

FCC Part 22H & 24E Test Report

FCC ID: 2AWB9-K101

Product Name:	Tablet pc
Trademark:	N/A
Model Name :	K101 T10K, KT107, CX1011, K102, T10N Plus, K88, T7K PLUS, K708
Prepared For : Address :	shen zhen langweishun technology co., Ltd 2F, building C, Number 4 of 1RD, Shang Xue technology Park, Bantian, Longgang, Shenzhen, China.
Prepared By : Address :	Shenzhen BCTC Testing Co., Ltd. BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Test Date:	Nov. 12, 2019 – Mar. 31, 2020
Date of Report :	Mar. 31, 2020
Report No.:	BCTC1911000685-3E

TEST RESULT CERTIFICATION

Applicant's name : shen zhen langweishun technology co., Ltd

Address..... : 2F, building C, Number 4 of 1RD, Shang Xue technology Park, Bantian, Longgang, Shenzhen, China.

Manufacture's Name : shen zhen langweishun technology co., Ltd

Address : 2F, building C, Number 4 of 1RD, Shang Xue technology Park, Bantian, Longgang, Shenzhen, China.

Product description

Product name : Tablet pc

Trademark..... : N/A

Model and/or type reference : K101
T10K, KT107, CX1011, K102, T10N Plus, K88, T7K PLUS, K708

Standards : FCC Part 22H & 24E

This device described above has been tested by BCTC, 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.

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Reviewer(Supervisor): Eric Yang

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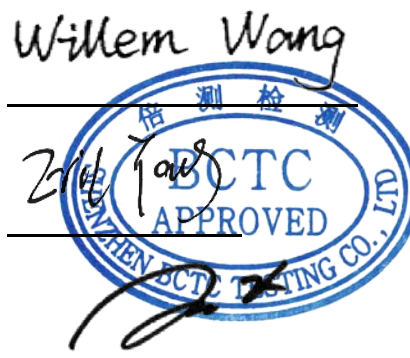


Table of Contents	page
1. GENERAL INFORMATION	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2 TEST STANDARDS.....	6
1.3TEST METHODOLOGY	6
1.4TEST FACILITY	6
1.5 EUT SETUP AND TEST MODE	7
1.6 MEASUREMENT UNCERTAINTY	9
1.7 TEST EQUIPMENT LIST AND DETAILS	10
2. SUMMARY OF TEST RESULTS.....	12
3. RF OUTPUT POWER.....	13
3.1 STANDARD APPLICABLE	13
3.2TEST PROCEDURE.....	13
3.3ENVIRONMENTAL CONDITIONS.....	13
3.4SUMMARY OF TEST RESULTS/PLOTS	14
4. PEAK-TO-AVERAGE RATIO(PAR) OF TRANSMITTER	18
4.1 STANDARD APPLICABLE	18
4.2 TEST PROCEDURE	18
4.3 ENVIRONMENTAL CONDITIONS	18
4.4SUMMARY OF TEST RESULTS.....	19
5. EMISSION BANDWIDTH.....	21
5.1 STANDARD APPLICABLE	21
5.2TEST PROCEDURE.....	21
5.3ENVIRONMENTAL CONDITIONS.....	21
6.4SUMMARY OF TEST RESULTS/PLOTS	22
6. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL	32
6.1 STANDARD APPLICABLE	32
6.2TEST PROCEDURE.....	32
6.3ENVIRONMENTAL CONDITIONS.....	32
6.4SUMMARY OF TEST RESULTS/PLOTS	33
7. SPURIOUS RADIATED EMISSIONS	57
7.1STANDARD APPLICABLE	57
7.2TEST PROCEDURE.....	57
7.3ENVIRONMENTAL CONDITIONS.....	57
7.4SUMMARY OF TEST RESULTS/PLOTS	57
8. FREQUENCY STABILITY	60
8.1 STANDARD APPLICABLE	60
8.2TEST PROCEDURE.....	60
8.3ENVIRONMENTAL CONDITIONS.....	60
8.4SUMMARY OF TEST RESULTS/PLOTS	61
9. EUT PHOTO	66
10. EUT TEST PHOTO	67

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Equipment	Tablet pc
Trade Name	N/A
Model Name	K101 T10K, KT107, CX1011, K102, T10N Plus, K88, T7K PLUS, K708
Model Difference	All the model are the same circuit and RF module, except model names .
Power Source	DC 3.7V
Connecting I/O Port(s)	Please refer to the User's Manual
hardware version	
Software version	
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT:	
3G	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 23.61dBm, WCDMA Band 5: 22.78dBm
Type of Emission:	WCDMA Band 2: 4M17F9W WCDMA Band 5: 4M18F9W
Type of Modulation:	BPSK
Antenna Type:	FPCB antenna
Antenna Gain:	WCDMA Band 2: 1.5dBi, WCDMA Band 5: 1.5dBi

1.2 Test Standards

The following report is prepared on behalf of the Michley Electronics Inc.in accordance withFCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3Test Methodology

All measurements contained in this report were conducted withANSI/TIA-603-D: 2010 andANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.The measurement guide KDB 971168 D01 Power Meas License Digital Systems v02r02 shall be performed also.

1.4Test Facility

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

Shenzhen BCTC Testing Co., Ltd.

Add. : BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest

possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	WCDMA Band 5	Low, Middle, High Channels
TM2	HSDPA Band 5	Low, Middle, High Channels
TM3	HSUPA Band 5	Low, Middle, High Channels
TM4	WCDMA Band 2	Low, Middle, High Channels
TM5	HSDPA Band 2	Low, Middle, High Channels
TM6	HSUPA Band 2	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency	Channel Number
WCDMA Band 5	WCDMA/HSDPA/HSUPA	826.4 MHz	4132
		836.6 MHz	4183
		846.6 MHz	4233
WCDMA Band 2	WCDMA/HSDPA/HSUPA	1852.4 MHz	9262
		1880.0 MHz	9400
		1907.6 MHz	9538
Note: the transmitter has been tested on the communications mode of WCDMA, HSDPA, HSUPA compliance test and record the worst case.			

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty

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

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	$U=4.3\text{dB}$
2	3m chamber Radiated spurious emission(1GHz-18GHz)	$U=4.5\text{dB}$
3	3m chamber Radiated spurious emission(18GHz-40GHz)	$U=3.34\text{dB}$
4	Conducted Adjacent channel power	$U=1.38\text{dB}$
5	Conducted output power uncertainty Above 1G	$U=1.576\text{dB}$
6	Conducted output power uncertainty below 1G	$U=1.28\text{dB}$
7	humidity uncertainty	$U=5.3\%$
8	Temperature uncertainty	$U=0.59^{\circ}\text{C}$

1.7 Test Equipment List and Details

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45109572	Jun. 13, 2019	Jun. 12, 2020
2	Test Receiver (9kHz-7GHz)	R&S	ESR7	101154	Jun. 13, 2019	Jun. 12, 2020
3	Bilog Antenna (30MHz-3GHz)	SCHWARZBEC K	VULB9163	VULB9163-942	Jun. 22, 2019	Jun. 21, 2020
4	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Jun. 22, 2019	Jun. 21, 2020
5	Horn Antenna (18GHz-40GHz)	SCHWARZBEC K	BBHA9170	822	Jun. 22, 2019	Jun. 21, 2020
6	Amplifier (9KHz-6GHz)	SCHWARZBEC K	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
7	Amplifier (0.5GHz-18GHz)	SCHWARZBEC K	BBV9718	9718-309	Jun. 25, 2019	Jun. 24, 2020
8	Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	Jun. 17, 2019	Jun. 16, 2020
9	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Jul. 02, 2019	Jul. 01, 2020
10	RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	Jun. 25, 2019	Jun. 24, 2020
11	RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	Jun. 25, 2019	Jun. 24, 2020
12	RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	Jun. 25, 2019	Jun. 24, 2020
13	Power Metter	Keysight	E4419B	\	Jun. 17, 2019	Jun. 16, 2020
14	Power Sensor (AV)	Keysight	E9 300A	\	Jun. 17, 2019	Jun. 16, 2020
15	Signal Analyzer 20kHz-26.5GHz	KEYSIGHT	N9020A	MY49100060	Jun. 13, 2019	Jun. 12, 2020
16	Spectrum Analyzer 9kHz-40GHz	Aglient	FSP40	100363	Jun. 13, 2019	Jun. 12, 2020
17	Communication test set	R&S	CMU200	119435	Jun. 13, 2019	Jun. 12, 2020
18	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
19	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESR3	102075	Jun. 13, 2019	Jun. 12, 2020
2	LISN	SCHWARZBEC K	NSLK8127	8127739	Jun. 13, 2019	Jun. 12, 2020
3	LISN	R&S	ENV216	101375	Jun. 13, 2019	Jun. 12, 2020
4	RF cables	Huber+Suhnar	9kHz-30MHz	B1702988-000 8	Jun. 25, 2019	Jun. 24, 2020
5	Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§1.1307, §2.1093	RF Exposure	Compliant
§22.913 (a), §24.232 (c),	RF Output Power	Compliant
§24.51,	Peak-to-average Ratio(PAR) of Transmitter	Compliant
§22.917 (b), §24.238 (b),	Emission Bandwidth	Compliant
§22.917 (a), §24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§22.917 (a), §24.238 (a)	Spurious Radiation Emissions	Compliant
§22.917 (a), §24.238 (a),	Out of Band Emissions	Compliant
§22.355, §24.235	Frequency Stability	Compliant

3. RF Output Power

3.1 Standard Applicable

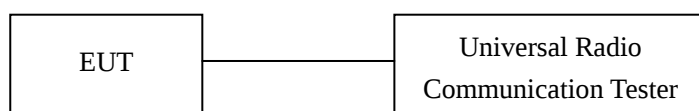
According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

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

According to §27.50(d)(4), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

3.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

3.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

3.4 Summary of Test Results/Plots

Max. Radiated Power

ERP For WCDMA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.35	1.5	0	H	1.5	0	19.85	38.45
826.4	21.45	1.5	0	V	1.5	0	19.95	38.45
Middle Channel								
836.6	21.87	1.5	0	H	1.5	0	20.37	38.45
836.6	22.09	1.5	0	V	1.5	0	20.59	38.45
High Channel								
846.6	21.69	1.5	0	H	1.5	0	20.19	38.45
846.6	22.47	1.5	0	V	1.5	0	20.97	38.45

ERP For HSDPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.33	1.5	0	H	1.5	0	19.83	38.45
826.4	21.45	1.5	0	V	1.5	0	19.95	38.45
Middle Channel								
836.6	20.62	1.5	0	H	1.5	0	19.12	38.45
836.6	21.74	1.5	0	V	1.5	0	20.24	38.45
High Channel								
846.6	20.32	1.5	0	H	1.5	0	18.82	38.45
846.6	21.21	1.5	0	V	1.5	0	19.71	38.45

ERP For HSUPA Mode Band 5

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 22H Limit
MHz	dBm	Meter	Degree	H / V	dB	dBd	dBm	dBm
Low Channel								
826.4	21.34	1.5	0	H	1.5	0	19.84	38.45
826.4	21.24	1.5	0	V	1.5	0	19.74	38.45
Middle Channel								
836.6	20.54	1.5	0	H	1.5	0	19.04	38.45
836.6	21.87	1.5	0	V	1.5	0	20.37	38.45
High Channel								
846.6	20.36	1.5	0	H	1.5	0	18.86	38.45
846.6	21.03	1.5	0	V	1.5	0	19.53	38.45

EIRP For WCDMA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1852.4	14.32	1.5	0	H	1.9	7.7	20.12	33
1852.4	14.55	1.5	0	V	1.9	7.7	20.35	33
Middle Channel								
1880.0	14.44	1.5	0	H	1.9	7.7	20.24	33
1880.0	14.74	1.5	0	V	1.9	7.7	20.54	33
High Channel								
1907.6	14.86	1.5	0	H	1.9	7.7	20.66	33
1907.6	14.95	1.5	0	V	1.9	7.7	20.75	33

EIRP For HSDPA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1852.4	13.86	1.5	0	H	1.9	7.7	19.66	33
1852.4	14.35	1.5	0	V	1.9	7.7	20.15	33
Middle Channel								
1880.0	13.65	1.5	0	H	1.9	7.7	19.45	33
1880.0	14.21	1.5	0	V	1.9	7.7	20.01	33
High Channel								
1907.6	13.76	1.5	0	H	1.9	7.7	19.56	33
1907.6	14.36	1.5	0	V	1.9	7.7	20.16	33

EIRP For HSUPA Mode Band 2

Frequency	Substitute SG	Height	Table	Polar	Cable loss	Antenna Gain	Result	FCC Part 24E Limit
MHz	dBm	Meter	Degree	H / V	dB	dB	dBm	dBm
Low Channel								
1852.4	13.65	1.5	0	H	1.9	7.7	19.45	33
1852.4	14.12	1.5	0	V	1.9	7.7	19.92	33
Middle Channel								
1880.0	14.32	1.5	0	H	1.9	7.7	20.12	33
1880.0	14.46	1.5	0	V	1.9	7.7	20.26	33
High Channel								
1907.6	13.63	1.5	0	H	1.9	7.7	19.43	33
1907.6	14.11	1.5	0	V	1.9	7.7	19.91	33

Note: Result = Substitute - Cable loss + Antenna Gain

Max. Conducted Output Power

For WCDMA Band 5

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 22.913 Limit (dBm)
WCDMA	Low Channel	826.4	22.72	38.45
	Middle Channel	836.6	22.54	38.45
	High Channel	846.6	22.78	38.45
HSDPA	Low Channel	826.4	21.53	38.45
	Middle Channel	836.6	21.56	38.45
	High Channel	846.6	21.56	38.45
HSUPA	Low Channel	826.4	21.58	38.45
	Middle Channel	836.6	21.51	38.45
	High Channel	846.6	21.67	38.45

For WCDMA Band 2

Test Mode	Channel	Frequency (MHz)	Average Power (dBm)	FCC Part 24.232 Limit (dBm)
WCDMA	Low Channel	1852.4	23.61	33.00
	Middle Channel	1880.0	22.74	33.00
	High Channel	1907.6	21.92	33.00
HSDPA	Low Channel	1852.4	22.56	33.00
	Middle Channel	1880.0	21.72	33.00
	High Channel	1907.6	20.88	33.00
HSUPA	Low Channel	1852.4	22.60	33.00
	Middle Channel	1880.0	21.75	33.00
	High Channel	1907.6	20.88	33.00

4. Peak-to-average Ratio(PAR) of Transmitter

4.1 Standard Applicable

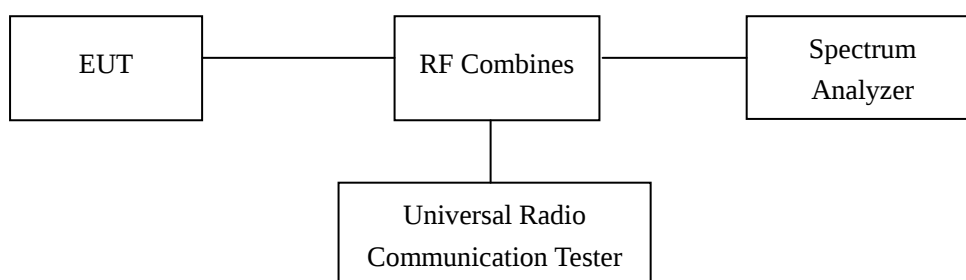
According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in 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.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

