



## Accredited testing-laboratory

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

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

**Recognized by the Federal Communications Commission**

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

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

**Certification ID: DE 0001**

**Accreditation ID: DE 0002**

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

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**Test report no. : 1-1121-01-13/09**  
**Type identification : CCW9M2443**  
**Applicant : Digi International GmbH**  
**FCC ID : MCQ-50M1663**  
**IC Certification No : 1846A-50M1663**  
**Test standards : 47 CFR Part 15**  
**RSS - 210 Issue 7**

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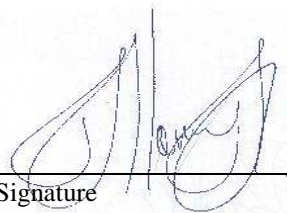
## 1 General information

### 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:

**2009-07-29**      **Daniel Muyunga**  
Date                      Name

Signature 

#### Technical responsibility for area of testing:

**2009-07-29**      **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: DAT-P-176/94-D1

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

Testing location, if different from CETECOM ICT Services GmbH:

Name :  
Street :  
Town :  
Country :  
Phone :  
Fax :

## 1.3 Details of applicant

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

## 1.4 Application details

<b>Date of receipt of order:</b>	<b>2009-06-05</b>
<b>Date of receipt of test item:</b>	<b>2009-07-13</b>
<b>Date of start test:</b>	<b>2009-07-13</b>
<b>Date of end test</b>	<b>2009-07-29</b>
<b>Persons(s) who have been present during the test:</b>	<b>-/-</b>

## 2 Test standard/s

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

### 3 Technical tests

#### 3.1 Details of manufacturer

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

##### 3.1.1 Test item

Kind of test item	:	WLAN Modul
Type identification	:	CCW9M2443
S/N serial number	:	B92834248, B92834249, B92834250
HW hardware status	:	-/-
SW software status	:	-/-
Frequency Band [MHz]	:	5.18 GHz – 5.24 GHz (lower band) 5.26 GHz – 5.32 GHz (middle band)
Type of Modulation	:	OFDM 64-QAM
Number of channels	:	4 (lower band) 4 (middle band)
Antenna	:	External rod. antenna
Power Supply	:	Developer board: 115 V AC / 60 Hz to 12 V DC from power adaptor TR10R0120
Temperature Range	:	-20 °C to +55 °C

#### 5.18 GHz – 5.24 GHz

Max. power radiated: 16.75 dBm  
Max. power conducted: 12.80 dBm

#### 5.26 GHz – 5.32 GHz

Max. power radiated: 23.60 dBm  
Max. power conducted: 19.83 dBm

FCC ID: MCQ-50M1663  
IC: 1846A-50M1663

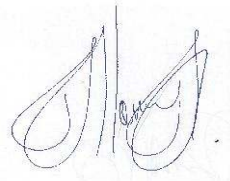
**3.1.2 Additional EUT information For IC Canada (appendix 2)**

IC Registration Number:	1846A-50M1663
Model Name:	CCW9M2443
Manufacturer (complete Address):	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]:	5.18 GHz – 5.24 GHz (lower band) 5.26 GHz – 5.32 GHz (middle band)
RF: Power [W] (max):	<u>5.18 GHz – 5.24 GHz</u> Rad. EIRP: 47.31 mW Conducted : 19.05 mW  <u>5.26 GHz – 5.32 GHz</u> Rad. EIRP: 229.08 mW Conducted : 96.16 mW
Antenna Type:	External rod. antenna
Occupied Bandwidth (99% BW) [MHz]:	<u>5.18 GHz – 5.24 GHz</u> 25.43  <u>5.26 GHz – 5.32 GHz</u> 25.33
Type of Modulation:	OFDM 64-QAM
Emission Designator (TRC-43):	<u>5.18 GHz – 5.24 GHz</u> 25M4G7D (OFDM)  <u>5.26 GHz – 5.32 GHz</u> 25M3G7D (OFDM)
Transmitter Spurious (worst case) [dBμV/m in 3m]:	50.20
Receiver Spurious (worst case) [dBμV/m in 3m]:	35.20

**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: Daniel K. Muyunga Date: 2009-07-29

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

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

- 1. COMPANY NUMBER: **1846A-50M1663**
- 2. MODEL NUMBER: **CCW9M2443**
- 3. MANUFACTURER: **Digi International GmbH**
- 4. TYPE OF EVALUATION: **(c) RF Evaluation**

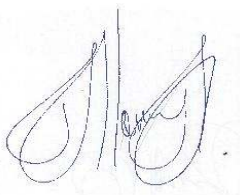
**(c) RF Evaluation**

- Evaluated against exposure limits: General Public Use  Controlled Use
- Duty cycle used in evaluation: 100 %
- Standard used for evaluation: RSS-102 Issue 2 (2005-11)
- Measurement distance: 0.20 m
- RF value: 0.455 V/m  A/m  W/m<sup>2</sup>
- Measured  Computed  Calculated

**Declaration of RF Exposure Compliance**

**ATTESTATION:**

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



Name: Daniel K. Muyunga  
Title: Engineer  
Company: Cetecom ICT Services GmbH



### 3.1.4 EUT operating modes

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

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

### 3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T <sub>nom</sub>	°C	+23
Nominal Humidity	H <sub>nom</sub>	%	50
Nominal Power Source	V <sub>nom</sub>	V	115 V AC / 60 Hz to 12 V DC

Type of power source: **AC from Power Supply**

#### 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 §15.407 - CANADA RSS-210	PASS	2009-07-29	-/-

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
Range:	5.18 GHz – 5.24 GHz and 5.26 GHz – 5.32 GHz				
None	Antenna Gain	Yes			
§15.407a(3)+(4)	Peak transmit power	Yes			
§15.407	Emission bandwidth (6 dB, 20 dB, 26 dB)	Yes			
§15.407a(5)	Peak power spectral density conducted	Yes			
§ 15.407a (6)	Ratio of peak excursion	Yes			
§ 15.407b (3)	Undesirable emissions conducted	Yes			
§ 15.209	Spurious Emission -radiated (TX)	Yes			
§ 15.209	Spurious Emission -radiated (RX)	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 MHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.

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

30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, biconical antenna

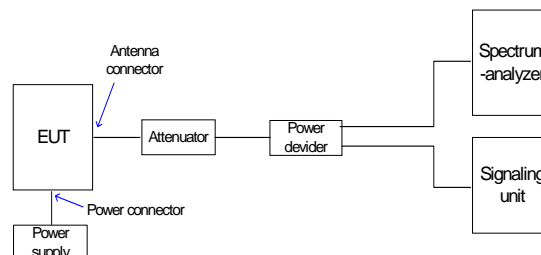
200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide 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

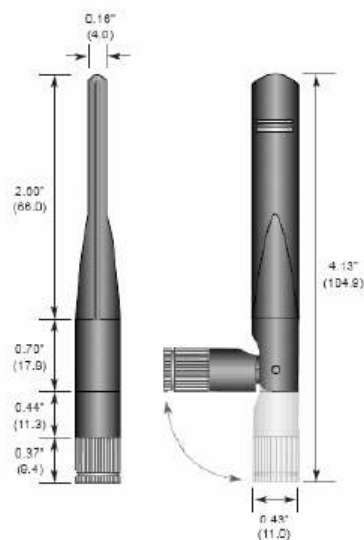
### Antenna specification: 802.11a/b/g antenna

#### Attributes

Attribute	Band 1	Band 2
Frequency	2.4-2.483.5GHz	5.15GHz~6GHz
Bandwidth	120MHz	875MHz
Wavelength	¼ Wave	¼ Wave
Impedance	50 Ohm	50 Ohm
VSWR	< 1.9 typ. Center	< 1.9 typ. Center
Connector	RP-SMA	RP-SMA
Gain	2.3dBi	3.6dBi
Dimension	See measurements in the drawing after the table.	
Maximum Power level	TBD	TBD
Operating temperature	TBD	TBD
Storage temperature	TBD	TBD
Part number	ANT-DB1-RAF-RPS	

#### Dimensions

**Note:** Dimensions are provided for reference purposes only. The actual antenna might vary.



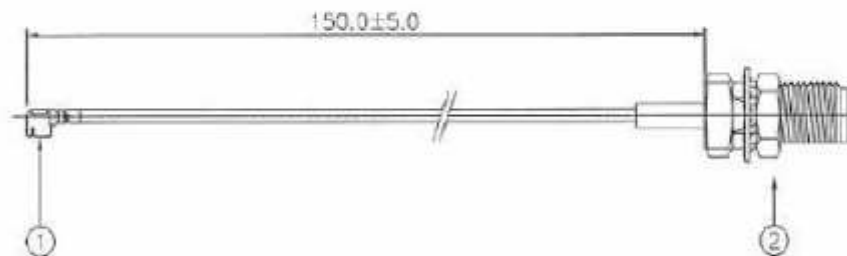
**Cable specification : U.FL/W.FL to RP-SMA FEMALE**

**Attributes**

Attribute	Property
Impedance	50 Ohm
Frequency Range	0 to 6 GHz
Length	150 mm /
Temperature Range	-40 to +90°C
Loss	3.8dB/m ( 3 GHz ) 5.6dB/m ( 6 GHz )

**Dimensions**

Note: Dimensions are provided for reference purposes only. The actual cable might vary.



- 1 = U.FL
- 2 = RP-SMA

Note: This module obtained its complete certification by using the cable described here. End users in North America should use a cable that matches these specs to maintain the module's certification.

**5.3 Additional comments**

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## 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.

### 5.18 GHz – 5.24 GHz

	low channel 5180 MHz	mid channel 5220 MHz	high channel 5240 MHz
Conducted power [dBm] <i>(measured)</i>	<b>12.80</b>	12.27	12.44
Radiated power [dBm] <i>(measured)</i>	16.58	<b>16.75</b>	16.53
Gain [dBi] <i>(measured)</i>	3.78	<b>4.48</b>	4.09

### 5.26 GHz – 5.32 GHz

	low channel 5260 MHz	mid channel 5300 MHz	high channel 5320 MHz
Conducted power [dBm] <i>(measured)</i>	19.52	<b>19.83</b>	19.82
Radiated power [dBm] <i>(measured)</i>	<b>23.60</b>	23.21	22.74
Gain [dBi] <i>(measured)</i>	<b>4.08</b>	3.38	2.92

The maximum antenna gain is below 6 dBi.

#### Limits:

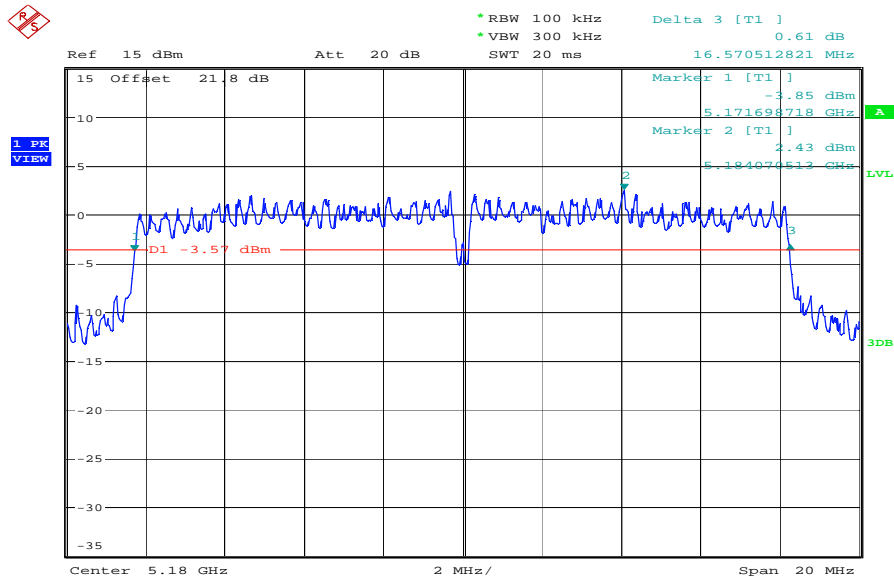
Under normal test conditions only	max. 6 dBi
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## 5.5 Emission bandwidth

### 5.5.1 Measurement 1: 6 dB emission bandwidth of the sample

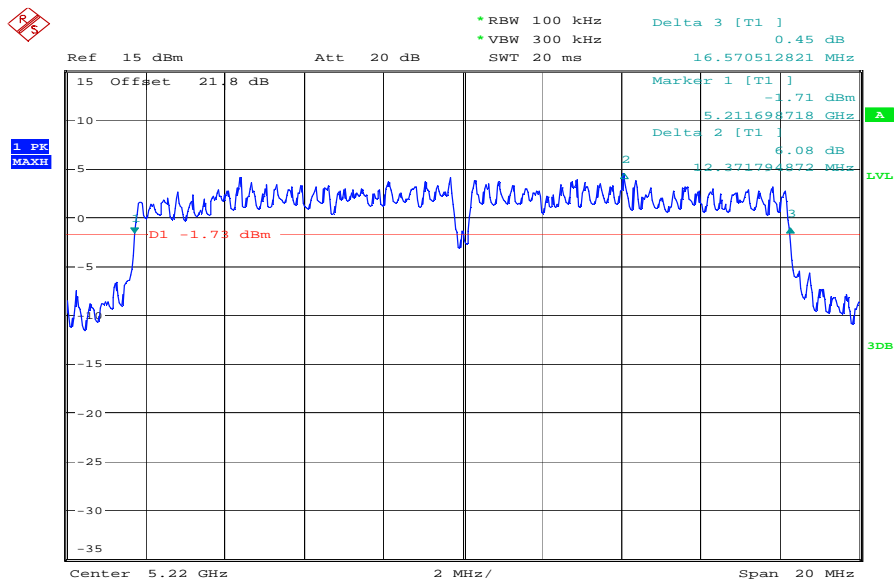
#### Mode a

Plot 1: Channel 36 - 5180 MHz



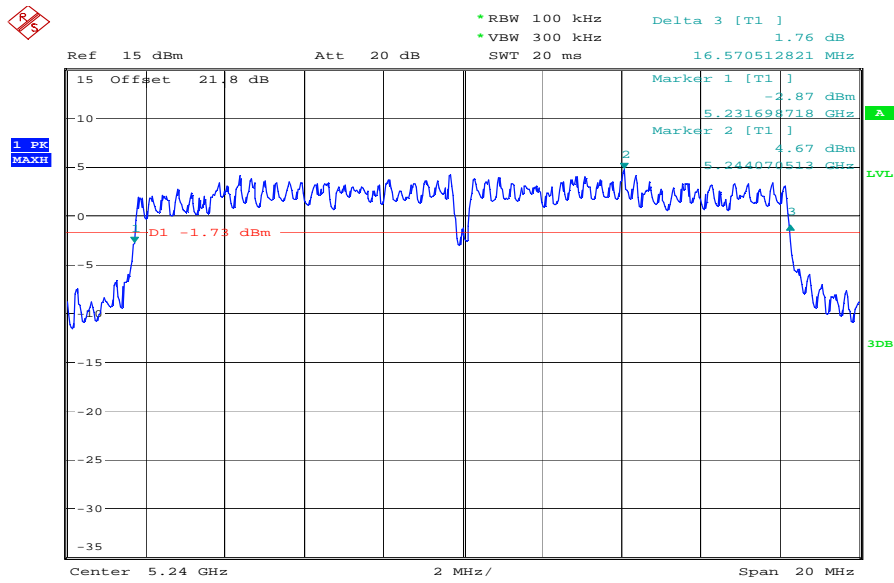
Date: 20.JUL.2009 13:37:17

Plot 2: Channel 44 - 5220 MHz



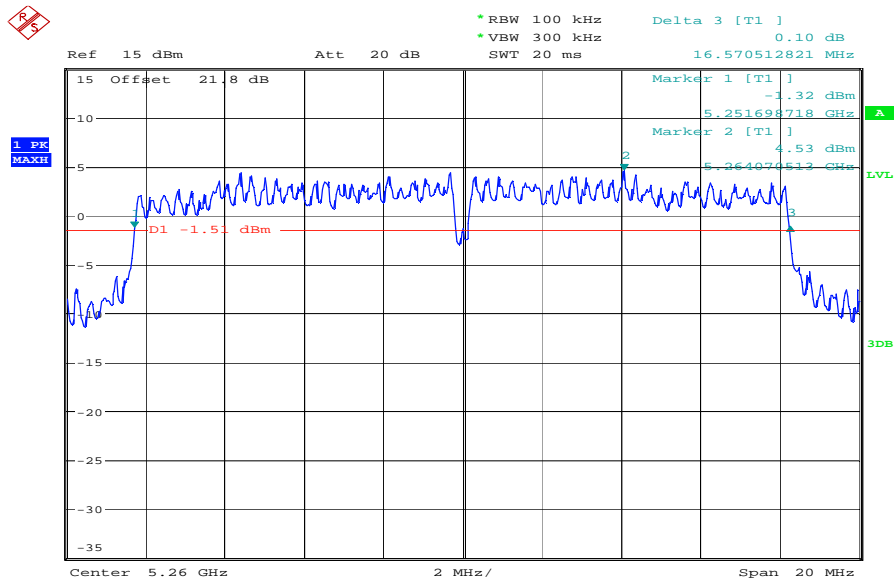
Date: 20.JUL.2009 13:46:30

Plot 3: Channel 48 - 5240 MHz



Date: 20.JUL.2009 13:53:09

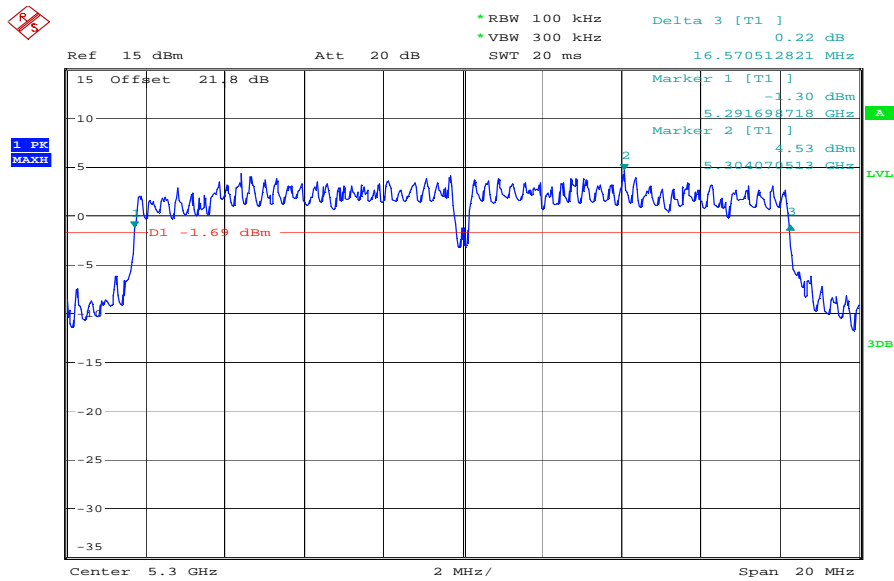
Plot 4: Channel 52 - 5260 MHz



Date: 20.JUL.2009 13:55:23

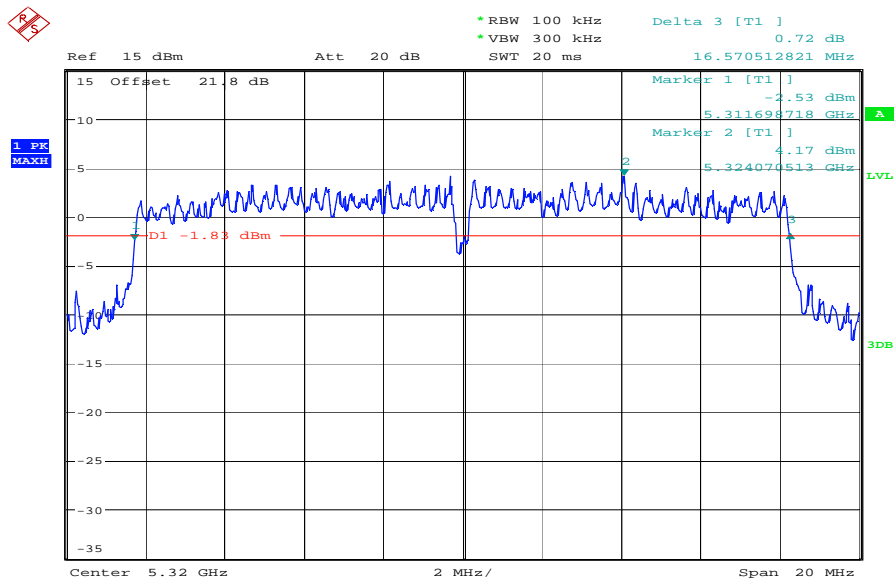


Plot 5: Channel 60 - 5300 MHz



Date: 20.JUL.2009 13:58:49

Plot 6: Channel 64 - 5320 MHz



Date: 20.JUL.2009 14:00:23

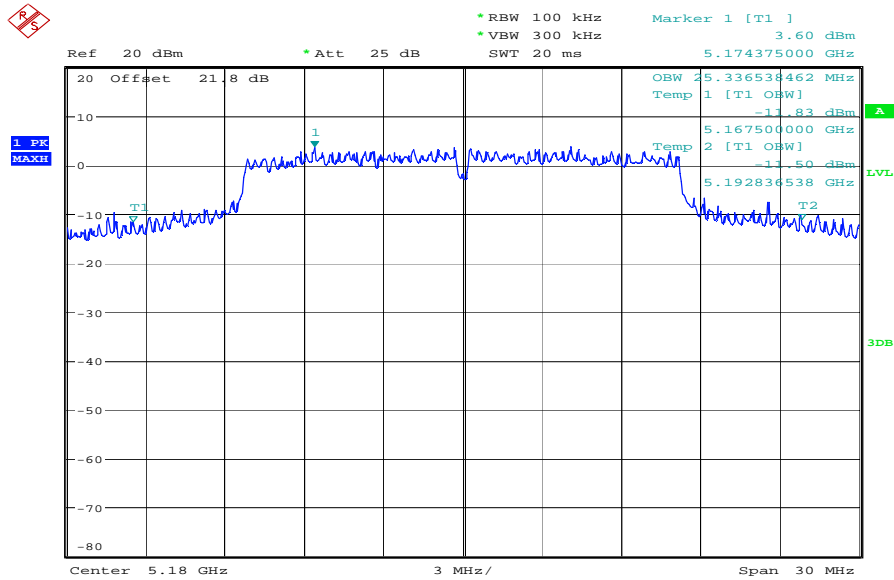
Results:

Frequency [MHz]	5180	5220	5240	5260	5300	5320
6 dB BANDWIDTH [MHz]	16.57	16.57	16.57	16.57	16.57	16.57

