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Report of Measurements
FCC Part 15, Subpart B, Section 15.109
FCC Part 15, Subpart C, Section 15.209

On

Zub Track Tester
50 kHz: Control Circuit with and without TCC and
850 kHz: Data Receiving Circuit with and without TCC
FCC ID: 2A8HRS25060-X44-H5

Customer Name:	Siemens Mobility
Customer P.O:	4510076816
Date of Report Rev.:	November 21, 2023
Test Report No:	R-3578P-5, Rev. B
Test Start Date:	January 5, 2023
Test Finish Date:	February 21, 2023

Certification and Signatures We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.

Richard J. Reitz Director of Engineering iNARTE Electromagnetic Compatibility Engineer EMC-050739-E	Scott Wentworth Branch Manager

Non-Warranty Provision
The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement
This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by ANAB or any agency of the U.S. Government.

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List of Tables

Technical Information

Report Number:	R-3578P-5, Rev. B
Applicant:	Siemens Mobility, Inc.
Address:	162 East Bridge Street
	Suite 200
	Homestead, PA 15120
FRN:	0032806093
Test Sample:	Zub Track Tester
Model Number:	S25060-X442-H510-1
Frequency Range of Operation:	50 kHz and 850 kHz
Equipment Class:	DCD – Part 15 Low Power Transmitter below 1705 kHz
Equipment Use:	Test Equipment
Power Requirements:	120 VAC, 60 Hz
Transmission Protocols/Modulation	50 kHz: Control Circuit 850 kHz: Data Receiving Circuit (Binary Coded FSK 50 kBd)

Test Specifications:
FCC Rules and Regulations Part 15, Subpart B, Section 15.109
FCC Rules and Regulations Part 15, Subpart C, Section 15.209

Test Procedures:
ANSI C63.4: 2014
ANSI C63.10: 2013

Test Facility:
Retlif Testing Laboratories
3131 Detwiler Road
Harleysville, PA 19438

FCC Registered Designation Number: US2321

Tests Performed

The test methods that were performed to demonstrate compliance with the FCC Rules are shown below:

FCC Rule Section	Test Method	EUT Component / Operating Frequency	Test Result
15.109(a)	ANSI C63.4, 7, Radiated Emissions, 30 MHz to 1 GHz	System	Pass
15.207(a)	ANSI C63.10, 6.2 AC Line Conducted Emissions	System	Pass
15.209	ANSI C63.10, 6.4 Radiated Emissions from Unlicensed Wireless Devices Below 30 MHz	50 kHz with TCC	Pass
		50 kHz without TCC	Pass
		850 kHz with TCC	Pass
		850 kHz Standalone	Pass

All test methods listed above are included in Retlif Testing Laboratories ANSI National Accreditation Board (ANAB), ISO/IEC 17025 Scope of Accreditation, Certificate Number: L2320.02.

General Test Information

Part 15.31 Measurement Standards

- Testing was performed using the procedures specified in ANSI C63.10-2013 in accordance with 15.31(a)(3).
- Testing was performed with the transmitter continuously transmitting at the selected frequency in accordance with 15.31(c).
- Field strength measurements were made on an Open Area Test Site in accordance with 15.31(d).
- Field strength measurements were made at a distance closer than specified in the regulations. The results were extrapolated to the specified test distance by using the square of an inverse linear distance extrapolation factor (40 dB/decade)

  Sample Calculation:
  - Extrapolation Factor (dB) = 40 Log (D_{Meas} / D_{Spec})

  Where:
  - D_{Meas} = Distance at which measurements were performed (10 Meters)
  - D_{Spec} = Distance at which the limit is specified (300 Meters)

  - Extrapolation Factor (dB) = 40 Log (10 / 300)
    = 40 Log (0.033)
    = 40 * -1.488
    = - 59.08

- The Device under test was positioned and adjusted to maximize the level of emissions in accordance with 15.31(g).
- The test sample operates at two (2) discrete frequencies under Part 15. All testing outlined herein was performed with the device under test operating at each of these frequencies.

Part 15.33 Frequency range of radiated measurements

- The radio frequency spectrum was investigated from 9 kHz to the 10th harmonic of the highest fundamental frequency as specified in 15.33(a)(1).

Part 15.35 Measurement detector function and bandwidths

- On frequencies below or equal to 1000 MHz, measurements were made utilizing either a peak or quasi-peak detector and associated bandwidths with the exception of measurements in the frequency bands of 9 to 90 kHz and 110 to 490 kHz in which an average detector was utilized.