4.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:



4.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results

For WCDMA Band II

Test Mode	Channel	Frequency (MHz)	PAR(dB)	Limited (dB)
WCDMA	9262	1852.4	2.77	13
	9400	1880.0	2.87	13
	9538	1907.6	2.55	13
HSDPA	9262	1852.4	3.62	13
	9400	1880.0	3.60	13
	9538	1907.6	3.46	13
HSUPA	9262	1852.4	3.64	13
	9400	1880.0	3.59	13
	9538	1907.6	3.46	13

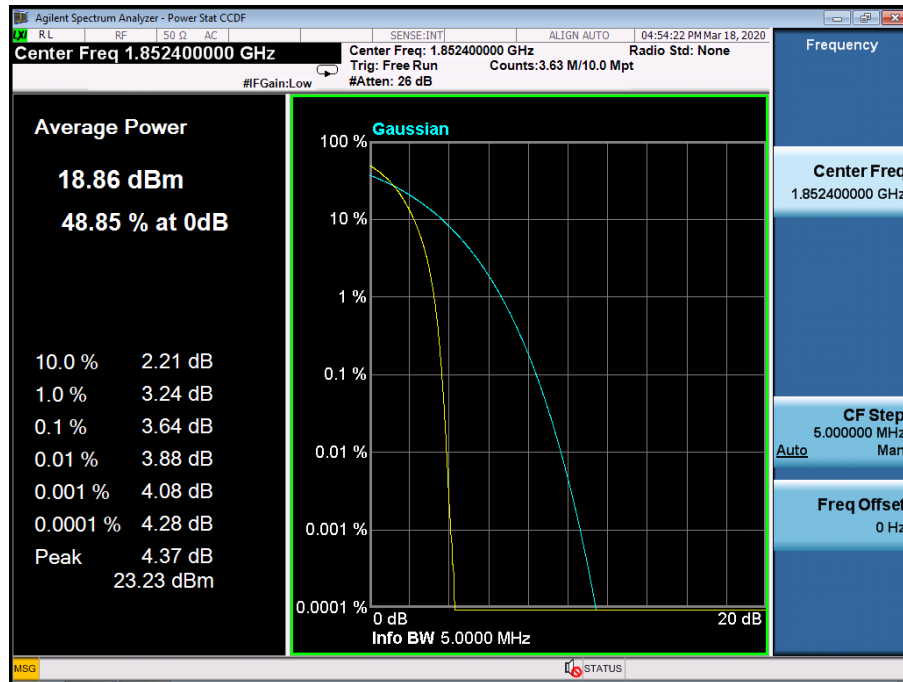
For WCDMA Band V

Test Mode	Channel	Frequency (MHz)	PAR(dB)	Limited (dB)
WCDMA	4132	826.4	2.62	13
	4175	836.6	2.93	13
	4233	846.6	2.51	13
HSDPA	4132	826.4	3.37	13
	4175	836.6	3.62	13
	4233	846.6	3.42	13
HSUPA	4132	826.4	3.39	13
	4175	836.6	3.59	13
	4233	846.6	3.41	13

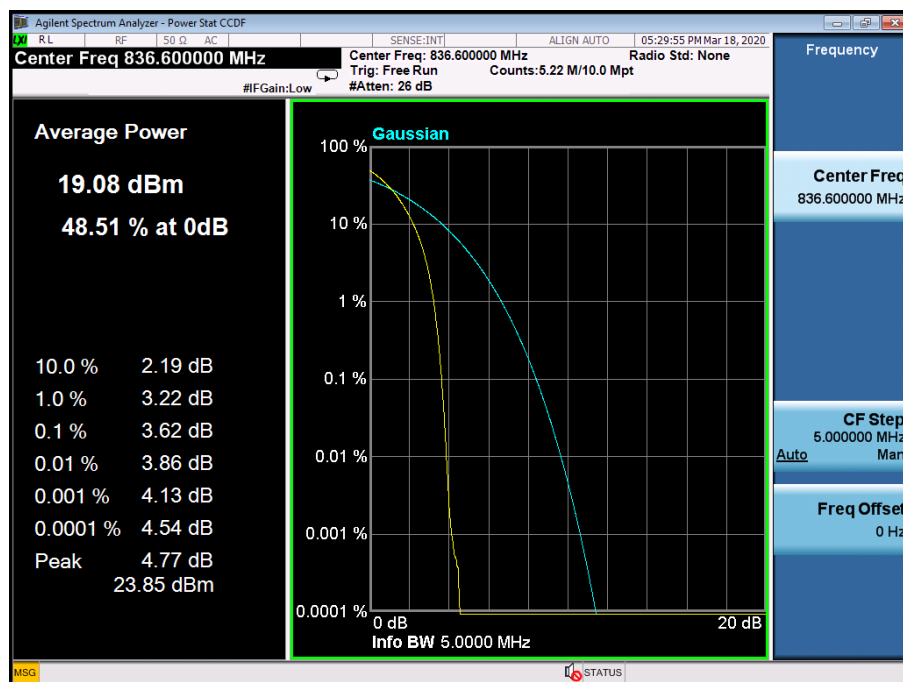


All modulations of EUT have been tested, but only show the test data of the worst case in this report.

WCDMA Band II Low Channel



For WCDMA Band V Middle Channel



5. Emission Bandwidth

5.1 Standard Applicable

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

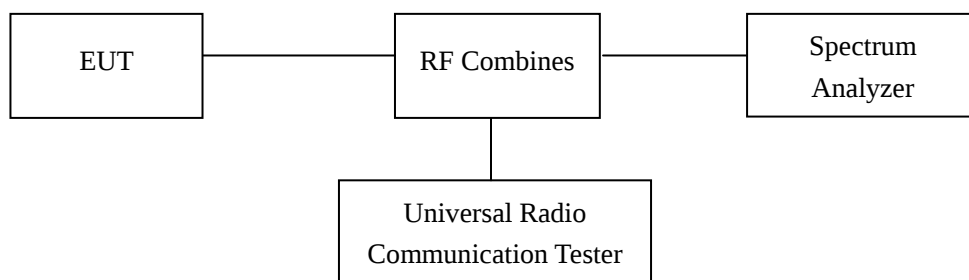
According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



5.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

For Band 5

Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	4132	826.4	4159	4691
	4183	836.6	4171	4685
	4233	846.6	4162	4714
HSDPA	4132	826.4	4150	4670
	4183	836.6	4141	4661
	4233	846.6	4167	4710
HSUPA	4132	826.4	4157	4662
	4183	836.6	4153	4696
	4233	846.6	4173	4670

For Band 2

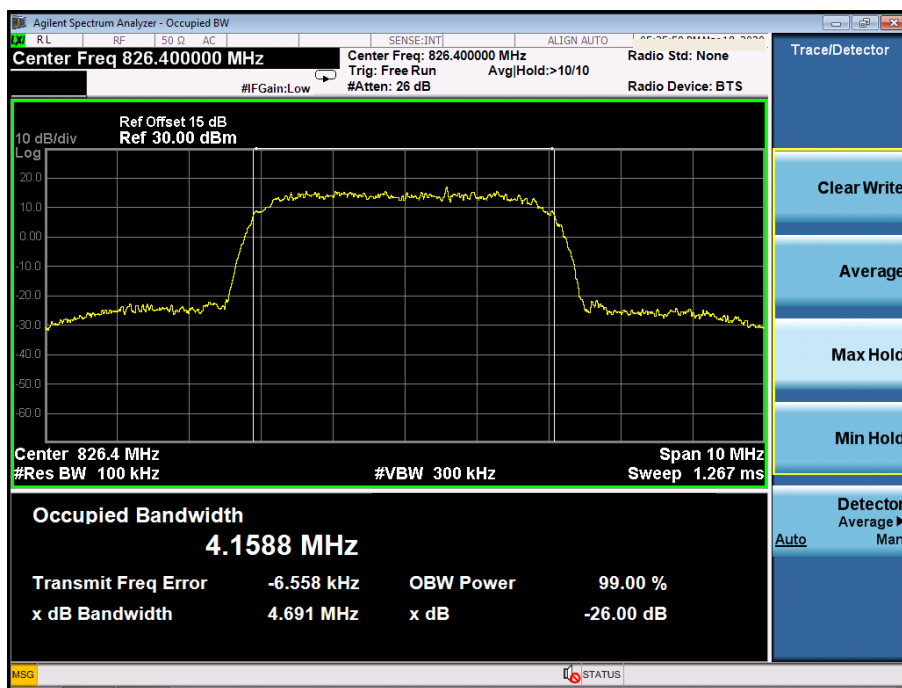
Test Mode	Channel	Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA	9262	1852.4	4172	4694
	9400	1880.0	4161	4676
	9538	1907.6	4163	4723
HSDPA	9262	1852.4	4184	4679
	9400	1880.0	4176	4702
	9538	1907.6	4178	4678
HSUPA	9262	1852.4	4173	4691
	9400	1880.0	4156	4673
	9538	1907.6	4161	4682



