Test report

379764 – 3R1TRFWL

Date of issue: March 4, 2021

Applicant:
Second Sight Medical Products, Inc.

Product:
OR Coil

Model:
112300

FCC ID #1: SMRA2S02 IC Registration number #1: NA

Specifications:

- FCC 47 CFR Part 15, Subpart C – §15.209
  Radiated emission limits; general requirements.
- RSS-210, Issue 9, August 2016 (Amendment November 2017)
  License-Exempt Radio Apparatus: Category I Equipment

Lab and test locations

Company name	Nemko USA Inc.
Address	2210 Faraday Ave, Suite 150
City	Carlsbad
State	California
Postal code	92008
Country	USA
Telephone	+1 760 444 3500
Website	www.nemko.com
FCC Site Number	Test Firm Registration Number: 392943 Designation Number: US5058
ISED Test Site	2040B-3

Tested by	Nikolay Shtin, Senior Wireless Engineer
	Andres Martinez, Test Engineer.
Reviewed by	James Cunningham, EMC/MIL/WL Supervisor
Review date	March 4, 2021
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.
This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government
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Table of Contents

Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart C – §15.209	Radiated emission limits; general requirements.
ISED RSS-210, Issue 9	License-Exempt Radio Apparatus: Category I Equipment

1.2 Test methods

ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.3 Exclusions

None

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Details of changes made to test report
379764-3TRFWL	Original report issued
379764-3R1TRFWL	Added explanatory tables to radiated emissions results

Notes:

Section 2 Summary of test results

2.1 Radiated Emissions in simultaneous transmission.

2.2 FCC Part 15 Subpart C, general requirements test results

Part	Test description	Verdict
§15.207(a)[1]	Conducted limits	Not applicable
§15.31(e)[2]	Variation of power source	Pass
§15.203[3]	Antenna requirement	Pass
§15.209	Radiated emission Intentional radiators.	Pass

Notes: [1] EUT is battery powered and has no direct connection to the AC mains.

[2] Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. No noticeable output power variation was observed

[3] The Antennas are located within the enclosure of EUT and not user accessible.

2.3 ISED RSS-GEN, Issue 4, test results

Part	Test description	Verdict
7.1.2[1]	Receiver radiated emission limits	Not applicable
7.1.3[1]	Receiver conducted emission limits	Not applicable
8.8[2]	Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus	Not applicable
8.10	Restricted Frequency Bands	Pass
6.6	Occupied bandwidth	Pass

Note: [1] According to sections 5.2 and 5.3 of RSS-Gen, Issue 4 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

[2] EUT is battery powered and has no direct connection to the AC mains.

2.4 ISED RSS-210, Issue 9, test results

Part	Test description	Verdict
4.3	General Field Strength Limits	Pass
4.4	Transmitters with Wanted Emissions That are Within the General Field Strength Limits	Pass
B.3 (a)(b)	The field strength of fundamental emissions.	Pass
B.3 (c)	The field strength outside the band 1.705-10 MHz	Pass

Note:

Section 3 Equipment under test (EUT) details

3.1 Applicant

Company name	Second Sight Medical Products, Inc.
Address	12744 San Fernando Road
City	Sylmar
Province/State	CA
Postal/Zip code	91342
Country	USA

3.2 Manufacturer

Company name	Second Sight Medical Products, Inc.
Address	12744 San Fernando Road
City	Sylmar
Province/State	CA
Postal/Zip code	91342
Country	USA

3.3 Sample information

Receipt date	July 23, 2018
Nemko sample ID number	379764

3.4 EUT information

Product name	OR Coil
Model	OR: 300200-450 OR model: 112300
Model variant	N/A
Serial number	OR: V010600 OR : EV011047
Power requirements	3.6 VDC (from rechargeable Li ion battery)
Description/theory of operation	The Second Sight Medical Products, Inc. Argus2s 300200-450OR Coil is a medical equipment containing low power transmitters operating at 3.156 MHz and 474/489 kHz.
Operational frequencies	3.156 MHz, 474/489 kHz
Software details	Ver. 1.0.10

3.5 EUT exercise and monitoring details

For this test the EUT was set to transmit mode at 3.156 MHz and 474/489 kHz with maximum power.
New model was use for this test:
OR Coil: 112300
VPU: 10001208

