

AUT Report

Prepared for: North Pole Engineering

Address: 1000 Boone Ave N #700,
Golden Valley, MN, 55427

Product: GEM4NFC

Test Report No: R20251105-70-A1

Approved by:


Fox Lane,
EMC Test Engineer

DATE: February 27, 2026

Total Pages: 11

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REVISION PAGE

Rev. No.	Date	Description
0	27 February 2026	Issued by FLane Prepared by FLane



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1.0 SUMMARY OF TEST RESULTS

Antenna gain measurements were reported for the band of operation.

2.0 EUT DESCRIPTION

2.1 EQUIPMENT UNDER TEST

Summary and Operating Condition:

The Equipment Under Test (EUT) was a transceiver manufactured by North Pole Engineering

EUT	GEM4NFC
FCC ID	XRH-NPE111
IC ID	1192A-NPE111
EUT Received	12 December 2025
EUT Tested	12 December 2025 - 23 January 2026
Model No.	NP4102
Serial No.	Test1 (Lab Assigned Serial number) Test3 (Lab Assigned Serial number)
Operating Band	2400 – 2483.5 MHz
Device Type	☒ GMSK ☒ GFSK ☐ BT BR ☐ BT EDR 2MB ☐ BT EDR 3MB ☐ 802.11x
Power Supply / Voltage	5VDC USB
Peak Antenna Gain	+5.572dBi

NOTE: For more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.0 LABORATORY AND GENERAL TEST DESCRIPTION

3.1 LABORATORY DESCRIPTION

All testing was performed at the following Facility:

The Nebraska Center for Excellence in Electronics (NCEE Labs)
4740 Discovery Drive
Lincoln, NE 68521

A2LA Certificate Number:	1953.01
FCC Accredited Test Site Designation No:	US1060
FCC Lab Registration No:	134067
Industry Canada Test Site Registration No:	4294A
NCC CAB Identification No:	US0177

Environmental conditions varied slightly throughout the tests:

Relative humidity of $35 \pm 4\%$
Temperature of $22 \pm 3^\circ$ Celsius



3.2 TEST PERSONNEL

No.	PERSONNEL	TITLE	ROLE
1	Fox Lane	Test Engineer	Testing and report
2	Ethan Schmidt	Test Engineer	Testing

Notes:

All personnel are permanent staff members of NCEE Labs. No testing or review was sub-contracted or performed by sub-contracted personnel.

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3.3 TEST EQUIPMENT

DESCRIPTION AND MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CALIBRATION DATE	CALIBRATION DUE DATE
Keysight MXE Signal Analyzer (26.5GHz)	N9038A	MY56400083	July 15, 2025	July 16, 2027
Keysight EXA Signal Analyzer	N9010A	MY56070862	July 14, 2025	July 14, 2027
EMCO Horn Antenna	3117	29616	June 12, 2024	June 12, 2026
ETS – Lindgren- VSWR on 10m Chamber	10m Semi-anechoic chamber- VSWR	4740 Discovery Drive	May 15, 2024	May 15, 2027
NCEE Labs-NSA on 10m Chamber*	10m Semi-anechoic chamber-NSA	NCEE-001	May 22, 2024	May 22, 2026
RF Cables (3m Ant. to Control room Bulkhead)	MFR-57500	1E3874	July 18, 2025	July 18, 2027
RF Cable (antenna to 10m chamber bulkhead)*	FSCM 64639	01E3872	July 18, 2025	July 18, 2027
RF Cable (10m chamber bulkhead to control room bulkhead)*	FSCM 64639	01E3874	July 18, 2025	July 18, 2027
RF Cable (control room bulkhead to test receiver)*	FSCM 64639	01F1206	July 18, 2025	July 18, 2027
N connector bulkhead (10m chamber)*	PE9128	NCEEBH1	July 18, 2025	July 18, 2027
N connector bulkhead (control room)*	PE9128	NCEEBH2	July 18, 2025	July 18, 2027
TDK Emissions Lab Software	V11.25	700307	NA	NA

*Internal Characterization

Notes:

All equipment is owned by NCEE Labs and stored permanently at NCEE Labs facilities.

