Report No. **383891-11-R00**

Test Report

Product	Headset
Name and address of the applicant	3M Svenska AB Box 2341, 331 02 Värnamo Sweden
Name and address of the manufacturer	3M Svenska AB Box 2341, 331 02 Värnamo Sweden
Model	MT14H41A-300NA
Rating	3.0V_{DC} (2x AAA cells, Alkaline Batteries)
Trademark	Comtac VII
Serial number	NI-B-2
Additional information	NMI, NFMI
Tested according to	**FCC Part 15.209** Operation within the general radiated emission limits **Industry Canada RSS-GEN, Issue 5** Operation within the general radiated emission limits
Order number	383891
Tested in period	2020-02-28
Issue date	2020-04-28
Name and address of the testing laboratory	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 [Frode Sveinsen]	Approved by [G.Suhanthakumar]

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ENTERPRISE NUMBER NO974404532

CONTENTS

1 INFORMATION

1.1 Test Item

Name	**Comtac VII**
FCC ID	**Y9ZMT14H4130**
ISED ID	**4406A-MT14H4130**
Model/version	**MT14H41A-300NA**
Serial number	**NI-B-2**
Hardware identity and/or version	**K409 AVE**
Software identity and/or version	**K409-sku 3.3.0**
Frequency Range	**9.983 – 11.771 MHz**
Number of Channels	**4 (9.983 MHz, 10.579 MHz, 11.175 MHz, 11.771 MHz)**
Type of Modulation	**8DPSK+PTCM**
User Frequency Adjustment	**None**
Rated Output Power	**N/A**
Type of Power Supply	**Primary Batteries (2x AAA alkaline cells)**
Antenna Connector	**None (Integral Antenna)**
Number of Antennas	**1**
Desktop Charger	**N/A**
Interfaces	**Proprietary Conncetor for connecting to SCU300**

Description of Test Item

This is a personal communications headset with 915MHz NMI transceiver for communication with other COMTAC VII headsets nearby and 10MHz NFMI transceiver for communication with the SCU300 System Control Unit.

1.2 Normal test condition

Temperature:	20 - 24 °C
Relative humidity:	20 - 50 %
Normal test voltage:	3.0 V_{DC} (Nominal Battery Voltage)

The values are the limit registered during the test period.

1.3 Test Engineer(s)

Frode Sveinsen

1.4 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

1.5 Worst-Case Configuration and Mode

The EUT was programmed to transmit at the highest and lowest frequency with modulation.

1.6 Comments

All measurements were done with the EUT powered by new batteries.

2 TEST REPORT SUMMARY

2.1 General

All measurements are tracable 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 9 and RSS-GEN Issue 5.

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

2.2 Test Summary

Name of test	FCC Part 15 reference	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
Number of Frequencies	15.31(m)	6.9 (RSS-GEN)	N/A	Complies
Antenna Requirement	15.203	6.8 (RSS-GEN)	5.8	Complies
Power Line Conducted Emission	15.207(a)	7.2 / 8.8 (RSS-GEN)	6.2	N/A
Occupied Bandwidth (99% BW)	15.215(c)	6.7 (RSS-GEN)	6.9.3	Complies
Radiated Emissions	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

