TEST REPORT

Report Number. : 13129294-E5V2

Applicant	:	MICROSOFT CORPORATION ONE MICROSOFT WAY REDMOND, WA 98052-6399, U.S.A.
Model	:	1930
FCC ID	:	C3K1930
IC	:	3048A-1930
EUT Description	:	PHABLET DEVICE
Test Standard(s)	:	FCC CFR47 PART 22H, 24E ISED RSS-132 ISSUE 3, RSS-133 ISSUE 6

Date Of Issue:
JUNE 09, 2020

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NVLAP Lab code: 200065-0
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	5/27/2020	Initial Review	---
V2	6/9/2020	Updated EUT	Grace Rincand

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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	MICROSOFT CORPORATION ONE MICROSOFT WAY REDMOND, WA 98052-6399, U.S.A.
Model	1930
FCC ID	C3K1930
IC	3048A-1930
EUT Description	PHABLET DEVICE
Serial Number	901139500365, 90006061165, 900065101165
Date Tested	MARCH 02, 2020 to MAY 26, 2020
Applicable Standards	FCC CFR47 PART 22H, 24E ISED RSS-132 ISSUE 3, RSS-133 ISSUE 6
Test Results	COMPLIES

UL Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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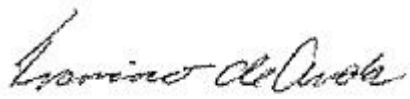
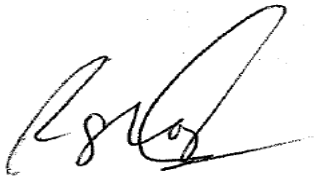
		
Francisco de Anda Operations Leader UL Verification Services Inc.	Tina Chu Senior Project Handler UL Verification Services Inc.	Rolly Alegre Laboratory Engineer UL Verification Services Inc.

2. 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
- 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-132 Issue 3, RSS-133 Issue 6

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA, and 2800 Suite Perimeter Park Dr., Morrisville, North Carolina, USA .The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Road
☐ Chamber A	☐ Chamber D	☐ Chamber I
☐ Chamber B	☐ Chamber E	☐ Chamber J
☐ Chamber C	☐ Chamber F	☐ Chamber K
	☐ Chamber G	☐ Chamber L
	☐ Chamber H	☐ Chamber M

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0
UL Verification Services Inc test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

2800 Suite Perimeter Park Dr.
☒ North Chamber
☒ South Chamber

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0
UL LLC (RTP) test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code: 2180C.

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. 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.

4.2. 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.)

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB
Occupied Channel Bandwidth	±0.39 %
Temperature	±0.9 °C
Supply voltages	±0.45 %
Time	±0.02 %

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

4.4. 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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Phablet Device with 802.11 a/b/g/n/ac 2x2 WLAN, Bluetooth, Bluetooth LE, GSM, WCDMA, and LTE radios.

5.2. 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.2

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.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

GSM MODES

RSS 132 850MHz								
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	31.80	-1.10	11.5	30.70	1.175	244.3565	244KGXW
Part 22 850MHz								
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	31.80	-1.10	7.0	28.55	0.716	244.3565	244KGXW
Part 24 / RSS 133 1900MHz								
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	29.60	0.40	2.0	30.00	1.000	235.8416	236KGXW

WCDMA MODE

RSS 132 Band 5

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	24.20	-1.10	11.5	23.10	0.204	4128.3	4M13F9W
	HSDPA	24.10			23.00	0.200	4129.4	4M13F9W

Part 22 Band 5

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	24.20	-1.10	7.0	20.95	0.124	4128.3	4M13F9W
	HSDPA	24.10			20.85	0.122	4129.4	4M13F9W

Part 24 / RSS 133 Band 2

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	24.20	0.40	2.0	24.60	0.288	4153.8	4M15F9W
	HSDPA	24.10			24.50	0.282	4160	4M16F9W

5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was Baseband version 0.c11-00081.1-SM8150_GEN_PACK-1

5.4. MAXIMUM ANTENNA GAIN

Frequency Range (MHz)	Antenna Gain (dBi)
824 - 849	-1.1
1850 - 1910	0.4

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X/Y/Z. Additionally, the EUT was investigated in four configurations with both screens: folded and closed/open 90 degrees/flat 180 degrees/folded and open. It was determined that the EUT with both screens folded and closed with X (Flatbed) orientation was worst-case orientation for below 1GHz bands with the AC/DC adapter; the EUT with both screens flat 180 degrees with Y (Landscape) orientation was worst-case orientation for above 1GHz bands with the AC/DC adapter.

The worst-case scenario for all measurements as followed:
- GSM GPRS. EUT does not support EGPRS.
- WCDMA REL 99
- WCDMA HSDPA

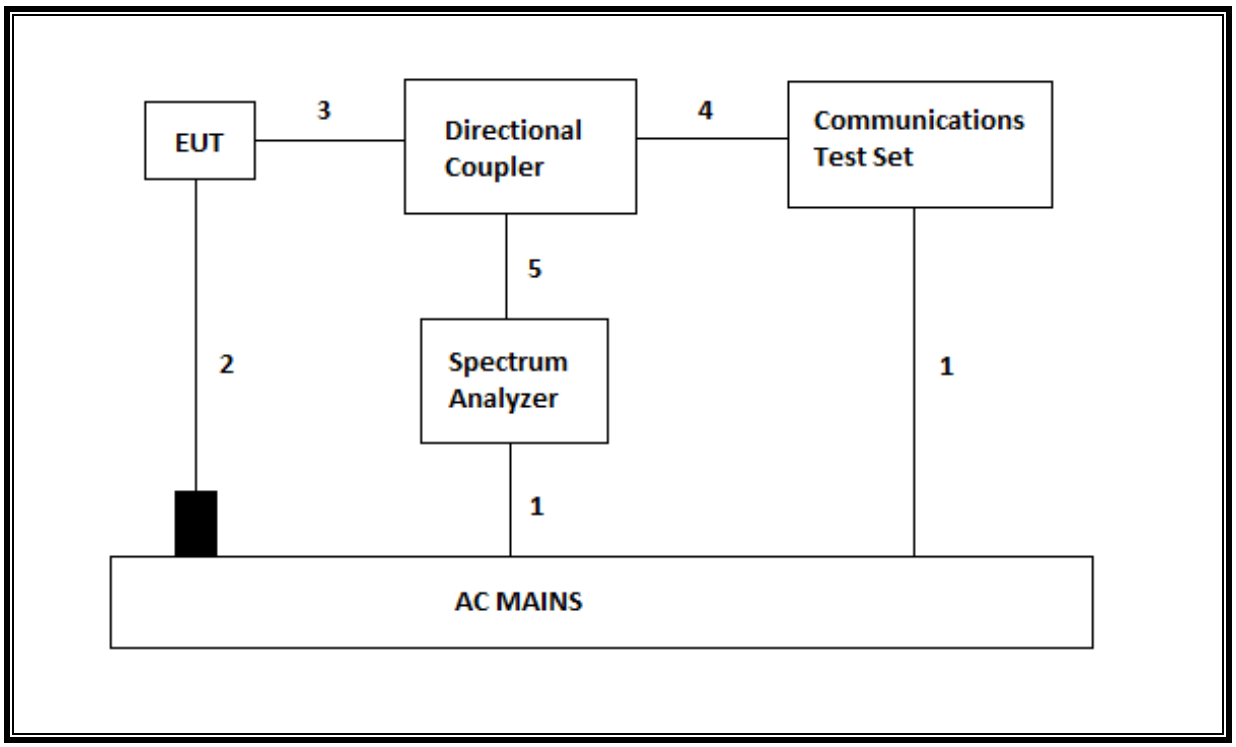
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For supported simultaneous transmission of any BT/BLE/WLAN (2.4GHz) and WWAN bands or WLAN 5GHz and WWAN bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. Please refer to 2.4GHz and 5GHz reports for results.

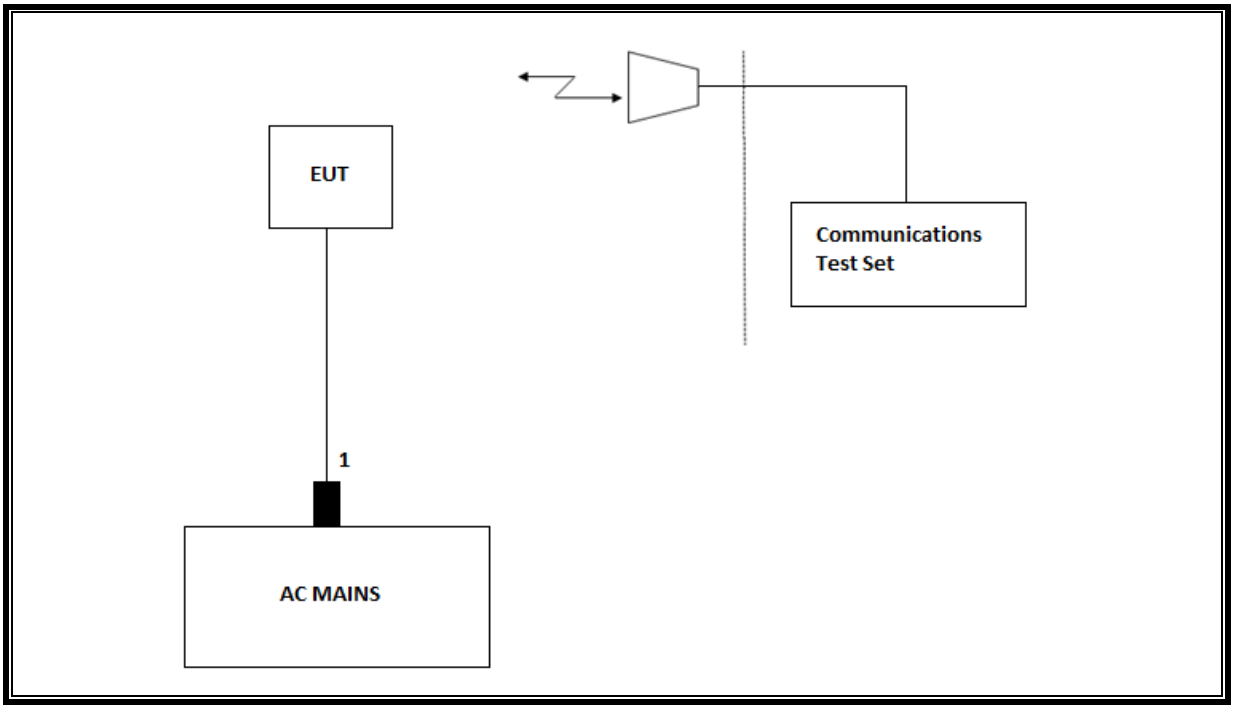
5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
AC/DC adapter		Microsoft	1847	0D130V01NZD9C		N/A
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	3-prongs	Un-shielded	2.0	N/A
2	DC	1	USB-C	Shielded	1.75	N/A
3	RF In/Out	1	SMA	Un-shielded	0.28	N/A
4	RF In/Out	1	SMA	Un-shielded	1	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	DC	1	USB-C	Shielded	1.75	N/A

