
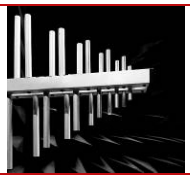
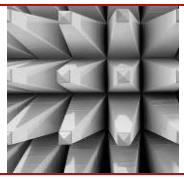

CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Test report no.: 1-4722/12-07-03-A

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
Area of Testing: Radio/Satellite Communications

Applicant

Aastra Deutschland GmbH
Zeughofstr. 1
10997 Berlin / GERMANY
Phone: +49 30 6104-0
Fax: +49 30 6104-5157
Contact: Gerhard Hofmann
e-mail: gerhard.hofmann@aastra.com
Phone: +49 30 6104-5329

Manufacturer

Aastra Deutschland GmbH
Zeughofstr. 1
10997 Berlin / GERMANY

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**DECT Handset**
Model name:	**622d**
FCC ID:	**UOU80E00009622**
IC:	**1884E-80E00009622**
Frequency:	ISM band 2400 MHz to 2483.5 MHz (lowest channel 00 - 2402 MHz; highest channel 78 – 2480 MHz)
Technology tested:	Bluetooth® (basic rate only)
Antenna:	Integrated antenna
Power Supply:	3.70 V DC by Li - Ion battery & Ktec power supply
Temperature Range:	-20°C to +55 °C

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorised:

p. o. A. Luckenbill
cn=Andreas Luckenbill, o=CETECOM ICT Services GmbH, ou=LUC-111202, email=andreas.luckenbill@cetecom.com, c=DE
2012.10.01 11:53:14 +02'00'

Stefan Bös
Senior Testing Manager

Test performed:

M. Bertolino
cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2012.10.01 11:50:06 +02'00'

Marco Bertolino
Testing Manager

1 Table of contents

2 General information

2.1 Notes and disclaimer

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2012-05-29
Date of receipt of test item:	2012-06-11
Start of test:	2012-06-11
End of test:	2012-06-21
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	2010-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+55 °C during high temperature tests
	T_{min}	-20 °C during low temperature tests
Relative humidity content:		60 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.70 V DC by Li - Ion battery & Ktec power supply
	V_{max}	4.20 V
	V_{min}	3.30 V

5 Test item

Kind of test item	**:**	**DECT Handset**
Type identification	**:**	**622d**
S/N serial number	**:**	**Radiated units: C58100019451; C58100020636; C5810002002F** **Conducted units: C58100020134**
HW hardware status	**:**	**63-001543-82**
SW software status	**:**	**1.01**
Frequency band [MHz]	**:**	**ISM band 2400 MHz to 2483.5 MHz** **(lowest channel 00 - 2402 MHz; highest channel 78 – 2480 MHz)**
Type of radio transmission **Use of frequency spectrum**	**:** **:**	**FHSS**
Channel access method	**:**	**FDMA**
Type of modulation	**:**	**GFSK**
Number of channels	**:**	**78**
Antenna	**:**	**Integrated antenna**
Power supply	**:**	**3.70 V DC by Li - Ion battery & Ktec power supply**
Temperature range	**:**	**-20°C to +55 °C**

6 Test laboratories sub-contracted

None

7 Summary of measurement results

☒ **No deviations from the technical specifications were ascertained**

☐ There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2012-10-01	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	GFSK	☐	☐	☒	☐	Not applicable for FHSS!
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(a)(1)(iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	Idle / RX mode	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

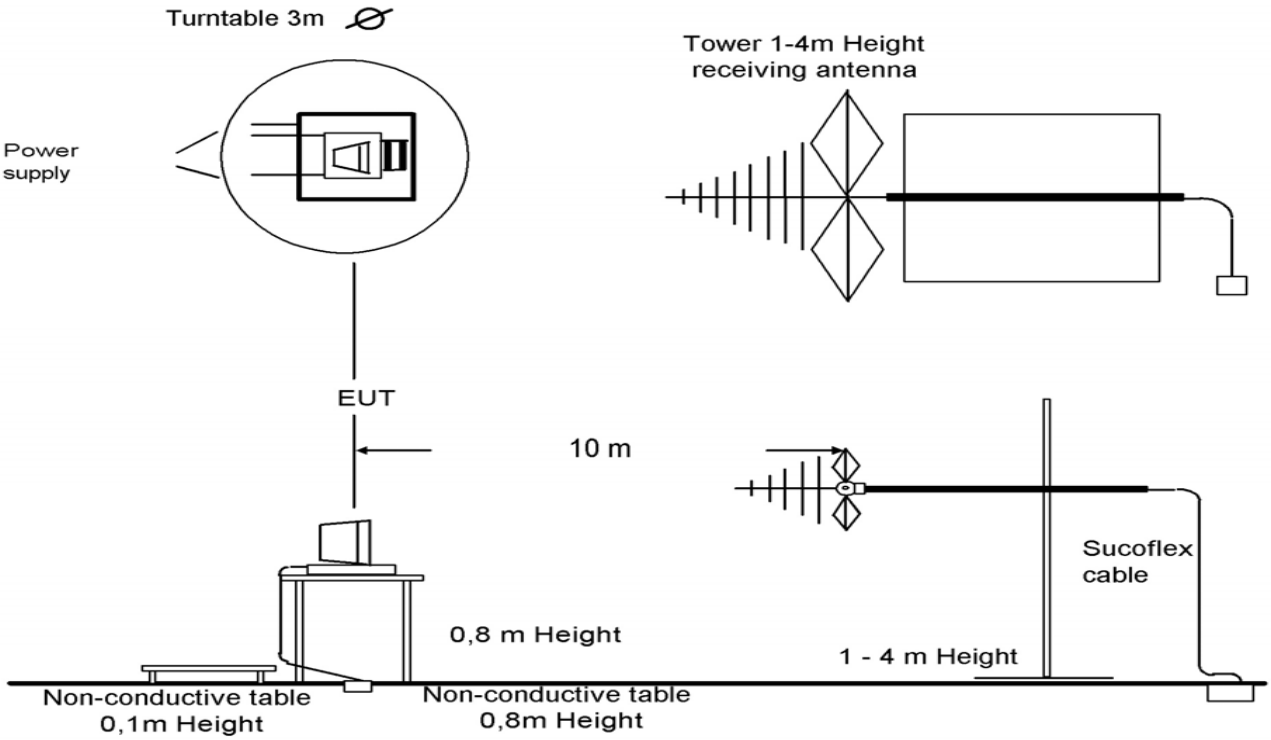
8 RF measurements

8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2009 clause 4.2.
Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



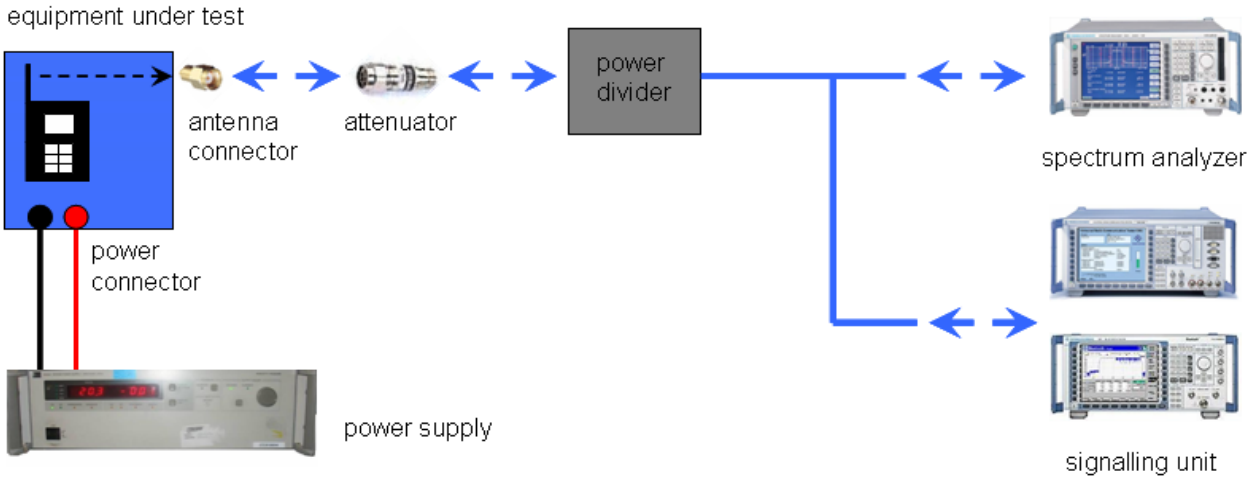
Picture 1: Diagram radiated measurements

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

All measurements are done in accordance with the Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA 00-705 and Appendix A "BLUETOOTH® APPROVALS"
The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 Additional comments

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Reference documents:	RF_IXIT, CP_GH, 07.06.2012 RF.ICS.4.0.2_2012-06-07_CP_GH
Special test descriptions:	None
Configuration descriptions:	TX tests: were performed with x-DH5 packets and static PRBS pattern payload. RX/Standby tests: BT test mode enabled, scan enabled, TX Idle The radiated measurements are performed by Tobias Wittenmeier.
Test mode:	☒ Bluetooth Test mode loop back enabled (EUT is controlled over CBT/CMU) ☐ Special software is used. EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

Test report number	**:**	**1-4722/12-07-03-A**
Equipment model number	**:**	**622d**
Certification number	**:**	**1884E-80E00009622**
Manufacturer (complete address)	**:**	**Aastra Deutschland GmbH Zeughofstr. 1 10997 Berlin / GERMANY**
Tested to radio standards specification no.	**:**	**RSS 210, Issue 8, Annex 8**
Open area test site IC No.	**:**	**IC 3462C-1**
Frequency range	**:**	**ISM band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz, highest channel 2480 MHz)**
RF-power (max.)	**:**	**Conducted power: 0.78 mW (GFSK modulation) Radiated power: 0.61 mW (GFSK modulation)**
Occupied bandwidth (99%-BW) [kHz]	**:**	**938 (GFSK modulation)**
Type of modulation	**:**	**FHSS technology with GFSK modulation.**
Emission designator (TRC-43)	**:**	**938 KFXD (GFSK modulation)**
Antenna information	**:**	**Integrated antenna**
Transmitter spurious (worst case) [dBµV/m @ 3m]:		**52.39 AVG @ 1602.1 MHz**
Receiver spurious (worst case) [dBµV/m @ 3m]:		**50.0 Peak @ 12.5 GHz (noise floor)**

ATTESTATION:
DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory manager:

2012-10-01	Marco Bertolino	
Date	Name	Signature

9 Measurement results

9.1 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth® devices, the GFSK modulation is used.

