RADIO TEST REPORT-LTE
47 CFR FCC Part 2&22&24

Client Information:

Applicant:	Neutron Holdings, Inc.
Applicant add.:	85 2nd St, San Francisco, CA 94105 USA
Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Manufacturer add.:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Product Information:

Product Name:	Central controller
Model No.:	Lime-4.1-GL
Brand Name:	Lime
FCC ID:	2APB2LIME-41-GL

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling Third Street, Jitigang, Huangjiang,Dongguan,
Guangdong, China

Tel.: +86-769-8202 0499 Fax.: +86-769-8202 0495

Date of Receipt:	Dec. 30, 2021	Date of Test:	Dec. 30, 2021~Jan. 20, 2022
Date of Issue:	Jan. 21, 2022	Test Result:	Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Reviewed by: Simba Huang Simba Huang **Approved by:** Seal.chen Seal.chen

Table of Contents Page

1. SUMMARY OF TEST

1.1 TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Aug.04, 2020

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	0.009MHz-30MHz	3.10dB	(1)
Radiated Emission	30MHz-1GHz	3.75dB	(1)
Radiated Emission	1GHz-18GHz	3.88dB	(1)
Radiated Emission	18GHz-40GHz	3.88dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	1.20dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Manufacturer:	Quectel Wireless Solutions Co., Ltd.
Manufacturer Address:	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Equipment :	Central controller
Trade Mark:	Lime
Model Name:	Lime-4.1-GL
Serial Model:	N/A
NB-IOT	
Support Band:	WCDMA Band 2 WCDMA Band 5
SIM CARD :	The EUT has one SIM Card sockets
Antenna:	PIFA: -1.0 dBi
H/W No.:	N/A
S/W No.:	N/A
Model different:	N/A

2.2 LIST OF TEST EQUIPMENTS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2021.08.30	2022.08.29
2	EMI Measuring Receiver	R&S	ESR	101660	2021.08.30	2022.08.29
3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2021.08.30	2022.08.29
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2021.08.30	2022.08.29
5	Passive Loop	ETS	6512	00165355	2020.09.05	2022.09.04
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2021.08.30	2022.08.29
10	LISN	Kyoritsu	KNW-242	8-837-4	2021.08.30	2022.08.29
11	LISN	R&S	ESH3-Z2	0357.8810.54101161-S2	2021.08.30	2022.08.29
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2021.08.30	2022.08.29
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2021.08.30	2022.08.29
14	Signal Generator	Agilent	N5182A	MY501430009	2021.08.30	2022.08.29
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2021.08.30	2022.08.29
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2021.08.30	2022.08.29
17	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A

3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	Band V: 824 MHz ~ 849 MHz Band II: 1850 MHz ~ 1910 MHz
Rx Frequency	Band V: 869 MHz ~ 894 MHz Band II: 1930 MHz ~ 1990 MHz
Maximum Output Power	WCDMA Band V:23.05dBm, WCDMA Band II:22.68dBm
Type of Modulation	QPSK; HSDPA:QPSK/16QAM; HSUPA:BPSK

RF Function	Band	Mode	Modulation	Power Class	Ant Gain(dBi)	Ant Type	SIM Card
WCDMA	2/5	WCDMA	QPSK	3	Band2: -1dBi Band5: -1dBi	PIFA	1 SIM 1 is used to tested.
		HSDPA	QPSK, 16QAM				
		HSUPA	BPSK				

4 TEST ITEMS

4.1 CONDUCTED OUTPUT POWER

TEST OVERVIEW

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

TEST PROCEDURES

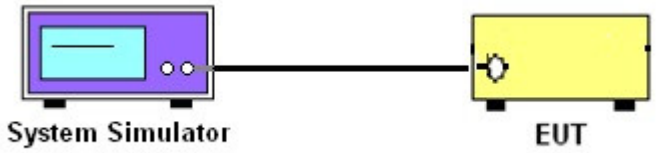
1. The transmitter output port was connected to the system simulator.

2. Set eut at maximum power through the system simulator.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 1.

4.2 PEAK TO AVERAGE RATIO

TEST OVERVIEW

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 db.

TEST PROCEDURES

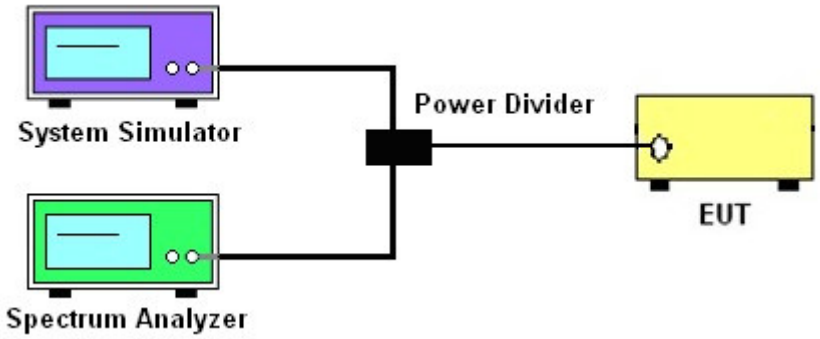
1. The testing follows FCC KDB 971168 v03r01 section.

2. The eut was connected to the peak and av system simulator& spectrum analyzer.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure average power of the spectrum analysis,

TEST SETUP



TEST RESULT

Note: Test data See Appendix 2.

4.3 TRANSMITTER RADIATED POWER (EIRP/ERP)

TEST OVERVIEW

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26 2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

TEST PROCEDURE

1. The testing follows FCC KDB 971168 Section 5.8 and ANSI C63.26-2015 Section 5.2.
2. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.
3. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
4. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
5. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a nonradiating cable. The absolute levels of the spurious emissions were measured by the substitution.
6. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26-2015. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

EIRP=S.G Level+ Gain-Cable loss; ERP=S.G Level+ Gain-Cable loss-2.15.

TEST RESULT

Note: Test data See Appendix 3.

4.4 OCCUPIED BANDWIDTH

TEST OVERVIEW

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

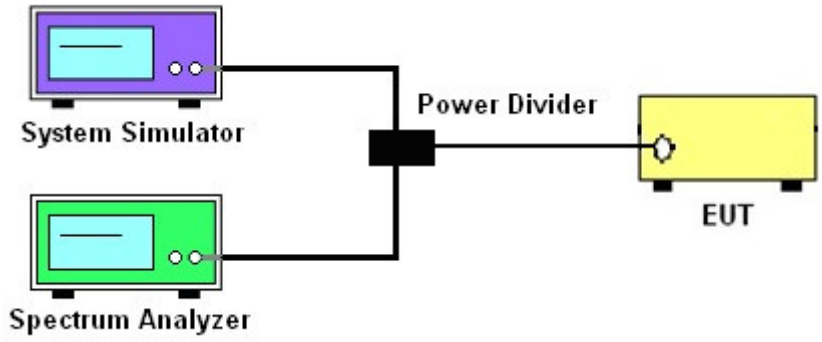
The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

All modes of operation were investigated and the worst case configuration results are reported in this section.

TEST PROCEDURE

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7.The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

TEST SETUP



TEST RESULT

Note: Test data See Appendix 4.

4.5 FREQUENCY STABILITY

TEST OVERVIEW

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26 2015.

The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

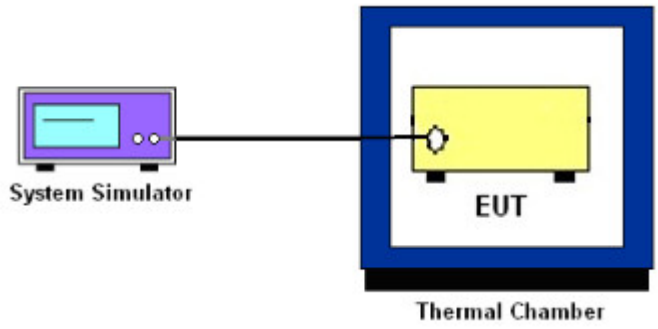
Temperature Variation

1. The testing follows FCC KDB 971168 D01 section 9.0
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Voltage Variation

1. The testing follows FCC KDB 971168 D01 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 5.

4.6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

TEST OVERVIEW

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

TEST PROCEDURE

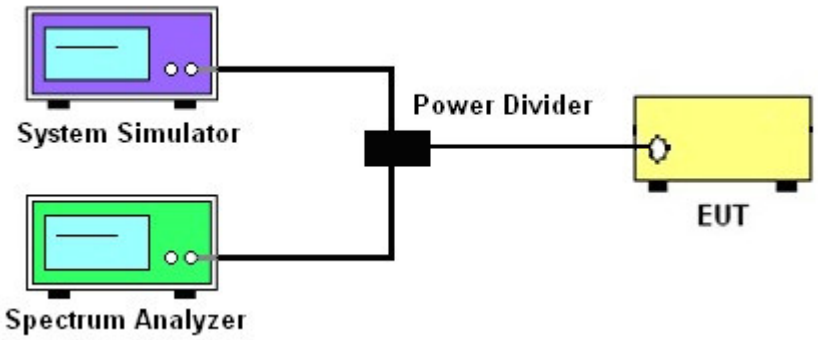
1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26-2015-Section 5.7.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 6.

4.7 BAND EDGE

TEST OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26-2015-Section 5.7
2. Start and stop frequency were set such that the band edge would be placed in the center of the Plot.
3. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
4. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator.

The path loss was compensated to the results for each measurement.

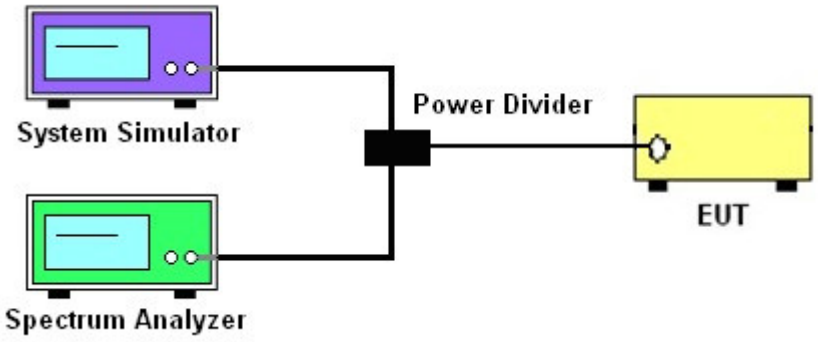
5. The band edges of low and high channels for the highest RF powers were measured.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP



TEST RESULT

Note: Test data See Appendix 7.

4.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

TEST OVERVIEW

Radiated spurious emissions measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signalsoperating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas.Measurements on signals operating above 1GHz are performed using vertically and horizontally polarizedhorn antennas. All measurements are performed as peak measurements while the EUT isoperating at maximum power and at the appropriate frequencies.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

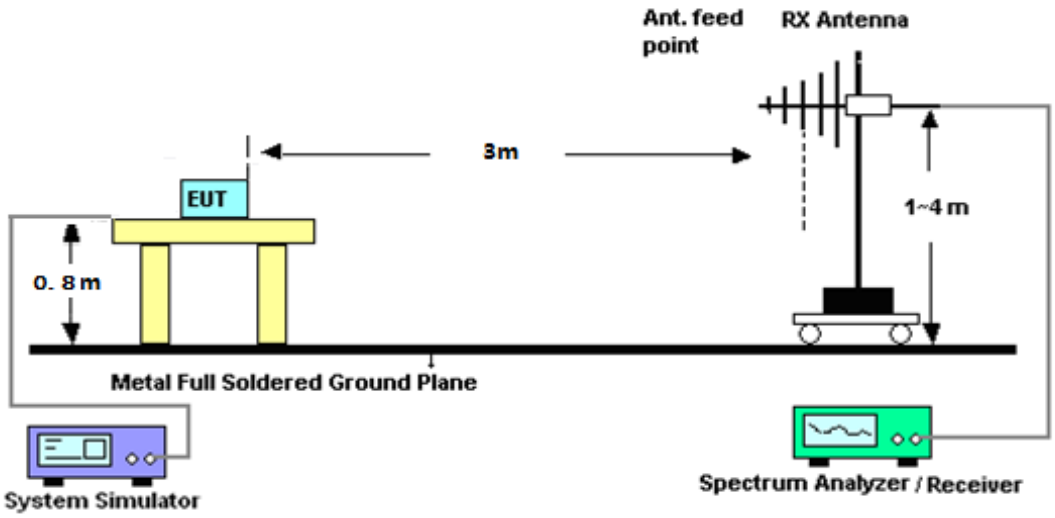
TEST PROCEDURE

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26-2015-Section 5.5.
2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5.No. of sweep points > 2 x span/RBW
6. Detector = Peak
7. Trace mode = max hold
8. The trace was allowed to stabilize
9. Effective Isotropic Spurious Radiation was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