CONDUCTED SETUP



RADIATED SETUP



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST (Fremont Building 1)				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Directional Coupler	KRYTAR	152610	T922	07/05/2020
Directional Coupler	Mini-Circuits	ZUDC10-183+	PRE0181619	08/21/2020
Power Meter, P-series single channel	Keysight	N1911A	T1269	01/21/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	T1225	02/13/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T1871	02/25/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T260	02/19/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T979	02/26/2021
*Chamber, Environmental	Thermotron	SE-600-10-10	T80	05/07/2020
Spectrum Analyzer, PSA 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T200	01/24/2021
Spectrum Analyzer, PXA 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/28/2021
DC Power Supply 15V	Sorensen	XT15-4	T463	CnR
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 2.7 and 2.8.1	
Power Measurement Software	UL	UL RF	Ver 2.7, 2019	

TEST EQUIPMENT LIST(Morrisville - South Chamber)				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	AT0076	11/07/2020
*Spectrum Analyzer	Agilent	N9030A	SA0027	05/15/2020
Environmental Meter	Fisher Scientific	15-077-963	s/n 181474409	07/27/2020
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T374	07/08/2020
1GHz high-pass filter, 2W, Fhigh =10GHz	Micro-Tronics	HPM17672	HPF009	02/19/2021
UL AUTOMATION SOFTWARE				
Radiated test software	UL	UL RF	Ver 9.5 June 12, 2019	

TEST EQUIPMENT LIST(Morrisville - North Chamber)				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Active Loop Antenna	ETS-Lindgren	6502	AT0079	08/08/2020
Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	AT0073	08/08/2020
*Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	AT0069	05/15/2020
*Spectrum Analyzer	Agilent	N9030A	SA0026	03/30/2020
Spectrum Analyzer	Agilent	N9030A	SA0025	03/17/2021
Environmental Meter	Fisher Scientific	15-077-963	s/n 181474341	07/27/2020
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T959	02/19/2021
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T978	02/20/2021
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T374	07/08/2020
1GHz high-pass filter, 2W, F_{high} =10GHz	Micro-Tronics	HPM17672	HPF009	02/19/2021
4GHz high-pass filter, 2W, F_{high} =18GHz	Micro-Tronics	HPM13351	HPF015	02/19/2021
DC-1000MHz low-pass filter	Pasternack	PE8720	LPF008	02/19/2021
900MHz notch filter, 2W, Fhigh =6GHz	Micro-Tronics	BRM50706	BRF001	02/19/2021
UL AUTOMATION SOFTWARE				
Radiated test software	UL	UL RF	Ver 9.5 June 12, 2019	

NOTES:

1. * Testing is completed before equipment expiration date.

7. RF OUTPUT POWER VERIFICATION

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

7.1. 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 > 30 dBm for GPRS1800/1900
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

7.1.1. GSM 850

Test Engineer ID:	15985	Test Date:	5/26/2020

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)
GPRS (GMSK)	CS1	1	128	824.2	**31.80**
			190	836.6	**31.80**
			251	848.8	31.70
		2	128	824.2	31.70
			190	836.6	31.60
			251	848.8	31.60

7.1.2. GSM 1900

Test Engineer ID:	40882 CJ	Test Date:	4/4/2020

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Conducted Average Power (dBm)
GPRS (GMSK)	CS1	1	512	1850.2	**29.60**
			661	1880	29.40
			810	1909.8	**29.60**
		2	512	1850.2	**29.60**
			661	1880	29.30
			810	1909.8	**29.60**

7.2. 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.

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	β_{ed}1: 47/15 β_{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.

RESULT

7.2.1. WCDMA BAND 5

Test Engineer ID:	50820 EC	Test Date:	3/2/2020

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)
W-CDMA Band 5 (850MHz)	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	24.2
			4183	836.6	N/A	**24.2**
			4233	846.6	N/A	24.1
	HSDPA	Subtest 1	4132	826.4	0	24.1
			4183	836.6	0	**24.1**
			4233	846.6	0	24.1
		Subtest 2	4132	826.4	0	24.1
			4183	836.6	0	24.1
			4233	846.6	0	24.0
		Subtest 3	4132	826.4	0.5	23.7
			4183	836.6	0.5	23.7
			4233	846.6	0.5	23.6
		Subtest 4	4132	826.4	0.5	23.7
			4183	836.6	0.5	23.7
			4233	846.6	0.5	23.6
	HSPA (HSDPA & HSUPA)	Subtest 1	4132	826.4	0	23.6
			4183	836.6	0	23.6
			4233	846.6	0	23.5
		Subtest 2	4132	826.4	2	22.1
			4183	836.6	2	22.1
			4233	846.6	2	22.0
		Subtest 3	4132	826.4	1	23.0
			4183	836.6	1	23.1
			4233	846.6	1	23.0
		Subtest 4	4132	826.4	2	22.1
			4183	836.6	2	22.1
			4233	846.6	2	22.0
		Subtest 5	4132	826.4	0	23.6
			4183	836.6	0	23.7
			4233	846.6	0	23.6
	DC-HSDPA	Subtest 1	4132	826.4	0	24.1
			4183	836.6	0	24.1
			4233	846.6	0	24.0
		Subtest 2	4132	826.4	0	24.1
			4183	836.6	0	24.1
			4233	846.6	0	24.0
		Subtest 3	4132	826.4	0.5	23.6
			4183	836.6	0.5	23.7
			4233	846.6	0.5	23.6
		Subtest 4	4132	826.4	0.5	23.7
			4183	836.6	0.5	23.7
			4233	846.6	0.5	23.6

7.2.2. WCDMA BAND 2

Test Engineer ID:	50820 EC	Test Date:	3/2/2020

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Conducted Average Power (dBm)
W-CDMA Band 2 (1900MHz)	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	24.2
			9400	1880.0	N/A	**24.2**
			9538	1907.6	N/A	24.1
	HSDPA	Subtest 1	9262	1852.4	0	24.0
			9400	1880.0	0	**24.1**
			9538	1907.6	0	24.0
		Subtest 2	9262	1852.4	0	24.0
			9400	1880.0	0	24.1
			9538	1907.6	0	24.0
		Subtest 3	9262	1852.4	0.5	23.6
			9400	1880.0	0.5	23.7
			9538	1907.6	0.5	23.6
		Subtest 4	9262	1852.4	0.5	23.7
			9400	1880.0	0.5	23.7
			9538	1907.6	0.5	23.6
	HSPA (HSDPA & HSUPA)	Subtest 1	9262	1852.4	0	23.4
			9400	1880.0	0	23.5
			9538	1907.6	0	23.5
		Subtest 2	9262	1852.4	2	21.9
			9400	1880.0	2	22.0
			9538	1907.6	2	21.9
		Subtest 3	9262	1852.4	1	22.9
			9400	1880.0	1	22.9
			9538	1907.6	1	22.9
		Subtest 4	9262	1852.4	2	21.9
			9400	1880.0	2	22.0
			9538	1907.6	2	22.0
		Subtest 5	9262	1852.4	0	23.5
			9400	1880.0	0	23.5
			9538	1907.6	0	23.5
	DC-HSDPA	Subtest 1	9262	1852.4	0	24.1
			9400	1880.0	0	24.1
			9538	1907.6	0	24.0
		Subtest 2	9262	1852.4	0	24.0
			9400	1880.0	0	24.1
			9538	1907.6	0	24.0
		Subtest 3	9262	1852.4	0.5	23.6
			9400	1880.0	0.5	23.7
			9538	1907.6	0.5	23.6
		Subtest 4	9262	1852.4	0.5	23.6
			9400	1880.0	0.5	23.7
			9538	1907.6	0.5	23.6

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
ISED: RSS132; RSS133§2.3

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.

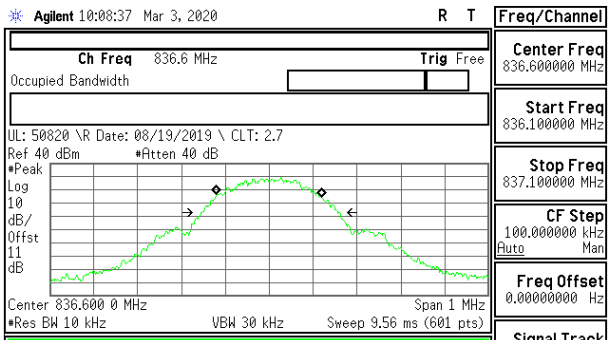
GSM

Band	Modulation	Channel	f(MHz)	99% BW (KHz)	-26dB BW (KHz)
850	GPRS	190	836.6	244.3565	311.596
1900	GPRS	661	1880.0	235.8416	314.948

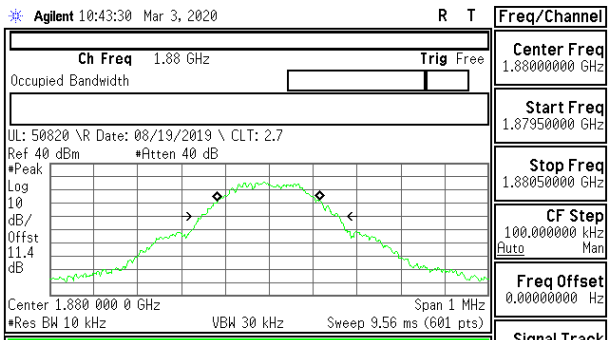
WCDMA

Band	Modulation	Channel	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
BAND 5	REL 99	4408	836.6	4.1283	4.683
	HSDPA			4.1294	4.720
BAND 2	REL 99	9800	1880.0	4.1538	4.734
	HSDPA			4.1600	4.713

