



EUROFINS PRODUCT SERVICE GMBH

# TEST - REPORT

FCC RULES PARTS 15.247  
IC RADIO STANDARDS RSS-210 Issue 7

**FCC ID: UHN-7648136510**

Model Name:

**TATA X18 High / 7648136510**

**Test report no.: G0M20810-2048-P-15**



**Testing Cert #1983.01**



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## 1 General information

### 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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 Eurofins Product Service GmbH.

#### Operator:

08.12.2008

M. Handrik



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Date

Eurofins-Lab.

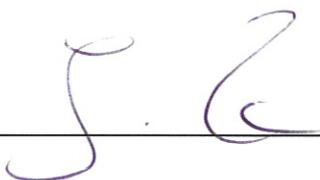
Name

Signature

#### Technical responsibility for area of testing:

08.12.2008

J. Zimmermann



---

Date

Eurofins-Lab.

Name

## 1.2 Testing laboratory

### 1.2.1 Location

EUROFINS PRODUCT SERVICE GMBH  
Storkower Straße 38c  
D-15526 Reichenwalde b. Berlin  
Germany  
Telephone : +49 33631 888 00  
Telefax : +49 33631 888 660

### 1.2.2 Details of accreditation status

**DAR ACCREDITED TESTING LABORATORY**  
DAR-REGISTRATION NUMBER: DAT-P-268/08

**RECOGNIZED NOTIFIED BODY EMC**  
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

**RECOGNIZED NOTIFIED BODY R&TTE**  
REGISTRATION NUMBER: BNetzA-bS-02/51-53

**FCC FILED TEST LABORATORY**  
REG.-No. 96970

**A2LA ACCREDITED TESTING LABORATORY**  
CERTIFICATE No. 1983.01

**BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)**  
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

**INDUSTRY CANADA FILED TEST LABORATORY**  
REG. No. IC 3470

## 1.3 Details of approval holder

Name	: Blaupunkt GmbH
Street	: Robert-Bosch-Straße 200
Town	: 31139 Hildesheim
Country	: Germany
Telephone	: +49 5121 492608
Contact	: Hr. Manfred Aufzug
E-Mail	: Manfred.Aufzug@de.bosch.com

## 1.4 Application details

Date of receipt of application : 21.11.2008  
Date of receipt of test item : 21.11.2008  
Date of test : 25.11.2008

## 1.5 Test item

FCC ID : UHN-7648136510  
Description of test item : TATA X18 High  
Type identification : 7648136510  
Serial number : without  
Photos : See annex A.

## Technical data

Frequency band : 2.4 - 2.4835 GHz  
Frequency Ch A : 2402 MHz  
Frequency Ch B : 2441 MHz  
Frequency Ch C : 2480 MHz

<u>Transmitter</u>	<u>V<sub>nom</sub></u>
Power (ch A)	Conducted: -2.41 dBm
Power (ch B)	Conducted: -2.67 dBm
Power (ch C)	Conducted: -2.43 dBm

Antenna Type : internal  
Antenna Gain : -2 dBi  
Power supply : 13.5 V DC  
Operating mode : duplex  
Type of modulation : FHSS  
Host device : none

## Classification :

Fixed Device	<input type="checkbox"/>
Mobile Device (Human Body distance > 20 cm)	<input checked="" type="checkbox"/>
Portable Device (Human Body distance < 20 cm)	<input type="checkbox"/>

**Manufacturer:**

(if applicable)

Name : Blaupunkt GmbH  
Street : Robert-Bosch-Straße 200  
Town : 31139 Hildesheim  
Country : Germany

## Additional information:

The test sample is designed as Bluetooth Part of a composite device. Its pseudorandom hopping scheme, authentication, receiver parameters, synchronization procedure and other parameters are determined by Bluetooth Core Specification.

According to attached declaration of manufacturer this device don't work in master inquiry mode.  
So we have only one frequency hopping system and the hopping sequence of the master inquiry mode is not verified.

## 1.6 Test standards

Technical standard: FCC Parts: 15.247  
IC Standards: RSS 210 Issue 7

## 2 Technical test

## 2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

or

The deviations as specified in 2.5 were ascertained in the course of the tests performed. □

## 2.2 Test environment

Temperature : 25 °C

Relative humidity content : 20 ... 75 %

Air pressure : 86 ... 103 kPa

Details of power supply : 13.5 V DC

Extreme conditions parameters: : test voltage - extreme min.: -- V DC (Vnom - 15%)  
max.: -- V DC (Vnom + 15%)

## 2.3 Test equipment utilized

No.	Test equipment	Type	Manufacturer
ETS 0012	Biconical Antenna	HK 116	R & S
ETS 0013	LPD Antenna	HL 223	R & S
ETS 0015	Log Periodical Antenna	HL 025	R & S
ETS 0018	Horn antenna	BBHA 9120 D	Schwarzbeck
ETS 0253	Spectrum Analyzer	FSIQ 26	R & S
ETS 0271	Spectrum Analyzer	FSEK 30	R & S
ETS 0288	Artificial mains	ESH2-Z5	R & S
ETS 0311	Anechoic chamber	AC 4	Frankonia
ETS 0474	EMI Test Receiver	ESCS 30	R&S

## 2.4 General test procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50  $\mu$ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The resolution bandwidth of the spectrum analyzer was 100 kHz for measurements below 1 GHz and RBW 1 MHz was used above 1 GHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

FORMULA OF CONVERSION FACTORS for Field strength: The Field Strength at 3 m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq. (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @ 3 m

ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1 m by 1.5 m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to at least 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by Eurofins Product Service GmbH at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde, Germany.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

### RF Exposure Compliance Requirements

According to FCC OET Bulletin 65 Edition 97-01 Supplement C and RSS-102 § 2.5, this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.

The antenna used for this transceiver must not be co-located or operating in conjunction with any other antenna or transmitter.

### ANTENNA & GROUND:

This unit uses internal antenna.

## 2.5 Test results

1<sup>st</sup> test

test after modification

production test

SECT.	TEST CASE	FCC 47CFR PART	IC RSS-	Required	Test passed	Test failed
3	<i>TRANSMITTER PARAMETERS</i>					
3.1	RF power output conducted	15.247 (b)	210 A8.4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.2	RF power output radiated (EIRP)	15.247 (b)	210 A8.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	20dB bandwidth	15.247 (a)(1)	210 A8.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.4	Time of occupancy (dwell time)	15.247 (a)(1)	210 A8.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.5	Number of hopping channels	15.247 (a)(1)	210 A8.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.6	Carrier frequency separation	15.247 (a)(1)	210 A8.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.7	Spurious emission conducted	15.247 (d)	210 A8.5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8	Spurious emission radiated	15.247 (d)	210 A8.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.9	Band-edge compliance	15.247 (d)	210 A8.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.10	AC power line conducted emissions	15.207	Gen 7.2.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<i>RECEIVER PARAMETERS</i>					
4.1	Radiated emissions	15.107	Gen 7.2.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 3 Transmitter parameters

#### 3.1 RF power output, conducted

##### Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A 8.4

##### Method of measurement

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

##### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	1 Watt (30 dBm) for systems with $\geq$ 75 hopping channels
2400 - 2483.5 MHz	1 Watt (30 dBm) for systems with $\geq$ 75 non - overlapping hopping channels 0.125 Watt (21 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	1 Watt (30 dBm) for systems with $\geq$ 50 hopping channels 0.25 Watt (24 dBm) for all other hopping systems, but at least 25 hopping channels

##### Test results

Test conditions	Channel A	Channel B	Channel C
	[dBm]	[dBm]	[dBm]
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	-2.41	-2.67	-2.43
Measurement uncertainty		< 3 dB	

See attached diagrams in Annex B.

**Test equipment:** ETS 0253, ETS 0271

### 3.2 RF power output, radiated

#### Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A8.4

#### Method of measurement

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

#### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	4 Watt (36 dBm) for systems with $\geq$ 75 hopping channels.
2400 - 2483.5 MHz	4 Watt (36 dBm) for systems with $\geq$ 75 non – overlapping hopping channels 0.631 Watt (28 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	4 Watt (36 dBm) for systems with $\geq$ 50 hopping channels 1.585 Watt (32 dBm) for all other hopping systems, but at least 25 hopping channels
FCC	The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
IC	Systems in the 2400 - 2483.5 MHz and 5725 - 5850 MHz which have an e.i.r.p. above 4 W are permitted only for point-to-point systems (i.e. point-to-multipoint systems and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p.). Point-to-point systems in these two bands may use higher e.i.r.p. as necessary for satisfactory operation provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. However, remote stations of point-to-multipoint systems shall be allowed to operate under the same condition as point-to-point systems.

**Test Results**

Test conditions	Channel A	Channel B	Channel C
	EIRP [dBm]	EIRP [dBm]	EIRP [dBm]
$T_{\text{nom}} = 25 \text{ }^{\circ}\text{C}$ $V_{\text{nom}} = 13.5 \text{ V}$	--	--	--
Measurement uncertainty		< 3 dB	

**Test equipment:** ETS 0012, ETS, 0013, ETS, 0015, ETS 0018, ETS 0253, ETS 0271, ETS 0311

### 3.3 20 dB bandwidth

#### Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

#### Method of measurement

The 20 dB bandwidth is measured on the lowest, middle and highest hopping channel. Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400 - 2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

#### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	$\leq 1$ MHz
2400 - 2483.5 MHz	$\leq$ carrier frequencies separation for hopping systems with max cond. power of 1 Watt $\leq$ 1.5 of the carrier frequencies separation for hopping systems with max cond. power of 0.125 Watt
902 - 928 MHz	$<$ 250 kHz for systems with $\geq 50$ hopping channels 250 kHz $\leq$ 500 kHz for all other hopping systems

#### Test results

Test conditions	Channel A	Channel B	Channel C
	MHz	MHz	MHz
$T_{\text{nom}} = 25^\circ \text{C}$ $V_{\text{nom}} = 13.5 \text{ V}$	930.225	934.625	939.016
Measurement uncertainty	< 10 Hz		

#### System receiver input bandwidth:

The manufacturer declares that the receiver input bandwidth matches to the bandwidth of the transmitter signal.

See attached diagrams in Annex C.

**Occupied Bandwidth (99%) – RSS Gen**

Test conditions	Channel A	Channel B	Channel C
	MHz	MHz	MHz
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	--	--	--
Measurement uncertainty	< 10 Hz		

**Test equipment:** ETS 0271

### 3.4 Time of occupancy (dwell time)

#### Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

#### Method of measurement

The EUT has its hopping function enabled.

Spectrum analyzer settings:

Span: zero span, centered on hopping channel  
RBW: 1 MHz  
VBW: > RBW  
Sweep: as necessary to capture the entire dwell time per hopping channel  
Detector: peak  
Trace: max hold

#### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≤ 0,4 s at measurement period of 30 seconds
2400 - 2483.5 MHz	≤ 0.4 s multiplied by the number of hopping channels employed
902 - 928 MHz	≤ 0,4 s at measurement period of 20 seconds for max 250 kHz 20 dB BW allowed ≤ 0,4 s at measurement period of 10 seconds for max 500 kHz 20 dB BW allowed

#### Test results

Test conditions	Operating mode	Measurement period	Time of occupancy
		[s]	[ms]
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	normal transmitting	31.6	186.490
	inquiry mode	--	--
Measurement uncertainty	< 1 $\mu\text{s}$		

See attached diagrams in Annex D

**Test equipment:** ETS 0271

### 3.5 Number of hopping channels

#### Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

#### Method of measurement

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400 - 2483.5 MHz and 5725 - 5850 MHz bands shall use at least 75 hopping frequencies.

According to FCC 00-312 appendix B systems in the 2400 - 2483.5 MHz band may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provide the systems use at least 15 non-overlapping channels.

#### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≥ 75 hopping channels
2400 - 2483.5 MHz	≥ 75 hopping channels for >0.125 Watt ≥ 15 hopping channels for ≤0.125 Watt
902 - 928 MHz	≥ 50 hopping channels for >0.25 Watt ≥ 25 hopping channels for ≤0.25 Watt

#### Test results

Test conditions	Operating mode	Number of channel
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	Normal transmitting	79
	Inquiry mode	--

See attached diagrams in Annex E.

**Test equipment:** ETS 0271

### 3.6 Carrier frequency separation

#### Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

#### Method of measurement

Carrier frequency separation was measured with modulation (declared by manufacturer)

#### Limits

Frequency band	FCC and IC
5725 - 5850 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater, but $\leq$ 1 MHz
2400 - 2483.5 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater minimum of 25 kHz or 2/3 of the 20 dB bandwidth of the hopping channel, whichever is greater, for $P_{out} \leq 0.125$ W
902 - 928 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

#### Test results

Test conditions	Channel B [GHz]	Channel Separation [kHz]
$T_{nom} = 25$ °C $V_{nom} = 13.5$ V	2.441	1000.80
Measurement uncertainty		< 10 Hz

See attached diagram in Annex F.

**Test equipment:** ETS 0271

### 3.7 Spurious emission conducted

#### Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

#### Method of measurement

The EUT is connected to the spectrum analyzer via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT is switched on, the hopping function is disabled.

The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1 GHz	100 kHz	100 kHz	100 kHz	100 kHz
f > 1 GHz	1 MHz	1 MHz	1 MHz	1 MHz

#### Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

#### Test results

Frequency	Result [dBm]	Limit [dBm]	Margin [dB]	Reference level [dBm]
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

### 3.8 Spurious emission radiated

#### Reference

FCC	CFR part 15.247(d), 15.205, 15.209, 15.35
IC	RSS-210 A8.5, RSS-210 2.7

#### Method of measurement

Spurious emission was measured with modulation (declared by manufacturer).

According to 47 CFR 15, Part 15.247 (d): 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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 15.205(c)).

