FCC LISTED, REGISTRATION NUMBER: 905266 **IC LISTED REGISTRATION NUMBER IC 4621**	**AT4 wireless, S.A.** Parque Tecnológico de Andalucía, c/ Severo Ochoa nº 2 29590 Campanillas/ Málaga/ España Tel. 952 61 91 00 - Fax 952 61 91 13 MÁLAGA, C.I.F. A29 507 456 Registro Mercantil de Málaga,Tomo 1169, Libro 82, Folio 133, Hoja MA3729

TEST REPORT

REFERENCE STANDARD:

USA FCC Part 15.247, 15.109 and 15.207

NIE ..... :	30893RET.001
Approved by (name / position & signature) ..... :	A. Llamas / RF Lab. Manager
Elaboration date ..... :	09/03/2010

Alejandro Llamas Rodríguez
Firmado digitalmente por Alejandro Llamas Rodríguez
Fecha: 2010.03.09 08:58:43 +01'00'

Identification of item tested ..... :	Base Station
Trademark ..... :	Polar
Model and/or type reference ..... :	Team2 Pro
Serial number ..... :	F005U60455555, F005U60455556
Other identification of the product ..... :	FCC ID: INWU6 IC: 6248A-N8
Features ..... :	2.4-2.4835 GHz band, WiFi 802.11b/g, AC adaptor
Description ..... :	Team2 Pro Base station is a stand alone unit which connect a PC/PDA to other transmitters or vice versa. Connection can occur via Bluetooth, WLAN or via Ethernet cable (RJ45). The device uses frequency range of 2400-2483,5 MHz and contains: 4 certified WT11 Bluetooth modules (FCC ID: QOQWT11) 1 certified EW-7318Mug 802.11gb WLAN module (FCC ID: NDD9573180818)

Applicant ..... :	POLAR ELECTRO OY.
Address ..... :	Professorintie 5, 90440 Kempele, FINLAND
CIF/NIF/Passport ..... :	VAT FI02099112
Contact person:	Kari Parkkisenniemi
Telephone / Fax ..... :	+358 8 5202100 / +358 8 5202200
e-mail: ..... :	Kari.parkkisenniemi@polar.fi
Test samples supplier ..... :	Same as applicant
Manufacturer ..... :	Polar (Guangzhou) Electronics Co. Ltd.
Address ..... :	No. 19 Nan Yun 1st Road, Guangzhou Science City, Guangzhou, PRC (510660) CHINA
CIF/NIF/Passport ..... :	----
Telephone / Fax ..... :	+86-20-2232 3800 / +86-20-2232 3970

Test method requested .....:	See Standard
Standard .....:	USA FCC Part 15.247 07-10-08 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz: Section 15.247 Subclause (b). Maximum output power (radiated) and antenna gain. Section 15.247 Subclause (d). Band-edge emissions compliance (Transmitter). Section 15.247 Subclause (d). Emissions radiated (Transmitter). Guidelines for measurement of Digital Transmission Systems operating under section 15.247 dated March 23, 2005. USA FCC part 15.207 07-10-08 Edition: Conducted limits. USA FCC Part 15.109 07-10-08 Edition: Receiver radiated emission.
Test procedure .....:	PEET034: Medidas radioeléctricas a equipos de radio de espectro ensanchado en la banda de 2,4 GHz. PEEM001: Medida de la tensión perturbadora en bornes de alimentación según EN 55022.
Non-standardized test method .....:	N/A
Used instrumentation .....:	Conducted Measurements

		Last Cal. date	Cal. due date
1.	EMI Test Receiver R&S ESIB26	2009/09	2011/09
2.	Transient limiter. HP 11947A	2009/06	2011/06
3.	Line Impedance Stabilization Network (L.I.S.N.) R&S. ESH2-Z5	2008/04	2010/04

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber IR 11. BS	N.A.	N.A.
2.	Control Chamber IR 12.BC	N.A.	N.A.
3.	Hybrid Bilog antenna Sunol Sciences Corporation JB6	2008/10	2011/10
4.	Antenna mast EM 1072 NMT	N.A.	N.A.
5.	Rotating table EM 1084-4. ON	N.A.	N.A.
6.	Double-ridge Guide Horn antenna 1-18 GHz HP 11966E	2008/03	2011/03
7.	Double-ridge Guide Horn antenna 18-40 GHz Agilent 119665J	2008/09	2011/09
8.	EMI Test Receiver R&S ESIB26	2009/09	2011/09
9.	RF pre-amplifier Miteq JS4-12002600-30-5A.	2008/07	2010/07
10.	Multi Device Controller EMCO 2090	N.A.	N.A.
11.	Spectrum Analyzer R&S ESU40	2009/11	2011/11
12.	RF pre-amplifier Miteq AFS5-04001300-15-10P-6.	2008/07	2010/07
13.	RF pre-amplifier Schaffner CPA 9231.	2009/03	2011/03
14.	Antenna tripod EMCO 11968C.	N.A.	N.A.
15.	Spectrum analyser R&S FSU8	2009/08	2011/08

Report template No. .....: FDT08_11

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Competences and guarantees

AT4 wireless is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjuction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

AT4 wireless is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the AT4 wireless internal documents:

PODT000: : Procedimiento para el cálculo de incertidumbres de medida

FEM12_07: Formato de cálculo de incertidumbre a aplicar en la medida de la tensión perturbadora en bornes de alimentación según EN 55022.

Usage of samples

Samples undergoing test have been selected by: **the client**.

Sample M/01 is formed by the following elements:

Control No.	Description	Model	Serial No.	Date of reception
30893/07	WiFi equipment	Team2 Pro	F005U60455555	2010-02-05
30893/02	AC adaptor	PSC30R-180	---	2010-02-05

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
30893/01	Power supply adapter	PSC30R-180	---	2010-02-05
30893/03	Ethernet cable	---	---	2010-02-05
30893/06	WiFi Equipment	Team2 Pro	F005U60455556	2010-02-05

1. Sample M/01 has undergone following test(s).
   All tests indicated in appendix A.

2. Samples S/01 has undergone the next test(s):
   Continuous conducted emission, power leads in appendix B.

Testing period

The performed test started on 2010-02-08 and finished on 2010-02-09.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 23.1 ºC Max. = 24.3 ºC
Relative humidity	Min. = 46.8 % Max. = 47.2 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters), the following limits were not exceeded during the test.

Temperature	Min. = 22 ºC Max. = 23 ºC
Relative humidity	Min. = 51 % Max. = 52 %
Air pressure	Min. = 1020 mbar Max. = 1020 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 30 ºC
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

Summary

Considering the results of the performed test according to standard USA FCC Parts 15.247, 15.207 and 15.109, the item under test is **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, “USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS”.

Remarks and comments

1: Test not requested.

Testing verdicts

Not applicable ..... : NA

Pass..... : P

Fail ..... : F

Not measured..... : NM

FCC PART 15 PARAGRAPH		VERDICT			
		NA	P	F	NM
Section 15.247 Subclause (a) (2).	6 dB Bandwidth				NM[1]
Section 15.247 Subclause (b).	Maximum output power (radiated) and antenna gain		P		
Section 15.247 Subclause (d).	Emission limitations conducted (Transmitter)				NM[1]
Section 15.247 Subclause (d).	Band-edge of radiated emissions (Transmitter)		P		
Section 15.247 Subclause (e).	Power spectral density				NM[1]
Section 15.247 Subclause (d).	Emission limitations radiated (Transmitter)		P		
Section 15.109.	Radiated emission limits for receiver		P		
Section 15.207.	Conducted limits		P		

1: See point “Remarks and comments”

APPENDIX A: Test result

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TEST CONDITIONS

Power supply (V):

$V_{nominal}$ = 18 Vdc

Type of power supply = External AC/DC adaptor.

Type of antenna = Integral antenna.

Maximum Gain for antenna = 5 dBi

TEST FREQUENCIES:

Lowest channel: 2412 MHz

Middle channel: 2437 MHz

Highest channel: 2462 MHz

The test set-up was made in accordance to the general provisions of ANSI C63.4: 2003.

RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive (wooden) platform one meter above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

Section 15.247 Subclause (b). Maximum output power and antenna gain

SPECIFICATION

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).

RESULTS

1. DSSS modulation

MAXIMUM OUTPUT POWER (RADIATED). See next plots.

Preliminary tests were done with the equipment operating with DSSS modulation mode at 1 Mbps, 2 Mbps, 5.5 Mbps and 11 Mbps and the worst case was for 11 Mbps bit rate. Results shown below correspond to 11 Mbps.

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
Maximum EIRP power (dBm)	20.09	24.45	22.62
Measurement uncertainty (dB)	±4.0		

Maximum declared antenna gain: 5 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

2. OFDM modulation

MAXIMUM OUTPUT POWER (RADIATED). See next plots.

Preliminary tests were done with the equipment operating with OFDM modulation mode at 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps, and the worst case was for 6 Mbps bit rate. Results shown below correspond to 6 Mbps.

	Lowest frequency 2412 MHz	Middle frequency 2437 MHz	Highest frequency 2462 MHz
Maximum EIRP power (dBm)	23.18	26.17	25.87
Measurement uncertainty (dB)	±4.0		

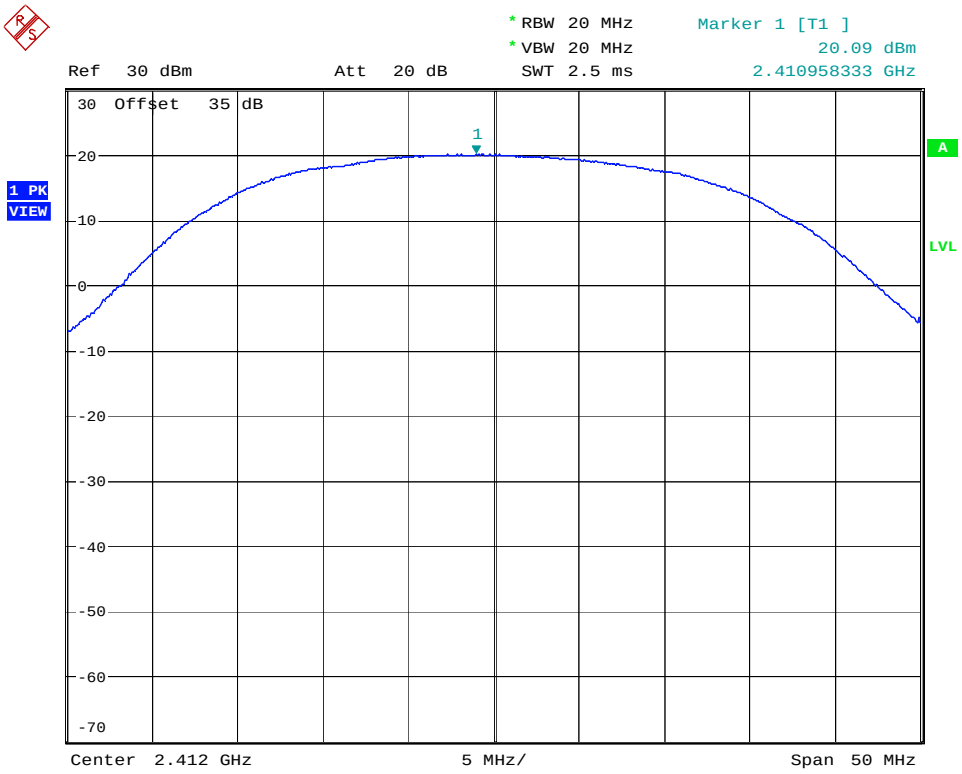
Maximum declared antenna gain: 5 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

