

Annex 1: Measurement diagrams 21-1-0132201T05a-A1

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Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	Applicant:	SOMMER Antriebs- und Funktechnik GmbH
Product:	Wireless Keypad		
Model:	Telecody+		
FCC ID:	T8C203	IC:	6496A-203
Testing has been carried out in accordance with:	FCC Regulations: Title 47 CFR, Chapter I, Subchapter A, Subpart C: §15.231 ISED Regulations: RSS-210, Issue 10 RSS-Gen, Issue 5 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		

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1 Measurement diagrams

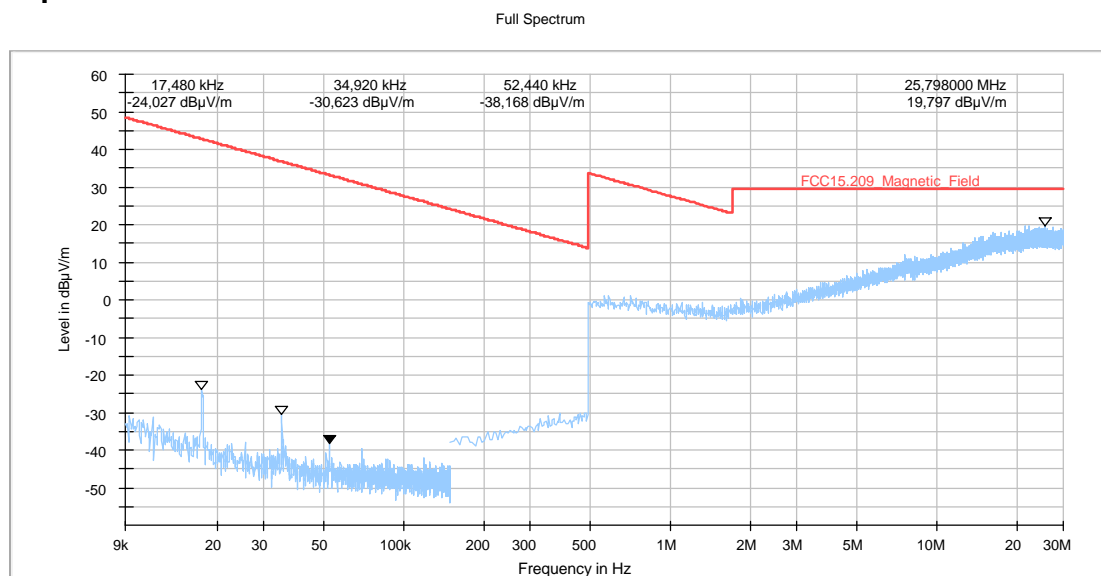
1.1 Radiated spurious emissions

2.01_RSE_TX_standing

Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Operator:	SSanthakum/TFra
Environmental Conditions:.	Humidity : 40%rH; Temperature: 20°C
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	standing

