

TEST REPORT

Test report no.: 1-1554-01-15/09-A



Testing laboratory

CETECOM ICT Services GmbH

Untertuerkheimer Straße 6 – 10
66117 Saarbrücken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: <http://www.cetecom.com>
e-mail: ict@cetecom.com

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

Digi International GmbH

Branch Breisach

Kueferstr.8
79206 Breisach / Germany
Phone: -/
Fax: +49 7667 908 200
Contact: Andreas Ortlieb
e-mail: andreas.ortlieb@digi.com
Phone: +49 7667 908 136

Manufacturer

Digi International GmbH

Branch Breisach

Kueferstr.8
79206 Breisach / 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 8

Spectrum Management and Telecommunications - Radio Standards Specification
Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands):
Category I Equipment

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

Test item

Kind of test item: WLAN module

Model name: ConnectCore Wi-i.Mx51

FCC ID: MCQ-50M1699

IC: 1846A-50M1699

Frequency [MHz]: 5725 MHz – 5850 MHz ISM band
(lowest channel 5745MHz; highest channel 5825 MHz)

Power supply: 115.0V AC by AC/DC power supply

Temperature range: -20 °C to +55 °C

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

Test performed:

Test report authorised:

Marco Bertolino

Stefan Bös

1 Table of contents

1	Table of contents	2
2	General information	3
2.1	Notes.....	3
2.2	Application details	3
3	Test standard/s	3
4	Test environment	3
5	Test item	4
6	Test laboratories sub-contracted	4
7	Summary of measurement results	5
8	RF measurement testing	6
8.1	Description of test setup.....	6
8.1.1	Radiated measurements	6
8.1.2	Conducted measurements	7
8.2	Additional comments	7
8.3	RSP100 test report cover sheet / performance test data	8
9	Measurement results.....	9
9.1	Maximum output power (conducted).....	9
9.2	Antenna gain.....	18
9.3	Power spectral density.....	21
9.4	Spectrum bandwidth of a FHSS system – 6 dB bandwidth.....	25
9.5	Spectrum bandwidth of a FHSS system – 20 dB bandwidth.....	29
9.6	Maximum output power.....	33
9.7	Band edge compliance conducted	38
9.8	Band edge compliance radiated	38
9.9	TX spurious emissions conducted.....	39
9.10	TX spurious emissions radiated	55
9.11	RX spurious emissions radiated	82
9.12	TX spurious emissions radiated < 30 MHz	88
9.13	TX spurious emissions conducted < 30 MHz	93
10	Test equipment and ancillaries used for tests.....	97
Annex A	Document history	99
Annex B	Further information.....	99

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 electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2010-02-17
Date of receipt of test item:	2010-10-01
Start of test:	2010-10-05
End of test:	2010-12-08
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 8	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature:	T_{nom}	+24 °C during room temperature tests
	T_{max}	+55 °C during high temperature test
	T_{min}	-20 °C during low temperature test
Relative humidity content:		60 %
Air pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	115.0 V AC by AC/DC power supply
	V_{max}	126.5 V
	V_{min}	103.5 V

5 Test item

Kind of test item	:	WLAN module
Type identification	:	ConnectCore Wi-i.Mx51
S/N serial number	:	Prototype 55001445-92
HW hardware status	:	No information available!
SW software status	:	No information available!
Frequency band [MHz]	:	5725 MHz – 5850 MHz ISM band (lowest channel 5745 MHz; highest channel 5825 MHz)
Type of modulation	:	ODFM technology with BPSK; QPSK; 16- & 64-QAM modulation.
Number of channels	:	5
Antenna	:	External rod antenna → for more information please take a look at the annex B – photos of the EUT.
Power supply	:	115.0 V AC by AC/DC power supply
Temperature range	:	-20 °C to +55 °C

6 Test laboratories sub-contracted

None

7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2011-01-13	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 6dB bandwidth	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(b)(3) RSS-210 / A8.4(4)	Maximum output power	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	OFDM	☐	☐	☒	☐	-/-
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	OFDM	☐	☐	☒	☐	-/-
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.109 RSS-Gen.	RX spurious emissions radiated	Nominal	Nominal	-/-	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	OFDM	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

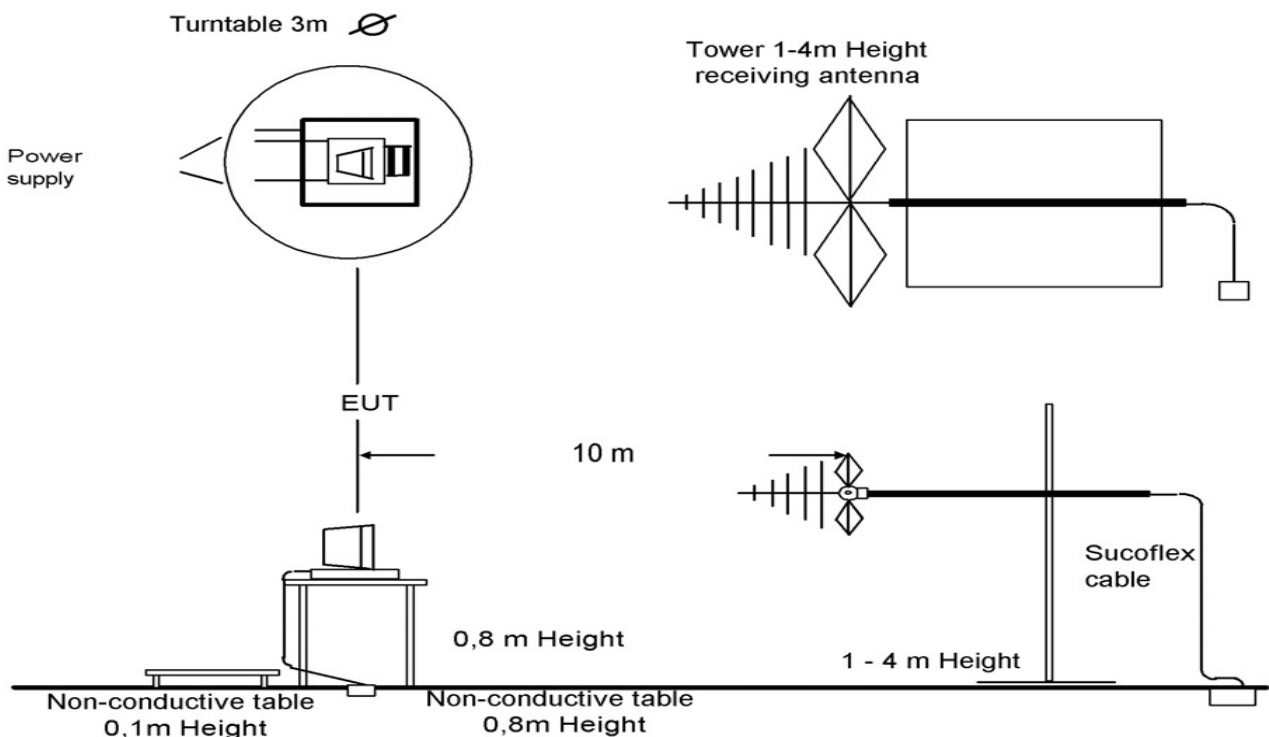
8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 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



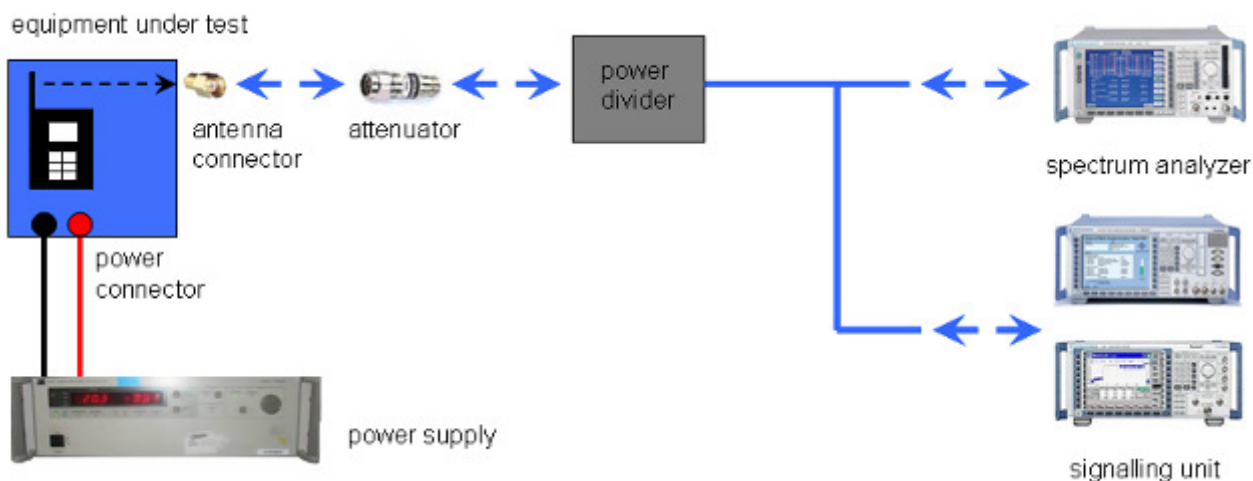
Picture 1: Diagram radiated measurements

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

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: None

Special test descriptions: None

Configuration descriptions: None

Test mode:

- ☐ No test mode available.
Iperf was used to ping an other device with the largest support packet size
- ☒ Special software is used.
EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

Test report number	:	1-1554-01-15/09-A
Equipment model number	:	ConnectCore Wi-i.Mx51
Certification number	:	1846A-50M1699
Manufacturer (complete address)	:	Digi International GmbH Branch Breisach Kueferstr.8 79206 Breisach / Germany
Tested to radio standards specification no.	:	RSS 210, Issue 8, Annex 8
Open area test site IC No.	:	IC 3462C-1
Frequency range	:	5725 MHz – 5850 MHz ISM band (lowest channel 5745MHz; highest channel 5825 MHz)
RF-power [W] (max.)	:	cond.: 26.48 mW (OFDM a – mode) 25.47 mW (OFDM n – mode) EIRP: 42.85 mW (OFDM a – mode) 41.21 mW (OFDM n – mode)
Occupied bandwidth (99%-BW)	:	OFDM a – mode: 19.52 MHz OFDM n – mode: 19.95 MHz
Type of modulation	:	ODFM technology with BPSK; QPSK; 16- & 64-QAM modulation.
Emission designator (TRC-43)	:	OFDM a – mode: 19M5G7D OFDM n – mode: 20M0G7D
Antenna information	:	External rod antenna → for more information please take a look at the annex B – photos of the EUT.
Transmitter spurious (worst case) [dBμV/m @ 3m]:		51.89 dBμV/m @ 11650 MHz (a – mode) 52.50 dBμV/m @ 28917 MHz (n – mode)
Receiver spurious (worst case) [dBμV/m @ 3m]:		48.94 dBμV/m @ 34167 MHz

ATTESTATION:

DECLARATION OF COMPLIANCE:

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

Laboratory manager:

2011-01-13

Marco Bertolino

Date

Name

Signature



9 Measurement results

9.1 Maximum output power (conducted)

Description:

Measurement of the maximum output power conducted. This measurement is performed only at the middle channel in both modes and all data rates to determine the data rate per mode which results in the highest output power. This mode will be selected for all further measurements.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	30 MHz
Resolution bandwidth:	50 MHz
Span:	100 MHz
Trace-Mode:	Max Hold

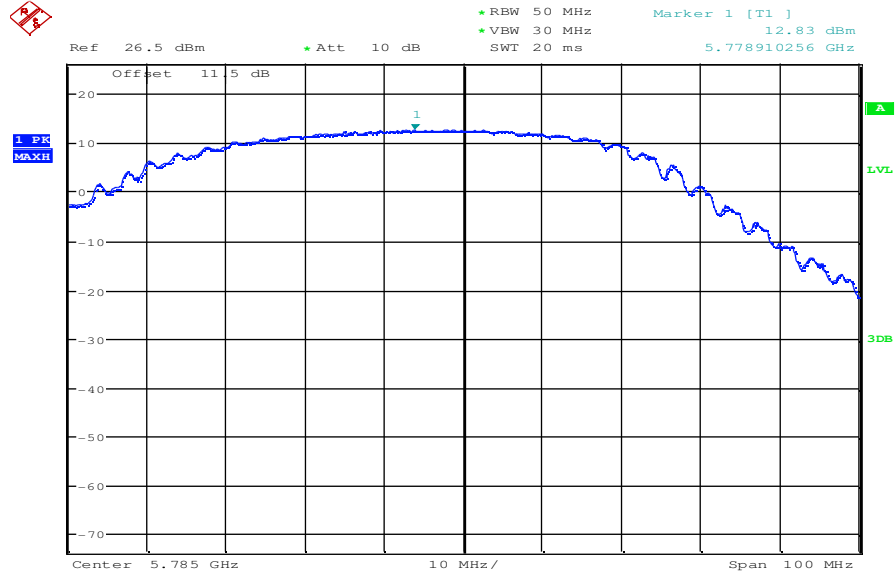
Result:

OFDM	Maximum Output Power Conducted [dBm]							
Data Rate [MBit/s]	6	9	12	18	24	36	48	54
Ch 157 - 5785 MHz	12.83	13.05	12.92	13.05	12.74	12.90	12.55	13.12
Measurement uncertainty	± 0.5 dB							

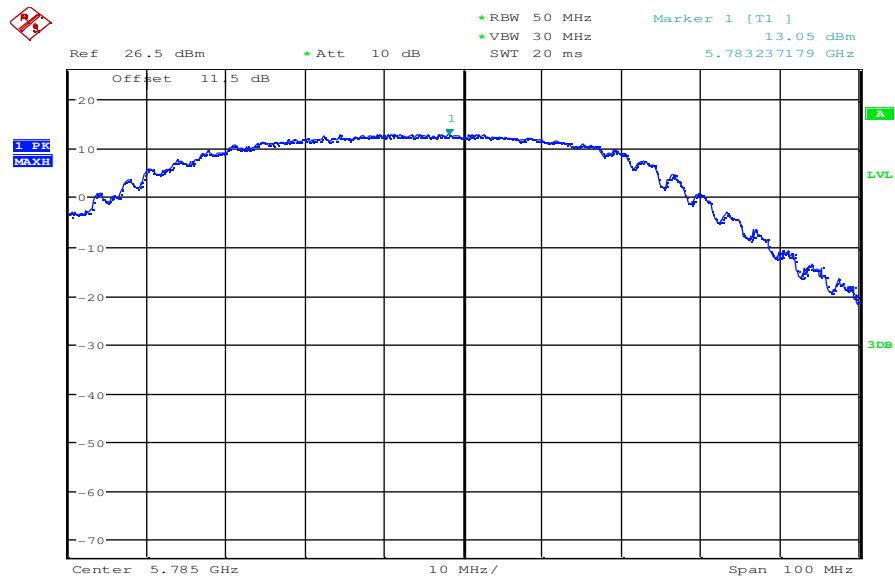
OFDM	Maximum Output Power Conducted [dBm]							
Data Rate [MBit/s]	mcs0	mcs1	mcs2	mcs3	mcs4	mcs5	mcs6	mcs7
Ch 157 - 5785 MHz	12.91	12.67	13.37	12.94	12.87	13.36	12.87	13.41
Measurement uncertainty	± 0.5 dB							

Result: Selected data rate for all measurements:

OFDM / a – mode: 54 MBit/s
OFDM / n – mode: mcs 7

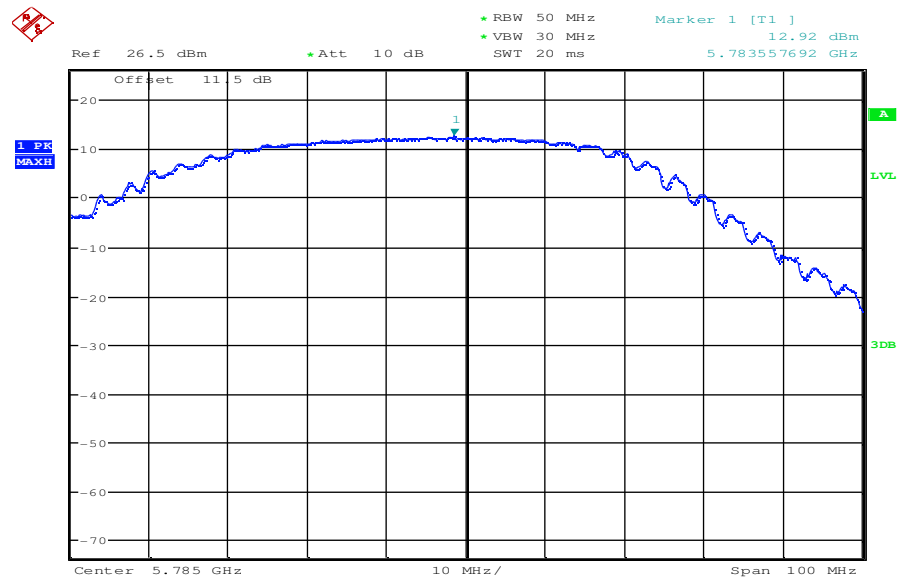
OFDM – mode / a – mode:**Plot 1: OFDM – mode; middle channel – 5785 MHz; power index 45; 6 MBit/s**

Date: 18.NOV.2010 13:39:19

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 9 MBit/s

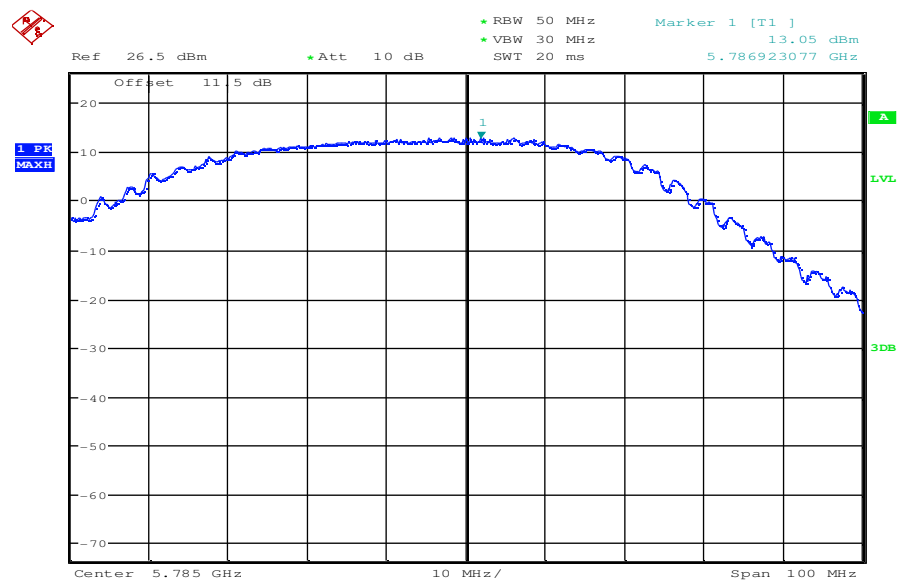
Date: 18.NOV.2010 13:40:22

Plot 3: OFDM – mode; middle channel – 5785 MHz; power index 45; 12 MBit/s

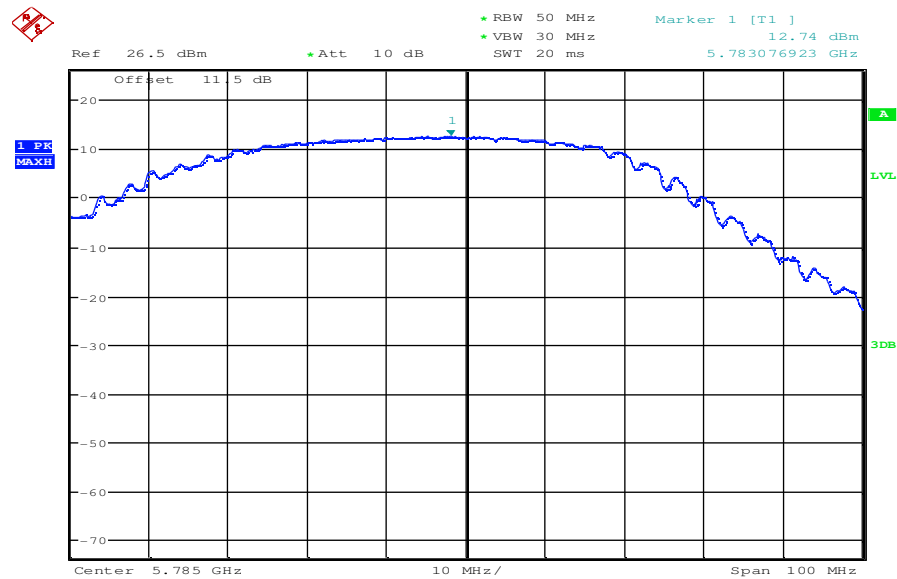


Date: 18.NOV.2010 13:41:15

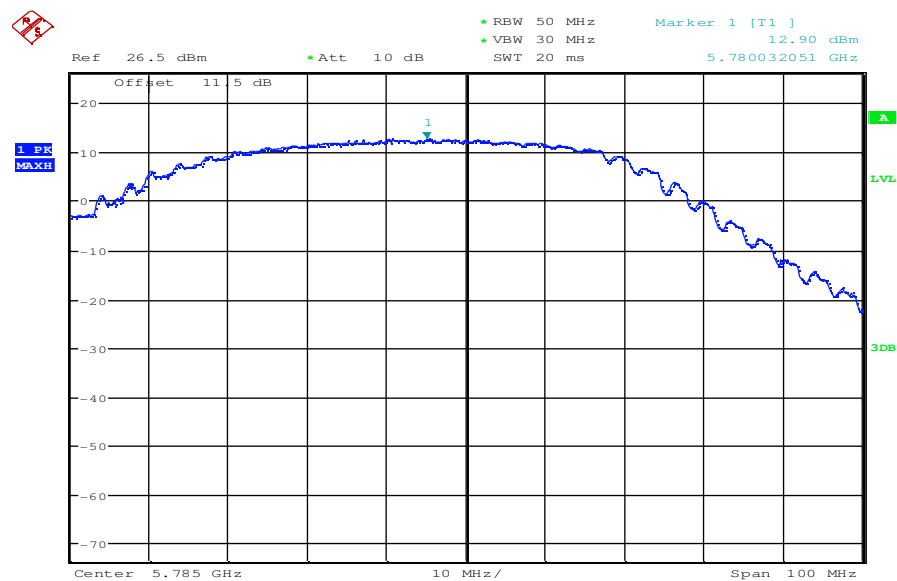
Plot 4: OFDM – mode; middle channel – 5785 MHz; power index 45; 18 MBit/s



Date: 18.NOV.2010 13:43:16

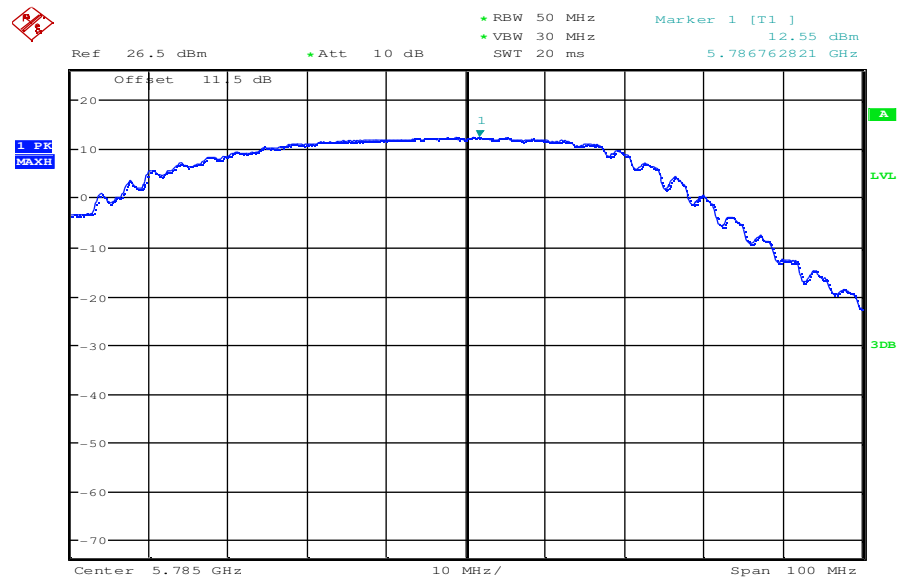
Plot 5: OFDM – mode; middle channel – 5785 MHz; power index 45; 24 MBit/s

Date: 18.NOV.2010 13:46:04

Plot 6: OFDM – mode; middle channel – 5785 MHz; power index 45; 36 MBit/s

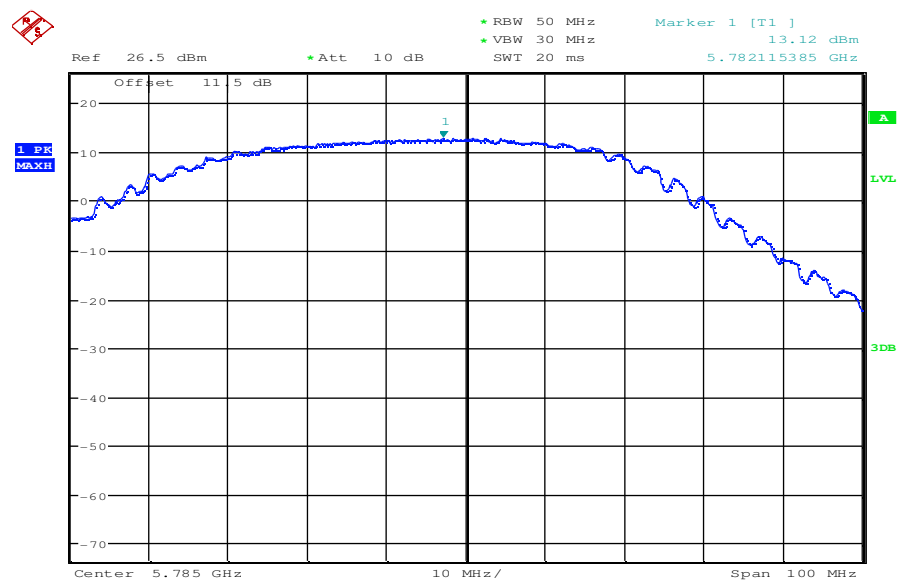
Date: 18.NOV.2010 13:46:52

Plot 7: OFDM – mode; middle channel – 5785 MHz; power index 45; 48 MBit/s



Date: 18.NOV.2010 13:48:08

Plot 8: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



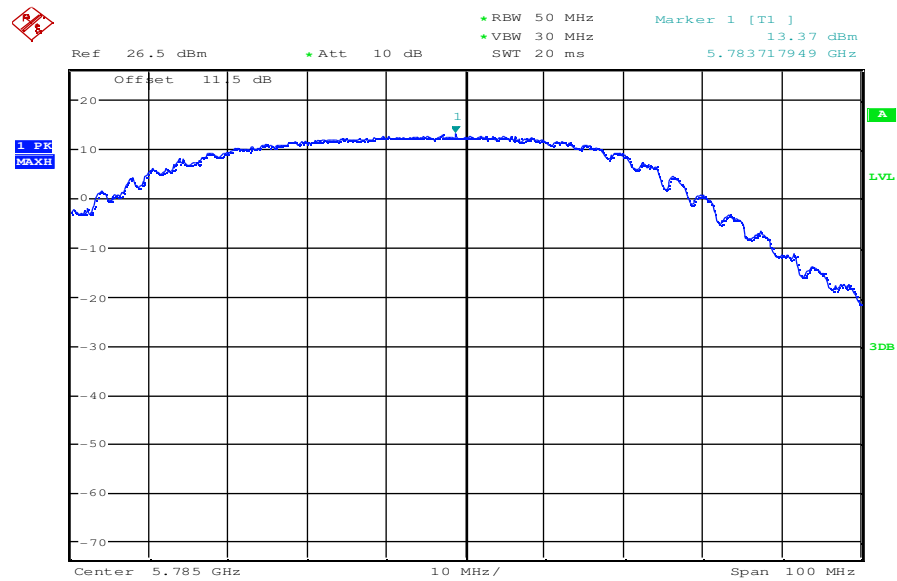
Date: 18.NOV.2010 13:51:20

Plot 1: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs0



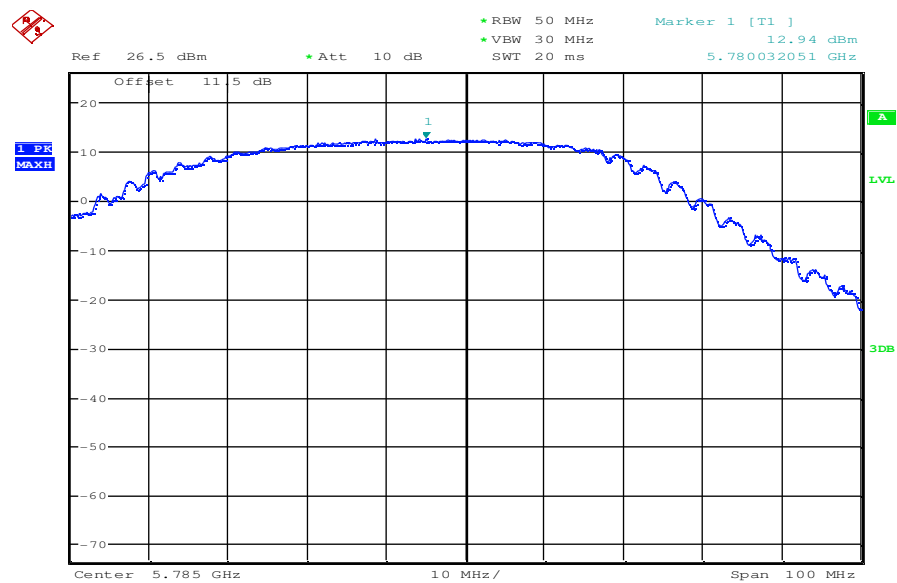
Date: 18.NOV.2010 13:56:20

Plot 3: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs2



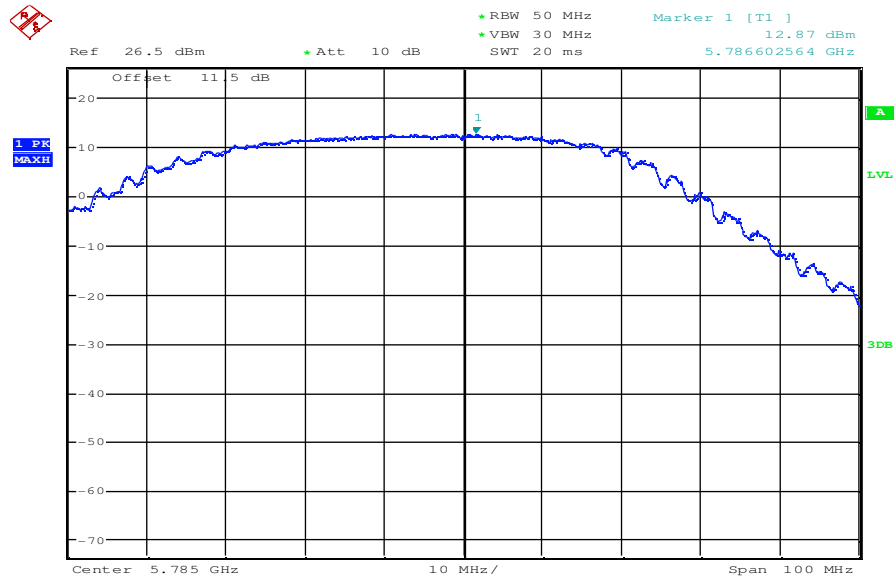
Date: 18.NOV.2010 13:57:18

Plot 4: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs3



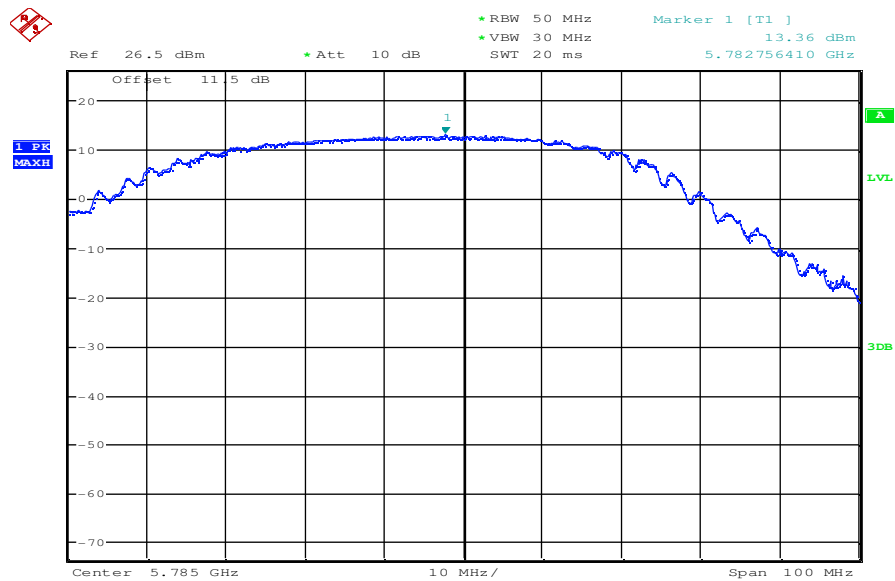
Date: 18.NOV.2010 13:58:06

Plot 5: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs4



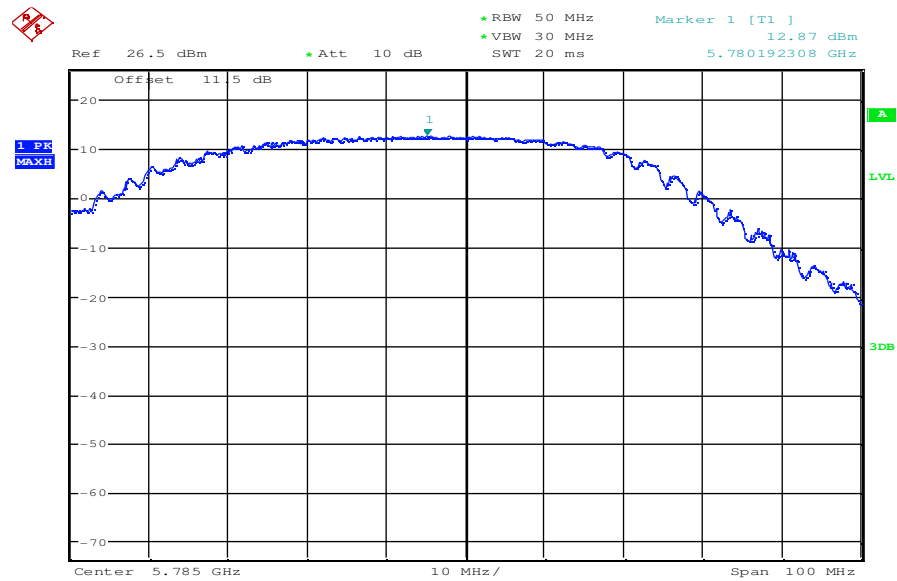
Date: 18.NOV.2010 13:59:33

Plot 6: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs5



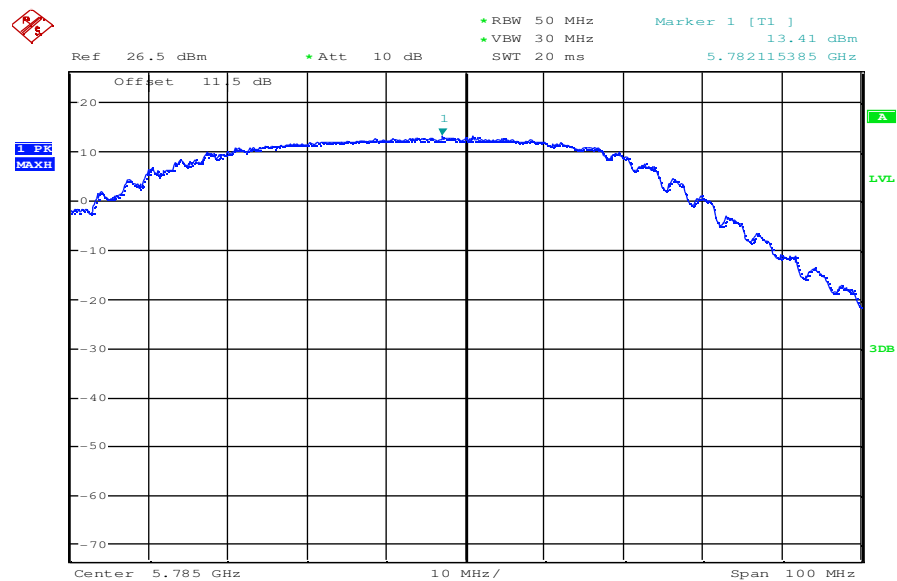
Date: 18.NOV.2010 14:03:02

Plot 7: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs6



Date: 18.NOV.2010 14:01:07

Plot 8: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs7



Date: 18.NOV.2010 14:00:12

9.2 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	50 MHz
Trace-Mode:	Max hold

