



Test Report – Article 2 Paragraph 1 of Item 47

Applicant: Ciholas Inc

Signature:

A handwritten signature in black ink, appearing to read "Tim Royer", is written over a horizontal line.

Sr. EMC Engineer
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

2026-05-20

Prepared By:

Mark Learner, Technical Writer

This test report relates only to the items tested as identified and is not valid for any subsequent changes or modifications made to the equipment under test.

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APPLICANT INFORMATION

Applicant: Ciholas Inc
 Address: 3700 Bell Road
 Newburgh, IN 47630

1.1 Test Result Summary

Full test results are available in this report.

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.

Clauses	Description of the Requirements	Result (Pass, Fail or N/A)
Applicable Standard Article 2 paragraph 1 item 47		
OR: Article 5 OR: Annex 1. 34	Frequency Allocation	Pass
OT: Article 49-29.	Antenna Power	Pass
OR: Article 14	Antenna Power Tolerance	Pass
OR: Article 6 OR: Annex 2. 49	Occupied Bandwidth	Pass
OR: Article 7 OR: Annex 3. 42	Unwanted Emission Strength:	Pass
OT: Article 49.27	Spreading Bandwidth	Pass
OT: Article 24 18	Secondary Rad. Emission Strength:	Pass
OR: Article 9-4. 8 RE: Article 6-2. 3	Interference Prevention Function	Good
OR: Article 15. 1	Frequency Stability under Voltage Fluctuation	N/A
OR : Article 14-2 Note: No.31 of 2019 Note: No.32 of 2019	Radio waves exposed to the human (Only 7.25 ~ 10.25 GHz (High Band))	N/A (Total power < 8mW)
OR: Ordinance Regulating radio equipment RE: Regulations of Enforcement of the radio law		

2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at IIA's permanent laboratory located at 13146 NW 86th Drive, Suite 400, Alachua, Florida 32615.

FCC test firm # 578780

FCC Designation # US1070

FCC site registration is under A2LA certificate # 0955.01

ISED Canada test site registration # 2056A

EU Notified Body # 1177

For all designations see A2LA scope # 0955.01

3. Test Sample(s) (EUT/DUT)

The test sample was received: 3/17/2026

Dates of Testing: 3/20/2026 – 4/6/2026

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2ALIR-PT321
Brief Description	UWB tag for use in real-time location system
Model(s) #	E01049
Firmware version	N/A
Software version	N/A
Serial Number	N/A

Technical Characteristics	
Frequency Range	7737.6-8236.8 MHz
Center Frequency	7987.2 MHz
Number of Channels	N/A
Duty Cycle	100%
Antenna Connector	N/A
Voltage Rating (AC or Batt.)	CR123 battery
Transmission Data Rate	6.81 Mbps data rate
DAA Function	None
Human Exposure (8mW or less)	Total Power 0.0184mW

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.

3.2 Configuration of EUT

Band (MHz)	Mode	Number of Ant.	Setting	
3100 MHz- 10600 MHz	1	1	17	PRF 64, Preamble Code 11
3100 MHz- 10600 MHz	2	1	23.5	PRF 16, Preamble Code 3

Mode 2 determined the worst case the following results reflect that

Operating conditions during Testing:

No modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT).

Operating Range	Temperature °C	Voltage V DC
	-20 to 60	5V USB (3.2V internally)

Low	Temperature °C	Voltage V DC
	-20	5V USB (3.2V internally)

Mid	Temperature °C	Voltage V DC
	22	5V USB (3.2V internally)

High	Temperature °C	Voltage V DC
	60	5V USB (3.2V internally)

Peripherals used during Testing:

A laptop was used to program the EUT.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power-line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance

The measurement was performed as per MIC notification No. 88 of 2004, Annex 70. Full test results are available in this report.

