Report on the FCC and IC Testing of the Sphinx Electronics GmbH & Co. KG Door Terminal. Model: DT 750 BLE In accordance with FCC 47 CFR Part 15C and Industry Canada RSS-210 and Industry Canada RSS-GEN

Product Service

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Prepared for: Sphinx Electronics GmbH & Co. KG
Tullastr. 3
79341 Kenzingen
Germany

FCC ID: TCN015
ICES: 5103A-15

COMMERCIAL-IN-CONFIDENCE

Date: 2019-01-30
Document Number: TR-50001330-46474-02 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Martin Steindl	2019-01-31	Steindl Martin
Authorised Signatory	Matthias Stumpe	2019-01-31	Stump

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 15C and Industry Canada RSS-210 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	Martin Steindl	2019-01-31	Steindl Martin

Laboratory Accreditation	Laboratory recognition	Industry Canada test site registration
DAkkS Reg. No. D-PL-11321-11-02	Registration No. BNetzA-CAB-16/21-15	3050A-2

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15C, Industry Canada RSS-210, Issue 09 (08-2016) and Industry Canada RSS-GEN:2016, Issue 04 (11-2014).

Trade Register Munich
HRB 85742
VAT ID No. DE129484267
Information pursuant to Section 2(1) DL-InfoV (Germany) at www.tuev-sued.com/imprint

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Product Service

Contents

Product Service

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	2019-01-30

Table 1

1.2 Introduction

Applicant	Sphinx Electronics GmbH & Co. KG
Manufacturer	Sphinx Electronics GmbH & Co. KG
Model Number(s)	DT 750 BLE
Serial Number(s)	10526A8B54
Hardware Version(s)	SHS-90: V1.5; SHS-92: V1.4; SHS-94: V1.2
Software Version(s)	9.2.0.44
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C, Industry Canada RSS-210, Issue 09 (08-2016) and Industry Canada RSS-GEN:2016, Issue 04 (11-2014)
Test Plan/Issue/Date	---
Order Number Date	926642 2018-11-22
Date of Receipt of EUT	2019-01-10
Start of Test	2019-01-11
Finish of Test	2019-01-31
Name of Engineer(s)	Martin Steindl
Related Document(s)	ANSI C63.10 (2013)
Note:	This test was performed because of a alternation of the antenna of the RFID-part. The Bluetooth part was not tested. However, radiated emissions were performed up to 25 GHz to perform a coexistence test.

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and Industry Canada RSS-210 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: 6 V Battery Supply Transmitting continuously				
2.1	15.225 (a)(b)(c)(d), 15.209, 4.3 and 6.13B.1 to B.9, 6.4 and 6.5.	Field Strength of any Emission	Passed	ANSI C63.10 (2013)
2.2	15.215 (c), N/A and 6.6	20 dB Bandwidth	Passed	ANSI C63.10 (2013)
2.3	15.225 (e), B.1 to B.9 and 6.11.	Frequency Tolerance Under Temperature Variations	Passed	ANSI C63.10 (2013)
2.4	ICES-003, 6.1	RF Exposure	Passed	IC RSS-102 Issue 5

Table 2

Product Service

1.4 Product Information

1.4.1 Technical Description

The product is an electronic door fitting for use in hotels, hospitals and other buildings with frequent changes of room occupant.

1.5 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
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.6 Test Location

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

Test Name	Name of Engineer(s)
Configuration and Mode: 6 V Battery Supply Transmitting continuously	
20 dB Bandwidth	Martin Steindl
Frequency Tolerance Under Temperature Variations	Martin Steindl
Field Strength of any Emission	Martin Steindl

Table 4

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

2 Test Details

2.1 Field Strength of any Emission

2.1.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.209, 15.225 (a)(b)(c)(d), 4.3 and 6.13, B.1 to B.9, 6.4 and 6.5.

2.1.2 Equipment Under Test and Modification State

DT 750 BLE, S/N: 10526A8B54 - Modification State 0

2.1.3 Date of Test

2019-01-10 to 2019-01-31

2.1.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5.

Measurements were made at a distance of 3 m, generally and at a distance of 10 m at frequencies below 30 MHz. The limit lines for frequencies below 30 MHz shown on the plot were extrapolated from either 300 m or 30 m to the measurement distance of 10 m in accordance with ANSI C63.10 Clause 6.4.4.2.

