

TEST REPORT

Test Report Reference: F101042E2

Equipment under Test / model name: cB-0926-02 inside cB-RWE241

FCC ID: PVH0926

IC: 5325A-0926

Serial Number: None

Applicant: connectBlue AB

Manufacturer: connectBlue AB

**Test Laboratory
(CAB)
accredited by
DATech in der TGA 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 IC3469A-1 and
FCC Test site registration number 90877**

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1 IDENTIFICATION

1.1 APPLICANT

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	Malmö SE-211 19
Country:	Sweden
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Fax:	+ 46 40 23 71 37
e-mail address:	martin.engdahl@connectblue.se

1.2 MANUFACTURER

Name:	connectBlue AB
Address:	Norra Vallgatan 64 3V
	Malmö SE-211 19
Country:	Sweden
Name for contact purposes:	Mr. Martin Engdahl
Tel:	+ 46 40 63 07 100
Fax:	+ 46 40 23 71 37
e-mail address:	martin.engdahl@connectblue.se

1.3 DATES

Date of receipt of test sample:	12 April 2010
Start of test:	14 April 2010
End of test:	04 May 2010

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1.4 TEST LABORATORY

The tests were carried out at:

PHOENIX TESTLAB GmbH
Königswinkel 10
D-32825 Blomberg
Germany

Phone: +49 (0) 52 35 / 95 00-0
Fax: +49 (0) 52 35 / 95 00-10

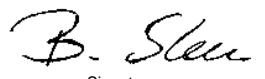
accredited by Deutsche Gesellschaft für Akkreditierung mbH in compliance with DIN EN ISO/IEC 17025 under Reg. No. DGA-PL-105/99-22, Industry Canada Test site registration IC3469A-1 and FCC Test site registration number 90877.

Test engineer: Thomas KÜHN
Name



05 May 2010
Date

Test report checked: Bernd STEINER
Name



05 May 2010
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 C63.4-2009** 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** Radio Frequency Devices
- [3] **FCC Public Notice DA 02-2138 (August 2002)**
- [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
- [6] **Publication Number 913591 (March 2007)** Measurement of radiated emissions at the edge of the band for a Part 15 RF Device

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.

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2 TECHNICAL DATA OF EQUIPMENT

Type of equipment: *	WLAN module inside 5 GHz Ethernet to WLAN Adapter					
Type designation / model name: *	cB-0926-02 inside cB-RWE241					
Hardware / software version: *	HW 2 / SW 2.0.0					
FCC ID: *	PVH0926					
IC: *	5235A-0926					
Antenna type: *	Integrated antenna (inside cB-RWE241) type cB-9017-01					
Antenna gain: *	4.0 dBi					
Power supply (WLAN-unit): *	$U_{\text{nom}}=$	5.0 V DC	$U_{\text{min}}=$	3.3 V DC	$U_{\text{max}}=$	5.5 V DC
Power supply (cB-RWE241): *	$U_{\text{nom}}=$	24.0 V DC	$U_{\text{min}}=$	9.0 V DC	$U_{\text{max}}=$	30.0 V DC
Type of modulation: *	DSSS/OFDM					
Operating frequency range: *	5.18 to 5.24 GHz (4 channels with 20 MHz channel separation)					
Number of channels: *	4					
Temperature range: *	-30 °C to +65 °C					

*: declared by the applicant

The following external I/O cables were used:

Cable	Length	Shielding	Connector	Connector name
DC in	2 m *	No	A-coded Male M12	Power
Digital input / output	2 m*	No	A-coded Male M12	Power
Ethernet	2 m *	Yes	D-coded Female M12	LAN
-	-	-	-	-

*: Length during the test if no other specified.

2.1 PERIPHERY DEVICES

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

- A personal computer with a configuration-software was used. It was connected to Ethernet port of the EUT for setting the equipment into the necessary operation mode. During emission measurements the personal computer was placed outside the measuring environment.
- For the conducted emission measurement on AC mains an AC / DC adaptor type VANSON Mod. SMP-1000A012 was used to supply the EUT with 24.0 V DC.

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3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

The EUT is intended to convert Ethernet to WLAN signals. All radiated tests were carried out with a sample with integral antenna (antenna integrated inside the cB-RWE241); conductive tests were carried out on the internal U.FL connector of the integrated WLAN module.

During the tests the EUT was mounted inside a cB-RWE241 and powered with 24.0 V DC. The operation mode was adjusted with the help of a configuration-software at a laptop computer, which was connected to the Ethernet interface of the cB-RWE241.

During the emission measurement on AC mains a communication link to a 5 GHz host was set up and with the software fping a ping was send to the host from the personal computer at the Ethernet port of the EUT. Events on the digital input port were monitored over Ethernet on the personal computer.

The EUT contains also a 2.4 WLAN-transceiver. Object of this test report is the 5 GHz WLAN-transceiver part of the cB-0926-02 only. The results of the measurements of the 2.4 GHz WLAN-transceiver part and the digital device (cB-RWE241) will be documented in separate test reports

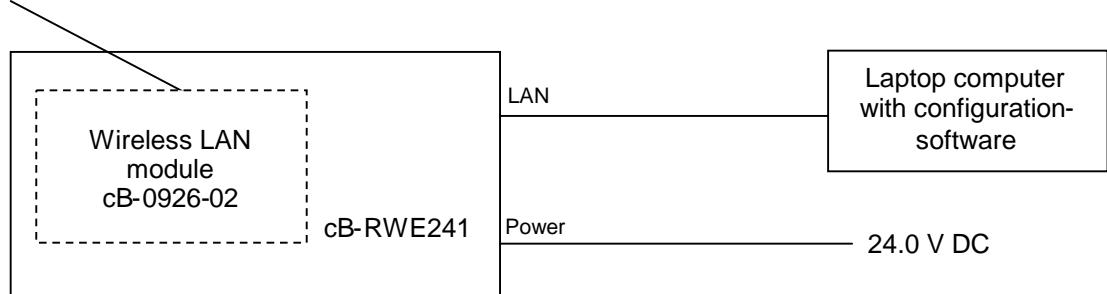
For adjusting the output power with the test software, a power setting of 82 was used during all tests.

During the tests, the EUT was not labelled with an FCC/IC-label.

The following operation modes were used during the tests:

Operation mode	Description of the operation mode
1	Continuous transmitting on 5180 MHz, a- or n-mode, with all applicable data rates
2	Continuous transmitting on 5200 MHz, a- or n-mode, with all applicable data rates
3	Continuous transmitting on 5220 MHz, a- or n-mode, with all applicable data rates
4	Continuous transmitting on 5240 MHz, a- or n-mode, with all applicable data rates
5	Continuous receiving on 5180 MHz
6	Continuous receiving on 5200 MHz
7	Continuous receiving on 5220 MHz
8	Continuous receiving on 5240 MHz

Physical boundary of the EUT



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4 LIST OF MEASUREMENTS

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section	RSS 210, Issue 7 [3] or RSS-Gen, Issue 2 [4]	Status	Refer page
26 dB spectrum bandwidth	5,150 – 5,250	15.407 (a)	A9.2 (1) [3]	Passed	10 et seq. of F091568E2
Maximum conducted output power	5,150 – 5,250	15.407 (a)	A9.2 (1) [3]	Passed	8 et seq.
Power spectral density	5,150 – 5,250	15.407 (a)	A9.2 (1) [3]	Passed	22 et seq. of F091568E2
Peak excursion	5,150 – 5,250	15.407 (a)	-	Passed	28 et seq. of F091568E2
Bandedge compliance	5,150 – 5,250	15.407 (b)	-	Passed	14 et seq.
Frequency stability	5,150 – 5,250	15.407 (g)	A9.5 (5) [3]	Passed	44 et seq. of F091568E2
Radiated emissions (transmitter)	30 – 40,000	15.209 (a) 15.407 (b)	A9.3 (1) [3], 4.7 [4]	Passed	19 et seq.
Conducted emissions on supply line	0.15 – 30	15.207 (a)	7.2.2 [4]	Passed	47 et seq.
Radiated emissions (receiver)	30 – 25,000	-	2.6 [3], 7.2.3 [4]	Passed	Annex D

5 ADDITIONAL INFORMATION

The WLAN-transceiver of the cB-RWE241 is already tested under the test report reference F091568E2 and certified under FCC ID PVH0926 / IC 5235A-0926. The reason for this test report is a new antenna type used with this application. This antenna is integrated inside the host device. Due to this fact all measurements were carried out with the WLAN module mounted inside the cB-RWE241 and no carrier board was used. All radiated measurements and the conducted output power measurement were repeated and documented. All conducted measurement results were documented under test report reference F091568E2.

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6 TEST RESULTS

6.1 MAXIMUM CONDUCTED OUTPUT POWER

6.1.1 METHOD OF MEASUREMENT (MAXIMUM CONDUCTED 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, the transmitter shall work with its maximum data rate.

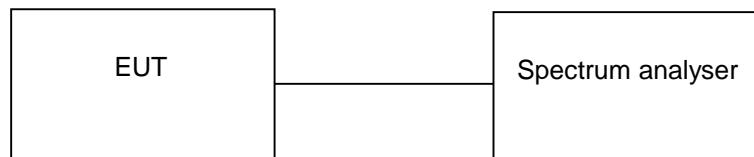
The following spectrum analyser settings shall be used:

- Span: Wide enough to encompass the entire emissions bandwidth (EBW) of the signal, centered on the actual channel.
- Resolution bandwidth: 1 MHz.
- Video bandwidth: 5 MHz.
- Sweep: Auto.
- Detector function: Sample
- Trace mode: Max hold.

Test will be performed in accordance with FCC Public Notice DA 02-2138, method 3. After trace stabilisation the marker shall be set on the signal peak. In case of multiple antennas, the measurement has to be repeated on each antenna port and the results have to be assumed.

The measurement will be performed on all channels.

Test set-up:



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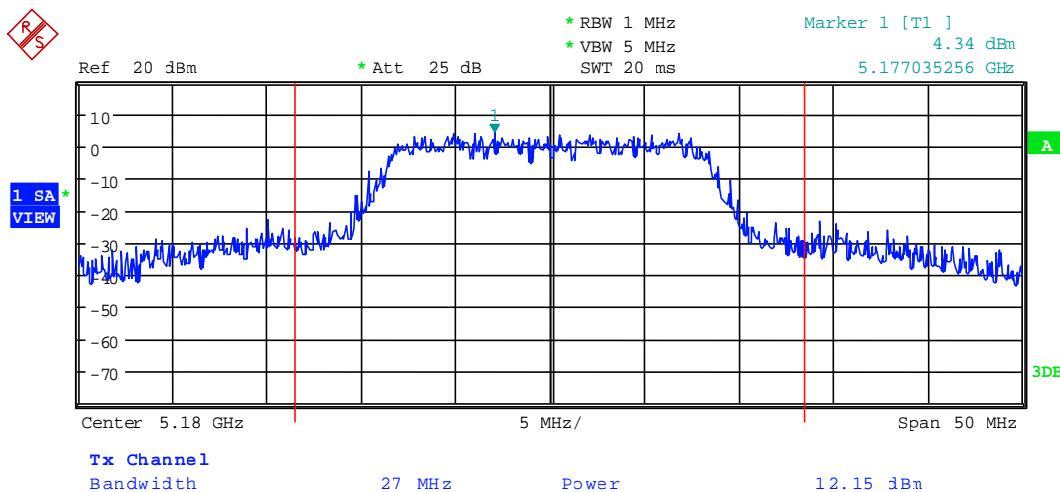
6.1.2 TEST RESULTS (MAXIMUM CONDUCTED OUTPUT POWER)

Ambient temperature	20 °C	Relative humidity	40 %
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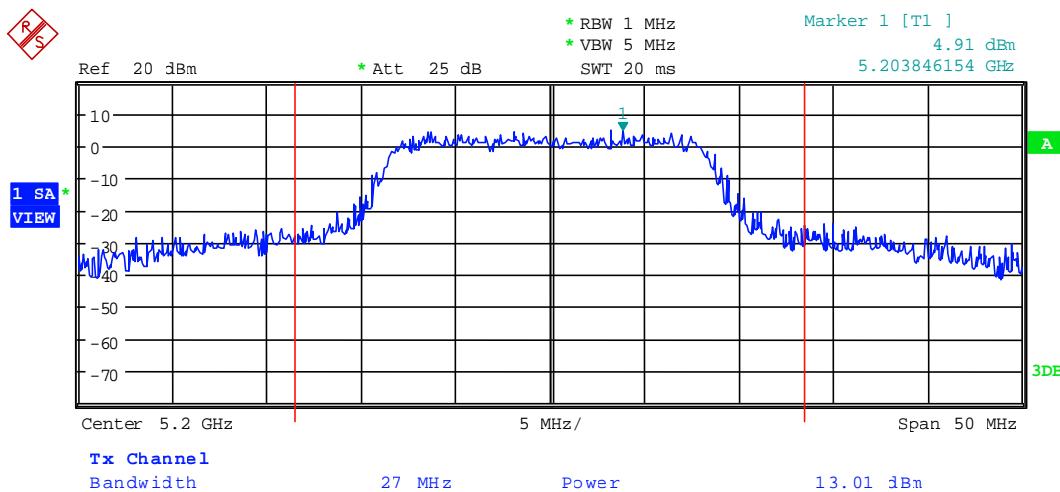
Measured with method 3

