


# Test Report

<b>Product</b>	Wireless Customizable Pull Code US		
<b>Name and address of the applicant</b>	Ascom (Sweden) AB Grimbodalen 2, Goteborg, SE-40276, Sweden		
<b>Name and address of the manufacturer</b>	Ascom (Sweden) AB Grimbodalen 2, Goteborg, SE-40276, Sweden		
<b>Model</b>	NUWPC3-HU		
<b>Rating</b>	3Vdc		
<b>Trademark</b>	Ascom		
<b>Serial number</b>	See page 3		
<b>Additional information</b>	Transceiver operates in 902 - 928 MHz band		
<b>Tested according to</b>	<b>FCC Part 15.249</b> Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz <b>Industry Canada RSS-210, Issue 10, Annex B10</b> Bands 902-928 MHz, 2400-2483.5 MHz and 5725-5875 MHz		
<b>Order number</b>	406902		
<b>Tested in period</b>	2020-10-20 -2020-10-21		
<b>Issue date</b>	2021-01-05		
<b>Name and address of the testing laboratory</b>	 Instituttveien 6 Kjeller, Norway www.nemko.com	CAB Number: FCC: NO0001 ISED: NO0470  TEL: +47 22 96 03 30 FAX: +47 22 96 05 50	 
An accredited technical test executed under the Norwegian accreditation scheme			
 Prepared by [G.Suhanthakumar]		 Approved by [Frode Sveinsen]	
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## 1 INFORMATION

### 1.1 Test Item

<b>Name</b>	Ascom
<b>FCC ID</b>	BXZNUWPC3
<b>ISED ID</b>	3724B-NUWPC3
<b>Model/version</b>	NUWPC3-HU
<b>Serial number</b>	G4492849
<b>Hardware identity and/or version</b>	Revision C
<b>Software identity and/or version</b>	0.2.3
<b>Frequency Range</b>	916.2125 - 920.2125 MHz
<b>Tunable Bands</b>	None
<b>Number of Channels</b>	11
<b>Operating Modes</b>	TX and RX
<b>Type of Modulation</b>	4-GFSK
<b>User Frequency Adjustment</b>	None, Software controlled
<b>Rated Output Power</b>	0.67mW
<b>Type of Power Supply</b>	3Vdc (2xAA batteries)
<b>Antenna Connector</b>	Integral antenna (connector type FL for testing)
<b>Number of Antennas</b>	1
<b>Diversity or Smart Antennas</b>	No
<b>Desktop Charger</b>	N/A

### Description of Test Item

Wireless devices for emergency calls intended for use in nursing homes and in assisted living facilities. This device contains radio module which operates in 902 – 928MHz band and is only powered with DC Voltage

## 1.2 Normal test condition

Temperature: 20 - 24 °C  
 Relative humidity: 20 - 50 %  
 Normal test voltage: 3 V DC

The values are the limit registered during the test period.

## 1.3 Test Engineer(s)

G. Suhanthakumar

## 1.4 Description of modification for Modification Filing

Not applicable.

## 1.5 Family List Rational

Not Applicable.

## 1.6 Antenna Requirement

Is the antenna detachable?

Yes  No

If detachable, is the antenna connector non-standard?

Yes  No

Type of antenna connector: N/A

Ref. FCC §15.203

## 1.7 Worst-Case Configuration and Mode

Radiated Emissions were performed with the EUT set to transmit at the channel with the highest output power as worst-case scenario.

## 1.8 Comments

All measurements were done with the EUT powered by a fully charged battery.

No ports to be populated during spurious emission measurements.

Channel	Frequency (MHz)	Power setting(hexadecimal number)
1	916.2125	1C
6	918.2125	1C
11	920.2125	1D

## 2 TEST REPORT SUMMARY

### 2.1 General

All measurements are traceable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.249 and Industry Canada RSS-210 Issue 10 and RSS-GEN Issue 5.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 3m.

A description of the test facility is on file with FCC and ISED.

New Submission

Production Unit

Class II Permissive Change

Pre-production Unit

**DXT** Equipment Code

Family Listing



#### **THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.**

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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## 2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-210 Issue 10, RSS-GEN Issue 5 reference	ANSI C63.10-2013 Reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	5.13	N/A <sup>1</sup>
Number of Frequencies	15.31(m)	6.9 (RSS-GEN)	N/A	Complies
Antenna Requirement	15.203	6.8 (RSS-GEN)	5.8	Complies <sup>2</sup>
Power Line Conducted Emission	15.107(a) 15.207(a)	7.2 / 8.8 (RSS-GEN)	6.2	N/A <sup>1</sup>
Occupied Bandwidth (99% BW)	15.215(c)	6.7 (RSS-GEN)	6.9.3	Complies
Field Strength of Fundamental	15.249(a)(c)(e)	B.10(a) (RSS-210)	6.6	Complies
Radiated Emissions	15.249(a)(c)(d)(e) 15.209(a)	B.10(a)(b) (RSS-210) 7.3 (RSS-GEN) 8.9 (RSS-GEN)	6.3, 6.5, 6.6 6.10	Complies

<sup>1</sup> Battery operated device

<sup>2</sup> only integral antenna

RSS Gen issue 5 covers section 6 & 8

RSS 210 issue 10 covers Annex B

### 3 TEST RESULTS

#### 3.1 Occupied Bandwidth (99% BW) and Emission Bandwidth

FCC Part 15.215 (c)

ISED Canada RSS-GEN Issue 5, Clause 6.7

Measurement procedure: ANSI C63.10-2013 Clause 6.9.3

Test Results: Complies

Measurement Data:

Carrier Frequency	Occupied Bandwidth (99% BW)	20 dB BW
916.2125 MHz	19.83 kHz	23.01 kHz
918.2125 MHz	19.83 kHz	23.01 kHz
920.2125 MHz	19.83 kHz	23.88 kHz

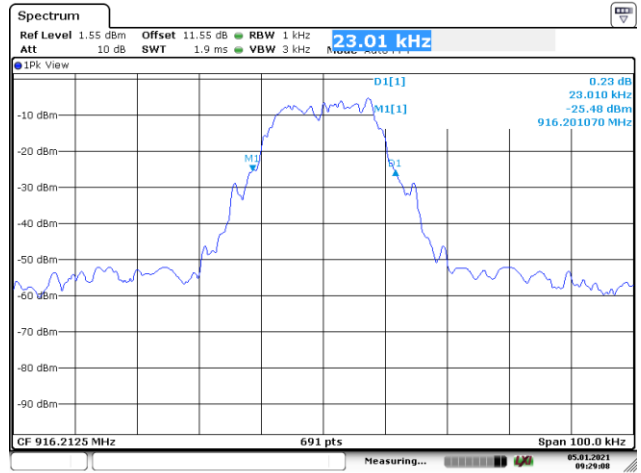
See attached plots.