Limits:

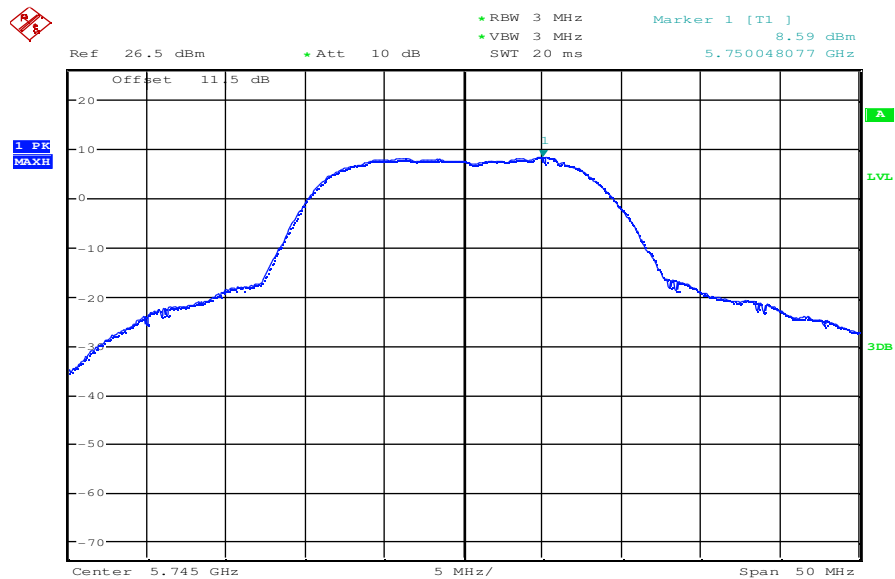
FCC	IC
CFR Part 15.247 (b)(4)	RSS 210, Issue 8, A 8.4(2)
Antenna Gain	
6 dBi	

Results:

T _{nom}	V _{nom}	lowest channel 5745 MHz	middle channel 5785 MHz	highest channel 5825 MHz
Conducted power [dBm] Measured with OFDM (a – mode / 54MBit/s)		8.59	6.74	5.19
Radiated power [dBm] Measured with (a – mode / 54MBit/s)		10.68	8.73	7.39
Gain [dBi] Calculated		2.09	1.99	2.20

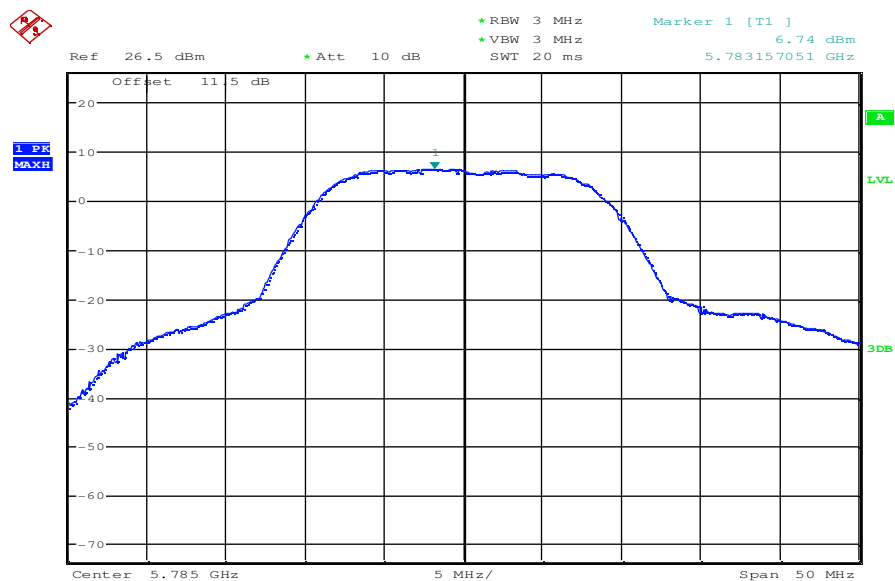
Result: The result of the measurement is passed.

Plot 1: OFDM – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s



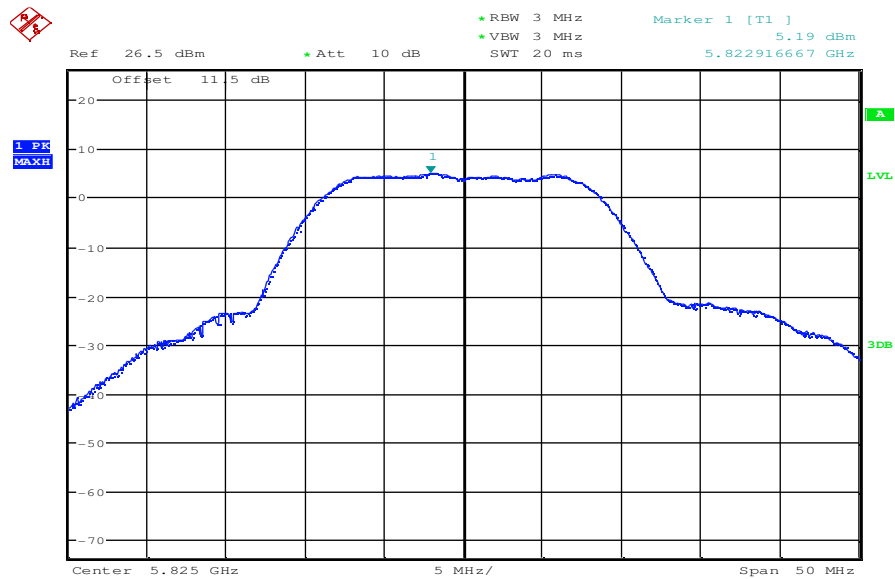
Date: 18.NOV.2010 14:10:14

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 14:08:42

Plot 3: OFDM – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 14:07:23

9.3 Power spectral density

Description:

Measurement of the power spectral density of a digital modulated system. The measurement is repeated for both modulations at the lowest, middle and highest channel.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	500 s
Video bandwidth:	30 kHz
Resolution bandwidth:	3 kHz
Span:	1,5 MHz
Trace-Mode:	Max Hold

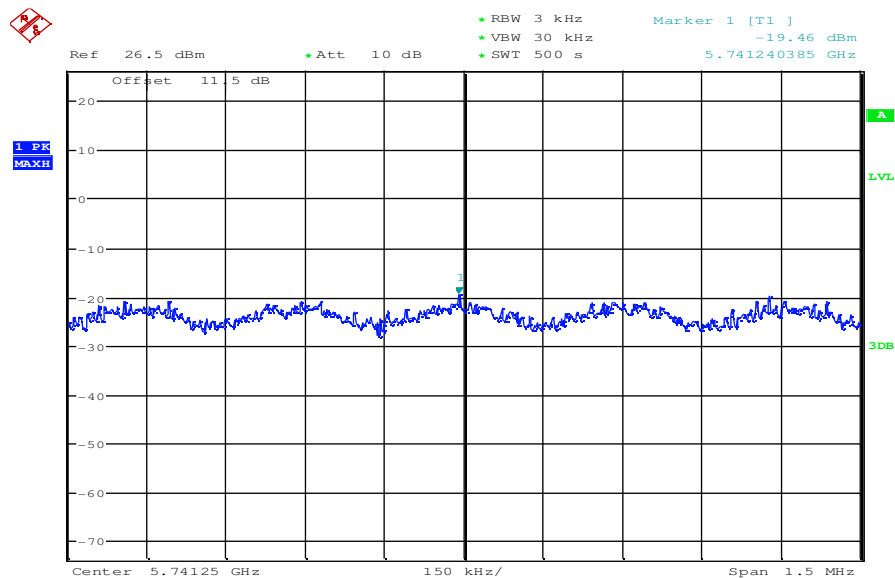
Limits:

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

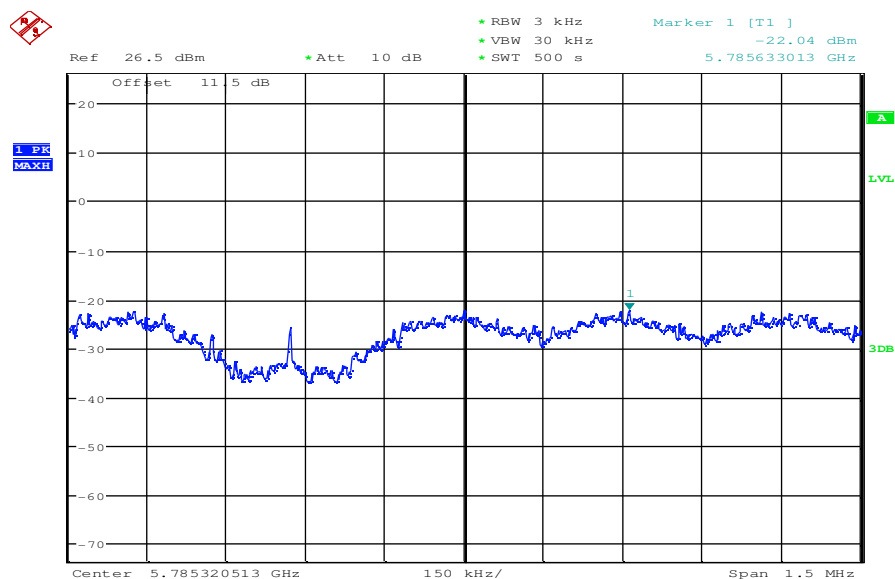
Results:

Modulation Frequency	Power Spectral density [dBm/3kHz]		
	5745 MHz	5785 MHz	5825 MHz
OFDM / a – mode	-19.46	-22.04	-23.21
OFDM / n – mode	-19.30	-21.80	-23.13
Measurement uncertainty	± 0.5 dB		

Result: The result of the measurement is passed.

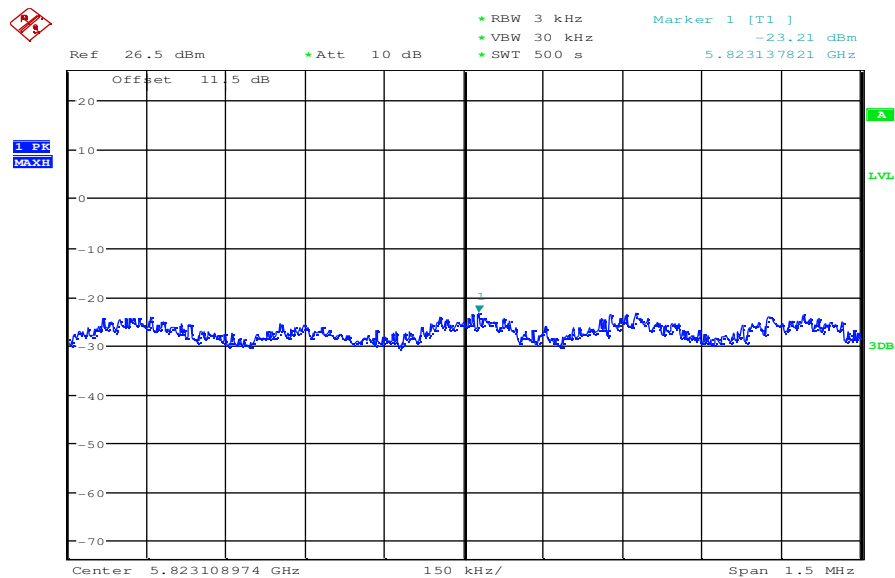
OFDM – mode / a – mode:**Plot 1: OFDM – mode; middle channel – 5745 MHz; power index 45; 54 MBit/s**

Date: 18.NOV.2010 14:33:58

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s

Date: 18.NOV.2010 14:43:50

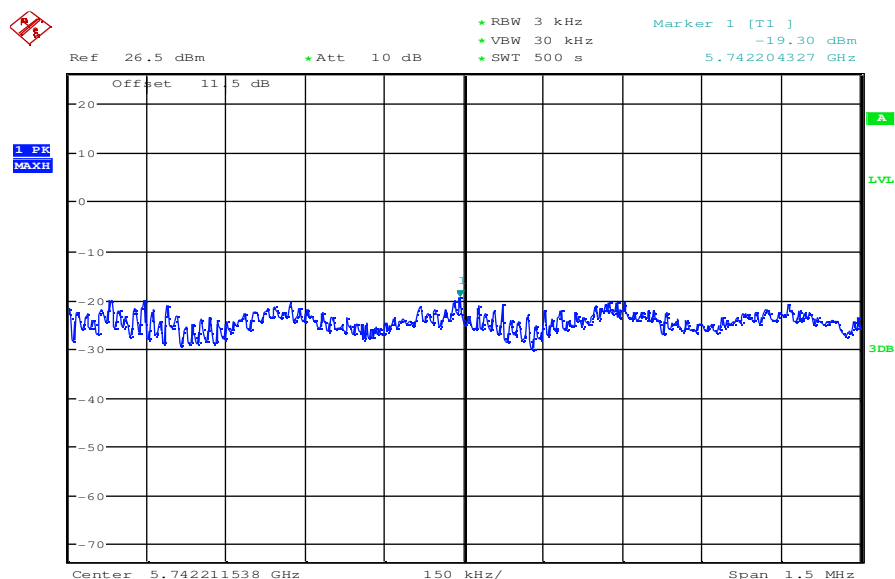
Plot 3: OFDM – mode; middle channel – 5825 MHz; power index 45; 54 MBit/s



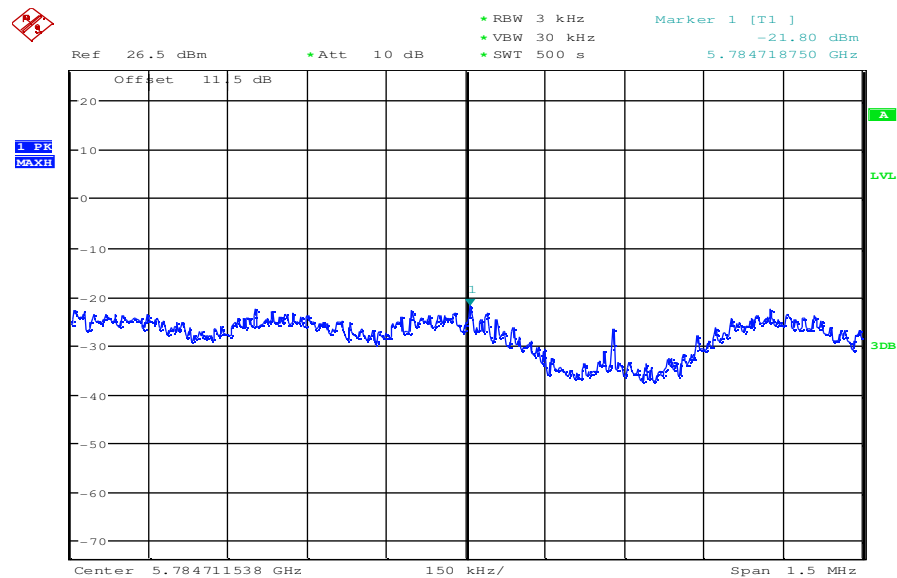
Date: 18.NOV.2010 14:53:54

OFDM – mode / n – mode:

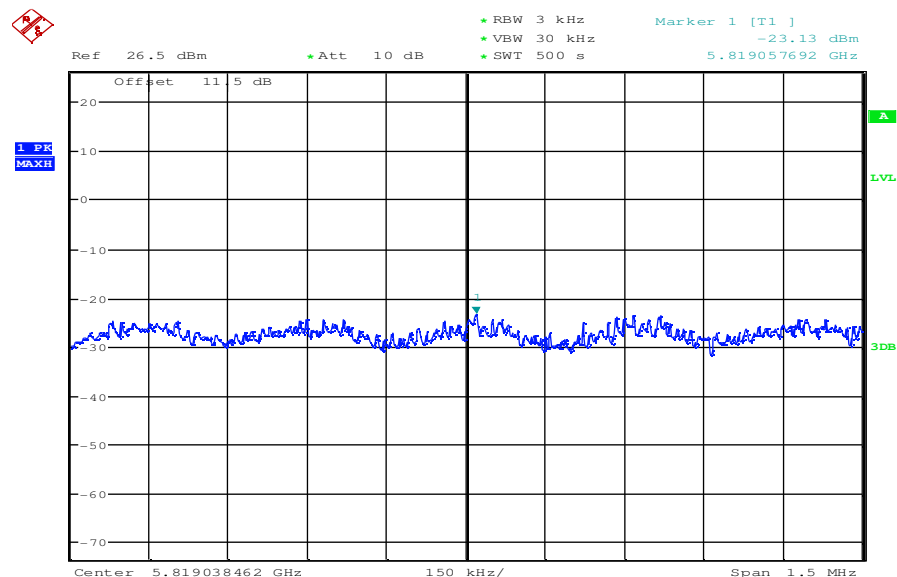
Plot 1: OFDM – mode; middle channel – 5745 MHz; power index 45; mcs 7



Date: 18.NOV.2010 15:03:29

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs 7

Date: 18.NOV.2010 15:16:48

Plot 3: OFDM – mode; middle channel – 5825 MHz; power index 45; mcs 7

Date: 18.NOV.2010 15:26:13

9.4 Spectrum bandwidth of a FHSS system – 6 dB bandwidth

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	1s
Video bandwidth:	300 kHz
Resolution bandwidth:	300 kHz
Span:	30 MHz
Trace-Mode:	Max Hold

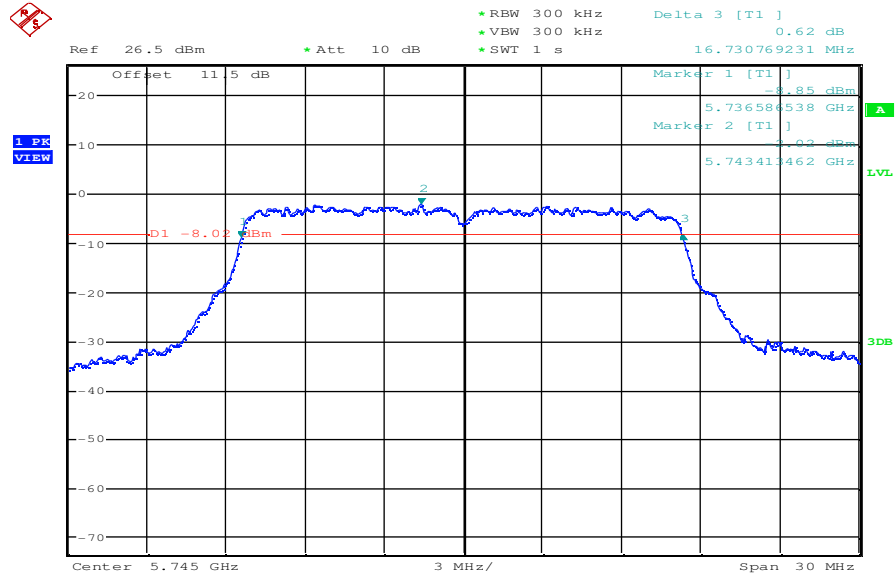
Limits:

FCC	IC
CFR Part 15.247 (a)(2)	RSS 210, Issue 8, A 8.2(a)
Spectrum Bandwidth of a FHSS System – 6 dB Bandwidth	
Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.	

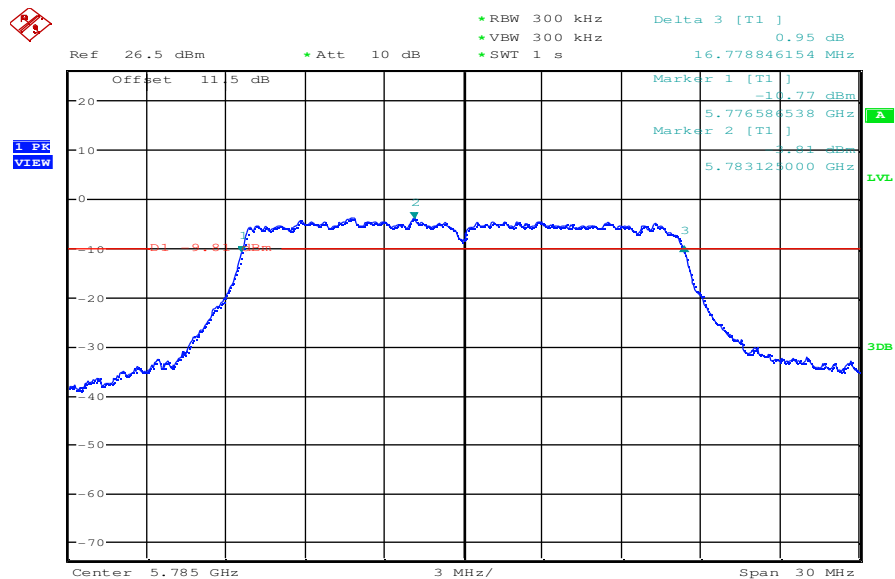
Result:

Modulation Frequency	6 dB BANDWIDTH [MHz]		
	5745 MHz	5785 MHz	5825 MHz
OFDM / a – mode	16.73	16.78	16.83
OFDM / n – mode	17.88	17.93	17.84
Measurement uncertainty	± 300 kHz		

Result: The result of the measurement is passed.

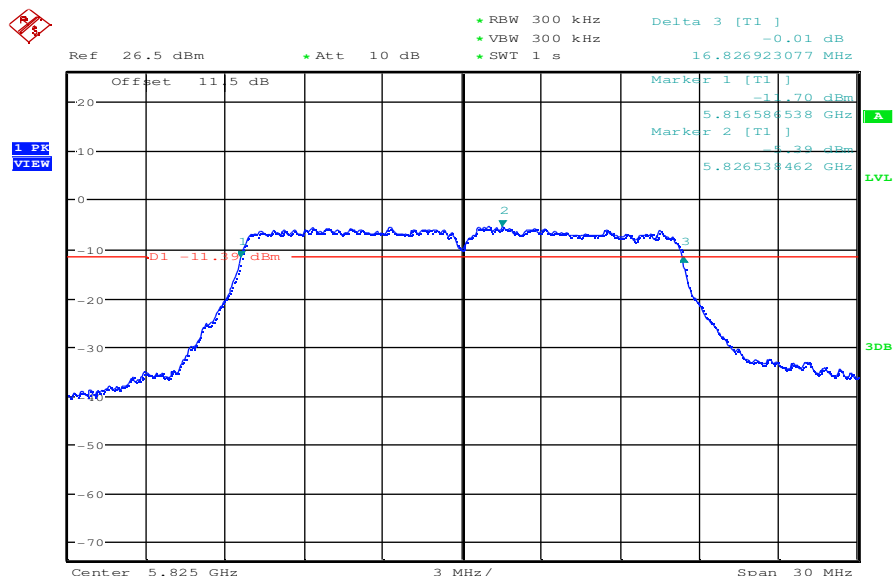
OFDM – mode / a – mode:**Plot 1: OFDM – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s**

Date: 18.NOV.2010 15:34:31

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s

Date: 18.NOV.2010 15:37:09

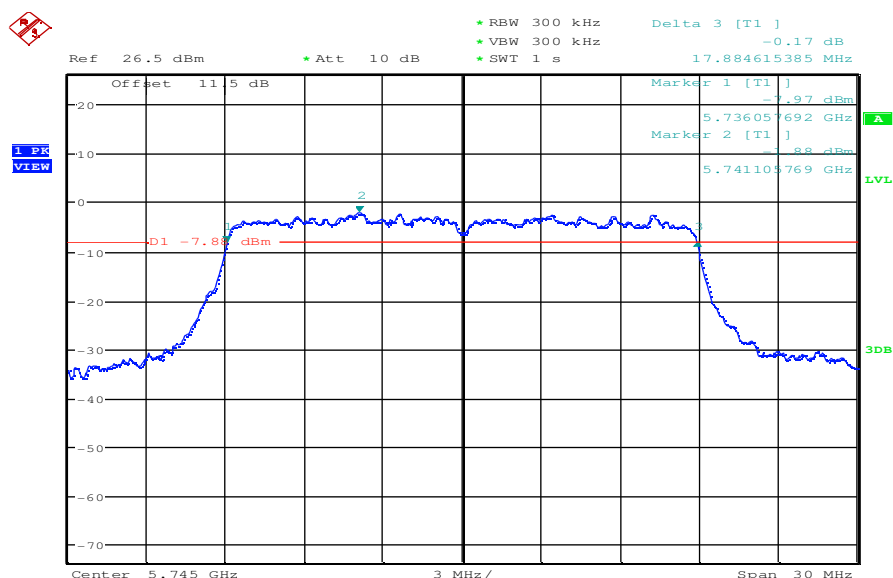
Plot 3: OFDM – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 15:40:19

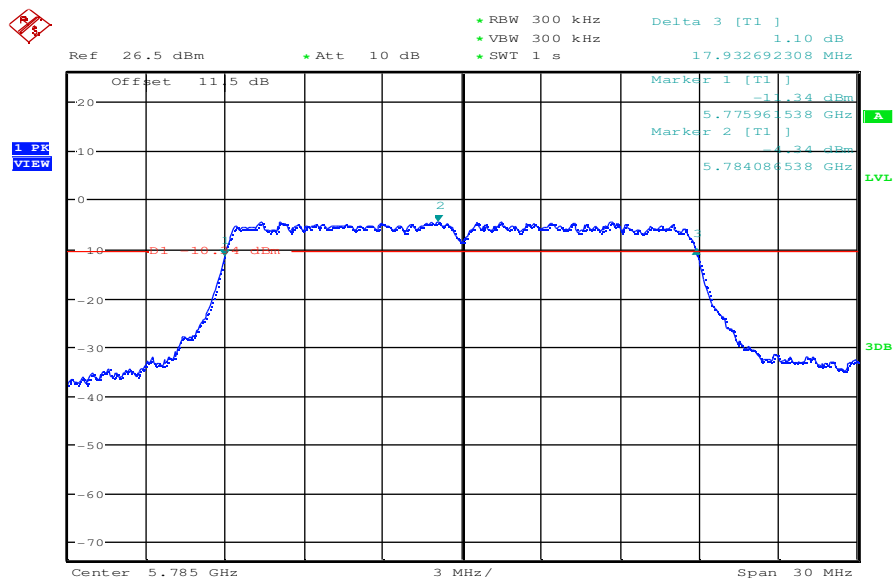
OFDM – mode / n – mode:

Plot 1: OFDM – mode; lowest channel – 5745 MHz; power index 45; mcs 7



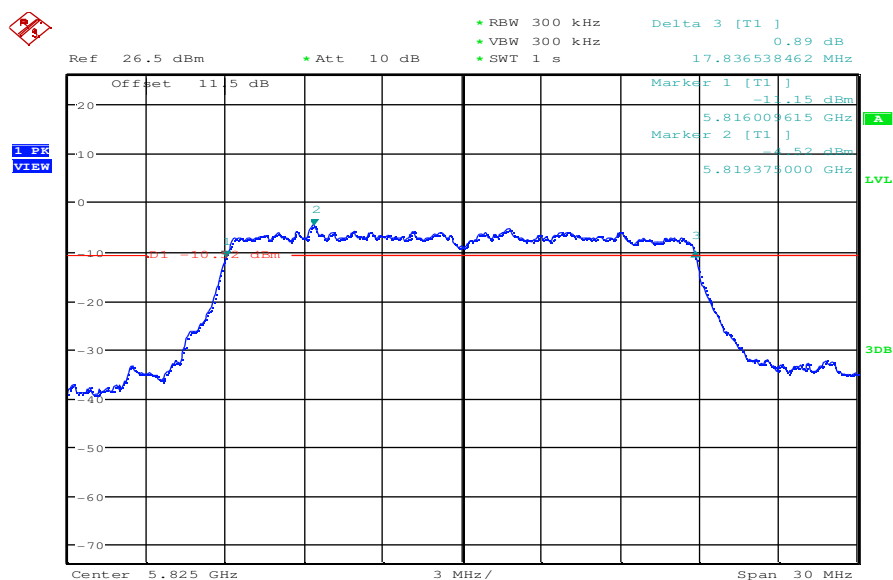
Date: 18.NOV.2010 15:47:12

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs 7



Date: 18.NOV.2010 15:45:02

Plot 3: OFDM – mode; highest channel – 5825 MHz; power index 45; mcs 7



Date: 18.NOV.2010 15:42:46

9.5 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Description:

Measurement of the 20 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	1s
Video bandwidth:	300 kHz
Resolution bandwidth:	300 kHz
Span:	30 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (a)(2)	RSS 210, Issue 8, A 8.2(a)
Spectrum Bandwidth of a FHSS System – 20 dB Bandwidth	
Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.	

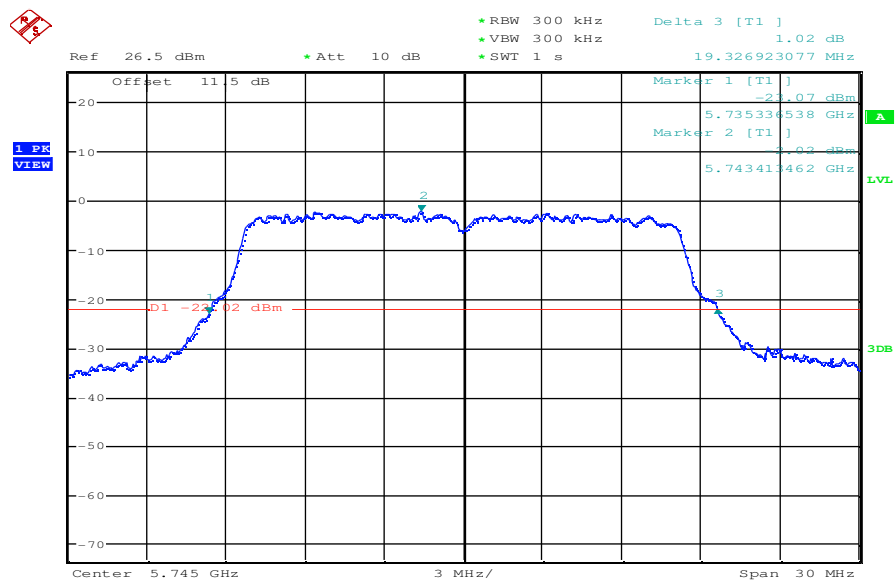
Result:

Modulation Frequency	-20 dB BANDWIDTH [MHz]		
	5745 MHz	5785 MHz	5825 MHz
OFDM / a – mode	19.33	19.13	19.52
OFDM / n – mode	19.71	19.95	19.86
Measurement uncertainty	± 300 kHz		

Result: The result of the measurement is passed.

