



RF TEST REPORT

Applicant Gosuncn Technology Group Co., Ltd.
FCC ID 2APNR-GW521
Product LTE CPE
Brand GOSUNCN
Model WF821, WF821A, WF821+, GW521
Report No. R1804A0169-R1V2
Issue Date May 21, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2/FCC CFR 47 Part 90Z**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Jiang peng Lan

Performed by: Jiangpeng Lan

Kai Xu

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

TABLE OF CONTENT

1. Test Laboratory	4
1.1. Notes of the Test Report	4
1.2. Test facility.....	4
1.3. TestingLocation	5
2. General Description of Equipment under Test.....	6
3. Applied Standards.....	8
4. Test Configuration.....	9
5. Test Case Results.....	10
5.1. RF Power Output & Effective Isotropic Radiated Power& the Peak EIRP Density.....	10
5.2. Occupied Bandwidth	21
5.3. Band Edge Compliance.....	27
5.4. Emission Mask	35
5.5. Frequency Stability	42
5.6. Spurious Emissions at Antenna Terminals	45
5.7. Field Strength of Spurious Radiation/ Radiated Spurious Emissions	53
6. Main Test Instruments	61
ANNEX A:EUT Appearanceand Test Setup.....	62
A.1 EUT Appearance	62
A.2 Test Setup	64

Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF Power Output & Effective Isotropic Radiated Power	2.1046/90.1321(a)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edges Compliance	2.1051/ 90.1323	PASS
4	Emission Mask	90.210(b)	PASS
5	Frequency Stability	2.1055	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 90.1323	PASS
7	Field Strength of Spurious Radiation / Radiated Spurious Emissions	2.1053/ 90.1323	PASS
Date of Testing: April 25, 2018~ May 7, 2018 and May 21, 2018			
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.			

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

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

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 electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

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

1.3. TestingLocation

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
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: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

Applicant	Gosuncn Technology Group Co., Ltd.
Applicant address	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China
Manufacturer	Gosuncn Technology Group Co., Ltd.
Manufacturer address	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China

General Information

EUT Description			
Model	WF821, WF821A, WF821+, GW521		
Product IMEI	860524031701657		
Hardware Version	V3.3		
Software Version	WF821_1.2.5_R26		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	4dBi		
Test Mode(s)	LTE Band 43		
Test Modulation	QPSK, 16QAM, 64QAM (DL only)		
Maximum E.I.R.P.	LTE Band 43: 21.62dBm		
Rated Power Supply Voltage	12V		
Extreme Voltage	Minimum: 9V Maximum: 13V		
Extreme Temperature	Lowest: -10°C Highest: +45°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	LTE Band 43	3650 ~ 3700	3650 ~ 3700
EUT Accessory			
Adapter	Manufacturer: Aquilstar Precision Industry (Shenzhen) Co., Ltd. Model: ASSA65A-120100		
Note: The information of the EUT is declared by the manufacturer.			

Item	WF821	WF821A	WF821+	GW521
Protocol Stack	The same	The same	The same	The same
MMS/STK	The same	The same	The same	The same
JAVA	The same	The same	The same	The same
Web User Interface page	The same	changes	changes	changes
HARDWARE	The same	The same	The same	The same
MECHANICAL	The same	The same	The same	The same
ACCESSORY	The same	The same	The same	The same
Note: Customer declaration, four models are the same, except for the logo and default parameters in the Web User Interface page, There are more than one Model, each one should be applied throughout the compliance test respectively, however, only the worst case (WF821) will be recorded in this report.				

3. Applied Standards

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

FCC CFR47 Part 2 (2017)

FCC CFR 47 Part 90Z (2017)

ANSI/TIA-603-E (2016)

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 552295 D01 CBP Guidance for 3650 3700 Band v03

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 (Z axis, vertical polarization) and the worst case was recorded.

All mode and data rates and positions were investigated.

The following testing in LTE is set based on the maximum RF Output Power.

Test modes are chosen as the worst case configuration below for LTE Band 43

Test items	Bandwidth (MHz)				Modulation		RB			Test Channel		
	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	O	O	O	O	O	O	-	-	O	O	O	O
Effective Isotropic Radiated power	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
Emission Mask	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
Field Strength of Spurious Radiation/ Radiates Spurious Emission	O	O	O	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 Results

5.1. RF Power Output & Effective Isotropic Radiated Power& the Peak EIRP Density

Ambient condition

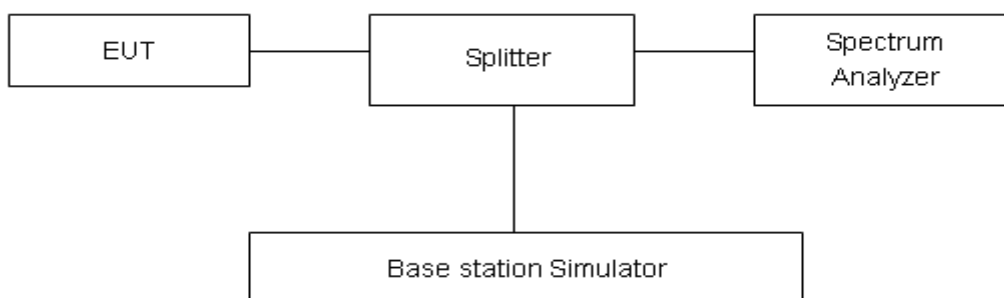
Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

During the process of the testing, The EUT is controlled by the Spectrum analyzer to ensure max power transmission and proper modulation.

Since this procedure utilizes a conducted measurement it does not directly result in EIRP levels for comparison to the output power limits. In order to determine the EIRP level, the effective antenna gain must be added to the corrected (for external test set-up factors) measurement result.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

According to FCC §2.1046 & 90.1321(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

Mobile and portable stations Limit	1 watt/25 MHz
------------------------------------	---------------