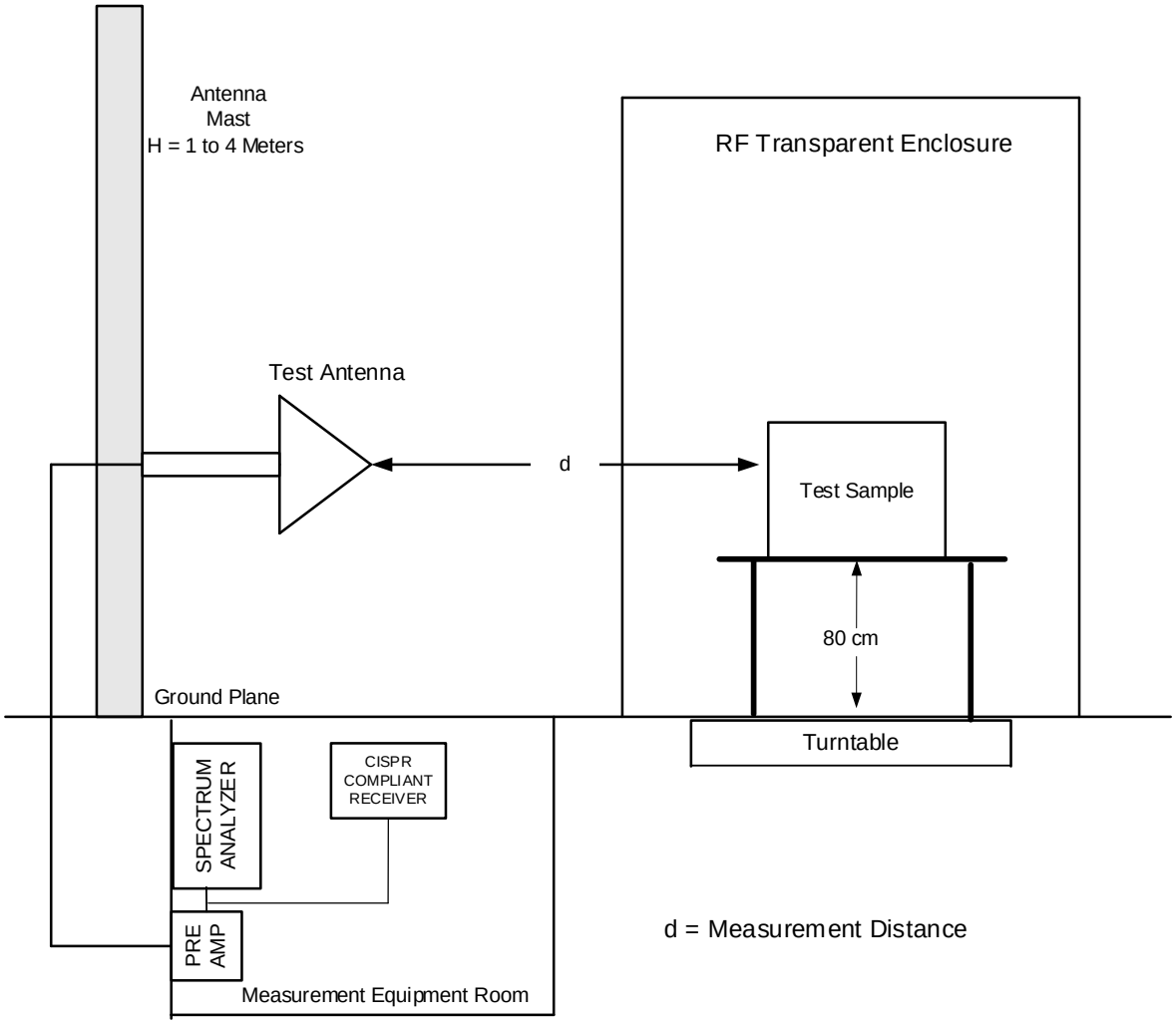
Requirements and Test Results

Requirement: 15.109(a) / 15.209(a), Radiated Emissions, General Requirements
Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 1.

Table 1 - Radiated Emission Limits

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

- Results:
  The field strength of spurious radiated emissions did not exceed the limits specified in Table 1.



EQUIPMENT LIST

EN	Manufacturer	Model No.	Description	Serial No.	Due Date
127A	ETS / EMCO	3104	ANTENNA, BICONICAL, 20 - 200 MHz	2319	12/31/2023
5272	ROHDE &	ESPC	RECEIVER, EMI, 150 kHz - 1 GHz	843820/023	3/31/2023
8300	RETLIF	RPA	OPEN AREA TEST SITE, ATTENUATION, 3/10 Meter OATS	N/A	5/31/2024
8300C	UNKNOWN	3 METER CABLE	CABLE, COAXIAL, 3/10 METER	N/A	8/31/2023
8644	AGILENT / HP	85662A	ANALYZER, SPECTRUM, 100 Hz - 22 GHz	2848A18175	9/30/2023
8644A	AGILENT / HP	8566B	ANALYZER, SPECTRUM, 100 Hz - 22.5 GHz	2937A06124	9/30/2023
8644B	AGILENT / HP	85685A	ANALYZER, RF PRESELECTOR, 20 Hz - 2 GHz	2724A00532	9/30/2023
8668	DIGI-SENSE	20250-31	HYGROMETER, 0 - 50 deg. c, 10 - 90 % RH	140908984	10/31/2023
8808	ETS / EMCO	3147	ANTENNA, LOG PERIODIC, 200 MHz - 5 GHz	00244881	9/30/2023

ZUB Track Tester - System

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart B, Section 15.109(a), Radiated Emissions, Class B
Method:	ANSI C63.4, Section 8, Radiated Emission Measurements, 30MHz to 1GHz
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	Continuously Sending Telegram
Technician:	M. Nowak
Date(s):	2/17/23
Temperature:	15.3 ºC
Relative Humidity:	80 %
Detector:	Quasi-Peak
Test Distance:	3m

Notes: The frequency range was scanned from 30 MHz to 1 GHz
The emissions observed from the EUT do not exceed the specified limits. The six highest readings relative to the limit are presented.

Frequency	Antenna Pol /Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / (m)	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
I							I
44.63	V / 1.00	263.9	24.4	13.3	37.7	76.74	I
44.63	H / 2.87	333.7	9.5	13.3	22.8	13.81	I
I							I
71.88	V / 1.00	191.5	22.7	8.1	30.8	34.68	I
71.88	H / 2.71	145.5	18.7	8.1	26.8	21.88	I
I							I
88.00							100
88.00							150
I							I
140.07	V / 1.00	157.1	20.5	14.2	34.7	54.33	I
140.07	H / 2.47	220.5	12.8	14.2	27.0	22.39	I
I							I
195.37	V / 1.00	225.1	17.8	19.1	36.9	69.99	I
195.37	H / 1.69	200.6	21.6	19.1	40.7	108.40	I
I							I
216.00							150
216.00							200
I							I
217.72	V / 1.00	246.3	30.5	13.1	43.2	144.55	I
217.72	H / 1.47	198.2	26.6	13.1	39.7	96.61	I
I							I
364.48	V / 1.00	37.0	8.1	18.3	26.4	20.90	I
364.48	H / 1.00	202.6	7.4	18.3	25.7	19.28	I
I							I
960.00							200
960.00							500
I							I
1000.00							500