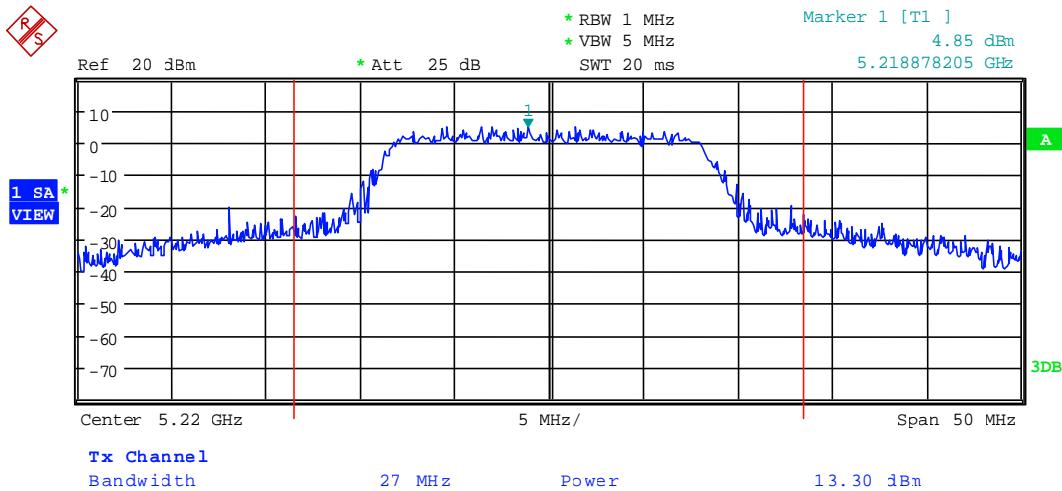
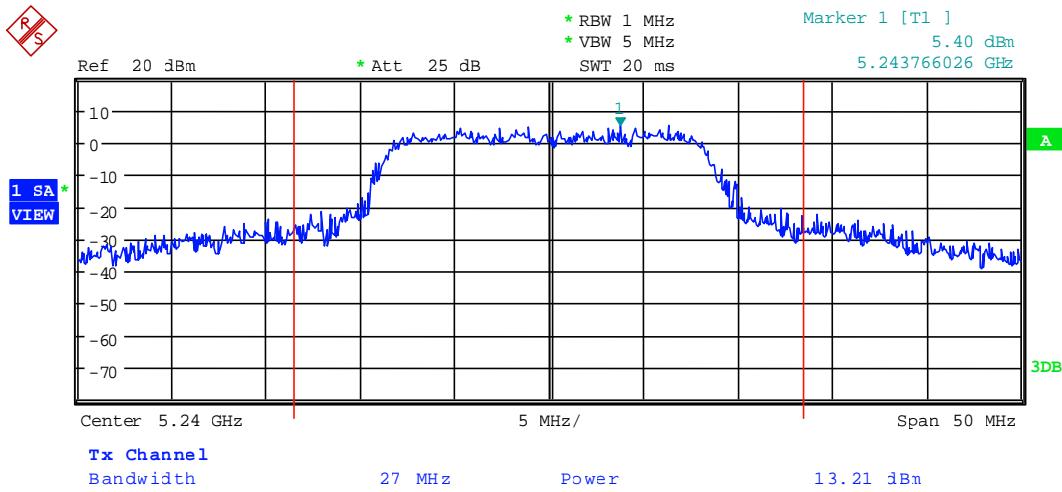
$T_{xon} = 200 \mu s$

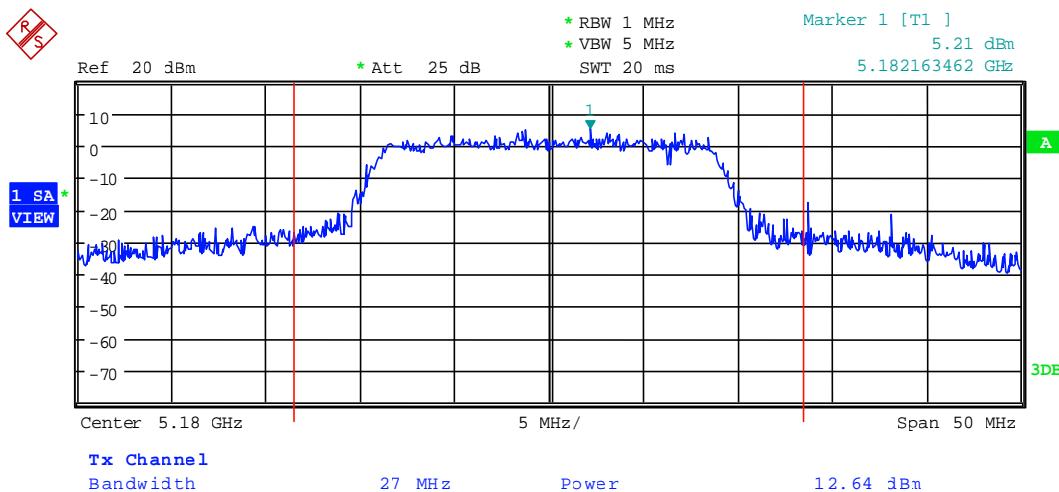
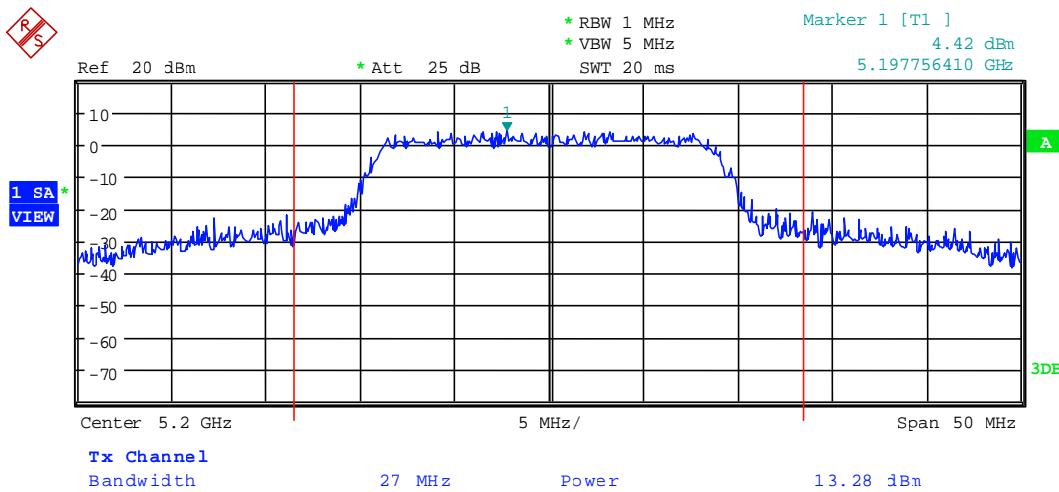
101041_102.wmf: Maximum conducted output power, operation mode 1, a-mode, 6 Mbps:



101042_103.wmf: Maximum conducted output power, operation mode 2, a-mode, 6 Mbps:

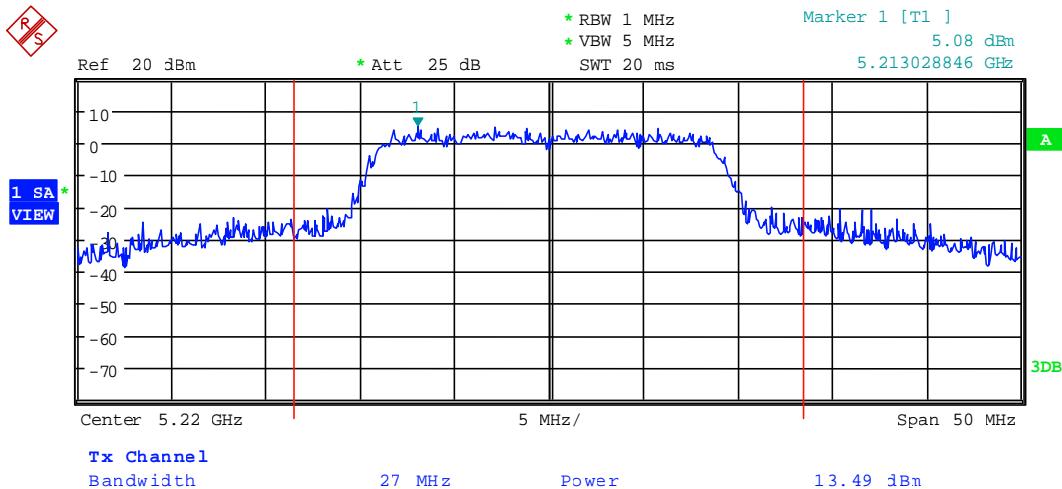


TEST REPORT REFERENCE: F101042E2
101042_104.wmf: Maximum conducted output power, operation mode 3, a-mode, 6 Mbps:

101042_105.wmf: Maximum conducted output power, operation mode 4, a-mode, 6 Mbps:


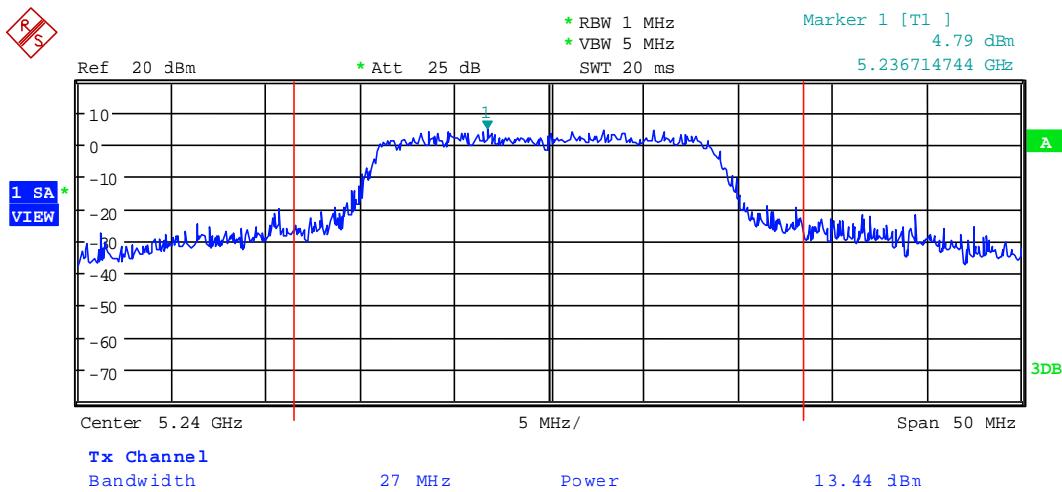
TEST REPORT REFERENCE: F101042E2
10102_106: Maximum conducted output power, operation mode 1, n-mode, 6 Mbps:

101042_107.jpg: Maximum conducted output power, operation mode 2, n-mode, 6 Mbps:


TEST REPORT REFERENCE: F101042E2

101042_108.wmf: Maximum conducted output power, operation mode 3, n-mode, 6 Mbps:



101042_109.wmf: Maximum conducted output power, operation mode 4, n-mode, 6 Mbps:



TEST REPORT REFERENCE: F101042E2

Operation mode 1 to 4 a-mode with 6 Mbps data rate (worst case)				
Channel number	Channel frequency [MHz]	Maximum conducted output power [dBm]	Antenna gain [dBi]	Limit [dBm]
36	5180	12.2	4.0	17.0
40	5200	13.0	4.0	17.0
44	5220	13.3	4.0	17.0
48	5240	13.2	4.0	17.0
Operation mode 1 to 4 n-mode with 6 Mbps data rate (worst case)				
Channel number	Channel frequency [MHz]	Maximum peak output power [dBm]	Antenna gain [dBi]	Limit [dBm]
36	5180	12.6	4.0	17.0
40	5200	13.3	4.0	17.0
44	5220	13.5	4.0	17.0
48	5240	13.4	4.0	17.0

Measurement uncertainty	+0.66 dB / -0.72 dB
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Test: Passed (output power measured in order to compare with the values measured for the original listing under test report reference F091568E1).

TEST EQUIPMENT USED FOR THE TEST:

75

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6.2 BAND-EDGE COMPLIANCE

6.2.1 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE)

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 antenna, which causes the highest field strength on the wanted frequency.

The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peak level of the emission on the channel closest to the band-edge, as well as any modulation products, which fall outside the assigned frequency band.
- Resolution bandwidth: 1 MHz.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

The same test set-up as used for the final radiated emission measurement shall be used (refer also subclause 6.3.1 of this test report).

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 6.3.1 of this test report.

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

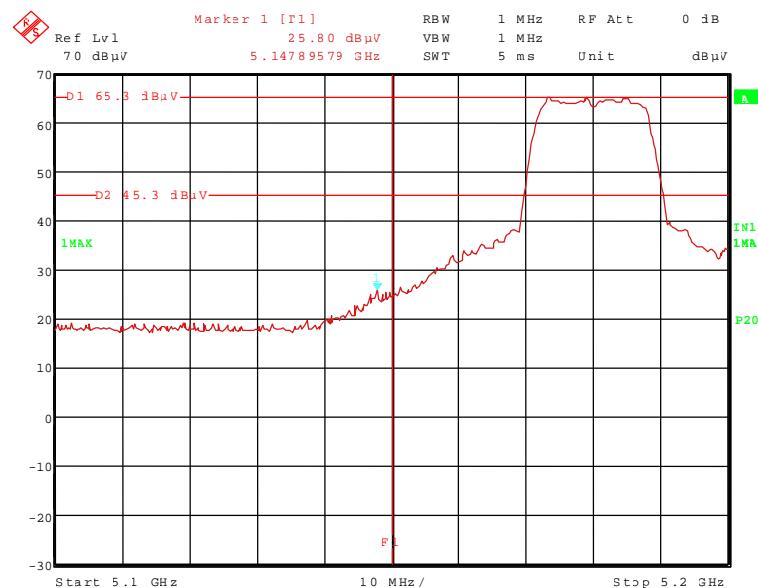
The plots at the next pages are showing radiated band-edge compliance with the worst case operation mode. The display line 1 (D1) in these plots represents the highest level within the assigned frequency band. The display line 2 (D2) represents the 20 dB offset to this highest level and shows the compliance with FCC 47 CFR Part 15.247 (d). The frequency line 1 (F1) shows the edge of the assigned frequency. The following tables are showing the results for the radiated band edge compliance for all applicable operation modes with the worst case data rate, causing the highest emissions at the band edges.