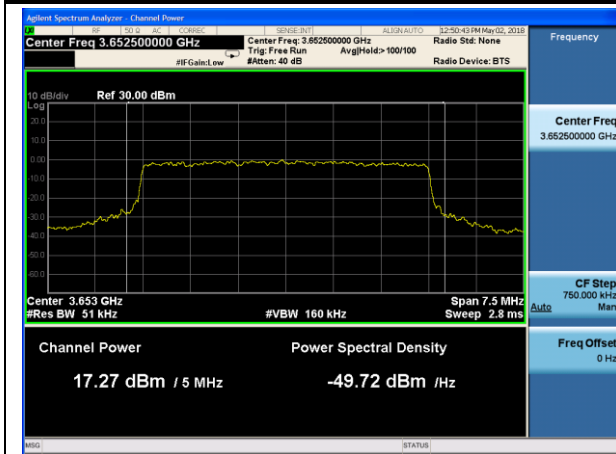
Measurement Uncertainty

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

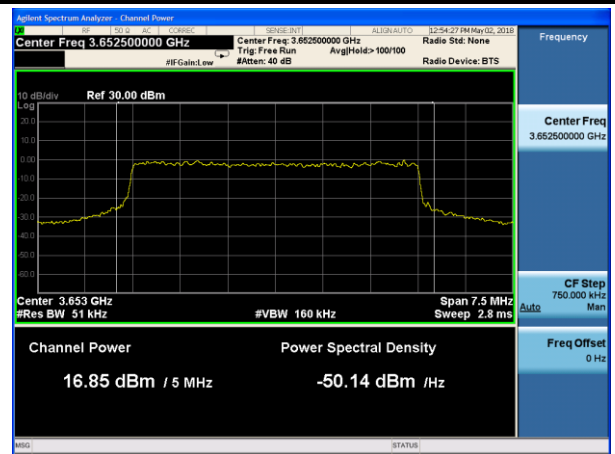


Test Results

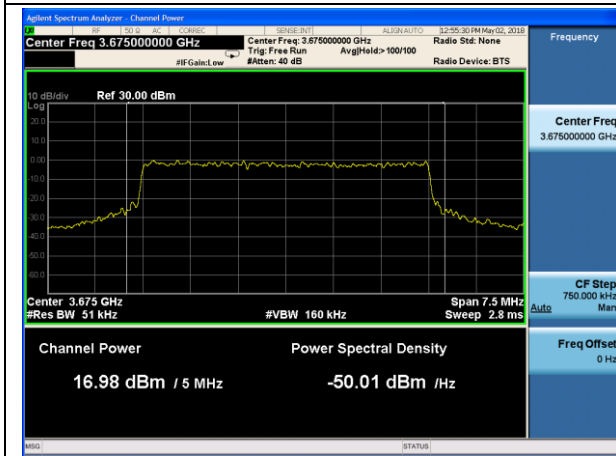
LTE Band 43				Conducted Power(dBm)			EIRP(dBm)			EIRP(mW)			EIRP(mW)/25MHz			Limit(mW) /25MHz
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			
				44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	
5MHz	QPSK	25	0	17.27	16.98	16.52	21.27	20.98	20.52	133.968	125.314	112.72	669.838	626.571	563.599	1000
	16QAM	25	0	16.85	17.62	16.96	20.85	21.62	20.96	121.619	145.211	124.738	608.093	726.056	623.692	1000
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	/
10MHz	QPSK	50	0	17.52	16.83	16.99	21.52	20.83	20.99	141.906	121.06	125.603	354.764	302.65	314.007	1000
	16QAM	50	0	17.24	17.15	16.66	21.24	21.15	20.66	133.045	130.317	116.413	332.614	325.792	291.032	1000
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44165 /3657.5	44340 /3675	44515 /3692.5	44165 /3657.5	44340 /3675	44515 /3692.5	44165 /3657.5	44340 /3675	44515 /3692.5	44165 /3657.5	44340 /3675	44515 /3692.5	/
15MHz	QPSK	75	0	16.95	16.29	15.88	20.95	20.29	19.88	124.451	106.905	97.2747	207.419	178.176	162.125	1000
	16QAM	75	0	16.71	16.45	15.81	20.71	20.45	19.81	117.761	110.917	95.7194	196.268	184.862	159.532	1000
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44190 /3660	44340 /3675	44490 /3690	44190 /3660	44340 /3675	44490 /3690	44190 /3660	44340 /3675	44490 /3690	44190 /3660	44340 /3675	44490 /3690	/
20MHz	QPSK	100	0	16.84	16.59	16.26	20.84	20.59	20.26	121.339	114.551	106.17	151.674	143.189	132.712	1000
	16QAM	100	0	16.41	16.01	16.37	20.41	20.01	20.37	109.901	100.231	108.893	137.376	125.288	136.116	1000
Note: EIRP=Conducted Power + Antenna Gain (Antenna Gain =4dBi) EIRP(mW)=10^(EIRP(dBm)/10) EIRP(mW)/25MHz= 25*EIRP(mW)/BW																