Limits and Regulatory Limits:

- 1) Article 2 Paragraph 1 of Item 47

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	

7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna, NSA	Log-Periodic	Electro-Metrics	LPA-30	409TX; 1243RX	7/15/25	7/14/2028
Antenna	Double Ridged Horn 1	ETS Lindgren	3117	00035923	5/31/2023	5/31/2026
Chamber	Chamber	Panashield	3M	N/A	12/31/2025	12/31/2027
Pre-Amp	Pre-Amp	RF-Lambda	RLNA00M45GA	N/A	9/3/2025	9/3/2027
Receiver	EMI Test Receiver	Rohde and Schwarz	ESW44	103049	1/20/2025	1/20/2028
Antenna	Double-Ridged Horn 18-40 GHz	EMCO	3116	9011-2145	2/8/24	2/7/2027

Note 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Units of measurement

Unless noted otherwise in the referenced standard, the measurements of ac power-line conducted emissions and conducted power output will be reported in units of dB μ V. Unless noted otherwise in the referenced standard, the measurements of radiated emissions will be reported in units of decibels, referenced to one microvolt per meter (dB μ V/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dB μ V if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

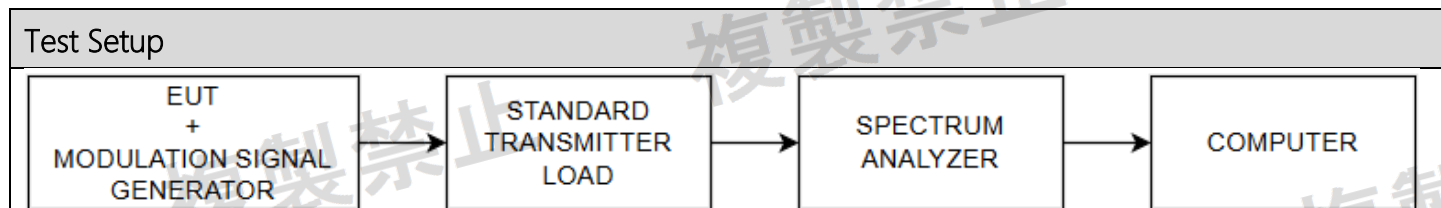
Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dB μ V	+ 10.36 dB/m	+0.40 dB	=30.36 dB μ V/m @ 3m

EIRP = Pcond (dBm) + dBi

8.1 FREQUENCY Allocation

Limits from: OT: Article 5, OT: Annex 1.34 and test procedure from MIC notification No. 88 of 2004, Annex 70.



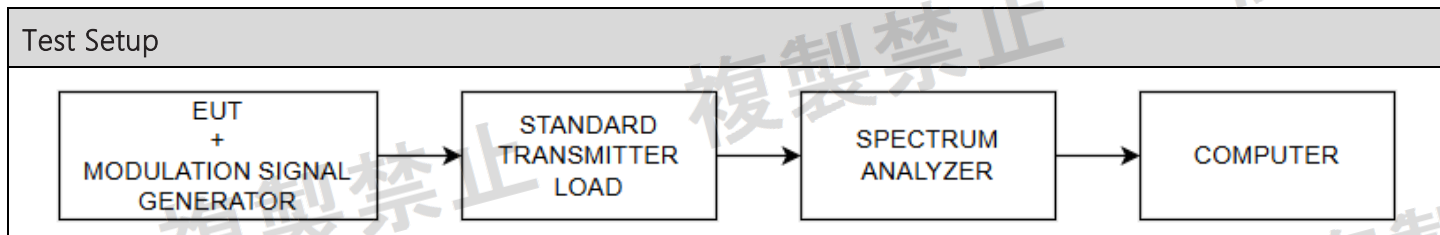
Frequency Allocation

Test Frequency	7.9872 GHz
F _L	7.6307 GHz
F _H	8.2896 GHz
Maximum 99% Occupied Bandwidth	0.6589 GHz

Note, the product was tested under the modulation condition that causes the worst-case OCB.

8.2 ANTENNA POWER TOLERANCE

Limits from: OR: Article 14.7 and test procedure from MIC notification No. 88 of 2004, Annex 70.



