TEST REPORT

Report Number: 14040866-E7V2

Applicant	:	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	:	A2651
Brand	:	APPLE
FCC ID	:	BCG-E8141A
IC	:	579C-E8141A
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC CFR47 PART 22H, 24E, AND 27L ISED RSS-GEN ISSUE 5, RSS-132 ISSUE 3, RSS-133 ISSUE 6, AND RSS-139 ISSUE 3

Date Of Issue:
JULY 30, 2022

Prepared by:
UL LLC
47173 Benicia Street
Fremont, CA 94538, U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	7/13/2022	Initial Review	Mengistu Mekuria
V2	7/30/2022	Address TCB questions section 5.4, 6.2 and 9.4	Michael Vang

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

TABLE OF CONTENTS

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 319-4000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

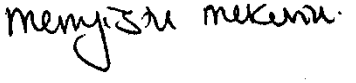
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	A2651
Brand	APPLE
FCC ID	BCG-E8141A
IC	579C-E8141A
EUT Description	SMARTPHONE
Serial Number	CT656X3X0G, C2V3Q7Q7D5 (CONDUCTED) AND JXM6L16XM3, H7VFKXH4D1 (RADIATED)
Sample Receipt Date	APRIL 15, 2022
Date Tested	APRIL 15, 2022 to JULY 05, 2022
Applicable Standards	FCC CFR 47 Part 2, Part 22, Part 24, and Part 27 ISED RSS-GEN ISSUE 5, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3.
Test Results	COMPLIES

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released By:	Reviewed By:	Prepared By:
		
Mengistu Mekuria Operations Leader UL LLC.	Tewodros Woldemichael Laboratory Engineer UL LLC.	Binod Sitaula Laboratory Engineer UL LLC.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

Requirement Description	Requirement Clause Number (FCC)	Requirement Clause Number (ISED)	Result	Remarks
RF Conducted Output Power	2.1046,	-	Complies	
Effective Radiated Power	22.913 (a)(5)	-	Complies	
Equivalent Isotropic Radiated power	24.232 (c), 27.50 (d) (4)	RSS132§5.4 RSS133§6.4 & SRSP-510, 5.1.2 RSS139§6.5	Complies	
Occupied Bandwidth	2.1049	RSS132 RSS133§2.3 RSS139 RSS-GEN§6.7	Complies	
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h),	RSS132§5.5 RSS133§6.5 RSS139§6.6	Complies	
Out of Band Emissions	2.1051, 22.917 (a), 24.238 (a), 27.53 (h),	RSS132§5.5 RSS133§6.5 RSS139§6.6	Complies	
Frequency Stability	2.1055, 22.355, 24.235, 27.54	RSS132§5.3 RSS133§6.3 RSS139§6.4	Complies	
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5)	RSS132§5.4 RSS133§6.4 RSS139§6.5	Complies	
Field Strength of Spurious Radiation	2.1053, 22.917 (a), 24.238 (a), 27.53 (h),	RSS132§5.5 RSS133§6.5 RSS139§6.6	Complies	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 24, and Part 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01. Determining ERP and EIRP
- ISED RSS-GEN Issue 5, ISED RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	550739
☐	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	550739

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{Lab}
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Occupied Channel Bandwidth	±1.22 %
Temperature	±2.26%
Supply voltages	±0.57 %
Time	±3.39 %

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G FR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC, and MSS. All models except refetence model support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC and by ISED-Canada.

6.2. MAXIMUM OUTPUT POWER

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015
KDB 971168 D01 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

GSM MODES

RSS 132 850MHz(Ant1)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
824.2-848.8	GPRS	33.50	-5.00	11.5	28.50	0.708	239.77	240KGXW
	EGPRS	27.95			22.95	0.197	237.21	237KG7W
Part 22 850MHz(Ant1)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
824.2-848.8	GPRS	33.50	-5.00	7.0	26.35	0.432	239.77	240KGXW
	EGPRS	27.95			20.80	0.120	237.21	237KG7W
Part 24 / RSS 133 1900MHz(Ant3)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1850.2-1909.8	GPRS	31.50	0.80	2.0	32.30	1.698	240.35	240KGXW
	EGPRS	26.50			27.30	0.537	239.07	239KG7W

WCDMA MODE

RSS 132 Band 5(Ant1)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
826.4-846.6	REL 99	25.70	-5.00	11.5	20.70	0.117	4137	4M14F9W
	HSDPA	25.32			20.32	0.108	4150	4M15F9W
Part 22 Band 5(Ant1)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	ERP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
826.4-846.6	REL 99	25.70	-5.00	7.0	18.55	0.072	4137	4M14F9W
	HSDPA	25.32			18.17	0.066	4150	4M15F9W
Part 24 / RSS 133 Band 2(Ant3)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1852.4-1907.6	REL 99	25.50	0.80	2.0	26.30	0.427	4154	4M15F9W
	HSDPA	24.46			25.26	0.336	4148	4M15F9W
Part 27 / RSS 139 Band 4(Ant3)								
Frequency range (MHz)	Modulation	Conducted (Average) (dBm)	Antenna Gain (dBi)	Limit (W)	EIRP		99% BW (kHz)	Emission Designator
					(dBm)	(W)		
1712.4-1752.6	REL 99	25.50	-0.90	1.0	24.60	0.288	4145	4M15F9W
	HSDPA	24.58			23.68	0.233	4161	4M16F9W

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version: 0.15.02.

6.4. MAXIMUM ANTENNA GAIN

The antenna(s) gain(s) and type, as provided by the manufacturer' are as follows:

Frequency Band	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	ANT 4 Antenna Gain (dBi)
GSM850 and WCDMA 5 824 – 849MHz	-5.0	-6.2		
GSM1900 and WCDMA 2 1850 – 1910 MHz	-4.0	-2.3	0.8	-2.0
WCDMA 4 1710 – 1755 MHz	-2.8	-5.1	-0.9	-2.2

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X/Y/Z on ANT 1, ANT2, ANT3 and ANT4 antennas to determine the worst- case orientation. The following table exhibits the worst-case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

Frequency Bands	ANT1	ANT2	ANT3	ANT4
824 – 849 MHz	Z	Z	N/A	N/A
1710 – 1915 MHz	Y	X	Y	Y

Based on average conducted output power measurement investigations. The worst-case is Ant1 with the highest power. Therefore, Ant 1 was used to perform all conducted tests.

The worst-case scenario for all measurements as followed:
- GSM GPRS
- GSM EGPRS
- WCDMA REL 99
- WCDMA HSDPA

Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For simultaneous transmission of multiple channels in the 2.4GHz/5GH WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

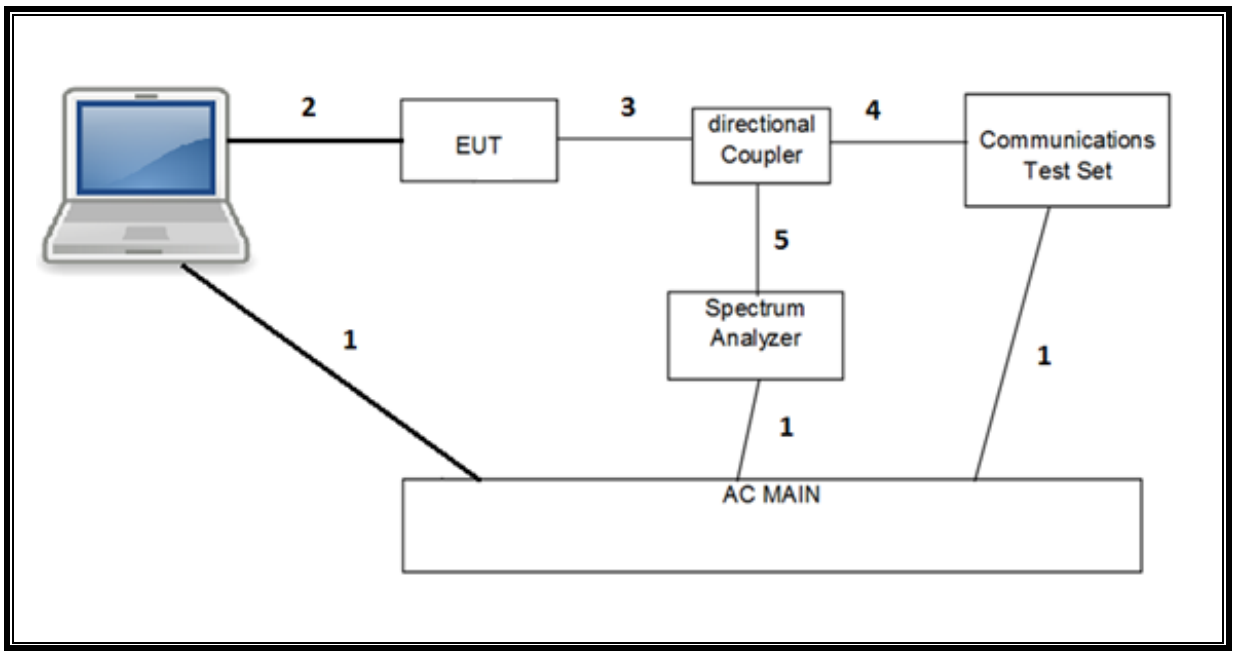
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

6.6. DESCRIPTION OF TEST SETUP

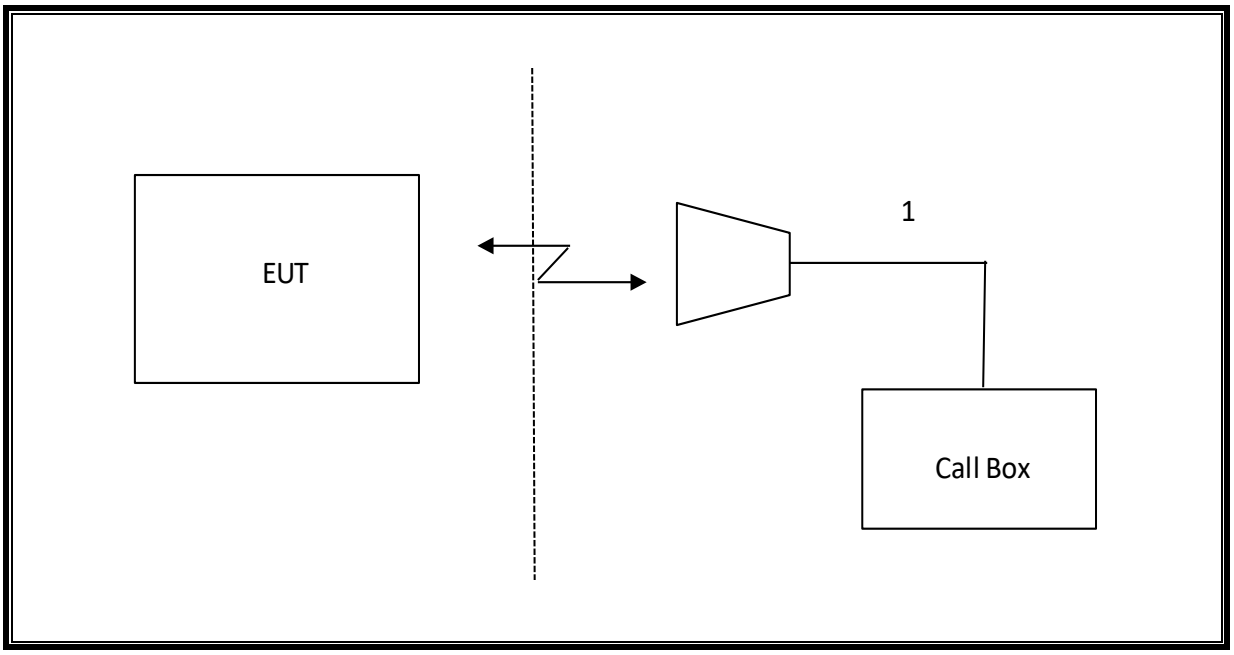
SUPPORT TEST EQUIPMENT						
Description		**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
Laptop		Apple	MacBook Pro	HRP082673		BCGA1708
AC/DC adapter		Apple	A1718	C4H64450HH3GN8RA6		--
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CONDUCTED SETUP



RADIATED SETUP



This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	80402	6/14/2022
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	85151	3/21/2023
*RF Amplifier, 1-18GHz	T1165	AFS42-00101800-25-S-42	T1165	6/12/2022
*Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T1165	6/12/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85212	1/30/2023
Wideband Communication Test Set, Call Box	Rohde & Schwarz	CMW500	85827	connection purpose only
Antenna, Horn 1-18GHz	ETS Lindgren	3117	80403	5/26/2023
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	125178	1/24/2023
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	80105	connection purpose only
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	203089	1/31/2023
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	170649	7/07/2022
Directional Coupler	KRYTAR	152613	T1536	9/23/2022
Directional Coupler	KRYTAR	152613	T1537	9/23/2022
Power Meter, P-series single channel	Keysight	N1911A	82174	1/24/2023
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	90388	1/24/2023
Filter, HPF 1.2GHz	Micro-Tronics	152043	152043	7/29/2022
Filter, BRF 1850 – 1910 MHz	Micro-Tronics	155055	155055	12/20/2022
Filter, BRF 2495 – 2690 MHz	Micro-Tronics	155050	155055	7/30/2022
Filter, BRF 3.4 – 3.8GHz	Micro-Tronics	208398	208398	7/30/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	80397	2/1/2023
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85201	2/1/2023
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	85214	2/2/2023
Spectrum Analyzer, PXA, 3Hz to 50GHz w/Ext. Mixer	Keysight	N9030A	80400	2/1/2023
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	85806	2/22/2023
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	85943	2/20/2023
Wireless Test Platform, UXM 5G	Keysight	E7515B	207269	1/24/2023
*Environmental Chamber	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	82472	6/15/2022
Antenna, Active Loop 100KHz to 30MHz	ELECTRO-METRICS	EM-6872	219911	05/10/2023
Antenna, Active Loop 30Hz to 1MHz	ELECTRO-METRICS	EM-6871	219909	05/10/2023
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 3.7.6, Match 1, 2022	
Power Measurement Software	UL	UL RF	Ver 3.4.9, April 29, 2022	
Radiated test software	UL	UL RF	Ver 9.5 June 15, 2022	

NOTES:

1. * Testing is completed before equipment expiration date.
2. ** Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8. RF OUTPUT POWER VERIFICATION

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted output powers as follows:

8.1. GSM

Using CMW500 Communication Test Set
Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus
Press **RESET** > choose all to reset all settings

Connection	Press **Signal Off** to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off	
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting	
	> Slot configuration	> Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel	
	Frequency Offset >	+ 0 Hz
	Mode >	BCCH and TCH
	BCCH Level >	-85 dBm (May need to adjust if link is not stable)
	BCCH Channel >	choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
	Channel Type >	Off
	P0>	4 dB
	Slot Config >	Unchanged (if already set under MS Signal)
	TCH >	choose desired test channel
	Hopping >	Off
	Main Timeslot >	3 (Default)
Network	Coding Scheme >	CS 1 (GPRS) and MCS5 (EGPRS)
	Bit Stream >	2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input	
Connection	Press **Signal On** to turn on the signal and change settings	

RESULT

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701i
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 319-4000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.1.1. GSM 850

Test Engineer ID:	25780	Test Date:	4/15/2022

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)	
					ANT 1	ANT 2
GPRS (GMSK)	CS1	1	128	824.2	33.11	31.68
			190	836.6	32.86	31.40
			251	848.8	**33.50**	**32.37**
		2	128	824.2	32.25	31.11
			190	836.6	32.36	31.17
			251	848.8	32.15	31.04
EGPRS (8PSK)	MCS5	1	128	824.2	27.94	26.95
			190	836.6	**27.95**	26.05
			251	848.8	27.92	**27.00**
		2	128	824.2	26.82	24.89
			190	836.6	26.85	25.98
			251	848.8	26.68	24.87

8.1.2. GSM 1900

Test Engineer ID:	25780	Test Date:	4/15/2022

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)			
					ANT 1	ANT 2	ANT 3	ANT 4
GPRS (GMSK)	CS1	1	512	1850.2	31.80	29.31	**31.50**	**29.00**
			661	1880.0	31.68	29.17	31.39	28.92
			810	1909.8	**32.00**	**29.49**	31.36	27.09
		2	512	1850.2	31.89	29.40	30.16	28.00
			661	1880.0	31.93	29.26	30.17	27.88
			810	1909.8	31.83	29.18	30.09	27.63
EGPRS (8PSK)	MCS5	1	512	1850.2	26.84	24.35	**26.50**	23.84
			661	1880.0	26.73	23.37	25.77	**23.98**
			810	1909.8	**27.00**	**24.50**	26.43	23.83
		2	512	1850.2	26.90	23.43	24.53	23.47
			661	1880.0	26.86	24.44	25.27	23.21
			810	1909.8	26.75	23.38	24.59	23.26

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA

TEST PROCEDURE

The transmitter output was connected to the input terminal of Directional Coupler via calibrated coaxial cable. The output coupling terminal of the Directional Coupler was directly connected to a spectrum analyzer while the output through terminal connected to the communication test set via calibrated coaxial cable.

The output power was measured with the spectrum analyzer at the low, middle and high channel in each band.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW ≥ RBW.≥ 26dB BW, typically 5MHz.
- Set a marker to point the corresponding peak value.

REL 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA REL 5

The following 4 Sub-tests were completed according to Release 5 procedures in table C.10.1.4 of 3GPP TS 34.121-1 A summary of these settings are illustrated below:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$, and Δ_{CQI} = 24/15 with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSPA REL 6 (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in table C.11.1.3 of 3GPP TS 34.121-1. A summary of these settings are illustrated below:

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DUAL CARRIER HSDPA (DC-HSDPA (REL 8, CAT 24)

The following 4 Sub-tests for DC-HSDPA were completed according to Release 8 procedures in table C08.1.12 of 3GPP TS 34.121-1. A summary of subtest settings are illustrated below:

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.

Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSPA+ REL 7

The following 1 Sub-test was completed according to Release 7 procedures in table C.11.1.4 of 3GPP TS34.121. A summary of these settings are illustrated below:

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed}1$: 30/15 $\beta_{ed}2$: 30/15	$\beta_{ed}3$: 24/15 $\beta_{ed}4$: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

RESULT

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.1.3. WCDMA BAND 5

Test Engineer ID:	25602	Test Date:	4/16/2022

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)	
						ANT 1	ANT 2
W-CDMA Band 5 (850MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	**25.70**	24.69
			4183	836.6	N/A	25.68	**24.70**
			4233	846.6	N/A	25.63	**24.70**
	HSDPA	Subtest 1	4132	826.4	0	**25.32**	**24.53**
			4183	836.6	0	24.93	24.49
			4233	846.6	0	24.88	24.49
		Subtest 2	4132	826.4	0	24.97	24.51
			4183	836.6	0	24.93	24.49
			4233	846.6	0	24.88	24.48
		Subtest 3	4132	826.4	0.5	24.45	24.02
			4183	836.6	0.5	24.41	23.99
			4233	846.6	0.5	24.36	23.96
		Subtest 4	4132	826.4	0.5	25.25	24.03
			4183	836.6	0.5	25.21	23.98
			4233	846.6	0.5	25.17	23.96
	HSPA (HSDPA & HSUPA)	Subtest 1	4132	826.4	0	24.56	24.50
			4183	836.6	0	24.28	24.48
			4233	846.6	0	23.93	24.44
		Subtest 2	4132	826.4	2	23.73	22.49
			4183	836.6	2	23.69	22.45
			4233	846.6	2	23.61	22.44
		Subtest 3	4132	826.4	1	24.74	23.49
			4183	836.6	1	24.67	23.47
			4233	846.6	1	24.62	23.43
		Subtest 4	4132	826.4	2	23.72	22.49
			4183	836.6	2	23.70	22.45
			4233	846.6	2	23.63	22.42
		Subtest 5	4132	826.4	0	25.31	24.06
			4183	836.6	0	25.27	24.03
			4233	846.6	0	25.22	24.03
	DC-HSDPA	Subtest 1	4132	826.4	0	23.77	24.49
			4183	836.6	0	23.92	24.49
			4233	846.6	0	24.16	24.47
		Subtest 2	4132	826.4	0	24.60	24.52
			4183	836.6	0	24.01	24.49
			4233	846.6	0	24.49	24.47
		Subtest 3	4132	826.4	0.5	25.25	24.02
			4183	836.6	0.5	25.23	23.99
			4233	846.6	0.5	25.17	23.97
		Subtest 4	4132	826.4	0.5	25.25	24.04
			4183	836.6	0.5	25.22	23.99
			4233	846.6	0.5	25.16	23.97

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.1.4. WCDMA BAND 2

Test Engineer ID:	25602	Test Date:	6/30/2022

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)			
						ANT 1	ANT 2	ANT 3	ANT 4
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	25.69	**23.40**	**25.50**	**23.40**
			9400	1880.0	N/A	**25.70**	23.39	25.48	23.37
			9538	1907.6	N/A	25.65	23.35	25.40	23.30
	HSDPA	Subtest 1	9262	1852.4	0	**24.75**	**22.48**	**24.46**	**22.42**
			9400	1880.0	0	24.70	22.41	24.42	22.37
			9538	1907.6	0	24.64	22.34	24.37	22.28
		Subtest 2	9262	1852.4	0	24.71	22.43	24.43	22.41
			9400	1880.0	0	24.67	22.41	24.38	22.33
			9538	1907.6	0	24.60	22.33	24.32	22.28
		Subtest 3	9262	1852.4	0.5	24.19	21.91	23.90	21.88
			9400	1880.0	0.5	24.15	21.89	23.85	21.88
			9538	1907.6	0.5	24.10	21.82	23.78	21.79
		Subtest 4	9262	1852.4	0.5	24.22	21.92	23.86	21.92
			9400	1880.0	0.5	24.17	21.91	23.83	21.87
			9538	1907.6	0.5	24.10	21.82	23.78	21.77
	HSPA (HSDPA & HSUPA)	Subtest 1	9262	1852.4	0	24.68	22.43	24.33	22.40
			9400	1880.0	0	24.65	22.40	24.28	22.37
			9538	1907.6	0	24.56	22.33	24.24	22.26
		Subtest 2	9262	1852.4	2	22.67	20.39	22.33	20.36
			9400	1880.0	2	22.62	20.38	22.24	20.31
			9538	1907.6	2	22.51	20.29	22.20	20.26
		Subtest 3	9262	1852.4	1	23.67	21.35	23.29	21.38
			9400	1880.0	1	23.64	21.37	23.20	21.34
			9538	1907.6	1	23.56	21.31	23.16	21.25
		Subtest 4	9262	1852.4	2	22.68	20.42	22.23	20.38
			9400	1880.0	2	22.65	20.38	22.18	20.33
			9538	1907.6	2	22.56	20.28	22.11	20.24
		Subtest 5	9262	1852.4	0	24.27	22.00	23.80	21.97
			9400	1880.0	0	24.24	21.97	23.74	21.95
			9538	1907.6	0	24.14	21.89	23.73	21.85
	DC-HSDPA	Subtest 1	9262	1852.4	0	24.73	22.40	24.22	22.40
			9400	1880.0	0	24.72	22.43	24.19	22.37
			9538	1907.6	0	24.63	22.35	24.14	22.26
		Subtest 2	9262	1852.4	0	**24.75**	22.46	24.23	**22.42**
			9400	1880.0	0	24.71	22.42	24.20	22.37
			9538	1907.6	0	24.61	22.34	24.17	22.30
		Subtest 3	9262	1852.4	0.5	24.23	21.95	23.74	21.93
			9400	1880.0	0.5	24.21	21.93	23.68	21.89
			9538	1907.6	0.5	24.13	21.82	23.65	21.79
		Subtest 4	9262	1852.4	0.5	24.27	21.95	23.74	21.93
			9400	1880.0	0.5	24.23	21.94	23.69	21.89
			9538	1907.6	0.5	24.14	21.85	23.65	21.79

