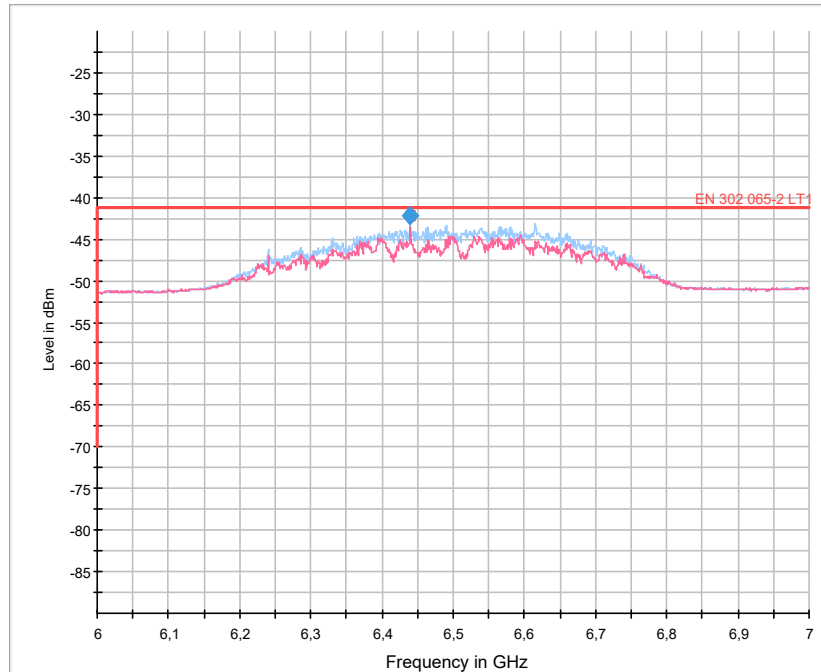


Preview Result 1V-RMS Preview Result 1H-RMS
RSS220 5.3.1d Final_Result RMS



— Preview Result 1H-RMS — Preview Result 1V-RMS * Critical_Freqs RMS
— EN 302 065-2 LT1 ◆ Final_Result RMS

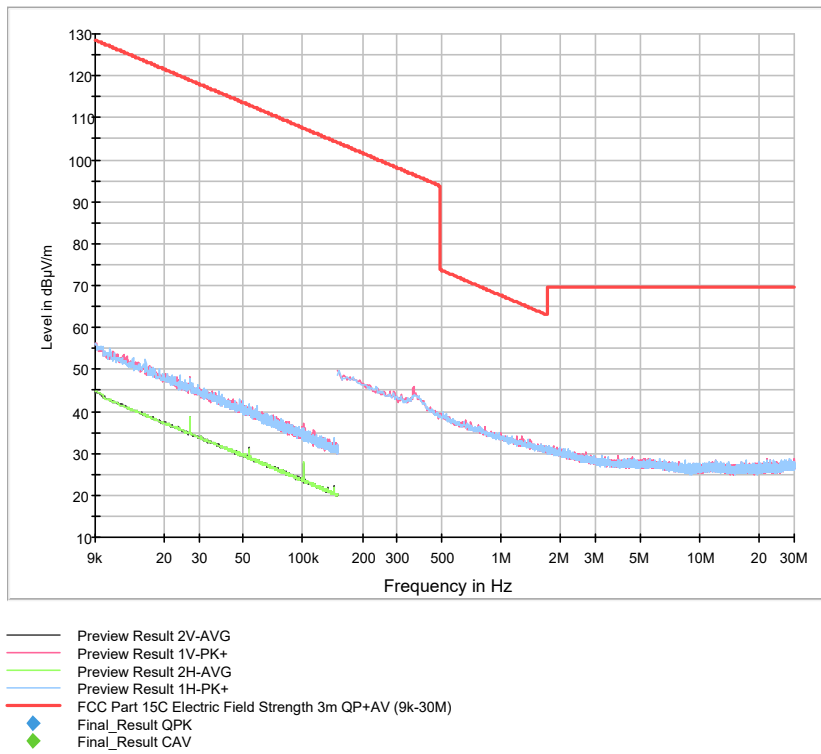
Final Results:

Frequency MHz	RMS dBm	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
6440.000000	-42.13	1000.0	1000.000	150.0	H	-79.0	-53.8
6440.000000	-42.13	1000.0	1000.000	150.0	H	-79.0	-53.8



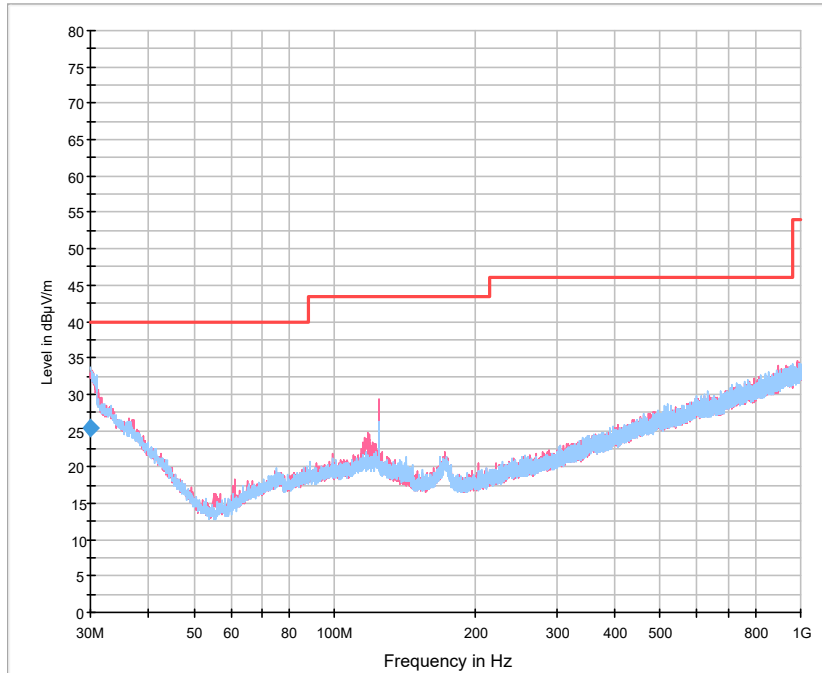
Transmitting continuously, Channel 5– final measurement in y axis

