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TEST REPORT

Test Report Reference: R70243 Edition 1

Equipment under Test: UDL500

FCC ID: IXLUDL500

IC: 1893B-UDL500

Serial Number: 7137001110

Applicant: deister electronic GmbH

Manufacturer: deister electronic GmbH

Test Laboratory
(CAB)
accredited by
DATech GmbH
in compliance with DIN EN ISO/IEC 17025
under the
Reg. No. DAT-P-105/99-21,
FCC Test site registration number 90877
and
Industry Canada Test site registration IC3469 and
FCC Test site registration number 90877

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1 IDENTIFICATION

1.1 APPLICANT

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1.2 MANUFACTURER

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Address:	Hermann-Bahlsen-Str. 11 30890 Barsinghausen
Country:	Germany
Name for contact purposes:	Mr. Stefan EICHLER
Tel:	+ 49 51 05 51 61 29
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1.3 DATES

Date of receipt of test sample:	29 October 2007
Start of test:	13 November 2007
End of test:	26 November 2007

1.4 TEST LABORATORY

The tests were carried out at: **PHOENIX TESTLAB GmbH**
Königswinkel 10
D-32825 Blomberg **Phone:** **+49 (0) 52 35 / 95 00-0**
Germany **Fax:** **+49 (0) 52 35 / 95 00-10**

accredited by DATech GmbH in compliance with DIN EN ISO/IEC 17025 under Reg. No. DAT-P-105/99, Industry Canada Test site registration IC3469 and FCC Test site registration number 90877.

Test engineer:	Thomas KÜHN		03 December 2007
	Name	Signature	Date
Test report checked:	Frank EIKERMANN		03 December 2007
	Name	Signature	Date

PHOENIX TESTLAB GmbH
Königswinkel 10
32825 Blomberg
Tel. 0 52 35 / 95 00-0
Fax 0 52 35 / 95 00-10

Stamp

1.5 RESERVATION

This test report is only valid in its original form.

Any reproduction of its contents without written permission of the accredited test laboratory PHOENIX TESTLAB GmbH is prohibited.

The test results herein refer only to the tested sample. PHOENIX TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TESTLAB Logo and the TEST REPORT REFERENCE.

1.6 NORMATIVE REFERENCES

[1] **ANSI C63.4-2003** American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

[2] **FCC CFR 47 Part 15 (October 2007)** Radio Frequency Devices

[3] **FCC Public Notice DA 00-705 (March 2000)**

[4] **RSS-210 Issue 7 (June 2007)** Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

[5] **RSS-Gen Issue 2 (June 2007)** General Requirements and Information for the Certification of Radiocommunication Equipment

1.7 TEST RESULTS

The requirements of this test document are fulfilled by the equipment under test. The complete test results are presented in the following.

2 TECHNICAL DATA OF EQUIPMENT

Type of equipment: *	UHF RFID reader
Type designation: *	UDL500
FCC ID: *	IXLUDL500
IC: *	1893B-UDL500
Antenna type: *	Internal
Antenna gain: *	6.2 dBi
Antenna connector: *	SMA for RX and TX antenna
Power supply: *	10.0 V DC to 30.0 V DC
Lowest internal frequency: *	12 MHz
Type of modulation: *	ASK
Operating frequency range:*	902.250 to 926.750 MHz
Number of channels: *	50
Temperature range: *	-20 °C to +85 °C

*: declared by the applicant

This UHF RFID reader device operates in the 902 to 928 MHz band at 2.4 GHz. In this band 50 RF channels spaced 500 kHz apart are defined. Please refer also the additional declaration in Annex D of this test report.

The following external I/O cables were used:

Cable	Length	Shielding	Connector
DC in	2 m *	No	6.3 mm jack plug
-	-	-	-

*: Length during the test if no other specified.

2.1 PERIPHERY DEVICES

The following equipment was used as control unit and ancillary equipment:

- The EUT was connected to a personal computer with a configuration-software via the RS 485 interface of the EUT. At the personal computer a RS 485 to USB converter was used. The personal computer was not part of the test set-up and was placed outside the measuring environment.
- During all tests the EUT was supplied with a DC supply voltage, which was provided by an external power supply or an AC / DC adaptor type FW 3288 (used only for the conducted emissions on AC-mains). For the conducted emission measurement on AC-mains the AC / DC adaptor was supplied with 120 V AC / 60 Hz.

3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

All tests were carried out with an unmodified sample.

During all tests the EUT was powered by 12 V DC, because additional pre tests have shown, that the variation of the supply voltage has no influence to the output signals.

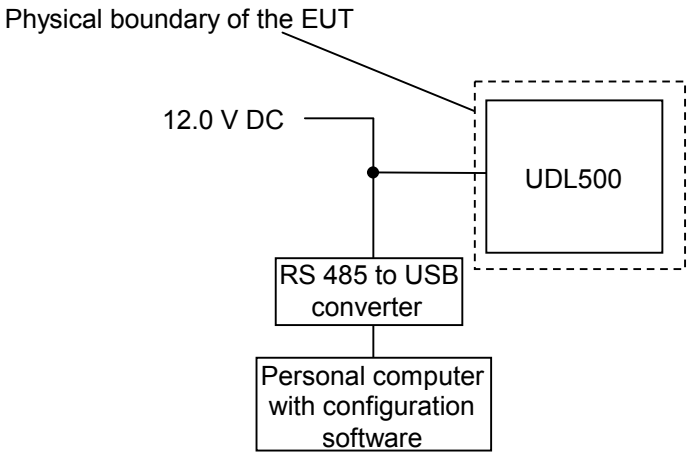
For selecting an operation mode, a personal computer with a configuration software delivered by the applicant was connected to the EUT via a RS 485 to USB converter. To do this the test-engineer was instructed by the applicant.

During the tests the EUT operates with an ASK modulation according ISO 18000-6-C with a data rate of 40 kbit/s (pulse interval encoding (PIE)).

During the tests, the EUT was not labelled with a FCC-label.

The following operation modes were used during the tests:

Operation mode	Description of the operation mode
1	Continuous transmitting on 902.250 MHz
2	Continuous transmitting on 914.750 MHz
3	Continuous transmitting on 926.750 MHz
4	Transmitter hopping on all channels



4 LIST OF MEASUREMENTS

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section	RSS 210, Issue 7 [4] or RSS-Gen, Issue 2 [5]	Status	Refer page
20 dB bandwitdh	General	15.247 (a) (1)	A8.1 (c) [4]	Passed	8 et seq.
Carrier frequency separation	General	15.247 (a) (1)	A8.1 (c) [4]	Passed	11 et seq.
Number of hopping channels	902.0 – 928.0	15.247 (a) (1) (i)	A8.1 (c) [4]	Passed	14 et seq.
Dwell time	902.0 – 928.0	15.247 (a) (1) (i)	A8.1 (c) [4]	Passed	16 et seq.
Maximum peak output power	902.0 – 928.0	15.247 (b) (2)	A8.4 (1) [4]	Passed	18 et seq.
Band edge compliance	902.0 – 928.0	15.247 (d)	A8.5 [4]	Passed	21 et seq.
Radiated emissions (transmitter)	10.0 - 25,000	15.205 (a) 15.209 (a)	A8.5 [4] 2.6 [4]	Passed	25 et seq.
Conducted emissions on supply line	0.15 - 80	15.207 (a)	7.2.2 [5]	Passed	et seq.
Radiated emissions (receiver)	0.009 - 25,000	15.109 (a)	7.2.3 [5] 2.6 [4]	Not applicable *	-

*: No receiver emissions were carried out, because the receiver operates with a permanently operating co-located transmitter. As declared by the applicant, at no time the receiver operates without the transmitter.

5 TEST RESULTS

5.1 20 dB BANDWIDTH

5.1.1 METHOD OF MEASUREMENT (20 dB BANDWIDTH)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be disenabled, the transmitter shall work with its maximum data rate.

The following spectrum analyser settings shall be used:

- Span: App. 2 to 3 times the 20 dB bandwidth, centred on the actual hopping channel.
- Resolution bandwidth: ≥ 1 % of the 20 dB bandwidth.
- Video bandwidth: ≥ the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency lines shall be set on the intersection points between the second display line and the measured curve.

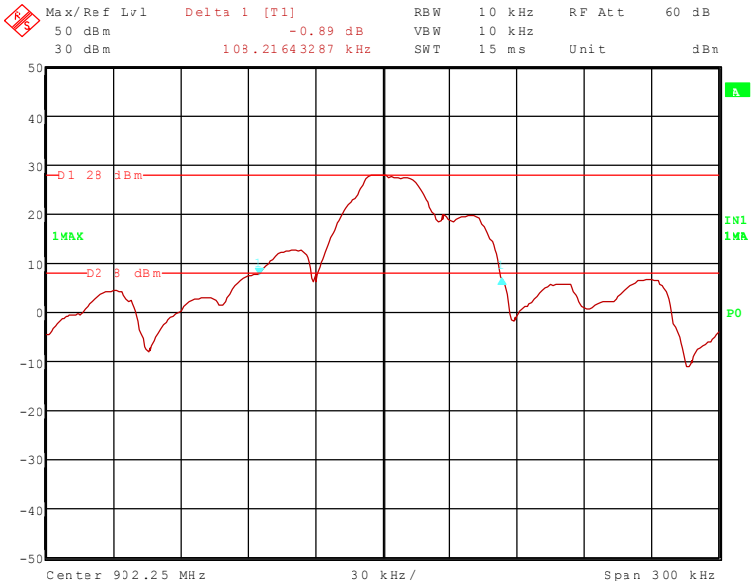
The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band.

Test set-up:

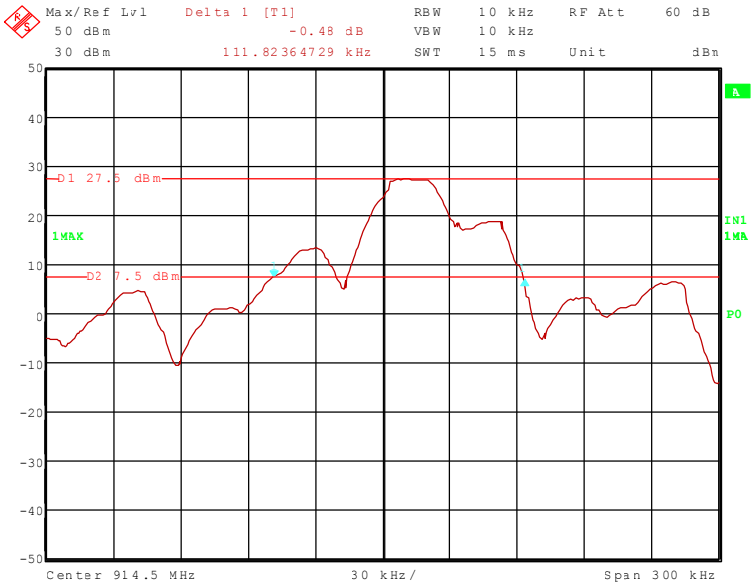
5.1.2 TEST RESULTS (20 dB BANDWIDTH)

Ambient temperature	21 °C		Relative humidity	34 %

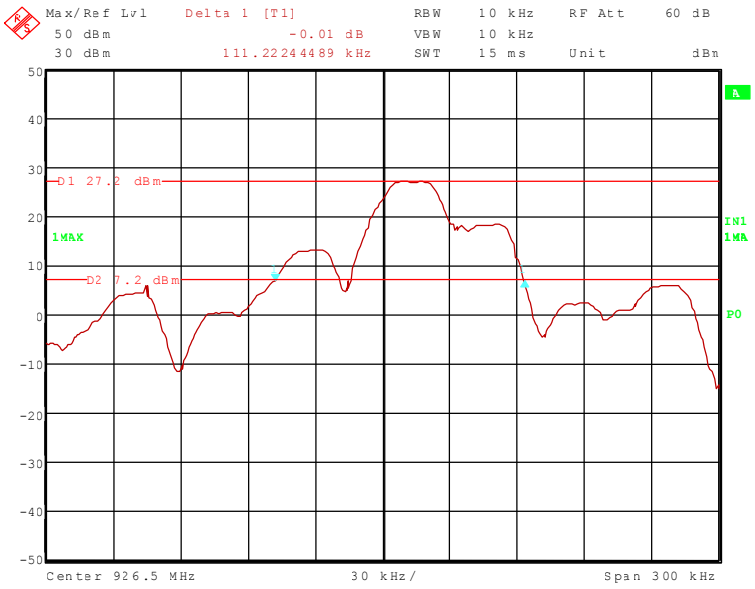
70243_39.wmf: (20 dB bandwidth at the lower end of the assigned frequency band):



70243_40.wmf: (20 dB bandwidth at the middle of the assigned frequency band):



70243_41.wmf: (20 dB bandwidth at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	20 dB bandwidth [kHz]
1	902.260	108.216
26	914.750	111.824
50	926.750	111.222
Measurement uncertainty		+0.66 dB / -0.72 dB

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

5.2 CARRIER FREQUENCY SEPARATION

5.2.1 METHOD OF MEASUREMENT (CARRIER FREQUENCY SEPARATION)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

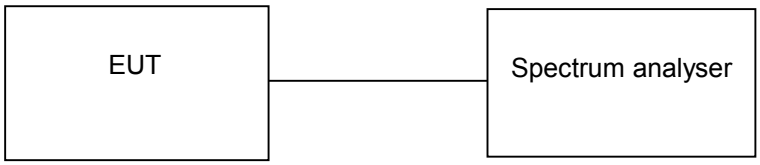
The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peaks of two adjacent channels.
- Resolution bandwidth: ≥ 1 % of the span.
- Video bandwidth: ≥ the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker and the delta marker function will be used to determine the separation between the peaks of two adjacent channel signals.

