

Report on the FCC and IC Testing of the INTEGRA Biosciences AG

Model: IDT305MT

In accordance with FCC 47 CFR Part 15C and
ISED Canada RSS-210 and ISED RSS-GEN

Prepared for: INTEGRA Biosciences AG
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Switzerland

FCC ID: 2BAQ7-191730RFIDT
IC: 29295-191730RFIDT



Product Service

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Date: 2023-04-19
Document Number: TR-713297030-00 (Revision 0)

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
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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 15 C and ISED RSS-210 and RSS-GEN.
The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Alexander Deese	2023-04-19	 SIGN-ID 783321

Laboratory Accreditation Laboratory recognition ISED Canada test site registration
DAkkS Reg. No. D-PL-11321-11-03 Registration No. BNetzA-CAB-16/21-15 3050A-2
DAkkS Reg. No. D-PL-11321-11-04

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15 C, ISED RSS-210, Issue 10 (12-2019) and ISED RSS-GEN, Issue 05 (03-2019).



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TR-713297030-00 rev0 Annex A: Test setup Photos
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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
0	First Issue	2023-03-30

Table 1

1.2 Introduction

Applicant	INTEGRA Biosciences AG
Manufacturer	iDTRONIC GmbH
Model Number(s)	IDT305MT
Serial Number(s)	---
Hardware Version(s)	---
Software Version(s)	---
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15C ISED Canada RSS-210, Issue 10 (12-2019) ISED Canada RSS-GEN, Issue 05 (03-2019), Amd.1, Amd.2: February 2021
Test Plan/Issue/Date	---
Order Number	5784970-1
Date of Receipt of EUT	2022-09-14
Start of Test	2023-03-30
Finish of Test	2023-03-30
Name of Engineer(s)	Alexander Deese, Patrick Müller
Related Document(s)	ANSI C63.10 (2013) ANSI C63.4 (2014)



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15 C and ISED RSS-210 and RSS-Gen is shown below.

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.3	15.215(c)	Bandwidth of Signal	Pass
	15.207	Conducted Disturbance at Mains Terminal	NA
2.1	15.209, 15.225	Radiated Disturbance	Pass
2.2	15.225(e)	Frequency Tolerance	Pass

Table 2: Results according to FCC 47 CFR Part 15 C

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.1	7.3	Radiated Emissions	Pass
	7.3	AC Power Line Conducted Emissions	NA
2.2	B.6 b.	Frequency Tolerance	Pass

Table 3: Results according to ISED RSS-210

<i>Section</i>	<i>Specification Clause</i>	<i>Test Description</i>	<i>Result</i>
2.3	6.7	Bandwidth of Signal	Pass
	8.8	AC Power Line Conducted Emissions	NA
2.1	8.9, 8.10	Radiated Emissions	Pass
2.2	6.11	Frequency Tolerance	Pass

Table 4: Results according to ISED RSS-Gen



1.4 Product Information

1.4.1 Technical Description

Equipment characteristics		
Type designation:	IDT305MT	
Type of equipment:	RFID Module	
Application ¹ :	Inductive Applications	
Equipment class:	Equipment for fixed use	
Kind of equipment	Transceiver	
Operating Frequency:	13.56 MHz	
Power supply:	DC supplied (USB)	
	Nominal:	5 V
	Minimum:	4.25 V
	Maximum:	5.75 V
	Nominal frequency:	DC

1.5 Deviations from the Standard

None



1.6 EUT Modification Record

The table below details modifications made to the EUT during the test program.
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

Table 5

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: 5V DC Powered – Continuously transmitting	
Field Strength of any Emission	Alexander Deese
Frequency Tolerance Under Temperature Variations	Patrick Müller
20 dB Bandwidth	Patrick Müller
Restricted Band Edges	Patrick Müller

Table 6

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details

2.1 Field Strength of any Emission

2.1.1 Specification Reference

FCC 47 CFR Part 15 C, Clauses 15.205, 15.209 and 15.225
ISED RSS-210, Clause 7.7 and B.6
ISED RSS-Gen, Clauses 8.9 and 8.10

