



Test Report

For:
Rivian Automotive, LLC

Brand:
-

Marketing Name:
Keyfob 2.0

Model Name:
Keyfob 2.0

Product Description:
Hand Held Automotive Vehicle Access Keyfob

FCC ID: 2AW3A-2WWG24R1TKFB
2A3WA-2WWG24R1SKFB *
IC: 26958-2WWG24R1TKF
26958-2WWG24R1SKF *
* Cosmetic difference, see 12 Annex

Applied Rules and Standards:
FCC CFR 47 Subpart 15.519 & KDB 393764
RSS-220, Issue 1, amendment 1 & RSS-Gen, Issue 5

REPORT #: RIVIA_069_24001_FCC15.519_RSS220_Rev1

DATE: 2024-10-15



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1 Assessment

The following device was evaluated against the applicable criteria specified in

- FCC rule Part 15.519 of Title 47 of the Code of Federal Regulations
- KDB 393764
- RSS-220, Issue 1, amendment 1
- RSS-Gen, Issue 5

No deviations were ascertained.

Company	Description	Model #
Rivian Automotive, LLC	Hand Held Automotive Vehicle Access Keyfob	Keyfob 2.0

Responsible for Testing Laboratory:

2024-10-15	Compliance	Alvin Ilarina (EMC Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2024-10-15	Compliance	Guangcheng Huang (Senior EMC Test Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. 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 CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing
City/Zip Code	Milpitas, 95035 CA
Country	USA
Telephone:	+ 1 (408) 586 6200
Fax:	+ 1 (408) 586 6299
EMC Lab Manager:	Alvin Ilarina
Project Manager:	Akanksha Baskaran

2.2 Identification of the Client

Client's Name:	Rivian Automotive, LLC
Street Address:	14600 Myford Road
City/Zip Code	Irvine, CA 92606
Country	USA

2.3 Identification of the Manufacturer

Manufacturer's Name:	same as client
Manufacturers Address:	same as client
City/Zip Code	same as client
Country	same as client

3 Equipment Under Test (EUT)

3.1 EUT Specifications

Model No:	Keyfob 2.0
Marketing Name:	Keyfob 2.0
HW Version:	Rev.B.
SW Version:	-
FCC ID:	2AW3A-2WWG24R1TKFB 2A3WA-2WWG24R1SKFB *
IC:	26958-2WWG24R1TKF 26958-2WWG24R1SKF *
FWIN:	N/A
HVIN:	R1TKFB R1SKFB *
PMN:	Keyfob 2.0
Product Description:	Hand Held Automotive Vehicle Access Keyfob
Power Supply / Rated operating Voltage Range:	Range: 2 - 3.3 V Nominal: 3 V
Operating Temperature Range	Range: -30 °C to +45 °C Nominal: 20 °C
Sample Revision	pre-production
EUT Dimensions	85mmx44mmx16mm
Note: All information provided by the client. * Cosmetic difference, see 12 Annex	

3.2 Radio Specifications

Tested radio technology	UWB CH9 (7.9 GHz)
Frequency Range / number of channels:	UWB: CH5 (6.5 GHz) (not supported), CH9 (8 GHz)
Modes of Operation	1. Continuous transmission (for testing purpose only) 2. normal mode (as in used case) (Data rate: 6.8Mbps, 850Kbps, SP3; max. power level setting: 7F)
Note: All information provided by the client.	

3.3 EUT Sample details

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	-	Rev.B.	-	For radiated testing
2	-	Rev.B.	-	For conducted testing

3.4 Accessory Equipment (AE) details

AE #	Type	Model	Manufacturer	Serial Number
0	URAT cable	-	-	-

3.5 Mode of Operation

Mode #	Mode of Operation	Comments
1	TX continuous	Continuously transmitting signal
2	Normal	Normal mode (as in used case)

3.6 Justification for Worst Case

The EUT is a handheld device with small form factor stated in the section 3.1. Pre-scan has been done to determine the worst-case data rate and the worst-case EUT position among all three orthogonal axes. The final radiated testing has been done at the worst-case EUT position as shown in the test setup photos, while the EUT continuously transmitting at the worst-case data rate.

4 Subject of Investigation

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant requirements specified in section 1 Assessment.

5 Measurement Results Summary

Test Specification	Test Case	Testing Conditions	Mode ²	NA	NP	Result
FCC15.519(a)(1) RSS-220 5.3.1(b)	Transmission cease time	Nominal	2	☐	☐	Pass
FCC15.503(d) FCC15.519(b) RSS-220 5.1(a)	10 dB Bandwidth	Nominal	1	☐	☐	Pass
RSS-Gen 6.7	99% Occupied Bandwidth	Nominal	1	☐	☐	Info only
§15.519(c)&(d) RSS-220 5.3.1(c),(d),(e)&(f)	Radiated emissions	Nominal	1	☐	☐	Pass
§15.519(e) RSS-220 5.3.1(d)&(g)	Effective isotropic radiated power	Nominal	1	☐	☐	Pass

Note: NA= Not Applicable; NP= Not Performed.

*): see manufacturer's product manual.

Note 2. See section 3.5 Mode of Operation

6 Measurements

6.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor k=2.

Radiated measurement

Measurement System	EMC 1	EMC 2
Conducted emissions (mains port)	1.12 dB	0.46 dB
Radiated emissions		
(< 30 MHz)	3.66 dB	3.88 dB
(30 MHz – 1GHz)	3.17 dB	3.34 dB
(1 GHz – 3 GHz)	5.01 dB	4.45 dB
(>3 GHz)	4.0 dB	4.79 dB

Conducted measurement

RF conducted measurement ± 0.5 dB

6.2 Environmental Conditions During Testing:

The following environmental conditions were maintained during testing:

- Ambient Temperature: 20-25 °C
- Relative humidity: 40-60%

6.3 Dates of Testing:

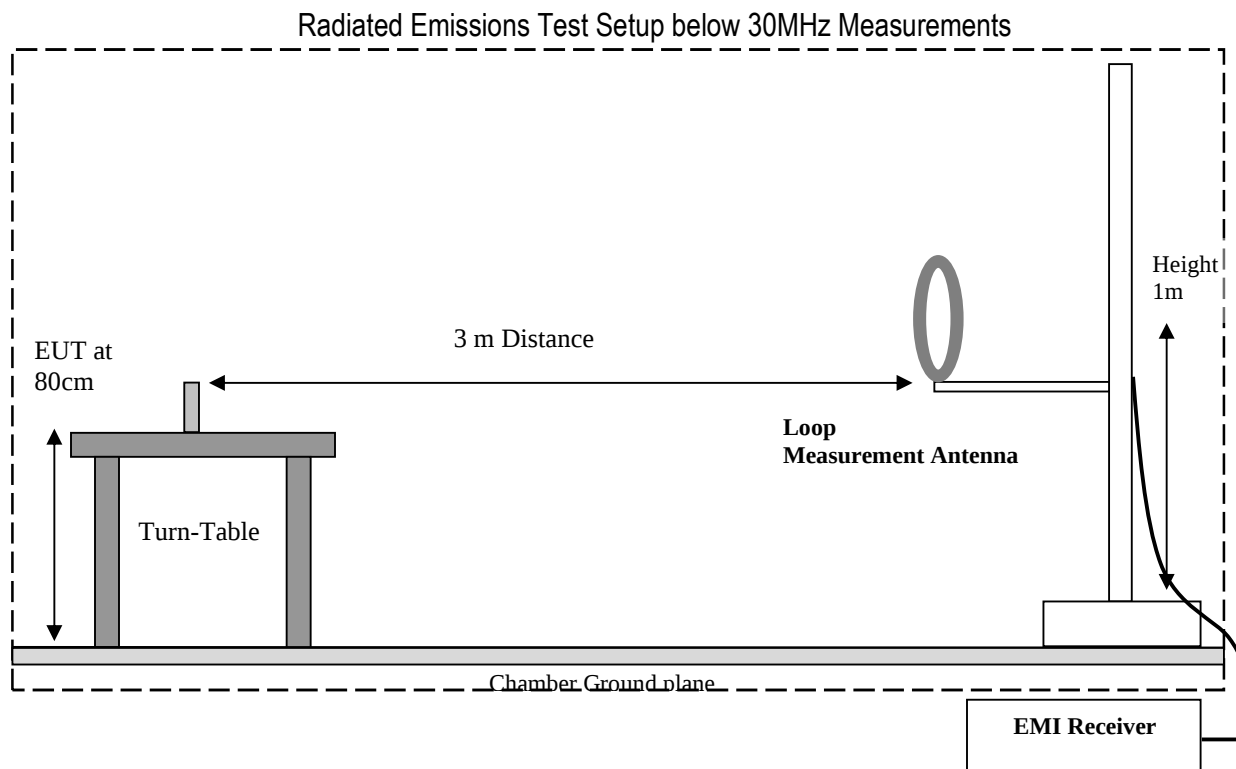
2024-09-03 to 2024-09-20

7 Measurement Procedures

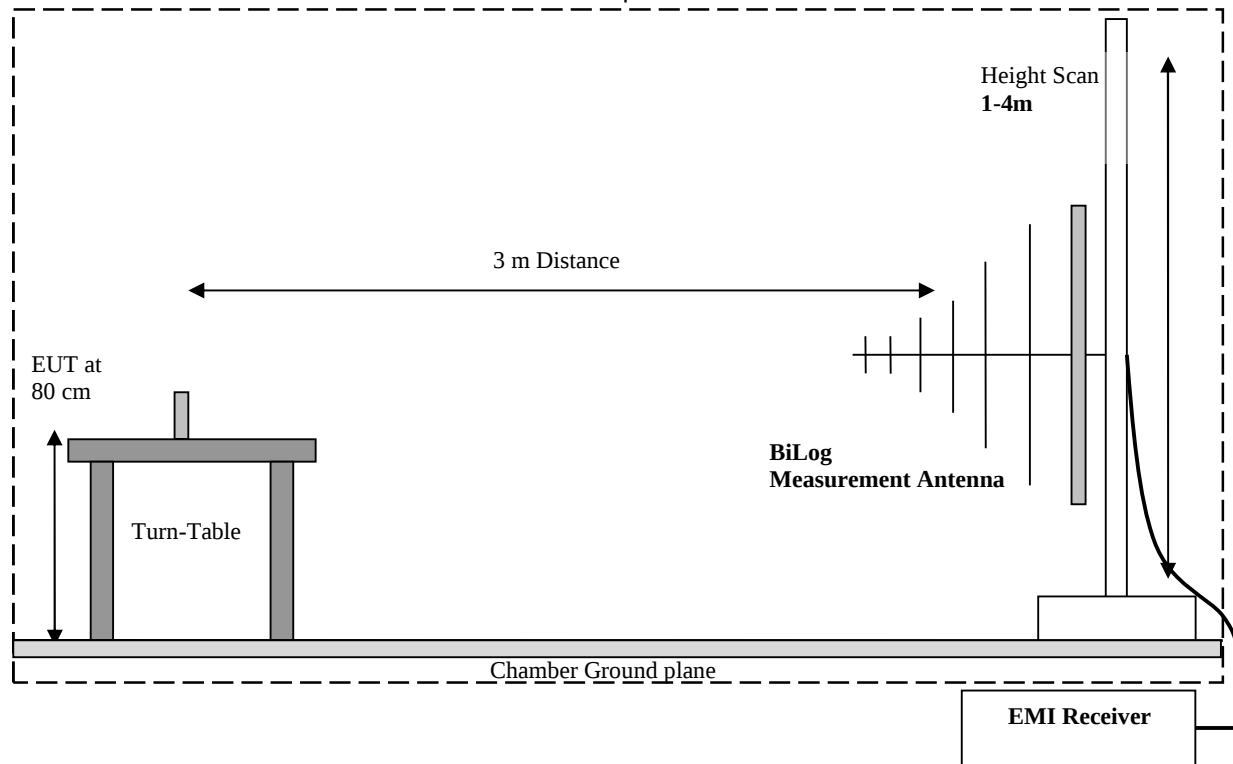
7.1 Radiated Measurement

The radiated measurement is performed according to: ANSI C63.10 (2013)