TEST REPORT REFERENCE: F101042E2

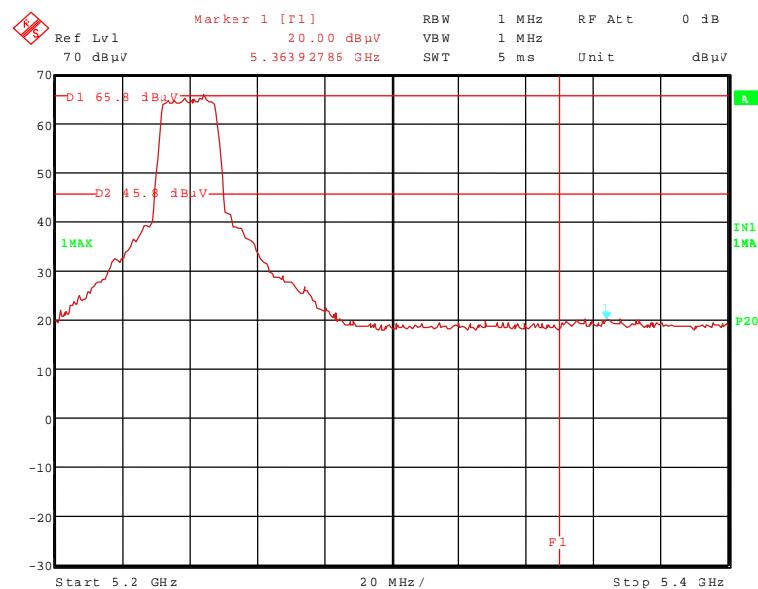
6.2.2 TEST RESULT (BAND-EDGE COMPLIANCE)

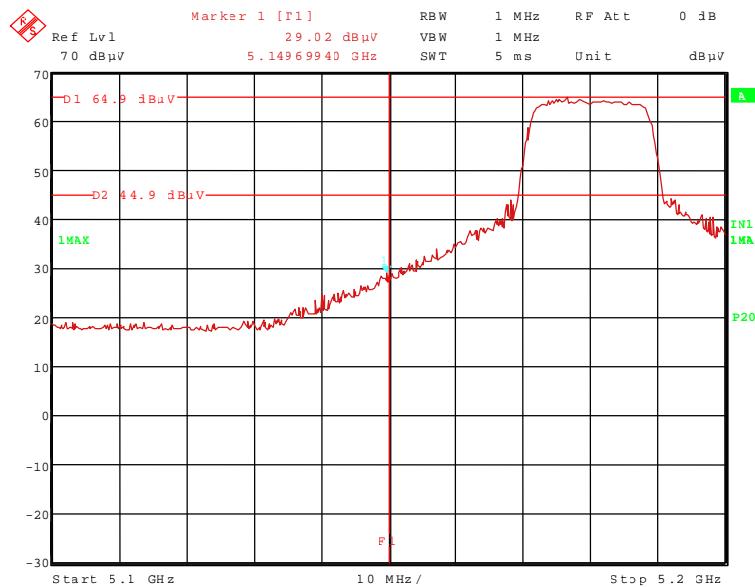
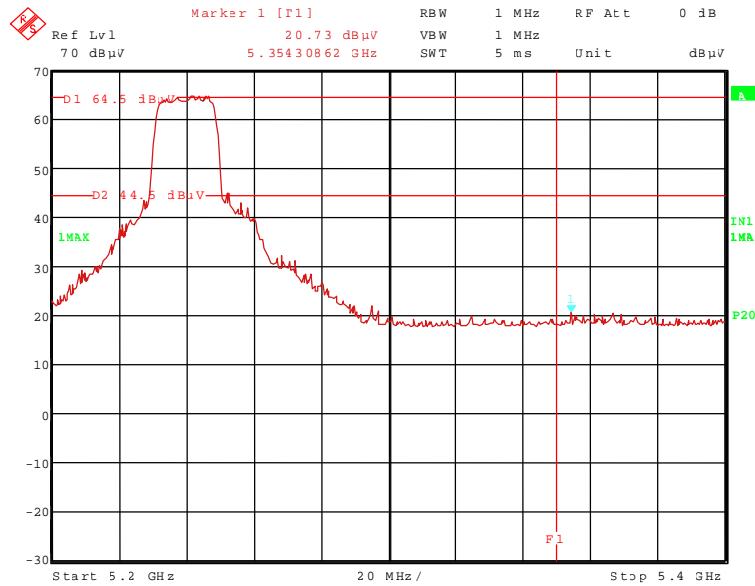
Ambient temperature	20 °C	Relative humidity	34 %
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101042_62.wmf: Radiated band-edge compliance, operation mode 1, a-mode, 54 Mbps:



101042_65.wmf: Radiated band-edge compliance, operation mode 4, a-mode, 54 Mbps:



TEST REPORT REFERENCE: F101042E2
101042_70.wmf: Radiated band-edge compliance, operation mode 1, n-mode, 6 Mbps:

101042_71.wmf: Radiated band-edge compliance, operation mode 4, n-mode, 6 Mbps:


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6.2.3 TEST RESULT (BAND-EDGE COMPLIANCE) a-mode

Band-edge compliance (a-mode, 54 Mbps (worst case), operation mode 1)										
Result measured with the peak detector:										
Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	dB	cm		
5.180	102.8	-	-	62.7	34.4	0.0	5.7	150	Hor.	-
5.1478	69.7	74.0	4.3	29.8	34.3	0.0	5.6	150	Hor.	Yes
Result measured with the average detector:										
Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	dB	cm		
5.180	93.2	-	-	53.1	34.4	0.0	5.7	150	Hor.	-
5.1478	50.1	54.0	3.9	10.2	34.3	0.0	5.6	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Band-edge compliance (a-mode, 54 Mbps (worst case), operation mode 4)										
Result measured with the peak detector:										
Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	dB	cm		
5.240	102.8	-	-	62.6	34.4	0.0	5.8	150	Hor.	-
5.3638	70.4	74.0	3.6	30.1	34.6	0.0	5.7	150	Hor.	Yes
Result measured with the average detector:										
Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dB μ V/m	dB μ V/m	dB	dB μ V	1/m	dB	dB	cm		
5.240	93.4	-	-	53.2	34.4	0.0	5.8	150	Hor.	-
5.3638	50.8	54.0	3.2	10.5	34.6	0.0	5.7	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Test: Passed

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6.2.4 TEST RESULT (BAND-EDGE COMPLIANCE) n-mode

Band-edge compliance (n-mode, 6 Mbps (worst case), operation mode 1)										
Result measured with the peak detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
5.180	103.5	-	-	63.4	34.4	0.0	5.7	150	Hor.	-
5.1493	67.0	74.0	7.0	27.1	34.3	0.0	5.6	150	Hor.	Yes
Result measured with the average detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
5.180	93.1	-	-	53.0	34.4	0.0	5.7	150	Hor.	-
5.1493	49.7	54.0	4.3	9.8	34.3	0.0	5.6	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Band-edge compliance (n-mode, 6 Mbps (worst case), operation mode 4)										
Result measured with the peak detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
5.240	104.2	-	-	64.0	34.4	0.0	5.8	150	Hor.	-
5.3699	59.0	74.0	15.0	18.7	34.6	0.0	5.7	150	Hor.	Yes
Result measured with the average detector:										
Frequency GHz	Corr. value dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor 1/m	Preamp dB	Cable loss dB	Height cm	Pol.	Restr. Band
5.240	93.4	-	-	53.2	34.4	0.0	5.8	150	Hor.	-
5.3699	45.9	54.0	8.1	5.6	34.6	0.0	5.7	150	Hor.	Yes
Measurement uncertainty							+2.2 dB / -3.6 dB			

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 34, 36, 44

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6.3 RADIATED EMISSIONS

6.3.1 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 9 kHz 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 9 kHz 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 40 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 40 GHz.

All measurements will be carried out with the EUT working on the upper and lower edge of the assigned frequency band.

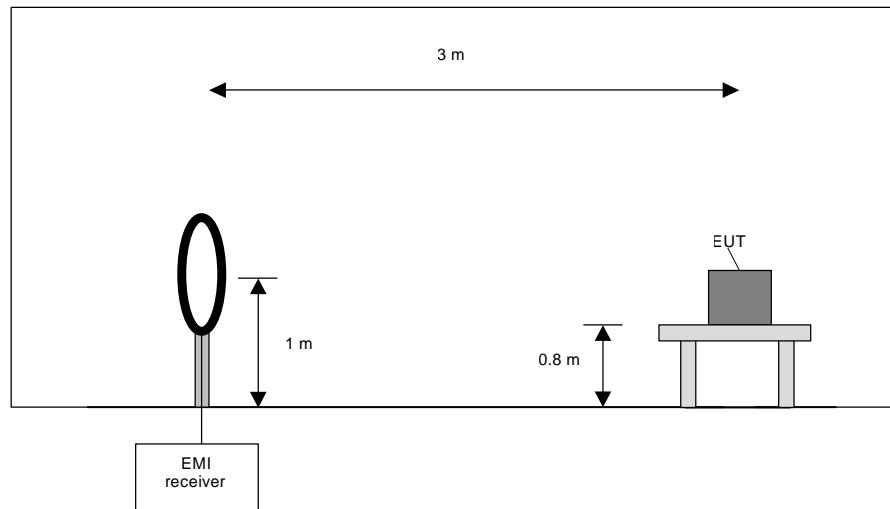
Preliminary measurement (9 kHz to 30 MHz):

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 C63.4-2009 [1].

The frequency range 9 kHz 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
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	10 kHz



TEST REPORT REFERENCE: F101042E2

Preliminary measurement procedure:

Prescans were performed in the frequency range 9 kHz to 150 kHz and 150 kHz 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 steps 1) to 5) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
- 7) Rotate the measuring antenna and repeat steps 1) to 5).

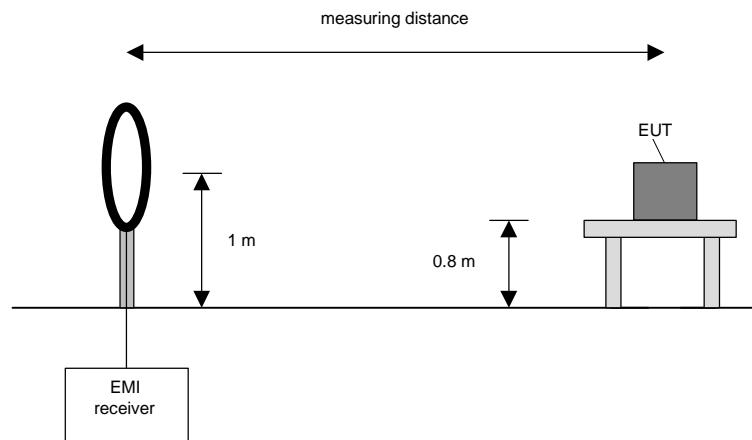
Final measurement (9 kHz to 30 MHz):

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
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



TEST REPORT REFERENCE: F101042E2

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.
- 5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

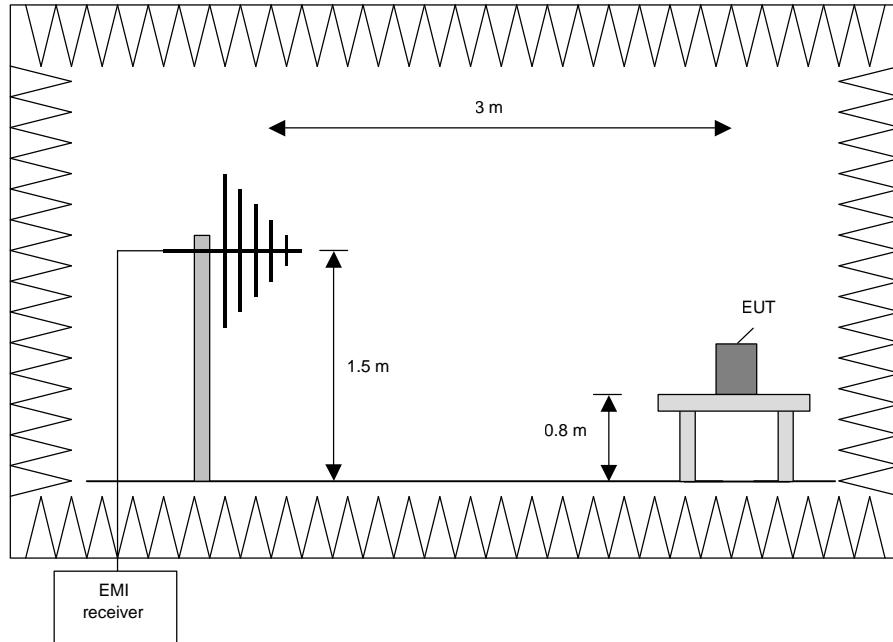
Preliminary measurement (30 MHz to 1 GHz)

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 C63.4-2009 [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



TEST REPORT REFERENCE: F101042E2

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:

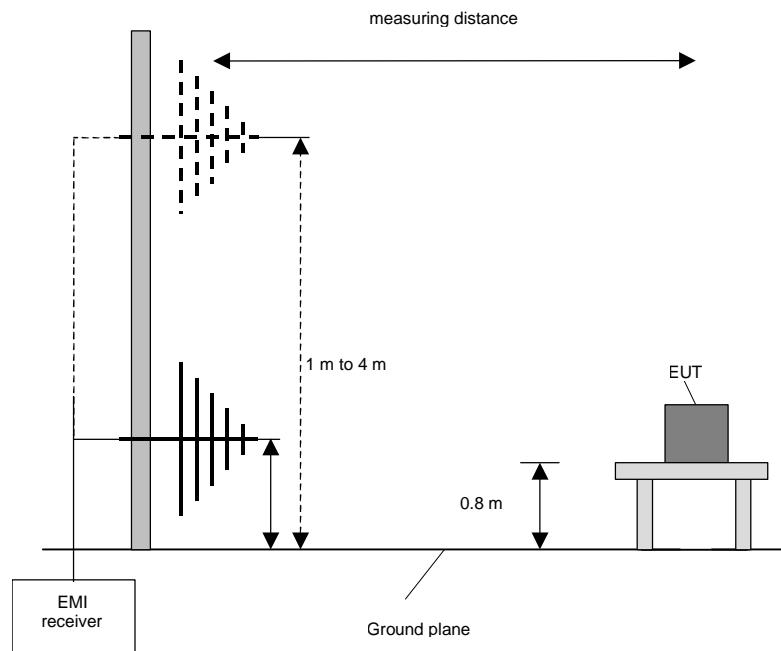
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the 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 (because of EUT is a module and might be used in a handheld equipment application).
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



TEST REPORT REFERENCE: F101042E2

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 40 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 C63.4-2009 [1].