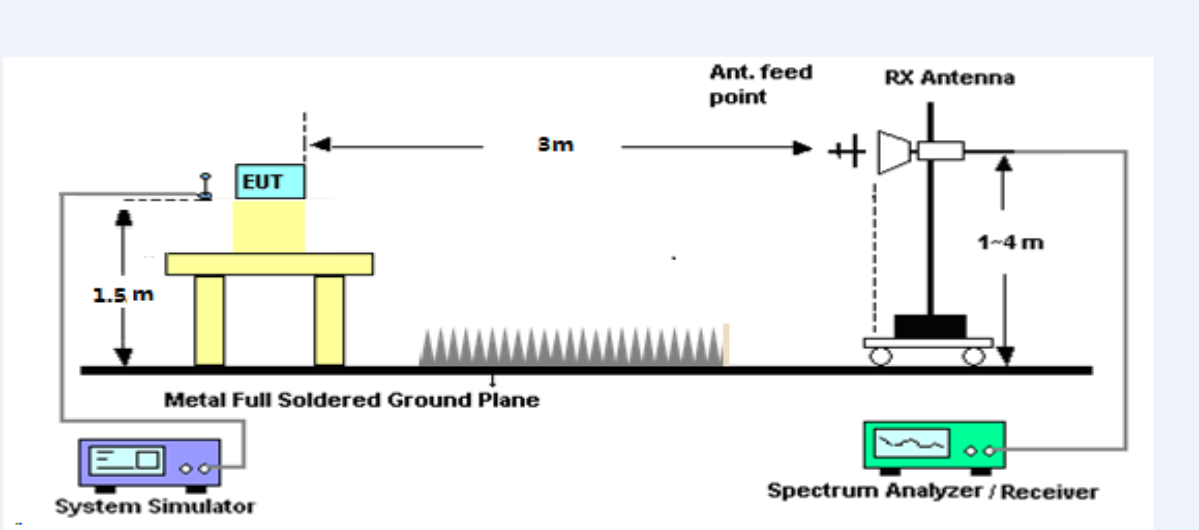
PMea=S.G Level+ Ant-Cable loss; Margin=PMea-Limit.

TEST SETUP

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



TEST RESULT

Note: Test data See Appendix 8.

APPENDIX A.TESTRESULT

A1. CONDUCTED OUTPUT POWER

UMTS BAND V

UMTS BAND 5		
Mode	Frequency(MHz)	AVG Power
WCDMA 850 RMC	826.4	22.14
	836.6	22.83
	846.6	23.05
HSDPA Subtest 1	826.4	21.73
	836.6	22.63
	846.6	22.96
HSDPA Subtest 2	826.4	21.25
	836.6	22.19
	846.6	22.52
HSDPA Subtest 3	826.4	20.81
	836.6	21.75
	846.6	22.09
HSDPA Subtest 4	826.4	20.47
	836.6	21.37
	846.6	21.62
HSUPA Subtest 1	826.4	21.55
	836.6	22.53
	846.6	22.90
HSUPA Subtest 2	826.4	20.65
	836.6	21.54
	846.6	21.94
HSUPA Subtest 3	826.4	20.62
	836.6	21.08
	846.6	21.62
HSUPA Subtest 4	826.4	20.26
	836.6	20.73
	846.6	21.18
HSUPA Subtest 5	826.4	18.81
	836.6	19.31
	846.6	19.72

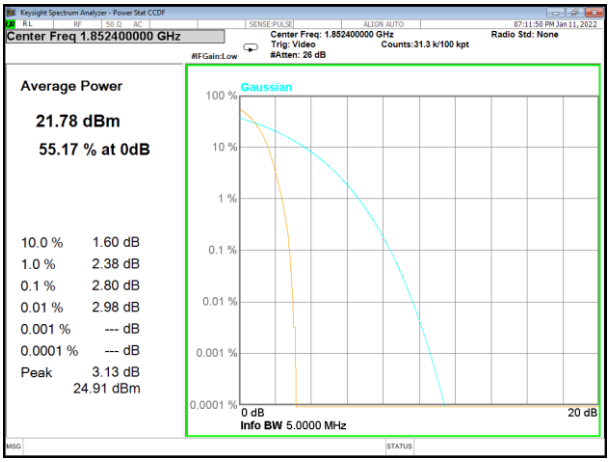
UMTS BAND II

UMTS BAND 2		
Mode	Frequency(MHz)	AVG Power
WCDMA 1900 RMC	1852.4	22.68
	1880	22.31
	1907.6	22.48
HSDPA Subtest 1	1852.4	22.62
	1880	22.29
	1907.6	22.40
HSDPA Subtest 2	1852.4	22.20
	1880	21.84
	1907.6	21.94
HSDPA Subtest 3	1852.4	21.72
	1880	21.43
	1907.6	21.63
HSDPA Subtest 4	1852.4	21.25
	1880	20.93
	1907.6	21.23
HSUPA Subtest 1	1852.4	22.56
	1880	22.14
	1907.6	22.31
HSUPA Subtest 2	1852.4	21.70
	1880	21.22
	1907.6	21.33
HSUPA Subtest 3	1852.4	21.68
	1880	20.74
	1907.6	20.95
HSUPA Subtest 4	1852.4	21.28
	1880	20.27
	1907.6	20.53
HSUPA Subtest 5	1852.4	19.86
	1880	18.78
	1907.6	19.12

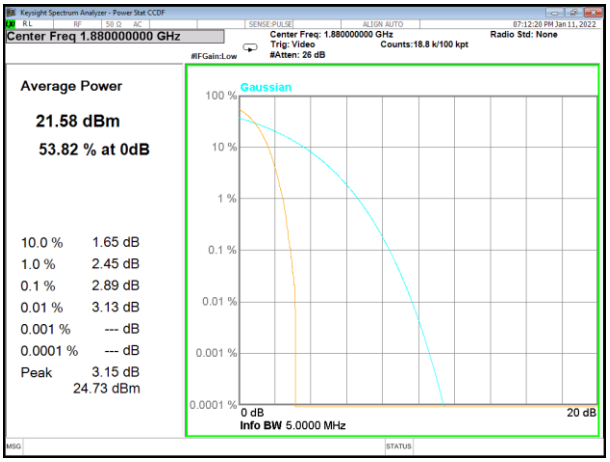
A2. PEAK-TO-AVERAGE RADIO

UMTS Band 2		
Mode	Frequency (MHz)	PAR
WCDMA 1900 RMC	1852.4	2.80
	1880	2.89
	1907.6	2.76
HSDPA 1900	1852.4	2.90
	1880	3.10
	1907.6	3.07
HSUPA 1900	1852.4	2.75
	1880	2.88
	1907.6	2.73

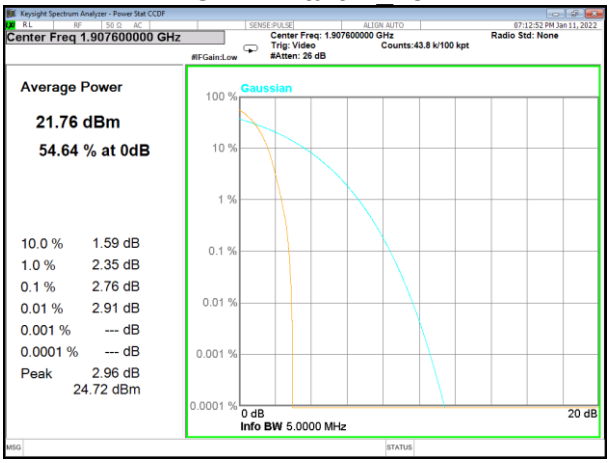
UMTS Band 5		
Mode	Frequency (MHz)	PAR
WCDMA 850 RMC	826.4	3.05
	836.6	2.88
	846.6	2.97
HSDPA 850	826.4	3.17
	836.6	2.98
	846.6	3.14
HSUPA 850	826.4	3.11
	836.6	2.86
	846.6	3.00



