

Test Report

Report Number:

F210562E1

Equipment under Test (EUT):

dDrive

Applicant:

Mettler-Toledo GmbH

Manufacturer:

Mettler-Toledo GmbH



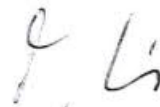

Deutsche
Akkreditierungsstelle
D-PL-17186-01-01
D-PL-17186-01-02
D-PL-17186-01-03

References

- [1] **ANSI C63.10: 2013** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- [2] **FCC CFR 47 Part 15** Radio Frequency Devices
- [3] **RSS-210 Issue 10 (December 2019)**
Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
- [4] **RSS-Gen Issue 5 (February 2021) Amendment 2**
General Requirements for Compliance of Radio Apparatus

Test Result

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test. The complete test results are presented in the following.

Tested and written by:	Thomas KÜHN <small>Name</small>	 <small>Signature</small>	23.04.2021 <small>Date</small>
Reviewed and approved by:	Manuel BASTERT <small>Name</small>	 <small>Signature</small>	23.04.2021 <small>Date</small>

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1 Identification

1.1 Applicant

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Applicant represented during the test by the following person:	---

1.2 Manufacturer

Name:	Mettler-Toledo GmbH
Address:	Heuwinkelstr. 3, 8606 Nänikon
Country:	Switzerland
Name for contact purposes:	Mr. Heiko DOBRINSKI
Phone:	+41 55 806 75 46
eMail address:	Heiko.Dobrinski@mt.com
Manufacturer represented during the test by the following person:	---

1.3 Test Laboratory

The tests were carried out by: **PHOENIX TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

Accredited by Deutsche Akkreditierungsstelle GmbH (DAkKS) in compliance with DIN EN ISO/IEC 17025 under Reg. No. D-PL-17186-01-06 and D-PL-17186-01-05, FCC Test Firm Designation Number DE0004, FCC Test Firm Registration Number 469623, CAB Identifier DE0003 and ISED# 3469A.

1.4 EUT (Equipment under Test)

Test object: *	Analytic device with RFID Reader/Writer for laboratory use
Model name: *	dDrive
Serial number: *	None
FCC ID: *	THVTI010
IC certification number: *	22032-TI010
PMN: *	dDrive
HVIN: *	dDrive
FVIN: *	N/A
Highest internal frequency: *	160 MHz

Note: PHOENIX TESTLAB GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

1.5 Technical Data of Equipment

Operating frequency: *	13.56 MHz					
Power supply: *	Externally 24 V _{DC} by dedicated power supply					
Rated output power: *	18 dBm / 63 mW					
Supply voltage (dedicated power supply): *	U _{nom} =	120 V _{AC}	U _{min} =	100 V _{AC}	U _{max} =	240 V _{AC}
Type of modulation: *	ASK					
Antenna connector: *	None					
Number of channels: *	1					
Antenna type: *	Integrated PCB coil antenna with 0.0006 m ²					
Data rate: *	106 kbit/s					
Temperature range: *	5 °C to +40 °C					

*: Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
Input line (CAN bus in and DC in)	Four pole M8 connector	Four pole M8 connector	2.5 m	No
Input line (CAN bus out and DC out)	Four pole M8 connector	Four pole M8 connector	25 cm	No

1.6 Dates

Date of receipt of test sample:	08.04.2021
Start of test:	09.04.2021
End of test:	22.04.2021

2 Operational States

Description of function of the EUT:

The EUT is an analytic device, which contains a RFID Reader/Writer and is intended to be used in laboratory environment. All tests were carried out with an unmodified test sample.

The following states were defined as the operating conditions:

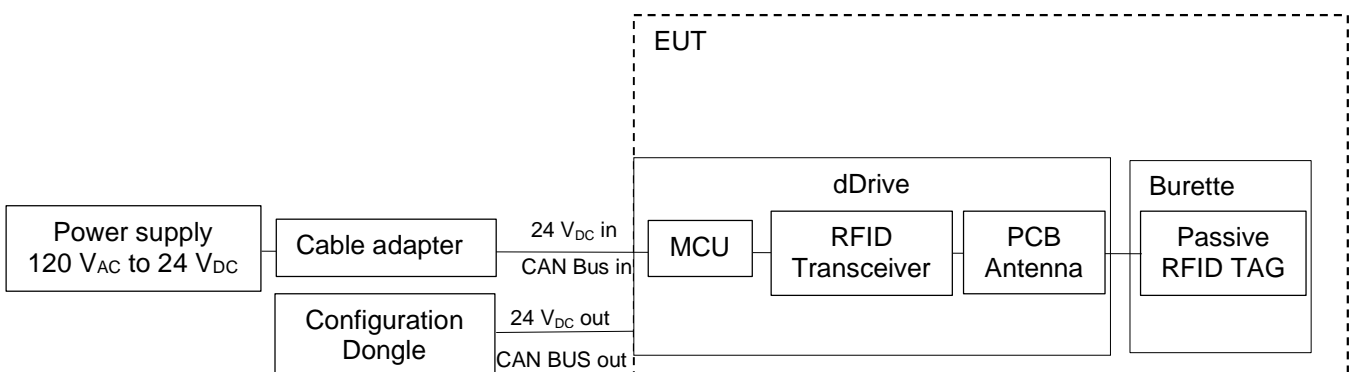
The operation mode could be selected with the help of a configuration dongle, which contains two switches, connected to the CAN-output of the device:

With switch 1 the piston and valve motor of the EUT could be switched on and off, with the switch 2 the RFID functionality could be switched on and off. All tests were carried out with the motors off and the RFID on.

During all tests the EUT was powered by the dedicated power supply with 24 V_{DC} by the dedicated power supply type PSAC30U-240L6, which was solely supplied by an AC mains network with 120 V / 60 Hz.

