



TEST REPORT

FCC Part 27 RSS-130 Issue 1/ RSS-GEN

HK1809151159E Report Reference No.:

FCC ID: 2AL7V-REOLINKGO

IC ID: 22869-REOLINKGO

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Date of issue...... Oct.24, 2018

Testing Laboratory Name Shenzhen HUAK Testing Technology Co., Ltd.

Applicant's name...... Shenzhen Reo-link Digital Technology Co., Ltd.

High-Tech Zone, Nanshan District, Shenzhen, China,518057

Test specification:

FCC Part 27

Standard: RSS-130 Issue 1

RSS-GEN Issue 5

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Test item description: IP Camera

Trade Mark: /

Manufacturer SHENZHEN BAICHUAN SECURITY TECHNOLOGY CO.,LTD

Model/Type reference..... Reolink GO

Listed Models /

Ratings.....: DC 3.6V From Battery;

DC 9V or DC 5V from USB

Modulation: QPSK

Hardware version: V2.0

Software version: V2.0

Frequency...... UMTS Band II, UMTS Band V, UMTS Band IV

Result..... PASS



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TEST REPORT

Test Report No. :	No. : HK1809151159E	Oct. 24, 2018
rest Report No	11K1009131139L	Date of issue

Equipment under Test : IP Camera

Model /Type : Reolink GO

Listed Models : /

Applicant : Shenzhen Reo-link Digital Technology Co., Ltd.

Address : 11th Floor, Building C, Unisplendour Information Harbour,

North High-Tech Zone, Nanshan District, Shenzhen,

China,518057

Manufacturer : SHENZHEN BAICHUAN SECURITY TECHNOLOGY

CO.,LTD

Address : 2-4th Floor, Building 4, YuanLing Industrial Park,

ShangWu, Shiyan Street, Bao'an District, Shenzhen, China

Test result	Pass *

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.





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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

TIA/EIA 603 D June 2010:Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

KDB971168 D01: MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL

TRANSMITTERS

RSS-130 Issue 1:Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz

RSS-GEN Issue 5: General Requirements for Compliance of Radio Apparatus

1.2 Test Description

Test Item	FCC /IC Rule No.	Result
RF Output Power	Part 2.1046 Part 27.50(c)(10) RSS-130§4.4	Pass
Peak-to-Average Ratio	Part 2.1046 RSS-130,§4.4	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 RSS-130,§4.4	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(g) RSS-130,§4.6 RSS-Gen, §6.13	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(g) RSS-130,§4.6 RSS-Gen, §6.13	Pass
Out of band emission, Band Edge	Part 2.1051 Part 27.53(g) RSS-130,§4.6 RSS-Gen, §6.13	Pass
Frequency stability	Part 2.1055 Part 27.54 RSS-130,§4.3 RSS-Gen, §6.11	Pass





1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao' an District, Shenzhen, China

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods — Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen HUAK Testing Technology Co., Ltd.. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HUAK Testing Technology Co., Ltd.

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

⁽¹⁾ This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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2 **GENERAL INFORMATION**

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 Description of Test Modes

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report. Note:

- 1. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst resulton this report.
- 2. Test method and refer to 3GPP TS136521.

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2.3 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	ENV216	R&S	HKE-059	2017/12/28	2018/12/27
LISN	R&S	ENV216	HKE-002	2017/12/28	2018/12/27
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2017/12/28	2019/12/26
Receiver	R&S	ESCI 7	HKE-010	2017/12/28	2018/12/27
Spectrum analyzer	Agilent	N9020A	HKE-048	2017/12/28	2018/12/27
RF automatic control unit	Tonscend	JS0806-2	HKE-060	2017/12/28	2018/12/27
Horn antenna	Schwarzbeck	9120D	HKE-013	2017/12/28	2019/12/26
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	2017/12/28	2019/12/26
Preamplifier	EMCI	EMC051845SE	HKE-015	2017/12/28	2018/12/27
Preamplifier	Agilent	83051A	HKE-016	2017/12/28	2018/12/27
Temperature and humidity meter	Boyang	HTC-1	HKE-075	2017/12/28	2018/12/27
High pass filter unit	Tonscend	JS0806-F	HKE-055	2017/12/28	2018/12/27
RF cable	Times	1-40G	HKE-034	2017/12/28	2018/12/27
Power meter	Agilent	E4419B	HKE-085	2017/12/28	2018/12/27
Power Sensor	Agilent	E9300A	HKE-086	2017/12/28	2018/12/27
Wireless Communication Test Set	R&S	CMU200	HKE-026	2017/12/28	2018/12/27

2.4 Modifications

No modifications were implemented to meet testing criteria.





3 TEST CONDITIONS AND RESULTS

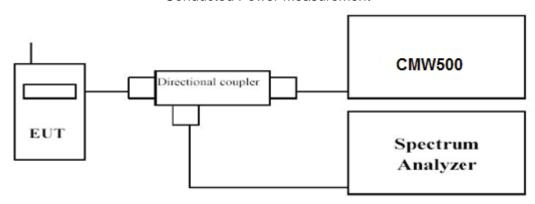
3.1 Output Power

LIMIT

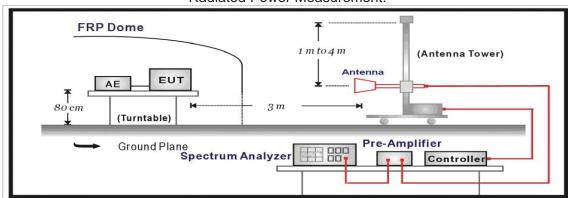
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are FCC limited to 3 watts ERP."IC limited to 5 watts ERP."

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Power Measurement:

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- c) EUT Communicate with CMW500, then select a channel for testing.
- d) Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to thefrequency of the transmitter
- c. The output of the test antenna shall be connected to the measuring receiver.
- d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.



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- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- I. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- g. Test site anechoic chamber refer to ANSI C63.4.

TEST RESULTS

Conducted Measurement:

	LTE F	DD Band 12			
TX Channel	DD 0:/0#	Frequency	Average Power [dBm]		
Bandwidth	RB Size/Offset	(MHz)	QPSK	16QAM	
		699.7	21.99	20.79	
	1 RB low	707.5	22.47	21.00	
		715.3	22.68	21.54	
		699.7	21.91	20.76	
	1 RB high	707.5	21.68	21.54	
4 4 1 1 1	G	715.3	22.58	21.59	
1.4 MHz		699.7	21.93	20.97	
	50% RB mid	707.5	22.11	21.09	
		715.3	22.76	21.75	
		699.7	20.90	20.65	
	100% RB	707.5	21.26	21.05	
		715.3	21.70	21.56	
		700.5	21.93	20.85	
	1 RB low	707.5	23.25	22.18	
		714.5	22.88	21.75	
		700.5	22.13	20.99	
	1 RB high	707.5	23.33	22.39	
O MI I-	· ·	714.5	22.73	21.60	
3 MHz		700.5	20.86	20.95	
	50% RB mid	707.5	23.25	23.08	
		714.5	21.83	20.92	
		700.5	20.92	21.06	
	100% RB	707.5	23.63	22.70	
		714.5	21.56	21.66	
		701.5	22.08	20.95	
	1 RB low	707.5	23.23	22.10	
		713.5	23.80	22.66	
		701.5	22.75	21.64	
	1 RB high	707.5	23.78	22.70	
E MU-	Ç	713.5	22.84	21.93	
5 MHz		701.5	22.41	21.30	
	50% RB mid	707.5	23.65	22.66	
		713.5	22.69	22.66	
		701.5	22.29	21.21	
	100% RB	707.5	23.49	22.53	
		713.5	22.14	22.21	



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		704.0	21.84	21.77
	1 RB low	707.5	22.47	22.40
		711.0	23.58	22.98
		704.0	23.23	22.98
	1 RB high	707.5	23.46	22.47
10 M⊔ -		711.0	22.86	22.72
10 MHz		704.0	22.51	21.55
	50% RB mid	707.5	23.51	22.60
		711.0	23.40	22.47
		704.0	23.37	22.38
	100% RB	707.5	23.80	22.75
		711.0	22.76	22.74

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Radiated Measurement:

Remark:

- 1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.
- 2. $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)$
- 3. ERP = EIRP 2.15dBi as EIRP by subtracting the gain of the dipole.