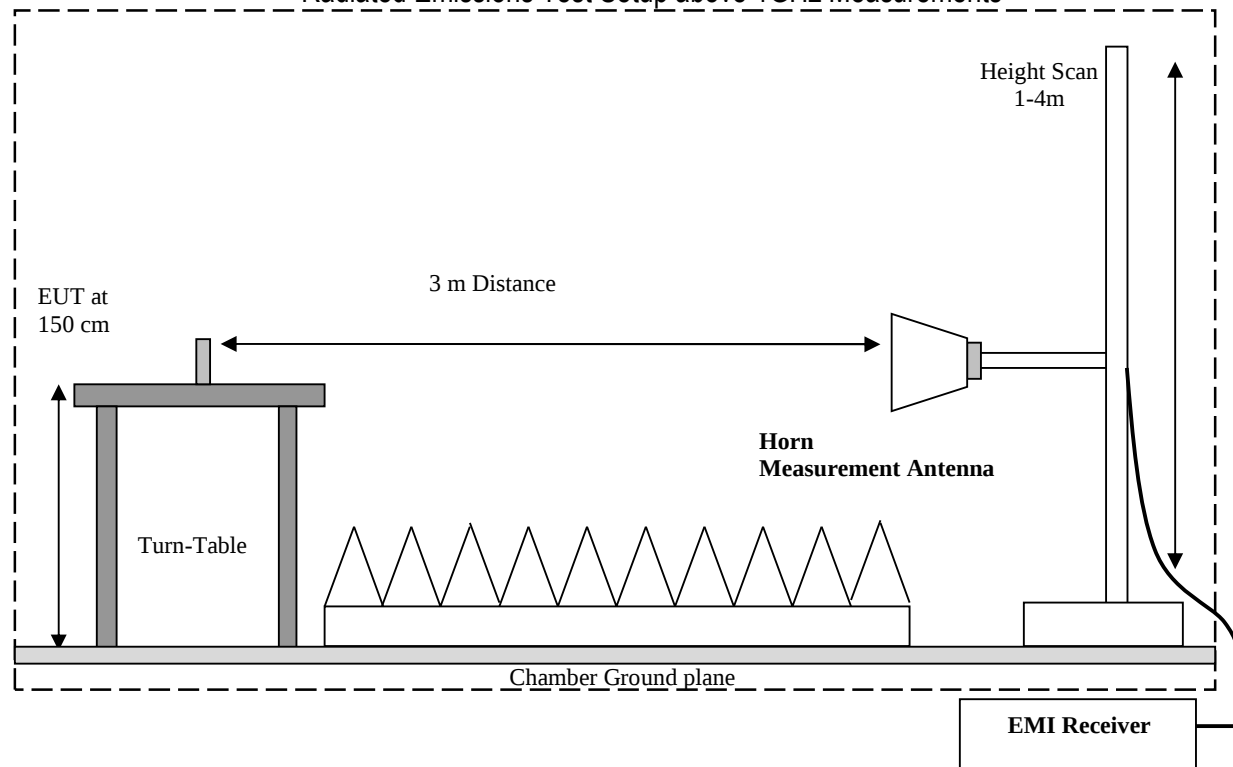
- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise floor and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise floor level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.



Radiated Emissions Test Setup 30MHz-1GHz Measurements



Radiated Emissions Test Setup above 1GHz Measurements



7.1.1 Sample Calculations for Field Strength Measurements

Field Strength is calculated from the Spectrum Analyzer/ Receiver readings, considering the following parameters:

1. Measured reading in dB μ V
2. Cable Loss between the receiving antenna and SA in dB and
3. Antenna Factor in dB/m

All radiated measurement plots in this report are taken from a test SW that calculates the Field Strength based on the following equation:

$$E = P + AF - \text{Cable loss}$$

E Field strength in dB μ V/m

P Test receiver raw value in dB μ V

AF antenna factor in dB/m, including gain from attached amplifier in dB

Example:

Frequency (MHz)	Measured raw value (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB/m)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

7.1.2 Sample Calculations for EIRP Measurement

All radiated measurement plots in this report show EIRP level are based on the following equation from ANSI C63.10, Formula 39:

$$EIRP(\text{dBm}) = E(\text{dB}\mu\text{V/m}) - 95.2 \text{ dB}$$

8 Test Result

8.1 Transmission cease time

8.1.1 Measurement according to ANSI C63.10 Section 7.4

1. Trigger the spectrum analyzer sweep on the wanted signal frequency
2. Set the spectrum analyzer sweep time much greater than 10 s
3. Manually activate the UWB device and confirm that it ceases transmission within the specified time of deactivation

8.1.2 Limits:

- FCC §15.519 (a)(1): 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.
- RSS-220 5.3.1(a): 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.

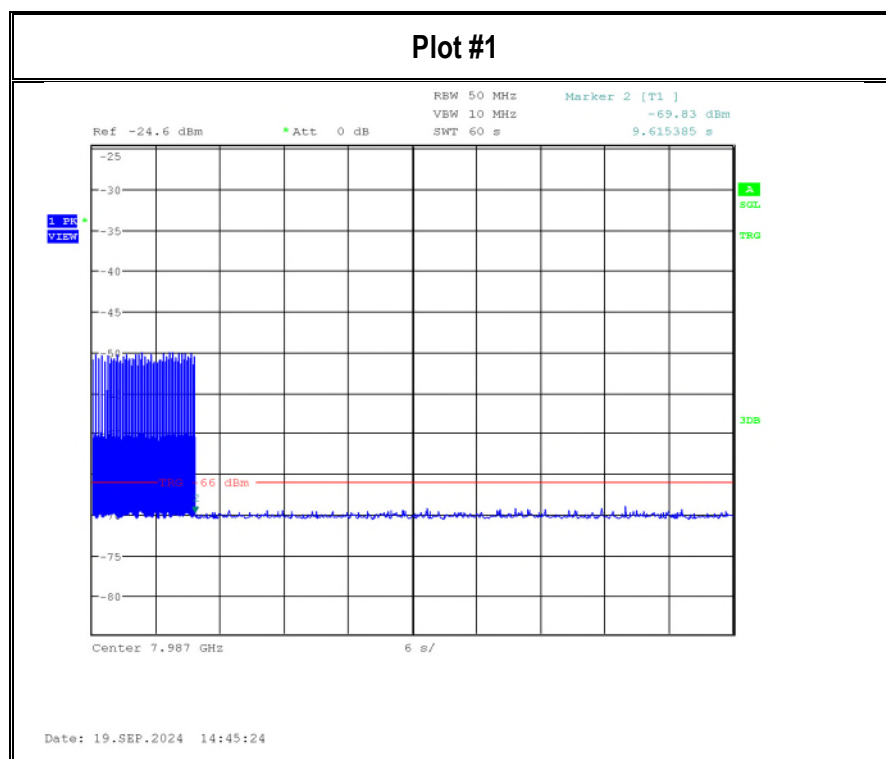
8.1.3 Test conditions and setup:

Temperature	EUT Set-Up #	EUT operating mode	Power Input
23 °C	2	2	nominal

8.1.4 Measurement result:

Plot #	Cease time	Limit cease time	Result
1	9.6 s	Max. 10 s	Pass

8.1.5 Measurement Plots:



Note: The EUT ceases transmission within 10 s and does not transmit again without receiving an acknowledgement from the associated receiver.

8.2 10 dB Bandwidth

8.2.1 Measurement according to ANSI C63.10 Section 10.1

- The frequency at which the maximum power level is measured with the peak detector is designated f_M . The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below f_M , where the peak power falls by 10 dB relative to the level at f_M , are designated as f_H and f_L , respectively:

8.2.2 Limits:

- FCC §15.503 (d): An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.
- FCC §15.519 (b): The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.
- RSS-220, 2: A UWB device is an intentional radiator that has either a -10 dB bandwidth of at least 500 MHz or a -10 dB fractional bandwidth greater than 0.2. There are eight distinct subclasses of UWB device.
- RSS-220, 5.1(a): The -10 dB bandwidth of the device shall be totally contained in the band 3.1-10.6 GHz.

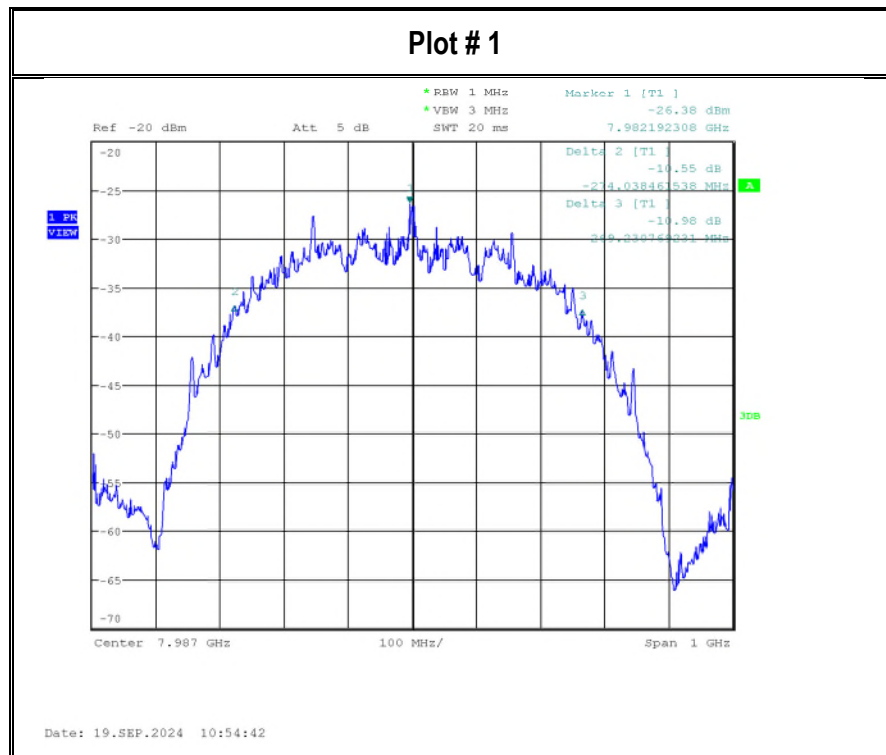
8.2.3 Test conditions and setup:

Temperature	EUT Set-Up #	EUT operating mode	Power Input
23 °C	2	1	nominal

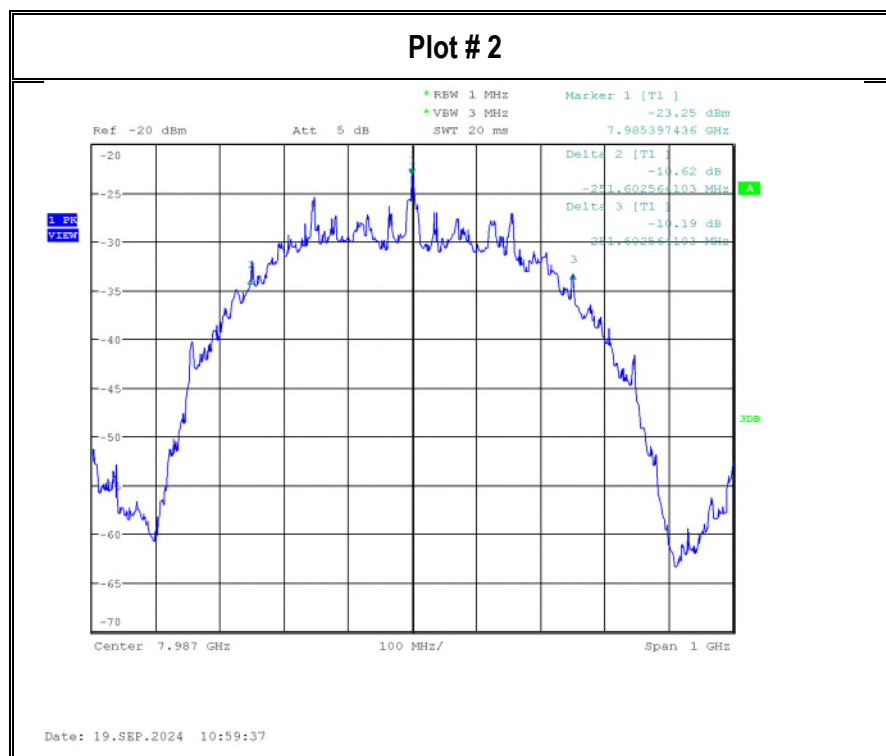
8.2.4 Measurement result:

Plot #	Data rate	f_{low}	f_{high}	10 dB bandwidth	Limit 10 dB bandwidth	Result
1	6.8Mbits	7708.1538	8251.4231	543.27	min. 500 MHz	Pass
2	850Kbits	7733.7944	8236.9996	503.21	min. 500 MHz	Pass
3	SP3	7720.9739	8251.4226	530.45	min. 500 MHz	Pass

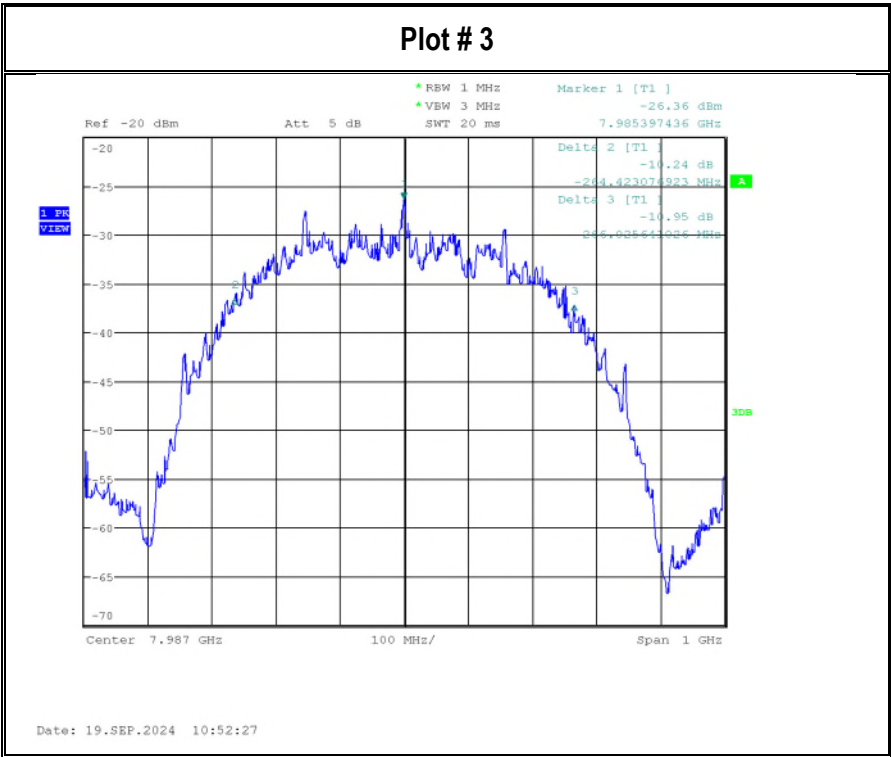
8.2.5 Measurement Plots:



Note: Data rate 6.8 Mbits



Note: Data rate 850 kbits



Note: Date rate SP3

8.3 99% Occupied Bandwidth

8.3.1 Measurement according to ANSI C63.10 Section 6.9

- Span = 1.5 to 5 times OBW
- RBW = 1% to 5% OBW
- VBW = 3 times RBW
- Reference level well above the maximal mixer level for linear operation
- Peak detector, max-hold

8.3.2 Limits:

- For information only

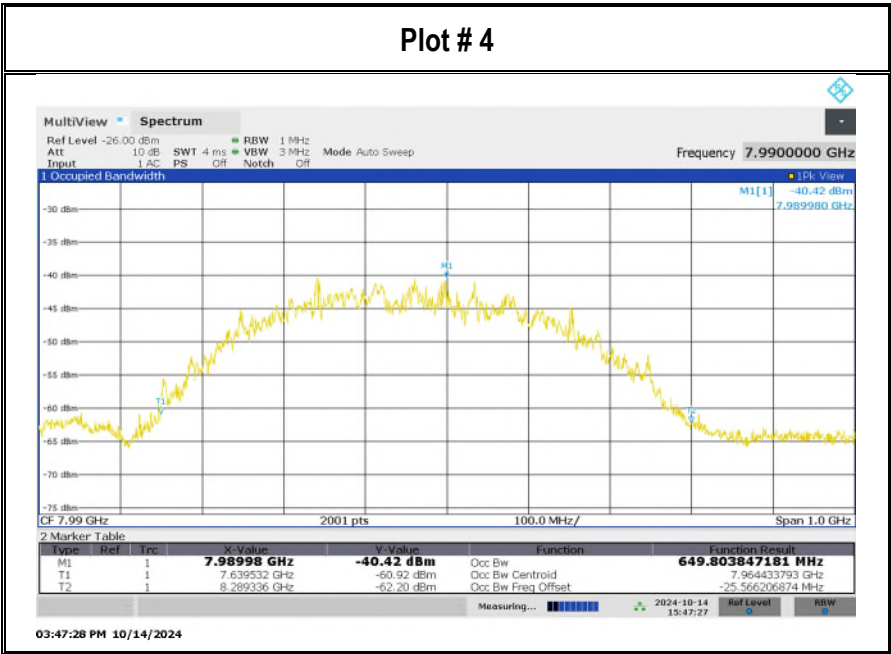
8.3.3 Test conditions and setup:

Temperature	EUT Set-Up #	EUT operating mode	Power Input
23 °C	1	1	nominal

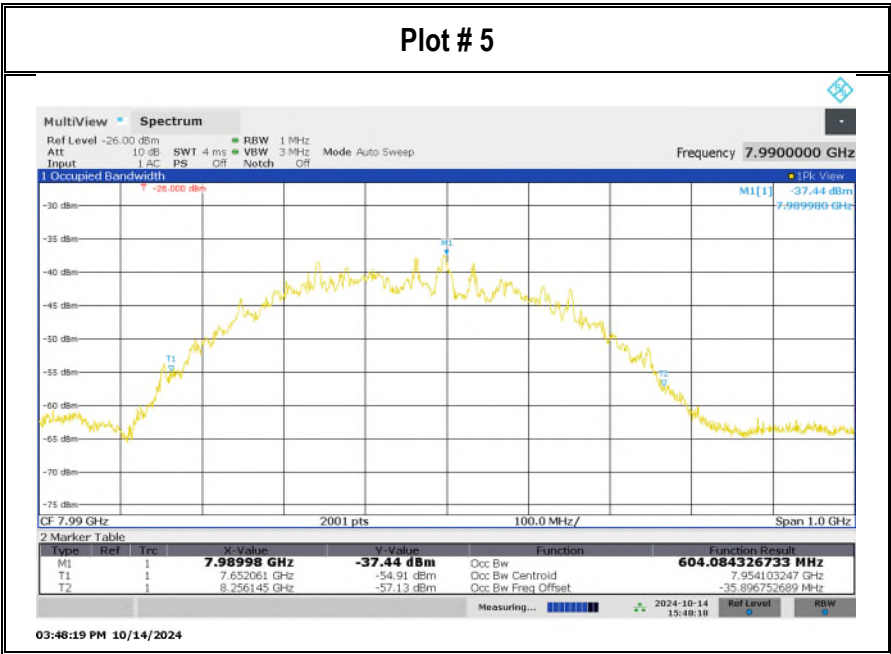
8.3.4 Measurement result:

Plot #	Data rate	f _{low} (MHz)	f _{high} (MHz)	99% OBW (MHz)
1	6.8Mbits	7639.532	8289.336	649.804
2	850Kbits	7652.061	8256.145	604.084
3	SP3	7653.893	8251.448	597.555

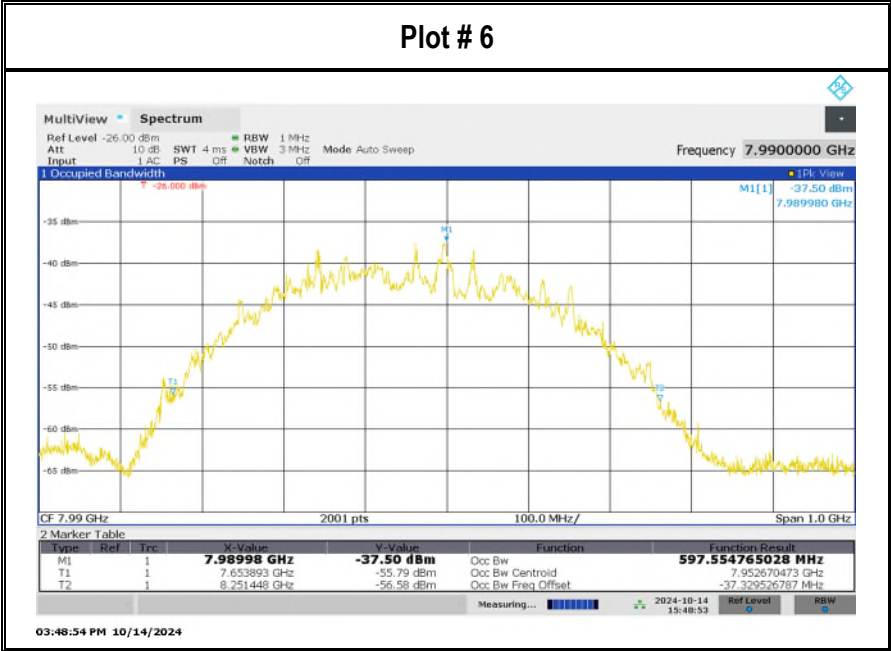
8.3.5 Measurement Plots:



Note: Date rate 6.8 Mbits



Note: Date rate 850 kbits



Note: Date rate SP3

8.4 Radiated emissions

8.4.1 Measurement according to ANSI C63.10 Section 10.2 & 10.3

8.4.2 Limits:

- FCC §15.519 (c): The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in § 15.209.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency in MHz	EIRP in dBm	Field strength at 1 m in dBμV/m	Field strength at 0.6 m in dBμV/m
960-1610	-75.3	29.4	-
1610-1990	-63.3	41.4	-
1990-3100	-61.3	43.4	-
3100-10600	-41.3	63.4	-
Above 10600	-61.3	43.4	47.9

Note: Limit conversion applying formula (38) from ANSI C63.10

- FCC §15.519 (d): In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm	Field strength at 1 m in dBμV/m
1164-1240	-85.3	19.4
1559-1610	-85.3	19.4

Note: Limit conversion applying formula (38) from ANSI C63.10

- RSS-220 3.4: Radiated emissions at or below 960 MHz

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3

- RSS-220 5.3.1(d): Radiated emissions above 960 MHz from a device shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz

Frequency in MHz	EIRP in dBm	Field strength at 1 m in dB μ V/m	Field strength at 0.6 m in dB μ V/m
960-1610	-75.3	29.4	-
1610-4750	-70.0	34.7	-
4750-10600	-41.3	63.4	-
Above 10600	-61.3	43.4	47.9

Note: Limit conversion applying formula (38) from ANSI C63.10

- RSS-220 5.3.1(e): In addition to the limits specified in paragraph (d) of this section, radiated emissions shall not exceed the following average limits when measured using a resolution bandwidth greater than or equal to 1 kHz. The measurements shall demonstrate compliance with the stated limits at whatever resolution bandwidth is used.

