

RADIO TEST REPORT

Report ID

REP089537

Project ID

PRJ0076072

Type of assessment:

Modular transmitter integration

Applicant:

Geotab Inc.

Product:

Telematics Device

Model:

GDSAA2

FCC ID:

2AV57GDSAA2

Specifications:

- ◆ FCC 47 CFR Part 22, Subpart H
- ◆ FCC 47 CFR Part 24, Subpart E
- ◆ FCC 47 CFR Part 27, Subpart C

Date of issue: May 2, 2025

Alvin Liu, EMC/RF Specialist

Tested by



Signature

Tarek Elkholy, EMC/RF Engineer

Reviewed by



Signature

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ANAB File Number: AT-3195 (Ottawa); AT-3193 (Pointe-Claire); AT-3194 (Cambridge)

Lab and test locations

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Test site identifier	– CA2040 (Ottawa) – CA2041 (Montreal) – CA0101 (Cambridge)		
Website	www.nemko.com		

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 22, Subpart H	Public Mobile Services
FCC 47 CFR Part 24, Subpart E	Broadband Personal Communications Services (PCS)
FCC 47 CFR Part 27, Subpart C	Miscellaneous wireless communications services

1.2 Test methods

KDB 996369 D04 Module Integration Guide v02	Modular transmitter integration guide guidance for host product manufacturers
ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

1.3 Exclusions

Partial testing was performed on the product with the transmitter operating to confirm that the host product meets the FCC requirements. This investigation of the final product was done by spot checking emissions from the device while operating the host as a composite system. This testing was performed with the host product configured in typical operational modes to check the spurious emissions for compliance with all the applicable rules.

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.3 above. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Date of issue	Details of changes made to test report
REP089537	May 2, 2025	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

There were no modifications performed to the EUT during this assessment.

2.2 Technical judgment

This test report addresses the GDSAA2 end-product which integrates a pre-certified cellular radio module, FCC ID: XMR202106EG91AUX, originally certified by Quectel Wireless Solutions. The module is installed as a component within the GDSAA2 without any physical or firmware modifications that would affect its radio characteristics.

Consequently, the conducted (antenna port) RF measurement results obtained during the module's original certification are considered representative and valid for the module's operation within the GDSAA2 host. These results can be found in the following referenced test reports:

- BTL-FCCP-1-2009H029B (for FCC Part 22), Issued on June 1, 2021
- BTL-FCCP-2-2009H029B (for FCC Part 24), Issued on June 1, 2021
- BTL-FCCP-3-2009H029B (for FCC Part 27), Issued on May 10, 2021

To verify compliance of the final host product, radiated spurious emissions testing was conducted with the cellular module active and transmitting within the GDSAA2. The transmit parameters (frequencies, channel bandwidth, and power levels) used during these tests were configured in accordance with the specifications provided in the module's original certification documentation. Based on the maximum transmit output power and associated antenna gain, the following cellular bands were selected for representative testing:

- 2G (GPRS/EDGE): Band 5
- 3G (WCDMA): Band 2
- LTE (LTE-FDD Cat 1): Band 7

2.3 Model variant declaration

There were no model variants declared by the applicant.

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

3.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 4 Information provided by the applicant

4.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

4.2 Applicant/Manufacture

Applicant name	Geotab Inc.
Applicant address	2440 Winston Park Drive, Oakville, Ontario, Canada, L6H 7V2
Manufacturer name	Geotab Inc.
Manufacturer address	2440 Winston Park Drive, Oakville, Ontario, Canada, L6H 7V2

4.3 EUT information

Product	Telematics Device
Model	GDSAA2
Serial number	GA-6Z3-SJE-CFVK
Power requirements	8 – 32 V _{DC} (typical 12/24 V _{DC} from host vehicle)
Description/theory of operation	Using Geotab's patented tracking algorithm, the GDSAA2 accurately recreates vehicle trips and analyzes incidents. The GDSAA2 also offers in-vehicle alerts to instantly notify drivers of infractions and — with hardware Add-Ons — provides live coaching for a driver's on-road performance. The GDSAA2 does not require a dash-mounted antenna or any wire splicing.

