

Annex 1: Measurement diagrams 20-1-0194901T16a-A1-C2

Number of pages:	47	Date of Report:	2022-May-19
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:	Eliko Tehnoloogia Arenduskeskus OÜ
Product:	Positioning device		
Model:	ELIKO TAG		
FCC ID:	2AF2I-TAG	IC:	--
Testing has been carried out in accordance with:	CFR Title 47, Chapter I, Subchapter A Part 15/Subpart F / §15.519		

Table of Contents

1	Measurement diagrams.....	3
1.1	10 dB bandwidth, §15.519(b), §15.503(a)(b)(c)(d).....	3
1.2	Peak power, §15.519(e).....	6
1.3	Magnetic field strength ($f < 30\text{MHz}$), §15.519(c), §15.209.....	9
1.4	Electric field strength ($30\text{MHz} < f < 960\text{MHz}$), §15.519(c), §15.209.....	11
1.5	Spurious emission measurements ($f > 960\text{MHz}$), §15.519(d).....	15
1.6	Spurious emission measurements ($f > 960\text{MHz}$), §15.519(c).....	21
1.7	Timing tests, §15.519(a)(1).....	41

1 Measurement diagrams

1.1 10 dB bandwidth, §15.519(b), §15.503(a)(b)(c)(d)

Common Information	
Test Description:	10dBc UWB Bandwidth
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	3 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(b) - UWB bandwidth restrictions FCC 15.503(a)(b)(c)(d) - Definition
Limit:	1.) minimum bandwidth of 500MHz or fractional bandwidth=0.2 2.) UWB-bandwidth within 3.1-10.6GHz
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal measured separately
Environmental Conditions::	Humidity : 49%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

MultiView Spectrum

Ref Level -30.00 dBm ● RBW 1 MHz
● Att 0 dB ● SWT 1.5 ms ● VBW 3 MHz Mode Sweep
 PA TDF "EMCO_133_ANT", "FSL-3M_30MHZ-18GHZ", "FAC2_Ant3m_OutCable"

1 Frequency Sweep ○ 1Pk Max

Y-axis labels: -10 dBm, -15 dBm, -20 dBm, -25 dBm, -30 dBm, -35 dBm, -40 dBm, -45 dBm, -50 dBm

X-axis labels: CF 3.993 6 GHz, 1500 pts, 150.0 MHz/, Span 1.5 GHz

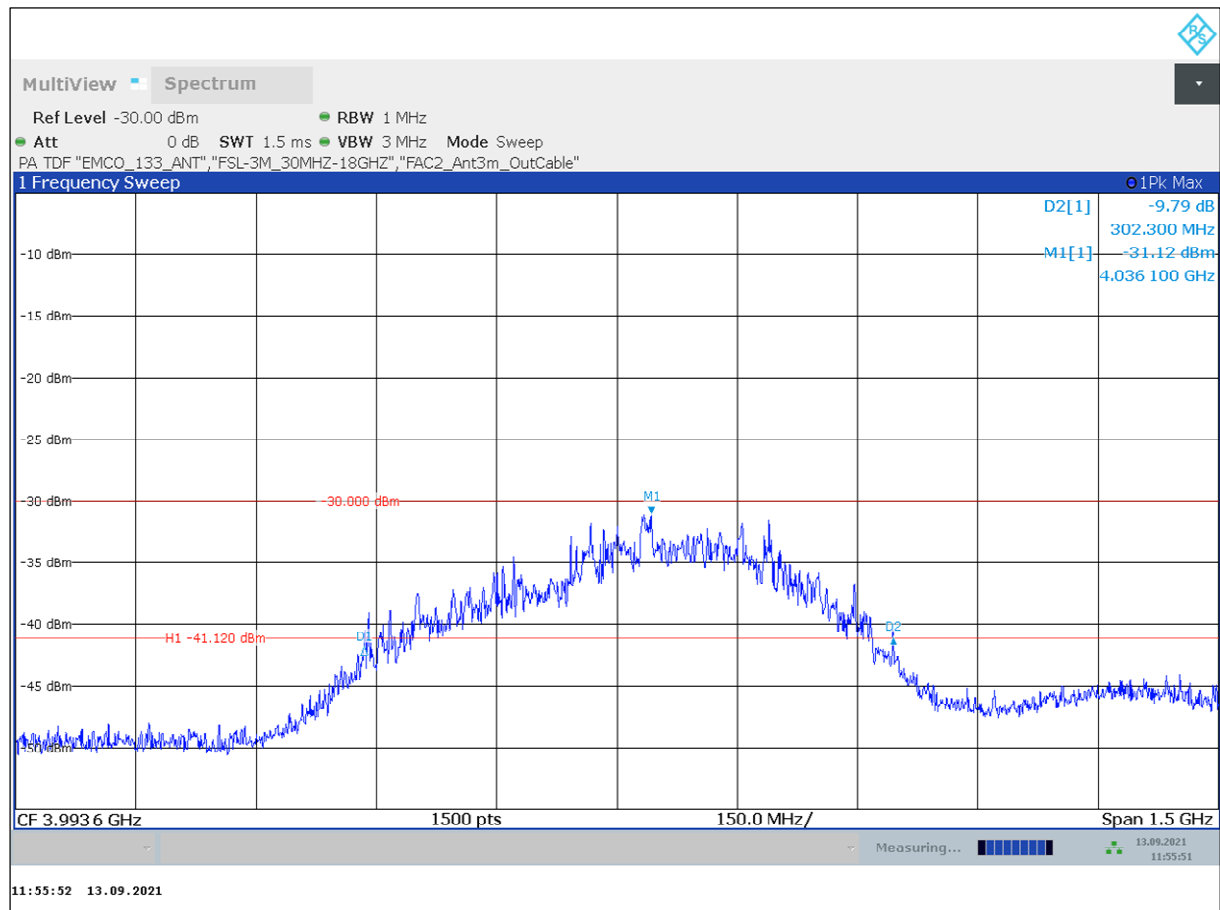
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	4.088 1 GHz	-30.77 dBm		
D1	M1	1	-348.1 MHz	-10.02 dB		
D2	M1	1	235.1 MHz	-10.36 dB		

Measuring... ■ 13.09.2021 11:48:28

11:48:29 13.09.2021

Bandwidth: 583.2 MHz (not maximum)

D16_40b_BBW10dBc_TX_Ch4_PWR0x05050505_AntV



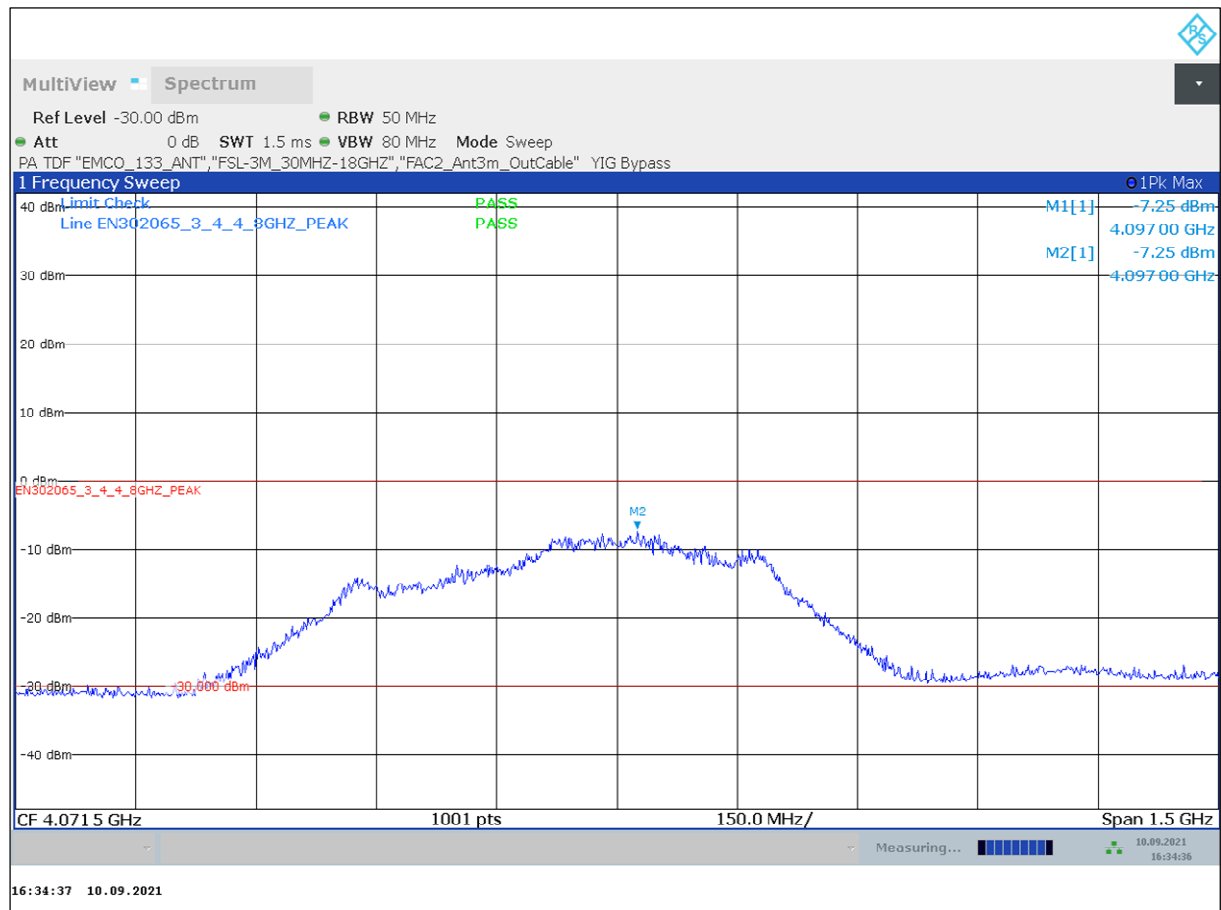
Measurement antenna: vertical polarisation

Bandwidth: 660.510473MHz (maximum)

1.2 Peak power, §15.519(e)

Common Information	
Test Description:	Peak level of emissions within 50MHz
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	3 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(e)
Limit:	0dBm/50MHz
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal separate measurements
Environmental Conditions::	Humidity : 48%rH; Temperature: 22°C
EUT Setup:	1
Verdict:	Passed
EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

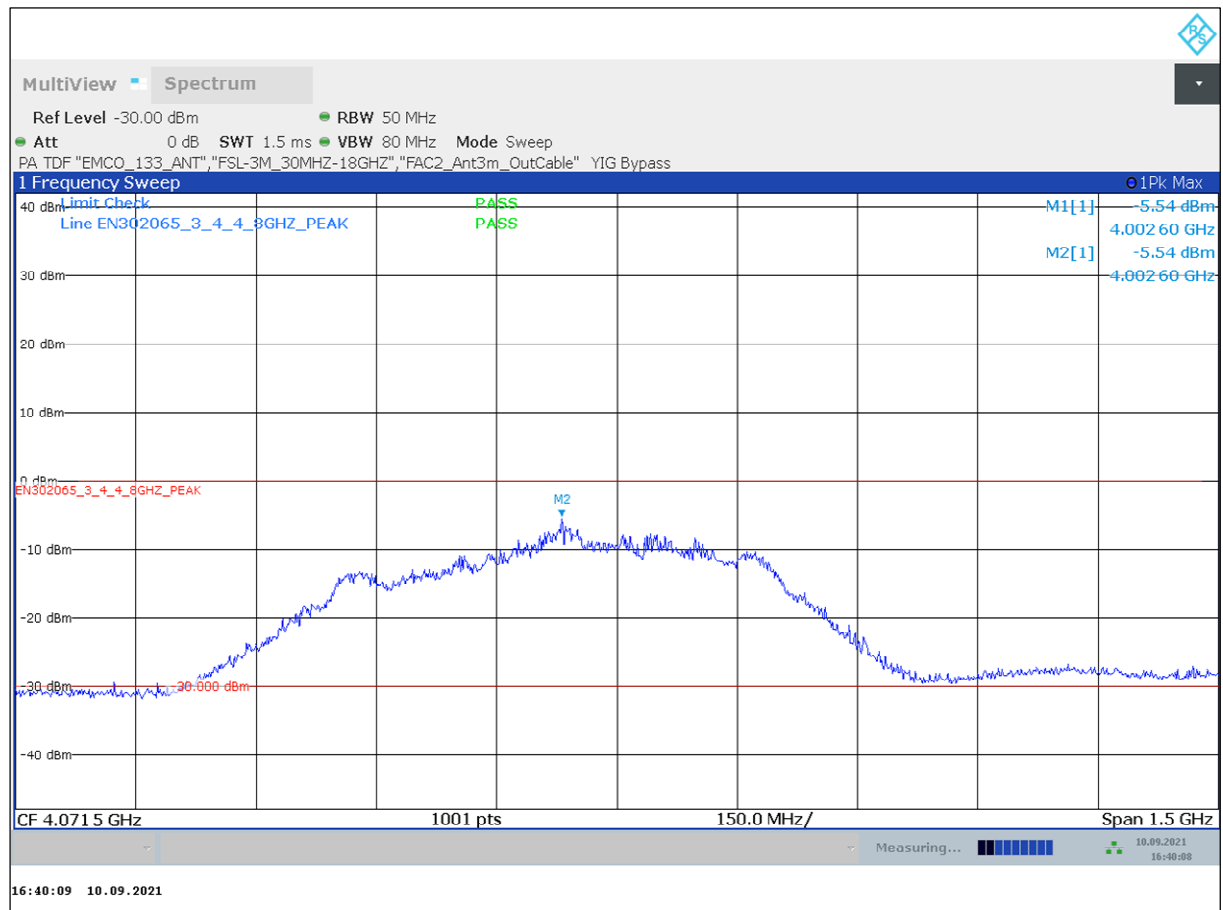
06a_PeakPWR_TX_Ch4_PWR0x05050505_AntH



Wrong naming of limit. Correct name designation 15.519(e)

Measurement antenna: horizontal

06b_PeakPWR_TX_Ch4_PWR0x05050505_AntV



Wrong naming of limit. Correct name designation 15.519(e)

Measurement antenna: vertical

1.3 Magnetic field strength (f<30MHz), §15.519(c), §15.209

D16_2.01_RSE_TX_Ch4_PWR0X05050505_EUT_standing

Common Information

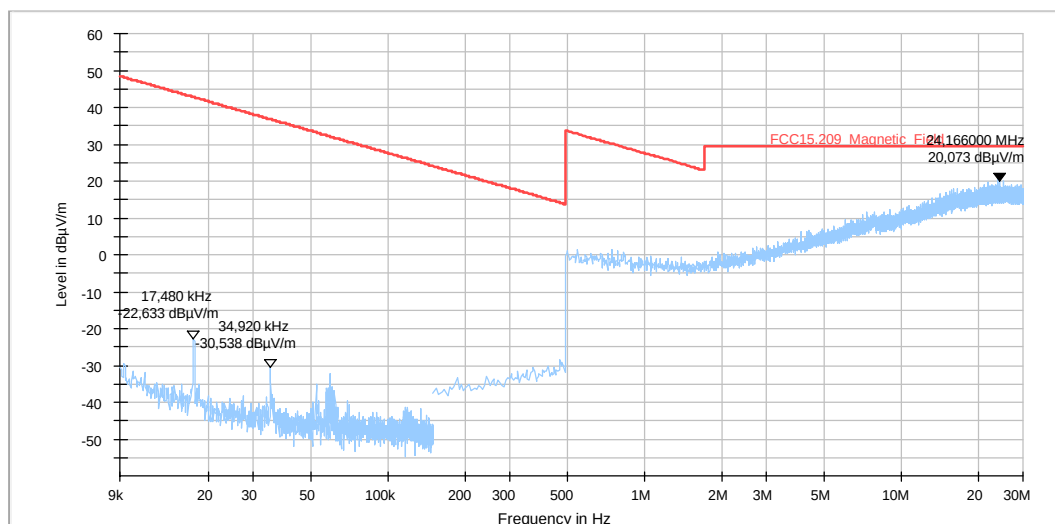
Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 5

Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	5V DC over AE AC/DC adapter
Comment 1:	Channel UWB 4
Comment 2:	EUT standing
Environmental Conditions:	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	2
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