2.1.2 Equipment Under Test and Modification State

IDT305MT - Modification State 0

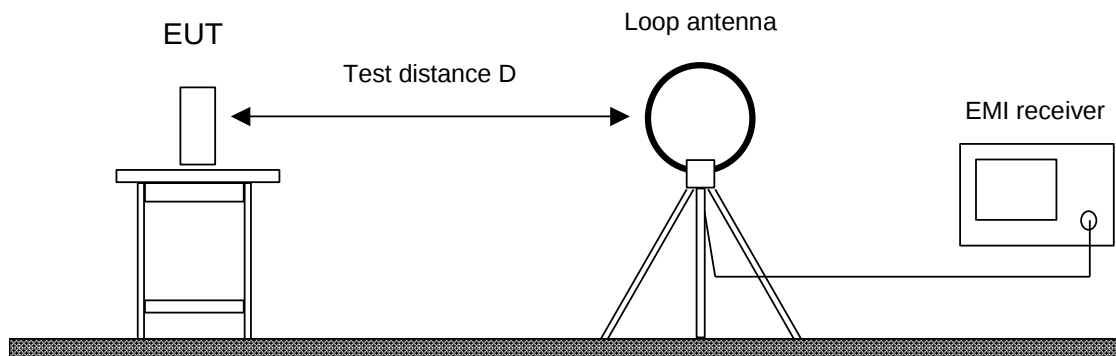
2.1.3 Date of Test

2023-03-30

2.1.4 Test Method

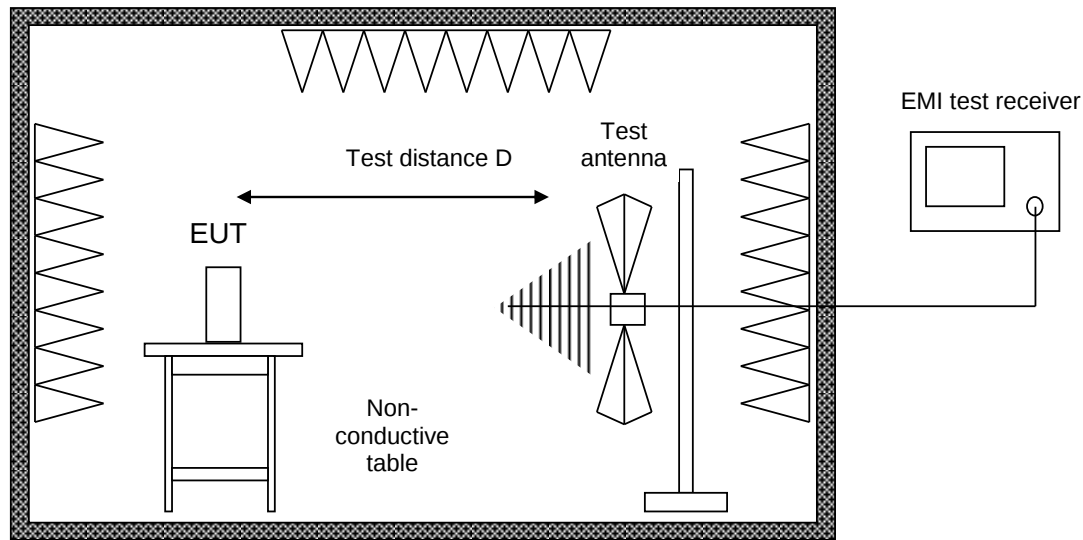
The test was performed in accordance with ANSI C63.10, clause 6.3, 6.4 and 6.5.

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.

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.