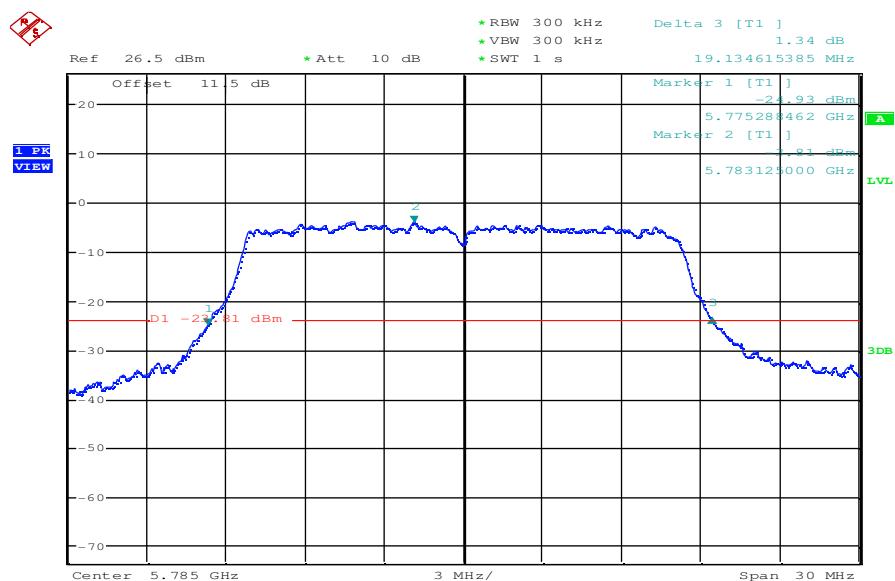
OFDM – mode / a – mode:

Plot 1: OFDM – mode; middle channel – 5745 MHz; power index 45; 54 MBit/s



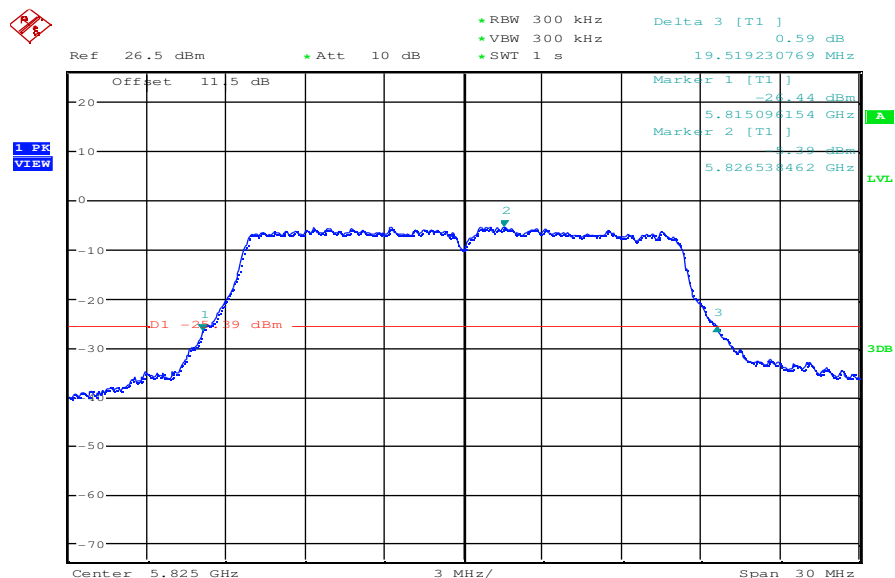
Date: 18.NOV.2010 15:35:19

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 15:37:47

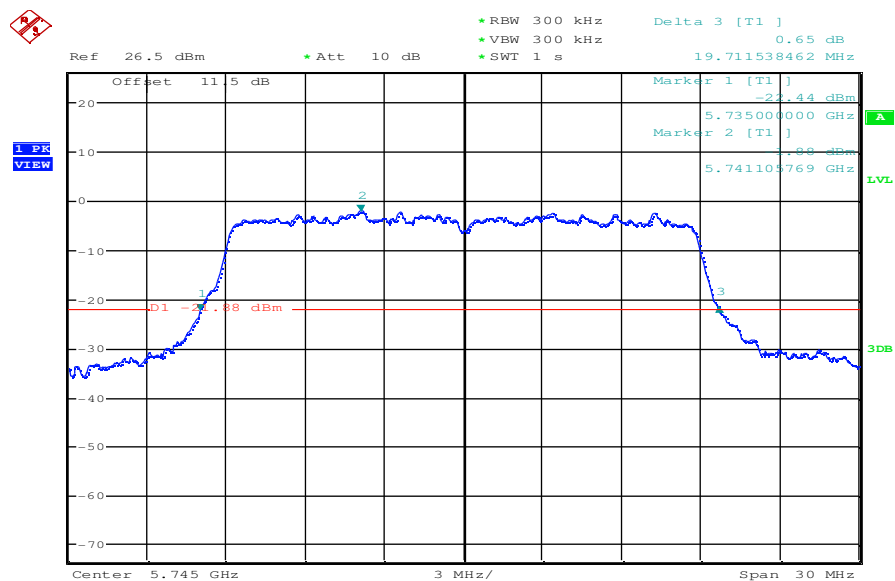
Plot 3: OFDM – mode; middle channel – 5825 MHz; power index 45; 54 MBit/s



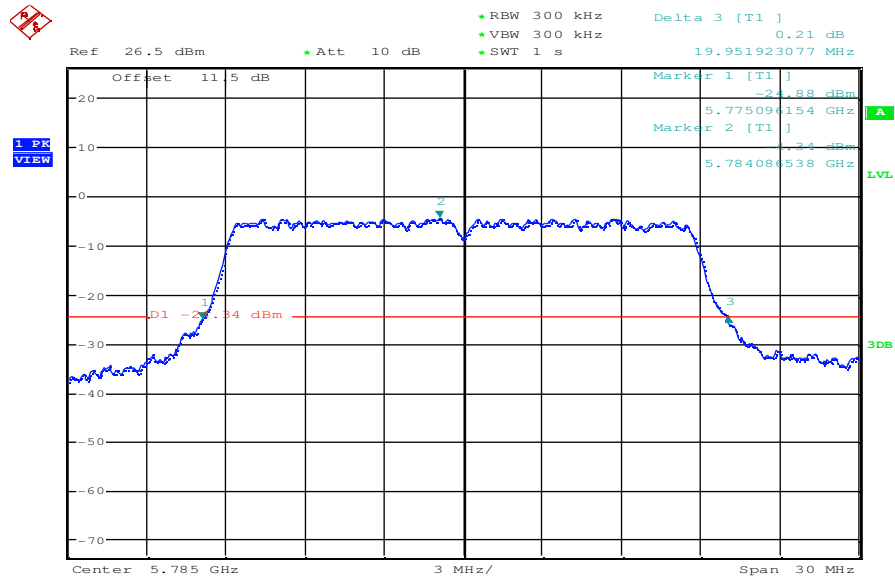
Date: 18.NOV.2010 15:41:18

OFDM – mode / n – mode:

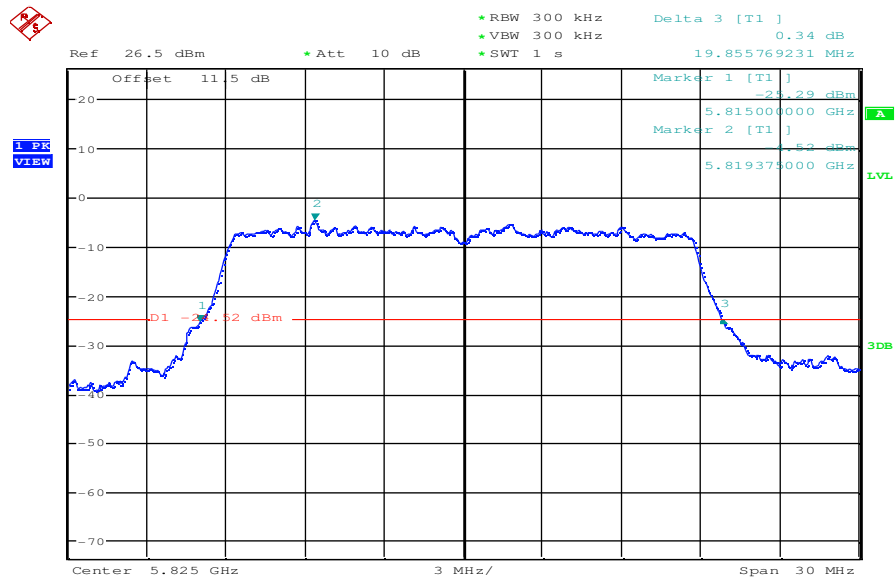
Plot 1: OFDM – mode; middle channel – 5745 MHz; power index 45; mcs 7



Date: 18.NOV.2010 15:47:48

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs 7

Date: 18.NOV.2010 15:45:42

Plot 3: OFDM – mode; middle channel – 5825 MHz; power index 45; mcs 7

Date: 18.NOV.2010 15:43:23

9.6 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. The measurements are performed using the data rate producing the highest conducted output power. The determination of these data rates was performed at the beginning of the tests. Additionally the average power is measured using a wideband power meter.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	30 MHz
Resolution bandwidth:	50 MHz
Span:	100 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part 15.247 (b)(3)	RSS 210, Issue 8, A 8.4(4)
Maximum Output Power	
Conducted: 1.0 W – Antenna Gain max. 6 dBi	

Results:

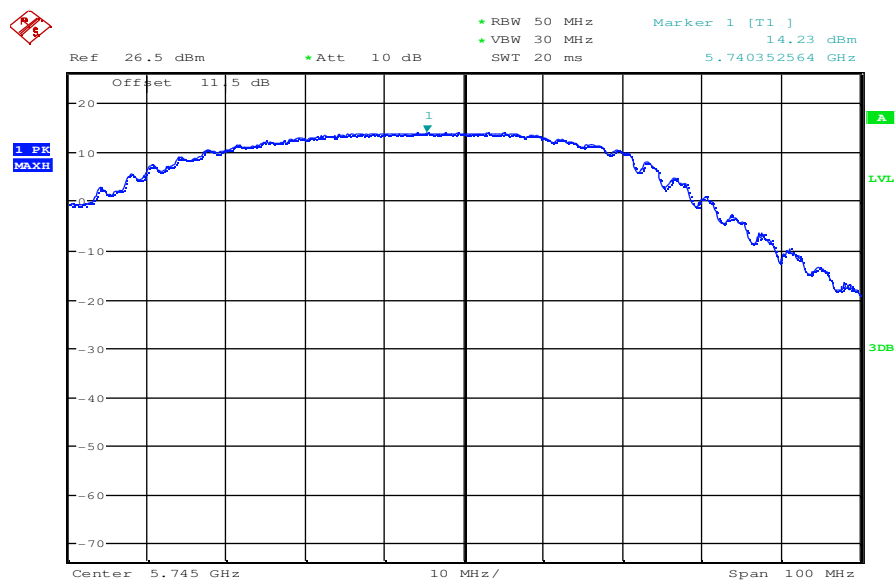
OFDM / a – mode Frequency	Maximum Output Power [dBm]		
	5745 MHz	5785 MHz	5825 MHz
Peak Output Power Conducted	14.23	13.12	12.07
Output Power Radiated - EIRP	16.32	15.11	14.27
Measurement uncertainty	± 0.5 dB (cond.) / ± 2 dB (rad.)		

OFDM / n – mode Frequency	Maximum Output Power [dBm]		
	5745 MHz	5785 MHz	5825 MHz
Peak Output Power Conducted	14.06	13.41	11.95
Output Power Radiated - EIRP	16.15	15.40	14.15
Measurement uncertainty	± 0.5 dB (cond.) / ± 2 dB (rad.)		

Result: The result of the measurement is passed.

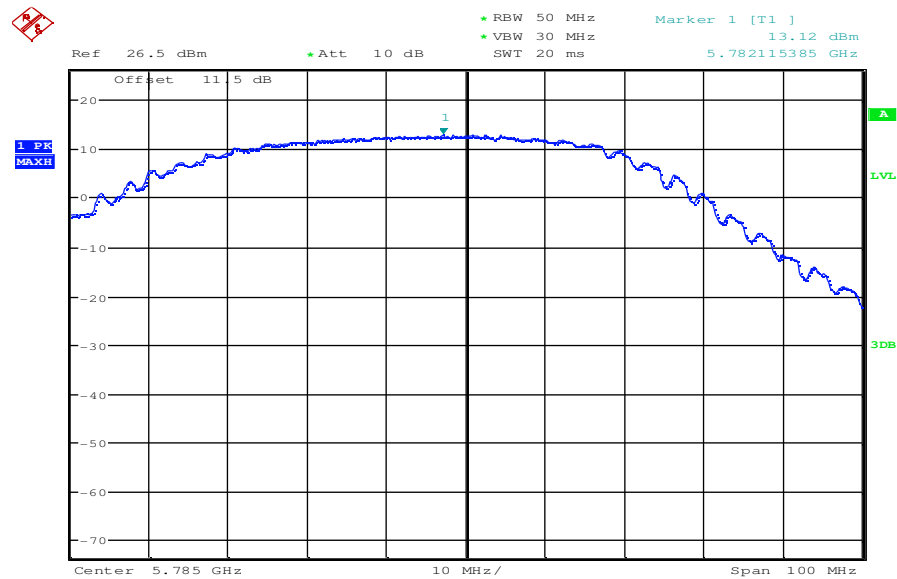
OFDM – mode / q – mode:

Plot 1: OFDM – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s



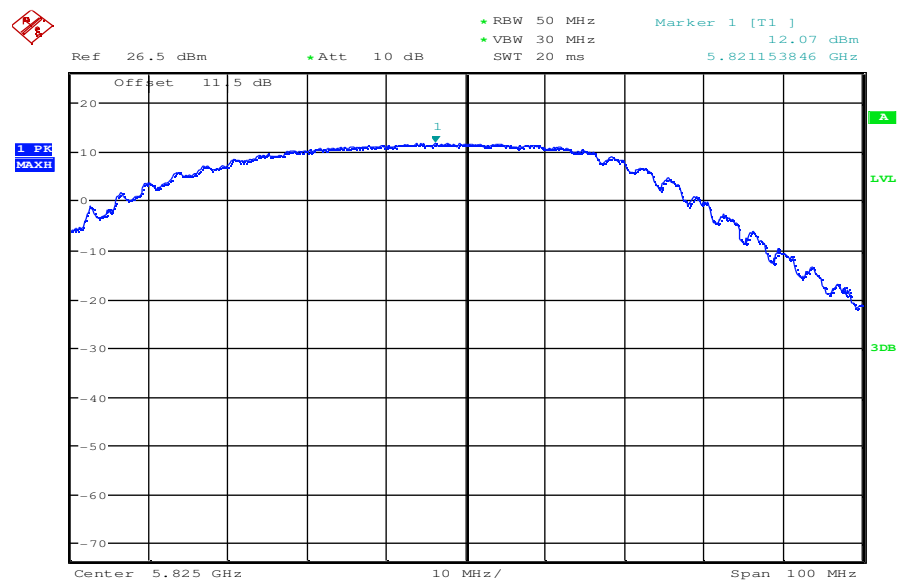
Date: 18.NOV.2010 13:52:12

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 13:51:20

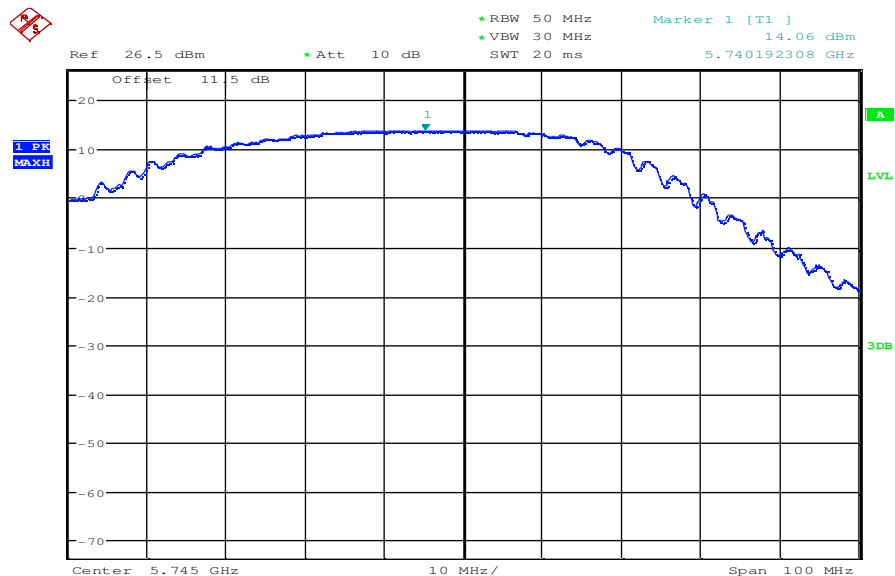
Plot 3: OFDM – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



Date: 18.NOV.2010 13:53:30

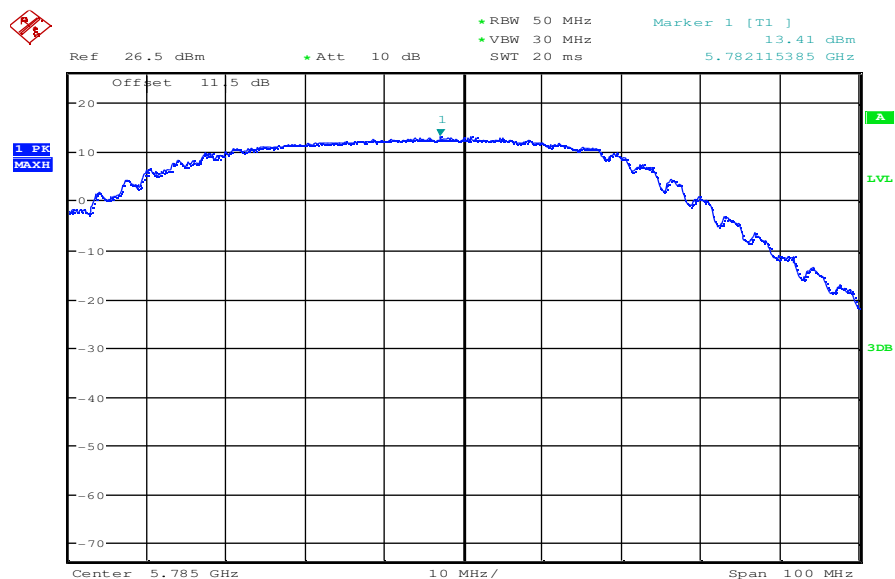
OFDM – mode / n – mode:

Plot 1: OFDM – mode; lowest channel – 5745 MHz; power index 45; mcs 7



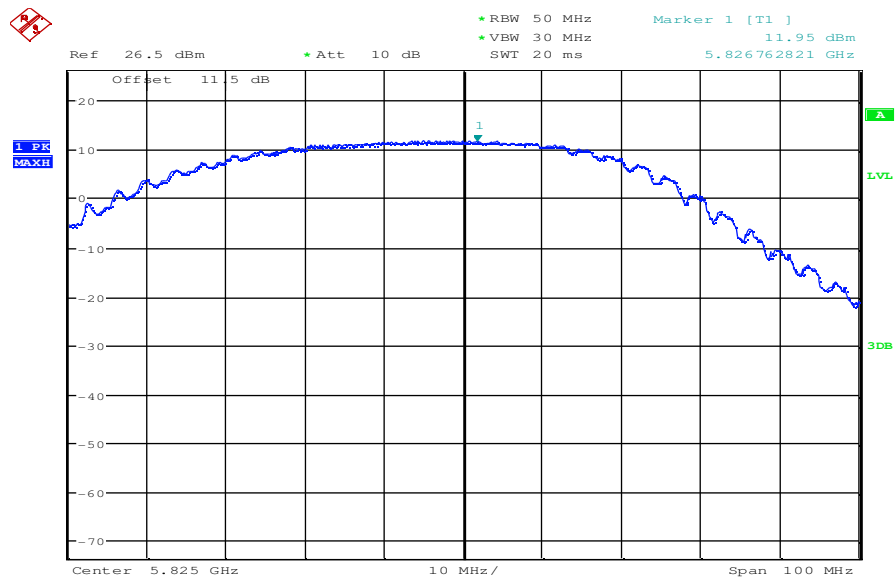
Date: 18.NOV.2010 14:04:01

Plot 2: OFDM – mode; middle channel – 5785 MHz; power index 45; mcs 7



Date: 18.NOV.2010 14:00:12

Plot 3: OFDM – mode; highest channel – 5825 MHz; power index 45; mcs 7



Date: 18.NOV.2010 14:05:27

9.7 Band edge compliance conducted

Not performed!

No restricted band in the range ± 2 channel bandwidths of the upper band edge of the specified emission band! (5.725 GHz – 5.850 GHz).

Note: restricted bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

9.8 Band edge compliance radiated

Not performed!

No restricted band in the range ± 2 channel bandwidths of the upper band edge of the specified emission band! (5.725 GHz – 5.850 GHz).

Note: restricted bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

9.9 TX spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 100 kHz
Video bandwidth:	F < 1 GHz: 500 kHz F > 1 GHz: 500 kHz
Span:	9 kHz to 40 GHz
Trace-Mode:	Max Hold

Limits:

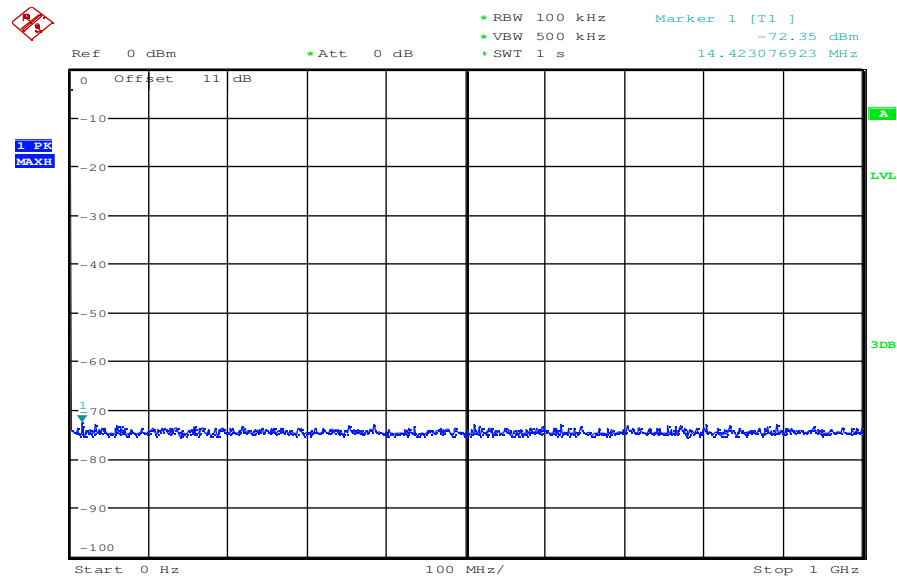
FCC	IC
CFR Part 15.247(d)	RSS 210, Issue 8, A 8.5
TX Spurious Emissions Conducted	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required	

Result: Also see plots

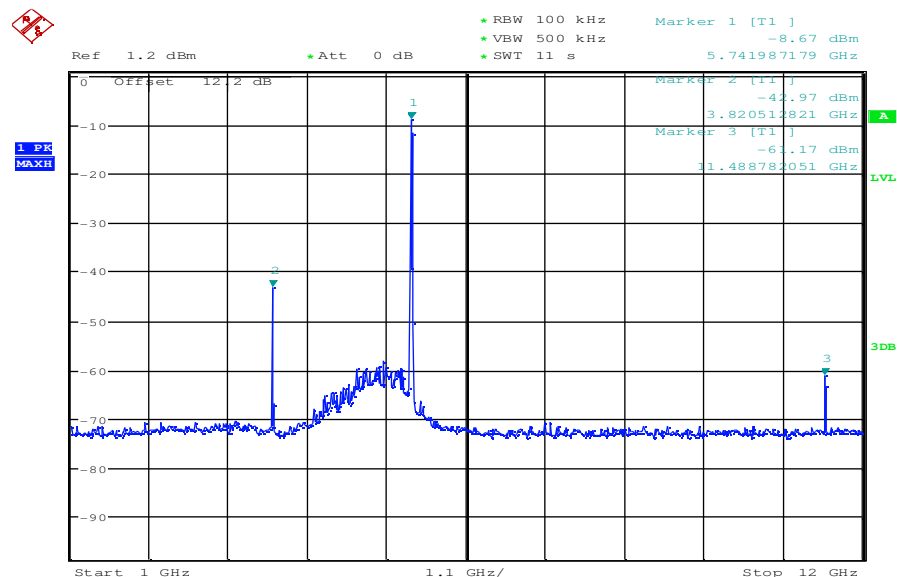
TX Spurious Emissions Conducted					
OFDM – mode / a –mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
5745		-8.67	30 dBm		Operating frequency
			-20 dBc		
3820.5		-42.97		34.30	complies
11488.8		-61.17		52.50	complies
5785		-11.08	30 dBm		Operating frequency
			-20 dBc		
3855.8		-42.43		31.35	complies
11576.9		-62.74		51.66	complies
5825		-12.29	30 dBm		Operating frequency
			-20 dBc		
3873.4		-42.03		29.74	complies
11647.4		-67.88		55.59	complies
Measurement uncertainty		± 3 dB			

TX Spurious Emissions Conducted					
OFDM – mode / n – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
5745		-9.77	30 dBm		Operating frequency
			-20 dBc		
3820.5		-43.31		33.54	complies
11506.4		-62.36		52.59	complies
5785		-11.23	30 dBm		Operating frequency
			-20 dBc		
3855.8		-42.70		31.47	complies
11576.9		-65.77		54.54	complies
5825		-12.57	30 dBm		Operating frequency
			-20 dBc		
3873.4		-42.24		29.67	complies
11665.1		-65.89		53.32	complies
Measurement uncertainty		± 3 dB			

Result: The result of the measurement is passed.

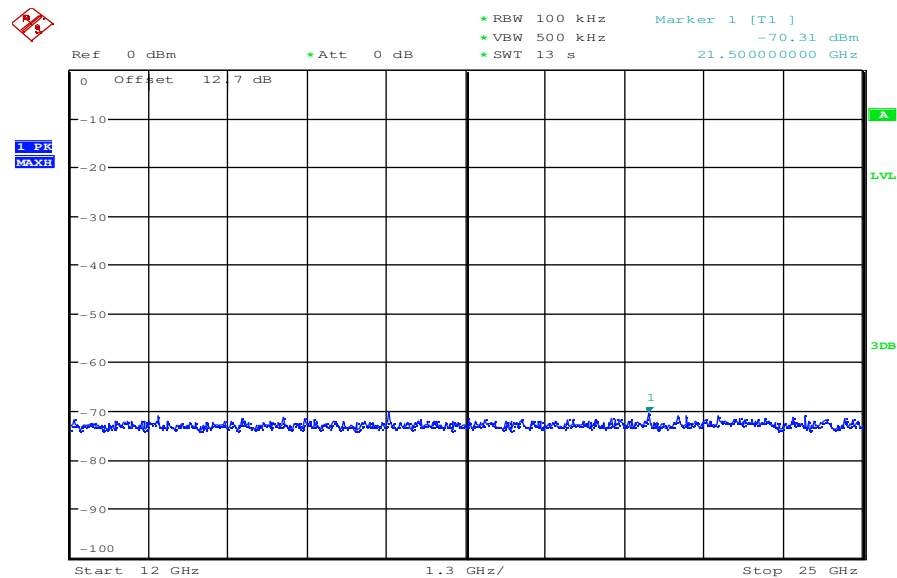
OFDM – mode / g – mode:**Plot 1: OFDM / a – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s**