Frequency range 9 kHz – 30 MHz:





Frequency range 30 MHz – 1 GHz:



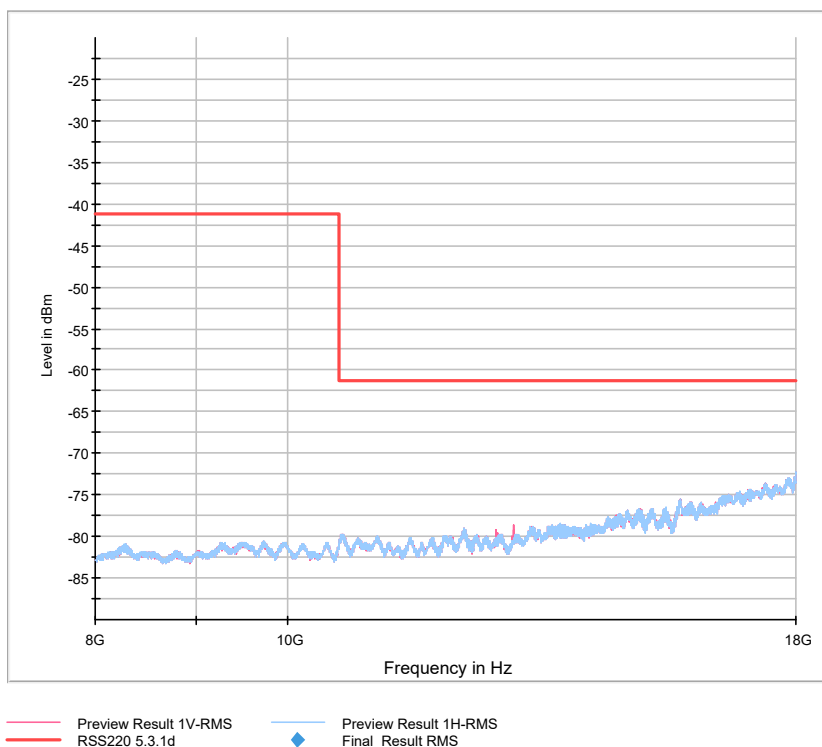
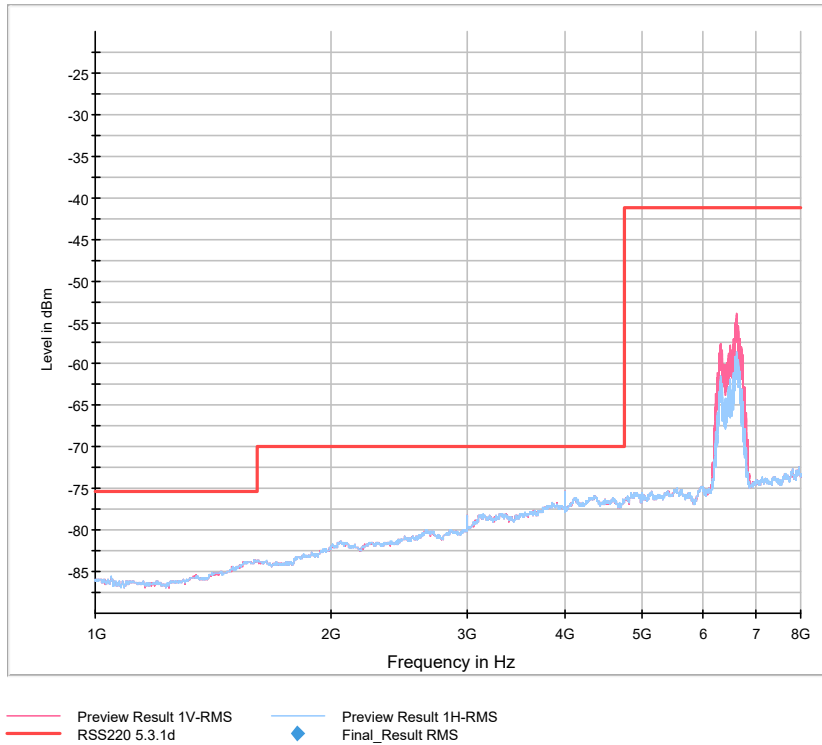
— Preview Result 1V-PK+
— FCC Part 15C Electric Field Strength 3m QP
 — Preview Result 1H-PK+
◆ Final_Result QPK

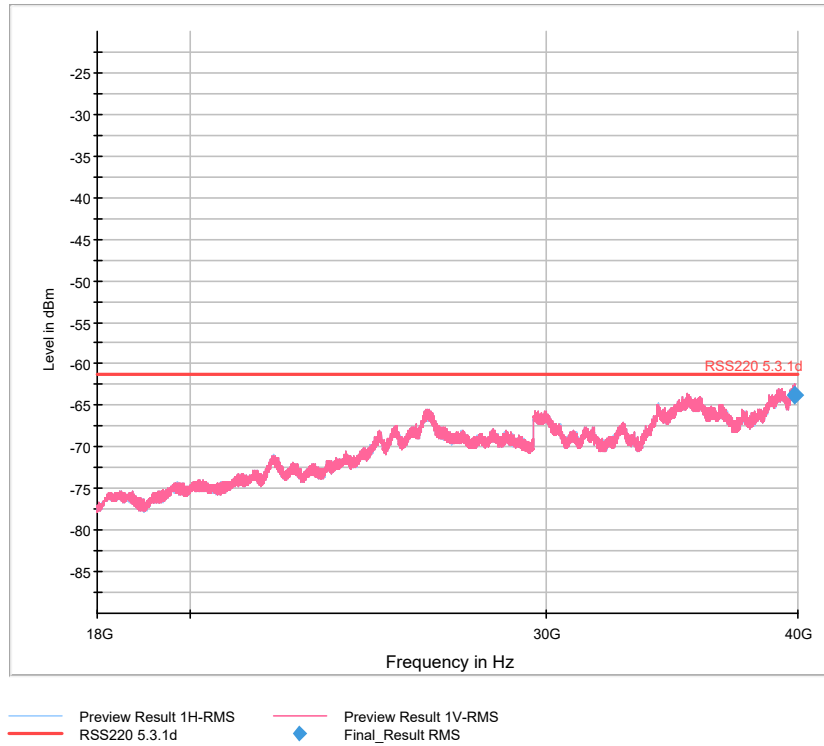
Final Results:

Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
30.030000	25.36	40.00	14.64	1000.0	120.000	205.0	H	-11.0	25.8



Frequency range 1 GHz – 40 GHz:



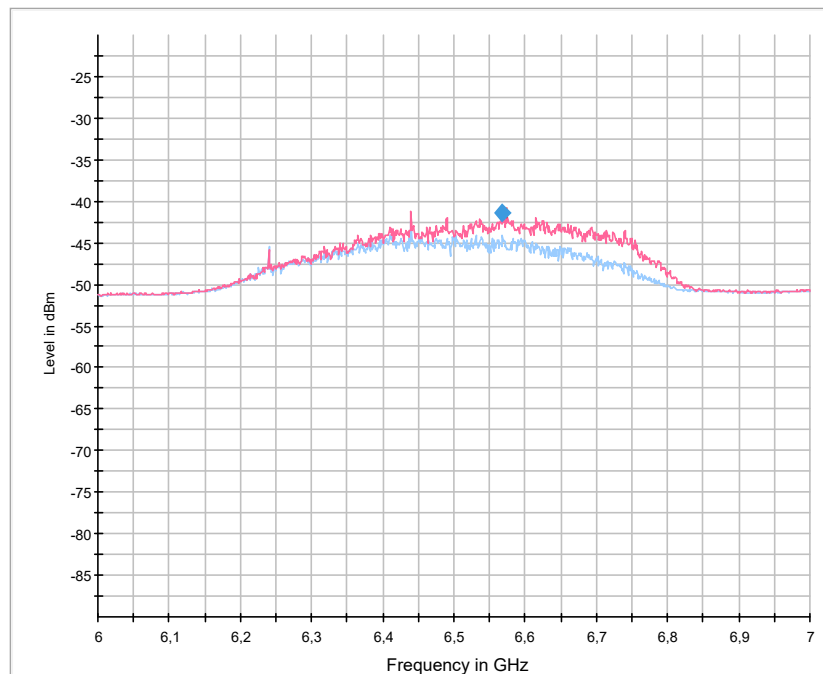


Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
39846.000000	-63.75	-61.30	2.45	1000.0	1000.000	122.0	V	-31.0	-85.1



Mean Power Spectral Density



— Preview Result 1H-RMS
— Preview Result 1V-RMS
* Critical_Freqs RMS ◆ Final_Result RMS

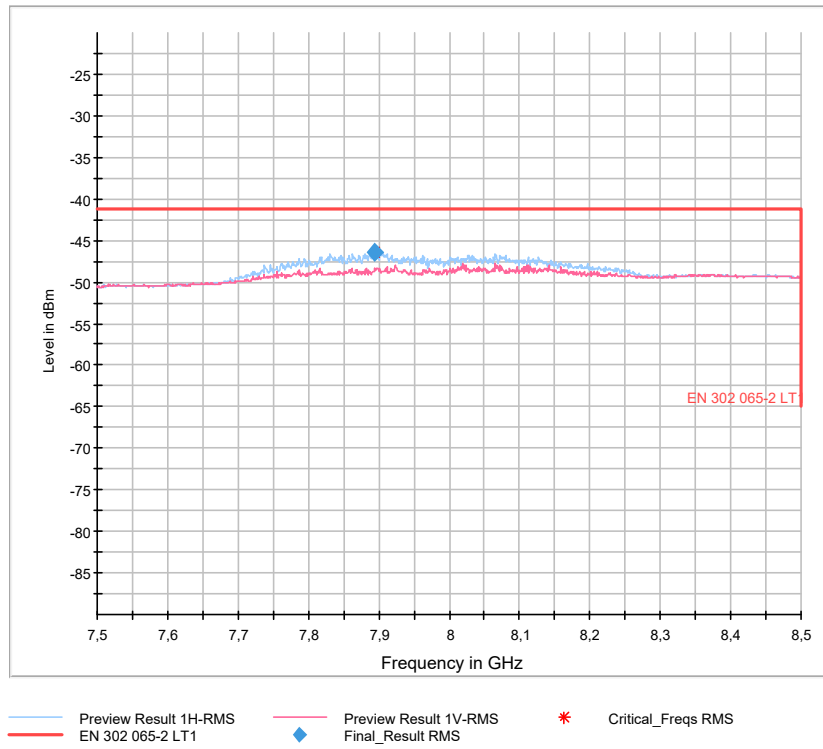
Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
6568.000000	-41.50	-41.30	0.20	1000.0	1000.000	150.0	V	-149.0	-53.4



Transmitting continuously, Channel 9 - Preliminary pre-scans for the worst-case orientation

