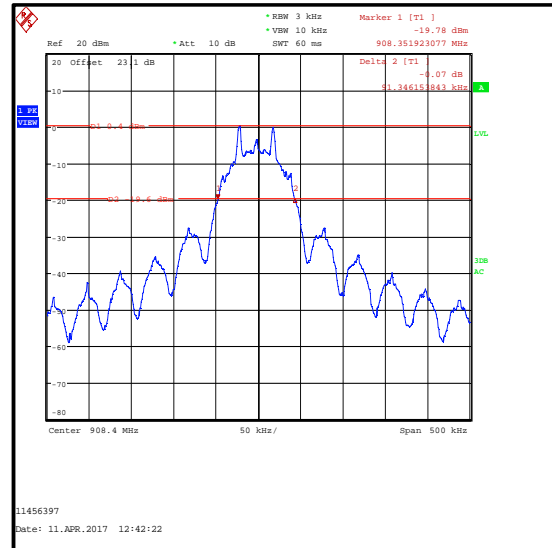
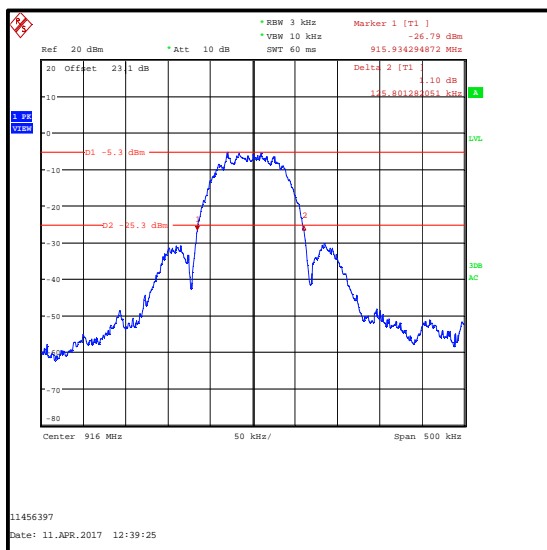
<b>Temperature (°C):</b>	24
<b>Relative Humidity (%):</b>	31

**Note(s):**

1. The test receiver resolution bandwidth was set to between 1% and 5% of the OBW as stated in ANSI C63.10 Section 6.9.2. and the VBW was set to as close to three times this value as the spectrum analyser allowed. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 500 kHz. Normal and delta markers were placed 20 dB down from the peak of the carrier. The occupied bandwidth results are recorded in the table below.

**Test setup:****Results:**

Transmitter Frequency (MHz)	Tx Data Rate (kbps)	20 dB Bandwidth (kHz)
908.42	9.6	99.359
908.4	40	91.346
916.0	100	125.801

**Transmitter 20 dB Bandwidth (continued)****908.42 MHz Channel / 9.6 kbps****908.4 MHz Channel / 40 kbps****916 MHz Channel / 100 kbps**

**Transmitter 20 dB Bandwidth (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	02 Apr 2017	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	04 Apr 2018	12
A2526	Attenuator	AtlanTecRF	AN18W5-20	832828#1	Calibrated before use	-
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	09 May 2017	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	11 Apr 2018	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	15 Apr 2018	24

**5.2.3. Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	13 January 2017
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Radiated sample</i> )		

