HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

July 13, 2021

Geotab Inc
2440 Winston Park Drive
Oakville ON, L6H7V2, Canada

Dear Moussa Kfouri,

Enclosed is the EMC Wireless test report for compliance testing of the Geotab, Inc., GP9-LTE as tested to the requirements of the FCC Certification rules under Title 47 of the CFR Part 22 Subpart H for Cellular Devices and FCC Part 24 Subpart E for Broadband PCS Devices and Title 47 of the CFR Part 27 Subpart L for Broadband Radio Service (BRS).

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. If you have any questions regarding these results or if we can be of further service to you, please contact me.

Sincerely yours,

Rheine Nguyen

Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: (\Geotab, Inc.\WIRS111663-FCC22_24_27 Rev.1)

ACCREDITED
TESTINGCERT #0591.02

HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

Electromagnetic Compatibility Criteria
Test Report

for the

Geotab, Inc.
GP9-LTE

Tested under
FCC Certification Rules
Title 47 of the CFR,
Part 22 Subpart H for Cellular Devices
Part 24 Subpart E for Broadband PCS Devices
Part 27 Subpart L for Broadband Radio Service (BRS) Devices

Report: WIRS111663-FCC22_24_27 Rev.1

Prepared For:

Geotab, Inc.
2440 Winston Park Drive
Oakville ON, L6H7V2, Canada

Prepared By:
Eurofins Electrical and Electronic Testing NA, Inc.
3162 Belick St., Santa Clara, CA 95054

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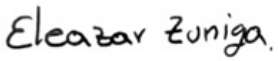
Part 27 Subpart L for Broadband Radio Service (BRS) Devices

Arsalan Hasan
Project Engineer, Electromagnetic Compatibility Lab

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 22 Subpart H and Part 24 Subpart E and Part 27 Subpart L of the FCC Rules under normal use and maintenance.



Eleazar Zuniga,
Director, Wireless Laboratory

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	July 13, 2021	Initial Issue.

Table of Contents

List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**z**
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Geotab, Inc. GP9-LTE, with the requirements of Part 22 Subpart H and Part 24 Subpart E and Part 27 Subpart L. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the GP9-LTE. Geotab, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the GP9-LTE, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22 Subpart H and Part 24 Subpart E and Part 27 Subpart L, in accordance with Geotab, Inc., purchase order number PO20559.

FCC Reference	Description	Compliance
§2.1049; §22.917; §24.232(d);	Occupied Bandwidth	Data valid from original certification FCC ID: 2AV57GP9LTE
§2.1049, §22.355, §24.238;	Frequency stability	Data valid from original certification FCC ID: 2AV57GP9LTE
§22.913(d), §24.323(d); §27.50;	Peak to Average Ratio	Data valid from original certification FCC ID: 2AV57GP9LTE
§2.1051; §22.917, §24.238; §27.53(m)	Conducted Spurious Emissions at Antenna Terminals and Band Edge	Data valid from original certification FCC ID: 2AV57GP9LTE
§2.1046; §22.913(a); §24.232: §27.50(d);	RF Power Output	Compliant
§2.1053; §22.917(a), §24.238;	Radiated Spurious Emissions	Compliant

Executive Summary of EMC ComplianceTesting

Rationale:

Per KDB 178919 D01 “Permissive Change Policy v06”, RF Power Output and Radiated Spurious Emissions should be performed to qualify CIIPC.

Per KDB 996369 D04 “Modular Transmitter Integration Guide – Guidance for Host Product Manufacturers” only spot checks are reported in this filing

II. Equipment Configuration

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by Geotab, Inc. to perform testing on the GP9-LTE, under Geotab, Inc.'s purchase order number PO20559.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Geotab, Inc., GP9-LTE.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	GP9-LTE	
Model(s) Covered:	GP9-LTE	
Filing Status:	CIIPC	
EUT Specifications:	Primary Power: 12/24VDC	
	FCC ID: 2AV57GP9LTE	
	Module Original Report Number(s): FG622601A (WCDMA) FG622601B (LTE)	
	Type of Modulations:	QPS`K, 16QAM
	Equipment Code:	PCB
	Technology	TX Frequency Range
	WCDMA Band II	1852.4 – 1907.6 MHz
	WCDMA Band V	826.4 – 846.6 MHz
	LTE Band 2	1850 – 1910 MHz
	LTE Band 4	1710 – 1755 MHz
	LTE Band 5	824 – 849 MHz
	LTE Band 12	699 – 716 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Arsalan Hasan	
Date(s):	July 13, 2021	

EUT Summary Table

B. References

CFR 47, Part 22, Subpart H	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 22: Rules and Regulations for Cellular Devices.
CFR 47, Part 24, Subpart E	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 24: Rules and Regulations for Personal Communications Services
CFR 47, Part 27	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 27: Rules and Regulations for Advanced Wireless Services
ANSI C63.4:20014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.26: 2015	Compliance Testing of Transmitters Used in Licensed Radio Services
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
EIA/TIA-603-D-2010	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards
KDB 971168 v02r02	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

C. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 3162 Belick St., Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology. Radiated Emissions measurements were performed in a 5 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins Electrical and Electronic Testing NA, Inc.