#### Calculation of Limit:

All results are updated by an automatic measuring system in accordance to point 2.3

Limit = max. reading (because peak detector is used)  
 81.85 dB $\mu$ V/m

Limit = Max. reading - 20 dB (because average detector is used)  
 81.85 dB $\mu$ V/m - 20 dB = 861.85 dB $\mu$ V/m

#### Limits for restricted bands

FCC & IC	20 dB below peak output power, emissions which fall in the restricted bands (15.205(a)) / (RSS-210 2.7) must comply the following limits: Frequencies below 1GHz:		
	Frequency of emission	Field strength	Field strength
	[MHz]	[ $\mu$ V / m]	[dB $\mu$ V / m]
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	Above 960	500	54.0
	For frequencies above 1 GHz (Avg measurements): 54.0 dB $\mu$ V / m		
	For frequencies above 1 GHz (Pk measurements): Limit + 20 dB = 54.0 dB $\mu$ V / m + 20 dB = 74 dB $\mu$ V / m		

#### Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

If in the column's correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the "Marker-Delta-Method" or the „Duty-Cycle Correction Factor“.

#### 15.35 (c) Duty cycle correction average value

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Duty cycle correction =  $20 \log (\text{dwell time} / 100 \text{ ms or less})$

#### DA 00-705 Duty cycle correction peak value

The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1GHz	100 kHz	100 kHz	10 Hz	10 Hz
f > 1GHz	1 MHz	1 MHz	10 Hz	10 Hz

Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20 \log (\text{dwell time} / 100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

## Test results

### Summary table with radiated data of the test plots

Freq.	Used Ch.	Frequency Marker [GHz]	Polari-zation	Δ correc-tions dB	Max. Field Strength [dB $\mu$ V/m]	Compliance Limit [dB $\mu$ V/m]	Detec-tor	BW [MHz]	Margin [dB]
3	L	1.525	V		49.24	74	P	1	-24.76
3	L	2.400	H		51.75	74	P	1	-22.25
4	M	7.543	V		51.43	74	P	1	-22.57
4	M	7.824	H		54.68	74	P	1	-19.32
3	H	2.313	V		51.83	74	P	1	-22.17

#### Freq. - Frequency Range:

- 1: 30 – 200 MHz
- 2: 200 – 1000 MHz
- 3: 1 – 4 GHz
- 4: 4 – 8 GHz
- 5: 8 – 12 GHz
- 6: 12 – 17 GHz
- 7: 17 – 26,5 GHz

All other not noted test plots do not contain significant test results in relation to the limits.

See attached diagrams in Annex G.

**Test equipment:** ETS 0012, ETS 0013, ETS 0015, ETS 0018, ETS 0271, ETS 0253, ETS 0311

### 3.9 Band edge compliance

#### Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

#### Method of measurement

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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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 15.205(c)).

#### Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

#### Test results

Test conditions	Single frequency (hopping disabled)	
	Lower band-edge	Upper band-edge
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	43.40 dB	49.82 dB
Measurement uncertainty	< 100 Hz	

Test conditions	Hopping frequency (hopping enabled)	
	Lower band-edge	Upper band-edge
$T_{\text{nom}} = 25^{\circ}\text{C}$ $V_{\text{nom}} = 13.5\text{ V}$	46.22 dB	49.81 dB
Measurement uncertainty	< 100 Hz	

See attached diagrams in Annex H.

**Test equipment:** ETS 0271

### 3.10 AC power line conducted emissions

#### Reference

FCC	CFR part 15.207
IC	RSS-Gen 7.2.2

#### Method of measurement

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

#### Limits

FCC & IC	Frequency of emission	Conducted limit field strength [dB $\mu$ V]	
	[MHz]	Quasi Peak	Avg
	0.15 - 0.5	66 to 56	56 - 46
	0.5 - 5	56	46
	5 - 30	60	50

#### Test results

Frequency	Level	
	Quasi-peak	Average
150 kHz	--	--

Comment: Not required.

Test equipment: --

## 4 Receiver parameters

### 4.1 Radiated emissions

#### Reference

FCC	Part 15.109
IC	RSS-Gen 7.2.3

#### Method of measurement

The compliance of the EUT Receiver with the Limits of spurious emissions was performed according to the radiated measurement method.

The spectrum analyzer RBW was set to 100 kHz for measurements below 100 kHz and 1.0 MHz above 1.0 GHz. The measurement results are evaluated according to the procedure described in section 2.4 of this test report.

#### Limits

	Spurious frequency	Field strength
	MHz	microvolt/m at 3 meter
FCC & IC	30 - 88	100
	88 - 216	150
	216 - 960	200
	above 960	500

#### Test Results

Device Frequency	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [ $\mu$ V/m]	Compliance limit [ $\mu$ V/m]	Results [ $\mu$ V/m]
2441 MHz	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--
	--	--	--	--	--

Comment: not required.

Test equipment: --

## Annex

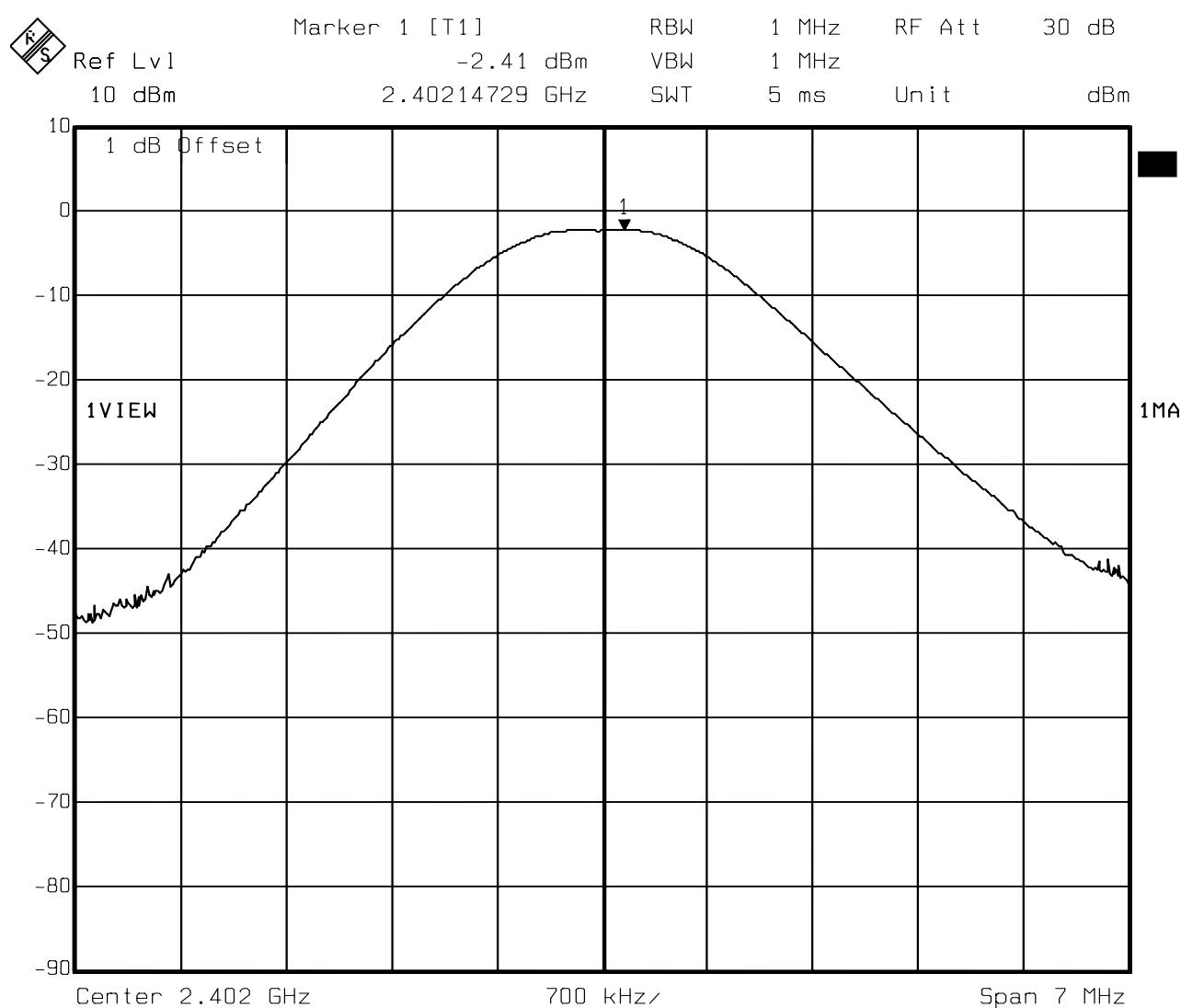
A	Pictures	8 pages
B	RF power output conducted	3 pages
C	20 dB bandwidth	3 pages
D	Time of occupancy (dwell time)	2 pages
E	Number of hopping frequencies	4 pages
F	Carrier frequency separation	1 page
G	Spurious emission radiated	6 pages
H	Band-edge compliance	4 pages

## **Annex B**

RF power output conducted

**Peak output power conducted FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(b)  
 Comment 1 Peak output power  
 Comment 2 Channel.: 0 / 2402 MHz  
 Comment 3



Comment A: Output power=-2.41 dBm; verdict: PASS  
 Date: 24.NOV.2008 15:01

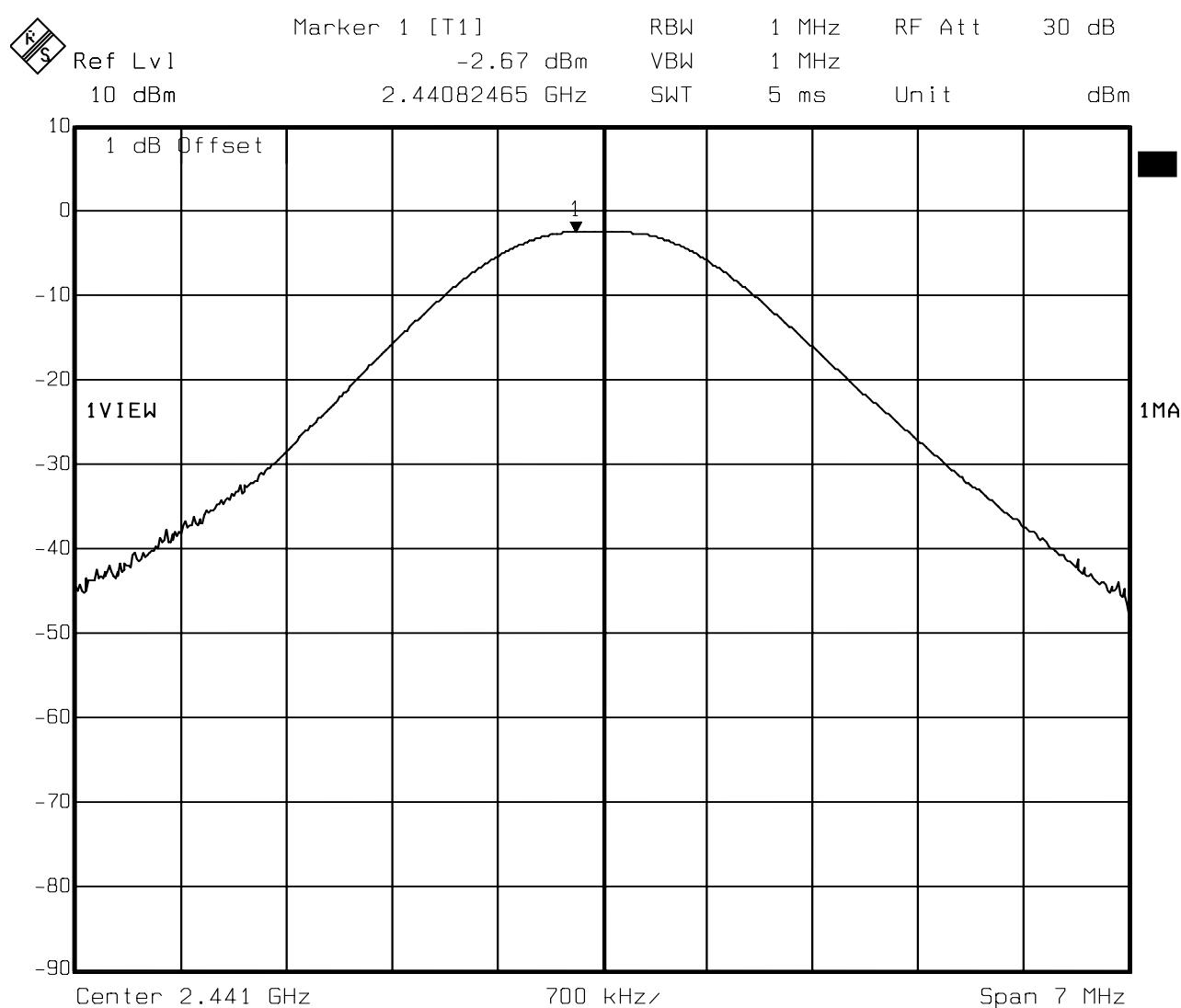
---

 Measurement diagram
 

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**Peak output power conducted FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(b)  
 Comment 1 Peak output power  
 Comment 2 Channel.: 39 / 2441 MHz  
 Comment 3



