Report on the FCC and IC Testing of the Siemens Healthcare GmbH

Model: 04787805

In accordance with FCC 47 CFR Part 15C and ISED Canada RSS-247 and ISED Canada RSS-GEN (partly)

Prepared for: Siemens Healthcare GmbH
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91058 Erlangen

Product Service

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COMMERCIAL-IN-CONFIDENCE

Date: 2022-07-28
Document Number: TR-43516-07324-11| Issue: 03

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Michael Ingerl	2022-07-28	SIGN-ID 680975
Authorized Signatory	Matthias Stumpe	2022-07-28	SIGN-ID 681390

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15C and ISED Canada RSS-247 and ISED Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Michael Ingerl	2022-07-28	SIGN-ID 680975

Laboratory Accreditation	Laboratory recognition	ISED Canada test site registration
DAkkS Reg. No. D-PL-11321-11-02	Registration No. BNetzA-CAB-16/21-15	3050A-2

EXECUTIVE SUMMARY

A sample of this product was partly tested and found to be compliant with FCC 47 CFR Part 15C (2019), ISED Canada RSS-247 (2017) and ISED Canada RSS-GEN (2018)
Contains FCC ID: S5H-WRC3
IC: 267AO- WRC3

Trade Register Munich
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Information pursuant to Section 2(1)
DL-InfoV (Germany) at
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Product Service

Contents

Annexes:

TR-43516-07324-11 Ed.1 Annex A
TR-43516-07324-11 Ed.1 Annex B

Product Service

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2021-04-12
2	Changed “Contains FCC IC ID”	2022-06-01
3	Retest of Maximum Conducted Output Power (Software Setting of RF Output set to 0 dBm) Changed Model Number (Misunderstanding)	2022-07-28

Table 1

1.2 Introduction

Applicant	Siemens Healthcare GmbH
Manufacturer	Siemens Healthcare GmbH
Model Number(s)	04787805
Serial Number(s)	23
Hardware Version(s)	00
Software Version(s)	VA00E
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C (2019), ISED Canada RSS-247 (2017) and ISED Canada RSS-GEN (2018)
Test Plan/Issue/Date	---
Order Number	5422660
Date of Receipt of EUT	2021-03-12
Start of Test	2021-03-17
Finish of Test	2022-07-21
Name of Engineer(s)	Michael Ingerl
Related Document(s)	ANSI C63.10 (2013) ANSI C63.4 (2014)

Product Service

1.3 Brief Summary

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and ISED Canada RSS-247 and ISED Canada RSS-GEN is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Battery powered – Transmitting continuously				
2.1	15.209 (a), 5.5 and 6.13	Transmitter Unwanted Emissions	Pass	ANSI C63.10 (2013)
2.3	15.247 (b). 5.4 and 6.12	Maximum Conducted Output Power	Pass	ANSI C63.10 (2013)

Table 2

Product Service

1.4 Product Information

1.4.1 Technical Description

Equipment characteristics		
Type designation:	04787805 (Tested EUT) 04787797 (Variant with the same electronic and software) 04787813 (Variant with the same electronic and software)	
Type of equipment:	Wireless XRay FSW Biplane (Tested EUT) Wireless XRay FSW Mono (Variant with the same electronic and software) Wireless XRay FSW Mono-MP (Variant with the same electronic and software)	
Application[1]:	Wideband transmission systems	
Equipment class:	Equipment for portable use	
Kind of equipment	Transceiver	
Frequency band: Frequency range:	3 b 2400 – 2483.5 MHz	
Channel spacing:	Wideband	
Number of RF channels	40	
Antenna:	Siemens PCB Antenna	
Antenna gain:	2.2 dBi	
Highest internal frequency:	22.1148 MHz	
Temperature Range:	15 C to 30 C	
Power supply:	Battery supplied	
	Nominal: Minimum: Maximum: Nominal frequency:	5 V --- --- DC

1.5 Deviations from the Standard

None

[1] Classification according to CEPT/ERC Recommendation 70-03

Product Service

1.6 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable
1	Software Setting of RF Output set to 0dBm	Customer	2022-07-20

Table 3

1.7 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing Test Laboratory.

Test Name	Name of Engineer(s)
Configuration and Mode: Battery powered – Transmitting continuously	
Transmitter Unwanted Emissions	Michael Ingerl
Maximum Conducted Output Power	Michael Ingerl

Table 4

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

2 Test Details

2.1 Transmitter Unwanted Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15 C,.209
ISED RSS-247, Clause 5.5
ISED RSS-Gen, Clause 6.13