Full Spectrum

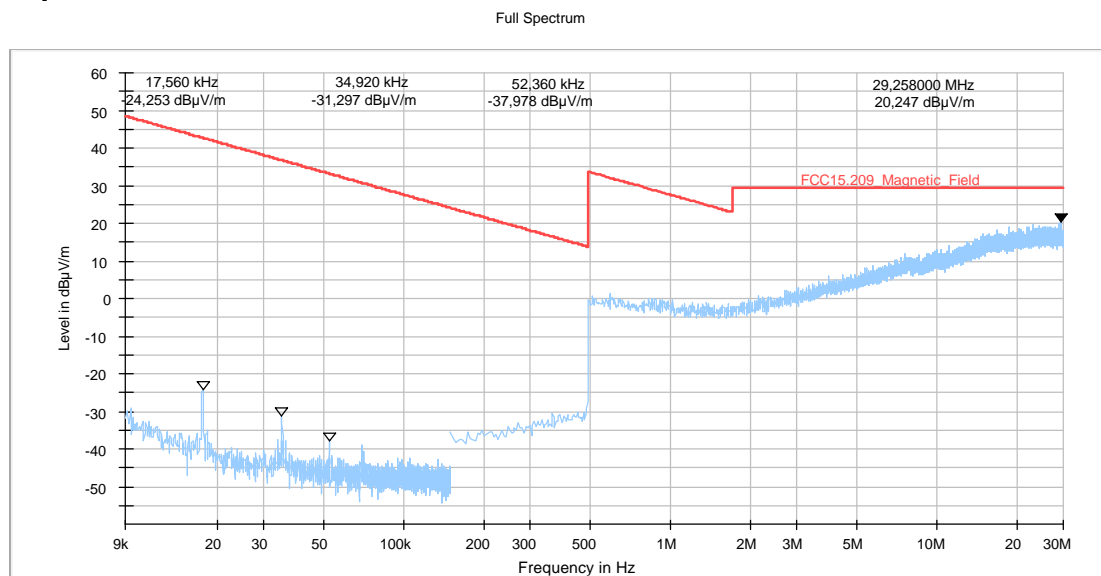


2.02_RSE_TX_lying

Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Operator:	SSanthakum/TFra
Environmental Conditions:	Humidity : 40%rH; Temperature: 20°C
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	lying

Full Spectrum



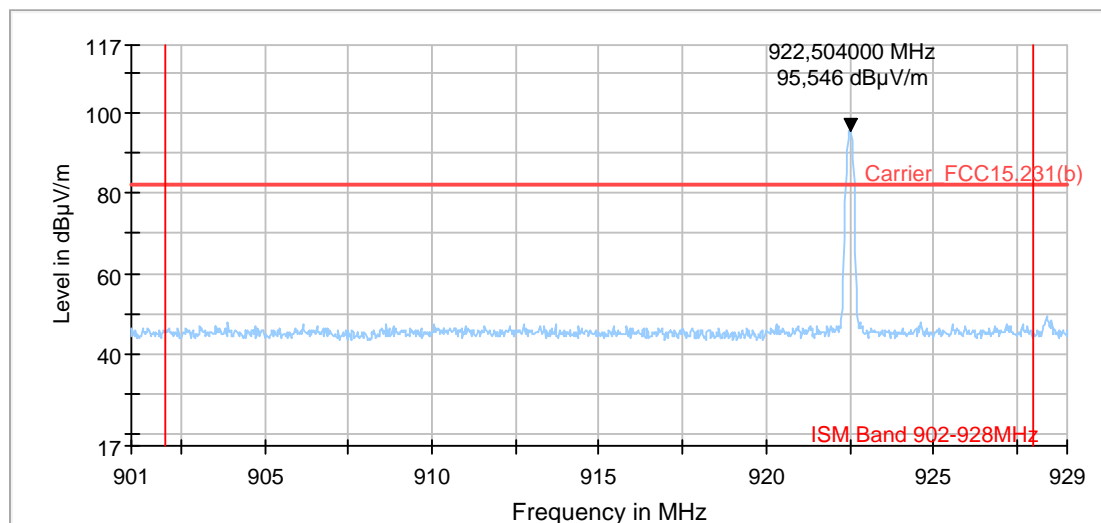
3.01_PWR_TX_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site Location:	CETECOM GmbH Essen
Version of Testsoftware:	EMC32 V10.50.0
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Operator:	SSanthakum/TFra
Environmental Conditions:	Humidity : 40%rH; Temperature: 20°C
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	standing

Full Spectrum

Full Spectrum



Remark: due to testmode EUT was transmitting a continuous wave (CW) signal and measured with a peak detector, therefore a duty-cycle correction factor is applied reducing the peak value by 16.33 dB. See section 1.2 Duty-cycle correcton for more information.

