

# 1 Annex D – RF Human Exposure

## 1.1 List of Pictures

Picture 1: EUT – Antenna – Cover distance 1 .....2  
Picture 2: EUT – Antenna – Cover distance 2 .....2

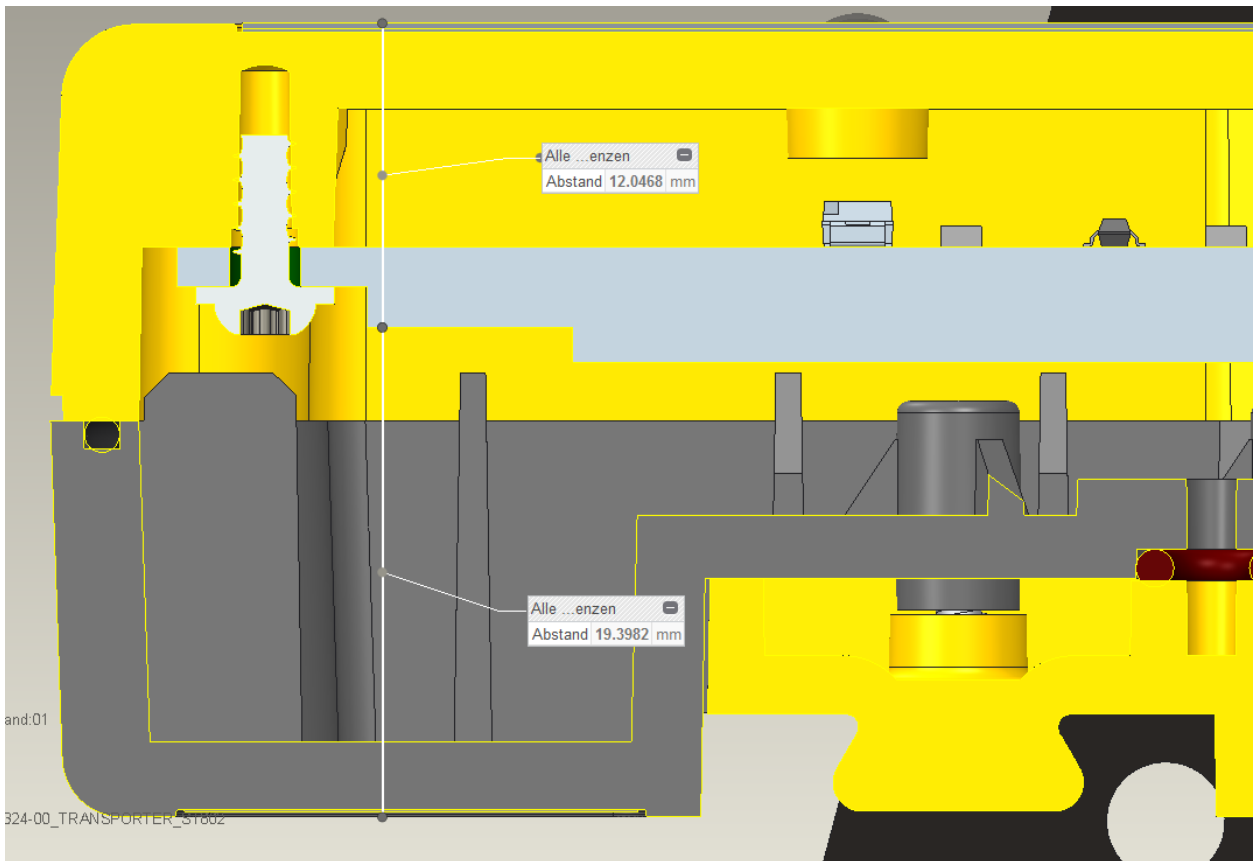


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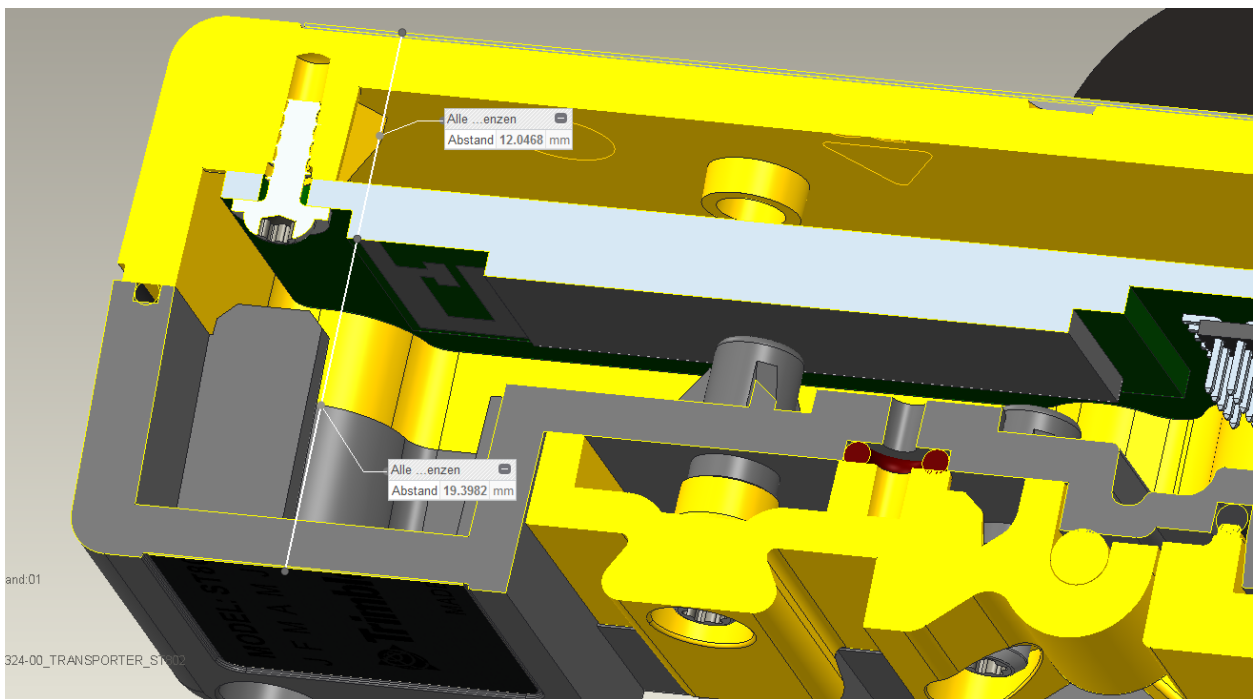
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Picture 1: EUT – Antenna – Cover distance 1 (contains module: PWR-TK42RF)



Picture 2: EUT – Antenna – Cover distance 2 (contains module: PWR-TK42RF)

SAR review for contains modul PWR-TK42RF :

In the following sections 1.2 and 1.3 the minimum distance value is determined due to the construction drawings pictures 1 and 2 in this document.

## 1.2 SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances $\leq 50$ mm and $< 5$ mm according to KDB 447498 D01 section 4.3.1.1:

$$\frac{P_{conducted}(mW) \cdot \sqrt{f(GHz)}}{\Delta_{min}} \leq 3.0$$

Calculation:  $\frac{1.922mW \cdot \sqrt{2.47}}{12mm} = 0.252 < 3.0$

## 1.3 Exemption Limits for SAR Evaluation according to RSS-102 Issue 5, section 2.5.1:

Limit according to table1:

Frequency (MHz)	Exemption Limits (mW) at separation distance of $\leq 10$ mm
2450	7

## 1.4 The average value of pulsed emissions according to ANSI C63.10-2013, section 7.5:

Duty cycle correction factor:

$$\delta(dB) = 20 \cdot \log(\Delta)$$

where

- $\delta$  is the duty cycle correction factor (dB)
- $\Delta$  is the duty cycle (dimensionless)



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Calculation with individual ON times according to the equation in section 7.5:

$$\delta(\text{dB})=20 \cdot \log \left[ \sum (nt_1+mt_2+\dots+\xi t_x/T) \right]$$

n is the number of pulses of duration  $t_1$

m is the number of pulses of duration  $t_2$

$\xi$  is the number of pulses of duration  $t_x$

T is the period of the pulse train, or 100 ms if the pulse train length is greater than 100 ms.

