5 TEST CONDITIONS AND RESULTS

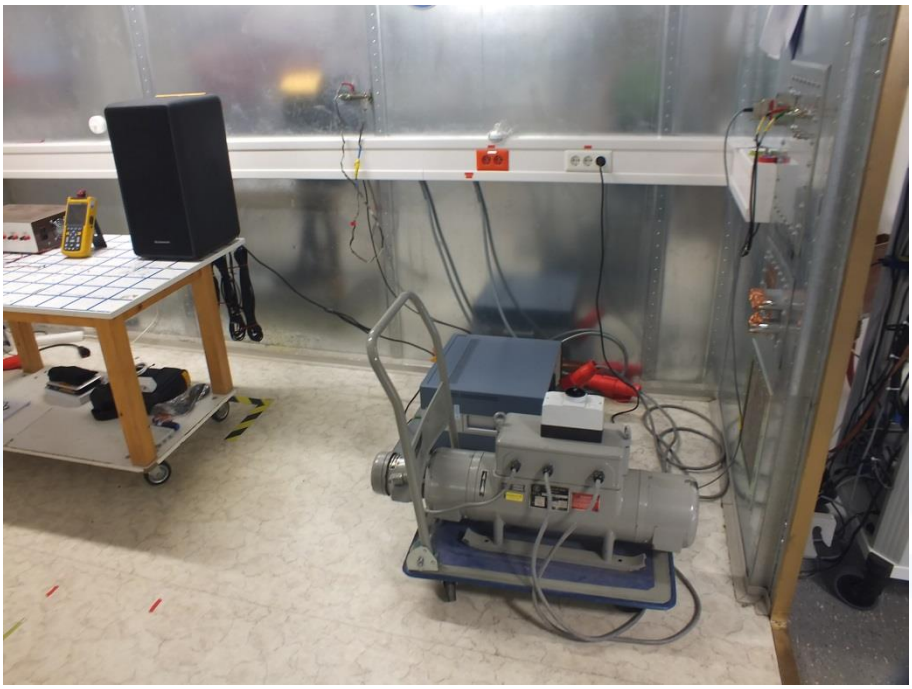
5.1 Conducted emissions

For test instruments and accessories used see section 6 Part **A 4**.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):
Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.4 described under item 4.4.3. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

