RF TEST REPORT

Applicant	OBSERVA Telecom
FCC ID	2AI23SQI4N4
Brand	observatelecom
Product	WIFI LTE ROUTER
Model	SQI4N4
Report No.	RXA1610-0218RF01R4
Issue Date	January 6, 2017

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.

Performed by: Xianqing Li *Approved by: Kai Xu*

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Summary of measurementresults

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	Frequency Stability	2.1055	PASS
5	Spurious Emissions at Antenna Terminals	2.1051 / 90.1323	PASS
6	Field Strength of Spurious Radiation / Radiated SpuriousEmissions	2.1053/ 90.1323	PASS
Date of Testing: October 22, 2016~November 8, 2016			

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. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

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 (recognition number is 428261)

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-766)

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
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E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

Applicant	OBSERVA Telecom
Applicant address	Monte Esquinza, 28 – 1st floor – Right hand
Manufacturer	OBSERVA Telecom
Manufacturer address	Monte Esquinza, 28 – 1st floor – Right hand

General Information

EUT Description			
Model	SQI4N4		
SN	/		
Hardware Version	V3.3		
Software Version	SQI4N4-1.2.5-R19-ARG		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	4dBi		
Test Mode(s)	LTE Band 43		
Test Modulation	(LTE)QPSK 16QAM;		
Maximum E.I.R.P.	LTE Band 43: 25.89dBm		
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	3600 ~ 3800	3600 ~ 3800
EUT Accessory			
Adapter	Manufacturer: AQUILSTAR PRECISION INDUSTRIAL(SHENZHEN)CO., LTD Model: ASSA55D-120100 Input power:100-240Vac 50-60Hz 0.45A max Output power:12Vdc 1A		
Ethernet cables	Model : UTP CAT5E		
Note: Theinformation of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.			

3. Applied Standards

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

FCC CFR47 Part 2 (2015)

FCC CFR 47 Part 90Z (2015)

ANSI/TIA-603-D(2010)

FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

FCC KDB 552295 D01 CBP Guidance for 3650 3700 Band v02r02

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.

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
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

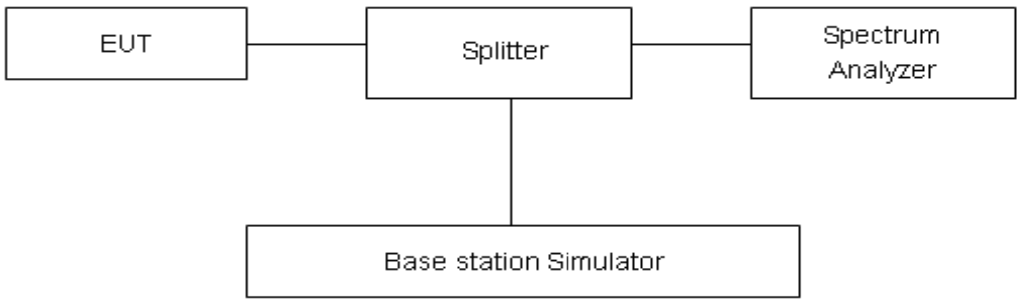
Temperature	Relative humidity
21°C ~25°C	40%~60%

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.

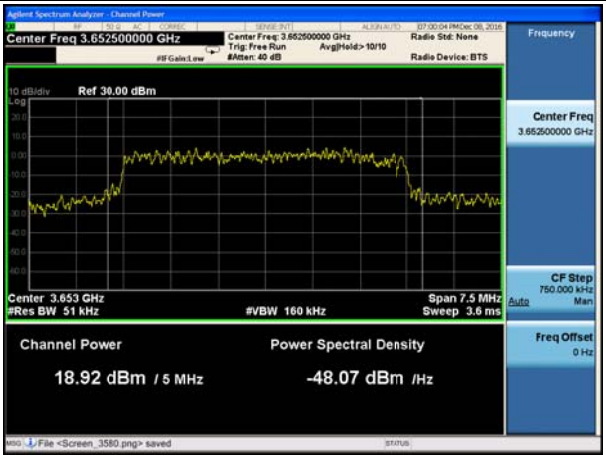
Limit	Limit
Base Station/ Fixed Station	1 watt/25 MHz

Measurement Uncertainty

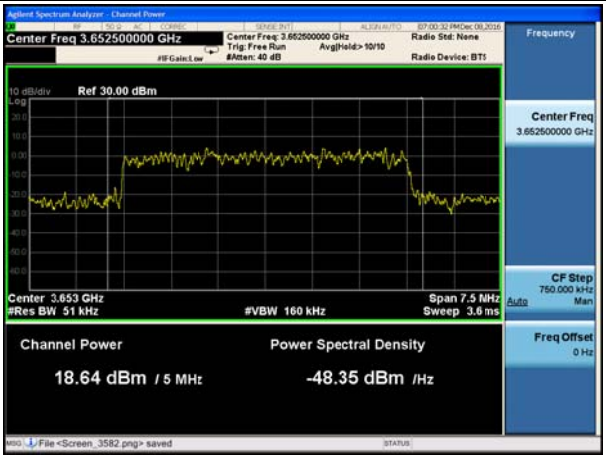
The assessed measurement uncertainty to ensure 95% confidence level for thenormal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

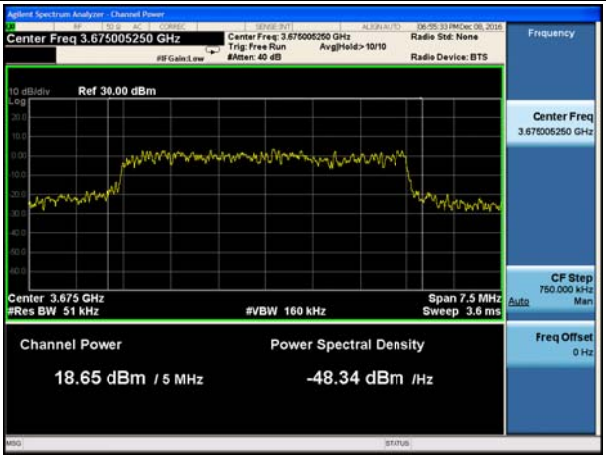
LTE FDD Band 43				Conducted Power(dBm)			EIRP(dBm)			EIRP(mW)			EIRP(mW)/25MHz			Limit(mW) /25MHz
BW	Modulation	RB size	RB offset	Channel/ Frequency(MHz)			Channel/ Frequency(MHz)			Channel/ Frequency(MHz)			Channel/ Frequency(MHz)			
				44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	
5MHz	QPSK	25	0	18.92	18.65	18.58	22.92	22.65	22.58	195.88	184.08	181.13	979.42	920.39	905.67	1000
	16QAM	25	0	18.64	18.58	18.21	22.64	22.58	22.21	183.65	181.13	166.34	918.27	905.67	831.71	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	20.88	21.76	18.52	24.88	25.76	22.52	307.61	376.70	178.65	769.02	941.76	446.62	1000
	16QAM	50	0	21.89	20.47	19.93	25.89	24.47	23.93	388.15	279.90	247.17	970.38	699.75	617.93	1000
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44165 /3675.5	44340 /3675	44515 /3692.5	44165 /3675.5	44340 /3675	44515 /3692.5	44165 /3675.5	44340 /3675	44515 /3692.5	44165 /3675.5	44340 /3675	44515 /3692.5	/
15MHz	QPSK	75	0	21.29	21.41	19.64	25.29	25.41	23.64	338.06	347.54	231.21	563.44	579.23	385.34	1000
	16QAM	75	0	19.17	19.87	20.48	23.17	23.87	24.48	207.49	243.78	280.54	345.82	406.30	467.57	1000
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			Channel/Frequency(MHz)			/
				44190 /3670	44340 /3675	44490 /3690	44190 /3670	44340 /3675	44490 /3690	44190 /3670	44340 /3675	44490 /3690	44190 /3670	44340 /3675	44490 /3690	/
20MHz	QPSK	100	0	21.02	19.66	19.23	25.02	23.66	23.23	317.69	232.27	210.38	397.11	290.34	262.97	1000
	16QAM	100	0	20.15	18.94	18.95	24.15	22.94	22.95	260.02	196.79	197.24	325.02	245.99	246.55	1000
Note: EIRP=Conducted Power + Antenna Gain, (Antenna Gain =4dBi)																