5.5.2 Measurement 2: 20 dB emission bandwidth of the sample

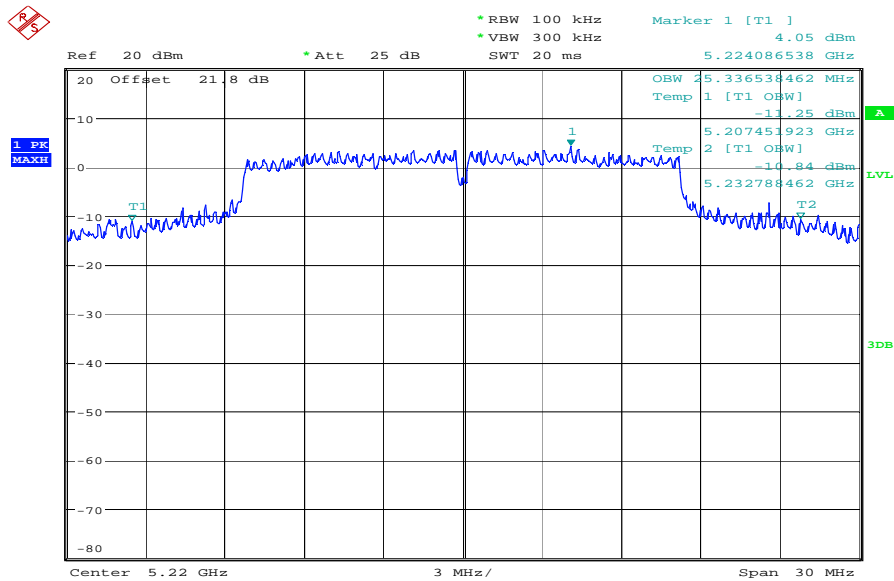
Mode a

Plot 1: Channel 36 - 5180 MHz



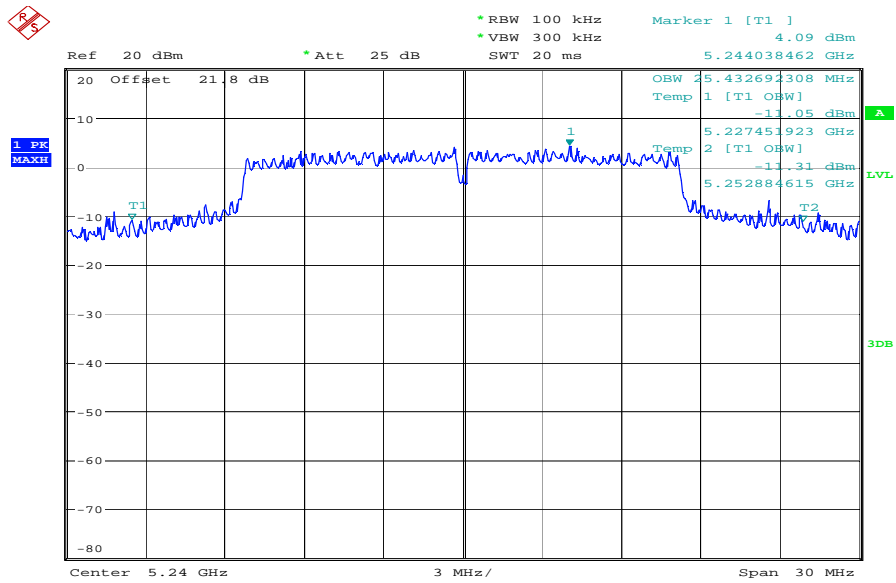
Date: 21.JUL.2009 13:17:38

Plot 2: Channel 44 - 5220 MHz



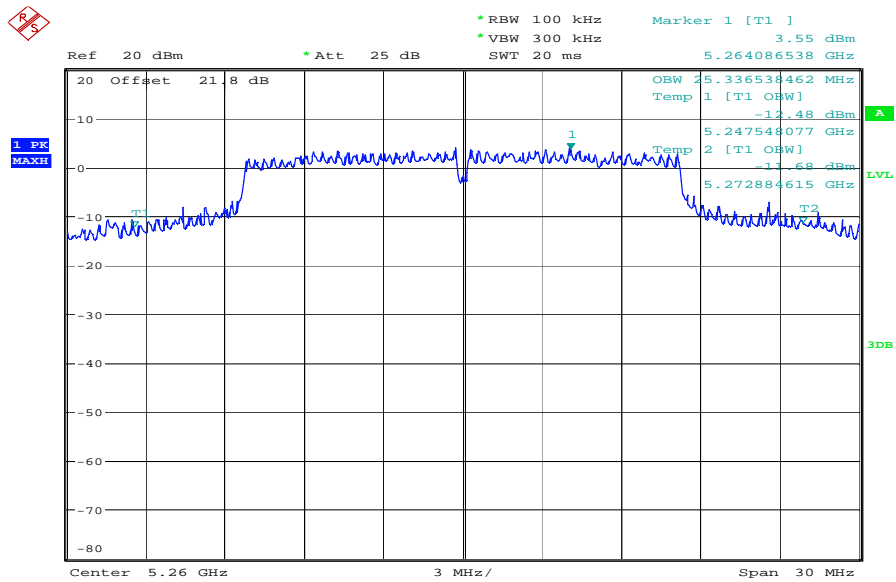
Date: 21.JUL.2009 13:16:49

Plot 3: Channel 48 - 5240 MHz



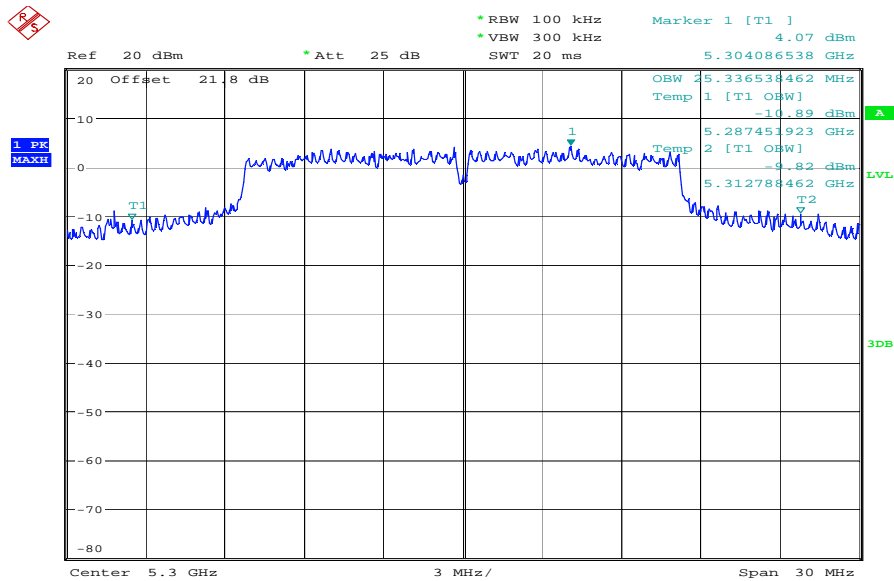
Date: 21.JUL.2009 13:15:41

Plot 4: Channel 52 - 5260 MHz



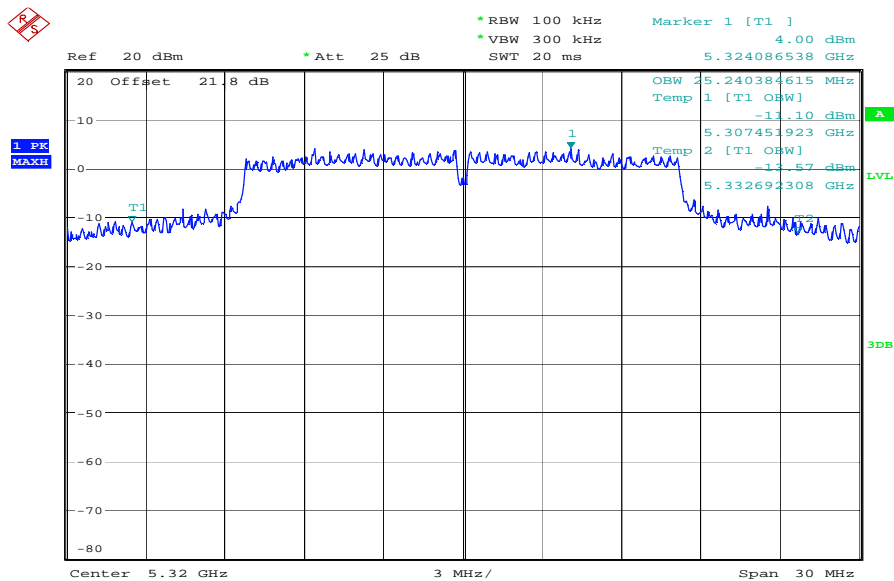
Date: 21.JUL.2009 13:14:27

Plot 5: Channel 60 - 5300 MHz



Date: 21.JUL.2009 13:13:25

Plot 6: Channel 64 - 5320 MHz



Date: 21.JUL.2009 13:12:31

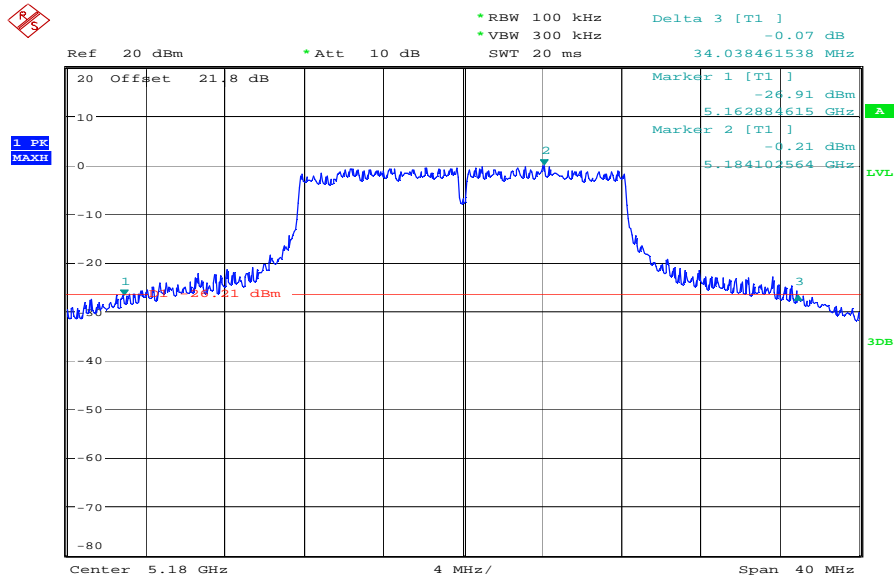
Results:

Frequency [MHz]	5180	5220	5240	5260	5300	5320
20 dB BANDWIDTH [MHz]	25.33	25.33	25.43	25.33	25.33	25.24

5.5.3 Measurement 3: 26 dB emission bandwidth of the sample

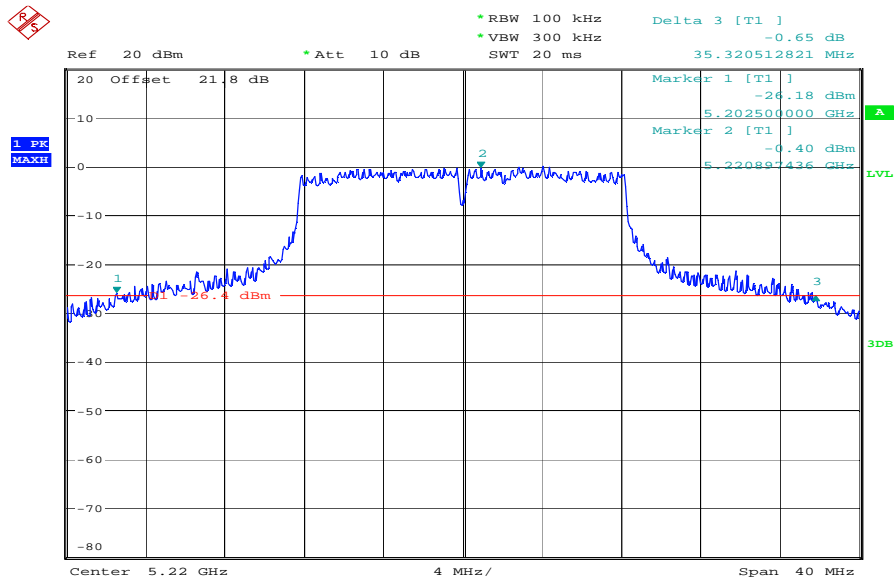
Mode a

Plot 1: Channel 36 - 5180 MHz



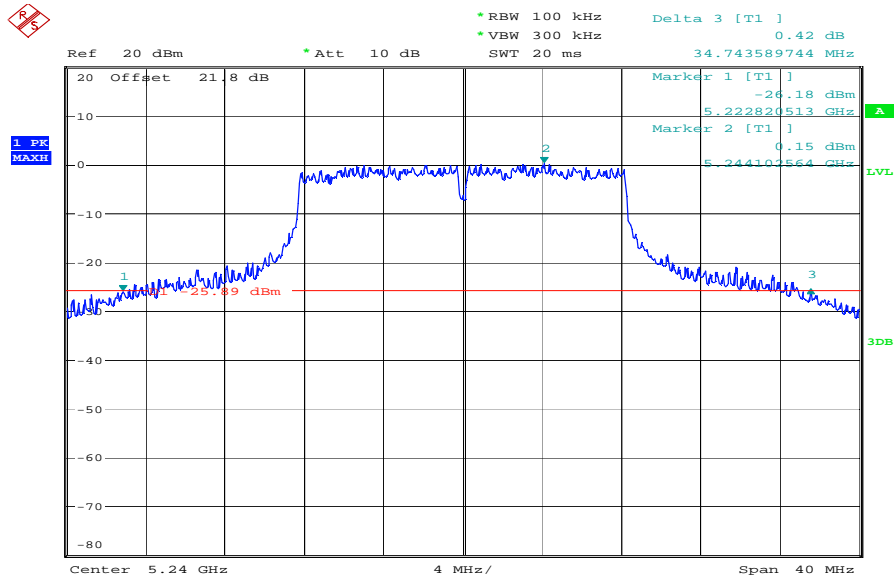
Date: 21.JUL.2009 15:38:06

Plot 2: Channel 44 - 5220 MHz



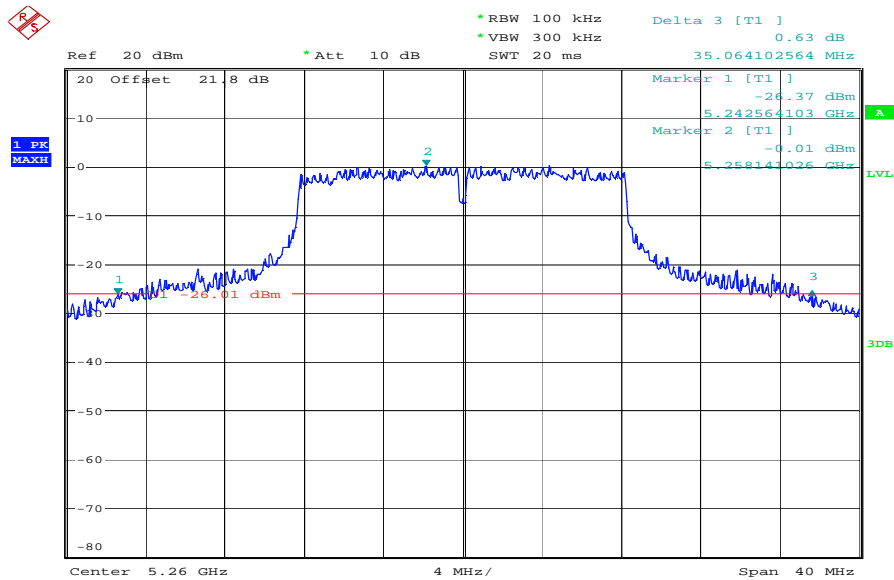
Date: 21.JUL.2009 15:39:44

Plot 3: Channel 48 - 5240 MHz



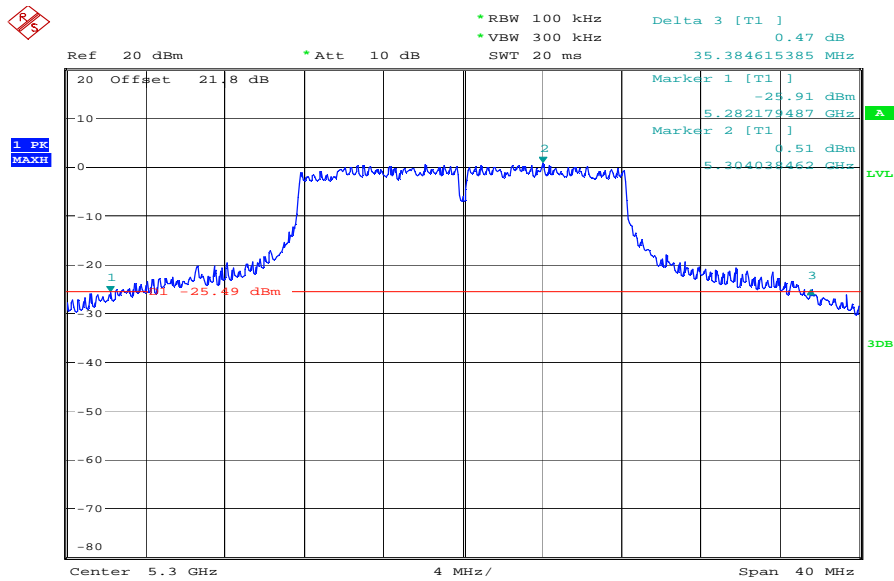
Date: 21.JUL.2009 15:46:25

Plot 4: Channel 52 - 5260 MHz



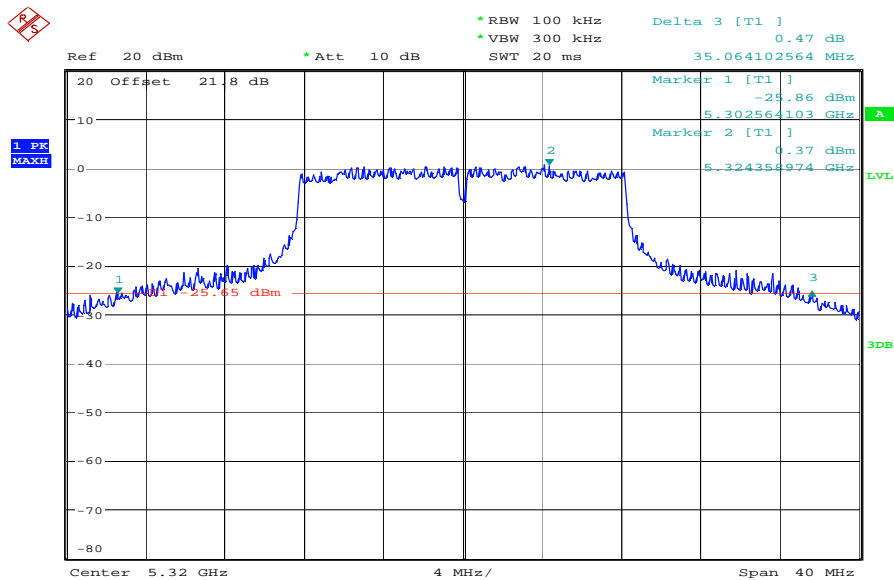
Date: 21.JUL.2009 15:48:24

Plot 5: Channel 60 - 5300 MHz



Date: 21.JUL.2009 16:27:20

Plot 6: Channel 64 - 5320 MHz



Date: 21.JUL.2009 16:41:28

Results:

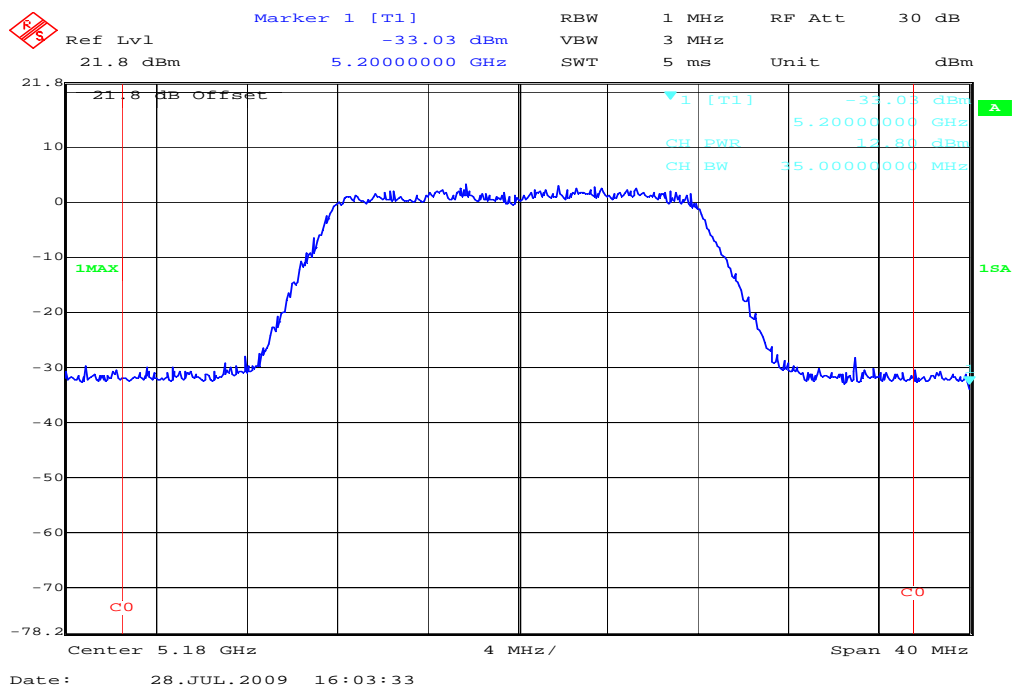
Frequency [MHz]	5180	5220	5240	5260	5300	5320
26 dB BANDWIDTH [MHz]	34.03	35.32	34.74	35.06	35.38	35.06

### 5.6 Peak conducted transmit output power

Measured with the spectrum analyzer's band power measurement according to the guidelines of the FCC public notice DA 02-2138 - method #3:

- Set span to encompass the entire emission bandwidth (EBW) of the signal
- Set sweep trigger to "free run"
- Set RBW = 1 MHz. Set VBW  $\geq 1/T$
- Use linear display mode
- Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode
- Set max hold
- Allow max hold to run for 60 seconds
- Compute power by integrating the spectrum across the 26 dB EBW or apply a bandwidth correction factor of  $10 \cdot \log(EBW/1 \text{ MHz})$  to the spectral peak of the emission. The integration can be performed using the spectrum analyzer's band power measurement function with band limits set to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

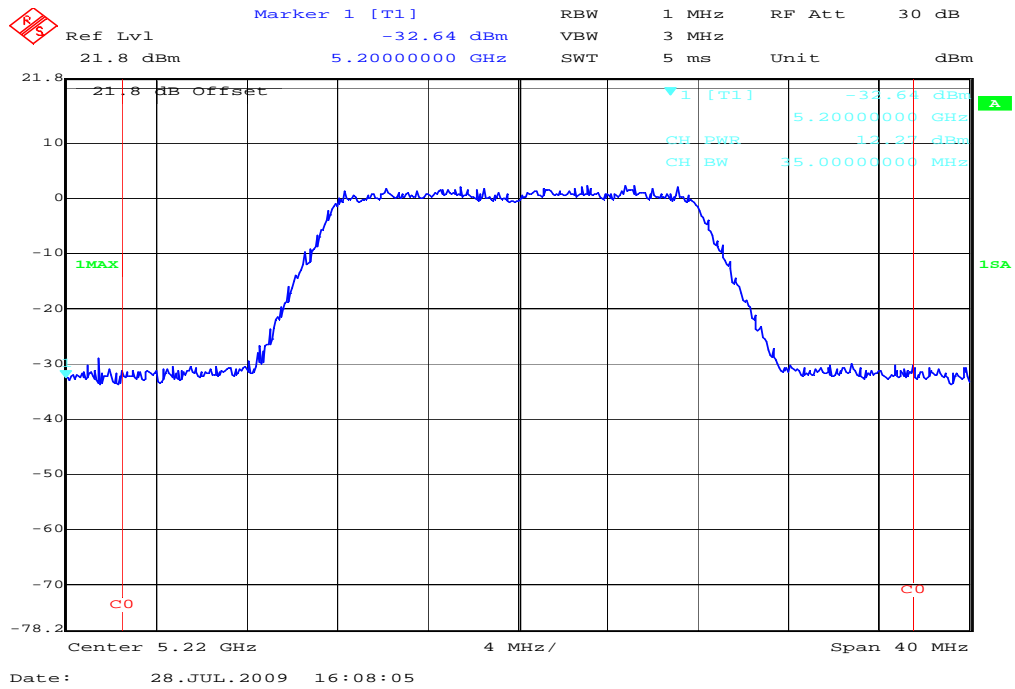
Plot 1: Channel 36 - 5180 MHz  
Max. power index 25





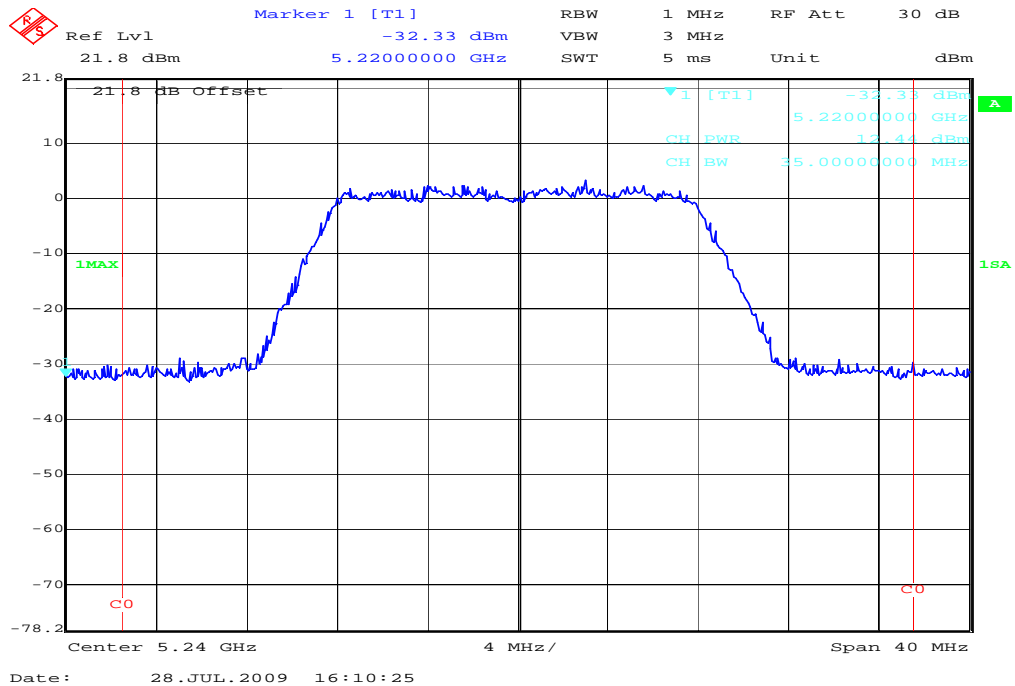
Plot 2: Channel 44 - 5220 MHz

Max. power index 25



Plot 3: Channel 48 - 5240 MHz

Max. power index 25

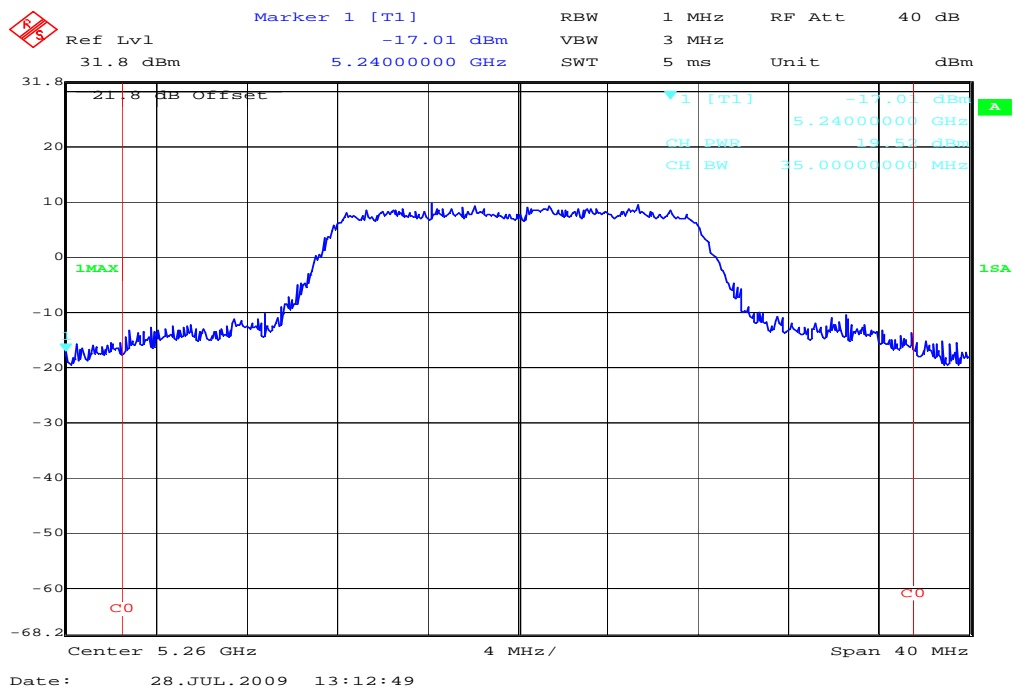


**Results:**  
 Plot 1: Peak transmit power: 19.1 mW / 12.80 dBm  
 Plot 2: Peak transmit power: 16.9 mW / 12.27 dBm  
 Plot 3: Peak transmit power: 17.5 mW / 12.44 dBm