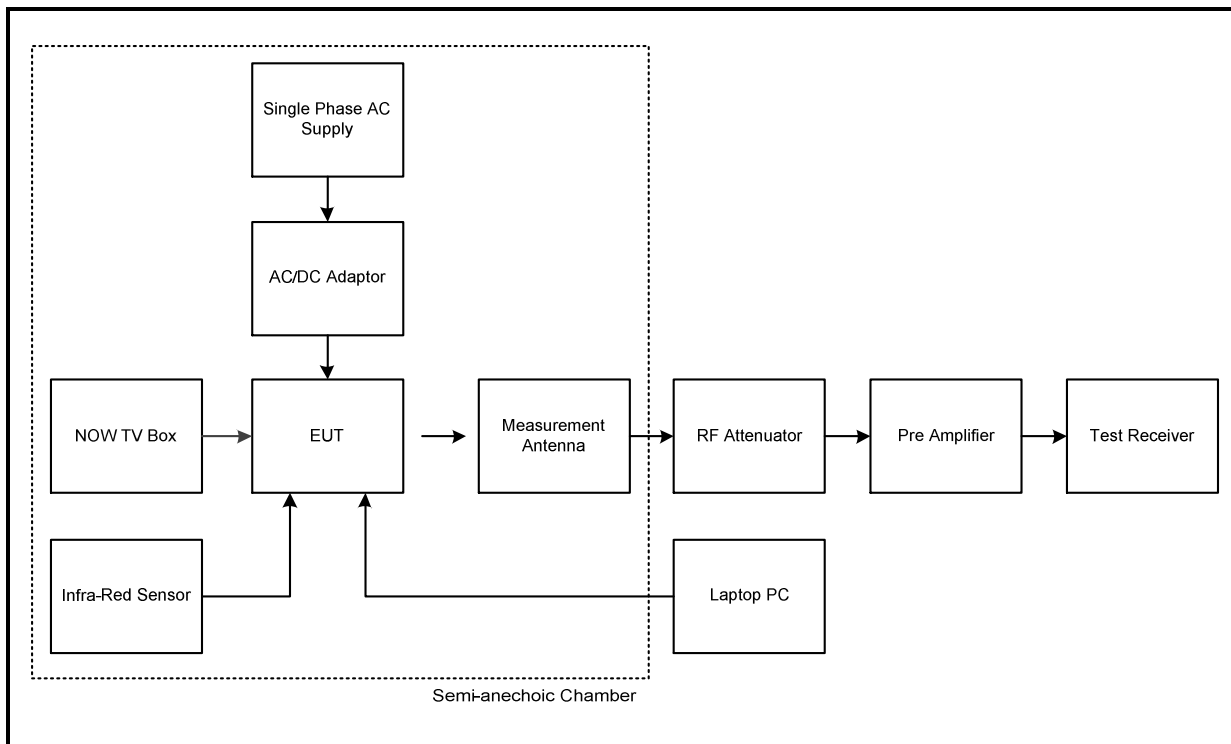
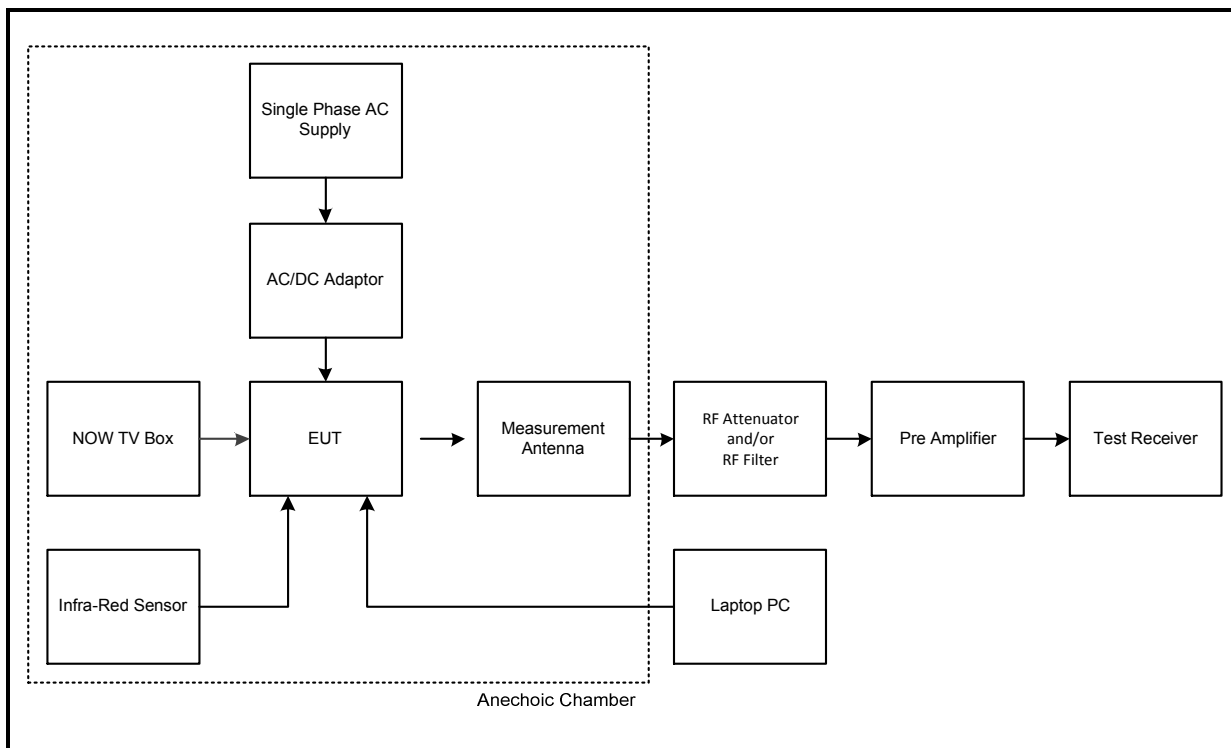
<b>FCC Reference:</b>	Parts 15.249(a) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range</b>	30 MHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	22
<b>Relative Humidity (%):</b>	30