LTE Band 43 QPSK 5MHz CH44115



LTE Band 43 16QAM 5MHz CH44115



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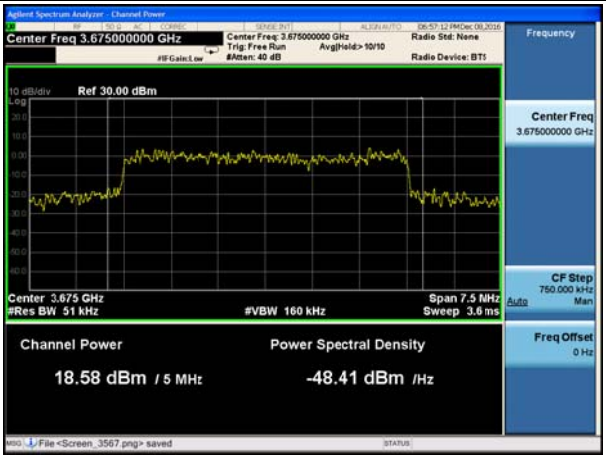
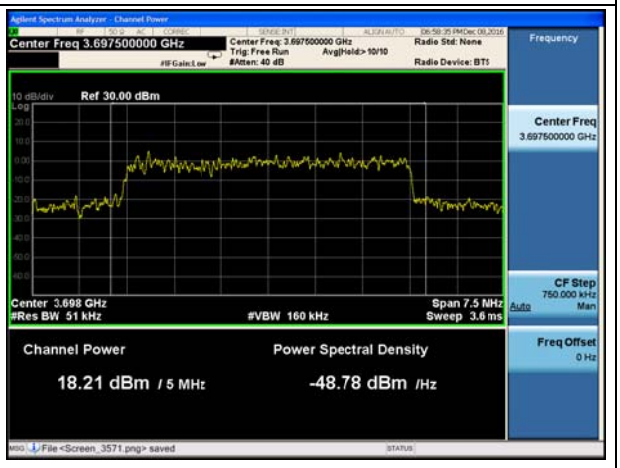


LTE Band 43 16QAM 5MHz CH44340

LTE Band 43 QPSK 5MHz CH44565



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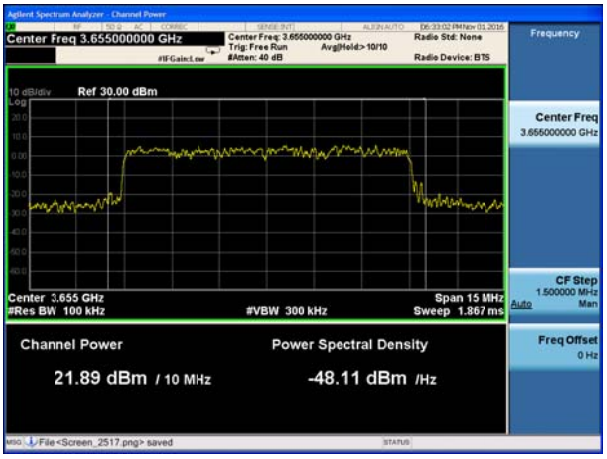
LTE Band 43 QPSK 10MHz CH44140



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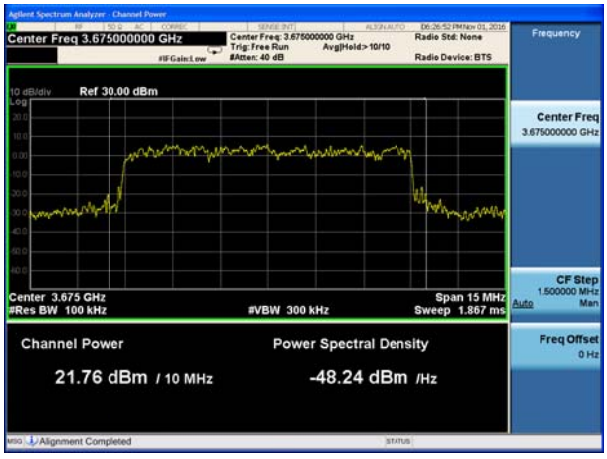
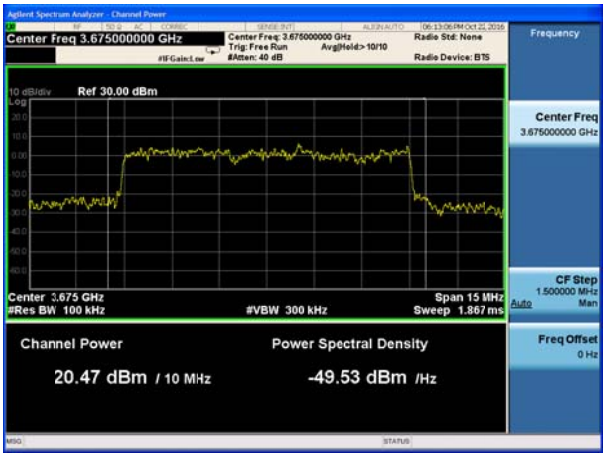
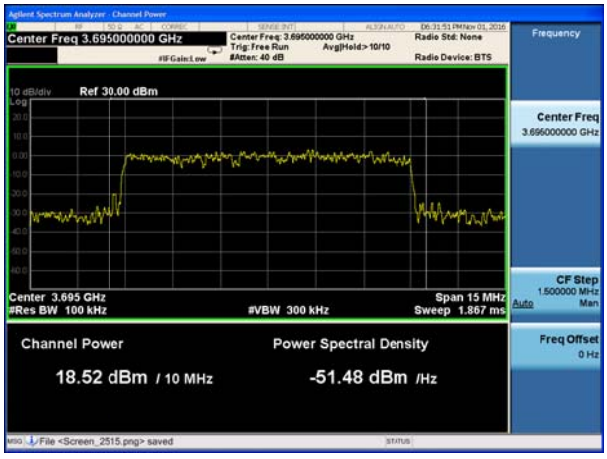