#### Requirements:

No limit specified for 99% BW, reported for information only.



Date: 21.OCT.2020 08:46:37



Date: 5.JAN.2021 09:29:08

**99% Occupied Bandwidth, Lower Channel**



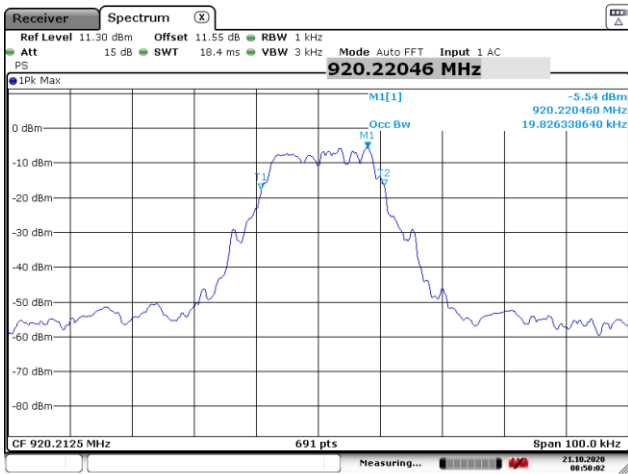
Date: 21.OCT.2020 08:40:37

**20 dB BW, Lower channel**



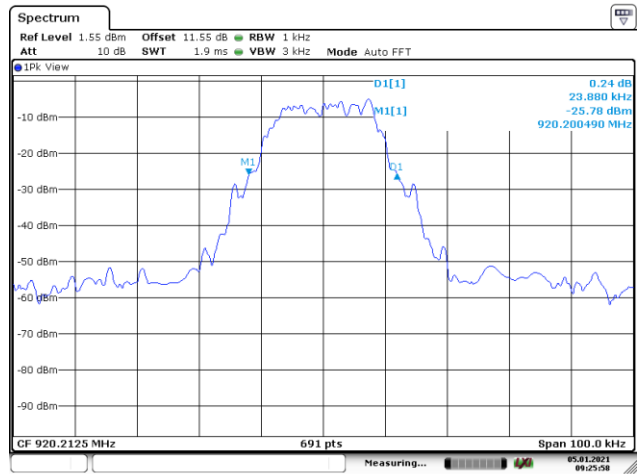
Date: 5.JAN.2021 09:33:34

**99% Occupied Bandwidth, Middle Channel**



Date: 21.OCT.2020 08:50:02

**20dB BW middle channel**



Date: 5.JAN.2021 09:25:58

**99% Occupied Bandwidth, Upper Channel**

**20 dB BW upper channel**



### 3.2 Field Strength of Fundamental

FCC 15.249 (a)(c)(e)

ISED Canada RSS-210 Issue 10, B.10(a)

Test Results: Complies

**Measurement Data:**

RF channel	916.2125MHz	918.2125MHz	920.2125MHz
Measured Maximum PK Field strength (dB $\mu$ V/m) –HP	93.91	94.00	93.98
Calc. Radiated Power (dBm)	-1.32	-1.23	-1.25
Calc. Radiated Power (mW)	0.74	0.75	0.75
Measured Conducted Power (dBm)	-2.08	-2.23	-1.75
Measured Conducted Power (mW)	0.62	0.60	0.67
Calculated Antenna Gain (dBd)	-1.4	-1.1	-1.6

Radiated measurements are performed at 3 m distance.

Radiated Power is calculated from measured field strength by the formulas in KDB 412172 D01 Determining ERP and EIRP v01.

Measured in Horizontal polarization and in YZ plane

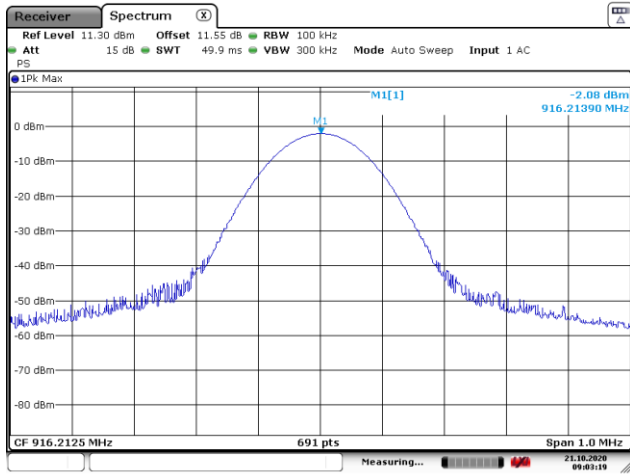
Field Strength reported is Maximum Field Strength.

See attached plots.

**Requirements:**

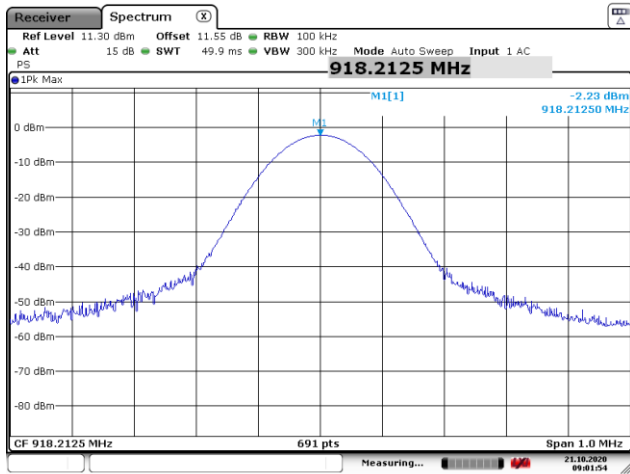
The PK field strength of fundamental, measured at 3 m, shall not exceed 50 mV/m (94 dB $\mu$ V/m).

