FCC and Industry Canada Testing of the BCF Technology Ltd Duo-Scan: Go Plus, Model: DSGC02 In accordance with FCC 47 CFR Part 18, Industry Canada RSS-216 and Industry Canada RSS-GEN

Product Service

Choose certainty.
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Prepared for: BCF Technology Ltd
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UNITED KINGDOM

FCC ID: 2AL6R-DSGC02
IC: 22758-DSGC01

COMMERCIAL-IN-CONFIDENCE

Date: October 2017
Document Number: 75940307-03 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Natalie Bennett	31 October 2017	
Authorised Signatory	Matthew Russell	31 October 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 18, Industry Canada RSS-216 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	31 October 2017	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 18: 2016, Industry Canada RSS-216: Issue 2 (2016) and Industry Canada RSS-GEN: Issue 4 (2014).

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Product Service

Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	31 October 2017

Table 1

1.2 Introduction

Applicant	BCF Technology Ltd
Manufacturer	BCF Technology Ltd
Model Number(s)	DSGC02
Serial Number(s)	DSGC0200003
Hardware Version(s)	PBA-PP520_REV_B
Software Version(s)	b04616d47050f71e21b3b62eb02eb13f26e4ff20 (CE/FCC test SW)
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 18: 2016 Industry Canada RSS-216: Issue 2 (2016) Industry Canada RSS-GEN: Issue 4 (2014)
Order Number Date	PO34233 12-September-2017
Date of Receipt of EUT	10-October-2017
Start of Test	16-October-2017
Finish of Test	16-October-2017
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.10 (2013) ICES-001 Issue 4 (2006) CISPR 11 Fourth Edition (inc Amend.1 IEC:2004)

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 18, Industry Canada RSS-216 and Industry Canada RSS-GEN. is shown below.

Section	Specification Clause			Test Description	Result	Comments/Base Standard
	Part 18	RSS-216	RSS-GEN			
Configuration: Wireless Charging						
2.1	18.305(b)	6.2.2.2	6.4, 6.5 and 6.13	Field Strength of Emissions	Pass	

Table 2

Product Service

1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	Duo-Scan:Go Plus - DSGC02
Part Number	DSG-SCANNER-C PLUS
Hardware Version	PBA-PP520_REV_B
Software Version	b04616d47050f71e21b3b62eb02eb13f26e4ff20 (CE/FCC test SW)
FCC ID (if applicable)	2AL6R-DSGC02
Industry Canada ID (if applicable)	22758-DSGC01
Technical Description (Please provide a brief description of the intended use of the equipment)	The product is a Swine Ultrasound Scanner used in the veterinary industry for scanning pigs, sheep or goats The product contains a Texas Instruments pre-approved 2.4 GHz and 5 GHz WLAN module which is FCC and Industry Canada certified and this is used to communicate to a commercial smart phone or tablet. The scanner is a compact handheld unit with a built in ultrasound probe and uses certified Li-ion batteries.

EQUIPMENT SUPPLIED	
WPT Source	☐
WPT Client	☒
WPT System (Client and source designed to work exclusively together)	☐

WPT SOURCE		
☐	Type 1	No intelligent communication transmitted wirelessly
☒	Type 2	Transmission is modulated including load modulation techniques where: 1. Fundamental is < 490 kHz and ; 2. All emissions are > 40 dB below RSS-GEN field strength limits.
☐	Type 3	Neither type 1 or type 2, but uses some form of modulation to transmit intelligent communication.

Is the device intended for us in any of the following?:	
☐	High power WPT device (e.g charging electric vehicles)
☐	WPT over a distance of > 10 cm
☐	Medical Device
☐	WPT source operating at a frequency > 400 MHz

Does the device support power management transfer?			Yes
Can the source and client operate at different separation distances?			No
Minimum Distance:	mm	Maximum Distance	mm
Does the EUT contain any other wireless modules (excluding WPT device)?			Yes
Can the device transmit secondary frequencies?			No Bluetooth
State Frequencies:	to MHz		

WPT SOURCE DESIGN	
☒	Single fixed power transfer zone – single client

WPT SOURCE DESIGN	
☐	Multiple fixed power transfer zone – single client
☐	Multiple non-fixed power transfer zone – single client
☐	Multiple power transfer zone – multiples clients

POWER SOURCE

☐ AC mains State voltage

AC supply frequency (Hz)