x axis

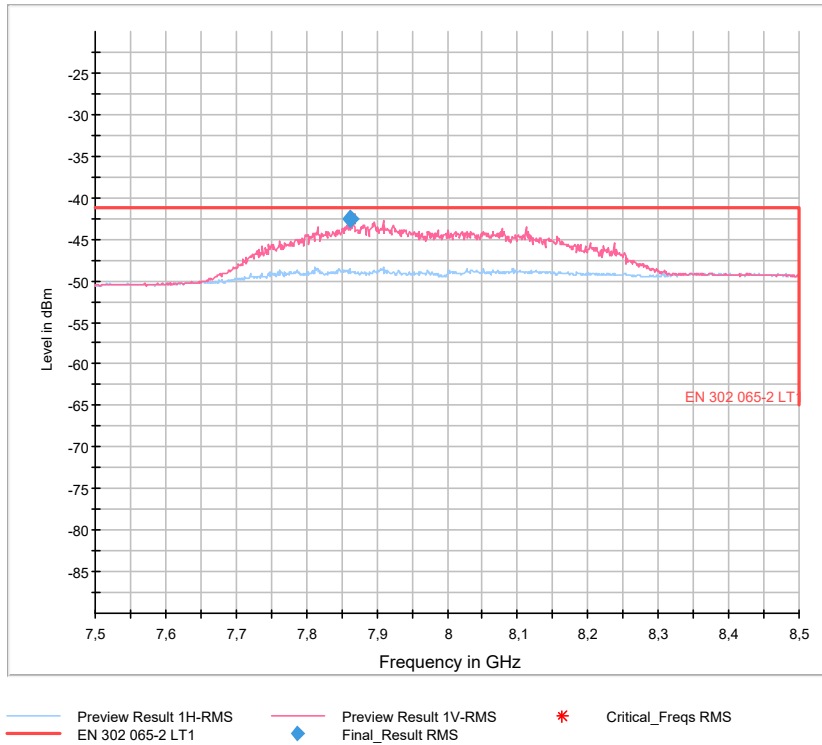


Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
7894.000000	-46.34	-41.30	5.04	1000.0	1000.000	150.0	H	-62.0	-51.8



y axis



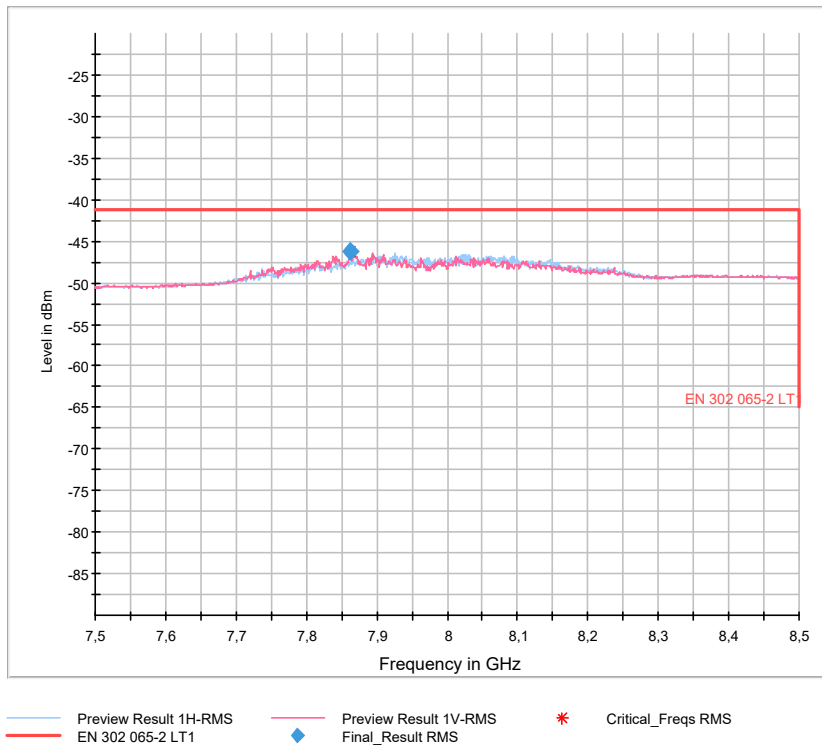
Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
7862.000000	-42.47	-41.30	1.17	1000.0	1000.000	150.0	V	-122.0	-51.8

➔ Worst case orientation is y axis



z axis



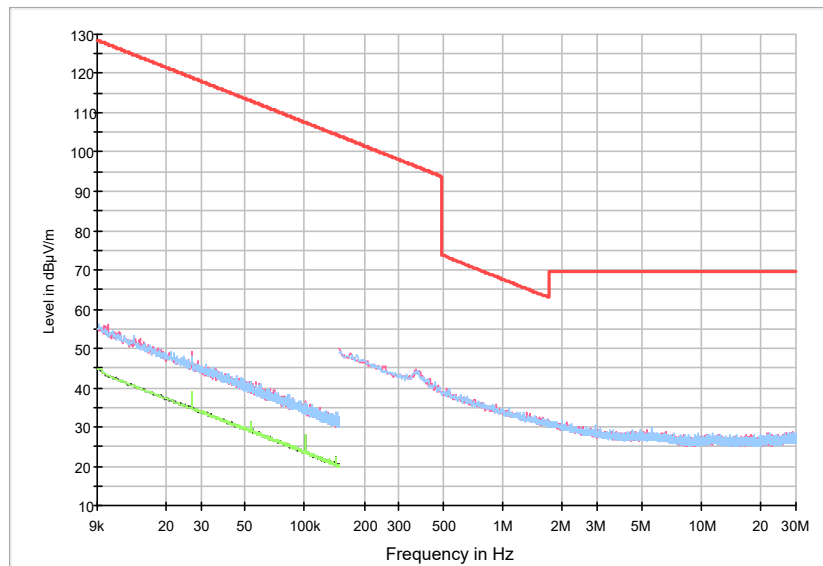
Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
7862.000000	-46.16	-41.30	4.86	1000.0	1000.000	150.0	V	-90.0	-51.8



