RF TEST REPORT

Applicant	Green Packet Berhad, Taiwan
FCC ID	W9V-DH725-GP
Product	DH-725 LTE Cat. 6 Wi-Fi Router
Brand	Greenpacket
Model	DH-725
Report No.	R1805A0242-R2V2
Issue Date	August 1, 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　　Kai Xu

Performed by: Jiang Peng Lan　　*Approved by: Kai Xu*

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Summary of measurementresults

No.	Test Type	Clause in FCC rules	Verdict
1	Power Output & Peak EIRP Density	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 SpuriousEmissions	2.1053/ 90.1323	PASS
Date of Testing: June 9, 2018~ June 22, 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.			

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1. Test Laboratory

1.1. Notes of the Test Report

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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.

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1.3. TestingLocation

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
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2. General Description of Equipment under Test

Client Information

Applicant	Green Packet Berhad, Taiwan
Applicant address	6F, No.21, Lane 583, Rueiguang Rd. Neihu District, Taipei City 11492, Taiwan
Manufacturer	Green Packet Berhad, Taiwan
Manufacturer address	6F, No.21, Lane 583, Rueiguang Rd. Neihu District, Taipei City 11492, Taiwan

General Information

EUT Description			
Model	DH-725		
Product IMEI	351918068962628		
Hardware Version	V2.1		
Software Version	MG6_0.3.2.14_V1.0-IDU-GP		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	5dBi		
Test Mode(s)	LTE Band 43		
Test Modulation	QPSK,16QAM;		
LTE Category	6		
Maximum E.I.R.P.	LTE Band 43:	22.02 dBm	
Rated Power Supply Voltage	12V		
Extreme Voltage	Minimum: 9V Maximum: 15V		
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: AQUIL STAR PRECISION INDUSTRIAL(SHENZHEN) CO.,LTD Model: ASSA65A-120100		
Note: The information of the EUT is declared by the manufacturer.			

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3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of thefollowing 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

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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, horizontal 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
Power Output & Peak EIRP Density	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
Emission Mask	O	O	O	O	O	O	O	-	O	O	-	O
Frequency Stability	O	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
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.											

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5. Test Case Results

5.1. Power Output & Peak EIRP Density

Ambient condition

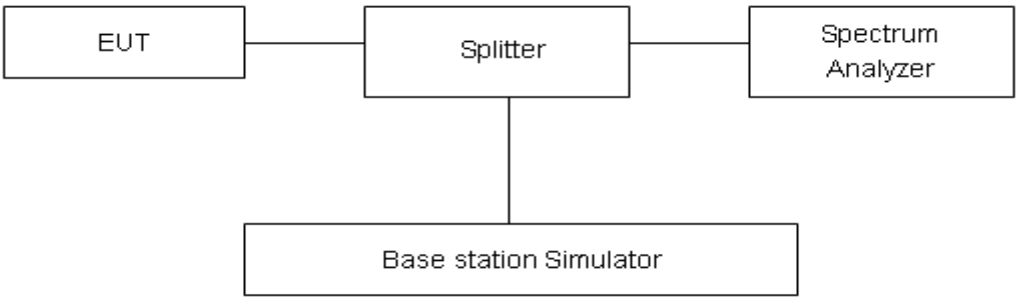
Temperature	Relative humidity
21°C ~25°C	40%~60%

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(a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

(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.

Limit	Limit
Base Station/ Fixed Station	25 watts/25 MHz
Mobile and portable stations	1 watt/25 MHz

Measurement Uncertainty

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

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Test Results

BW	Mddulation	Channel/Frequency (MHz)	Maximum Output Power(dBm/5MHz)	EIRP Limit (dBm/5MHz)	Margin(dB)	Peak EIRP Density(dBm/MHz)	EIRP Limit (dBm/5MHz)	Margin (dB)
5MHz	QPSK	44115/3652.5	21.91	36.99	15.08	9.99	30.00	20.01
		44340/3675	23.35	36.99	13.64	9.69	30.00	20.31
		44565/3697.5	24.26	36.99	12.73	9.47	30.00	20.53
	16QAM	44115/3652.5	21.29	36.99	15.70	8.84	30.00	21.17
		44340/3675	22.62	36.99	14.37	8.99	30.00	21.01
		44565/3697.5	23.45	36.99	13.54	8.70	30.00	21.30
BW	Mddulation	Channel/Frequency (MHz)	Maximum Output Power(dBm/10MHz)	EIRP Limit (dBm/10MHz)	Margin(dB)	Peak EIRP Densityr(dBm/MHz)	EIRP Limit (dBm/10MHz)	Margin (dB)
10MHz	QPSK	44140/3655	22.76	40.00	17.24	7.45	30.00	22.55
		44340/3675	23.85	40.00	16.15	7.10	30.00	22.90
		44540/3695	24.26	40.00	15.74	6.07	30.00	23.93
	16QAM	44140/3655	21.28	40.00	18.72	6.09	30.00	23.91
		44340/3675	22.62	40.00	17.38	6.26	30.00	23.74
		44540/3695	23.34	40.00	16.66	5.71	30.00	24.29
BW	Mddulation	Channel/Frequency (MHz)	Maximum Output Power(dBm/15MHz)	EIRP Limit (dBm/15MHz)	Margin(dB)	Peak EIRP Densityr(dBm/MHz)	EIRP Limit (dBm/15MHz)	Margin (dB)
15MHz	QPSK	44165/3675.5	22.74	41.76	19.02	5.64	30.00	24.36
		44340/3675	23.81	41.76	17.95	5.20	30.00	24.80
		44515/3692.5	24.21	41.76	17.55	7.98	30.00	22.02
	16QAM	44165/3675.5	21.25	41.76	20.51	3.91	30.00	26.09
		44340/3675	22.57	41.76	19.19	3.88	30.00	26.12
		44515/3692.5	23.30	41.76	18.46	5.04	30.00	24.97
BW	Mddulation	Channel/Frequency (MHz)	Maximum Output Power(dBm/20MHz)	EIRP Limit (dBm/20MHz)	Margin(dB)	Peak EIRP Densityr(dBm/MHz)	EIRP Limit (dBm/20MHz)	Margin (dB)

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20MHz	QPSK	44190/3670	22.71	43.01	20.30	5.19	30.00	24.81
		44340/3675	23.76	43.01	19.25	5.62	30.00	24.38
		44490/3690	24.17	43.01	18.84	2.96	30.00	27.04
	16QAM	44190/3670	21.23	43.01	21.78	3.77	30.00	26.24
		44340/3675	22.53	43.01	20.48	3.90	30.00	26.10
		44490/3690	23.27	43.01	19.74	3.19	30.00	26.81

Note: Limit(25W/25MHz)=43.98dBm/25MHz.

Limit(5W/5MHz)=36.99dBm/5MHz.

Limit(10W/10MHz)=40dBm/10MHz.

Limit(15W/15MHz)=41.76dBm/15MHz.

Limit(20W/20MHz)=43.01dBm/10MHz.

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LTE Band 43 QPSK 5MHz CH44115

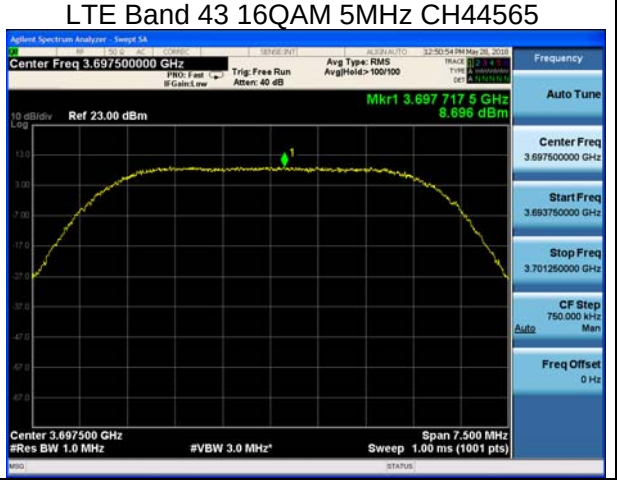
LTE Band 43 16QAM 5MHz CH44115

LTE Band 43 QPSK 5MHz CH44340

LTE Band 43 16QAM 5MHz CH44340

LTE Band 43 QPSK 5MHz CH44565

LTE Band 43 16QAM 5MHz CH44565



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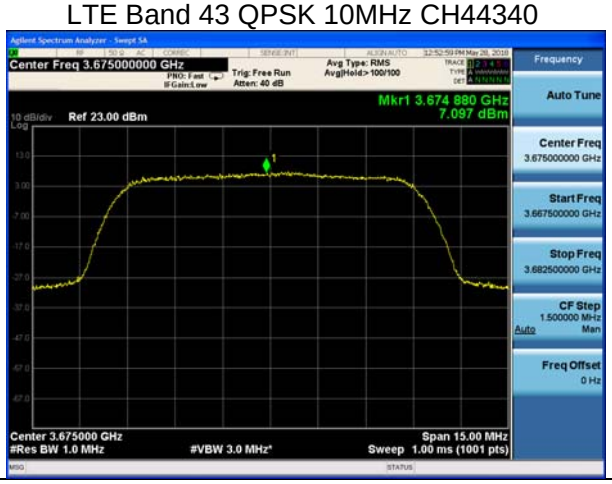
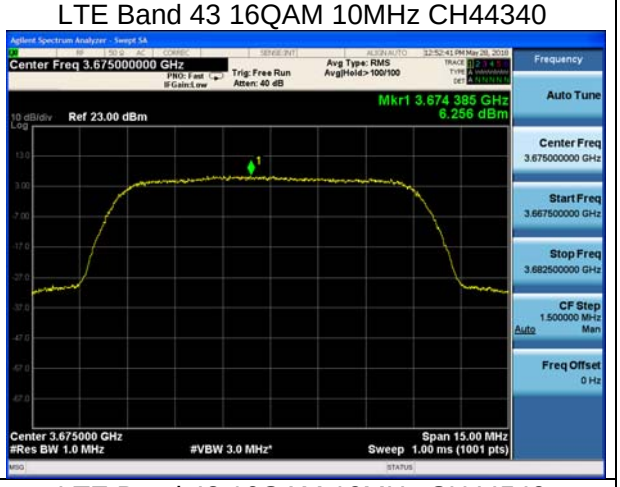
LTE Band 43 QPSK 10MHz CH44140

LTE Band 43 16QAM 10MHz CH44140

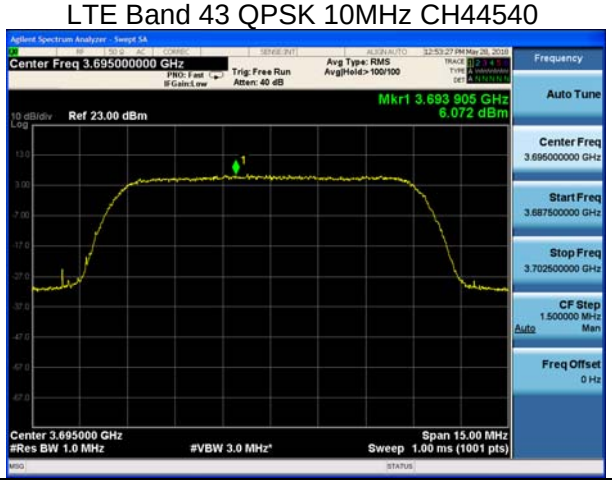
LTE Band 43 QPSK 10MHz CH44340



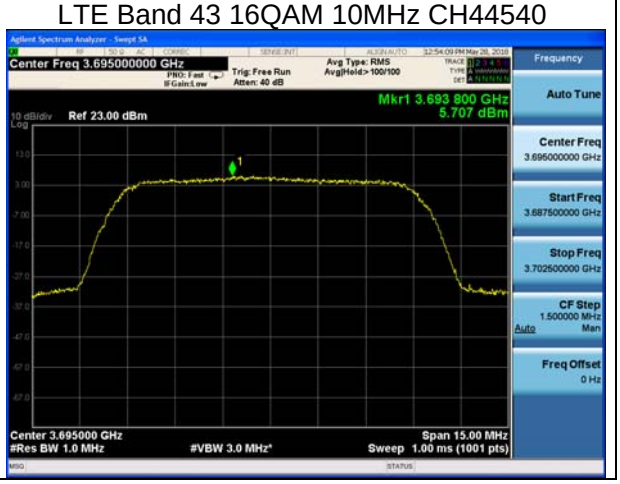
LTE Band 43 16QAM 10MHz CH44340



LTE Band 43 QPSK 10MHz CH44540



LTE Band 43 16QAM 10MHz CH44540



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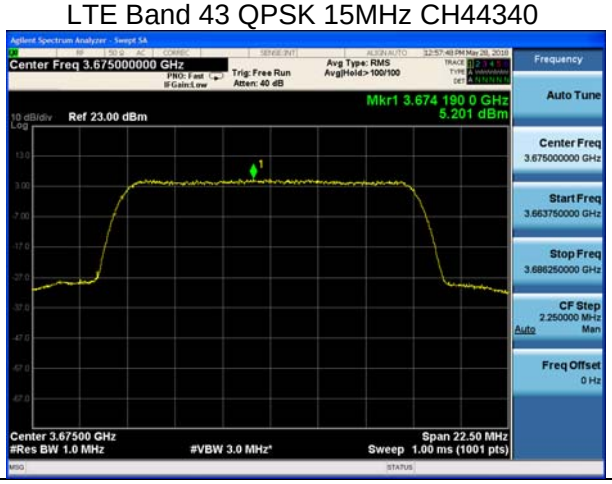
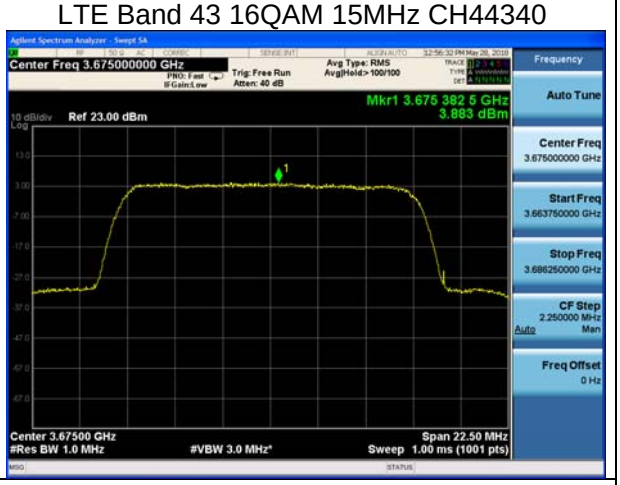
LTE Band 43 QPSK 15MHz CH44165

LTE Band 43 16QAM 15MHz CH44165

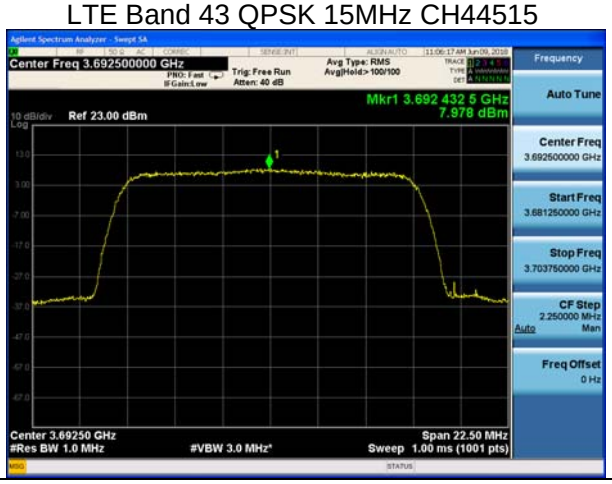
LTE Band 43 QPSK 15MHz CH44340



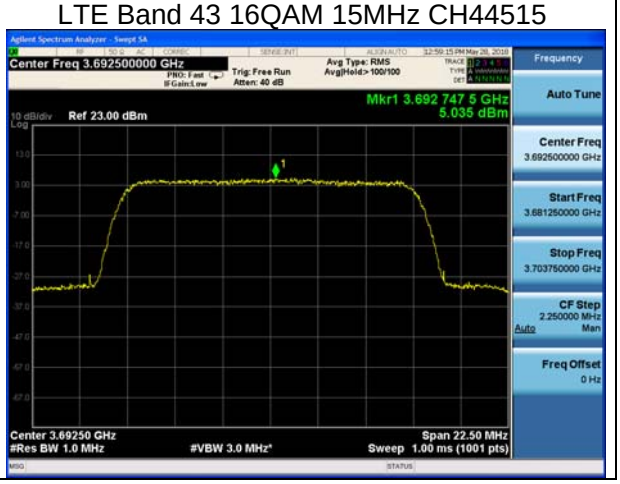
LTE Band 43 16QAM 15MHz CH44340



LTE Band 43 QPSK 15MHz CH44515



LTE Band 43 16QAM 15MHz CH44515



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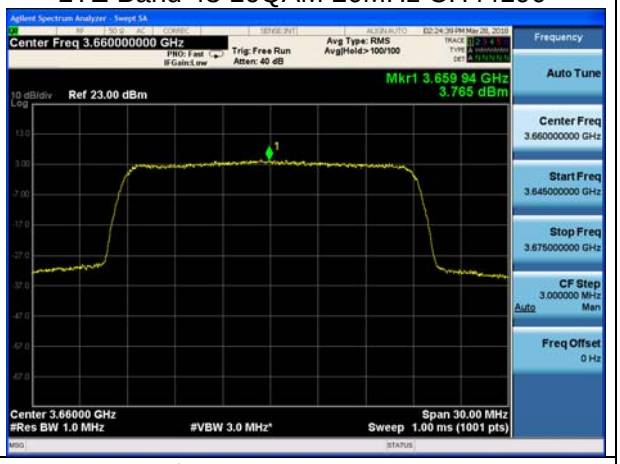
LTE Band 43 QPSK 20MHz CH44190

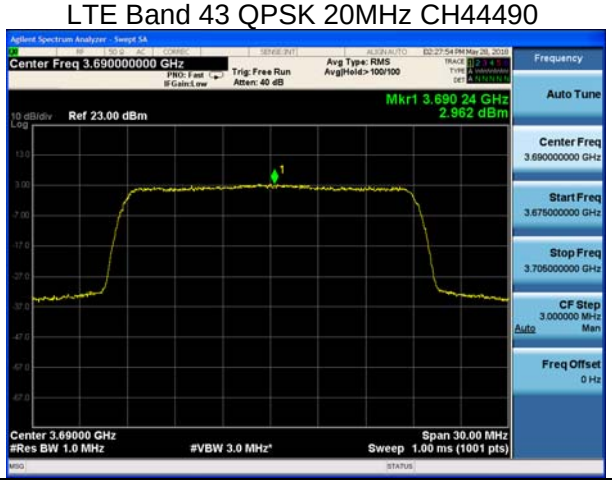
LTE Band 43 16QAM 20MHz CH44190



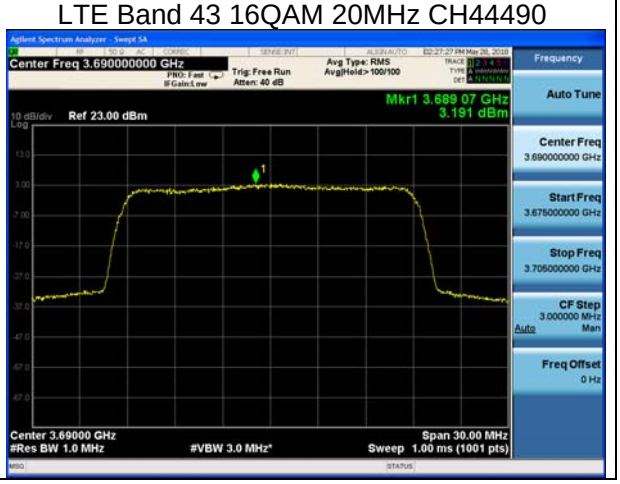
LTE Band 43 QPSK 20MHz CH44340

LTE Band 43 16QAM 20MHz CH44340

LTE Band 43 QPSK 20MHz CH44490



LTE Band 43 16QAM 20MHz CH44490



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5.2. Occupied Bandwidth

Ambient condition

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

Method of Measurement

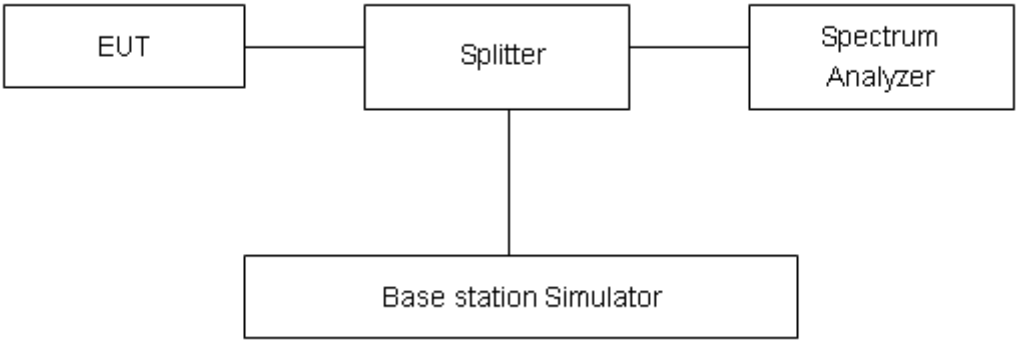
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 43 (5MHz),

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 43 (10MHz/15MHz/20MHz).

