RF TEST REPORT

Applicant	Asiatelco Technologies Co.
FCC ID	XYO-AMA01R
Product	LTE Cellular Module
Brand	ATEL
Model	AMA-01R
Report No.	R2401A0042-R1
Issue Date	February 26, 2024

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2023)/ FCC CFR 47 Part 22H (2023)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Zhu Chentao

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Summary of Measurement Results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Radiated Power	2.1046 22.913(a)(5)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 / 22.917(a)	PASS
4	Peak-to-Average Power Ratio	22.913(d) KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiated Spurious Emission	2.1053 / 22.917 (a)	PASS
Date of Testing: January 16, 2024 ~ January 23, 2024 Date of Sample Received: January 11, 2024			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

1. Test Laboratory

1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test Facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	https://www.eurofins.com/electrical-and-electronics
E-mail:	Kain.Xu@cpt.eurofinscn.com

2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

Applicant	Asiatelco Technologies Co.
Applicant address	#68 HuaTuo Road, Building-8, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
Manufacturer	Asiatelco Technologies Co.
Manufacturer address	#68 HuaTuo Road, Building-8, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China

2.2. General Information

EUT Description			
Model	AMA-01R		
Lab internal SN	R2404A0042/S01		
Hardware Version	p2		
Software Version	v1.002.015		
Power Supply	External power supply		
Antenna Type	External Antenna		
Test Mode(s)	GSM 850; WCDMA Band V; LTE Band 5;		
Test Modulation	(GPRS)GMSK, (EGPRS) GMSK/ 8PSK; (WCDMA) BPSK, QPSK; (LTE) QPSK, 16QAM;		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	14		
HSUPA UE Category	6		
LTE Category	1		
Maximum E.R.P.	GSM 850:	33.53 dBm	
	WCDMA Band V:	23.40 dBm	
	LTE Band 5:	24.28 dBm	
Rated Power Supply Voltage	3.8V		
Operating Voltage	Minimum: 3.4V Maximum: 4.2V		
Operating Temperature	Lowest: -20°C Highest: +55°C		
Testing Temperature	Lowest: -30°C Highest: +50°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	WCDMA Band V	824 ~ 849	869 ~ 894
	LTE Band 5	824 ~ 849	869 ~ 894
Auxiliary Test Equipment			
Antenna	Manufacturer:	Asiatelco Technologies Co.	

	Model:	N12-7088-ROA
	Gain:	GSM850: 3.53 dBi WCDMA Band V: 3.53 dBi LTE Band 5: 3.53 dBi
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.		

3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:
FCC CFR 47 Part 22H (2023)

FCC CFR47 Part 2 (2023)

Reference standard:
ANSI C63.26-2015

KDB 971168 D01 Power Meas License Digital Systems v03r01

4. Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (horizontal polarization, horizontal polarization for GSM/WCDMA; vertical polarization, vertical polarization for LTE) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.
Subsequently, only the worst case emissions are reported.
The following testing in GSM/WCDMA/LTE is set based on the maximum RF Output Power.
Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation	
	GSM 850	WCDMA Band V
RF Power Output and Effective Radiated power	GPRS EGPRS	RMC HSDPA/HSUPA
Occupied Bandwidth	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GPRS	RMC
Radiated Spurious Emission	GPRS	RMC

Test modes are chosen as the worst case configuration below for LTE Band 5.

Test items	Bandwidth (MHz)				Modulation		RB			Test Channel		
	1.4	3	5	10	QPSK	16QAM	1	50%	100%	L	M	H
RF power output and Effective Radiated power	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	O	O	O	O	O	O	O	-	-	-	O	-
Spurious Emissions at Antenna Terminals	O	O	O	O	O	-	O	-	-	O	O	O
Radiated Spurious Emission	O	-	O	O	O	-	O	-	-	-	O	-
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.											

5. Test Case

5.1. RF Power Output and Effective Radiated Power

Ambient Condition

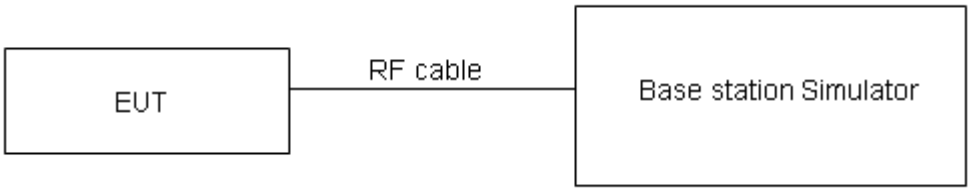
Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

ERP can then be calculated as follows:
EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)
EIRP (dBm) = ERP (dBm) + 2.15 (dB).

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 22.913(a)(5) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	≤ 7 W (38.45 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.4 dB for RF power output, *k* = 2, *U*= 1.19 dB for ERP.

Test Results

Refer to the section 6.1 of this report for test data.

5.2. Occupied Bandwidth

Ambient Condition

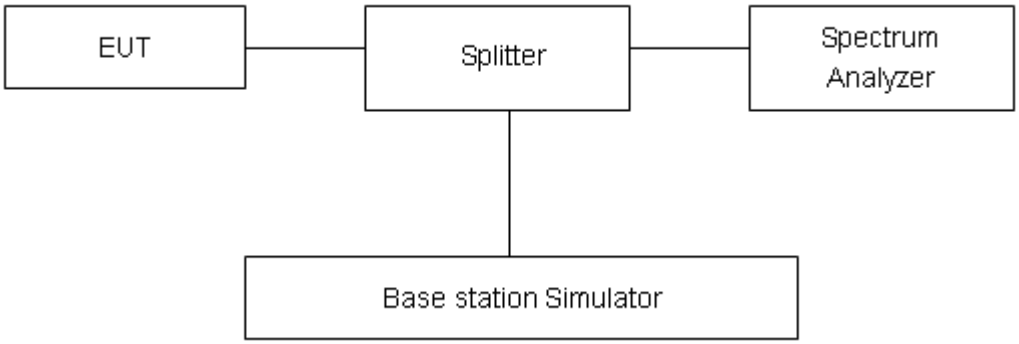
Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to ≥1%EBW, VBW is set to 3x RBW.

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 624Hz.

Test Results

Refer to the section 6.2 of this report for test data.

