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PART 25 | RSS-170 MEASUREMENT REPORT

Applicant Name:
Garmin International Inc
1200 E. 151st. Street
Olathe,Kansas
United States 66062

Date of Testing:
7/10/2026 - 8/21/2026
Test Report Issue Date:
9/4/2026
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2607100063-02-R1.IPH

FCC ID:	**IPH-05242**
IC:	**1792A-05242**
APPLICANT:	**Garmin International Inc**

Application Type:	Certification
Model/HVIN:	A05242
EUT Type:	Portable Digital Transceiver
FCC Classification:	PCS licensed Transmitter worn on body(PCT)
FCC Rule Part:	25
ISED Specification:	RSS-Gen Issue 5, RSS-170 Issue 4
Test Procedure(s):	ANSI C63.26-2015

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

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TEST REPORT REVISION HISTORY

Rev. No.	Description	Issue Date	Revised By
-	Initial Release	8/28/2026	WKR0000005883
1	Addressed Comments from client	9/4/2026	WKR0000005883

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Mode	SCS	Tx Frequency Range [MHz]	EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
NTN BAND 255	3.75kHz / 15kHz	1626.6 - 1660.4	0.031	14.88	186KG7D
NTN BAND 252(23)	3.75kHz / 15kHz	2000.1 - 2019.9	0.116	20.65	189KG7D

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 Element Test Location

Measurements were conducted at the Element laboratory indicated in Section 1.3 below. All measurement facilities are compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- Element Washington DC LLC facility is a registered test laboratory with the site description on file with ISED (Wireless Test Lab number 2451B) and FCC (Designation Number US1113, Test Lab Registration Number 445776).

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreements (MRAs).

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Garmin Portable Digital Transceiver FCC ID: IPH-05242** and **IC: 1792A-05242**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 25 and RSS-170.

The EUT integrated a certified module (Nordic) which is authorized under FCC ID: 2ANPO00NRF9151 and IC: 24529-NRF9151

For this EUT configuration, only the NB-IoT capability of the module is enabled for NTN specific opertion

Test Device Serial No.: 3637869122, 3637869095, 3644224118, 3644224060, 3644224106, 3644224117, 3644224067

2.2 Device Capabilities

This device contains the following capabilities:

Multi-band LTE (CAT-M1) / Multi-band NTN / Bluetooth (1x, EDR, LE) / ANT+ / 802.11b/g/n WLAN / NFC

For NTN operation under B255 (1626.5 – 1660.5MHz) and B23/252 (2000.1 - 2019.9MHz), this device supports both 3.75kHz and 15kHz subcarrier spacings with QPSK and BPSK modulations.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

The EUT was configured for testing using client-provided software/instruction that allowed direct control of the modem operating parameters. The device was connected to a call box to establish and maintain a communication link, enabling the EUT to operate in a controlled transmit state. The call box was configured to force the EUT to transmit at maximum output power for all applicable measurements.

2.4 Antenna Description

The manufacturer provided the antenna gains which can affect the validity of test results used for determination of compliance. The following antenna gains are used in this device provided by the client.

Band	Frequency Range [MHz]	Maximum Peak Gain (dBi)
LTE Cat M1 B2	1850 - 1910	0.0
LTE Cat M1 B4	1710 -1755	-3.0
LTE Cat M1 B12	699 - 716	-18.4
NTN n23	2000 - 2020	-1.8
NTN n255	1626.5 - 1660.5	-7.6

Table 2-1. Antenna Peak Gain

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2.5 Software and Firmware

Testing was performed on device(s) using software/firmware version 5.25 installed on the EUT.

2.6 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure……..……..None

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, ERP or EIRP are calculated based on the manufacturer provided antenna gain and the measured conducted output power per the guidance of ANSI C63.26:2015. The power of the emission is calculated using the following formula:

$$\text{ERP or EIRP}_{[dBm]} = P_{measured\,[dBm]} + G_{T\,[dBd/dBi]};$$

where $\text{ERP or EIRP}_{[dBm]}$ is the effective radiated power or equivalent isotropically radiated power, $P_{measured}$ is measured transmitter output power or PSD, in dBm or dBW, G_T is gain of the transmitting antenna in dBd (ERP) or dBi (EIRP)

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26:2015. Field Strength (EIRP) is calculated using the following formulas:

$$E_{[dB\mu V/m]} = \text{Measured amplitude level}_{[dBm]} + 107 + \text{Cable Loss}_{[dB]} + \text{Antenna Factor}_{[dB/m]}$$

And

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;$$ where D is the measurement distance in meters.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4:2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26:2015.

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4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

Table 4-1. Measurement Uncertainty Budget

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	ETS-001	EMC Cable and Switch System	1/29/2026	Annual	1/29/2027	ETS-001
-	ETS-002	EMC Cable and Switch System	1/29/2026	Annual	1/29/2027	ETS-002
-	WL25-1	Conducted Cable Set (25GHz)	1/30/2026	Annual	1/30/2027	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	1/30/2026	Annual	1/30/2027	WL25-2
Agilent	N9038A	MXE EMI Receiver	11/10/2025	Annual	11/10/2026	MY51210133
EMCO	3115	Horn Antenna (1-18GHz)	9/6/2024	Biennial	9/6/2026	9704-5182
Espec	ESX-2CA	Environmental Chamber	11/20/2024	Biennial	11/20/2026	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	6/4/2025	Biennial	6/4/2027	125518
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	1/16/2026	Annual	1/16/2027	100348
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	8/14/2025	Annual	8/14/2026	164948
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	9/11/2024	Biennial	9/11/2026	A051107

Table 5-1. Test Equipment Calibration Table

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

Component	Serial Number
Pasternack Cable RG214/U	111815
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001

Table 5-2. ETS-001 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001
MegaPhase (CAGE 1GVT4) Cable NC29-N1N1-324	20502201 001
Rohde & Schwarz SF Unit	102134
Minicircuits Cable CBL=0.5M-NMNM+	15440

Table 5-3. ETS-002 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase Cable, Model: TM26-S1S1-36	18160103 003
Pasternack 6dB Attenuator, Model: PE7005-6	N/A

Table 5-4. WL25-1 Conducted Cable Set Components

Component	Serial Number
Mini-Circuits Cable, Model: CBL-2FT-SMSM+	77743
MCL 6dB Attenuator, Model: BW-S6W2+	1314

Table 5-5. WL25-2 Conducted Cable Set Components

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6.0 SAMPLE EMISSION DESIGNATORS

PSK Modulation

Emission Designator = 200KG7D
BW = 200 kHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

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7.0 TEST RESULTS

7.1 Summary

Company Name: Garmin International Inc

FCC ID: IPH-05242

IC: 1792A-05242

FCC Classification: PCS licensed Transmitter worn on body(PCT)

