Deutscher Akkreditierungs Rat

Accredited testing-laboratory

DAR registration number: DGA-PL-176/94-D1

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

Recognized by the Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3462C-1 (IC)
Certification ID: DE 0001
Accreditation ID: DE 0002

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Test report no.	**:**	**1-1954-18-06/10**
Type identification	**:**	**AAD-3880061-BV**
Applicant	**:**	**Sony Ericsson Mobile Communications AB**
FCC ID	**:**	**PY7A3880061**
IC Certification No	**:**	**4170B-A3880061**
Test standards	**:**	**47 CFR Part 15**
		RSS - 210 Issue 7

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1 General information

1.1 Notes

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

Test laboratory manager:

2010-04-15	**Jakob Reschke**	
Date	Name	Signature

Technical responsibility for area of testing:

2010-04-15	**Stefan Bös**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

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

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

Testing location, if different from CETECOM ICT Services GmbH:

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

1.3 Details of applicant

Name:	**Sony Ericsson Mobile Communications AB**
Street:	**Nya Vattentornet**
Town:	**22188 Lund**
Country:	**Sweden**
Telephone:	**+46-46-19-3000**
Fax:	**+46 (0) 46 19 32 95**
Contact:	**Johan Wedin**
E-mail:	**johan.wedin@sonyericsson.com**
Telephone:	**+46 (0) 707 19 57 36**

1.4 Application details

Date of receipt of order:	**2010-03-29**
Date of receipt of test item:	**2010-04-06**
Date of start test:	**2010-04-06**
Date of end test	**2010-04-14**
Persons(s) who have been present during the test:	**-/-**

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:	**Sony Ericsson Mobile Communications AB**
Street:	**Nya Vattentornet**
Town:	**22188 Lund**
Country:	**Sweden**

3.1.1 Test item

Kind of test item	:	**Mobile Phone GSM 850/900/1800/1900, UMTS FDD1/FDD8, HSDPA/HSUPA/ BT2.0+EDR, A-GPS, FM Rx, WLAN**
Type identification	:	**AAD-3880061-BV**
S/N serial number	:	**Rad. BX901CFTWQ, BX901CFTW9** **Cond. BX9018QJTN**
HW hardware status	:	**AP1.2**
SW software status	:	**R1AB014**
Frequency Band [MHz]	:	**ISM 2.400 - 2.483,5**
Type of Modulation	:	**DSSS & OFDM (BPSK, QPSK, 16-QAM, 64-QAM)**
Number of channels	:	**11**
Antenna	:	**Integrated antenna**
Power Supply	:	**3.80 V DC by Li-Polymer Battery (BST-41) and Power Supply**
Temperature Range	:	**-20 °C to 55 °C**

DSSS
Max. power radiated: **20.31 dBm**
Max. power conducted: **19.34 dBm**

OFDM
Max. power radiated: **24.86 dBm**
Max. power conducted: **23.97 dBm**

FCC ID: **PY7A3880061**
IC: **4170B-A3880061**

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	**4170B-A3880061**
Model Name:	**AAD-3880061-BV**
Manufacturer (complete Adress):	**Sony Ericsson Mobile Communications AB Nya Vattentornet 22188 Lund Sweden**
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]:	**2412 – 2462 MHz**
RF: Power [W] (max):	**DSSS: Rad. EIRP: 107.40 mW Conducted : 85.90 mW OFDM: Rad. EIRP: 306.20 mW Conducted : 249.46 mW**
Antenna Type:	**Integrated antenna**
Occupied Bandwidth (99% BW) [kHz]:	**DSSS: 14.08 OFDM: 16.98**
Type of Modulation:	**DSSS & OFDM**
Emission Designator (TRC-43):	**1M41G1D (DSSS) 1M70G1D (OFDM)**
Transmitter Spurious (worst case) [µV/m in 3m]:	**316 (noise floor)**
Receiver Spurious (worst case) [µV/m in 3m]:	**316 (noise floor)**

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

Signature:

Test engineer: Jakob Reschke
Date: 2010-04-15

3.1.3 EUT operating modes

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

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

3.1.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T_{nom}	°C	**22**
Nominal Humidity	H_{nom}	%	**50**
Nominal Power Source	V_{nom}	V	**3.80**

Type of power source: **DC by Li-Polymer Battery (BST-41) and 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 §15.247 - CANADA RSS-210	PASS	2010-04-15	-/-

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

5 RF measurement testing

5.1 Description of test set-up

5.1.1 Radiated measurements

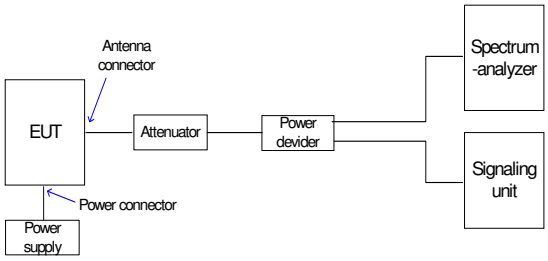
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.
The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.
Antennas are confirmed with ANSI C63.2-1996 item 15.

9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, active loop antenna.
150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, active loop antenna.
30 MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, Trilog antenna
>1GHz: Average, RBW 1MHz, VBW 10 Hz, waveguide horn

All measurement settings are according to FCC 15.209 and 15.207

5.1.2 Conducted measurements

The EUT´s RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal path are first checked within a calibration. The measurement readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



5.2 Referenced Documents

None

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.

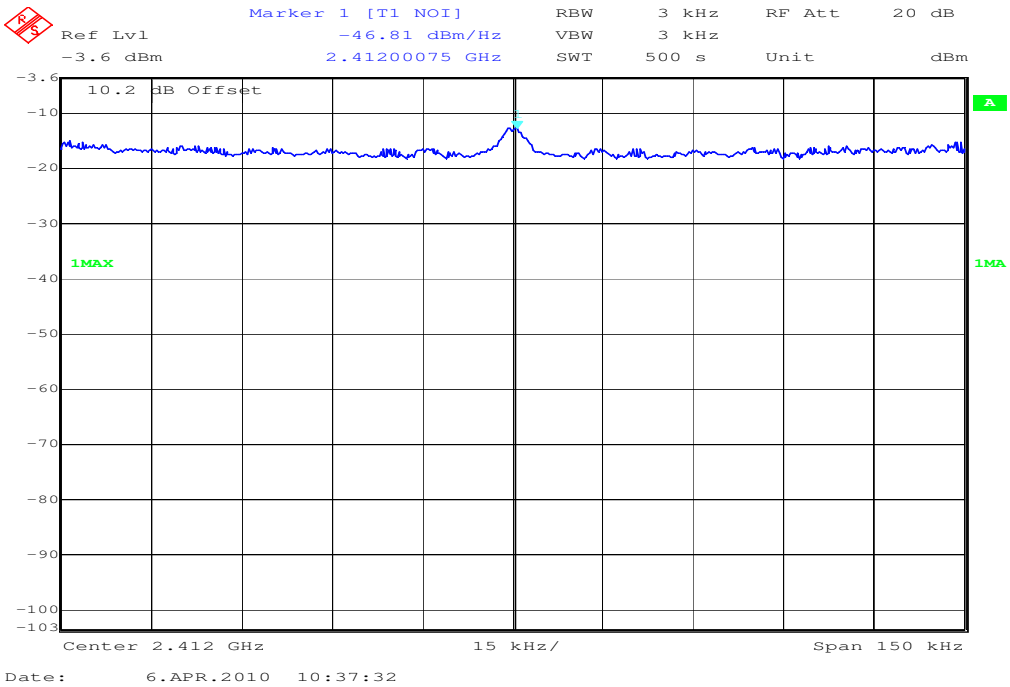
Calculated with DSSS

	low channel	mid channel	high channel
Conducted power [dBm] *(measured)*	19.24	19.10	19.34
Radiated power [dBm] *(measured)*	20.31	19.94	19.64
Gain [dBi] *(calculated)*	1.07	0.84	0.30

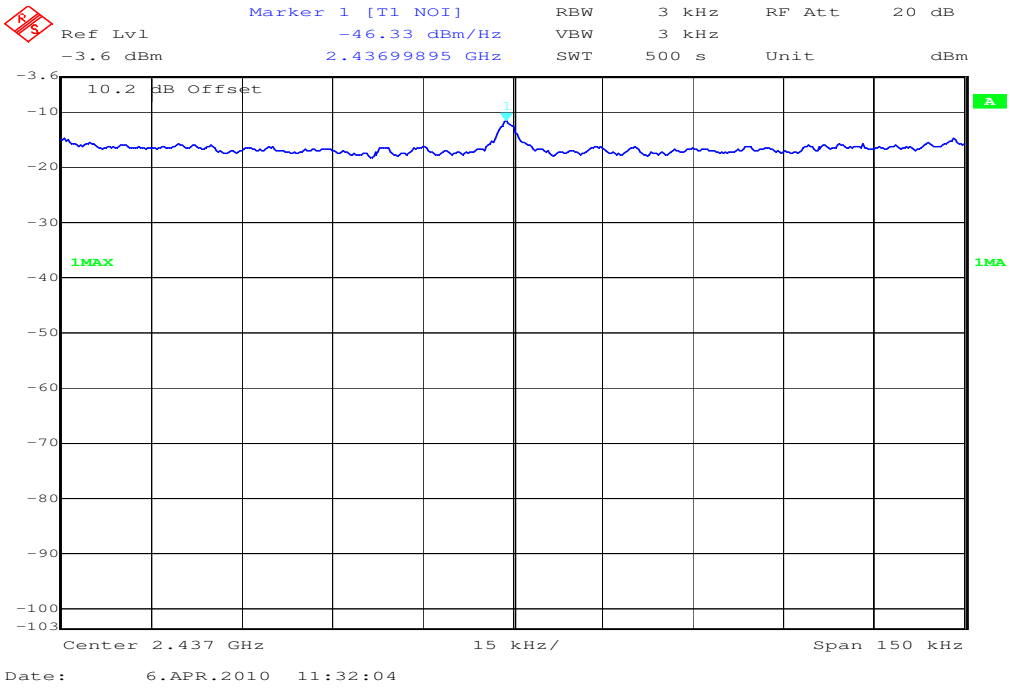
5.5 Peak Power Spectral density (digitally modulated systems) §15.247(e)

DSSS

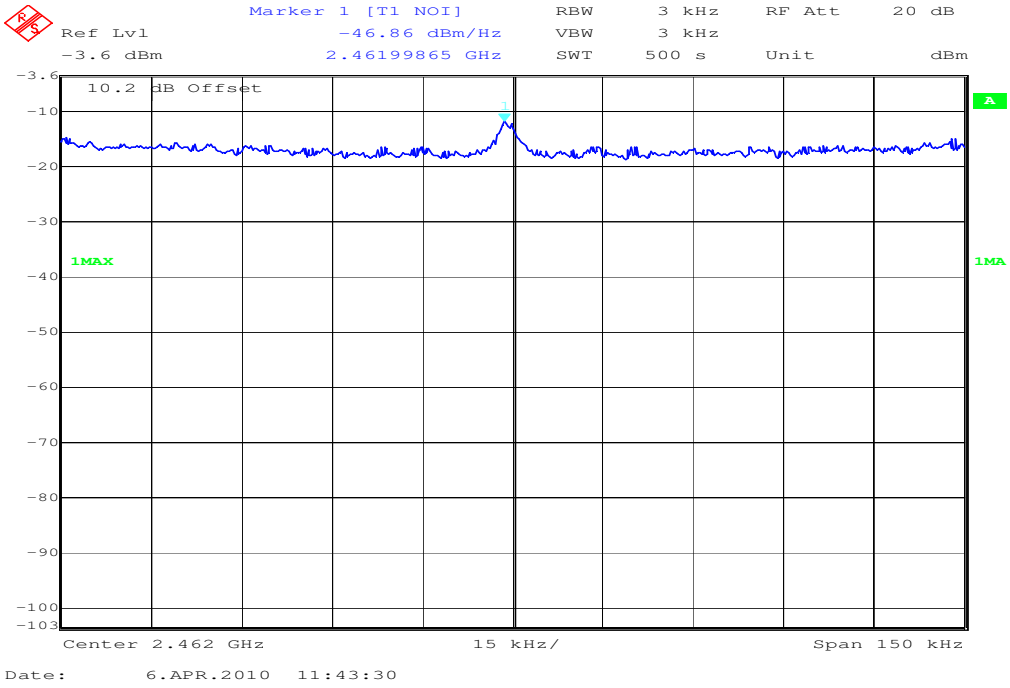
Plot 1: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 2: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 3: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)

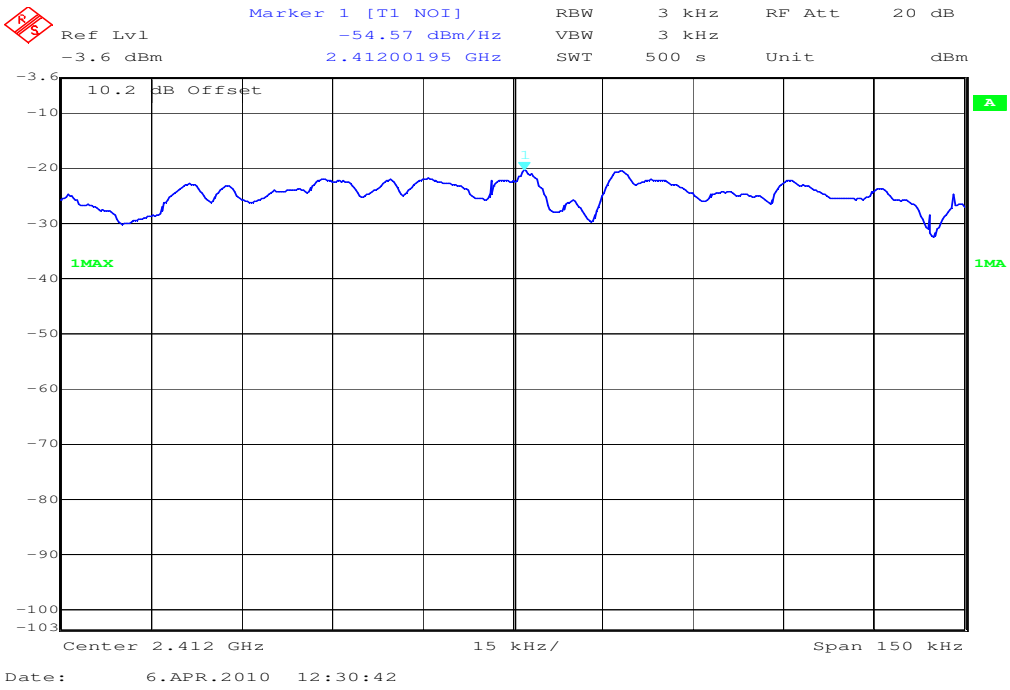


Results: Plot 1: Power density: -46.81 dBm/Hz = -12.01 dBm / 3 kHz
Plot 2: Power density: -46.33 dBm/Hz = -11.53 dBm / 3 kHz
Plot 3: Power density: -46.86 dBm/Hz = -12.06 dBm / 3 kHz

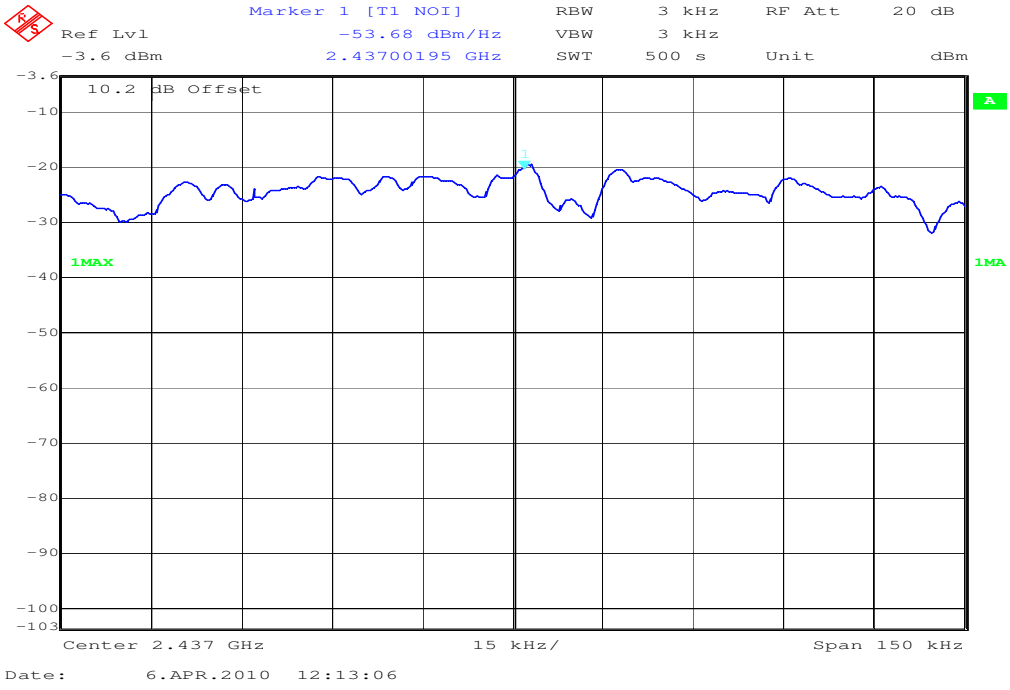
Correction factor from dBm/Hz to dBm/3 kHz is +34,8 dB

