



Accredited testing-laboratory

DAR registration number: DGA-PL-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. : 1-1350-01-25/09-A
Type identification : Digi Connect Wi-Wave 802.11 b/g
Applicant : Digi International GmbH
FCC ID : MCQ-50M1746
IC Certification No : 1846A-50M1746
Test standards : 47 CFR Part 15
RSS - 210 Issue 7

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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:

2010-05-27	Jakob Reschke	
Date	Name	Signature

Technical responsibility for area of testing:

2010-05-27	Stefan Bös	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: 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: DGA-PL-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

Name:	Digi International GmbH Branch Breisach
Street:	Kueferstr.8
Town:	79206 Breisach
Country:	Germany
Telephone:	
Fax:	+49 7667 908 200
Contact:	Andreas Ortlieb
E-mail:	andreas.ortlieb@digicom
Telephone:	+49 7667 908 136

1.4 Application details

Date of receipt of order:	2009-10-26
Date of receipt of test item:	2010-05-26
Date of start test:	2010-05-26
Date of end test:	2010-05-27
Persons(s) who have been present during the test:	Mr. Ortlieb

2 Test standard/s

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

3 Technical tests

3.1 Details of manufacturer

Name:	Digi International GmbH Branch Breisach
Street:	Kueferstr.8
Town:	79206 Breisach
Country:	Germany

3.1.1 Test item

Kind of test item	:	WLAN Modul PCI/Carrierboard
Type identification	:	Digi Connect Wi-Wave 802.11 b/g
S/N serial number	:	MAC: 00409D440782
HW hardware status	:	Digi-Connect Wi-Wave 802.11 b/g
SW software status	:	Not specified
Frequency Band [MHz]	:	ISM 2.400 - 2.483,5
Type of Modulation	:	DSSS & OFDM (QPSK, 16-QAM, 64-QAM)
Number of channels	:	11
Antenna	:	External antenna
Power Supply	:	12.00 V DC by power adapter
Temperature Range	:	22 °C

DSSS

Max. power radiated: 20.59 dBm
 Max. power conducted: not performed

OFDM

Max. power radiated: 21.67 dBm
 Max. power conducted: not performed

FCC ID: MCQ-50M1746
 IC: 1846A-50M1746

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	1846A-50M1746
Model Name:	Digi Connect Wi-Wave 802.11 b/g
Manufacturer (complete Adress):	Digi International GmbH Kueferstr.8 79206 Breisach Germany
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]:	2400 – 2483.5 MHz
RF: Power [W] (max):	DSSS: Rad. EIRP: 114.55 mW OFDM: Rad. EIRP: 146.89 mW
Antenna Type:	External antenna
Occupied Bandwidth (99% BW) [kHz]:	DSSS: 17.10 OFDM: 19.51
Type of Modulation:	DSSS & OFDM - QPSK, 16 / 64 QAM
Emission Designator (TRC-43):	17M1G1D (DSSS) 19M5G7D (OFDM)
Transmitter Spurious (worst case) [μ V/m in 3m]:	311
Receiver Spurious (worst case) [μ V/m in 10m]:	26

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: Jakob Reschke
Date: 2010-05-31

3.1.3 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

3.1.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	22
Nominal Humidity	H _{nom}	%	52
Nominal Power Source	V _{nom}	V	12.00

Type of power source: DC by power adapter

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	PASS	2010-05-31	-/-

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
None	Antenna Gain	Yes			
§15.247 (e)	Peak power spectral density				Yes
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 6dB BW				Yes
§15.247(a)(2)	Spectrum Bandwidth of a DSSS System / 20dB BW				Yes
§ 15.247 (b)(3)	Maximum output power (conducted)				Yes
§ 15.247 (b)(3)	Max. peak output power (radiated)	Yes			
§15.247 (d)	Band-edge compliance of conducted emissions				Yes
§15.205	Band-edge compliance of radiated emissions	Yes			
§15.247 (d)	Spurious Emission - conducted (Transmitter)				Yes
§ 15.209	Spurious Emission -radiated (Transmitter)	Yes			
§ 15.109	Spurious Emissions-radiated (Receiver)	Yes			
§ 15.209	Spurious Emissions-radiated <30 MHz	Yes			
§ 15.107/207	Conducted Emissions <30 MHz				Yes

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 20 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 set-ups 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, active loop antenna.

150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, active loop antenna.

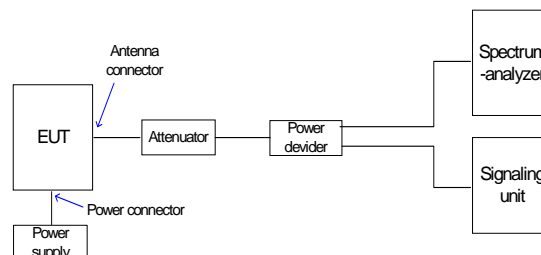
30 MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, Trilog antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, waveguide horn

All measurement settings are according to FCC 15.209 and 15.207

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 connected to the spectrum analyzer. The specific losses for signal path are first checked within a calibration. The measurement readings on the 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

1-1350-01-08/09

5.3 Additional comments

Only delta measurements were performed.

The conducted output power was measured and it was the same as in the referenced test report.

The manufacturer had a special software to set the EUT in continuous transmission with a duty cycle of 99%. All measurements were performed with the power setting 46.

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.

For DSSS

	low channel	mid channel	high channel
Conducted power [dBm] <i>(from test report No. 1-1350-01-08/09)</i>	18.58	18.60	18.33
Radiated power [dBm] <i>(measured)</i>	20.59	20.05	18.87
Gain [dBi] <i>(calculated)</i>	2.01	1.45	0.54

5.5 Peak Power Spectral density (digitally modulated systems) §15.247(e)

Not performed

5.6 Spectrum Bandwidth of a DSSS System / 6 dB Bandwidth §15.247(a)(2)

Not performed

5.7 Spectrum Bandwidth of a DSSS System / 20 dB Bandwidth

Not performed

5.8 Maximum output power (conducted) §15.247 (b)(3)

Not performed

5.9 Max. peak output power (radiated) §15.247 (b)(3)

DSSS

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	20.59	20.05	18.87
Measurement uncertainty		±3dB		

RBW: 1 MHz

VBW: 1 MHz

Measured at a distance of 3m

Measurement results corrected according to description below.

OFDM

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T _{nom}	V _{nom}	21.46	21.67	20.59
Measurement uncertainty		±3dB		

RBW: 1 MHz

VBW: 1 MHz

Measured at a distance of 3m

Measurement results corrected according to description below.

Measured radiated at a distance of 3m with RBW/VBW = 1 MHz.

Measured conducted with RBW/VBW = 1 MHz and RBW/VBW as described above. The delta value was added to the radiated measurement.