4.4 Transmitter info

Wireless technology	2G, 3G, LTE
Frequency band	LTE (LTE-FDD Cat 1): B1/B2/B3/B4/B5/B7/B8/B28/B66 3G (WCDMA): B1/B2/B5/B8 2G (GPRS/EDGE): B2/B3/B5/B8 (1900/1800/850/900 MHz)
Manufacturer	Quectel
Model	EG91-AUX
Modulation	LTE: QPSK, 16-QAM, 64-QAM; 3G: QPSK, 16-QAM, 64-QAM; 2G: GMSK, 8-PSK
Antenna information	Type: WWAN PIFA antenna, Gain: -2.94 dBi for B28, B8, B5; -2.09 dBi for B3, B4, B66, -1.54 dBi for B2, -1.3 dBi for B1, -1.76 dBi for B7

4.5 EUT setup details

4.5.1 Radio exercise details

Operating conditions	<ul style="list-style-type: none"> – EUT was powered up using DC power supply and fully booted. – EUT connected with a laptop running terminal tool. – EUT was commanded into cellular transmitting mode.
Transmitter state	Transmitter set into max power continuous transmitting mode at selected Band.

4.5.2 EUT setup configuration

Table 4.5-1: EUT interface ports

Description	Qty.
OBDII interface (contained DC Power input)	1
IOX expansion port	1

Table 4.5-2: Support equipment

Description	Brand name	Serial number, Part number, Model, Revision level
Test kit (that allows AT command access EUT and contains a UartUSBv1 PCB, USB cable, AC power adapter)	Geotab	MN: HRN-PASSKIT
Laptop	Dell	MN: Latitude E6420, DPN: VVF52 A01, SN: 28MCCS1

Table 4.5-3: Inter-connection cables

Cable description	From	To	Length (m)
OBDII (DC power input) harness	EUT	Test kit	> 3

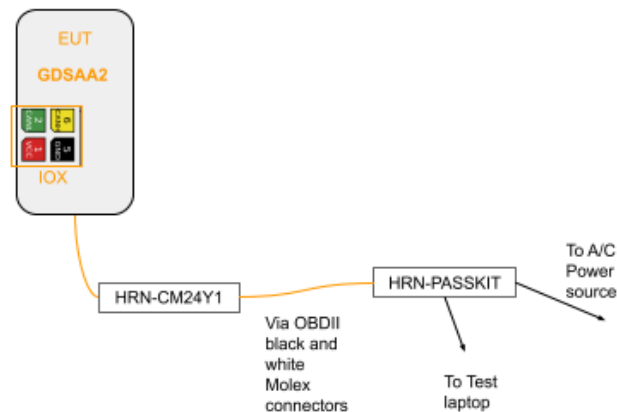


Figure 4.5-1: Block diagram

Section 5 Summary of test results

5.1 Testing period

Test start date	March 22, 2025	Test end date	March 24, 2025
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5.2 Sample information

Receipt date	March 21, 2025	Nemko sample ID number	PRJ00760720003
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5.3 Test results

Table 5.3-1: FCC Test results

Part	Test description	Verdict
§22.917(a)	Emission limitations for cellular equipment	Pass
§24.238(a)	Field strength of spurious radiation	Pass
§27.53	Radiated spurious emissions	Pass

Notes: As per scope of this report, only radiated spurious emissions were evaluated.

Section 6 Test equipment

6.1 Test equipment list

Table 6.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA003012	1 year	March 9, 2026
Flush mount turntable	SUNAR	FM2022	FA003006	—	NCR
Controller	SUNAR	SC110V	FA002976	—	NCR
Antenna mast	SUNAR	TLT2	FA003007	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESR26	FA002969	1 year	May 17, 2025
Bilog antenna (30–2000 MHz)	SUNAR	JB1	FA003009	1 year	April 24, 2025
Horn antenna (1–18 GHz)	ETS Lindgren	3117	FA002911	1 year	May 16, 2025
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002956	1 year	April 2, 2025
High pass filter (1.2–12 GHz)	Microwave circuits	H1G212G1	FA003031	—	NCR
High pass filter (3–18 GHz)	Microwave circuits	H3G020G8	FA003026	—	NCR
50 Ω coax cable	Huber + Suhner	None	FA003047	1 year	July 29, 2025
50 Ω coax cable	Huber + Suhner	None	FA003402	1 year	July 29, 2025
50 Ω SMA coax cable	Huber + Suhner	None	FA003056	1 year	July 29, 2025

Notes: NCR - no calibration required
All equipment related to the contribution of measurement has been included in this list. Such items include, but are not limited to, cables and pre-amps.