Full Spectrum



D16_2.02_RSE_TX_Ch4_PWR0X05050505_EUT_laying

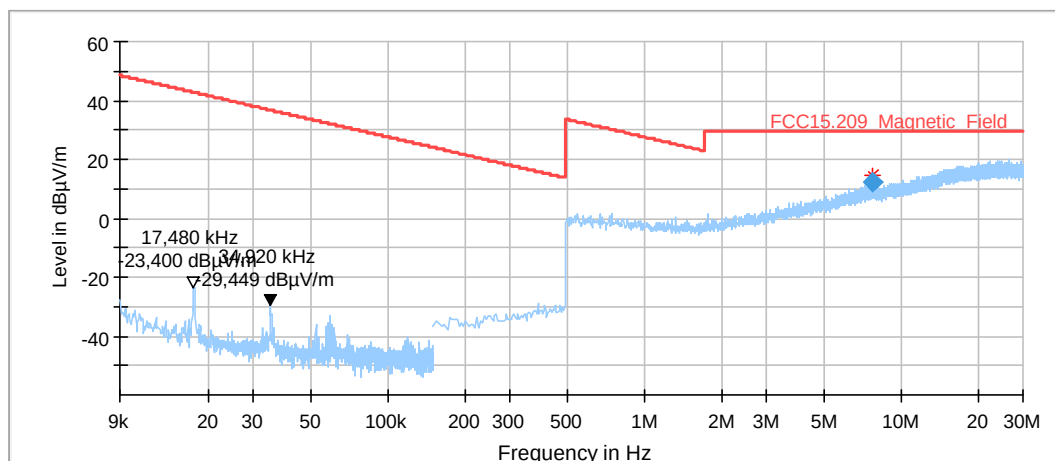
Common Information

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
Distance correction:	used accord. table, pls. see test report
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
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	5V DC over AE AC/DC adapter
Comment 1:	Channel UWB 4
Comment 2:	EUT standing
Environmental Conditions:	Humidity : 52%rH; Temperature: 19°C
EUT Setup:	2
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

Full Spectrum



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin	Meas. Time (ms)	Bandwidth h	Pol	Azimuth h	Corr. (dB/m)	Comment
7.790000	12.53	29.54	17.01	1000.0	9.000	V	30.0	-7.1	11:50:51 - 20.09.2021

1.4 Electric field strength (30MHz < f < 960 MHz), §15.519(c), §15.209

D16_3.01_RSE_TX_Ch4_PWR0X05050505_EUT_laying

Common Information

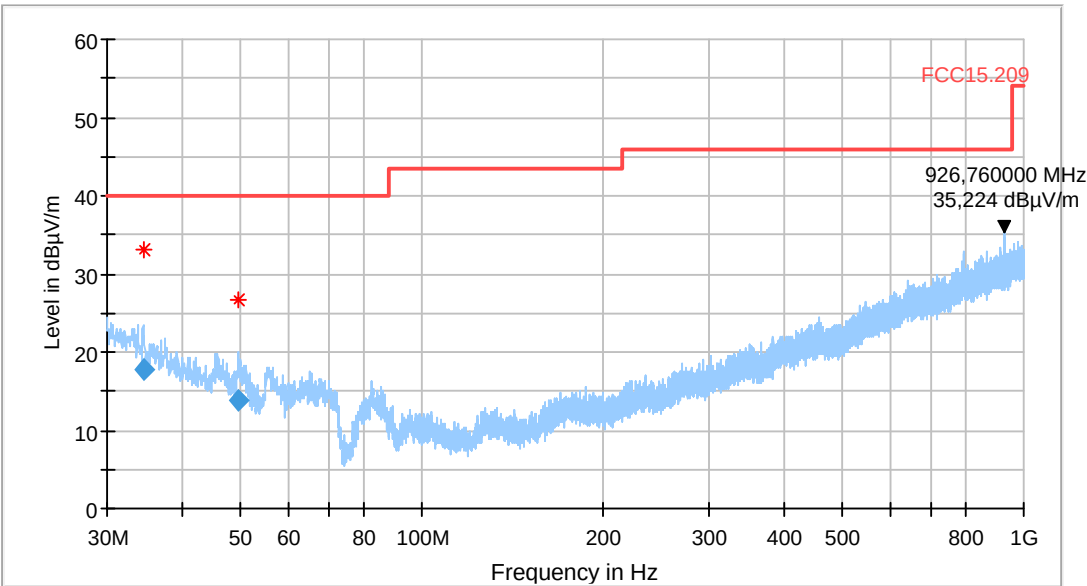
Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 5
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	5V DC over AE AC/DC adapter
Comment 1:	Channel UWB 4
Comment 2:	EUT laying
Environmental Conditions::	Humidity : 52%rH; Temperature: 19°C
EUT Setup:	2
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

Full Spectrum

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)
34.415000	17.66	40.00	22.34	120.000	318.0	H	225.0	19.4	0.0	0.5	18.9
49.585000	13.86	40.00	26.14	120.000	177.0	V	7.0	13.1	0.0	0.7	12.4

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)	Comment
34.415000	-1.8	09:53:01 - 20.09.2021
49.585000	0.8	09:58:49 - 20.09.2021

D16_3.02_RSE_TX_Ch4_PWR0X05050505_EUT_standing

Common Information

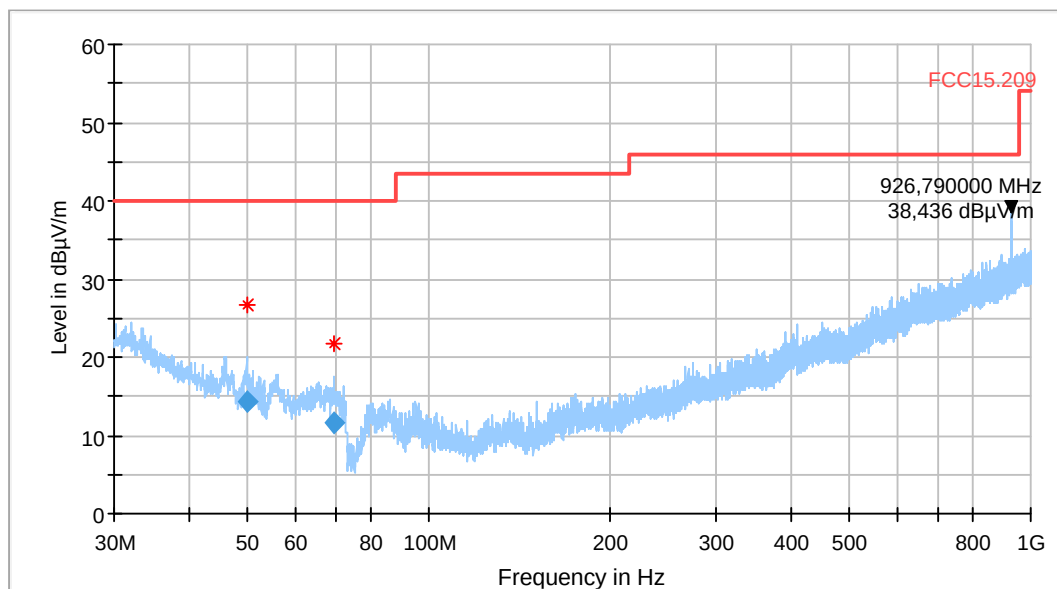
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity : 50%rH; Temperature: 19°C
Operator Name:	Lor
EUT:	Sample #40_C02
Operating Mode:	TX UWB Ch4
Power supply:	USB 5V DC
Comment 1:	Channel UWB 4
Comment 2:	EUT standing
EUT Setup:	2
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

Full Spectrum

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Pream p (dB)	Trd Corr. (dB/m)
49.799000	14.24	40.00	25.76	120.000	161.0	V	23.0	13.0	0.0	0.7	12.3
69.663000	11.71	40.00	28.29	120.000	170.0	V	69.0	6.6	0.0	0.8	5.8

(continuation of the "Final_Result" table from column 19 ...)

Frequency (MHz)	Raw Rec (dBμV)	Comment
49.799000	1.2	10:23:18 - 20.09.2021
69.663000	5.1	10:17:28 - 20.09.2021

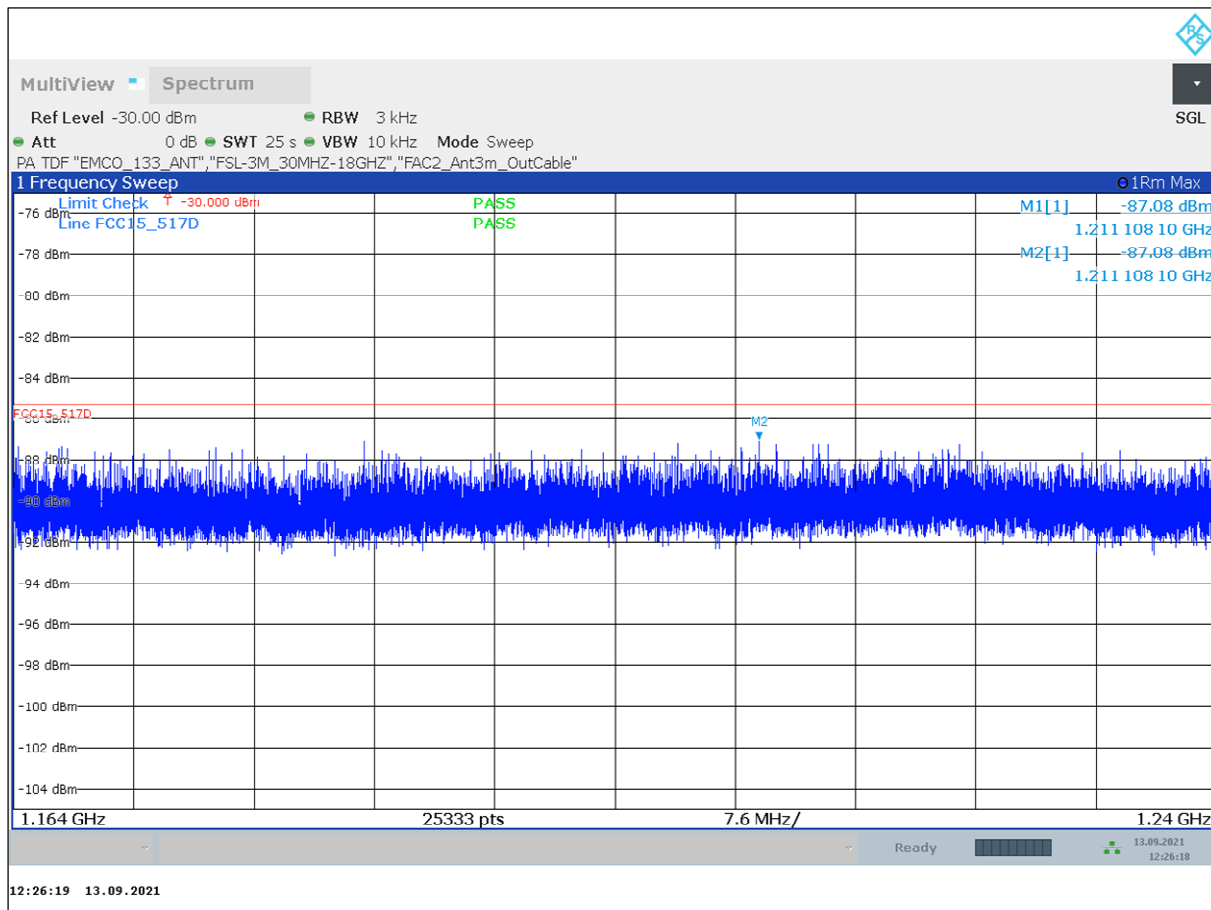
1.5 Spurious emission measurements (f> 960MHz), §15.519(d)

1.5.1 Emissions in GPS Band 1

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	3 m
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(d) - radiated emissions in GPS1 band (1164-1240MHz)
Limit:	-85.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal performed separately
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_42a_RSE_GPS1_TX_Ch4_PWR0x05050505_AntH



Limit line wrong name designation: correct naming §15.519d

Limit: - 85.3 dBm passed

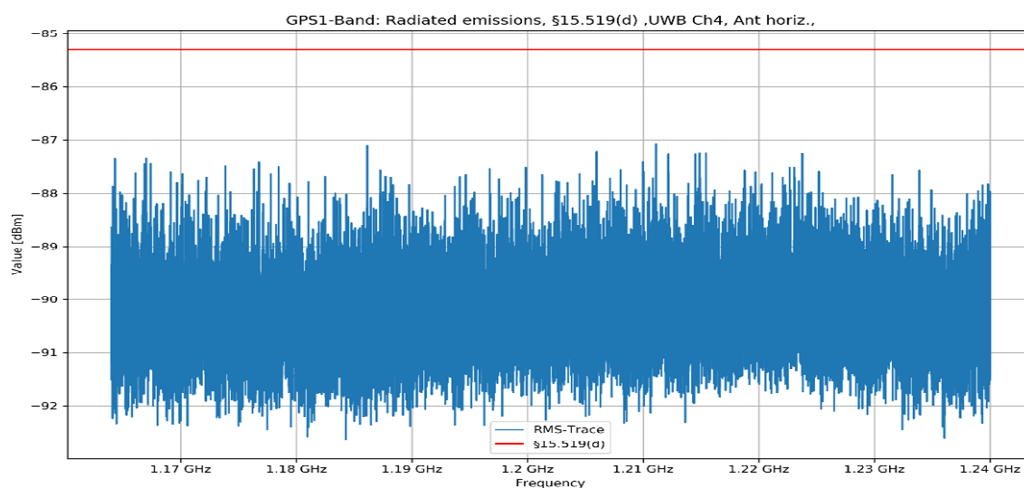
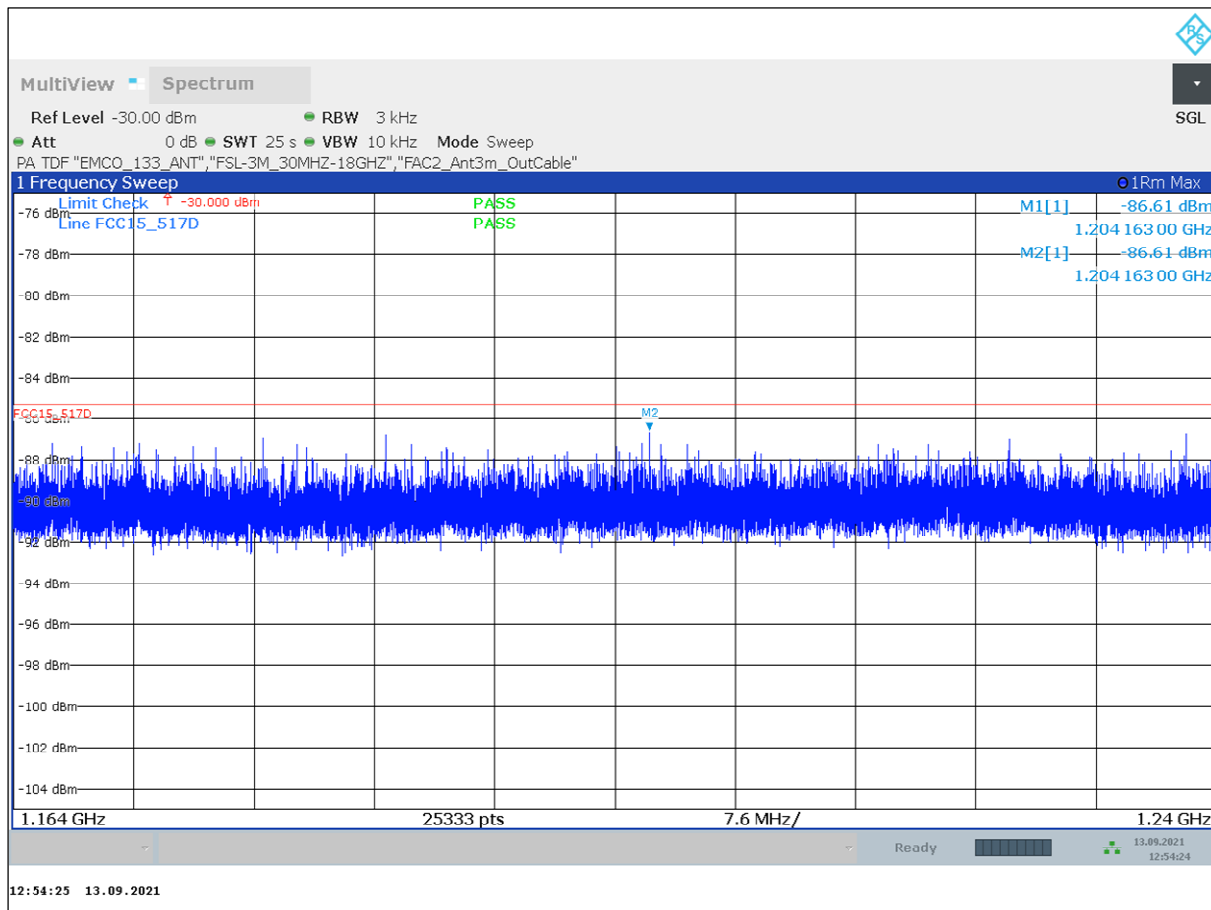


Diagram D16_42a re-scaled/re-drawn (post-processing from raw-data)