OFDM

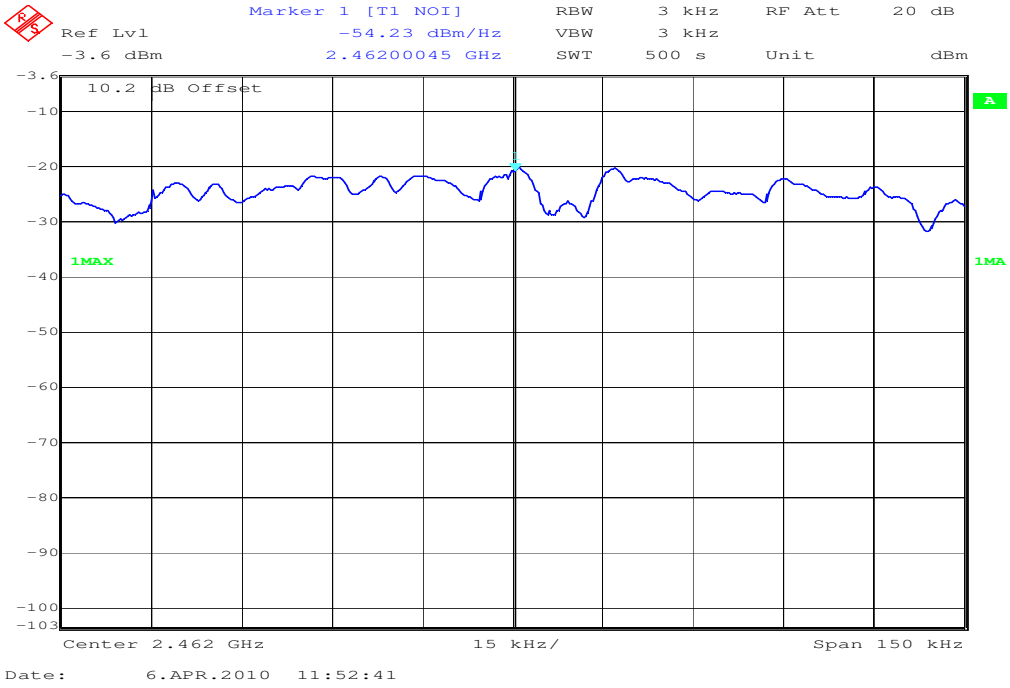
Plot 1: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 2: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Plot 3: (result calculated by the Signal analyzer FSIQ 26 from Rohde & Schwarz)



Results: Plot 1: Power density: -54.57 dBm/Hz = -19.77 dBm / 3 kHz
Plot 2: Power density: -53.68 dBm/Hz = -18.88 dBm / 3 kHz
Plot 3: Power density: -54.23 dBm/Hz = -19.43 dBm / 3 kHz

Correction factor from dBm/Hz to dBm/3 kHz is +34,8 dB

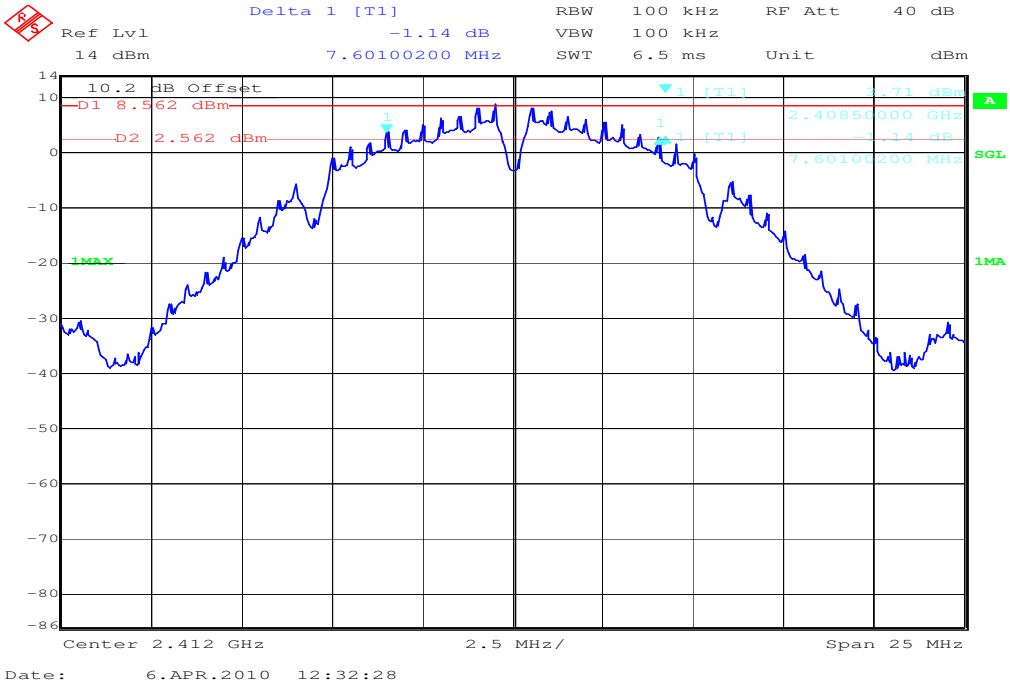
Limits :

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

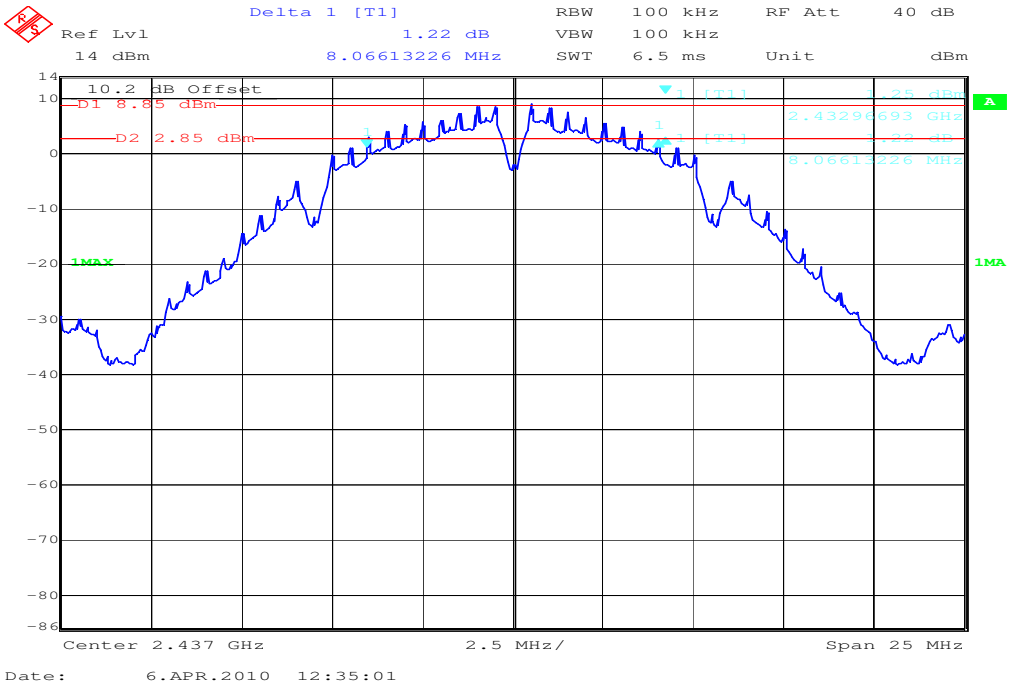
5.6 Spectrum Bandwidth of a DSSS System / 6 dB Bandwidth §15.247(a)(2)

DSSS

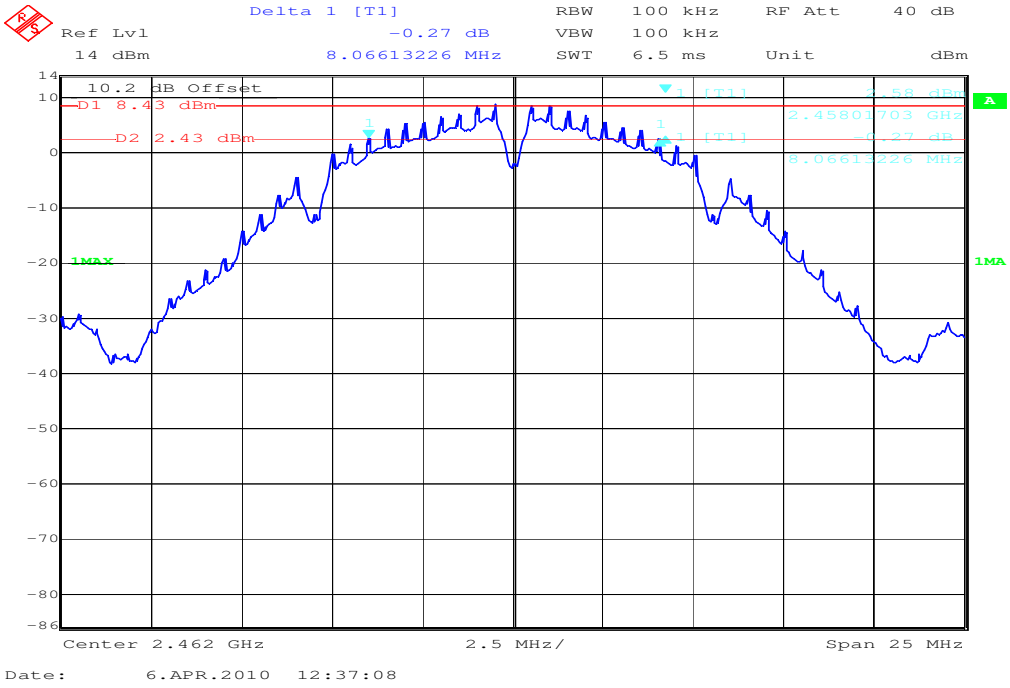
Plot 1:



Plot 2:



Plot 3:



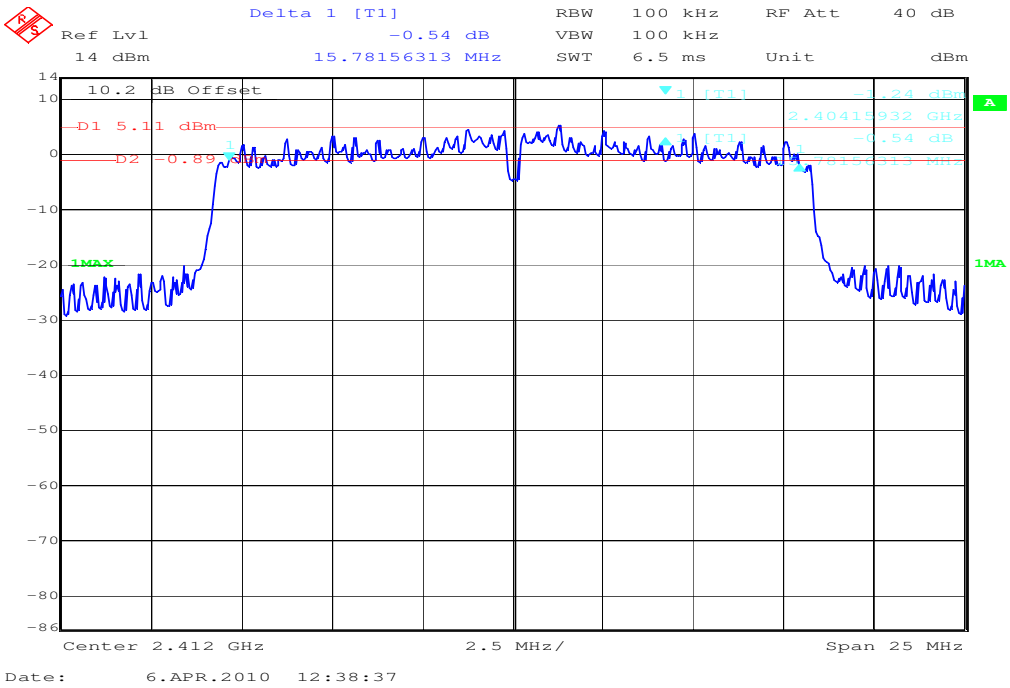
Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	7.60	8.07	8.07
Measurement uncertainty		±100 kHz		

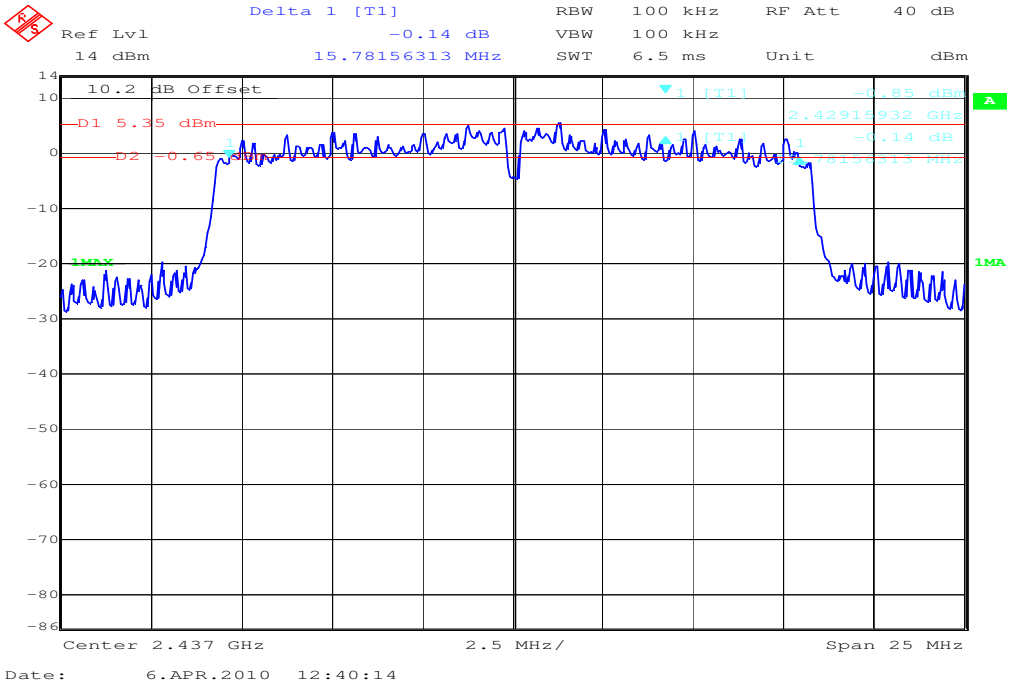
RBW: 100 kHz / VBW 100 kHz

OFDM

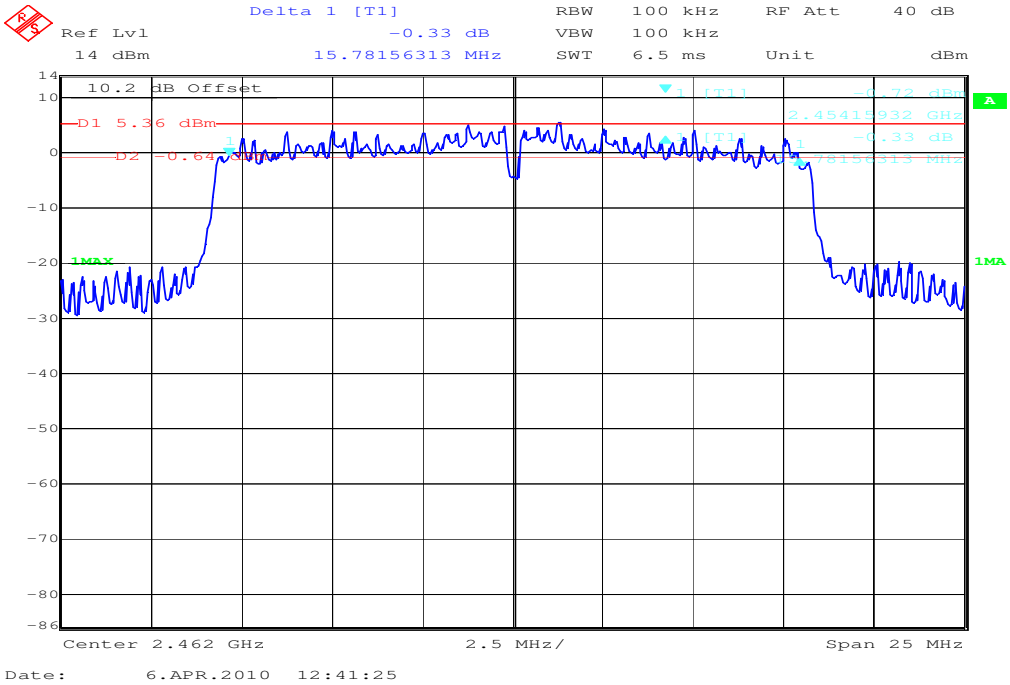
Plot 1:



Plot 2:



Plot 3:



Results:

Test conditions		6 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	15.78	15.78	15.78
Measurement uncertainty		±100kHz		

RBW: 100 kHz / VBW 100 kHz

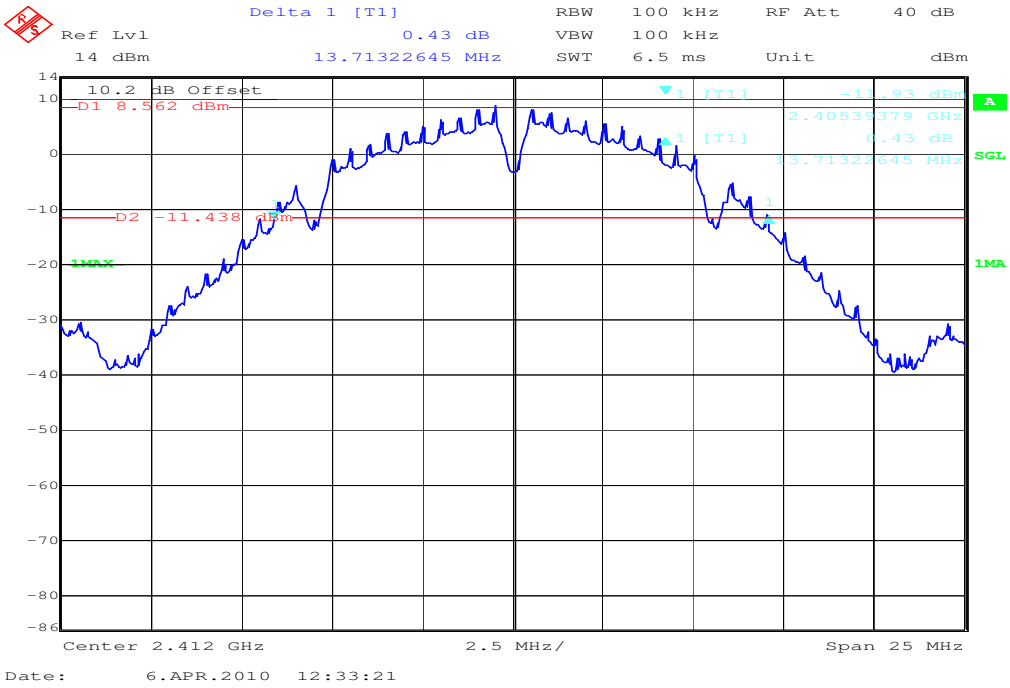
Limits:

Under normal test conditions only	> 500 kHz

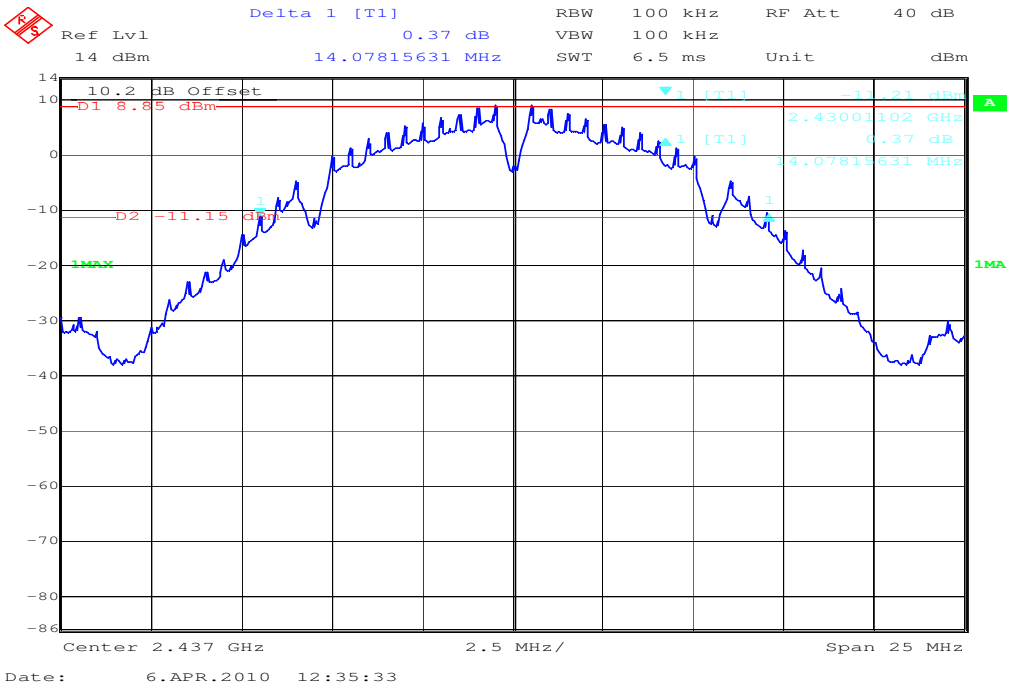
5.7 Spectrum Bandwidth of a DSSS System / 20 dB Bandwidth

DSSS

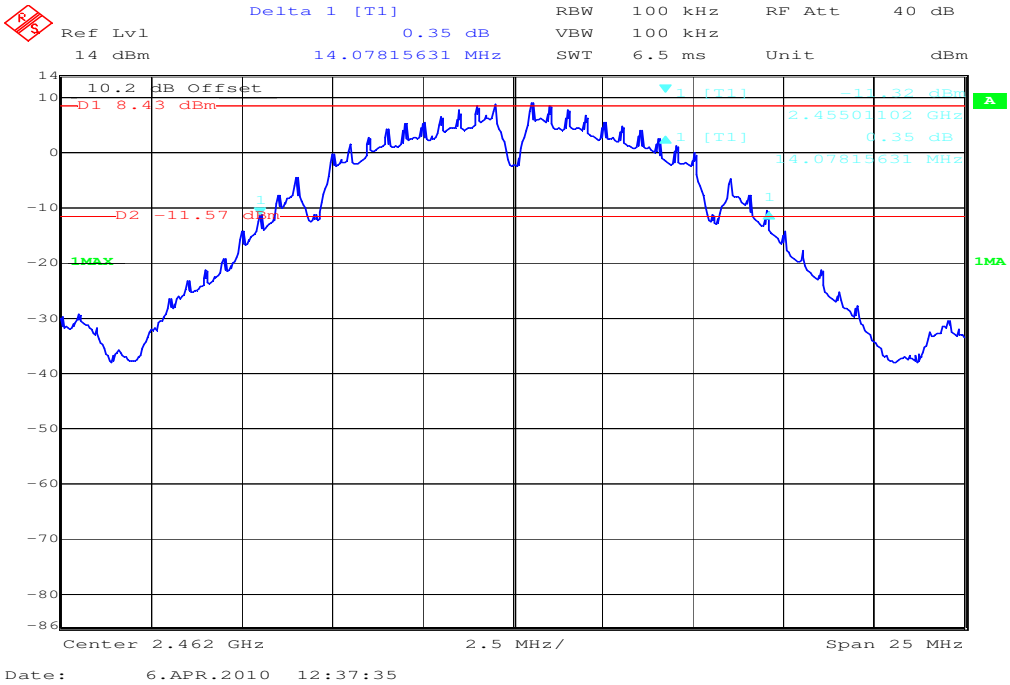
Plot 1:



Plot 2:



Plot 3:



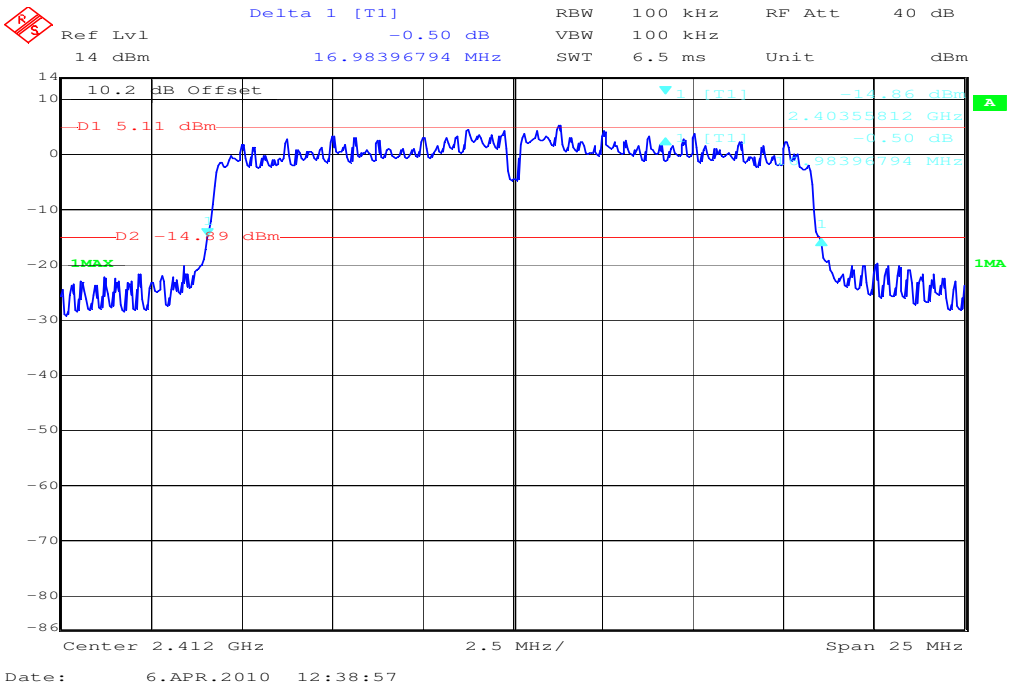
Results:

Test conditions		20 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	13.71	14.08	14.08
Measurement uncertainty		±100kHz		

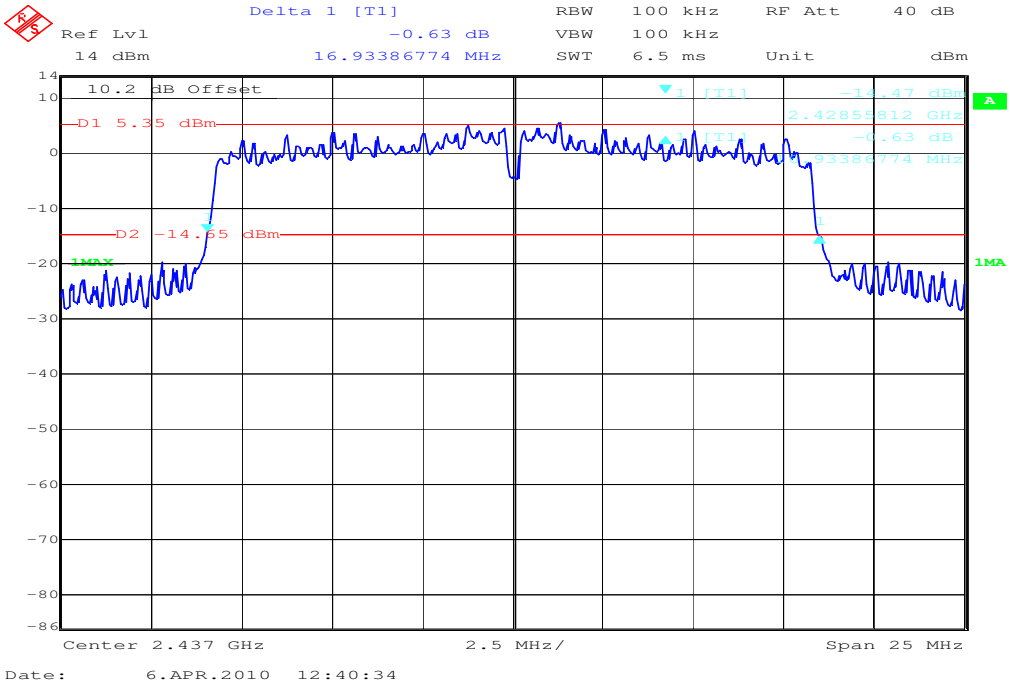
RBW: 100 kHz / VBW 100 kHz

OFDM

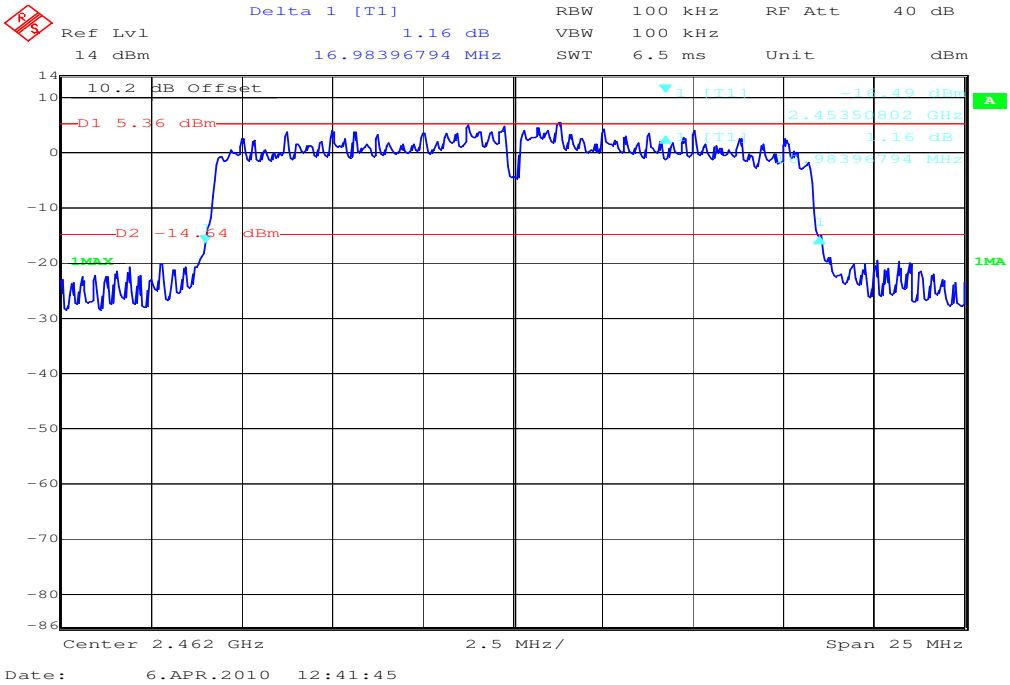
Plot 1:



Plot 2:



Plot 3:



Results:

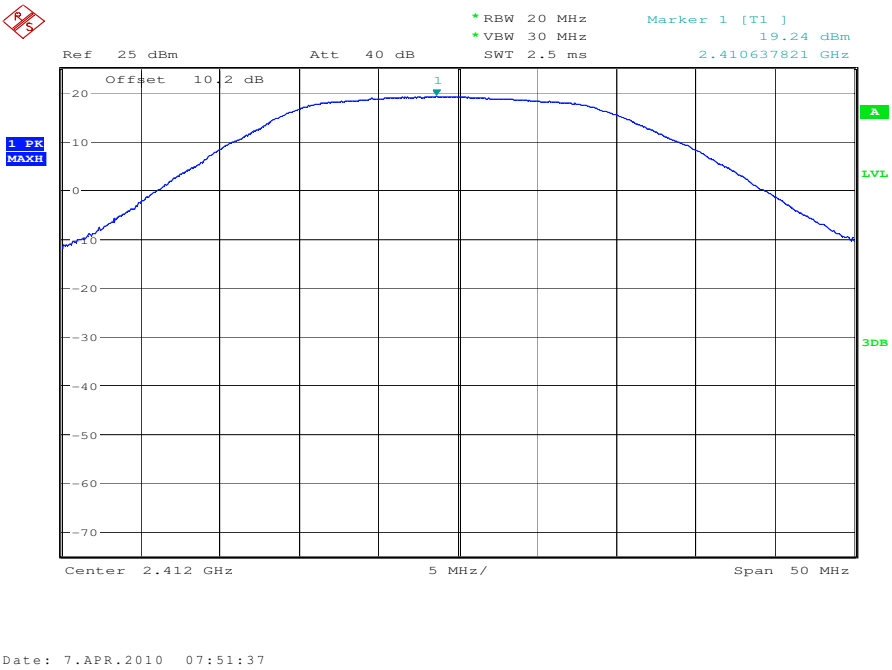
Test conditions		20 dB BANDWIDTH [MHz]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	16.98	16.93	16.98
Measurement uncertainty		±100kHz		