VAC

Max Current

Hz

☐ Single phase ☐ Three phase

And / Or

☐ External DC supply

Nominal voltage V Max Current A

Extreme upper voltage V

Extreme lower voltage V

Battery

☐ Nickel Cadmium ☐ Lead acid (Vehicle regulated)

☐ Alkaline ☐ Leclanche

☒ Lithium ☐ Other Details:

3.7 Volts nominal.

End point voltage as quoted by equipment manufacturer 2.3 V

FREQUENCY INFORMATION

Frequency Range	0.11 to 0.205	MHz		
Channel Spacing (where applicable)				
Receiver Frequency Range (if different)	to	MHz		
Channel Spacing (if different)				
Test Frequencies*	Bottom	0.110	MHz	Channel Number (if applicable)
	Middle		MHz	Channel Number (if applicable)
	Top	0.205	MHz	Channel Number (if applicable)
Intermediate Frequencies		MHz		
Highest Internally Generated Frequency:		0.205MHz		

POWER CHARACTERISTICS			
Maximum TX power	W		
Minimum TX power	W (if variable)		
Is transmitter intended for:			
Continuous duty		☐ Yes	☐ No
Intermittent duty		☐ Yes	☐ No
If intermittent state DUTY CYCLE			
Transmitter ON	seconds		
Transmitter OFF	seconds		

ANTENNA CHARACTERISTICS				
☐	Antenna connector		State impedance	Ohm
☐	Temporary antenna connector		State impedance	Ohm
☐	Integral antenna	Type	State impedance	dBi
☐	External antenna	Type	State impedance	dBi

MODULATION CHARACTERISTICS			
☒	Amplitude	☐	Frequency
☐	Phase	☐	Other (please provide details):
Can the transmitter operate un-modulated?		☐ Yes	☒ No

CLASS OF EMISSION USED
ITU designation or Class of Emission:
1
(if applicable) 2
(if applicable) 3
If more than three classes of emission, list separately:

BATTERY POWER SUPPLY			
Model name/number	103450AR2-1S-3M	Identification/Part number	
Manufacturer	Shenzhen BAK Technology Co Ltd	Country of Origin	China

ANCILLARIES (If applicable)	
Model name/number	Identification/Part number
Manufacturer	Country of Origin

EXTREME CONDITIONS			
Extreme test voltages (Max)	V	Extreme test voltages (Mix)	V
Nominal DC Voltage	V	DC Maximum Current	A
Maximum temperature	°C	Minimum temperature	°C

I hereby declare that the information supplied is correct and complete.

Name: Fabrizio Gaudenzi Position held: Lead Design Engineer
Date: 21/9/17

1.5 Product Information

1.5.1 Technical Description

The product is a Swine Ultrasound Scanner used in the veterinary industry for scanning pigs, sheep or goats. The product contains a Texas Instruments pre-approved 2.4 GHz and 5 GHz WLAN module which is FCC and Industry Canada certified and this is used to communicate to a commercial smart phone or tablet. The scanner is a compact handheld unit with a built in ultrasound probe and uses certified Li-ion batteries.

1.6 Deviations from the Standard

Industry Canada RSS-216, Clause 6.1.3.1 - Setup for Verifying the Power Transfer Function

The Battery voltage is nominally 3.3 volts

When the battery is charging normally the current is in the region of 800 mA

When the battery is replaced with a load resistor of 2R7 the charge current drops to only 19.6mA

We believe the reason for this is that the voltage across the battery terminals with the load resistor connected is only 52mV and the charging circuit on the EUT is not powered and so the intelligent charging circuit will not provide the required 800mA current.

Therefore, it is not possible to test the charging circuit of this unit without the battery connected.

This test was performed with the battery connected.

No other deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: DSGC0200003			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration: Wireless Charging		
Field Strength of Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Field Strength of Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 18, Clause 18.305(b)
Industry Canada RSS-216, Clause 6.2.2.2
Industry Canada RSS-GEN, Clause 6.4, 6.5 and 6.13

2.1.2 Equipment Under Test and Modification State

DSGC02, S/N: DSGC0200003 - Modification State 0

2.1.3 Date of Test

16-October-2017

2.1.4 Test Method

This test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5 and Industry Canada RSS-216, clause 6.2.2.2.

For FCC the following expressions were used to convert the limit from uV/m @ 300 m to dBuV/m @ 3 m:

a. To convert uV/m to dBuV/m = $20*LOG_{10}$(Field Strength in uV/m).
b. To convert from 300 m to 3 m, the method described in ANSI C63.10 clause 6.4.4.2 was used.