**Limits:**

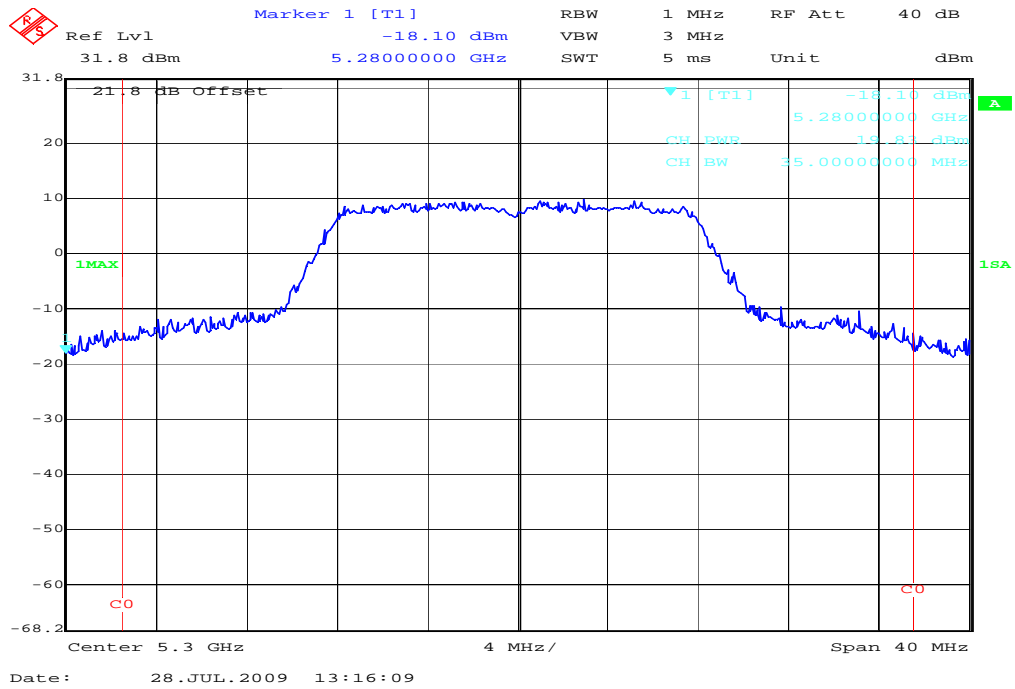
Under normal test conditions only	For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10logB, where B is the 26dB-emission bandwidth in MHz. If transmitting antennas if directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.
-----------------------------------	--

Plot 4: Channel 52 - 5260 MHz  
 Max. power index 45



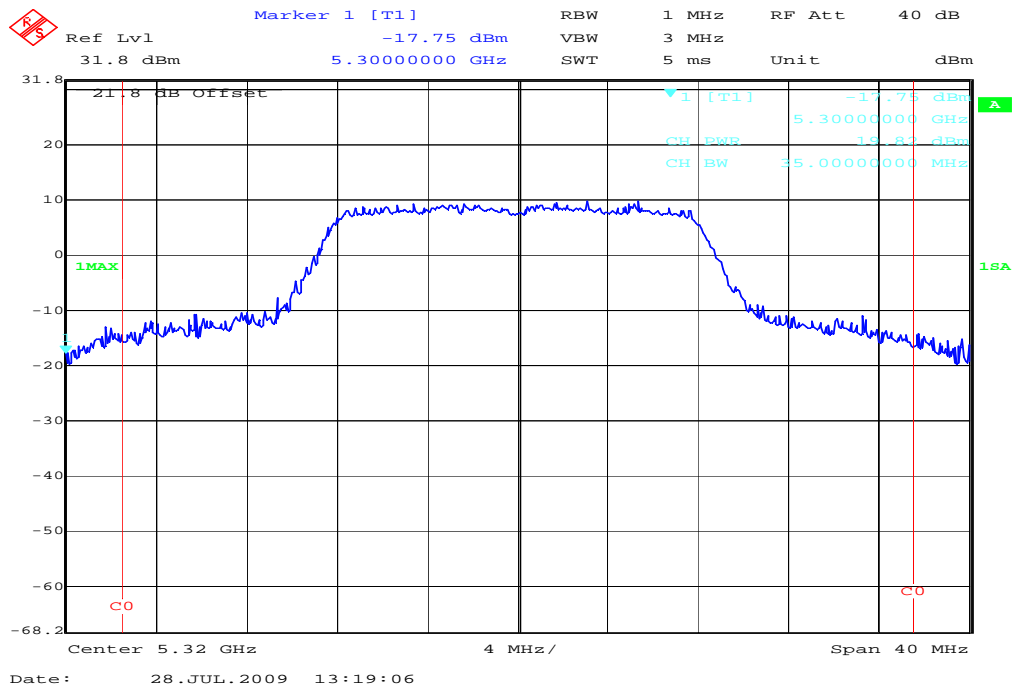
Plot 5: Channel 60 - 5300 MHz

Max. power index 45



Plot 6: Channel 64 - 5320 MHz

Max. power index 45



---

Results: Plot 4: Peak transmit power: 89.5 mW / 19.52 dBm  
Plot 5: Peak transmit power: 96.2 mW / 19.83 dBm  
Plot 6: Peak transmit power: 95.9 mW / 19.82 dBm

Limits:

Under normal test conditions only	For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
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5.7 Peak power spectral density

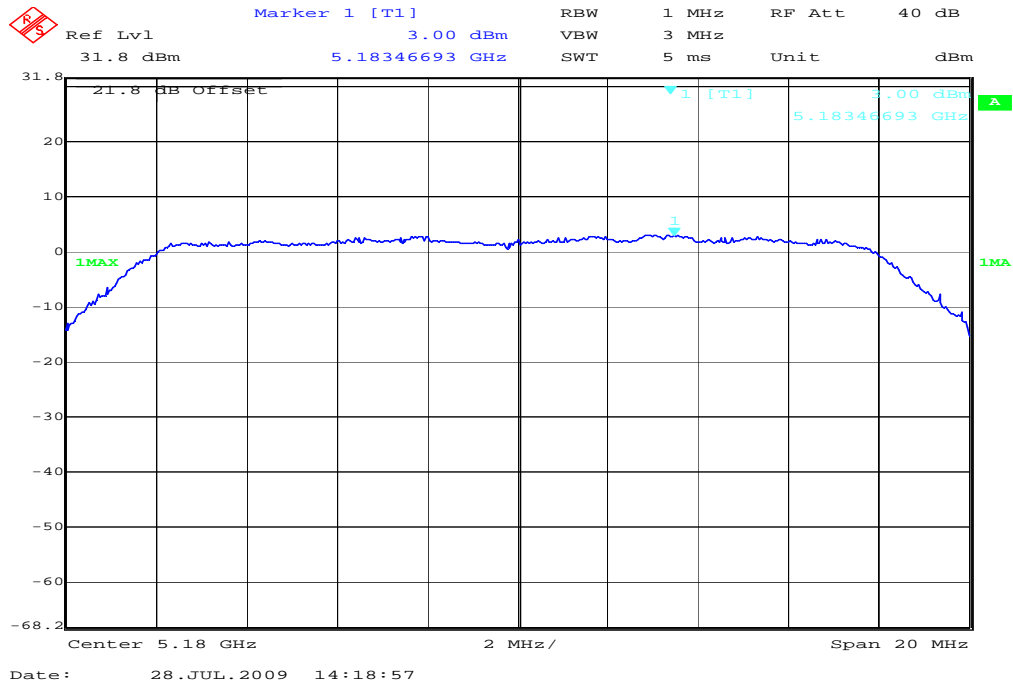
§15.407(a5)

Measured according to the guidelines of the FCC public notice DA 02-2138 - method #1:

- Use peak detector and max hold
- Set RBW = 1 MHz. Set VBW > 1 MHz
- The PPSD is the highest level found across the emission in any 1 MHz band.

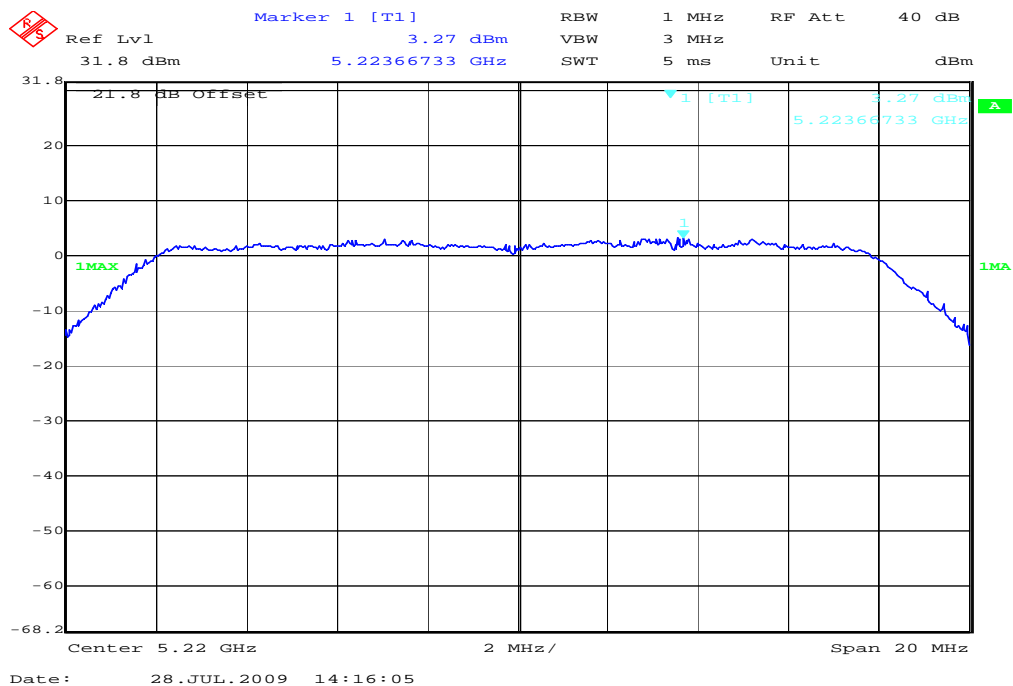
Plot 1: Channel 36 - 5180 MHz

Max. power index 25



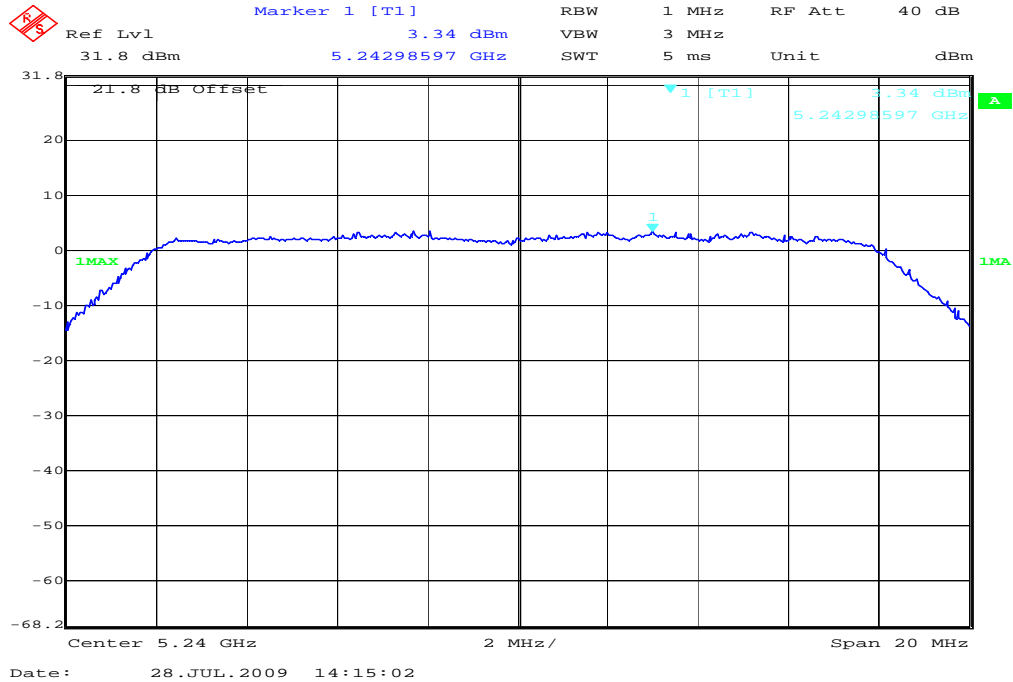
Plot 2: Channel 44 - 5220 MHz

Max. power index 25



Plot 3: Channel 48 - 5240 MHz

Max. power index 25



Results:

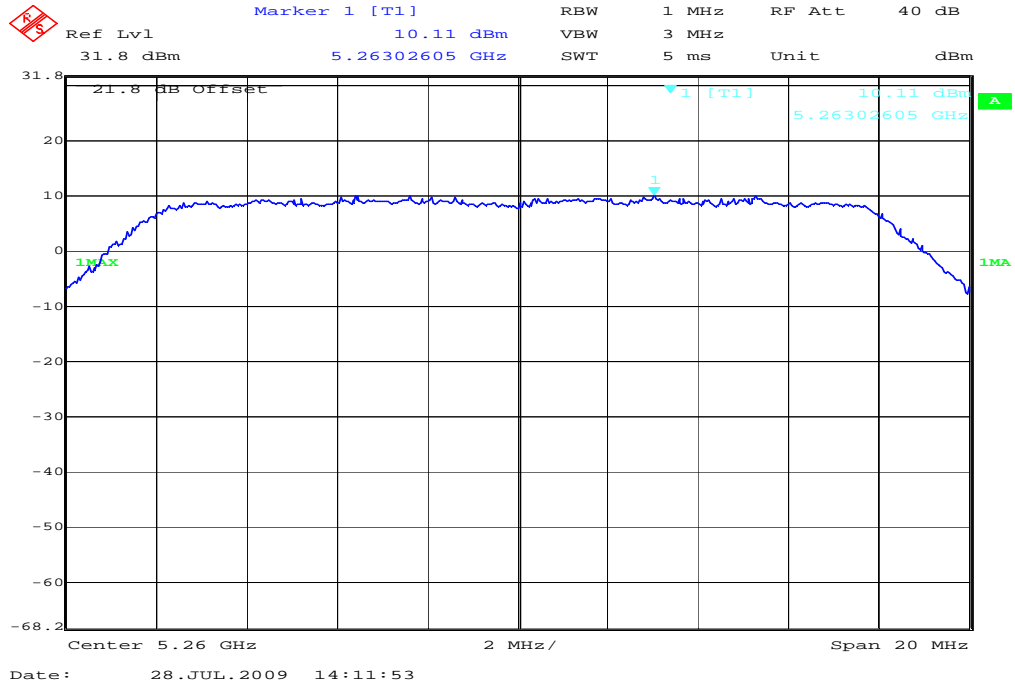
Frequency [MHz]	Spectral density [dBm] (1 MHz BW)
5180 MHz	3.00 dBm
5220 MHz	3.27 dBm
5240 MHz	3.34 dBm

Limits:

Under normal test conditions only	For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1 MHz-band. If transmitting antennas with directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.
-----------------------------------	--

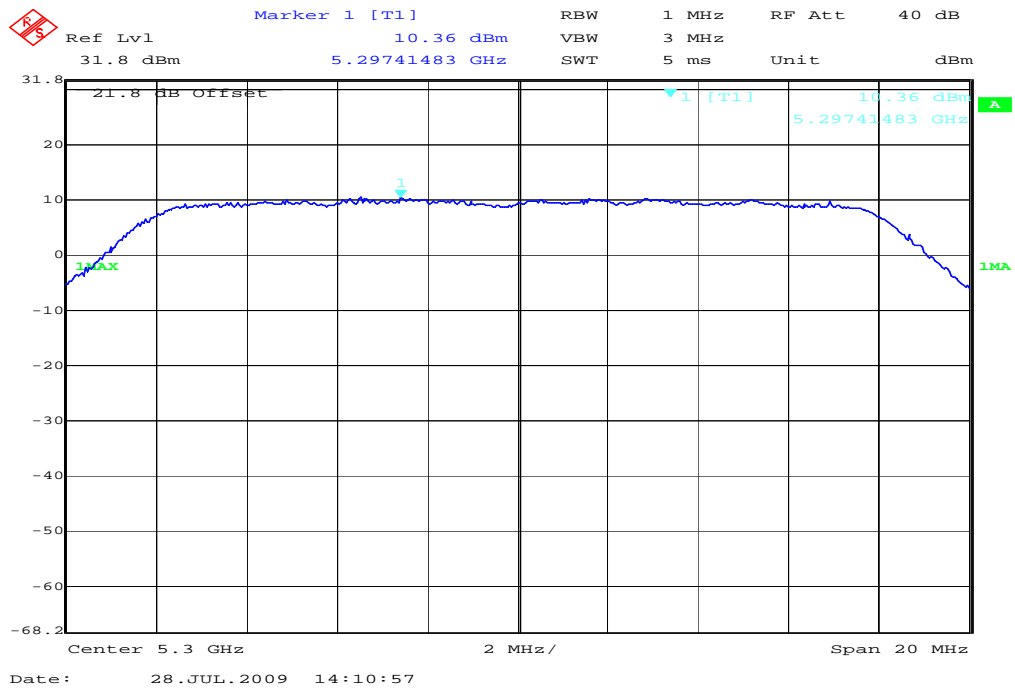
Plot 4: Channel 52 - 5260 MHz

Max. power index 45



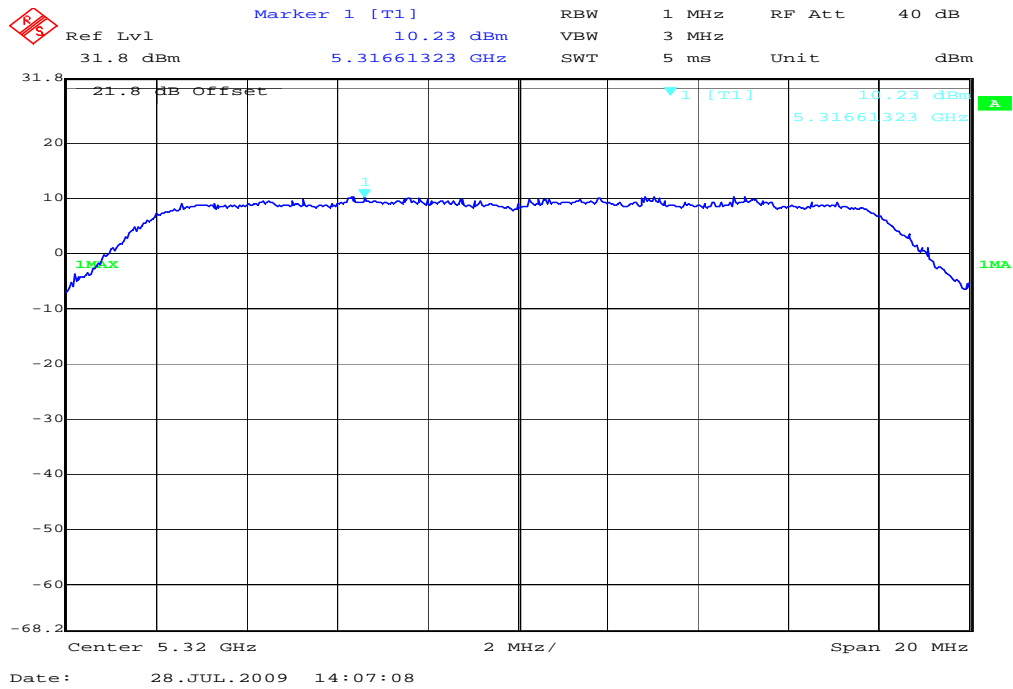
Plot 5: Channel 60 - 5300 MHz

Max. power index 45



Plot 6: Channel 64 - 5320 MHz

Max. power index 45



Results:

Frequency [MHz]	Spectral density [dBm] (1 MHz BW)
5260 MHz	10.11 dBm
5300 MHz	10.36 dBm
5320 MHz	10.23 dBm

Limits:

Under normal test conditions only	For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1 MHz-band. If transmitting antennas with directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.
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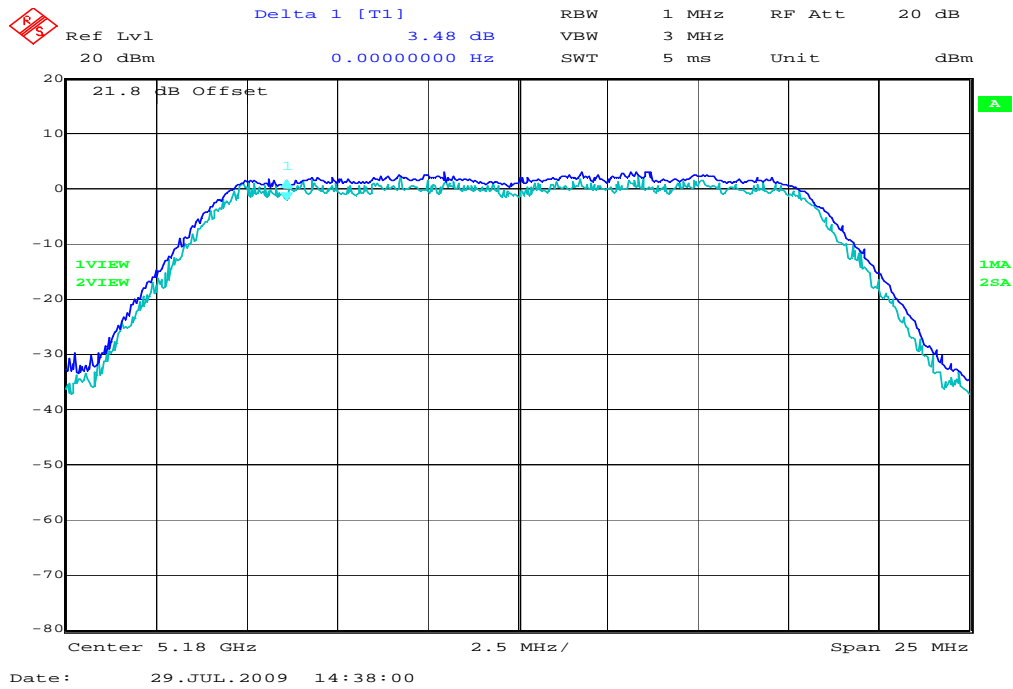
5.8 Ratio of Peak Excursion

§15.407(a6)

Measured according to the guidelines of the FCC public notice DA 02-2138.