Because the EUT is intended to be positioned on a laboratory table and the analytic function could be carried out only in its normal position, all measurements were carried out with the EUT in its normal position

The system was setup as follows:



3 Additional Information

The EUT was not labeled.

4 Overview

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS-Gen, Issue 5 [4] and RSS-210, Issue 10 [3]	Status
Conducted emissions on supply line	0.15 – 30	15.207 (a)	8.8 [4]	Passed
Radiated emissions	0.150 – 2000 **	15.205 (a) 15.209 (a)	8.9 and 8.10 [4] 7.1 and 7.3 [3]	Passed
99 % bandwidth	13.56	-	6.7 [4]	Passed
Antenna requirement	-	15.203 [2]	6.8 [4]	Passed *

*: Integrated antenna only, requirement fulfilled.

** : As declared by the applicant the highest radio clock frequency is 160 MHz.
Therefore, the radiated emission measurement must be carried out up to 2 GHz.

5 Results

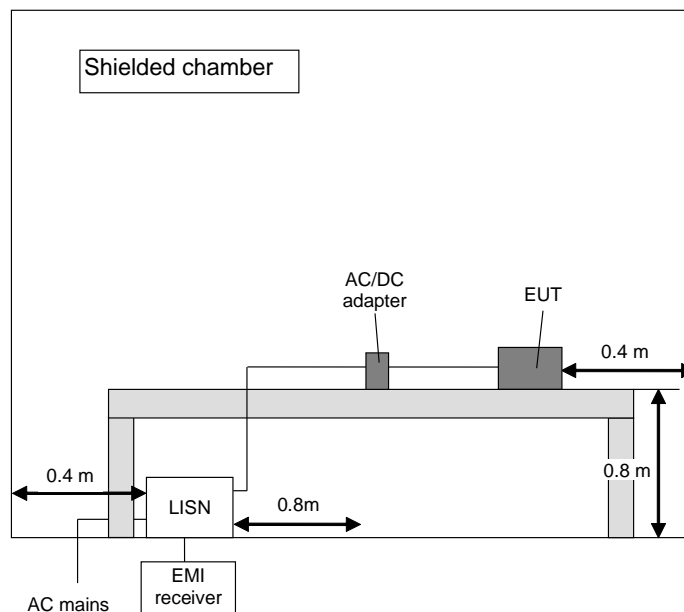
5.1 Conducted emissions on power supply lines

5.1.1 Test method

The test is carried out in a shielded chamber. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices are placed directly on the ground plane. In case of DC powered equipment, which is not exclusively powered by a battery, it is connected to the LISN via a suitable AC/DC adaptor. The setup of the equipment under test is in accordance to [1].

The frequency range 150 kHz to 30 MHz is measured with an EMI receiver set to MAX hold mode with Peak and Average detectors and a resolution bandwidth of 9 kHz. A scan is carried out on the phase and neutral line of the AC mains network. If emissions less than 10 dB below the appropriate limit are detected, these emissions are measured with an Average and Quasi-Peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz

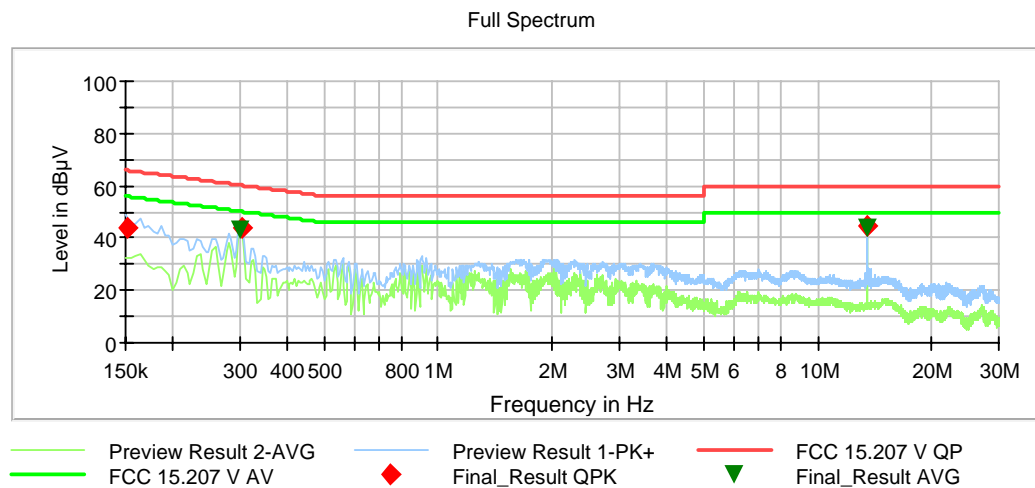


5.1.2 Test results conducted emissions on power supply lines

Ambient temperature:	23 °C
Relative humidity:	38 %

Date:	20.04.2021
Tested by:	Thomas KÜHN

The curves in the diagrams below only represent for each frequency point the maximum measured value of all preliminary measurements which were made for each power supply line. The top measured curve represents the peak measurement and the bottom measured curve the average measurement. The quasi-peak measured points are marked by ◆ and the average measured points by ▼.



