FCC TCB & ISED CB

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1309

46390-2049

AT-1945

SL2-IN-E-1119R

CA2049

3000 Bristol Circle,
Oakville, Ontario,
Canada L6H 6G4
Tel.: (905) 829-1570
Fax.: (905) 829-8050
Website: www.ultratech-labs.com
Email: vic@ultratech-labs.comm

June 12, 2017

Camden Door Control
5502 Timberlea Blvd
Mississauga, Ontario
Canada, L4W 2T7

Attn.: **Frank Gerlach**

Subject: **Verification Testing under ISED CANADA ICES-003, ISSUE 6, Class B - Information Technology Equipment (Including Digital Apparatus).**

Product: **SureWave Line Powered Hands Free Switch**
Model No.: **CM-331/CM-332**

Dear Mr. Gerlach,

The product sample, as provided by you, has been tested and found to comply with **ISED Canada ICES-003, Issue 6, Class B - Information Technology Equipment (Including Digital Apparatus),** the compliance is suggested by Industry Canada as follows:

CAN ICES-3 (B)/NMB-3(B)

Enclosed you will find copies of the engineering report. If you have any queries, please do not hesitate to contact us.

Yours truly,

Tri Minh Luu, BASc.
V.P., Engineering

Encl

VERIFICATION CERTIFICATE

NOT TRANSFERABLE

This Verification Certificate is hereby issued to the named GRANTEE and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below:

GRANTEE:	
Address:	Camden Door Control. 5502 Timberlea Blvd Mississauga, Ontario Canada L4W 2T7
Contact Person:	Mr. Frank Gerlach Phone #: 905-282-1750 Fax #: 905-282-9691 Email Address: fgerlach@embeddedsense.com
Equipment Type:	Class B Information Technology Equipment (Including Digital Apparatus)
Product Name:	SureWave Line Powered Hands Free Switch
Model No.:	CM-331/CM-332
The above product was tested by UltraTech Engineering Labs Inc. and found to comply with:	ISED Canada ICES-003, Issue 6 - Information Technology Equipment (Including Digital Apparatus) — Limits and methods of measurement
Date of Authorization:	June 12, 2017

- **Note(s):** *See attached report, UltraTech's File No.: 17EMSI060_ICES003B, dated* June 12, 2017 *for details and conditions of Verification Compliance.*

Approved by: Tri M. Luu, BASc.
V.P. – Engineering

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
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ENGINEERING TEST REPORT

SureWave Line Powered Hands Free Switch
Model No.: CM-331/CM-332

Applicant: **Camden Door Control**
5502 Timberlea Blvd
Mississauga, Ontario
Canada, L4W 2T7

Tested in Accordance With

Innovation, Science and Economic Development , (ISED) Canada, ICES-003, ISSUE 6, CLASS B Verification Authorization - Information Technology Equipment (Including Digital Apparatus)

UltraTech's File No.: 17EMSI060_ICES003B

This Test report is Issued under the Authority of Tri M. Luu Vice President of Engineering UltraTech Group of Labs Date: June 12, 2017	
Report Prepared by: Lien Trinh Issued Date: June 12, 2017	Tested by: Hien Luu, Phuong Ngo Test Dates: January 24 - June 1, 2017

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by any agency of the US Government.*
- *This test report shall not be reproduced, except in full, without a written approval from UltraTech.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
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91038 **1309** **46390-2049** **AT-1945** **SL2-IN-E-1119R** **CA2049**

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- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	ISED Canada ICES-003, Issue 6
Title	Information Technology Equipment (Including Digital Apparatus) — Limits and methods of measurement
Purpose of Test:	Verification of Compliance for a Class B Unintentional Radiator.
Test Procedures	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz and ISED Canada ICES-003, Issue 6
Environmental Classification:	Residential, Light-industry, Commercial & Industry

1.2. REVISION HISTORY

Document	Issue Date	Description
17EMSI060_ICES003B	June 12, 2017	Original Document

