



TEST REPORT

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

Report Reference No.: HK1907301843-4E

FCC ID: 2AUAE-M3300001

Compiled by

(position+printed name+signature)..: File administrators Gary Qian

Supervised by

(position+printed name+signature)..: Technique principal Eden Hu

Approved by

(position+printed name+signature)..: Manager Jason Zhou

Good Fine Edon Hu Jason Zhou

Date of issue.....: Aug. 13, 2019

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

Applicant's name...... Proscend Communications Inc.

Taiwan, R.O.C.

Test specification:

Standard : FCC Part 27

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Test item description Industrial 4G LTE Cellular Router

Trade Mark Proscend

Manufacturer Proscend Communications Inc.

Model/Type reference.....: M330-W

MXXX-XXXXX-XX (Where "X" can be used as "A-Z", or "0-9", or "-",

Listed Models or blank for hardware/software changes/applications or marketing

purpose only)

Ratings..... DC 8-48V

Modulation QPSK. 16QAM

Hardware version V2.0

Software version V2.0

Frequency...... LTE Band 12

Result..... PASS



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TEST REPORT

Test Report No. :	HK1907301843-4E	Aug. 13, 2019
	111(190/301043-4L	Date of issue

Equipment under Test : Industrial 4G LTE Cellular Router

Model /Type : M330-W

: MXXX-XXXXX-XX(Where "X" can be used as "A-Z", or "0-

Listed Models 9", or "-", or blank for hardware/software

changes/applications or marketing purpose only)

Applicant : Proscend Communications Inc.

Address : 2F, No. 36, Industry E. Rd. IV, Hsinchu Science Park,

Hsinchu, Taiwan, R.O.C.

Manufacturer : Proscend Communications Inc.

Address : 2F, No. 36, Industry E. Rd. IV, Hsinchu Science Park,

Hsinchu, Taiwan, R.O.C.

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

1.2 Test Description

Test Item	FCC /IC Rule No.	Result
RF Output Power	Part 2.1046 Part 27.50(c)(10)	Pass
Peak-to-Average Ratio	Part 2.1046	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(g)	Pass
Out of band emission, Band Edge	Part 2.1051 Part 27.53(g)	Pass
Frequency stability	Part 2.1055 Part 27.54	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	2018/12/27	2019/12/26
LISN	R&S	ENV216	HKE-002	2018/12/27	2019/12/26
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2018/12/27	2019/12/26
Receiver	R&S	ESCI 7	HKE-010	2018/12/27	2019/12/26
Spectrum analyzer	Agilent	N9020A	HKE-048	2018/12/27	2019/12/26
RF automatic control unit	Tonscend	JS0806-2	HKE-060	2018/12/27	2019/12/26
Horn antenna	Schwarzbeck	9120D	HKE-013	2018/12/27	2019/12/26
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	2018/12/27	2019/12/26
Preamplifier	EMCI	EMC051845SE	HKE-015	2018/12/27	2019/12/26
Preamplifier	Agilent	83051A	HKE-016	2018/12/27	2019/12/26
Temperature and humidity meter	Boyang	HTC-1	HKE-075	2018/12/27	2019/12/26
High pass filter unit	Tonscend	JS0806-F	HKE-055	2018/12/27	2019/12/26
RF cable	Times	1-40G	HKE-034	2018/12/27	2019/12/26
Power meter	Agilent	E4419B	HKE-085	2018/12/27	2019/12/26
Power Sensor	Agilent	E9300A	HKE-086	2018/12/27	2019/12/26
Wireless Communication Test Set	R&S	CMW500	HKE-026	2018/12/27	2019/12/26

2.4 Modifications

No modifications were implemented to meet testing criteria.





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3 TEST CONDITIONS AND RESULTS

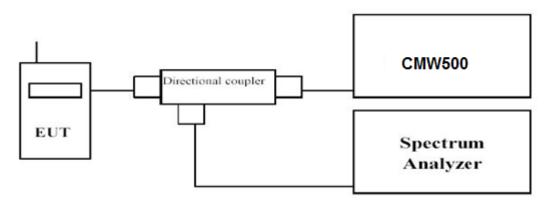
3.1 Output Power

LIMIT

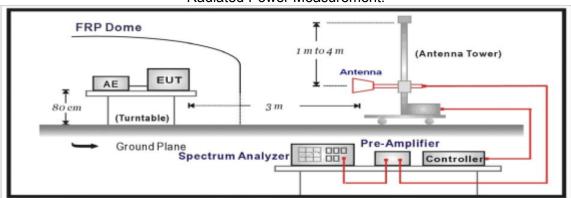
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are FCC limited to 3 watts ERP." IC limited to 5 watts ERP."