2.1.2 Equipment Under Test and Modification State

04787805, S/N: 23 - Modification State 0

2.1.3 Date of Test

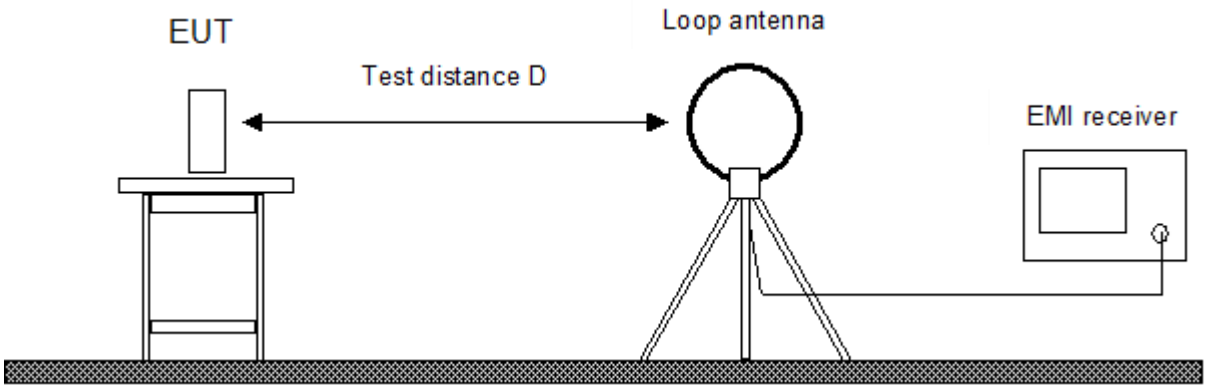
2021-03-17 – 2021-03-24

2.1.4 Test Method

The test was performed according to ANSI C63.10, sections 11.11 and 11.12

Prescans are performed in six positions of the EUT to get the full spectrum of emission caused by the EUT with the measuring antenna raised and lowered from 1 m to 4 m with vertical and horizontal polarisation to find the combination of table position, antenna height and antenna polarisation for the maximum emission levels.
Data reduction is applied to these results to select those levels having less margin than 10 dB or exceeding the limit using subranges and limited number of maximums.
Further maximisation for adjusting the maximum position is following.
Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

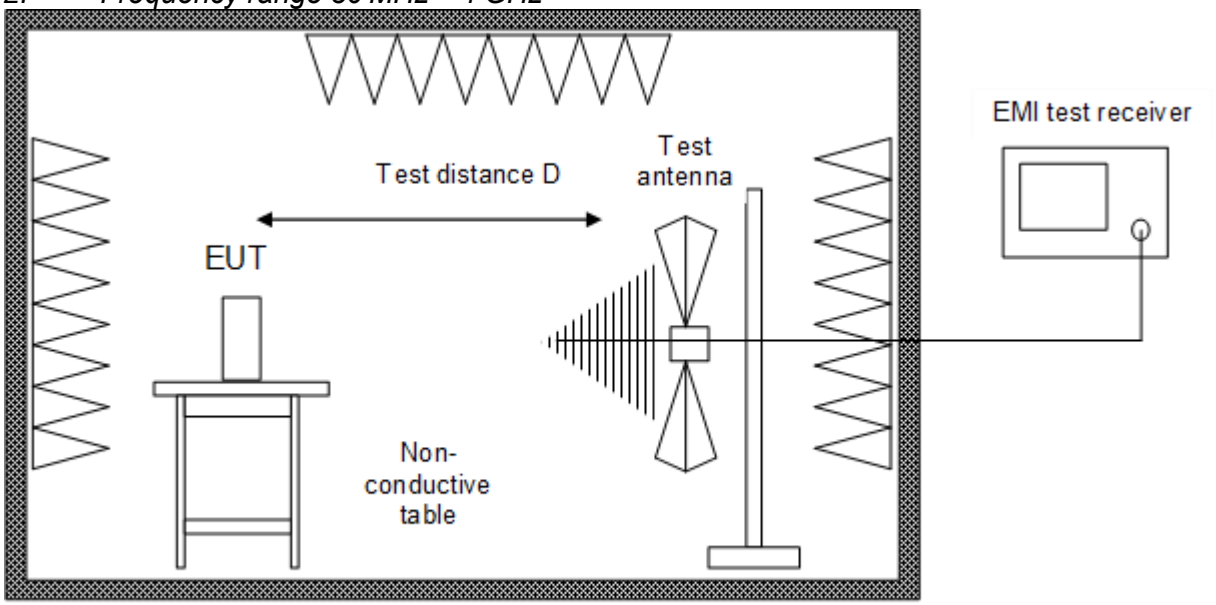
1. Frequency range 9 kHz – 30 MHz



The EUT was placed on a non-conductive table, 0.8 m above the ground.
Radiated emissions in the frequency 9 kHz – 30 MHz is measured within a semi-anechoic room with an active loop antenna with the measurement detector set to peak. In addition in the frequency range 9 kHz to 490 kHz also an average detector was used. The measurement bandwidth of the receiver was set to 300 Hz in the frequency range 9 kHz to 150 kHz and 10 kHz in the frequency range 150 kHz to 30 MHz. Prescans were performed in six positions of the EUT.
For final measurements the detector was set to CISPR quasi-peak and in addition to CISPR average in the frequency range 9 kHz to 490 kHz with a resolution bandwidth 200 Hz in the frequency range 9 kHz to 150 kHz and 9 kHz in the frequency range 150 kHz to 30 MHz. Final tests were performed immediately after a final frequency and zoom (for drifting disturbances) and maximum adjustment.