Mode(s): NTN

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference	Data Leveraged
CONDUCTED	Transmitter Conducted Output Power / Equivalent Isotropic Radiated Power	2.1046, 25.204(a)	N/A	40dBW (FCC)	PASS	Section 7.2	No
	Occupied Bandwidth	2.1049	RSS-Gen (6.7)	N/A	PASS	Section 7.3	No
	Conducted Emission Mask; Conducted Spurious Emissions	2.1051, 25.202(f)	RSS-170 (5.1) (5.8)	25.202(f)	PASS	Please see Note 5	Yes
	Frequency Stability	2.1055, 25.202(d)	RSS-170 (5.3)	<0.001% of reference frequency	PASS	Please see Note 5	Yes
RADIATED	Radiated Spurious Emissions	25.202(f)	RSS-170 (5.8)	> 43 + 10 log10 P[Watts] for all out-of-band emissions	PASS	Section 7.4	No
	Radiated Spurious Emissions (1559 - 1610MHz)	25.216(c/h)	RSS-170 (5.9)	< -70dBW/MHz for emissions in the band 1559 - 1605MHz; < -46dBW/MHz at 1610MHz	PASS	Section 7.5	No
	Carrier-Off State Emissions (1559 - 1610MHz)	25.216(i)	RSS-170 (5.10)	< -80dBW/MHz for emissions in the band 1559 - 1610MHz	PASS	Section 7.6	No

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst-case emissions.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v2.3.0.
5) This report is based on the original report (Report No. 5121ERM.001A1) for Model: nRF9151 (FCC ID: 2ANPO00NRF9151 and IC: 24529-NRF9151). The firmware remains identical, with only a difference in the software name. The new sample has been evaluated to verify worst-case Radiated Spurious Emissions (RSE) and conducted power. Accordingly, this report includes only the conducted power and RSE results. All other test data are leveraged from the original report as noted in the Data Leveraged column of the above table.

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7.2 Conducted Output Power & Radiated Power (EIRP)

Test Overview

All emissions are measured with a power meter connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

The EIRP shall not exceed +40 dBW in any 4 kHz band.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2.4.2

Test Settings

1. Detector = RMS
2. Trace mode = trace average for continuous emissions
3. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. For NB operation in this band, the 3.75kHz and 15kHz subcarrier spacings support both QPSK and BPSK modulation as shown in the following tables.
2. Customer provided antenna gain values were used in this section to determine the EIRP.

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SCS	SC Size	Tx Channel	Frequency [MHz]	Conducted Power [dBm]		EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
				BPSK	QPSK				
3.75kHz	1SC0	261505	1626.6	22.19	22.20	14.60	0.03	70.00	-55.40
	1SC24	261505	1626.6	22.35	22.36	14.76	0.03	70.00	-55.24
	1SC47	261505	1626.6	22.13	22.14	14.54	0.03	70.00	-55.47
15kHz	1SC0	261505	1626.6	22.35	22.29	14.75	0.03	70.00	-55.25
	1SC6	261505	1626.6	22.40	22.38	14.80	0.03	70.00	-55.20
	1SC11	261505	1626.6	22.29	22.27	14.69	0.03	70.00	-55.31
	3SC0	261505	1626.6	N/A	22.15	14.55	0.03	70.00	-55.45
	3SC6	261505	1626.6	N/A	22.33	14.73	0.03	70.00	-55.27
	3SC9	261505	1626.6	N/A	22.16	14.56	0.03	70.00	-55.44
	6SC0	261505	1626.6	N/A	21.39	13.79	0.02	70.00	-56.21
	6SC6	261505	1626.6	N/A	21.40	13.80	0.02	70.00	-56.21
	12SC0	261505	1626.6	N/A	20.33	12.73	0.02	70.00	-57.27
3.75kHz	1SC0	261674	1643.5	22.24	22.21	14.64	0.03	70.00	-55.36
	1SC24	261674	1643.5	22.38	22.37	14.78	0.03	70.00	-55.22
	1SC47	261674	1643.5	22.15	22.25	14.65	0.03	70.00	-55.35
15kHz	1SC0	261674	1643.5	22.37	22.36	14.77	0.03	70.00	-55.24
	1SC6	261674	1643.5	22.35	22.48	14.88	0.03	70.00	-55.13
	1SC11	261674	1643.5	22.31	22.35	14.75	0.03	70.00	-55.26
	3SC0	261674	1643.5	N/A	21.69	14.09	0.03	70.00	-55.91
	3SC6	261674	1643.5	N/A	21.83	14.23	0.03	70.00	-55.77
	3SC9	261674	1643.5	N/A	21.72	14.12	0.03	70.00	-55.88
	6SC0	261674	1643.5	N/A	21.44	13.84	0.02	70.00	-56.16
	6SC6	261674	1643.5	N/A	21.46	13.86	0.02	70.00	-56.14
	12SC0	261674	1643.5	N/A	20.41	12.81	0.02	70.00	-57.19
3.75kHz	1SC0	261843	1660.4	21.86	21.88	14.28	0.03	70.00	-55.72
	1SC24	261843	1660.4	22.05	22.03	14.45	0.03	70.00	-55.55
	1SC47	261843	1660.4	21.82	21.92	14.32	0.03	70.00	-55.68
15kHz	1SC0	261843	1660.4	21.95	22.01	14.41	0.03	70.00	-55.59
	1SC6	261843	1660.4	22.20	22.10	14.60	0.03	70.00	-55.40
	1SC11	261843	1660.4	22.00	22.07	14.47	0.03	70.00	-55.53
	3SC0	261843	1660.4	N/A	21.82	14.22	0.03	70.00	-55.79
	3SC6	261843	1660.4	N/A	21.92	14.32	0.03	70.00	-55.68
	3SC9	261843	1660.4	N/A	21.80	14.20	0.03	70.00	-55.80
	6SC0	261843	1660.4	N/A	21.06	13.46	0.02	70.00	-56.54
	6SC6	261843	1660.4	N/A	21.07	13.47	0.02	70.00	-56.53
	12SC0	261843	1660.4	N/A	20.04	12.44	0.02	70.00	-57.56