D16_42b_RSE_GPS1_TX_Ch4_PWR0x05050505_AntV



Limit line wrong name designation: correct naming §15.519d

Limit: - 85.3 dBm passed

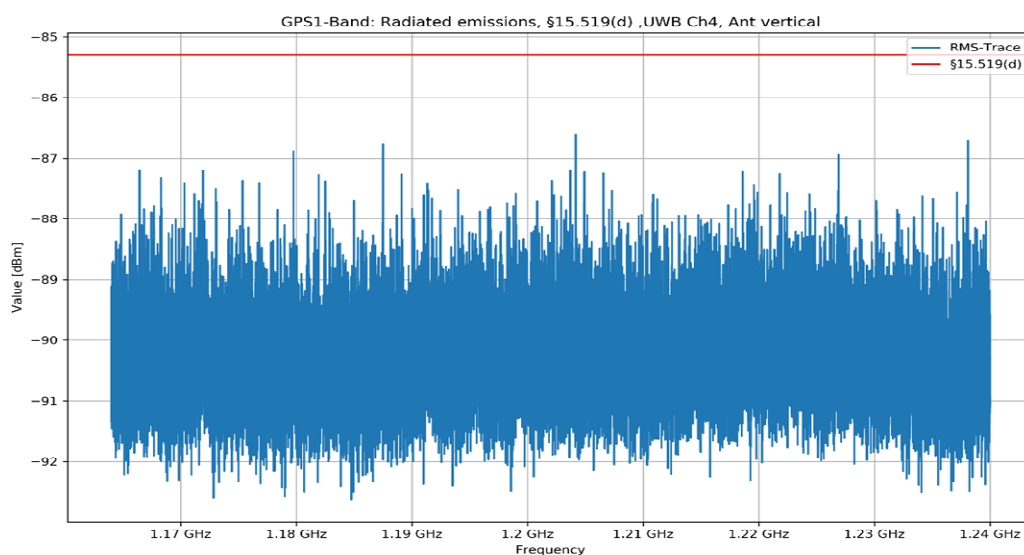


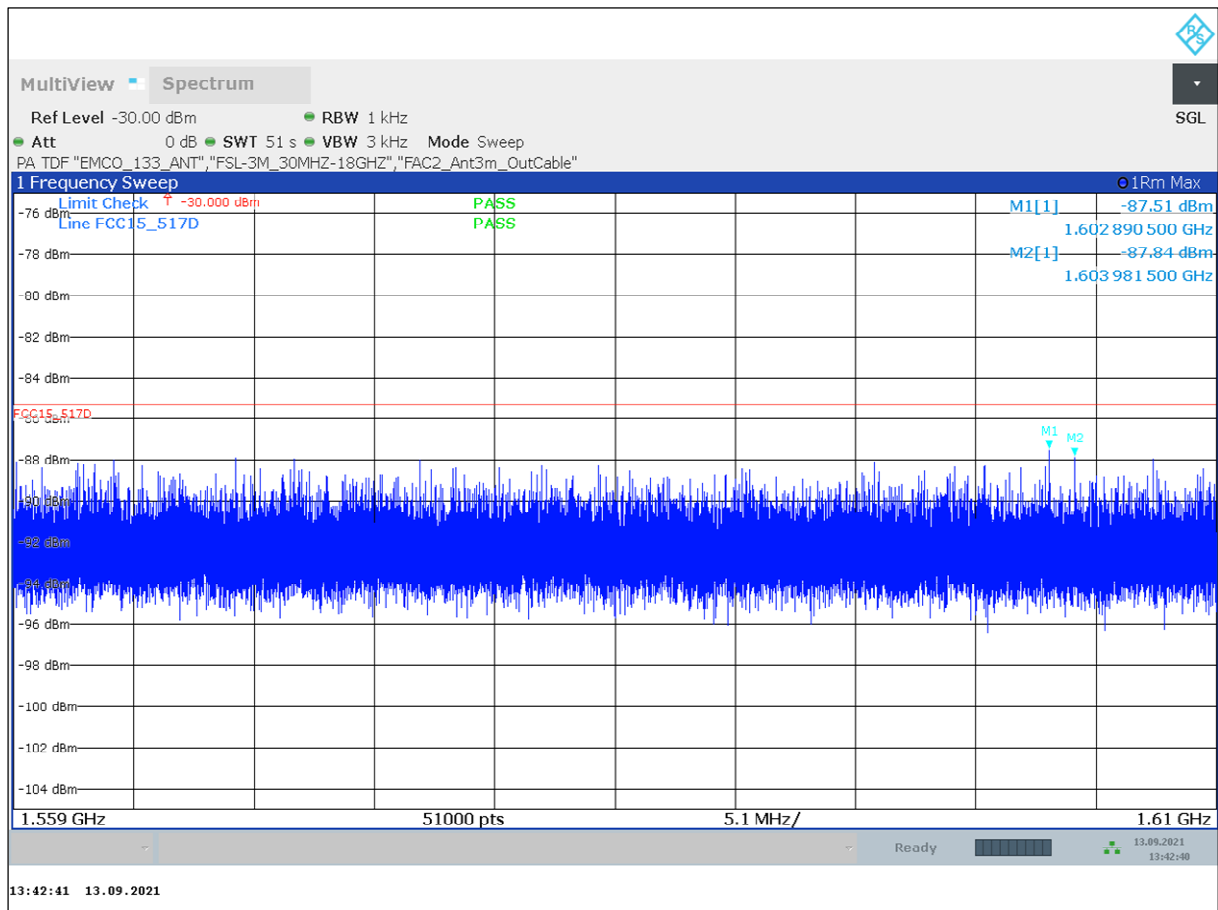
Diagram D16_42b re-scaled/re-drawn (post-processing from raw data)

1.5.2 Emission in GPS Band 2

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	3 m
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(d) - radiated emissions in GPS2 band (1559-1610MHz)
Limit:	-85.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal performed separately
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_43a_RSE_GPS2_TX_Ch4_PWR0x05050505_AntH



Limit line wrong name designation: correct naming §15.519d

Limit: - 85.3 dBm passed

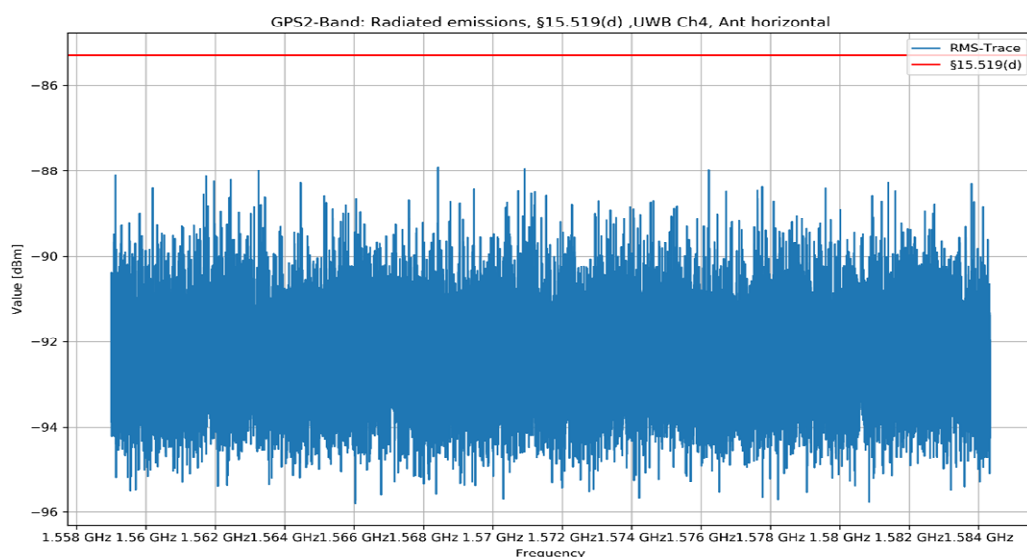
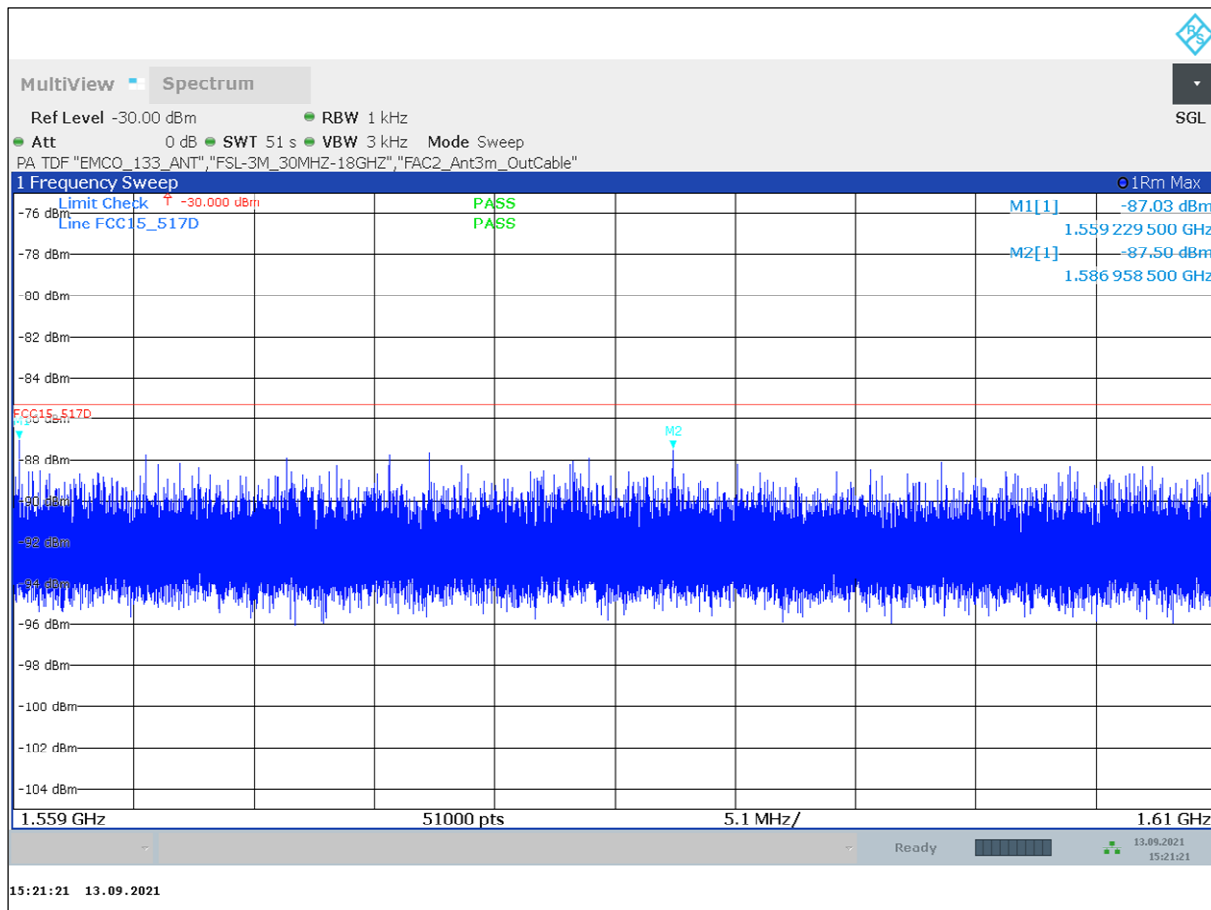


Diagram D16_43a re-scaled/re-drawn (post-processing from raw data)

D16_43b_RSE_GPS2_TX_Ch4_PWR0x05050505_AntV



Limit line wrong name designation: correct naming §15.519d

Limit: - 85.3 dBm passed

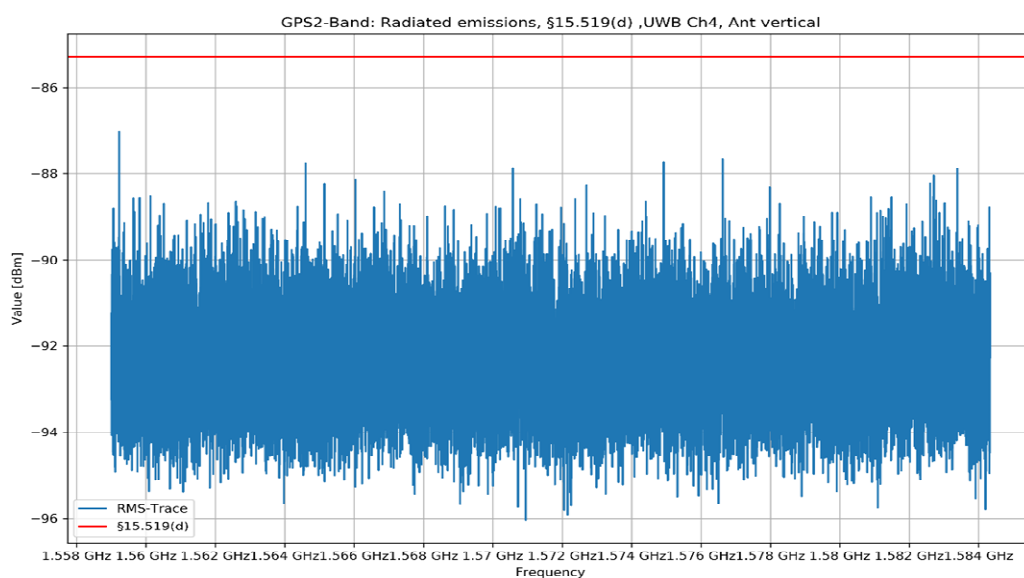


Diagram D16_43b re-scaled/re-drawn (post-processing from raw data)

1.6 Spurious emission measurements (f > 960MHz), §15.519(c)

1.6.1 960MHz < f < 3.1GHz, §15.519(c)

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	2 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	5V DC over AE AC/DC adapter
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying separate measurements
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	2
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_48a_RSE_TX_Ch4_PWR0x05050505_EUT_laying_AntH



Wrong visible limit line on original diagram: Limit line with values -63.3 dBm (1610-1990MHz) and -61.3 dBm (1990-3100MHz) passed

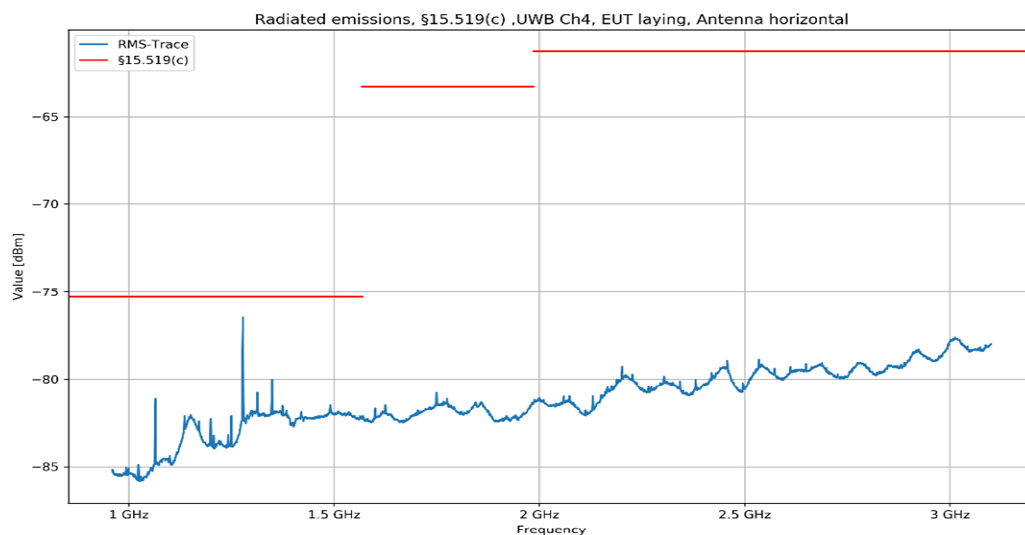
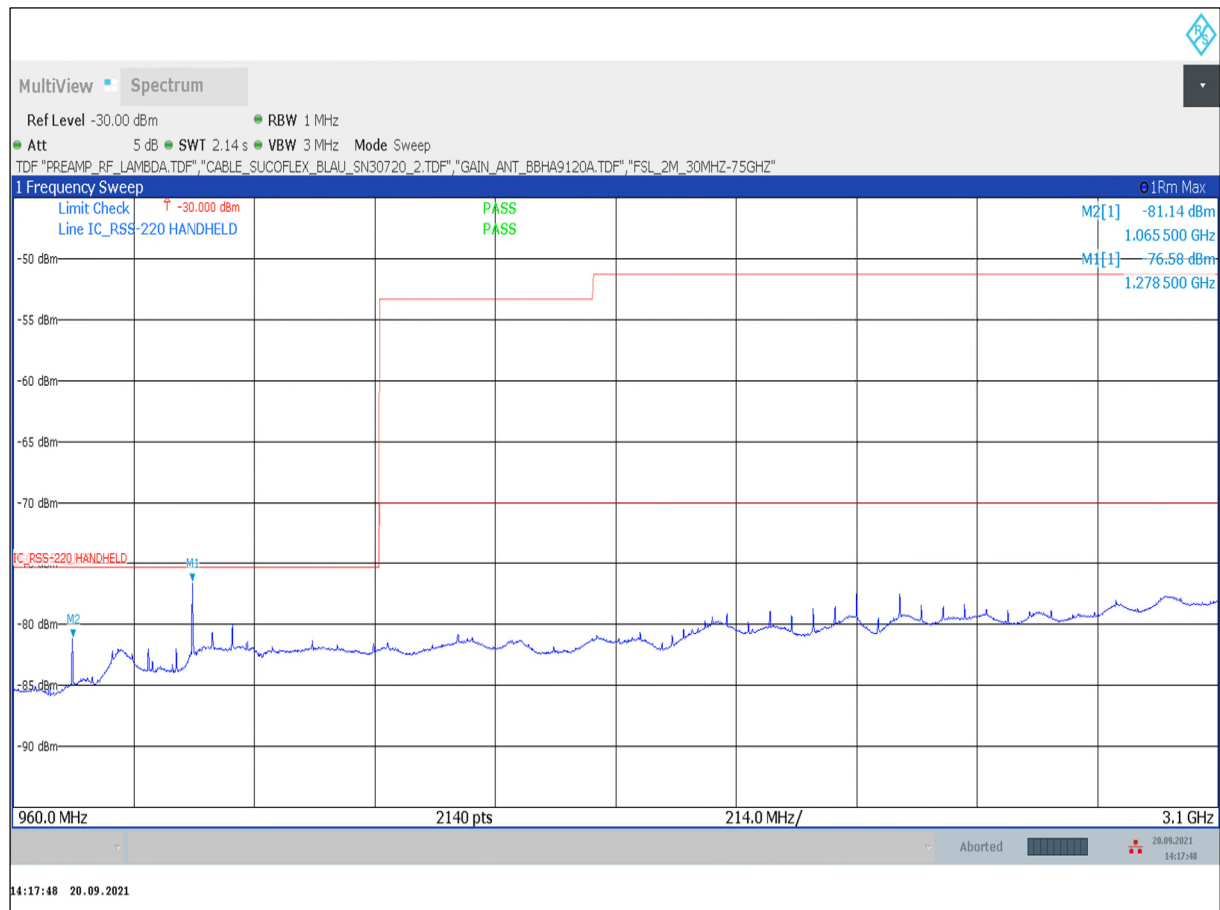