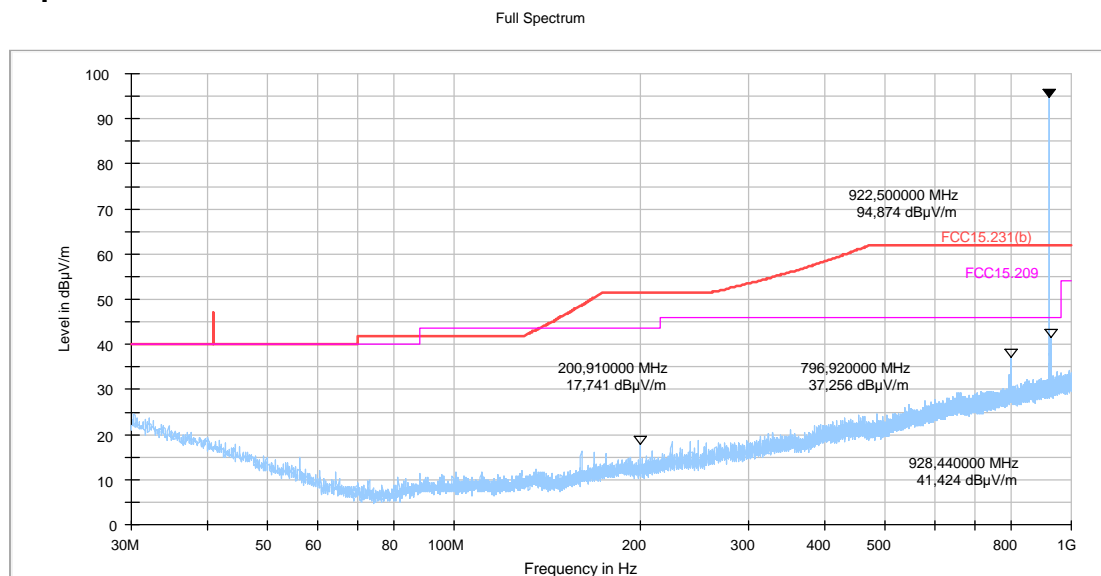
$$95.546 \text{ dB}\mu\text{V/m (PK)} - 16.33 \text{ dB } (\delta) = 79.216 \text{ dB}\mu\text{V/m (AV)} = \text{PASSED}$$

3.02_RSE_TX_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site Location:	CETECOM GmbH Essen
Version of Testsoftware:	EMC32 V10.50.0
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Operator:	SSanthakum/TFra
Environmental Conditions:	Humidity : 40%rH; Temperature: 20°C
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	standing

Full Spectrum



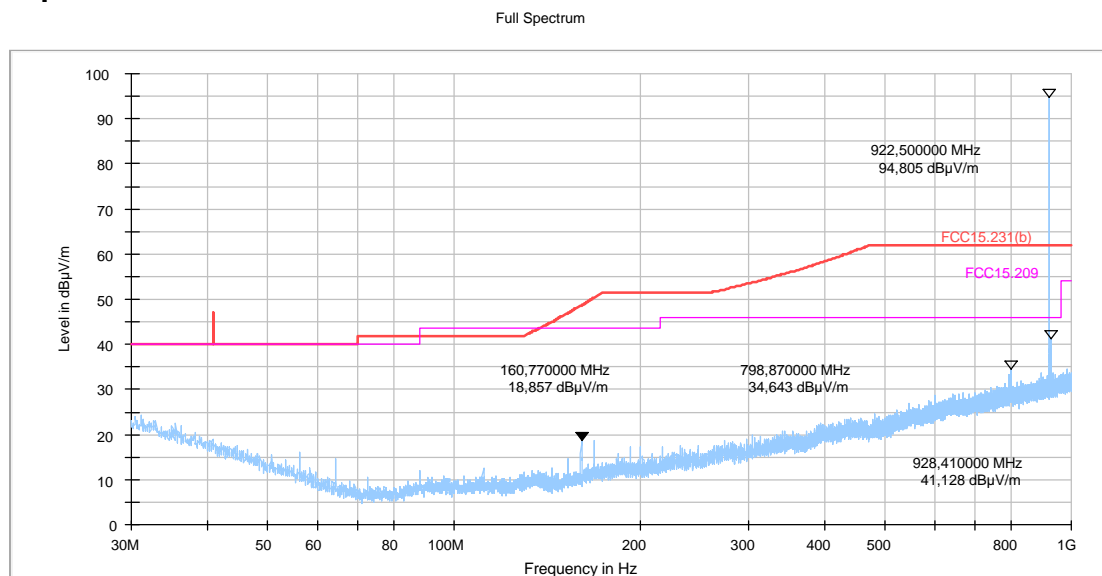
Remark 1: for the fundamental emission at 922.5 MHz a different limit applies.