Transmitting continuously, Channel 9– final measurement in y axis

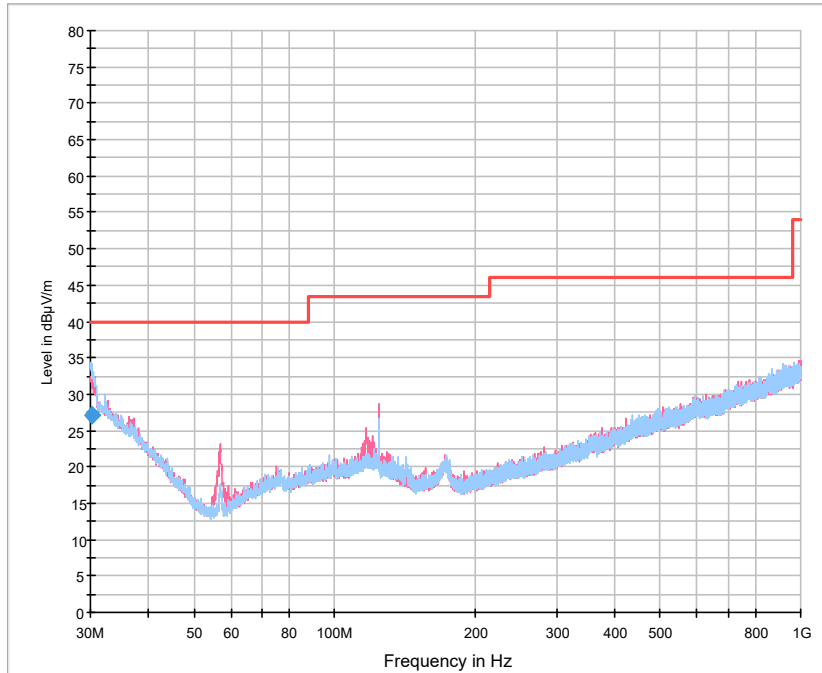
Frequency range 9 kHz – 30 MHz:



- Preview Result 2V-AVG
- Preview Result 1V-PK+
- Preview Result 2H-AVG
- Preview Result 1H-PK+
- * PK+
- * AVG
- FCC Part 15C Electric Field Strength 3m QP+AV (9k-30M)
- ◆ Final_Result QPK
- ◆ Final_Result CAV



Frequency range 30 MHz – 1 GHz:



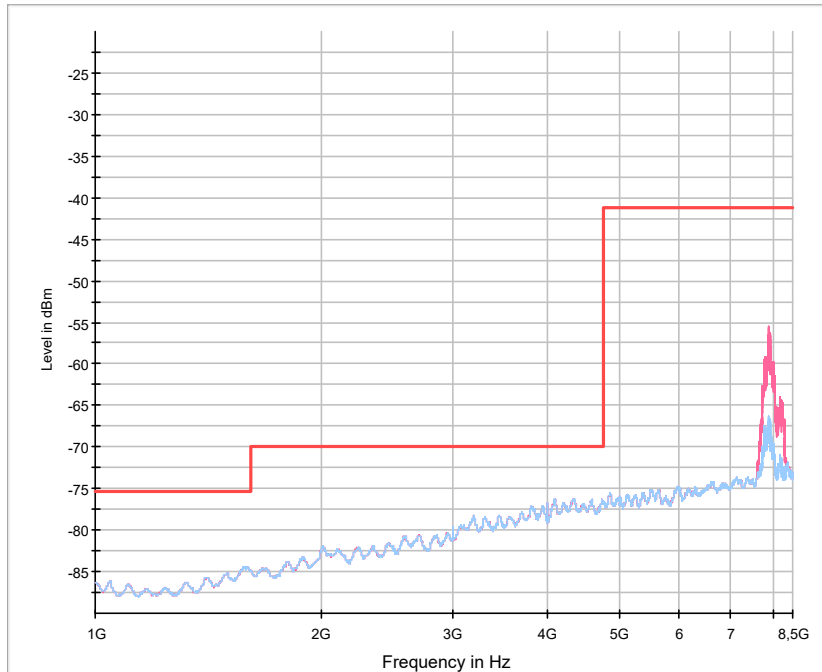
— Preview Result 1V-PK+
— FCC Part 15C Electric Field Strength 3m QP
 — Preview Result 1H-PK+
◆ Final_Result QPK

Final Results:

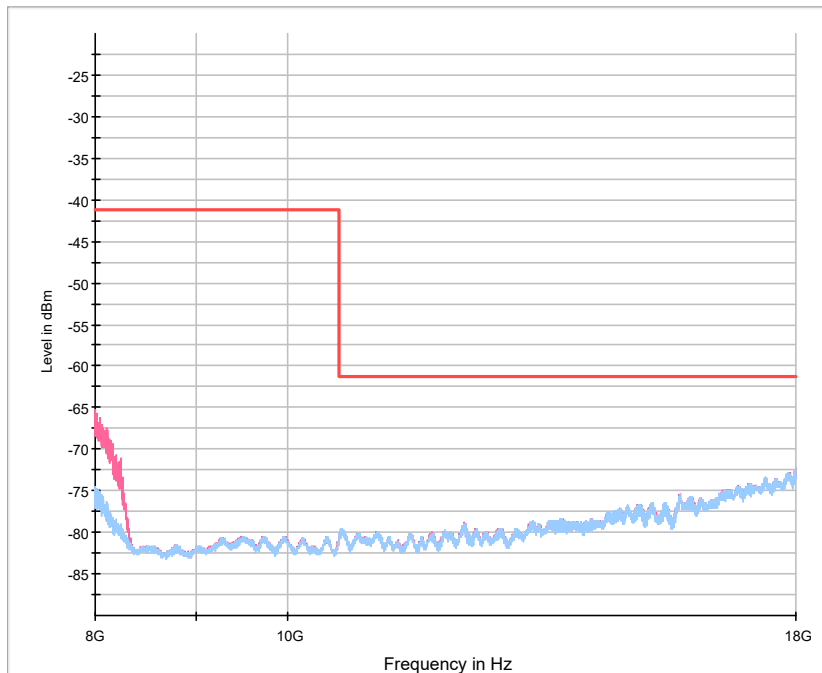
Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
30.120000	27.03	40.00	12.97	1000.0	120.000	206.0	H	214.0	25.7