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

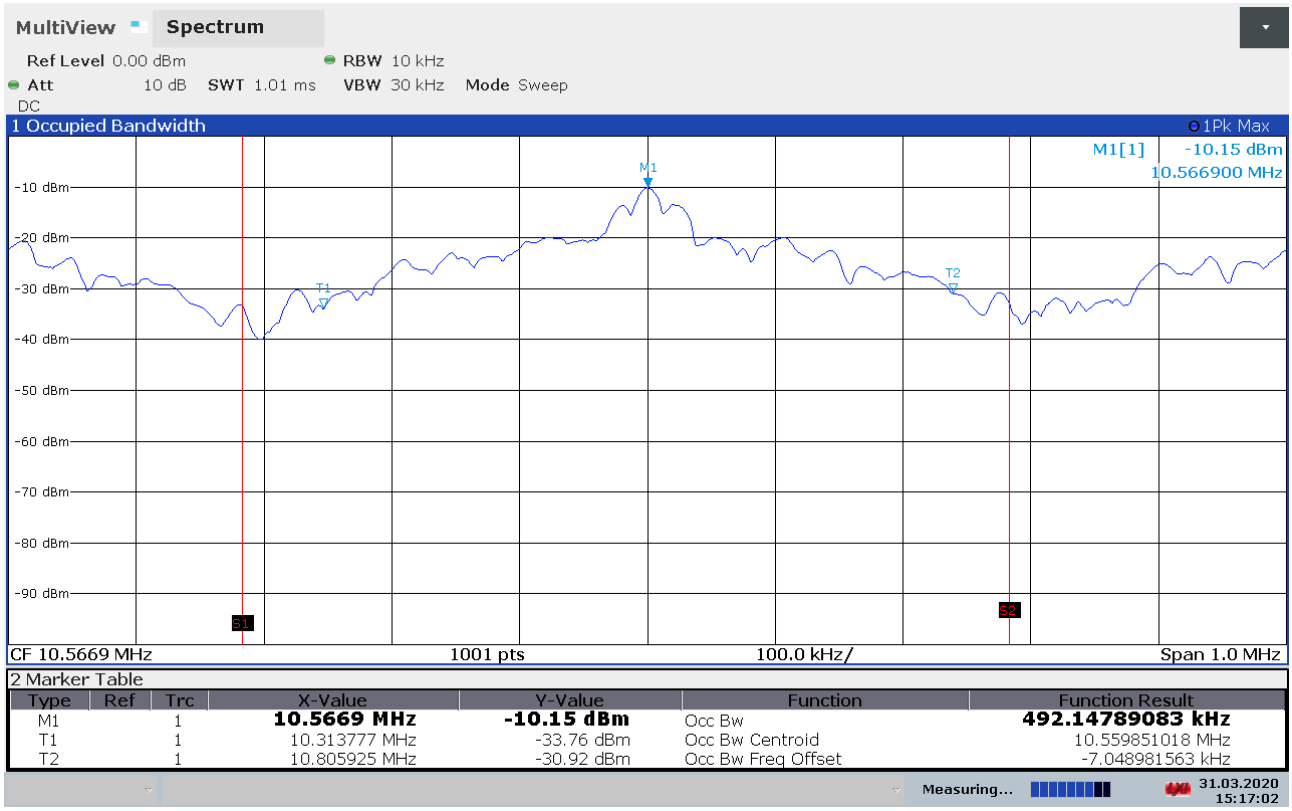
Measurement Data:

Carrier Frequency	Occupied Bandwidth (99% BW)
10.579 MHz	492 kHz

See attached plots.

Requirements:

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



Occupied BW, 99%

3.2 Field Strength of Fundamental

FCC 15.209 (a)(c)(e)

Ised Canada RSS-210 Issue 9, B.10(a)

Test Results: Complies

Measurement Data:

Maximum Field Strength	
	10.6 MHz
Peak Field Strength, @1.5m	**71.0 dBµV/m**
Distance Correction Factor 1.5m to 3m	**12.0 dB**
Calculated Peak Field Strength @3m	**59.0 dBµV/m**
Limit @3m	**69.5 dBµV/m**
Margin	**10.5 dB**