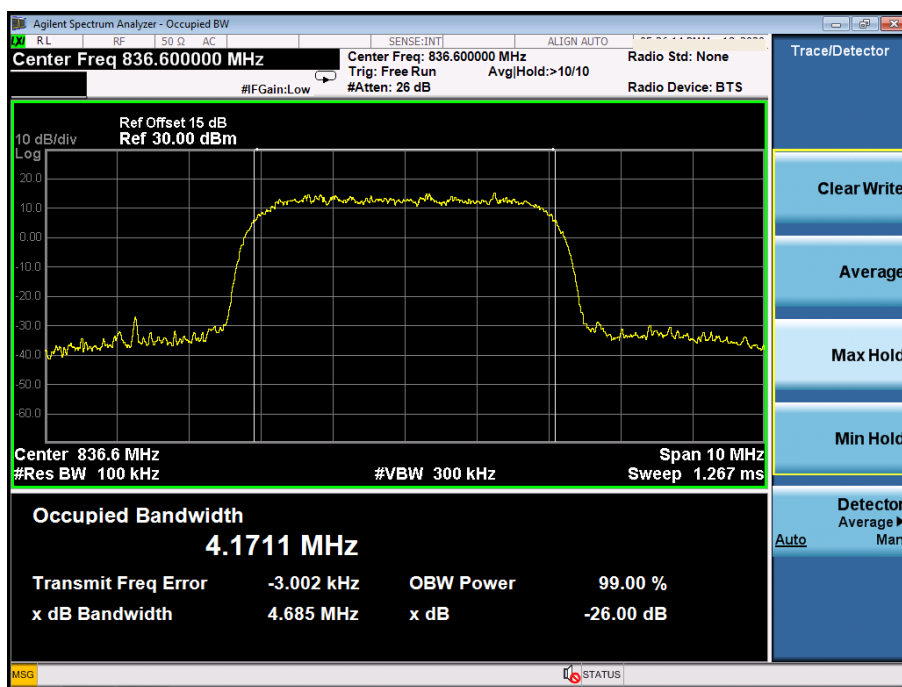
For Cellular Band

For Band V

WCDMA Low Channel

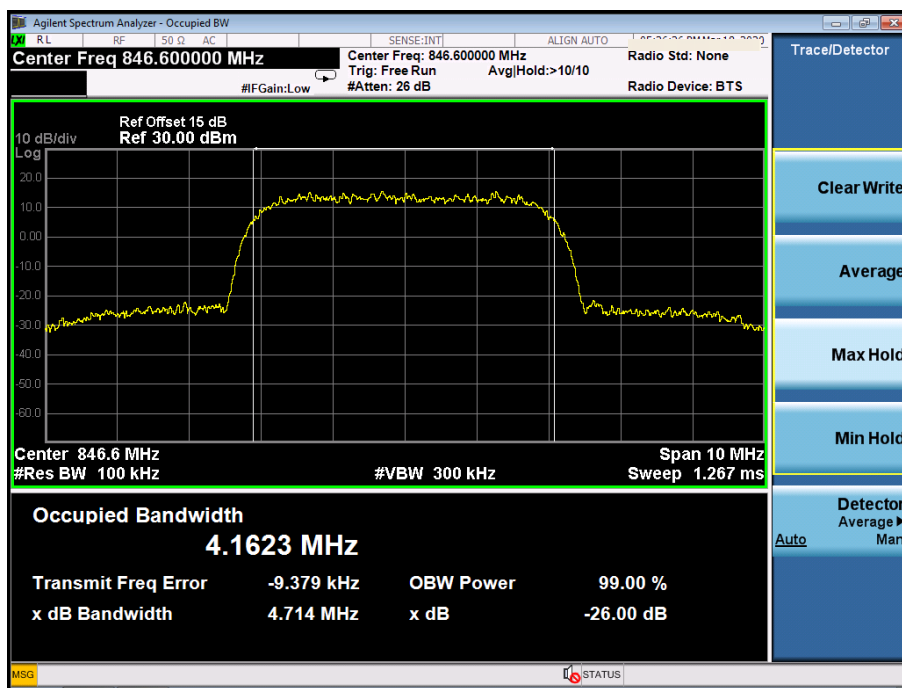


WCDMA Middle Channel

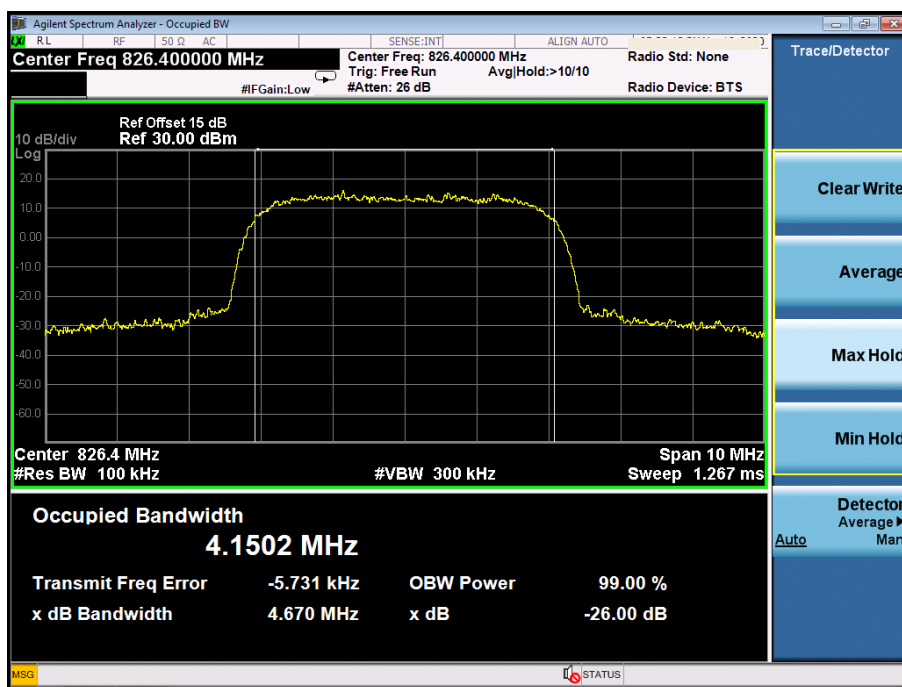




WCDMA High Channel

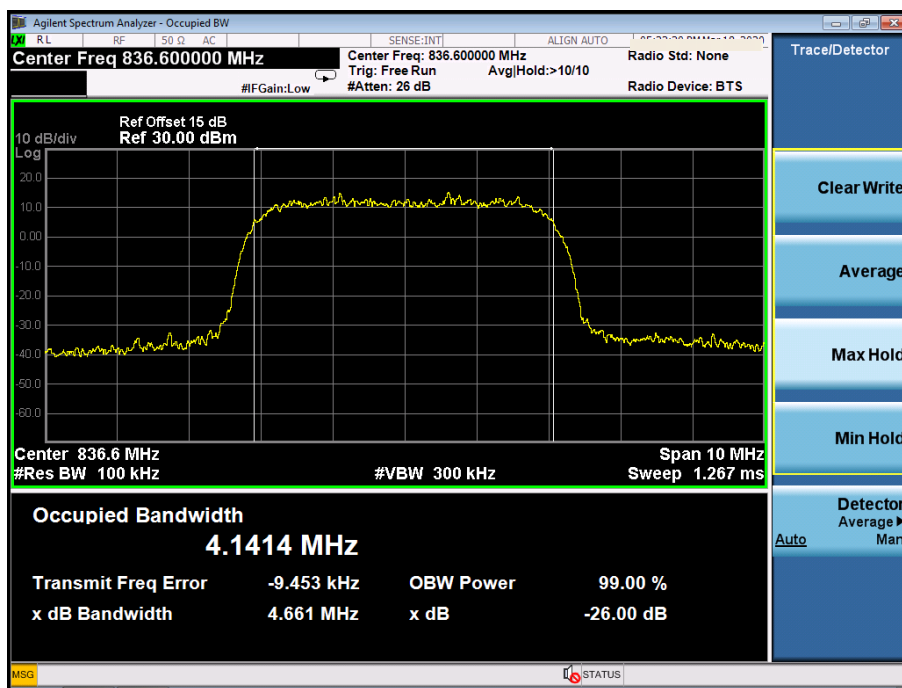


HSDPA Low Channel

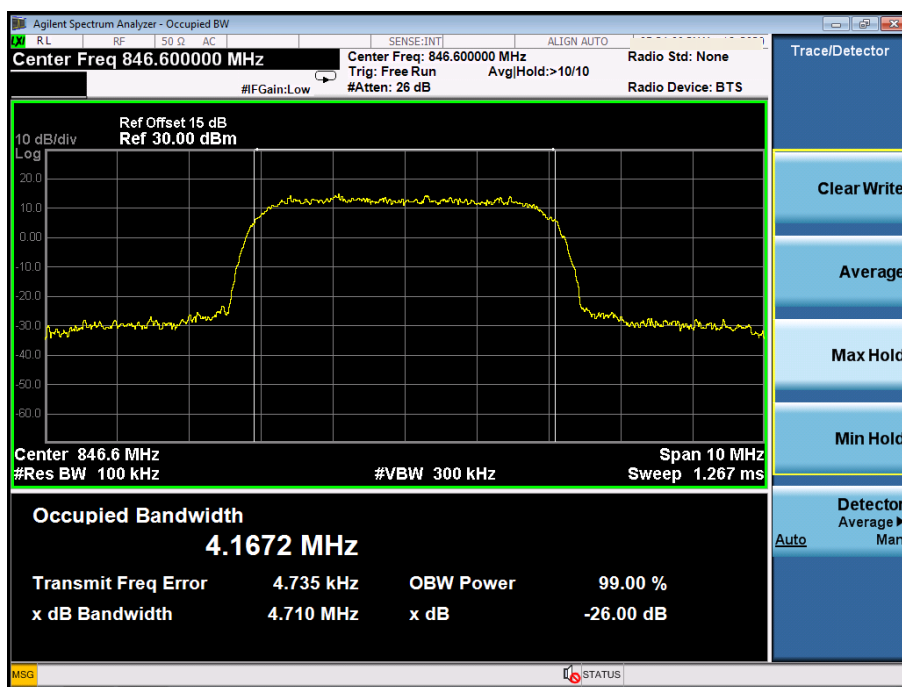




HSDPA Middle Channel

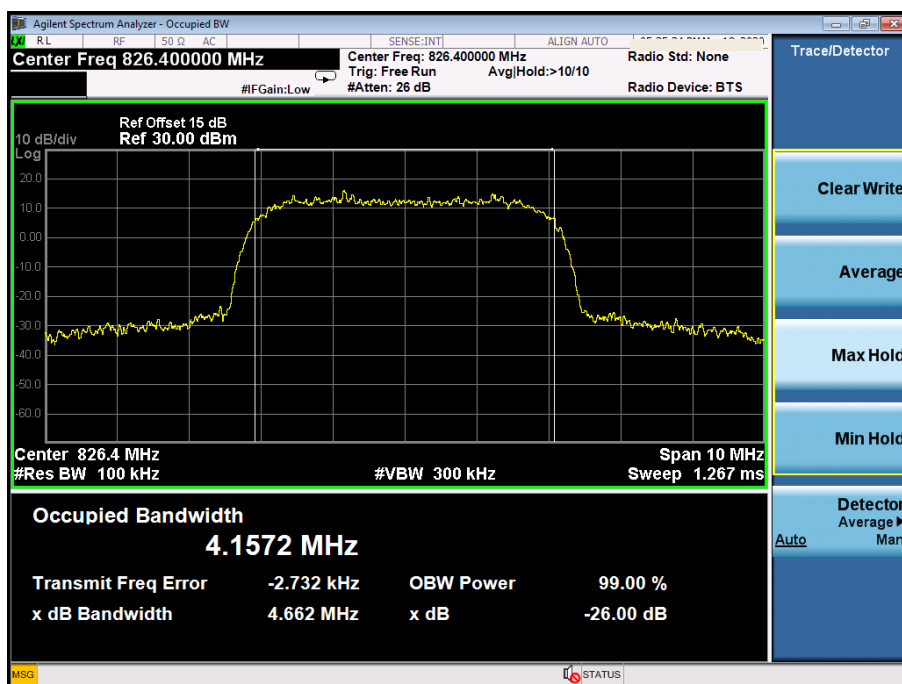


HSDPA High Channel

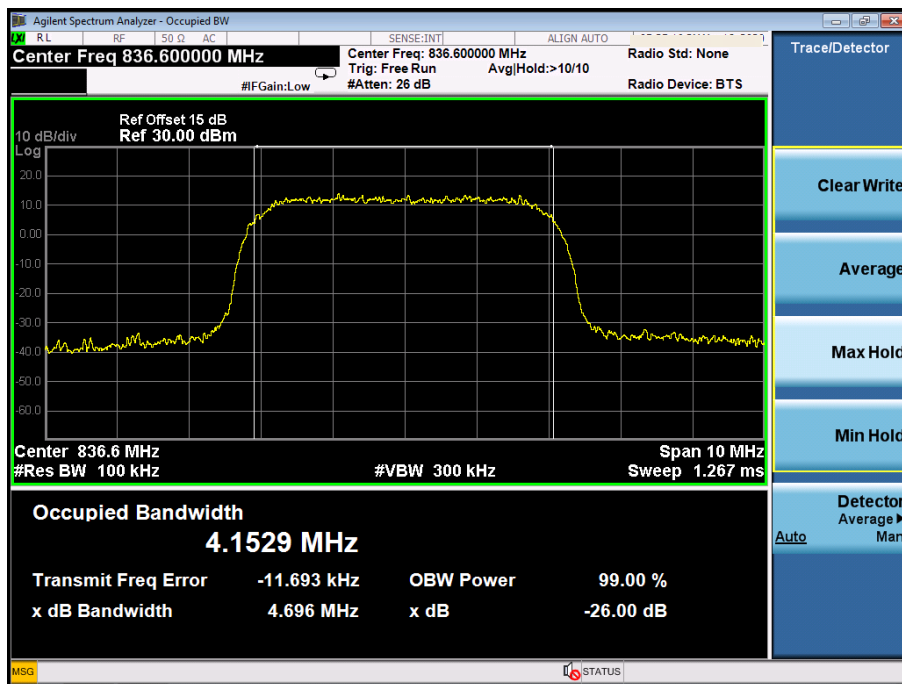




HSUPA Low Channel

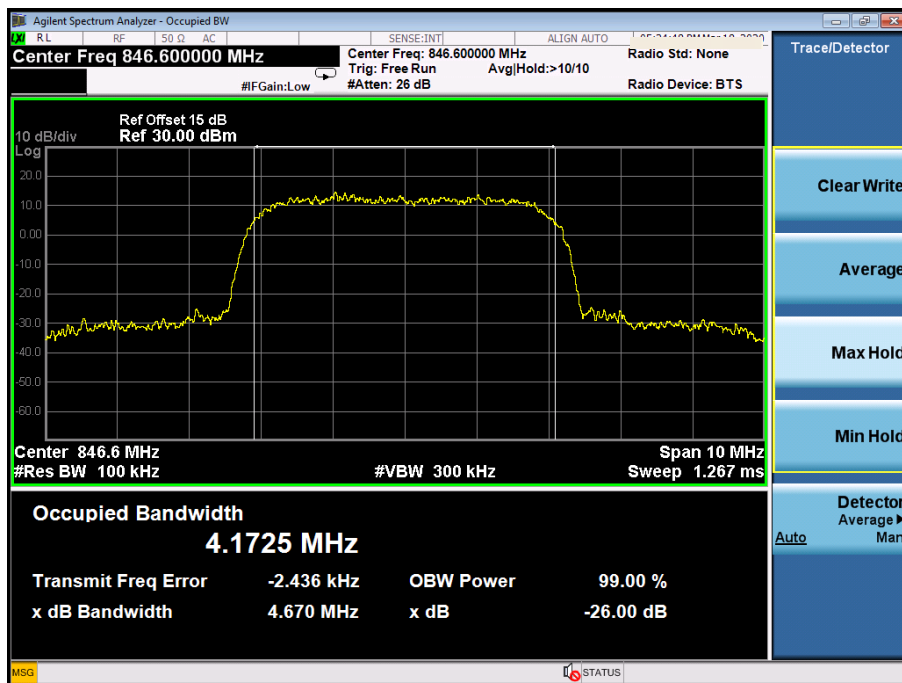


HSUPA Middle Channel



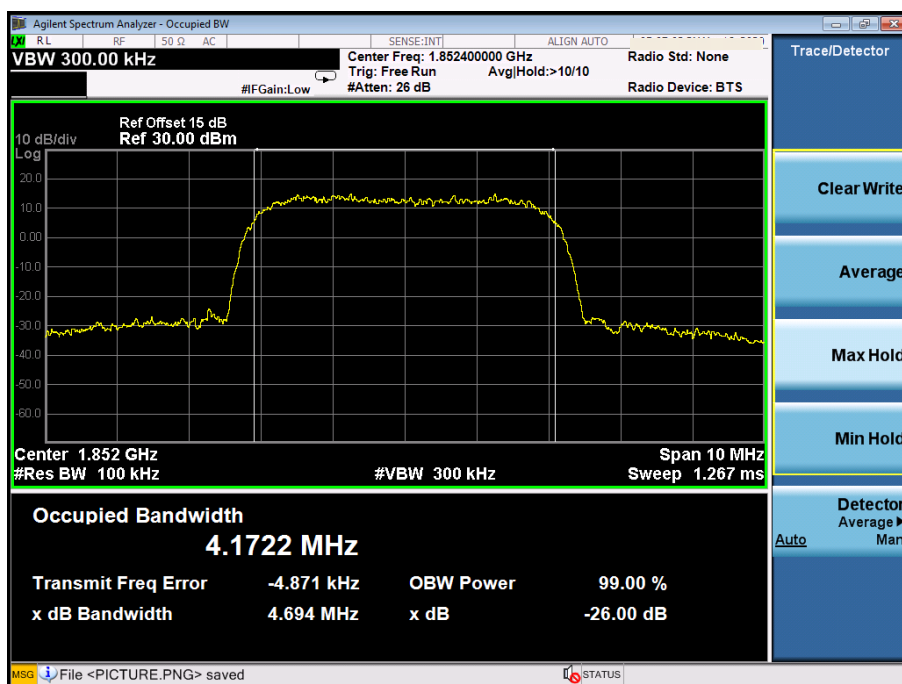


HSUPA High Channel



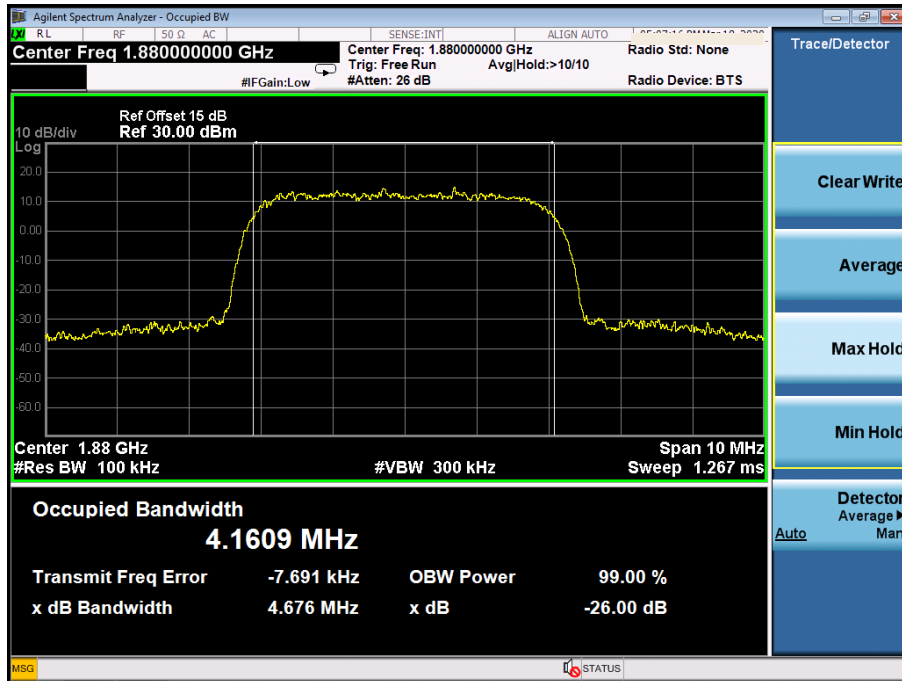
For Band II

WCDMA Low Channel