3.6 EUT setup details

Table 3.6-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
OR Coil	Second Sight Medical Products, Inc.	300200-450	V010600
New OR Coil	Second Sight Medical Products, Inc.	112300	EV011047
VPU	Second Sight Medical Products, Inc.	300300-001	N/A
New VPU	Second Sight Medical Products, Inc.	10001208	EV011009

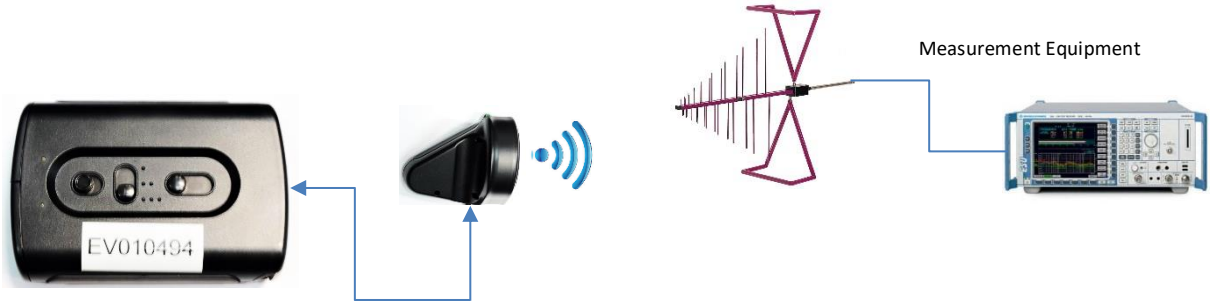


Figure 3.6-1: EUT Test Setup

Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

1. Increased value of bypass cap in RX circuitry for improved stability
2. New OR coil model tested for Radiated emissions, model 112300.
3. Changed modulation depth for improved range
4. Modified rising and falling edges of transmit carrier to improve emissions.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5 Test conditions

5.1 Atmospheric conditions

Temperature	21.4 °C
Relative humidity	55.7 %
Air pressure	86–106 kPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6 Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

Section 7 Test equipment

7.1 Test equipment list

Table 7.1-1: Radiated disturbance equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Antenna, Loop	EMCO	6504	1733	2 yr.	02/21/2021
EMC Test Receiver	Rohde & Schwarz	ESU 40	E1121	1 yr.	05/25/2020
Antenna, Bilog	Schaffner-Chase	CBL6111C	1763	2 yr.	01/17/2021

Notes: None

Table 7.1-2: Radiated disturbance test software details

Manufacturer of Software	Details
R&S	EMC32 V10.00.00

Notes: None

Section 8 Terms and definitions

8.1.1 Equipment type

Multimedia Equipment (MME)	Equipment that is information technology equipment, audio equipment, video equipment, broadcast receiver equipment, entertainment lighting control equipment or combinations of these.
Information technology equipment [ITE]	Equipment having a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control of data and/or telecommunication messages and which may be equipped with one or more ports typically for information transfer. - Examples include data processing equipment, office machines, electronic business equipment and telecommunication equipment.
Audio equipment	Equipment which has a primary function of either (or a combination of) generation, input, storage, play, retrieval, transmission, reception, amplification, processing, switching or control of audio signals
Video equipment	Equipment which has a primary function of either (or a combination of) generation, input, storage, display, play, retrieval, transmission, reception, amplification, processing, switching, or control of video signals.
Broadcast receiver equipment	Equipment containing a tuner that is intended for the reception of broadcast services - These broadcast services are typically television and radio services, including terrestrial broadcast, satellite broadcast and/or cable transmission.
Entertainment lighting control equipment	Equipment generating or processing electrical signals for controlling the intensity, color, nature or direction of the light from a luminaire, where the intention is to create artistic effects in theatrical, televisual or musical productions and visual presentations.