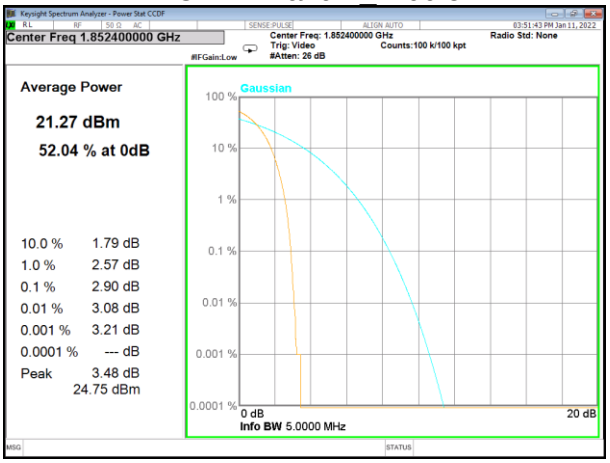
WCDMA Band 2_Low



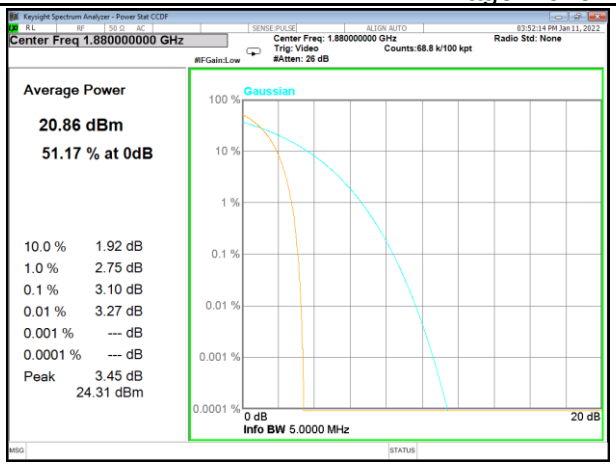
WCDMA Band 2_Middle



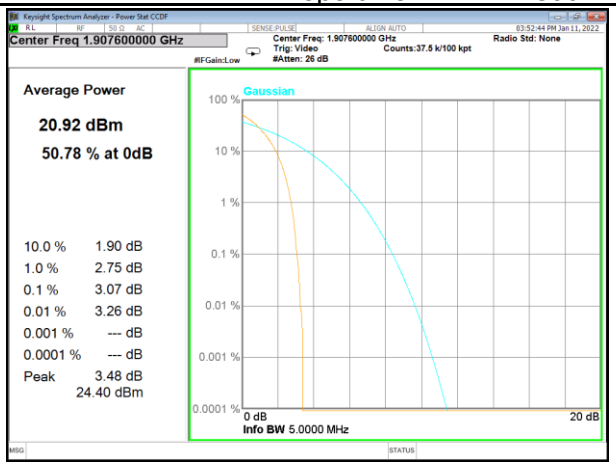
WCDMA Band 2_High



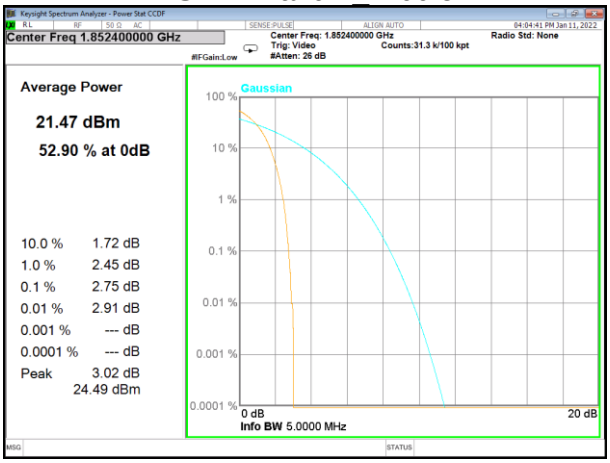
HSDPA Band 2_Low



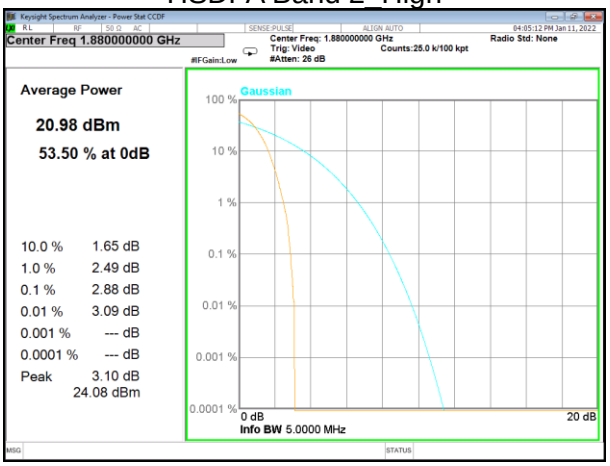
HSDPA Band 2_Middle



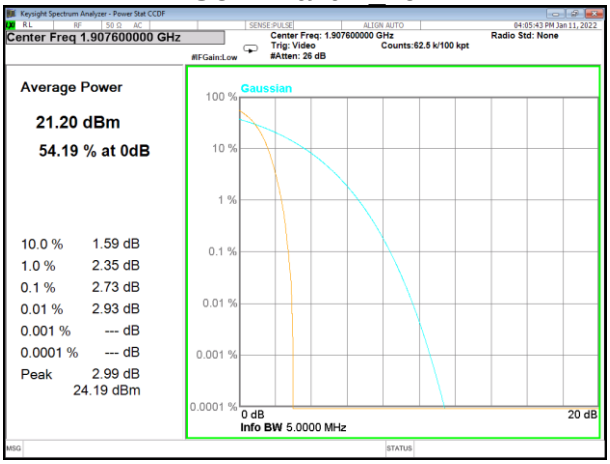
HSDPA Band 2_High



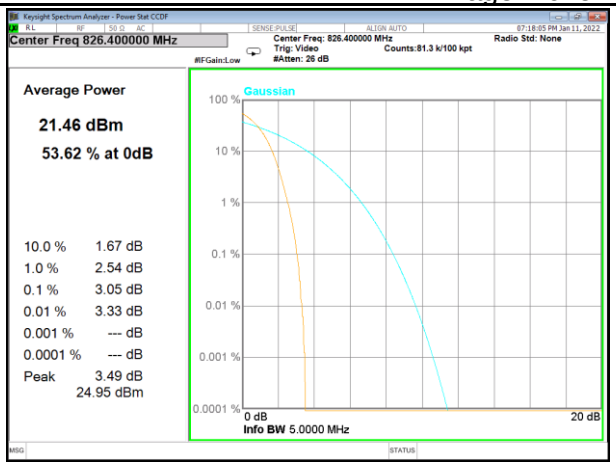
HSUPA Band 2_Low



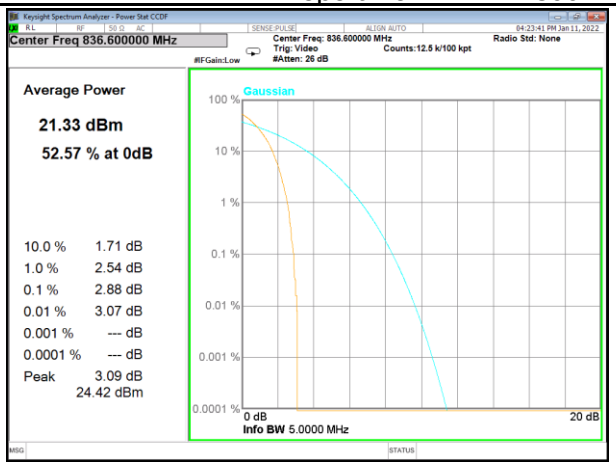
HSUPA Band 2_Middle



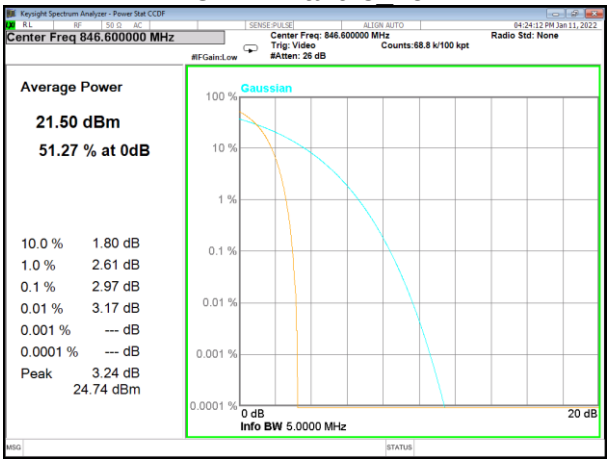
HSUPA Band 2_High



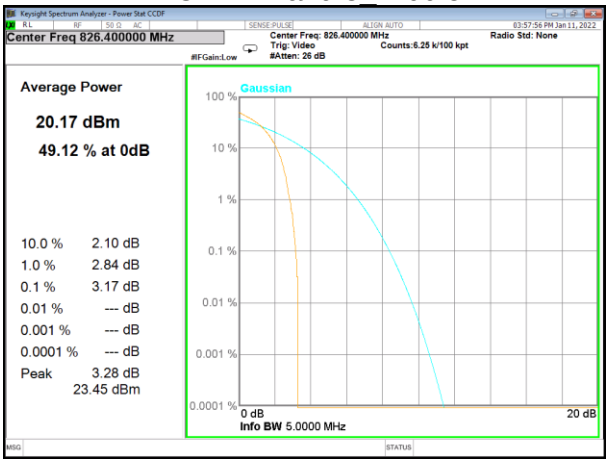
WCDMA Band 5_Low



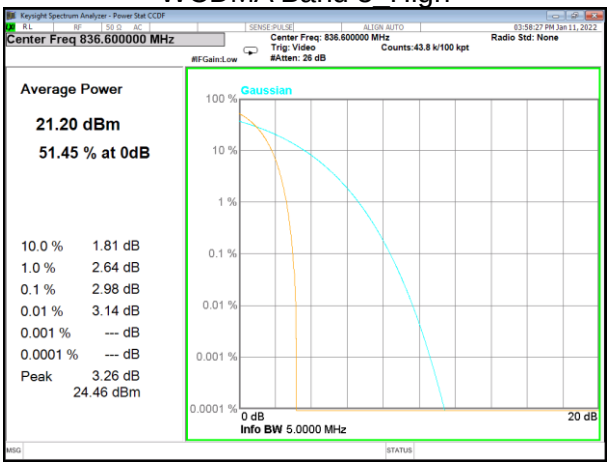
WCDMA Band 5_Middle



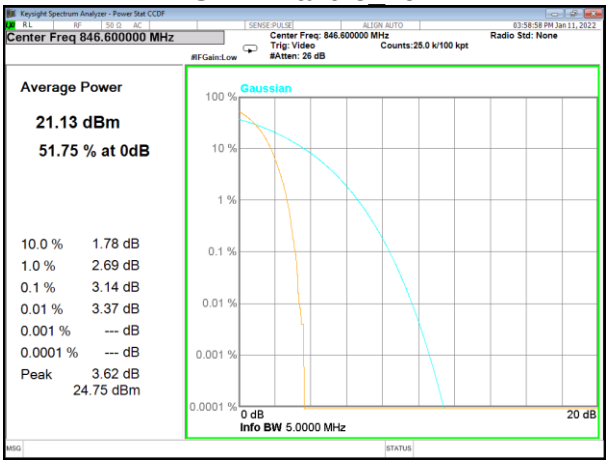
WCDMA Band 5_High



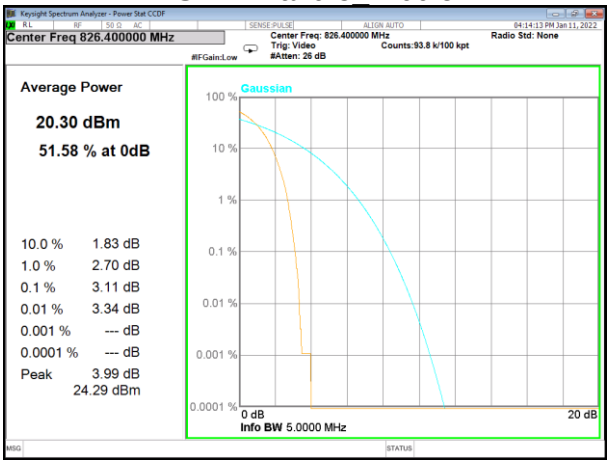
HSDPA Band 5_Low



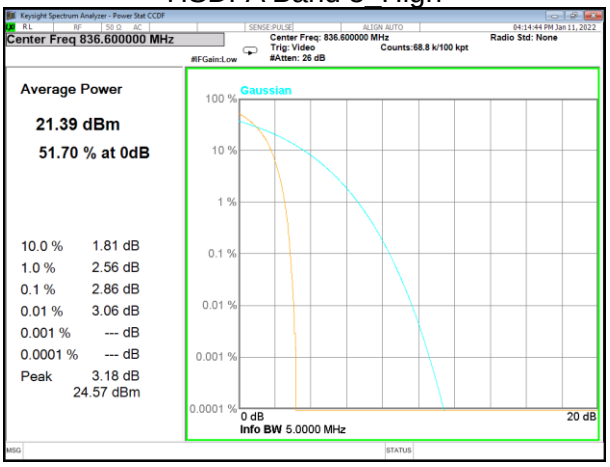
HSDPA Band 5_Middle



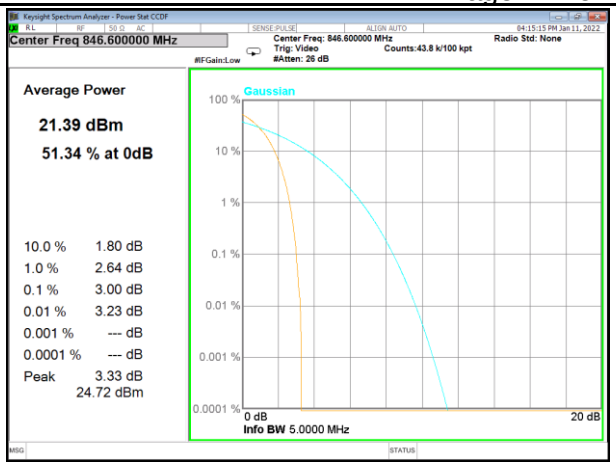
HSDPA Band 5_High



HSUPA Band 5_Low



HSUPA Band 5_Middle



HSUPA Band 5_High

A3. TRANSMITTER RADIATED POWER (EIRP/ERP)

Note: Test is divided into three directions, X/Y/Z. X pattern for the worst

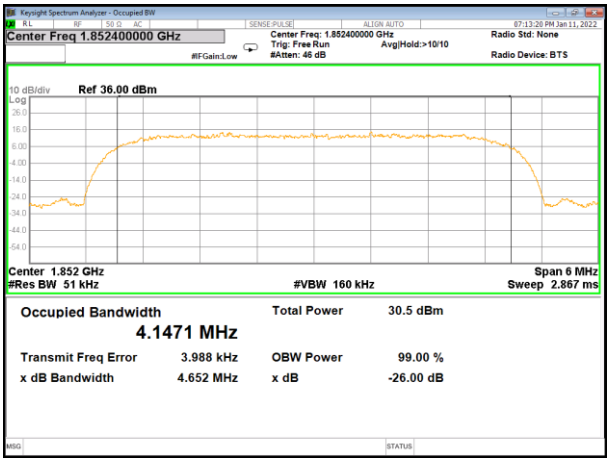
Radiated Power (EIRP) for WCDMA Band 2								
Mode	Frequency	Result						Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.I.R.P.(dBm)	Polarization Of Max. EIRP		
WCDMA	1852.4	12.37	2.41	10.35	20.31	Horizontal		Pass
	1852.4	14.13	2.41	10.35	22.07	Vertical		Pass
	1880	12.12	2.42	10.35	20.05	Horizontal		Pass
	1880	13.86	2.42	10.35	21.79	Vertical		Pass
	1907.4	12.05	2.43	10.35	19.97	Horizontal		Pass
	1907.4	13.99	2.43	10.35	21.91	Vertical		Pass
HSUPA	1852.4	11.93	2.41	10.35	19.87	Horizontal		Pass
	1852.4	13.86	2.41	10.35	21.80	Vertical		Pass
	1880	11.91	2.42	10.35	19.84	Horizontal		Pass
	1880	13.81	2.42	10.35	21.74	Vertical		Pass
	1907.4	12.02	2.43	10.35	19.94	Horizontal		Pass
	1907.4	13.83	2.43	10.35	21.75	Vertical		Pass
HSDPA	1852.4	12.21	2.41	10.35	20.15	Horizontal		Pass
	1852.4	14.04	2.41	10.35	21.98	Vertical		Pass
	1880	11.86	2.42	10.35	19.79	Horizontal		Pass
	1880	13.65	2.42	10.35	21.58	Vertical		Pass
	1907.4	11.57	2.43	10.35	19.49	Horizontal		Pass
	1907.4	13.49	2.43	10.35	21.41	Vertical		Pass
Limit	EIRP<2W=33dBm							

