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

March 29, 2024

CalAmp Wireless Networks, Inc

2200 Faraday Ave, #200
Carlsbad, CA 92008

Dear Imad Rizk,

Enclosed is the RF Wireless test report for compliance testing of the CalAmp Wireless Networks, Inc., LTE CAT1 Telematics Gateway as tested to the requirements of the

FCC Part §2.1053, §22.917(a), §24.238(a), §27.53(a)(4), §27.53(c)(2), §27.53(f) ,§27.53(g), § 90.691
RSS-GEN Issue 5, April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021)
RSS-130 Issue 2, February 2019
RSS-132 Issue 4, January 2023
RSS-133 Issue 6, January 2018
RSS-139 Issue 4, September 2022
RSS-140 Issue 1, April 2018
RSS-199 Issue 4, July 2023

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

Sincerely yours,

Gary Chou

Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

ACCREDITED
TESTINGCERT #0591.02

FCC Test Site(s) Reg #:US1123
IC Test Site(s) Reg. #: 2043C

Eurofins Electrical and Electronic Testing NA, Inc. is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

FCC/ ISED Test Report

Applicant name: CalAmp Wireless Networks, Inc

Manufacturer name: CalAmp Wireless Networks, Inc

Product: LTE CAT1 Telematics Gateway

Report: WIR130984_130989_FCC_ISED_CalAmp_LTE_WCDMA_GSM_Rev 1.2

Applicant Address:

2200 Faraday Ave, #200
Carlsbad, CA 92008

Manufacturer Address:

2200 Faraday Ave, #200
Carlsbad, CA 92008

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

Applicant name: CalAmp Wireless Networks, Inc

Product: LTE CAT1 Telematics Gateway

Standard
47 CFR Part 2, 22, 24, 27, 90
RSS-GEN Issue 5, April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021)
RSS-130 Issue 2, February 2019
RSS-132 Issue 4, January 2023
RSS-133 Issue 6, January 2018
RSS-139 Issue 4, September 2022
RSS-140 Issue 1, April 2018
RSS-199 Issue 4, July 2023

Richard Dollente
Richard Dollente
Test Engineer, Wireless Laboratory

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 FCC and ISED Rules under normal use and maintenance.

Gary Chou
Gary Chou
Wireless Engineering Manager, Wireless Laboratory

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	March 29, 2024	Initial Issue.
1.0	April 10, 2024	Update Test Data
1.1	April 21, 2024	Update Test Data
1.2	May 03, 2024	Update Power Level Data

Table of Contents

I. Executive Summary

A. Purpose of Test

An WIRELESS evaluation was performed to determine compliance of the LTE CAT1 Telematics Gateway Terminal, with the requirements of 47 CFR FCC CFR Part 2, 22, 24, 27, 90 RSS-GEN Issue 5 April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021), RSS-130 Issue 2 February 2019, RSS-132 Issue 4 January 2023, RSS-133 Issue 6 January 2018, RSS-139 Issue 4 September 2022, RSS-140 Issue 1, April 2018, RSS-199 Issue 4 July 2023. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with PVG-04 technical requirements

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with 47 CFR FCC CFR Part 2, 22, 24, 27, RSS-Gen Issue 5 2018, RSS-130 Issue 2 February 2019, RSS-132 Issue 4 January 2023, RSS-133 Issue 6 January 2018, RSS-139 Issue 4 September 2022, RSS-199 Issue 4 July 2023. All tests were conducted using measurement procedure.

FCC ISED Clause	ISED Cluse	Description	Compliance
§2.1053 §22.917(a) §24.238 §27.53(l)(4)(6) § 90.543(e),(f)	RSS-132§5.5 RSS-133§6.5 RSS-130§4.6 RSS-139§6.6 RSS-199§4.5 RSS-140§3.2, §4.4	Radiated Spurious Emissions	Compliant
§2.1046, §22.913(a)(5),(a)(2) §24.232(c) §27.50(b)(10), (d)(4) §27.50(h)(2) §90.542(a)(7)	RSS-130 § 5.4 RSS-133 §4.1 RSS-133 §6.4 RSS-199 §4.4 RSS-140 §3.1, §4.3	Transmitter Conducted Output Power/ Effective Radiated Power	Compliant, Note 2
§2.1049	RSS-Gen §6.7	Occupied Bandwidth	Note 1
§2.1051 §22.917(a) §24.238(a) §27.1059(a) §27.53 §27.53(m) §90.691(a) §90.543(e)	RSS-132 §5.5 RSS-133 §6.5 RSS-199 §4.5 RSS-140 §4.4	Conducted Band Edge/ Spurious Emission	Note 1
§24.232(d) §27.1507(d) §27.50(d)(5)	RSS-132 §5.4 RSS-133 §6.4 RSS-199 §4.4 RSS-140 §4.3	Peak-Average Ratio	Note 1

§2.1055 §22.355 §24.235 §27.54 §90.213	RSS-132 §5.3 RSS-133 §6.3 RSS-199 §4.3 RSS-140 §4.2	Frequency Stability	Note 1

Note:

1. Refer to RF module Report FCC ID : RI7LE910CXWWX, RF module report, ISED ID: 5131A-LE910CXWWX
2. Caculated base on report FCC ID : RI7LE910CXWWX, RF module report, ISED ID: 5131A-LE910CXWWX

Rationale:

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

Per ANSI C63.26: 2015 section 5.1.2.2, the results include worst case modulation only.

II. Equipment Information

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by CalAmp Wireless Networks, Inc to perform testing on the LTE CAT1 Telematics Gateway.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of CalAmp Wireless Networks, Inc, LTE CAT1 Telematics Gateway Terminal.
The results obtained relate only to the item(s) tested.
EUT Summary Table

Model(s) Tested:	LMU4350LB/ LMU4351LB	
EUT Specifications:	Input Power: Voltage: 12 Vdc/ 24 Vdc	
	Type of Modulations:	QPSK, 16QAM, 8PSK, GMSK
	Technology:	GSM/ WCDMA/ LTE
	Operating Frequency :	GSM Band 850: 824.2 MHz ~ 824.8 MHz GSM Band 1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band 2: 1850 MHz~ 1910 MHz WCDMA Band 4: 1710 MHz~ 1755 MHz WCDMA Band 5: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26 : 814 MHz ~ 849 MHz
	Product:	LTE CAT1 Telematics Gateway
	Brand:	CalAmp Wireless Networks, Inc
	FCC ID	APV-4350LB
	ISED ID	5843C-4350LB
	Hardware Version	REV A
	Software Version	3.21.21

	Antenna Type/ Manufacturer/ Model:	Cellular External: Combination Antenna/ TAOGLAS/ Optimus MA220 Cellular Internal: Universal Broadband FR4 Embedded Antenna/ KYOCERA AVX/ 1004795 Bluetooth: Dielectric Chip Antenna/ CIROCOMM TECHNOLOGY, DCAK0012
	Antenna Gain:	Cellular External: 617 MHz- 960 MHz : 1.4 dBi 1427 MHz- 1518 MHz : -4.5 dBi 1710 MHz- 2200 MHz : 2.0 dBi 2490 MHz- 2690 MHz : -3 dBi Cellular Internal: 698 MHz- 960 MHz : 1.6 dBi 1710 MHz- 2400 MHz : 3.1 dBi 2500 MHz- 2700 MHz : 1.7 dBi
	Antenna Port:	External Cellular: SMA Internal Cellular: N/A
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Richard Dollente	
Date(s):	March 29, 2024	

B. General Description of Applied Standards

References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

- **FCC 47 CFR Part 2**
- **FCC 47 CFR Part 22(H)**
- **FCC 47 CFR Part 24(E)**
- **FCC 47 CFR Part 27**
- **FCC 47 CFR Part 90**
- **RSS-GEN Issue 5, April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021)**
- **RSS-130 Issue 2, February 2019**
- **RSS-132 Issue 4, January 2023**
- **RSS-133 Issue 6, January 2018**
- **RSS-139 Issue 4, September 2022**
- **RSS-140 Issue 1, April 2018**
- **RSS-199 Issue 4, July 2023**
- **ANSI/TIA/EIA-603-E 2016**
- **ANSI 63.26 2015**

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.