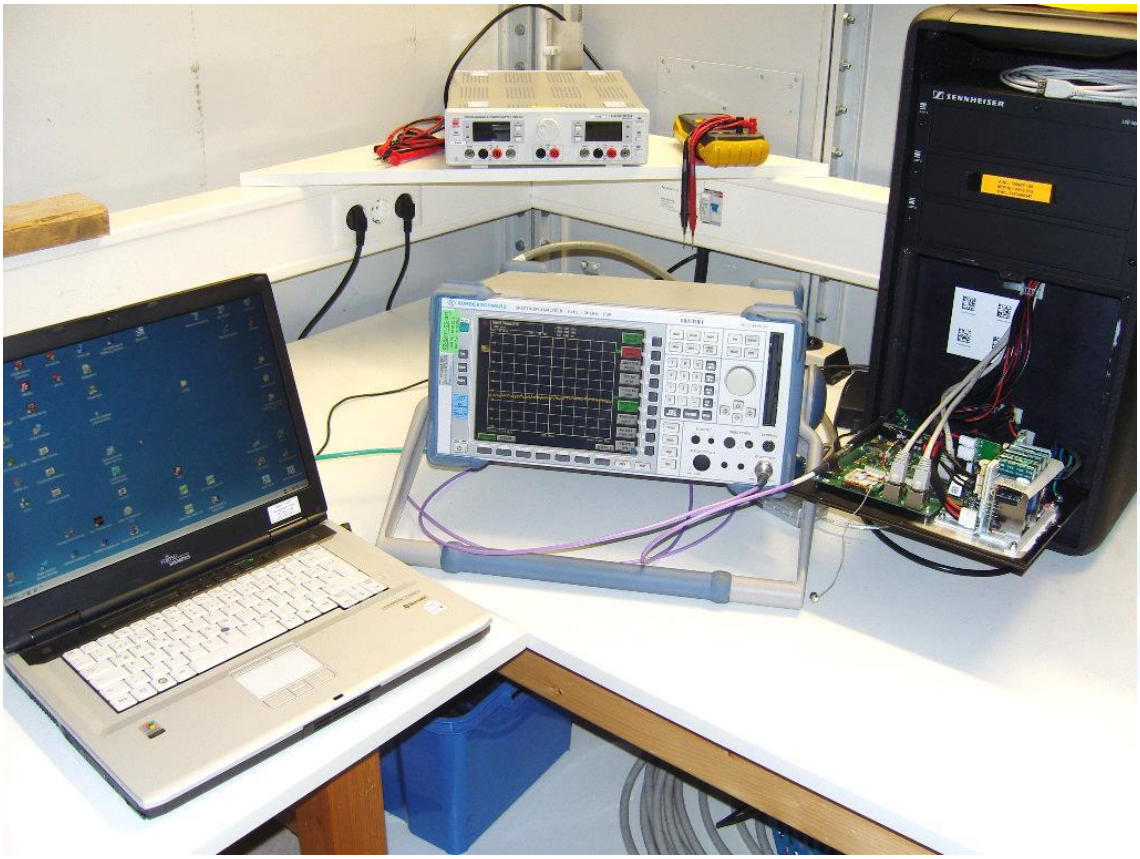
5.2 Emission bandwidth

For test instruments and accessories used see section 6 Part **MB**.

5.2.1 Description of the test location

Test location: AREA4

5.2.2 Photo documentation of the test set-up



5.2.1 Applicable standard

According to FCC Part 15C, Section 15.247(a):
Frequency hopping systems shall have hopping carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.2.2 Description of Measurement

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio of -20 dB. The reference level is the level of the highest signal amplitude observed from the transmitter at either the fundamental frequency or the first-order modulation products in all typical modes of operation.
Analyser settings:
RBW: 30 kHz, VBW: 100 kHz, Sweep time: auto, Detector: Peak, Trace mode: Max hold

5.3 Maximum peak output power radiated

For test instruments and accessories used see section 6 Part **CPR 3**.

5.3.1 Description of the test location

Test location: Anechoic chamber 2

5.3.2 Photo documentation of the test set-up

5.3.3 Applicable standard

According to FCC Part 15C, Section 15.247(a)(1):
The maximum peak output power of an intentional radiator shall not exceed the limit defined in dependency of the channel separation and of the number of hopping channels.

5.3.4 Description of Measurement

A spectrum analyser is connected to the output of the transmitter via a suitable attenuator while EUT is operating in transmit mode using the assigned frequency according to DA 00-705. The correction factor takes the cable loss into account.

Analyser settings:
RBW: 3 MHz, VBW ≥ RBW, Detector: Max peak, Trace: Max hold, Sweep time: auto

5.4 Out-of-band emission, radiated

For test instruments and accessories used see section 6 Part **SER1, SER2 and SER3**.

5.4.1 Description of the test location

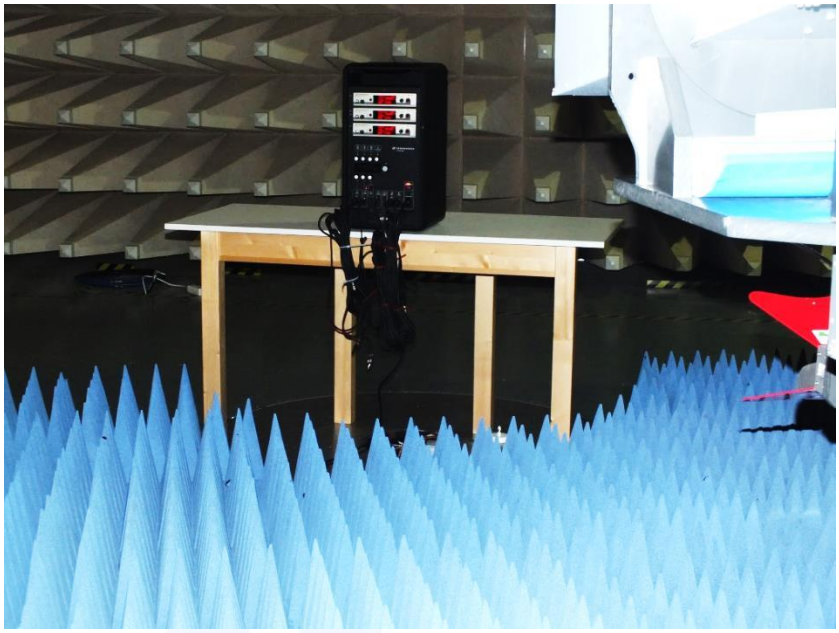
Test location: OATS 1
Test location: Anechoic chamber 1
Test distance: 3 m