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
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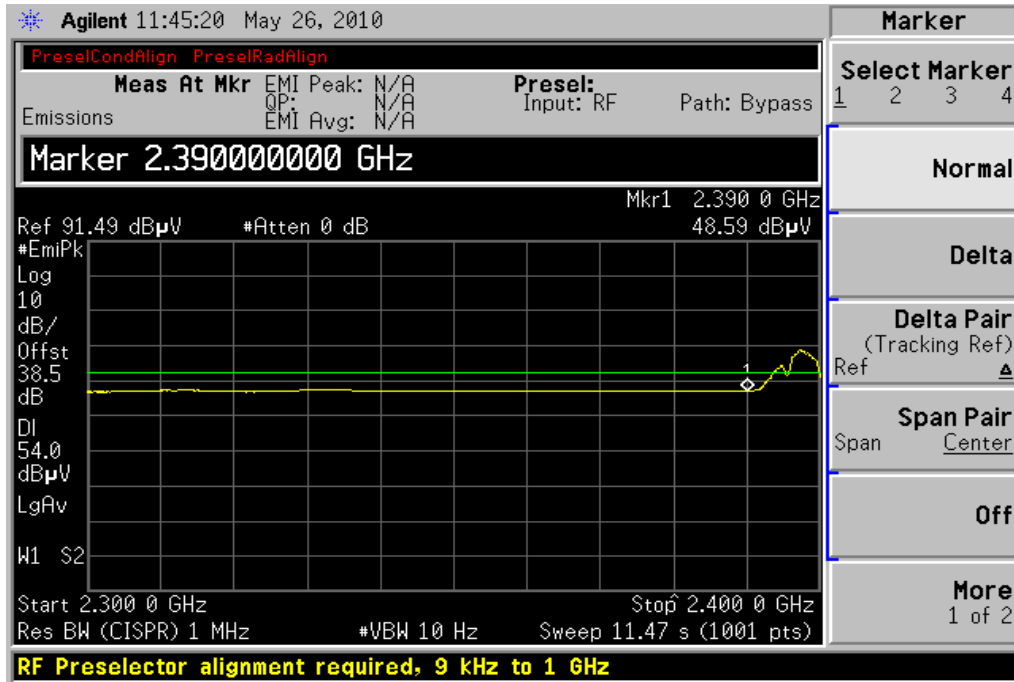
5.10 Band-edge compliance of conducted emissions §15.247 (d)

Not performed

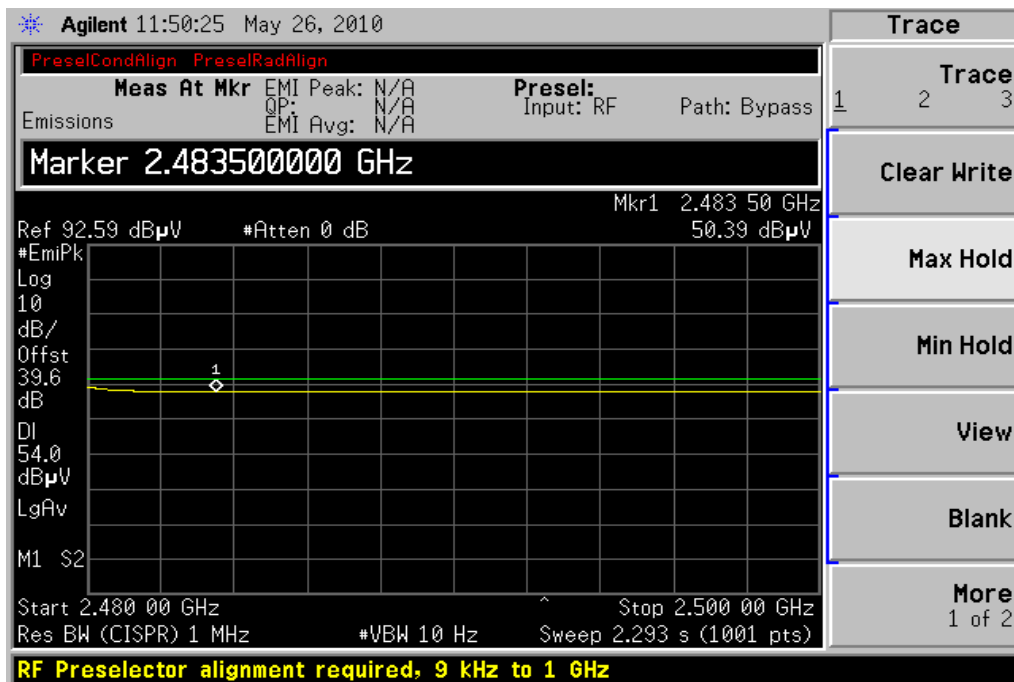
5.11 Band-edge compliance of radiated emissions §15.205

DSSS

Plot 1: Band edge compliance (lowest channel)

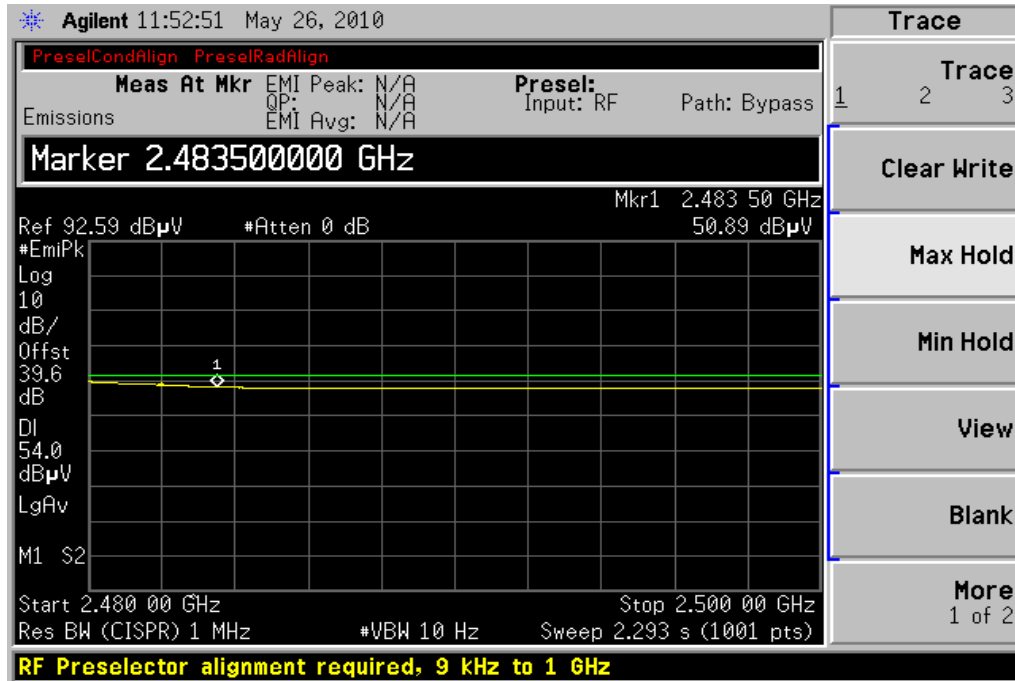


Plot 2: Band edge compliance (highest channel)