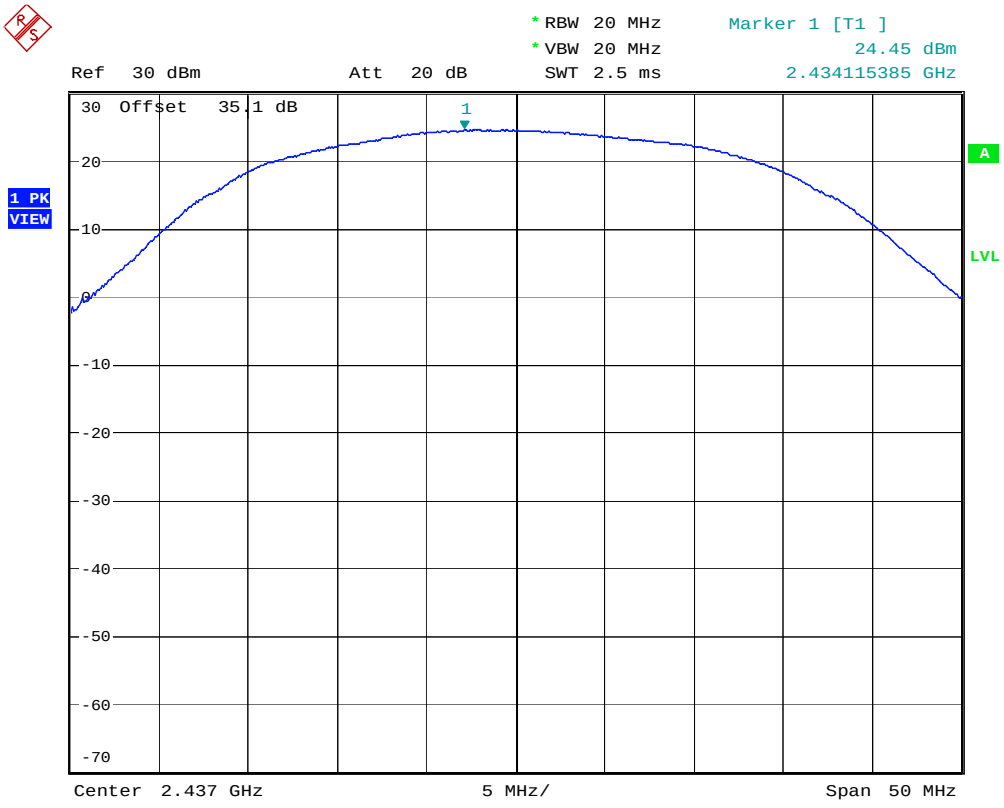
Verdict: PASS

DSSS modulation

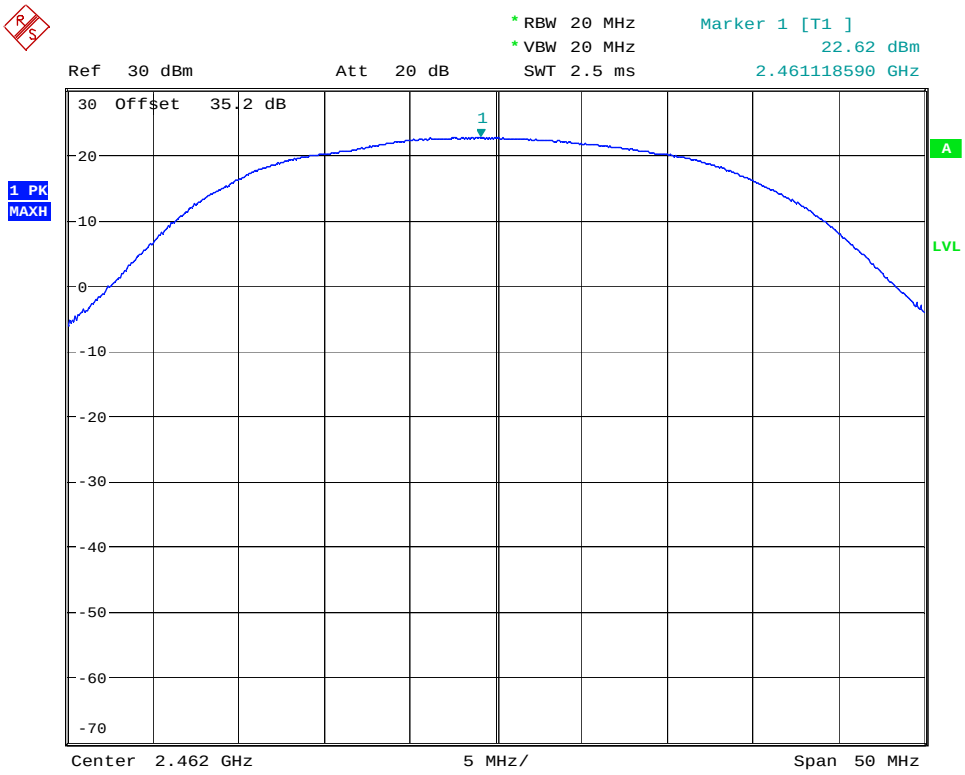
Lowest frequency 2412 MHz



Middle frequency 2437 MHz

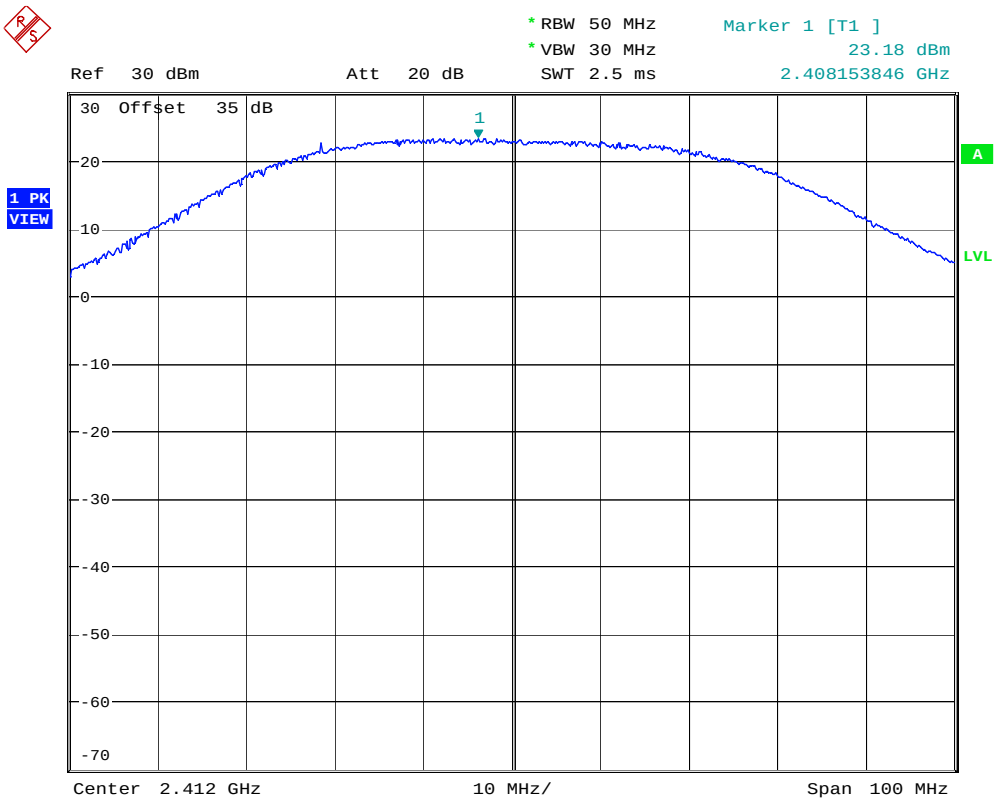


Highest frequency 2462 MHz

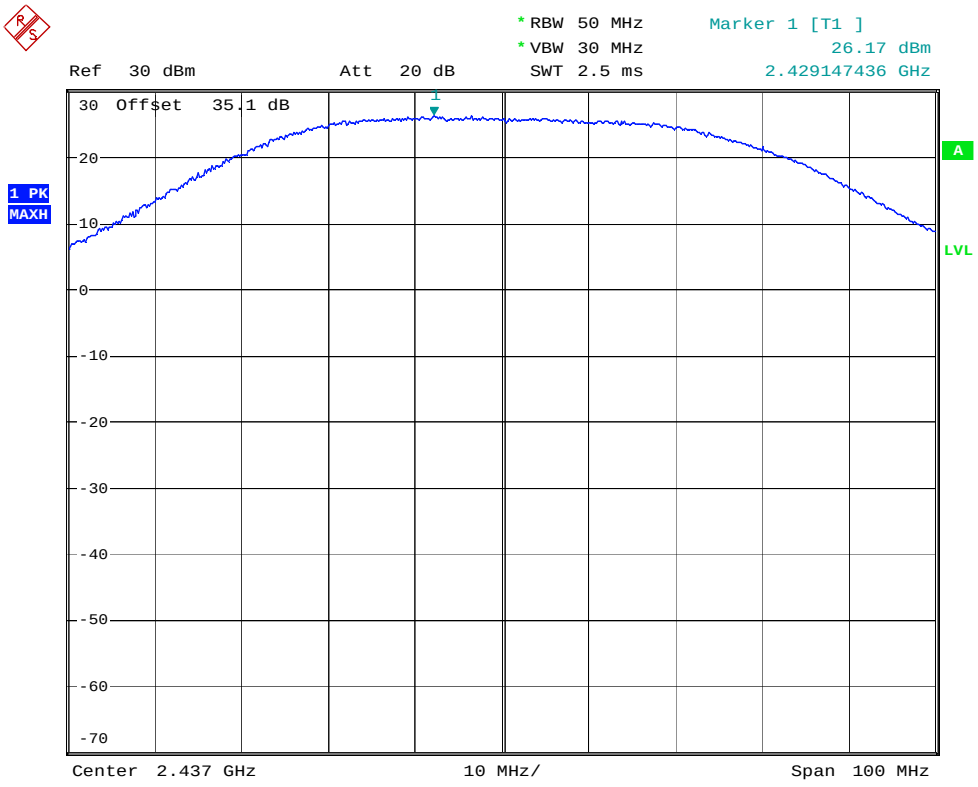


OFDM modulation

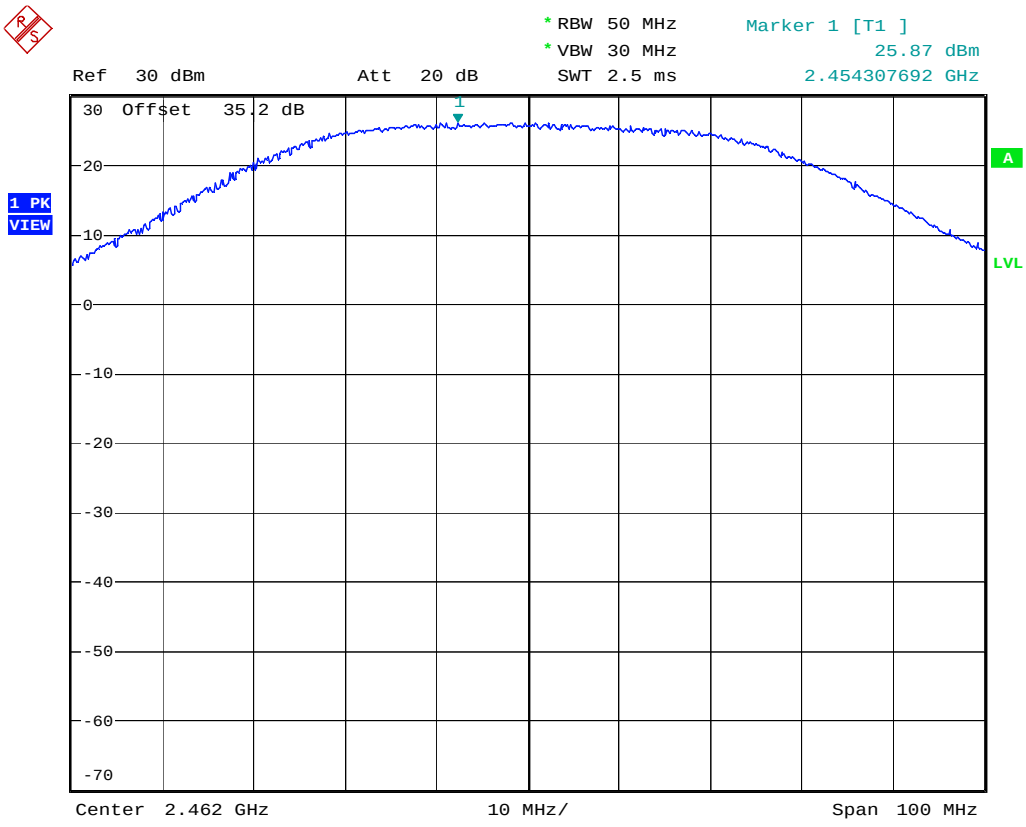
Lowest frequency 2412 MHz



Middle frequency 2437 MHz



Highest frequency 2462 MHz



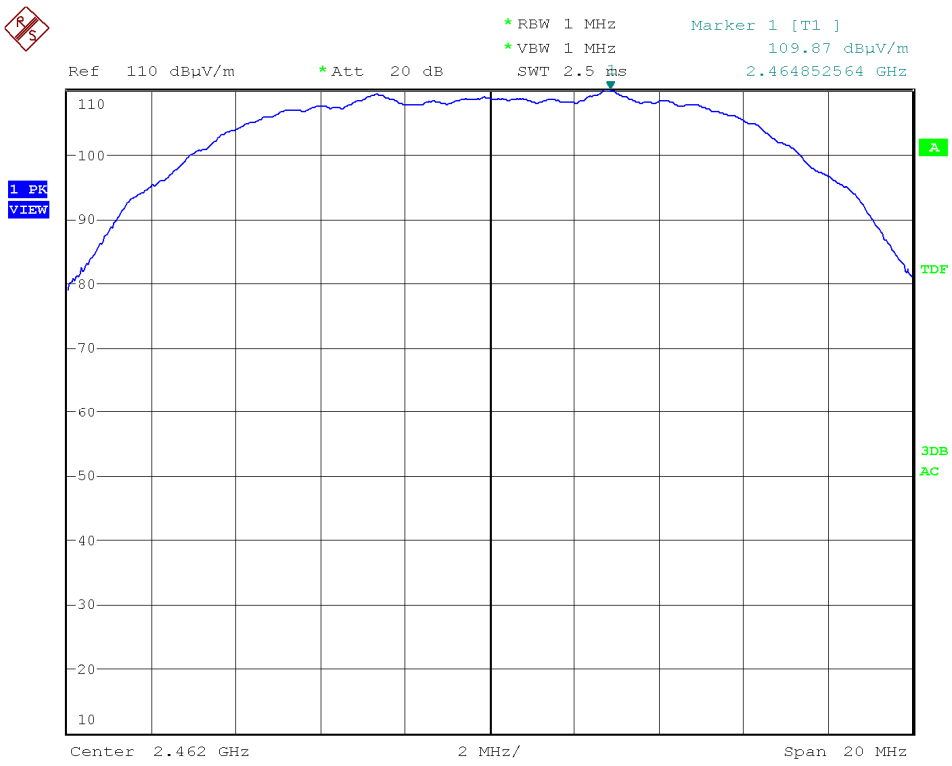
1. DSSS Modulation

Preliminary tests were done with the equipment operating with DSSS modulation mode at 1 Mbps, 2 Mbps, 5.5 Mbps and 11 Mbps and the worst case was for 1 Mbps bit rate. Results shown below correspond to 1 Mbps.

Maximum peak and average field strength of fundamental emission at 3 m distance.

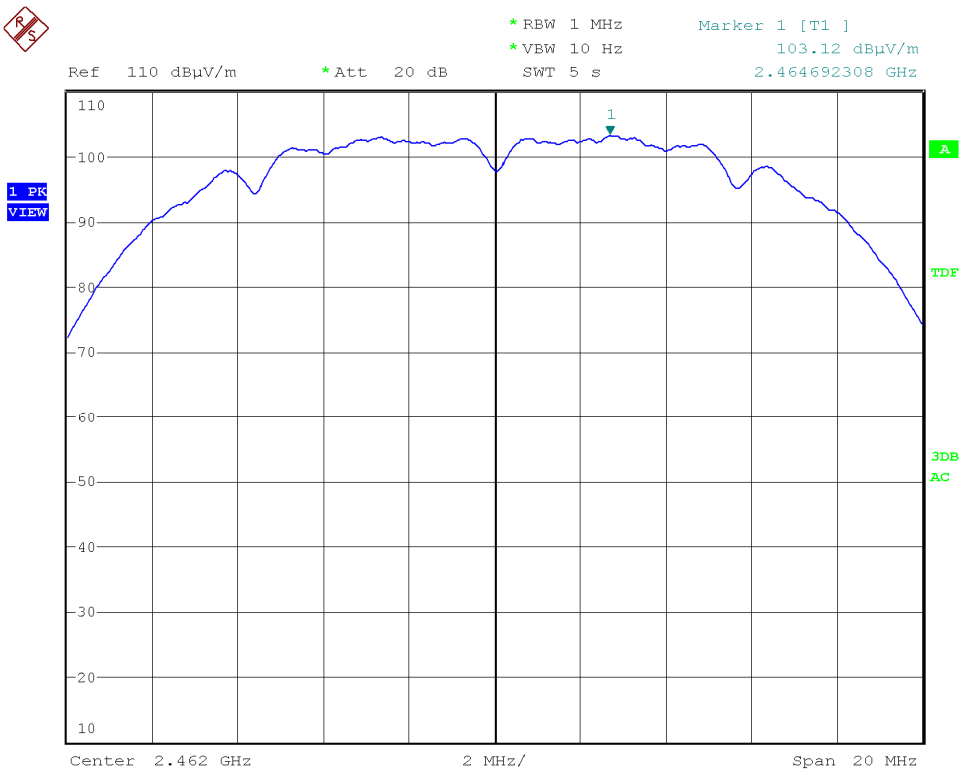
HIGHEST CHANNEL (2462 MHz):

Maximum field strength at 3 m. Peak value.



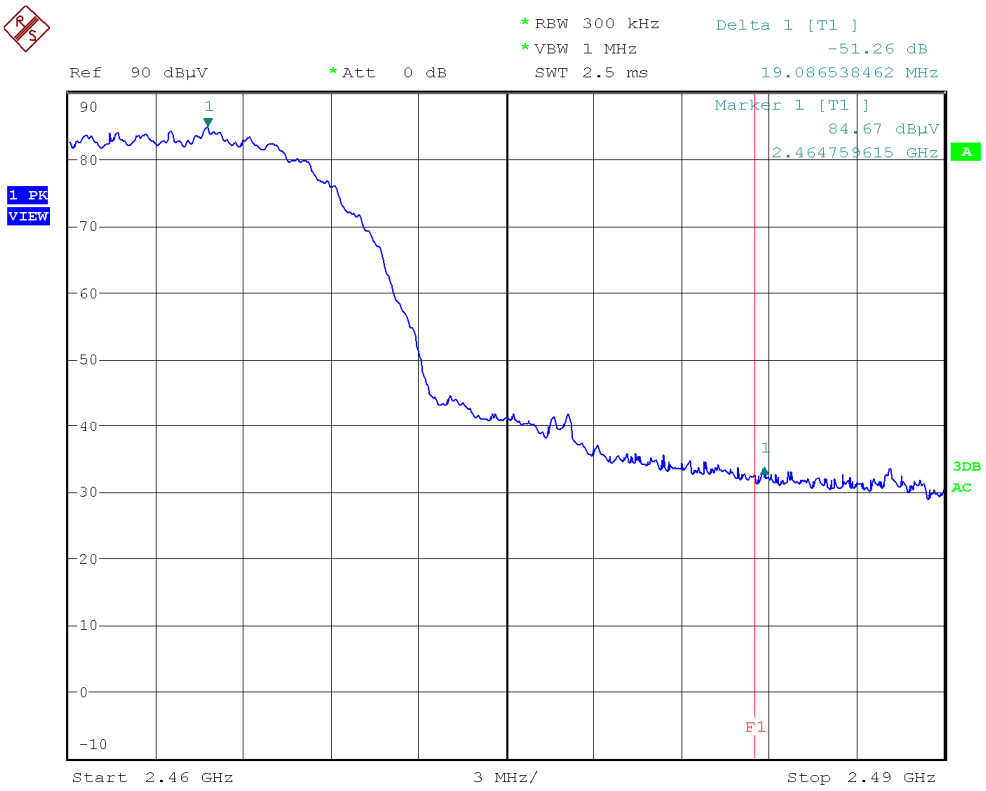
Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

Maximum field strength at 3 m. Average value.



Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

BAND-EDGE COMPLIANCE. RADIATED. Marker-Delta Method.



Note: No correction is applied for this relative measurement.

Band edge compliance of radiated emissions

Fundamental max. average value 3 m	Delta value	Calculated value 3 m	Limit
103.12 dBµV/m	51.26 dB	51.86 dBµV/m	54 dBµV/m

Fundamental max. Peak value 3 m	Delta value	Calculated value 3 m	Limit
109.87 dBµV/m	51.26 dB	58.61 dBµV/m	74 dBµV/m

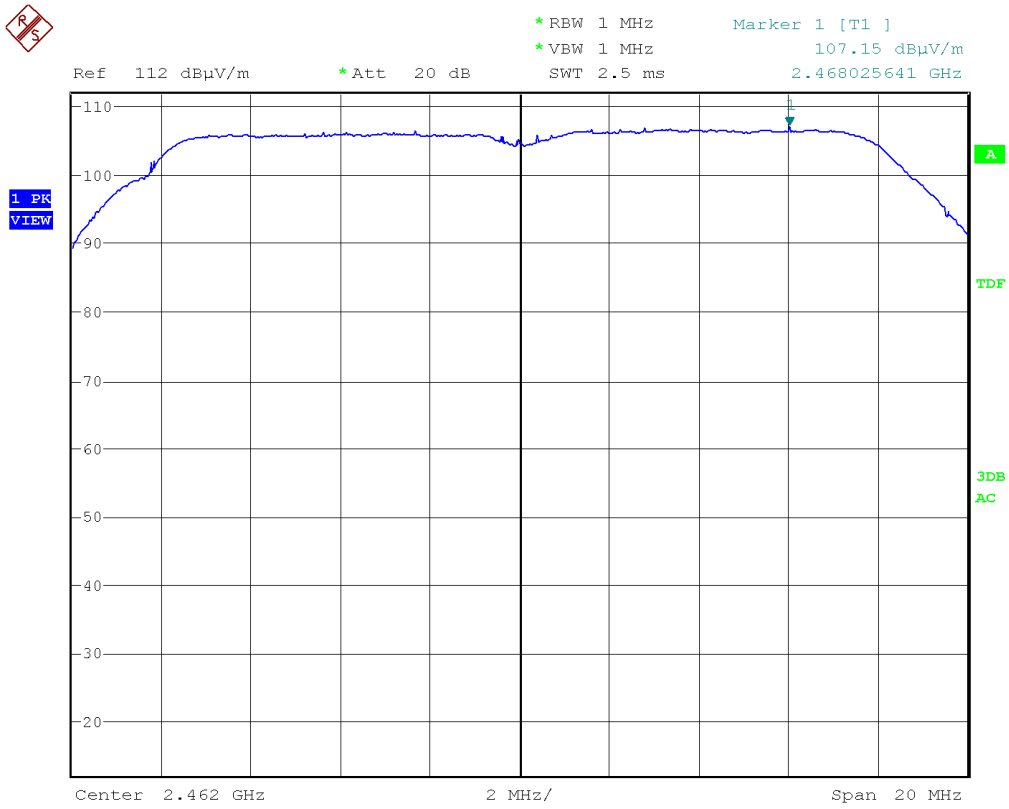
Verdict: PASS

2. OFDM Modulation

Preliminary tests were done with the equipment operating with OFDM modulation mode at 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps, and the worst case was for 6 Mbps bit rate. Results shown below correspond to 6 Mbps.