8.1.2 Port type

AC mains power port	Port used to connect to the mains supply network - Equipment with a DC power port which is powered by a dedicated AC/DC power converter is defined as AC mains powered equipment
Antenna port	Port, other than a broadcast receiver tuner port (3.1.8), for connection of an antenna used for intentional transmission and/or reception of radiated RF energy.
Broadcast receiver tuner port	Port intended for the reception of a modulated RF signal carrying terrestrial, satellite and/or cable transmissions of audio and/or video broadcast and similar services - This port may be connected to an antenna, a cable distribution system, a VCR or similar device.
DC network power port	Port, not powered by a dedicated AC/DC power converter and not supporting communication, that connects to a DC supply network. - Equipment with a DC power port which is powered by a dedicated AC/DC power converter is considered to be AC mains powered equipment. - DC power ports supporting communications are considered to be wired networks ports, for example Ethernet ports which include Power Over Ethernet (POE).
Enclosure port	Physical boundary of the EUT through which electromagnetic fields may radiate.
Optical fiber port	Port at which an optical fiber is connected to an equipment.
RF modulator output port	Port intended to be connected to a broadcast receiver tuner port to transmit a signal to the broadcast receiver.
Signal/control port	Port intended for the interconnection of components of an equipment under test, or between an equipment under test and local associated equipment and used in accordance with relevant functional specifications (for example for the maximum length of cable connected to it) - Examples include RS-232, Universal Serial Bus (USB), High-Definition Multimedia Interface (HDMI), IEEE Standard 1394 (“Fire Wire”)
Wired network port	Point of connection for voice, data and signaling transfers intended to interconnect widely-dispersed systems by direct connection to a single-user of multi-user communication network (for example CATV, PSTN, ISDN, xDSL, LAN and similar networks) - These ports may support screened or unscreened cables and may also carry AC or DC power where this is an integral part of the telecommunication specification.

Section 9 Testing data

9.1 Clause 15.215(c) Emission bandwidth RSS Gen 6.6 Occupied bandwidth

9.1.1 Definitions and limits

Part 15.215(c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that 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. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80 % of the permitted band in order to minimize the possibility of out-of-band operation.

RSS-Gen Clause 6.6 Occupied bandwidth

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99 percent emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

9.1.2 Test summary

Test date:	July 26, 2018	Temperature:	20 °C
Test engineer:	Nikolay Shtin	Air pressure:	1006 mbar
Verdict:	Pass	Relative humidity:	43 %

9.1.3 Observations/special notes

None

9.1.4 Test data

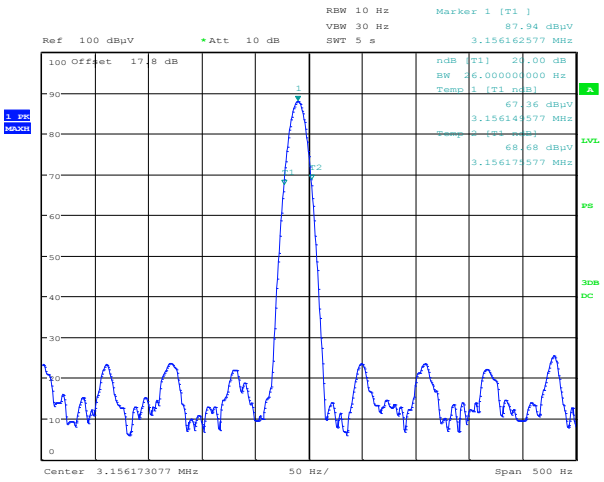


Figure 9.1-1: 20 dB Bandwidth

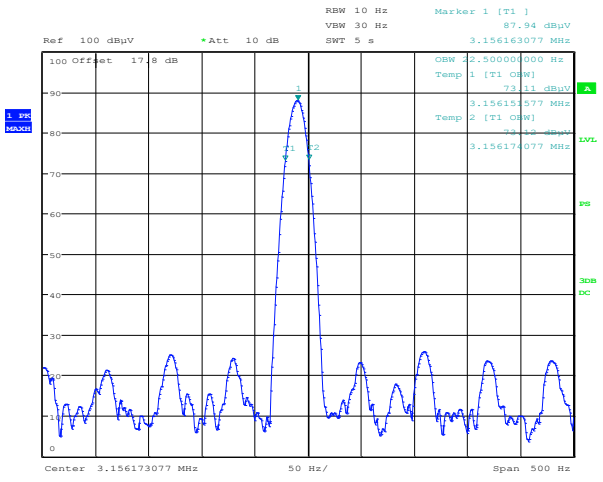


Figure 9.1-2: 99 % Bandwidth

Table 9.1-1: 20 dB and 99 % bandwidth results

Frequency (MHz)	20dB bandwidth (Hz)	99 % bandwidth (Hz)
3.156	26.0	22.5

9.2 Radiated emission limits; Intentional Radiators.

9.2.1 References

Title 47 → Chapter I → Subchapter A → Part 15 → Subpart C → §15.209 / ANSI C63.4: 2014

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

(b)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, however, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

(f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device.