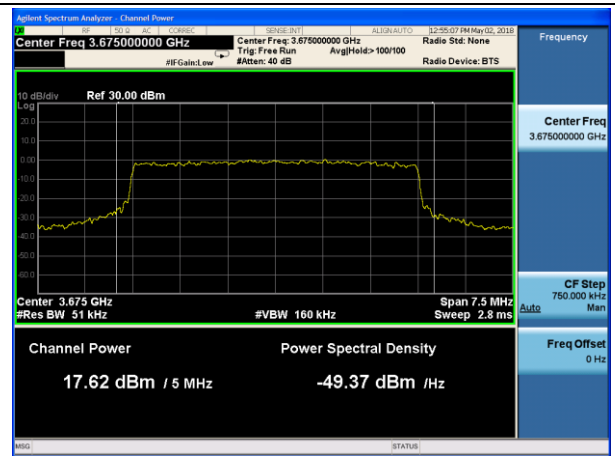
LTE Band 43 QPSK 5MHz CH44115



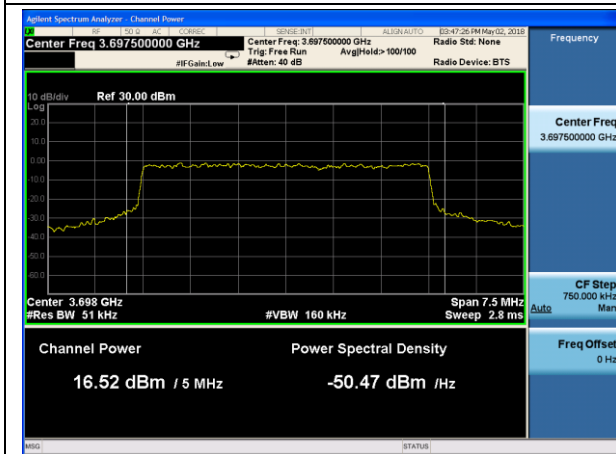
LTE Band 43 16QAM 5MHz CH44115



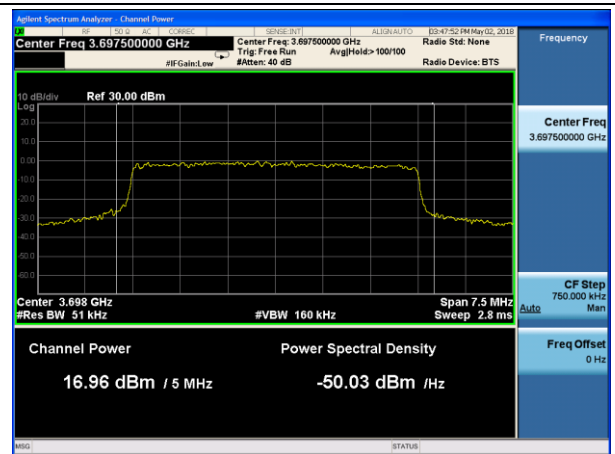
LTE Band 43 QPSK 5MHz CH44340



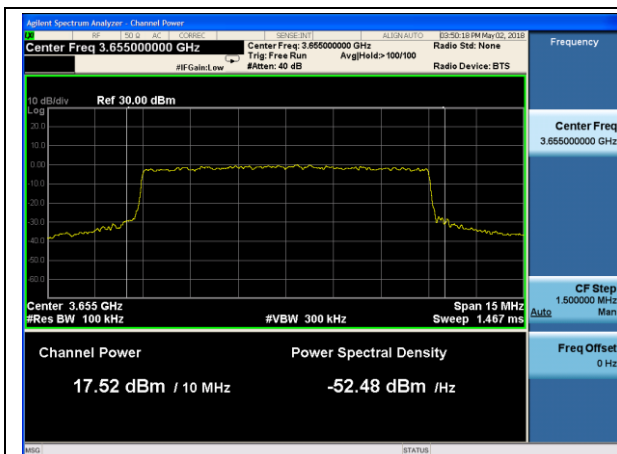
LTE Band 43 16QAM 5MHz CH44340



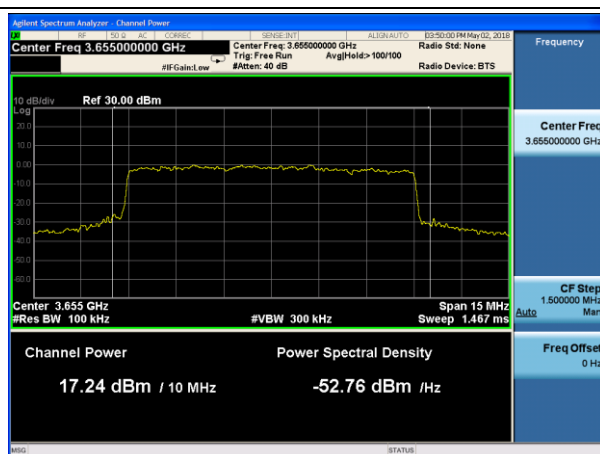
LTE Band 43 QPSK 5MHz CH44565



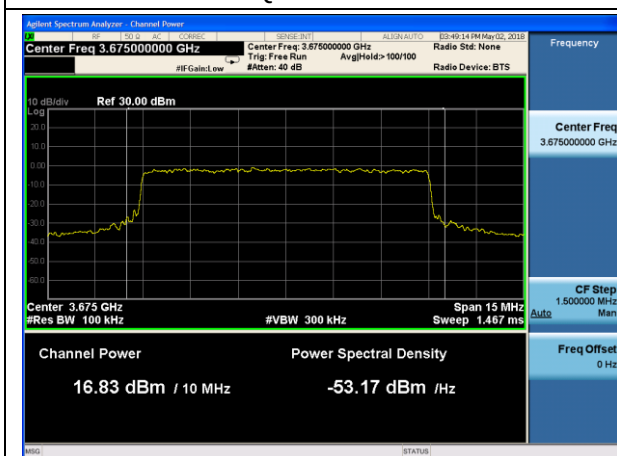
LTE Band 43 16QAM 5MHz CH44565



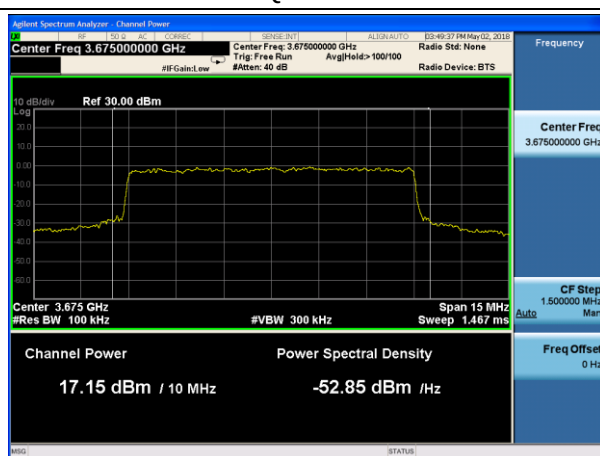
LTE Band 43 QPSK 10MHz CH44140



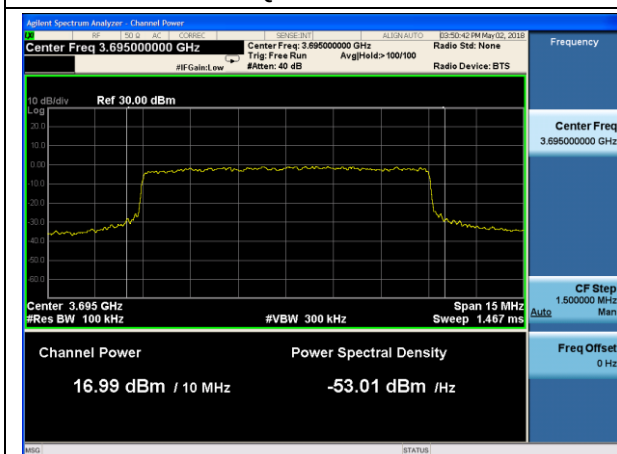
LTE Band 43 16QAM 10MHz CH44140



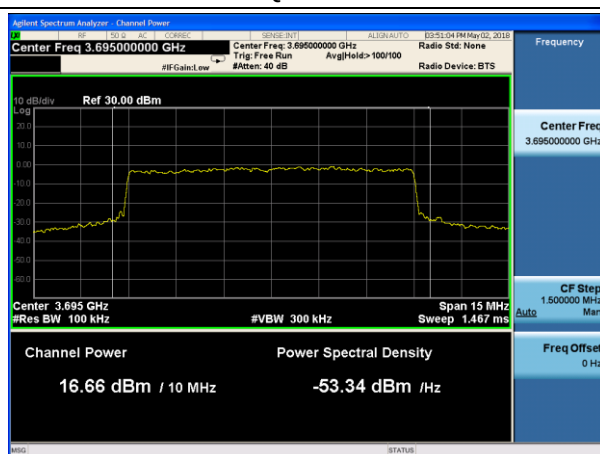
LTE Band 43 QPSK 10MHz CH44340



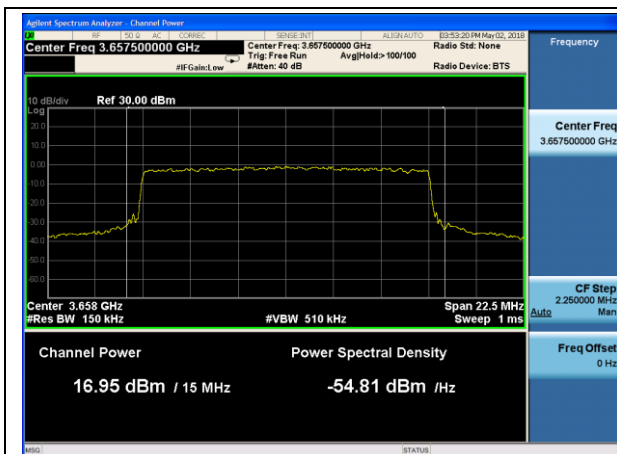
LTE Band 43 16QAM 10MHz CH44340



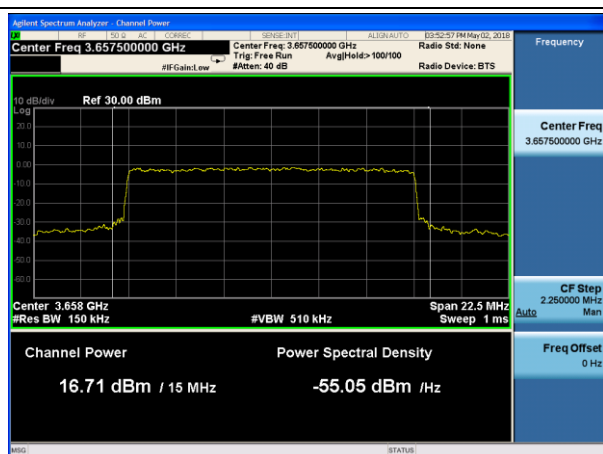
LTE Band 43 QPSK 10MHz CH44540



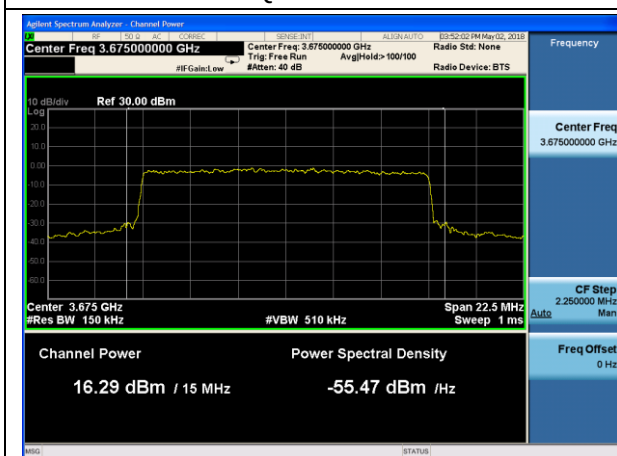
LTE Band 43 16QAM 10MHz CH44540



LTE Band 43 QPSK 15MHz CH44165



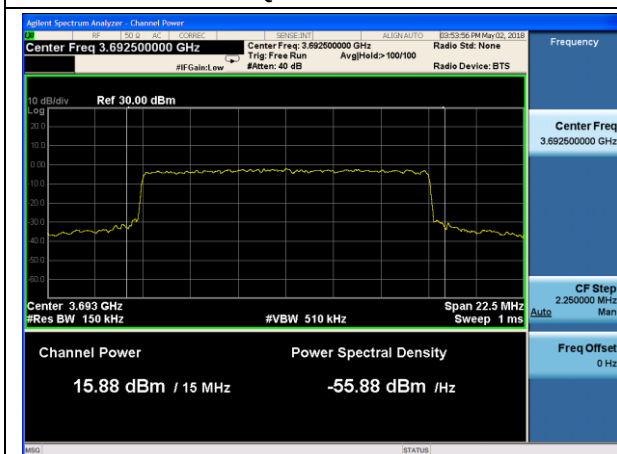
LTE Band 43 16QAM 15MHz CH44165



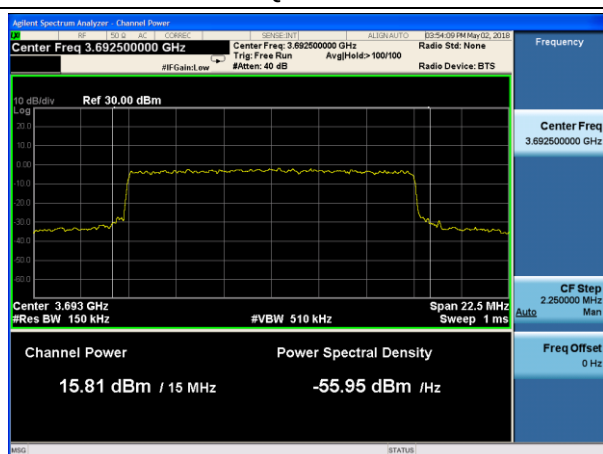