Eurofins Electrical and Electronic Testing NA, Inc. has been accredited by the American Association for Laboratory Accreditation (A2LA) (Certificate #: 0591.02) in accordance with ISO/IEC 17025:2017.

Eurofins Electrical and Electronic Testing NA, Inc. 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. 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.

F. Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to CalAmp Wireless Networks, Inc upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

Transmitter Conducted Output Power/ Effective Radiated Power

The transmitter conducted output power is a measure of the total average power contained within an allocated channel bandwidth. All modes of operation were investigated and the worst-case configuration results are reported in this section.

Test Procedures:
ANSI C63.26-2015 – Section 5.2.4.2

Test Result:

Band/ Mode	Frequency (MHz)	Max Conducted Power (dBm)	Antenna Gain(dBi)	ERP (dBm)	ERP Limit	Margin (dB)	EIRP(dBm)	EIRP Limit (dBm)	Margin (dB)
GSM/ GPRS Cell	824.2-848.8	32.18	1.6	31.64	38.45	-6.81	-	-	-
EDGE Cell	824.5-848.9	26.99	1.6	26.45	38.45	-12	-	-	-
GPRS	1850.2 - 1909.8	29.76	3.1	-	-	-	32.86	33.01	-0.15
GPRS	1850.2 - 1909.8	25.95	3.1	-	-	-	29.05	33.01	-3.96
WCDMA CELL	826.4-846.6	23.93	1.6	23.39	30.86	-7.47	-	-	-
WCDMA AWS	1712.4-1752.6	23.89	3.1	-	-	-	26.99	40.61	-13.62
WCDMA PCS	1852.4-1907.6	24.31	3.1	-	-	-	27.41	30	-2.59
LTE BAND 25/ 2	1850.7-1914.3	23.89	3.1	-	-	-	26.99	33.01	-6.02
LTE BAND 25/ 2	1850.7-1914.3	22.85	3.1	-	-	-	25.95	33.01	-7.06
LTE Band 4	1710.7-1705.4	23.62	3.1	-	-	-	26.72	33.01	-6.29
LTE Band 4	1710.7-1705.4	22.63	3.1	-	-	-	25.73	33.01	-7.28
LTE BAND 26/ 5	824.7-848.3	23.48	1.6	22.94	27.85	-4.91	-	-	-
LTE BAND 26/ 5	824.7-848.3	22.86	1.6	22.32	27.85	-5.53	-	-	-
LTE Band 7	2502.5-2567.5	23.81	1.7	-	-	-	25.51	40.61	-15.1
LTE Band 7	2502.5-2567.5	22.82	1.7	-	-	-	24.52	40.61	-16.09
LTE Band 12	699.7-715.3	23.71	1.6	23.17	30.86	-7.69	-	-	-
LTE Band 12	699.7-715.3	22.65	1.6	22.11	30.86	-8.75	-	-	-
LTE Band 13	779.5-784.5	23.52	1.6	22.98	34.77	-11.79	-	-	-
LTE Band 13	779.5-784.5	22.54	1.6	22	34.77	-12.77	-	-	-
LTE Band 14	790.5-795.5	23.69	1.6	23.15	34.77	-11.62	-	-	-
LTE Band 14	790.5-795.5	22.8	1.6	22.26	34.77	-12.51	-	-	-
LTE Band 26(Part 90)	814.7-823.3	23.78	1.6	23.24	34.77	-11.53	-	-	-
LTE Band 26(Part 90)	814.7-823.3	22.73	1.6	22.19	34.77	-12.58	-	-	-
LTE Band 26(Part 90)	814.7-823.3	23.77	1.6	23.23	34.77	-11.54	-	-	-
LTE Band 26(Part 90)	814.7-823.3	22.61	1.6	22.07	34.77	-12.7	-	-	-

Radiated Emission Measurement

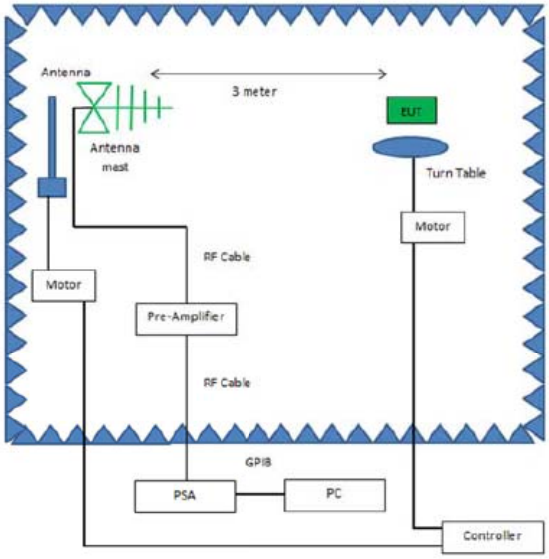
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

Test Procedures:

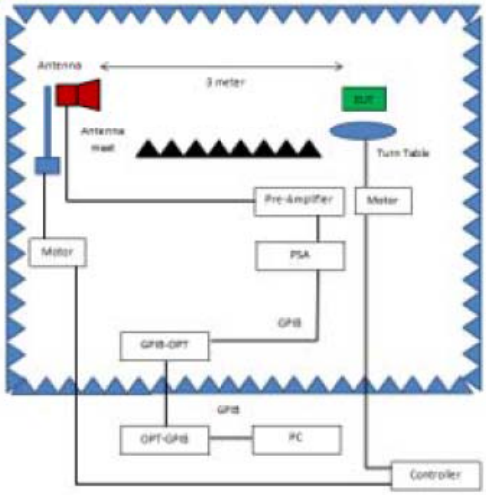
KDB 971168 D01 v03r01 – Section 5.8

NOTE: The resolution and video of test receiver/spectrum analyzer is 1MHz/3MHz.

Deviation from Test Standard
No deviation.