Using the above when measuring at 148.5 kHz, a limit of 15 uV/m @ 300 m equates to 103.52 dBuV/m at 3m.

For IC the following expression is used to convert to dBuV/m: dBuA/m + 51.5.

The WPT source device used during testing was a Samsung Wireless Charging Pad, Model: EP-PN920. The FCC and Industry Canada identification numbers for this product are as follows:

FCC ID: A3LEPPN920
IC: 649E-EPPN920

2.1.5 Environmental Conditions

Ambient Temperature	19.5 - 19.8 °C
Relative Humidity	53.0 %

2.1.6 Test Results

Wireless Charging

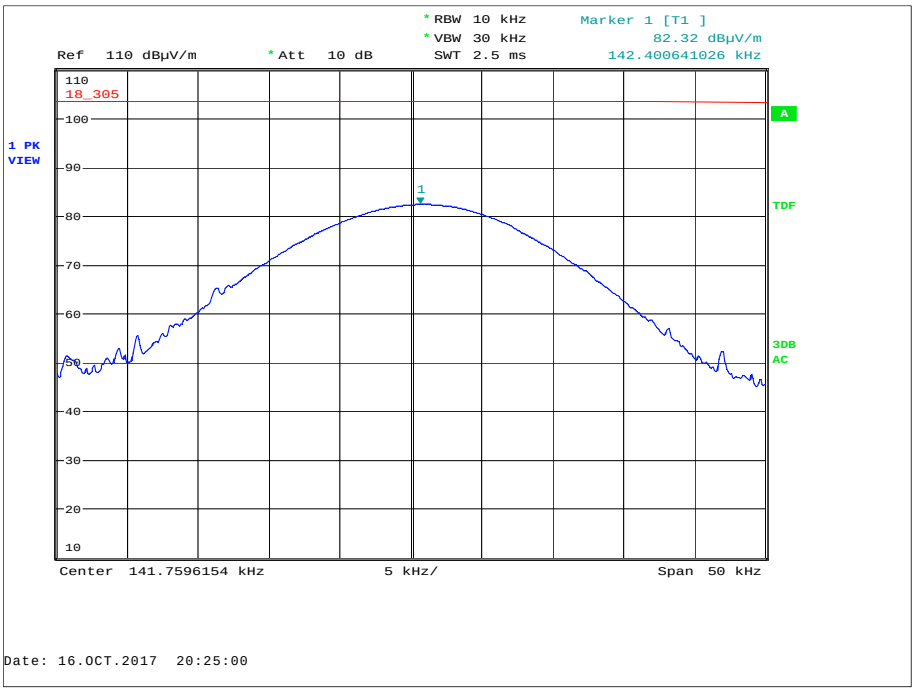

Figure 1 - 142.401 kHz

Frequency (MHz)	QP Level at 3m (dBµV/m)	QP Level at 3m (µV/m)	QP Limit at 3m (dBµV/m)	QP Limit at 3m (µV/m)	Angle	Height (m)	Polarity
0.142401	81.96	12531.41	103.52	150000.00	180	1.50	Face On