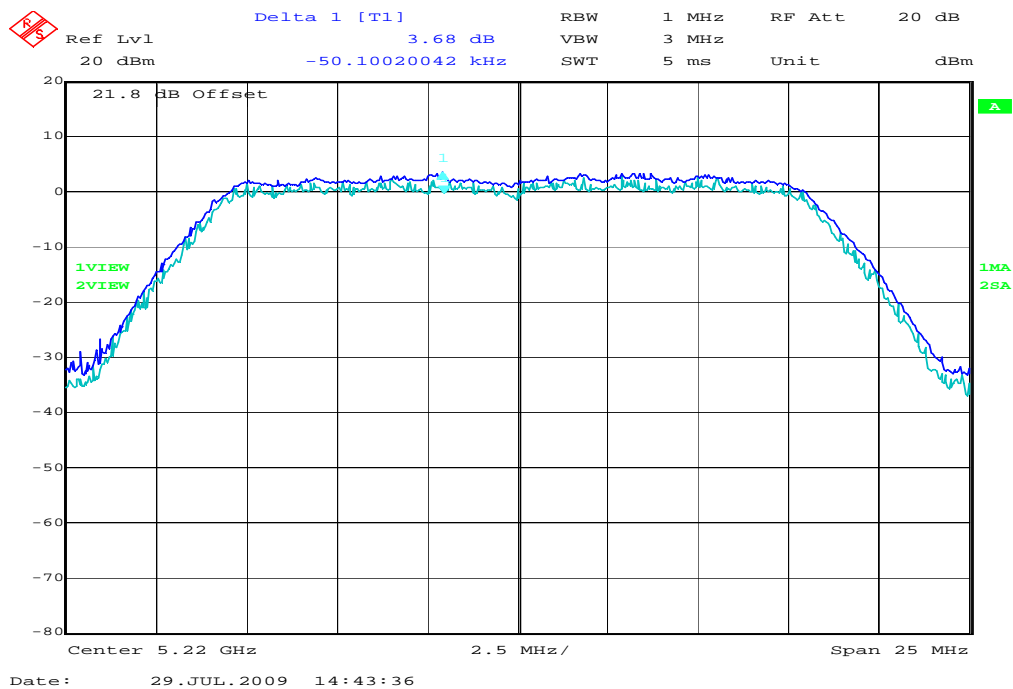
Plot 1: Channel 36 - 5180 MHz

Max. power index 25



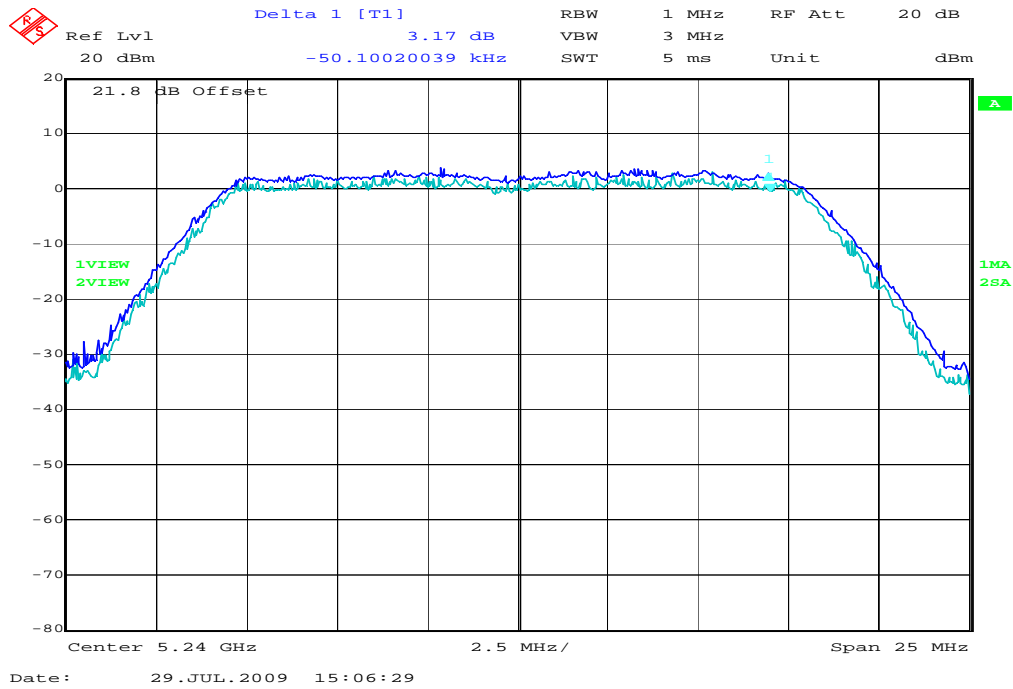
Plot 2: Channel 44 - 5220 MHz

Max. power index 25



Plot 3: Channel 48 - 5240 MHz

Max. power index 25

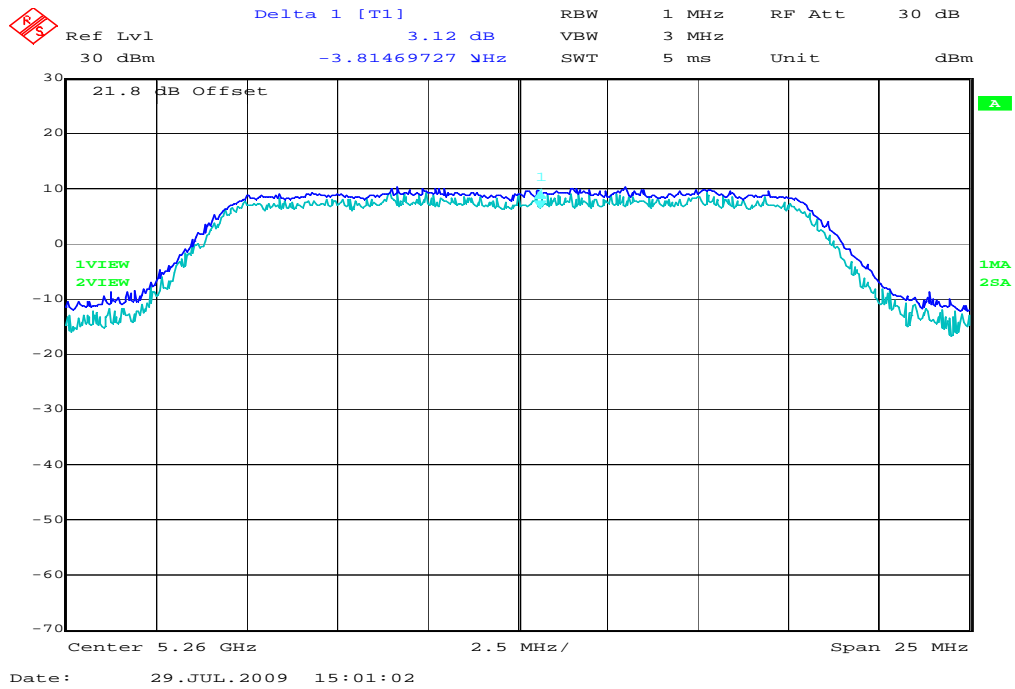


Results:

Frequency [MHz]	Ratio of peak excursion of the modulation envelope		
	Limit	Ratio(dB)	pass / fail
5180 MHz	< 13 dB	3.48	pass
5220 MHz	< 13 dB	3.68	pass
5240 MHz	< 13 dB	3.17	pass
Measurement uncertainty		±1dB	

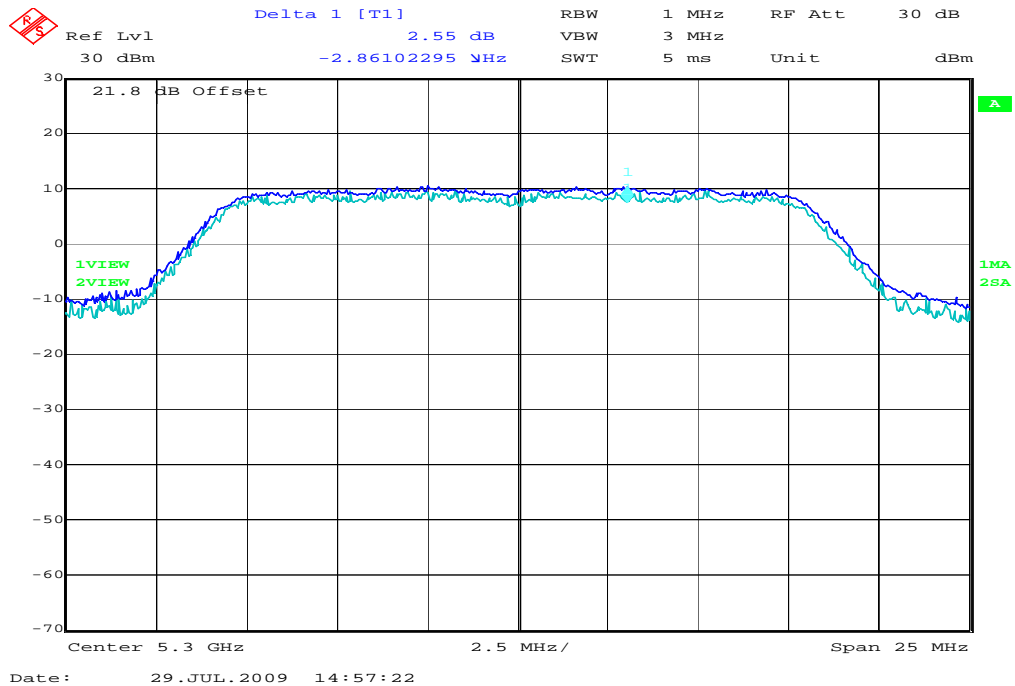
Plot 4: Channel 52 - 5260 MHz

Max. power index 45



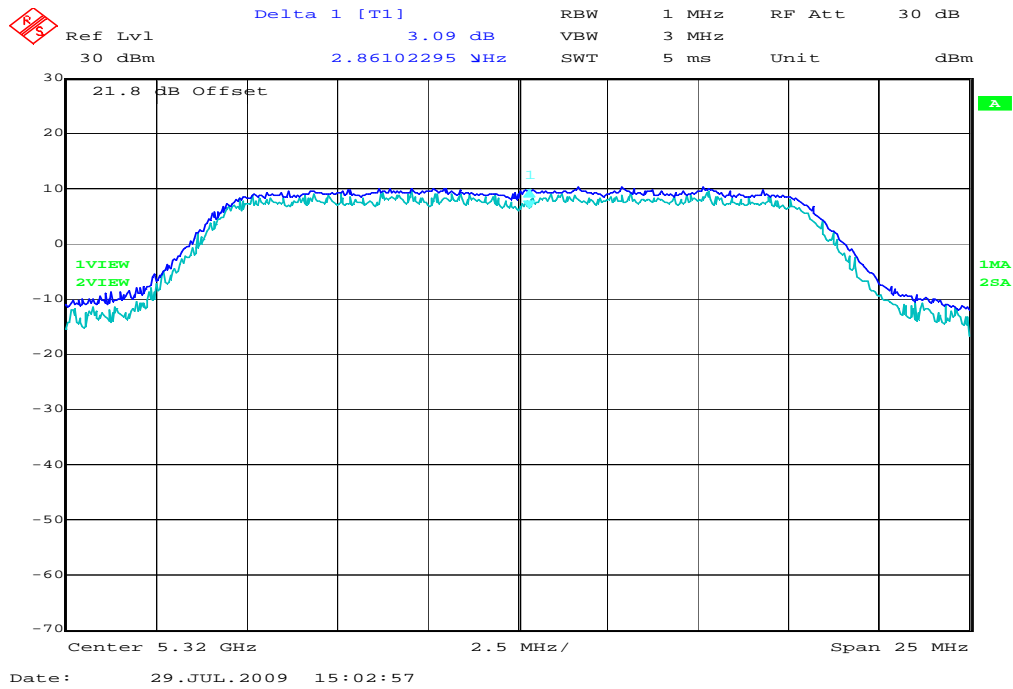
Plot 5: Channel 60 - 5300 MHz

Max. power index 45



Plot 6: Channel 64 - 5320 MHz

Max. power index 45



Results:

Frequency [MHz]	Ratio of peak excursion of the modulation envelope		
	Limit	Ratio(dB)	pass / fail
5260 MHz	< 13 dB	3.12	pass
5300 MHz	< 13 dB	2.55	pass
5320 MHz	< 13 dB	3.09	pass
Measurement uncertainty		±1dB	

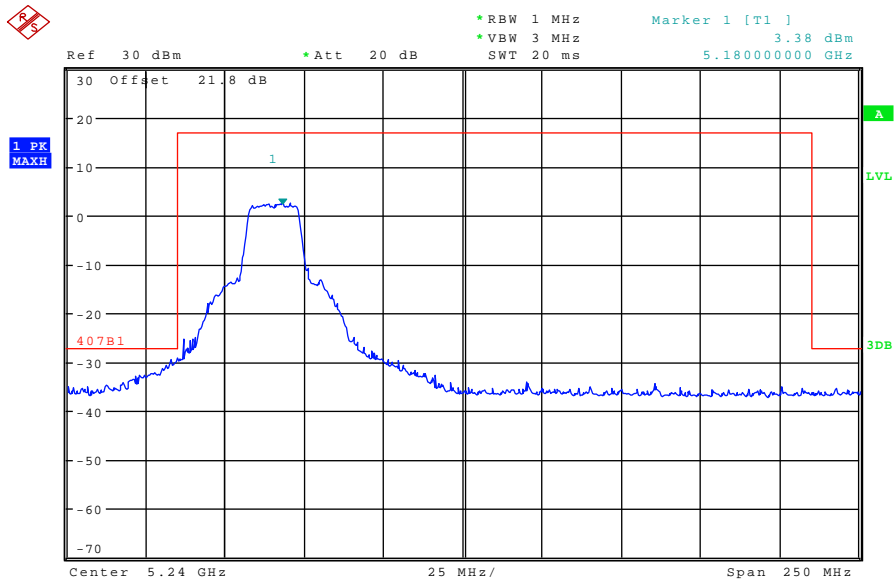
Under normal test conditions only	The ratio of peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.
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### 5.9 Undesirable emission limits at band edges

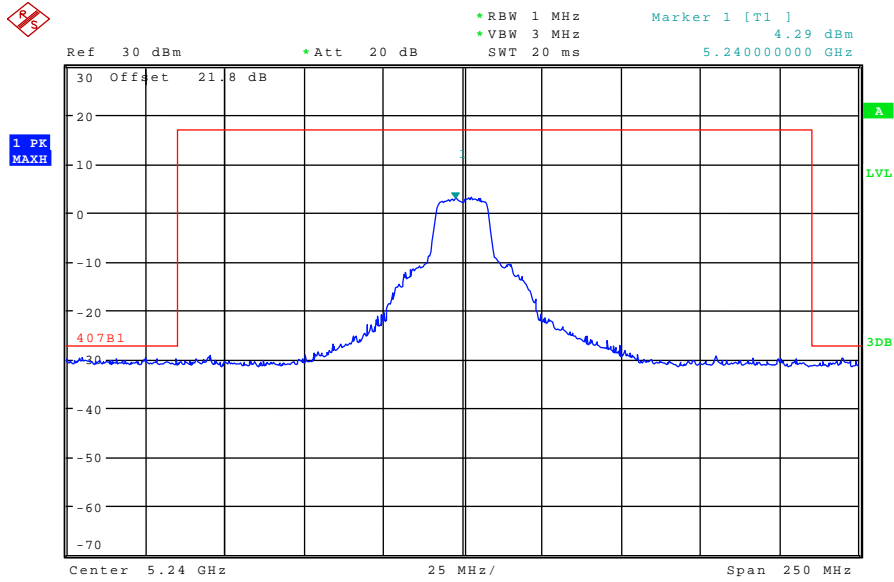
15.407 (b3)

#### Lower Band

Plot 1: lower band edge  
Max. power index 25

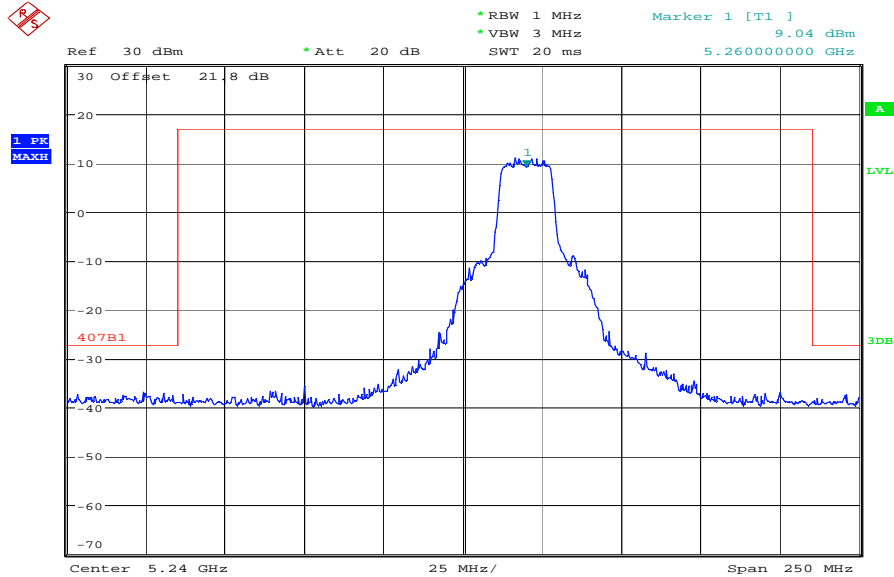


Plot 2: upper band edge  
Max. power index 25



**Middle Band**

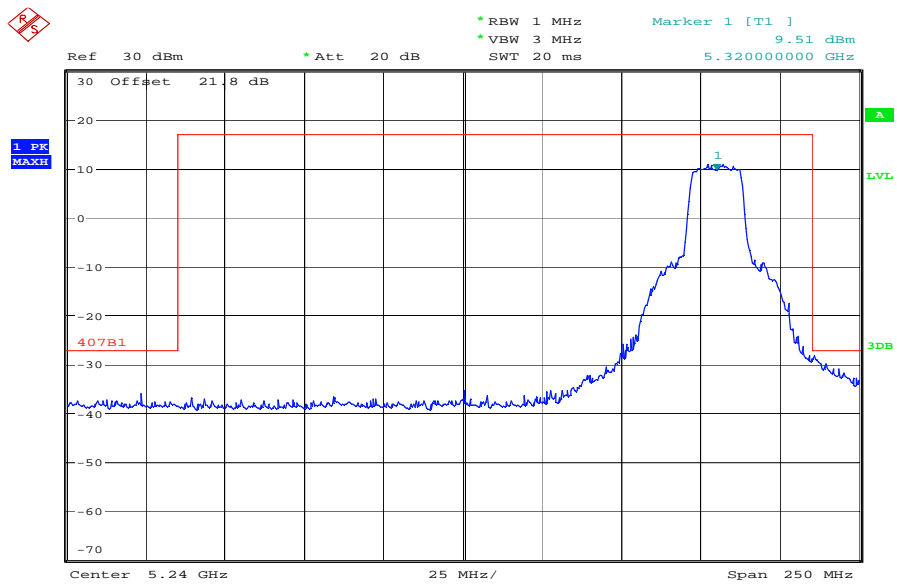
Plot 1: lower band edge  
Max. power index 45



Date: 21.JUL.2009 15:07:53

Plot 2: upper band edge

Max. power index 45



Date: 21.JUL.2009 14:57:14

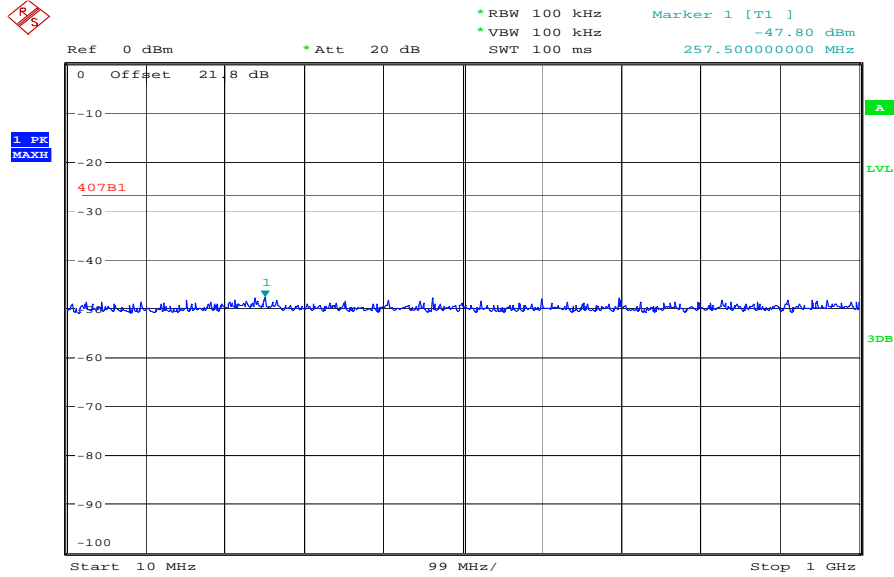
5.10 Spurious emissions (conducted)

15.407 (b1,b2)

Lower Band

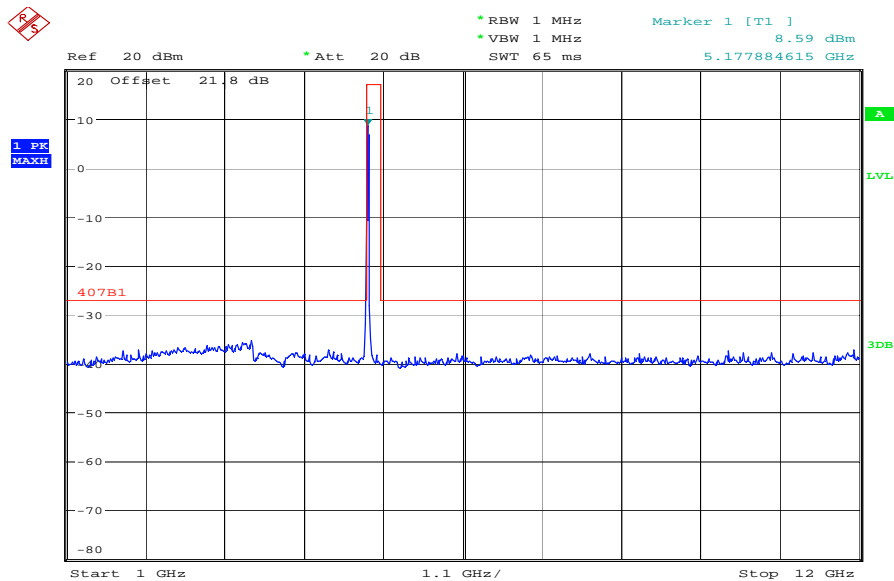
Mode a

Plot 1.1: Channel 36 - 5180 MHz  
 Power Index 25



Date: 23.JUL.2009 11:19:01

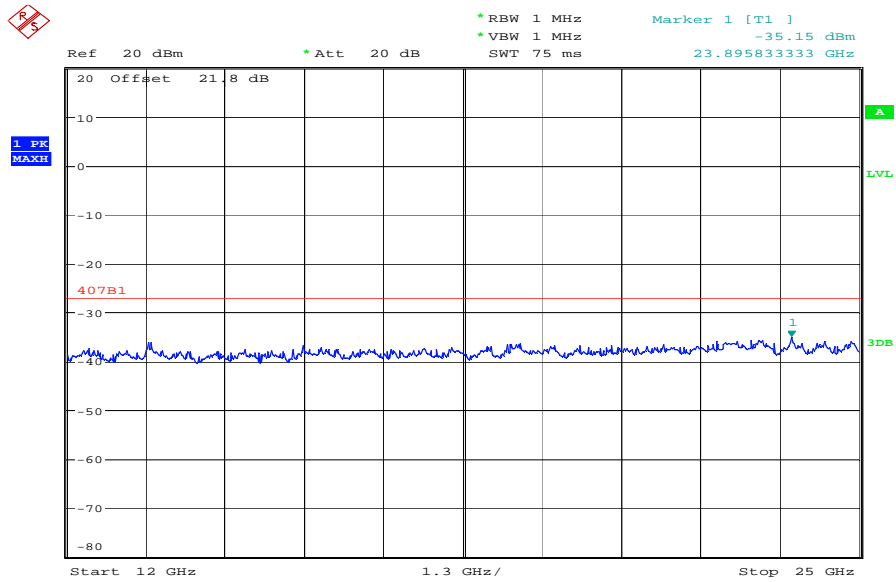
Plot 1.2: Channel 36 - 5180 MHz  
 Power Index 25



