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TEST REPORT

Test Report No.: 1-2194-01-04/10-E



Testing Laboratory

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Accredited Test Laboratory:

The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAR registration number: DGA-PL-176/94-D1

Area of Testing: Radio Satellite Communications

Applicant

Stollmann E+V GmbH

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22761 Hamburg/Germany
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Contact: Jens Jensen
e-mail: jj@stollmann.de
Phone: +49 40 890 88 498

Manufacturer

Stollmann E+V GmbH

Mendelssohnstr. 15D
22761 Hamburg/Germany

Test Standard/s

47 CFR Part 15	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	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: Bluetooth Class 1 Module



Model name: BlueMod+C11/G2, BlueMod+C11/G2/AE
FCC ID: RFR-C11G2
IC: 4957A-C11G2
Frequency [MHz]: 2400 – 2483.5 MHz (2402 – 2480 MHz)
Power supply: 3.0 to 3.6 V DC nom. 3.3V DC
Temperature range: -40°C to +85°C

Test performed:

2010-08-17 Jakob Reschke

Test Report authorised:

2010-08-17 Stefan Bös

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2 General Information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. 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 CETECOM ICT Services GmbH.

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

2.2 Application details

Date of receipt of order: 2010-04-28
 Date of receipt of test item: 2010-06-16
 Start of test: 2010-06-16
 End of test: 2010-07-02
 Person(s) present during the test: -/-

3 Test standard/s

Test Standard	Version	Test Standard Description
47 CFR Part 15	2009-10	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

4 Test Environment

Temperature:	T_{nom}	22 °C during room temperature tests
	T_{max}	85 °C during high temperature test
	T_{min}	-40 °C during low temperature test
Relative humidity content:		52 %
Air pressure:		Not relevant for this kind of testing
Power supply:	V_{nom}	3.0 to 3.6 V DC nom. 3.3 V DC
	V_{max}	3.6 V
	V_{min}	3.0 V

5 Test item

Kind of test item	Bluetooth Class 1 Module
Type identification	BlueMod+C11/G2, BlueMod+C11/G2/AE
S/N serial number	00802514EBE4
HW hardware status	V2.7
SW software status	HCI21e / V1.208.4
Frequency Band [MHz]	ISM-band 2400 – 2483.5 MHz (2402 – 2480 MHz)
Type of Modulation	FHSS (GFSK, Pi/4 DQPSK, 8DPSK)
Number of channels	79
Antenna	Integrated antenna
Power Supply	3.0 to 3.6 V DC nom. 3.3 V DC
Temperature Range	-40°C to +85°C

Max. power radiated: 19.33 dBm

Max. power conducted: -/- dBm

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 7, Annex 8	Passed	2010-08-17	Only delta tests performed

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Mode	Pass	Fail	NA	NP	Results (max.)
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna Gain	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) (iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(only middle channel) complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Note:NA = Not Applicable; NP = Not Performed

8 RF measurement testing

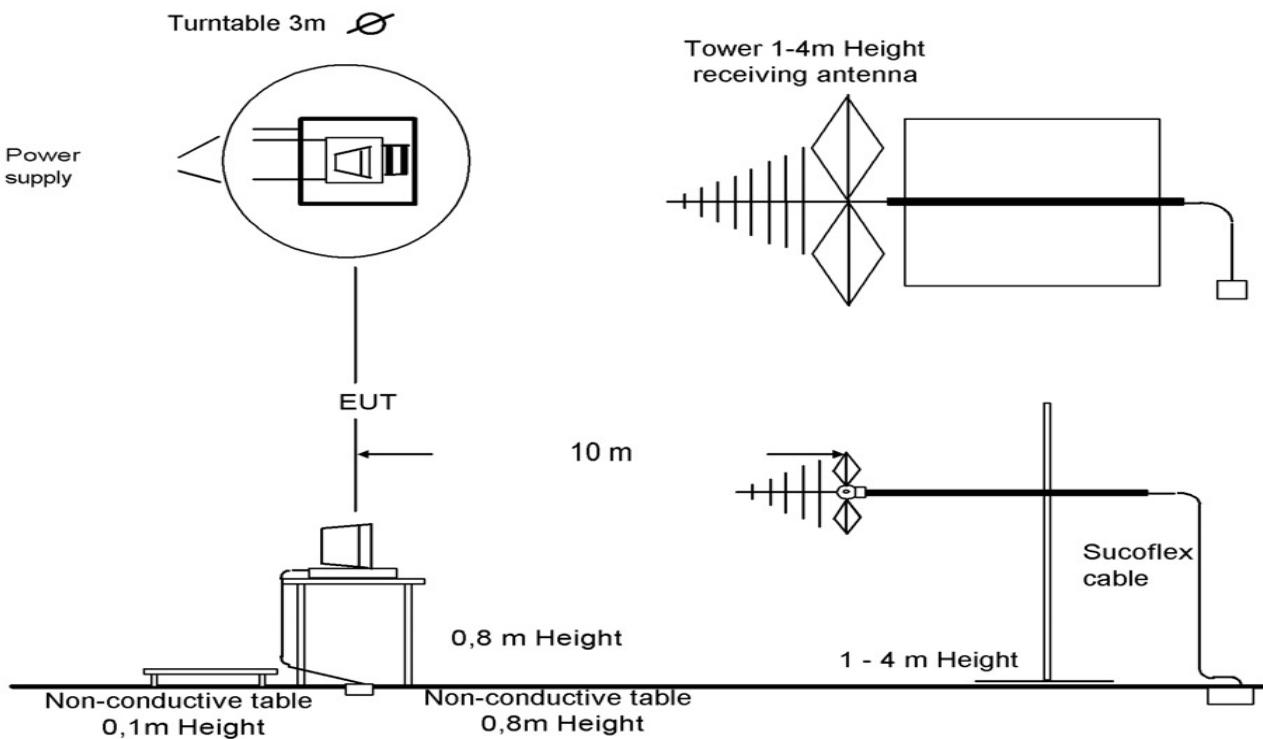
8.1 Description of test set-up

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 C63.4-2003 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.

Semi anechoic chamber



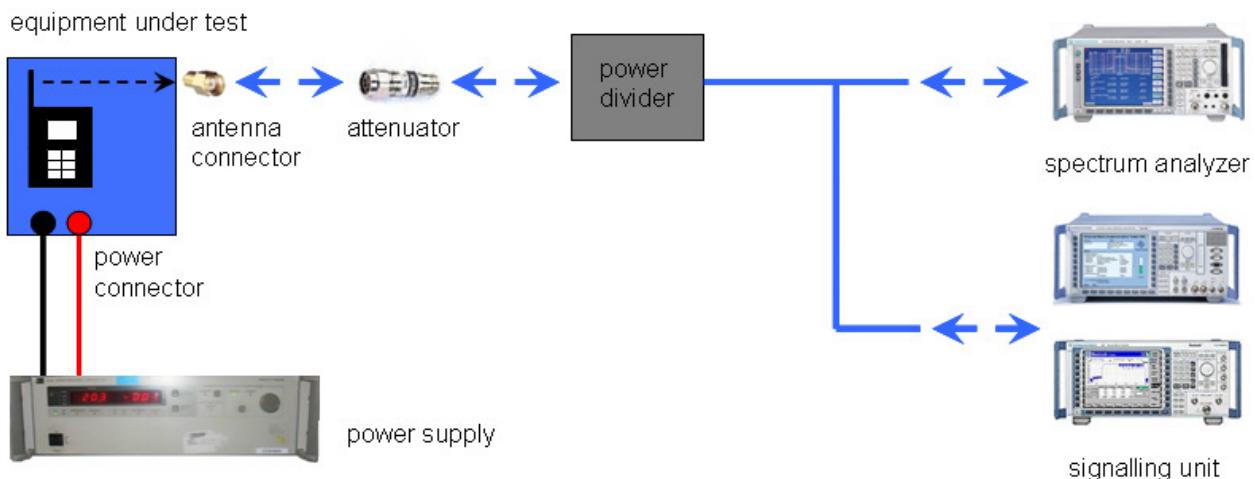
Picture 1: Diagram radiated measurements

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

Reference documents: 2-4483-01-04/06 (origin test report module BlueMod+C11/G2)
2-4804-01-02/07 (origin delta test report module BlueMod+C11/G2/AE)

Special test descriptions: None

Configuration descriptions: A Bluetooth – Module was tested on a developer board. With AT commands the Bluetooth – Test mode was enabled.

This test report only contains delta measurements. Please refer to the original test report no. 2-4483-01-04/06.

The test report is valid for both versions of the module:

BlueMod+C11/G2: (Antenna integrated): Surface mounted 1/4-wave Monopole Chip antenna
BlueMod+C11/G2/AE: (Antenna external): Rod Antenna model WIMO17010.010 via UMP connector

8.3 RSP100 Test Report Cover Sheet / Performance Test Data

Test Report Number	:	2-4483-01-04/06 (BlueMod+C11/G2) ¹ 2-4804-01-02/07 (BlueMod+C11/G2/AE) ² 1-2194-01-04/10-E (BlueMod+C11/G2 and BlueMod+C11/G2/AE)
Equipment Model Number	:	BlueMod+C11/G2, BlueMod+C11/G2/AE
Certification Number	:	4957A-C11G2
Manufacturer (complete Address)	:	Stollmann E+V GmbH Mendelssohnstr. 15D 22761 Hamburg / Germany
Tested to radio standards specification no.	:	RSS 210, Issue 7, Annex 8
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range	:	2400 – 2483.5 MHz-band (2402 – 2480 MHz)
RF-power [W] (max.)	:	Cond.: 42.4 mW (GFSK) EIRP: 72.4 mW (GFSK) Cond.: 21.1 mW (Pi/4-DQPSK) EIRP: 36.3 mW (Pi/4-DQPSK) Cond.: 24.3 mW (8DPSK) EIRP: 40.7 mW (8DPSK)
Occupied bandwidth (99%-BW) [kHz]	:	872 (GFSK) ¹ 1172 (Pi/4-DQPSK) ¹ 1184 (8DPSK) ¹
Type of modulation	:	GFSK; Pi/4-DQPSK; 8DPSK
Emission Designator (TRC-43)	:	872KFXD (GFSK) ¹ 1M12GXD (Pi/4-DQPSK) ¹ 1M12GXD (8DPSK) ¹
Antenna Information	:	PCB mounted antenna ¹ Rod Antenna (model number WIMO 17010.010) ²
Transmitter Spurious (worst case) [µV/m @ 3m]	:	427 µV/m @ 3255 MHz
Receiver Spurious (worst case) [µV/m @ 3m]	:	102 µV/m (noise floor)

ATTESTATION:

DECLARATION OF COMPLIANCE:

I declare 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:

2010-08-17	Jakob Reschke	
Date	Name	Signature

9 Measurement Results

9.1 Antenna Gain

Not performed

9.2 Carrier Frequency Separation

Not performed

9.3 Number of Hopping Channels

Not performed

9.4 Time of Occupancy (Dwell Time)

Not performed

9.5 Spectrum Bandwidth of a FHSS System – 20 dB Bandwidth

Not performed

9.6 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 7, 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	

Result:

Modulation	Maximum Output Power Conducted [dBm]		
	2402 MHz	2441 MHz	2480 MHz
GFSK	Not performed	16.27	
Pi/4 DQPSK		13.24	Not performed
8DPSK		13.86	
Measurement uncertainty	± 0.5 dB		

Modulation	Maximum Output Power Radiated - EIRP [dBm]		
	2402 MHz	2441 MHz	2480 MHz
GFSK	Not performed	18.6	
Pi/4 DQPSK		15.6	Not performed
8DPSK		16.1	
Measurement uncertainty	± 2.0 dB		

Result: The result of the measurement is passed.