LTE FDD Band 12_Channel Bandwidth 1.4MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
699.7	-21.42	2.38	8.23	2.15	36.70	18.98	34.77	36.99	V
707.5	-19.50	2.40	8.29	2.15	36.70	20.94	34.77	36.99	V
715.3	-20.06	2.43	8.28	2.15	36.70	20.34	34.77	36.99	V

LTE FDD Band 12_Channel Bandwidth 3MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
700.5	-20.94	2.38	8.23	2.15	36.70	19.46	34.77	36.99	V
707.5	-17.11	2.40	8.29	2.15	36.70	23.33	34.77	36.99	V
714.5	-20.11	2.43	8.28	2.15	36.70	20.29	34.77	36.99	V

LTE FDD Band 12 Channel Bandwidth 5MHz QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
701.5	-19.79	2.38	8.23	2.15	36.70	20.61	34.77	36.99	V
707.5	-16.67	2.40	8.29	2.15	36.70	23.77	34.77	36.99	V
713.5	-18.97	2.43	8.28	2.15	36.70	21.43	34.77	36.99	V

LTE FDD Band 12 Channel Bandwidth 10MHz QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
704.0	-21.24	2.38	8.23	2.15	36.70	19.16	34.77	36.99	V
707.5	-17.96	2.40	8.29	2.15	36.70	22.48	34.77	36.99	V
711.0	-18.13	2.43	8.28	2.15	36.70	22.27	34.77	36.99	V

LTE FDD Band 12_Channel Bandwidth 1.4MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
699.7	-22.73	2.38	8.23	2.15	36.70	17.67	34.77	36.99	V
707.5	-20.58	2.40	8.29	2.15	36.70	19.86	34.77	36.99	V
715.3	-21.15	2.43	8.28	2.15	36.70	19.25	34.77	36.99	V

LTE FDD Band 12_Channel Bandwidth 3MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
700.5	-22.12	2.38	8.23	2.15	36.70	18.28	34.77	36.99	V
707.5	-18.18	2.40	8.29	2.15	36.70	22.26	34.77	36.99	V
714.5	-21.21	2.43	8.28	2.15	36.70	19.19	34.77	36.99	V

LTE FDD Band 12_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
701.5	-20.65	2.38	8.23	2.15	36.70	19.75	34.77	36.99	V
707.5	-17.72	2.40	8.29	2.15	36.70	22.72	34.77	36.99	V
713.5	-19.80	2.43	8.28	2.15	36.70	20.60	34.77	36.99	V



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LTE FDD Band 12_Channel Bandwidth 10MHz_16QAM

F	requency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	Correction (dB)	P _{Ag} (dB)	ERP (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Polarization
	704.0	-22.36	2.38	8.23	2.15	36.70	18.04	34.77	36.99	V
	707.5	-19.12	2.40	8.29	2.15	36.70	21.32	34.77	36.99	V
	711.0	-19.43	2.43	8.28	2.15	36.70	20.97	34.77	36.99	V

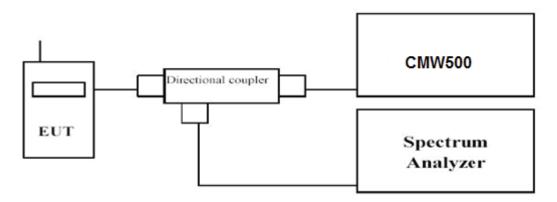


3.3 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

- Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- 2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
- 3. Set the number of counts to a value that stabilizes the measured CCDF curve;
- 4. Set the measurement interval as follows:
 - 1). for continuous transmissions, set to 1 ms,
 - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
- 5. Record the maximum PAPR level associated with a probability of 0.1%.

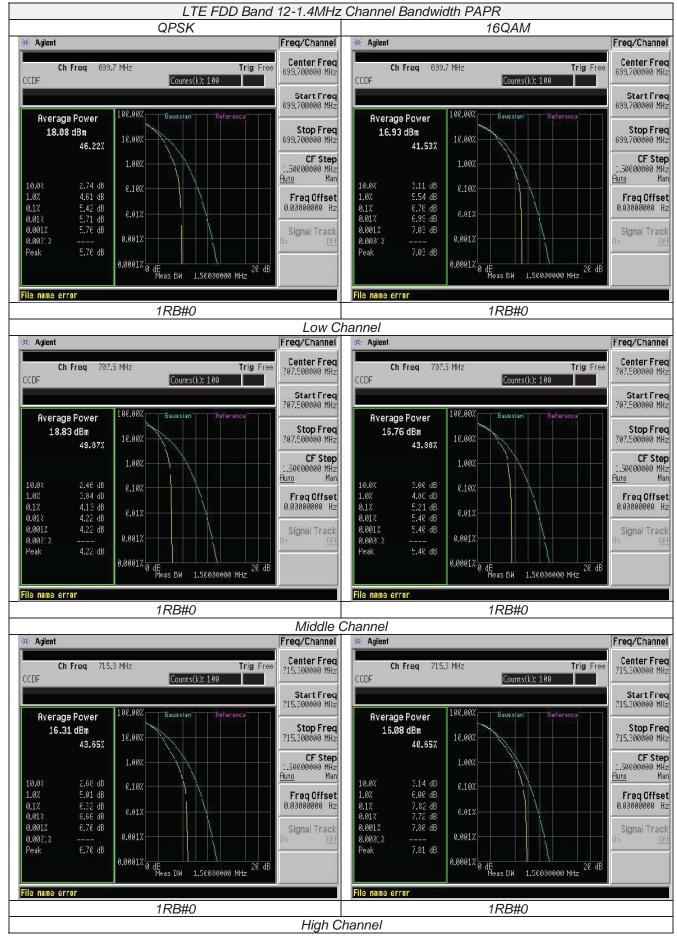
TEST RESULTS

Remark:

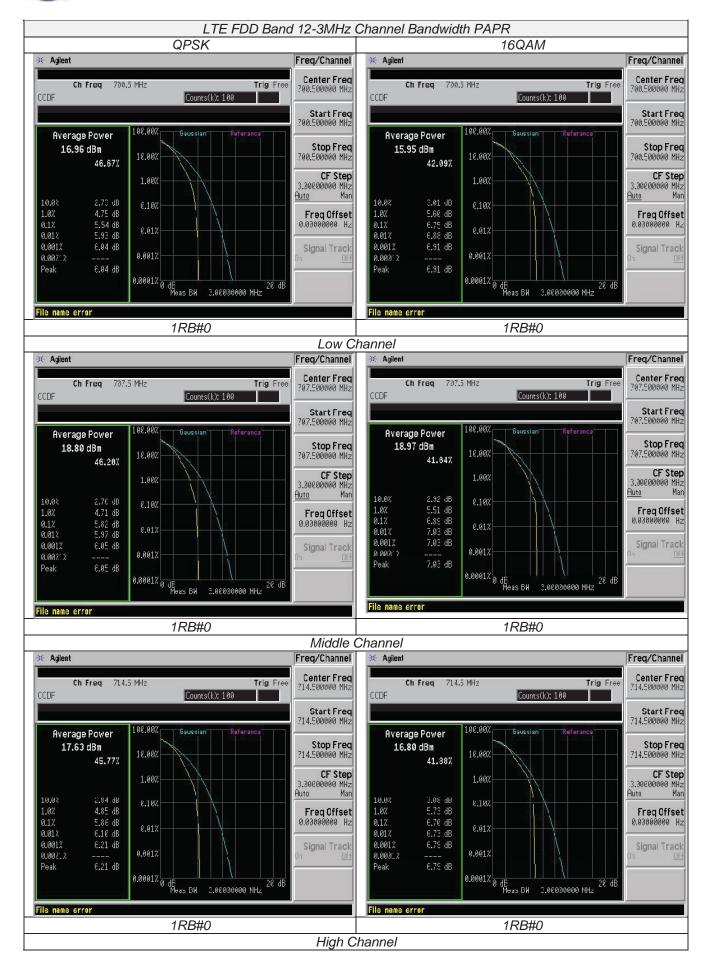
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.

		LTE FDD Band 12		
TX Channel	Frequency	RB Size/Offset	PAPI	R (dB)
Bandwidth	(MHz)	RB Size/Oliset	QPSK	16QAM
	699.7		5.42	6.76
1.4 MHz	707.5	1RB#0	4.13	5.21
	715.3		6.32	7.82
	700.5		5.54	6.75
3 MHz	707.5	1RB#0	5.82	6.89
	714.5		5.86	6.70
	701.5		5.46	6.37
5 MHz	707.5	1RB#0	6.57	7.14
	713.5		4.24	5.15
10 MHz	704.0	·	5.44	6.81
	707.5	1RB#0	5.87	6.31
	711.0		7.18	8.34