RBW: 100 kHz / VBW 100 kHz

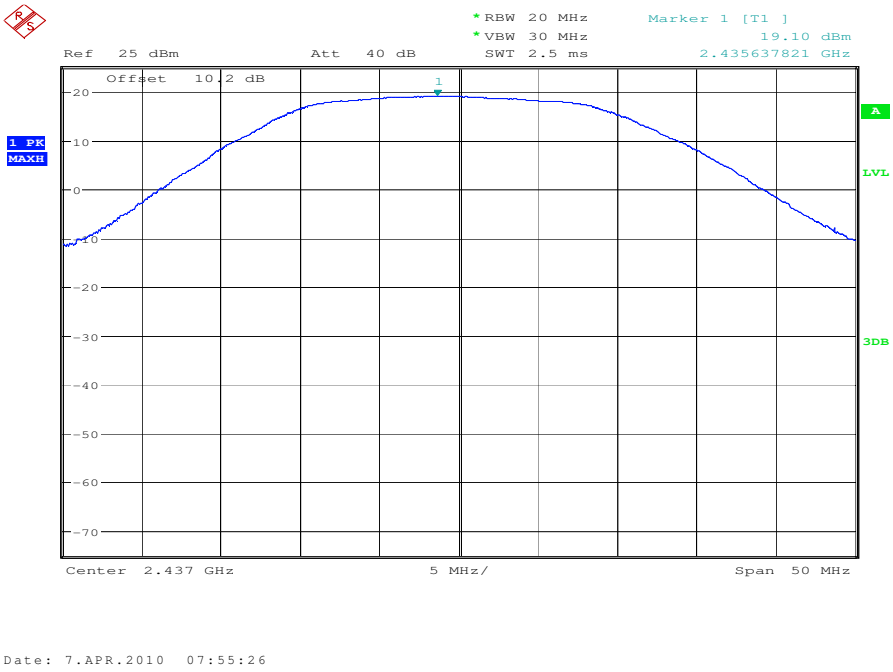
5.8 Maximum output power (conducted) §15.247 (b)(3)

DSSS

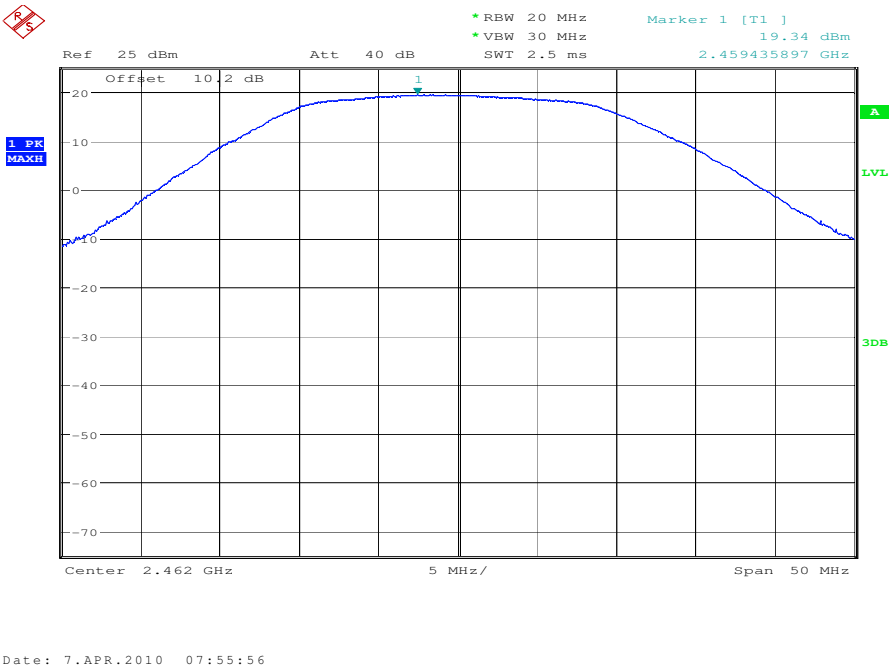
Plot 1:



Plot 2:



Plot 3:



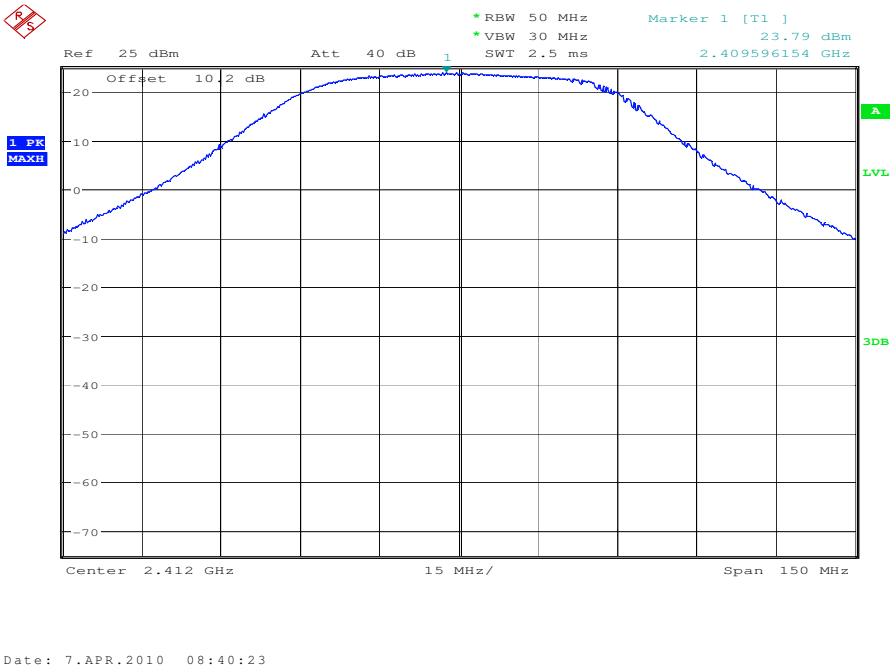
Results:

Test conditions		Max. peak output power [dBm]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	19.24	19.10	19.34
Measurement uncertainty		±3dB		

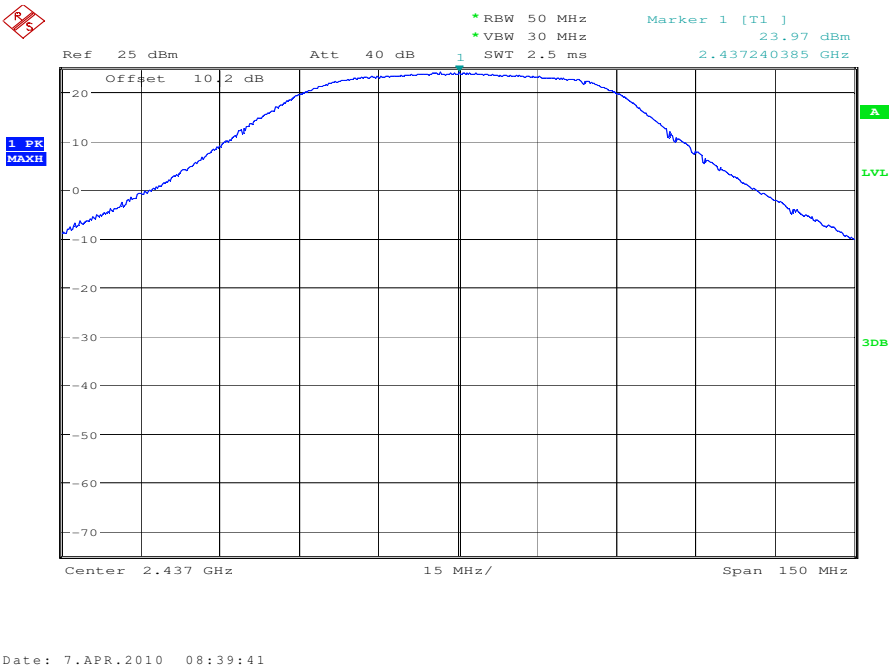
RBW: 20 MHz
VBW: 30 MHz

OFDM

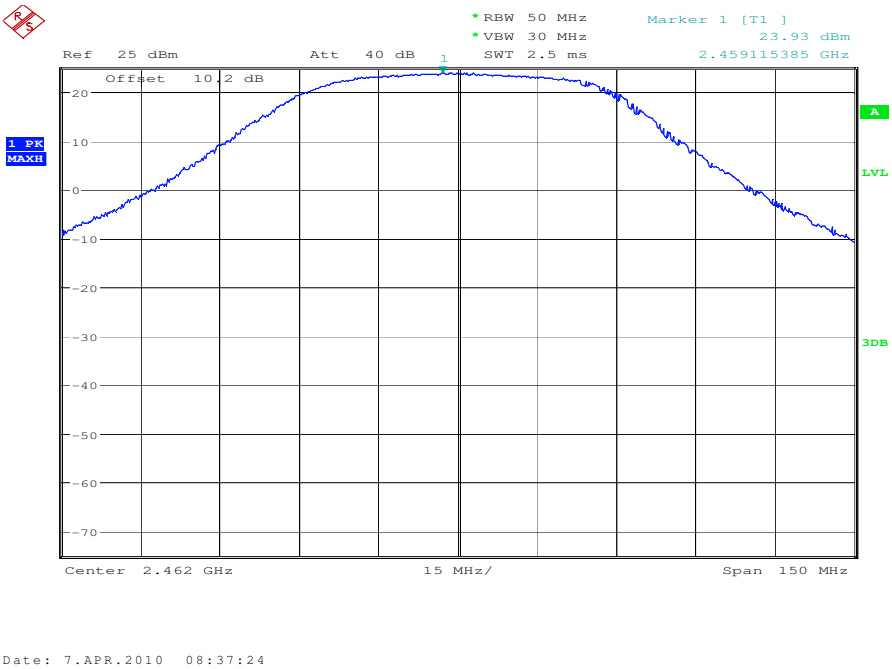
Plot 1:



Plot 2:



Plot 3:



Results:

Test conditions		Max. peak output power [dBm]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	23.79	23.97	23.93
Measurement uncertainty		±3dB		

RBW: 50 MHz
VBW: 30 MHz

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt / 30 dBm

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^2)
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 centre 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: 24.86 dBm (306.20 mW)

calculated at distance of 20 cm:

power density = $306.20 / 4\pi 20^2 = 0.06$ mW/ cm^2

Limit:

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

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

DSSS

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	20.31	19.94	19.64
Measurement uncertainty		±3dB		

RBW: 20 MHz
VBW: 30 MHz
Measured at a distance of 3m

OFDM

Results:

Test conditions		Max. peak output power EIRP [dBm]		
Frequency [MHz]		2412	2437	2462
T_{nom}	V_{nom}	24.86	24.81	24.23
Measurement uncertainty		±3dB		

RBW: 50 MHz
VBW: 30 MHz
Measured at a distance of 3m

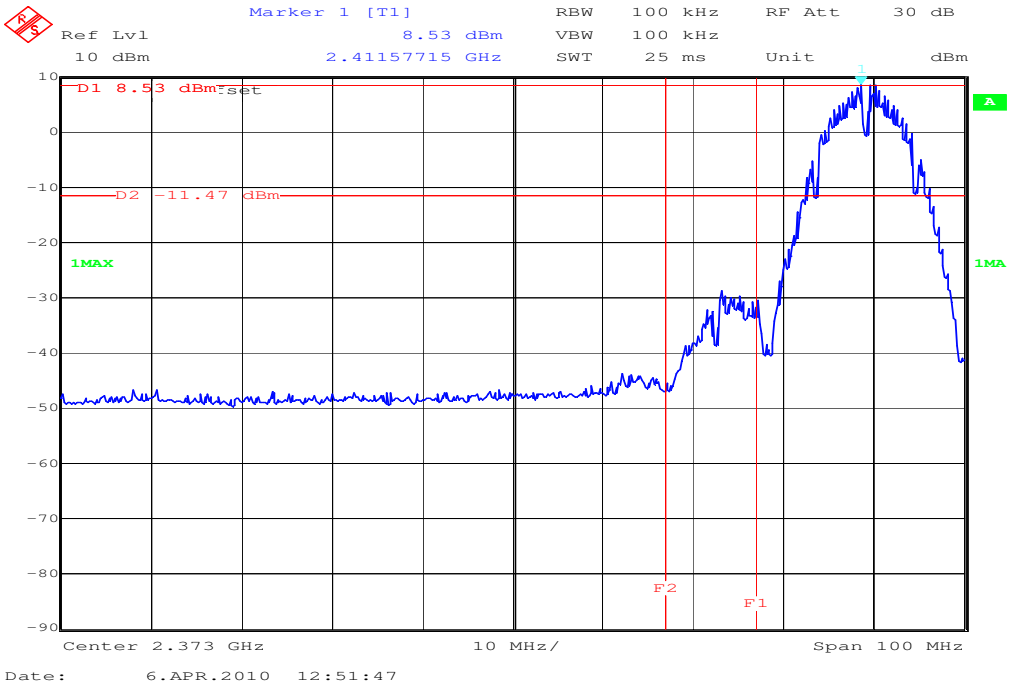
Limits:

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

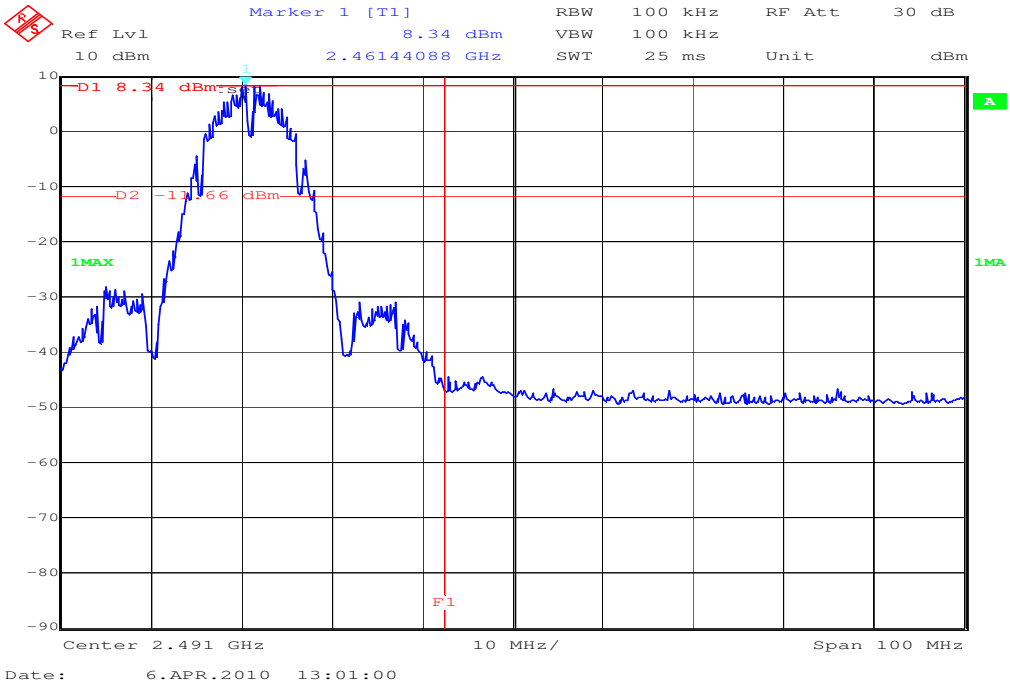
5.10 Band-edge compliance of conducted emissions §15.247 (d)