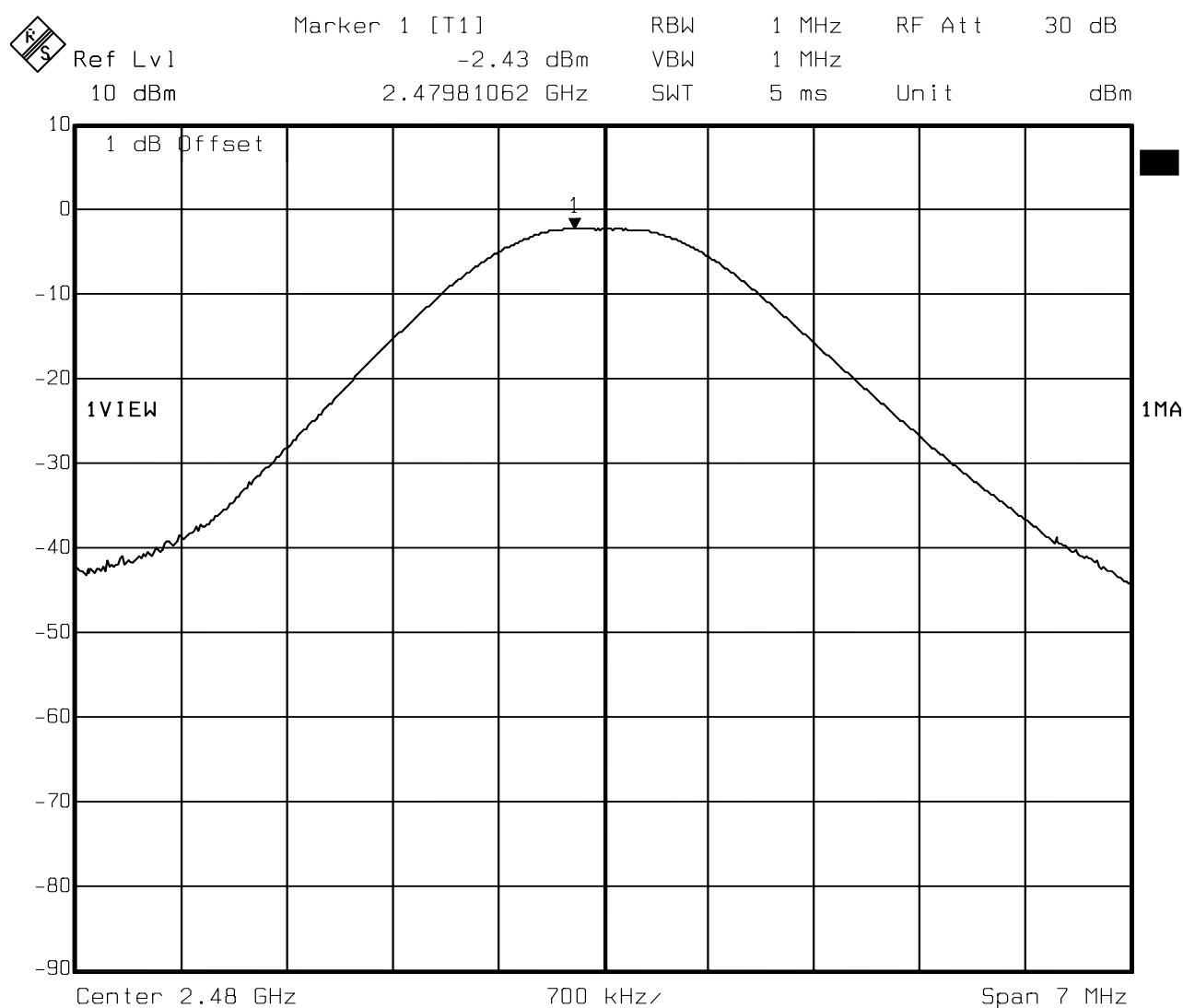

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 Measurement diagram
 

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**Peak output power conducted FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(b)  
 Comment 1 Peak output power  
 Comment 2 Channel.: 78 / 2480 MHz  
 Comment 3



Comment A: Output power=-2.43 dBm; verdict: PASS  
 Date: 24.NOV.2008 15:18:36

---

 Measurement diagram
 

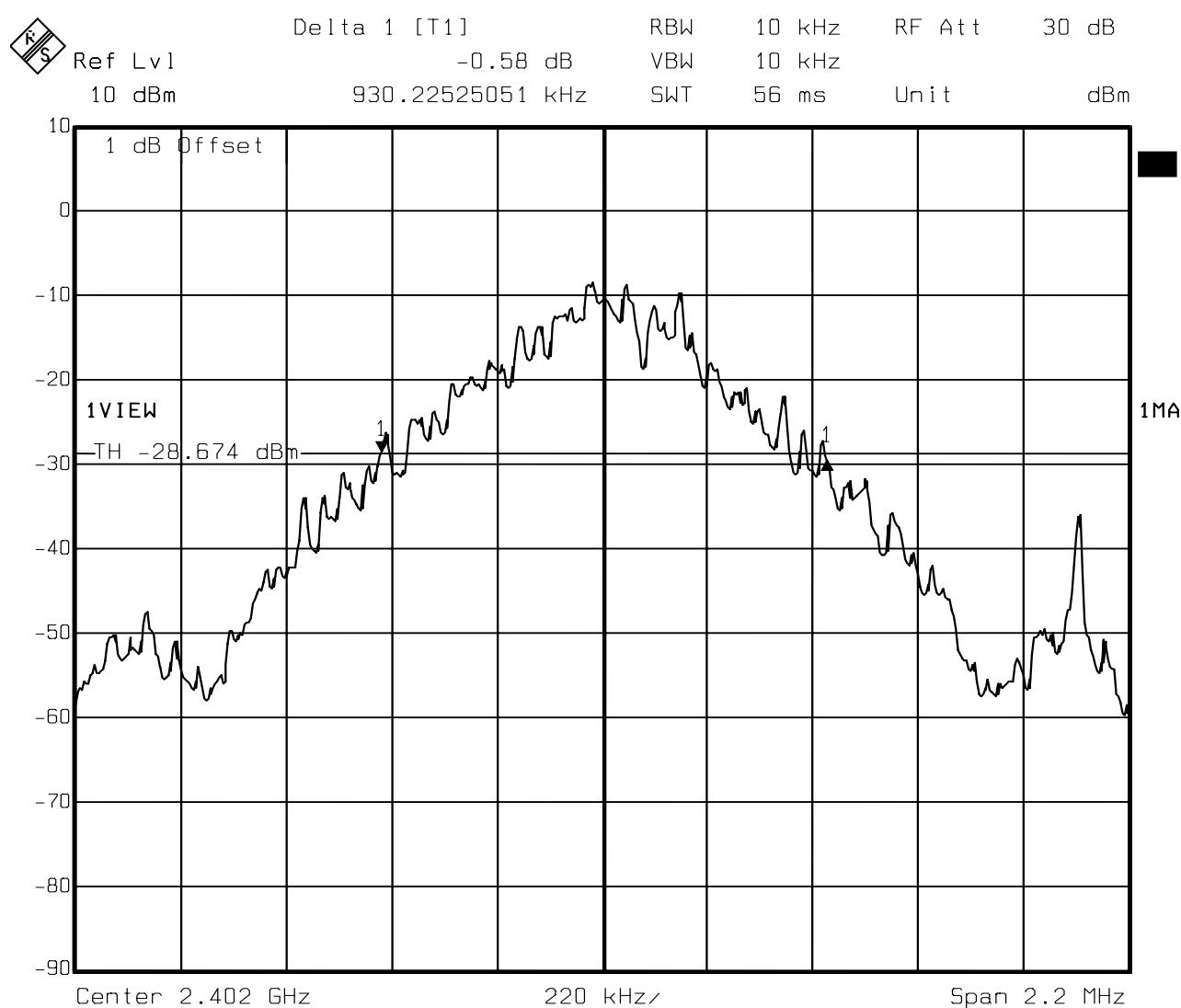
---

## **Annex C**

20 dB bandwidth

**20 dB bandwidth FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 20 dB bandwidth  
 Comment 2 Channel.: 0 / 2402 MHz  
 Comment 3



Comment A: 20 dB bandwidth: 930.2 KHz

Date: 25.NOV.2008 06:49:43

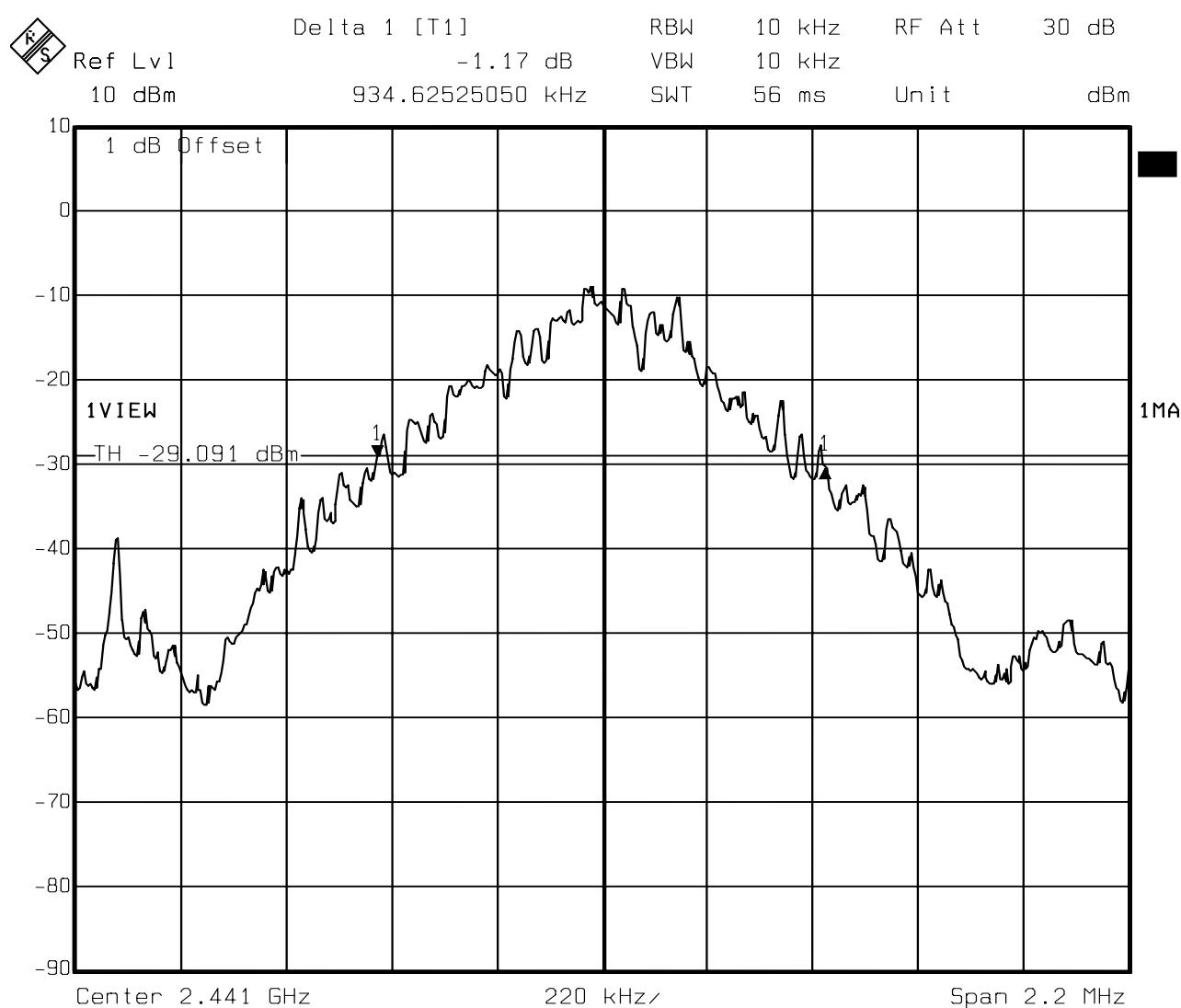
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 Measurement diagram
 

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**20 dB bandwidth FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 20 dB bandwidth  
 Comment 2 Channel.: 39 / 2441 MHz  
 Comment 3



Comment A: 20 dB bandwidth: 934.6 KHz

Date: 25.NOV.2008 07:16:34

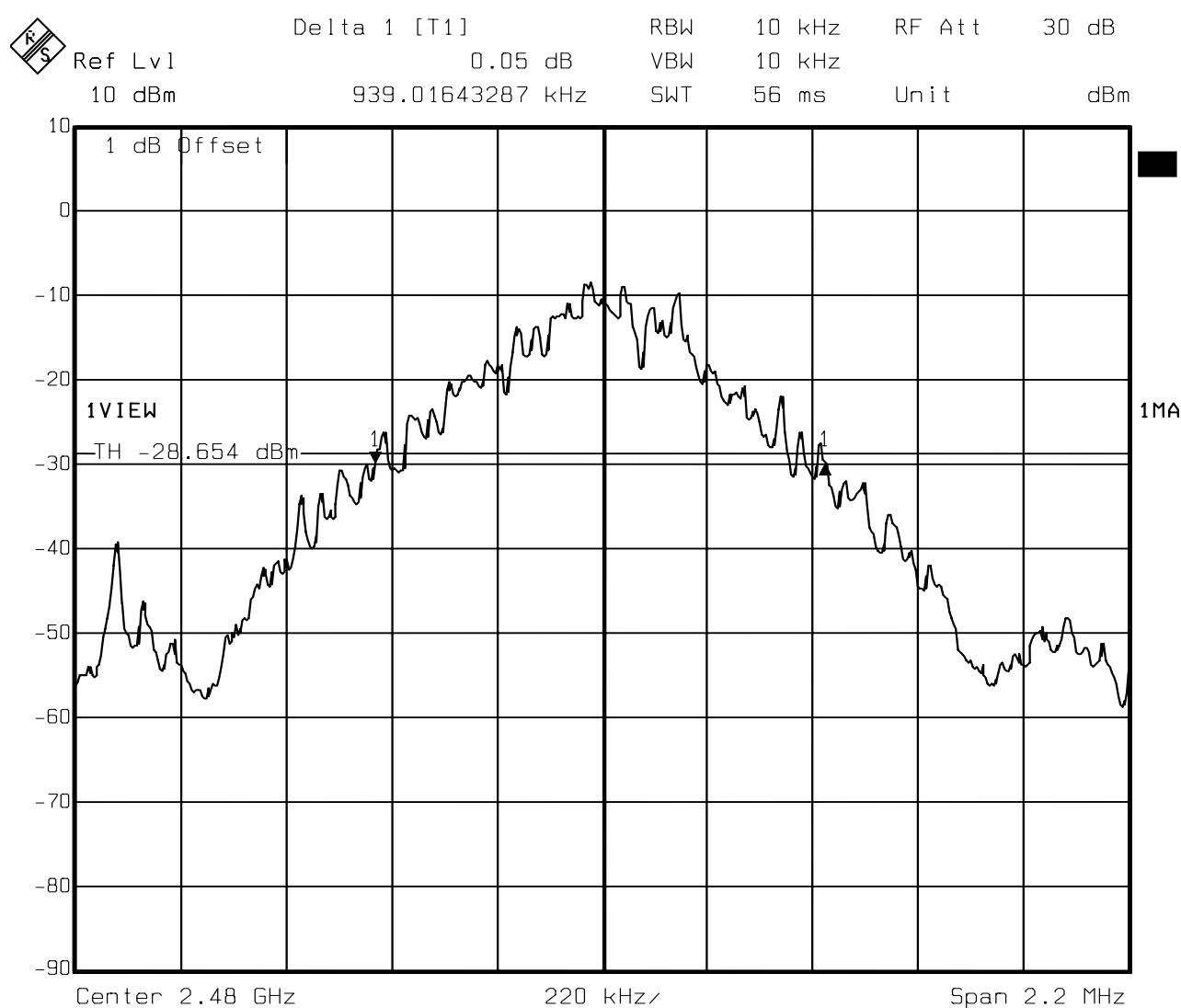
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**Measurement diagram**