3.03_RSE_TX_lying

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site Location:	CETECOM GmbH Essen
Version of Testsoftware:	EMC32 V10.50.0
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Operator:	SSanthakum/TFra
Environmental Conditions:	Humidity : 40%rH; Temperature: 20°C
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	lying

Full Spectrum



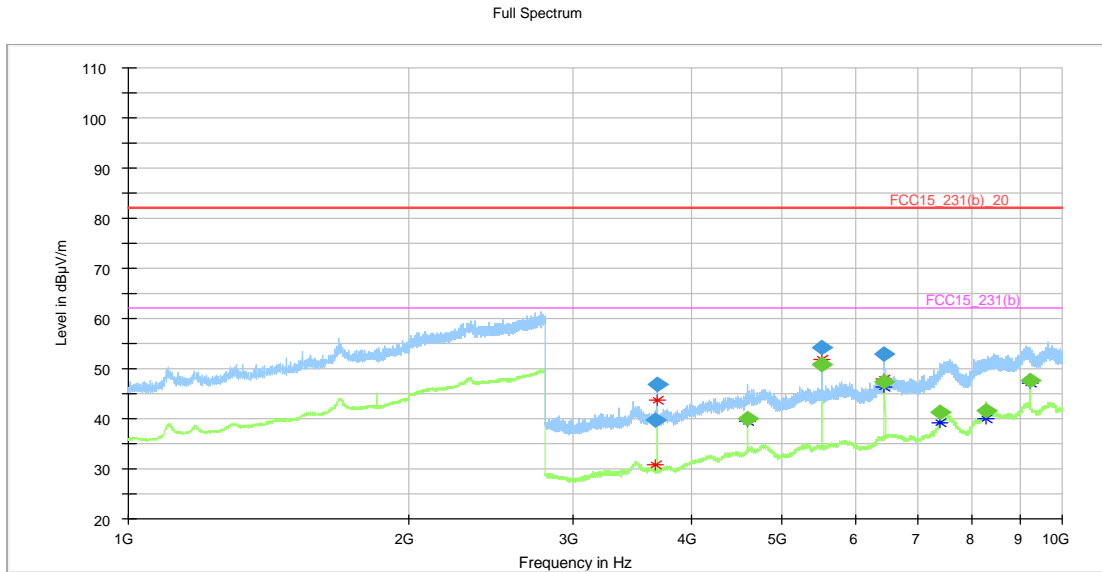
Remark 1: for the fundamental emission at 922.5 MHz a different limit applies.

4.01_RSE_TX

Common Information

Test Description:	Radiated Field Strength Emissions Emissions in 3m distance
Test Site:	Fully Anechoic Chamber (FAC1) - EMC32 V10.60.20
Test Standard:	FCC 15.205 § 15.209 § 15.231; RSS-Gen: Issue 5; RSS-210: Issue 10
Antenna polarisation:	horizontal/vertical
Operator:	HEI
Operating Mode:	Continuous TX
Verdict:	Passed
PMT number:	21-1-01322S05_C01
Power Supply:	3 VDC
EUT Setup:	--

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Trd Corr. (dB/m)
3675.090000	39.71	---	82.00	42.29	100.0	1000.000	155.0	H	-24.0	90.0	33
3689.970000	46.87	---	82.00	35.13	100.0	1000.000	155.0	V	266.0	90.0	33
4612.450000	---	39.99	62.00	22.01	100.0	1000.000	155.0	H	313.0	90.0	35
5534.930000	54.10	---	82.00	27.90	100.0	1000.000	155.0	H	-29.0	90.0	36
5534.930000	---	50.66	62.00	11.34	100.0	1000.000	155.0	H	-28.0	90.0	36
6457.450000	52.92	---	82.00	29.08	100.0	1000.000	155.0	H	30.0	90.0	38
6457.450000	---	47.29	62.00	14.71	100.0	1000.000	155.0	H	30.0	90.0	38
7379.930000	---	41.20	62.00	20.80	100.0	1000.000	155.0	V	27.0	90.0	39
8302.410000	---	41.65	62.00	20.35	100.0	1000.000	155.0	H	-18.0	90.0	40
9224.890000	---	47.60	62.00	14.40	100.0	1000.000	155.0	H	11.0	90.0	42