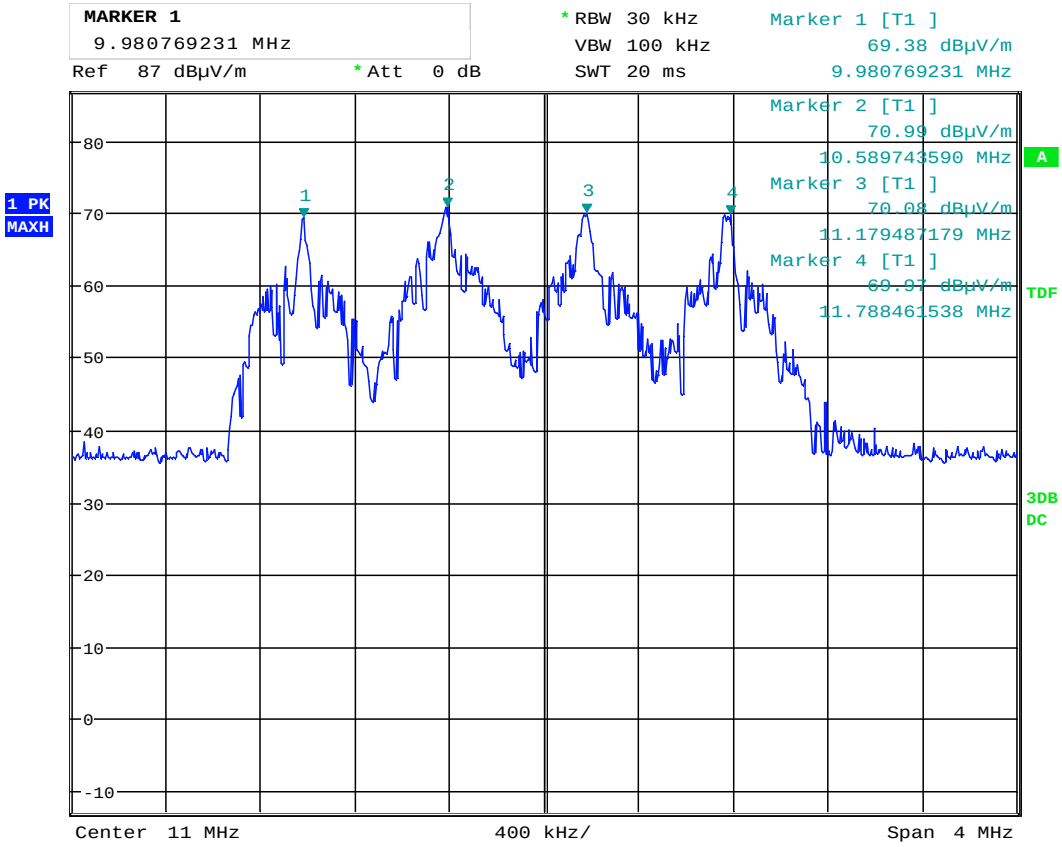
Field Strength reported is Maximum Field Strength.

See attached plots.

Requirements:

The field strength of fundamental, measured at 10m, shall not exceed 29.5 dBµV/m.

Limit is converted to 3 m using 40 dB/decade according to 15.31 (f) (2).



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Field Strength of Fundamental, Modulated, @1.5m

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 (MHz)	FCC (GHz)	ISED (GHz)
0.090-0.110		**0.96-1.24** **1.3-1.427**	**0.96-1.427**
0.495-0.505		1.435-1.6265	
2.1735-2.1905		1.6455-1.6465	
	3.020-3.026	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	
	5.677-5.683	2.4835-2.5	
6.215-6.218		**2.69-2.9**	**2.655-2.9**
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		**3.6-4.4**	**3.5-4.4**
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	
108-121.94 **123-138**	**108-138**	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, 9 kHz – 30 MHz.