Eurofins MET Laboratories Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Uncertainty Calculations Summary

E. Description of Test Sample

Name of EUT/Model:	GP9-LTE
Description of EUT and its intended use:	GO9 Telematics device with on-board Wi-Fi hotspot functionality.
Selected Operation Mode(s):	The EUT cellular radio is paired with a call box CMW500 to exercise the radio.
Rationale for the selection of the Operation Mode(s):	The cellular radio requires a base station to establish a radio connection.
Monitoring Method(s):	The display screen on the CMW500 shows the radio connection with info like frequency band, modulation, power etc.
Emissions Class Declaration:	Class B
Configuration(s):	The EUT was connected to an engineering test harnesses for test setup. These harnesses allow Powering the device on a bench setup and AT commands access.
EUT Power Requirement	
Voltage:	12 VDC (Vehicle battery powered)
AC or DC:	DC
Voltage Frequency:	NA
Number of Phases:	NA
Current:	0.5 A
Physical Description	
EUT Arrangement:	Table Top
System with Multiple Chassis?	False
Size (HxWxD - inches):	77.3 x 53 x 27.5 mm
Weight (lbs):	0.21 lbs
Highest Internal Frequency (MHz):	38 MHz
Other Info	
EUT Software (internal to EUT):	123.30.43
Support Software (used by support PC to exercise EUT):	TeraTrem + AT Commands
Firmware:	Rev B
Transmitter Parameters	
Description of your unit:	Cellular + WiFi
Modulation Type:	QPSK, 16QAM, OFDM
Number of Channels:	NA
Frequency range (MHz):	Cellular: 1850 – 1910 MHz 1710 – 1755 MHz 824.7 – 848.3 MHz 699 – 716 MHz WiFi 2412 – 2462 MHz
Antenna Type:	Internal, 3D printed
Antenna Gain (dBi):	Cellular 1850 – 1910 MHz : 3.90 dBi

	1710 – 1755 MHz : 2.10 dBi 824.7 – 848.3 MHz : -0.27 dBi 699 – 716 MHz : -0.89 dBi WiFi 2412 – 2462 MHz : 4.20 dBi
PMN:	GP9-LTE
HVIN:	GP9-LTE
FVIN:	N/A
HMN:	N/A
Data Rates:	LTE Cat4
Number of Antenna:	2
Number of Intentional Transmitters:	2
Number of Certified Intentional Transmitter Modules:	1 of FCC ID: NKRM18Q2

EUT List

Ref. ID	Slot #	Name/Description	Model Number	Part Number	Serial Number	Rev. #
NA	NA	GO9+	GP9-LTE	NA	G9-PB3-8ZR-4S42	NA
NA	NA	GO9+	GP9-LTE	NA	G9-1Z0-PZD-8MWT	NA
NA	NA	GO9+	GP9-LTE	NA	G9-W7D-WXB-J62A	NA
NA	NA	GO9+	GP9-LTE	NA	G9-U51-ZB2-244P	NA

Ports and Cabling

Ref. Id	Port Name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
NA	OBDII	Harness cable	1	NA	NA	No	NA

Support Equipment

Ref. ID	Name/Description	Manufacturer	Model Number	Customer Supplied Calibration Data
NA	NA	NA	NA	NA

F. Modifications

a) Modifications to EUT
No modifications were made to the EUT.

b) Modifications to Test Standard
No modifications were made to the test standard.

G. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Geotab, Inc. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria for Intentional Radiators

Output Power

Test Requirements:

§22.913(a)(2): Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

§24.232 (c): Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

§27.50 (b)(10): Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

§27.50 (b)(10): Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

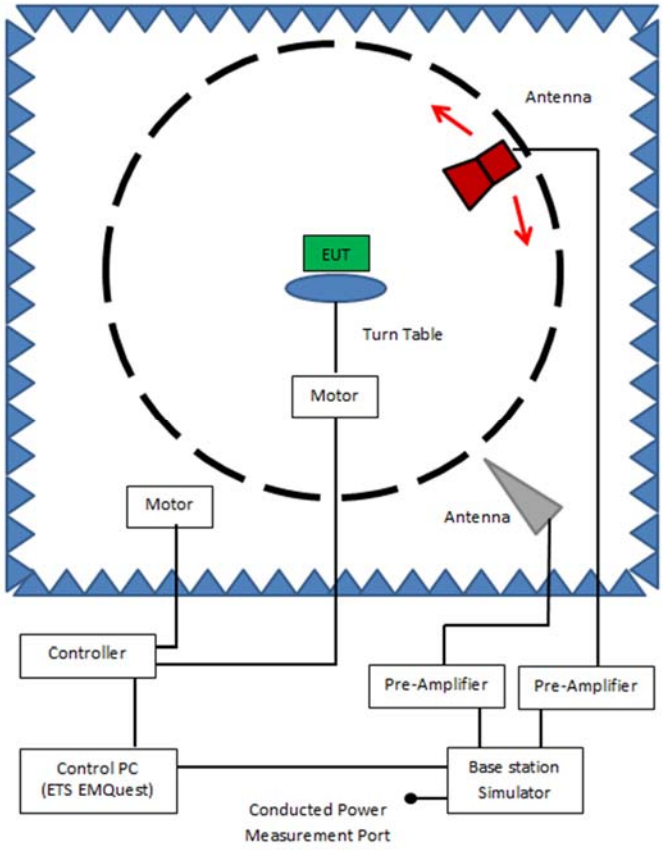
§27.50 (d)(4): Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

Test Procedures: The EUT was tested according to the procedures of CTIA Test Plan for Over-The-Air performance Version 3.9.2 and ANSI C63.26 (2015) 5.5.3.

Test Results: The EUT was found compliant with the requirements of this section.

Test Engineer(s): Arsalan Hasan

Test Date(s): 06/28/2021; 07/13/2021



OTA Chamber EIRP Measurement Test Setup, Block Diagram

Conducted Power Measurement Test Results

WCDMA Band II

Frequency (MHz)	Measured EIRP (dBm)	Limit (dBm)	Result
1880.0	26.68	33.00	Pass

WCDMA Band V

Frequency (MHz)	Measured EIRP (dBm)	Calculated ERP (dBm)	Limit (dBm)	Result
836.5	20.39	18.24	38.45	Pass

LTE Band 2

Frequency (MHz)	Measured EIRP (dBm)	Limit (dBm)	Result
1880.0	26.00	33.00	Pass

LTE Band 4

Frequency (MHz)	Measured EIRP (dBm)	Limit (dBm)	Result
1732.5	22.50	30.00	Pass

LTE Band 5

Frequency (MHz)	Measured EIRP (dBm)	Calculated ERP (dBm)	Limit (dBm)	Result
836.5	20.70	18.55	38.45	Pass

LTE Band 12

Frequency (MHz)	Measured EIRP (dBm)	Calculated ERP (dBm)	Limit (dBm)	Result
707.5	21.80	19.65	34.77	Pass

Note:

ERP = EIRP – 2.15

Electromagnetic Compatibility Criteria for Intentional Radiators

Radiated Spurious Emissions

Test Requirement(s): **§ 2.1053 Measurements required: Field strength of spurious radiation.**

§ 2.1053 (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

§ 2.1053 (b): The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

§ 22.917 Emission limitations Cellular equipment: The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

§ 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).

§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.

§ 27.53(h): 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.

§ 27.53(g): For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

§ 27.53(f): For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Test Procedures:

The EUT was tested according to the average power integration procedures of ANSI C63.26 (2015) 5.5.3.

Radiated measurements shall be performed using the test arrangement shown in Figure. After a direct field strength measurement of the maximum emission amplitude level (maximized as described previously), a signal generator and transmit antenna are substituted in place of the EUT, as shown in Figure 7. The output power of the signal generator is adjusted to replicate the maximized signal amplitude measured in the direct field strength measurement. The signal generator power setting is then used to determine the ERP or EIRP of the EUT spurious emission(s). These measurements shall be performed in accordance with the common requirements specified in 5.5.2 and the specific requirements provided in this subclause.

A step-by-step procedure is as follows.

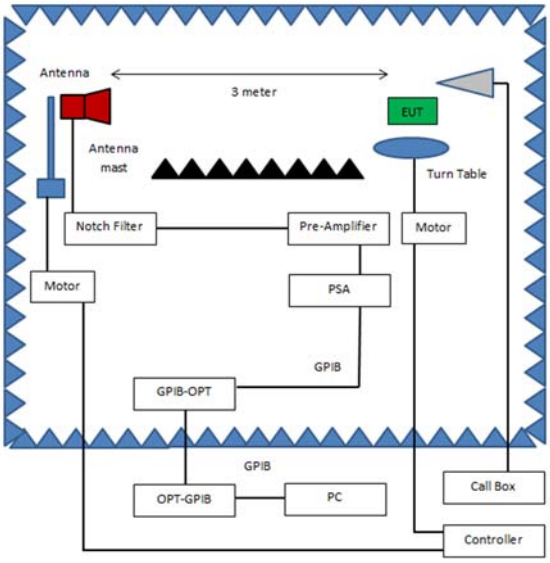
a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:

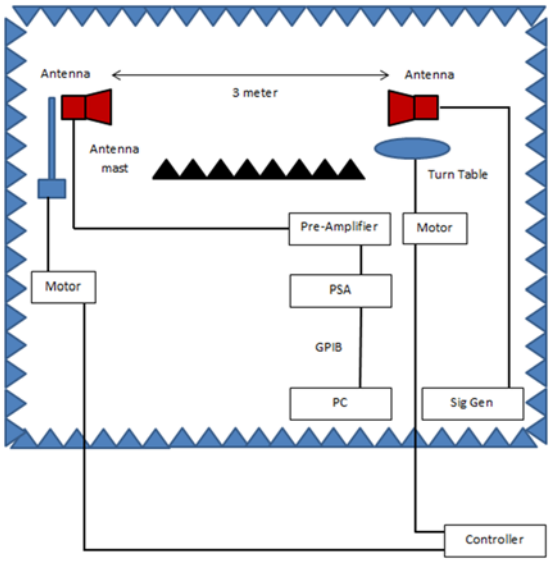
1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
3) Return the turntable to the azimuth where the highest emission amplitude level was observed.
4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

d) Set-up the substitution measurement with the reference point of the substitution a antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.



Radiated Spurious Emissions, Block Diagram, Test Setup



Radiated Spurious Emissions, Block Diagram, Test Setup

e) Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.

f) Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.

g) For each emission that was detected and measured in the initial test [i.e., in step b) and step c)]:

1) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
2) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step b) and step c).
3) Record the output power level of the signal generator when equivalence is achieved in step 2).

h) Repeat step e) through step g) with the measurement antenna oriented in the opposite polarization.

i) Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

Pe = Ps(dBm) - cable loss (dB) + antenna gain (dBd)

where
Pe = equivalent emission power in dBm
Ps = source (signal generator) power in dBm

NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

j) Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from: gain (dBd) = gain (dBi) - 2.15 dB. If necessary, the antenna gain can be calculated from calibrated antenna factor information

Test Results: The EUT was found compliant with the requirements of this section.

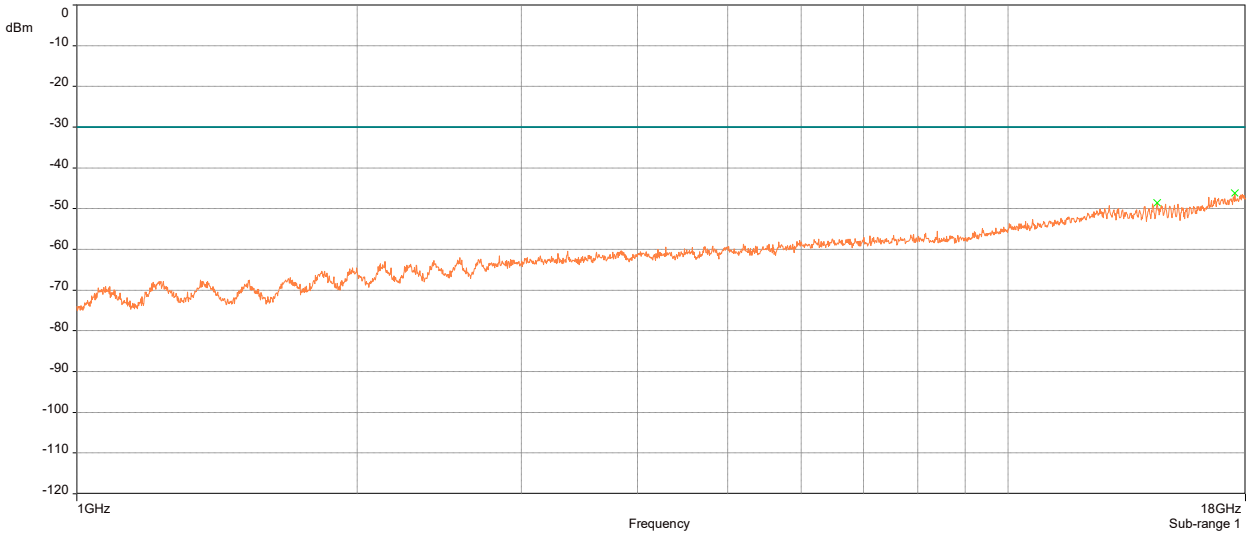
Measurements were made in each configuration. Data is presented for the worse case configuration.