Requirements and Test Results

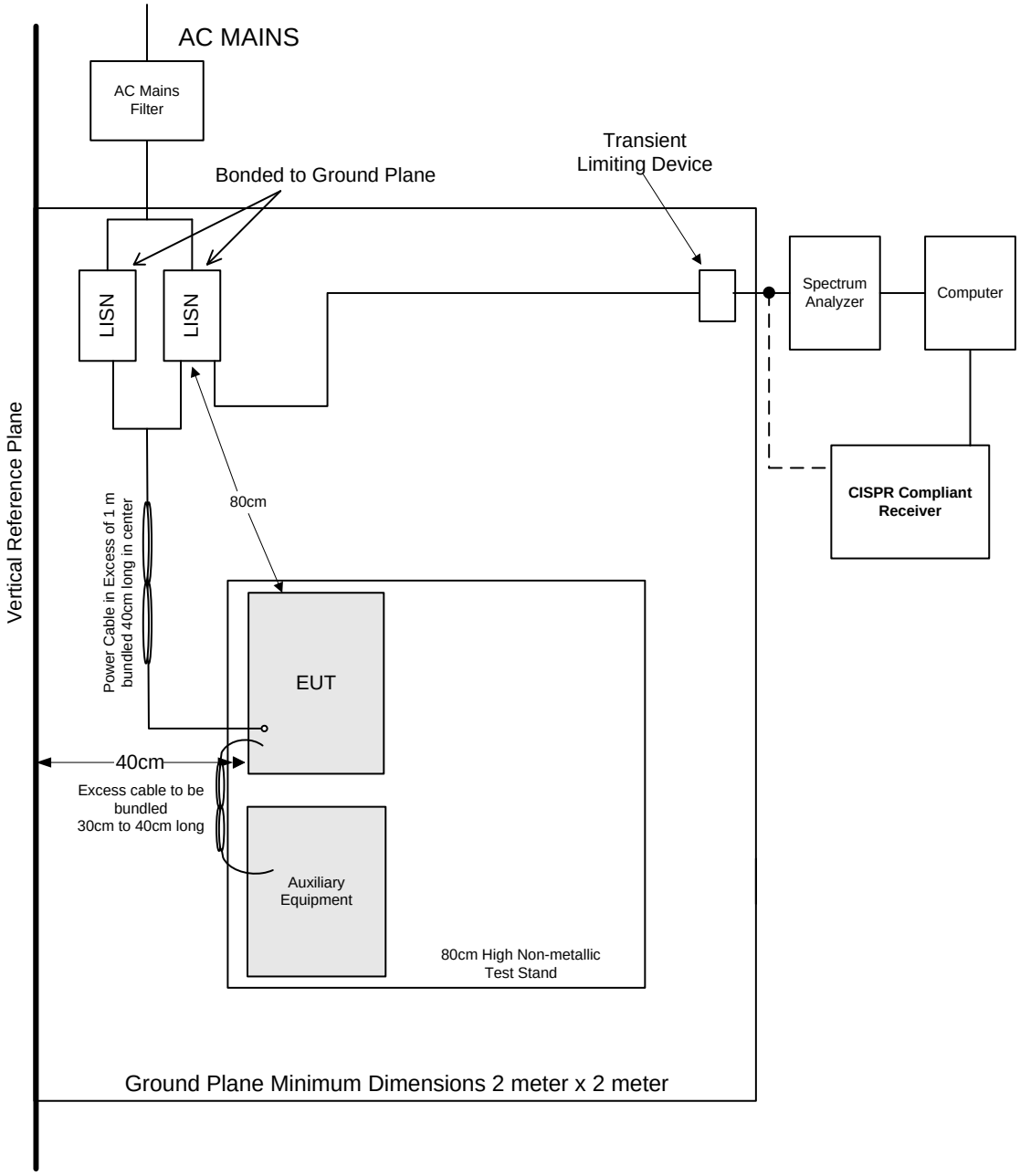
Requirement 15.107/15.207(a) - Conducted Limits

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits shown in Table 2, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of the paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applied at the boundary between the frequency ranges.

Table 2 - Conducted Emission Limits

Frequency of Emission (MHz)	**Conducted Limit (dBµV)**	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
*Decreases due to logarithm of the frequency		

- Results:
  The conducted emissions observed did not exceed the limits specified in Table 2.



Equipment List

EN	Manufacturer	Model No.	Description	Serial No.	Due Date
8079	ROHDE &	ESH3	RECEIVER, EMI, 9 kHz - 30 MHz	861742/012	6/30/2023
8366A	RETLIF	20' BNC	CABLE, COAXIAL, 10 KHz - 1 GHz	n/a	5/31/2023
8496	NARDA MICROWAVE	768-10	ATTENUATOR, COAXIAL, 10 dB, DC - 11 GHz, 20 W	04105	6/30/2023
8619	OMEGA	OM-73	HYGROMETER, -20 to 70 deg. C, 0-99% RH	051442102C	4/30/2023
8633	SOLAR ELECTRONICS	21106-50-BP-25-BNC	LISN, 50 uH, 150 kHz - 30 MHz	21106141201	9/30/2023
8634	SOLAR ELECTRONICS	21106-50-BP-25-BNC	LISN, 50 uH, 150 kHz - 30 MHz	21106141202	9/30/2023
8749	RIGOL	DSA832E	ANALYZER, SPECTRUM, 9 kHz - 3.2 GHz	DSA8G201800133	5/31/2023

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Section 15.207(a), Conducted Emissions
Method:	ANSI C63.4, Section 7., AC power-line conducted emission measurements
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	Continuously Sending Telegram
Technician:	M. Nowak
Date(s):	2/21/23
Temperature:	21.3 ºC
Relative Humidity:	33.3 %
Lead Tested:	120 VAC, 60 Hz, Hot

The frequency range was scanned from 0.15 MHz to 30 MHz.
The six highest emissions relative to the limit are presented.
The emissions observed from the EUT do not exceed the specified limits.

Frequency	Detector	Meter Reading	Total Correction Factor	Corrected Reading	Limit	Margin
MHz	–	dBµV	dB	dBµV	dBµV	dB
0.1540	Peak	44.7	10.1	54.8*	–	–
0.1540	Quasi-Peak	31.2	10.1	41.3	65.8	24.5
0.1540	Average	11.6	10.1	21.7	55.8	34.1
0.2061	Peak	39.7	10.2	49.9*	–	–
0.2061	Quasi-Peak	27.2	10.2	37.4	63.4	26.0
0.2061	Average	5.9	10.2	16.1	53.4	37.3
0.2858	Peak	33.4	10.2	43.6*	–	–
0.2858	Quasi-Peak	20.2	10.2	30.4	60.6	30.2
0.2858	Average	2.5	10.2	12.7	50.6	37.9
0.8393	Peak	35.2	10.2	45.4*	–	–
0.8393	Quasi-Peak	30.2	10.2	40.4	56.0	15.6
0.8393	Average	3.1	10.2	13.3	46.0	32.7
1.6612	Peak	33.9	10.2	44.1*	–	–
1.6612	Quasi-Peak	28.4	10.2	38.6	56.0	17.4
1.6612	Average	3.8	10.2	14.0	46.0	32.0
3.3576	Peak	22.8	10.3	33.1*	–	–
3.3576	Quasi-Peak	12.6	10.3	22.9	56.0	33.1
3.3576	Average	2.0	10.3	12.3	46.0	33.7

* Peak measurements are recorded for informational purposes only.