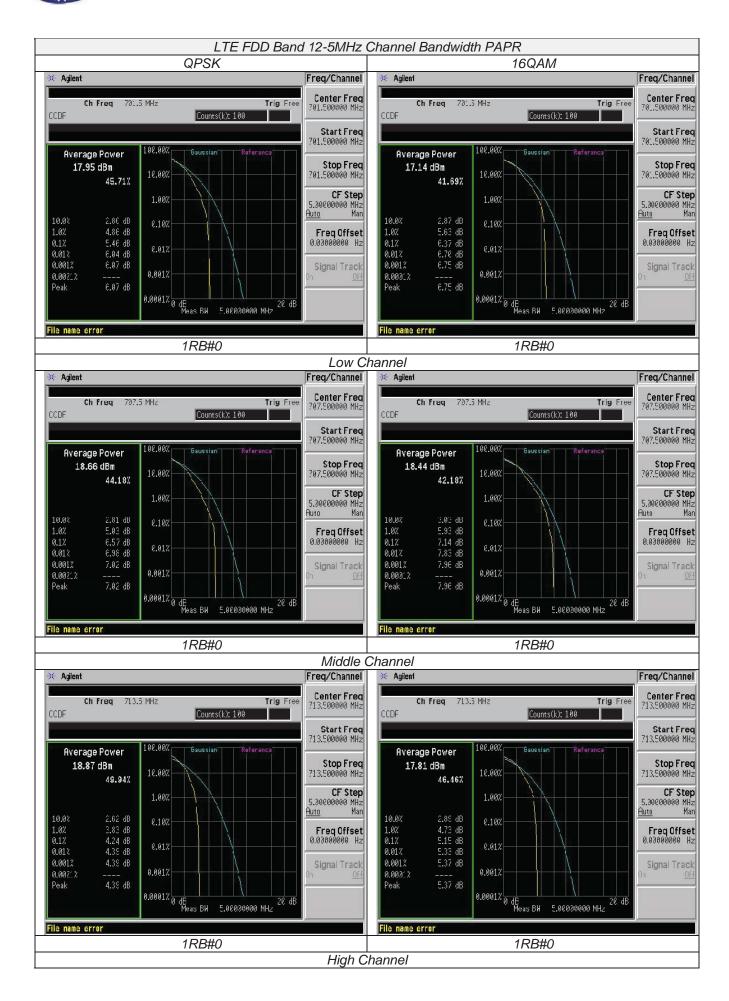
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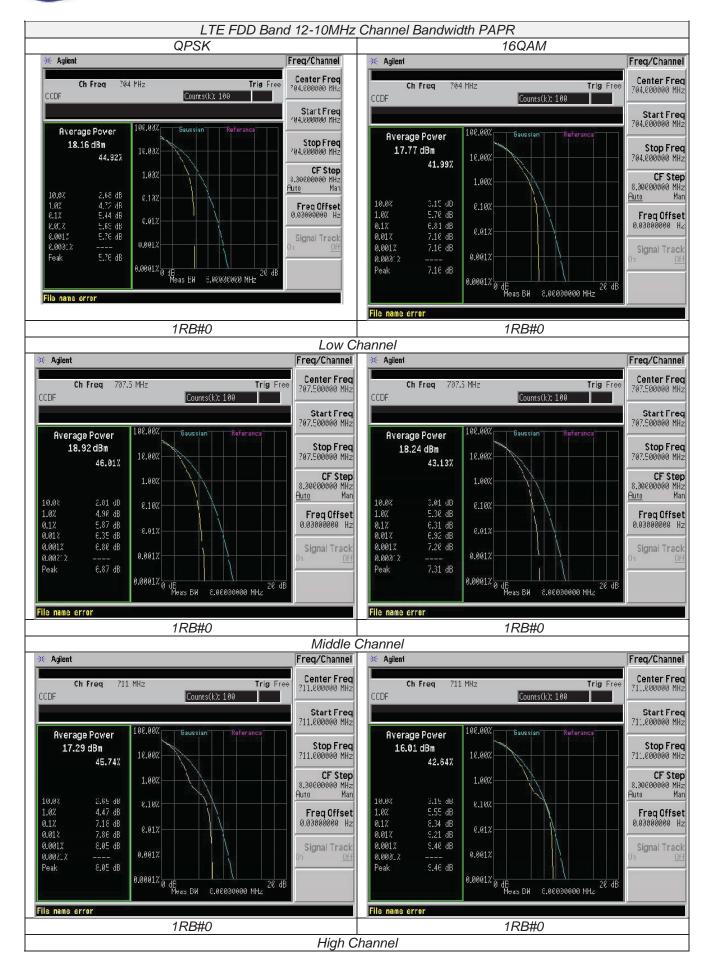
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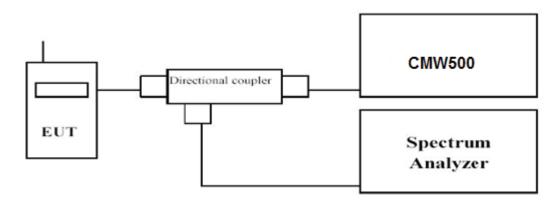


3.4 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBW was set to about 1% of emission BW, VBW≥3 times RBW.

-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.

		LTE FDD	Band 12			
TX Channel	RB Size/Offset	Frequency		Emission dth (MHz)		ed bandwidth Hz)
Bandwidth		(MHz)	QPSK	16QAM	QPSK	16QAM
		699.7	1.200	1.231	1.0728	1.0881
1.4 MHz	6RB#0	707.5	1.327	1.260	1.0883	1.0798
		715.3	1.203	1.284	1.0768	1.0828
		700.5	2.999	3.026	2.6822	2.6876
3 MHz	15RB#0	707.5	2.910	3.038	2.6890	2.6982
		714.5	2.971	2.930	2.6722	2.6863
		701.5	5.097	5.079	4.4876	4.4877
5 MHz	25RB#0	707.5	5.062	5.046	4.4833	4.4824
		713.5	5.055	5.060	4.4938	4.4833
	_	704.0	9.892	9.839	8.9594	8.9575
10 MHz	50RB#0	707.5	9.700	9.884	8.9687	8.9465
		711.0	9.799	9.917	8.9866	8.9595

* TITE

Transmit Freq Error x dB Bandwidth

File name error

-1.465 kHz 1.203 M⊦z

6RB#0

Page 19 of 40 Report No.: HK1809151159E LTE FDD Band 12-1.4MHz Channel Bandwidth **QPSK** 16QAM ₩ Agilent Freq/Channel # Agilent Freq/Channel Center Freq 699.700000 MHz Center Freq 699.700000 MHz Ch Freq 699.7 MHz Trig Free Ch Freq 639.7 MHz Trig Free Occupied Bandwidth Occupied Bandwidth Start Freq 698.300000 MHz Start Freq 698.300000 MHz Re: 20.7 dBm #Peak #Atten 30 d3 Rei 20.7 cBr #Peak #Atten 30 dB **Stop Freq** 701.100000 MHz Stop Freq 701.100000 MHz Log 10 Log 10 **CF Step** ďB/ ďB∕ 282.000000 kHz Auto Man 280.000000 kHz Auto Man Offs: 0.7 dB Offs: <u>Auto</u> <u>Auto</u> Freq Offset 0.00000000 Hz Freq Offset Center 639,700 MHz #Res BW 15 kHz 699.700 MHz Span 2.8 MFz Span 2.8 MF: ≠VBW 43 kHz #Res BW 15 kHz **♦VBW 43 kHz** #Sweep 100 ms (601 pts) #Sweep 100 ms (601 pts) Signal Track Signal Track Occ BN % Pwr x dB Occ BH % Pwr 99.00 % x dB -26.00 dB Occupied Bandwidth 99.00 % Occupied Bandwidth Off Off -26.00 dB 1.0728 MHz 1.0881 MHz –1.242 kHz 1.200 M⊦z Transmit Freq Error x dB Bandwidth Transmit Freq Error x dB Bandwidth 2.119 kHz 1.231 MHz File name error File name error 6RB#0 6RB#0 Low Channel # Agilent Freq/Channel Freq/Channel Center Freq Center Freq Ch Freq Ch Frea 707.5 MHz Trig Free 707.5 MHz Trig Free 707.500000 MHz Occupied Bandwidth Occupied Bandwidth Start Freq Start Freq 706,100000 MHz 706.100000 MHz Re: 20.7 dBm #9-ten 30 d3 Ref 20.7 cBr #Atten 30 dB Stop Freq Stop Freq 708.900000 MHz 708.900000 MHz Log 10 Log 10 **CF Step** 280.000000 kHz <u>luto</u> Man **CF Step** dB/ dR/ 282.000000 kHz Auto Man Offs: Offs: 0.7 · (- Auto <u>Auto</u> Freq Offset 0.000000000 Hz Freq Offset Center 707.500 MHz #Res BW 15 kHz Center 707.500 MHz #Res BW 15 kHz *VBW 43 kHz **#VBW 43 kHz** #Sweep 100 ms (601 pts) #Sween 100 ns (601 nts) Signal Track Signal Track Occ BN % Pwr 99.00 % × dB -26.00 dB Occupied Bandwidth Occupied Bandwidth Occ BN % Per 99.00 % 99.00 % Off x dB 1.0883 MHz -26.00 dB 1.0798 MHz -1.406 kHz 1.327 M⊦z Transmit Freq Error × dB Bandwidth 1.412 kHz 1.260 MHz Transmit Freq Error x dB Bandwidth File name error File name error 6RB#0 6RB#0 Middle Channel ₩ Agilent Freq/Channel Freq/Channel Center Freq Center Freq Ch Frea 71.5.3 MHz Ch Frea 715.3 MHz Trig Free Trig Free 715.300000 MHz Occupied Bandwidth Occupied Bandwidth Start Freq 713.900000 MHz Start Freq 713.800000 MHz Rei 2017 dBm #^Deak #Atten 30 d3 #Atten 30 dB Stop Freq Stop Freq 716.700000 MHz 716.700000 MHz Log 10 Log 10 **CF Step** 280.000000 kHz <u>luto</u> Man **CF Step** 282.000000 kHz <u>Nuto</u> Man dB/dBZ<u>Auto</u> Auto Freq Offset Freq Offset 0.00000000 Hz Center 715.300 MHz #Res BW 15 kHz 0.030000000 Hz Center 715.300 MHz #Res BW 15 kHz ŧVBW 43 kHz #Sweep 100 ms (601 pts) *VBW 43 kHz #Sweep 100 ms (601 pts) Signal Track Signal Track Occupied Bandwidth Occupied Bandwidth Occ BH % PWr 99.00 % Occ BN % Pwr 99.00 % x dB x dB -26.00 dE -26.00 dE 1.0768 MHz 1.0828 MHz