5.3. Band Edge Compliance

Ambient Condition

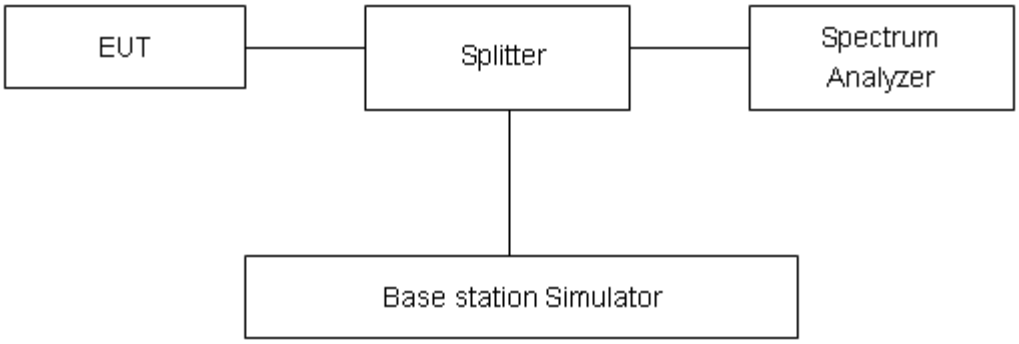
Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used.
RBW is set to ≥1%EBW, VBW is set to 3x RBW.

Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U=0.684dB.

Test Results

Refer to the section 6.3 of this report for test data.

5.4. Peak-to-Average Power Ratio (PAPR)

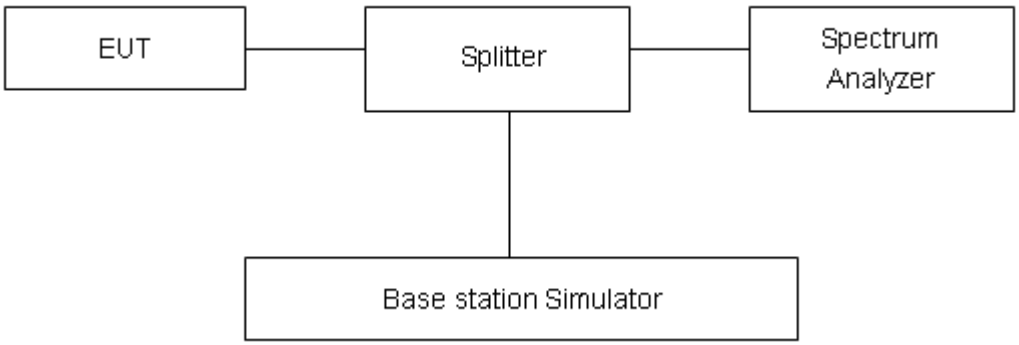
Ambient Condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Methods of Measurement

Measure the total peak power and record as P_{Pk}. And measure the total average power and record as P_{Avg}. Both the peak and average power levels must be expressed in the same logarithmic units (*e.g.*, dBm). Determine the PAPR from:
PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm).

Test Setup



Limits

According to the Sec. 22.913(d), The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

Refer to the section 6.4 of this report for test data.

5.5. Frequency Stability

Ambient Condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +50°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

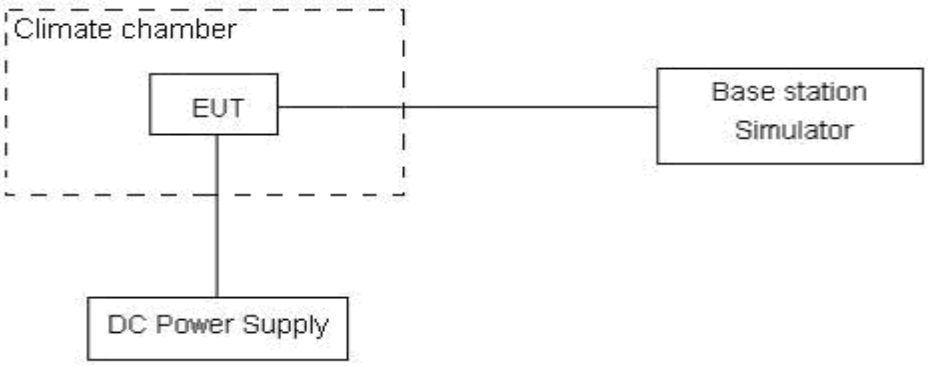
(3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements. Frequency Stability (Voltage Variation)

The frequency stability shall be measured with variation of primary supply voltage as follows:

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.

This transceiver is specified to operate with an input voltage of between 3.4 V and 4.2 V, with a nominal voltage of 3.8V.

Test Setup



Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency for mobile stations.

Limits	≤ 2.5 ppm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor k = 3, U= 0.01ppm.

Test Results

Refer to the section 6.5 of this report for test data.

5.6. Spurious Emissions at Antenna Terminals

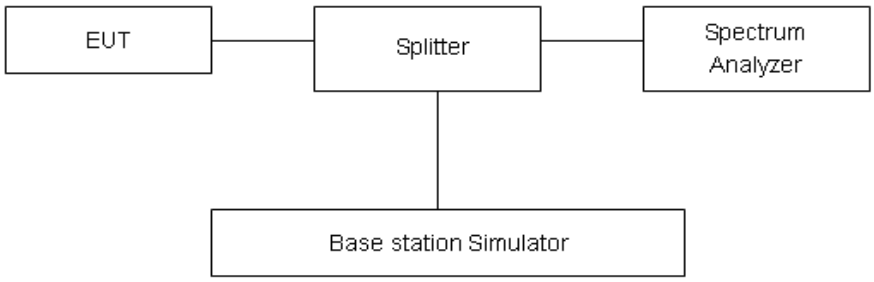
Ambient Condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier.
The peak detector is used.
RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),
RBW is set to 10 kHz (0.15 MHz~ 30 MHz)
RBW is set to 100 kHz (30MHz~1000 MHz)
RBW is set to 1000 kHz (above 1000MHz)
Sweep is set to AUTO.
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test Setup



Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

Test Results

Refer to the section 6.6 of this report for test data.