Diagram D16_48a re-scaled/re-drawn (post-processing from raw data)

D16_48a_RSE_TX_Ch4_PWR0x05050505_EUT_standing_AntH



Wrong visible limit line on original diagram: Limit line with values -63.3 dBm (1610-1990MHz) and -61.3 dBm (1990-3100MHz) passed

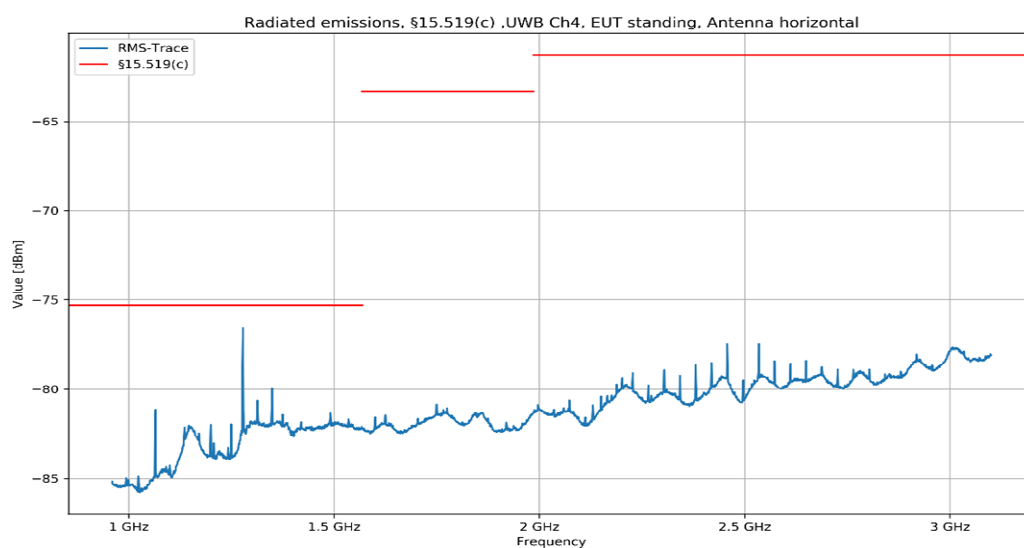
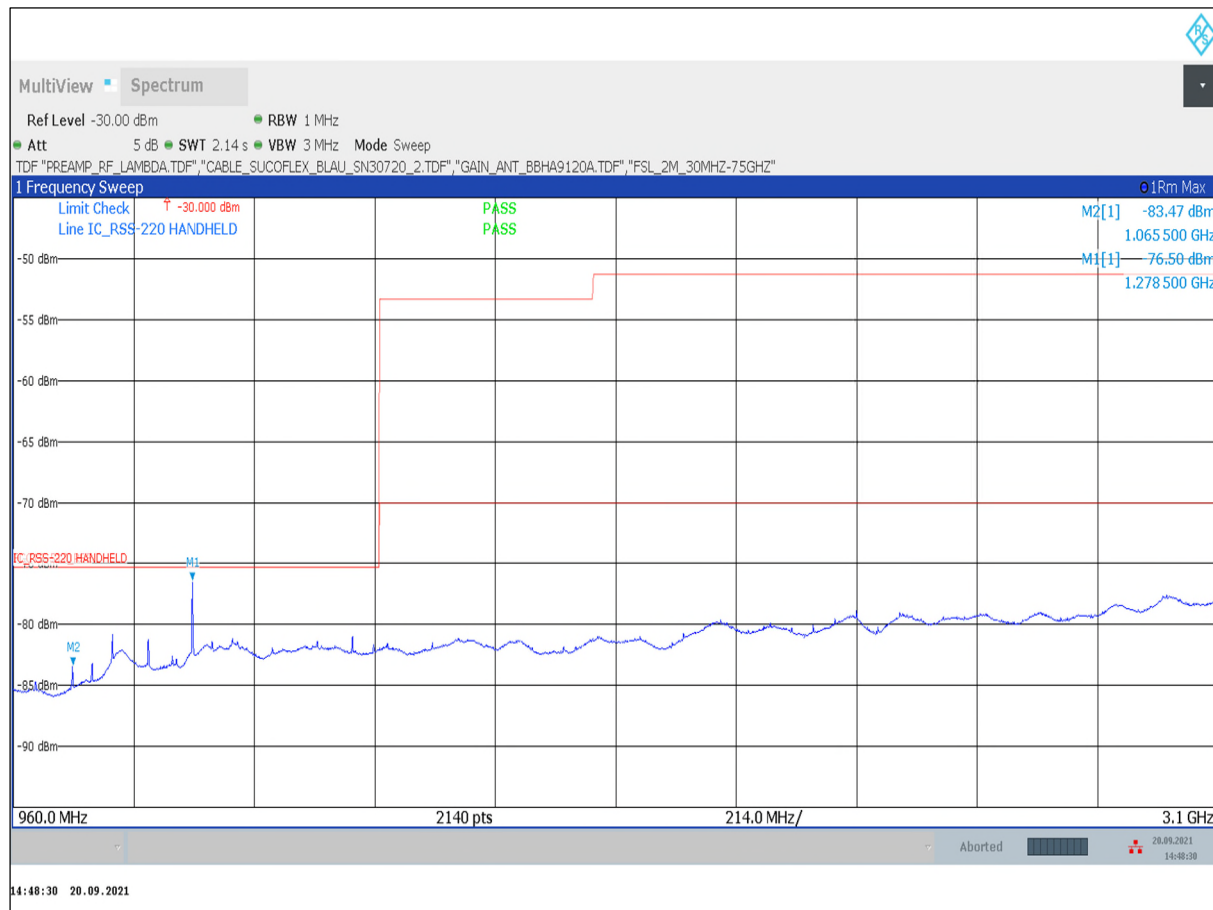


Diagram D16_48a re-scaled/re-drawn (post-processing from raw data)

D16_48b_RSE_TX_Ch4_PWR0x05050505_EUT_laying_AntV



Wrong visible limit line on original diagram: Limit line with values -63.3 dBm (1610-1990MHz) and -61.3 dBm (1990-3100MHz) passed

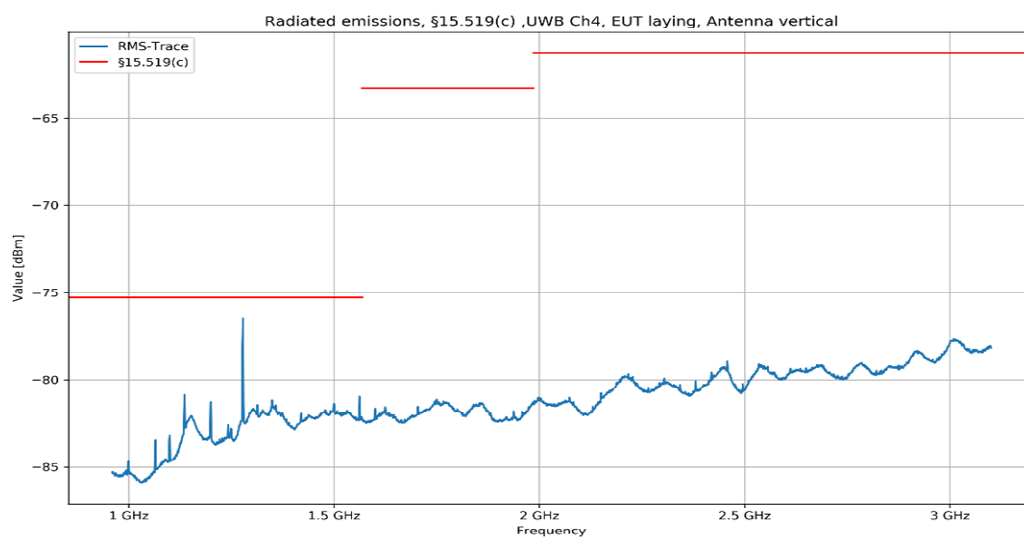
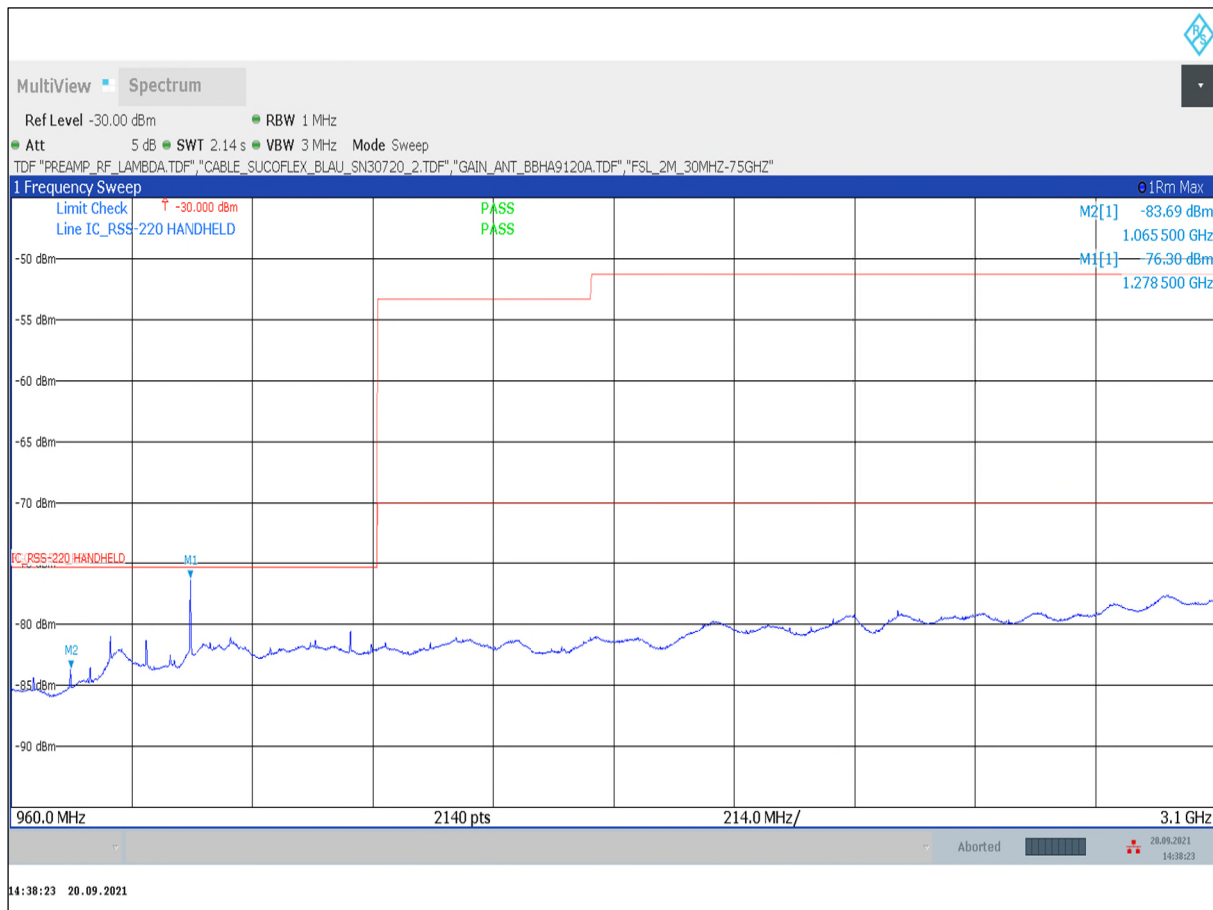


Diagram D16_48b re-scaled/re-drawn (post-processing from raw data)

D16_48b_RSE_TX_Ch4_PWR0x05050505_EUT_standing_AntV



Wrong visible limit line on original diagram: Limit line with values -63.3 dBm (1610-1990MHz) and -61.3 dBm (1990-3100MHz) passed

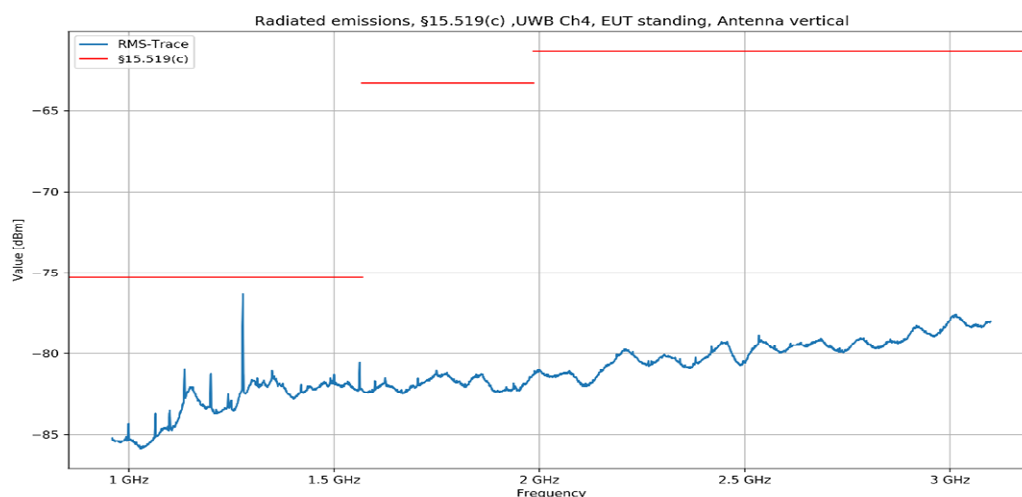


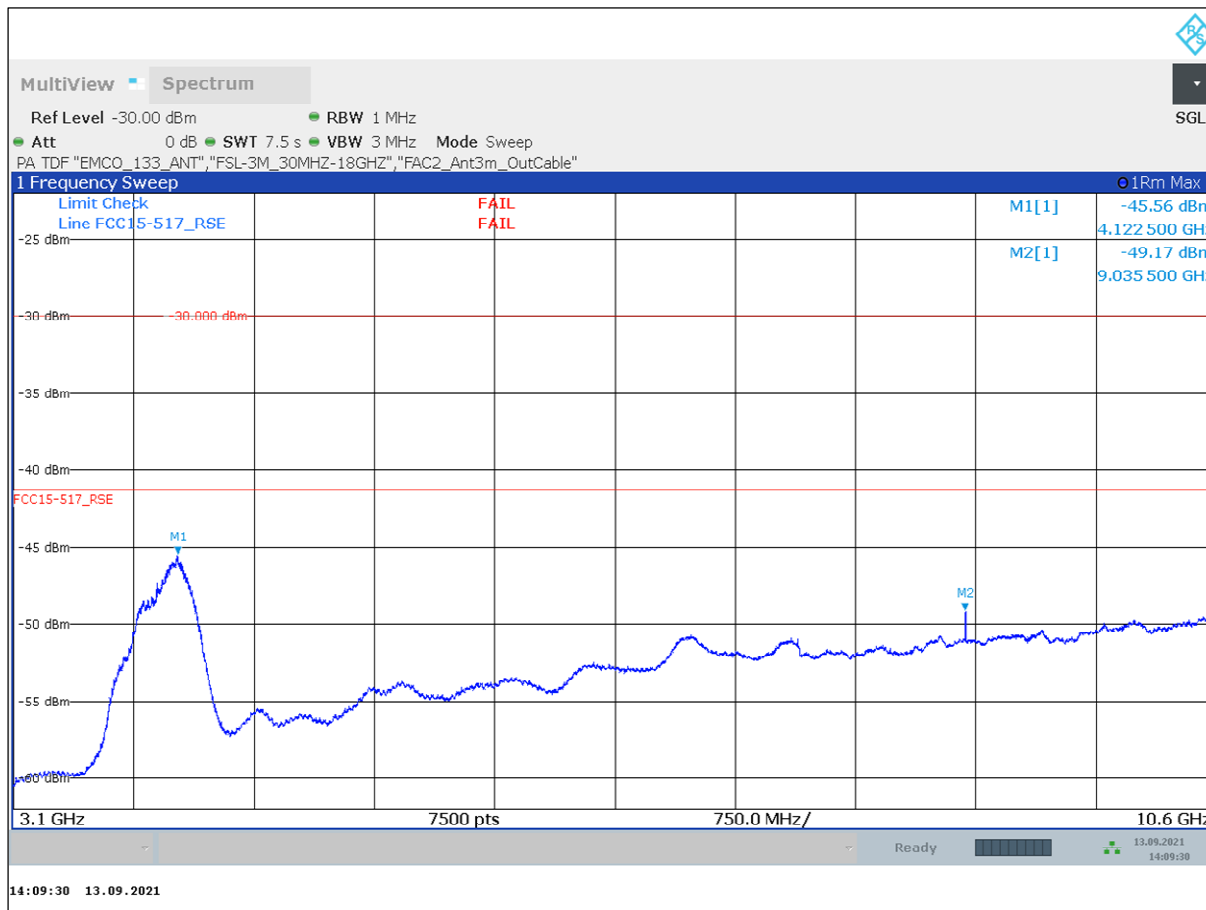
Diagram D16_48b re-scaled/re-drawn (post-processing from raw data)