8.1.1. GSM

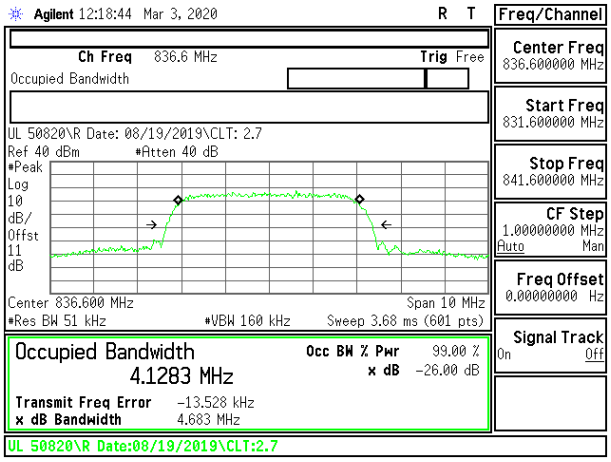


GSM 850 GPRS Middle Channel

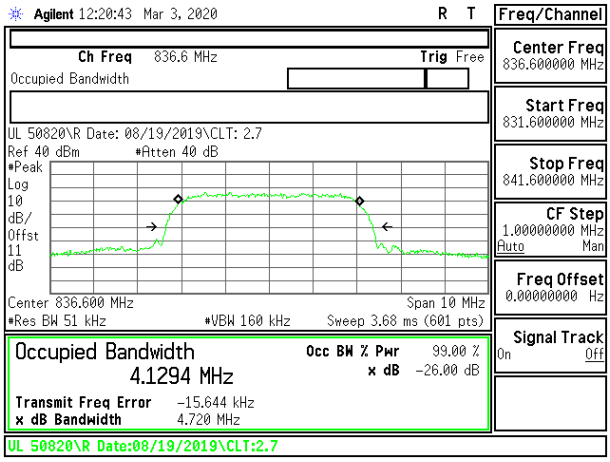


GSM 1900 GPRS Middle Channel

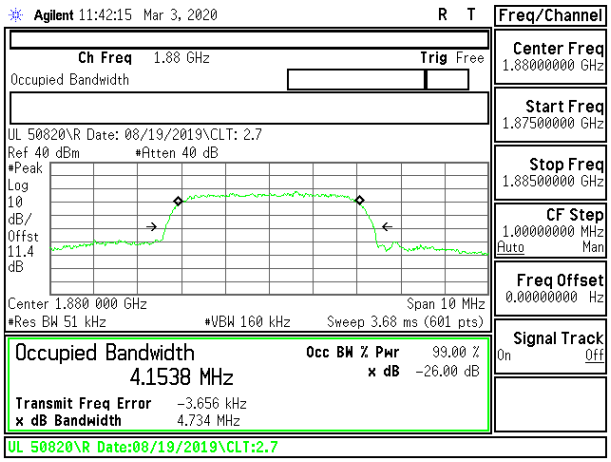
8.1.2. WCDMA



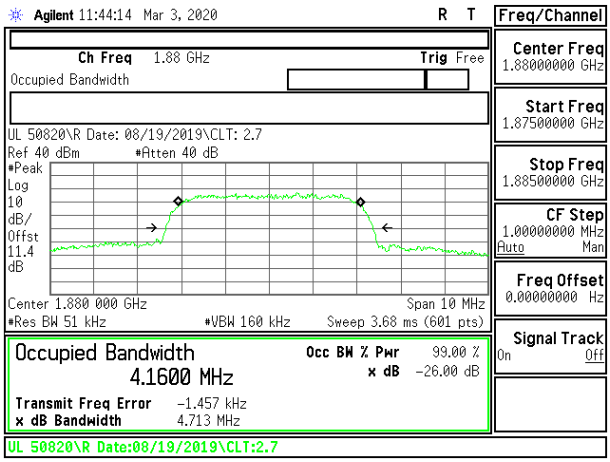
WCDMA Band 5 Rel 99 Middle Channel



WCDMA Band 5 HSDPA Middle Channel



WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel

8.2. BAND EDGE AND EMISSION MASK

LIMITS

FCC: §22.917, §24.238
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
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.

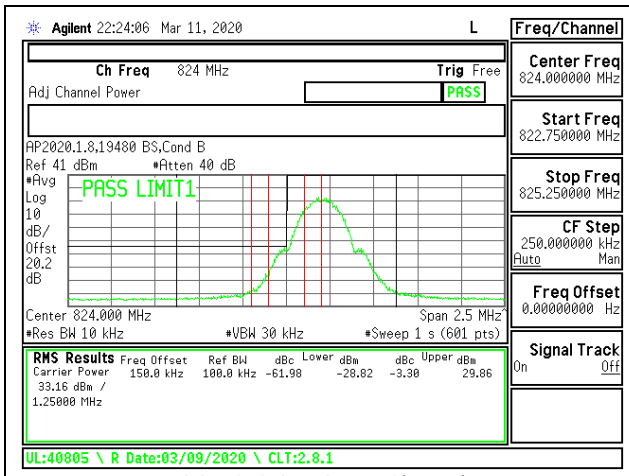
TEST PROCEDURE

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:

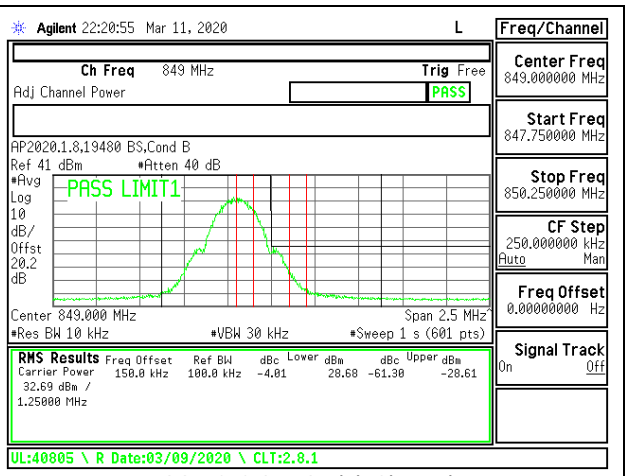
- Set the spectrum analyzer span to include the block edge frequency.
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