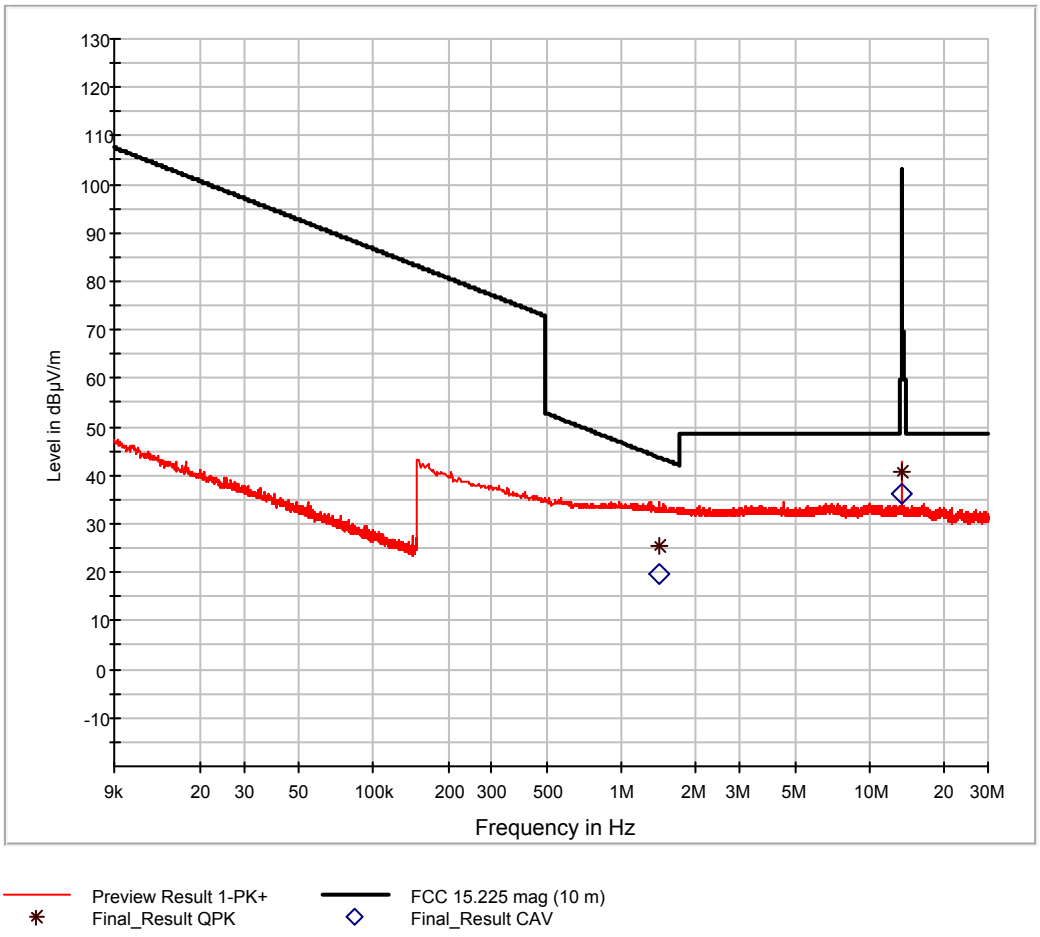
2.1.5 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	28 %

Product Service

2.1.6 Test Results

6 V Battery Supply Transmitting continuously, Carrier Results



Extrapolation factor: -40 dB/decade

Frequency (MHz)	Detector	Distance d1 (m)	Distance d (m)	Reading Value (dBµV)	Correction Factor (dB/m)	Extrapolation Factor (dB)	Pulse Train Correction (dB)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1.42350	Quasi-Peak	10	30	5.6	20.0	-19.1		6.5	24.5	**18.0**
13.56000	Quasi-Peak	10	30	20.9	20.0	-19.1		21.8	84.0	62.2

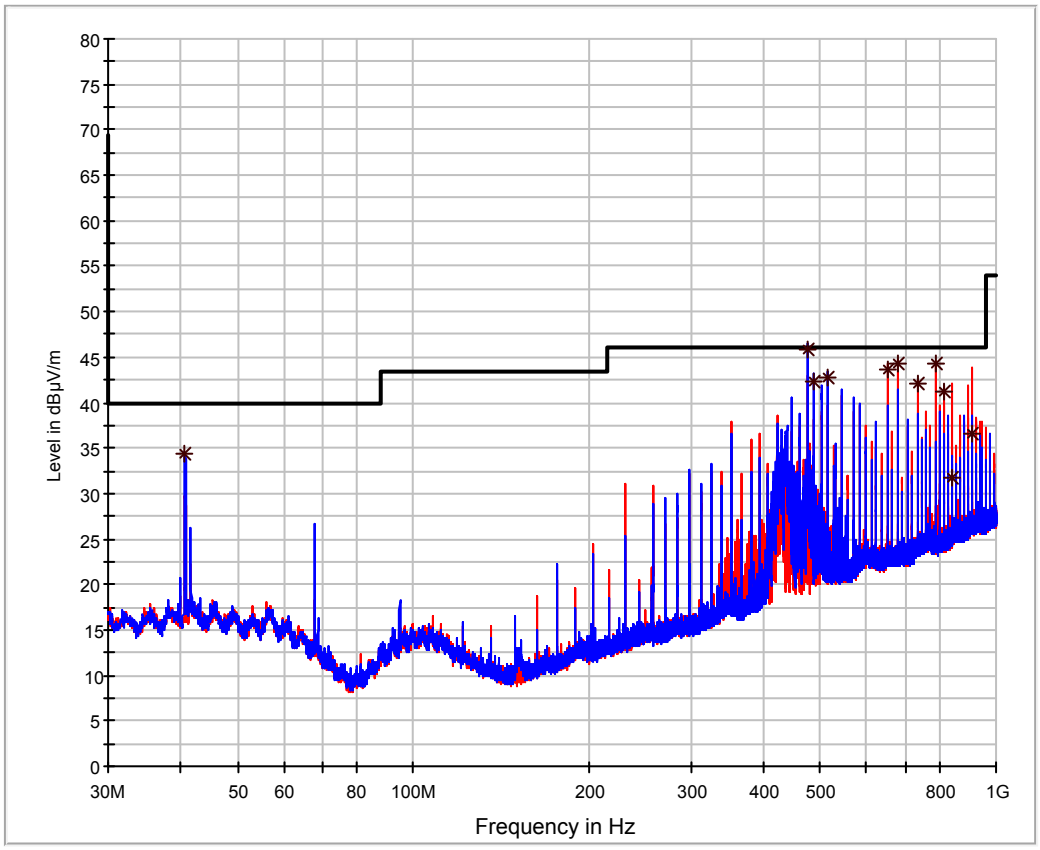
Table 5

Sample calculation of final values:

Extrapolation Factor (dB) = (Log(d) - Log(d_1)) · Extrapolation Factor (dB/decade)

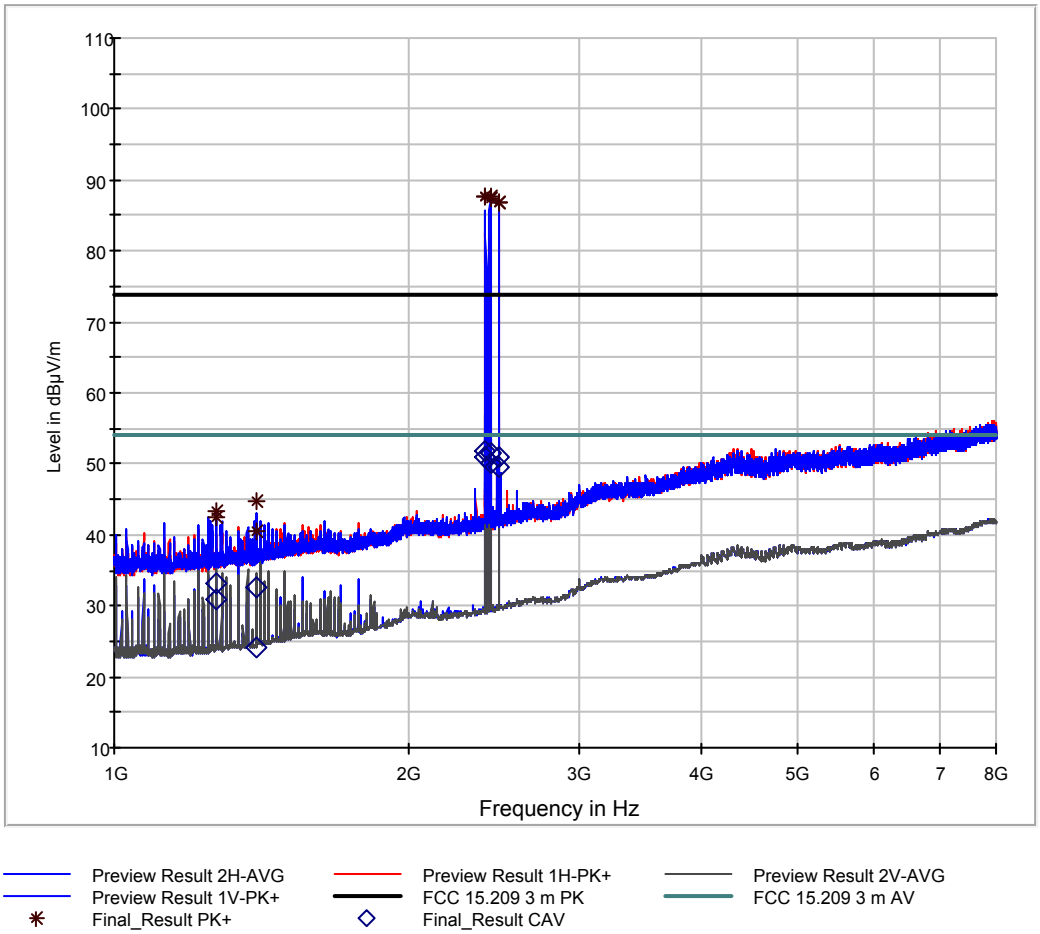
Final Value (dBµV/m) = Reading Value d_1 (dBµV) + Antenna Correction Factor (dB/m) + Cable Attenuation Factor (dB) + Extrapolation Factor (dB) + Pulse Train Correction (dB)

Note: Extrapolation factor (dB) and final value (dBµV/m) are relating to distance d.



Frequency MHz	*QuasiPeak dBµV/m*	*Limit dBµV/m*	*Margin dB*	*Meas. Time ms*	*Bandwidth kHz*	*Height cm*	*Pol*	*Azimuth deg*	*Corr. dB*
40.6800	34.5	40.0	5.6	1000	120	102	V	174	14.9
474.6300	45.9	46.0	0.1	1000	120	100	V	-102	18.8
488.1900	42.4	46.0	3.6	1000	120	102	V	-96	19.3
515.3100	42.8	46.0	3.2	1000	120	150	V	-90	19.7
650.9100	43.6	46.0	2.4	1000	120	104	H	142	21.9
678.0300	44.2	46.0	1.8	1000	120	102	H	146	22.2
732.2700	42.1	46.0	3.9	1000	120	100	H	90	23.1
786.5100	44.4	46.0	1.6	1000	120	100	H	82	23.6
813.6300	41.3	46.0	4.7	1000	120	146	H	83	23.8
840.6600	31.7	46.0	14.3	1000	120	231	H	82	24.2
908.4900	36.5	46.0	9.5	1000	120	193	H	109	25.4