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.

Measurement Uncertainty

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

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Test Result

LTE Band 43						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth (MHz)
100%	QPSK	5	44115	3652.5	4.5496	5.545
			44340	3675	4.5385	5.487
			44565	3697.5	4.5280	5.225
		10	44140	3655	9.0672	10.050
			44340	3675	9.0667	10.780
			44540	3695	9.0784	10.710
		15	44165	3657.5	13.4830	14.410
			44340	3675	13.5230	15.160
			44515	3692.5	13.4920	14.720
		20	44190	3660	17.9170	18.910
			44340	3675	17.8680	18.930
			44490	3690	17.8640	19.080
	16QAM	5	44115	3652.5	4.5300	5.242
			44340	3675	4.5218	5.318
			44565	3697.5	4.5207	5.174
		10	44140	3655	9.0534	10.330
			44340	3675	9.0224	10.250
			44540	3695	9.0656	10.140
		15	44165	3657.5	13.4950	14.870
			44340	3675	13.4790	15.110
			44515	3692.5	13.4800	14.620
		20	44190	3660	17.8580	19.420
			44340	3675	17.8860	19.150
			44490	3690	17.8910	19.130

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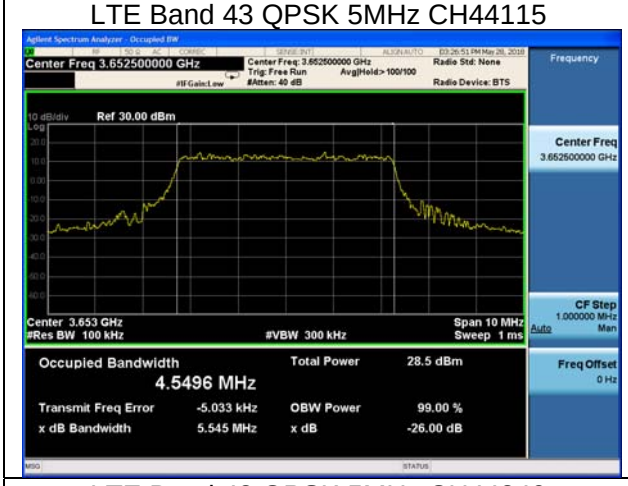
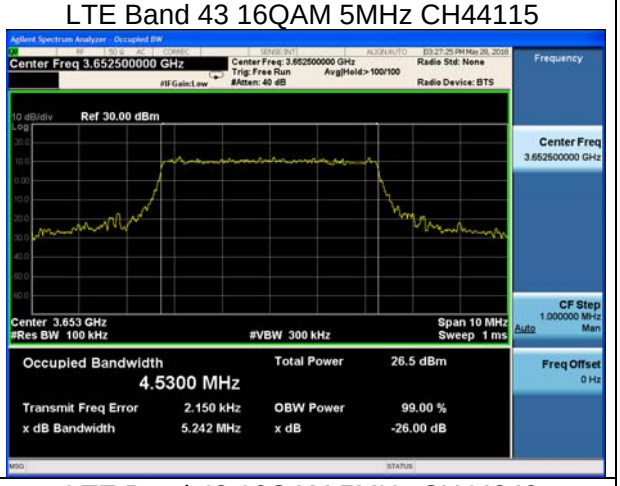
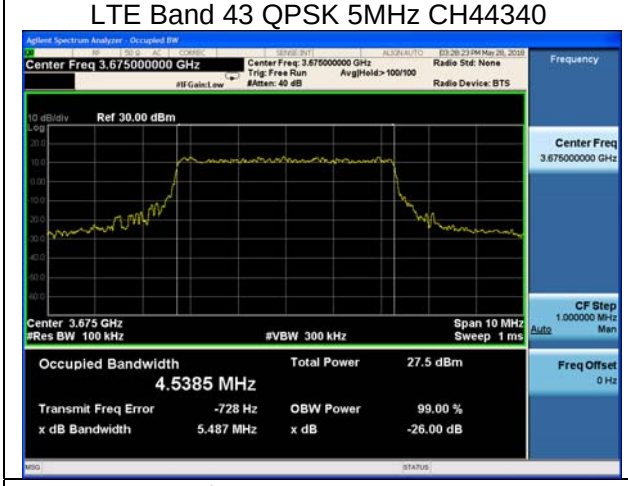
LTE Band 43 QPSK 5MHz CH44115



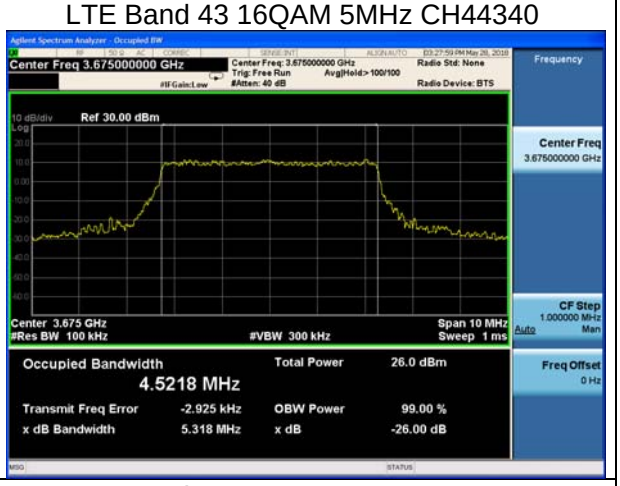
LTE Band 43 16QAM 5MHz CH44115



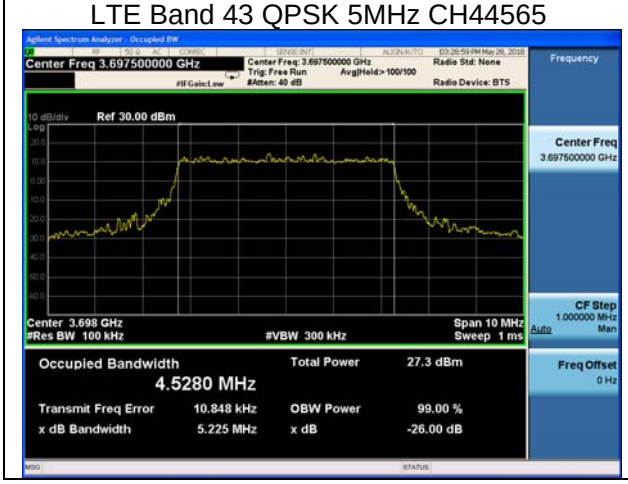
LTE Band 43 QPSK 5MHz CH44340



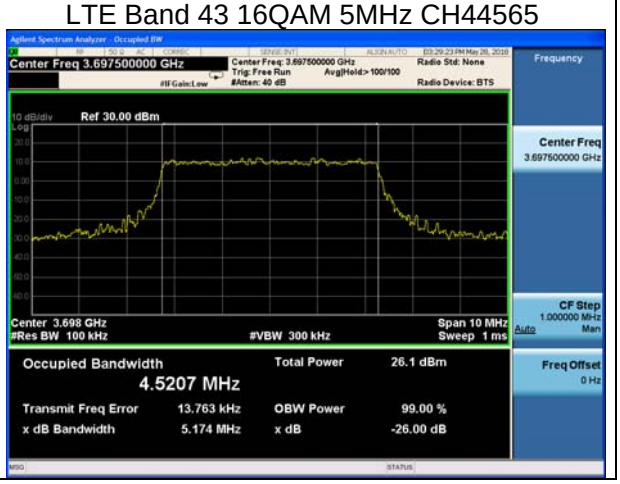
LTE Band 43 16QAM 5MHz CH44340



LTE Band 43 QPSK 5MHz CH44565



LTE Band 43 16QAM 5MHz CH44565



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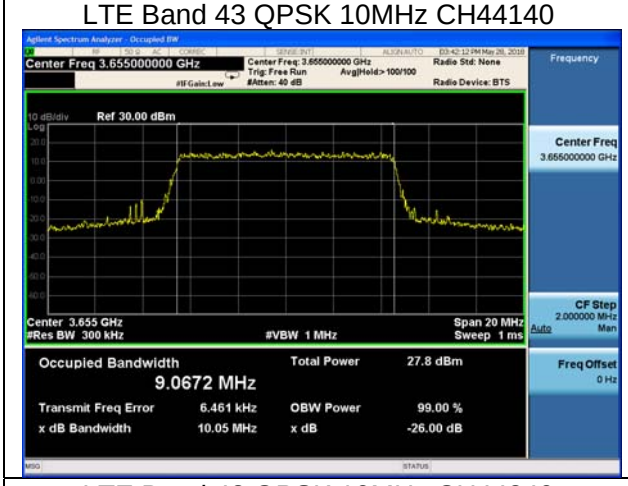
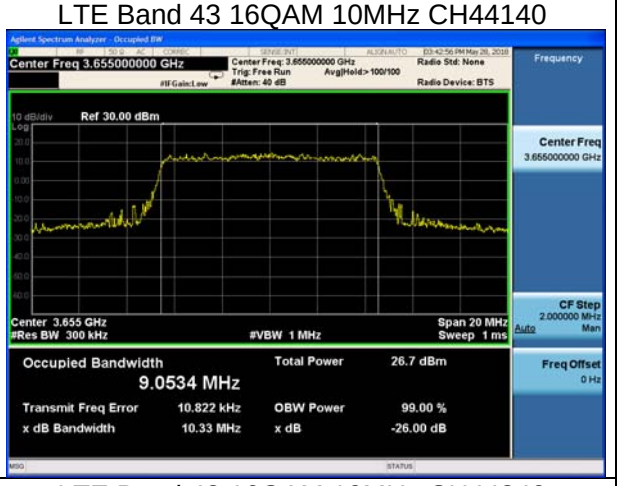
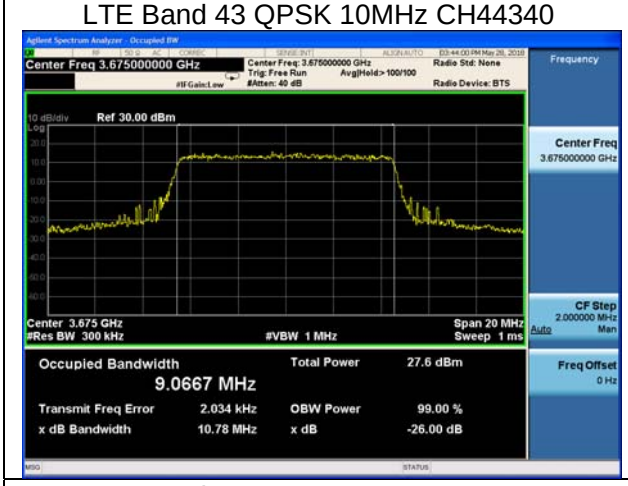
LTE Band 43 QPSK 10MHz CH44140



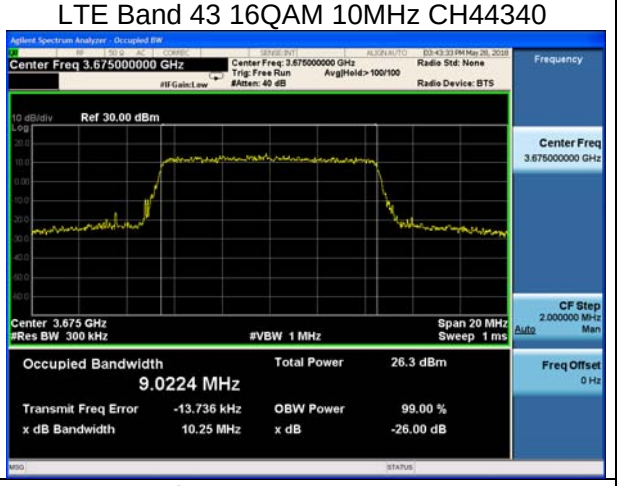
LTE Band 43 16QAM 10MHz CH44140



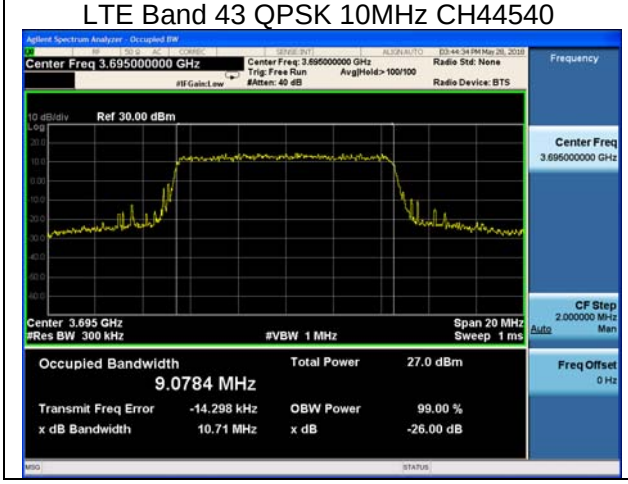
LTE Band 43 QPSK 10MHz CH44340



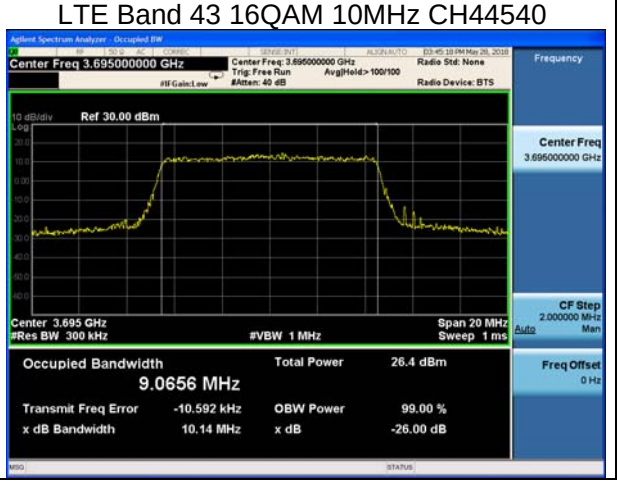
LTE Band 43 16QAM 10MHz CH44340



LTE Band 43 QPSK 10MHz CH44540



LTE Band 43 16QAM 10MHz CH44540



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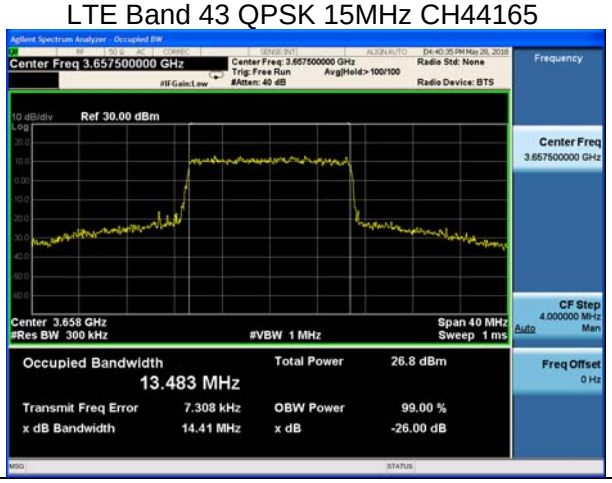
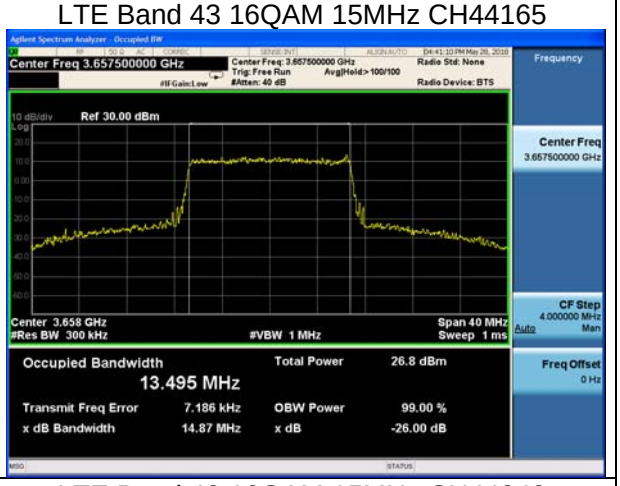
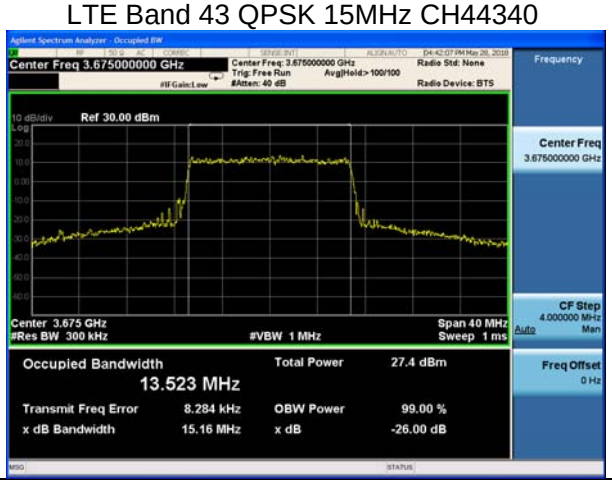
LTE Band 43 QPSK 15MHz CH44165