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.1.5. WCDMA BAND 4

Test Engineer ID:	25602	Test Date:	4/14/2022

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)			
						ANT 1	ANT 2	ANT 3	ANT 4
W-CDMA Band 4 (1700MHz)	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	**25.70**	**23.40**	25.48	**23.40**
			1413	1732.6	N/A	25.61	23.31	25.49	23.34
			1513	1752.6	N/A	25.60	23.30	**25.50**	23.29
	HSDPA	Subtest 1	1312	1712.4	0	**24.72**	**22.39**	24.49	**22.44**
			1413	1732.6	0	24.61	22.31	**24.58**	22.32
			1513	1752.6	0	24.59	22.29	24.49	22.27
		Subtest 2	1312	1712.4	0	24.68	**22.39**	24.49	22.43
			1413	1732.6	0	24.62	22.30	24.48	22.33
			1513	1752.6	0	24.59	22.22	24.53	22.28
		Subtest 3	1312	1712.4	0.5	24.19	21.86	24.01	21.95
			1413	1732.6	0.5	24.10	21.81	23.97	21.84
			1513	1752.6	0.5	24.09	21.78	24.02	21.79
		Subtest 4	1312	1712.4	0.5	24.21	21.88	24.00	21.93
			1413	1732.6	0.5	24.10	21.78	23.97	21.81
			1513	1752.6	0.5	24.09	21.76	24.00	21.78
	HSPA (HSDPA & HSUPA)	Subtest 1	1312	1712.4	0	24.66	22.37	24.48	22.42
			1413	1732.6	0	24.57	22.25	24.45	22.33
			1513	1752.6	0	24.56	22.23	24.50	22.28
		Subtest 2	1312	1712.4	2	22.66	20.37	22.48	20.40
			1413	1732.6	2	22.57	20.28	22.45	20.31
			1513	1752.6	2	22.54	20.26	22.46	20.26
		Subtest 3	1312	1712.4	1	23.67	21.35	23.47	21.40
			1413	1732.6	1	23.56	21.24	23.46	21.29
			1513	1752.6	1	23.55	21.25	23.51	21.25
		Subtest 4	1312	1712.4	2	22.69	20.35	22.48	20.38
			1413	1732.6	2	22.58	20.24	22.44	20.30
			1513	1752.6	2	22.53	20.21	22.50	20.25
		Subtest 5	1312	1712.4	0	24.25	21.94	24.06	21.96
			1413	1732.6	0	24.15	21.85	24.05	21.89
			1513	1752.6	0	24.14	21.80	24.06	21.82
	DC-HSDPA	Subtest 1	1312	1712.4	0	24.69	22.37	24.49	22.42
			1413	1732.6	0	24.61	22.29	24.50	22.35
			1513	1752.6	0	24.61	22.27	24.54	22.32
		Subtest 2	1312	1712.4	0	24.71	22.38	24.52	22.43
			1413	1732.6	0	24.63	22.29	24.51	22.35
			1513	1752.6	0	24.62	22.25	24.57	22.33
		Subtest 3	1312	1712.4	0.5	24.21	21.85	24.03	21.95
			1413	1732.6	0.5	24.12	21.80	24.01	21.85
			1513	1752.6	0.5	24.12	21.77	24.07	21.84
		Subtest 4	1312	1712.4	0.5	24.21	21.92	24.00	21.94
			1413	1732.6	0.5	24.11	21.79	24.02	21.84
			1513	1752.6	0.5	24.10	21.77	24.04	21.82

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9. CONDUCTED TEST RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
ISED: RSS132; RSS133§2.3; RSS139

LIMITS

For reporting purposes only.

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

RESULTS

There is no limit required and power is the same for low, middle, and high channel; therefore, only middle channel was tested.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

GSM

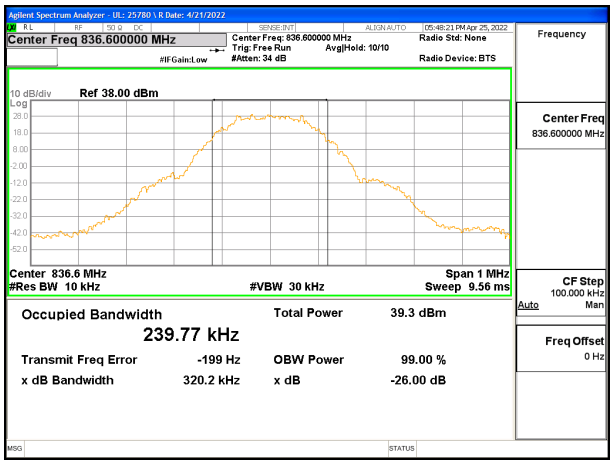
Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
850	GPRS	190	836.6	239.77	320.2
	EGPRS			237.21	297.1
1900	GPRS	661	1880.0	240.35	319.9
	EGPRS			239.07	307.8

WCDMA

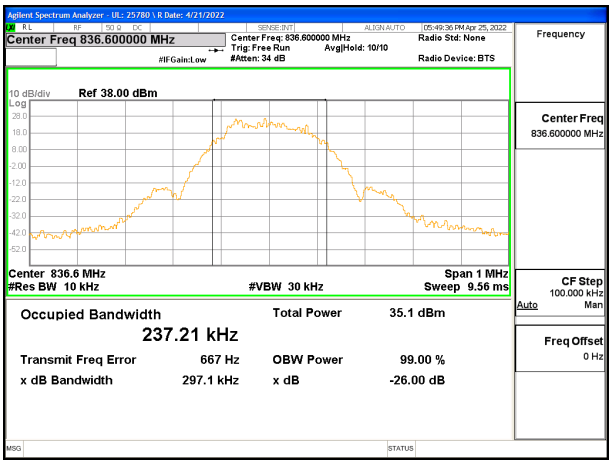
Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND 5	REL 99	4408	836.6	4.1471	4.707
	HSDPA			4.1267	4.693
BAND 2	REL 99	9800	1880.0	4.1451	4.708
	HSDPA			4.1479	4.695
BAND 4	REL 99	1638	1732.6	4.1537	4.698
	HSDPA			4.1654	4.704

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

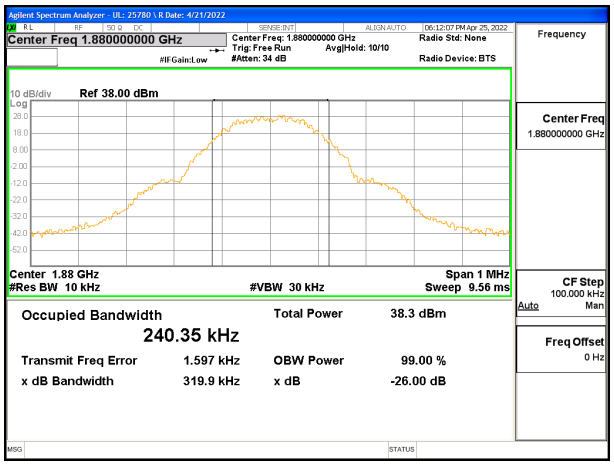
9.1.1. GSM



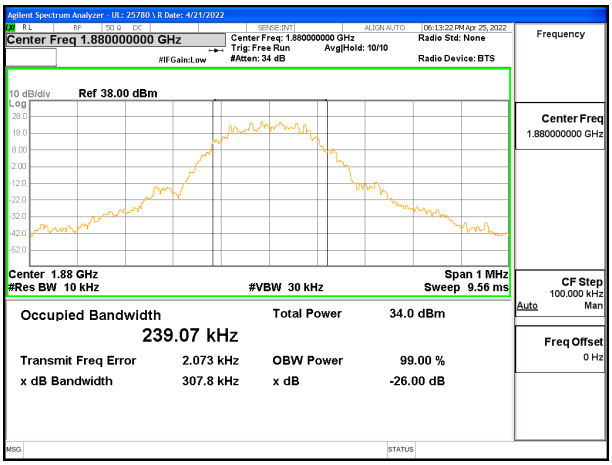
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



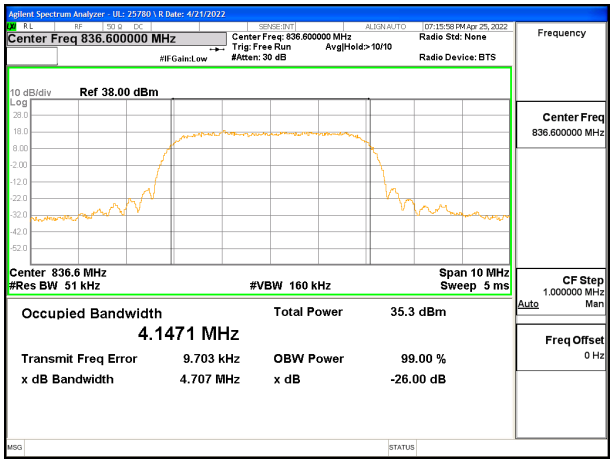
GSM 1900 GPRS Middle Channel



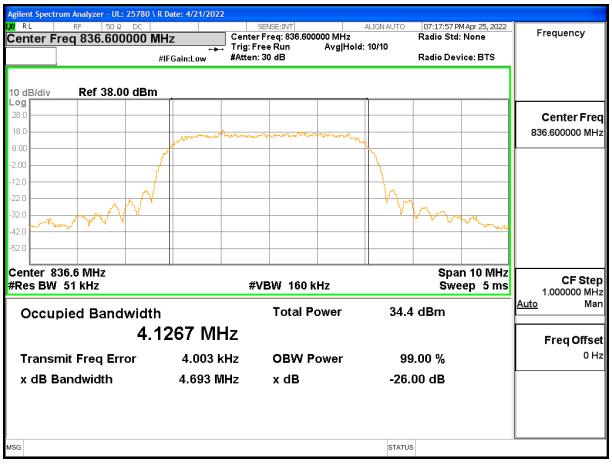
GSM 1900 EGPRS Middle Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

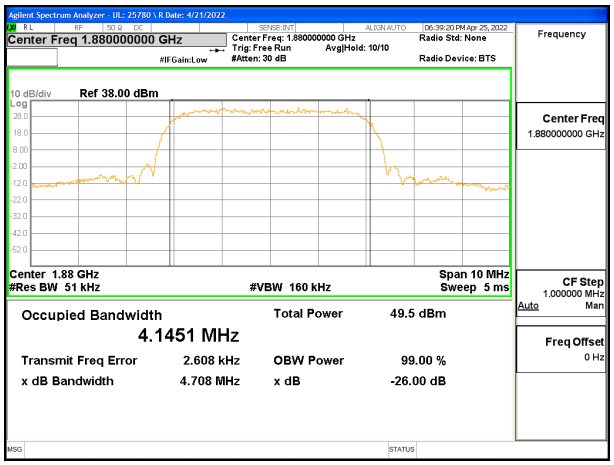
9.1.2. WCDMA



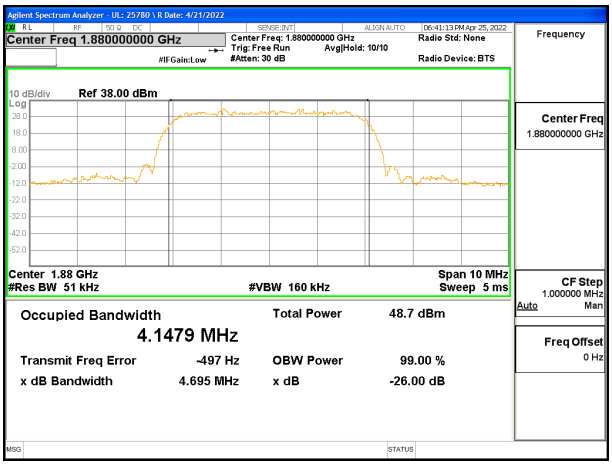
WCDMA Band 5 Rel 99 Middle Channel



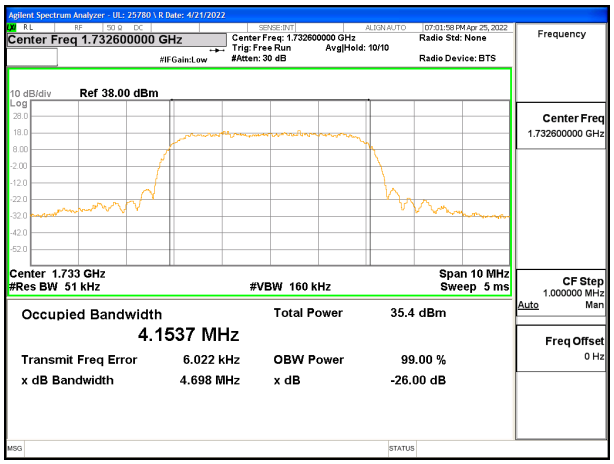
WCDMA Band 5 HSDPA Middle Channel



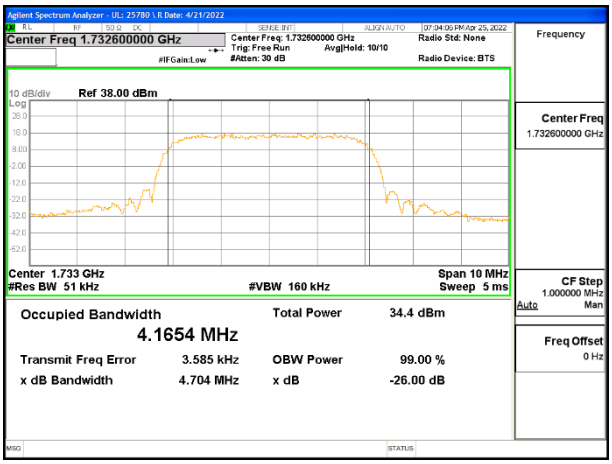
WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel



WCDMA Band 4 Rel 99 Middle Channel



WCDMA Band 4 HSDPA Middle Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.2. BAND EDGE AND EMISSION MASK

LIMITS

FCC: §22.917(a), §24.238, §27.53 (h)
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.

RSS132§5.5
Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS133§6.5.1
Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS139§6.6

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least43 + 10 log10 p (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

TEST PROCEDURE

The transmitter output was connected to a R&S CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer. For each band edge measurement:

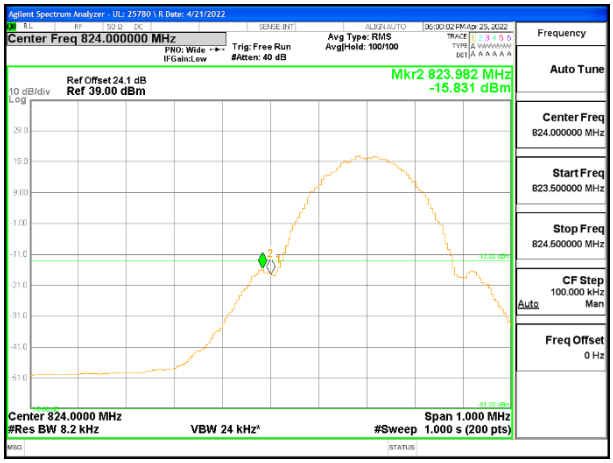
- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

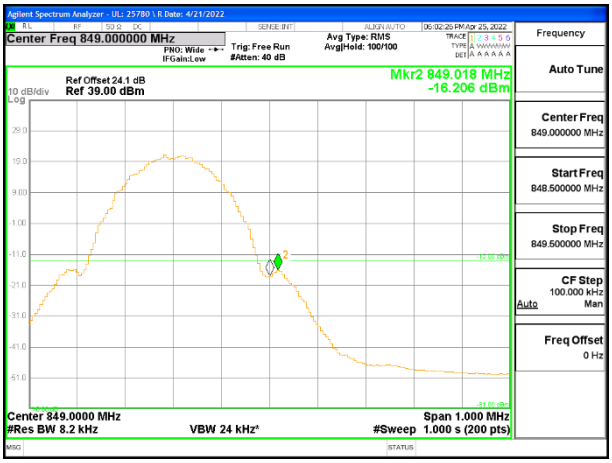
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.2.1. GSM

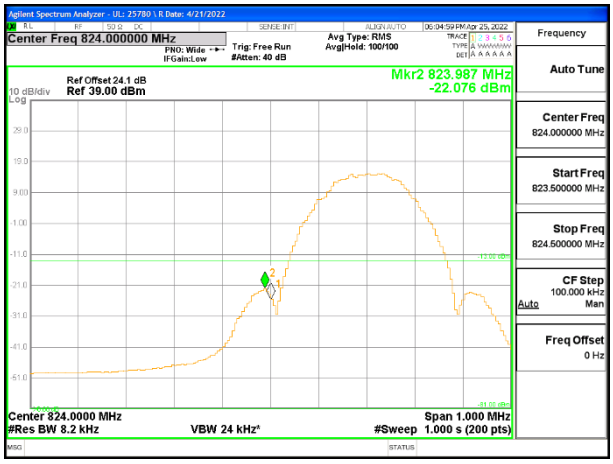
GSM 850



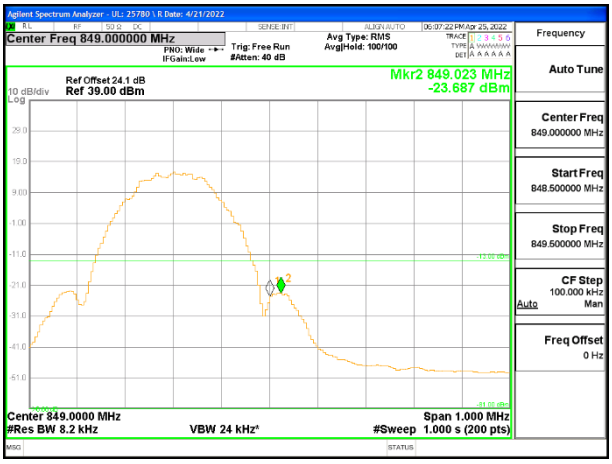
GSM 850 GPRS Low Channel



GSM 850 GPRS High Channel



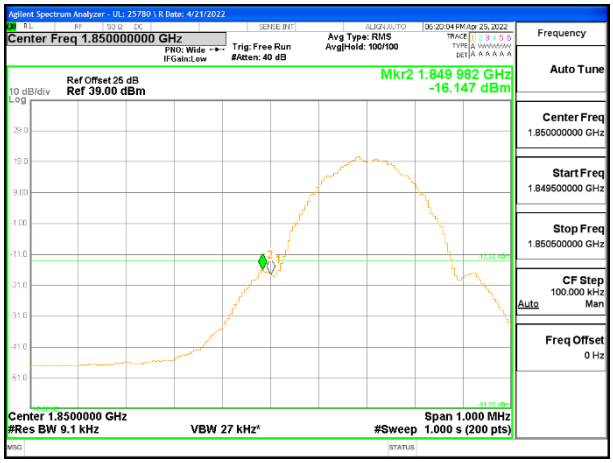
GSM 850 EGPRS Low Channel



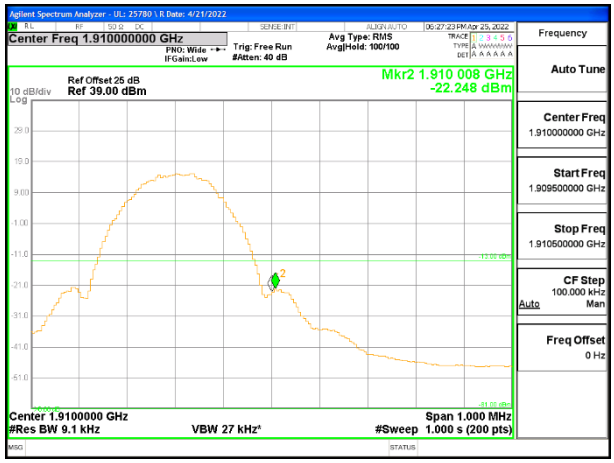
GSM 850 EGPRS High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