The PK field strength limits shall be less than or equal to 94 dB $\mu$ V/m, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.



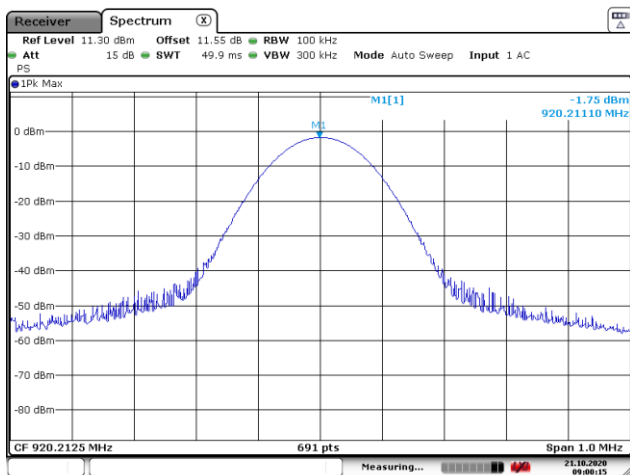
Date: 21.OCT.2020 09:03:19

**Conducted power of Fundamental, Lower Channel**



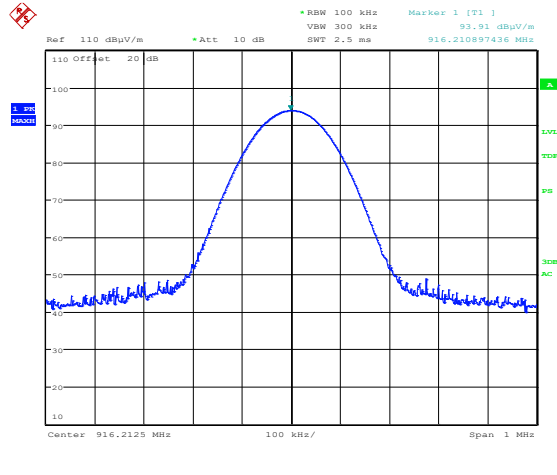
Date: 21.OCT.2020 09:01:54

**Conducted power of Fundamental, Middle Channel**



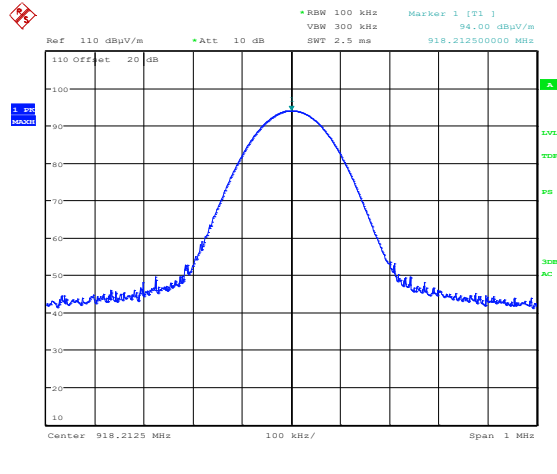
Date: 21.OCT.2020 09:00:15

**Conducted power of Fundamental, Upper Channel**



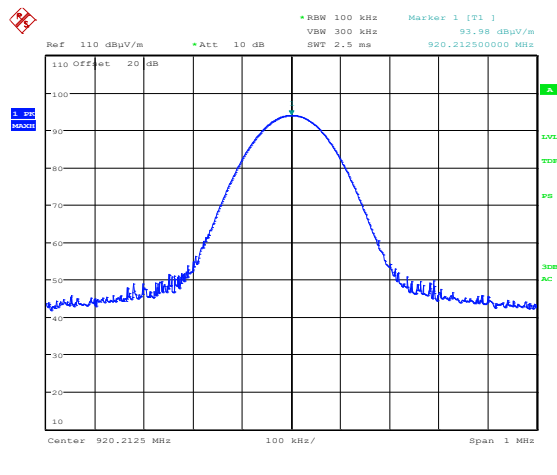
Date: 20.OCT.2020 16:02:46

**Field Strength of Fundamental, Lower Channel**



Date: 20.OCT.2020 15:59:16

**Field Strength of Fundamental, Middle Channel**



Date: 20.OCT.2020 15:53:05

**Field Strength of Fundamental, Upper Channel**

### 3.3 Restricted Bands of operation

Restricted Bands of operation for FCC and ISED are defined in FCC Part 15.205 and ISED RSS-GEN, Issue 5 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 5, clause 8.9.

FCC (MHz)	ISED Canada (MHz)	FCC (GHz)	ISED Canada (GHz)
0.090-0.110		<b>0.96-1.24</b> <b>1.3-1.427</b>	<b>0.96-1.427</b>
0.495-0.505		1.435-1.6265	
2.1735-2.1905		1.6455-1.6465	
	<b>3.020-3.026</b>	1.660-1.710	
4.125-4.128		1.7188-1.7222	
4.17725-4.17775		2.2-2.3	
4.20725-4.20775		2.31-2.39	
	<b>5.677-5.683</b>	2.4835-2.5	
6.215-6.218		<b>2.69-2.9</b>	<b>2.655-2.9</b>
6.26775-6.26825		3.26-3.267	
6.31175-6.31225		3.332-3.339	
8.291-8.294		3.3458-3.358	
8.362-8.366		<b>3.6-4.4</b>	<b>3.5-4.4</b>
8.37625-8.38675		4.5-5.15	
8.41425-8.41475		5.35-5.46	
12.29-12.293		7.25-7.75	
12.51975-12.52025		8.025-8.5	
12.57675-12.57725		9.0-9.2	
13.36-13.41		9.3-9.5	
16.42-16.423		10.6-12.7	
16.69475-16.69525		13.25-13.4	
16.80425-16.80475		14.47-14.5	
25.5-25.67		15.35-16.2	
37.5-38.25		17.7-21.4	
73-74.6		22.01-23.12	
74.8-75.2		23.6-24.0	
<b>108-121.94</b> <b>123-138</b>	<b>108-138</b>	31.2-31.8	
149.9-150.05		36.43-36.5	
156.52475-156.52525		Above 38.6	
156.7-156.9			
162.0125-167.17			
167.72-173.2			
240-285			
322-335.4			
399.9-410			
608-614			

Frequencies in **Bold** text are specific for FCC or ISED, all other frequencies are common.