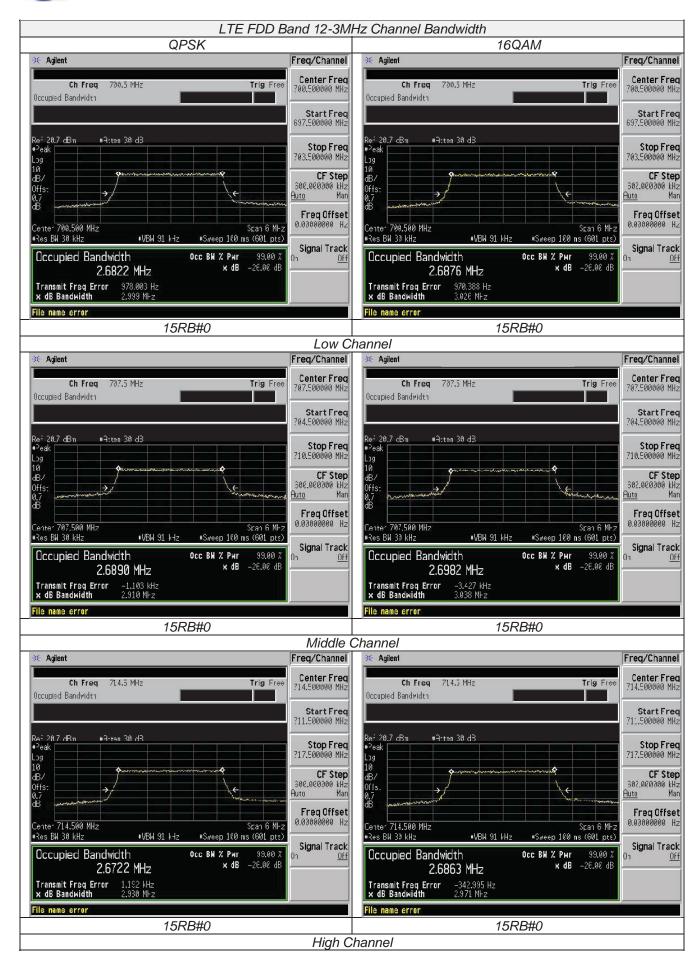
> Transmit Freq Error × dB Bandwidth

High Channel

2.354 kHz 1.284 MHz

6RB#0

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25RB#0

*ATA *

LTE FDD Band 12-5MHz Channel Bandwidth QPSK 16QAM # Agilent Freq/Channel # Agilent Freq/Channel Center Freq 701.500000 MHz Center Freq 701.500000 MHz Ch Freq Trig Free Ch Freq Occupied Bandwidth Occupied Bandwidth Start Freq 696.500000 MHz Start Freq 696.500000 MHz #9-ten 30 d3 Re: 20.7 dRm #Atten 30 dB Re: 20 7 cBm Stop Freq 706.500000 MHz Stop Freq 706.500000 MHz L∋g 10 dB/ CF Step CF Step .30000000 MHz <u>ito</u> Man 1.00000000 MHz <u>Auto</u> Man Öffs 0.7 dB <u>Auto</u> Freq Offset 0.00000000 Hz Freq Offset 0.03000000 Hz 701.50 MHz #Res BW 56 kHz #Res BW 56 kHz #VBW 160 <Hz #Sweep 100 ms (601 pts) #VBW 160 <Hz #Sweep 100 ms (601 pts) Signal Track Signal Track Occupied Bandwidth Occ BN % Pwr 99.00 % Occupied Bandwidth Occ BN % Pwr 99.00 % OFF x dB -2€.0€ dB x dB -2€.0€ dB 4.4876 MHz 4.4877 MHz Transmit Freq Error 7.465 kHz x dB Bandwidth 5.097 MFz Transmit Freq Error 4.516 kHz x dB Bandwidth 5.079 MFz File name error File name error 25RB#0 25RB#0 Low Channel Freq/Channel Freq/Channel # Agilent # Agilent Center Freq Center Freq Ch Frea Trig Free Ch Frea 707.5 MHz 707.5 MHz Trig Free 707.500000 MHz Occupied Bandwidth Start Freq 702.500000 MHz Start Freq 702.500000 MHz Rei 20.7 dBm #Atten 30 dB Rei 20.7 cBm #Atten 30 d3 **Stop Freq** 712.500000 MHz Stop Freq _0g 10 Log 10 CF Step CF Step dB/_.00000000 MHz <u>Auto</u> Man .30000000 MHz <u>ito</u> Man Offs 0.7 <u>Auto</u> Freq Offset 0.000000000 Hz Freq Offset 0.00000000 Hz 707.50 MHz #VBW 160 <Hz #Sweep 100 ms (601 pts) #Res BW 50 kHz #VBW 160 <Hz #Sweep 100 ms (601 pts) #Res BW 56 kHz Signal Track Signal Track Occ BH % PWr 99.00 % × dB −26.00 dB Occ BN % Pwr 99.00 % x dB -26.00 dB Occupied Bandwidth Occupied Bandwidth Off Off 4.4833 MHz 4.4824 MHz Transmit Freq Error x dB Bandwidth Transmit Freq Error x dB Bandwidth -2.059 kHz 5.0€2 M⊦z -2.074 kHz 5.046 MFz File name error File name error 25RB#0 25RB#0 Middle Channel € Agilent Freq/Channel Freq/Channel Center Freq 713.500000 MHz Center Freq Ch Frea 713.5 MHz Trig Free Ch Frea 713.5 MHz Trig Free Occupied Bandwidth Occupied Bandvidth Start Freq 708.500000 MHz Start Freq 708.500000 MHz #Atten 30 dB Re: 20.7 cBm #Atten 30 dB Re: 20.7 dBm Stop Freq Stop Freq .0g 10 718.500000 MHz 718.500000 MHz Log 10 **CF Step** CF Step dR/.aacaaaaa MHz uto Man .200000000 MHz ito Man 0[[s <u>Auto</u> <u>Auto</u> Freq Offset Freq Offset 0.00000000 Hz Center 713.50 MHz #Res BW 53 kHz 3pan 10 M⊦z 713.50 MHz #Res BW 56 kHz #VBW 160 kHz #Sweep 100 ms (601 pts) #VBW 160 kHz #Sweep 100 ns (601 pts) Signal Track Signal Track Occ BH % Pwr 99.00 % x dB -26.00 dB Occupied Bandwidth Occupied Bandwidth Occ BN % Pwr 99.00 % Off x dB -26.00 dB 4.4938 MHz 4.4833 MHz Transmit Freq Error x dB Bandwidth Transmit Freq Error x dB Bandwidth 2.497 kHz 5.055 MHz 1.760 kHz 5.060 MHz File name error File name error

High Channel

25RB#0

50RB#0

* TITE

LTE FDD Band 12-10MHz Channel Bandwidth QPSK 16QAM # Agilent Freq/Channel # Agilent Freq/Channel Center Freq 704,000000 MHz Center Freq 704.000000 MHz Ch Freq Trig Free Ch Freq Trig Free Occupied Bandwidth Occupied Bandwidth Start Freq 694.000000 MHz Start Freq 694.000000 MHz #9-ten 30 d3 Re: 20.7 dRm #Atten 30 dB Re: 20.7 cBm Stop Freq 714.000000 MHz \$top Freq 714.000000 MHz Log 10 dB/ CF Step CF Step 2.00000000 MHz <u>Auto</u> Man 2.000000000 MHz <u>Auto</u> Man Öffs 0.7 dB <u>Auto</u> Freq Offset 0.03000000 Hz Freq Offset 0.03000000 Hz 704.00 MHz Center #Res BW 110 kHz #VBW 330 <Hz #VBW 330 <Hz #Res BW 110 kHz #Sweep 100 ms (601 pts) #Sweep 100 ms (601 pts) Signal Track Signal Track Occupied Bandwidth Occ BW % Pwr 99.00 % Occupied Bandwidth Occ BN % Pwr 99.00 % OFF OFF x dB -2€.0€ dB x dB -2€.0€ dB 8.9594 MHz 8.9575 MHz Transmit Freq Error 4.479 kHz x dB Bandwidth 9.892 MFz Transmit Freq Error 13.069 kHz x dB Bandwidth 9.839 MHz File name error File name error 50RB#0 50RB#0 Low Channel Freq/Channel ₩ Agilent # Agilent Freq/Channel Center Freq Center Freq Ch Frea Trig Free Ch Frea 707.5 MHz 707.5 MHz Trig Free 707.500000 MHz Occupied Bandwidth Start Freq 697.500000 MHz Start Freq 697.500000 MHz Rei 20.7 dBm #Atten 30 dB Rei 20.7 cBm #Atten 30 d3 **Stop Freq** 717.500000 MHz Stop Freq _0g 10 Log 10 CF Step CF Step dB/ 2.000000000 MHz A<u>uto</u> Man 2,300000000 MHz <u>Auto</u> Man Offs: 0.7 dB <u>Auto</u> <u>Auto</u> Freq Offset 0.000000000 Hz Freq Offset 0.00000000 Hz 707.50 MHz #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) #Res BW 110 kHz #VBW 330 kHz #Sweep 100 ms (601 pts) Signal Track Signal Track Occ BN % Pwr Occ BN % Pwr Occupied Bandwidth 99.00 % Occupied Bandwidth 99.00 % Off Off x dB -26.00 dB x dB -26.00 dB 8.9687 MHz 8.9465 MHz Transmit Freq Error x dB Bandwidth Transmit Freq Error x dB Bandwidth -6.839 kHz 9.700 MHz 3.948 kHz 9.884 MHz File name error File name error 50RB#0 50RB#0 Middle Channel Freq/Channel ₩ Agilent Freq/Channel Center Freq Center Freq Ch Freq Trig Free Ch Frea 711 MHz Trig Free Occupied Bandwidth Occupied Bandwidth Start Freq Start Freq 701,000000 MHz 701.000000 MH #9.ten 30 d3 #9-ten 30 d3 Stop Freq 221,000000 HHz Ref 20.7 cBm Stop Freq 721.000000 MHz Log 10 **CF Step** CF Step 2.00000000 MHz Auto Man Man Offs: Freq Offset 0.00000000 Hz Freq Offset Center 711.00 MHz #Ras BW 110 kHz Span 20 MHz Center 711.00 MHz #Res BW 110 kHz 0.030000000 Hz #VDW 338 kHz #Sweep 100 ms (801 bts) Signal Track #VBW 330 kHz #Sweep 100 ms (601 pts) OCC BN 7 PWF 99.00 3 Occupied Bandwidth Signal Track Occ BN % Pwr 99.00 7 × dB -26.00 dB Occupied Bandwidth 8.9866 MHz 99.00 %
 Tranenit Frog Error
 7,445 kH₂