Table 5 - Field Strength of Emissions, 9 kHz to 30 MHz

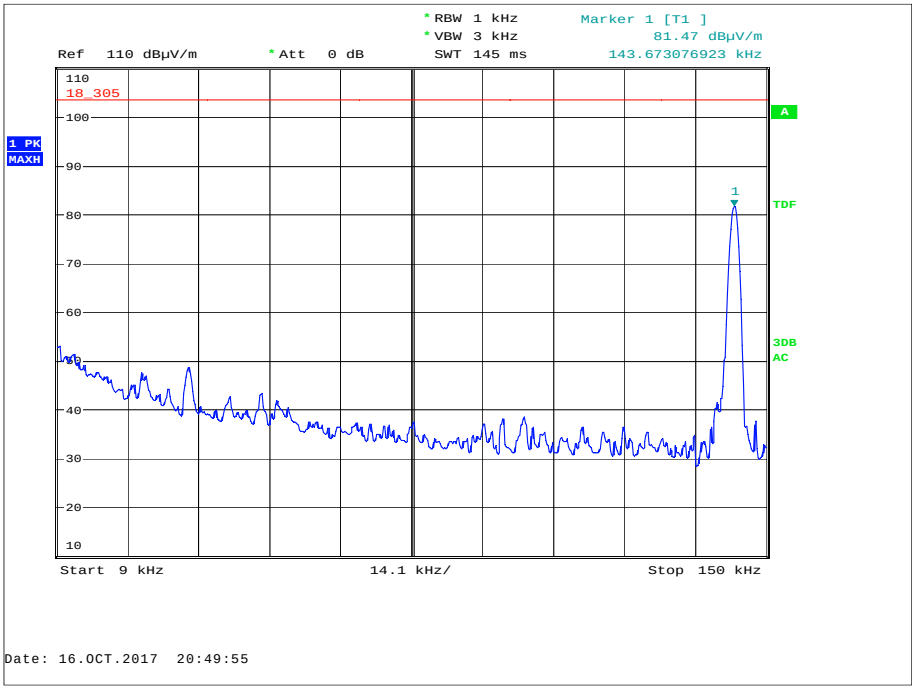

Figure 2 - 9 kHz to 150 kHz

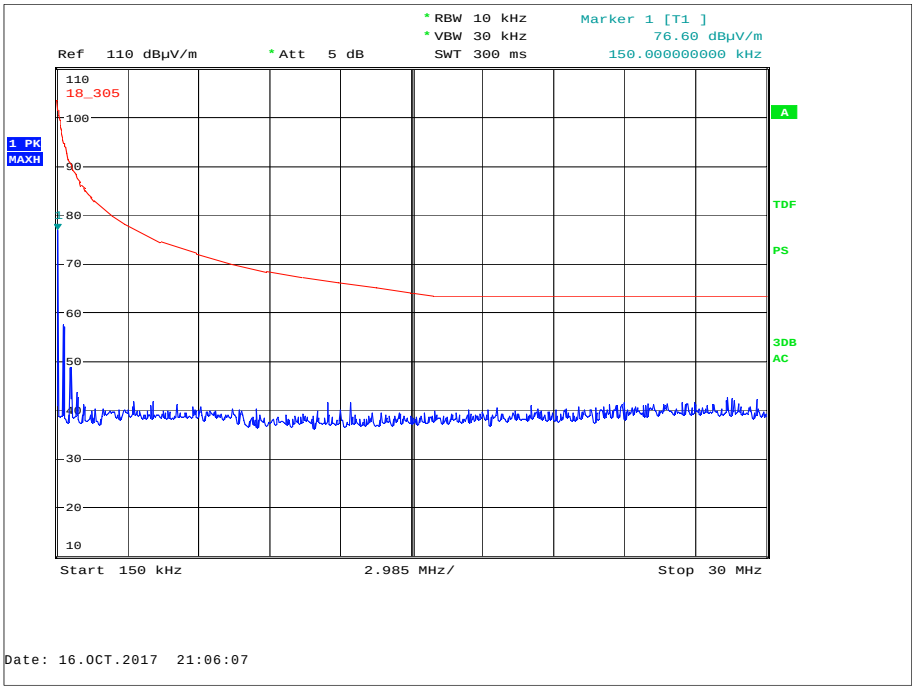

Figure 3 - 150 kHz to 30 MHz

The above plots detail the FCC limit line but an assessment was made for IC and the product is compliant.

Frequency (MHz)	QP Level at 10m (dBµV/m)	QP Limit at 10m (dBµV/m)	Angle	Height (m)	Polarity
30.511	21.4	30.0	170	1.00	Vertical
220.569	21.5	30.0	122	1.00	Vertical