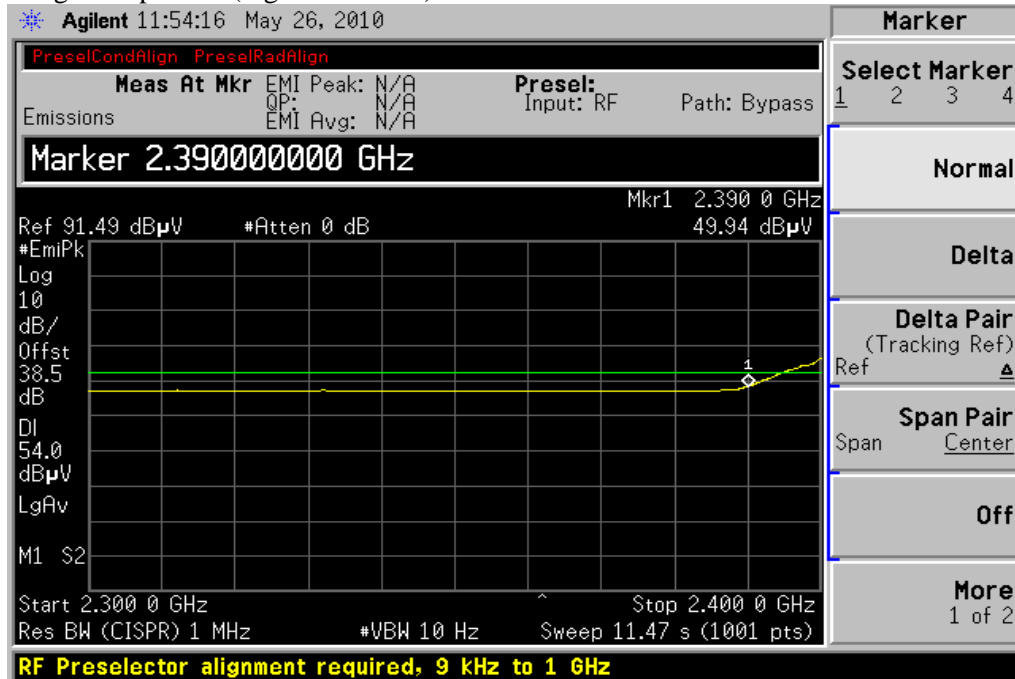


OFDM

Plot 1: Band edge compliance (lowest channel)



Plot 2: Band edge compliance (highest channel)



5.12 Spurious Emissions - conducted (Transmitter) §15.247 (c)

Not performed

5.13 Spurious Emissions - radiated (Transmitter) §15.209

The plots are valid for DSSS and OFDM modulation. Both measurements were performed. The worst case is plotted.

Plot 1: 0.03 - 1 GHz (lowest channel)

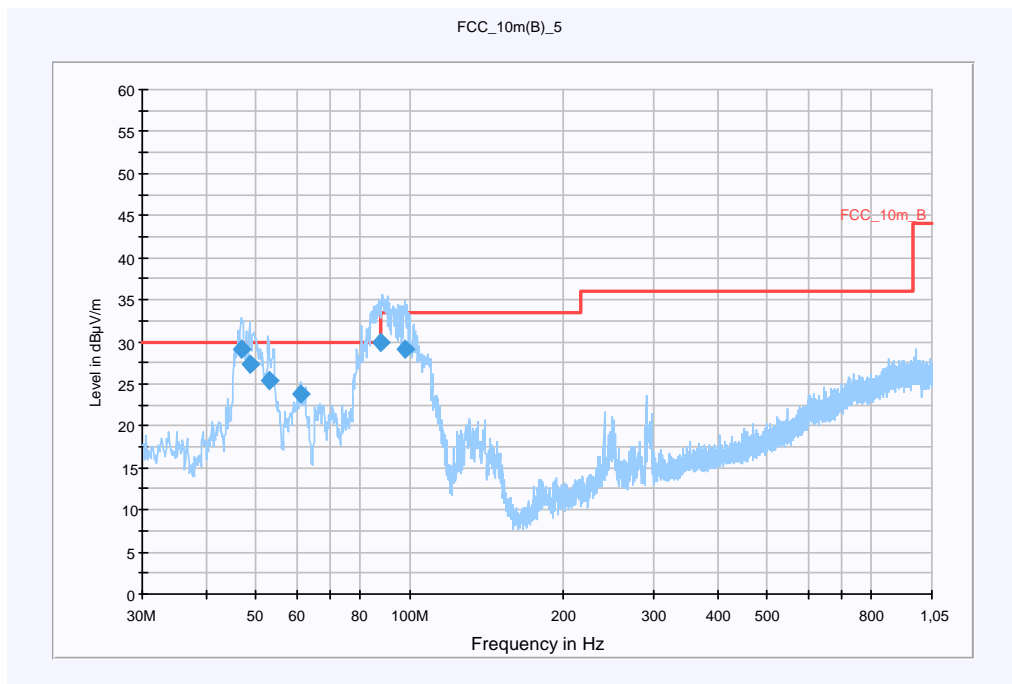
Common Information

EUT:	Digi Connect Wi-Wave 802.11 b/g
Serial Number:	50001746-xx
Test Description:	FCC Part 15
Operating Conditions:	WLAN test mode, channel 1
Operator Name:	Kraus
Comment:	DC powered

Scan Setup: STAN_Fin [EMI radiated]

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

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



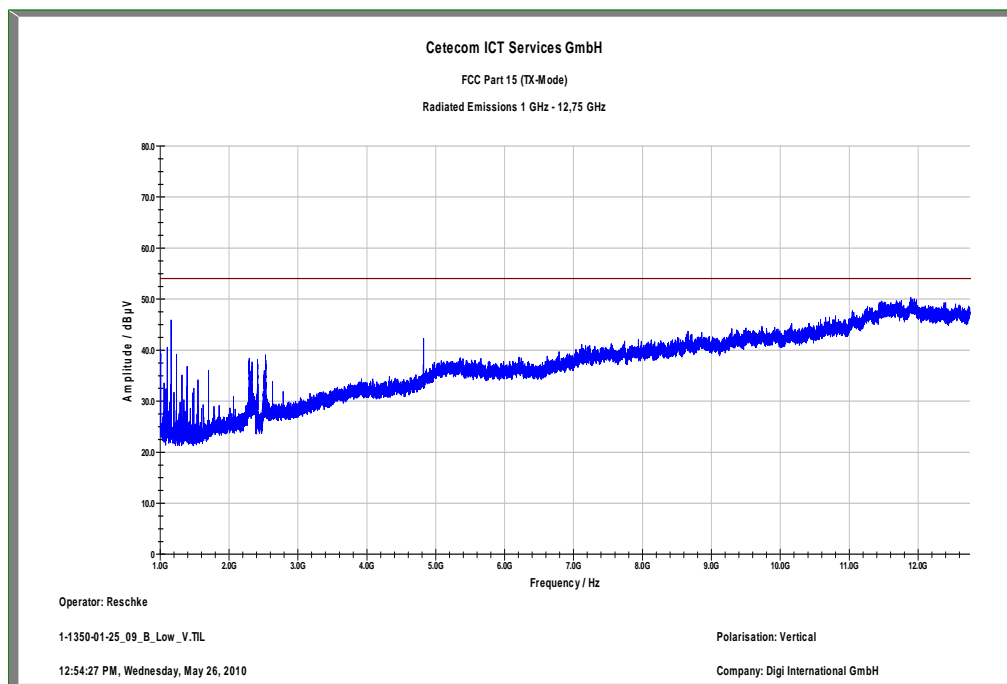
Final Result 1

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
46.920000	29.1	15000.000	120.000	98.0	V	95.0	13.3	0.9	30.0	
48.600000	27.2	15000.000	120.000	98.0	V	55.0	13.3	2.8	30.0	
53.040000	25.4	15000.000	120.000	98.0	V	294.0	13.1	4.6	30.0	
61.080000	23.7	15000.000	120.000	110.0	V	38.0	11.4	6.3	30.0	
87.960000	29.9	15000.000	120.000	130.0	V	181.0	10.3	0.1	30.0	
97.680000	29.0	15000.000	120.000	106.0	V	286.0	11.6	4.5	33.5	

