RADIO REPORT

FCC 47 CFR Part 15F
ISED Canada RSS-220

Ultra Wide Band Devices

Report Reference No	G0M-2006-9089-TFC15FUW-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	In-Circuit GmbH
Address	Boltenhagener Str. 124 01109 Dresden GERMANY
Test Specification	47 CFR Part 15F RSS-220, Issue 1 + A1, 2018-07 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model(s)	radino40 DW1000
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	A
Software Version(s)	A
FCC-ID	2AWXURADINO40DW1000
IC	N/A
Test Result	**PASSED**

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 23 °C	
Test Lab Humidity	32 % - 38 %	
Date of receipt of test item	2020-07-20	Test Sample ID 30163 Test Sample ID 30164
	2020-07-30	Test Sample ID 30448 Test Sample ID 30449
Report:		
Compiled by	Abdullah Al Jamal	
Tested by (+ signature) (Responsible for Test)	Abdullah Al Jamal	.....
Approved by (+ signature) (Head of Lab)	Christian Weber	.....
Date of Issue	2020-08-05	
Total number of pages	67	
General Remarks:		
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-08-05	Initial Release	

ABBREVIATIONS AND ACRONYMS

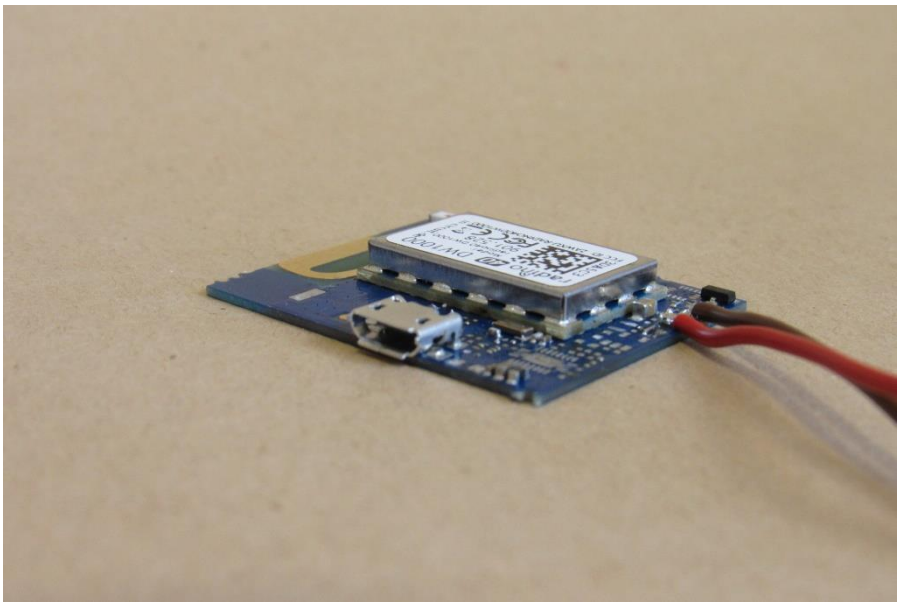
Acronyms	
Acronym	Description
CH	Channel
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
N/A	Not applicable
RBW	Resolution bandwidth
RFID	Radio Frequency Identification
RMS	Root mean square
T_{NOM}	Nominal temperature
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

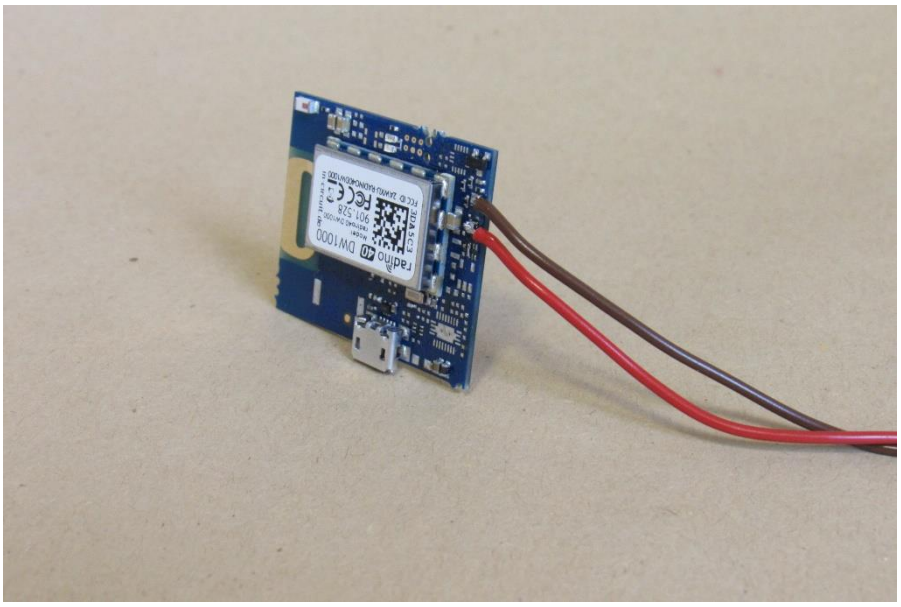
REPORT INDEX

1 Equipment (Test Item) Under Test

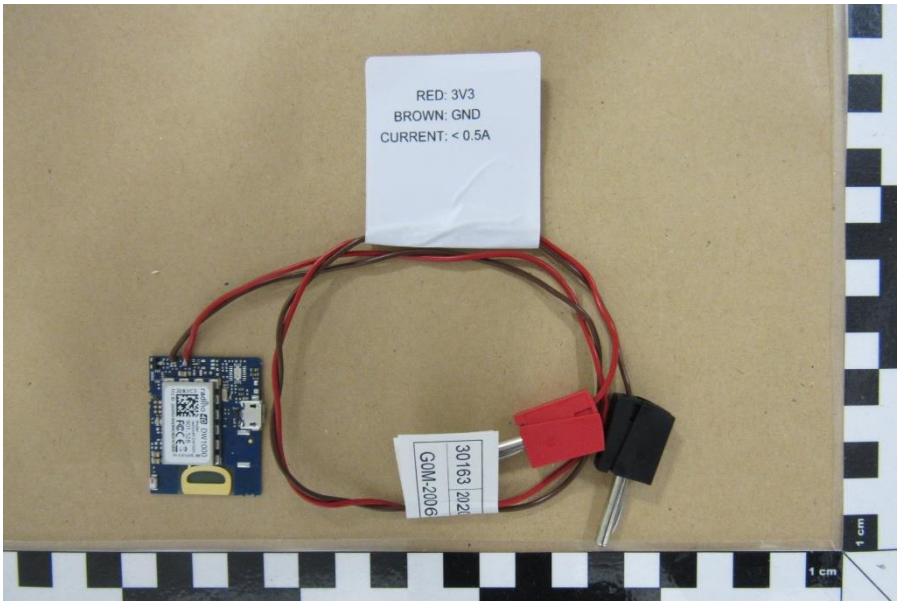
Description	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)	
Model	radino40 DW1000	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	Not specified	
Hardware Version(s)	A	
Software Version(s)	A	
PMN	N/A	
HVIN	N/A	
FVIN	N/A	
HMN	N/A	
FCC-ID	2AWXURADINO40DW1000	
IC	N/A	
Equipment class	Hand held	
Equipment type	End Product	
Radio type	Transceiver	
Operating frequency range	3.1 GHz - 10.6 GHz	
Radio technology	Ultra Wide-band	
Antenna	Type	External antenna
	Model	902.055 PCB-Antenne 3-8GHz RP-SMA
	Manufacturer	In-Circuit GmbH
	Gain	2.2 dBi (declared by client)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A
Manufacturer	In-Circuit GmbH Boltenhagener Str. 124 01109 Dresden GERMANY	

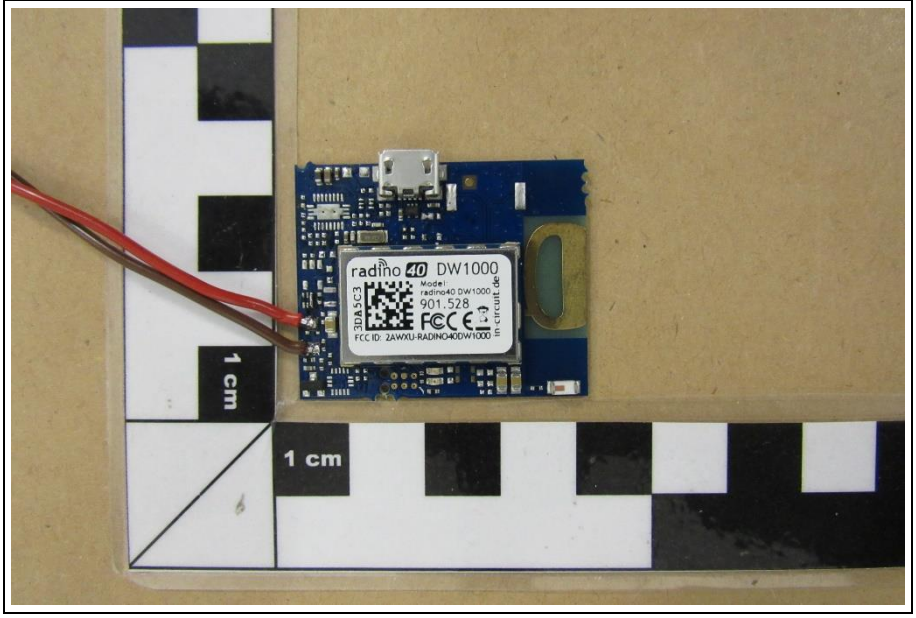
1.1 Photos – Equipment

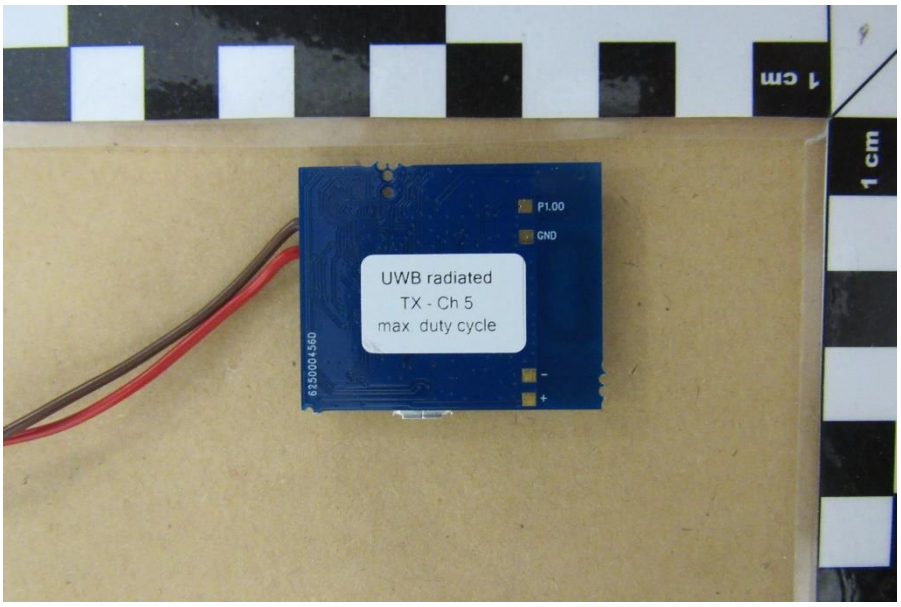
VIEW A[1]


VIEW B[2]


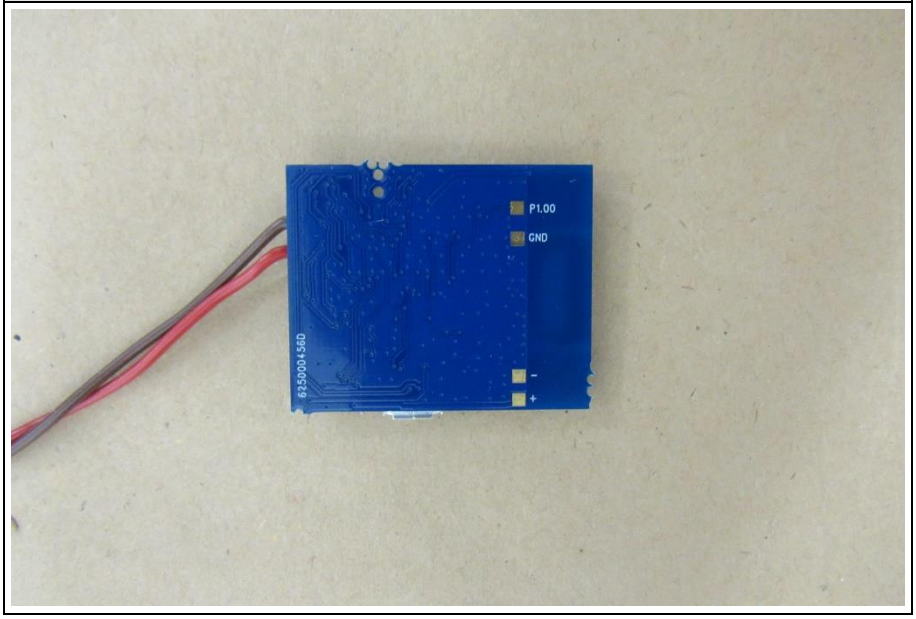
[1]EUT measurement position HORIZONTAL
[2]EUT measurement position VERTICAL

VIEW C
 RED: 3V3 BROWN: GND CURRENT: < 0.5A 1 cm

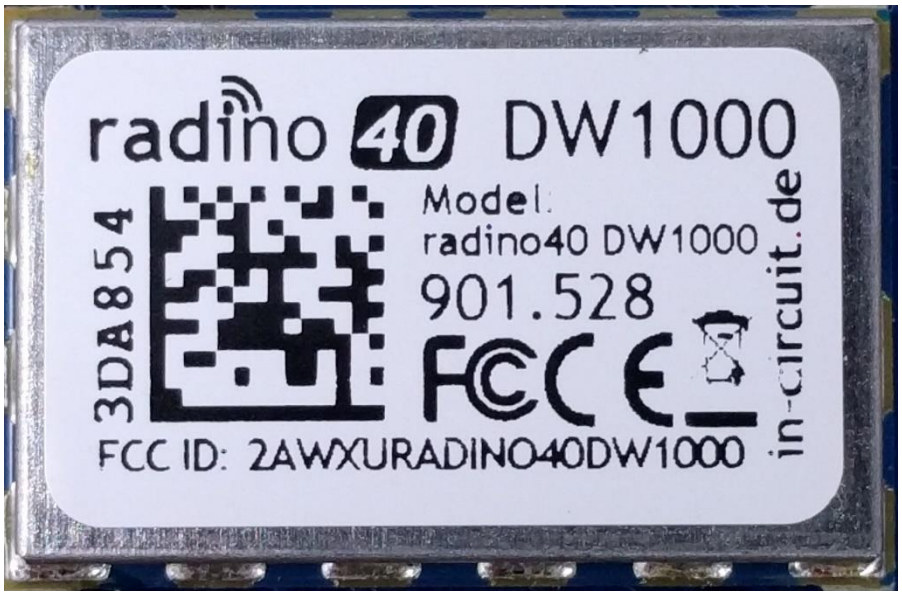
VIEW D
 radino 40 DW1000 901.528 1 cm 1 cm

VIEW E


1 cm
P1.00
GND
UWB radiated
TX - Ch 5
max. duty cycle
6250004560
-
+

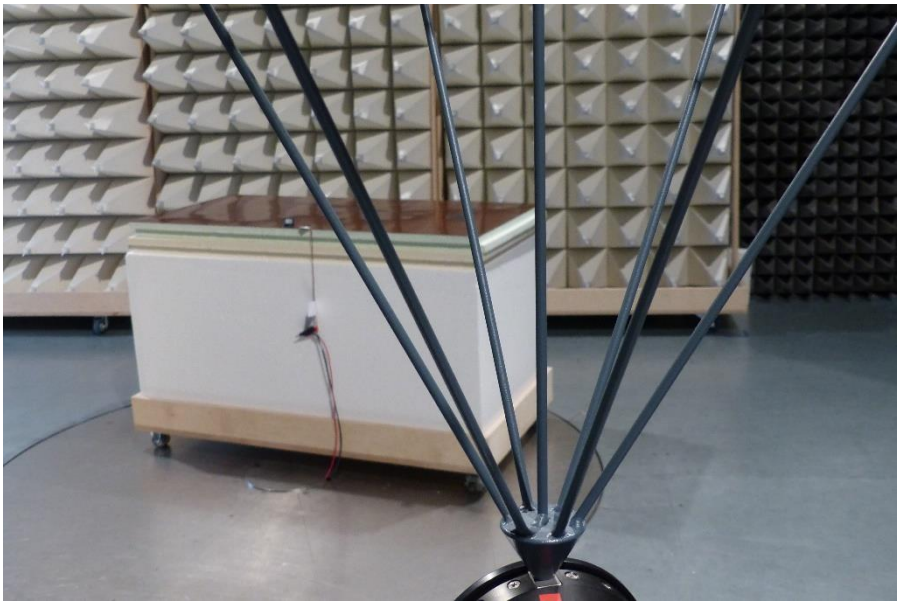
VIEW F


P1.00
GND
6250004560
-
+

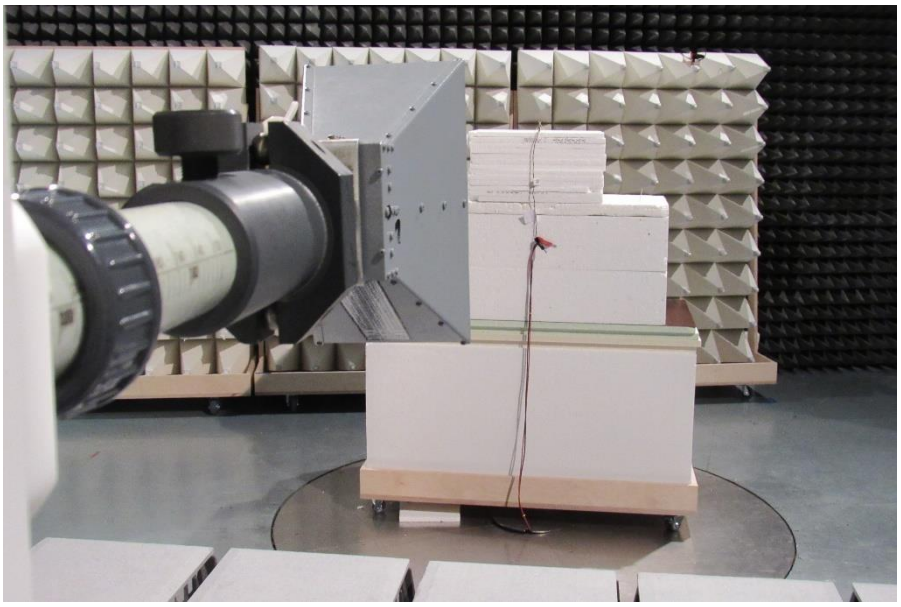
VIEW G[1]


[1]The customer provided the label above as a final label version. Figures VIEW A to VIEW F show the former label version.

