



## **Accredited testing-laboratory**

**DAR registration number: DAT-P-176/94-D1**

**Federal Motor Transport Authority (KBA)  
DAR registration number: KBA-P 00070-97**

**Recognized by the Federal Communications Commission**

**Anechoic chamber registration no.: 90462 (FCC)**

**Anechoic chamber registration no.: 3462C-1 (IC)**

**Certification ID: DE 0001**

**Accreditation ID: DE 0002**

**Accredited Bluetooth® Test Facility (BQTF)**

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**Test report no. : 1-1041-17-02/09 B**  
**Type identification : NA08A02**  
**Applicant : Aisin AW Co., Ltd**  
**FCC ID : XEMNA08A02**  
**IC Certification No : 8192A-NA08A02**  
**Test standards : 47 CFR Part 15**  
**RSS - 210 Issue 7**

## Table of contents

<b>1</b>	<b>General information.....</b>	<b>3</b>
1.1	Notes .....	3
1.2	Testing laboratory .....	4
1.3	Details of applicant .....	4
1.4	Application details .....	4
<b>2</b>	<b>Test standard/s .....</b>	<b>5</b>
<b>3</b>	<b>Technical tests .....</b>	<b>6</b>
3.1	Details of manufacturer.....	6
3.1.1	Test item.....	6
3.1.2	Additional EUT information For IC Canada (appendix 2).....	7
3.1.3	RF Technical Brief Cover Sheet acc. To RSS-102 .....	8
3.1.4	EUT operating modes.....	9
3.1.5	Extreme conditions testing values .....	9
<b>4</b>	<b>Summary of Measurement Results and list of all performed test cases .....</b>	<b>10</b>
<b>5</b>	<b>RF measurement testing .....</b>	<b>11</b>
5.1	Description of test set-up.....	11
5.1.1	Radiated measurements.....	11
5.1.2	Conducted measurements.....	11
5.2	Referenced documents .....	12
5.3	Additional comments .....	12
5.4	Antenna gain .....	12
5.5	Carrier frequency separation §15.247(a)(1) .....	12
5.6	Number of hopping channels §15.247(a)(1) .....	13
5.7	Time of occupancy (dwell time) §15.247(a)(1)(iii).....	13
5.8	Power Spectral density (Hybrid system in Inquiry mode/Page scan) §15.247(e) .....	14
5.9	Spectrum Bandwidth of a FHSS System / 20dB Bandwidth §15.247(a)(1).....	14
5.10	Maximum output power (conducted) § 15.247 (b)(1).....	15
5.11	Max. peak output power (radiated) § 15.247 (b)(1) .....	16
5.12	Band-edge compliance of conducted emissions §15.247 (d) .....	17
5.13	Band-edge compliance of radiated emissions §15.205 .....	18
5.14	Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1) .....	22
5.15	Spurious Emissions > 30 MHz- radiated (Transmitter) § 15.247 (c)(1).....	24
5.16	Spurious Emissions - radiated (Receiver) § 15.109 .....	33
5.17	Spurious Emissions < 30 MHz - Transmitter radiated § 15.209 .....	37
5.18	Conducted Emissions <30 MHz § 15.107/207.....	38
<b>6</b>	<b>Test equipment and ancillaries used for tests.....</b>	<b>39</b>
<b>7</b>	<b>Photographs of the Test Set-up.....</b>	<b>41</b>
<b>8</b>	<b>Photographs of the EUT .....</b>	<b>42</b>

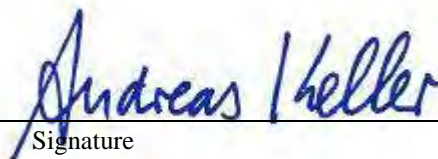
## 1 General information

### 1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

#### Test laboratory manager:

2009-10-06      Andreas Keller  
Date                      Name

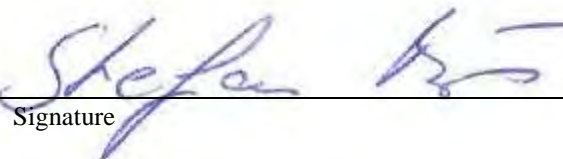
Signature  


2009-10-06      Marco Bertolino  
Date                      Name

Signature  


#### Technical responsibility for area of testing:

2009-10-06      Stefan Bös  
Date                      Name

Signature  


## 1.2 Testing laboratory

CETECOM ICT Services GmbH

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66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

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e-mail: [info@ICT.cetecom.de](mailto:info@ICT.cetecom.de)

Internet: <http://www.cetecom-ict.de>

State of accreditation:

The test laboratory (area of testing) is accredited according to  
DIN EN ISO/IEC 17025

DAR registration number: DAT-P-176/94-D1

Accredited by:

Federal Motor Transport Authority (KBA)

DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name :

Street :

Town :

Country :

Phone :

Fax :

## 1.3 Details of applicant

<b>Name:</b>	Aisin AW Co., Ltd
<b>Street:</b>	6-18 Harayama, Oka-Cho
<b>Town:</b>	Okazaki, Aichi 444-8564
<b>Country:</b>	JAPAN
<b>Telephone:</b>	+ 81 564 57 0500
<b>Fax:</b>	+ 81 564 57 0773
<b>Contact:</b>	Takao Noguchi
<b>E-mail:</b>	<a href="mailto:i25545_noguchi@aisin-aw.co.jp">i25545_noguchi@aisin-aw.co.jp</a>
<b>Telephone:</b>	+ 81 564 57 3471

## 1.4 Application details

<b>Date of receipt of order:</b>	2009-09-15
<b>Date of receipt of test item:</b>	2009-09-15
<b>Date of start test:</b>	2009-09-16
<b>Date of end test:</b>	2009-10-06
<b>Persons(s) who have been present during the test:</b>	-/-

## 2 Test standard/s

47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

### 3 Technical tests

#### 3.1 Details of manufacturer

Name:	Aisin AW Co., Ltd
Street:	6-18 Harayama, Oka-Cho
Town:	Okazaki, Aichi 444-8564
Country:	JAPAN

##### 3.1.1 Test item

Kind of test item	:	Car Navigation System (with Bluetooth 2.0 + EDR)
Type identification	:	NA08A02
S/N serial number	:	FXZA300052
HW hardware status	:	V-573 1A
SW software status	:	V5731000
Frequency Band [MHz]	:	2402MHz – 2480MHz (ISM-Band: 2400 – 2483.5 MHz)
Type of Modulation	:	GFSK, Pi/4 DQPSK (FHSS)
Number of channels	:	79
Antenna	:	External patch antenna (no identification mark) connected via 125cm coaxial cable, type: SHIKOKU 1.5DS-QEHB
Power Supply	:	12 V DC by power supply
Temperature Range	:	-20°C to +55°C

**Max. power radiated:** 3.85 dBm (Pi/4 DQPSK modulation)

**FCC ID:** XEMNA08A02  
**IC:** 8192A-NA08A02

### 3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	8192A-NA08A02
Model Name:	NA08A02
Manufacturer (complete Address):	Aisin AW Co., Ltd 6-18 Harayama, Oka-Cho Okazaki, Aichi 444-8564 JAPAN
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7
Open Area Test Site Industry Canada Number:	IC 3462C-1
Frequency Range (or fixed frequency) [MHz]:	2402MHz – 2480MHz (ISM-Band: 2400 – 2483.5 MHz)
RF: Power [W] (max):	<u>GFSK:</u> Rad. EIRP: 1.05 mW Conducted : 1.35 mW*  <u>Pi/4 DQPSK:</u> Rad. EIRP: 2.43 mW Conducted : 1.89 mW*
Antenna Type:	External patch antenna without identification mark, connected via 125cm coaxial cable type: SHIKOKU 1.5DS-QEHB
Occupied Bandwidth (99% BW) [kHz]:	GFSK: 920* Pi/4 DQPSK: 1244*
Type of Modulation:	GFSK, Pi/4 DQPSK
Emission Designator (TRC-43):	GFSK: 920KFXD Pi/4 DQPSK: 1M24GXD
Transmitter Spurious (worst case) [dBμV/m in 3m]:	42.33 (noise floor)
Receiver Spurious (worst case) [dBμV/m in 3m]:	41.63 (noise floor)

\* Data taken from test report 1-1041-03-06/09

#### ATTESTATION:

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

Signature:



Test engineer: Andreas Keller

Date: 2009-10-06

### 3.1.3 RF Technical Brief Cover Sheet acc. To RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

- |                        |                   |
|------------------------|-------------------|
| 1. COMPANY NUMBER:     | 8192A             |
| 2. MODEL NUMBER:       | NA08A02           |
| 3. MANUFACTURER:       | Aisin AW Co., Ltd |
| 4. TYPE OF EVALUATION: | N/A               |

#### Declaration of RF Exposure Compliance

#### ATTESTATION:

I attest that the information provided in this test report are correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Name: Andreas Keller  
Title: Project engineer  
Company: Cetecom ICT Services GmbH

Signature:



Date: 2009-10-06



### 3.1.4 EUT operating modes

EUT operating mode no. *)	Description of operating modes	Additional information
Op. 0	normal mode	normal temperature and power source conditions
Op. 1		Low temperature, low power source conditions
Op. 2		Low temperature, high power source conditions
Op. 3		High temperature, low power source conditions
Op. 4		High temperature, high power source conditions

\*) EUT operating mode no. is used to simplify the test plan

### 3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T <sub>nom</sub>	°C	<b>24</b>
Nominal Humidity	H <sub>nom</sub>	%	<b>54</b>
Nominal Power Source	V <sub>nom</sub>	V	<b>12</b>

Type of power source: **DC by power supply** (12.5 V @ 2.0 A)

Deviations from these values are reported in chapter 2

#### 4 Summary of Measurement Results and list of all performed test cases

- ☒ No deviations from the technical specifications were ascertained
- ☐ There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.247 - CANADA RSS-210	PASSED	2009-10-06	-/-

Test Specification Clause	Test Case	Modulation	Pass	Fail	N/A	Not performed
None	Antenna Gain	Pi/4 DQPSK	Yes			
§15.247(a1)	Carrier frequency separation	--				X
§15.247(a1)	Number of hopping channels	--				X
§15.247(a)(1)(iii)	Time of occupancy (dwell time)	GFSK Pi/4 DQPSK	Yes			
§15.247(e)	Power Spectral density (Hybrid system in Inquiry mode/Page scan)	--			X	
§15.247(a)(1)	Spectrum Bandwidth of a FHSS System / 20dB Bandwidth	--				X
§ 15.247 (b)(1)	Maximum output power (conducted)	--				X
§ 15.247 (b)(1)	Max. peak output power (radiated)	GFSK Pi/4 DQPSK	Yes Yes			
§ 15.247 (d)	Band-edge compliance of conducted emissions	--				X
§ 15.205	Band-edge compliance of radiated emissions	GFSK Pi/4 DQPSK	Yes Yes			
§ 15.247 (d)	Spurious Emission - conducted (Transmitter)	--				X
§ 15.247 (d)	Spurious Emission - radiated (Transmitter) >30 MHz	Pi/4 DQPSK	Yes			
§ 15.109	Spurious Emissions - radiated (Receiver)	--	Yes			
§ 15.209	Spurious Emissions - radiated (Transmitter) <30 MHz	Pi/4 DQPSK	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	--				X

## 5 RF measurement testing

### 5.1 Description of test set-up

#### 5.1.1 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 C63.4-2003 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 C63-4-2003 clause 4.2. Antennas are confirmed with ANSI C63.2-1996 item 15.

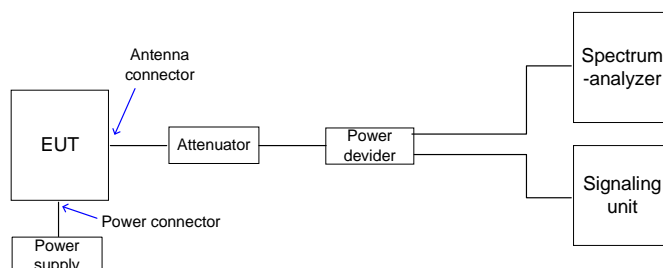
9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.  
150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.  
30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, bi-conical antenna  
200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna  
>1GHz: Average, RBW 1MHz, VBW 10 Hz, waveguide horn

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.

#### 5.1.2 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.



## 5.2 Referenced documents

Delta tests according to 1-1041-03-06/09. Conducted results extracted from test report 1-1041-03-06/09.

## 5.3 Additional comments

The EUT supports 8DPSK-Modulation only in test mode. The final product doesn't support 8DPSK-Modulation.