Mode 1

Frequency (MHz)	Detector	Antenna Power	Rated Power	Power Tolerance (%)	Limit
7987.2 MHz	Peak	18.3 μ W/50MHz	100 μ W/50MHz	-81.7	1 mW/50MHz
7987.2 MHz	Average	0.007533 μ W/MHz	0.07413 μ W/MHz	-89.838	0.07413 μ W/MHz

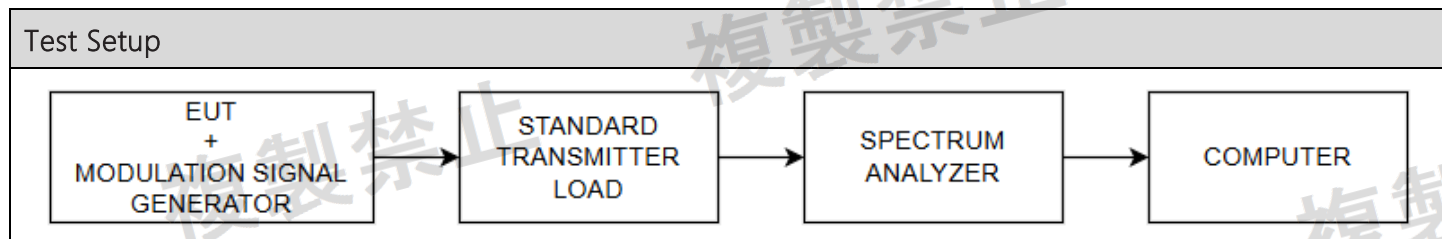
Mode 2

Frequency (MHz)	Detector	Antenna Power	Rated Power	Power Tolerance (%)	Limit
7987.2 MHz	Peak	4.89 μ W/50MHz	100 μ W/50MHz	-95.11	1 mW/50MHz
7987.2 MHz	Average	0.0537 μ W/MHz	0.07413 μ W/MHz	-27.56	0.07413 μ W/MHz

Note, the product was tested under the condition that causes the max antenna power.

8.3 OCCUPIED CHANNEL BANDWIDTH

Limits from OR: Article 6 OR: Annex 2. 30 and test procedure from MIC notification No. 88 of 2004, Annex 70.