Table 6.1-2: Automation software details

Test description	Manufacturer of Software	Details
EMC/Radio test software	Rohde & Schwarz	EMC32, Software for EMC Measurements, Version 10.60.00

Table 6.1-3: Measurement uncertainty calculations based on equipment list

Measurement	Measurement uncertainty, \pm dB
Radiated spurious emissions (30 MHz to 1 GHz)	4.27
Radiated spurious emissions (1 GHz to 6 GHz)	4.74
Radiated spurious emissions (6 GHz to 18 GHz)	5.04

Notes: UKAS Lab 34, TIA-603 and ETSI TR 100 028-1&2 have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Section 7 Testing data

7.1 Radiated spurious (unwanted) emissions

7.1.1 References, definitions and limits

FCC §22.917:

- (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §24.238:

- (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §27.53:

- (h) AWS emission limits
(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.1.2 Test summary

Verdict	Pass		
Test date	March 22-24, 2025	Temperature	24 °C
Tested by	Alvin Liu	Air pressure	975 mbar
Test location	Cambridge	Relative humidity	39–49 %

7.1.3 Observations, settings and special notes

- As part of the current assessment, the test range of 9 kHz to 5th harmonic has been fully considered and compared to the actual frequencies utilized within the EUT. Since the EUT contains a transmitter in the GHz range, the EUT has been deemed compliant without formal testing in the 9 kHz to 30 MHz test range, therefore formal test results (tabular data and/or plots) are not provided within this test report.
- Where tabular data has not been provided, no emissions were observed within 10 dB of the specified limit when measured with the appropriate detector. Additionally, where less than 6 measurements per detector have been provided, fewer than 6 emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- All measurements were performed as per ANSI C63.26.
- All measurements were performed at the distance of 3 m.
- The spectrum was searched from 30 MHz to the 15 GHz.

Spectrum analyser settings

Resolution bandwidth:	Measurements below 1 GHz: 100 kHz Peak or 120 kHz Q-Peak, Measurements above 1 GHz: 1 MHz
Video bandwidth:	Measurements below 1 GHz: 300 kHz, Measurements above 1 GHz: 3 MHz
Detector mode:	Peak or Q-Peak
Trace mode:	Max Hold

Spectrum analyser settings (Average measurements above 1 GHz)