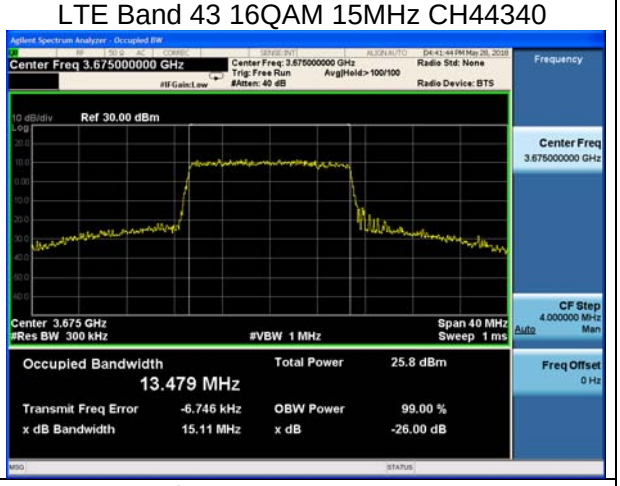
LTE Band 43 16QAM 15MHz CH44165



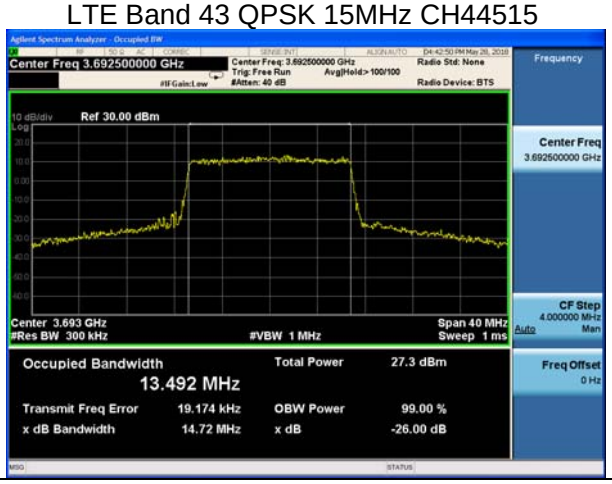
LTE Band 43 QPSK 15MHz CH44340



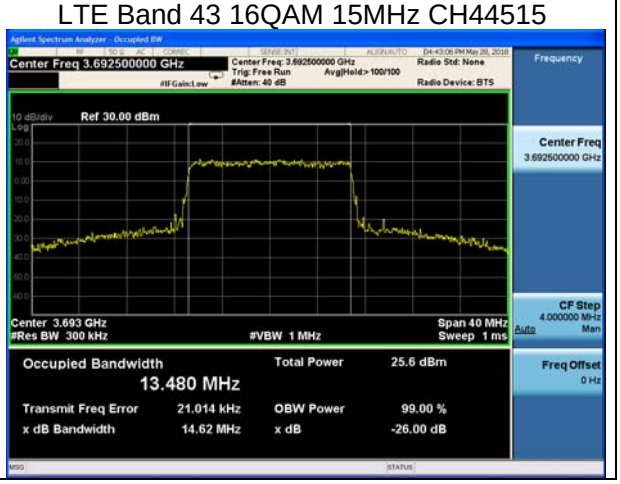
LTE Band 43 16QAM 15MHz CH44340



LTE Band 43 QPSK 15MHz CH44515



LTE Band 43 16QAM 15MHz CH44515



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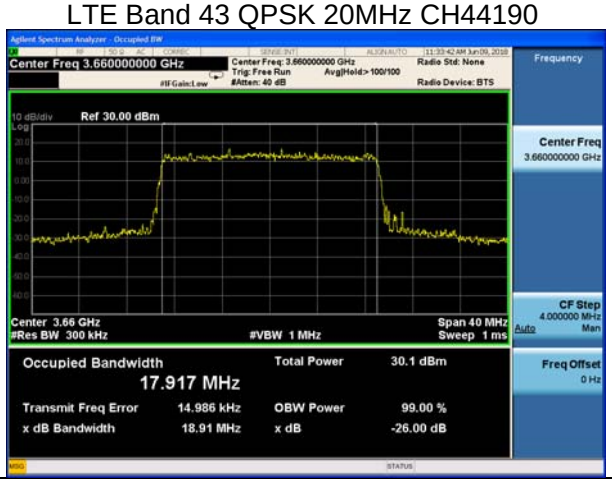
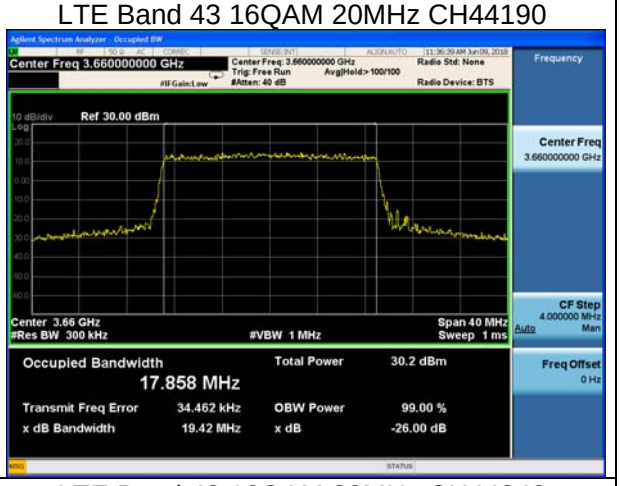
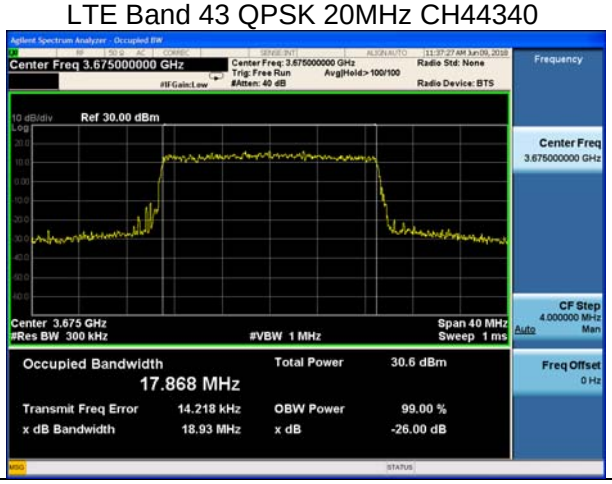
LTE Band 43 QPSK 20MHz CH44190



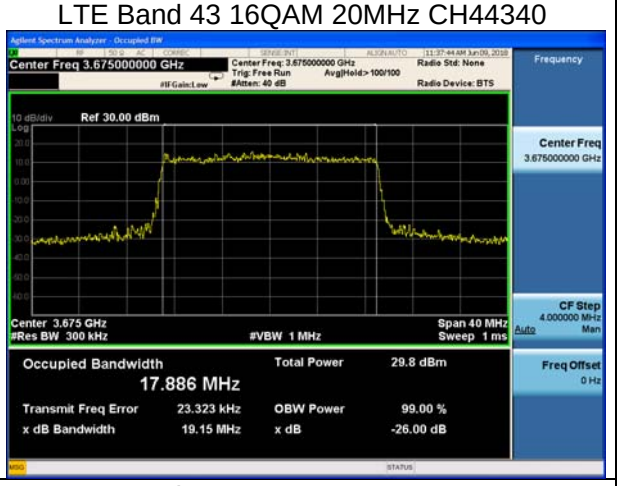
LTE Band 43 16QAM 20MHz CH44190



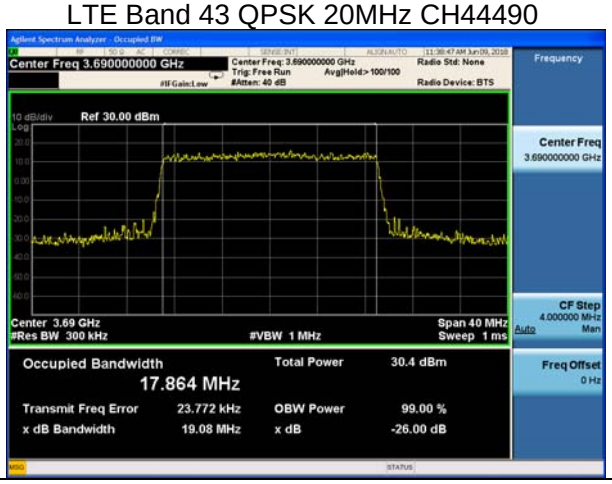
LTE Band 43 QPSK 20MHz CH44340



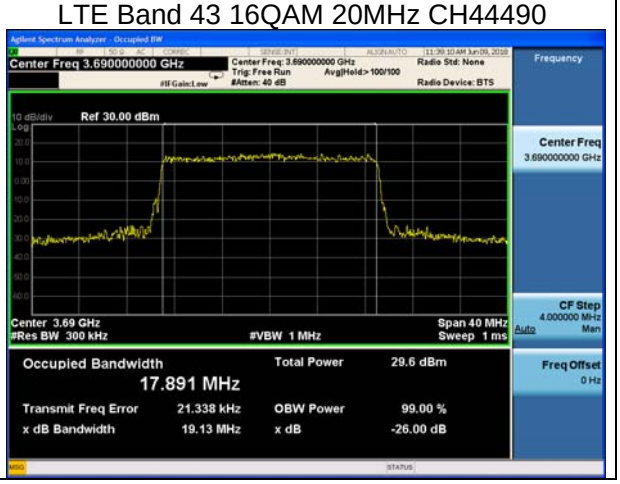
LTE Band 43 16QAM 20MHz CH44340



LTE Band 43 QPSK 20MHz CH44490



LTE Band 43 16QAM 20MHz CH44490



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5.3. Band Edge Compliance

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.

2. The band edges of low and high channels for the highest RF powers were measured.

3. For LTE Band 43 Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.Beyond the 1 MHz band from the band edge, RBW=1MHz was used.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 43 (5MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 43 (10MHz).

RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 43 (15MHz).

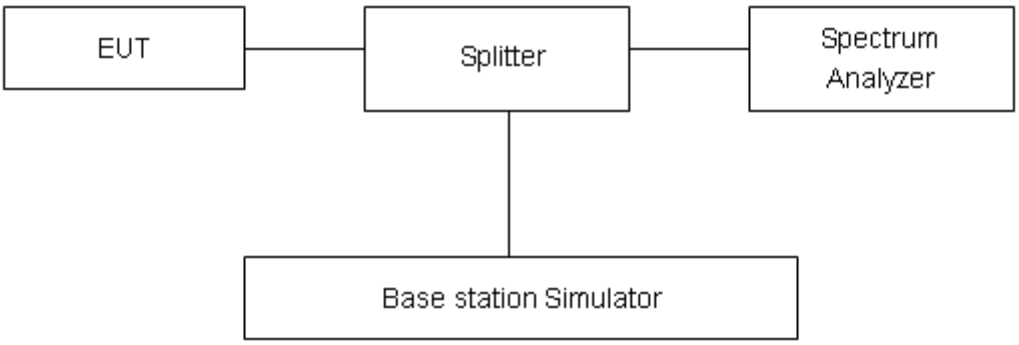
RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 43 (20MHz) onspectrumanalyzer.

4. Set spectrum analyzer with RMS detector.

5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

6. Checked that all the results comply with the emission limit line.

Test Setup



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Limits

Rule Part 2.1051&90.1323 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.

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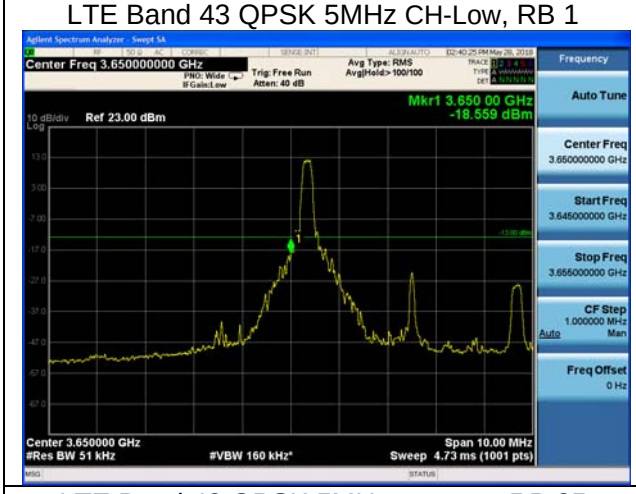
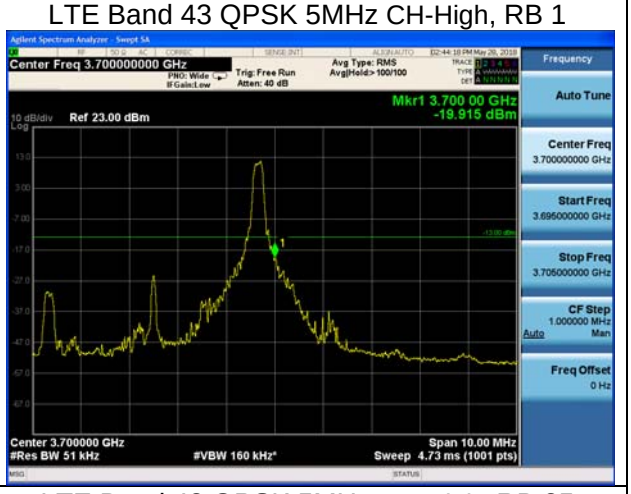
Test Result

All the test traces in the plots shows the test results clearly.

LTE Band 43 QPSK 5MHz CH-Low, RB 1

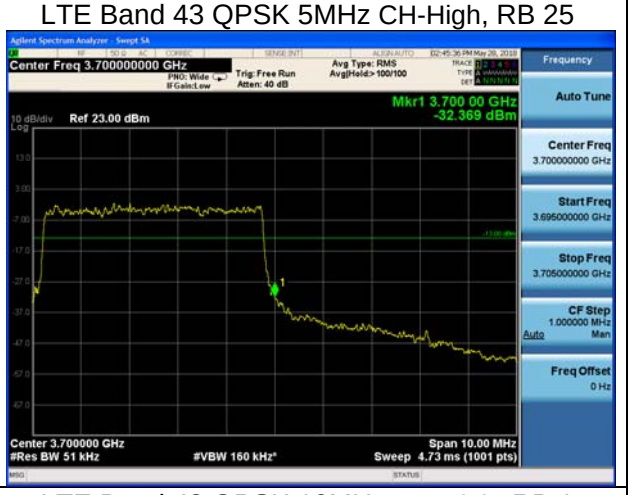


LTE Band 43 QPSK 5MHz CH-High, RB 1

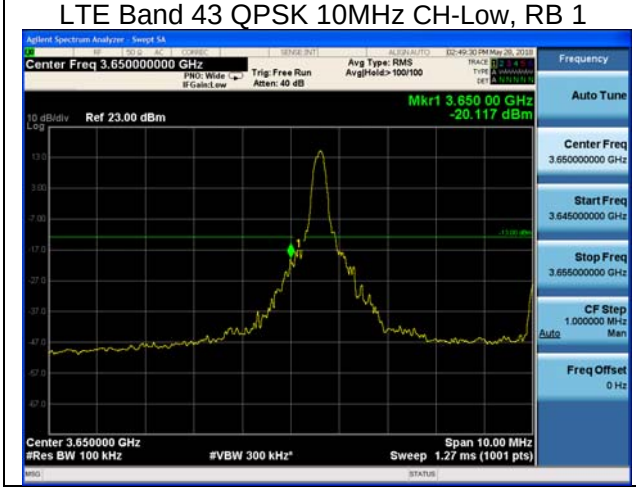


LTE Band 43 QPSK 5MHz CH-Low, RB 25

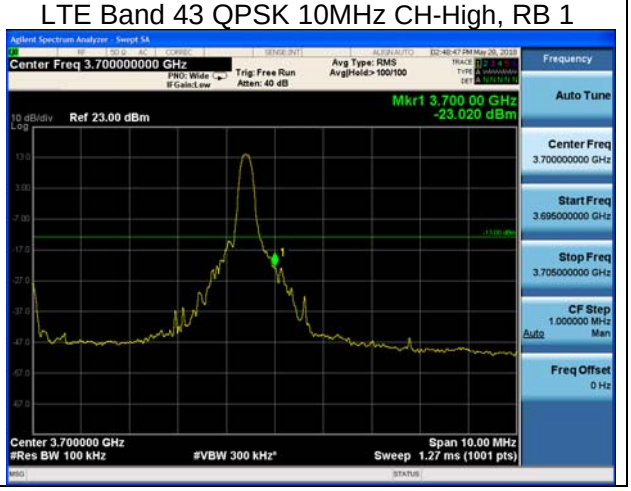
LTE Band 43 QPSK 5MHz CH-High, RB 25



LTE Band 43 QPSK 10MHz CH-Low, RB 1



LTE Band 43 QPSK 10MHz CH-High, RB 1



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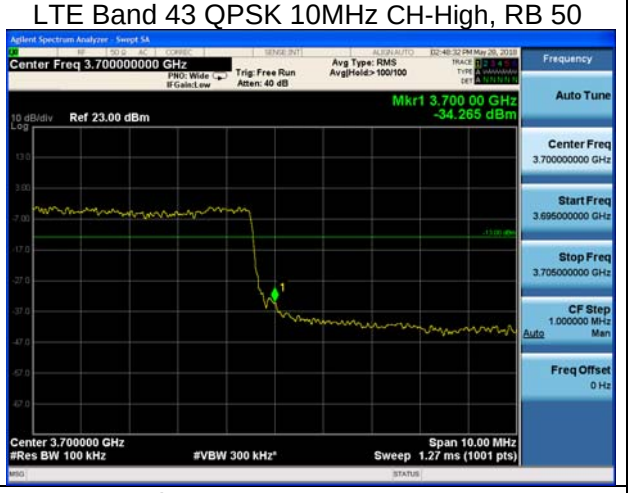
LTE Band 43 QPSK 10MHz CH-Low, RB 50

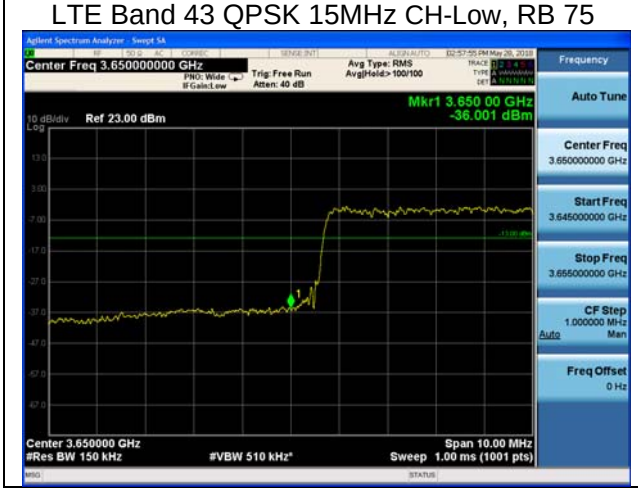
LTE Band 43 QPSK 10MHz CH-High, RB 50



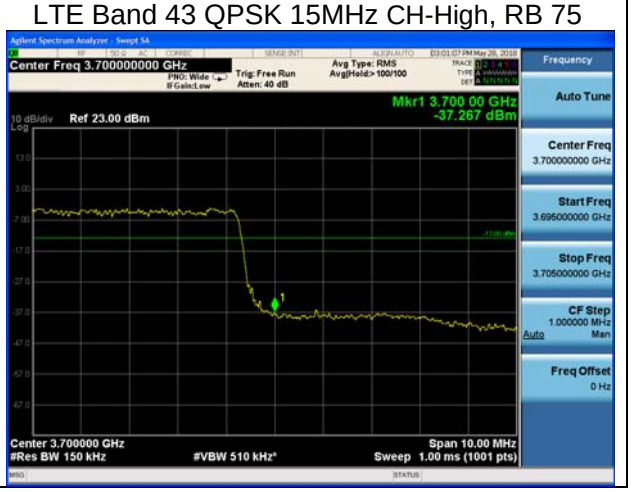
LTE Band 43 QPSK 15MHz CH-Low, RB 1

LTE Band 43 QPSK 15MHz CH-High, RB 1

LTE Band 43 QPSK 15MHz CH-Low, RB 75



LTE Band 43 QPSK 15MHz CH-High, RB 75



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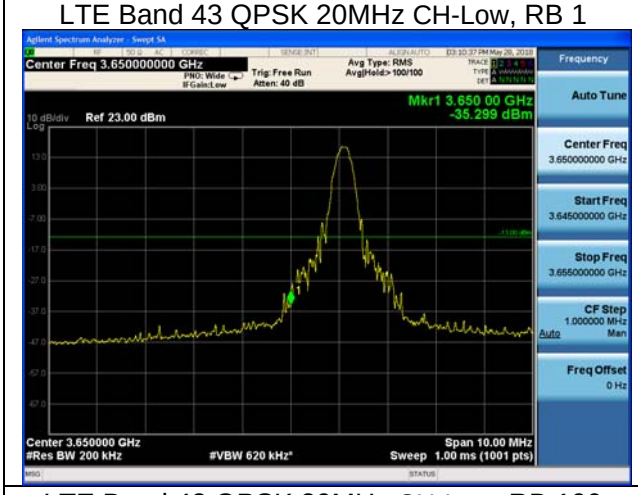
LTE Band 43 QPSK 20MHz CH-Low, RB 1

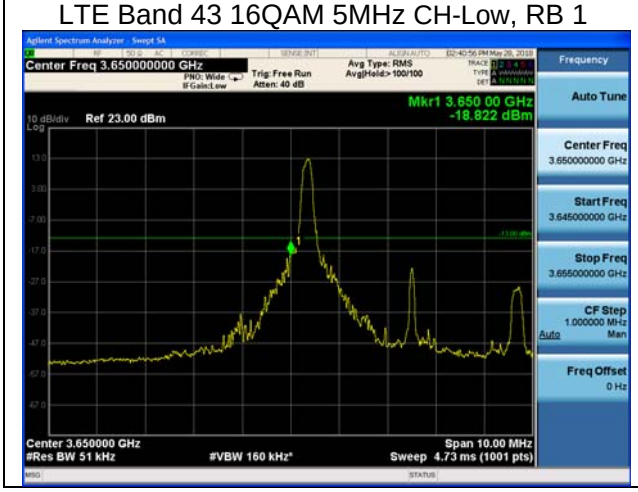


LTE Band 43 QPSK 20MHz CH-High, RB 1

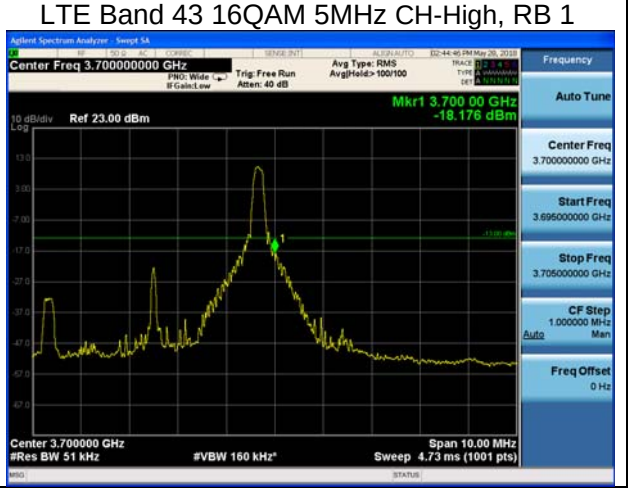
LTE Band 43 QPSK 20MHz CH-Low, RB 100

LTE Band 43 QPSK 20MHz CH-High, RB 100

LTE Band 43 16QAM 5MHz CH-Low, RB 1



LTE Band 43 16QAM 5MHz CH-High, RB 1



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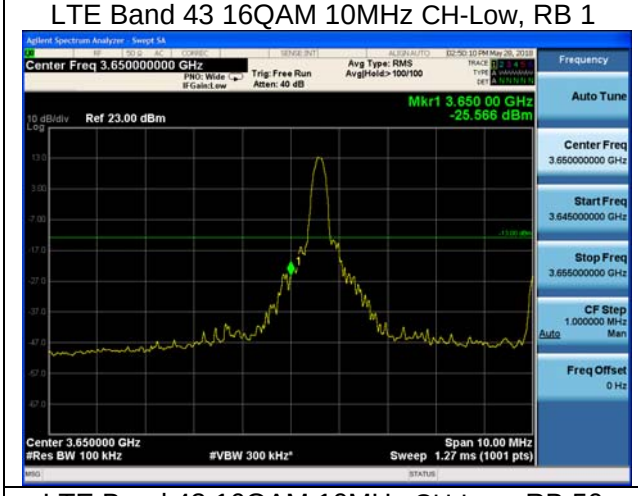
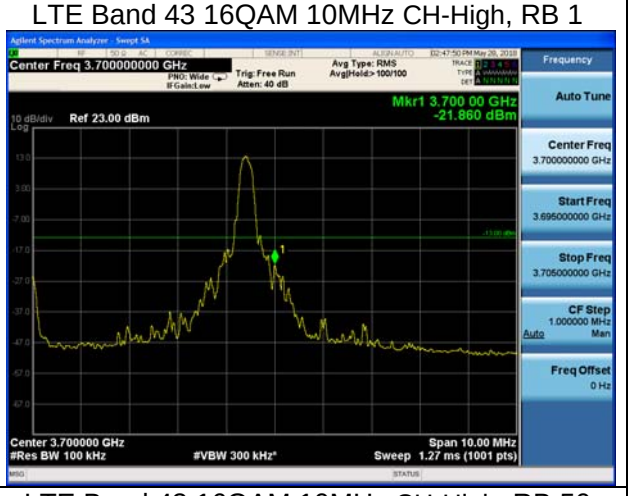
LTE Band 43 16QAM 5MHz CH-Low, RB 25