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Section 15.207(a), Conducted Emissions
Method:	ANSI C63.4, Section 7., AC power-line conducted emission measurements
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	Continuously Sending Telegram
Technician:	M. Nowak
Date(s):	2/21/23
Temperature:	21.3 ºC
Relative Humidity:	33.3 %
Lead Tested:	120 VAC, 60 Hz, Neutral

The frequency range was scanned from 0.15 MHz to 30 MHz.
The six highest emissions relative to the limit are presented.
The emissions observed from the EUT do not exceed the specified limits.

Frequency	Detector	Meter Reading	Total Correction Factor	Corrected Reading	Limit	Margin
MHz	–	dBµV	dB	dBµV	dBµV	dB
0.1790	Peak	37.0	10.1	47.1*	–	–
0.1790	Quasi-Peak	22.5	10.1	32.6	64.5	31.9
0.1790	Average	6.2	10.1	16.3	54.5	38.2
0.2080	Peak	36.2	10.2	46.4*	–	–
0.2080	Quasi-Peak	28.5	10.2	38.7	63.3	24.6
0.2080	Average	6.2	10.2	16.4	53.3	36.9
0.2735	Peak	34.7	10.2	44.9*	–	–
0.2735	Quasi-Peak	25.8	10.2	36.0	61.0	25.0
0.2735	Average	4.8	10.2	15.0	51.0	36.0
0.8319	Peak	34.3	10.2	44.5*	–	–
0.8319	Quasi-Peak	29.6	10.2	39.8	56.0	16.2
0.8319	Average	4.5	10.2	14.7	46.0	31.3
1.6713	Peak	31.5	10.2	41.7*	–	–
1.6713	Quasi-Peak	24.9	10.2	35.1	56.0	20.9
1.6713	Average	3.9	10.2	14.1	46.0	31.9
3.3281	Peak	23.7	10.3	34.0*	–	–
3.3281	Quasi-Peak	16.4	10.3	26.7	56.0	29.3
3.3281	Average	2.4	10.3	12.7	46.0	33.3

* Peak measurements are recorded for informational purposes only.

Requirements and Test Results

Requirement: 15.209 Radiated Emissions Limits; General Requirements

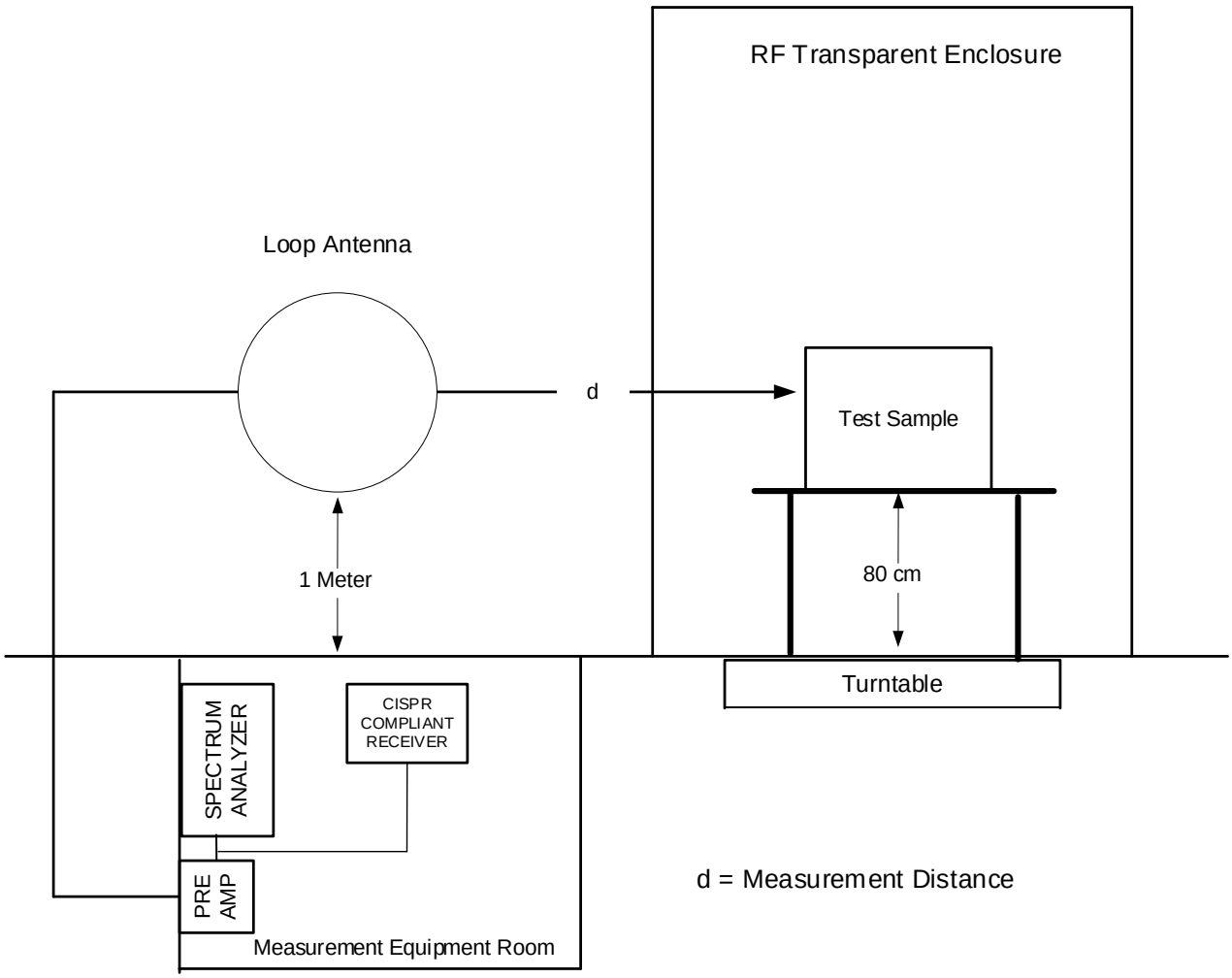
(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

Limit Calculation:

- 50 kHz
  Limit (uV/m) = 2400 / 50 = 48.0 uV/m
- 850 kHz
  Limit (uV/m) = 24000 / 850 = 28.2 uV/m

- Results:
  The emissions observed from the EUT do not exceed the specified limits when measured in a peak detector function.