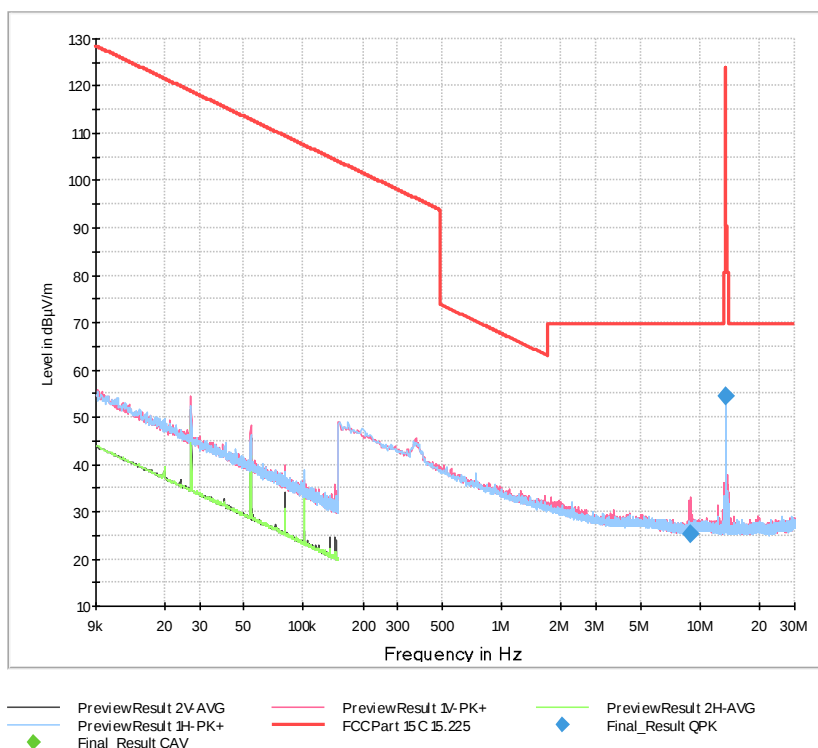
2.1.5 Environmental Conditions

Ambient Temperature 25.0 °C
 Relative Humidity 46.0 %

2.1.6 Test Results

5V DC Powered – Continuously transmitting

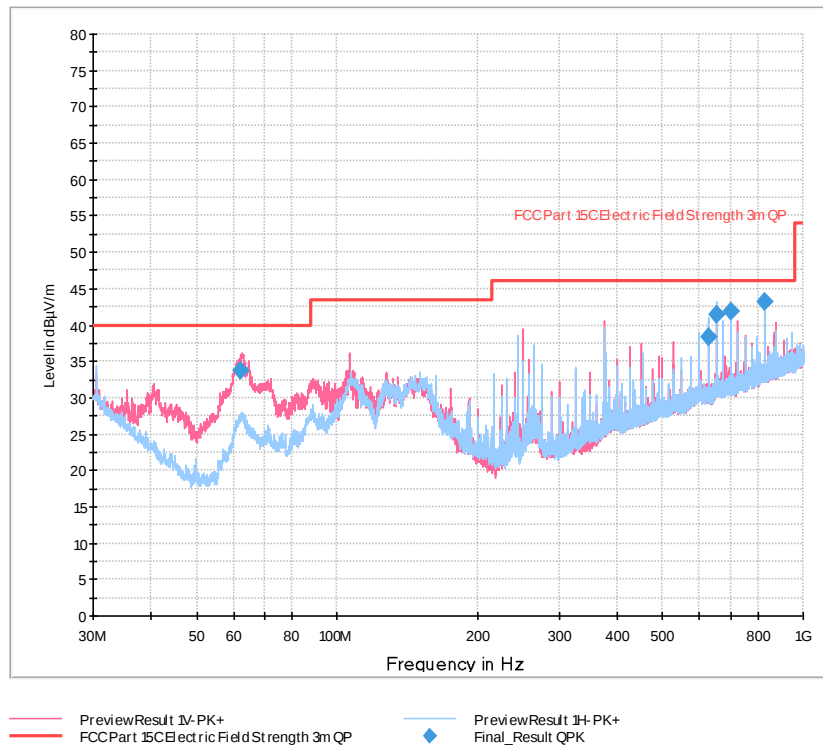
Measuring distance was 3m.