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:

- 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		Frequency	Average Po	ower [dBm]
Bandwidth	RB Size/Offset	(MHz)	QPSK	16QAM
		699.7	23.28	22.54
	1 RB low	707.5	23.42	22.37
		715.3	23.31	23.37
		699.7	23.38	22.37
	1 RB high	707.5	23.56	22.53
	3	715.3	23.41	22.35
1.4 MHz		699.7	23.33	22.33
	50% RB mid	707.5	23.48	22.17
		715.3	23.31	23.34
		699.7	23.42	23.29
	100% RB	707.5	23.24	23.04
		715.3	23.04	22.43
		700.5	22.81	21.97
	1 RB low	707.5	22.83	21.99
	-	714.5	22.81	22.01
		700.5	22.85	21.74
	1 RB high	707.5	22.82	21.70
0.141	3	714.5	22.80	21.67
3 MHz		700.5	22.83	21.97
	50% RB mid	707.5	22.82	21.95
		714.5	22.03	22.04
		700.5	21.69	21.71
	100% RB	707.5	21.70	21.69
		714.5	21.67	21.80
		701.5	22.75	21.95
	1 RB low	707.5	22.98	21.83
		713.5	22.83	21.85
		701.5	22.80	21.79
	1 RB high	707.5	22.96	21.87
5 141 1-	3	713.5	22.80	21.73
5 MHz		701.5	21.81	21.95
	50% RB mid	707.5	21.83	21.81
		713.5	21.87	21.87
		701.5	21.87	21.91
	100% RB	707.5	21.81	21.84
		713.5	21.84	21.01



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		704.0	22.79	21.93
	1 RB low	707.5	22.82	22.12
		711.0	22.80	21.96
		704.0	22.84	21.72
	1 RB high	707.5	22.95	21.82
10 MHz		711.0	22.82	21.68
TO IVIEZ		704.0	21.92	21.95
	50% RB mid	707.5	21.89	21.90
		711.0	21.86	21.90
		704.0	21.92	21.87
	100% RB	707.5	21.83	21.86
		711.0	21.84	20.98



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.

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- 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	-21.43	2.38	8.23	2.15	36.7	18.97	34.77	36.99	V
707.5	-19.4	2.4	8.29	2.15	36.7	21.04	34.77	36.99	V
715.3	-19.91	2.43	8.28	2.15	36.7	20.49	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	-21.86	2.38	8.23	2.15	36.7	18.54	34.77	36.99	V
707.5	-19.52	2.4	8.29	2.15	36.7	20.92	34.77	36.99	V
714.5	-19.64	2.43	8.28	2.15	36.7	20.76	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	-21.77	2.38	8.23	2.15	36.7	18.63	34.77	36.99	V
707.5	-19.6	2.4	8.29	2.15	36.7	20.84	34.77	36.99	V
713.5	-19.69	2.43	8.28	2.15	36.7	20.71	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	-21.02	2.38	8.23	2.15	36.7	19.38	34.77	36.99	V
707.5	-19.09	2.4	8.29	2.15	36.7	21.35	34.77	36.99	V
711.0	-20.09	2.43	8.28	2.15	36.7	20.31	34.77	36.99	V

LTE FDD Band 12_Channel Bandwidth 1.4MHz_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
	699.7	-21.67	2.38	8.23	2.15	36.7	18.73	34.77	36.99	V
	707.5	-19.65	2.4	8.29	2.15	36.7	20.79	34.77	36.99	V
	715.3	-20.1	2.43	8.28	2.15	36.7	20.3	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	-21.69	2.38	8.23	2.15	36.7	18.71	34.77	36.99	V
707.5	-19.87	2.4	8.29	2.15	36.7	20.57	34.77	36.99	V
714.5	-20.48	2.43	8.28	2.15	36.7	19.92	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	-21.16	2.38	8.23	2.15	36.7	19.24	34.77	36.99	V
707.5	-19.86	2.4	8.29	2.15	36.7	20.58	34.77	36.99	V
713.5	-20.09	2.43	8.28	2.15	36.7	20.31	34.77	36.99	V



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LTE FDD Band 12_Channel Bandwidth 10MHz_16QAM

	ETET DE Bana TE_Gnamer Banamatr Term E_Teq. III										
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	-21.36	2.38	8.23	2.15	36.7	19.04	34.77	36.99	V		
707.5	-19.43	2.4	8.29	2.15	36.7	21.01	34.77	36.99	V		
711.0	-20.37	2.43	8.28	2.15	36.7	20.03	34.77	36.99	V		

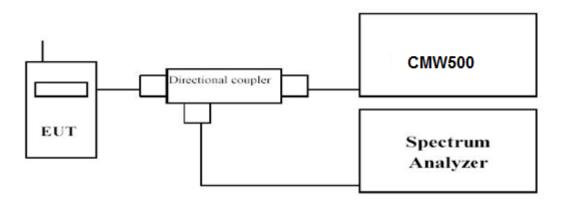


3.3 Peak-to-Average Ratio (PAR)

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%.