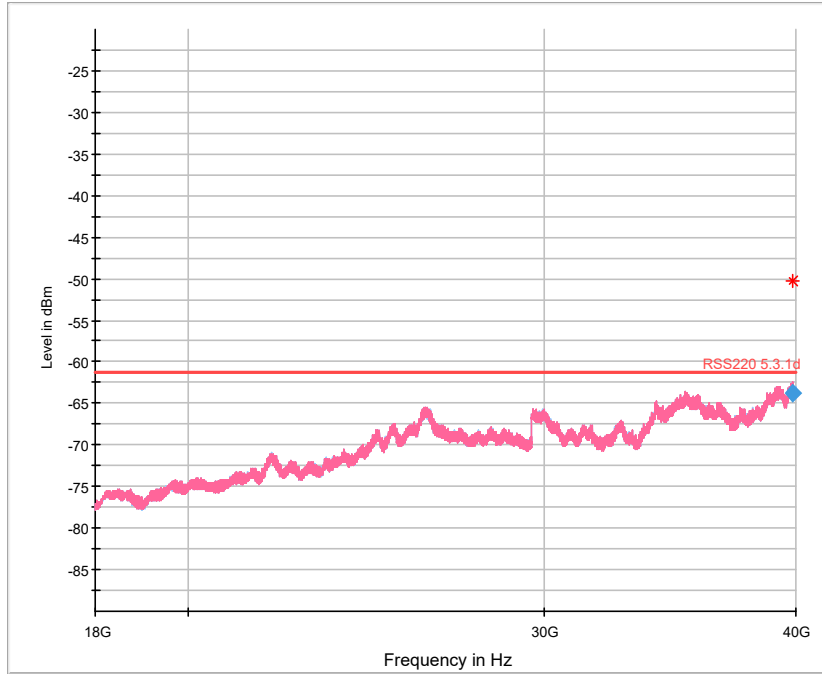
Frequency range 1 GHz – 40 GHz:



Preview Result 1V-RMS
RSS220 5.3.1d
Preview Result 1H-RMS
Final_Result RMS



Preview Result 1V-RMS
RSS220 5.3.1d
Preview Result 1H-RMS
Final_Result RMS



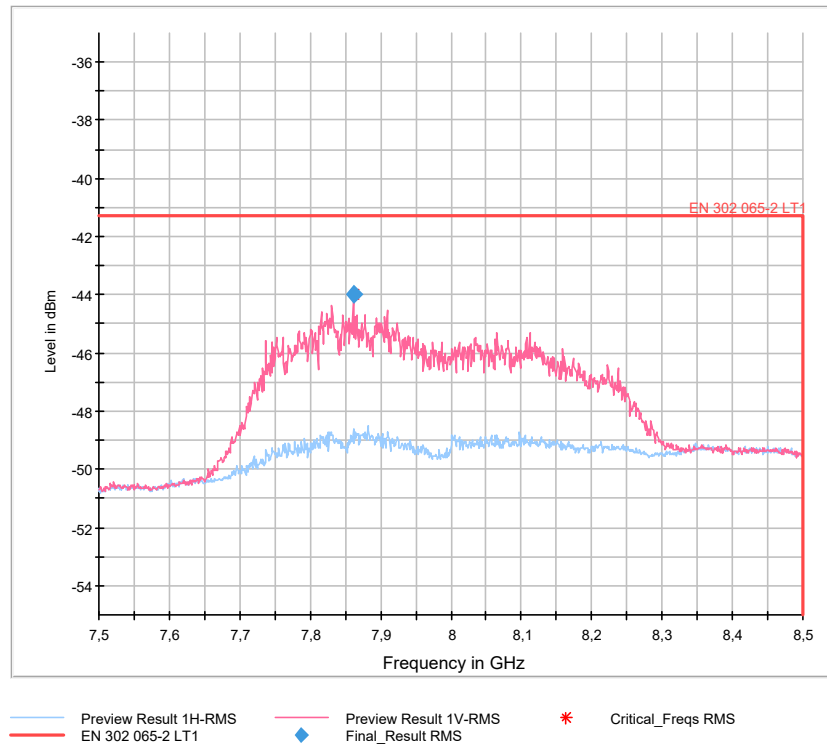
◆ Preview Result 1H-RMS
◆ Final_Result RMS
 — Preview Result 1V-RMS
— RSS220 5.3.1d
 * RMS

Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
39846.0000	-63.75	-61.30	16.75	1000.0	1000.000	108.0	H	-80.0	-85.1



Mean Power Spectral Density



Final Results:

Frequency MHz	RMS dBm	Limit dBm	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB
7862.000000	-43.99	-41.30	2.69	1000.0	1000.000	150.0	V	-122.0	-51.8



2.3.8 Test Location and Test Equipment

This test was carried out in Semi anechoic room - cabin no. 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2021-03-31
Loop antenna	Schwarzbeck	FMZB 1519 B	44334	36	2023-01-31
ULTRALOG Antenna	Rohde & Schwarz	HL562E	38401	36	2021-05-31
Horn antenna	Rohde & Schwarz	HF907	40089	36	2021-02-28
Horn Antenna with preamplifier	Rohde & Schwarz	A-INFOMW LB-180400H-KF+ TS-	43661	12	2020-10-31
Semi anechoic room	Rohde & Schwarz	No. 11	---	---	---
EMC measurement software	Rohde & Schwarz	EMC32 Emission K11 - V10.50.10	42986	---	---

Table 13



2.4 Radiated Emissions in GPS bands

2.4.1 Specification Reference

FCC 47 CFR Part 15 F, Clauses 15.519 (d)
ISED RSS-220, Clause 5.3.1 (d)

2.4.2 Equipment under Test and Modification State

BK1, S/N: 47BA99B6 - Modification State 0

2.4.3 Date of Test

2020-08-05

2.4.4 Environmental Conditions

Ambient Temperature 21 °C
Relative Humidity 35 %

2.4.5 Specification Limits

In addition to the radiated emission limits above, UWB transmitters shall not exceed the following average (RMS) limits when measured using a resolution bandwidth of no less than 1 kHz:

<i>Frequency range</i>	<i>EIRP</i>
1164 MHz – 1240 MHz	-85.3 dBm
1559 MHz – 1620 MHz	-85.3 dBm



Product Service

2.4.6 Test Method

The test was performed according to ANSI C63.10, sections 11.11 and 11.12
See section 2.4.6 for details.