9.7 Band Edge Compliance Conducted

Not performed

9.8 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 Higher Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

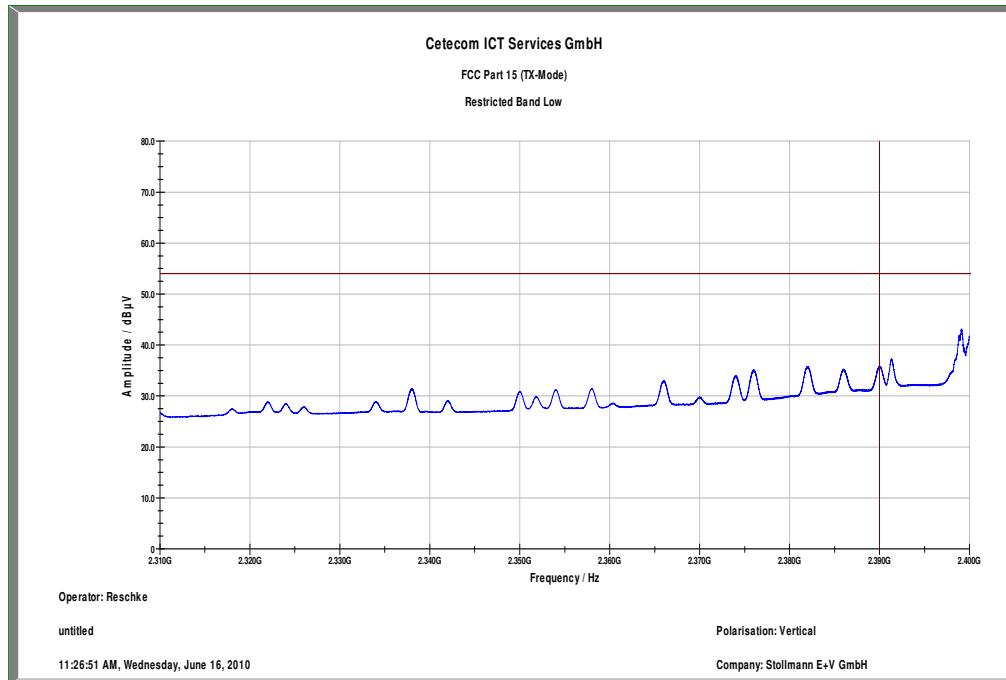
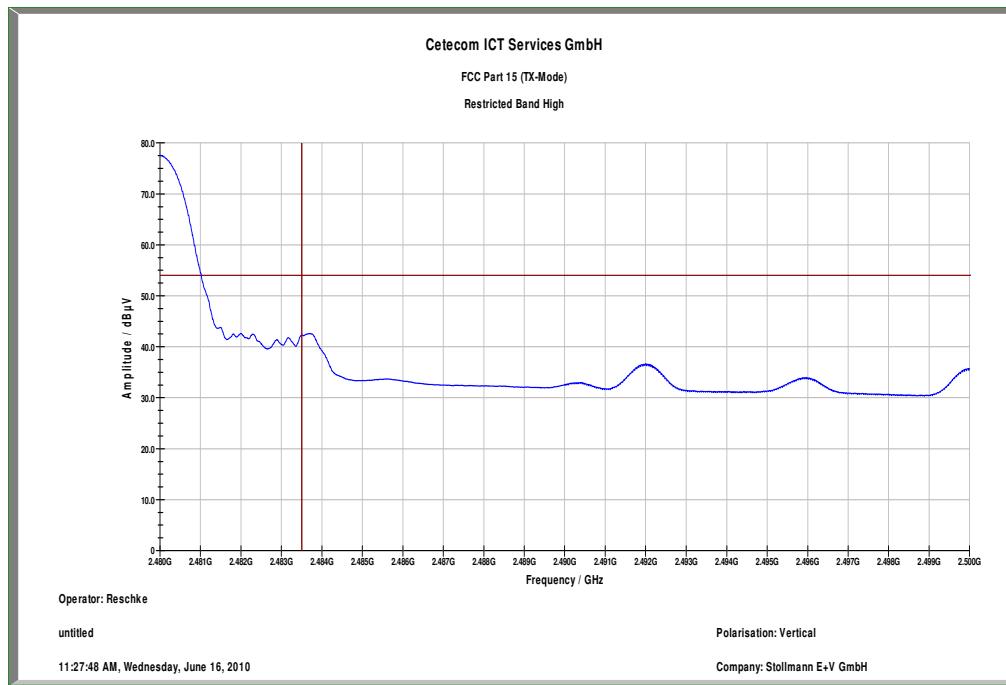
Limits:

FCC	IC
CFR Part 15.205	RSS 210, Issue 7, 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 dB μ V/m AVG	

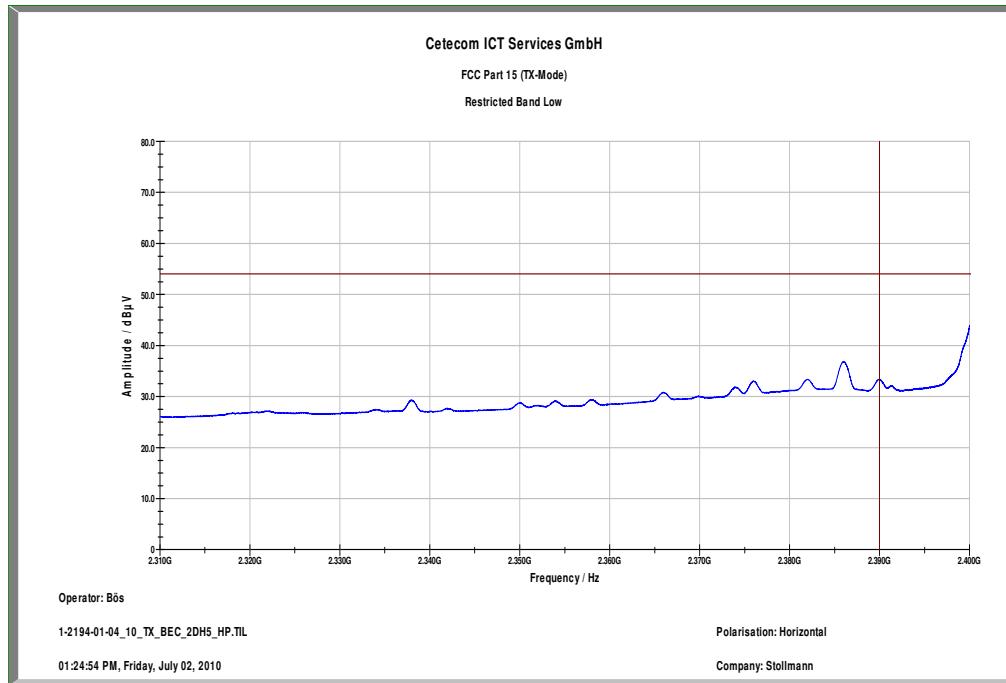
Result:

Szenario	Band Edge Compliance Radiated [dB μ V/m]		
	GFSK	Pi/4 DQPSK	8DPSK
Lower Restricted Band	< 54 (see plot 1)	< 54 (see plot 3)	< 54 (see plot 5)
Upper Restricted Band	< 54 (see plot 2)	< 54 (see plot 4)	< 54 (see plot 6)
Measurement uncertainty	± 1.5 dB		

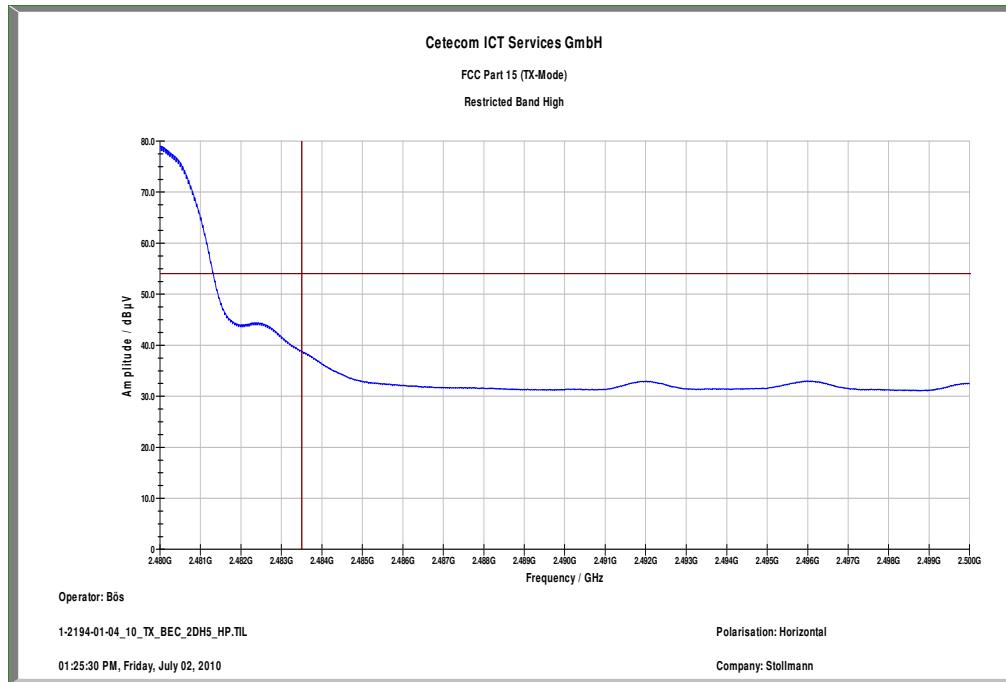
Result: The result of the measurement is passed.

Plot 1: Lower Restricted Band / GFSK (radiated)

Plot 2: Upper Restricted Band / GFSK (radiated)


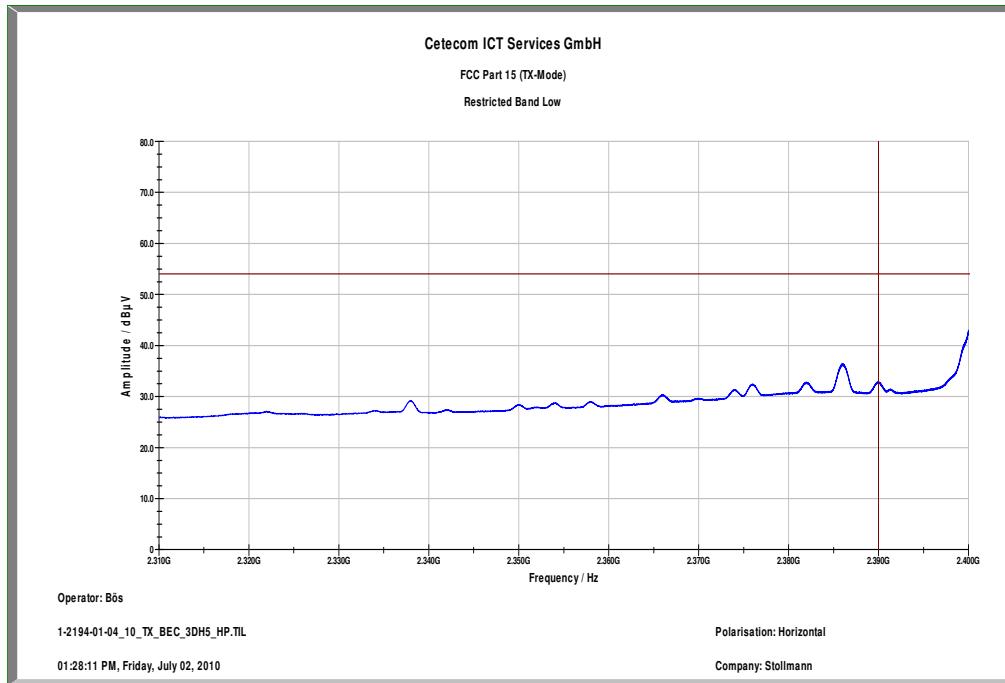
Plot 3: Lower Restricted Band / Pi/4 DQPSK (radiated)