### 3.4 Radiated Emissions, Band Edge

FCC Part 15.249 (a)(d)(e)

FCC Part 15.209 (a)

ISED Canada RSS-210 issue 10, B.10 (a)(b)

ISED Canada RSS-GEN Issue 5, Clause 7.3 / 8.9

Measurement procedure: ANSI C63.10-2013 Clause 6.10.4 / 6.10.5 / 6.10.6

Test Results: Complies

#### Measurement Data:

	Measured field strength (dB $\mu$ V/m)		Limit dB $\mu$ V/m	Margin dB	
	916.2125 MHz	920.2125 MHz			
Peak Detector	41.13	40.37	74	32.87	33.63
Average Detector	/	/	54	/	/

Measured Peak value is below the Average Limit.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor"

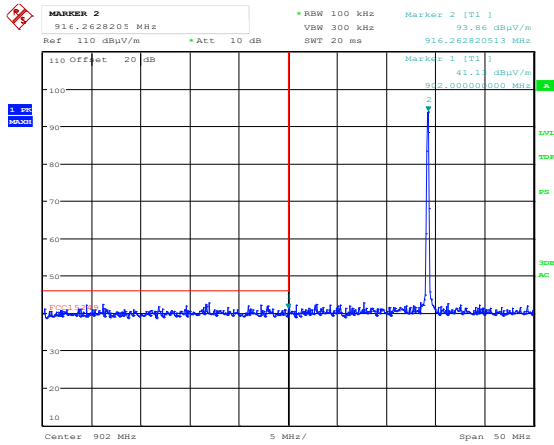
See attached plots.

#### Limit:

The field strength of harmonic emissions, measured at 3 m, shall not exceed 0.5 mV/m (54 dB $\mu$ V/m).

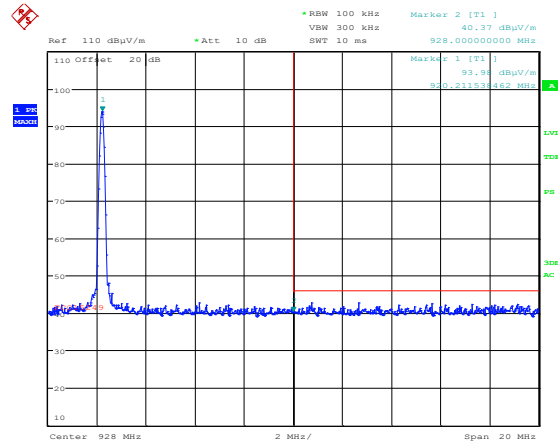
The field strength limits shall be measured using an average detector.

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen or §15.209, whichever is less stringent.



Date: 20.OCT.2020 16:03:34

Lower Band Edge, Peak



Date: 20.OCT.2020 15:55:17

Upper Band Edge, Peak

### 3.5 Radiated Emission, 30 – 1000 MHz.

FCC Part 15.209(a) / 15.249(a)

ISED Canada RSS-210 issue 10, B.10 (a)(b)

ISED Canada RSS-GEN Issue 5, Clause 7.3 / 8.9

Measurement procedure: ANSI C63.10-2013 Clause 6.5

Test Results: Complies

#### Measurement Data:

Detector: Peak (found frequencies were measured with Quasi-Peak Detector)

Measuring distance: 3m

Tested in TX mode

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
854.374650	19.24	46.00	26.76	1000.0	120.000	116.0	H	219.0
886.205900	27.25	46.00	18.75	1000.0	120.000	347.0	H	170.0
900.914500	19.96	46.00	26.04	1000.0	120.000	158.0	H	2.0
929.546000	17.35	46.00	28.65	1000.0	120.000	115.0	H	162

See attached plots

#### Requirements/Limit

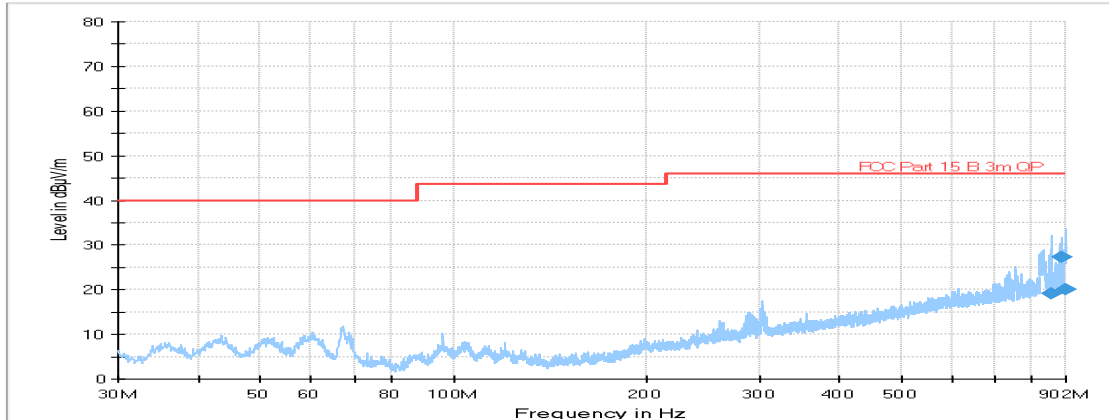
The field strength of harmonic emissions, measured at 3 m, shall not exceed 0.5 mV/m (54 dB $\mu$ V/m).

The field strength limits shall be measured using an average detector.