LTE Band 43 QPSK 10MHz CH44340

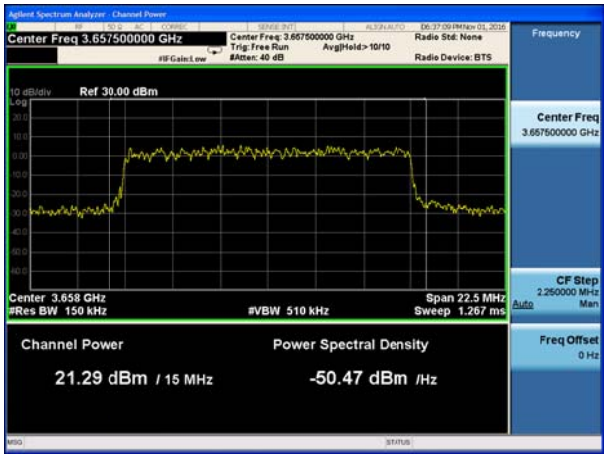


LTE Band 43 16QAM 10MHz CH44340



LTE Band 43 QPSK 10MHz CH44540

LTE Band 43 16QAM 10MHz CH44540



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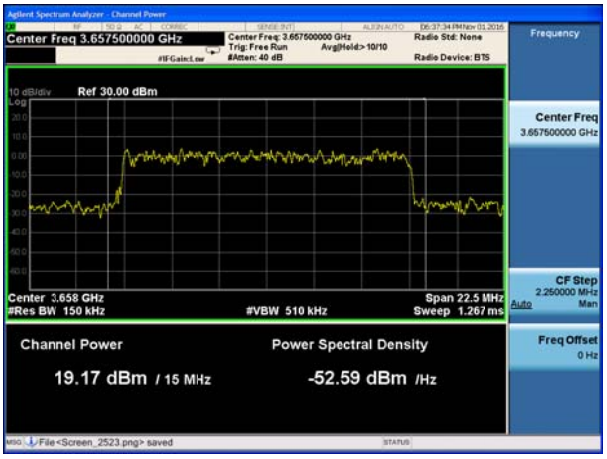
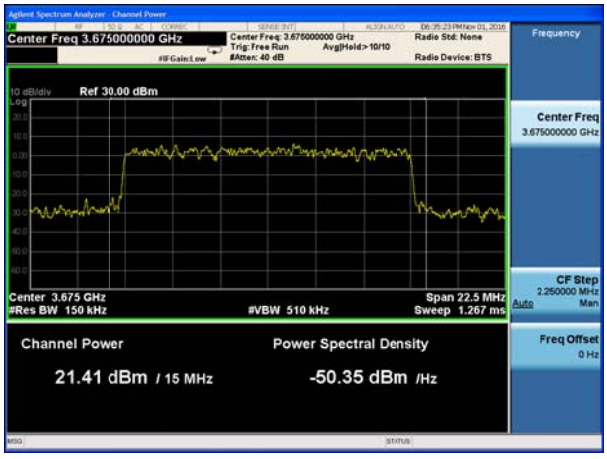


LTE Band 43 16QAM 15MHz CH44165



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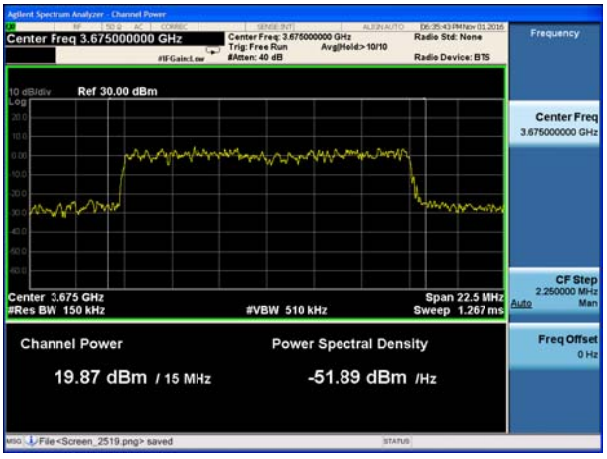

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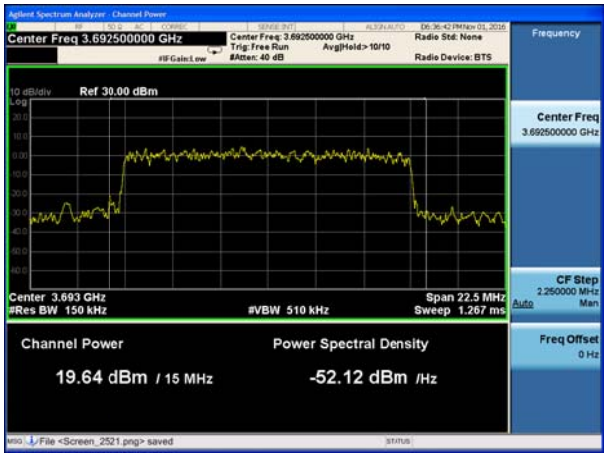