The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band.

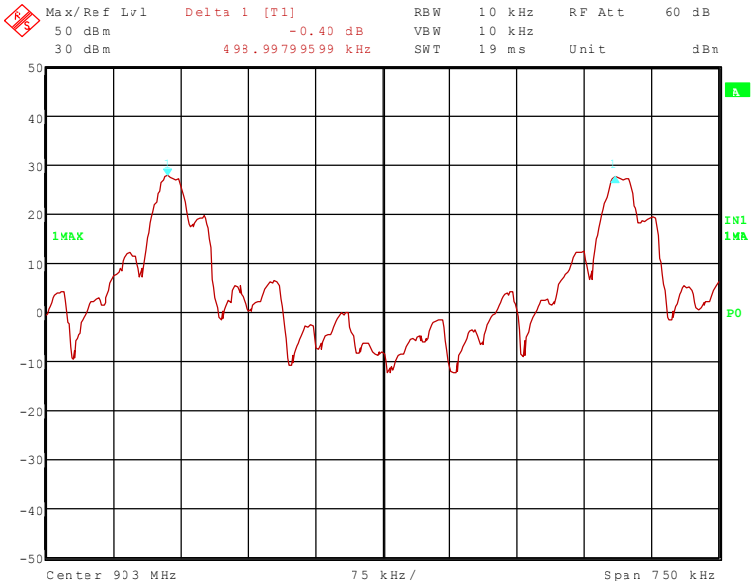
Test set-up:



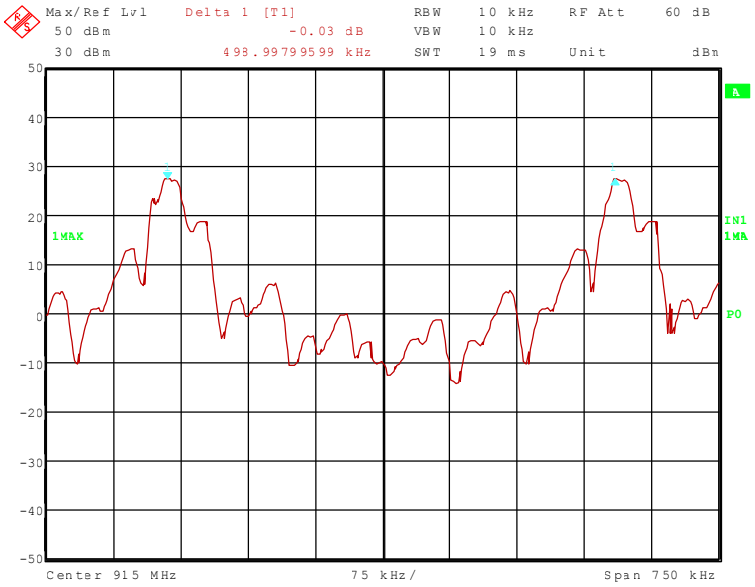
5.2.2 TEST RESULTS (CARRIER FREQUENCY SEPARATION)

Ambient temperature	21 °C	Relative humidity	34 %

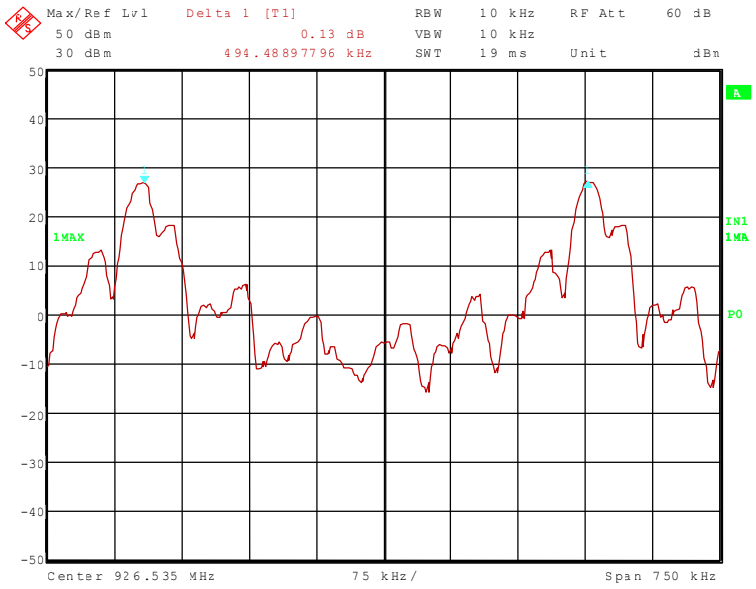
70243_42.wmf: (channel separation at the lower end of the assigned frequency band):



70243_43.wmf: (channel separation at the middle of the assigned frequency band):



70243_44.wmf: (channel separation at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	Channel separation [kHz]	Minimum limit [kHz]
1	902.250	498.998	108.216 (20 dB bandwidth)
26	914.750	498.998	111.824 (20 dB bandwidth)
50	926.750	494.489	111.222 (20 dB bandwidth)
Measurement uncertainty			$<10^{-7}$

Test result: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

5.3 NUMBER OF HOPPING FREQUENCIES

5.3.1 METHOD OF MEASUREMENT (NUMBER OF HOPPING FREQUENCIES)

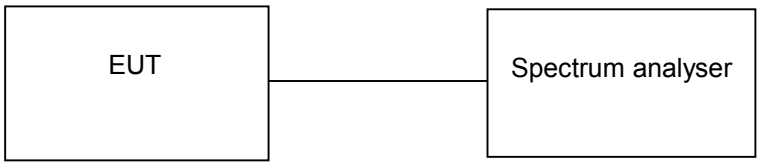
The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

The following spectrum analyser settings shall be used:

- Span: Equal to the assigned frequency band.
- Resolution bandwidth: ≥ 1 % of the span.
- Video bandwidth: ≥ the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

After trace stabilisation the number of hopping channels could be counted. It might be possible to divide the span into some sub ranges in order to clearly show all hopping frequencies.

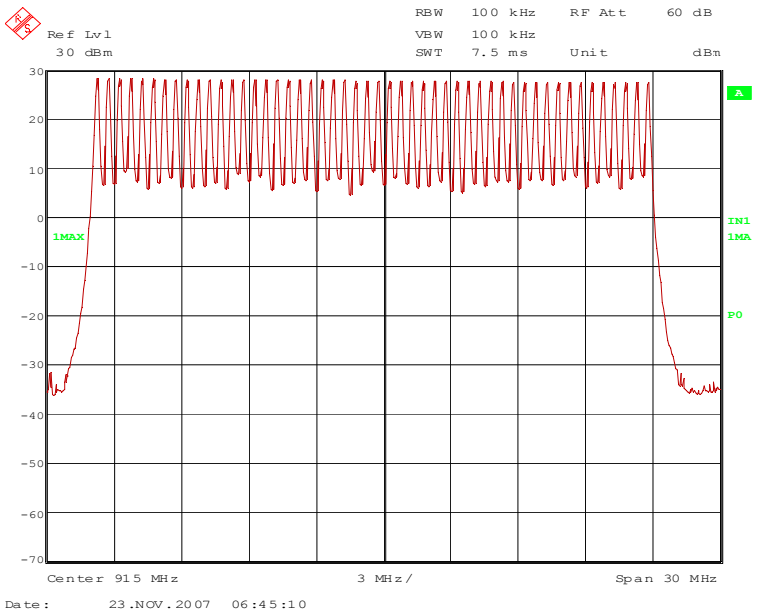
Test set-up:



5.3.2 TEST RESULTS (NUMBER OF HOPPING FREQUENCIES)

Ambient temperature	21 °C	Relative humidity	34 %

70243_38.wmf (number of hopping channels):



Number of hopping channels	Limit
50	At least 50

Test result: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

5.4 DWELL TIME

5.4.1 METHOD OF MEASUREMENT (DWELL TIME)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be enabled.

The following spectrum analyser settings shall be used:

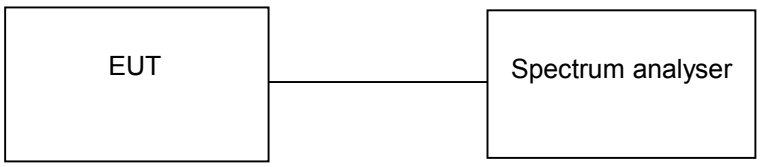
- Span: Zero, centred on a hopping channel.
- Resolution bandwidth: 1 MHz.
- Video bandwidth: ≥ the resolution bandwidth.
- Sweep: As necessary to capture the entire dwell time per hopping channel.
- Detector function: peak.
- Trace mode: Max hold.

The marker and delta marker function of the spectrum analyser will be used to determine the dwell time.

The measurement will be performed at the middle of the assigned frequency band.

If the EUT is possible to operate with different mode of operation (data rates, modulation formats etc.) the test will be repeated with every different operation mode of the EUT.

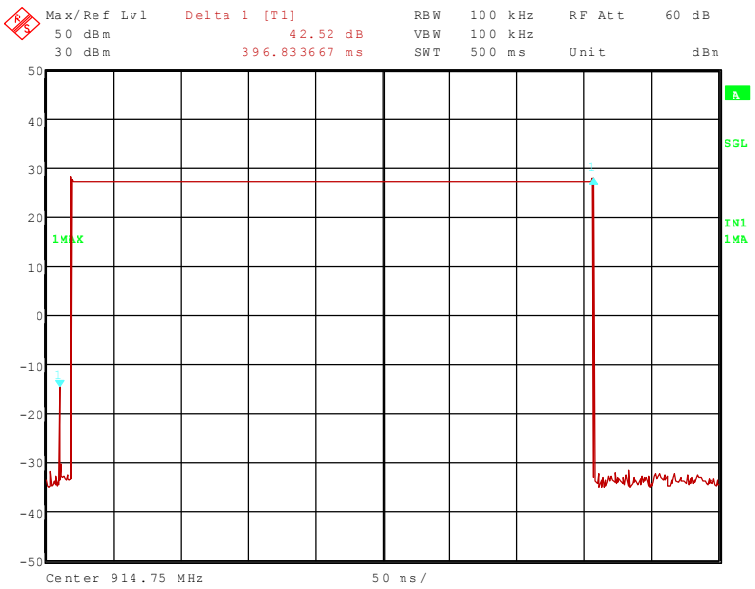
Test set-up:



5.4.2 TEST RESULTS (DWELL TIME)

Ambient temperature	21 °C	Relative humidity	34 %

70243_60.wmf: Dwell time at the middle of the assigned frequency band):



The dwell time is calculated with the following formula:

Dwell time = t_{pulse} x n_{hops} / number of hopping channels x 20 s

Where:

t_{pulse} is the measured pulse time (pls. refer the plots of the spectrum analyser above) [s],
n_{hops} is the number of hops per second in the actual operating mode of the transmitter [1/s].

The hopping rate of the system is 2.5 hops per second and the system uses 50 channels.

Channel number	Channel frequency [MHz]	t_{pulse} [ms]	Dwell time [ms]	Limit [ms]
26	914.750	396.834	396.834	400
Measurement uncertainty			$<10^{-7}$	

Test result: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

5.5 MAXIMUM PEAK OUTPUT POWER

5.5.1 METHOD OF MEASUREMENT (MAXIMUM PEAK OUTPUT POWER)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on and the hopping function has to be disenabled.

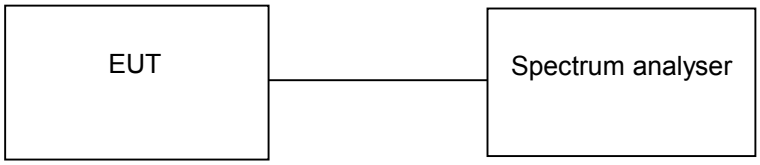
The following spectrum analyser settings shall be used:

- Span: Approx. 5 times the 20 dB bandwidth, centred on a hopping channel.
- Resolution bandwidth: > the 20 dB bandwidth of the emission being measured.
- Video bandwidth: ≥ the resolution bandwidth.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The indicated level is the peak output power, which has to be corrected with the value of the cable loss and an external attenuation (if necessary).

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band.