LTE Band 43 QPSK 15MHz CH44340



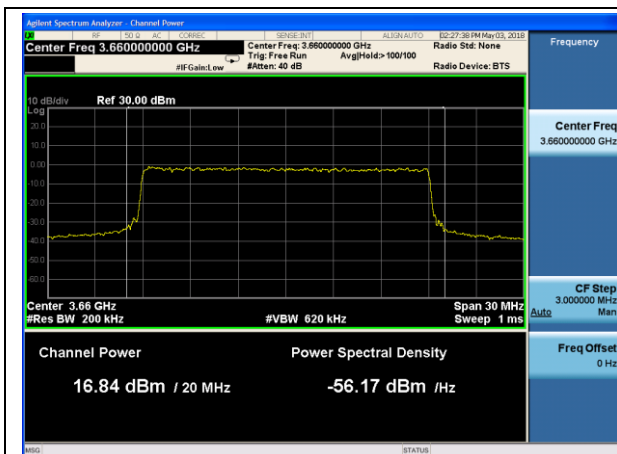
LTE Band 43 16QAM 15MHz CH44340



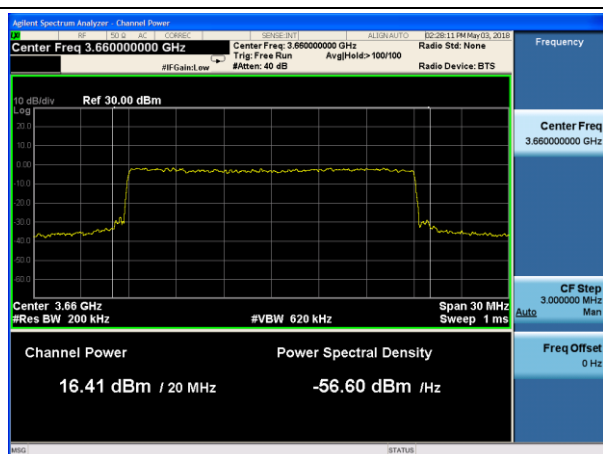
LTE Band 43 QPSK 15MHz CH44515



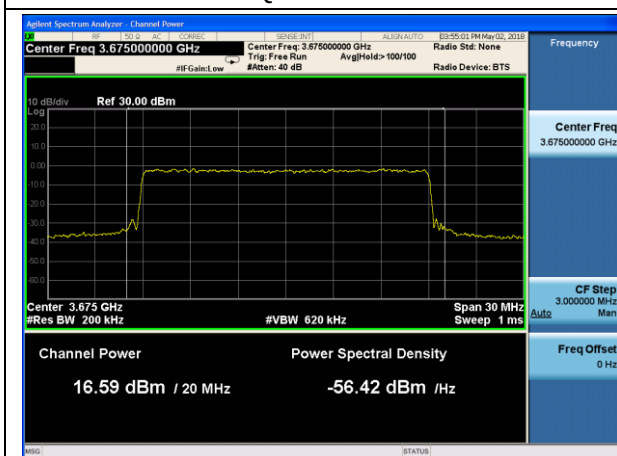
LTE Band 43 16QAM 15MHz CH44515



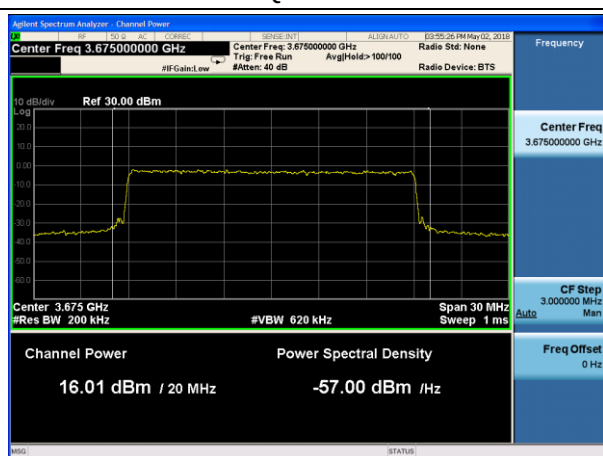
LTE Band 43 QPSK 20MHz CH44190



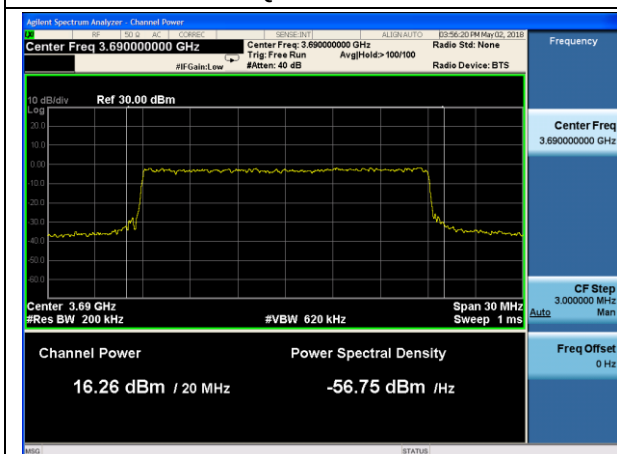
LTE Band 43 16QAM 20MHz CH44190



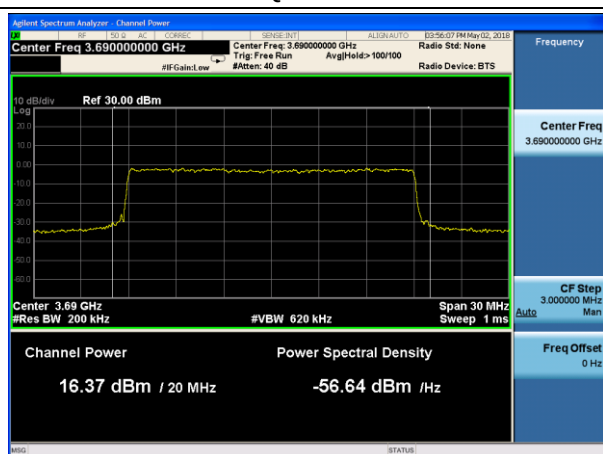
LTE Band 43 QPSK 20MHz CH44340



LTE Band 43 16QAM 20MHz CH44340



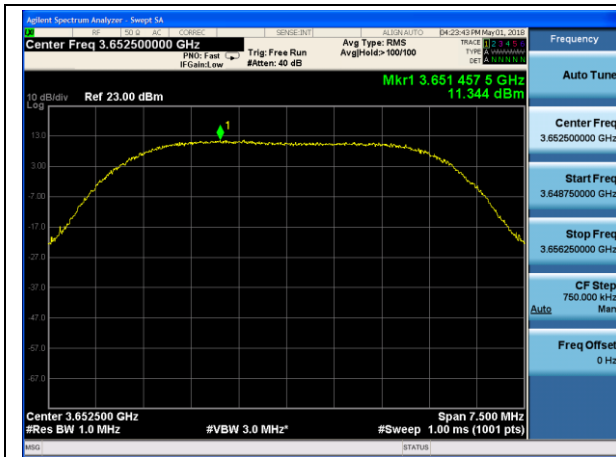
LTE Band 43 QPSK 20MHz CH44490



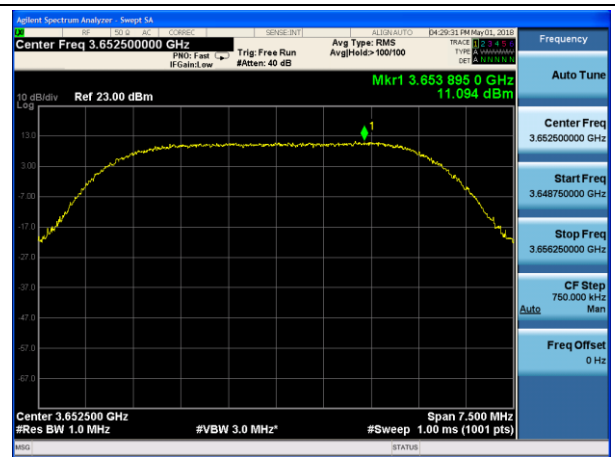
LTE Band 43 16QAM 20MHz CH44490



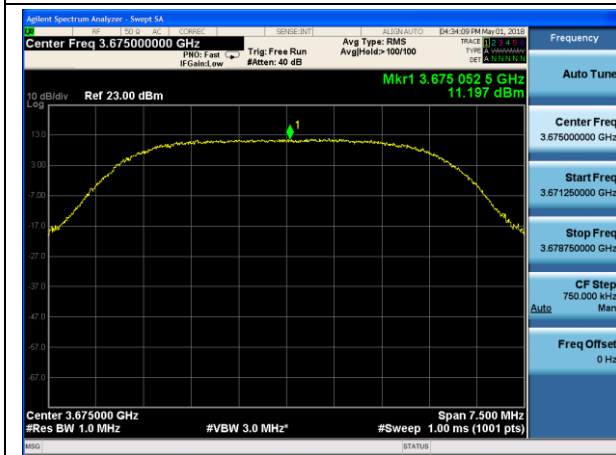
LTE TDD Band 43				Conducted Power Spectral Density(dBm)/1MHz			EIRP Power Spectral Density(dBm)/1MHz			EIRP Power Spectral Density(mW)/1MHz			Limit(mW)/1MHz
BW	Mddulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			
				44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	