1.2 Photos – Test Setup

VIEW A


VIEW B


VIEW C


1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	UWB radio module (Companion device)	In-Circuit GmbH	radino40 DW1000	Cease of transmitter operation – Test Sample ID 30448
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment: None.				

1.4 Test Modes

Mode	Description
Transmit	Mode = Transmit Duty cycle = 100%
Receive	Mode = Receive
Comment: None.	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	5	6489.6

1.6 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB/m) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBµV + 26 dB/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 15F, ISED RSS-220				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
ISED RSS-220 3.1, RSS-Gen 6.7	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC 15.503(a), 15.519(b), ISED RSS-220 5.1a	UWB (-10 dB) Bandwidth	ANSI C63.10-2013	PASS	
FCC 15.519(e) ISED RSS-220 5.3.1g	Peak power	ANSI C63.10-2013	PASS	
FCC 15.519(a)(1) ISED RSS-220 5.3.1b	Cease of transmitter operation	ANSI C63.10-2013	PASS	
FCC 15.519(c)(d) ISED RSS-220 5.3.1c-e	Transmitter radiated emissions	ANSI C63.10-2013	PASS	
ISED RSS-220 3.1, ISED RSS-Gen 7.1	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
FCC 15.207 ISED RSS-220 3.1, RSS-Gen 8.8	AC power line conducted emissions	ANSI C63.10-2013	N/R	EUT not powered (directly or indirectly) via AC-mains (declared by client)
Comment: None.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

3.1.1 Information

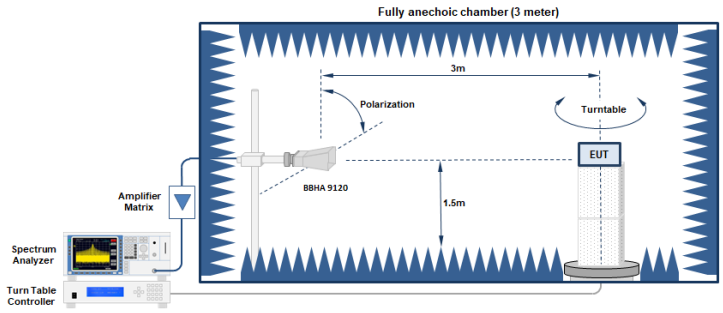
Test Information	
Product Standard Reference	ISED RSS-220 3.1, RSS-Gen 6.7
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	± 1.3 %
Date	2020-07-22
Operator	Abdullah Al Jamal

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup

Test Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum Analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01159	2018-12	2020-12

3.1.5 Procedure

Test Procedure

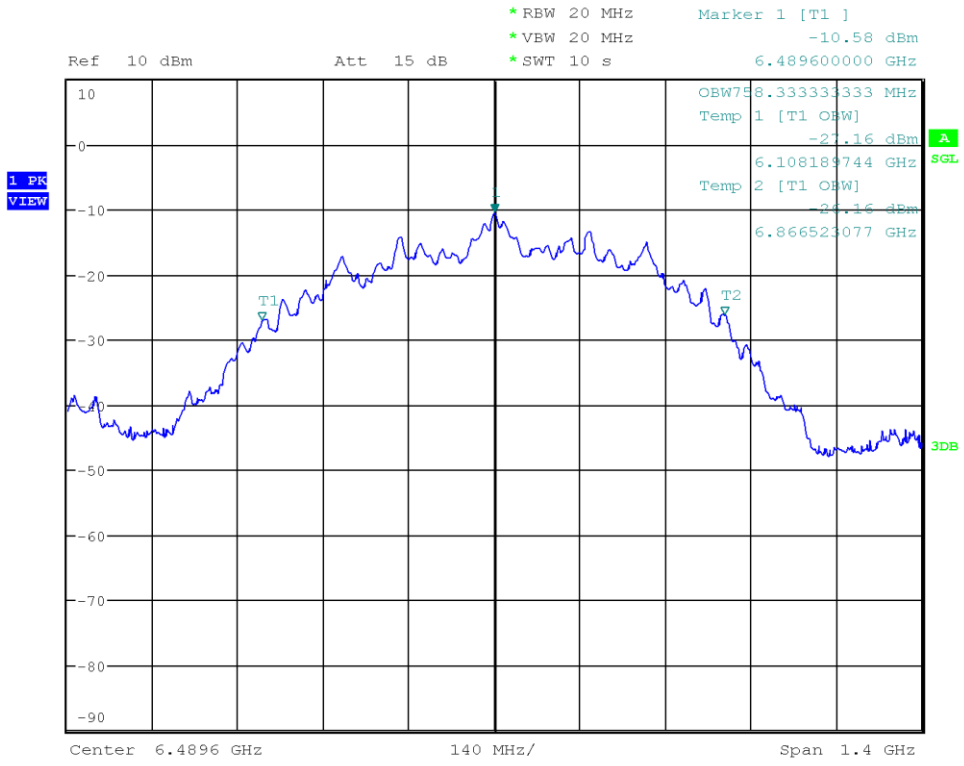
1. EUT set to test mode
2. The turntable and antenna height are set to the maximum emission level for the fundamental emission of the EUT
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set between 1 % to 5 % of OBW
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

3.1.6 Results

Test Results	
Channel [MHz]	Bandwidth [MHz]
6489.6	758.3

Occupied Bandwidth (99% Bandwidth)

Project Number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
Model Description:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Sample ID:	30163
Operator:	Abdullah Al Jamal
Test Site:	Eurofins Product Service GmbH
Test Date:	2020-07-22
Operating Conditions:	Tnom/Vnom



3.2 Test Conditions and Results - UWB (-10 dB) Bandwidth

3.2.1 Information

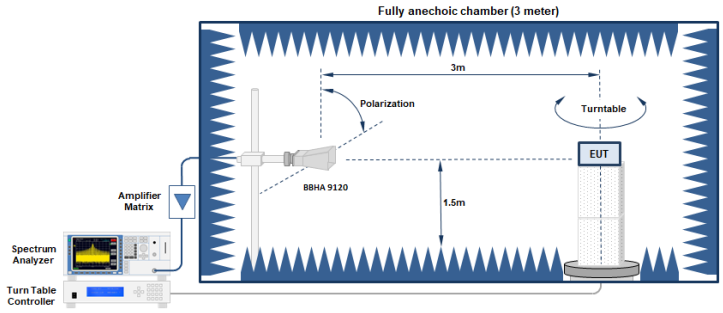
Test Information	
Product Standard Reference	FCC Part 15.519 (a), ISED RSS-220 5.1 a
Measurement Method	ANSI C63.10 10.1
Measurement Uncertainty	± 1.3 %
Date	2020-07-22
Operator	Abdullah Al Jamal

3.2.2 Limits

Limits
UWB (-10 dB) bandwidth totally contained in the band 3.1 GHz - 10.6 GHz

3.2.3 Setup

Test Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum Analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01159	2018-12	2020-12

3.2.5 Procedure

Test Procedure

1. EUT set to test mode
2. The turntable and antenna polarization are set to the maximum emission level for the fundamental emission of the EUT
3. Span is set so that the complete fundamental emission spectrum is captured
3. Resolution bandwidth set to 1 MHz and the VBW is set to 3 MHz with peak detector and max. hold
4. The emission spectrum is corrected by the antenna gain cable loss, low-noise amplifier gain
5. The maximum of the spectrum envelope is determined as reference
6. The spectrum is searched from the left edge to the center of the spectrum in order to find the lower -10 dB frequency
7. The spectrum is searched from the right edge to the center of the spectrum in order to find the upper -10 dB frequency
8 From the lower frequency (f_L) and upper frequency (f_H) the center frequency (f_C), the -10 dB bandwidth (B_{-10}) and the fractional bandwidth (μ_{-10}) are calculated:

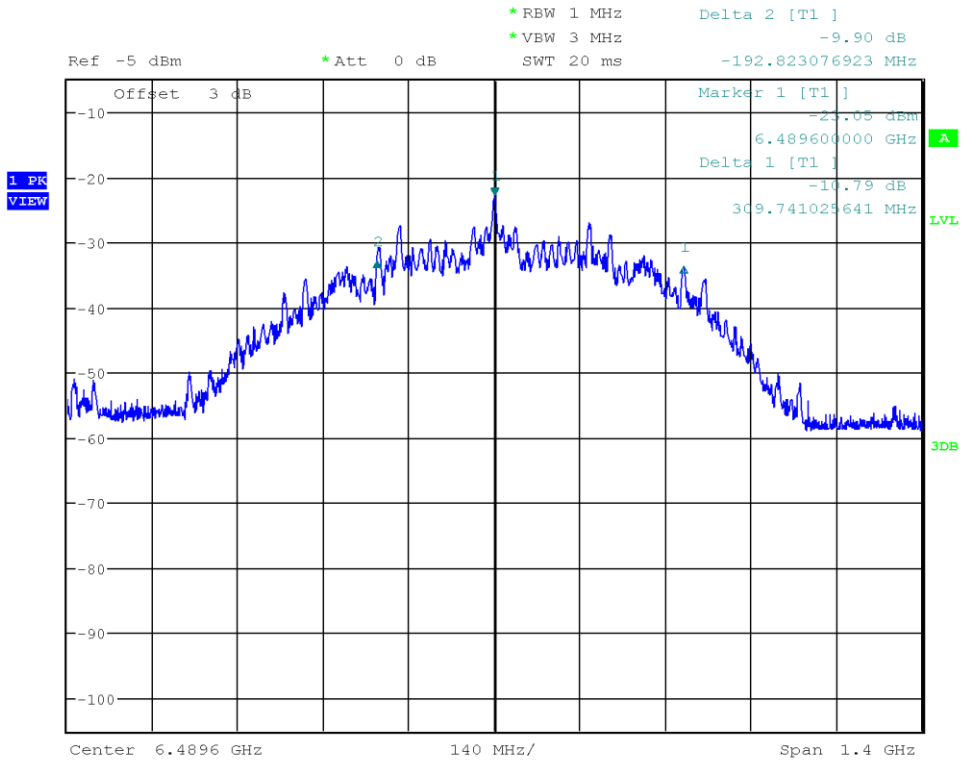
$$B_{-10} = f_H - f_L \qquad \mu_{-10} = B_{-10} \cdot f_C^{-1}$$

3.2.6 Results

Test Results		
Channel [MHz]	-10 dB Bandwidth (B_{-10}) [MHz]	Fractional Bandwidth (μ_{-10}) [MHz]
6489.6	502.5	0.08

(-10 dB) Bandwidth

Project Number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
Model Description:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Sample ID:	30163
Operator:	Abdullah Al Jamal
Test Site:	Eurofins Product Service GmbH
Test Date:	2020-07-22
Operating Conditions:	Tnom/Vnom



3.3 Test Conditions and Results - Maximum Peak Power

3.3.1 Information

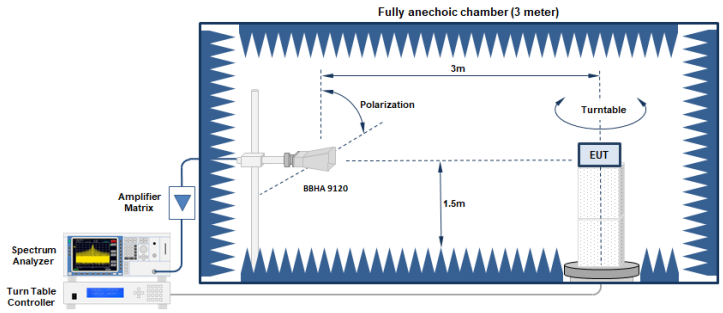
Test Information	
Product Standard Reference	FCC Part 15.519 (e), ISED RSS-220 5.3.1 g
Date	2020-07-22
Operator	Abdullah Al Jamal
Measurement Method	ANSI C63.10 10.3.5, 10.3.6, 10.3.9
Measurement Uncertainty	± 4.4 dB

3.3.2 Limits

Limits	
Bandwidth [MHz]	Power [dBm EIRP]
50	0

3.3.3 Setup

Test Setup



3.3.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum Analyzer	R&S	FSU 26	EF01003	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01159	2018-12	2020-12

3.3.5 Procedure

Test Procedure
1. EUT set to test mode 2. The turntable and antenna polarization are set to the maximum emission level for the fundamental emission of the EUT 3. Span is set so that the complete fundamental emission spectrum is captured 3. Resolution bandwidth set to 50 MHz and the VBW is set to maximum with peak detector and max. hold 4. The emission spectrum is corrected by the antenna gain cable loss, low-noise amplifier gain and path loss 5. The maximum of the spectrum envelope is determined and compared to the limit

3.3.6 Results

Test Results				
Channel [MHz]	Emission [MHz]	Power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]
6489.6	6492.48	-6.30	0.00	-06.30

3.4 Test Conditions and Results - Cease of transmitter operation

3.4.1 Information

Test Information	
Product Standard Reference	FCC Part 15.519 (a)(1), ISED RSS-220 5.3.1 b
Date	2020-07-30
Operator	Abdullah Al Jamal
Test Sample ID	30448 (Rx, sending acknowledgment) 30449 (Tx, receiving acknowledgment and transmitting data)

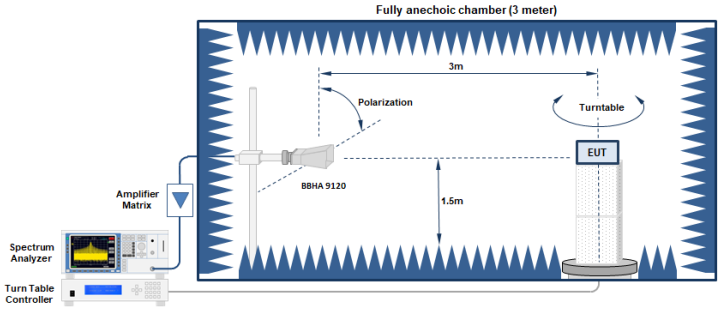
3.4.2 Limits

Limits - FCC
An UWB device shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

Limits - ISED
The device is to transmit only when it is sending information to an associated receiver. The device shall cease transmission of information within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB device at least every 10 seconds or the UWB device shall cease transmitting any information other than periodic signals used for the establishment or re-establishment of a communication link with an associated receiver.