5.7. Radiated Spurious Emission

Ambient Condition

Temperature	Relative humidity	Pressure
15°C ~ 35°C	20% ~ 80%	86 kPa ~ 106 kPa

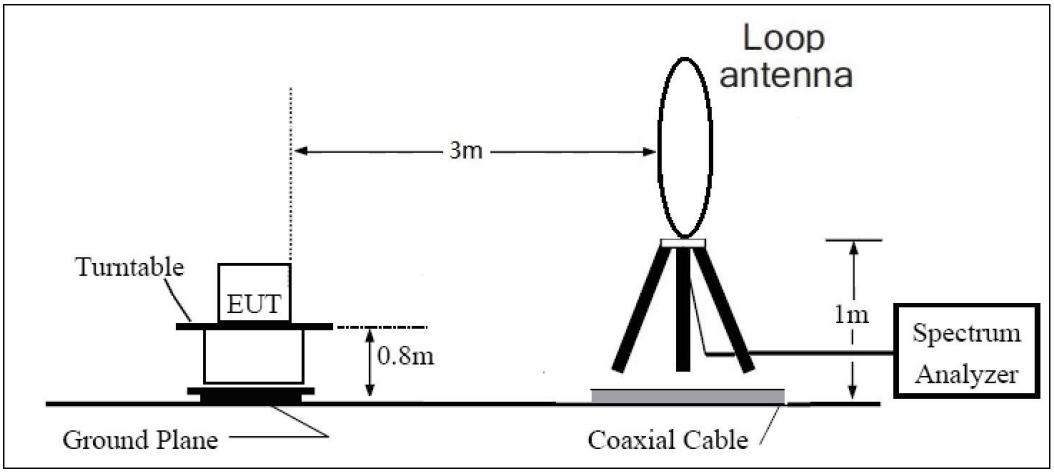
Method of Measurement

1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26-2015.
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=100kHz, VBW=300kHz, and the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power (EIRP) = PMea - PAg - Pcl + Ga
The measurement results are amend as described below:
Power (EIRP) = PMea - Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dB.

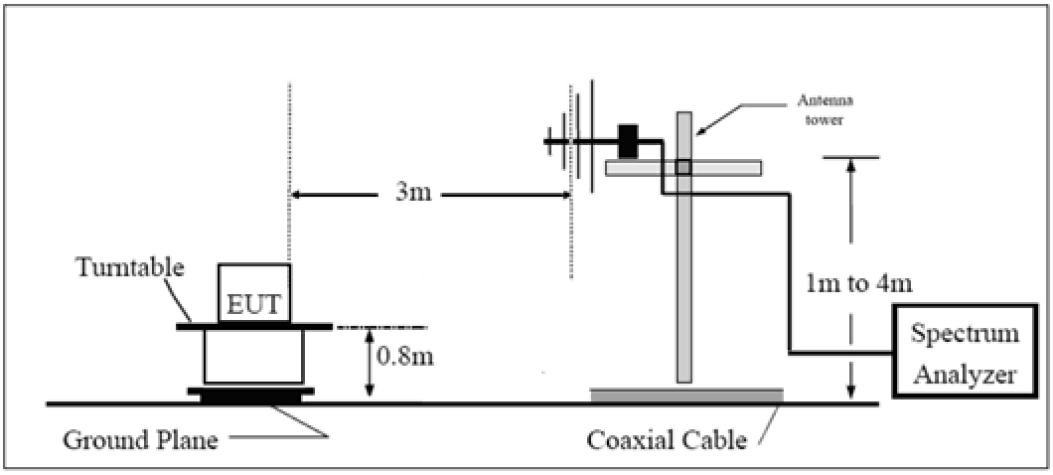
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test Setup

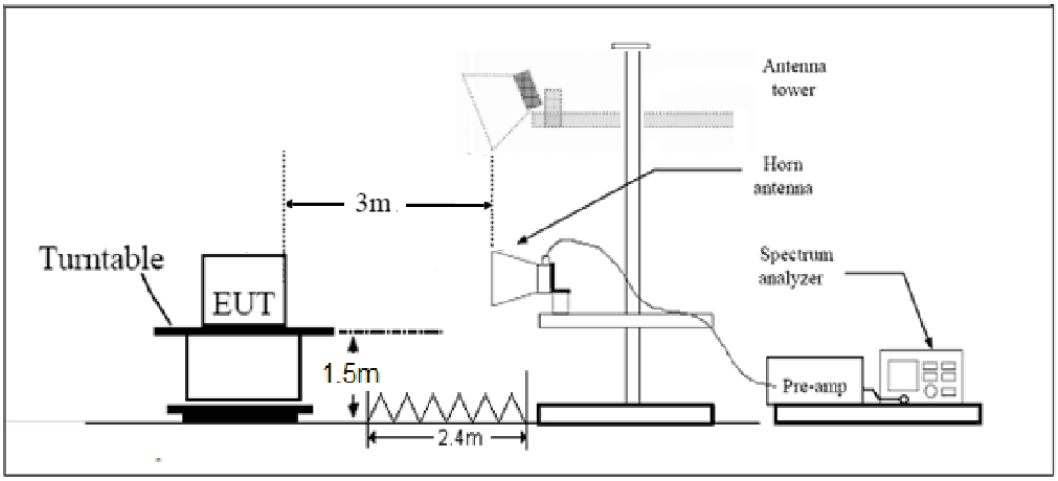
9KHz~ 30MHz



30MHz~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

Limits

Rule Part 22.917(a) specifies that “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.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor k = 1.96, U= 3.55 Db.

Test Results

Refer to the section 6.7 of this report for test data.

6. Test Result

6.1. RF Power Output and Effective Radiated Power

GSM 850		Maximum Output Power (dBm)			ERP (dBm)		
		Channel 128	Channel 190	Channel 251	Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)	824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GPRS (GMSK)	1Txslot	32.04	32.15	32.04	33.42	33.53	33.42
	2Txslots	32.03	32.15	32.02	33.41	33.53	33.40
	3Txslots	30.68	30.86	30.81	32.06	32.24	32.19
	4Txslots	28.95	29.09	29.06	30.33	30.47	30.44
EGPRS (8PSK)	1Txslot	25.77	25.73	25.74	27.15	27.11	27.12
	2Txslots	24.01	24.12	24.13	25.39	25.50	25.51
	3Txslots	21.97	22.01	21.95	23.35	23.39	23.33
	4Txslots	19.71	19.82	19.78	21.09	21.20	21.16

WCDMA Band V		Maximum Output Power (dBm)			ERP (dBm)		
		Channel 4132	Channel 4183	Channel 4233	Channel 4132	Channel 4183	Channel 4233
		826.4 (MHz)	836.6 (MHz)	846.6 (MHz)	826.4 (MHz)	836.6 (MHz)	846.6 (MHz)
RMC	12.2k	21.16	22.02	21.36	22.54	23.40	22.74
HSDPA	Sub - Test 1	20.58	21.44	20.78	21.96	22.82	22.16
	Sub - Test 2	20.57	21.43	20.77	21.95	22.81	22.15
	Sub - Test 3	20.06	20.92	20.26	21.44	22.30	21.64
	Sub - Test 4	20.05	20.91	20.25	21.43	22.29	21.63
HSUPA	Sub - Test 1	19.54	20.40	19.74	20.92	21.78	21.12
	Sub - Test 2	17.53	18.39	17.73	18.91	19.77	19.11
	Sub - Test 3	18.51	19.38	18.72	19.89	20.76	20.10
	Sub - Test 4	17.50	18.37	17.71	18.88	19.75	19.09
	Sub - Test 5	20.99	21.86	21.20	22.37	23.24	22.58