 x dB Bandwidth
 9,798, M-z
 8.9595 MHz -5.495 kHz 9.917 MHz Transmit Freq Error × dB Bandwidth File name error

High Channel

50RB#0





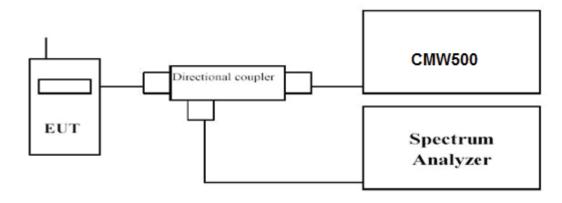
3.5 Band Edge compliance

LIMIT

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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output port was connected to base station.
- 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
- 3. Set EUT at maximum power through base station.
- 4. Select lowest and highest channels for each band and different modulation.
- 5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.

6RB#0



LTE FDD Band 12-1.4MHz Channel Bandwidth Band Edge Compliance QPSK 16QAM Freq/Channel * Agilent ★ Agilent Freq/Channel Mkr1 699.000 MHz -40.13 dBm Center Freq 699.000000 MHz Center Freq 699,000000 MHz #Atten 30 dB Log 10 dB/ Offst 13.2 dB Log 10 dB/ Offs: 13.2 dB Start Freq 698.000000 MHz Start Freq 698.000000 MHz Stop Freq 700.000000 MHz Stop Freq 700.000000 MHz DI -13.0 dBm DI -13.0 dBm PAvg **CF Step** 200.0000000 kHz <u>Auto</u> Man **CF Step** 200_000000 kHz <u>Auto</u> Man PAvg <u>Auto</u> M1 \$2 \$3 F\$ Freq Offset 0.00000000 Hz Freq Offset 0.03000000 Hz **£**(÷): f>5€k Signal Track Signal Track f>50k Span 2 MHz ⊭Sweep 1 s (601 pts) Span 2 MHz #Sweep 1 s (601 pts) Center 639.000 MHz ≠VBW 82 kHz #Res BW 27 kHz #VBW 82 kHz ≢Res BW 27 kHz 6RB#0 6RB#0 Low Channel Freq/Channel ₩ Agilent Freq/Channel Mkr1 716.003 MHz -37.16 dBn Mkr1 716.000 MHz -37.99 dBn Center Freq 716.000000 MHz Center Freq 716.000000 MHz Rei 30 dBn #Avg Rei3 #Avg #A:ten 30 d3 #A:ten 30 d3 Log 10 dB/ Log 10 dB/ Start Freq 715.000000 MHz Start Freq 715.000000 MHz 0ffs 13.4 dB 0ffs: 13.4 dB \$top Freq 717.000000 MHz \$top Freq 717.000000 MHz DI -13.0 dBn 13.0 dBn CF Step 202.000000 kHz Auto Man **CF Step** 200.000000 kHz <u>Puto</u> Man PAvg PAvg M1 S2 S3 FS M1 52 S3 FS Freq Offset 0.03000000 Hz Freq Offset 0.03000000 Hz £(-); £(-): Signal Track Signal Track f>5€k f>50k Center 716.000 MHz #Res BW 27 kHz Sran 2 MHz #Sweep 1 s (601 pts) Center 716.000 MHz #Res BW 27 kHz Span 2 MHz #Sweep 1 s (601 pts) #VBW 82 kHz *VBW 82 kHz File name error

High Channel

6RB#0

Page 25 of 40 Report No.: HK1809151159E LTE FDD Band 12-3MHz Channel Bandwidth Band Edge Compliance **QPSK** 16QAM ₩ Agilent Freq/Channel ₩ Agilent Freq/Channel Mkr1 693,993 MHz -35,03 dBn Mkr1 698.993 MHz -37.16 dBn Center Freq 699,000000 MHz Center Freq 699,000000 MHz Rei 30 dBn #Avg 30 dBm #A.ten 30 d3 #A.ten 30 d3 Re"∃ #∃vg Log 10 dB/ Offs: 13.2 dB Log 10 dB/ Start Freq 698.000000 MHz Start Freq 698.000000 MHz 0ffs: 13.2 dB **Stop Freq** 700.000000 MHz Stop Freq 700.000000 MHz DI -13.0 dBn DI -13.0 dBn **CF Step** 200.0000000 kHz <u>Puto</u> Man 202.000000 kHz Au<u>to</u> Man PAvg PAvg Auto <u>Auto</u> M1 S2 S3 FS M1 S2 S3 FS Freq Offset 0.00000000 Hz Freq Offset 0.00000000 Hz £(÷): f>50k **£**(÷): f>5€k Signal Track Signal Track Off Center 639,000 MHz #Res BW 32 kHz Span 2 MHz #Sweep 1 s (601 pts) Center 699.000 MHz #Res BW 62 kHz Span 2 MHz #Sweep 1 s (601 pts) #VBW 180 <Hz #VBW 180 <Hz File name error File name error 15RB#0 15RB#0 Low Channel ₩ Agilent Freq/Channel Freq/Channel Mkr1 716.000 MHz –33.99 dBn 716.000 MHz Center Freq Center Freq -33.21 dBn #Alten 30 d3 Rei 3 #Avg 30 dBn #A.ten 30 d3 30 dBm Re'∃ #∃vg 716.000000 MHz Log 10 dB/ Log 10 dB/ Start Freq 715.000000 MHz Start Freq 715.000000 MHz 0ffs: 13.4 dB 0ffs: 13.4 dB **Stop Freq** 717.000000 MHz **Stop Freq** 717.000000 MHz DI -13.0 dBn DI -13.0 dBn **CF Step** 200.000000 kHz <u>Auto</u> Man **CF Step** 202.000000 kHz <u>Auto</u> Man PAvg PAvg Auto Auto M1 92 S3 FS Freq Offset 0.00000000 Hz M1 92 93 FS Freq Offset 0.00000000 Hz £(-) Signal Track Signal Track f>50k f>50k

> Center 716.000 MHz #Res BW 62 kHz

File name error

High Channel

Span 2 MHz #Sweep 1 s (601 pts)

#VBW 180 <Hz

15RB#0

Span 2 MHz #Sweep 1 s (601 pts)

#VBW 180 <Hz

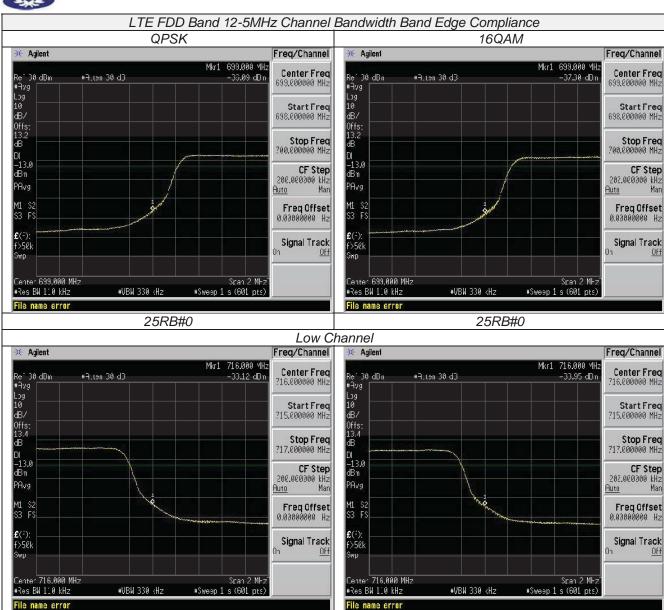
15RB#0

Center 716.000 MHz #Res BW 32 kHz

File name error

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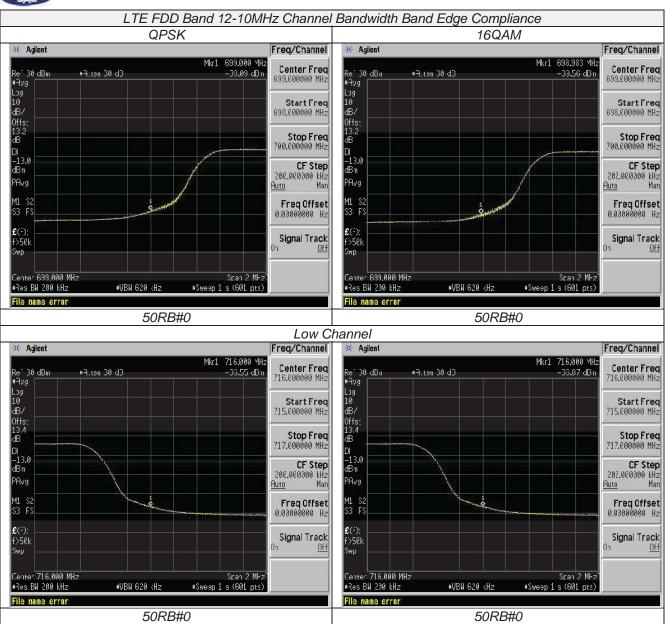
25RB#0