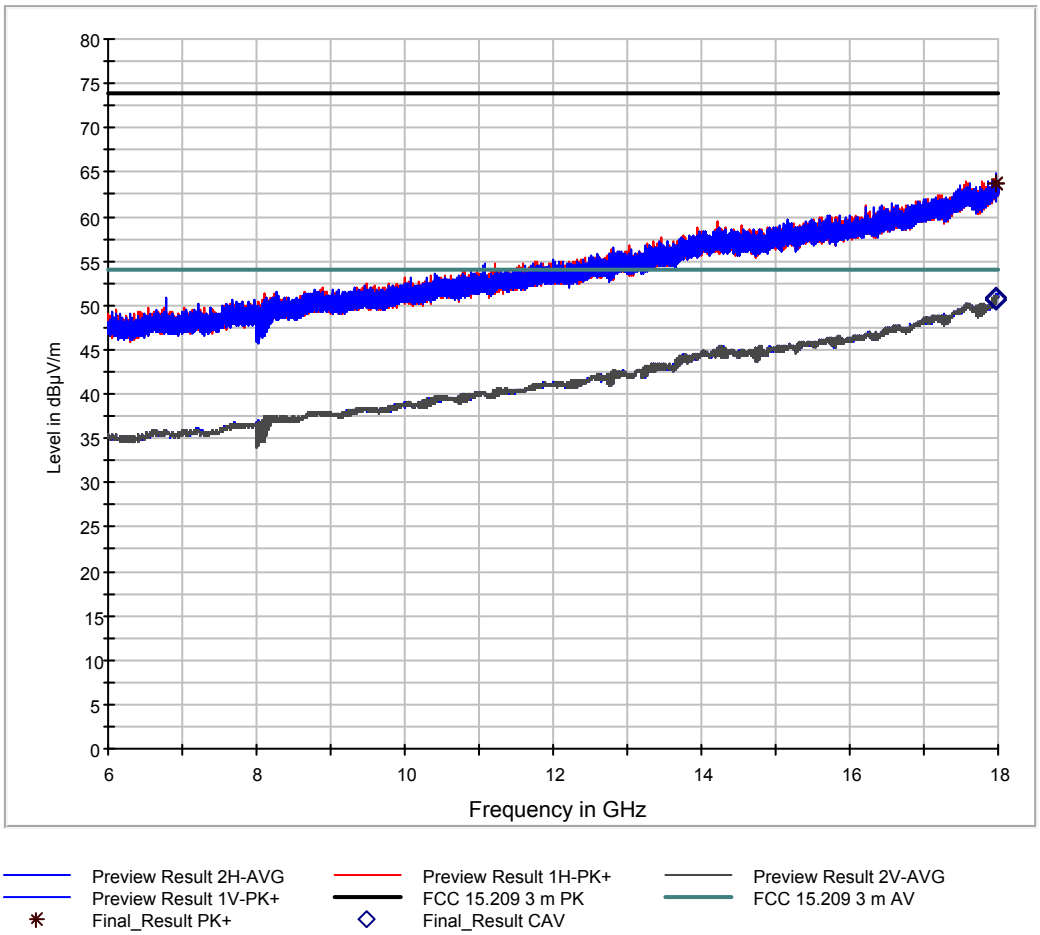
Table 6



Frequency MHz	*MaxPeak dBµV/m*	*CAverage dBµV/m*	*Limit dBµV/m*	*Margin dB*	*Meas. Time ms*	*Bandwidth kHz*	*Height cm*	*Pol*	*Azimuth deg*	*Corr. dB*
1274.250	43.21		74.0	30.8	1000.0	1000.000	113.0	V	-81.0	27.9
1274.250		30.92	54.0	23.1	1000.0	1000.000	113.0	V	-81.0	27.9
1274.750		33.13	54.0	20.9	1000.0	1000.000	272.0	V	-21.0	27.9
1274.750	42.60		74.0	31.4	1000.0	1000.000	272.0	V	-21.0	27.9
1396.750		32.73	54.0	21.3	1000.0	1000.000	307.0	V	-177.0	28.4
1396.750	44.80		74.0	29.2	1000.0	1000.000	307.0	V	-177.0	28.4
1398.250	40.59		74.0	33.4	1000.0	1000.000	117.0	V	-104.0	28.4
1398.250		24.24	54.0	29.7	1000.0	1000.000	117.0	V	-104.0	28.4
2402.000		51.69	*	*	1000.0	1000.000	327.0	V	-25.0	33.3
2402.000	87.63		*	*	1000.0	1000.000	327.0	V	-25.0	33.3
2402.250		50.98	*	*	1000.0	1000.000	328.0	V	-26.0	33.3
2402.250	87.70		*	*	1000.0	1000.000	328.0	V	-26.0	33.3
2425.750	87.63		*	*	1000.0	1000.000	276.0	V	-90.0	33.4
2425.750		50.16	*	*	1000.0	1000.000	276.0	V	-90.0	33.4
2426.000		51.54	*	*	1000.0	1000.000	276.0	V	-63.0	33.4
2426.000	87.31		*	*	1000.0	1000.000	276.0	V	-63.0	33.4
2479.750	86.81		*	*	1000.0	1000.000	200.0	H	-19.0	33.8
2479.750		49.41	*	*	1000.0	1000.000	200.0	H	-19.0	33.8
2480.000		50.98	*	*	1000.0	1000.000	200.0	H	-21.0	33.8
2480.000	86.88		*	*	1000.0	1000.000	200.0	H	-21.0	33.8