Final Results:

Frequency MHz	Quasi Peak@3m dBμV/m	Quasi Peak@30m dBμV/m	Limit@30m dBμV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
8.871000	25.21 ^{#1}	-14.79 ^{#1}	29.50	44.29	1000.0	9.000	100.0	V	60.0	19.1
13.560000	54.43 ^{#1}	14.43 ^{#1}	84.00	69.57	1000.0	9.000	100.0	V	-34.0	18.9

#1: Measurement was performed at 3 meters, conversion factor of -40 dB/decade (according to § 15.31(f)(2) of FCC 47 Part 15) was added to test results.



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
62.160000	33.61	40.00	6.39	1000.0	120.000	162.0	V	-90.0	12.6
624.990000	38.28	46.02	7.74	1000.0	120.000	209.0	H	62.0	27.1
650.010000	41.47	46.02	4.55	1000.0	120.000	234.0	H	91.0	27.7
699.990000	41.84	46.02	4.18	1000.0	120.000	100.0	H	44.0	28.2
825.000000	43.18	46.02	2.84	1000.0	120.000	100.0	H	-18.0	30.0



FCC 47 CFR Part 15, Limit Clause 15.225 (a)(b)(c)(d)

- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 m.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 m.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 m.
- (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 to 0.490	2400/F (kHz)	300
0.490 to 1.705	24000/F (kHz)	30
1705 to 30	30	30
30 to 88	100**	3
88 to 216	150**	3
216 to 960	200**	3
Above 960	500	5

Table 7 - FCC Radiated Emission Limit



ISED Canada RSS-210, Limit Clause B.6

The field strength of any emission shall not exceed the following limits:

- (a) 15.848 mW/m (84 dB μ V/m) at 30 m, within the band 13.553 – 13.567 MHz.
- (b) 334 μ V/m (50.5 dB μ V/m) at 30 m, within the bands 13.410 – 13.553 MHz and 13.567 – 13.710 MHz.
- (c) 106 μ V/m (40.5 dB μ V/m) at 30 m, within the bands 13.110 – 13.410 MHz and 13.710 – 14.010 MHz.
- (d) RSS-GEN general field strength limits for frequencies outside the band 13.110 – 14.010 MHz.

ISED Canada RSS-GEN, Limit Clause

Frequency	Electric Field Strength (μ V/m)	Magnetic Field Strength (H-Field) (μ A/m)	Measurement Distance (m)
9 - 490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490 - 1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1,705 kHz - 30 MHz	30	N/A	30

Table 8 - ISED Canada Radiated Emission Limit - Less than 30 MHz

Frequency (MHz)	Field Strength (μ V/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
> 960	500

Table 9 - ISED Canada Radiated Emission Limit - 30 MHz to 1 GHz



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	2023-04-30
ULTRALOG antenna	Rohde&Schwarz	HL562E	39969	36	2025-03-31
Loop antenna	Schwarzbeck	FMZB 1519B	44334	36	2023-03-31
EMC measurement software	Rohde&Schwarz	EMC32 V10.50.10	42986	N/A	N/A

Table 10

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.2 Frequency Tolerance Under Temperature Variations

2.2.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.225(e)
ISSED RSS-210, Clause B.6 b.
ISED RSS-Gen, Clause 6.11

2.2.2 Equipment Under Test and Modification State

IDT305MT - Modification State 0

2.2.3 Date of Test

2022-09-15

2.2.4 Test Method

The EUT is installed in an environmental test chamber, the carrier frequency and frequency stability is measured under temperatures and voltage variations.