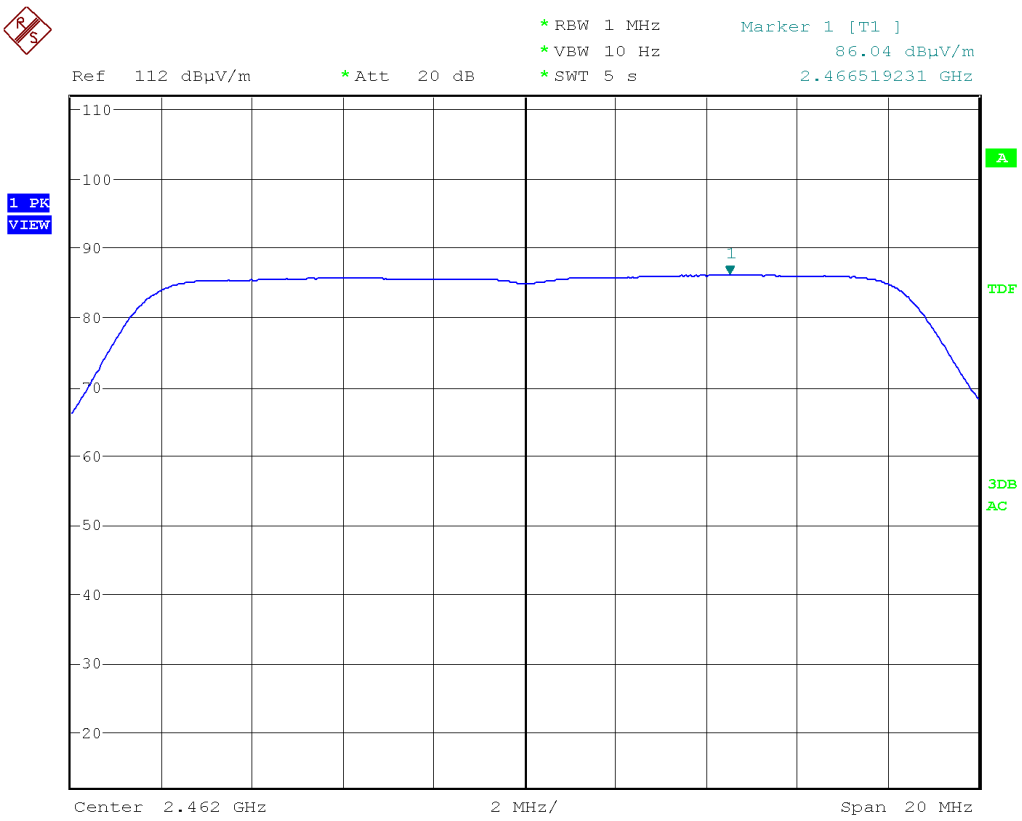
HIGHEST CHANNEL (2462 MHz):

Maximum field strength at 3 m. Peak value.



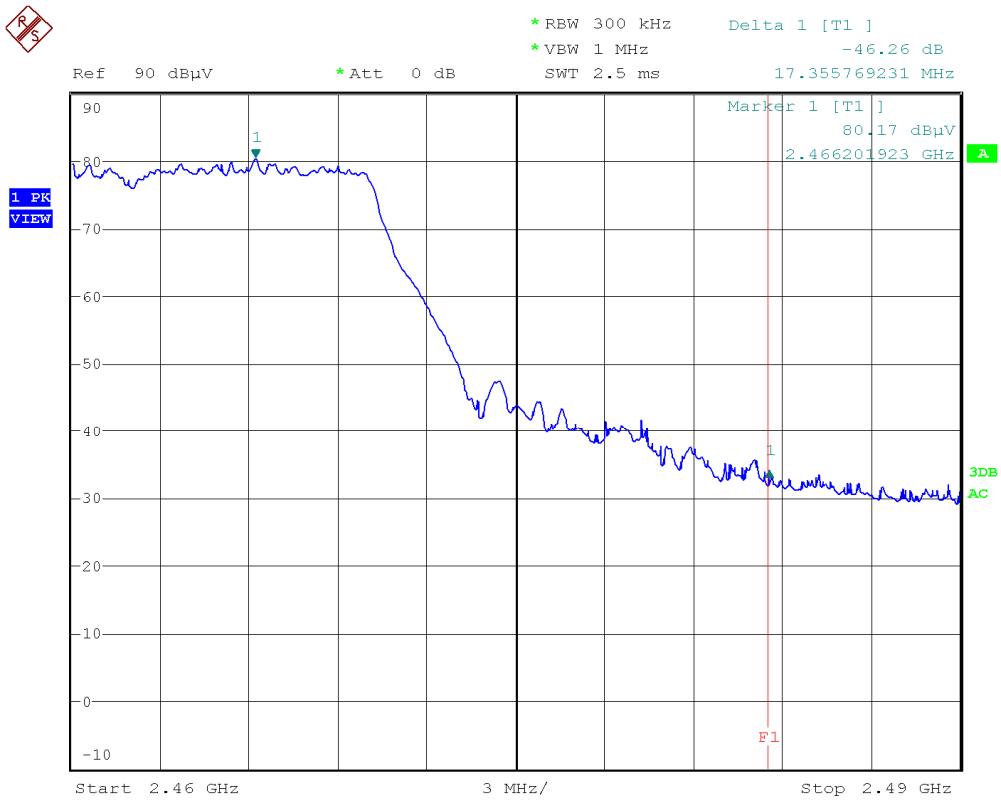
Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

Maximum field strength at 3 m. Average value.



Note: The correction factor is already included in the spectrum analyzer as a transducer factor so that the marker shows directly the field strength level.

BAND-EDGE COMPLIANCE. RADIATED. Marker-Delta Method.



Note: No correction is applied for this relative measurement.

Band edge compliance of radiated emissions

Fundamental max. average value 3 m	Delta value	Calculated value 3 m	Limit
86.04 dBµV/m	46.26 dB	39.78 dBµV/m	54 dBµV/m

Fundamental max. Peak value 3 m	Delta value	Calculated value 3 m	Limit
107.15 dBµV/m	46.26 dB	60.89 dBµV/m	74 dBµV/m

Verdict: PASS

Section 15.247 Subclause (d). Emission limitations radiated (Transmitter)

SPECIFICATION

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)):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

The equipment transmits continuously in the selected channel so it is not necessary a duty cycle correction factor.

Frequency range 30 MHz-1000 MHz.

The spurious signals detected do not depend on either the operating channel or the modulation mode.

Spurious signals at less than 20 dB below the limit:

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
148.5771	V	Quasi-Peak	28.44	± 3.8
298.2565	V	Quasi-Peak	31.10	± 3.8
348.7976	V	Quasi-Peak	36.26	± 3.8
358.5170	V	Quasi-Peak	45.92	± 3.8
399.3387	V	Quasi-Peak	27.56	± 3.8
449.8797	V	Quasi-Peak	35.19	± 3.8
479.0381	V	Quasi-Peak	36.74	± 3.8
500.4208	V	Quasi-Peak	37.85	± 3.8
539.2986	V	Quasi-Peak	32.40	± 3.8
550.9619	V	Quasi-Peak	32.79	± 3.8
564.5691	V	Quasi-Peak	28.20	± 3.8
576.2325	V	Quasi-Peak	29.40	± 3.8
587.8958	V	Quasi-Peak	28.54	± 3.8
599.5591	V	Quasi-Peak	33.19	± 3.8
650.1002	V	Quasi-Peak	29.49	± 3.8
659.8196	V	Quasi-Peak	33.52	± 3.8
700.6413	V	Quasi-Peak	31.21	± 3.8
720.0801	V	Quasi-Peak	32.28	± 3.8
784.2284	V	Quasi-Peak	30.56	± 3.8

Frequency range 1 GHz-25 GHz

DSSS Modulation

Preliminary tests were done with the equipment operating with DSSS modulation mode at 1 Mbps, 2 Mbps, 5.5 Mbps and 11 Mbps and the worst case was for 5.5 Mbps bit rate. Results shown below correspond to 5.5 Mbps.

1. CHANNEL: LOWEST (2412 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3216.089	V	Peak	47.99	± 4.0
	V	Average	36.21	± 4.0
4824.0235	V	Peak	47.72	± 4.0
	V	Average	33.90	± 4.0
6431.8910	V	Peak	56.12	± 4.0
	V	Average	38.27	± 4.0
7246.5762	V	Peak	58.50	± 4.0
	V	Average	49.80	± 4.0

2. CHANNEL: MIDDLE (2437 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3249.3910	V	Peak	47.36	± 4.0
	V	Average	36.78	± 4.0
4874.03846	V	Peak	52.66	± 4.0
	V	Average	37.69	± 4.0
6498.8782	V	Peak	55.26	± 4.0
	V	Average	48.82	± 4.0

3. CHANNEL: HIGHEST (2462 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3282.7885	V	Peak	49.16	± 4.0
	V	Average	38.58	± 4.0
4923.9808	V	Peak	45.05	± 4.0
	V	Average	32.47	± 4.0
6565.5769	V	Peak	54.24	± 4.0
	V	Average	48.53	± 4.0

Verdict: PASS

OFDM Modulation

Preliminary tests were done with the equipment operating with OFDM modulation mode at 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps, and the worst case was for 6 Mbps bit rate. Results shown below correspond to 6 Mbps.

1. CHANNEL: LOWEST (2412 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3216.0544	V	Peak	48.32	± 4.0
	V	Average	38.72	± 4.0
4824.0839	V	Peak	42.96	± 4.0
	V	Average	32.07	± 4.0
6431.9602	V	Peak	56.98	± 4.0
	V	Average	49.84	± 4.0

2. CHANNEL: MIDDLE (2437 MHz).

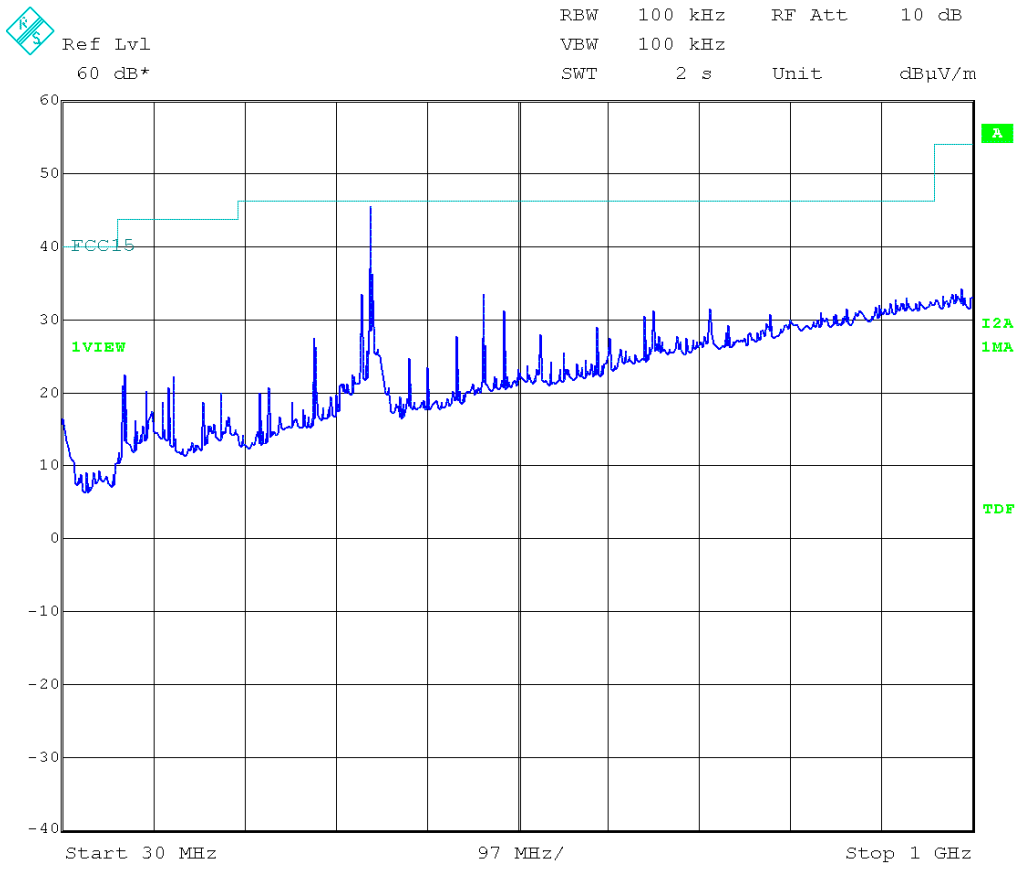
Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3249.3686	V	Peak	48.12	± 4.0
	V	Average	37.68	± 4.0
4871.5304	V	Peak	48.59	± 4.0
	V	Average	37.95	± 4.0
6498.8006	V	Peak	55.81	± 4.0
	V	Average	49.09	± 4.0

3. CHANNEL: HIGHEST (2462 MHz).

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
3282.6679	V	Peak	48.78	± 4.0
	V	Average	40.23	± 4.0
4923.8994	V	Peak	41.47	± 4.0
	V	Average	31.61	± 4.0
6565.3846	V	Peak	52.14	± 4.0
	V	Average	45.03	± 4.0

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

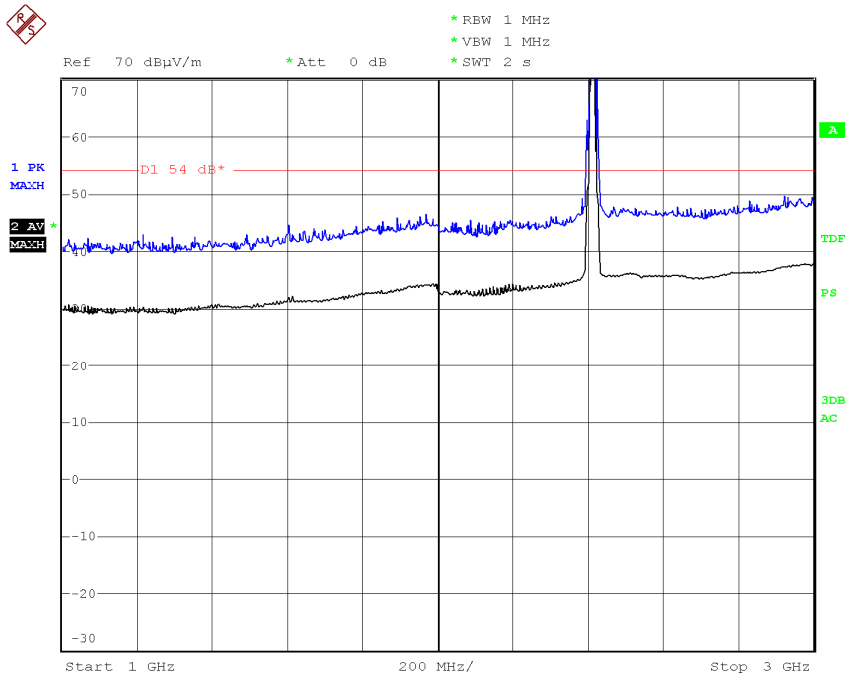


(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 1 GHz to 3 GHz.

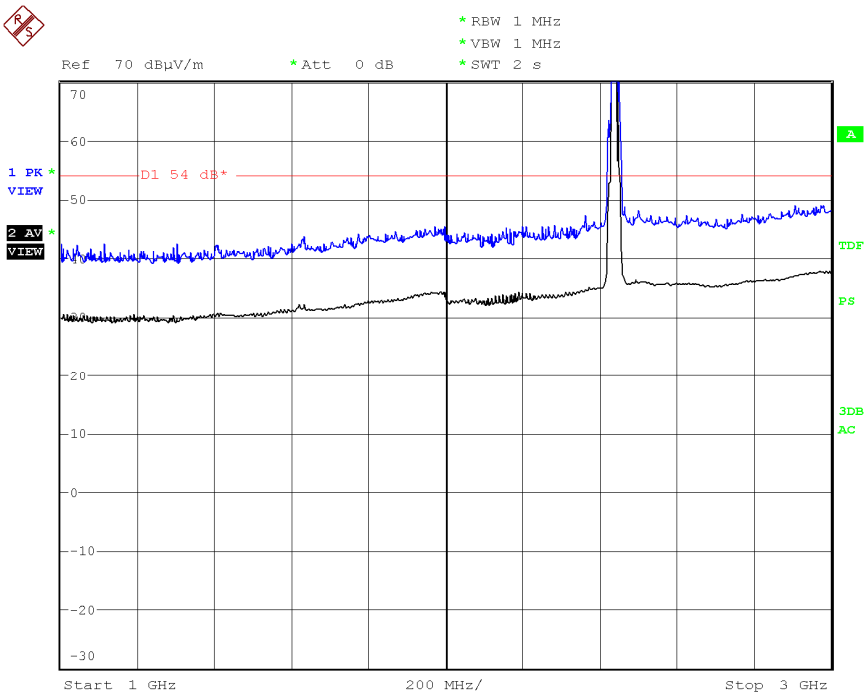
1. DSSS modulation

CHANNEL: Lowest (2412 MHz).



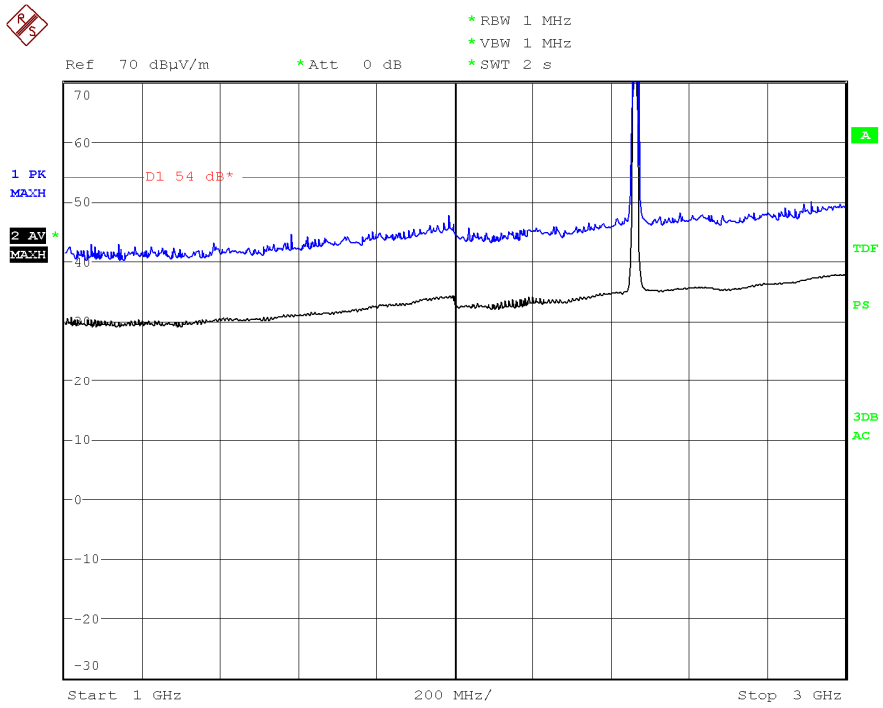
Note: The peak above the limit is the carrier frequency.

CHANNEL: Middle (2437 MHz).



Note: The peak above the limit is the carrier frequency.