## 5.4 Antenna gain

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

	low channel 2402 MHz	mid channel 2441 MHz	high channel 2480 MHz
Conducted power [dBm] Measured, Pi/4 DQPSK modulation	2.19	<b>2.77</b>	2.48
Radiated power [dBm] Measured, Pi/4 DQPSK modulation	3.41	<b>3.85</b>	1.48
Gain [dBi] Calculated	<b>1.22</b>	1.08	-1.00

\* Data taken from test report 1-1041-03-06/09

## 5.5 Carrier frequency separation §15.247(a)(1)

### Not performed

Modulation: GFSK

Result: Channel separation is: ~ 1 MHz

Limits:

Under normal test conditions only	Minimum 25 kHz or 20 dB Bandwidth of the hopping system
-----------------------------------	---

## 5.6 Number of hopping channels §15.247(a)(1)

**Not performed**

Modulation: GFSK

Result: The number of hopping channels is: 79

Limits:

Under normal test conditions only	at least 15 non-overlapping channels
-----------------------------------	--------------------------------------

## 5.7 Time of occupancy (dwell time) §15.247(a)(1)(iii)

### **For Bluetooth devices:**

The dwell time of 0.4 s within a 31.6 second period in data mode is independent from the packet type (packet length).  
The calculation for a 31.6 second period is as follows:

Dwell 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)

Dwell time =  $625 \mu\text{s} * 1600 \text{ 1/s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$  (in a 31.6 s period)

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

Example for a DH5 packet (with a maximum length of five time slots)

Dwell time =  $5 * 625 \mu\text{s} * 1600 * 1/5 * 1/s / 79 * 31.6 \text{ s} = 0.4 \text{ s}$  (in a 31.6 s period)

This is according to the Bluetooth Core Specification V 1.1 & V 1.2 & V2.0 (+ critical errata) for all Bluetooth devices.

Therefore, all Bluetooth devices comply with the FCC dwell time requirement in the data mode.

This was checked during the Bluetooth Qualification tests.

The Dwell time in hybrid mode is approximately 2.6 ms (in a 12.8s period)

## 5.8 Power Spectral density (Hybrid system in Inquiry mode/Page scan) §15.247(e)

**Not applicable**

**Result:** Power density: - dBm/Hz = - dBm / 3 kHz  
Correction factor from dBm/Hz to dBm / 3 kHz is +34,8 dB

**Limits:**

Under normal test conditions only	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission
-----------------------------------	---

## 5.9 Spectrum Bandwidth of a FHSS System / 20dB Bandwidth §15.247(a)(1)

**Not performed**

**Result:**

Modulation Frequency [MHz]	20 dB BANDWIDTH [kHz]		
	2402	2441	2480
<i>GFSK</i>			
<i>Pi/4 DQPSK</i>			
<i>8DPSK</i>			
Measurement uncertainty	±1kHz		

**Limits:**

Under normal test conditions only	GFSK < 1000 kHz Pi/4 DQPSK < 1500 8DPSK < 1500
-----------------------------------	--

**5.10 Maximum output power (conducted) § 15.247 (b)(1)****Not performed**Results:

Modulation Frequency [MHz]	Max. peak output power [dBm]		
	2402	2441	2480
<i>GFSK</i>			
<i>Pi/4 DQPSK</i>			
<i>8DPSK</i>			
Measurement uncertainty	±2dB		

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------

### 5.11 Max. peak output power (radiated) § 15.247 (b)(1)

Modulation: GFSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T <sub>nom</sub>	V <sub>nom</sub>	-0.26	<b>0.21</b>	0.29
Measurement uncertainty		±3dB		

Modulation: Pi/4 DQPSK

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2402	2442	2480
T <sub>nom</sub>	V <sub>nom</sub>	3.41	<b>3.85</b>	1.48
Measurement uncertainty		±3dB		

RBW / VBW: 3 MHz

Measured at a distance of 3m

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
--	---------------



## 5.12 Band-edge compliance of conducted emissions §15.247 (d)

### Not performed

Modulation: GFSK

Results:

SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: Pi/4 DQPSK

Results:

SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Modulation: 8 DPSK

Results:

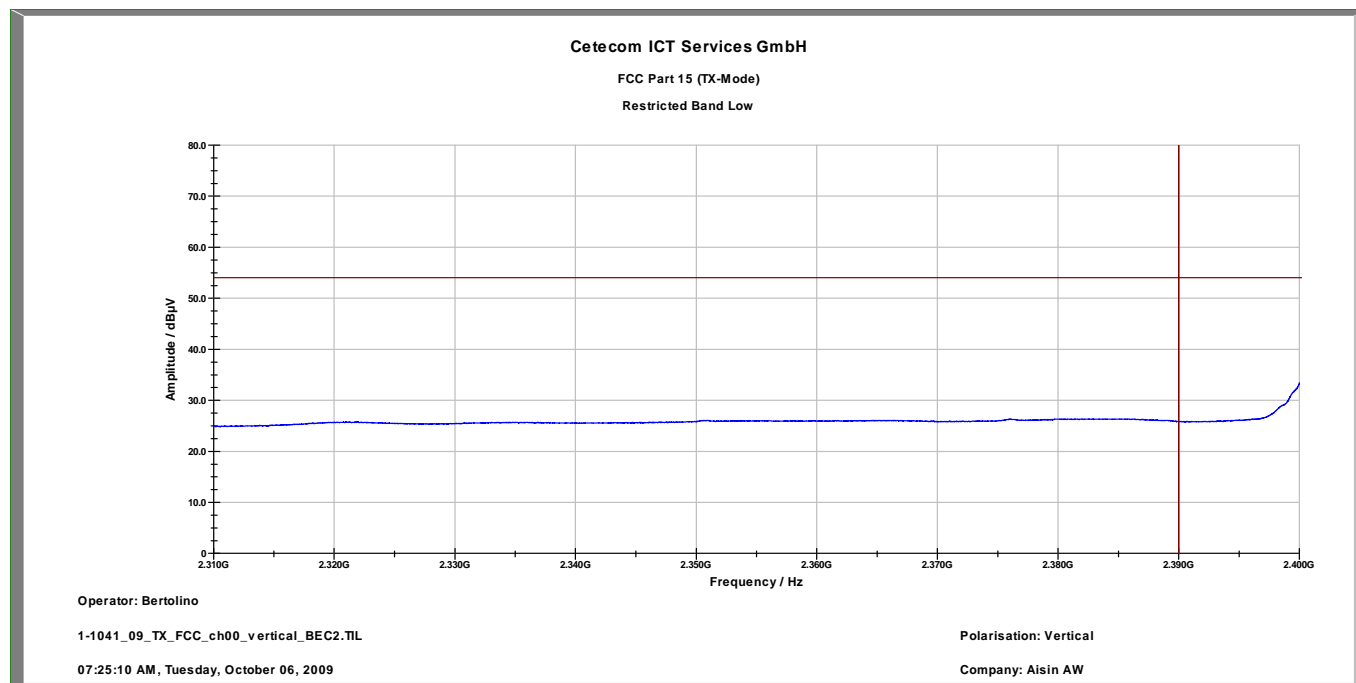
SZENARIO	DELTA VALUE [DB]
hopping off, lowest frequency	> 20 dB
hopping on, lowest frequency	> 20 dB
hopping off, highest frequency	> 20 dB
hopping on, highest frequency	> 20 dB
Measurement uncertainty	±1,5dB

Limits:

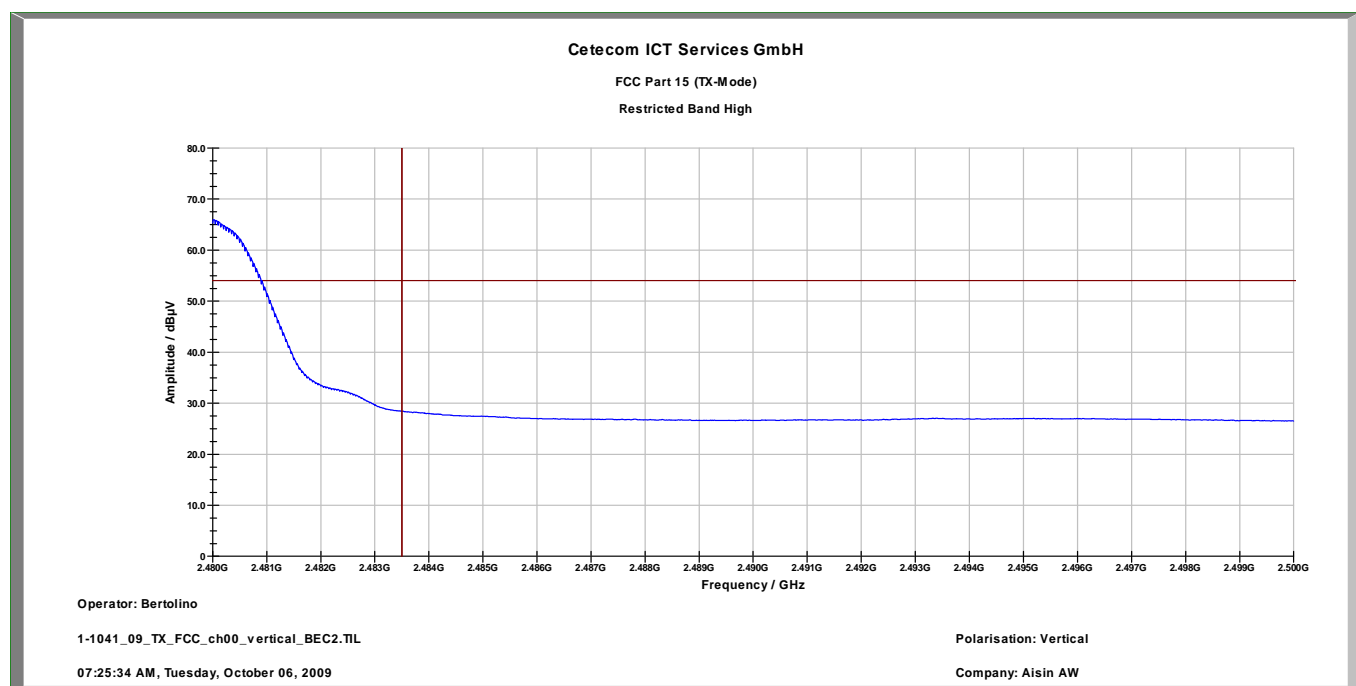
Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth 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)).
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## 5.13 Band-edge compliance of radiated emissions §15.205

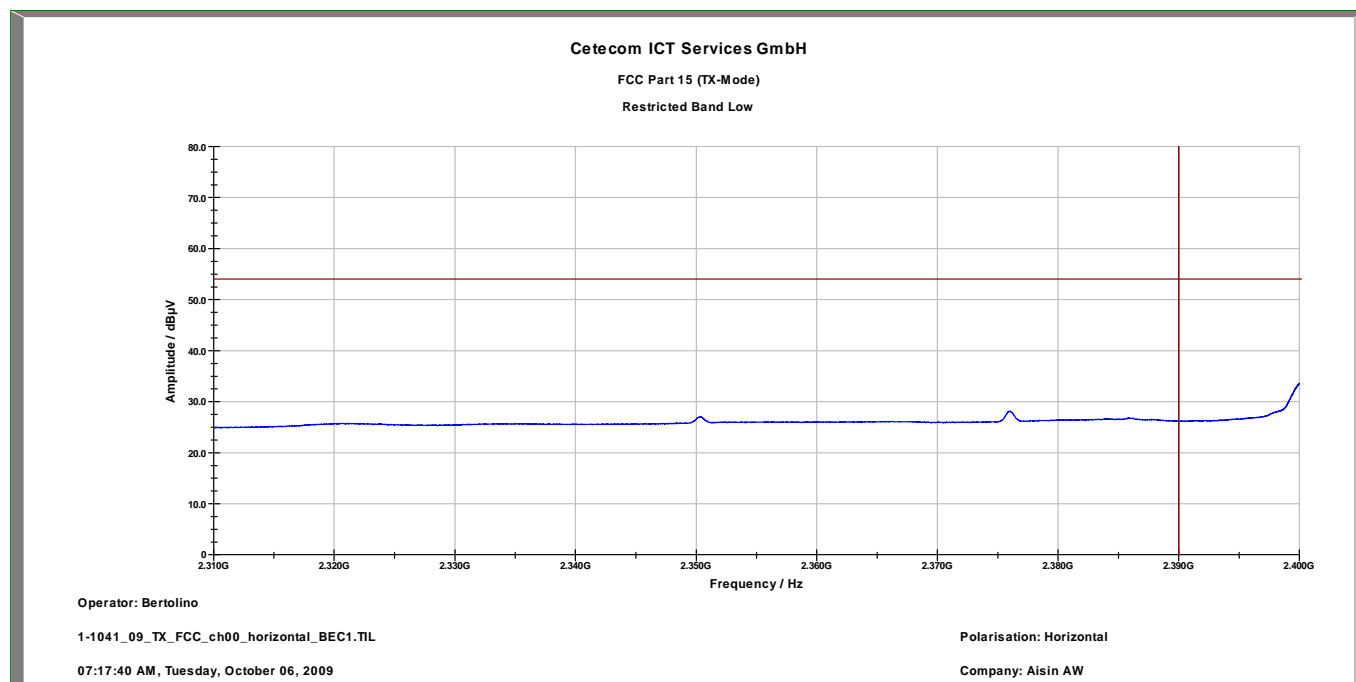
Plot 1: GFSK modulation (lower band edge), vertical polarization