Test set-up:

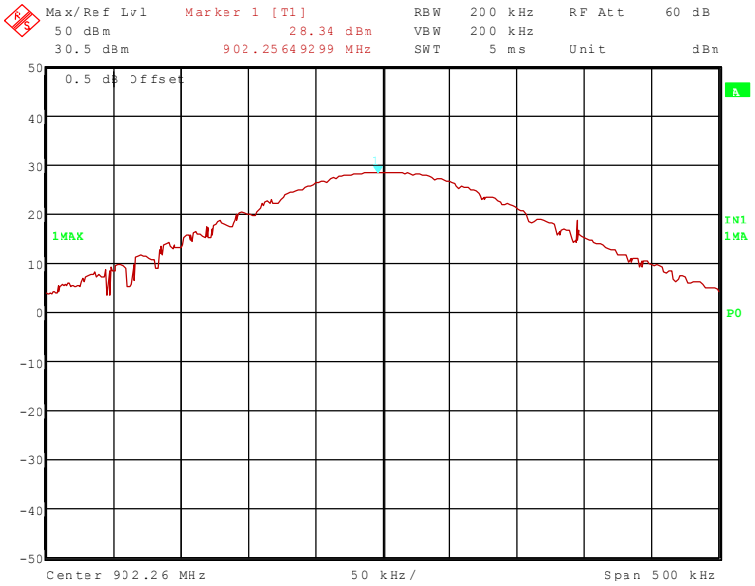


5.5.2 TEST RESULTS (MAXIMUM PEAK OUTPUT POWER)

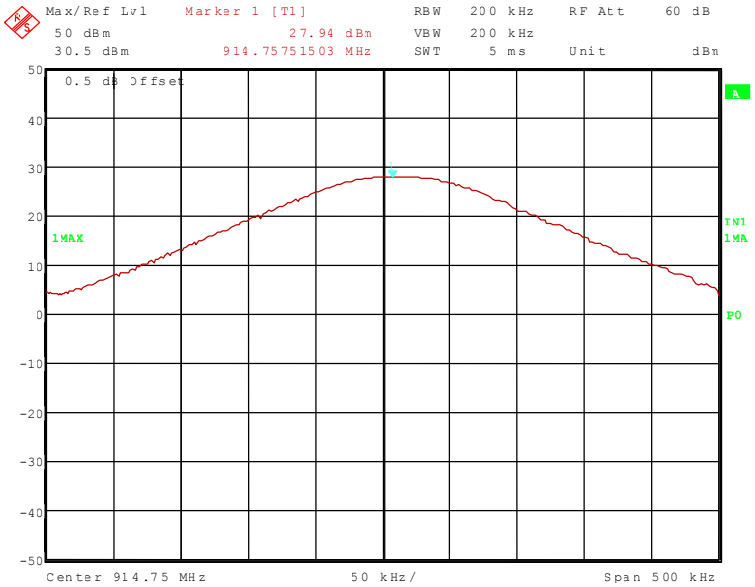
Ambient temperature	21 °C

Relative humidity	34 %

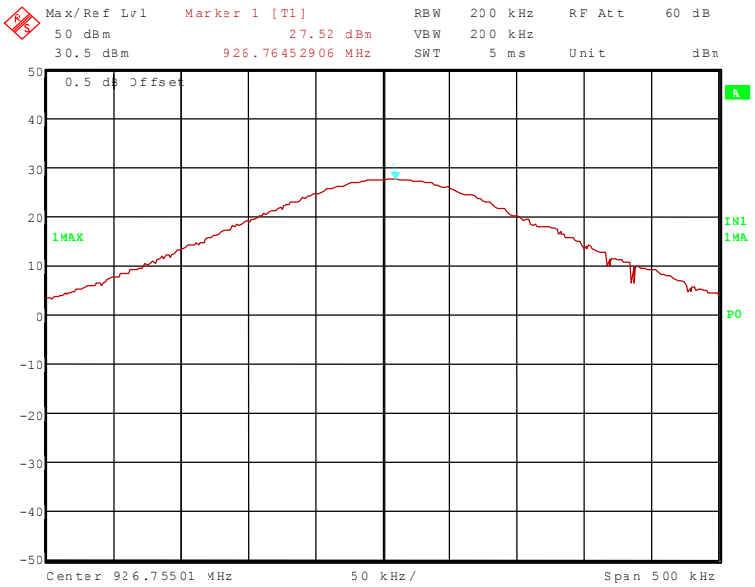
70243_47.wmf (maximum peak output power at the lower end of the assigned frequency band):



70243_48.wmf (maximum peak output power at the middle of the assigned frequency band):



70243_49.wmf (maximum peak output power at the upper end of the assigned frequency band):



Channel number	Channel frequency [MHz]	Maximum peak output power [dBm]	Antenna gain [dBi]	Peak power limit [dBm]
1	902.260	28.3	6.2	29.8
26	914.500	27.9	6.2	29.8
50	926.750	27.5	6.2	29.8
Measurement uncertainty				+0.66 dB / -0.72 dB

Test result: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54

5.6 BAND-EDGE COMPLIANCE

5.6.1 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE (RADIATED))

The same test set-up as used for the final radiated emission measurement shall be used (refer also subclause 5.7.1 of this test report). The measurements shall be carried out with using a resolution bandwidth of 100 kHz.

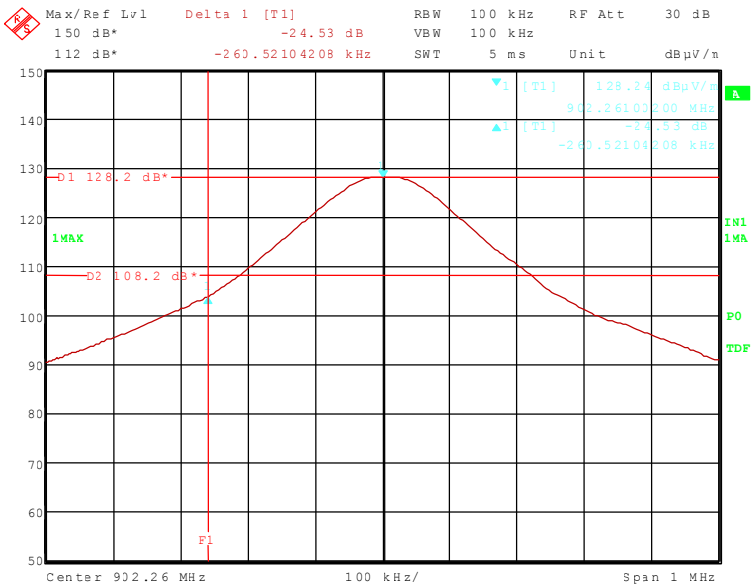
After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency line shall be set on the edge of the assigned frequency band. Set the second marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is higher than that at the band-edge. This frequency shall be measured with the EMI receiver as described in subclause 5.7.1 of this test report.

The measurement will be performed at the upper end of the assigned frequency band and with hopping on and off.

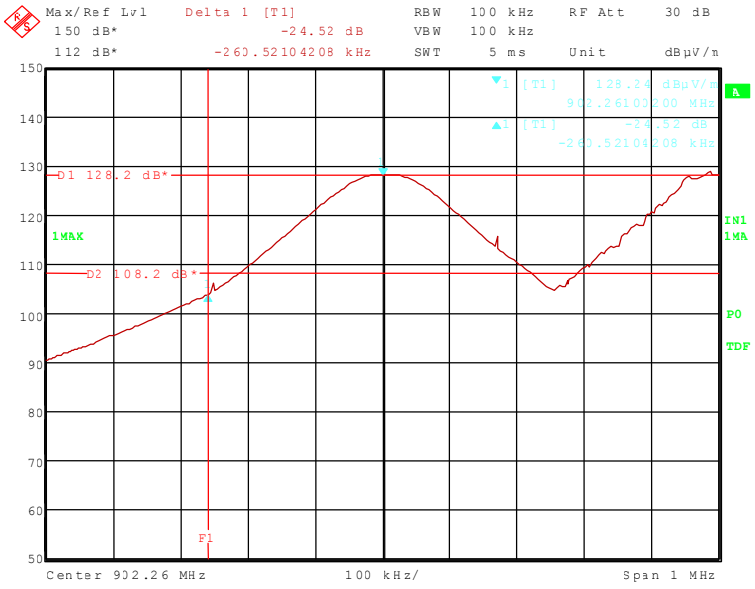
5.6.2 TEST RESULT (BAND-EDGE COMPLIANCE (RADIATED))

Ambient temperature	21 °C	Relative humidity	36 %

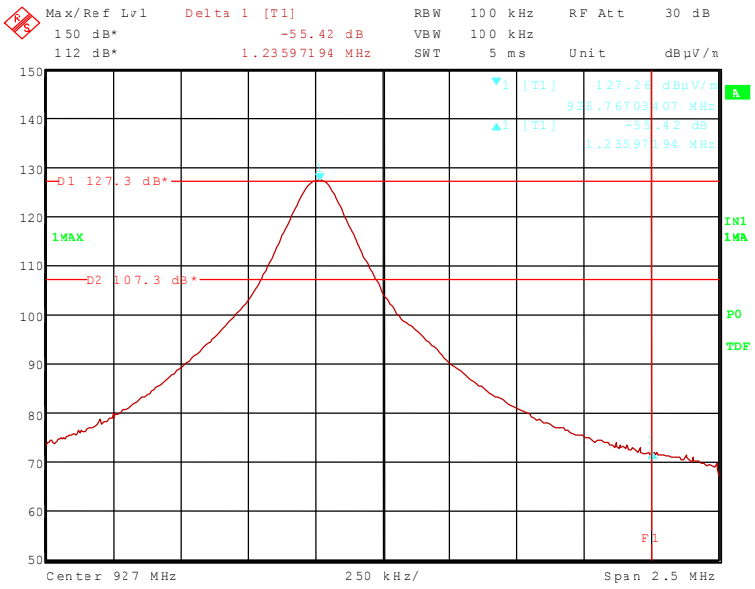
70243_53: Band-edge compliance (lower band-edge hopping off):



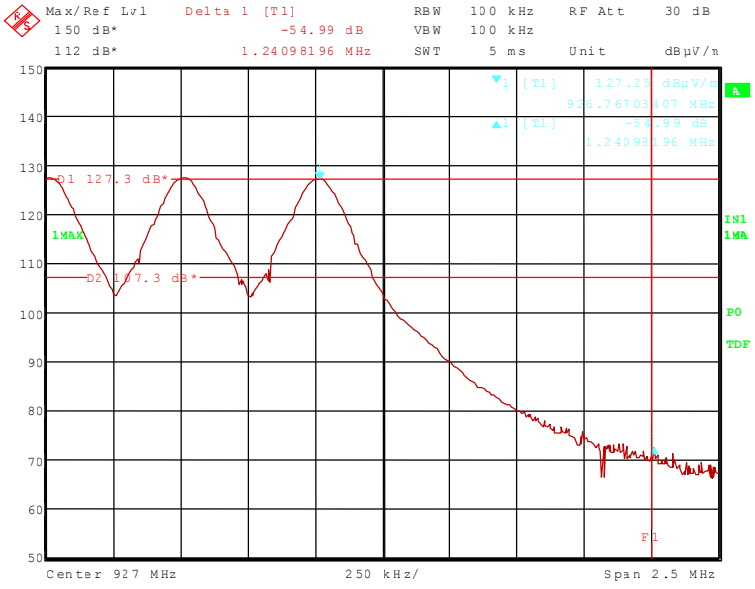
70243_54: Band-edge compliance (lower band-edge, hopping on):



70243_35: Band-edge compliance (upper band-edge, hopping off):



70243_55: Band-edge compliance (upper band-edge, hopping on):



The plots on the page before are showing the radiated band-edge compliance for the upper and lower band-edge, with and without hopping. The display line 1 (D1) in these plots represents the highest level within the assigned frequency band. The display line 2 (D2) represents the 20 dB offset to this highest level and shows the compliance with FCC 47 CFR Part 15.247 (d). The frequency line 1 (F1) shows the edge of the assigned frequency.

Band-edge compliance (hopping disenabled)										
Result measured with the quasi-peak detector:										
Frequency MHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
902.000	105.8	110.3	4.5	79.4	24.4	0.0	2.0	122	Hor.	No
928.000	75.2	110.6	35.4	48.2	25.0	0.0	2.0	111	Hor.	No
Measurement uncertainty							+2.2 dB / -3.6 dB			

Band-edge compliance (hopping enabled)										
Result measured with the quasi-peak detector:										
Frequency MHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
902.000	105.8	110.3	4.5	79.4	24.4	0.0	2.0	122	Hor.	No
928.000	75.6	110.6	35.0	48.6	25.0	0.0	2.0	111	Hor.	No
Measurement uncertainty							+2.2 dB / -3.6 dB			

Test result: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 35, 43, 54

5.7 RADIATED EMISSIONS

5.7.1 METHOD OF MEASUREMENT (RADIATED EMISSIONS)

The radiated emission measurement is subdivided into five stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 10 MHz to 1 GHz.
- A final measurement carried out on an outdoor test side without reflecting ground plane and a fixed antenna height in the frequency range 10 MHz to 30 MHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna height in the frequency range 30 MHz to 1 GHz.
- A preliminary measurement carried out in a fully anechoic chamber with a variable antenna distance and height in the frequency range 1 GHz to 10 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 10 GHz.

All measurements will be carried out with the EUT working on the middle and upper and lower edge of the assigned frequency band. For this reason the hopping function of the EUT has to be disenabled.

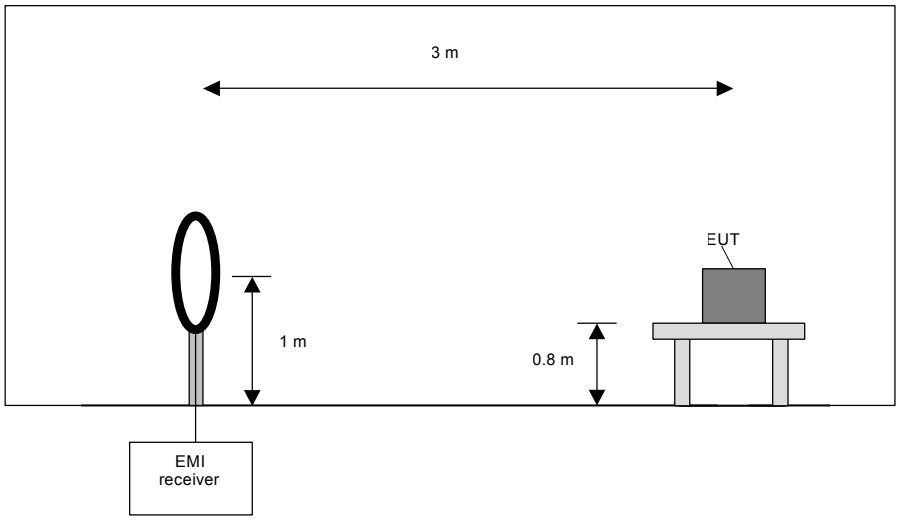
Preliminary measurement (10 MHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Tabletop devices will 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 will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 10 MHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to found the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
10 MHz to 30 MHz	10 kHz



Preliminary measurement procedure:

Prescans were performed in the frequency range 10 MHz to 30 MHz.