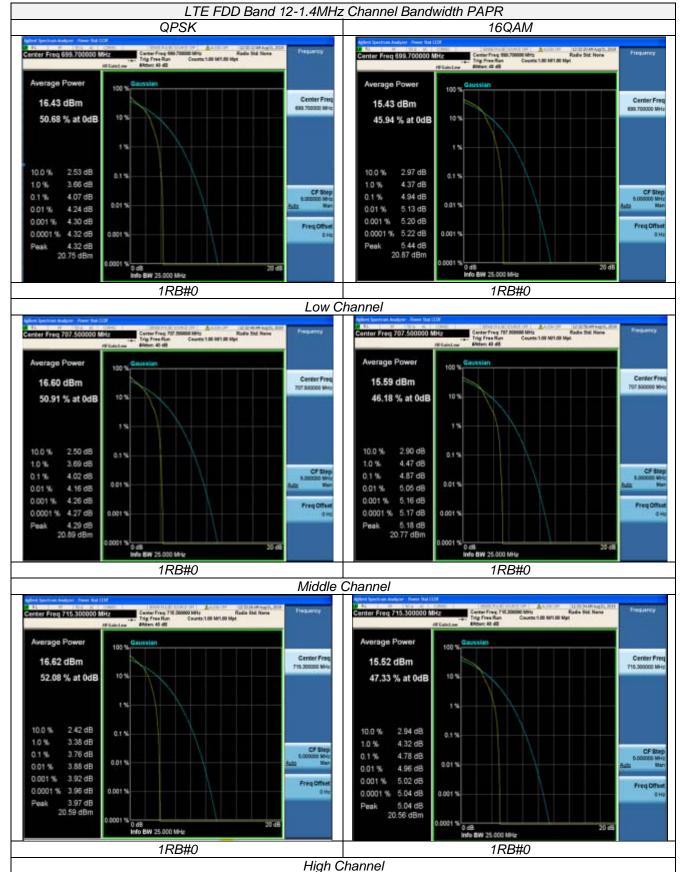
TEST RESULTS

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	PAPR (dB)		
Bandwidth	(MHz)	RB Size/Offset	QPSK	16QAM		
	699.7		4.07	4.94		
1.4 MHz	707.5	1RB#0	4.02	4.87		
	715.3		3.76	4.78		
	700.5		3.94	4.91		
3 MHz	707.5	1RB#0	4.17	5.11		
	714.5		4.09	4.94		
	701.5		4.05	4.84		
5 MHz	707.5	1RB#0	4.52	5.25		
	713.5		4.53	8.50		
	704.0		4.16	4.98		
10 MHz	707.5	1RB#0	4.39	5.18		
	711.0		4.20	5.22		

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* TITE

LTE FDD Band 12-3MHz Channel Bandwidth PAPR QPSK 16QAM Center Freq. 70 50000 Mrs.
Trig Free Ran
Country 100 101 101 101 101 May
Show: 48 45 Center Freq. 700,00000 MHz . Radio Std: None Affairs 40 48 Country 100 MP1.00 M ter Freq 700.500000 MHz 100 % Center Fre Center Freq 16.52 dBm 15.52 dBm 10 % 10% 45.97 % at 0dB 51.08 % at 0dB 10.0% 2.54 dB 10.0 % 2.95 dB 0.1% 0.1 % 3.63 dB 4.36 dB 1.0 % 0.1% 3.94 dB 0.1 % 4.91 dB 0.01 % 0.01 % 0.01 % 4.14 dB 0.01 % 5.15 dB 0.001 % 4.27 dB 0.001 % 5.20 dB 0.0001 % 4.33 dB 0.0001 % 5.22 dB 0.001 % 4.33 dB 5.25 dB 20.85 dBm 20.77 dBm 1RB#0 1RB#0 Low Channel Center Freq. 707 500000 Note: Radio Stat Name
Trig Free Flux
Counts: 130 NOT 300 Mgr.
Althour 40 die Center Free 787 500000 Ming.

Center Free 787 500000 Ming.

Trig Free Run

Center 1.00 NR1.00 Ming.

Radio 596. Name

Altam 42 dB Center Freq 707.500000 MHz enter Freq 707.500000 MHz Average Power Center Free 707 500000 MH 16.58 dBm 15.61 dBm 50.05 % at 0dB 10 % 45.70 % at 0dB 10% 10.0 % 10.0 % 2.97 dB 2.59 dB 3.82 dB 1.0% 4.64 dB 1.0 % CF Std 5.000000 Ms CF Str 0.1% 4.17 dB 0.1% 5.11 dB 0.01% 4.35 dB 0.01% 5.27 dB 0.001 % 5.39 dB 0.001 % 4.51 dB 0.0001 % 4.57 dB 0.001 % 0.0001 % 5.44 dB 0.001% 4.61 dB 21.19 dBm Peak 5.47 dB 21.08 dBm 0.0001 % 0 dB Info BW 25.000 MHz o dB info BW 25.000 MHz 1RB#0 1RB#0 Middle Channel enter Freq 714.500000 MHz enter Freq 714.500000 MHz Average Power Average Power 100 % Center Free 314,500000 184 Center Free 714.500000 MHz 15.68 dBm 16.66 dBm 50.37 % at 0dB 10% 45.67 % at 0dB 10% 10.0 % 2.50 dB 10.0 % 2.87 dB 1.0 % 3.76 dB 1.0 % 4.50 dB CF 51 0.1% 4.09 dB 0.1% 4.94 dB 0.01 % 0.01 % 0.01 % 5.07 dB 0.001 % 5.21 dB 0.01 % 4.25 dB 0.001 % 4.30 dB 0.0001 % 4.32 dB 0.0001 % 5.25 dB 0.001 % 0.001 % 4.37 dB 21.03 dBm Peak 5.30 dB 20.98 dBm