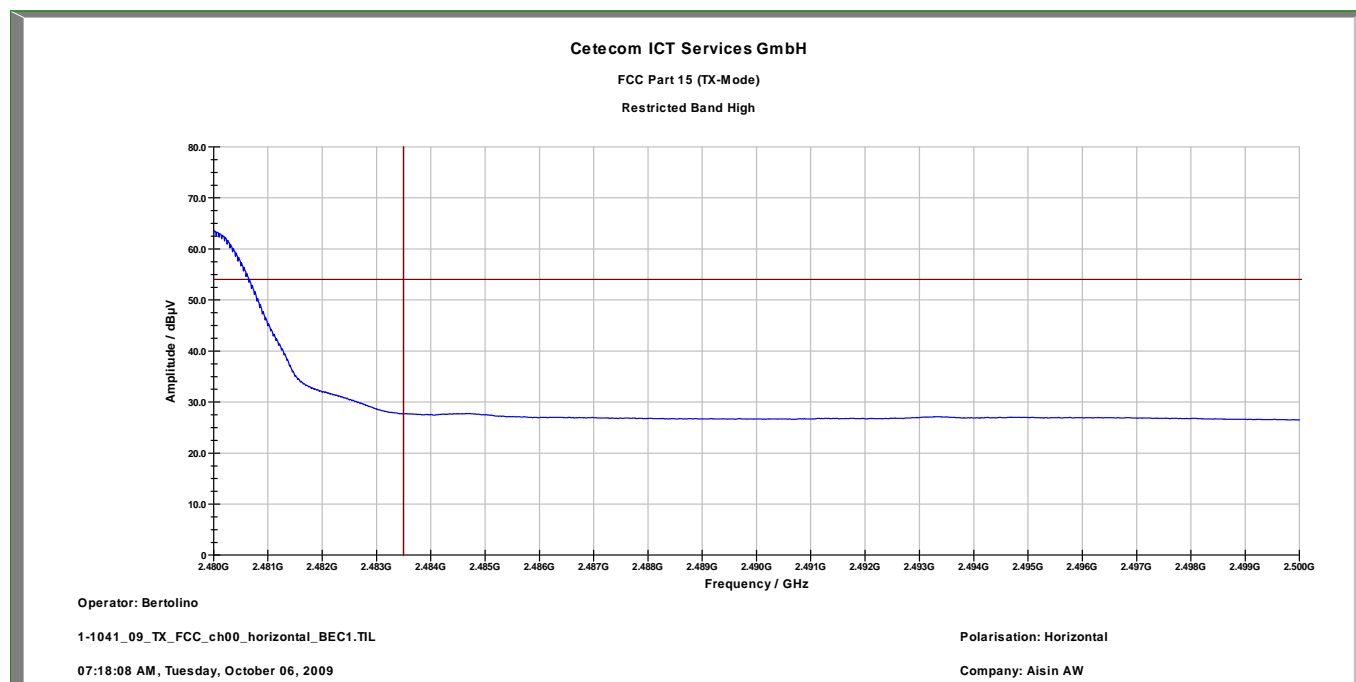
Plot 2: GFSK modulation (upper band edge), vertical polarization



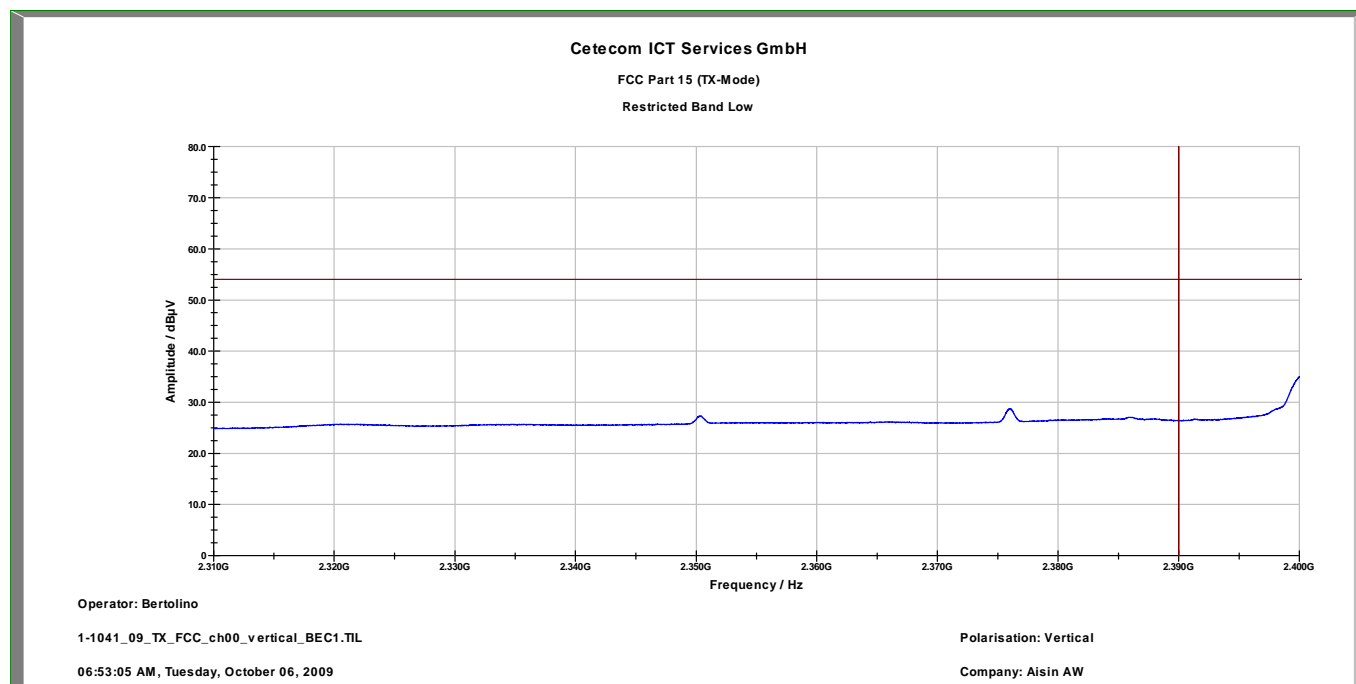
Plot 3: GFSK modulation (lower band edge), horizontal polarization



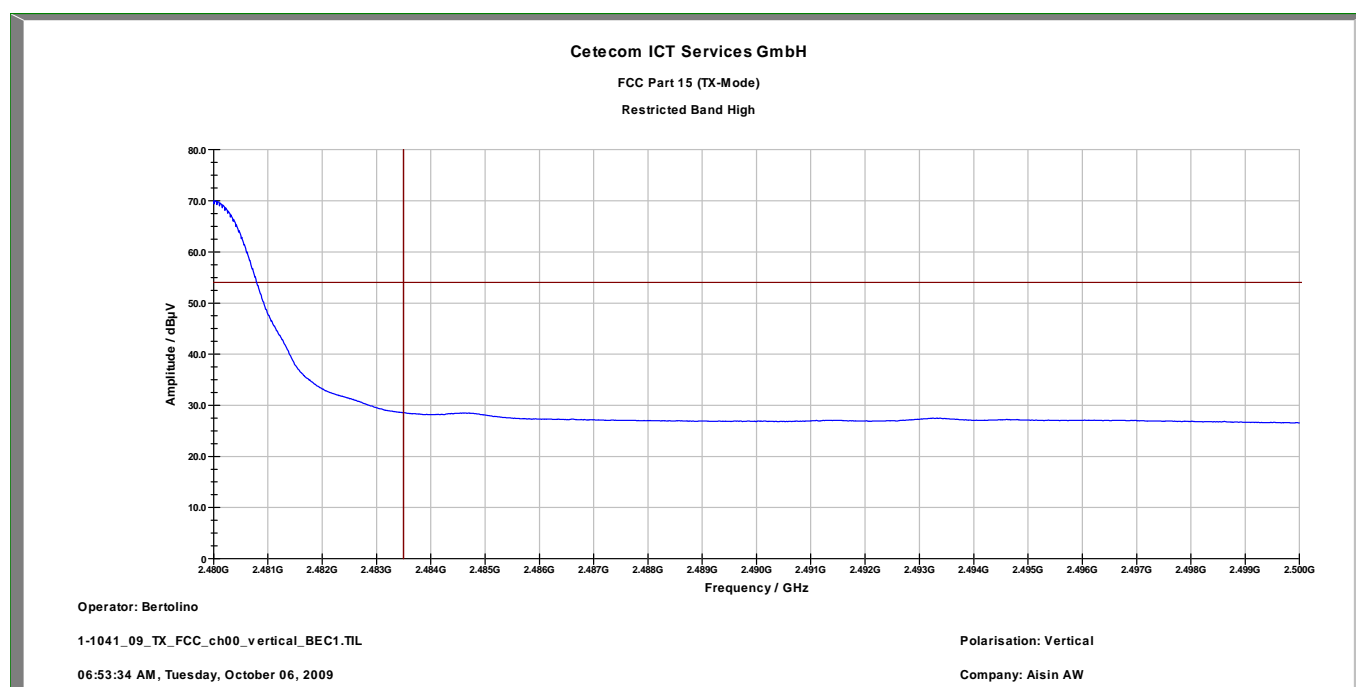
Plot 4: GFSK modulation (upper band edge), horizontal polarization



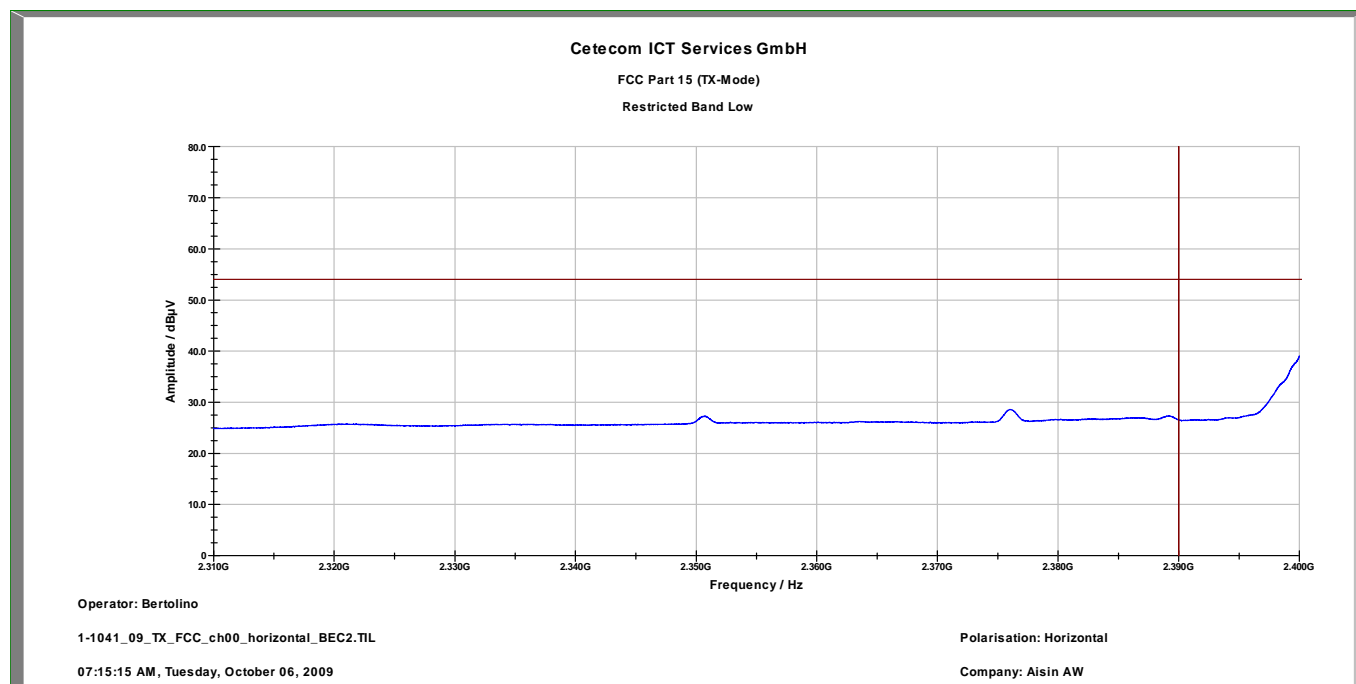
Plot 5: Pi/DQPSK modulation (lower band edge), vertical polarization