Frequency in MHz	EIRP in dBm	Field strength at 1 m in dB μ V/m
1164-1240	-85.3	19.4
1559-1610	-85.3	19.4

8.4.3 Test conditions and setup:

Temperature	EUT Set-Up #	EUT operating mode	Voltage
23 °C	1	1	nominal

8.4.4 Measurement result:

Plot #	Frequency	Scan Frequency	Spurious emission level with lowest margin	Limit	Result
1-7	7.9 GHz (Channel 9)	9 kHz – 40 GHz	45.21 dB μ V/m at 31948 MHz (RMS)	See section 8.4.2	Pass
8	7.9 GHz (Channel 9)	1164 MHz – 1240 MHz	12 dB μ V/m (PK) *	See section 8.4.2	Pass
9	7.9 GHz (Channel 9)	1559 MHz – 1610 MHz	12 dB μ V/m (PK) *	See section 8.4.2	Pass

Note *: noise floor level.

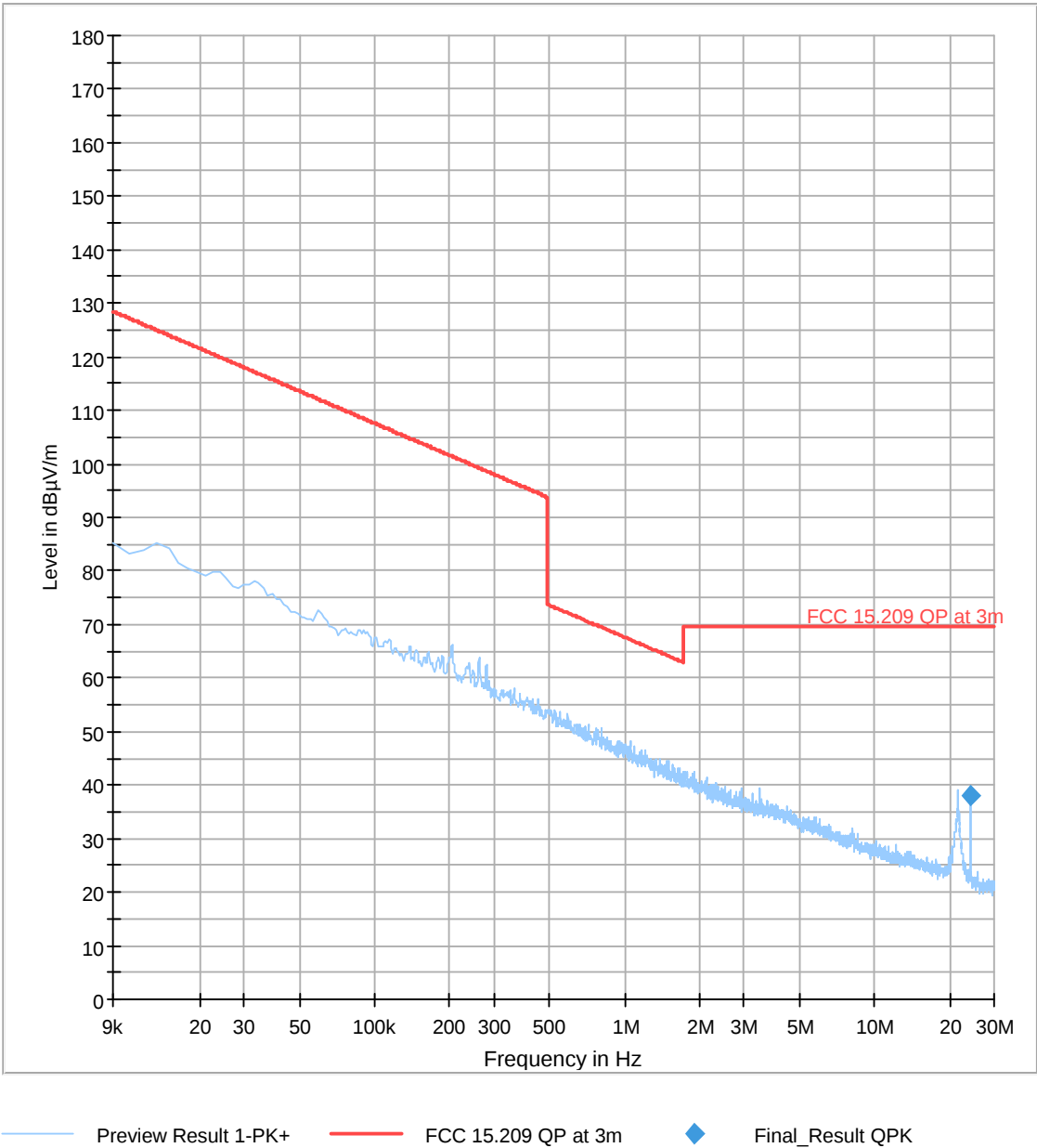


8.4.5 Measurement Plots:

Plot #1: 9 kHz – 30 MHz

Final Result

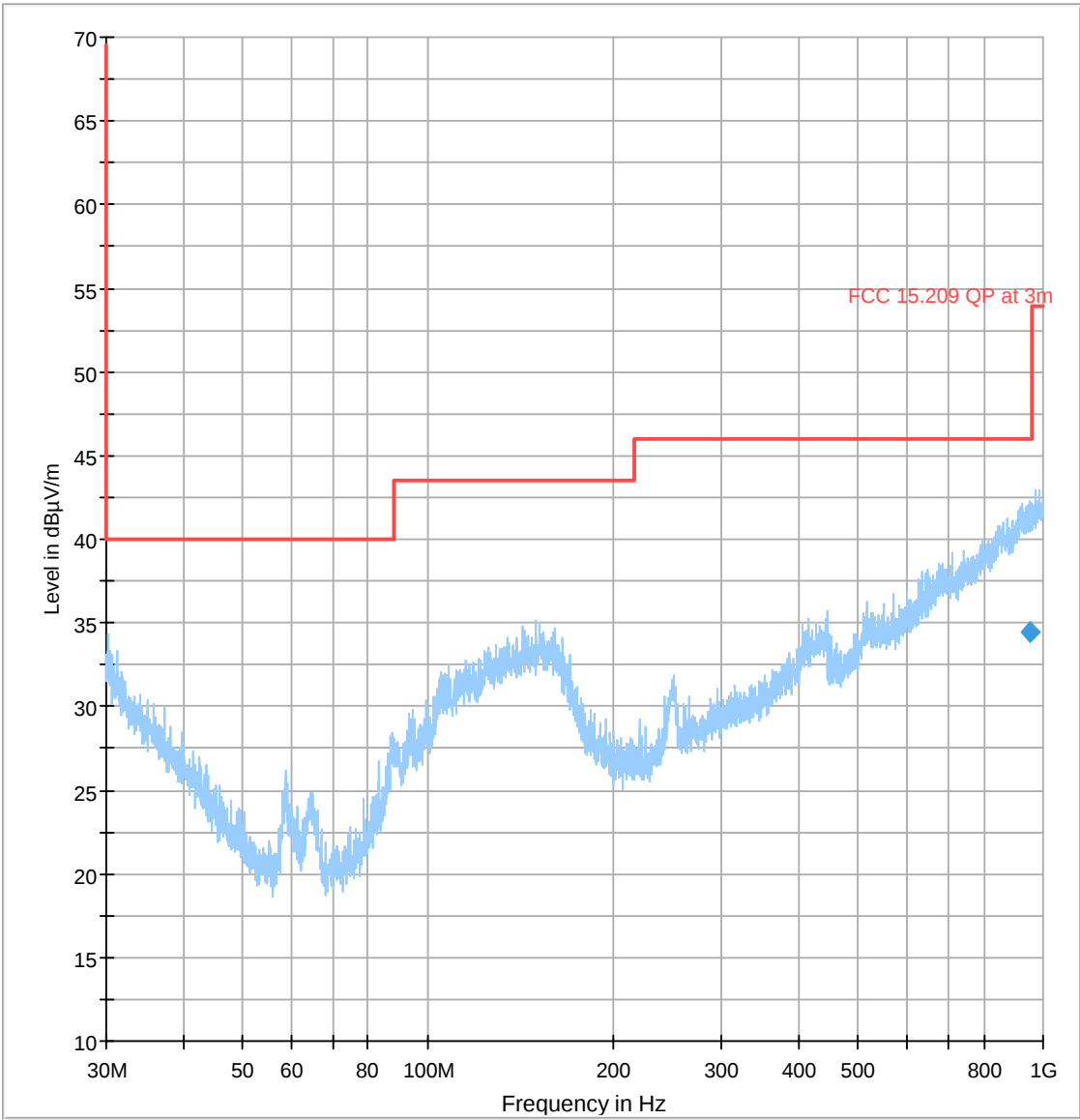
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)
23.999	37.993	69.50	31.51	500.0	9.000	100.0	V	108.0	16.7	0.5	0.0	16.2	21.3



Plot #2: 30 MHz – 1 GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
950.094	34.479	46.02	11.54	500.0	120.000	193.0	H	285.0	32.7	3.2	0.0	29.4	1.8