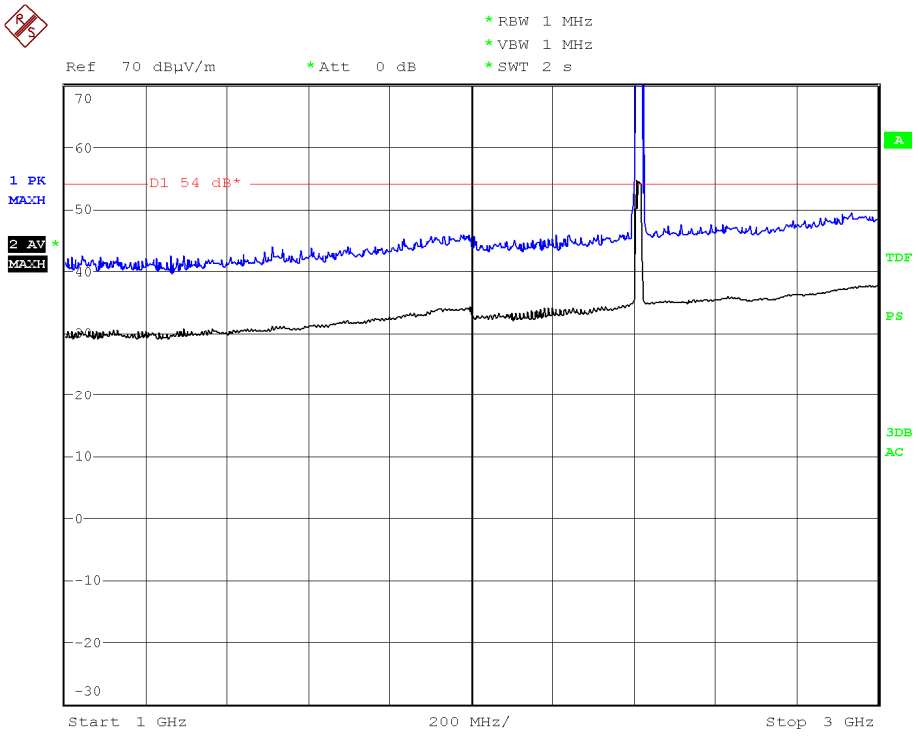
CHANNEL: Highest (2462 MHz).



Note: The peak above the limit is the carrier frequency.

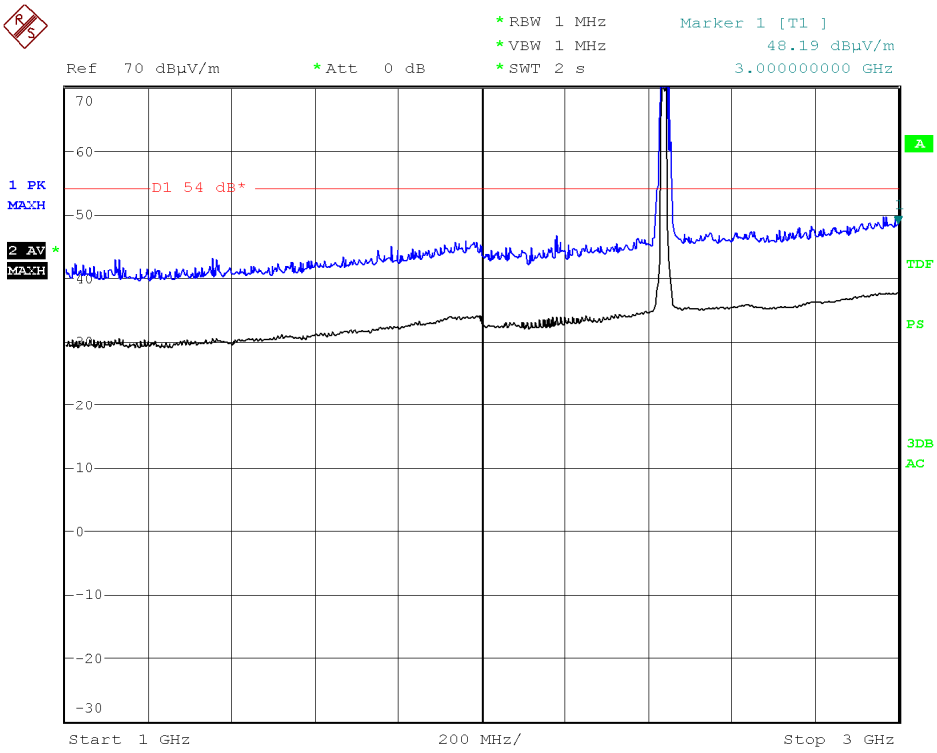
2. OFDM modulation

CHANNEL: Lowest (2412 MHz).



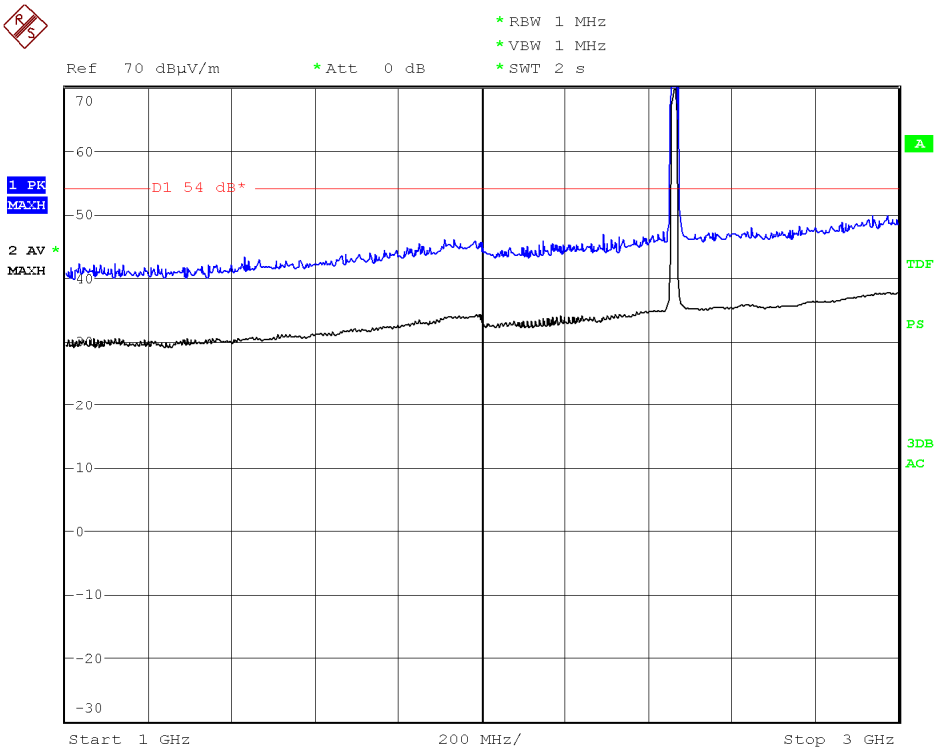
Note: The peak above the limit is the carrier frequency.

CHANNEL: Middle (2437 MHz).



Note: The peak above the limit is the carrier frequency.

CHANNEL: Highest (2462 MHz).

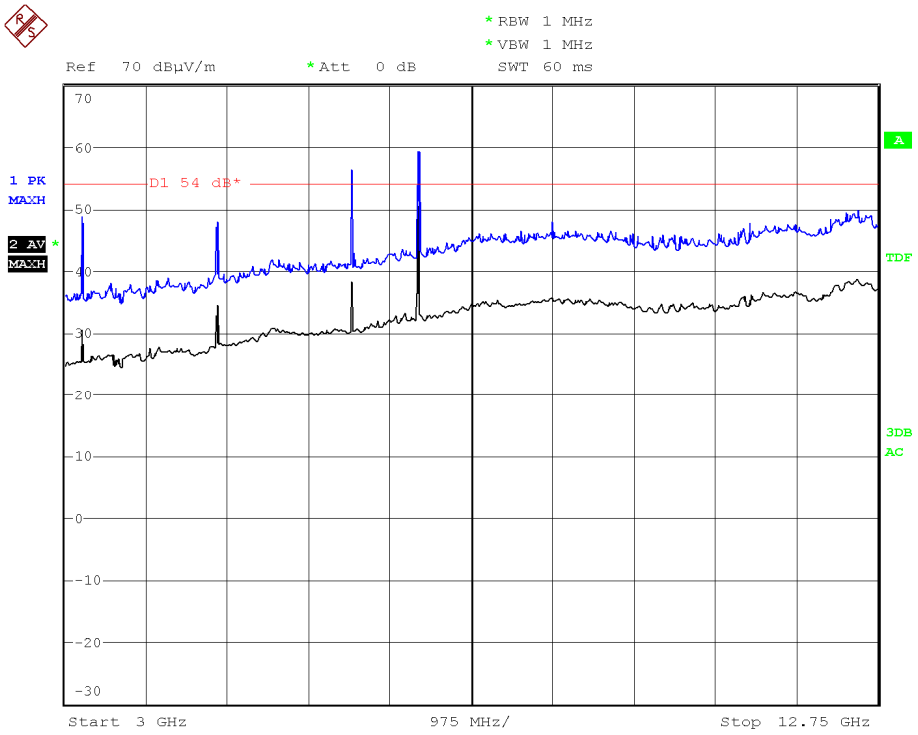


Note: The peak above the limit is the carrier frequency.

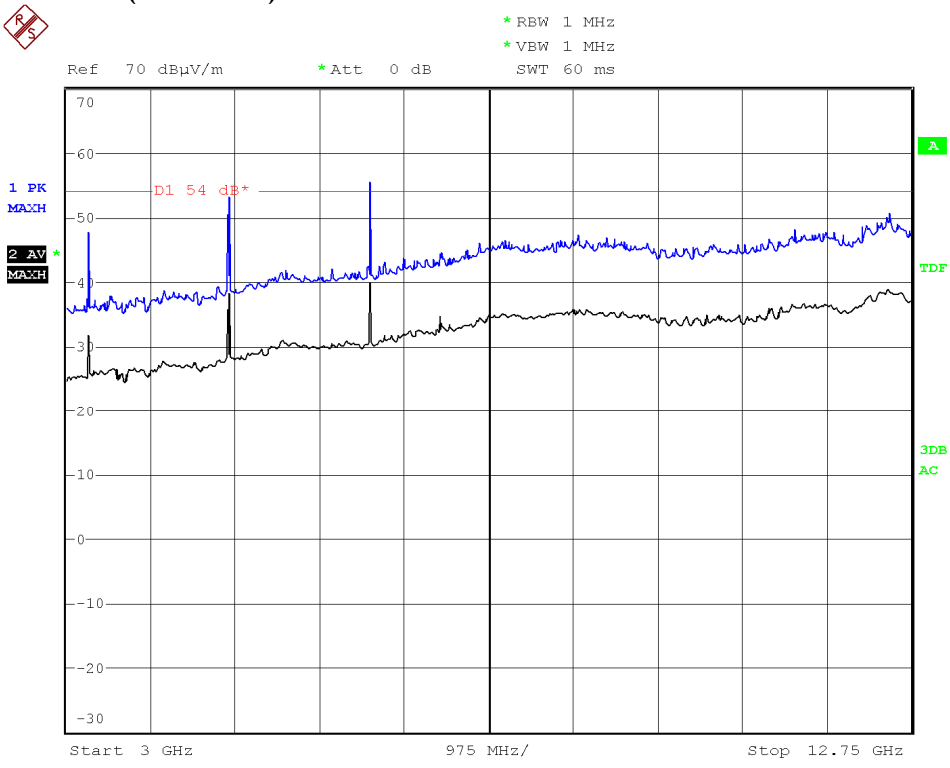
FREQUENCY RANGE 3 GHz to 12.75 GHz.

1. DSSS modulation

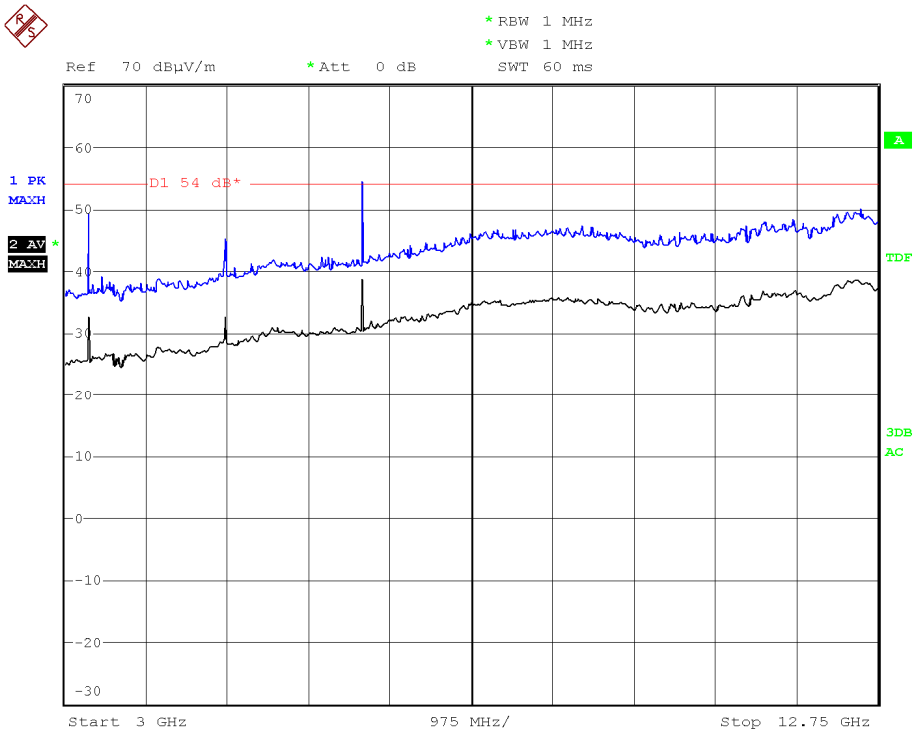
CHANNEL: Lowest (2412 MHz).



CHANNEL: Middle (2437 MHz).

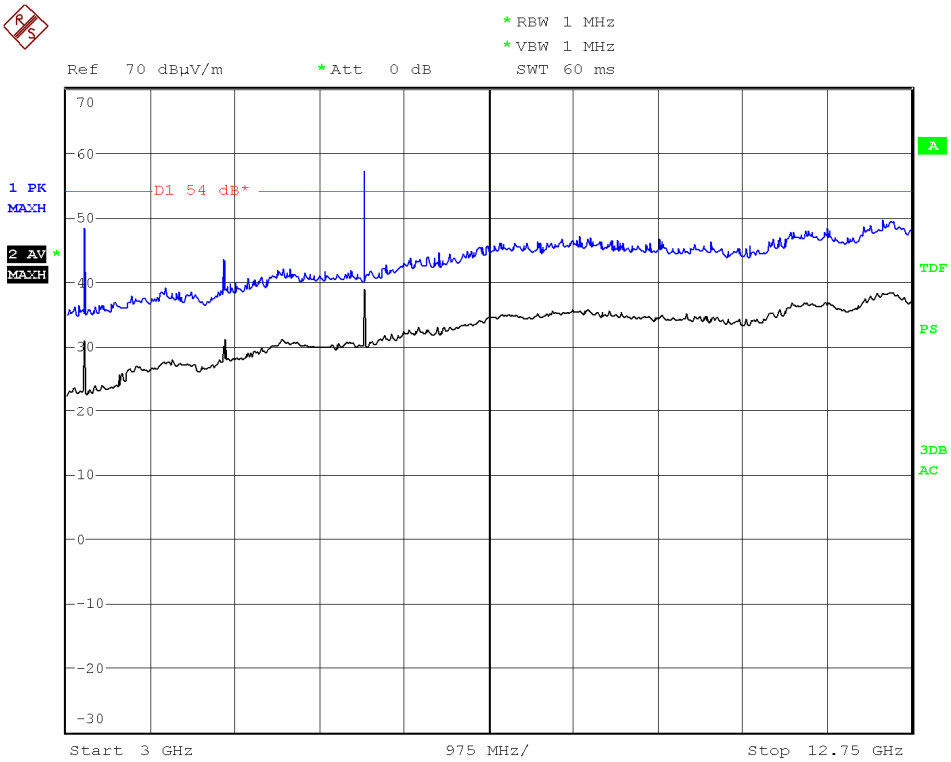


CHANNEL: Highest (2462 MHz).