DSSS

Plot 1: lowest channel

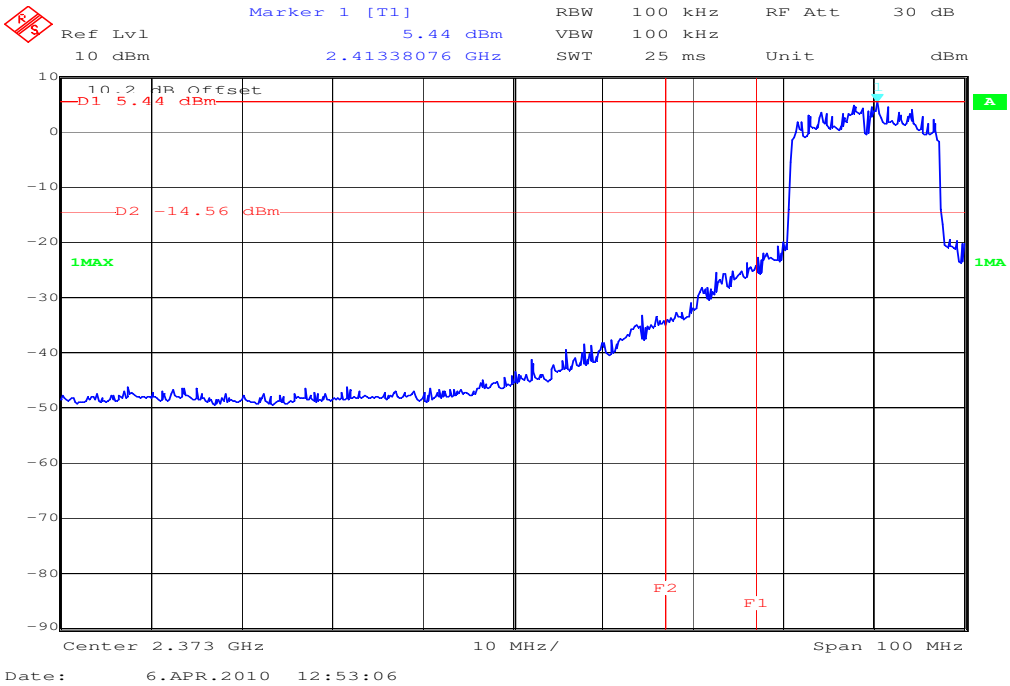


Plot 2: highest channel

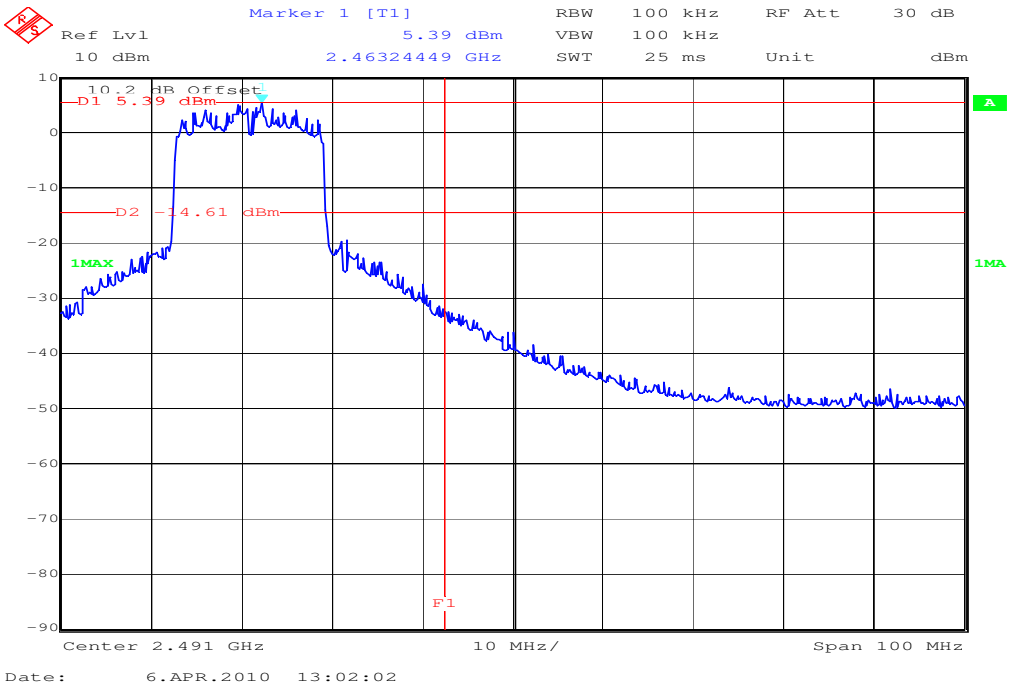


OFDM

Plot 1: lowest channel



Plot 2: highest channel



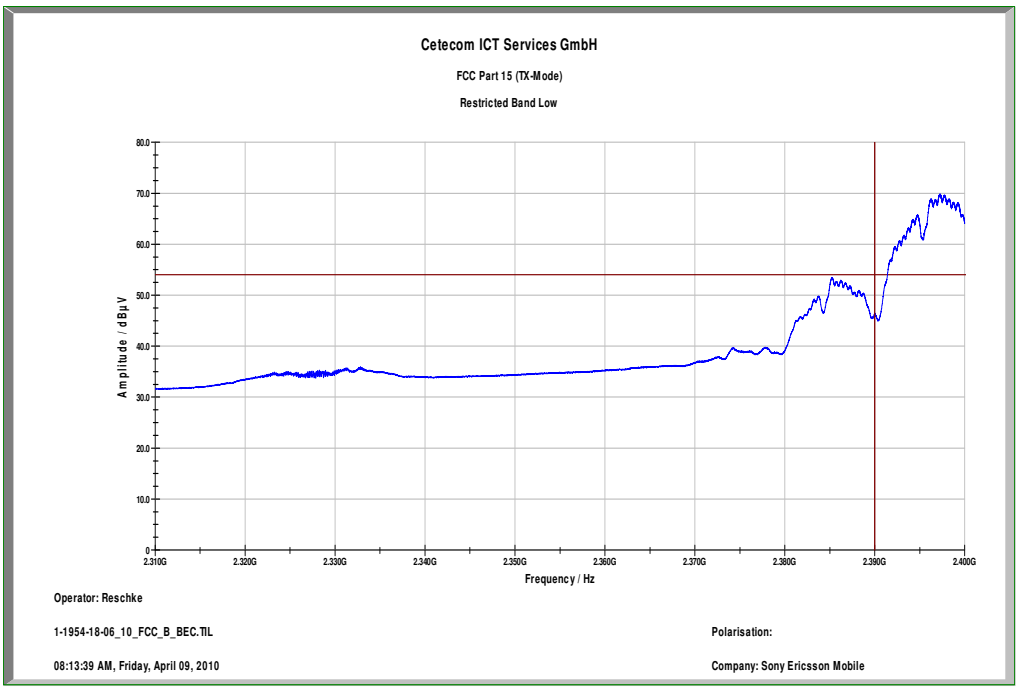
Limits:

Under normal test conditions only	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).

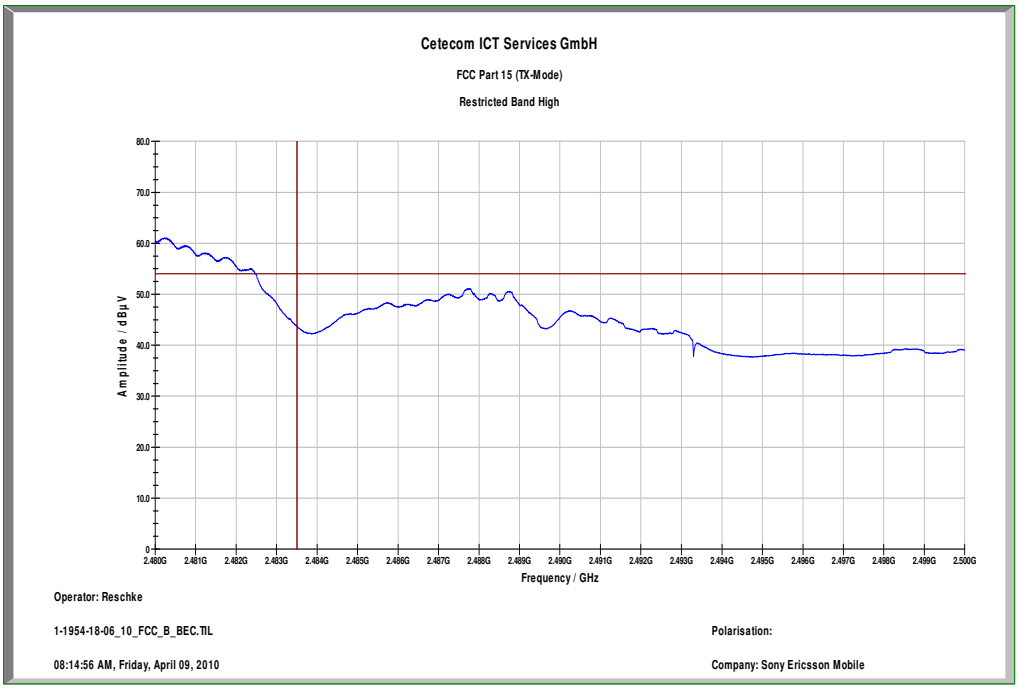
5.11 Band-edge compliance of radiated emissions §15.205