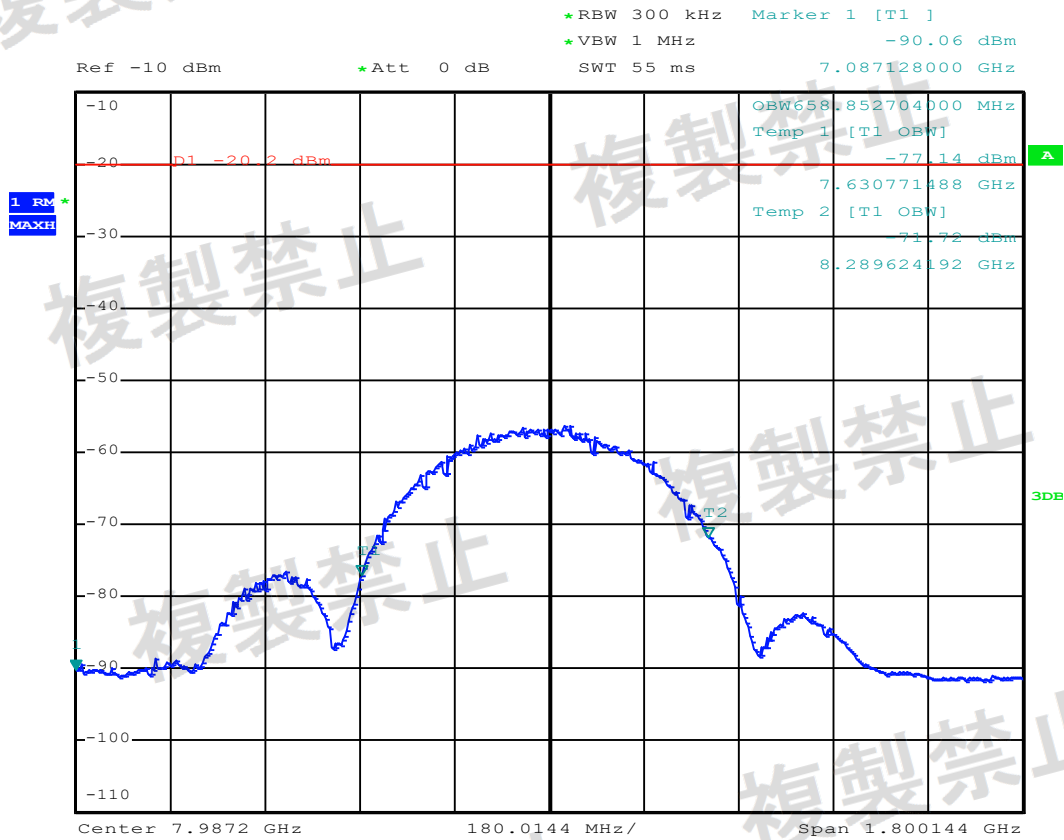


99% BW Test Results

Tuned Frequency (MHz)	99% BW (MHz)
7987.2	658.85

Note, the product was tested under the modulation condition that causes the worst-case OCB.

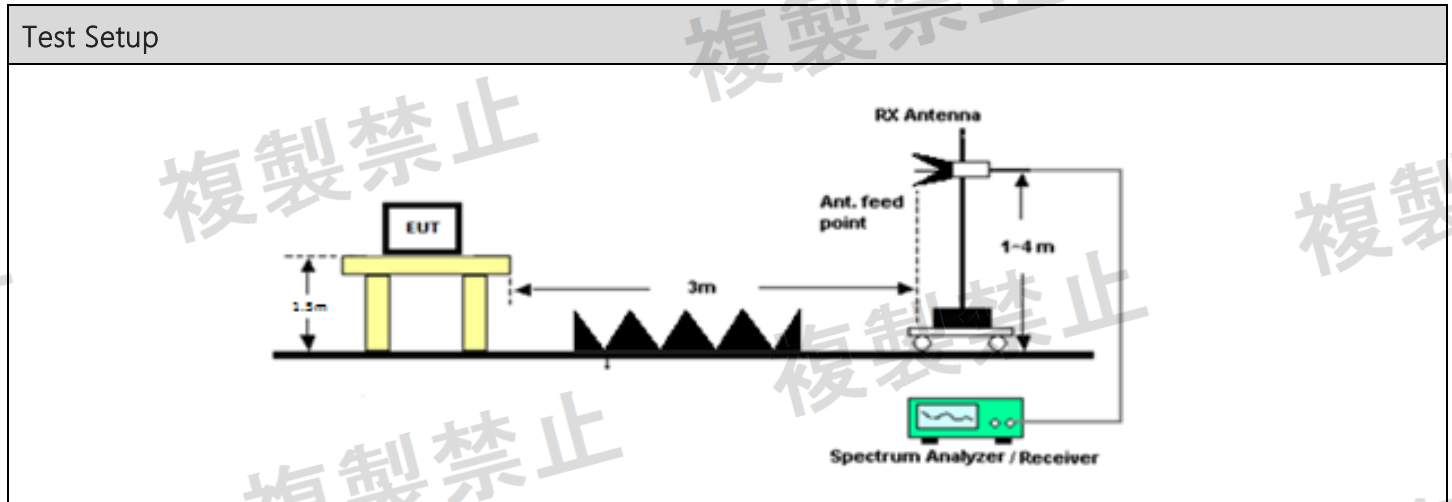
8.3.1 99 % Occupied Bandwidth, 7987.2 MHz



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8.4 UNWANTED EMISSION STRENGTH

Limits from OR: Article 7 OR: Annex 3. 26 and test procedure from MIC notification No. 88 of 2004, Annex 70.