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	RMS
Trace mode:	Average

7.1.4 Test data

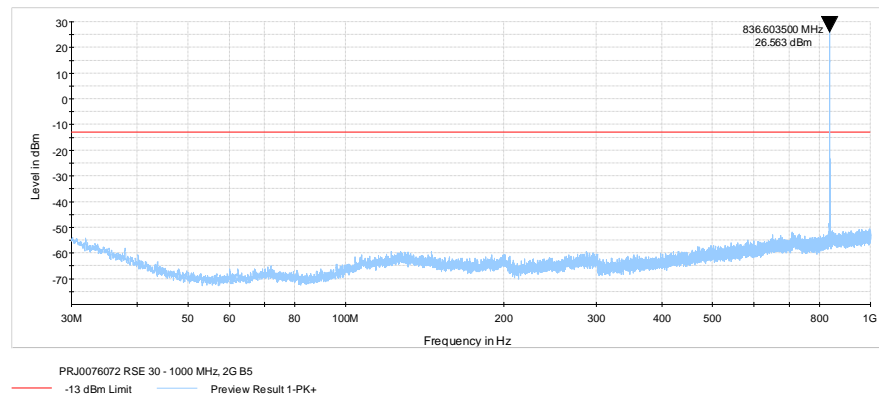


Figure 7.1-1: Radiated spurious emissions 30 – 1000 MHz, 2G Band 5

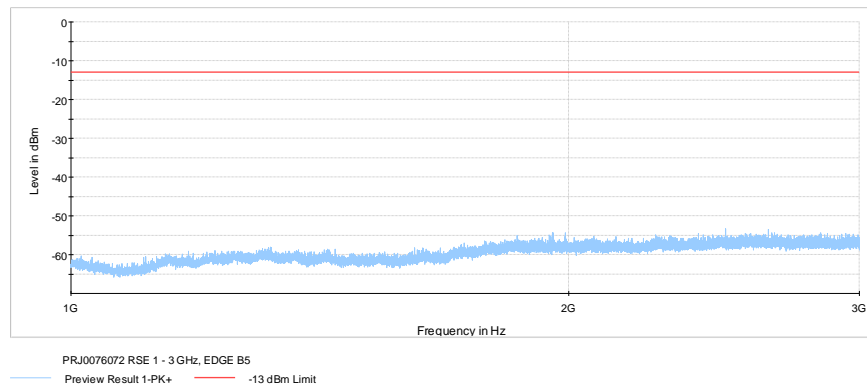


Figure 7.1-2: Radiated spurious emissions 1 – 3 GHz, 2G Band 5

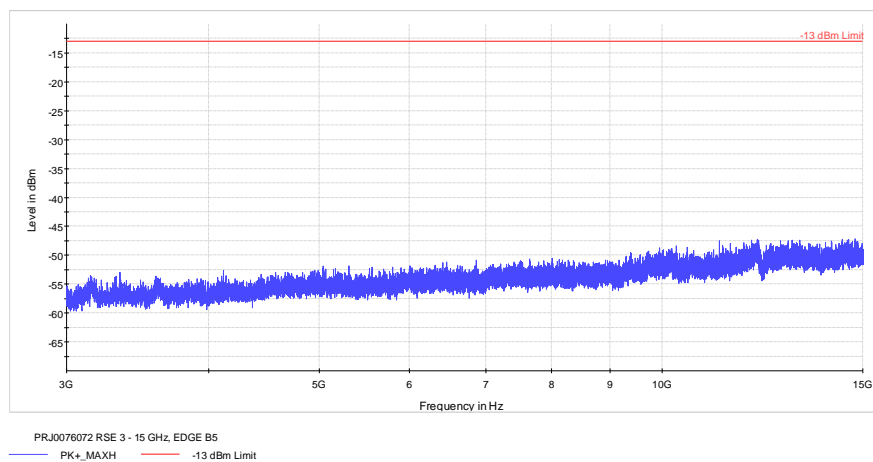


Figure 7.1-3: Radiated spurious emissions 3 – 12.75 GHz, 2G Band 5

Test data, continued

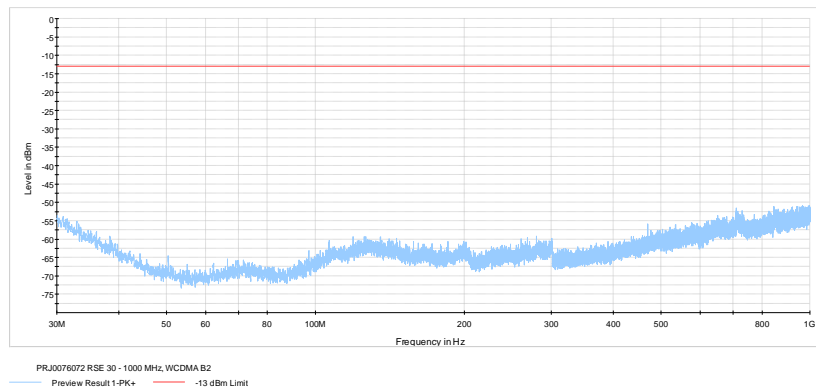


Figure 7.1-4: Radiated spurious emissions 30 – 1000 MHz, 3G Band 2