RESULTS

8.2.1. GSM 850

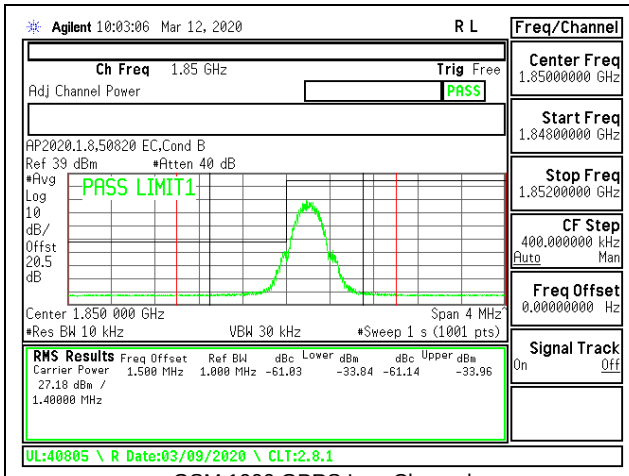


GSM 850 GPRS Low Channel

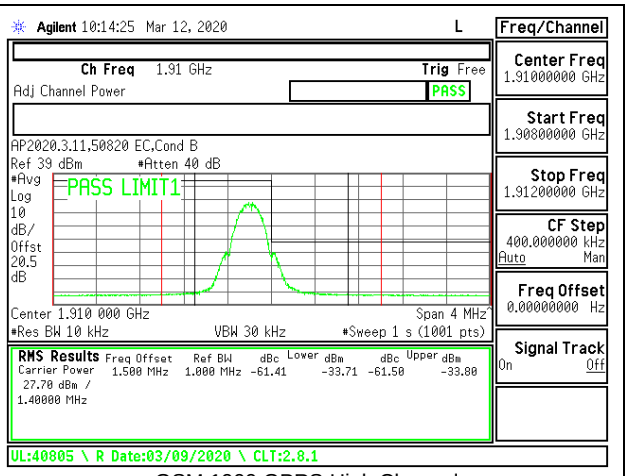


GSM 850 GPRS High Channel

8.2.2. GSM 1900

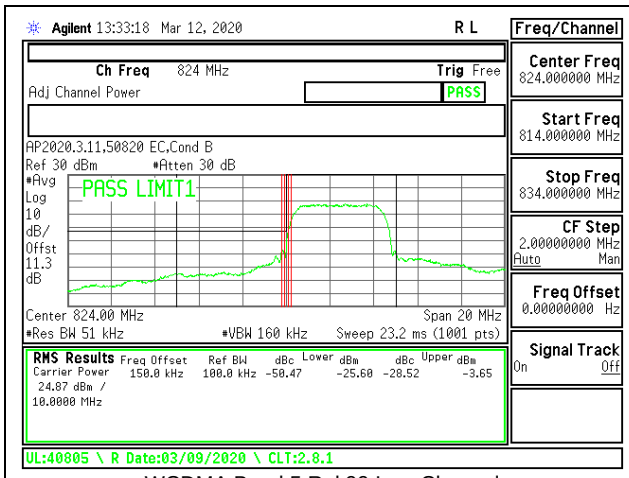


GSM 1900 GPRS Low Channel

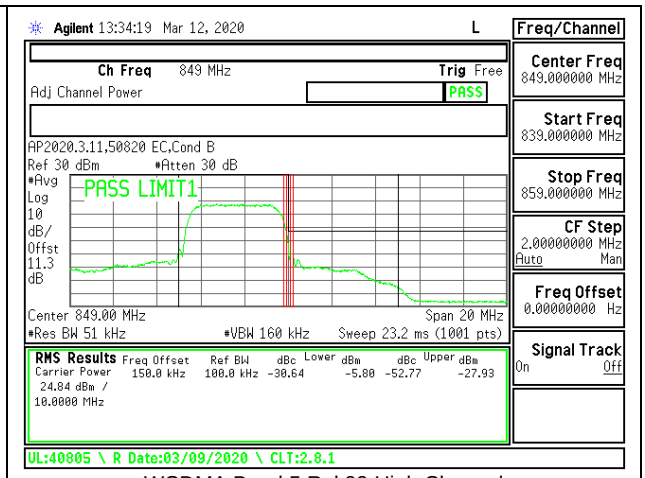


GSM 1900 GPRS High Channel

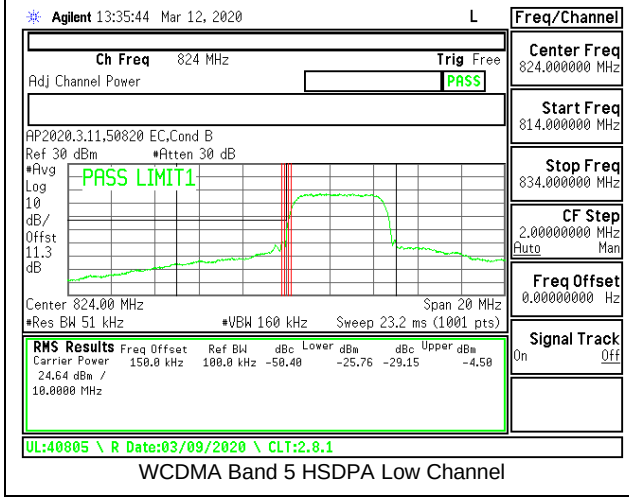
8.2.3. WCDMA BAND 5



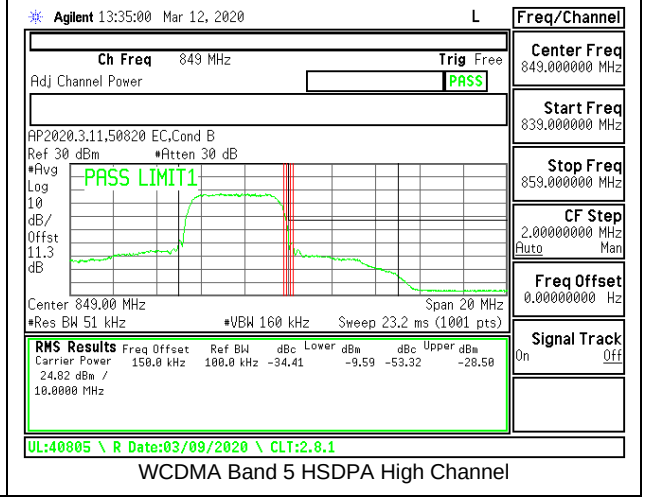
WCDMA Band 5 Rel 99 Low Channel



WCDMA Band 5 Rel 99 High Channel

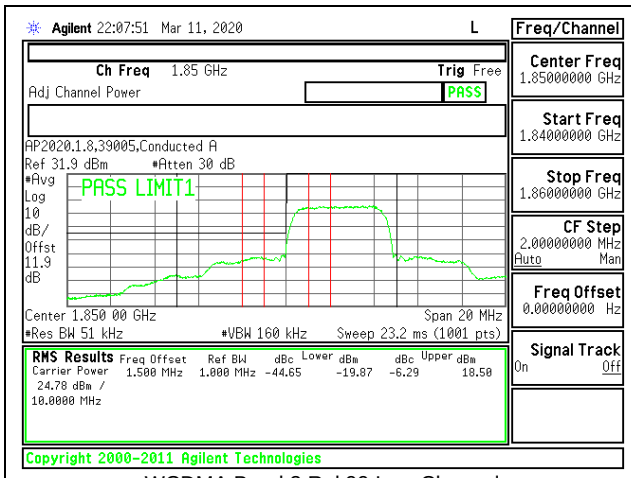


WCDMA Band 5 HSDPA Low Channel

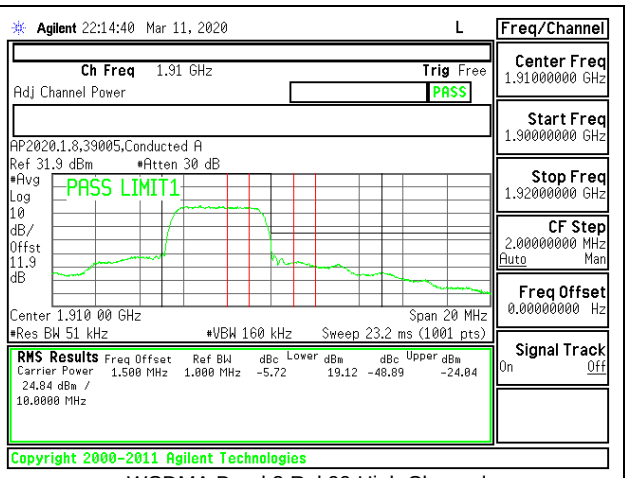


WCDMA Band 5 HSDPA High Channel

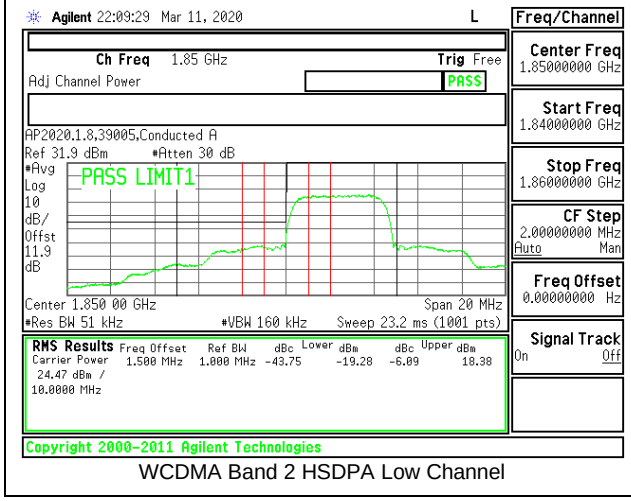
8.2.4. WCDMA BAND 2



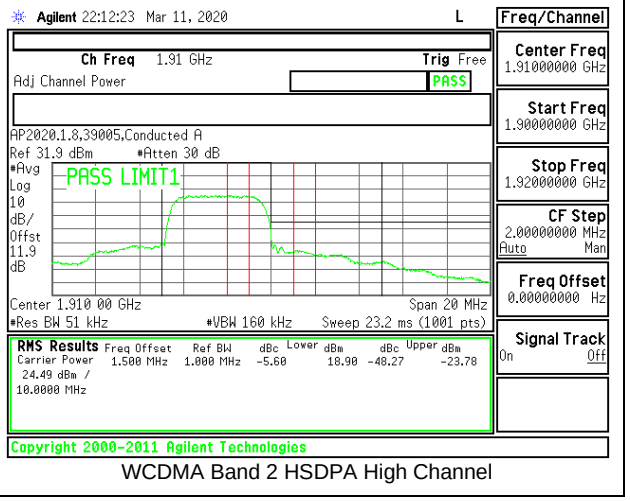
WCDMA Band 2 Rel 99 Low Channel



WCDMA Band 2 Rel 99 High Channel



WCDMA Band 2 HSDPA Low Channel



WCDMA Band 2 HSDPA High Channel

8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.917, §24.238
ISED: RSS132§5.5; RSS133§6.5

LIMITS

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

TEST PROCEDURE

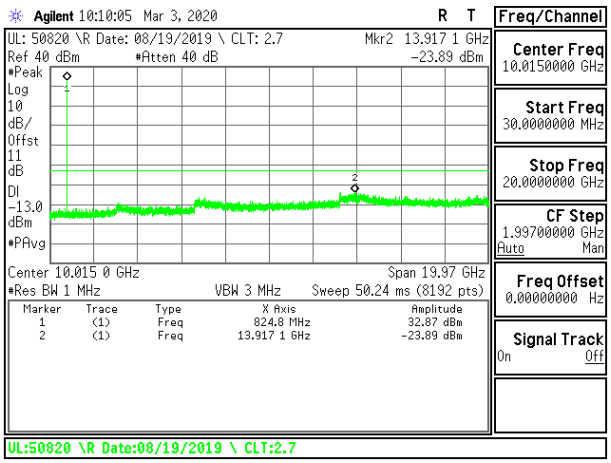
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case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

For each out of band emissions measurement:

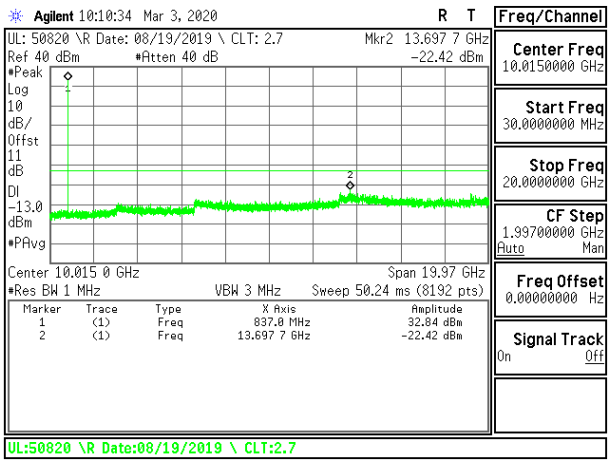
- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