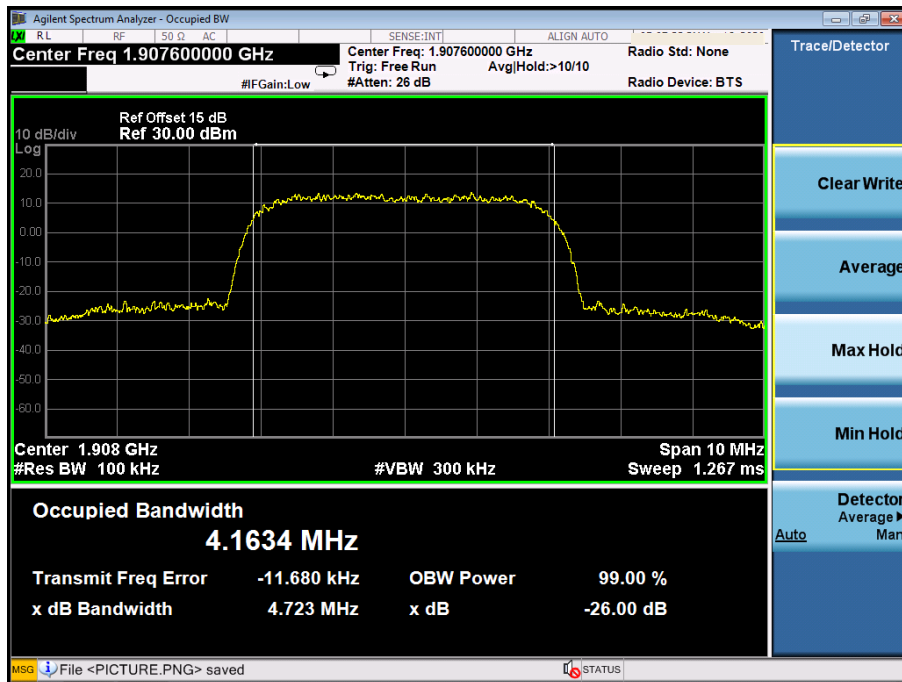




WCDMA Middle Channel

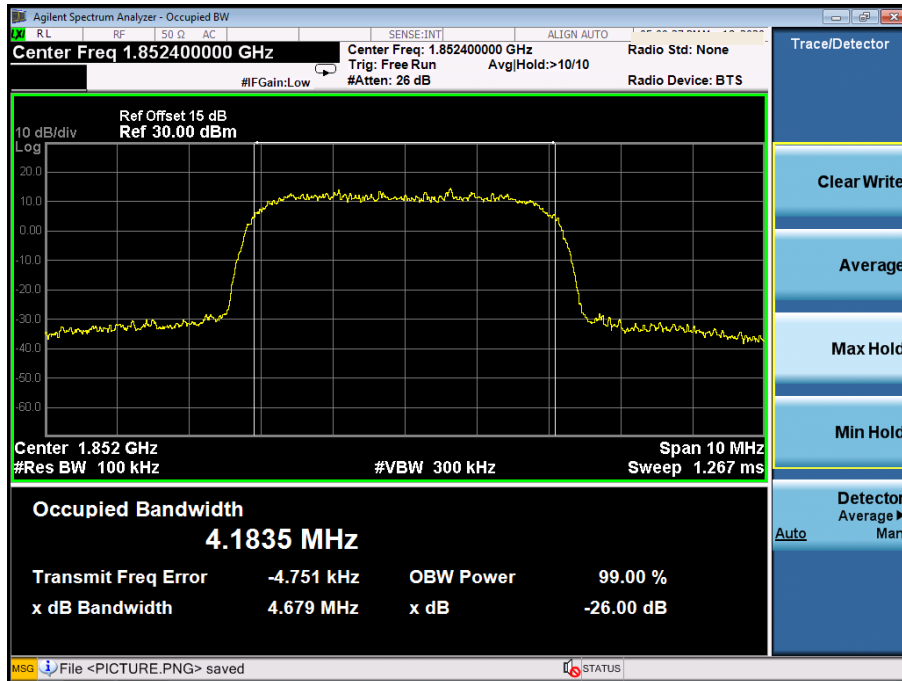


WCDMA High Channel

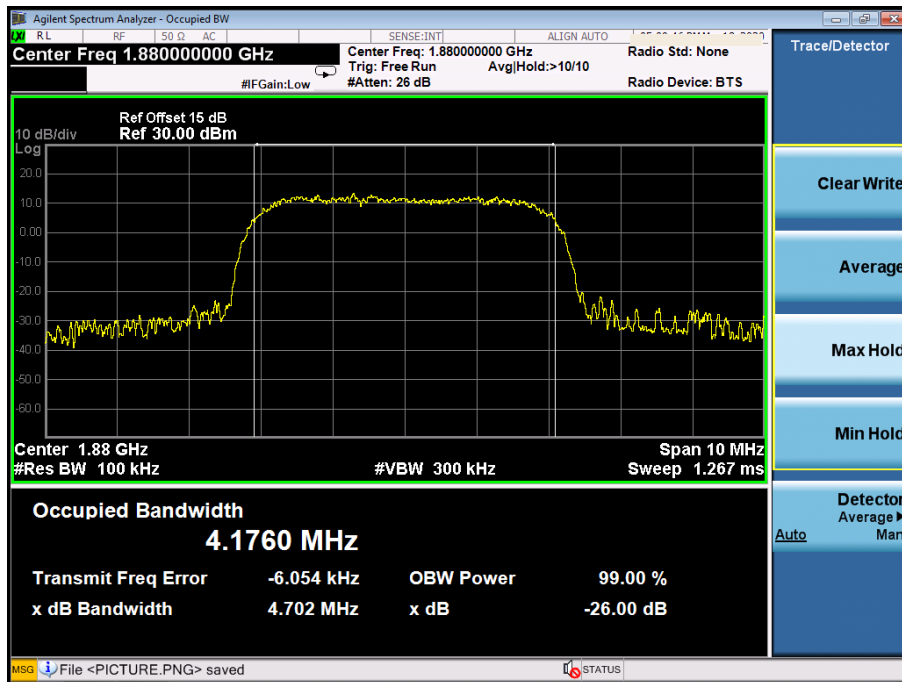




HSDPA Low Channel

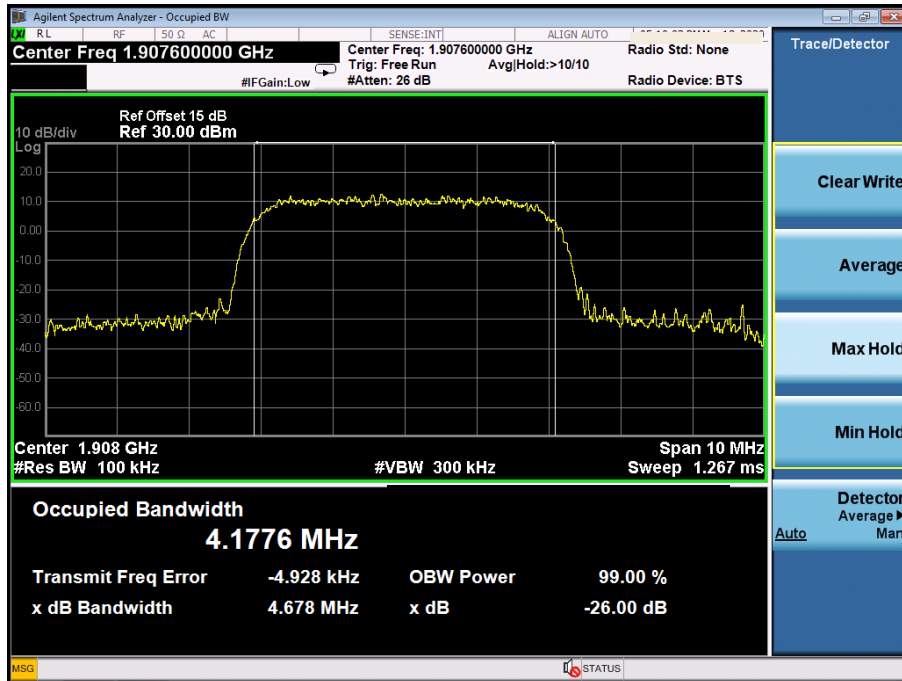


HSDPA Middle Channel

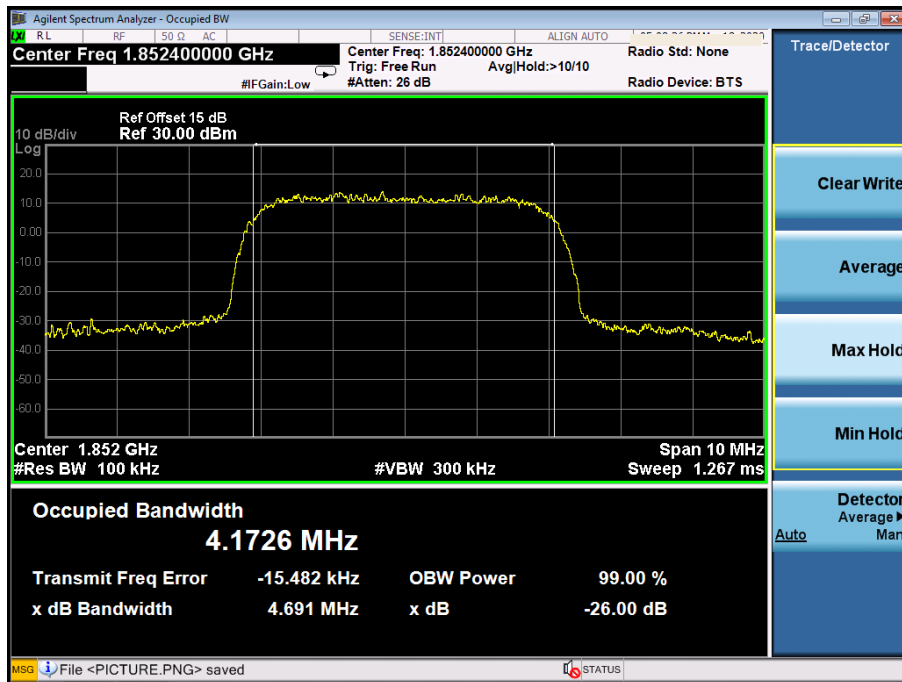




HSDPA High Channel

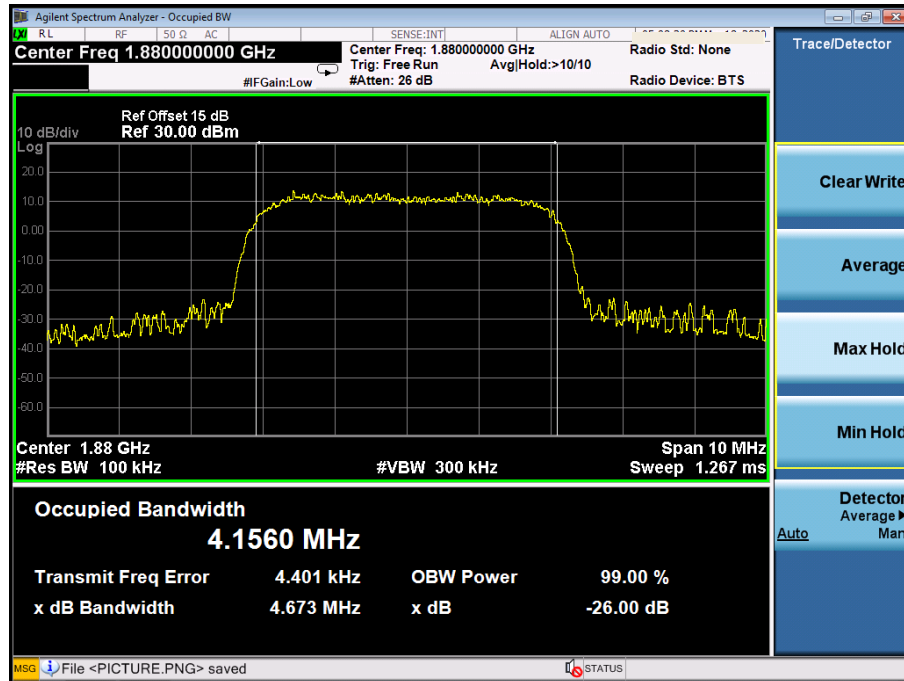


HSUPA Low Channel

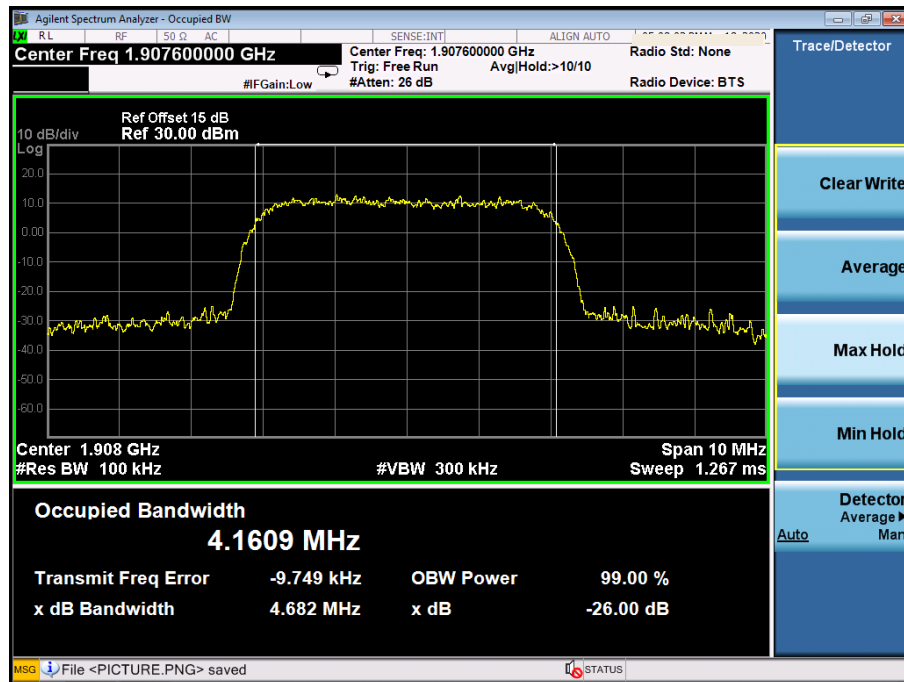




HSUPA Middle Channel



HSUPA High Channel



6. Out of Band Emissions at Antenna Terminal

6.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

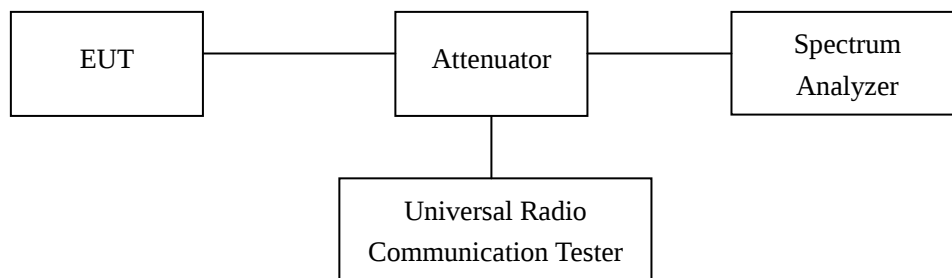
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