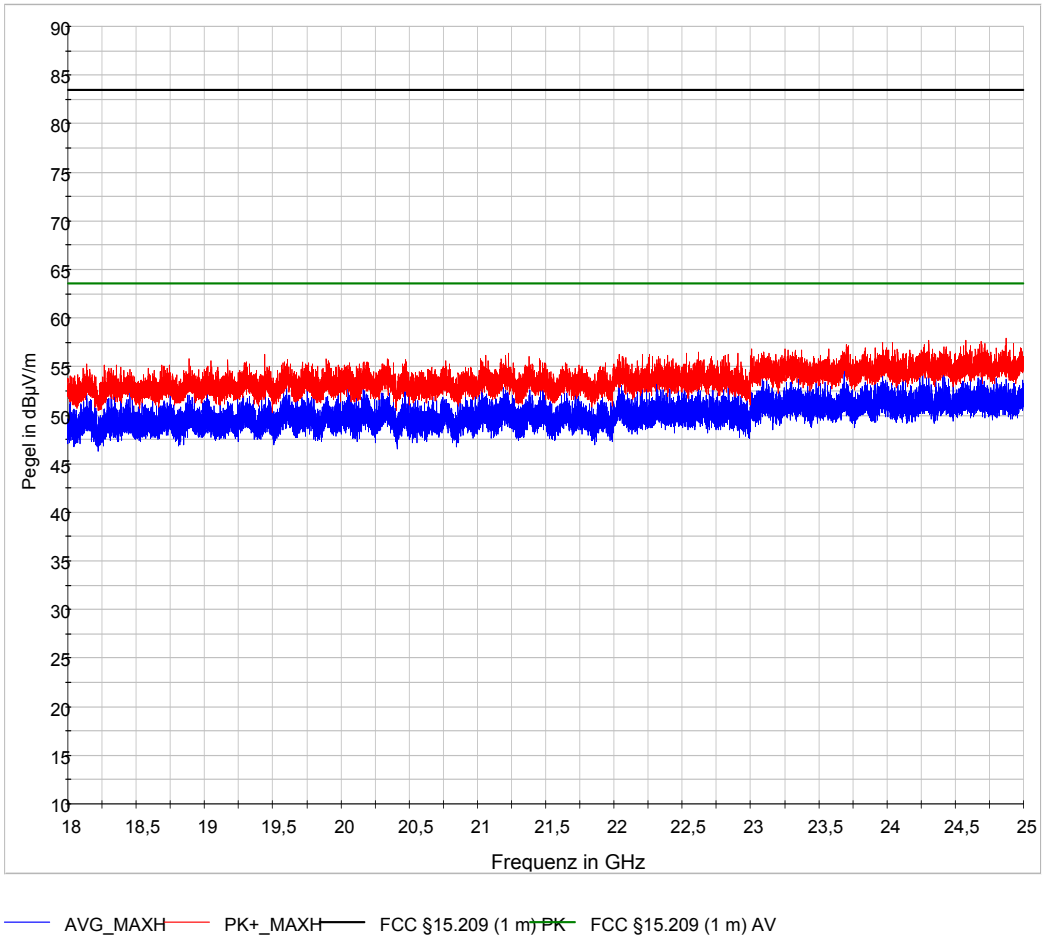
* Note: Emissions within the Bluetooth frequency band 2400.0 MHz – 2483.5 MHz were not evaluated to the spurious emission limit

Table 7



Frequency *MHz*	*MaxPeak* *dBµV/m*	*CAverage* *dBµV/m*	*Limit* *dBµV/m*	*Margin* *dB*	*Meas. Time* *ms*	*Bandwidth* *kHz*	*Height* *cm*	*Pol*	*Azimuth* *deg*	*Corr.* *dB*
17967.500	63.7		74.0	10.3	1000	1000	233	V	200	50.5
17967.500		50.7	54.0	3.3	1000	1000	233	V	200	50.5
17980.000	63.7		74.0	10.2	1000	1000	165	H	99	50.5
17980.000		50.7	54.0	3.2	1000	1000	165	H	99	50.5

Table 8



Sample calculation of final values:

Final Value (dBµV/m) = Reading Value (dBµV)
+ Antenna Correction Factor (dB/m)
+ Cable Attenuation Factor (dB)
+ Pulse Train Correction (dB)

Product Service

FCC 47 CFR Part 15, Limit Clause 15.225 (a)(b)(c)(d)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 m.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 m.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 m.

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	5

Table 9 - FCC Radiated Emission Limit

Industry Canada RSS-210, Limit Clause B.6

The field strength of any emission shall not exceed the following limits:

(a) 15.848 mW/m (84 dBµV/m) at 30 m, within the band 13.553 – 13.567 MHz.

(b) 334 µV/m (50.5 dBµV/m) at 30 m, withing the bands 13.410 – 13.553 MHz and 13.567 – 13.710 MHz.

(c) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110 – 13.410 MHz and 13.710 – 14.010 MHz.

(d) RSS-GEN general field strength limits for frequencies outside the band 13.110 – 14.010 MHz.

Industry Canada RSS-GEN, Limit Clause

Frequency	Electric Field Strength (µV/m)	Magnetic Field Strength (H-Field) (µA/m)	Measurement Distance (m)
9 - 490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490 - 1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1,705 kHz - 30 MHz	30	N/A	30

Table 10 - Industry Canada Radiated Emission Limit - Less than 30 MHz

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
> 960	500

Table 11 - Industry Canada Radiated Emission Limit - 30 MHz to 1 GHz

Product Service

2.1.7 Test Location and Test Equipment Used

This test was carried out in Semi-anechoic room, No. 8.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Loop Antenna	Rohde & Schwarz	HFH2-Z2	18876	36	2019-07-31
Trilog Antenna	Schwarzbeck	VULB 9163	19589	36	2020-10-31
Double Ridged Horn Antenna	Rohde & Schwarz	HF907	19933	24	2019-06-30
Horn Antenna	EMCO Elektronik	3160-09	19125	O/P	
EMI Test Receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2020-01-31
Test Software	Rohde & Schwarz	EMC32 V10.20.01			

Table 12

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

2.2 20 dB Bandwidth

2.2.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.215 (c), N/A and 6.6

2.2.2 Equipment Under Test and Modification State

DT 750 BLE, S/N: 10526A8B54 - Modification State 0

2.2.3 Date of Test

2019-01-17

2.2.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.9.1.