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

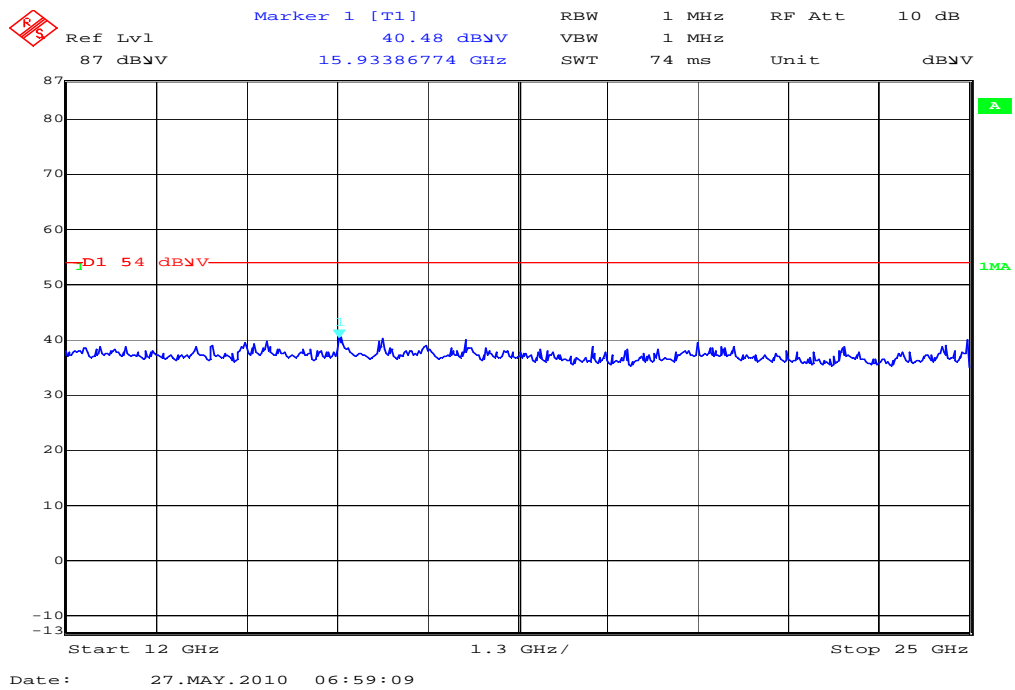
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
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 – 12.75 GHz (lowest channel)



Carrier notched with 2.4 GHz rejection filter.

Plot 3: 12- 25 GHz (valid for all channels)



Plot 4: 0.03 - 1 GHz (middle channel)

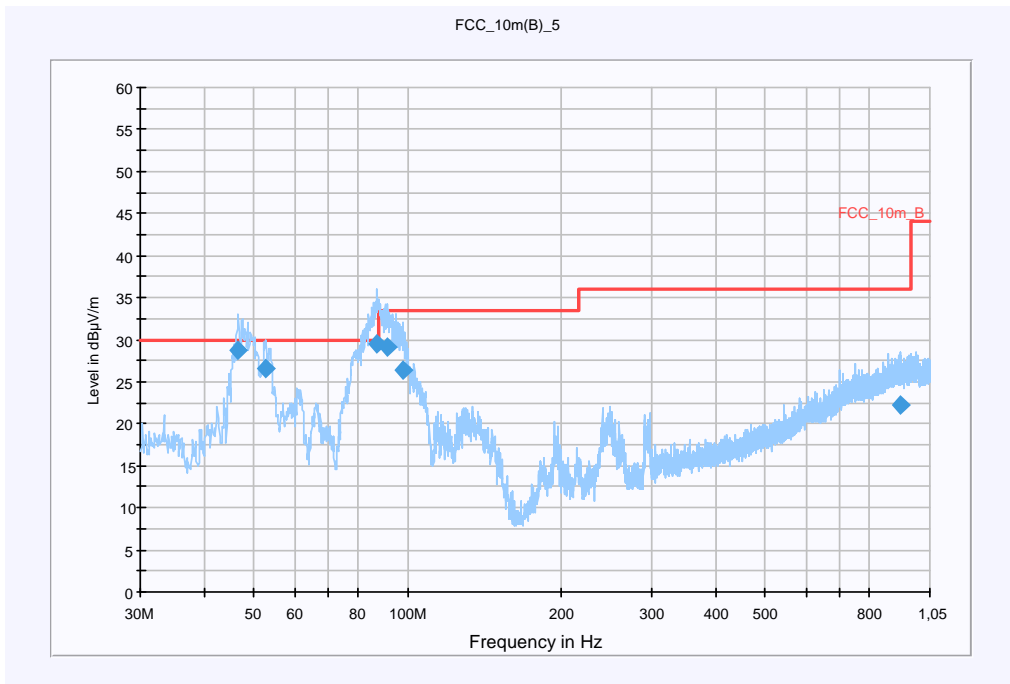
Common Information

EUT:	Digi Connect Wi-Wave 802.11 b/g
Serial Number:	50001746-xx
Test Description:	FCC Part 15
Operating Conditions:	WLAN test mode, channel 6
Operator Name:	Kraus
Comment:	DC powered

Scan Setup: STAN_Fin [EMI radiated]

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

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



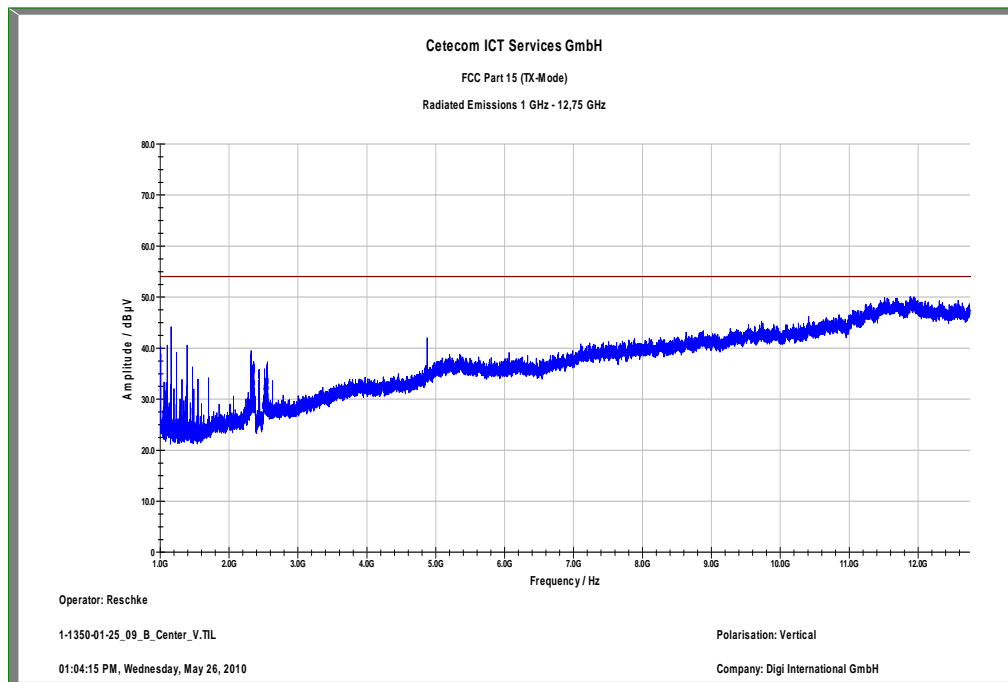
Final Result 1

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
46.680000	28.8	15000.000	120.000	98.0	V	-1.0	13.3	1.2	30.0	
52.560000	26.5	15000.000	120.000	98.0	V	352.0	13.1	3.5	30.0	
86.760000	29.5	15000.000	120.000	116.0	V	55.0	10.1	0.5	30.0	
91.080000	29.2	15000.000	120.000	122.0	V	161.0	10.7	4.3	33.5	
98.040000	26.4	15000.000	120.000	111.0	V	228.0	11.6	7.1	33.5	
918.120000	22.3	15000.000	120.000	220.0	V	120.0	25.3	13.7	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 (0909)
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 – 12.75 GHz (middle channel)



Carrier notched with 2.4 GHz rejection filter.