3.4.3 Setup

Test Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Spectrum Analyzer	R&S	FSU 43	EF01631	2019-12	2020-12
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10

3.4.5 Procedure

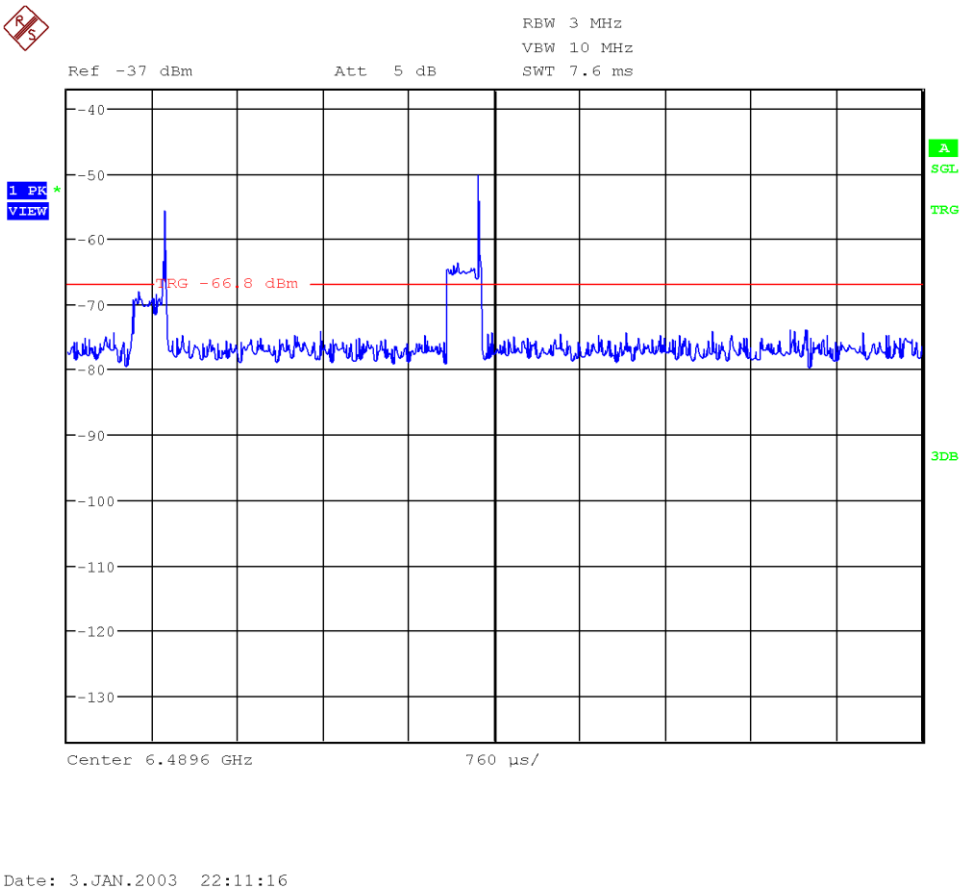
Test Procedure
1. EUT set to normal operation 2. The emissions of the EUT are captured with a spectrum analyzer 3. The transmitter is stopped either by switching off the companion device or by releasing the manual switch 4. From the moment the transmitter is released the emission are recorded and a marker is set to the moment the transmitter has switched off 5. The marker time is recorded an compared to the limit

3.4.6 Results

Test Results			
Channel [MHz]	Transmission stop time [s]	Limit [s]	Margin [s]
6489.6	< 0.024	10.00	-09.98

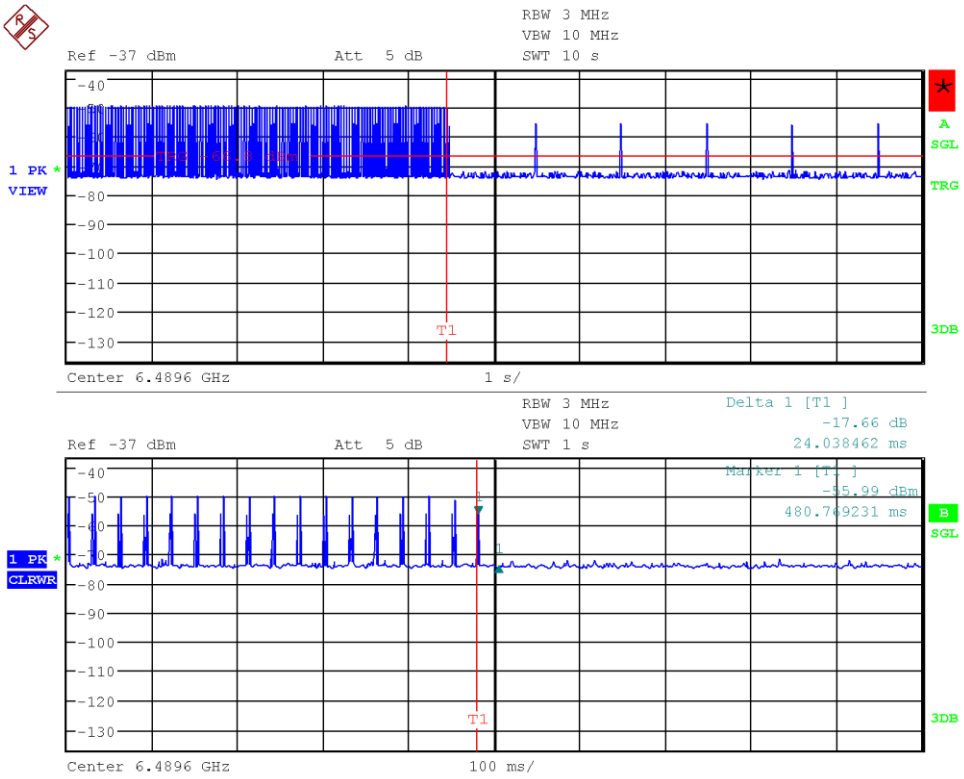
Cease of transmitter operation (1)

Project Number:	G0M-2007-9142
Applicant:	Leica Geosystems AG
Model Description:	Motorized Imaging Totalstation
Model:	TS16 I R1000
Test Sample ID:	30448 (Rx) + 30449 (Tx)
Operator:	Abdullah Al Jamal
Test Site:	Eurofins Product Service GmbH
Test Date:	2020-07-30
Operating Conditions:	Tnom/Vnom
Description:	Rx Sending acknowledgment (companion device) – second (higher) burst in the plot below Tx Receiving acknowledgment and transmitting data (EUT) – first (lower) burst in the plot below



Cease of transmitter operation (2)

Project Number:	G0M-2007-9142
Applicant:	Leica Geosystems AG
Model Description:	Motorized Imaging Totalstation
Model:	TS16 I R1000
Test Sample ID:	30448 (Rx) + 30449 (Tx)
Operator:	Abdullah Al Jamal
Test Site:	Eurofins Product Service GmbH
Test Date:	2020-07-30
Operating Conditions:	Tnom/Vnom
Description:	Upper figure: The bursts from *Cease of transmitter operation (2)* in a larger time span are shown. The red line (display line T1) marks the end of transmission as no acknowledgements are received from the EUT. Lower below: The observation period is shortened. The red line (display line T1) marks the end of transmission as no acknowledgements are received from the EUT. The marker (M1) represents the point in time when a new transmission by the transmitter was expected.



Date: 3.JAN.2003 22:19:55

3.5 Test Conditions and Results - Transmitter radiated emissions

3.5.1 Information

Test Information	
Product Standard Reference	FCC Part 15.519 (c)(d), ISED RSS-220 5.3.1 c-f
Measurement Method	ANSI C63.10 10.2, 10.3
Measurement Uncertainty	± 5.7 dB
Date	2020-07-21 2020-07-22
Operator	Abdullah Al Jamal
Test Sample ID	30163
Measurement note	Measurement plots not listed in this test report (related to the frequency range to be measured) contain noise floor only. No significant emissions detected in these measurement ranges. An evaluation was performed manually with the spectrum analyser.

3.5.2 Limits

Limits - below 960 MHz			
Frequency [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3

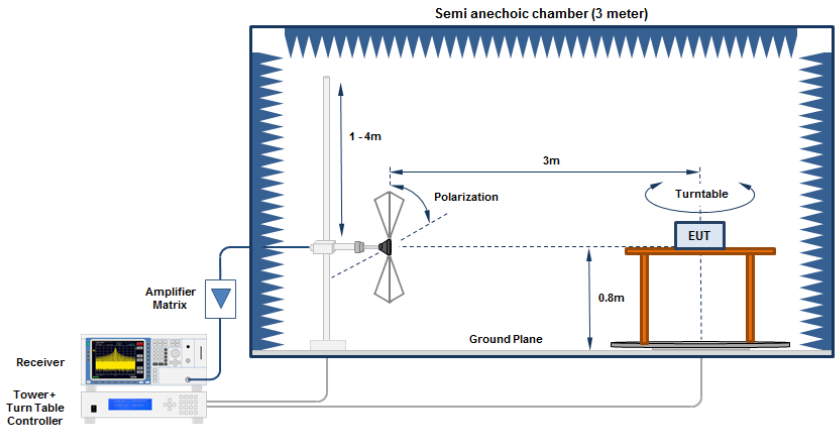
Limits - FCC - above 960 MHz					
Frequency [MHz]	Bandwidth	Detector	Power [dBm EIRP]	Field Strength [dBµV/m@3m]	Field Strength [dBµV/m@1m]
960-1610	1 MHz	RMS	-75.3	19.9	29.5
1610-1990	1 MHz	RMS	-63.3	31.9	41.5
1990-3100	1 MHz	RMS	-61.3	33.9	43.5
3100-10600	1 MHz	RMS	-41.3	53.9	63.5
> 10600	1 MHz	RMS	-61.3	33.9	43.5

Limits - ISED - above 960 MHz					
Frequency [MHz]	Bandwidth	Detector	Power [dBm EIRP]	Field Strength [dBµV/m@3m]	Field Strength [dBµV/m@1m]
960-1610	1 MHz	RMS	-75.3	19.9	29.5
1610-4750	1 MHz	RMS	-70.0	25.2	34.7
4750-10600	1 MHz	RMS	-41.3	53.9	63.5
> 10600	1 MHz	RMS	-61.3	33.9	43.5

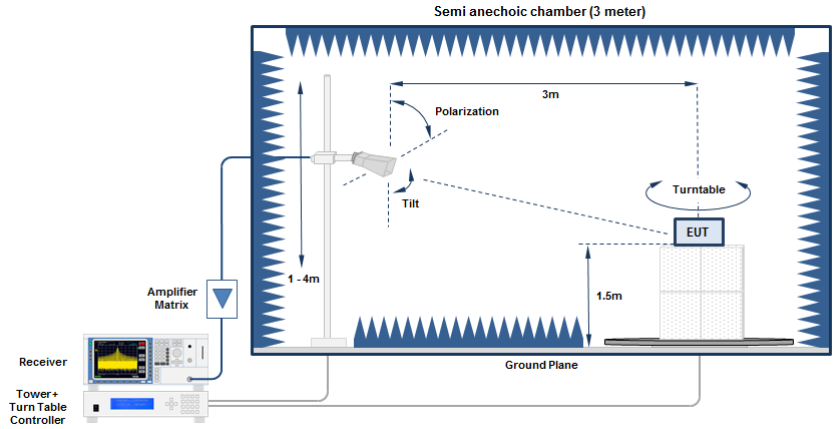
Limits - GPS Band					
Frequency [MHz]	Bandwidth	Detector	Power [dBm EIRP]	Field Strength [dBµV/m@3m]	Field Strength [dBµV/m@1m]
1164-1240	1 kHz	RMS	-85.3	9.9	19.5
1559-1610	1 kHz	RMS	-85.3	9.9	19.5

3.5.3 Setup

Test Setup 30 MHz - 1000 MHz



Test Setup > 1 GHz



3.5.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Spectrum Analyser	R&S	FSW 43	EF00896	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	ATH18G40	EF01152	2018-10	2020-10
Antenna	Amplifier Research	22240-25	EF00301	2019-12	2022-12

3.5.5 Procedure

Test Procedure 30 MHz - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground
2. EUT set to test mode
3. The receiver is set to peak detection with max hold
4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground
2. EUT set to test mode
3. The receiver is set to peak detection with max hold
4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m
5. All significant emissions are measured again using the corresponding final detector

3.5.6 Results

Test Results 30 MHz - 960 MHz						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
6489.6	No significant emission detected.					

Test Results 960 MHz - 40 GHz						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
6489.6	1235.6	-80.5 dBm	RMS	hor	-75.3 dBm	-05.21
6489.6	6493.6	-50 dBm	RMS	hor	-41.3 dBm	-08.67
6489.6	14046.5	-67.4 dBm	RMS	ver	-61.3 dBm	-06.14
6489.6	14579	-68.8 dBm	RMS	hor	-61.3 dBm	-07.46

Test Results GPS Band						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
6489.6	No significant emission detected.					

3.6 Test Conditions and Results - Receiver radiated emissions

3.6.1 Information

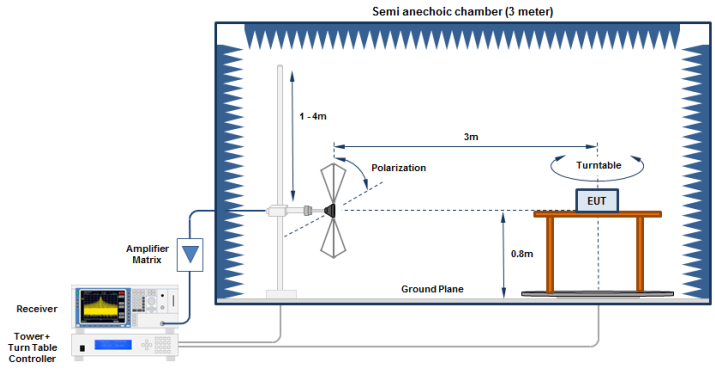
Test Information	
Product Standard Reference	ISED RSS-220 3.1, RSS-Gen 7.3
Measurement Method	ANSI C63.10 6.5, 6.6
Operator	Abdullah Al Jamal
Date	2020-07-21
Test Sample ID	30164
Measurement note	Measurement plots not listed in this test report (related to the frequency range to be measured) contain noise floor only. No significant emissions detected in these measurement ranges. An evaluation was performed manually with the spectrum analyser.

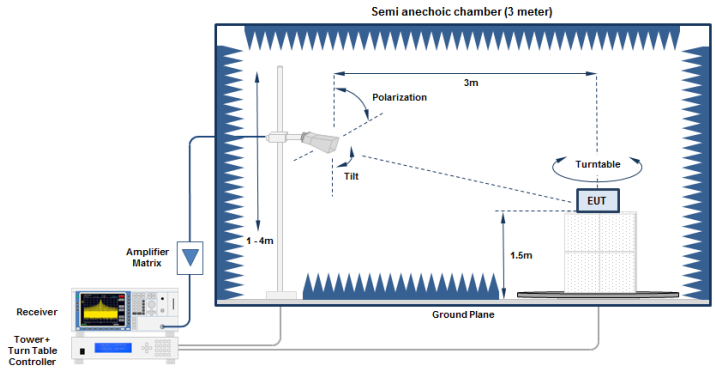
3.6.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [dBµV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.6.3 Setup

Test Setup 30 MHz - 1000 MHz



Test Setup > 1 GHz


3.6.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-06	2021-06
Spectrum Analyser	R&S	FSW 43	EF00896	2019-07	2020-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	ATH18G40	EF01152	2018-10	2020-10
Antenna	Amplifier Research	22240-25	EF00301	2019-12	2022-12

3.6.5 Procedure

Test Procedure 30 MHz - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.6.6 Results

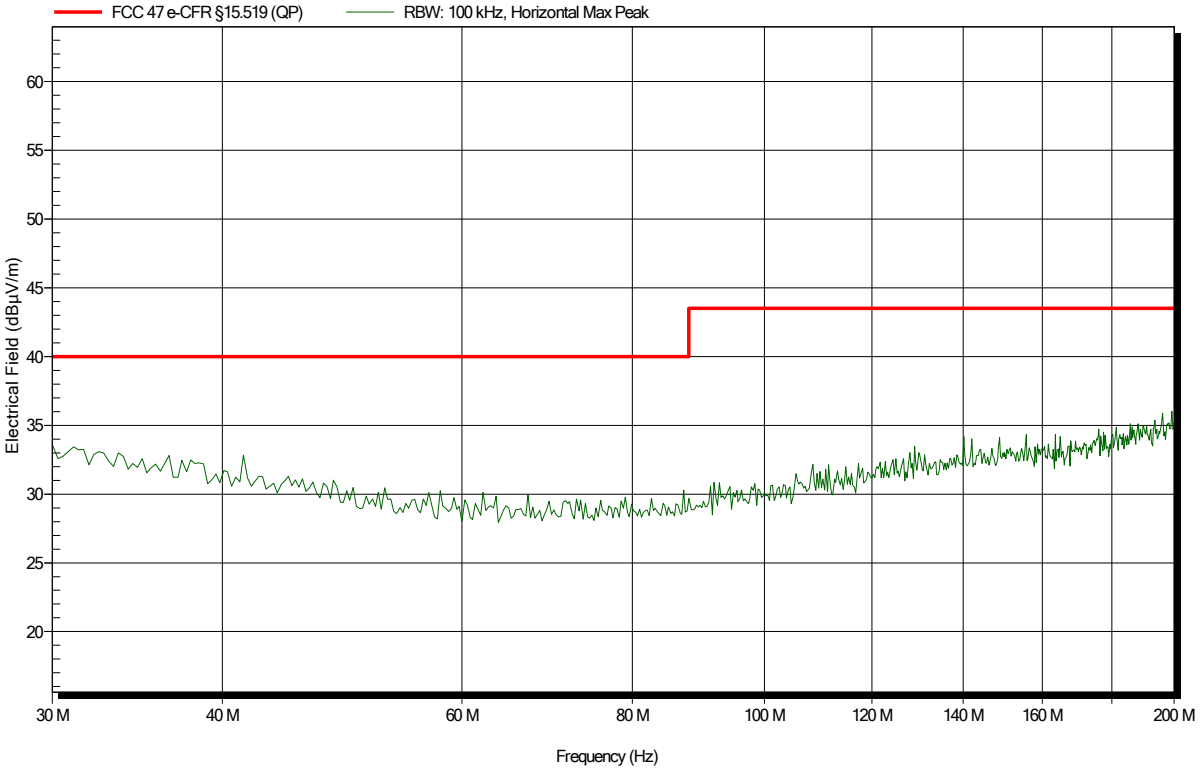
Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
6489.6	219.231	36.89	pk	hor	46.00	-09.11
6489.6	14620	47.19	pk	hor	53.98	-06.79