Radiated Power (ERP) for WCDMA Band 5								
Mode	Frequency	Result						Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	correction factor(dB)	PMeas E.R.P(dBm)	Polarization Of Max. ERP	
WCDMA	826.4	15.71	0.44	6.5	2.15	19.62	Horizontal	Pass
	826.4	17.65	0.44	6.5	2.15	21.56	Vertical	Pass
	836.6	16.66	0.45	6.5	2.15	20.56	Horizontal	Pass
	836.6	18.37	0.45	6.5	2.15	22.27	Vertical	Pass
	846.4	16.76	0.46	6.5	2.15	20.65	Horizontal	Pass
	846.4	18.48	0.46	6.5	2.15	22.37	Vertical	Pass
HSUPA	826.4	15.36	0.44	6.5	2.15	19.27	Horizontal	Pass
	826.4	17.19	0.44	6.5	2.15	21.10	Vertical	Pass
	836.6	16.23	0.45	6.5	2.15	20.13	Horizontal	Pass
	836.6	17.96	0.45	6.5	2.15	21.86	Vertical	Pass
	846.4	16.79	0.46	6.5	2.15	20.68	Horizontal	Pass
	846.4	18.50	0.46	6.5	2.15	22.39	Vertical	Pass
HSDPA	826.4	15.14	0.44	6.5	2.15	19.05	Horizontal	Pass
	826.4	16.92	0.44	6.5	2.15	20.83	Vertical	Pass
	836.6	16.19	0.45	6.5	2.15	20.09	Horizontal	Pass
	836.6	18.10	0.45	6.5	2.15	22.00	Vertical	Pass
	846.4	16.51	0.46	6.5	2.15	20.40	Horizontal	Pass
	846.4	18.38	0.46	6.5	2.15	22.27	Vertical	Pass
Limit	ERP<7W=38.45dBm							

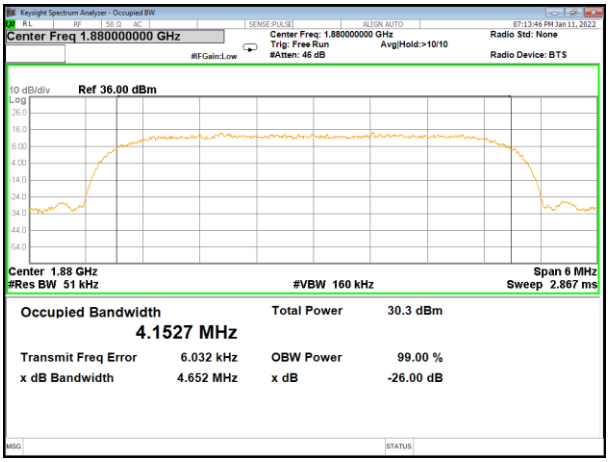
A4. OCCUPIED BANDWIDTH (99% OCCUPIED BANDWIDTH/26dB BANDWIDTH)

WCDMA Bandwidth [MHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
WCDMA 2	4.1471	4.652	4.153	4.652	4.148	4.661
HSDPA 2	4.149	4.667	4.153	4.641	4.146	4.658
HSUPA 2	4.16	4.659	4.159	4.664	4.149	4.657

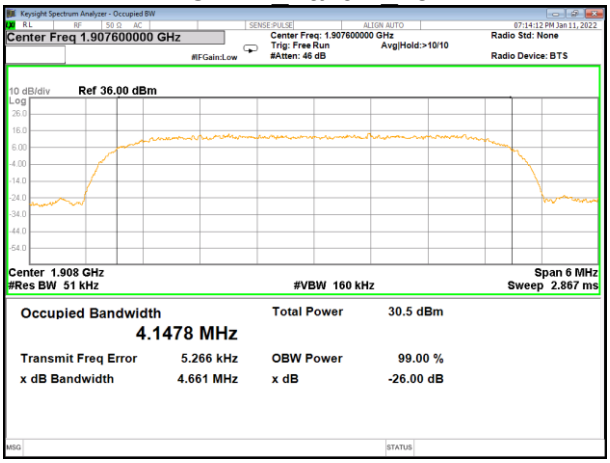
WCDMA Bandwidth [MHz]						
Mode	Lowest		Middle		Highest	
	99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
WCDMA 5	4.151	4.647	4.142	4.662	4.117	4.645
HSDPA 5	4.15	4.644	4.143	4.675	4.128	4.648
HSUPA 5	4.155	4.647	4.1433	4.684	4.119	4.628