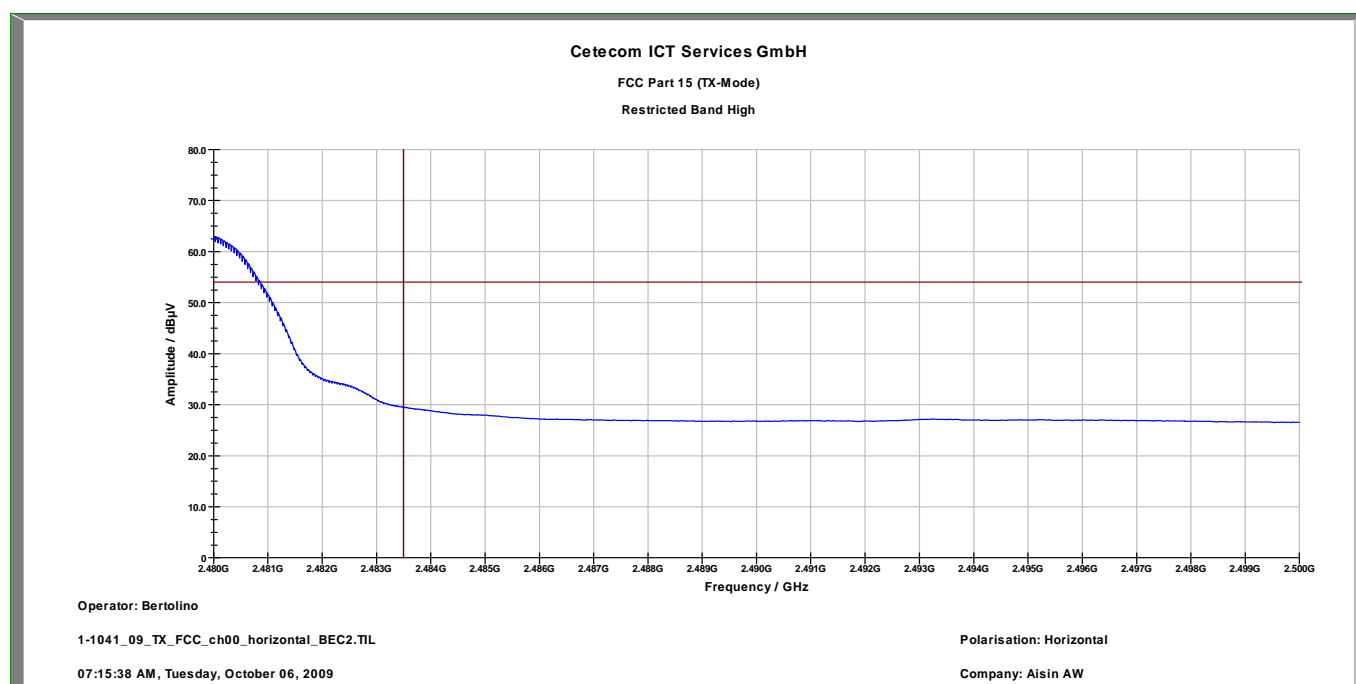
Plot 6: Pi/DQPSK modulation (upper band edge), vertical polarization



Plot 7: Pi/DQPSK modulation (lower band edge), horizontal polarization



Plot 8: Pi/DQPSK modulation (upper band edge), horizontal polarization



## 5.14 Spurious Emissions - conducted (Transmitter) § 15.247 (c)(1)

### Not performed

Modulation: GFSK

Result & Limits:

Emission Limitation						
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results	
2402			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
2441			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
2480			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
Measurement uncertainty		± 3dB				

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: Pi/4 DQPSK

Result & Limits:

Emission Limitation						
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results	
2402			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
2441			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
2480			30 dBm		Operating frequency	
			-20 dBc		complies	
						complies
Measurement uncertainty		± 3dB				

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
 F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Modulation: 8 DPSK

Result & Limits:

Emission Limitation					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402			30 dBm		Operating frequency
			-20 dBc		complies
					complies
2441			30 dBm		Operating frequency
			-20 dBc		complies
					complies
2480			30 dBm		Operating frequency
			-20 dBc		complies
					complies
Measurement uncertainty			± 3dB		

F < 1 GHz: RBW: 100 kHz VBW: 100 kHz  
F > 1 GHz: RBW: 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).
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Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

## 5.15 Spurious Emissions > 30 MHz- radiated (Transmitter) § 15.247 (c)(1)

Modulation: Pi/4 DQPSK

Plot 1: 0.03 - 1 GHz vertical & horizontal (lowest channel)

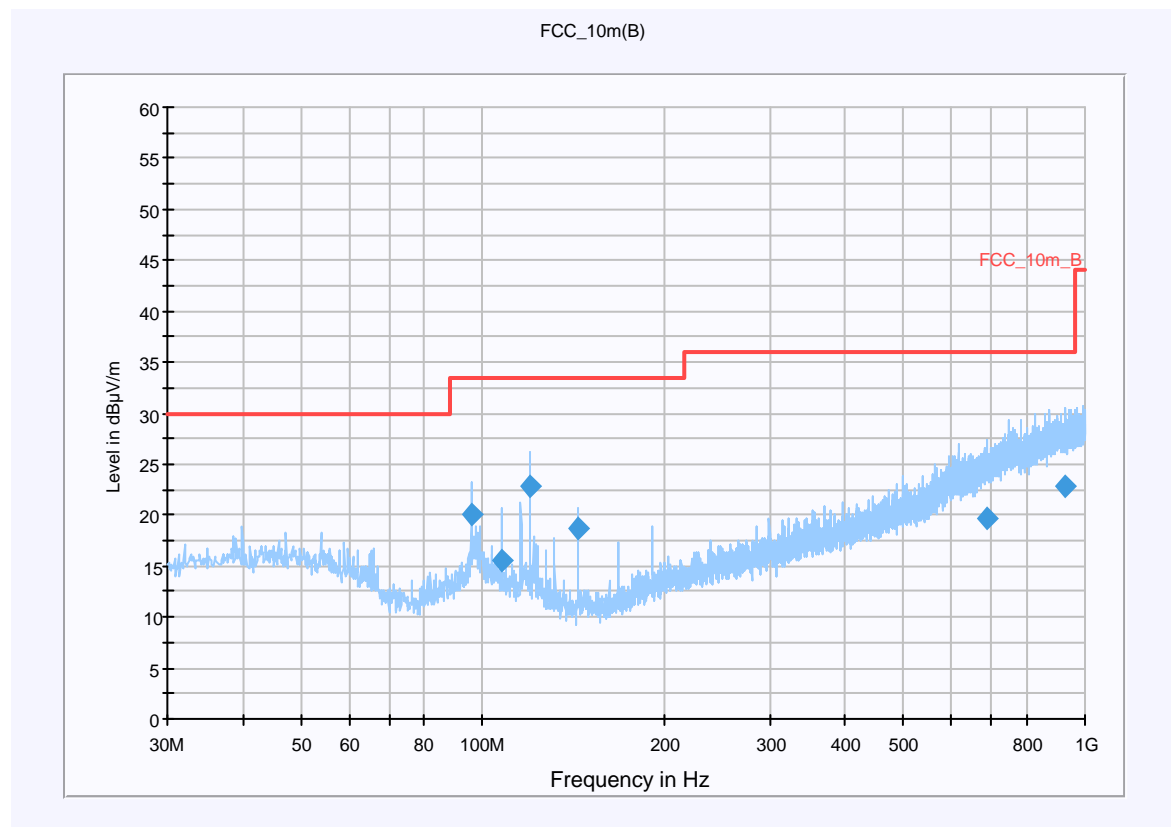
### Common Information

EUT: NA08A02  
 Serial Number: FXZA300052  
 Test Description: FCC part 15 @ 10 m  
 Operating Conditions: BT Testmode, cont. Tx, CH: 0  
 Operator Name: Lang  
 Comment: Power: 12 V DC

### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Level Unit: dBμV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
95.919050	20.1	15000.000	120.000	100.0	V	225.0	11.7	13.4	33.5	
107.892600	15.6	15000.000	120.000	200.0	V	236.0	11.6	17.9	33.5	
119.922150	22.7	15000.000	120.000	121.0	V	93.0	10.6	10.8	33.5	
143.895950	18.7	15000.000	120.000	118.0	V	80.0	9.0	14.9	33.5	
687.205550	19.7	15000.000	120.000	200.0	V	95.0	22.7	16.3	36.0	
927.943700	22.9	15000.000	120.000	184.0	H	-4.0	25.8	13.1	36.0	