2.2.5 Environmental Conditions

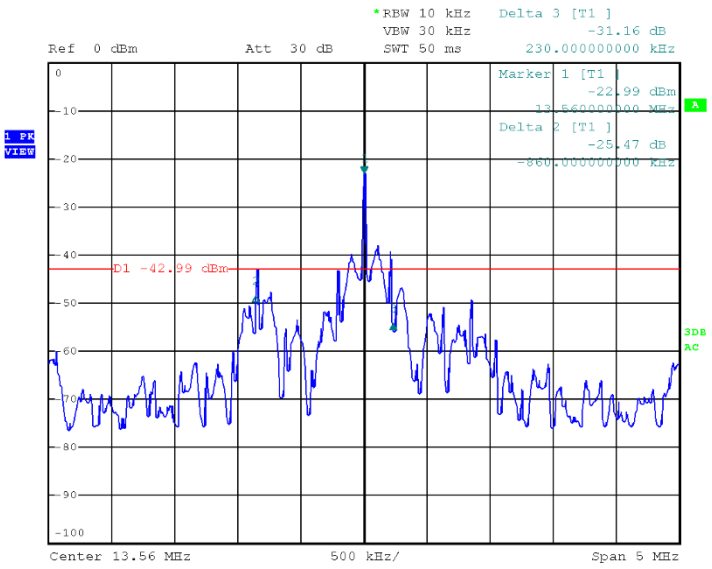
Ambient Temperature °C
Relative Humidity %

2.2.6 Test Results

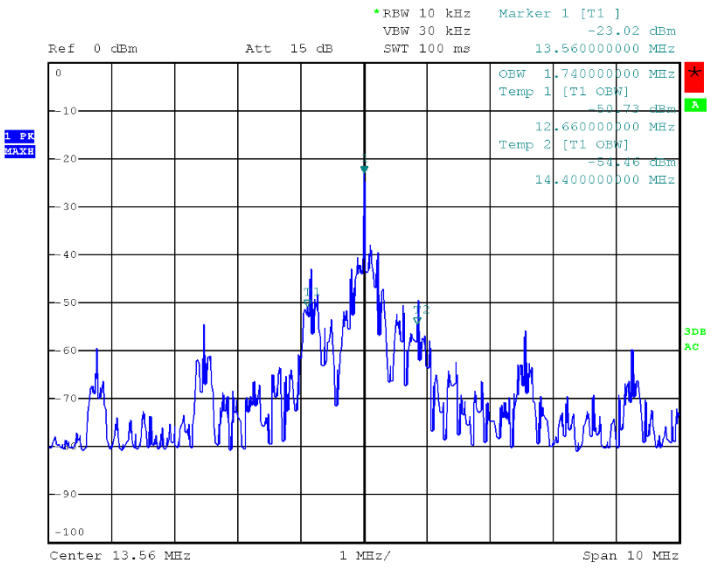
6 V Battery Supply Transmitting continuously

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
13.56	1090	1740

Table 13



20 dB Bandwidth



99% Occupied Bandwidth

Product Service

FCC 47 CFR Part 15, Limit Clause 15.215 (c)

The 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Industry Canada RSS 210 and Industry Canada RSS GEN, Limit Clause

None specified.

2.2.7 Test Location and Test Equipment Used

This test was carried out in <TestLocations_Comma>.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Loop Antenna	Rohde & Schwarz	HFH2-Z2	18876	36	2019-07-31
EMI test receiver	Rohde & Schwarz	ESPI7	19578	24	2019-03-31

Table 14

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

2.3 Frequency Tolerance Under Temperature Variations

2.3.1 Specification Reference

FCC 47 CFR Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.225 (e), B.1 to B.9 and 6.11.

2.3.2 Equipment Under Test and Modification State

DT 750 BLE, S/N: 10526A8B54 - Modification State 0

2.3.3 Date of Test

2017-01-10

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.8

2.3.5 Environmental Conditions

Ambient Temperature 23 °C
Relative Humidity 31 %

2.3.6 Test Results

6 V Battery Supply Transmitting continuously

Temperature	Voltage	Measured Frequency (MHz)	Frequency Error (ppm)
-20.0 °C	6.0	13.5607126	9.59
-10.0 °C	6.0	13.5607046	9.00
0.0 °C	6.0	13.5606806	7.22
+10.0 °C	6.0	13.5606366	3.98
+20.0 °C	6.0	13.5605826	0.00
+30.0 °C	6.0	13.5605266	-4.13
+40.0 °C	6.0	13.5604806	-7.52
+50.0 °C	6.0	13.5604426	-10.32

Table 15 - Frequency Tolerance Under Temperature Variation

Temperature	Voltage	Measured Frequency (MHz)	Frequency Error (ppm)
+20.0 °C	4.8	13.5605686	-0.44
+20.0 °C	6.0	13.5605746	0.00
+20.0 °C	6.9	13.5605726	-0.15

Table 16 - Frequency Tolerance Under Voltage Variation

Product Service

FCC 47 CFR Part 15, Limit Clause 15.225 (e)

The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency.