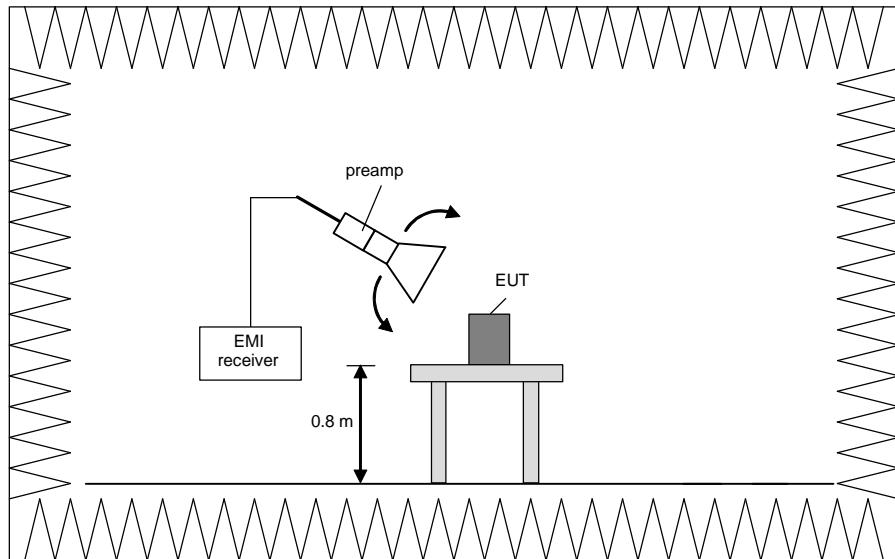
Preliminary measurement (1 GHz to 40 GHz)

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 1 MHz. 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 level of the spurious emission will be noted.

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 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

TEST REPORT REFERENCE: F101042E2

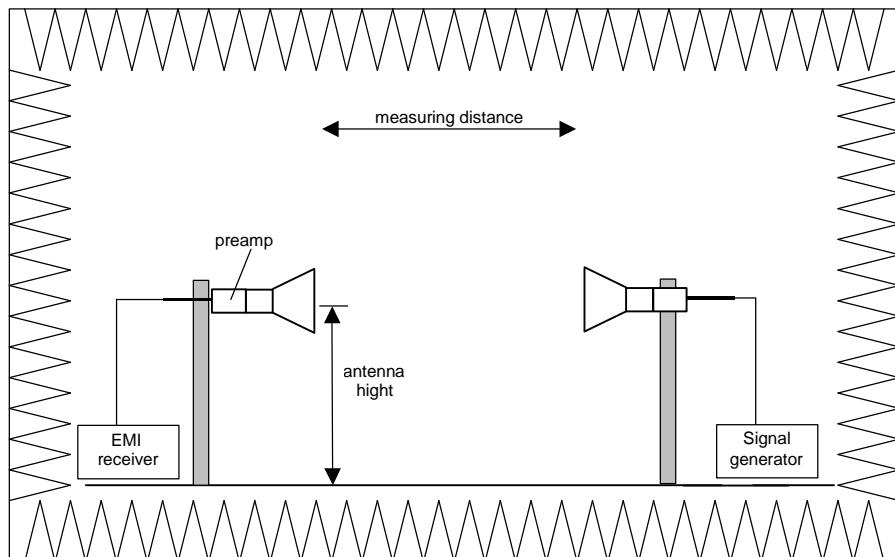


Final measurement (1 GHz to 40 GHz)

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 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



TEST REPORT REFERENCE: F101042E2

Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz, 18 GHz to 26.5 GHz and 26.5 GHz to 40 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 peak detector, which causes the maximum emission. Note the level and the frequency of the emission.
- 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
- 9) Replace the EUT by a known substitution antenna and a signal generator and set the frequency of the signal generator to the noted frequency.
- 10) Increase the signal generator level until the noted value is reached. Note the level of the signal generator minus the cable attenuation as level of the spurious emission.

Step 1) to 8) are defined as preliminary measurement.

TEST REPORT REFERENCE: F101042E2

6.3.2 TEST RESULTS (RADIATED EMISSIONS)

6.3.2.1 PRELIMINARY MEASUREMENT (9 kHz to 1 GHz)

Ambient temperature	21 °C	Relative humidity	32 %
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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.

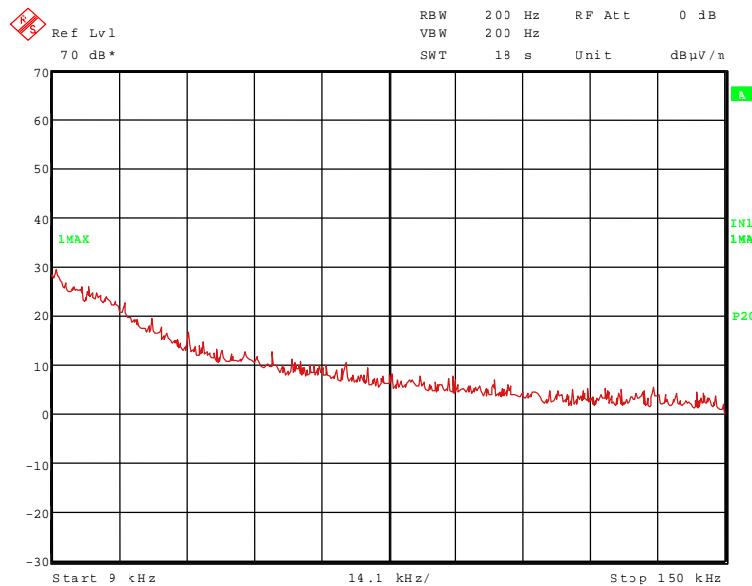
Cable guide: The cables of the EUT were fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.

Test record: All results are shown in the following.

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

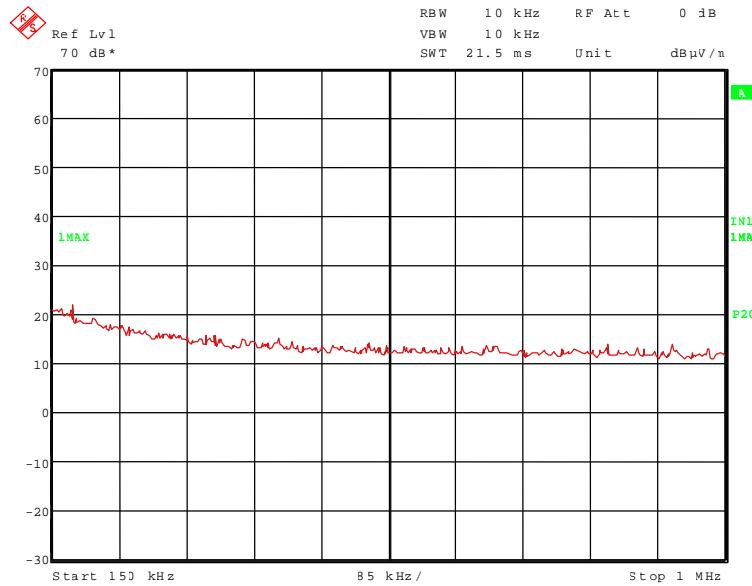
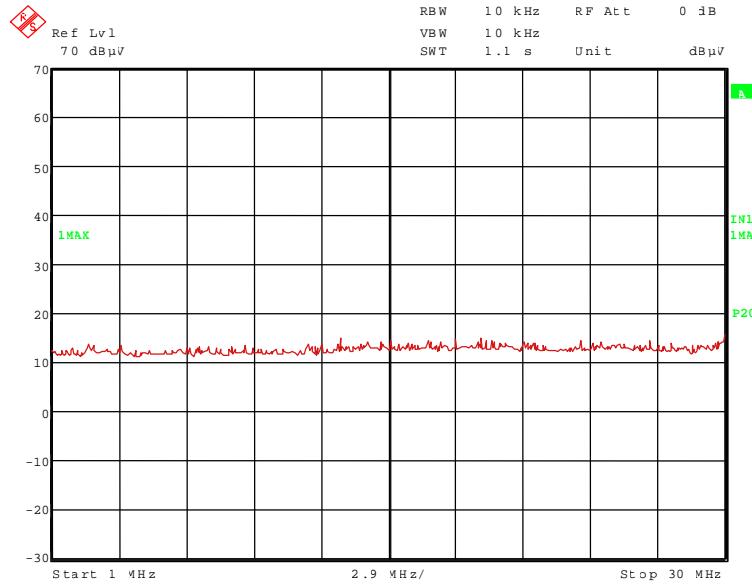
Remark: As pre-tests have shown, the emissions in the frequency range 9 kHz to 1 GHz are not depending on the transmitter operation mode or frequency. Therefore, the emissions in this frequency range were measured only in a-mode with 6 Mbps and transmit in the middle of the assigned frequency range (operation mode 2).

101042_96.wmf: Spurious emissions from 9 kHz to 150 kHz (a-mode, 6 Mbps, operation mode 2):

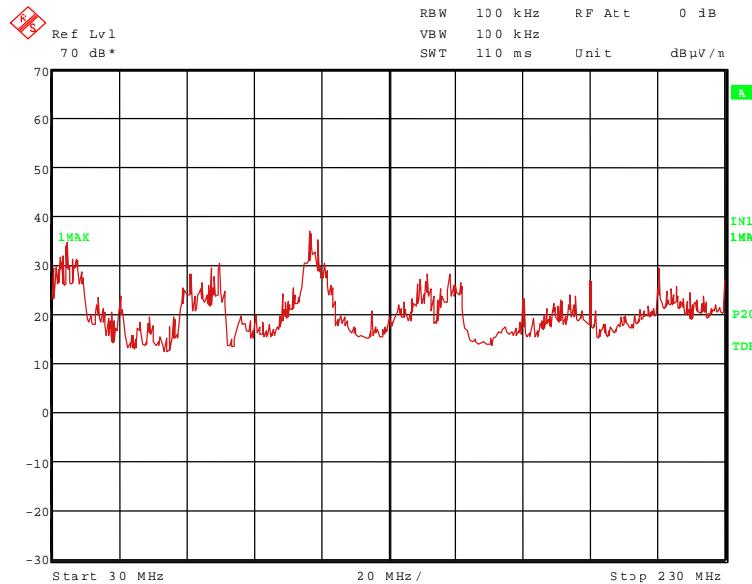
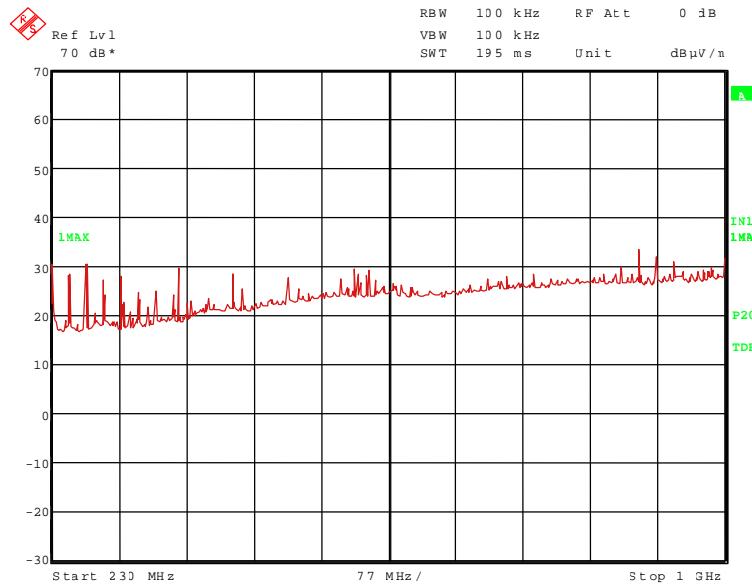


TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 35, 43, 55

TEST REPORT REFERENCE: F101042E2
101042_97.wmf: Spurious emissions from 150 kHz to 1 MHz (a-mode, 6 Mbps, operation mode 2):

101042_98.wmf: Spurious emissions from 1 MHz to 30 MHz (a-mode, 6 Mbps, operation mode 2):


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

TEST REPORT REFERENCE: F101042E2
101042_94.wmf: Spurious emissions from 30 MHz to 230 MHz (a-mode, 6 Mbps, operation mode 2):

101042_95.wmf: Spurious emissions from 230 MHz to 1 GHz (a-mode, 6 Mbps, operation mode 2):


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

- 34.670 MHz, 79.800 MHz, 106.766 MHz, 148.128 MHz, 190.000 MHz, 210.000 MHz, 230.000 MHz, 250.000 MHz, 270.000 MHz, 375.000 MHz, 437.500 MHz, 592.000 MHz, 900.000 MHz

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

TEST REPORT REFERENCE: F101042E2

6.3.2.2 PRELIMINARY MEASUREMENT (1 GHz to 40 GHz), a-mode

Ambient temperature	20 °C	Relative humidity	34 %
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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.

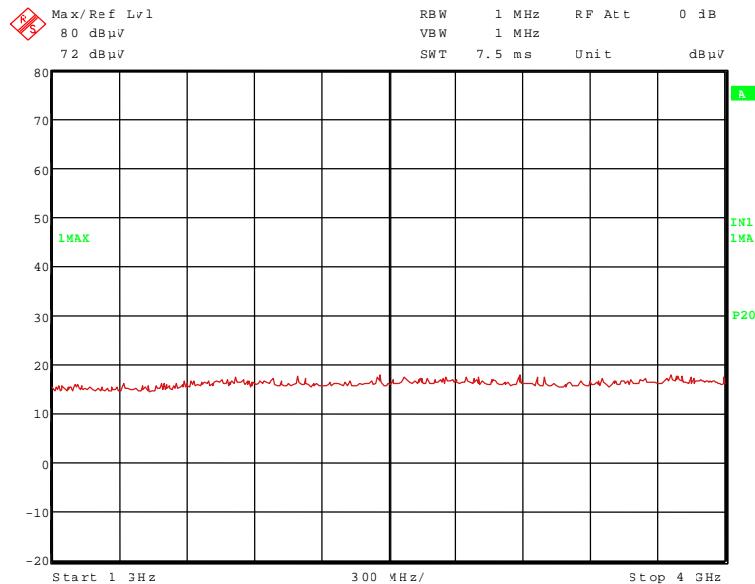
Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 24.0 V DC.