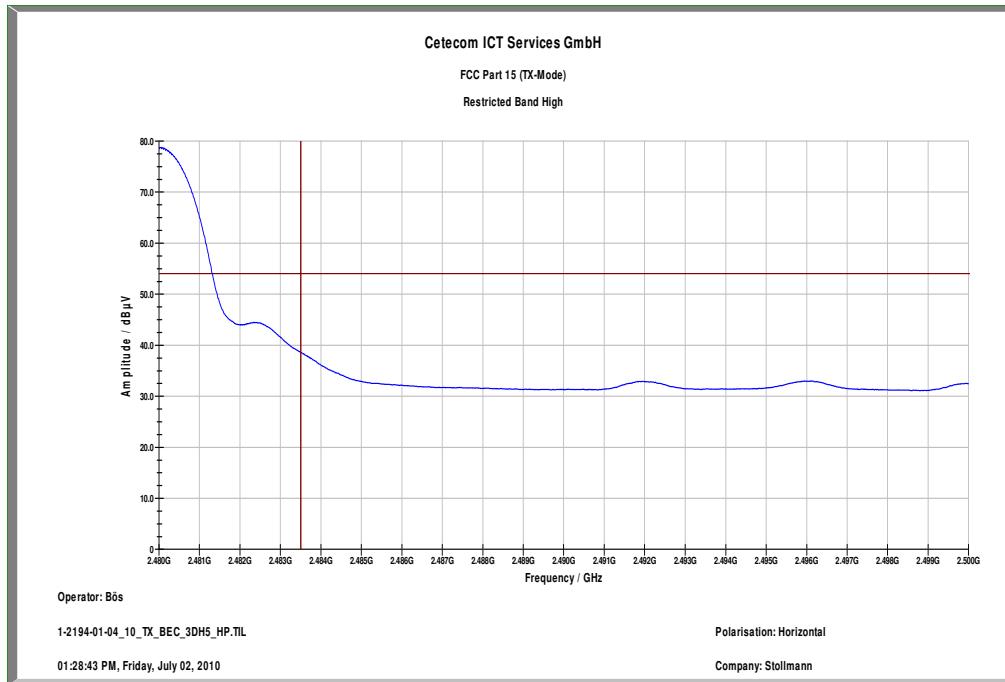
Plot 4: Upper Restricted Band / Pi/4 DQPSK (radiated)



Plot 5: Lower Restricted Band / 8 DPSK (radiated)



Plot 6: Upper Restricted Band / 8 DPSK (radiated)



9.9 TX Spurious Emissions Conducted

Not performed

9.10 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
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
Connection:	CBT Testmode (DH5)

Limits:

FCC	IC	
CFR Part 15.247(d)	RSS 210, Issue 7, A 8.5	
TX Spurious Emissions Radiated		
<p>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)).</p>		
§15.209		
Frequency (MHz)	Field Strength (dB μ V/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Result:

TX Spurious Emissions Radiated [dB μ V/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
1600	PK	41.61	1626	PK	41.06	1654	PK	41.75
3203	AV	40.98	3255	PK	52.61	3307	PK	50.94
4804	AV	47.04	4882	AV	48.57	4960	AV	52.13
7206	AV	47.59	7323	AV	48.32	7440	AV	49.96
						9920	AV	43.30
						12400	AV	41.39
Measurement uncertainty			± 3 dB					

Result: The result of the measurement is passed.

Plot 1: 30 MHz to 1 GHz / Channel 00 (horizontal/vertical)

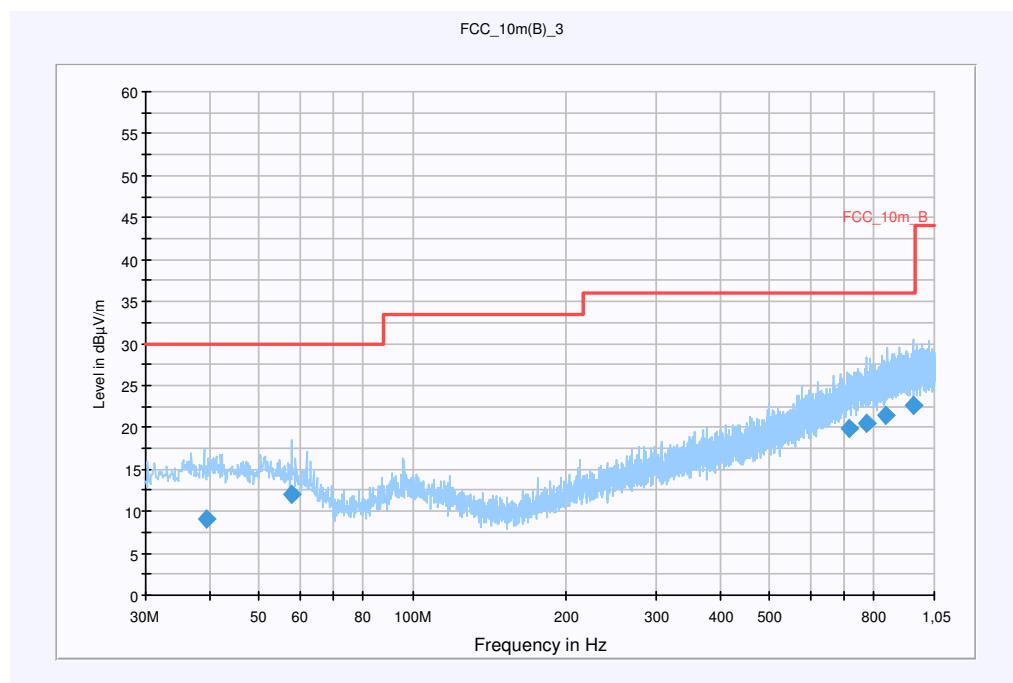
Common Information

EUT: BlueMod+C11/G2
 Serial Number: 008025114EBE4
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 0
 Operator Name: Hennemann
 Comment: powered by test board

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver

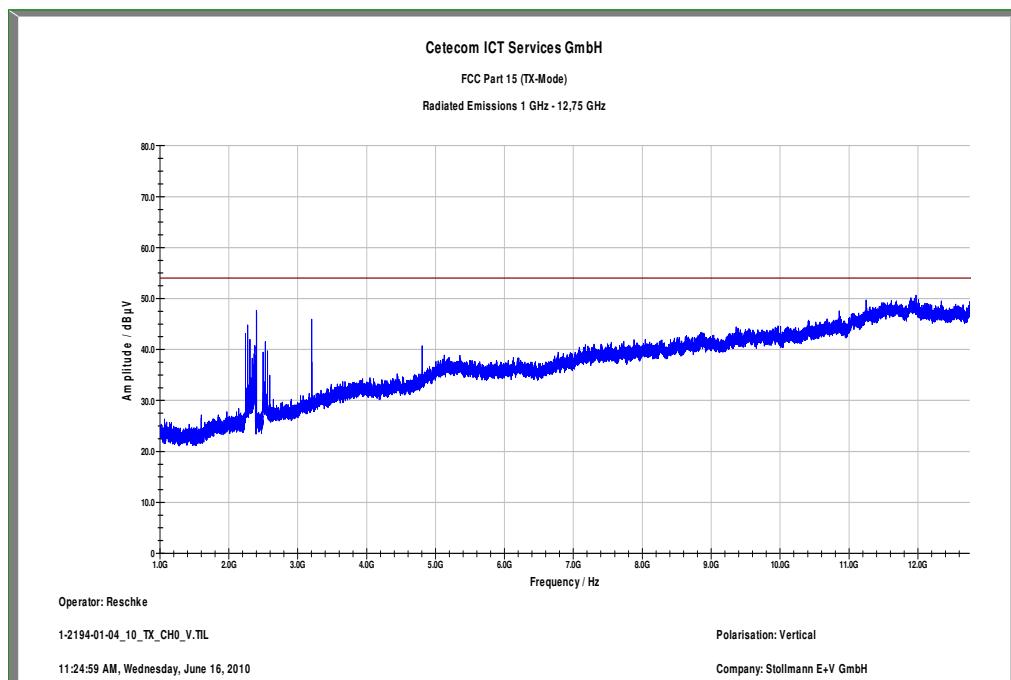


Final Result 1

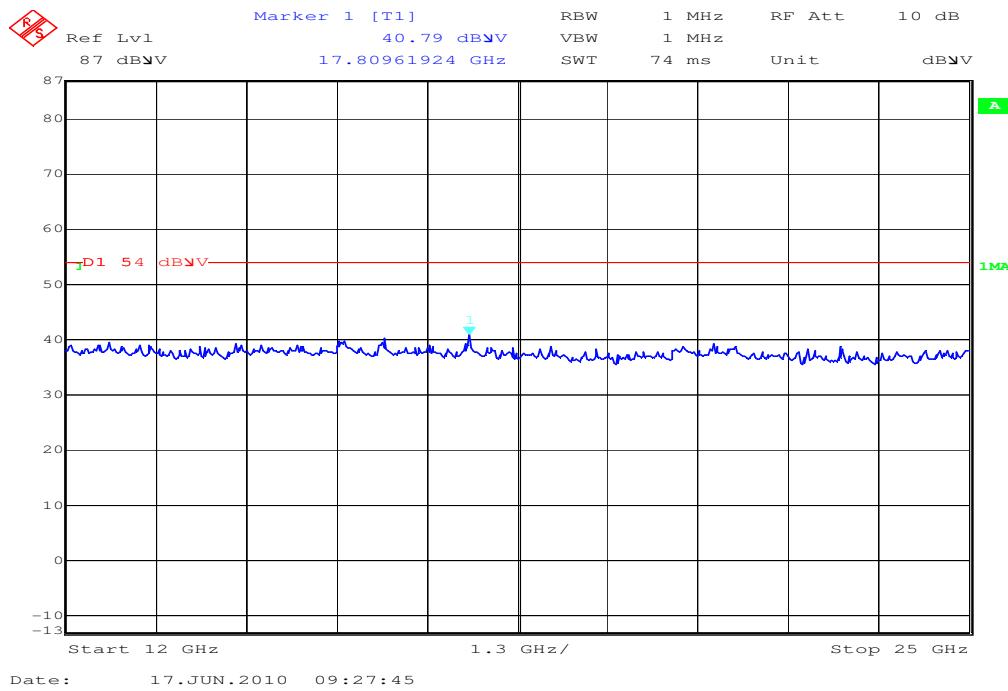
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
39.420750	9.0	15000.000	120.000	220.0	V	193.0	13.4	21.0	30.0	
58.020600	12.1	15000.000	120.000	220.0	V	95.0	12.1	17.9	30.0	
712.626600	19.9	15000.000	120.000	220.0	V	110.0	22.8	16.1	36.0	
770.886900	20.6	15000.000	120.000	220.0	V	3.0	23.7	15.4	36.0	
846.369300	21.5	15000.000	120.000	129.0	H	171.0	24.5	14.5	36.0	
952.612650	22.6	15000.000	120.000	105.0	H	190.0	25.4	13.4	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 (1005)
 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

Plot 2: 1 GHz to 12.75 GHz / Channel 00 (horizontal/vertical)


Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 3: 12 GHz to 25 GHz / Channel 00 (horizontal/vertical) – valid for all channels

Plot 4: 30 MHz to 1 GHz / Channel 39 (horizontal/vertical)

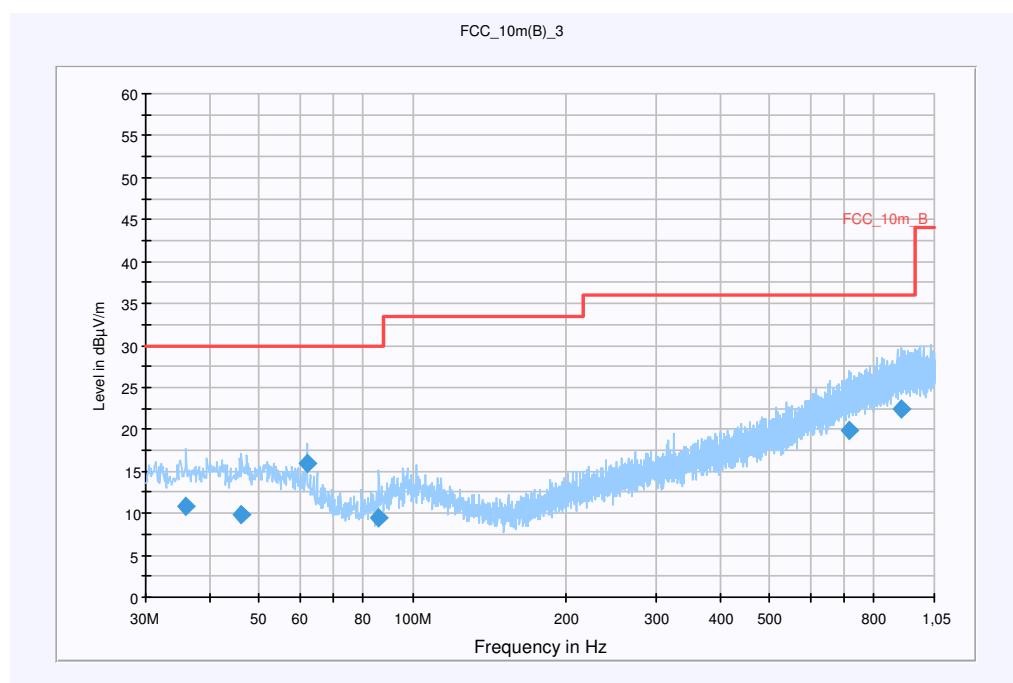
Common Information

EUT: BlueMod+C11/G2
 Serial Number: 008025114EBE4
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 39
 Operator Name: Hennemann
 Comment: powered by test board