6.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

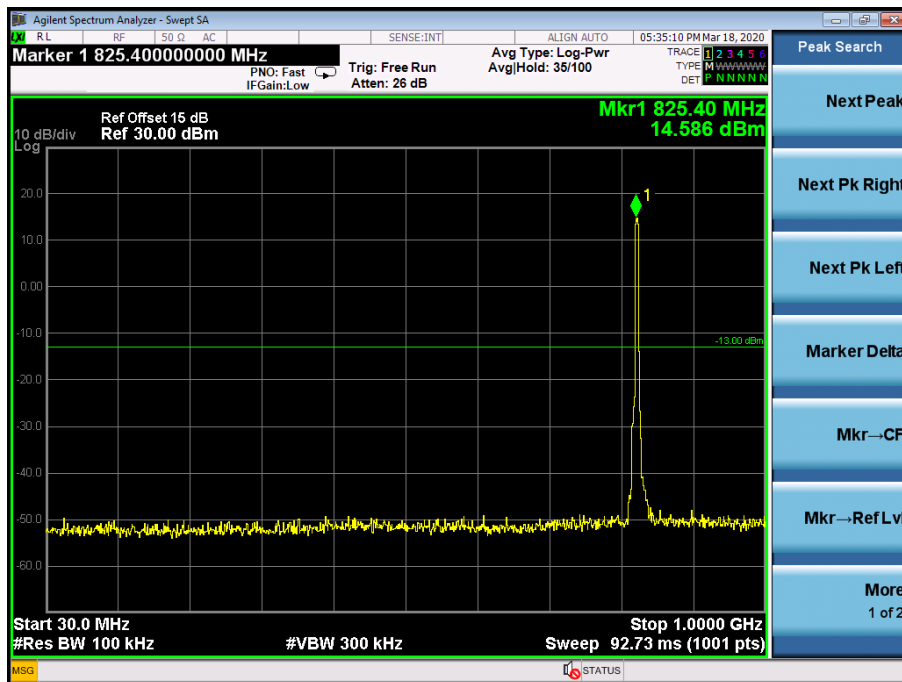


6.4 Summary of Test Results/Plots

Please refer to the following test plots For Cellular Band

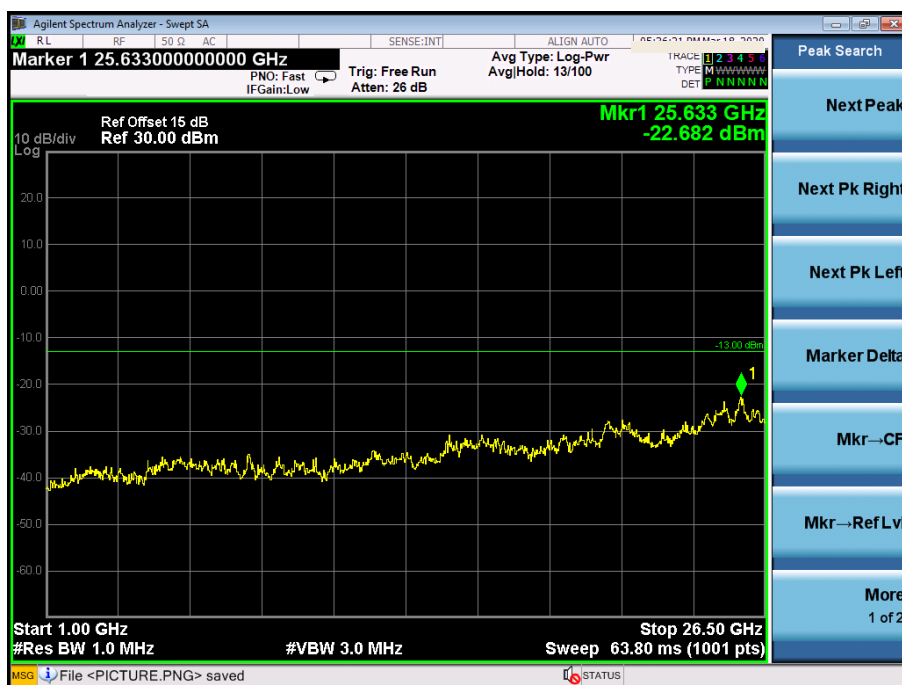
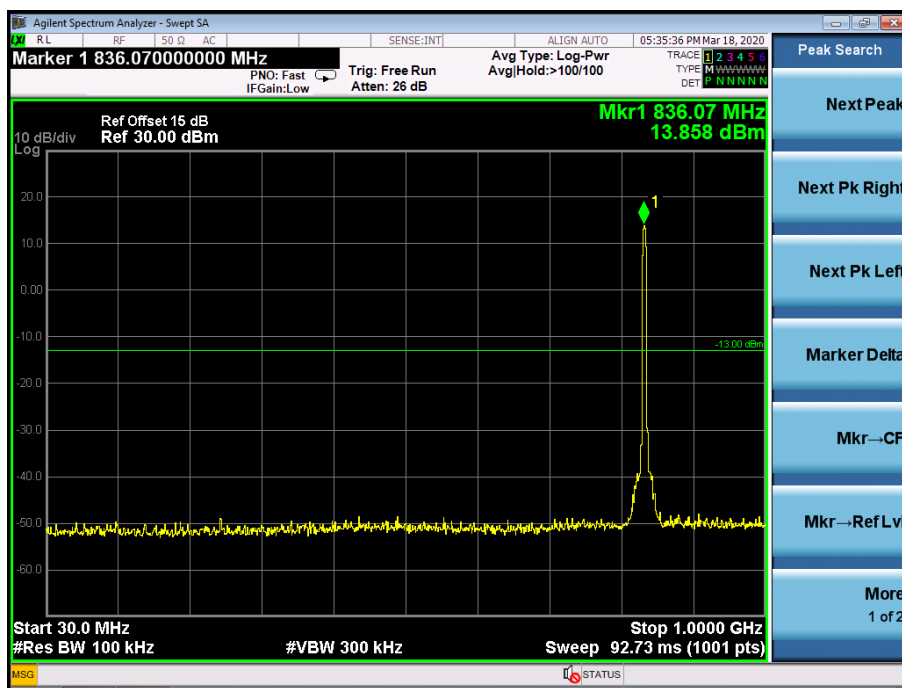
For Band V