Table 7-2. Conducted/Radiated Power Result – Band 255

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SCS	SC Size	Channel	Frequency [MHz]	Conducted Power [dBm]		EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
				BPSK	QPSK				
3.75kHz	1SC0	261070	2000.1	22.12	22.14	20.34	0.11	70.00	-49.66
	1SC24	261070	2000.1	22.31	22.31	20.51	0.11	70.00	-49.49
	1SC47	261070	2000.1	22.20	22.21	20.41	0.11	70.00	-49.60
15kHz	1SC0	261070	2000.1	22.36	22.39	20.59	0.11	70.00	-49.41
	1SC6	261070	2000.1	22.45	22.45	20.65	0.12	70.00	-49.35
	1SC11	261070	2000.1	22.35	22.33	20.55	0.11	70.00	-49.45
	3SC0	261070	2000.1	N/A	21.65	19.85	0.10	70.00	-50.16
	3SC6	261070	2000.1	N/A	21.65	19.85	0.10	70.00	-50.15
	3SC9	261070	2000.1	N/A	21.55	19.75	0.09	70.00	-50.25
	6SC0	261070	2000.1	N/A	21.38	19.58	0.09	70.00	-50.42
	6SC6	261070	2000.1	N/A	21.25	19.45	0.09	70.00	-50.55
	12SC0	261070	2000.1	N/A	20.40	18.60	0.07	70.00	-51.40
3.75kHz	1SC0	261169	2010	22.17	22.11	20.37	0.11	70.00	-49.64
	1SC24	261169	2010	22.32	22.26	20.52	0.11	70.00	-49.49
	1SC47	261169	2010	22.06	22.07	20.27	0.11	70.00	-49.73
15kHz	1SC0	261169	2010	22.34	22.35	20.55	0.11	70.00	-49.46
	1SC6	261169	2010	22.39	22.38	20.59	0.11	70.00	-49.41
	1SC11	261169	2010	22.33	22.32	20.53	0.11	70.00	-49.47
	3SC0	261169	2010	N/A	21.60	19.80	0.10	70.00	-50.20
	3SC6	261169	2010	N/A	21.77	19.97	0.10	70.00	-50.03
	3SC9	261169	2010	N/A	21.74	19.94	0.10	70.00	-50.06
	6SC0	261169	2010	N/A	21.35	19.55	0.09	70.00	-50.45
	6SC6	261169	2010	N/A	21.17	19.37	0.09	70.00	-50.64
	12SC0	261169	2010	N/A	20.38	18.58	0.07	70.00	-51.42
3.75kHz	1SC0	261268	2019.9	22.10	22.08	20.30	0.11	70.00	-49.70
	1SC24	261268	2019.9	22.23	22.24	20.44	0.11	70.00	-49.56
	1SC47	261268	2019.9	22.03	22.04	20.24	0.11	70.00	-49.76
15kHz	1SC0	261268	2019.9	22.25	22.25	20.45	0.11	70.00	-49.55
	1SC6	261268	2019.9	22.40	22.42	20.62	0.12	70.00	-49.38
	1SC11	261268	2019.9	22.24	22.22	20.44	0.11	70.00	-49.56
	3SC0	261268	2019.9	N/A	21.62	19.82	0.10	70.00	-50.18
	3SC6	261268	2019.9	N/A	21.69	19.89	0.10	70.00	-50.11
	3SC9	261268	2019.9	N/A	21.60	19.80	0.10	70.00	-50.20
	6SC0	261268	2019.9	N/A	21.27	19.47	0.09	70.00	-50.53
	6SC6	261268	2019.9	N/A	21.17	19.37	0.09	70.00	-50.63
	12SC0	261268	2019.9	N/A	20.38	18.58	0.07	70.00	-51.42

Table 7-3. Conducted/Radiated Power Result – Band 23/252

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Sample e.i.r.p Calculation:

At 2000.1MHz (NTN n23/252), the average conducted output power was measured to be 22.14 dBm with antenna gain -1.80 dBi.

$$\text{ERP or EIRP}_{[dBm]} = P_{measured\ [dBm]} + G_{T\ [dBd/dBi]};$$

ERP or EIRP = effective radiated power or equivalent isotropically radiated power
$P_{measured}$ = measured transmitter output power
G_T = gain of the transmitting antenna in dBd (ERP) or dBi (EIRP)

22.14 dBm + -1.80 dBi = 20.34 dBm

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7.3 Occupied Bandwidth

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst-case configuration results are reported in this section.

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

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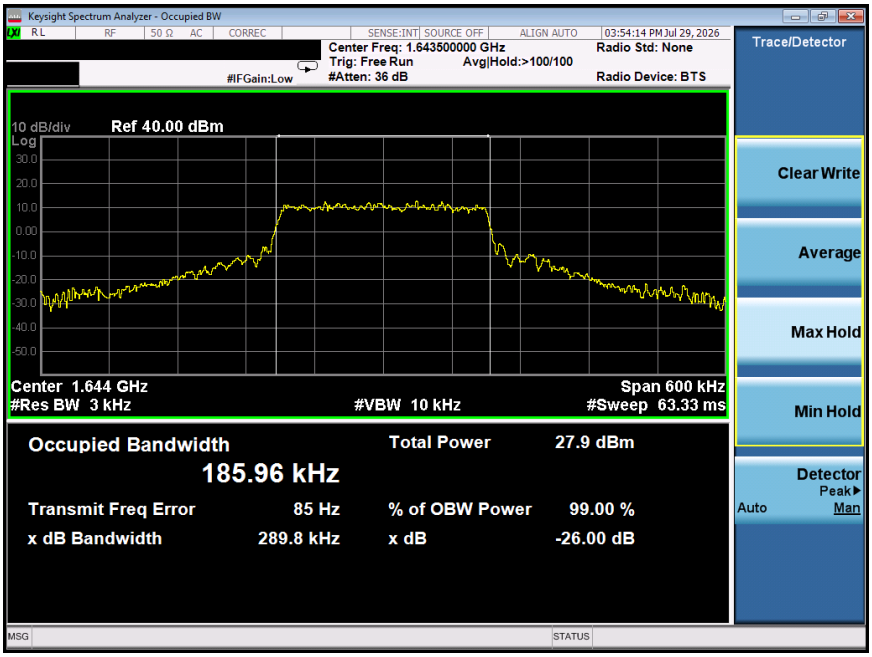
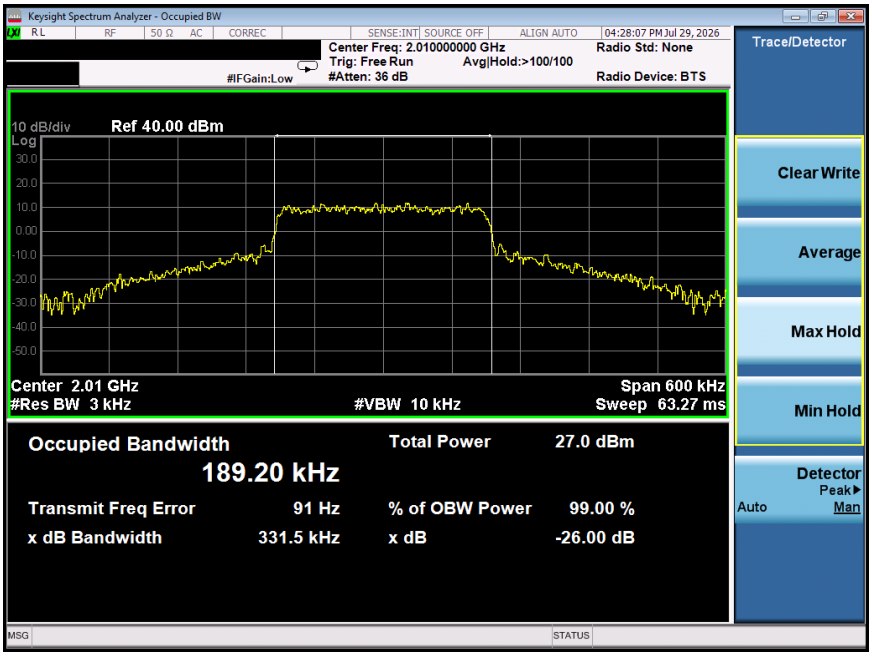
Mode	SCS / SC Size	Modulation	Channel	OBW [kHz]
NTN BAND 255	15kHz/12SC0	QPSK	Mid	185.96
NTN BAND 252(23)	15kHz/12SC0	QPSK	Mid	189.20

Table 7-4. Occupied Bandwidth Results



Plot 7-1. Bandwidth Plot (Band 255, Mid Channel) – QPSK



Plot 7-2. Bandwidth Plot (Band 23/252, Mid Channel) - QPSK

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7.4 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

Test Settings

1. RBW ≥ 100kHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average
7. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