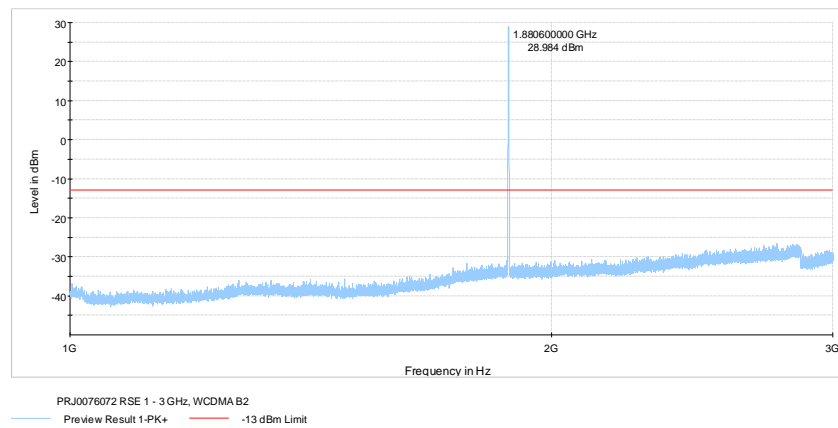


Figure 7.1-5: Radiated spurious emissions 1 – 3 GHz, 3G Band 2

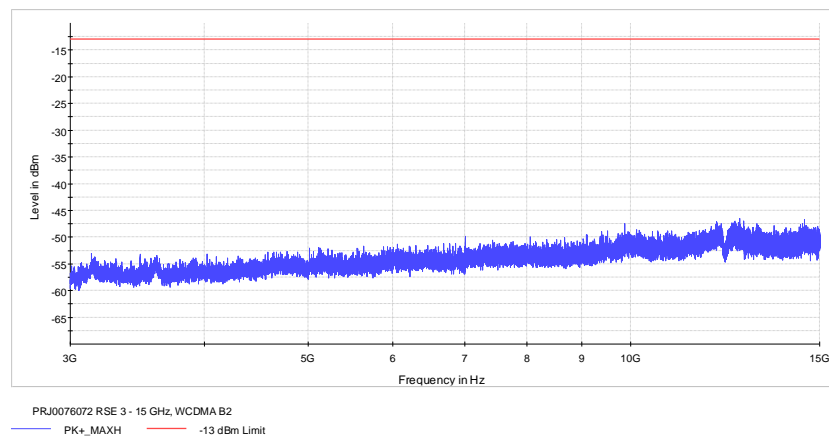


Figure 7.1-6: Radiated spurious emissions 3 – 15 GHz, 3G Band 2

Test data, continued

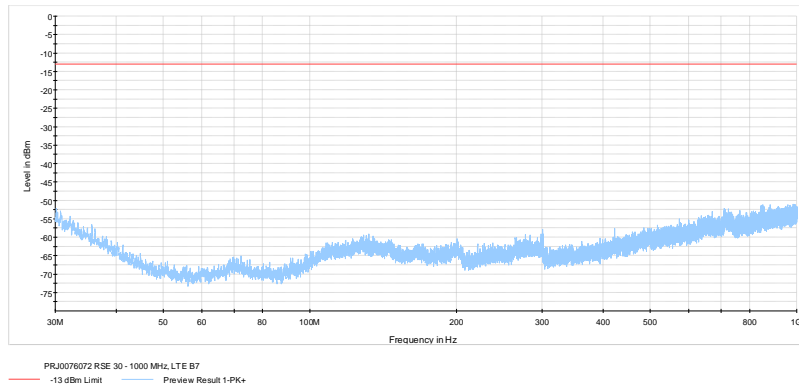


Figure 7.1-7: Radiated spurious emissions 30 – 1000 MHz, LTE Band 7

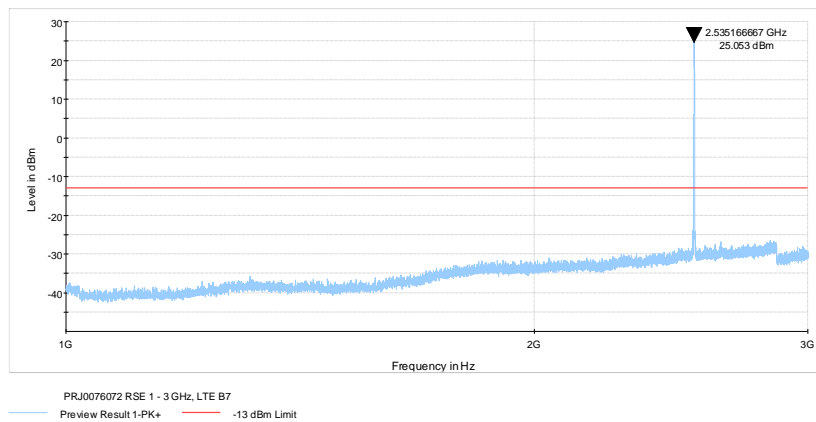


Figure 7.1-8: Radiated spurious emissions 1 – 3 GHz, LTE Band 7

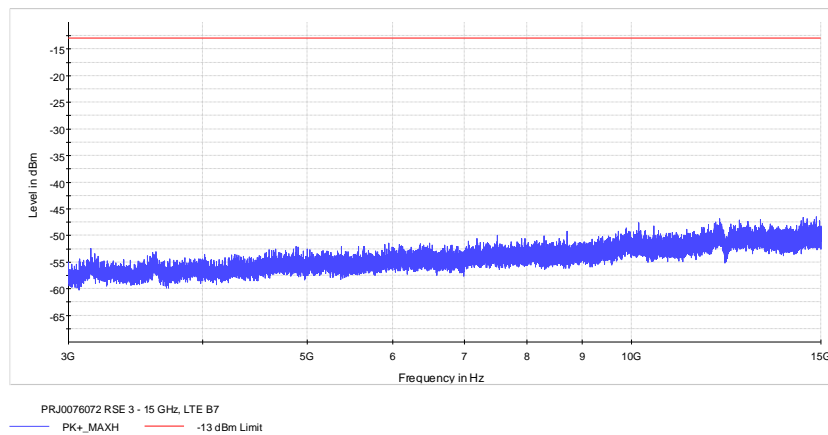


Figure 7.1-9: Radiated spurious emissions 3 – 15 GHz, LTE Band 7

End of the test report