**Note(s):**

1. The emission at 916 MHz shown on the 30 MHz to 1 GHz plot is the EUT fundamental.
2. The final measured value, for the given emissions, in the tables below incorporates the calibrated antenna factor and cable loss.
3. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
5. Pre-scans were performed on all three modes and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. Only the pre-scan plots for 916 MHz / 100 kbps, which produced the highest level emissions, have been included in this section.
6. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span wide enough to see the whole emission.

**Transmitter Radiated Emissions (continued)****Test setup for radiated measurements:****Semi-anechoic chamber****Anechoic chamber**



**Transmitter Radiated Emissions (continued)****Results: Quasi-Peak / 908.42 MHz / 9.6 kbps**

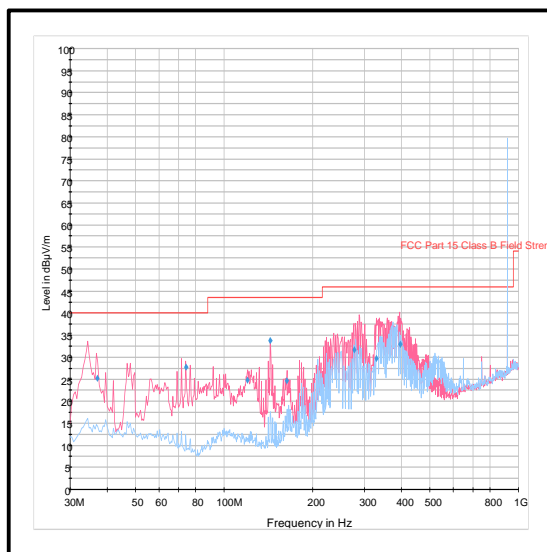
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
74.222	Vertical	25.0	40.0	15.0	Complied
163.290	Vertical	26.1	43.5	17.4	Complied

**Results: Quasi-Peak / 908.4 MHz / 40 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
74.229	Vertical	29.0	40.0	11.0	Complied
277.155	Vertical	37.5	46.0	8.5	Complied
279.628	Vertical	37.1	46.0	8.9	Complied
329.136	Vertical	38.4	46.0	7.6	Complied
400.861	Vertical	36.4	46.0	9.6	Complied

**Results: Quasi-Peak / 916 MHz / 100 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
74.243	Vertical	27.7	40.0	12.3	Complied
119.982	Vertical	24.7	43.5	18.8	Complied
163.341	Vertical	24.6	43.5	18.9	Complied
277.147	Vertical	31.7	46.0	14.3	Complied
329.143	Vertical	29.8	46.0	16.2	Complied
395.907	Vertical	32.9	46.0	13.1	Complied



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2014	Thermohygrometer	Testo	608-H1	45046246	10 Jun 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	07 Dec 2017	12
G0543	Amplifier	Sonoma	310N	230801	09 Jun 2017	6
M1273	Test Receiver	Rohde & Schwarz	ESIB26	100275	11 Apr 2017	12
A2959	Antenna	Schwarzbeck	VULB 9163	9163-967	08 Sep 2017	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Mar 2017	12

**Transmitter Radiated Emissions (continued)****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	03 January 2017
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Radiated sample</i> )		

<b>FCC Reference:</b>	Parts 15.249(a)(d)(e) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3 & 6.6
<b>Frequency Range</b>	1 GHz to 9.2 GHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	20
<b>Relative Humidity (%):</b>	35

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Pre-scans were performed on all three modes and markers placed on the highest measured levels. Only the pre-scan plots for 916 MHz 100 kbps, which produced the highest level emissions, have been included in this report.
4. Measurements above 1 GHz were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
5. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with appropriate detectors during the pre-scan measurements.
6. \* In accordance with ANSI C63.10 Section 6.6.4.3, Note 1, where the peak detected amplitude was shown to comply with the average limit, an average measurement was not performed.