LTE Band 5						
Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	Power (dBm)	ERP (dBm)
1.4	20407	1	#0	QPSK	22.14	23.52
1.4	20407	1	#Mid	QPSK	21.86	23.24
1.4	20407	1	#Max	QPSK	21.83	23.21
1.4	20407	3	#0	QPSK	21.81	23.19
1.4	20407	3	#Mid	QPSK	21.81	23.19
1.4	20407	3	#Max	QPSK	21.68	23.06
1.4	20407	6	#0	QPSK	20.78	22.16
1.4	20407	1	#0	16QAM	21.13	22.51
1.4	20407	1	#Mid	16QAM	20.95	22.33
1.4	20407	1	#Max	16QAM	20.89	22.27
1.4	20407	3	#0	16QAM	21.07	22.45
1.4	20407	3	#Mid	16QAM	21.08	22.46
1.4	20407	3	#Max	16QAM	21.01	22.39
1.4	20407	6	#0	16QAM	19.95	21.33
1.4	20525	1	#0	QPSK	22.90	24.28
1.4	20525	1	#Mid	QPSK	22.80	24.18
1.4	20525	1	#Max	QPSK	22.89	24.27
1.4	20525	3	#0	QPSK	22.75	24.13
1.4	20525	3	#Mid	QPSK	22.75	24.13
1.4	20525	3	#Max	QPSK	22.78	24.16
1.4	20525	6	#0	QPSK	21.79	23.17
1.4	20525	1	#0	16QAM	22.14	23.52
1.4	20525	1	#Mid	16QAM	22.01	23.39
1.4	20525	1	#Max	16QAM	22.18	23.56
1.4	20525	3	#0	16QAM	21.90	23.28
1.4	20525	3	#Mid	16QAM	21.90	23.28
1.4	20525	3	#Max	16QAM	21.90	23.28
1.4	20525	6	#0	16QAM	20.77	22.15
1.4	20643	1	#0	QPSK	22.27	23.65
1.4	20643	1	#Mid	QPSK	22.33	23.71
1.4	20643	1	#Max	QPSK	22.67	24.05
1.4	20643	3	#0	QPSK	22.10	23.48
1.4	20643	3	#Mid	QPSK	22.06	23.44
1.4	20643	3	#Max	QPSK	22.33	23.71
1.4	20643	6	#0	QPSK	21.21	22.59
1.4	20643	1	#0	16QAM	21.01	22.39
1.4	20643	1	#Mid	16QAM	21.18	22.56
1.4	20643	1	#Max	16QAM	21.53	22.91
1.4	20643	3	#0	16QAM	21.10	22.48
1.4	20643	3	#Mid	16QAM	21.07	22.45
1.4	20643	3	#Max	16QAM	21.32	22.70

1.4	20643	6	#0	16QAM	20.14	21.52
3	20415	1	#0	QPSK	21.85	23.23
3	20415	1	#Mid	QPSK	21.50	22.88
3	20415	1	#Max	QPSK	21.26	22.64
3	20415	8	#0	QPSK	20.80	22.18
3	20415	8	#Mid	QPSK	20.82	22.20
3	20415	8	#Max	QPSK	20.54	21.92
3	20415	15	#0	QPSK	20.60	21.98
3	20415	1	#0	16QAM	21.21	22.59
3	20415	1	#Mid	16QAM	20.91	22.29
3	20415	1	#Max	16QAM	20.65	22.03
3	20415	8	#0	16QAM	19.94	21.32
3	20415	8	#Mid	16QAM	19.98	21.36
3	20415	8	#Max	16QAM	19.69	21.07
3	20415	15	#0	16QAM	19.76	21.14
3	20525	1	#0	QPSK	22.83	24.21
3	20525	1	#Mid	QPSK	22.81	24.19
3	20525	1	#Max	QPSK	22.90	24.28
3	20525	8	#0	QPSK	21.83	23.21
3	20525	8	#Mid	QPSK	21.83	23.21
3	20525	8	#Max	QPSK	21.97	23.35
3	20525	15	#0	QPSK	21.79	23.17
3	20525	1	#0	16QAM	22.01	23.39
3	20525	1	#Mid	16QAM	22.03	23.41
3	20525	1	#Max	16QAM	22.15	23.53
3	20525	8	#0	16QAM	20.89	22.27
3	20525	8	#Mid	16QAM	20.89	22.27
3	20525	8	#Max	16QAM	21.05	22.43
3	20525	15	#0	16QAM	20.71	22.09
3	20635	1	#0	QPSK	21.48	22.86
3	20635	1	#Mid	QPSK	21.94	23.32
3	20635	1	#Max	QPSK	22.53	23.91
3	20635	8	#0	QPSK	20.62	22.00
3	20635	8	#Mid	QPSK	20.58	21.96
3	20635	8	#Max	QPSK	21.08	22.46
3	20635	15	#0	QPSK	20.75	22.13
3	20635	1	#0	16QAM	20.30	21.68
3	20635	1	#Mid	16QAM	20.77	22.15
3	20635	1	#Max	16QAM	21.29	22.67
3	20635	8	#0	16QAM	19.72	21.10
3	20635	8	#Mid	16QAM	19.71	21.09
3	20635	8	#Max	16QAM	20.13	21.51
3	20635	15	#0	16QAM	19.95	21.33
5	20425	1	#0	QPSK	21.89	23.27

5	20425	1	#Mid	QPSK	21.36	22.74
5	20425	1	#Max	QPSK	21.12	22.50
5	20425	12	#0	QPSK	20.61	21.99
5	20425	12	#Mid	QPSK	20.63	22.01
5	20425	12	#Max	QPSK	20.25	21.63
5	20425	25	#0	QPSK	20.40	21.78
5	20425	1	#0	16QAM	21.15	22.53
5	20425	1	#Mid	16QAM	20.78	22.16
5	20425	1	#Max	16QAM	20.50	21.88
5	20425	12	#0	16QAM	19.69	21.07
5	20425	12	#Mid	16QAM	19.73	21.11
5	20425	12	#Max	16QAM	19.36	20.74
5	20425	25	#0	16QAM	19.62	21.00
5	20525	1	#0	QPSK	22.74	24.12
5	20525	1	#Mid	QPSK	22.83	24.21
5	20525	1	#Max	QPSK	22.84	24.22
5	20525	12	#0	QPSK	21.86	23.24
5	20525	12	#Mid	QPSK	21.85	23.23
5	20525	12	#Max	QPSK	21.90	23.28
5	20525	25	#0	QPSK	21.69	23.07
5	20525	1	#0	16QAM	22.00	23.38
5	20525	1	#Mid	16QAM	22.07	23.45
5	20525	1	#Max	16QAM	22.12	23.50
5	20525	12	#0	16QAM	20.89	22.27
5	20525	12	#Mid	16QAM	20.88	22.26
5	20525	12	#Max	16QAM	20.95	22.33
5	20525	25	#0	16QAM	20.69	22.07
5	20625	1	#0	QPSK	21.32	22.70
5	20625	1	#Mid	QPSK	21.50	22.88
5	20625	1	#Max	QPSK	22.29	23.67
5	20625	12	#0	QPSK	20.31	21.69
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5	20625	12	#Max	QPSK	20.78	22.16
5	20625	25	#0	QPSK	20.50	21.88
5	20625	1	#0	16QAM	20.55	21.93
5	20625	1	#Mid	16QAM	20.78	22.16
5	20625	1	#Max	16QAM	21.57	22.95
5	20625	12	#0	16QAM	19.48	20.86
5	20625	12	#Mid	16QAM	19.50	20.88
5	20625	12	#Max	16QAM	19.94	21.32
5	20625	25	#0	16QAM	19.67	21.05
10	20450	1	#0	QPSK	21.43	22.81
10	20450	1	#Mid	QPSK	21.06	22.44
10	20450	1	#Max	QPSK	22.07	23.45