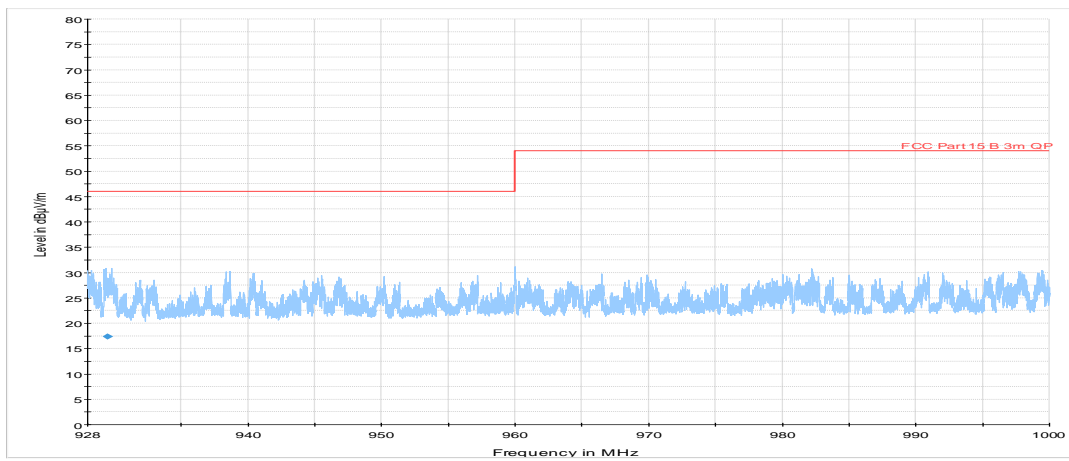
Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen or §15.209, whichever is less stringent.

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, Clause 8.9 @ frequencies defined in clause 8.10	
Frequency	Radiated emission limit @3 meters	
30 – 88 MHz	100 $\mu$ V/m	40.0 dB $\mu$ V/m
88 – 216 MHz	150 $\mu$ V/m	43.5 dB $\mu$ V/m
216 – 960 MHz	200 $\mu$ V/m	46.0 dB $\mu$ V/m
960 – 1000 MHz	500 $\mu$ V/m	54.0 dB $\mu$ V/m
Limits above are with Quasi Peak Detector		

Full Spectrum



Radiated Emissions 30 – 902 MHz, 916.2125 MHz, HP/VP



Radiated Emissions 928 - 1000 MHz, 920.2125 MHz, HP/VP

### 3.6 Radiated Emissions, 1-10 GHz

FCC Part 15.209(a) / 15.249(a)

ISED Canada RSS-210 issue 10, B.10 (a)(b)

ISED Canada RSS-GEN Issue 5, Clause 7.3 / 8.9

Measurement procedure: ANSI C63.10-2013 Clause 6.6

Test Results: Complies

#### Measurement Data:

Measuring distance: 3m (1 – 10 GHz)

A PK pre-scan was performed upto 10 GHz and no spurious emissions were detected above the average limit.

#### Peak Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Peak Detector, 3m	Limit	Margin
MHz	L,M,H	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
3664.85	916.2125	0	47.80	74	
3672.85	918.2125	0	/	74	/
3680.85	920.2125	0	/	74	/
Other freqs	L,M,H	0	None detected	74	>20

All emissions are below the Average Limit even when measured with Peak Detector.

A high pass Filter was used for measurements from 1.5 GHz to 10 GHz.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

See plots.

#### Requirements/Limit

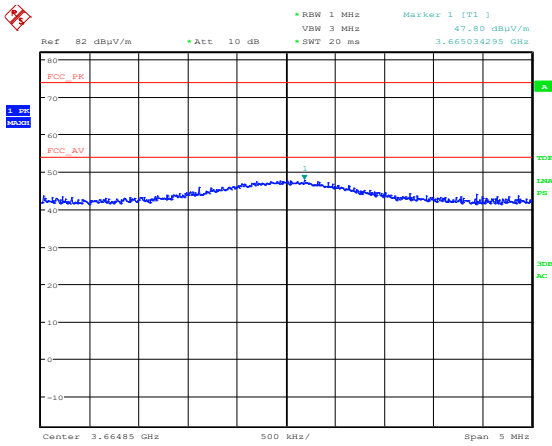
The field strength of harmonic emissions, measured at 3 m, shall not exceed 0.5 mV/m (54 dB $\mu$ V/m).

The field strength limits shall be measured using an average detector.

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen or §15.209, whichever is less stringent.

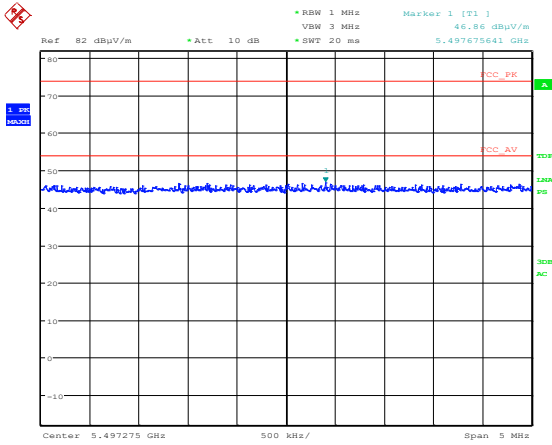
FCC	Part 15.209 @ frequencies defined in §15.205	
ISED Canada	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	Average Detector (dB $\mu$ V/m)	Peak Detector (dB $\mu$ V/m)
1 – 40 GHz	54.0	74.0