5MHz	QPSK	25	0	11.344	11.197	10.593	15.344	15.197	14.593	34.2295	33.0902	28.7939	40
	16QAM	25	0	11.094	10.523	10.833	15.094	14.523	14.833	32.3147	28.3335	30.4299	40
BW	Mddulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	/
10MHz	QPSK	50	0	7.429	7.108	7.284	11.429	11.108	11.284	13.8963	12.9062	13.44	40
	16QAM	50	0	8.01	6.758	7.658	12.01	10.758	11.658	15.8855	11.9069	14.6487	40
BW	Mddulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44165 /3657.5	44340 /3675	44515 /3692.5	44165 /3657.5	44340 /3675	44515 /3692.5	44165 /3657.5	44340 /3675	44515 /3692.5	/
15MHz	QPSK	75	0	6.364	5.946	5.281	10.364	9.946	9.281	10.8743	9.87643	8.47423	40
	16QAM	75	0	6.429	5.809	5.716	10.429	9.809	9.716	11.0382	9.56974	9.36699	40
BW	Mddulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44190 /3660	44340 /3675	44490 /3690	44190 /3660	44340 /3675	44490 /3690	44190 /3660	44340 /3675	44490 /3690	/
20MHz	QPSK	100	0	5.184	4.342	4.298	9.184	8.342	8.298	8.28705	6.82653	6.75772	40
	16QAM	100	0	4.724	4.181	4.192	8.724	8.181	8.192	7.45418	6.57809	6.59478	40