1.6.2 3.1 GHz < f < 10.6GHz

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	3 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_44a_RSE_TX_Ch4_PWR0x05050505_AntH



Limit line wrong name designation: correct naming §15.519c

Limit: -41.3 dBm passed

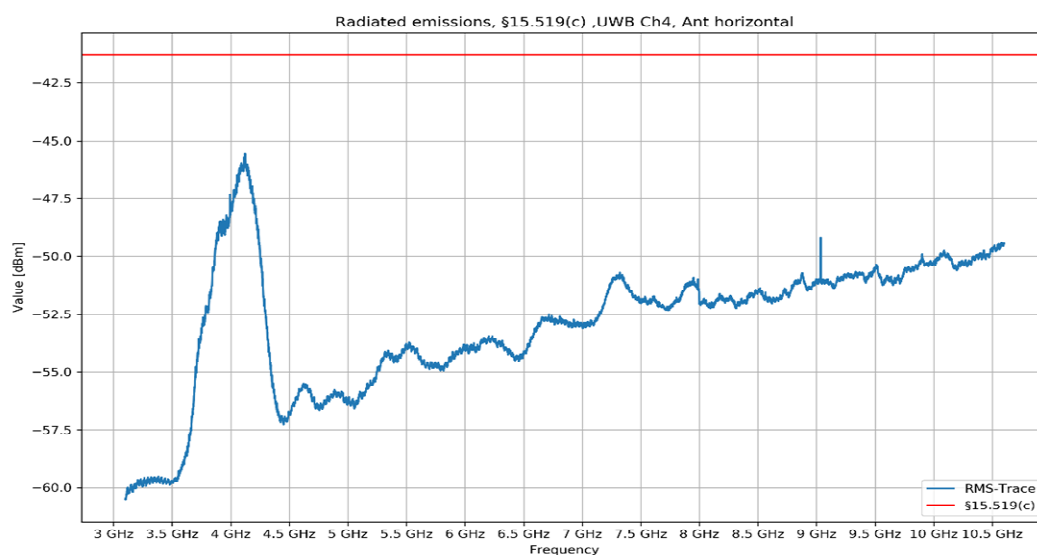
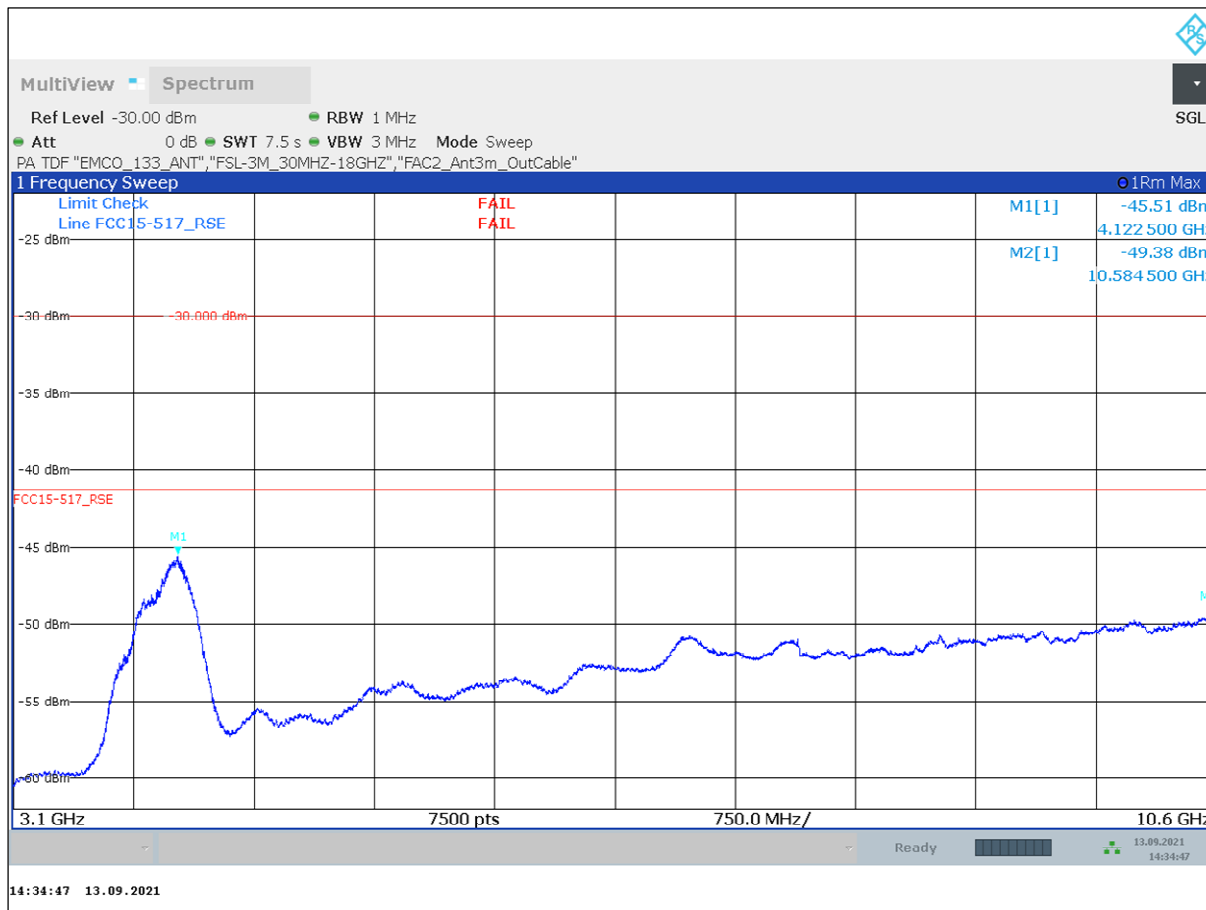


Diagram D16_44a re-scaled/re-drawn (post-processing from raw data)

D16_44b_RSE_TX_Ch4_PWR0x05050505_AntV_TAG



Limit line wrong name designation: correct naming §15.519c

Limit: - 41.3 dBm passed

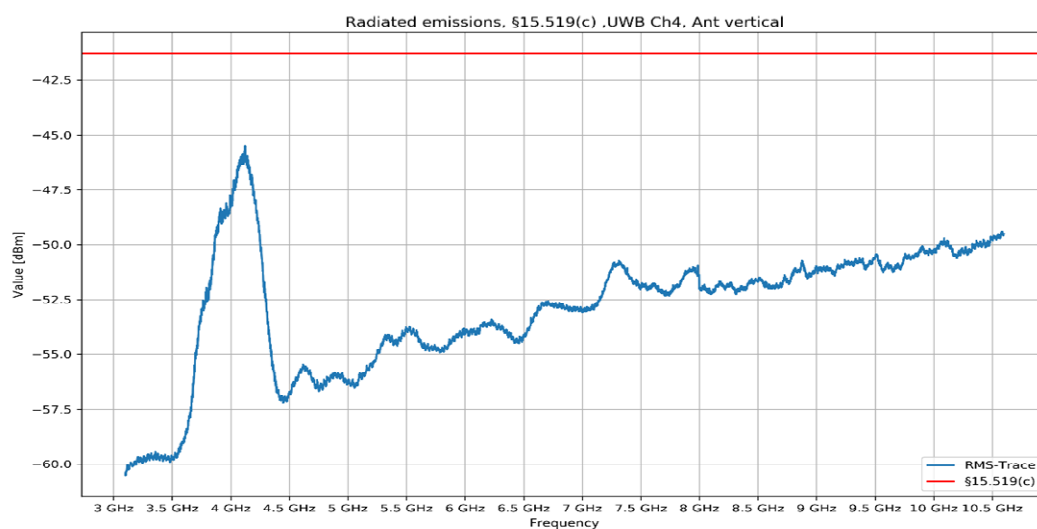


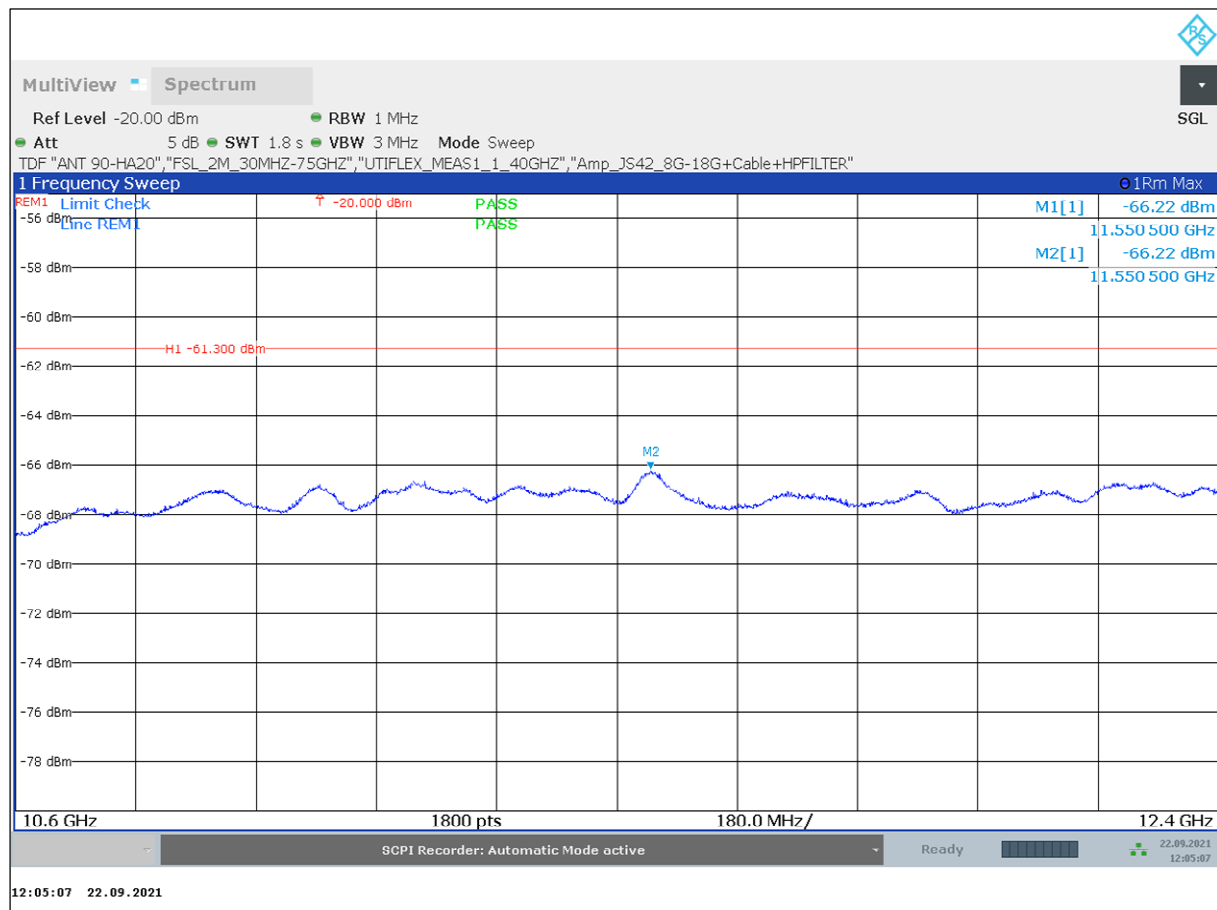
Diagram D16_44b re-scaled/re-drawn (post-processing from raw data)

1.6.3 10.6GHz < f < 12.4GHz

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	2 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

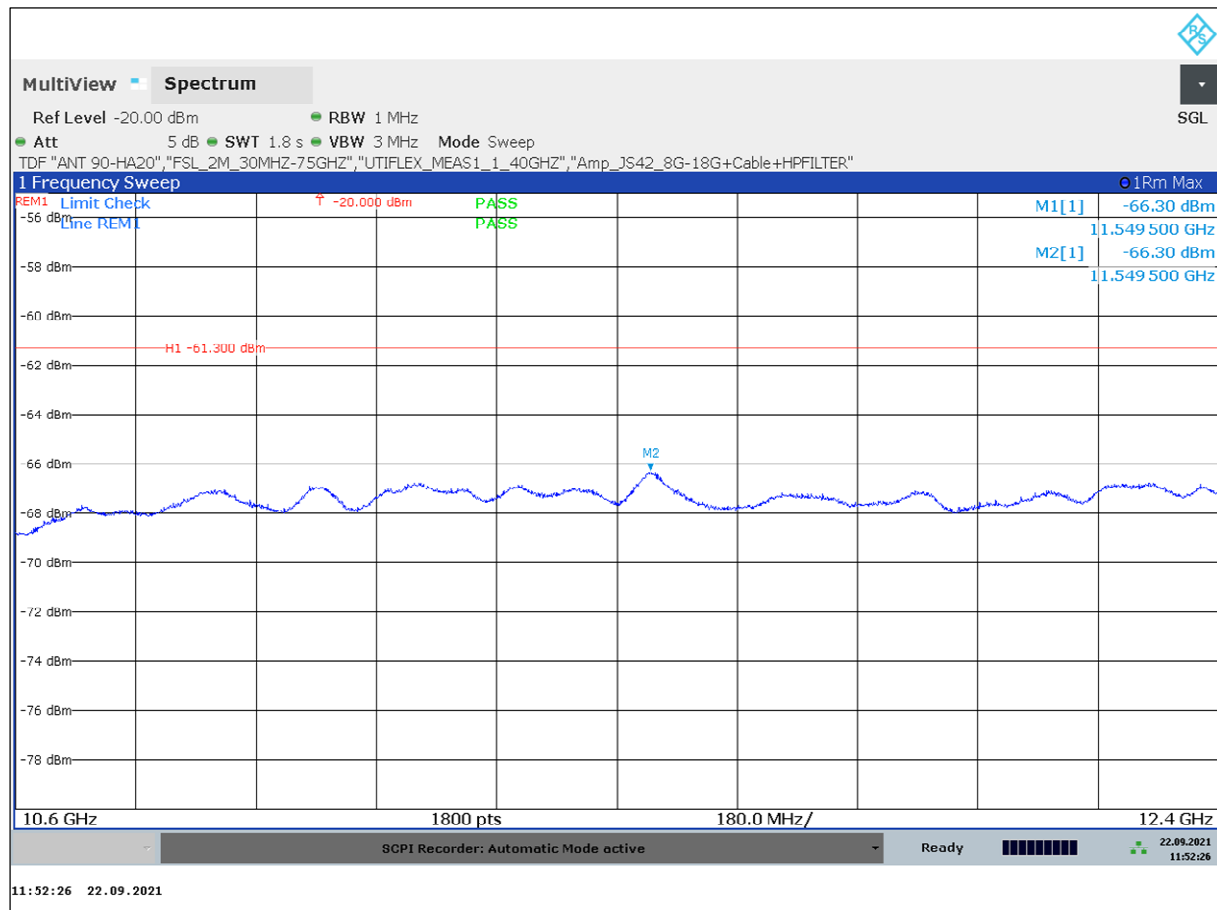
EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16__45a_RSE_TX_Ch4_PWR0x05050505_AntH