5.4.2 Photo documentation of the test set-up

Open area test site

Open area test site

Anechoic chamber 1



5.4.3 Applicable standard

According to FCC Part 15C, Section 15.247(d):
In any 100 kHz bandwidth outside the frequency bands 2400 – 2483.5 MHz and 5725 – 5850 MHz, the digitally modulated radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

5.4.4 Description of Measurement

The spurious emissions falling in non restricted bands are measured radiated using a spectrum analyser in a test setup following the procedures set out in ANSI C63. The measurement is performed at normal test conditions in modulated TX continuous mode.
Spectrum analyser settings:
RBW: 100 kHz, VBW: 300 kHz, Detector: Max peak, Trace: Max hold, Sweep: auto

5.4.5 Test result

9 kHz < f < 1000 MHz:
3-DH5 Packet
For all kinds of modulation no emission could be detected within 20 dB to the limit.

5.5 Emissions in restricted bands, radiated

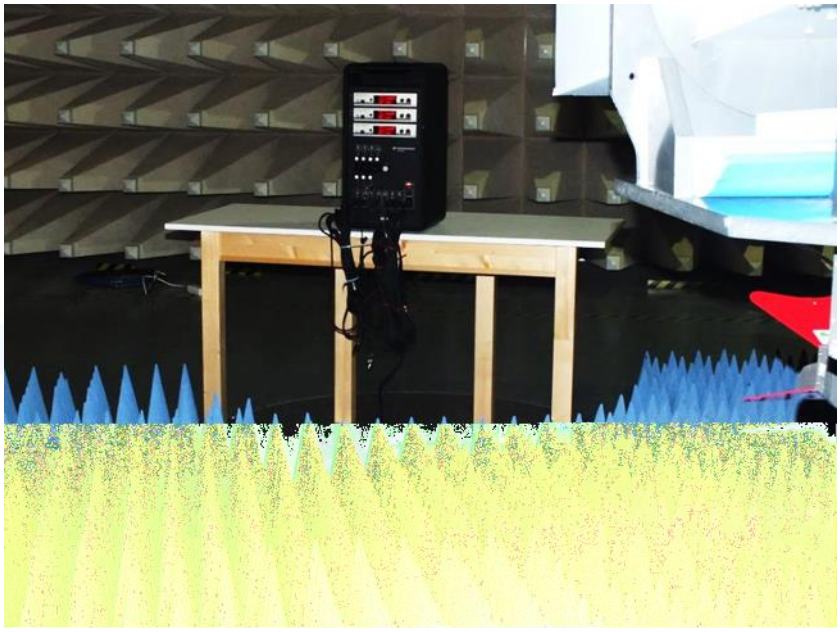
For test instruments and accessories used see section 6 Part **SER3**.

5.5.1 Description of the test location

Test location: Anechoic chamber 1
Test distance: 3 m

5.5.2 Photo documentation of the test set-up

Test setup 1 – 18 GHz



5.5.3 Applicable standard

According to FCC Part 15, Section 15.205(a):
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a).

5.5.4 Description of Measurement

The spurious emissions falling in non restricted bands are measured radiated using a spectrum analyser in a test setup following the procedures set out in ANSI C63. The measurement is performed at normal test conditions in modulated TX continuous mode.
Spectrum analyser settings:

Peak:

9 kHz < f < 150 kHz:	RBW: 300 Hz,	VBW: 1 kHz,	Detector: Max peak,	Trace Mode: Max hold
150 kHz < f < 30 MHz:	RBW: 10 kHz,	VBW: 30 kHz,	Detector: Max peak,	Trace Mode: Max hold
30 MHz < f < 1000 MHz:	RBW: 100 kHz,	VBW: 300 kHz,	Detector: Max peak,	Trace Mode: Max hold
f > 1000 MHz:	RBW: 1 MHz,	VBW: 3 MHz,	Detector: Max peak,	Trace Mode: Max hold
AV: f > 1000 MHz:	RBW: 1 MHz,	VBW: 10 Hz,	Detector: Max peak,	Trace Mode: Max hold