3.4 GENERAL TEST PROCEDURE AND SETUP FOR RADIO MEASUREMENTS

Measurement type presented in this report (Please see the checked box below):

Conducted ☒

The conducted measurements were performed by connecting the output of the transmitter directly into a spectrum analyzer using an impedance matched cable and connector soldered to the EUT in place of the antenna. The information regarding resolution bandwidth, video bandwidth, span and the detector used can be found in the graphs provided in Appendix C. All the radio measurements were performed using the sections from ANSI C63.10, details about the section used can be found in the spectrum analyzer titles on the graph.

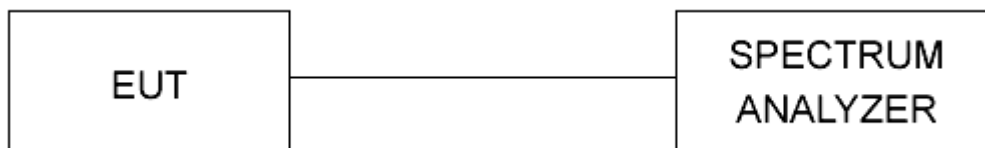


Figure 1 - Bandwidth Measurements Test Setup

Radiated ☒

All the radiated measurements were taken at a distance of 3m from the EUT. The information regarding resolution bandwidth, video bandwidth, span and the detector used can be found in the graphs provided in Appendix C. All the radio measurements were performed using the sections from ANSI C63.10, details about the section used can be found in the spectrum analyzer titles on the graph.

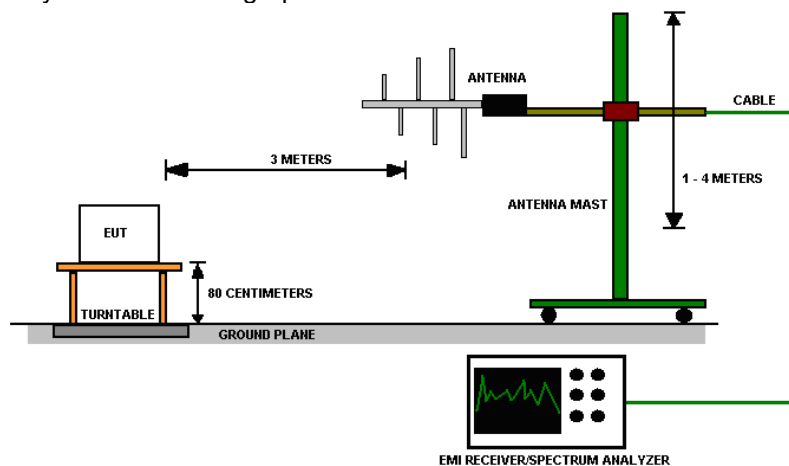


Figure 2 - Radiated Emissions Test Setup



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4.0 RESULTS

4.1 ANTENNA GAIN

Test procedures:

The device's conducted power was measured then the same measurement was repeated on a radiated sample at 3m test distance and converted to E.I.R.P.

Test setup:

Details can be found in section 2.1 of this report.

EUT operating conditions:

Details can be found in section 2.1 and 2.2 of this report.

Test results:

Antenna Gain:

Radiated Average Power (EIRP) – Conducted Average Power = Antenna gain
 $10.696\text{dBm} - 5.124\text{dBm} = \mathbf{+5.572\text{dBi}}$

Comments:

NA

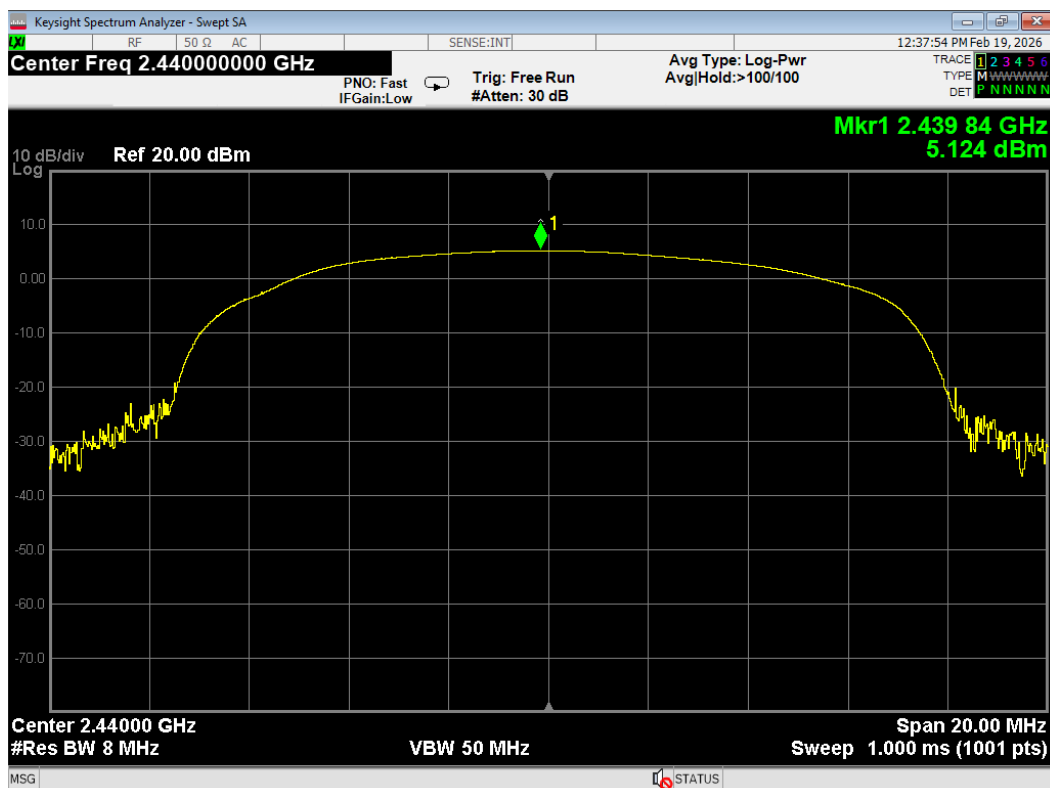


Figure 3 – Conducted Peak Power Measurement, BLE 1MB, Mid Channel

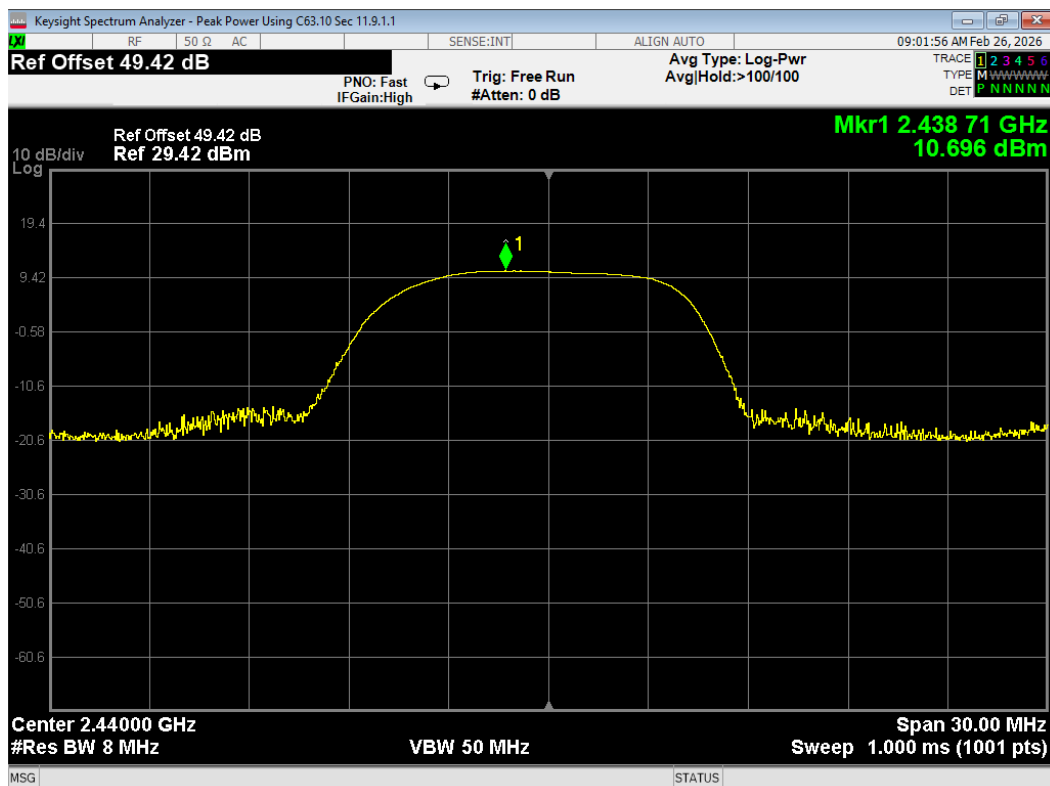


Figure 4 – Radiated Peak Power Measurement, BLE 1MB, Mid Channel