Radiated Emissions, Below 1GHz, Test Setup



Radiated Emissions, Above 1GHz, Test Setup

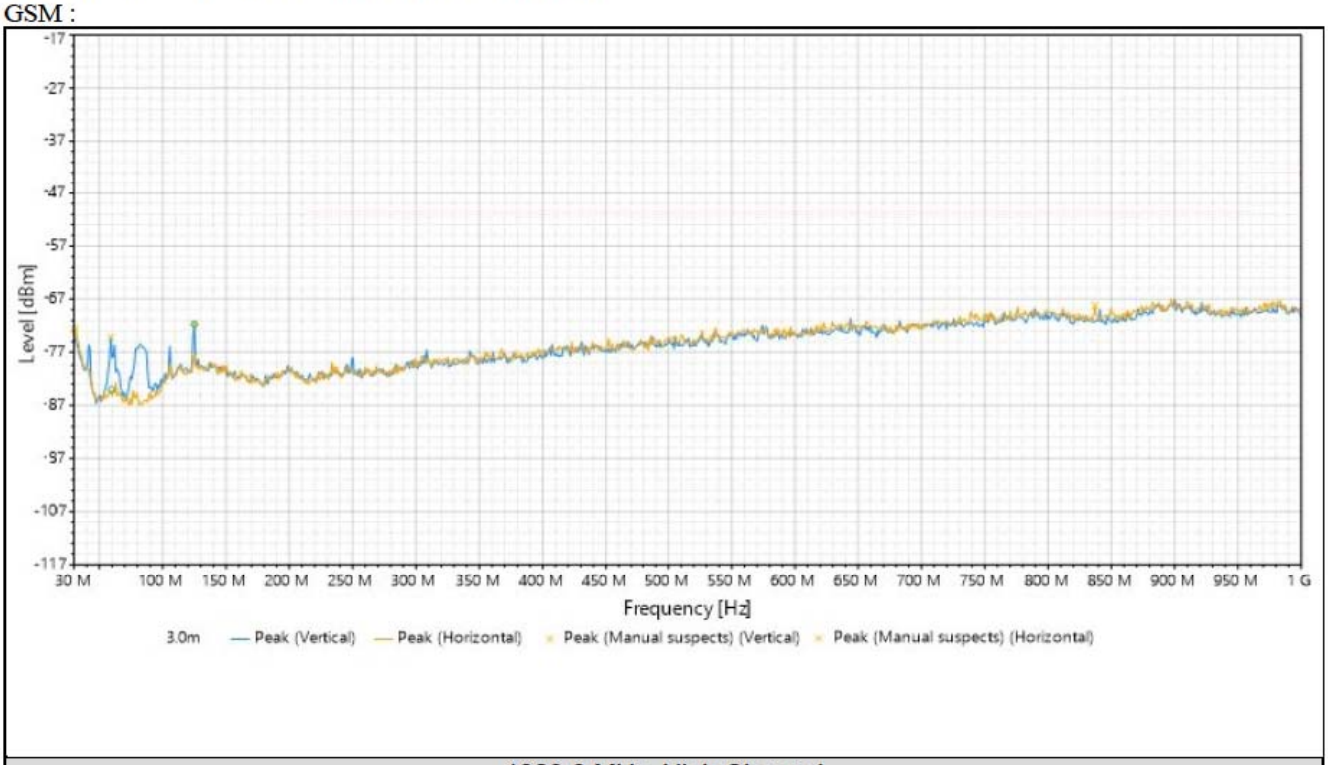
Test Engineer: Richard Dollente
Test Date(s): March 12, 2024
Notc:
The test data only shows worst cast result (Model "LMU4350LB"-internal antenna model, gain is more than external antenna model "LMU4351LB")

Radiated Spurious Emissions (Traffic – Below 1 GHz) Test Results

Plots

(The worst-case mode is based on the original module report's Power Table since testing Radiated Emission below 1GHz was not conducted in original module report)

GSM :



1909.8 MHz, High Channel

Test Data

GSM (The worst-case mode is based on the original module report's Power Table since testing Radiated Emission below 1GHz was not conducted in original module report)

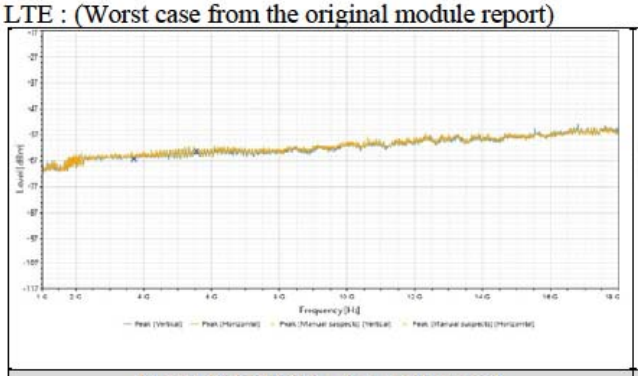
Frequency Range	30 MHz ~ 1GHz	Operating Channel	1909.8 MHz, Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
30	V	-73.16	-13	-60.16
30	H	-73.04	-13	-60.04
59.1	V	-74.66	-13	-61.66
125.06	V	-71.80	-13	-58.8
125.06	H	-78.06	-13	-65.06
837.04	H	-69.19	-13	-56.19

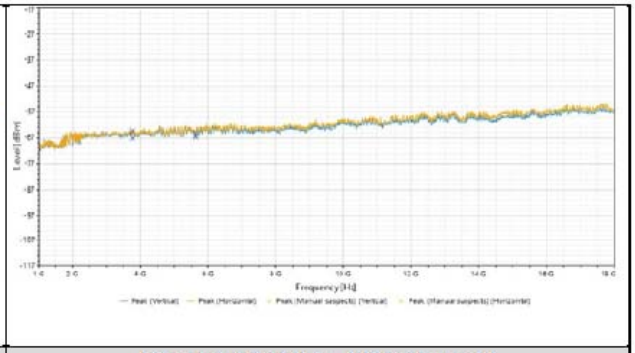
Radiated Spurious Emissions (Traffic – Above 1 GHz) Test Results

Plot:

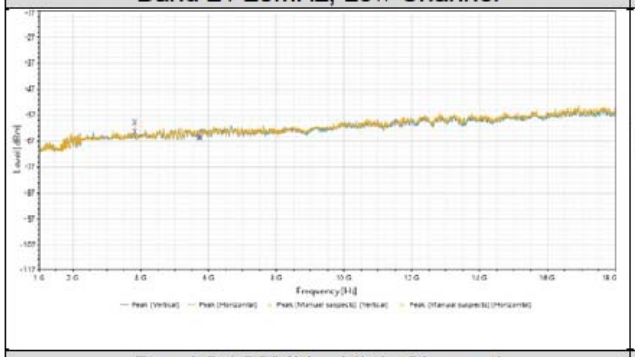
LTE : (Worst case from the original module report)