Date: 23.JUL.2009 11:28:19

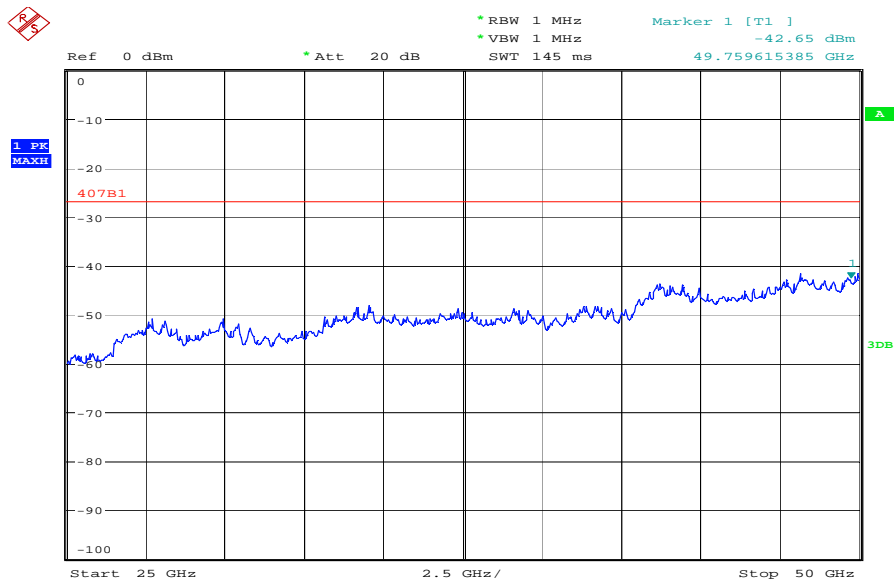


Plot 1.3: Channel 36 - 5180 MHz  
Power Index 25



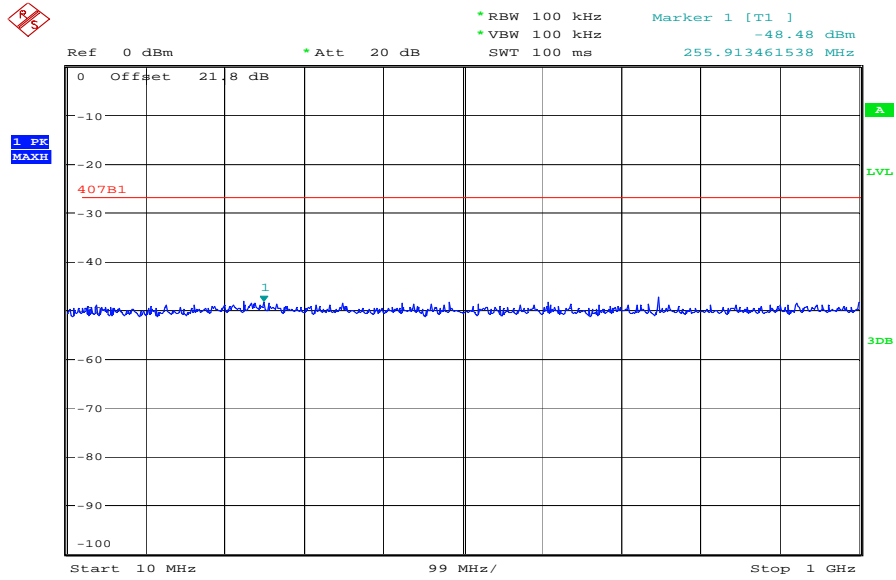
Date: 23.JUL.2009 11:29:19

Plot 1.4: Channel 36 - 5180 MHz  
Power Index 25



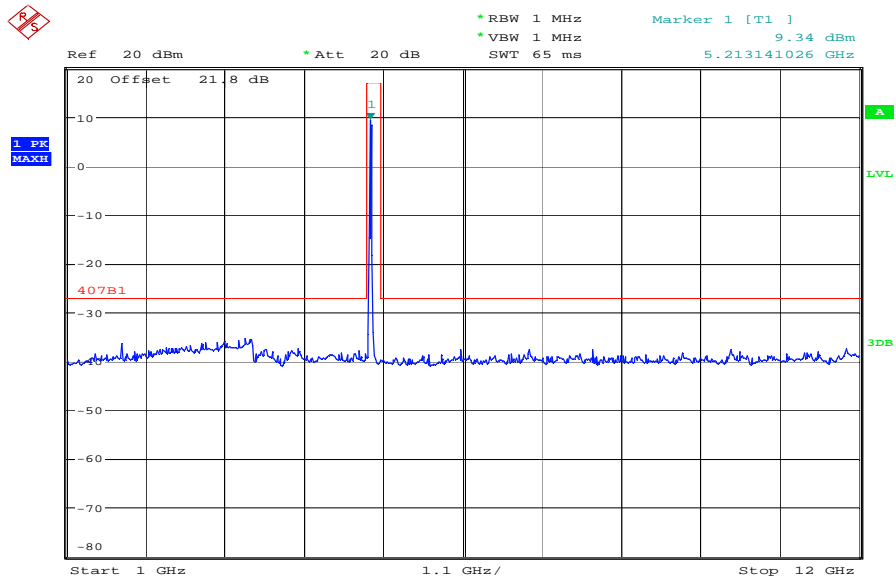
Date: 23.JUL.2009 12:55:12

Plot 2.1: Channel 44 - 5220 MHz  
Power Index 25



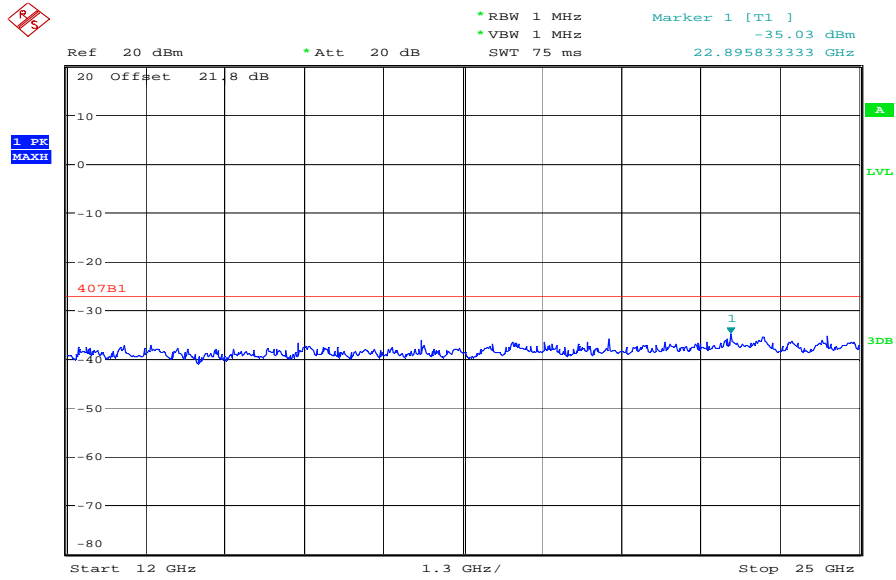
Date: 23.JUL.2009 11:19:56

Plot 2.2: Channel 44 - 5220 MHz  
Power Index 25



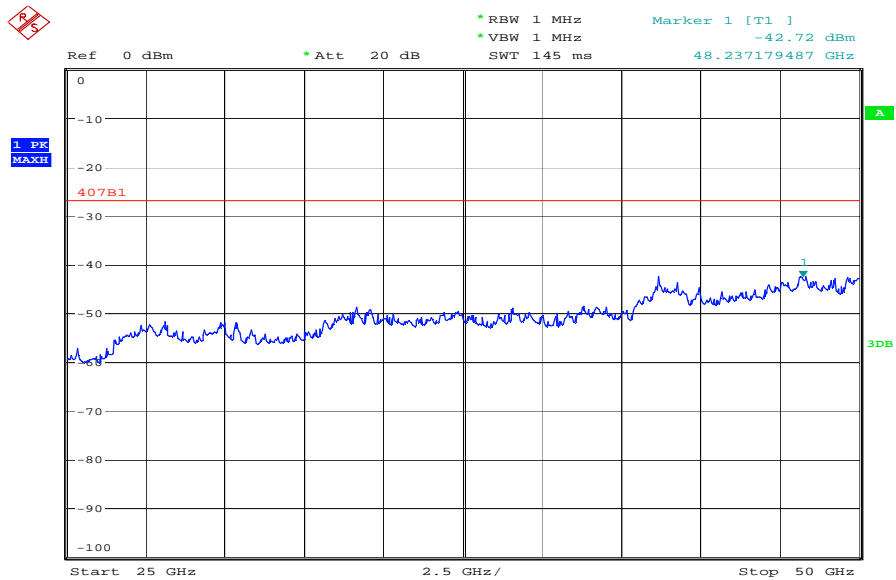
Date: 23.JUL.2009 11:27:16

Plot 2.3: Channel 44 - 5220 MHz  
Power Index 25



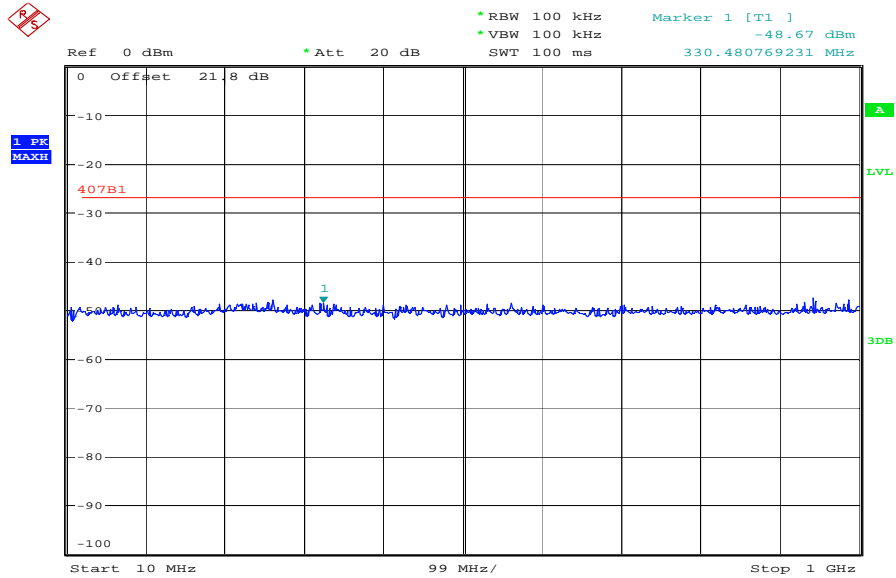
Date: 23.JUL.2009 11:30:43

Plot 2.4: Channel 44 - 5220 MHz  
Power Index 25



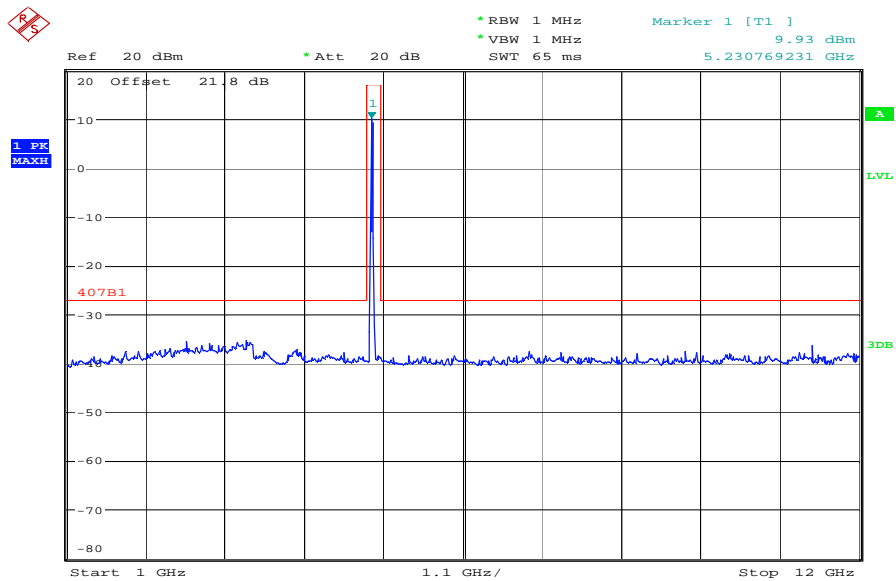
Date: 23.JUL.2009 13:01:05

Plot 3.1: Channel 48 - 5240 MHz  
 Power Index 25



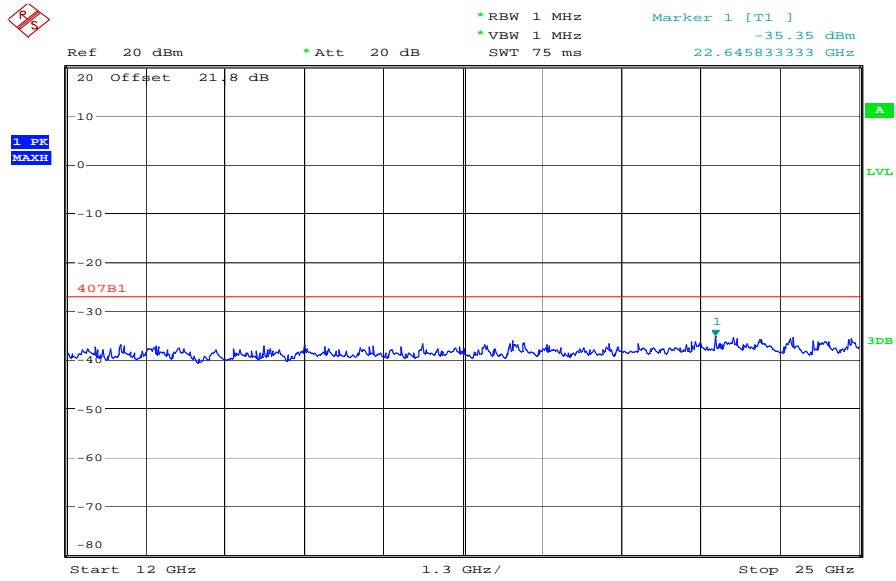
Date: 23.JUL.2009 11:20:33

Plot 3.2: Channel 48 - 5240 MHz  
 Power Index 25



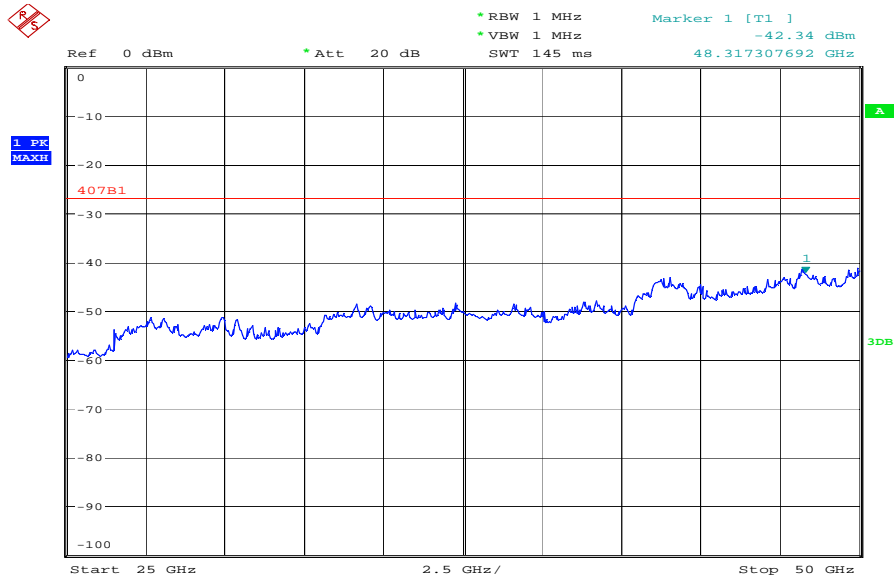
Date: 23.JUL.2009 11:26:39

Plot 3.3: Channel 48 - 5240 MHz  
Power Index 25



Date: 23.JUL.2009 11:32:14

Plot 3.4: Channel 48 - 5240 MHz  
Power Index 25



Date: 23.JUL.2009 13:15:46

Result & Limits:

Emission Limitations					
Frequency [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
5180			17 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
5220			17 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
5240			17 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
Measurement uncertainty			± 3dB		

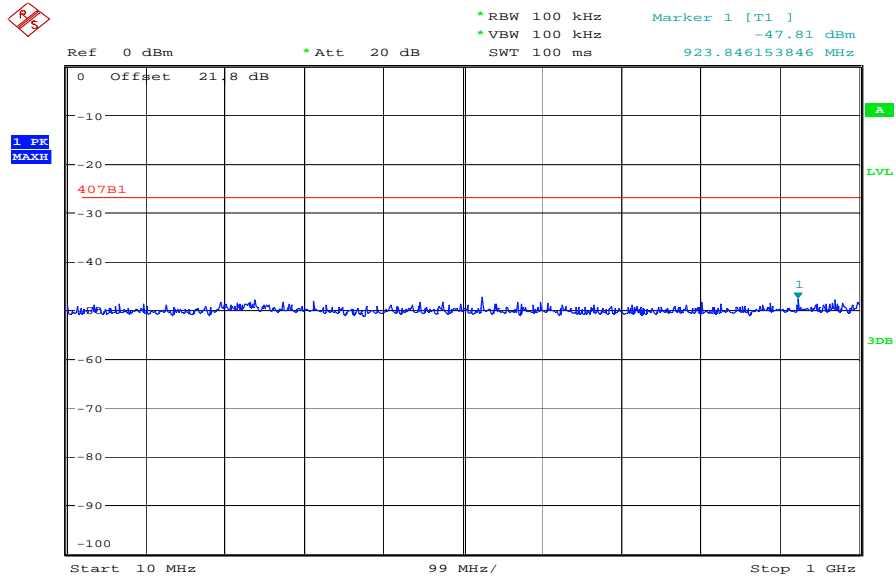
RBW : 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
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Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

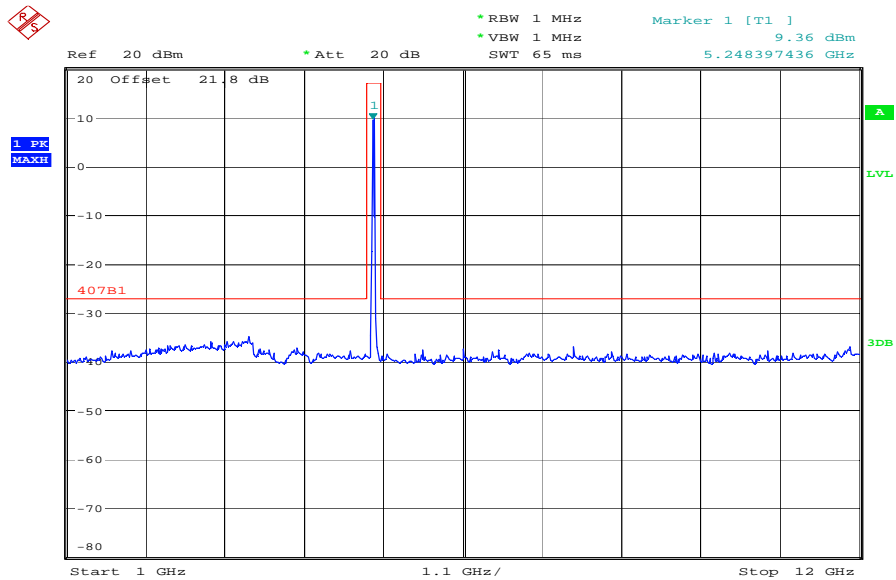
**Middle band**

Plot 1.1: Channel 52 - 5260 MHz  
 Power Index 45



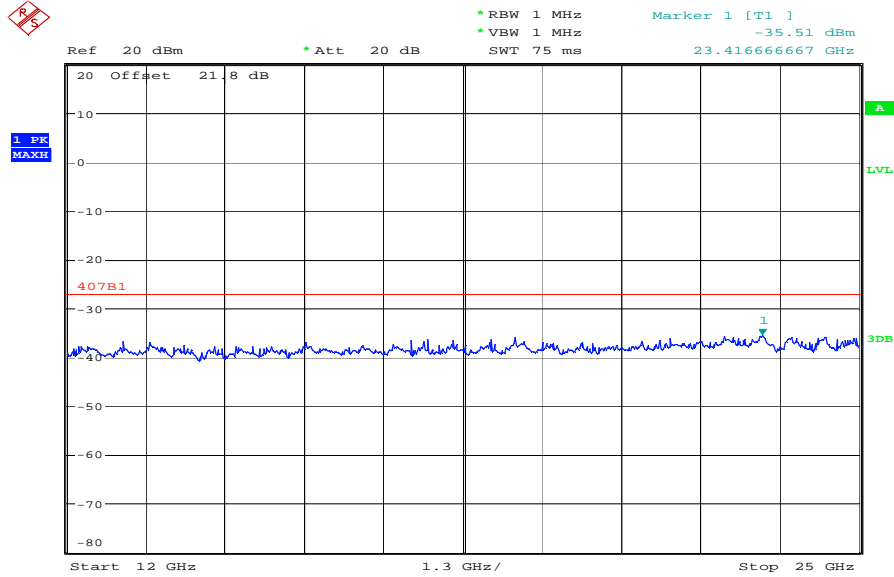
Date: 23.JUL.2009 11:21:14

Plot 1.2: Channel 52 - 5260 MHz  
 Power Index 45



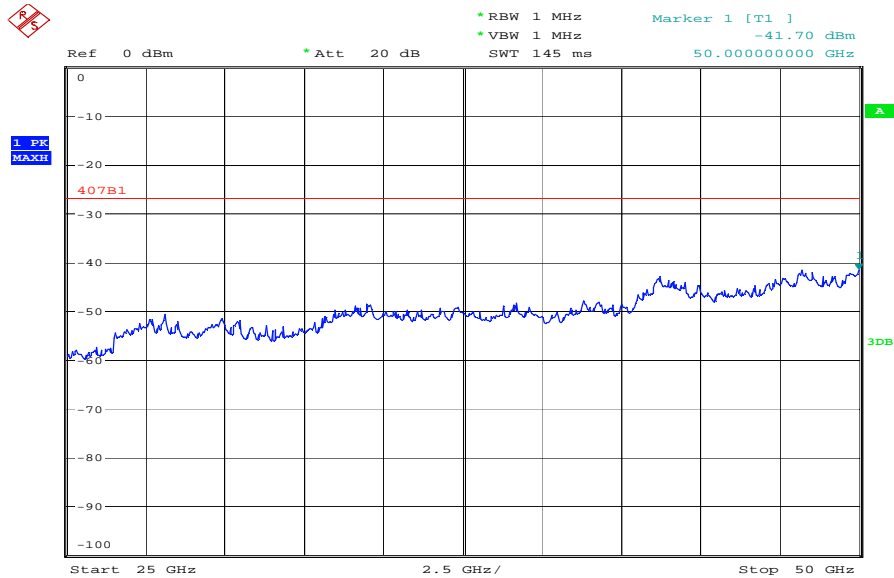
Date: 23.JUL.2009 11:25:46

Plot 1.3: Channel 52 - 5260 MHz  
Power Index 45



Date: 23.JUL.2009 11:36:01

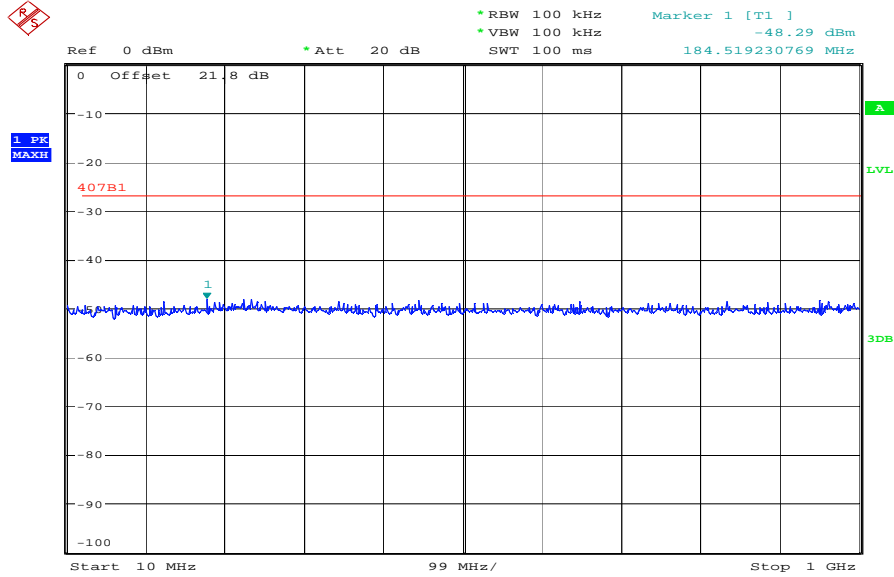
Plot 1.4: Channel 52 - 5260 MHz  
Power Index 45