Table 6 - Field Strength of Emissions, 9 kHz to 30 MHz

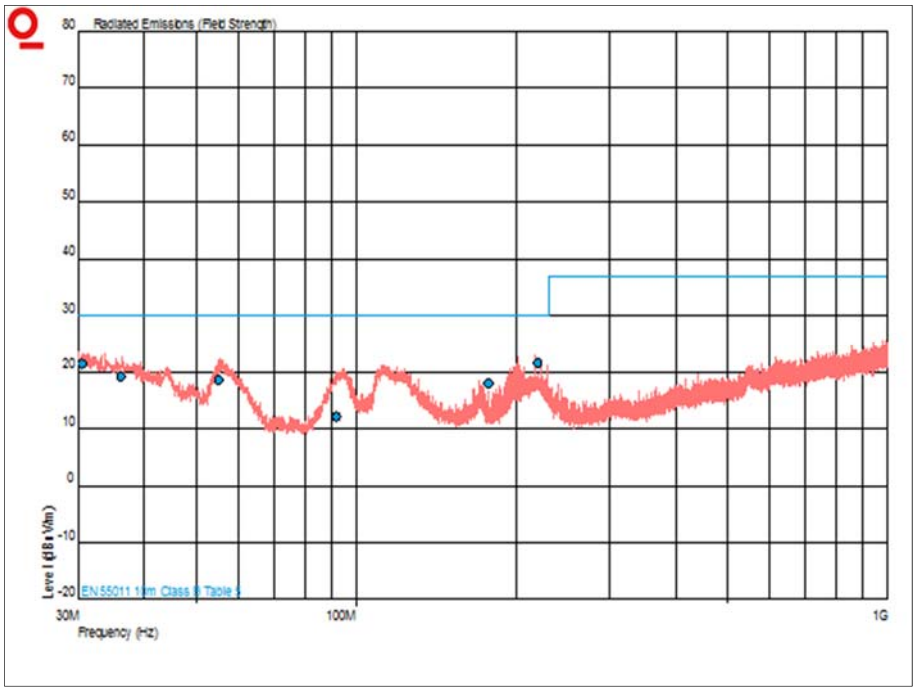

Figure 4 - 30 MHz to 1 GHz

FCC 47 CFR Part 18, Limit Clause 18.305 (b)

Equipment	Operating Frequency	RF Power generated by equipment (Watts)	Field Strength Limit (µV/m)	Distance (Meters)
Any type unless otherwise specified (miscellaneous).	Any ISM frequency	Below 500	25	300
		500 or more	25 x $\sqrt{P/500}$	300
	Any non-ISM frequency	Below 500	15	300
		500 or more	15 x $\sqrt{P/500}$	300

Table 7 - Limit Table

Industry Canada RSS-216, Limit Clause 6.2.2.2, ICES-001, Limit Clause 7.1.1 and CAN/CSA-CEI/IEC CISPR 11, Clause 5.2 - Table 3b

Frequency Band (MHz)	Limits in dBµA/m at 3 m distance
0.009 to 0.070	69
0.070 to 0.1485	69 Decreasing linearly with logarithm of frequency to 39
0.1485 to 4.0	39 Decreasing linearly with logarithm of frequency to 3
4.0 to 30	3
NOTE The limits of Table 3b apply to induction cooking appliances for commercial use and those for domestic use with a diagonal diameter of more than 1.6 m. Measurements are performed at 3 m distance with a 0.6 m loop antenna as described in 5.5.2.1 of CISPR 16-1. The antenna shall be vertically installed, with the lower edge of the loop at 1 m height above the floor.	

Table 8 - Limits of Magnetic Field Strength

Industry Canada RSS-216, Limit Clause 6.2.2.2, ICES-001, Limit Clause 7.1.1 and CAN/CSA-CEI/IEC CISPR 11, Clause 5.2 - Table 4

Frequency Band (MHz)	Electric Field Measurement Distance 10m		Magnetic Field Measurement Distance 10 m Quasi-peak limits (dBµA/m)
	Quasi-Peak Limits (dBµ/V/m)	Average Limits (dBµ/V/m) [1]	
0.15 to 30	-	-	39 Decreasing linearly with logarithm of frequency to 3
30 to 80.872	30	25	-
80.872 to 81.848	50	45	-
81.848 to 134.786	30	25	-
134.786 to 136.414	50	45	-
136.141 to 230	30	25	-
230 to 1000	37	32	-
[1] The average limits apply to magnetron driven equipment only. If magnetron driven equipment exceeds the quasi-peak limit at certain frequencies, then the measurement shall be repeated at these frequencies with the average detector and the average limits specified in this table apply.			

Table 9 - Electromagnetic Radiation Disturbance Limits for Group 2, Class B Equipment Measured on a Test Site

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Antenna (Active Loop, 9kHz-30MHz)	Rohde & Schwarz	HFH2-Z2	333	24	09-Dec-2018
Antenna (Dish/Tripod/Adaptor, 1GHz-18GHz)	Rohde & Schwarz	AC-008	334	-	TU
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Comb Generator	Schaffner	RSG1000	3034	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Multimeter	Fluke	177	3813	12	14-Sep-2018
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Digital thermo Hygrometer	Radio Spares	1260	4300	12	30-Aug-2018
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	04-Nov-2017

Table 10

TU - Traceability Unscheduled

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Field Strength of Emissions	9 kHz to 30 MHz: ± 3.4 dB 30 MHz to 1 GHz: ± 5.2 dB

Table 11