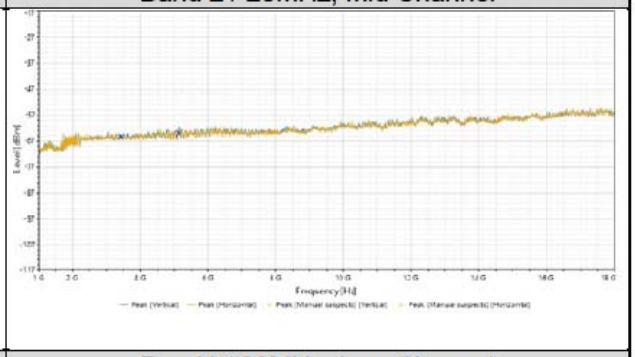
Band 2 / 20MHz, Low Channel



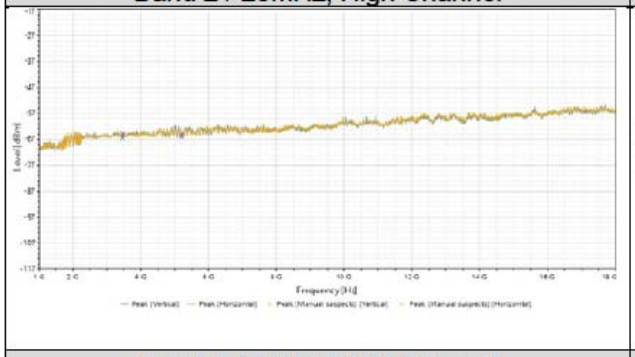
Band 2 / 20MHz, Mid Channel



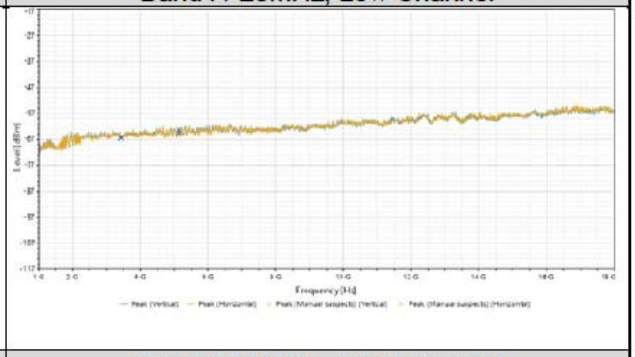
Band 2 / 20MHz, High Channel



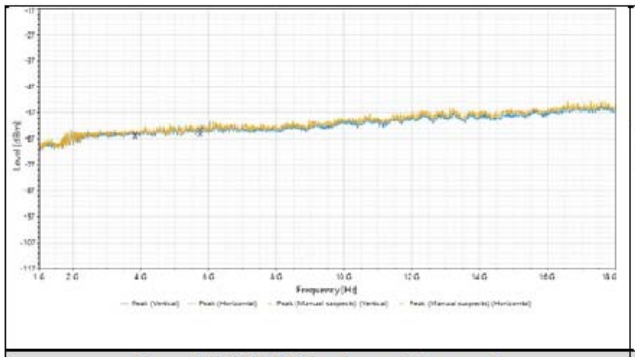
Band4 / 20MHz, Low Channel



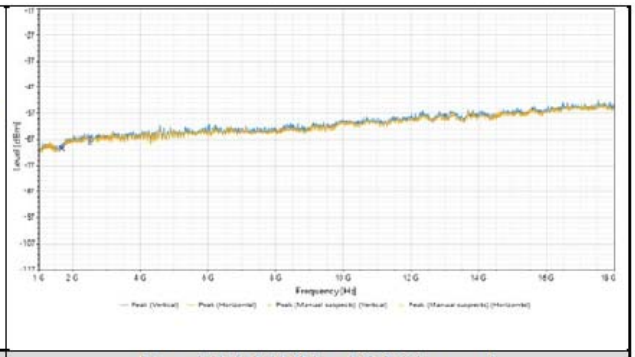
Band 4 / 20MHz, Mid Channel



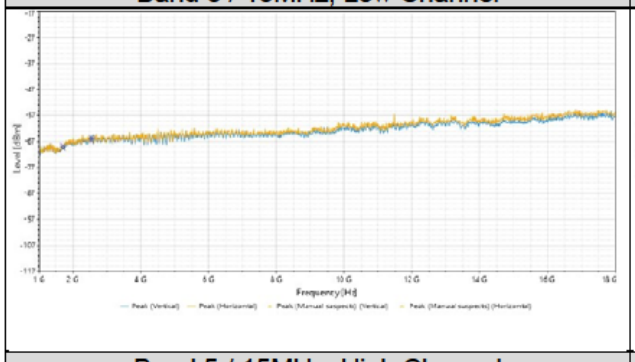
Band 4 / 20MHz, High Channel



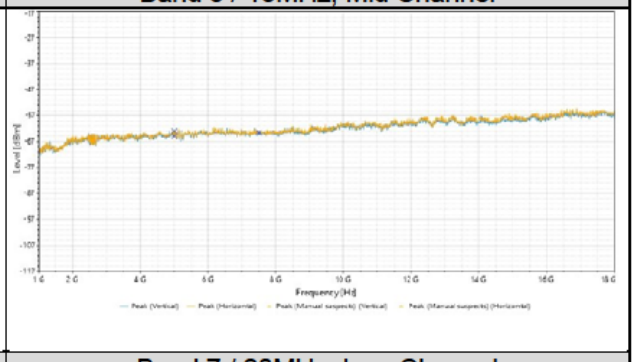
Band 5 / 15MHz, Low Channel



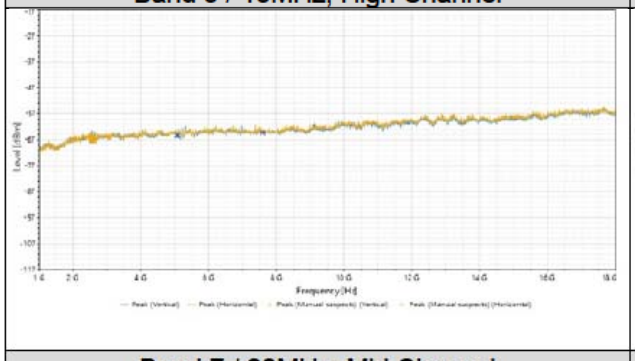
Band 5 / 15MHz, Mid Channel



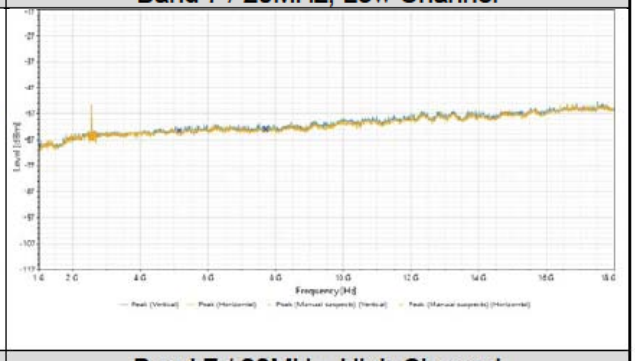
Band 5 / 15MHz, High Channel



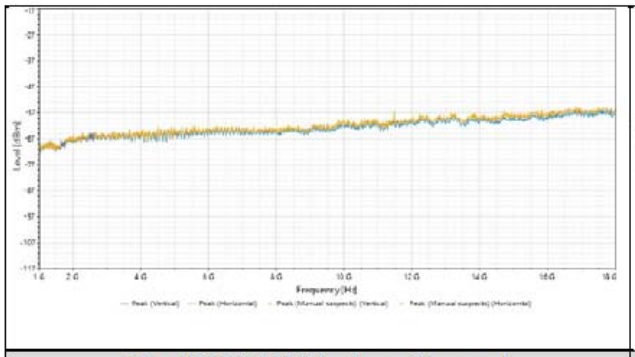
Band 7 / 20MHz, Low Channel



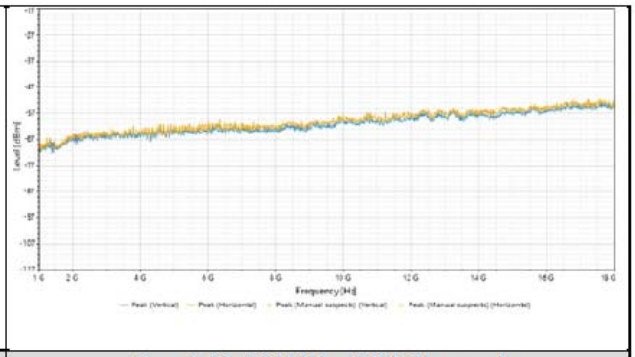
Band 7 / 20MHz, Mid Channel



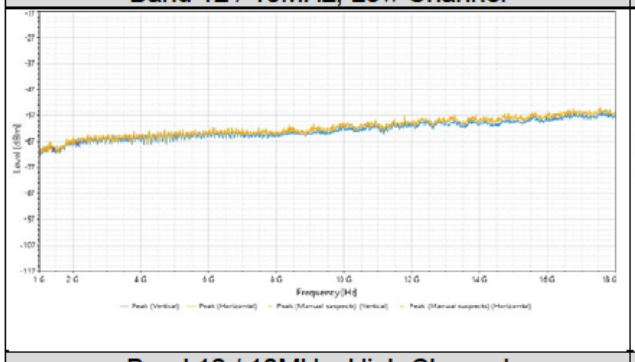