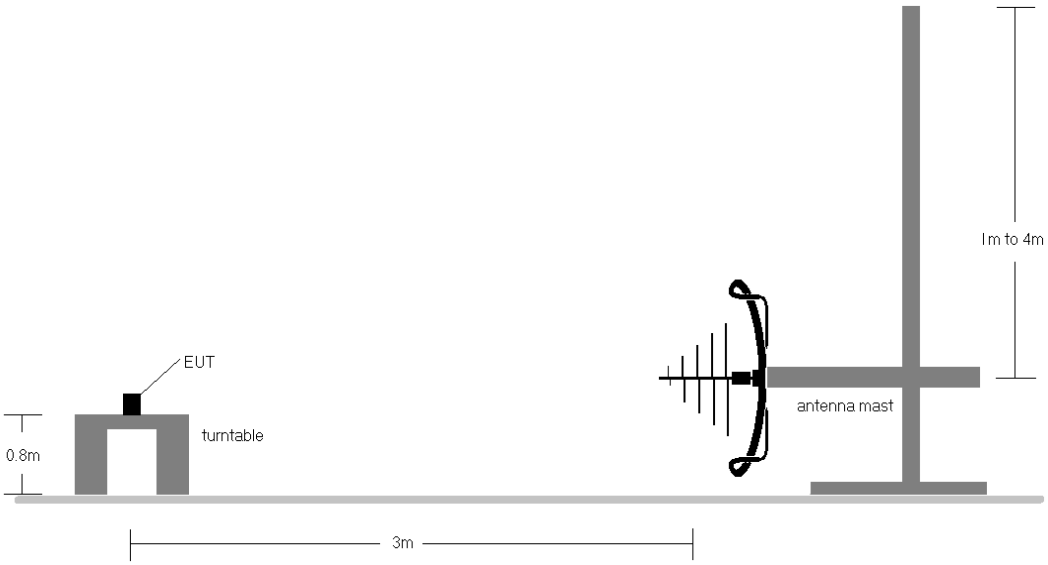

Figure 7-3. Test Instrument & Measurement Setup < 1GHz

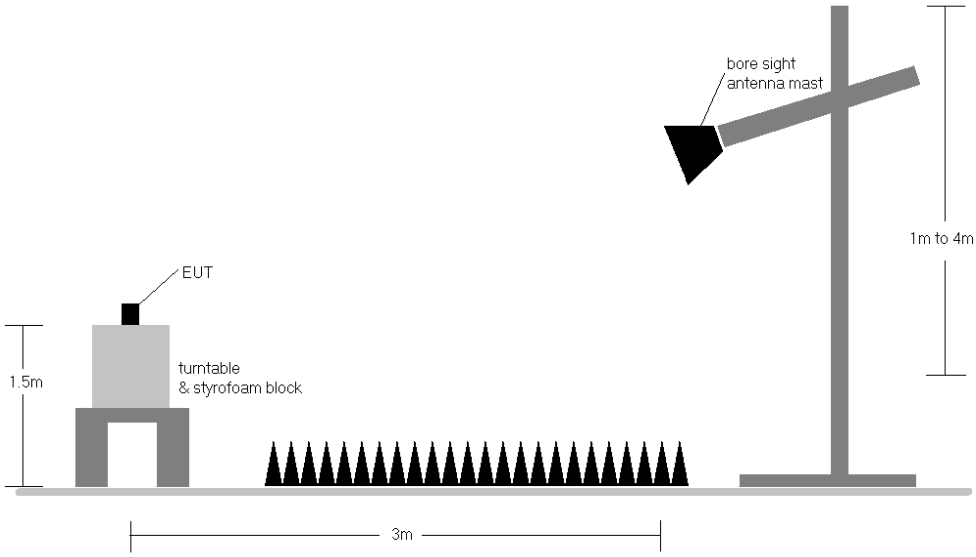

Figure 7-4. Test Instrument & Measurement Setup >1 GHz

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Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBμV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBμV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

3) This unit was tested with its standard battery.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

6) This device supports simultaneous transmission operation, which allows LTE or NTN band and BT or BLE or ANT to operate simultaneously. BLE or ANT case is not considered as worst case since the BLE and ANT power is lower than BT powers

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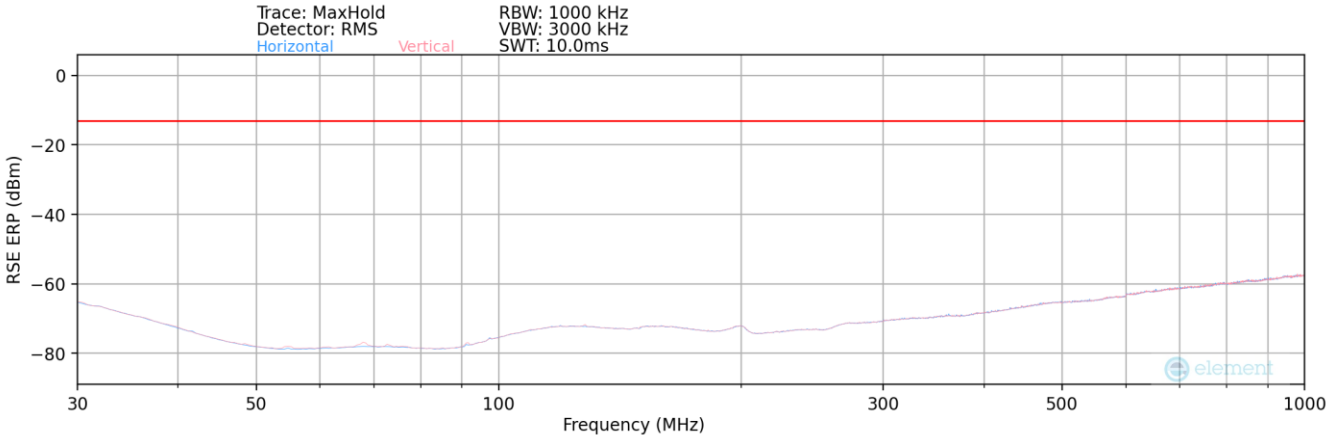
Band 255

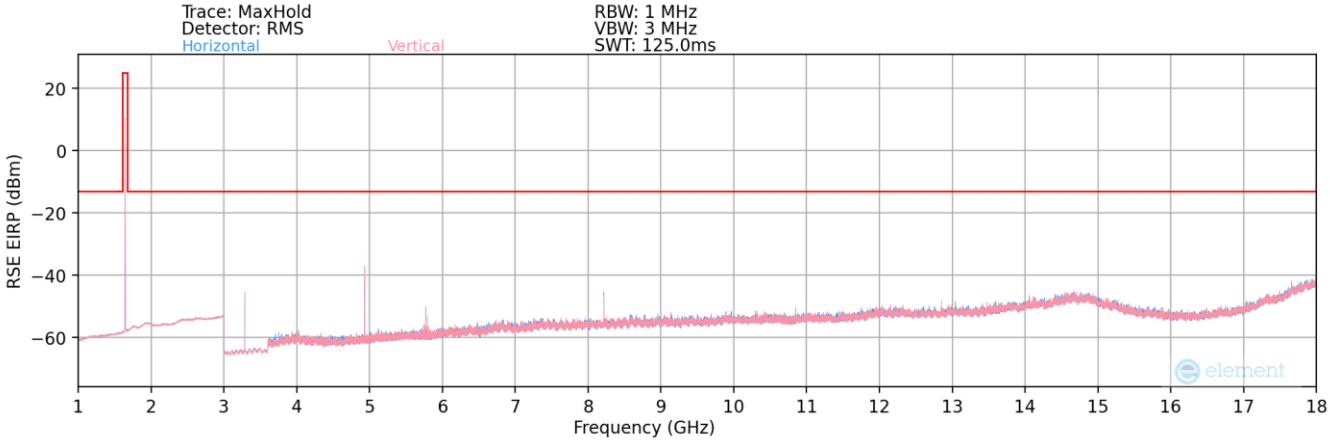


Plot 7-3. Radiated Spurious Plot – Band 255

Frequency (MHz):	1643.5
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
93.96	V	-	-	-97.92	15.61	24.69	-72.72	-13.00	-59.72
152.55	H	-	-	-97.57	19.79	29.22	-68.19	-13.00	-55.19
357.79	H	-	-	-96.90	22.30	32.40	-65.01	-13.00	-52.01