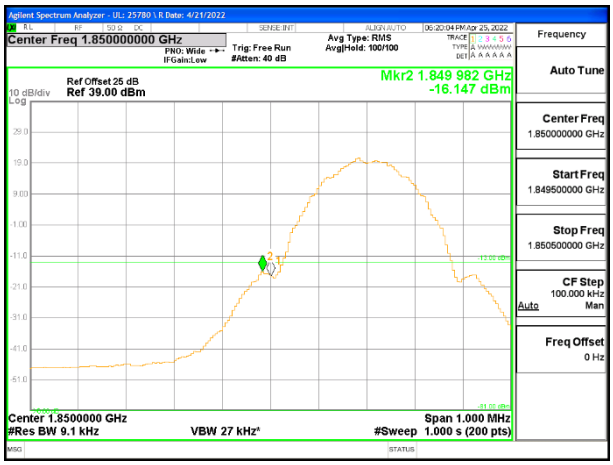
GSM 1900



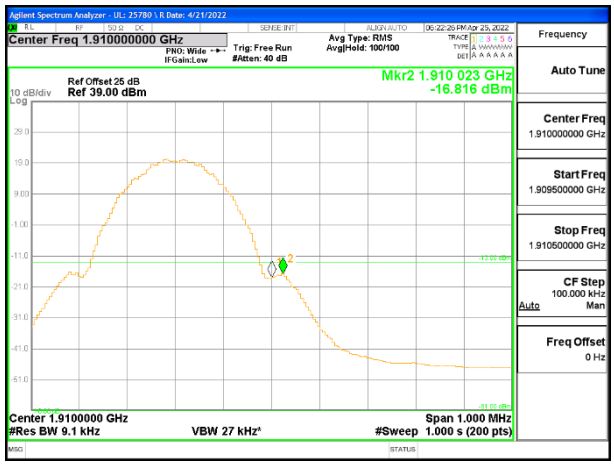
GSM 1900 GPRS Low Channel



GSM 1900 GPRS High Channel



GSM 1900 EGPRS Low Channel

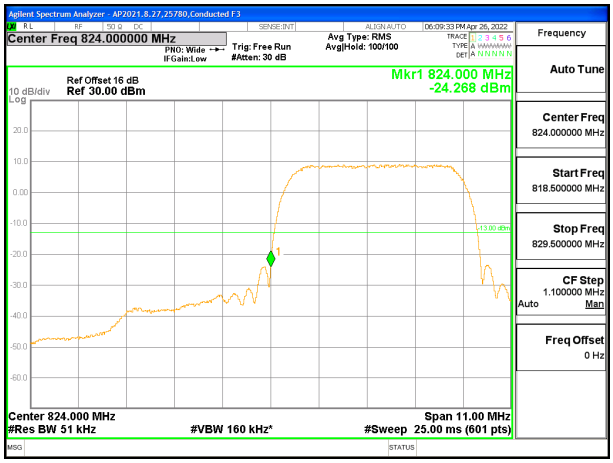


GSM 1900 EGPRS High Channel

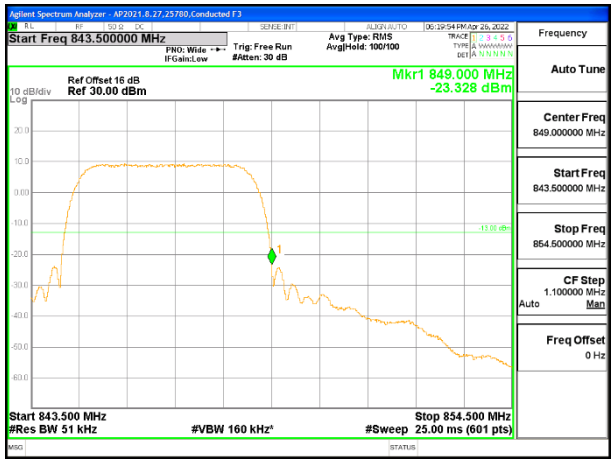
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.2.2. WCDMA

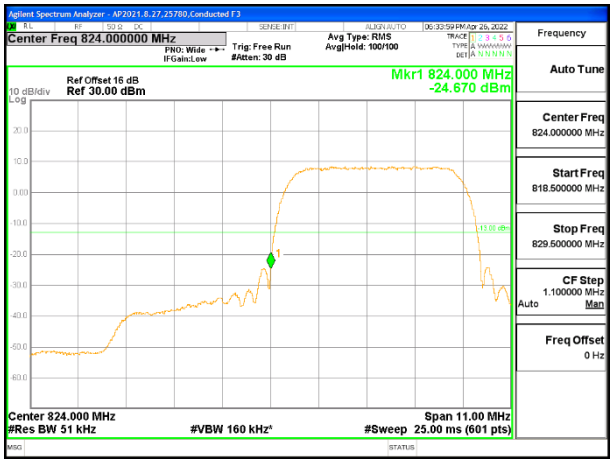
WCDMA BAND 5



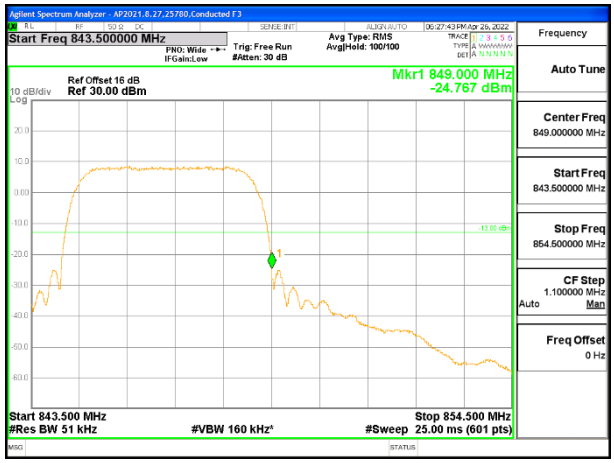
WCDMA Band 5 Rel 99 Low Channel



WCDMA Band 5 Rel 99 High Channel



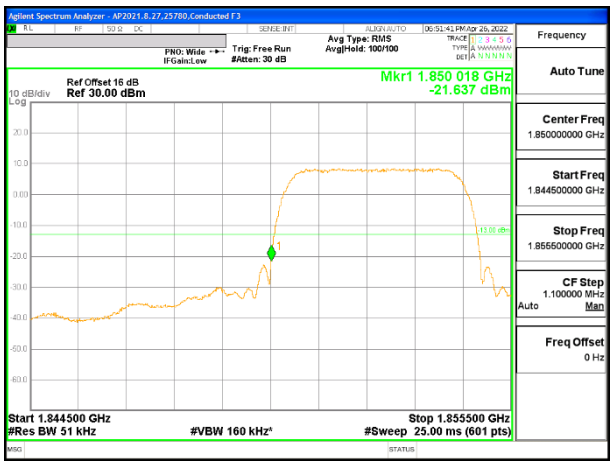
WCDMA Band 5 HSDPA Low Channel



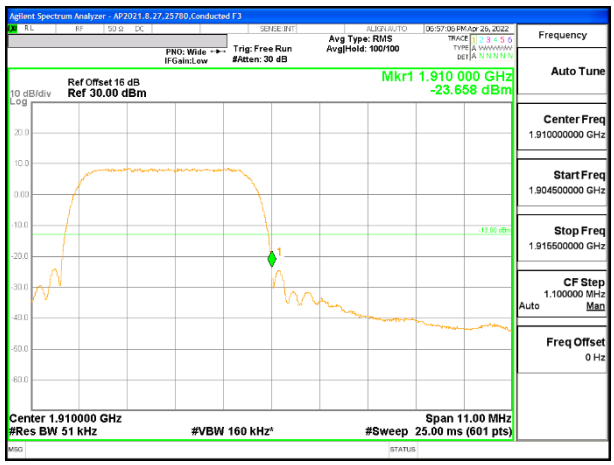
WCDMA Band 5 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

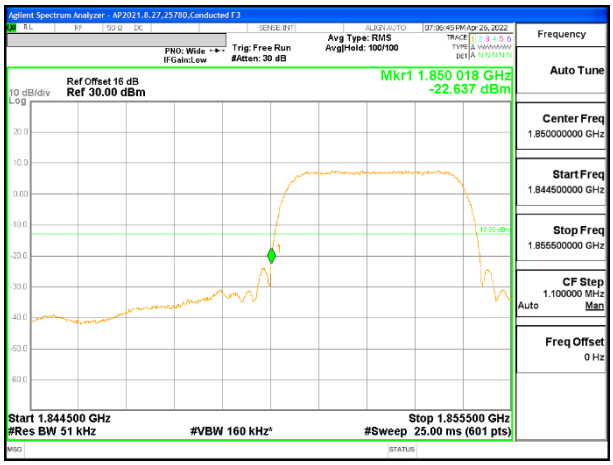
WCDMA BAND 2



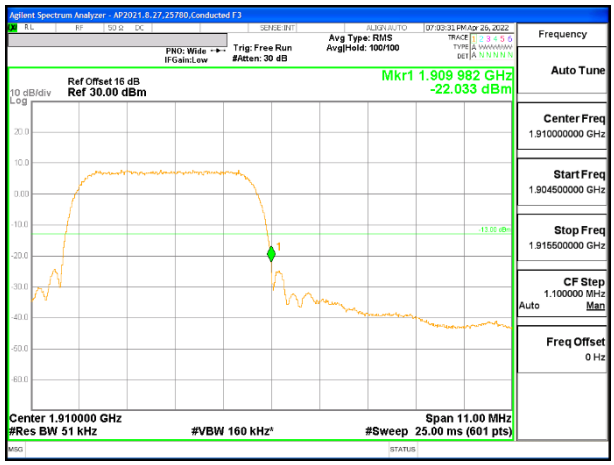
WCDMA Band 2 Rel 99 Low Channel



WCDMA Band 2 Rel 99 High Channel



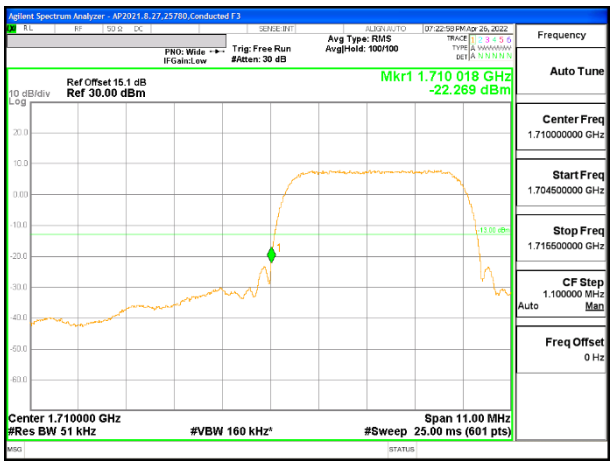
WCDMA Band 2 HSDPA Low Channel



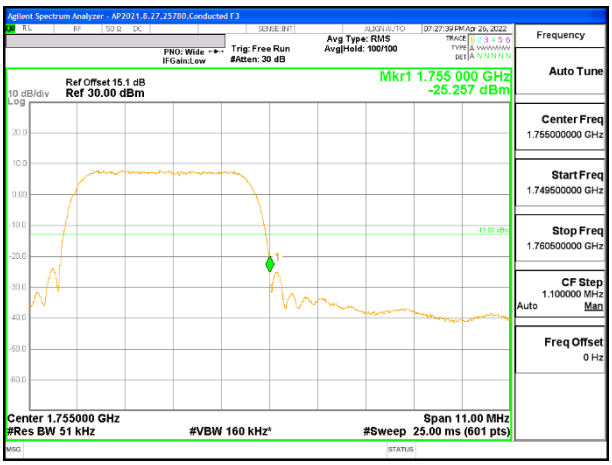
WCDMA Band 2 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

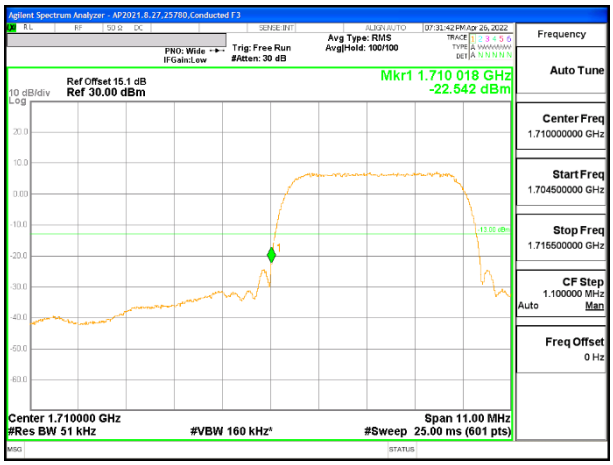
WCDMA BAND 4



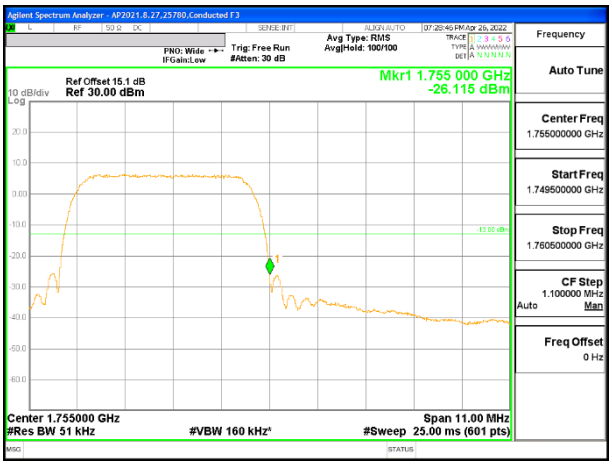
WCDMA Band 4 Rel 99 Low Channel



WCDMA Band 4 Rel 99 High Channel



WCDMA Band 4 HSDPA Low Channel



WCDMA Band 4 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917, §24.238, and §27.53
ISED: RSS132§5.5; RSS133§6.5 and RSS139§6.6

LIMITS

FCC: §22.917(a), §24.238, §27.53 (h)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

RSS132§5.5, RSS133§6.5.1, RSS139§6.6
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

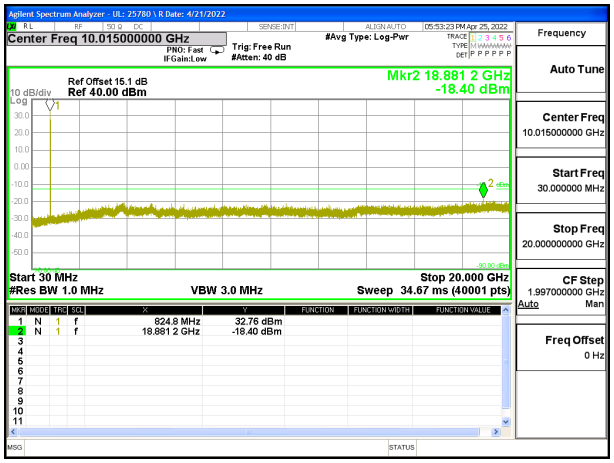
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

RESULTS

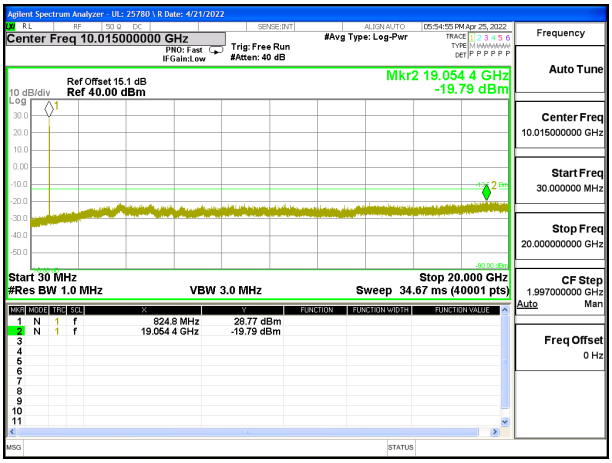
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.3.1. GSM

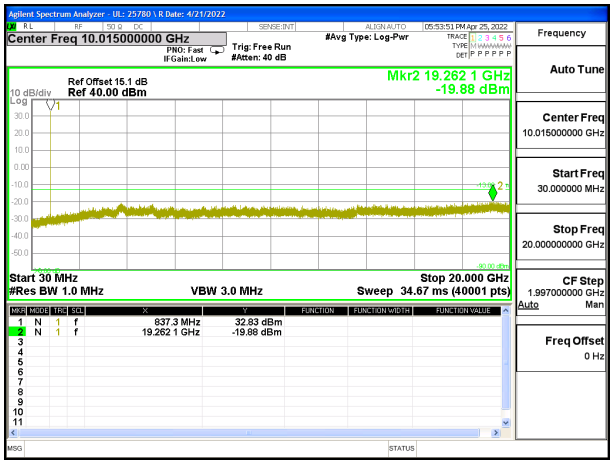
GPRS 850



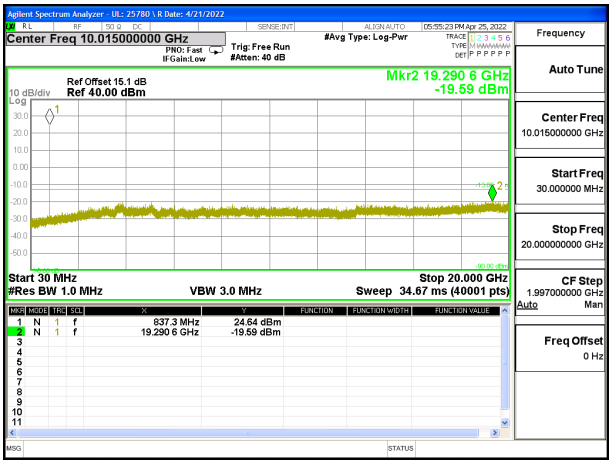
GSM 850 GPRS Low Channel



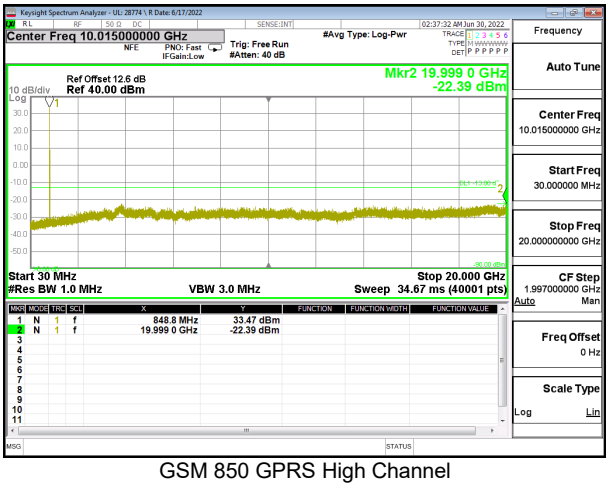
GSM 850 EGPRS Low Channel



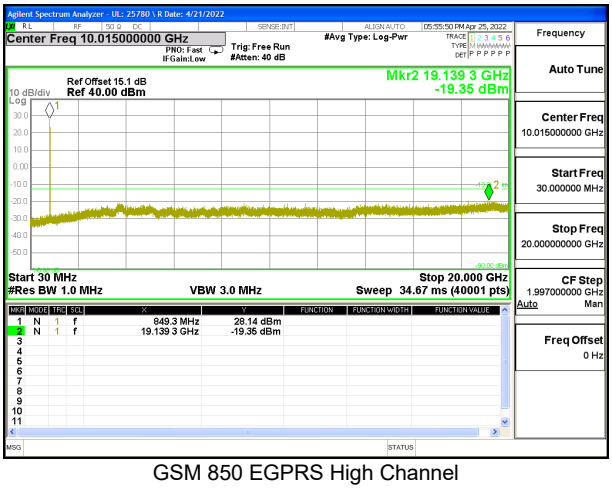
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



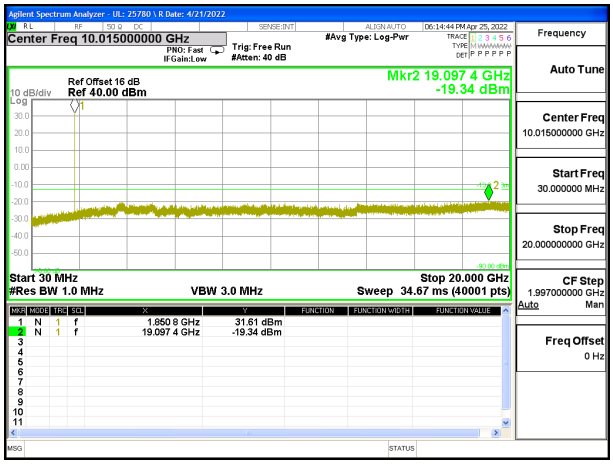
GSM 850 GPRS High Channel



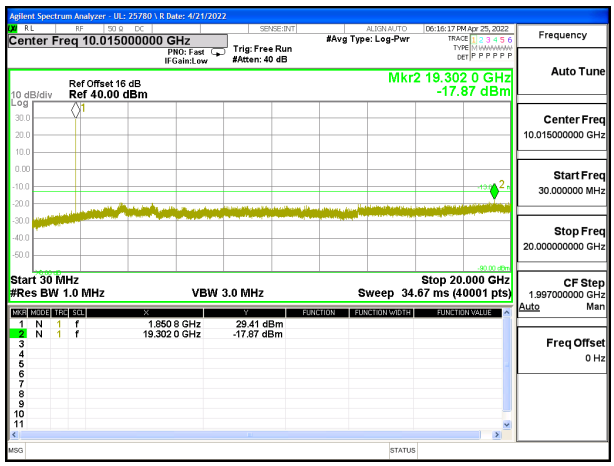
GSM 850 EGPRS High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