#### Calculated RF peak:

Separately measured values in section 1.5

RF peak = measured value + cable attenuation

#### Channel low:

RF peak: 13.7dBm + 0.7dB = 14.40dBm

$$\delta=20 \cdot \log \left( \frac{1.48}{1.48 + 8.54} \right) = 16.61\text{dB}$$

Calculated average factor: 14.40dBm – 16.61dB = -2.21dBm

#### Channel mid:

RF peak: 12.83dBm + 0.8dB = 13.63dBm

$$\delta=20 \cdot \log \left( \frac{1.48}{1.48 + 8.55} \right) = 16.62\text{dB}$$

Calculated average factor: 13.63dBm – 16.62dB = -2.99dBm

#### Channel high:

RF peak: 12.03dBm + 0.8dB = 12.83dBm

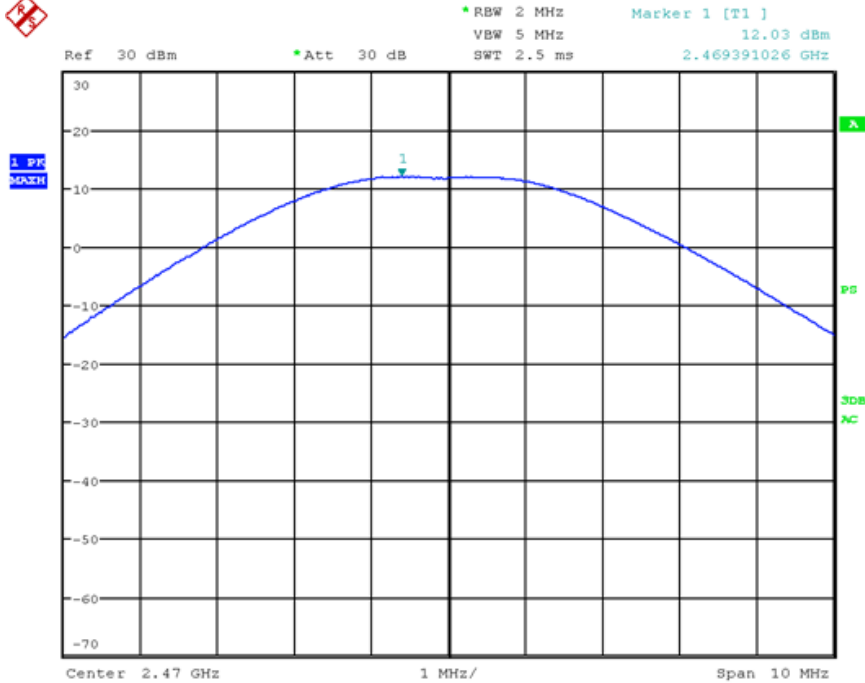
$$\delta=20 \cdot \log \left( \frac{1.48}{1.48 + 8.53} \right) = 16.60\text{dB}$$