9.2.2 Test summary

Verdict	Pass		
Test date	August 23, 2019 & August 30, 2019	Temperature	21°C
Test engineer	Andres Martinez & Rodel Resolme	Air pressure	1001 mbar
Test location	10m semi anechoic chamber	Relative humidity	42 %

9.2.3 Notes

The spectrum was searched from 9 kHz to 1 GHz.

New model was used for this testing.
OR Coil: 112300
VPU: 10001208

9.2.4 Setup details

EUT setup configuration	Table top
Test facility	10 m Semi anechoic chamber
Measuring distance (all Spurious)	3 m
Transmitter Measurement distance	10 m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver/spectrum analyzer settings for frequencies below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	– Peak (Preview measurement) – Quasi-peak (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 1000 ms (Quasi-peak final measurement)

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak (Preview measurement) Peak and CAverage (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 100 ms (Peak and CAverage final measurement)

9.2.6 Test data Radiated Emissions 9KHz-1GHz

Final Data:

In the table below:

The limit in dBµV/m is calculated by converting the limit in microvolts/m described in Section 9.2.1 above into dBµV/m using the formula: Limit (dBµV/m) = 20 x Log10(Limit (µV/m)). For example, at 9kHz the limit is defined as (2400/F(kHz) = 20 x Log10(2400/9)) = 48.52 dBµV/m
The quasi-peak measurements, made at a 3 m measurement distance, are extrapolated to the distance of the limit using the formula: QP(Limit distance) = QP(3m) – 40 x Log10(Limit distance / 3). This corresponds to equation (4) in ANSI C63.10 Section 6.4.4.2. The 3.156 MHz fundamental measurements, made at a 10 m measurement distance, are extrapolated to the limit distance using the same equation.

Table 9.2-1: Final results (9 kHz - 30 MHz, Test antenna at 0 deg)

Frequency (MHz)	Limit (dBµV/m)	Limit distance (m)	Measured (dBµV/m) at 3m	Measurement corrected to limit distance (dBµV/m)	Margin (dB)
0.011861	46.12	300	63.51	-16.49	62.61
0.518655	33.31	30	51.97	11.97	21.34
0.671875	31.06	30	49.70	9.70	21.36

Table 9.2-2: Final results (9 kHz - 30 MHz, Test antenna at 90 deg)

Frequency (MHz)	Limit (dBµV/m)	Limit distance (m)	Measured (dBµV/m) at 3m	Measurement corrected to limit distance (dBµV/m)	Margin (dB)
0.009403	48.14	300	65.02	-14.98	63.12
0.509700	33.46	30	52.17	12.17	21.29
0.930585	28.23	30	46.65	6.65	21.58
1.658895	23.21	30	42.27	2.27	20.94

Table 9.2-3: Final results - Fundamental (460 - 500 kHz)

Frequency (MHz)	Limit (dBµV/m)	Limit distance (m)	Measured (dBµV/m) at 3m	Measurement corrected to limit distance (dBµV/m)	Margin (dB)
0.473960	14.09	300	25.17	-54.83	68.92
0.489232	13.81	300	24.96	-55.04	68.85

Table 9.2-4: Final results (30 - 1000 MHz)

Frequency (MHz)	Measured (dBµV/m) at 3m	Limit (dBµV/m) at 3m	Margin (dB)
34.744500	26.91	40.00	13.09
53.853500	32.31	40.00	7.69
66.269500	37.00	43.50	3.00
325.206000	32.84	46.00	13.16
403.298500	40.86	46.00	5.14
883.996500	39.18	46.00	6.82