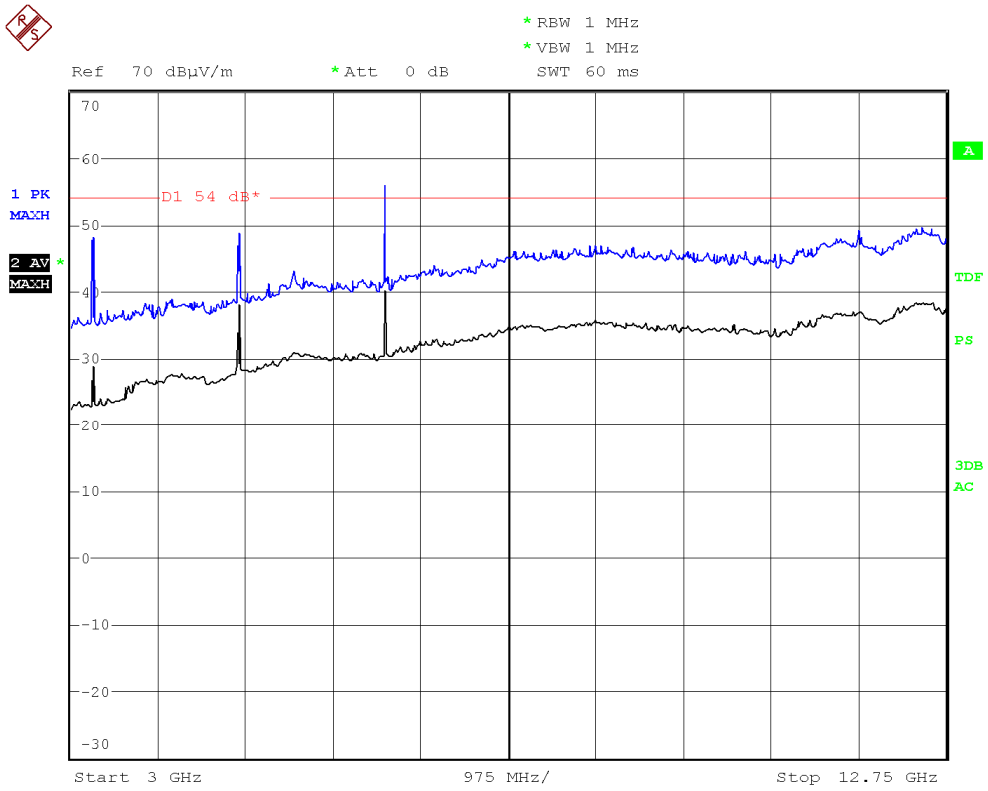


2. OFDM modulation

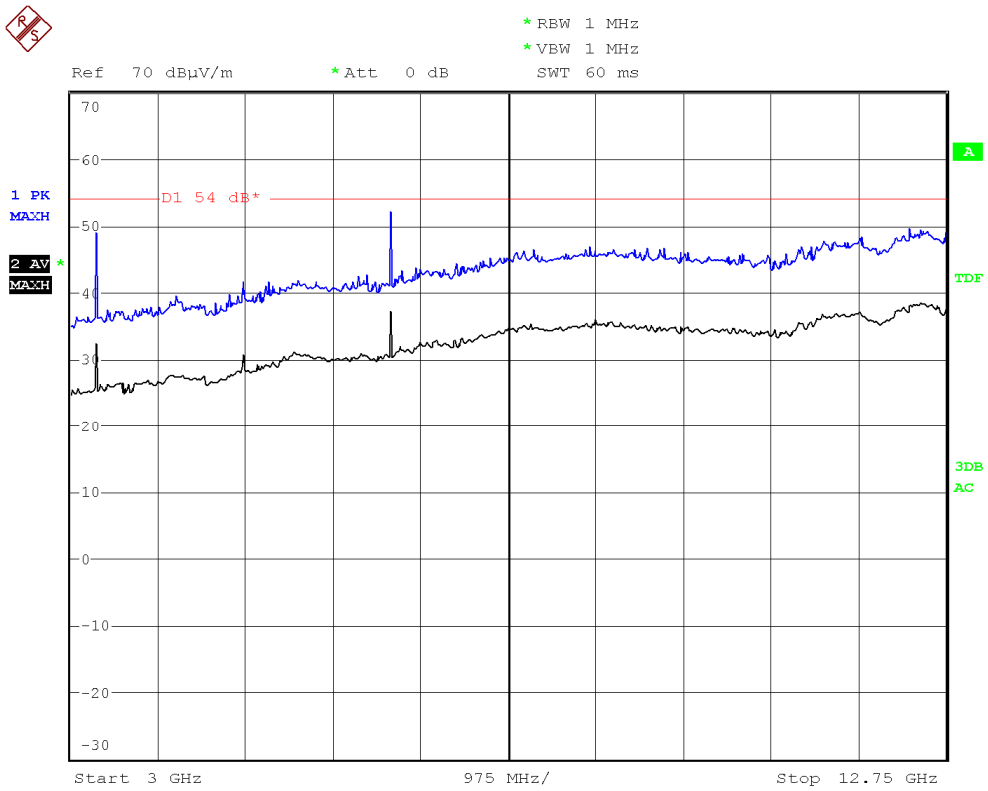
CHANNEL: Lowest (2412 MHz).



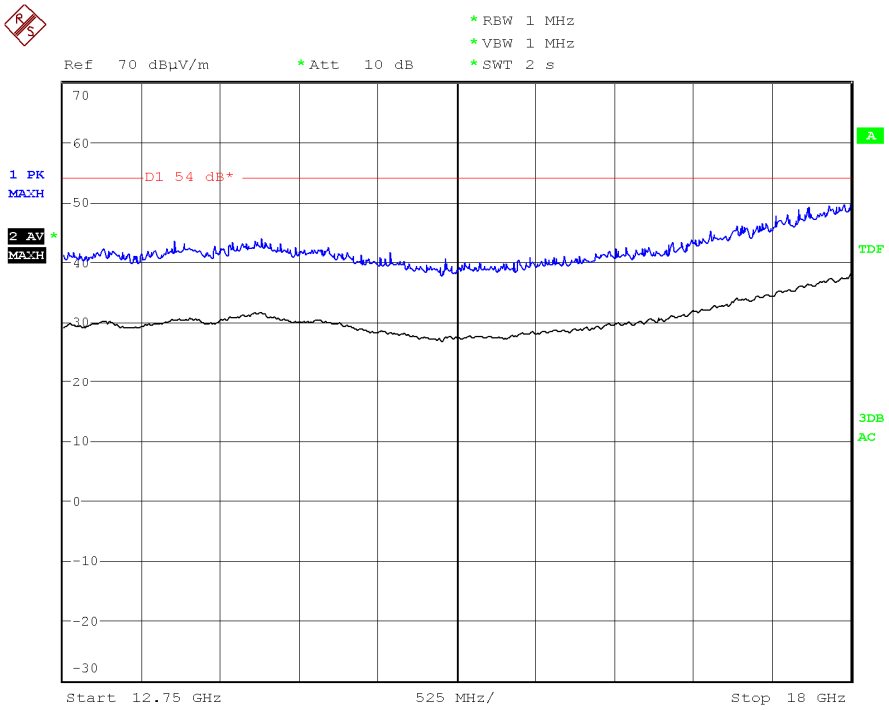
CHANNEL: Middle (2437 MHz).



CHANNEL: Highest (2462 MHz).

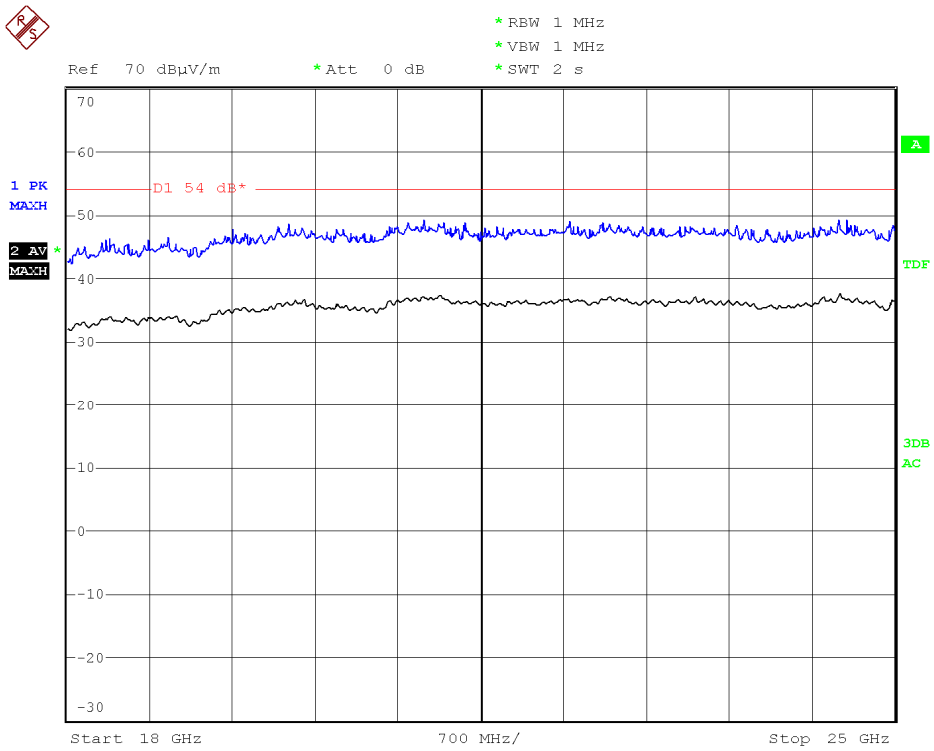


FREQUENCY RANGE 12.75 GHz to 18 GHz.



(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 18 GHz to 25 GHz.

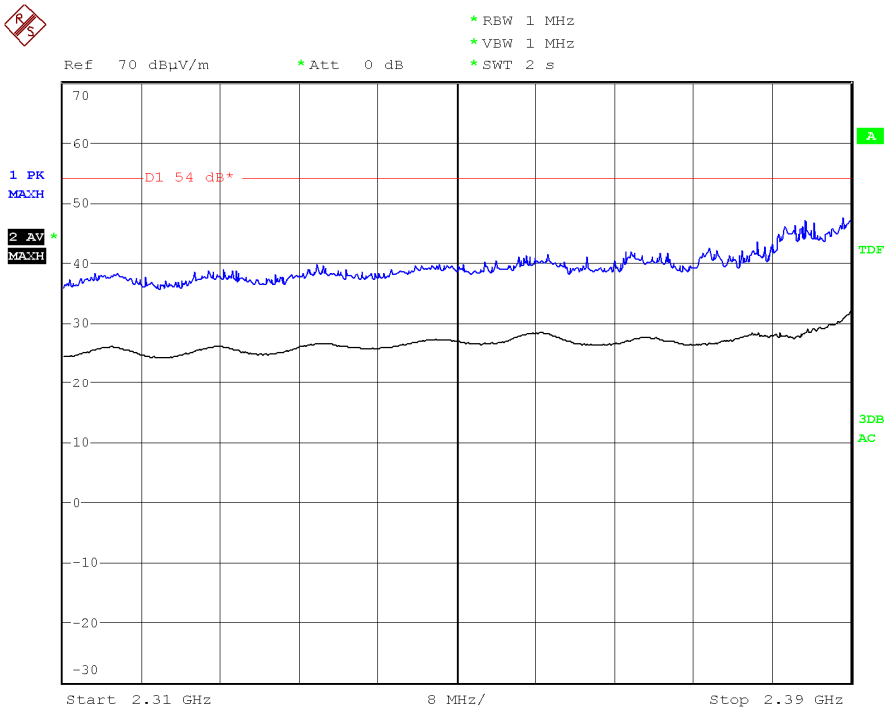


(This plot is valid for all three channels and all modulation modes).

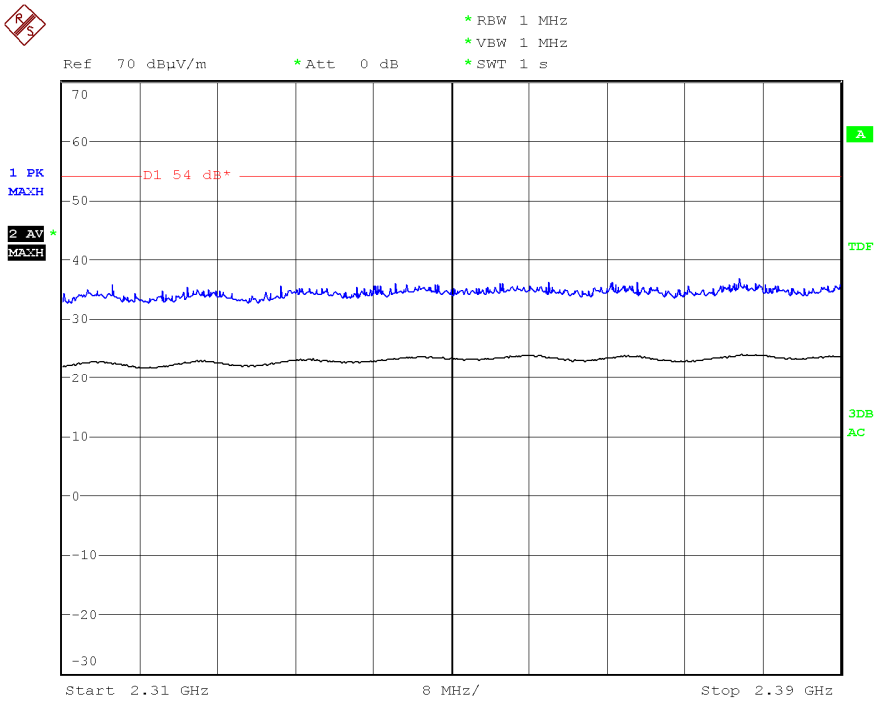
FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

1. DSSS Modulation

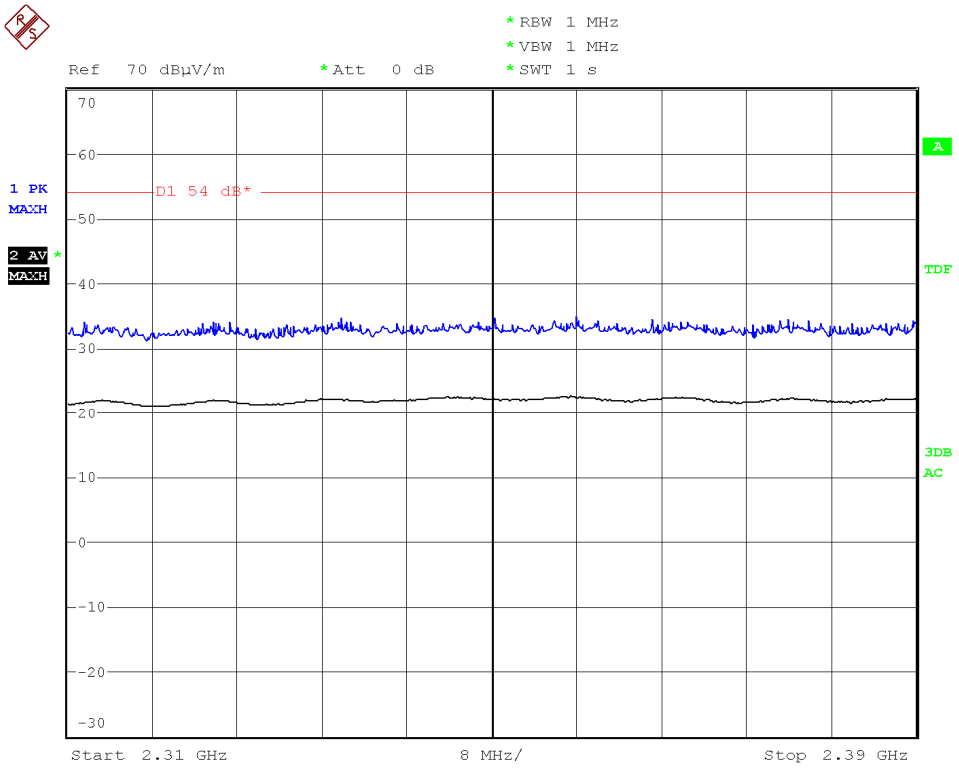
CHANNEL: Lowest (2412 MHz).



CHANNEL: Middle (2437 MHz).

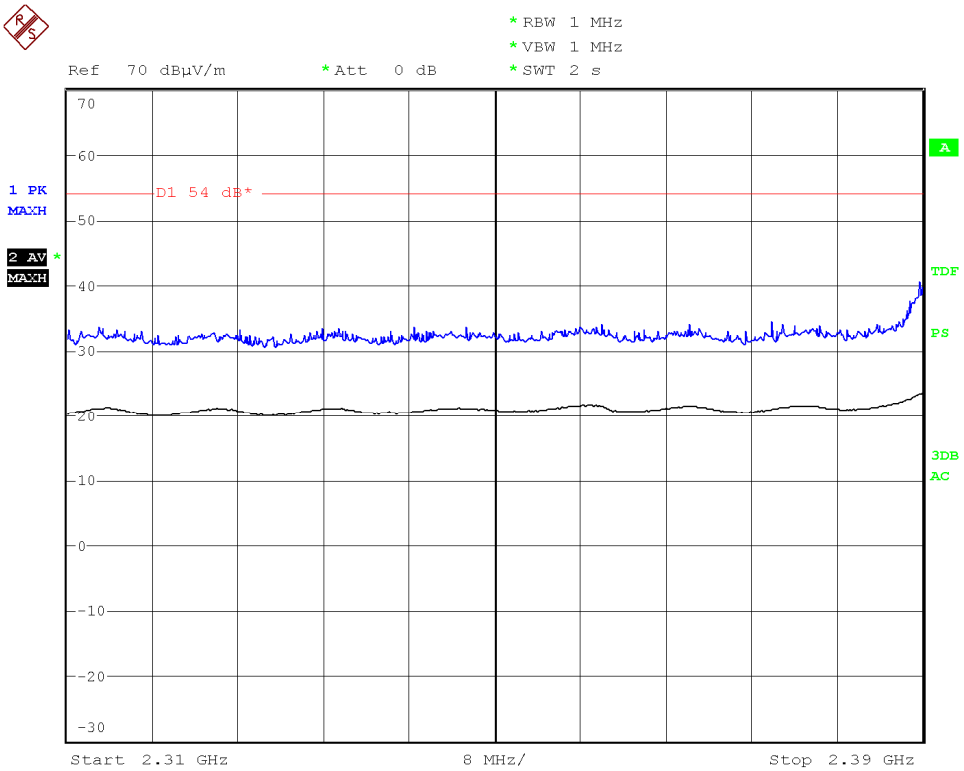


CHANNEL: Highest (2462 MHz).