LTE Band 43 16QAM 5MHz CH-High, RB 25

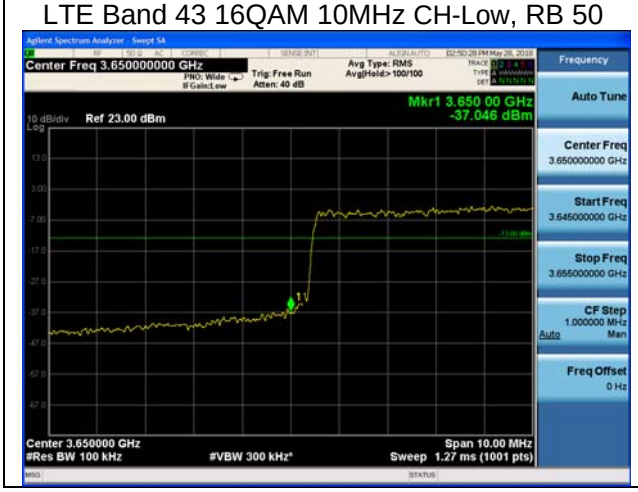
LTE Band 43 16QAM 10MHz CH-Low, RB 1



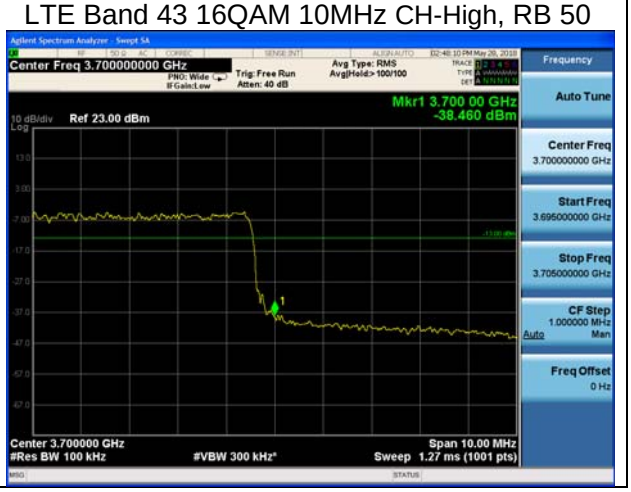
LTE Band 43 16QAM 10MHz CH-High, RB 1



LTE Band 43 16QAM 10MHz CH-Low, RB 50



LTE Band 43 16QAM 10MHz CH-High, RB 50



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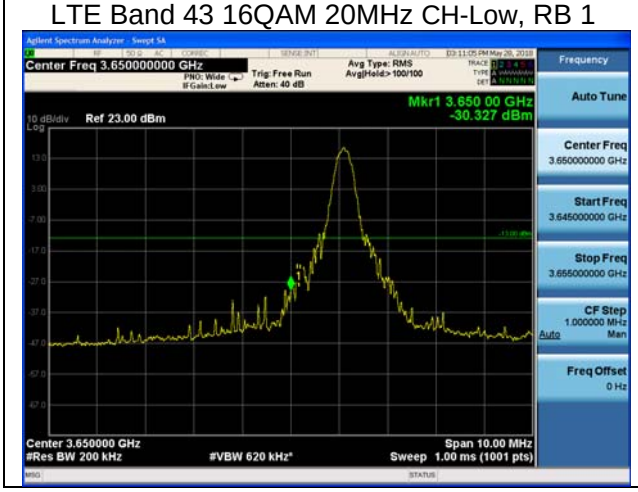
LTE Band 43 16QAM 15MHz CH-Low, RB 1

LTE Band 43 16QAM 15MHz CH-High, RB 1

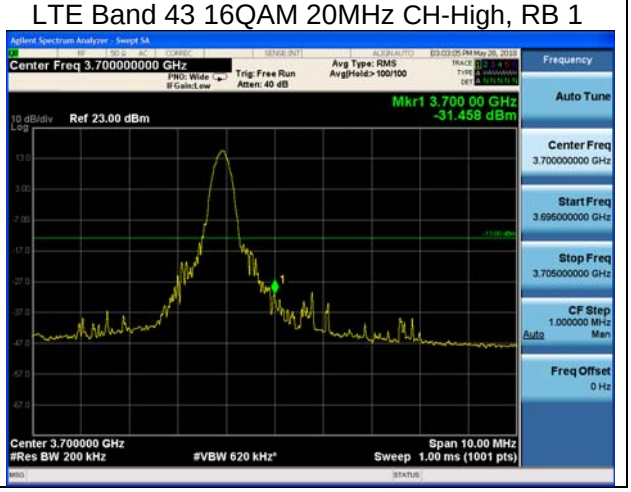
LTE Band 43 16QAM 15MHz CH-Low, RB 75

LTE Band 43 16QAM 15MHz CH-High, RB 75

LTE Band 43 16QAM 20MHz CH-Low, RB 1



LTE Band 43 16QAM 20MHz CH-High, RB 1



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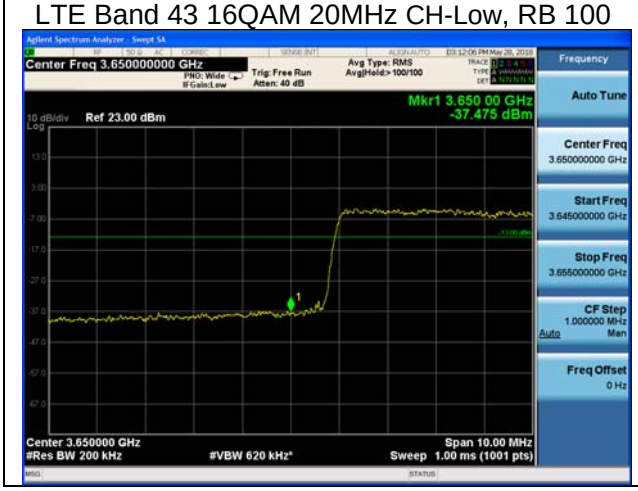
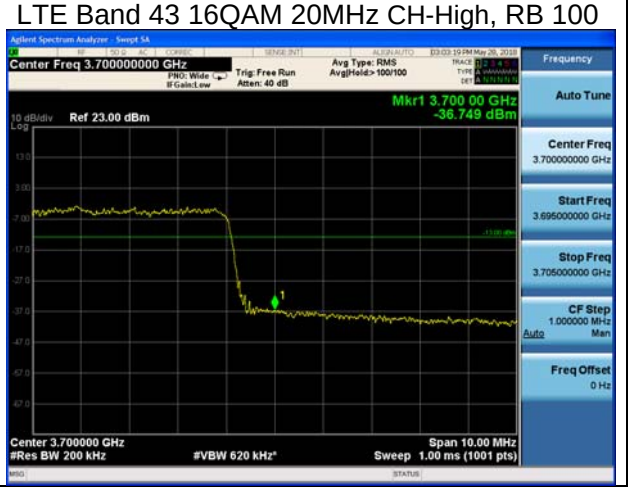
LTE Band 43 16QAM 20MHz CH-Low, RB 100	LTE Band 43 16QAM 20MHz CH-High, RB 100
	

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5.4. Emission Mask

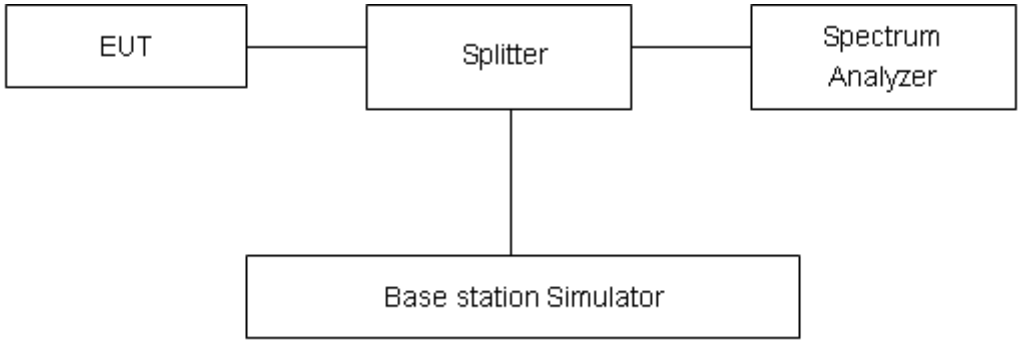
Ambient condition

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

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 51kHz, VBW is set to 160kHz for 5MHz, .
RBW is set to 100kHz, VBW is set to 300kHz for 10MHz,
RBW is set to 150kHz, VBW is set to 510kHz for 15MHz,
RBW is set to 200kHz, VBW is set to 620kHz for 20MHz.
Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 90.210(b) For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

Rule Part 90.1323(a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

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.

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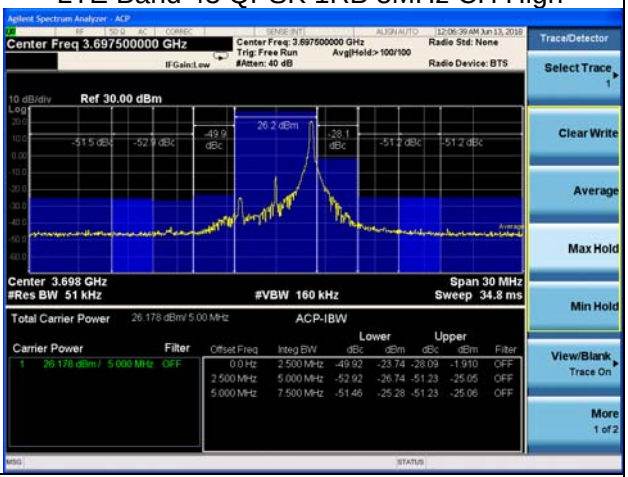
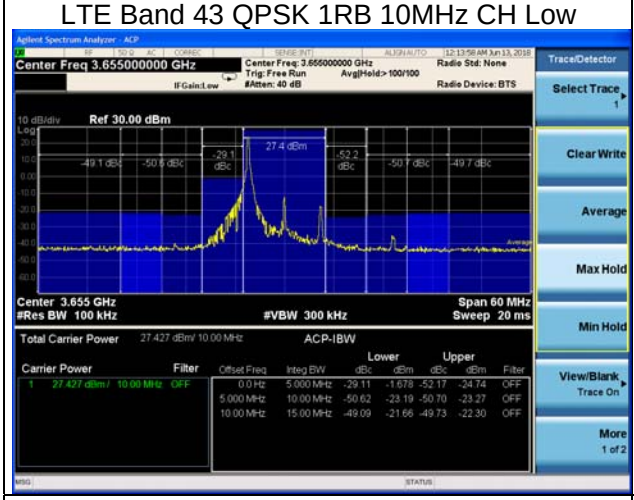
Test Result:

LTE Band 43 QPSK 1RB 5MHz CH Low

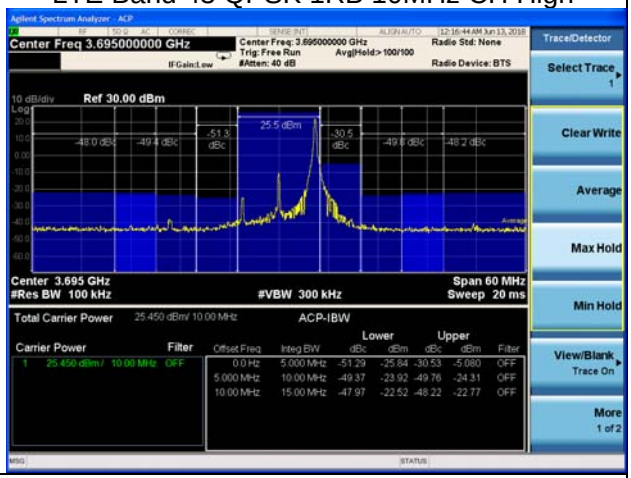
LTE Band 43 QPSK 1RB 5MHz CH High



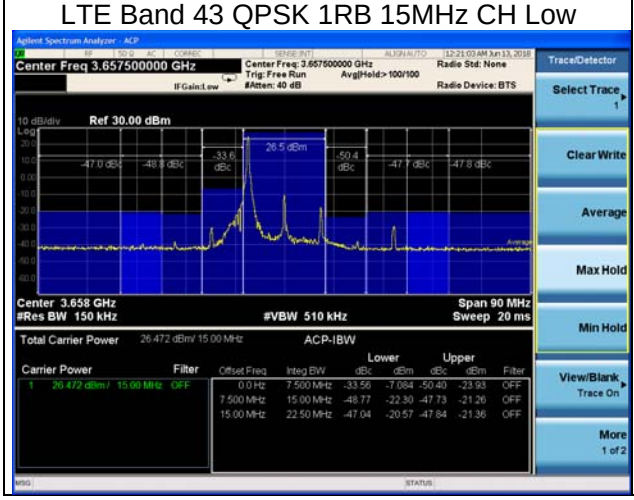
LTE Band 43 QPSK 1RB 10MHz CH Low



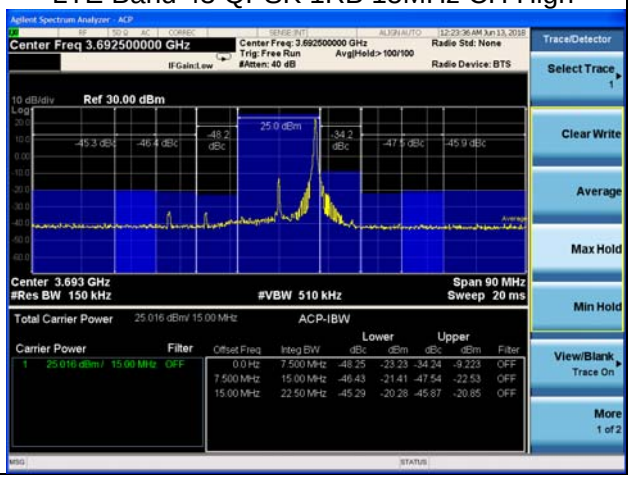
LTE Band 43 QPSK 1RB 10MHz CH High



LTE Band 43 QPSK 1RB 15MHz CH Low



LTE Band 43 QPSK 1RB 15MHz CH High



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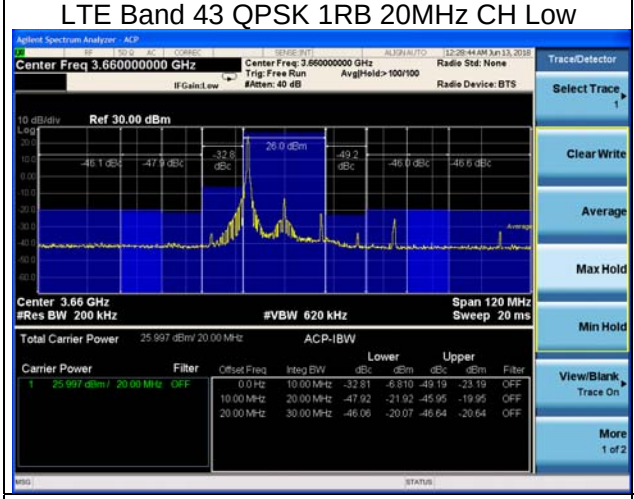
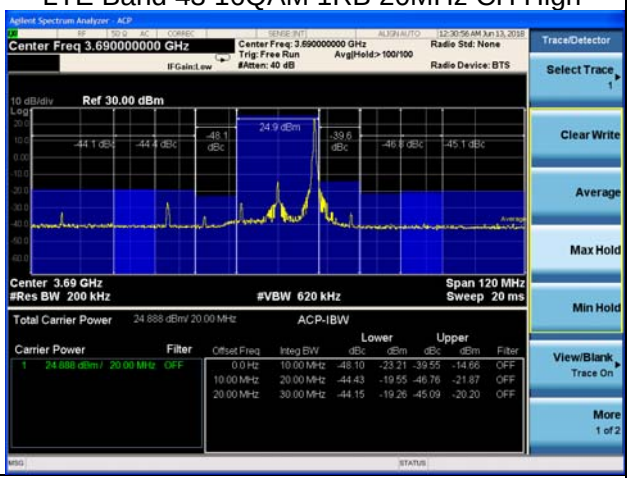
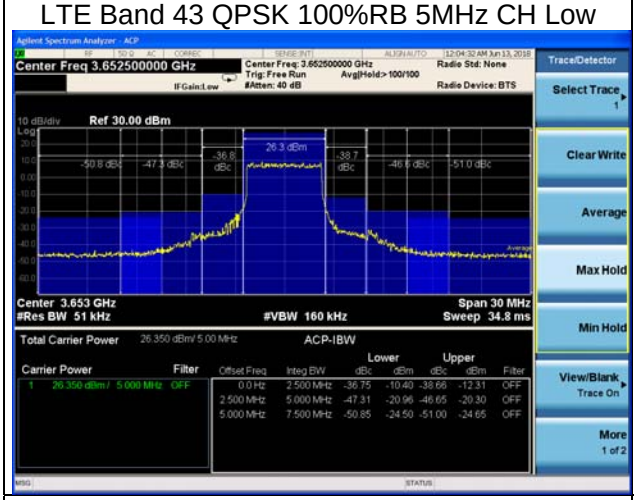
LTE Band 43 QPSK 1RB 20MHz CH Low