2.4.7 Test Results

<i>Frequency range</i>	<i>Limit applied</i>	<i>Test distance</i>
1164 MHz – 1240 MHz	-85.3 dBm	1 m
1559 MHz – 1620 MHz	-85.3 dBm	1 m

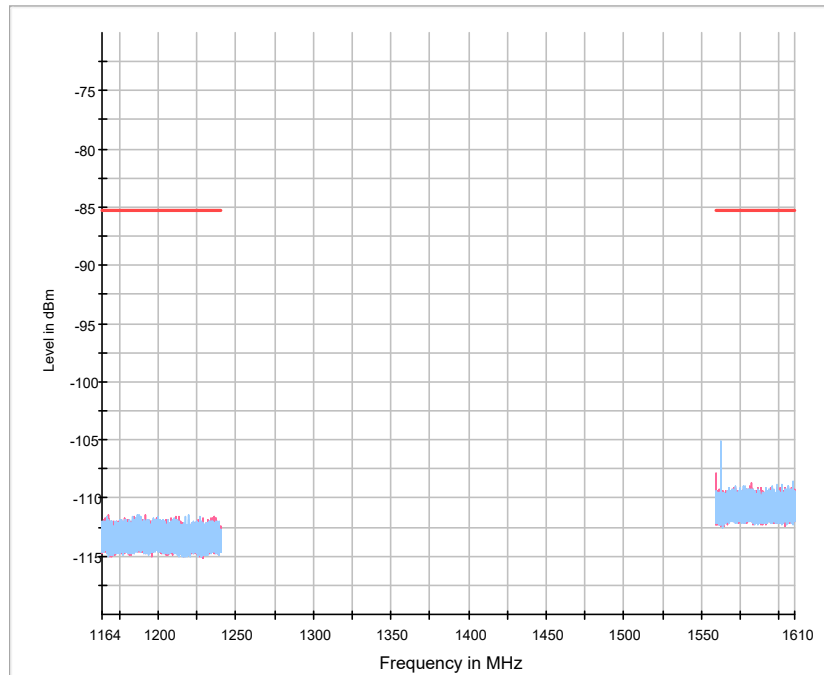
Table 14

Sample calculation:

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + (\text{Cable attenuation (dB)} \\ + \text{Antenna Transducer (dB(1/m))})$$



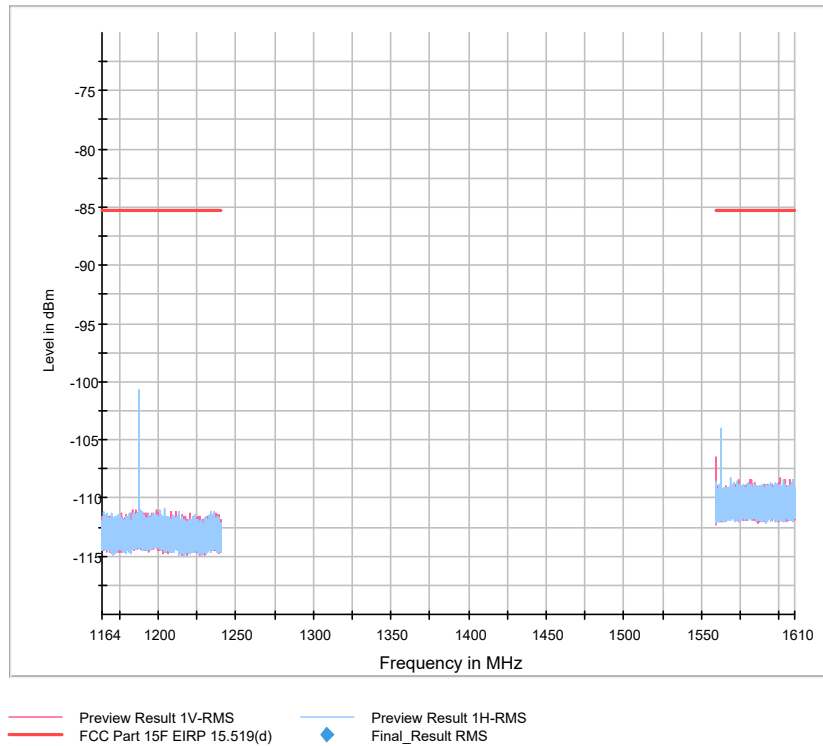
Transmitting continuously, Channel 5 – y axis



Preview Result 1V-RMS Preview Result 1H-RMS
FCC Part 15F EIRP 15.519(d) Final_Result RMS



Transmitting continuously, Channel 9 – y axis



2.4.8 Test Location and Test Equipment

This test was carried out in Semi anechoic room - cabin no. 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2021-03-31
Horn antenna	Rohde & Schwarz	HF907	40089	36	2021-02-28
Semi anechoic room	Rohde & Schwarz	No. 11	---	---	---
EMC measurement software	Rohde & Schwarz	EMC32 Emission K11 - V10.50.10	42986	---	---

Table 15



2.5 Signal deactivation

2.5.1 Specification Reference

FCC 47 CFR Part 15 F, Clause 15.519(a)
ISED RSS-220, Clauses 4. 5.3.1(b)