EQUIPMENT LIST

EN	Manufacturer	Model No.	Description	Serial No.	Due Date
3207	ETS / EMCO	6502	ANTENNA, ACTIVE LOOP, 9 kHz - 30 MHz	1033	5/31/2023
713	ROHDE &	ESIB26	RECEIVER, EMI, 20 Hz - 26.5 GHz	834000/008	3/31/2023
8300B	UNKNOWN	10 METER CABLE	CABLE, COAXIAL, 3/10 Meter Site	N/A	2/28/2023
8644	AGILENT / HP	85662A	ANALYZER, SPECTRUM, 100 Hz - 22 GHz	2848A18175	9/30/2023
8644A	AGILENT / HP	8566B	ANALYZER, SPECTRUM, 100 Hz - 22.5 GHz	2937A06124	9/30/2023
8668	DIGI-SENSE	20250-31	HYGROMETER, 0 - 50 deg. c, 10 - 90 % RH	140908984	10/31/2023

ZUB Track Tester with TCC, Operating at 50 kHz

EMISSIONS TEST DATA SHEET	
Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS); S25442-M1-A1-15.K (TCC)
Serial Number:	0047 (ZUB); P01400860A1 (PS); 6101020657-007 (TCC)
Operating Mode:	ZUB Track Tester Transmitting at 50 kHz, with Track Coupling Coil
Technician:	M. Nowak
Date(s):	1/5/23, 1/12/23
Temperature:	15.8 ºC
Relative Humidity:	50%
Detector:	Peak
Test Distance:	10m

Notes: The frequency range was scanned from 9kHz to 500kHz
The emissions observed from the EUT do not exceed the limits specified.
*Noise floor measurement, minimum sensitivity of measurement system.

Frequency	Antenna Pol / Height	EUT Orientation	Peak Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
I								I
0.050	Parallel	257.4	75.8	12.4	-59.1	29.1	28.52	48.0
0.050	Perpendicular	182.3	70.9	12.4	-59.1	24.2	16.22	48.0
0.050	Horizontal	280.0	56.2	12.4	-59.1	9.6	3.02	48.0
I								I
0.100	Parallel	271.8	56.3	11.9	-59.1	9.1	2.86	24.0
0.100	Perpendicular	187.6	57.6	11.9	-59.1	10.4	3.32	24.0
*0.100	Horizontal	180.0	51.4	11.9	-59.1	4.2	1.63	24.0
I								I
*0.150	Parallel	180.0	46.5	11.7	-59.1	-1.0	0.90	16.0
*0.150	Perpendicular	180.0	47.3	11.7	-59.1	-0.2	0.98	16.0
*0.150	Horizontal	180.0	47.1	11.7	-59.1	-0.4	0.96	16.0
I								I
*0.200	Parallel	180.0	56.6	11.7	-59.1	9.2	2.89	12.0
*0.200	Perpendicular	180.0	50.4	11.7	-59.1	2.9	1.40	12.0
*0.200	Horizontal	180.0	45.6	11.7	-59.1	-1.9	0.81	12.0
I								I
*0.250	Parallel	180.0	55.4	11.7	-59.1	8.0	2.52	9.6
*0.250	Perpendicular	180.0	43.3	11.7	-59.1	-4.2	0.62	9.6
*0.250	Horizontal	180.0	43.2	11.7	-59.1	-4.3	0.61	9.6
I								I
*0.300	Parallel	180.0	53.7	11.7	-59.1	6.3	2.07	8.0
*0.300	Perpendicular	180.0	41.3	11.7	-59.1	-6.2	0.49	8.0
*0.300	Horizontal	180.0	41.5	11.7	-59.1	-6.0	0.51	8.0
I								I
*0.350	Parallel	180.0	54.7	11.7	-59.1	7.4	2.35	6.86
*0.350	Perpendicular	180.0	40.2	11.7	-59.1	-7.2	0.44	6.86
*0.350	Horizontal	180.0	41.4	11.7	-59.1	-6.1	0.50	6.86
I								I

Frequency	Antenna Pol / Height	EUT Orientation	Peak Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
*0.400	Parallel	180.0	40.5	11.7	-59.1	-6.9	0.46	6.0
*0.400	Perpendicular	180.0	38.3	11.7	-59.1	-9.1	0.36	6.0
*0.400	Horizontal	180.0	39.6	11.7	-59.1	-7.9	0.41	6.0
I								I
*0.450	Parallel	180.0	38.3	11.7	-59.1	-9.1	0.36	5.33
*0.450	Perpendicular	180.0	37.6	11.7	-59.1	-9.8	0.33	5.33
*0.450	Horizontal	180.0	37.5	11.7	-59.1	-10.0	0.32	5.33
I								I
0.490								4.90
0.490								48.98
I								I
0.500	Parallel	270.4	40.6	11.8	-19.1	33.3	46.24	48.0
0.500	Perpendicular	187.6	40.4	11.8	-19.1	33.1	45.19	48.0
*0.500	Horizontal	180.0	36.8	11.8	-19.1	29.3	29.18	48.0
I								I
0.500								48.0

EMISSIONS TEST DATA SHEET

Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS); S25442-M1-A1-15.K (TCC)
Serial Number:	0047 (ZUB); P01400860A1 (PS); 6101020657-007 (TCC)
Operating Mode:	ZUB Track Tester Transmitting at 50 kHz, with Track Coupling Coil
Technician:	M. Nowak
Date(s):	1/5/23, 1/12/23
Temperature:	15.8 ºC
Relative Humidity:	50%
Detector:	Average
Test Distance:	10m

Notes: The frequency range was scanned from 9kHz to 500kHz
The emissions observed from the EUT do not exceed the limits specified.
*Noise floor measurement, minimum sensitivity of measurement system.