**Transmitter Radiated Emissions (continued)****Results: Peak 908.42 MHz / 9.6 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2725.179	Horizontal	55.4	74.0	18.6	Complied
4542.276	Horizontal	47.9	54.0*	6.1	Complied
8175.744	Horizontal	49.7	54.0*	4.3	Complied

**Results: Average 908.42 MHz / 9.6 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2725.186	Horizontal	53.8	54.0	0.2	Complied

**Results: Peak 908.4 MHz / 40 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2725.179	Horizontal	55.4	74.0	18.6	Complied
4541.650	Horizontal	48.1	54.0*	5.9	Complied
8175.250	Horizontal	48.7	54.0*	5.3	Complied
9083.736	Horizontal	45.9	54.0*	8.1	Complied

**Results: Average 908.4 MHz / 40 kbps**

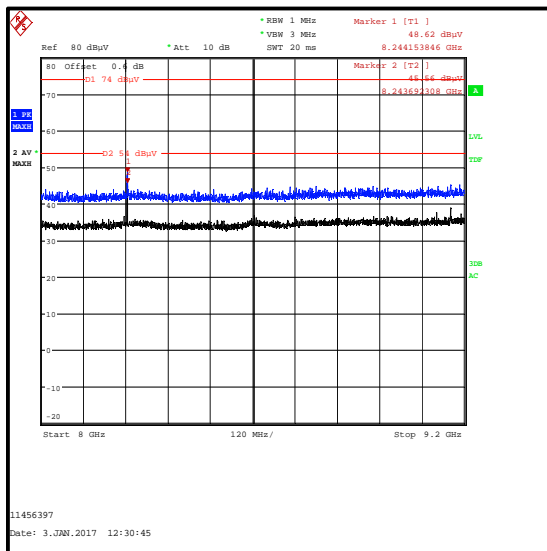
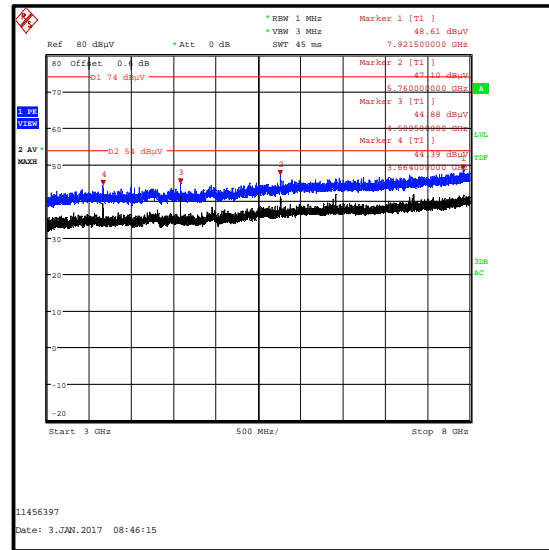
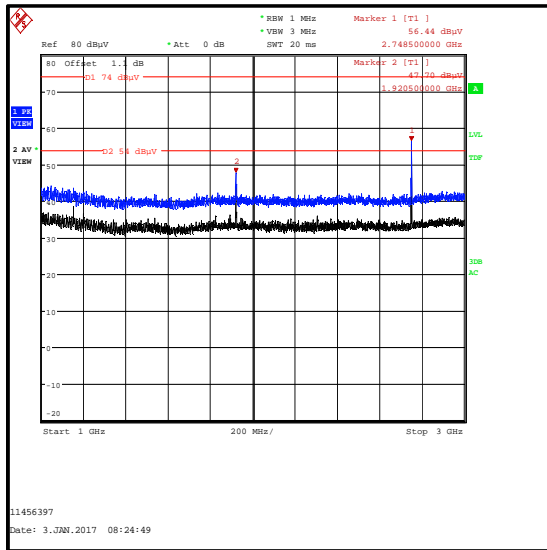
Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2725.186	Horizontal	53.8	54.0	0.2	Complied

**Results: Peak 916 MHz / 100 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2748.024	Horizontal	55.4	74.0	18.6	Complied
3663.986	Horizontal	46.3	54.0*	7.7	Complied
4580.207	Horizontal	47.0	54.0*	7.0	Complied
7327.207	Horizontal	49.7	54.0*	4.3	Complied
8244.279	Horizontal	49.9	54.0*	4.1	Complied
9160.150	Horizontal	46.7	54.0*	7.3	Complied