Table 7-5. Radiated Spurious Data – Band 255



Plot 7-4. Radiated Spurious Plot – Band 255

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Frequency (MHz):	1626.6
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3253.20	H	129	65	-55.84	0.81	51.97	-43.29	-13.00	-30.29
4879.80	H	340	123	-51.72	2.89	58.17	-37.09	-13.00	-24.09
6506.40	H	248	310	-78.83	6.47	34.64	-60.61	-13.00	-47.61
8133.00	H	353	89	-68.74	9.20	47.46	-47.80	-13.00	-34.80
9759.60	H	-	-	-81.13	10.72	36.59	-58.67	-13.00	-45.67
11386.20	H	-	-	-82.50	12.09	36.59	-58.67	-13.00	-45.67
13012.80	H	-	-	-82.40	14.76	39.36	-55.89	-13.00	-42.89

Table 7-6. Radiated Spurious Data – Band 255 – Low Channel

Frequency (MHz):	1643.5
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3287.00	H	141	62	-61.59	1.09	46.50	-48.76	-13.00	-35.76
4930.50	H	332	121	-52.58	3.04	57.46	-37.80	-13.00	-24.80
5769.00	H	-	-	-79.55	4.60	32.05	-63.20	-13.00	-50.20
6574.00	H	-	-	-79.65	6.34	33.69	-61.57	-13.00	-48.57
8217.50	H	329	108	-66.99	8.96	48.97	-46.29	-13.00	-33.29
9861.00	H	-	-	-81.52	11.52	37.00	-58.26	-13.00	-45.26
11504.50	H	-	-	-82.63	12.63	37.00	-58.26	-13.00	-45.26
13148.00	H	-	-	-81.70	14.24	39.54	-55.72	-13.00	-42.72

Table 7-7. Radiated Spurious Data – Band 255 – Mid Channel

Frequency (MHz):	1660.4
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3320.80	H	114	60	-64.82	1.08	43.26	-51.99	-13.00	-38.99
4981.20	H	324	124	-52.60	3.09	57.49	-37.77	-13.00	-24.77
6641.60	H	354	278	-77.41	6.40	35.99	-59.26	-13.00	-46.26
8302.00	H	328	168	-67.39	9.29	48.90	-46.36	-13.00	-33.36
9962.40	H	-	-	-81.22	11.17	36.95	-58.30	-13.00	-45.30
11622.80	H	-	-	-82.04	12.52	37.48	-57.78	-13.00	-44.78
13283.20	H	-	-	-82.57	14.68	39.11	-56.14	-13.00	-43.14

Table 7-8. Radiated Spurious Data – Band 255 – High Channel

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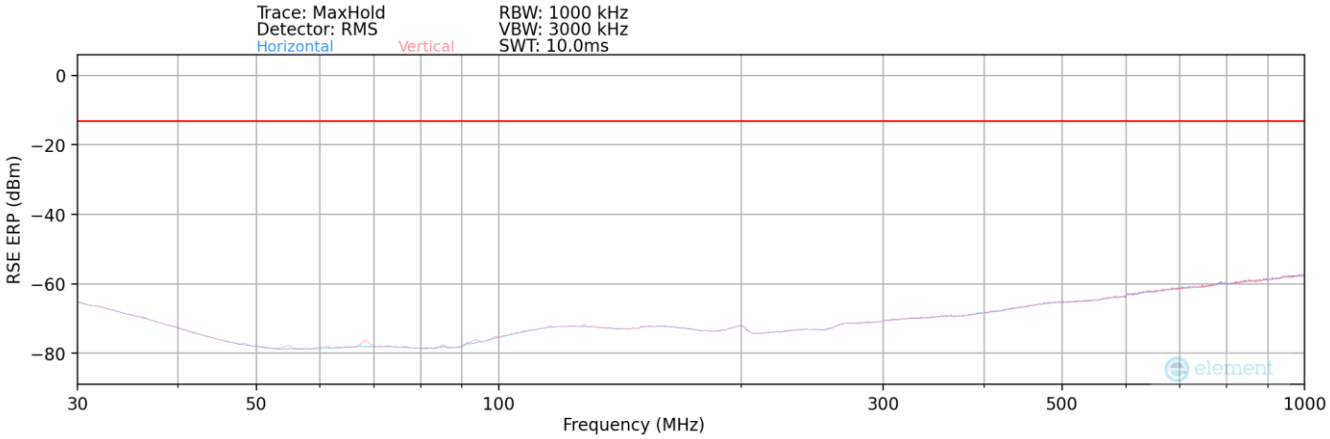
Band 23/252

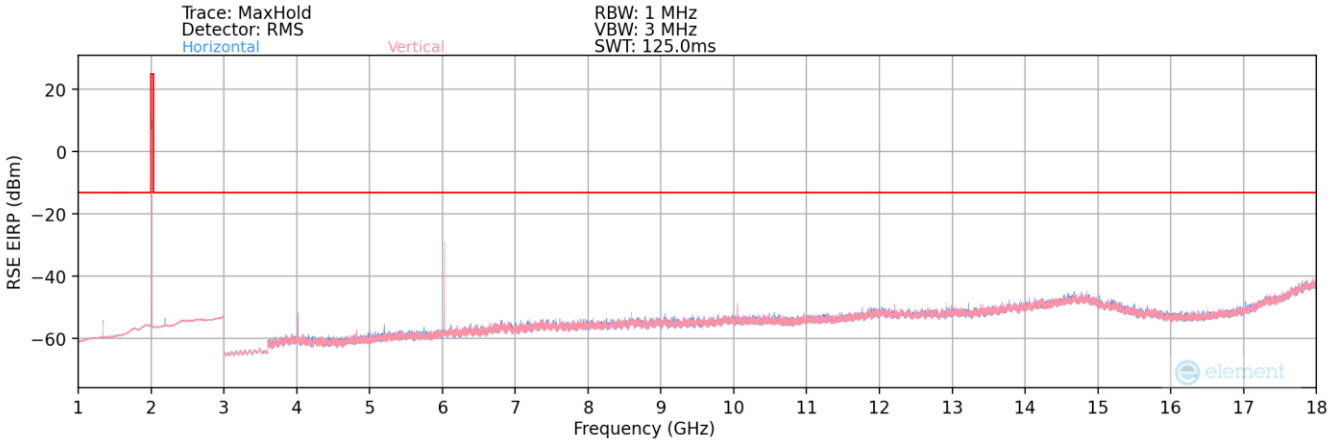


Plot 7-5. Radiated Spurious Plot – Band 23/252

Frequency (MHz):	2010.0
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
48.43	V	-	-	-97.79	15.21	24.42	-72.98	-13.00	-59.98
68.31	V	-	-	-97.74	14.60	23.86	-73.55	-13.00	-60.55
127.38	V	-	-	-97.99	20.44	29.45	-67.96	-13.00	-54.96