RESULTS

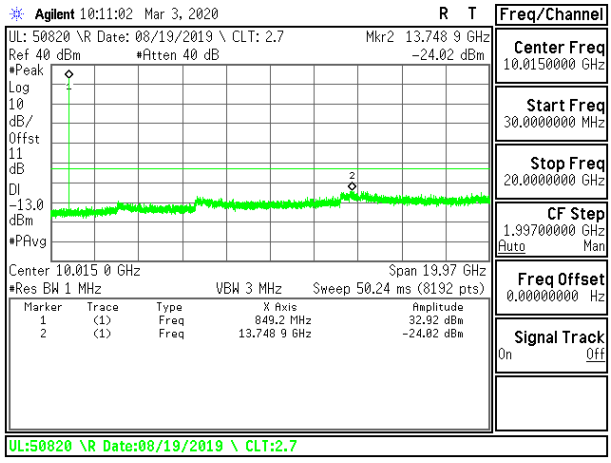
8.3.1. GSM 850



GSM 850 GPRS Low Channel

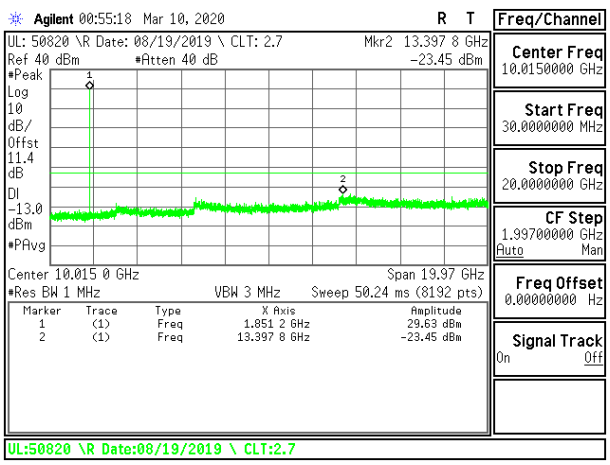


GSM 850 GPRS Middle Channel

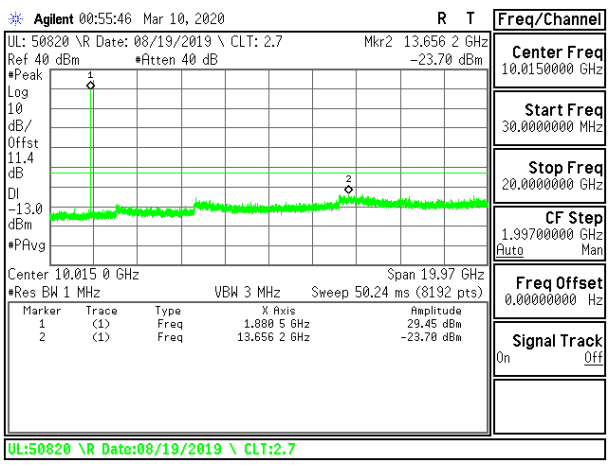


GSM 850 GPRS High Channel

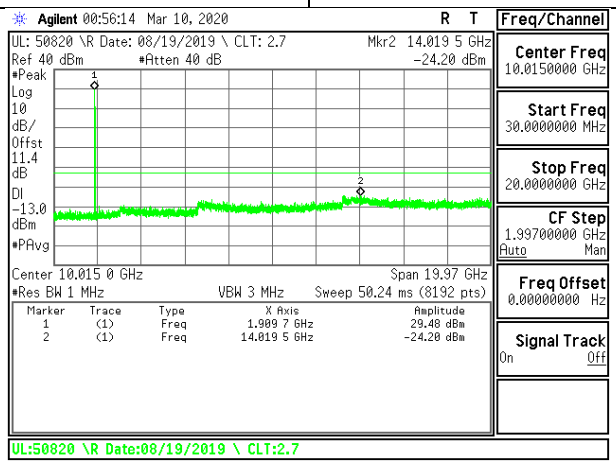
8.3.2. GSM 1900



GSM 1900 GPRS Low Channel

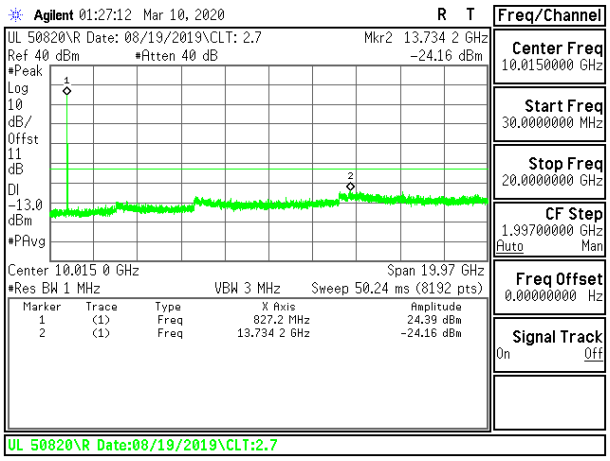


GSM 1900 GPRS Middle Channel

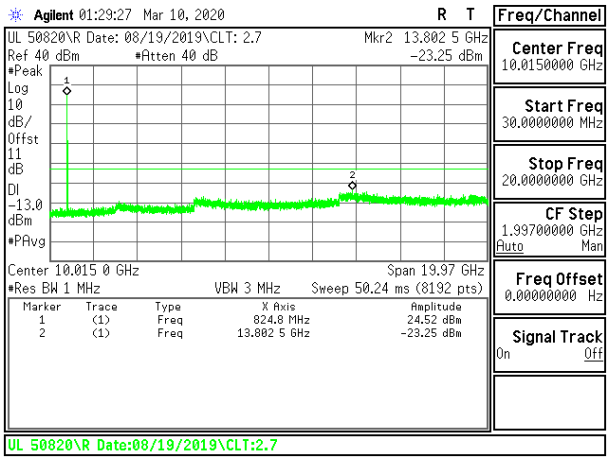


GSM 1900 GPRS High Channel

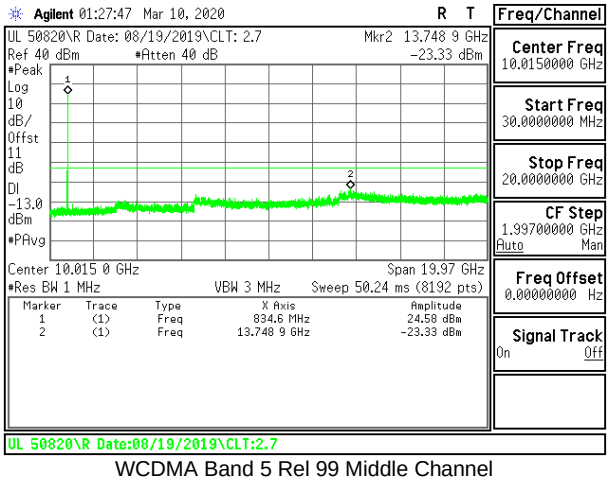
8.3.3. WCDMA BAND 5



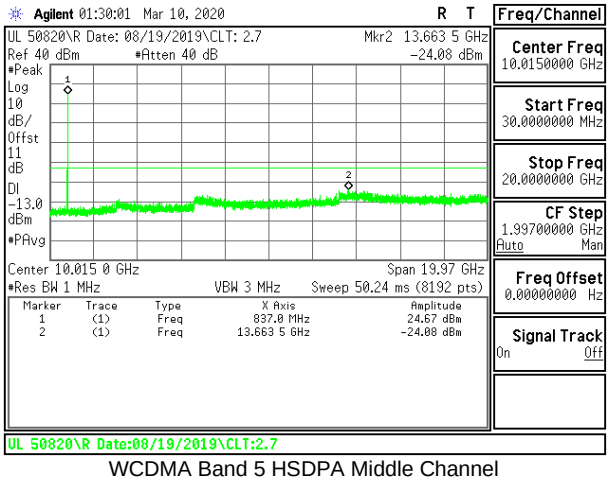
WCDMA Band 5 Rel 99 Low Channel



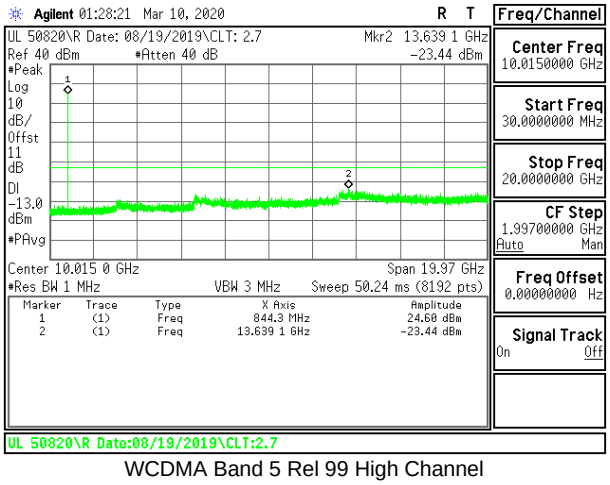
WCDMA Band 5 HSDPA Low Channel



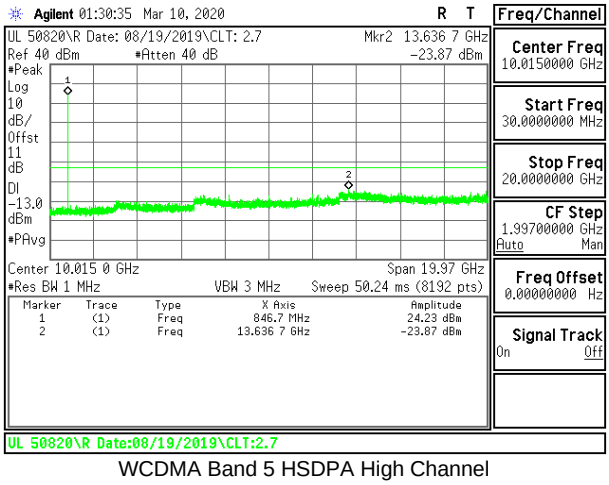
WCDMA Band 5 Rel 99 Middle Channel



WCDMA Band 5 HSDPA Middle Channel

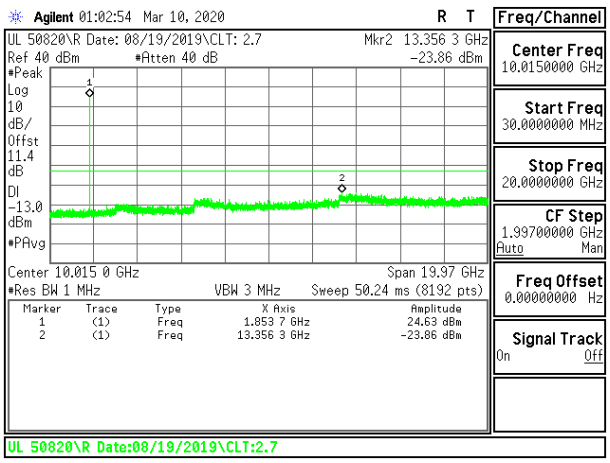


WCDMA Band 5 Rel 99 High Channel

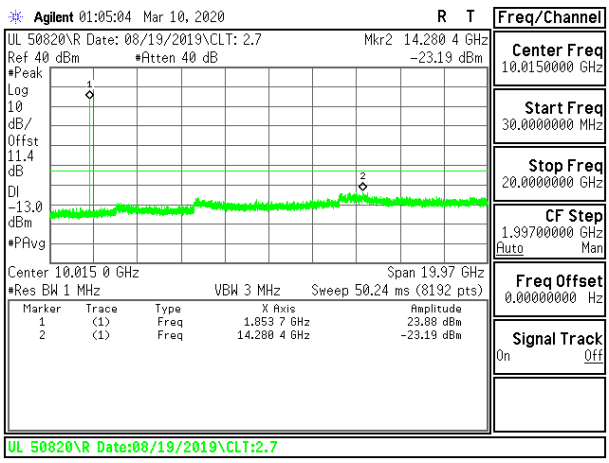


WCDMA Band 5 HSDPA High Channel

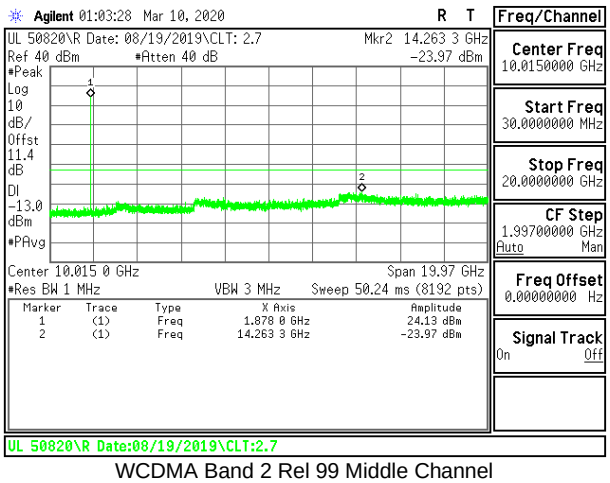
8.3.4. WCDMA BAND 2



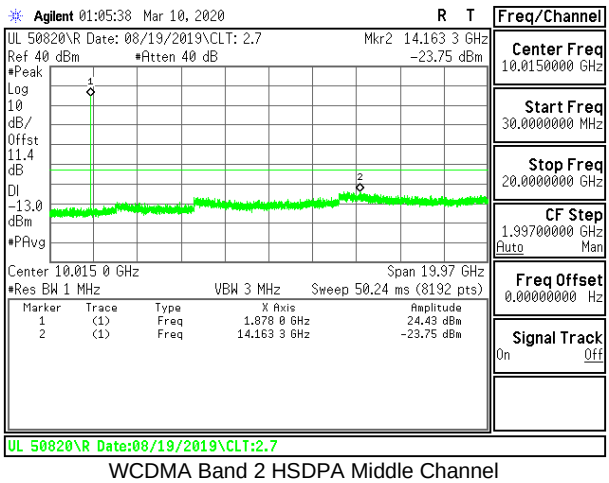
WCDMA Band 2 Rel 99 Low Channel



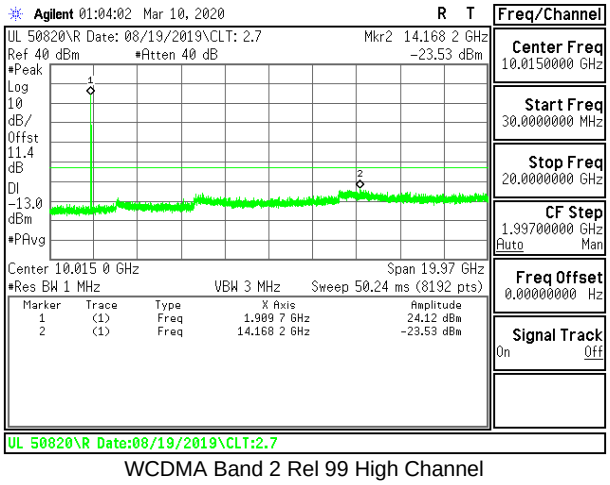
WCDMA Band 2 HSDPA Low Channel



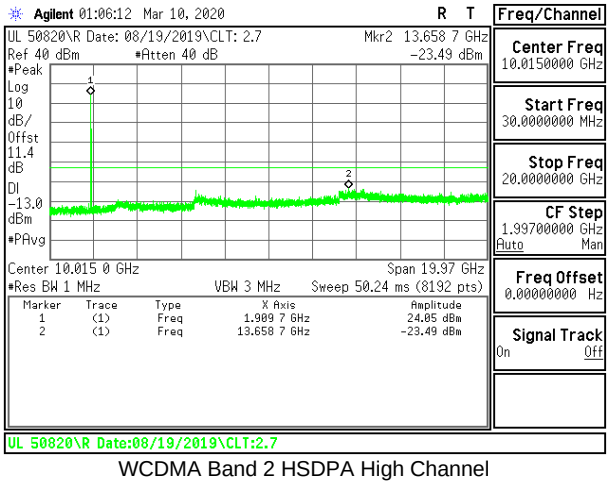
WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel



WCDMA Band 2 Rel 99 High Channel



WCDMA Band 2 HSDPA High Channel

8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235
ISED: RSS132§5.3; RSS133§6.3

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
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.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

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

  Low voltage, 3.61VDC, Normal, 3.8VDC and High voltage, 4.18VDC.
  End Voltage, 2.7VDC.

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.

8.4.1. GSM

Test Engineer ID:	43575 OS	Test Date:	3/5/2020

GPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.0419	848.9580		
Extreme (50C)		824.0419	848.9580	15.6	0.019
Extreme (40C)		824.0419	848.9580	19.0	0.023
Extreme (30C)		824.0419	848.9580	23.0	0.028
Extreme (10C)		824.0419	848.9580	21.6	0.026
Extreme (0C)		824.0419	848.9580	23.3	0.028
Extreme (-10C)		824.0419	848.9580	21.7	0.026