High Channel

25RB#0

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High Channel





3.6 Spurious Emission

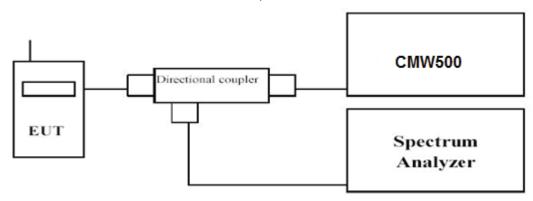
LIMIT

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.

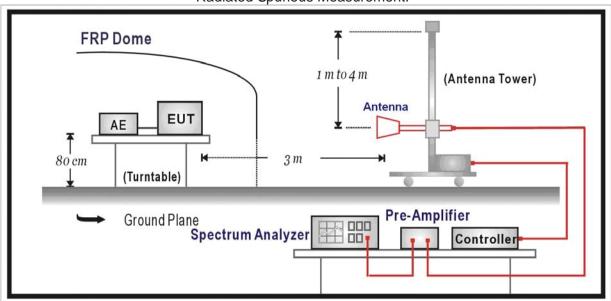
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Spurious Measurement:

- a. Place the EUT on a bench and set it in transmitting mode.
- b. Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- c. EUT Communicate with CMW500, then select a channel for testing.
- d. Add a correction factor to the display of spectrum, and then test.
- e. The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to10th harmonic.
- f. Please refer to following tables for test antenna conducted emissions.

	9			
Working	Sub range	RBW	VBW	Sweep time



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Frequency	(GHz)			(s)
LTE FDD Band 12	0.03~26.5	1 MHz	3 MHz	Auto

Radiated Spurious Measurement:

- a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c. The output of the test antenna shall be connected to the measuring receiver.
- d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- I. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
- r. Test site anechoic chamber refer to ANSI C63.

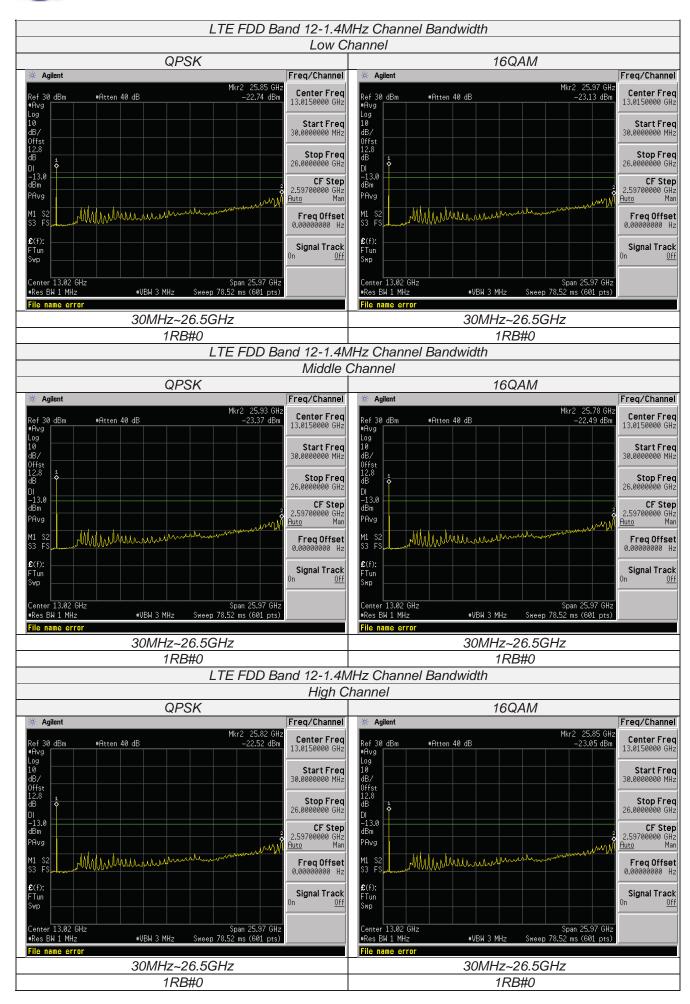
TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.

Conducted Measurement:

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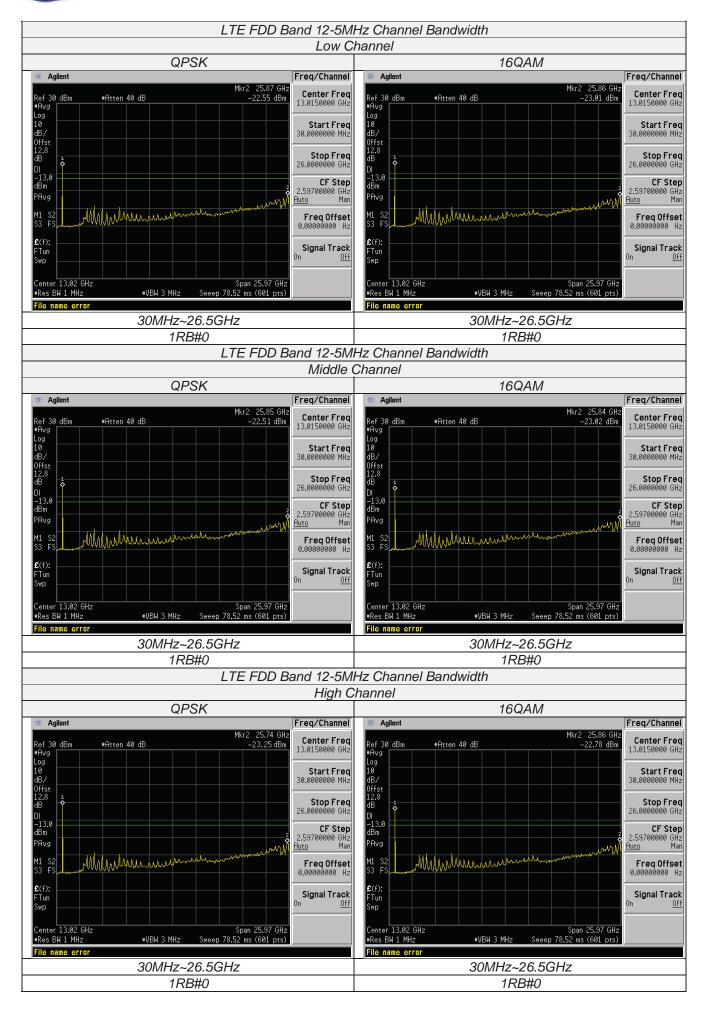
Report No.: HK1809151159E LTE FDD Band 12-3MHz Channel Bandwidth Low Channel QPSK 16QAM * Agilent Freq/Channel # Agilent Freq/Channel Center Freq Center Freq #Atten 40 dB -22.54 dBm Ref 30 dBm #Avg #Atten 40 dB -22.30 dBm Log 10 dB/ Log 10 dB/ Start Freq Start Freq 30.0000000 MHz 30.0000000 MHz Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz DI -13.0 dBm CF Step 2.59700000 GHz Auto Man -13.0 dBm **CF Step** 2.59700000 GHz <u>Auto</u> Man PAvg Ava Auto Auto Myllosteria Myllowarene M1 S3 Freq Offset 0.00000000 Hz Freq Offset 0.00000000 Hz £(f): £(f): Signal Track Signal Track Tun Tun Off Off qw aw∂ 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Cente #VBW 3 MHz #VBW 3 MHz File name error File name error 30MHz~26.5GHz 30MHz~26.5GHz 1RB#0 1RB#0 LTE FDD Band 12-3MHz Channel Bandwidth Middle Channel **QPSK** 16QAM Freq/Channel Freg/Channel Mkr2 25.81 GHz -22.13 dBm Center Freq 13.0150000 GHz Center Freq -22.55 dBm Ref 30 dBm #Atten 40 dB Ref 30 dBm #Atten 40 dB #Avg Log 10 dB/ Offst 13.3 dB Log 10 dB/ Offst 13.3 dB Start Freq 30.0000000 MHz Start Freq 30.0000000 MHz Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz DI -13.0 dBm DI -13.0 dBm **CF Step** 2.59700000 GHz <u>Auto</u> Man **CF Step** 2.59700000 GHz <u>Auto</u> Man PAvg PAvg <u>Auto</u> <u>Auto</u> Mylholastaning Malanthannan M1 S2 S3 F3 Μ1 Freq Offset Freq Offset £(f): FTun **£**(f): FTun Signal Track Signal Track Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) #VBW 3 MHz #Res BW 1 MHz #VBW 3 MHz #Res BW 1 MHz File name error File name error 30MHz~26.5GHz 30MHz~26.5GHz 1RB#0 1RB#0 LTE FDD Band 12-3MHz Channel Bandwidth High Channel **QPSK** 16QAM Agilent Freq/Channel Freq/Channel Center Freq 13.0150000 GHz Center Freq 13.0150000 GHz 22.02 dBm Ref 30 dBm #Avg #Atten 40 dB #Atten 40 dB Log Start Freq 30.0000000 MHz Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz **CF Step** 2.59700000 GHz <u>Auto</u> Man **CF Step** 2.59700000 GHz Auto Man PAvg PAvg Malashahaninam Mallantherman M1 S S3 F Freq Offset 0.00000000 Hz Freq Offset 0.00000000 Hz £(f): £(f): Signal Track Signal Track FTun FTun wp qwi Span 25.97 GHz Sweep 78.52 ms (601 pts) Span 25.97 GHz Sweep 78.52 ms (601 pts) #VBW 3 MHz #VBW 3 MHz #Res BW 1 MHz 30MHz~26.5GHz 30MHz~26.5GHz