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	5 MHz
Trace-Mode:	Max hold

Limits:

FCC	IC
CFR Part 15.247 (b)(4)	RSS 210, Issue 8, A 8.4(2)
Antenna Gain	
6 dBi	

Results:

T_{nom}	V_{nom}	lowest channel 2402 MHz	middle channel 2441 MHz	highest channel 2480 MHz
Conducted power [dBm] Measured with GFSK modulation		-1.10	-1.53	-1.62
Radiated power [dBm] Measured with GFSK modulation		-2.18	-3.00	-3.38
Gain [dBi] Calculated		-1.08	-1.47	-1.76

Result: **Passed**

9.2 Power spectral density

Description:

Measurement of the power spectral density of a digital modulated system. This requirement is only valid for digitally modulated systems without hopping functionality.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	500 s
Video bandwidth:	3 kHz
Resolution bandwidth:	3 kHz
Span:	150 kHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (e)	RSS 210, Issue 8, A 8.2(b)
Power Spectral Density	
For digitally modulated systems the transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration.	

Results:

Modulation	Power spectral density [dBm/3kHz]		
Frequency	2412 MHz	2437 MHz	2462 MHz
GFSK	Not required for hopping systems!		
-/-			
-/-			
Measurement uncertainty	± 1.5 dB		

9.3 Carrier frequency separation

Description:

Measurement of the carrier frequency separation of a hopping system. The carrier frequency separation is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	100 kHz
Resolution bandwidth:	100 kHz
Span:	4 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (a)(1)	RSS 210, Issue 8, A 8.1(b)
Carrier Frequency Separation	
Minimum 25 kHz or two-thirds of the 20 dB bandwidth of the hopping system whichever is greater.	

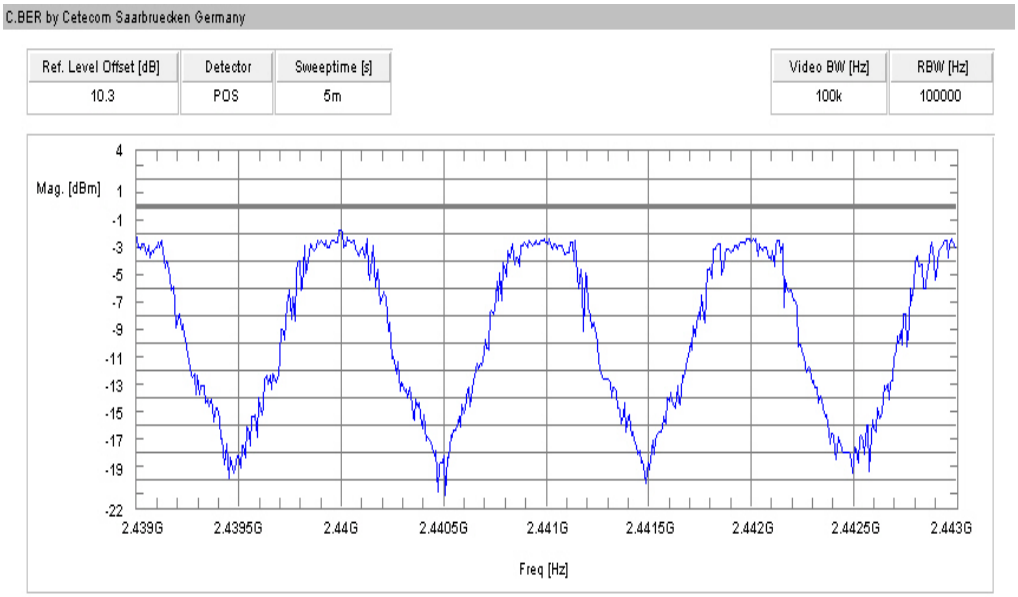
Result:

Carrier frequency separation	~ 1 MHz

Result: Passed

Plot:

Plot 1: Carrier frequency separation (GFSK modulation)



9.4 Number of hopping channels

Description:

Measurement of the total number of used hopping channels. The number of hopping channels is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	500 kHz
Resolution bandwidth:	500 kHz
Span:	Plot 1: 2400 – 2445 MHz Plot 2: 2445 – 2485 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (a)(1)	RSS 210, Issue 8, A 8.1(d)
Number of hopping channels	
At least 15 non overlapping hopping channels	

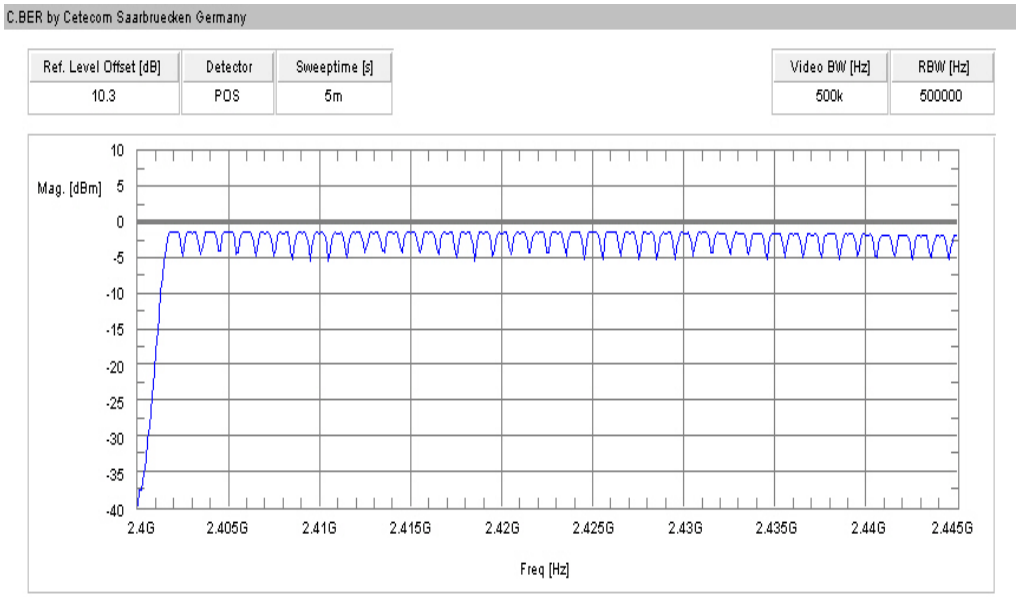
Result:

Number of hopping channels	79

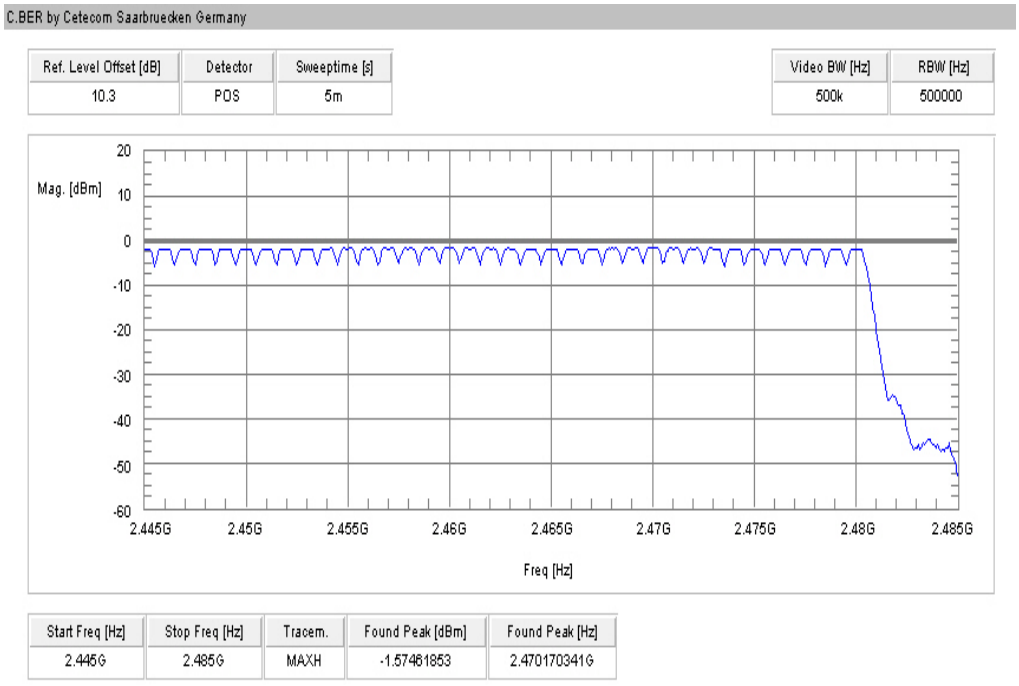
Result: **Passed.**

Plots:

Plot 1: Number of hopping channels (GFSK modulation)



Plot 2: Number of hopping channels (GFSK modulation)



9.5 Time of occupancy (dwell time)

Measurement:

For Bluetooth® devices no measurements mandatory depending on the fixed requirements according to the Bluetooth® Core Specifications!

For Bluetooth® devices:

The channel staying time of 0.4 s within a 31.6 second period in data mode is constant for Bluetooth® devices and independent from the packet type (packet length). The calculation for a 31.6 second period is a follows:

Channel staying time = time slot length * hop rate / number of hopping channels * 31.6 s

Example for a DH1 packet (with a maximum length of one time slot)
Channel staying time = 625 µs * 1600*1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

For multi-slot packets the hopping is reduced according to the length of the packet.

Example for a DH3 packet (with a maximum length of three time slots)
Channel staying time = 3 * 625 µs * 1600/3 *1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

Example for a DH5 packet (with a maximum length of five time slots)
Channel staying time = 5 * 625 µs * 1600/5 *1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

This is according the Bluetooth® Core Specification V2.0 & V2.1 & V3.0 & V4.0 (+ critical errata) for all Bluetooth® devices.

The following table shows the relations:

Packet Size	Pulse Width [ms] *	Max. number of transmissions per channel in 31.6 sec
DH1	0.366	640
DH3	1.622	214
DH5	2.870	128

* according Bluetooth® specification

Results:

Packet Size	Pulse Width [ms]*	Max. number of transmissions in 31.6 sec	Dwell time [Pulse width * Number of transmissions]
DH1	0.366	640	234.2 ms
DH3	1.622	214	347.1 ms
DH5	2.870	128	367.4 ms

Limits:

FCC	IC
CFR Part 15.247 (a)(1)(iii)	RSS 210, Issue 8, A 8.3(1)
Time of occupancy (dwell time)	
The frequency hopping operation shall have an average time of occupancy on any frequency not exceeding 0.4 seconds within a duration in seconds equal to the number of hopping frequencies multiplied by 0.4.	