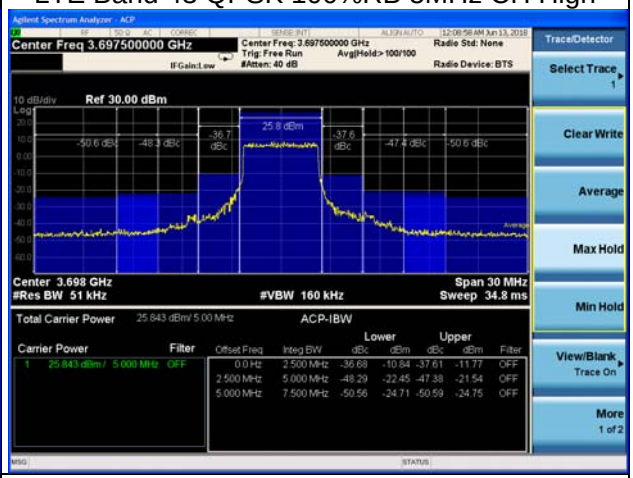
LTE Band 43 16QAM 1RB 20MHz CH High



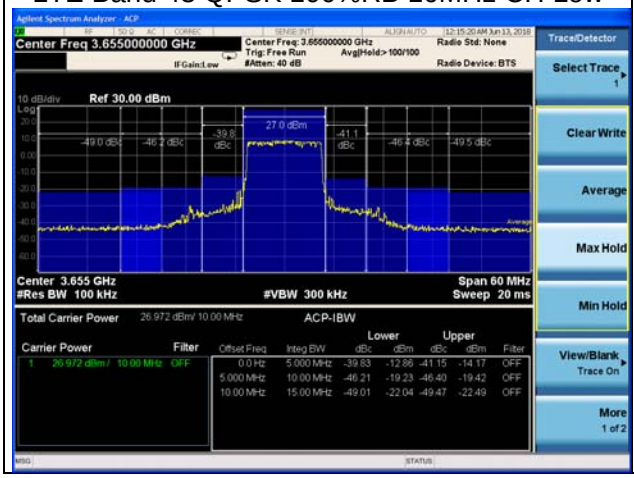
LTE Band 43 QPSK 100%RB 5MHz CH Low



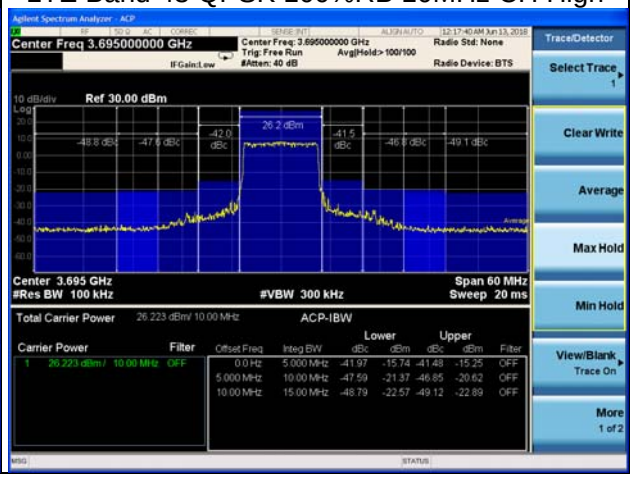
LTE Band 43 QPSK 100%RB 5MHz CH High



LTE Band 43 QPSK 100%RB 10MHz CH Low



LTE Band 43 QPSK 100%RB 10MHz CH High



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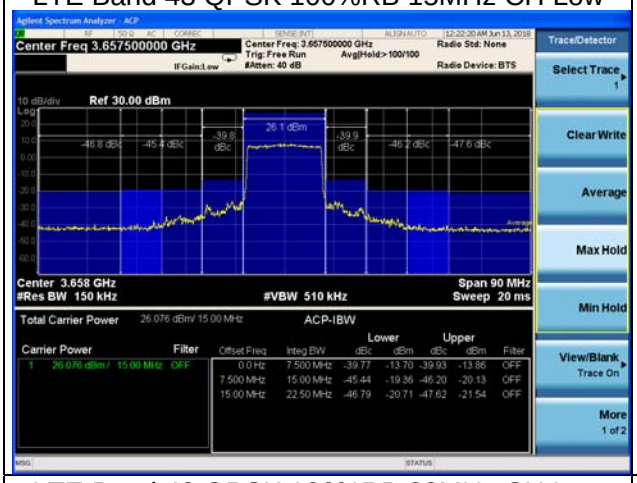
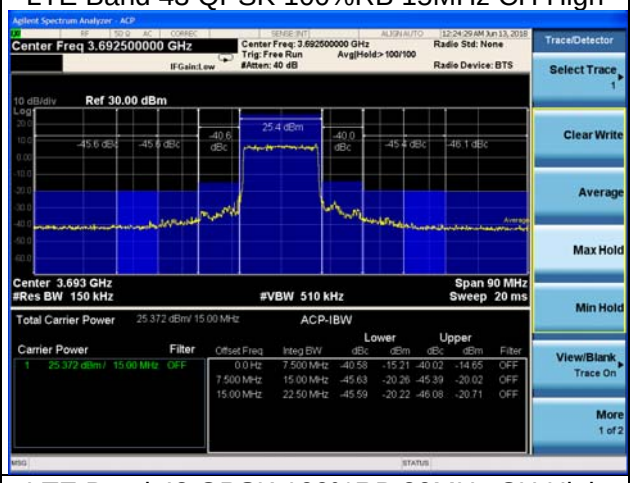
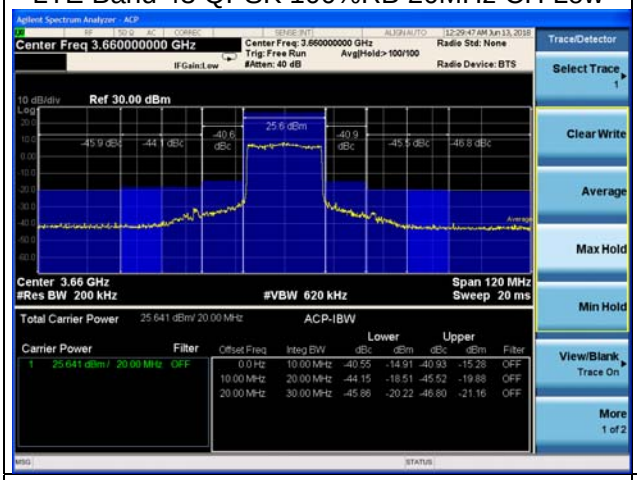
LTE Band 43 QPSK 100%RB 15MHz CH Low



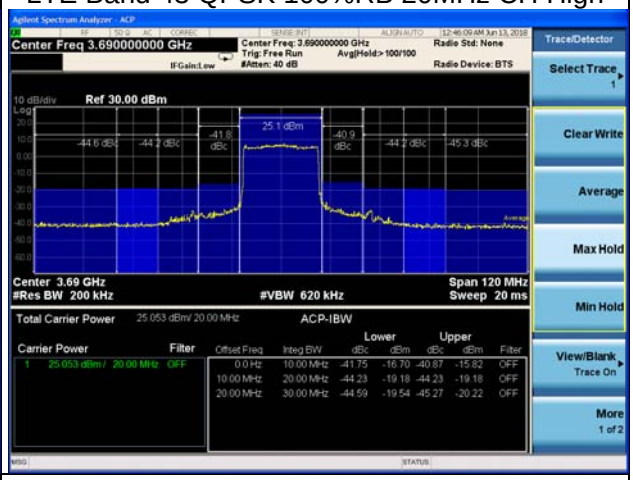
LTE Band 43 QPSK 100%RB 15MHz CH High



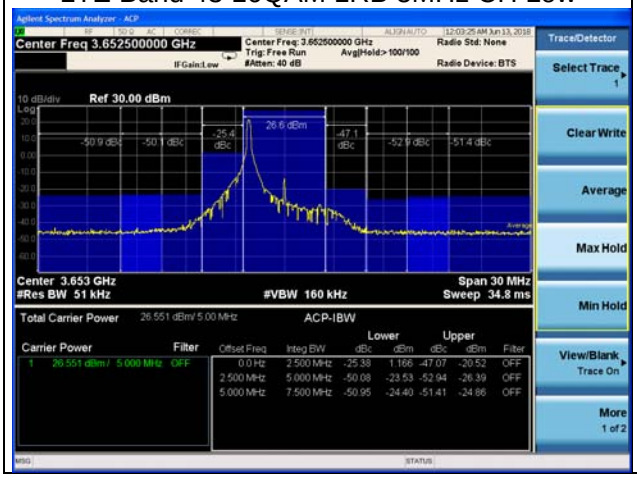
LTE Band 43 QPSK 100%RB 20MHz CH Low



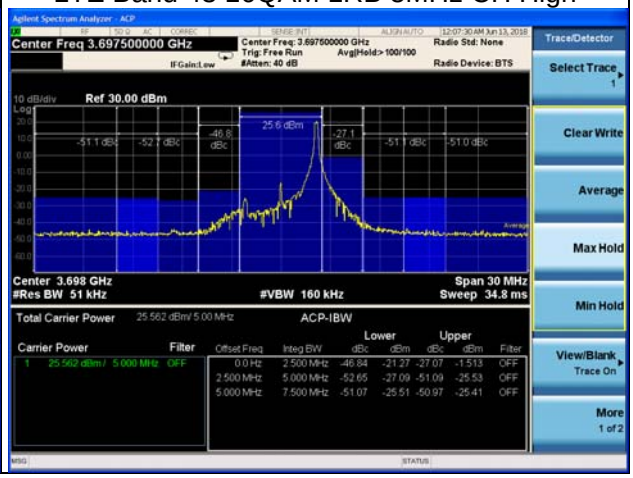
LTE Band 43 QPSK 100%RB 20MHz CH High



LTE Band 43 16QAM 1RB 5MHz CH Low



LTE Band 43 16QAM 1RB 5MHz CH High



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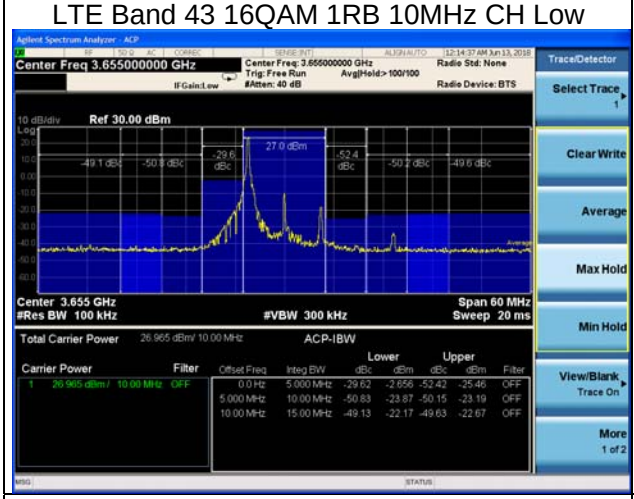
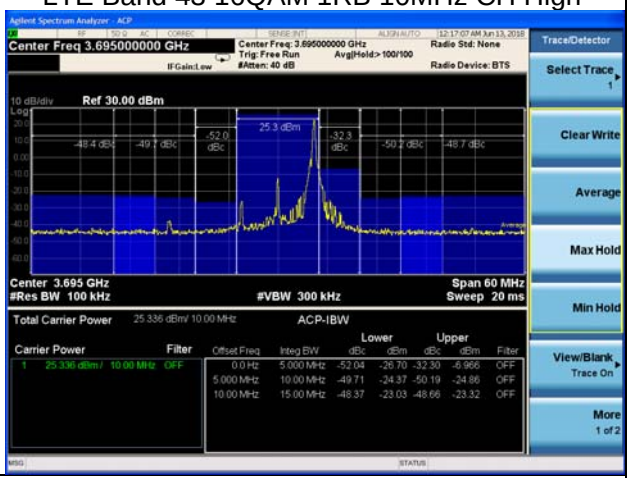
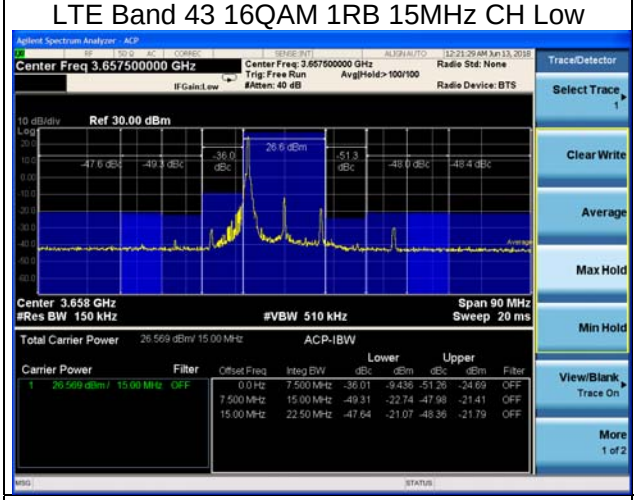
LTE Band 43 16QAM 1RB 10MHz CH Low



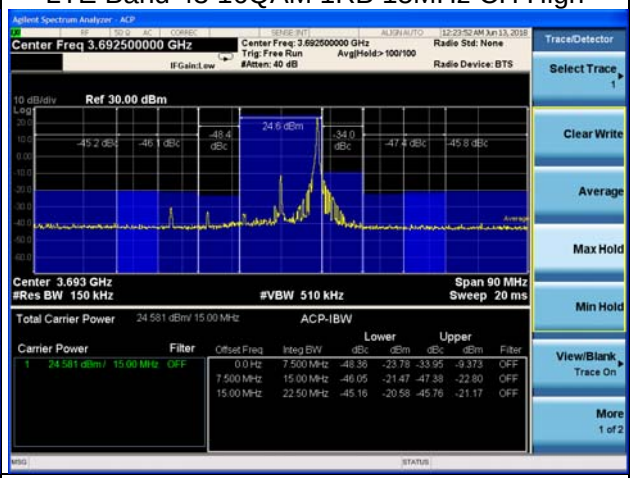
LTE Band 43 16QAM 1RB 10MHz CH High



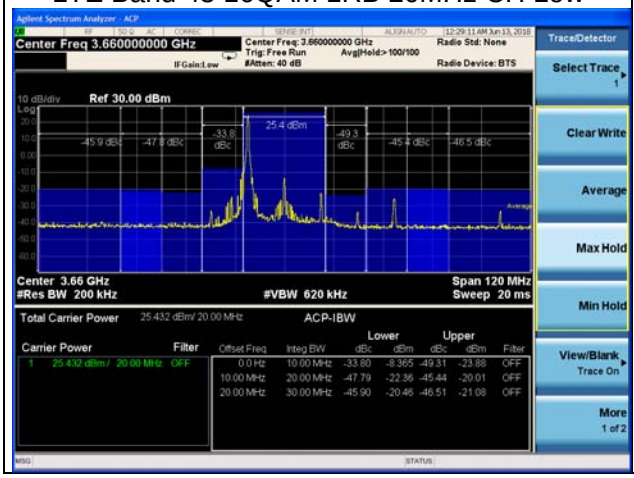
LTE Band 43 16QAM 1RB 15MHz CH Low



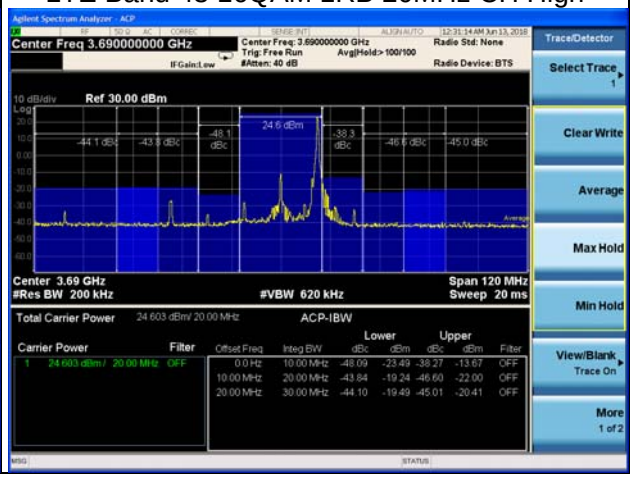
LTE Band 43 16QAM 1RB 15MHz CH High



LTE Band 43 16QAM 1RB 20MHz CH Low



LTE Band 43 16QAM 1RB 20MHz CH High



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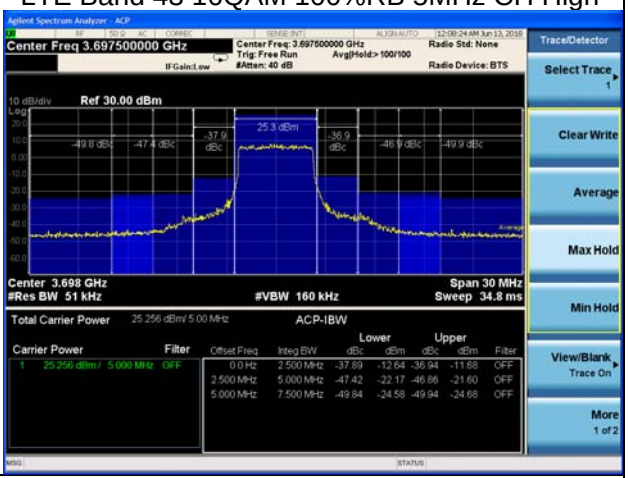
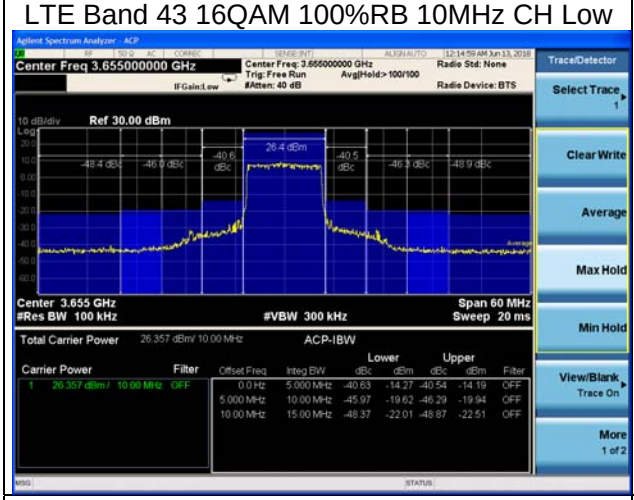
LTE Band 43 16QAM 100%RB 5MHz CH Low

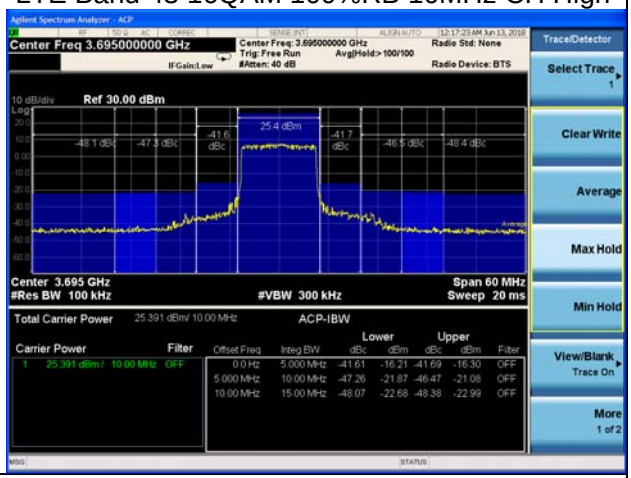
LTE Band 43 16QAM 100%RB 5MHz CH High



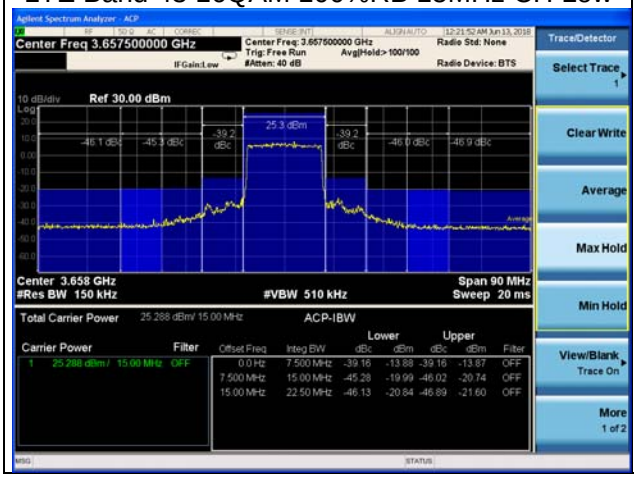
LTE Band 43 16QAM 100%RB 10MHz CH Low



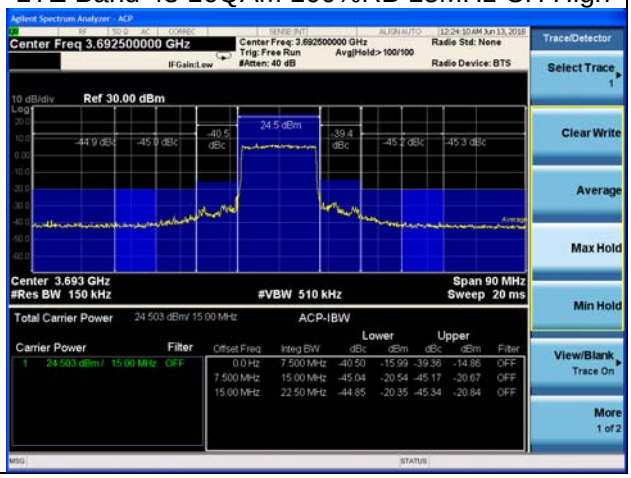
LTE Band 43 16QAM 100%RB 10MHz CH High



LTE Band 43 16QAM 100%RB 15MHz CH Low



LTE Band 43 16QAM 100%RB 15MHz CH High



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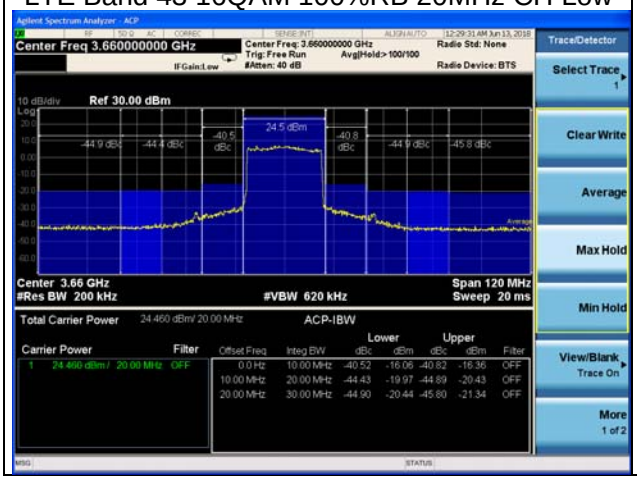
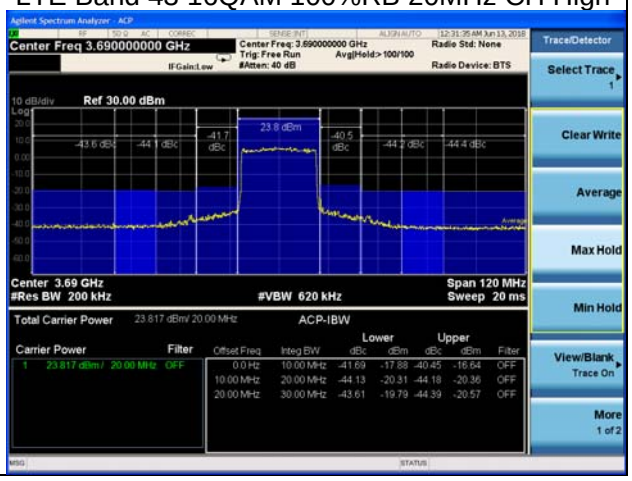
LTE Band 43 16QAM 100%RB 20MHz CH Low	LTE Band 43 16QAM 100%RB 20MHz CH High
	

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5.5. Frequency Stability

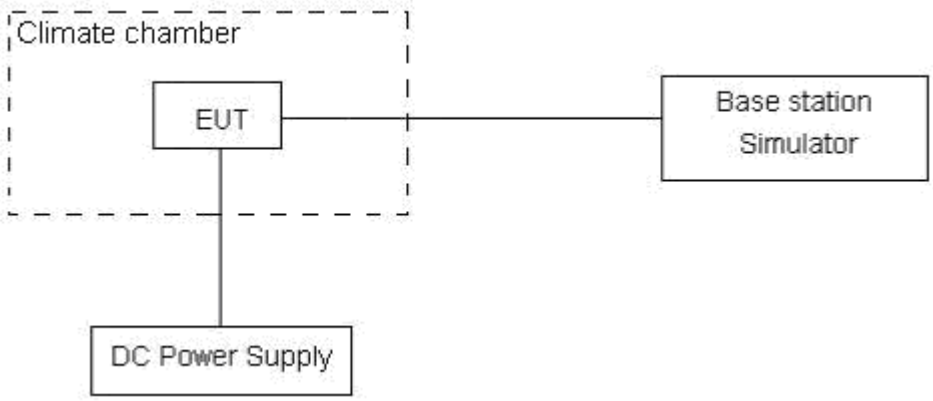
Ambient condition

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

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 -10°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:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage 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 9 V and 15 V, with a nominal voltage of 12V.