Remark: The plots at the next pages are showing radiated spurious emissions with the worst case data rate. The tables of the final measurements in the next clauses are showing the results for the radiated spurious emissions with the worst case data rate, causing the highest emission level.

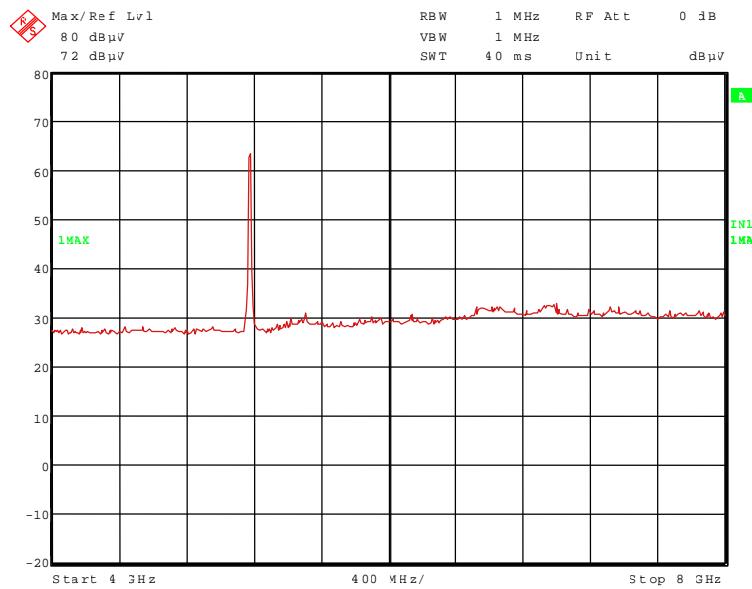
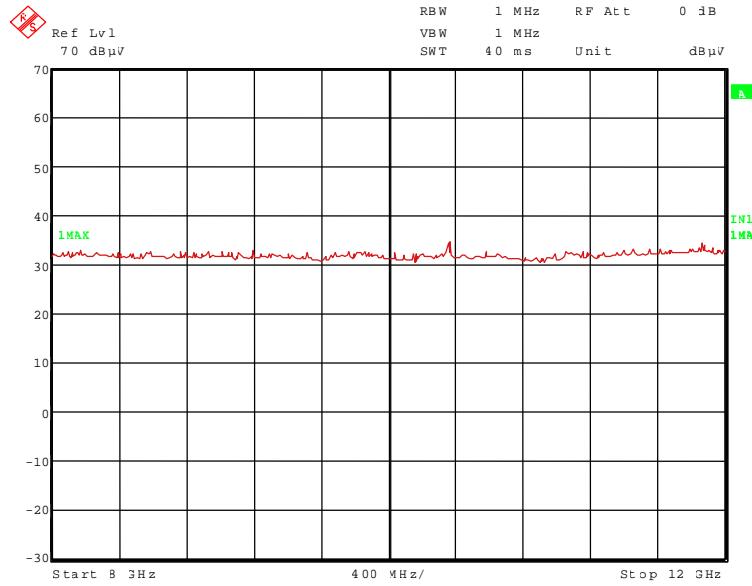
Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

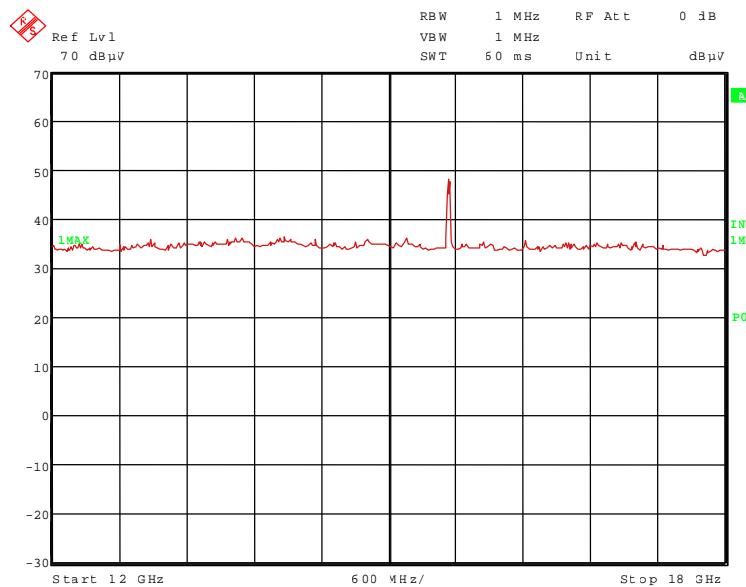
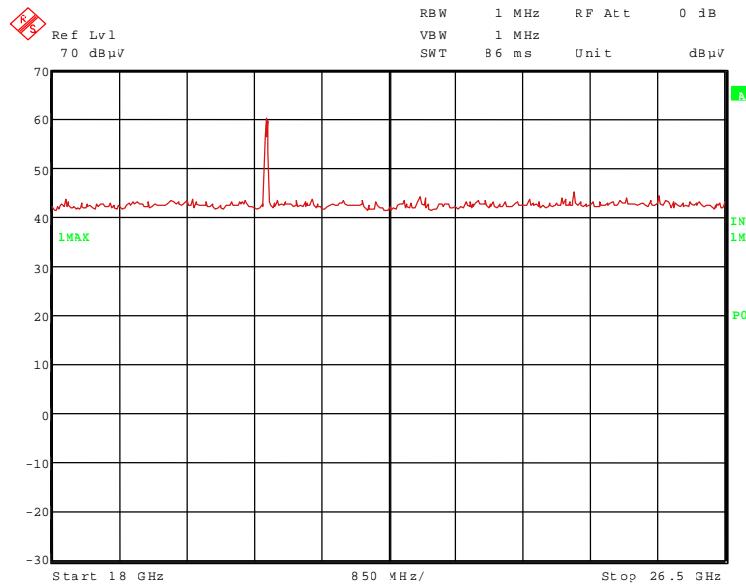
101042_60.wmf: Spurious emissions from 1 GHz to 4 GHz:



TEST EQUIPMENT USED FOR THE TEST:

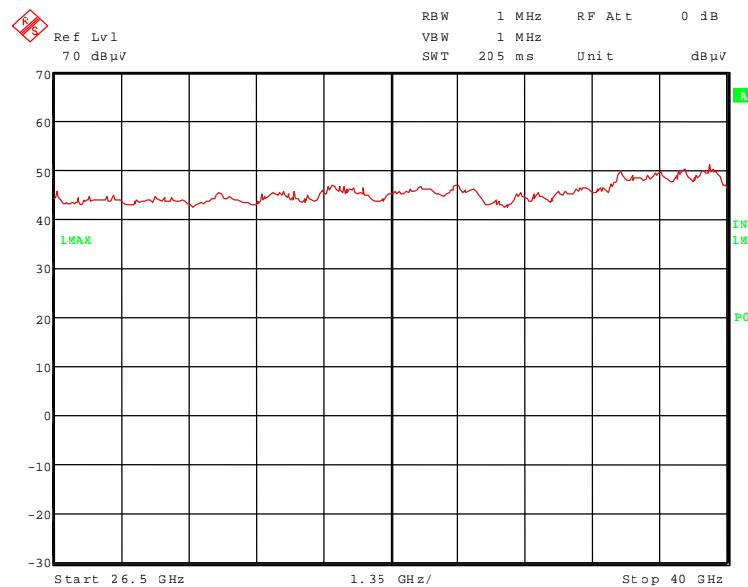
29, 31 – 34, 36 – 42, 44, 46, 49 – 52, 74

TEST REPORT REFERENCE: F101042E2
101042_61.wmf: Spurious emissions from 4 GHz to 8 GHz:

101042_72.wmf: Spurious emissions from 8 GHz to 12 GHz:


TEST REPORT REFERENCE: F101042E2
101042_78.wmf: Spurious emissions from 12 GHz to 18 GHz:

101042_85.wmf: Spurious emissions from 18 GHz to 26.5 GHz:


TEST REPORT REFERENCE: F101042E2

101042_86.wmf: Spurious emissions from 26.5 GHz to 40 GHz:



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

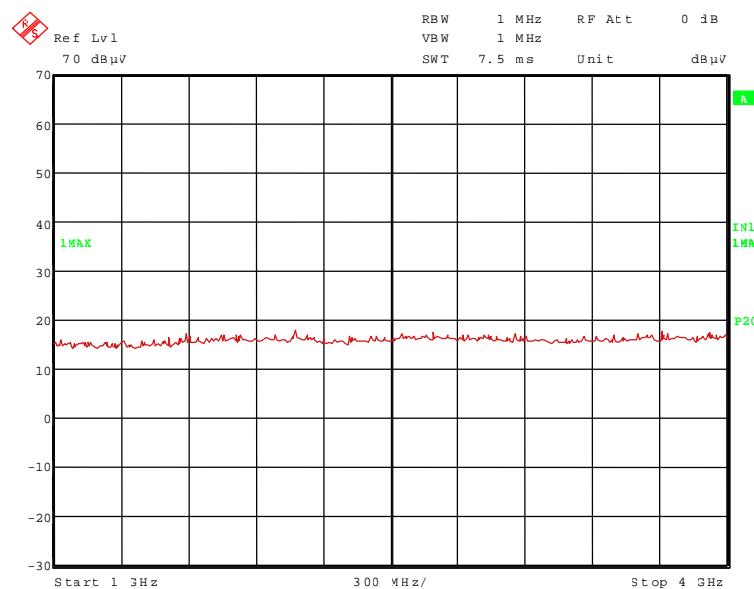
- 5.180 GHz, 10.360 GHz, 15.540 GHz and 20.720 GHz.

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

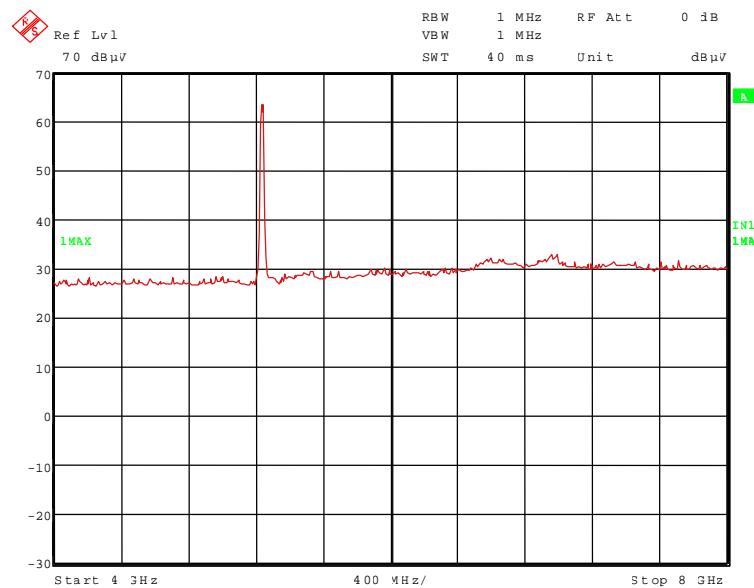
TEST REPORT REFERENCE: F101042E2

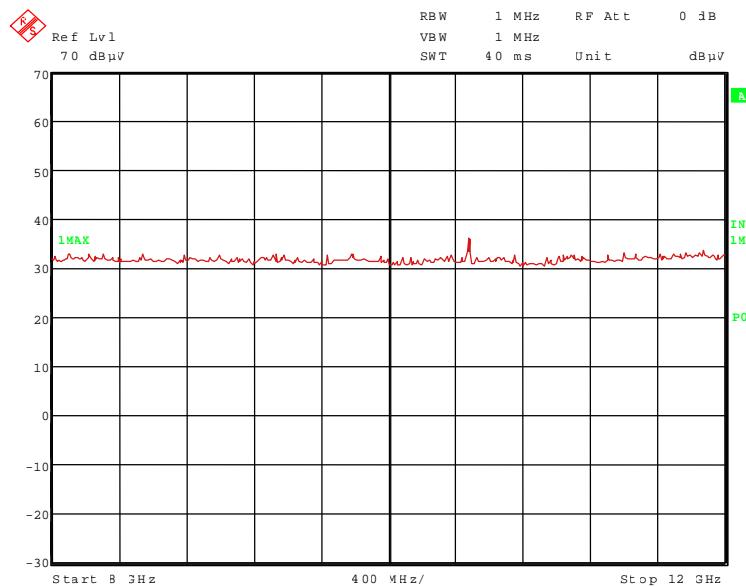
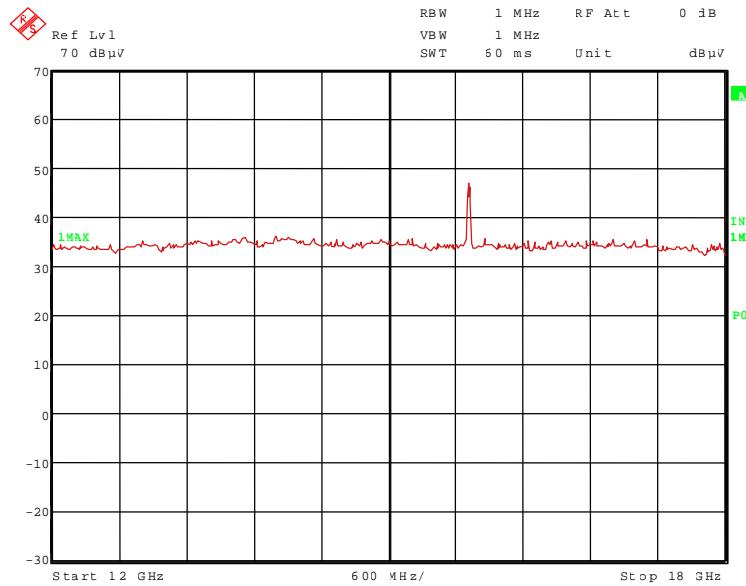
Transmitter operates at the upper end of the assigned frequency band (operation mode 4)