Date: 23.JUL.2009 13:23:00

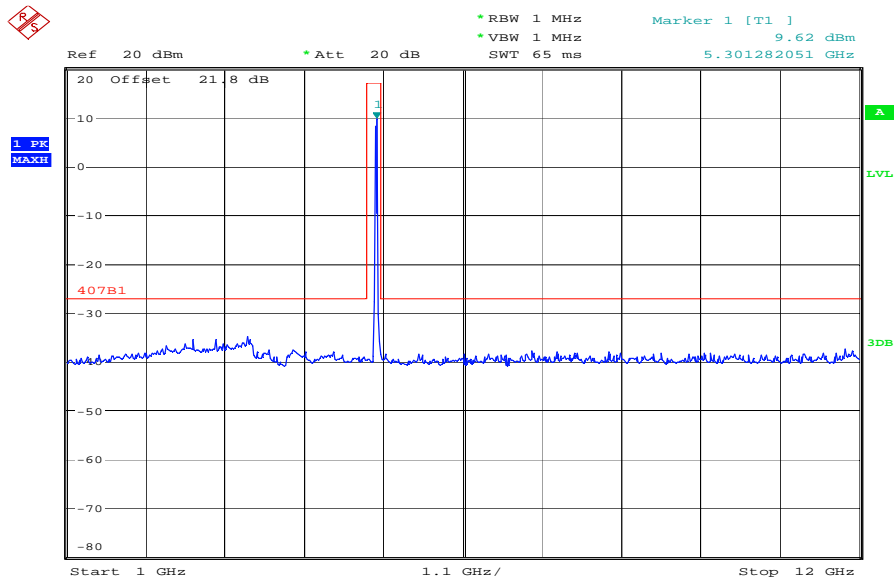


Plot 2.1: Channel 60 - 5300 MHz  
Power Index 45



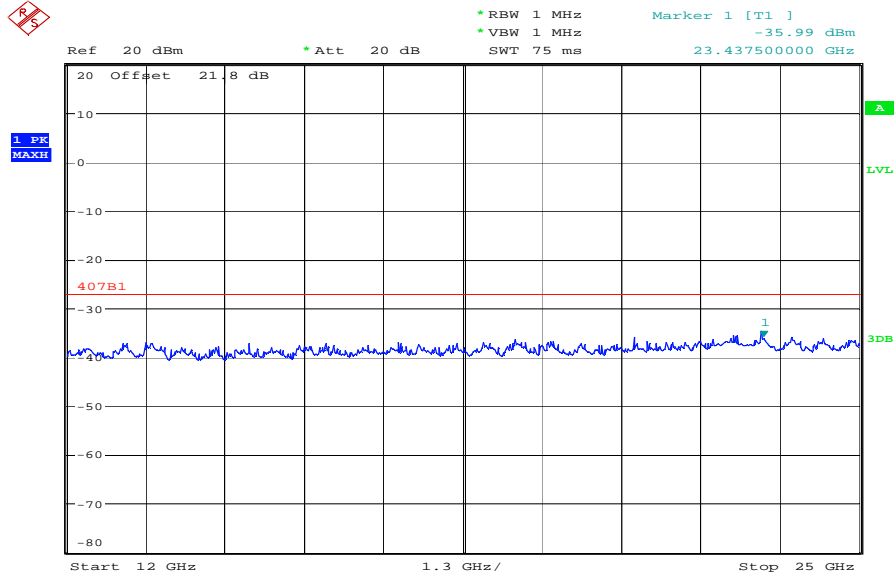
Date: 23.JUL.2009 11:21:45

Plot 2.2: Channel 60 - 5300 MHz  
Power Index 45



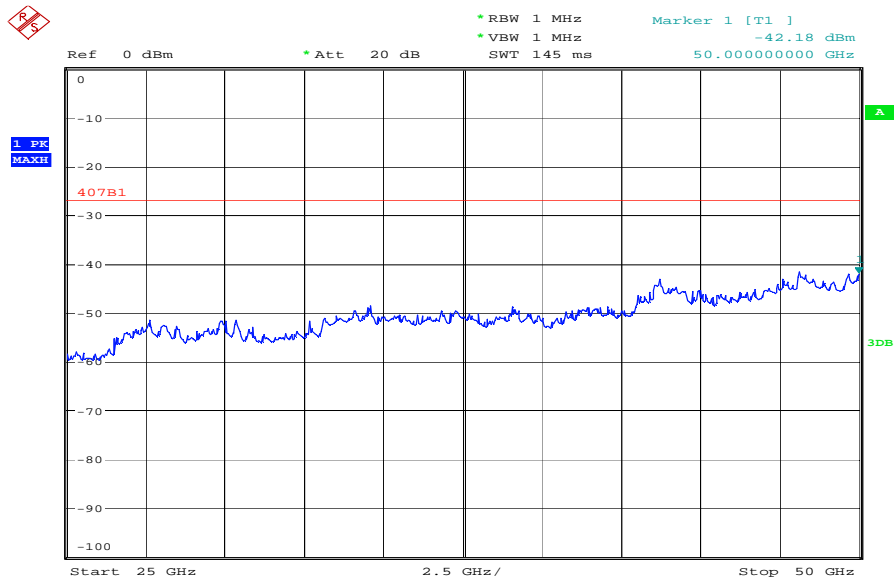
Date: 23.JUL.2009 11:24:28

Plot 2.3: Channel 60 - 5300 MHz  
Power Index 45



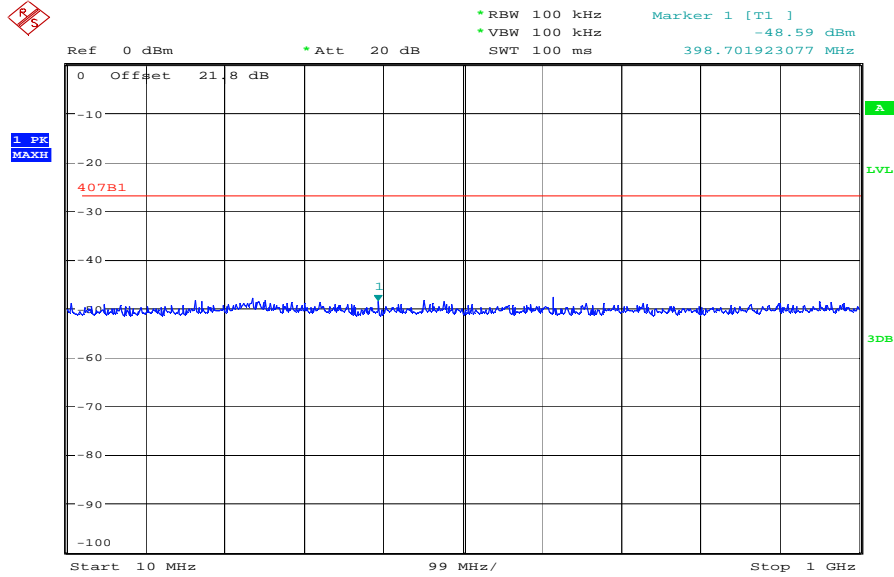
Date: 23.JUL.2009 11:38:20

Plot 2.4: Channel 60 - 5300 MHz  
Power Index 45



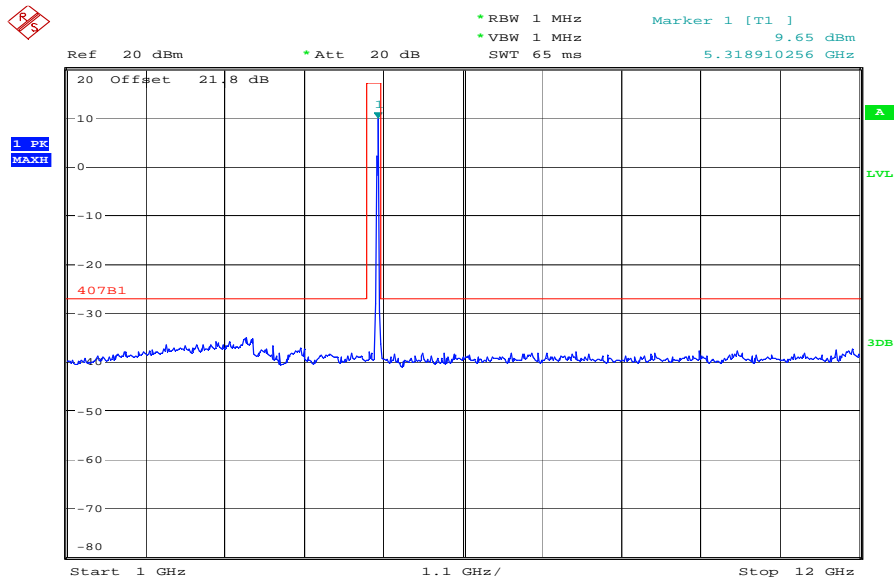
Date: 23.JUL.2009 13:51:52

Plot 3.1: Channel 64 - 5320 MHz  
Power Index 45



Date: 23.JUL.2009 11:22:12

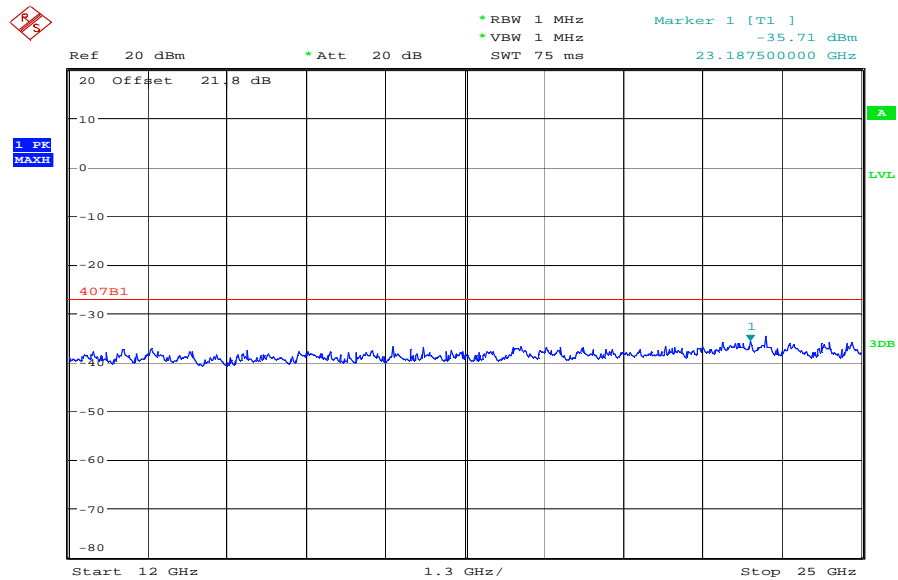
Plot 3.2: Channel 64 - 5320 MHz  
Power Index 45



Date: 23.JUL.2009 11:23:48

Plot 3.3: Channel 64 - 5320 MHz

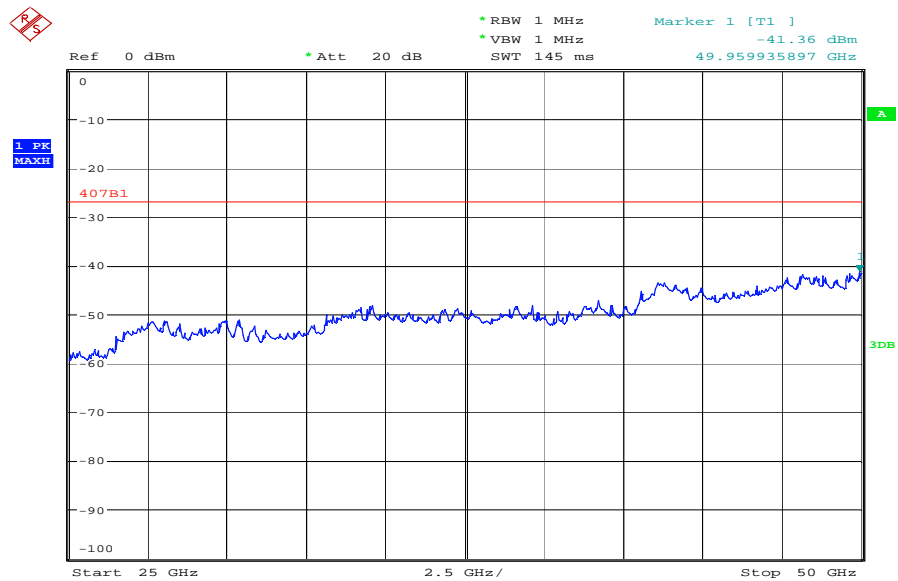
Power Index 45



Date: 23.JUL.2009 11:40:06

Plot 3.4: Channel 64 - 5320 MHz

Power Index 45



Date: 23.JUL.2009 13:54:59

Result & Limits :

Emission Limitations					
Frequency [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
5260			24 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
5300			24 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
5320			24 dBm		Operating frequency
No critical peaks detected!					<b>Complies</b>
Measurement uncertainty		± 3dB			

RBW : 1 MHz VBW: 1 MHz

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
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Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

**5.11 Max. peak output power radiated §15.407**

**5.18 GHz – 5.24 GHz**

Max. power index 25

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		5180 MHz	5220 MHz	5240 MHz
T <sub>nom</sub>	V <sub>nom</sub>	16.58	<b>16.75</b>	16.53
Measurement uncertainty		±3dB		

**5.26 GHz – 5.32 GHz**

Max. power index 45

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		5260 MHz	5300 MHz	5320 MHz
T <sub>nom</sub>	V <sub>nom</sub>	<b>23.60</b>	23.21	22.74
Measurement uncertainty		±3dB		

Limits:

for antennas with gain > 6 dBi	reduce the conducted output power by the amount in dB that the directional gain exceeds 6 dBi
--------------------------------	---

## 5.12 MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density ( in appropriate units, e.g. mW/cm<sup>2</sup>)  
P = power input to the antenna (in appropriate units e.g. mW)  
G = power gain of the antenna in the direction of interest relative to the isotropic radiator  
R = distance to the center of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = EIRP/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

### Calculation:

(Calculated for max. EIRP)

EIRP: 23.60 dBm = 229.1 mW  
calculated at distance of 20 cm:

$$\text{power density} = 229.1 \text{ mW}/4\pi 20^2 = 0.0455 \text{ mW}/\text{cm}^2$$

Limit:

1mW/ cm<sup>2</sup> is the reference level for general public exposure according to the OET Bulletin 65,  
Edition 97-01 Table 1.

**5.13 Spurious Emissions - radiated (Transmitter)**

**§15.209**

Plot 1: 0.03 - 1 GHz (Channel 36 - 5.18 GHz)

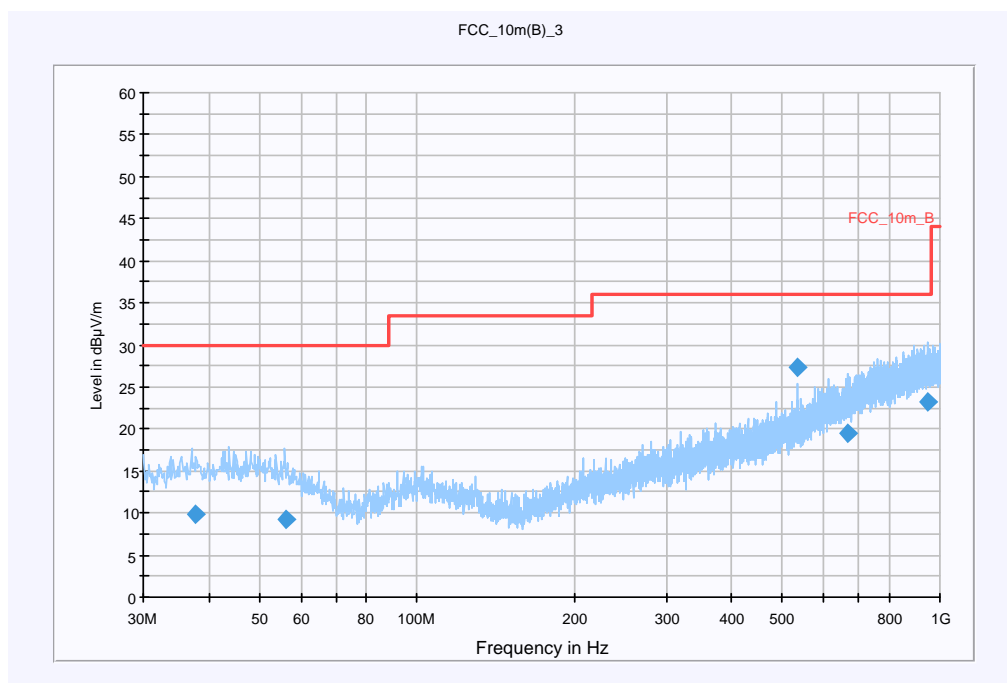
**Information**

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5180 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

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

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

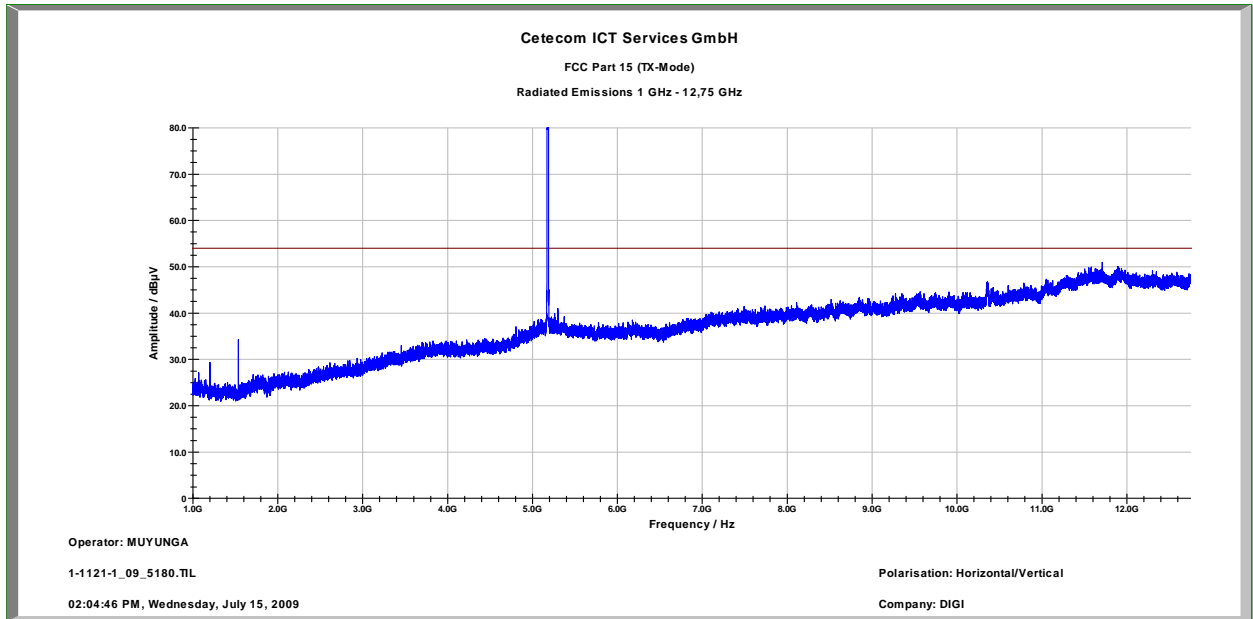


Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.629350	9.9	15000.000	120.000	220.0	V	209.0	13.4	20.1	30.0
56.088300	9.3	15000.000	120.000	105.0	H	239.0	12.8	20.7	30.0
533.985350	27.3	15000.000	120.000	140.0	H	66.0	19.6	8.7	36.0
667.428450	19.5	15000.000	120.000	209.0	V	315.0	22.1	16.5	36.0
948.771900	23.2	15000.000	120.000	220.0	H	143.0	25.8	12.8	36.0



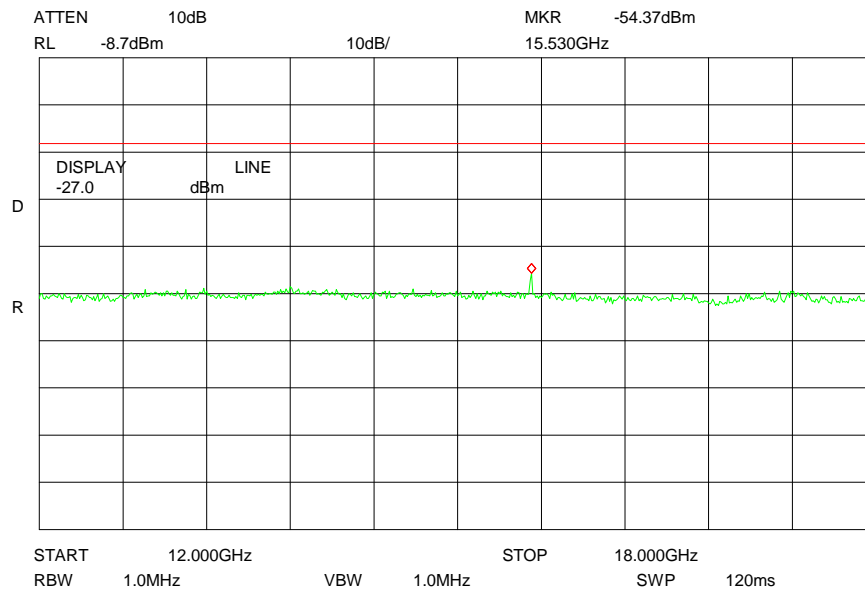
Plot 2: 1 GHz - 12 GHz (Channel 36 - 5.18 GHz)

Max. power index 25



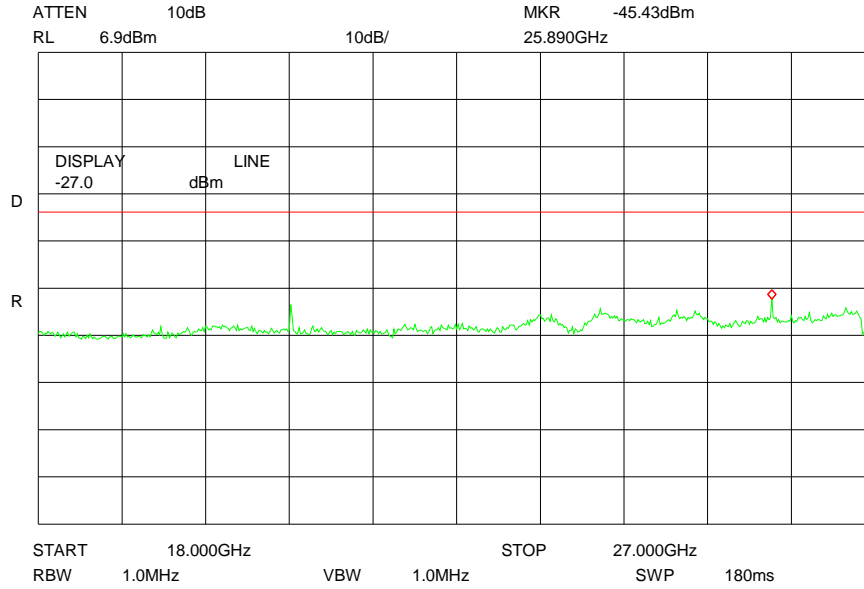
Plot 3: 12 GHz – 18 GHz (valid for all channels)

Max. power index 25



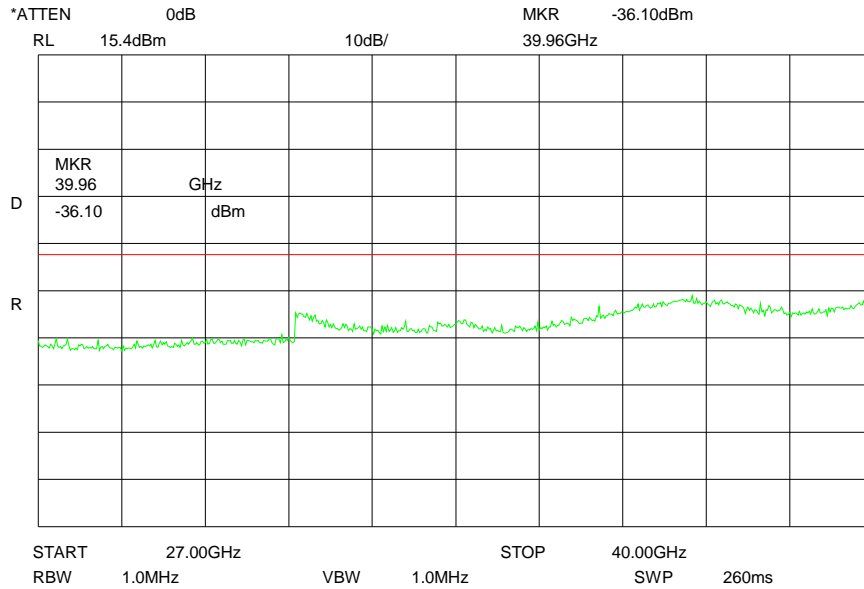
Plot 4: 18 GHz – 27 GHz (valid for all channels)

Max. power index 25



Plot 5: 27 GHz – 40 GHz (valid for all channels)

Max. power index 25



Plot 6: 30 MHz to 1 GHz (Channel 44 - 5.22 GHz)

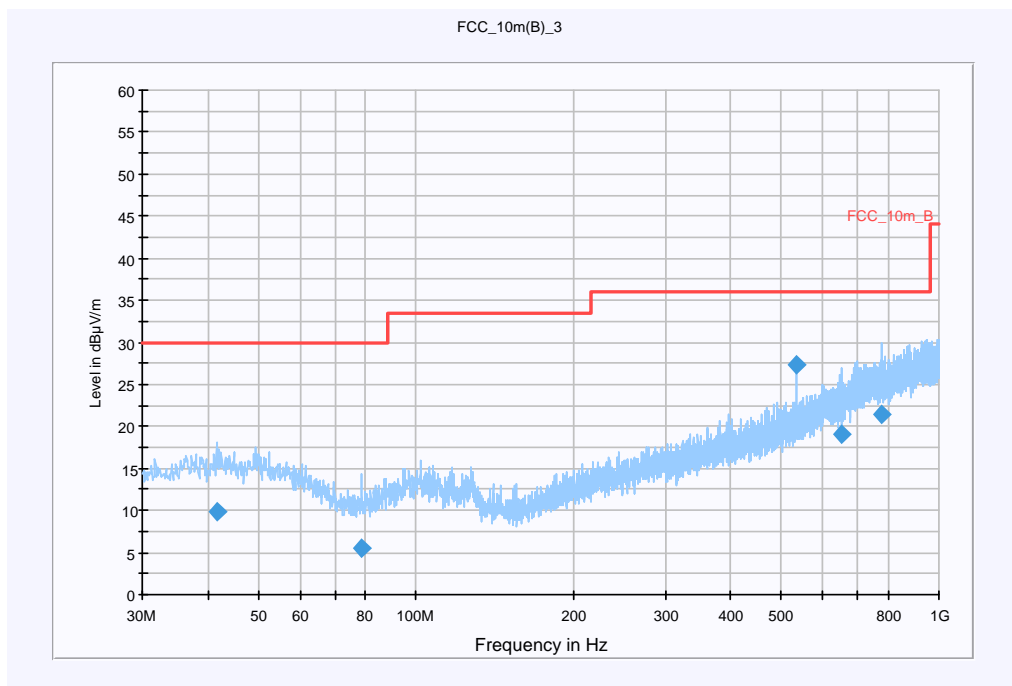
**Information**

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5220 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