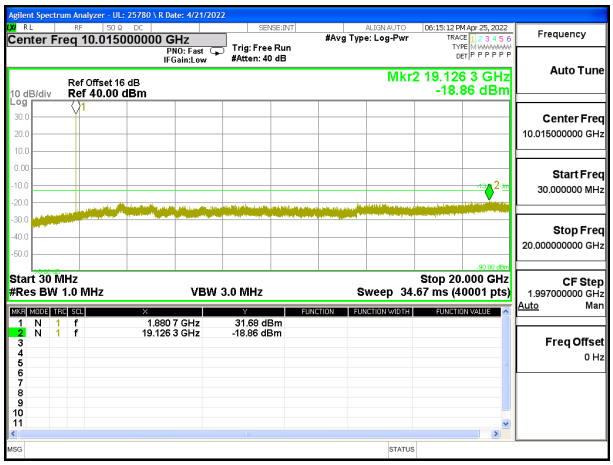
GSM 1900



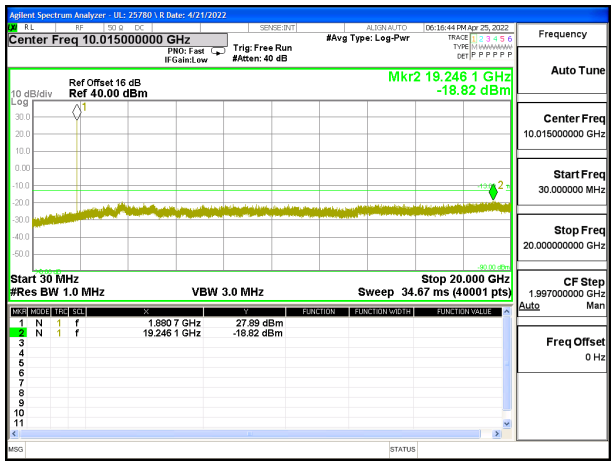
GSM 1900 GPRS Low Channel



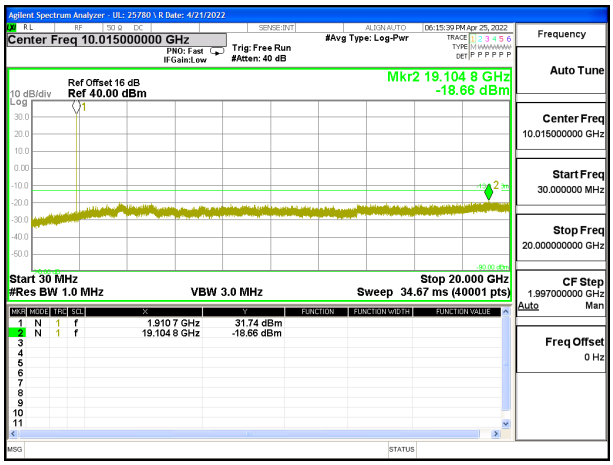
GSM 1900 EGPRS Low Channel



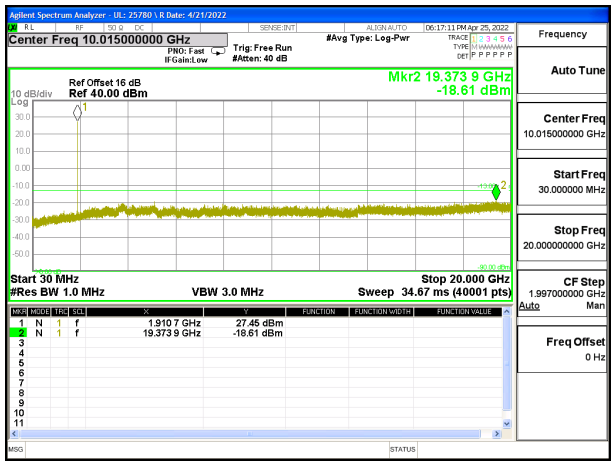
GSM 1900 GPRS Middle Channel



GSM 1900 EGPRS Middle Channel



GSM 1900 GPRS High Channel

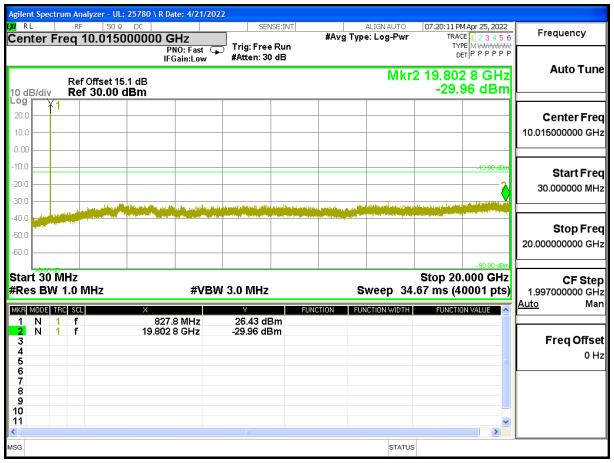


GSM 1900 EGPRS High Channel

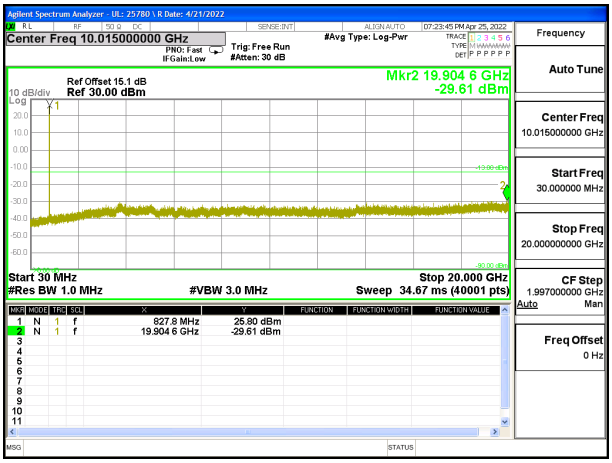
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.3.2. WCDMA

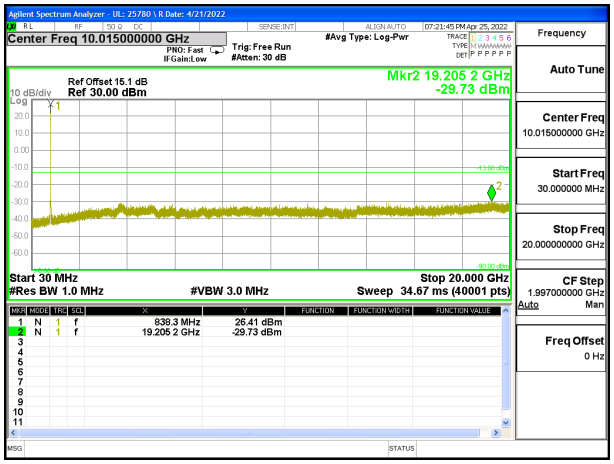
WCDMA BAND 5



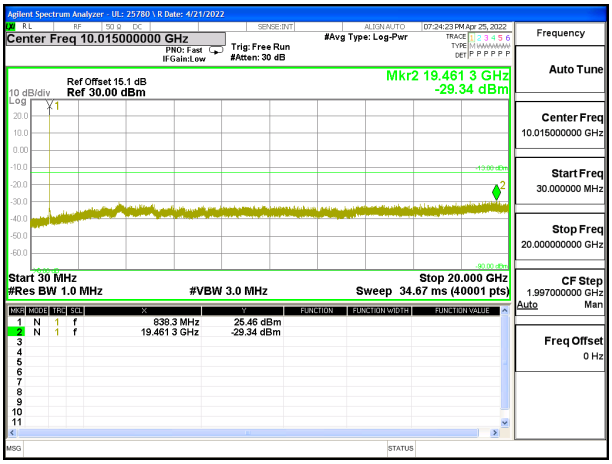
WCDMA Band 5 Rel 99 Low Channel



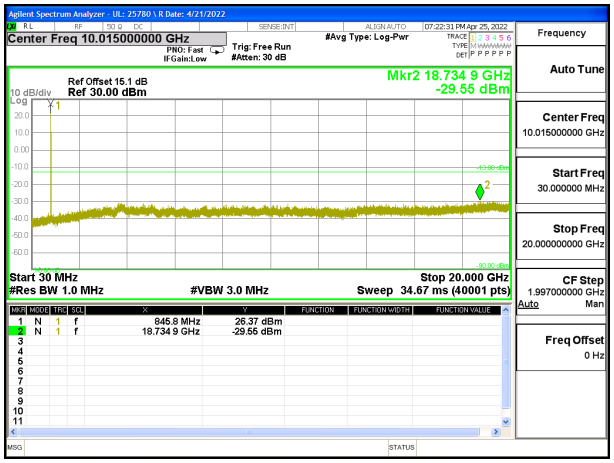
WCDMA Band 5 HSDPA Low Channel



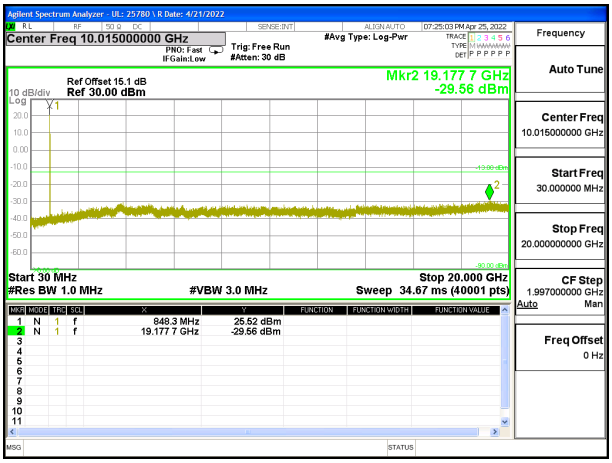
WCDMA Band 5 Rel 99 Middle Channel



WCDMA Band 5 HSDPA Middle Channel



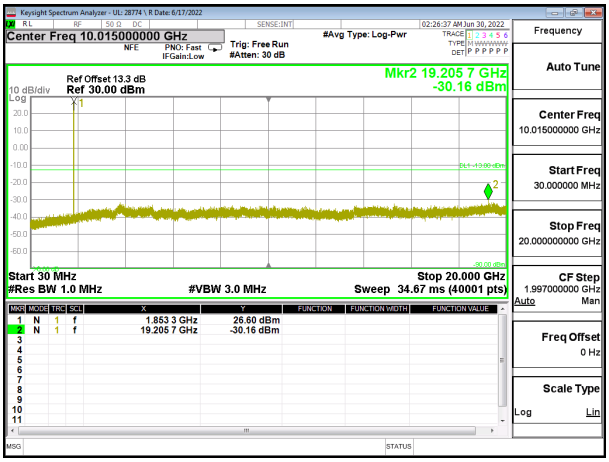
WCDMA Band 5 Rel 99 High Channel



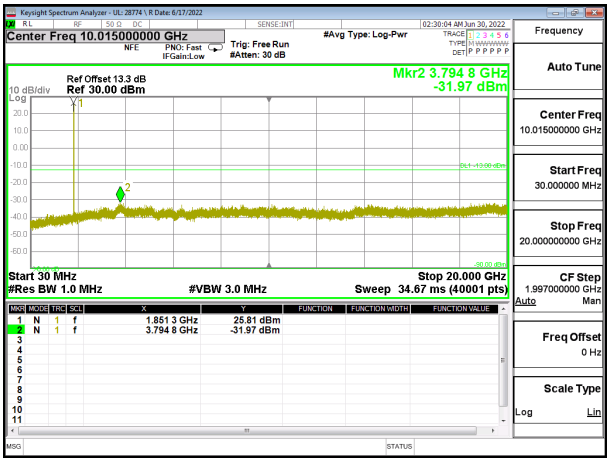
WCDMA Band 5 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

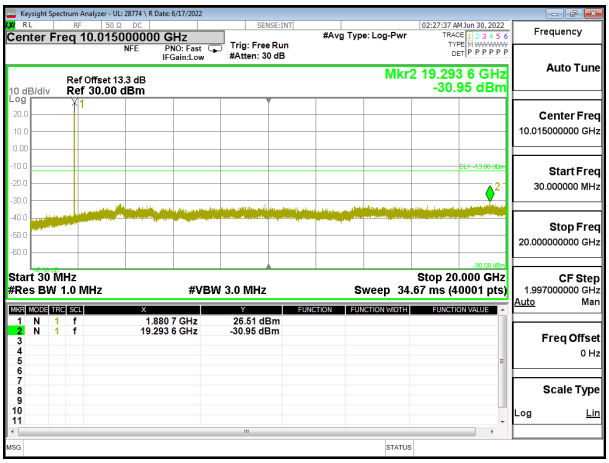
WCDMA BAND 2



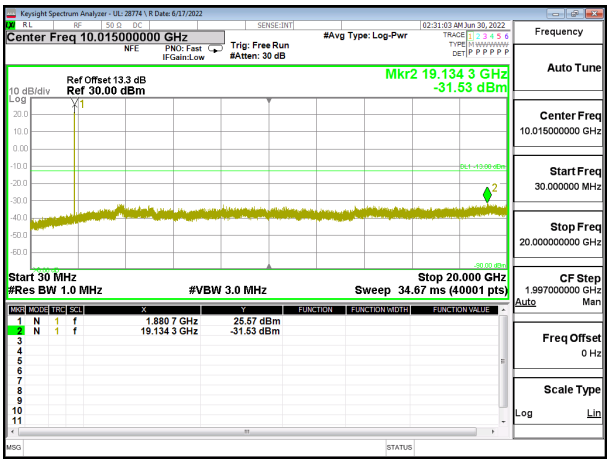
WCDMA Band 2 Rel 99 Low Channel



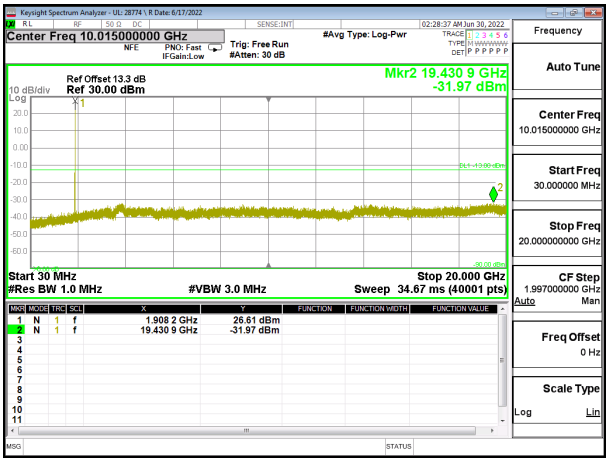
WCDMA Band 2 HSDPA Low Channel



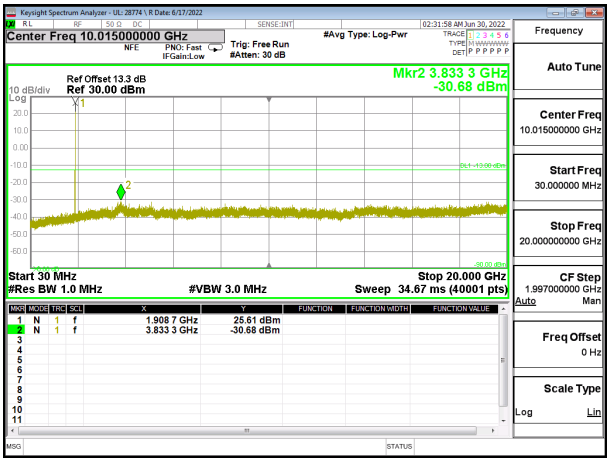
WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel



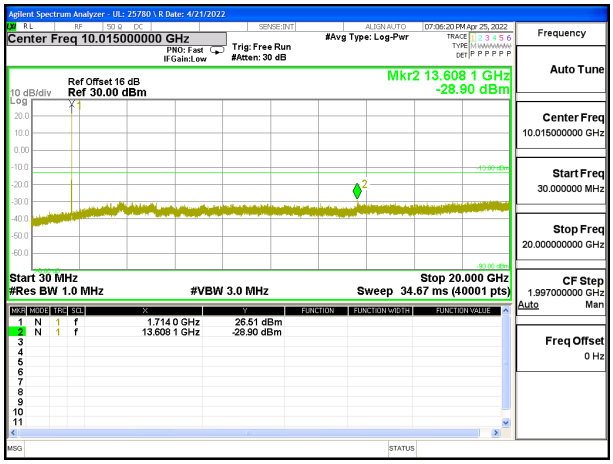
WCDMA Band 2 Rel 99 High Channel



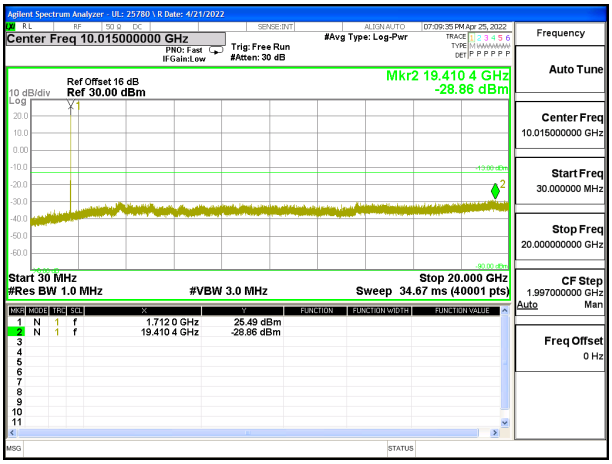
WCDMA Band 2 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

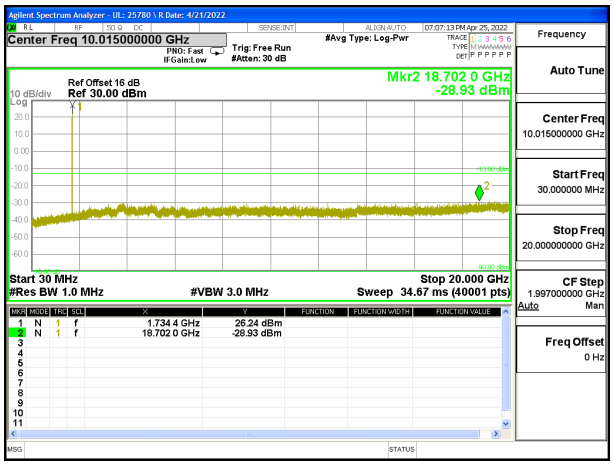
WCDMA BAND 4



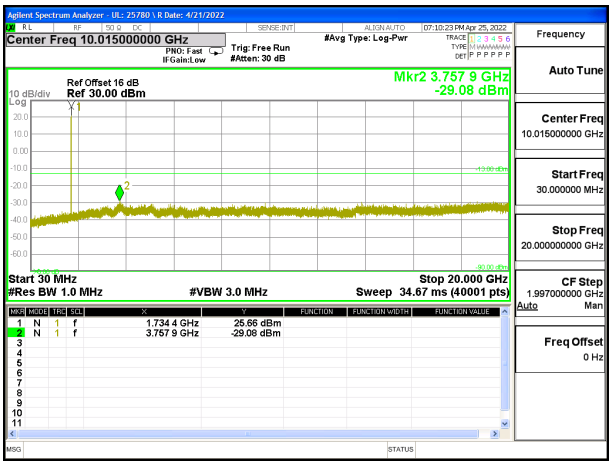
WCDMA Band 4 Rel 99 Low Channel



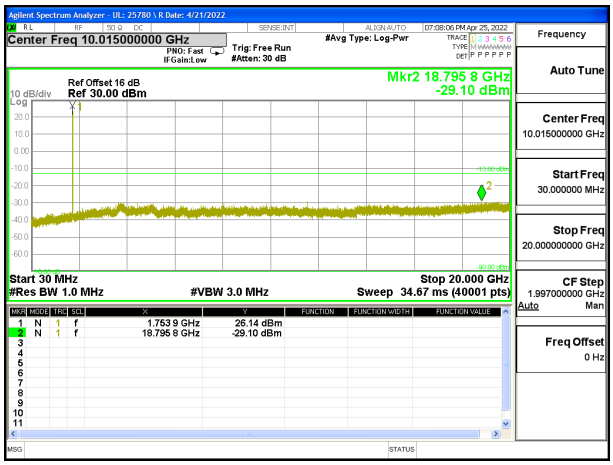
WCDMA Band 4 HSDPA Low Channel



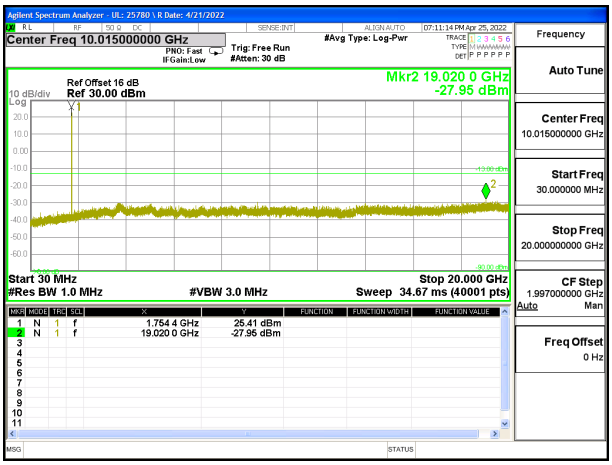
WCDMA Band 4 Rel 99 Middle Channel



WCDMA Band 4 HSDPA Middle Channel



WCDMA Band 4 Rel 99 High Channel



WCDMA Band 4 HSDPA High Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, and §27.54
ISED: RSS132§5.3; RSS133§6.3 and RSS139§6.4

LIMITS

FCC §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

FCC §24.235 & §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

RSS132§5.3
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 SRSP for mobile stations and±1.5 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within each of the sub-bands (see Section 5.1) when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS133§6.3
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and±1.0 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS139§6.4
The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30°C to +50°C
- Voltage = (85% - 115%)

  Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
  End Voltage, 2.95VDC.

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.4.1. GSM

Test Engineer ID:	25602	Test Date:	6/22/2022

GPRS 850

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)		824.0423	848.9530			
Extreme (50°C)		824.0423	848.9530	12.7	0.015	Yes
Extreme (40°C)		824.0423	848.9530	11.9	0.014	Yes
Extreme (30°C)		824.0423	848.9530	13.3	0.016	Yes
Extreme (10°C)	Normal	824.0423	848.9530	13.1	0.016	Yes
Extreme (0°C)		824.0423	848.9530	14.6	0.017	Yes
Extreme (-10°C)		824.0423	848.9530	18.1	0.022	Yes
Extreme (-20°C)		824.0423	848.9530	15.6	0.019	Yes
Extreme (-30°C)		824.0423	848.9530	15.8	0.019	Yes
20°C	15%	824.0423	848.9530	14.5	0.017	Yes
	-15%	824.0423	848.9530	12.3	0.015	Yes
	End Point Voltage	824.0423	848.9530	17.1	0.020	Yes

GPRS 1900

Band	2	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1850	1910		2.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)		1850.0411	1909.9430			
Extreme (50°C)		1850.0411	1909.9430	9.5	0.005	Yes
Extreme (40°C)		1850.0411	1909.9430	13.1	0.007	Yes
Extreme (30°C)		1850.0411	1909.9430	12.1	0.006	Yes
Extreme (10°C)	Normal	1850.0411	1909.9430	13.3	0.007	Yes
Extreme (0°C)		1850.0411	1909.9430	15.1	0.008	Yes
Extreme (-10°C)		1850.0411	1909.9430	15.3	0.008	Yes
Extreme (-20°C)		1850.0411	1909.9430	15.5	0.008	Yes
Extreme (-30°C)		1850.0411	1909.9430	15.1	0.008	Yes
20°C	15%	1850.0411	1909.9430	8.5	0.005	Yes
	-15%	1850.0411	1909.9430	11.2	0.006	Yes
	End Point Voltage	1850.0411	1909.9430	13.3	0.007	Yes

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.4.2. WCDMA

Test Engineer ID:	25602	Test Date:	5/22/2022

WCDMA REL 99 BAND 5

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)		824.0813	848.9150			
Extreme (50°C)		824.0813	848.9150	-2.9	-0.003	Yes
Extreme (40°C)		824.0813	848.9150	3.4	0.004	Yes
Extreme (30°C)		824.0813	848.9150	-3.5	-0.004	Yes
Extreme (10°C)	Normal	824.0813	848.9150	-3.4	-0.004	Yes
Extreme (0°C)		824.0813	848.9150	-2.6	-0.003	Yes
Extreme (-10°C)		824.0813	848.9150	3.3	0.004	Yes
Extreme (-20°C)		824.0813	848.9150	3.5	0.004	Yes
Extreme (-30°C)		824.0813	848.9150	-3.6	-0.004	Yes
20°C	15%	824.0813	848.9150	-2.9	-0.003	Yes
	-15%	824.0813	848.9150	-3.3	-0.004	Yes
	End Point Voltage	824.0813	848.9150	-3.2	-0.004	Yes