Test setup



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Limits

Requirements: FCC § 2.1055 (a)(d), The frequency stability shall be sufficient to ensure thatthe fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

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

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Test Result

LTE Band 43					
QPSK,(20MHz BANDWIDTH)					
Condition		3650	3700	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal（25°C）	Normal	3650.3155	3699.7824	8.73	0.00238
Extreme（50°C）		3650.3151	3699.7828	-4.67	-0.00127
Extreme（40°C）		3650.3149	3699.7831	1.02	0.00028
Extreme（30°C）		3650.3147	3699.7832	6.71	0.00183
Extreme（20°C）		3650.3154	3699.7825	2.66	0.00072
Extreme（10C）		3650.3151	3699.7829	1.11	0.00030
Extreme（0°C）		3650.3153	3699.7826	0.54	0.00015
Extreme（-10°C）		3650.3156	3699.7823	0.15	0.00004
Extreme（-20°C）		3650.3159	3699.7823	9.72	0.00264
Extreme（-30°C）		3650.3152	3699.7827	5.89	0.00160
25°C	LV	3650.3152	3699.7827	-8.51	-0.00232
	HV	3650.3154	3699.7825	4.04	0.00110
16QAM,(20MHz BANDWIDTH)					
Condition		3650	3700	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal（25°C）	Normal	3650.3681	3699.7242	9.92	0.00270
Extreme（50°C）		3650.3677	3699.7244	-2.29	-0.00062
Extreme（40°C）		3650.3675	3699.7246	3.40	0.00093
Extreme（30°C）		3650.3673	3699.7248	9.09	0.00247
Extreme（20°C）		3650.3682	3699.7241	5.04	0.00137
Extreme（10C）		3650.3676	3699.7245	2.30	0.00063
Extreme（0°C）		3650.3679	3699.7242	1.73	0.00047
Extreme（-10°C）		3650.3682	3699.7239	1.34	0.00036
Extreme（-20°C）		3650.3685	3699.7236	10.91	0.00297
Extreme（-30°C）		3650.3678	3699.7243	7.08	0.00193
25°C	LV	3650.3678	3699.7243	-7.32	-0.00199
	HV	3650.3683	3699.7241	5.23	0.00142

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5.6. Spurious Emissions at Antenna Terminals

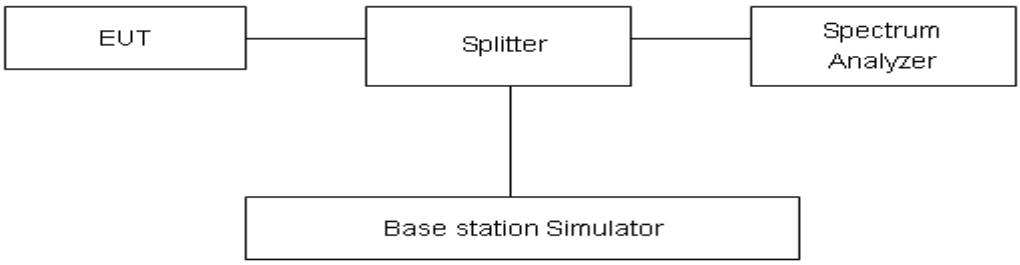
Ambient condition

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

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 9kHzto the 10th harmonic of the carrier. The peak detector is used.
RBW =0.001MHz, VBW=0.003MHz for 9kHz-150kHz;
RBW =0.01MHz, VBW=0.03MHzfor 150kHz-30MHz;
RBW =0.1MHz, VBW=0.3MHzfor 30MHz-1GHz;
RBW =1MHz, VBW=3MHzfor above 1GHz; Sweep is set to ATUO.

Test setup



Limits

Rule Part 2.1051&90.1323 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-3GHz	1.407 dB
3GHz-40GHz	1.815 dB

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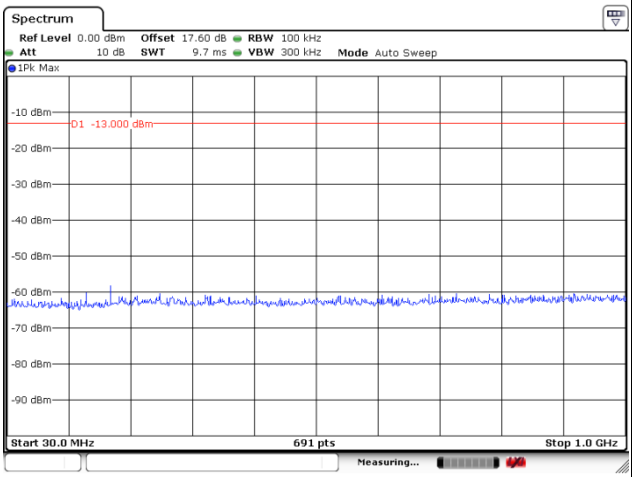
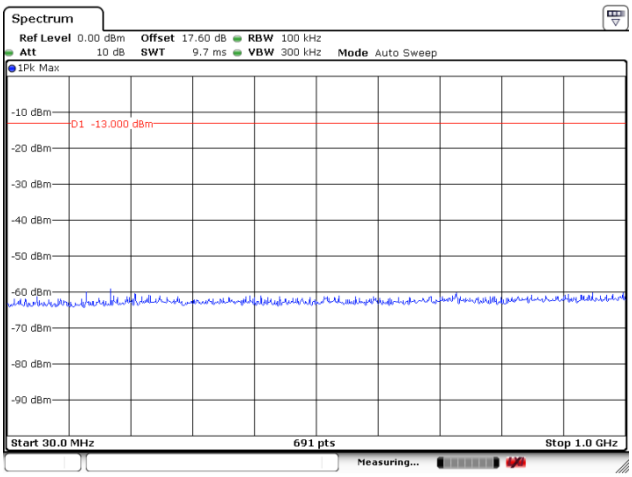
Test Result:

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.
The signal beyond the limit is carrier in the following plots.

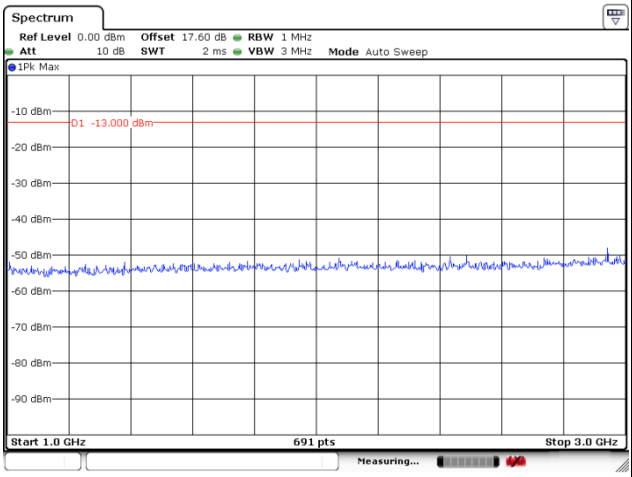
LTE Band 43 5MHz CH Low 30MHz~1GHz



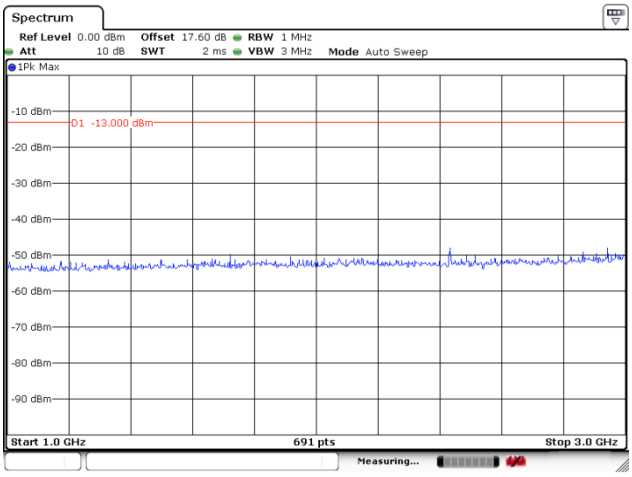
LTE Band 43 5MHz CH Middle 30MHz~1GHz



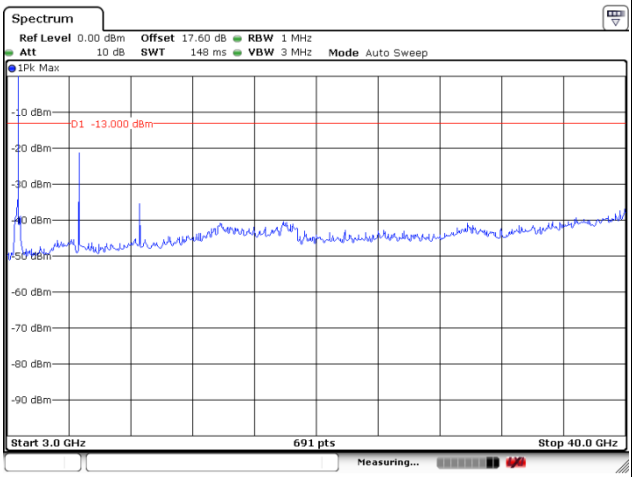
LTE Band 43 5MHz CH Low 1GHz~3GHz



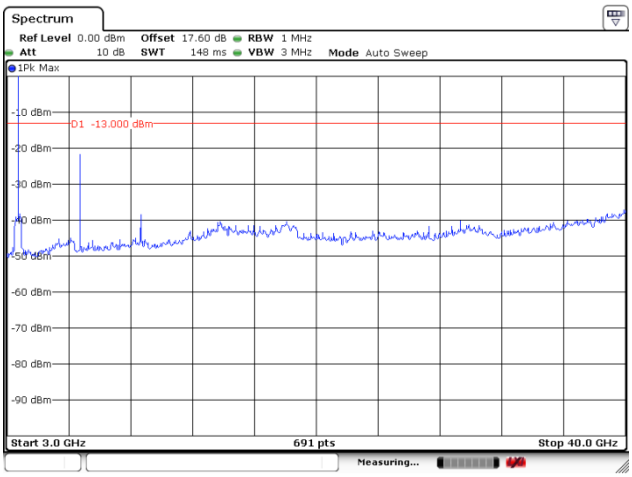
LTE Band 43 5MHz CH Middle 1GHz~3GHz



LTE Band 43 5MHz CH Low 3GHz~40GHz



LTE Band 43 5MHz CH Middle 3GHz~40GHz



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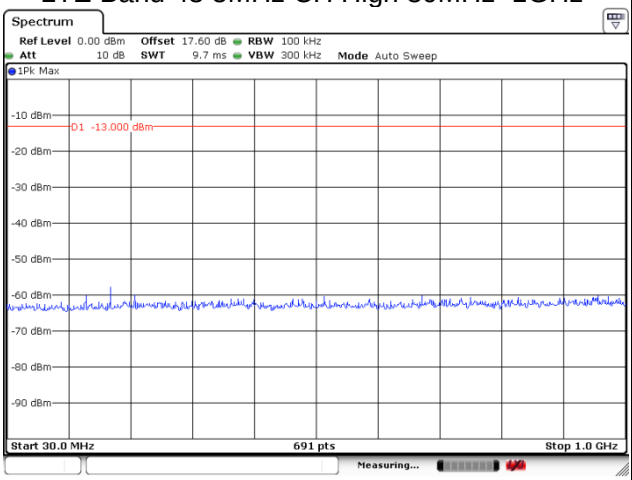
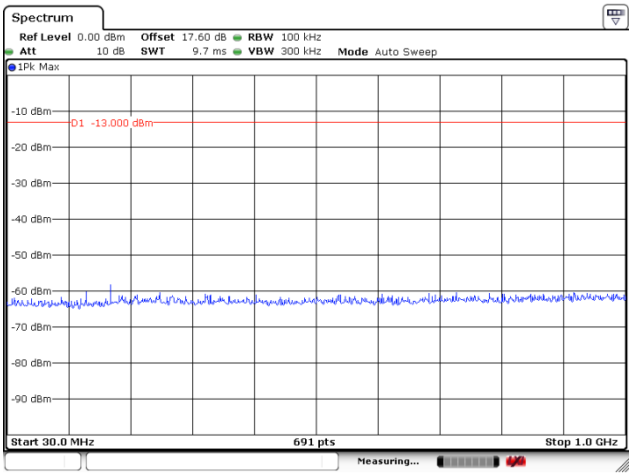
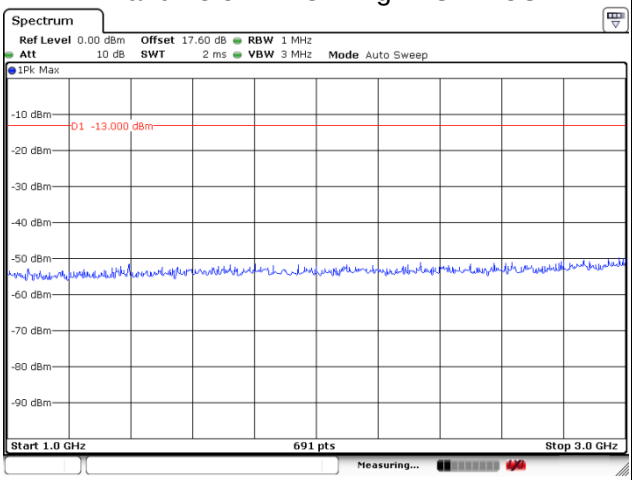
LTE Band 43 5MHz CH High 30MHz~1GHz



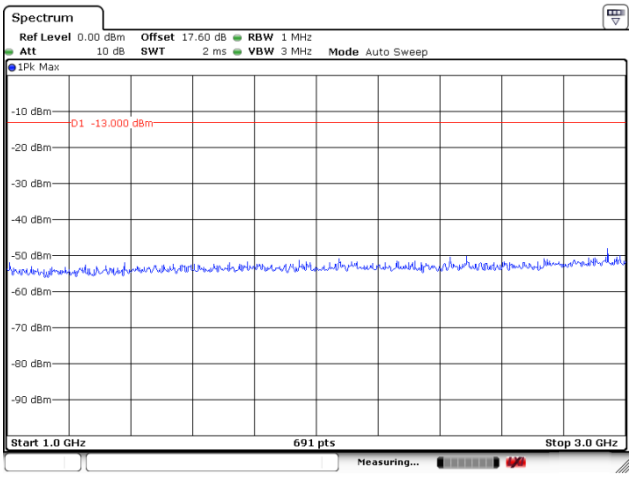
LTE Band 43 10MHz CH Low 30MHz~1GHz



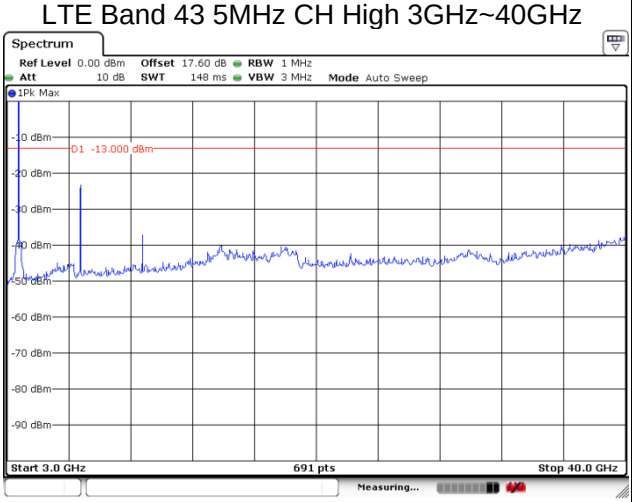
LTE Band 43 5MHz CH High 1GHz~3GHz



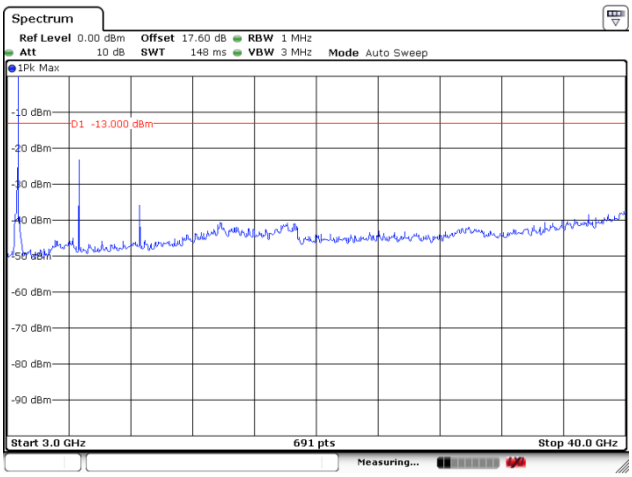
LTE Band 43 10MHz CH Low 1GHz~3GHz



LTE Band 43 5MHz CH High 3GHz~40GHz



LTE Band 43 10MHz CH Low 3GHz~40GHz



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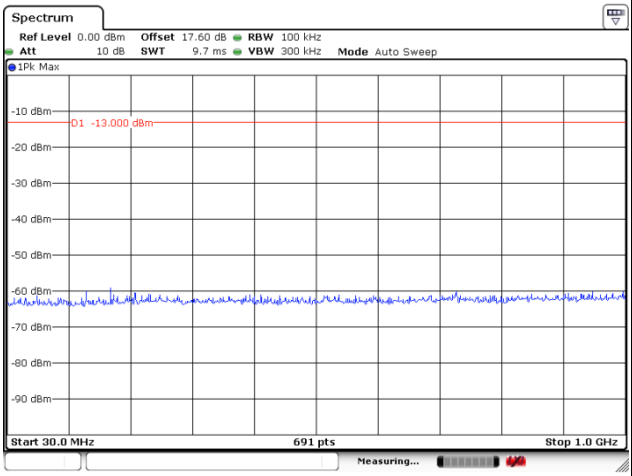
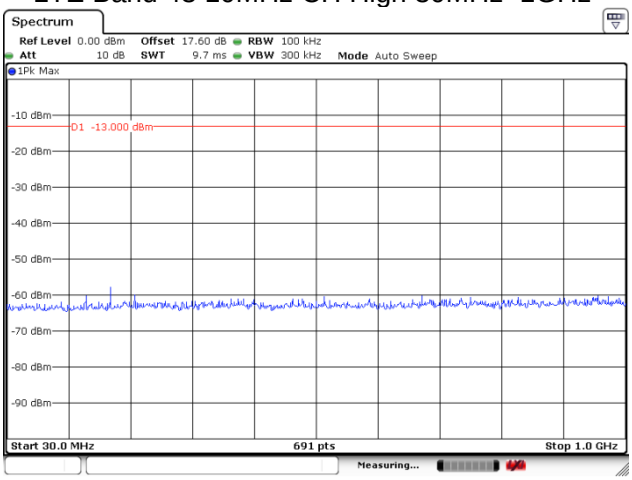
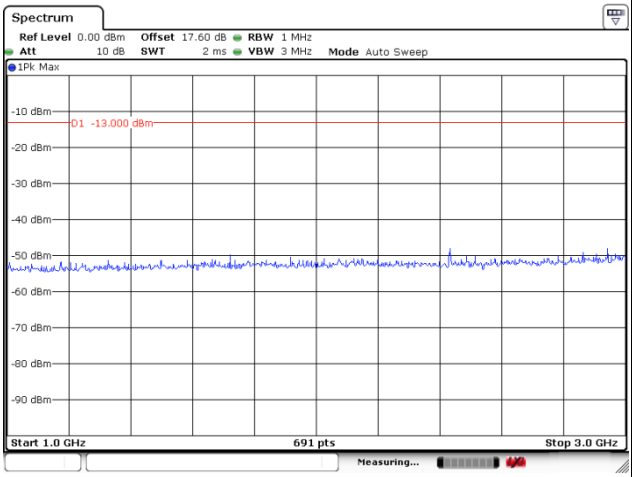
LTE Band 43 10MHz CH Middle 30MHz~1GHz