ANNEX A Transmitter radiated emissions

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

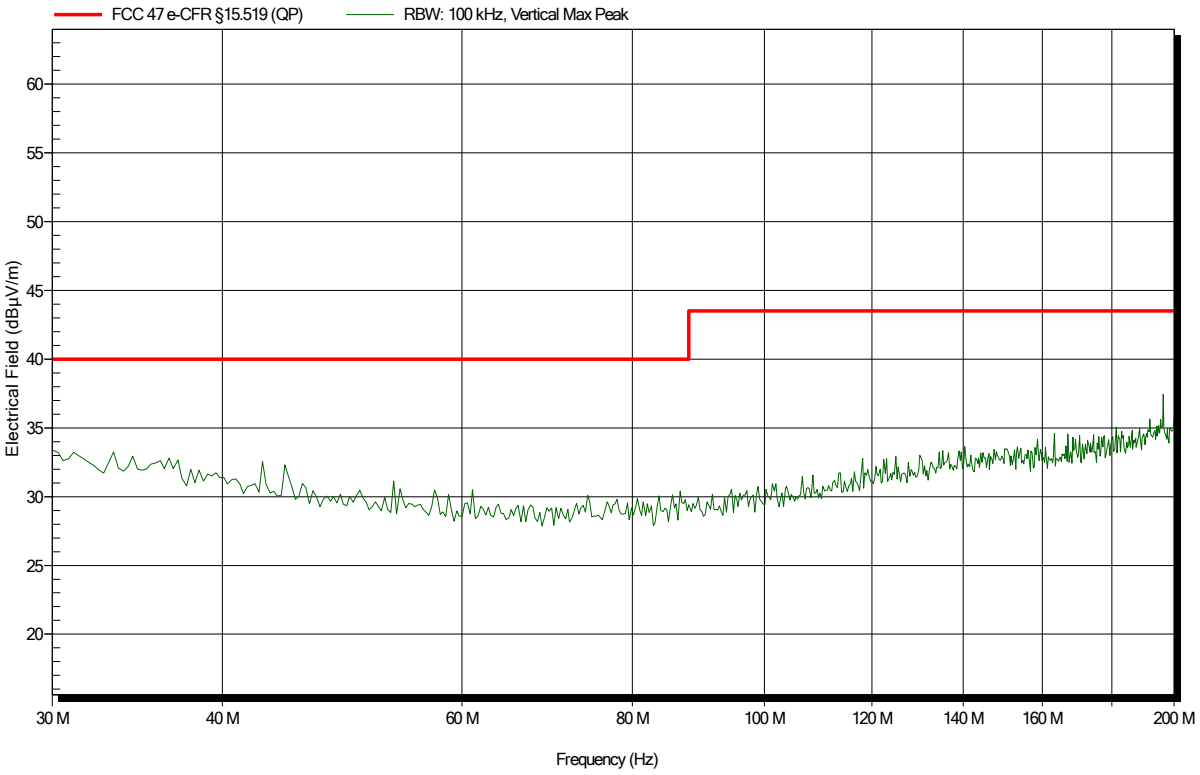
Index 1



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

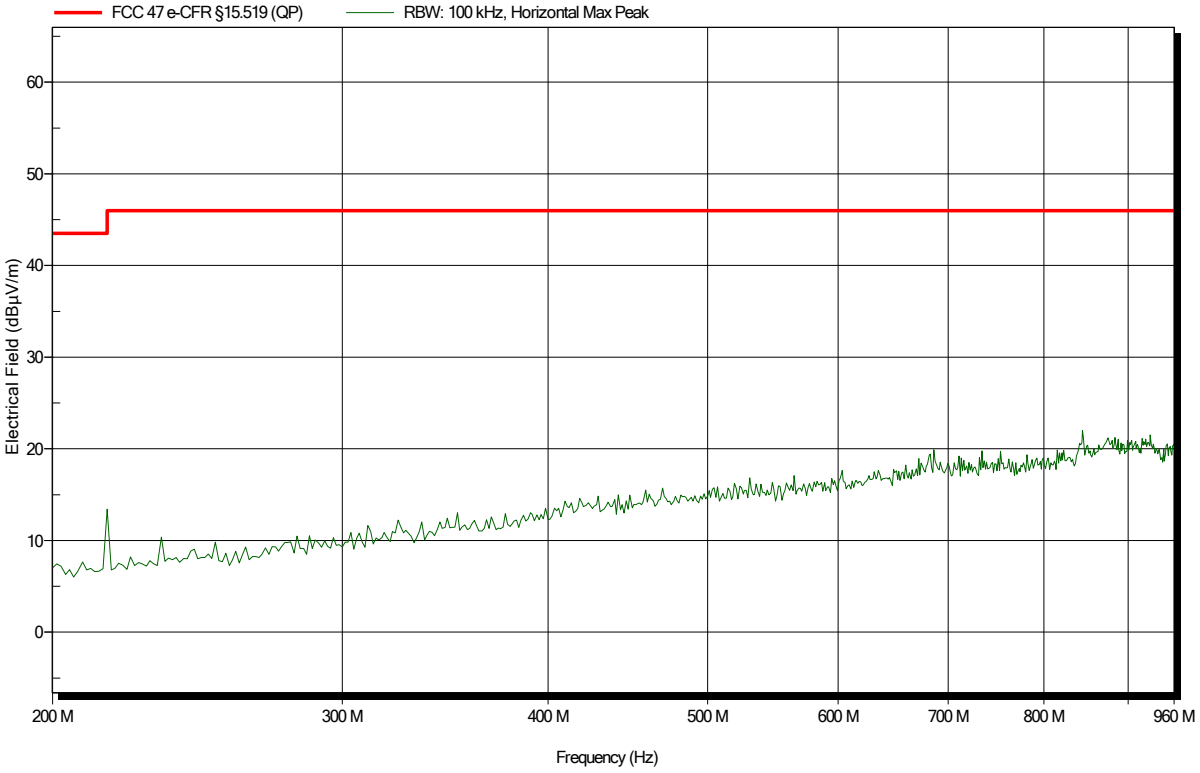
Index 2



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

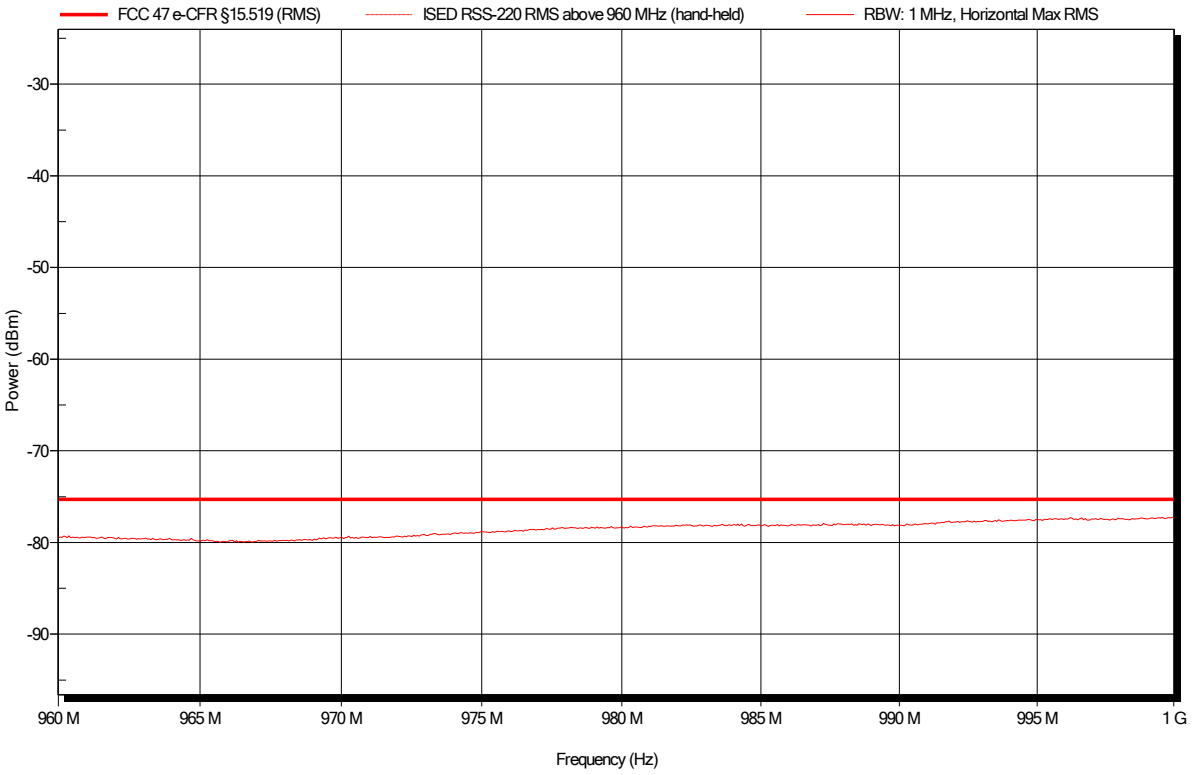
Index 3



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

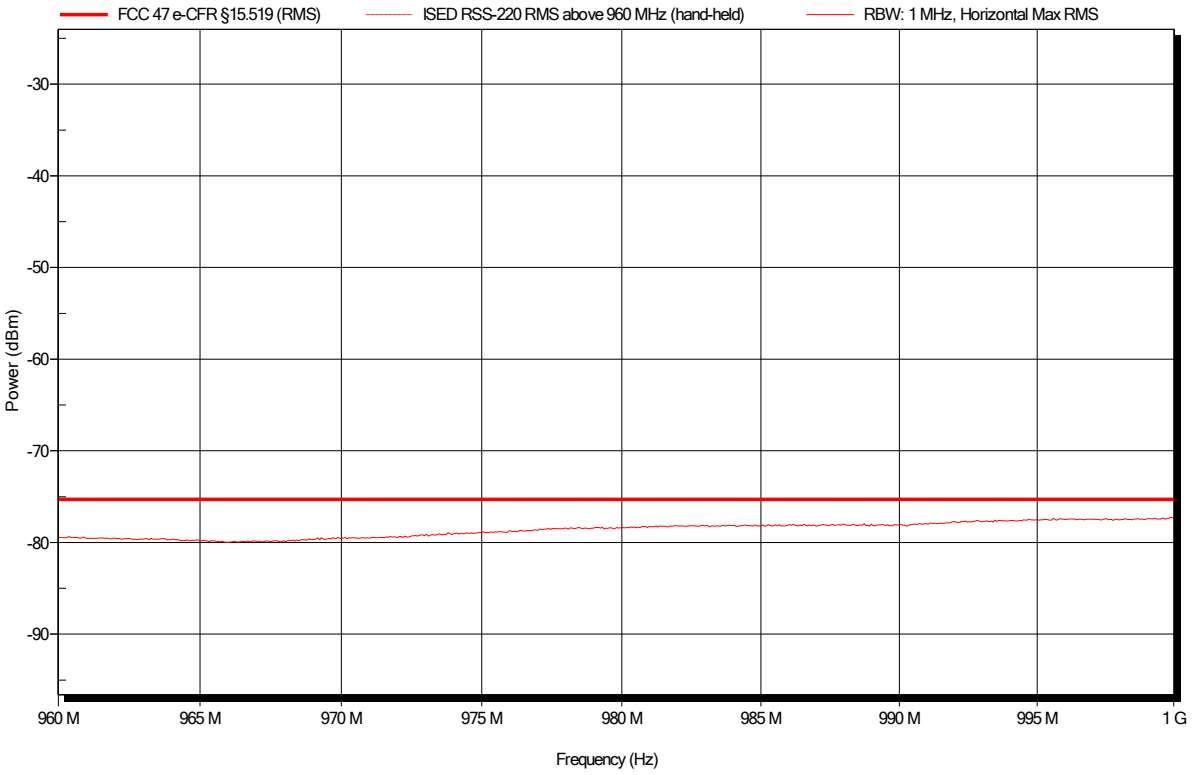
Index 4



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT horizontal

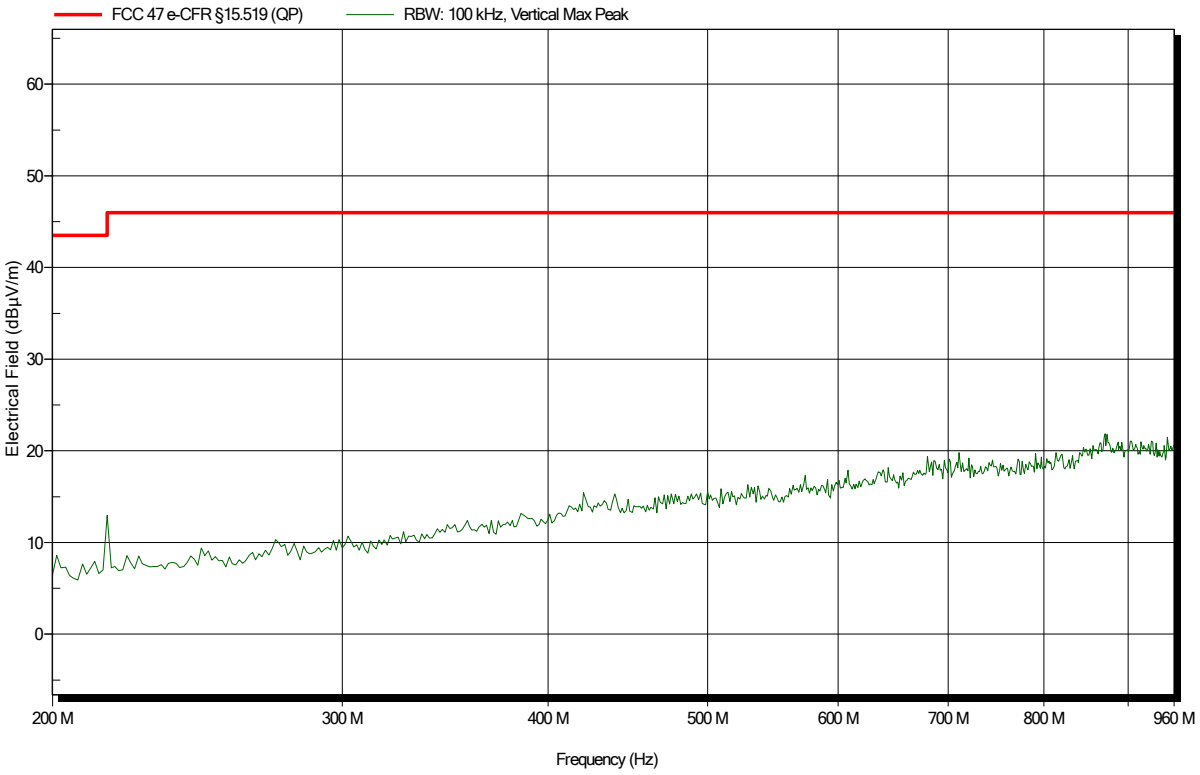
Index 8



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

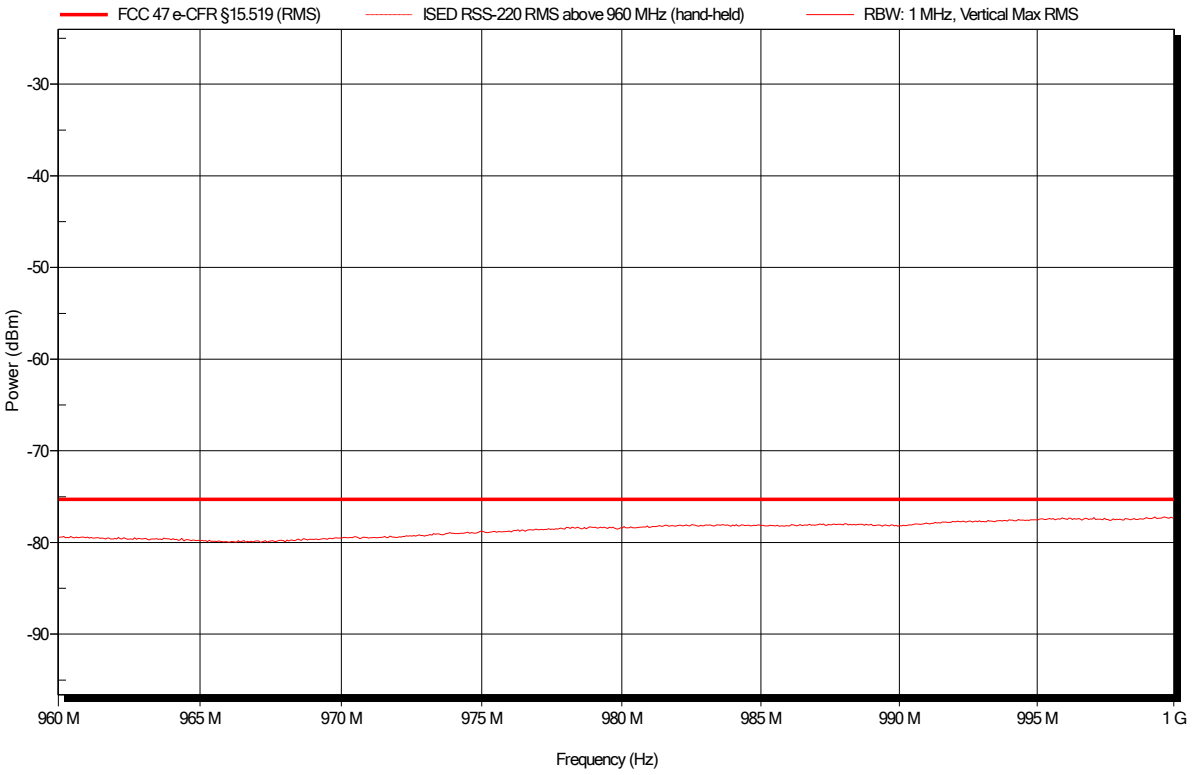
Index 5



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

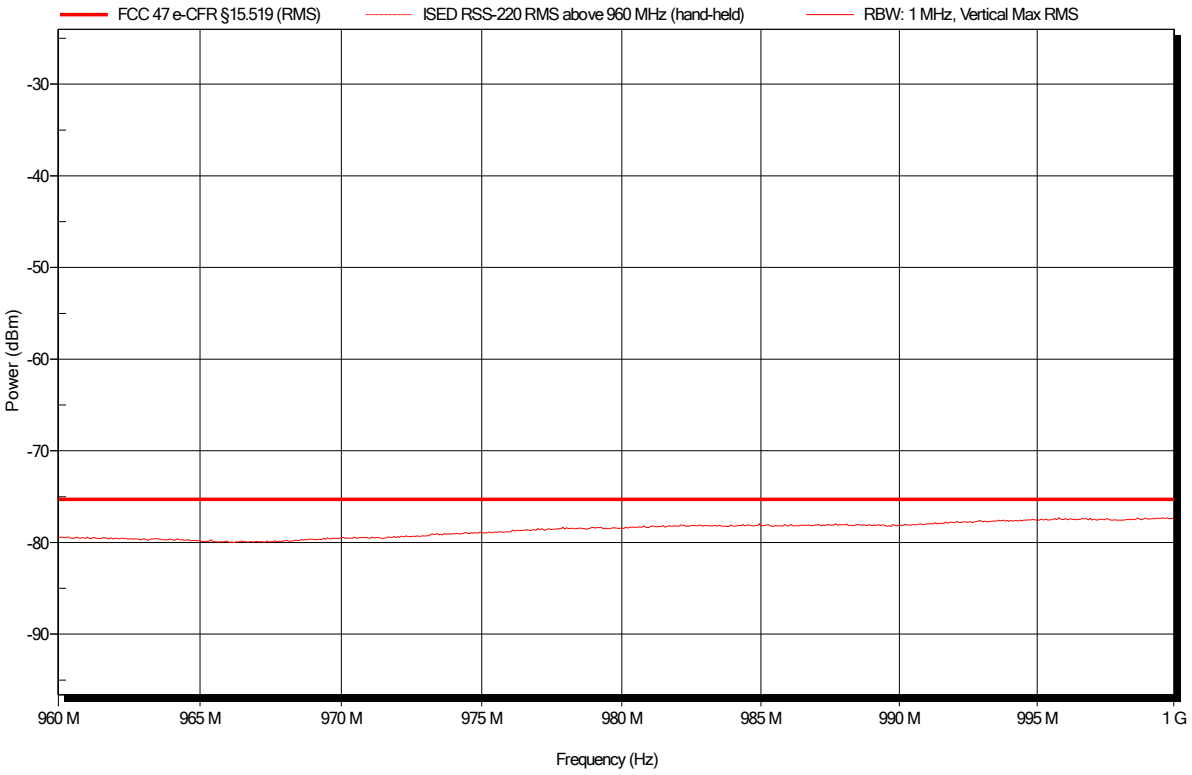
Index 6



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT horizontal

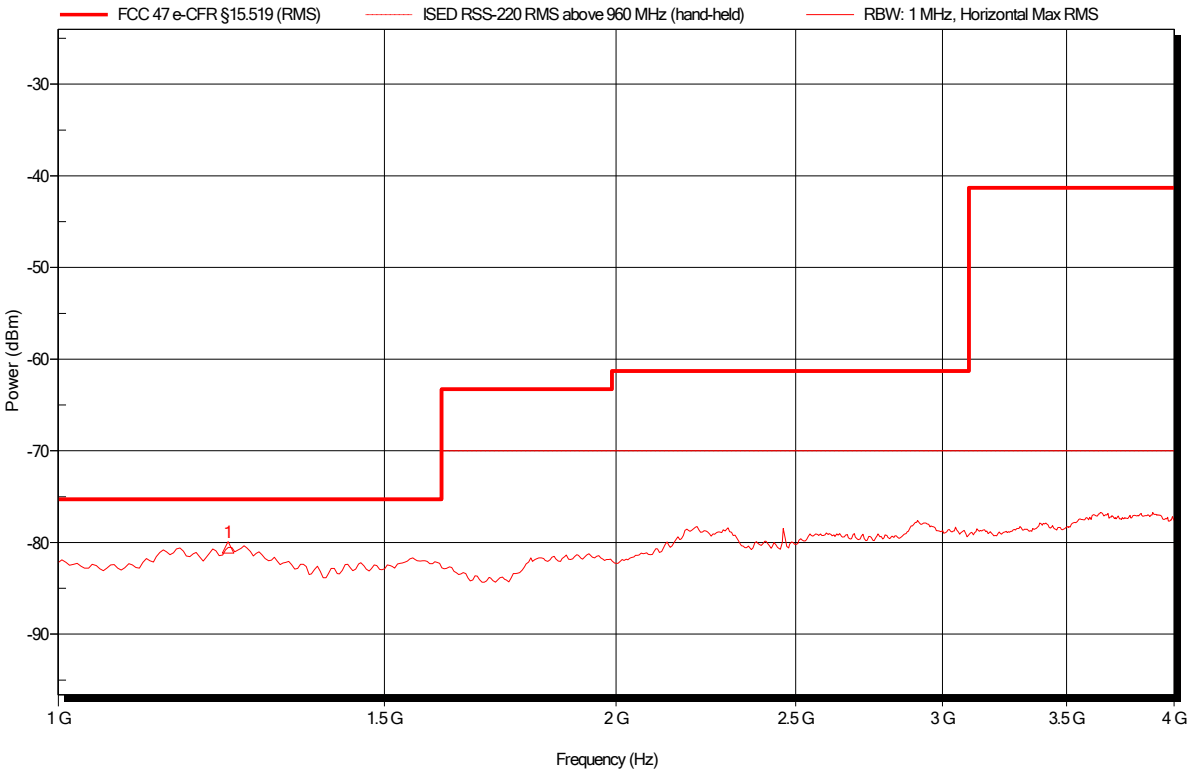