DSSS

Plot 1: Lowest Channel



Plot 2 : Highest Channel

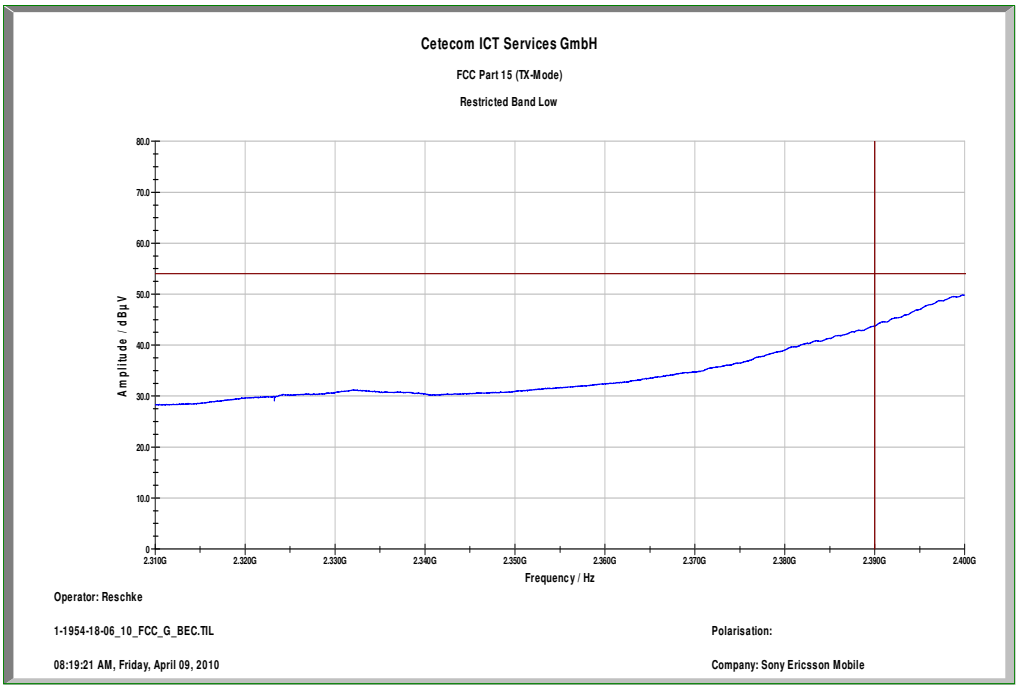


Limit: 54 dBµV

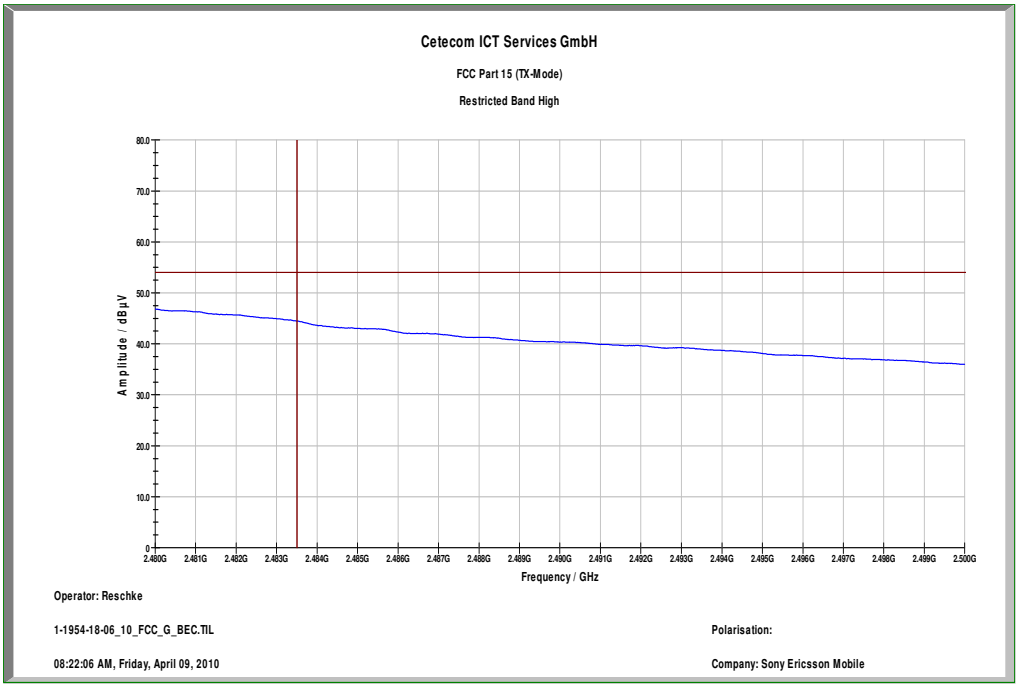
Result: Pass

OFDM

Plot 1: Lowest Channel



Plot 2 : Highest Channel



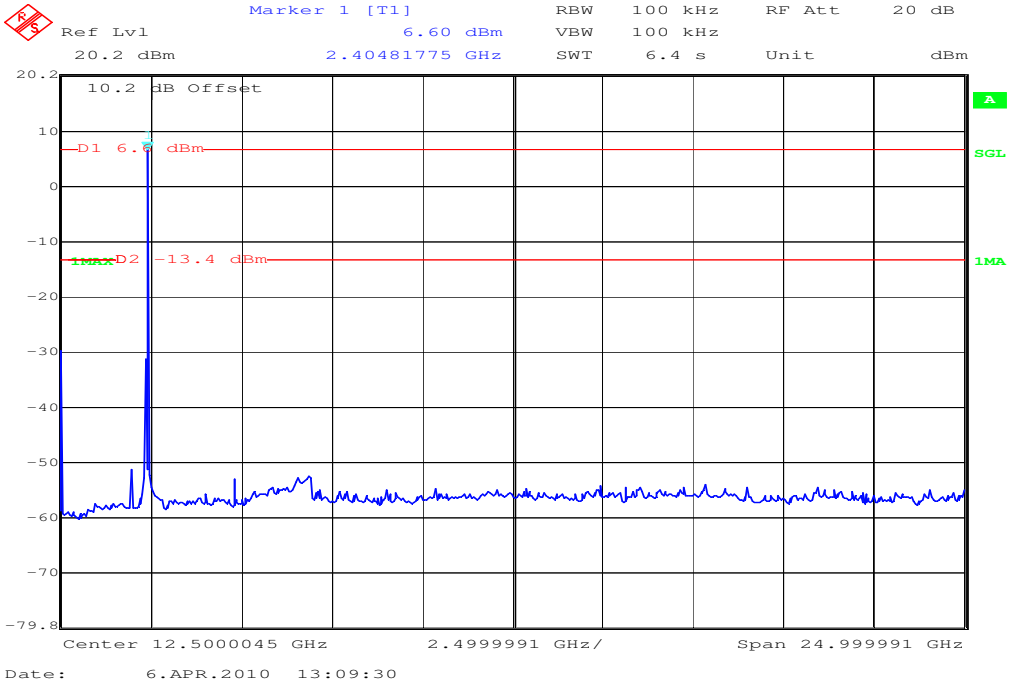
Limit: 54 dBµV

Result: Pass

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

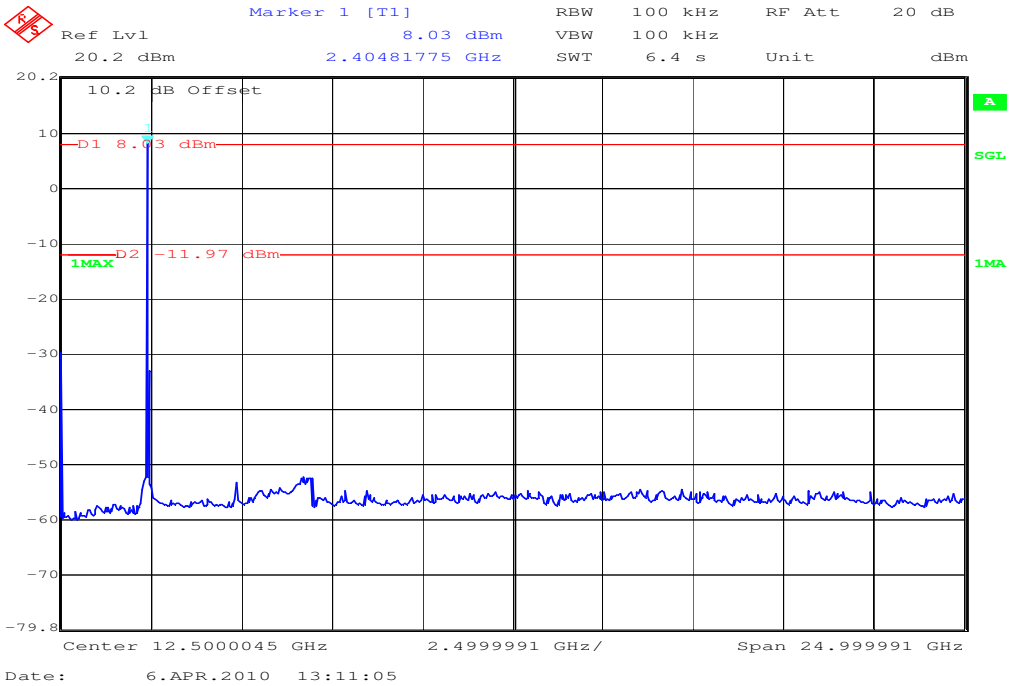
DSSS

Plot 1: Lowest Channel



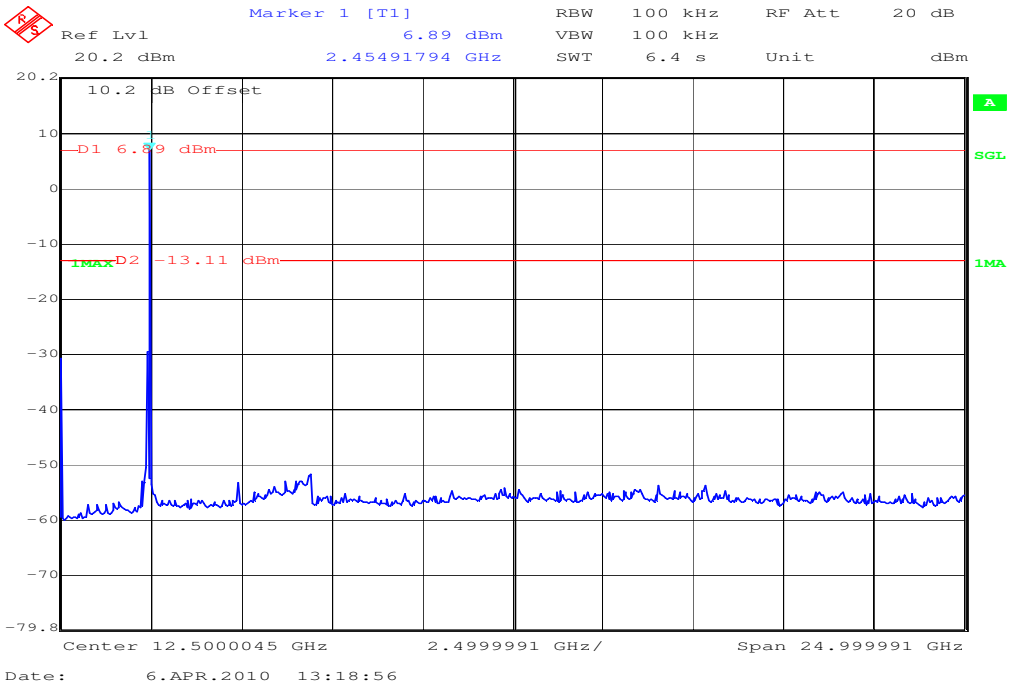
The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

Plot 2: Middle Channel



The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

Plot 3: Highest Channel



The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

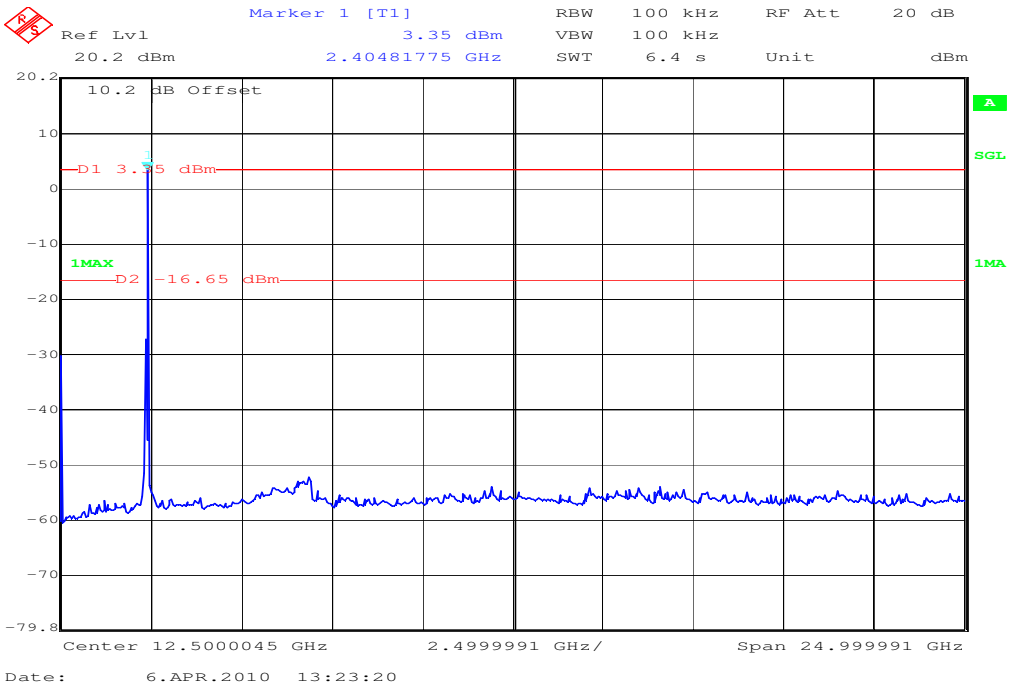
Result & Limits:

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emmision power	actual attenuation below frequency of operation [dB]	results
2412		6.60	30 dBm	-	Operating frequency
No critical peaks found			-20 dBc		
2437		8.03	30 dBm		Operating frequency
No critical peaks found			-20 dBc		
2462		6.89	30 dBm		Operating frequency
No critical peaks found			-20 dBc		
Measurement uncertainty		± 3dB			

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

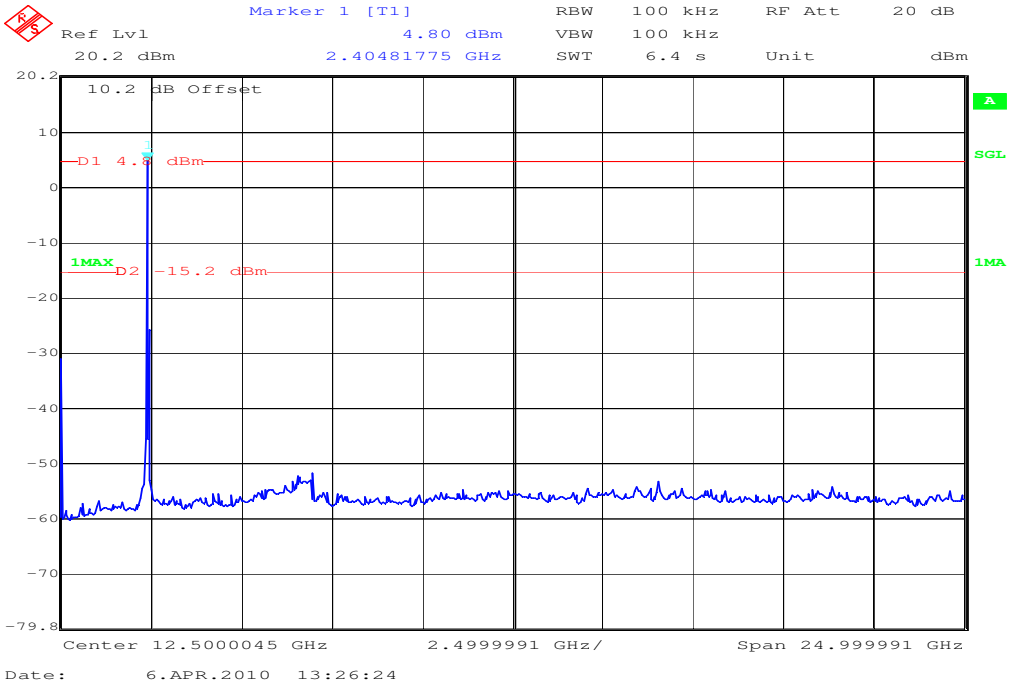
OFDM

Plot 1: Lowest Channel



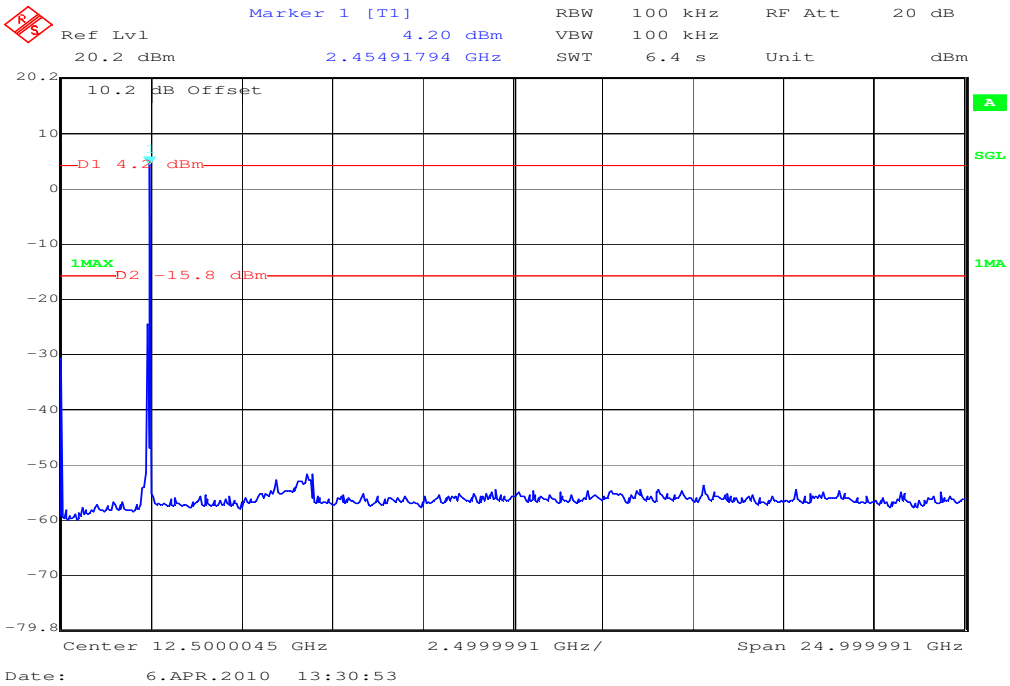
The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

Plot 2: Middle Channel



The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

Plot 3: Highest Channel



The peak at the beginning of the plot is the LO from the Spectrum Analyzer.

Result & Limits:

Emission Limitations					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emmision power	actual attenuation below frequency of operation [dB]	results
2412		3.35	30 dBm	-	Operating frequency
No critical peaks found			-20 dBc		
2437		4.80	30 dBm		Operating frequency
No critical peaks found			-20 dBc		
2462		4.20	30 dBm		Operating frequency
No critical peaks found			-20 dBc		
Measurement uncertainty		± 3dB			

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

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

Note: For emissions that fall into restricted bands you find the radiated emissions later in the report.

5.13 Spurious Emissions - radiated (Transmitter) §15.209

Plot 1: 0.03 - 1 GHz (lowest channel)

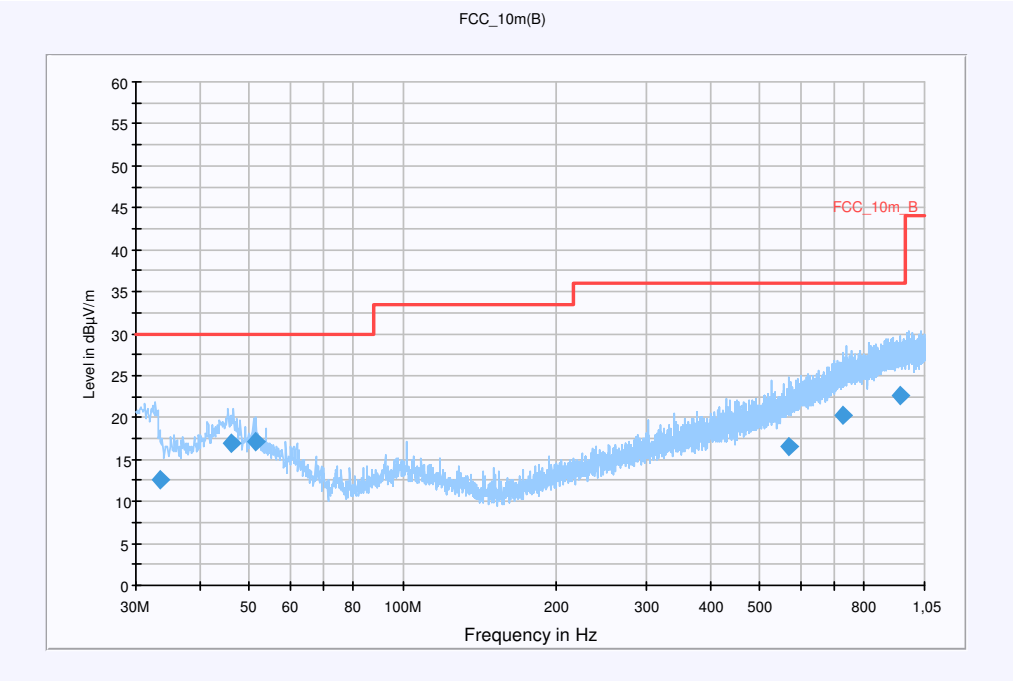
Common Information

EUT:	AAD-3880061-BV + CAA-0002016-BV
Serial Number:	IMEI:00440107-849425-5 + 1109W504000514
Test Description:	FCC part 15 C class B
Operating Conditions:	WiFi Testmode; Tx Ch:0; 54 MBit/s; max power
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

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



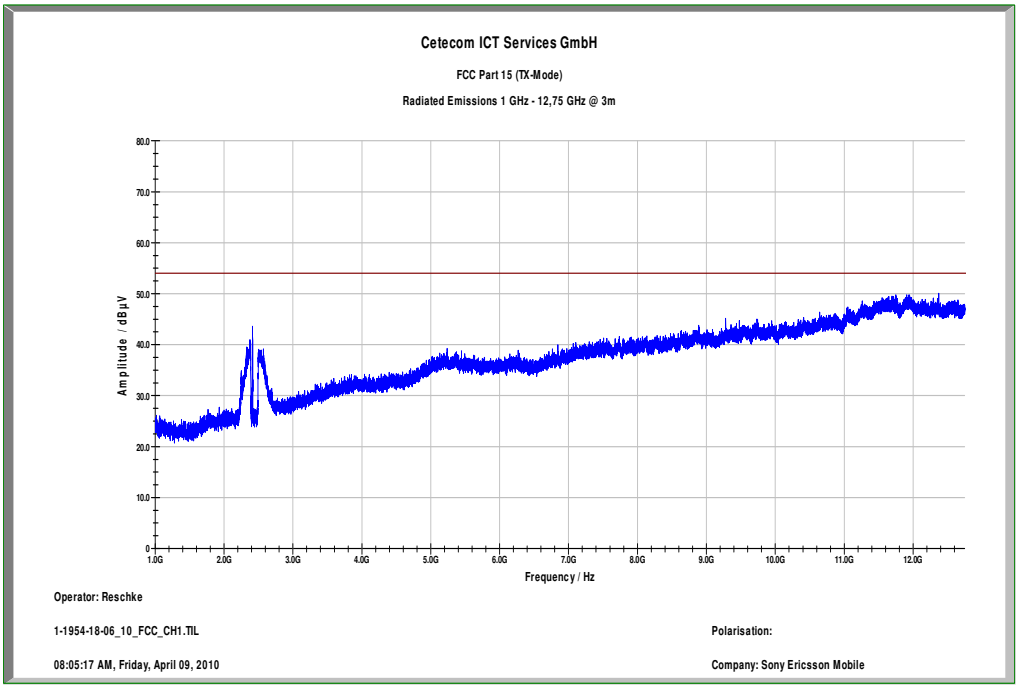
Final Result 1

33.358650	12.6	15000.000	120.000	198.0	V	149.0	12.9	17.4	30.0	
46.116450	17.0	15000.000	120.000	106.0	V	287.0	13.3	13.0	30.0	
1.616050	17.2	15000.000	120.000	98.0	V	196.0	13.2	12.8	30.0	
571.861500	16.6	15000.000	120.000	400.0	V	148.0	20.0	19.4	36.0	
724.210950	20.2	15000.000	120.000	400.0	V	140.0	23.0	15.8	36.0	
940.525350	22.5	15000.000	120.000	198.0	V	149.0	25.3	13.5	36.0	