Table 7-9. Radiated Spurious Data – Band 23/252



Plot 7-6. Radiated Spurious Plot – Band 23/252

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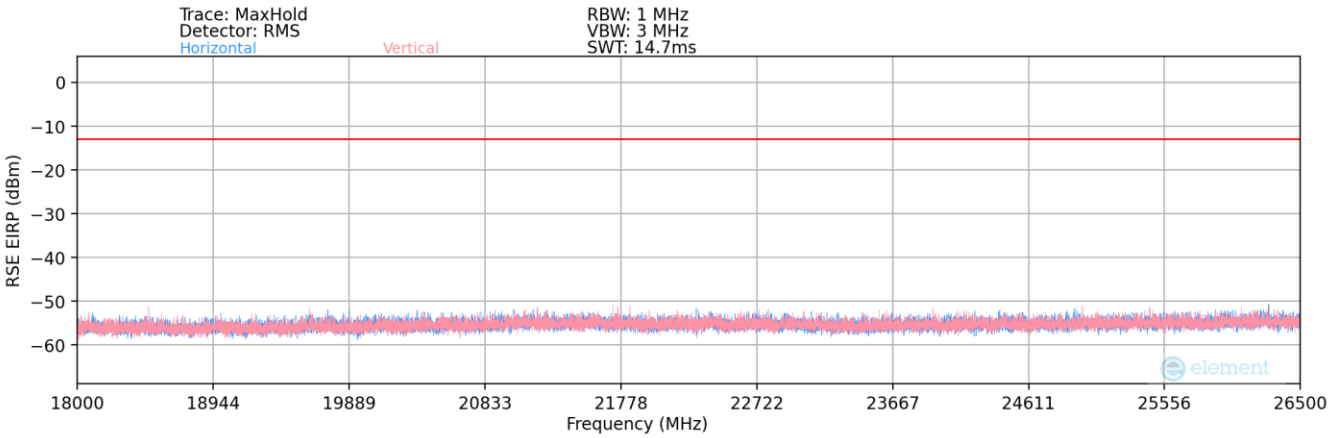

Plot 7-7. Radiated Spurious Plot – Band 23/252

Frequency (MHz):	2000.1
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
4000.20	V	124	83	-65.15	3.01	44.86	-50.40	-13.00	-37.40
6000.30	V	326	307	-45.75	6.00	67.25	-28.01	-13.00	-15.01
8000.40	V	-	-	-78.59	8.96	37.37	-57.88	-13.00	-44.88
10000.50	V	113	223	-71.12	10.81	46.69	-48.57	-13.00	-35.57
12000.60	V	-	-	-80.28	14.10	40.82	-54.44	-13.00	-41.44
14000.70	V	264	162	-76.72	16.30	46.58	-48.68	-13.00	-35.68
16000.80	V	-	-	-80.37	13.32	39.95	-55.31	-13.00	-42.31
18000.90	V	-	-	-61.58	1.30	46.73	-48.53	-13.00	-35.53

Table 7-10. Radiated Spurious Data – Band 23/252 – Low Channel

Frequency (MHz):	2010.0
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
4020.00	V	116	86	-65.87	2.90	44.03	-51.23	-13.00	-38.23
6030.00	V	325	304	-45.08	6.13	68.05	-27.21	-13.00	-14.21
8040.00	V	-	-	-78.29	9.15	37.86	-57.40	-13.00	-44.40
10050.00	V	389	1	-70.13	11.23	48.10	-47.15	-13.00	-34.15
12060.00	V	-	-	-79.83	14.39	41.56	-53.70	-13.00	-40.70
14070.00	V	335	56	-78.92	16.75	44.83	-50.43	-13.00	-37.43
16080.00	V	-	-	-80.22	13.42	40.20	-55.06	-13.00	-42.06
18090.00	V	-	-	-61.61	1.43	46.82	-48.44	-13.00	-35.44

Table 7-11. Radiated Spurious Data – Band 23/252 – Mid Channel

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Frequency (MHz):	2019.9
SC / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
4039.80	V	132	92	-67.77	2.67	41.90	-53.35	-13.00	-40.35
6059.70	V	318	307	-45.64	6.35	67.71	-27.54	-13.00	-14.54
8079.60	V	-	-	-78.10	9.00	37.90	-57.36	-13.00	-44.36
10099.50	V	113	223	-71.34	11.46	47.12	-48.14	-13.00	-35.14
12119.40	V	-	-	-79.97	14.16	41.19	-54.07	-13.00	-41.07
14139.30	V	318	216	-78.86	17.32	45.46	-49.79	-13.00	-36.79
16159.20	V	-	-	-80.25	13.66	40.41	-54.85	-13.00	-41.85
18179.10	V	-	-	-61.59	1.45	46.86	-48.39	-13.00	-35.39

Table 7-12. Radiated Spurious Data – Band 23/252 – High Channel

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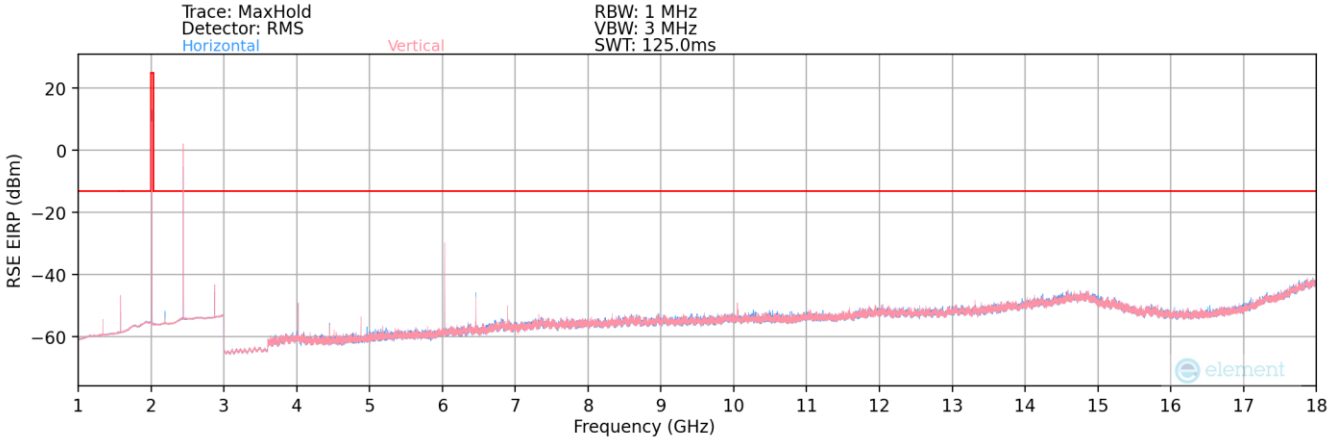
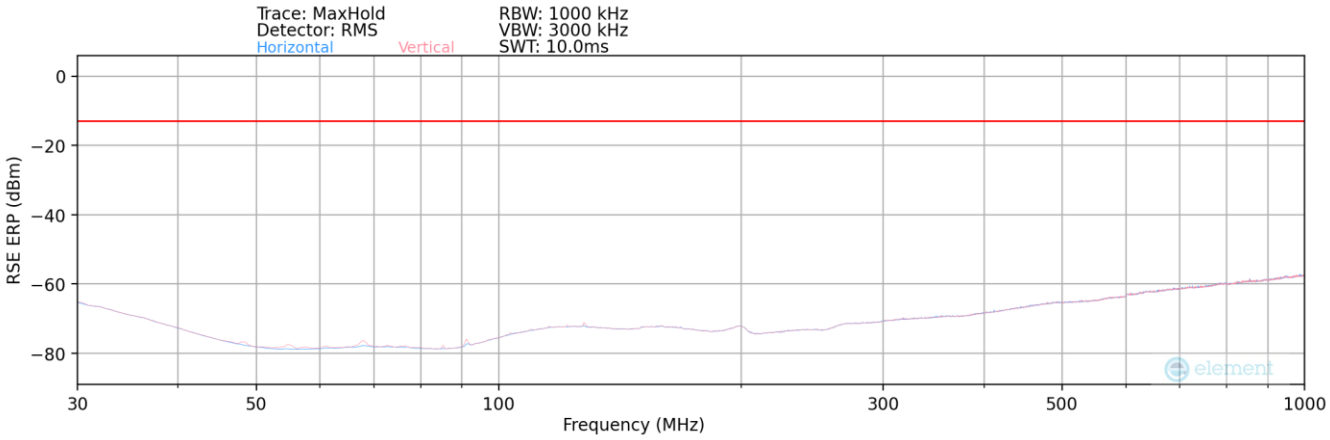
Simultaneous Transmission – NTN n23/252 + Bluetooth