10	20450	25	#0	QPSK	20.04	21.42
10	20450	25	#Mid	QPSK	20.06	21.44
10	20450	25	#Max	QPSK	20.35	21.73
10	20450	50	#0	QPSK	20.19	21.57
10	20450	1	#0	16QAM	20.78	22.16
10	20450	1	#Mid	16QAM	20.45	21.83
10	20450	1	#Max	16QAM	21.37	22.75
10	20450	25	#0	16QAM	19.23	20.61
10	20450	25	#Mid	16QAM	19.26	20.64
10	20450	25	#Max	16QAM	19.54	20.92
10	20450	50	#0	16QAM	19.40	20.78
10	20525	1	#0	QPSK	21.59	22.97
10	20525	1	#Mid	QPSK	22.54	23.92
10	20525	1	#Max	QPSK	21.97	23.35
10	20525	25	#0	QPSK	21.48	22.86
10	20525	25	#Mid	QPSK	21.46	22.84
10	20525	25	#Max	QPSK	21.50	22.88
10	20525	50	#0	QPSK	21.13	22.51
10	20525	1	#0	16QAM	20.85	22.23
10	20525	1	#Mid	16QAM	21.81	23.19
10	20525	1	#Max	16QAM	21.25	22.63
10	20525	25	#0	16QAM	20.62	22.00
10	20525	25	#Mid	16QAM	20.60	21.98
10	20525	25	#Max	16QAM	20.64	22.02
10	20525	50	#0	16QAM	20.17	21.55
10	20600	1	#0	QPSK	22.49	23.87
10	20600	1	#Mid	QPSK	21.32	22.70
10	20600	1	#Max	QPSK	21.90	23.28
10	20600	25	#0	QPSK	20.75	22.13
10	20600	25	#Mid	QPSK	20.81	22.19
10	20600	25	#Max	QPSK	20.19	21.57
10	20600	50	#0	QPSK	20.46	21.84
10	20600	1	#0	16QAM	21.37	22.75
10	20600	1	#Mid	16QAM	20.25	21.63
10	20600	1	#Max	16QAM	20.72	22.10
10	20600	25	#0	16QAM	19.87	21.25
10	20600	25	#Mid	16QAM	19.94	21.32
10	20600	25	#Max	16QAM	19.30	20.68
10	20600	50	#0	16QAM	19.71	21.09

6.2. Occupied Bandwidth

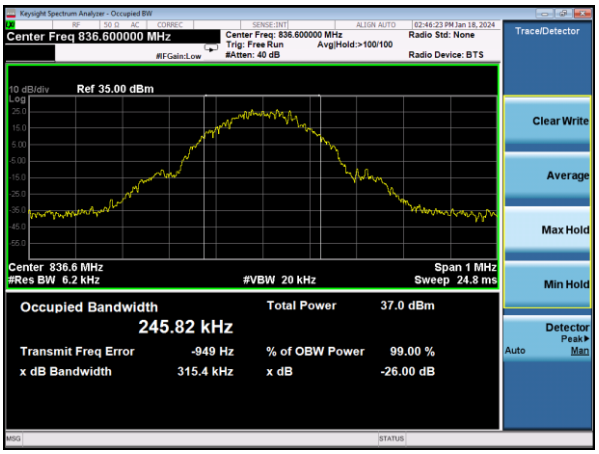
Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GPRS 850 (GMSK)	128	824.2	0.2467	0.3146
	190	836.6	0.2458	0.3154
	251	848.8	0.2543	0.3110
EGPRS 850 (8PSK)	128	824.2	0.2434	0.3013
	190	836.6	0.2368	0.3036
	251	848.8	0.2398	0.2988
WCDMA Band V (RMC)	4132	826.4	4.1597	4.641
	4183	836.6	4.1446	4.666
	4233	846.6	4.1729	4.680

LTE Band 5						
Bandwidth (MHz)	UL Channel	RB Size	RB Position	Modulation	99% OBW (MHz)	-26dB EBW (MHz)
1.4	20407	6	#0	QPSK	1.098	1.271
1.4	20407	6	#0	16QAM	1.096	1.266
1.4	20525	6	#0	QPSK	1.098	1.262
1.4	20525	6	#0	16QAM	1.099	1.260
1.4	20643	6	#0	QPSK	1.111	1.261
1.4	20643	6	#0	16QAM	1.101	1.262
3	20415	15	#0	QPSK	2.694	2.931
3	20415	15	#0	16QAM	2.696	2.944
3	20525	15	#0	QPSK	2.688	2.916
3	20525	15	#0	16QAM	2.691	2.935
3	20635	15	#0	QPSK	2.701	2.932
3	20635	15	#0	16QAM	2.704	2.939
5	20425	25	#0	QPSK	4.518	4.835
5	20425	25	#0	16QAM	4.503	4.832
5	20525	25	#0	QPSK	4.496	4.892
5	20525	25	#0	16QAM	4.493	4.865
5	20625	25	#0	QPSK	4.496	4.828
5	20625	25	#0	16QAM	4.519	4.868
10	20450	50	#0	QPSK	9.000	9.693
10	20450	50	#0	16QAM	8.963	9.682
10	20525	50	#0	QPSK	8.935	9.569
10	20525	50	#0	16QAM	8.932	9.587
10	20600	50	#0	QPSK	9.001	9.586
10	20600	50	#0	16QAM	9.006	9.537