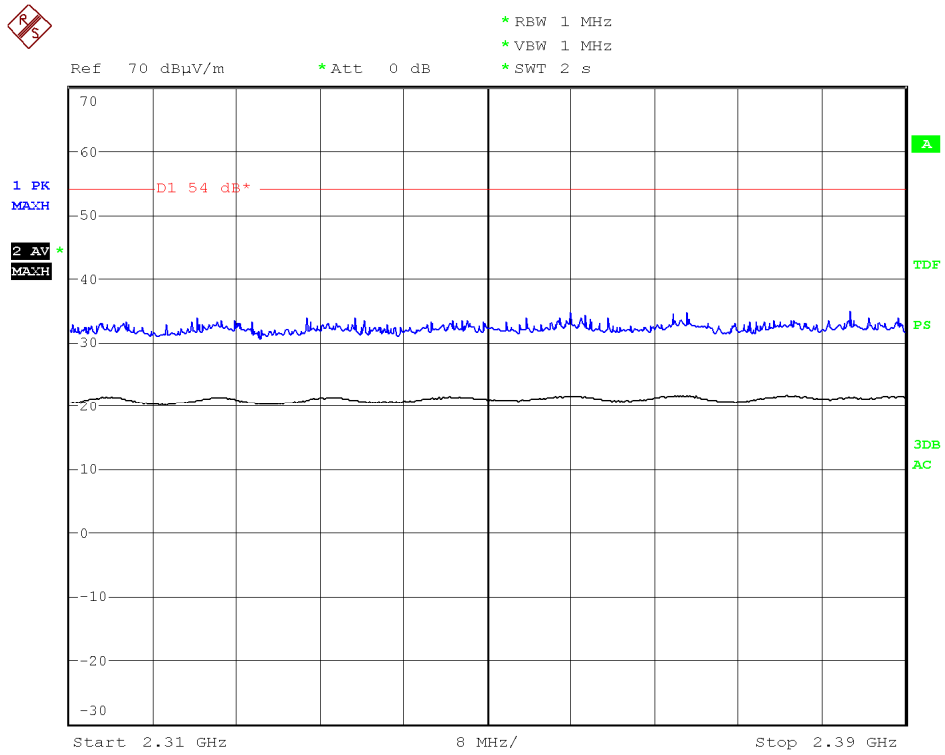


2. OFDM Modulation

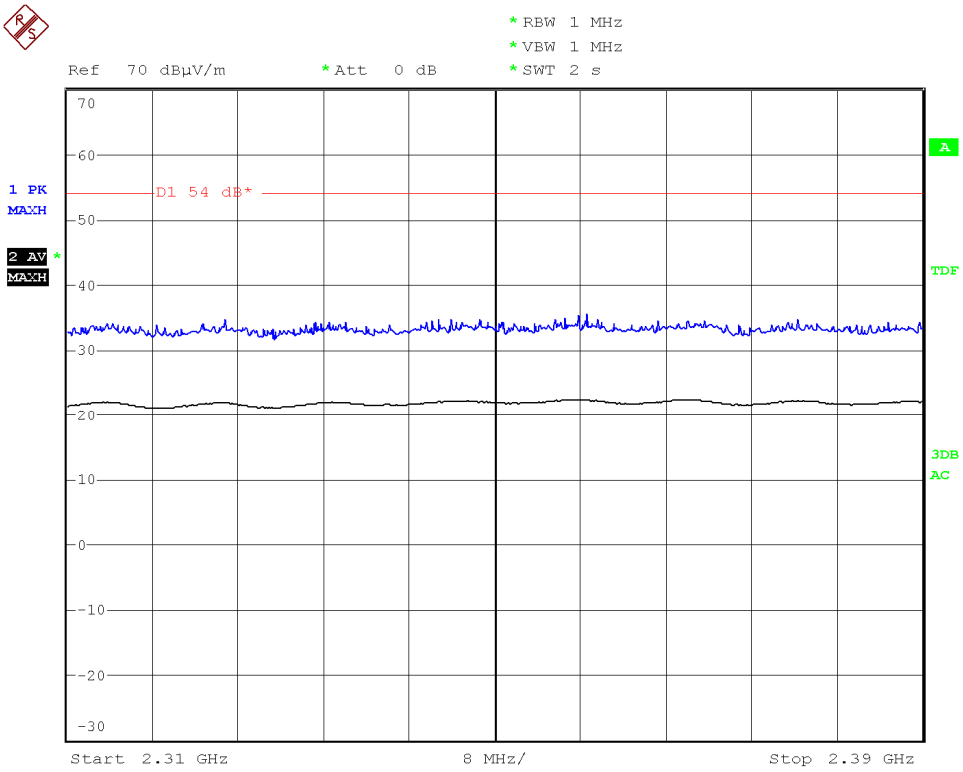
CHANNEL: Lowest (2412 MHz).



CHANNEL: Middle (2437 MHz).



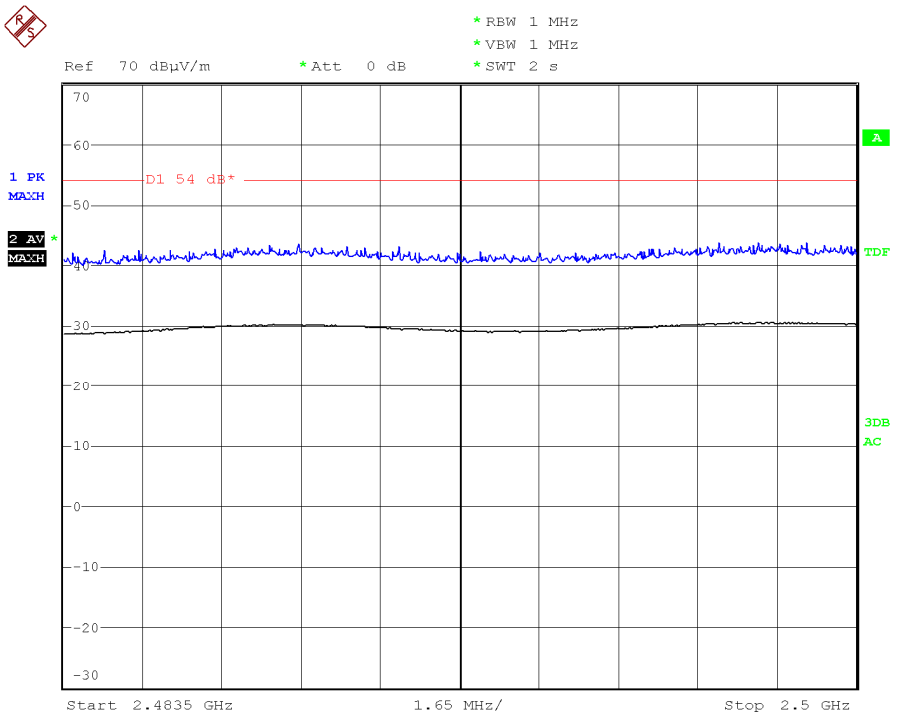
CHANNEL: Highest (2462 MHz).



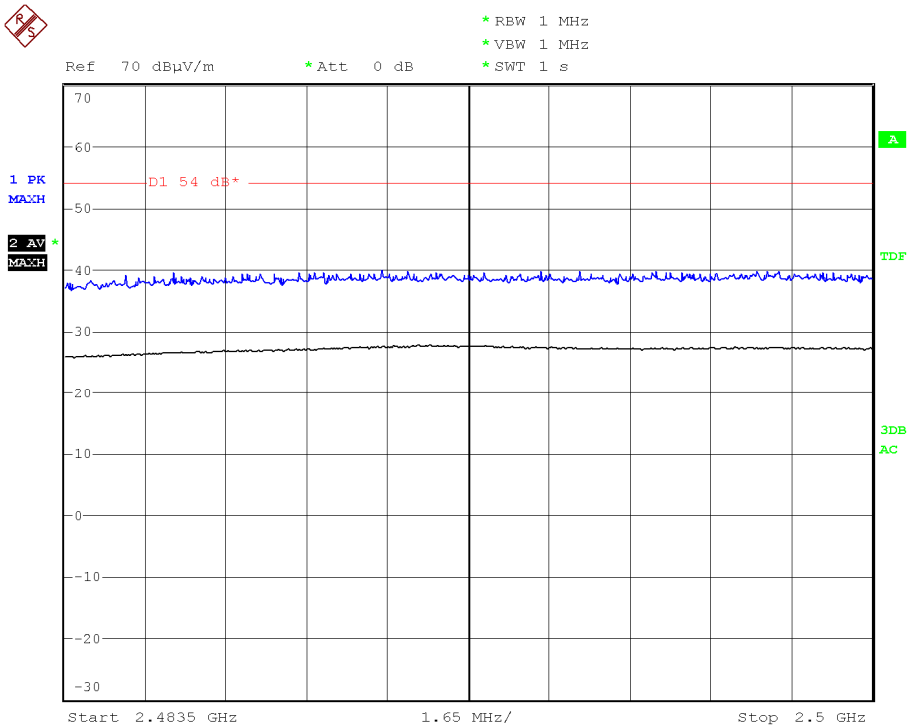
FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

1. DSSS Modulation

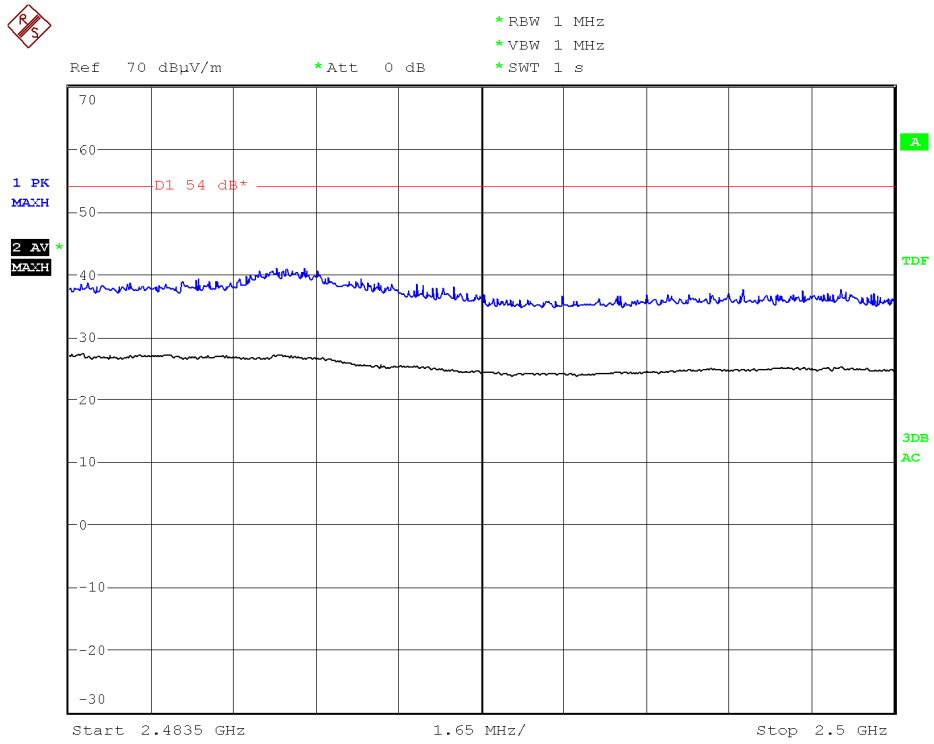
CHANNEL: Lowest (2412 MHz).



CHANNEL: Middle (2437 MHz).

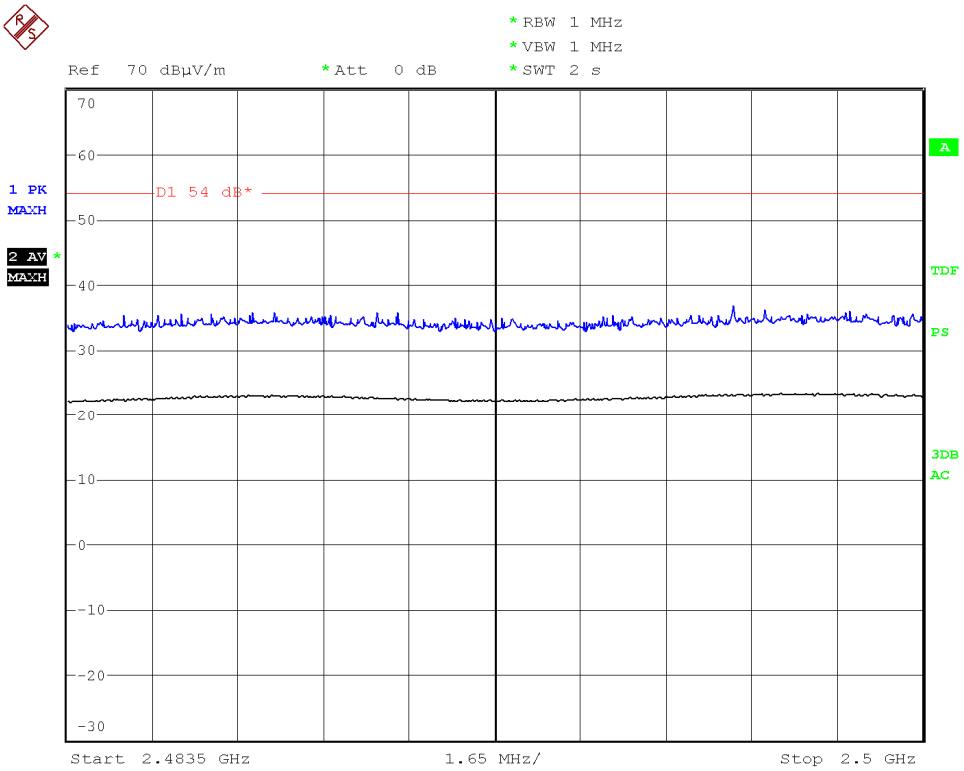


CHANNEL: Highest (2462 MHz).

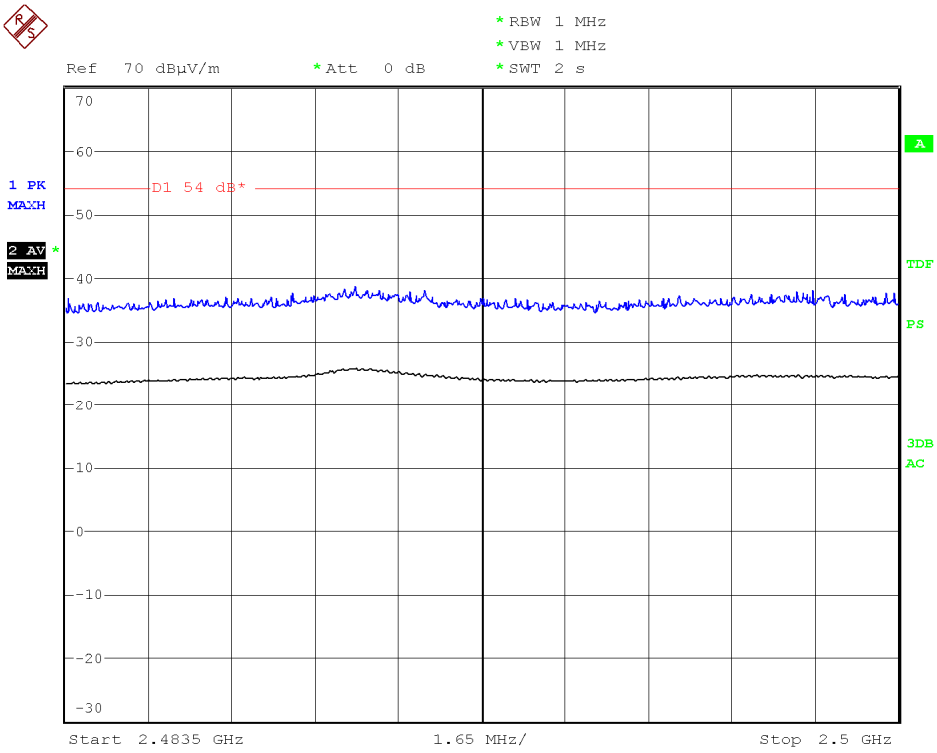


2. OFDM Modulation

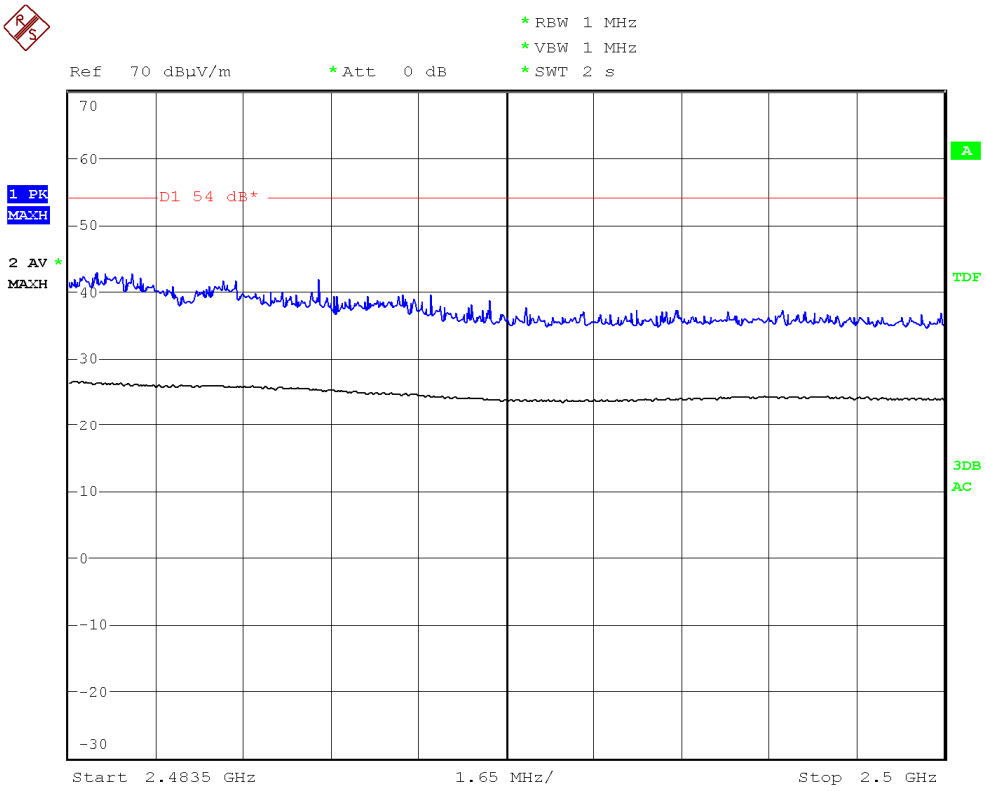
CHANNEL: Lowest (2412 MHz).



CHANNEL: Middle (2437 MHz).



CHANNEL: Highest (2462 MHz).



Section 15.109. Receiver spurious radiation

SPECIFICATION

The field strength shall not exceed the following values:

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyser. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Frequency range 30 MHz-1000 MHz.

The spurious signals detected do not depend on either the operating channel or the modulation mode.