WCDMA REL 99 BAND 2

Band	2	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1850	1910		2.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)		1850.0763	1909.9275			
Extreme (50°C)		1850.0763	1909.9275	6.0	0.003	Yes
Extreme (40°C)		1850.0763	1909.9275	5.3	0.003	Yes
Extreme (30°C)		1850.0763	1909.9275	4.8	0.003	Yes
Extreme (10°C)	Normal	1850.0763	1909.9275	5.9	0.003	Yes
Extreme (0°C)		1850.0763	1909.9275	8.9	0.005	Yes
Extreme (-10°C)		1850.0763	1909.9275	8.9	0.005	Yes
Extreme (-20°C)		1850.0763	1909.9275	8.6	0.005	Yes
Extreme (-30°C)		1850.0763	1909.9275	7.8	0.004	Yes
20°C	15%	1850.0763	1909.9275	5.4	0.003	Yes
	-15%	1850.0763	1909.9275	4.4	0.002	Yes
	End Point Voltage	1850.0763	1909.9275	-4.8	-0.003	Yes

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA REL 99 BAND 4

Band	4	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1710	1755			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	1710.0713	1754.9288			
Extreme (50°C)		1710.0713	1754.9288	-6.8	-0.004	Yes
Extreme (40°C)		1710.0713	1754.9288	-8.1	-0.005	Yes
Extreme (30°C)		1710.0713	1754.9288	-9.9	-0.006	Yes
Extreme (10°C)		1710.0713	1754.9288	-7.1	-0.004	Yes
Extreme (0°C)		1710.0713	1754.9288	-5.8	-0.003	Yes
Extreme (-10°C)		1710.0713	1754.9288	-5.9	-0.003	Yes
Extreme (-20°C)		1710.0713	1754.9288	-5.3	-0.003	Yes
Extreme (-30°C)		1710.0713	1754.9288	-5.7	-0.003	Yes
20°C	15%	1710.0713	1754.9288	-7.1	-0.004	Yes
	-15%	1710.0713	1754.9288	-7.5	-0.004	Yes
	End Point Voltage	1710.0713	1754.9288	-8.6	-0.005	Yes

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.5. PEAK-TO-AVERAGE POWER RATIO

LIMIT

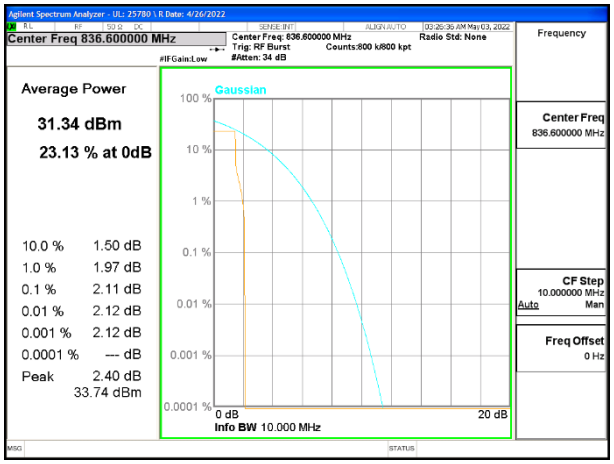
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

RESULT

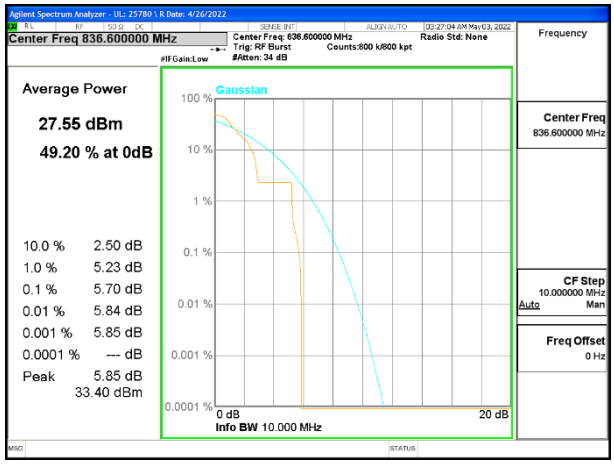
Ant 1 was used to measure as the worst case. The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

Test Engineer ID:	25780	Test Date:	5/3/2022

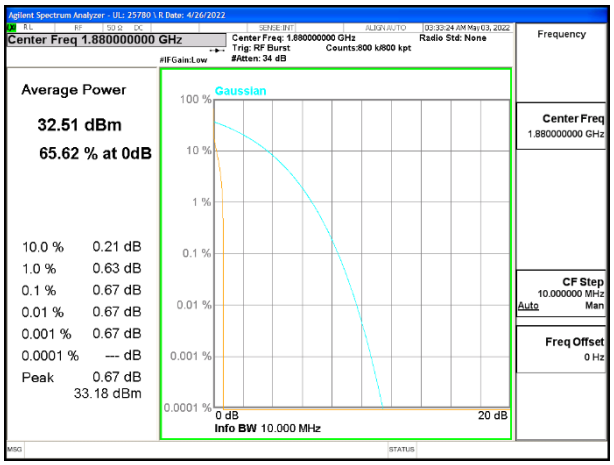
9.5.1. GSM



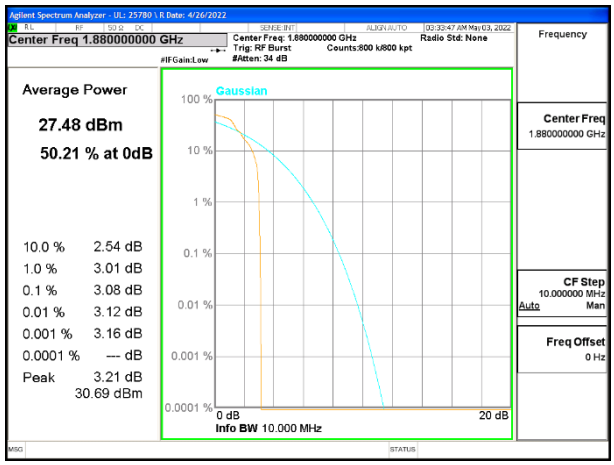
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel



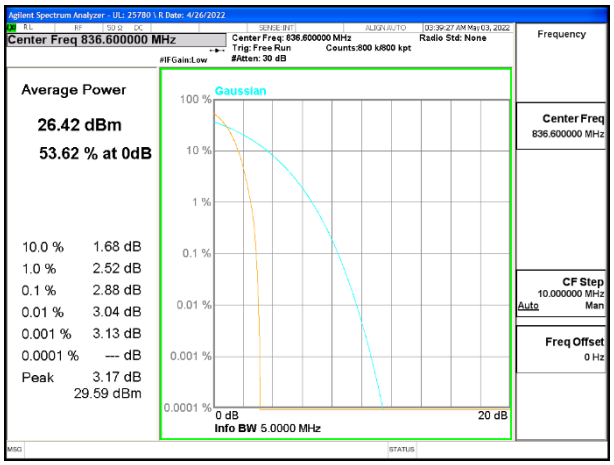
GSM 1900 GPRS Middle Channel



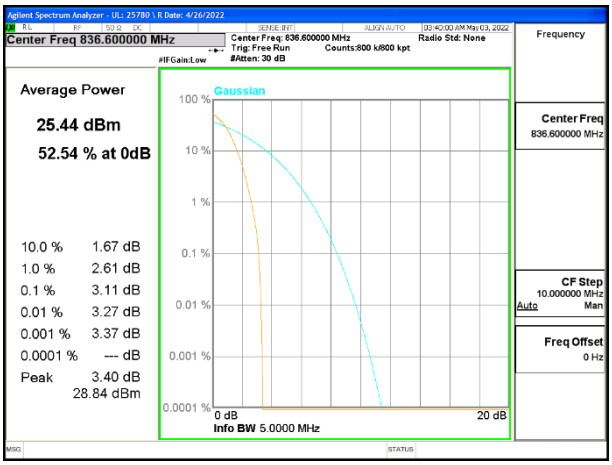
GSM 1900 EGPRS Middle Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

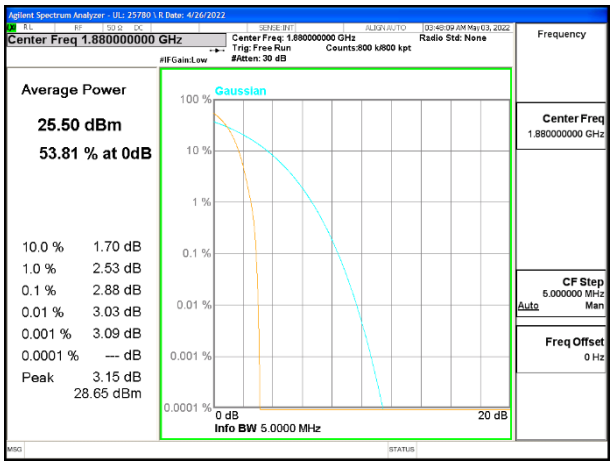
9.5.2. WCDMA



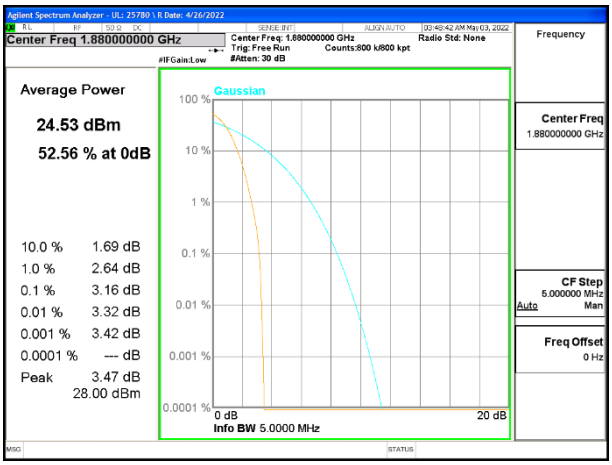
WCDMA Band 5 Rel 99 Middle Channel



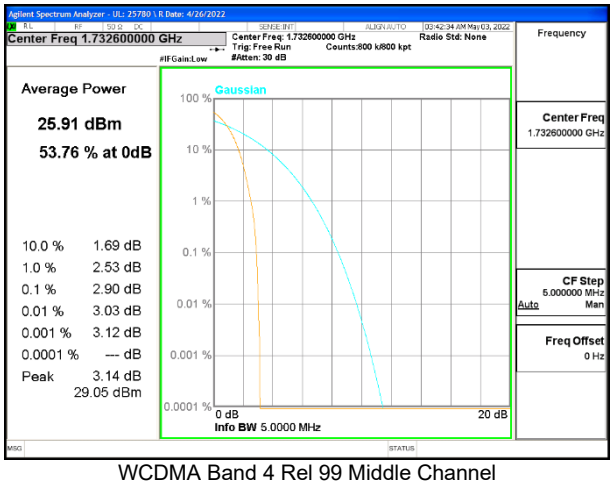
WCDMA Band 5 HSDPA Middle Channel



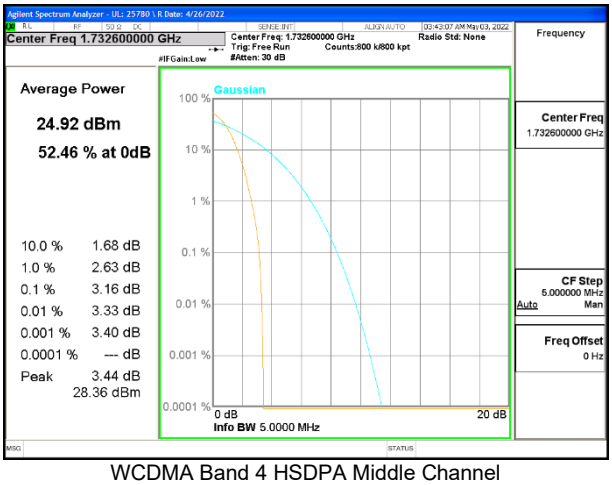
WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel



WCDMA Band 4 Rel 99 Middle Channel



WCDMA Band 4 HSDPA Middle Channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, we measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

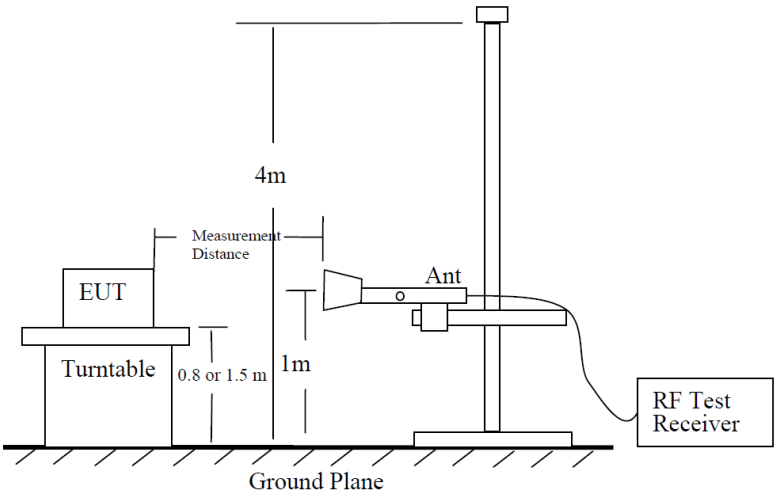


Figure 6—Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

a) E (dBµV/m) = Measured amplitude level (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m).
b) E (dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).
c) E (dBµV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.
d) EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

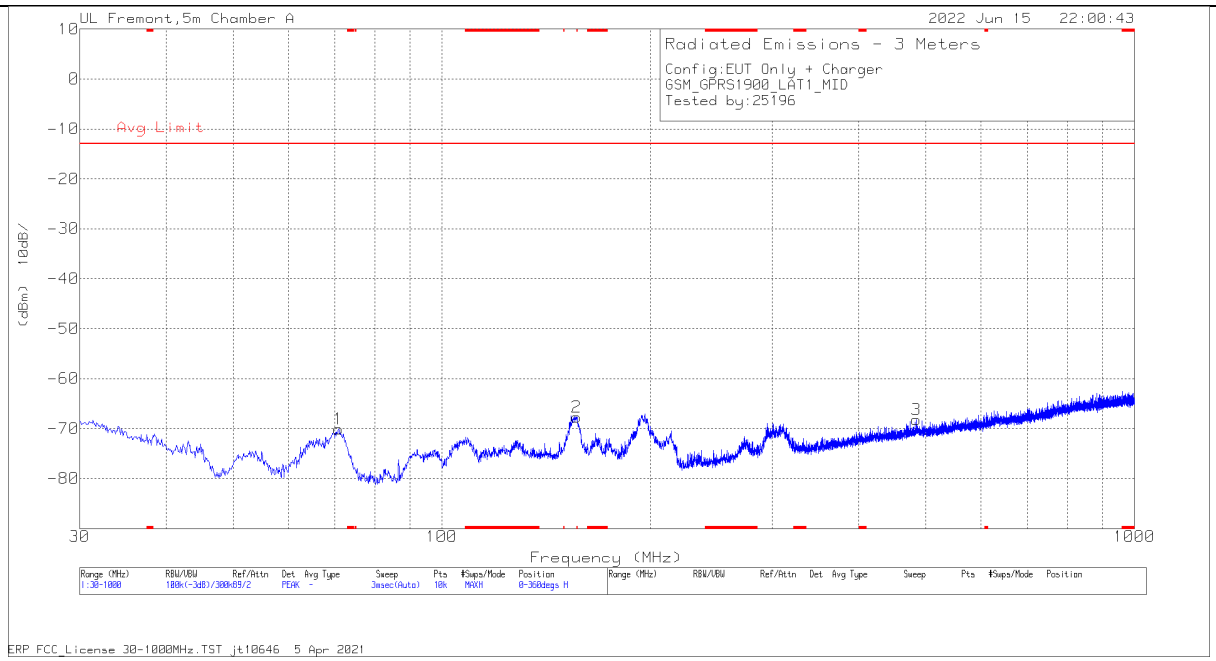
So, from d)
The measuring distance is usually at 3m, then 20*Log(3)=9.5424

Then, EIRP (dBm) = E (dBµV/m) + 9.5424 − 104.8 = E (dBµV/m) – 95.2576

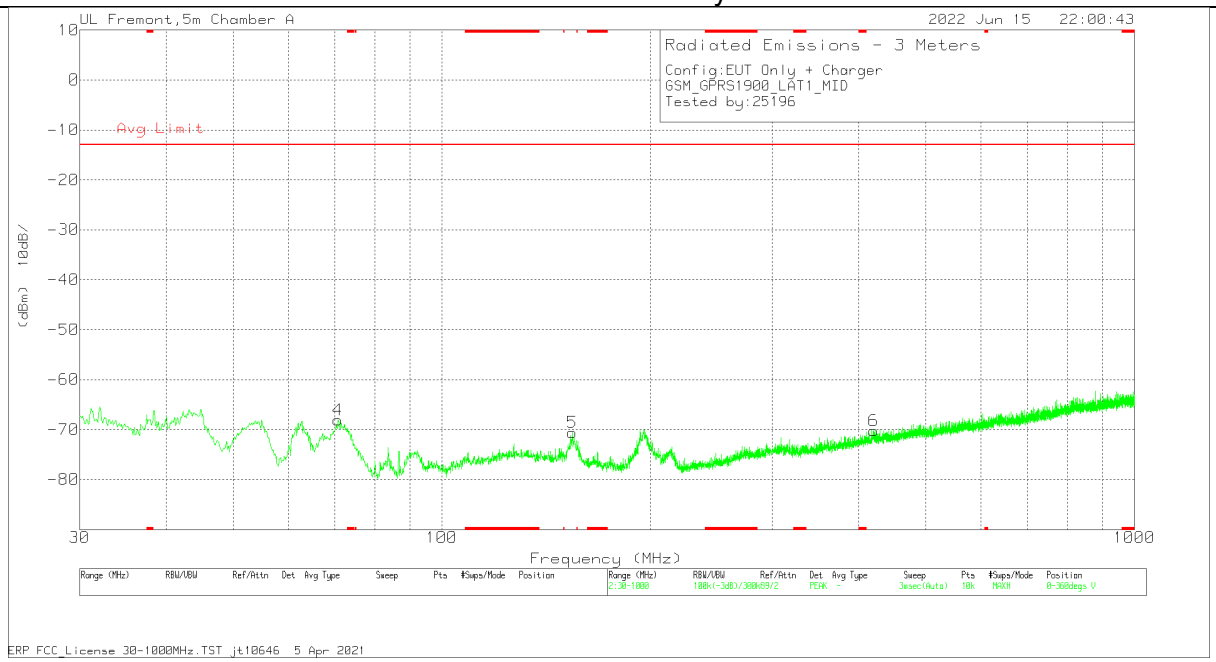
Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Example Plot Below 1GHz



Horizontal Polarity



Vertical Polarity

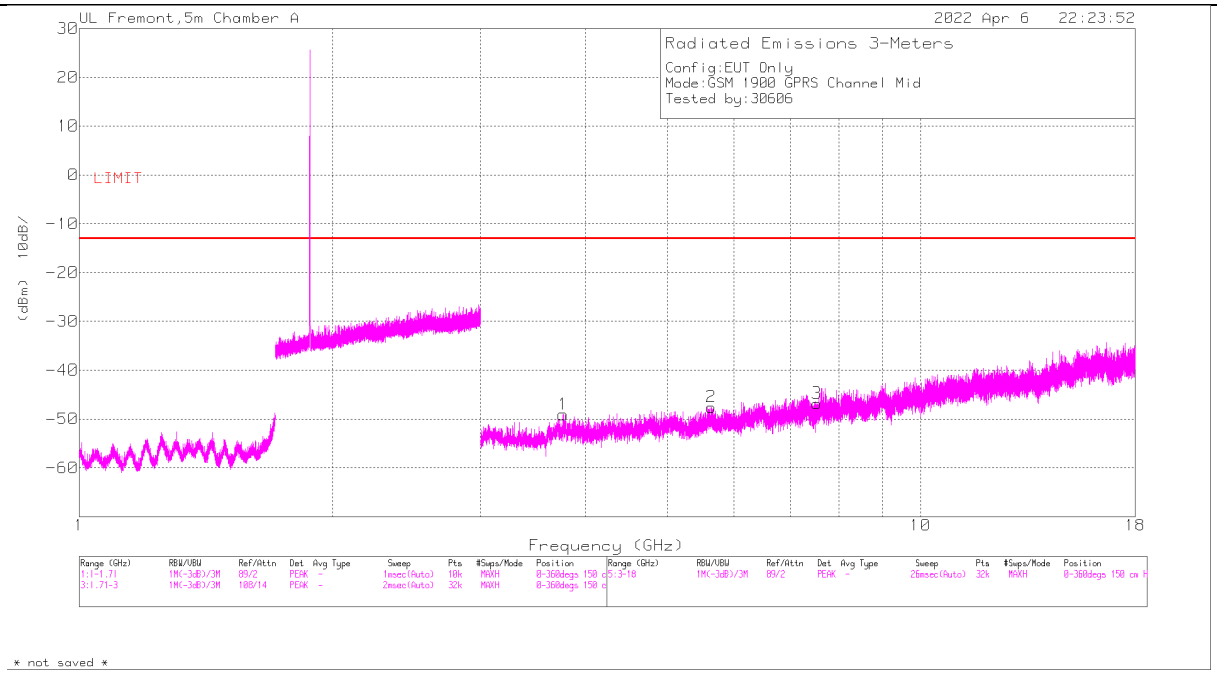
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Trace Markers

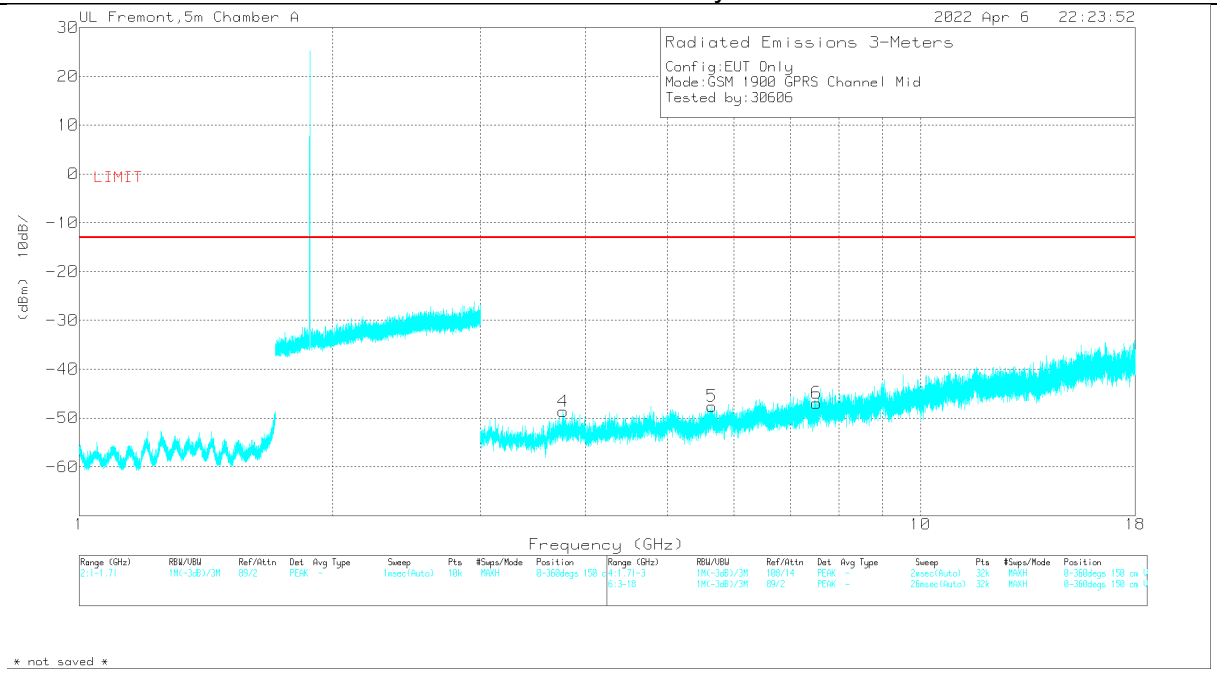
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	85151 ACF (dB)_3m	Amp/Cbl (dB/m)	EIRP CF	Corrected Reading (dBm)	Avg Limit	Margin (dB)	Azimuth (Degs)
4	70.837	39.38	Pk	14.4	-26.7	-95.2	-68.12	-13	-55.12	0-360
1	70.934	37.37	Pk	14.4	-26.7	-95.2	-70.13	-13	-57.13	0-360
5	154.354	31.5	Pk	18.8	-25.7	-95.2	-70.6	-13	-57.6	0-360
2	156.585	34.54	Pk	18.7	-25.7	-95.2	-67.66	-13	-54.66	0-360
6	420.231	27.14	Pk	22.8	-24.9	-95.2	-70.16	-13	-57.16	0-360
3	484.057	28.04	Pk	24	-25.1	-95.2	-68.26	-13	-55.26	0-360

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Example Plot Above 1GHz



Horizontal Polarity



Vertical Polarity

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	EIRP CF	Corrected Reading (dBm)	LIMIT	Margin (dB)	Azimuth (Degs)
4	3.759844	38.07	Pk	33.4	-24.9	-95.2	-48.63	-13	-35.63	0-360
1	3.760313	37.64	Pk	33.4	-24.9	-95.2	-49.06	-13	-36.06	0-360
2	5.64	34.85	Pk	34.8	-22	-95.2	-47.55	-13	-34.55	0-360
5	5.653125	34.63	Pk	34.8	-21.8	-95.2	-47.57	-13	-34.57	0-360
6	7.524375	32.26	Pk	35.6	-19.6	-95.2	-46.94	-13	-33.94	0-360
3	7.530469	32.38	Pk	35.6	-19.6	-95.2	-46.82	-13	-33.82	0-360

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 1

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.53
ISED: RSS132§5.5; RSS133§6.5 and RSS139§6.6

LIMIT

FCC: §22.917(a), §24.238(a), §27.53 (h)
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.