FCC Part 15.209 (a)

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

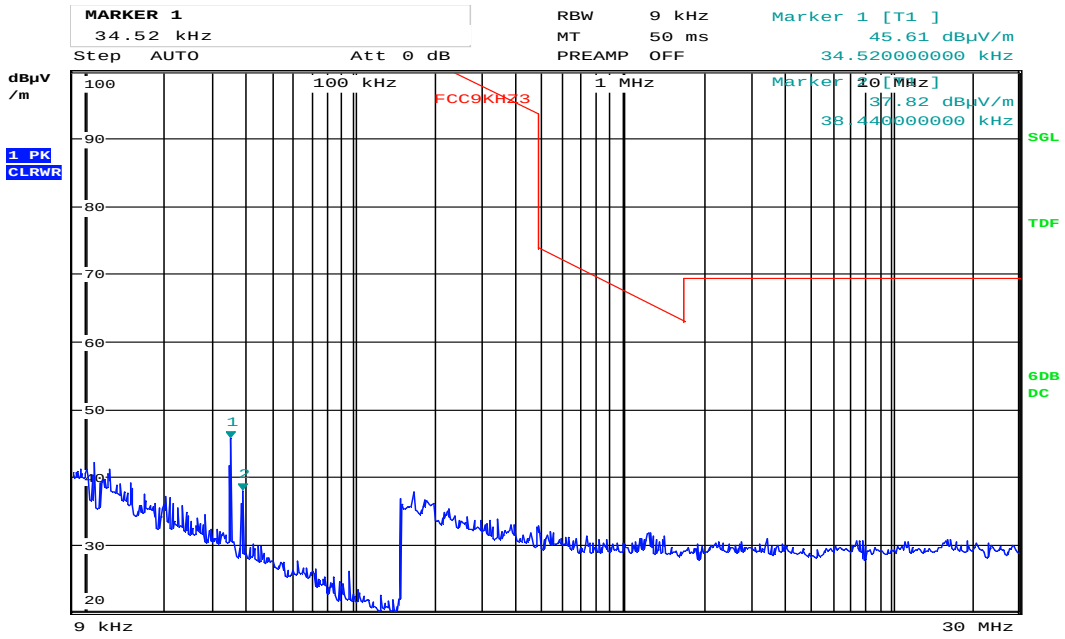
Measurement procedure: ANSI C63.10-2013 Clause 11.12

Test Results: Complies

Frequency	Measuring Bandwidth	Field strength @3m Peak Det., dBµV/m	Limit dBµV/m	Margin dB
9 – 150 kHz	200 Hz	< 50	> 104	> 54
150 – 490 kHz	9 kHz	< 40	> 93.8	> 53.8
0.490 – 1.705 MHz	9 kHz	< 35	> 63	> 28
1.705 – 30 MHz	9 kHz	< 35	69.5	> 34.5

Measuring distance 3 m, Peak detector.

Limit is converted to 3 m using 40 dB/decade according to 15.31 (f) (2).



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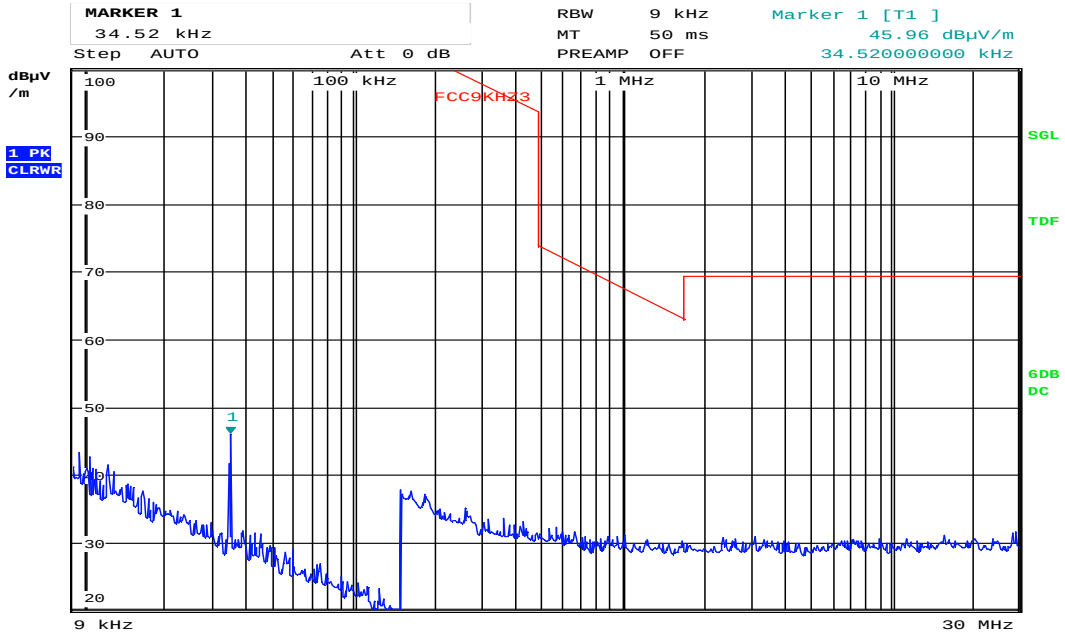
Radiated Emissions, 9kHz – 30MHz, HP, @3m (emission at 34.52 kHz is ambient noise)