Extreme (-20C)		824.0419	848.9580	21.0	0.025
Extreme (-30C)		824.0419	848.9580	21.4	0.026
20C	15%	824.0419	848.9580	17.7	0.021
	-15%	824.0419	848.9580	22.9	0.027
	End Point	824.0419	848.9580	18.9	0.023

GPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0461	1909.9470		
Extreme (50C)		1850.0462	1909.9471	24.5	0.013
Extreme (40C)		1850.0462	1909.9471	31.9	0.017
Extreme (30C)		1850.0462	1909.9471	42.0	0.022
Extreme (10C)		1850.0462	1909.9471	47.9	0.025
Extreme (0C)		1850.0462	1909.9471	43.8	0.023
Extreme (-10C)		1850.0462	1909.9471	36.5	0.019
Extreme (-20C)		1850.0462	1909.9471	32.1	0.017
Extreme (-30C)		1850.0462	1909.9471	35.0	0.019
20C	15%	1850.0462	1909.9470	15.9	0.008
	-15%	1850.0462	1909.9470	15.5	0.008
	End Point	1850.0462	1909.9471	20.7	0.011

8.4.2. WCDMA

Test Engineer ID:	43575 OS	Test Date:	3/5/2020

WCDMA REL 99 BAND 5

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)		824.1135	848.2878		
Extreme (50C)		824.1135	848.2878	-2.5	-0.0030
Extreme (40C)		824.1135	848.2878	-3.3	-0.0040
Extreme (30C)		824.1135	848.2878	-3.6	-0.0043
Extreme (10C)	Normal	824.1135	848.2878	-6.0	-0.0072
Extreme (0C)		824.1135	848.2878	-6.9	-0.0082
Extreme (-10C)		824.1135	848.2878	-7.7	-0.0092
Extreme (-20C)		824.1135	848.2878	-9.2	-0.0110
Extreme (-30C)		824.1135	848.2878	-8.0	-0.0095
	15%	824.1135	848.2878	-3.2	-0.0038
20C	-15%	824.1135	848.2878	-3.4	-0.0040
	End Point	824.1135	848.2878	-2.3	-0.0027

WCDMA REL 99 BAND 2

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)		1850.1161	1909.8849		
Extreme (50C)		1850.1161	1909.8849	12.7	0.0067
Extreme (40C)		1850.1161	1909.8849	19.4	0.0103
Extreme (30C)		1850.1161	1909.8849	18.3	0.0097
Extreme (10C)	Normal	1850.1161	1909.8849	11.7	0.0062
Extreme (0C)		1850.1161	1909.8849	11.4	0.0061
Extreme (-10C)		1850.1161	1909.8849	8.7	0.0046
Extreme (-20C)		1850.1161	1909.8849	8.5	0.0045
Extreme (-30C)		1850.1161	1909.8849	9.8	0.0052
	15%	1850.1161	1909.8849	11.6	0.0062
20C	-15%	1850.1161	1909.8849	11.9	0.0063
	End Point	1850.1161	1909.8849	12.0	0.0064

8.5. PEAK-TO-AVERAGE POWER RATIO

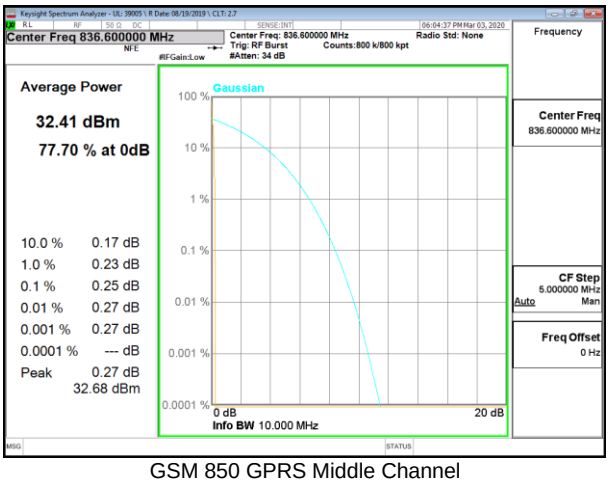
LIMIT

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.