Table 9.2-5: Final results - fundamental (3.156MHz)

Test antenna	Frequency (MHz)	15.209 Limit at 30m (dBµV/m)	Limit with waiver at 30m (dBµV/m)	Limit with waiver at 10m (dBµV/m)	Measured (dBµV/m) at 10m	Measurement corrected to limit at 30m (dBµV/m)	Margin (dB)
0 deg	3.156360	30	41.51	60.59	55.57	36.49	5.03
90 deg	3.157120	30	41.51	60.59	57.32	38.24	3.28

In accordance with FCC waiver DA 11-1951 current and future generations of the Argus II are allowed to operate with emissions not to exceed 119 µV/m at 30 meters (Limit was corrected for 10 meters measurements) 119 µV/m= 0.000119V/m or 41.51dBµV/m @30 meters {20log (0.000119V/m) +120}

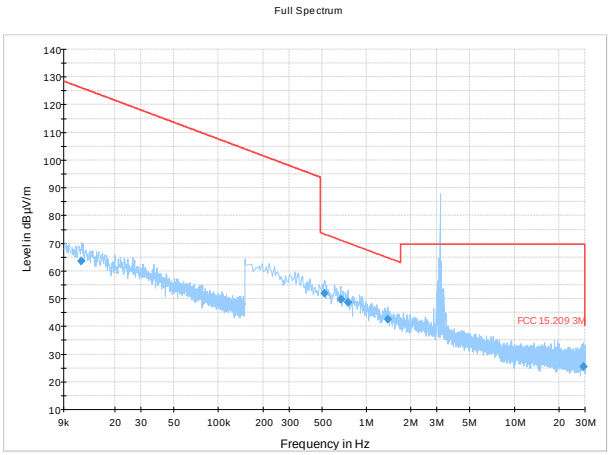


Figure 9.2.1: *Radiated spurious emissions, 9 kHz-30 MHz (Test antenna at 0 deg)*

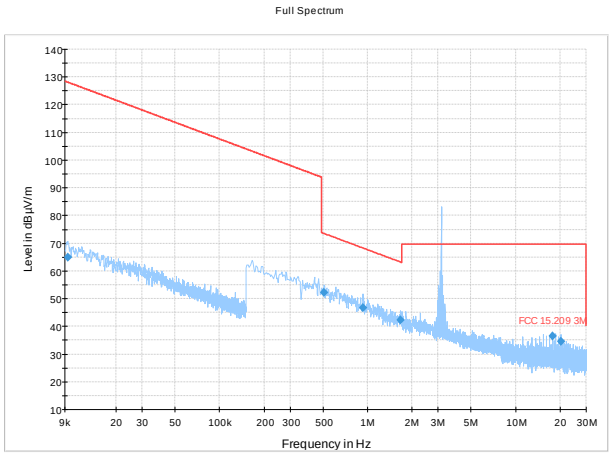


Figure 9.2.2: *Radiated spurious emissions, 9 kHz-30 MHz (Test antenna at 90 deg)*