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Radiated Emissions, 9kHz – 30MHz, VP, @3m (emission at 34.52 kHz is ambient noise)

3.5 Radiated Emission, 30 – 200 MHz.

FCC Part 15.209(a)

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

Measuring distance: 3 m

Tested in transmit mode with modulation

Frequency MHz	Field strength @3m Peak Det., dBµV/m	Limit dBµV/m	Margin dB
30 - 88	< 20	40.0	> 20
88 - 200	< 20	43.5	> 23.5

See attached plots

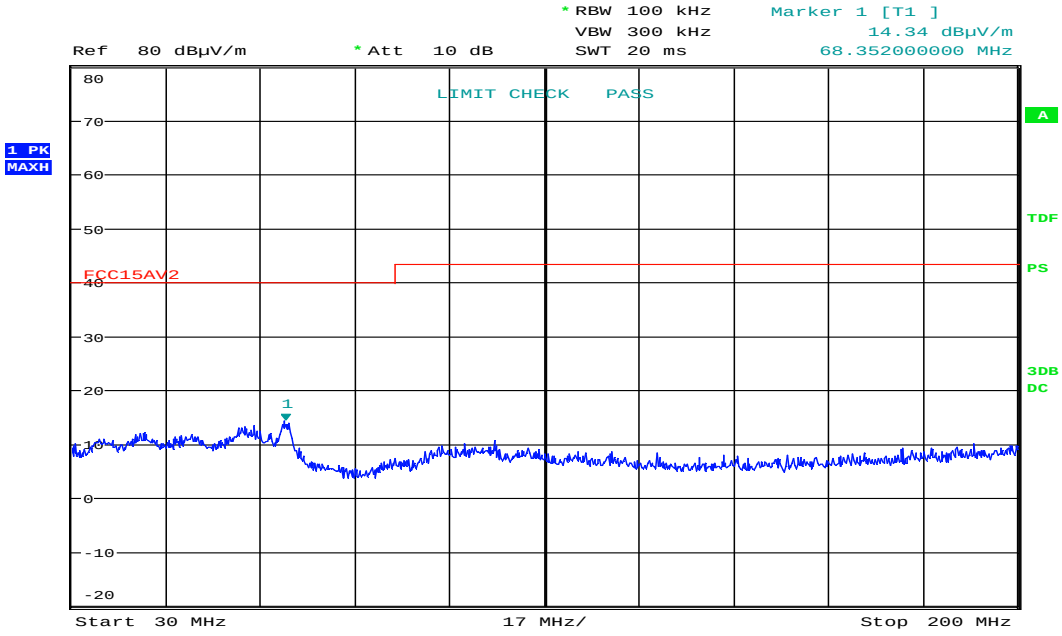
Requirements/Limit

The field strength of harmonic emissions, measured at 3 m, shall not exceed 0.5 mV/m (54 dBµV/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 µV/m	40.0 dBµV/m
88 – 216 MHz	150 µV/m	43.5 dBµV/m
216 – 960 MHz	200 µV/m	46.0 dBµV/m
960 – 1000 MHz	500 µV/m	54.0 dBµV/m
	Limits above are with Quasi Peak Detector	