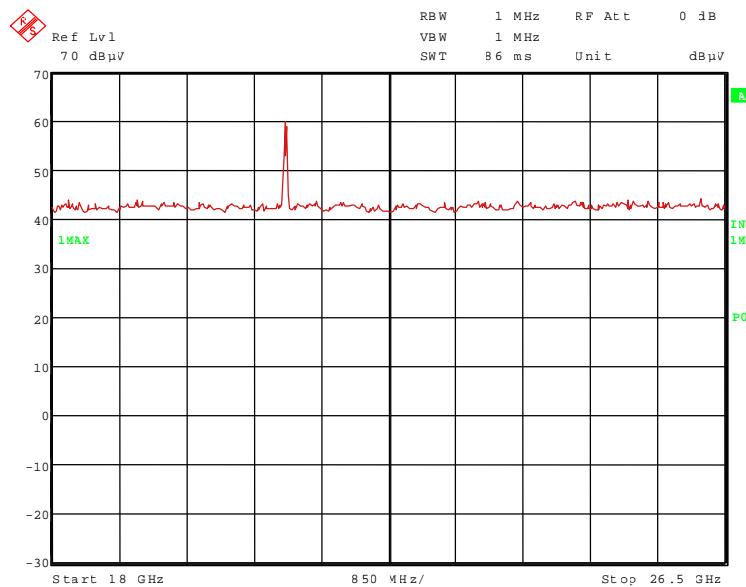
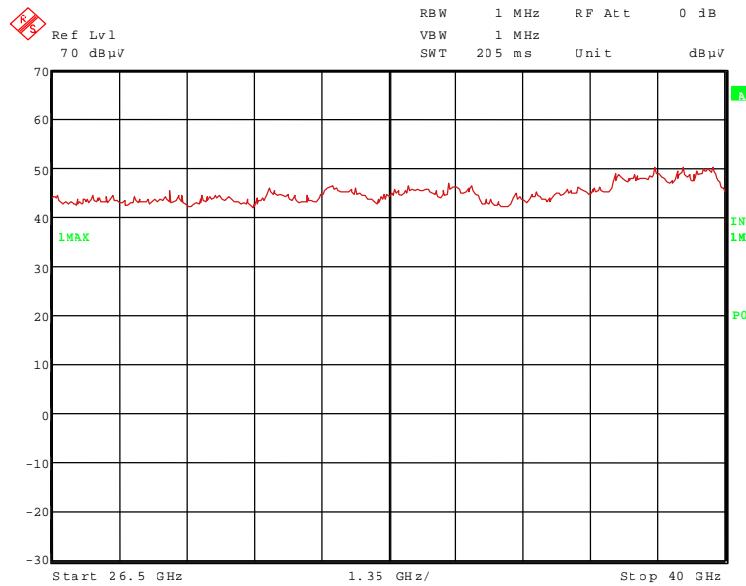
101042_64.wmf: Spurious emissions from 1 GHz to 4 GHz:



101042_63.wmf: Spurious emissions from 4 GHz to 8 GHz:



TEST REPORT REFERENCE: F101042E2
101042_73.wmf: Spurious emissions from 8 GHz to 12 GHz:

101042_79.wmf: Spurious emissions from 12 GHz to 18 GHz:


TEST REPORT REFERENCE: F101042E2
101042_84.wmf: Spurious emissions from 18 GHz to 26.5 GHz:

101042_87.wmf: Spurious emissions from 26.5 GHz to 40 GHz:


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

- 5.240 GHz, 10.480 GHz, 15.720 GHz and 20.960 GHz.

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

TEST REPORT REFERENCE: F101042E2

6.3.2.3 PRELIMINARY MEASUREMENT (1 GHz to 40 GHz), n-mode

Ambient temperature	21 °C	Relative humidity	33 %
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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.

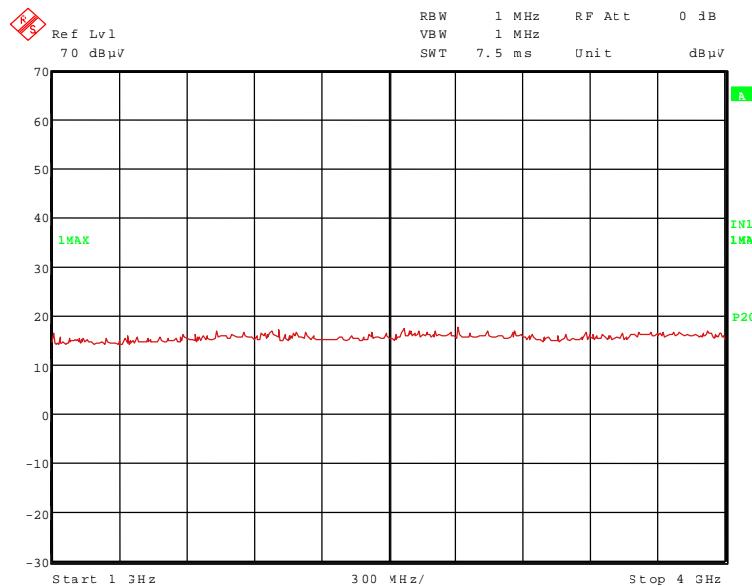
Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 24.0 V DC.

Remark: The plots at the next pages are showing radiated spurious emissions with the worst case data rate. The tables of the final measurements in the next clauses are showing the results for the radiated spurious emissions with the worst case data rate, causing the highest emission level.

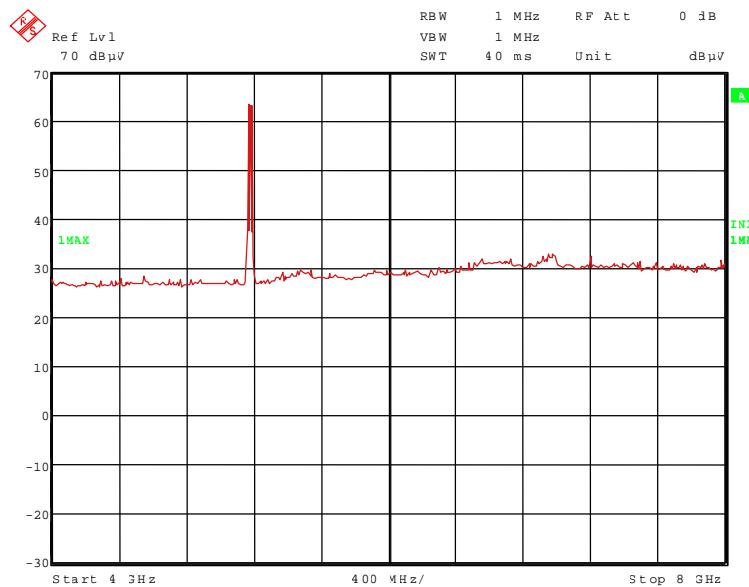
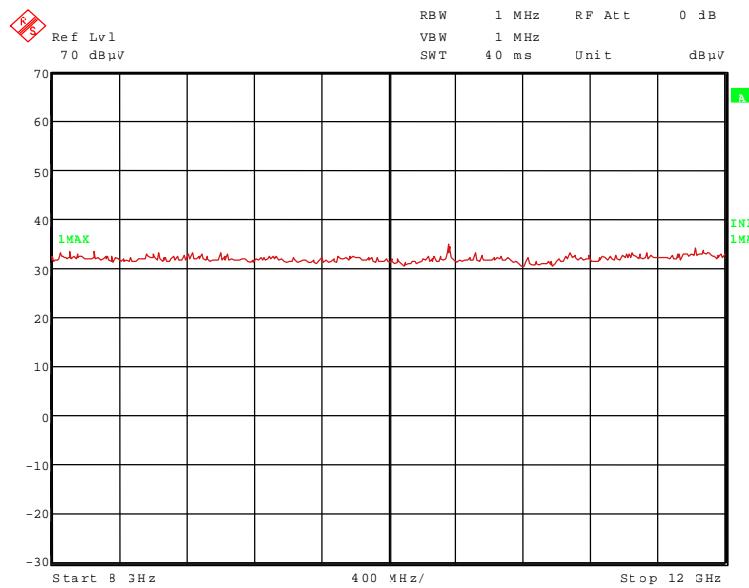
Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

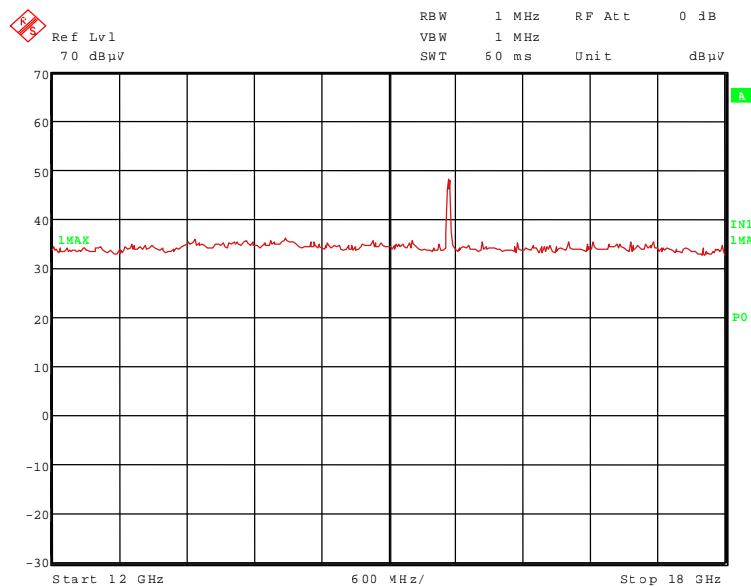
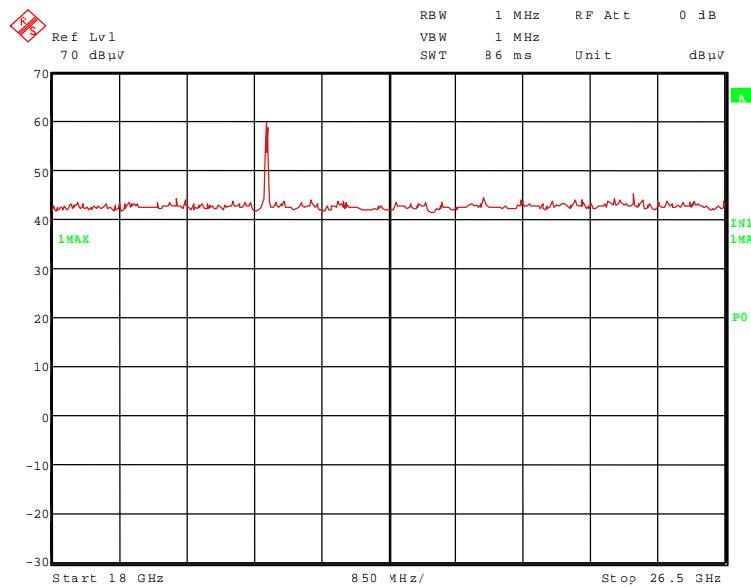
101042_66.wmf: Spurious emissions from 1 GHz to 4 GHz:

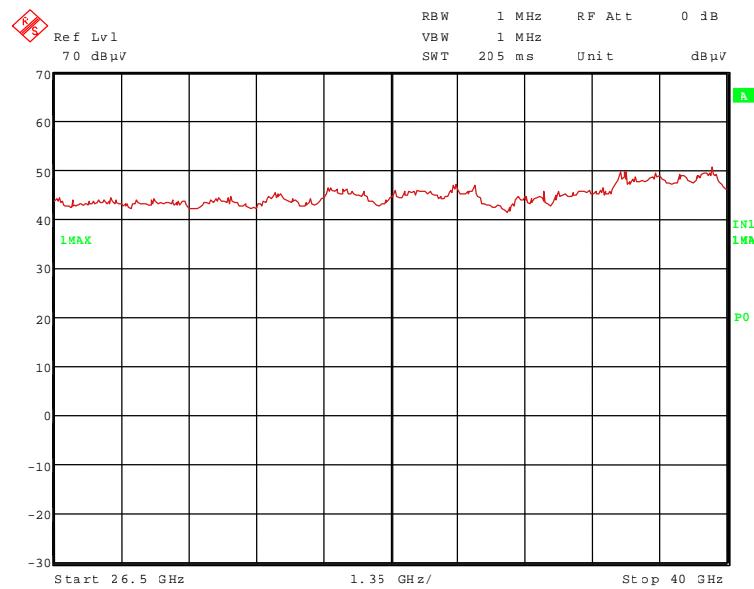


TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 34, 36 – 42, 44, 46, 49 – 52, 74

TEST REPORT REFERENCE: F101042E2
101042_67.wmf: Spurious emissions from 4 GHz to 8 GHz:

101042_74.wmf: Spurious emissions from 8 GHz to 12 GHz:


TEST REPORT REFERENCE: F101042E2
101042_80.wmf: Spurious emissions from 12 GHz to 18 GHz:

101042_83.wmf: Spurious emissions from 18 GHz to 26.5 GHz:


TEST REPORT REFERENCE: F101042E2
101042_88.wmf: Spurious emissions from 26.5 GHz to 40 GHz:


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

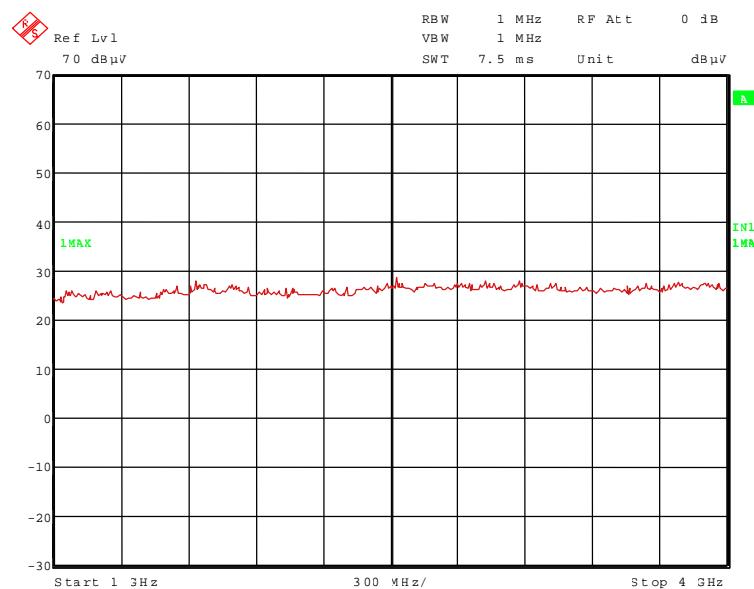
- 5.180 GHz, 10.360 GHz, 15.540 GHz and 20.720 GHz.