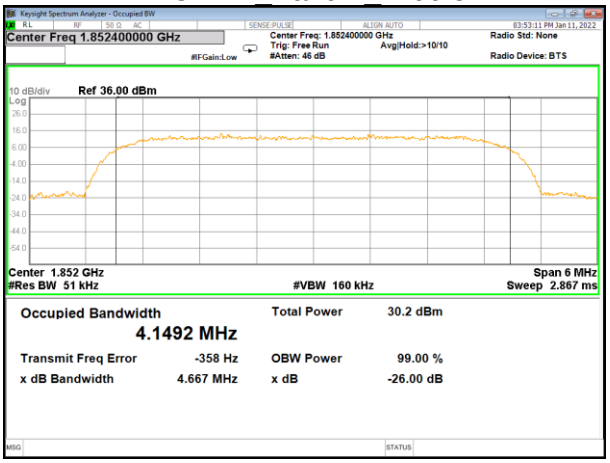
WCDMA_Band 2_Low



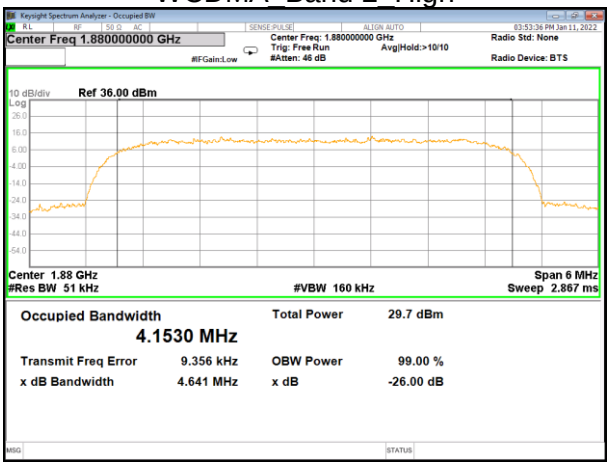
WCDMA_Band 2_Middle

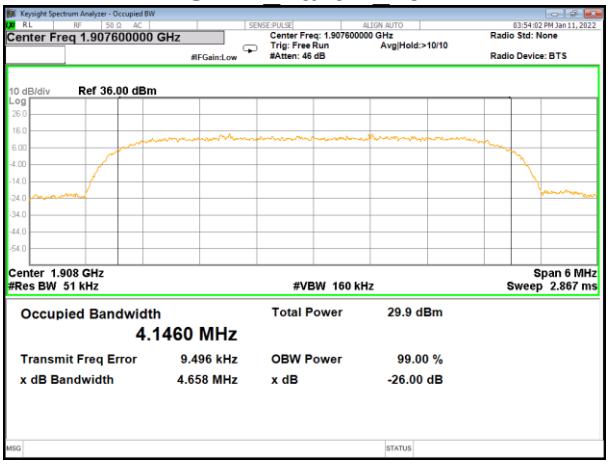


WCDMA_Band 2_High

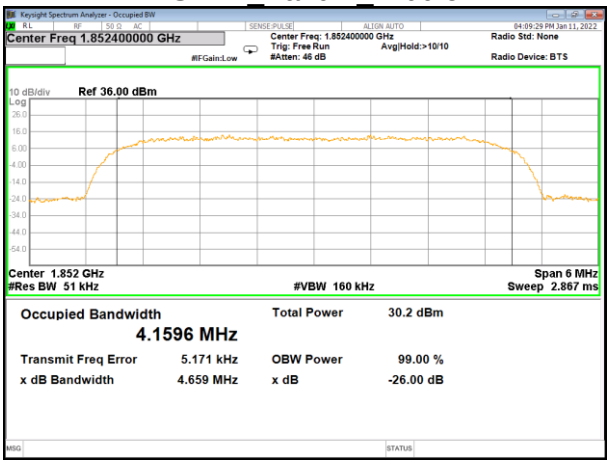


HSDPA_Band 2_Low

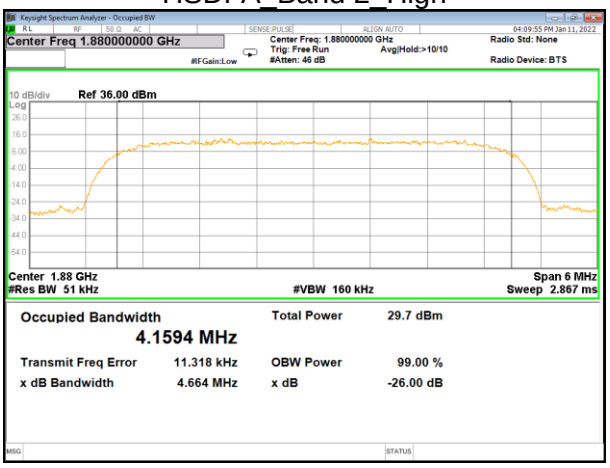




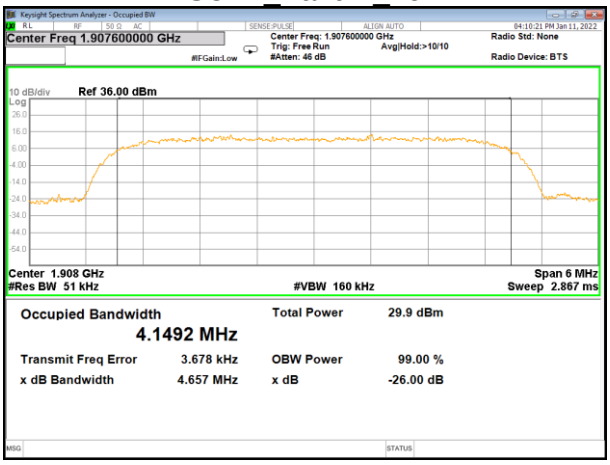
HSDPA_Band 2_Middle



HSDPA_Band 2_High

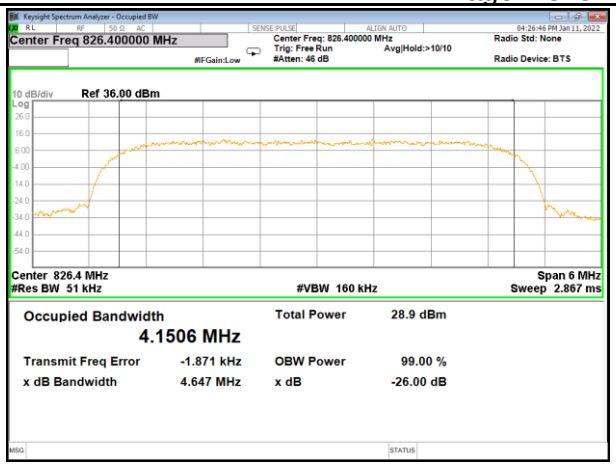


HSUPA_Band 2_Low

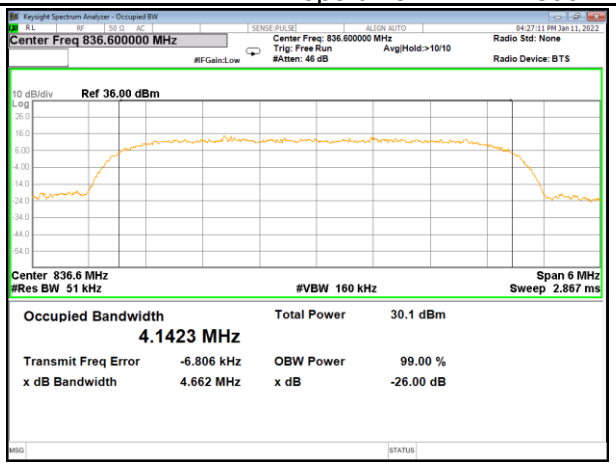


HSUPA_Band 2_Middle

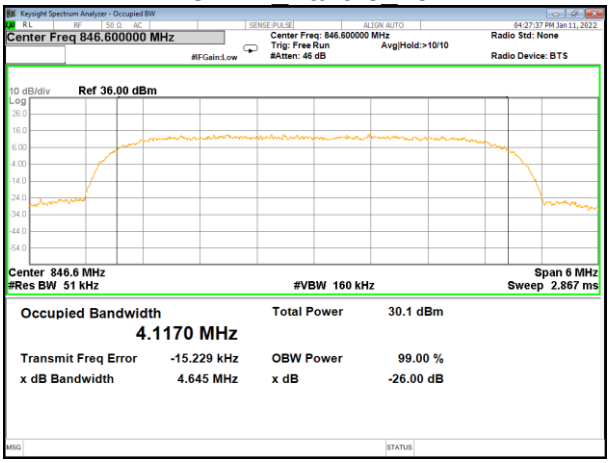
HSUPA_Band 2_High



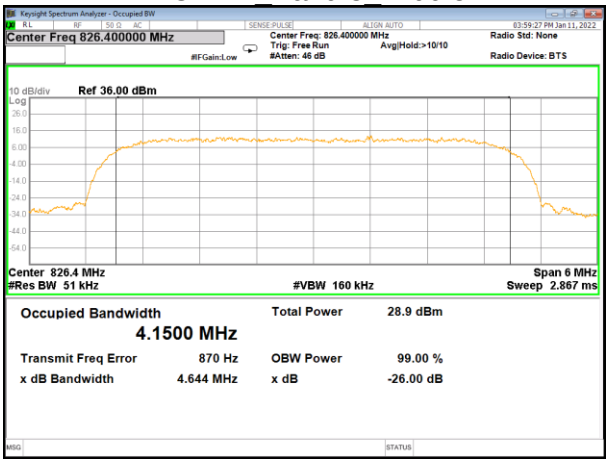
WCDMA_Band 5_Low



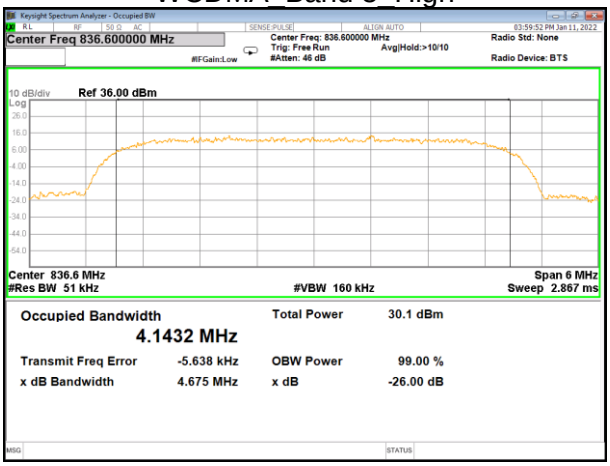
WCDMA_Band 5_Middle



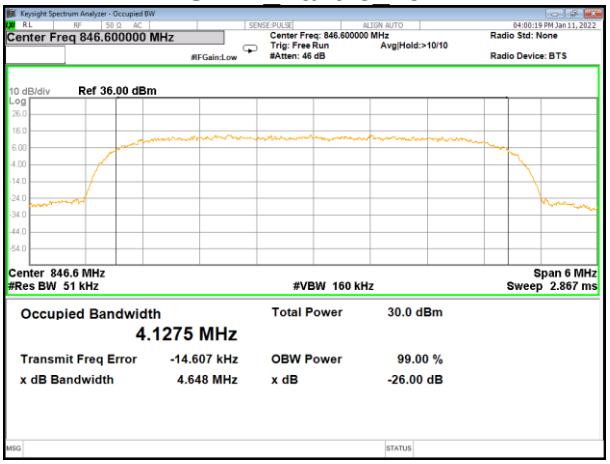
WCDMA_Band 5_High



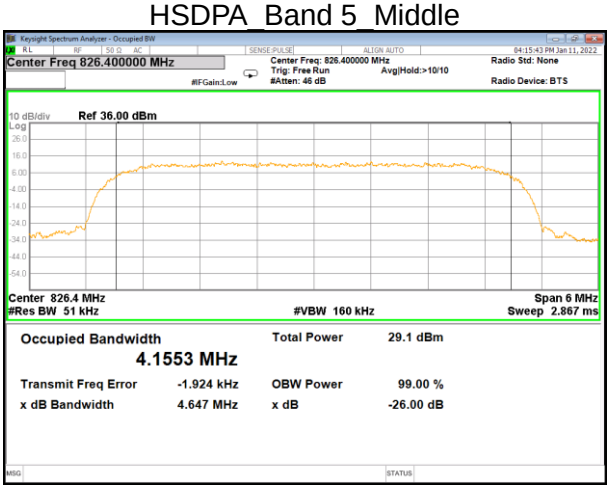
HSDPA_Band 5_Low



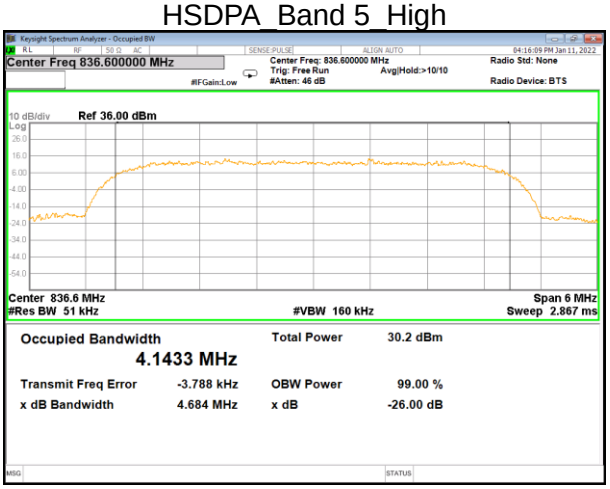
HSDPA_Band 5_Middle



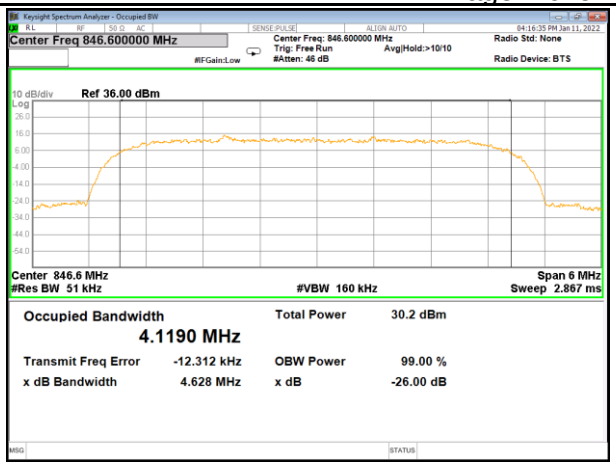
HSDPA_Band 5_High



HSUPA_Band 5_Low



HSUPA_Band 5_Middle



HSUPA_Band 5_High

A5. FREQUENCY STABILITY

Normal Voltage = 3.8V; Battery End Point (BEP) = 4.3V; Maximum Voltage =3.6V

UMTS Band 2 /1880MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	25.78	0.014	Within Authorized Band	PASS
40		17.36	0.009		
30		31.82	0.017		
20		20.28	0.011		
10		36.39	0.019		
0		35.18	0.019		
-10		34.23	0.018		
-20		17.33	0.009		
-30		18.22	0.010		
20	Maximum Voltage	30.02	0.016		
20	BEP	13.88	0.007		

HSDPA Band 2 /1880MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	31.05	0.017	Within Authorized Band	PASS
40		20.64	0.011		
30		14.52	0.008		
20		33.07	0.018		
10		22.39	0.012		
0		18.20	0.010		
-10		36.21	0.019		
-20		12.85	0.007		
-30		35.38	0.019		
20	Maximum Voltage	16.08	0.009		
20	BEP	31.52	0.017		

HSUPA Band 2 /1880MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	22.45	0.012	Within Authorized	PASS

40		29.35	0.016	Band	
30		16.07	0.009		
20		35.11	0.019		
10		29.00	0.015		
0		24.70	0.013		
-10		25.04	0.013		
-20		26.08	0.014		
-30		13.44	0.007		
20	Maximum Voltage	23.21	0.012		
20	BEP	15.44	0.008		

UMTS Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	36.05	0.043	2.5ppm	PASS
40		21.47	0.026		
30		15.32	0.018		
20		18.63	0.022		
10		18.38	0.022		
0		33.00	0.039		
-10		13.55	0.016		
-20		13.46	0.016		
-30		33.66	0.040		
20	Maximum Voltage	31.97	0.038		
20	BEP	25.68	0.031		

HSDPA Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev.	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	35.07	0.042	2.5ppm	PASS
40		18.92	0.023		
30		20.91	0.025		
20		12.75	0.015		
10		17.99	0.022		
0		30.50	0.036		
-10		18.80	0.022		
-20		15.13	0.018		
-30		25.72	0.031		
20	Maximum Voltage	36.28	0.043		
20	BEP	16.81	0.020		

HSUPA Band 5 / 836.6MHz					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	14.54	0.017	2.5ppm	PASS
40		20.78	0.025		
30		30.13	0.036		
20		17.98	0.021		
10		20.61	0.025		
0		25.61	0.031		
-10		29.23	0.035		
-20		25.62	0.031		

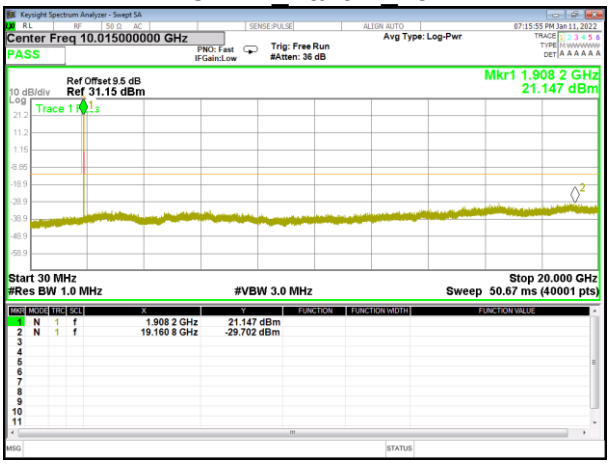
-30		30.71	0.037		
20	Maximum Voltage	20.32	0.024		
20	BEP	18.33	0.022		

1. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

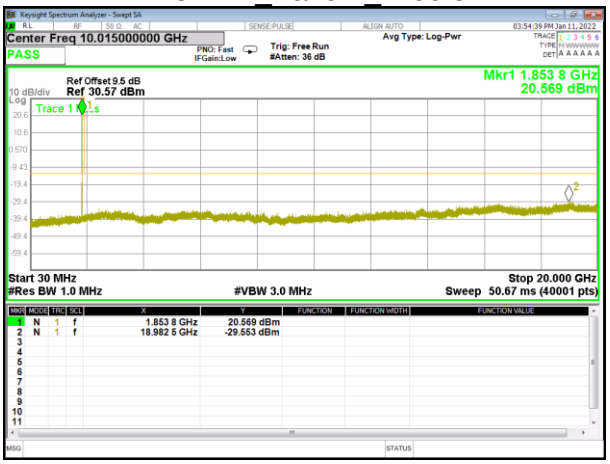
A6. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