Measurement antenna: horizontal polarisation

D16__45b_RSE_TX_Ch4_PWR0x05050505_AntV



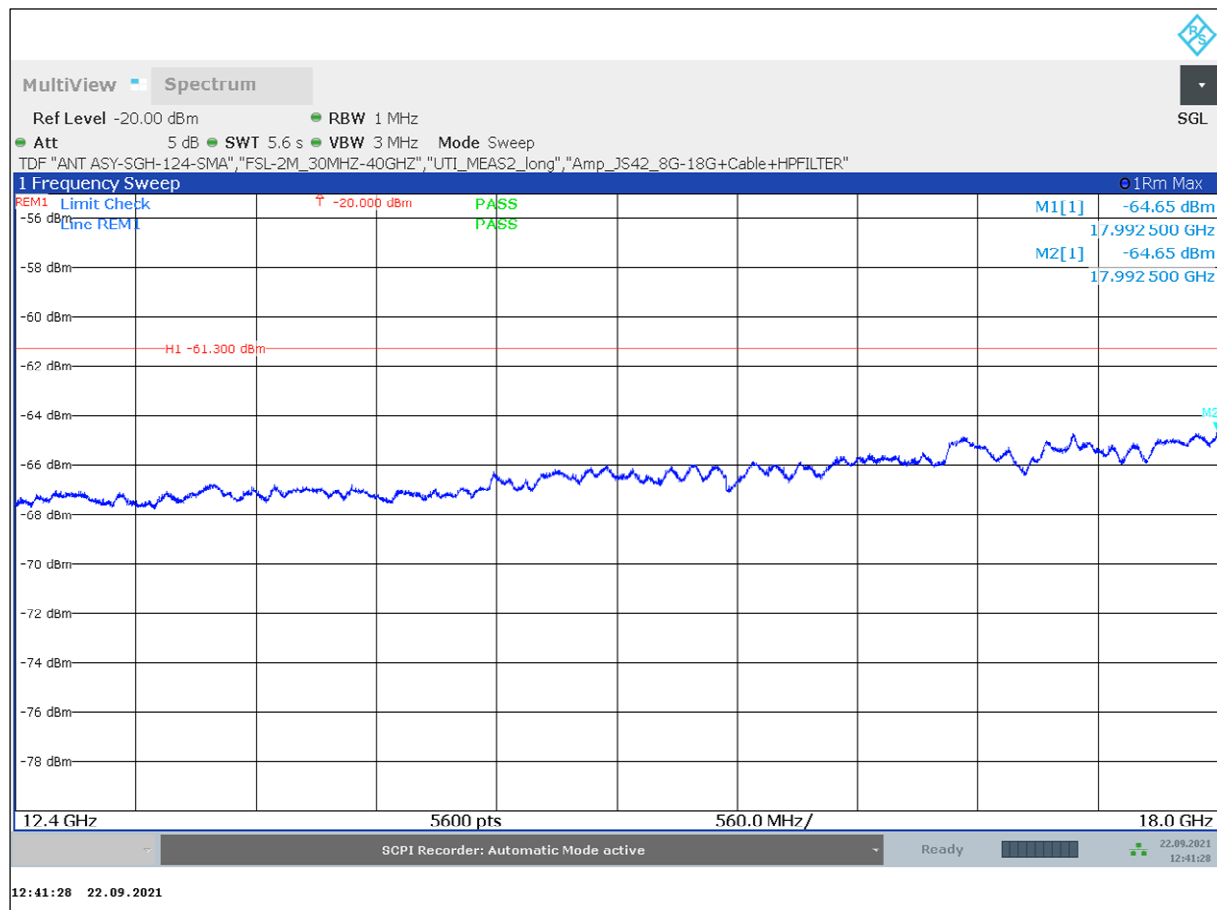
Measurement antenna: vertical polarisation

1.6.4 12.4GHz < f < 18GHz

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	2 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

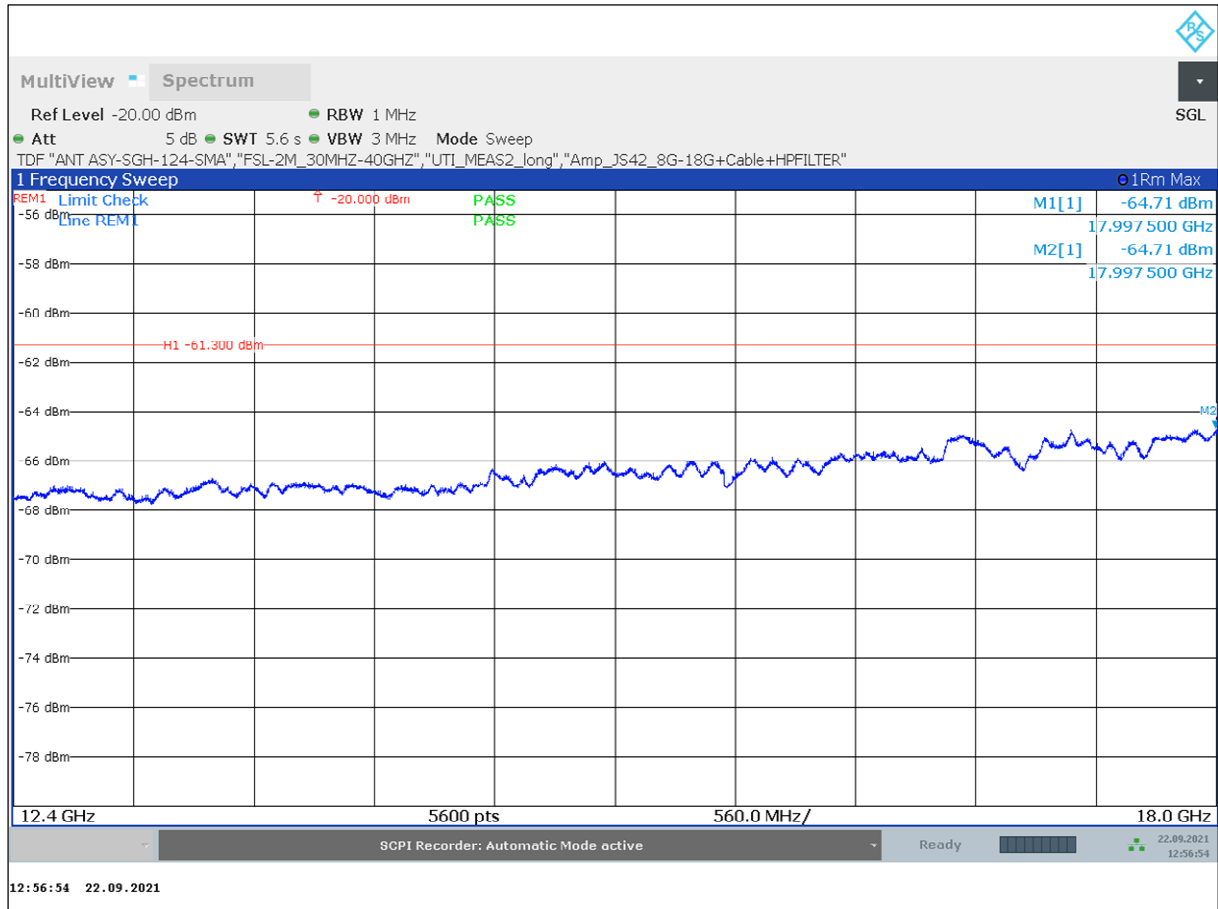
EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16__46a_RSE_TX_Ch4_PWR0x05050505_AntH_



Measurement antenna: horizontal polarisation

D16__46b_RSE_TX_Ch4_PWR0x05050505_AntV_



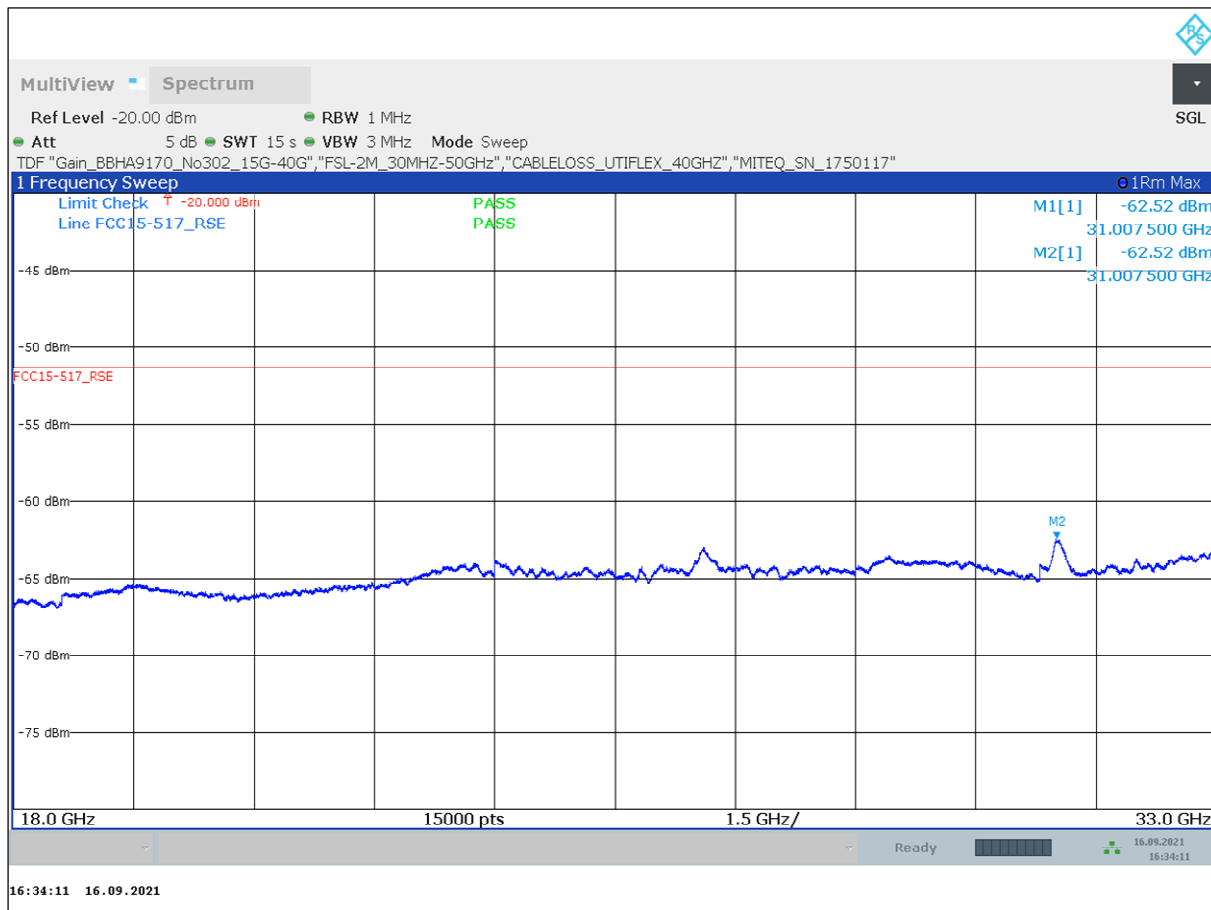
Measurement antenna: vertical polarisation

1.6.5 18GHz < f < 33GHz

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	2 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_47a_RSE_TX_Ch4_PWR0x05050505_AntH



Limit line wrong name designation and value shown: correct naming is §15.519c

Limit: - 61.3 dBm passed

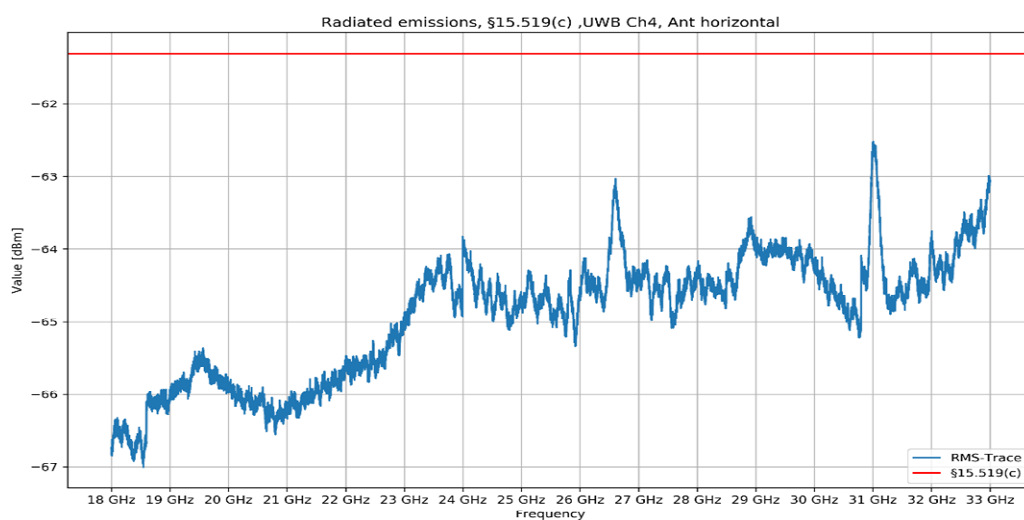
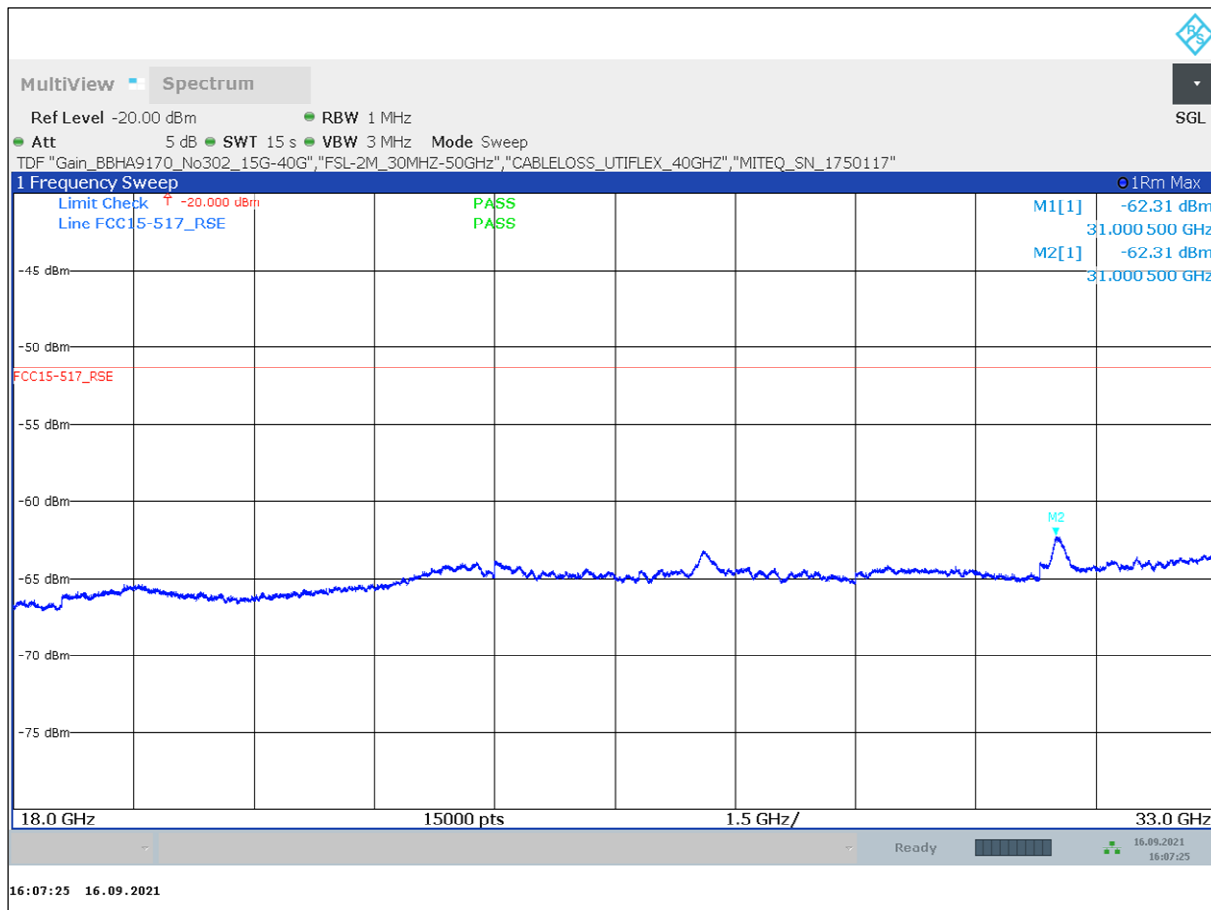