2.2.5 Environmental Conditions

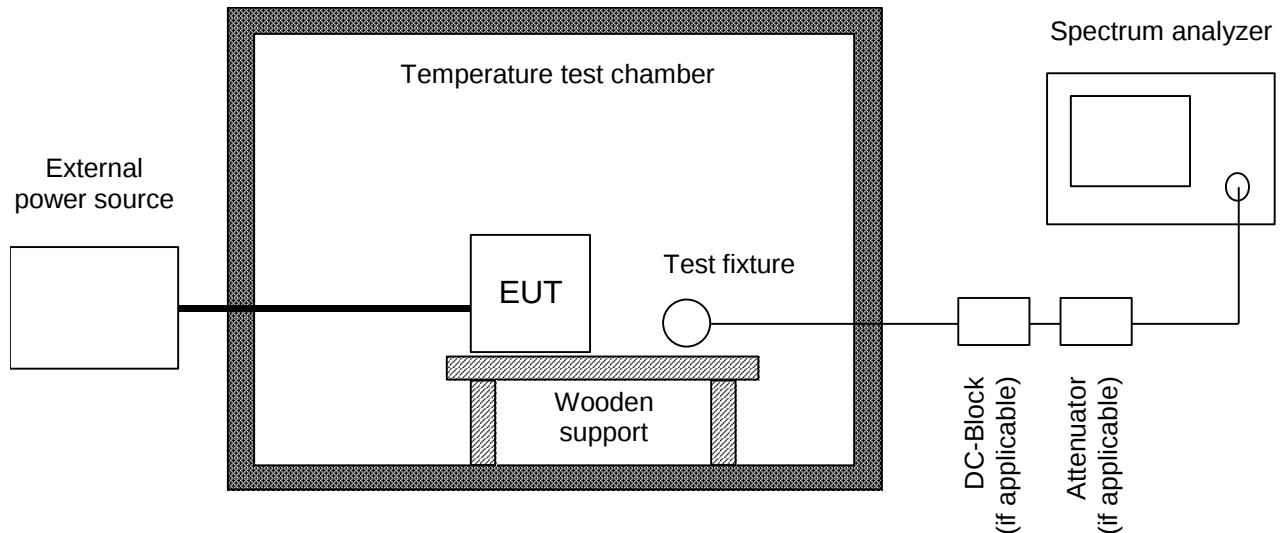
Ambient Temperature	25.0 °C
Relative Humidity	56.0 %

2.2.6 Specification Limits

The frequency tolerance of the carrier signal shall be maintained within ± 0.01 % of the operating frequency over a temperature variation of -20 °C to +50 °C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20 °C. For battery operated equipment, the equipment tests shall be performed using a new battery.

2.2.7 Test Method

The test was performed according to ANSI C63.10, section 6.8.



The frequency tolerance of the carrier signal is measured over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rated supply voltage at a temperature of 20°C . Temperature and voltage range may vary if the manufacturer states another temperature or voltage range.

If the EUT provides an antenna connector the spectrum analyzer is connected to this port. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as a DC block and appropriate ($50\ \Omega$) attenuators. In case where the EUT does not provide an antenna connector or a test fixture is used.

For battery operated equipment, the test is performed using a new battery. Alternatively, an external supply voltage can be used and is at least set to:

- The maximum battery voltage as delivered by a new battery or 115 % of the battery nominal voltage;
- The battery nominal voltage
- 85 % of the battery nominal voltage
- The battery operating end point voltage which shall be specified by the equipment manufacturer.

The EUT is operating providing an unmodulated carrier for frequency error tests. The peak detector of the spectrum analyzer is selected and resolution as well as video bandwidth are set to values appropriate to shape of the spectrum of the EUT. The frequency counter mode of the spectrum analyzer is used to maximize the accuracy of the measured frequency tolerance.

If an unmodulated carrier is not available a significant and stable point of the spectrum is selected and the span is reduced to a value that delivers an accuracy which shall be better than 1 % of the maximum frequency tolerance allowed for the carrier signal. This method may be performed as long as the margin to the frequency tolerance is larger than the uncertainty of the measured frequency tolerance.