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

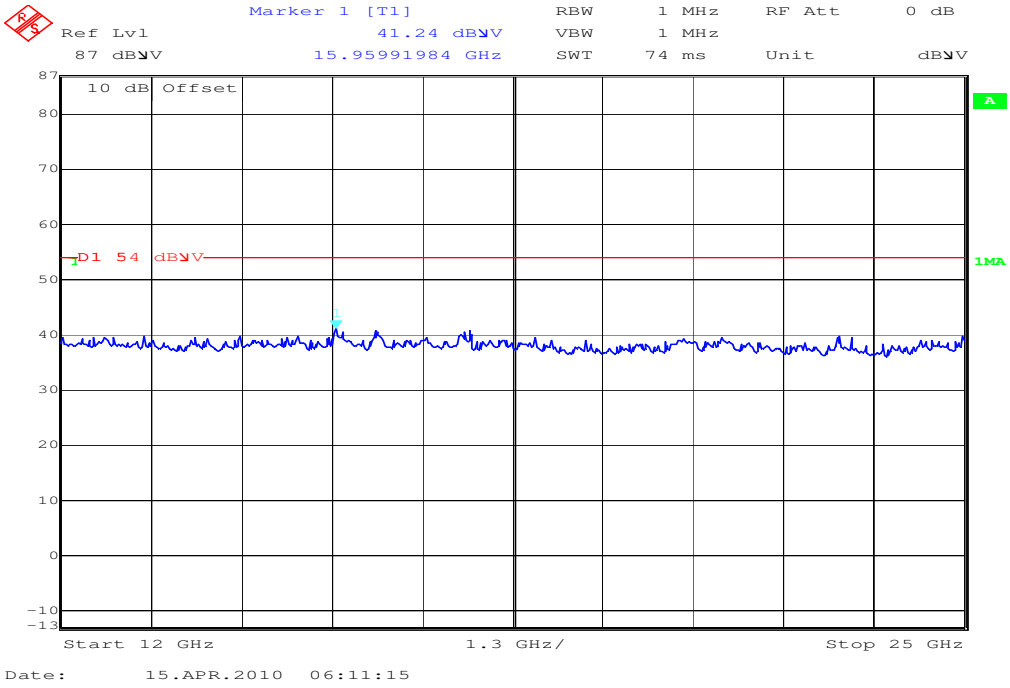
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 2: 1 - 12 GHz (lowest channel)



Carrier suppressed with 2.4 GHz rejection filter

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



Plot 4: 0.03 - 1 GHz (middle channel)

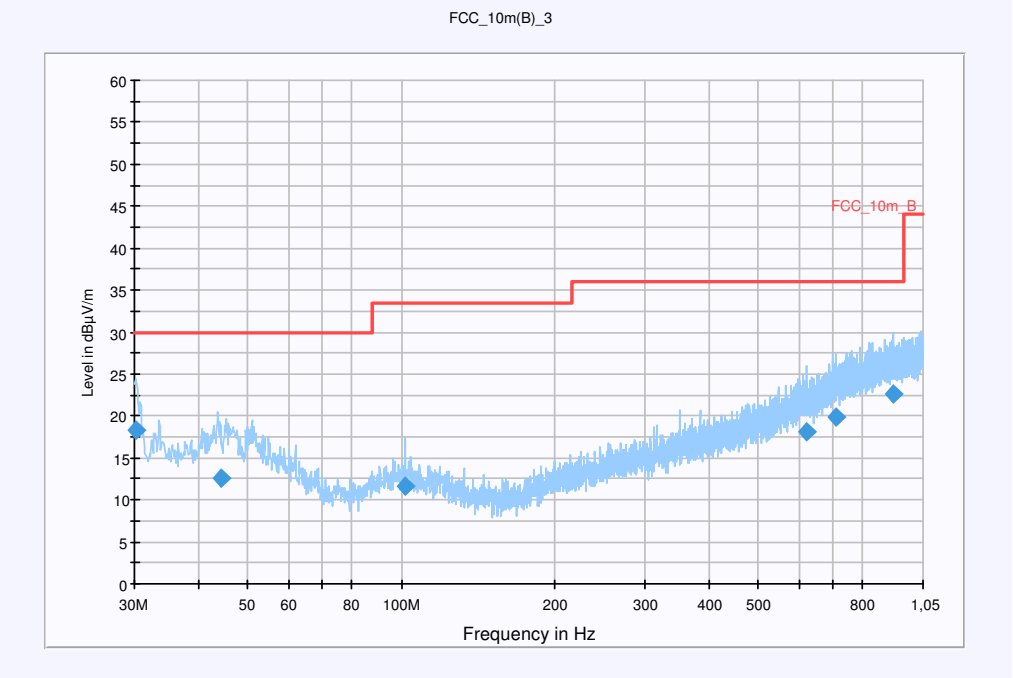
Common Information

EUT:	AAD-3880061-BV + CAA-0002016-BV
Serial Number:	IMEI:00440107-849425-5 + 1109W504000514
Test Description:	FCC part 15 C class B
Operating Conditions:	WiFi Testmode; Tx Ch:6; 54 MBit/s; max power
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

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



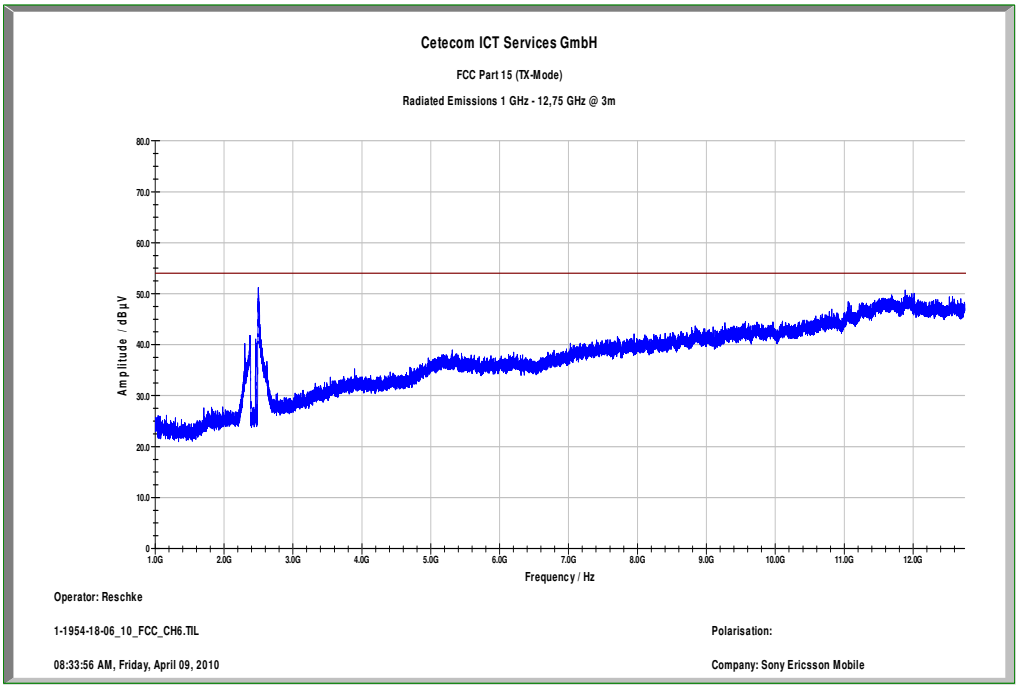
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.126949	18.2	15000.000	120.000	152.0	V	287.0	12.5	11.8	30.0	
44.307300	12.6	15000.000	120.000	220.0	V	285.0	13.3	17.4	30.0	
101.659650	11.5	15000.000	120.000	220.0	V	306.0	11.7	22.0	33.5	
620.317650	18.1	15000.000	120.000	125.0	V	324.0	20.9	17.9	36.0	
709.818450	19.9	15000.000	120.000	220.0	V	214.0	22.6	16.1	36.0	
916.188300	22.5	15000.000	120.000	220.0	H	232.0	25.2	13.5	36.0	

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

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 5: 1 - 12 GHz (middle channel)



Carrier suppressed with 2.4 GHz rejection filter

Plot 6: 0.03 - 1 GHz (highest channel)

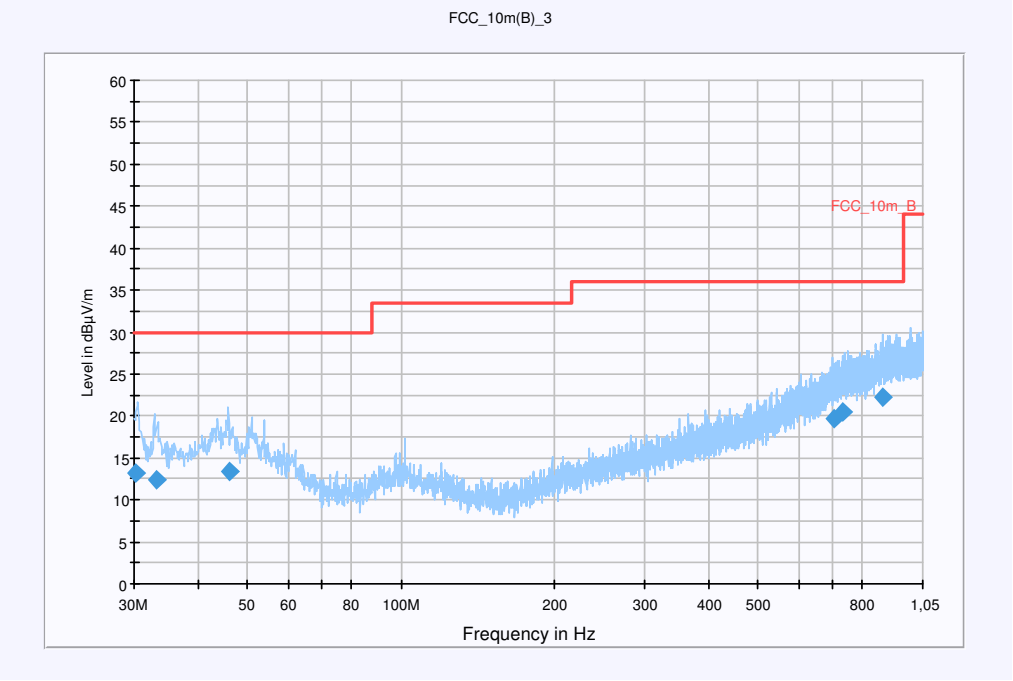
Common Information

EUT:	AAD-3880061-BV + CAA-0002016-BV
Serial Number:	IMEI:00440107-849425-5 + 1109W504000514
Test Description:	FCC part 15 C class B
Operating Conditions:	WiFi Testmode; Tx Ch:11; 54 MBit/s; max power
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

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



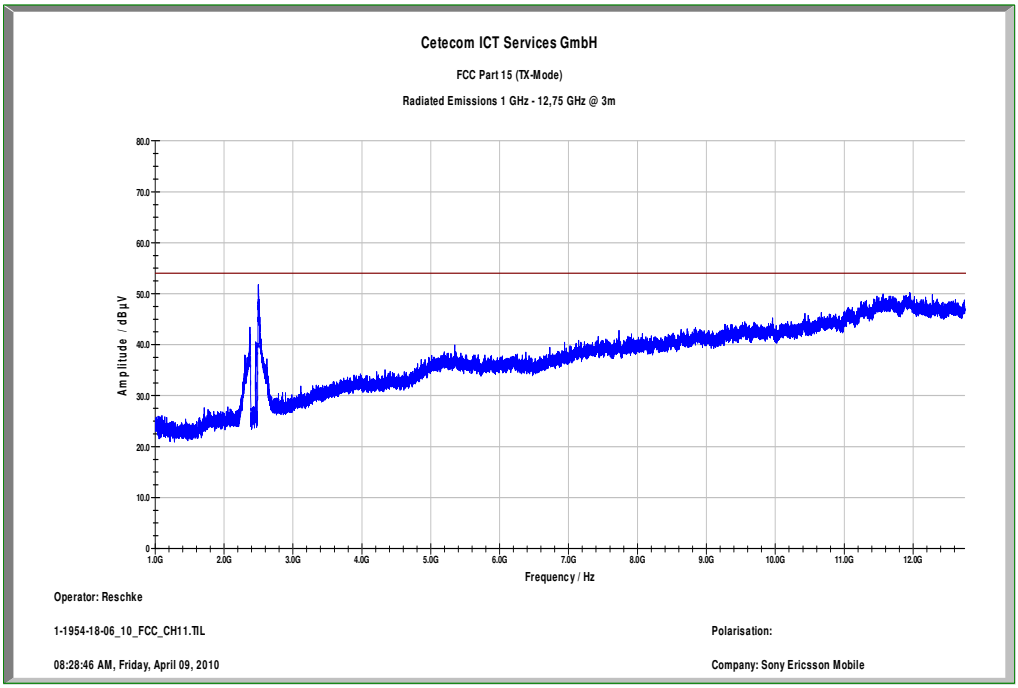
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.138334	13.2	15000.000	120.000	184.0	V	294.0	12.5	16.8	30.0	
33.237000	12.3	15000.000	120.000	157.0	V	146.0	12.8	17.7	30.0	
46.225050	13.4	15000.000	120.000	157.0	V	184.0	13.3	16.6	30.0	
702.318150	19.7	15000.000	120.000	98.0	V	17.0	22.5	16.3	36.0	
731.418450	20.4	15000.000	120.000	143.0	H	255.0	23.2	15.6	36.0	
874.159800	22.2	15000.000	120.000	220.0	H	238.0	24.9	13.8	36.0	

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

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 7: 1 - 12 GHz (highest channel)



Carrier suppressed with 2.4 GHz rejection filter

Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			±3 dB					

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

Limits: § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits: § 15.109

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

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

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

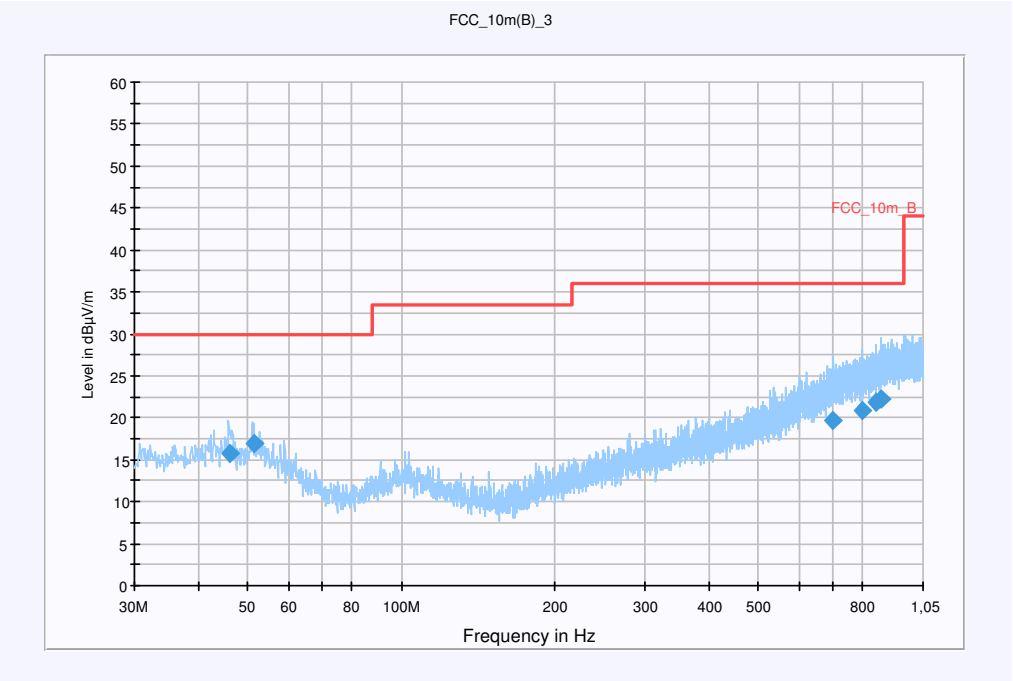
Common Information

EUT:	AAD-3880061-BV + CAA-0002016-BV
Serial Number:	IMEI:00440107-849425-5 + 1109W504000514
Test Description:	FCC part 15 C class B
Operating Conditions:	WiFi Testmode; Rx Ch:6
Operator Name:	Lang
Comment:	AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