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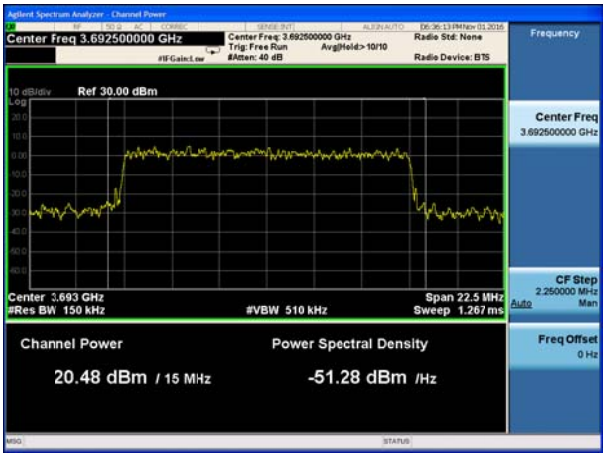
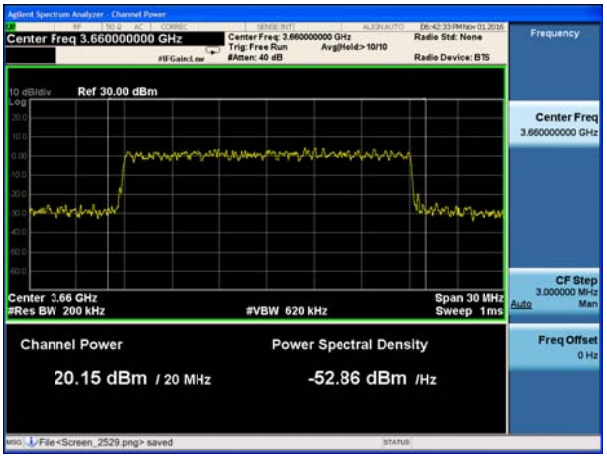
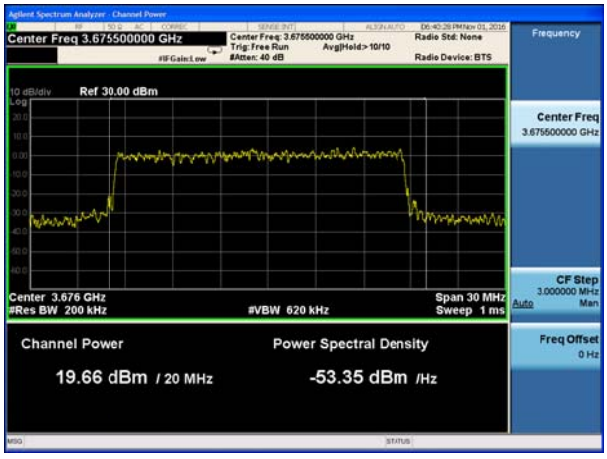


LTE Band 43 16QAM 15MHz CH44515

LTE Band 43 QPSK 20MHz CH44190



LTE Band 43 16QAM 20MHz CH44190



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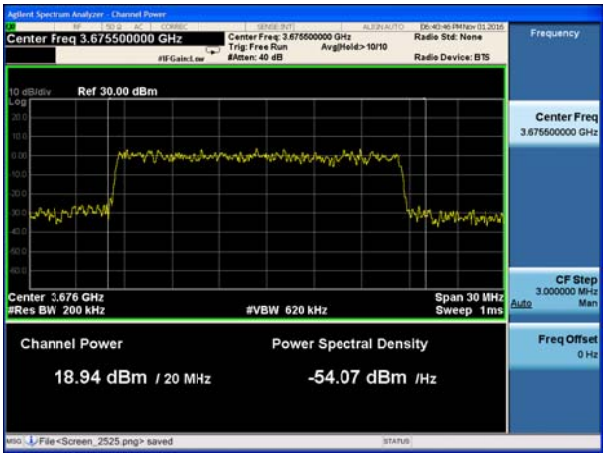

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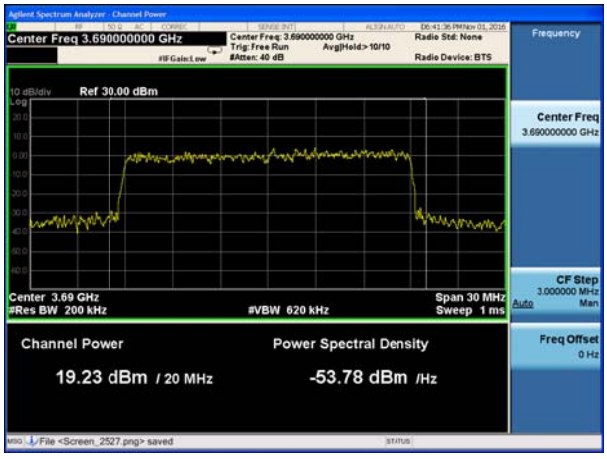

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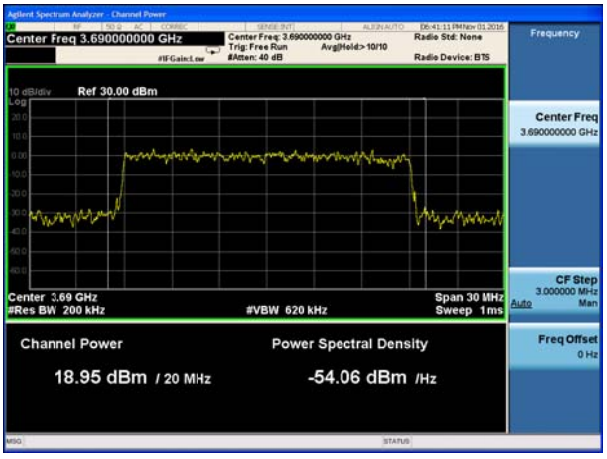


LTE Band 43 16QAM 20MHz CH44490

LTE FDD Band 43				Conducted Power Spectral Density (dBm)/1MHz			EIRP Power Spectral Density (mW)/1MHz			Limit(mW) /1MHz
BW	Modulation	RB size	RB offset	Channel/ Frequency(MHz)			Channel/ Frequency(MHz)			
				44115 /3652.5	44340 /3675	44565 /3697.5	44115 /3652.5	44340 /3675	44565 /3697.5	
5MHz	QPSK	25	0	11.539	10.923	10.624	35.801	31.067	29.000	40
	16QAM	25	0	11.127	11.424	9.628	32.561	34.866	23.057	40
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			
				44140 /3655	44340 /3675	44540 /3695	44140 /3655	44340 /3675	44540 /3695	/
10MHz	QPSK	50	0	7.965	8.208	8.394	15.722	16.626	17.354	40
	16QAM	50	0	8.620	7.828	8.409	18.281	15.234	17.414	40
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			
				44165 /3675.5	44340 /3675	44515 /3692.5	44165 /3675.5	44340 /3675	44515 /3692.5	/
15MHz	QPSK	75	0	6.794	6.816	6.297	12.006	12.067	10.708	40
	16QAM	75	0	6.406	7.085	5.808	10.980	12.838	9.568	40
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)			Channel/Frequency(MHz)			
				44190 /3670	44340 /3675	44490 /3690	44190 /3670	44340 /3675	44490 /3690	/
20MHz	QPSK	100	0	5.423	5.462	4.478	8.756	8.835	7.044	40
	16QAM	100	0	5.039	4.758	4.631	8.015	7.513	7.296	40
NOTE: EIRP PSD(dBm)=conducted PSD(dBm)+ Antenna Gain, (Antenna Gain =4dBi) EIRP PSD(mW)= 10^EIRP PSD(dBm)/10										