Test Engineer: Arsalan Hasan

Test Date(s): 06/24/2021; 07/08/2021

Radiated Spurious Emissions

WCDMA Band II

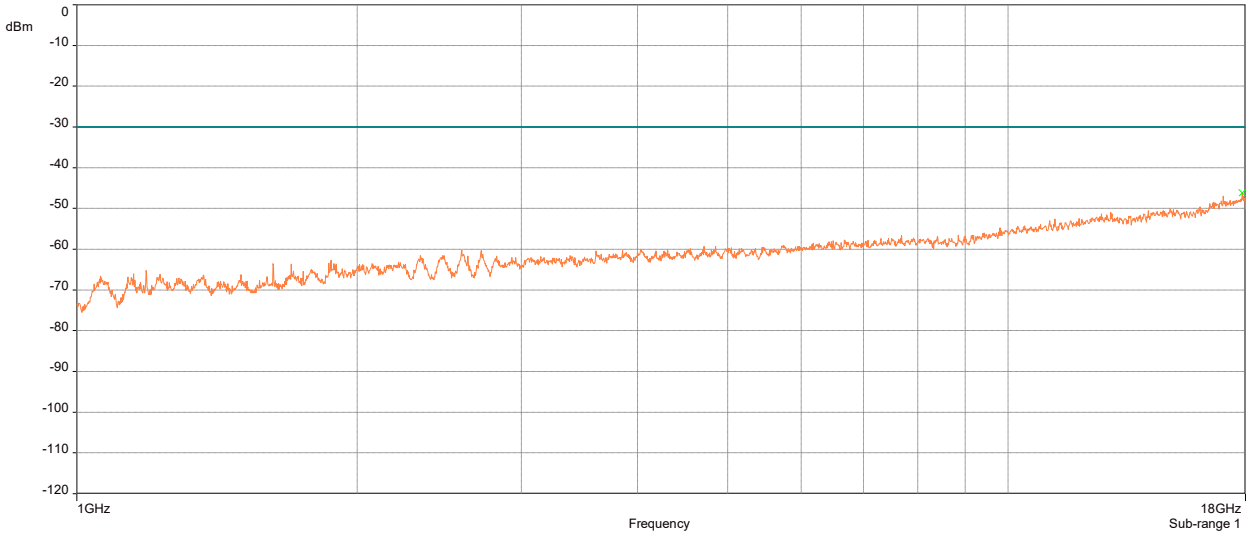


WCDMA Band II

1880.0	SG	SL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
3760.0	-61.30	37.440	8.222	29.218	Vertical	-32.082	-13	19.082	-62.798
5640.0	-59.20	33.480	10.555	22.925	Vertical	-36.275	-13	23.275	-61.848
7520.0	-56.80	32.080	12.099	19.981	Vertical	-36.819	-13	23.819	-58.213
9400.0	-54.00	29.400	13.455	15.945	Vertical	-38.055	-13	25.055	-57.820
11280.0	-47.20	28.730	13.254	15.476	Vertical	-31.724	-13	18.724	-54.420
13160.0	-41.70	29.180	13.299	15.881	Vertical	-25.819	-13	12.819	-51.719
15040.0	-41.20	27.150	13.915	13.235	Vertical	-27.965	-13	14.965	-53.660
16920.0	-40.10	27.000	12.566	14.434	Vertical	-25.666	-13	12.666	-50.224
18800.0	x	x	x	x	x	x	x	x	x