1.3. RELATED SUBMITTAL(S)/GRANT(S)

None

1.4. NORMATIVE REFERENCES

Publication	Year	Title
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
ICES-003, Issue 6	2016	Information Technology Equipment (Including Digital Apparatus) — Limits and methods of measurement

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT:	
Name:	Camden Door Control
Address:	5502 Timberlea Blvd Mississauga, Ontario Canada L4W 2T7
Contact Person:	Mr. Frank Gerlach Phone #: 905-282-1750 Fax #: 905-282-9691 Email Address: fgerlach@embeddedsense.com

MANUFACTURER:	
Name:	Embedded Sense Inc.
Address:	5155 Spectrum Way, Unit 17 Mississauga, Ontario Canada L4W 5A1
Contact Person:	Mr. Frank Gerlach Phone #: 905-282-1750 Fax #: 905-282-9691 Email Address: fgerlach@embeddedsense.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name	SureWave Hands Free Switch
Product Name	SureWave Line Powered Hands Free Switch
Model Name or Number	CM-331/CM-332
Type of Equipment	Unintentional Radiators
Power input source:	12/24 VAC/VDC

2.3. FUNCTION /APPLICATION OF THE EUT

EUT is a hand free switch to operate and/or unlock a door.

2.4. LIST OF COMPONENTS/PARTS OF THE EUT

None

2.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Specify minimum length and shielded/non-shielded)
1	External Switch	3	Terminal Block	Shielded, 1m
2	Relay Contacts	2	Terminal Block	Shielded, 1m

2.6. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests: None

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

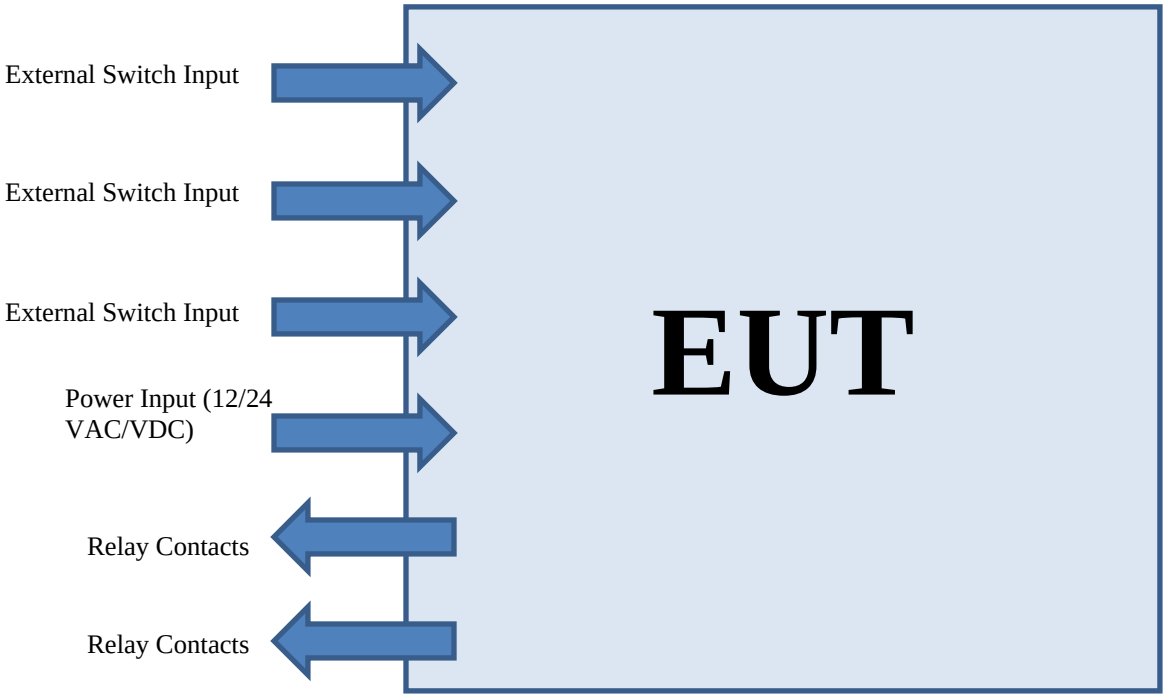
Temperature:	21°C
Humidity:	31%
Pressure:	102 kPa
Power input source:	12/24 VAC/VDC

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

I) **Equipment Setup / operating instructions:**
Power on device and wait approximately 10 seconds for unit to boot up and stabilize

II) **Description or theory of normal operation:**
The EUT will take about 10s to boot and stabilize. The DIP switches are used to change the operating configurations and the potentiometers are used to adjust the operating time or the relays and the sensing range distance.