Spurious signals at less than 20 dB below the limit:

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
148.5771	V	Quasi-Peak	24.97	± 3.8
298.2565	V	Quasi-Peak	28.98	± 3.8
348.7976	V	Quasi-Peak	35.93	± 3.8
358.5170	V	Quasi-Peak	45.83	± 3.8
362.4048	V	Quasi-Peak	31.61	± 3.8
368.2365	V	Quasi-Peak	30.78	± 3.8
399.3387	V	Quasi-Peak	28.77	± 3.8
449.8797	V	Quasi-Peak	34.85	± 3.8
479.0381	V	Quasi-Peak	36.94	± 3.8
500.4208	V	Quasi-Peak	37.81	± 3.8
550.9619	V	Quasi-Peak	32.29	± 3.8
559.5591	V	Quasi-Peak	30.98	± 3.8
650.1002	V	Quasi-Peak	31.52	± 3.8
659.8196	V	Quasi-Peak	31.50	± 3.8
700.6413	V	Quasi-Peak	31.55	± 3.8
720.0801	V	Quasi-Peak	31.33	± 3.8
799.7795	V	Quasi-Peak	32.54	± 3.8
840.6012	V	Quasi-Peak	33.29	± 3.8

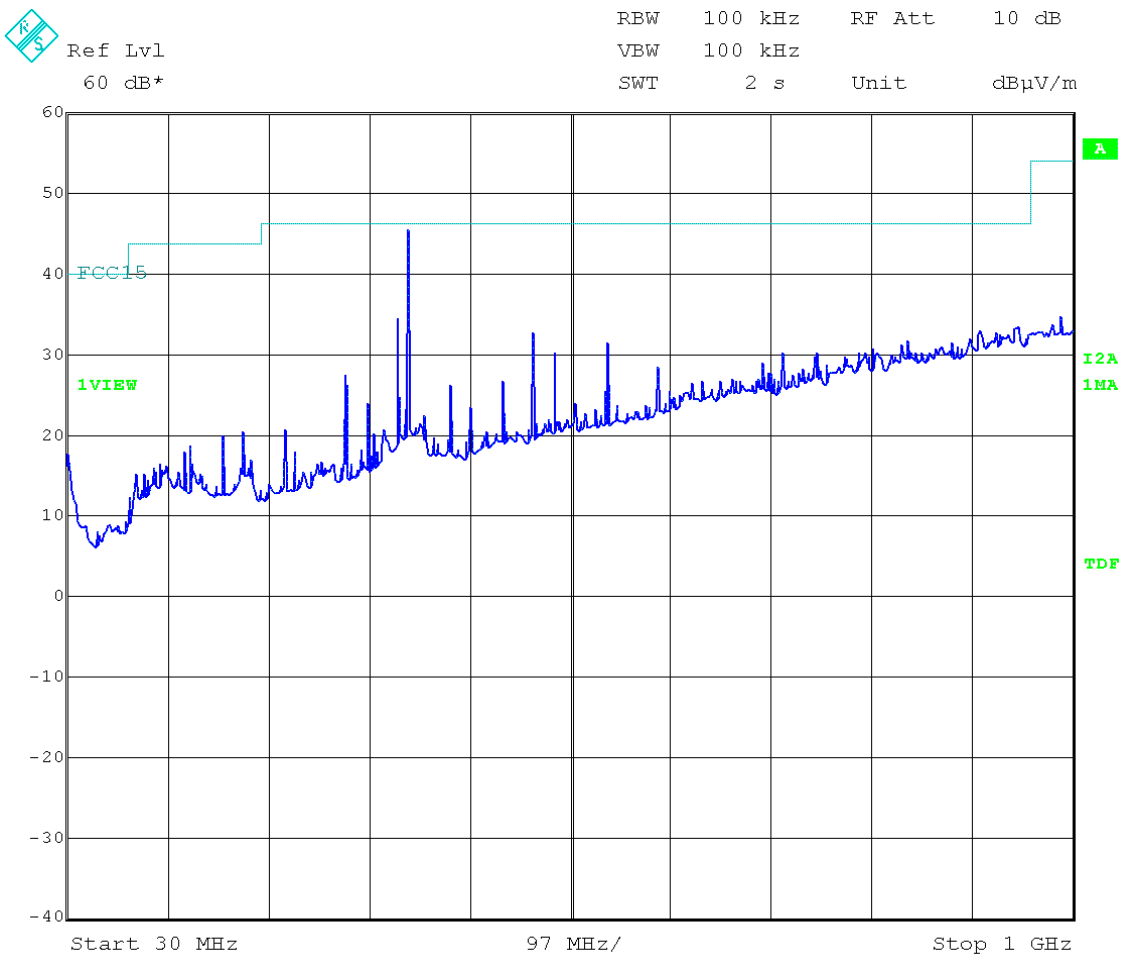
Frequency range 1 GHz-25 GHz

The spurious signals detected do not depend on either the operating channel or the modulation mode.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
1608.0096	V	Peak	37.14	± 4.0
	V	Average	28.33	± 4.0
3216.0367	V	Peak	51.49	± 4.0
	V	Average	49.11	± 4.0

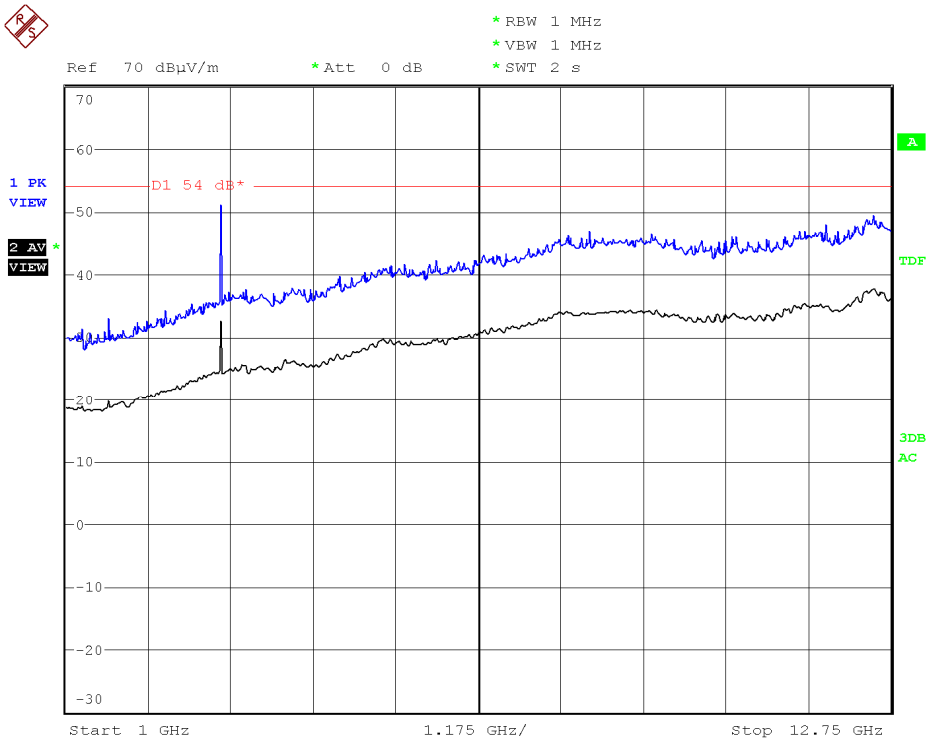
Verdict: PASS.

FREQUENCY RANGE 30 MHz-1000 MHz.



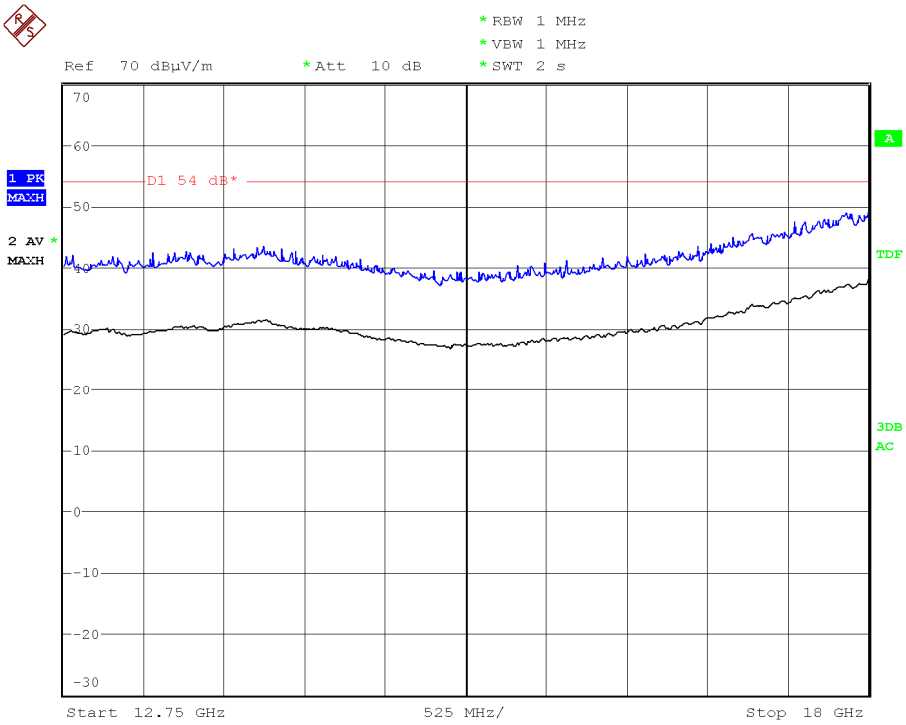
(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 1 GHz-12.75 GHz.



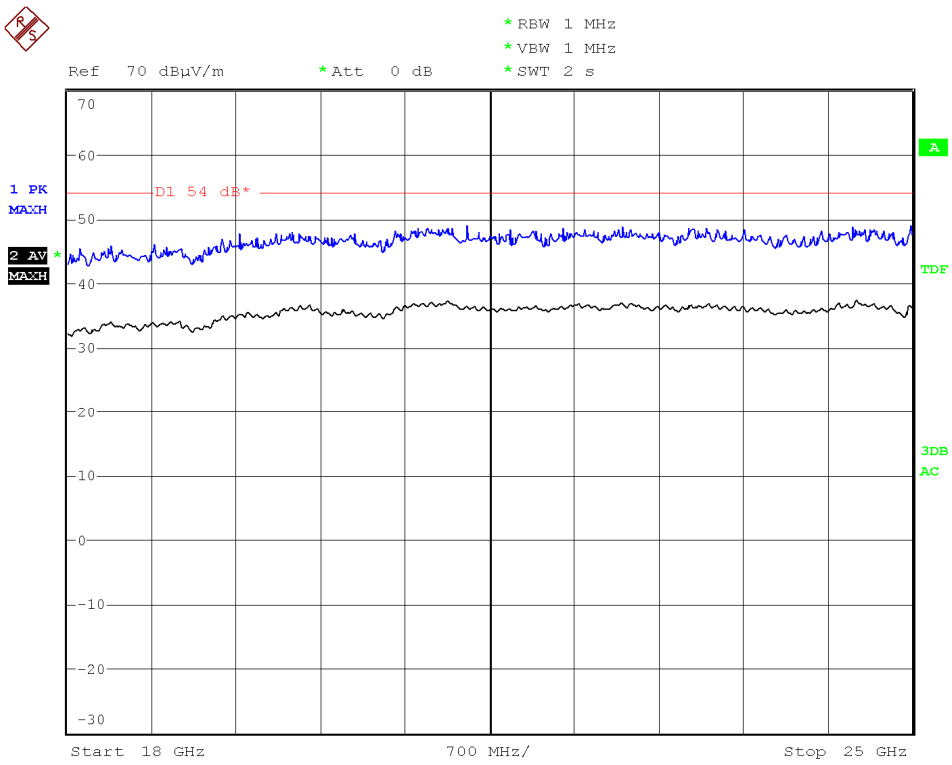
(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 12.75 GHz-18 GHz.



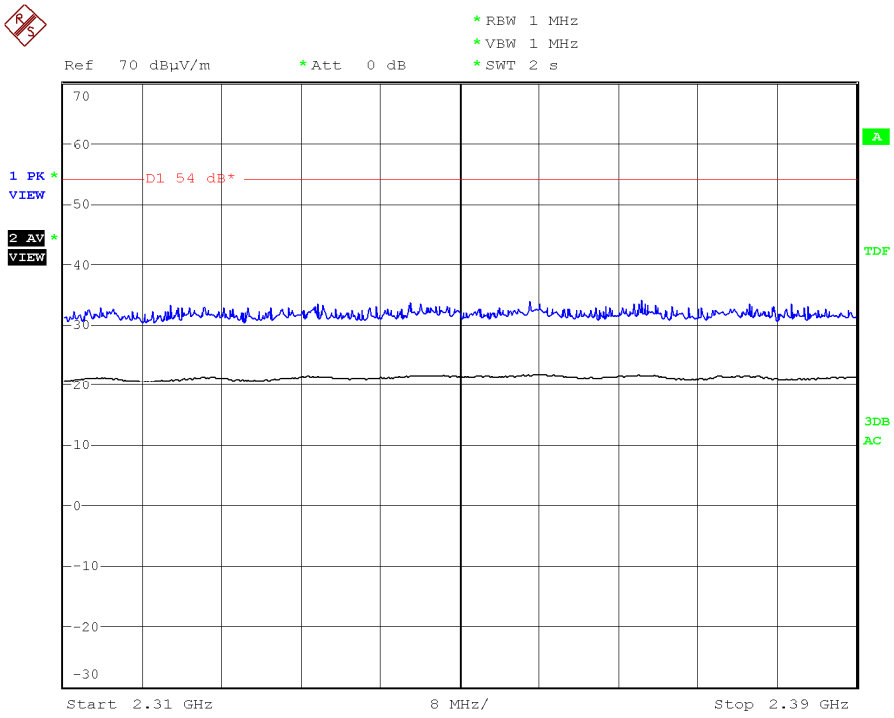
(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 18 GHz-25 GHz.



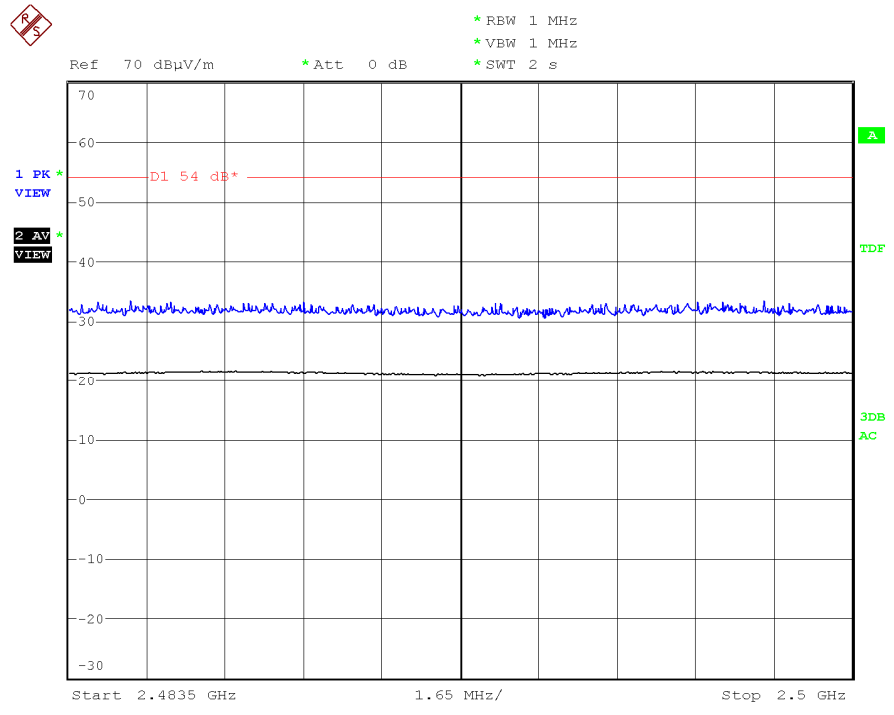
(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)



(This plot is valid for all three channels and all modulation modes).

FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)



(This plot is valid for all three channels and all modulation modes).

APPENDIX B: Measuring results for electromagnetic conducted emission

CONTENT:

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

In the following table appears the operation modes used by the samples tested to that it refers the present test report.

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. IDLE mode. Power Supply Voltage: 115Vac. WiFi RX mode. Bluetooth RX mode.
OM#02	EUT ON. Transmission mode. Power Supply Voltage: 115Vac. WiFi TX mode. Bluetooth TX mode. Ethernet TX mode.

CONTINUOUS CONDUCTED EMISSION ON POWER LEADS

LIMITS:	Product standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B.
	Test standard :	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B.

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	**Limit (dBµV)**	
	Quasi-peak	**Average**
0,15 to 0,5	66-56	56-46
0,5 to 5	56	46
5 to 30	60	50

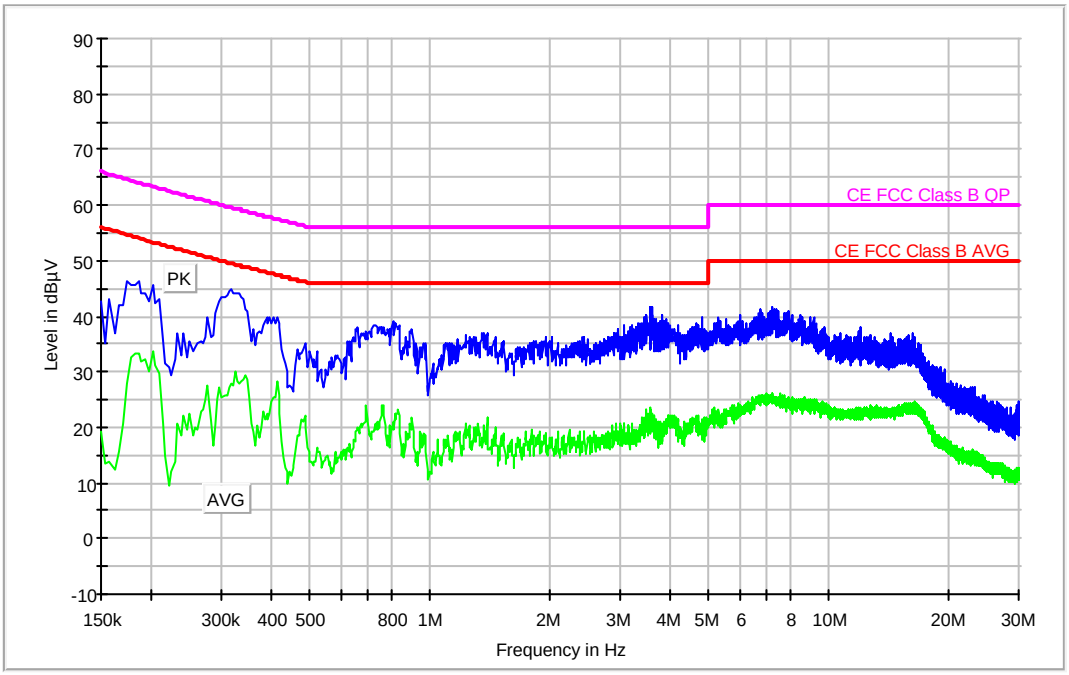
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01 & OM#02
TEST RESULTS :	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	**Description**	**Result**
CC0101L1	Phase noise	P
CC01010N	Neutral noise	P
CC0102L1	Phase noise	P
CC01020N	Neutral noise	P

Continuous Conducted emission : CC0101L1	Detector : Peak / Average / Cuasi-peak

Proyect:	30893iem.001
Company:	POLAR ELECTRO OY
Sample:	S/01
Operation mode:	OM#01
Date:	2010-02-08 20:51
Setup:	EMI conducted
Mode:	EUT ON. Wifi RX mode. Bluetooth RX mode. Phase noise.