The following procedure will be used:

1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2) Manipulate the system cables within the range to produce the maximum level of emission.
3) Rotate the EUT by 360 ° to maximize the detected signals.
4) Make a hardcopy of the spectrum.
5) Measure the frequencies of highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6) Repeat 1) to 5) with the other orthogonal axes of the EUT (handheld equipment only)
7) Rotate the measuring antenna and repeat steps 1) to 6).

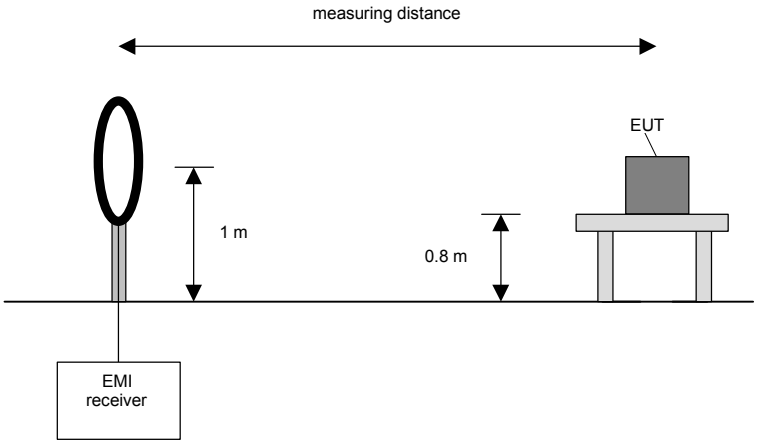
Final measurement (10 MHz to 30 MHz):

In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with a 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 will be used according Section 15.209 (d) [2].

On the during the preliminary measurement detected frequencies the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

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

Frequency range	Resolution bandwidth
10 MHz to 30 MHz	9 kHz



Final measurement procedure:

The following procedure will be used:

1) Monitor the frequency range with the measuring antenna at vertical orientation parallel to the EUT at an azimuth of 0 °.
2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
3) Rotate the measuring antenna to find the maximum and note the value.
4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.

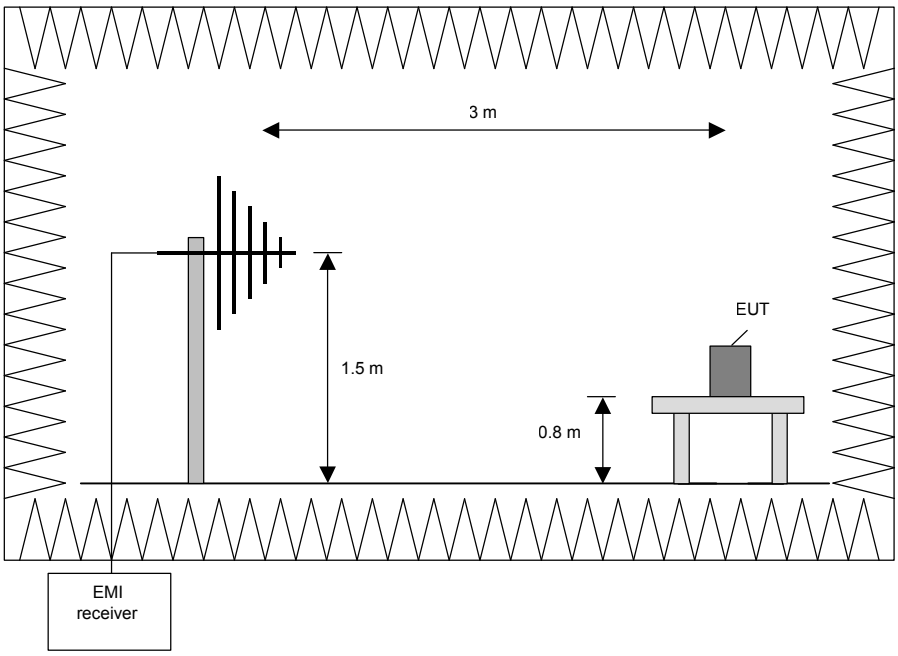
Preliminary measurement (30 MHz to 1 GHz)

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will 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 will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

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

Frequency range	Resolution bandwidth
30 MHz to 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz.
The following procedure will be used:

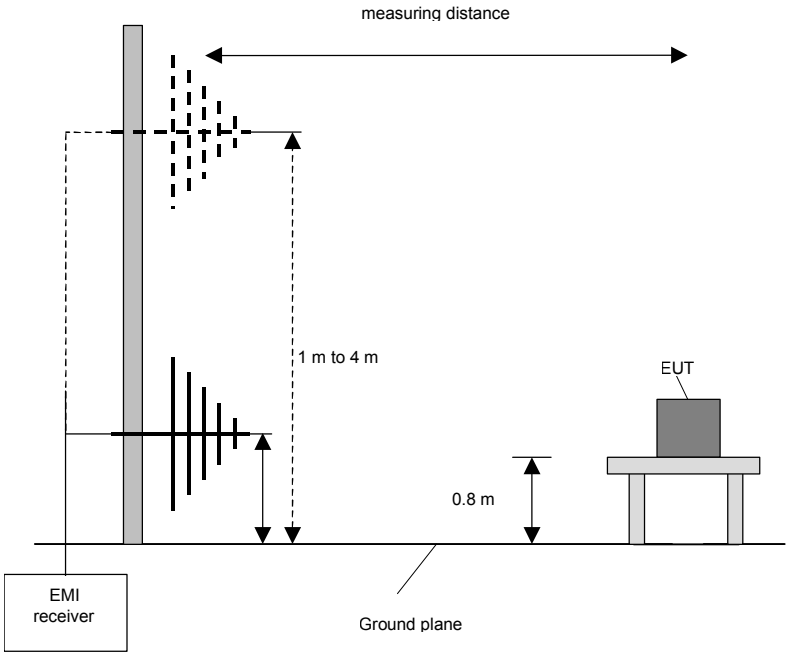
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat 1) to 4) with the other orthogonal axes of the EUT (handheld equipment only).
7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

Final measurement (30 MHz to 1 GHz)

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of
0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation 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 will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



Procedure final measurement:

The following procedure will be used:

1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
4) Repeat 1) to 3) for the other orthogonal antenna polarization.
5) Move the antenna and the turntable to the position where the maximum value is detected.
6) Measure while moving the antenna slowly +/- 1 m.
7) Set the antenna to the position where the maximum value is found.
8) Measure while moving the turntable +/- 45 °.
9) Set the turntable to the azimuth where the maximum value is found.
10) Measure with Final detector (QP and AV) and note the value.
11) Repeat 5) to 10) for each frequency.
12) Repeat 1) to 11) for each orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

Preliminary and final measurement (1 GHz to 10 GHz)

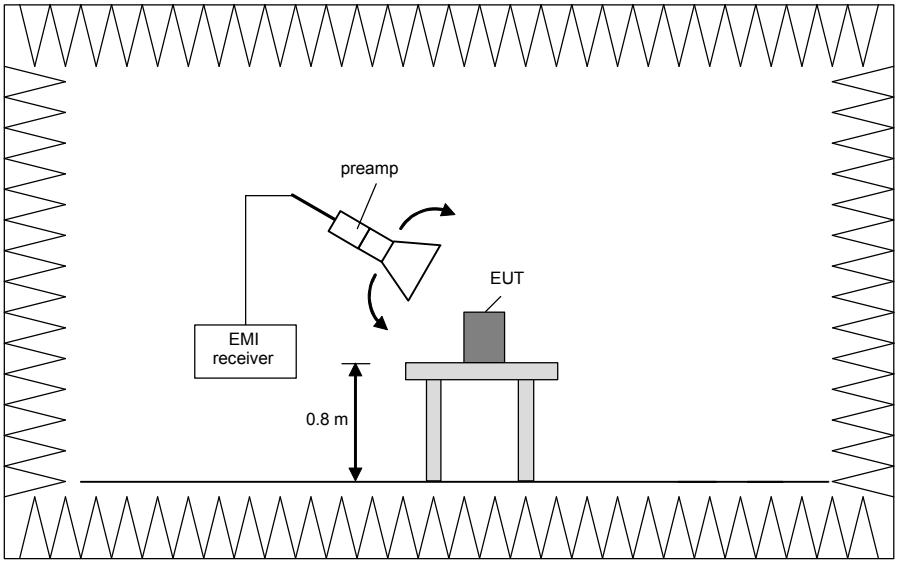
This measurement will be performed in a fully anechoic chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

Preliminary measurement (1 GHz to 10 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The spectrum analyser set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna, the antenna close to the EUT and while moving the antenna over all sides of the EUT. With the spectrum analyser in CLEAR / WRITE mode the cone of the emission should be found and than the measuring distance will be set to 3 m with the receiving antenna moving in this cone of emission. At this position the final measurement will be carried out.

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

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	100 kHz
4 GHz to 10 GHz	100 kHz

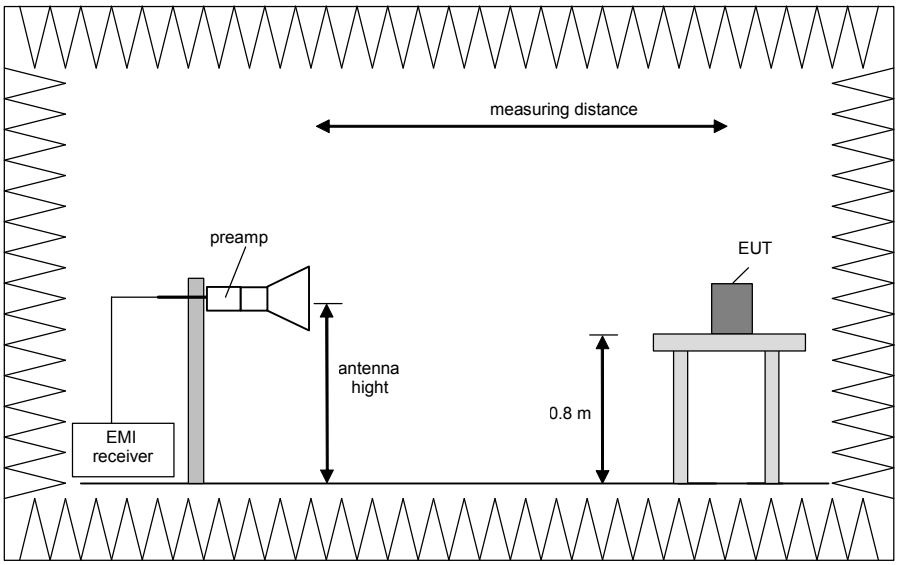


Final measurement (1 GHz to 10 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1 MHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 ° in order to have the antenna inside the cone of radiation.

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

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 10 GHz	1 MHz



Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz and 4 GHz to 10 GHz.
The following procedure will be used:

1) Monitor the frequency range at horizontal polarisation and move the antenna over all sides of the EUT (if necessary move the EUT to another orthogonal axis).
2) Change the antenna polarisation and repeat 1) with vertical polarisation.
3) Make a hardcopy of the spectrum.
4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
5) Change the analyser mode to Clear / Write and found the cone of emission.
6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3 m and the antenna will be still inside the cone of emission.
7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarisation and azimuth and the peak and average detector, which causes the maximum emission.
8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

Step 1) to 6) are defined as preliminary measurement.

5.7.2 TEST RESULTS (RADIATED EMISSIONS)

5.7.2.1 PRELIMINARY MEASUREMENT (10 MHz to 10 GHz)

Ambient temperature	21 °C	Relative humidity	36 %

Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

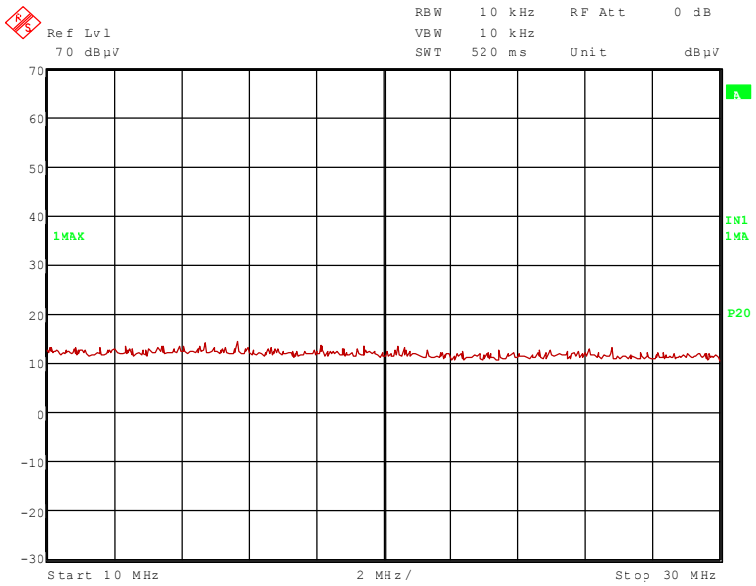
Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 12.0 V DC.