Diagram D16_47a re-scaled/re-drawn (post-processing from raw data)

D16_47b_RSE_TX_Ch4_PWR0x05050505_AntV



Limit line wrong name designation and value shown: correct naming is §15.519c

Limit: - 61.3 dBm passed

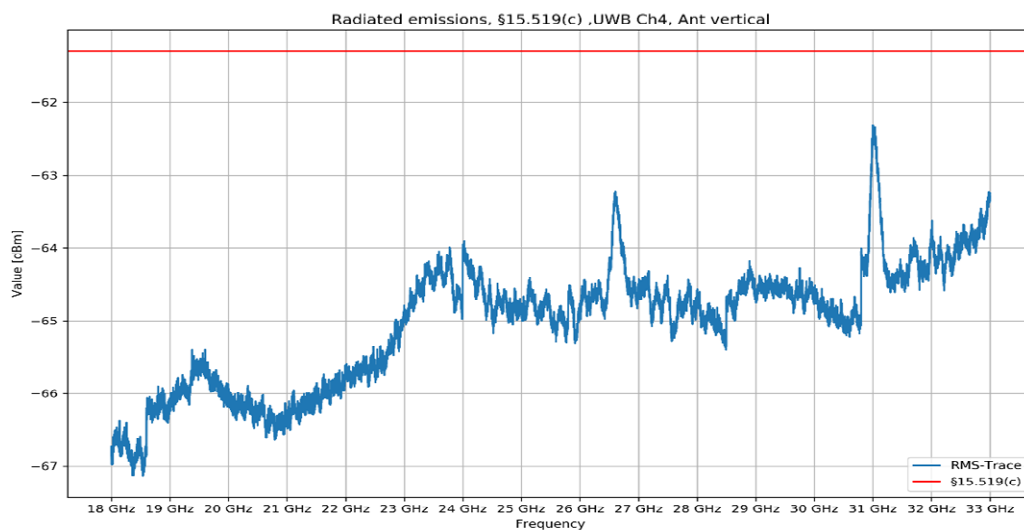


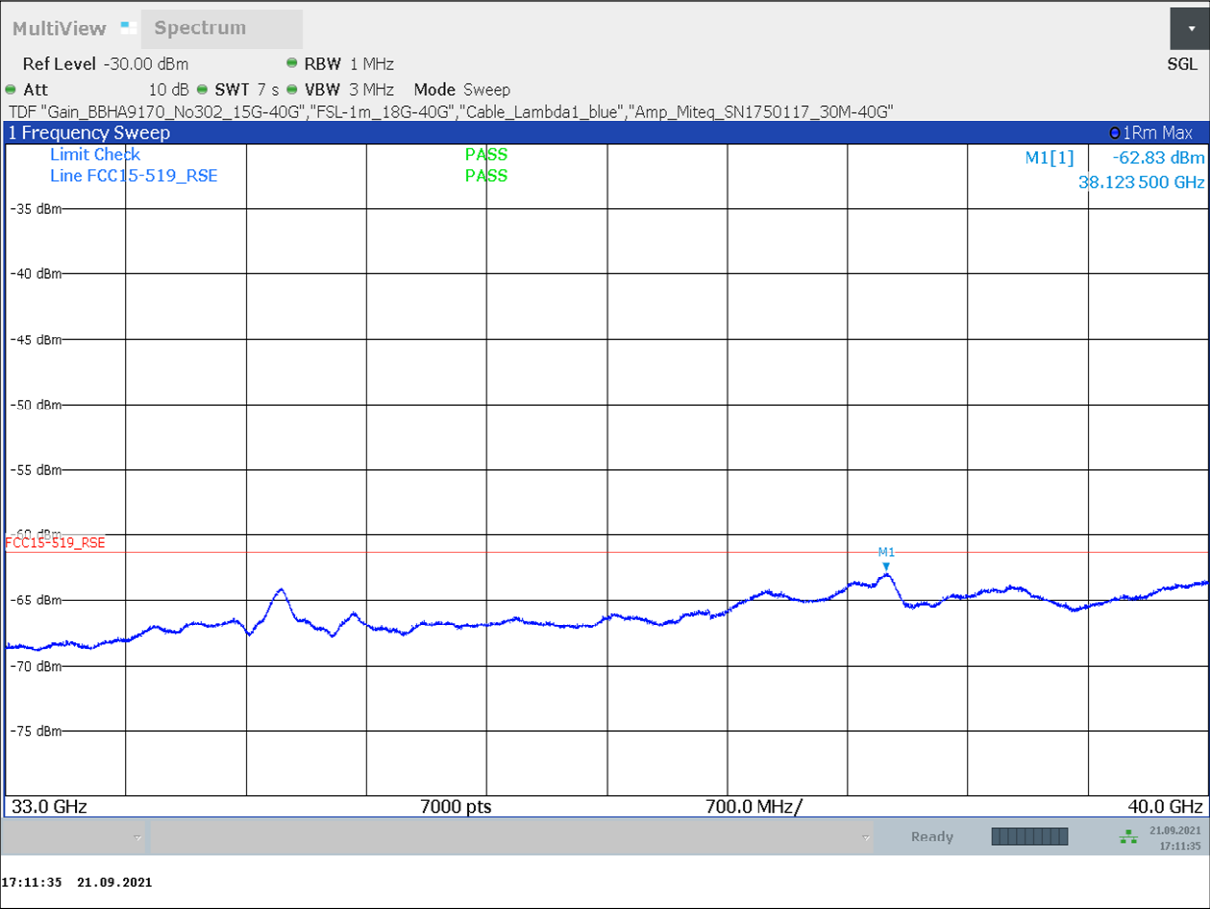
Diagram D16_47b re-scaled/re-drawn (post-processing from raw data)

1.6.6 33GHz < f < 40GHz

Common Information	
Test Description:	Radiated EIRP emissions
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	1 meter
Distance correction:	Free-Space-Loss dependency of frequency and measurement distance
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(c) - radiated emissions (EIRP)
Limits:	-75.3 / -63.3 / -61.3 / -41.3 / -61.3 dBm
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	internal battery (fully charged)
Comment 1:	Channel UWB 4
Comment 2:	EUT standing/laying
Comment 3:	Antenna polarisation: vertical/horizontal, separate measurements
Environmental Conditions::	Humidity : 50%rH; Temperature: 19°C
EUT Setup:	1
Verdict:	Passed

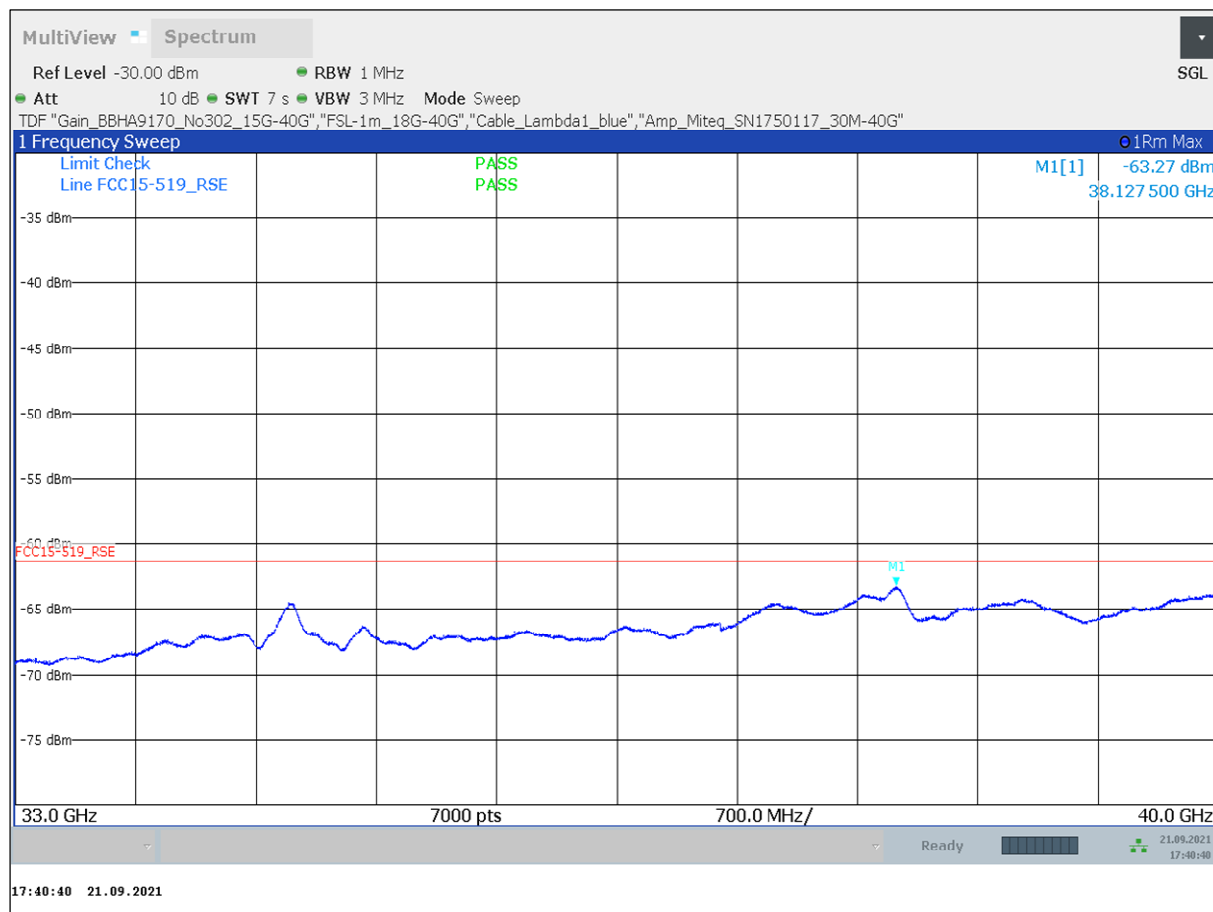
EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

D16_049a_RSE_TX_Ch4_PWR05050505_AntH



Measurement antenna: horizontal polarisation

D16_049b_RSE_TX_Ch4_PWR05050505_AntV

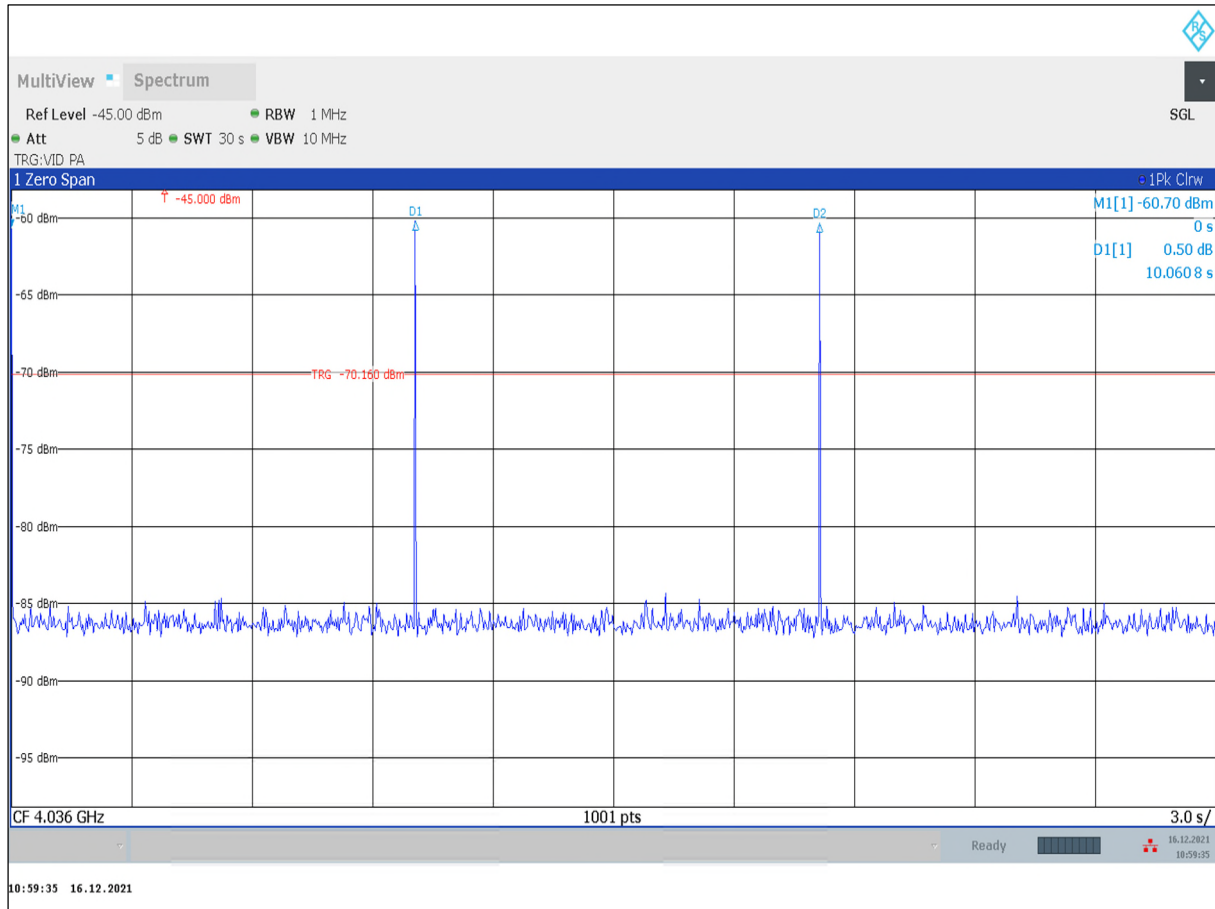


Measurement antenna: vertical polarisation

1.7 Timing tests, §15.519(a)(1)

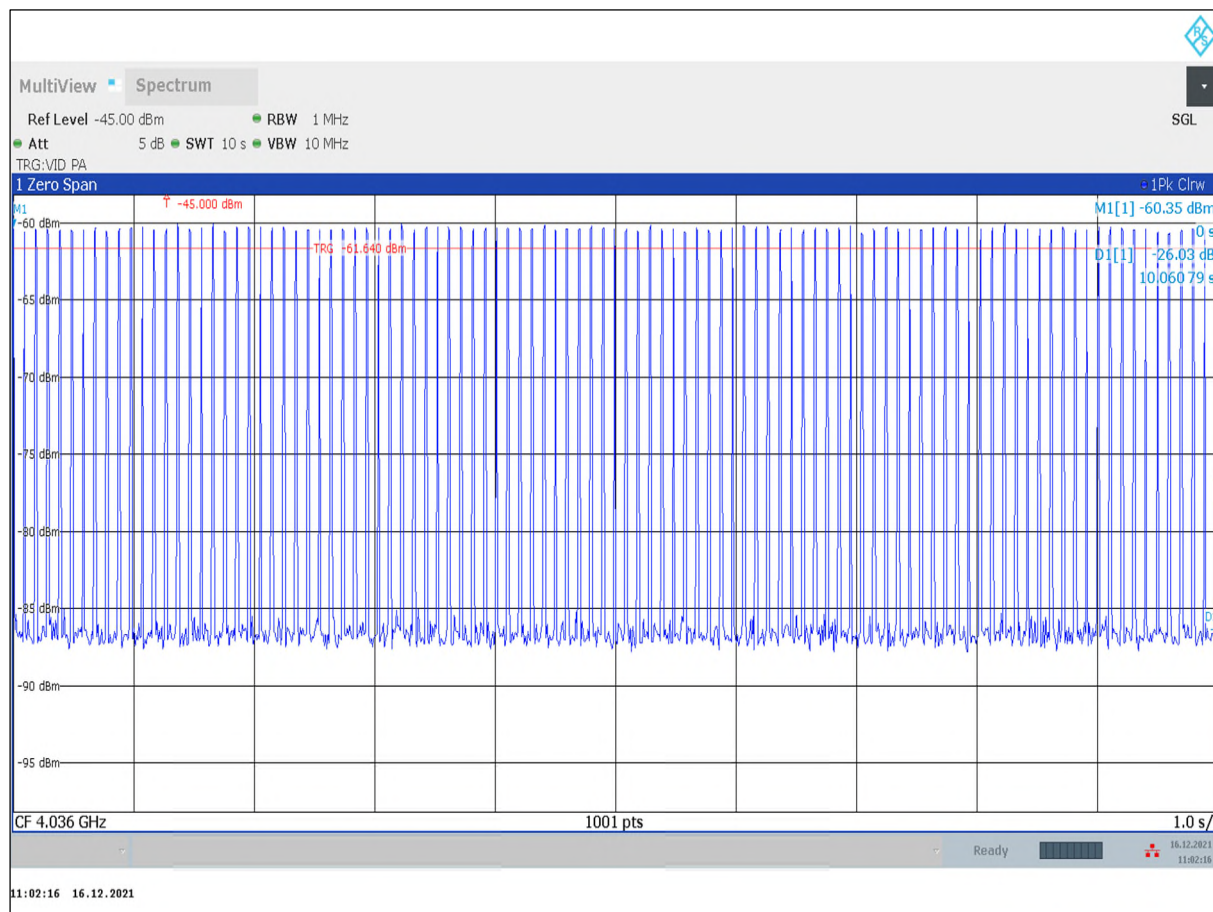
Common Information	
Test Description:	Emission timing
Test Site Location:	Ref.-Nr. 120907 Fully-Anechoic Chamber (FAC2)
Version of Testsoftware:	None (Manual) / Individual settings on spectrum-analyzer
Measurement distance	1.5m
Distance correction:	none
Technical measurement data/settings:	See spectrum-analyzer screenshot
Used Filter:	None
Test Standard:	FCC 15.519(a)(1) - emission timing/cease of transmission
Limit:	<i>A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.</i>
Operator:	Lor
Operating Mode:	TX UWB Ch4
Power during tests:	integrated battery (fully charged)
Comment 1:	--
Environmental Conditions::	Humidity : 45%rH; Temperature: 20°C
EUT Setup:	3
Verdict:	Passed