1.2 Duty-cycle correcton

A duty-cycle Peak to Average correction factor applies since the transmitter is not 100% on during one complete pulse train, as long the pulse train does not exceed 100 ms. When the Pulse train exceeds 100 ms the absolute voltage during a 100 ms window where the field strength is at its maximum shall be used to determine the correction factor.

PEAK to AVARAGE calculation:

Pulse train exceeds 100 ms time periode, therefore cumulative TX_{on}-Time within a 100 ms time periode used.

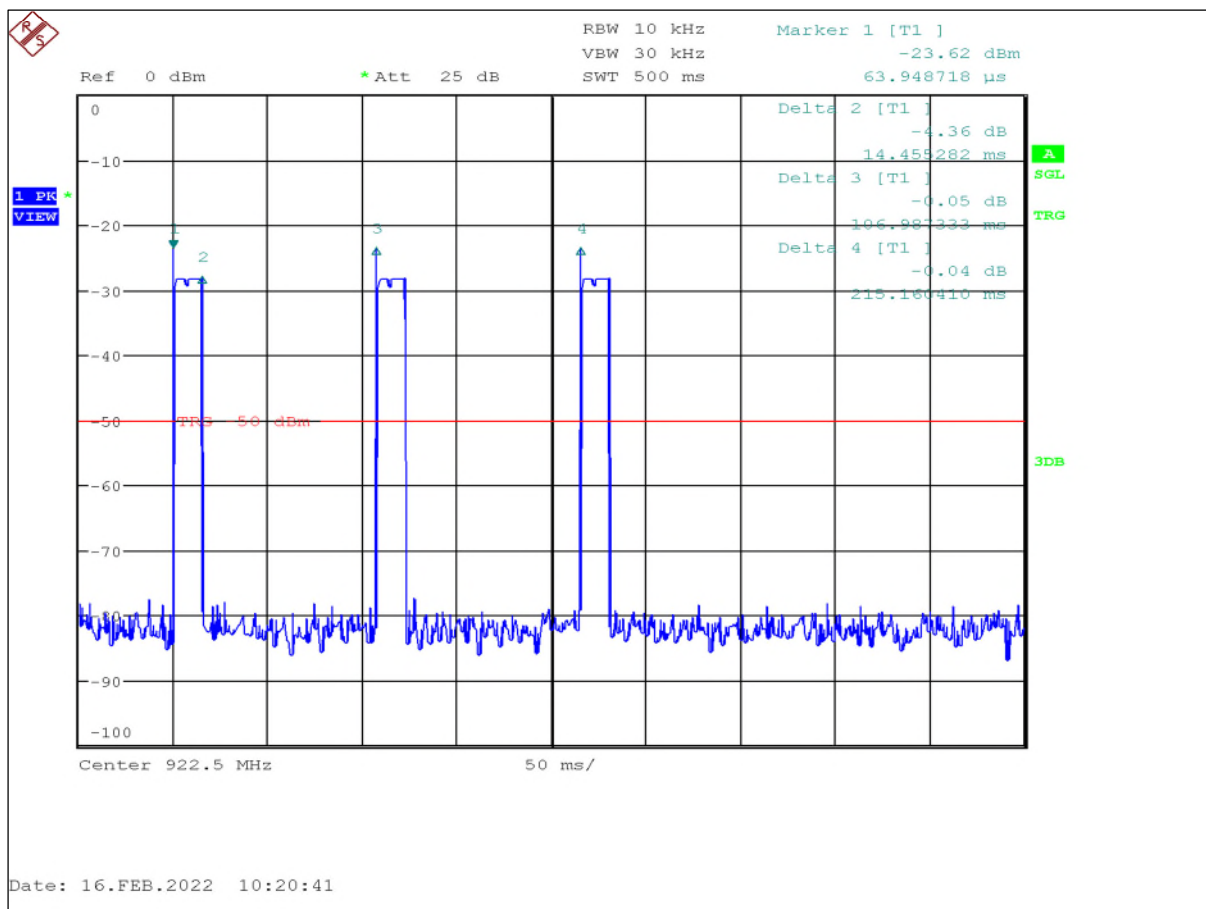
Only one pulse can be observed during a 100 ms time period.