Product Service

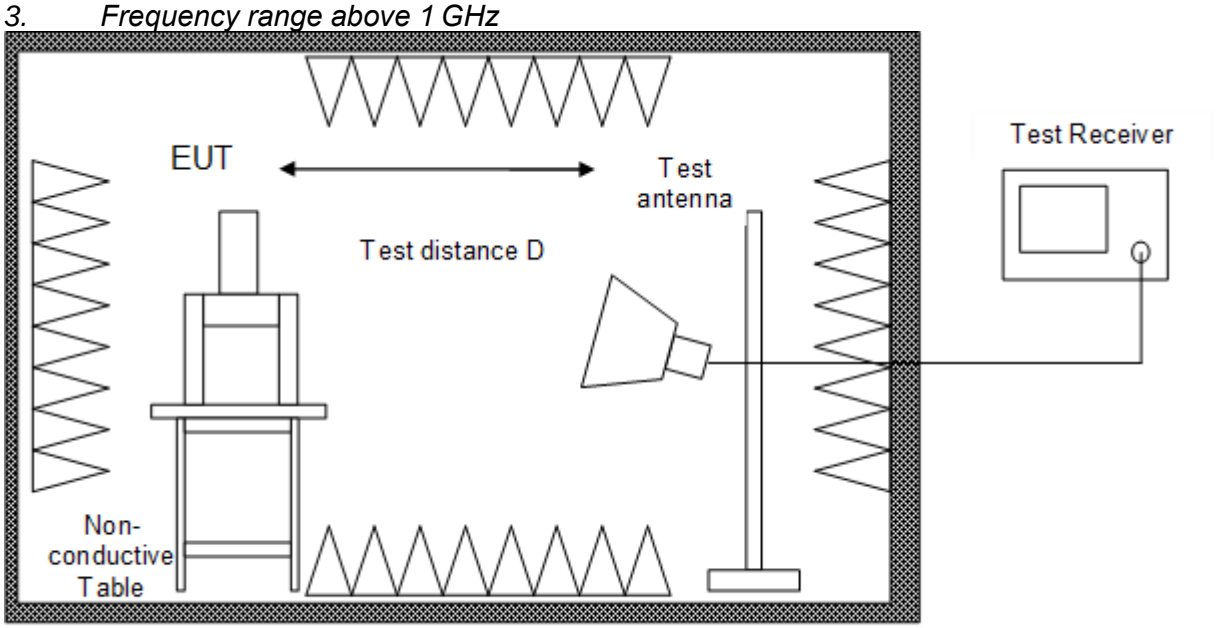
2. Frequency range 30 MHz – 1 GHz



Alternate test site (semi anechoic room)

The EUT was placed on a non-conductive table, 0.8 m above the ground plane
Radiated emissions in the frequency range 30 MHz – 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4. for alternative test sites. A linear polarised logarithmic periodic antenna combined with a 4:1 broadband dipole (“Trilog broadband antenna”) is used.
For prescan tests the test receiver is set to peak-detector with a bandwidth of 120 kHz.
With the measurement bandwidth of the test receiver set to 120 kHz CISPR quasi-peak detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

3. Frequency range above 1 GHz



Fully anechoic room

The EUT was placed on a non-conductive table, 1.5 m above the ground plane
Radiated emission tests above 1 GHz are performed in a fully anechoic room with the S_{VSWR} requirements of ANSI C63.4. Measurements are performed both in the horizontal and vertical planes of polarisation using a test receiver with the detector function set to peak and average and the resolution bandwidth set to 1 MHz. Testing above 1 GHz is performed with horn antennas with the EUT in boresight of the antenna.
For prescan tests the test receiver is set to peak- and average-detector with a bandwidth of 1 MHz.

Product Service

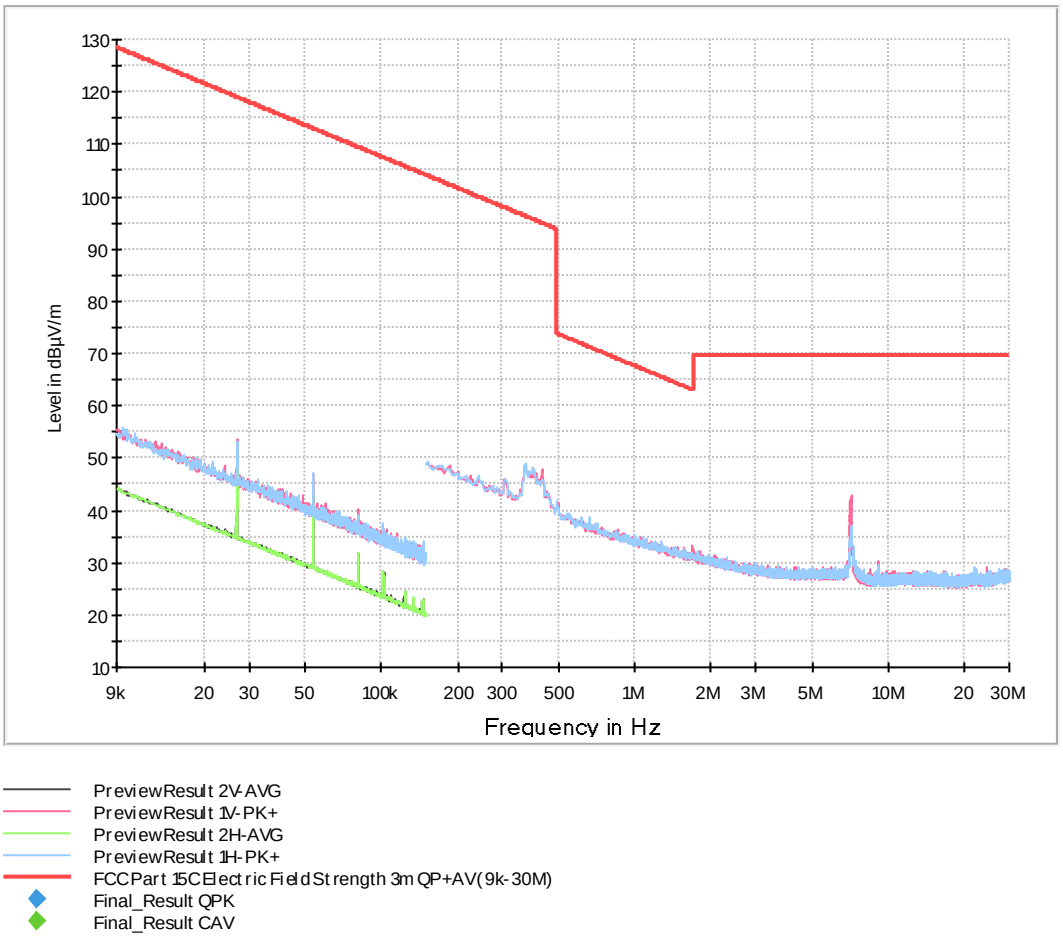
With the measurement bandwidth of the test receiver set to 1 MHz and peak- and CISPR average-detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