Industry Canada RSS-210, Limit Clause B.6

Carrier frequency stability shall be maintained to ±0.01% (±100 ppm)

2.3.7 Test Location and Test Equipment Used

This test was carried out in Non-Shielded Room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESPI7	19578	24	2019-03-31
Test probe	Senton	Test Probe	19495	O/P	
Climatic test chamber	Espec	PL-2J	18843	36	2020-03-31

Table 17

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

2.4 RF Exposure

2.4.1 Specification Reference

ICES-003, Clause 6.1

2.4.2 Guide

IC RSS-102 Issue 5, section 2.5

2.4.3 Equipment Under Test and Modification State

ES 110, S/N: 381803F7 - Modification State 0

2.4.4 Date of Test

2019-01-31

Product Service

2.4.5 Test Results

Exposure of Humans to RF Fields	Applicable	Declared by applicant	Measured	Exemption
The antenna is				
☐ detachable				
The conducted output power (CP in watts) is measured at the antenna connector: CP = **..... W**			☐	
The effective isotropic radiated power (EIRP in watts) is calculated using				
☐ the numerical antenna gain: G = **.....** $EIRP = G \cdot CP \Rightarrow EIRP$ = **..... W**		☐		
☐ the field strength[1] in V/m: FS = **..... V/m** $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP$ = **..... W**			☐	
with: Distance between the antennas in m: D = **..... m**			☐	
☒ not detachable				
A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by: $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP$ = **41 nW (13.56 MHz)** = **117.2 µW (2.402 GHz)** with: Field strength: FS = **110.9 µV/m (13.56 MHz)** = **24.3 mV/m (2.402 GHz)** Distance between the two antennas: D = **10 m (13.56 MHz)** = **3 m (2.402 GHz)**			☒ ☒	
Selection of output power				
The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.): TP_1 = **41 nW (13.56 MHz)** TP_2 = **117.2 µW (2.402 GHz)**				

[1] The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses.
If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.

Product Service

Exposure of Humans to RF Fields (continued)		Applicable	Declared by applicant	Measured	Exemption
Separation distance between the user and the transmitting device is					
☒ less than or equal to 20 cm	☐ greater than 20 cm		☒		
Transmitting device is					
☐ in the vicinity of the human head	☐ body-worn		☐		

Product Service

SAR evaluation														

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.

For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.

Frequency (MHz)	Exemption limits (mW)[2] at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
≤300 [3]	71	101	132	162	193	223	254	284	315	345
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106

[2] The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separaton distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from alinear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from athird order polynomial fit.

[3] Transmitters operating between 3 kHz and 10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in IC RSS-102, issue 5, section 4.

	Carrier frequency:	*f*	=	**13.56 MHz**			
	Distance:	*d*	=	**5 mm**			
	Transmitter output power:	*TP*	=	**41 nW**			
	Limit:	TP_{limit}	=	**71 mW**			☒
☐	SAR evaluation is documented in test report no. …						

	Carrier frequency:	*f*	=	**2402 MHz**			
	Distance:	*d*	=	**5 mm**			
	Transmitter output power:	*TP*	=	**117.2 µW**			
	Limit:	TP_{limit}	=	**4 mW**			☒
☐	SAR evaluation is documented in test report no. …						

2.4.6 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 8.

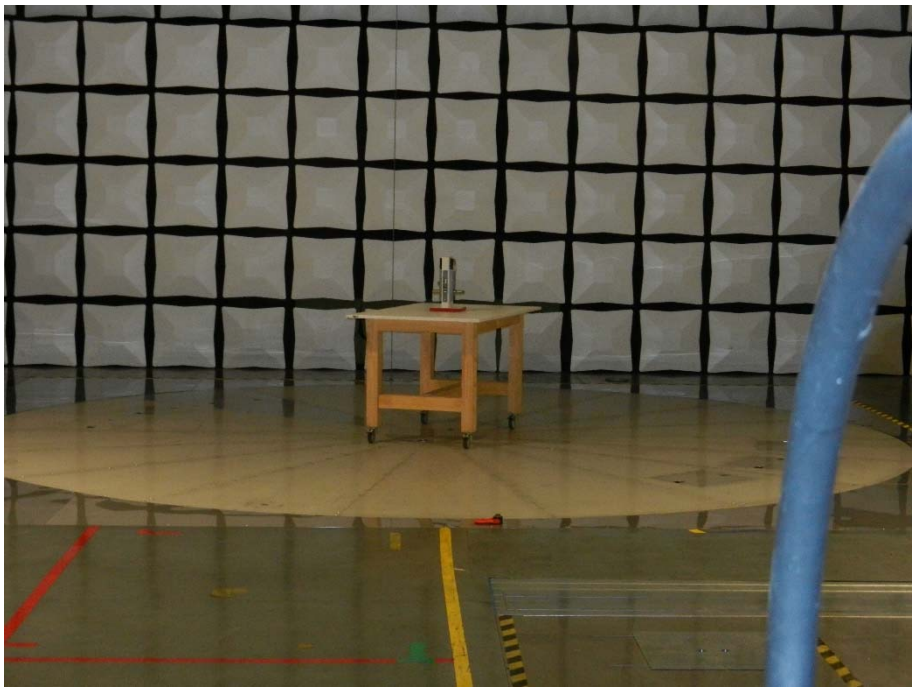
Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Loop antenna	Rohde & Schwarz	HFH2-Z2	18876	24	2019-07-31
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2019-05-31