Date: 19.NOV.2010 06:26:52

Plot 2: OFDM / a – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s

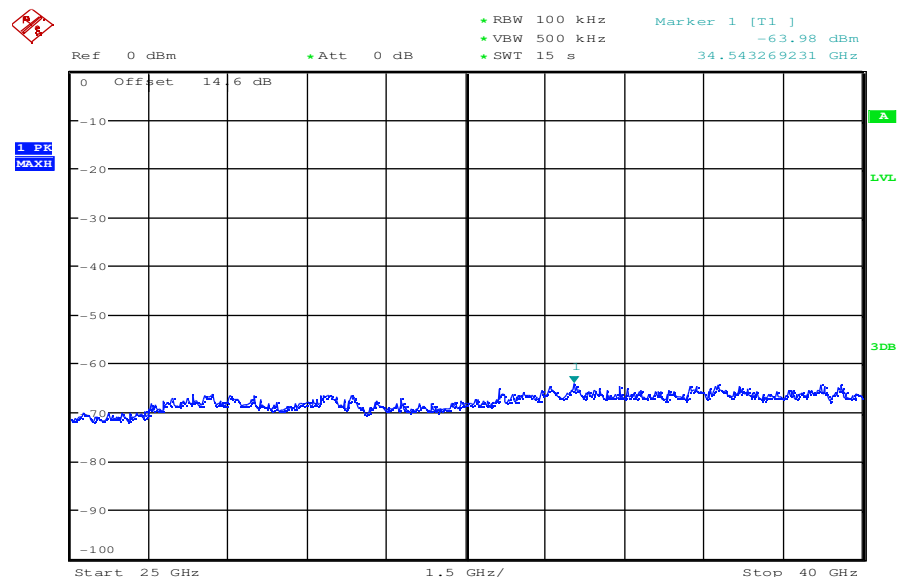
Date: 19.NOV.2010 06:36:07

Plot 3: OFDM / a – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s



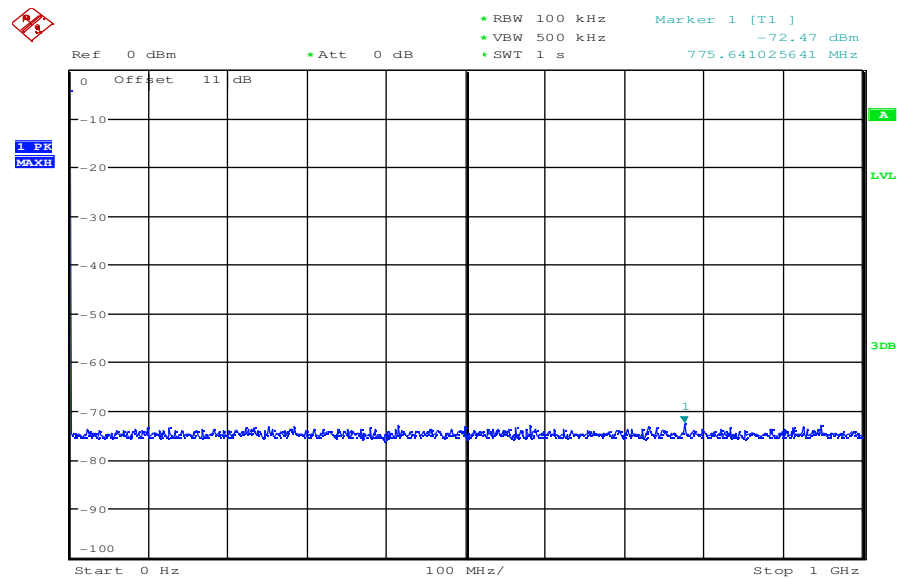
Date: 19.NOV.2010 06:45:38

Plot 4: OFDM / a – mode; lowest channel – 5745 MHz; power index 45; 54 MBit/s



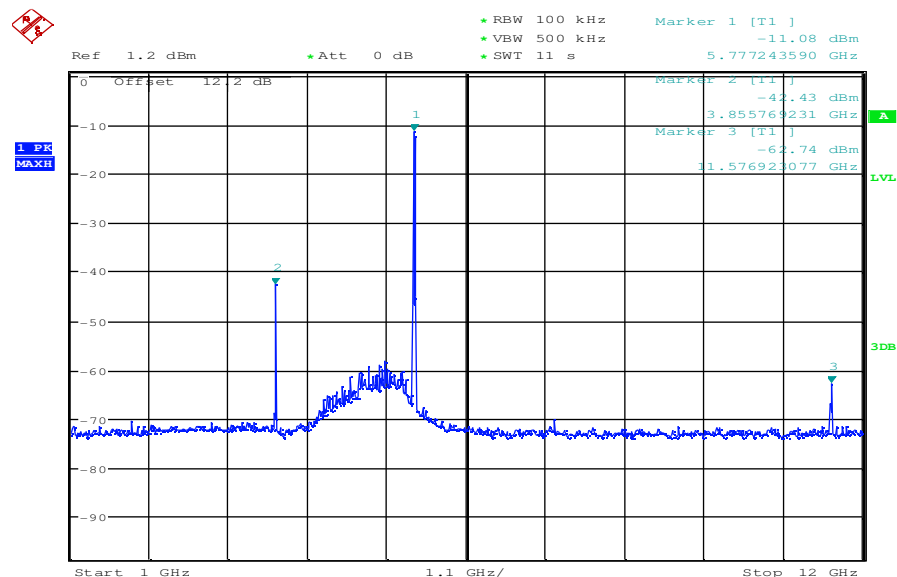
Date: 19.NOV.2010 06:53:45

Plot 5: OFDM / a – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



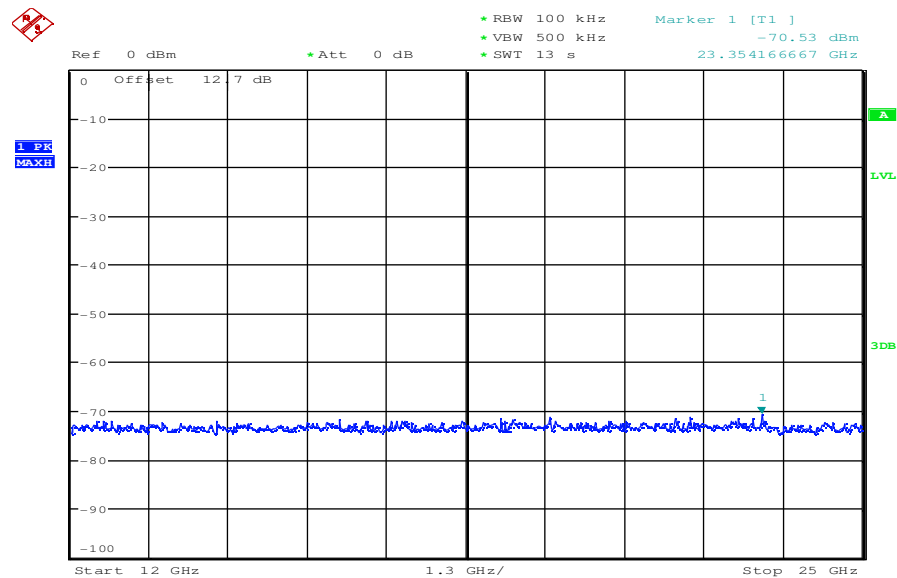
Date: 19.NOV.2010 06:27:47

Plot 6: OFDM / a – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



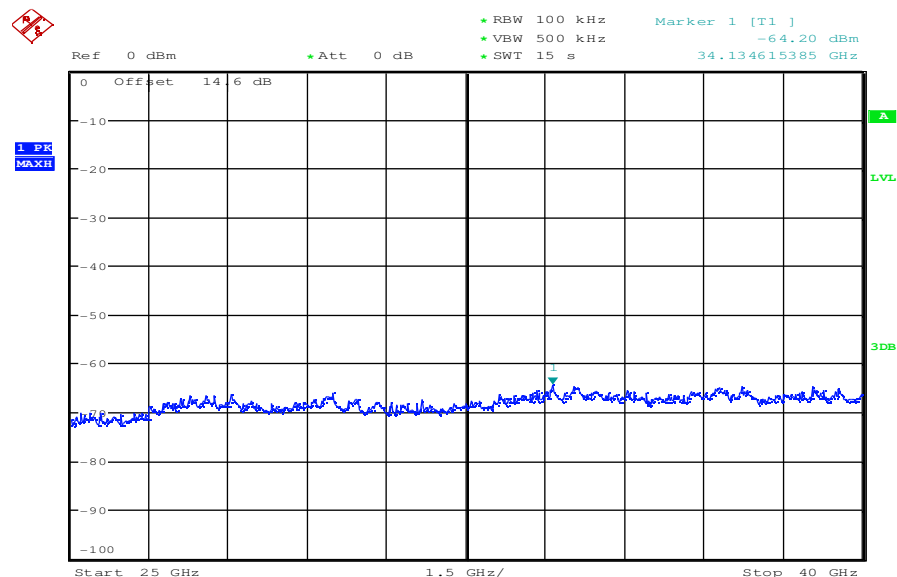
Date: 19.NOV.2010 06:37:50

Plot 7: OFDM / a – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



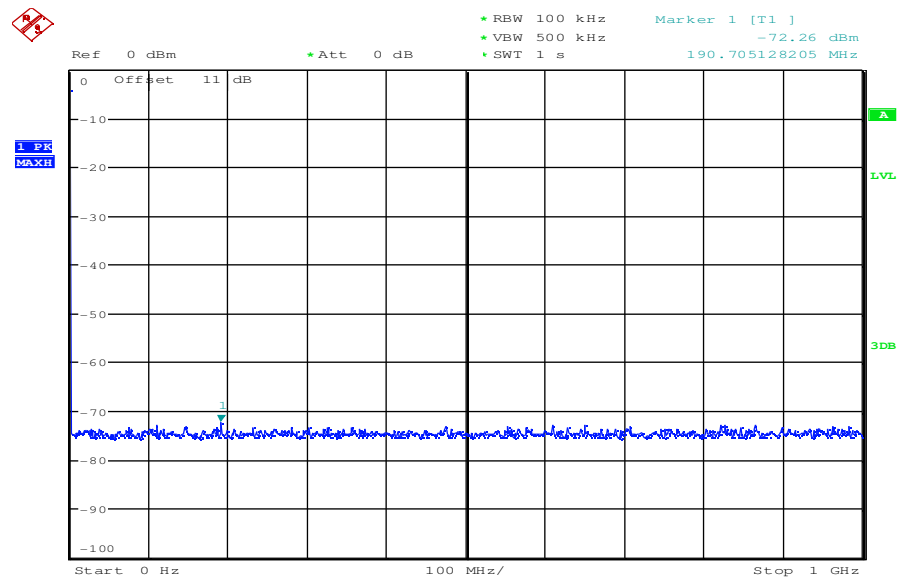
Date: 19.NOV.2010 06:46:30

Plot 8: OFDM / a – mode; middle channel – 5785 MHz; power index 45; 54 MBit/s



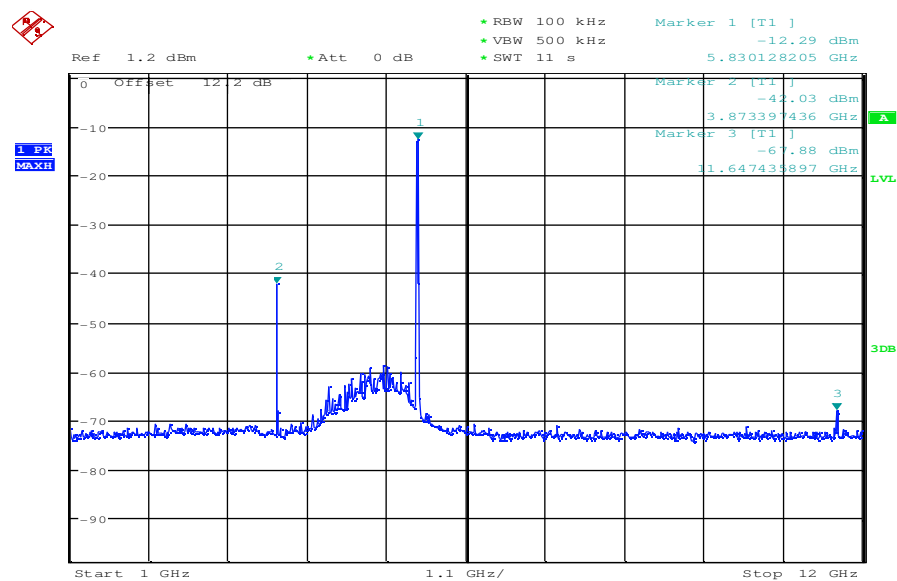
Date: 19.NOV.2010 06:54:45

Plot 9: OFDM / a – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



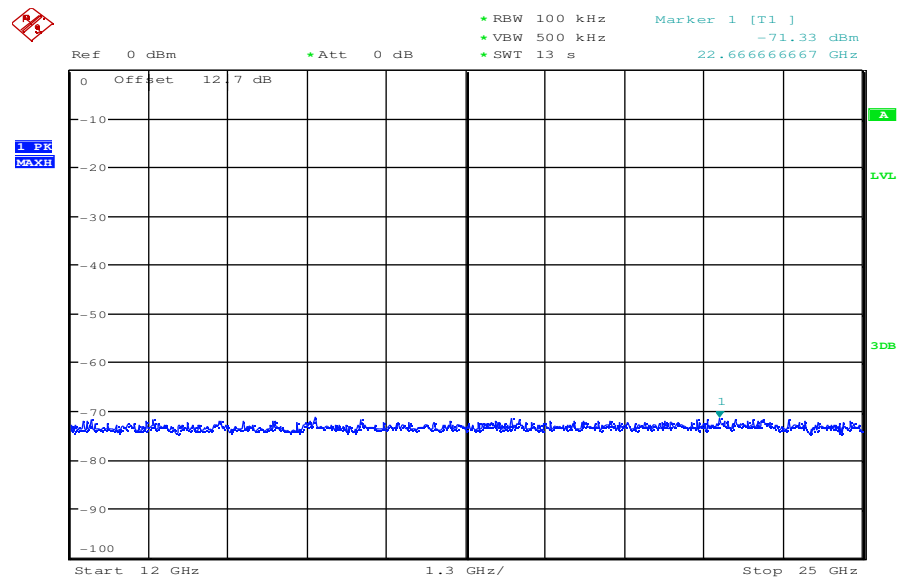
Date: 19.NOV.2010 06:28:47

Plot 10: OFDM / a – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



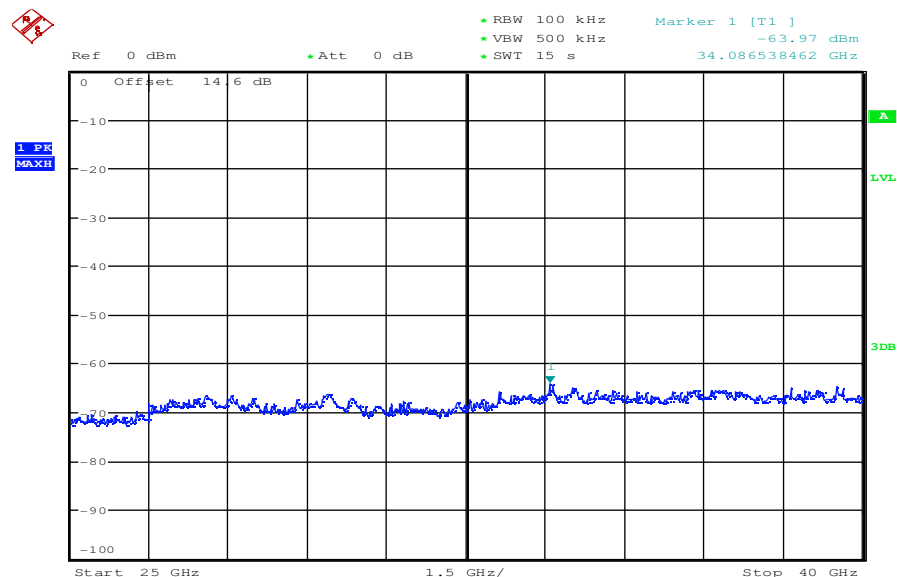
Date: 19.NOV.2010 06:39:07

Plot 11: OFDM / a – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



Date: 19.NOV.2010 06:47:26

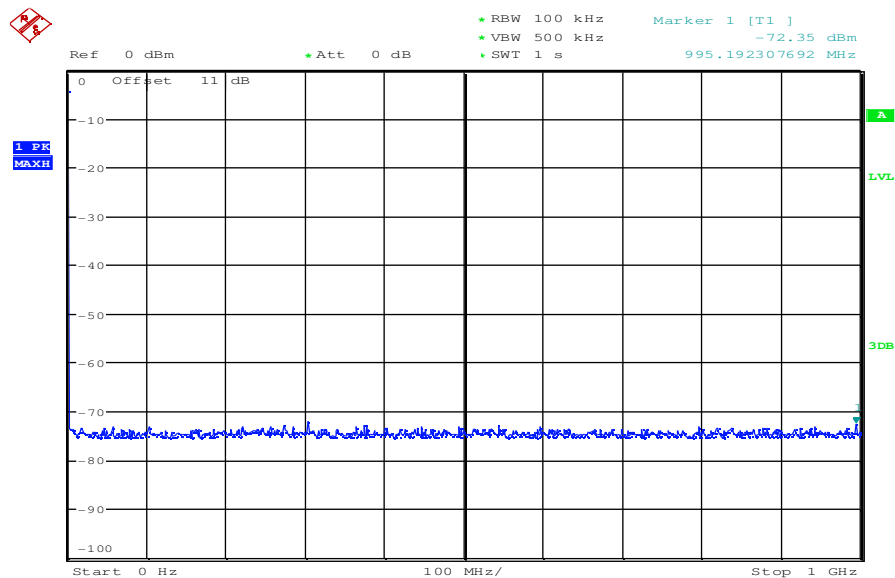
Plot 12: OFDM / a – mode; highest channel – 5825 MHz; power index 45; 54 MBit/s



Date: 19.NOV.2010 06:55:52

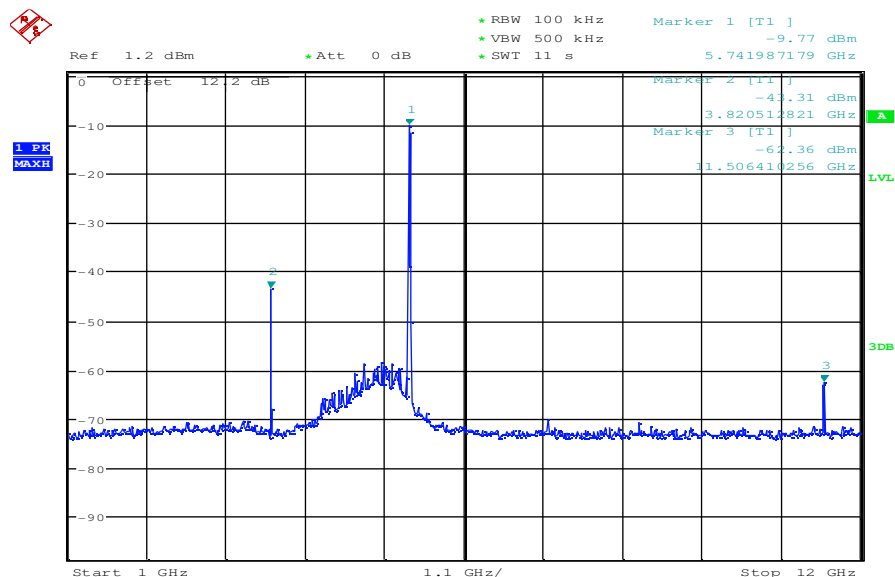
OFDM – mode / n – mode:

Plot 1: OFDM / n – mode; lowest channel – 5745 MHz; power index 45; mcs 7



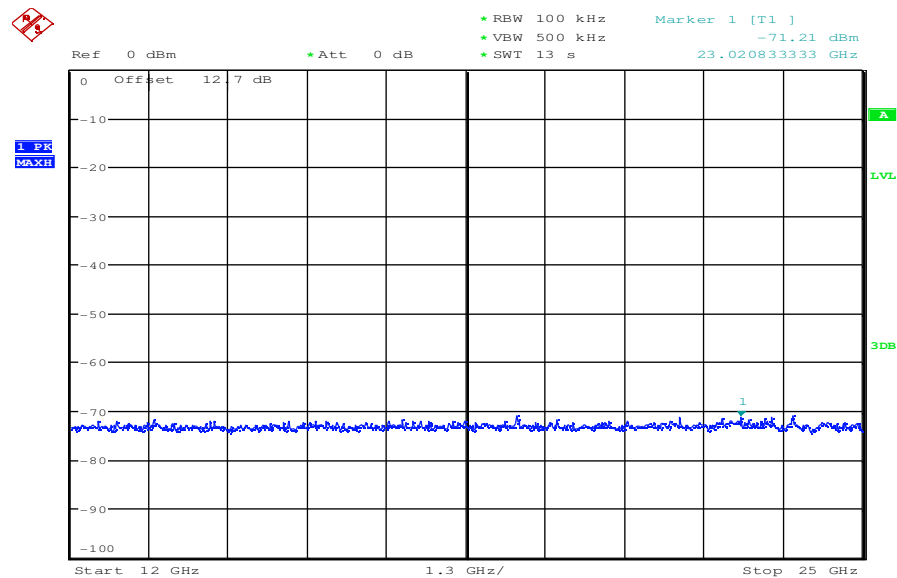
Date: 19.NOV.2010 06:29:57

Plot 2: OFDM / n – mode; lowest channel – 5745 MHz; power index 45; mcs 7



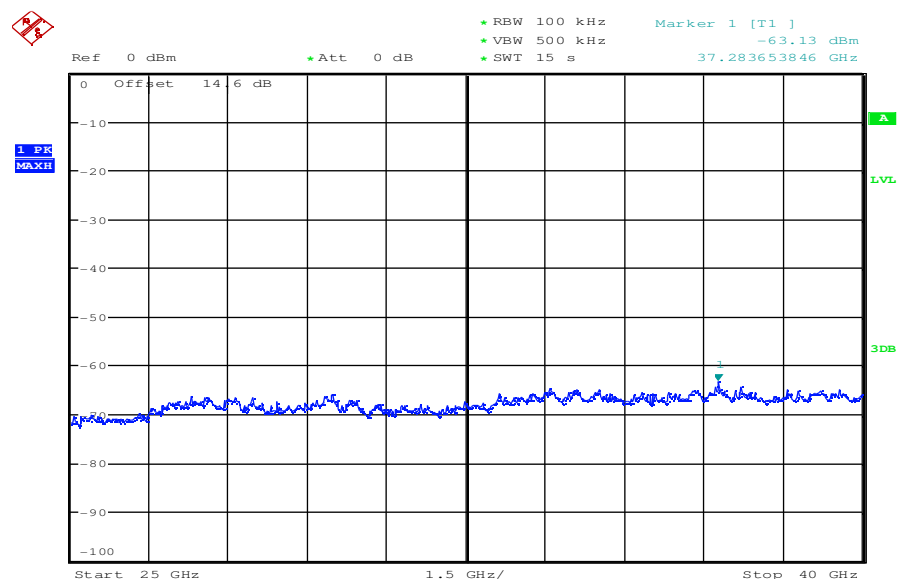
Date: 19.NOV.2010 06:40:19

Plot 3: OFDM / n – mode; lowest channel – 5745 MHz; power index 45; mcs 7

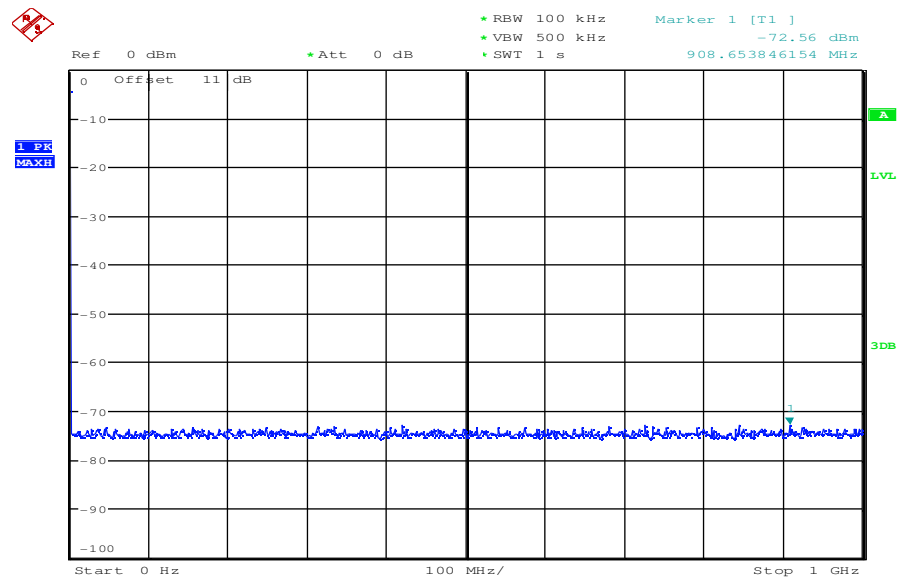


Date: 19.NOV.2010 06:48:47

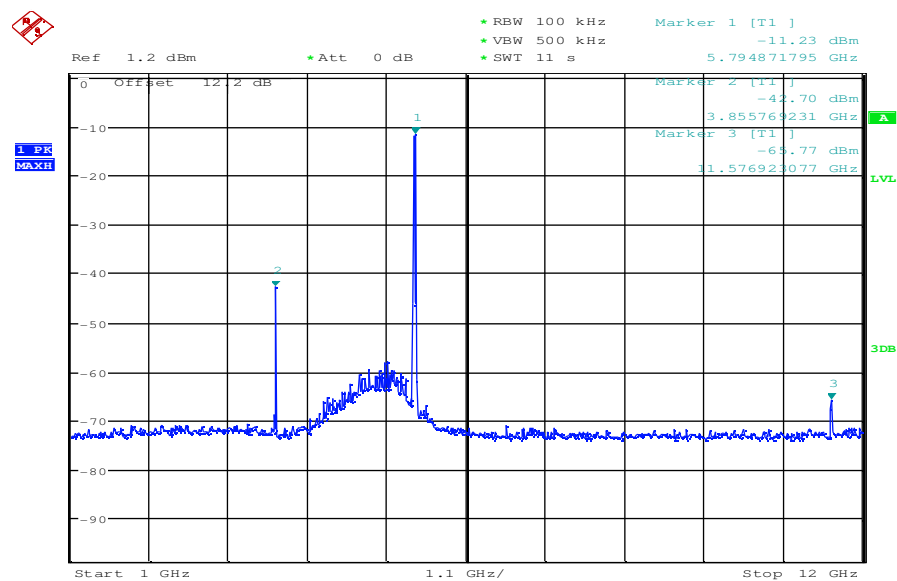
Plot 4: OFDM / n – mode; lowest channel – 5745 MHz; power index 45; mcs 7



Date: 19.NOV.2010 06:57:35

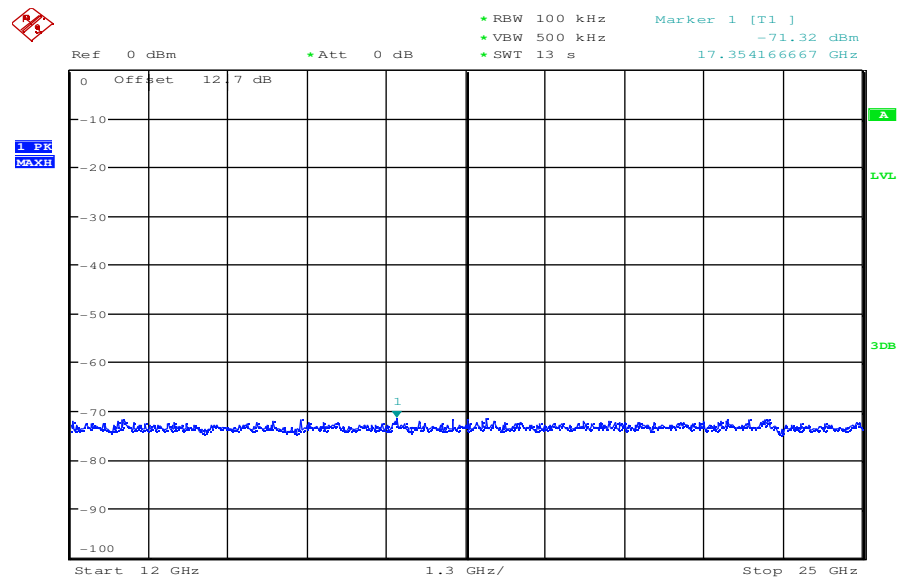
Plot 5: OFDM / n – mode; middle channel – 5785 MHz; power index 45; mcs 7

Date: 19.NOV.2010 06:30:56

Plot 6: OFDM / n – mode; middle channel – 5785 MHz; power index 45; mcs 7

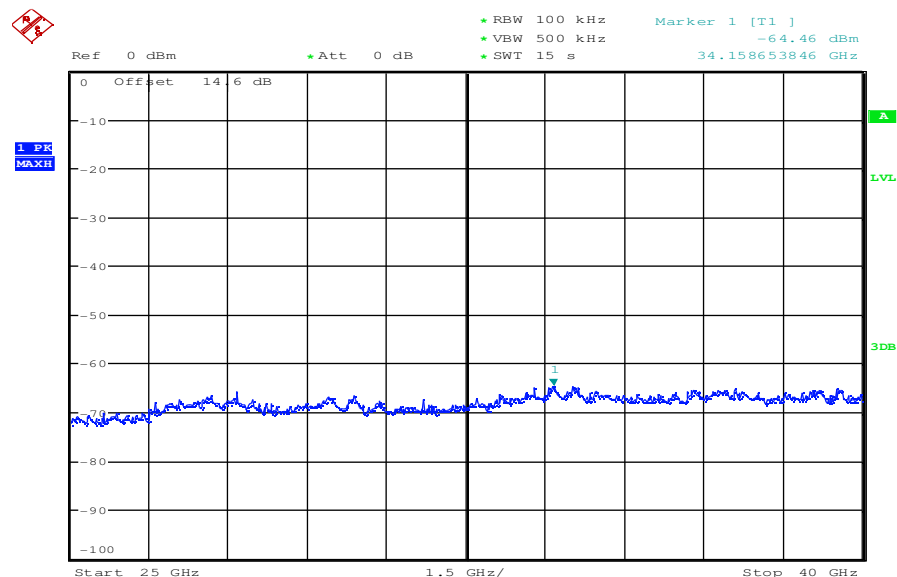
Date: 19.NOV.2010 06:41:40

Plot 7: OFDM / n – mode; middle channel – 5785 MHz; power index 45; mcs 7

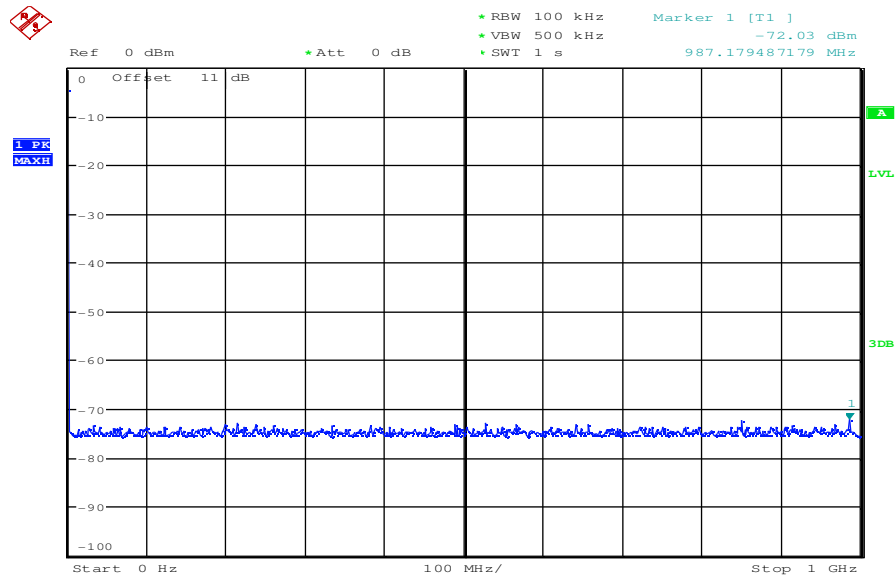


Date: 19.NOV.2010 06:49:45

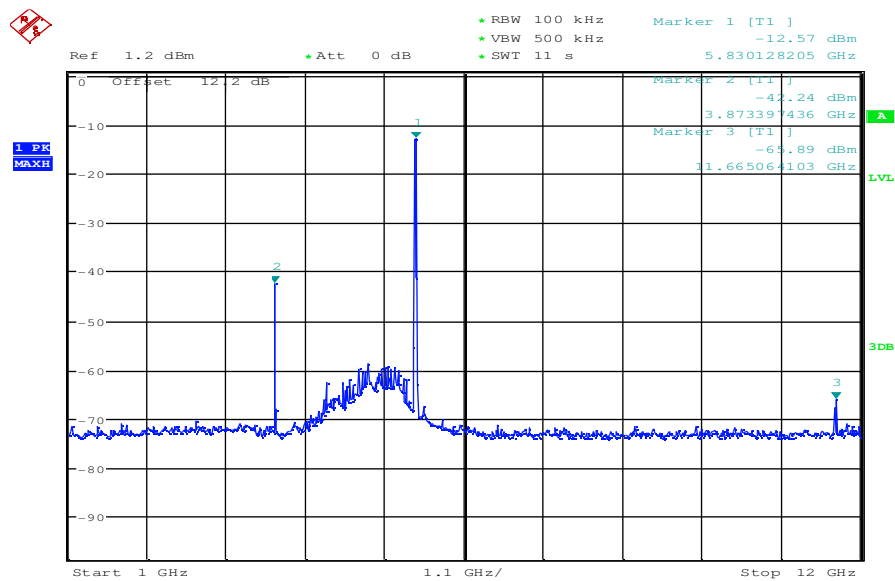
Plot 8: OFDM / n – mode; middle channel – 5785 MHz; power index 45; mcs 7



Date: 19.NOV.2010 06:58:36

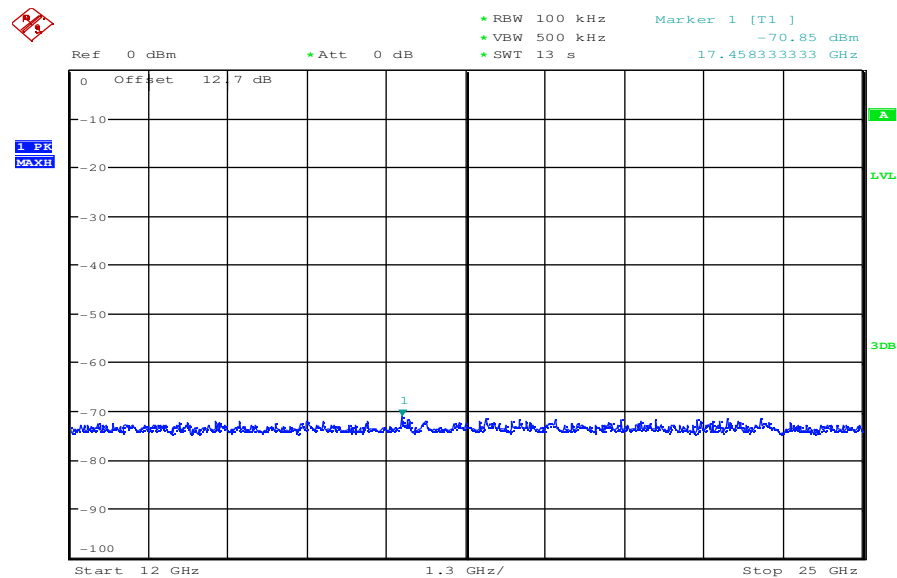
Plot 9: OFDM / n – mode; highest channel – 5825 MHz; power index 45; mcs 7

Date: 19.NOV.2010 06:31:46

Plot 10: OFDM / n – mode; highest channel – 5825 MHz; power index 45; mcs 7

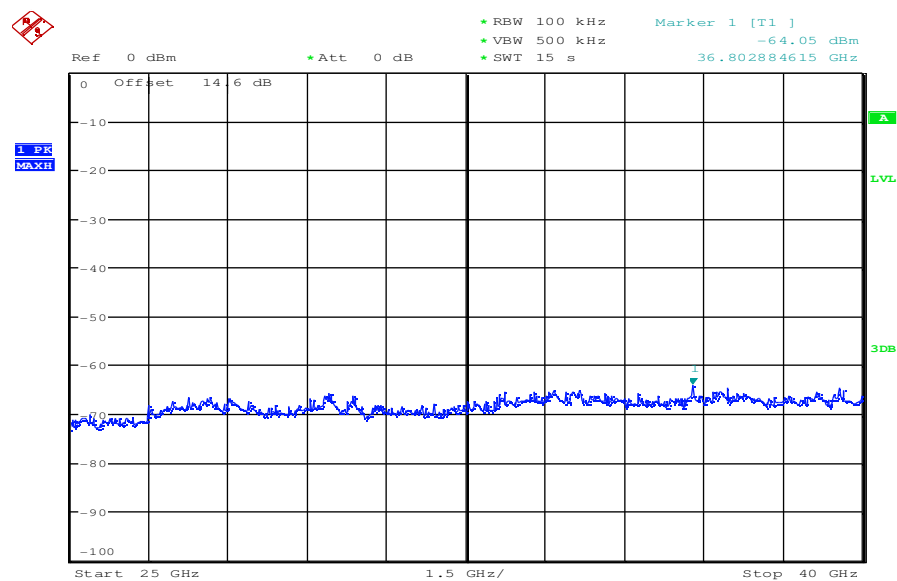
Date: 19.NOV.2010 06:43:24

Plot 11: OFDM / n – mode; highest channel – 5825 MHz; power index 45; mcs 7



Date: 19.NOV.2010 06:50:28

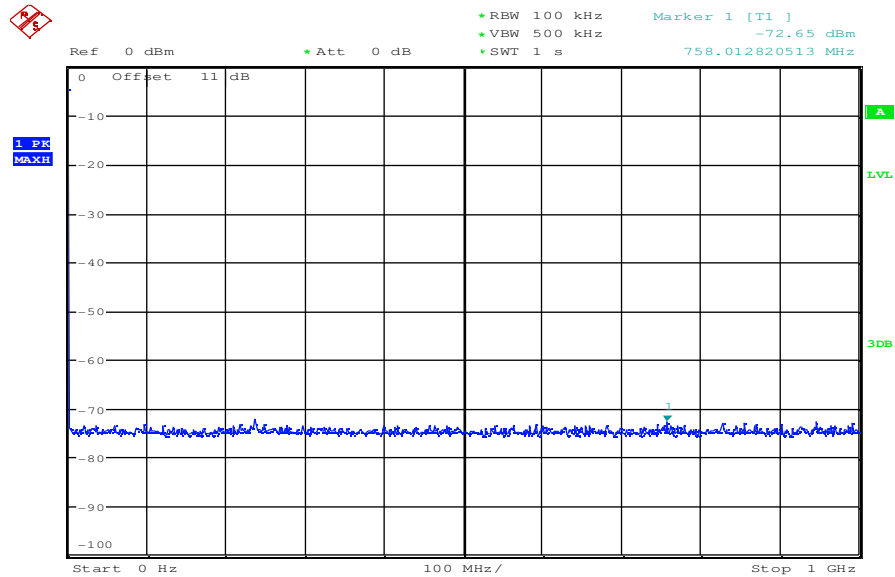
Plot 12: OFDM / n – mode; highest channel – 5825 MHz; power index 45; mcs 7



Date: 19.NOV.2010 06:59:20

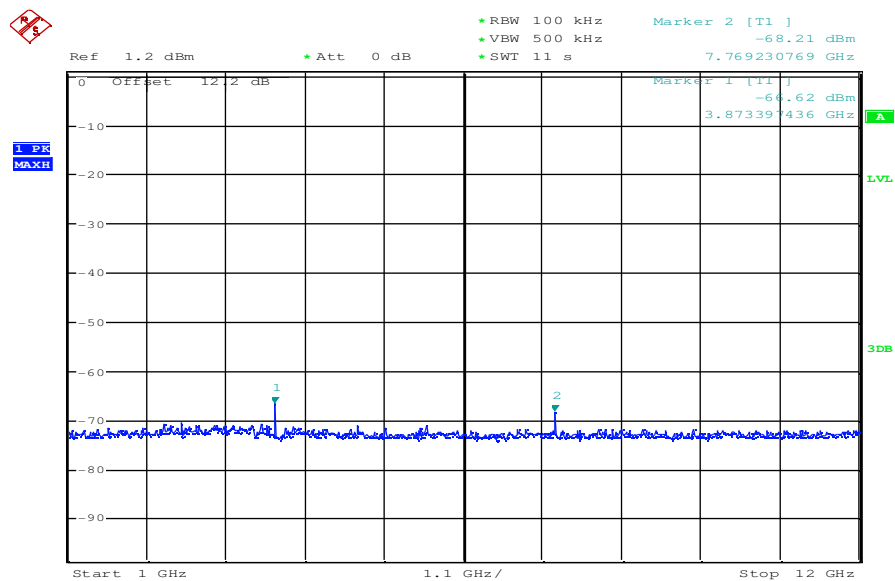
RX – mode / Idle – mode:

Plot 1: RX – mode



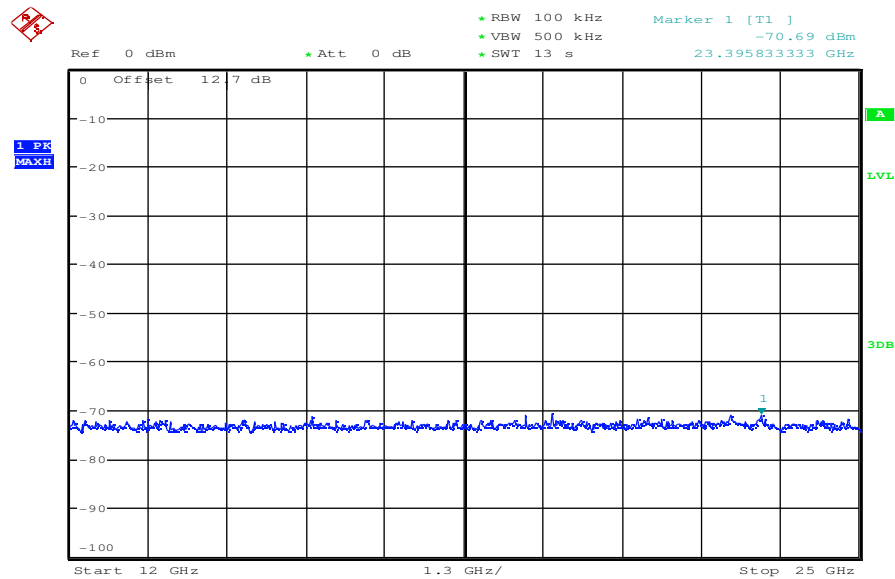
Date: 19.NOV.2010 06:32:35

Plot 2: RX – mode



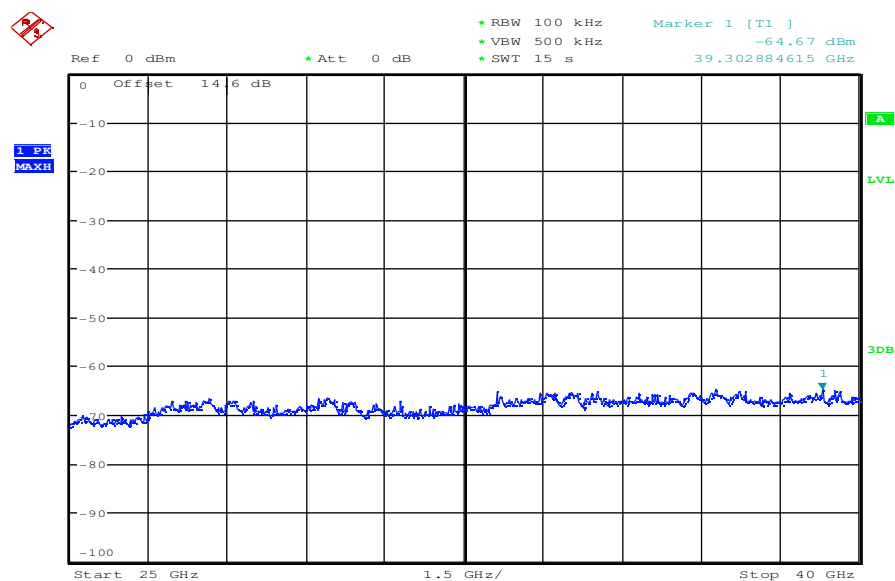
Date: 19.NOV.2010 06:34:19

Plot 3: RX – mode



Date: 19.NOV.2010 06:51:28

Plot 4: RX – mode



Date: 19.NOV.2010 06:52:48

9.10 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Re-measurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 40 GHz
Trace-Mode:	Max Hold
Measured Modulation	☒ OFDM a & n mode

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

Limits:

FCC		IC
CFR Part 15.247(d)		RSS 210, Issue 8, A 8.5
TX Spurious Emissions Radiated		
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
§15.209		
Frequency (MHz)	Field Strength (dBμV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Results:**OFDM – mode / a – mode:**

TX Spurious Emissions Radiated [dBμV/m]								
OFDM – mode (a – mode)								
5745 MHz			5785 MHz			5825 MHz		
F	Detector	Level	F	Detector	Level	F	Detector	Level
3830.0	1 MHz / 10 Hz PP	49.80 dBμV/m vertical 50.57 dBμV/m horizontal	3856.7	1 MHz / 10 Hz PP	49.56 dBμV/m vertical 51.41 dBμV/m horizontal	3883.3	1 MHz / 10 Hz PP	50.95 dBμV/m vertical 50.41 dBμV/m horizontal
5625.0	1 MHz / 10 Hz PP	43.67 dBμV/m vertical 42.98 dBμV/m horizontal	5376.7	1 MHz / 10 Hz PP	44.27 dBμV/m vertical 43.86 dBμV/m horizontal	5665	-/-	Do not fall into a r. b.
11490.0	1 MHz / 10 Hz PP	50.53 dBμV/m vertical 49.71 dBμV/m horizontal	7713.2	1 MHz / 10 Hz PP	42.43 dBμV/m vertical 43.99 dBμV/m horizontal	11650.0	1 MHz / 10 Hz PP	51.89 dBμV/m vertical 51.01 dBμV/m horizontal
15324.5	1 MHz / 1 MHz PP	48.78 dBμV/m vertical & horizontal	11570.0	1 MHz / 10 Hz PP	51.33 dBμV/m vertical 49.51 dBμV/m horizontal	15534.9	1 MHz / 1 MHz PP	45.65 dBμV/m vertical & horizontal
17234.4	1 MHz / 1 MHz PP	51.98 dBμV/m vertical & horizontal	15425.5	1 MHz / 1 MHz PP	44.07 dBμV/m vertical & horizontal	17470.0	1 MHz / 1 MHz PP	50.44 dBμV/m vertical & horizontal
22974.4	1 MHz / 1 MHz PP	50.59 dBμV/m vertical & horizontal	17352.2	1 MHz / 1 MHz PP	49.84 dBμV/m vertical & horizontal	23307.7	1 MHz / 1 MHz PP	50.98 dBμV/m vertical & horizontal
28714.7	1 MHz / 1 MHz PP	49.28 dBμV/m vertical & horizontal	23141.0	1 MHz / 1 MHz PP	50.49 dBμV/m vertical & horizontal	29118.6	1 MHz / 1 MHz PP	50.83 dBμV/m vertical & horizontal
34480.8	1 MHz / 1 MHz PP	50.20 dBμV/m vertical & horizontal	28916.7	1 MHz / 1 MHz PP	50.38 dBμV/m vertical & horizontal	34974.4	1 MHz / 1 MHz PP	50.65 dBμV/m vertical & horizontal
All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.			All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.			All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.		
Measurement uncertainty			± 3 dB					

Result: The result of the measurement is passed.

OFDM – mode / n – mode:

TX Spurious Emissions Radiated [dBμV/m]								
OFDM – mode (n – mode)								
5745 MHz			5785 MHz			5825 MHz		
F	Detector	Level	F	Detector	Level	F	Detector	Level
3883.3	1 MHz / 10 Hz PP	50.95 dBμV/m vertical 50.41 dBμV/m horizontal	3856.7	1 MHz / 10 Hz PP	50.08 dBμV/m vertical 50.31 dBμV/m horizontal	3883.3	1 MHz / 10 Hz PP	50.14 dBμV/m vertical 49.77 dBμV/m horizontal
11650.0	1 MHz / 10 Hz PP	51.89 dBμV/m vertical 51.01 dBμV/m horizontal	11570.0	1 MHz / 10 Hz PP	47.89 dBμV/m vertical 46.91 dBμV/m horizontal	11650.0	1 MHz / 10 Hz PP	47.09 dBμV/m vertical 46.53 dBμV/m horizontal
15324.5	1 MHz / 1 MHz PP	39.88 dBμV/m vertical & horizontal	15425.5	1 MHz / 1 MHz PP	44.33 dBμV/m vertical & horizontal	15534.9	1 MHz / 1 MHz PP	48.34 dBμV/m vertical & horizontal
17234.4	1 MHz / 1 MHz PP	51.80 dBμV/m vertical & horizontal	17352.2	1 MHz / 1 MHz PP	51.29 dBμV/m vertical & horizontal	17470.0	1 MHz / 1 MHz PP	50.91 dBμV/m vertical & horizontal
22987.2	1 MHz / 1 MHz PP	52.38 dBμV/m vertical & horizontal	23128.2	1 MHz / 1 MHz PP	51.93 dBμV/m vertical & horizontal	23307.7	1 MHz / 1 MHz PP	50.12 dBμV/m vertical & horizontal
28737.2	1 MHz / 1 MHz PP	52.15 dBμV/m vertical & horizontal	28916.7	1 MHz / 1 MHz PP	52.50 dBμV/m vertical & horizontal	29118.6	1 MHz / 1 MHz PP	51.14 dBμV/m vertical & horizontal
34480.8	1 MHz / 1 MHz PP	51.52 dBμV/m vertical & horizontal	34727.6	1 MHz / 1 MHz PP	50.97 dBμV/m vertical & horizontal	34951.9	1 MHz / 1 MHz PP	49.55 dBμV/m vertical & horizontal
All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.			All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.			All other detected emissions are more than 20 dB below the limit. For emissions below 1 GHz – please take a look at the table below the 1 GHz plot.		
Measurement uncertainty			± 3 dB					

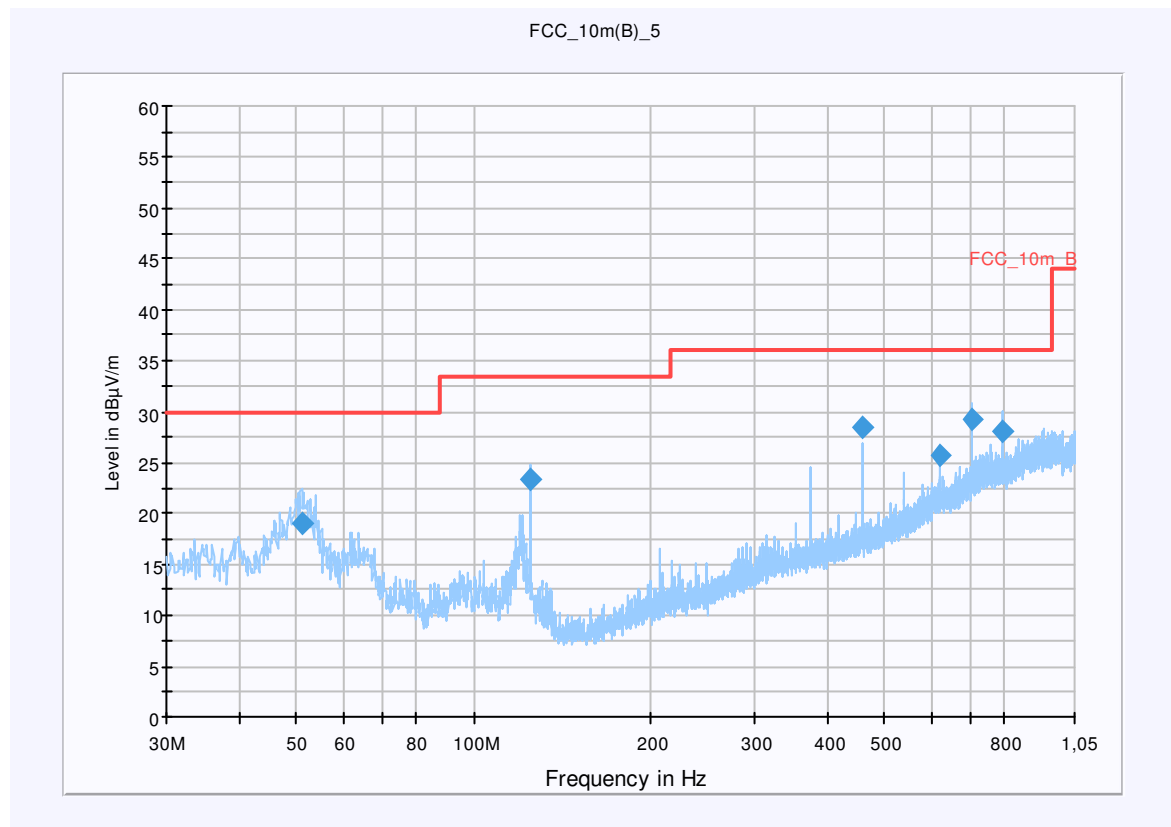
Result: The result of the measurement is passed.

OFDM – mode / a – mode (54 MBit/s):**Plot 1:** lowest channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization**Common Information**

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5745 MHz, CH 149, 54Mbps, a mode, power index 45
 Operator Name: Merten
 Comment: DC powered via development 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

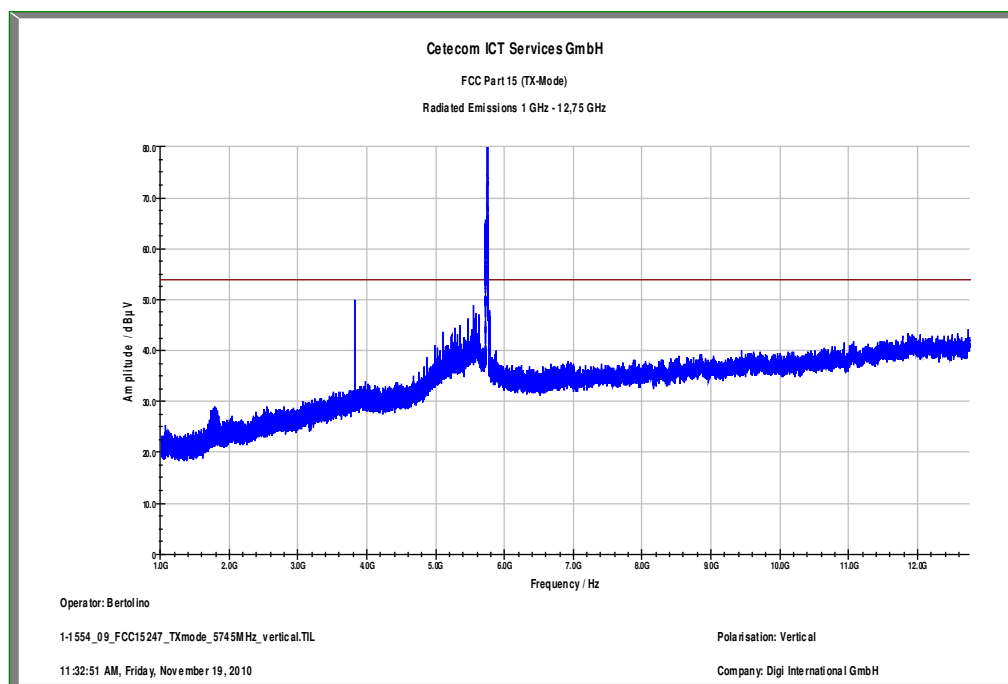
**Final Result 1**

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
51.000000	19.0	15000.000	120.000	98.0	V	228.0	13.3	11.0	30.0	
124.680000	23.5	15000.000	120.000	98.0	V	238.0	9.8	10.0	33.5	
457.200000	28.5	15000.000	120.000	212.0	H	173.0	17.8	7.5	36.0	
623.400000	25.8	15000.000	120.000	135.0	H	36.0	20.9	10.2	36.0	
706.560000	29.2	15000.000	120.000	120.0	H	53.0	22.7	6.8	36.0	
789.600000	28.1	15000.000	120.000	129.0	H	-2.0	23.8	7.9	36.0	

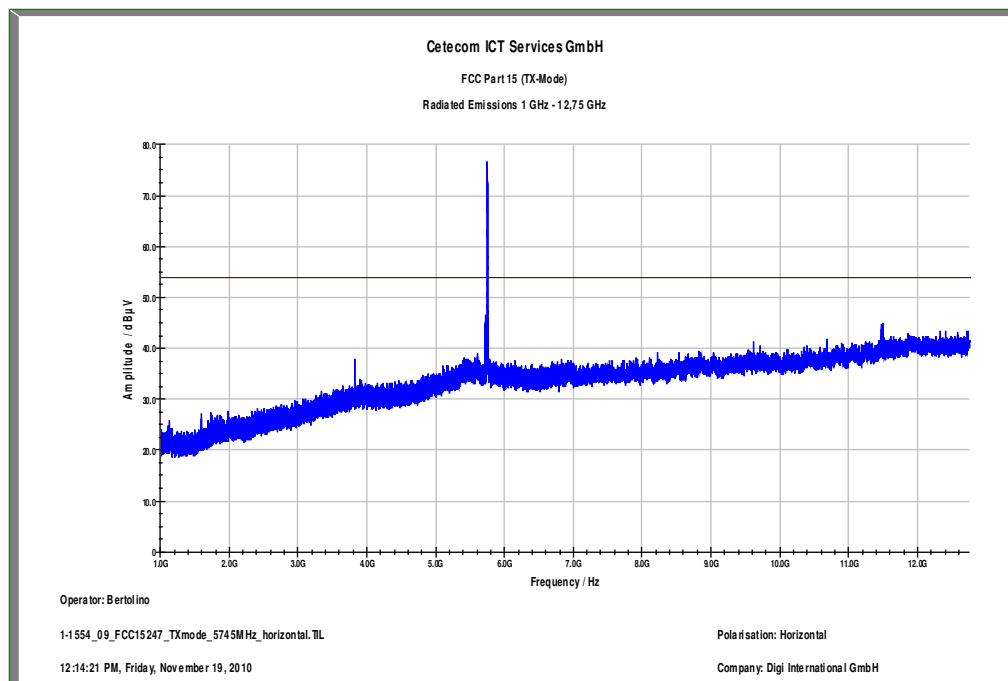
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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

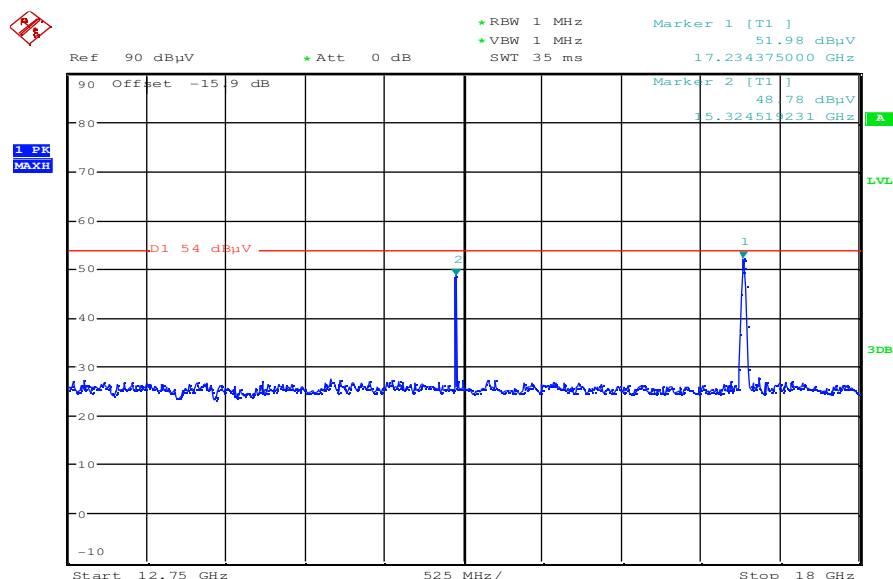
EMC 32 Version 8.10.00

Plot 2: lowest channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

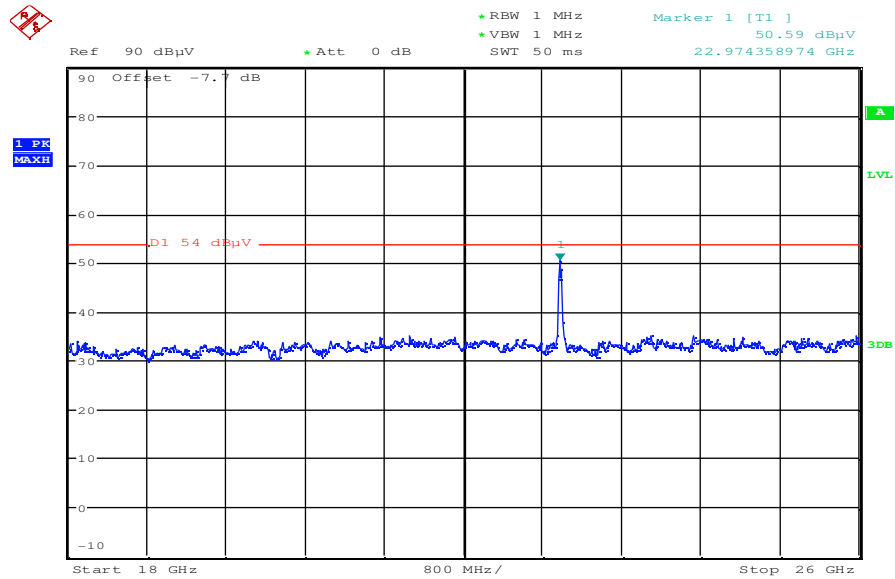
Plot 3: lowest channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization



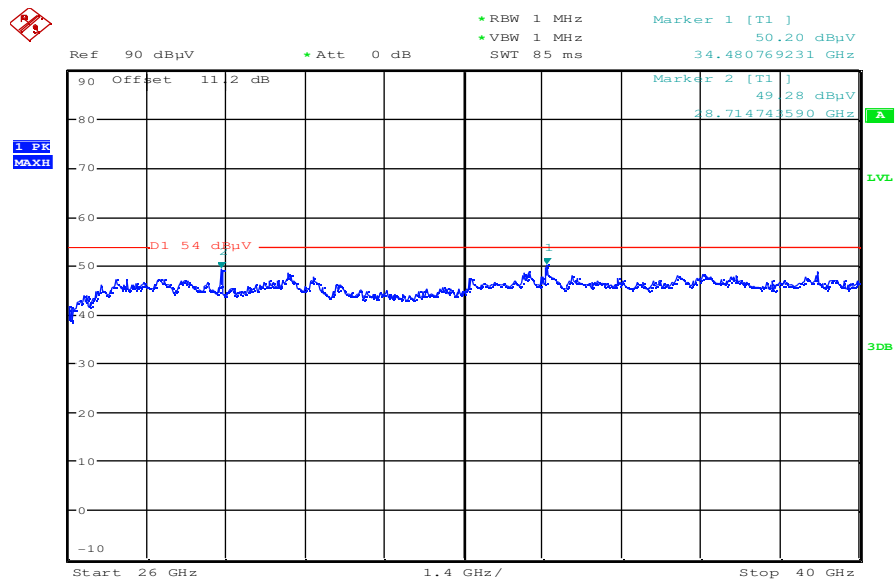
Plot 4: lowest channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 07:44:04

Plot 5: lowest channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 07:55:51

Plot 6: lowest channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:10:03

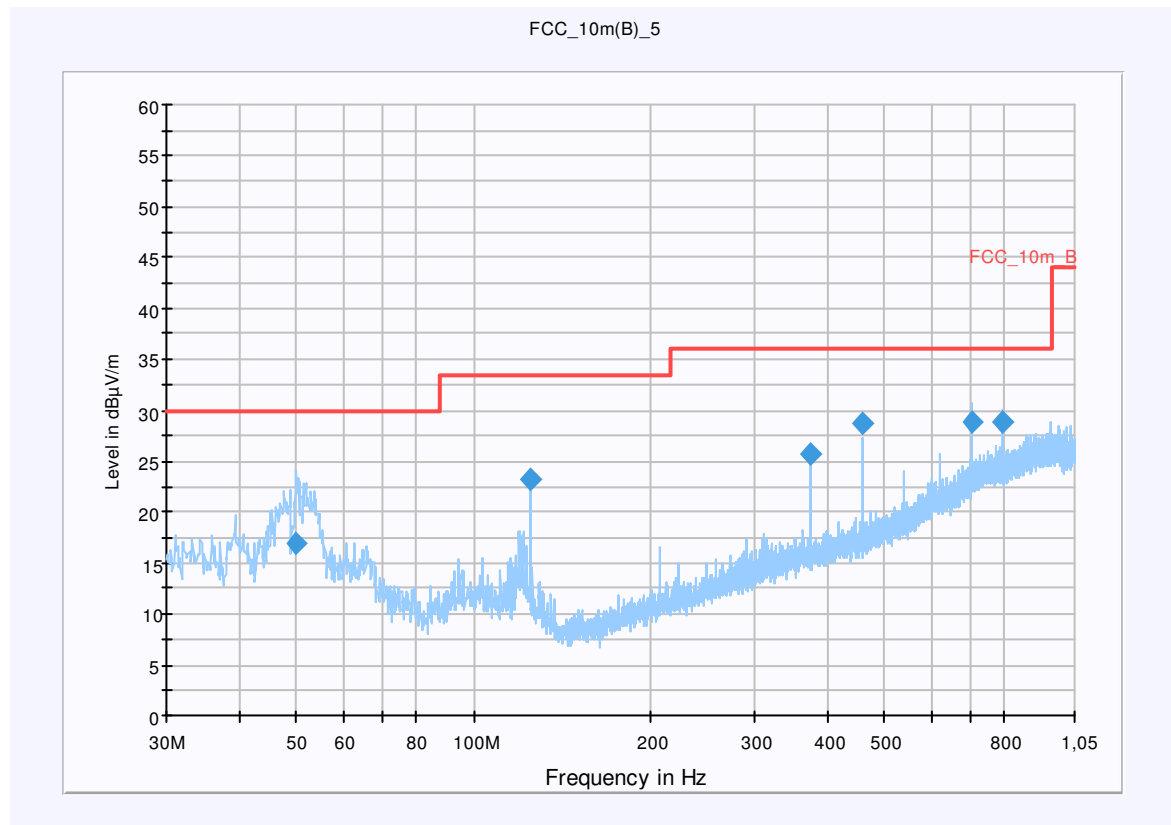
Plot 7: middle channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization

Common Information

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5785 MHz, CH 157, 54Mbps, a mode, power index 45
 Operator Name: Merten
 Comment: DC powered via development 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



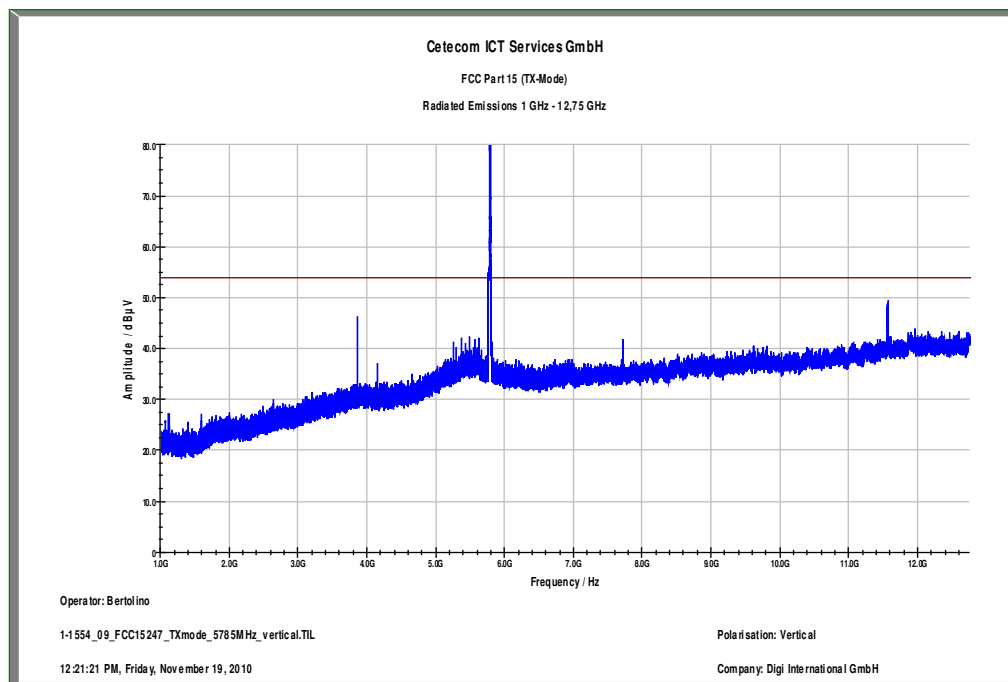
Final Result 1

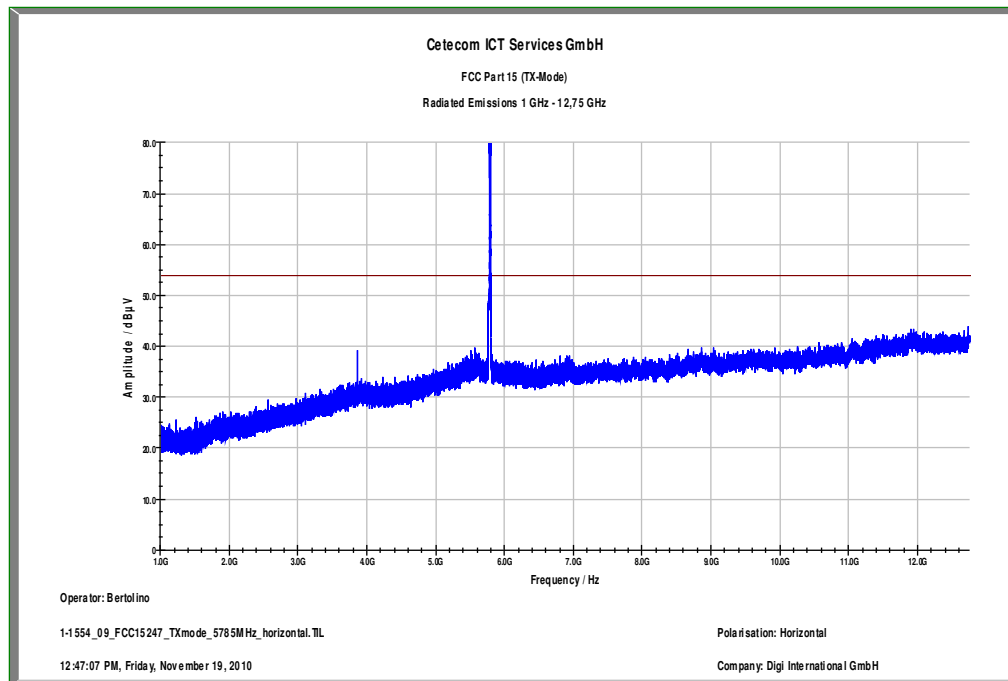
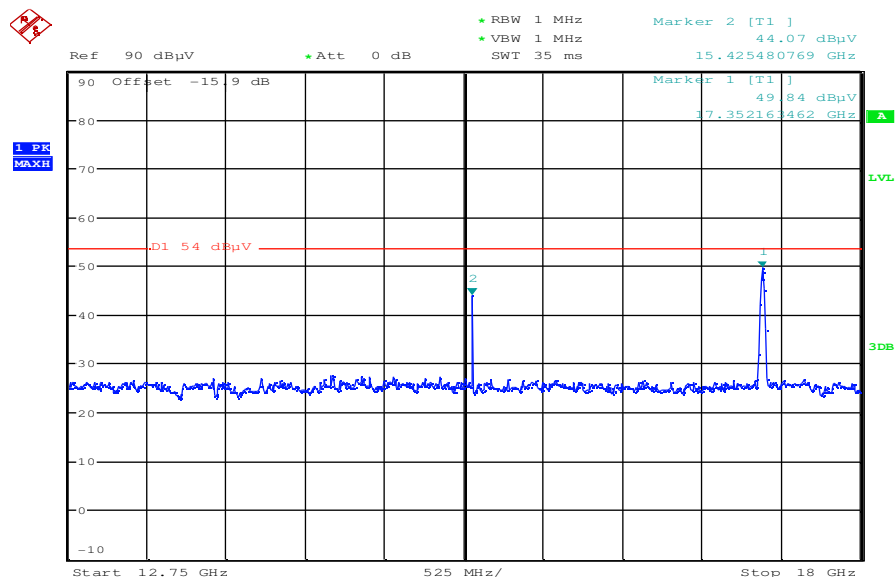
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
50.040000	16.9	15000.000	120.000	172.0	V	55.0	13.4	13.1	30.0	
124.680000	23.2	15000.000	120.000	120.0	V	86.0	9.8	10.3	33.5	
374.040000	25.8	15000.000	120.000	232.0	H	-2.0	16.5	10.2	36.0	
457.200000	28.7	15000.000	120.000	180.0	H	162.0	17.8	7.3	36.0	
706.560000	28.9	15000.000	120.000	109.0	H	333.0	22.7	7.1	36.0	
789.600000	28.9	15000.000	120.000	98.0	H	342.0	23.8	7.1	36.0	

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

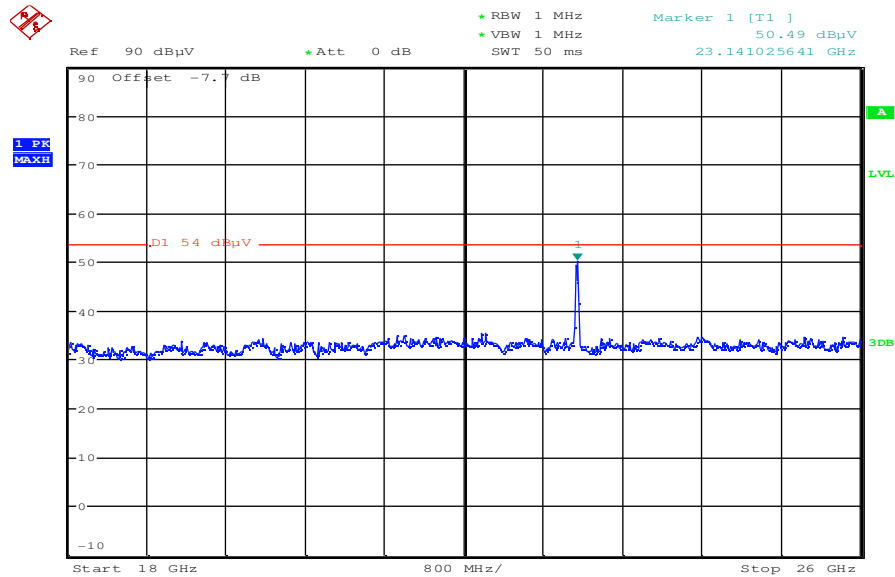
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)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