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



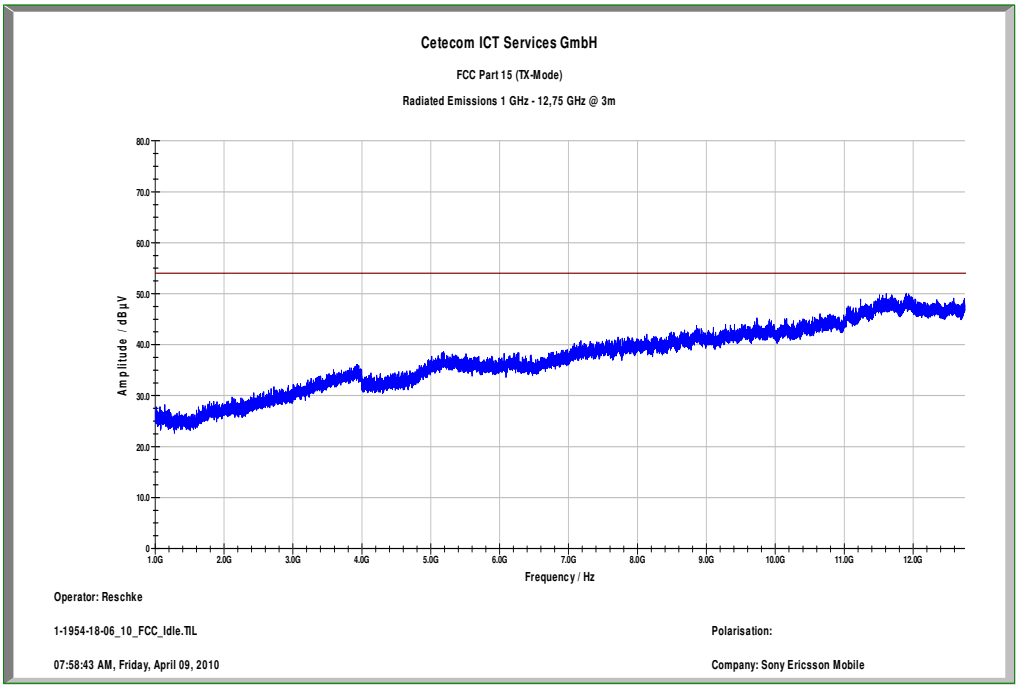
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
46.039500	15.8	15000.000	120.000	98.0	V	213.0	13.3	14.2	30.0	
51.620550	16.9	15000.000	120.000	98.0	V	223.0	13.2	13.1	30.0	
701.296200	19.7	15000.000	120.000	108.0	V	317.0	22.4	16.3	36.0	
796.093800	20.9	15000.000	120.000	220.0	V	238.0	23.8	15.1	36.0	
852.016350	21.8	15000.000	120.000	135.0	H	142.0	24.6	14.2	36.0	
869.245050	22.2	15000.000	120.000	220.0	V	73.0	24.8	13.8	36.0	

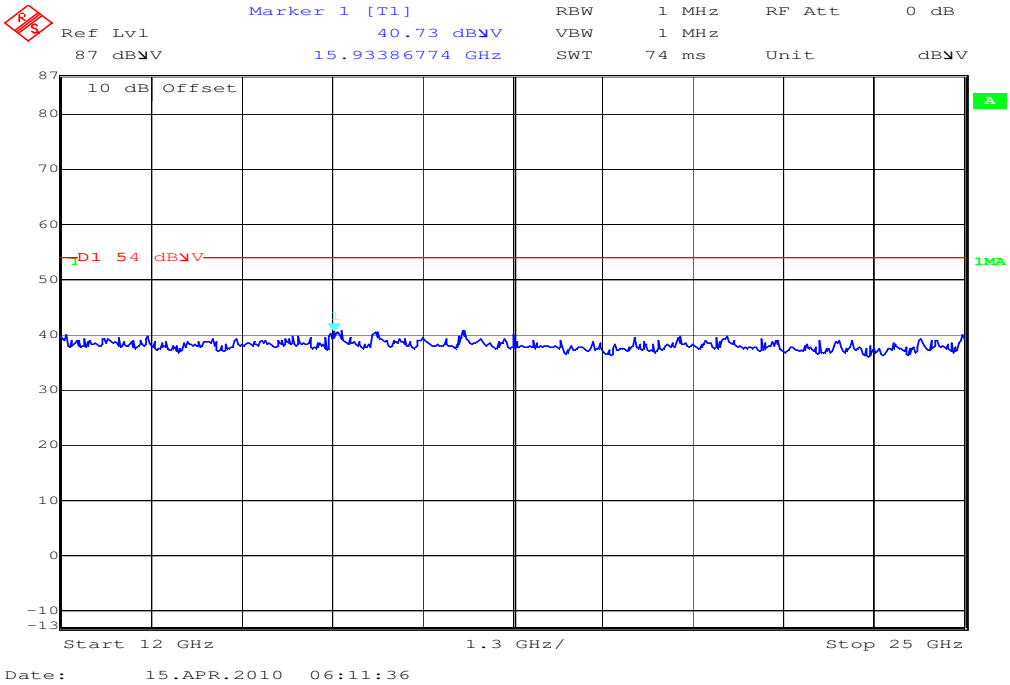
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 2: 1 - 12 GHz vertical / horizontal (receiver)



Plot 3: 12- 25 GHz (receiver)



Results:

Spurious Emissisons level [dBµV/m]		
f[MHz]	Detector	Level [dBµV/m]
No critical peaks found		
Measurement uncertainty	±3 dB	

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

Measurement distance see table

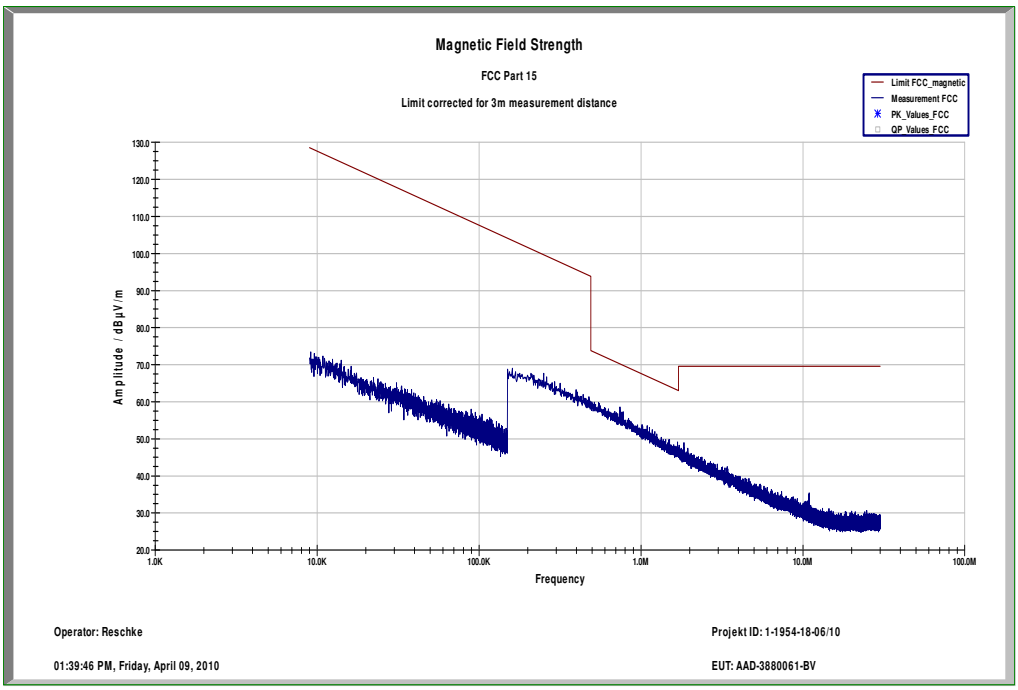
Limits: § 15.109

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

5.15 Spurious Emissions - radiated <30 MHz §15.209

Measured at 3 m distance.
Values recalculated with 40 dB/decade according to FCC rules.

Plot 1:

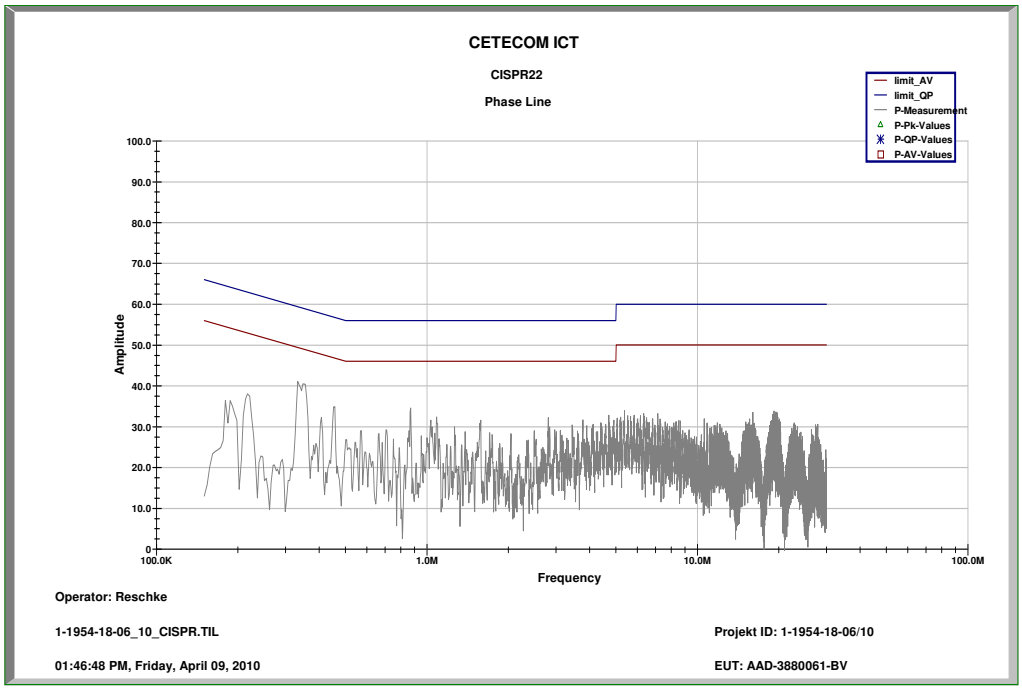


Limits:

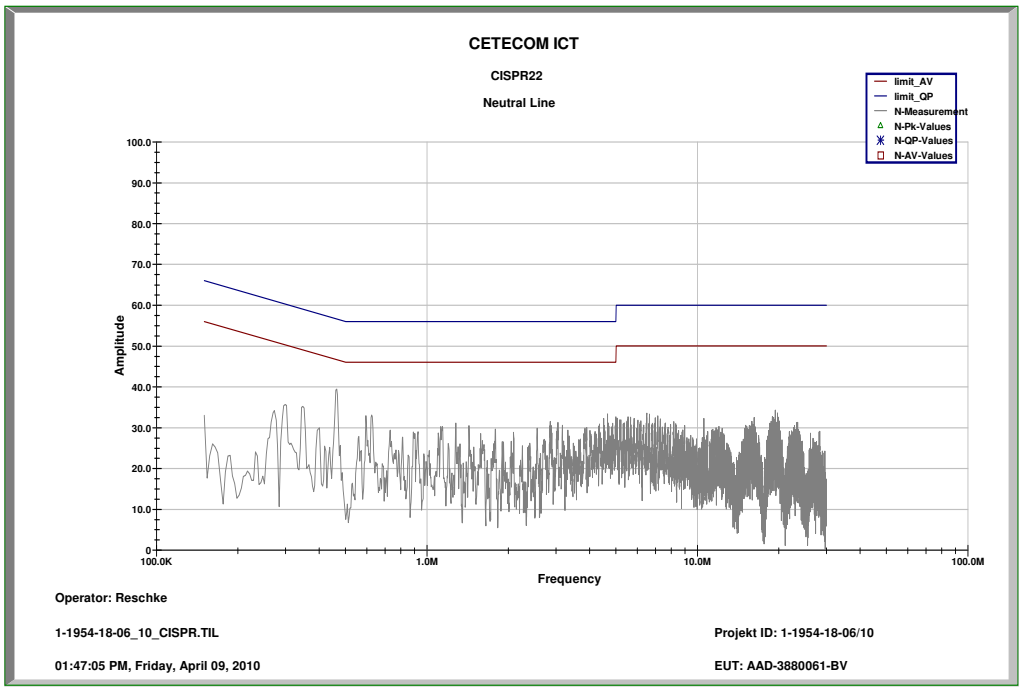
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	54 dBµV/m	3

5.16 Conducted Emissions <30 MHz §15.107/207

Plot 1: Phase Line



Plot 2: Neutral Line



We measured in TX and RX mode, L1 and N floating and grounded, max value was hold.

Limits:

Under normal test conditions only	See plots

6 Test equipment and ancillaries used for tests

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

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

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calibration	Next Calibration
1	19	Double-Ridged Waveguide Horn Antenna 1-26.5GHz	3115	EMCO	9107-3697	300001605	Ve	30.06.2008	30.06.2010
2	n. a.	Isolating Transformer	913501	Erfi		300001205	ne		
3	4	Radiocom. Analyzer	CMTA 54	R&S	894043/010	300001175	NK!	06.06.2007	
4	9	Signal Generator 0.1-4320 MHz, AM/FM/PHIM/Puls Mod.	SMHU	R&S	894055/005	300001190	Ve	05.01.2010	05.01.2013
5	10	Signal Generator 0.1-2000 MHz	SMH	R&S	864219/033	300001410	Ve	10.05.2007	10.05.2010
6	n. a.	DC Power Supply 0 – 32V	1108-32	Heiden	1802	300001383	Ve	13.05.2007	13.05.2010
7	n. a.	System Autoranging DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04590	300001041	Ve	08.01.2009	08.01.2012
8	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	Ve	28.05.2009	28.05.2011
9	n. a.	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	08.01.2010	08.01.2012
10	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
11	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	Ve	06.01.2009	06.01.2011
12	n. a.	Temperature Test Chamber	T-40/50	CTS GmbH	064023	300003540	vlKI!	04.06.2009	04.06.2011
13	n. a.	Spektrumanalysator 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	05.06.2008	05.06.2010
14	n. a.	System Autoranging DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
15	n. a.	PowerAttenuator	8325	Byrd	1530	300001595			
16	n. a.	Double-Ridged Waveguide Horn Antenna 1-26.5GHz	3115	EMCO	8812-3088	300001032	vlKI!	05.03.2009	05.03.2011
17	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
18	n. a.	Anechoic chamber		MWB	87400/02	300000996			
19	Spec.A. 2_2e	System-Rack	85900	HP I.V.	*	300000222	ne		
20	9	Artificial Mains 9	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012

		kHz to 30 MHz, 4 x 25 Ampere							
21	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
22	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
23	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
24	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
25	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
26	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
27	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
28	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
29	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
30	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
31	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Vertr. Bad Hom	MY48250080	300003812	k	05.08.2008	05.08.2010
32	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Vertr. Bad Hom	MY47420220	300003813	k	06.08.2008	06.08.2010
33	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Vertr. Bad Hom	MY48260003	300003825	vlKI!	19.08.2008	19.08.2010
34	n. a.	TRILOG Super Breitband Antenne	VULB9163	Schwarzbeck	371	300003854	vlKI!	17.12.2008	17.12.2010
35	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
36	50	Netzgerät	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
37	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	k	03.09.2001	03.09.2003
38	n. a.	EMI-Messempfänger	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
39	n. a.	Analysator-Referenz-System (Harmonics u. Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	06.06.2007	06.06.2009
40	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
41	n. a.	Antennenmast	Model 2175	ETS-LINDGREN	64762	300003745	izw		
42	n. a.	Steuergerät	Model 2090	ETS-LINDGREN	64672	300003746	izw		
43	n. a.	Interface-Box für Drehtisch	Model 105637	ETS-LINDGREN	44583	300003747	izw		
44	n. a.	Breitbandantenne	VULB9163	Schwarzbeck	295	300003787	k	01.04.2008	01.04.2010
45	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012