GSM 850 GPRS CH-Low

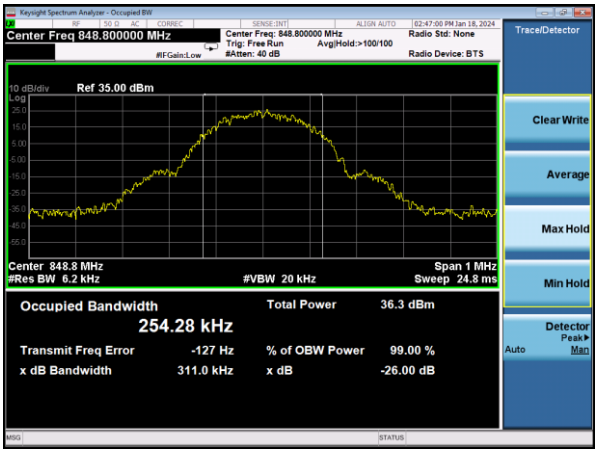
GSM 850 EGPRS CH-Low

GSM 850 GPRS CH-Middle



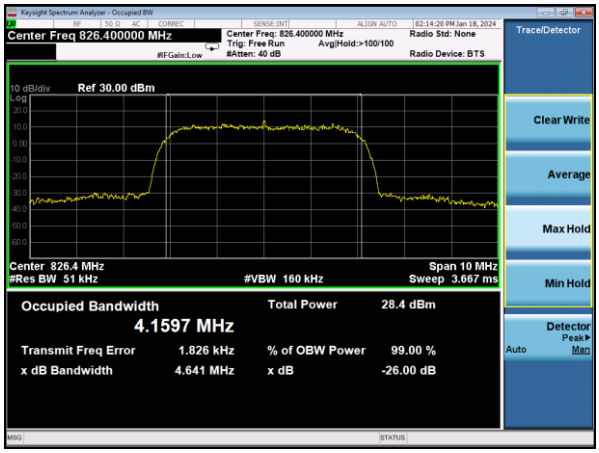
GSM 850 EGPRS CH-Middle

GSM 850 GPRS CH-High



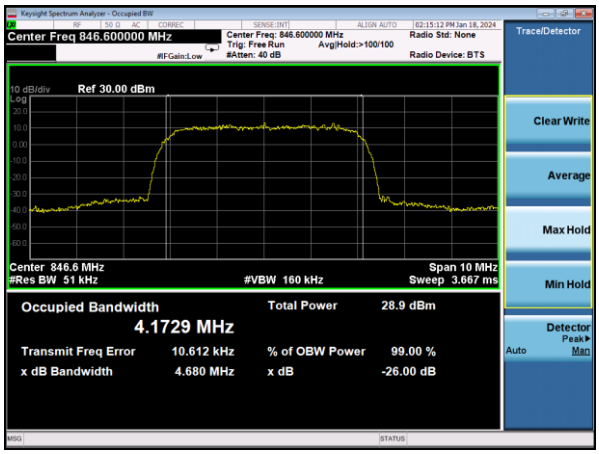
GSM 850 EGPRS CH-High

WCDMA Band V CH-Low

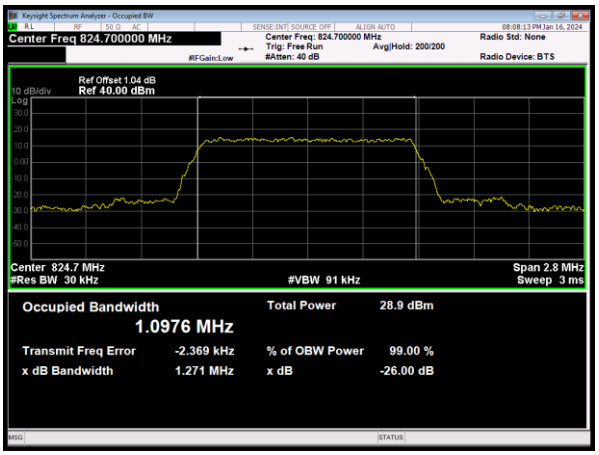


WCDMA Band V CH-Middle

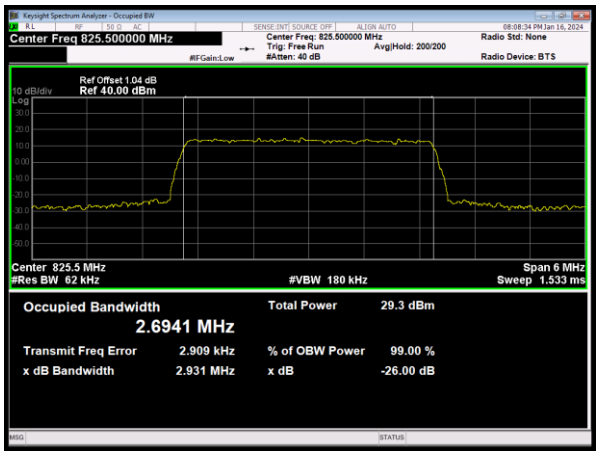
WCDMA Band V CH-High



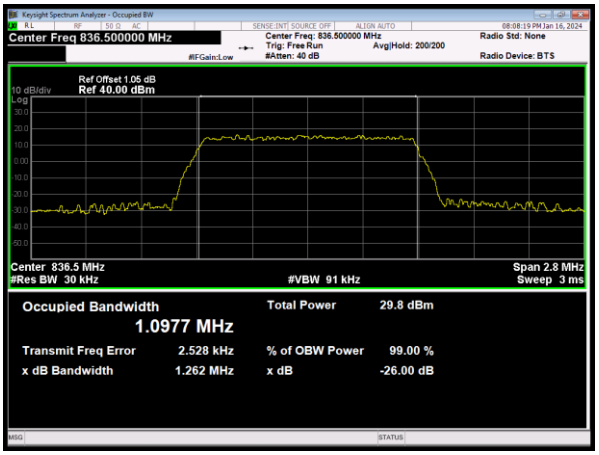