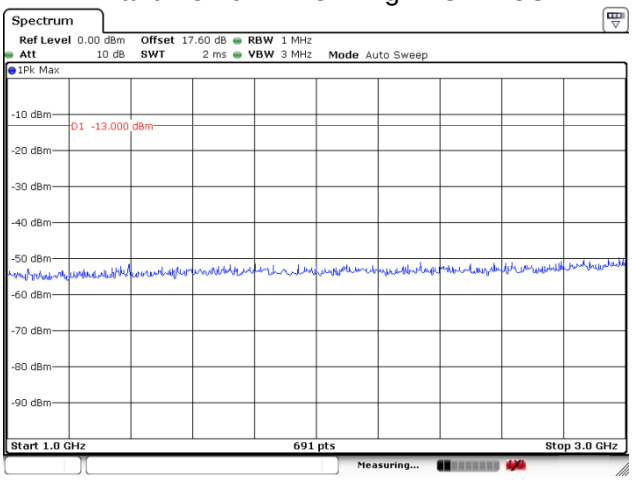
LTE Band 43 10MHz CH High 30MHz~1GHz



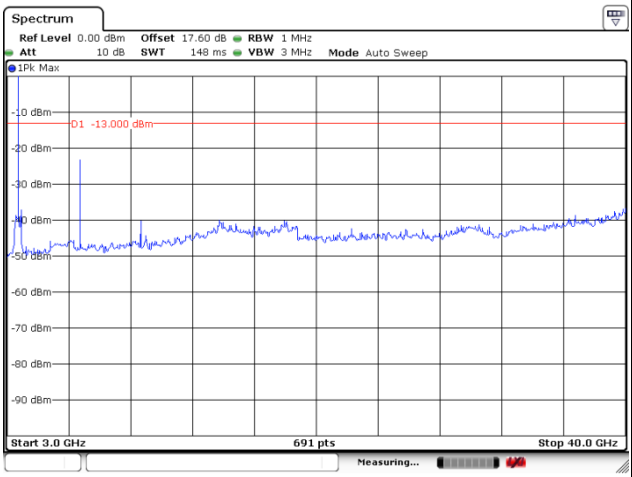
LTE Band 43 10MHz CH Middle 1GHz~3GHz



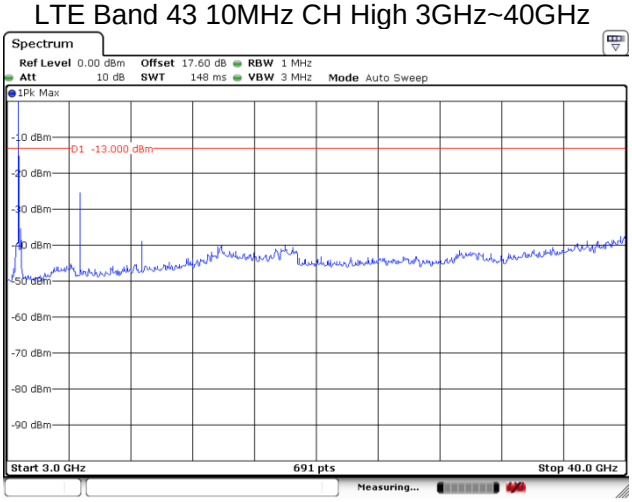
LTE Band 43 10MHz CH High 1GHz~3GHz



LTE Band 43 10MHz CH Middle 3GHz~40GHz



LTE Band 43 10MHz CH High 3GHz~40GHz



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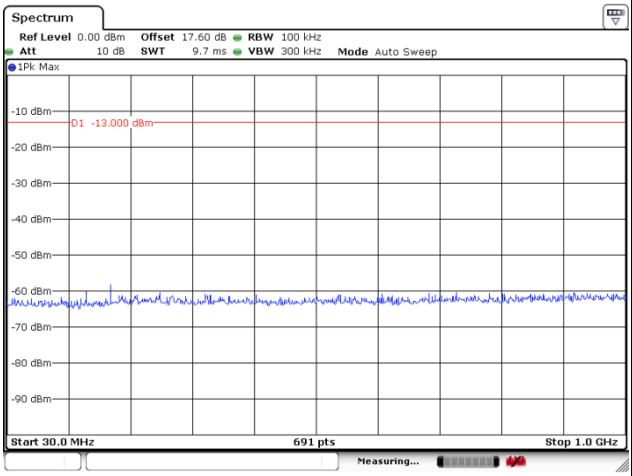
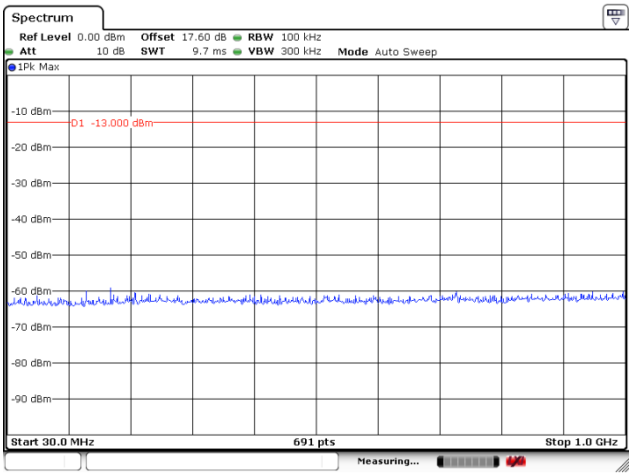
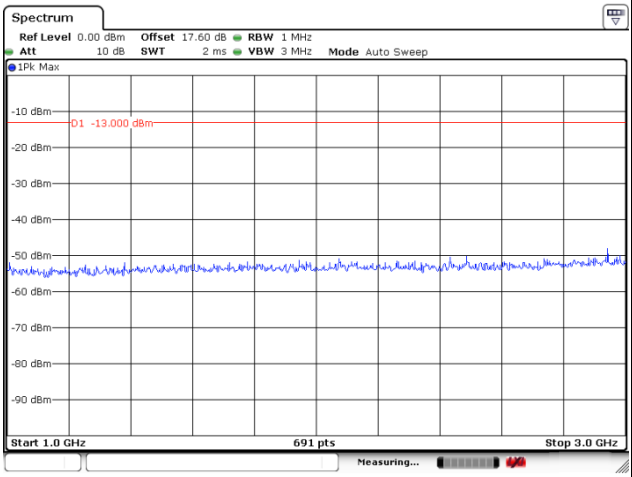
LTE Band 43 15MHz CH Low 30MHz~1GHz



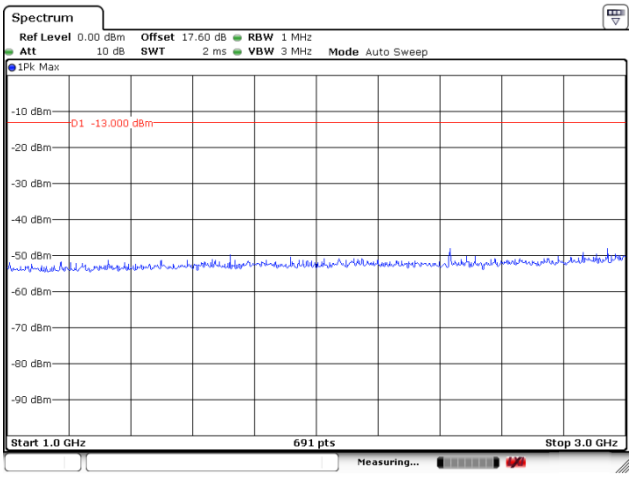
LTE Band 43 15MHz CH Middle 30MHz~1GHz



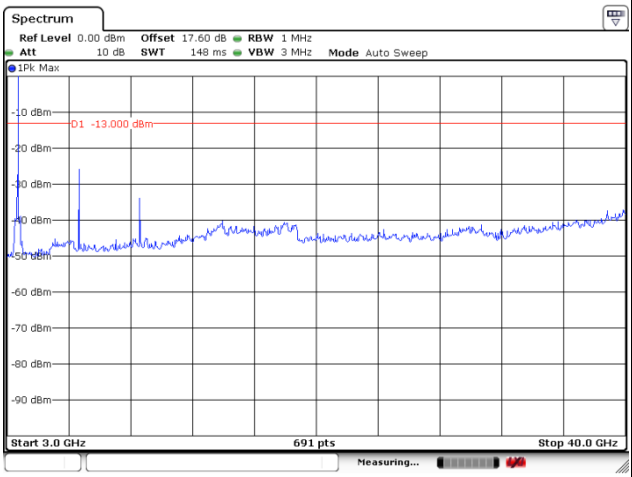
LTE Band 43 15MHz CH Low 1GHz~3GHz



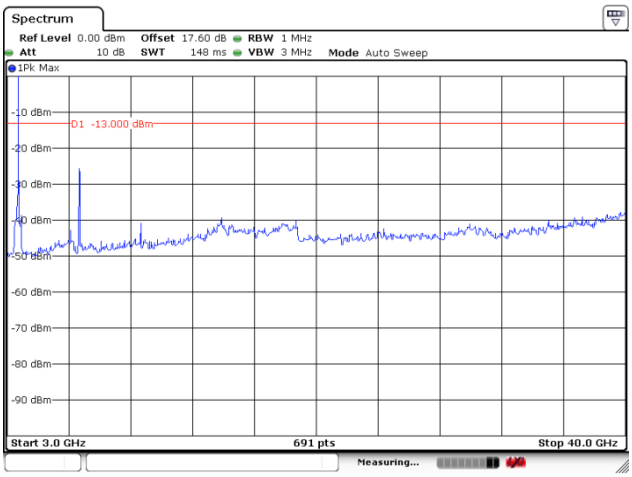
LTE Band 43 15MHz CH Middle 1GHz~3GHz



LTE Band 43 15MHz CH Low 3GHz~40GHz



LTE Band 43 15MHz CH Middle 3GHz~40GHz



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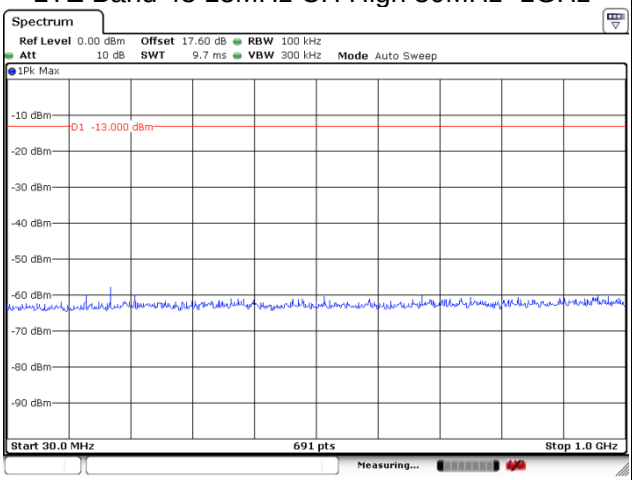
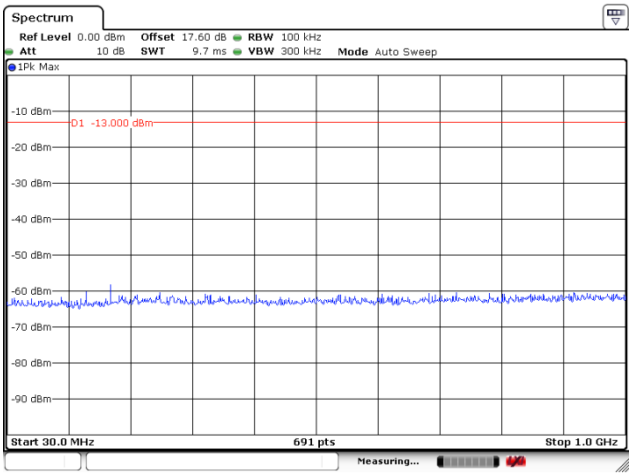
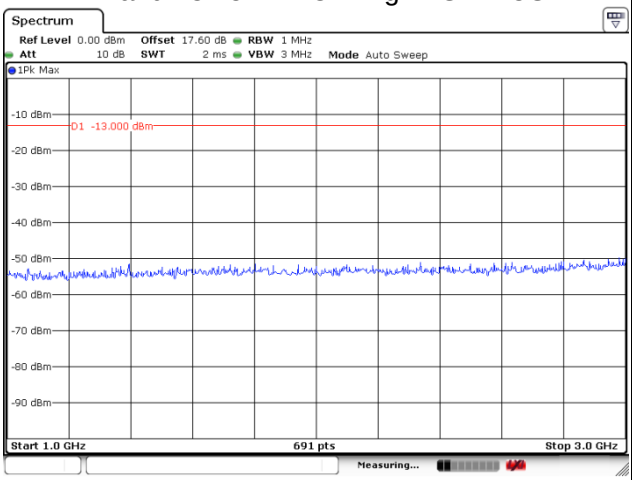
LTE Band 43 15MHz CH High 30MHz~1GHz



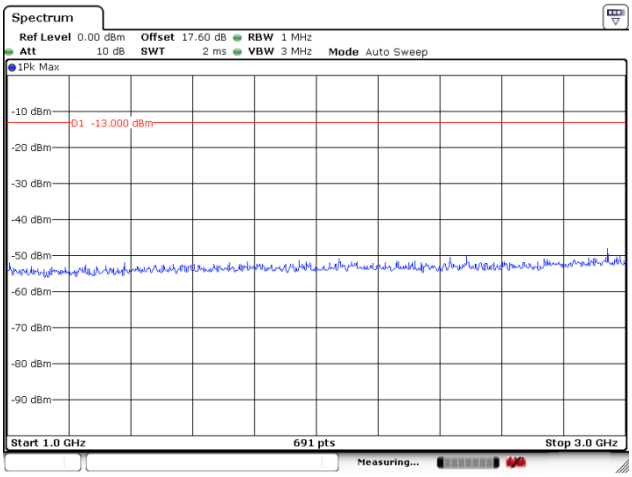
LTE Band 43 20MHz CH Low 30MHz~1GHz



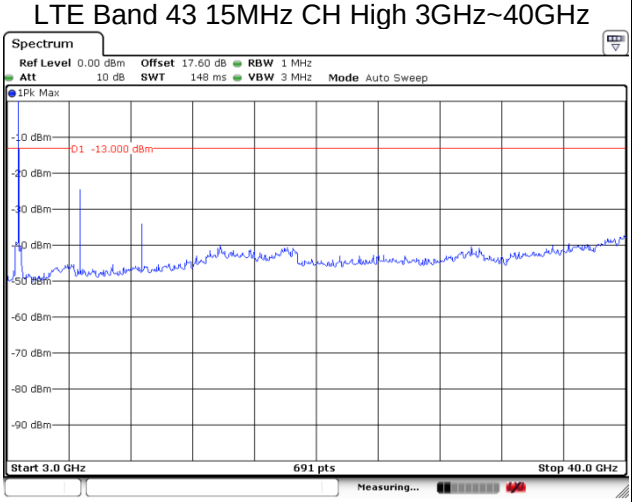
LTE Band 43 15MHz CH High 1GHz~3GHz



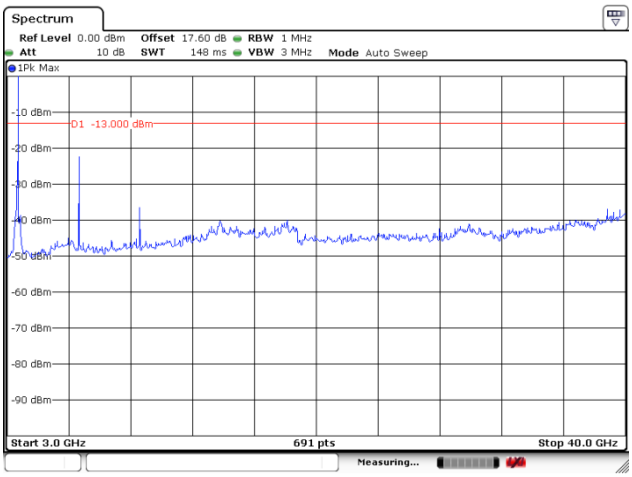
LTE Band 43 20MHz CH Low 1GHz~3GHz



LTE Band 43 15MHz CH High 3GHz~40GHz



LTE Band 43 20MHz CH Low 3GHz~40GHz



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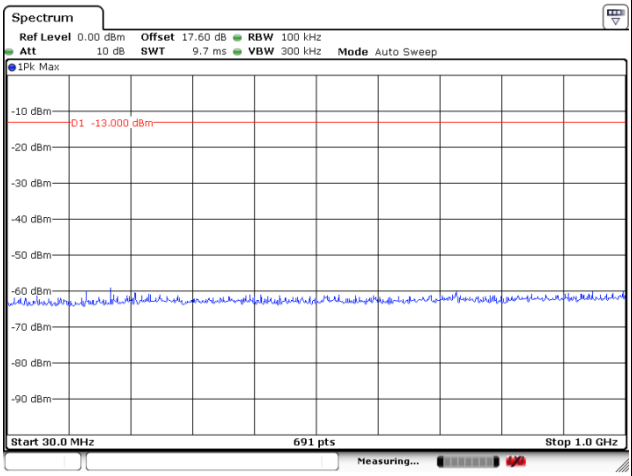
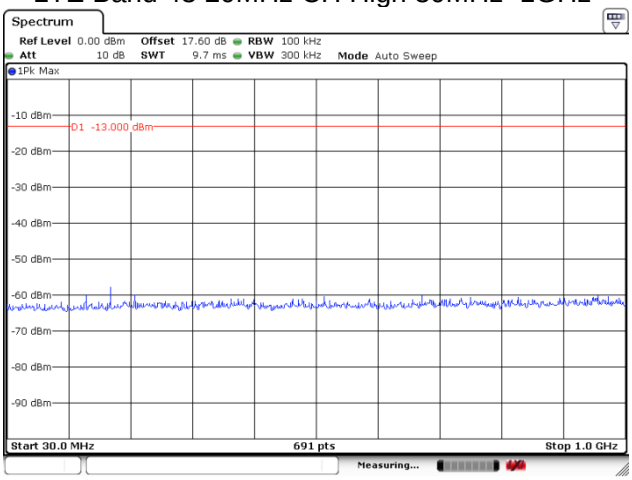
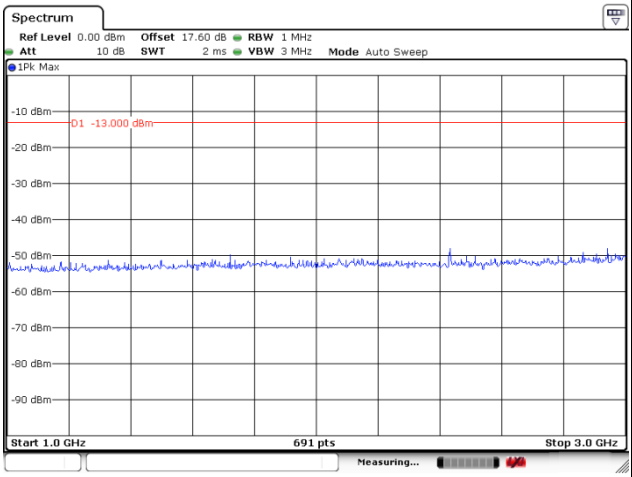
LTE Band 43 20MHz CH Middle 30MHz~1GHz