Frequency	Antenna Pol / Height	EUT Orientation	Avg Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
I								I
0.050	Parallel	257.4	67.9	12.4	-59.1	21.2	11.49	48.0
0.050	Perpendicular	182.3	61.3	12.4	-59.1	14.6	5.38	48.0
0.050	Horizontal	282.3	45.6	12.4	-59.1	-1.0	0.9	48.0
I								I
0.100	Parallel	271.8	46.9	11.9	-59.1	-0.2	0.98	24.0
0.100	Perpendicular	187.6	43.7	11.9	-59.1	-3.5	0.67	24.0
*0.100	Horizontal	180.0	39.1	11.9	-59.1	-8.1	0.40	24.0
I								I
*0.150	Parallel	180.0	35.4	11.7	-59.1	-12.0	0.26	16.0
*0.150	Perpendicular	180.0	35.7	11.7	-59.1	-11.7	0.27	16.0
*0.150	Horizontal	180.0	36.5	11.7	-59.1	-11.0	0.29	16.0
I								I
*0.200	Parallel	180.0	43.8	11.7	-59.1	-3.6	0.57	12.0
*0.200	Perpendicular	180.0	41.4	11.7	-59.1	-6.0	0.51	12.0
*0.200	Horizontal	180.0	33.6	11.7	-59.1	-13.9	0.21	12.0
I								I
*0.250	Parallel	180.0	42.7	11.7	-59.1	-4.7	0.59	9.6
*0.250	Perpendicular	180.0	31.4	11.7	-59.1	-16.0	0.16	9.6
*0.250	Horizontal	180.0	32.4	11.7	-59.1	-15.1	0.18	9.6
I								I
*0.300	Parallel	180.0	41.5	11.7	-59.1	-5.9	0.51	8.0
*0.300	Perpendicular	180.0	29.8	11.7	-59.1	-17.7	0.14	8.0
*0.300	Horizontal	180.0	30.1	11.7	-59.1	-17.4	0.14	8.0
I								I
*0.350	Parallel	180.0	42.9	11.7	-59.1	-4.5	0.60	6.86
*0.350	Perpendicular	180.0	28.5	11.7	-59.1	-18.9	0.12	6.86
*0.350	Horizontal	180.0	28.8	11.7	-59.1	-18.7	0.12	6.86
I								I
*0.400	Parallel	180.0	27.6	11.7	-59.1	-19.8	0.11	6.0
*0.400	Perpendicular	180.0	27.3	11.7	-59.1	-20.1	0.10	6.0

Frequency	Antenna Pol / Height	EUT Orientation	Avg Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
*0.400	Horizontal	180.0	27.8	11.7	-59.1	-19.7	0.11	6.0
I								I
*0.450	Parallel	180.0	26.6	11.7	-59.1	-20.8	0.10	5.33
*0.450	Perpendicular	180.0	26.6	11.7	-59.1	-20.8	0.10	5.33
*0.450	Horizontal	180.0	26.4	11.7	-59.1	-21.1	0.09	5.33
I								I
0.490								4.90
0.490								48.98
I								I
0.500	Parallel	270.4	31.6	11.8	-19.1	24.3	16.41	48.0
0.500	Perpendicular	187.6	32.7	11.8	-19.1	25.4	18.63	48.0
*0.500	Horizontal	180.0	25.7	11.8	-19.1	18.2	8.13	48.0
I								I
0.500								48.0

ZUB Track Tester without TCC, Operating at 50 kHz

EMISSIONS TEST DATA SHEET	
Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	ZUB Track Tester Transmitting at 50 kHz, without Track Coupling Coil
Technician:	M. Nowak
Date(s):	1/5/23, 1/12/23
Temperature:	15.8 ºC
Relative Humidity:	50%
Detector:	Peak
Test Distance:	10m

Notes: The frequency range was scanned from 9kHz to 500kHz
The emissions observed from the EUT do not exceed the limits specified.
*Noise floor measurement, minimum sensitivity of measurement system.

Frequency	Antenna Pol / Height	EUT Orientation	Peak Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
I								I
0.050	Parallel	257.4	76.3	12.4	-59.1	29.6	30.20	48.0
0.050	Perpendicular	182.3	71.3	12.4	-59.1	24.6	16.99	48.0
0.050	Horizontal	273.6	57.1	12.4	-59.1	10.4	3.32	48.0
I								I
0.100	Parallel	271.8	56.3	11.9	-59.1	9.1	2.86	24.0
0.100	Perpendicular	187.6	57.6	11.9	-59.1	10.4	3.32	24.0
*0.100	Horizontal	180.0	50.8	11.9	-59.1	3.6	1.52	24.0
I								I
*0.150	Parallel	180.0	46.5	11.7	-59.1	-1.0	0.90	16.0
*0.150	Perpendicular	180.0	47.4	11.7	-59.1	0.0	1.00	16.0
*0.150	Horizontal	180.0	48.6	11.7	-59.1	1.1	1.14	16.0
I								I
*0.200	Parallel	180.0	56.6	11.7	-59.1	9.2	2.89	12.0
*0.200	Perpendicular	180.0	50.5	11.7	-59.1	3.1	1.43	12.0
*0.200	Horizontal	180.0	45.4	11.7	-59.1	-2.1	0.79	12.0
I								I
*0.250	Parallel	180.0	55.4	11.7	-59.1	8.0	2.52	9.6
*0.250	Perpendicular	180.0	43.5	11.7	-59.1	-3.9	0.64	9.6
*0.250	Horizontal	180.0	42.8	11.7	-59.1	-4.7	0.59	9.6
I								I
*0.300	Parallel	180.0	53.7	11.7	-59.1	6.3	2.07	8.0
*0.300	Perpendicular	180.0	42.1	11.7	-59.1	-5.3	0.55	8.0
*0.300	Horizontal	180.0	40.9	11.7	-59.1	-6.6	0.47	8.0
I								I
*0.350	Parallel	180.0	54.7	11.7	-59.1	7.4	2.35	6.86
*0.350	Perpendicular	180.0	40.2	11.7	-59.1	-7.2	0.44	6.86
*0.350	Horizontal	180.0	39.7	11.7	-59.1	-7.8	0.41	6.86
I								I
*0.400	Parallel	180.0	40.5	11.7	-59.1	-6.9	0.46	6.0
*0.400	Perpendicular	180.0	38.3	11.7	-59.1	-9.1	0.36	6.0
*0.400	Horizontal	180.0	38.5	11.7	-59.1	-9.0	0.36	6.0

Frequency	Antenna Pol / Height	EUT Orientation	Peak Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
I								I
*0.450	Parallel	180.0	38.3	11.7	-59.1	-9.1	0.36	5.33
*0.450	Perpendicular	180.0	37.9	11.7	-59.1	-9.5	0.34	5.33
*0.450	Horizontal	180.0	38.1	11.7	-59.1	-9.3	0.35	5.33
I								I
0.490								4.90
0.490								48.98
I								I
0.500	Parallel	270.4	40.6	11.8	-19.1	33.3	46.24	48.0
0.500	Perpendicular	187.6	40.4	11.8	-19.1	33.1	45.19	48.0
*0.500	Horizontal	180.0	37.9	11.8	-19.1	30.4	33.12	48.0
I								I
0.500								48.0

EMISSIONS TEST DATA SHEET

Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	ZUB Track Tester Transmitting at 50 kHz, without Track Coupling Coil
Technician:	M. Nowak
Date(s):	1/5/23, 1/12/23
Temperature:	15.8 ºC
Relative Humidity:	50%
Detector:	Average
Test Distance:	10m

Notes: The frequency range was scanned from 9kHz to 500kHz
The emissions observed from the EUT do not exceed the limits specified.
*Noise floor measurement, minimum sensitivity of measurement system.