Result: **Passed**

9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Description:

Measurement of the 20dB bandwidth of the modulated signal. The measurement is performed according to the "Measurement Guidelines" (DA 00-705, March 30, 2000). EUT in single channel mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	2 s
Video bandwidth:	30 kHz
Resolution bandwidth:	10 kHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (a)(1)	RSS 210, Issue 8, A 8.2(a)
Spectrum bandwidth of a FHSS system – 20 dB bandwidth	
GFSK < 1500 kHz Pi/4 DQPSK < 1500 kHz 8DPSK < 1500 kHz	

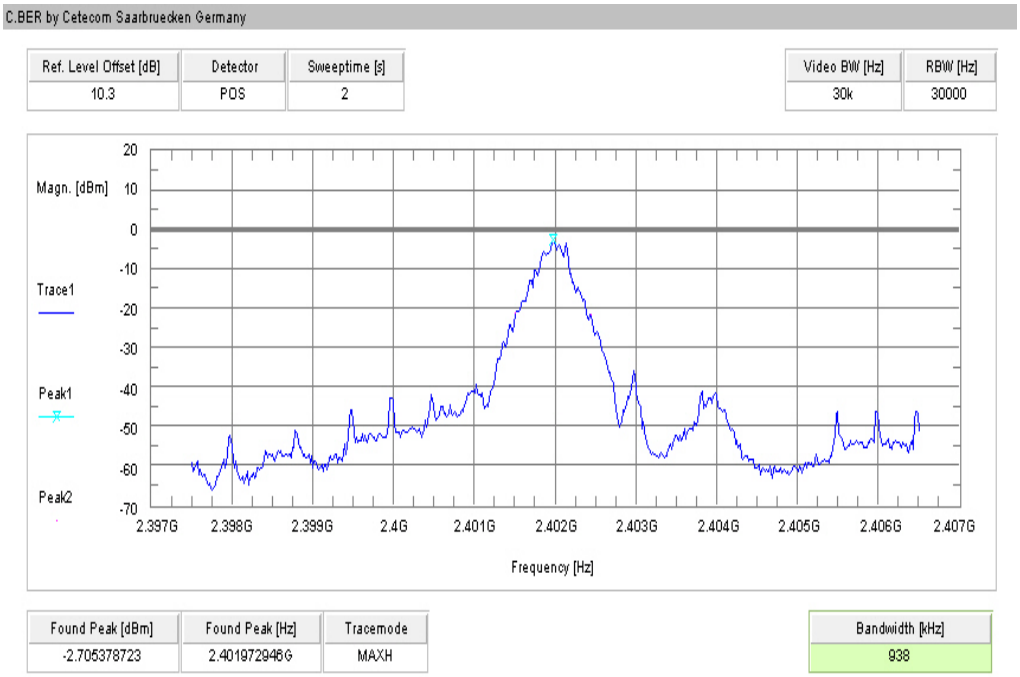
Results:

Modulation	20 dB BANDWIDTH [kHz]		
Frequency	2402 MHz	2441 MHz	2480 MHz
GFSK	938	938	938
Measurement uncertainty	± 10 kHz		

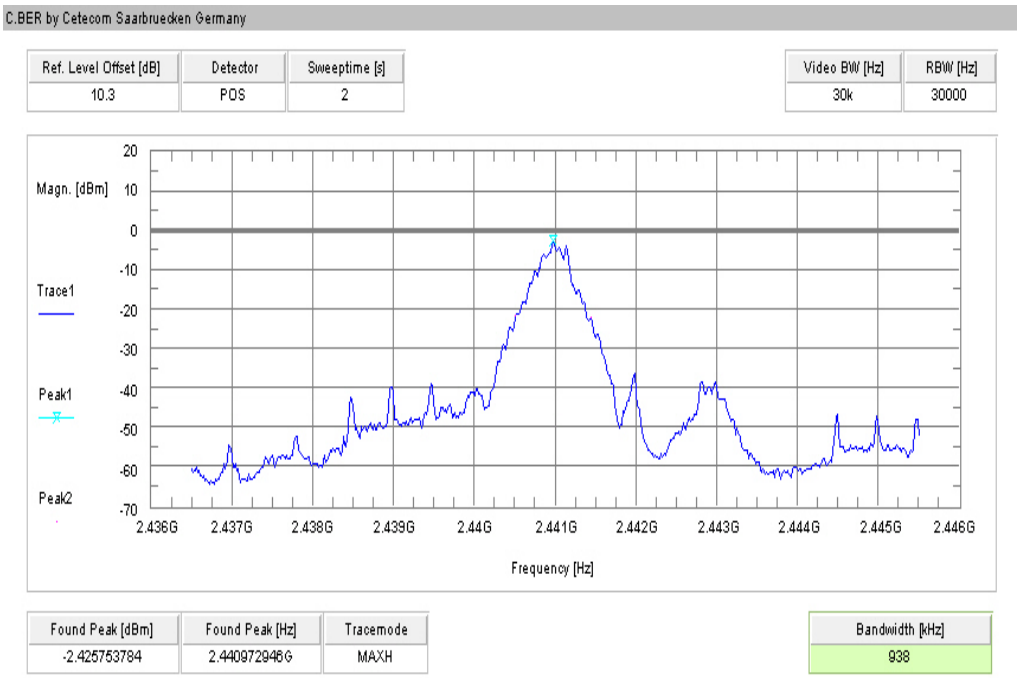
Result: Passed

Plots:

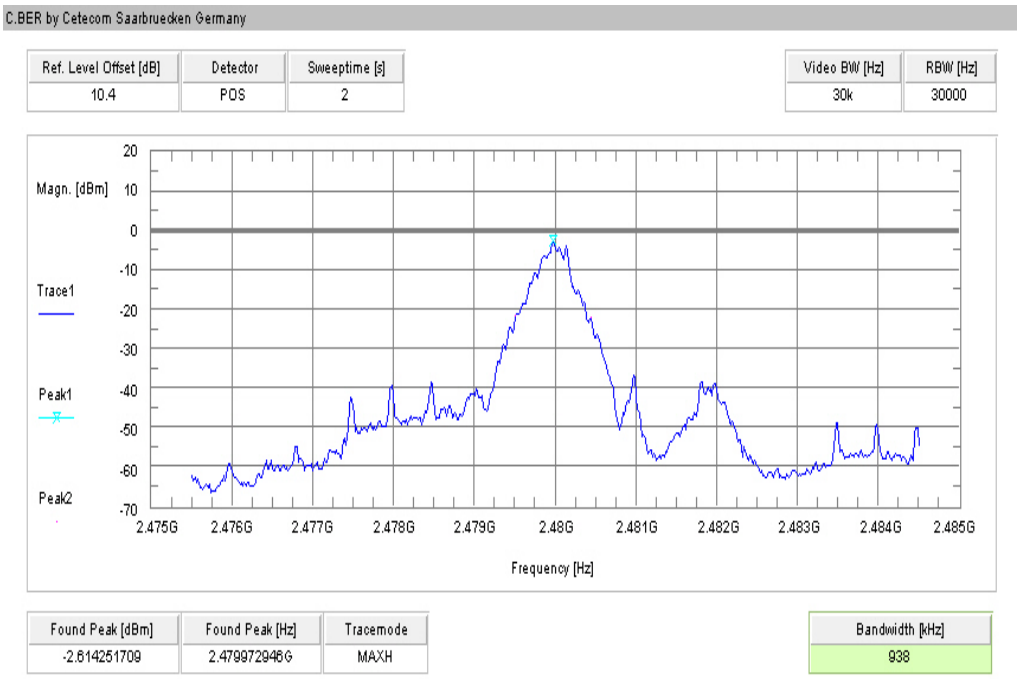
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.7 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. EUT in single channel mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (b)(1)	RSS 210, Issue 8, A 8.4(2)
Maximum output power	
[Conducted: 0.125 W – antenna gain max. 6 dBi] Systems using more than 75 hopping channels: Conducted: 1.0 W – antenna gain max. 6 dBi	

Results:

Modulation	Maximum output power conducted [dBm]		
Frequency	2402 MHz	2441 MHz	2480 MHz
GFSK	-1.10	-1.53	-1.62
Measurement uncertainty	± 1 dB		

Results:

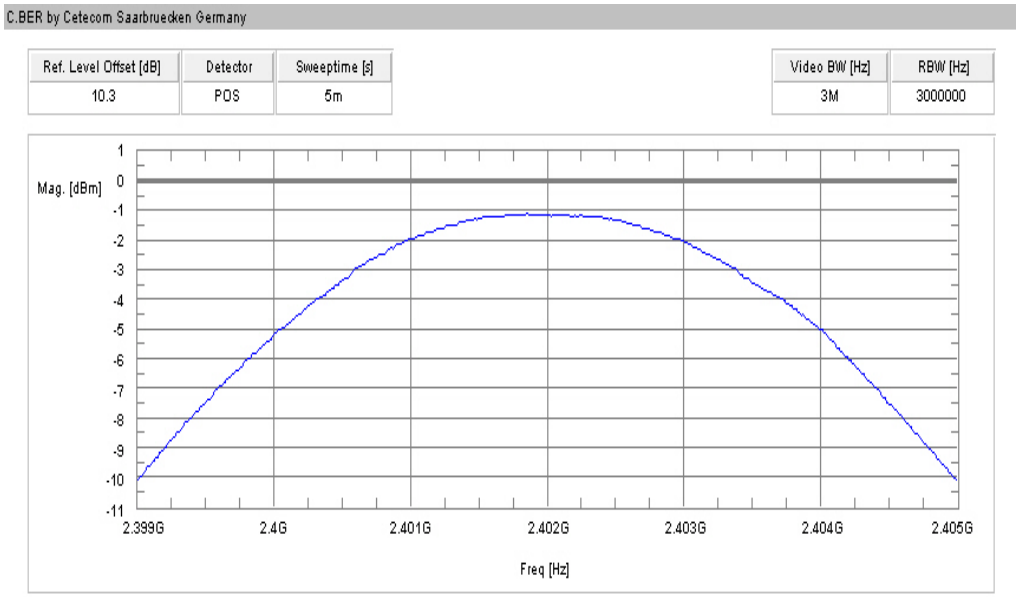
Modulation	Maximum output power radiated - EIRP [dBm]		
Frequency	2402 MHz	2441 MHz	2480 MHz
GFSK	-2.18	-3.00	-3.38
Measurement uncertainty	± 3 dB		