2.2.8 Test Results

5V DC Powered – Continuous transmitting

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
-20.0 °C	5.0V	13.560475	0.000050	3.687
-10.0 °C	5.0V	13.560475	0.000050	3.687
0.0 °C	5.0V	13.560475	0.000050	3.687
+10.0 °C	5.0V	13.560475	0.000050	3.687
+20.0 °C	5.0V	13.560525	0.000000	0.000
+30.0 °C	5.0V	13.560500	0.000000	1.843
+40.0 °C	5.0V	13.560475	0.000050	3.687
+50.0 °C	5.0V	13.560475	0.000050	3.687

Table 11 - Frequency Tolerance Under Temperature Variation

Temperature	Voltage	Measured Frequency (MHz)	Frequency Deviation (%)	Frequency Error (ppm)
+20.0 °C	4.25V	13.560525	0.000000	0.000
+20.0 °C	5.0V	13.560525	0.000000	0.000
+20.0 °C	5.75V	13.560525	0.000000	0.000

Table 12 - Frequency Tolerance Under Voltage Variation



Product Service

2.2.9 Test Location and Test Equipment Used

This test was carried out in Non shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2024-02-29
Climatic test chamber	Feutron Klimasimulation	KPK200-2	19868	18	2023-01-31

Table 13

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



2.3 20 dB Bandwidth

2.3.1 Specification Reference

FCC 47 CFR Part 15 C, Clause 15.215(c)
ISED RSS-Gen, Clause 6.7

2.3.2 Equipment Under Test and Modification State

IDT305MT - Modification State 0

2.3.3 Date of Test

2022-09-15

2.3.4 Test Method

The test was performed in accordance with ANSI C63.10, clause 6.9.1.

2.3.5 Environmental Conditions

Ambient Temperature 25.0 °C
Relative Humidity 56.0 %

2.3.6 Test Results

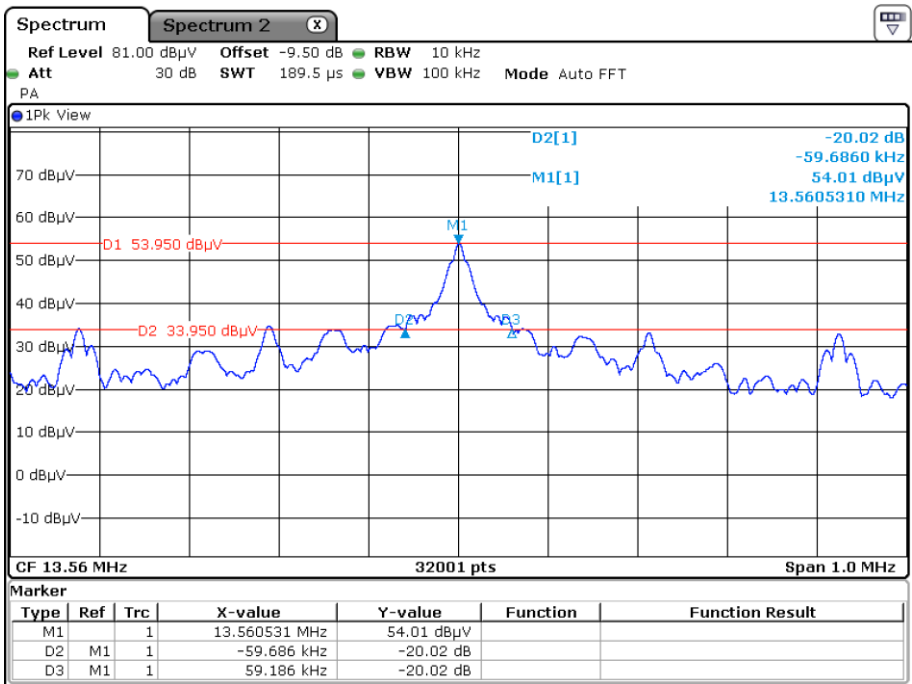
5V DC Powered – Continuous transmitting

Frequency (MHz)	20 dB Bandwidth (Hz)	99% Occupied Bandwidth (Hz)	F _{LOWER} (MHz)	F _{UPPER} (MHz)
13.56	118372	540708	13.27288	13.81359