Plot 6: 0.03 - 1 GHz (highest channel)

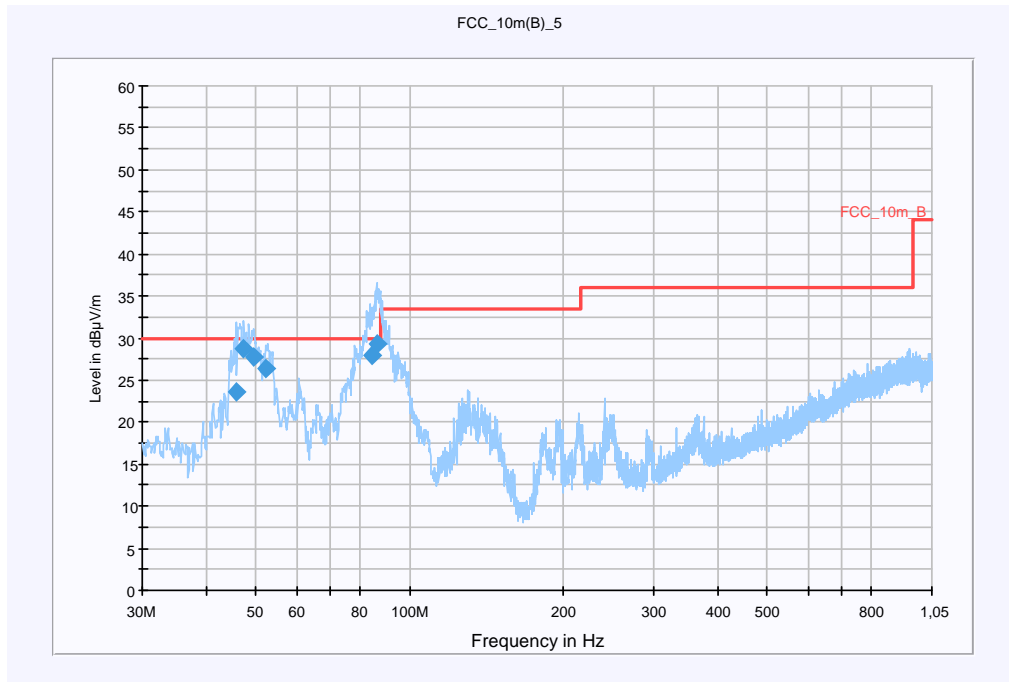
Common Information

EUT:	Digi Connect Wi-Wave 802.11 b/g
Serial Number:	50001746-xx
Test Description:	FCC Part 15
Operating Conditions:	WLAN test mode, channel 11
Operator Name:	Kraus
Comment:	DC powered

Scan Setup: STAN_Fin [EMI radiated]

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

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



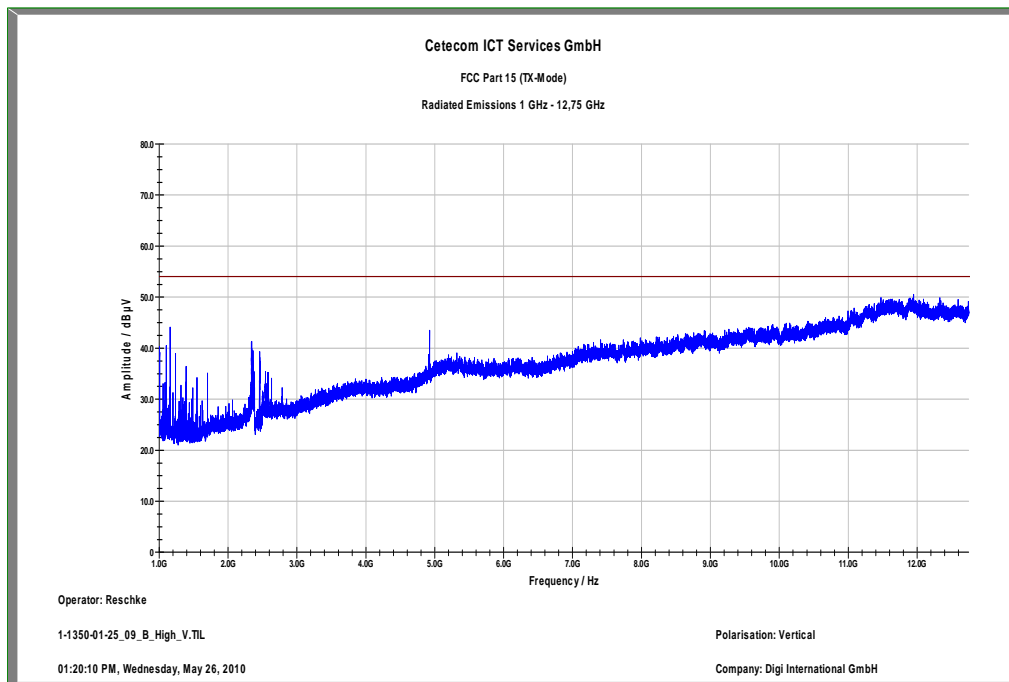
Final Result 1

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
45.840000	23.7	15000.000	120.000	98.0	V	104.0	13.3	6.3	30.0	
47.400000	28.8	15000.000	120.000	98.0	V	203.0	13.3	1.2	30.0	
49.680000	27.7	15000.000	120.000	98.0	V	70.0	13.4	2.3	30.0	
52.320000	26.3	15000.000	120.000	98.0	V	357.0	13.1	3.7	30.0	
84.120000	28.0	15000.000	120.000	151.0	V	30.0	9.7	2.0	30.0	
86.040000	29.4	15000.000	120.000	123.0	V	181.0	10.0	0.6	30.0	

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 (0909)
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 – 12.75 GHz (highest channel)



Carrier notched with 2.4 GHz rejection filter.

Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
4824	PK 1 MHz	49.80	4874	PK 1 MHz	49.87	4924	PK 1 MHz	48.77
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

The other spurious from 1 GHz to 2 GHz are not from the EUT.
This spurious are related to the developer board.