Preview Result 1-PK+ FCC 15.209 QP at 3m Final_Result QPK

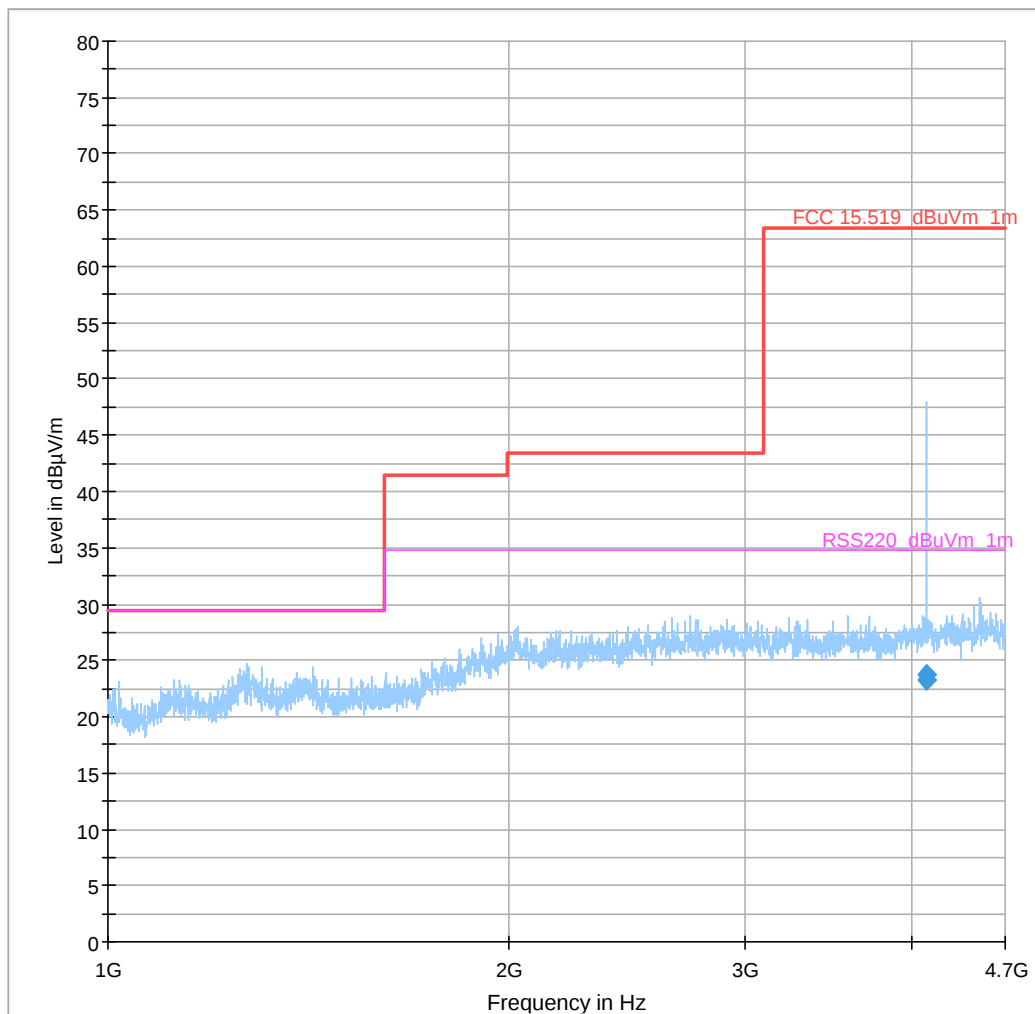
Plot #3: 1 GHz – 4.7 GHz

FCC Final Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
4103.300	23.205	63.46	40.25	1.0	1000.000	145.0	V	346.0	-6.4	6.8	-46.5	33.3	29.6
4103.350	23.721	63.46	39.74	1.0	1000.000	147.0	V	342.0	-6.4	6.8	-46.5	33.3	30.2

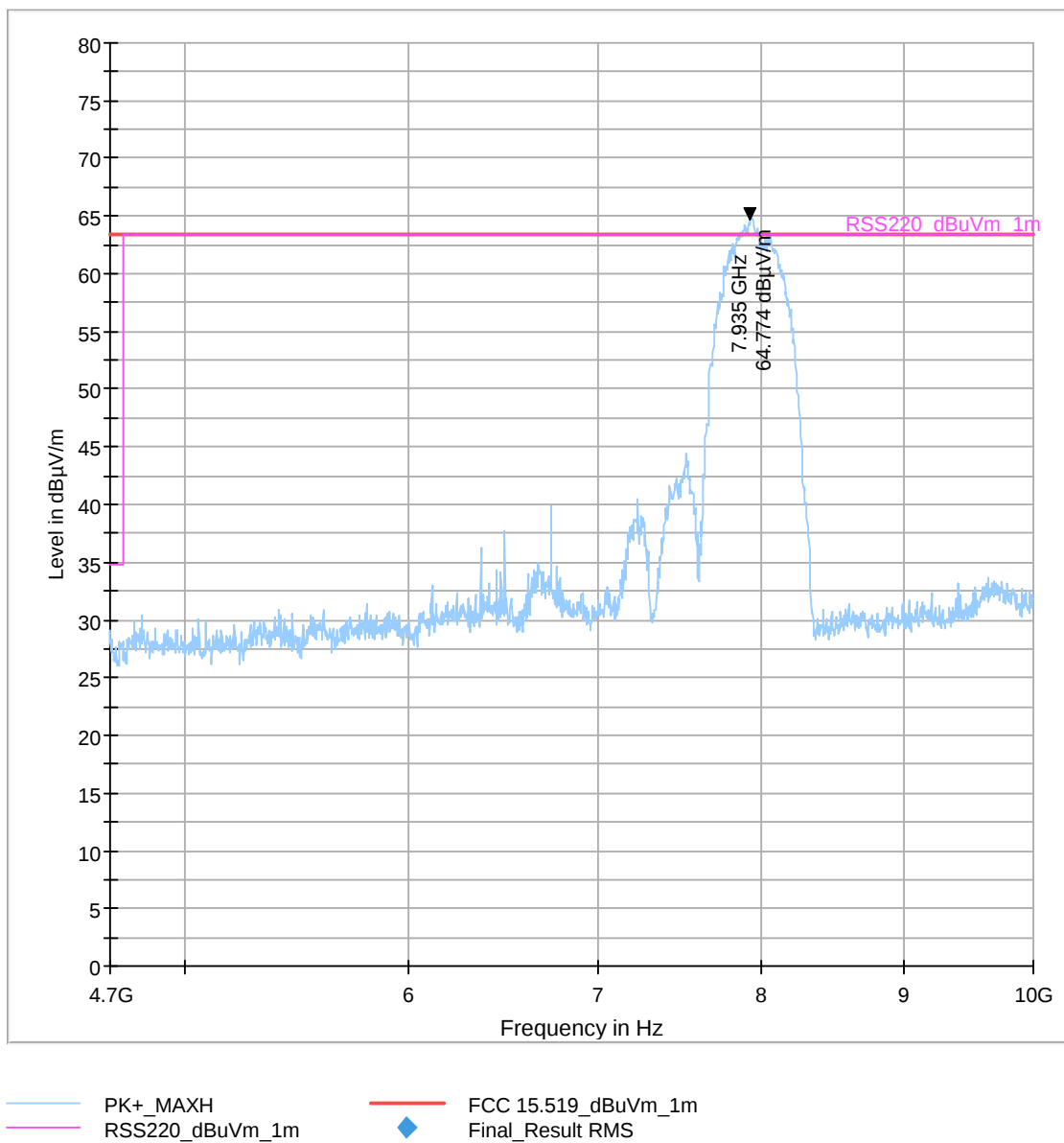
RSS Final Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
4103.300	23.205	34.77	11.57	1.0	1000.000	145.0	V	346.0	-6.4	6.8	-46.5	33.3	29.6
4103.350	23.721	34.77	11.05	1.0	1000.000	147.0	V	342.0	-6.4	6.8	-46.5	33.3	30.2

— PK+_MAXH
— RSS220_dBuVm_1m— FCC 15.519_dBuVm_1m
◆ Final_Result RMS

Plot #4: 4.7 GHz – 10 GHz

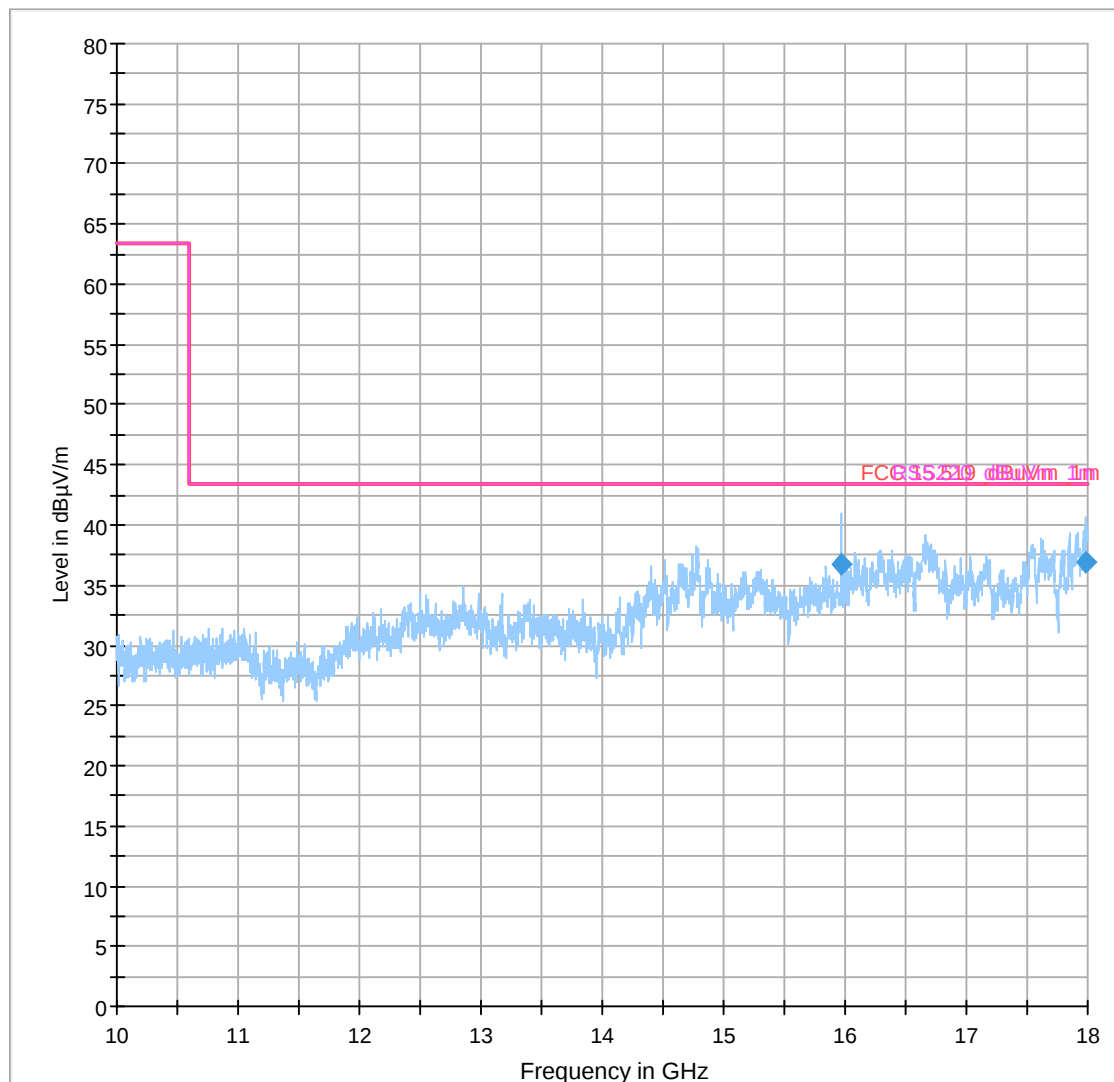
Note: The trace is peak pre-scan measurement, which is not relevant to the average limit shown in the following plot. For the final measurement with RMS detector on the wanted signal at 7.9 GHz, see section 8.5 EIRP.