WCDMA Low Channel



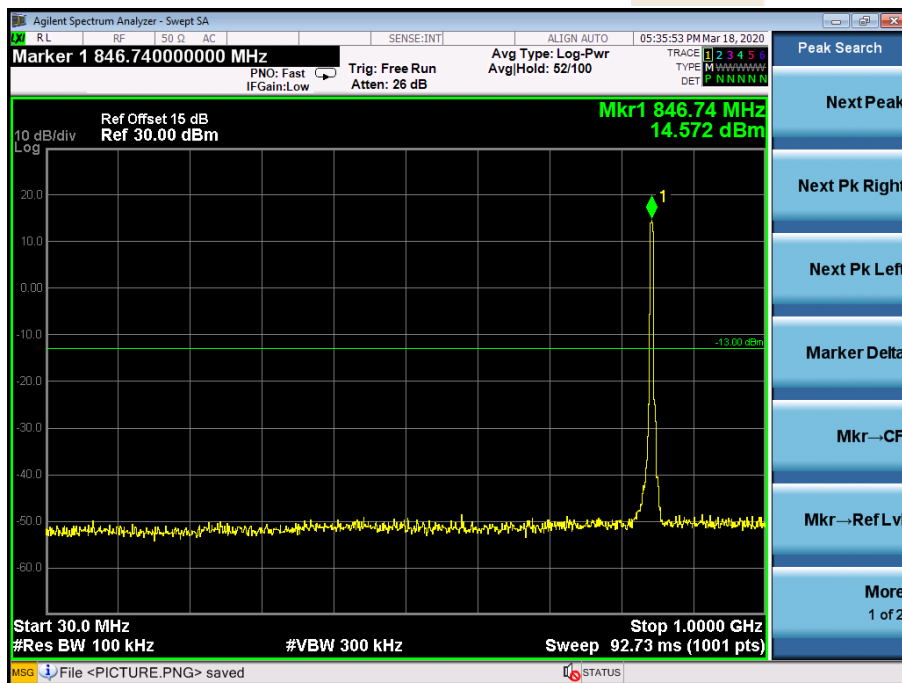


WCDMA Middle Channel

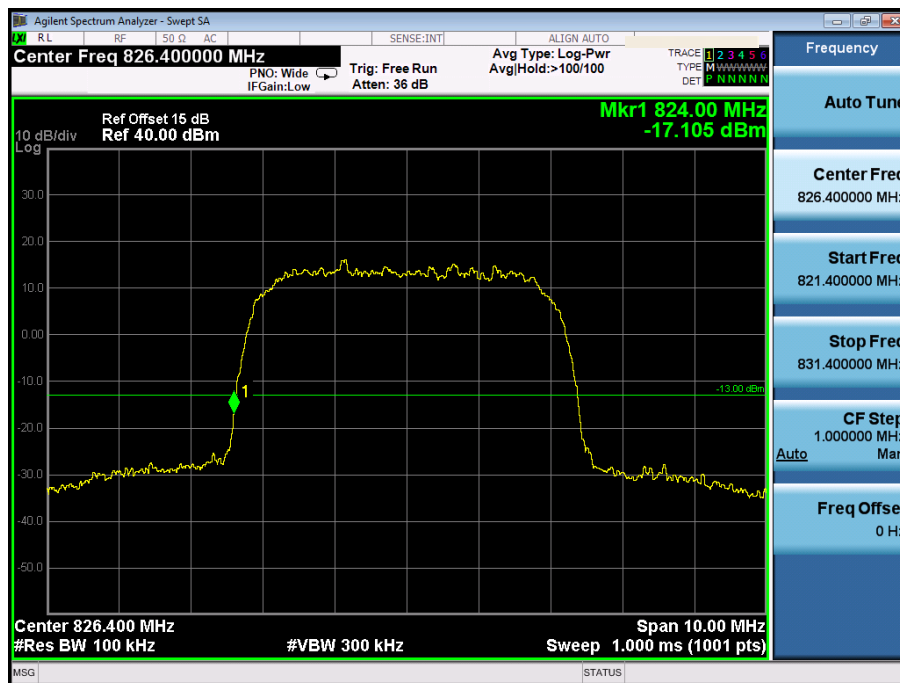




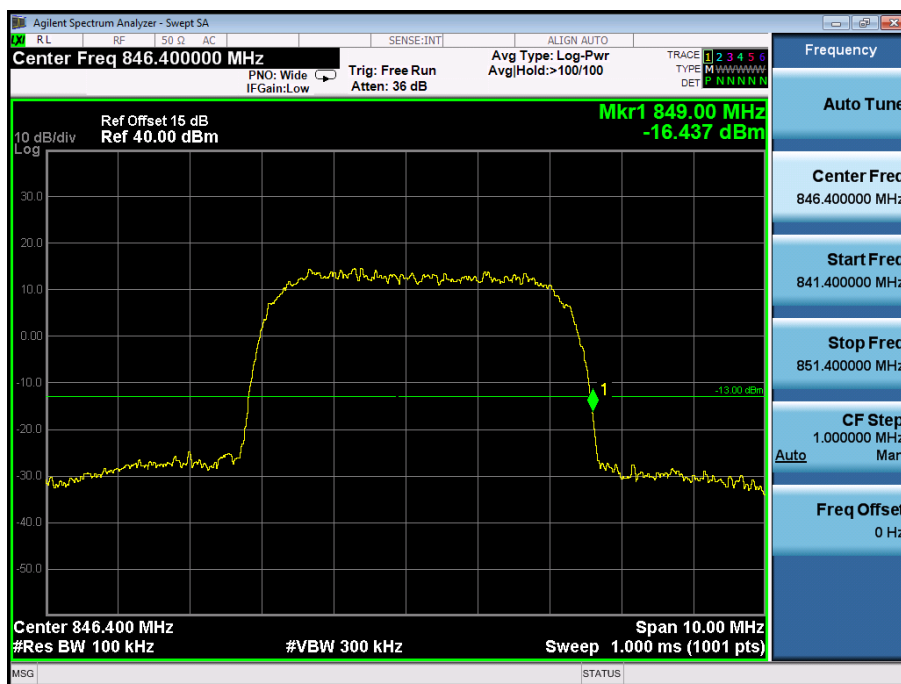
WCDMA High Channel



WCDMA Low Band Spurious Emission

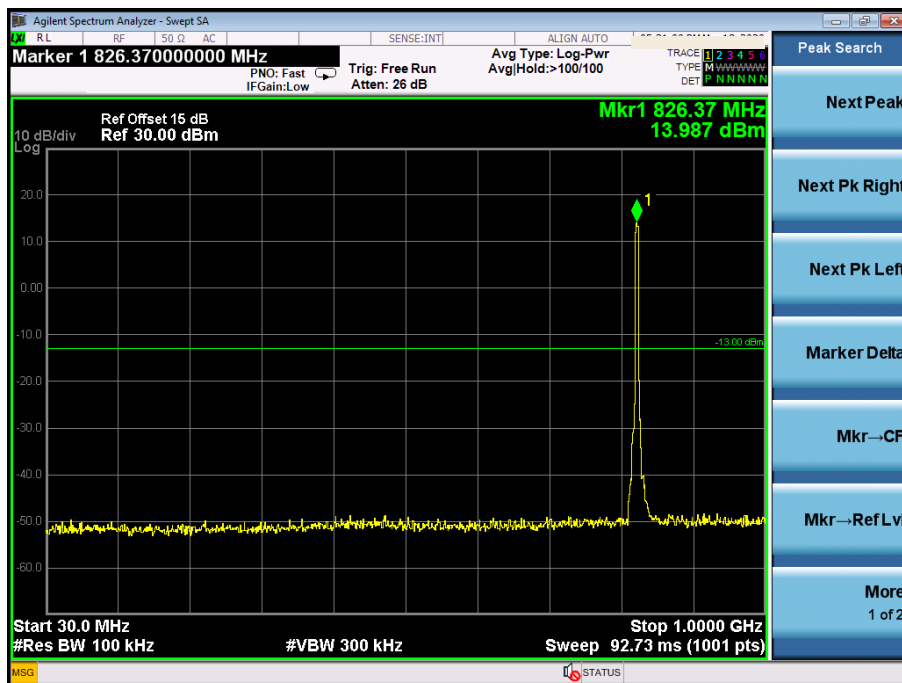


WCDMA High Band Spurious Emission



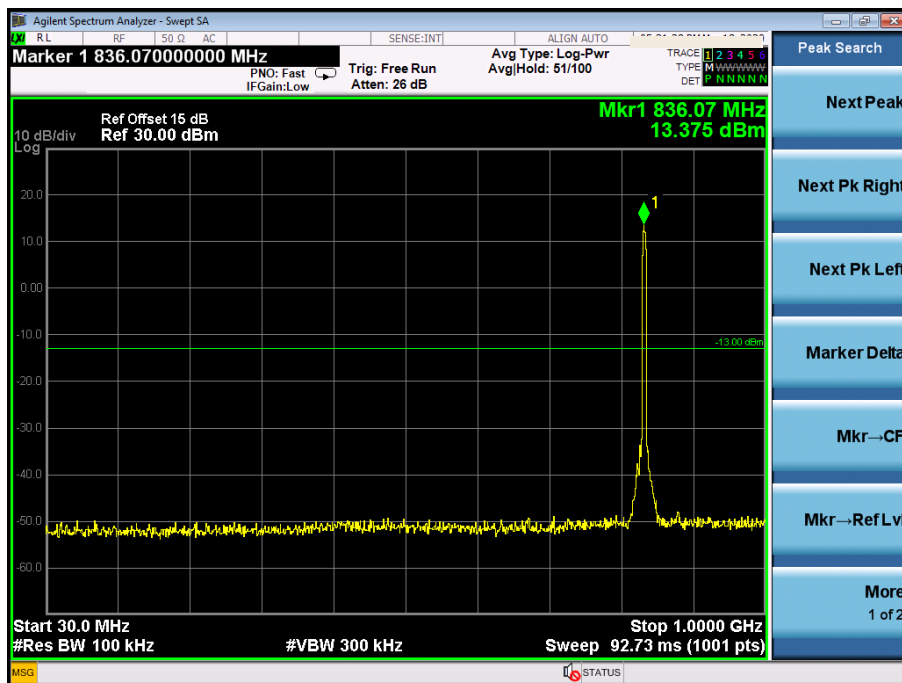


HSDPALow Channel



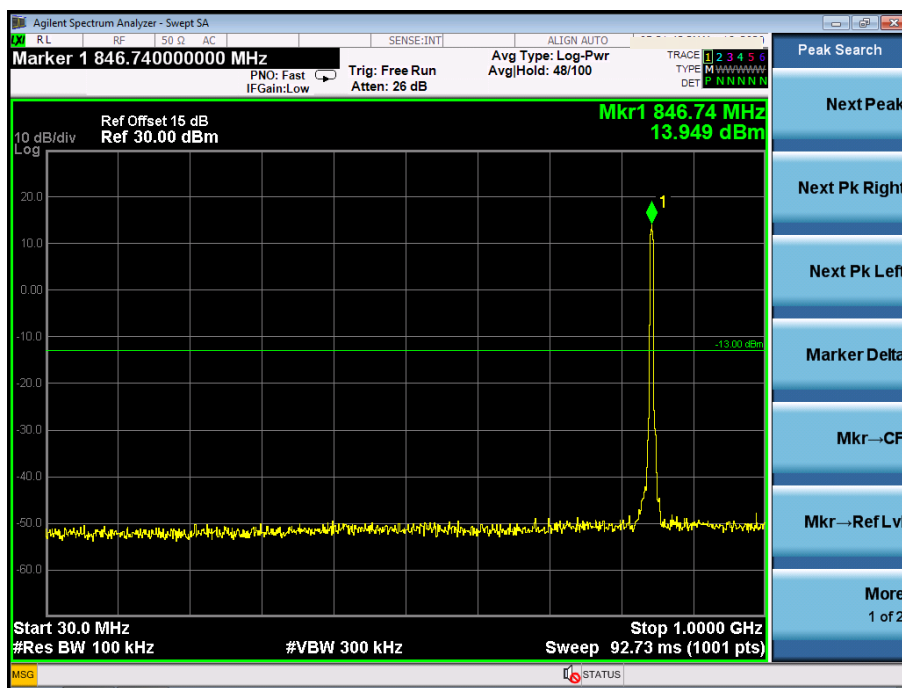


HSDPA Middle Channel



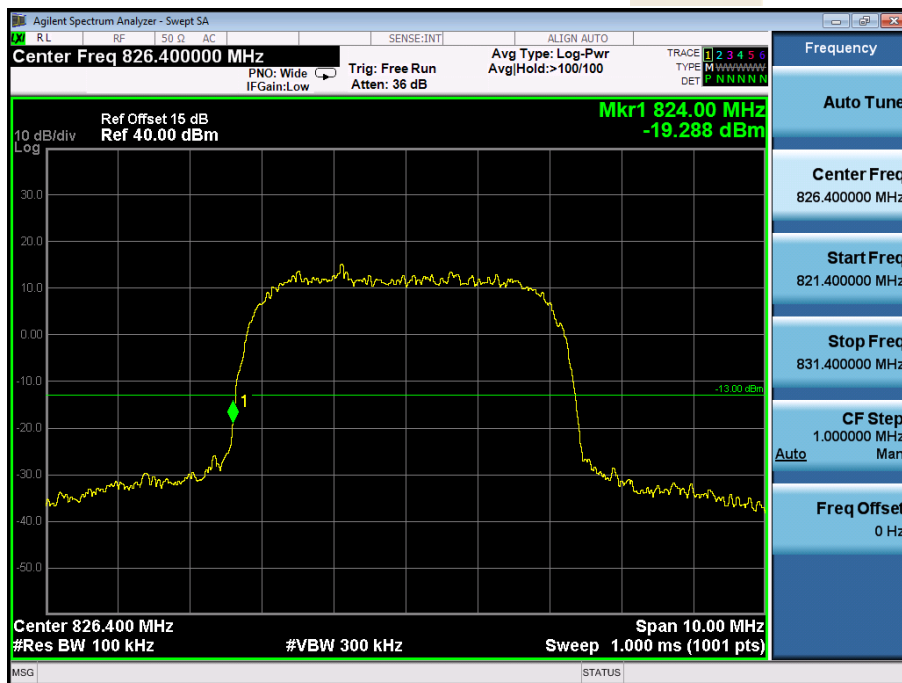


HSDPA High Channel





HSDPA Low Band Spurious Emission

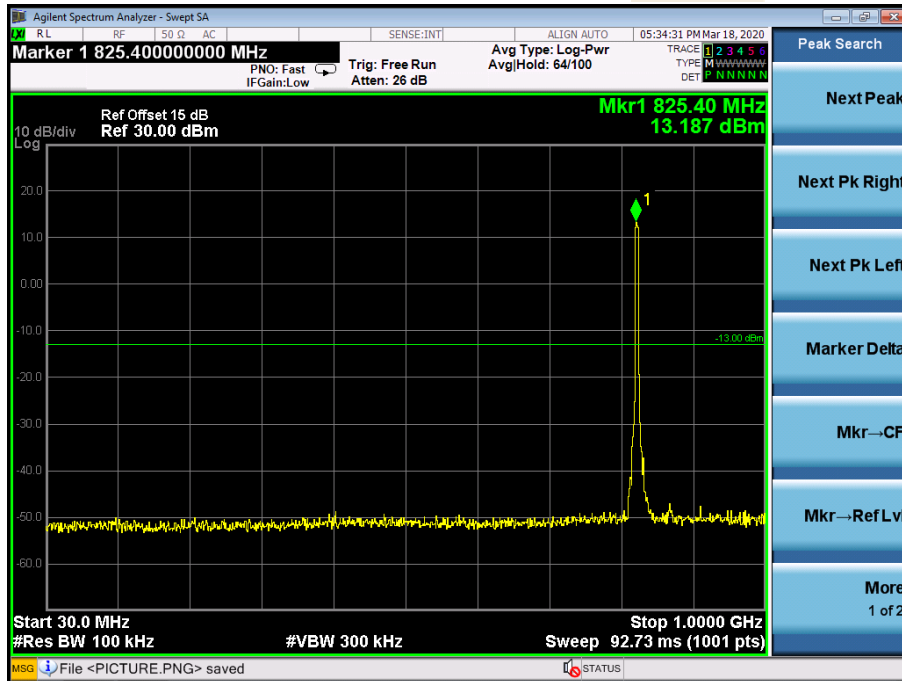


HSDPA High Band Spurious Emission



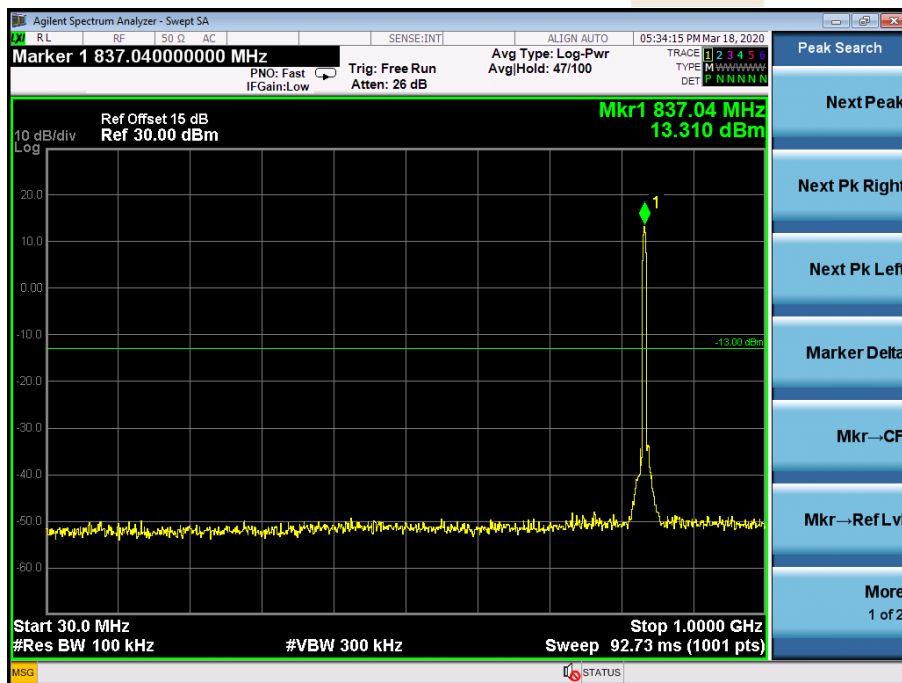


HSUPALow Channel



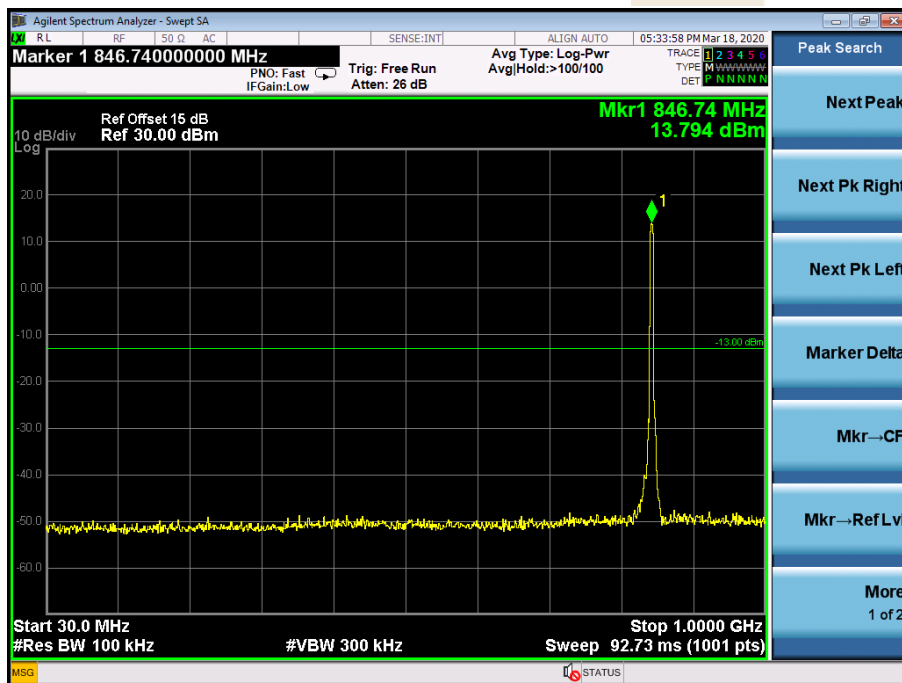


HSUPA Middle Channel



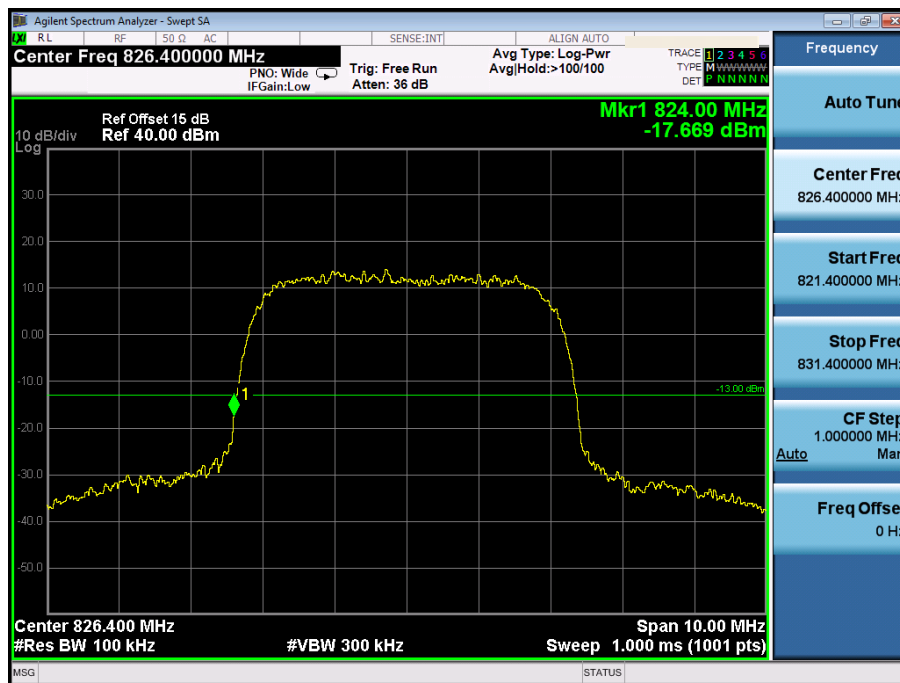


HSUPA High Channel

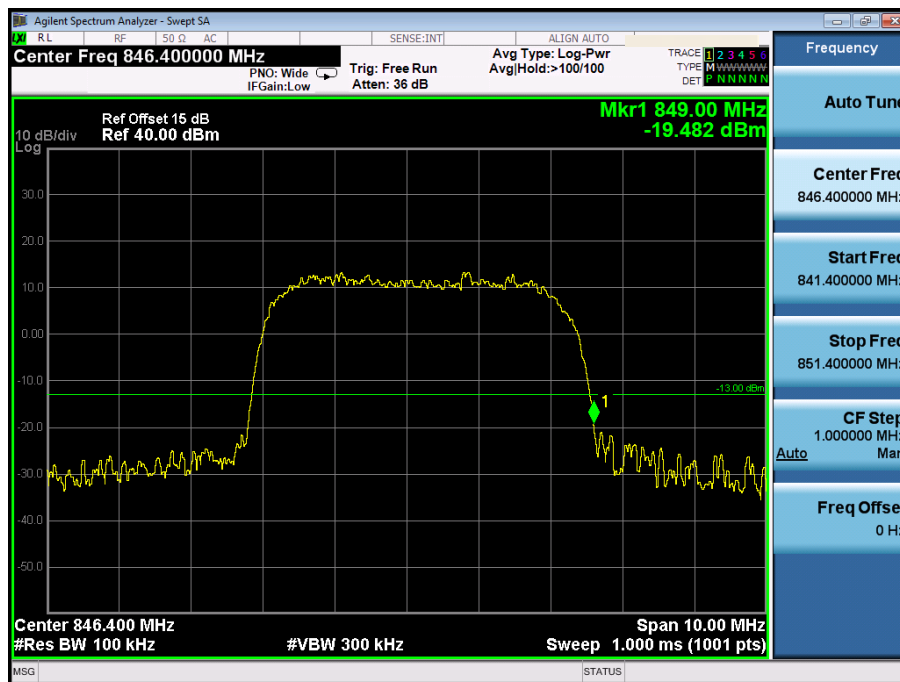




HSUPA Low Band Spurious Emission



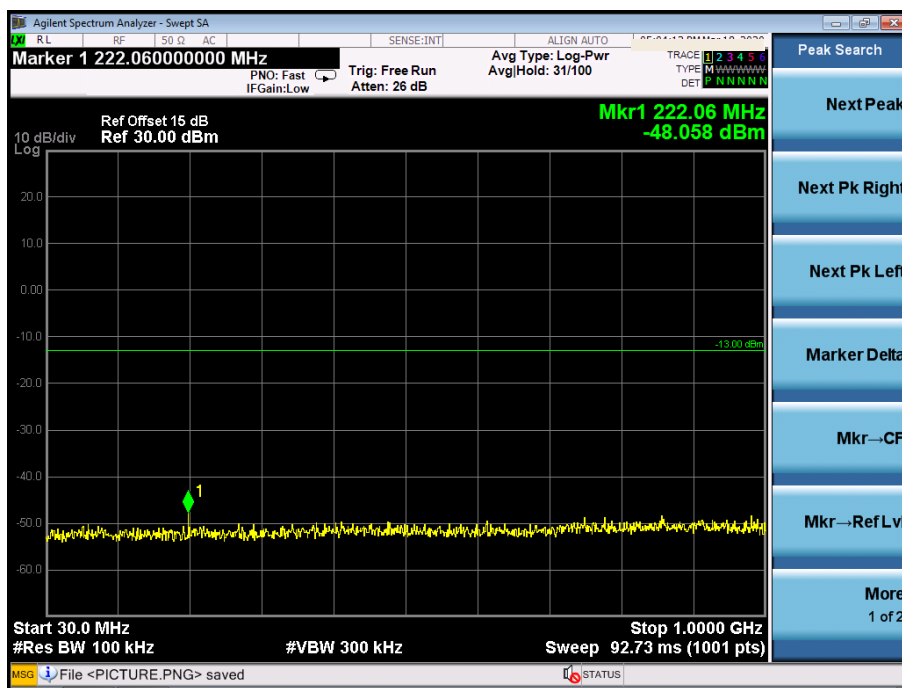
HSUPA High Band Spurious Emission





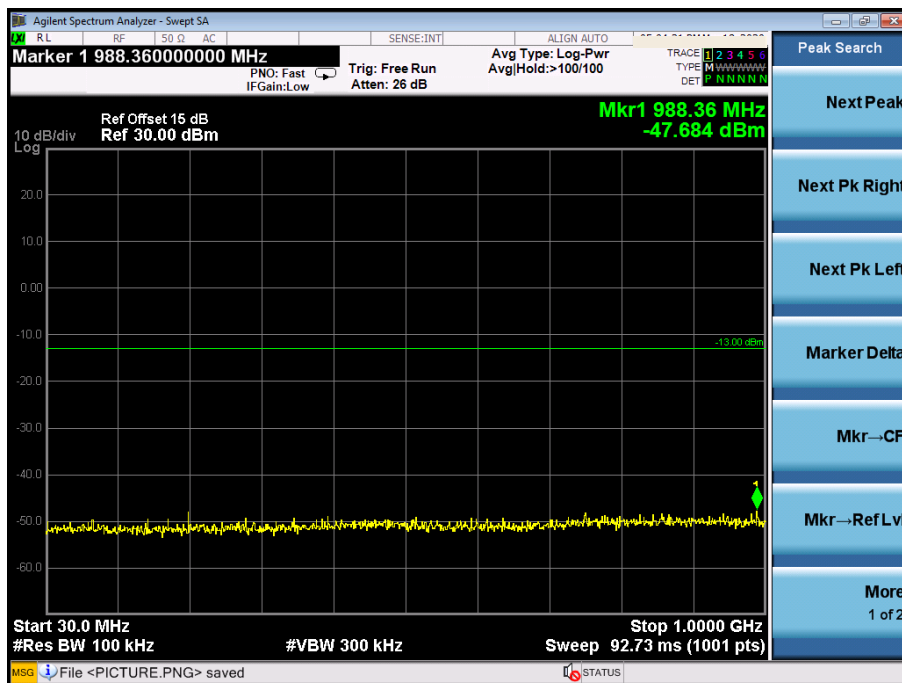
For Band II

WCDMA Low Channel



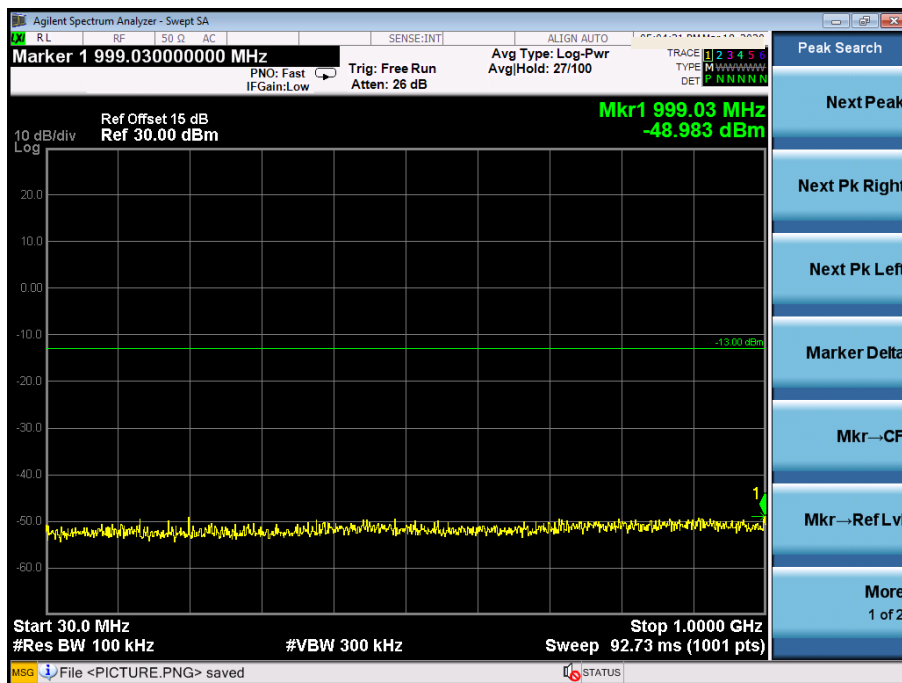


WCDMA Middle Channel



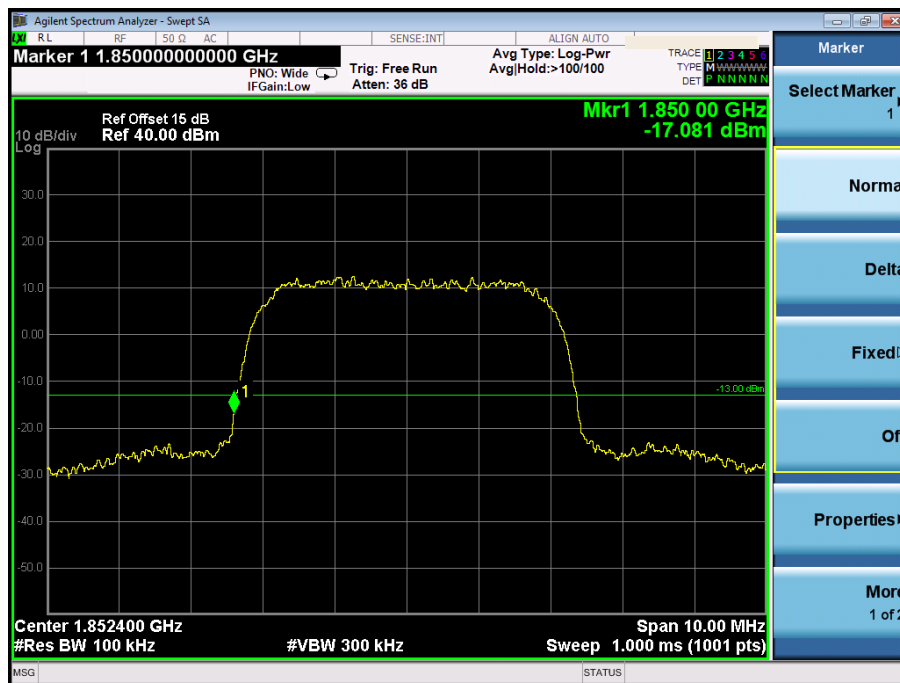


WCDMA High Channel





WCDMA Low Band Spurious Emission

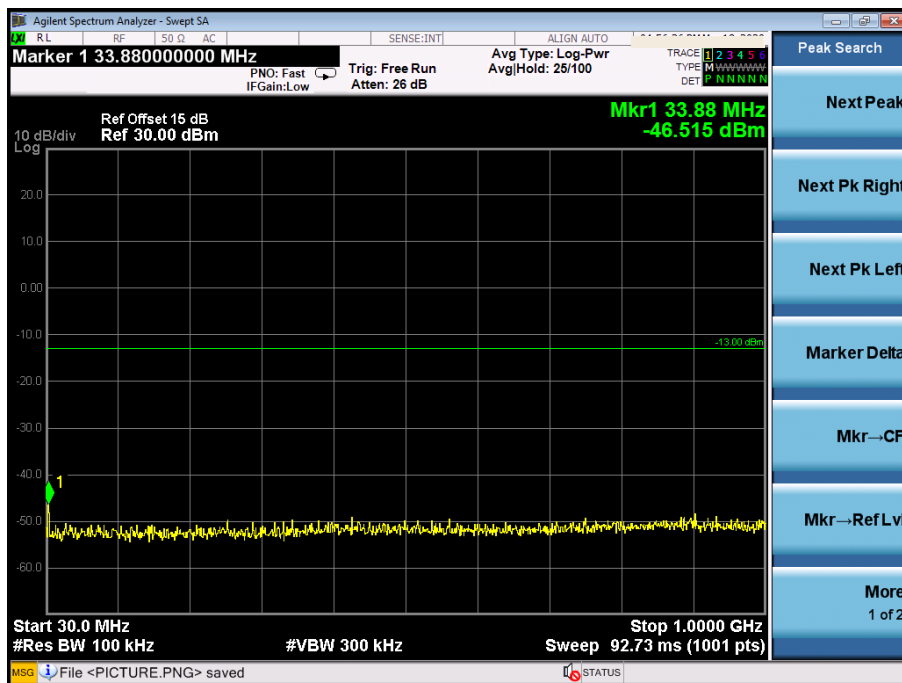


WCDMA High Band Spurious Emission



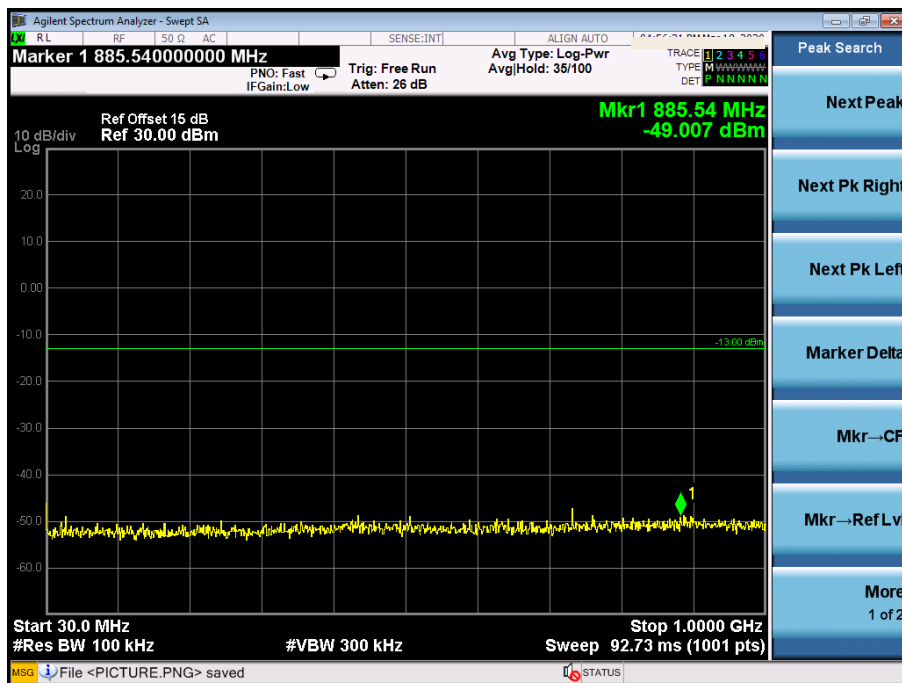


HSDPALow Channel



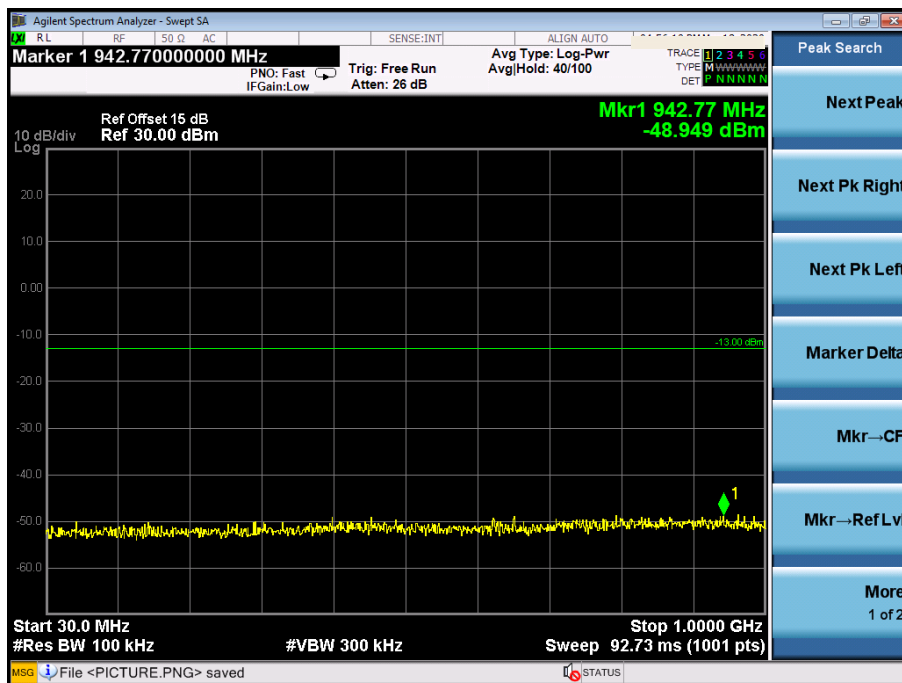


HSDPA Middle Channel





HSDPA High Channel





HSDPA Low Band Spurious Emission

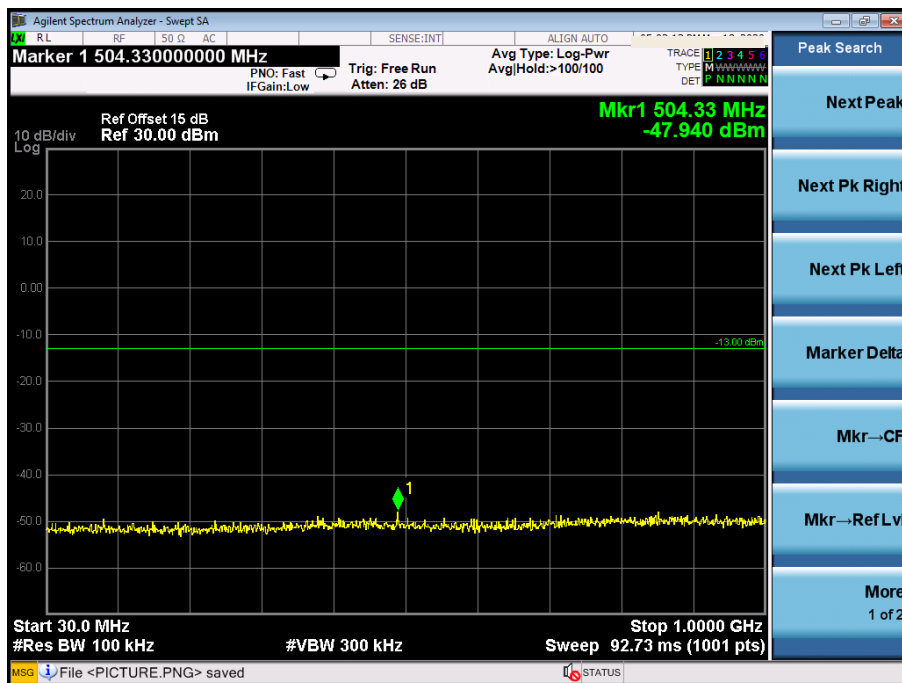


HSDPA High Band Spurious Emission



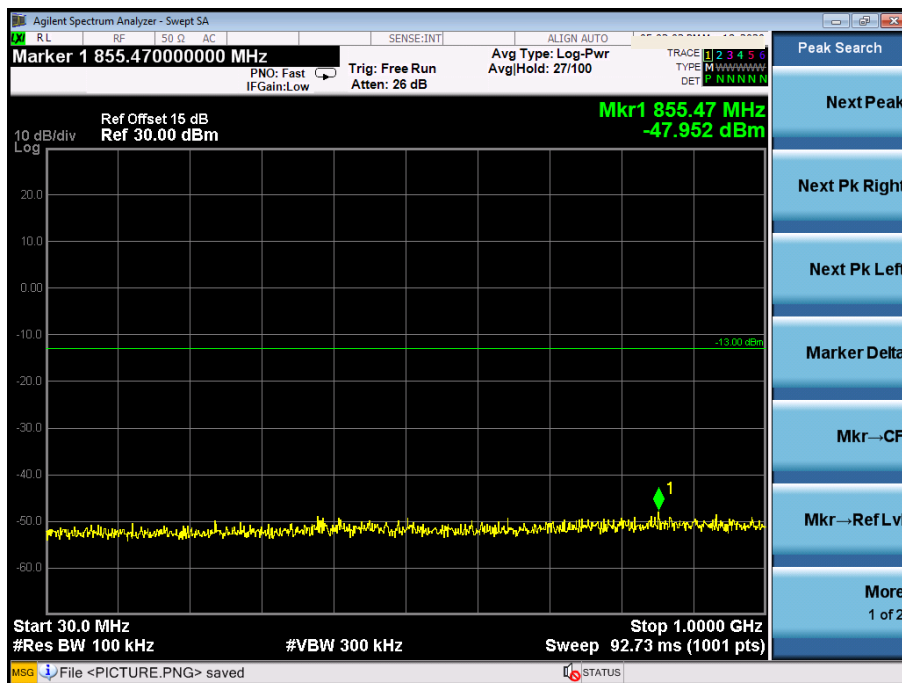


HSUPALow Channel



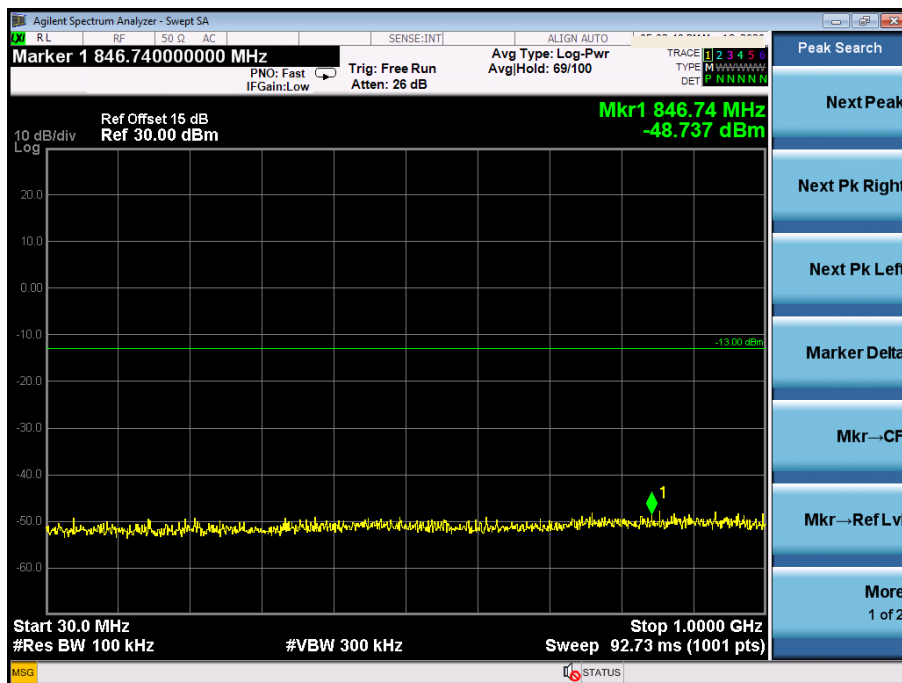


HSUPA Middle Channel





HSUPA High Channel

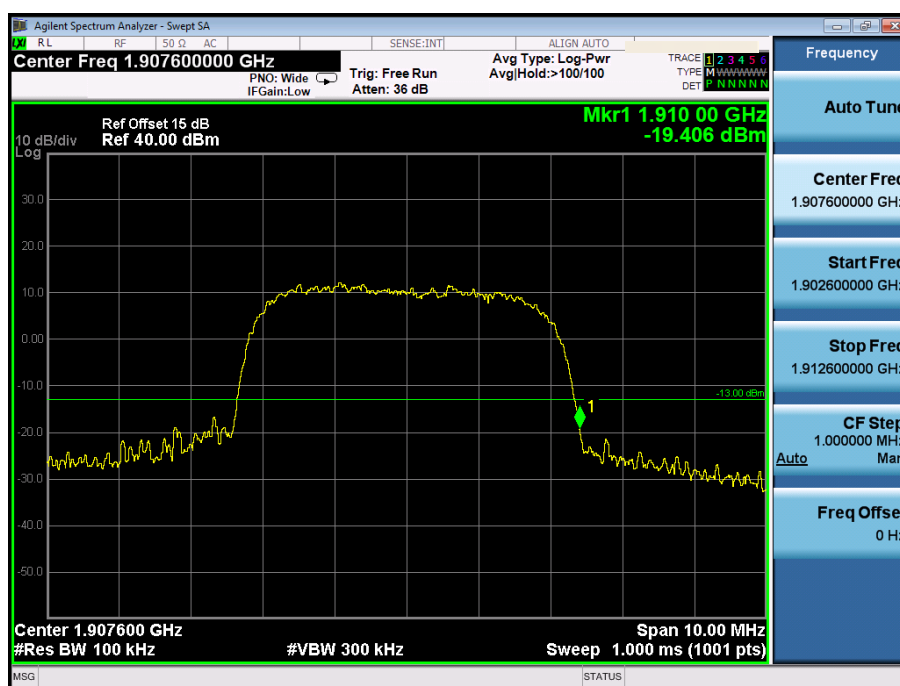




HSUPA Low Band Spurious Emission



HSUPA High Band Spurious Emission



7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

7.3 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	54%
ATM Pressure:	101 kPa
Test Voltage	DC3.7V

7.4 Summary of Test Results/Plots

According to the data below, the FCC Part22.917 and 24.238 standards, and had the worst margin of:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