TX_{on}(100ms) = 15.26 ms

$$\delta[dB] = 20 * \log_{10} \left(\frac{15.26ms}{100ms} \right) = -16.33dB$$

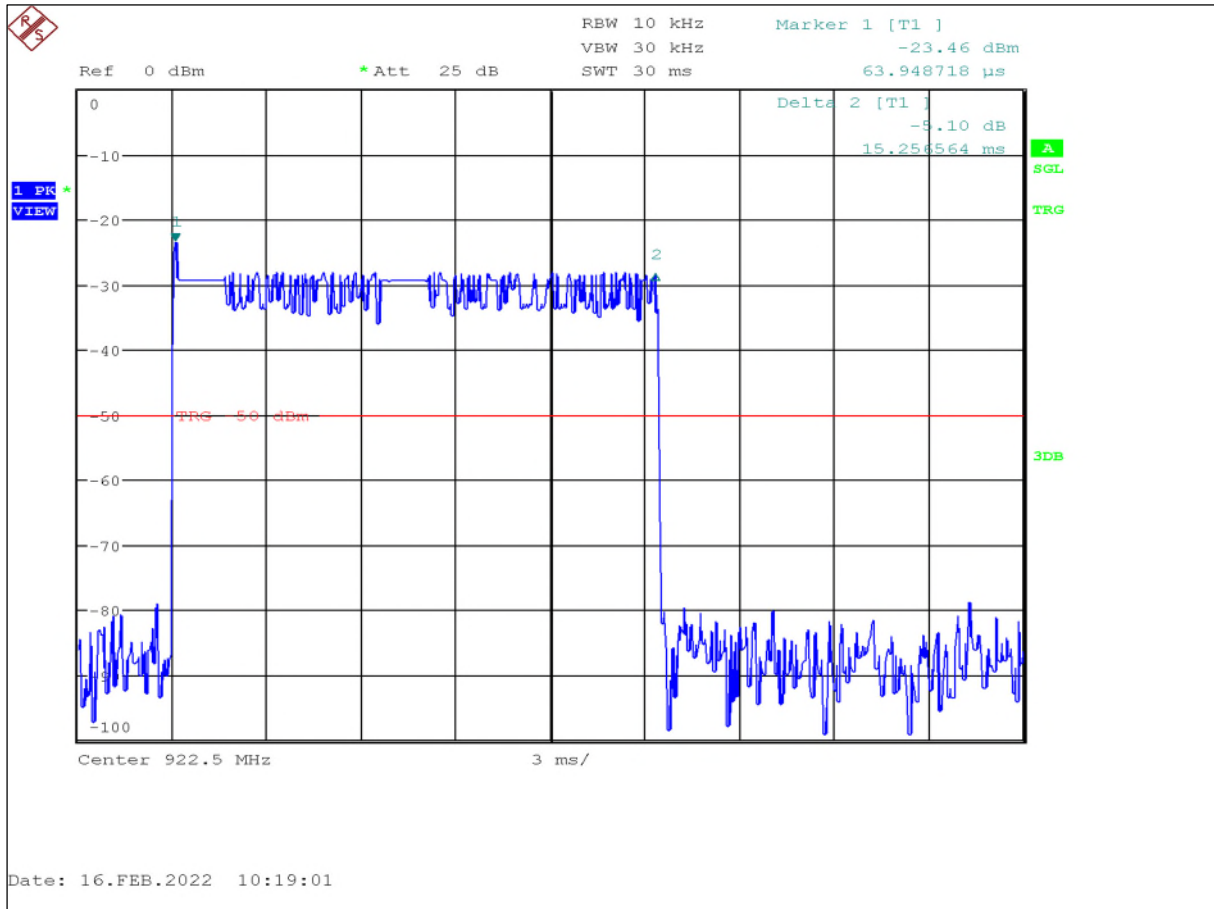