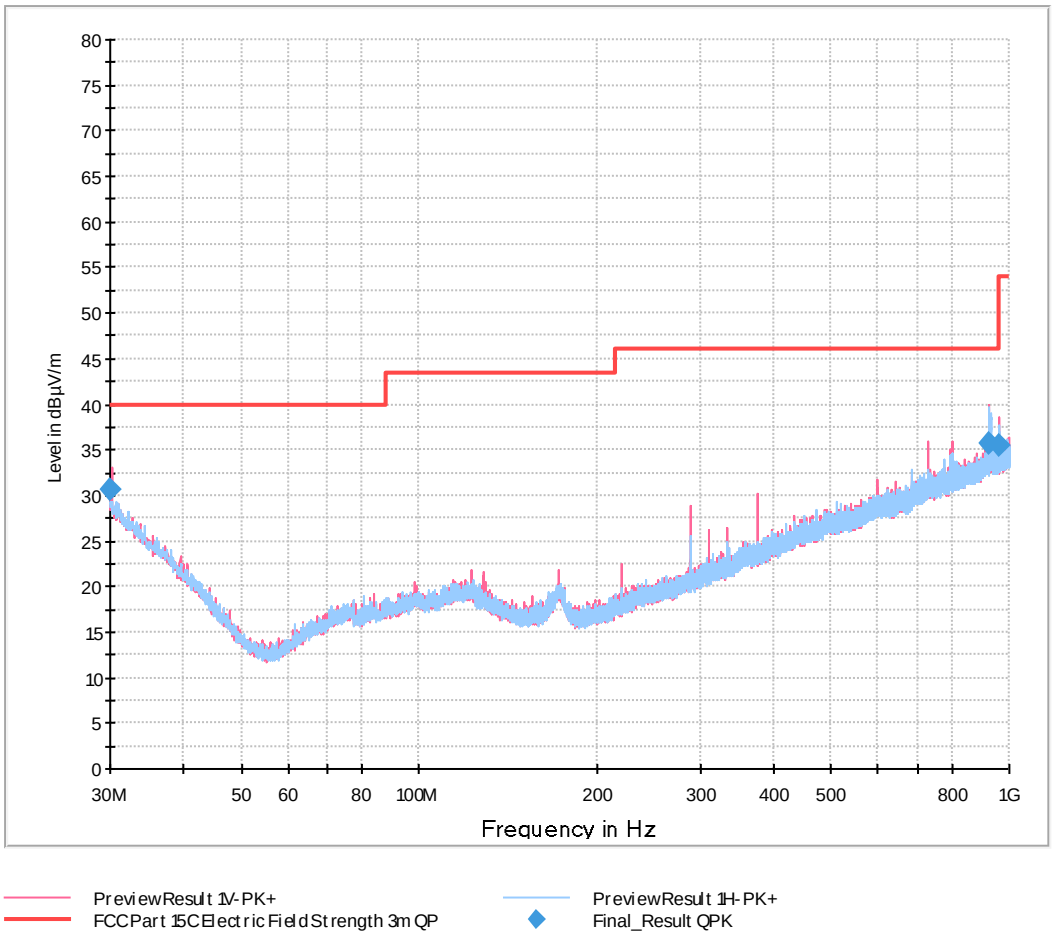
2.1.5 Environmental Conditions

Ambient Temperature	21.0 °C
Relative Humidity	33.0 %

2.1.6 Test Results

Battery powered – Transmitting continuously

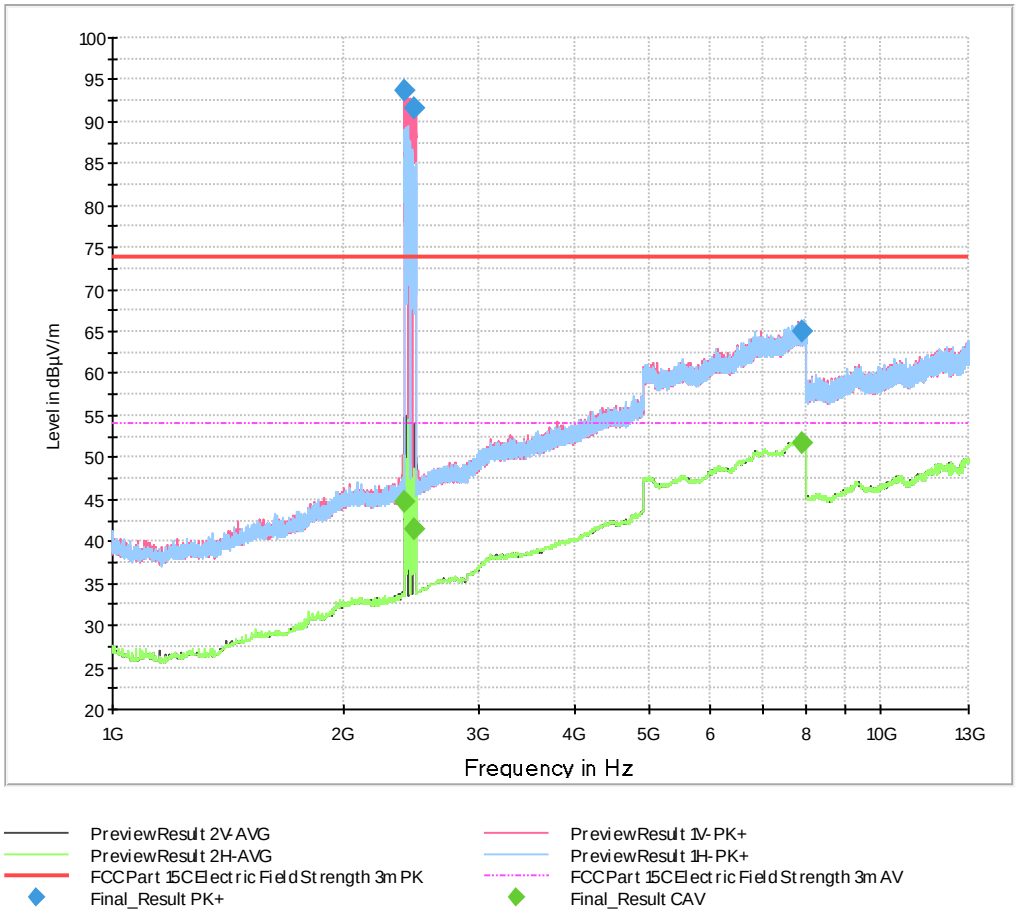




Final Results 1:

Frequency *MHz*	*QuasiPeak* *dBµV/m*	*Limit* *dBµV/m*	*Margin* *dB*	*Meas. Time* *ms*	*Bandwidth* *kHz*	*Height* *cm*	*Pol*	*Azimuth* *deg*	*Corr.* *dB/m*
30.000000	30.70	40.00	9.30	1000.0	120.000	122.0	V	-8.0	24.6
926.670000	35.73	46.02	10.29	1000.0	120.000	177.0	V	-69.0	30.2
958.770000	35.54	46.02	10.48	1000.0	120.000	195.0	V	-153.0	30.4