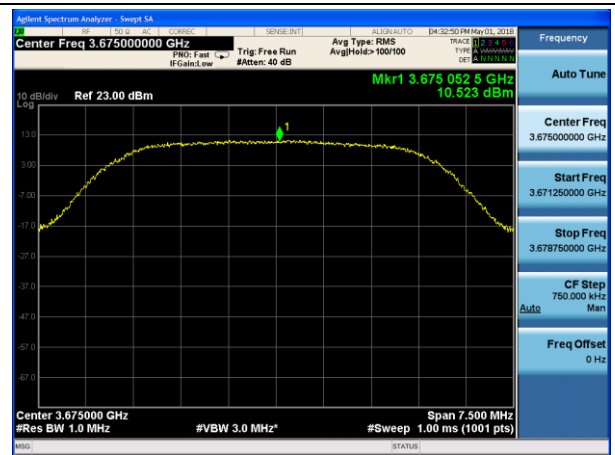
LTE Band 43 QPSK 5MHz CH44115



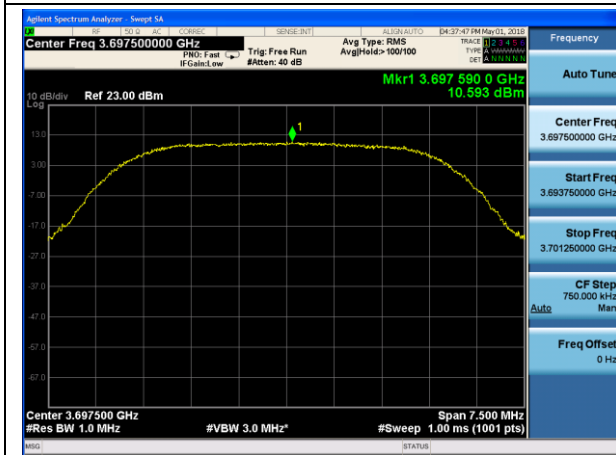
LTE Band 43 16QAM 5MHz CH44115



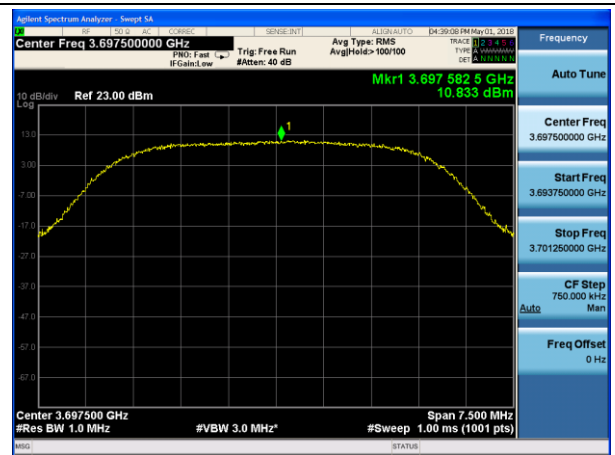
LTE Band 43 QPSK 5MHz CH44340



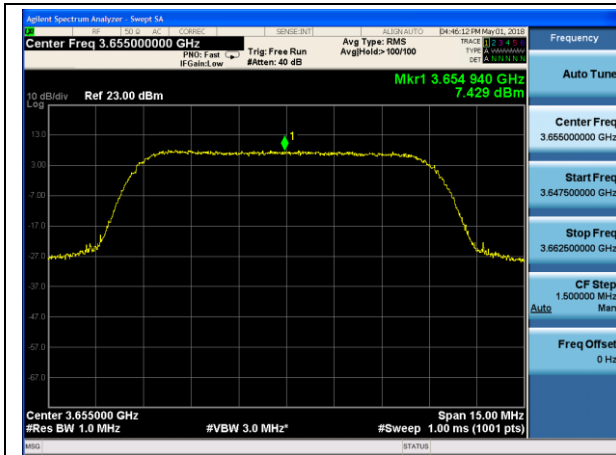
LTE Band 43 16QAM 5MHz CH44340



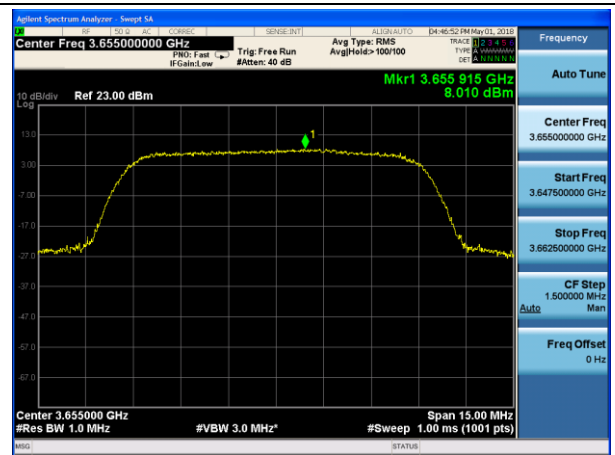
LTE Band 43 QPSK 5MHz CH44565



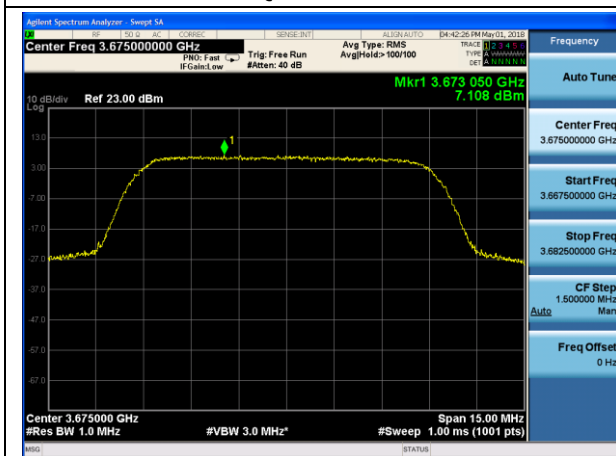
LTE Band 43 16QAM 5MHz CH44565



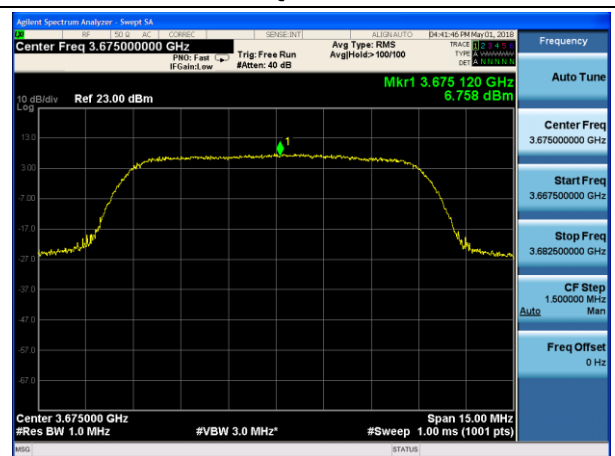
LTE Band 43 QPSK 10MHz CH44140



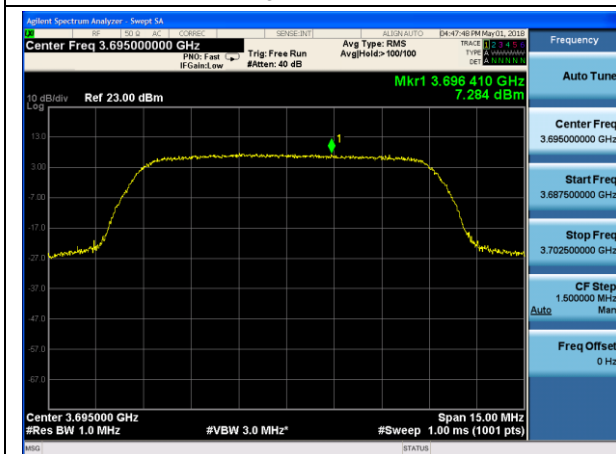