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: § 15.109

Frequency (MHz)	Field strength (dBµV/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.14 Spurious Emissions - radiated (Receiver) §15.109 / 209

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

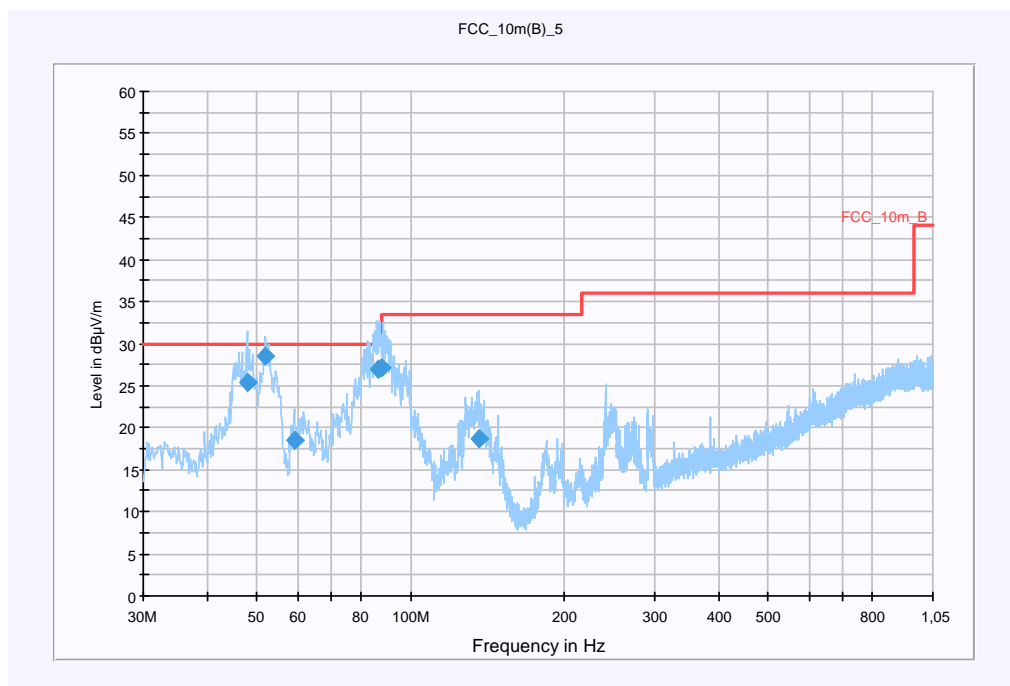
Common Information

EUT: Digi Connect Wi-Wave 802.11 b/g
 Serial Number: 50001746-xx
 Test Description: FCC Part 15
 Operating Conditions: WLAN test mode, channel 6 Rx
 Operator Name: Langer
 Comment: DC powered

Scan Setup: STAN_Fin [EMI radiated]

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

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



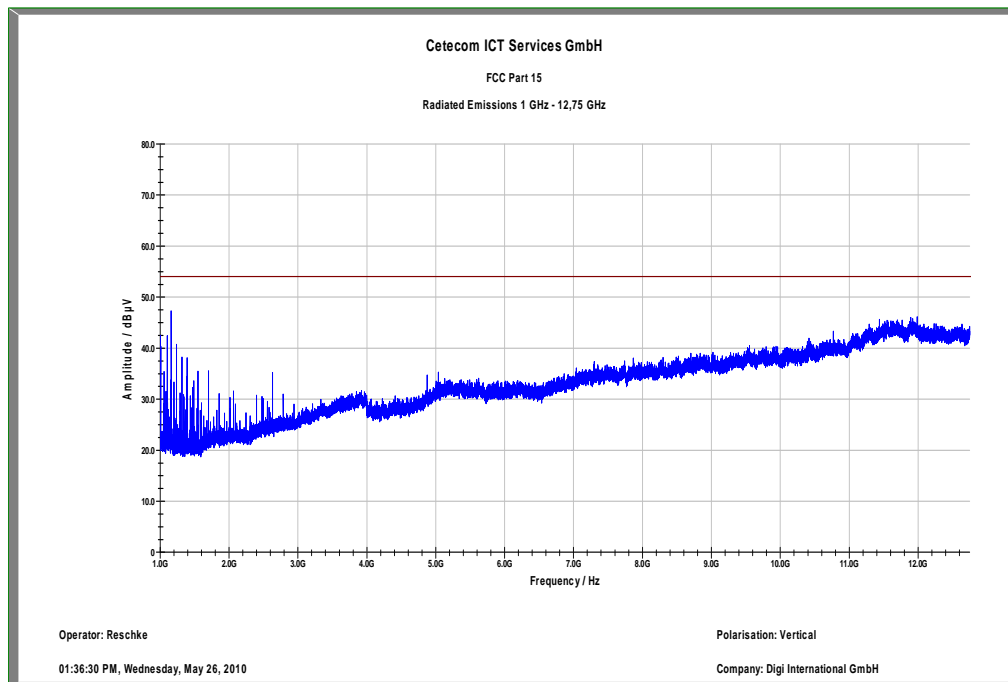
Final Result 1

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
47.880000	25.4	15000.000	120.000	98.0	V	-2.0	13.3	4.6	30.0	
52.080000	28.5	15000.000	120.000	98.0	V	239.0	13.2	1.5	30.0	
59.160000	18.5	15000.000	120.000	106.0	V	307.0	11.8	11.5	30.0	
86.040000	27.0	15000.000	120.000	144.0	V	46.0	10.0	3.0	30.0	
87.480000	27.2	15000.000	120.000	129.0	V	104.0	10.2	2.8	30.0	
135.720000	18.6	15000.000	120.000	144.0	V	199.0	9.0	14.9	33.5	

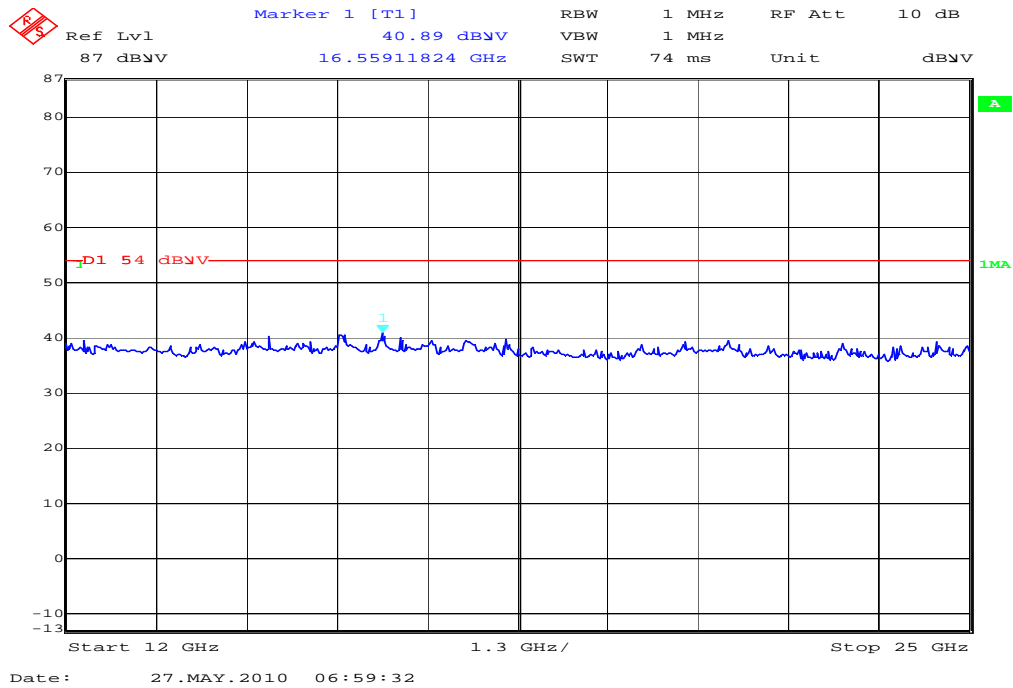
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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 (0909)
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 – 12.75 GHz vertical / horizontal (receiver)



Plot 3: 12- 25 GHz (receiver)



Results:

Spurious Emissions level [dBµV/m]		
f[MHz]	Detector	Level [dBµV/m]
No critical peaks found (The spurious from 1 GHz to 3 GHz are related to the developer board)		
Measurement uncertainty		±3 dB