LTE Band 43 QPSK 5MHz CH44115

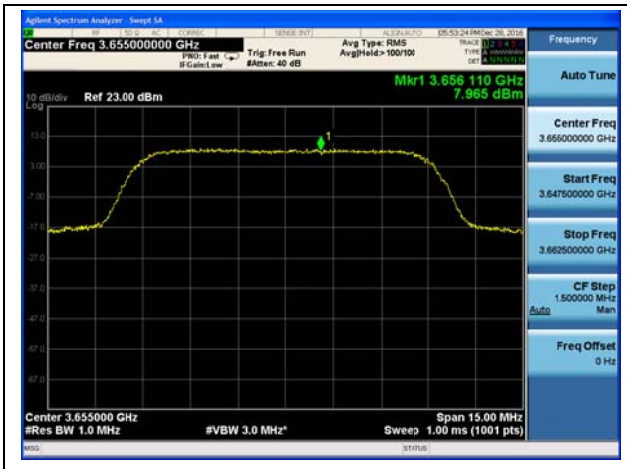
LTE Band 43 16QAM 5MHz CH44115

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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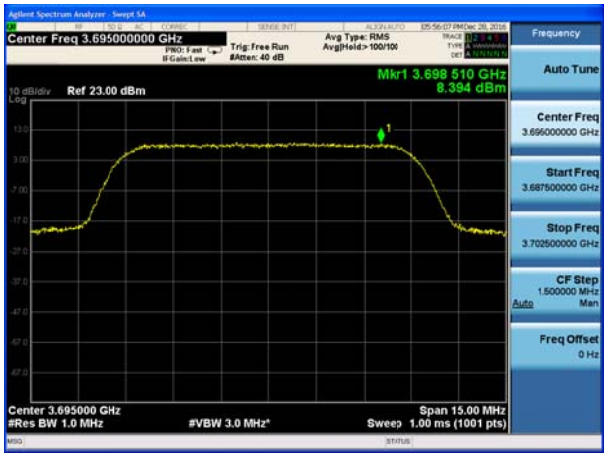
LTE Band 43 16QAM 10MHz CH44140

LTE Band 43 QPSK 10MHz CH44340

LTE Band 43 16QAM 10MHz CH44340



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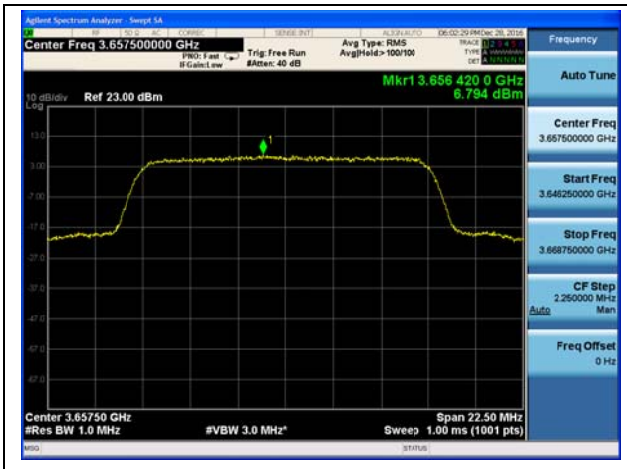
LTE Band 43 16QAM 10MHz CH44540