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**20 dB bandwidth FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 20 dB bandwidth  
 Comment 2 Channel.: 78 / 2480 MHz  
 Comment 3



Comment A: 20 dB bandwidth: 939 KHz  
 Date: 25.NOV.2008 07:21:17

---

**Measurement diagram**

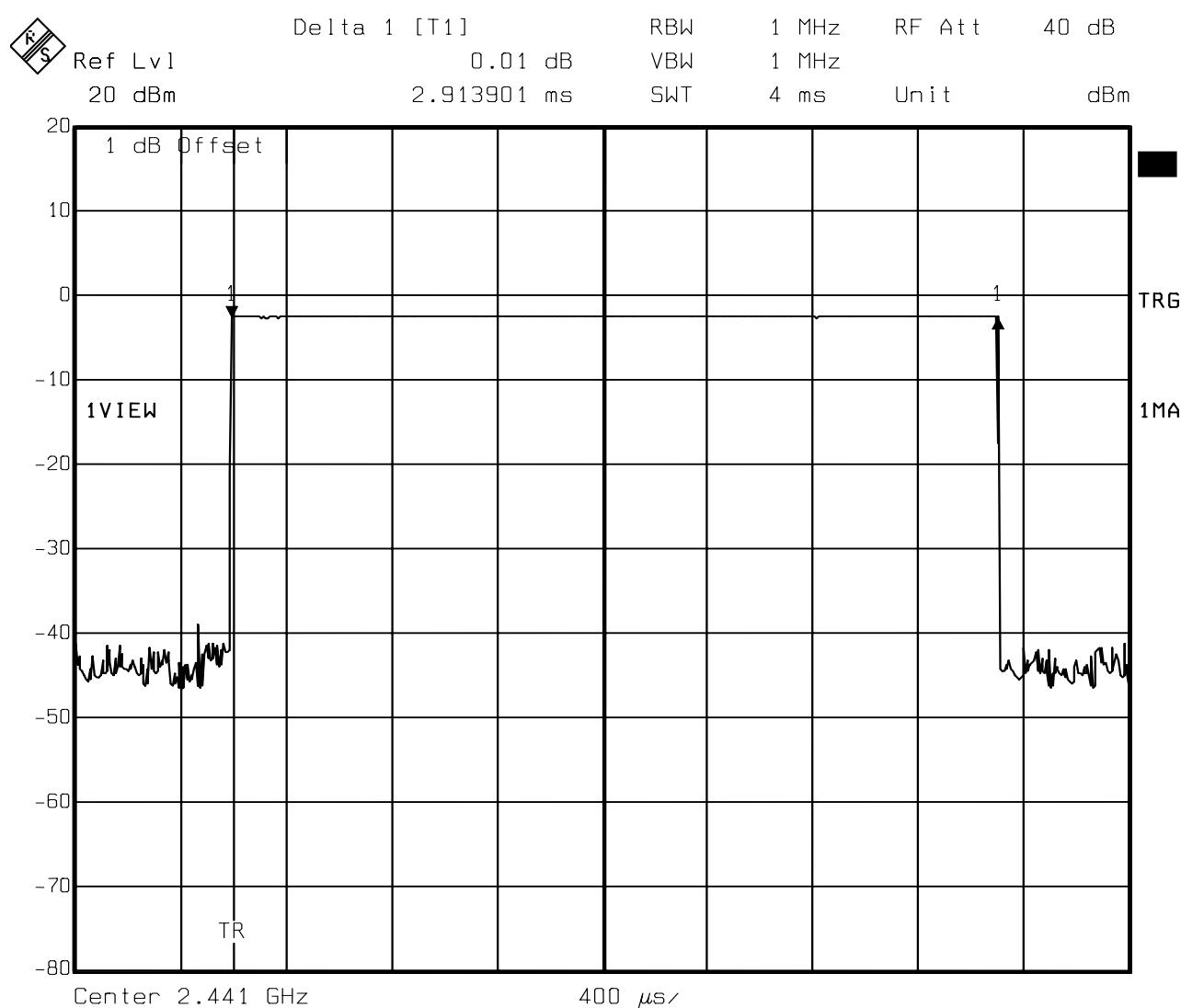

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## **Annex D**

Time of occupancy (dwell time)

**Time of occupancy (dwell time) FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 Time of occupancy  
 Comment 2 Channel.: 39 / 2441 MHz (Hopping mode)  
 Comment 64 events \* 2.914 ms result: 186.490 ms



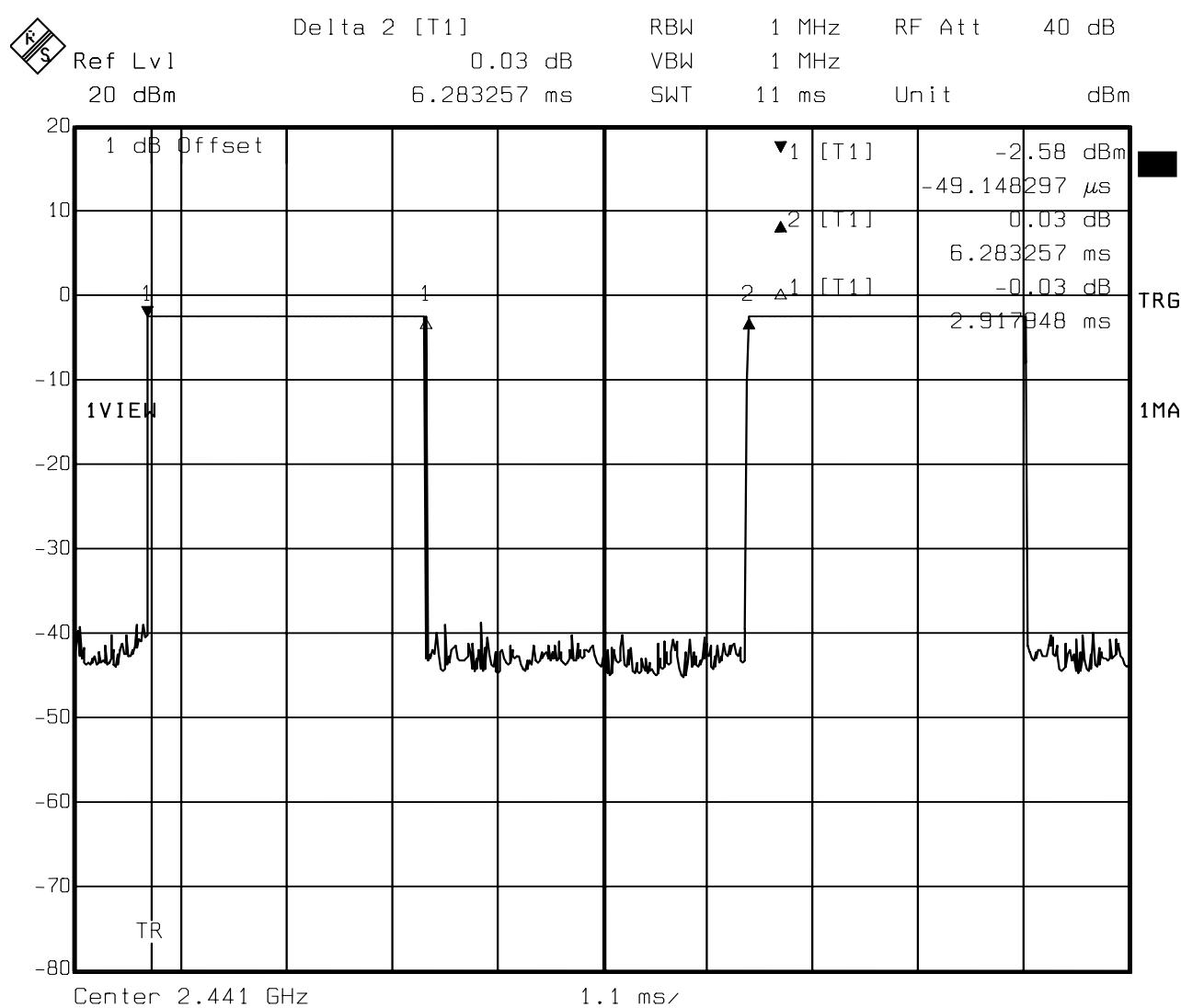

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**Measurement diagram**


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**Duty cycleFCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(b)  
 Comment 1 Duty cycle  
 Comment 2 Channel.: 39 / 2441 MHz  
 Comment 3




---

 Measurement diagram
 

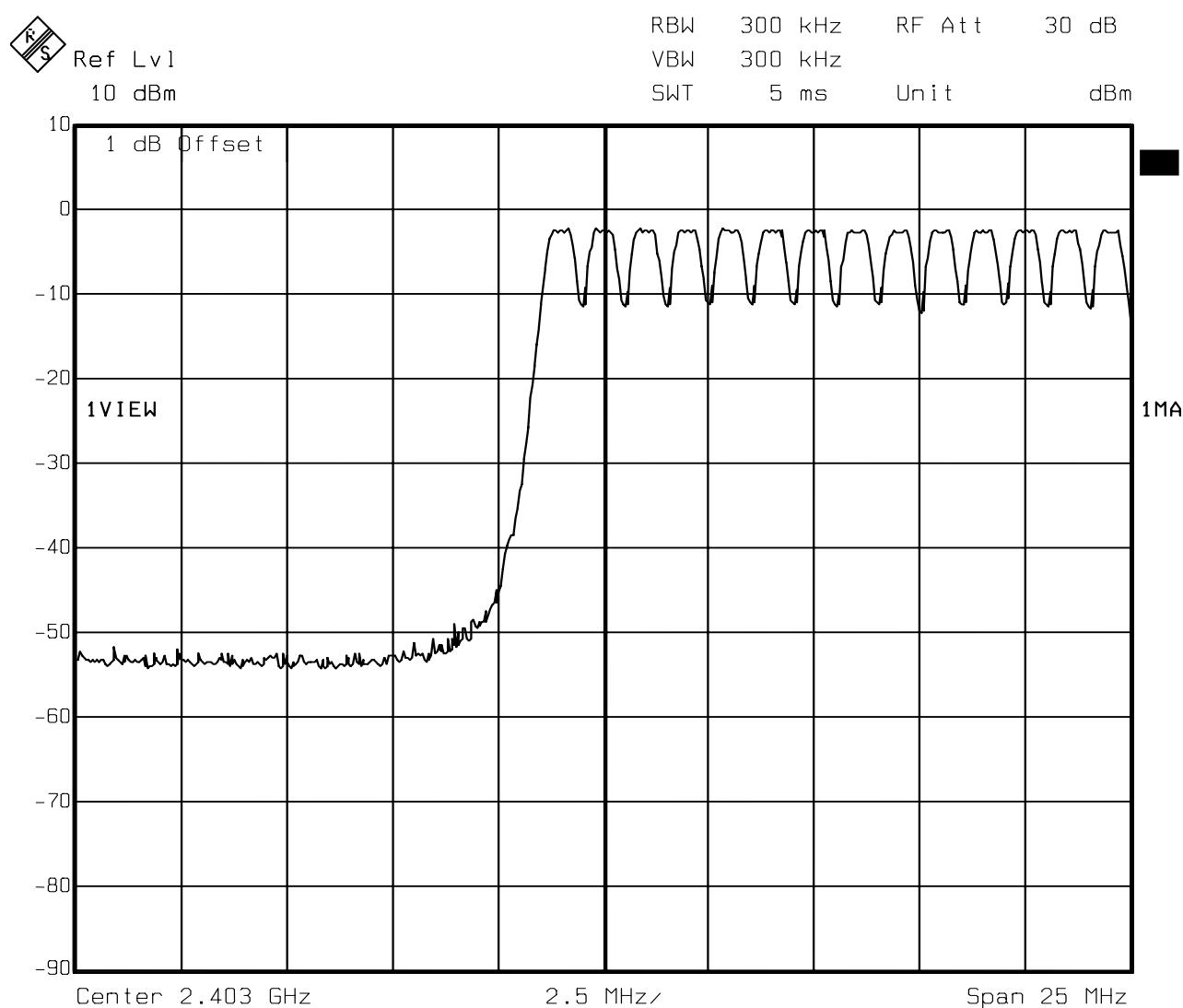
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## **Annex E**

### Number of hopping frequencies

**Number of hopping frequencies FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 Number of hopping frequencies  
 Comment 2 Channel.: 0-13  
 Comment 3