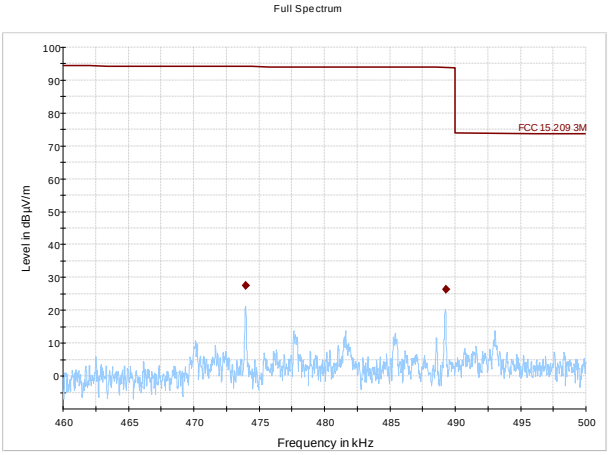


Figure 9.2.3: *Fundamental measurements, 460-500 kHz*

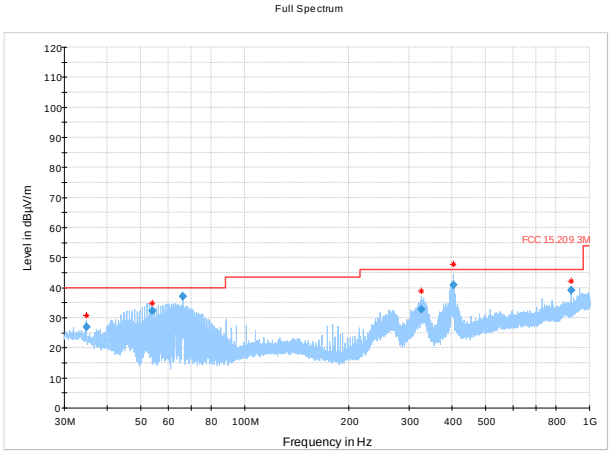


Figure 9.2.4: *Radiated spurious emissions, 30-1000 MHz*

Notes:

[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)

[3] The maximum measured value observed over a period of 15 seconds was recorded.

[4]The spectral plot is a summation of a vertical and horizontal scan.

Table 9.2-6: Radiated field strength measurement results (9 kHz - 30 MHz, Test antenna at 0 deg)

Frequency (MHz)	Measured (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
0.011861	63.51	126.10	62.59	15000.0	0.200	H	276.0
0.518655	51.97	73.31	21.34	15000.0	9.000	H	262.0
0.671875	49.70	71.07	21.36	15000.0	9.000	H	119.0

Table 9.2-7: Radiated field strength measurement results (9 kHz - 30 MHz, Test antenna at 90 deg)

Frequency (MHz)	Measured (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
0.009403	65.02	128.12	63.10	15000.0	0.200	H	339.0
0.509700	52.17	73.46	21.29	15000.0	9.000	H	299.0
0.930585	46.65	68.25	21.59	15000.0	9.000	H	168.0
1.658895	42.27	63.24	20.97	15000.0	9.000	H	132.0

Table 9.2-8: Fundamental measurement results (460 - 500 kHz)

Frequency (MHz)	Measured (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
0.473960	25.17	94.10	68.93	5000.0	9.000	H	0.0
0.489232	24.96	93.82	68.86	5000.0	9.000	H	0.0

Table 9.2-9: Radiated field strength measurement results (30 - 1000 MHz)

Frequency (MHz)	Measured (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.744500	26.91	40.00	13.09	5000.0	120.000	118.3	V	32.0
53.853500	32.31	40.00	7.69	5000.0	120.000	299.1	V	163.0
66.269500	37.00	40.00	3.00	5000.0	120.000	156.6	V	123.0
325.206000	32.84	46.00	13.16	5000.0	120.000	112.3	H	284.0
403.298500	40.86	46.00	5.14	5000.0	120.000	205.3	H	32.0
883.996500	39.18	46.00	6.82	5000.0	120.000	153.4	H	0.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)

[2] Correction factors = antenna factor ACF (dB) + cable loss (dB) − amplifier gain (dB)

[3] The maximum measured value observed over a period of 15 seconds was recorded.