RSS132§5.5
Mobile and base station equipment shall comply with the limits in (i) and (ii) below.

(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS133§6.5.1
Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS139§6.6

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least43 + 10 log10 p (watts) dB.

(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

TEST PROCEDURE

KDB 971168 D01

RESULTS

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.1. GSM 850

GPRS MODE

Project #:	14040866
Date:	04/01/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 850
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 824.2 MHz										
1.647333	38.69	Pk	28.5	-29.4	.7	-95.2	-56.71	-13	-43.71	V
1.6488	39.57	Pk	28.5	-29.4	.7	-95.2	-55.83	-13	-42.83	H
2.472578	37.47	Pk	32.2	-28.2	.5	-95.2	-53.23	-13	-40.23	V
2.474045	37.74	Pk	32.2	-28.1	.5	-95.2	-52.86	-13	-39.86	H
3.290489	37	Pk	32.6	-26.4	.8	-95.2	-51.20	-13	-38.20	V
3.303689	37.34	Pk	32.6	-26.5	.7	-95.2	-51.06	-13	-38.06	H
Mid Channel, 836.6 MHz										
1.668356	38.8	Pk	28.5	-29.4	.7	-95.2	-56.6	-13	-43.6	V
1.673733	45.43	Pk	28.4	-29.3	.7	-95.2	-49.97	-13	-36.97	H
2.509245	37.24	Pk	32.4	-28.1	.7	-95.2	-52.96	-13	-39.96	V
2.518045	37.91	Pk	32.4	-28.1	.8	-95.2	-52.19	-13	-39.19	H
3.338889	36.57	Pk	32.6	-26.6	.5	-95.2	-52.13	-13	-39.13	V
3.341334	37.55	Pk	32.6	-26.5	.5	-95.2	-51.05	-13	-38.05	H
High Channel, 848.8 MHz										
1.680089	38.47	Pk	28.4	-29.3	.7	-95.2	-56.93	-13	-43.93	V
1.6884	38.82	Pk	28.4	-29.2	.7	-95.2	-56.48	-13	-43.48	H
2.522934	36.95	Pk	32.4	-28.1	.8	-95.2	-53.15	-13	-40.15	V
2.526356	37.67	Pk	32.4	-28.1	.8	-95.2	-52.43	-13	-39.43	H
3.415645	35.79	Pk	32.8	-26.3	.5	-95.2	-52.41	-13	-39.41	H
3.417112	35.77	Pk	32.7	-26.3	.5	-95.2	-52.53	-13	-39.53	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	04/01/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 850
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 824.2 MHz										
1.633645	39.22	Pk	28.6	-29.4	.7	-95.2	-56.08	-13	-43.08	V
1.6444	39.79	Pk	28.5	-29.4	.7	-95.2	-55.61	-13	-42.61	H
2.486756	37.17	Pk	32.2	-28	.5	-95.2	-53.33	-13	-40.33	H
2.487734	37.87	Pk	32.2	-28	.5	-95.2	-52.63	-13	-39.63	V
3.275334	35.91	Pk	32.6	-26.3	.8	-95.2	-52.19	-13	-39.19	V
3.289023	36.58	Pk	32.6	-26.4	.9	-95.2	-51.52	-13	-38.52	H
Mid Channel, 836.6 MHz										
1.665422	38.41	Pk	28.5	-29.4	.7	-95.2	-56.99	-13	-43.99	V
1.672756	39.94	Pk	28.4	-29.3	.7	-95.2	-55.46	-13	-42.46	H
2.519511	36.7	Pk	32.4	-28.1	.8	-95.2	-53.40	-13	-40.40	V
2.521711	36.82	Pk	32.4	-28.1	.8	-95.2	-53.28	-13	-40.28	H
3.3428	36.27	Pk	32.6	-26.5	.5	-95.2	-52.33	-13	-39.33	H
3.349156	36.23	Pk	32.7	-26.6	.5	-95.2	-52.37	-13	-39.37	V
High Channel, 848.8 MHz										
1.699156	38.82	Pk	28.7	-29.2	.6	-95.2	-56.28	-13	-43.28	V
1.703067	38.64	Pk	28.8	-29.2	.6	-95.2	-56.36	-13	-43.36	H
2.538578	37.46	Pk	32.2	-27.8	.7	-95.2	-52.64	-13	-39.64	H
2.542978	37.34	Pk	32.2	-27.8	.6	-95.2	-52.86	-13	-39.86	V
3.373112	36	Pk	32.8	-26.6	.6	-95.2	-52.40	-13	-39.40	V
3.375556	35.88	Pk	32.8	-26.5	.6	-95.2	-52.42	-13	-39.42	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.2. GSM 1900

GPRS MODE

Project #:	14040866
Date:	04/06/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.684375	37.86	Pk	33.2	-25.6	-95.2	-49.74	-13	-36.74	V
3.700313	40.47	Pk	33.3	-25.3	-95.2	-46.73	-13	-33.73	H
5.541563	33.99	Pk	34.7	-22.4	-95.2	-48.91	-13	-35.91	V
5.550938	35.71	Pk	34.8	-22.5	-95.2	-47.19	-13	-34.19	H
7.393594	31.91	Pk	35.6	-19.6	-95.2	-47.29	-13	-34.29	V
7.400625	33.97	Pk	35.5	-19.6	-95.2	-45.33	-13	-32.33	H
Mid Channel, 1880MHz									
3.759844	38.07	Pk	33.4	-24.9	-95.2	-48.63	-13	-35.63	V
3.760313	37.64	Pk	33.4	-24.9	-95.2	-49.06	-13	-36.06	H
5.64	34.85	Pk	34.8	-22	-95.2	-47.55	-13	-34.55	H
5.653125	34.63	Pk	34.8	-21.8	-95.2	-47.57	-13	-34.57	V
7.524375	32.26	Pk	35.6	-19.6	-95.2	-46.94	-13	-33.94	V
7.530469	32.38	Pk	35.6	-19.6	-95.2	-46.82	-13	-33.82	H
High Channel, 1909.8MHz									
3.819375	39.98	Pk	33.3	-25.2	-95.2	-47.12	-13	-34.12	H
3.819844	36.55	Pk	33.3	-25.2	-95.2	-50.55	-13	-37.55	V
5.729297	41.75	Pk	35	-23.2	-95.2	-41.65	-13	-28.65	V
5.743594	35.21	Pk	34.9	-23.4	-95.2	-48.49	-13	-35.49	H
7.610625	32.47	Pk	35.7	-18.7	-95.2	-45.73	-13	-32.73	V
7.613906	32.61	Pk	35.7	-18.6	-95.2	-45.49	-13	-32.49	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	04/07/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.699375	38.28	Pk	33.3	-25.3	-95.2	-48.92	-13	-35.92	V
3.713906	36.34	Pk	33.4	-25	-95.2	-50.46	-13	-37.46	H
5.579063	35.93	Pk	34.8	-22.3	-95.2	-46.77	-13	-33.77	H
5.587031	34.14	Pk	34.8	-22	-95.2	-48.26	-13	-35.26	V
7.393594	33.55	Pk	35.6	-19.6	-95.2	-45.65	-13	-32.65	H
7.407188	31.68	Pk	35.5	-19.7	-95.2	-47.72	-13	-34.72	V
Mid Channel, 1880MHz									
3.756094	36.33	Pk	33.4	-25	-95.2	-50.47	-13	-37.47	H
3.759844	39.95	Pk	33.4	-24.9	-95.2	-46.75	-13	-33.75	V
5.638125	34.23	Pk	34.8	-22	-95.2	-48.17	-13	-35.17	V
5.646563	34.39	Pk	34.8	-21.9	-95.2	-47.91	-13	-34.91	H
7.499531	31.87	Pk	35.7	-19.8	-95.2	-47.43	-13	-34.43	V
7.512188	33.36	Pk	35.6	-19.6	-95.2	-45.84	-13	-32.84	H
High Channel, 1909.8MHz									
3.795469	37.36	Pk	33.3	-25.2	-95.2	-49.74	-13	-36.74	V
3.799219	37.83	Pk	33.3	-25.3	-95.2	-49.37	-13	-36.37	H
5.712188	35.59	Pk	34.9	-23	-95.2	-47.71	-13	-34.71	H
5.71875	34.41	Pk	34.9	-23.1	-95.2	-48.99	-13	-35.99	V
7.632656	32.4	Pk	35.7	-18.4	-95.2	-45.5	-13	-32.5	H
7.655156	32.85	Pk	35.7	-18.7	-95.2	-45.35	-13	-32.35	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.3. WCDMA BAND 5

REL 99 MODE

Project #:	14040866
Date:	03/14/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 5
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 826.4MHz										
1.647333	39.23	Pk	28.5	-29.4	.7	-95.2	-56.17	-13	-43.17	V
1.650267	39.96	Pk	28.5	-29.4	.8	-95.2	-55.34	-13	-42.34	H
2.4804	38.17	Pk	32.2	-28.1	.5	-95.2	-52.43	-13	-39.43	H
2.481378	41.71	Pk	32.2	-28.1	.5	-95.2	-48.89	-13	-35.89	V
3.313467	35.97	Pk	32.5	-26.6	.6	-95.2	-52.73	-13	-39.73	V
3.315912	37.72	Pk	32.5	-26.6	.6	-95.2	-50.98	-13	-37.98	H
Mid Channel, 836.6MHz										
1.674711	40.24	Pk	28.4	-29.3	.7	-95.2	-55.16	-13	-42.16	H
1.674711	38.53	Pk	28.4	-29.3	.7	-95.2	-56.87	-13	-43.87	V
2.5112	38.73	Pk	32.4	-28.1	.7	-95.2	-51.47	-13	-38.47	H
2.513645	43	Pk	32.4	-28.1	.7	-95.2	-47.20	-13	-34.20	V
3.3384	36.14	Pk	32.6	-26.6	.5	-95.2	-52.56	-13	-39.56	V
3.349156	37.01	Pk	32.7	-26.6	.5	-95.2	-51.59	-13	-38.59	H
High Channel, 846.6MHz										
1.682045	38.98	Pk	28.4	-29.2	.7	-95.2	-56.32	-13	-43.32	V
1.683022	38.43	Pk	28.4	-29.2	.7	-95.2	-56.87	-13	-43.87	H
2.540045	37.79	Pk	32.2	-27.8	.7	-95.2	-52.31	-13	-39.31	H
2.542978	46.12	Pk	32.2	-27.8	.6	-95.2	-44.08	-13	-31.08	V
3.368223	35.71	Pk	32.8	-26.6	.6	-95.2	-52.69	-13	-39.69	V
3.374089	36.31	Pk	32.8	-26.6	.6	-95.2	-52.09	-13	-39.09	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/21/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 5
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 826.4MHz										
1.651245	37.81	Pk	28.5	-29.4	.8	-95.2	-57.49	-13	-44.49	V
1.653689	39.08	Pk	28.5	-29.4	.8	-95.2	-56.22	-13	-43.22	H
2.476489	37.74	Pk	32.2	-28.1	.5	-95.2	-52.86	-13	-39.86	H
2.481867	41.23	Pk	32.2	-28.1	.5	-95.2	-49.37	-13	-36.37	V
3.314445	35.82	Pk	32.5	-26.6	.6	-95.2	-52.88	-13	-39.88	H
3.322756	36.57	Pk	32.6	-26.6	.6	-95.2	-52.03	-13	-39.03	V
Mid Channel, 836.6MHz										
1.673245	39.63	Pk	28.4	-29.3	.7	-95.2	-55.77	-13	-42.77	H
1.6796	40.79	Pk	28.4	-29.3	.7	-95.2	-54.61	-13	-41.61	V
2.512667	38.27	Pk	32.4	-28.1	.7	-95.2	-51.93	-13	-38.93	H
2.512667	40.73	Pk	32.4	-28.1	.7	-95.2	-49.47	-13	-36.47	V
3.351112	36.33	Pk	32.7	-26.6	.5	-95.2	-52.27	-13	-39.27	H
3.352089	35.63	Pk	32.7	-26.5	.6	-95.2	-52.77	-13	-39.77	V
High Channel, 846.6MHz										
1.699156	38.37	Pk	28.7	-29.2	.6	-95.2	-56.73	-13	-43.73	H
1.704045	37.71	Pk	28.8	-29.2	.6	-95.2	-57.29	-13	-44.29	V
2.539067	36.74	Pk	32.2	-27.8	.7	-95.2	-53.36	-13	-40.36	H
2.542	40.55	Pk	32.2	-27.8	.7	-95.2	-49.55	-13	-36.55	V
3.385334	35.39	Pk	32.8	-26.4	.6	-95.2	-52.81	-13	-39.81	V
3.398045	36.58	Pk	32.7	-26.3	.6	-95.2	-51.62	-13	-38.62	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.4. WCDMA BAND 2

REL 99 MODE

Project #:	14040866
Date:	04/20/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.716719	36.36	Pk	33.4	-24.9	-95.2	-50.34	-13	-37.34	V
3.721406	36.64	Pk	33.4	-24.9	-95.2	-50.06	-13	-37.06	H
5.538281	34.89	Pk	34.7	-22.5	-95.2	-48.11	-13	-35.11	V
5.541094	34.47	Pk	34.8	-22.4	-95.2	-48.33	-13	-35.33	H
7.394531	31.92	Pk	35.5	-19.6	-95.2	-47.38	-13	-34.38	V
7.404375	32.96	Pk	35.5	-19.6	-95.2	-46.34	-13	-33.34	H
Mid Channel, 1880MHz									
3.750938	36.35	Pk	33.4	-25	-95.2	-50.45	-13	-37.45	V
3.771563	36.5	Pk	33.3	-24.8	-95.2	-50.2	-13	-37.2	H
5.631094	33.68	Pk	34.8	-22.1	-95.2	-48.82	-13	-35.82	V
5.643281	34.7	Pk	34.8	-21.9	-95.2	-47.60	-13	-34.60	H
7.545469	33.64	Pk	35.6	-19.3	-95.2	-45.26	-13	-32.26	H
7.549688	31.97	Pk	35.6	-19.1	-95.2	-46.73	-13	-33.73	V
High Channel, 1907.6MHz									
3.833438	36.47	Pk	33.4	-25.2	-95.2	-50.53	-13	-37.53	V
3.837656	37.35	Pk	33.4	-25.3	-95.2	-49.75	-13	-36.75	H
5.697188	33.64	Pk	34.9	-22.9	-95.2	-49.56	-13	-36.56	V
5.710781	34.3	Pk	34.9	-23	-95.2	-49.00	-13	-36.00	H
7.641563	32.81	Pk	35.7	-18.4	-95.2	-45.09	-13	-32.09	H
7.642969	33.98	Pk	35.7	-18.4	-95.2	-43.92	-13	-30.92	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/20/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.70875	35.79	Pk	33.4	-25	-95.2	-51.01	-13	-38.01	V
3.713438	36.92	Pk	33.4	-25	-95.2	-49.88	-13	-36.88	H
5.532188	35.25	Pk	34.7	-22.5	-95.2	-47.75	-13	-34.75	V
5.548594	35.02	Pk	34.8	-22.4	-95.2	-47.78	-13	-34.78	H
7.423125	32.4	Pk	35.6	-20	-95.2	-47.20	-13	-34.20	V
7.42875	33.84	Pk	35.6	-20.1	-95.2	-45.86	-13	-32.86	H
Mid Channel, 1880MHz									
3.76875	37.09	Pk	33.3	-24.8	-95.2	-49.61	-13	-36.61	H
3.769219	36.05	Pk	33.3	-24.8	-95.2	-50.65	-13	-37.65	V
5.625938	34.58	Pk	34.8	-22	-95.2	-47.82	-13	-34.82	H
5.629688	33.69	Pk	34.9	-22.1	-95.2	-48.71	-13	-35.71	V
7.539375	34.19	Pk	35.6	-19.5	-95.2	-44.91	-13	-31.91	V
7.540781	32.82	Pk	35.6	-19.4	-95.2	-46.18	-13	-33.18	H
High Channel, 1907.6MHz									
3.772969	36.27	Pk	33.4	-24.8	-95.2	-50.33	-13	-37.33	V
3.790313	36.8	Pk	33.3	-25.1	-95.2	-50.20	-13	-37.20	H
5.740781	35.4	Pk	34.9	-23.4	-95.2	-48.30	-13	-35.30	V
5.745	34.7	Pk	34.9	-23.3	-95.2	-48.90	-13	-35.90	H
7.633125	33.95	Pk	35.7	-18.4	-95.2	-43.95	-13	-30.95	V
7.639219	32.88	Pk	35.7	-18.4	-95.2	-45.02	-13	-32.02	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.5. WCDMA BAND 4

REL 99 MODE

Project #:	14040866
Date:	03/22//2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.391875	35.87	Pk	32.8	-25.7	-95.2	-52.23	-13	-39.23	V
3.405	35.36	Pk	32.8	-25.9	-95.2	-52.94	-13	-39.94	H
5.13	36.43	Pk	34.4	-23.2	-95.2	-47.57	-13	-34.57	H
5.1375	35.8	Pk	34.3	-23.3	-95.2	-48.40	-13	-35.40	V
6.833438	32.75	Pk	35.5	-20.6	-95.2	-47.55	-13	-34.55	H
6.855	32.71	Pk	35.5	-20.8	-95.2	-47.79	-13	-34.79	V
Mid Channel, 1732.6MHz									
3.467813	36.19	Pk	32.6	-26.1	-95.2	-52.51	-13	-39.51	H
3.46875	36.11	Pk	32.6	-26	-95.2	-52.49	-13	-39.49	V
5.210625	36.04	Pk	34.4	-23.9	-95.2	-48.66	-13	-35.66	H
5.22	35.91	Pk	34.5	-23.9	-95.2	-48.69	-13	-35.69	V
6.945469	34.25	Pk	35.5	-20.4	-95.2	-45.85	-13	-32.85	H
6.946875	32.5	Pk	35.5	-20.4	-95.2	-47.6	-13	-34.6	V
High Channel, 1752.61MHz									
3.496875	34.94	Pk	32.7	-25.5	-95.2	-53.06	-13	-40.06	V
3.51375	36.22	Pk	32.8	-25.5	-95.2	-51.68	-13	-38.68	H
5.267344	35.84	Pk	34.4	-23.4	-95.2	-48.36	-13	-35.36	H
5.269219	33.65	Pk	34.4	-23.4	-95.2	-50.55	-13	-37.55	V
7.003125	32.87	Pk	35.5	-19.6	-95.2	-46.43	-13	-33.43	H
7.0125	32.36	Pk	35.5	-19.6	-95.2	-46.94	-13	-33.94	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/22/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.412031	35.64	Pk	32.8	-26	-95.2	-52.76	-13	-39.76	V
3.4125	35.61	Pk	32.8	-26	-95.2	-52.79	-13	-39.79	H
5.115	33.99	Pk	34.4	-22.9	-95.2	-49.71	-13	-36.71	V
5.129063	35.1	Pk	34.4	-23.2	-95.2	-48.90	-13	-35.90	H
6.799688	33.9	Pk	35.5	-20.2	-95.2	-46.00	-13	-33.00	H
6.807188	33.77	Pk	35.5	-20.4	-95.2	-46.33	-13	-33.33	V
Mid Channel, 1732.6MHz									
3.473438	35.33	Pk	32.6	-26	-95.2	-53.27	-13	-40.27	V
3.485625	35.29	Pk	32.6	-25.7	-95.2	-53.01	-13	-40.01	H
5.207344	35.82	Pk	34.4	-23.9	-95.2	-48.88	-13	-35.88	V
5.209219	35.32	Pk	34.4	-23.9	-95.2	-49.38	-13	-36.38	H
6.924844	33.65	Pk	35.5	-20.7	-95.2	-46.75	-13	-33.75	H
6.927188	32.91	Pk	35.4	-20.7	-95.2	-47.59	-13	-34.59	V
High Channel, 1752.61MHz									
3.494531	35.85	Pk	32.7	-25.6	-95.2	-52.25	-13	-39.25	V
3.501094	35.86	Pk	32.7	-25.5	-95.2	-52.14	-13	-39.14	H
5.229375	36.69	Pk	34.5	-24	-95.2	-48.01	-13	-35.01	V
5.250938	35.37	Pk	34.4	-23.4	-95.2	-48.83	-13	-35.83	H
7.027031	33.74	Pk	35.6	-19.8	-95.2	-45.66	-13	-32.66	H
7.03875	34.61	Pk	35.5	-19.7	-95.2	-44.79	-13	-31.79	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 2