High Channel

1RB#0

0 dB Info BW 25,000 MHz

* TITE

LTE FDD Band 12-5MHz Channel Bandwidth PAPR QPSK 16QAM Center Frag. 701-200000 MHz Badlo Std: None Shifter 40 48 Center Free Port 500000 INNs Radio Bol Nore Trig: Free Port County: 180 MH 50 Mpr 8Atter: 40 dD ter Freq 701.500000 MHz enter Freq 701.500000 MHz Average Power Center Freq 701.600000 MHz Center Fre 16.37 dBm 15.50 dBm 10% 49.72 % at 0dB 45.46 % at 0dB 10.0 % 2.60 dB 10.0% 2.87 dB 0.1 % 3.72 dB 4.50 dB 1.0 % 1.0 % 0.1% 4.05 dB 0.1% 4.84 dB 0.01 % 0.01% 0.01% 4.19 dB 4.93 dB 0.01% 0.001 % 4.28 dB 0.001 % 4.95 dB 0.0001 % 4.31 dB 0.001 % 0.0001 % 5.00 dB 0.0019 4.31 dB 5.01 dB 20.68 dBm 20.51 dBm 1RB#0 1RB#0 Low Channel Gentar Freig 707 50000 Réfs; Tolge 100 MP1 20 MP1 Stock Home
Trig Frei Run
Ceurts: 1.00 MP1 20 MP1
Rhafte 50d: Home
Abban: 40 dB Center Tires: FOY 500000 MRts Tires Tires Tires Conducted to MYLOS Male Stat: Hone Manage Conducted to MYLOS Male State No. 68 center Freq 707.500000 MHz enter Freq 707.500000 MHz Average Power Average Power Center Free 16.46 dBm 15.56 dBm 48.12 % at 0dB 10 % 44.25 % at 0dB 10.0 % 2.65 dB 10.0 % 2.91 dB 0.1% 1.0 % 4.04 dB 4.70 dB 1.0 % CF Ste 9.000000 No. CF St 0.1 % 4.52 dB 5,25 dB 0.01 % 4.69 dB 0.01 % 5.46 dB 0.001 % 4.74 dB 0.001 % 5.49 dB 0.0001 % 4.75 dB 0.001 % 0.0001 % 5.51 dB 0.001% 4.76 dB 21.22 dBm Peak 5.56 dB 21.12 dBm 0.0001 9 0.00011 0 dB Info BW 25,000 MHz 1RB#0 1RB#0 Middle Channel ter Freg 713.500000 MHz er Freq 713.500000 MHz Average Power 100 % Center Fre 713 500000 M-Center Free 713.500000 MH 16,53 dBm -31.42 dBm 10 % 48.03 % at 0dB 10% 36.74 % at 0dB 2.70 dB 10.0 % 3.63 dB 0.1 % 1.0 % 4.09 dB 1.0 % 6.68 dB CF SI 4.53 dB 0.1% 0.1% 8.50 dB 0.01% 0.01 % 0.01 % 4.80 dB 0.01 % 9.75 dB 0.001 % 4.86 dB 0.0001 % 4.90 dB 0.001 % 10.81 dB 0.0001 % 11.31 dB 0.001% 0.001 % Peak 11.94 dB -19.48 dBm 4.94 dB 21.47 dBm