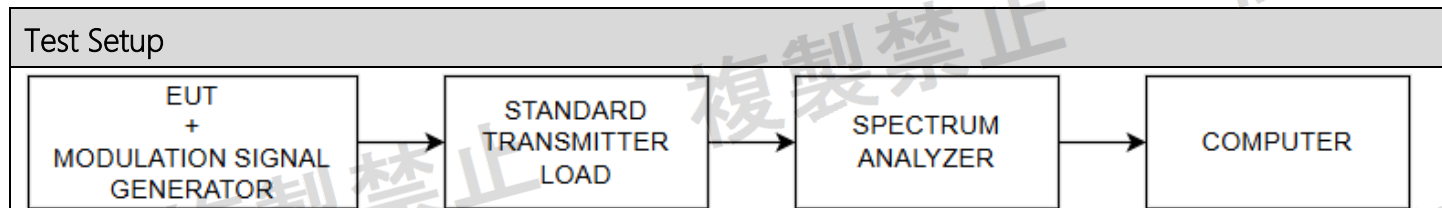


Radiated emissions tabular data

Test Freq (MHz)	Freq Range	Test Point (MHz)	Reading AV Value (dBm/MHz)	Reading PK Value (dBm/MHz)	AV Limit (dBm/MHz)	PK Limit (dBm/MHz)	Pass/Fail
7987.2	30 MHz-1600MHz	No Emissions Detected			-90	-84	Pass
	1600 MHz-2700MHz	No Emissions Detected			-85	-79	Pass
	2700MHz-10.6GHz	No Emissions Detected			-70	-64	Pass
	10.6GHz-10.7GHz	No Emissions Detected			-85	-79	Pass
	10.7GHz-11.7GHz	No Emissions Detected			-70	-64	Pass
	11.7GHz-12.75GHz	No Emissions Detected			-85	-79	Pass
	12.7GHz-26GHz	23961.6	-72.27	-82.27	-70	-64	Pass

8.5 SPREADING BANDWIDTH

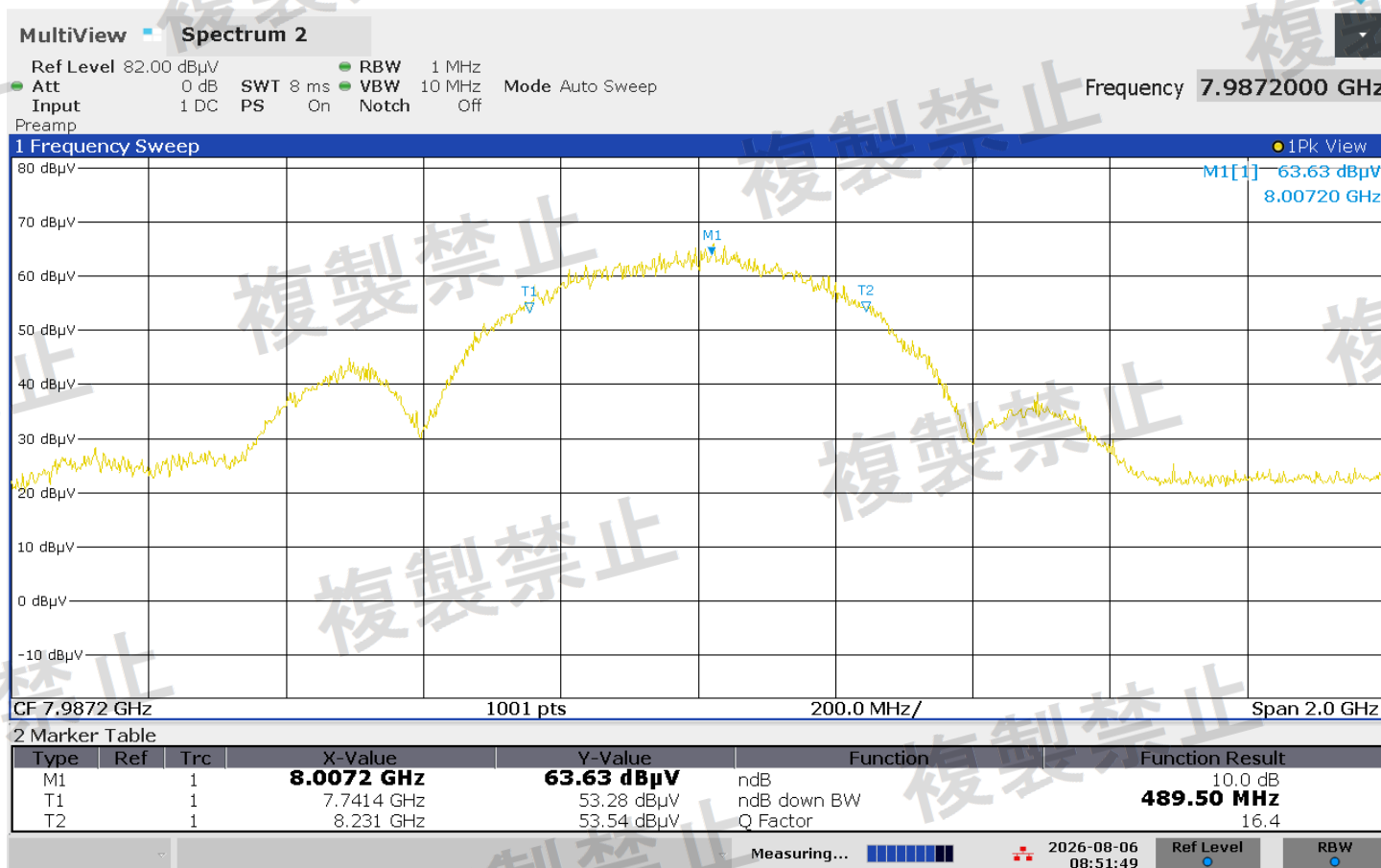
Limits from OT: Article 49.27 and test procedure from MIC notification No. 88 of 2004, Annex 70.