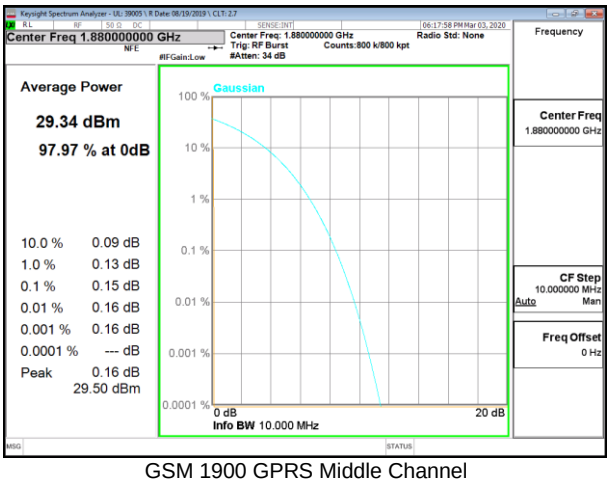
RESULT

The results from all CCDF plots are passed with 13dB peak-to-average power ratio criteria.

8.5.1. GSM

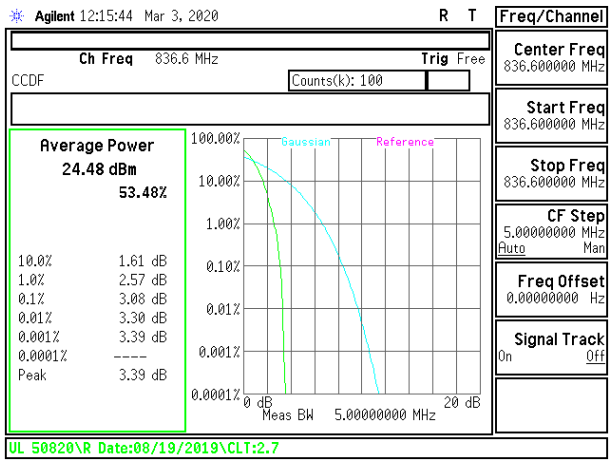


GSM 850 GPRS Middle Channel

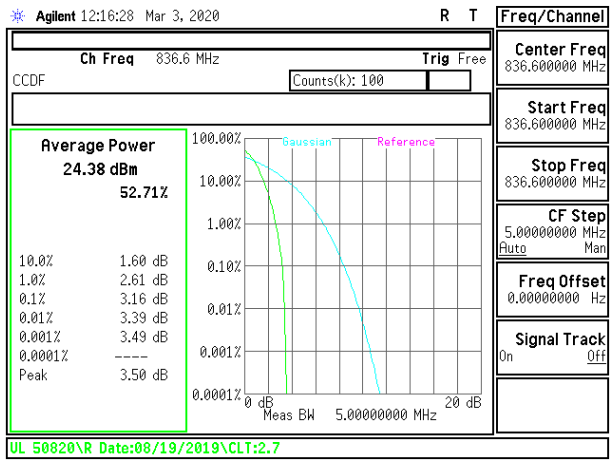


GSM 1900 GPRS Middle Channel

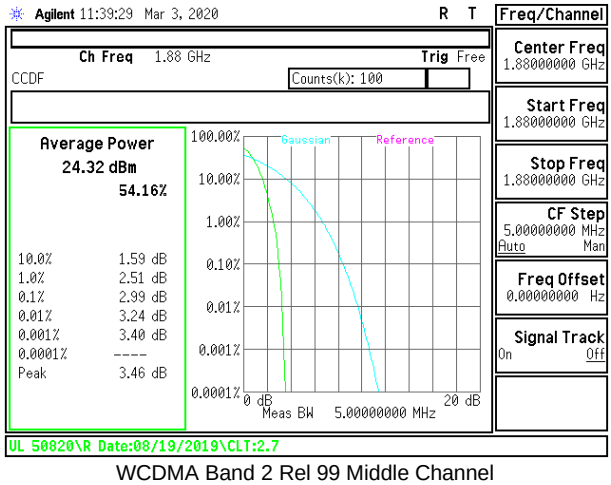
8.5.2. WCDMA



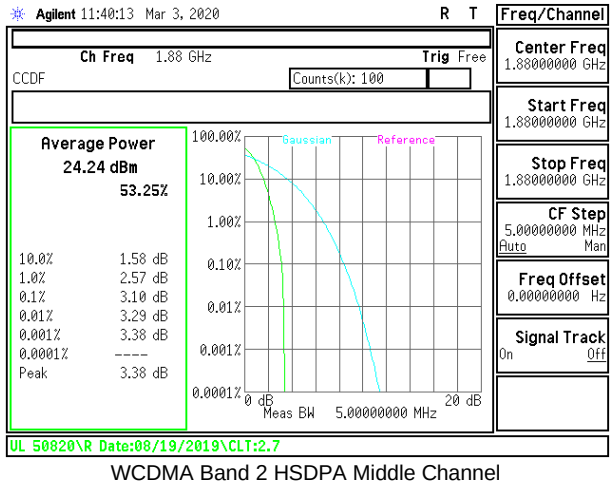
WCDMA Band 5 Rel 99 Middle Channel



WCDMA Band 5 HSDPA Middle Channel



WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel

9. RADIATED TEST RESULTS

9.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

RULE PART(S)

FCC: §2.1053, §22.917, §24.238.
ISED: RSS132§5.5; RSS133§6.5

LIMIT

FCC: §22.917(a), §24.238(a)
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
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.

TEST PROCEDURE

KDB 971168 D01

RESULTS

9.1.1. GSM 850

GPRS MODE

Company:	Microsoft
Project #:	13129294
Date:	04/10/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	GPRS 850
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
824.2 MHz													
1	1.64796	-62.12	Pk	28.7	-35.6	.5	11.8	-56.72	-13	-43.72	0-360	98	H
2	2.47242	-43.02	Pk	32.4	-34.1	.4	11.8	-32.52	-13	-19.52	0-360	298	H
3	4.12133	-65.23	Pk	33.4	-32.6	.4	11.8	-52.23	-13	-39.23	0-360	298	H
4	1.64846	-63.6	Pk	28.7	-35.6	.5	11.8	-58.2	-13	-45.2	0-360	102	V
5	2.47242	-52.13	Pk	32.4	-34.1	.4	11.8	-41.63	-13	-28.63	0-360	298	V
6	4.12083	-66.52	Pk	33.4	-32.6	.4	11.8	-53.52	-13	-40.52	0-360	102	V
836.6 MHz													
1	1.67346	-62.65	Pk	28.7	-35.6	.5	11.8	-57.25	-13	-44.25	0-360	100	H
2	2.50992	-47.4	Pk	32.4	-34	.4	11.8	-36.8	-13	-23.8	0-360	198	H
3	4.38331	-64.64	Pk	33.6	-32.2	.4	11.8	-51.04	-13	-38.04	0-360	100	H
4	1.67396	-63.38	Pk	28.7	-35.6	.5	11.8	-57.98	-13	-44.98	0-360	202	V
5	2.50942	-53.19	Pk	32.4	-34	.4	11.8	-42.59	-13	-29.59	0-360	102	V
6	7.31015	-67.7	Pk	35.5	-29.4	.3	11.8	-49.5	-13	-36.5	0-360	298	V
848.8 MHz													
1	1.92845	-63.06	Pk	30.8	-35	.4	11.8	-55.06	-13	-42.06	0-360	100	H
2	2.54641	-47.84	Pk	32.3	-34	.4	11.8	-37.34	-13	-24.34	0-360	198	H
3	7.32465	-67.12	Pk	35.5	-29.5	.3	11.8	-49.02	-13	-36.02	0-360	198	H
4	1.95845	-62.79	Pk	31	-34.9	.4	11.8	-54.49	-13	-41.49	0-360	102	V
5	2.54641	-49.84	Pk	32.3	-34	.4	11.8	-39.34	-13	-26.34	0-360	102	V
6	7.24465	-67.63	Pk	35.5	-29.4	.3	11.8	-49.43	-13	-36.43	0-360	298	V

9.1.2. GSM 1900

GPRS MODE

Company:	Microsoft
Project #:	13129294
Date:	04/08/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	GPRS 1900
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1850.2 MHz											
1	3.70098	-67.04	Pk	33.1	-31.7	11.8	-53.84	-13	-40.84	0-360	198	H
2	5.55041	-56.58	Pk	34.6	-31.8	11.8	-41.98	-13	-28.98	0-360	198	H
3	7.57884	-67.69	Pk	35.7	-28.6	11.8	-48.79	-13	-35.79	0-360	198	H
4	3.69998	-65.65	Pk	33.1	-31.7	11.8	-52.45	-13	-39.45	0-360	298	V
5	5.55091	-55.64	Pk	34.6	-31.8	11.8	-41.04	-13	-28.04	0-360	102	V
6	15.03359	-69.12	Pk	39.5	-25.3	11.8	-43.12	-13	-30.12	0-360	298	V
	1880 MHz											
1	5.63991	-58.09	Pk	34.7	-31.2	11.8	-42.79	-13	-29.79	0-360	198	H
2	11.38122	-70.49	Pk	38.1	-24.6	11.8	-45.19	-13	-32.19	0-360	298	H
3	17.38251	-69.92	Pk	41.1	-23.6	11.8	-40.62	-13	-27.62	0-360	198	H
4	3.1085	-64.34	Pk	33.8	-32.6	11.8	-51.34	-13	-38.34	0-360	102	V
5	5.63991	-58.74	Pk	34.7	-31.2	11.8	-43.44	-13	-30.44	0-360	102	V
6	10.78224	-70.32	Pk	37.8	-25.1	11.8	-45.82	-13	-32.82	0-360	202	V
	1909.8 MHz											
1	3.81947	-63.55	Pk	33.4	-32.1	11.8	-50.45	-13	-37.45	0-360	198	H
2	5.72941	-57.15	Pk	34.7	-30.7	11.8	-41.35	-13	-28.35	0-360	198	H
3	16.97303	-70.04	Pk	41.5	-23.5	11.8	-40.24	-13	-27.24	0-360	198	H
4	3.95697	-64.18	Pk	33.3	-31.2	11.8	-50.28	-13	-37.28	0-360	102	V
5	5.72891	-58.34	Pk	34.7	-30.7	11.8	-42.54	-13	-29.54	0-360	102	V
6	13.08866	-69.32	Pk	38.9	-25.2	11.8	-43.82	-13	-30.82	0-360	202	V