LTE Band 43 QPSK 15MHz CH44165

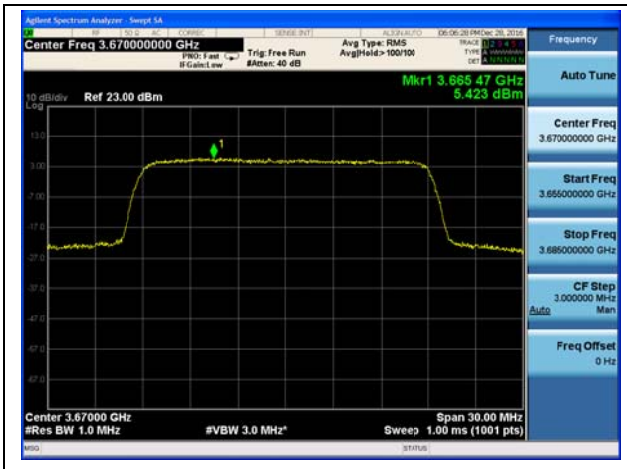
LTE Band 43 16QAM 15MHz CH44165

LTE Band 43 QPSK 15MHz CH44340

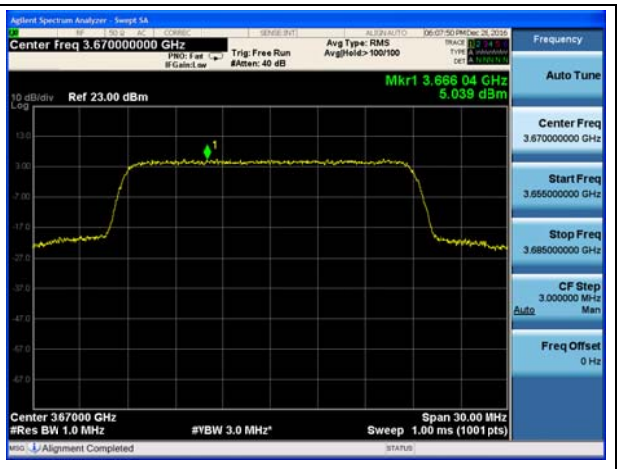
LTE Band 43 16QAM 15MHz CH44340

LTE Band 43 QPSK 15MHz CH44515

LTE Band 43 16QAM 15MHz CH44515



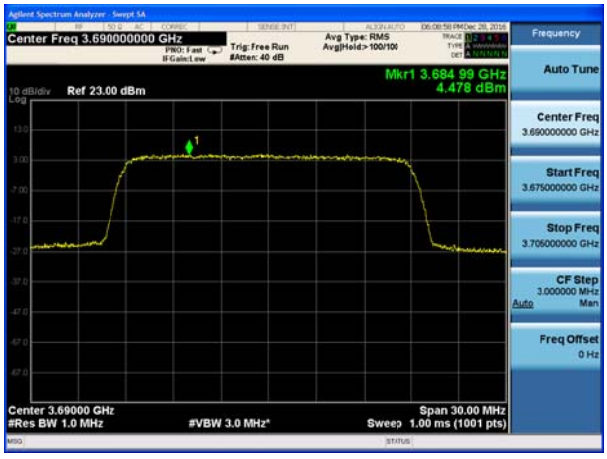
LTE Band 43 QPSK 20MHz CH44190



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

5.2. Occupied Bandwidth

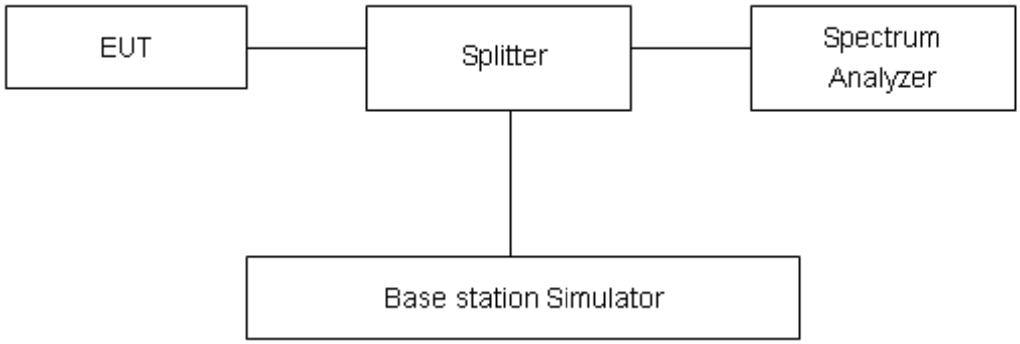
Ambient condition

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

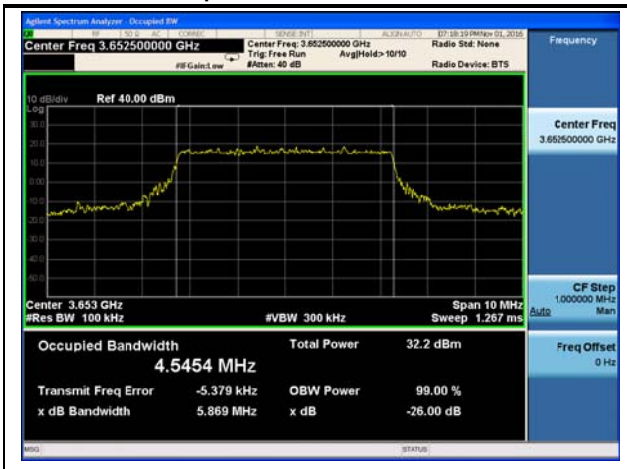
The occupied bandwidth, that is the frequency bandwidth such that, below its lower andabove its upper frequency limits, the mean powers radiated are each equal to 0.5 percentof the total mean power.

Measurement Uncertainty

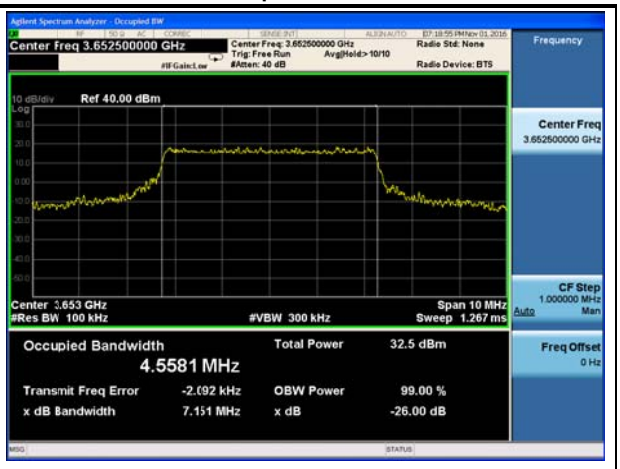
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2,U=624Hz.

Test Result

LTE Band 43					
RB	**Modulation**	**Bandwidth (MHz)**	**Channel**	**Frequency (MHz)**	**99% Power Bandwidth(MHz)**
100%	QPSK	5	44115	3652.5	4.5454
			44340	3675	4.5726
			44565	3697.5	4.5910
		10	44140	3655	9.0950
			44340	3675	9.1294
			44540	3695	9.1073
		15	44165	3675.5	13.498
			44340	3675	13.561
			44515	3692.5	13.519
		20	44190	3670	17.942
			44340	3675	17.973
			44490	3690	17.923
	16QAM	5	44115	3652.5	4.5581
			44340	3675	4.6036
			44565	3697.5	4.5574
		10	44140	3655	9.1717
			44340	3675	9.1798
			44540	3695	9.0919
		15	44165	3675.5	13.562
			44340	3675	13.564
			44515	3692.5	13.503
		20	44190	3670	17.982
			44340	3675	17.970
			44490	3690	17.975