Calculated average factor: 13.63dBm – 16.62dB = -3.79dBm

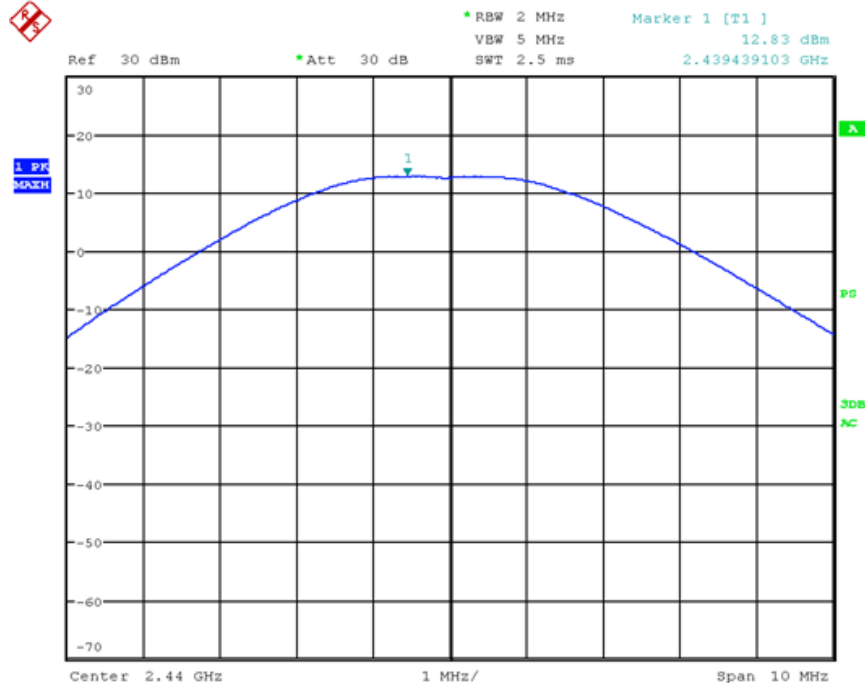


# 1.5 Separate conducted measured peak values according to the test report section 4 :

Channel High:



Channel Mid:



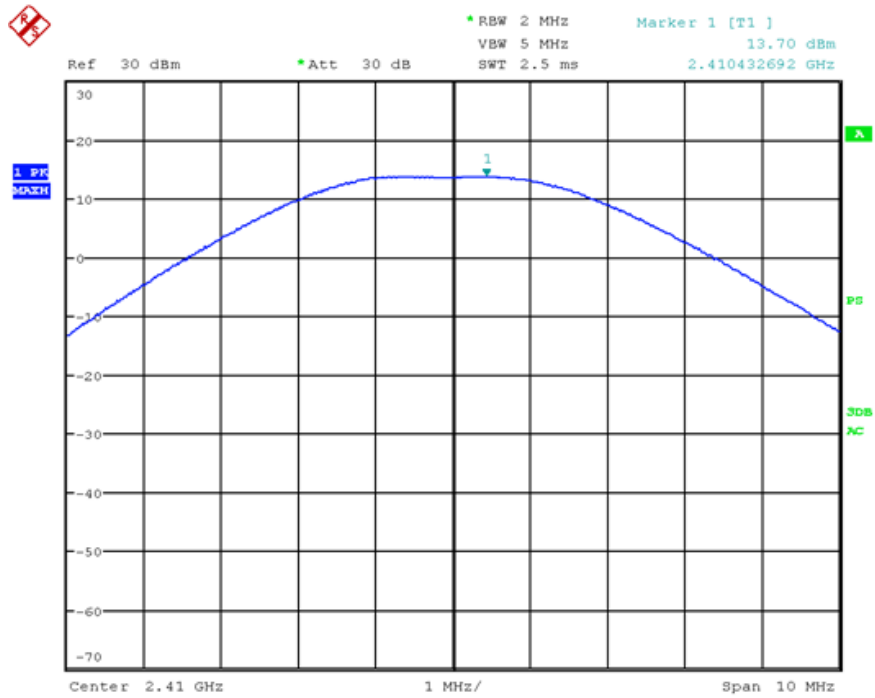
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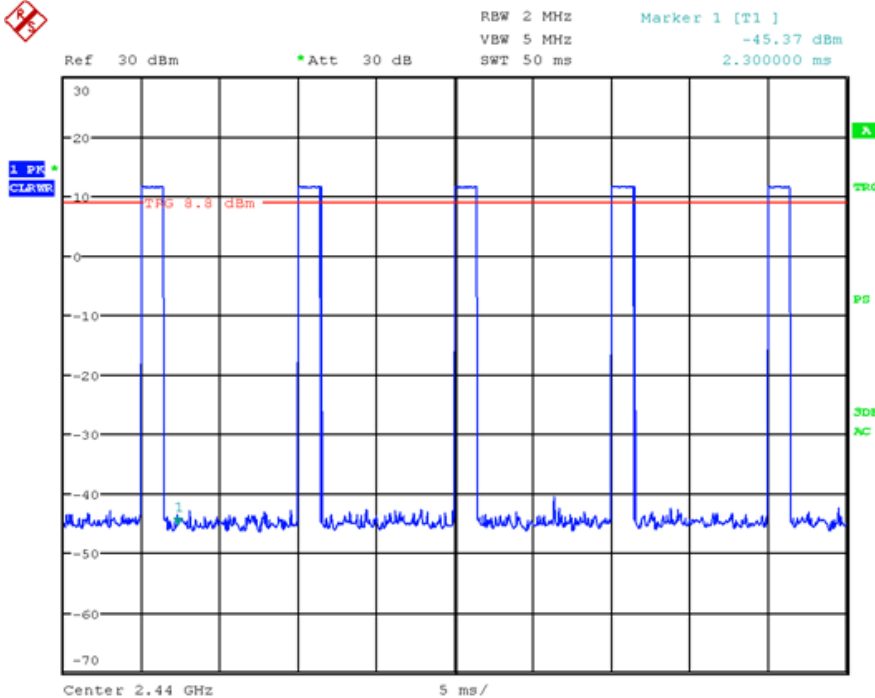
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Channel low:



## 1.6 Measured duty cycle:

Channel High:



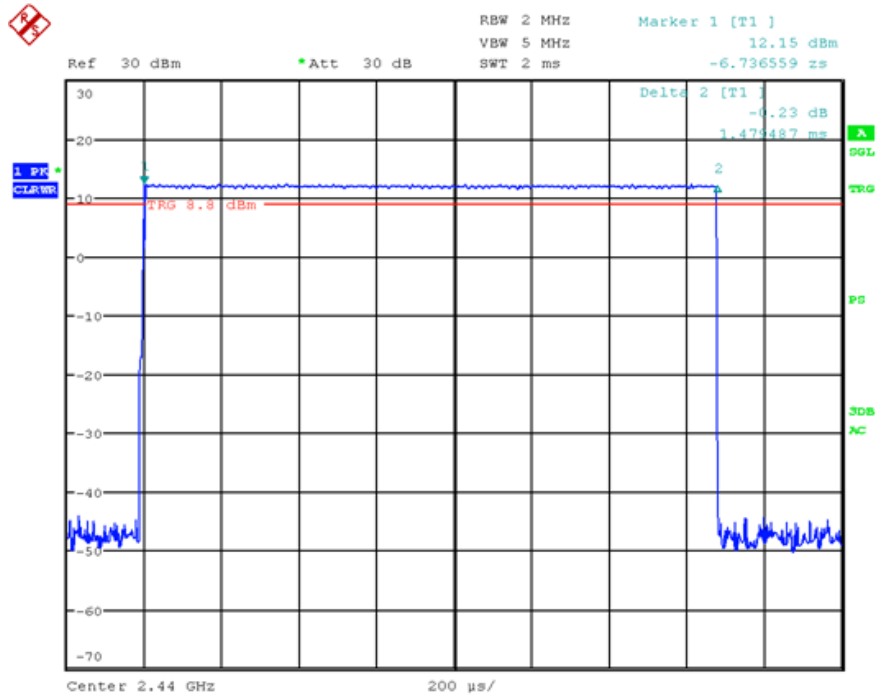
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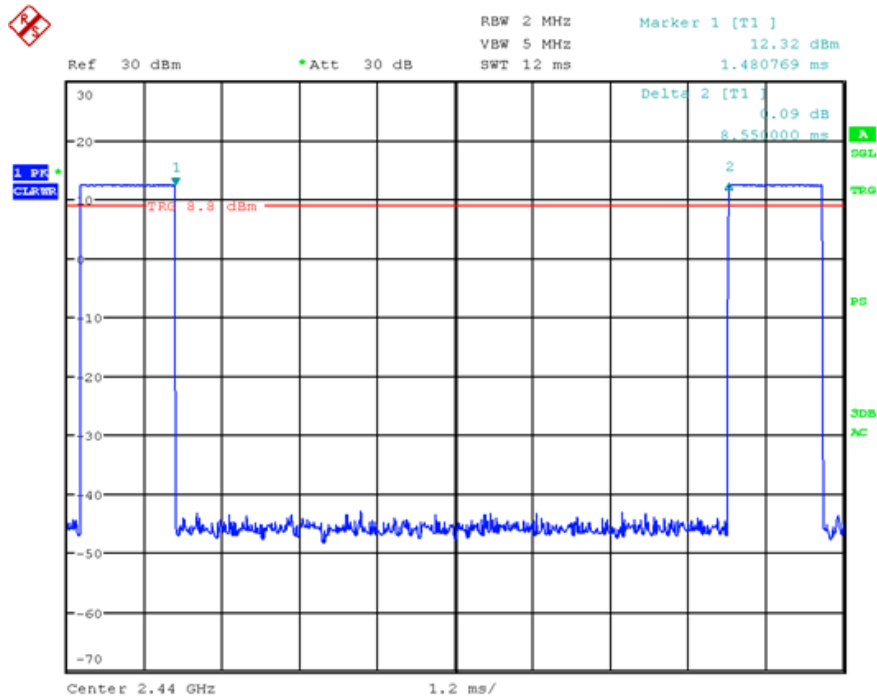
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On time:



Off time:



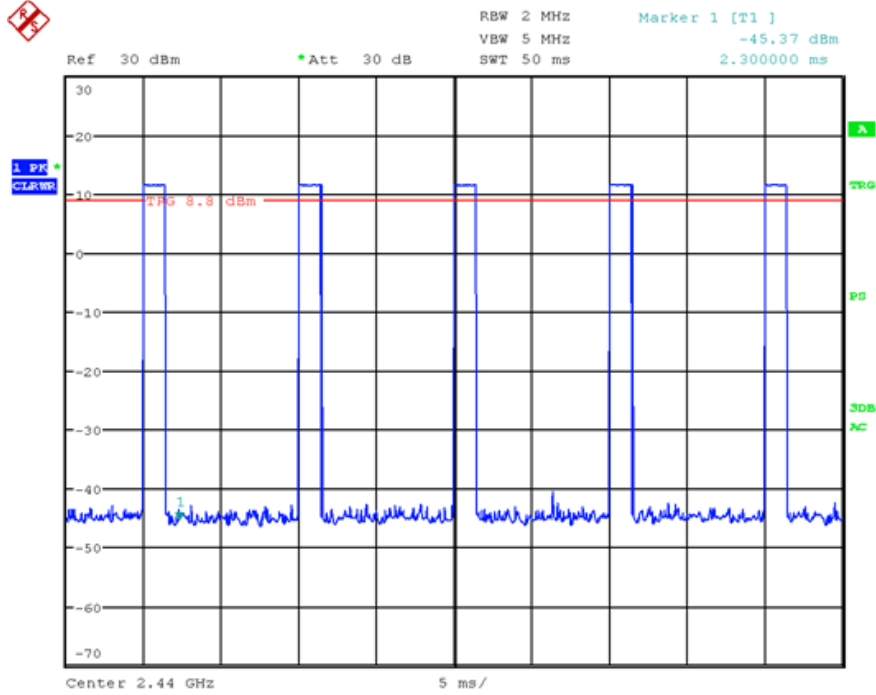
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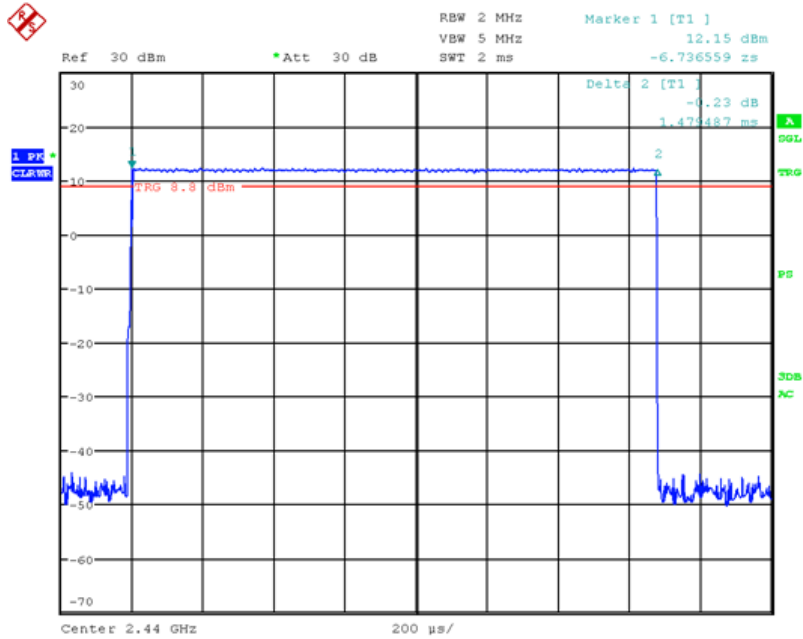
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Channel mid:



On time:



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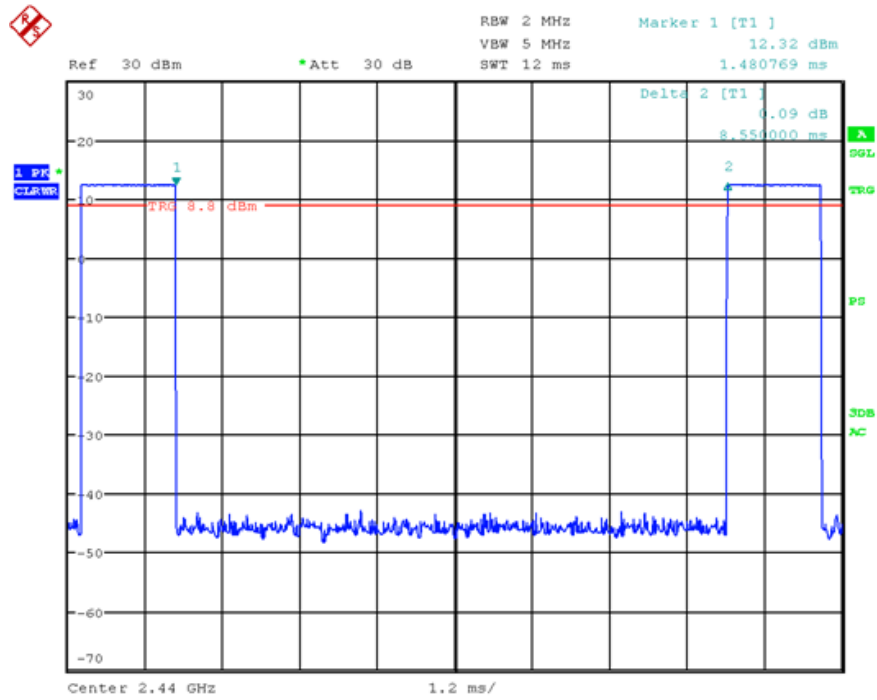
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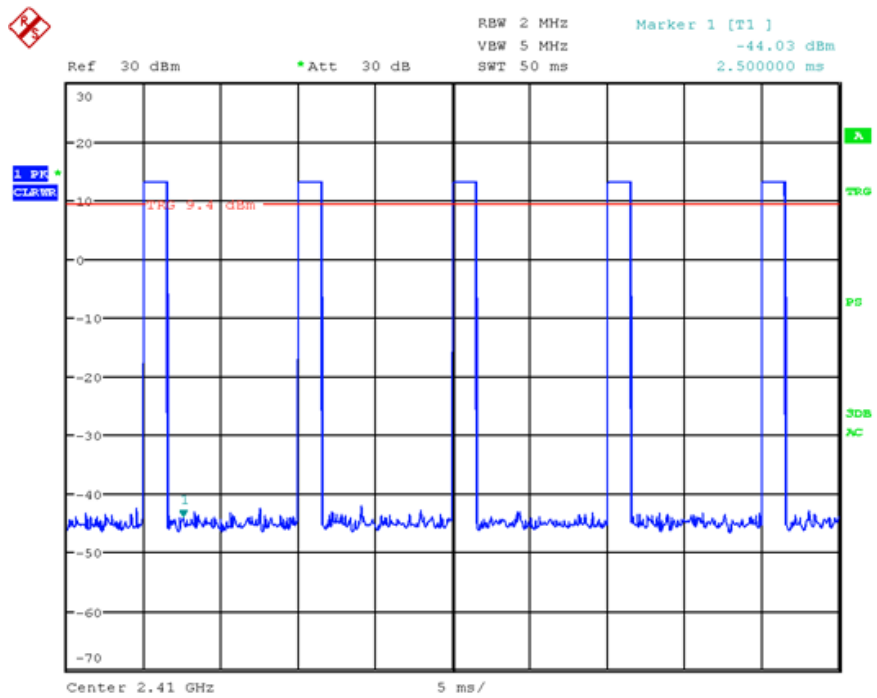
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Off time:



Channel low:

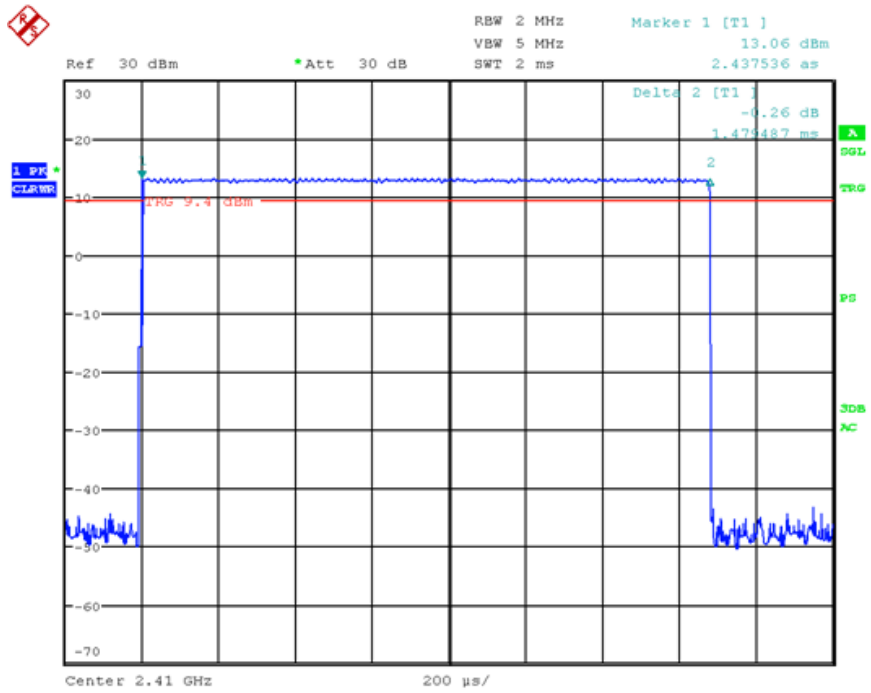


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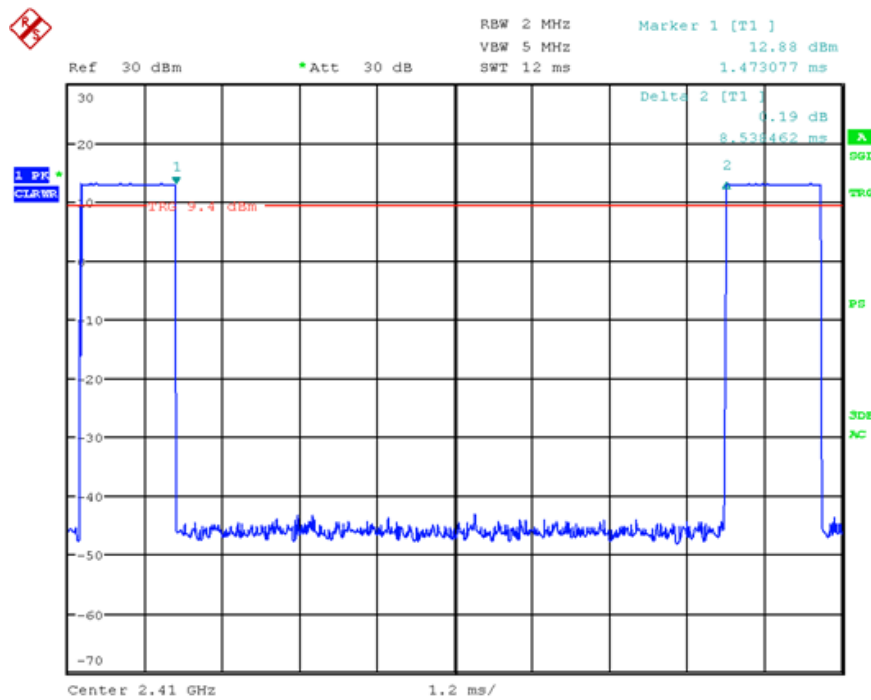
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On time:



Off time:



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