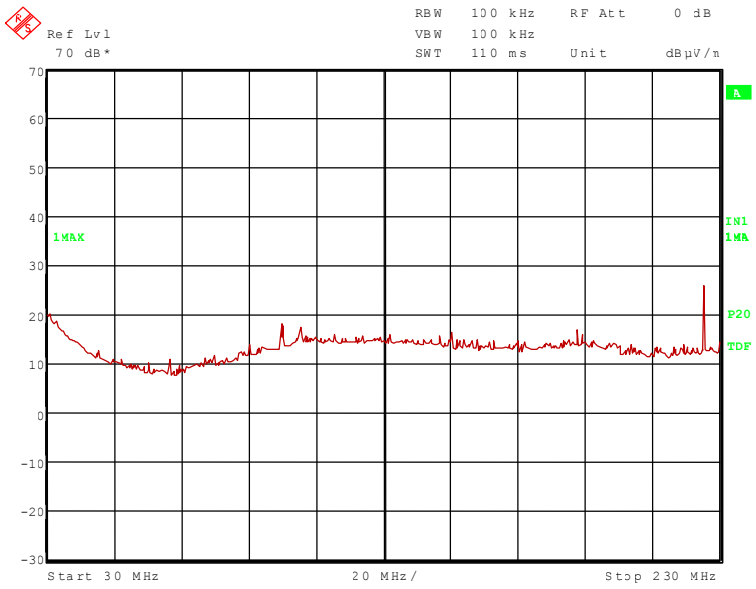
Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

70243_50: Spurious emissions from 10 MHz to 30 MHz:

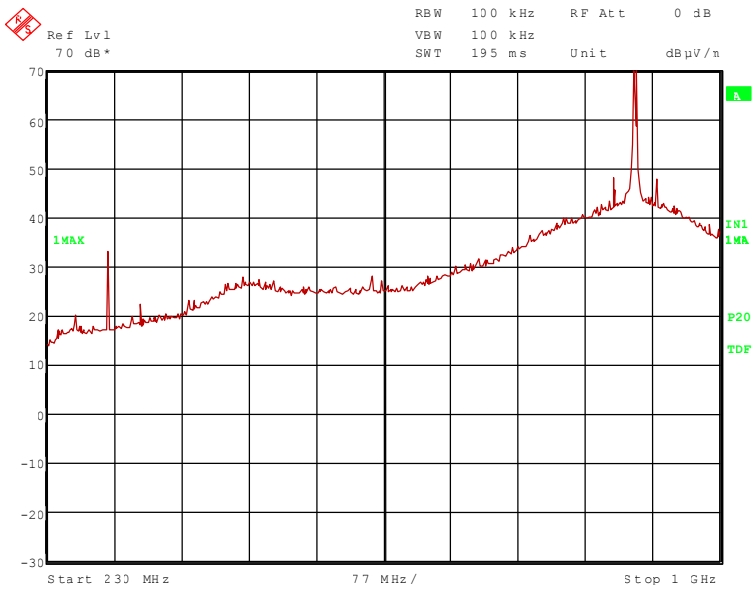


No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the outdoor test site.

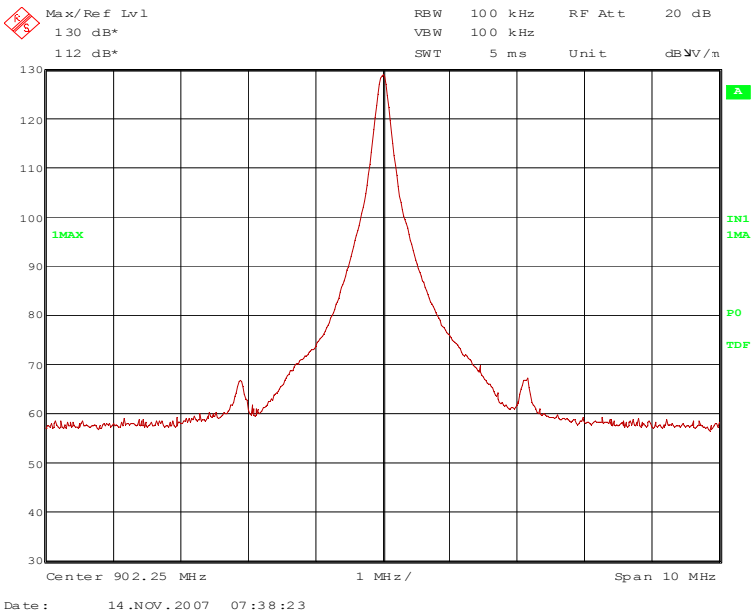
70243_27: Spurious emissions from 30 MHz to 230 MHz:



70243_28: Spurious emissions from 230 MHz to 1 GHz:



70243_29: Carrier frequency:

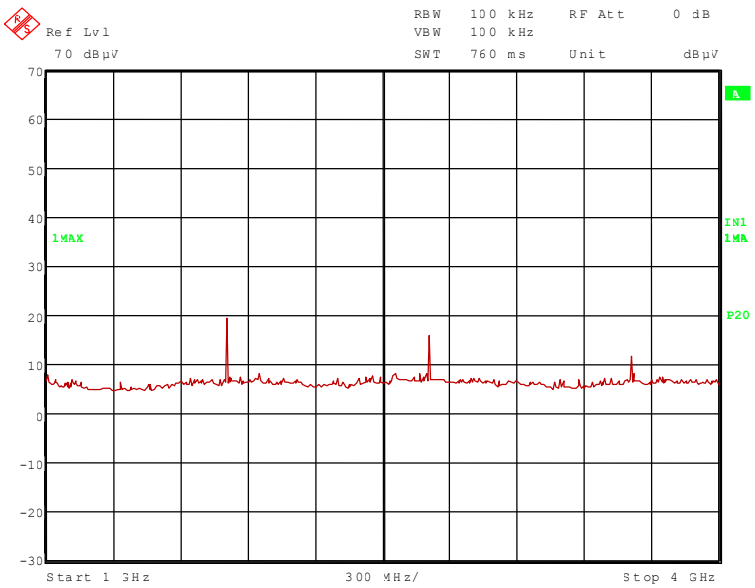


The following frequencies were found during the preliminary radiated emission test:

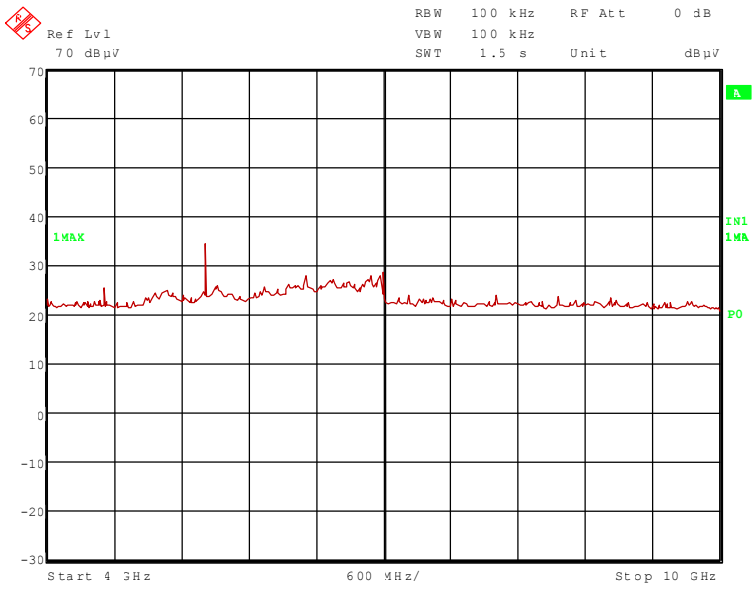
- 99.558 MHz, 225.037 MHz, 300.050 MHz, 878.257 MHz, 900.148 MHz, 902.260 MHz, 904.374 MHz and 926.257 MHz

These frequencies have to be measured in a final measurement on a open area test site. The results were presented in the following.

70243_21: Spurious emissions from 1 GHz to 4 GHz:



70243_26: Spurious emissions from 4 GHz to 10 GHz:



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 2.7068 GHz, 3.609 GHz and 5.4135 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 1.8045 GHz.

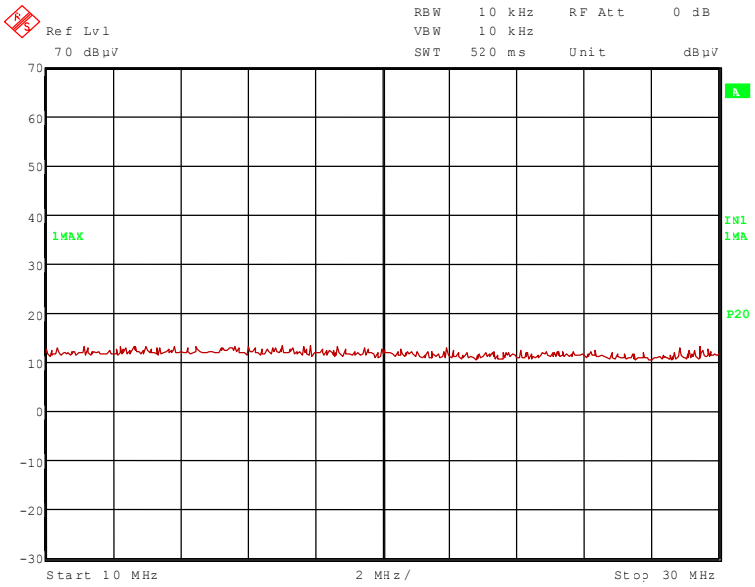
These frequencies have to be measured in a final measurement. The results were presented in the following.

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54

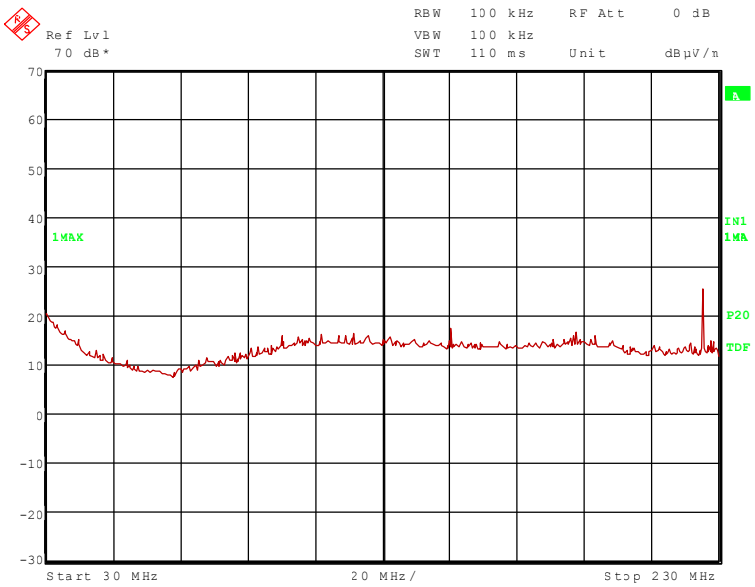
Transmitter operates at the middle of the assigned frequency band (operation mode 2)

70243_52: Spurious emissions from 10 MHz to 30 MHz:

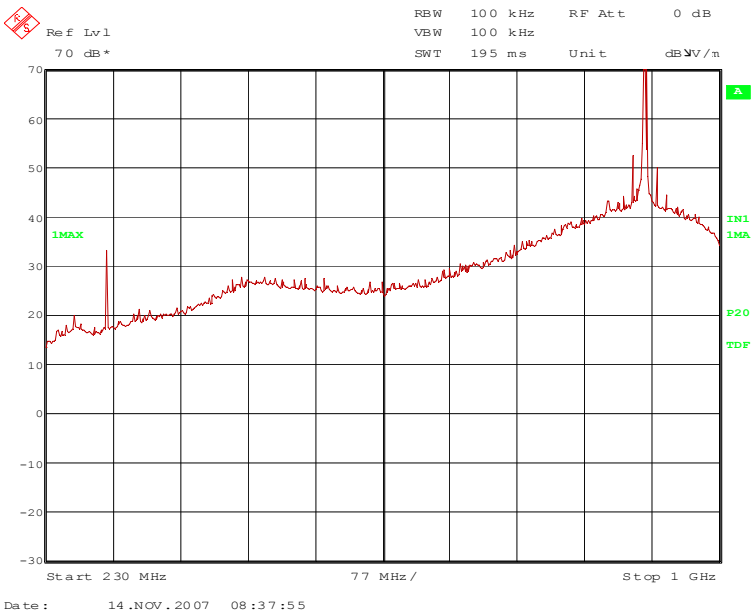


No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the outdoor test site.