WCDMA_Band 2_Low

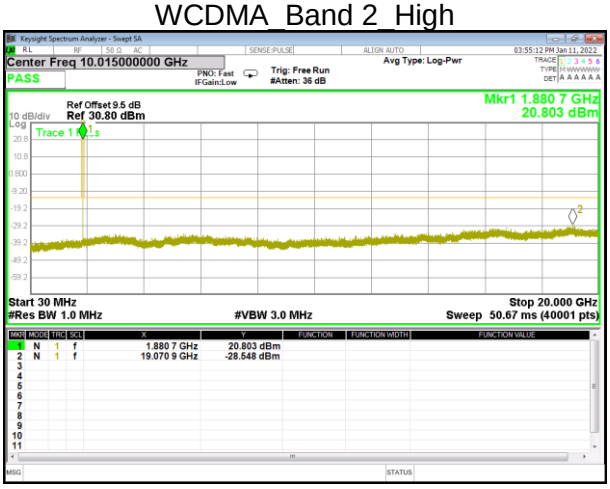
WCDMA_Band 2_Middle



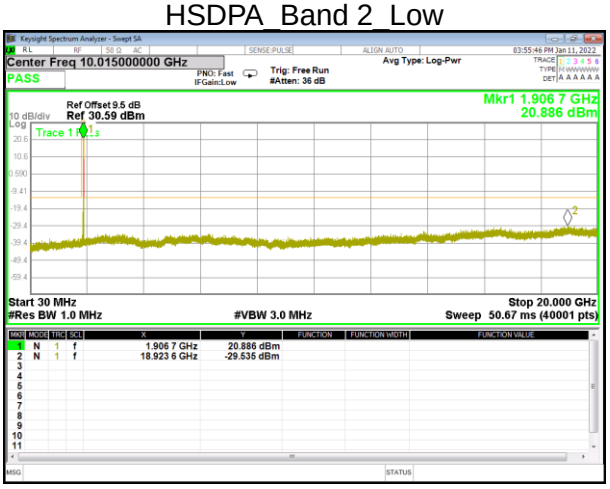
WCDMA_Band 2_High



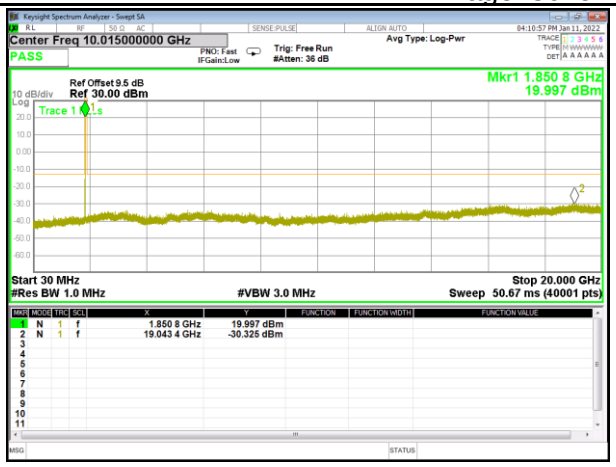
HSDPA_Band 2_Low



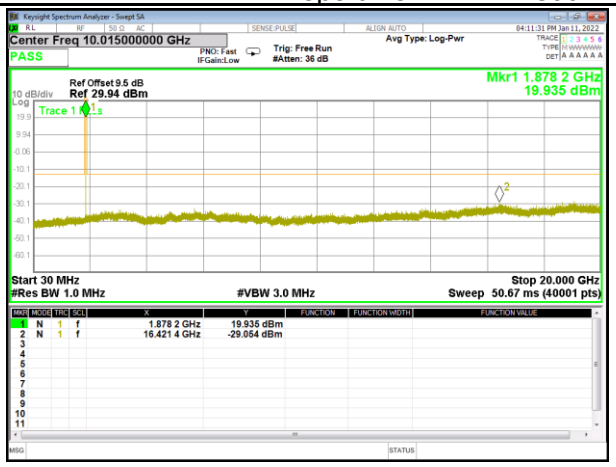
HSDPA_Band 2_Middle



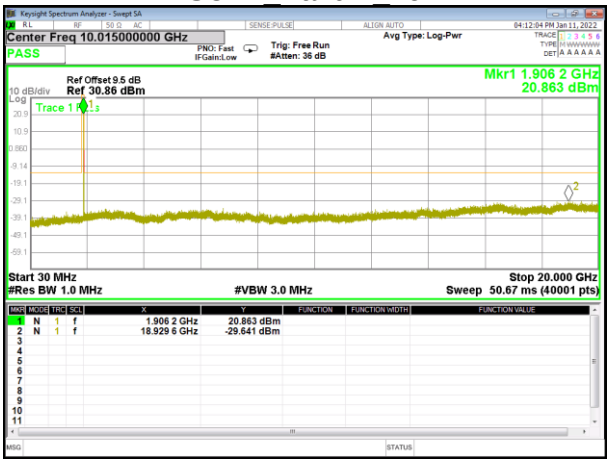
HSDPA_Band 2_High



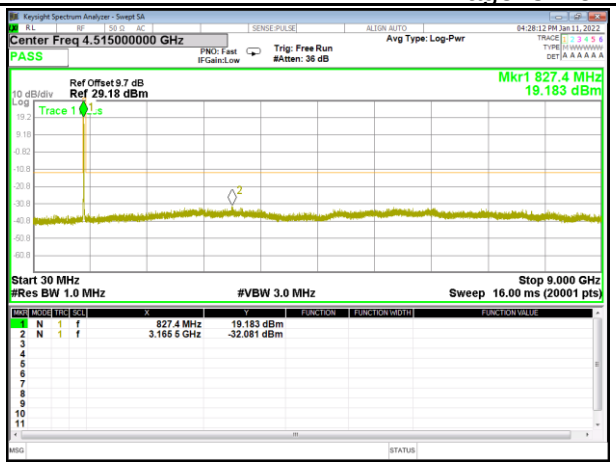
HSUPA_Band 2_Low



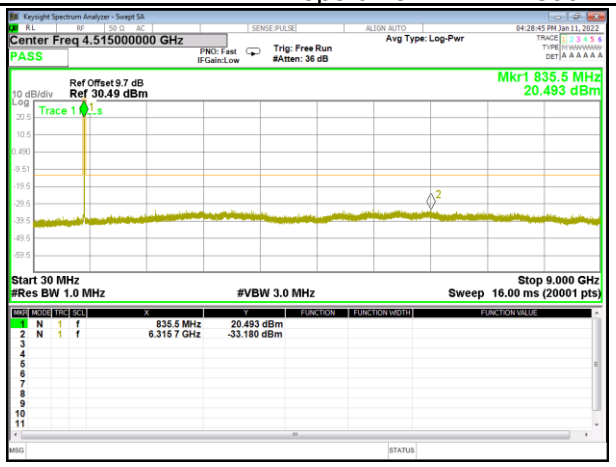
HSUPA_Band 2_Middle



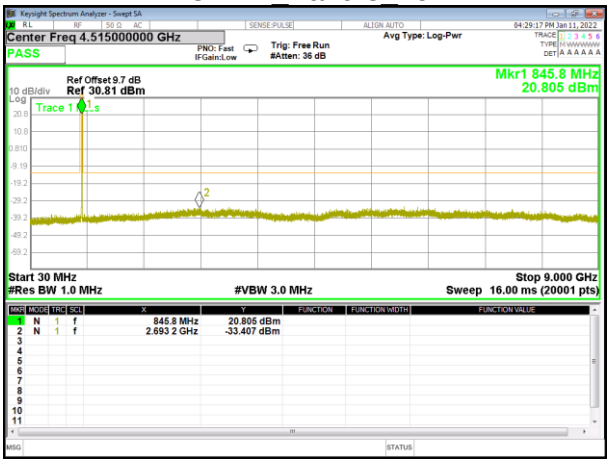
HSUPA_Band 2_High



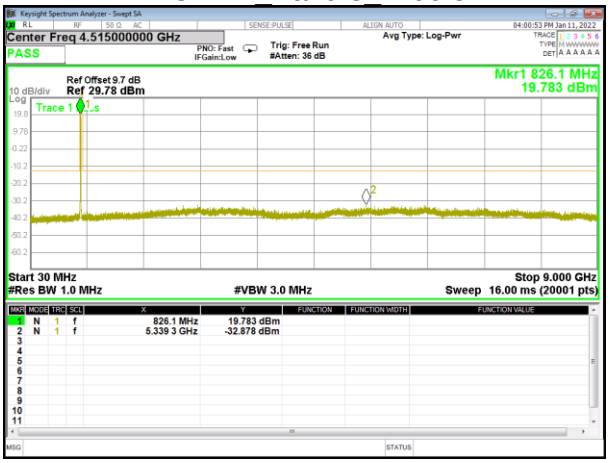
WCDMA_Band 5_Low



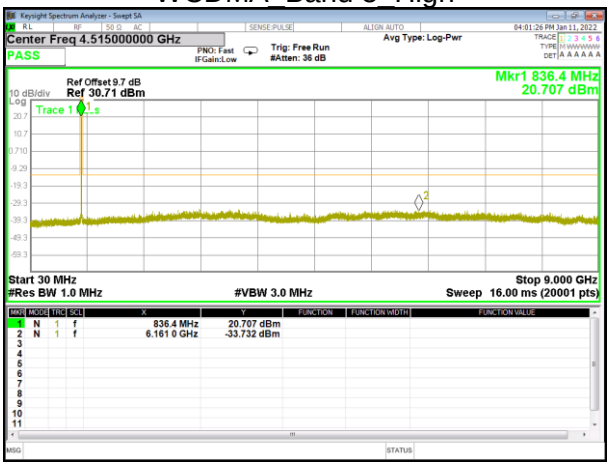
WCDMA_Band 5_Middle



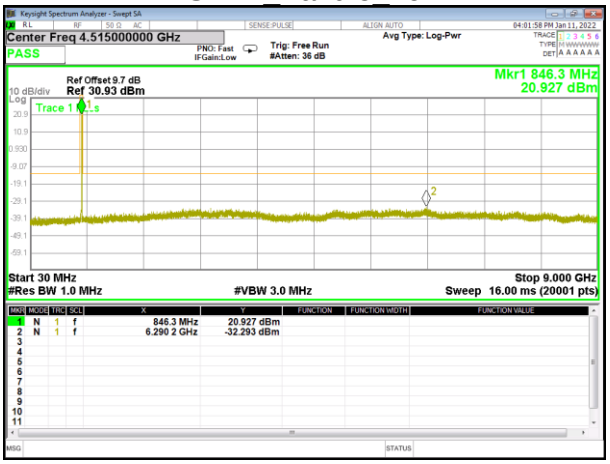
WCDMA_Band 5_High



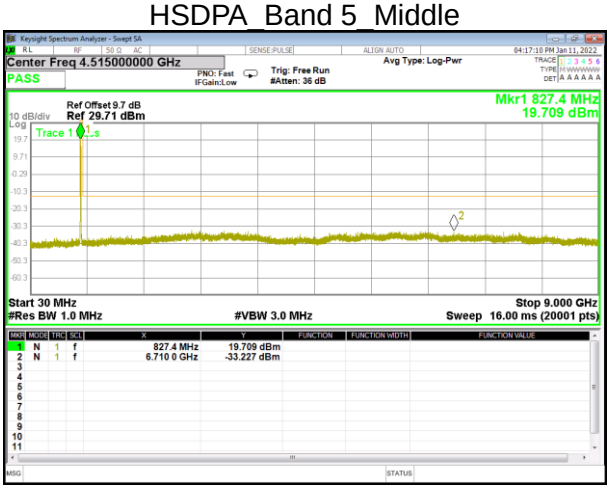
HSDPA_Band 5_Low



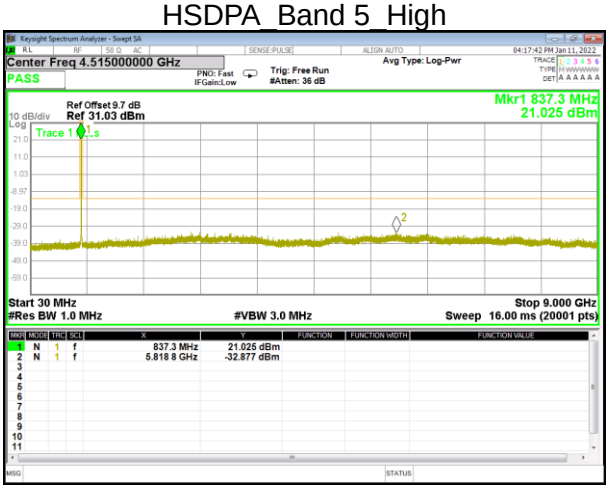
HSDPA_Band 5_Middle



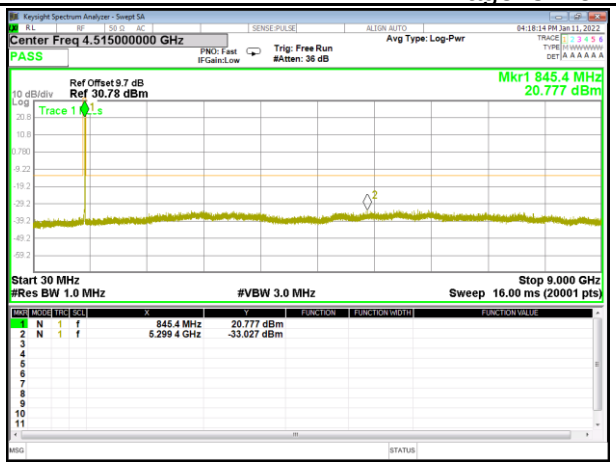
HSDPA_Band 5_High



HSUPA_Band 5_Low

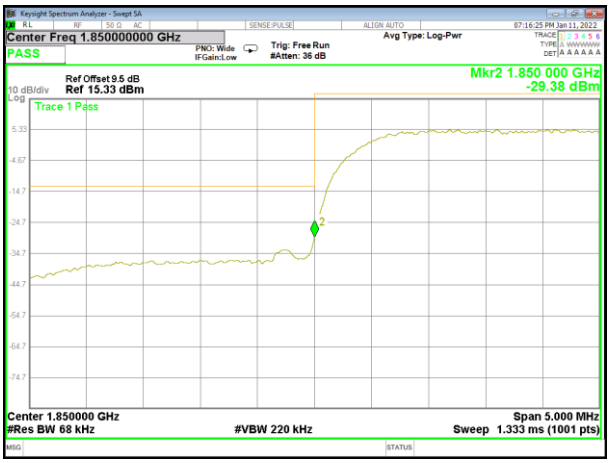


HSUPA_Band 5_Middle

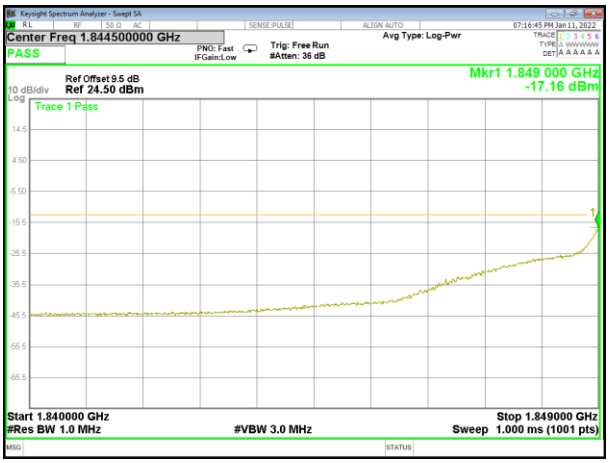


HSUPA_Band 5_High

A7. BAND EDGE

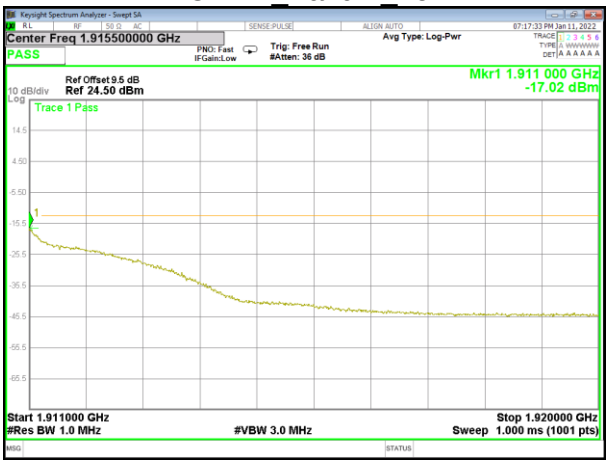


WCDMA_Band 2_Low

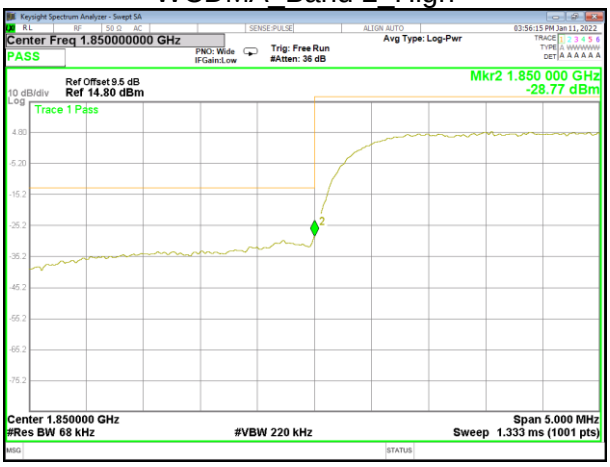


WCDMA_Band 2_Low

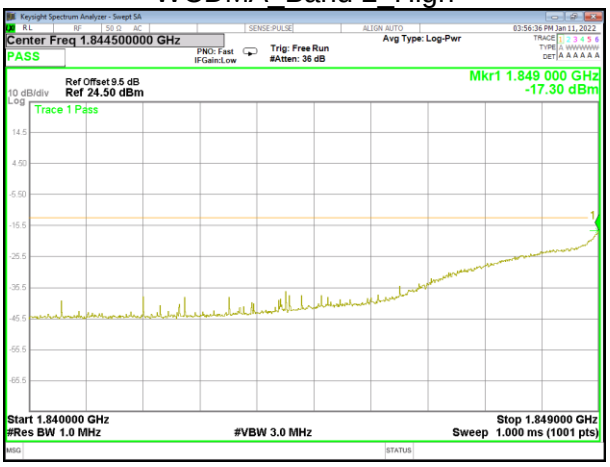
WCDMA_Band 2_High



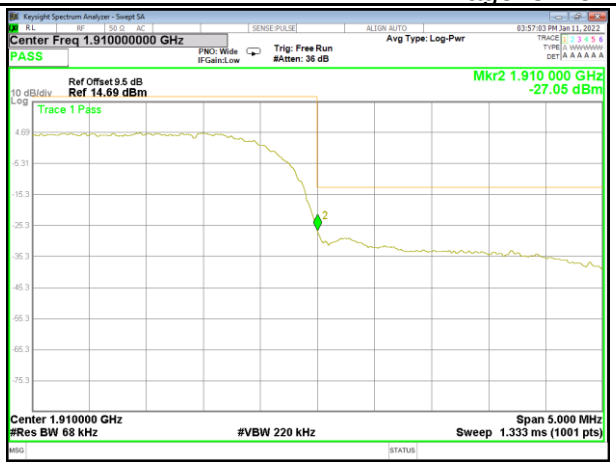
WCDMA_Band 2_High



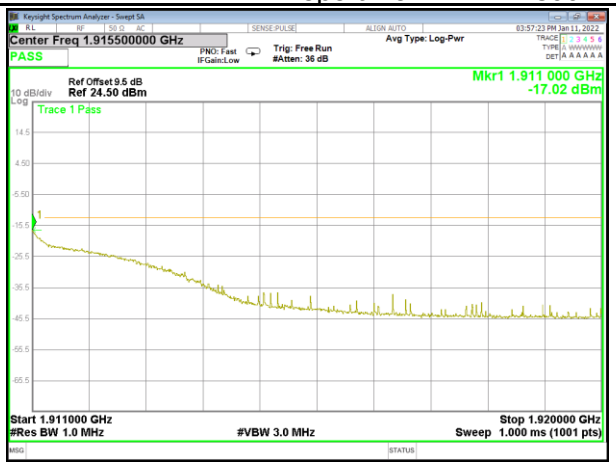
HSDPA_Band 2_Low



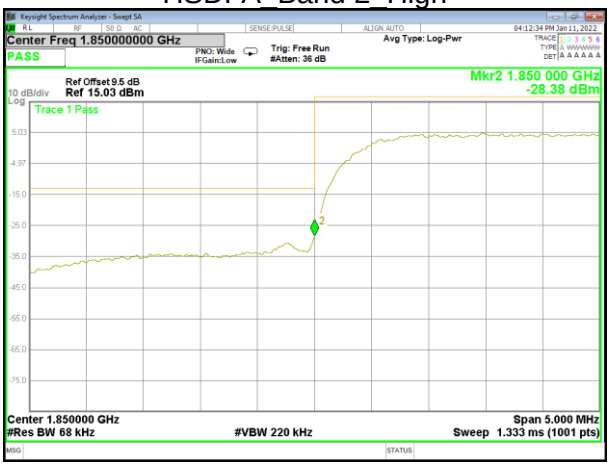
HSDPA_Band 2_Low



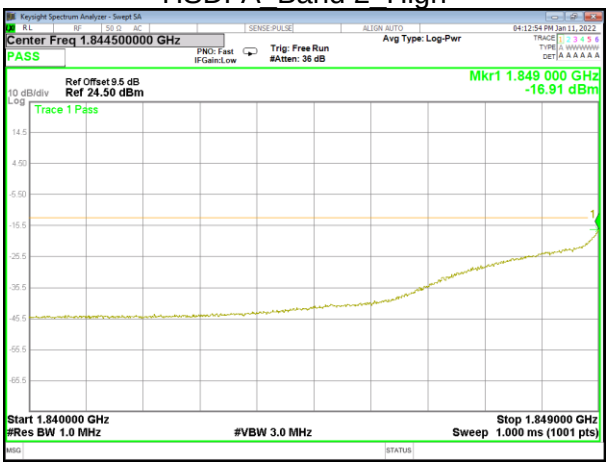
HSDPA_Band 2_High



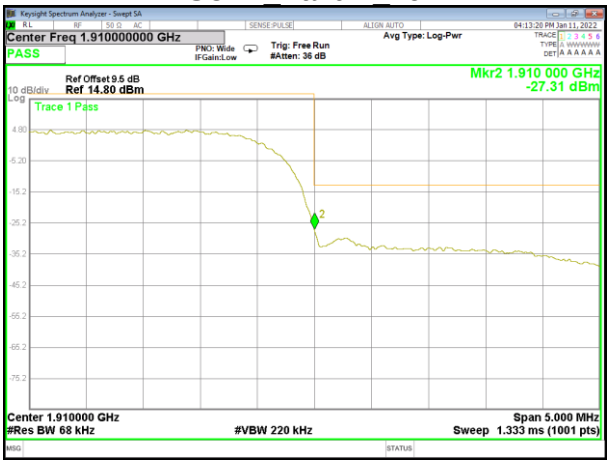
HSDPA_Band 2_High



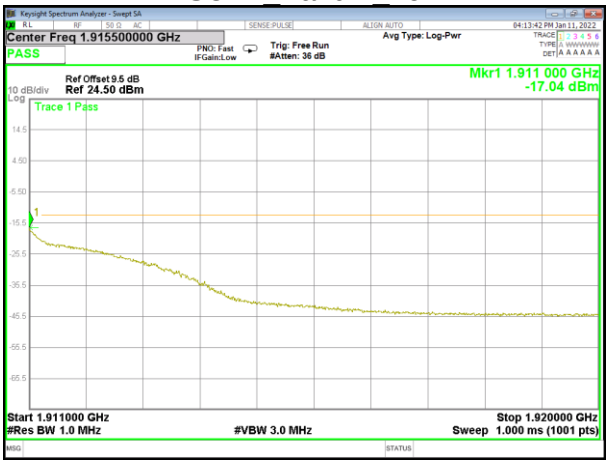
HSUPA_Band 2_Low



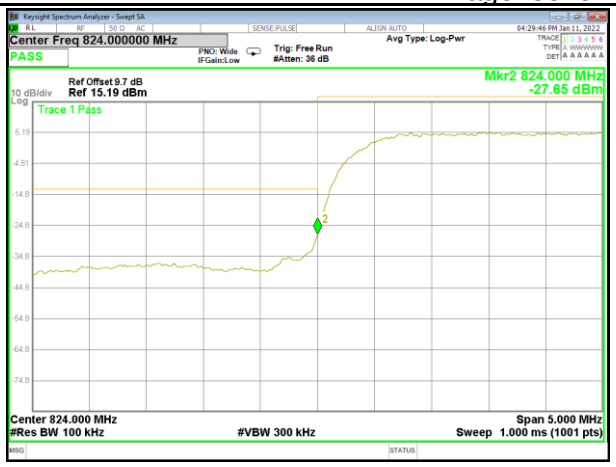
HSUPA_Band 2_Low



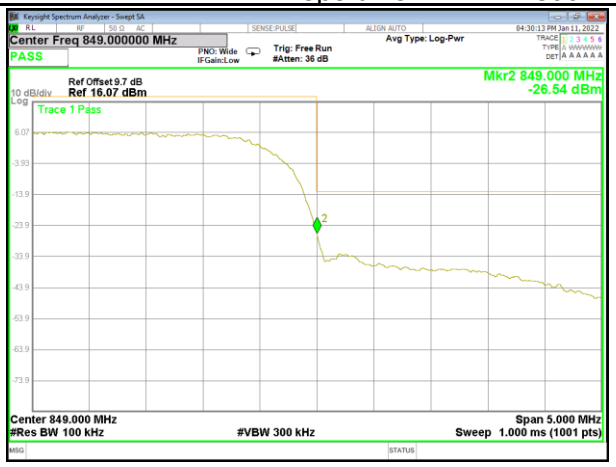
HSUPA_Band 2_High



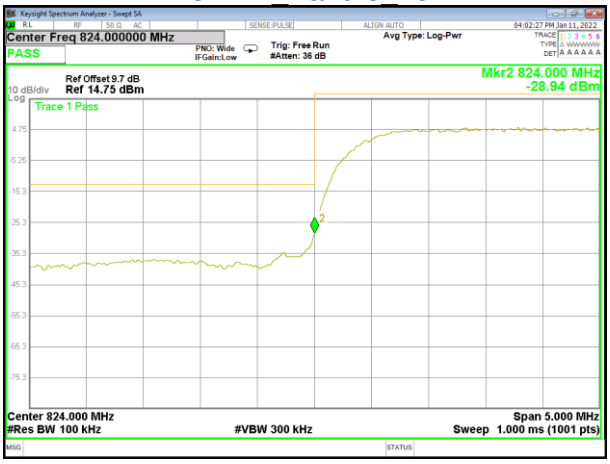
HSUPA_Band 2_High



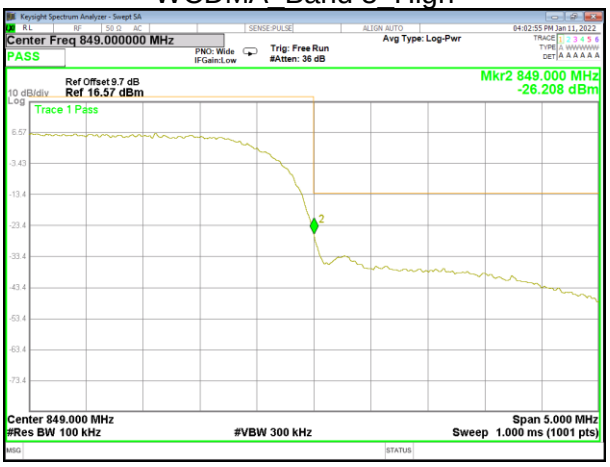
WCDMA_Band 5_Low



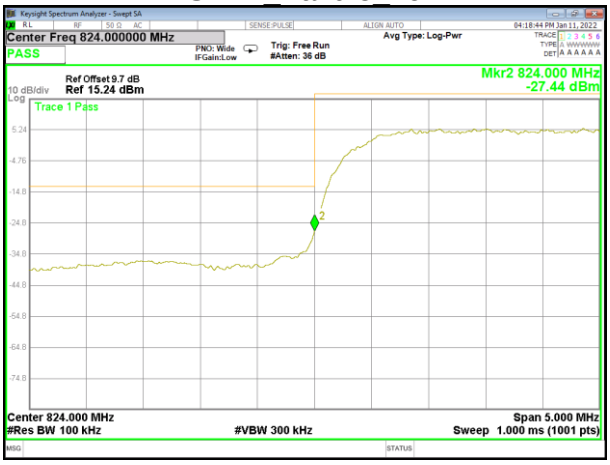
WCDMA_Band 5_High



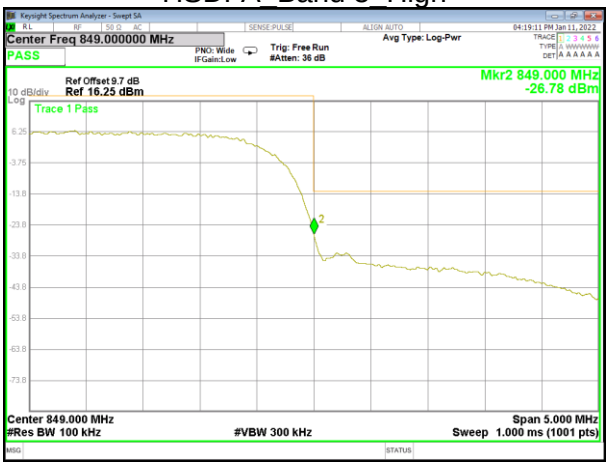
HSDPA_Band 5_Low



HSDPA_Band 5_High



HSUPA_Band 5_Low



HSUPA_Band 5_High

A8. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

Note: (1) Spurious emissions which are attenuated by more than 20dB below the permissible value for frequeny below 1000MHz.

(2) Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value

(3)Test is divided into three directions, X/Y/Z. X pattern for the worst.

HSUPA Band 5: (30-9000)MHz							
The wost testresults channel 4132/826.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1652.25	-41.37	9.40	4.75	-36.72	-13.00	-23.72	H
2479.68	-39.81	10.60	8.39	-37.60	-13.00	-24.60	H
3305.77	-31.87	12.00	11.79	-31.66	-13.00	-18.66	H
1652.19	-43.62	9.40	4.75	-38.97	-13.00	-25.97	V