Measurement corrections conversions are included in reference offset.

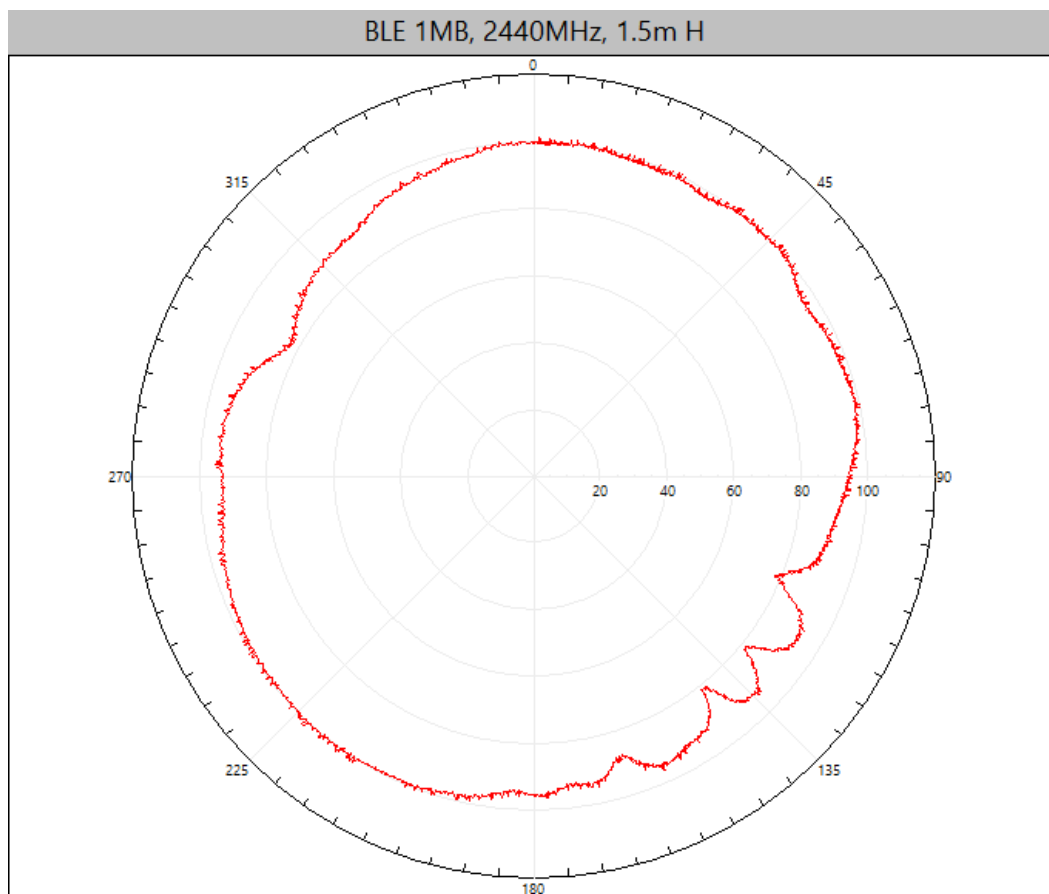


Figure 5 – Antenna Pattern, 1.5m Antenna height, 1.5m EUT Height



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