EMC 32 Version 8.10.00

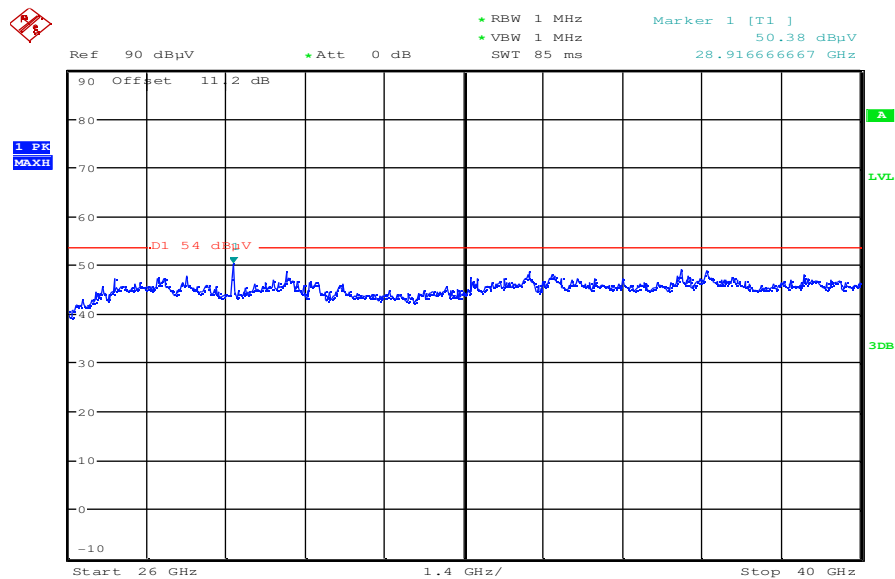
Plot 8: middle channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

Plot 9: middle channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization**Plot 10:** middle channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 07:45:39

Plot 11: middle channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 07:57:07

Plot 12: middle channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:11:11

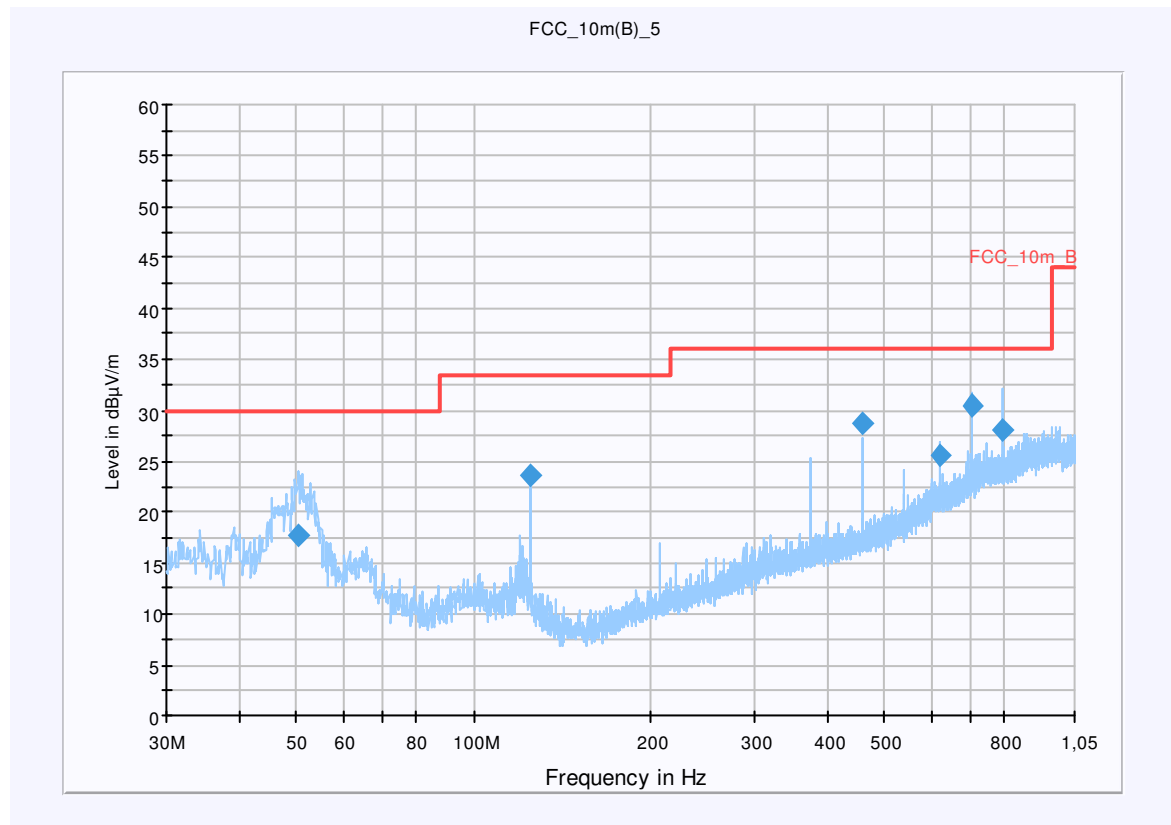
Plot 13: highest channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization

Common Information

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5825 MHz, CH 165, 54Mbps, a mode, power index 45
 Operator Name: Merten
 Comment: DC powered via development 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



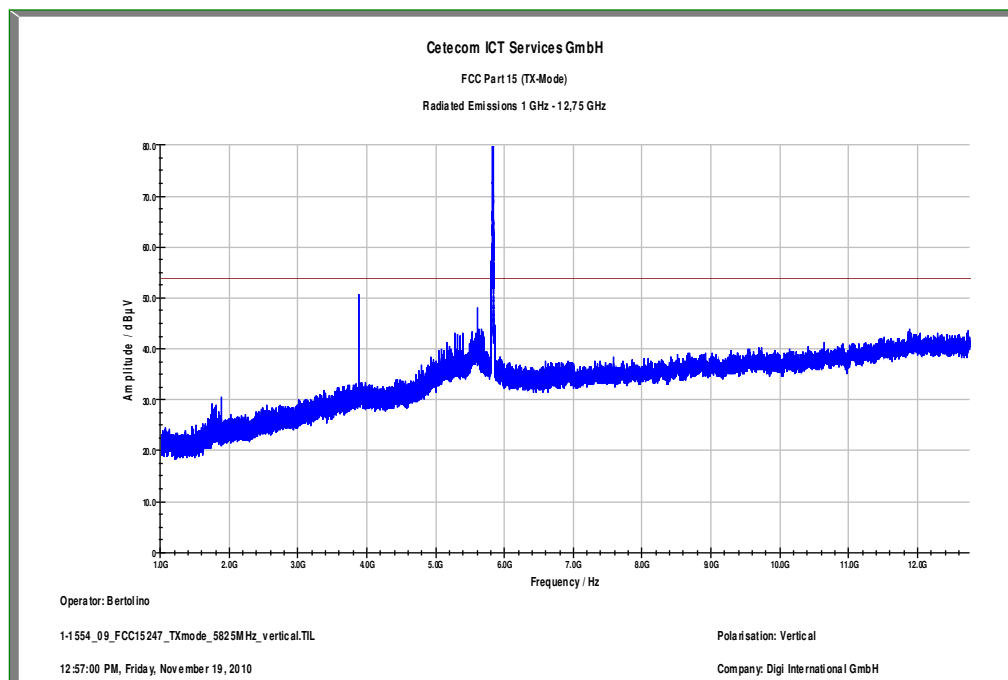
Final Result 1

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
50.280000	17.6	15000.000	120.000	110.0	V	102.0	13.3	12.4	30.0	
124.680000	23.7	15000.000	120.000	121.0	V	238.0	9.8	9.8	33.5	
457.200000	28.7	15000.000	120.000	180.0	H	172.0	17.8	7.3	36.0	
623.400000	25.5	15000.000	120.000	160.0	H	38.0	20.9	10.5	36.0	
706.560000	30.4	15000.000	120.000	98.0	H	153.0	22.7	5.6	36.0	
789.720000	28.1	15000.000	120.000	117.0	H	46.0	23.8	7.9	36.0	

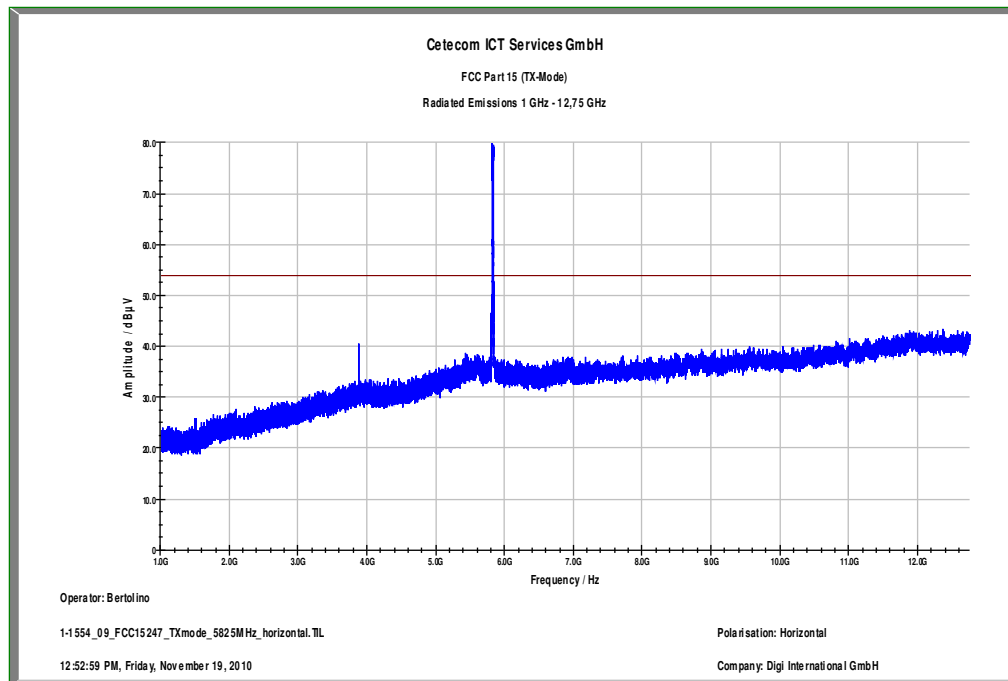
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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

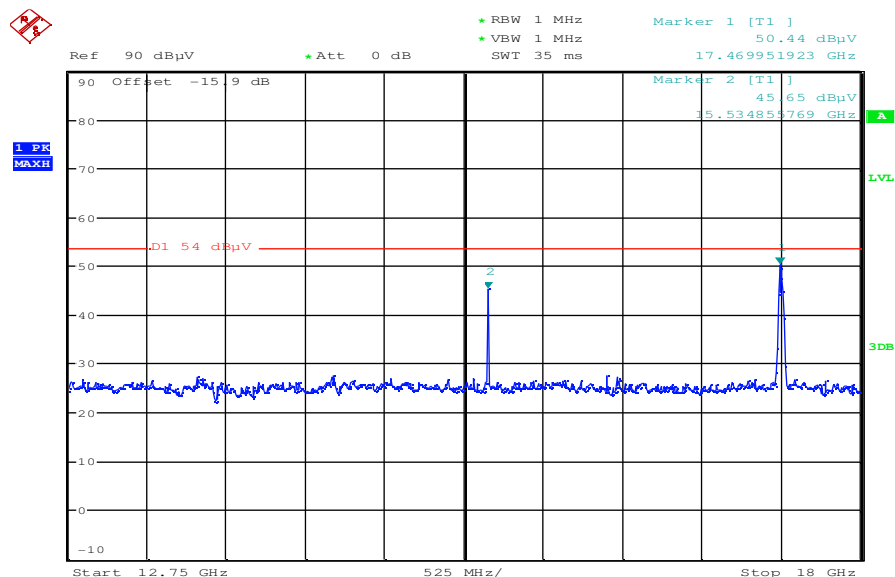
EMC 32 Version 8.10.00

Plot 14: highest channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

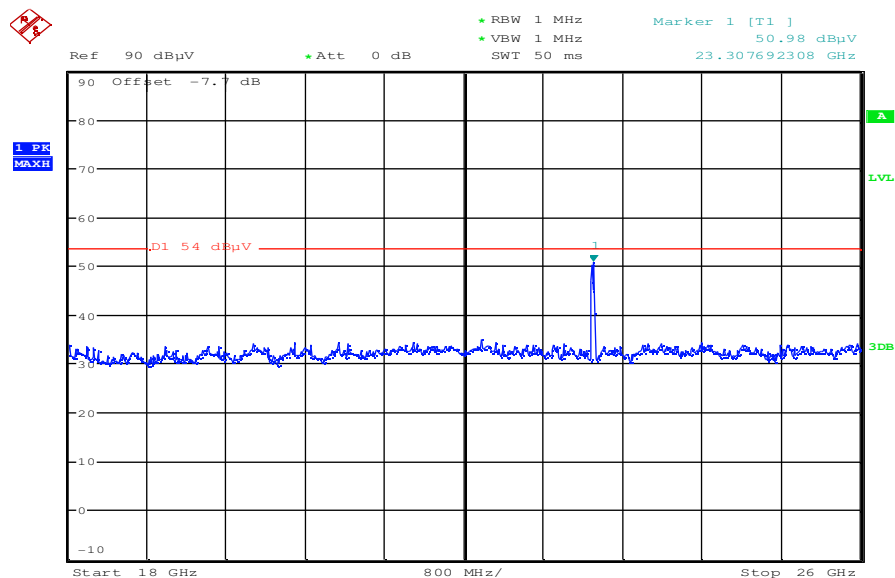
Plot 15: highest channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization



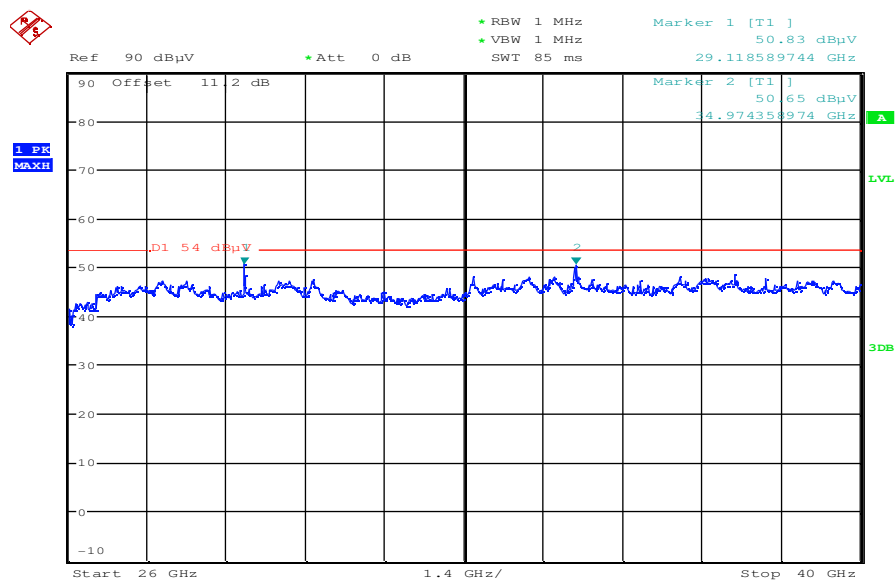
Plot 16: highest channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 07:47:01

Plot 17: highest channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 07:59:01

Plot 18: highest channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization

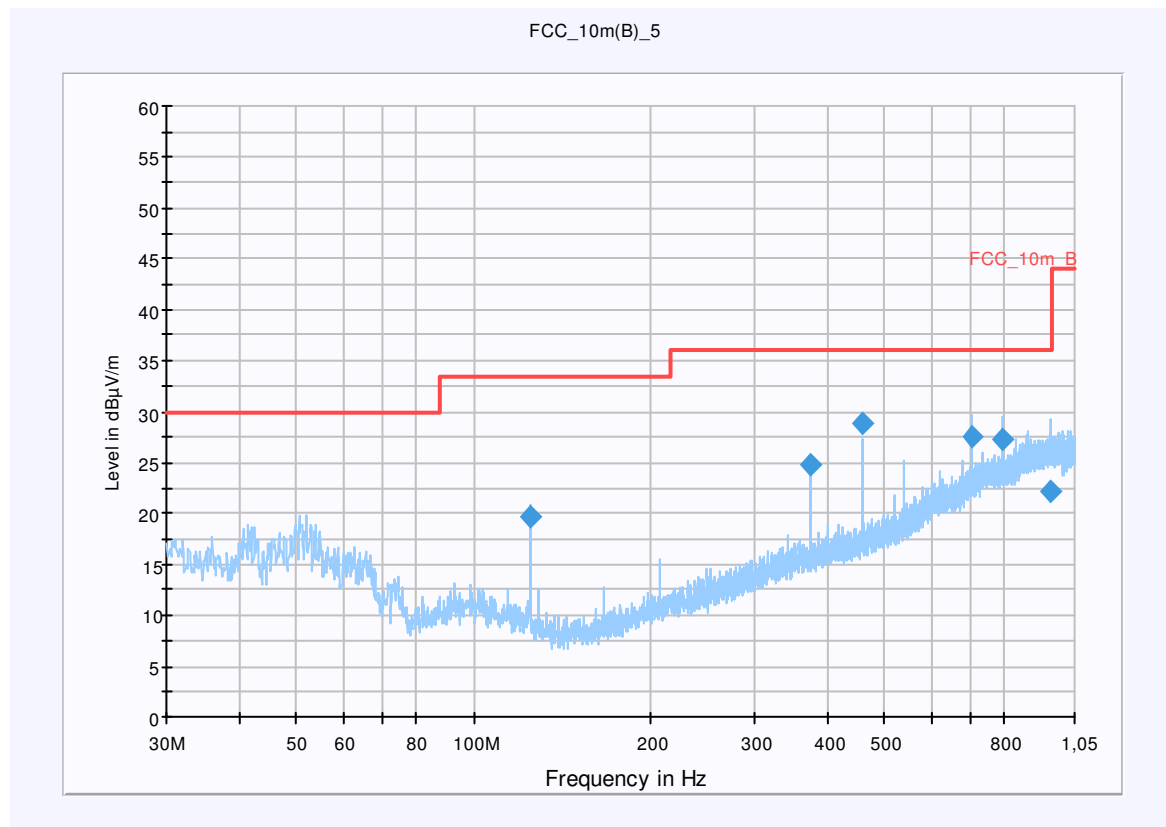
Date: 19.NOV.2010 08:12:23

OFDM – mode / n – mode (mcs 7):**Plot 1:** lowest channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization**Common Information**

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5745 MHz, CH 149, mcs7, n mode, power index 45
 Operator Name: Hennemann
 Comment: DC powered via development board

Scan Setup: STAN_Fin [EMI radiated]

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

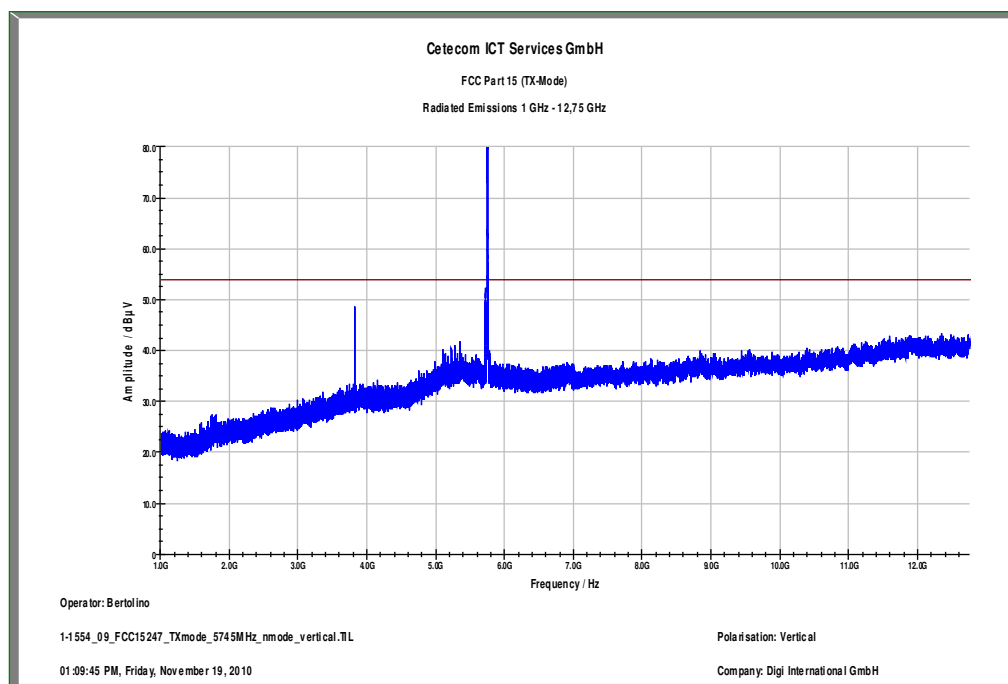
**Final Result 1**

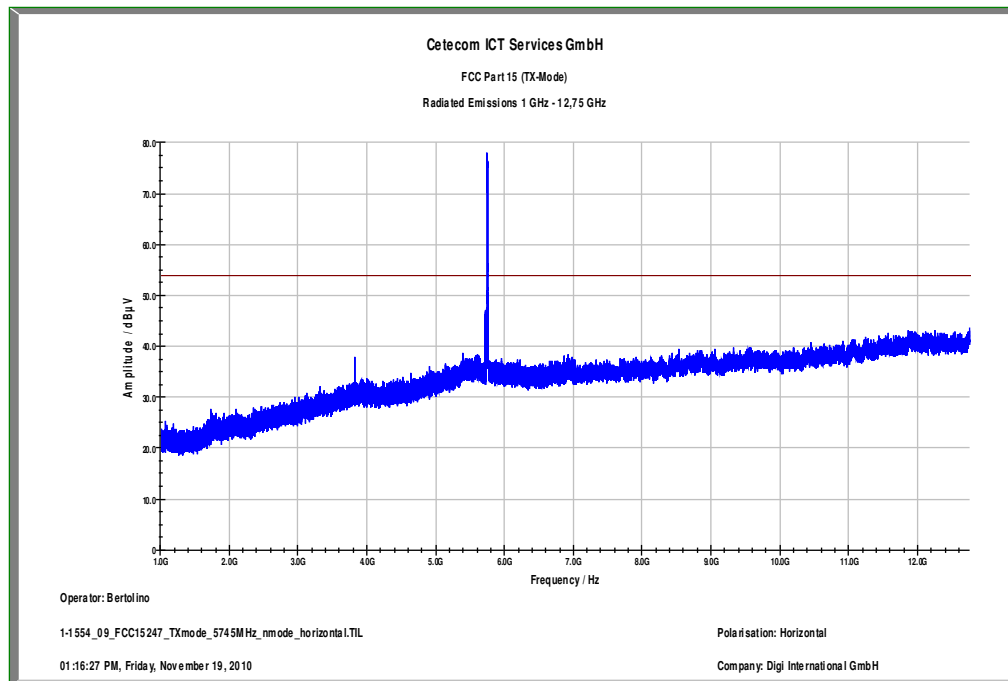
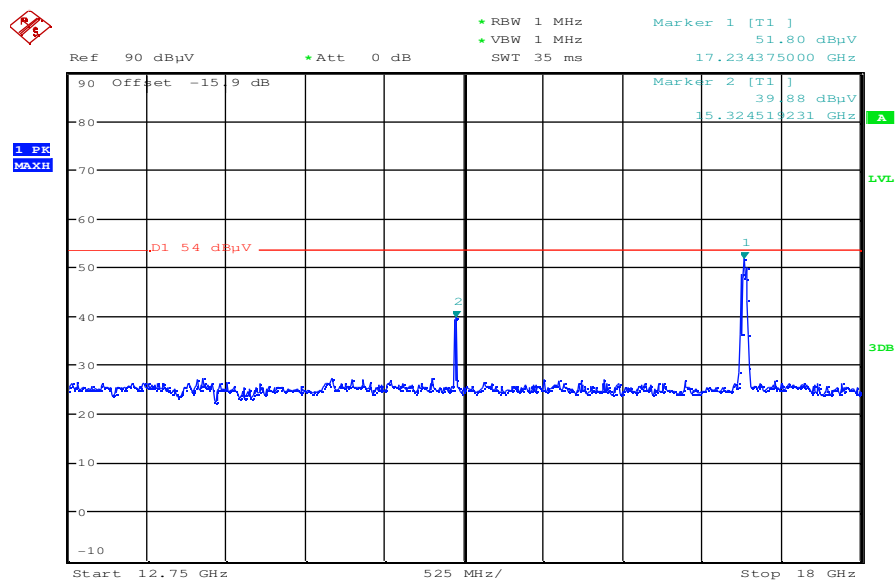
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
124.680000	19.7	15000.000	120.000	98.0	V	182.0	9.8	13.8	33.5	
374.040000	24.7	15000.000	120.000	235.0	H	-2.0	16.5	11.3	36.0	
457.200000	28.9	15000.000	120.000	203.0	H	162.0	17.8	7.1	36.0	
706.560000	27.6	15000.000	120.000	98.0	H	171.0	22.7	8.4	36.0	
789.600000	27.3	15000.000	120.000	106.0	H	162.0	23.8	8.7	36.0	
958.320000	22.3	15000.000	120.000	251.0	V	-2.0	25.4	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

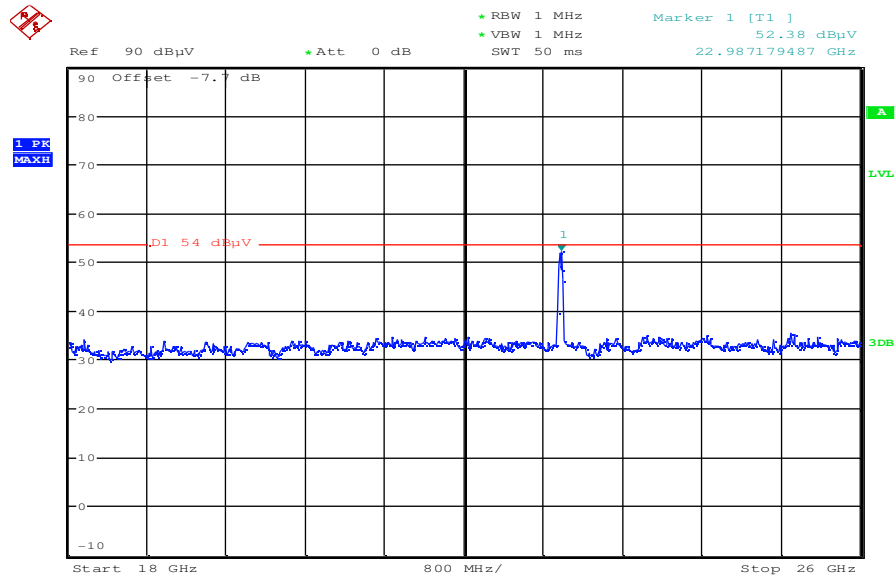
EMC 32 Version 8.10.00

Plot 2: lowest channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

Plot 3: lowest channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization**Plot 4:** lowest channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization

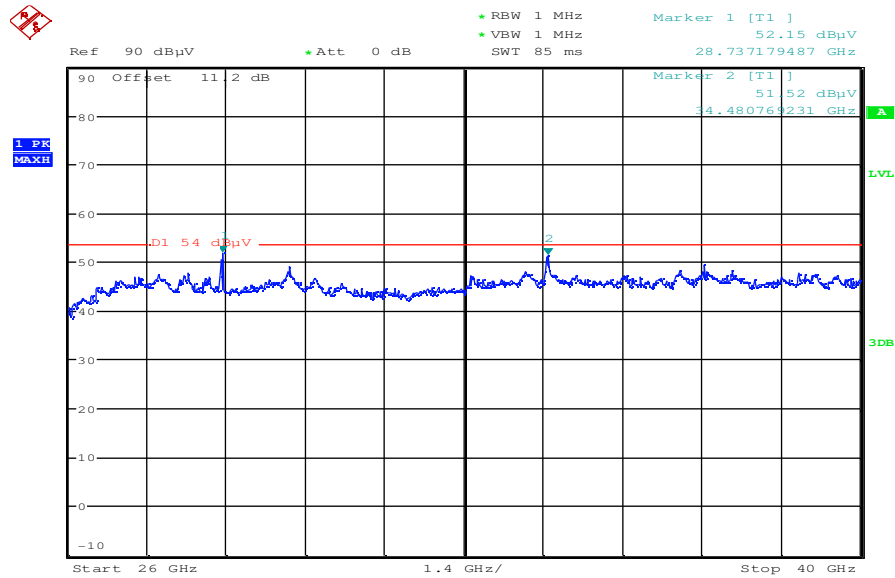
Date: 19.NOV.2010 07:48:44

Plot 5: lowest channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 08:00:24

Plot 6: lowest channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 08:13:36

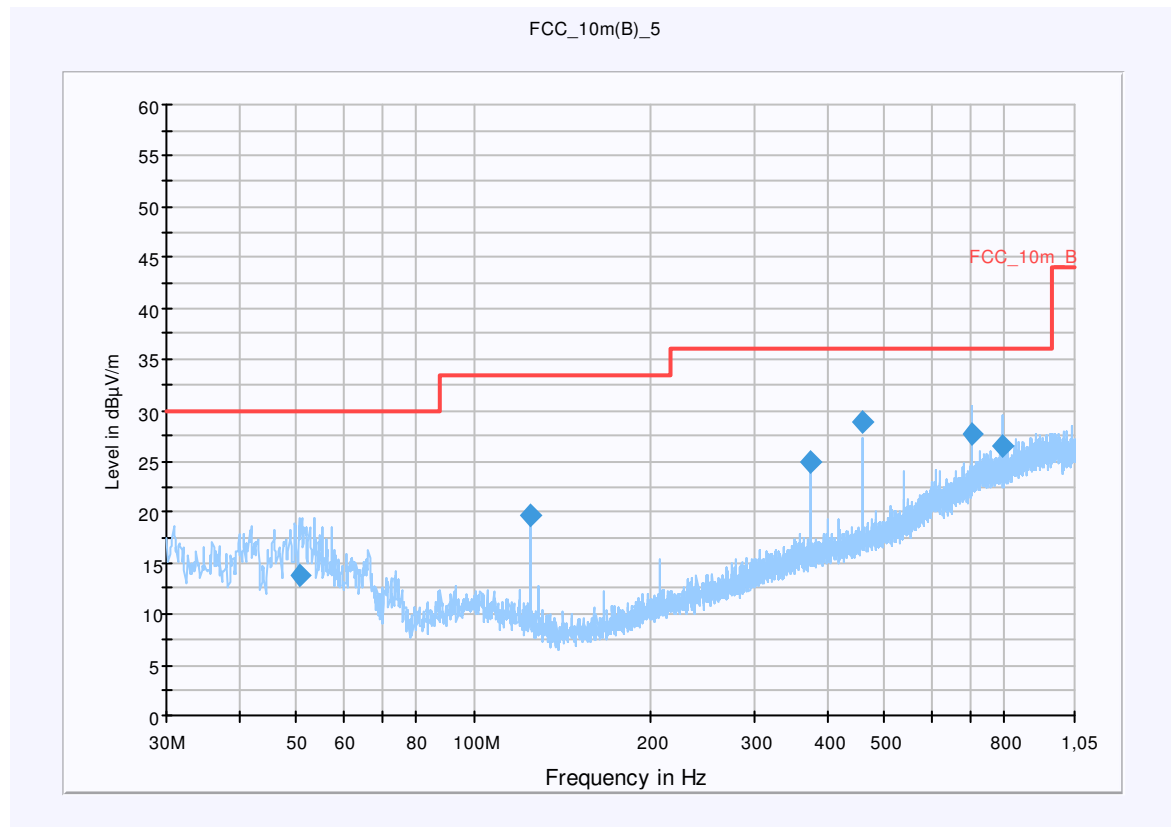
Plot 7: middle channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization

Common Information

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5785 MHz, CH 157, mcs7, n mode, power index 45
 Operator Name: Hennemann
 Comment: DC powered via development 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



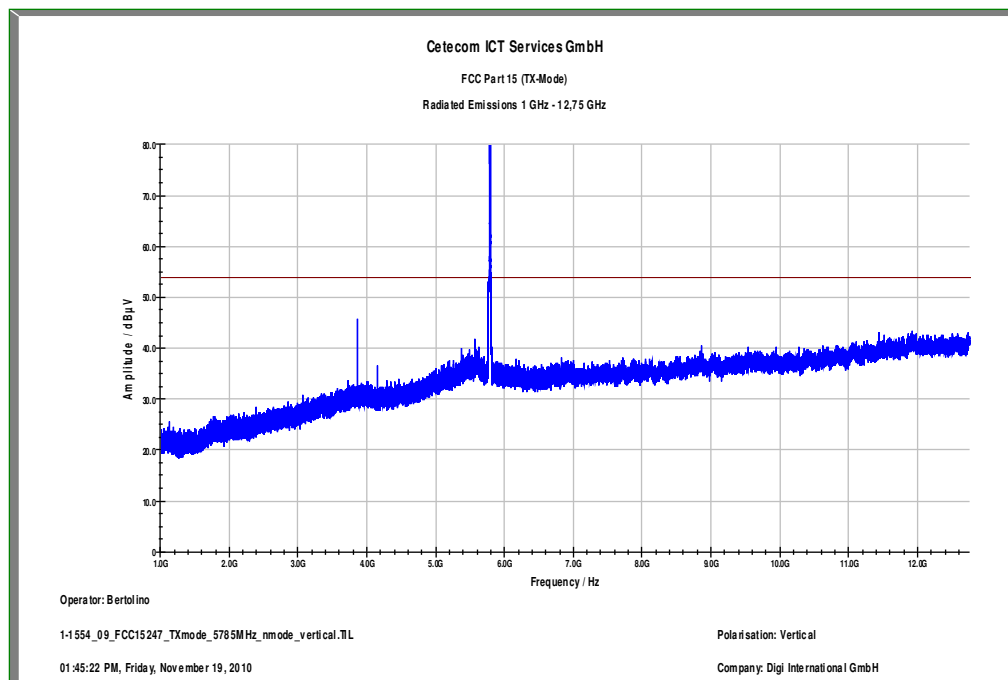
Final Result 1

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
50.520000	13.7	15000.000	120.000	126.0	V	45.0	13.3	16.3	30.0	
124.680000	19.7	15000.000	120.000	98.0	V	123.0	9.8	13.8	33.5	
374.040000	25.0	15000.000	120.000	228.0	H	10.0	16.5	11.0	36.0	
457.200000	28.9	15000.000	120.000	202.0	H	161.0	17.8	7.1	36.0	
706.560000	27.7	15000.000	120.000	98.0	H	45.0	22.7	8.3	36.0	
789.600000	26.6	15000.000	120.000	98.0	H	352.0	23.8	9.4	36.0	