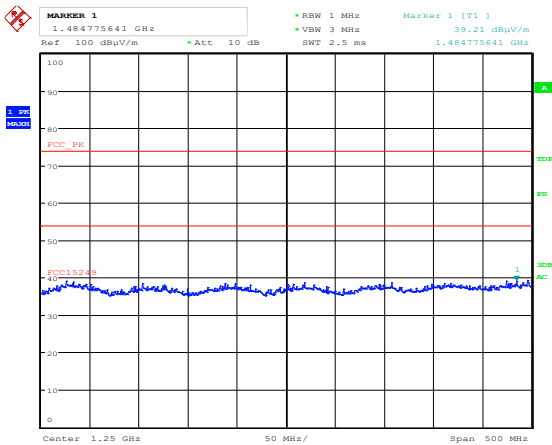
Date: 20.OCT.2020 13:02:49

**Radiated Emissions 3.67 GHz, 916.2125 MHz, HP**



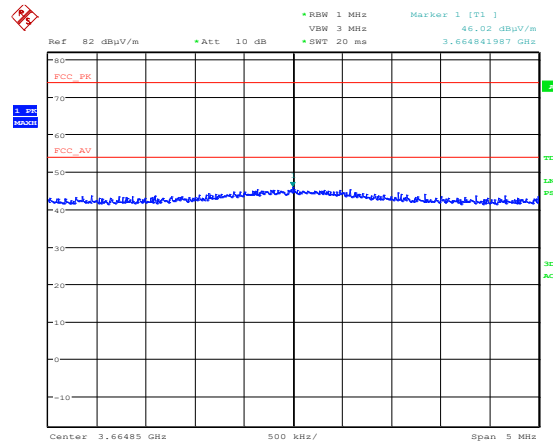
Date: 20.OCT.2020 13:13:31

**Radiated Emissions 5.497 GHz, 916.2125 MHz, HP**



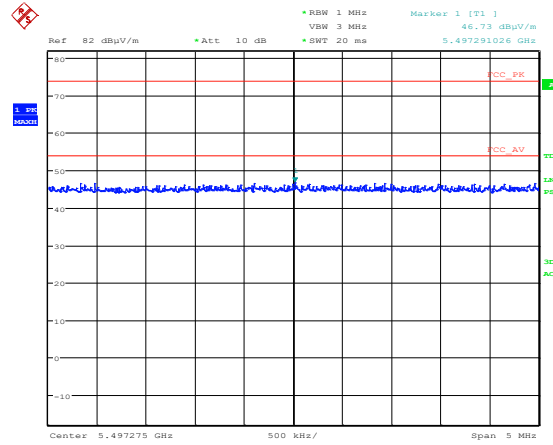
Date: 20.OCT.2020 12:43:40

**Radiated Emissions 1 – 1.5 GHz, 916.2125 MHz, HP**



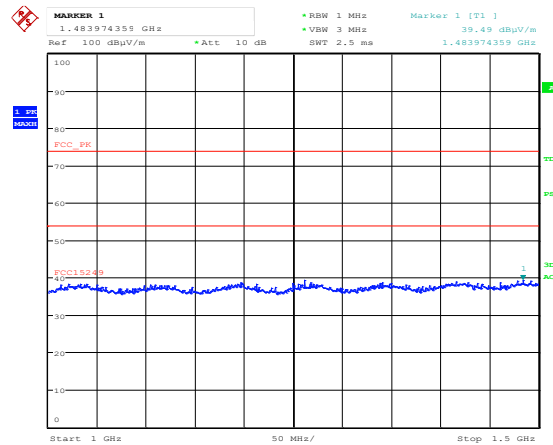
Date: 20.OCT.2020 13:04:21

**Radiated Emissions 3.67 GHz, 916.2125 MHz, VP**



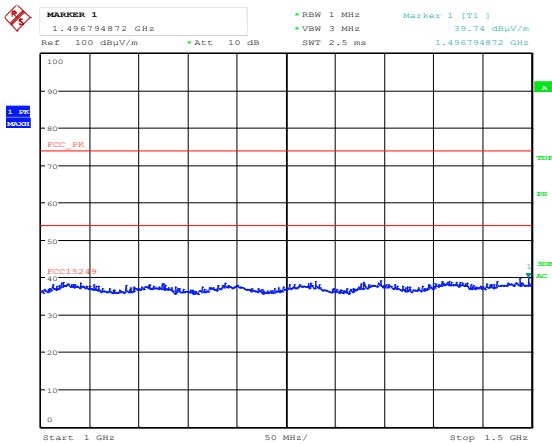
Date: 20.OCT.2020 13:15:08

**Radiated Emissions 5.497 GHz, 916.2125 MHz, VP**



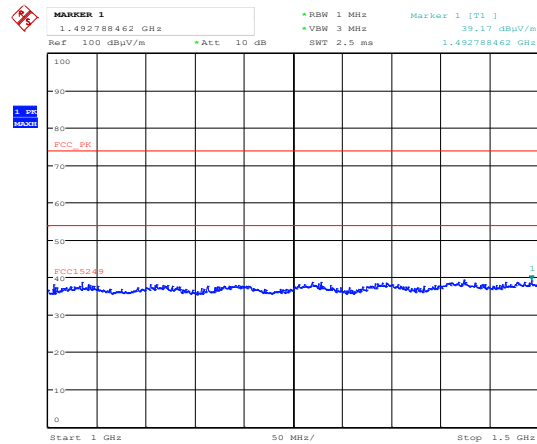
Date: 20.OCT.2020 12:42:38

**Radiated Emissions 1 – 1.5 GHz, 916.2125 MHz, VP**



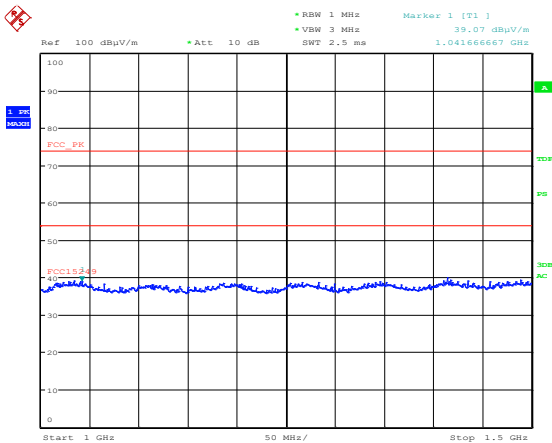
Date: 20.OCT.2020 12:36:23

**Radiated Emissions 1 – 1.5 GHz, 918.2125 MHz, HP**



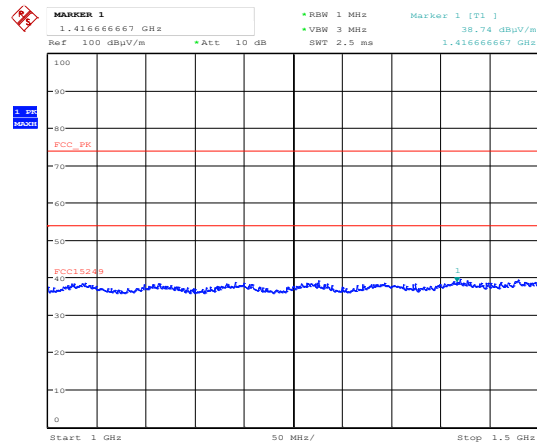
Date: 20.OCT.2020 12:37:56

**Radiated Emissions 1 – 1.5 GHz, 918.2125 MHz, VP**



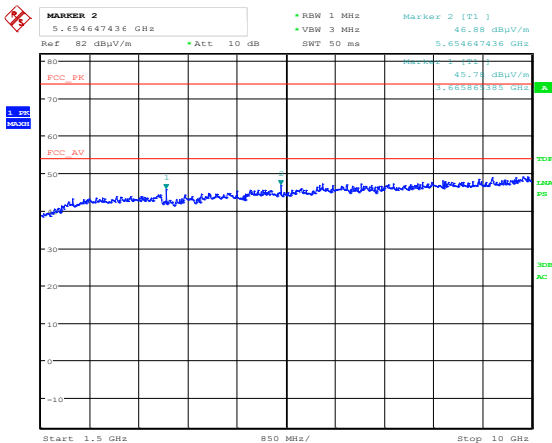
Date: 20.OCT.2020 12:30:06

**Radiated Emissions 1 – 1.5 GHz, 920.2125 MHz, HP**



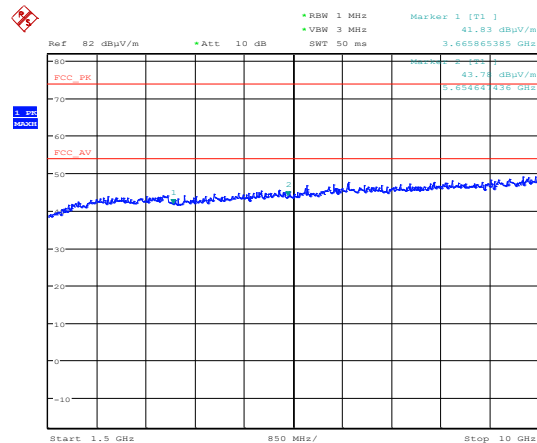
Date: 20.OCT.2020 12:28:22

**Radiated Emissions 1 – 1.5 GHz, 920.2125 MHz, VP**



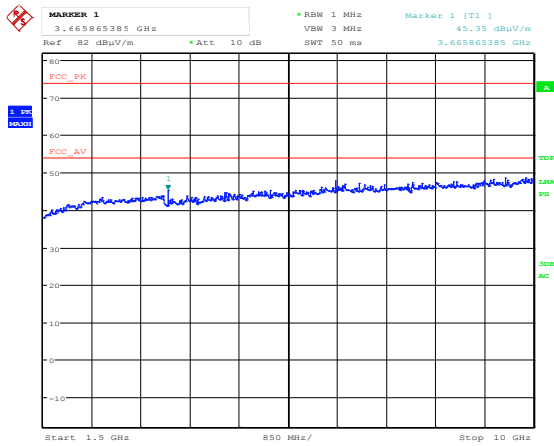
Date: 20.OCT.2020 12:53:12