Comment A: Number of hopping frequencies  
 Date: 25.NOV.2008 08:45:51

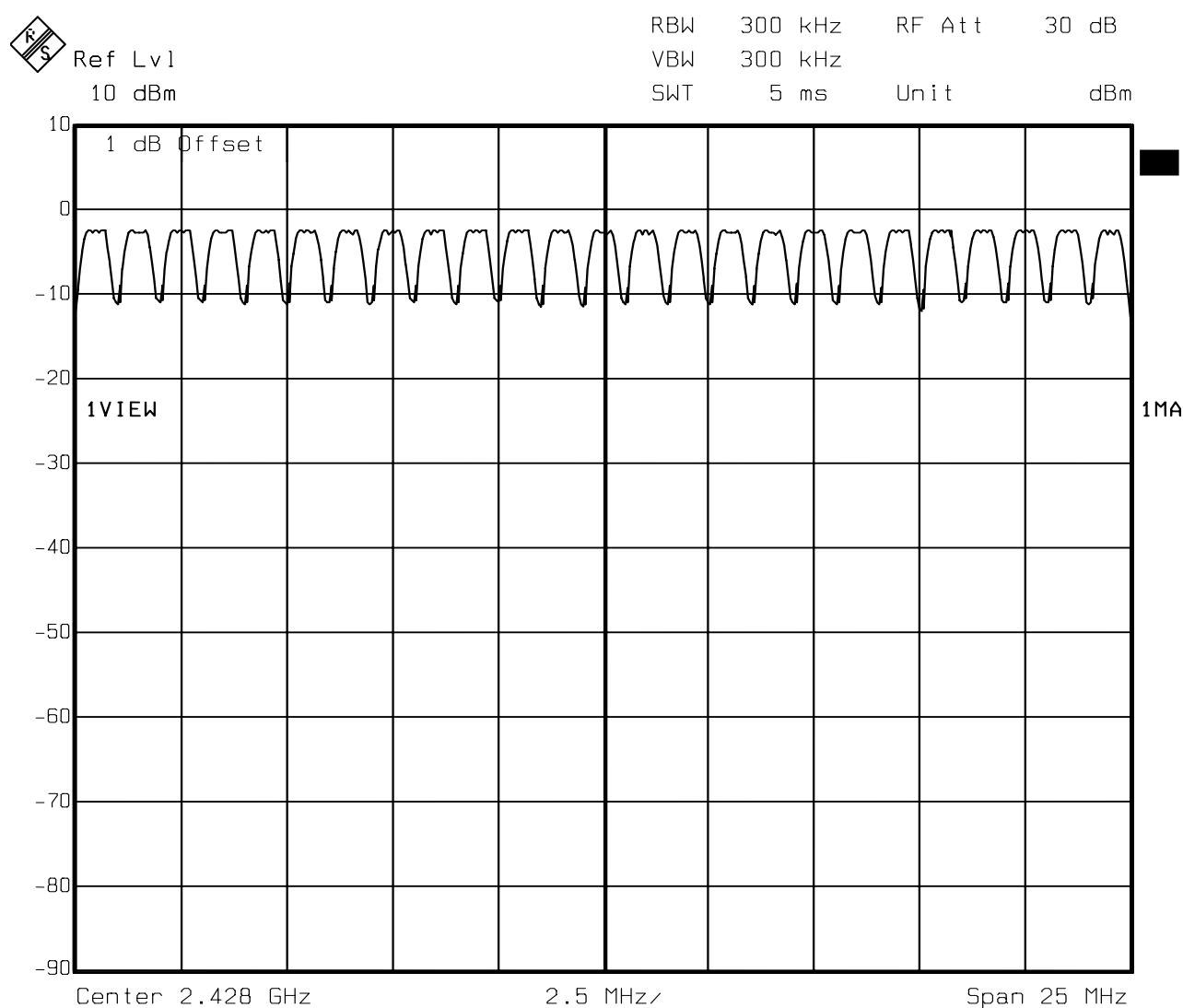
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**Measurement diagram**


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**Number of hopping frequencies FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 Number of hopping frequencies  
 Comment 2 Channel.: 14-38  
 Comment 3



Comment A: Number of hopping frequencies  
 Date: 25.NOV.2008 09:04:45

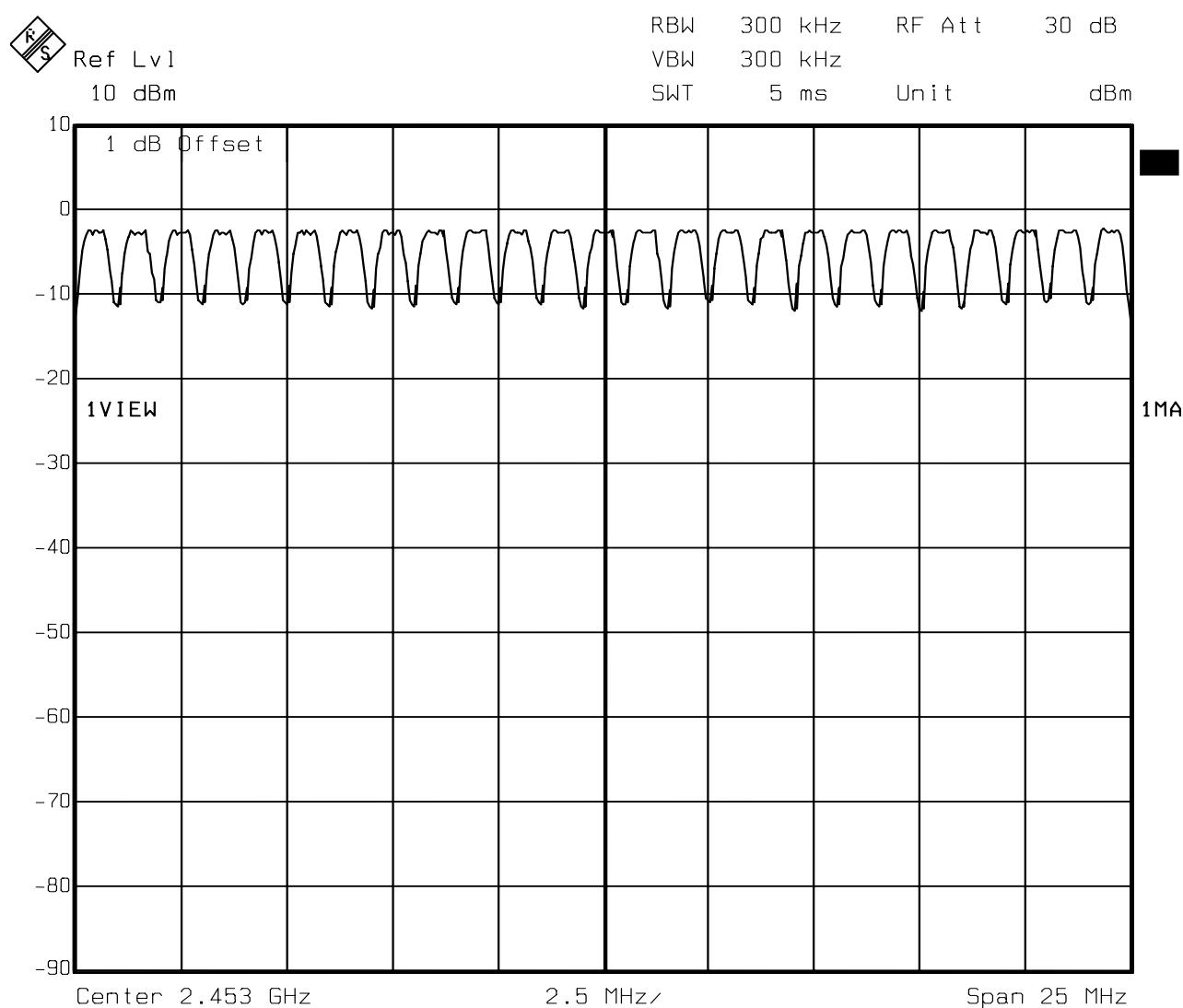
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**Measurement diagram**


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**Number of hopping frequencies FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 Number of hopping frequencies  
 Comment 2 Channel.:39-63  
 Comment 3



Comment A: Number of hopping frequencies  
 Date: 25.NOV.2008 09:08:33

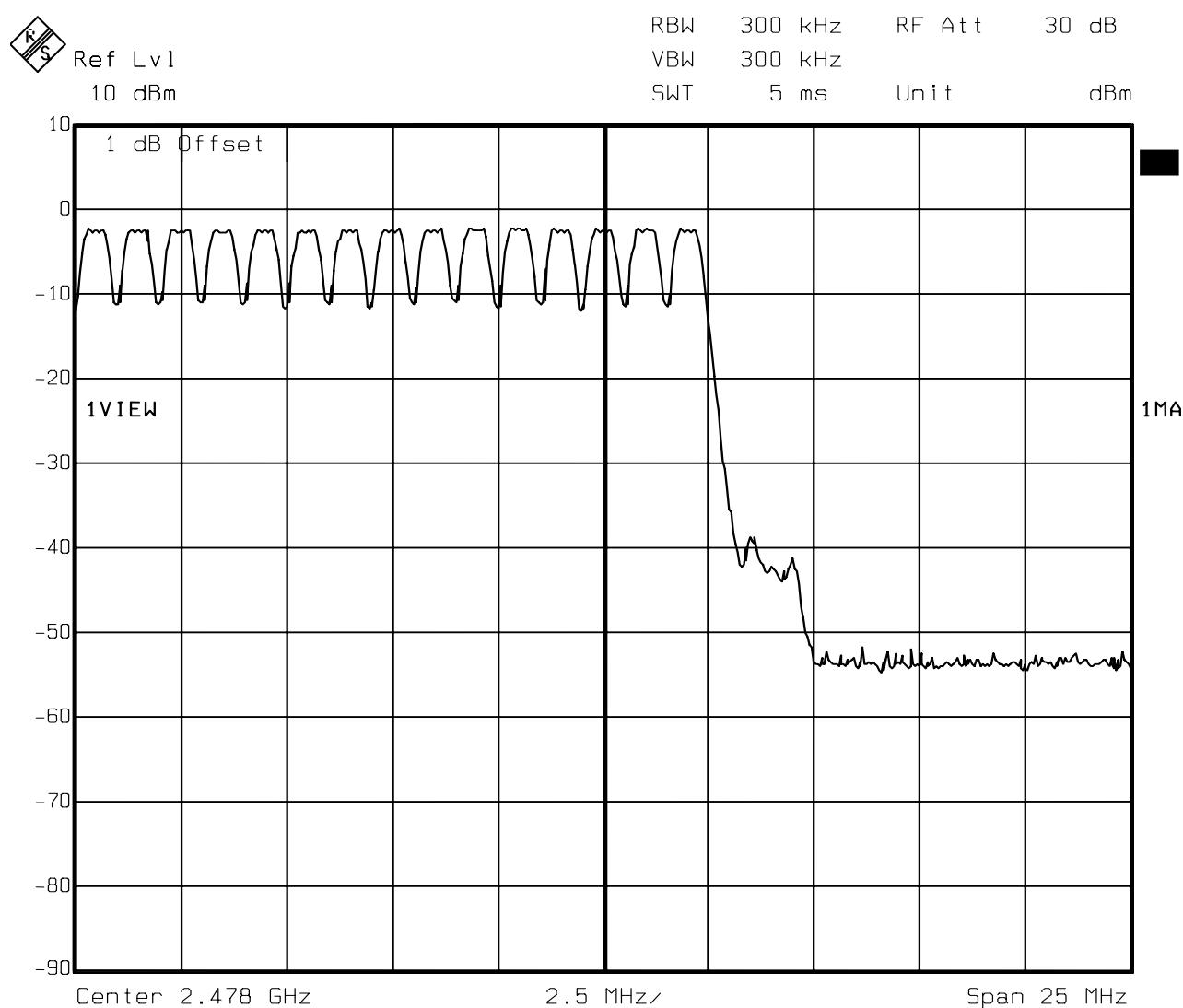
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**Measurement diagram**


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**Number of hopping frequencies FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)  
 Comment 1 Number of hopping frequencies  
 Comment 2 Channel.: 64-78  
 Comment 3



Comment A: Number of hopping frequencies  
 Date: 25.NOV.2008 09:11:40

---

 Measurement diagram
 

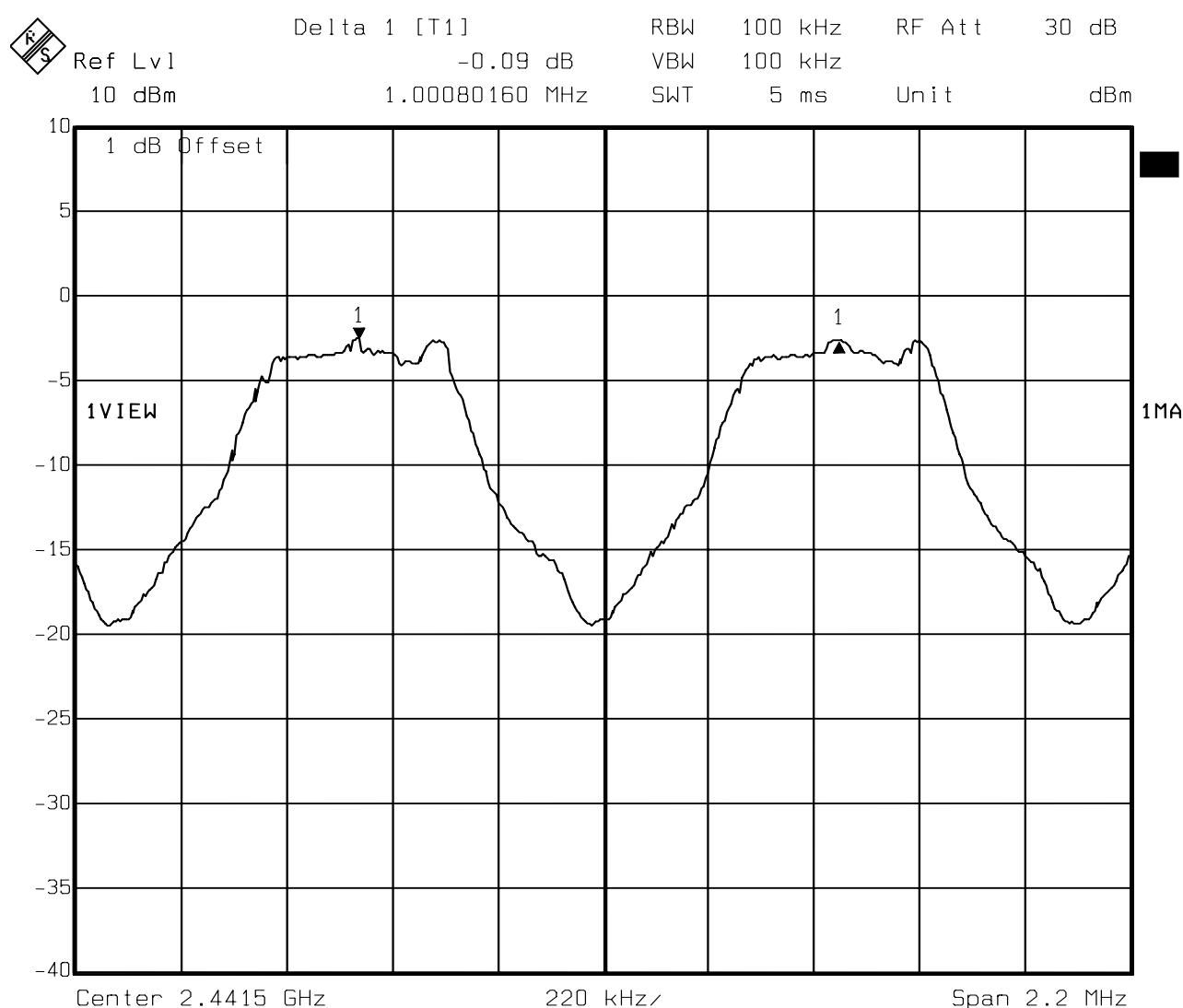
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## **Annex F**