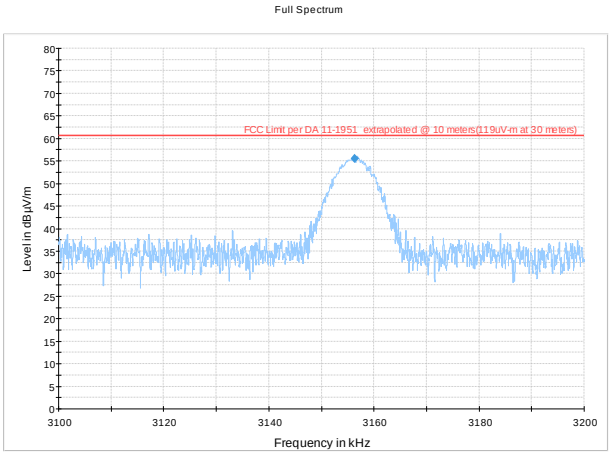


Figure 9.2.5: *Fundamental Measurements, 3.156MHz*

0 Degrees at 10 meters

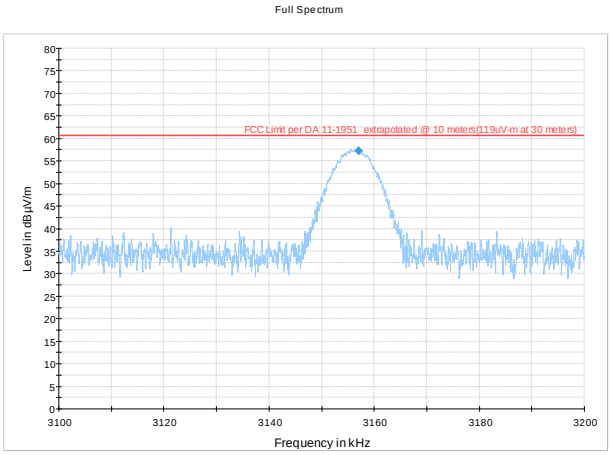


Figure 9.2.6: *Fundamental Measurements, 3.156MHz*

90 Degrees at 10 meters

Notes:

[1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factors = antenna factor ACF (dB) + cable loss (dB)
[3] The maximum measured value observed over a period of 15 seconds was recorded.
[4]The spectral plot is a summation of a vertical and horizontal scan.

Table 9.2-10: Fundamental (3.156MHz) measurement results (Test antenna at 0 deg at 10 meters) – With waiver allowance added

Frequency (MHz)	15.209 Limit at 30m (dBµV/m)	Waiver limit (dBuV/m) (30m)	Waiver Limit (dBµV/m) (10m)	Measured (dBµV/m) (10m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
3.156360	30	41.51	60.59	55.57	5.02	15000.0	9.000	H	265.0

Table 9.2-11: Fundamental (3.156MHz) measurement results (Test antenna at 90 deg at 10 meters) – With Waiver allowance added

Frequency (MHz)	15.209 Limit at 30m (dBµV/m)	Waiver limit (dBuV/m) (30m)	Waiver Limit (dBµV/m) (10m)	Measured (dBµV/m) (10m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
3.157120	30	41.51	60.59	57.32	3.27	15000.0	9.000	H	340.0

Notes: In accordance with FCC waiver DA 11-1951 current and future generations of the Argus II are allowed to operate with emissions not to exceed 119 µV/m at 30 meters (Limit was corrected for 10 meters measurements)
119 µV/m= 0.000119V/m or 41.51dBµV/m @30 meters {20log (0.000119V/m) +120}

Now extrapolating the limit from 30 meters to 10 meters per ANSI63.10 (method 6.4.4):
-Since both the single point and the limit distance are equal to or closer to the EUT than λ/2π (15.13meters), then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{\text{limit}} = FS_{\text{max}} - 40\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

where
FS_{limit} is the calculation of field strength at the limit distance, expressed in dBµV/m
FS_{max} is the measured field strength, expressed in dBµV/m
$d_{near\ field}$ is the λ/2π distance
$d_{measure}$ is the distance of the measurement point from the EUT
d_{limit} is the reference distance or the distance of the λ/2π point

$FS_{Lim\ @\ 10m}$=41.51dBµV/m – 40 log (10/30)
$FS_{Lim\ @\ 10m}$=60.59 dBµV/m

9.2.7 Radiated Emissions Setup photos

Figure 9.2.7 Radiated emissions 9 kHz-30 MHz (Test antenna at 0 deg, Front)

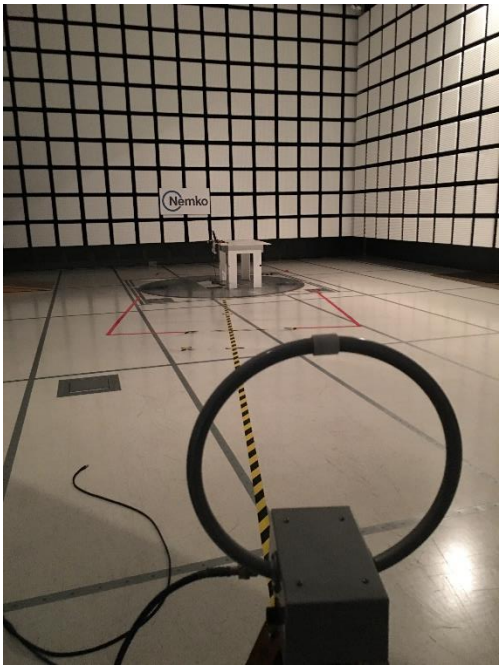


Figure 9.2.8 Radiated emissions 9 kHz-30 MHz (Test antenna at 0 deg, Back)