10.2.1. GSM 850

GPRS MODE

Project #:	14040866
Date:	04/29/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 850
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 824.2 MHz										
1.648311	41.36	Pk	28.5	-29.4	.7	-95.2	-54.04	-13	-41.04	V
1.652222	38.74	Pk	28.5	-29.4	.8	-95.2	-56.56	-13	-43.56	H
2.472578	41.8	Pk	32.2	-28.2	.5	-95.2	-48.90	-13	-35.90	H
2.472578	51.08	Pk	32.2	-28.2	.5	-95.2	-39.62	-13	-26.62	V
3.307112	36.91	Pk	32.5	-26.5	.7	-95.2	-51.59	-13	-38.59	H
3.308578	37.49	Pk	32.5	-26.5	.7	-95.2	-51.01	-13	-38.01	V
Mid Channel, 836.6 MHz										
1.663467	38.93	Pk	28.5	-29.4	.8	-95.2	-56.37	-13	-43.37	V
1.673245	40.27	Pk	28.4	-29.3	.7	-95.2	-55.13	-13	-42.13	H
2.509734	41.3	Pk	32.4	-28.1	.7	-95.2	-48.90	-13	-35.90	H
2.509734	48.98	Pk	32.4	-28.1	.7	-95.2	-41.22	-13	-28.22	V
3.355023	37.02	Pk	32.7	-26.6	.6	-95.2	-51.48	-13	-38.48	H
3.358445	36.32	Pk	32.8	-26.6	.6	-95.2	-52.08	-13	-39.08	V
High Channel, 848.8 MHz										
1.698667	38.38	Pk	28.7	-29.2	.6	-95.2	-56.72	-13	-43.72	V
1.705511	38.62	Pk	28.8	-29.2	.6	-95.2	-56.38	-13	-43.38	H
2.545911	40.71	Pk	32.3	-27.7	.6	-95.2	-49.29	-13	-36.29	H
2.546889	46.89	Pk	32.3	-27.7	.6	-95.2	-43.11	-13	-30.11	V
3.380445	37.26	Pk	32.8	-26.5	.6	-95.2	-51.04	-13	-38.04	H
3.381423	36.86	Pk	32.8	-26.5	.6	-95.2	-51.44	-13	-38.44	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	04/28/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 850
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 824.2 MHz										
1.638533	38.86	Pk	28.5	-29.4	.7	-95.2	-56.54	-13	-43.54	H
1.640978	38.9	Pk	28.5	-29.4	.7	-95.2	-56.50	-13	-43.50	V
2.472578	39.01	Pk	32.2	-28.2	.5	-95.2	-51.69	-13	-38.69	H
2.472578	47.14	Pk	32.2	-28.2	.5	-95.2	-43.56	-13	-30.56	V
3.289023	38.34	Pk	32.6	-26.4	.9	-95.2	-49.76	-13	-36.76	V
3.300756	36.48	Pk	32.6	-26.4	.8	-95.2	-51.72	-13	-38.72	H
Mid Channel, 836.6 MHz										
1.680578	38.99	Pk	28.4	-29.3	.7	-95.2	-56.41	-13	-43.41	H
1.683511	39.45	Pk	28.4	-29.2	.7	-95.2	-55.85	-13	-42.85	V
2.509734	46.11	Pk	32.4	-28.1	.7	-95.2	-44.09	-13	-31.09	V
2.521956	37.32	Pk	32.4	-28.1	.8	-95.2	-52.78	-13	-39.78	H
3.359423	35.42	Pk	32.8	-26.6	.6	-95.2	-52.98	-13	-39.98	V
3.359912	37.1	Pk	32.8	-26.6	.6	-95.2	-51.30	-13	-38.30	H
High Channel, 848.8 MHz										
1.686933	38.01	Pk	28.4	-29.2	.7	-95.2	-57.29	-13	-44.29	V
1.693289	38.82	Pk	28.5	-29.2	.7	-95.2	-56.38	-13	-43.38	H
2.527334	37.25	Pk	32.4	-28.1	.8	-95.2	-52.85	-13	-39.85	H
2.527823	37.29	Pk	32.4	-28	.8	-95.2	-52.71	-13	-39.71	V
3.406845	36.71	Pk	32.8	-26.2	.6	-95.2	-51.29	-13	-38.29	H
3.414667	36.86	Pk	32.8	-26.3	.5	-95.2	-51.34	-13	-38.34	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.2. GSM 1900

GPRS MODE

Project #:	14040866
Date:	04/28/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.712031	37.29	Pk	33.4	-25	-95.2	-49.51	-13	-36.51	V
3.7275	37.09	Pk	33.4	-25	-95.2	-49.71	-13	-36.71	H
5.564063	34.78	Pk	34.7	-22.6	-95.2	-48.32	-13	-35.32	V
5.572031	35.22	Pk	34.7	-22.4	-95.2	-47.68	-13	-34.68	H
7.371563	32.05	Pk	35.5	-19.1	-95.2	-46.75	-13	-33.75	V
7.37625	31.75	Pk	35.6	-19.3	-95.2	-47.15	-13	-34.15	H
Mid Channel, 1880MHz									
3.748125	36.07	Pk	33.4	-25.1	-95.2	-50.83	-13	-37.83	V
3.755156	36.8	Pk	33.4	-25	-95.2	-50.00	-13	-37.00	H
5.64	36.01	Pk	34.8	-22	-95.2	-46.39	-13	-33.39	V
5.655	33.84	Pk	34.8	-21.9	-95.2	-48.46	-13	-35.46	H
7.529531	31.68	Pk	35.6	-19.6	-95.2	-47.52	-13	-34.52	H
7.542656	32.73	Pk	35.6	-19.4	-95.2	-46.27	-13	-33.27	V
High Channel, 1909.8MHz									
3.8175	39.03	Pk	33.3	-25.2	-95.2	-48.07	-13	-35.07	V
3.825469	38.14	Pk	33.3	-25.2	-95.2	-48.96	-13	-35.96	H
5.729063	34.12	Pk	35	-23.2	-95.2	-49.28	-13	-36.28	V
5.740313	35.54	Pk	34.9	-23.4	-95.2	-48.16	-13	-35.16	H
7.598438	33.36	Pk	35.7	-18.7	-95.2	-44.84	-13	-31.84	V
7.608281	33.26	Pk	35.7	-18.7	-95.2	-44.94	-13	-31.94	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	03/28/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.702891	36.86	Pk	33.3	-25.2	-95.2	-50.24	-13	-37.24	V
3.712969	35.85	Pk	33.4	-25	-95.2	-50.95	-13	-37.95	H
5.539688	33.71	Pk	34.7	-22.5	-95.2	-49.29	-13	-36.29	V
5.559844	34.22	Pk	34.7	-22.6	-95.2	-48.88	-13	-35.88	H
7.371563	32.44	Pk	35.5	-19.1	-95.2	-46.36	-13	-33.36	V
7.396406	33.65	Pk	35.5	-19.6	-95.2	-45.65	-13	-32.65	H
Mid Channel, 1880MHz									
3.777656	37.4	Pk	33.4	-24.9	-95.2	-49.3	-13	-36.3	V
3.779531	37.07	Pk	33.3	-24.9	-95.2	-49.73	-13	-36.73	H
5.629688	33.99	Pk	34.9	-22.1	-95.2	-48.41	-13	-35.41	V
5.640938	34.17	Pk	34.8	-22	-95.2	-48.23	-13	-35.23	H
7.498594	34.78	Pk	35.7	-19.9	-95.2	-44.62	-13	-31.62	V
7.513125	33.51	Pk	35.6	-19.6	-95.2	-45.69	-13	-32.69	H
High Channel, 1909.8MHz									
3.804375	36.64	Pk	33.3	-25.3	-95.2	-50.56	-13	-37.56	V
3.808125	38.37	Pk	33.3	-25.3	-95.2	-48.83	-13	-35.83	H
5.748281	34.66	Pk	34.9	-23.3	-95.2	-48.94	-13	-35.94	H
5.757656	34.67	Pk	35	-23.2	-95.2	-48.73	-13	-35.73	V
7.628438	32.39	Pk	35.7	-18.4	-95.2	-45.51	-13	-32.51	V
7.628906	32.52	Pk	35.7	-18.4	-95.2	-45.38	-13	-32.38	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.3. WCDMA BAND 5

REL 99 MODE

Project #:	14040866
Date:	04/25/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 5
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 826.4MHz										
1.6532	38.38	Pk	28.5	-29.4	.8	-95.2	-56.92	-13	-43.92	V
1.663467	38.31	Pk	28.5	-29.4	.8	-95.2	-56.99	-13	-43.99	H
2.475511	44.62	Pk	32.2	-28.1	.5	-95.2	-45.98	-13	-32.98	V
2.481867	37.37	Pk	32.2	-28.1	.5	-95.2	-53.23	-13	-40.23	H
3.315423	36.09	Pk	32.5	-26.6	.6	-95.2	-52.61	-13	-39.61	H
3.328134	36.35	Pk	32.6	-26.6	.6	-95.2	-52.25	-13	-39.25	V
Mid Channel, 836.6MHz										
1.671778	40.2	Pk	28.5	-29.3	.7	-95.2	-55.10	-13	-42.10	H
1.671778	39.31	Pk	28.5	-29.3	.7	-95.2	-55.99	-13	-42.99	V
2.512178	38.73	Pk	32.4	-28.1	.7	-95.2	-51.47	-13	-38.47	H
2.513645	47.58	Pk	32.4	-28.1	.7	-95.2	-42.62	-13	-29.62	V
3.346223	36.07	Pk	32.7	-26.5	.5	-95.2	-52.43	-13	-39.43	H
3.352578	36.71	Pk	32.7	-26.5	.6	-95.2	-51.69	-13	-38.69	V
High Channel, 846.6MHz										
1.677645	38.49	Pk	28.4	-29.3	.7	-95.2	-56.91	-13	-43.91	V
1.678133	39.3	Pk	28.4	-29.3	.7	-95.2	-56.10	-13	-43.10	H
2.531734	37.33	Pk	32.4	-27.9	.7	-95.2	-52.67	-13	-39.67	H
2.536134	41.93	Pk	32.3	-27.9	.7	-95.2	-48.17	-13	-35.17	V
3.368712	36.53	Pk	32.8	-26.6	.6	-95.2	-51.87	-13	-38.87	V
3.371645	37.82	Pk	32.8	-26.6	.6	-95.2	-50.58	-13	-37.58	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/23/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 5
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	HPF 1.2GHz T1737 1-18GHz	EIRP CF	Corrected Reading (dBm)	Limit	Margin (dB)	Polarity
Low Channel, 826.4MHz										
1.637556	39.17	Pk	28.5	-29.4	.7	-95.2	-56.23	-13	-43.23	V
1.645867	38.26	Pk	28.5	-29.4	.7	-95.2	-57.14	-13	-44.14	H
2.471111	36.94	Pk	32.2	-28.2	.5	-95.2	-53.76	-13	-40.76	H
2.477956	40.2	Pk	32.2	-28.1	.5	-95.2	-50.40	-13	-37.40	V
3.287067	35.88	Pk	32.6	-26.3	.9	-95.2	-52.12	-13	-39.12	V
3.289023	36.84	Pk	32.6	-26.4	.9	-95.2	-51.26	-13	-38.26	H
Mid Channel, 836.6MHz										
1.677645	39.05	Pk	28.4	-29.3	.7	-95.2	-56.35	-13	-43.35	V
1.687911	38.35	Pk	28.4	-29.2	.7	-95.2	-56.95	-13	-43.95	H
2.506311	43	Pk	32.3	-28	.7	-95.2	-47.20	-13	-34.20	V
2.510223	39.21	Pk	32.4	-28.1	.7	-95.2	-50.99	-13	-37.99	H
3.355023	36.08	Pk	32.7	-26.6	.6	-95.2	-52.42	-13	-39.42	H
3.361378	36.79	Pk	32.8	-26.6	.6	-95.2	-51.61	-13	-38.61	V
High Channel, 846.6MHz										
1.693778	38.27	Pk	28.5	-29.2	.7	-95.2	-56.93	-13	-43.93	H
1.693778	38.79	Pk	28.5	-29.2	.7	-95.2	-56.41	-13	-43.41	V
2.534178	37.97	Pk	32.3	-27.9	.7	-95.2	-52.13	-13	-39.13	H
2.541511	44.51	Pk	32.2	-27.8	.7	-95.2	-45.59	-13	-32.59	V
3.379956	36	Pk	32.8	-26.5	.6	-95.2	-52.3	-13	-39.3	H
3.380934	36.31	Pk	32.8	-26.5	.6	-95.2	-51.99	-13	-38.99	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.4. WCDMA BAND 2

REL 99 MODE

Project #:	14040866
Date:	04/25/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.705938	37.05	Pk	33.4	-25.1	-95.2	-49.85	-13	-36.85	V
3.718594	35.93	Pk	33.4	-24.9	-95.2	-50.77	-13	-37.77	H
5.559844	34.56	Pk	34.7	-22.6	-95.2	-48.54	-13	-35.54	H
5.570625	34.48	Pk	34.7	-22.5	-95.2	-48.52	-13	-35.52	V
7.401563	32.37	Pk	35.5	-19.6	-95.2	-46.93	-13	-33.93	H
7.405781	32.93	Pk	35.5	-19.6	-95.2	-46.37	-13	-33.37	V
Mid Channel, 1880MHz									
3.766406	36.53	Pk	33.4	-24.8	-95.2	-50.07	-13	-37.07	H
3.767813	36.39	Pk	33.4	-24.8	-95.2	-50.21	-13	-37.21	V
5.64	34.85	Pk	34.8	-22	-95.2	-47.55	-13	-34.55	V
5.64375	34.42	Pk	34.8	-21.9	-95.2	-47.88	-13	-34.88	H
7.544063	32.72	Pk	35.6	-19.3	-95.2	-46.18	-13	-33.18	H
7.548281	32.17	Pk	35.6	-19.2	-95.2	-46.63	-13	-33.63	V
High Channel, 1907.6MHz									
3.805313	37.09	Pk	33.3	-25.3	-95.2	-50.11	-13	-37.11	V
3.826875	37.22	Pk	33.3	-25.2	-95.2	-49.88	-13	-36.88	H
5.723906	34.13	Pk	34.9	-23.2	-95.2	-49.37	-13	-36.37	H
5.724375	35.13	Pk	34.9	-23.2	-95.2	-48.37	-13	-35.37	V
7.647188	32.52	Pk	35.7	-18.5	-95.2	-45.48	-13	-32.48	H
7.662188	33.59	Pk	35.7	-18.9	-95.2	-44.81	-13	-31.81	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/25/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.722813	37.25	Pk	33.4	-24.9	-95.2	-49.45	-13	-36.45	H
3.722813	36.45	Pk	33.4	-24.9	-95.2	-50.25	-13	-37.25	V
5.572969	35.65	Pk	34.7	-22.4	-95.2	-47.25	-13	-34.25	H
5.579531	36.73	Pk	34.8	-22.2	-95.2	-45.87	-13	-32.87	V
7.386563	33.21	Pk	35.5	-19.5	-95.2	-45.99	-13	-32.99	H
7.393594	32.95	Pk	35.6	-19.6	-95.2	-46.25	-13	-33.25	V
Mid Channel, 1880MHz									
3.764531	37.03	Pk	33.4	-24.8	-95.2	-49.57	-13	-36.57	V
3.766406	36.46	Pk	33.4	-24.8	-95.2	-50.14	-13	-37.14	H
5.627813	34.01	Pk	34.9	-22.1	-95.2	-48.39	-13	-35.39	H
5.642813	33.87	Pk	34.8	-21.9	-95.2	-48.43	-13	-35.43	V
7.504219	32.61	Pk	35.6	-19.7	-95.2	-46.69	-13	-33.69	H
7.511719	32.18	Pk	35.6	-19.6	-95.2	-47.02	-13	-34.02	V
High Channel, 1907.6MHz									
3.811406	37.45	Pk	33.3	-25.3	-95.2	-49.75	-13	-36.75	V
3.82125	37.53	Pk	33.3	-25.2	-95.2	-49.57	-13	-36.57	H
5.739375	34.78	Pk	35	-23.4	-95.2	-48.82	-13	-35.82	V
5.742656	35.07	Pk	34.9	-23.4	-95.2	-48.63	-13	-35.63	H
7.642031	32.53	Pk	35.7	-18.4	-95.2	-45.37	-13	-32.37	H
7.648125	32.76	Pk	35.7	-18.5	-95.2	-45.24	-13	-32.24	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.2.5. WCDMA BAND 4

REL 99 MODE

Project #:	14040866
Date:	03/22/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.400781	36.04	Pk	32.8	-25.8	-95.2	-52.16	-13	-39.16	V
3.405938	35.66	Pk	32.8	-25.9	-95.2	-52.64	-13	-39.64	H
5.112656	35.5	Pk	34.4	-22.8	-95.2	-48.10	-13	-35.10	H
5.115	35.93	Pk	34.4	-22.9	-95.2	-47.77	-13	-34.77	V
6.860625	32.96	Pk	35.5	-20.9	-95.2	-47.64	-13	-34.64	V
6.87375	34.02	Pk	35.5	-20.8	-95.2	-46.48	-13	-33.48	H
Mid Channel, 1732.6MHz									
3.453281	37.2	Pk	32.7	-26.1	-95.2	-51.40	-13	-38.40	H
3.456563	36.09	Pk	32.6	-26.1	-95.2	-52.61	-13	-39.61	V
5.157188	35.82	Pk	34.3	-23.6	-95.2	-48.68	-13	-35.68	V
5.181563	34.84	Pk	34.4	-24	-95.2	-49.96	-13	-36.96	H
6.946406	33.4	Pk	35.5	-20.4	-95.2	-46.70	-13	-33.70	H
6.955313	34.09	Pk	35.5	-20.4	-95.2	-46.01	-13	-33.01	V
High Channel, 1752.61MHz									
3.511406	35.11	Pk	32.8	-25.5	-95.2	-52.79	-13	-39.79	V
3.51375	35.9	Pk	32.8	-25.5	-95.2	-52.00	-13	-39.00	H
5.2725	34.68	Pk	34.4	-23.4	-95.2	-49.52	-13	-36.52	H
5.278594	33.9	Pk	34.4	-23.5	-95.2	-50.40	-13	-37.40	V
6.987188	32.59	Pk	35.5	-19.9	-95.2	-47.01	-13	-34.01	V
6.988125	34.48	Pk	35.5	-19.8	-95.2	-45.02	-13	-32.02	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/22/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.435	36.99	Pk	32.7	-26.1	-95.2	-51.61	-13	-38.61	H
3.437344	36.56	Pk	32.7	-26.1	-95.2	-52.04	-13	-39.04	V
5.108906	34.95	Pk	34.3	-22.7	-95.2	-48.65	-13	-35.65	V
5.112656	34.92	Pk	34.4	-22.8	-95.2	-48.68	-13	-35.68	H
6.827813	32.91	Pk	35.4	-20.6	-95.2	-47.49	-13	-34.49	H
6.831094	33.5	Pk	35.5	-20.6	-95.2	-46.80	-13	-33.80	V
Mid Channel, 1732.6MHz									
3.433594	35.99	Pk	32.7	-26.1	-95.2	-52.61	-13	-39.61	V
3.441094	36.5	Pk	32.7	-26.1	-95.2	-52.10	-13	-39.10	H
5.180625	36.92	Pk	34.4	-24	-95.2	-47.88	-13	-34.88	V
5.188125	36.29	Pk	34.4	-24	-95.2	-48.51	-13	-35.51	H
6.920156	33.85	Pk	35.5	-20.8	-95.2	-46.65	-13	-33.65	H
6.921563	33.27	Pk	35.5	-20.8	-95.2	-47.23	-13	-34.23	V
High Channel, 1752.61MHz									
3.490313	37.8	Pk	32.6	-25.6	-95.2	-50.40	-13	-37.40	H
3.495938	35.78	Pk	32.7	-25.5	-95.2	-52.22	-13	-39.22	V
5.236875	34.9	Pk	34.5	-23.8	-95.2	-49.60	-13	-36.60	V
5.254219	35.32	Pk	34.4	-23.4	-95.2	-48.88	-13	-35.88	H
6.990938	32.99	Pk	35.5	-19.8	-95.2	-46.51	-13	-33.51	V
7.005938	33.51	Pk	35.5	-19.6	-95.2	-45.79	-13	-32.79	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 3