Plot #5: 10 GHz – 18 GHz

Final_Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
15974.400	36.828	43.46	6.63	1.0	1000.000	130.0	V	320.0	11.4	13.7	-43.3	40.9	25.5
17984.050	36.973	43.46	6.49	1.0	1000.000	143.0	H	94.0	17.0	17.4	-42.1	41.6	20.0



Preview Result 1-PK+
RSS220_dBuVm_1m

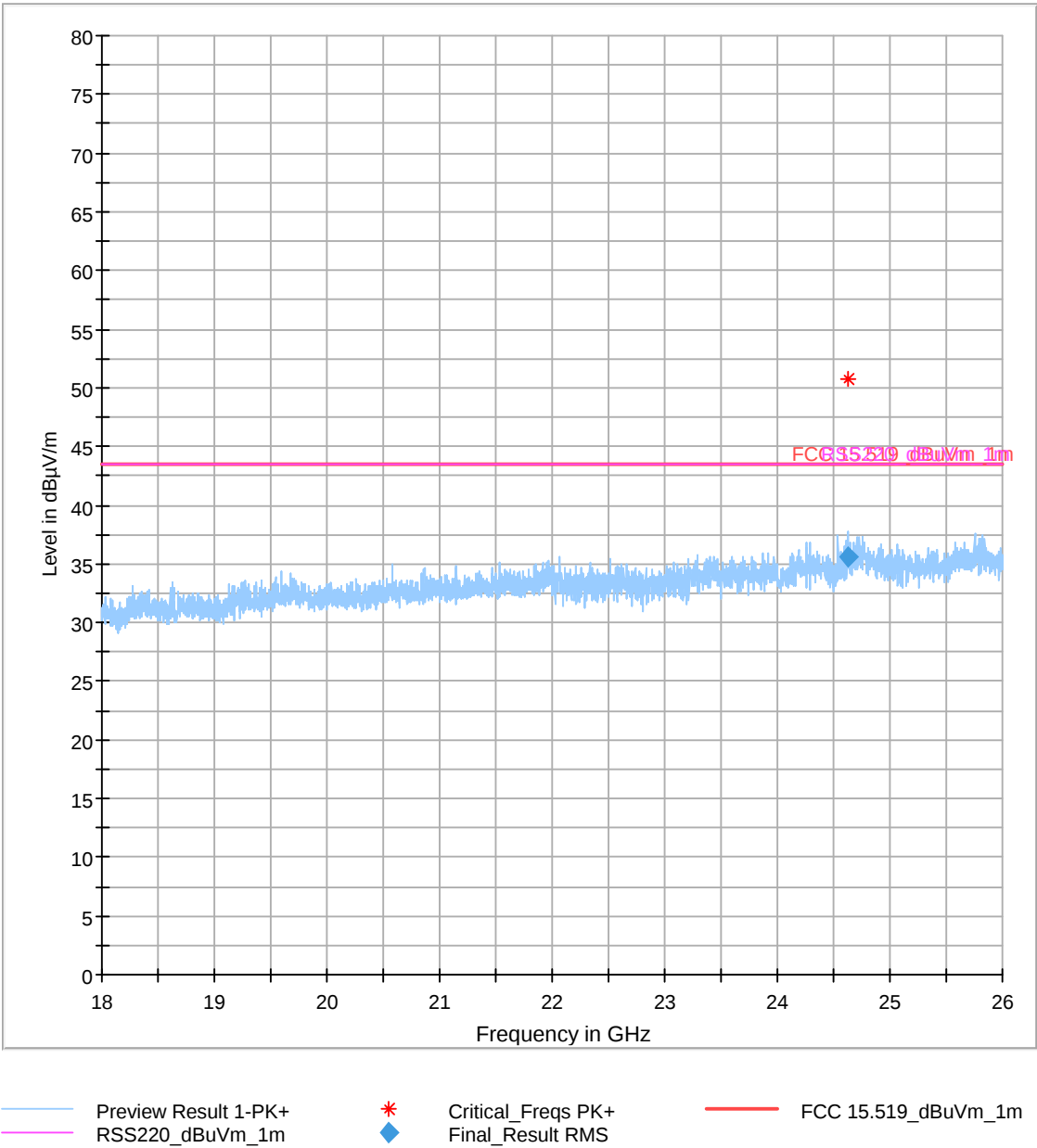
FCC 15.519_dBuVm_1m
Final_Result RMS



Plot #6: 18 GHz – 26 GHz

Final_Result

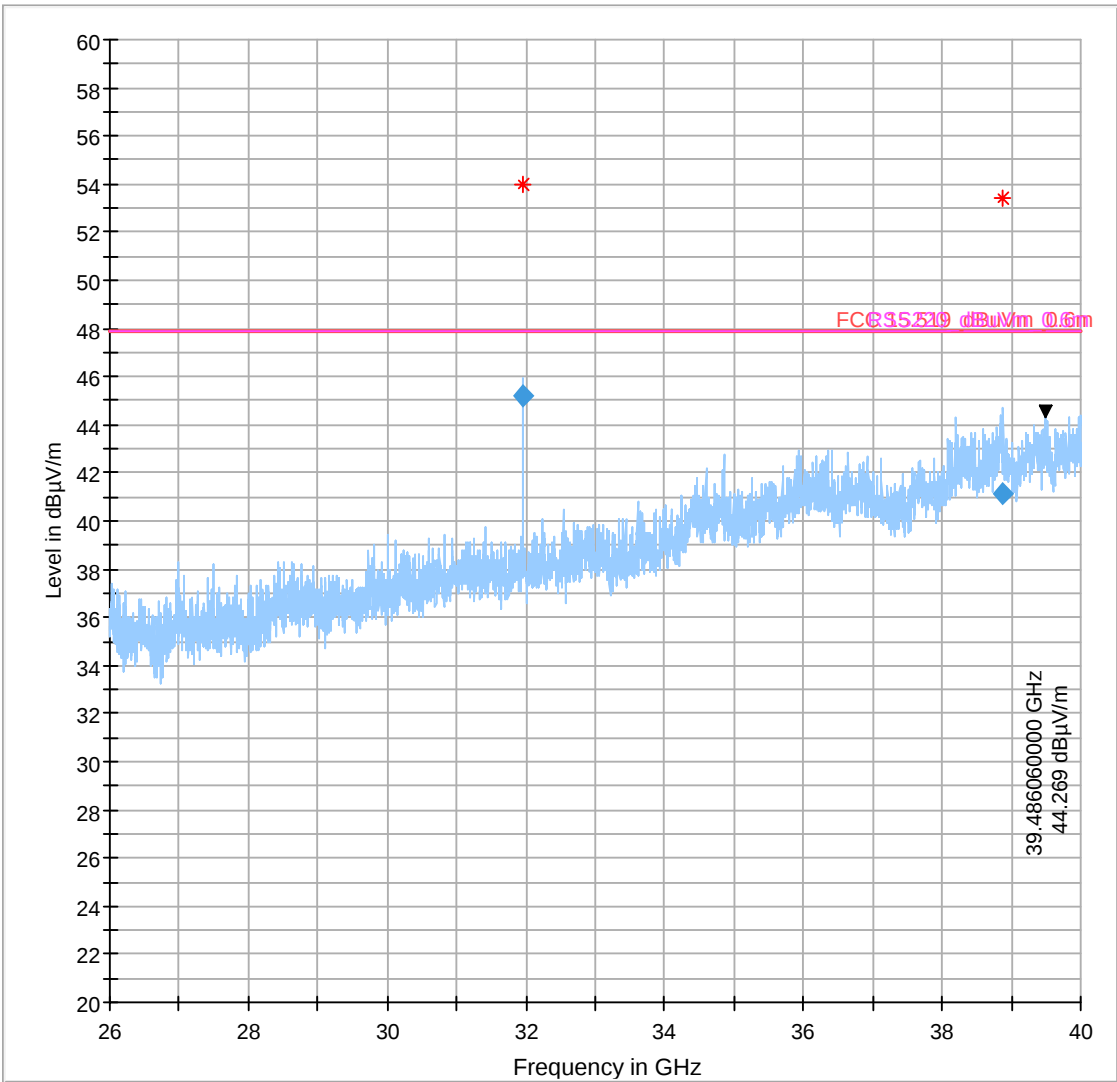
Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
24633.625	35.565	43.46	7.89	500.0	1000.000	150.0	V	290.0	6.6	-31.5	0.0	38.1	29.0



Plot #7: 26 GHz – 40 GHz

Final_Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
31948.800	45.209	47.91	2.70	1.0	1000.000	153.0	H	65.0	-22.1	-60.1	0.0	38.0	67.3
38884.620	41.152	47.91	6.76	1.0	1000.000	125.0	V	141.0	-12.0	-51.5	0.0	39.5	53.2



Preview Result 1-PK+
RSS220_dBuVm_0.6m

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◆

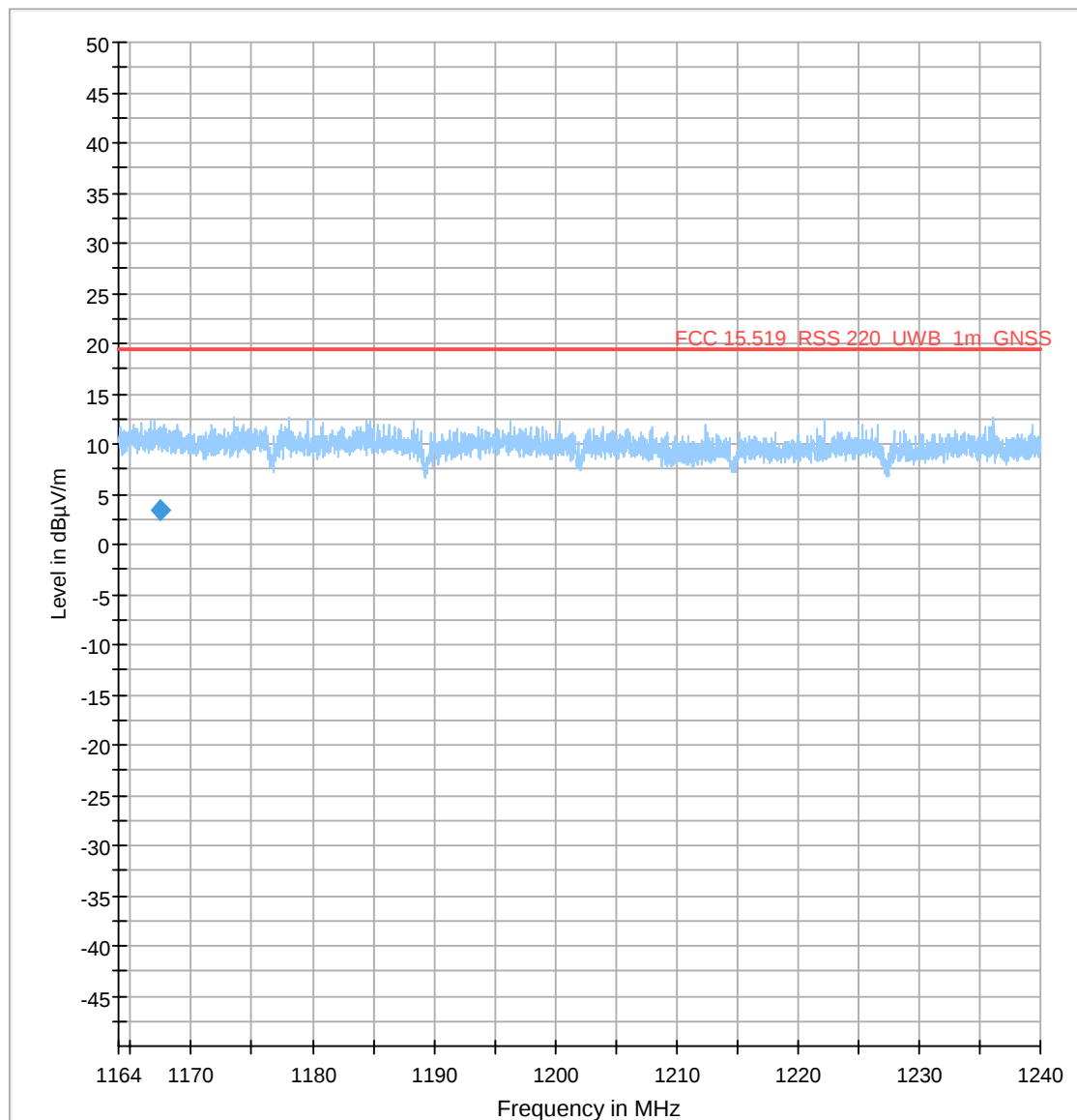
Critical_Freqs PK+
Final_Result RMS

FCC 15.519_dBuVm_0.6m

Plot #8: GNSS band 1164 MHz – 1240 MHz

Final_Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
1167.411	3.396	19.40	16.00	1.0	1.000	153.0	V	228.0	-14.6	3.5	-46.7	28.6	18.0