High Channel

1RB#0

0 dB Info BW 25,000 MHz

1RB#0

* TITE

LTE FDD Band 12-10MHz Channel Bandwidth PAPR QPSK 16QAM Center Free Pics 000000 MHs. Rules Sed Name
Trig Free Run Counts:100 MHs.00 Mge
Mittack 48 45 Center Fine; 704.000000 MHz Rusin Std. Name Trig: Fine Rum Counts: 1.00 MHt.00 Mpt Mitter: 40 dB ter Freg 704,000000 MHz enter Freg 704.000000 MHz Average Power Center Free To4.000000 MH Center Freq 704 000000 MHz 16.51 dBm 15.65 dBm 10% 10% 50.15 % at 0dB 45.19 % at 0dB 2.89 dB 10.0% 2.57 dB 10.0 % 0.1% 0.1% 3.75 dB 4.45 dB 1.0 % 0.1% 4.16 dB 0.1% 4.98 dB 0.01% 0.01% 0.01 % 4.37 dB 0.01% 5.17 dB 0.001 % 5.21 dB 0.001 % 4.40 dB 0,0001 % 4.43 dB 0.0001 % 5.23 dB 4.44 dB 5.34 dB 20.99 dBm 20.95 dBm 1RB#0 1RB#0 Low Channel Center Free, NOT-500000 MHz O MHz O Mgz Std Nume Trig Free Run County-1.00 MHz Oo Mgz Std Nume Stdern 40 GE Centre Fine T07.00000 MHz Centre T00 MFL00 Mpt State None Country T07.00000 MHz Centre T07.00000 MHz Centre T07.00000 MHz Centre T07.00000 MPL00 Mpt State T07.00000 MPL00 Mpt State T07.00000 MPL00 Mpt State T07.00000 MPL enter Freq 707.500000 MHz Average Power 16.58 dBm 15.64 dBm 49.10 % at 0dB 10% 44.82 % at 0dB 10% 1% 10.0 % 2.53 dB 10.0 % 2.92 dB 0.1 % 1.0% 3.94 dB 1.0 % 4.61 dB CF Ste 0.1% 4.39 dB 5.18 dB 0.01% 4.56 dB 0.01 % 5.40 dB 0.001 % 5.47 dB 0.001 % 4.60 dB 0.0001 % 4.63 dB 0.001 % 0.0001 % 5.48 dB 0.001 % 4.69 dB 21.27 dBm 5.48 dB 21.12 dBm Peak 0.0001 1 0 dB Info BW 25,000 MHz 1RB#0 1RB#0 Middle Channel Center Freq 711.000000 MHz Radio Std: Hone
Trig Free Run Counts 1.00 M/1.00 Mpt enter Freq 711.000000 MHz Average Power 100 % 100 % Center Fre Center Free 711.000000 MHz 16,64 dBm 15.65 dBm 10% 45.39 % at 0dB 50.20 % at 0dB 10.0 % 2.54 dB 10.0 % 2.92 dB 0.1% 0.1% 4.65 dB 1.0% 3.79 dB 1.0 % 0.1% 5.22 dB 4.20 dB 0.1% 0.01% 0.01% 0.01 % 5.43 dB 0.001 % 5.47 dB 4.43 dB 0.01% 0.001 % 4.50 dB 0.0001 % 4.54 dB 0.0001 % 5.49 dB 0.001 % 0.001 9 5.50 dB 21.15 dBm 4.55 dB 21.19 dBm

High Channel

0 dB Info BW 25,000 MHz



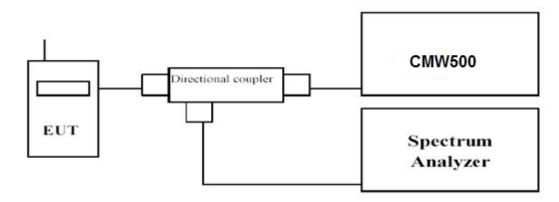
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Occupied Bandwidth and Emission Bandwidth

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

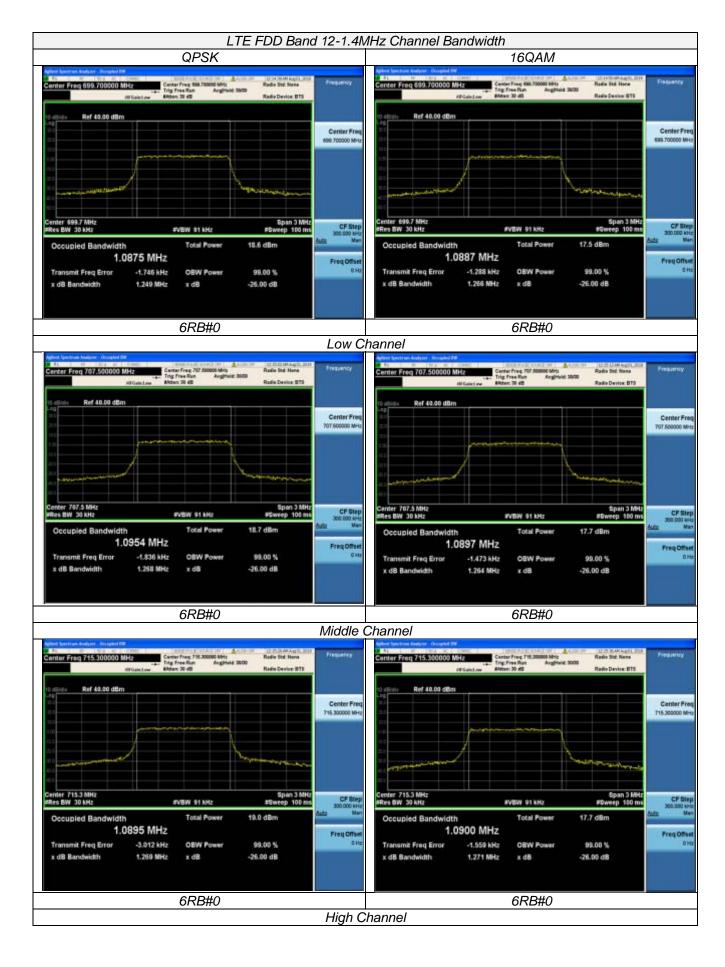
Remark:

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 Ith (MHz)	99% Occupied bandwidth (MHz)					
Bandwidth		(MHz)	QPSK	16QAM	QPSK	16QAM				
		699.7	1.249	1.266	1.0875	1.0887				
1.4 MHz	6RB#0	707.5	1.268	1.264	1.0954	1.0897				
		715.3	1.269	1.271	1.0895	1.0900				
		700.5	2.851	2.848	2.6874	2.6883				
3 MHz	15RB#0	707.5	2.862	2.869	2.6961	2.6870				
		714.5	2.867	2.853	2.6919	2.6919				
		701.5	5.000	4.939	4.5086	4.5064				
5 MHz	25RB#0	707.5	4.944	4.973	4.5009	4.5015				
		713.5	4.957	4.981	4.5057	4.5121				
		704.0	9.600	9.592	9.0022	8.9936				
10 MHz	50RB#0	707.5	9.571	9.588	8.9809	8.9811				
		711.0	9.572	9.565	8.9820	8.9780				



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15RB#0

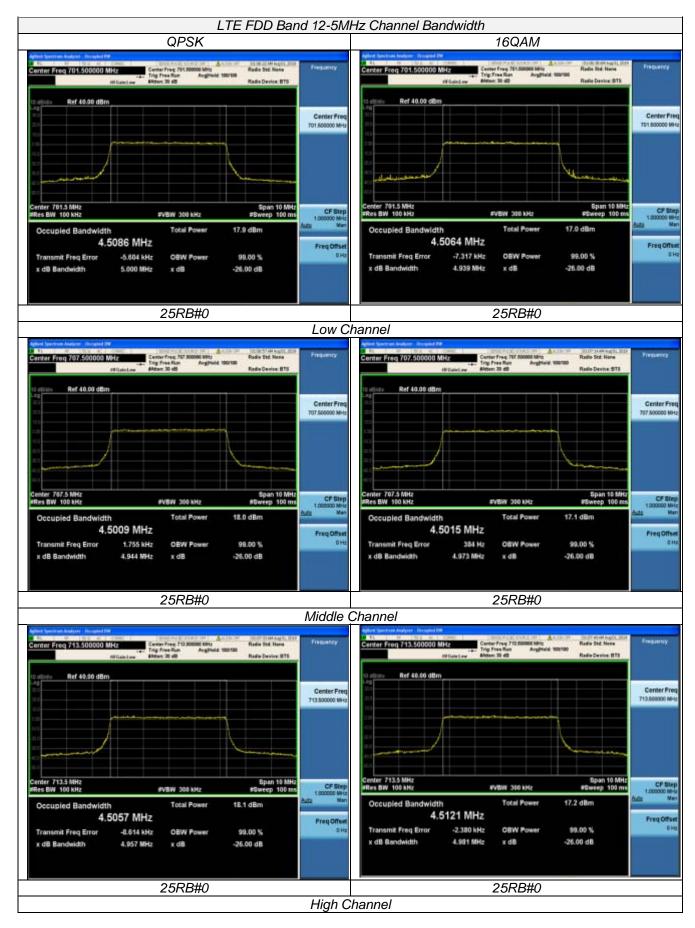


LTE FDD Band 12-3MHz Channel Bandwidth QPSK 16QAM Ref 40.00 dBn Ref 40.00 dBn Center Fred Center Freq 700,600000 MHz Res BW 51 kHz CF Step #VBW 150 kHz 16.7 dBm Occupied Bandwidth Occupied Bandwidth 2.6883 MHz 2.6874 MHz 947 Hz Transmit Freq Error **OBW Power** 99.00 % Transmit Freq Error **OBW Power** 99.00 % 2.848 MHz 2.851 MHz x dil x dB Bandwidth x dB -26.00 dB -26.00 dB 15RB#0 15RB#0 Low Channel enter Freq 707.500000 MHz Ref 40.00 dBm Ref 40.00 dBm Center Freq 707.500000 WHz Center Freq enter 707.5 MHz Res BW 51 kHz enter 707.5 MHz Res BW 51 kHz CF Step CF Ste #VBW 150 kHz #VBW 150 kHz Occupied Bandwidth 2.6870 MHz 2.6961 MHz Freq Offsi **OBW Power** 99.00 % Transmit Freq Error **CBW Power** 99.00 % Transmit Freq Error 351 Hz x dB Bandwidth 2.862 MHz -26.00 dB x dB x dB 15RB#0 15RB#0 Middle Channel enter Freq 714.500000 MHz Ref 40.00 dBm Ref 40.00 dBm Center Fre Center Freq 714 500000 MHz Center 714.5 MHz Res BW 51 kHz #V6W 150 kHz #VBW 150 kHz 17.7 dBm Occupied Bandwidth 16.8 dBm 2.6919 MHz 2.6919 MHz Transmit Freq Error -220 Hz **OBW Power** 99.00 % Transmit Freq Error -2.917 kHz 2.867 MHz -26.00 dB x dB Bandwidth 2.853 MHz -26.00 dB x dB