**Radiated Emissions 1.5 – 10 GHz, 916.2125 MHz, HP**



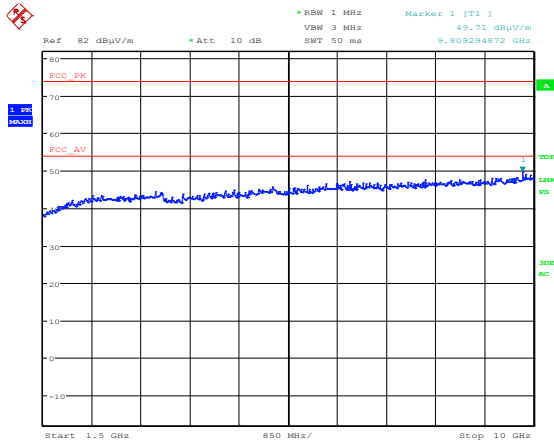
Date: 20.OCT.2020 12:54:49

**Radiated Emissions 1.5 – 10 GHz, 916.2125 MHz, VP**



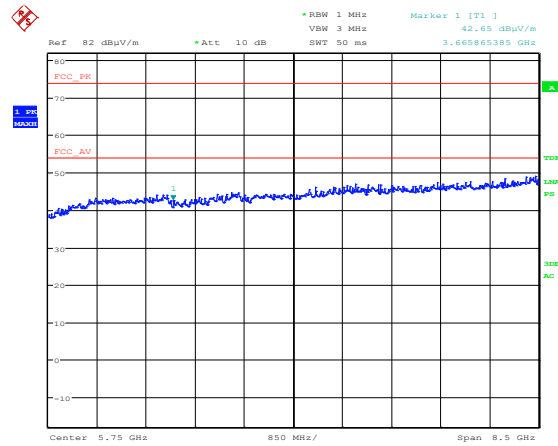
Date: 20.OCT.2020 13:20:19

**Radiated Emissions 1.5 – 10 GHz, 918.2125 MHz, HP**



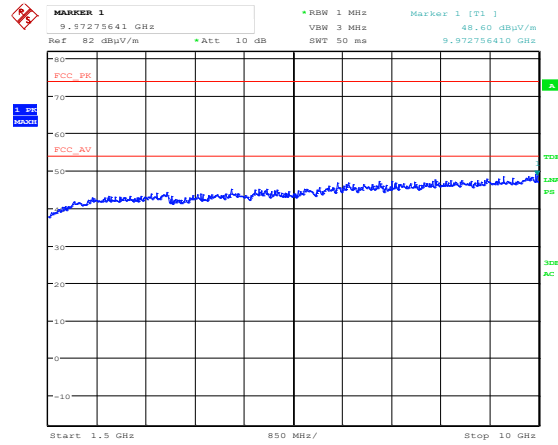
Date: 20.OCT.2020 13:26:27

**Radiated Emissions 1.5 – 10 GHz, 920.2125 MHz, HP**



Date: 20.OCT.2020 13:21:11

**Radiated Emissions 1.5 – 10 GHz, 918.2125 MHz, VP**



Date: 20.OCT.2020 13:25:11

**Radiated Emissions 1.5 – 10 GHz, 920.2125 MHz, VP**

## 4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

## 5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2020.01	2021.01
2.	ESR	Spectrum analyser	Rohde & Schwarz	LR1675	2019.01	2021.01
3.	HFH2-Z2	Active Loop antenna	Rohde & Schwarz	LR1660	2019.06	2021.06
4.	3115	Antenna horn	EMCO	LR 1330	2016.10	2020.10
5.	3117-PA	Horn antenna with PreA	EMCO	LR 1717	2017.12	2020.12
6.	PM 320K	Antenna Horn	Sivers	LR 1717	N/A	
7.	DBF-520-20	Antenna Horn	Systron-Donner corp	LR 102	N/A	
8.	638	Antenna Horn	NARDA	LR 1480	N/A	
9.	637	Antenna Horn	NARDA	LR 099	N/A	
10.	VULB9163	Bi-log Hybrid Antenna	Schwarzbeck	LR 1616	2020.01	2022.01
11.	4768-10	Attenuator	Narda	LR 1670	Cal b4 use	
12.	6HC1500/18000	Highpass Filter	Trilithic	LR 1612	Cal b4 use	