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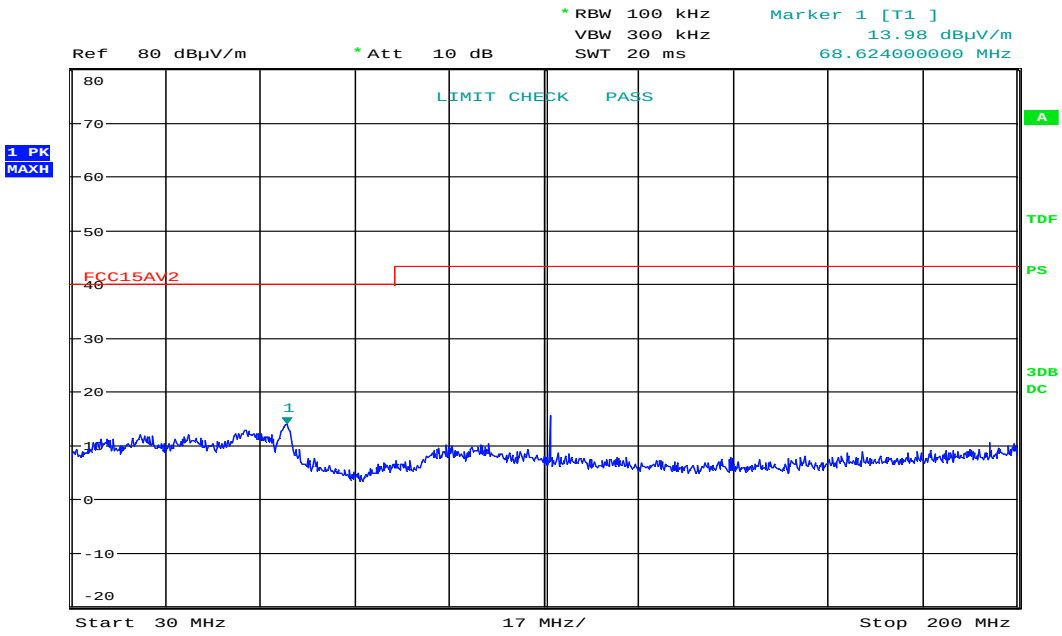
Radiated Emissions, 30 -200MHz, HP



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Radiated Emissions, 30 -200MHz, 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.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2020.01	2021.01
2	HFH2-Z2	Active Loop Antenna	Rohde & Schwarz	LR 1660	2019-06	2022-06
3	VULB 9163	BiLog Antenna	Schwarzbech	LR 1616	2020-01	2023-01
4	317	Preamplifier	Sonoma Instruments	LR 1687	2019-07	2020-07

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

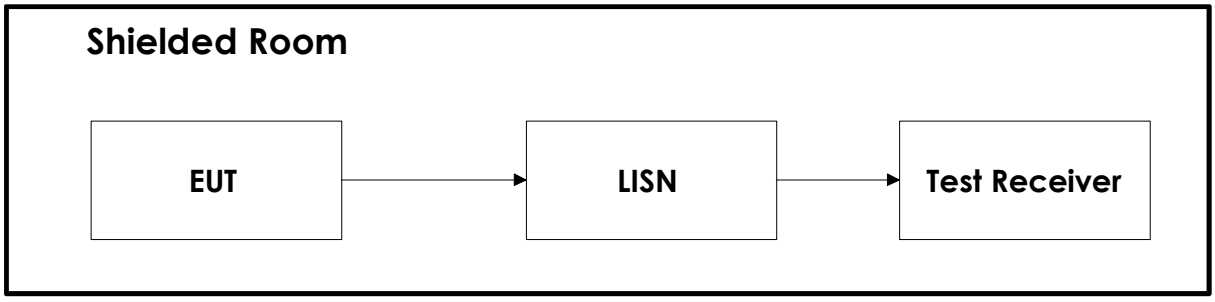
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	GPIBShot	2.7	Screenshots from R&S Spectrum Analyzers
2				