9.1.3. WCDMA BAND 5

REL 99 MODE

Company:	Microsoft
Project #:	13129294
Date:	04/08/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	REL 99 Band 5
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
826.4 MHz													
1	2.48292	-58.25	Pk	32.3	-34	.4	11.8	-47.75	-13	-34.75	0-360	100	H
2	3.54486	-63.92	Pk	33	-32.8	.5	11.8	-51.42	-13	-38.42	0-360	298	H
3	9.40503	-68.1	Pk	36.6	-28.4	.4	11.8	-47.7	-13	-34.7	0-360	198	H
4	3.80084	-64.58	Pk	33.4	-32.6	.5	11.8	-51.48	-13	-38.48	0-360	202	V
5	5.72374	-64.88	Pk	34.7	-32.1	.4	11.8	-50.08	-13	-37.08	0-360	202	V
6	9.50652	-68.54	Pk	36.7	-28	.4	11.8	-47.64	-13	-34.64	0-360	102	V
836.6 MHz													
1	1.67146	-62.08	Pk	28.7	-35.6	.5	11.8	-56.68	-13	-43.68	0-360	198	H
2	2.50642	-58.76	Pk	32.4	-34	.4	11.8	-48.16	-13	-35.16	0-360	98	H
3	4.22782	-64.12	Pk	33.3	-32.2	.4	11.8	-50.82	-13	-37.82	0-360	98	H
4	1.91795	-62.24	Pk	30.7	-35.1	.4	11.8	-54.44	-13	-41.44	0-360	102	V
5	2.51342	-64.32	Pk	32.4	-34	.4	11.8	-53.72	-13	-40.72	0-360	102	V
6	3.80984	-63.75	Pk	33.4	-32.6	.5	11.8	-50.65	-13	-37.65	0-360	202	V
846.6 MHz													
1	1.96045	-63.04	Pk	31	-34.9	.4	11.8	-54.74	-13	-41.74	0-360	298	H
2	2.53691	-59.73	Pk	32.4	-33.9	.4	11.8	-49.03	-13	-36.03	0-360	198	H
3	4.37481	-64	Pk	33.6	-32.2	.4	11.8	-50.4	-13	-37.4	0-360	298	H
4	1.86795	-63.31	Pk	30.7	-35.2	.4	11.8	-55.61	-13	-42.61	0-360	202	V
5	2.53591	-62.97	Pk	32.4	-33.9	.4	11.8	-52.27	-13	-39.27	0-360	202	V
6	3.82934	-63.63	Pk	33.4	-32.6	.5	11.8	-50.53	-13	-37.53	0-360	298	V

HSDPA MODE

Company:	Microsoft
Project #:	13129294
Date:	04/08/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	HSDPA Band 5
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
826.4 MHz													
1	2.48142	-63.23	Pk	32.3	-34	.4	11.8	-52.73	-13	-39.73	0-360	100	H
2	4.33931	-63.99	Pk	33.6	-32.4	.4	11.8	-50.59	-13	-37.59	0-360	298	H
3	6.63518	-66.7	Pk	35.5	-30.6	.4	11.8	-49.6	-13	-36.6	0-360	198	H
4	1.81246	-62.88	Pk	30.2	-35.3	.5	11.8	-55.68	-13	-42.68	0-360	298	V
5	2.47642	-64.84	Pk	32.4	-34	.4	11.8	-54.24	-13	-41.24	0-360	202	V
6	3.63585	-63.99	Pk	33.1	-32.9	.5	11.8	-51.49	-13	-38.49	0-360	102	V
836.6 MHz													
1	1.70996	-62.26	Pk	28.9	-35.5	.5	11.8	-56.56	-13	-43.56	0-360	298	H
2	2.46642	-62.67	Pk	32.4	-34.1	.4	11.8	-52.17	-13	-39.17	0-360	100	H
3	8.48108	-67.32	Pk	35.9	-28.6	.4	11.8	-47.82	-13	-34.82	0-360	198	H
4	1.64546	-62.38	Pk	28.7	-35.6	.5	11.8	-56.98	-13	-43.98	0-360	202	V
5	2.50892	-65.71	Pk	32.4	-34	.4	11.8	-55.11	-13	-42.11	0-360	202	V
6	7.13816	-66.65	Pk	35.6	-29.9	.3	11.8	-48.85	-13	-35.85	0-360	102	V
846.6 MHz													
1	1.26449	-62.24	Pk	28.9	-36.4	.5	11.8	-57.44	-13	-44.44	0-360	100	H
2	2.54241	-60.41	Pk	32.3	-34	.4	11.8	-49.91	-13	-36.91	0-360	298	H
3	6.03772	-65.74	Pk	35.2	-31.4	.4	11.8	-49.74	-13	-36.74	0-360	198	H
4	1.95995	-63.06	Pk	31	-34.9	.4	11.8	-54.76	-13	-41.76	0-360	202	V
5	2.53741	-62.85	Pk	32.4	-33.9	.4	11.8	-52.15	-13	-39.15	0-360	298	V
6	4.5543	-64.85	Pk	34	-32.6	.4	11.8	-51.25	-13	-38.25	0-360	298	V

9.1.4. WCDMA BAND 2

REL 99 MODE

Company:	Microsoft
Project #:	13129294
Date:	04/06/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	REL 99 Band 2
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1852.4 MHz											
1	5.56091	-54.19	Pk	34.6	-31.8	11.8	-39.59	-13	-26.59	0-360	100	H
2	11.46571	-69.77	Pk	38.2	-25	11.8	-44.77	-13	-31.77	0-360	198	H
3	17.8265	-71.3	Pk	41.1	-21.5	11.8	-39.9	-13	-26.9	0-360	298	H
4	5.55941	-54.69	Pk	34.6	-31.8	11.8	-40.09	-13	-27.09	0-360	202	V
5	16.93603	-70.4	Pk	41.6	-22.9	11.8	-39.9	-13	-26.9	0-360	202	V
6	17.8115	-72.12	Pk	41.2	-21.5	11.8	-40.62	-13	-27.62	0-360	202	V
	1880 MHz											
1	5.63641	-50.5	Pk	34.7	-31.3	11.8	-35.3	-13	-22.3	0-360	100	H
2	13.01066	-70.16	Pk	39.1	-25.4	11.8	-44.66	-13	-31.66	0-360	198	H
3	17.32901	-69.82	Pk	41.2	-24	11.8	-40.82	-13	-27.82	0-360	298	H
4	5.64341	-53.61	Pk	34.7	-31.1	11.8	-38.21	-13	-25.21	0-360	202	V
5	13.07466	-70.07	Pk	38.9	-25	11.8	-44.37	-13	-31.37	0-360	298	V
6	17.00302	-69.37	Pk	41.5	-23.8	11.8	-39.87	-13	-26.87	0-360	202	V
	1907.6 MHz											
1	5.72491	-56.13	Pk	34.7	-30.7	11.8	-40.33	-13	-27.33	0-360	100	H
2	14.47961	-67.98	Pk	39.2	-26.7	11.8	-43.68	-13	-30.68	0-360	298	H
3	17.77075	-71.12	Pk	41.2	-22	11.8	-40.12	-13	-27.12	0-360	198	H
4	5.72041	-58.75	Pk	34.7	-30.7	11.8	-42.95	-13	-29.95	0-360	202	V
5	15.53057	-70.57	Pk	40.1	-23.4	11.8	-42.07	-13	-29.07	0-360	202	V
6	16.96103	-71.36	Pk	41.6	-23.4	11.8	-41.36	-13	-28.36	0-360	202	V

HSDPA MODE

Company:	Microsoft
Project #:	13129294
Date:	04/06/2020
Test Engineer:	17051
Configuration;	EUT + Support Equipment
Mode:	HSDPA Band 2
Chamber #:	N-SAC

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fltr/Pad (dB)	CF (dB)	Corrected Reading dBm	WWAN Harmonics Limit	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	1852.4 MHz											
1	5.56041	-55.01	Pk	34.6	-31.8	11.8	-40.41	-13	-27.41	0-360	100	H
2	12.99266	-68.65	Pk	39.1	-25.7	11.8	-43.45	-13	-30.45	0-360	198	H
3	17.747	-71.04	Pk	41.2	-22.4	11.8	-40.44	-13	-27.44	0-360	100	H
4	5.56041	-54.04	Pk	34.6	-31.8	11.8	-39.44	-13	-26.44	0-360	202	V
5	9.71527	-68.5	Pk	36.8	-26.5	11.8	-46.4	-13	-33.4	0-360	298	V
6	17.776	-70.27	Pk	41.2	-21.9	11.8	-39.17	-13	-26.17	0-360	298	V
	1880 MHz											
1	5.64291	-52.18	Pk	34.7	-31.2	11.8	-36.88	-13	-23.88	0-360	100	H
2	9.39478	-66.42	Pk	36.6	-27.4	11.8	-45.42	-13	-32.42	0-360	198	H
3	16.99552	-70.6	Pk	41.5	-23.7	11.8	-41	-13	-28	0-360	298	H
4	5.63691	-53.93	Pk	34.7	-31.3	11.8	-38.73	-13	-25.73	0-360	202	V
5	12.76817	-68.96	Pk	39.1	-26.1	11.8	-44.16	-13	-31.16	0-360	102	V
6	16.98702	-69.1	Pk	41.5	-23.7	11.8	-39.5	-13	-26.5	0-360	102	V
	1907.6 MHz											
1	5.71941	-58.33	Pk	34.7	-30.7	11.8	-42.53	-13	-29.53	0-360	98	H
2	15.75257	-69.33	Pk	40.4	-23.6	11.8	-40.73	-13	-27.73	0-360	198	H
3	16.90753	-71.08	Pk	41.6	-22.2	11.8	-39.88	-13	-26.88	0-360	298	H
4	5.71841	-61.79	Pk	34.7	-30.7	11.8	-45.99	-13	-32.99	0-360	202	V
5	10.39375	-70.3	Pk	37.5	-25.1	11.8	-46.1	-13	-33.1	0-360	202	V
6	11.32472	-71.08	Pk	38.1	-24.3	11.8	-45.48	-13	-32.48	0-360	298	V