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

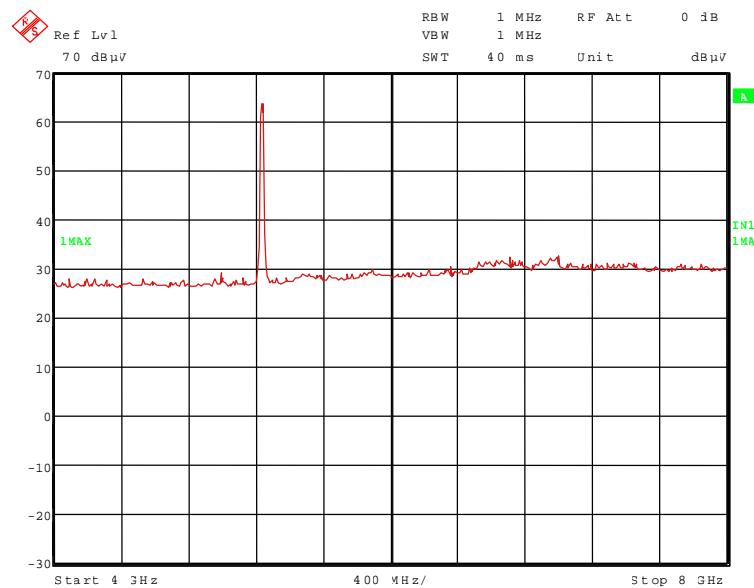
TEST REPORT REFERENCE: F101042E2

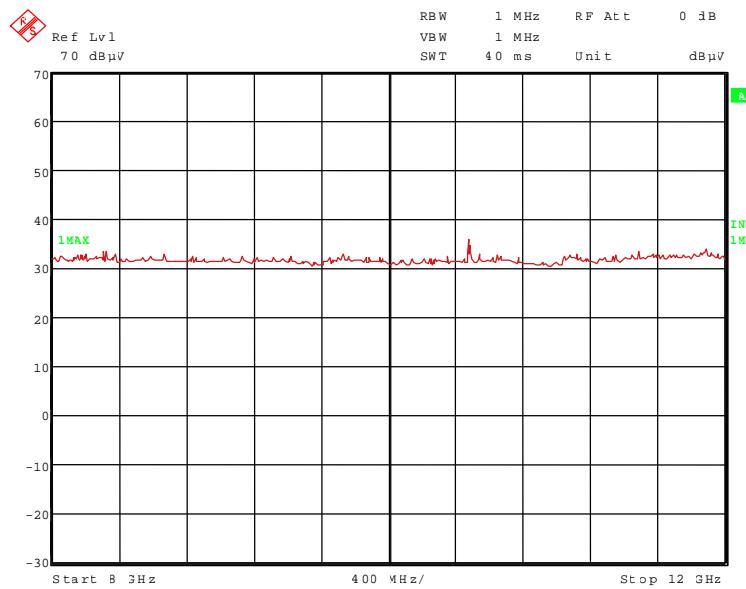
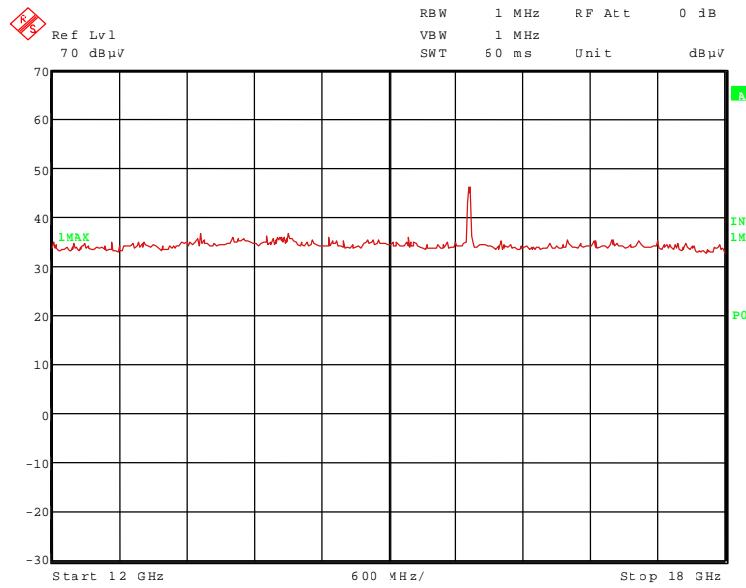
Transmitter operates at the upper end of the assigned frequency band (operation mode 4)

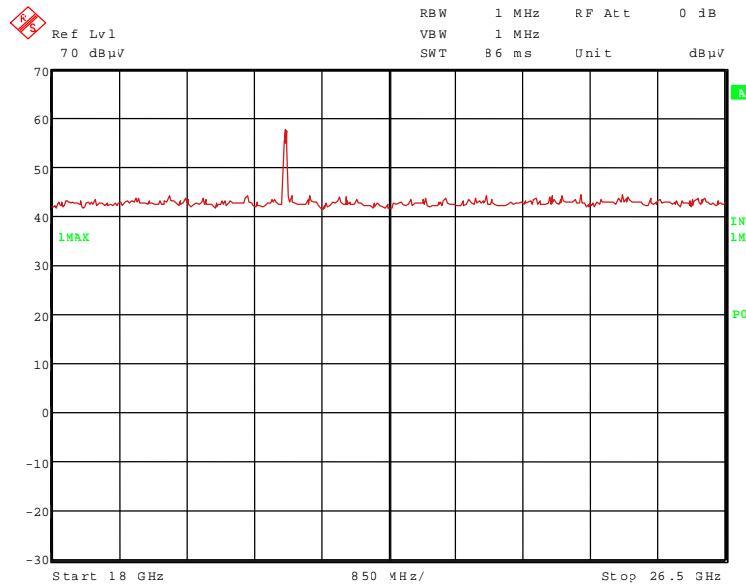
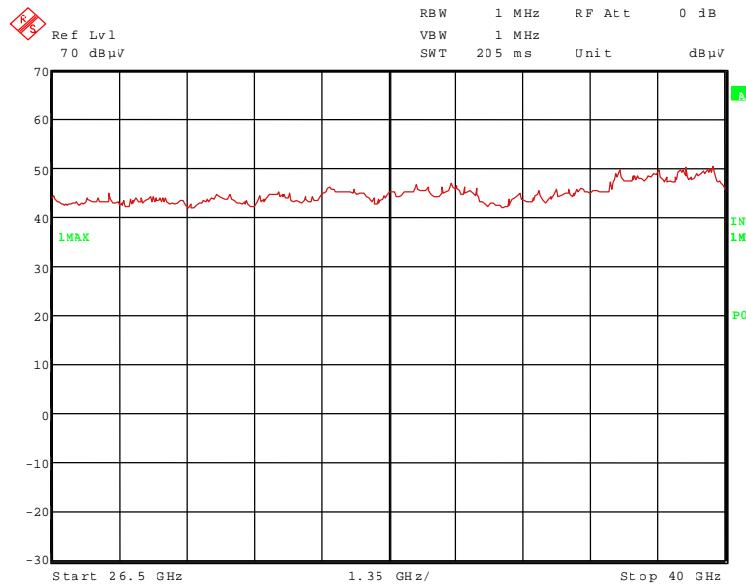
101042_69.wmf: Spurious emissions from 1 GHz to 4 GHz:



101042_68.wmf: Spurious emissions from 4 GHz to 8 GHz:



TEST REPORT REFERENCE: F101042E2
101042_75.wmf: Spurious emissions from 8 GHz to 12 GHz:

101042_81.wmf: Spurious emissions from 12 GHz to 18 GHz:


TEST REPORT REFERENCE: F101042E2
101042_82.wmf: Spurious emissions from 18 GHz to 26.5 GHz:

101042_89.wmf: Spurious emissions from 26.5 GHz to 40 GHz:


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

- 5.240 GHz, 10.480 GHz, 15.720 GHz and 20.960 GHz.

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

TEST REPORT REFERENCE: F101042E2

6.3.2.4 FINAL MEASUREMENT (30 MHz to 1 GHz), a-mode

Ambient temperature	21 °C	Relative humidity	35 %
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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: For detail information of test set-up and 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 DC.

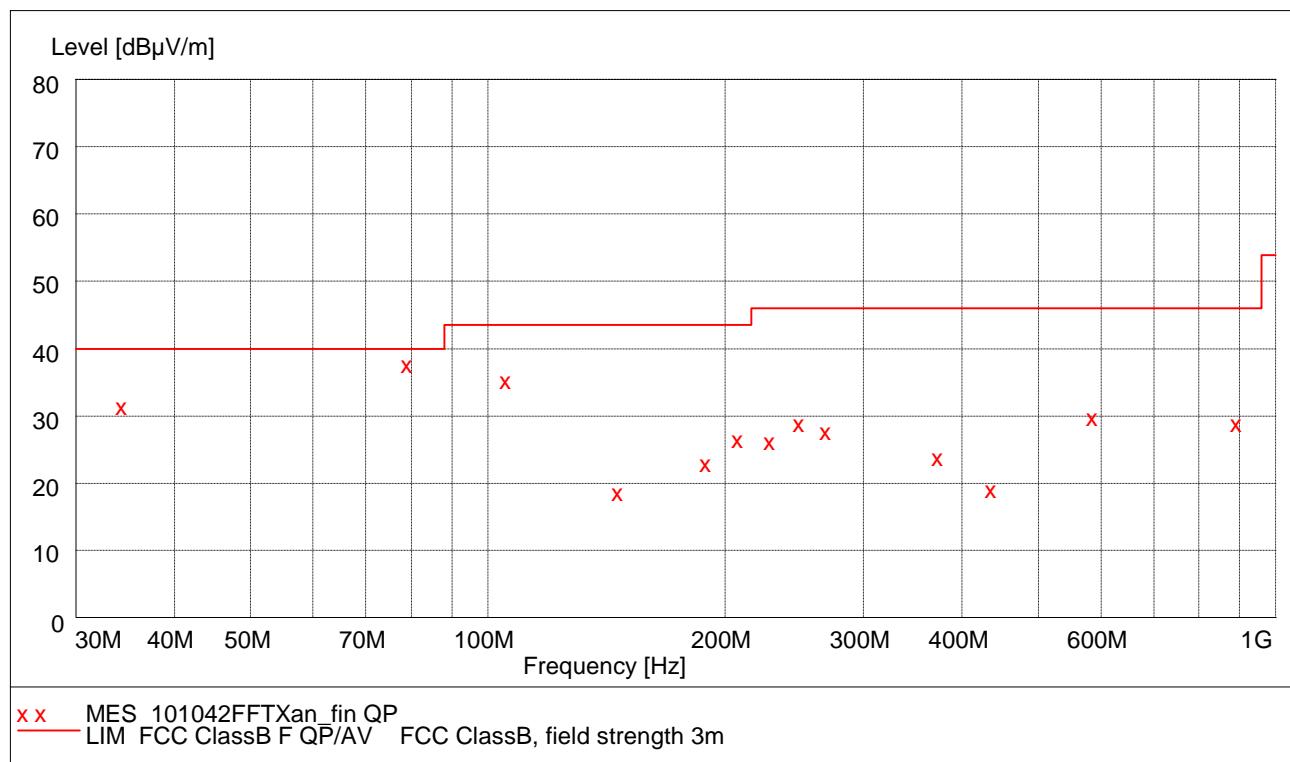
Test record: The test was carried out in test mode 2 (a-mode with 6 Mbps) of the EUT, because there was no difference to the other test modes.

Resolution bandwidth: For all measurements a resolution bandwidth of 120 kHz was used.

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

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{antenna factor [dB/m]}$$

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



Data record name: 101042FFTXan

TEST REPORT REFERENCE: F101042E2

The results of the standard subsequent 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 1 second.

Result measured with the quasipeak detector:

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

Spurious emissions									
Frequency MHz	Result dB μ V/m	Limit dB μ V/m	Margin dB	Readings dB μ V	Antenna factor dB/m	Cable loss dB	Height cm	Azimuth deg	Pol.
34.670	31.9	40.0	8.1	13.6	17.7	0.6	100.0	158.0	Vert.
79.800	38.4	40.0	1.6	29.2	8.2	1.0	150.0	113.0	Vert.
106.766	36.1	43.5	7.4	23.5	11.5	1.1	200.0	112.0	Hor.
148.128	19.2	43.5	24.3	6.2	11.7	1.3	200.0	67.0	Hor.
190.000	23.4	43.5	20.1	12.9	9.0	1.5	100.0	68.0	Vert.
210.000	27.2	43.5	16.3	16.3	9.3	1.6	100.0	112.0	Hor.
230.000	26.8	46.0	19.2	14.9	10.3	1.6	100.0	158.0	Vert.
250.000	29.4	46.0	16.6	15.5	12.1	1.8	100.0	247.0	Hor.
270.000	28.3	46.0	17.7	14.1	12.3	1.9	100.0	247.0	Hor.
375.000	24.4	46.0	21.6	7.4	14.8	2.2	100.0	158.0	Vert
437.500	19.5	46.0	26.5	0.7	16.4	2.4	150.0	293.0	Vert.
592.000	30.5	46.0	15.5	8.6	19.1	2.8	100.0	113.0	Vert.
900.000	29.6	46.0	16.4	3.7	22.4	3.5	100.0	113.0	Vert.
Measurement uncertainty					+2.2 dB / -3.6 dB				

The test results were calculated with the following formula:

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{cable loss [dB]} + \text{antenna factor [dB/m]}$$

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

14 – 20

TEST REPORT REFERENCE: F101042E2

6.3.2.5 FINAL MEASUREMENT (1 GHz to 40 GHz) a-mode

Ambient temperature	20 °C	Relative humidity	34 %
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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 cables of the EUT were 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 24.0 V DC.