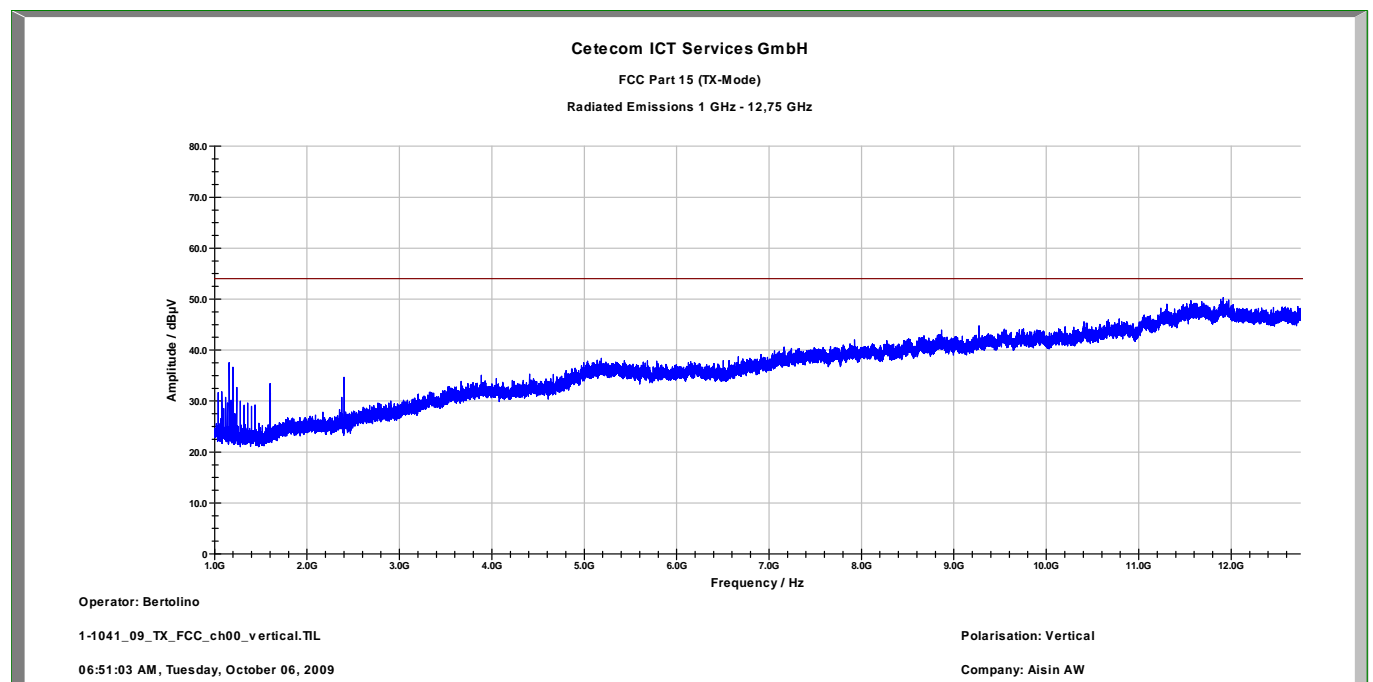


## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

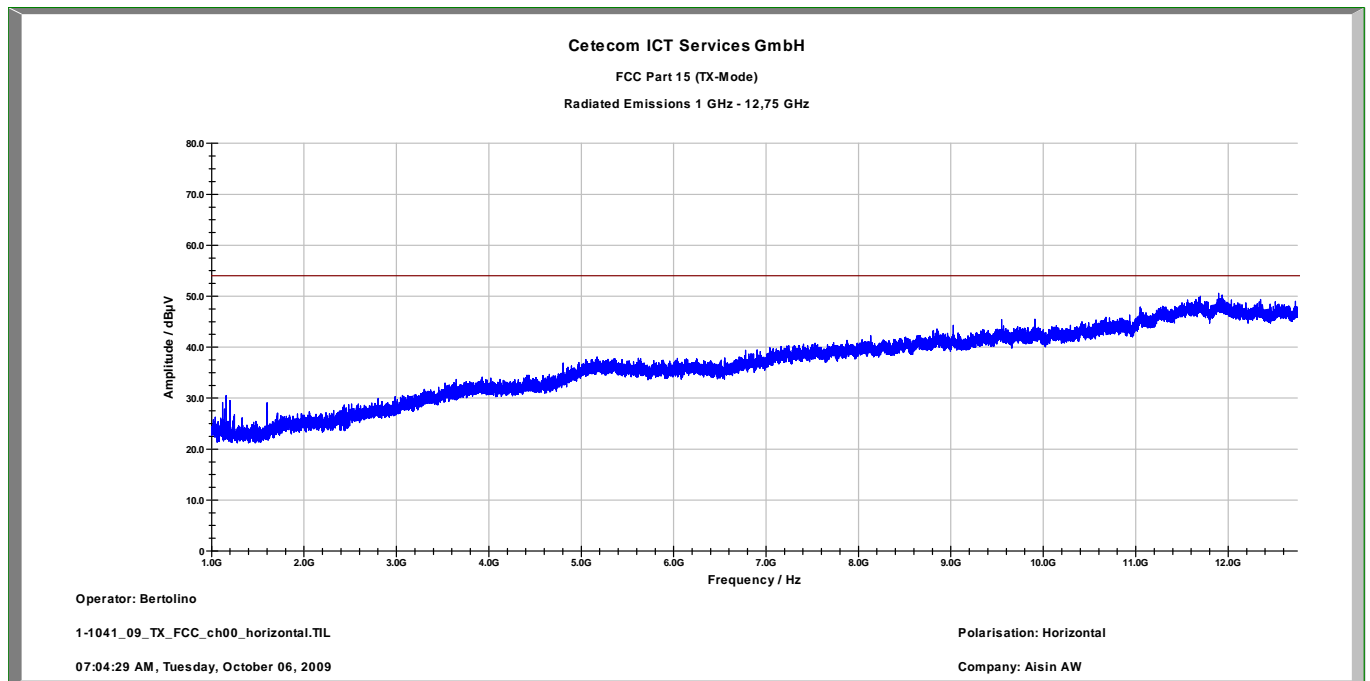
EMC 32 Version 8.10.00

Plot 2: 1 GHz – 12.75 GHz, vertical polarization (lowest channel)



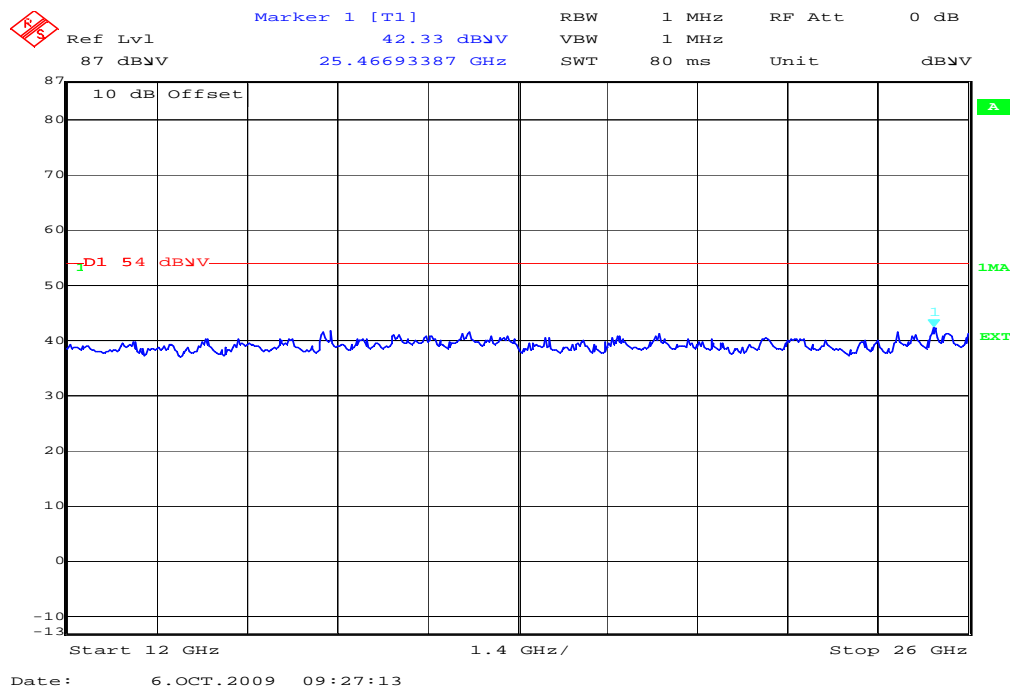
Carrier was suppressed with a 2.4 GHz notched filter

Plot 3: 1 GHz – 12.75 GHz, horizontal polarization (lowest channel)



Carrier was suppressed with a 2.4 GHz notched filter

Plot 4: 12 - 25 GHz vertical & horizontal polarization (valid for all channels)



Plot 5: 0.03 - 1 GHz vertical &amp; horizontal (middle channel)

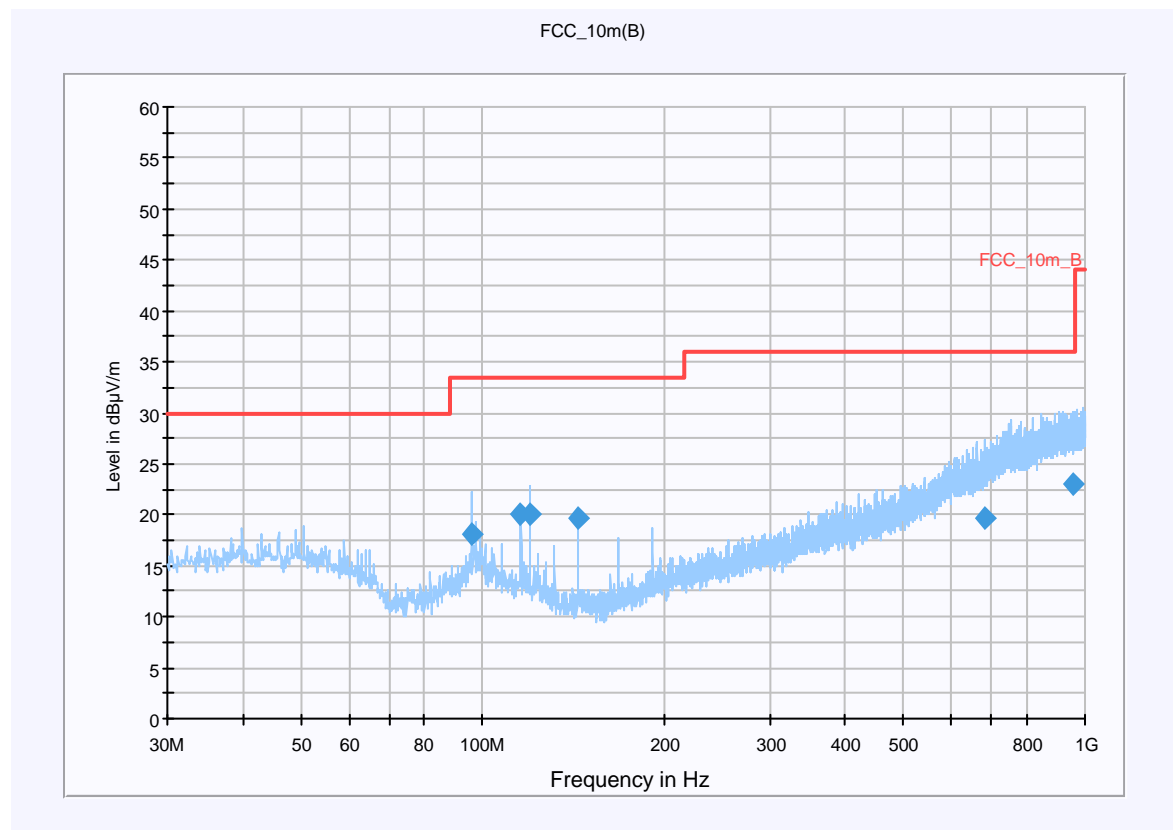
**Common Information**

EUT: NA08A02  
Serial Number: FXZA300052  
Test Description: FCC part 15 @ 10 m  
Operating Conditions: BT Testmode, cont. Tx, CH: 39  
Operator Name: Lang  
Comment: Power: 12 V DC

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup: Electric Field (NOS)  
Level Unit: dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

**Final Result 1**

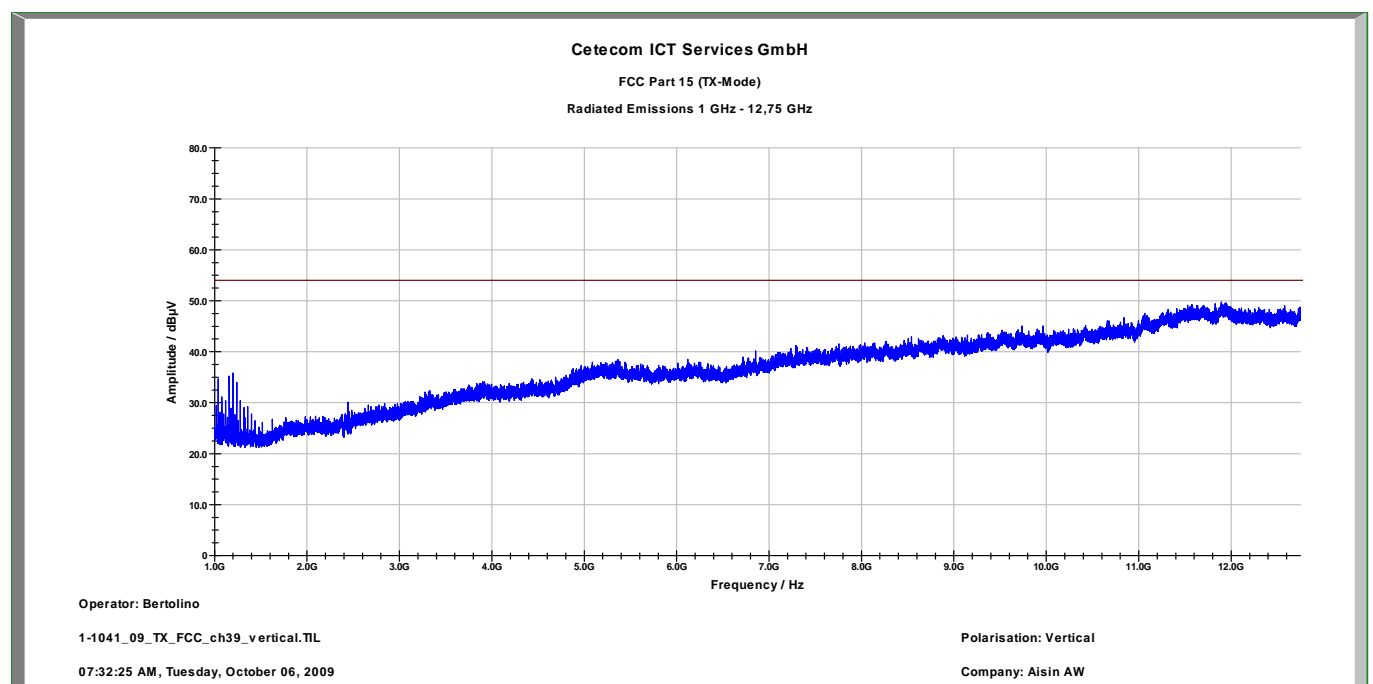
Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
96.001400	18.0	15000.000	120.000	132.0	V	6.0	11.8	15.5	33.5	
115.861950	20.0	15000.000	120.000	98.0	V	79.0	10.9	13.5	33.5	
119.984000	20.0	15000.000	120.000	98.0	V	120.0	10.5	13.5	33.5	
143.968350	19.7	15000.000	120.000	98.0	V	63.0	9.0	13.8	33.5	
684.166900	19.6	15000.000	120.000	124.0	H	23.0	22.6	16.4	36.0	
955.833750	23.0	15000.000	120.000	369.0	H	126.0	25.9	13.0	36.0	

## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

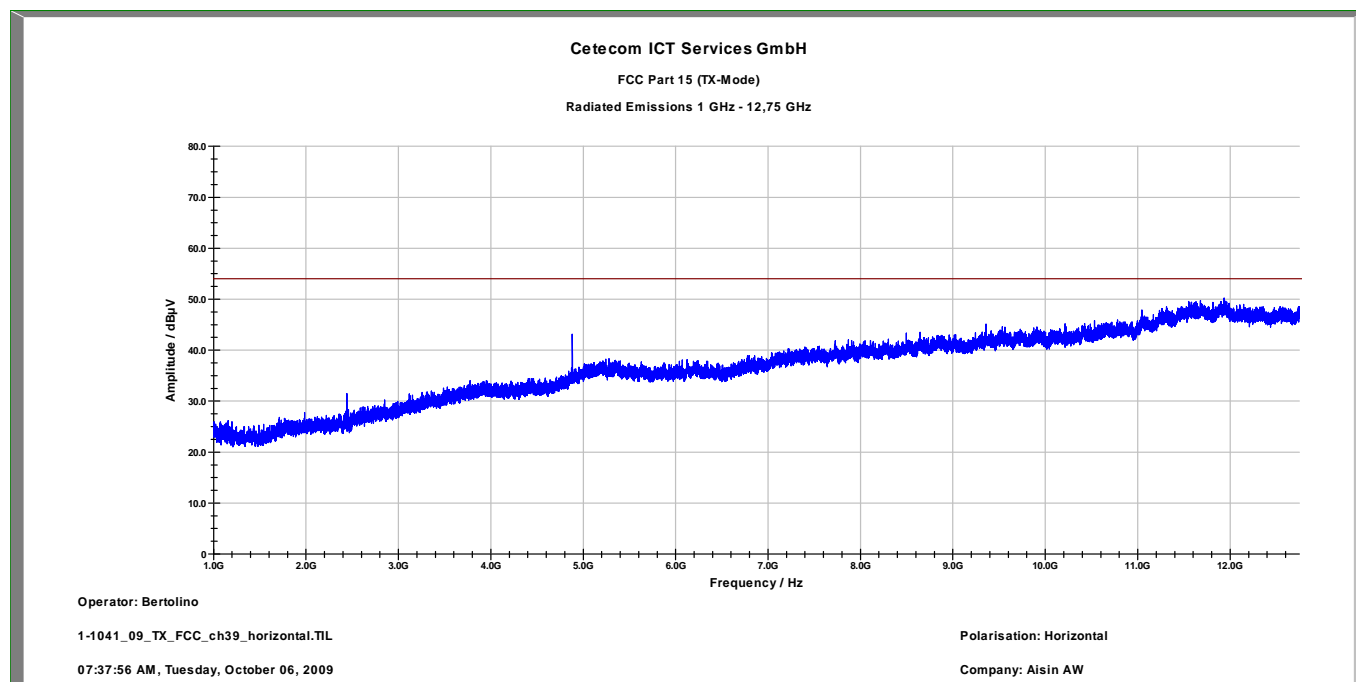
EMC 32 Version 8.10.00

Plot 6: 1 GHz – 12.75 GHz, vertical polarization (middle channel)



Carrier was suppressed with a 2.4 GHz notched filter

Plot 7: 1 GHz – 12.75 GHz, horizontal polarization (middle channel)



Carrier was suppressed with a 2.4 GHz notched filter

Plot 8: 0.03 - 1 GHz vertical &amp; horizontal (highest channel)

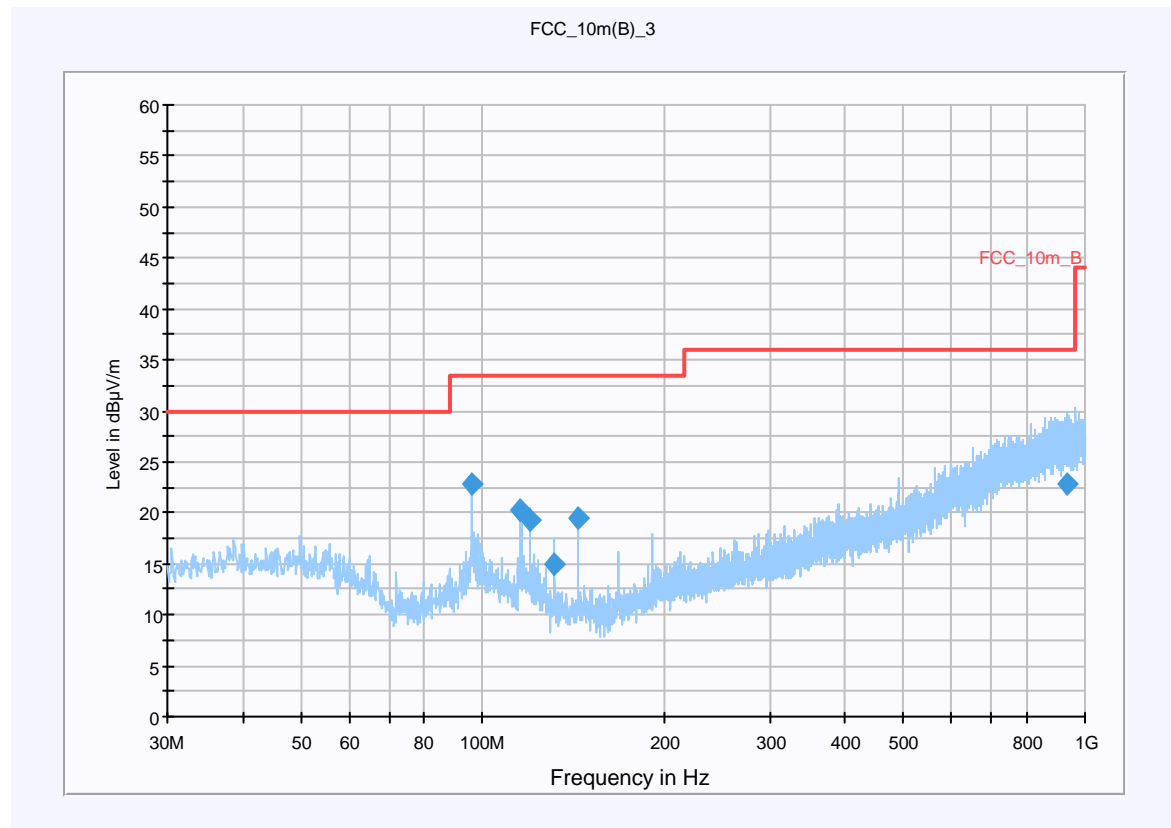
**Common Information**

EUT: NA08A02  
 Serial Number: FXZA300052  
 Test Description: FCC part 15 @ 10 m  
 Operating Conditions: BT Testmode, cont. Tx, CH: 78  
 Operator Name: Lang  
 Comment: Power: 12 V DC

**Scan Setup: STAN\_Fin [EMI radiated]**

Hardware Setup: Electric Field (NOS)  
 Level Unit: dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

**Final Result 1**

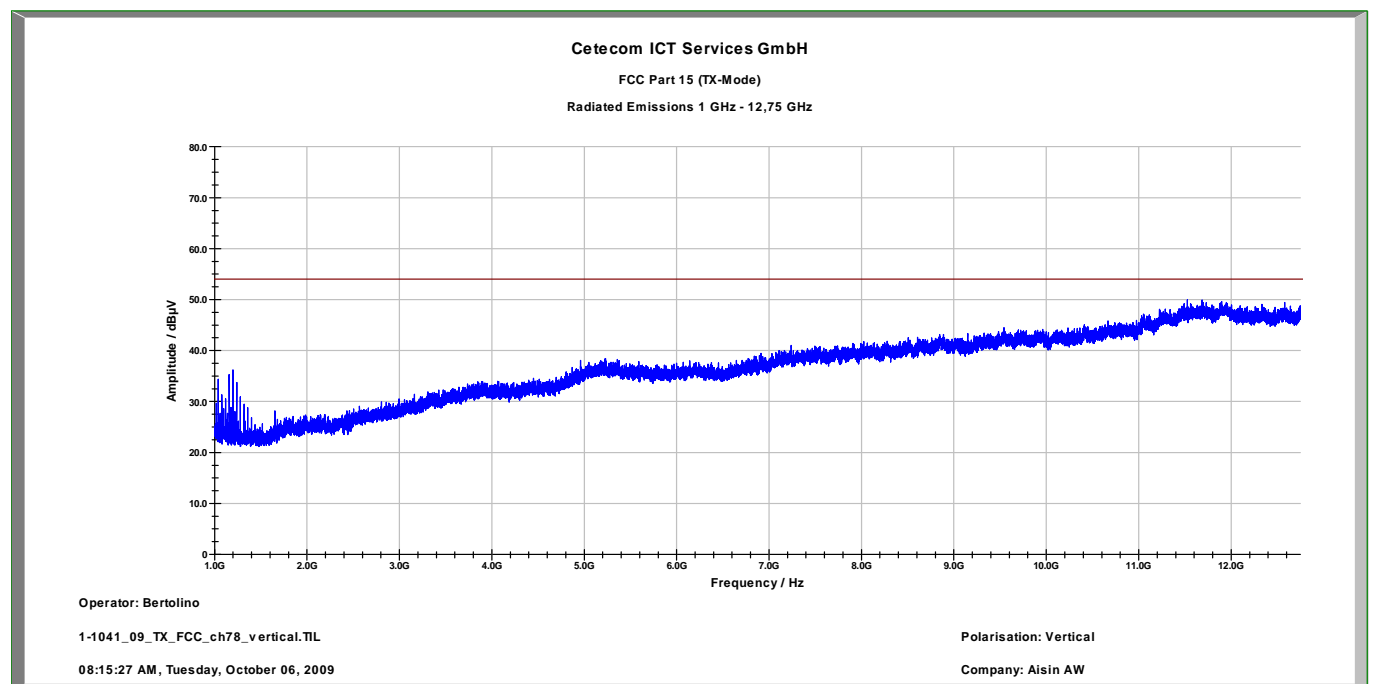
Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
95.896250	22.8	15000.000	120.000	115.0	V	8.0	11.7	10.7	33.5	
115.865700	20.2	15000.000	120.000	166.0	V	54.0	10.9	13.3	33.5	
119.959950	19.3	15000.000	120.000	114.0	V	236.0	10.5	14.2	33.5	
131.863050	15.0	15000.000	120.000	194.0	V	58.0	9.5	18.5	33.5	
143.929300	19.5	15000.000	120.000	98.0	V	95.0	9.0	14.0	33.5	
934.566700	22.9	15000.000	120.000	204.0	H	138.0	25.8	13.1	36.0	

## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

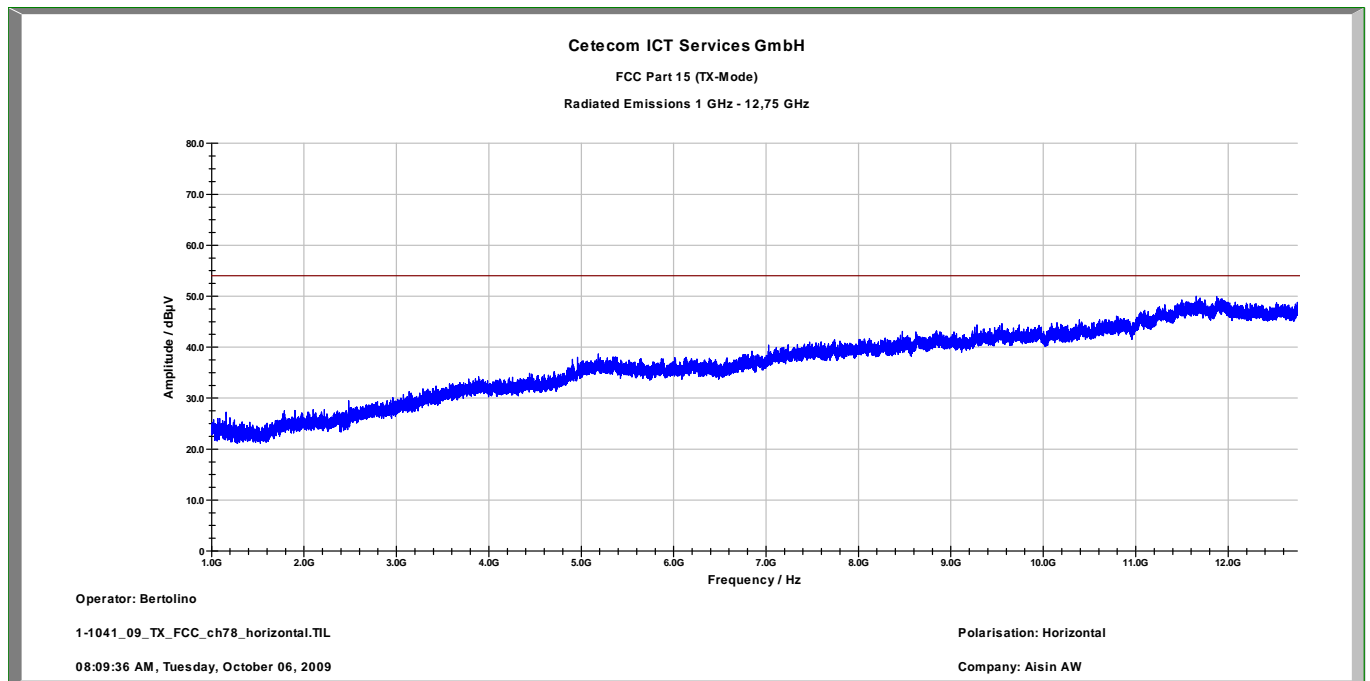
EMC 32 Version 8.10.00

Plot 9: 1 GHz – 12.75 GHz, vertical polarization (highest channel)