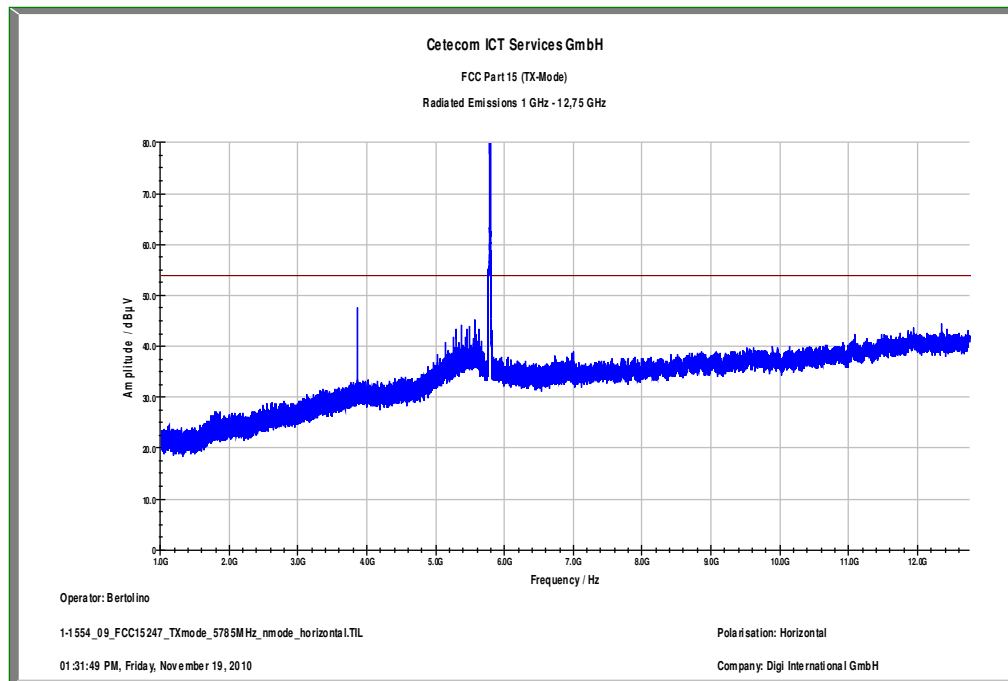
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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 (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

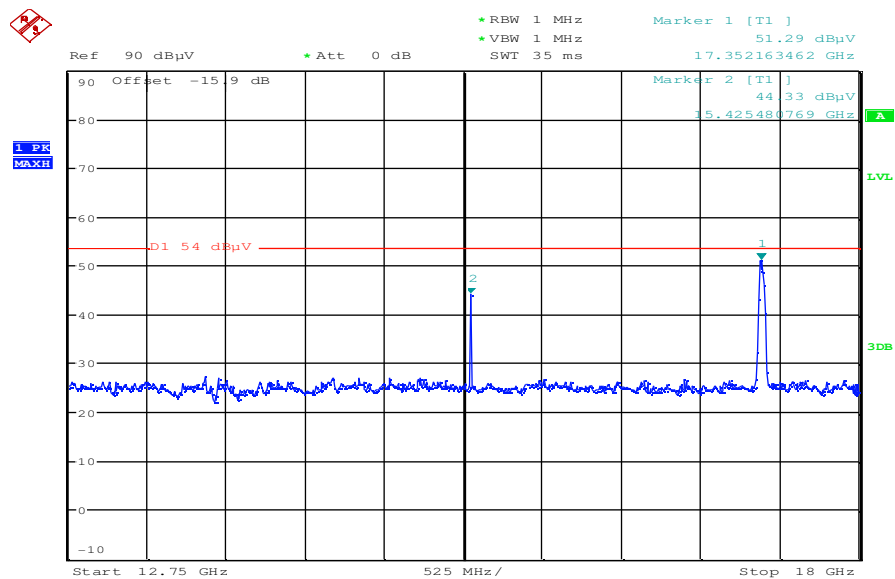
EMC 32 Version 8.10.00

Plot 8: middle channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

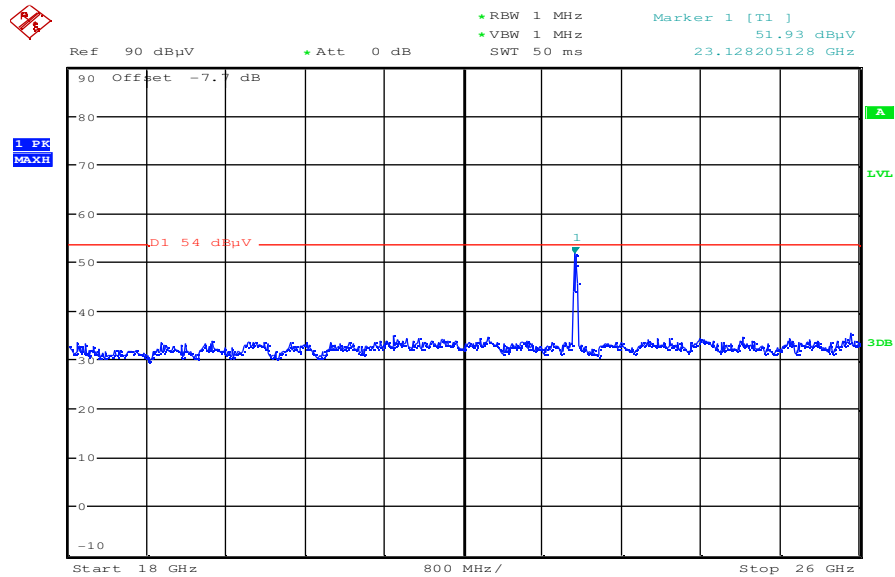
Plot 9: middle channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization



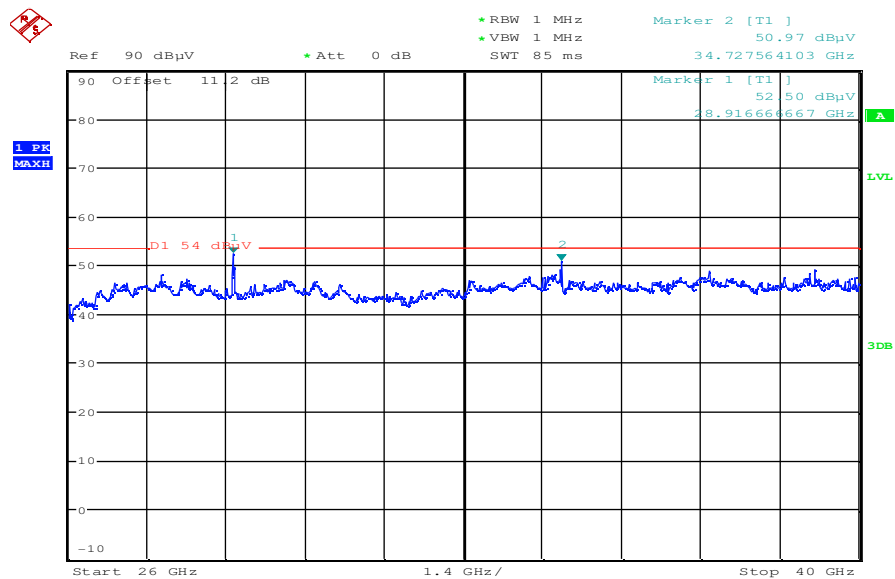
Plot 10: middle channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 07:50:07

Plot 11: middle channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:01:19

Plot 12: middle channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:14:31

Plot 13: highest channel; power index 45; 30 MHz to 1 GHz – vertical & horizontal polarization

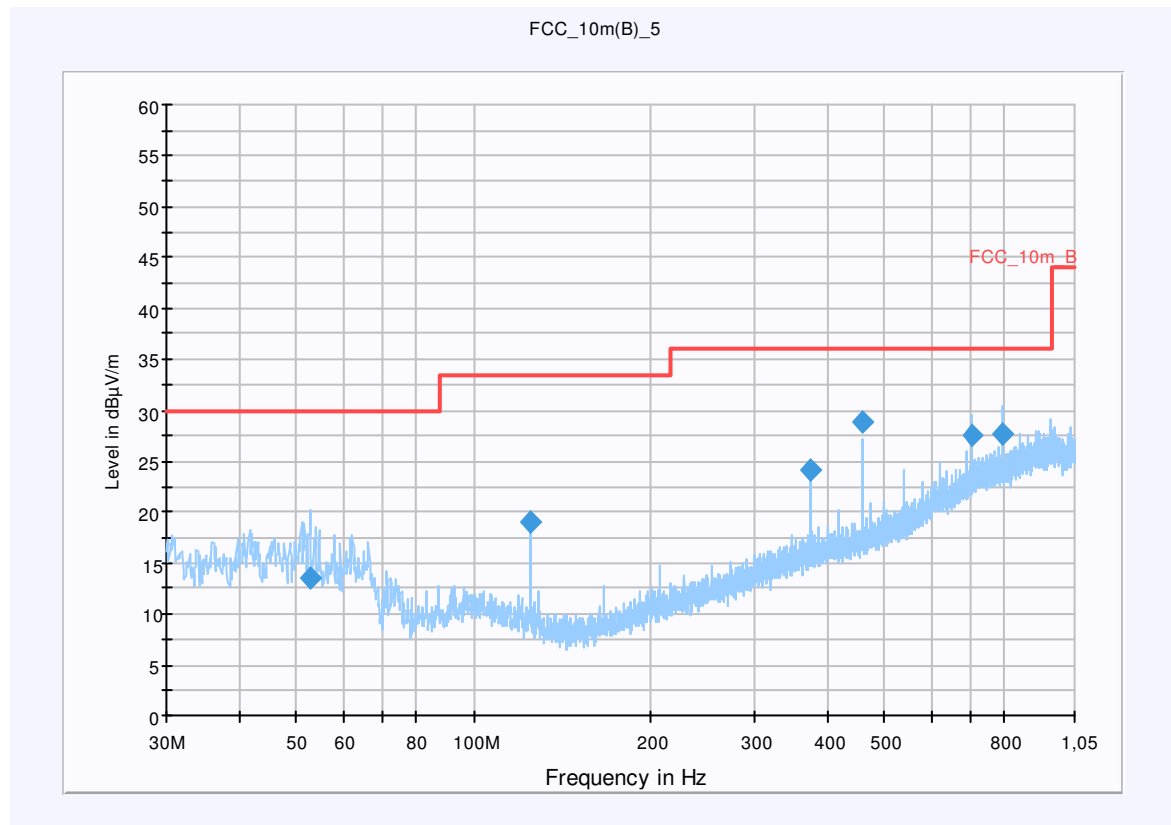
Common Information

EUT: i.MX51
 Serial Number: Proto
 Test Description: FCC part 15
 Operating Conditions: Tx, 5825 MHz, CH 165, mcs7, n mode, power index 45
 Operator Name: Hennemann
 Comment: DC powered via development 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



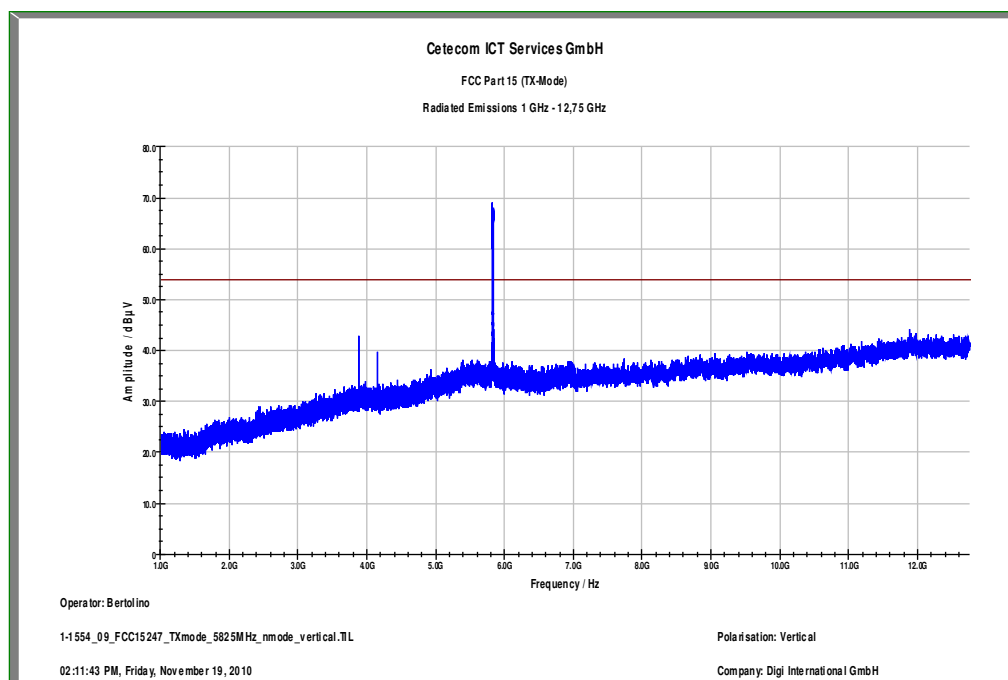
Final Result 1

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
52.800000	13.5	15000.000	120.000	98.0	V	140.0	13.1	16.5	30.0	
124.680000	19.1	15000.000	120.000	165.0	V	210.0	9.8	14.5	33.5	
374.040000	24.2	15000.000	120.000	270.0	H	23.0	16.5	11.8	36.0	
457.200000	28.9	15000.000	120.000	205.0	H	166.0	17.8	7.1	36.0	
706.560000	27.6	15000.000	120.000	98.0	H	46.0	22.7	8.4	36.0	
789.600000	27.8	15000.000	120.000	110.0	H	152.0	23.8	8.2	36.0	

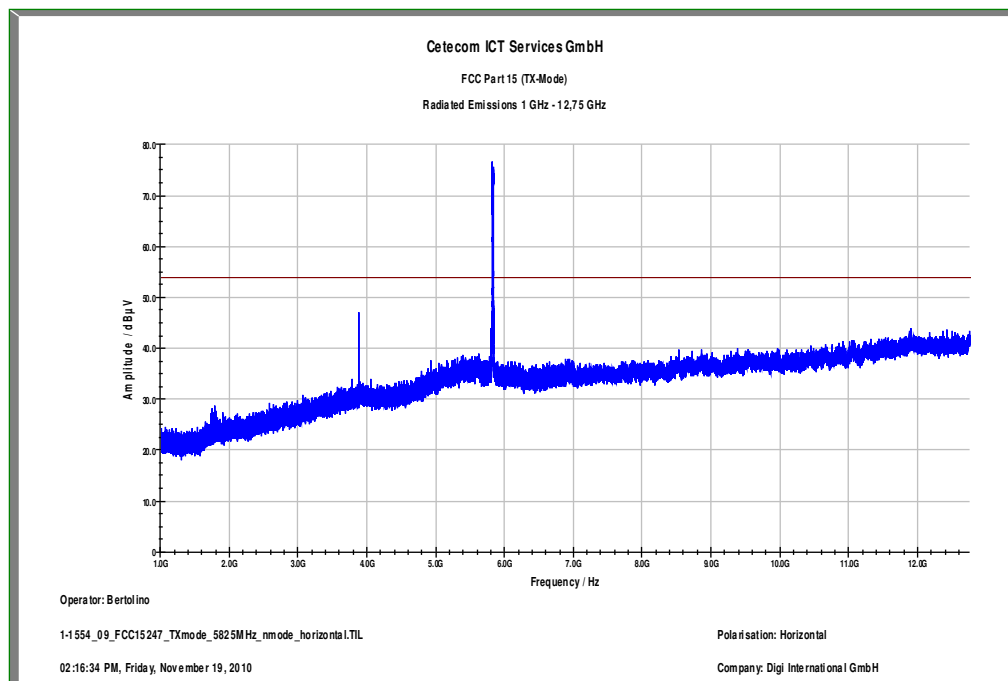
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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

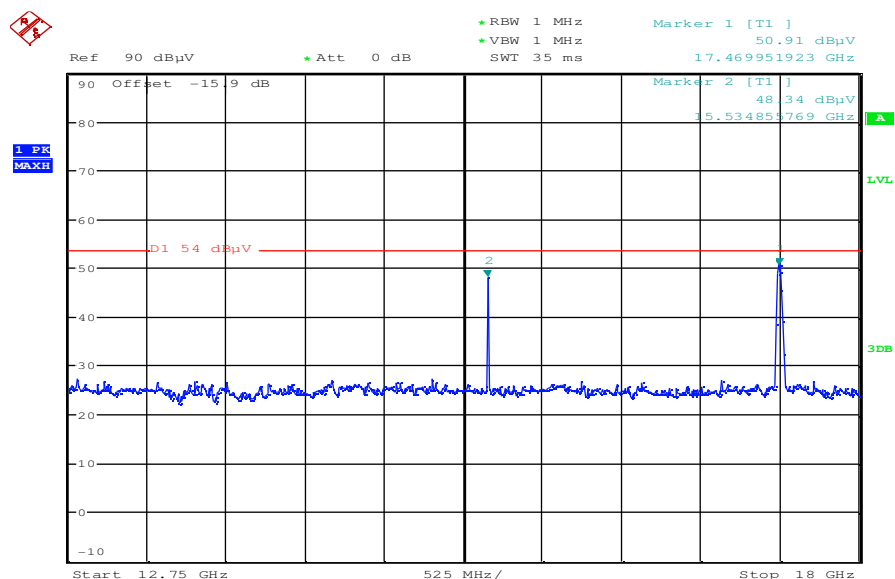
EMC 32 Version 8.10.00

Plot 14: highest channel; power index 45; 1 GHz to 12.75 GHz – vertical polarization

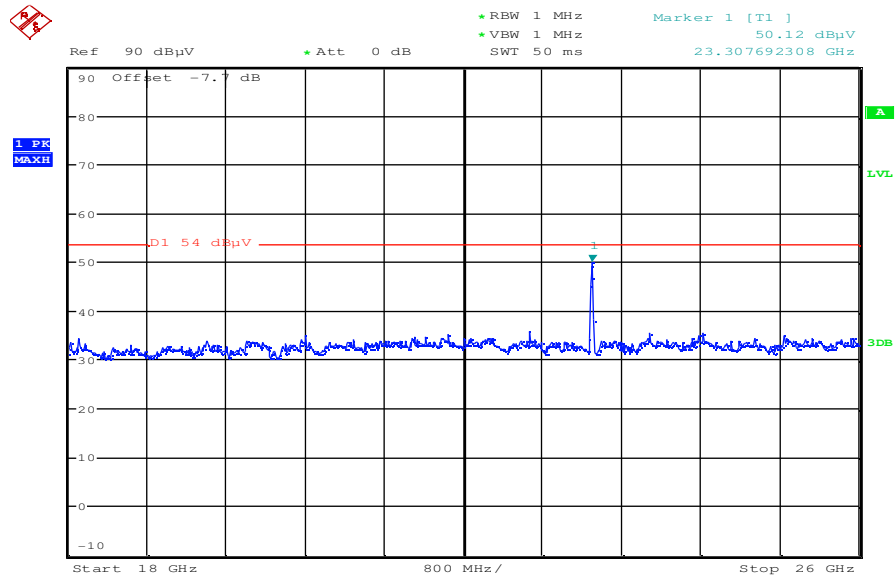
Plot 15: highest channel; power index 45; 1 GHz to 12.75 GHz – horizontal polarization



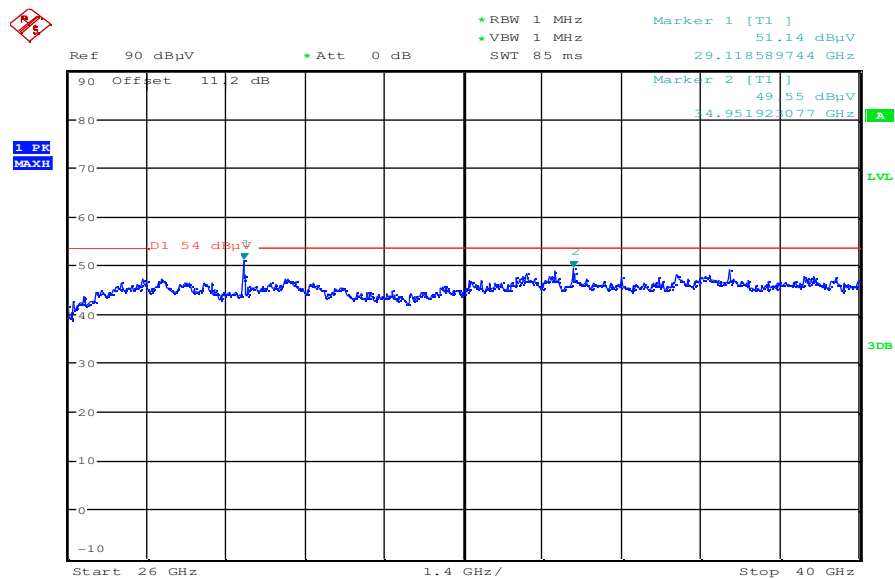
Plot 16: highest channel; power index 45; 12.75 GHz to 18 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 07:51:08

Plot 17: highest channel; power index 45; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:02:42

Plot 18: highest channel; power index 45; 26 GHz to 40 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:15:32

9.11 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The results are valid for both modes.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Re-measurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

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

Results:

RX Spurious Emissions Radiated [dB μ V/m]		
F	Detector	Level
4160.0 MHz	1 MHz / 10 Hz PP	45.44 dB μ V/m vertical 43.53 dB μ V/m horizontal
15534.9 MHz	1 MHz / 1 MHz PP	47.12 dB μ V/m vertical & horizontal
34166.7 MHz	1 MHz / 1 MHz PP	48.94 dB μ V/m vertical & horizontal
Measurement uncertainty	± 3 dB	

Result: The result of the measurement is passed.

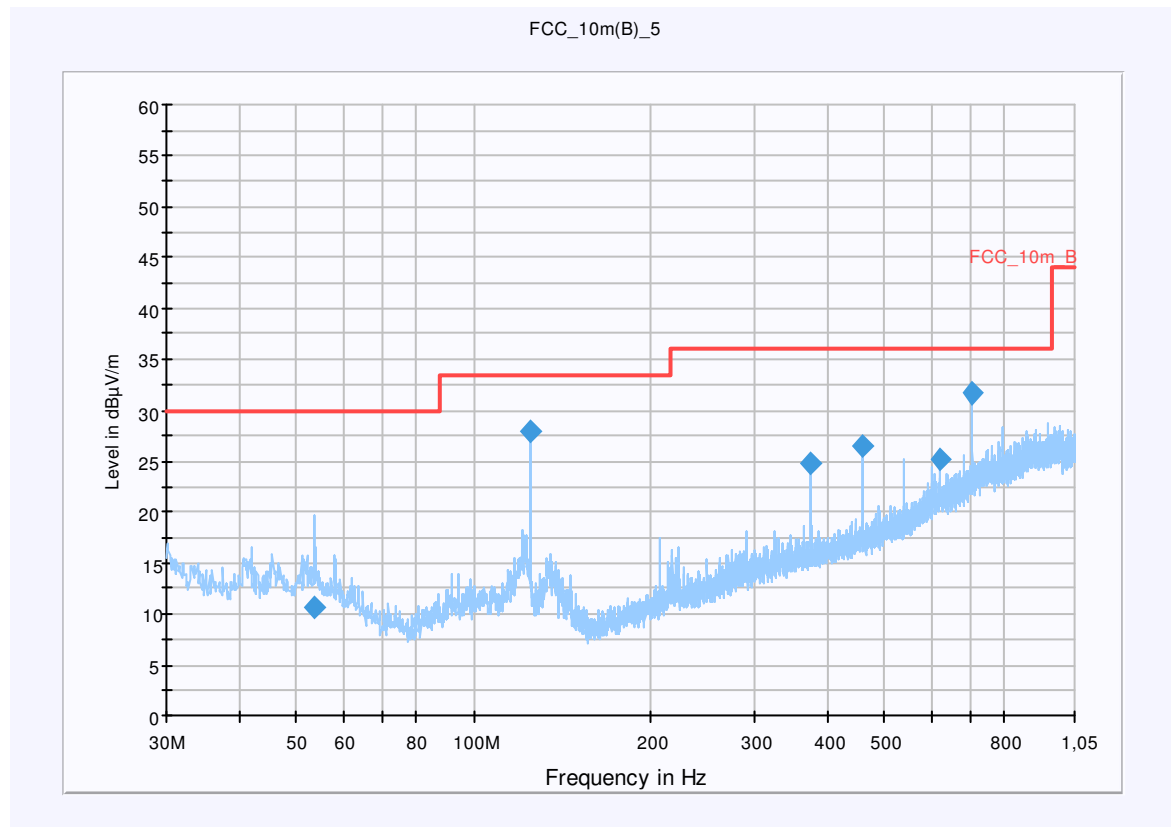
Plot 1: RX – mode; 30 MHz to 1 GHz – vertical & horizontal polarization

Common Information

EUT: i.MX51
 Serial Number: Prototype
 Test Description: FCC part 15 C @ 10 m
 Operating Conditions: Idle mode
 Operator Name: Merten
 Comment: 115 V / 60 Hz

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



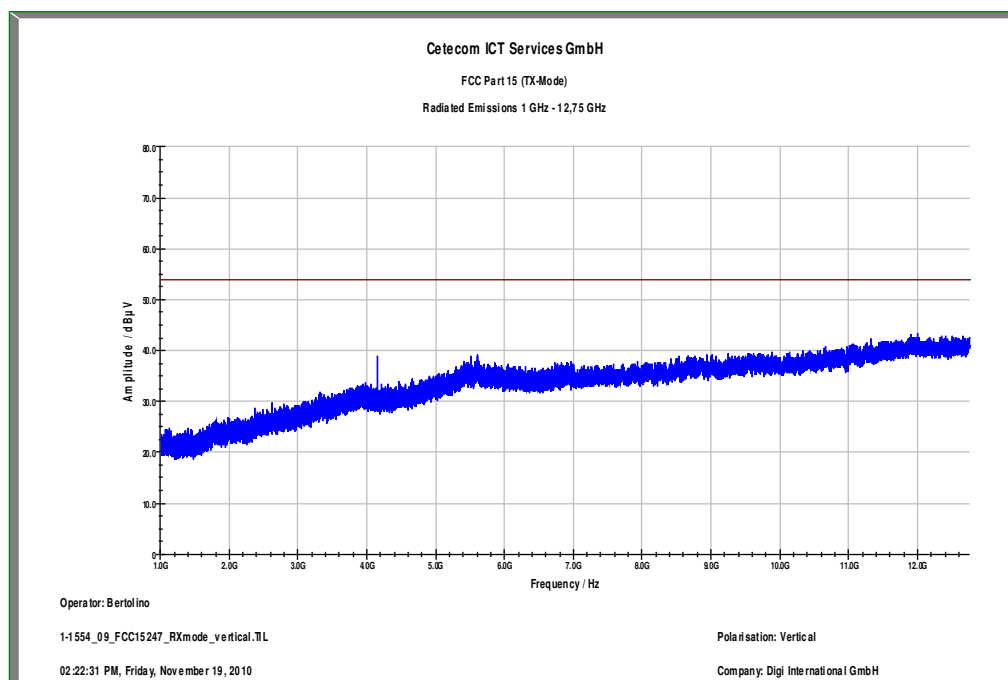
Final Result 1

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
53.640000	10.7	15000.000	120.000	270.0	V	-2.0	13.0	19.3	30.0	
124.680000	27.9	15000.000	120.000	119.0	V	220.0	9.8	5.6	33.5	
374.040000	24.7	15000.000	120.000	251.0	H	339.0	16.5	11.3	36.0	
457.200000	26.6	15000.000	120.000	165.0	H	-2.0	17.8	9.4	36.0	
623.400000	25.1	15000.000	120.000	110.0	H	201.0	20.9	10.9	36.0	
706.560000	31.7	15000.000	120.000	98.0	H	352.0	22.7	4.3	36.0	

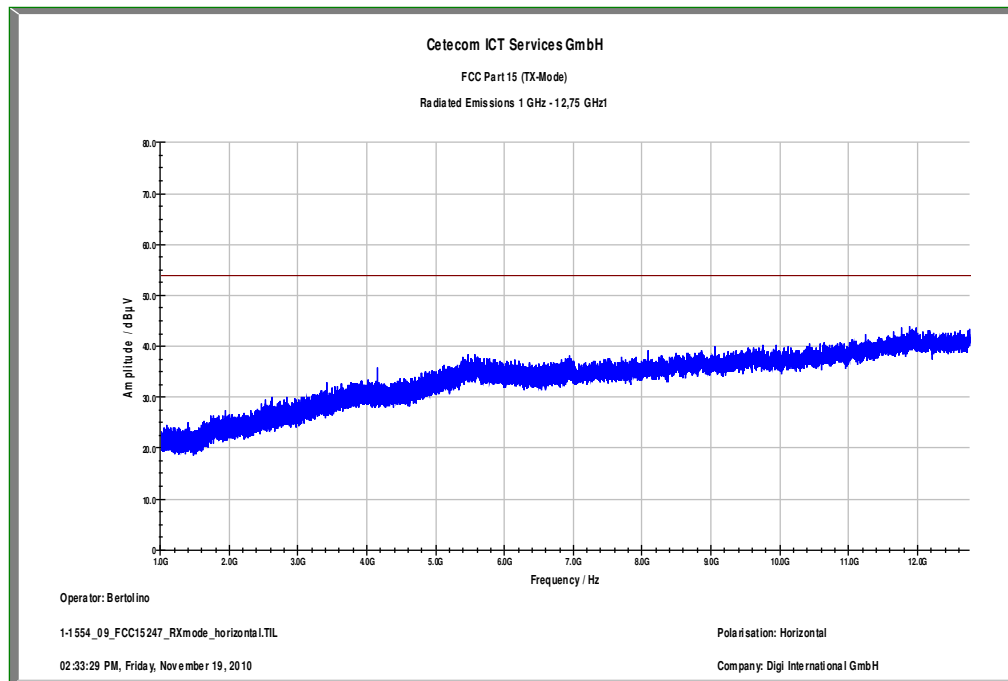
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

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

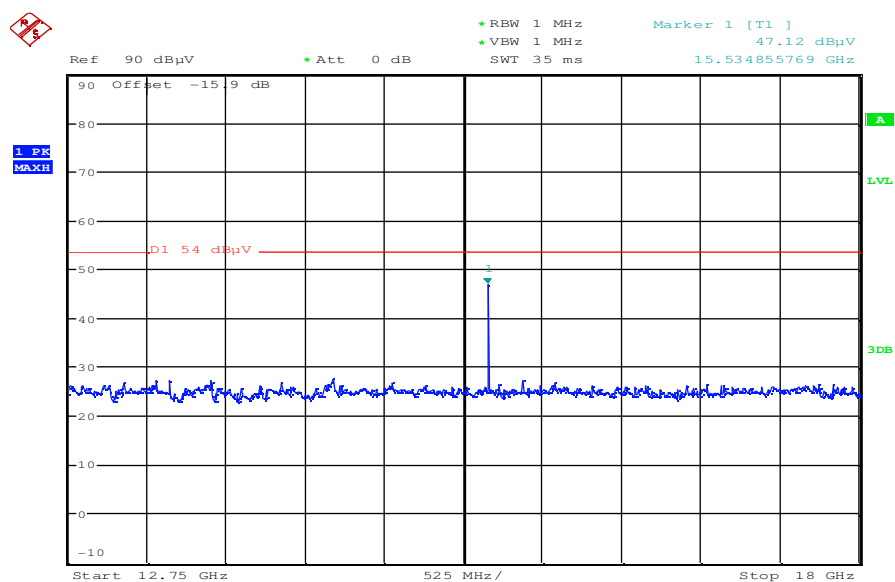
EMC 32 Version 8.10.00

Plot 2: RX – mode; 1 GHz to 12.75 GHz – vertical polarization

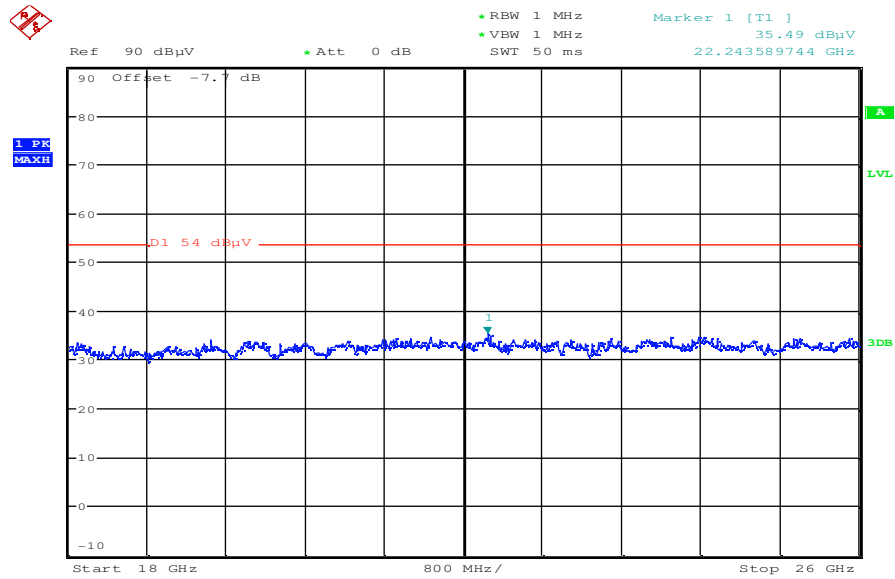
Plot 3: RX – mode; 1 GHz to 12.75 GHz – horizontal polarization