Product Service

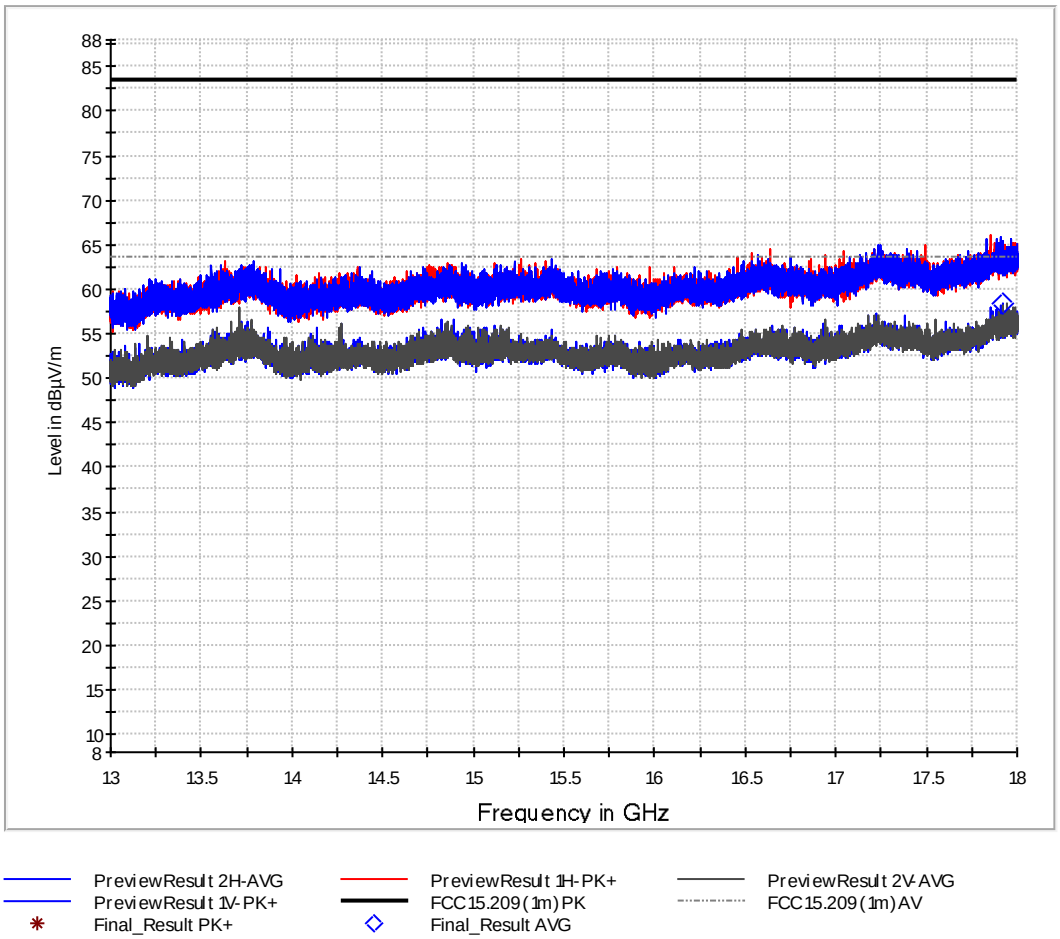


Final Results 1:

Frequency *MHz*	*MaxPeak* *dBµV/m*	*CAverage* *dBµV/m*	*Limit* *dBµV/m*	*Margin* *dB*	*Meas. Time* *ms*	*Bandwidth* *kHz*	*Height* *cm*	*Pol*	*Azimuth* *deg*	*Corr.* *dB*
2403.000000	---	44.68	#1	#1	1000.0	1000.000	150.0	V	-90.0	32.7
2403.000000	93.61	---	#1	#1	1000.0	1000.000	150.0	V	-90.0	32.7