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

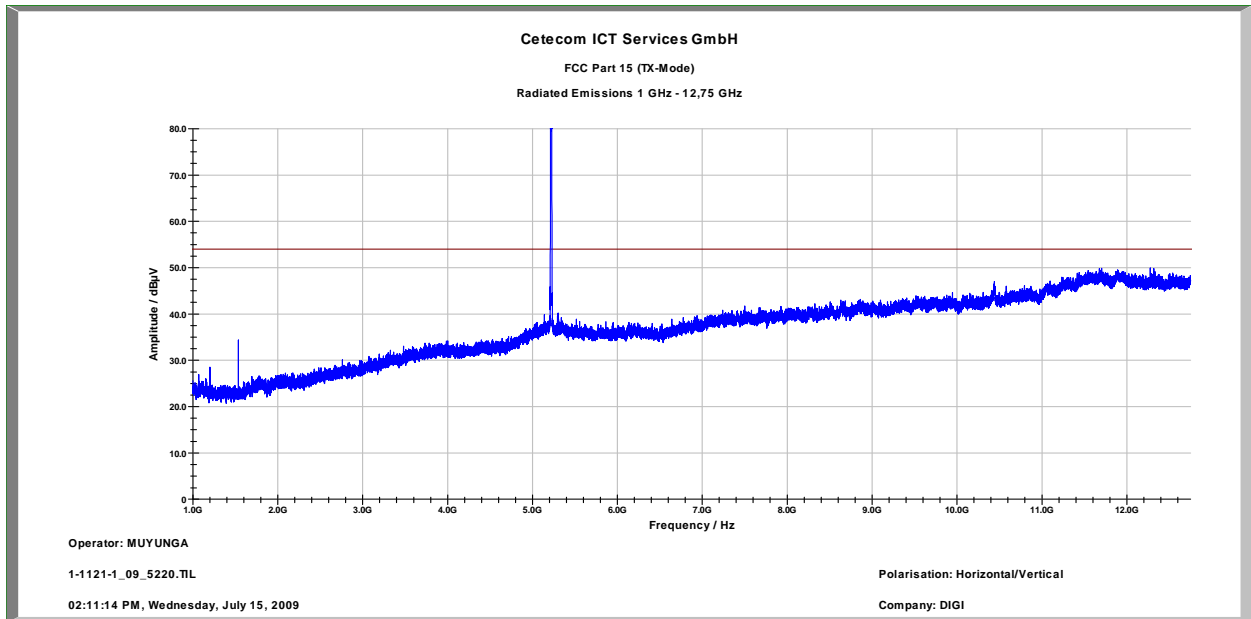
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
41.755950	9.8	15000.00	120.000	220.0	V	277.0	13.5	20.2	30.0
78.887000	5.4	15000.00	120.000	220.0	H	248.0	9.4	24.6	30.0
533.97025	27.3	15000.00	120.000	128.0	H	54.0	19.6	8.7	36.0
651.20590	19.0	15000.00	120.000	169.0	V	-1.0	21.7	17.0	36.0
774.46955	21.5	15000.00	120.000	220.0	V	230.0	24.2	14.5	36.0

Plot 7: 1 GHz to 12 GHz (Channel 44 - 5.22 GHz)

Max. power index 25



Plot 8: 30 MHz to 1 GHz (Channel 48 - 5.24 GHz)

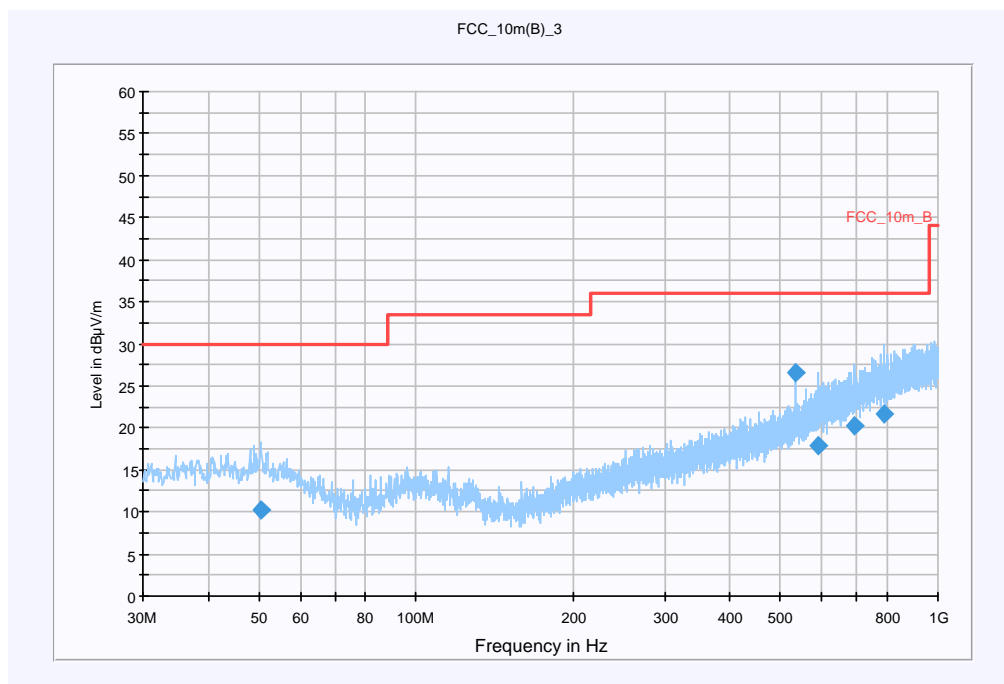
### Information

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5240 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

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

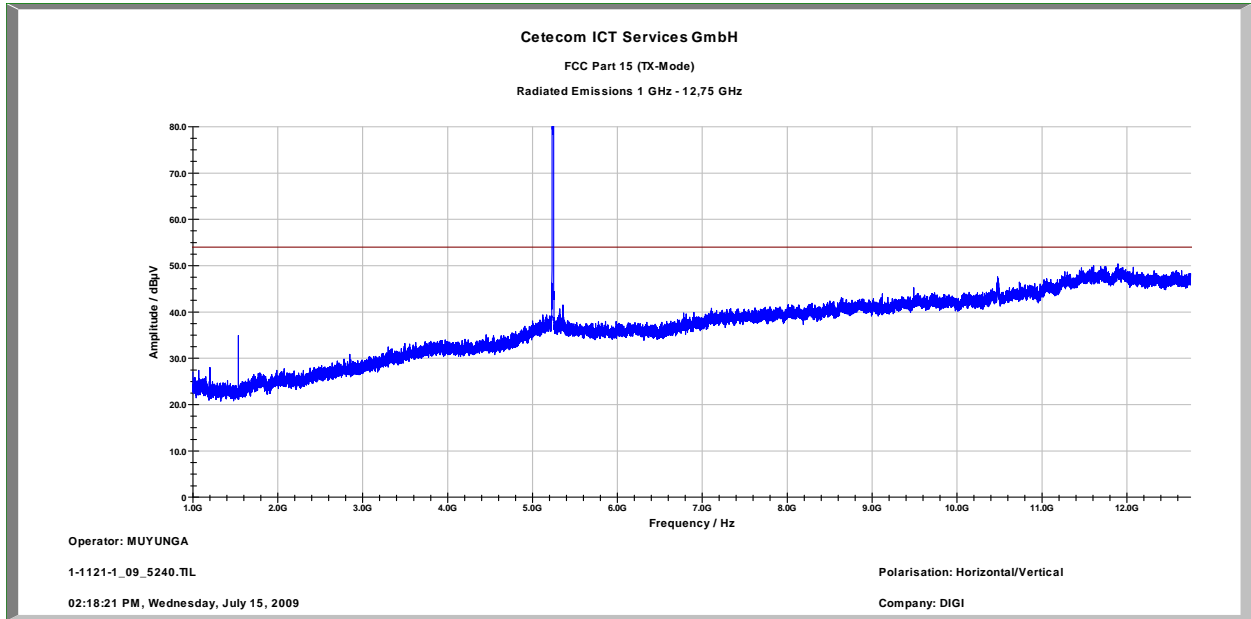
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
50.346150	10.2	15000.000	120.000	183.0	V	24.0	13.5	19.8	30.0
533.999800	26.6	15000.000	120.000	204.0	H	70.0	19.6	9.4	36.0
588.989450	17.8	15000.000	120.000	220.0	H	124.0	21.1	18.2	36.0
694.191200	20.4	15000.000	120.000	209.0	H	26.0	22.8	15.6	36.0
788.640700	21.6	15000.000	120.000	220.0	V	286.0	24.3	14.4	36.0
50.346150	10.2	15000.000	120.000	183.0	V	24.0	13.5	19.8	30.0

Plot 9: 1 GHz to 12 GHz (Channel 48 - 5.24 GHz)

Max. power index 25



Results:

SPURIOUS EMISSIONS LEVEL §15.209								
5180 MHz			5220 MHz			5240 MHz		
Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]
<b>No critical peaks detected</b>								
Measurement uncertainty			±3 dB					

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

See above plots

Limits :

Under normal test conditions only	See plots
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Plot 10: 30 MHz to 1 GHz (Channel 52 - 5.26 GHz)

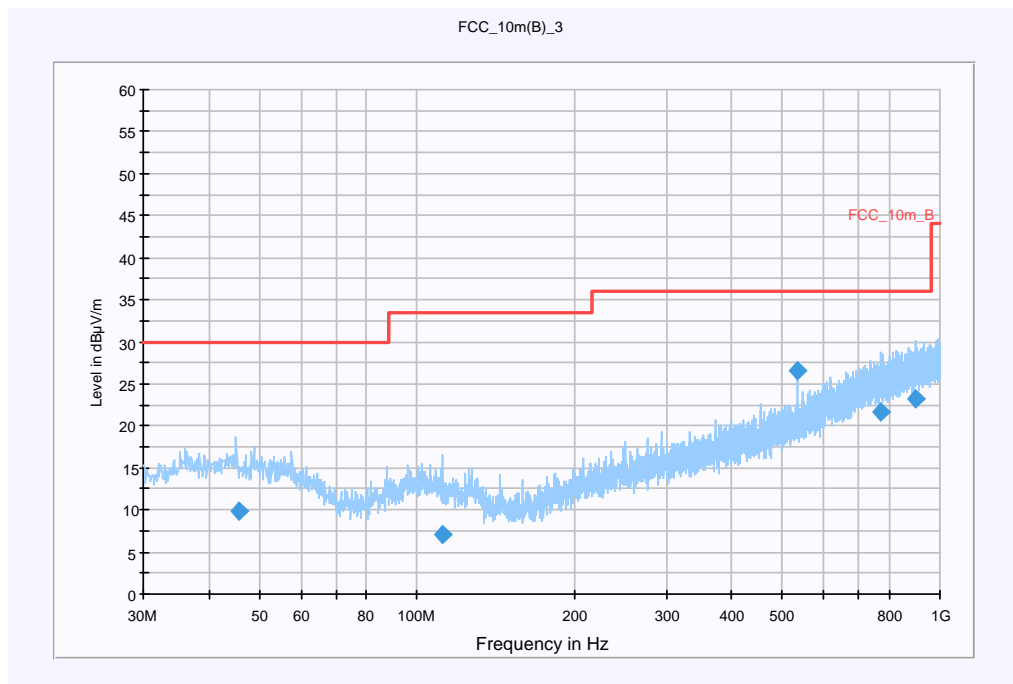
### Information

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5260 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

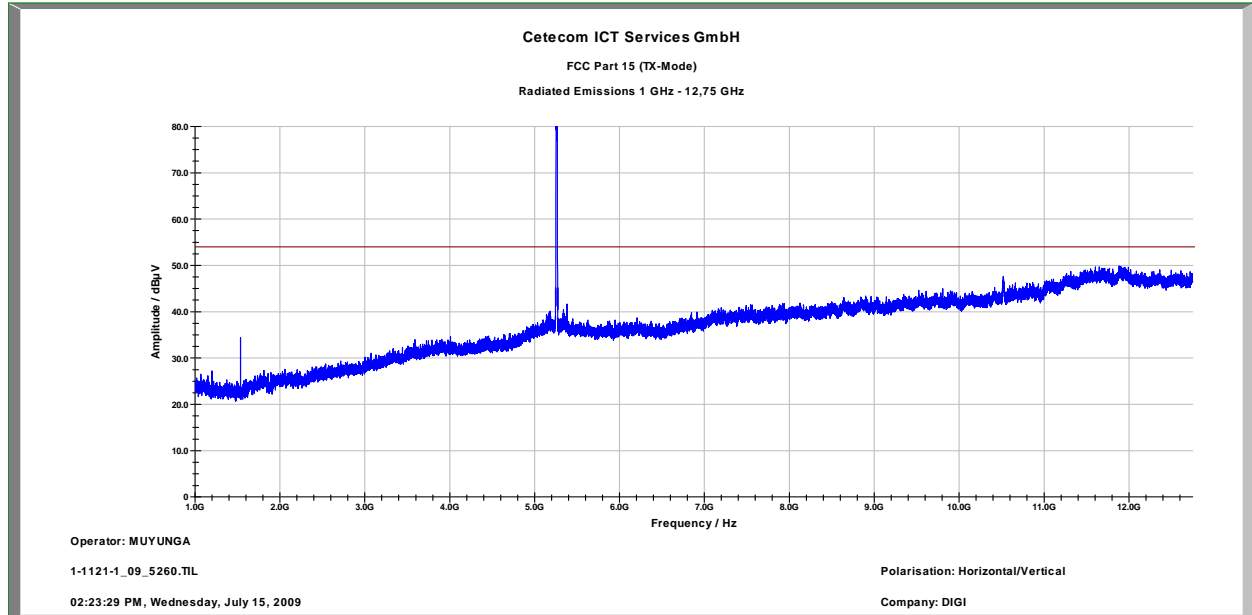
Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

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



Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
45.585250	9.8	15000.000	120.000	220.0	V	138.0	13.4	20.2	30.0
112.245550	7.2	15000.000	120.000	150.0	V	234.0	11.2	26.3	33.5
533.965000	26.6	15000.000	120.000	198.0	H	69.0	19.6	9.4	36.0
768.863150	21.5	15000.000	120.000	220.0	V	165.0	24.2	14.5	36.0
899.442600	23.2	15000.000	120.000	220.0	V	47.0	25.7	12.8	36.0

Plot 11: 1 GHz to 12 GHz (Channel 52 - 5.26 GHz)  
Max. power index 45





Plot 12: 30 MHz to 1 GHz (Channel 60 - 5.30 GHz)

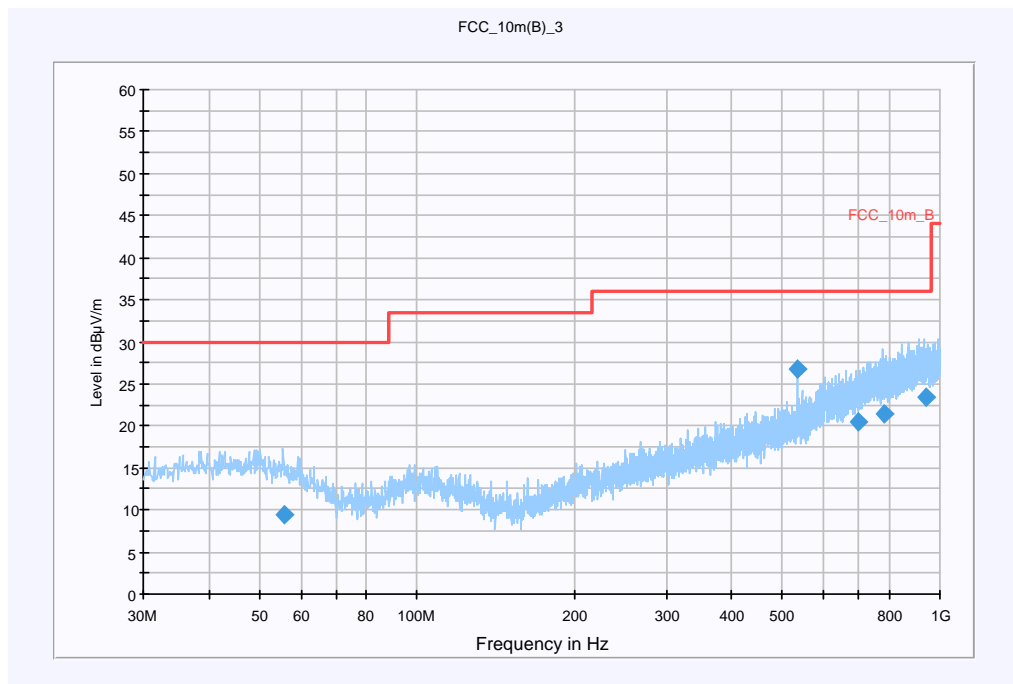
**Information**

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5300 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

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

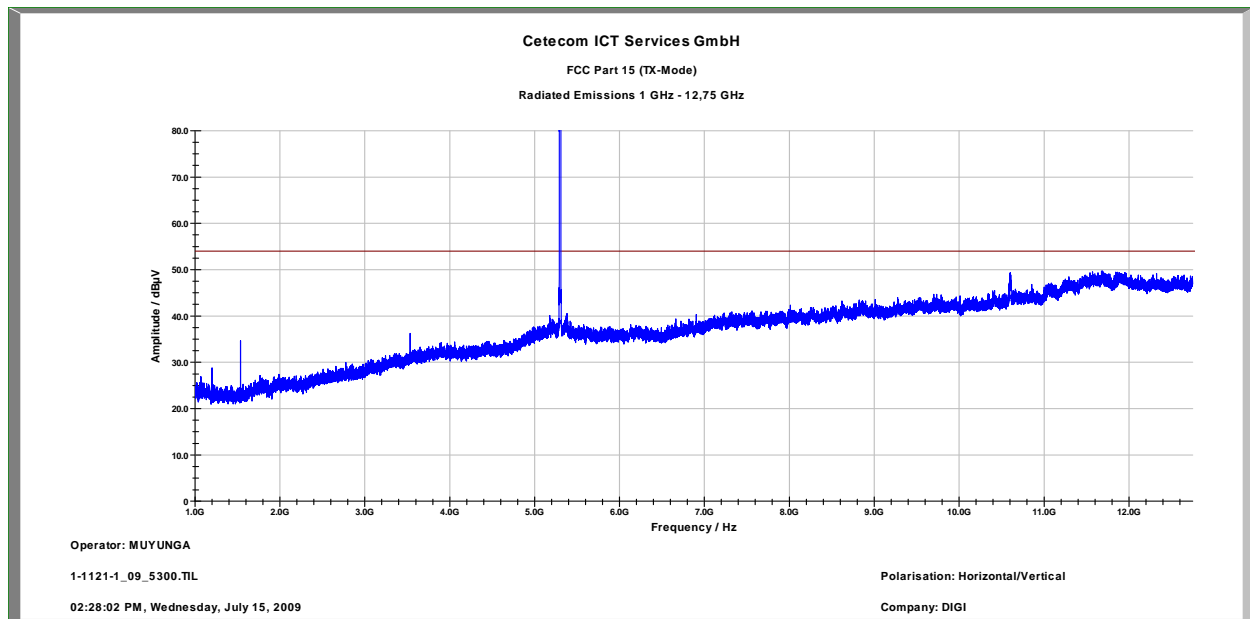
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver



Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
55.688100	9.3	15000.000	120.000	98.0	V	226.0	12.9	20.7	30.0
533.966050	26.7	15000.000	120.000	203.0	H	54.0	19.6	9.3	36.0
695.167250	20.4	15000.000	120.000	117.0	H	7.0	22.9	15.6	36.0
779.844750	21.5	15000.000	120.000	220.0	V	49.0	24.2	14.5	36.0
937.153800	23.4	15000.000	120.000	104.0	V	144.0	25.8	12.6	36.0

Plot 13: 1 GHz to 12 GHz (Channel 60 - 5.30 GHz)

Max. power index 45



Plot 14: 30 MHz to 1 GHz (Channel 64 - 5.32 GHz)

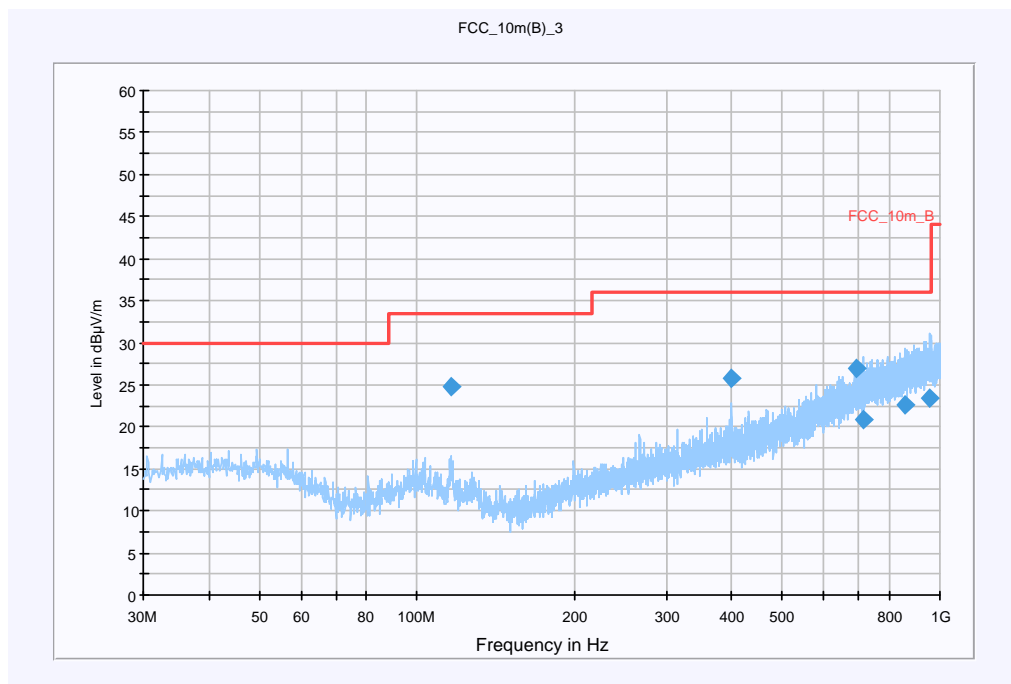
### Information

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	TX - 5320 MHz; 54Mbit/s
Operator Name:	COA
Comment:	115 V AC to 12 V DC

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

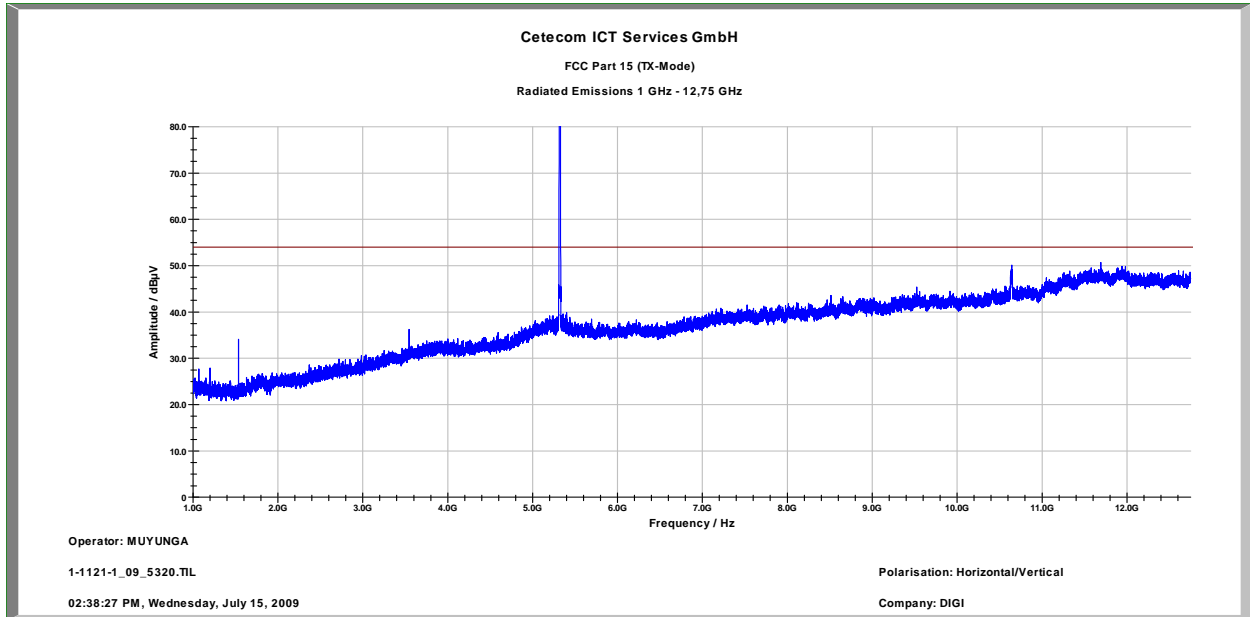
Hardware Setup:	Electric Field (NOS)
Level Unit:	dB $\mu$ V/m

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



Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V/m)
116.557900	24.8	15000.000	120.000	220.0	V	292.0	10.8	8.7	33.5
400.469350	25.8	15000.000	120.000	220.0	H	69.0	17.3	10.2	36.0
694.355300	26.9	15000.000	120.000	98.0	H	11.0	22.9	9.1	36.0
713.646150	20.8	15000.000	120.000	160.0	H	78.0	23.3	15.2	36.0
858.769050	22.5	15000.000	120.000	220.0	V	210.0	25.2	13.5	36.0
954.909400	23.3	15000.000	120.000	220.0	V	260.0	25.9	12.7	36.0

Plot 15: 1 GHz to 12 GHz (Channel 64 - 5.32 GHz)  
 Max. power index 45



SPURIOUS EMISSIONS LEVEL §15.209								
5260 MHz			5300 MHz			5320 MHz		
Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]
10520	Peak	50.12	10600	Peak	50.20	10640	Peak	49.85
Measurement uncertainty			±3 dB					

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

Limits :

Under normal test conditions only	See plots
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5.14 Spurious emissions radiated (RX)

§ 15.209

Plot 1: 30 MHz to 1 GHz (valid for all channels)