**Results: Average 916 MHz / 100 kbps**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
2747.960	Horizontal	53.4	54.0	0.6	Complied

**Transmitter Radiated Emissions (continued)**

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	17 May 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 653	07 Apr 2017	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	06 May 2017	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	07 Apr 2017	12
A2891	Pre-Amplifier	Schwarzbeck	BBV 9718	9718-306	07 Apr 2017	12
A2914	High Pass Filter	AtlanTecRF	AFH-03000	2155	19 May 2017	12
A2947	High Pass Filter	AtlanTecRF	AFH-07000	1601900001	01 Jun 2017	12
A2908	High Pass Filter	Wainwright Instruments	WHJE5-920 - 1000-4000-60EE	3	23 May 2017	12

**5.2.4. Transmitter Band Edge Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	04 January 2017
<b>Test Sample Serial Number:</b>	Not marked or stated ( <i>Radiated sample</i> )		

<b>FCC Reference:</b>	Parts 15.249(d) & 15.209(a)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.10.4

**Environmental Conditions:**

<b>Temperature (°C):</b>	21
<b>Relative Humidity (%):</b>	37

**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The plots shown on the following page were performed using a peak detector as this was deemed worst case.

**Results: 908.42 MHz / 9.6 kbps**

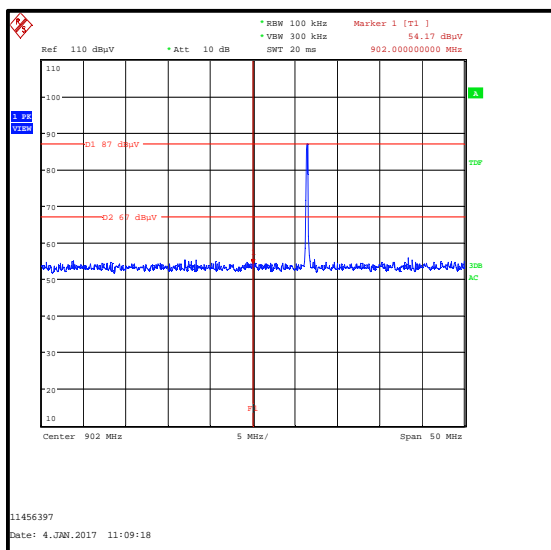
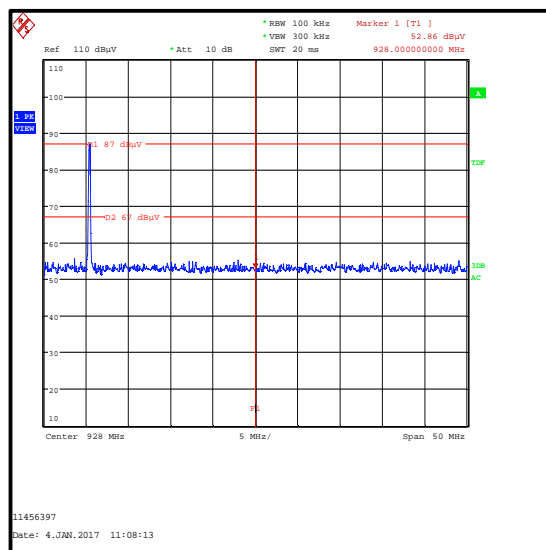
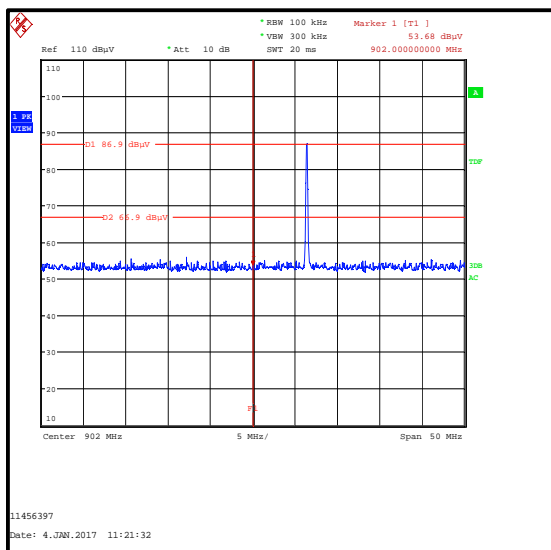
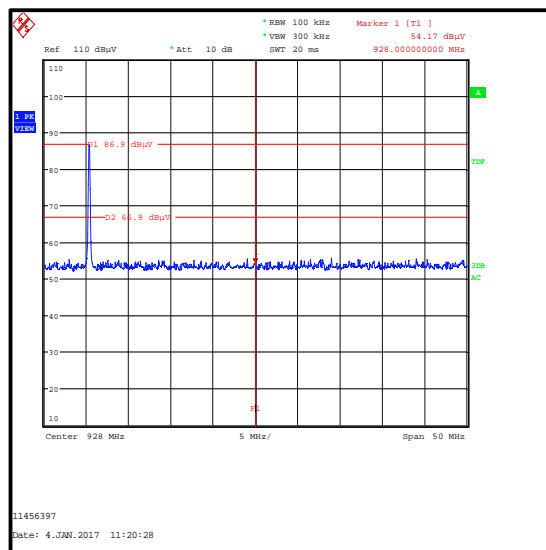
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
902	Horizontal	54.2	67.0	12.8	Complied
928	Horizontal	52.9	67.0	14.1	Complied