All test modes are performed, but only the worst case is recorded in this report.



For Band 5 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
46.34	-69.23	4.34	-64.89	-13.00	-51.89	H
1652.8	-58.54	4.94	-53.60	-13.00	-40.60	H
2479.2	-58.63	8.46	-50.17	-13.00	-37.17	H
46.34	-69.44	4.34	-65.10	-13.00	-52.10	V
1652.8	-57.23	4.94	-52.29	-13.00	-39.29	V
2479.2	-57.52	8.46	-49.06	-13.00	-36.06	V
Middle Channel (836.6MHz)						
46.34	-69.35	4.34	-65.01	-13.00	-52.01	H
1672.8	-56.13	5.11	-51.02	-13.00	-38.02	H
2509.2	-58.06	8.54	-49.52	-13.00	-36.52	H
46.34	-69.34	4.34	-65.00	-13.00	-52.00	V
1672.8	-57.61	5.11	-52.50	-13.00	-39.50	V
2509.2	-58.65	8.54	-50.11	-13.00	-37.11	V
High Channel (846.6MHz)						
46.34	-69.23	4.34	-64.89	-13.00	-51.89	H
1693.2	-58.54	5.29	-53.25	-13.00	-40.25	H
2539.8	-59.13	8.59	-50.54	-13.00	-37.54	H
46.34	-68.53	4.34	-64.19	-13.00	-51.19	V
1693.2	-58.01	5.29	-52.72	-13.00	-39.72	V
2539.8	-58.32	8.59	-49.73	-13.00	-36.73	V

For Band 2 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.4MHz)						
46.34	-69.42	4.34	-65.08	-13.00	-52.08	H
3704.8	-57.61	10.17	-47.44	-13.00	-34.44	H
5557.2	-57.76	14.69	-43.07	-13.00	-30.07	H
46.34	-68.69	4.34	-64.35	-13.00	-51.35	V
3704.8	-58.43	10.17	-48.26	-13.00	-35.26	V
5557.2	-58.12	14.69	-43.43	-13.00	-30.43	V
Middle Channel (1880MHz)						
46.34	-68.86	4.34	-64.52	-13.00	-51.52	H
3760.8	-57.44	10.26	-47.18	-13.00	-34.18	H
5640	-57.38	14.78	-42.60	-13.00	-29.60	H
46.34	-68.76	4.34	-64.42	-13.00	-51.42	V
3760.8	-57.14	10.26	-46.88	-13.00	-33.88	V
5640	-57.39	14.78	-42.61	-13.00	-29.61	V
High Channel (1907.6MHz)						
46.34	-69.36	4.34	-65.02	-13.00	-52.02	H
3815.2	-58.46	10.59	-47.87	-13.00	-34.87	H
5722.8	-58.17	15.03	-43.14	-13.00	-30.14	H
46.34	-69.06	4.34	-64.72	-13.00	-51.72	V
3815.2	-58.34	10.59	-47.75	-13.00	-34.75	V
5722.8	-57.53	15.03	-42.50	-13.00	-29.50	H

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

8. Frequency Stability

8.1 Standard Applicable

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Cellular Band

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm

is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

8.3 Environmental Conditions

Temperature:	26°C
Relative Humidity:	54%
ATM Pressure:	101kPa

8.4 Summary of Test Results/Plots