LTE Band 43 16QAM 10MHz CH44140



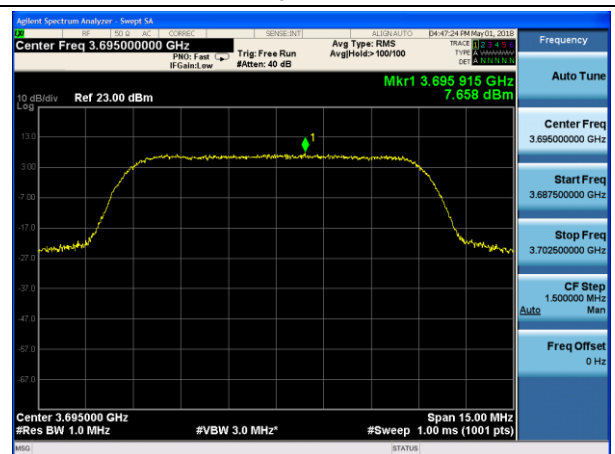
LTE Band 43 QPSK 10MHz CH44340



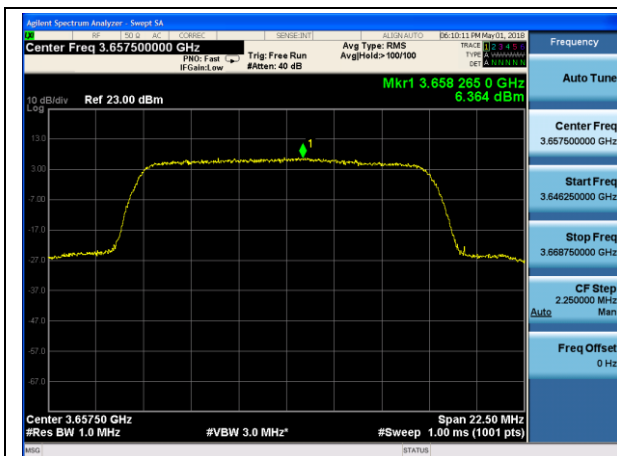
LTE Band 43 16QAM 10MHz CH44340



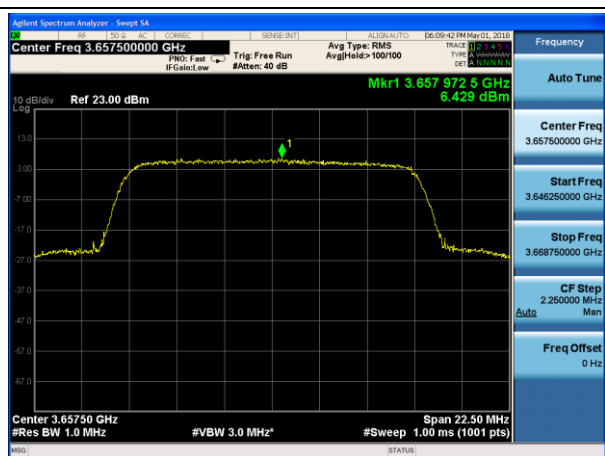
LTE Band 43 QPSK 10MHz CH44540



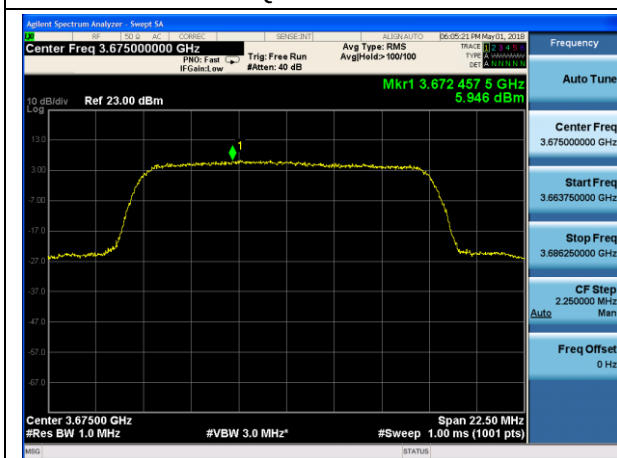
LTE Band 43 16QAM 10MHz CH44540



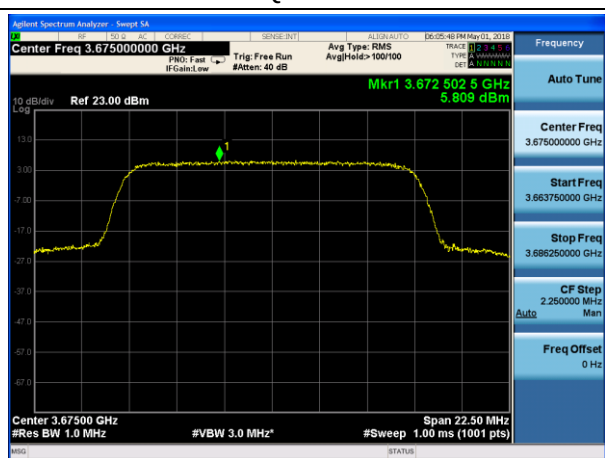
LTE Band 43 QPSK 15MHz CH44165



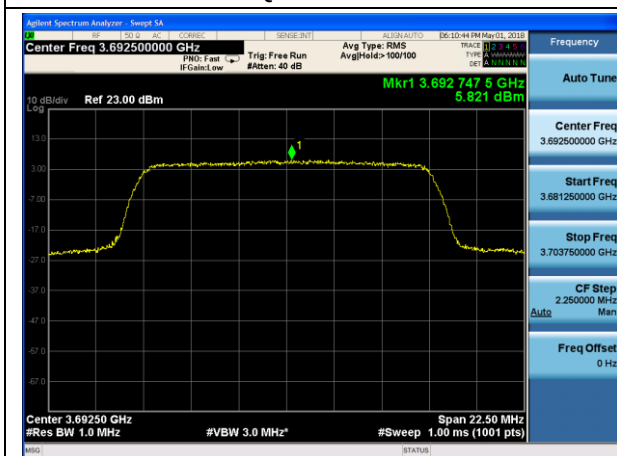
LTE Band 43 16QAM 15MHz CH44165



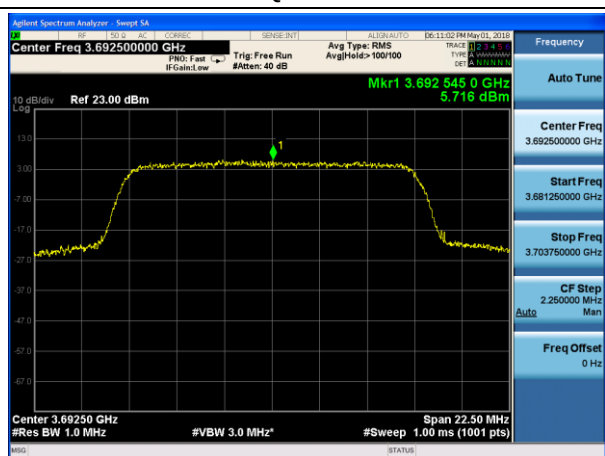
LTE Band 43 QPSK 15MHz CH44340