Carrier frequency separation

**Carrier frequency separation FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(a)(1)  
 Comment 1 Carrier frequency separation  
 Comment 2 Channel.: 39/40 / 2441/2442 MHz  
 Comment 3 Hopping mode



Comment A: Limit: > two-thirds of the 20 dB bandwidth ; Result: Pass  
 Date: 25.NOV.2008 08:13:15

---

**Measurement diagram**

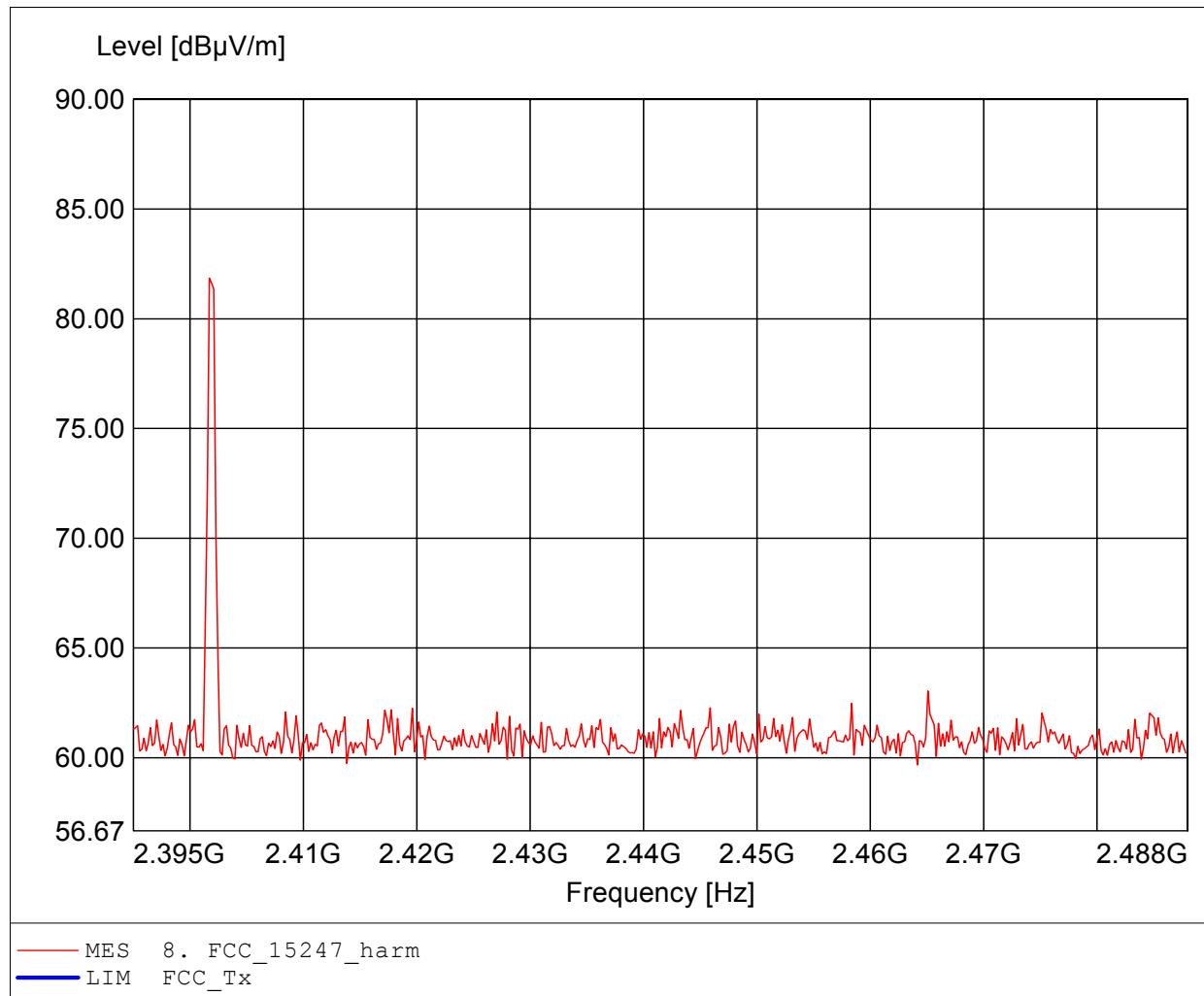

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## **Annex G**

Spurious emission radiated

**Carrier power (Field Strength)****FCC RULES PART 15, SUBPART C**

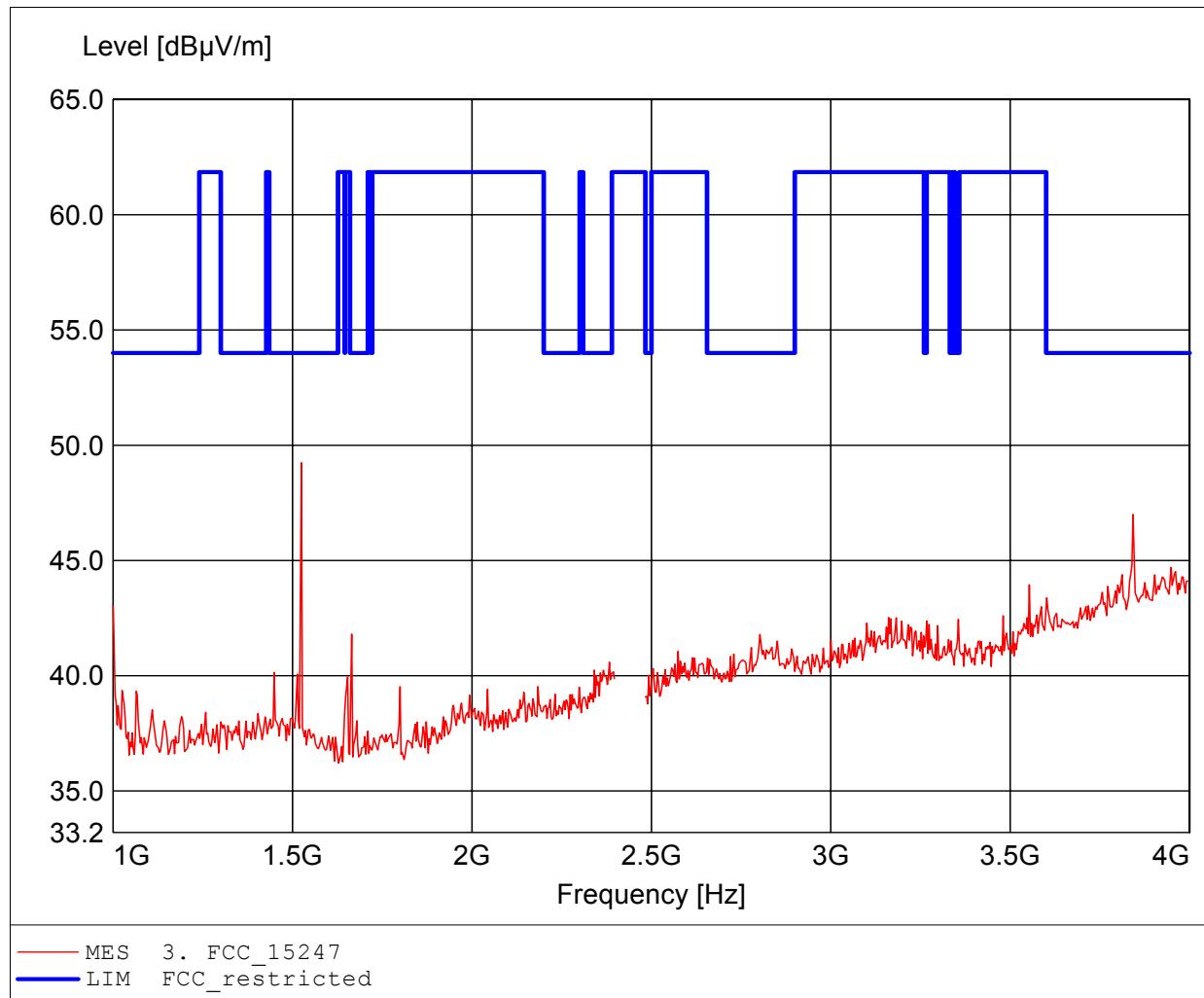
Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2402 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247  
Comment 1: Dist.: 3m, Ant.: BBHA9120D  
Comment 2: Freq: 2.402GHz, Emax: 81.85dB $\mu$ V/m, RBW: 100kHz



## **Spurious emissions Field Strength**

### **FCC RULES PART 15, SUBPART C**

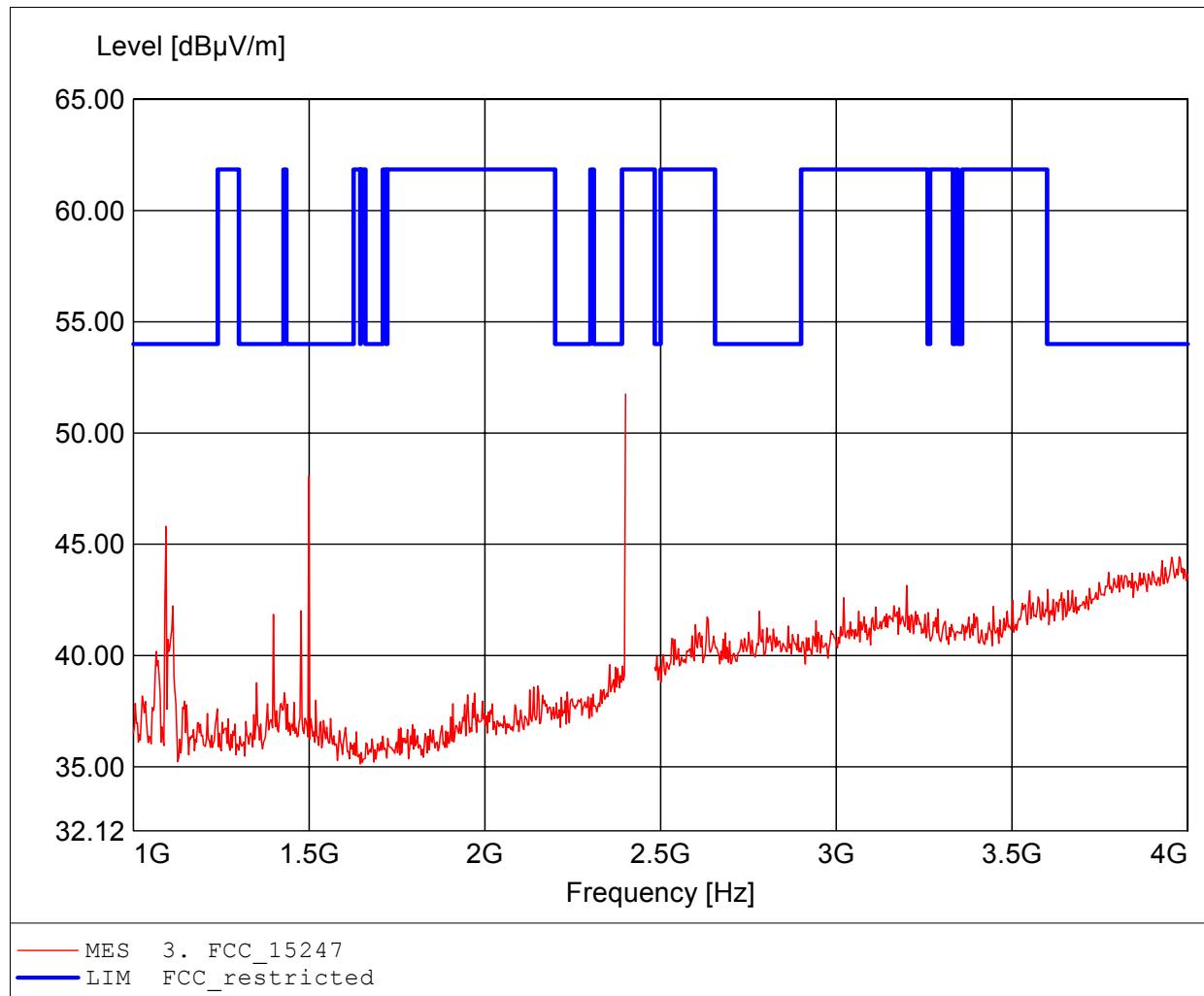
Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2402 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247, peak detector  
Comment 1: Dist.: 3m, Ant.: BBHA9120D, amplif.  
Comment 2: Freq: 1.525GHz, Emax: 49.24dB $\mu$ V/m, RBW: 1MHz