Frequency [MHz]	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Line	PE	Corr. [dB]
0.150900	44.1	---	66.0	21.9	5000	9	N	GND	9.8
0.302100	---	43.0	50.2	7.2	5000	9	L1	FLO	9.9
0.303000	44.0	---	60.2	16.1	5000	9	N	FLO	9.9
13.560000	---	43.5	50.0	6.5	5000	9	N	FLO	10.8
13.560000	44.3	---	60.0	15.7	5000	9	N	FLO	10.8
Measurement uncertainty ±2.76 dB									

Test result: Passed

Test equipment (please refer to chapter 6 for details)
1 - 7

5.2 Radiated emissions

5.2.1 Test method

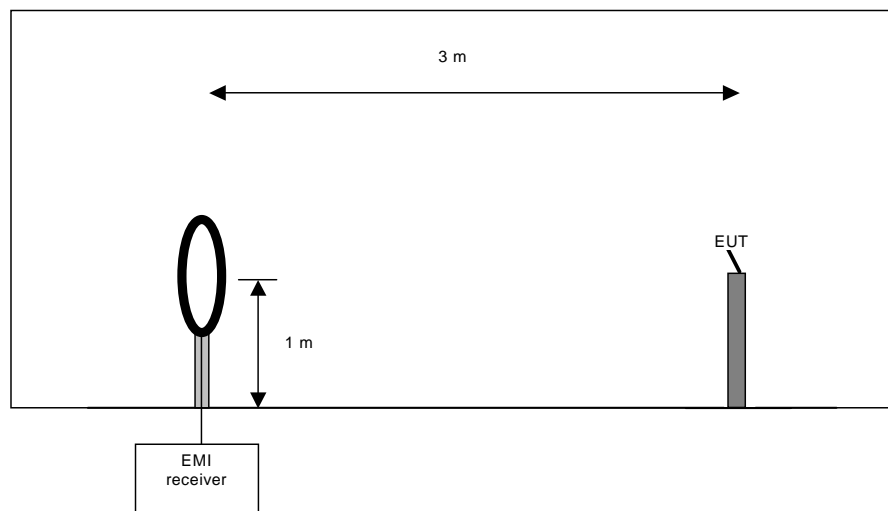
Preliminary measurement 9 kHz to 30 MHz

In the first stage a preliminary measurement is performed in an anechoic chamber with a measuring distance of 3 meters. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices are placed directly on the turntable / ground plane. The setup of the equipment under test is in accordance to [1].

The frequency range 9 kHz to 30 MHz is monitored with an EMI receiver while the system and its cables are manipulated to find out the configuration with the maximum emission levels if applicable. The EMI receiver is set to MAX hold mode. The EUT and the measuring antenna are rotated around their vertical axis to find the maximum emission levels.

The resolution bandwidth of the EMI receiver is set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



Procedure preliminary measurement:

Pre-scans are performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure is used:

- 1) Monitor the frequency range with the measuring antenna facing the EUT and an EUT / turntable azimuth of 0 °.
- 2) Manipulate the system cables to produce the maximum levels of emissions.
- 3) Rotate the EUT by 360 ° to maximize the detected signals.
- 4) Measure the frequencies of the highest detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency values.
- 5) If the EUT is portable or ceiling mounted, repeat steps 1 to 4 with other orientations (x,y,z) of the EUT.
- 6) Rotate the measuring antenna and repeat steps 1 to 5.

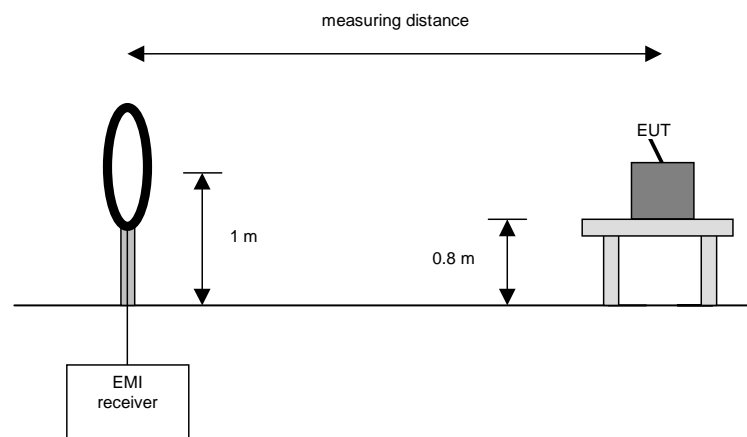
Final measurement 9 kHz to 30 MHz

In the second stage a final measurement is performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m or 30 m. In the case where larger measuring distances are required the results are extrapolated based on the values measured on the closer distances according to section 15.31 (f) (2) [2]. The final measurement is performed with an EMI receiver set to Quasi-Peak detector, except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an Average detector is used according section 15.209 (d) [2].

At the frequencies, which were detected during the preliminary measurements, the final measurement is performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum level value is found.

The resolution bandwidth of the EMI receiver is set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



Procedure final measurement:

The following procedure is used:

- 1) Monitor the selected frequencies from the preliminary measurement with the measuring antenna facing the EUT and an EUT azimuth of 0 °.
- 2) Rotate the EUT by 360 ° to maximize the detected signals.
- 3) Rotate the measuring antenna and repeat steps 1 to 2 until the maximum value is found and note it.
- 4) If the EUT is portable or ceiling mounted, repeat steps 1 to 3 with other orientations (x,y,z) of the EUT.

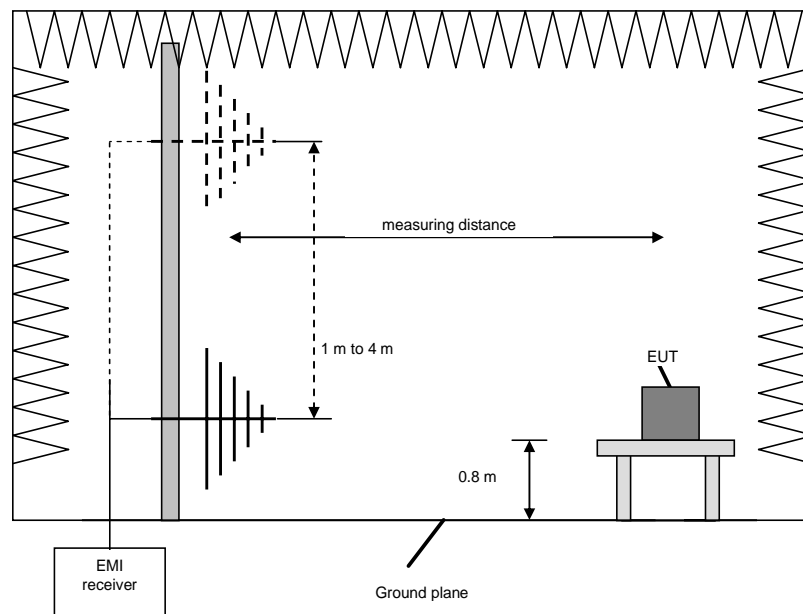
Preliminary and final measurement 30 MHz to 1 GHz

The preliminary and final measurements are performed in a semi-anechoic chamber with a metal ground plane in a 3 m distance.