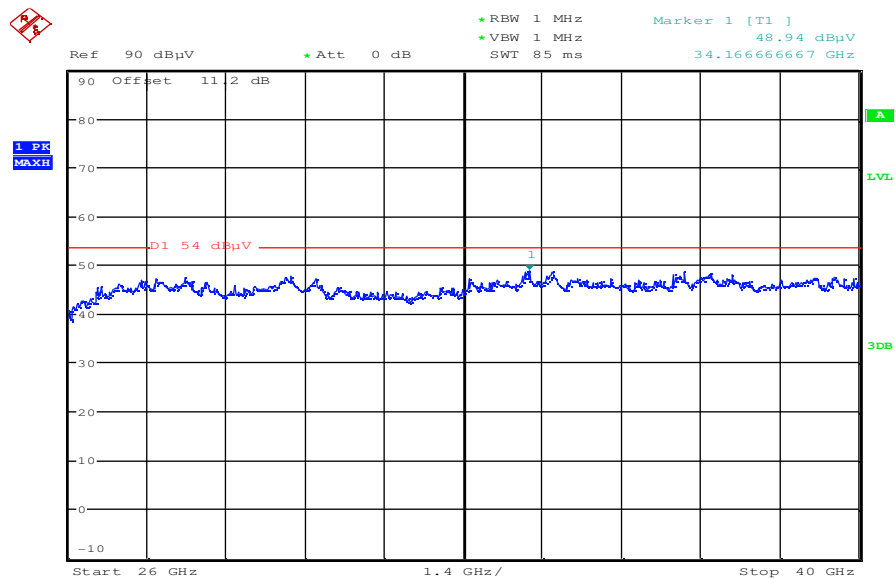
Plot 4: RX – mode; 12.75 GHz to 18 GHz – vertical & horizontal polarization



Date: 19.NOV.2010 07:52:02

Plot 5: RX – mode; 18 GHz to 26 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 07:53:53

Plot 6: RX – mode; 26 GHz to 40 GHz – vertical & horizontal polarization

Date: 19.NOV.2010 08:16:24

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 channel 6. This measurement is representative for all channels and modes. If critical peaks are found channel 1 and channel 11 will be measured too. The measurement is performed with the data rate producing 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:	Peak / 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

Limits:

FCC		IC
CFR Part 15.209(a)		RSS –Gen
TX Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dBμV/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

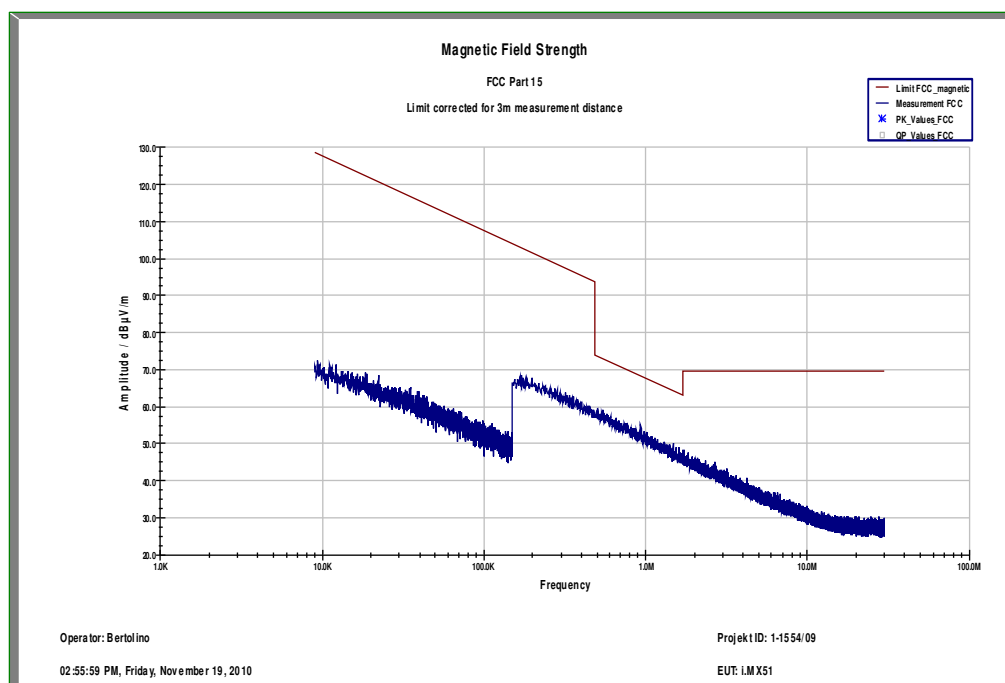
Result: Also see plots

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

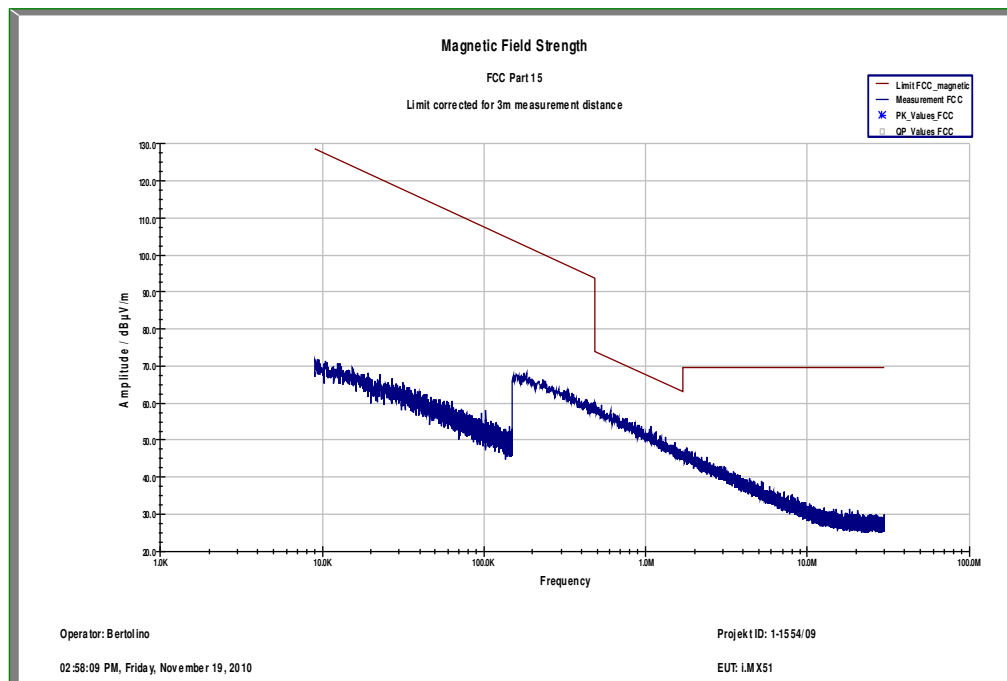
Result: The result of the measurement is passed.

OFDM – mode / a – mode:

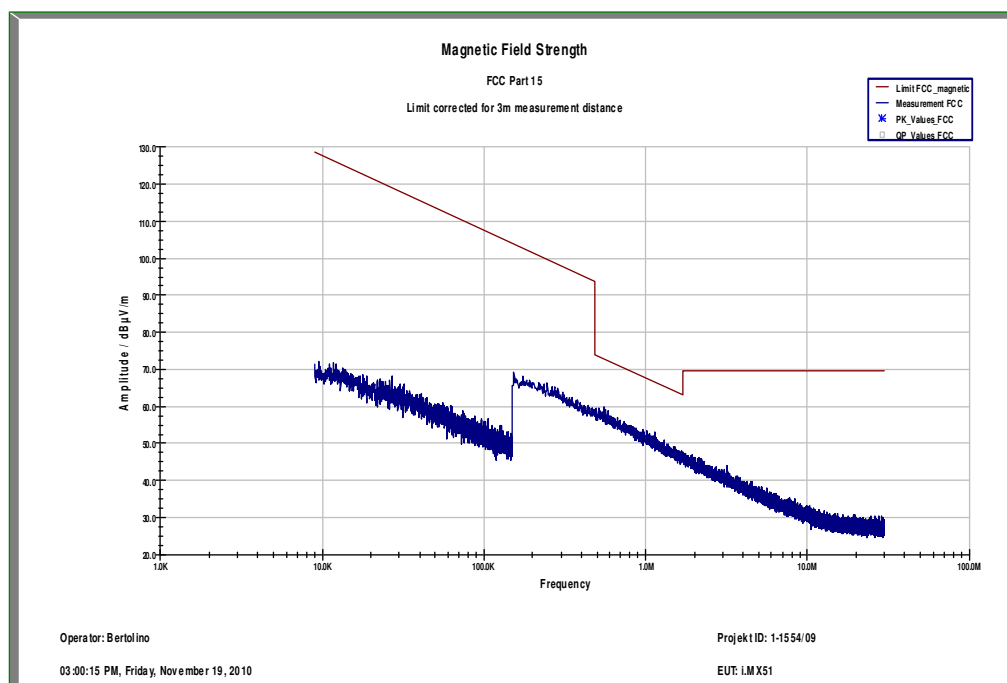
Plot 1: lowest channel; power index 45; 9 kHz to 30 MHz – magnetic

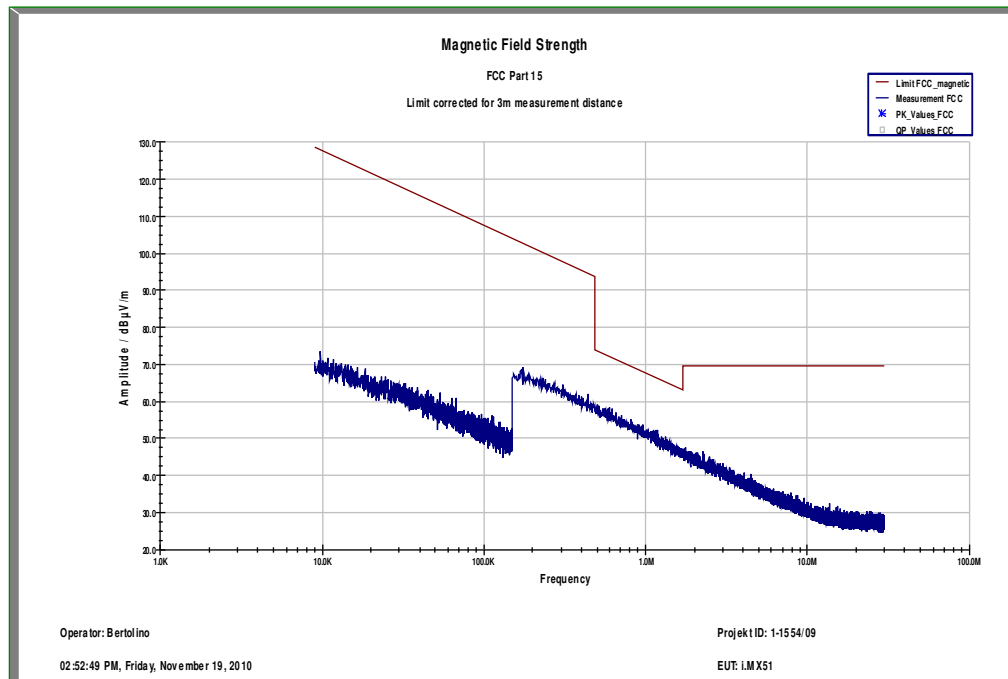
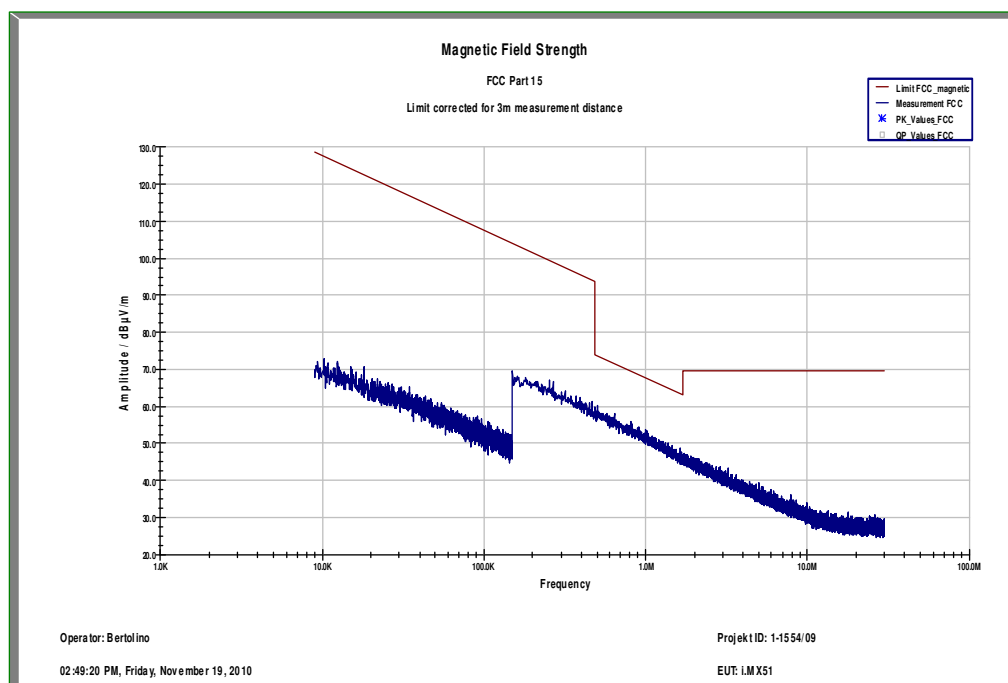


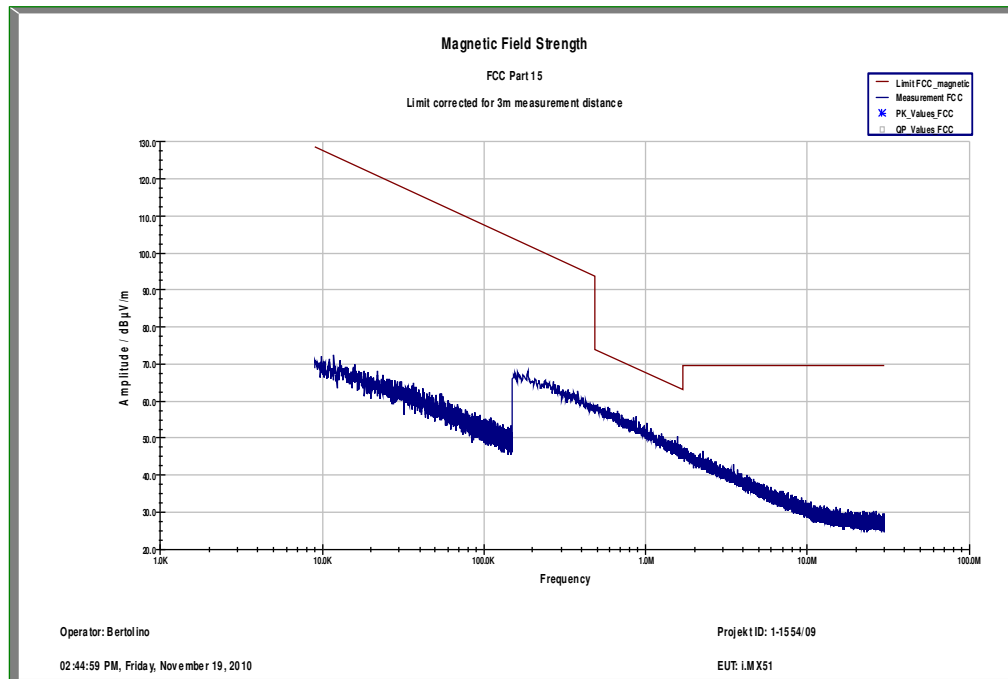
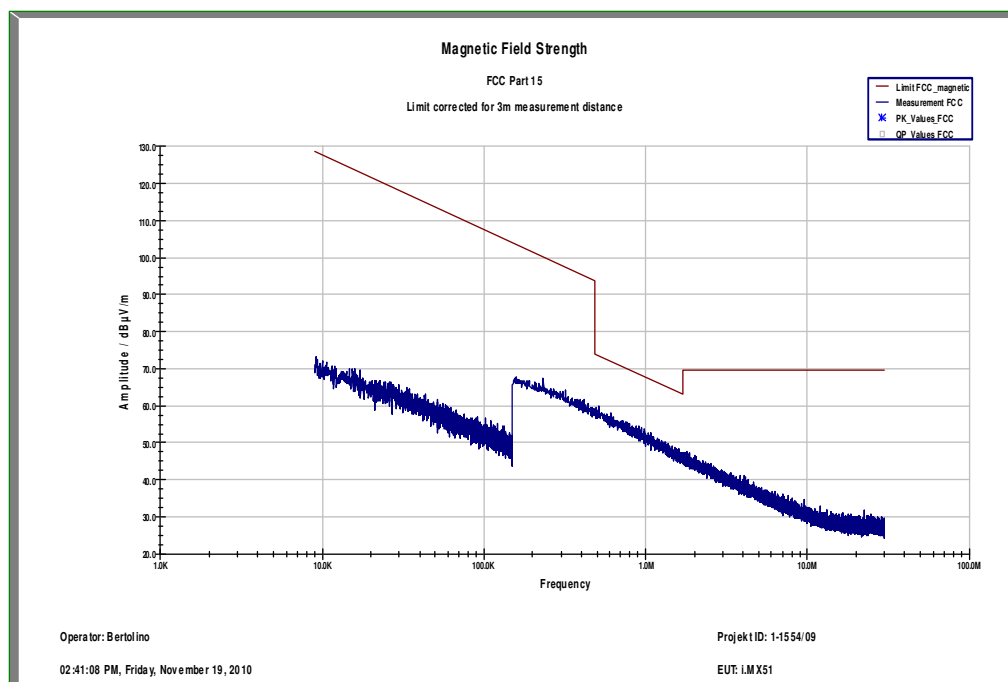
Plot 2: middle channel; power index 45; 9 kHz to 30 MHz – magnetic



Plot 3: highest channel; power index 45; 9 kHz to 30 MHz – magnetic



OFDM – mode / n – mode:**Plot 1:** lowest channel; power index 45; 9 kHz to 30 MHz – magnetic**Plot 2:** middle channel; power index 45; 9 kHz to 30 MHz – magnetic

Plot 3: highest channel; power index 45; 9 kHz to 30 MHz – magnetic**RX – mode / idle – mode:****Plot 1:** RX mode; 9 kHz to 30 MHz – magnetic

9.13 TX spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to channel 6. This measurement is repeated for DSSS and OFDM modulation. If critical peaks are found channel 1 and channel 11 will be measured too. The measurement is performed with the data rate producing the highest output power. Both power lines, phase and neutral line, are measured. Found peaks are re-measured with average and quasi peak detection to show compliance to the limits.

Measurement:

Measurement parameter	
Detector:	Peak - Quasi Peak / Average
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

Limits:

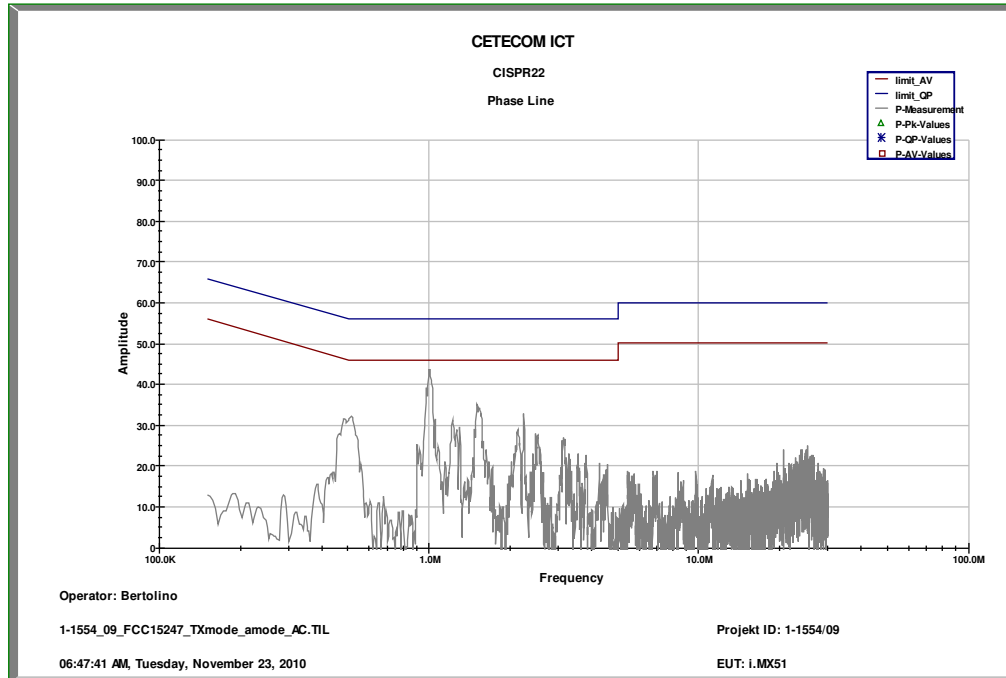
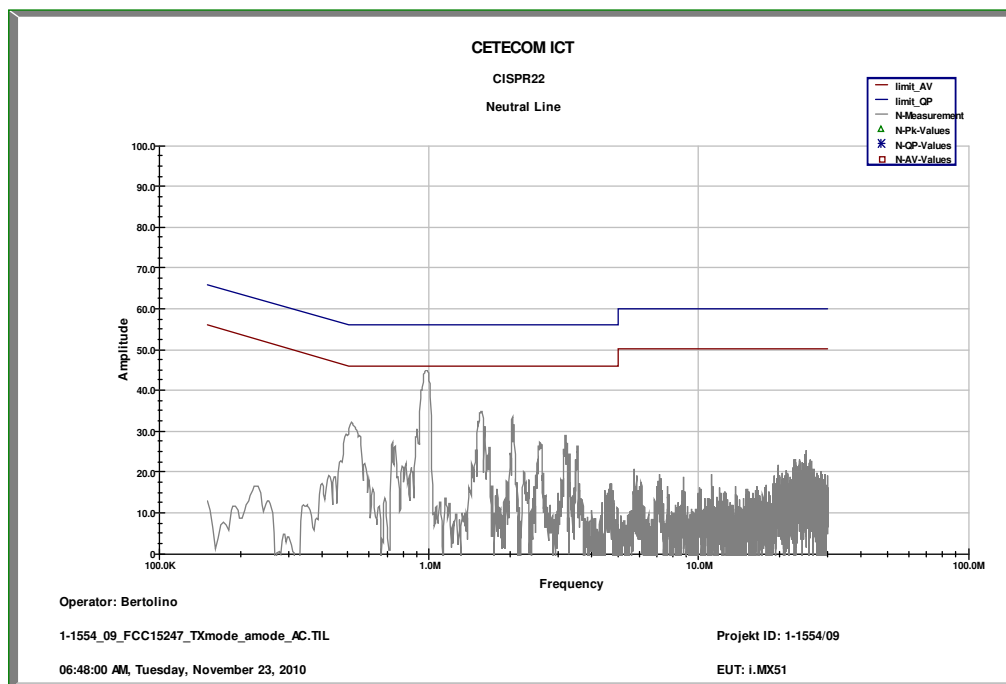
FCC		IC	
CFR Part 15.107(a)		ICES-003, Issue 4	
TX Spurious Emissions Conducted < 30 MHz			
Frequency (MHz)	Quasi-Peak (dBμV/m)	Average (dBμV/m)	
0.15 – 0.5	66 to 56*	56 to 46*	
0.5 – 5	56	46	
5 – 30.0	60	50	

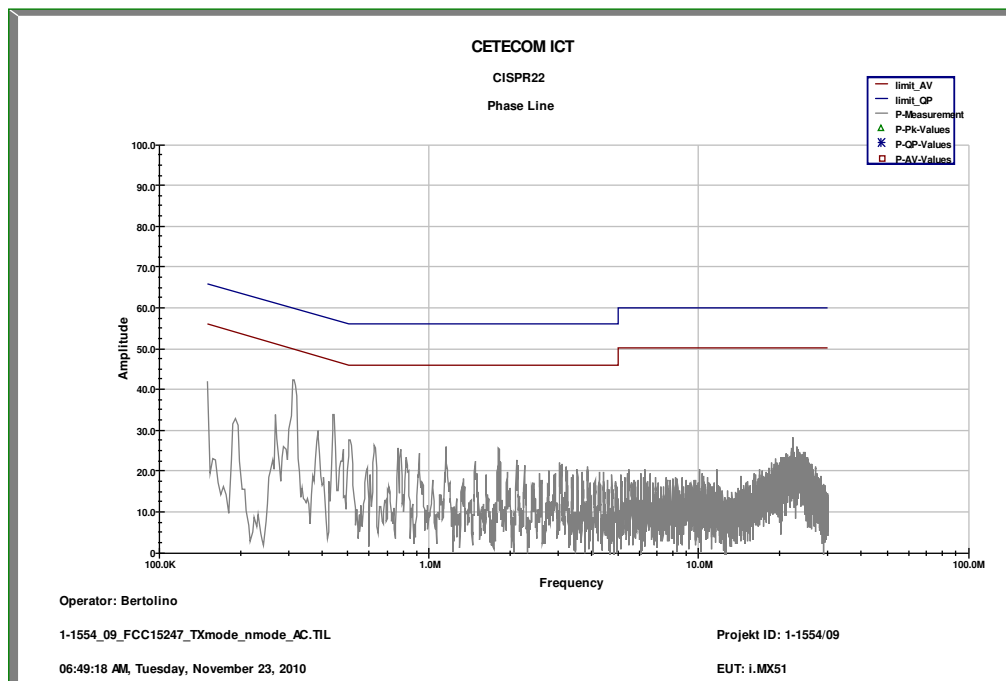
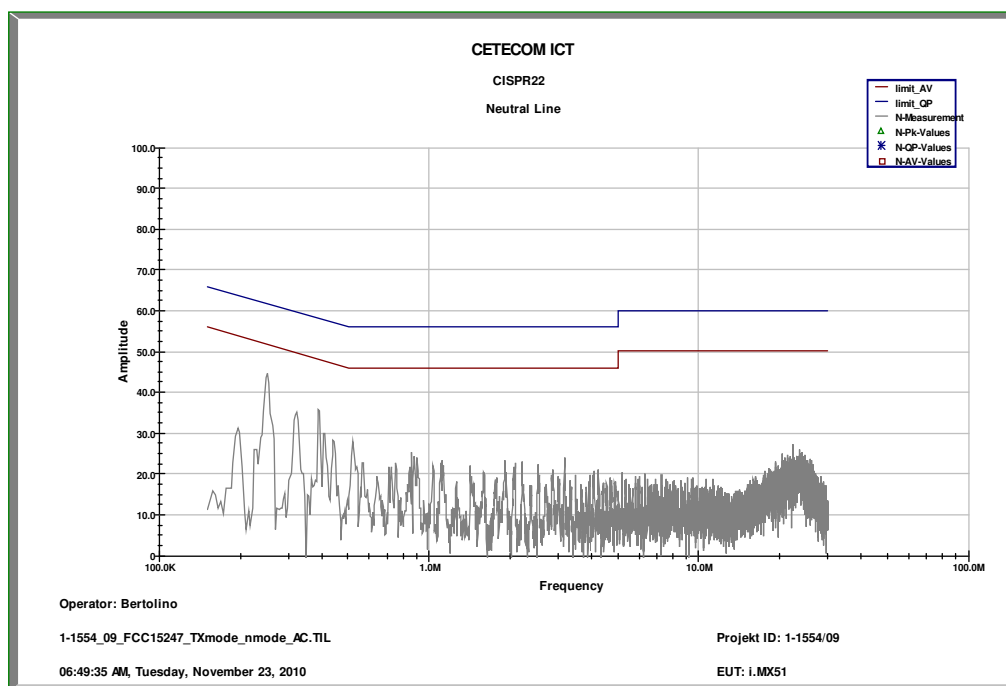
*Decreases with the logarithm of the frequency

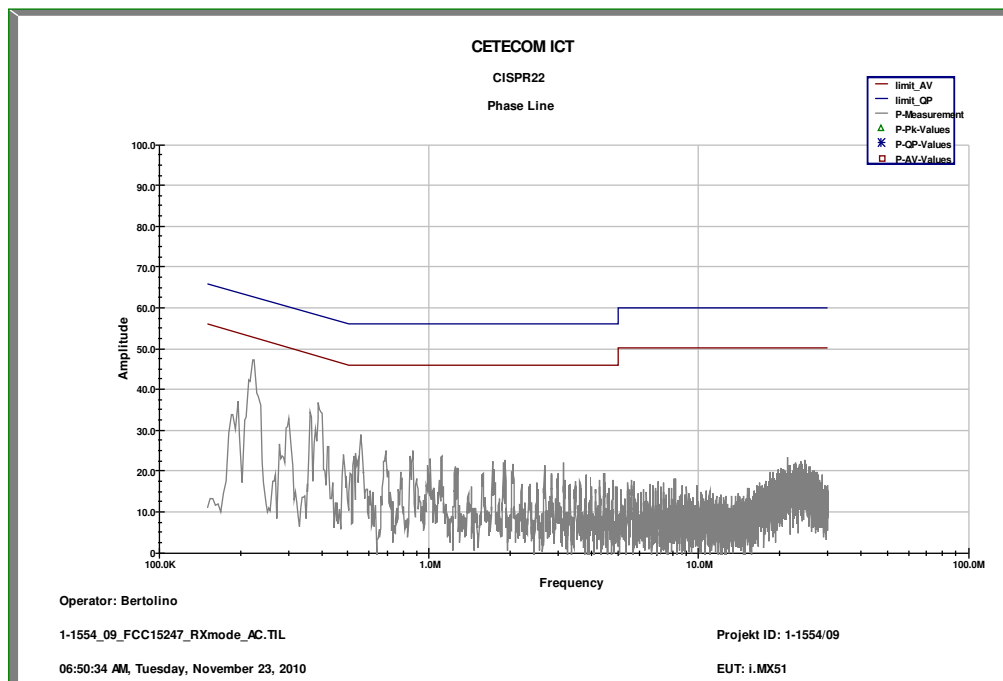
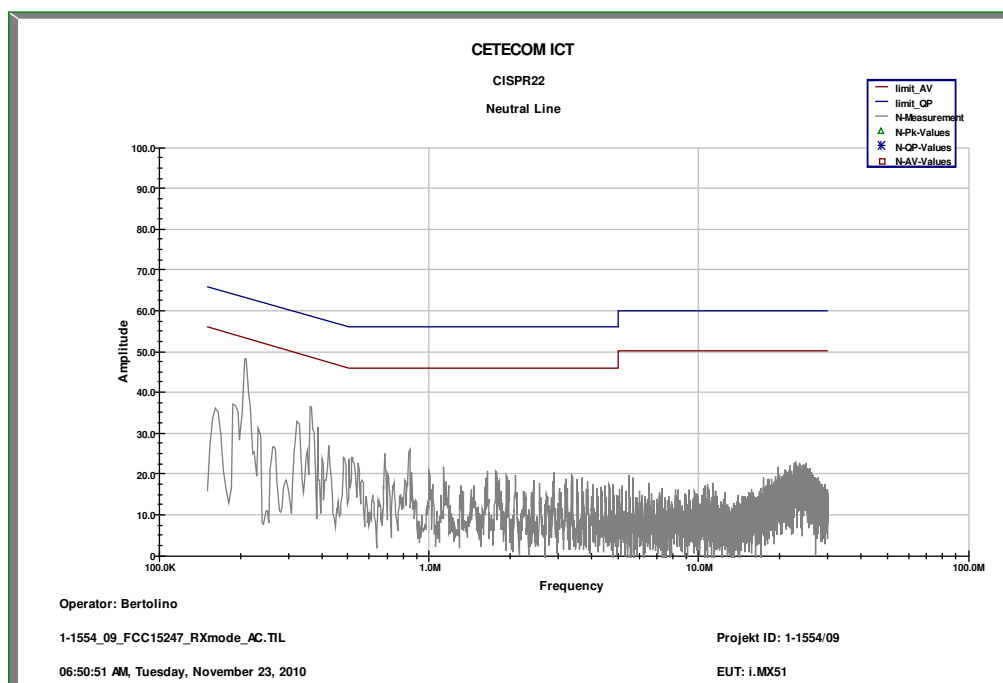
Result: Also see plots

TX Spurious Emissions Conducted < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
Measurement uncertainty	± 3 dB	

Result: The result of the measurement is passed.

OFDM – mode / a – mode:**Plot 1:** middle channel; power index 45; 9 kHz to 30 MHz – phase line**Plot 2:** middle channel; power index 45; 9 kHz to 30 MHz – neutral line

OFDM – mode / n – mode:**Plot 1:** middle channel; power index 45; 9 kHz to 30 MHz – phase line**Plot 2:** middle channel; power index 45; 9 kHz to 30 MHz – neutral line

RX – mode / idle – mode:**Plot 1:** RX mode; 9 kHz to 30 MHz – phase line**Plot 2:** RX mode; 9 kHz to 30 MHz – neutral line

10 Test equipment and ancillaries used for tests

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).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	PowerAttenuator	8325	Byrd	1530	300001595	ev		
2	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.03.2009	05.03.2011
3	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
4	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
5	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
6	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
7	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
8	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
9	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
10	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
11	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
12	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
13	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
14	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
15	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
16	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
17	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKI!	08.09.2010	08.09.2012
18	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKI!	17.12.2008	17.12.2011
19	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
20	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
21	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
22	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
23	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	01.06.2009	01.06.2011
24	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
25	n. a.	Antenna Tower	Model 2175	ETS-	64762	300003745	izw		

				LINDGREN					
26	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
27	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
28	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
29	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012
30	CR 79	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751	ne		
31	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
32	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
33	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	01.07.2010	01.07.2012
34	11b	Microwave System Amplifier, 0.5-26.5 GHz; 25 dB gain	83017A	HP Meßtechnik	3123A00105	300002268	ev		

Agenda: Kind of Calibration

k calibration / calibrated
 ne not required (k, ev, izw, zw not required)
 ev periodic self verification
 Ve long-term stability recognized
 vlkl! Attention: extended calibration interval
 NK! Attention: not calibrated

EK limited calibration
 zw cyclical maintenance (external cyclical maintenance)
 izw internal cyclical maintenance
 g blocked for accredited testing
 *) next calibration ordered / currently in progress

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2010-12-16
1.0-A	Without photos	2011-01-12

Annex B 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