**Results: 908.4 MHz / 40 kbps**

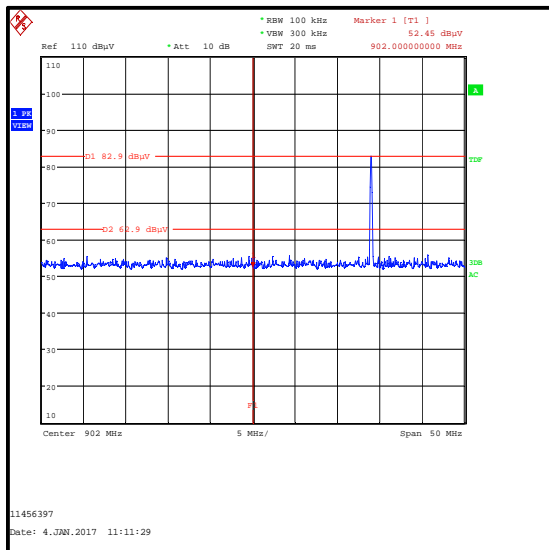
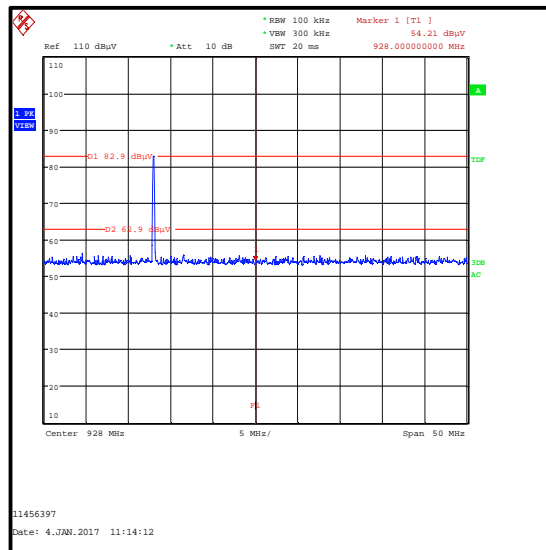
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
902	Horizontal	53.7	66.9	13.2	Complied
928	Horizontal	54.2	66.9	12.7	Complied

**Results: 916 MHz / 100 kbps**

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
902	Horizontal	52.5	62.9	10.4	Complied
928	Horizontal	54.2	62.9	8.7	Complied

**Transmitter Band Edge Radiated Emissions (continued)****Results: 908.42 MHz / 9.6 kbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Results: 908.4 MHz / 40 kbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**



**Transmitter Band Edge Radiated Emissions (continued)****Results: 916 MHz / 100 kbps****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	17 May 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2888	Antenna	Schwarzbeck	VULB 9163	9163-941	06 May 2017	12

## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Fundamental Field Strength	902 MHz to 928 MHz	95%	$\pm 2.94$ dB
20 dB Bandwidth	902 MHz to 928 MHz	95%	$\pm 4.59$ %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	$\pm 5.65$ dB
Radiated Spurious Emissions	1 GHz to 9.3 GHz	95%	$\pm 2.94$ dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

**7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version

--- END OF REPORT ---