3.3. BLOCK DIAGRAM OF TEST SETUP FOR AC POWERLINE CONDUCTED EMISSION & RADIATED EMISSION MEASUREMENTS



- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

3.4. PHOTOGRAPHS OF TEST SETUP FOR AC CONDUCTED EMISSION MEASUREMENTS


HIGH
CAUTION
DO NOT exceed 10 Amps

3.5. PHOTOGRAPHS OF TEST SETUP FOR RADIATED EMISSION MEASUREMENTS


UltraTech

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with ANAB File No.: AT-1945.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

ICES-003, Issue 6	TEST REQUIREMENTS	MARGIN BELOW (-) / ABOVE (+) THE LIMITS	COMPLAINCE (YES/NO)
Class B Table 2	AC Power Line Conducted Emissions Measurements	- 7.2 dB @ 0.155 MHz	Yes
Class B Table 5 & 7	Radiated Emissions from Computing Devices (Digital Devices)	- 9.6 dB @ 73.5 MHz	Yes

4.3. MODIFICATIONS REQUIRED FOR COMPLIANCE

None

EXHIBIT 5. MEASUREMENT DATA

5.1. AC POWERLINE CONDUCTED EMISSIONS @ ISED CANADA ICES-003, ISSUE 6

5.1.1. Limits

The equipment shall meet the limits of the following table:

	CLASS B LIMITS		
Test Frequency Range (MHz)	**Quasi-Peak (dBμV)**	**Average* (dBμV)**	**Measuring Bandwidth**
0.15 to 0.5	66 to 56*	56 to 46*	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average
0.5 to 5	56	46	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average
5 to 30	60	50	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average

* Decreasing linearly with logarithm of frequency

5.1.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-2004 & ANSI C63.4 for method of measurements.

Calculation of Conducted Emission Voltage (dBμV):

This is calculated by adding the L.I.S.N factor, Cable loss factor, and Attenuator factor to the measured reading. The basic equation with a sample calculation is as follows:

$$\text{Voltage (dB}\mu\text{V)} = RA + AF + CF + LF$$

Where

RA = Receiver/Analyzer Reading in dBμV
AF = Attenuation Factor in dB
CF = Cable loss Factor in dB
LF = L.I.S.N Factor in dB