Band 7 / 20MHz, High Channel



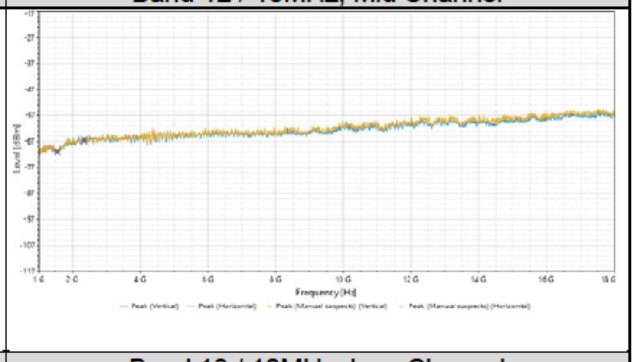
Band 12 / 10MHz, Low Channel



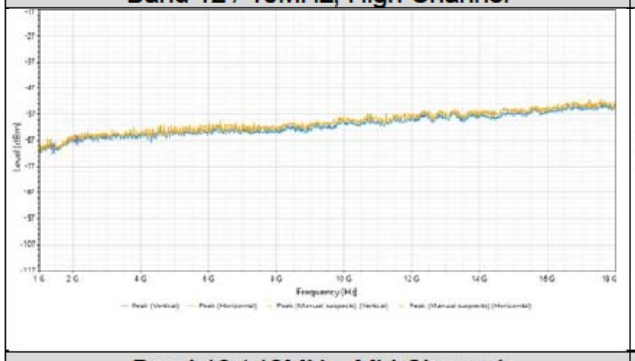
Band 12 / 10MHz, Mid Channel



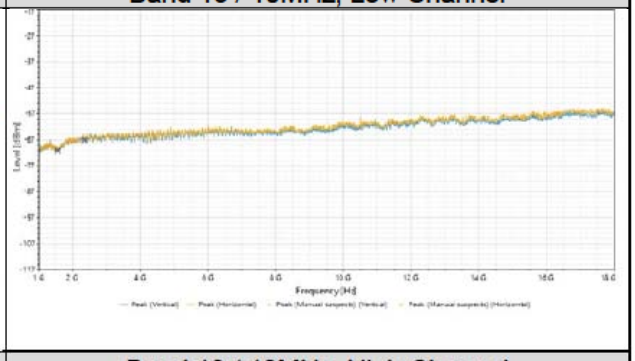
Band 12 / 10MHz, High Channel



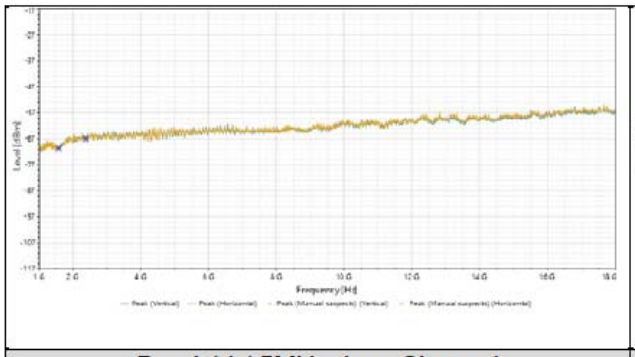
Band 13 / 10MHz, Low Channel



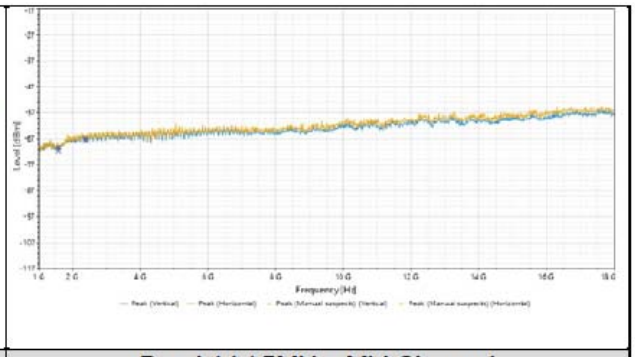
Band 13 / 10MHz, Mid Channel



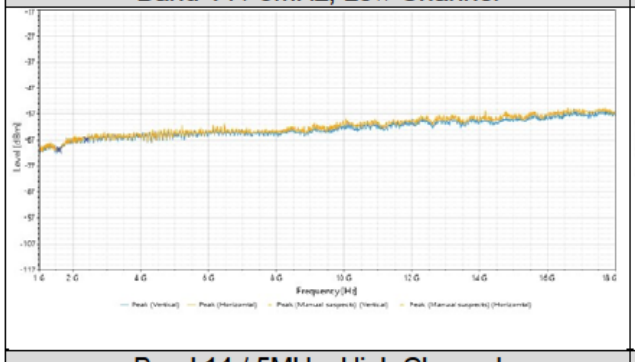
Band 13 / 10MHz, High Channel



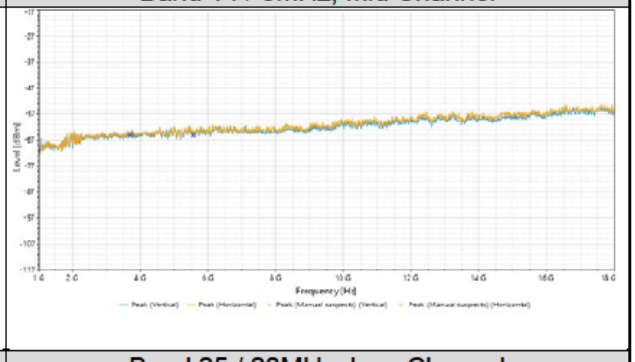
Band 14 / 5MHz, Low Channel



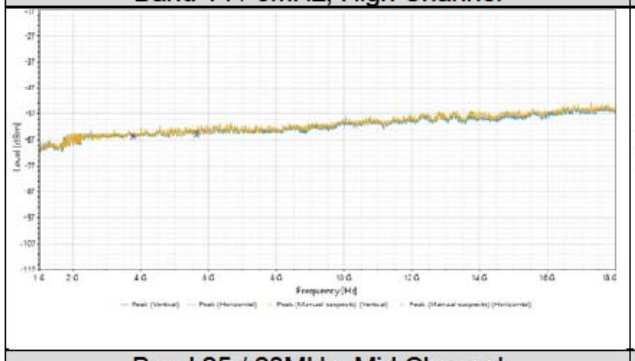
Band 14 / 5MHz, Mid Channel



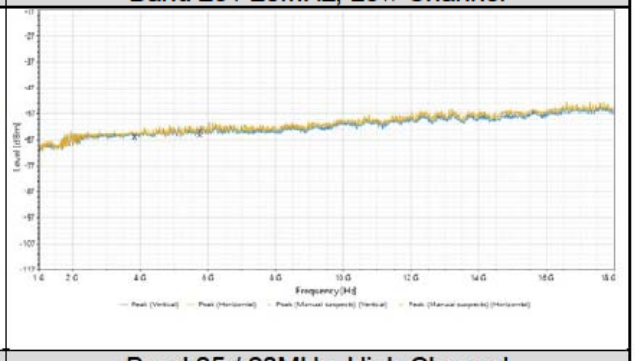
Band 14 / 5MHz, High Channel



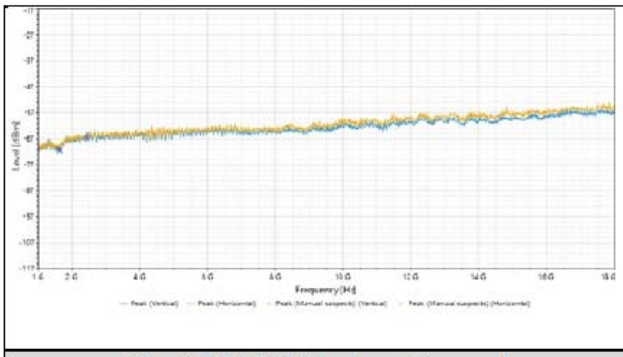
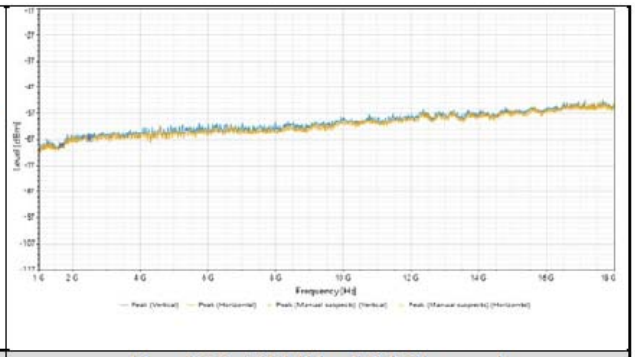
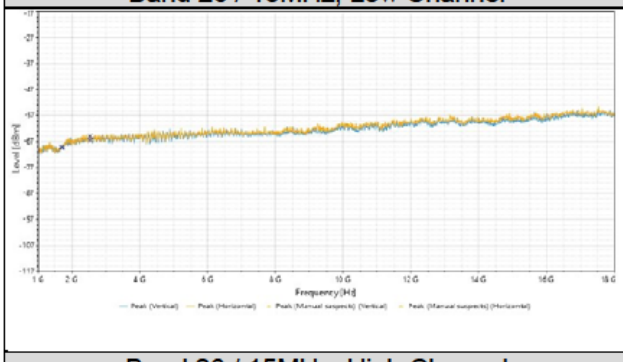
Band 25 / 20MHz, Low Channel