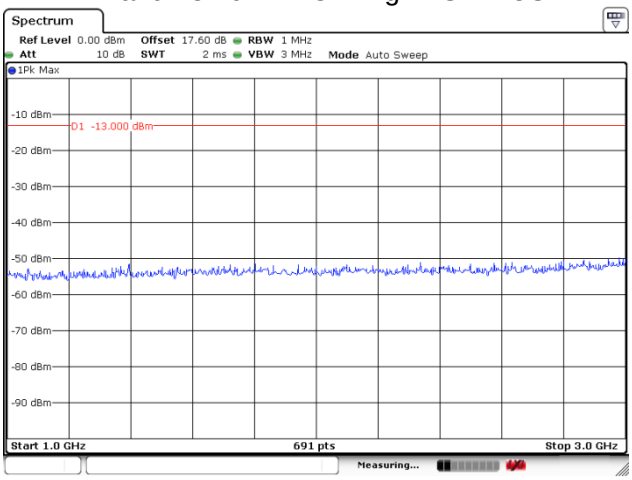
LTE Band 43 20MHz CH High 30MHz~1GHz



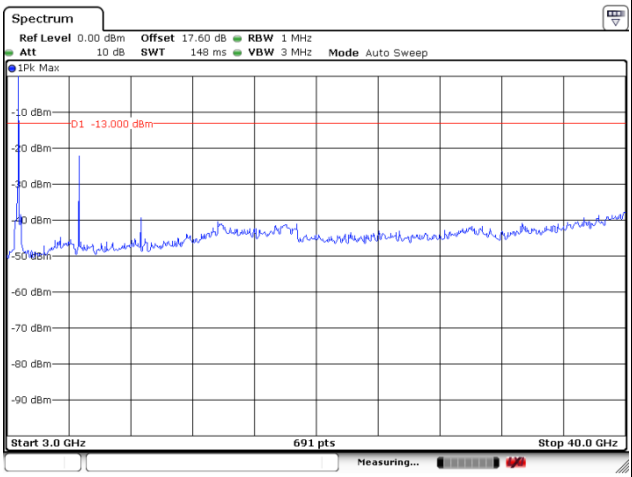
LTE Band 43 20MHz CH Middle 1GHz~3GHz



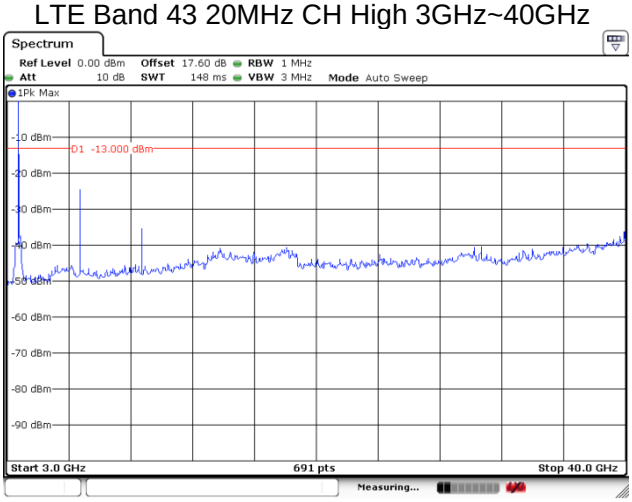
LTE Band 43 20MHz CH High 1GHz~3GHz



LTE Band 43 20MHz CH Middle 3GHz~40GHz



LTE Band 43 20MHz CH High 3GHz~40GHz



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If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

Mode	Frequency	Peak (dBm)	Limit (dBm)	Margin (dB)
B43_CHLOW_5M_RB1_3-40GHz	7310.5	-21.144	-13	8.144
B43_CHMID_5M_RB1_3-40GHz	7363.8	-21.302	-13	8.302
B43_CHHIGH_5M_RB1_3-40GHz	7417.9	-22.528	-13	9.528
B43_CHLOW_10M_RB1_3-40GHz	7311.1	-22.235	-13	9.235
B43_CHMID_10M_RB1_3-40GHz	7363.2	-22.299	-13	9.299
B43_CHHIGH_10M_RB1_3-40GHz	7418.3	-25.734	-13	12.734
B43_CHLOW_15M_RB1_3-40GHz	7310.5	-25.384	-13	12.384
B43_CHMID_15M_RB1_3-40GHz	7363.7	-25.375	-13	12.375
B43_CHHIGH_15M_RB1_3-40GHz	7418.2	-24.452	-13	11.452
B43_CHLOW_20M_RB1_3-40GHz	7310.6	-22.865	-13	9.865
B43_CHMID_20M_RB1_3-40GHz	7364.4	-22.125	-13	9.125
B43_CHHIGH_20M_RB1_3-40GHz	7418.6	-22.204	-13	9.204

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5.7. Field Strength of Spurious Radiation/ Radiated Spurious Emissions

Ambient condition

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

Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).
2. 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).
3. A log-periodic antenna or double-ridged waveguide 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=1MHz,VBW=3MHz, 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 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

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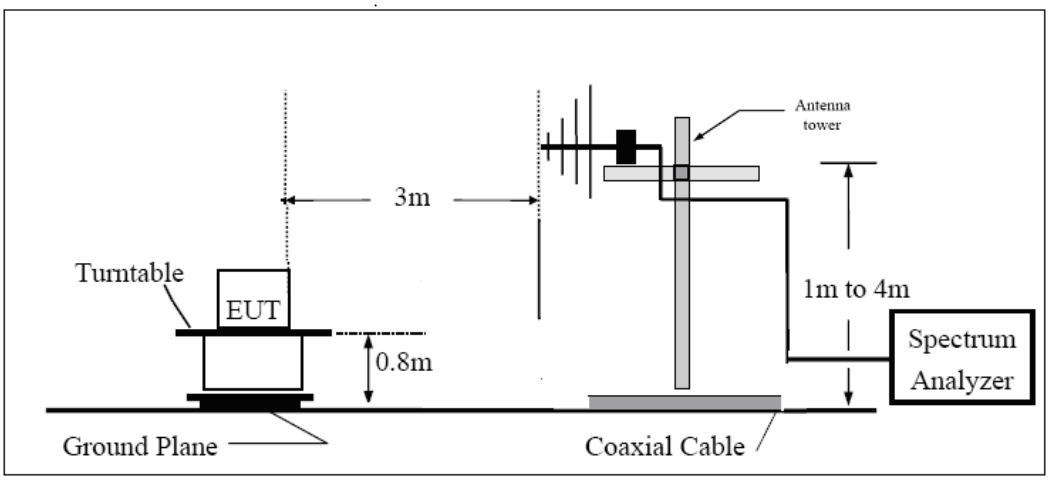
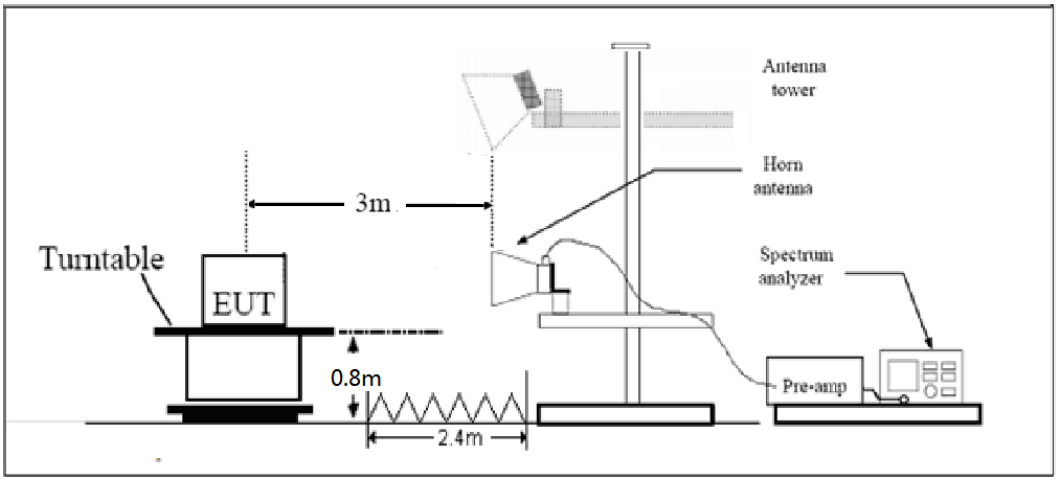
Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

Limits

Rule Part 90.1323 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

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Measurement Uncertainty

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

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Test Result

Sweep the whole frequency band through the range from 30MHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 43 QPSK 5MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7200.8	-52.45	2.50	11.35	horizontal	-43.60	-13.00	30.60	180
3	10801.1	-32.85	4.20	12.05	horizontal	-25.00	-13.00	12.00	315
4	14402.3	-47.33	5.50	14.23	horizontal	-38.60	-13.00	25.60	225
5	18012.5	--	--	--	--	--	--	--	--
6	21615.0	--	--	--	--	--	--	--	--
7	25217.5	--	--	--	--	--	--	--	--
8	28820.0	--	--	--	--	--	--	--	--
9	32422.5	--	--	--	--	--	--	--	--
10	36025.0	--	--	--	--	--	--	--	--
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 43 QPSK 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7396.0	-51.35	2.50	11.35	horizontal	-42.50	-13.00	29.50	180
3	11093.6	-40.35	4.20	12.05	horizontal	-32.50	-13.00	19.50	180
4	14791.5	-48.13	5.50	14.23	horizontal	-39.40	-13.00	26.40	315
5	18500.0	--	--	--	--	--	--	--	--
6	22200.0	--	--	--	--	--	--	--	--
7	25900.0	--	--	--	--	--	--	--	--
8	29600.0	--	--	--	--	--	--	--	--
9	33300.0	--	--	--	--	--	--	--	--
10	37000.0	--	--	--	--	--	--	--	--
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

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LTE Band 43 QPSK 5MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7590.8	-55.85	2.50	11.35	horizontal	-47.00	-13.00	34.00	180
3	11386.1	-41.95	4.20	12.05	horizontal	-34.10	-13.00	21.10	225
4	15181.9	-49.83	5.50	14.23	horizontal	-41.10	-13.00	28.10	225
5	18987.5	--	--	--	--	--	--	--	--
6	22785.0	--	--	--	--	--	--	--	--
7	26582.5	--	--	--	--	--	--	--	--
8	30380.0	--	--	--	--	--	--	--	--
9	34177.5	--	--	--	--	--	--	--	--
10	37975.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 43 QPSK 15MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7201.8	-52.05	2.50	11.35	horizontal	-43.20	-13.00	30.20	180
3	10802.3	-37.55	4.20	12.05	horizontal	-29.70	-13.00	16.70	315
4	14403.4	-47.23	5.50	14.23	horizontal	-38.50	-13.00	25.50	225
5	18037.5	--	--	--	--	--	--	--	--
6	21645.0	--	--	--	--	--	--	--	--
7	25252.5	--	--	--	--	--	--	--	--
8	28860.0	--	--	--	--	--	--	--	--
9	32467.5	--	--	--	--	--	--	--	--
10	36075.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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LTE Band 43 QPSK 15MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7386.8	-53.95	2.50	11.35	horizontal	-45.10	-13.00	32.10	180
3	11080.1	-30.15	4.20	12.05	horizontal	-22.30	-13.00	9.30	315
4	14773.5	-47.53	5.50	14.23	horizontal	-38.80	-13.00	25.80	180
5	18500.0	--	--	--	--	--	--	--	--
6	22200.0	--	--	--	--	--	--	--	--
7	25900.0	--	--	--	--	--	--	--	--
8	29600.0	--	--	--	--	--	--	--	--
9	33300.0	--	--	--	--	--	--	--	--
10	37000.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 43 QPSK 15MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7572.0	-54.85	2.50	11.35	horizontal	-46.00	-13.00	33.00	180
3	11358.0	-37.35	4.20	12.05	horizontal	-29.50	-13.00	16.50	225
4	15142.5	-51.13	5.50	14.23	horizontal	-42.40	-13.00	29.40	225
5	18962.5	--	--	--	--	--	--	--	--
6	22755.0	--	--	--	--	--	--	--	--
7	26547.5	--	--	--	--	--	--	--	--
8	30340.0	--	--	--	--	--	--	--	--
9	34132.5	--	--	--	--	--	--	--	--
10	37925.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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LTE Band 43 QPSK 20MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7202.0	-53.05	2.50	11.35	horizontal	-44.20	-13.00	31.20	180
3	10803.4	-37.55	4.20	12.05	horizontal	-29.70	-13.00	16.70	180
4	14404.5	-46.93	5.50	14.23	horizontal	-38.20	-13.00	25.20	225
5	18050.0	--	--	--	--	--	--	--	--
6	21660.0	--	--	--	--	--	--	--	--
7	25270.0	--	--	--	--	--	--	--	--
8	28880.0	--	--	--	--	--	--	--	--
9	32490.0	--	--	--	--	--	--	--	--
10	36100.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 43 QPSK 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7382.0	-53.65	2.50	11.35	horizontal	-44.80	-13.00	31.80	180
3	11073.4	-30.75	4.20	12.05	horizontal	-22.90	-13.00	9.90	180
4	14800.0	-48.13	5.50	14.23	horizontal	-39.40	-13.00	26.40	45
5	18950.0	--	--	--	--	--	--	--	--
6	22200.0	--	--	--	--	--	--	--	--
7	25900.0	--	--	--	--	--	--	--	--
8	29600.0	--	--	--	--	--	--	--	--
9	33300.0	--	--	--	--	--	--	--	--
10	37000.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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LTE Band 43 QPSK 20MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7562.3	-53.55	2.50	11.35	horizontal	-44.70	-13.00	31.70	180
3	11343.4	-39.05	4.20	12.05	horizontal	-31.20	-13.00	18.20	315
4	15124.5	-50.63	5.50	14.23	horizontal	-41.90	-13.00	28.90	225
5	18950.0	--	--	--	--	--	--	--	--
6	22740.0	--	--	--	--	--	--	--	--
7	26530.0	--	--	--	--	--	--	--	--
8	30320.0	--	--	--	--	--	--	--	--
9	34110.0	--	--	--	--	--	--	--	--
10	37900.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

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6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113645	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	NA	NA
Spectrum Analyzer	Agilent	N9010A	MY47191109	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV40	15195-01-00	2018-05-13	2019-05-12
EMI Test Receiver	R&S	ESCI	100948	2017-12-17	2018-12-16
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2020-01-29
Horn Antenna	STEATITE	QSH-SL-26-40-K-15	16779	2016-03-21	2019-03-20
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
RF Cable	Agilent	SMA 15cm	0001	NA	NA

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

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ANNEX A:EUT Appearanceand Test Setup

A.1 EUT Appearance

Front Side

Back Side

a: EUT

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b:Adapter

Picture 1: EUT and Accessory

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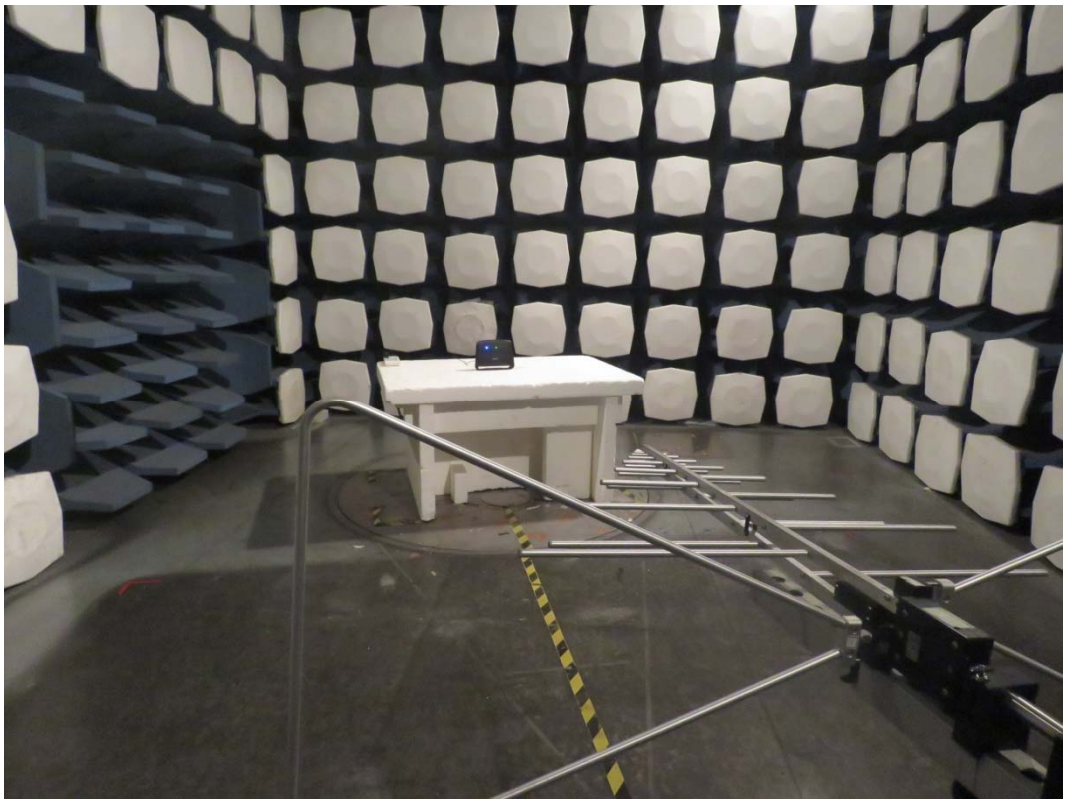
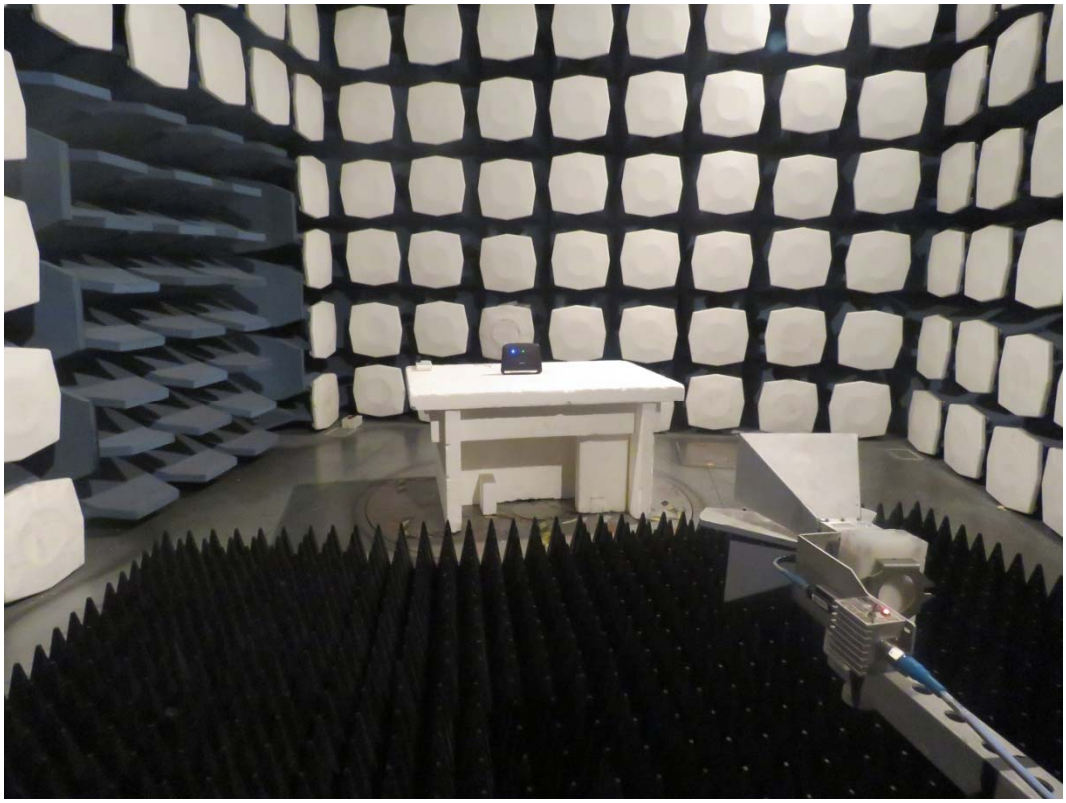
A.2 Test Setup



Below 1GHz



Above 1GHz

Picture 2: Radiated Spurious Emissions Test setup

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