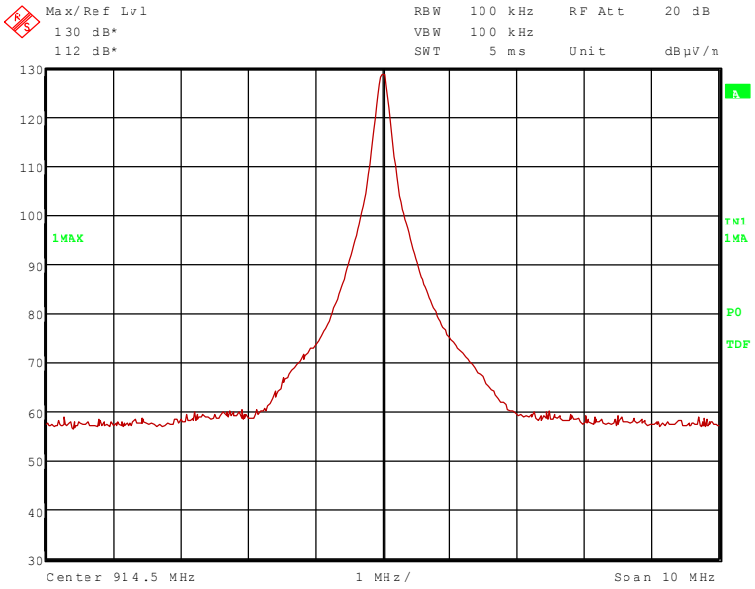
70243_32: Spurious emissions from 30 MHz to 230 MHz:



70243_33: Spurious emissions from 230 MHz to 1 GHz:



70243_31: Carrier frequency:

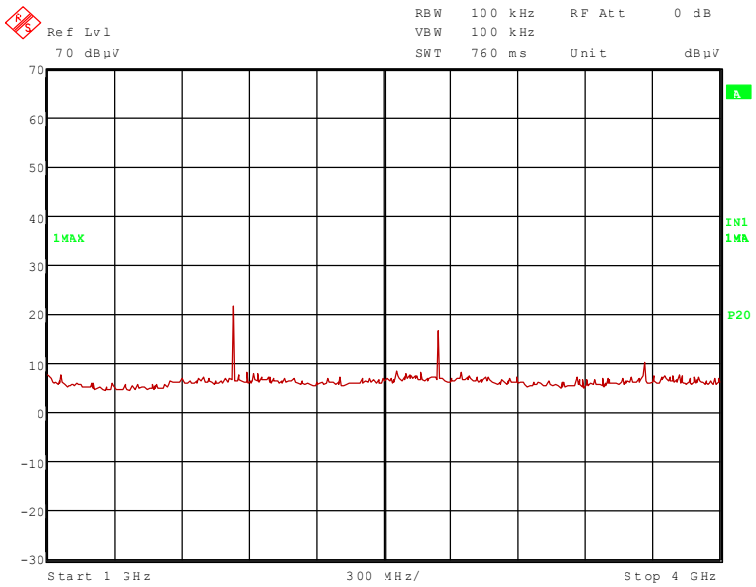


The following frequencies were found during the preliminary radiated emission test:

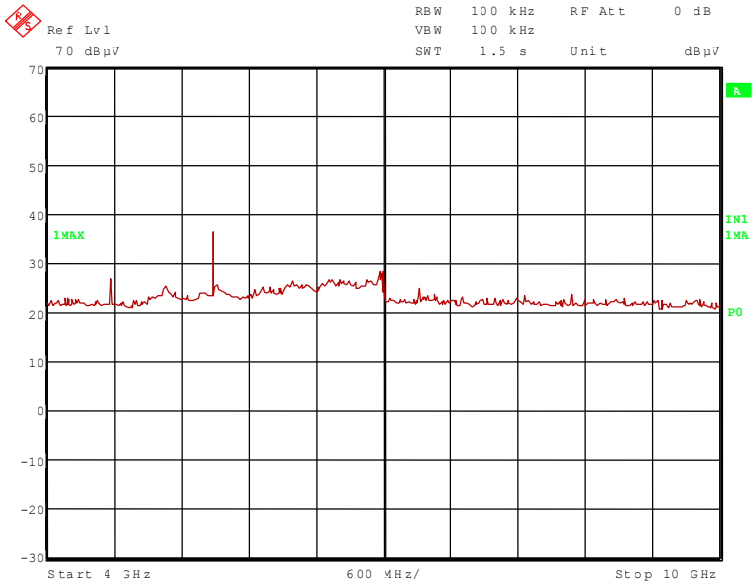
- 225.037 MHz, 300.050 MHz, 900.149 MHz, 914.750 MHz and 928.868 MHz.

These frequencies have to be measured in a final measurement on a open area test site. The results were presented in the following.

70243_22: Spurious emissions from 1 GHz to 4 GHz:



70243_25: Spurious emissions from 4 GHz to 10 GHz:



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 2.7443 GHz and 4.5738 GHz.

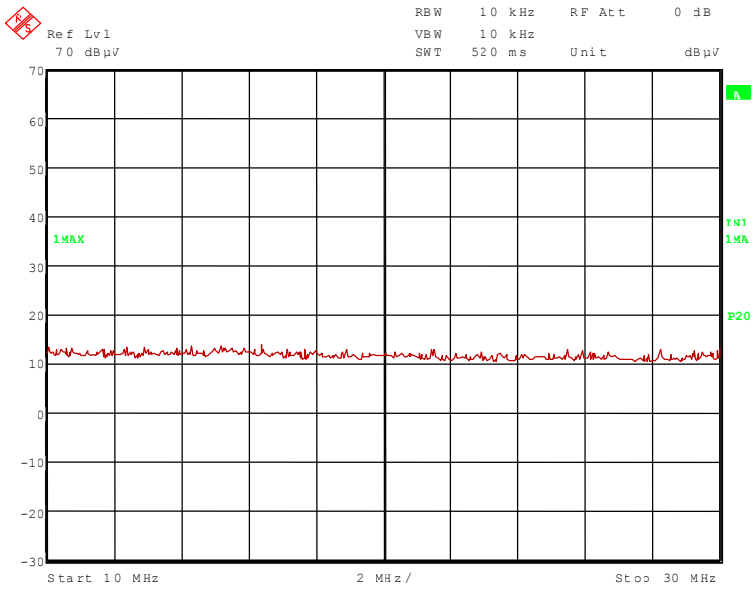
The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 1.8295 GHz and 5.4885 GHz

These frequencies have to be measured in a final measurement. The results were presented in the following.

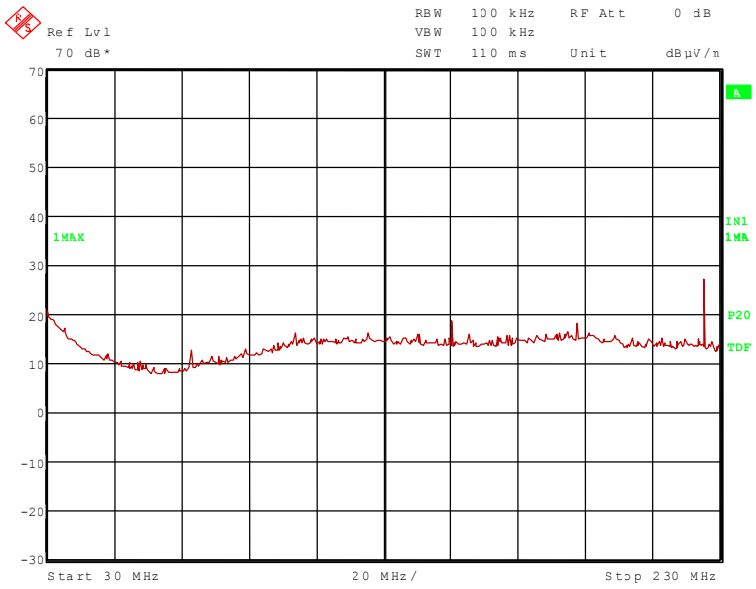
Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

70243_51: Spurious emissions from 10 MHz to 30 MHz:

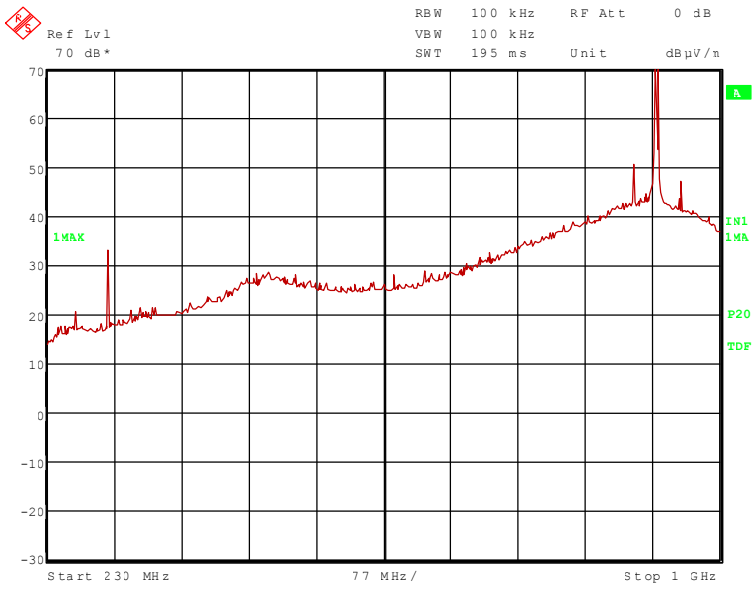


No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the outdoor test site.

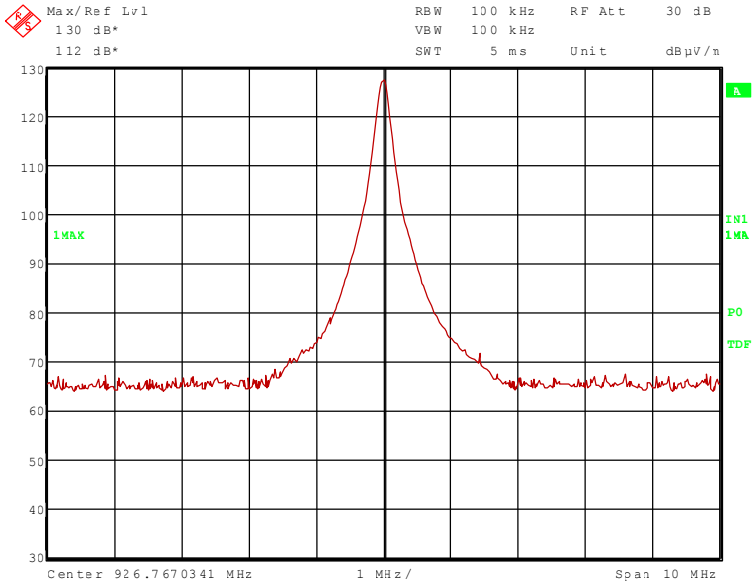
70243_36: Spurious emissions from 30 MHz to 230 MHz:



70243_37: Spurious emissions from 230 MHz to 1 GHz:



70243_34: Carrier frequency:

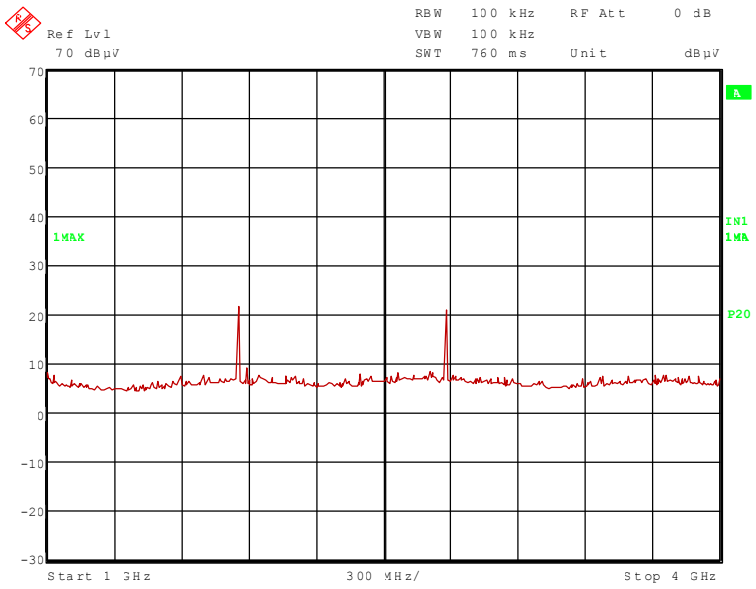


The following frequencies were found during the preliminary radiated emission test:

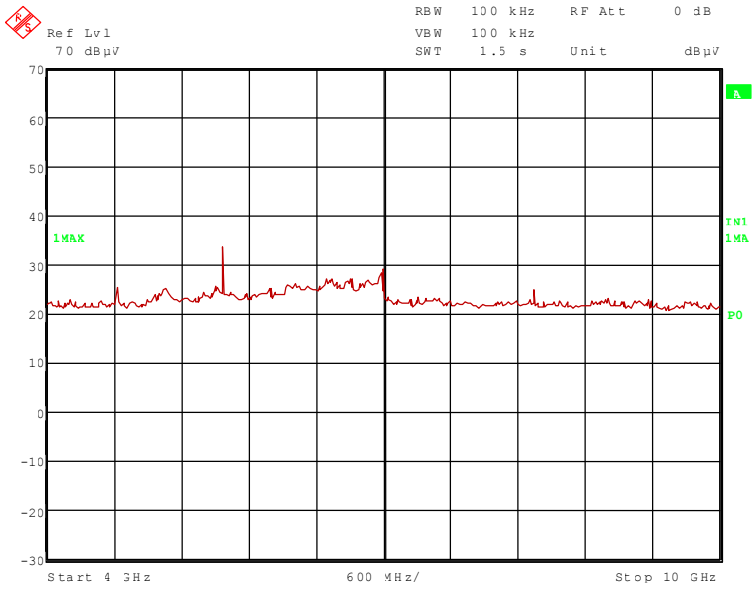
- 225.037 MHz, 300.050 MHz, 900.148 MHz, 926.750 MHz and 953.870 MHz.

These frequencies have to be measured in a final measurement on a open area test site. The results were presented in the following.

70243_23: Spurious emissions from 1 GHz to 4 GHz:



70243_24: Spurious emissions from 4 GHz to 10 GHz:



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 2.7803 GHz.

The following frequencies were found outside the restricted bands during the preliminary radiated emission test:

- 1.8535 GHz and 5.5605 GHz

These frequencies have to be measured in a final measurement. The results were presented in the following.