EC FCC Class B ESIB26 CC



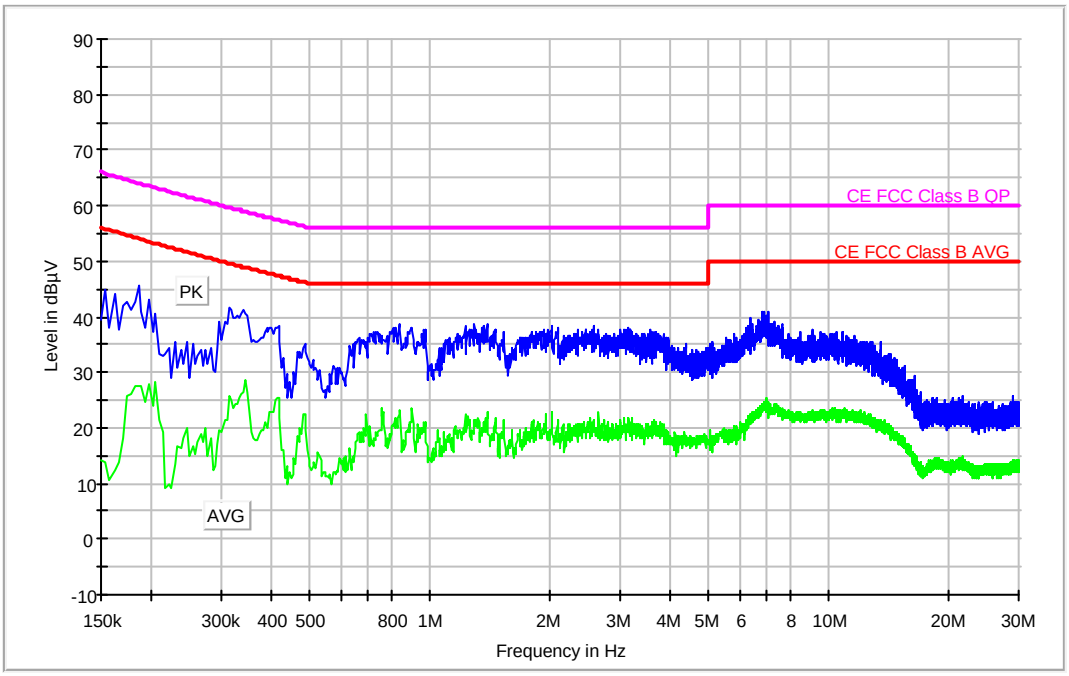
Result Table_Single

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.174000	46.4	28.0
0.318000	44.7	27.9
0.398000	39.8	22.6
0.810000	39.0	21.2
0.902000	37.7	21.2
1.398000	37.0	21.8
3.218000	38.3	20.7
3.558000	41.7	23.3
7.250000	41.6	25.1
8.506000	40.2	24.2
16.310000	36.9	24.1
19.458000	30.4	17.3

Continuous Conducted emission : CC01010N	Detector : Peak / Average / Cuasi-peak

Proyect: 30893iem.001
Company: POLAR ELECTRO OY
Sample: S/01
Operation mode: OM#01
Date: 2010-02-08 20:51
Setup: EMI conducted
Mode: EUT ON. Wifi RX mode. Bluetooth RX mode. Neutral noise.

EC FCC Class B ESIB26 CC



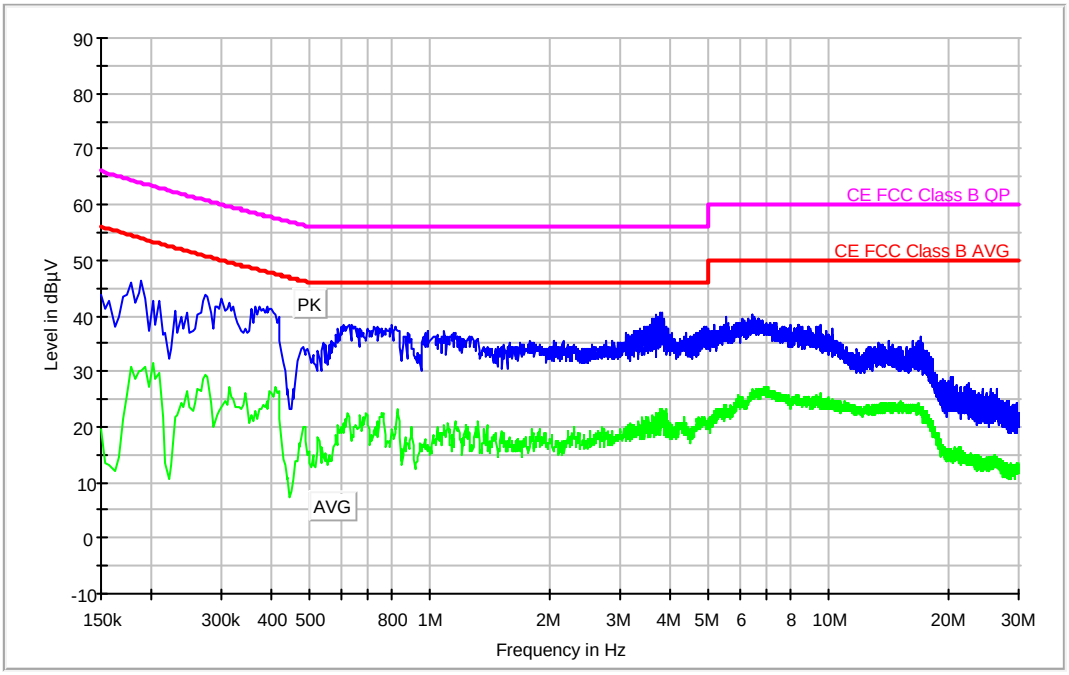
Result Table_Single

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.186000	45.5	27.5
0.314000	41.5	25.7
0.418000	38.4	25.2
0.838000	38.8	22.6
1.294000	38.9	21.3
1.394000	38.7	21.7
2.574000	38.4	21.5
3.570000	37.7	20.0
7.070000	41.1	24.4
9.102000	37.5	22.1
12.954000	35.5	21.5
29.130000	25.7	13.9

Continuous Conducted emission : CC0102L1	Detector : Peak / Average / Cuasi-peak

Proyect:	30893iem.001
Company:	POLAR ELECTRO OY
Sample:	S/01
Operation mode:	OM#02
Date:	2010-02-08 21:02
Setup:	EMI conducted
Mode:	EUT ON. Wifi TX mode. Bluetooth TX mode. ETHERNET TX mode. Phase noise.

EC FCC Class B ESIB26 CC



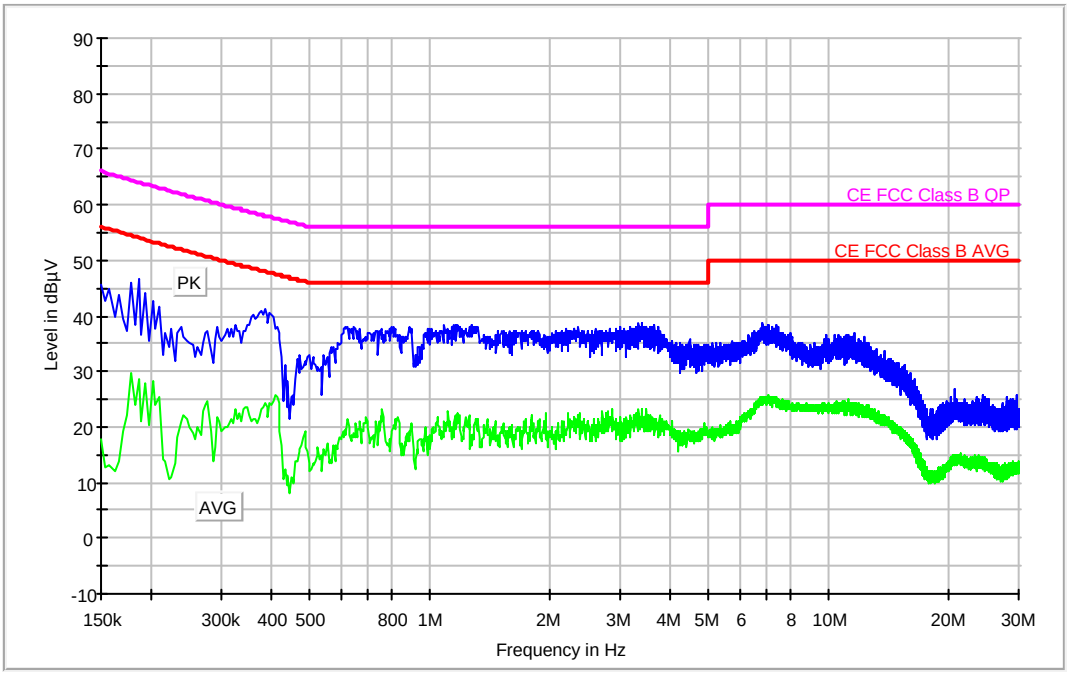
Result Table_Single

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.190000	46.2	30.0
0.274000	43.6	29.5
0.390000	41.8	24.8
0.638000	38.5	18.6
1.090000	37.3	20.4
2.058000	35.4	16.3
3.286000	37.4	19.6
3.834000	40.6	23.1
6.430000	40.0	26.3
8.386000	38.4	24.6
16.990000	36.4	23.4
20.350000	29.1	15.5

Continuous Conducted emission : CC01020N	Detector : Peak / Average / Cuasi-peak

Proyect: 30893iem.001
Company: POLAR ELECTRO OY
Sample: S/01
Operation mode: OM#02
Date: 2010-02-08 21:07
Setup: EMI conducted
Mode: EUT ON. Wifi TX mode. Bluetooth TX mode. ETHERNET TX mode. Neutral noise.

EC FCC Class B ESIB26 CC



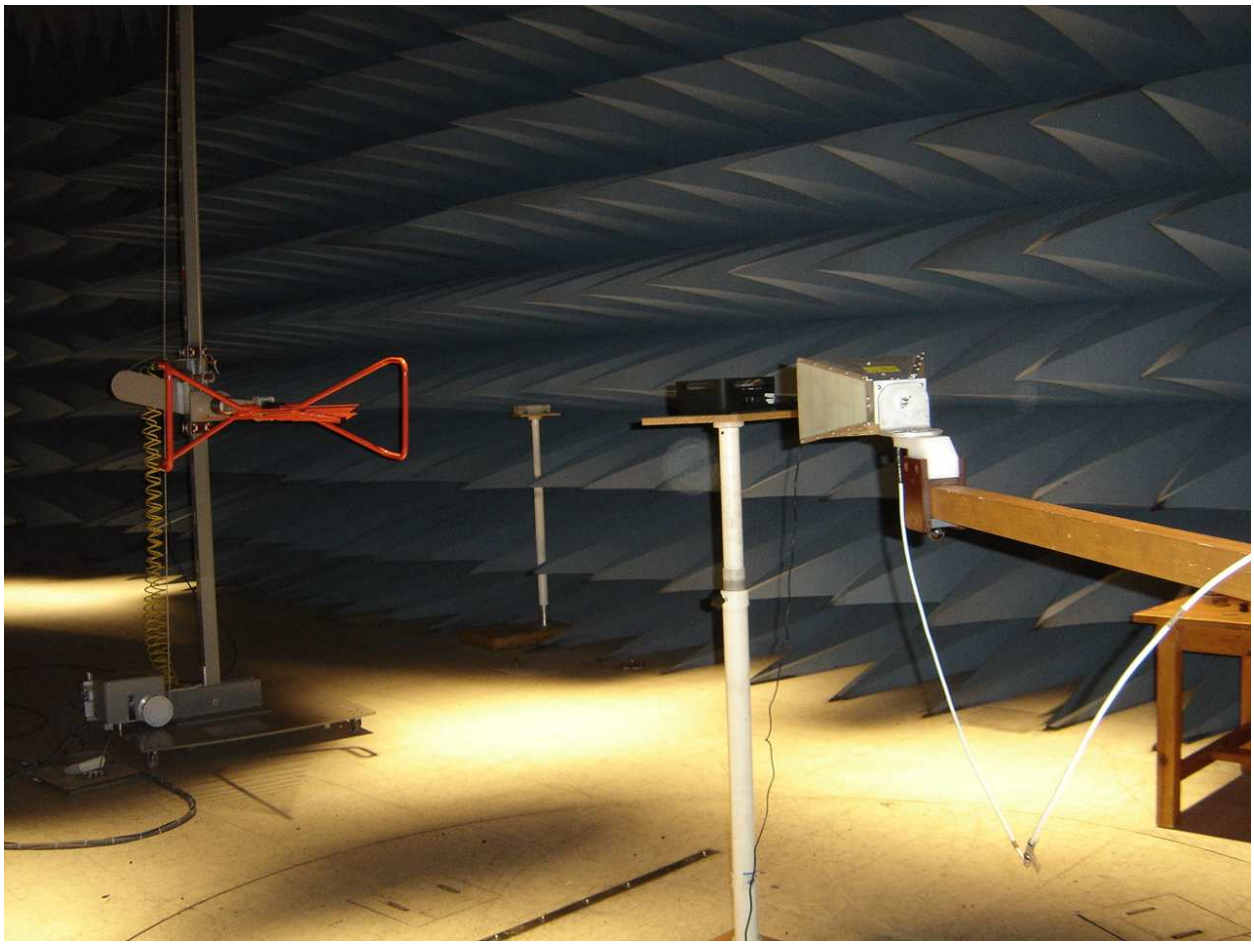
Result Table_Single

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.186000	46.7	28.6
0.362000	40.1	21.6
0.386000	41.1	24.2
0.810000	38.2	20.1
1.170000	38.5	21.9
1.878000	37.4	20.4
3.190000	38.2	21.9
3.350000	38.7	23.3
6.846000	38.6	24.7
11.666000	37.0	23.8
12.646000	35.2	22.7
20.826000	26.8	14.2

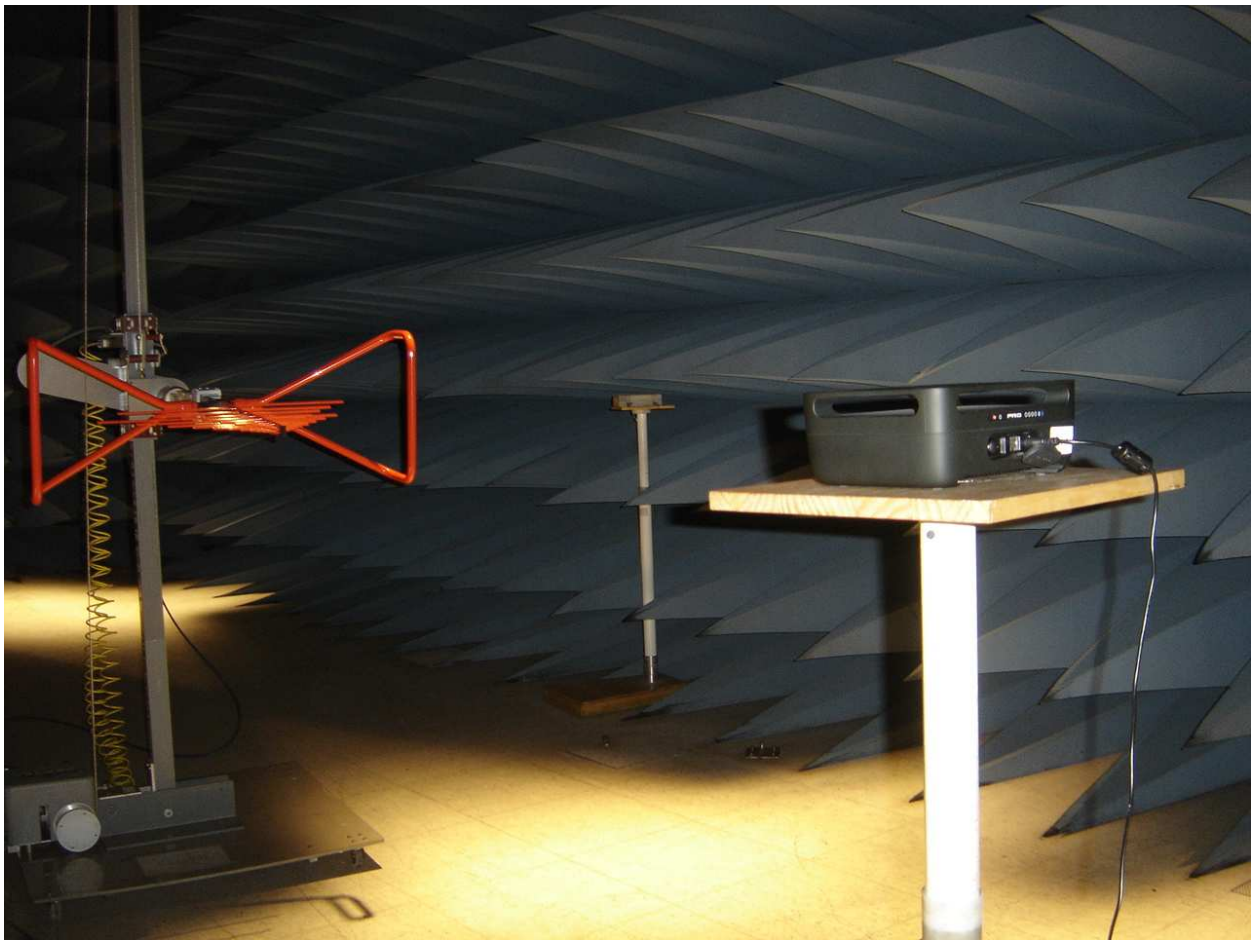
APPENDIX C: Photographs

EQUIPMENT FOR RADIATED MEASUREMENTS

GENERAL SET-UP FOR RADIATED MEASUREMENTS



TEST SET-UP FOR RADIATED MEASUREMENTS BELOW 1 GHz



TEST SET-UP FOR RADIATED MEASUREMENTES ABOVE 1GHz