Note, the product was tested under the modulation condition that causes the worst-case OCB.

8.5.1 10dB Occupied Bandwidth, 7987.2 MHz (Mode 2)

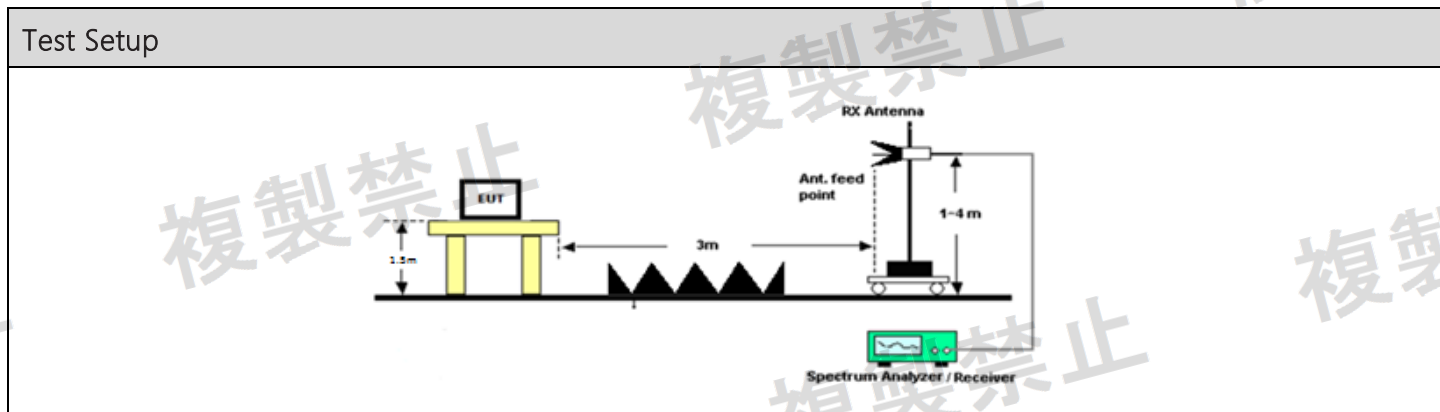
Spreading Bandwidth	
Tuned Frequency (MHz)	10 dB BW (MHz)
7987.2 MHz	489.5



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8.6 SECONDARY RADIATED EMISSION STRENGTH

Limits from OR: Article 49-20 and test procedure from MIC notification No. 88 of 2004, Annex 70.