LTE Band 43 QPSK 5MHz CH44115



LTE Band 43 16QAM 5MHz CH44115

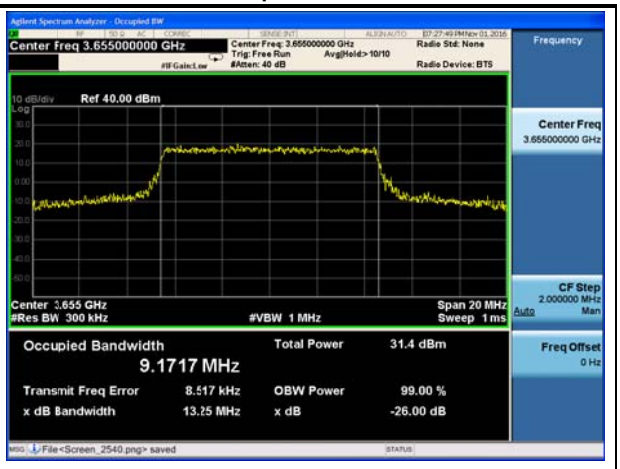
LTE Band 43 QPSK 5MHz CH44340

LTE Band 43 16QAM 5MHz CH44340

LTE Band 43 QPSK 5MHz CH44565

LTE Band 43 16QAM 5MHz CH44565

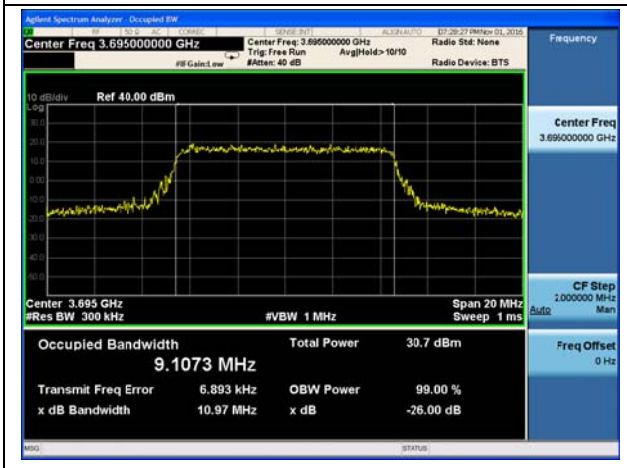
LTE Band 43 QPSK 10MHz CH44140



LTE Band 43 16QAM 10MHz CH44140

LTE Band 43 QPSK 10MHz CH44340

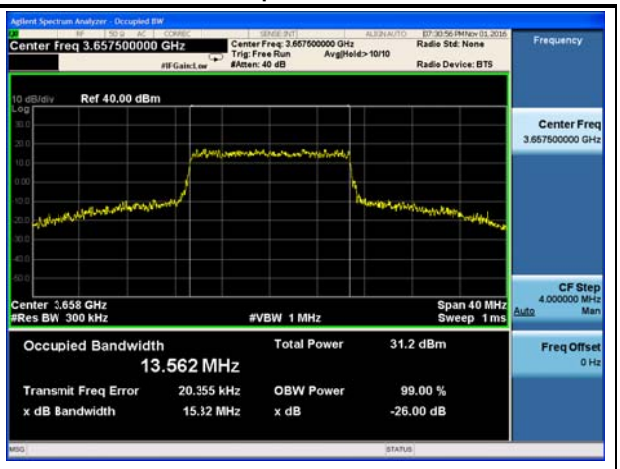
LTE Band 43 16QAM 10MHz CH44340



LTE Band 43 QPSK 10MHz CH44540

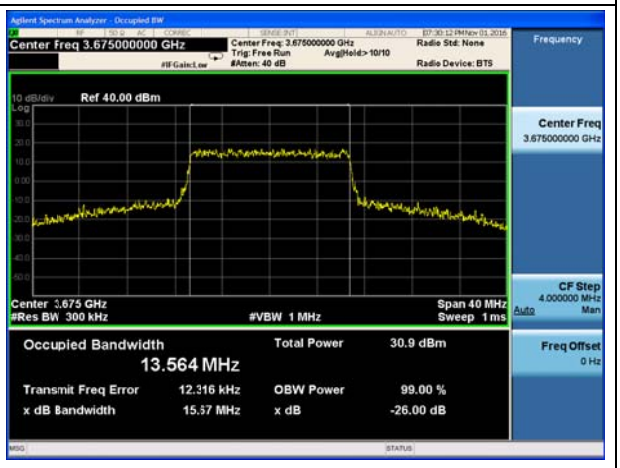
LTE Band 43 16QAM 10MHz CH44540

LTE Band 43 QPSK 15MHz CH44165



LTE Band 43 16QAM 15MHz CH44165

LTE Band 43 QPSK 15MHz CH44340

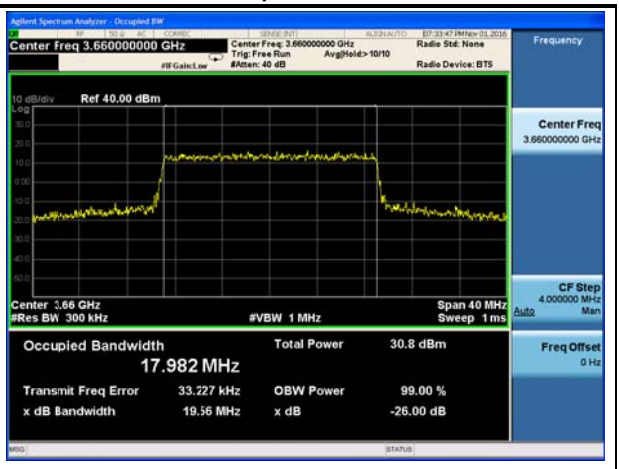


LTE Band 43 16QAM 15MHz CH44340

LTE Band 43 QPSK 15MHz CH44515

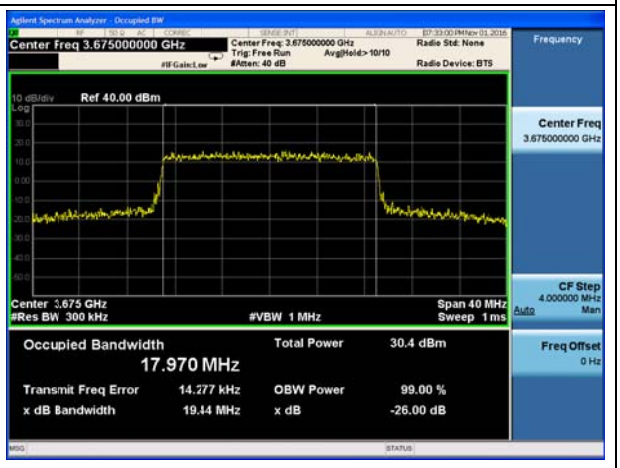
LTE Band 43 16QAM 15MHz CH44515

LTE Band 43 QPSK 20MHz CH44190



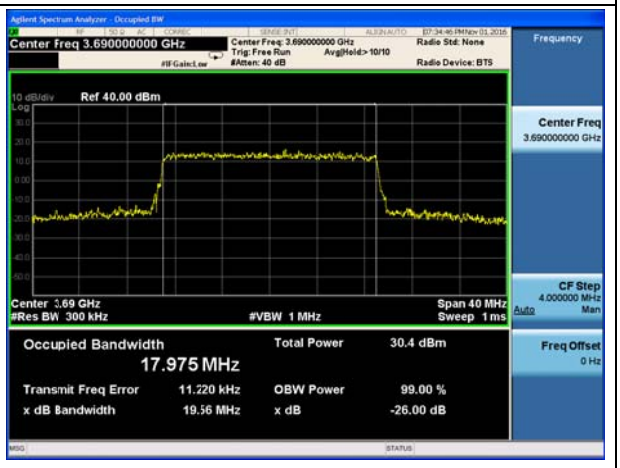
LTE Band 43 16QAM 20MHz CH44190

LTE Band 43 QPSK 20MHz CH44340



LTE Band 43 16QAM 20MHz CH44340

LTE Band 43 QPSK 20MHz CH44490



LTE Band 43 16QAM 20MHz CH44490

5.3. Band Edge Compliance

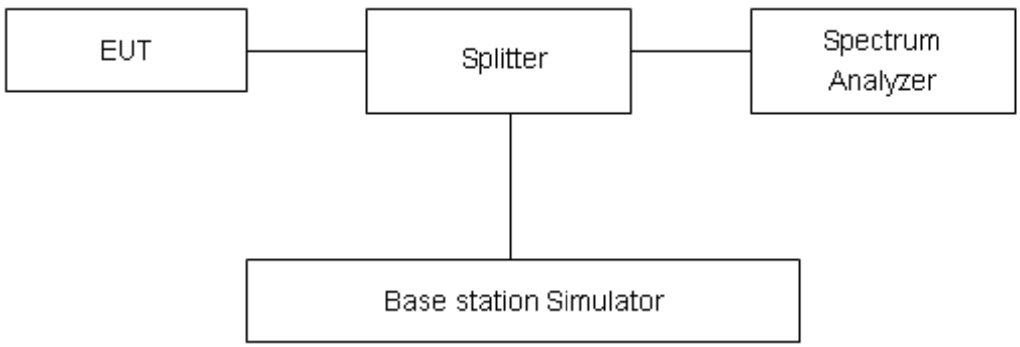
Ambient condition

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 43Set 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