During the tests the EUT is rotated in the range of 0 ° to 360 °, the measuring antenna is set to horizontal and vertical polarization and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver is set to the following values:

Test	Frequency range	Resolution bandwidth
Preliminary measurement	30 MHz to 1 GHz	100 kHz
Frequency peak search	+ / - 1 MHz	10 kHz
Final measurement	30 MHz to 1 GHz	120 kHz



Procedure preliminary measurement:

The following procedure is used:

- 1) Set the measuring antenna to 1 m height.
- 2) Monitor the frequency range at horizontal polarisation of the measuring antenna and an EUT / turntable azimuth of 0 °.
- 3) Rotate the EUT by 360° to maximize the detected signals.
- 4) Repeat steps 2 to 3 with the vertical polarisation of the measuring antenna.
- 5) Increase the height of the measuring antenna for 0.5 m and repeat steps 2 to 4 until the final height of 4 m is reached.
- 6) The highest values for each frequency are saved by the software, including the measuring antenna height and polarization and the turntable azimuth for that value.

Procedure final measurement:

The following procedure is used:

- 1) Select the highest frequency peaks (lowest margin to the limit) for the final measurement.
- 2) The software determines the exact peak frequencies by doing a partial scan with reduced RBW with +/- 10 times the RBW of the pre-scan of the selected peaks.
- 3) If the EUT is portable or ceiling mounted, find the worst-case EUT orientation (x,y,z) for the final test.
- 4) The worst-case measuring antenna height is found via varying the height by +/- 0.5 m from the value obtained in the preliminary measurement while monitoring the emission level.
- 5) The worst-case turntable position is found via varying the turntable azimuth by +/- 30° from the value obtained in the preliminary measurement while monitoring the emission level.
- 6) The final measurement is performed at the worst-case measuring antenna height and the worst-case turntable azimuth.
- 7) Steps 2 to 6 are repeated for each frequency peak selected in step 1.

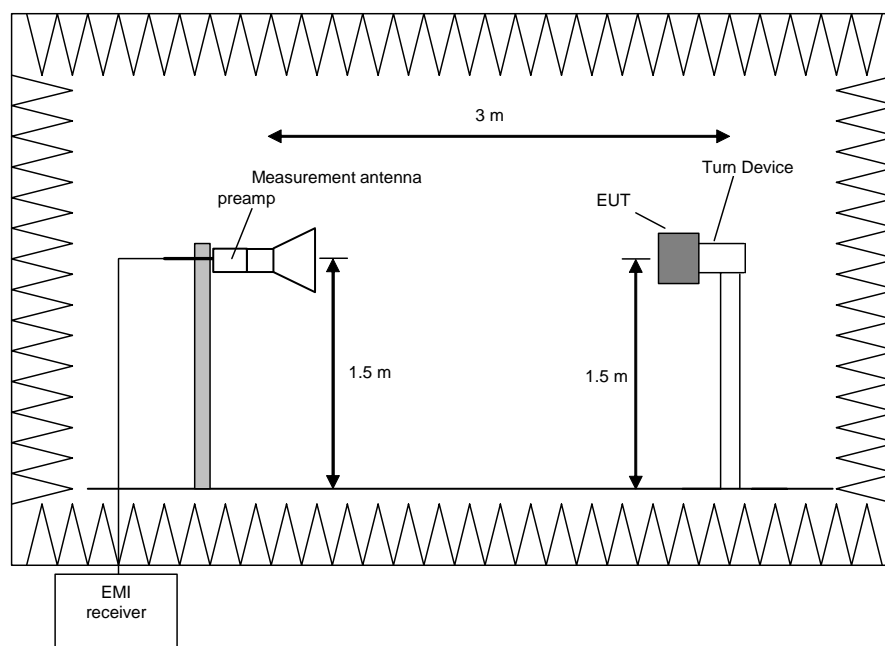
Preliminary and final measurement > 1 GHz

The preliminary and final measurements are performed in a fully anechoic chamber. Table-top devices are set up on a non-conducting turn device at the height of 1.5 m. The setup of the equipment under test is in accordance to [1].

The frequency range is divided into different sub-ranges depending on the frequency range of the used horn antenna. The frequency range 30 MHz to 1 GHz is monitored with an EMI receiver which is set to MAX hold mode. The EUT is rotated in the range of 0 ° to 360 ° and the measuring antenna is set to horizontal and vertical polarisation to find the maximum levels of emissions. After these steps, the measurement is repeated after reorientating the EUT in 30 ° steps according to [1].

The resolution bandwidth of the EMI receiver is set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 26.5 GHz	1 MHz
26.5 GHz to 40 GHz	1 MHz
40 GHz to 60 GHz	1 MHz
50 GHz to 75 GHz	1 MHz
75 GHz to 110 GHz	1 MHz



Procedure preliminary measurement:

Pre-scans are performed in the frequency range 1 to 110 GHz.

The following procedure is used:

- 1) Monitor the frequency range at horizontal polarisation of the measuring antenna and an EUT / turntable azimuth of 0°.
- 2) Rotate the EUT by 360° to maximize the detected signals.
- 3) Repeat steps 1 to 2 with the vertical polarisation of the measuring antenna.
- 4) Repeat steps 1 to 3 with the EUT reorientated by an angle of 30° (60°, 90°, 120° and 150°), according to 6.6.5.4 in [1].
- 5) Measure the frequencies of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the resulting frequencies.
- 6) The highest emissions (smallest margin to the limit) will be used for the final measurement.