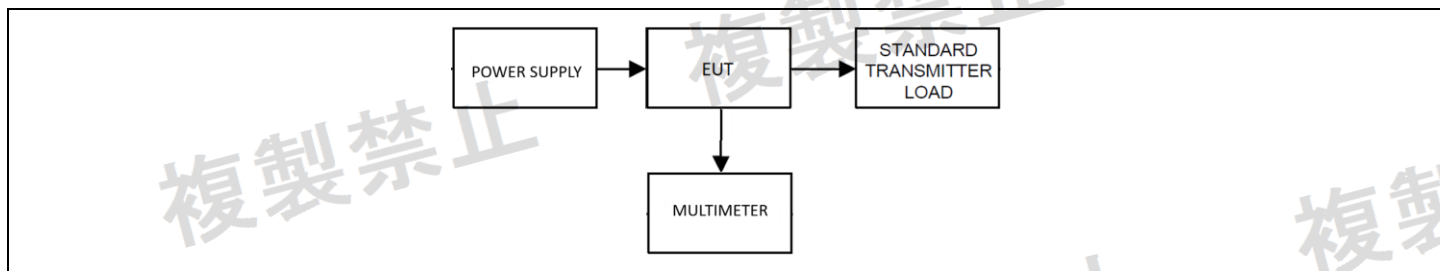


Result: Compliant

Test Freq (MHz)	Freq Range	Test Point (MHz)	Reading Value (dBm/MHz)	PK Limit (dBm/MHz)	Pass/Fail
7987.2	30 MHz-1600MHz	870.56	-90.79	-90	Pass
	1600 MHz-2700MHz	1614	-85.52	-85	Pass
	2.7GHz-3.4GHz	No Emissions Detected		-70	Pass
	3.4GHz-4.8GHz	No Emissions Detected		-70	Pass
	4.5GHz – 7.25GHz	No Emissions Detected		-70	Pass
	7.25GHz-10.25GHz	7986.4	-84.9	-54	Pass
	10.25GHz – 10.6GHz	No Emissions Detected		-70	Pass
	10.6GHz-10.7GHz	No Emissions Detected		-85	Pass
	10.7GHz-11.7GHz	No Emissions Detected		-70	Pass
	11.7GHz-12.75GHz	11883.6	-84.84	-85	Pass
	12.7GHz-26GHz	15935	-82.44	-70	Pass

8.7 Power Supply Voltage Fluctuation Test

Limits from OR: Article 15.1 and test procedure from MIC notification No. 88 of 2004, Annex 70.



Test Type	Input voltage to the EUT (VDC)	Expected Radio Unit Voltage (V DC)	Measured Radio Unit Voltage (V DC)	Deviation Radio
-10% Voltage	2.88	2.88	2.88	0%
Normal Voltage	3.2	3.2	3.2	0%
+10% Voltage	3.52	3.2	3.2	0%

Result: The Power supply supplies the rated voltage.

The input voltage variation at the radio unit (except power supply section) in the radio equipment to be tested is less than +1% against a variation of +10% at the input voltage from the external power supply to the radio equipment, the test may be done for the rated voltage.

8.8 History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_26695-26_MIC Act 38-2-2.1.1_	1	Initial release	2026-05-20
	2	Updated section 1.1, 3.1, 3.2, 8.1, 8.2, 8.3, 8.4/8.6, 8.7. Updated by Mark Learner/Tim Royer.	2026-06-22
	3	Updated sections 8.1-8.6. Updated by Mark Learner	2026-07-16
	4	Updated sections 8.4/8.6 & page 16	2026-08-6
	5	Updated page 18	2026-08-7
	7	Updated pages 6,11,14,18	2026-08-13
	8	Updated pages 11,18	2026-08-14
	9	Updated pages 11,18	2026-08-17
	10	Updated pages 11	2026-08-19

END OF TEST REPORT