2473.000000	---	41.49	#1	#1	1000.0	1000.000	150.0	V	0.0	32.9
2473.000000	91.54	---	#1	#1	1000.0	1000.000	150.0	V	0.0	32.9
7902.500000	---	51.69	53.98	2.29	1000.0	1000.000	150.0	V	180.0	43.6
7902.500000	65.08	---	73.98	8.90	1000.0	1000.000	150.0	V	180.0	43.6

#1 Intentional Radiator

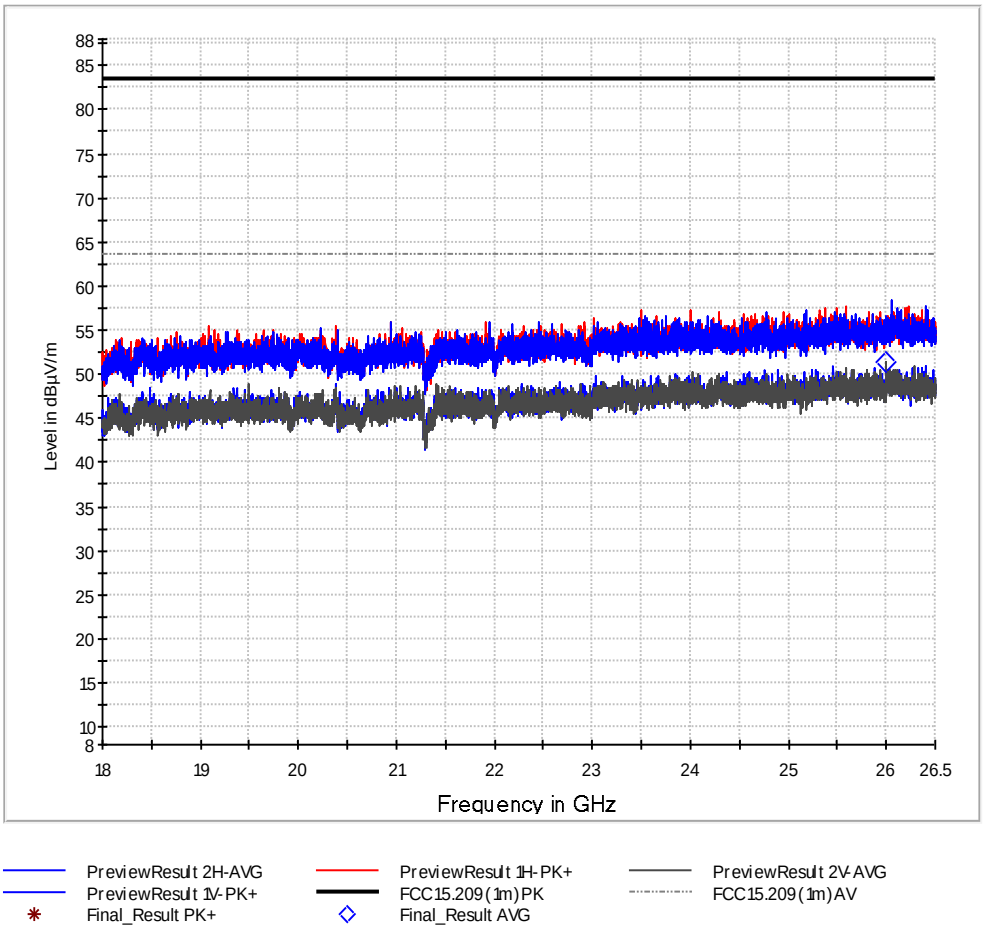
Product Service



Final Results 1:

Frequency *MHz*	*Average* *dBµV/m*	*Limit* *dBµV/m*	*Margin* *dB*	*Meas. Time* *ms*	*Bandwidth* *kHz*	*Height* *cm*	*Pol*	*Azimuth* *deg*	*Corr.* *dB/m*
17925.800000	58.49	63.50	5.01	2.5	1000.000	150.0	H	82.0	19

Product Service



Final Results 1:

Frequency *MHz*	*Average* *dBµV/m*	*Limit* *dBµV/m*	*Margin* *dB*	*Meas. Time* *ms*	*Bandwidth* *kHz*	*Height* *cm*	*Pol*	*Azimuth* *deg*	*Corr.* *dB/m*
25997.437500	51.34	63.50	12.16	5.0	1000.000	150.0	V	323.0	41

FCC 47 CFR Part 15, Limit Clause 15.209

General radiated emission limits:					
Frequency Range (MHz)	*Test distance (m)*	*Field strength*		*Field strength*	
		(µA/m)	*(dBµA/m)*	*(µV/m)*	*(dBµV/m)*
0.009 – 0.49	300	6.37 / *f*	20*lg(6.37 / *f*)	2400 / *f*	20*lg(2400 / *f*)
0.49 – 1.705	30	63.7 / *f*	20*lg(63.7 / *f*)	24000 / *f*	20*lg(24000 / *f*)
1.705 - 30	30	0.08	20*lg(0.08 / *f*)	30	20*lg(30 / *f*)
30 – 88	3	---	---	100	40
88 – 216	3	--	---	150	43.5
126 – 960	3	--	---	200	46
above 960	3	--	---	500	54
Note 1: *f* in kHz					

2.1.7 Test Location and Test Equipment Used

This test was carried out in a 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
ULTRALOG antenna	Rohde&Schwarz	HL562E	39969	36	2022-11-30
Loop antenna	Schwarzbeck	FMZB 1519B	44334	36	2023-01-31
Double ridged horn antenna	Rohde&Schwarz	HF 907	40089	24	2023-02-28
Horn antenna with preamplifier	Rohde & Schwarz	LB-180400H + TS-LNA1840	43551	12	2021-12-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A

Table 5

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

2.2 Maximum Conducted Output Power

2.2.1 Specification Reference

FCC 47 CFR Part 15C, 15.247 (b).
ISED Canada RSS-247 Clause 5.4
ISED Canada RSS-GEN. Clause 6.12

2.2.2 Equipment Under Test and Modification State

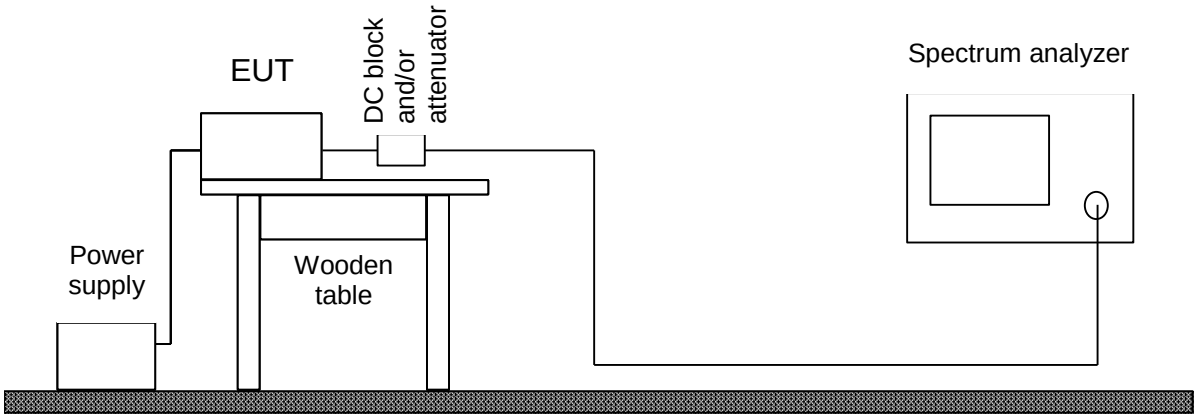
04787805, S/N: 23 - Modification State 0

2.2.3 Date of Test

2022-07-21

2.2.4 Test Method

This test was performed in accordance with ANSI C63.10. clause 11.9.1.
The RF output terminals are connected to a spectrum analyzer. If required. a resistive matching network equal to the impedance specified or employed for the antenna is used as well as dc block and appropriate attenuators (50 Ohms). The electrical characteristics of the radio frequency load attached to the output terminals shall be stated. if applicable.



2.2.5 Environmental Conditions

Ambient Temperature	*22 °C*
Relative Humidity	*30 %*

Product Service

2.2.6 Test Results

Configuration Mode-1

Frequency (MHz)	dBm	mW
2402	-0.491	0.893
2440	-0.512	0.888
2480	-0.547	0.882

Table 6

FCC 47 CFR Part 15. Limit Clause 15.247 (b)

For systems using digital modulation in the 902–928 MHz. 2400–2483.5 MHz. and 5725–5850 MHz bands: 1 Watt.