## **Spurious emissions Field Strength**

### **FCC RULES PART 15, SUBPART C**

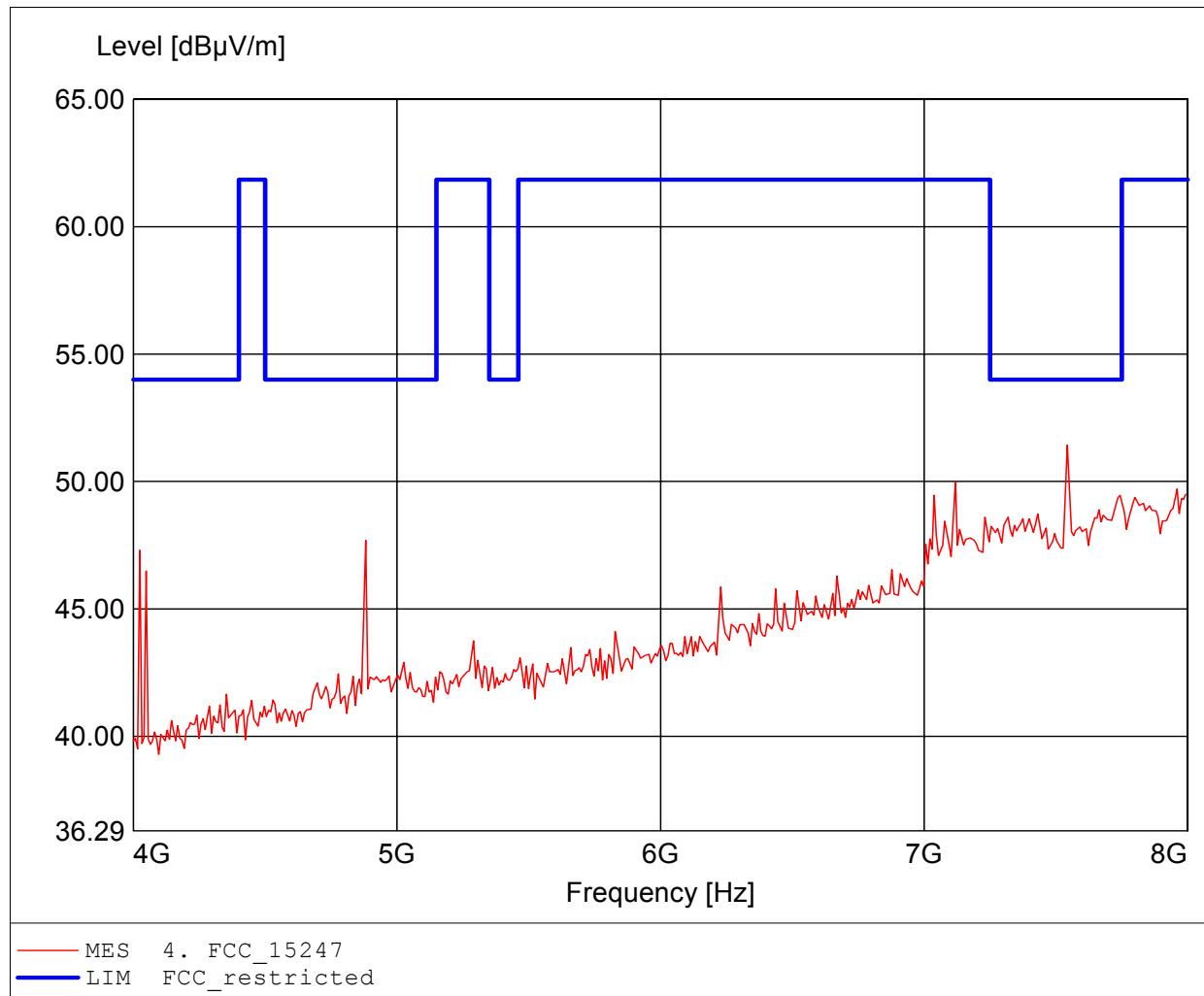
Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2402 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247, peak detector  
Comment 1: Dist.: 3m, Ant.: BBHA9120D, amplif.  
Comment 2: Freq: 2.400GHz, Emax: 51.75dB $\mu$ V/m, RBW: 1MHz



# **Spurious emissions Field Strength**

## **FCC RULES PART 15, SUBPART C**

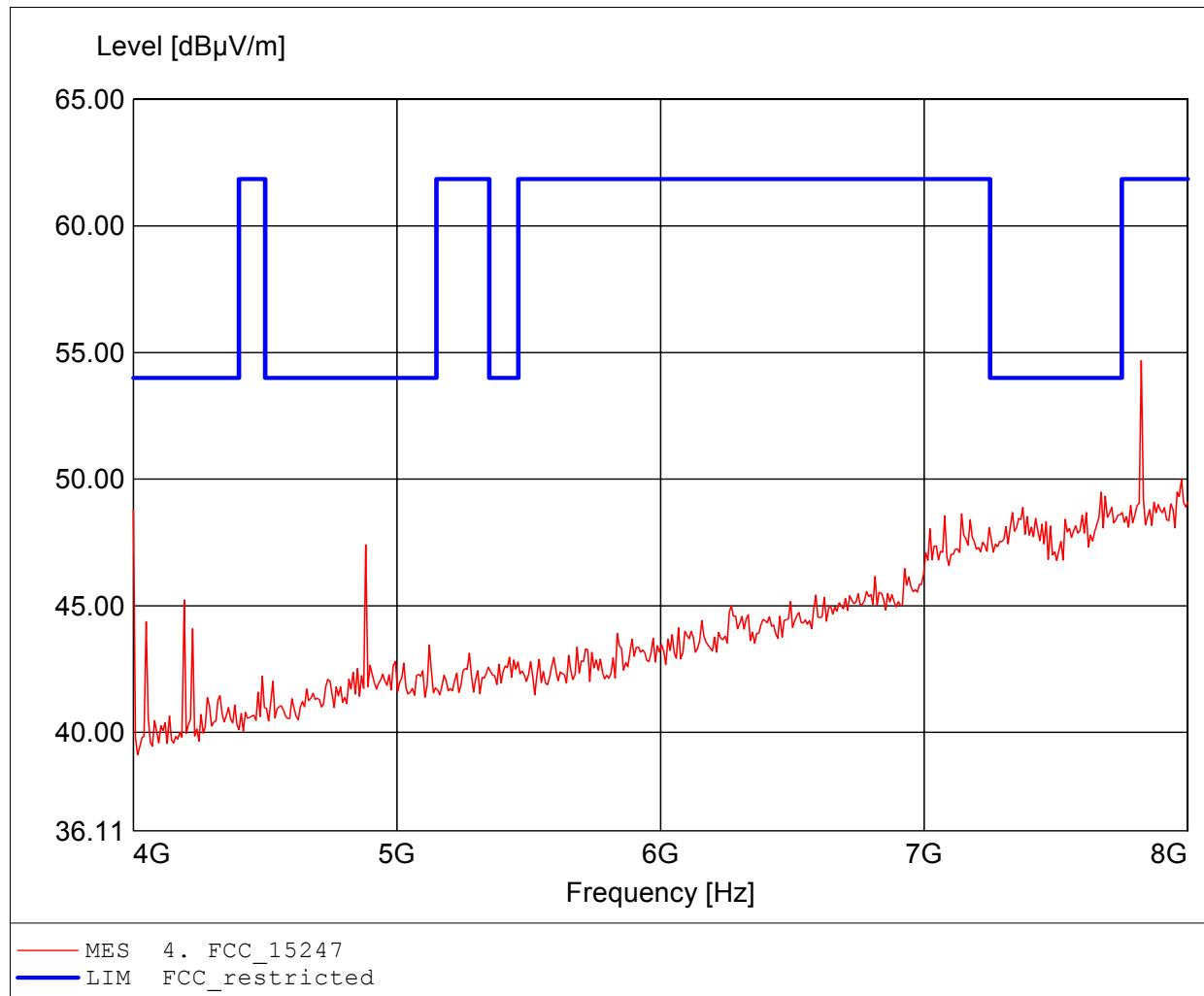
Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2441 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247, peak detector  
Comment 1: Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.  
Comment 2: Freq: 7.543GHz, Emax: 51.43dB $\mu$ V/m, RBW: 1MHz



## **Spurious emissions Field Strength**

### **FCC RULES PART 15, SUBPART C**

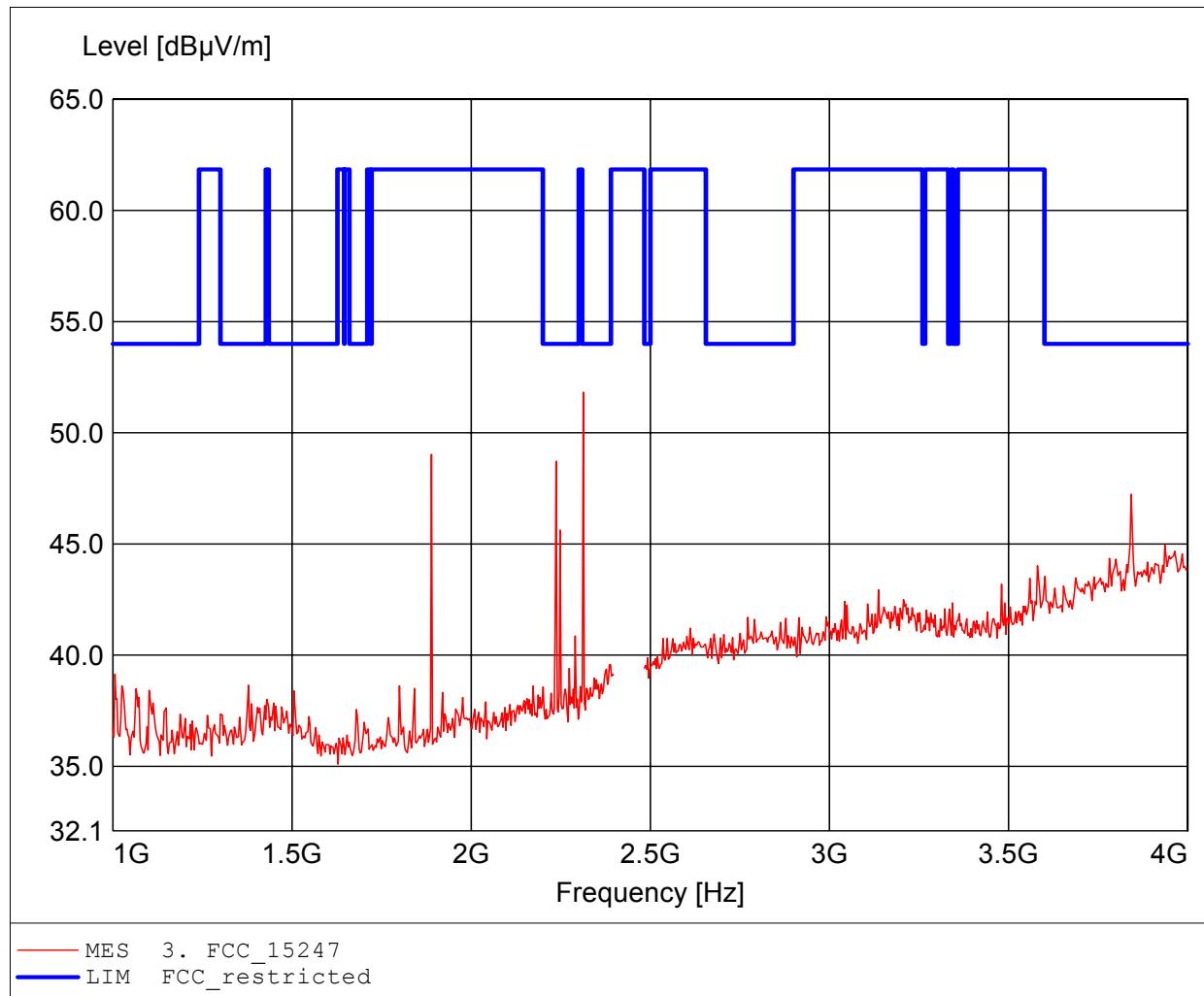
Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2441 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247, peak detector  
Comment 1: Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.  
Comment 2: Freq: 7.824GHz, Emax: 54.68dB $\mu$ V/m, RBW: 1MHz



## **Spurious emissions Field Strength**

### **FCC RULES PART 15, SUBPART C**

Approval Holder: Blaupunkt GmbH  
EUT: TATA X 18  
Model: 7648136510 / 2480 MHz  
Test Site / Operator: Eurofins Product Service GmbH / Mr. Handrik  
Test Condition: 25°C / Unom.: 12 V DC  
Test Specification: according to §15.247, peak detector  
Comment 1: Dist.: 3m, Ant.: BBHA9120D, amplif.  
Comment 2: Freq: 2.313GHz, Emax: 51.83dB $\mu$ V/m, RBW: 1MHz



## **Annex H**

Band-edge compliance

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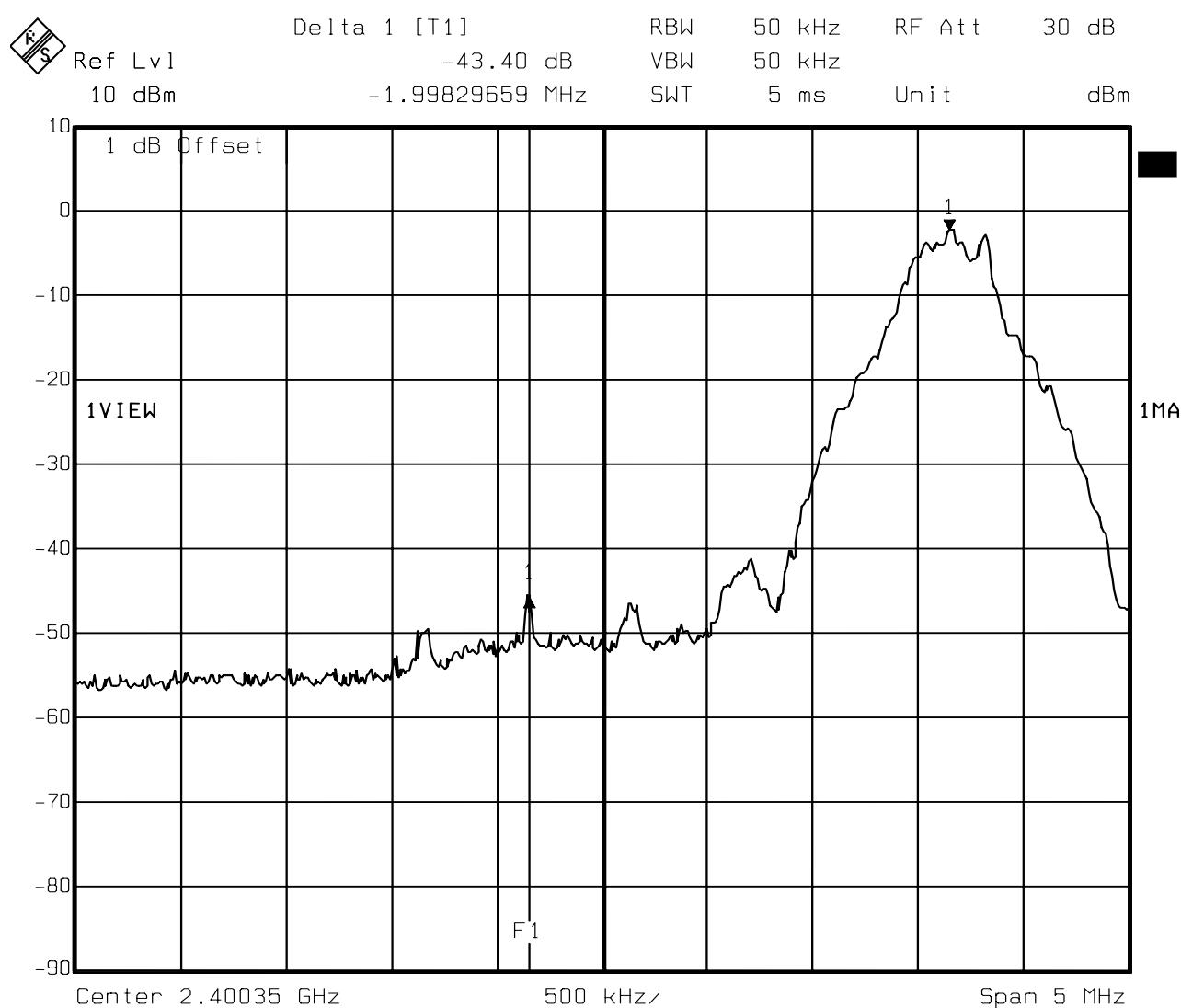
Test Report No.: G0M20810-2048-P-15