Procedure of measurement:

The following procedure is used:

- 1) Set the turntable and the turn device to the position which leads to the highest emission for the first frequency identified in the preliminary measurements.
- 2) Set the measurement antenna to the polarisation which leads to the highest emission for the first frequency identified in the preliminary measurements.
- 3) Set the spectrum analyser to EMI mode with Peak and Average detector activated.
- 4) Rotate the turntable from 0° to 360° to find the EUT angle that results in the highest emission level.
- 5) Note the highest displayed peak and average values.
- 6) Repeat steps 1 to 5 for each frequency detected during the preliminary measurements.

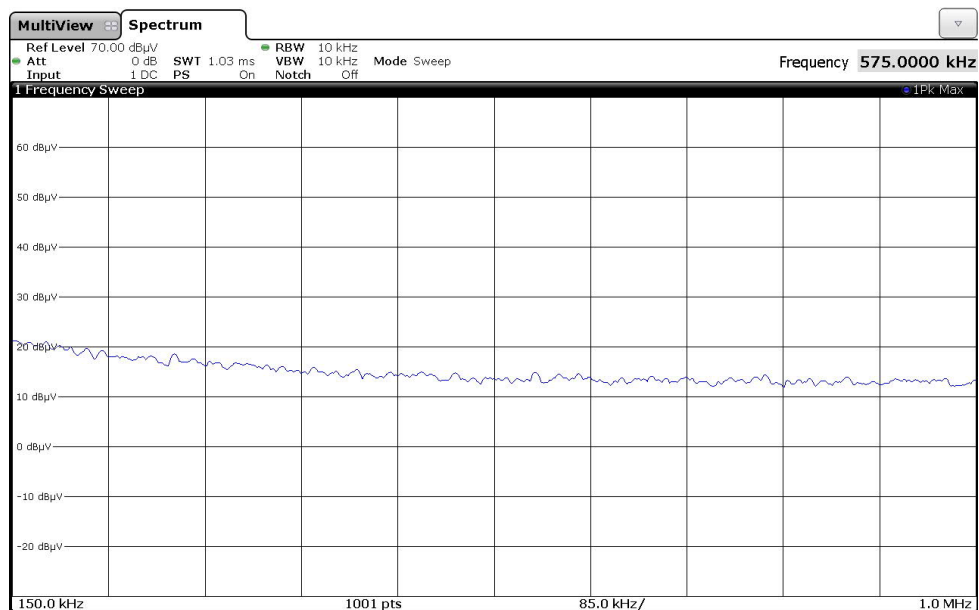
5.2.2 Test results preliminary measurement 150 kHz to 2 GHz

Ambient temperature:	21 / 21 °C
Relative humidity:	17 / 21 %

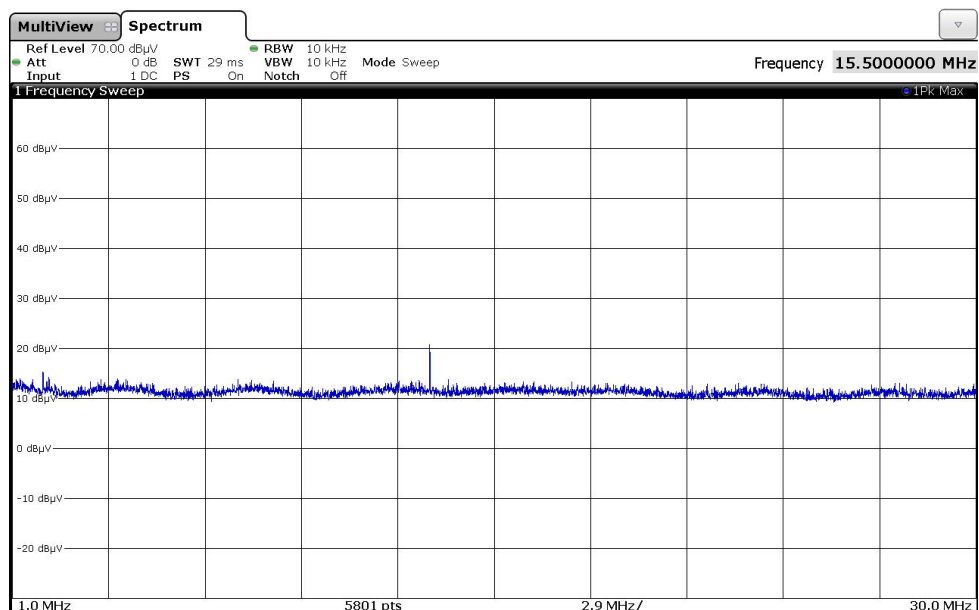
Date:	09. + 22.04.2021
Tested by:	Thomas KÜHN

The curves in the diagrams only represent the maximum measured value for each frequency point of all preliminary measurements, which were carried out with the EUT in standard position.

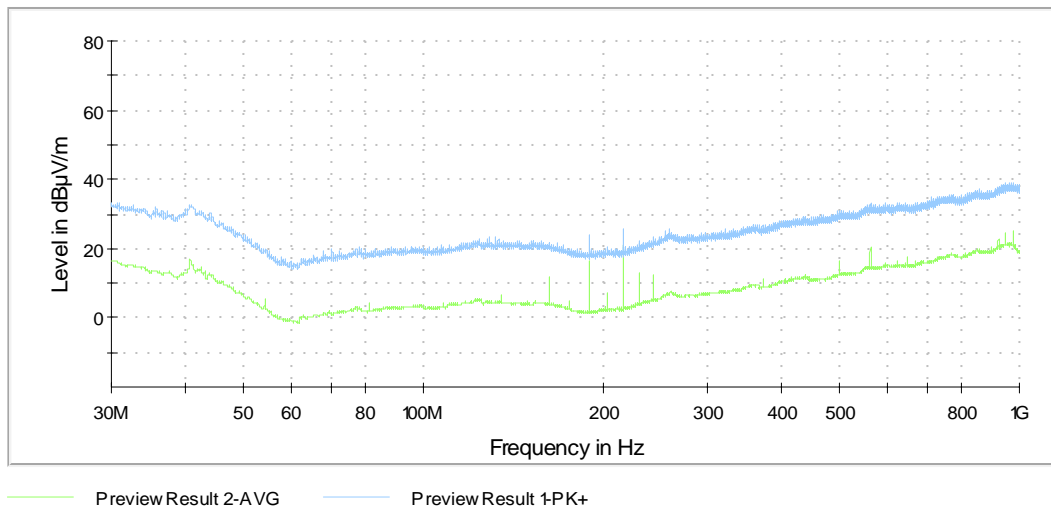
210562 2: Spurious emissions from 150 kHz to 1 MHz:



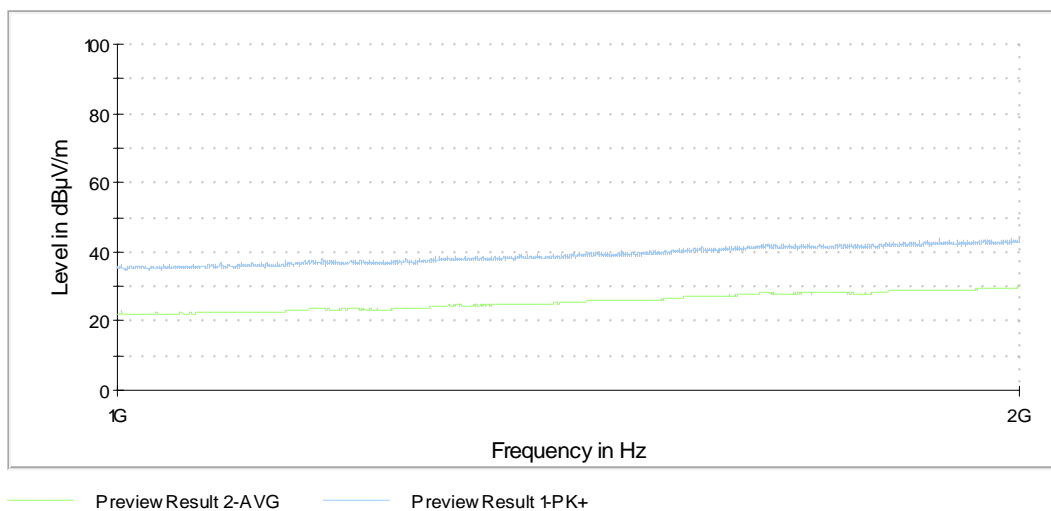
210562 3: Spurious emissions from 1 MHz to 30 MHz:



Spurious emissions from 30 MHz to 1 GHz:



Spurious emissions from 1 GHz to 2 GHz:



The following emissions were found during the preliminary measurement:

2.064 MHz, 13.560 MHz, 30.870 MHz, 40.650 MHz, 189.840MHz, 216.960MHz, 562.500MHz, 950.790 MHz, 1881.600 MHz and 1999.300 MHz.

On these frequencies a final measurement has to be carried out. The final results are presented in the following.

Test equipment (please refer to chapter 6 for details)
6 - 16, 18, 22

5.2.3 Test results final measurement 150 kHz to 30 MHz

Ambient temperature:	8 °C
Relative humidity:	56 %

Date:	13.04.2021
Tested by:	Thomas KÜHN

The results of the standard subsequent measurement on the outdoor test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 30 / 300 m measuring distance.

Results 9kHz - 30 MHz										
Frequency	Reading	Result*	Result*	Limit acc. 15.209	Limit acc. RSS-Gen Table 6	Margin**	Detector	Antenna factor	Measuring Distance	Distance correction factor***
[MHz]	[dBµV]	[dBµV/m]	[dBµA/m]	[dBµV/m]	[dBµA/m]	[dB]		[dB/m]	[m]	[dB]
2.064	4.7	-15.2	-66.7	29.5	-21.9	44.7	QP	20.1	3	40
13.560	19.4	-0.7	-52.2	29.5	-21.9	30.0	QP	19.9	3	40
Measurement uncertainty: 4.36 dB										

* Result @ norm dist. = Reading + Antenna factor - Distance correction factor;

Result [dBµA/m] = Result [dBµV/m] - 20*log(377 Ω)

** Margin = Limit [dBµV|A/m] - Result @ norm dist.

*** 40dB/decade according Part §15.31 (f) (2)

Remark: At 10 m measuring distance the signal of the EUT was below the sensitivity of the measuring system.

Test result: Passed

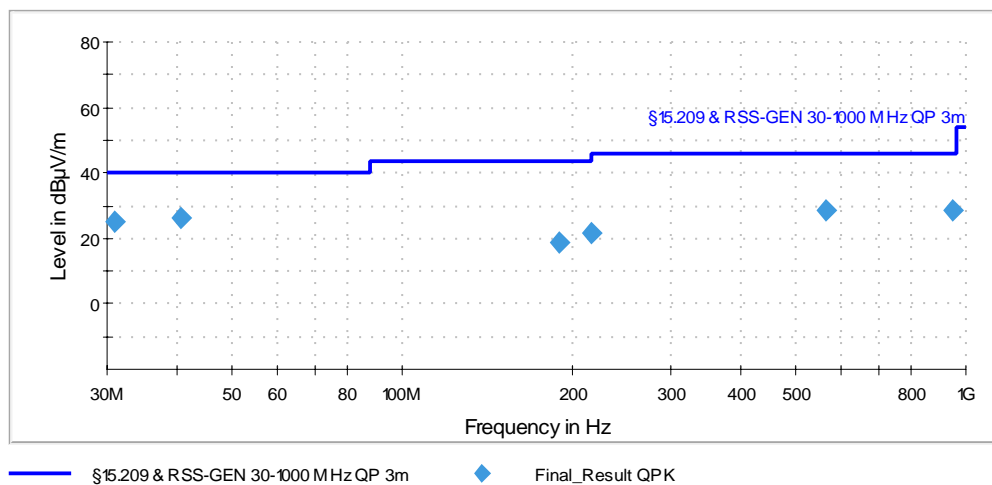
Test equipment (please refer to chapter 6 for details)
6, 7, 17, 18, 21

5.2.4 Test results final measurement 30 MHz to 1 GHz

Ambient temperature:	21 °C
Relative humidity:	17 %

Date:	09.04.2021
Tested by:	Thomas KÜHN

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with “◆” are the measured results of the standard subsequent measurement in a semi-anechoic chamber.