1RB#0

1RB#0

*ATA *

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Report No.: HK1809151159E LTE FDD Band 12-10MHz Channel Bandwidth Low Channel QPSK 16QAM * Agilent Freq/Channel # Agilent Freq/Channel Center Freq Center Freq #Atten 40 dB -23.03 dBm Ref 30 dBm #Avg #Atten 40 dB -22.80 dBm Log 10 dB/ Log 10 dB/ Start Freq Start Freq 30.0000000 MHz 30.0000000 MHz Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz DI -13.0 dBm CF Step 2.59700000 GHz Auto Man -13.0 dBm **CF Step** 2.59700000 GHz <u>Auto</u> Man PAvg Ava Auto Auto MANANAMANANA Mallantemarian M1 S3 Freq Offset 0.00000000 Hz Freq Offset 0.00000000 Hz £(f): £(f): Signal Track Signal Track Tun Tun Off Off qw aw∂ 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Cente #Res BW 1 MHz #VBW 3 MHz #VBW 3 MHz File name error File name error 30MHz~26.5GHz 30MHz~26.5GHz 1RB#0 1RB#0 LTE FDD Band 12-10MHz Channel Bandwidth Middle Channel **QPSK** 16QAM Freq/Channel Freg/Channel Mkr2 25.85 GH: -22.98 dBm Center Freq 13.0150000 GHz Center Freq -22.52 dBm Ref 30 dBm #Atten 40 dB Ref 30 dBm #Atten 40 dB #Avg Log 10 dB/ Offst 12.8 dB Log 10 dB/ Offst 12.8 dB Start Freq 30.0000000 MHz Start Freq 30.0000000 MHz Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz DI -13.0 dBm −13.0 dBm **CF Step** 2.59700000 GHz <u>Auto</u> Man **CF Step** 2.59700000 GHz <u>Auto</u> Man PAvg PAvg <u>Auto</u> <u>Auto</u> Mylandhalananaman Mallochemin M1 S2 S3 F3 Freq Offset Freq Offset £(f): FTun **£**(f): FTun Signal Track Signal Track Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) Center 13.02 GHz Span 25.97 GHz Sweep 78.52 ms (601 pts) #VBW 3 MHz #Res BW 1 MHz #VBW 3 MHz #Res BW 1 MHz File name error File name error 30MHz~26.5GHz 30MHz~26.5GHz 1RB#0 1RB#0 LTE FDD Band 12-10MHz Channel Bandwidth High Channel **QPSK** 16QAM Agilent Freq/Channel Freq/Channel Center Freq 13.0150000 GHz Center Freq 13.0150000 GHz Ref 30 dBm #Avg #Atten 40 dB #Atten 40 dB Log 10 dB/ Start Freq 30.0000000 MHz Start Freq 30.0000000 MHz Offst 12.8 dB Stop Freq 26.0000000 GHz Stop Freq 26.0000000 GHz **CF Step** 2.59700000 GHz <u>Auto</u> Man **CF Step** 2.59700000 GHz Auto Man Avg PAvg Auto M1 S S3 F Malenterennen Marthaland Freq Offset 0.00000000 Hz Freq Offset 0.00000000 Hz £(f): £(f): Signal Track Signal Track FTun FTun wp gw6 Span 25.97 GHz Sweep 78.52 ms (601 pts) Span 25.97 GHz Sweep 78.52 ms (601 pts) Center 13.02 GHz #VBW 3 MHz #VBW 3 MHz #Res BW 1 MHz 30MHz~26.5GHz 30MHz~26.5GHz

1RB#0

1RB#0





Radiated Measurement:

Remark:

- 1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case for each Channel Bandwidth of LTE FDD Band 12.
- 2. $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+G_a(dBi)$
- 3. We were not recorded other points as values lower than limits.
- 4. Margin = Limit EIRP

LTE FDD Band 12_Channel Bandwidth 1.4MHz_QPSK_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1399.4	-35.77	2.86	3.00	7.25	-31.38	-13.00	18.38	Н
2099.1	-43.01	2.94	3.00	9.53	-36.42	-13.00	23.42	Н
1399.4	-43.92	2.86	3.00	7.25	-39.53	-13.00	26.53	V
2099.1	-47.41	2.94	3.00	9.53	-40.82	-13.00	27.82	V

LTE FDD Band 12_Channel Bandwidth 1.4MHz_QPSK_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.35	2.86	3.00	7.25	-29.96	-13.00	16.96	Н
2122.5	-40.25	2.94	3.00	9.53	-33.66	-13.00	20.66	Н
1415.0	-41.85	2.86	3.00	7.25	-37.46	-13.00	24.46	V
2122.5	-48.51	2.94	3.00	9.53	-41.92	-13.00	28.92	V

LTE FDD Band 12 Channel Bandwidth 1.4MHz QPSK High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1430.6	-39.99	2.86	3.00	7.82	-35.03	-13.00	22.03	Н
2145.9	-45.19	2.94	3.00	9.35	-38.78	-13.00	25.78	Н
1430.6	-49.11	2.86	3.00	7.82	-44.15	-13.00	31.15	V
2145.9	-52.71	2.94	3.00	9.35	-46.30	-13.00	33.30	V

LTE FDD Band 12_Channel Bandwidth 3MHz_QPSK_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1401.0	-35.43	2.86	3.00	7.25	-31.04	-13.00	18.04	Н
2101.5	-42.42	2.94	3.00	9.53	-35.83	-13.00	22.83	Н
1401.0	-43.10	2.86	3.00	7.25	-38.71	-13.00	25.71	V
2101.5	-46.83	2.94	3.00	9.53	-40.24	-13.00	27.24	V

LTE FDD Band 12_Channel Bandwidth 3MHz_QPSK_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.86	2.86	3.00	7.25	-30.47	-13.00	17.47	Н
2122.5	-39.61	2.94	3.00	9.53	-33.02	-13.00	20.02	Н
1415.0	-41.11	2.86	3.00	7.25	-36.72	-13.00	23.72	V
2122.5	-48.03	2.94	3.00	9.53	-41.44	-13.00	28.44	V



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LTE FDD Band 12_Channel Bandwidth 3MHz_QPSK_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1429.0	-40.06	2.86	3.00	7.82	-35.10	-13.00	22.10	Н
2143.5	-44.80	2.94	3.00	9.35	-38.39	-13.00	25.39	Н
1429.0	-48.45	2.86	3.00	7.82	-43.49	-13.00	30.49	V
2143.5	-52.11	2.94	3.00	9.35	-45.70	-13.00	32.70	V

LTE FDD Band 12_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1403.0	-35.72	2.86	3.00	7.25	-31.33	-13.00	18.33	Н
2104.5	-43.06	2.94	3.00	9.53	-36.47	-13.00	23.47	Н
1403.0	-43.83	2.86	3.00	7.25	-39.44	-13.00	26.44	V
2104.5	-47.08	2.94	3.00	9.53	-40.49	-13.00	27.49	V

LTE FDD Band 12 Channel Bandwidth 5MHz QPSK Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.52	2.86	3.00	7.25	-30.13	-13.00	17.13	Н
2122.5	-40.24	2.94	3.00	9.53	-33.65	-13.00	20.65	Н
1415.0	-41.29	2.86	3.00	7.25	-36.90	-13.00	23.90	V
2122.5	-47.28	2.94	3.00	9.53	-40.69	-13.00	27.69	V

LTE FDD Band 12_Channel Bandwidth 5MHz_QPSK_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1427.0	-39.45	2.86	3.00	7.82	-34.49	-13.00	21.49	Н
2140.5	-44.21	2.94	3.00	9.35	-37.80	-13.00	24.80	Н
1427.0	-48.77	2.86	3.00	7.82	-43.81	-13.00	30.81	V
2140.5	-52.84	2.94	3.00	9.35	-46.43	-13.00	33.43	V