1.3 Timing parameter

D001_01_SWT500ms



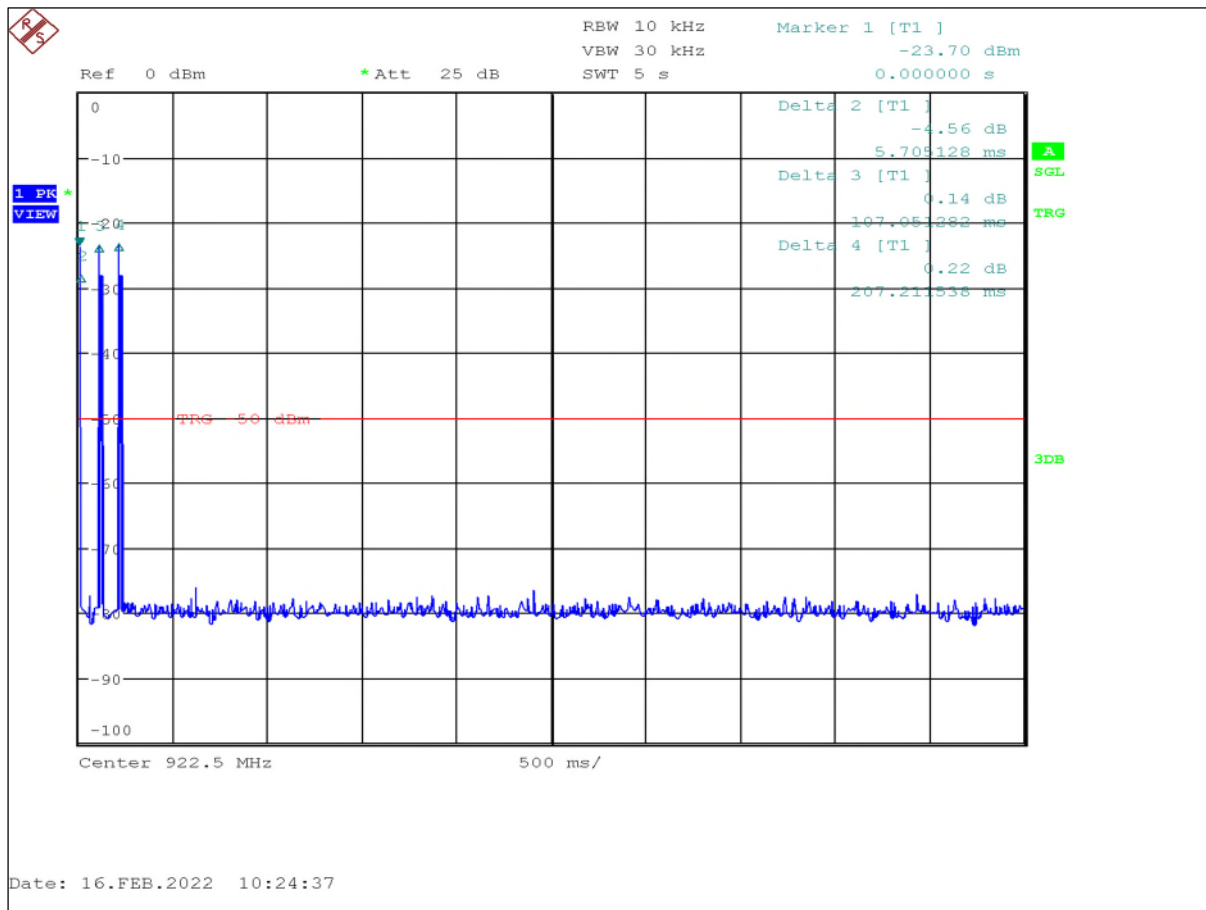
Remark: complete pulse train when activating the transmitter.