Index 7



Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

Index 9



Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.2356 GHz	-80.5 dBm	-75.3 dBm	-5.21 dB	Pass

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

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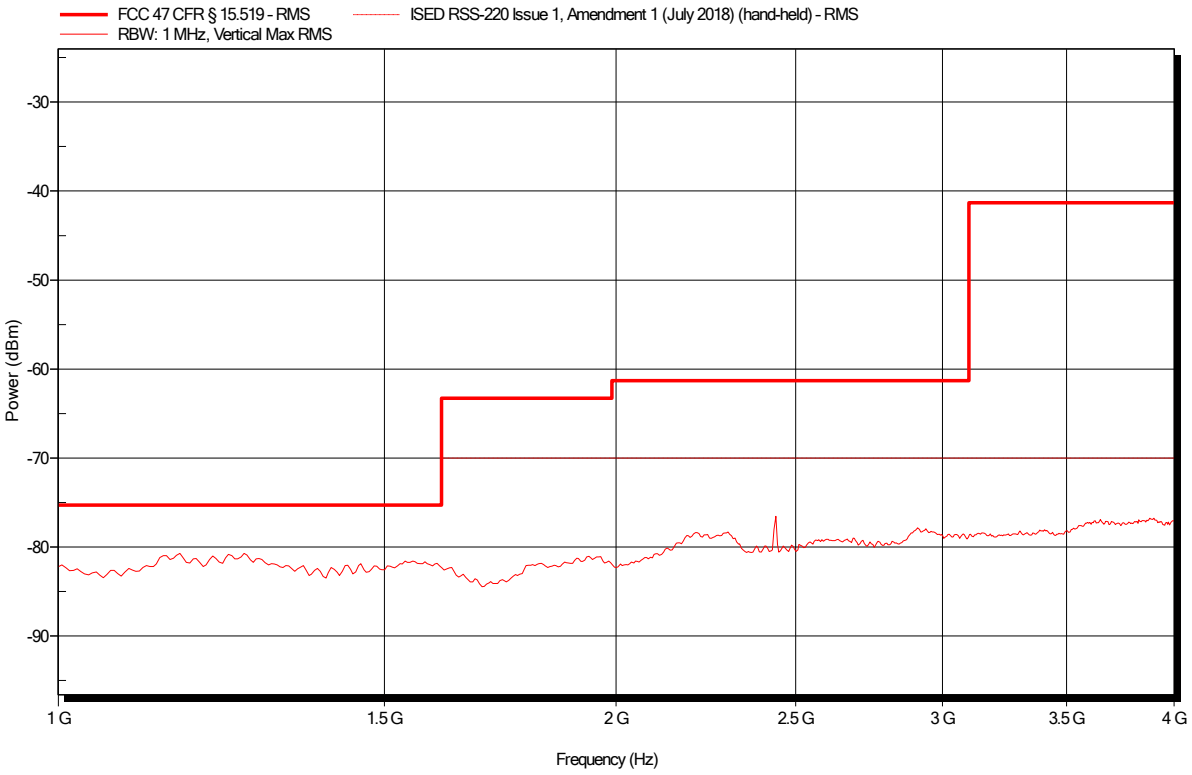

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

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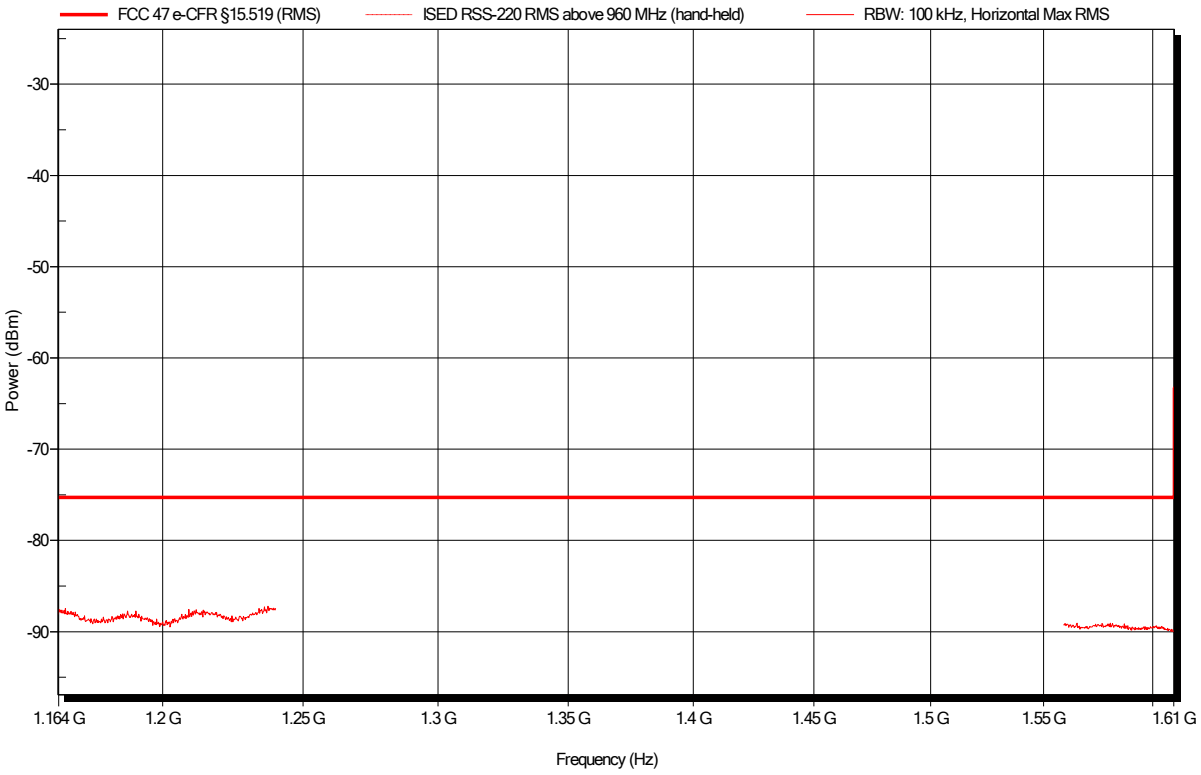

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

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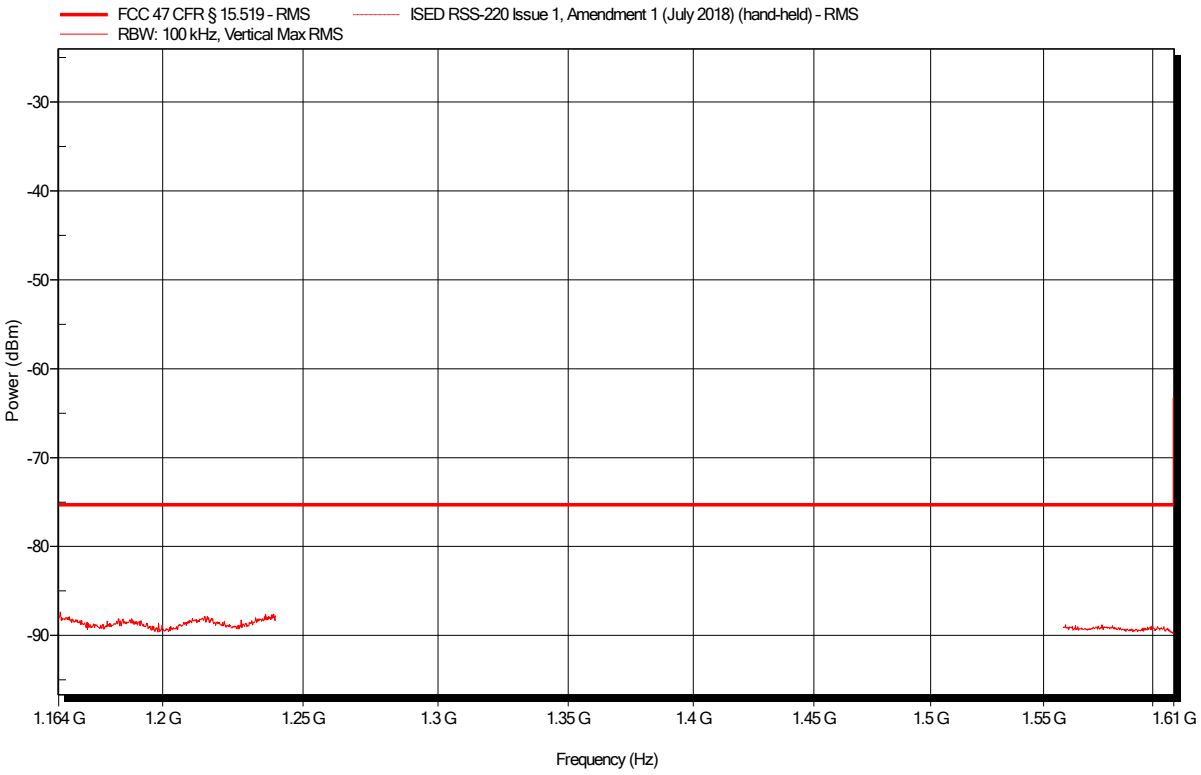
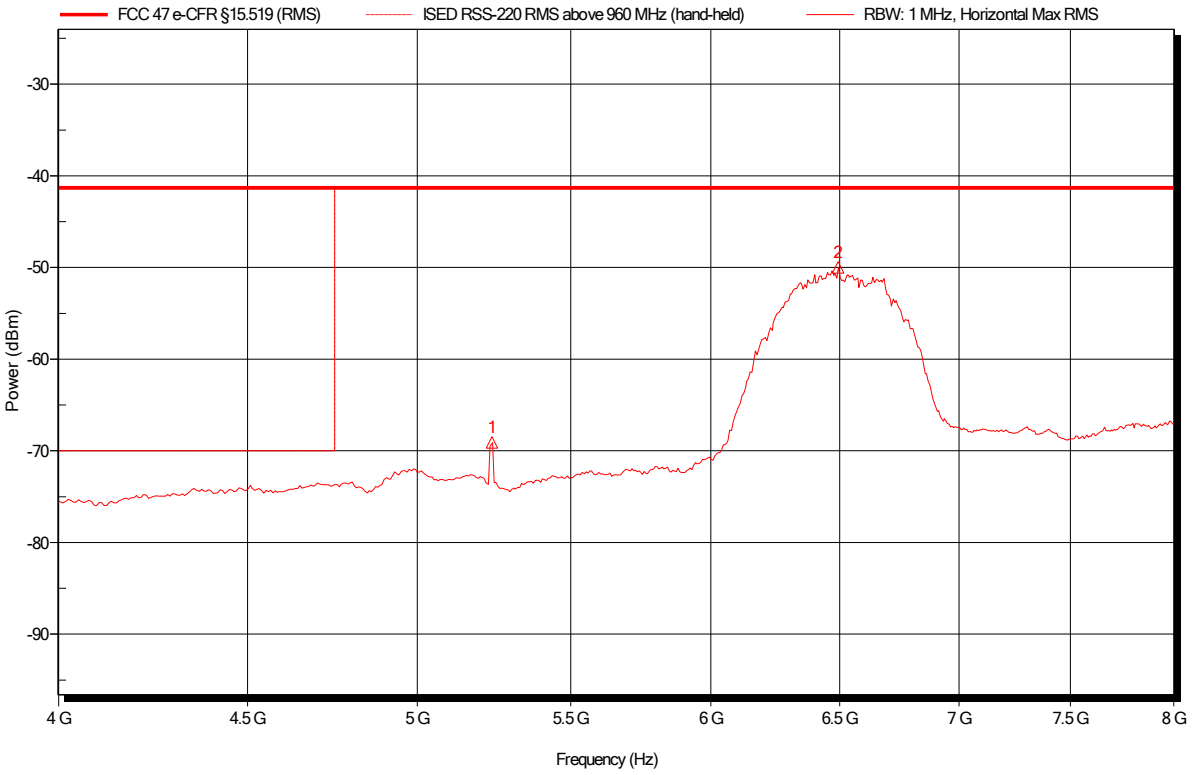


Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

Index 11



Frequency	RMS	RMS Limit	RMS Difference	RMS Status
5.2372 GHz	-69.1 dBm	-41.3 dBm	-27.79 dB	Pass
6.4936 GHz	-50 dBm	-41.3 dBm	-8.67 dB	Pass