*) - Values calculated with antenna gain

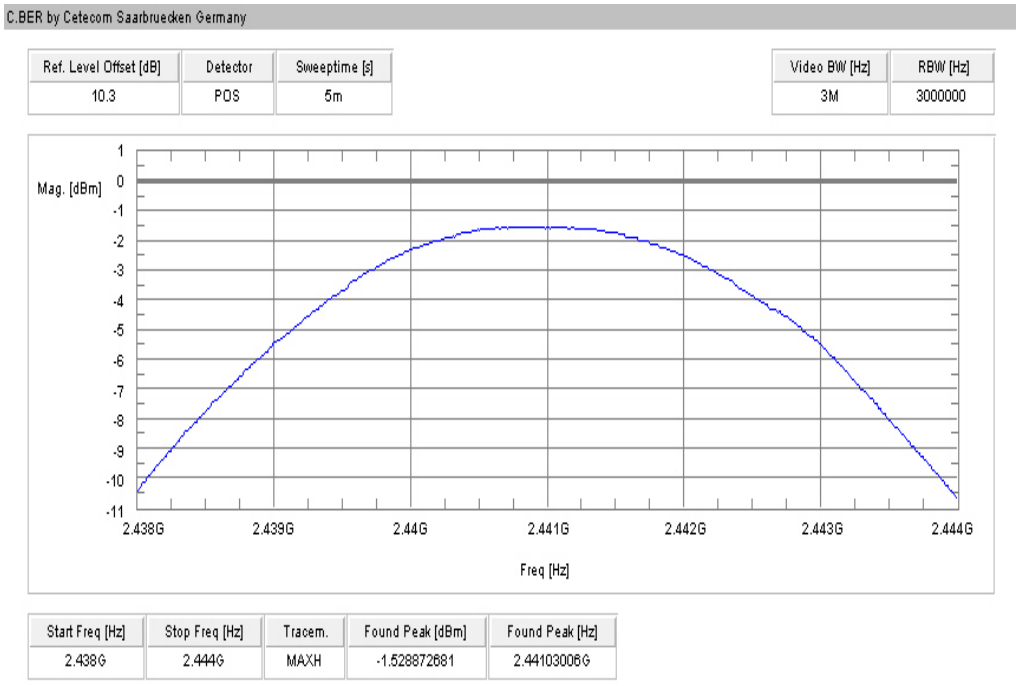
Result: **Passed**

Plots:

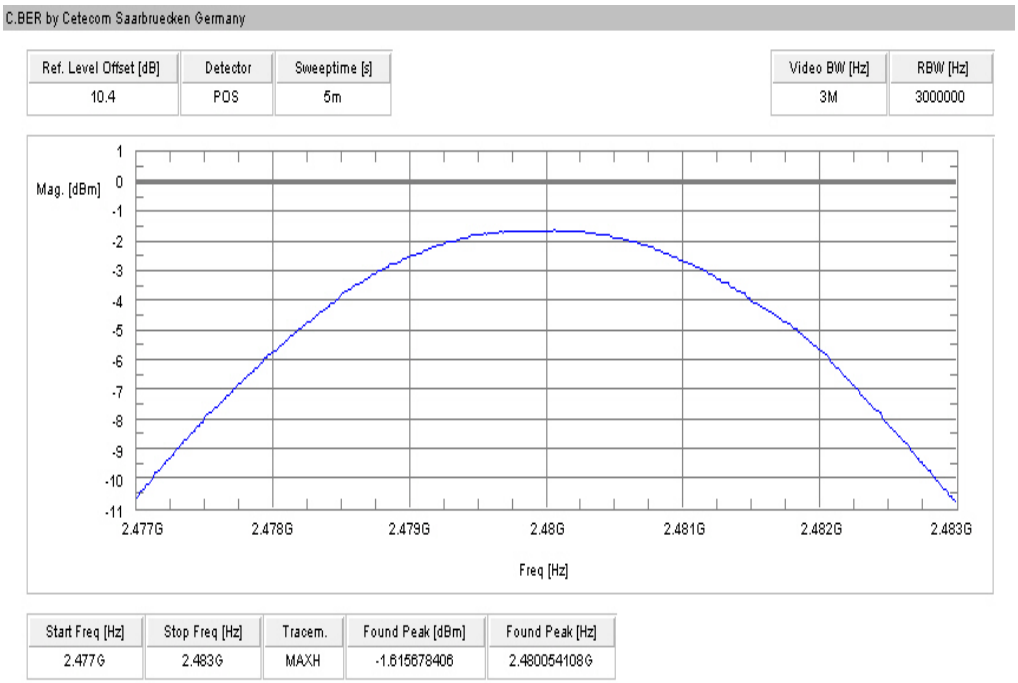
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.8 Band edge compliance conducted

Description:

Measurement of the conducted band edge compliance. EUT is measured at the lower and upper band edge in single channel and hopping mode. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	100 kHz
Resolution bandwidth:	100 kHz
Span:	Lower Band Edge: 2395 – 2405 MHz Upper Band Edge: 2478 – 2489 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (d)	RSS 210, Issue 8, A 8.5
Band edge compliance conducted	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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 a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.	

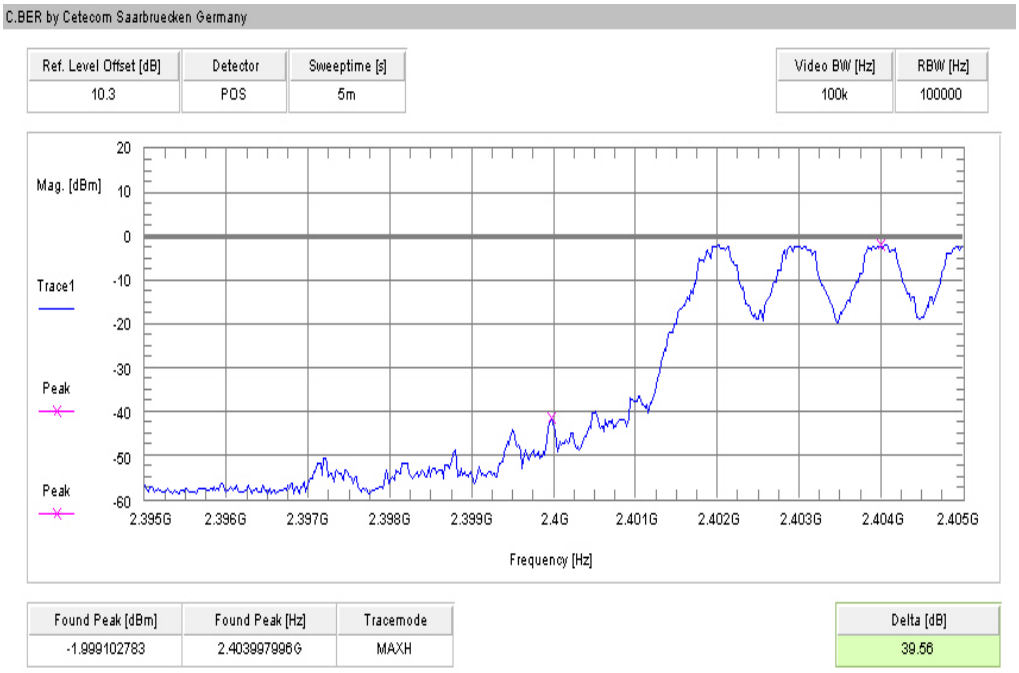
Results:

Scenario	Band edge compliance conducted [dB]		
Modulation	GFSK	-/-	-/-
Lower band edge – hopping off	> 20 dB	-/-	-/-
Lower band edge – hopping on	> 20 dB	-/-	-/-
Upper band edge – hopping off	> 20 dB	-/-	-/-
Upper band edge – hopping on	> 20 dB	-/-	-/-
Measurement uncertainty	± 1.5 dB		

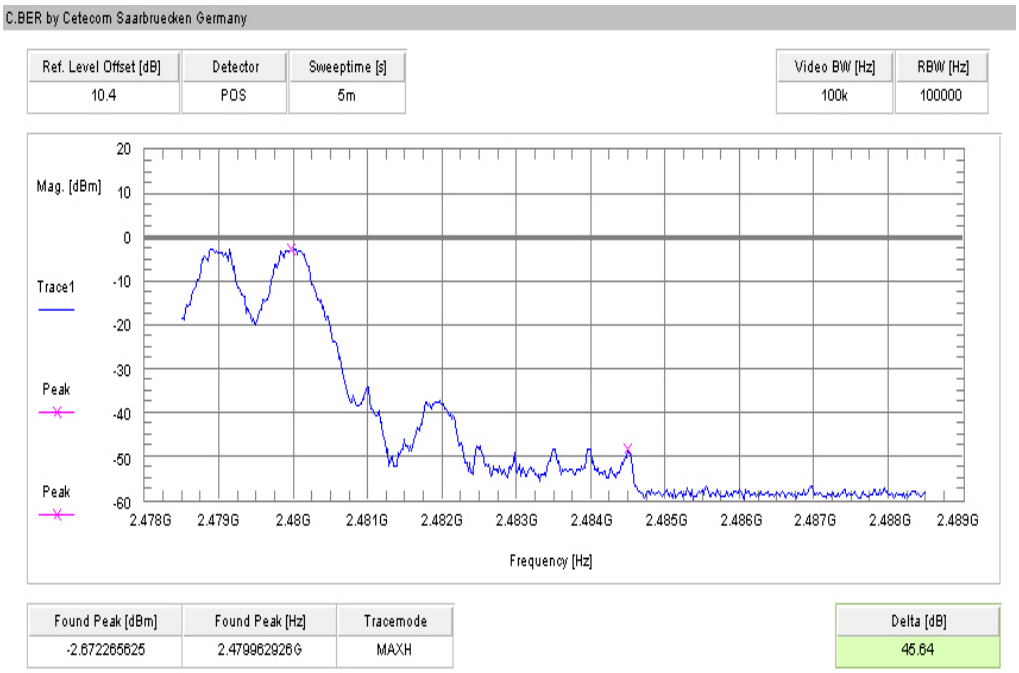
Result: Passed

Plots:

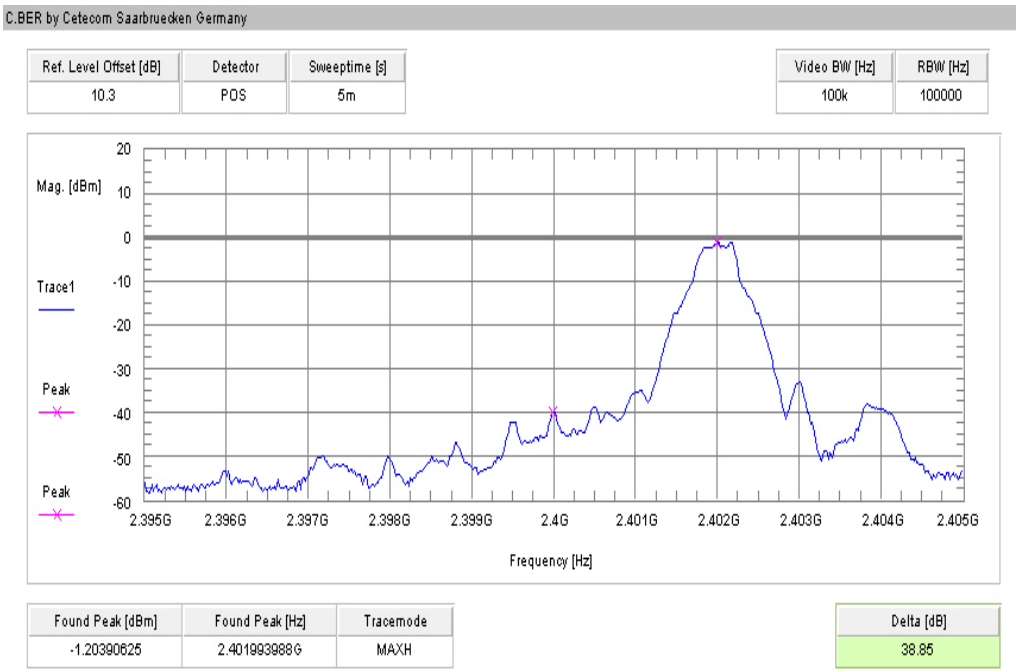
Plot 1: Lower band edge – hopping on, GFSK modulation



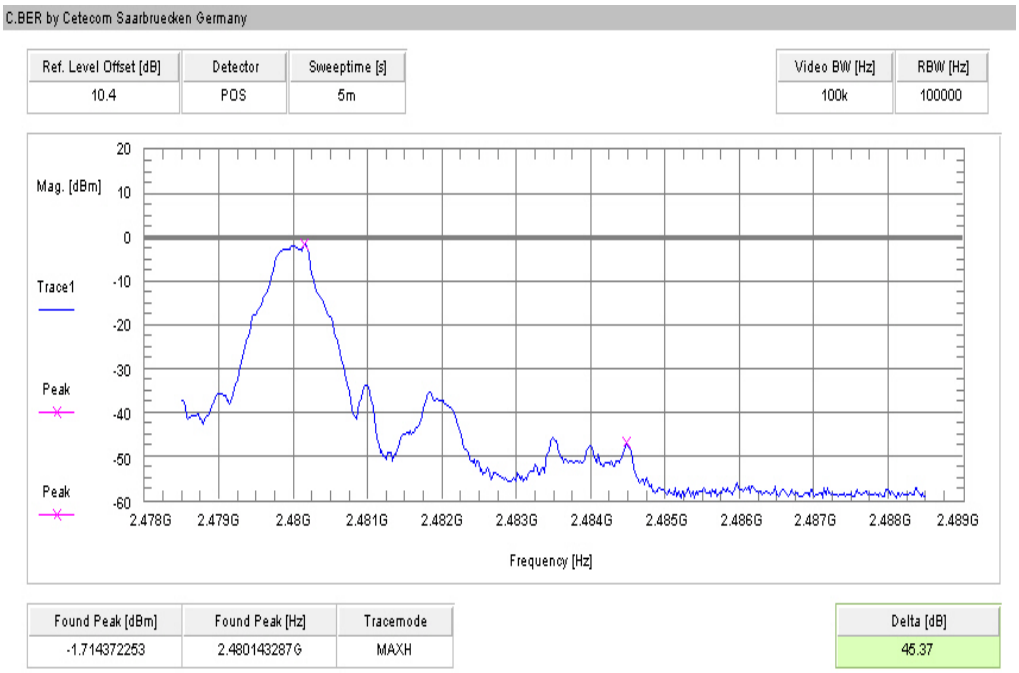
Plot 2: Upper band edge – hopping on, GFSK modulation



Plot 3: Lower band edge – hopping off, GFSK modulation



Plot 4: Upper band edge – hopping off, GFSK modulation



9.9 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 78 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	10 Hz
Resolution bandwidth:	1 MHz
Span:	Lower Band: 2300 – 2400 MHz Upper Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.205	RSS 210, Issue 8, A 8.5
Band edge compliance radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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 a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).	
54 dBµV/m AVG	

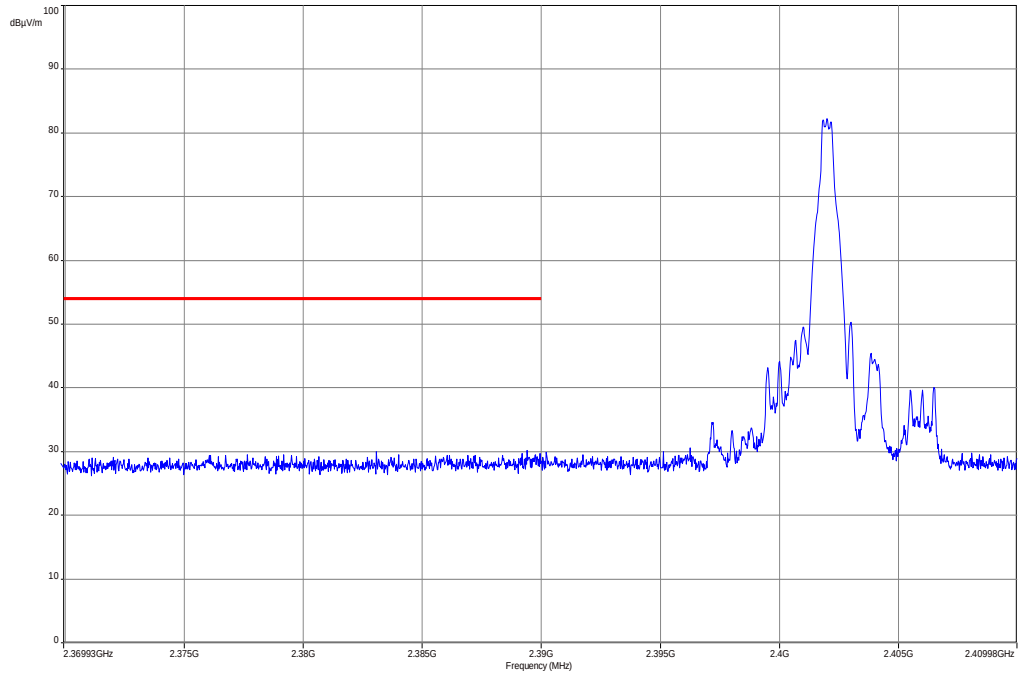
Results:

Scenario	Band edge compliance radiated [dBµV/m]		
Modulation	GFSK	-/-	-/-
Lower restricted band	< 54	-/-	-/-
Upper restricted band	< 54	-/-	-/-
Measurement uncertainty	± 3 dB		

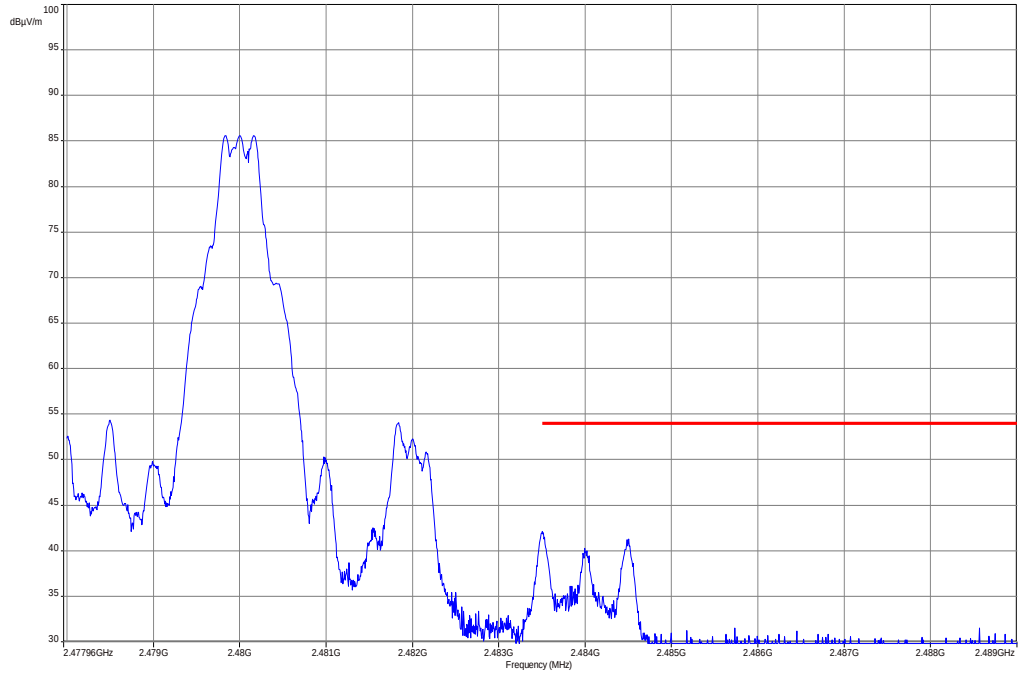
Result: Passed

Plots:

Plot 1: Lower band edge, GFSK modulation, vertical & horizontal polarization



Plot 2: Upper band edge, GFSK modulation, vertical & horizontal polarization



9.10 TX spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	9 kHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247(d)	RSS 210, Issue 8, A 8.5
TX spurious emissions conducted	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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 a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required	

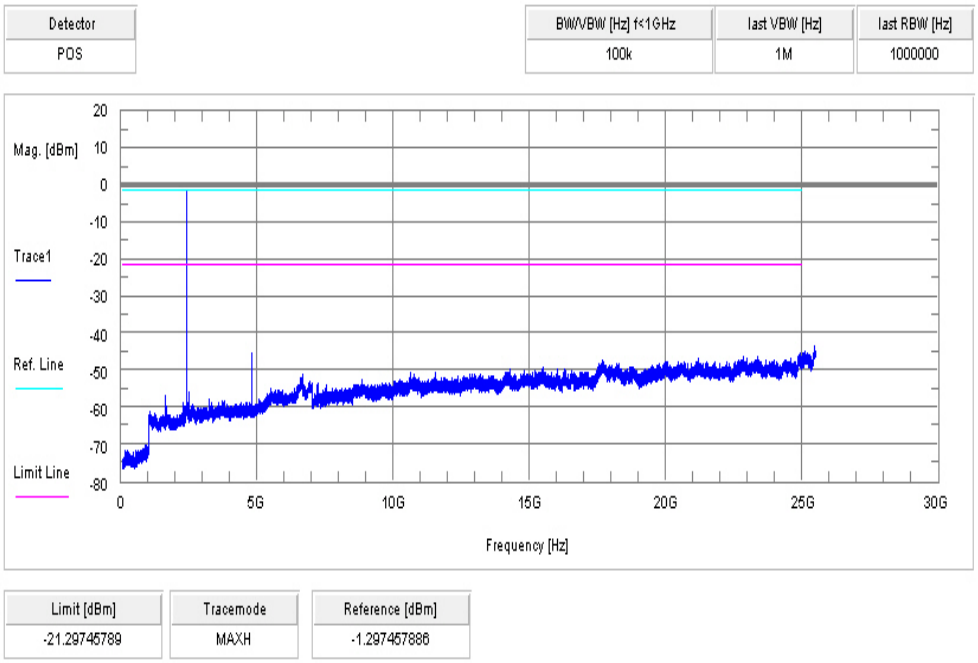
Results:

TX spurious emissions conducted					
GFSK - mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		-1.30	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are more than 20 dBc below the limit!			-20 dBc		complies
2441		-1.63	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are more than 20 dBc below the limit!			-20 dBc		complies
2480		-1.76	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are more than 20 dBc below the limit!			-20 dBc		complies
Measurement uncertainty		± 3 dB			

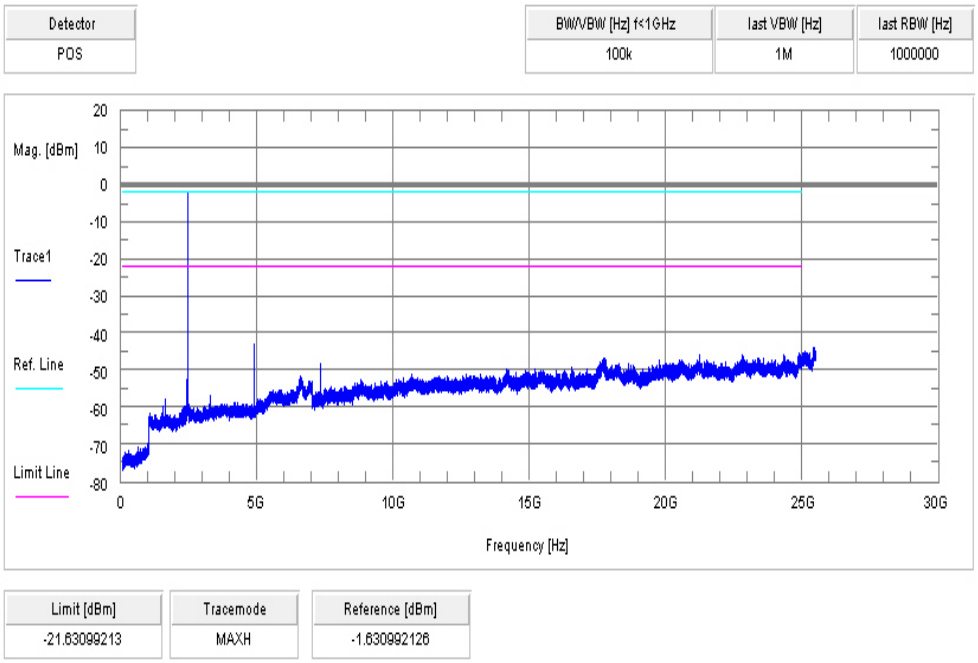
Result: **Passed**

Plots:

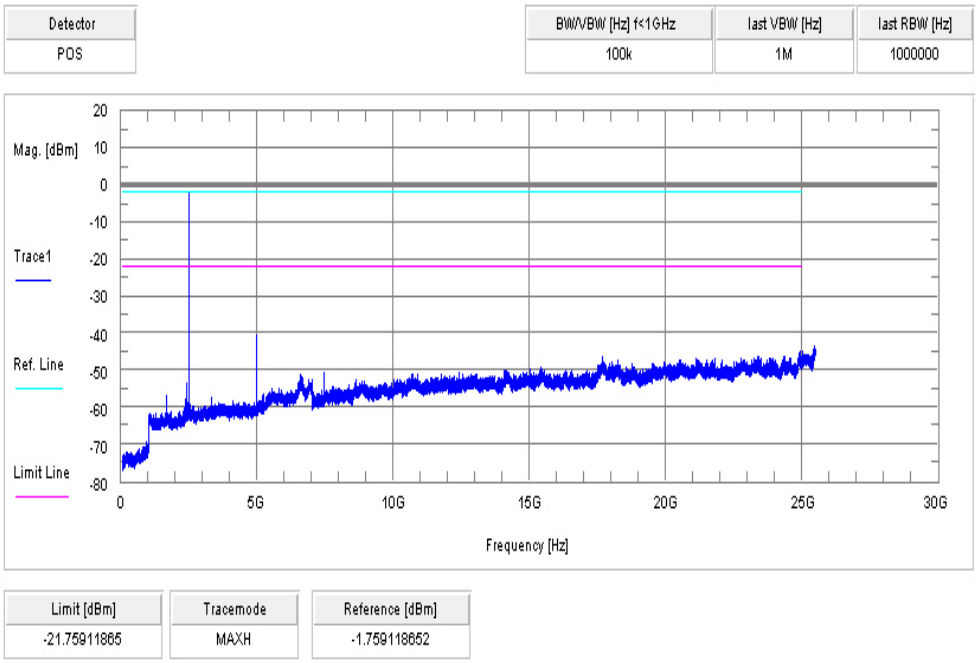
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.11 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is performed in the mode with the highest output power.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold
Measured Modulation:	☒ GFSK ☐ Pi/4 DQPSK ☐ 8DPSK

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

FCC	IC	
CFR Part 15.247(d)	RSS 210, Issue 8, A 8.5	
TX spurious emissions radiated		
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the 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 a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
§15.209		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Results:

TX spurious emissions radiated [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks detected			No critical peaks detected			No critical peaks detected		
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
1602.1	Peak	58.46	1626.4	Peak	57.54	1654.0	Do not fall into a restricted band!	
	AVG	52.39		AVG	51.46			
4803.3	Peak	52.71	4882.0	Peak	56.13	3834.4	Peak	52.03
	AVG	44.76		AVG	49.14		AVG	46.42
						4959.9	Peak	52.66
							AVG	45.86
Measurement uncertainty			± 3 dB					

Result: **Passed**

Plots:

Plot 1: 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization

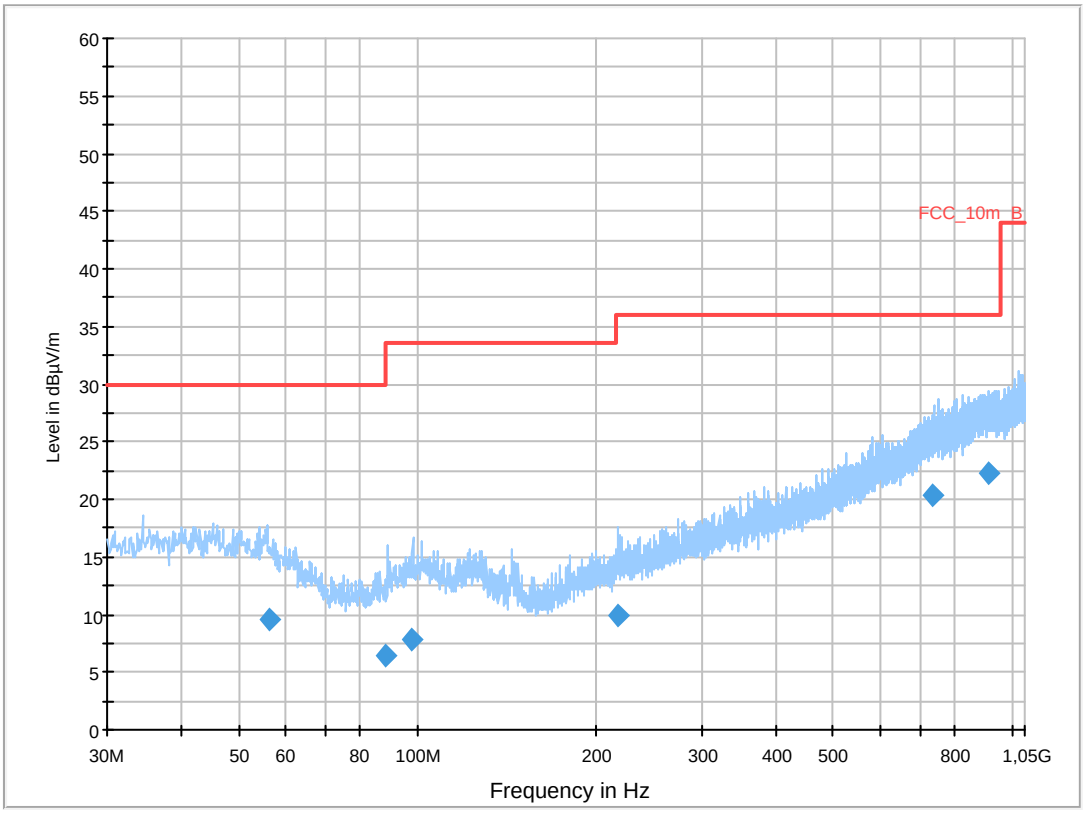
Common Information

EUT:	622D Aastra
Serial Number:	C58100020636
Test Description:	FCC part 15 C class B@10m
Operating Conditions:	BT CH0 GFSK DH5 + charging
Operator Name:	Wolsdorfer
Comment:	AC 115V/60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

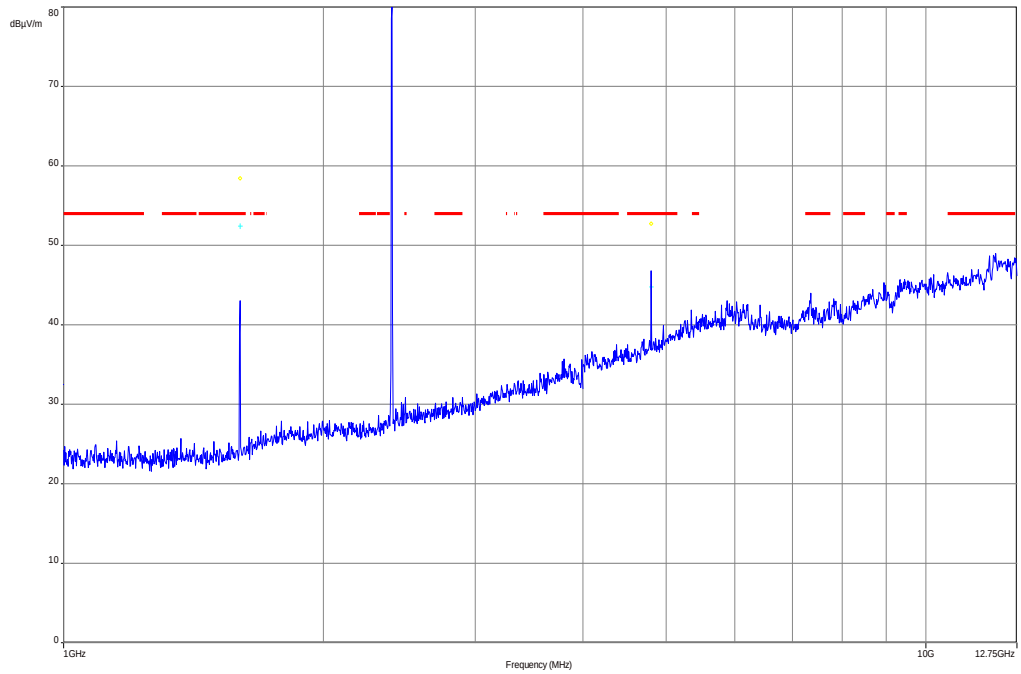
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