10.3.1. GSM 1900

GPRS MODE

Project #:	14040866
Date:	04/29/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.710625	36.89	Pk	33.4	-25	-95.2	-49.91	-13	-36.91	V
3.719063	37.32	Pk	33.4	-24.9	-95.2	-49.38	-13	-36.38	H
5.572031	34.31	Pk	34.7	-22.4	-95.2	-48.59	-13	-35.59	H
5.573438	33.86	Pk	34.8	-22.4	-95.2	-48.94	-13	-35.94	V
7.39875	33.15	Pk	35.5	-19.6	-95.2	-46.15	-13	-33.15	H
7.400625	32.3	Pk	35.5	-19.6	-95.2	-47.00	-13	-34.00	V
Mid Channel, 1880MHz									
3.755156	37.11	Pk	33.4	-25	-95.2	-49.69	-13	-36.69	V
3.765938	37.2	Pk	33.4	-24.8	-95.2	-49.40	-13	-36.40	H
5.657344	34.44	Pk	34.8	-21.9	-95.2	-47.86	-13	-34.86	V
5.664844	34.59	Pk	34.9	-22	-95.2	-47.71	-13	-34.71	H
7.495781	32.87	Pk	35.6	-19.9	-95.2	-46.63	-13	-33.63	V
7.51125	33.23	Pk	35.6	-19.6	-95.2	-45.97	-13	-32.97	H
High Channel, 1909.8MHz									
3.801094	39.61	Pk	33.6	-31.8	-95.2	-53.79	-13	-40.79	V
3.804375	40.1	Pk	33.6	-31.8	-95.2	-53.30	-13	-40.30	H
5.75625	37.09	Pk	34.9	-28.4	-95.2	-51.61	-13	-38.61	H
5.758125	37.58	Pk	34.9	-28.4	-95.2	-51.12	-13	-38.12	V
7.6125	35.44	Pk	35.8	-26.4	-95.2	-50.36	-13	-37.36	V
7.626094	36.15	Pk	35.8	-26.5	-95.2	-49.75	-13	-36.75	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	04/20/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.713438	40.14	Pk	33.3	-32.2	-95.2	-53.96	-13	-40.96	V
3.714375	40.44	Pk	33.3	-32.2	-95.2	-53.66	-13	-40.66	H
5.506875	37.83	Pk	34.8	-29.5	-95.2	-52.07	-13	-39.07	V
5.52375	40.16	Pk	34.9	-29.6	-95.2	-49.74	-13	-36.74	H
7.400156	35.81	Pk	35.7	-26.3	-95.2	-49.99	-13	-36.99	H
7.41375	36.46	Pk	35.8	-26.4	-95.2	-49.34	-13	-36.34	V
Mid Channel, 1880MHz									
3.757031	40.12	Pk	33.5	-32.1	-95.2	-53.68	-13	-40.68	H
3.757031	40.55	Pk	33.5	-32.1	-95.2	-53.25	-13	-40.25	V
5.629688	38.87	Pk	35.1	-30	-95.2	-51.23	-13	-38.23	H
5.661563	38.69	Pk	35	-30	-95.2	-51.51	-13	-38.51	V
7.530469	35.76	Pk	35.8	-26.1	-95.2	-49.74	-13	-36.74	H
7.545938	34.9	Pk	35.8	-26.2	-95.2	-50.70	-13	-37.70	V
High Channel, 1909.8MHz									
3.801563	40.51	Pk	33.6	-31.8	-95.2	-52.89	-13	-39.89	V
3.815156	40.06	Pk	33.7	-31.8	-95.2	-53.24	-13	-40.24	H
5.726719	37.81	Pk	34.8	-29	-95.2	-51.59	-13	-38.59	H
5.73375	37.93	Pk	34.8	-28.9	-95.2	-51.37	-13	-38.37	V
7.60125	35.4	Pk	35.8	-26.3	-95.2	-50.30	-13	-37.30	V
7.630313	35.63	Pk	35.8	-26.5	-95.2	-50.27	-13	-37.27	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3.2. WCDMA BAND 2

REL 99 MODE

Project #:	14040866
Date:	04/26/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.724219	39.84	Pk	33.4	-32.2	-95.2	-54.16	-13	-41.16	V
3.725625	40.16	Pk	33.4	-32.2	-95.2	-53.84	-13	-40.84	H
5.575313	38.66	Pk	34.9	-29.7	-95.2	-51.34	-13	-38.34	H
5.594531	37.61	Pk	35	-29.6	-95.2	-52.19	-13	-39.19	V
7.385625	35.23	Pk	35.7	-26.4	-95.2	-50.67	-13	-37.67	V
7.389375	36.14	Pk	35.7	-26.4	-95.2	-49.76	-13	-36.76	H
Mid Channel, 1880MHz									
3.72375	36.13	Pk	33.4	-24.9	-95.2	-50.57	-13	-37.57	V
3.735	38.5	Pk	33.4	-25	-95.2	-48.30	-13	-35.30	H
5.644688	34.85	Pk	34.8	-21.9	-95.2	-47.45	-13	-34.45	V
5.649375	34.8	Pk	34.8	-21.8	-95.2	-47.40	-13	-34.40	H
7.494844	33.56	Pk	35.6	-19.9	-95.2	-45.94	-13	-32.94	H
7.496719	31.72	Pk	35.7	-19.9	-95.2	-47.68	-13	-34.68	V
High Channel, 1907.6MHz									
3.78375	37.75	Pk	33.3	-25	-95.2	-49.15	-13	-36.15	V
3.794063	36.76	Pk	33.3	-25.2	-95.2	-50.34	-13	-37.34	H
5.713125	34.45	Pk	35	-23.1	-95.2	-48.85	-13	-35.85	V
5.722969	34.8	Pk	34.9	-23.1	-95.2	-48.60	-13	-35.60	H
7.669219	33.03	Pk	35.7	-19	-95.2	-45.47	-13	-32.47	H
7.693125	34.15	Pk	35.7	-19.1	-95.2	-44.45	-13	-31.45	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/25/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.715781	38.02	Pk	33.4	-24.9	-95.2	-48.68	-13	-35.68	V
3.7275	37.88	Pk	33.4	-25	-95.2	-48.92	-13	-35.92	H
5.577188	35.24	Pk	34.8	-22.3	-95.2	-47.46	-13	-34.46	H
5.580938	34.33	Pk	34.8	-22.2	-95.2	-48.27	-13	-35.27	V
7.401563	32.84	Pk	35.5	-19.6	-95.2	-46.46	-13	-33.46	H
7.409531	32.37	Pk	35.5	-19.7	-95.2	-47.03	-13	-34.03	V
Mid Channel, 1880MHz									
3.7575	37.19	Pk	33.4	-24.9	-95.2	-49.51	-13	-36.51	V
3.771094	36.64	Pk	33.3	-24.8	-95.2	-50.06	-13	-37.06	H
5.616094	33.64	Pk	34.8	-21.8	-95.2	-48.56	-13	-35.56	V
5.633906	34.79	Pk	34.8	-22.1	-95.2	-47.71	-13	-34.71	H
7.517813	32.41	Pk	35.6	-19.6	-95.2	-46.79	-13	-33.79	V
7.521563	33.27	Pk	35.6	-19.6	-95.2	-45.93	-13	-32.93	H
High Channel, 1907.6MHz									
3.834844	37.65	Pk	33.4	-25.2	-95.2	-49.35	-13	-36.35	H
3.846563	38.06	Pk	33.5	-25.4	-95.2	-49.04	-13	-36.04	V
5.725313	33.32	Pk	34.9	-23.2	-95.2	-50.18	-13	-37.18	V
5.734922	34.66	Pk	35	-23.3	-95.2	-48.84	-13	-35.84	H
7.639688	32.97	Pk	35.7	-18.4	-95.2	-44.93	-13	-31.93	V
7.644844	32.23	Pk	35.7	-18.4	-95.2	-45.67	-13	-32.67	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3.3. WCDMA BAND 4

REL 99 MODE

Project #:	14040866
Date:	04/26/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.429375	35.96	Pk	32.7	-26.1	-95.2	-52.64	-13	-39.64	V
3.432188	36.66	Pk	32.7	-26.1	-95.2	-51.94	-13	-38.94	H
5.085469	36.24	Pk	34.4	-22.3	-95.2	-46.86	-13	-33.86	V
5.114297	35.17	Pk	34.4	-22.9	-95.2	-48.53	-13	-35.53	H
6.874219	34.14	Pk	35.5	-20.8	-95.2	-46.36	-13	-33.36	H
6.878906	31.88	Pk	35.5	-20.8	-95.2	-48.62	-13	-35.62	V
Mid Channel, 1732.6MHz									
3.44625	37.37	Pk	32.7	-26.1	-95.2	-51.23	-13	-38.23	H
3.447656	37.84	Pk	32.7	-26.1	-95.2	-50.76	-13	-37.76	V
5.19375	35.69	Pk	34.4	-24	-95.2	-49.11	-13	-36.11	V
5.1975	36.3	Pk	34.4	-23.9	-95.2	-48.40	-13	-35.40	H
6.918281	33.15	Pk	35.5	-20.8	-95.2	-47.35	-13	-34.35	V
6.920156	34.31	Pk	35.5	-20.8	-95.2	-46.19	-13	-33.19	H
High Channel, 1752.61MHz									
3.512344	36.55	Pk	32.8	-25.5	-95.2	-51.35	-13	-38.35	V
3.520313	35.25	Pk	32.9	-25.4	-95.2	-52.45	-13	-39.45	H
5.256563	34.4	Pk	34.4	-23.4	-95.2	-49.80	-13	-36.80	V
5.269688	34.81	Pk	34.4	-23.4	-95.2	-49.39	-13	-36.39	H
7.006406	32.57	Pk	35.5	-19.6	-95.2	-46.73	-13	-33.73	V
7.00875	33.49	Pk	35.5	-19.6	-95.2	-45.81	-13	-32.81	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/26/2022
Test Engineer:	27661
Configuration;	EUT Only
Mode:	HSDPA Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.419531	37.5	Pk	32.7	-26.1	-95.2	-51.10	-13	-38.10	H
3.42375	36.57	Pk	32.7	-26.1	-95.2	-52.03	-13	-39.03	V
5.143125	37.16	Pk	34.3	-23.4	-95.2	-47.14	-13	-34.14	V
5.145	35.8	Pk	34.3	-23.4	-95.2	-48.50	-13	-35.50	H
6.857813	33.03	Pk	35.5	-20.8	-95.2	-47.47	-13	-34.47	V
6.868594	34.3	Pk	35.4	-20.9	-95.2	-46.40	-13	-33.40	H
Mid Channel, 1732.6MHz									
3.45	36.25	Pk	32.7	-26.1	-95.2	-52.35	-13	-39.35	H
3.452813	36.15	Pk	32.7	-26.1	-95.2	-52.45	-13	-39.45	V
5.173125	35.61	Pk	34.4	-24	-95.2	-49.19	-13	-36.19	V
5.177344	34.91	Pk	34.4	-24	-95.2	-49.89	-13	-36.89	H
6.915938	33.78	Pk	35.5	-20.8	-95.2	-46.72	-13	-33.72	H
6.919219	32.93	Pk	35.5	-20.8	-95.2	-47.57	-13	-34.57	V
High Channel, 1752.61MHz									
3.477188	35.41	Pk	32.7	-25.9	-95.2	-52.99	-13	-39.99	V
3.493125	35.66	Pk	32.6	-25.6	-95.2	-52.54	-13	-39.54	H
5.262656	34.28	Pk	34.4	-23.4	-95.2	-49.92	-13	-36.92	V
5.267344	34.53	Pk	34.4	-23.4	-95.2	-49.67	-13	-36.67	H
7.028438	32.89	Pk	35.6	-19.8	-95.2	-46.51	-13	-33.51	H
7.033125	33.48	Pk	35.5	-19.8	-95.2	-46.02	-13	-33.02	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.4. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 4

10.4.1. GSM 1900

GPRS MODE

Project #:	14040866
Date:	04/29/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	GPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.719063	36.78	Pk	33.4	-24.9	-95.2	-49.92	-13	-36.92	V
3.721875	38.45	Pk	33.4	-24.9	-95.2	-48.25	-13	-35.25	H
5.5725	34.15	Pk	34.7	-22.4	-95.2	-48.75	-13	-35.75	H
5.579063	33.93	Pk	34.8	-22.3	-95.2	-48.77	-13	-35.77	V
7.420313	32.04	Pk	35.5	-19.9	-95.2	-47.56	-13	-34.56	V
7.420781	33.3	Pk	35.5	-19.9	-95.2	-46.30	-13	-33.30	H
Mid Channel, 1880MHz									
3.753281	36.25	Pk	33.4	-25	-95.2	-50.55	-13	-37.55	V
3.754688	37.08	Pk	33.4	-25	-95.2	-49.72	-13	-36.72	H
5.657344	34.1	Pk	34.8	-21.9	-95.2	-48.20	-13	-35.20	V
5.659688	34.6	Pk	34.9	-21.9	-95.2	-47.60	-13	-34.60	H
7.5075	33.25	Pk	35.6	-19.7	-95.2	-46.05	-13	-33.05	H
7.508906	32.02	Pk	35.6	-19.7	-95.2	-47.28	-13	-34.28	V
High Channel, 1909.8MHz									
3.818906	36.34	Pk	33.3	-25.2	-95.2	-50.76	-13	-37.76	V
3.831563	37.39	Pk	33.4	-25.2	-95.2	-49.61	-13	-36.61	H
5.740313	34.77	Pk	34.9	-23.4	-95.2	-48.93	-13	-35.93	H
5.74125	35.82	Pk	34.9	-23.4	-95.2	-47.88	-13	-34.88	V
7.643906	31.85	Pk	35.7	-18.4	-95.2	-46.05	-13	-33.05	V
7.651875	32.99	Pk	35.7	-18.7	-95.2	-45.21	-13	-32.21	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

EGPRS MODE

Project #:	14040866
Date:	04/29/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	EGPRS 1900
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1850.2MHz									
3.693281	37.57	Pk	33.3	-25.5	-95.2	-49.83	-13	-36.83	V
3.709219	36.72	Pk	33.4	-25	-95.2	-50.08	-13	-37.08	H
5.578594	33.59	Pk	34.8	-22.3	-95.2	-49.11	-13	-36.11	H
5.585625	33.55	Pk	34.8	-22.1	-95.2	-48.95	-13	-35.95	V
7.401094	32.95	Pk	35.5	-19.6	-95.2	-46.35	-13	-33.35	H
7.410469	32.96	Pk	35.5	-19.7	-95.2	-46.44	-13	-33.44	V
Mid Channel, 1880MHz									
3.751875	37.23	Pk	33.4	-25	-95.2	-49.57	-13	-36.57	H
3.751875	36.24	Pk	33.4	-25	-95.2	-50.56	-13	-37.56	V
5.61	33.29	Pk	34.8	-21.8	-95.2	-48.91	-13	-35.91	V
5.616563	35.79	Pk	34.8	-21.8	-95.2	-46.41	-13	-33.41	H
7.523438	33.38	Pk	35.6	-19.6	-95.2	-45.82	-13	-32.82	V
7.525781	32.95	Pk	35.6	-19.6	-95.2	-46.25	-13	-33.25	H
High Channel, 1909.8MHz									
3.815625	38.1	Pk	33.3	-25.2	-95.2	-49.00	-13	-36.00	H
3.819375	35.81	Pk	33.3	-25.2	-95.2	-51.29	-13	-38.29	V
5.703281	35.58	Pk	34.8	-23	-95.2	-47.82	-13	-34.82	H
5.709844	34.61	Pk	34.9	-23	-95.2	-48.69	-13	-35.69	V
7.642969	32.98	Pk	35.7	-18.4	-95.2	-44.92	-13	-31.92	H
7.650938	32.96	Pk	35.7	-18.6	-95.2	-45.14	-13	-32.14	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.4.2. WCDMA BAND 2

REL 99 MODE

Project #:	14040866
Date:	04/27/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.490781	35.5	Pk	32.6	-25.6	-95.2	-52.70	-13	-39.70	V
3.497344	36.51	Pk	32.7	-25.5	-95.2	-51.49	-13	-38.49	H
5.235938	34.91	Pk	34.5	-23.9	-95.2	-49.69	-13	-36.69	V
5.247188	35.81	Pk	34.4	-23.5	-95.2	-48.49	-13	-35.49	H
6.998438	32.42	Pk	35.5	-19.6	-95.2	-46.88	-13	-33.88	V
7.009688	33.84	Pk	35.5	-19.6	-95.2	-45.46	-13	-32.46	H
Mid Channel, 1880MHz									
3.765938	37.07	Pk	33.4	-24.8	-95.2	-49.53	-13	-36.53	H
3.770625	36.47	Pk	33.4	-24.8	-95.2	-50.13	-13	-37.13	V
5.618438	34.04	Pk	34.8	-21.9	-95.2	-48.26	-13	-35.26	V
5.636719	35.25	Pk	34.8	-22.1	-95.2	-47.25	-13	-34.25	H
7.516406	32.25	Pk	35.6	-19.6	-95.2	-46.95	-13	-33.95	V
7.531406	33.7	Pk	35.6	-19.6	-95.2	-45.50	-13	-32.50	H
High Channel, 1907.6MHz									
3.820781	37.39	Pk	33.3	-25.2	-95.2	-49.71	-13	-36.71	V
3.83625	37.38	Pk	33.4	-25.3	-95.2	-49.72	-13	-36.72	H
5.685938	35.35	Pk	34.9	-22.7	-95.2	-47.65	-13	-34.65	V
5.702813	34.28	Pk	34.8	-23	-95.2	-49.12	-13	-36.12	H
7.629844	33.35	Pk	35.7	-18.4	-95.2	-44.55	-13	-31.55	H
7.640156	31.17	Pk	35.7	-18.4	-95.2	-46.73	-13	-33.73	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	04/27/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 2
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1852.4MHz									
3.718594	37.01	Pk	33.4	-24.9	-95.2	-49.69	-13	-36.69	H
3.719531	37.31	Pk	33.4	-24.9	-95.2	-49.39	-13	-36.39	V
5.574844	34.45	Pk	34.8	-22.3	-95.2	-48.25	-13	-35.25	H
5.581406	34.51	Pk	34.8	-22.2	-95.2	-48.09	-13	-35.09	V
7.419375	31.95	Pk	35.5	-19.9	-95.2	-47.65	-13	-34.65	V
7.422656	32.88	Pk	35.6	-20	-95.2	-46.72	-13	-33.72	H
Mid Channel, 1880MHz									
3.771094	38.7	Pk	33.3	-24.8	-95.2	-48.00	-13	-35.00	H
3.778125	37.44	Pk	33.4	-24.9	-95.2	-49.26	-13	-36.26	V
5.632969	35.02	Pk	34.8	-22.1	-95.2	-47.48	-13	-34.48	H
5.639063	34.79	Pk	34.8	-22	-95.2	-47.61	-13	-34.61	V
7.525313	32.5	Pk	35.6	-19.6	-95.2	-46.70	-13	-33.70	V
7.582969	35.53	Pk	35.7	-18.5	-95.2	-42.47	-13	-29.47	H
High Channel, 1907.6MHz									
3.799219	36.65	Pk	33.3	-25.3	-95.2	-50.55	-13	-37.55	V
3.810938	37.44	Pk	33.3	-25.3	-95.2	-49.76	-13	-36.76	H
5.699063	34.48	Pk	34.9	-22.9	-95.2	-48.72	-13	-35.72	V
5.702344	35.29	Pk	34.8	-22.9	-95.2	-48.01	-13	-35.01	H
7.605	32.73	Pk	35.7	-18.7	-95.2	-45.47	-13	-32.47	V
7.630781	32.61	Pk	35.7	-18.4	-95.2	-45.29	-13	-32.29	H

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.4.3. WCDMA BAND 4

REL 99 MODE

Project #:	14040866
Date:	04/27/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	REL 99 Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.4125	35.94	Pk	32.8	-26	-95.2	-52.46	-13	-39.46	V
3.427969	35.96	Pk	32.7	-26.1	-95.2	-52.64	-13	-39.64	H
5.108438	34.67	Pk	34.3	-22.7	-95.2	-48.93	-13	-35.93	V
5.115	34.41	Pk	34.4	-22.9	-95.2	-49.29	-13	-36.29	H
6.861563	33.01	Pk	35.5	-20.9	-95.2	-47.59	-13	-34.59	V
6.867656	33.13	Pk	35.4	-20.9	-95.2	-47.57	-13	-34.57	H
Mid Channel, 1732.6MHz									
3.452344	36.2	Pk	32.7	-26.1	-95.2	-52.40	-13	-39.40	V
3.468281	36.5	Pk	32.6	-26.1	-95.2	-52.20	-13	-39.20	H
5.174531	36.22	Pk	34.4	-24	-95.2	-48.58	-13	-35.58	V
5.176875	35.05	Pk	34.4	-24	-95.2	-49.75	-13	-36.75	H
6.954375	33.43	Pk	35.5	-20.4	-95.2	-46.67	-13	-33.67	H
6.962813	33.01	Pk	35.5	-20.4	-95.2	-47.09	-13	-34.09	V
High Channel, 1752.61MHz									
3.523125	35.18	Pk	32.9	-25.3	-95.2	-52.42	-13	-39.42	V
3.524063	35.58	Pk	32.9	-25.3	-95.2	-52.02	-13	-39.02	H
5.279531	35.25	Pk	34.4	-23.5	-95.2	-49.05	-13	-36.05	H
5.279531	34.8	Pk	34.4	-23.5	-95.2	-49.50	-13	-36.50	V
7.021406	33.38	Pk	35.5	-19.7	-95.2	-46.02	-13	-33.02	H
7.021875	32.36	Pk	35.5	-19.7	-95.2	-47.04	-13	-34.04	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HSDPA MODE

Project #:	14040866
Date:	03/14/2022
Test Engineer:	30606
Configuration;	EUT Only
Mode:	HSDPA Band 4
Chamber #:	Chamber A

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl (dB)	EIRP CF	Corrected Reading (dBm)	Harmonics limit	Margin (dB)	Polarity
Low Channel, 1712.4MHz									
3.417188	35.79	Pk	32.7	-26.1	-95.2	-52.81	-13	-39.81	V
3.43125	36.63	Pk	32.7	-26.1	-95.2	-51.97	-13	-38.97	H
5.107969	35.3	Pk	34.3	-22.6	-95.2	-48.20	-13	-35.20	V
5.117813	34.54	Pk	34.4	-23	-95.2	-49.26	-13	-36.26	H
6.854063	32.52	Pk	35.5	-20.8	-95.2	-47.98	-13	-34.98	V
6.859219	33.37	Pk	35.5	-20.8	-95.2	-47.13	-13	-34.13	H
Mid Channel, 1732.6MHz									
3.443906	36.8	Pk	32.7	-26.1	-95.2	-51.80	-13	-38.80	V
3.45375	36.06	Pk	32.7	-26.1	-95.2	-52.54	-13	-39.54	H
5.20125	35.78	Pk	34.4	-23.9	-95.2	-48.92	-13	-35.92	H
5.212969	34.45	Pk	34.4	-23.9	-95.2	-50.25	-13	-37.25	V
6.940781	32.83	Pk	35.5	-20.5	-95.2	-47.37	-13	-34.37	V
6.951094	33.86	Pk	35.5	-20.4	-95.2	-46.24	-13	-33.24	H
High Channel, 1752.61MHz									
3.518906	35.49	Pk	32.9	-25.4	-95.2	-52.21	-13	-39.21	V
3.525938	35.74	Pk	32.9	-25.3	-95.2	-51.86	-13	-38.86	H
5.236406	34.64	Pk	34.5	-23.8	-95.2	-49.86	-13	-36.86	H
5.245781	34.71	Pk	34.4	-23.5	-95.2	-49.59	-13	-36.59	V
6.985313	32.86	Pk	35.5	-19.9	-95.2	-46.74	-13	-33.74	H
6.990938	32.86	Pk	35.5	-19.8	-95.2	-46.64	-13	-33.64	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

11. SETUP PHOTOS

Please refer to 14040866-EP1V1 for setup photos.

END OF REPORT

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.