ISED Canada RSS-247. Limit Clause 5.4

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz. the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W. except as provided in section 5.4(e) of the specification.

2.2.7 Test Location and Test Equipment Used

This test was carried out in a non-shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40 for TS8997	20219	24	2024-02-29
Switching device	Rohde & Schwarz	OSP120 for TS8997	20248	36	2023-02-28
Testsystem 2,4 & 5 GHz Band	Rohde & Schwarz	TS8997	20251	24	2024-02-29
Switching device	Rohde & Schwarz	OSP120 for TS8997	38807	36	2023-11-30
EMC measurement software	Rohde & Schwarz	EMC32 V10.50.00	44381	N/A	N/A

Table 7

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

3 Test Equipment Information

3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde&Schwarz	ESW44	39897	12	2021-03-31
ULTRALOG antenna	Rohde&Schwarz	HL562E	39969	36	2022-11-30
Loop antenna	Schwarzbeck	FMZB 1519B	44334	36	2023-01-31
Double ridged horn antenna	Rohde&Schwarz	HF 907	40089	24	2023-02-28
Horn antenna with preamplifier	Rohde & Schwarz	LB-180400H + TS-LNA1840	43551	12	2021-12-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A
Signal and Spectrum Analysator	Rohde&Schwarz	FSV40 for TS8997	20219	24	2024-02-29
Switching device	Rohde&Schwarz	OSP120 for TS8997	20248	36	2023-02-28
Testsystem 2,4 & 5 GHz Band	Rohde&Schwarz	TS8997	20251	24	2024-02-29
Switching device	Rohde&Schwarz	OSP120 for TS8997	38807	36	2023-11-30
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.00	44381	N/A	N/A

Table 8

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment
N/A - Not Applicable

Product Service

4 Measurement Uncertainty

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

Radio Testing			
Test Name	kp	Expanded Uncertainty	Note
Occupied Bandwidth	2.0	±1.14 %	2
RF-Frequency error	1.96	±1 · 10-7	7
RF-Power, conducted carrier	2	±0.079 dB	2
RF-Power uncertainty for given BER	1.96	+0.94 dB / -1.05	7
RF power, conducted, spurious emissions	1.96	+1.4 dB / -1.6 dB	7
RF power, radiated			
25 MHz – 4 GHz	1.96	+3.6 dB / -5.2 dB	8
1 GHz – 18 GHz	1.96	+3.8 dB / -5.6 dB	8
18 GHz – 26.5 GHz	1.96	+3.4 dB / -4.5 dB	8
40 GHz – 170 GHz	1.96	+4.2 dB / -7.1 dB	8
Spectral Power Density, conducted	2.0	±0.53 dB	2
Maximum frequency deviation			
300 Hz – 6 kHz	2	±2,89 %	2
6 kHz – 25 kHz	2	±0.2 dB	2
Maximum frequency deviation for FM	2	±2,89 %	2
Adjacent channel power 25 MHz – 1 GHz	2	±2.31 %	2
Temperature	2	±0.39 K	4
(Relative) Humidity	2	±2.28 %	2
DC- and low frequency AC voltage			
DC voltage	2	±0.01 %	2
AC voltage up to 1 kHz	2	±1.2 %	2
Time	2	±0.6 %	2

Table 9

Product Service

Radio Interference Emission Testing			
Test Name	kp	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5µH AMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 1 m (ALSE)			
9 kHz to 150 kHz	2	± 4.6 dB	1
150 kHz to 30 MHz	2	± 4.1 dB	1
30 MHz to 200 MHz	2	± 5.2 dB	1
200 MHz to 2 GHz	2	± 4.4 dB	1
2 GHz to 3 GHz	2	± 4.6 dB	1
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			4
Voltage Changes, Voltage Fluctuations and Flicker			4

Table 10

Product Service

Immunity Testing			
Test Name	kp	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2	+32.2 / -24.3 %	5
Dynamic feedback field level	2.05	+21.2 / -17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances, induced by RF-Fields			
via CDN	2	+15.1 / -13.1 %	6
via EM clamp	2	+42.6 / -29.9 %	6
via current clamp	2	+43.9 / -30.5 %	6
Power Frequency Magnetic Field	2	+20.7 / -17.1 %	2
Pulse Magnetic Field			4
Voltage Dips, Short Interruptions and Voltage Variations			4
Oscillatory Waves			4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

Table 11

Note 1:
The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 2:
The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 3:
The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of kp = 2.05, providing a level of confidence of p = 95.45%
Note 4:
It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95%confidence.
Note 5:
The expanded uncertainty reported according to IEC 61000-4-3 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 6:
The expanded uncertainty reported according to IEC 61000-4-6 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%
Note 7:
The expanded uncertainty reported according ETSI TR 100 028 V1.4.1 (all parts) to is based on a standard uncertainty multiplied by a coverage factor of kp = 1.96, providing a level of confidence of p = 95.45%
Note 8:
The expanded uncertainty reported according to ETSI TR 102 273 V1.2.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of kp = 1.96, providing a level of confidence of p = 95.45%