High Channel

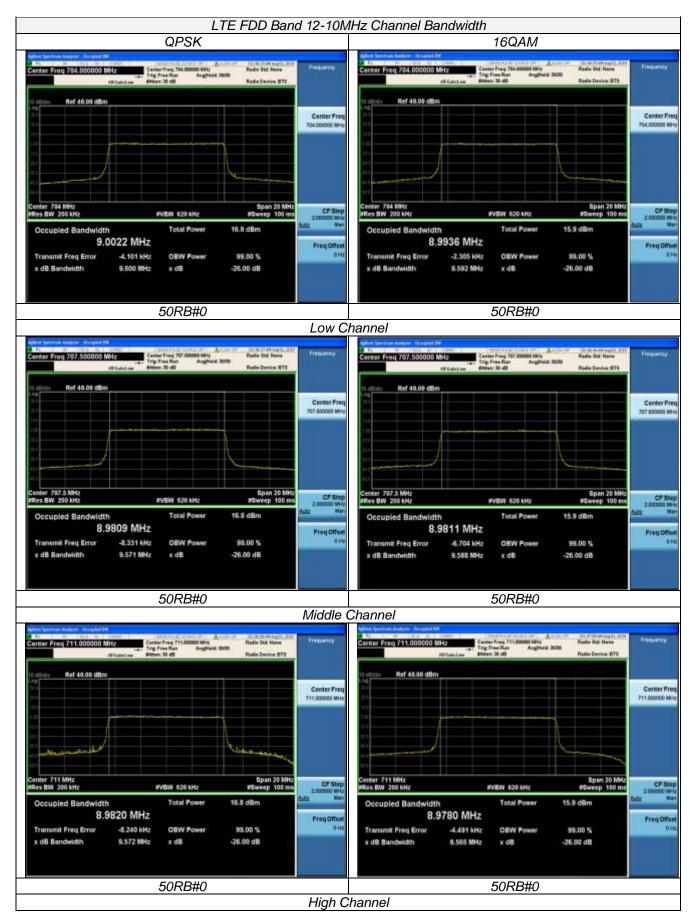


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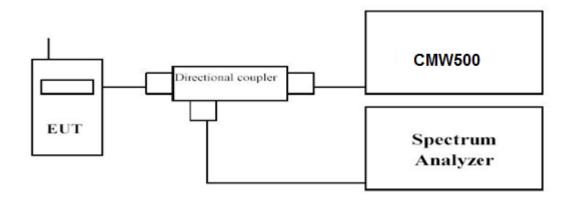
3.5 Band Edge compliance

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

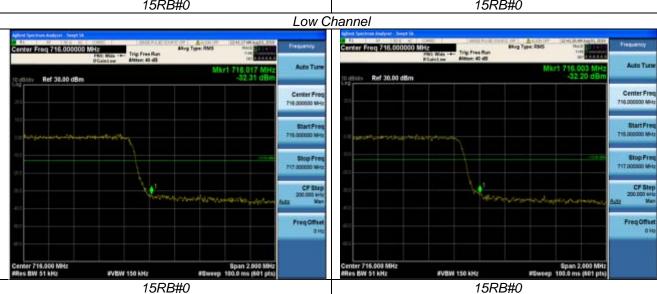
LTE FDD Band 12-1.4MHz Channel Bandwidth Band Edge Compliance QPSK 16QAM Ref 30.00 dBm Ref 30.00 dBm Center Freq OF Step 200,000 MHz Span 2.000 MHz #Sweep 100.0 ms (601 pts) EVBW 91 kHz 6RB#0 6RB#0 Low Channel Ref 30.00 dBm Center Freq 716.000000 MHz Center Free Span 2,000 MHz rep 100.0 ms (501 pts)

High Channel



Report No.: HK1907301843-4E LTE FDD Band 12-3MHz Channel Bandwidth Band Edge Compliance QPSK 16QAM

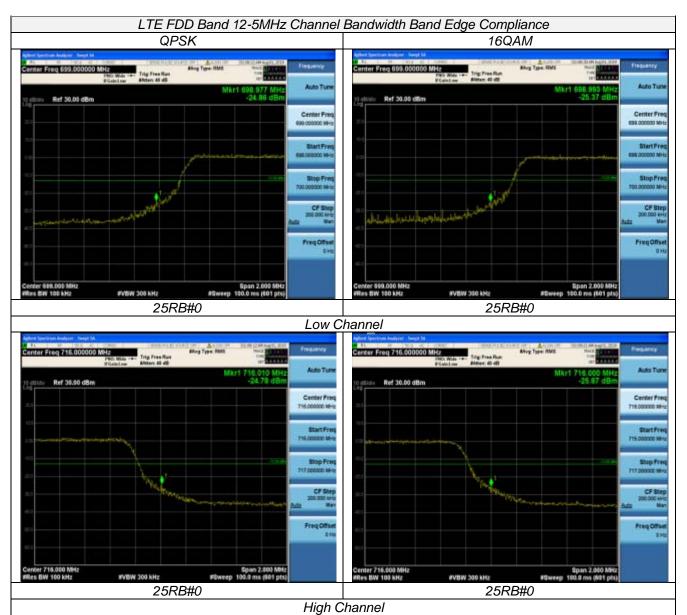




High Channel



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50RB#0



LTE FDD Band 12-10MHz Channel Bandwidth Band Edge Compliance **QPSK** 16QAM Ref 30,00 dBm Ref 30.00 dBm Center Fred 50RB#0 50RB#0 Low Channel Ref 30.00 dBm Ref 30.00 dBm Center 716.000 MHz Res BW 200 kHz Span 2.000 MHz 100.0 ms (601 pts) Span 2.000 MHz eep 100.0 ms (601 pts) enter 716,000 MHz Res BW 200 kHz