D002_01_SWT30ms



Remark: one single pulse within a pulse train.

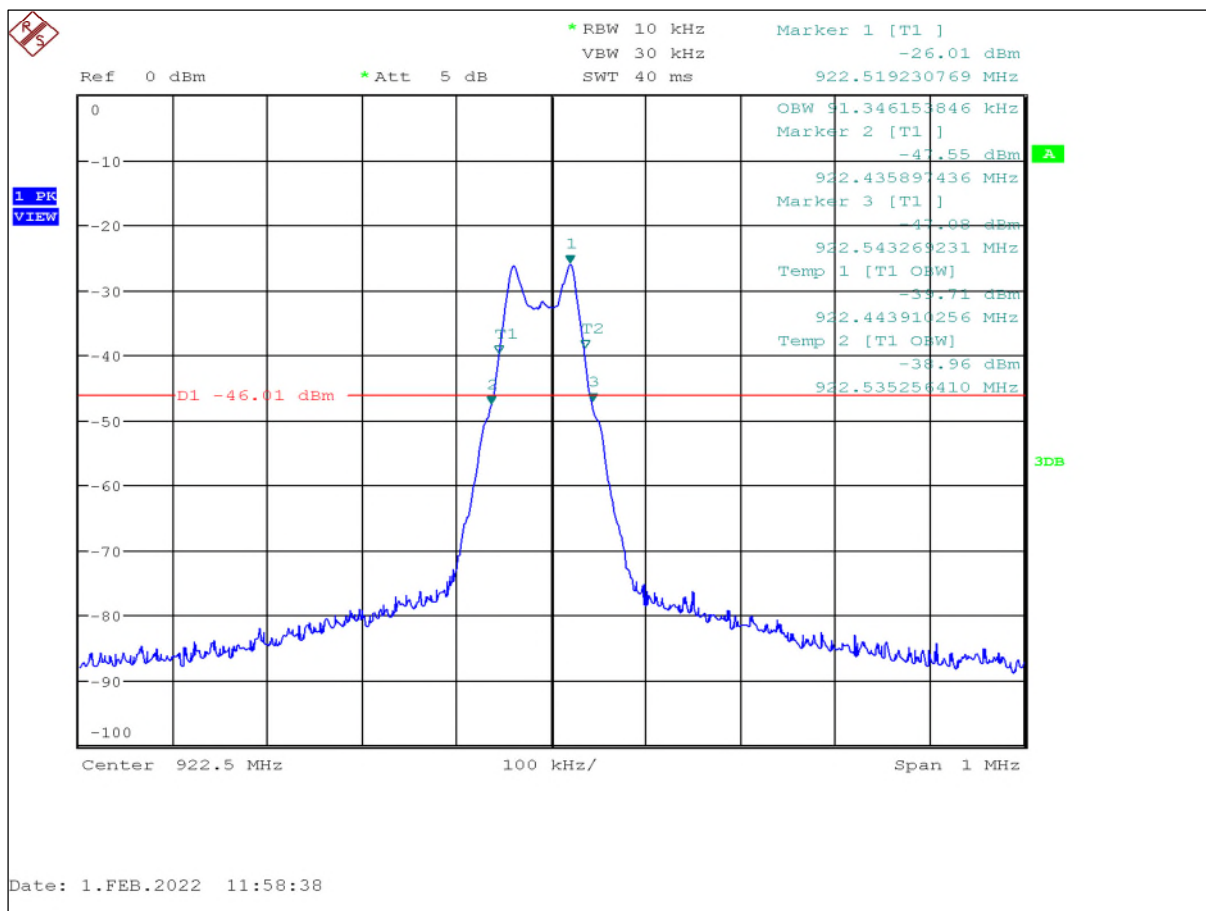
D003_01_SWT5s



Remark: transmitter deactivates after not more than 5 s after manually activating the transmitter.

1.4 Emission bandwidth

D004_01_99%OBW_20dB



Remark: the modulated bandwidth is determined at Marker 2 and Marker 3 - 20dB below the maximum level.

$$MBW = \Delta M_{23} = 107.37kHz$$

End Of Annex 1