2.5.2 Equipment under Test and Modification State

BK1, S/N: 47BA99B6 - Modification State 0

2.5.3 Date of Test

2020-07-30

2.5.4 Environmental Conditions

Ambient Temperature	21 °C
Relative Humidity	35 %

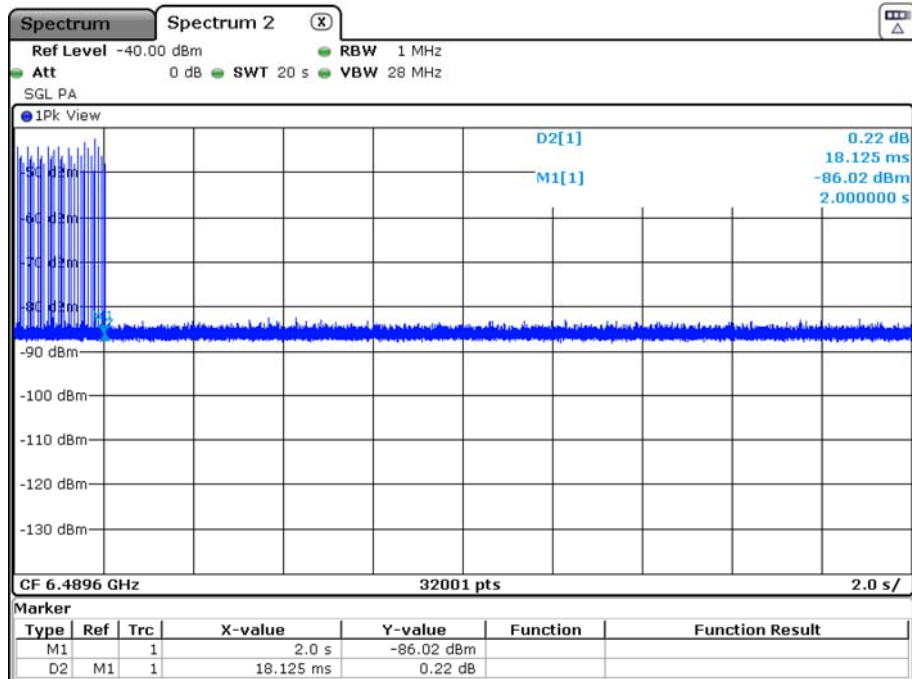
2.5.5 Specification Limits

The device is to transmit only when it is sending information to an associated receiver. The device shall cease transmission of information 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 device at least every 10 seconds or the UWB device shall cease transmitting any information other than periodic signals used for the establishment or re-establishment of a communication link with an associated receiver

2.5.6 Test Method



2.5.7 Test Results



Date: 30 JUL 2020 21:54:49

Description:

Associated receiver (125 kHz and 434 MHz test bench BDC 18) was turned off at 0 seconds (Marker 1) Device under test, BK1, stopped transmission after 2.018 seconds (Marker 2).

Result:

The requirement is fulfilled.



2.5.8 Test Location and Test Equipment

This test was carried out in Semi anechoic room - cabin no. 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	03/20	03/21
Horn antenna	Rohde & Schwarz	HF907	40089	02/19	02/21
Semi anechoic room	Rohde & Schwarz	No. 11	---	---	---

Table 16



2.6 RF Exposure

2.6.1 Specification Reference

FCC 47 CFR Part 2 J, Clause 2.1093
KDB 447498 D01 V06, section 4.3.1
ISED RSS-Gen, Clause 3.4
ISED RSS-102, Clause

2.6.2 Equipment under Test and Modification State

BK1, S/N: 47BA99B6 - Modification State 0

2.6.3 Date of Test

2020-07-27

2.6.4 Environmental Conditions

Ambient Temperature	21 °C
Relative Humidity	35 %

2.6.5 Test Method

Estimation is based on output power test.
For details please refer to section 2.2.6 of this test report.

2.6.6 Specification Limits

Acc. to KDB 477498:

The 1 g and 10 g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separations distances ≤ 50 mm are determined by:

$$\frac{\text{max. power of channel, incl. tune - up tol., mW}}{\text{min. test separation distance, mm}} \cdot \sqrt{f, \text{GHz}} \leq \begin{cases} 3.0 & \text{for 1 g} \\ 7.5 & \text{for 10 g} \end{cases} \text{ extremity SAR}$$

1. f (GHz) is the RF channel frequency in GHz;
2. Power and distance are rounded to the nearest mW and mm before calculation;
3. The result is rounded to one decimal place for comparison;
4. 3.0 and 7.5 are referred to as the numeric thresholds

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied.



ISED RSS-102, Clause 2.5.1

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.

For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.:

Frequency (MHz)	Exemption limits (mW) ¹ at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
≤300 ²	71	101	132	162	193	223	254	284	315	345
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106

¹ The exemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

² Transmitters operating between 3 kHz and 10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in IC RSS-102, issue 5, section 4.



2.6.7 Test Results

acc. to KDB 447495 D01:

Carrier frequency:	f	=	6.614 GHz
Distance:	d	=	2 mm
Transmitter output power:	TP	=	281 μW (-5.51 dBm)

Carrier frequency:	f	=	7.861 GHz
Distance:	d	=	2 mm
Transmitter output power:	TP	=	148 μW (-8.31 dBm)

Note: The 6614 MHz and 7851 MHz UWB radio is exempt from SAR based on the output power (0.281 mW) being less than 1 mW.

At the present time ISED Canada SAR Exemption calculations are valid only for frequencies up to and including 6 GHz, and RSS-102 Clause 2.5.1 refers. Furthermore, ISED Canada RF Exposure calculations are valid only for distances of 20 cm or more. Therefore, the applicant cannot perform RF Exposure calculations at 0.2 cm for demonstration of compliance without ISED Canada permission.

The power density calculation at a minimum distance of 0.2 cm based on power with no accounting for duty cycle is:

Frequency (GHz)	Max EIRP Peak Level (dBm)	Max EIRP Peak Level (mW)	Min. distance (cm)	Power Density at min distance	Power Density Limit (mW/cm ²)
6.614	-5.51	0.281	0.2	0.559 mW/cm ²	1.0
7.861	-8.31	0.148	0.2	0.294 mW/cm ²	1.0

Table 17

For Max. EIRP Peak level emission test, please refer to test report section 2.2.

1.1.1 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2021-03-31
Double ridged horn antenna	Rohde & Schwarz	HF907	40089	24	2021-02-28
EMC Measurement Software	Rohde & Schwarz	EMC32 V10.50.10	19893	N/A	N/A

Table 18



3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$		

Table 19 Measurement uncertainty based on CISPR 16-4-2



<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
9 kHz ≤ f < 26.5 GHz	2	± 6.5 dB
26.5 GHz ≤ f < 60 GHz	2	± 8.0 dB
60 GHz ≤ f < 325 GHz	2	± 10 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10 ⁻⁷
The expanded uncertainty reported according to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$		

Table 20 Measurement uncertainty based on ETSI TR 100 028