Revision history

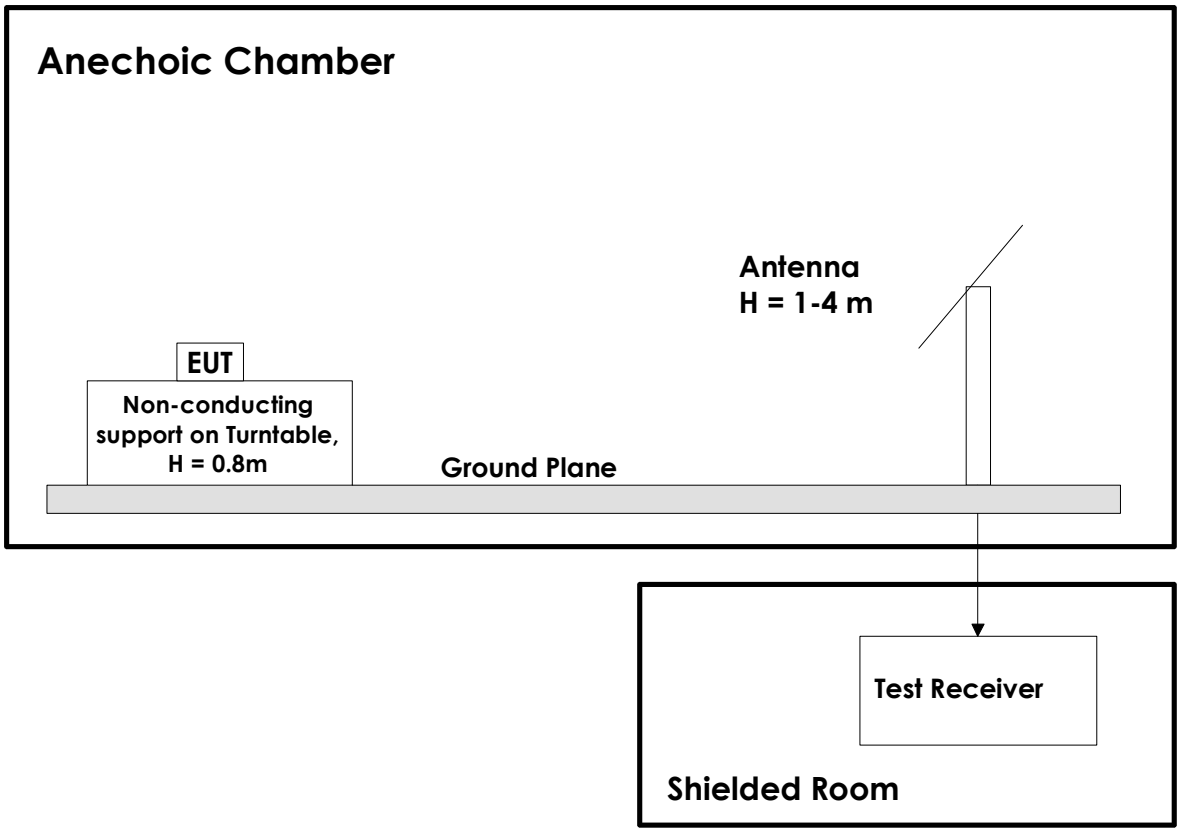
Revision	Date	Comment	Sign
00	2020-04-28	First edition	FS

6 BLOCK DIAGRAM

6.1 Power Line Conducted Emission



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.