Carrier was suppressed with a 2.4 GHz notched filter

Plot 10: 1 GHz – 12.75 GHz, horizontal polarization (highest channel)



Carrier was suppressed with a 2.4 GHz notched filter

## Results:

SPURIOUS EMISSIONS LEVEL (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]
1159	PP	41.9	1159	PP	41.1	1159	PP	41.3
4804	PP	39.7	4882	Video AV	38.8	4960	PP	40.9
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW: 1 MHz/ VBW: 10 Hz

## Limits: § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

## Limits: § 15.209

Frequency [MHz]	Field strength [μV/m]	Measurement distance (m)
30 - 88	100 (40 dBμV/m)	3
88 - 216	150 (43.5 dBμV/m)	3
216 - 960	200 (46 dBμV/m)	3
above 960	500 (54 dBμV/m)	3



## 5.16 Spurious Emissions - radiated (Receiver) § 15.109

Plot 1: 0.03 - 1 GHz vertical/horizontal (Idle)

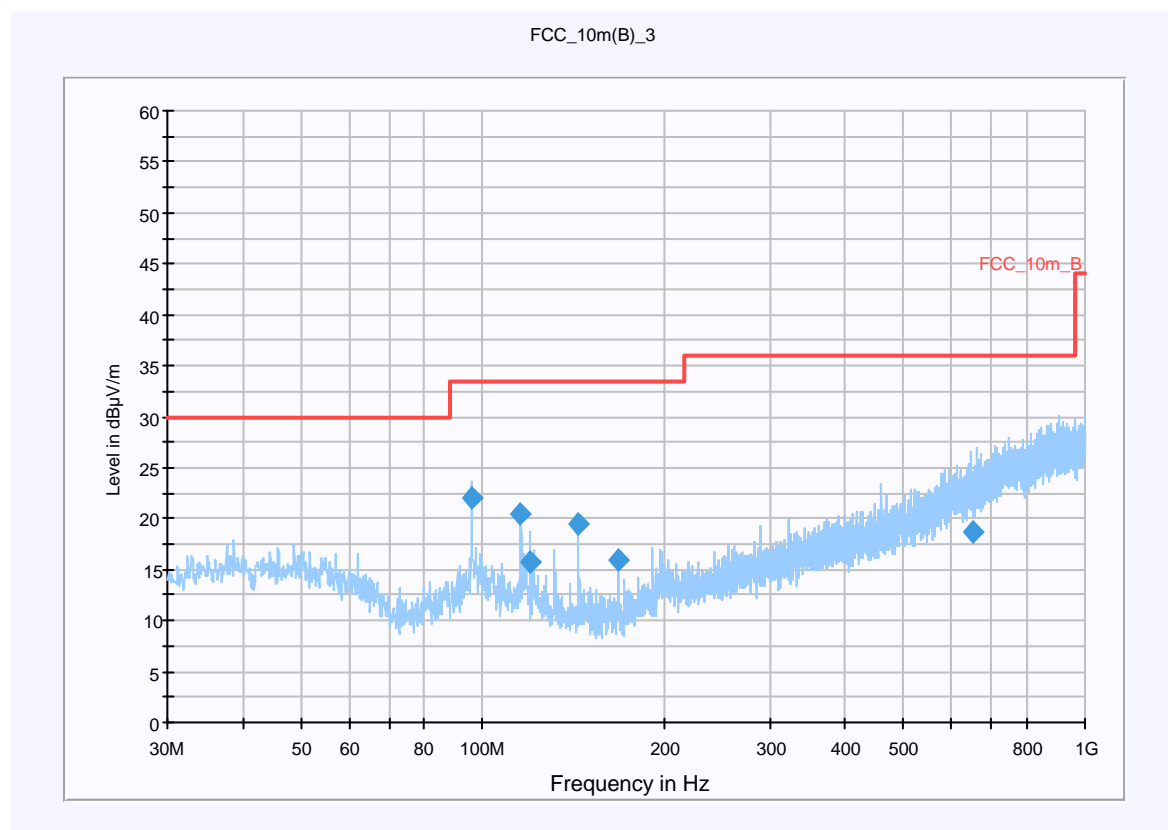
### Common Information

EUT: NA08A02  
 Serial Number: FXZA300052  
 Test Description: FCC part 15 @ 10 m  
 Operating Conditions: BT-Rx-Testmode  
 Operator Name: Lang  
 Comment: Power: 12 V DC

### Scan Setup: STAN\_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)  
 Level Unit: dB $\mu$ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



### Final Result 1

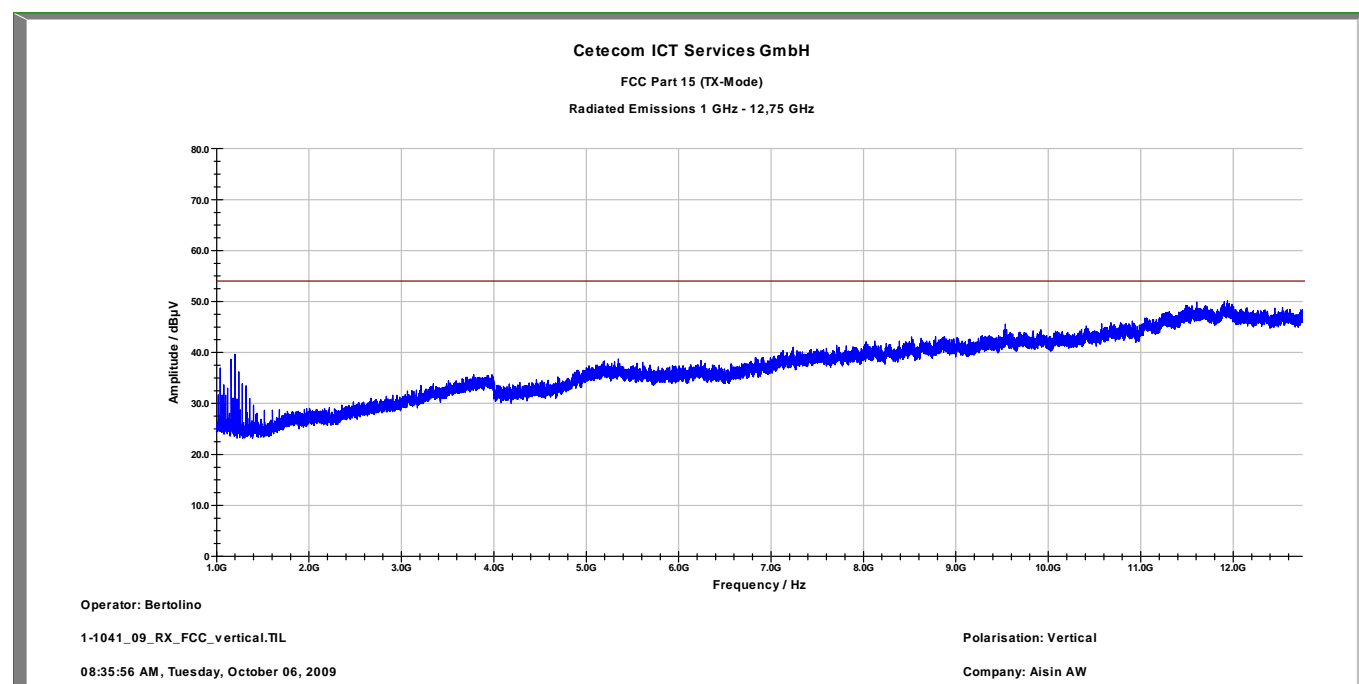
Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)	Comment
95.875800	22.1	15000.000	120.000	120.0	V	10.0	11.7	11.4	33.5	
115.864050	20.4	15000.000	120.000	149.0	V	51.0	10.9	13.1	33.5	
119.996100	15.8	15000.000	120.000	120.0	V	228.0	10.5	17.7	33.5	
143.929450	19.4	15000.000	120.000	98.0	V	53.0	9.0	14.1	33.5	
167.797350	15.9	15000.000	120.000	98.0	V	5.0	9.9	17.6	33.5	
648.974100	18.6	15000.000	120.000	220.0	V	146.0	21.6	17.4	36.0	

## Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

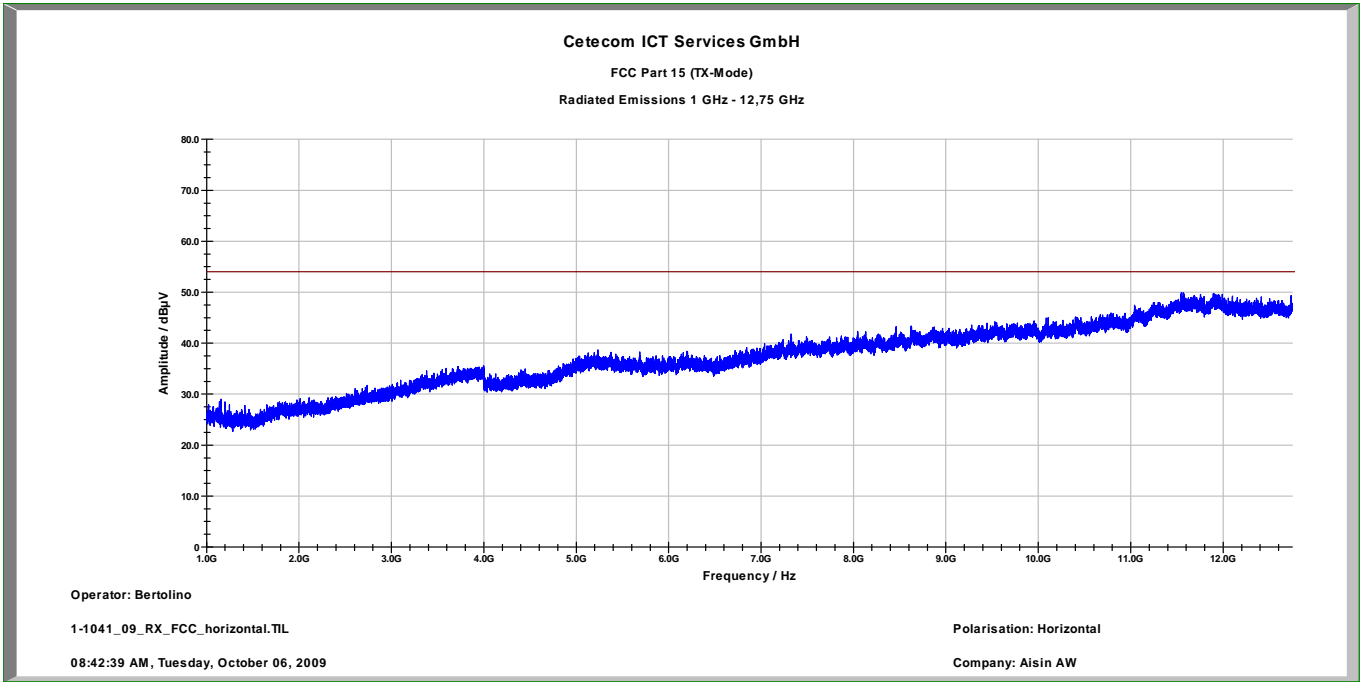
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