The results of the standard subsequent measurement in a semi-anechoic chamber are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

Frequency [MHz]	QuasiPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB]
30.870	25.1	40.00	14.9	1000	120	131	Vert.	250.0	28.1
40.650	26.4	40.00	13.6	1000	120	100	Vert.	320.0	23.4
189.840	18.8	43.5	24.7	1000	120	113	Vert.	311.0	15.9
216.960	21.7	46.0	24.3	1000	120	128	Hor.	115.0	16.4
562.500	28.3	46.0	17.7	1000	120	100	Vert.	201.0	28.4
950.790	28.5	46.0	17.5	1000	120	314	Vert.	105.0	34.0
Measurement uncertainty ±5.12 dB									

Test result: Passed

The correction factor was calculated as follows:

$$\text{Corr. [dB]} = \text{cable attenuation [dB]} + 6 \text{ dB attenuator [dB]} + \text{antenna factor [dB]}$$

Therefore, the reading can be calculated as follows:

$$\text{Reading [dBµV/m]} = \text{result QuasiPeak [dBµV/m]} - \text{Corr. [dB]}$$

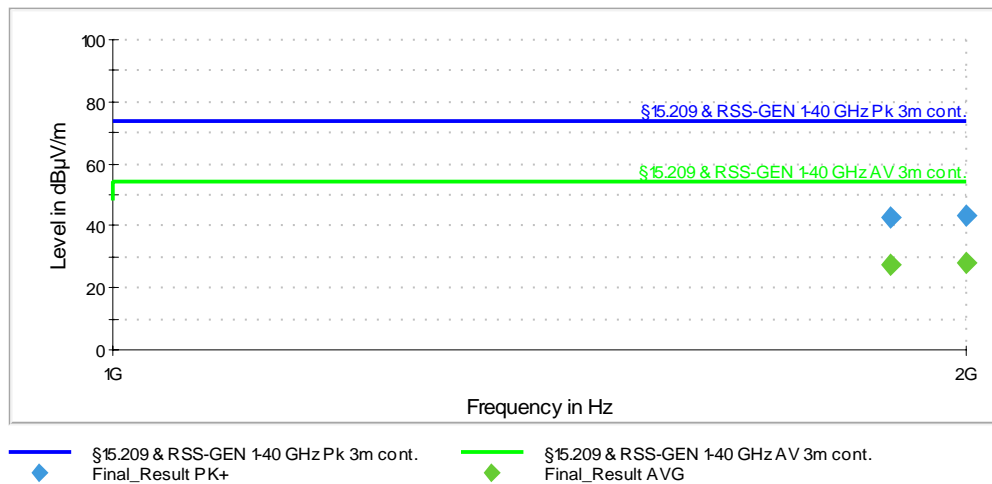
Test equipment (please refer to chapter 6 for details)
6 - 9, 11 – 16, 22

5.2.5 Test results final measurement above 1 GHz

Ambient temperature:	21 °C
Relative humidity:	21 %

Date:	22.04.2021
Tested by:	Thomas KÜHN

The measured points marked with "◆" are frequency points for the final peak detector measurement. These values are indicated in the following table. The measured points marked with "◆" are frequency points for the final average detector measurement.



The results of the standard subsequent measurement above 1 GHz in a fully anechoic chamber are indicated in the table below. The limits as well as the measured results (levels) refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

Frequency [MHz]	MaxPeak [dBµV/m]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Meas. Time [ms]	Bandwidth [MHz]	Height [cm]	Pol.	Azimuth [deg]	Corr. [dB]
1881.600	---	27.3	54.0	26.7	1000	1000	142	Hor.	286	32
1881.600	42.6	---	74.0	31.4	1000	1000	142	Hor.	286	32
1999.300	---	28.0	54.0	26.0	1000	1000	337	Hor.	230	32
1999.300	43.6	---	74.0	30.4	1000	1000	337	Hor.	230	32
Measurement uncertainty ±5.14 dB										

Test result: Passed

The correction factor was calculated as follows:

Corr. (dB) = cable attenuation (dB) + preamplifier (dB) + antenna factor (dB)

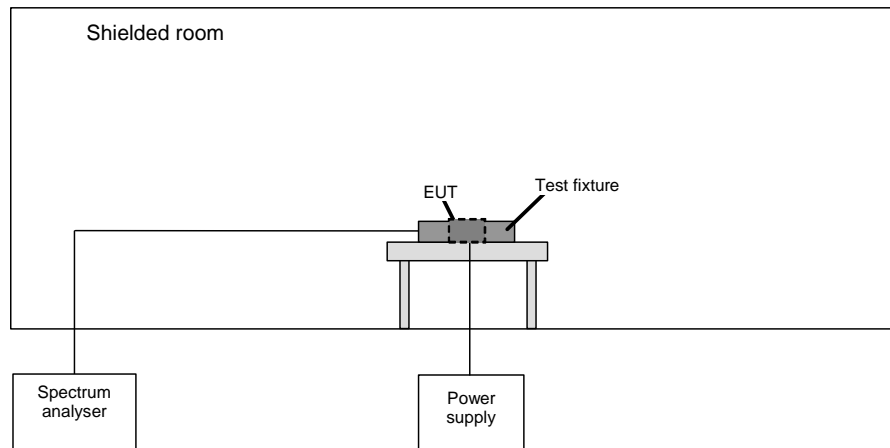
Therefore, the reading can be calculated as follows:

Reading (dBµV/m) = result Peak or Average (dBµV/m) - Corr. (dB)

Test equipment (please refer to chapter 6 for details)
6 - 8, 10 – 16, 22

5.3 99 % bandwidth

5.3.1 Test method



The following procedure is used for the occupied bandwidth measurement according to [1]:

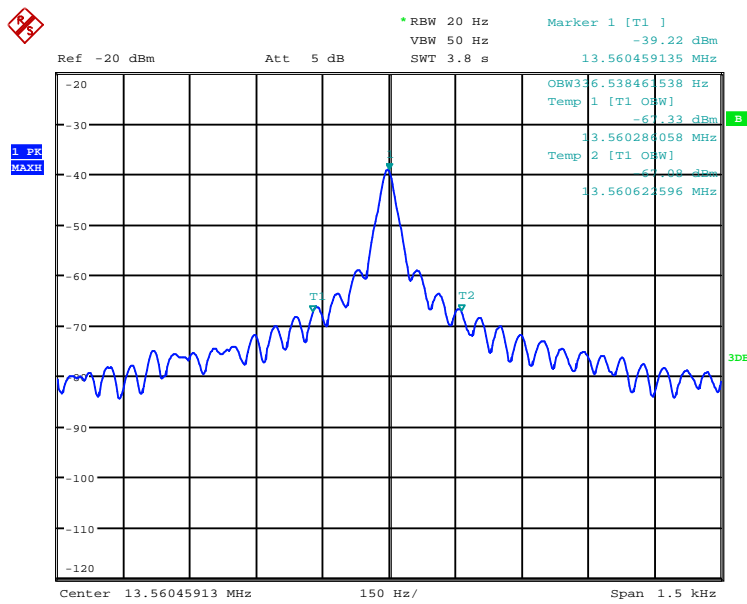
The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure is used for measuring the 99% power bandwidth:

- 1) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- 2) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- 3) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.
- 4) Step 1) through step 3) might require iteration to adjust within the specified range.

5.3.2 Test results 99 % bandwidth

Ambient temperature:	23 °C
Relative humidity:	27 %

Date:	14.04.2021
Tested by:	Thomas KÜHN



F _L	F _U	BW (F _U - F _L)
13.560286 MHz	13.560623 MHz	337 kHz
Measurement uncertainty < 1*10 ⁻⁷		

Test result: Passed

Test equipment (please refer to chapter 6 for details) 6, 7, 19, 20
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6 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM No.	Cal Date	Cal Due
1	Shielded chamber M4	B83117-S1-X158	Siemens	190075	480088	Calibration not necessary	
2	EMI Receiver	ESIB 26	Rohde & Schwarz	100292	481182	12.02.2020	02.2022
3	LISN	NSLK8128	Schwarzbeck	8128161	480138	11.02.2020	02.2022
4	Transient Filter Limiter	CFL 9206A	Teseq GmbH	38268	481982	Calibration not necessary	
5	EMI Software	EMC 32	Rohde & Schwarz	100061	481022	Calibration not necessary	
6	Digital multimeter	971A	Hewlett Packard	JP39009358	480721	17.02.2021	02.2022
7	AC source	AC6803A	Keysight	JPVJ002509	482350	Calibration not necessary	
8	Semi Anechoic Chamber M276	SAC5-2	Albatross Projects	C62128-A540-A138-10-0006	483227	Calibration not necessary	
9	Bilog Antenna	CBL6111D	Schaffner	24127010	480674	26.02.2021	02.2024
10	Log.-Per. antenna	HL050	Rohde & Schwarz	100908	482977	13.08.2019	08.2022
11	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
12	Antenna support	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
13	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
14	RF Switch Matrix	OSP220	Rohde & Schwarz	-	482976	Calibration not necessary	
15	Cable 416	Sucoflex 116	Huber & Suhner	500651/119	-	Calibration not necessary	
16	Systemsoftware EMC32 M276	EMC32	Rohde & Schwarz	100970	482972	Calibration not necessary	
17	Outdoor test site	-	PHOENIX-Testlab	-	480293	Calibration not necessary	
18	Loop antenna	HFH2-Z2	Rohde & Schwarz	100417	480912	25.02.2021	02.2022
19	Signal & Spectrum Analyzer	FSU	Rohde & Schwarz	200125	480956	25.02.2021	02.2022
20	Loop antenna Ø 110 mm	-	PHOENIX-Testlab	-	410084	Calibration not necessary	
21	EMI Receiver / Spectrum Analyser	ESI 40	Rohde & Schwarz	100064/040	480355	25.02.2021	02.2022
22	EMI Testreceiver	ESW44	Rohde & Schwarz	101828	482979	17.10.2019	10.2021

7 Test site Validation

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
OATS Outdoor	480293	9 kHz – 30 MHz	-	ANSI C63.4-2014	-	-
Semi anechoic chamber M276	483227	30 – 1000 MHz	NSA	ANSI C63.4a-2017	19.09.2019	18.09.2021
Semi anechoic chamber M276	483227	1 -18 GHz	SVSWR	CISPR 16-1-4 + Cor1:2010 + A1:2012 +A2:2017	25.02.2021	24.02.2023
Shielded chamber M4	480088	9 kHz – 30 MHz	GND-Plane	ANSI C63.4-2014	12.05.2020	11.05.2022

8 Report History

Report Number	Date	Comment
F210562E1	23.04.2021	Initial Test Report
-	-	-
-	-	-

9 List of Annexes

Annex A Test Setup Photos

7 pages