5.7.2.2 FINAL RADIATED EMISSION TEST (30 MHz to 1 GHz)

Ambient temperature:	19 °C	Relative humidity:	32 %

Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

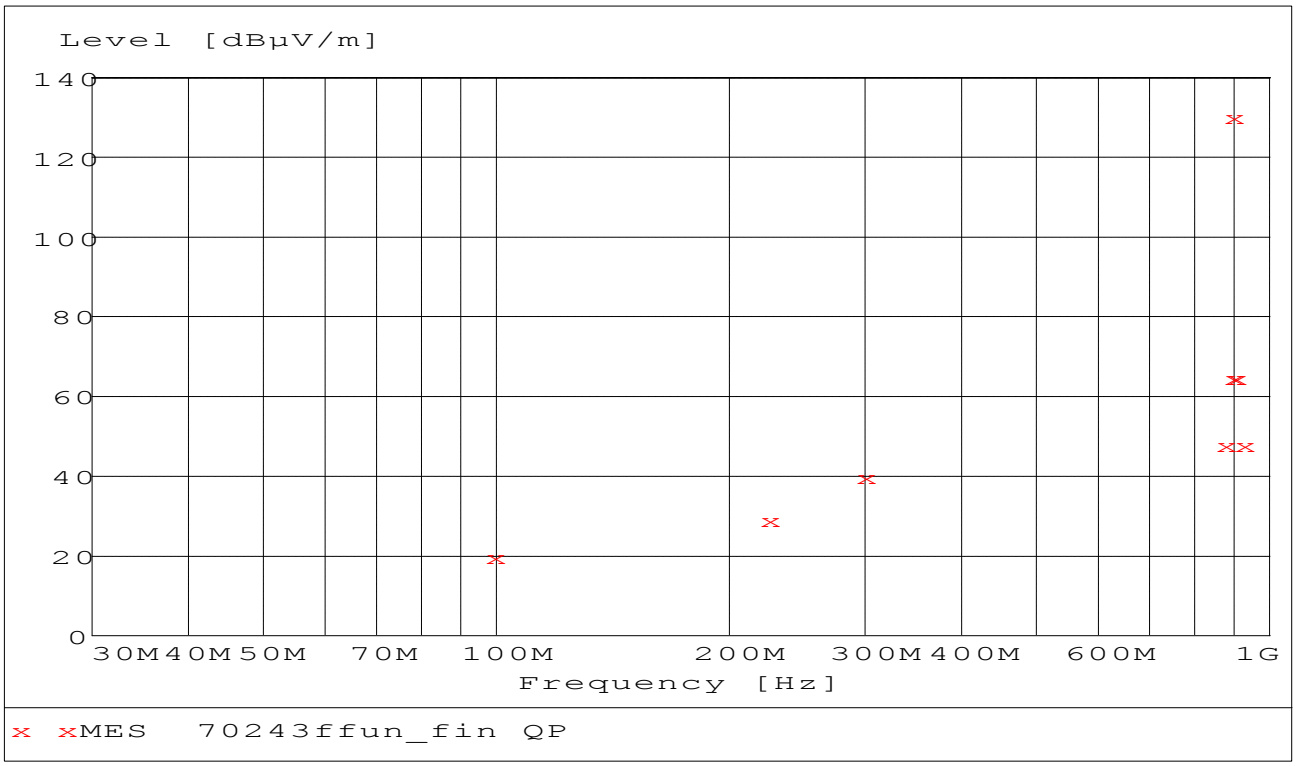
Supply voltage: During all measurements the EUT was supplied with 12.0 V DC.

Test results: The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + cable loss [dB] + antenna factor [dB/m]

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

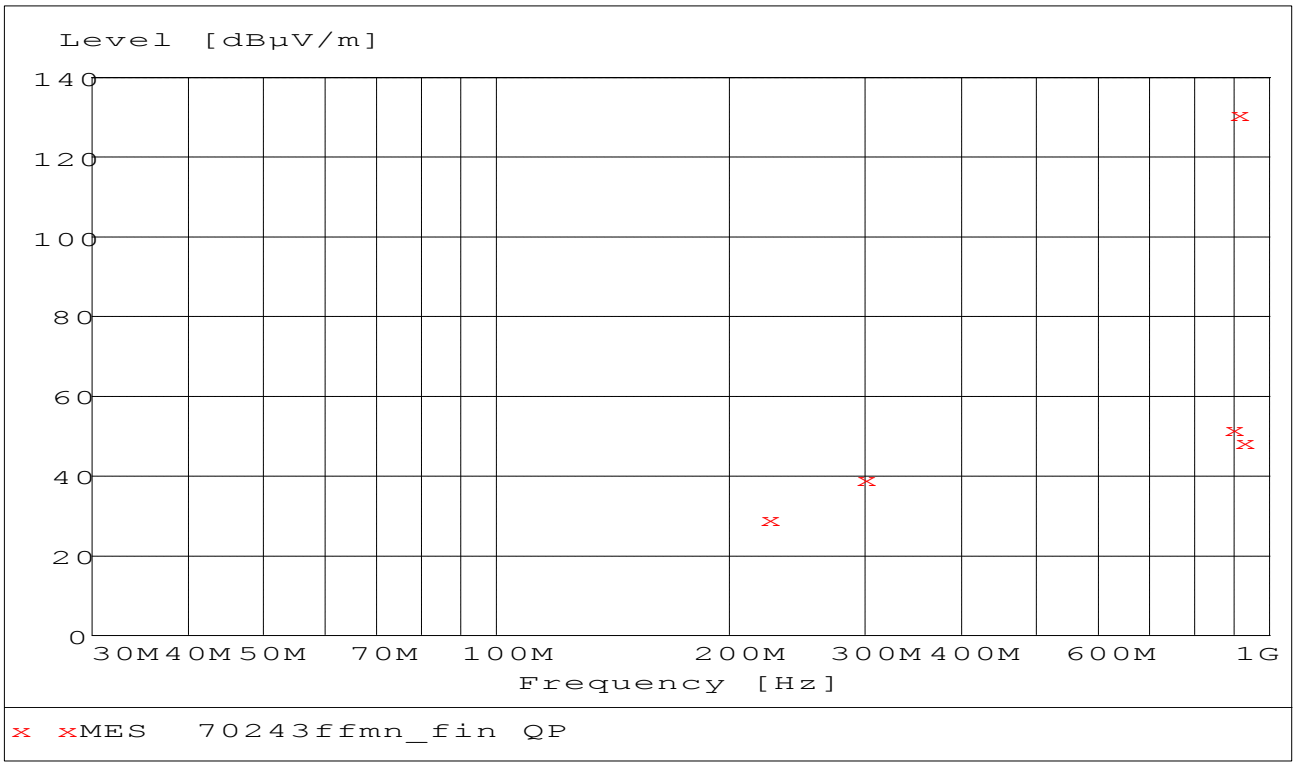
The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with x are the measured results of the standard final measurement on the open area test site.



Data record name: 70243ffun

Transmitter operates at the middle of the assigned frequency band (operation mode 2)

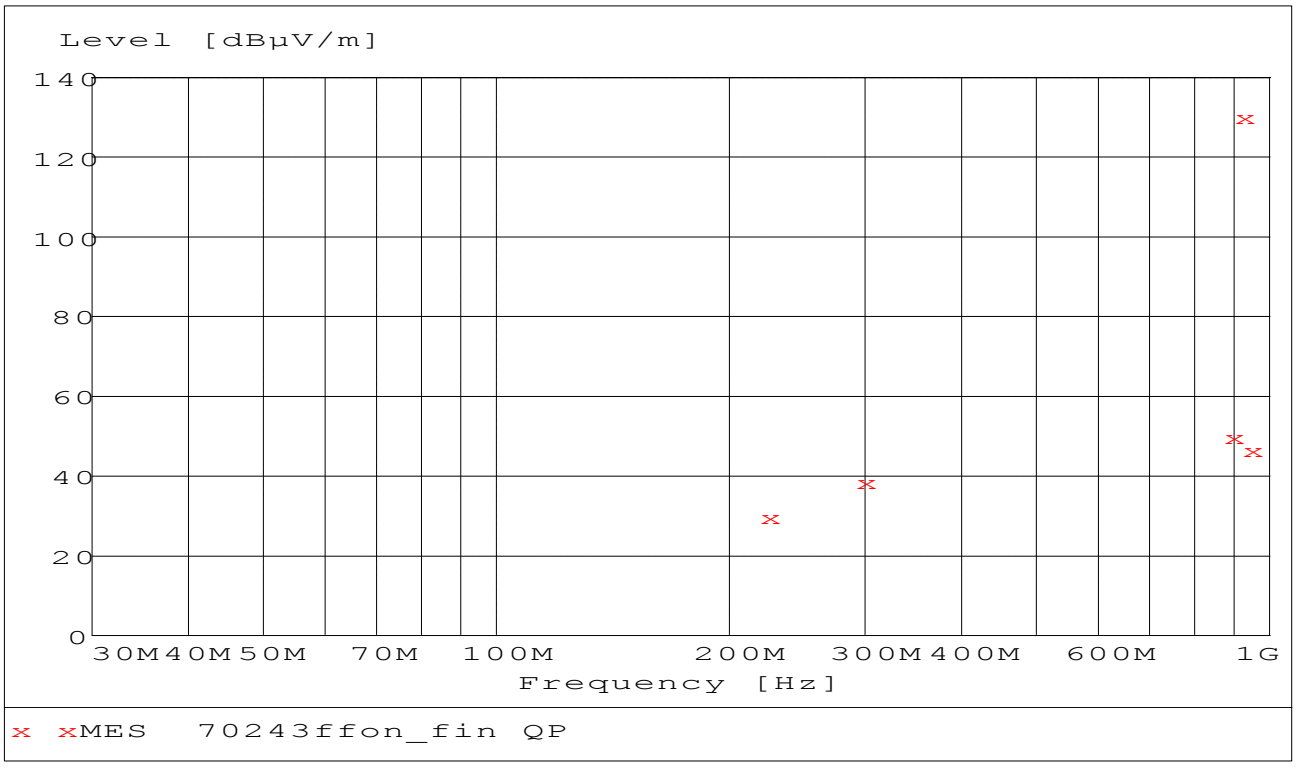
The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with x are the measured results of the standard final measurement on the open area test site.



Data record name: 70243ffmn

Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

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 x are the measured results of the standard final measurement on the open area test site.



Data record name: 70243ffon

The results of the standard final measurement on the open area 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 3 m measuring distance.

The measurement time with the quasi-peak measuring detector is 5 seconds.

Result measured with the quasipeak detector:

(These values are marked in the above diagram by x)

Spurious emissions outside restricted bands									
Transmitter operates at the lower end of the assigned frequency band (operation mode 1)									
Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor dB/m	Cable loss dB	Height cm	Azimuth deg	Pol.
99.558	19.7	43.5	23.8	8.4	10.7	0.6	138.0	227.0	Hor.
225.037	29.3	46.0	16.7	18.3	10.1	0.9	141.0	224.0	Vert.
300.050	39.9	46.0	6.1	25.8	13.0	1.1	106.0	146.0	Hor.
878.257	48.2	110.3	62.1	24.2	22.1	1.9	100.0	78.0	Vert.
900.148	64.5	110.3	45.8	40.1	22.4	2.0	100.0	83.0	Vert.
902.250	130.3	-	-	105.9	22.4	2.0	122.0	57.0	Hor.
904.374	64.7	110.3	45.6	40.2	22.5	2.0	100.0	83.0	Vert.
926.257	48.3	110.3	62.0	23.0	23.3	2.0	100.0	81.0	Vert.
Transmitter operates at the middle of the assigned frequency band (operation mode 2)									
Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor dB/m	Cable loss dB	Height cm	Azimuth deg	Pol.
225.037	29.6	46.0	16.4	18.6	10.1	0.9	143.0	210.0	Vert.
300.050	39.7	46.0	6.3	25.6	13.0	1.1	104.0	136.0	Hor.
900.149	52.3	111.1	58.8	27.9	22.4	2.0	100.0	63.0	Vert.
914.750	131.1	-	-	106.3	22.8	2.0	122.0	57.0	Hor.
928.868	49.0	111.1	62.1	23.6	23.4	2.0	100.0	45.0	Vert.
Transmitter operates at the upper end of the assigned frequency band (operation mode 3)									
Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor dB/m	Cable loss dB	Height cm	Azimuth deg	Pol.
225.037	29.8	46.0	16.2	18.8	10.1	0.9	144.0	201.0	Vert.
300.050	38.9	46.0	7.1	24.8	13.0	1.1	100.0	134.0	Hor.
900.148	50.2	110.6	60.4	25.8	22.4	2.0	100.0	45.0	Vert.
926.750	130.6	-	-	105.3	23.3	2.0	111.0	45.0	Hor.
953.870	46.7	110.6	63.9	20.7	23.9	2.1	400.0	90.0	Vert.
Spurious emissions in restricted bands									
Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor dB/m	Cable loss dB	Height cm	Azimuth deg	Pol.
-	-	-	-	-	-	-	-	-	-
Measurement uncertainty				+2.2 dB / -3.6 dB					

The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + cable loss [dB] + antenna factor [dB/m]

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

14 – 20

5.7.2.3 FINAL MEASUREMENT (1 GHz to 25 GHz)

Ambient temperature	21 °C	Relative humidity	36 %

Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

Supply voltage: During all measurements the EUT was supplied with 5.0 V DC via the carrier board.

Resolution bandwidth: For all measurements a resolution bandwidth of 1 MHz was used.

Remark: As external antenna the SOA 2400/360/6/0/V with a 30 cm antenna cable was used, because of the highest gain of this antenna type. Additionally pre-tests have shown that this antenna and this antenna cable caused the highest spurious emissions of all monopole antennas in question.