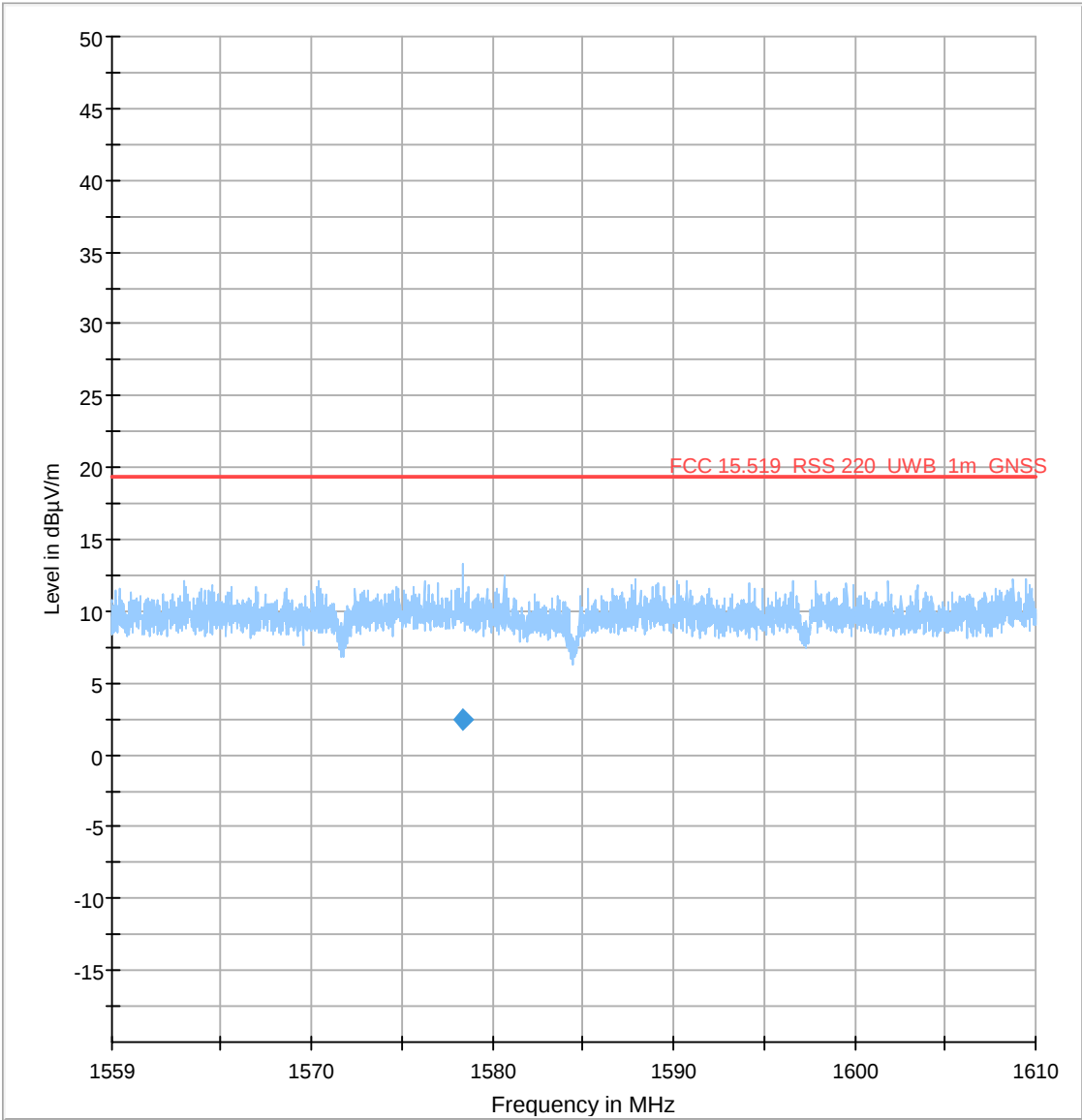


Preview Result 1-PK+ FCC 15.519_RSS 220_UWB_1m_GNSS Final_Result RMS

Plot #9: GNSS band 1559 MHz – 1610 MHz

Final_Result

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margi n (dB)	Meas. Time (ms)	Bandwidt h (kHz)	Heigh t (cm)	Pol	Azimut h (deg)	Corr. (dB/m)	Sig Path (dB)	Pream p (dB)	Trd Corr. (dB/m)	Raw Rec (dBμV)
1578.410	2.415	19.40	16.99	1.0	1.000	130.0	V	314.0	-15.1	4.2	-47.4	28.1	17.5



Preview Result 1-PK+ FCC 15.519_RSS 220_UWB_1m_GNSS Final_Result RMS

8.5 EIRP

8.5.1 Measurement according to ANSI C63.10 Section 10.3

1. Peak power measurement: Peak detector, maximum hold activated, RBW = 10 MHz, VBW = min. 10 MHz
2. RMS-Average power spectral density: RMS detector, maximum hold activated, RBW = 1 MHz, VBW = min. 1 MHz, average time 1 ms for 1 measurement bin.
3. Measurement distance: 3 m

8.5.2 Limits:

- FCC §15.519 (e): There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_M . The limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in § 15.521.
- ANSI C63.10, formula 28: Bandwidth conversion of peak power measurements, e.g. RBW = 10 MHz:

$$EIRP_{10\text{ MHz}} = EIRP_{50\text{ MHz}} + 20 \log \left(\frac{10\text{ MHz}}{50\text{ MHz}} \right) = 0\text{ dBm} + (-14\text{ dBm}) = -14\text{ dBm}$$

- FCC §15.519 (c): The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the EIRP -41.3 dBm average limits when measured using a resolution bandwidth of 1 MHz
- RSS-220 5.3.1(g): The peak level of the transmissions shall not exceed the peak equivalent of the average limit contained within any 50 MHz bandwidth. Bandwidth conversion of peak power measurement allow applying formula 28 from ANSI C63.10
- RSS-220 5.3.1(d): Radiated emissions above 960 MHz from a device shall not exceed the EIRP -41.3 dBm average limits when measured using a resolution bandwidth of 1 MHz

8.5.3 Test conditions and setup:

Temperature	EUT Set-Up #	EUT operating mode	Voltage
23 °C	1	1	nominal

8.5.4 Measurement result:

Plot #	Data rate	EIRP	Limit EIRP	Result
1	6.8Mbits	-16.44	Max. -13.98 dBm / PK, 10 MHz RBW	Pass
2	850Kbits	-16.61	Max. -13.98 dBm / PK, 10 MHz RBW	Pass
3	SP3	-16.49	Max. -13.98 dBm / PK, 10 MHz RBW	Pass
4	6.8Mbits	-42.02	Max. -41.3 dBm / RMS, 1 MHz RBW	Pass
5	850Kbits	-41.91	Max. -41.3 dBm / RMS, 1 MHz RBW	Pass
6	SP3	-41.97	Max. -41.3 dBm / RMS, 1 MHz RBW	Pass

Note: EUT power level setting is 7F.

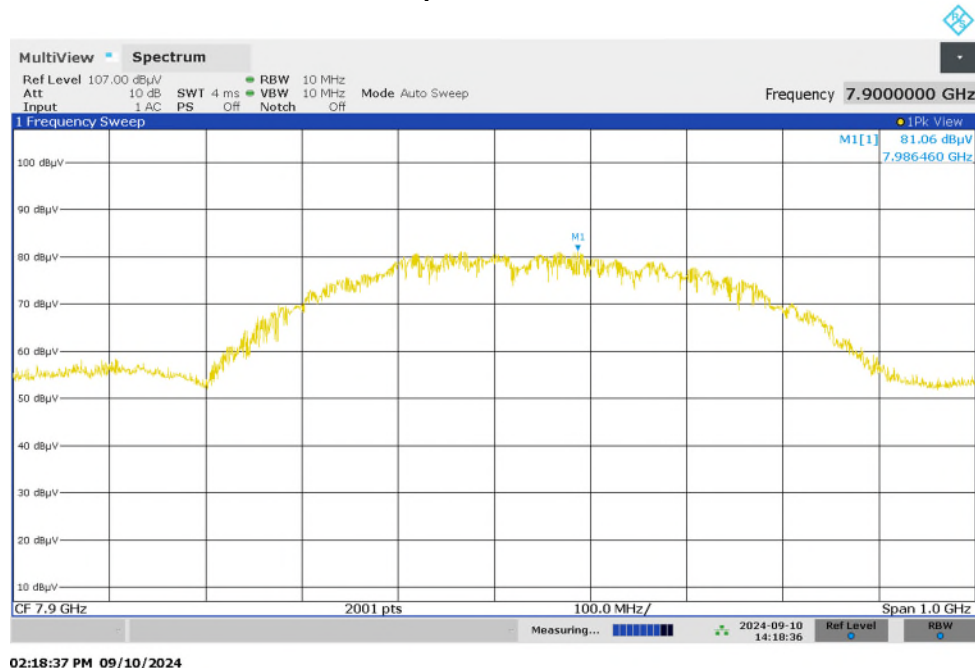
8.5.5 Measurement Plots:

Sample calculation:

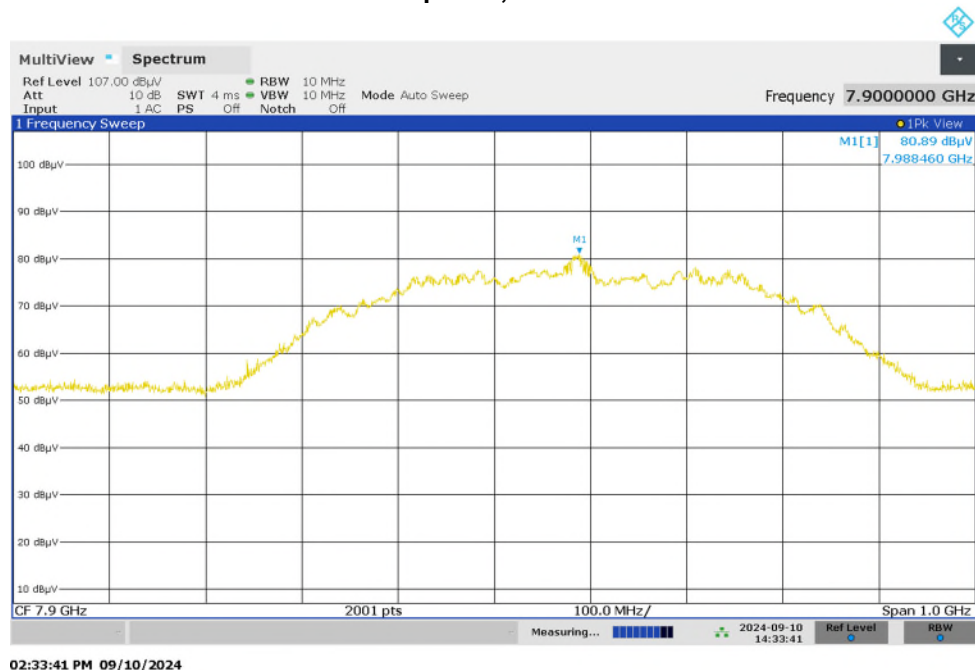
$$EIRP = 81.06 \text{ dB}\mu\text{V} + 4.7 \text{ dB/m} - 7 \text{ dB} - 95.2 \text{ dB} = -16.44 \text{ dBm}$$