Table 14

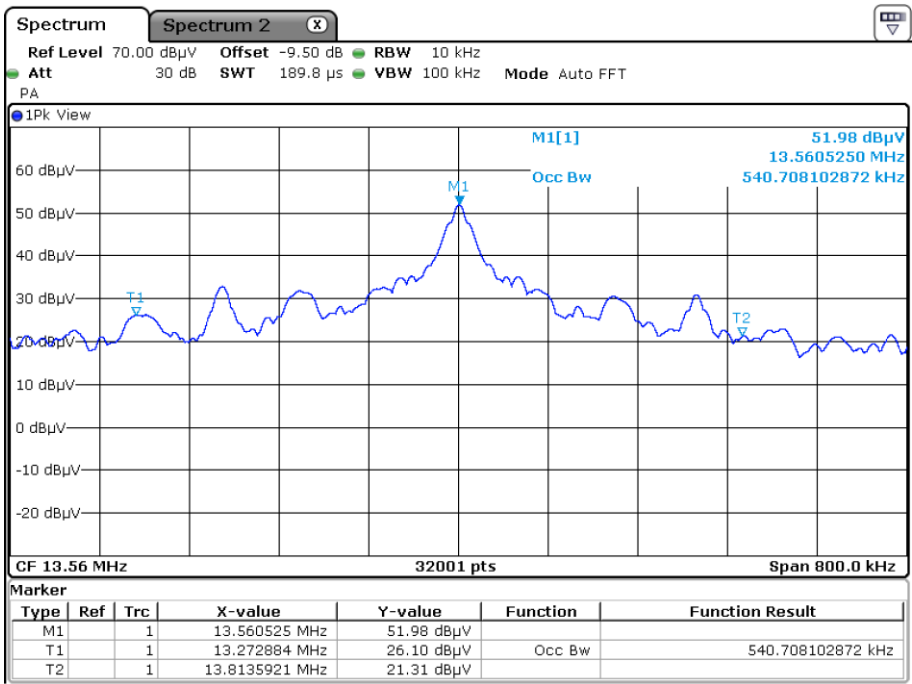


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Date: 15.SEP.2022 21:01:49

Figure 1 - 20 dB Bandwidth



Date: 15.SEP.2022 17:01:21

Figure 2 - 99% Occupied Bandwidth



FCC 47 CFR Part 15, Limit Clause 15.215 (c)

The 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

ISED Canada RSS 210 and ISED Canada RSS GEN, Limit Clause

None specified.

2.3.7 Test Location and Test Equipment Used

This test was carried out in Non shielded room.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	12	2024-02-29
Climatic test chamber	Feutron Klimasimulation	KPK200-2	19868	18	2023-01-31

Table 15

TU - Traceability Unscheduled

O/P Mon – Output Monitored using calibrated equipment

N/A - Not Applicable



3 Measurement Uncertainty

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

<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 16 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		
25 MHz – 6 GHz	1.96	±4.4 dB
1 GHz – 18 GHz	1.96	±4.7 dB
18 GHz – 40 GHz	1.96	±4.9 dB
40 GHz – 325 GHz	1.96	±6.1 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 kp = 2, providing a level of confidence of p = 95.45%		

Table 17 Measurement uncertainty based on ETSI TR 100 028

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}) and as specified in the test report below. This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.



<i>Test Name</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	±5 %
Conducted Power	
9 kHz ≤ f < 30 MHz	±1.0 dB
30 MHz ≤ f < 1 GHz	±1.5 dB
1 GHz ≤ f ≤ 40 GHz	±2.5 dB
1 MS/s power sensor (2.4 / 5 GHz band)	±1.5 dB
Power Spectral Density	±3.0 dB
Radiated Power	
25 MHz – 26.5 GHz	±6.0 dB
26.5 GHz – 66 GHz	±8.0 dB
40 GHz – 325 GHz	±10.0 dB
Conducted Spurious Emissions	±3.0 dB
Radiated Field Strength 9 kHz – 40 GHz	±6.0 dB
Voltage	
DC	± 1.0 %
AC	± 2.0 %
Time (automatic)	± 5 %
Frequency	± 10 ⁻⁷

Table 18 Decision Rule: Maximum allowed measurement uncertainty