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

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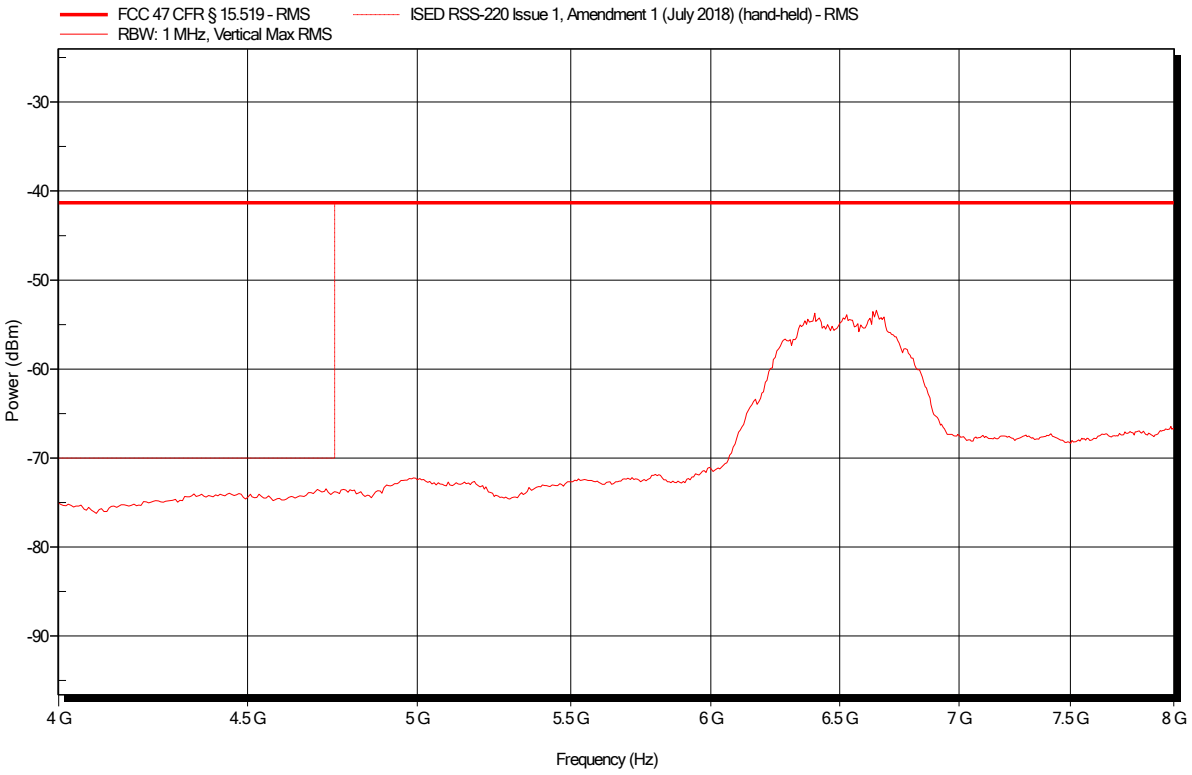
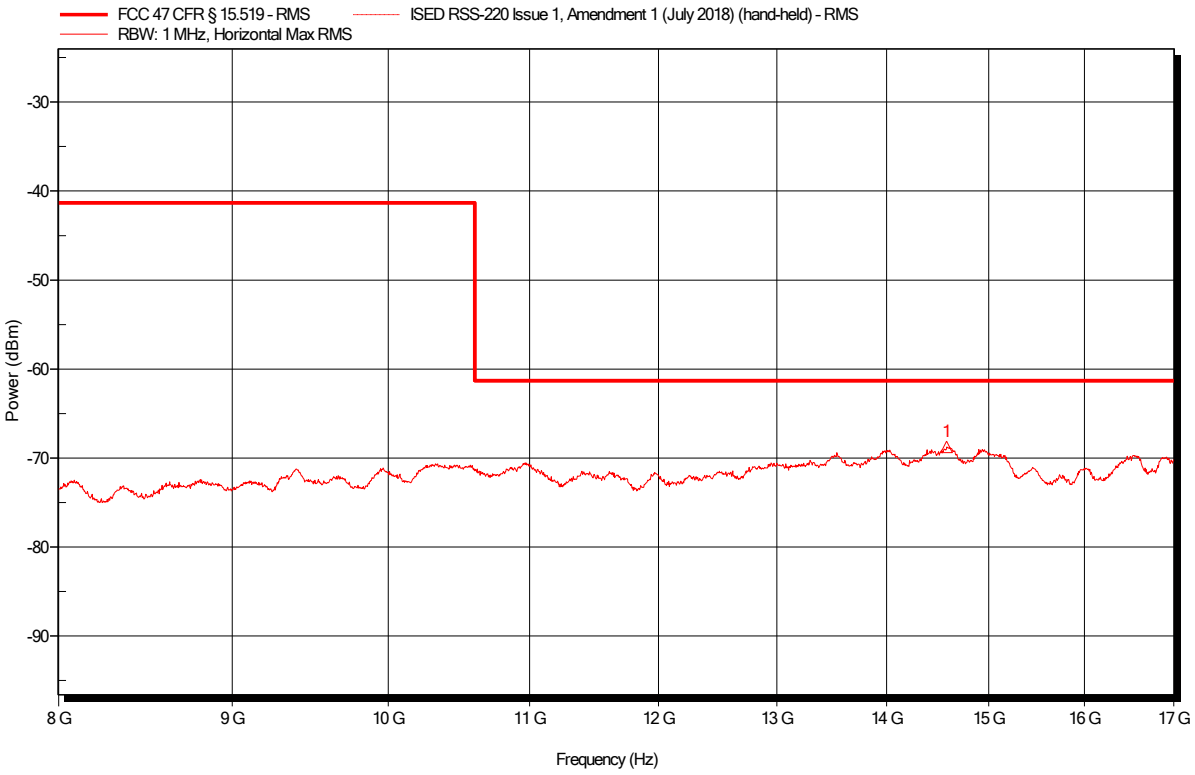


Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

Index 12

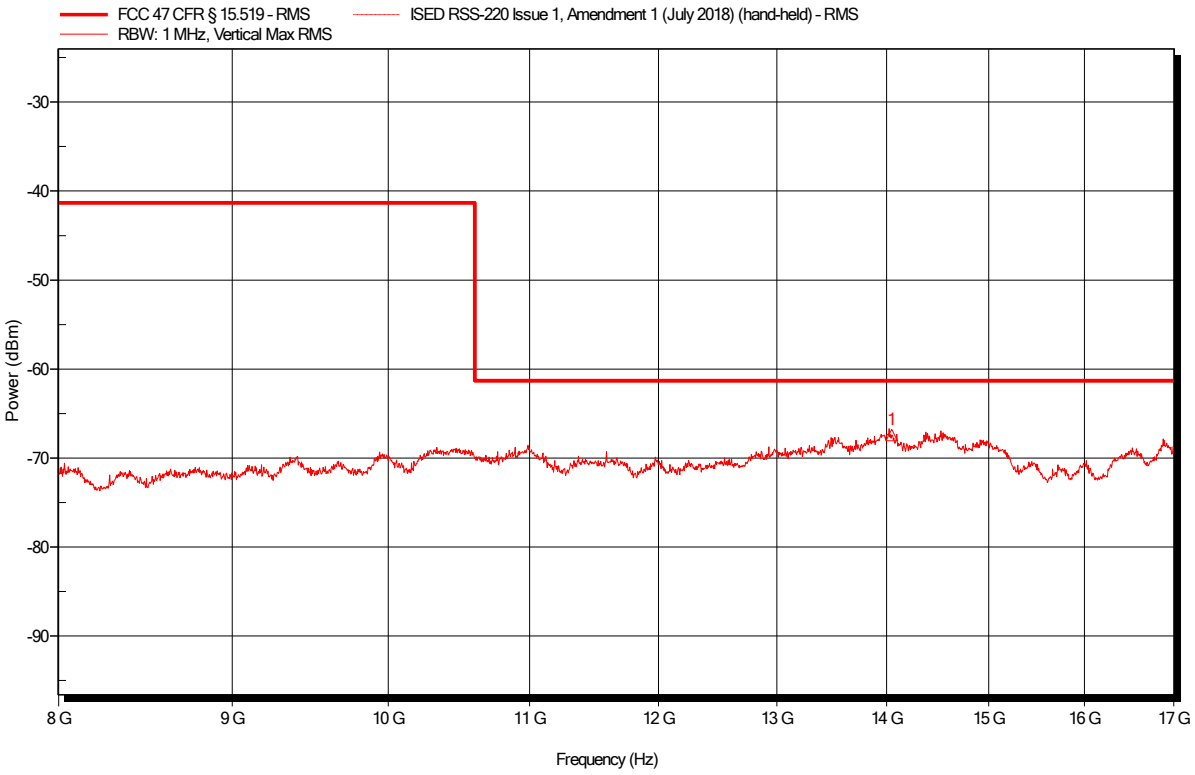


Frequency	RMS	RMS Limit	RMS Difference	RMS Status
14.579 GHz	-68.8 dBm	-61.3 dBm	-7.46 dB	Pass

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

Index 13



Frequency	RMS	RMS Limit	RMS Difference	RMS Status
14.0465 GHz	-67.4 dBm	-61.3 dBm	-6.14 dB	Pass

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

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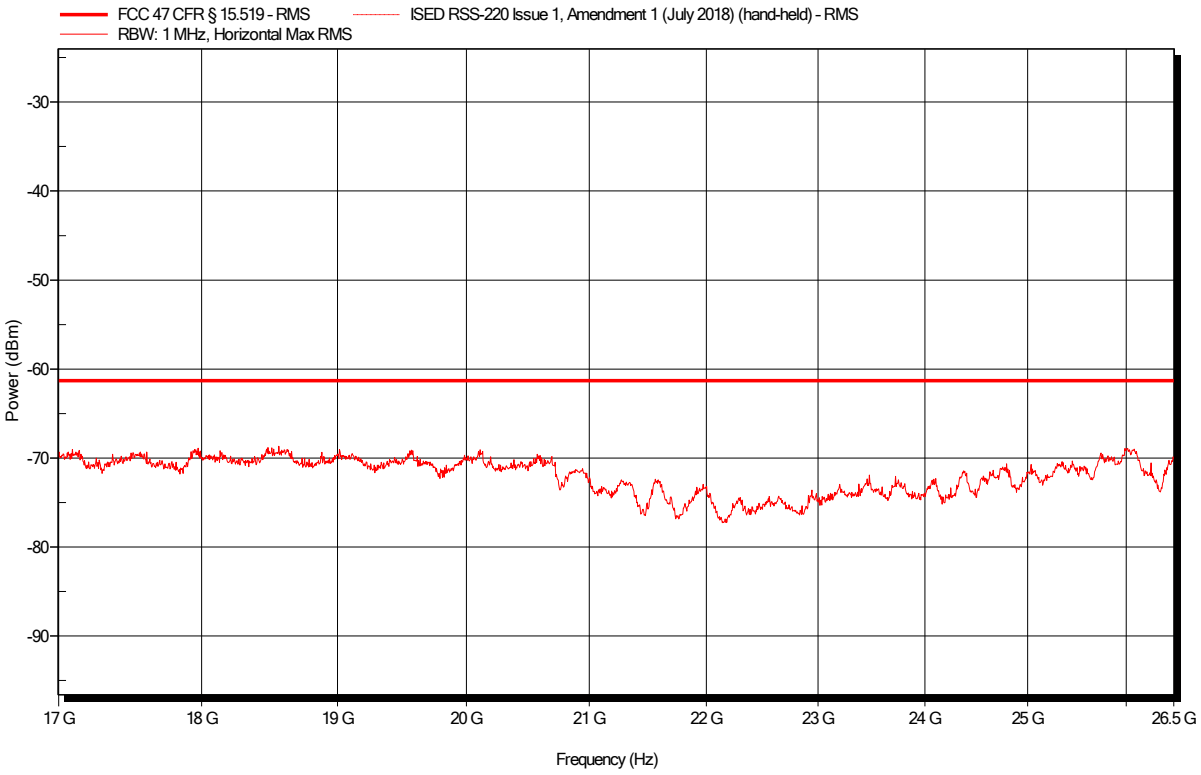

Spurious emissions according to FCC 47 CFR § 15.519 and ISED RSS-220 Issue 1, Amendment 1 (July 2018)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25°C, Vnom: 3.3 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; CH5
Test Date:	2020-07-22
Note:	EUT vertical

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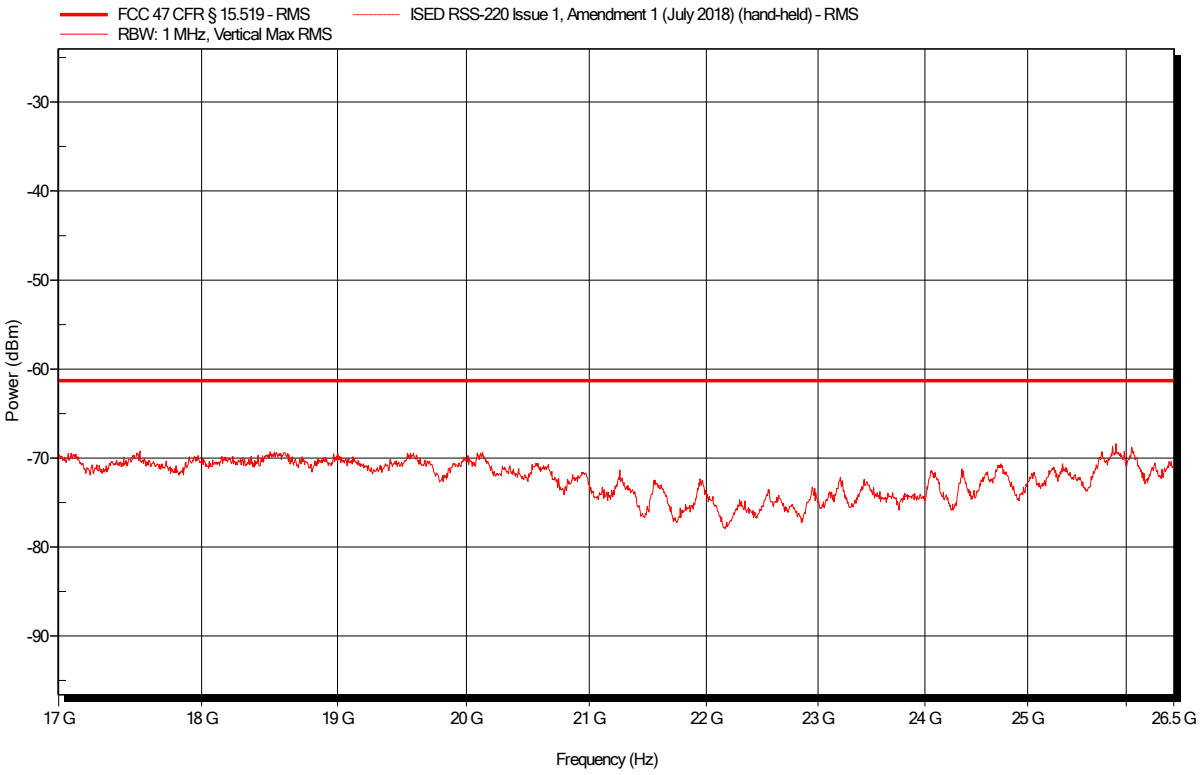

ANNEX B Receiver radiated emissions

Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

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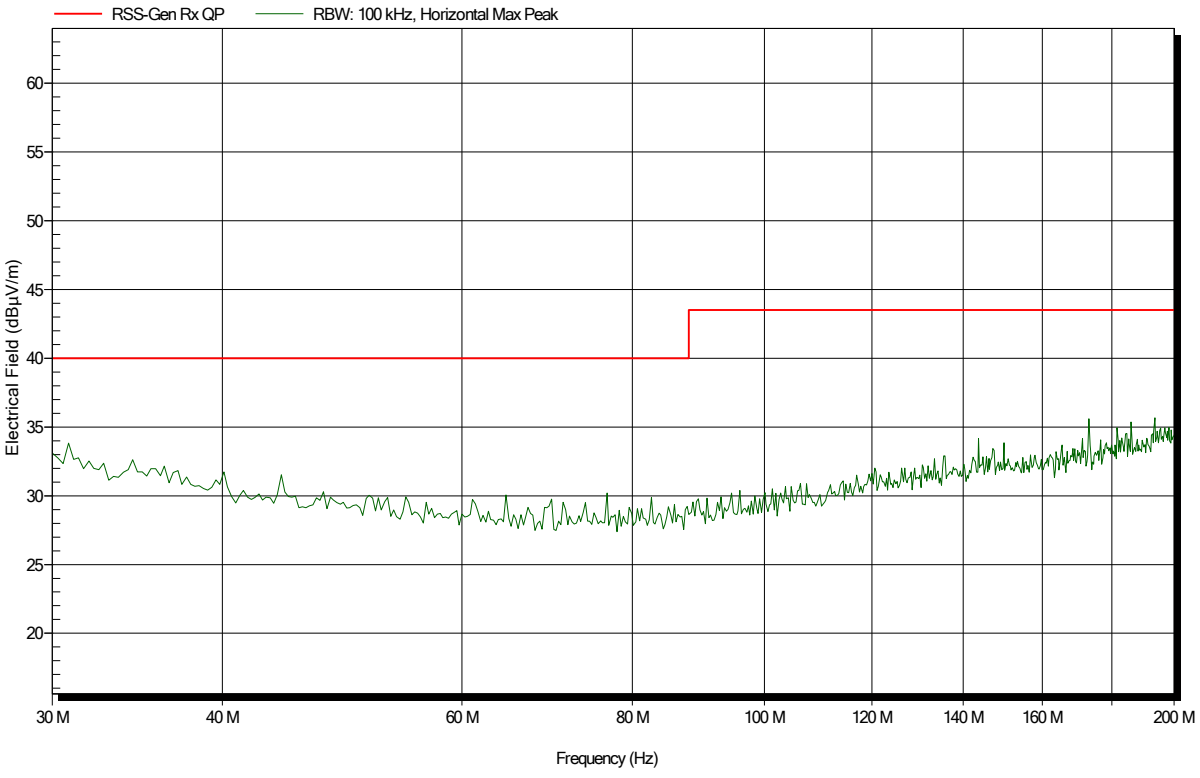
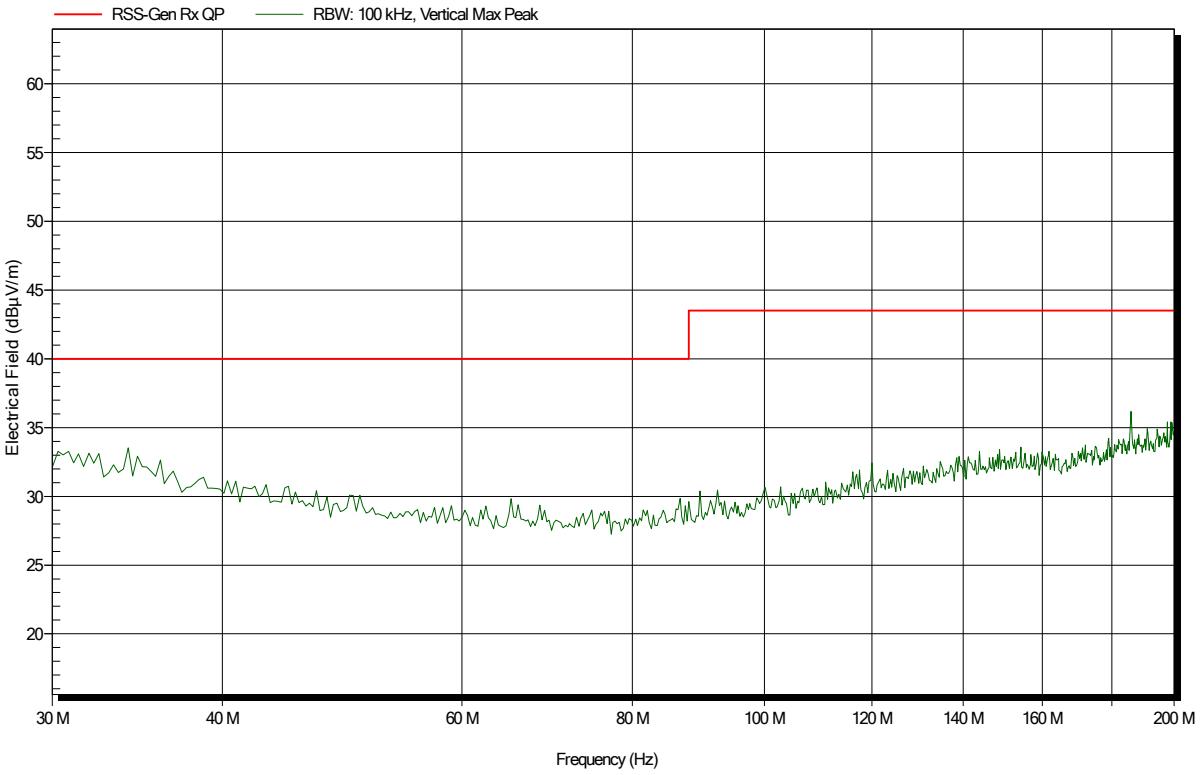


Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

Index 15



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

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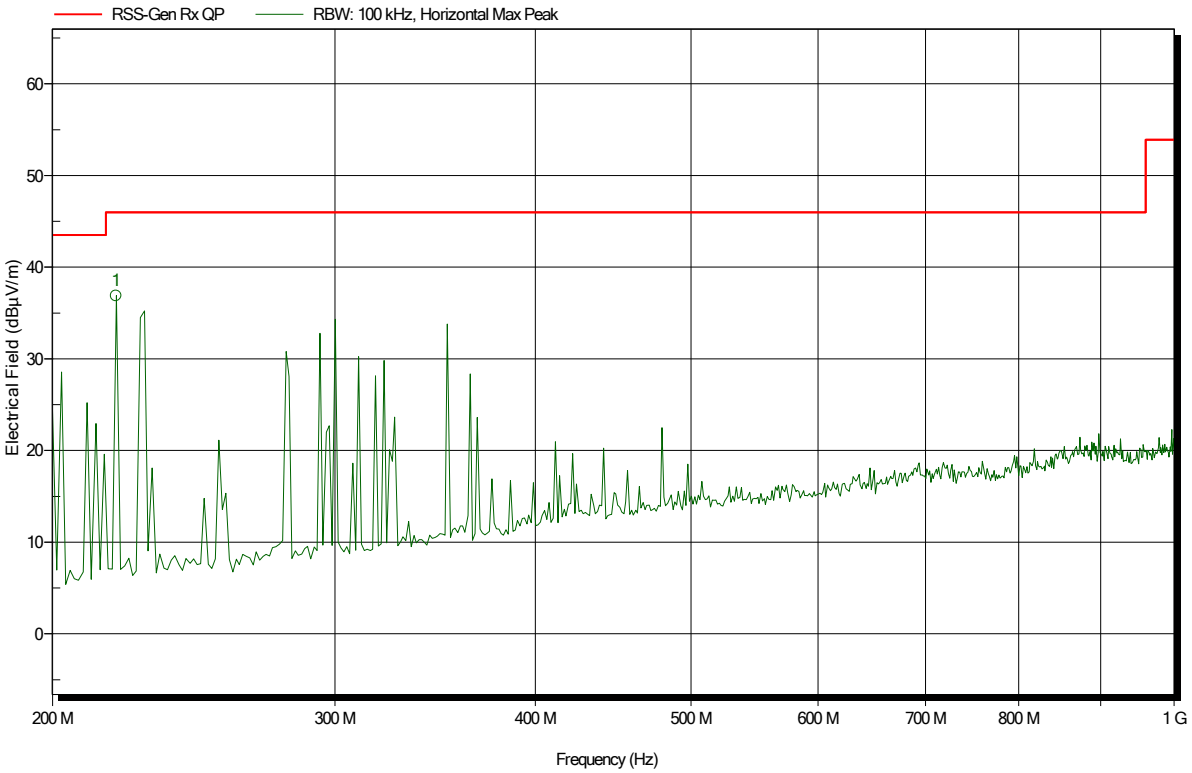
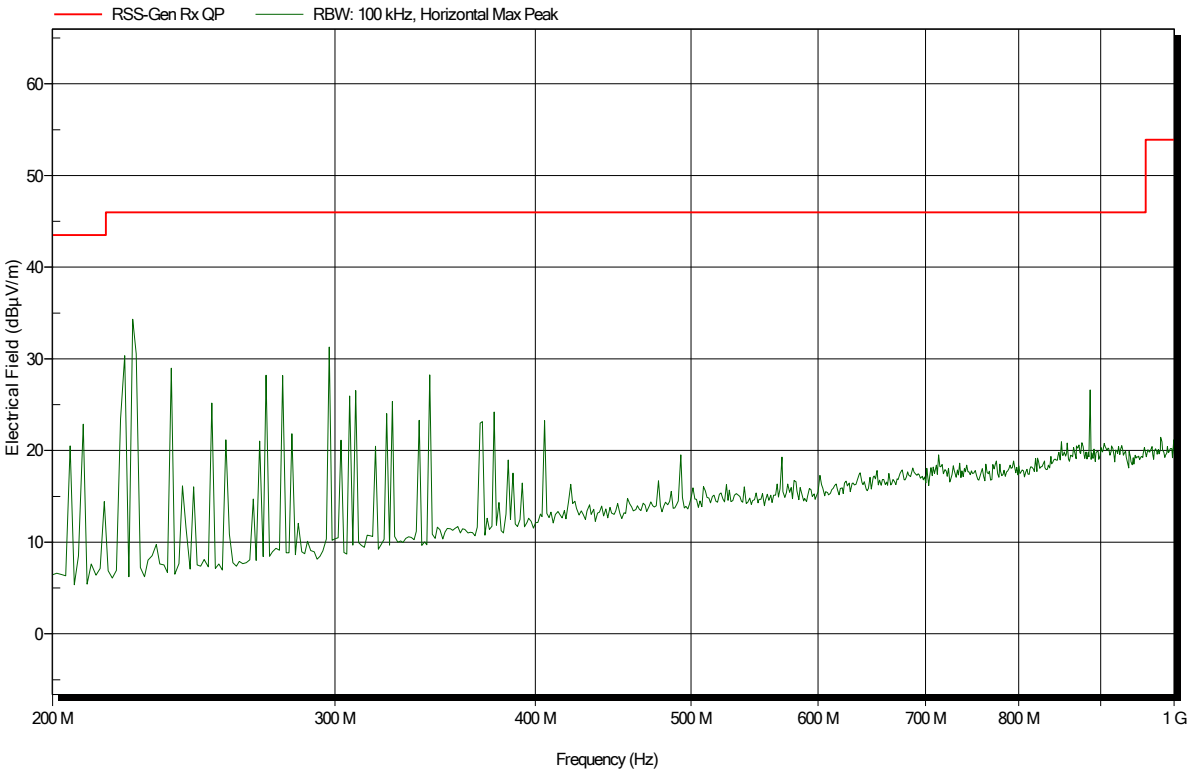


Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
219.231 MHz	36.89 dBµV/m	46 dBµV/m	-9.11 dB	Pass	315 Degree	1.2 m

Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT horizontal

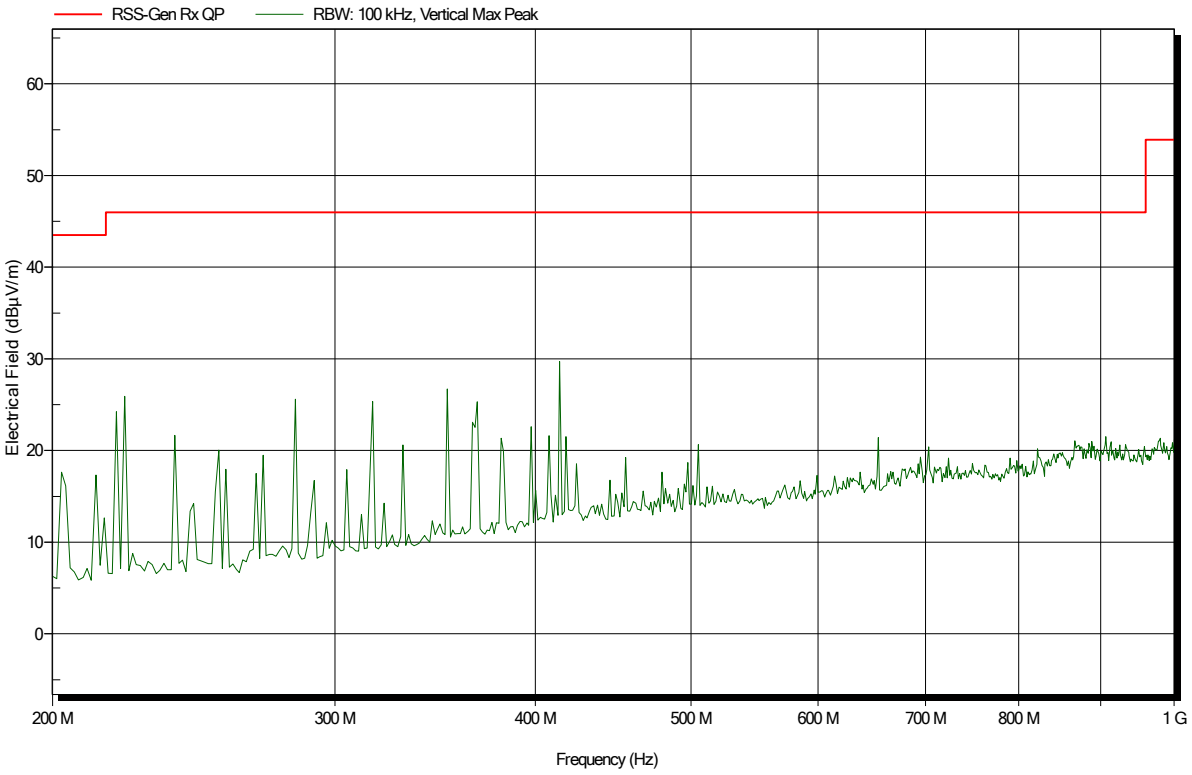
Index 12



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

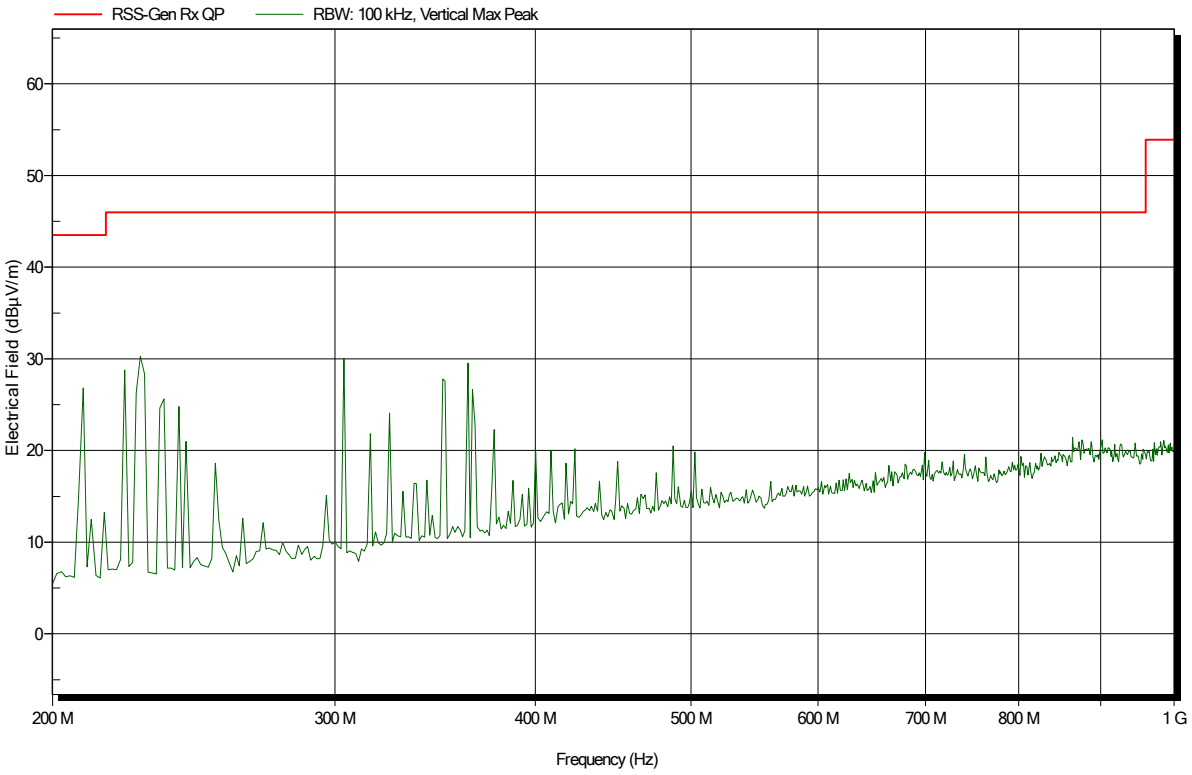
Index 10



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Measurement software:	RadiMation, version 2016.1.10
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT horizontal