Plot 7-8. Radiated Spurious Plot below 1GHz NTN n23/252 + Bluetooth



Plot 7-9. Radiated Spurious Plot below 1-18GHz NTN n23/252 + Bluetooth

Sim Tx	NTN BAND 23/252 + Bluetooth 1Mbps								
Frequency (MHz):	2010 MHz + 2441 MHz								
Frequency [MHz]	**Ant. Pol. [H/V]**	**Antenna Height [cm]**	**Turntable Azimuth [degree]**	**Analyzer Level [dBm]**	**AFCL [dB/m]**	**Field Strength [dBµV/m]**	**EIRP Spurious Emission Level [dBm]**	**Limit [dBm]**	**Margin [dB]**
70.00	V	-	-	-97.72	14.60	23.88	-71.37	-13.00	-58.37
431.00	V	-	-	-96.75	24.29	34.54	-60.72	-13.00	-47.72
862.00	V	-	-	-94.99	30.77	42.78	-52.48	-13.00	-39.48
1340.00	V	154	58	-65.77	1.99	43.22	-52.04	-13.00	-39.04
1579.00	V	113	41	-59.93	2.65	49.72	-45.54	-13.00	-32.54
2872.00	V	135	123	-60.41	7.85	54.44	-40.82	-13.00	-27.82
4020.00	V	116	81	-63.30	2.90	46.60	-48.66	-13.00	-35.66
4451.00	H	350	74	-70.88	2.14	38.26	-57.00	-13.00	-44.00
4882.00	V	114	321	-69.35	2.88	40.53	-54.73	-13.00	-41.73
6030.00	V	304	276	-50.91	6.13	62.22	-33.04	-13.00	-20.04
6461.00	H	365	270	-62.97	6.78	50.81	-44.45	-13.00	-31.45
6892.00	V	343	89	-69.73	8.22	45.49	-49.77	-13.00	-36.77

Table 7-13. Radiated Measurements NTN n23/252 + Bluetooth

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7.5 Radiated Spurious Emissions Measurements (1559 – 1610MHz)

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Per FCC Part 25.216:

(c) The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed −70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed −80 dBW, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band

(h) Mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies in the 1626.5-1660.5 MHz band shall suppress the power density of emissions in the 1605-1610 MHz band-segment to an extent determined by linear interpolation from −70 dBW/MHz at 1605 MHz to −46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. The e.i.r.p of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from −80 dBW at 1605 MHz to −56 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

Test Settings

1. RBW = 1MHz
2. VBW ≥ 3 x RBW
3. Span = 1559 – 1610MHz
4. No. of sweep points = 1001
5. Detector = RMS
6. Trace mode = Average
7. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

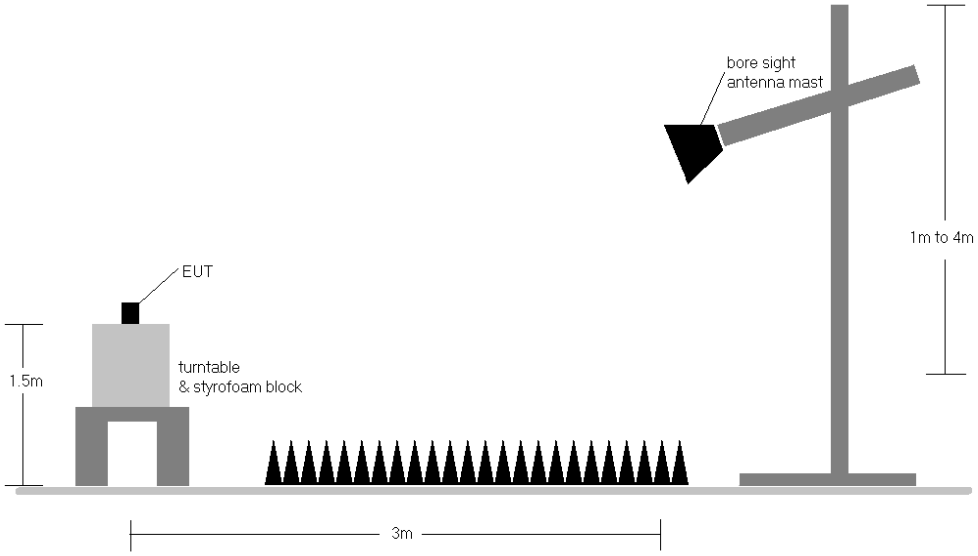

Figure 7-5. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

3) This unit was tested with its standard battery.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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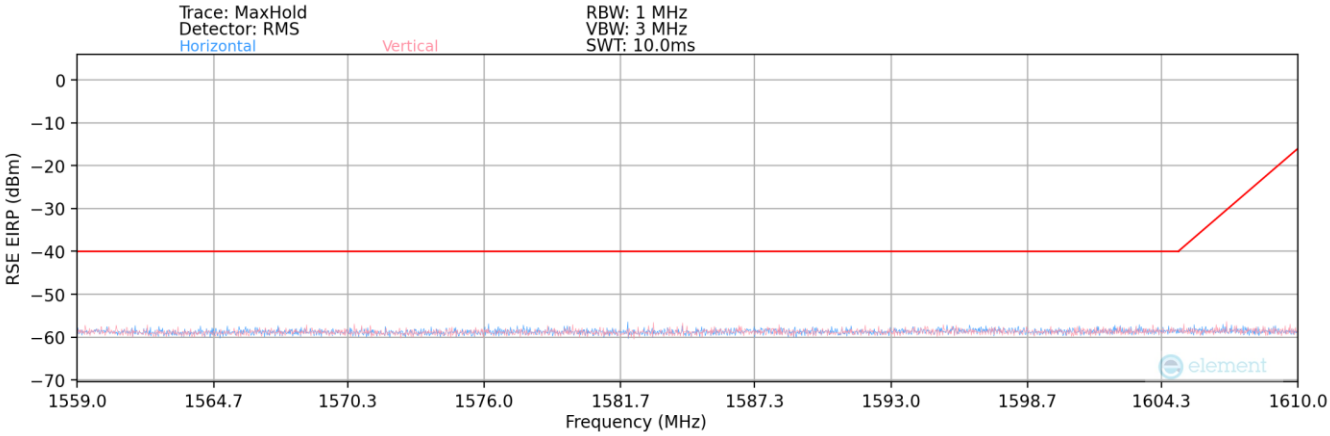
Band 255 (1559 – 1610MHz)