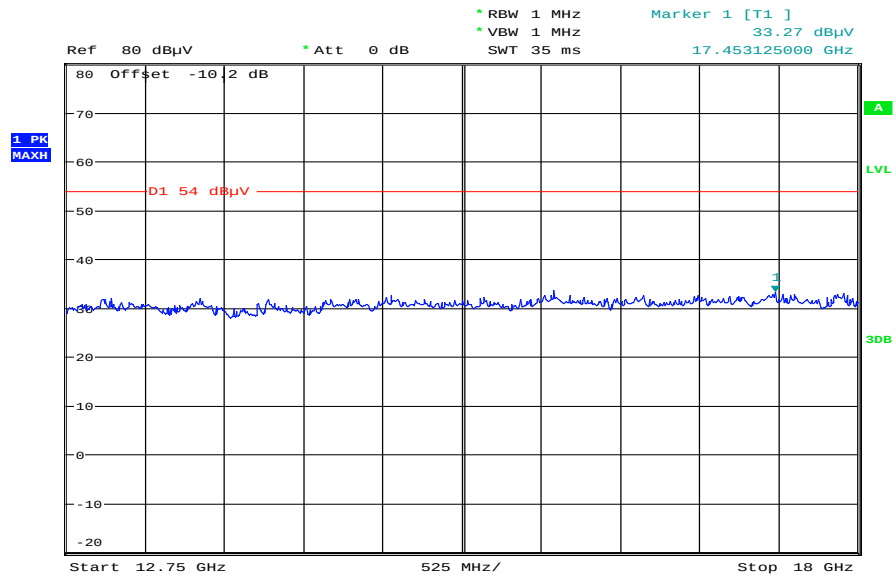
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
56.133450	9.5	1000.0	120.000	284.0	H	108.0	12.6	20.5	30.0	
88.441950	6.4	1000.0	120.000	360.0	V	234.0	10.3	27.1	33.5	
97.852800	7.9	1000.0	120.000	200.0	V	193.0	11.6	25.6	33.5	
216.564300	9.9	1000.0	120.000	106.0	V	282.0	12.3	26.1	36.0	
732.619200	20.4	1000.0	120.000	258.0	V	265.0	23.3	15.6	36.0	
913.044000	22.3	1000.0	120.000	100.0	H	207.0	25.2	13.7	36.0	

Plot 2: 1 GHz to 12.75 GHz, TX mode, channel 00, vertical & horizontal polarization

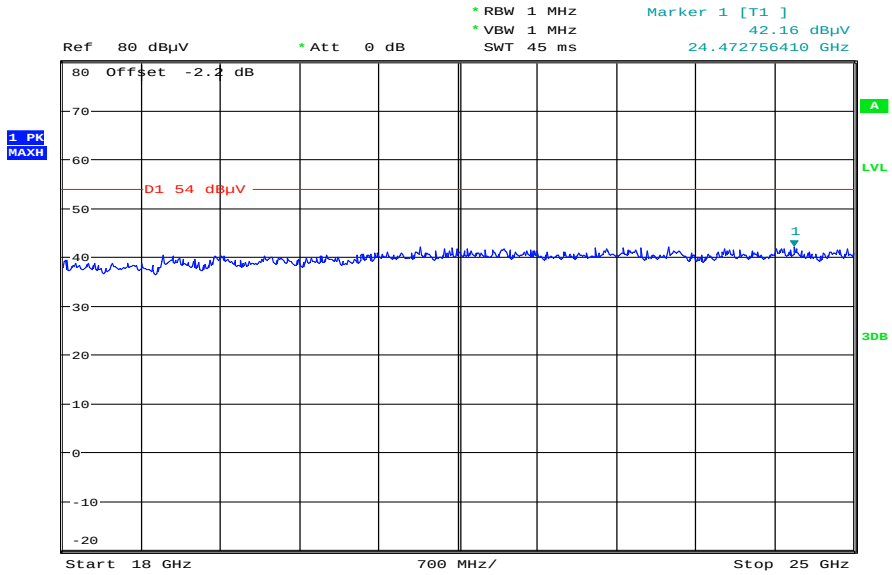


Plot 3: 12.75 GHz to 18 GHz, TX mode, channel 00, vertical & horizontal polarization



Date: 21.JUN.2012 12:05:22

Plot 4: 18 GHz to 25 GHz, TX mode, channel 00, vertical & horizontal polarization



Plot 5: 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization

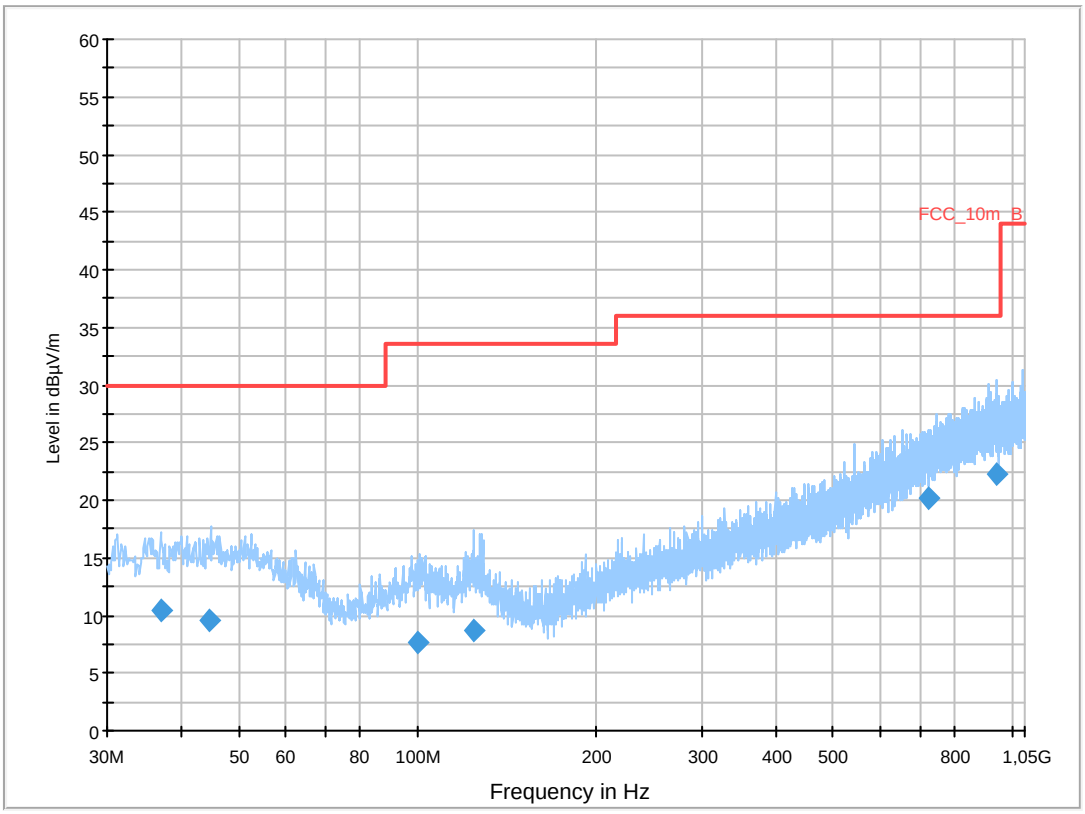
Common Information

EUT:	622D Aastra
Serial Number:	C58100020636
Test Description:	FCC part 15 C class B@10m
Operating Conditions:	BT CH39 GFSK DH5 + charging
Operator Name:	Wolsdorfer
Comment:	AC 115V/60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

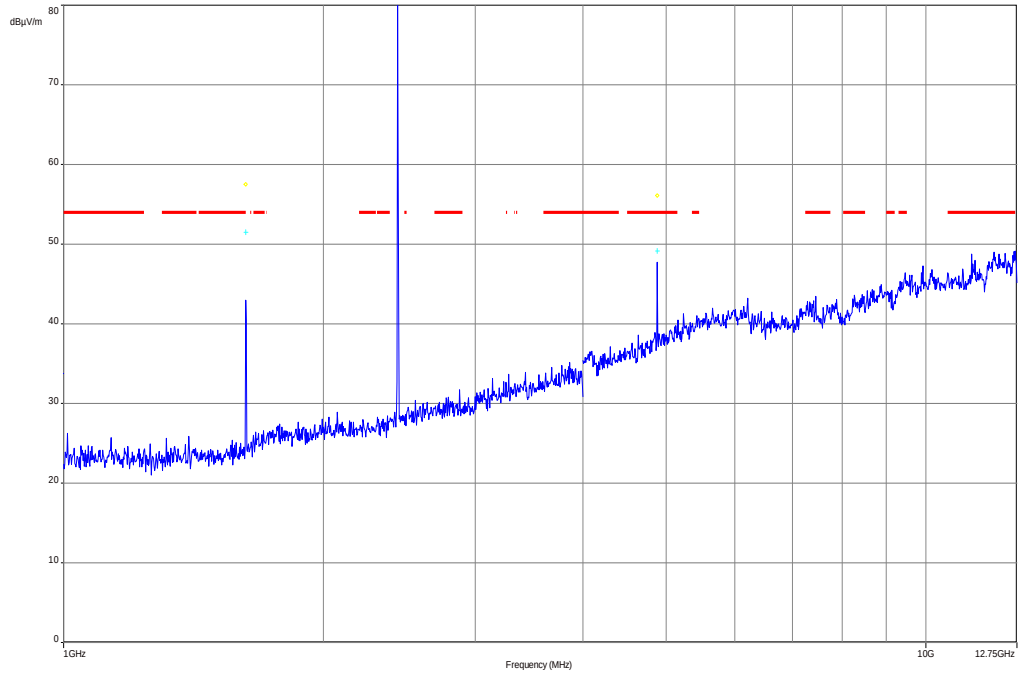
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