Frequency	Antenna Pol / Height	EUT Orientation	Avg Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
I								I
0.050	Parallel	257.4	75.8	12.4	-59.1	29.1	28.52	48.0
0.050	Perpendicular	182.3	70.9	12.4	-59.1	24.2	16.22	48.0
0.050	Horizontal	273.6	45.6	12.4	-59.1	-1.1	0.89	48.0
I								I
*0.100	Parallel	180.0	49.7	11.9	-59.1	2.5	1.34	24.0
*0.100	Perpendicular	180.0	50.8	11.9	-59.1	3.6	1.52	24.0
*0.100	Horizontal	180.0	38.9	11.9	-59.1	-8.3	0.39	24.0
I								I
*0.150	Parallel	180.0	46.3	11.7	-59.1	-1.1	0.89	16.0
*0.150	Perpendicular	180.0	47.3	11.7	-59.1	-0.2	0.98	16.0
*0.150	Horizontal	180.0	35.5	11.7	-59.1	-12.0	0.26	16.0
I								I
*0.200	Parallel	180.0	46.1	11.7	-59.1	-1.3	0.87	12.0
*0.200	Perpendicular	180.0	50.4	11.7	-59.1	-8.7	1.42	12.0
*0.200	Horizontal	180.0	33.6	11.7	-59.1	-13.9	0.21	12.0
I								I
*0.250	Parallel	180.0	42.2	11.7	-59.1	-5.2	0.55	9.6
*0.250	Perpendicular	180.0	43.3	11.7	-59.1	-4.1	0.63	9.6
*0.250	Horizontal	180.0	32.9	11.7	-59.1	-14.6	0.19	9.6
I								I
*0.300	Parallel	180.0	41.6	11.7	-59.1	-5.8	0.52	8.0
*0.300	Perpendicular	180.0	41.3	11.7	-59.1	-6.1	0.50	8.0
*0.300	Horizontal	180.0	30.2	11.7	-59.1	-17.3	0.14	8.0
*0.350	Parallel	180.0	40.4	11.7	-59.1	-7.0	0.45	6.86
*0.350	Perpendicular	180.0	40.1	11.7	-59.1	-7.3	0.44	6.86
*0.350	Horizontal	180.0	28.9	11.7	-59.1	-18.6	0.12	6.86
I								I
*0.400	Parallel	180.0	39.3	11.7	-59.1	-8.1	0.40	6.0
*0.400	Perpendicular	180.0	36.6	11.7	-59.1	-7.8	0.41	6.0
*0.400	Horizontal	180.0	27.8	11.7	-59.1	-19.7	0.11	6.0
I								I
*0.450	Parallel	180.0	38.1	11.7	-59.1	-9.3	0.35	5.33
*0.450	Perpendicular	180.0	37.6	11.7	-59.1	-9.8	0.33	5.33

Frequency	Antenna Pol / Height	EUT Orientation	Avg Meter Reading @ 10 M	Correction Factor	Distance Correction	Corrected Reading @ 300m (30m above 0.490 MHz)	Converted Reading	Limit @ 300m (30m above 0.490 MHz)
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
*0.450	Horizontal	180.0	26.7	11.7	-59.1	-20.8	0.10	5.33
I								I
0.490								4.90
0.490								48.98
I								I
0.500	Parallel	269.9	39.3	11.8	-19.1	32.0	39.82	48.0
*0.500	Perpendicular	180.0	40.2	11.8	-19.1	32.9	44.16	48.0
*0.500	Horizontal	180.0	25.7	11.8	-19.1	18.2	8.13	48.0
I								I
0.500								48.0

ZUB Track Tester with TCC, Operating at 850 kHz

EMISSIONS TEST DATA SHEET	
Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS); S25442-M1-A1-15.K (TCC)
Serial Number:	0047 (ZUB); P01400860A1 (PS); 6101020657-007 (TCC)
Operating Mode:	ZUB Track Tester with TCC, Operating at 850 kHz
Technician:	M. Nowak
Date(s):	1/17/23
Temperature:	7.2 ºC
Relative Humidity:	45%
Detector:	Quasi-Peak
Test Distance:	3 m (Parallel and Perpendicular); 6m (Horizontal)

Notes: The frequency range was scanned from 9kHz to 8.5 MHz
The emissions observed from the EUT do not exceed the limits specified.
*Noise floor measurement, minimum sensitivity of measurement system.
The limit shown for below 0.490 MHz is for a measurement distance of 300m.

Frequency	Antenna Pol / Height	EUT Orientation	QP Meter Reading @ 6 M	Correction Factor	Distance Correction	Corrected Reading @ 30 M	Converted Reading	Limit @ 30m
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
0.490								4.90
0.490								48.98
0.825	Parallel	278.9	40.3	11.7	-40.00	12.0	3.99	29.1
0.825	Perpendicular	234.0	33.7	11.7	-40.00	5.6	1.91	29.1
0.825	Horizontal	173.1	36.8	11.7	-28.00	20.5	10.6	29.1
1.650	Parallel	278.9	26.1	11.7	-40.00	-2.2	0.78	14.55
1.650	Perpendicular	234.0	27.7	11.7	-40.00	-0.7	0.93	14.55
1.650	Horizontal	173.1	24.9	11.7	-28.00	8.6	2.70	14.55
1.705								14.08
1.705								30
*2.475	Parallel	278.9	19.8	11.7	-40.00	-8.5	0.38	
*2.475	Perpendicular	234.0	21.0	11.7	-40.00	-7.3	0.44	
*2.475	Horizontal	173.1	24.3	11.7	-28.00	8.0	2.52	
*3.300	Parallel	278.9	20.4	11.7	-40.00	-7.9	0.41	
*3.300	Perpendicular	234.0	23.7	11.7	-40.00	-4.6	0.59	
*3.300	Horizontal	173.1	28.1	11.7	-28.00	11.8	3.9	
*4.125	Parallel	278.9	17.9	11.8	-40.00	-10.3	0.31	
*4.125	Perpendicular	234.0	18.4	11.8	-40.00	-9.8	0.33	
*4.125	Horizontal	173.1	19.5	11.8	-28.00	3.3	1.47	
*4.950	Parallel	180.0	11.3	11.9	-40.00	-16.8	0.15	
*4.950	Perpendicular	180.0	12.4	11.9	-40.00	-15.7	0.17	
*4.950	Horizontal	180.0	11.6	11.9	-28.00	-4.5	0.60	