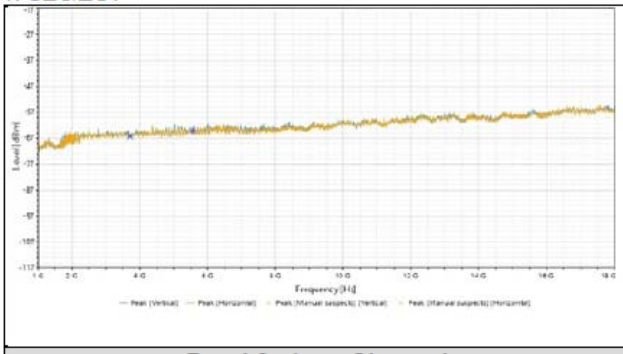
Band 25 / 20MHz, Mid Channel



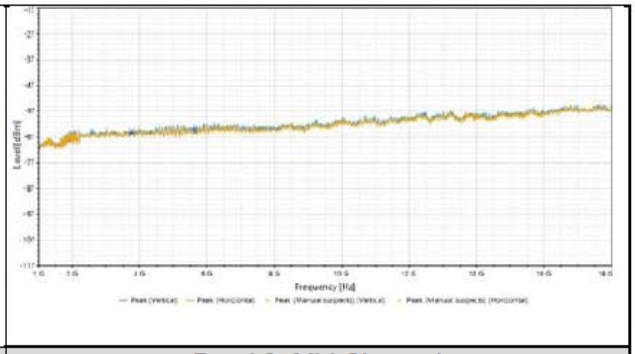
Band 25 / 20MHz, High Channel

	
Band 26 / 15MHz, Low Channel	Band 26 / 15MHz, Mid Channel
	
Band 26 / 15MHz, High Channel	

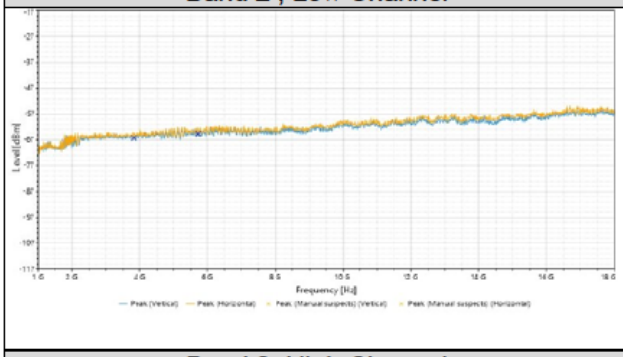
WCDMA :



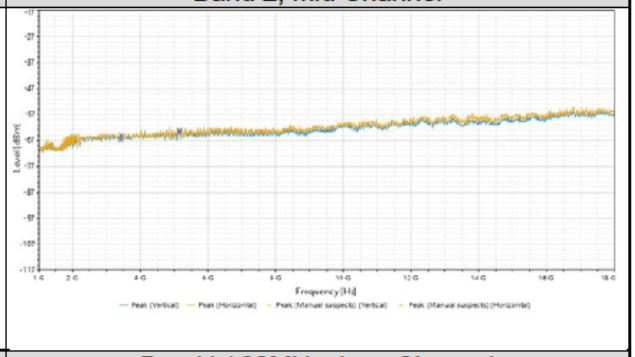
Band 2 , Low Channel



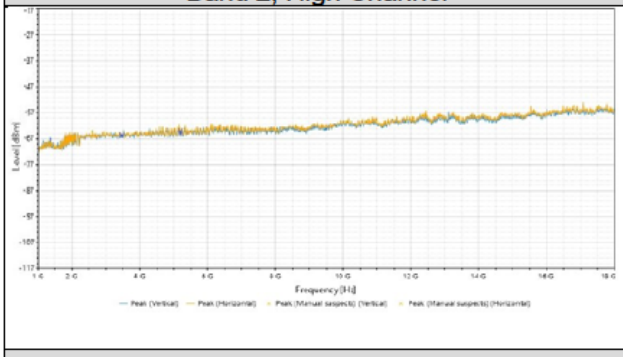
Band 2, Mid Channel



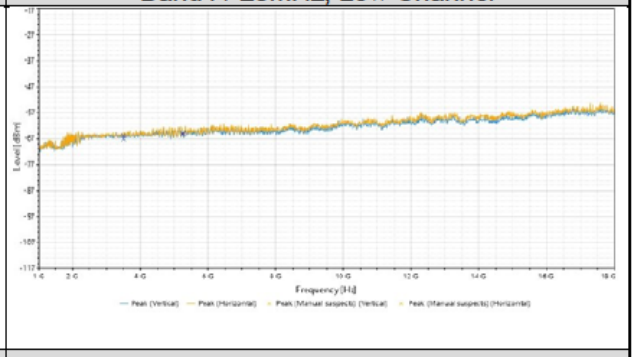
Band 2, High Channel



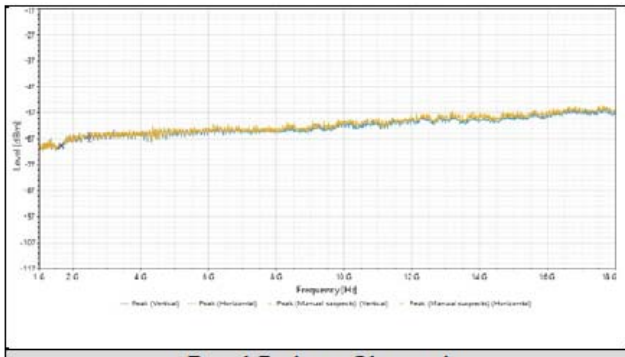
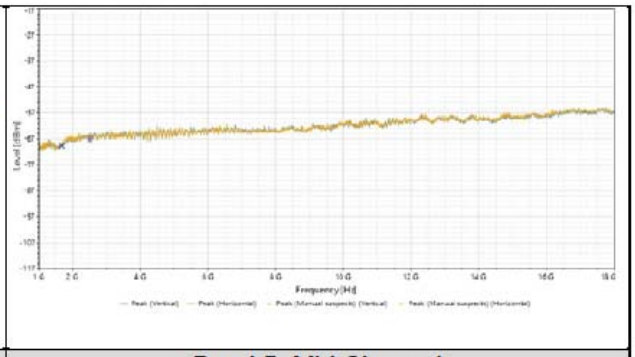
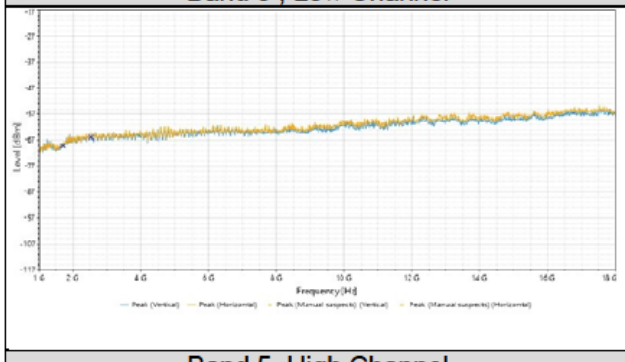
Band4 / 20MHz, Low Channel