For WCDMA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	73	0.087
40	3.7	32	0.038
30	3.7	37	0.044
20	3.7	43	0.051
10	3.7	23	0.027
0	3.7	35	0.042
-10	3.7	41	0.049
-20	3.7	21	0.025
-30	3.7	31	0.037

For WCDMA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	84	0.045
40	3.7	35	0.019
30	3.7	43	0.023
20	3.7	66	0.035
10	3.7	44	0.023
0	3.7	62	0.033
-10	3.7	74	0.039
-20	3.7	46	0.025
-30	3.7	26	0.014

For HSDPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	59	0.071
40	3.7	52	0.062
30	3.7	58	0.069
20	3.7	56	0.067
10	3.7	63	0.075
0	3.7	61	0.073
-10	3.7	62	0.074
-20	3.7	55	0.066
-30	3.7	44	0.053

For HSDPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	55	0.029
40	3.7	56	0.030
30	3.7	44	0.023
20	3.7	63	0.034
10	3.7	38	0.020
0	3.7	52	0.078
-10	3.7	65	0.035
-20	3.7	64	0.034
-30	3.7	64	0.034

For HSUPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	69	0.082
40	3.7	61	0.073
30	3.7	63	0.075
20	3.7	82	0.098
10	3.7	65	0.078
0	3.7	65	0.078
-10	3.7	63	0.075
-20	3.7	62	0.074
-30	3.7	67	0.080

For HSUPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	3.7	53	0.028
40	3.7	73	0.039
30	3.7	75	0.040
20	3.7	78	0.041
10	3.7	57	0.030
0	3.7	68	0.036
-10	3.7	44	0.023
-20	3.7	53	0.028
-30	3.7	38	0.020

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): WCDMA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	68	0.081
	3.7	89	0.11
	3.33	75	0.090
Reference Frequency(Middle Channel): WCDMA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	62	0.033
	3.7	73	0.039
	3.33	54	0.029
Reference Frequency(Middle Channel): HSDPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	44	0.053
	3.7	55	0.066
	3.33	58	0.039
Reference Frequency(Middle Channel): HSDPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	64	0.034
	3.7	73	0.039
	3.33	54	0.029
Reference Frequency(Middle Channel): HSUPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	57	0.068
	3.7	77	0.092

	3.33	62	0.074
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Reference Frequency(Middle Channel): HSUPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	4.07	54	0.029
	3.7	72	0.038
	3.33	68	0.036

9. EUT PHOTO

EUT Photo 1



EUT Photo 2





10. EUT TEST PHOTO

Radiated Measurement Photos



***** END OF REPORT *****