Radiated Spurious Emissions, Harmonics using substitution method

WCDMA Band V

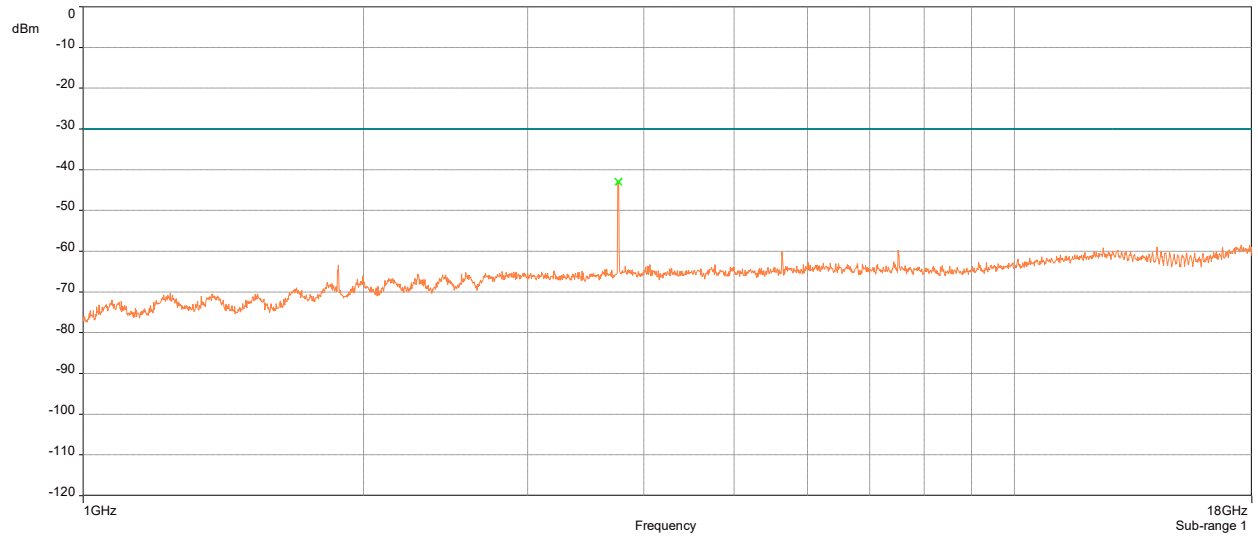


WCDMA Band V

836.6	SG	SL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
1673.2	-69.60	37.130	5.692	31.438	Vertical	-38.162	-13	25.162	-68.591
2509.8	-63.30	37.990	5.673	32.317	Vertical	-30.983	-13	17.983	-65.683
3346.4	-63.20	35.110	7.787	27.323	Vertical	-35.877	-13	22.877	-64.186
4183.0	-60.70	35.860	9.330	26.530	Vertical	-34.170	-13	21.170	-63.189
5019.6	57.20	34.000	9.894	24.106	Vertical	81.306	-13	-94.306	-61.493
5856.2	-56.00	32.550	10.688	21.862	Vertical	-34.138	-13	21.138	-60.536
6692.8	-55.90	32.200	11.043	21.157	Vertical	-34.743	-13	21.743	-58.231
7529.4	-57.80	31.760	12.099	19.661	Vertical	-38.139	-13	25.139	-59.395
8366.0	-57.20	30.800	12.820	17.980	Vertical	-39.220	-13	26.220	-59.796

Radiated Spurious Emissions, Harmonics using substitution method

LTE Band 2

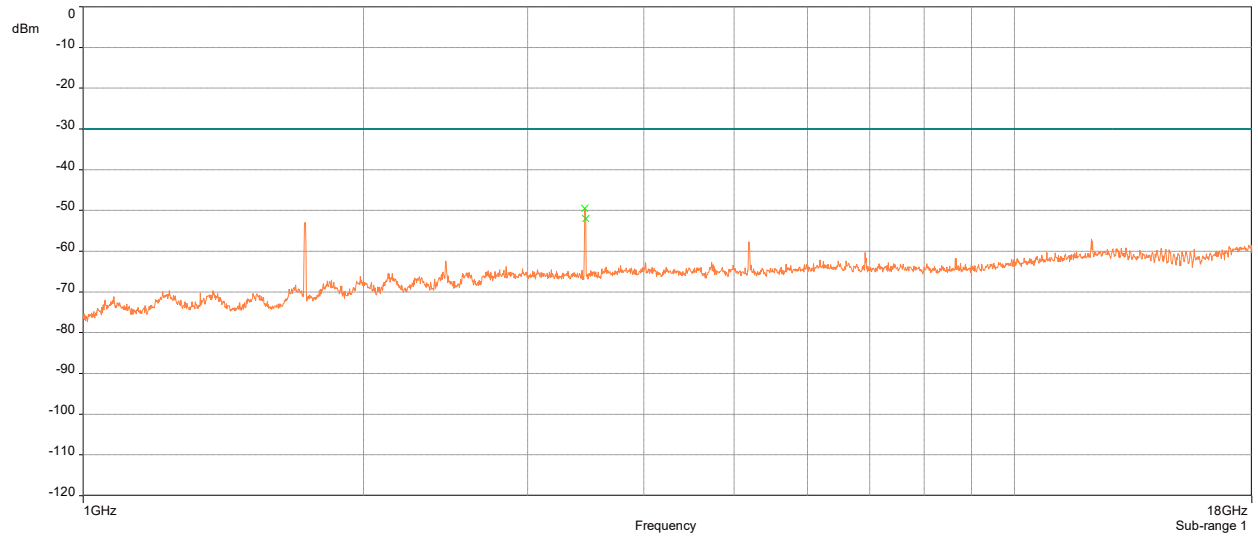


LTE Band 2

1880.0	SG	SL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
3760.0	-45.00	36.960	8.222	28.738	Vertical	-16.26	-13	3.262	-43.516
5640.0	-58.50	32.040	10.555	21.485	Vertical	-37.02	-13	24.015	-63.653
7520.0	-58.50	31.890	12.099	19.791	Vertical	-38.71	-13	25.709	-60.936
9400.0	-61.50	28.640	13.455	15.185	Vertical	-46.32	-13	33.315	-65.754
11280.0	-56.50	26.680	13.254	13.426	Vertical	-43.07	-13	30.074	-63.836
13160.0	-53.50	25.880	13.299	12.581	Vertical	-40.92	-13	27.919	-61.957
15040.0	-52.00	24.050	13.915	10.135	Vertical	-41.87	-13	28.865	-63.456
16920.0	-47.50	23.580	12.566	11.014	Vertical	-36.49	-13	23.486	-61.662
18800.0	x	x	x	x	x	x	x	x	x