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Level Unit: dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
36.050850	10.9	15000.000	120.000	98.0	V	186.0	13.1	19.1	30.0	
46.081050	9.7	15000.000	120.000	115.0	V	13.0	13.3	20.3	30.0	
61.995300	16.0	15000.000	120.000	220.0	V	201.0	11.1	14.0	30.0	
85.980150	9.5	15000.000	120.000	220.0	V	77.0	10.0	20.5	30.0	
715.250400	19.9	15000.000	120.000	166.0	V	289.0	22.9	16.1	36.0	
905.174700	22.4	15000.000	120.000	105.0	V	86.0	25.2	13.6	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

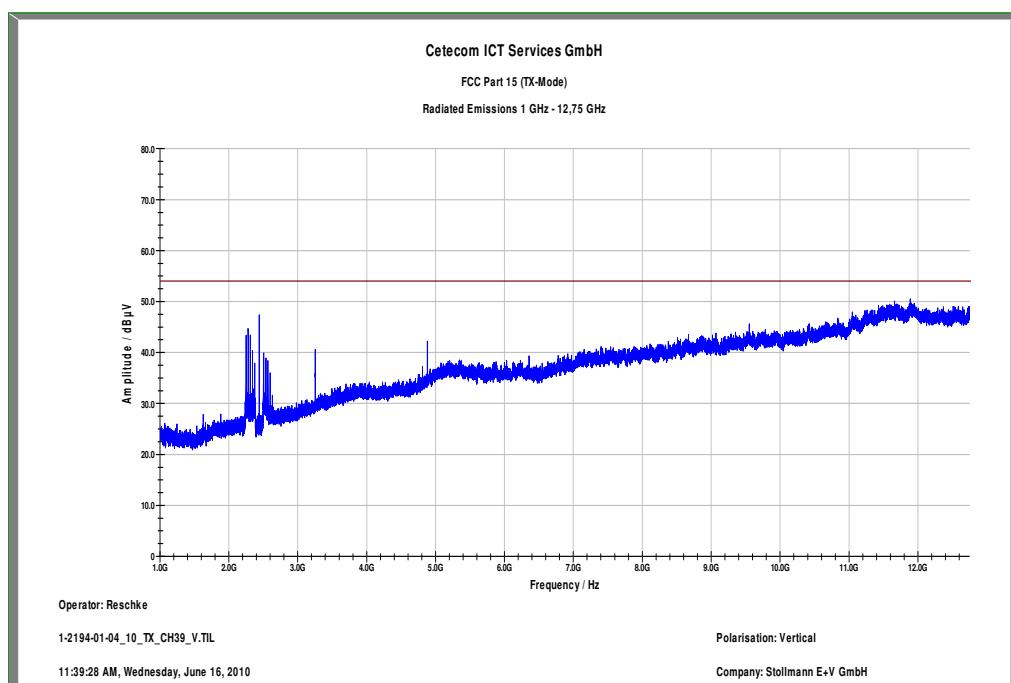
Correction Table: Cable_EN_1GHz (1005)

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

Plot 5: 1 GHz to 12.75 GHz / Channel 39 (horizontal/vertical)


Carrier suppressed with a 2.4 GHz-band rejection filter.

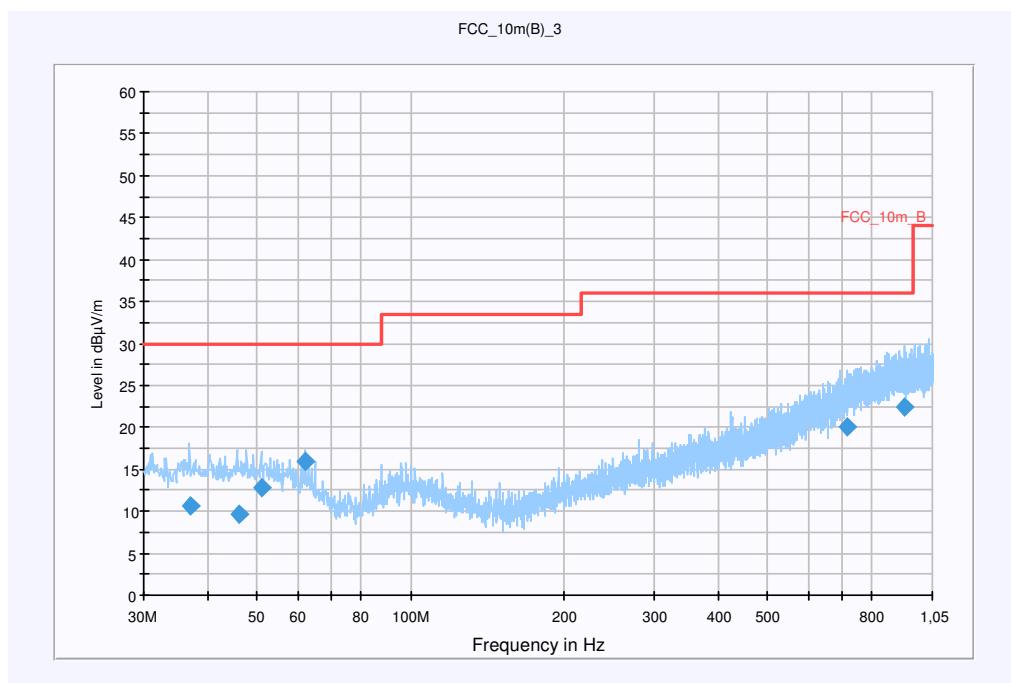
Plot 6: 30 MHz to 1 GHz / Channel 78 (horizontal/vertical)

Common Information

EUT: BlueMod+C11/G2
 Serial Number: 008025114EBE4
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT TX Ch. 78
 Operator Name: Hennemann
 Comment: powered by test board

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)			
Level Unit:	dB μ V/m			
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
36.959250	10.7	15000.000	120.000	98.0	V	90.0	13.2	19.3	30.0	
46.020450	9.6	15000.000	120.000	201.0	H	289.0	13.3	20.4	30.0	
50.972700	12.8	15000.000	120.000	220.0	V	270.0	13.3	17.2	30.0	
61.982100	15.8	15000.000	120.000	220.0	V	181.0	11.1	14.2	30.0	
715.965900	20.0	15000.000	120.000	220.0	V	13.0	22.9	16.0	36.0	
925.531950	22.4	15000.000	120.000	116.0	H	172.0	25.3	13.6	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

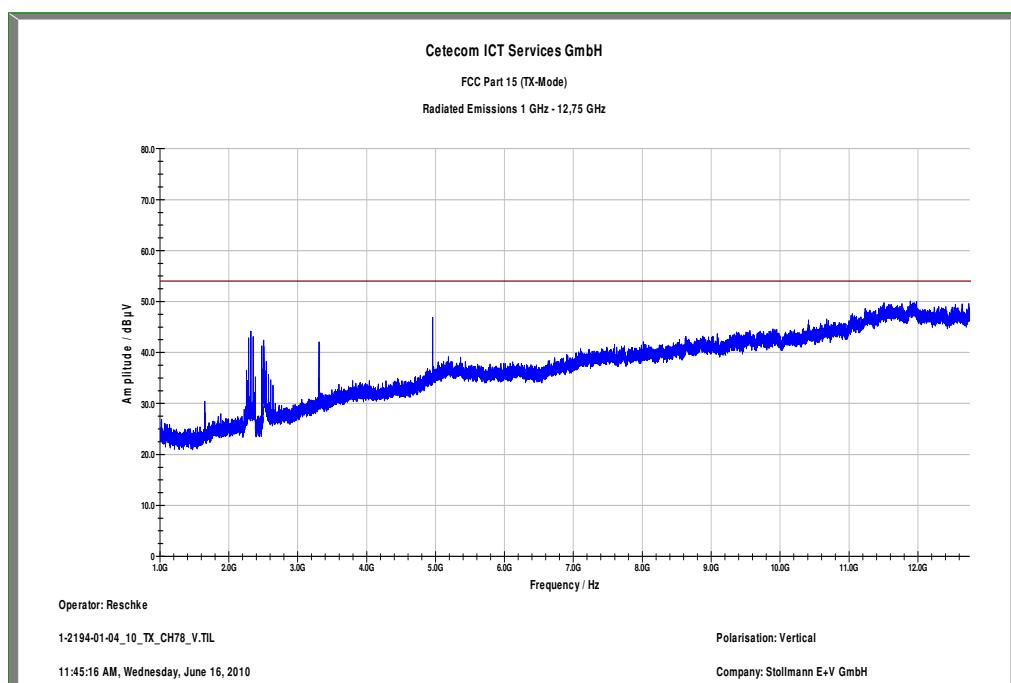
Correction Table: Cable_EN_1GHz (1005)

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

Plot 7: 1 GHz to 12.75 GHz / Channel 78 (horizontal/vertical)


Carrier suppressed with a 2.4 GHz-band rejection filter.

9.11 RX Spurious Emissions Radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode.

Measurement:

Measurement parameter	
Detector:	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
Connection:	Transmitter standby

Limits:

FCC	IC	
CFR Part 15.109	RSS Gen, Issue 2, 4.10	
RX Spurious Emissions Radiated		
Frequency (MHz)	Field Strength (dB μ V/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Result:

Result: The result of the measurement is passed.

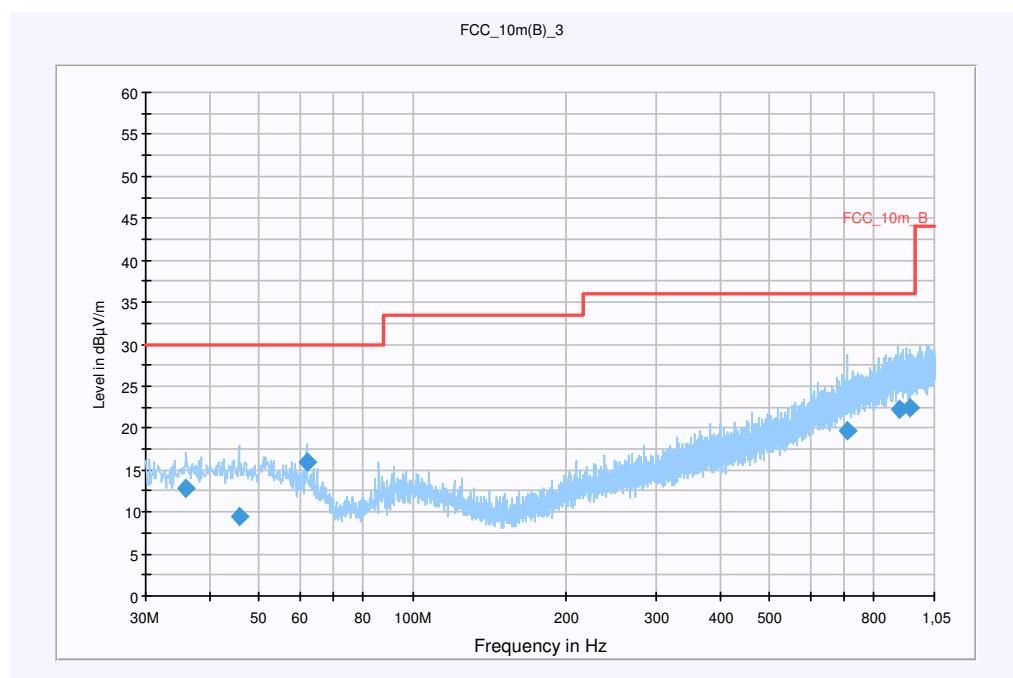
Plot 1: 30 MHz to 1 GHz (horizontal/vertical)

Common Information

EUT: BlueMod+C11/G2
 Serial Number: 008025114EBE4
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT RX
 Operator Name: Hennemann
 Comment: powered by test board