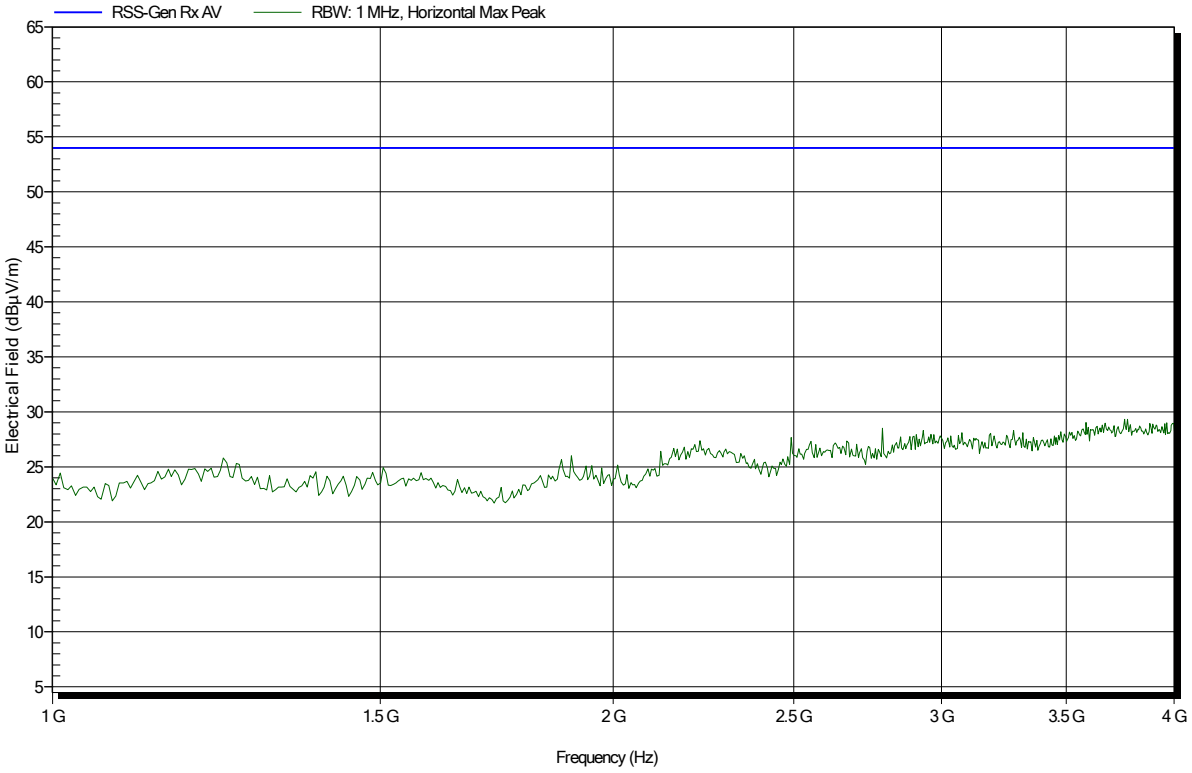
Index 11



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

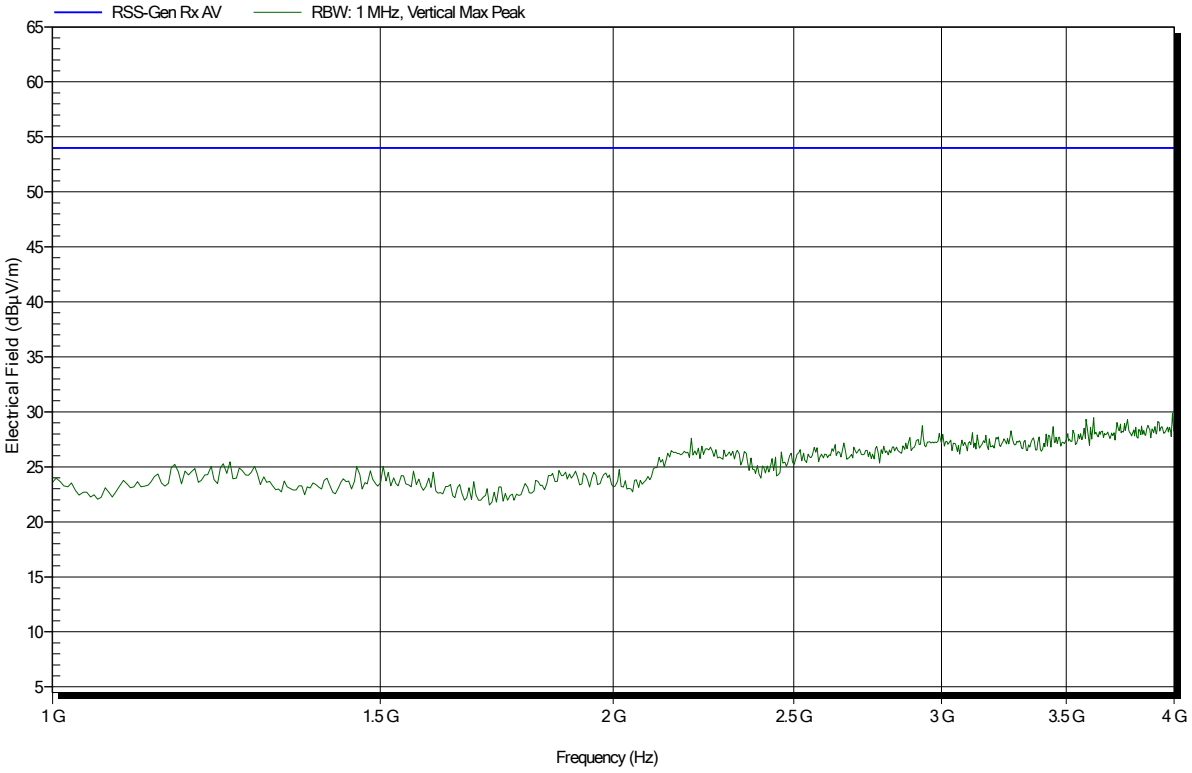
Index 1



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

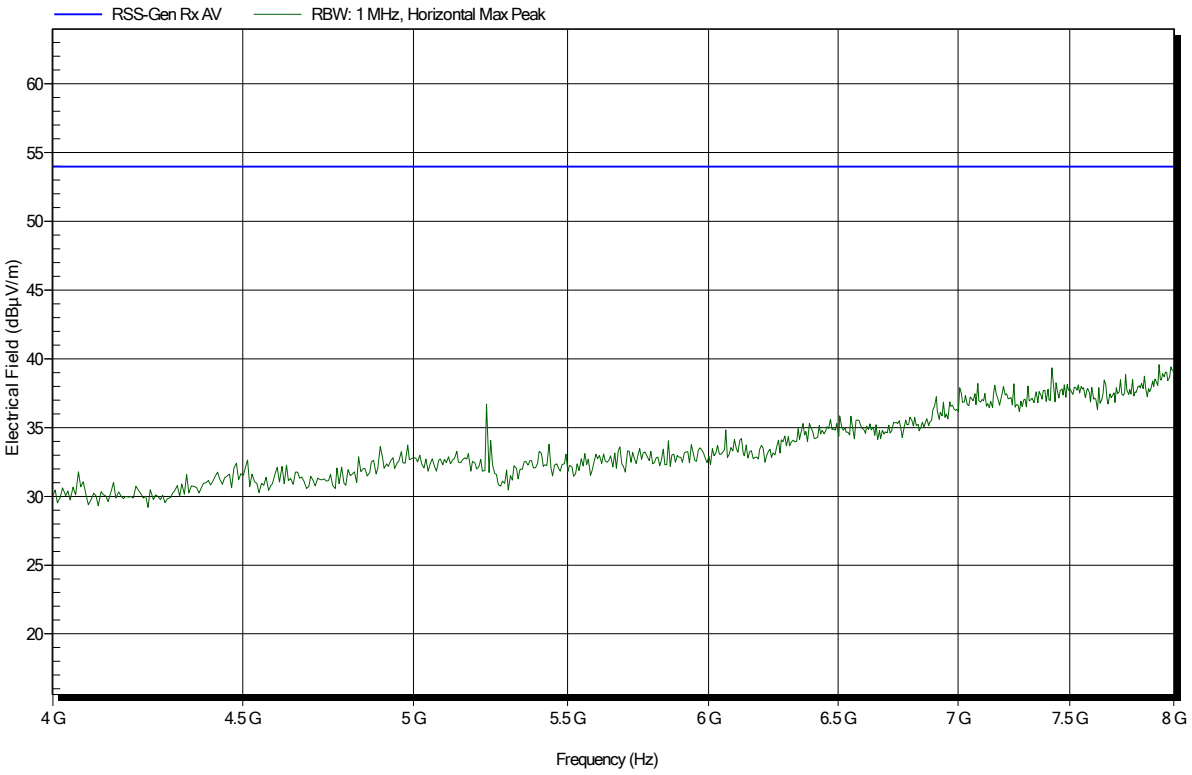
Index 8



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

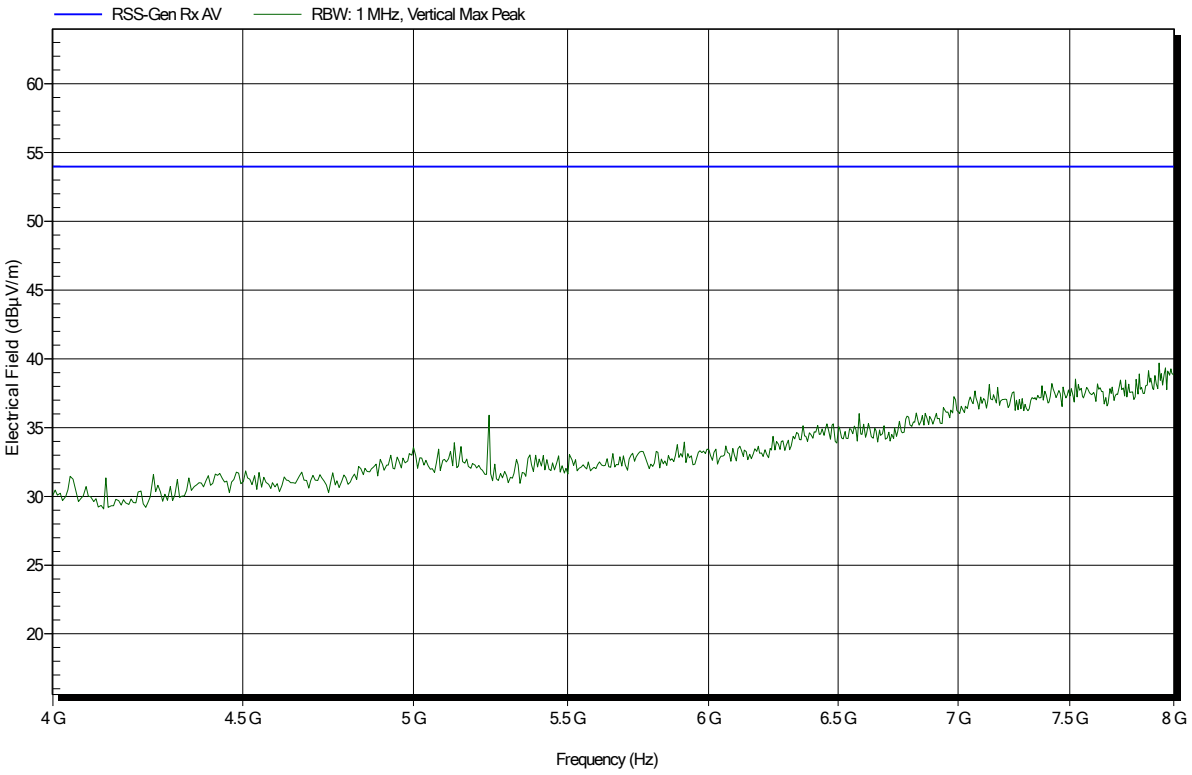
Index 2



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

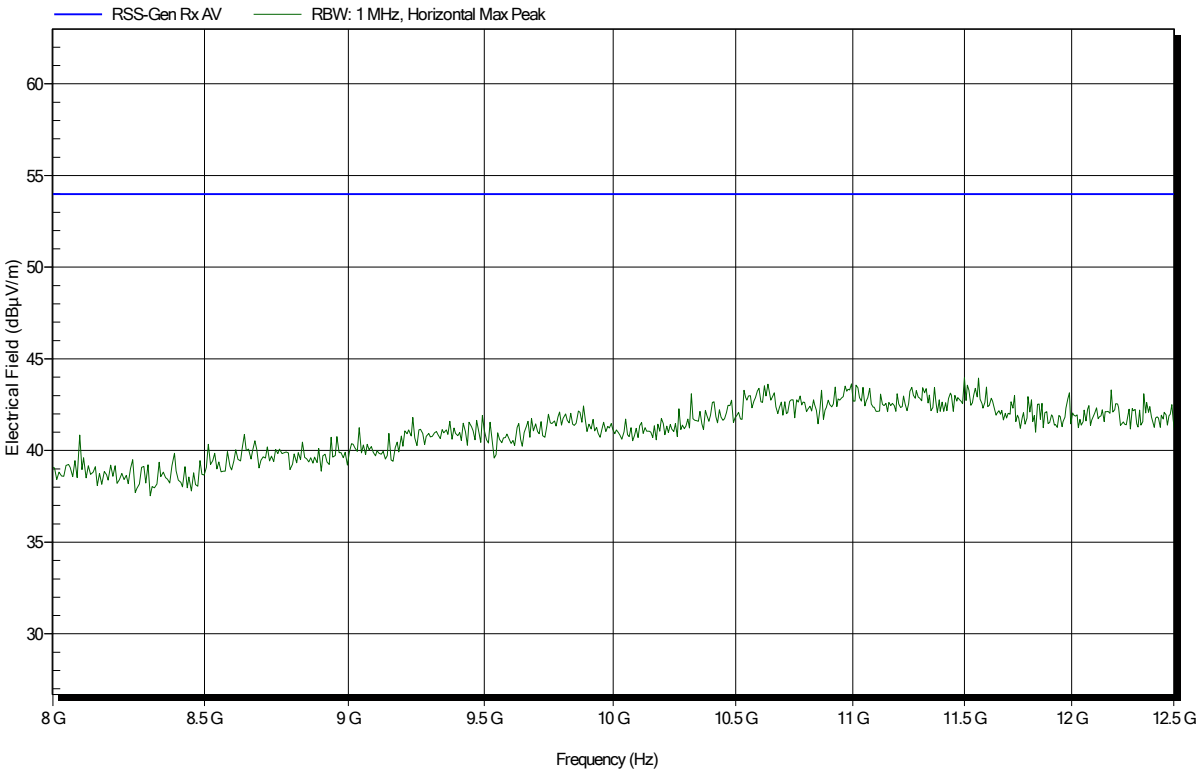
Index 7



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

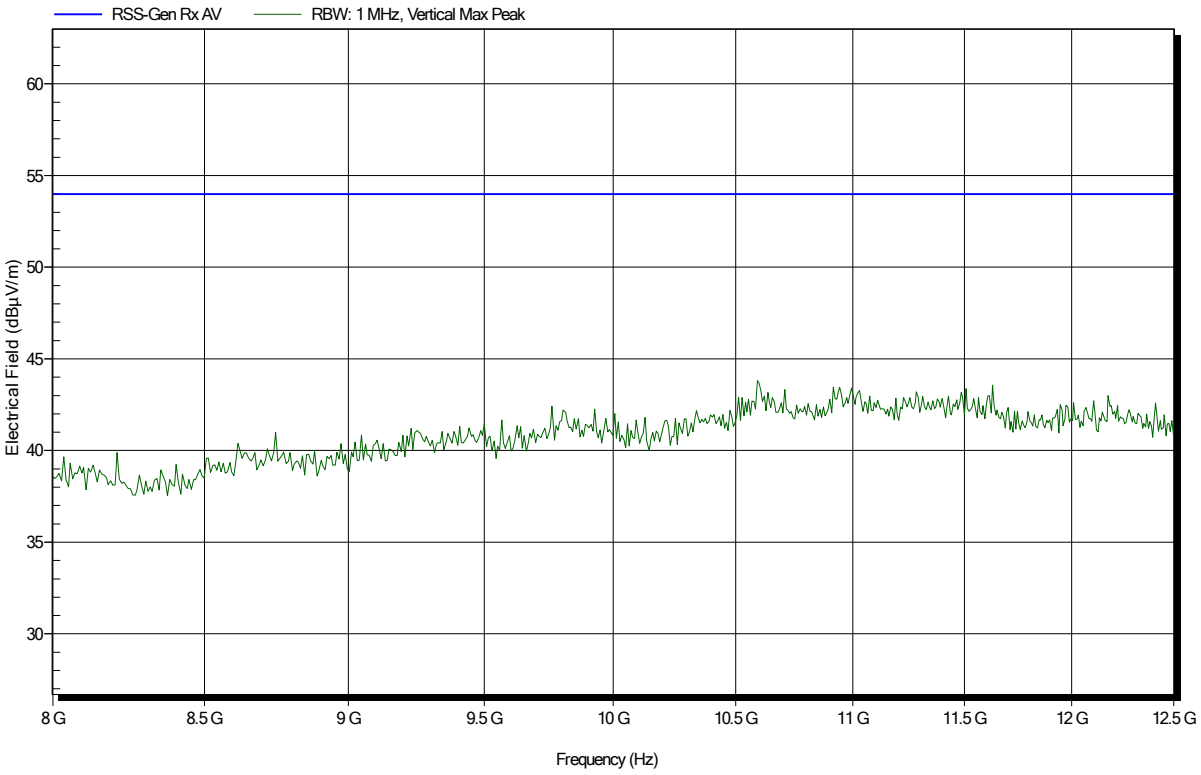
Index 3



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

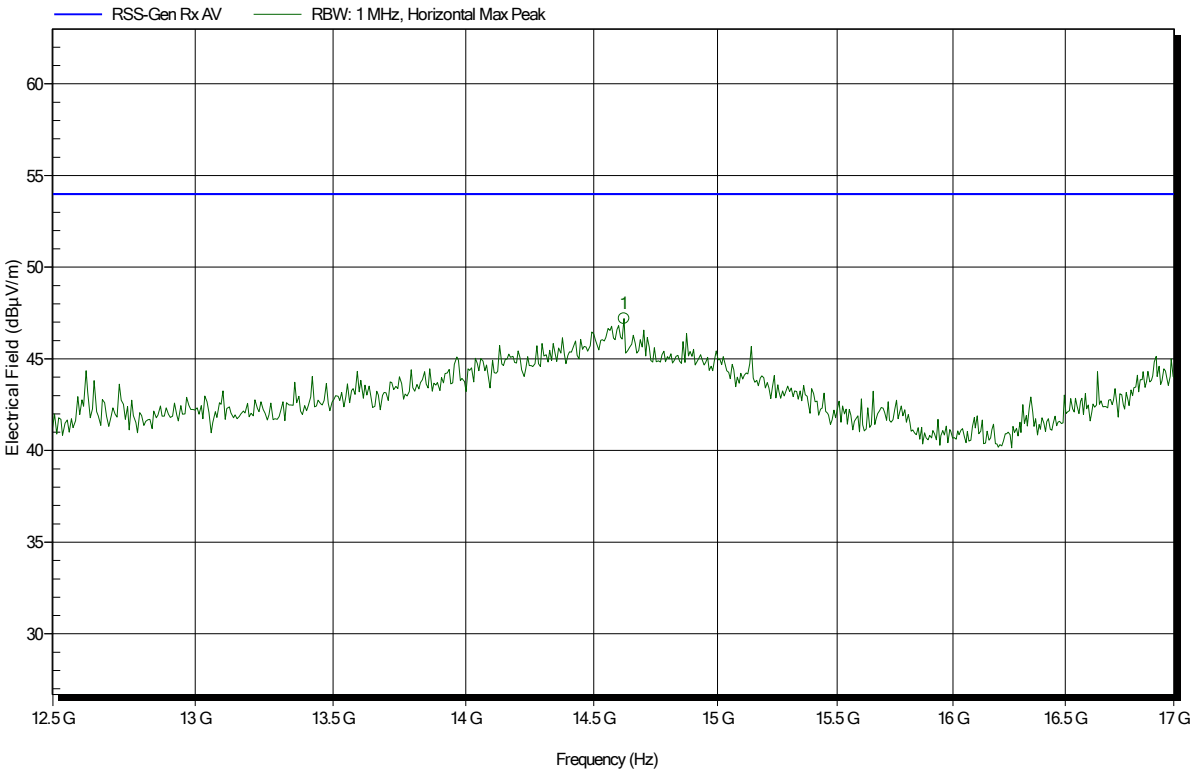
Index 6



Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

Index 4



Frequency	Peak	Peak Limit	Peak Difference	Status
14.62 GHz	47.19 dBµV/m	53.98 dBµV/m	-6.79 dB	Pass

Spurious emissions according to ISED RSS-220 Issue 1, Amendment 1 (July 2018) and ISED RSS-Gen Issue 5, Amendment 1 (March 2019)

Project number:	G0M-2006-9089
Applicant:	In-Circuit GmbH
EUT Name:	radio module with integrated microcontroller (nRF52840), BLE and UWB interface (DW1000)
Model:	radino40 DW1000
Test Site:	Eurofins Product Service GmbH
Measurement software:	RadiMation, version 2016.1.10
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 25.1°C, Vnom: 3.3 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; CH5
Test Date:	2020-07-21
Note:	EUT vertical

Index 5