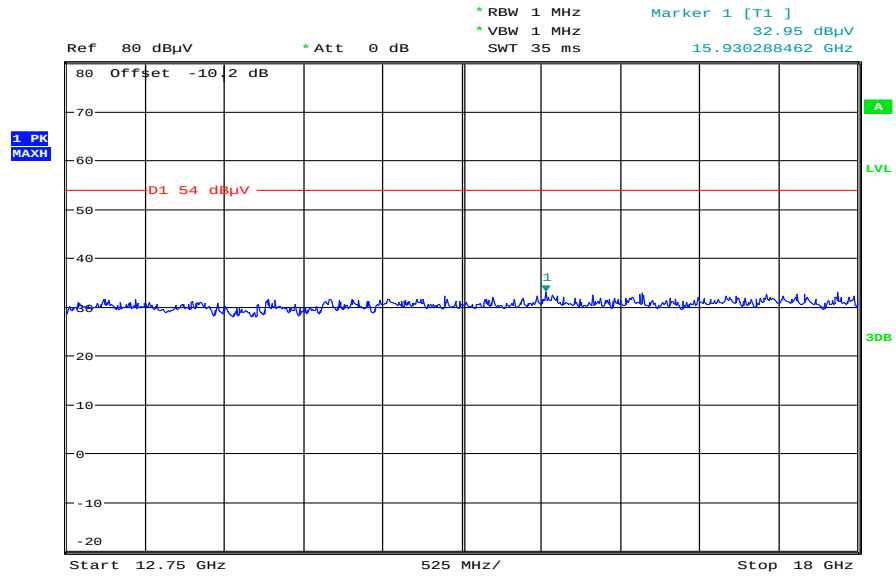
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.979500	10.4	1000.0	120.000	119.0	V	100.0	13.2	19.6	30.0	
44.455500	9.6	1000.0	120.000	143.0	H	100.0	13.3	20.4	30.0	
99.747600	7.7	1000.0	120.000	170.0	H	-5.0	11.9	25.8	33.5	
123.834000	8.7	1000.0	120.000	98.0	V	4.0	9.9	24.8	33.5	
725.827650	20.2	1000.0	120.000	170.0	H	265.0	23.1	15.8	36.0	
941.331150	22.3	1000.0	120.000	170.0	H	85.0	25.3	13.7	36.0	

Plot 6: 1 GHz to 12.75 GHz, TX mode, channel 39, vertical & horizontal polarization

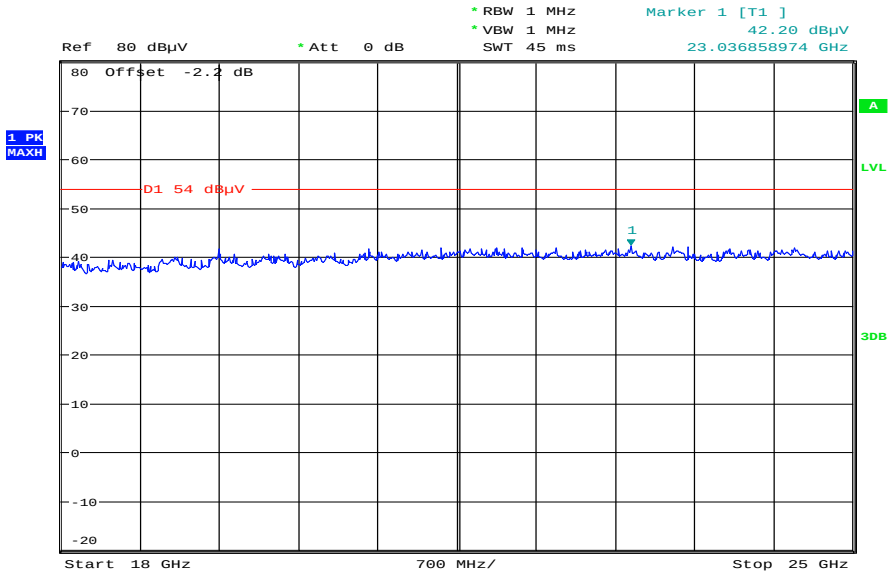


Plot 7: 12.75 GHz to 18 GHz, TX mode, channel 39, vertical & horizontal polarization



Date: 21.JUN.2012 12:06:55

Plot 8: 18 GHz to 25 GHz, TX mode, channel 39, vertical & horizontal polarization



Plot 9: 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization

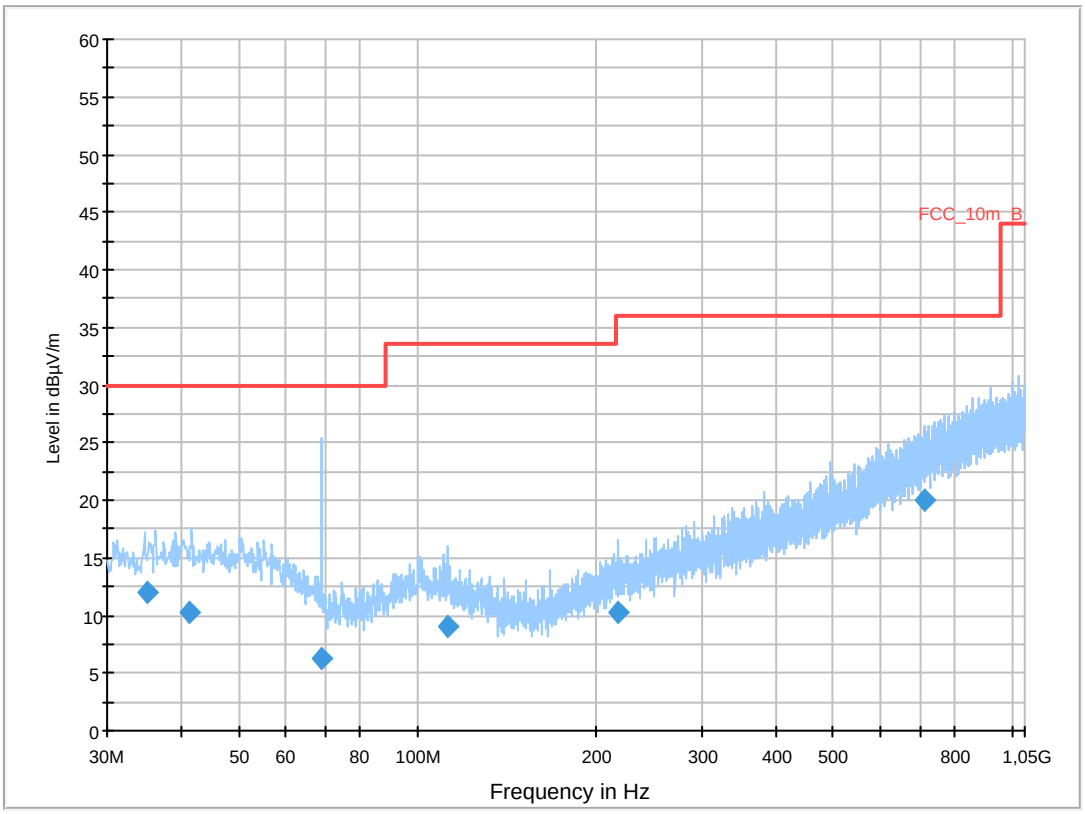
Common Information

EUT:	622D Aastra
Serial Number:	C58100020636
Test Description:	FCC part 15 C class B@10m
Operating Conditions:	BT CH78 GFSK DH5 + charging
Operator Name:	Wolsdorfer
Comment:	AC 115V/60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

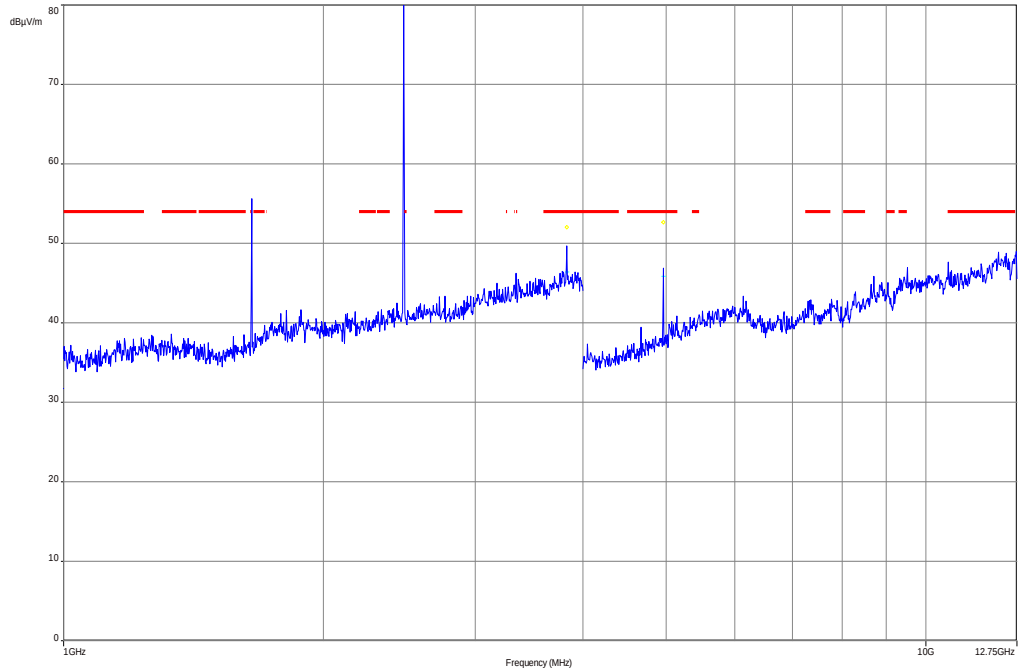
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.055750	12.1	1000.0	120.000	98.0	V	10.0	13.0	17.9	30.0	
41.256600	10.2	1000.0	120.000	161.0	H	10.0	13.4	19.8	30.0	
68.793600	6.3	1000.0	120.000	170.0	V	85.0	9.6	23.7	30.0	
111.963300	9.0	1000.0	120.000	170.0	V	-10.0	10.9	24.5	33.5	
216.933600	10.2	1000.0	120.000	170.0	V	10.0	12.3	25.8	36.0	
710.821200	20.0	1000.0	120.000	170.0	V	190.0	22.8	16.0	36.0	

Plot 10: 1 GHz to 12.75 GHz, TX mode, channel 78, vertical & horizontal polarization



Plot 11: 12.75 GHz to 18 GHz, TX mode, channel 78, vertical & horizontal polarization