13.	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2020.08	2021.08
14.	310N	Pre-amplifier	Sonoma	LR 1686	2020.08	2021.08
15.	Model 87	Multimeter	Fluke	N4672	2018.11	2020.11
16.	CPX400D	Power supply	TTi	LR 1744	Cal b4 use	
17.	6812B	AC Power source	Agilent	LR 1515	2019.03	2021.03

The software listed below has been used for one or more tests.

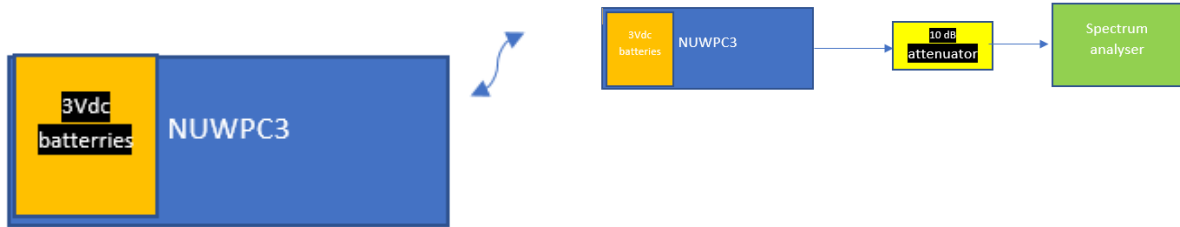
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.50.10	Power Line Conducted test software
2	Rohde & Schwarz	EMC32	10.50.10	Radiated Emission test software
3	Nemko AS	RSPlot	1.0.1.0	Screenshots from R&S Spectrum Analyzers

### Revision history

Version	Date	Comment	Sign
00	2020-10-28	First Version	gns
01	2021-01-05	RSS-210 Version is corrected, and 20 dB BW measurement is included.	gns

## 6 BLOCK DIAGRAM

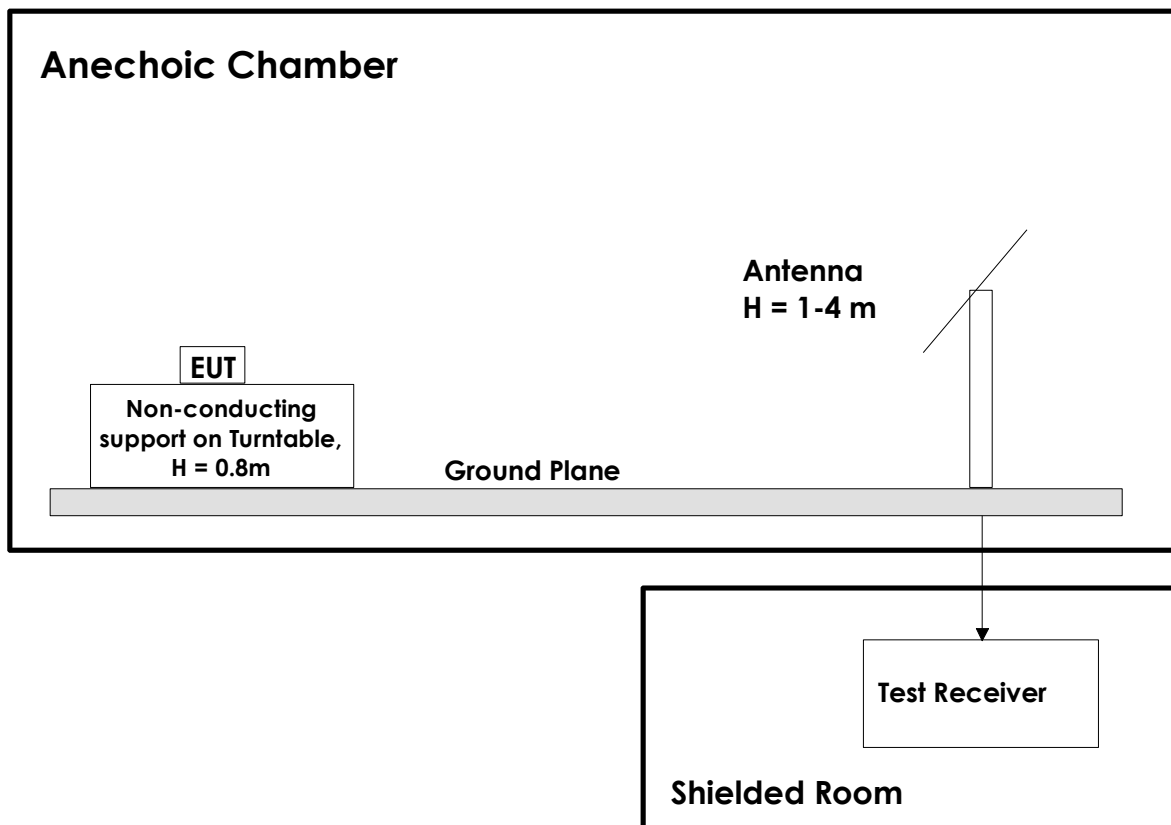
### 6.1 System set up for radiated measurements



Radiated test setup

Conducted test setup

### 6.2 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10m, for all other frequencies it is 3m or 1m. Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna. For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss. All measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers. A pre-amplifier is used for all measurements above 30 MHz, and High-Pass or Band-Pass filter is used for all harmonics.