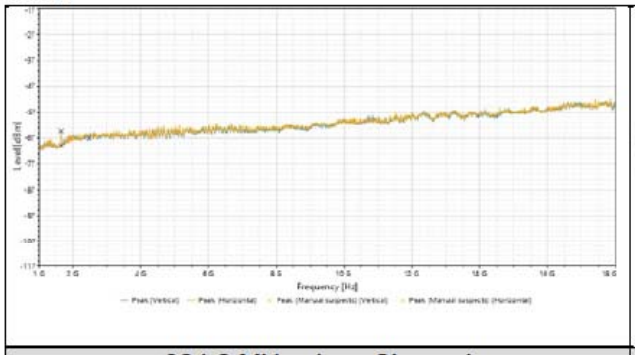
Band 4 / 20MHz, Mid Channel



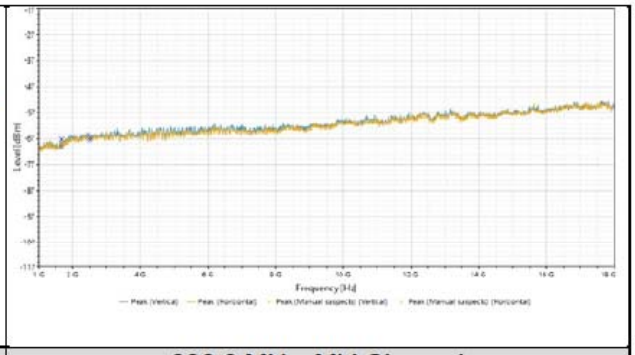
Band 4 / 20MHz, High Channel

	
Band 5 , Low Channel	Band 5, Mid Channel
	
Band 5, High Channel	

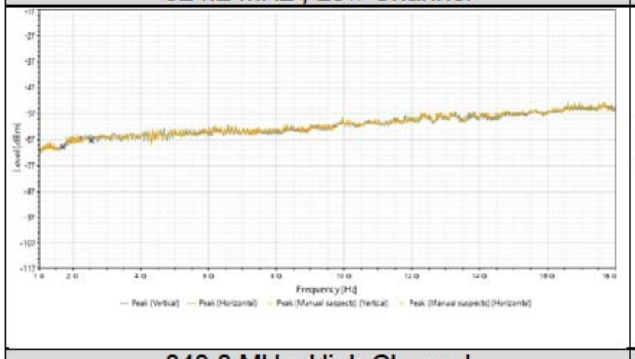
GSM :



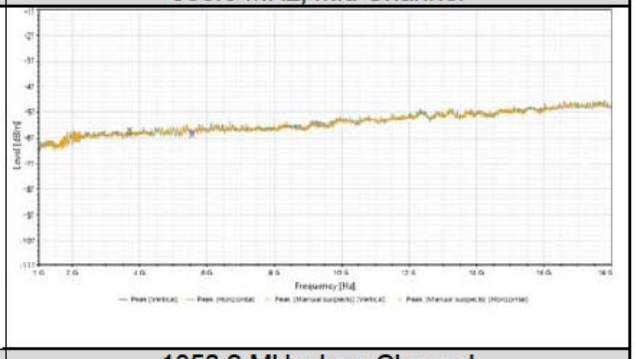
824.2 MHz , Low Channel



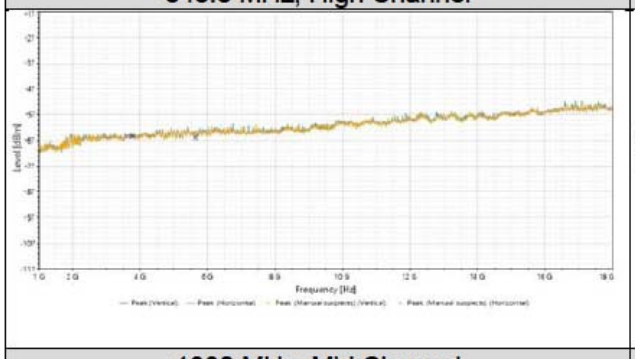
836.6 MHz, Mid Channel



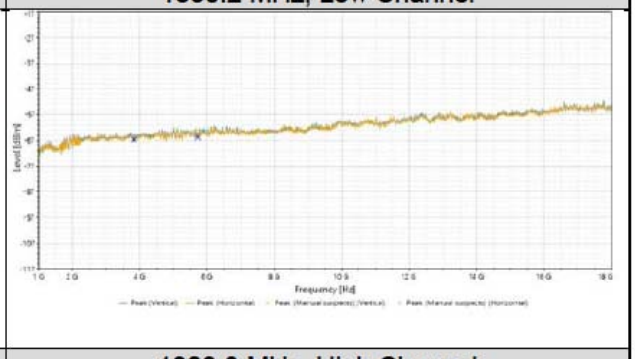
848.8 MHz, High Channel



1850.2 MHz, Low Channel



1880 MHz, Mid Channel



1909.8 High Channel

LTE Band 2

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3701.3	V	-54.77	-13	-41.77
3701.3	H	-54.28	-13	-41.28
5550.9	V	-51.54	-13	-38.54
5552.6	H	-51.75	-13	-38.75

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Middle Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3760.8	V	-55.36	-13	-42.36
3760.8	H	-52.51	-13	-39.51
5639.3	V	-54.90	-13	-41.9
5639.3	H	-53.60	-13	-40.6

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3816.9	V	-47.87	-13	-34.87
3818.6	H	-51.63	-13	-38.63
5727.7	V	-53.52	-13	-40.52
5727.7	H	-54.23	-13	-41.23

LTE Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3419.1	V	-53.63	-13	-40.63
3420.8	H	-53.27	-13	-40.27
5131	V	-52.46	-13	-39.46
5132.7	H	-52.04	-13	-39.04

LTE Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3465	V	-55.05	-13	-42.05
3465	H	-53.83	-13	-40.83
5199	V	-54.11	-13	-41.11
5199	H	-52.78	-13	-39.78

LTE Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3420.8	V	-54.49	-13	-41.49
3420.8	H	-54.79	-13	-41.79
5132.7	V	-52.73	-13	-39.73
5132.7	H	-51.80	-13	-38.8

LTE Band 5

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1649.4	V	-58.11	-13	-45.11
1649.4	H	-58.94	-13	-45.94
2473.9	V	-55.93	-13	-42.93
2473.9	H	-54.74	-13	-41.74

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1673.2	V	-58.45	-13	-45.45
1673.2	H	-58.70	-13	-45.7
2509.6	V	-55.23	-13	-42.23
2509.6	H	-56.64	-13	-43.64

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1697	V	-57.83	-13	-44.83
1697	H	-56.67	-13	-43.67
2545.3	V	-54.68	-13	-41.68
2545.3	H	-53.76	-13	-40.76

LTE Band 7

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
5005.2	V	-51.12	-13	-38.12
5005.2	V	-53.24	-13	-40.24
7505.9	V	-51.69	-13	-38.69
7507.6	H	-52.17	-13	-39.17

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
5068.1	V	-53.37	-13	-40.37
5069.8	H	-53.75	-13	-40.75
7602.8	V	-52.65	-13	-39.65
7602.8	H	-52.37	-13	-39.37

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
5136.1	V	-51.30	-13	-38.3
5136.1	H	-51.70	-13	-38.7
7701.4	V	-51.17	-13	-38.17
7703.1	H	-50.80	-13	-37.8