LTE Band 5 QPSK 1.4MHz CH-Low



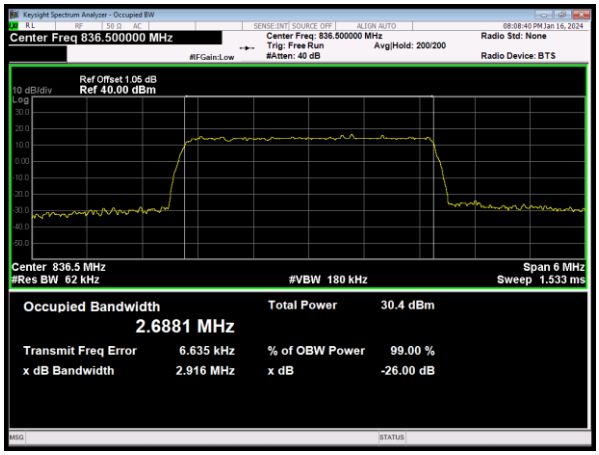
LTE Band 5 QPSK 3MHz CH-Low



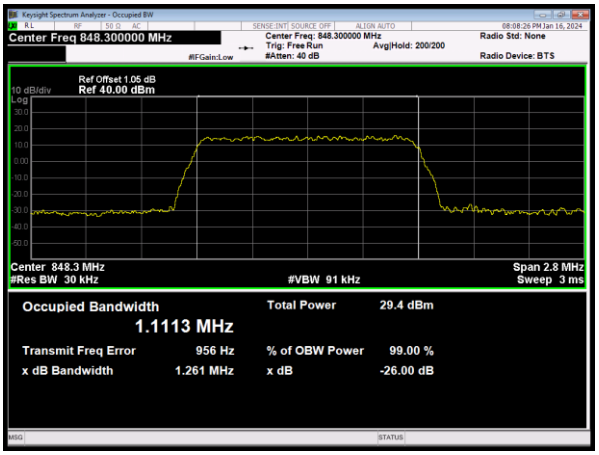
LTE Band 5 QPSK 1.4MHz CH-Middle



LTE Band 5 QPSK 3MHz CH-Middle



LTE Band 5 QPSK 1.4MHz CH-High



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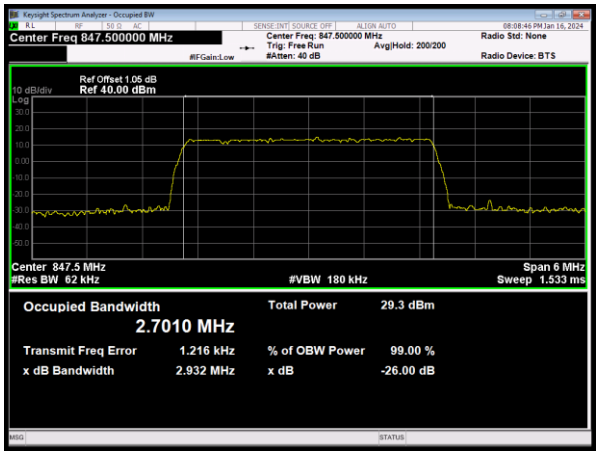
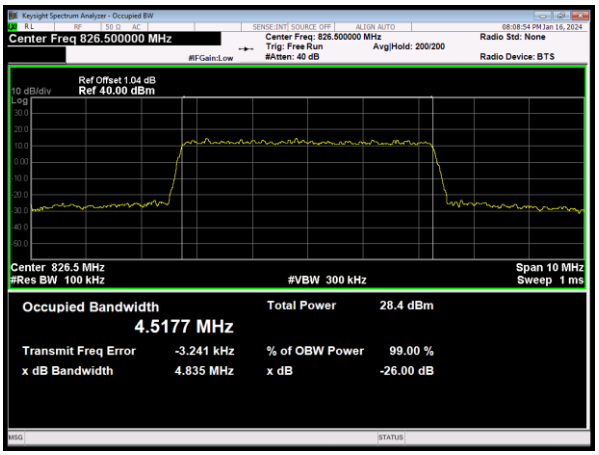
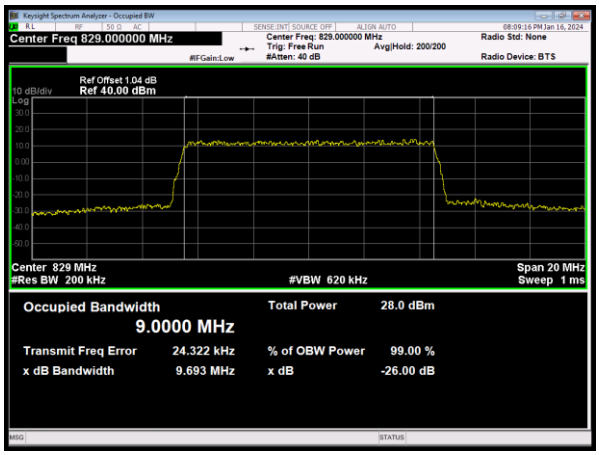