Radiated Spurious Emissions, Harmonics using substitution method

LTE Band 4

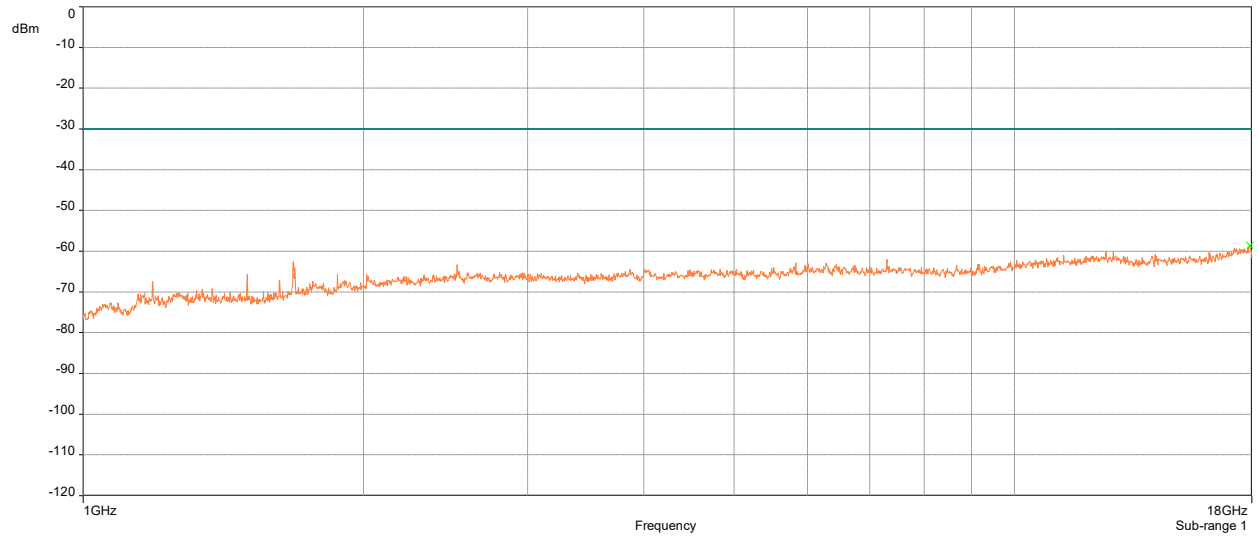


LTE Band 4

1732.5	SG	CL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
3465.0	-52.50	36.830	8.544	28.286	Vertical	-24.21	-13	11.214	-52.245
5197.5	-55.50	32.880	10.253	22.627	Vertical	-32.87	-13	19.873	-60.157
6930.0	-60.00	31.040	11.451	19.589	Vertical	-40.41	-13	27.411	-63.136
8662.5	-59.50	30.250	13.046	17.204	Vertical	-42.30	-13	29.296	-76.540
10395.0	-56.50	27.460	13.081	14.379	Vertical	-42.12	-13	29.121	-62.698
12127.5	-50.50	27.430	13.063	14.367	Vertical	-36.13	-13	23.133	-57.468
13860.0	-55.00	23.890	14.385	9.505	Vertical	-45.50	-13	32.495	-64.133
15592.5	-50.00	23.770	13.470	10.300	Vertical	-39.70	-13	26.700	-62.907
17325.0	-43.00	23.680	13.143	10.537	Vertical	-32.46	-13	19.463	-60.857