Note: Sample calculation details refer to section 7.1.1 and 7.1.2

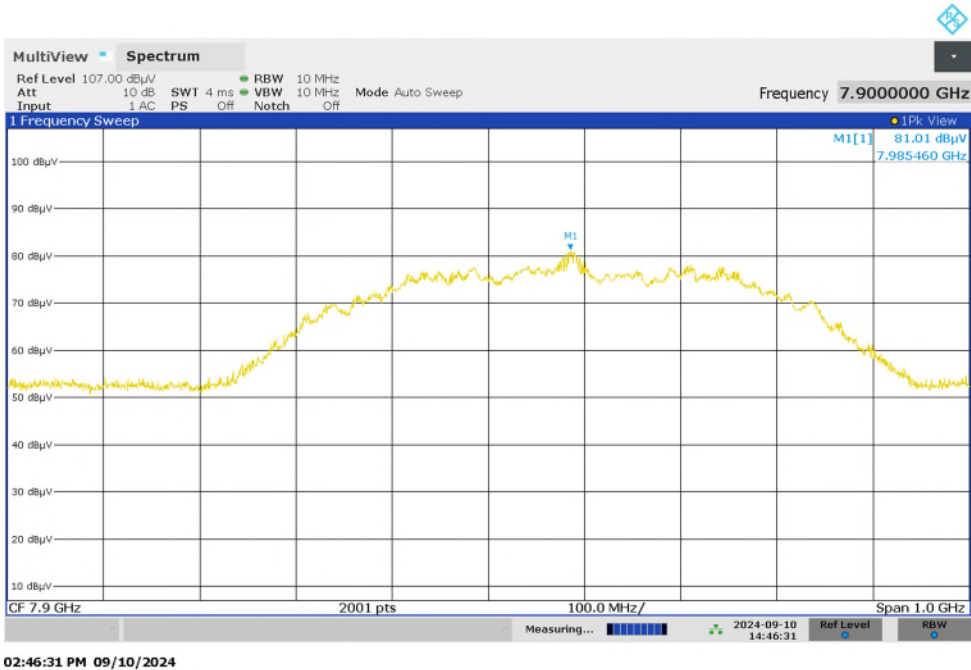
Plot # 1: Peak power, data rate 6.8 Mbits



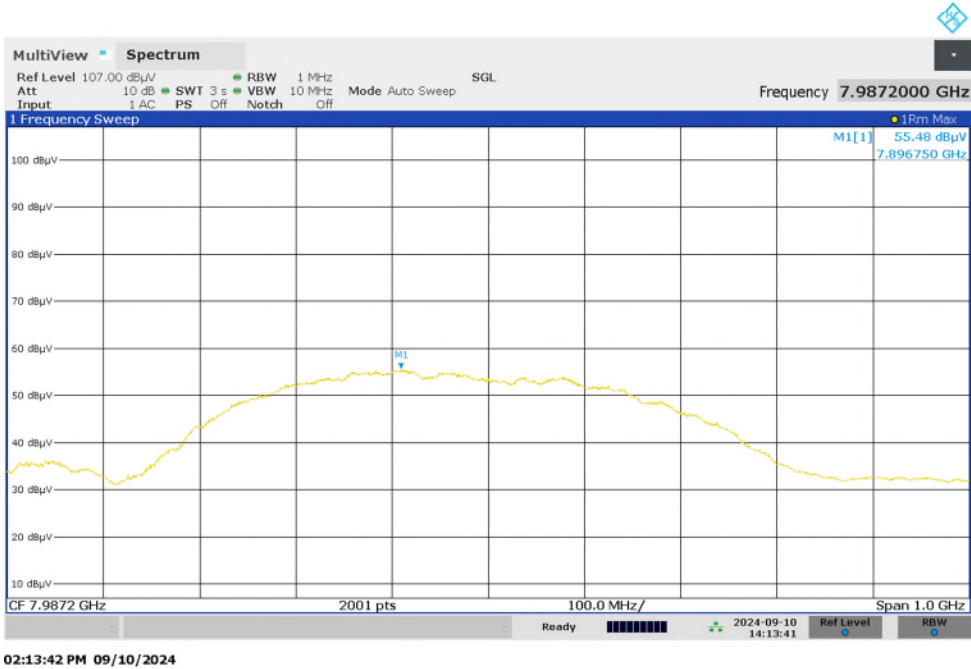
Plot # 2: Peak power, data rate 850 kbits



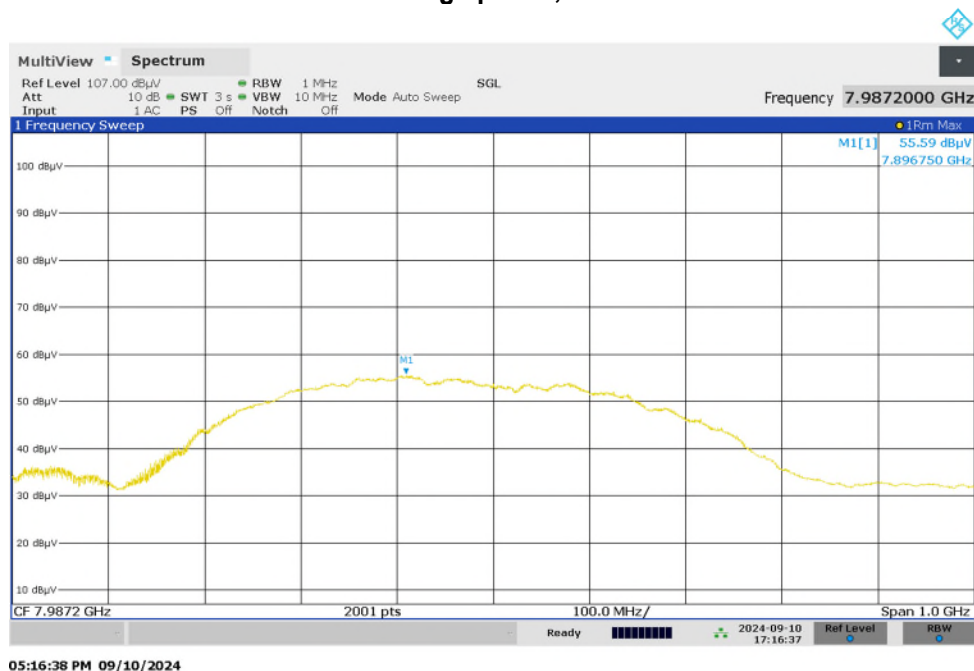
Plot # 3: Peak power, data rate SP3



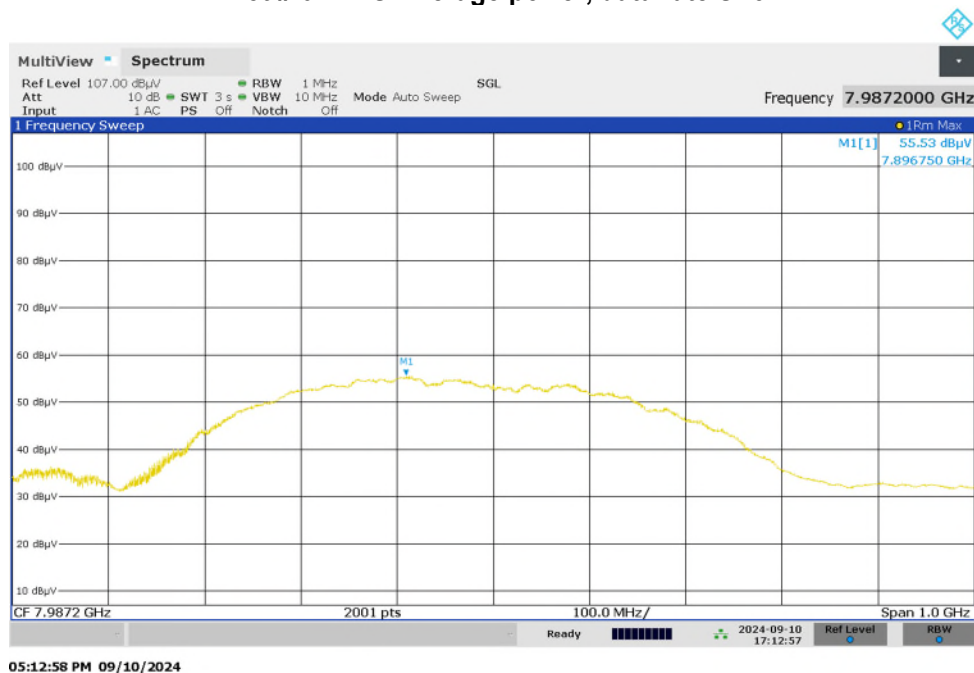
Plot # 4: RMS-Average power, data rate 6.8 Mbits



Plot # 5: RMS-Average power, data rate 850 kbits



Plot # 6: RMS-Average power, data rate SP3



9 Test Setup Photos

Setup photos are included in supporting file name:
“RIVIA_069_24001_FCC15.519_RSS220_Setup_Photos.pdf”

10 Test Equipment and Ancillaries Used for Testing

Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
BILOG ANTENNA	A.H. SYSTEMS	BiLA2G	569	3 Years	10/30/2023
HORN ANTENNA	EMCO	3115	00035111	3 Years	10/26/2023
HORN ANTENNA	ETS LINDGREN	3117-PA	00167061	3 Years	9/25/2023
HORN ANTENNA	ETS LINDGREN	3116C-PA	00166821	3 Years	10/26/2023
HORN ANTENNA	A.H. Systems	SAS-200/572	141	-	07/31/2024
HORN ANTENNA	A.R.A	MWH-2640-283	220021	-	03/26/2021
Amplifier 18GHz-26.5GHz	Miteq	JS4-18002650-26-5A	710618	-	N/A
Double Amplifier 26GHz-40GHz	Miteq	JS4-26004000-25-5A JS4-26004000-30-5A	742174 742177	-	N/A
Low Pass Filter	Wainwright Instrument	WLKX14-4700-4900-21000-3OSS	012830	-	N/A
ESW.EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	101715	3 Years	10/24/2023
DIGITAL THERMOMETER	Control Company	4410,90080-03	230712972	3 Years	10/18/2023
Signal Analyzer	R&S	FSV40	101022	3 Years	09/25/2023
Software	EMC32	Version 10.50.40	-	-	-

Note: Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels. Calibration due dates, unless defined specifically, falls on the last day of the month. Items indicated “N/A” for cal status either do not specifically require calibration or is internally characterized before use.

11 Revision History

Date	Report name	Changes to report	Prepared by
2024-10-11	RIVIA_069_24001_FCC15.519_RSS220	Initial version	Guangcheng Huang
2024-10-15	RIVIA_069_24001_FCC15.519_RSS220_Rev1	Updates: Assessment: Applied rules and standards. EUT information: product description and wording. Justification for worst case: adding details. Test results: adding 99% OBW, update 10 dB BW	Guangcheng Huang

12 Annex: Declaration of Similarity



14600 Myford Rd
Irvine CA, 92606

Declaration of Similarity

TO WHOM IT MAY CONCERN

We, Rivian Automotive LLC., hereby declare that the following Models of Keyfob 2.0 are electrically identical and have the same electromagnetic emissions and electromagnetic compatibility characteristics. The models only difference is cosmetic on the cover.

Model	FCC ID	IC	Description
R1TKFB	2AW3A-2WWG24R1TKFB	26958-2WWG24R1TKF	Automotive Vehicle Access Keyfob (R1T)
R1SKFB	2AW3A-2WWG24R1SKFB	26958-2WWG24R1SKF	Automotive Vehicle Access Keyfob (R1S)

Sincerely,

Sep Zaker
Director, Homologation
E: sepzaker@rivian.com



Rivian Internal

<<< The End >>>