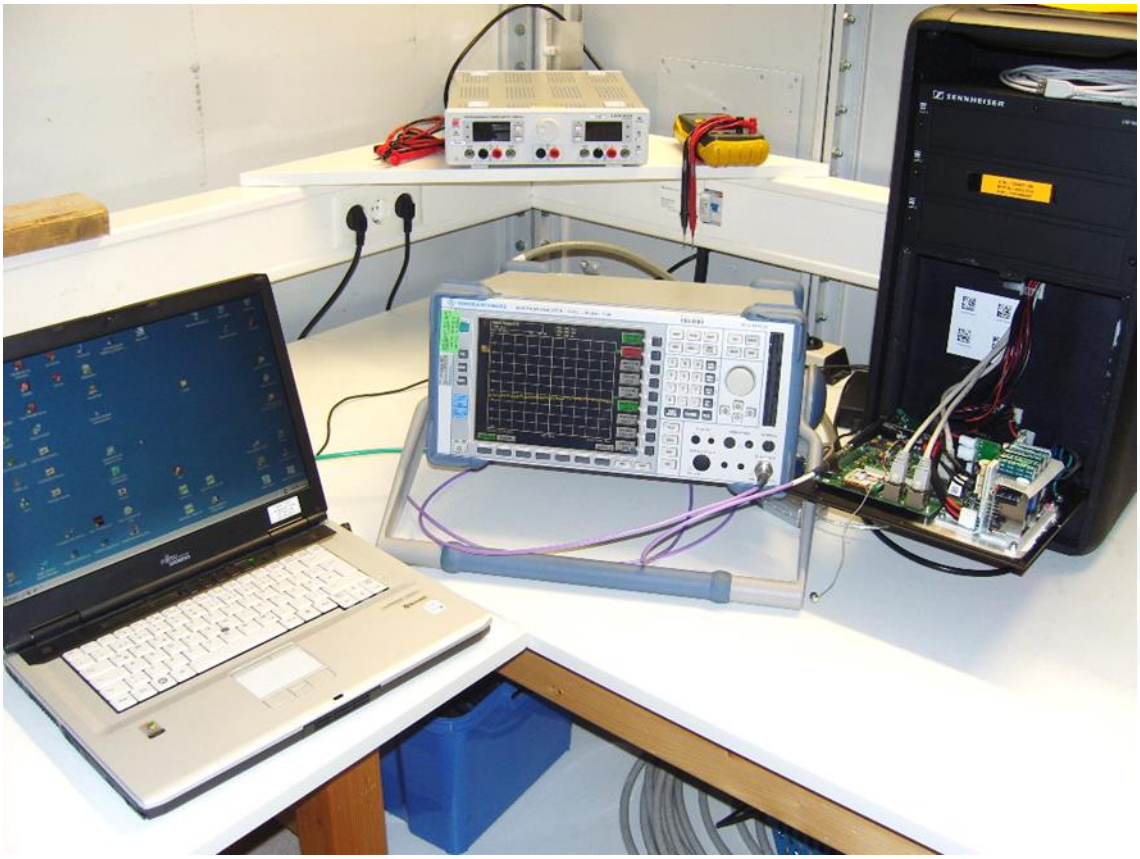
5.10 Carrier frequency separation

For test instruments and accessories used see section 6 Part **MB**.

5.10.1 Description of the test location

Test location: AREA4

5.10.2 Photo documentation of the test set-up



5.10.3 Applicable standard

According to FCC Part 15, Section 15.247(a):
Frequency hopping systems operating in the frequency band of 2400 MHz – 2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or 2/3 of the 20 dB bandwidth of the hopping channel.

5.10.4 Description of Measurement

The measurement is performed using a spectrum analyser in single sweep mode. A part of the operating frequency is used for better resolution. In normal application mode all the channels of the part of operating frequency are displayed and the separation is measured. The 20 dB OBW has to be measured before to compare whether the OBW requirement is fulfilled.

5.13 Maximum permissible exposure (MPE)

For test instruments and accessories used see section 6 Part **CPR 3**.

5.13.1 Description of the test location

Test location: Anechoic chamber 2
Test distance: 3 m

5.13.2 Photo documentation of the test set-up

5.13.3 Applicable standard

According to FCC Part 15, Section 15.247(i):
Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.
The test methods used comply with ANSI/IEEE C95.1, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".
This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC Part 1, Section 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC Part 1, Section 1.1307(b).

5.13.4 Description of Measurement

The maximum total power input to the antenna is measured conducted as described in clause 5.3 of this document. To calculate the MPE in a defined distance away from the product the Friis transmission formula is used.