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

See above plots

Measurement distance see table

Limits: § 15.109

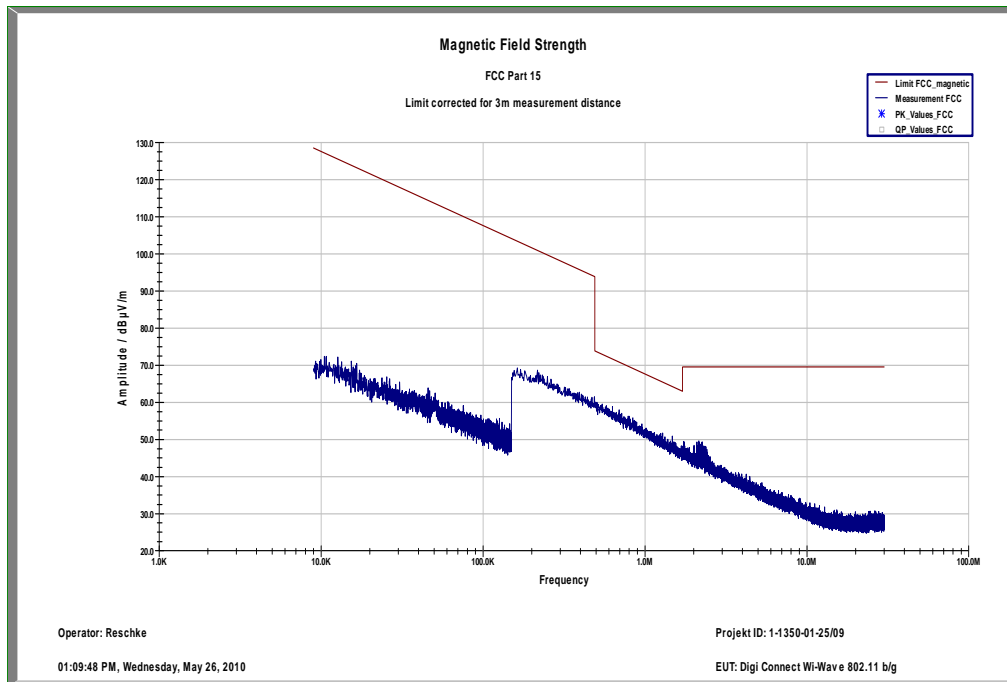
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.15 Spurious Emissions - radiated <30 MHz §15.209

Measured at 3 m distance.

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

Plot 1:



Limits:

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

5.16 Conducted Emissions <30 MHz §15.107/207

Not performed

6 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 Double-Ridged Waveguide	8325	Byrd	1530	300001595			
3	n. a.	Horn Antenna 1-26.5GHz	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	N5183A	Agilent	MY47420220	300003813	k	06.08.2008	06.08.2010

		Microwave Analog Signal Generator			Technologies				
21	n. a.	RF Filter Section 9kHz - 1GHz TRILOG	N9039A	Agilent Technologies	MY48260003	300003825	vIKI!	19.08.2008	19.08.2010
22	n. a.	Broadband Test- Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	17.12.2008	17.12.2010
23	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
24	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
25	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	k		
26	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
27	n. a.	Analyzer- Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k		
28	n. a.	Amplifier	JS42-00502650- 28-5A	MITEQ	1084532	300003379	ev		
29	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
30	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
31	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
32	n. a.	TRILOG Broadband Test- Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787			
33	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012
34	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	05.06.2008	05.06.2010

7 Photographs of the Test Set-up

Photo documentation

Photo 1:

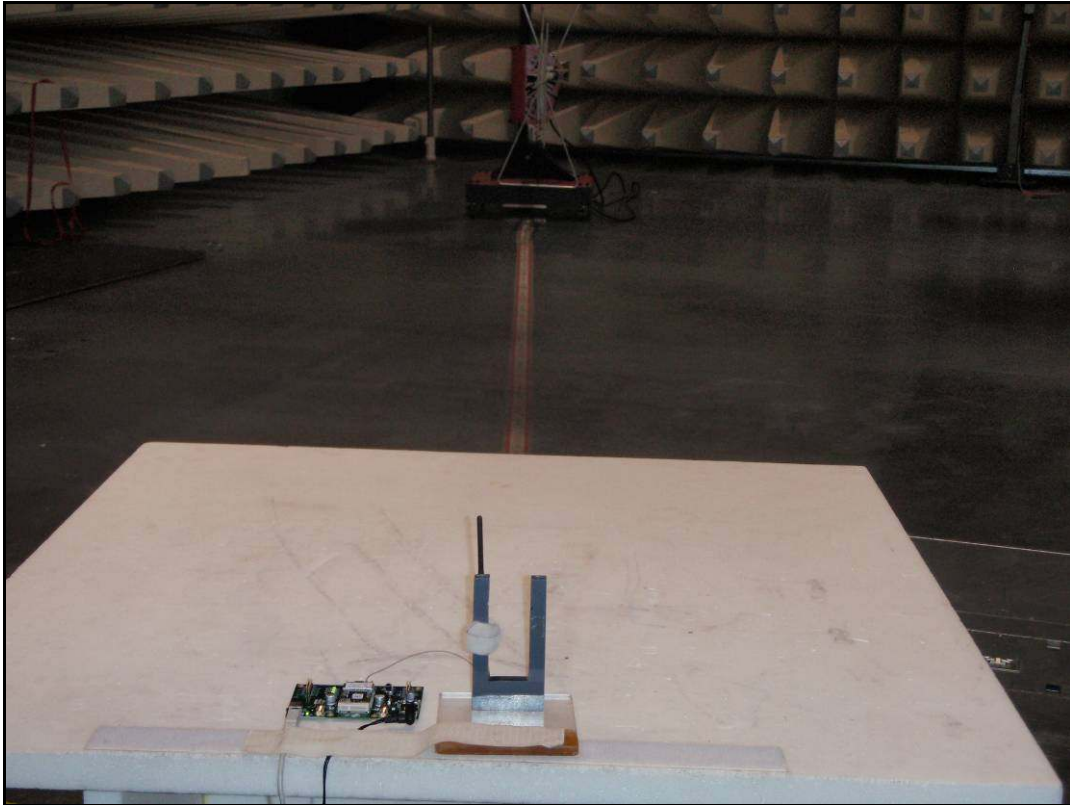


Photo 2:

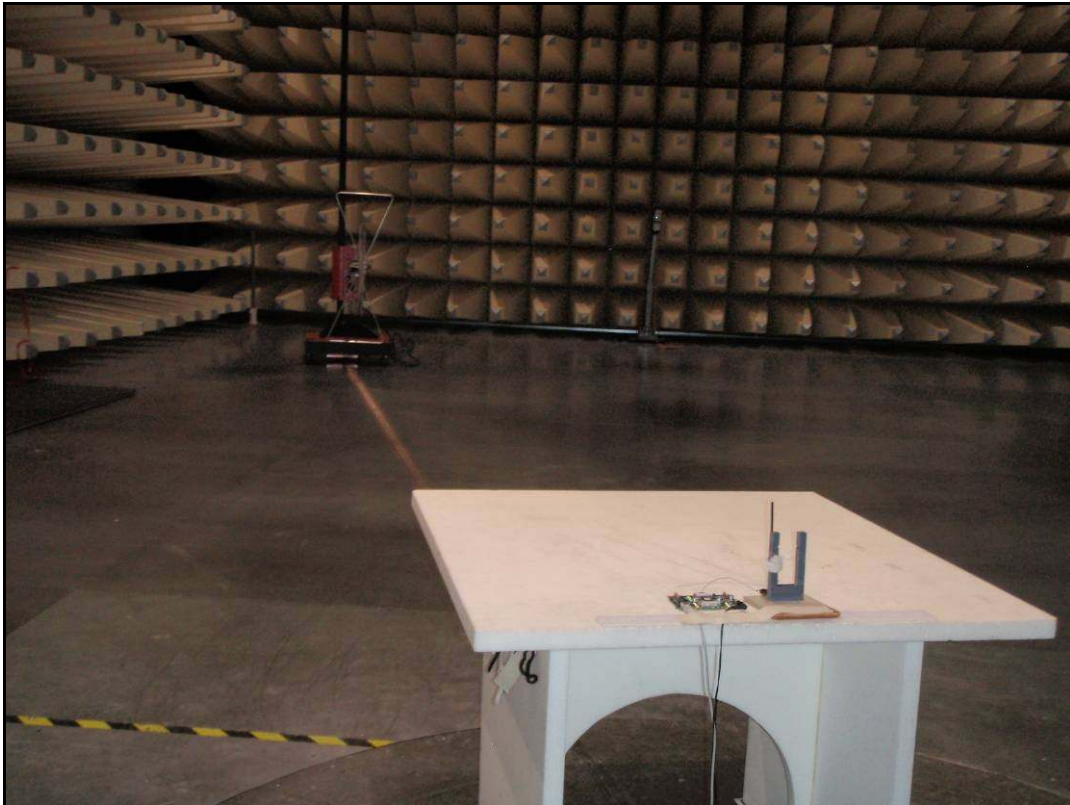
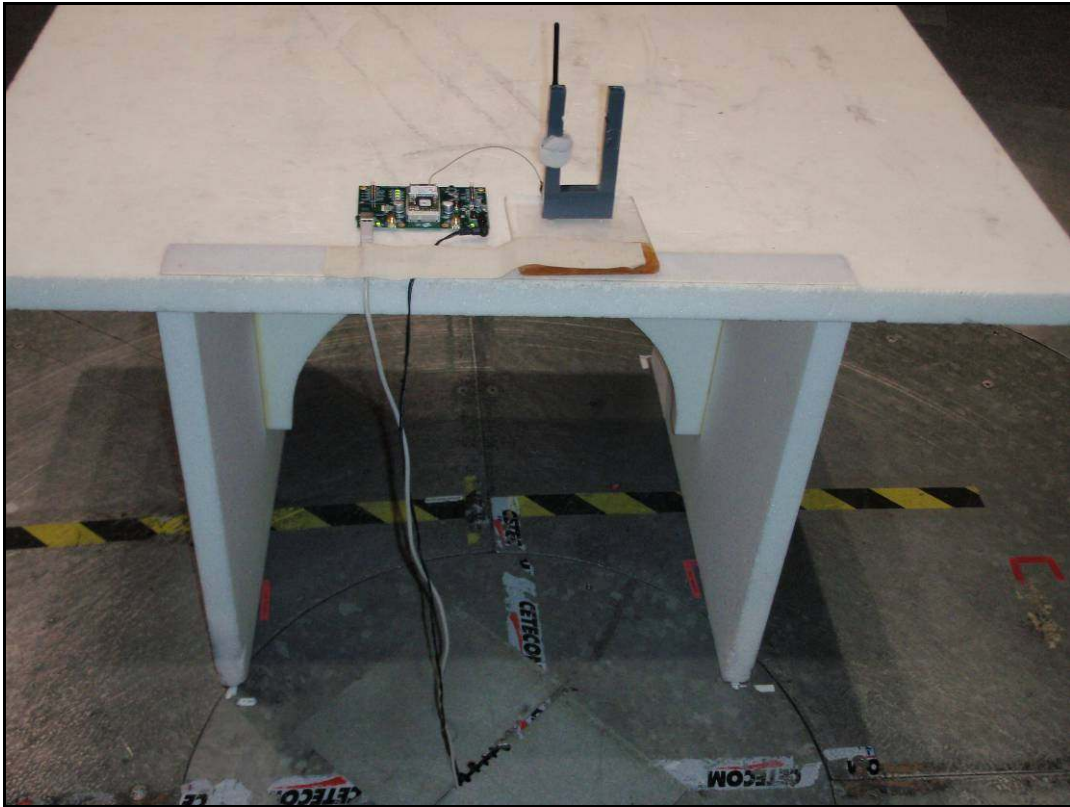


Photo 3:



Photo 4:



8 Photographs of the EUT

Photo documentation

Photo 5: EUT (module) with host board

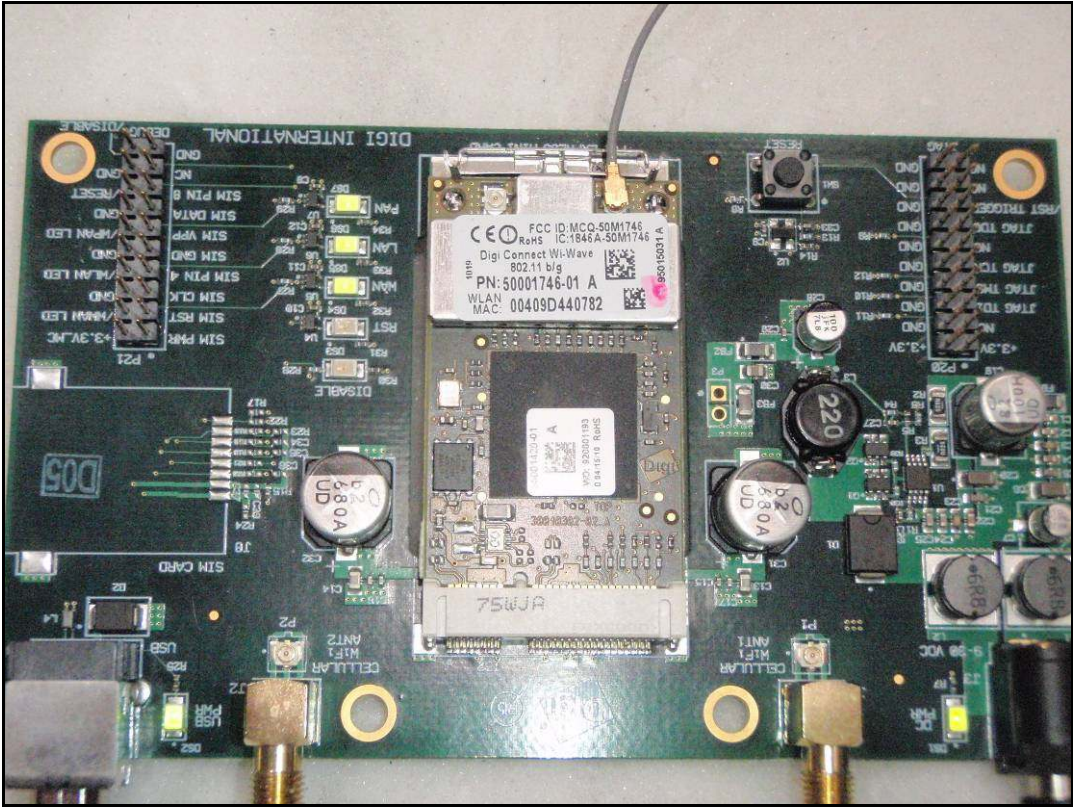


Photo 6: EUT



Photo 7: EUT