Eurofins Product Service GmbH  
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Annex H

**Band-edge compliance of RF conducted emissions FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(c)  
 Comment 1 Band-edge compliance  
 Comment 2 Channel.: 0 / 2402 MHz  
 Comment 3 Single frequency mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS  
 Date: 25.NOV.2008 08:33:11

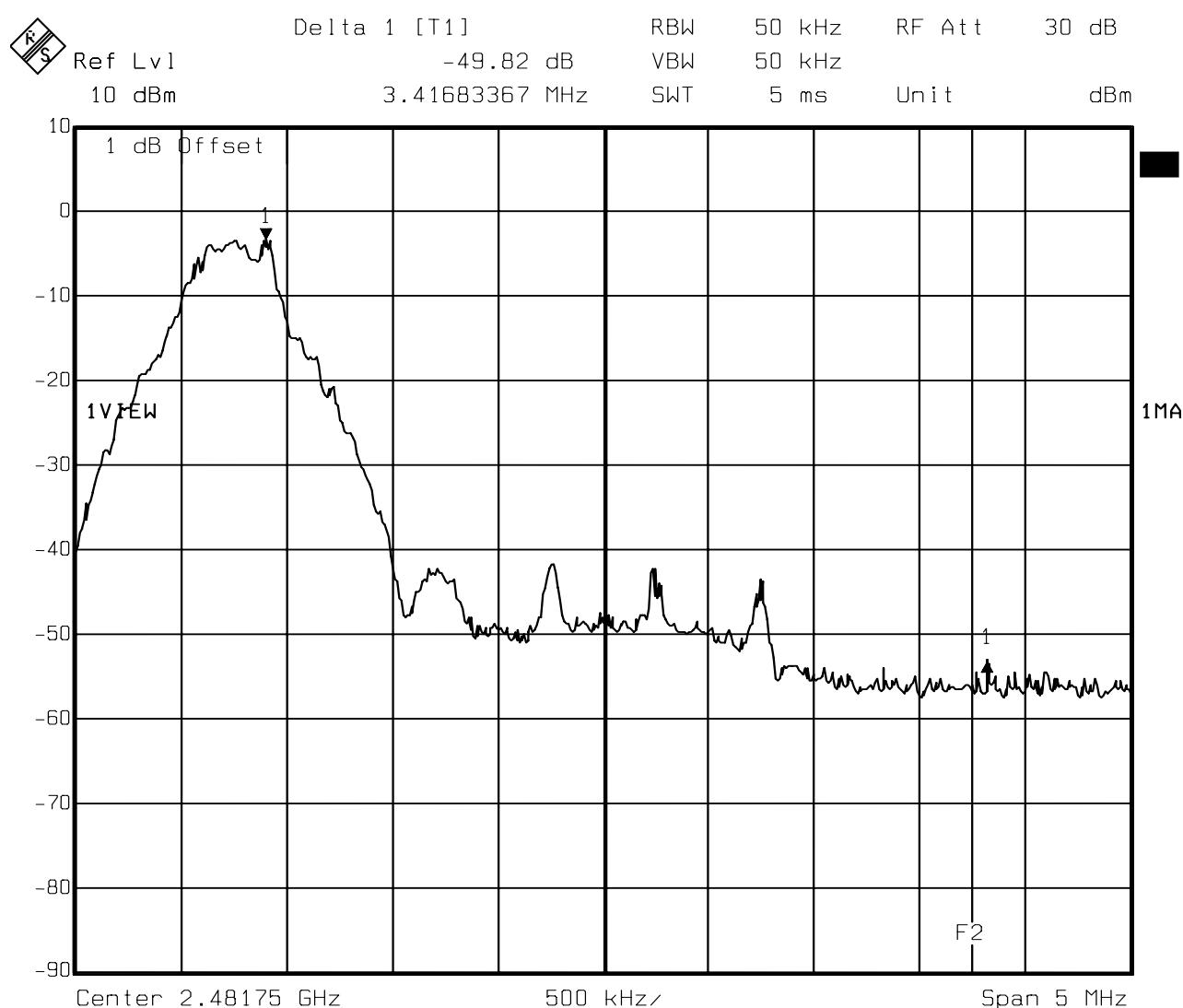
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 Measurement diagram
 

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**Band-edge compliance of RF conducted emissions FCC part 15.247**

EUT	TATA X 18
Model	7648136510
Approval Holder	Blaupunkt GmbH
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Handrik
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz
Comment 3	Single frequency mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS  
 Date: 25.NOV.2008 08:35:18

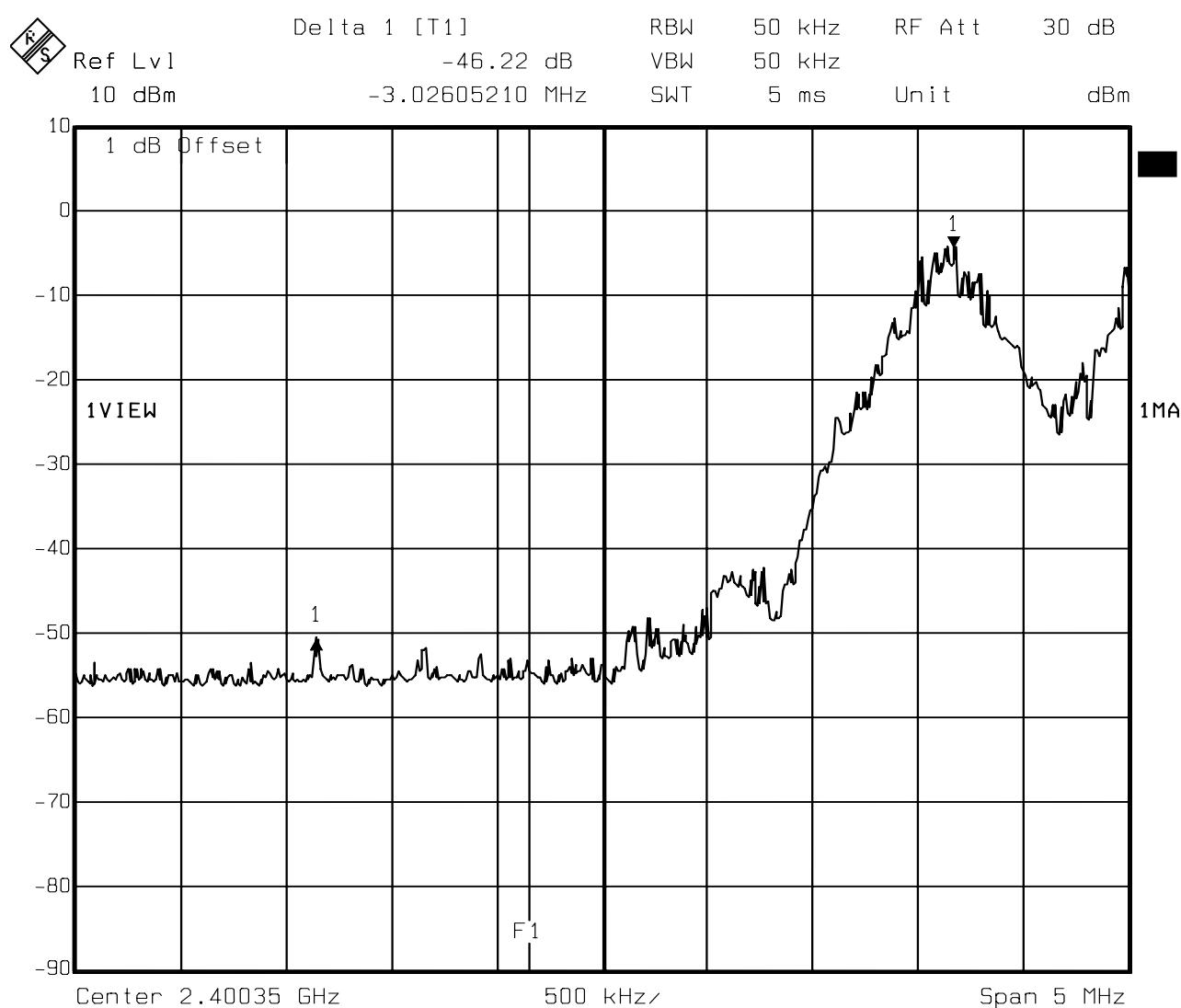
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 Measurement diagram
 

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**Band-edge compliance of RF conducted emissions FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(c)  
 Comment 1 Band-edge compliance  
 Comment 2 Channel.: 0 / 2402 MHz  
 Comment 3 Hopping mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS  
 Date: 25.NOV.2008 08:17:58

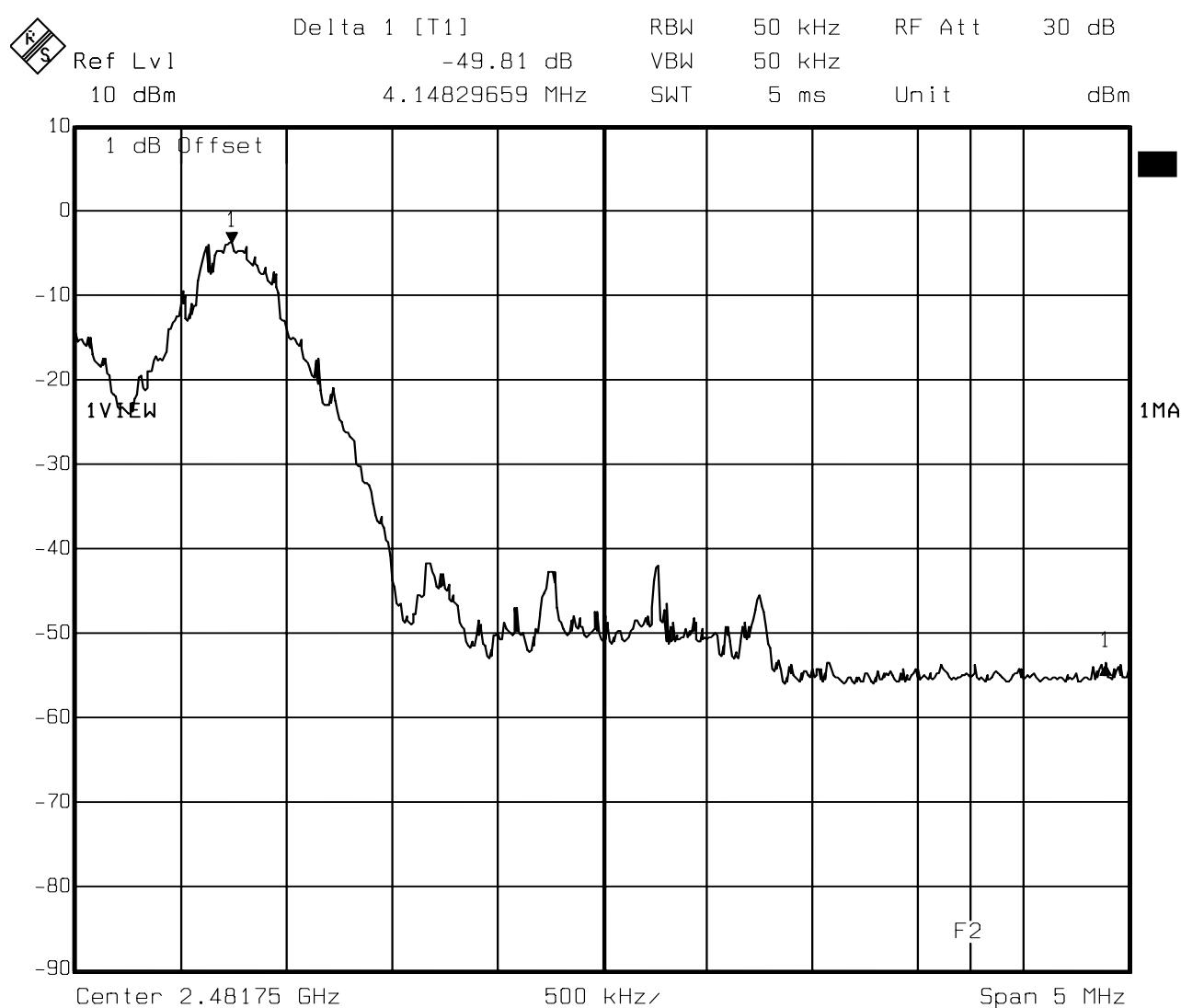
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 Measurement diagram
 

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**Band-edge compliance of RF conducted emissions FCC part 15.247**

EUT TATA X 18  
 Model 7648136510  
 Approval Holder Blaupunkt GmbH  
 Temperature / Voltage 23°C / Vnom  
 Test Site / Operator Eurofins Product Service GmbH / Mr. Handrik  
 Test Specification FCC part 15 section 247(c)  
 Comment 1 Band-edge compliance  
 Comment 2 Channel.: 78 / 2480 MHz  
 Comment 3 Hopping mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS  
 Date: 25.NOV.2008 08:24:04

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 Measurement diagram
 

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