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

Remark: The worst case data rate for this measurement was 6 Mbps.

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

Frequency GHz	Emission level dBm	Limit dBm	Margin dB	Polarisation
5.180	7.6	carrier	-	Horizontal
10.360	-36.2	-27.0	9.2	Vertical
15.540	-37.8	-27.0	10.8	Vertical
20.720	-34.7	-27.0	7.7	Vertical
Measurement uncertainty			+2.2 dB / -3.6 dB	

Transmitter operates at the upper end of the assigned frequency band (operation mode 4)

Frequency GHz	Emission level dBm	Limit dBm	Margin dB	Polarisation
5.240	7.6	carrier	-	Horizontal
10.480	-35.2	-27.0	8.2	Vertical
15.720	-39.3	-27.0	12.3	Vertical
20.960	-34.2	-27.0	7.2	Horizontal
Measurement uncertainty			+2.2 dB / -3.6 dB	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 42, 44, 46, 49 – 52, 56, 57, 74, 102

TEST REPORT REFERENCE: F101042E2

6.3.2.6 FINAL MEASUREMENT (1 GHz to 40 GHz) n-mode

Ambient temperature	21 °C	Relative humidity	33 %
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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 cables of the EUT were 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 24.0 V DC.

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

Remark: The worst case data rate for this measurement was 13 Mbps.

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

Frequency GHz	Emission level dBm	Limit dBm	Margin dB	Polarisation
5.180	8.3	carrier	-	Horizontal
10.360	-34.9	-27.0	7.9	Vertical
15.540	-37.4	-27.0	10.4	Horizontal
20.720	-34.8	-27.0	7.8	Horizontal
Measurement uncertainty			+2.2 dB / -3.6 dB	

Transmitter operates at the upper end of the assigned frequency band (operation mode 4)

Frequency GHz	Emission level dBm	Limit dBm	Margin dB	Polarisation
5.240	9.0	carrier	-	Horizontal
10.480	-35.1	-27.0	8.1	Vertical
15.720	-40.0	-27.0	13.0	Vertical
20.960	-35.8	-27.0	8.8	Horizontal
Measurement uncertainty			+2.2 dB / -3.6 dB	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 42, 44, 46, 49 – 52, 56, 57, 74, 102

TEST REPORT REFERENCE: F101042E2

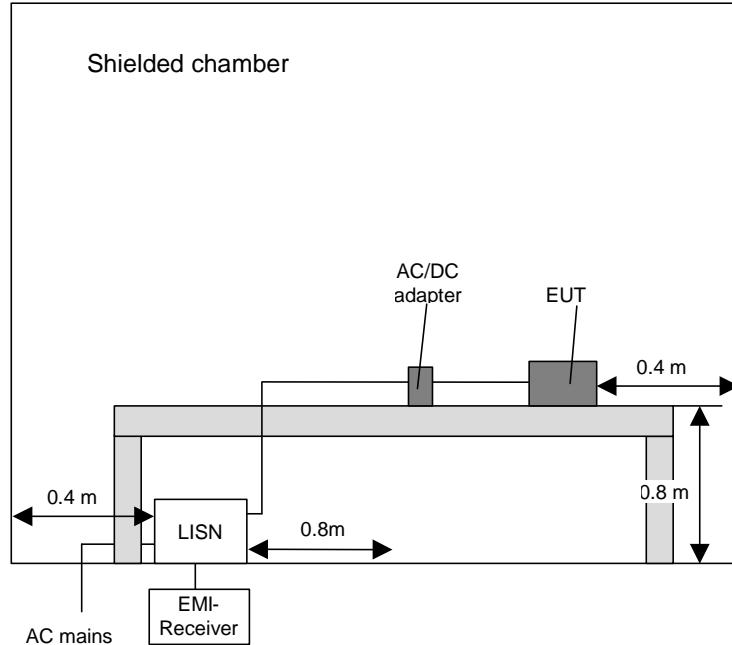
6.4 CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 kHz to 30 MHz)

6.4.1 METHOD OF MEASUREMENT

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 C63.4-2009 [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 appropriate 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



TEST REPORT REFERENCE: F101042E2

6.4.2 TEST RESULTS (CONDUCTED EMISSIONS ON POWER SUPPLY LINES)

Ambient temperature	21 °C	Relative humidity	35 %
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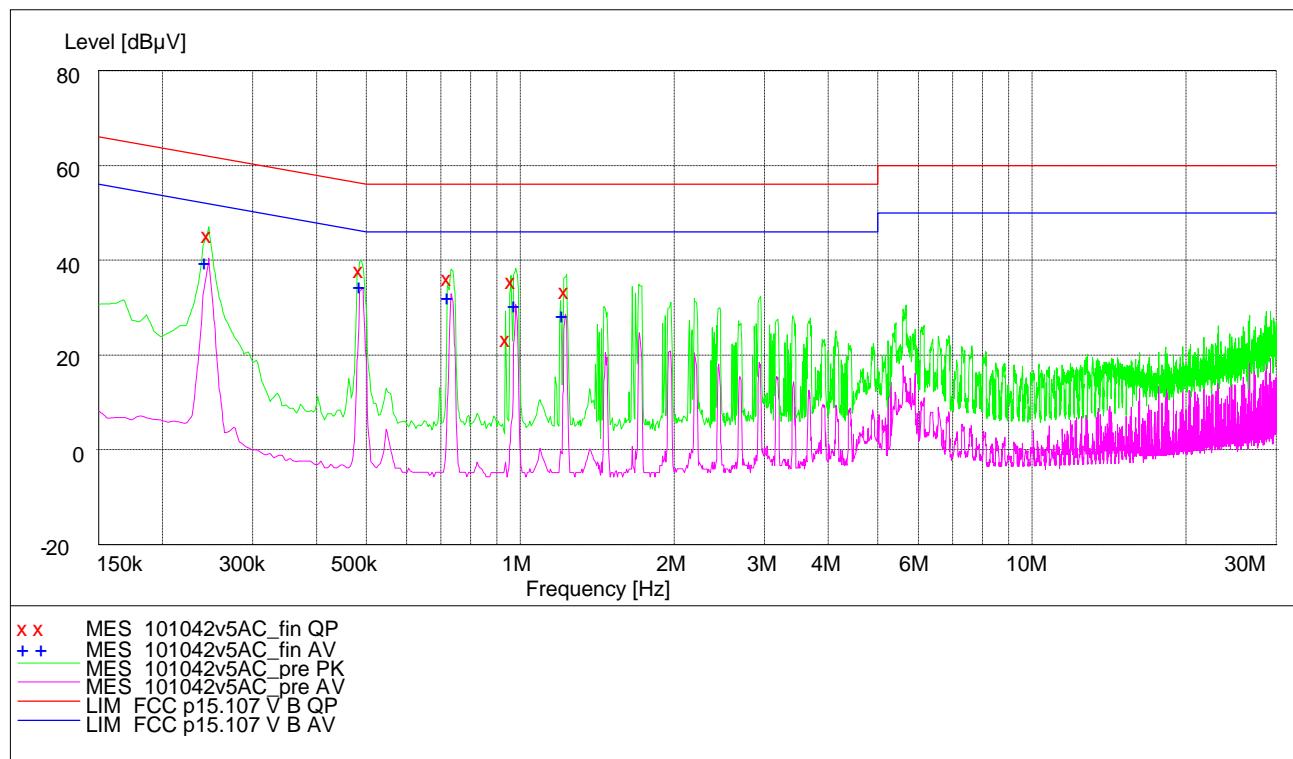
Position of EUT: The EUT was set-up on a non-conducting table of a height of 0.8 m.

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 the measurement the EUT was supplied 24.0 V DC by an AC / DC adaptor type VANSON Mod. SMP-1000A 012. The EUT transmits in fping mode, because there was no difference to the other test modes.

The curves in the diagram 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 an x and the average measured points by an +.



Data record name: 101042v5AC

TEST REPORT REFERENCE: F101042E2

Result measured with the peak detector:

(These values are marked in the diagram by an +)

Frequency MHz	Level dB μ V	Transducer dB	Limit dB μ V	Margin dB	Line	PE
0.246300	45.8	0.9	61.9	16.1	N	FLO
0.492000	38.8	0.8	56.1	17.4	N	FLO
0.731400	37.2	0.8	56.0	18.8	N	FLO
0.954600	23.9	0.8	56.0	32.1	L1	FLO
0.972600	36.3	0.8	56.0	19.7	L1	FLO
1.233600	34.1	0.7	56.0	21.9	N	FLO
Measurement uncertainty				+3.6 dB / -4.5 dB		

Data record name: 101042v5AC_fin QP

Result measured with the average detector:

(These values are marked in the diagram by an +)

Frequency MHz	Level dB μ V	Transducer dB	Limit dB μ V	Margin dB	Line	PE
0.244500	40.5	0.9	51.9	11.4	N	FLO
0.489300	35.5	0.8	46.2	10.7	N	FLO
0.733200	33.1	0.8	46.0	12.9	N	FLO
0.978900	31.3	0.7	46.0	14.7	L1	FLO
1.223700	28.9	0.7	46.0	17.1	N	FLO
Measurement uncertainty				+3.6 dB / -4.5 dB		

Data record name: 101042v5AC_fin AV

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

1 – 3, 5, 6

TEST REPORT REFERENCE: F101042E2

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

TEST REPORT REFERENCE: F101042E2

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. due
1	Shielded chamber M47	-	Albatross Projects	B83117-C6439-T262	480662	Weekly verification (system cal.)	
2	EMI Receiver	ESIB26	Rohde & Schwarz	100292	481182	02/08/2010	02/2012
3	LISN	ESH2-Z5	Rohde & Schwarz	879675/037	580006	08/14/2009	08/2010
5	High pass filter	HR 0.13-5ENN	FSY Microwave Inc.	DC 0109 SN 002	480340	Weekly verification (system cal.)	
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111	Not applicable	
14	Open area test site	-	Phoenix Test-Lab	-	480085	Weekly verification	
15	Measuring receiver	ESIB7	Rohde & Schwarz	100304	480521	03/15/2010	03/2012
16	Controller	MCU	Maturo	MCU/043/971107	480832	-	-
17	Turntable	DS420HE	Deisel	420/620/80	480087	-	-
18	Antenna support	AS615P	Deisel	615/310	480086	-	-
19	Antenna	CBL6111 A	Chase	1643	480147	08/01/2007	08/2012
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111	-	-
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Weekly verification	
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355	03/17/2010	03/2012
32	Controller	MCU	Maturo	MCU/043/971107	480832	-	-
33	Turntable	DS420HE	Deisel	420/620/80	480315	-	-
34	Antenna support	AS615P	Deisel	615/310	480187	-	-
35	Antenna	CBL6112 B	Chase	2688	480328	10/11/2005	10/2010
36	Antenna	3115 A	EMCO	9609-4918	480183	04/11/2008	11/2013
37	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294	Six month verification (system cal.)	
38	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	482	480295	Six month verification (system cal.)	
39	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297	Six month verification (system cal.)	
40	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	410	480296	Six month verification (system cal.)	
41	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	469	480299	Six month verification (system cal.)	
42	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	468	480298	Six month verification (system cal.)	
43	RF-cable No. 36	Sucoflex 106B	Huber + Suhner	0522/6B	480571	Weekly verification	
44	RF-cable No. 31	RTK 081	Rosenberger	-	410142	Weekly verification	
46	RF-cable 1m	KPS-1533-400-KPS	Insulated Wire	-	480301	Six month verification (system cal.)	
49	Preamplifier	JS3-00101200-23-5A	Miteq	681851	480337	Six month verification (system cal.)	

TEST REPORT REFERENCE: F101042E2

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. due
50	Preamplifier	JS3-12001800-16-5A	Miteq	571667	480343	Six month verification (system cal.)	
51	Preamplifier	JS3-18002600-20-5A	Miteq	658697	480342	Six month verification (system cal.)	
52	Preamplifier	JS3-26004000-25-5A	Miteq	563593	480344	Six month verification (system cal.)	
55	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	03/10/2010	03/2013
56	Horn Antenna	3115 B	EMCO	9609-4922	480184	09/11/2008	09/2013
57	Signal generator	83650L	Agilent	3844A00554	480333	03/17/2010	03/2012
58	RF-cable 2m	KPS-1533-400-KPS	Insulated Wire	-	480302	Weekly verification	
59	Power supply	TOE 8752	Toellner	31566	480010	10/21/2009	10/2011
61	Climatic chamber	MK 240	BINDER	05-79022	480462	07/01/2009	01/2011
74	High Pass Filter	WHKX8.0/18 G-8SS	Wainwright Instruments GmbH	4	480586	Weekly verification	
75	Spectrum analyser	FSU	Rohde & Schwarz	200125	480956	02/04/2009	02/2011
102	RF-cable No. 2	RTK 081	Rosenberger	-	410094	Weekly verification	

TEST REPORT REFERENCE: F101042E2

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	cB-RWE241, test set-up fully anechoic chamber	101042_1.jpg
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	cB-RWE241, test set-up open area test-site	101042_15.jpg
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	cB-RWE241, main PCB, bottom view	101042_k.jpg
	cB-RWE241, main PCB, bottom view, antenna desoldered	101042_l.jpg
	cB-0926-02, top view	101042_f.jpg
	cB-0926-02, top view, shielding removed	101042_n.jpg
	cB-0926-02, bottom view	101042_g.jpg
ANNEX D	ADDITIONAL RESULTS FOR INDUSTRY CANADA:	15 pages