Plot 7-10. Radiated Spurious Plot – Band 255 (1559 – 1610MHz)

Frequency (MHz):	1626.6
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1559.00	H	-	-	-77.40	2.67	32.27	-62.99	-40.00	-22.99
1578.00	H	-	-	-77.27	2.65	32.38	-62.88	-40.00	-22.88
1605.00	H	-	-	-77.10	2.83	32.73	-62.53	-40.00	-22.53

Table 7-14. Radiated Spurious Data – Band 255 – Low Channel

Frequency (MHz):	1643.5
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1559.00	H	-	-	-77.33	2.67	32.34	-62.92	-40.00	-22.92
1579.00	H	-	-	-77.52	2.65	32.13	-63.13	-40.00	-23.13
1605.00	H	-	-	-77.42	2.83	32.41	-62.85	-40.00	-22.85

Table 7-15. Radiated Spurious Data – Band 255 – Mid Channel

Frequency (MHz):	1660.4
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1567.00	H	-	-	-77.41	2.66	32.25	-63.01	-40.00	-23.01
1586.00	H	-	-	-77.42	2.73	32.31	-62.95	-40.00	-22.95
1604.00	H	-	-	-77.18	2.83	32.65	-62.61	-40.00	-22.61

Table 7-16. Radiated Spurious Data – Band 255 – High Channel

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7.6 Carrier-Off State Emissions Measurements (1559 – 1610MHz)

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Per FCC Part 25.216:

(i) The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed −80 dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

Test Settings

1. RBW = 1MHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points = 1001
5. Detector = RMS
6. Trace mode = Average
7. The trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

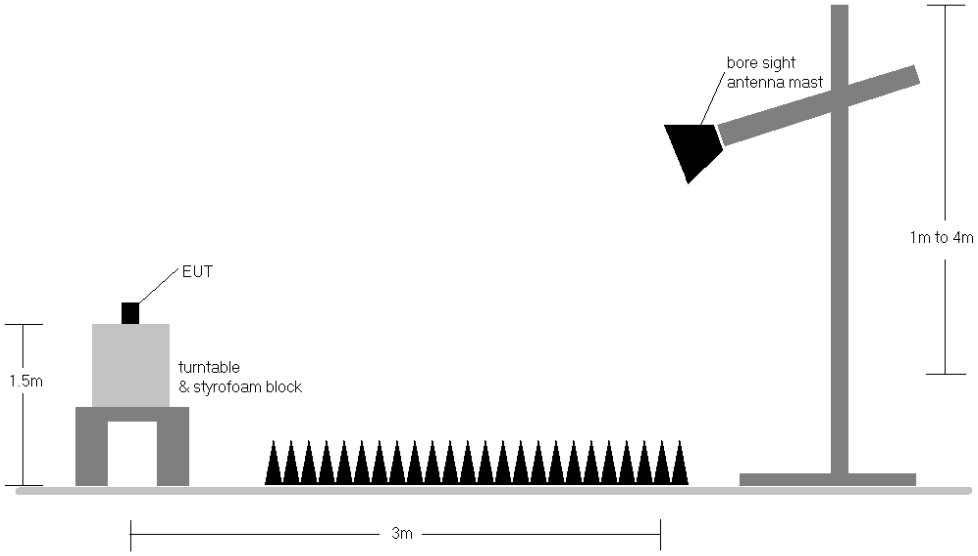

Figure 7-6. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

3) This unit was tested with its standard battery.

4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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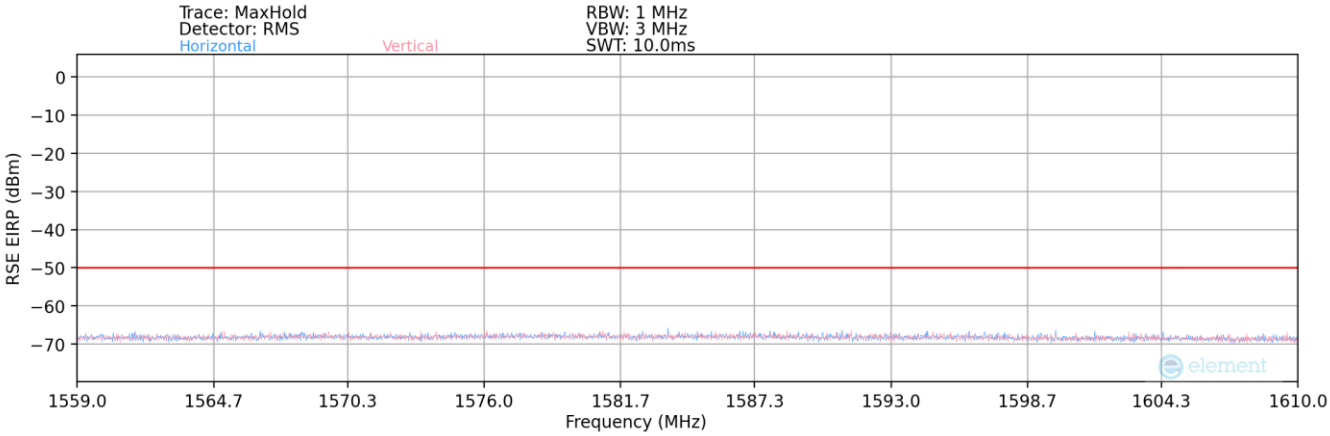
Band 255 (1559 – 1610MHz, Carrier Off)



Plot 7-11. Radiated Spurious Plot – Band 255 (1559 – 1610MHz, Carrier Off)

Frequency (MHz):	1626.6
RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1568.00	H	-	-	-77.35	2.66	32.31	-62.95	-50.00	-12.95
1580.00	H	-	-	-77.13	2.65	32.52	-62.74	-50.00	-12.74
1605.00	H	-	-	-77.62	2.83	32.21	-63.05	-50.00	-13.05

Table 7-17. Radiated Spurious Data – Band 255 – Low Channel, Carrier Off

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Garmin Portable Digital Transceiver FCC ID: IPH-05242** and **IC: 1792A-05242** complies with the requirements of Part 25 of the FCC rules and RSS-170 of the ISED rules for operation in the 1626.5 – 1660.5MHz and 2000.1 - 2019.9MHz band.

- END OF TEST REPORT -

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