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

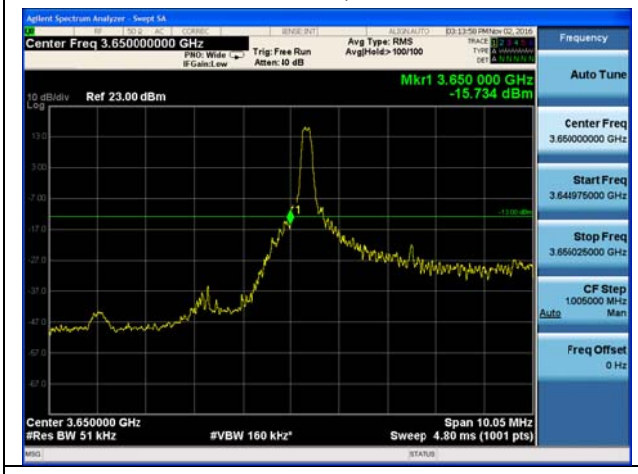
Measurement Uncertainty

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

Test Result

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

LTE Band 43 QPSK Bandwidth = 5MHz
CH44115, RB 1

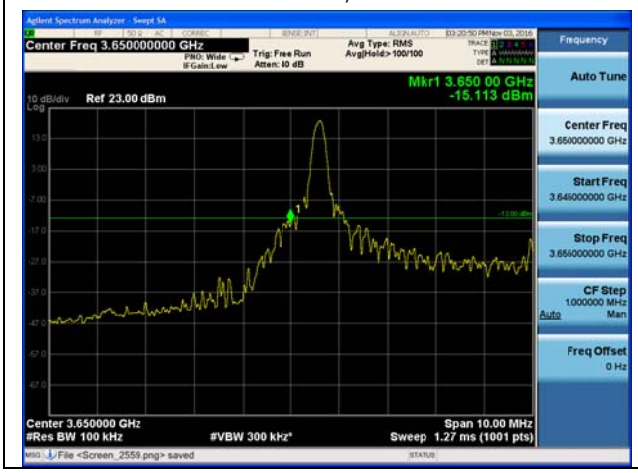


LTE Band 43 QPSK Bandwidth = 5MHz
CH44565, RB 1

LTE Band 43 QPSK Bandwidth = 5MHz
CH44115, RB 25

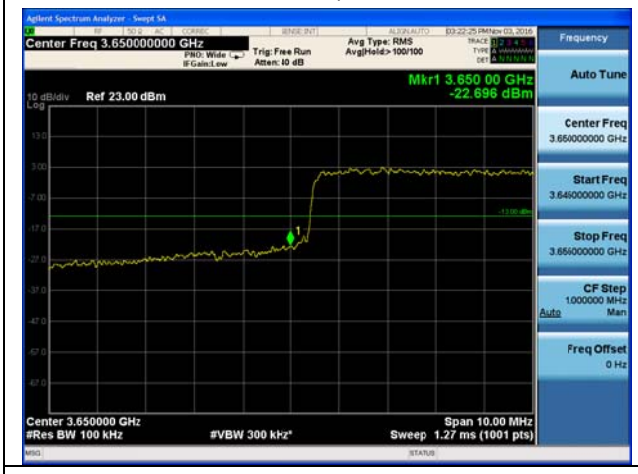
LTE Band 43 QPSK Bandwidth = 5MHz
CH44565, RB 25

LTE Band 43 QPSK Bandwidth = 10MHz
CH44140, RB 1



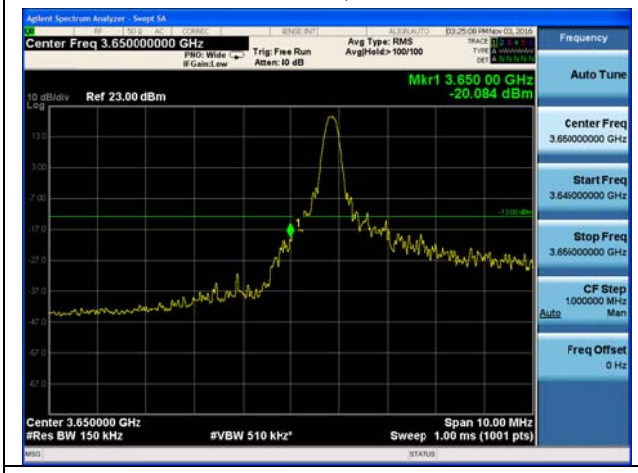
LTE Band 43 QPSK Bandwidth = 10MHz
CH44540, RB 1

LTE Band 43 QPSK Bandwidth = 10MHz
CH44140, RB 50



LTE Band 43 QPSK Bandwidth = 10MHz
CH44540, RB 50

LTE Band 43 QPSK Bandwidth = 15MHz
CH44165, RB 1

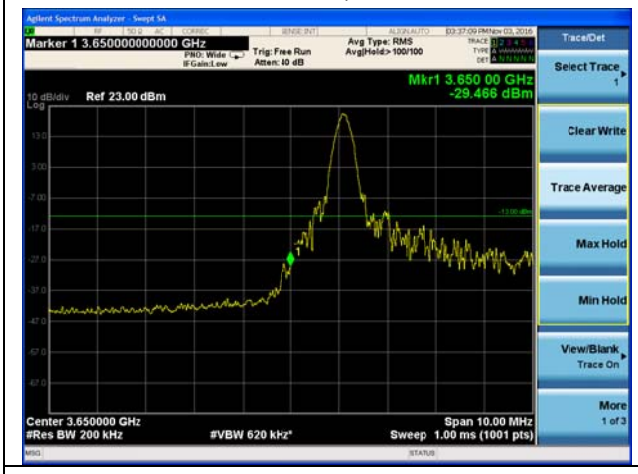


LTE Band 43 QPSK Bandwidth = 15MHz
CH44515, RB 1

LTE Band 43 QPSK Bandwidth = 15MHz
CH44165, RB 75

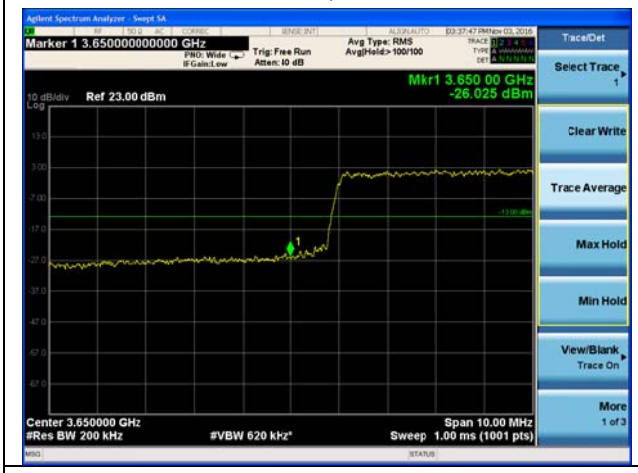
LTE Band 43 QPSK Bandwidth = 15MHz
CH44515, RB 75

LTE Band 43 QPSK Bandwidth = 20MHz
CH44190, RB 1



LTE Band 43 QPSK Bandwidth = 20MHz
CH44490, RB 1

LTE Band 43 QPSK Bandwidth = 20MHz
CH44190, RB 100



LTE Band 43 QPSK Bandwidth = 20MHz
CH44490, RB 100

LTE Band 43 16QAM Bandwidth = 5MHz
CH44115, RB 1

LTE Band 43 16QAM Bandwidth = 5MHz
CH44565, RB 1