EUT Information	
PMT number:	20-1-01949S40_C02
Manufacturer:	OÜ Eliko Tehnoloogia Arenduskeskus
Product:	Positioning device
Model:	ELIKO TAG

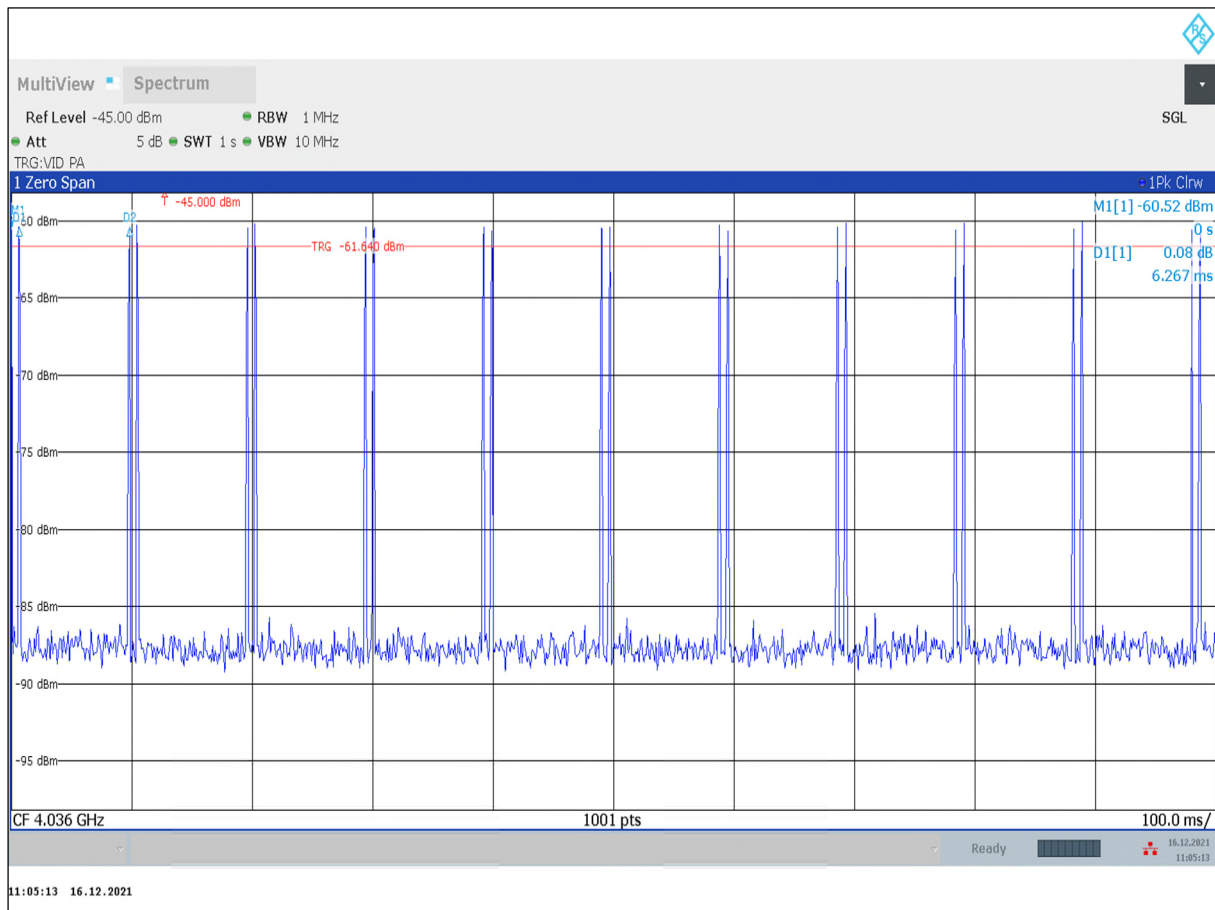
D16_050a_Timing_Tag_noCompanion_PRI

Pulse repetition of Tag transmission without companion device (switched-off)

-> only discovery ping transmissions every 10seconds. No data transmission.

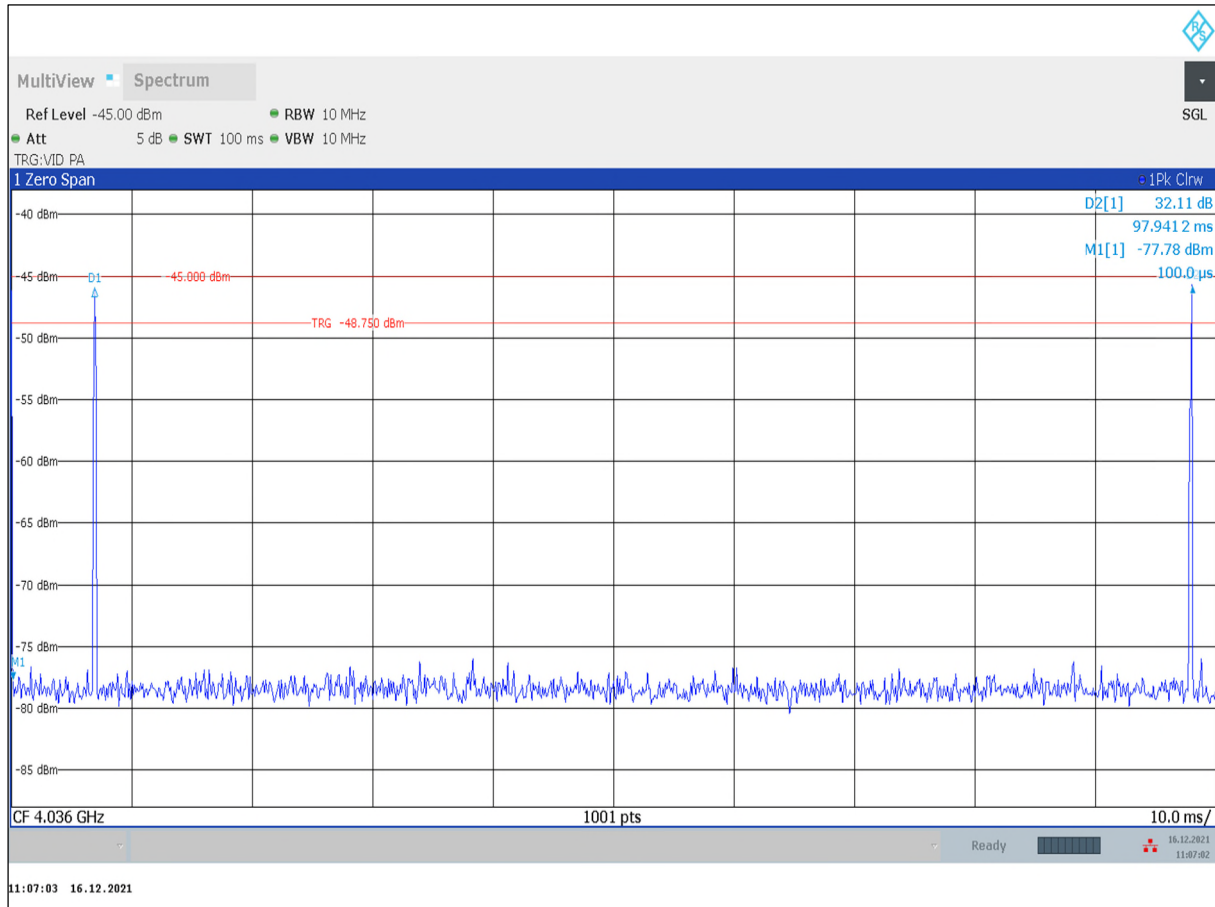
D16_051a_Timing_Tag_with_Companion_Device_DataCommunication

Data communication with companion device.

D16_052a_Timing_Tag_with_Companion_Device_DataCommunication_1Second

Data communication with companion device.

➔ Zoomed-in with lower time base 100ms

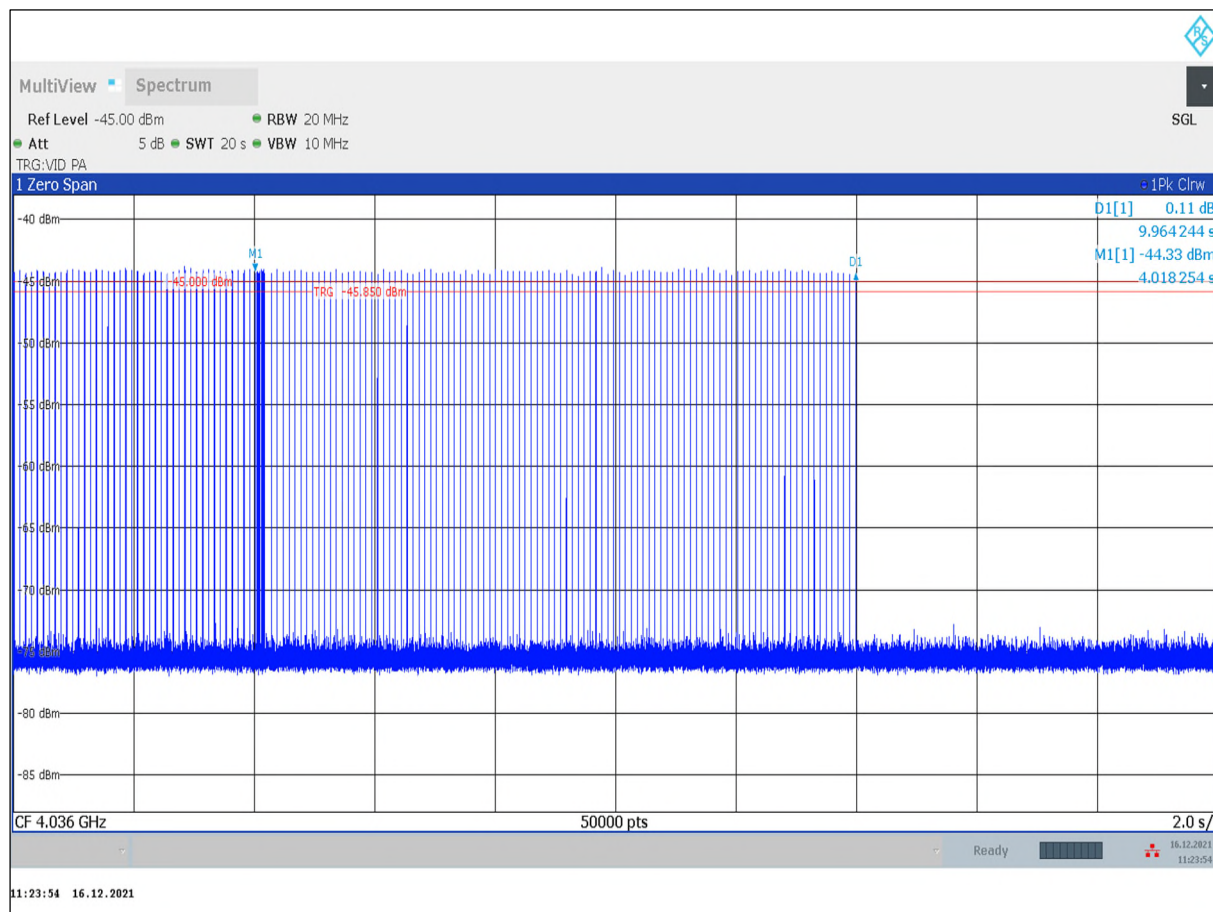
D16_053a_Timing_Tag_with_Companion_Device_DataCommunication_100ms

Data communication with companion device.

➔ Zoomed-in with lower time base 10ms

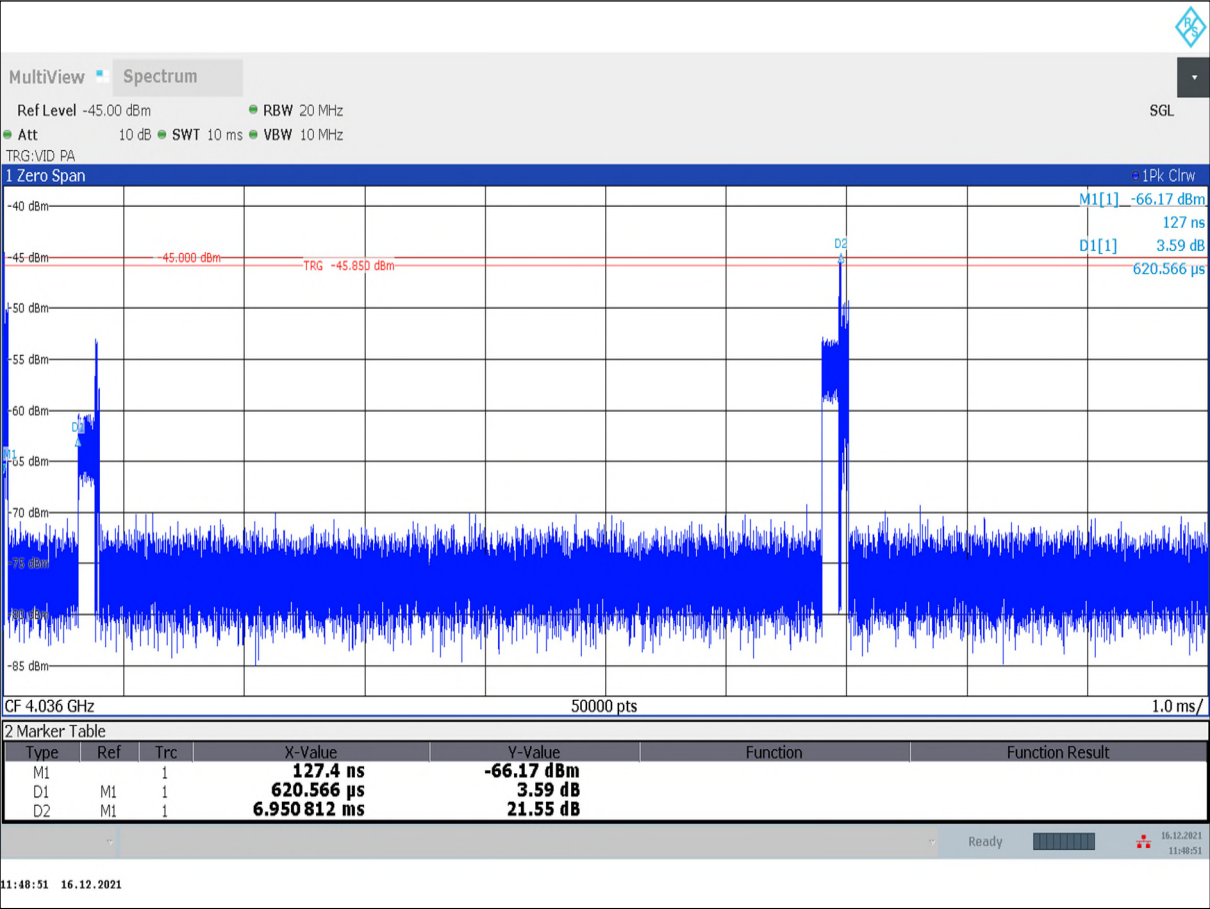
D1-Marker: 6.8245ms

D2-Marker: 97.9412ms

D16_054a_Timing_Tag_DataCommunication_Interruption

Interruptions of data transmissions at D1 Marker time (9.9642ms) at after companion device switched off at M1-Marker time (4.0182s)

D16_056a_Timing_Tag_DataCommunication_Timing_with_Anchor



Timing to companion device. Tag transmissions are higher field value, lower are companion device. Companion device transmits around 620us after EUT ends transmission.

Pulse width of tag emission: approx. 223.4 us

End Of Annex 1