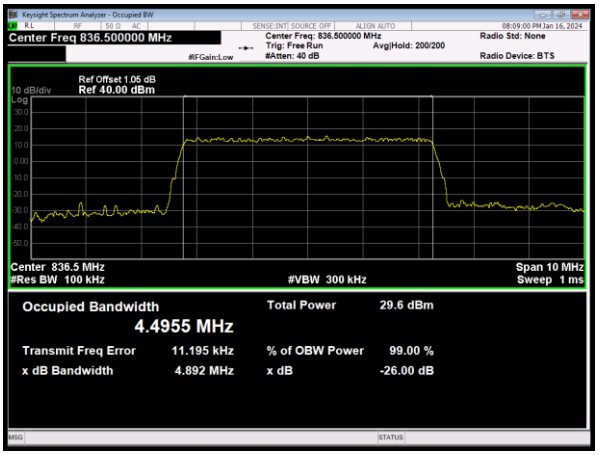
LTE Band 5 QPSK 5MHz CH-Low



LTE Band 5 QPSK 10MHz CH-Low



LTE Band 5 QPSK 5MHz CH-Middle



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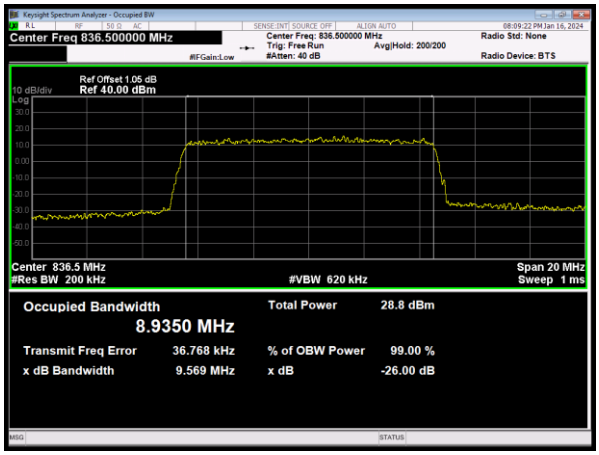
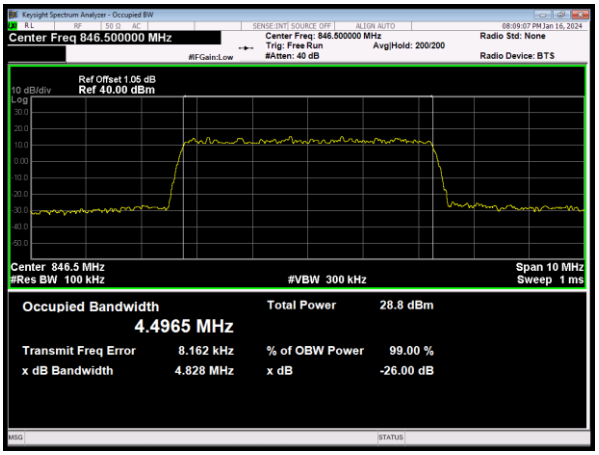
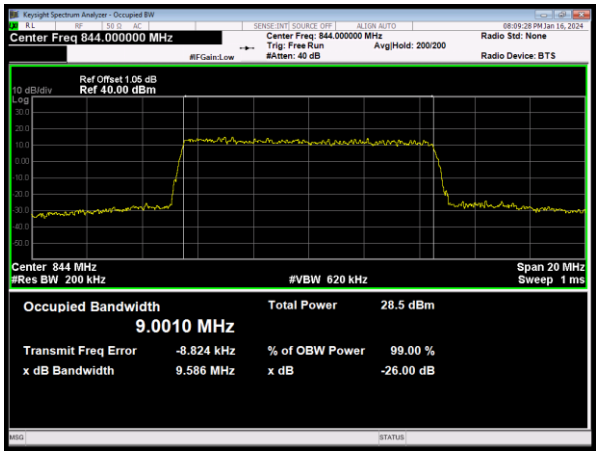


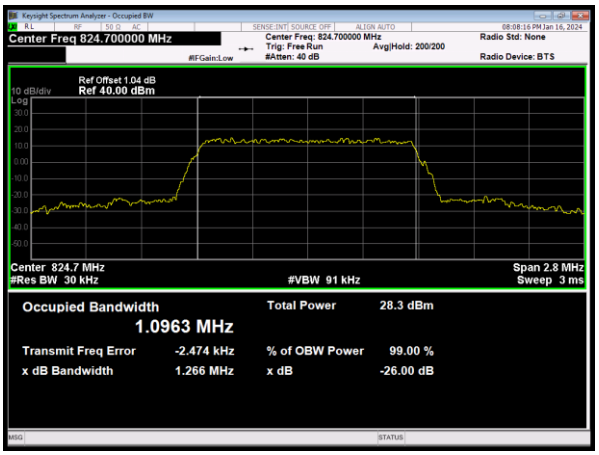
LTE Band 5 QPSK 5MHz CH-High



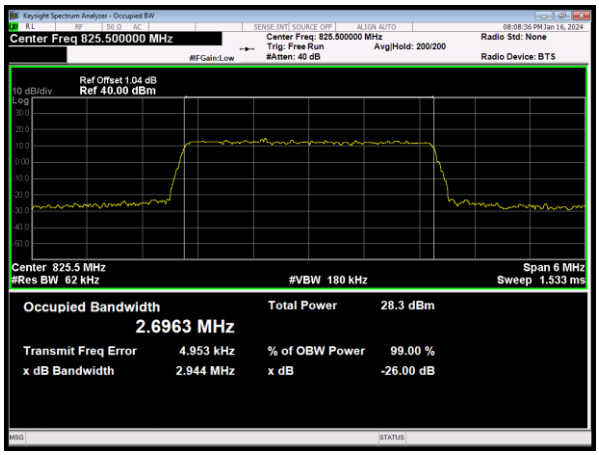
LTE Band 5 QPSK 10MHz CH-High



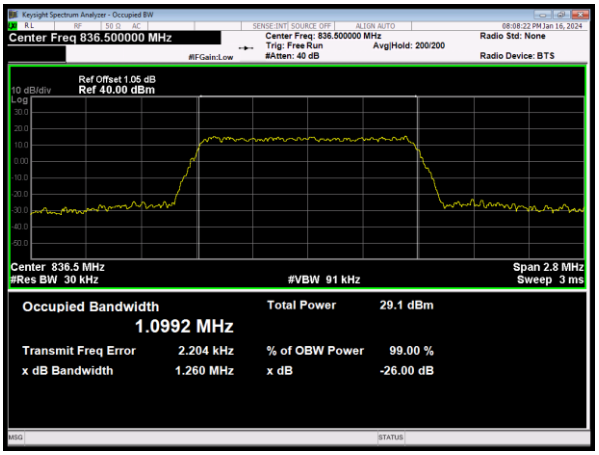
LTE Band 5 16QAM 1.4MHz CH-Low



LTE Band 5 16QAM 3MHz CH-Low



LTE Band 5 16QAM 1.4MHz CH-Middle



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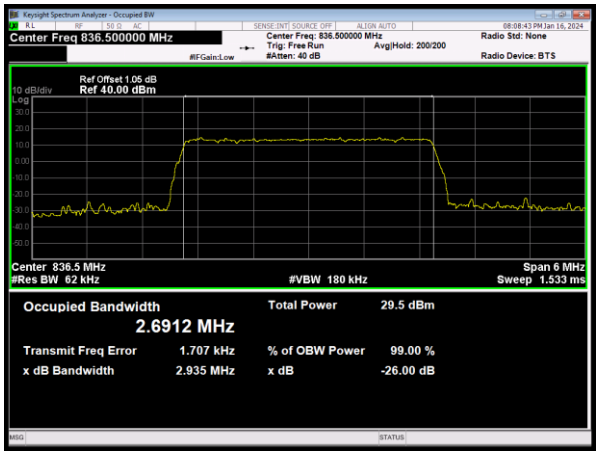
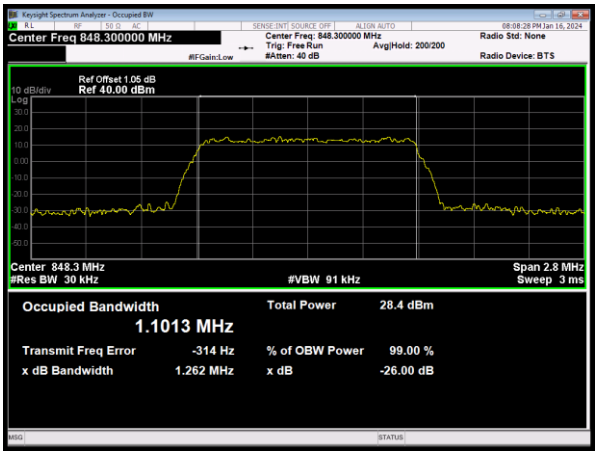


LTE Band 5 16QAM 1.4MHz CH-High



LTE Band 5 16QAM 3MHz CH-High