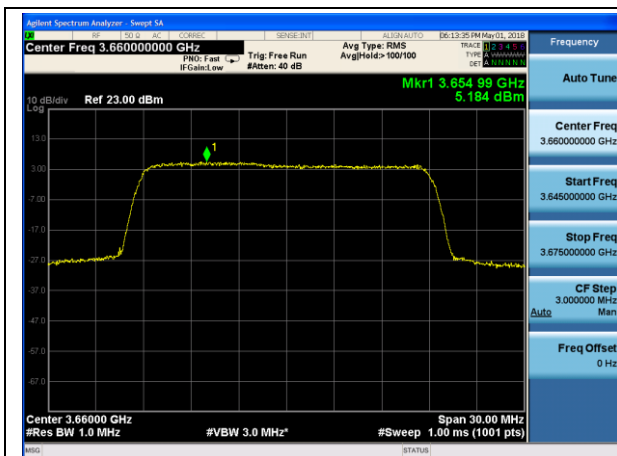
LTE Band 43 16QAM 15MHz CH44340



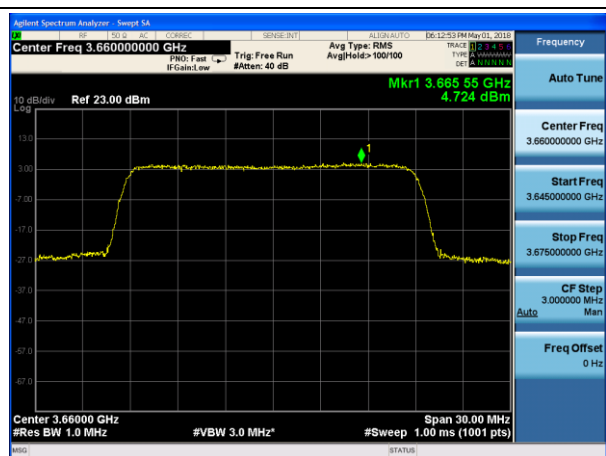
LTE Band 43 QPSK 15MHz CH44515



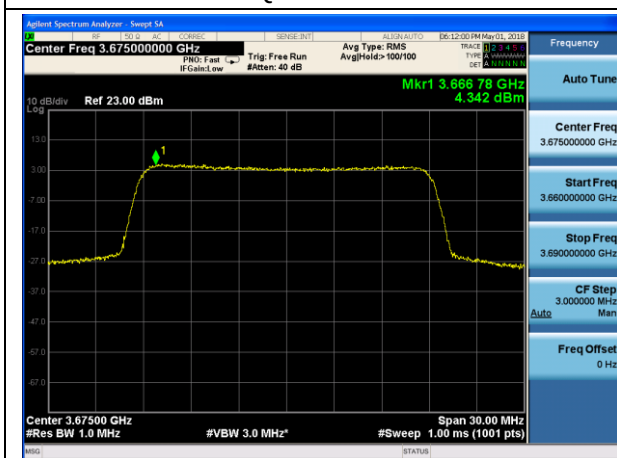
LTE Band 43 16QAM 15MHz CH44515



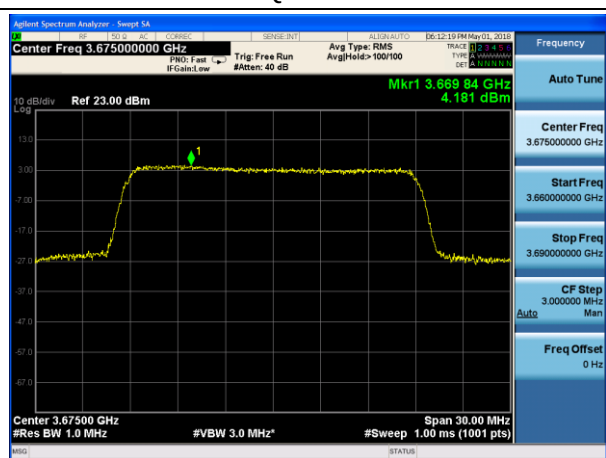
LTE Band 43 QPSK 20MHz CH44190



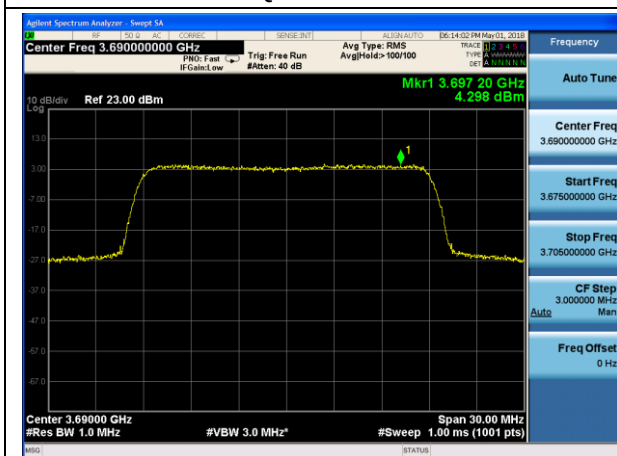
LTE Band 43 16QAM 20MHz CH44190



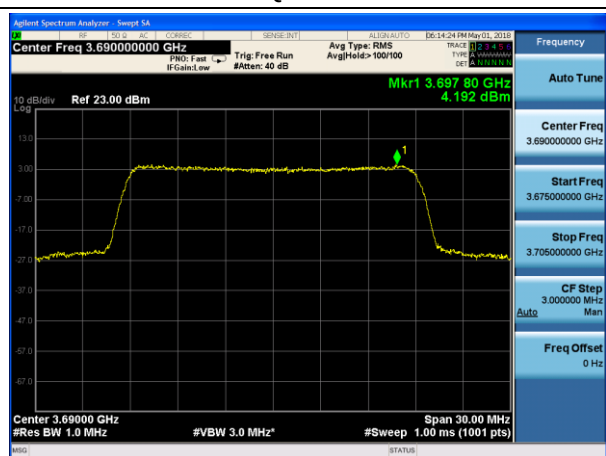
LTE Band 43 QPSK 20MHz CH44340



LTE Band 43 16QAM 20MHz CH44340



LTE Band 43 QPSK 20MHz CH44490



LTE Band 43 16QAM 20MHz CH44490