LTE Band 12

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1399.5	V	-58.72	-13	-45.72
1399.5	H	-58.77	-13	-45.77
2099.9	V	-56.32	-13	-43.32
2099.9	H	-56.28	-13	-43.28

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1415.70	V	-59.37	-13	-46.37
1415.70	H	-56.94	-13	-43.94
2123.20	V	-56.06	-13	-43.06
2123.20	H	-54.19	-13	-41.19

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1430.1	V	-58.34	-13	-45.34
1430.1	H	-58.43	-13	-45.43
2145.8	V	-56.53	-13	-43.53
2145.8	H	-56.05	-13	-43.05

LTE Band 13

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1557.6	V	-59.30	-13	-46.3
1557.6	H	-59.15	-13	-46.15
2337.9	V	-54.34	-13	-41.34
2337.9	H	-55.08	-13	-42.08

LTE Band 13

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1564.4	V	-59.32	-13	-46.32
1564.4	H	-59.31	-13	-46.31
2346.4	V	-55.09	-13	-42.09
2346.4	H	-55.30	-13	-42.3

LTE Band 13

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 10MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1567.8	V	-59.42	-13	-46.42
1569.5	H	-58.87	-13	-45.87
2353.2	V	-54.13	-13	-41.13
2353.2	H	-53.53	-13	-40.53

LTE Band 14

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 5MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1579.7	V	-58.53	-13	-45.53
1583.1	H	-59.15	-13	-46.15
2370.2	V	-54.74	-13	-41.74
2371.9	H	-55.39	-13	-42.39

LTE Band 14

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 5MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1586.5	V	-59.74	-13	-46.74
1586.5	H	-58.48	-13	-45.48
2378.7	V	-55.08	-13	-42.08
2380.4	H	-55.87	-13	-42.87

LTE Band 14

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 5MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1589.9	V	-59.28	-13	-46.28
1589.9	H	-58.61	-13	-45.61
2387.2	V	-55.07	-13	-42.07
2388.9	H	-55.09	-13	-42.09

LTE Band 25

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3701.3	V	-53.69	-13	-40.69
3701.3	H	-52.72	-13	-39.72
5552.6	V	-53.43	-13	-40.43
5552.6	H	-53.23	-13	-40.23

LTE Band 25

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3764.2	V	-54.21	-13	-41.21
3764.2	H	-53.59	-13	-40.59
5647.8	V	-53.62	-13	-40.62
5647.8	H	-52.19	-13	-39.19

LTE Band 25

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 20MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3828.8	V	-53.86	-13	-40.86
3828.8	H	-54.30	-13	-41.3
5743	V	-53.52	-13	-40.52
5743	H	-51.77	-13	-38.77

LTE Band 26

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1629	V	-59.69	-13	-46.69
1629	H	-59.19	-13	-46.19
2443.3	V	-55.04	-13	-42.04
2443.3	H	-53.57	-13	-40.57

LTE Band 26

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1663	V	-57.62	-13	-44.62
1663	H	-56.90	-13	-43.9
2494.3	V	-54.60	-13	-41.6
2494.3	H	-55.13	-13	-42.13

LTE Band 26

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel, 15MHz

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1697	V	-57.24	-13	-44.24
1697	H	-57.61	-13	-44.61
2545.3	V	-54.66	-13	-41.66
2545.3	H	-53.29	-13	-40.29

GSM 850

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1647.7	V	-58.11	-13	-45.11
1647.7	V	-52.46	-13	-39.46
2472.2	V	-55.38	-13	-42.38
2472.2	H	-55.33	-13	-42.33

GSM 850

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1673.2	V	-58.35	-13	-45.35
1673.2	H	-55.42	-13	-42.42
2509.6	V	-54.72	-13	-41.72
2509.6	H	-55.80	-13	-42.8

GSM 850

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1697	V	-57.87	-13	-44.87
1697	H	-58.27	-13	-45.27
2547	V	-55.77	-13	-42.77
2547	H	-55.46	-13	-42.46

GSM 1900

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3699.6	V	-51.71	-13	-38.71
3699.6	H	-53.89	-13	-40.89
5550.9	V	-52.98	-13	-39.98
5550.9	H	-54.04	-13	-41.04

GSM 1900

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3759.1	V	-53.64	-13	-40.64
3759.1	H	-53.72	-13	-40.72
5639.3	V	-54.04	-13	-41.04
5639.3	H	-53.93	-13	-40.93

GSM 1900

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3820.3	V	-55.05	-13	-42.05
3820.3	H	-54.55	-13	-41.55
5729.4	V	-53.43	-13	-40.43
5729.4	H	-54.16	-13	-41.16

WCDMA Band 2

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3706.4	V	-54.68	-13	-41.68
3706.4	H	-54.23	-13	-41.23
5556	V	-52.82	-13	-39.82
5559.4	H	-52.02	-13	-39.02

WCDMA Band 2

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3759.1	V	-52.79	-13	-39.79
3762.5	V	-53.74	-13	-40.74
5637.6	H	-52.22	-13	-39.22
5641	H	-52.79	-13	-39.79

WCDMA Band 2

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3816.9	V	-54.65	-13	-41.65
3816.9	H	-54.38	-13	-41.38
5726	V	-53.05	-13	-40.05
5726	H	-52.72	-13	-39.72

WCDMA Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3424.2	V	-55.01	-13	-42.01
3424.2	H	-53.24	-13	-40.24
5136.1	V	-52.16	-13	-39.16
5137.8	H	-51.37	-13	-38.37

WCDMA Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3466.7	V	-54.21	-13	-41.21
3466.7	H	-53.77	-13	-40.77
5197.3	V	-52.38	-13	-39.38
5199	H	-53.16	-13	-40.16

WCDMA Band 4

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3504.1	V	-54.09	-13	-41.09
3505.8	H	-55.21	-13	-42.21
5258.5	V	-53.46	-13	-40.46
5258.5	H	-53.10	-13	-40.1

WCDMA Band 5

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Low Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1651.1	V	-57.76	-13	-44.76
1652.8	H	-58.09	-13	-45.09
2477.3	V	-53.70	-13	-40.7
2479	H	-55.41	-13	-42.41

WCDMA Band 5

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	Mid Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1671.5	V	-58.14	-13	-45.14
1673.2	V	-57.84	-13	-44.84
2511.3	V	-54.93	-13	-41.93
2511.3	H	-55.69	-13	-42.69

WCDMA Band 5

Frequency Range	1GHz ~ 26.5GHz	Operating Channel	High Channel

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1693.6	V	-57.50	-13	-44.5
1695.3	H	-57.16	-13	-44.16
2538.5	V	-54.35	-13	-41.35
2538.5	H	-54.07	-13	-41.07

Test Setup Photo

(Please refer to the attached file (Test Setup Photo)

IV. Test Equipment List

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
1S2003	EMI Test Receiver	Keysight	N9030B	11/06/2023	11/06/2024
1S2399	Turntable Controller	SUNOL SCIENCE	SC99V	Not Required	Not Required
1S2486	5 Meter Chamber Control Room	Panashield	5 Meter Control Room	Not Required	Not Required
1S3826	Horn Antenna	ETS-LINDGREN	3117	04/06/2023	04/06/2025
1S4802	Preamplifier	EMC Instrument	EMC118A45SE	Note 1	Note 1
1S2668	Preamplifier	Sonoma Instrument	310N	Note 1	Note 1
1S2600	Antenna	Sunol Sciences Corp	JB3	04/ 11/ 2023	04/ 11/ 2025
Note 1: Verified by calibrated instrumentation at the time of testing					

Table 1. Radiated Emission and Bandage Measurement, Test Equipment List

END OF REPORT