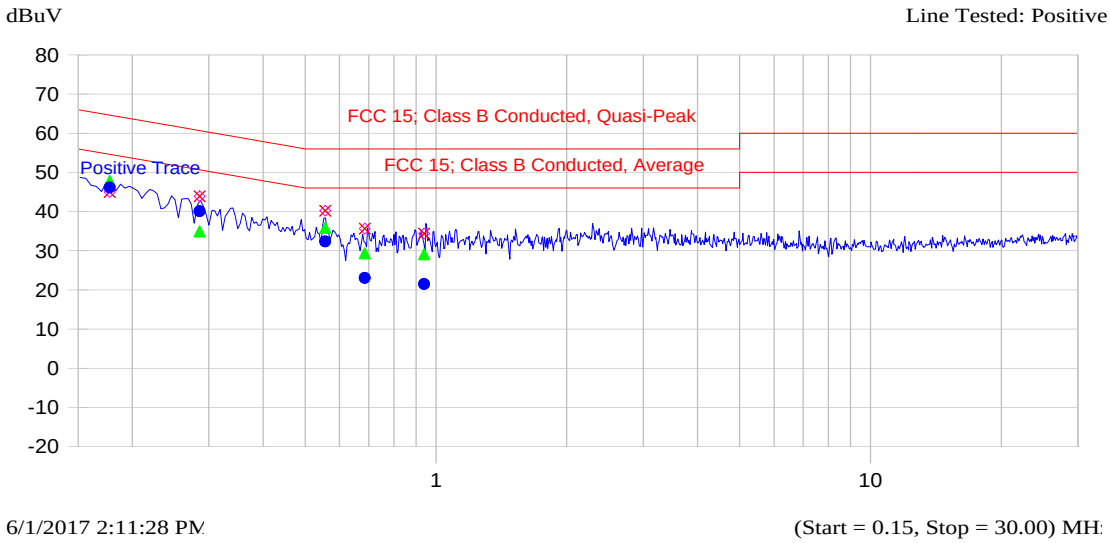
5.1.3. Test Instruments

Refer to Exhibit 6 for Test Instruments & Measurement Uncertainty

5.1.4. Test Results

FCC 15 Sub B; Class B Power Line Conducted Emission

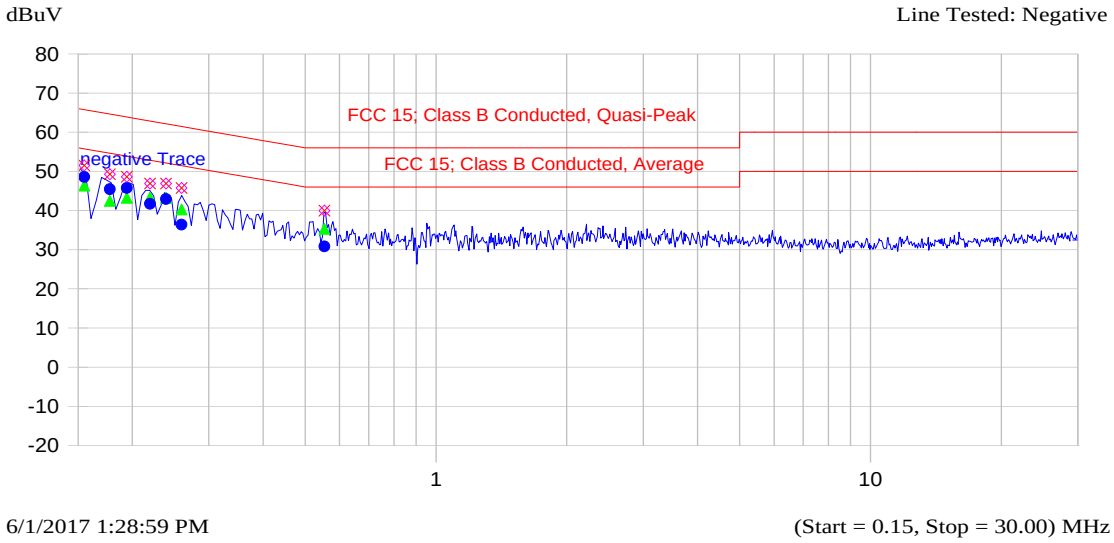
Description: Line Voltage: 24Vdc
Setup Name: FCC 15 Class B
Customer Name: Embedded Sense Inc.
Project Number: EMSI-060Q
Operator Name: Phuong Luu
EUT Name: SureWave hands Free Switch
Date Created: 6/1/2017 1:25:11 PM
Date Modified: 6/1/2017 2:09:28 PM



Frequency MHz	Peak dBuV	QP dBuV	QP-QP Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.177	45.0	47.8	-16.8	46.1	-8.5	Positive Trace
0.286	43.9	35.0	-25.7	40.1	-10.6	Positive Trace
0.556	40.2	35.8	-20.2	32.4	-13.6	Positive Trace
0.685	35.6	29.4	-26.6	23.0	-23.0	Positive Trace
0.939	34.4	29.1	-26.9	21.5	-24.5	Positive Trace

FCC 15 Sub B; Class B Power Line Conducted Emission

Description: Line Voltage: 24Vdc
Setup Name: FCC 15 Class B
Customer Name: Embedded Sense Inc.
Project Number: EMSI-060Q
Operator Name: Phuong Luu
EUT Name: SureWave hands Free Switch
Date Created: 6/1/2017 1:25:11 PM
Date Modified: 6/1/2017 1:25:11 PM