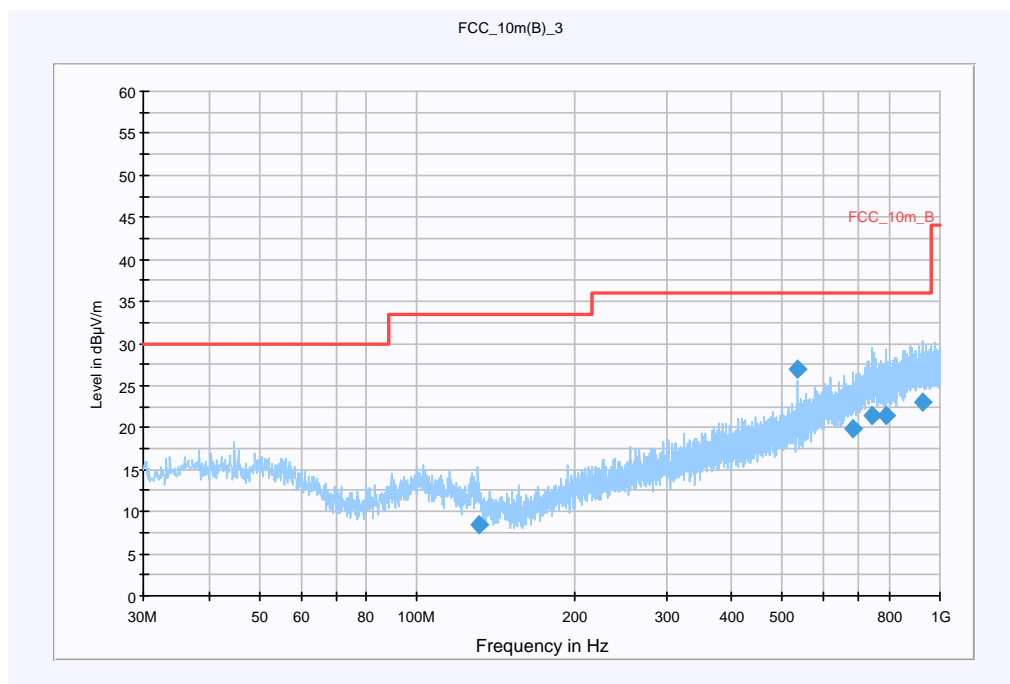
Information

EUT:	CCW9M2443
Serial Number:	B92834249
Test Description:	FCC Part 15 B
Operating Conditions:	RX-Mode
Operator Name:	MKL
Comment:	115 V AC to 12 V DC

Scan Setup: STAN\_Fin [EMI radiated]

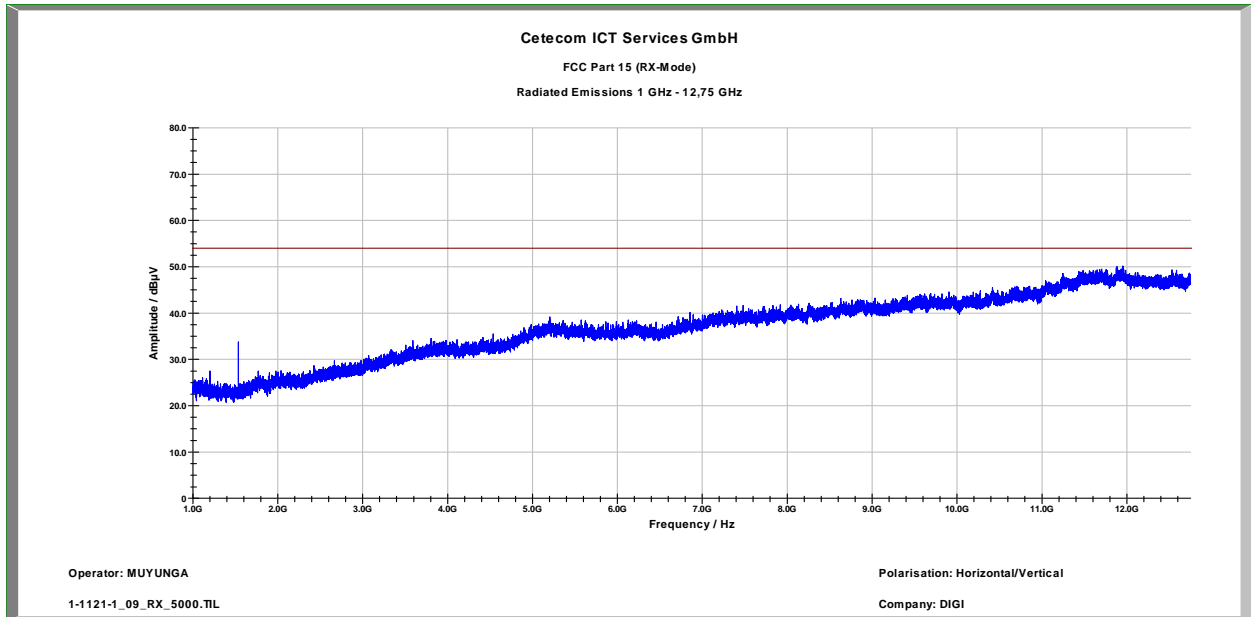
Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

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

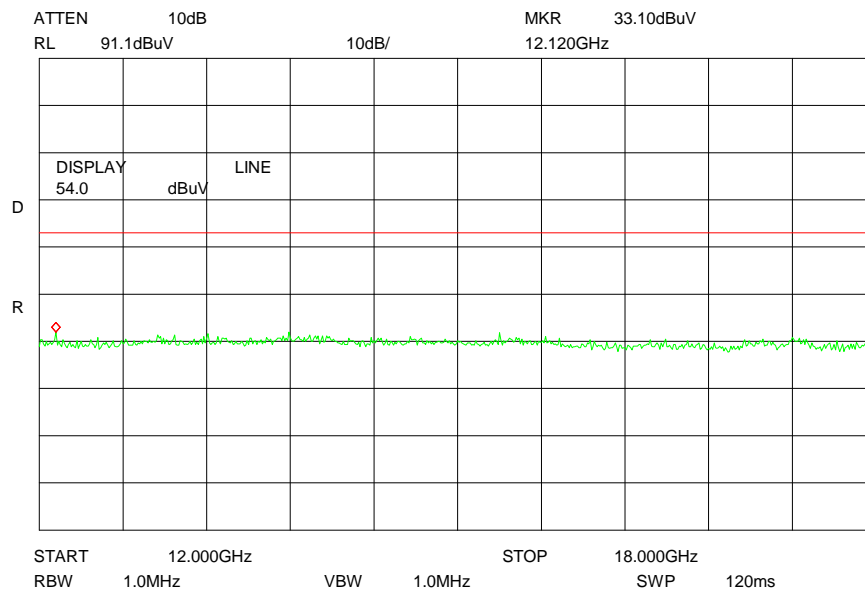


Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
131.320850	8.5	15000.000	120.000	98.0	V	-2.0	9.6	25.0	33.5
533.987800	27.0	15000.000	120.000	220.0	H	75.0	19.6	9.0	36.0
681.805000	19.8	15000.000	120.000	120.0	V	65.0	22.5	16.2	36.0
744.482450	21.4	15000.000	120.000	208.0	H	174.0	24.0	14.6	36.0
789.281050	21.5	15000.000	120.000	151.0	V	147.0	24.3	14.5	36.0
927.185200	23.0	15000.000	120.000	220.0	V	39.0	25.8	13.0	36.0

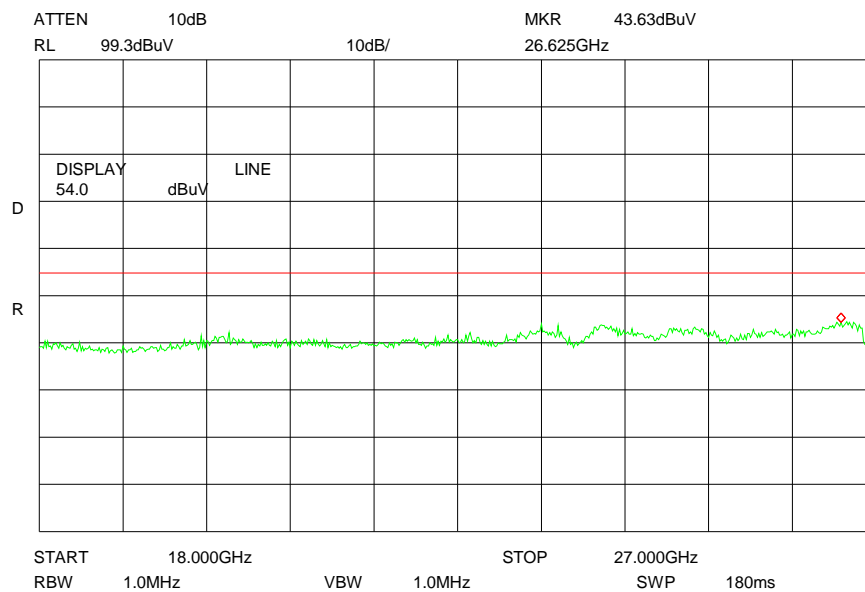
Plot 2: 1 GHz to 12 GHz (valid for all channels)



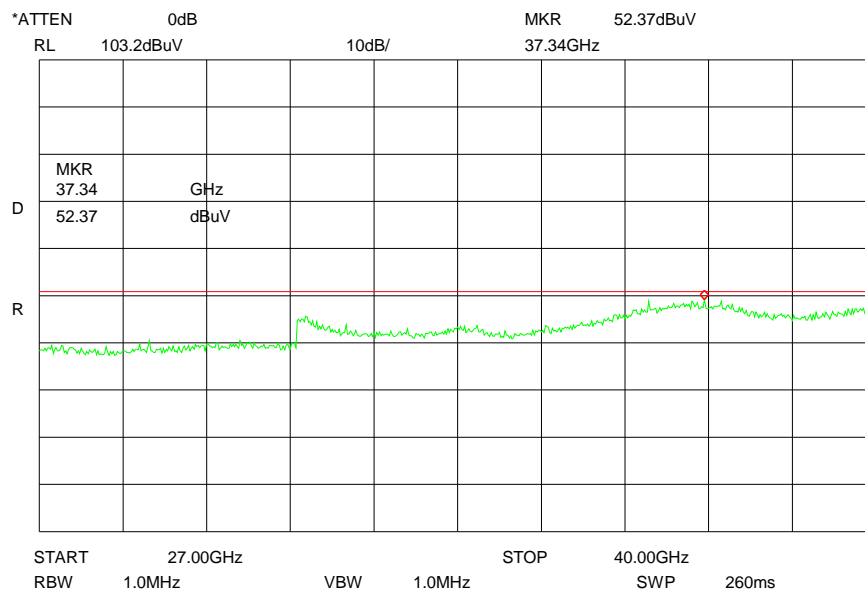
Plot 3: 12 GHz to 18 GHz (valid for all channels)



Plot 4: 18 GHz to 26 GHz (valid for all channels)



Plot 4: 26 GHz to 40 GHz (valid for all channels)



Results:

Spurious Emissions level [ $\mu\text{V/m}$ ]								
RX / Idle mode			--			--		
Frequency [MHz]	Detector	Level [ $\mu\text{V/m}$ ]	Frequency [MHz]	Detector	Level [ $\mu\text{V/m}$ ]	Frequency [MHz]	Detector	Level [ $\mu\text{V/m}$ ]
1536	Peak	57.54						
Measurement uncertainty			$\pm 3$ dB					

$f < 1$  GHz: RBW/VBW: 100 kHz

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

See above plots

Limits:

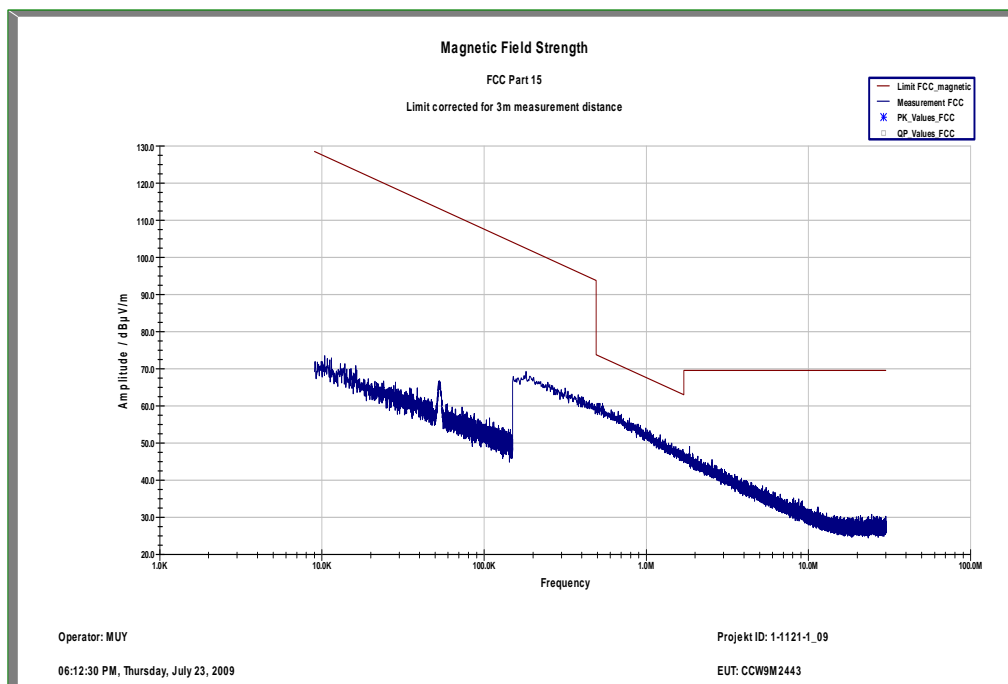
Under normal test conditions only	See plots
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**5.15 Spurious Emissions - radiated <30 MHz (valid for all antenna types) §15.109**

Measured at 3 m distance.

Plot 1:



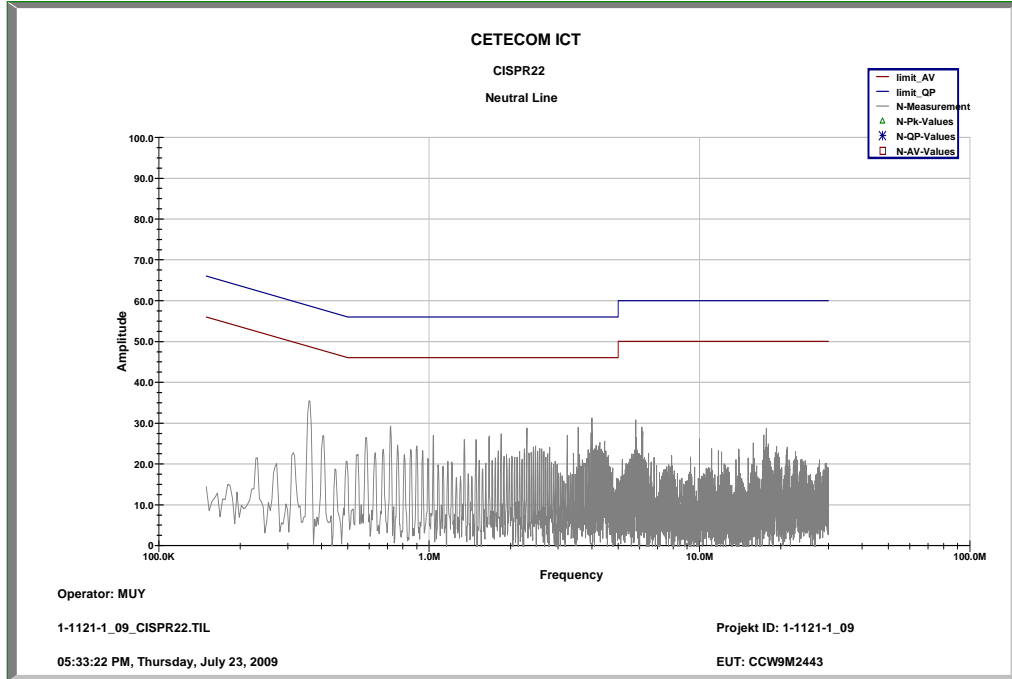
Limits:

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 dBµ V/m	30
30 - 88	100 / 40 dBµ V/m	3
88 - 216	150 / 43.5 dBµ V/m	3
216 - 960	200 / 46 dBµ V/m	3
above 960	54 dBµ V/m	3

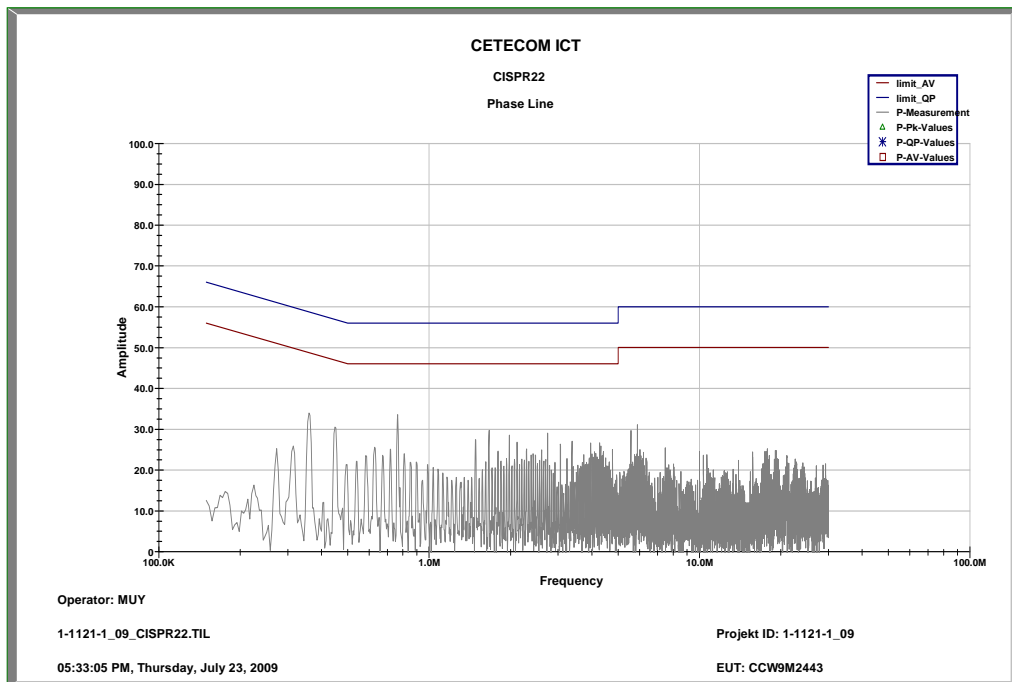
5.16 Conducted Emissions <30 MHz

§15.107/207

Plot 1: CISPR 22, Neutral line



Plot 2: CISPR 22, Phase Line



Limits:

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

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

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

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

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

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

### *Anechoic chamber C:*

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	PSA-Spektrumanalysator 3 Hz - 26.5 GHz (E4440A)	Agilent	MY48250080	300003812	05.08.2008	24	05.08.2010
5	EMI Preselector 9 kHz - 1 GHz (N9039A)	Agilent	MY48260003	300003825	19.08.2008	24	19.08.2010
6	Microwave Analog Signal Generator (N5183A)	Agilent	MY47420220	300003813	06.08.2008	24	06.08.2010
7	PC	F+W			n.a.		
8	TILE	TILE			n.a.		
9	TRILOG Super Broadband Antenna (VULB9163)	Schwarzbeck	371	300003854	Monthly verification (System cal.)		
10	Double Ridged Antenna 3115	EMCO	3088	300001032	Monthly verification (System cal.)		
11	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
12	Switch / Control Unit 3488A	HP	2719A15013	300001156	n.a.		
13	Power Supply 6032A	HP	2818A03450	300001040	08.01.2009	36	08.01.2012
14	Busisolator	Kontron		300001056	n.a.		
15	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
16	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
17	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
18	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		
19	Hochpassfilter WHK1.1/15G-10SS	Wainwright	3	300003255	Monthly verification (System cal.)		
20	Hochpassfilter WHKX2.9/18G-12SS	Wainwright	1	300003492	Monthly verification (System cal.)		
21	Hochpassfilter WHKX7.0/18G-8SS	Wainwright	18	300003789	Monthly verification (System cal.)		
22	Switch / Control Unit 3488A	HP	2605e08770	300001443	n.a.		
23	Trenntrafo RT5A	Grundig	9242	300001263	n.a.		
24	Relais Matrix PSU	R&S	890167/024	300001168	n.a.		
25	Netznachbildung ESH3-Z5	R&S	828576/020	300001210	n.a.		

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	300002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	300002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	300002681	n.a.		
4	19" Monitor		22759020-ED	300002681	n.a.		
5	Mouse		LZE 0095/6639	300002681	n.a.		
6	Keyboard		G00013834L461	300002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	300002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	300002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	300002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	300002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	300002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	300002681	s.No.10		
14	Broadband horn antenna (1-18 GHz)	EMCO	9107-3696	300001604	16.04.2008	24	16.04.2010
15	Broadband horn antenna (1-18 GHz)	EMCO	9107-3697	300001605	21.08.2008	24	21.08.2010
16	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000486	n.a.		
17	Std gain horn antenna (18-26.5 GHz)	Narda	Model no. 638	300000487	n.a.		
18	Sleeve dipole antenna Model 3126-880	ETS-Lindgren	00040887	3000000	n.a.		
19	Fast CPU SM-B50	R&S	To 10	300002681	s.No.10		
20	FM Modulator SM-B5	R&S	835676/033	300002681	s.No.10		
21	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	300002681-0001	25.08.2008	36	25.08.2011
22	Modulation Coder SMIQ-B20	R&S	To 21	300002681	s.No.21		
23	Data Generator SMIQ-B11	R&S	To 21	300002681	s.No.21		
24	RF Rear Connection SMIQ-B19	R&S	To 21	300002681	s.No.21		
25	Fast CPU SM-B50	R&S	To 21	300002681	s.No.21		
26	FM Modulator SM-B5	R&S	836061/022	300002681	s.No.21		
27	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	300002681-0003	26.08.2008	36	26.08.2011
28	Attenuator SMP-B15	R&S	835136/014	300002681	S.No.27		
29	RF Rear Connection SMP-B19	R&S	834745/007	300002681	S.No.27		
30	Power Meter NRVD	R&S	835430/044	300002681-0004	26.08.2008	24	26.08.2010
31	Power Sensor NRVD-Z1	R&S	833894/012	300002681-0013	26.08.2008	24	26.08.2010
32	Power Sensor NRVD-Z1	R&S	833894/011	300002681-0010	26.08.2008	24	26.08.2010
33	Rubidium Standard RUB	R&S		300002681-0009	27.08.2008	24	27.08.2010
34	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	300002681-0006	Verified with path compensation		
35	Laser Printer HP Deskjet 2100	HP	N/A	300002681-0011	n.a.		
36	19" Rack	R&S	11138363000004	300002681	n.a.		
37	RF-cable set	R&S	N/A	300002681	n.a.		
39	IEEE-cables	R&S	N/A	300002681	n.a.		
40	Sampling System FSIQ-B70	R&S	835355/009	300002681	s.No.7		
41	RSP programmable attenuator	R&S	834500/010	300002681-0007	26.08.2008	24	26.08.2010
42	Signalling Unit	R&S	838312/011	300002681	n.a.		
43	NGPE programmable Power Supply for EUT	R&S	192.033.41	300002681			
44	Power Splitter 6005-3	Inmet Corp.	none	300002841	n.a.		
45	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
46	CBT32 with EDR Signaling Unit	R&S					

47	Coupling unit	Narda	N/A	--	n.a.		
48	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
49	RF-cable set	R&S	N/A	different	n.a.		
50	IEEE-cables	R&S	N/A	--	n.a.		

**Anechoic chamber F:**

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Microwave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2009	24	31.01.2010
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

**Test laboratory 011:**

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Climatic box VUK 04/500	Heraeus Vötsch	32678	300000297	29.07.2008	24	27.07.2010
2	Spectrum Analyser 8565E	HP	3738A00773	300001665	08.01.2008	24	08.01.2010
3	Spectrum Analyser FSU 50	R&S	200012	300003443	05.06.2008	24	05.06.2010
4	SGH 12 ... 18 GHz	narda	01005	300000787	cyclic verification		
5	SGH 18 ... 27 GHz	narda	01005	300000487	cyclic verification		
6	SGH 27 ... 40 GHz	narda	82016	300000510	cyclic verification		
7	SGH 33 ...50 GHz	Thomson		300000812	cyclic verification		
8	Adapter WG/SMA	narda	64088	-/-	cyclic verification		
9	Adapter WG/SMA	flann	213	-/-	cyclic verification		
10	Adapter WG/SMA	HP	00231	-/-	cyclic verification		
11	SGH 50 ... 75GHz	Thomson	-/-	300000813	cyclic verification		
12	Mixer 50 ... 75 GHz 11970V	HP	-/-	30000781i	07.08.2007	36	07.08.2010
13	SGH 75 ... 110 GHz	Thomson	-/-	30000798b	cyclic verification		
14	Mixer 75 ... 110 GHz 11970W	HP	-/-	30000781e	07.08.2007	36	07.08.2010
15	SGH 110 ... 170 GHz	Flann	-/-	300001999	cyclic verification		
16	Mixer 110 ... 170 GHz	Tektronix	B010186	300001685d	cyclic verification		
17	SGH 170 ... 325 GHz	Flann	-/-	300002000	cyclic verification		
18	Mixer 170 ... 325 GHz	Tektronix	B010241	300001685j	cyclic verification		