Radiated Spurious Emissions, Harmonics using substitution method

LTE Band 5

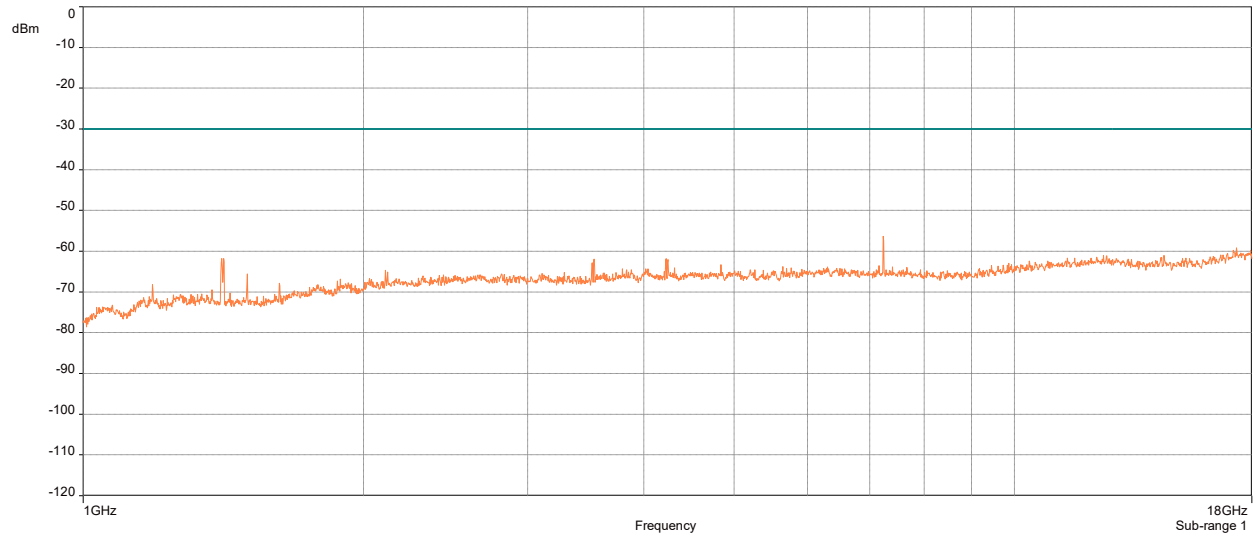


LTE Band 5

836.5	SG	SL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
1673.0	-65.00	37.820	5.692	32.128	Vertical	-32.87	-13	19.872	-70.897
2509.5	-65.00	38.580	5.673	32.907	Vertical	-32.09	-13	19.093	-67.615
3346.0	-65.00	38.420	7.787	30.633	Vertical	-34.37	-13	21.367	-67.141
4182.5	-64.00	35.980	9.330	26.650	Vertical	-37.35	-13	24.350	-66.649
5019.0	-61.50	33.950	9.894	24.056	Vertical	-37.44	-13	24.444	-64.937
5855.5	-61.50	32.250	10.688	21.562	Vertical	-39.94	-13	26.938	-66.338
6692.0	-62.00	32.080	11.043	21.037	Vertical	-40.96	-13	27.963	-65.653
7528.5	-62.00	32.100	12.099	20.001	Vertical	-42.00	-13	28.999	-65.551
8365.0	-62.00	30.480	12.820	17.660	Vertical	-44.34	-13	31.340	-66.598

Radiated Spurious Emissions, Harmonics using substitution method

LTE Band 12



LTE Band 12

707.5	SG	SL	AG	SL-AG	Ant Pol	EIRP	Limit	Margin	Target SA
1415.0	-64.00	35.980	4.721	31.259	Vertical	-32.74	-13	19.741	-64.202
2122.5	-65.00	36.270	5.066	31.204	Vertical	-33.80	-13	20.796	-69.966
2830.0	-63.50	37.480	7.104	30.376	Vertical	-33.12	-13	20.124	-65.997
3537.5	-59.50	36.910	8.161	28.749	Vertical	-30.75	-13	17.751	-61.886
4245.0	-59.00	35.160	9.491	25.669	Vertical	-33.33	-13	20.331	-62.824
4952.5	-60.50	33.880	9.858	24.022	Vertical	-36.48	-13	23.478	-66.579
5660.0	-60.00	32.140	10.634	21.506	Vertical	-38.49	-13	25.494	-66.829
6367.5	-63.50	31.070	10.760	20.310	Vertical	-43.19	-13	30.190	-67.695
7075.0	-54.50	31.150	11.741	19.409	Vertical	-35.09	-13	22.091	-57.428

Radiated Spurious Emissions, Harmonics using substitution method

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S4075	RADIO COMMUNICATION TESTER	ROHDE & SCHWARZ	CMW500	09/20/2020	09/20/2022
1S2399	TURNTABLE/MAST CONTROLLER	SUNOL SCIENCES	SC99V	SEE NOTE 1	
1S2600	BILOG ANTENNA	TESEQ	CBL6112D	03/19/2021	03/19/2022
1S2733	BILOG ANTENNA	TESEQ	CBL6112D	06/05/2021	06/05/2022
1S3826	DRG HORN ANTENNA	ETS-LINDGREN	3117	12/03/2020	12/03/2022
1S2198	DRG HORN ANTENNA	ETS-LINDGREN	3117	10/07/2019	10/07/2021
1S2003	PXA Signal Analyzer	Keysight	N9030B	09/15/2020	09/15/2021
1S2811	Radio Communication Analyzer	Anritsu	MT8821C	12/15/2020	12/15/2021
1S2587	PRE AMPLIFIER	AML COMMUNICATIONS	AML0126L3801	SEE NOTE 1	
1S2653	AMPLIFIER	SONOMA INSTRUMENT	310 N	SEE NOTE 1	
1S2486	5 METER CHAMBER	PANASHIELD - ETS	5M	SEE NOTE 2	
1S2643	SIGNAL GENERATOR	Anritsu	MG3694B	07/13/2020	07/13/2021

Test Equipment List

Note 1: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.
Note 2: Latest NSA and VSWR data available upon request.

End of Report