2479.21	-45.26	10.60	8.39	-43.05	-13.00	-30.05	V
3305.86	-42.52	12.00	11.79	-42.31	-13.00	-29.31	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.11	-40.56	9.40	4.75	-35.91	-13.00	-22.91	H
2509.48	-40.23	10.60	8.39	-38.02	-13.00	-25.02	H
3346.30	-32.05	12.00	11.79	-31.84	-13.00	-18.84	H
1672.84	-44.21	9.40	4.75	-39.56	-13.00	-26.56	V
2509.90	-44.08	10.60	8.39	-41.87	-13.00	-28.87	V
3345.95	-42.71	12.00	11.79	-42.50	-13.00	-29.50	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1693.44	-41.21	9.40	4.75	-36.56	-13.00	-23.56	H
2539.18	-39.40	10.60	8.39	-37.19	-13.00	-24.19	H
3386.21	-31.18	12.00	11.79	-30.97	-13.00	-17.97	H
1693.55	-43.50	9.40	4.75	-38.85	-13.00	-25.85	V
2539.29	-44.71	10.60	8.39	-42.50	-13.00	-29.50	V
3386.24	-43.75	12.00	11.79	-43.54	-13.00	-30.54	V

HSDPA Band 5: (30-9000)MHz							
The wost testresults channel 4132/826.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1652.36	-41.41	9.40	4.75	-36.76	-13.00	-23.76	H
2479.28	-39.27	10.60	8.39	-37.06	-13.00	-24.06	H
3305.72	-31.22	12.00	11.79	-31.01	-13.00	-18.01	H
1652.26	-43.66	9.40	4.75	-39.01	-13.00	-26.01	V
2479.48	-44.88	10.60	8.39	-42.67	-13.00	-29.67	V
3305.82	-43.07	12.00	11.79	-42.86	-13.00	-29.86	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1672.90	-41.23	9.40	4.75	-36.58	-13.00	-23.58	H
2509.65	-40.18	10.60	8.39	-37.97	-13.00	-24.97	H
3346.15	-31.74	12.00	11.79	-31.53	-13.00	-18.53	H
1672.91	-43.51	9.40	4.75	-38.86	-13.00	-25.86	V
2509.83	-44.63	10.60	8.39	-42.42	-13.00	-29.42	V
3345.97	-43.53	12.00	11.79	-43.32	-13.00	-30.32	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1693.61	-40.18	9.40	4.75	-35.53	-13.00	-22.53	H
2539.46	-40.24	10.60	8.39	-38.03	-13.00	-25.03	H
3385.88	-32.21	12.00	11.79	-32.00	-13.00	-19.00	H
1693.51	-43.84	9.40	4.75	-39.19	-13.00	-26.19	V
2539.33	-45.19	10.60	8.39	-42.98	-13.00	-29.98	V
3386.11	-43.64	12.00	11.79	-43.43	-13.00	-30.43	V

WCDMA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3704.36	-33.44	12.60	12.93	-33.77	-13.00	-20.77	H
5557.39	-35.44	13.10	17.11	-39.45	-13.00	-26.45	H
7409.80	-32.55	11.50	22.20	-43.25	-13.00	-30.25	H
3704.33	-35.88	12.60	12.93	-36.21	-13.00	-23.21	V
5557.33	-35.13	13.10	17.11	-39.14	-13.00	-26.14	V
7409.74	-32.08	11.50	22.20	-42.78	-13.00	-29.78	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.86	-34.20	12.60	12.93	-34.53	-13.00	-21.53	H
5640.17	-35.11	13.10	17.11	-39.12	-13.00	-26.12	H
7519.85	-33.37	11.50	22.20	-44.07	-13.00	-31.07	H
3760.03	-35.49	12.60	12.93	-35.82	-13.00	-22.82	V
5640.02	-35.07	13.10	17.11	-39.08	-13.00	-26.08	V
7520.05	-31.93	11.50	22.20	-42.63	-13.00	-29.63	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3815.23	-33.46	12.60	12.93	-33.79	-13.00	-20.79	H