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)			
Level Unit:	dB μ V/m			
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
35.987850	12.9	15000.000	120.000	116.0	V	264.0	13.1	17.1	30.0	
45.624450	9.5	15000.000	120.000	98.0	V	13.0	13.3	20.5	30.0	
61.980900	15.9	15000.000	120.000	199.0	V	110.0	11.1	14.1	30.0	
707.661150	19.7	15000.000	120.000	220.0	V	289.0	22.7	16.3	36.0	
894.293700	22.3	15000.000	120.000	220.0	H	176.0	25.1	13.7	36.0	
943.938750	22.5	15000.000	120.000	220.0	V	290.0	25.3	13.5	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

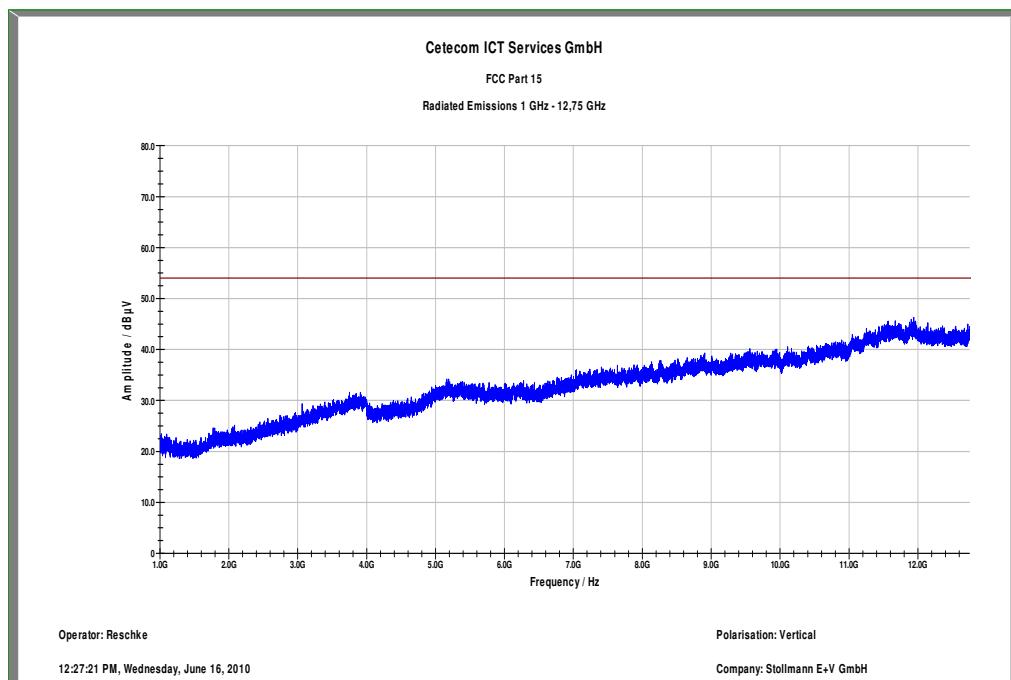
Correction Table: Cable_EN_1GHz (1005)

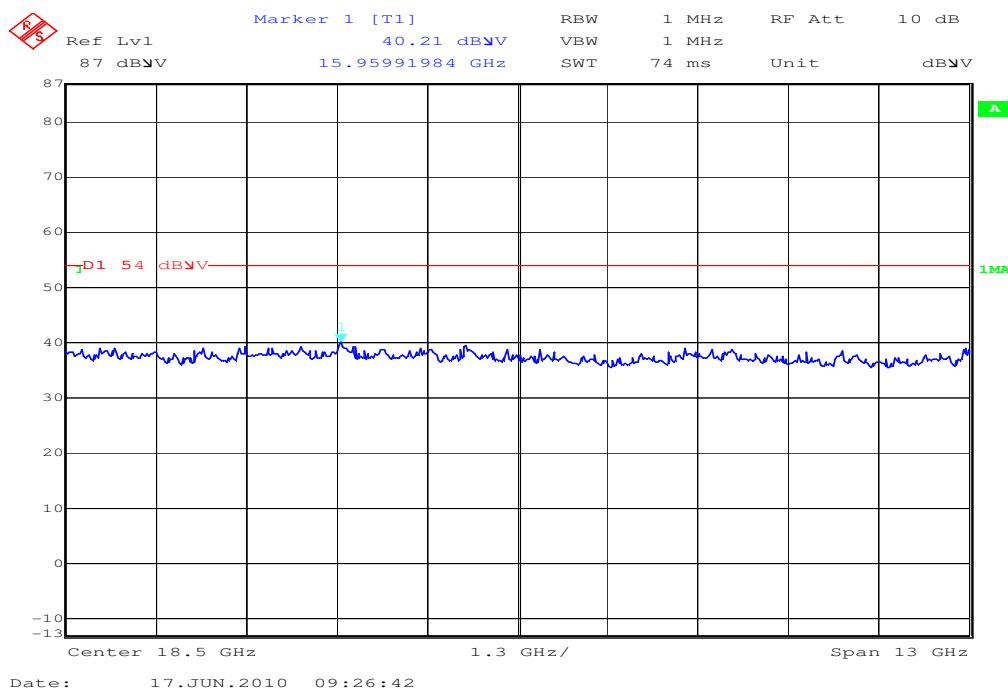
Antenna Tower: Tower [EMCO 2090 Antenna Tower]

@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]

@ GPIB0 (ADR 9), FW REV 3.12

Plot 2: 1 GHz to 12.75 GHz (horizontal/vertical)

Plot 3: 12 GHz to 25 GHz (horizontal/vertical) – valid for all channels

9.12 TX Spurious Emissions Radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Quasi Peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold
Connection:	CBT Testmode (DH5)

Limits:

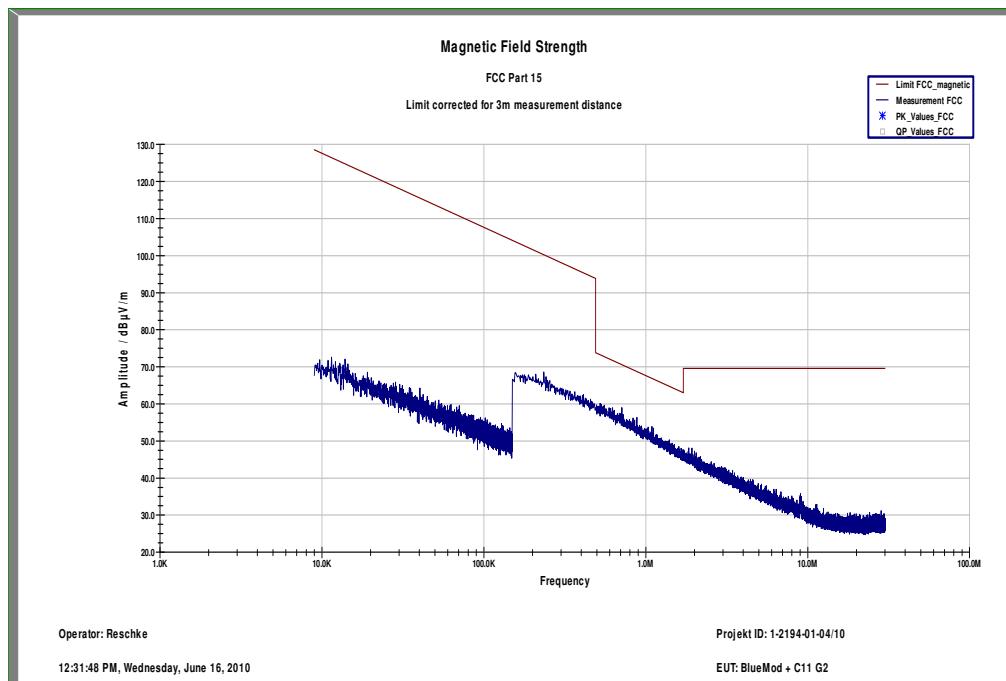
FCC	IC	
CFR Part 15.209(a)	RSS 210, Issue 7, 2.2	
TX Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dB μ V/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Result:

TX Spurious Emissions Radiated < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No critical peaks found		
Measurement uncertainty		±3 dB

Result: The result of the measurement is passed.

Plot 1: 9 kHz to 30 MHz / Channel 39 (valid for all channels and modes)



9.13 TX Spurious Emissions Conducted < 30 MHz

Not performed

10 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calibration	Next Calibration
1	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
2	n. a.	PowerAttenuator	8325	Byrd	1530	300001595			
3	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	05.03.2009	05.03.2011
4	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
5	n. a.	Anechoic chamber		MWB	87400/02	300000996			
6	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
7	9	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
8	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
9	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
10	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
11	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
12	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
13	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
14	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
15	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
16	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
17	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
18	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
19	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	05.08.2008	05.08.2010
20	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	06.08.2008	06.08.2010
21	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vIKI!	19.08.2008	19.08.2010
22	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	17.12.2008	17.12.2010

Annex A Photographs of the Test Setup

Photo documentation

Photo 1:



Photo 2:



Annex B External Photographs of the EUT

Photo documentation

Photo 3:

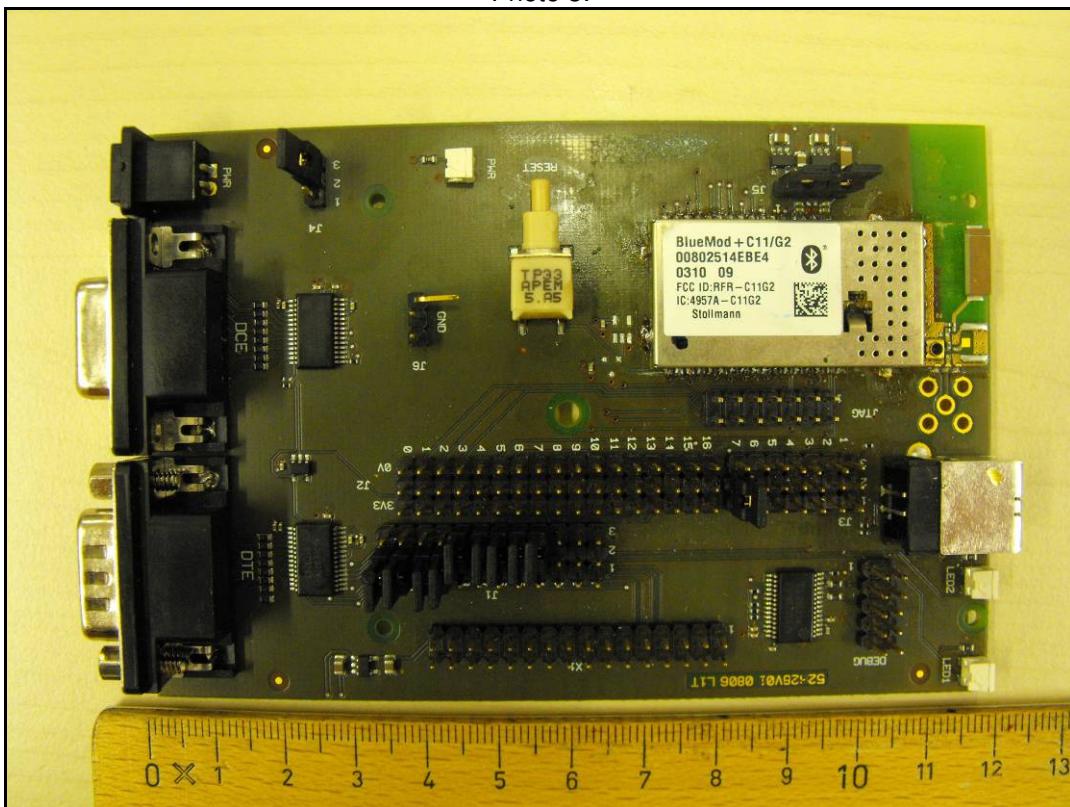


Photo 4:

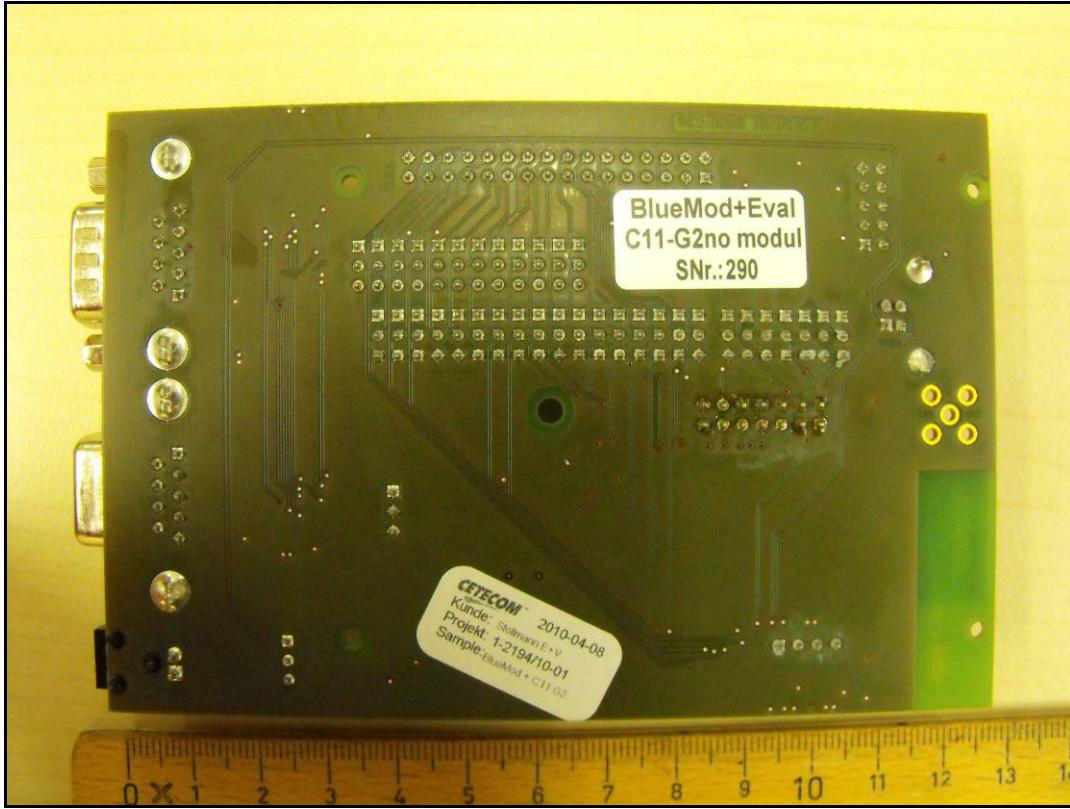


Photo 5:

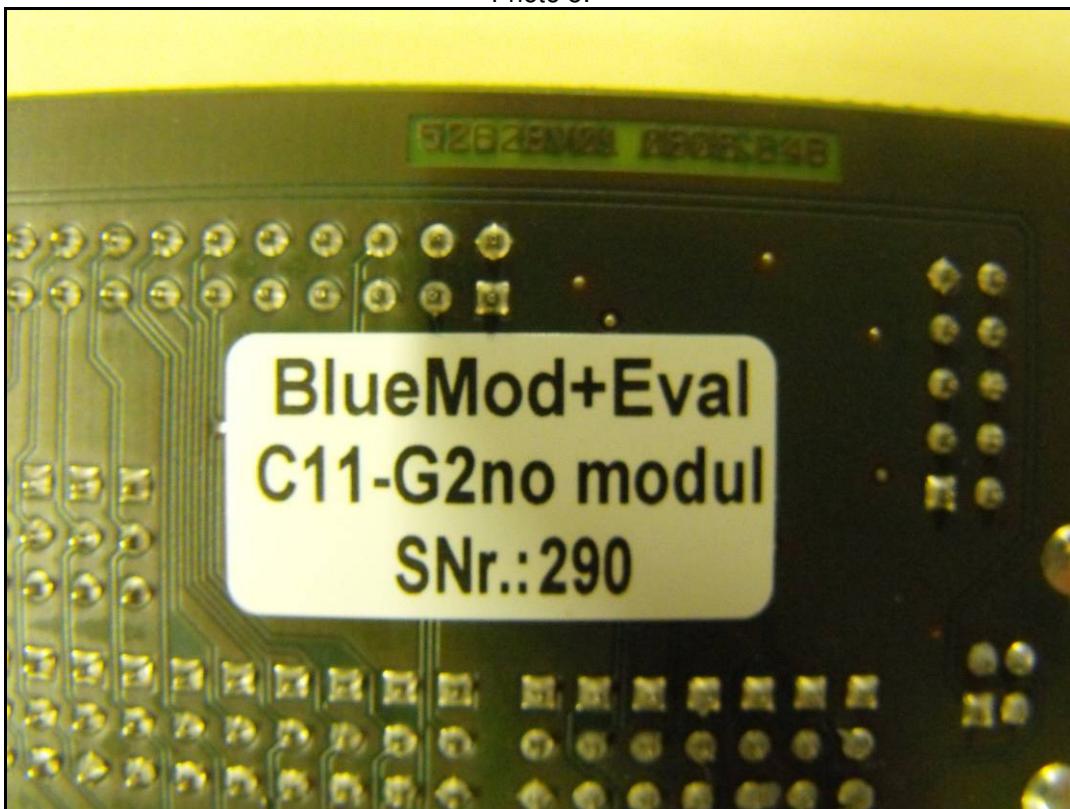


Photo 6:

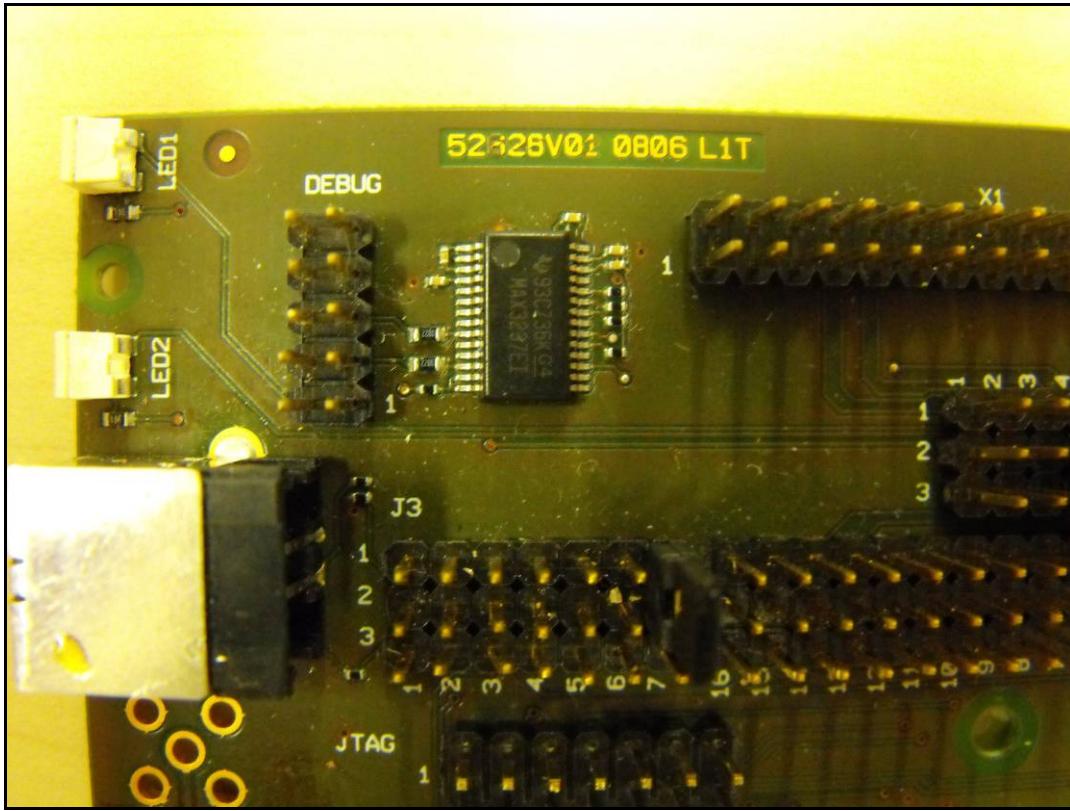


Photo 7:



Photo 8:

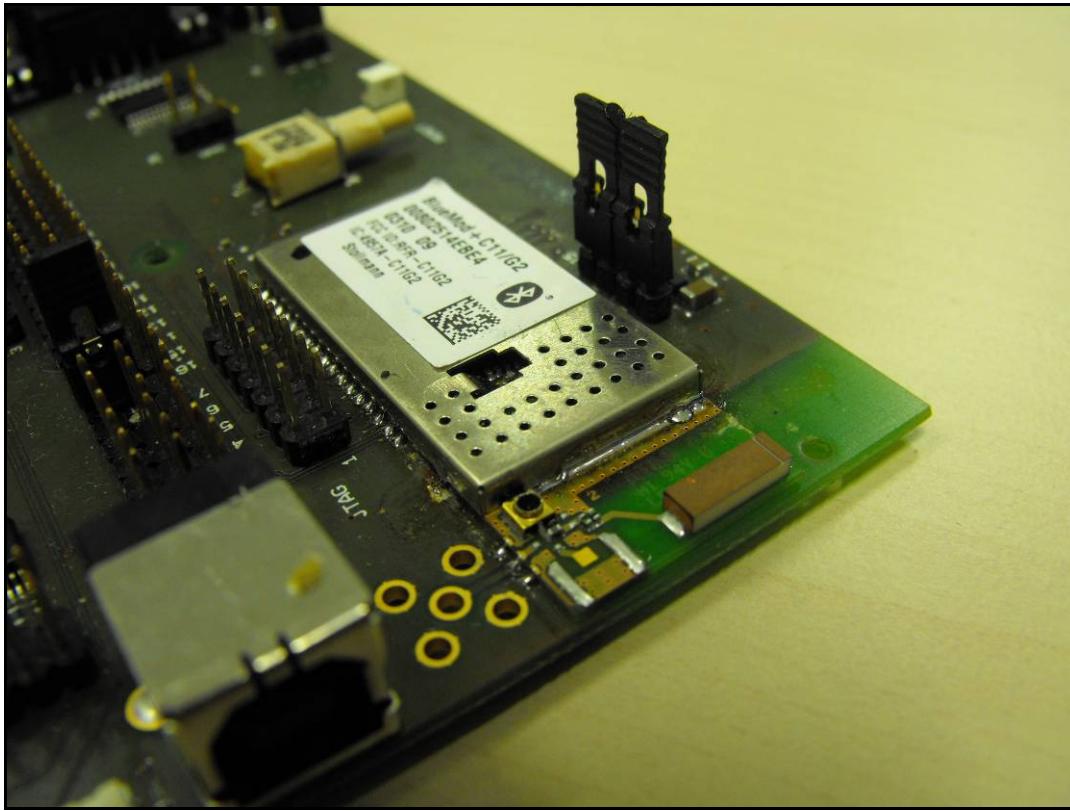


Photo 9:

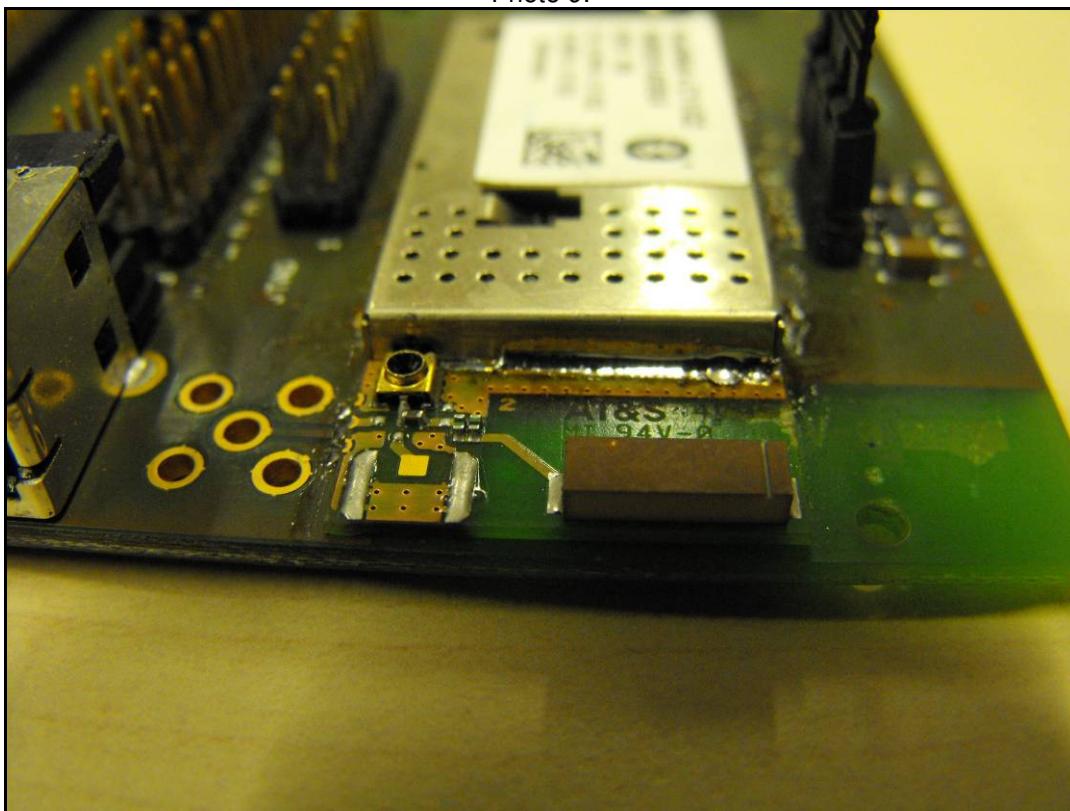


Photo 10:

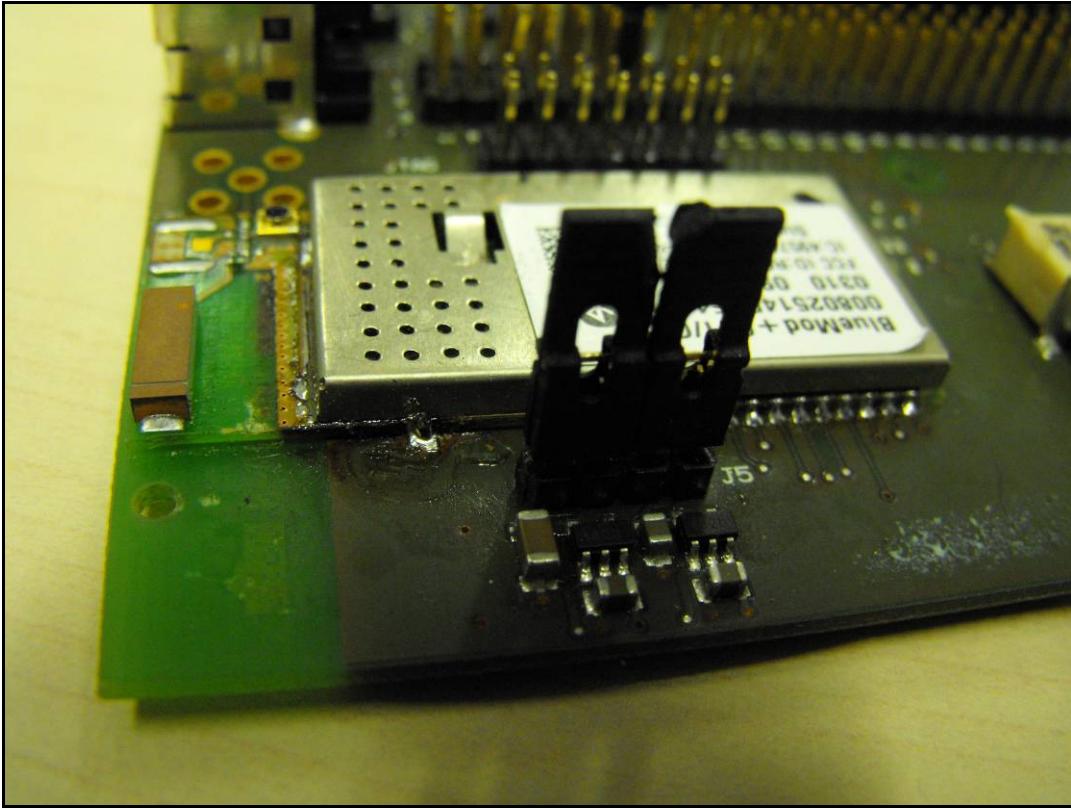


Photo 11:

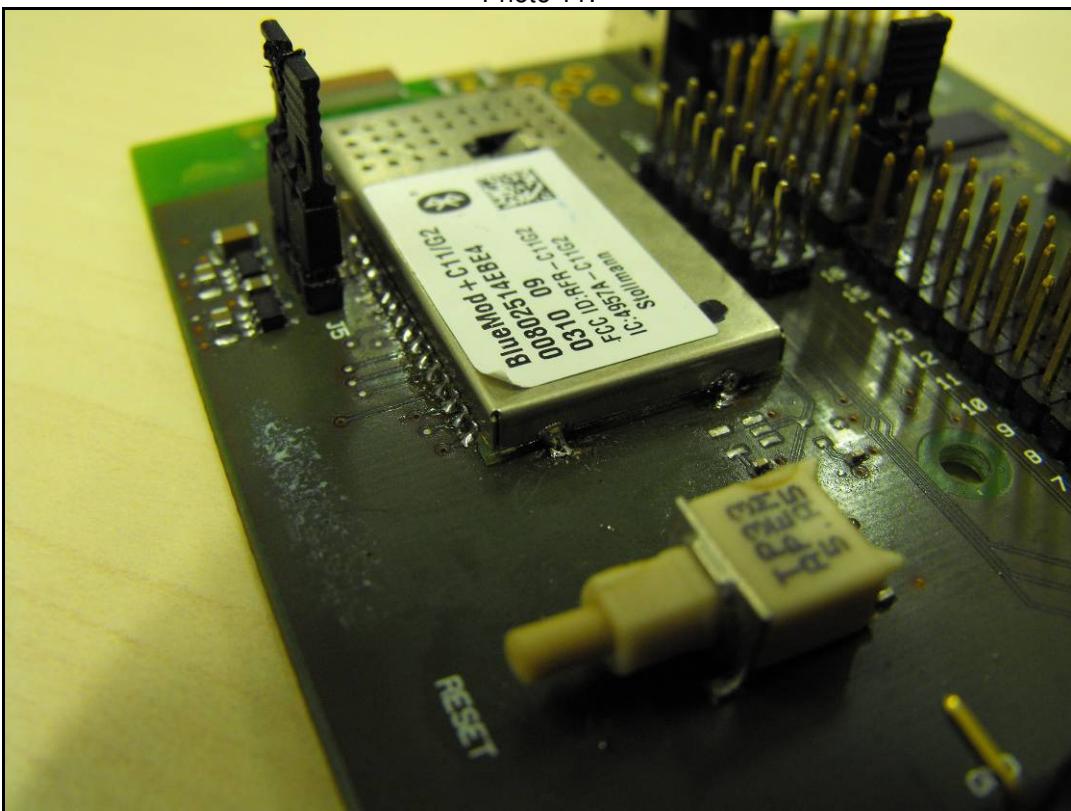


Photo 12:

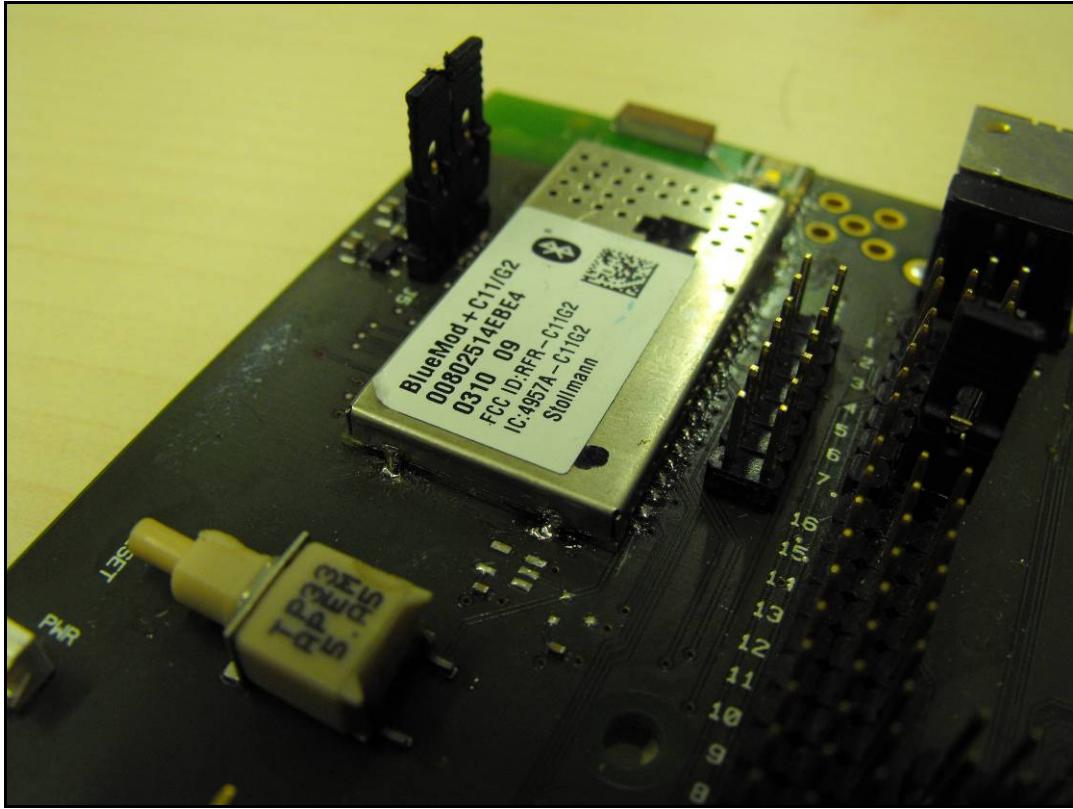


Photo 13:

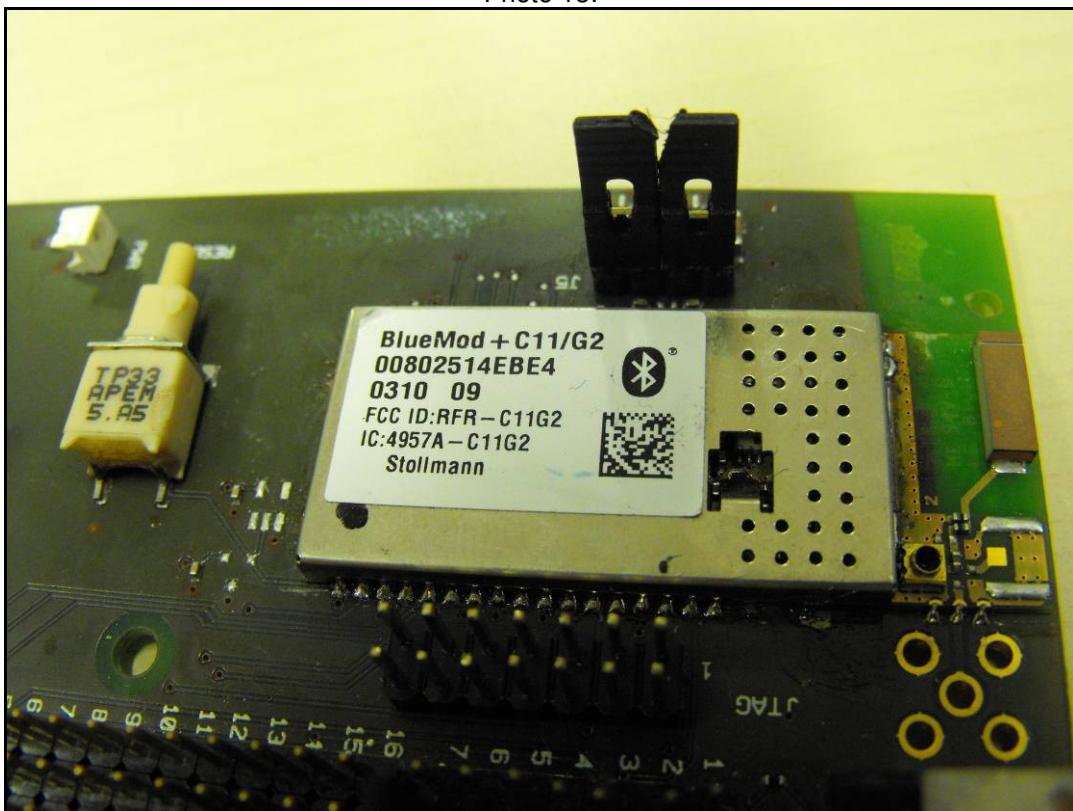


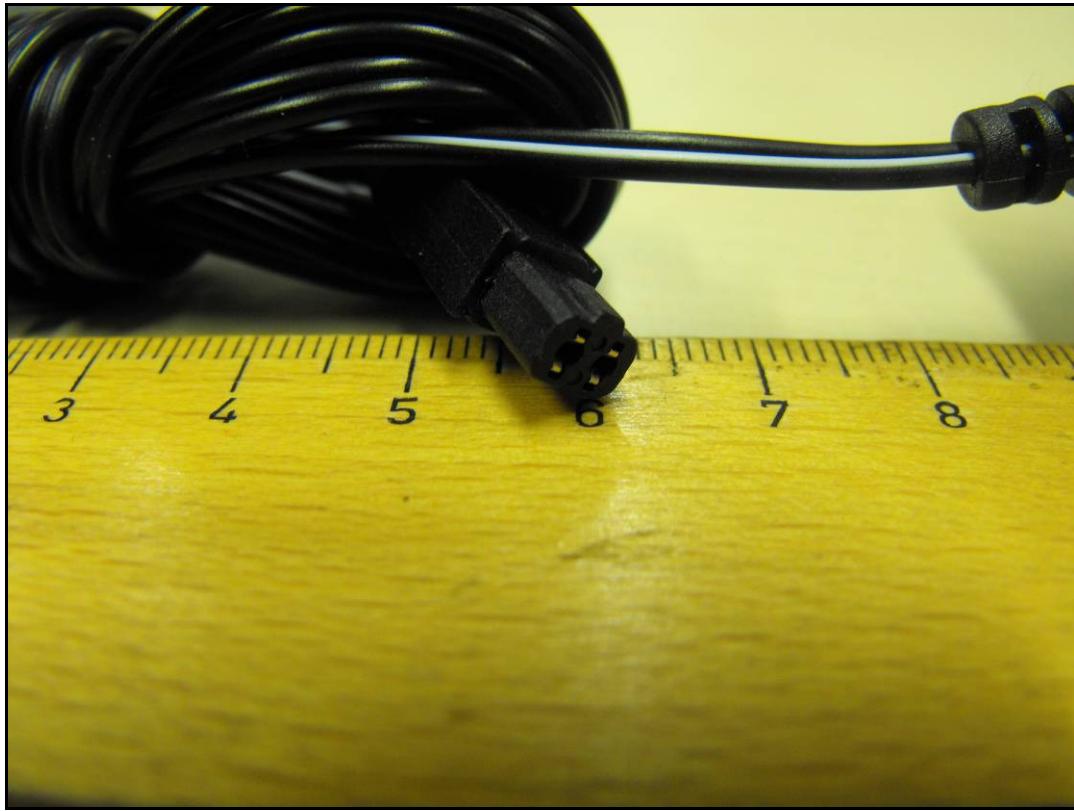
Photo 14:



Photo 15:



Photo 16:



Annex C Internal Photographs of the EUT

Photo documentation

Photo 17:

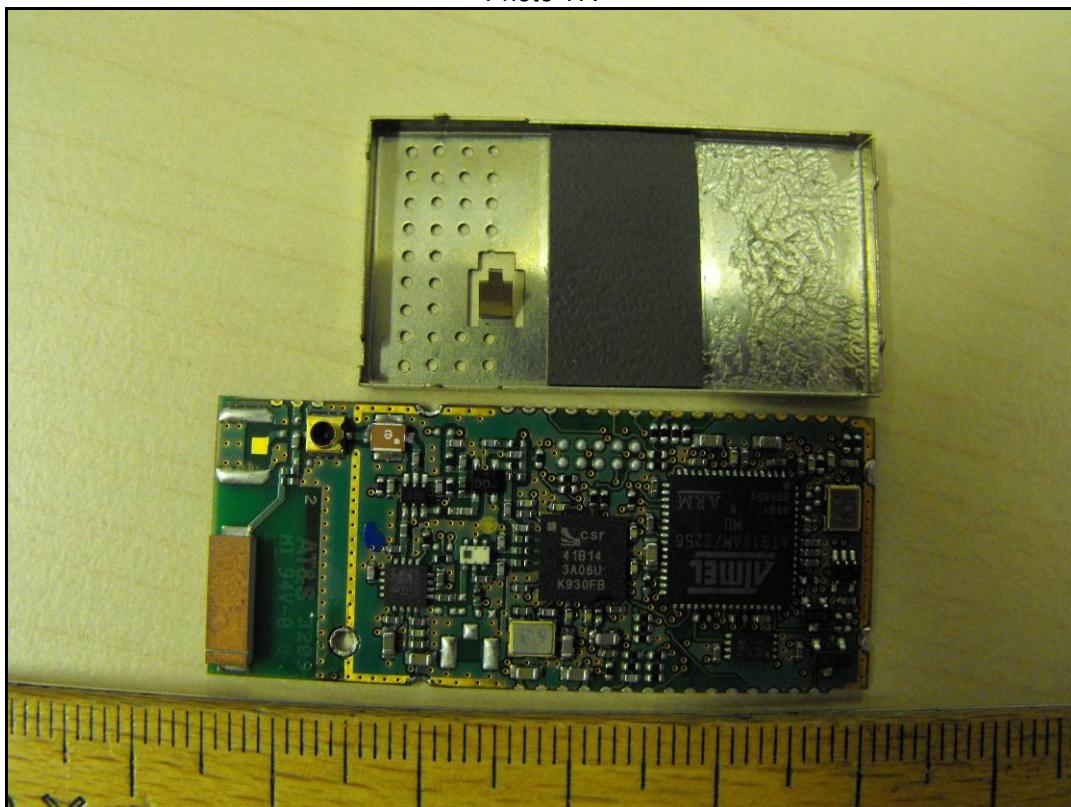


Photo 18:

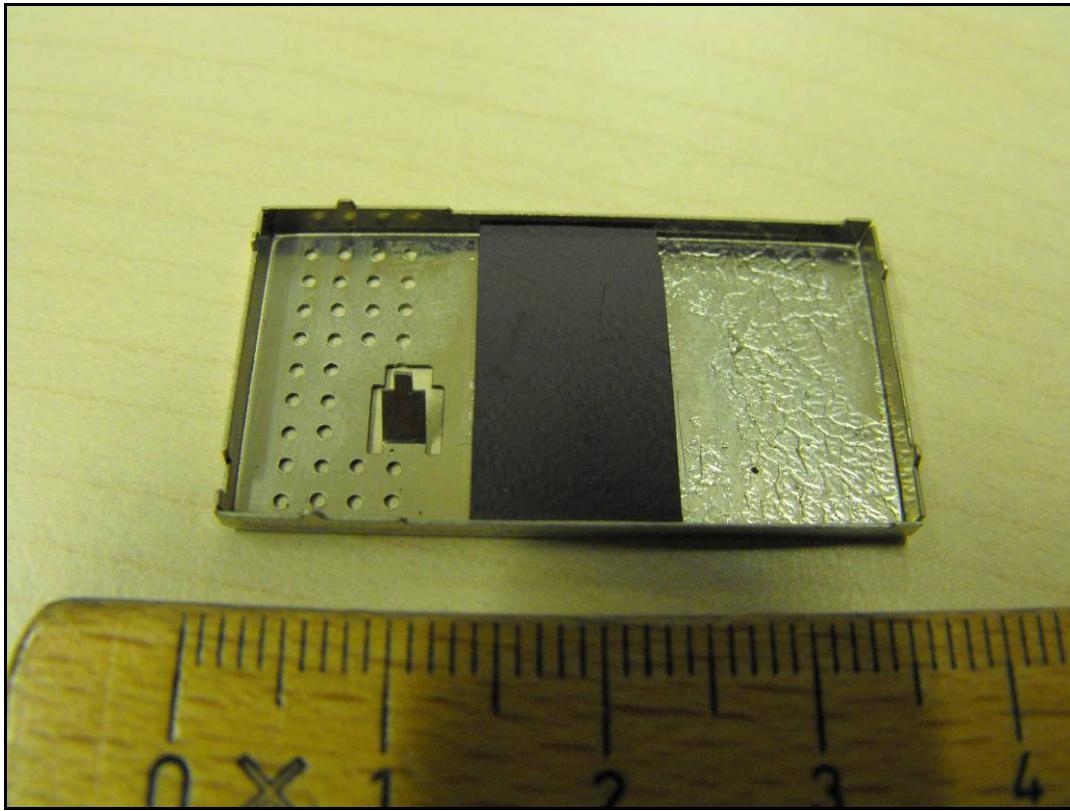


Photo 19:



Photo 20:

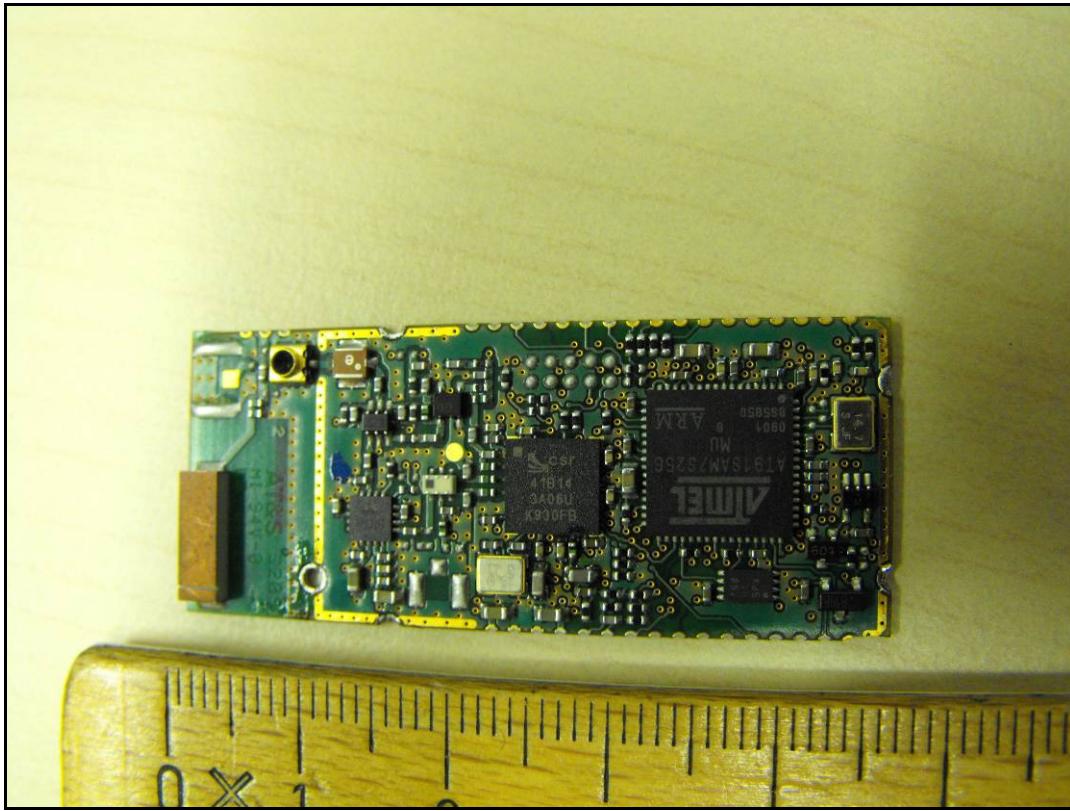


Photo 21:



Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2010-06-17
1.1	HW/SW Version added and editorial corrections (1-1294-01-04/10-A)	2010-06-21
1.2	Module BlueMod+C11/G2/AE added + reference to origin test reports added (1-1294-01-04/10-B)	2010-06-24
1.3	EIRP- and BEC-Measurements in High Power Mode for EDR-Modes added (1-1294-01-04/10-C)	2010-07-05
1.4	Editorial corrections (1-1294-01-04/10-D)	2010-07-05

Annex E Further information

Glossary

DUT	-	Device under Test
EMC	-	Electromagnetic Compatibility
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	not applicable
S/N	-	Serial Number
SW	-	Software