Table 18

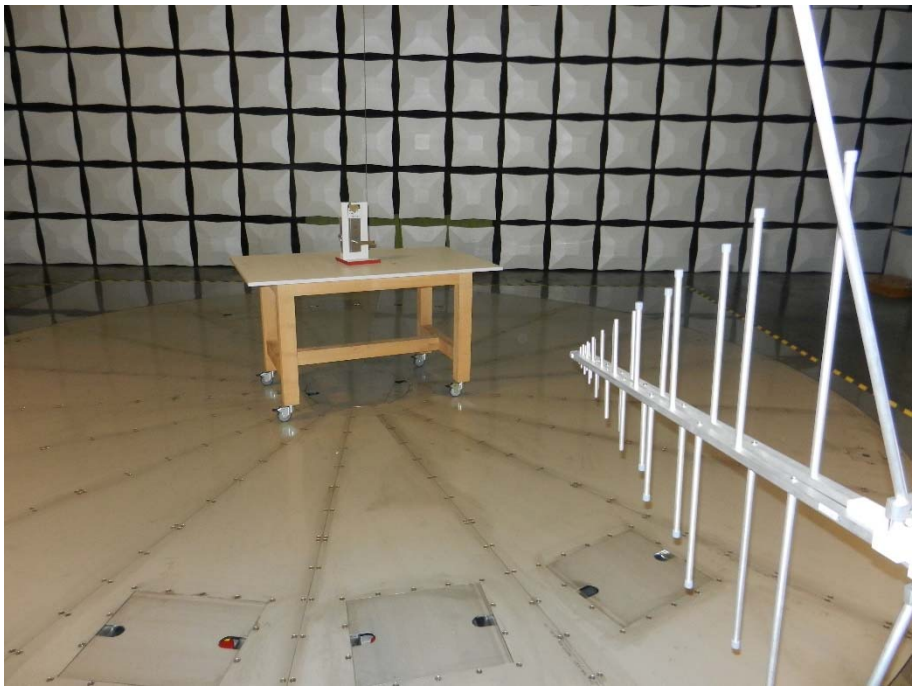
Product Service

3 Photographs

3.1 Equipment Under Test (EUT)



Radiated Emissions 9 kHz – 30 MHz



Radiated Emissions 30 MHz – 1 GHz

Product Service

Radiated Emissions above 1 GHz

Product Service

4 Measurement Uncertainty

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

Radio Testing			
Test Name	kp	Expanded Uncertainty	Note
Occupied Bandwidth	2.0	±1.14 %	2
RF-Frequency error	1.96	±1 · 10-7	7
RF-Power, conducted carrier	2	±0.079 dB	2
RF-Power uncertainty for given BER	1.96	+0.94 dB / -1.05	7
RF power, conducted, spurious emissions	1.96	+1.4 dB / -1.6 dB	7
RF power, radiated			
25 MHz – 4 GHz	1.96	+3.6 dB / -5.2 dB	8
1 GHz – 18 GHz	1.96	+3.8 dB / -5.6 dB	8
18 GHz – 26.5 GHz	1.96	+3.4 dB / -4.5 dB	8
40 GHz – 170 GHz	1.96	+4.2 dB / -7.1 dB	8
Spectral Power Density, conducted	2.0	±0.53 dB	2
Maximum frequency deviation			
300 Hz – 6 kHz	2	±2,89 %	2
6 kHz – 25 kHz	2	±0.2 dB	2
Maximum frequency deviation for FM	2	±2,89 %	2
Adjacent channel power 25 MHz – 1 GHz	2	±2.31 %	2
Temperature	2	±0.39 K	4
(Relative) Humidity	2	±2.28 %	2
DC- and low frequency AC voltage			
DC voltage	2	±0.01 %	2
AC voltage up to 1 kHz	2	±1.2 %	2
Time	2	±0.6 %	2

Table 19

Product Service

Radio Interference Emission Testing			
Test Name	kp	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5µH AMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 1 m (ALSE)			
9 kHz to 150 kHz	2	± 4.6 dB	1
150 kHz to 30 MHz	2	± 4.1 dB	1
30 MHz to 200 MHz	2	± 5.2 dB	1
200 MHz to 2 GHz	2	± 4.4 dB	1
2 GHz to 3 GHz	2	± 4.6 dB	1
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			4
Voltage Changes, Voltage Fluctuations and Flicker			4

Table 20

Product Service

Immunity Testing			
Test Name	kp	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2	+32.2 / -24.3 %	5
Dynamic feedback field level	2.05	+21.2 / -17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances, induced by RF-Fields			
via CDN	2	+15.1 / -13.1 %	6
via EM clamp	2	+42.6 / -29.9 %	6
via current clamp	2	+43.9 / -30.5 %	6
Power Frequency Magnetic Field	2	+20.7 / -17.1 %	2
Pulse Magnetic Field			4
Voltage Dips, Short Interruptions and Voltage Variations			4
Oscillatory Waves			4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

Table 21

Note 1:
The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 2:
The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 3:
The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of kp = 2.05, providing a level of confidence of p = 95.45%
Note 4:
It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95%confidence.
Note 5:
The expanded uncertainty reported according to IEC 61000-4-3 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 6:
The expanded uncertainty reported according to IEC 61000-4-6 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 7:
The expanded uncertainty reported according ETSI TR 100 028 V1.4.1 (all parts) to is based on a standard uncertainty multiplied by a coverage factor of kp = 1.96, providing a level of confidence of p = 95.45%
Note 8:

Product Service

The expanded uncertainty reported according to ETSI TR 102 273 V1.2.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of kp = 1.96, providing a level of confidence of p = 95.45%