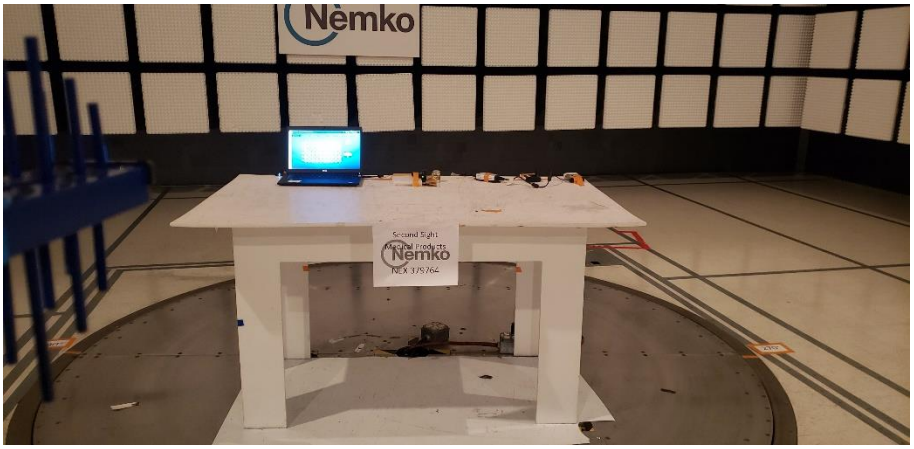
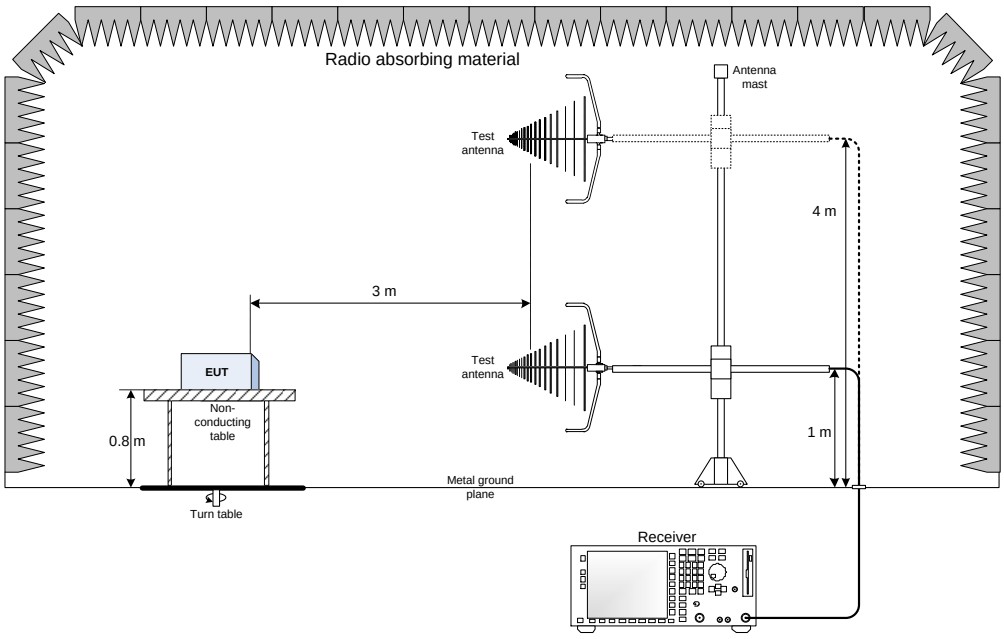


Figure 9.2.9 Radiated emissions 30-1000 MHz (Front)

Figure 9.2.10 Radiated emissions 30-1000 MHz (Back)

Section 10 Block diagrams of test set-ups

10.1 Radiated emissions set-up



30-1000MHz Setup

Thank you for choosing

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