Frequency	Antenna Pol / Height	EUT Orientation	QP Meter Reading @ 6 M	Correction Factor	Distance Correction	Corrected Reading @ 30 M	Converted Reading	Limit @ 30m
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
I								|
*5.775	Parallel	180.0	11.8	11.9	-40.00	-16.3	0.16	|
*5.775	Perpendicular	180.0	11.5	11.9	-40.00	-16.6	0.15	|
*5.775	Horizontal	180.0	8.1	11.9	-28.00	-8.0	0.40	|
I								|
*6.600	Parallel	180.0	9.8	11.9	-40.00	-18.3	0.13	|
*6.600	Perpendicular	180.0	11.1	11.9	-40.00	-17.0	0.15	|
*6.600	Horizontal	180.0	13.4	11.9	-28.00	-2.7	0.74	|
I								|
*7.425	Parallel	180.0	7.1	11.9	-40.00	-21.0	0.09	|
*7.425	Perpendicular	180.0	8.2	11.9	-40.00	-19.9	0.11	|
*7.425	Horizontal	180.0	7.9	11.9	-28.00	-8.2	0.39	|
I								|
*8.250	Parallel	180.0	6.9	11.9	-40.00	-21.2	0.09	|
*8.250	Perpendicular	180.0	7.7	11.9	-40.00	-20.4	0.10	|
*8.250	Horizontal	180.0	8.1	11.9	-28.00	-8.0	0.4	|
I								|
8.50								30

ZUB Track Tester Standalone, Operating at 850 kHz

EMISSIONS TEST DATA SHEET	
Method:	FCC Part 15.209(a)
Job Number/Customer:	R-3578P-5 / Siemens Mobility
Test Sample:	ZUB Track Tester
Model Number:	S25060-X442-H510-1 (ZUB); PSAA60W-150 (PS)
Serial Number:	0047 (ZUB); P01400860A1 (PS)
Operating Mode:	ZUB Track Tester Operating at 850 kHz
Technician:	M. Nowak
Date(s):	1/17/23
Temperature:	7.2 ºC
Relative Humidity:	45%
Detector:	Quasi-Peak
Test Distance:	3 m (Parallel and Perpendicular); 6m (Horizontal)
Notes: The frequency range was scanned from 9kHz to 8.5 MHz The emissions observed from the EUT do not exceed the limits specified. *Noise floor measurement, minimum sensitivity of measurement system. The limit shown for below 0.490 MHz is for a measurement distance of 300m.	

Frequency	Antenna Pol / Height	EUT Orientation	QP Meter Reading @ 6 M	Correction Factor	Distance Correction	Corrected Reading @ 30 M	Converted Reading	Limit @ 30m
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
0.009								266.67
I								I
0.490								4.90
0.490								48.98
0.825	Parallel	278.9	40.3	11.7	-40.00	12.0	3.99	29.1
0.825	Perpendicular	234.0	33.7	11.7	-40.00	5.6	1.91	29.1
0.825	Horizontal	173.1	36.8	11.7	-28.00	20.5	10.6	29.1
1.650	Parallel	278.9	26.1	11.7	-40.00	-2.2	0.78	14.55
1.650	Perpendicular	234.0	27.7	11.7	-40.00	-0.7	0.93	14.55
1.650	Horizontal	173.1	24.9	11.7	-28.00	8.6	2.70	14.55
I								I
1.705								14.08
1.705								30
*2.475	Parallel	278.9	19.8	11.7	-40.00	-8.5	0.38	
*2.475	Perpendicular	234.0	21.0	11.7	-40.00	-7.3	0.44	
*2.475	Horizontal	173.1	24.3	11.7	-28.00	8.0	2.52	
I								
*3.300	Parallel	278.9	20.4	11.7	-40.00	-7.9	0.41	
*3.300	Perpendicular	234.0	23.7	11.7	-40.00	-4.6	0.59	
*3.300	Horizontal	173.1	28.1	11.7	-28.00	11.8	3.9	
I								
*4.125	Parallel	278.9	17.9	11.8	-40.00	-10.3	0.31	
*4.125	Perpendicular	234.0	18.4	11.8	-40.00	-9.8	0.33	
*4.125	Horizontal	173.1	19.5	11.8	-28.00	3.3	1.47	
I								
*4.950	Parallel	180.0	11.3	11.9	-40.00	-16.8	0.15	
*4.950	Perpendicular	180.0	12.4	11.9	-40.00	-15.7	0.17	
*4.950	Horizontal	180.0	11.6	11.9	-28.00	-4.5	0.60	

Frequency	Antenna Pol / Height	EUT Orientation	QP Meter Reading @ 6 M	Correction Factor	Distance Correction	Corrected Reading @ 30 M	Converted Reading	Limit @ 30m
MHz	(Parallel/Perpendicular/Horizontal)	Degrees	dBuV	dB	dB	dBuV/m	uV/m	uV/m
I								|
*5.775	Parallel	180.0	11.8	11.9	-40.00	-16.3	0.16	|
*5.775	Perpendicular	180.0	11.5	11.9	-40.00	-16.6	0.15	|
*5.775	Horizontal	180.0	8.1	11.9	-28.00	-8.0	0.40	|
I								|
*6.600	Parallel	180.0	9.8	11.9	-40.00	-18.3	0.13	|
*6.600	Perpendicular	180.0	11.1	11.9	-40.00	-17.0	0.15	|
*6.600	Horizontal	180.0	13.4	11.9	-28.00	-2.7	0.74	|
I								|
*7.425	Parallel	180.0	7.1	11.9	-40.00	-21.0	0.09	|
*7.425	Perpendicular	180.0	8.2	11.9	-40.00	-19.9	0.11	|
*7.425	Horizontal	180.0	7.9	11.9	-28.00	-8.2	0.39	|
I								|
*8.250	Parallel	180.0	6.9	11.9	-40.00	-21.2	0.09	|
*8.250	Perpendicular	180.0	7.7	11.9	-40.00	-20.4	0.10	|
*8.250	Horizontal	180.0	8.1	11.9	-28.00	-8.0	0.4	|
I								|
8.50								30