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

Result measured with the peak detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8045	50.9	110.3	59.4	20.5	27.9	0	2.5	150	Vert.	No
2.7068	54.6	74.0	19.4	21.0	30.7	0	2.9	150	Vert.	Yes
3.6090	55.8	74.0	18.2	19.7	32.8	0	3.3	150	Vert.	Yes
5.4135	50.3	74.0	23.7	36.4	35.2	25.4	4.1	150	Hor.	Yes
Measurement uncertainty						+2.2 dB / -3.6 dB				

Result measured with the average detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8045	43.8	110.3	66.5	13.4	27.9	0	2.5	150	Vert.	No
2.7068	46.9	54.0	7.1	13.3	30.7	0	2.9	150	Vert.	Yes
3.6090	46.9	54.0	7.1	10.8	32.8	0	3.3	150	Vert.	Yes
5.4135	42.5	54.0	11.5	28.6	35.2	25.4	4.1	150	Hor.	Yes
Measurement uncertainty						+2.2 dB / -3.6 dB				

Transmitter operates at the middle of the assigned frequency band (operation mode 2)

Result measured with the peak detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8295	54.8	111.1	56.3	24.4	27.9	0	2.5	150	Vert.	No
2.7443	53.1	74.0	20.9	19.5	30.7	0	2.9	150	Hor.	Yes
4.5738	43.2	74.0	30.8	32.3	33.0	26.0	3.9	150	Vert.	Yes
5.4885	54.4	111.1	56.7	40.5	35.2	25.4	4.1	150	Hor.	No
Measurement uncertainty						+2.2 dB / -3.6 dB				

Result measured with the average detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8295	50.8	111.1	60.3	20.4	27.9	0	2.5	150	Vert.	No
2.7443	43.9	54.0	10.1	10.3	30.7	0	2.9	150	Hor.	Yes
4.5738	32.4	54.0	21.6	21.5	33.0	26.0	3.9	150	Vert.	Yes
5.4885	50.1	111.1	61.0	36.2	35.2	25.4	4.1	150	Hor.	No
Measurement uncertainty						+2.2 dB / -3.6 dB				

Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

Result measured with the peak detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8535	55.6	110.6	55.0	25.2	27.9	0	2.5	150	Vert.	No
2.7803	58.0	74.0	16.0	24.4	30.7	0	2.9	150	Hor.	Yes
5.5605	52.6	110.6	58.0	38.7	35.2	25.4	4.1	150	Hor.	No
Measurement uncertainty						+2.2 dB / -3.6 dB				

Result measured with the average detector:

Frequency GHz	Corr. value dBµV/m	Limit dBµV/m	Margin dB	Readings dBµV	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
1.8535	51.1	110.6	59.1	20.7	27.9	0	2.5	150	Vert.	No
2.7803	53.7	54.0	0.3	20.1	30.7	0	2.9	150	Hor.	Yes
5.5605	46.6	110.6	64.0	32.7	35.2	25.4	4.1	150	Hor.	No
Measurement uncertainty						+2.2 dB / -3.6 dB				

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54

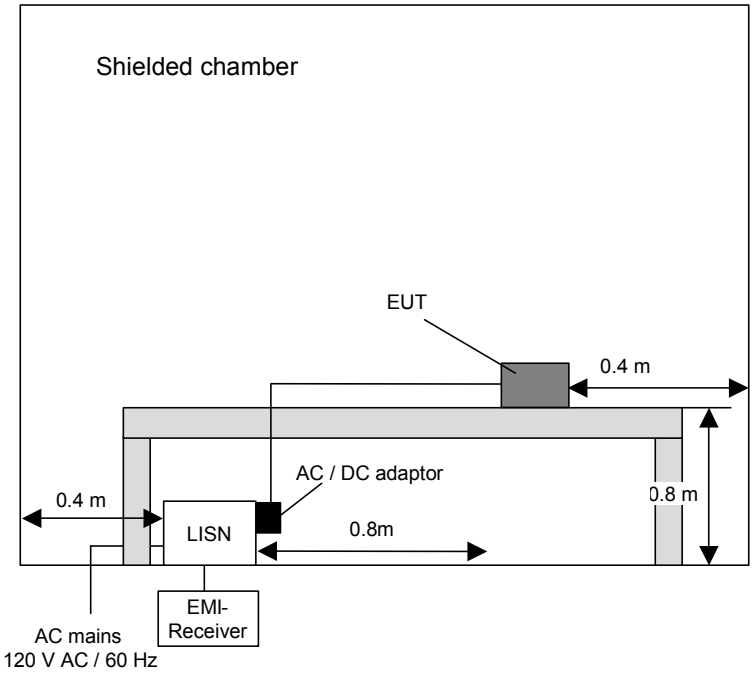
5.8 CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 kHz to 30 MHz)

5.8.1 METHOD OF MEASUREMENT (CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 KHz to 30 MHz))

This test will be carried out in a shielded chamber. Tabletop devices will 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 will be placed directly on the ground plane. The set up of the Equipment under test will be in accordance to
ANSI C63.4-2003 [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase (or plus pole in case of DC powered devices) of the AC mains network. If levels detected 10 dB below the appropriable limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz



5.8.2 TEST RESULTS (CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 KHz to 30 MHz))

Ambient temperature:	20 °C	Relative humidity:	43 %

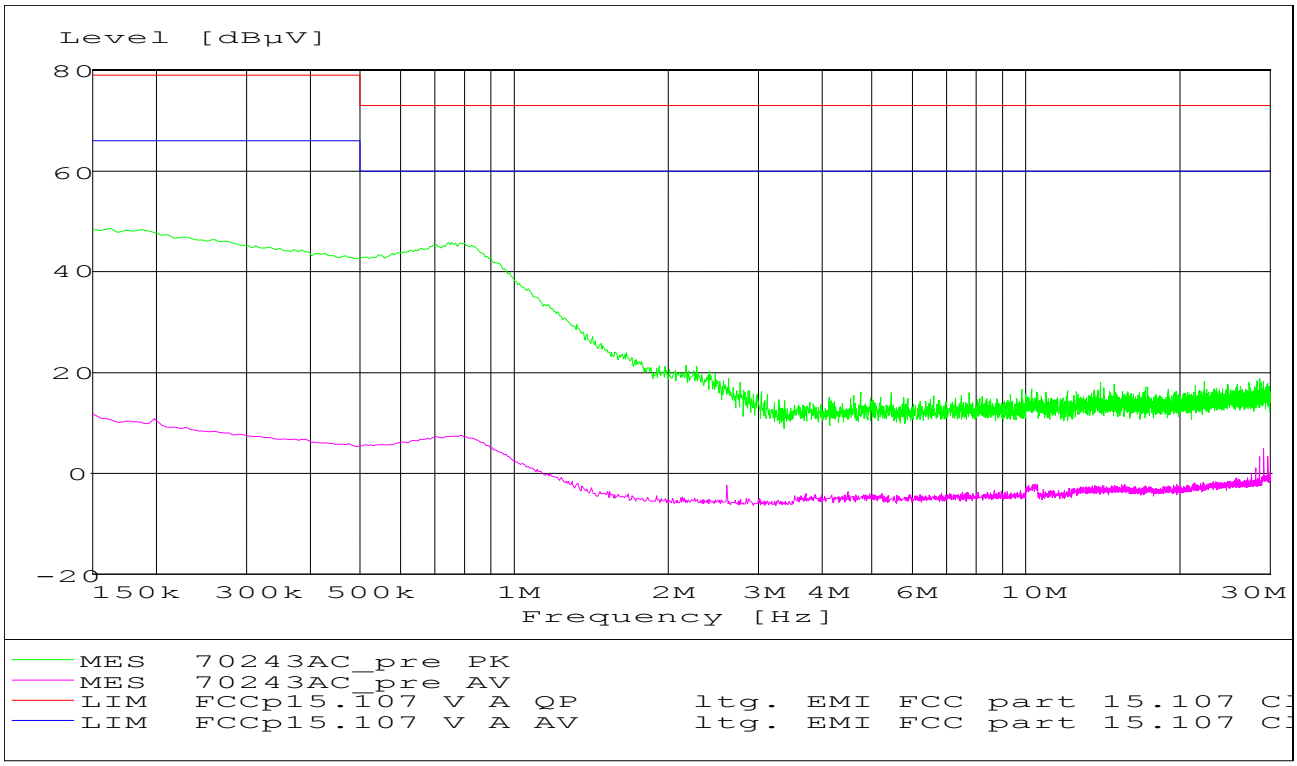
Position of EUT: The EUT was set-up on a wooden table of a height of 0.8 m.

Cable guide: All cables of the EUT were fixed on the wooden table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: The test was carried out in normal operation mode of the EUT(without reading a TAG). All results are shown in the following.

Power supply: During this test the EUT was powered by an AC/DC adaptor type FW 3288 with 12 V DC.

EUT: UDL500
Manufacturer: deister electronic GmbH
Operating Condition: 120 V / 60 Hz
Test site: PHOENIX TESTLAB Blomberg M4
Operator: Th. Kühn
Test Specification: Frequency hopping (normal)
Comment: With AC / DC adaptor type FRIWO FW 3288



Data record name: 70243AC

Test: Passed

TEST EQUIPMENT USED:

1 - 3, 5, 6

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

Emission measurement at AC mains and DC in / out ports at M4					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
1	Shielded chamber M4	-	Siemens	B83117S1-X158	480088
2	Measuring receiver	ESAI	Rohde & Schwarz	831953/001 833181/018	480025 480026
3	LISN	NSLK8128	Schwarzbeck	8128155	480058
4	DC-filter	B84266-A21-E13	Siemens	940164525	480099
5	AC-filter	B84299-D87-E3	Siemens	930262292	480097
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M5					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
7	Fully anechoic chamber M5	-	Siemens	B83177-S1-X156	480073
8	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
9	Controller	HD100	Deisel	100/324	480067
10	Antenna support	MA240	Deisel	228/314	480069
11	Turntable	DS412	Deisel	412/317	480070
12	Antenna	CBL6112C	Chase	2689	480327
13	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M6					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
14	Open area test site	-	Phoenix Test-Lab	-	480085
15	Measuring receiver	ESCS30	Rohde & Schwarz	828985/014	480270
16	Controller	HD100	Deisel	100/670	480139
17	Turntable	DS420HE	Deisel	420/620/80	480087
18	Antenna support	AS615P	Deisel	615/310	480086
19	Antenna	CBL6111 A	Chase	1643	480147
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M8					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
21	Fully anechoic chamber M8	-	Siemens	B83117-E7019-T231	480190
22	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
23	Measuring receiver	ESCS 30	Rohde & Schwarz	828985/014	480270
24	Controller	HD100	Deisel	100/427	480181
25	Turntable	DS420	Deisel	420/435/97	480186
26	Antenna support	AS615P	Deisel	615/310	480187
27	Antenna	CBL6112 A	Chase	2034	480185
28	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M20					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303
30	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355
32	Controller	HD100	Deisel	100/670	480326
33	Turntable	DS420HE	Deisel	420/620/80	480315
34	Antenna support	AS615P	Deisel	615/310	480187
35	Antenna	CBL6112 B	Chase	2688	480328
36	Antenna	3115 A	EMCO	9609-4918	480183
37	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294
38	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	482	480295
39	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297
40	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	410	480296
41	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	469	480299

No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
42	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	468	480298
43	RF-cable No. 30	RTK 081	Rosenberger	-	410141
44	RF-cable No. 31	RTK 081	Rosenberger	-	410142
45	RF-cable 1m	KPS-1533-400-KPS	Insulated Wire	-	480300
46	RF-cable 1m	KPS-1533-400-KPS	Insulated Wire	-	480301
47	RF-cable 2m	KPS-1533-400-KPS	Insulated Wire	-	480302
48	RF-cable No. 5	RTK 081	Rosenberger		410097
49	Preamplifier	JS3-00101200-23-5A	Miteq	681851	480337
50	Preamplifier	JS3-12001800-16-5A	Miteq	571667	480343
51	Preamplifier	JS3-18002600-20-5A	Miteq	658697	480342
52	Preamplifier	JS3-26004000-25-5A	Miteq	563593	480344
53	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Ancillary equipment used for testing					
No.	Test equipment	Type	Manufacturer	Serial No.	PM-No
54	Power supply	TOE 8852	Toellner	51712	480233
55	Audio analyser	UPL	Rohde & Schwarz	845646/019	480226
-	-	-	-	-	-
-	-	-	-	-	-

All used measurement equipment was calibrated (if necessary). The calibration intervals and the calibration history will be given out on request.

7 LIST OF ANNEXES

ANNEX A	**PHOTOGRAPHS OF THE TEST SET-UPS**:	**6 pages**
	UDL500, test set-up fully anechoic chamber	70243_d.jpg
	UDL500, test set-up fully anechoic chamber	70243_a.jpg
	UDL500, test set-up fully anechoic chamber	70243_c.jpg
	UDL500, test set-up fully anechoic chamber	70243_e.jpg
	UDL500, test set-up open area test site	70243_f.jpg
	UDL500, test set-up shielded room	70243_b.jpg
ANNEX B	**INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE**:	**12 pages**
	UDL500, front housing removed	70243_13.jpg
	UDL500, reader sandwich, 3-D-view 1	70243_12.jpg
	UDL500, reader sandwich, 3-D-view 2	70243_11.jpg
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	UDL500, rf PCB, top view	70243_5.jpg
	UDL500, rf PCB, top view, shielding removed	70243_4.jpg
	UDL500, rf PCB, bottom view	70243_6.jpg
	UDL500, antenna PCB, top view	70243_3.jpg
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ANNEX C	**EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE**:	**4 pages**
	UDL500, 3-D-view 1	70243_15.jpg
	UDL500, 3-D-view 2	70243_14.jpg
	UDL500, type plate	70243_16.jpg
	UDL500, rear cover opened	70243_1.jpg
ANNEX D	**ADDITIONAL DECLARATION 902 MHz**:	**1 page**