5722.28	-34.27	13.10	17.11	-38.28	-13.00	-25.28	H
7630.30	-32.92	11.50	22.20	-43.62	-13.00	-30.62	H
3815.47	-34.88	12.60	12.93	-35.21	-13.00	-22.21	V
5722.32	-34.55	13.10	17.11	-38.56	-13.00	-25.56	V
7629.83	-33.04	11.50	22.20	-43.74	-13.00	-30.74	V

HSUPA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3704.02	-34.30	12.60	12.93	-34.63	-13.00	-21.63	H
5557.52	-34.86	13.10	17.11	-38.87	-13.00	-25.87	H
7409.54	-33.21	11.50	22.20	-43.91	-13.00	-30.91	H
3704.15	-34.64	12.60	12.93	-34.97	-13.00	-21.97	V
5557.59	-34.58	13.10	17.11	-38.59	-13.00	-25.59	V
7409.70	-31.93	11.50	22.20	-42.63	-13.00	-29.63	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.79	-34.01	12.60	12.93	-34.34	-13.00	-21.34	H
5640.13	-35.49	13.10	17.11	-39.50	-13.00	-26.50	H
7520.26	-32.83	11.50	22.20	-43.53	-13.00	-30.53	H
3760.05	-35.80	12.60	12.93	-36.13	-13.00	-23.13	V
5640.21	-34.79	13.10	17.11	-38.80	-13.00	-25.80	V
7520.09	-32.36	11.50	22.20	-43.06	-13.00	-30.06	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3815.63	-34.53	12.60	12.93	-34.86	-13.00	-21.86	H
5722.22	-34.38	13.10	17.11	-38.39	-13.00	-25.39	H
7629.92	-32.15	11.50	22.20	-42.85	-13.00	-29.85	H
3815.66	-35.57	12.60	12.93	-35.90	-13.00	-22.90	V
5722.39	-34.57	13.10	17.11	-38.58	-13.00	-25.58	V
7630.27	-32.13	11.50	22.20	-42.83	-13.00	-29.83	V

HSDPA Band 2: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3704.31	-34.73	12.60	12.93	-35.06	-13.00	-22.06	H
5557.62	-34.91	13.10	17.11	-38.92	-13.00	-25.92	H
7409.90	-33.05	11.50	22.20	-43.75	-13.00	-30.75	H
3704.45	-35.57	12.60	12.93	-35.90	-13.00	-22.90	V
5557.58	-34.73	13.10	17.11	-38.74	-13.00	-25.74	V
7409.68	-32.38	11.50	22.20	-43.08	-13.00	-30.08	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.96	-34.47	12.60	12.93	-34.80	-13.00	-21.80	H
5640.13	-35.16	13.10	17.11	-39.17	-13.00	-26.17	H
7520.16	-32.46	11.50	22.20	-43.16	-13.00	-30.16	H
3759.87	-35.14	12.60	12.93	-35.47	-13.00	-22.47	V
5640.23	-33.78	13.10	17.11	-37.79	-13.00	-24.79	V
7520.12	-32.30	11.50	22.20	-43.00	-13.00	-30.00	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3815.53	-34.64	12.60	12.93	-34.97	-13.00	-21.97	H
5722.17	-34.61	13.10	17.11	-38.62	-13.00	-25.62	H
7630.16	-33.45	11.50	22.20	-44.15	-13.00	-31.15	H
3815.60	-35.52	12.60	12.93	-35.85	-13.00	-22.85	V
5722.10	-35.03	13.10	17.11	-39.04	-13.00	-26.04	V
7630.27	-32.14	11.50	22.20	-42.84	-13.00	-29.84	V

APPENDIX ——PHOTOS

TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

EXTERNAL PHOTOGRAPHS OF EUT

Please refer to separated files for External Photos of the EUT.

INTERNAL PHOTOGRAPHS OF EUT

Please refer to separated files for Internal Photos of the EUT.

End of report