Frequency MHz	Peak dBuV	QP dBuV	QP-QP Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.155	51.5	46.4	-19.4	48.6	**-7.2**	negative Trace
0.178	49.3	42.5	-22.1	45.4	-9.2	negative Trace
0.194	48.6	43.3	-20.6	45.7	-8.1	negative Trace
0.220	46.9	43.3	-19.5	41.7	-11.1	negative Trace
0.239	46.9	43.2	-18.9	42.9	-9.2	negative Trace
0.260	45.8	40.2	-21.2	36.4	-15.1	negative Trace
0.554	40.0	35.3	-20.7	30.8	-15.2	negative Trace

5.2. RADIATED EMISSIONS FROM CLASS B INFORMATION TECHNOLOGY EQUIPMENT (INCLUDING DIGITAL APPARATUS) @ ISED CANADA ICES-003, ISSUE 6

5.2.1. Limits

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Class B Limits (dBμV/m)	EMI Detector Used	Measurement Distance (meters)
30 – 88	40.0	Quasi-Peak	3
88 – 216	43.5	Quasi-Peak	3
216 – 960	46.0	Quasi-Peak	3
960 -1000	54.0	Quasi-Peak	3
Above 1000	54.0 74.0	Average Peak	3

5.2.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-2004 & ANSI C63.4 for method of measurements.

The spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	No radiated tests required
1.705 – 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

Calculation of Field Strength:
The field strength is calculated by adding the calibrated antenna factor and cable factor, and subtracting the Amplifier gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
RA = Receiver/Analyzer Reading
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

5.2.3. Test Instruments

Refer to Exhibit 6 for Test Instruments & Measurement Uncertainty

5.2.4. Test Results

The emissions were scanned from 30 to 1000 MHz at 3 Meters distance and all emissions less than 20 dB below the limits were recorded.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/ FAIL
73.5	30.5	PEAK	V	40.0	**-9.6**	PASS
73.5	17.5	PEAK	H	40.0	-22.5	PASS
95.3	33.5	PEAK	V	43.5	-10.0	PASS
95.3	18.0	PEAK	H	43.5	-25.5	PASS
113.9	30.9	PEAK	V	43.5	-12.6	PASS
129.5	30.2	PEAK	V	43.5	-13.3	PASS

EXHIBIT 6. TEST INSTRUMENTS AND MEASUREMENT UNCERTAINTY (K=2, 95% CONFIDENCE LEVEL)

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

6.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY (9 KHZ - 30 MHZ)

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Calibration Due Date
EMI Receiver System/Spectrum Analyzer with built-in Amplifier	HP	8593EM	3710A00223	9KHz-22 GHz,	Oct 4, 2017
Attenuator	Pasternack	PE7010-20	07	DC to 2 GHz	Mar 13, 2018
L.I.S.N.	EMCO	3810/2	2209	9Khz-30Mhz	Jan 23, 2018

Test Date: Jun 1, 2017

	Line Conducted Emission Measurement Uncertainty (9 kHz – 30 MHz):	Measured	Limit
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.44**	**± 1.8**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 2.89**	**± 3.6**

6.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Due Date
EMI Receiver	Rohde & Schawrz	ESU40	100037	20 Hz to 40 GHz	May 8, 2017
Pre Amplifier	Com-Power	Pam-118A	551052	500 MHz to 18 GHz	July 13, 2017
Biconilog Antenna	EMCO	3142	9601-1005	26 – 3000 MHz	May 12, 2018
Horn Antenna	EMCO	3115	9911-5061	1GHz – 18 GHz	April 24, 2018
Semi-Anechoic Chamber	TDK	FCC: 91038 IC: 2049A-3	--	--	Mar 27, 2020

Test Date: January 24, 2017

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured (dB)**	**Limit (dB)**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.39**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.79**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	**Measured (dB)**	**Limit (dB)**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.39**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.78**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	**Measured (dB)**	**Limit (dB)**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.87**	Under consideration
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.75**	Under consideration