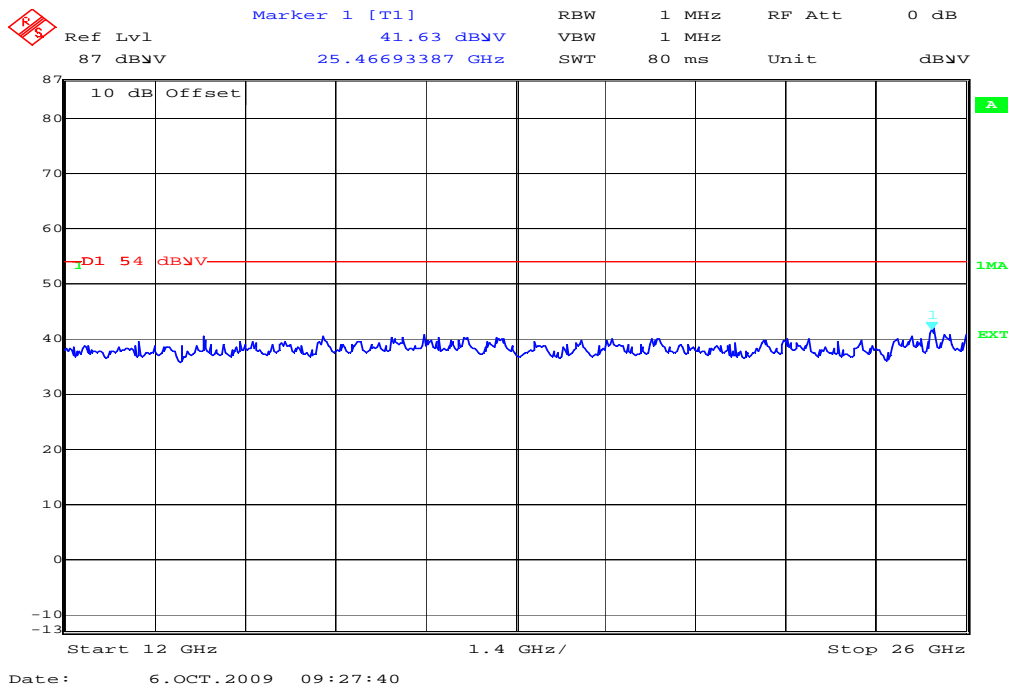
Plot 2: 1 GHz – 12.75 GHz, vertical polarization (Idle)



Plot 3: 1 GHz – 12.75 GHz, horizontal polarization (Idle)



Plot 4: 12 - 25 GHz vertical & horizontal (Idle)



## Results:

Spurious Emissions level [dB $\mu$ V/m]		
f[MHz]	Detector	Level [dB $\mu$ V/m]
1159	PP	41.6
Measurement uncertainty		$\pm 3$ dB

f < 1 GHz : RBW/VBW: 100 kHz

f  $\geq$  1GHz : RBW: 1 MHz/ VBW: 10 Hz

Measurement distance see table

Limits: § 15.109

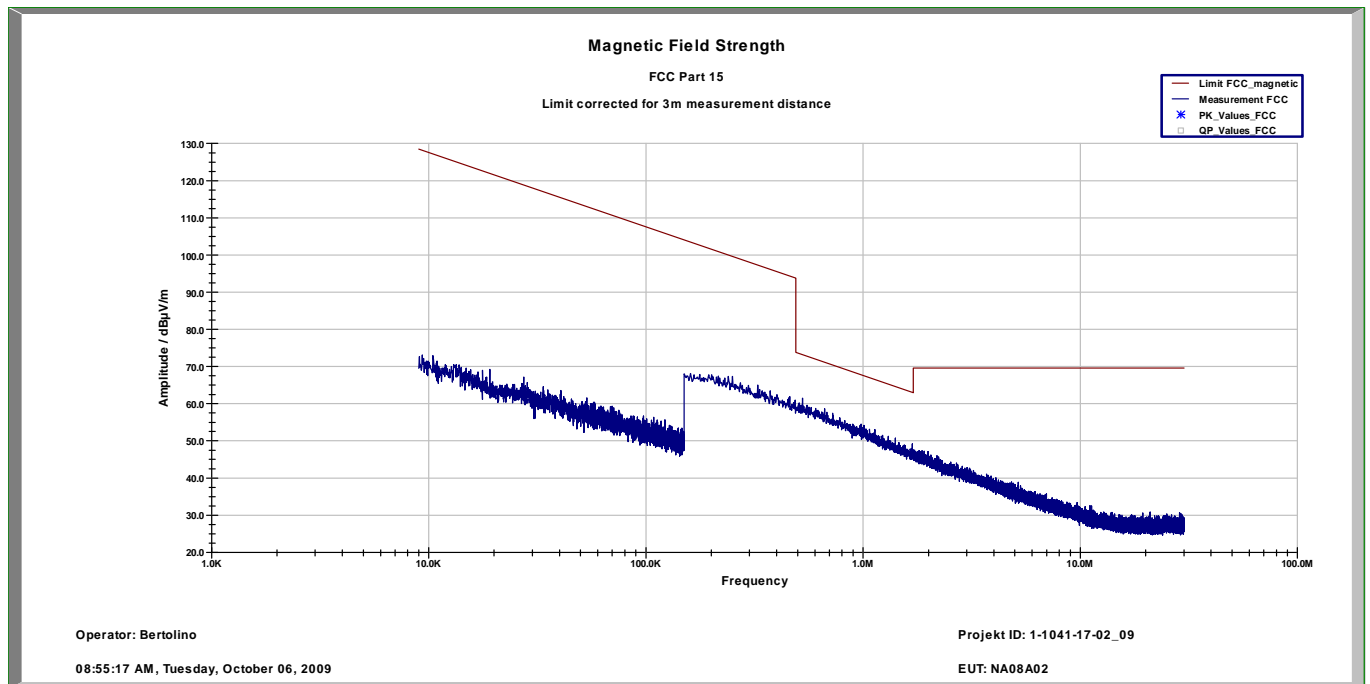
Frequency (MHz)	Field strength ( $\mu$ V/m)	Measurement distance (m)
30 - 88	100 (40 dB $\mu$ V/m)	3
88 - 216	150 (43.5 dB $\mu$ V/m)	3
216 - 960	200 (46 dB $\mu$ V/m)	3
above 960	500 (54 dB $\mu$ V/m)	3

## 5.17 Spurious Emissions < 30 MHz - Transmitter radiated § 15.209

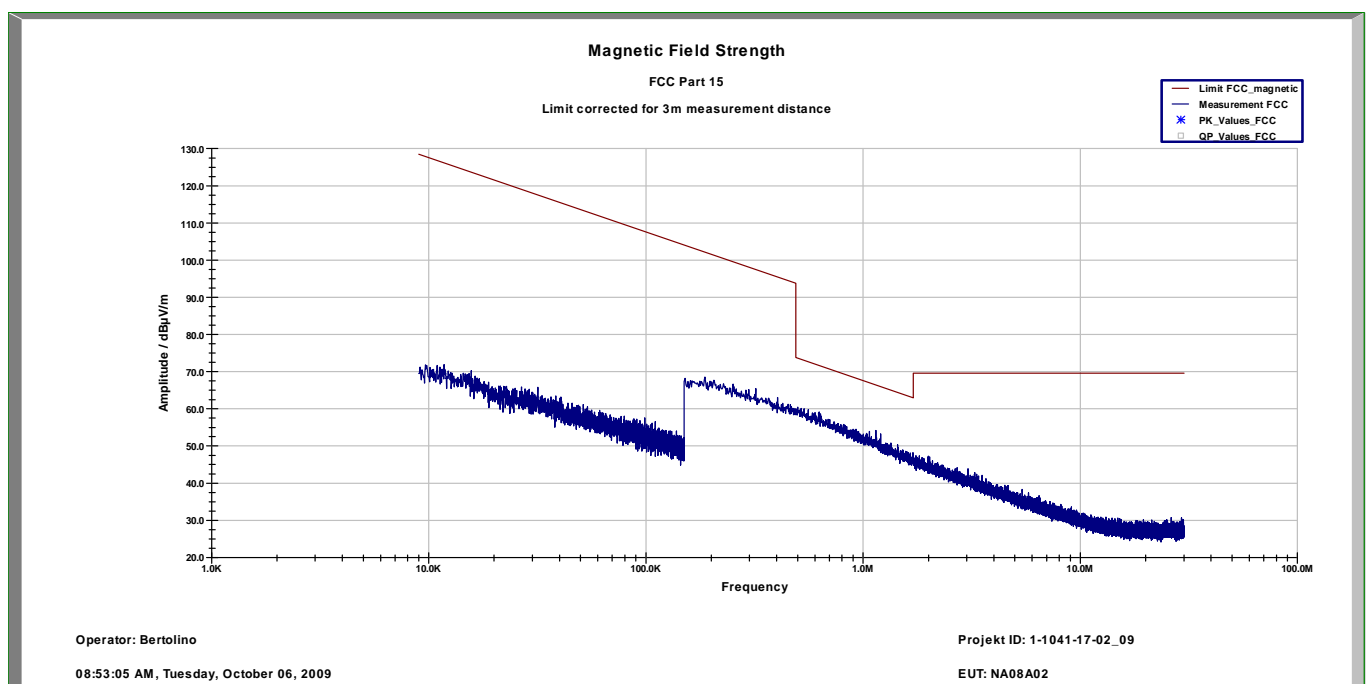
Modulation: Pi/DQPSK

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1: TX mode



Plot 2: RX mode



Limits:

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dB $\mu\text{V/m}$	30

**5.18 Conducted Emissions <30 MHz § 15.107/207**

**Not performed**

Modulation: GFSK

Limits:

Under normal test conditions only	See plots
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## 6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

### *SRD Laboratory Room 002:*

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	300002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	300002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	300002681	n.a.		
4	19" Monitor		22759020-ED	300002681	n.a.		
5	Mouse		LZE 0095/6639	300002681	n.a.		
6	Keyboard		G00013834L461	300002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	300002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	300002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	300002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	300002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	300002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	300002681	s.No.10		
14	Broadband horn antenna (1-18 GHz)	EMCO	9107-3696	300001604	16.04.2008	24	16.04.2010
15	Broadband horn antenna (1-18 GHz)	EMCO	9107-3697	300001605	21.08.2008	24	21.08.2010
16	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000486	n.a.		
17	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000487	n.a.		
18	Sleeve dipole antenna Model 3126-880	ETS-Lindgren	00040887	3000000	n.a.		
19	Fast CPU SM-B50	R&S	To 10	300002681	s.No.10		
20	FM Modulator SM-B5	R&S	835676/033	300002681	s.No.10		
21	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	300002681-0001	25.08.2008	36	25.08.2011
22	Modulation Coder SMIQ-B20	R&S	To 21	300002681	s.No.21		
23	Data Generator SMIQ-B11	R&S	To 21	300002681	s.No.21		
24	RF Rear Connection SMIQ-B19	R&S	To 21	300002681	s.No.21		
25	Fast CPU SM-B50	R&S	To 21	300002681	s.No.21		
26	FM Modulator SM-B5	R&S	836061/022	300002681	s.No.21		
27	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	300002681-0003	26.08.2008	36	26.08.2011
28	Attenuator SMP-B15	R&S	835136/014	300002681	S.No.27		
29	RF Rear Connection SMP-B19	R&S	834745/007	300002681	S.No.27		
30	Power Meter NRVD	R&S	835430/044	300002681-0004	26.08.2008	24	26.08.2010
31	Power Sensor NRVD-Z1	R&S	833894/012	300002681-0013	26.08.2008	24	26.08.2010
32	Power Sensor NRVD-Z1	R&S	833894/011	300002681-0010	26.08.2008	24	26.08.2010
33	Rubidium Standard RUB	R&S		300002681-0009	27.08.2008	24	27.08.2010

34	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	300002681-0006	Verified with path compensation		
35	Laser Printer HP Deskjet 2100	HP	N/A	300002681-0011	n.a.		
36	19" Rack	R&S	11138363000004	300002681	n.a.		
37	RF-cable set	R&S	N/A	300002681	n.a.		
39	IEEE-cables	R&S	N/A	300002681	n.a.		
40	Sampling System FSIQ-B70	R&S	835355/009	300002681	s.No.7		
41	RSP programmable attenuator	R&S	834500/010	300002681-0007	26.08.2008	24	26.08.2010
42	Signalling Unit	R&S	838312/011	300002681	n.a.		
43	NGPE programmable Power Supply for EUT	R&S	192.033.41	300002681			
44	Power Splitter 6005-3	Inmet Corp.	none	300002841	n.a.		
45	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
46	CBT32 with EDR Signaling Unit	R&S					
47	Coupling unit	Narda	N/A	--	n.a.		
48	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
49	RF-cable set	R&S	N/A	different	n.a.		
50	IEEE-cables	R&S	N/A	--	n.a.		

Note: 3000002681-00xx inventoried as a system

## SRD Laboratory Room 005:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Spektrum Analyzer 8566B	HP	2747A05275	300000219	18.01.2008	24	18.01.2010
2	Spektrum Analyzer Display 85662A	HP	2816A16497	300001690	23.01.2008	24	23.01.2010
3	Quasi-Peak-Adapter 85650A	HP	2811A01135	300000216	23.01.2008	24	23.01.2010
4	Power Supply	Heiden	003202	300001187	12.05.2007	36	12.05.2010
5	Power Supply	Heiden	1701	300001392	12.05.2007	36	12.05.2010

## Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Micro-wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2007	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-