LTE FDD Band 12_Channel Bandwidth 10MHz_QPSK_ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1408.0	-35.68	2.86	3.00	7.25	-31.29	-13.00	18.29	Н
2112.0	-42.56	2.94	3.00	9.53	-35.97	-13.00	22.97	Н
1408.0	-43.70	2.86	3.00	7.25	-39.31	-13.00	26.31	V
2112.0	-46.54	2.94	3.00	9.53	-39.95	-13.00	26.95	V

LTE FDD Band 12_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.32	2.86	3.00	7.25	-29.93	-13.00	16.93	Н
2122.5	-39.89	2.94	3.00	9.53	-33.30	-13.00	20.30	Н
1415.0	-42.00	2.86	3.00	7.25	-37.61	-13.00	24.61	V
2122.5	-47.54	2.94	3.00	9.53	-40.95	-13.00	27.95	V

LTE FDD Band 12_Channel Bandwidth 10MHz_QPSK_ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1422.0	-38.81	2.86	3.00	7.82	-33.85	-13.00	20.85	Н
2133.0	-43.68	2.94	3.00	9.35	-37.27	-13.00	24.27	Н
1422.0	-49.43	2.86	3.00	7.82	-44.47	-13.00	31.47	V
2133.0	-52.12	2.94	3.00	9.35	-45.71	-13.00	32.71	V



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LTE FDD Band 12_Channel Bandwidth 1.4MHz_16QAM _ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1399.4	-36.03	2.86	3.00	7.25	-31.64	-13.00	18.64	Н
2099.1	-42.96	2.94	3.00	9.53	-36.37	-13.00	23.37	Н
1399.4	-43.98	2.86	3.00	7.25	-39.59	-13.00	26.59	V
2099.1	-47.59	2.94	3.00	9.53	-41.00	-13.00	28.00	V

LTE FDD Band 12_Channel Bandwidth 1.4MHz_16QAM _ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.43	2.86	3.00	7.25	-30.04	-13.00	17.04	Н
2122.5	-40.33	2.94	3.00	9.53	-33.74	-13.00	20.74	Н
1415.0	-41.85	2.86	3.00	7.25	-37.46	-13.00	24.46	V
2122.5	-48.62	2.94	3.00	9.53	-42.03	-13.00	29.03	V

LTE FDD Band 12_Channel Bandwidth 1.4MHz_16QAM _ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1430.6	-40.30	2.86	3.00	7.82	-35.34	-13.00	22.34	Н
2145.9	-45.98	2.94	3.00	9.35	-39.57	-13.00	26.57	Н
1430.6	-49.55	2.86	3.00	7.82	-44.59	-13.00	31.59	V
2145.9	-52.33	2.94	3.00	9.35	-45.92	-13.00	32.92	V

LTE FDD Band 12_Channel Bandwidth 3MHz_16QAM _ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1401.0	-35.35	2.86	3.00	7.25	-30.96	-13.00	17.96	Н
2101.5	-42.77	2.94	3.00	9.53	-36.18	-13.00	23.18	Н
1401.0	-43.07	2.86	3.00	7.25	-38.68	-13.00	25.68	V
2101.5	-46.40	2.94	3.00	9.53	-39.81	-13.00	26.81	V

LTE FDD Band 12_Channel Bandwidth 3MHz_16QAM _ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-35.15	2.86	3.00	7.25	-30.76	-13.00	17.76	Н
2122.5	-39.94	2.94	3.00	9.53	-33.35	-13.00	20.35	Н
1415.0	-41.58	2.86	3.00	7.25	-37.19	-13.00	24.19	V
2122.5	-47.53	2.94	3.00	9.53	-40.94	-13.00	27.94	V

LTE FDD Band 12_Channel Bandwidth 3MHz_16QAM _ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1429.0	-39.85	2.86	3.00	7.82	-34.89	-13.00	21.89	Н
2143.5	-44.39	2.94	3.00	9.35	-37.98	-13.00	24.98	Н
1429.0	-48.98	2.86	3.00	7.82	-44.02	-13.00	31.02	V
2143.5	-51.85	2.94	3.00	9.35	-45.44	-13.00	32.44	V

LTE FDD Band 12_Channel Bandwidth 5MHz_16QAM _ Low Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1403.0	-36.49	2.86	3.00	7.25	-32.10	-13.00	19.10	Н
2104.5	-42.50	2.94	3.00	9.53	-35.91	-13.00	22.91	Н
1403.0	-43.65	2.86	3.00	7.25	-39.26	-13.00	26.26	V
2104.5	-47.16	2.94	3.00	9.53	-40.57	-13.00	27.57	V



3,2			
LTF FDD Band 12 Channel Bandwidth 5MHz	16QAM	Middle Channel	

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Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.96	2.86	3.00	7.25	-30.57	-13.00	17.57	Н
2122.5	-39.68	2.94	3.00	9.53	-33.09	-13.00	20.09	Н
1415.0	-41.85	2.86	3.00	7.25	-37.46	-13.00	24.46	V
2122.5	-46.73	2.94	3.00	9.53	-40.14	-13.00	27.14	V

LTE FDD Band 12_Channel Bandwidth 5MHz_16QAM _ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1427.0	-39.82	2.86	3.00	7.82	-34.86	-13.00	21.86	Н
2140.5	-44.72	2.94	3.00	9.35	-38.31	-13.00	25.31	Н
1427.0	-48.38	2.86	3.00	7.82	-43.42	-13.00	30.42	V
2140.5	-52.32	2.94	3.00	9.35	-45.91	-13.00	32.91	V

LTE FDD Band 12 Channel Bandwidth 10MHz 16QAM Low Channel

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Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1408.0	-35.27	2.86	3.00	7.25	-30.88	-13.00	17.88	Н
2112.0	-42.99	2.94	3.00	9.53	-36.40	-13.00	23.40	Н
1408.0	-43.10	2.86	3.00	7.25	-38.71	-13.00	25.71	V
2112.0	-47.41	2.94	3.00	9.53	-40.82	-13.00	27.82	V

LTE FDD Band 12_Channel Bandwidth 10MHz_16QAM _ Middle Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-34.05	2.86	3.00	7.25	-29.66	-13.00	16.66	Н
2122.5	-39.50	2.94	3.00	9.53	-32.91	-13.00	19.91	Н
1415.0	-42.41	2.86	3.00	7.25	-38.02	-13.00	25.02	V
2122.5	-47.33	2.94	3.00	9.53	-40.74	-13.00	27.74	V

LTE FDD Band 12_Channel Bandwidth 10MHz_16QAM _ High Channel

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1422.0	-38.19	2.86	3.00	7.82	-33.23	-13.00	20.23	Н
2133.0	-43.23	2.94	3.00	9.35	-36.82	-13.00	23.82	H
1422.0	-48.86	2.86	3.00	7.82	-43.90	-13.00	30.90	V
2133.0	-51.88	2.94	3.00	9.35	-45.47	-13.00	32.47	V

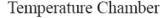
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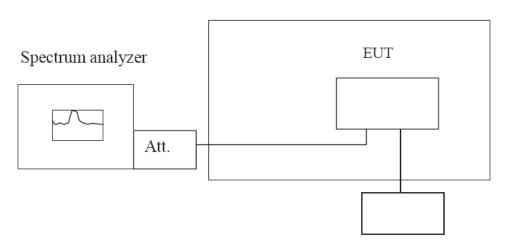
3.7 Frequency Stability under Temperature & Voltage Variations

LIMIT

the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

TEST CONFIGURATION





Variable Power Supply

TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Frequency Stability Under Temperature Variations:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

- 1. Measure the carrier frequency at room temperature.
- 2. Subject the EUT to overnight soak at -30 °C.
- 3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 12, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 4. Repeat the above measurements at 10° C increments from -30° C to $+50^{\circ}$ C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
- 5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
- 6. Subject the EUT to overnight soak at +50°C.
- 7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 8. Repeat the above measurements at 10 $^{\circ}$ C increments from +50 $^{\circ}$ C to -30 $^{\circ}$ C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
- 9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.



TEST RESULTS

Remark:

1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 12; recorded worst case.

LTE Band 12, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Trequency Error	vo vonage					
Voltage	Frequency	error (Hz)	Frequency	Frequency error (ppm)		
(V)	QPSK	16QAM	QPSK	16QAM	(ppm)	
3.40	-2.37	-1.05	-0.0033	-0.0015	2.50	
3.60	-6.13	-2.17	-0.0087	-0.0031	2.50	
4.20	-6.09	-3.68	-0.0086	-0.0052	2.50	

Frequency Error vs Temperature

Frequency Error	vs remperature				
Temperature	Frequency	error (Hz)	Frequency	error (ppm)	Limit
(℃)	QPSK	16QAM	QPSK	16QAM	(ppm)
-30°	-6.19	4.29	-0.0087	0.0061	2.50
-20°	-2.82	1.79	-0.0040	0.0025	2.50
-10°	-1.47	1.46	-0.0021	0.0021	2.50
0°	2.09	-3.15	0.0030	-0.0045	2.50
10°	2.25	-2.32	0.0032	-0.0033	2.50
20°	2.47	0.17	0.0035	0.0002	2.50
30°	0.68	4.65	0.0010	0.0066	2.50
40°	0.59	-1.12	0.0008	-0.0016	2.50
50°	-4.47	3.52	-0.0063	0.0050	2.50





4 Test Setup Photos of the EUT