High Channel





3.6 Spurious Emission

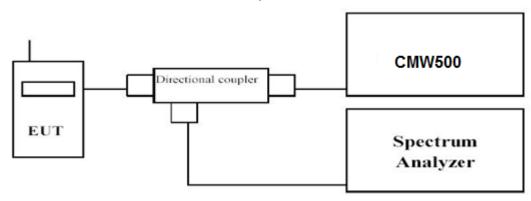
LIMIT

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.

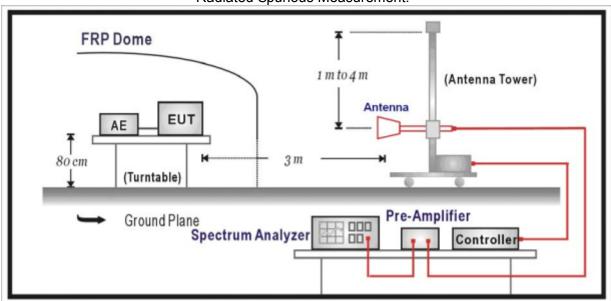
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. 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.

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Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (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.

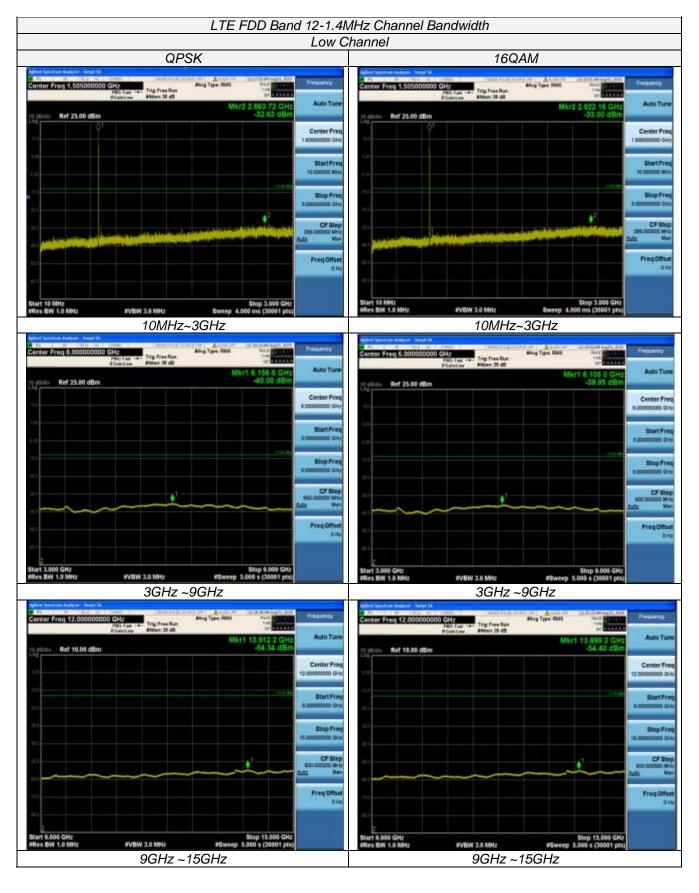
TEST RESULTS

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:

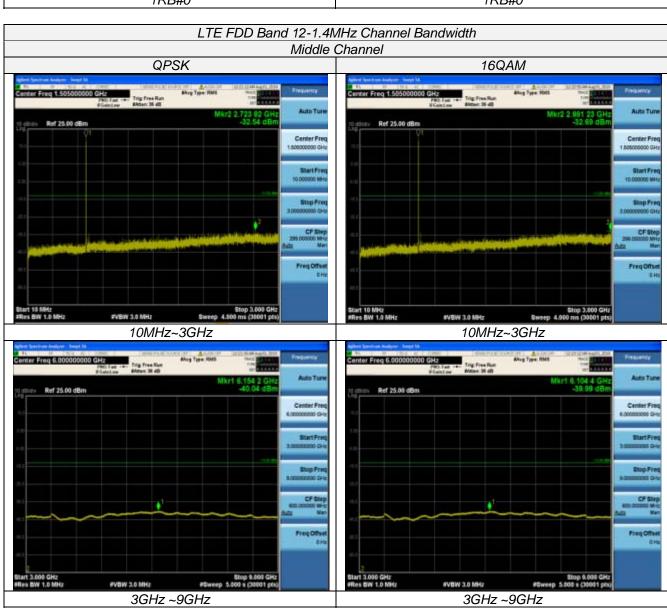
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* ATA *

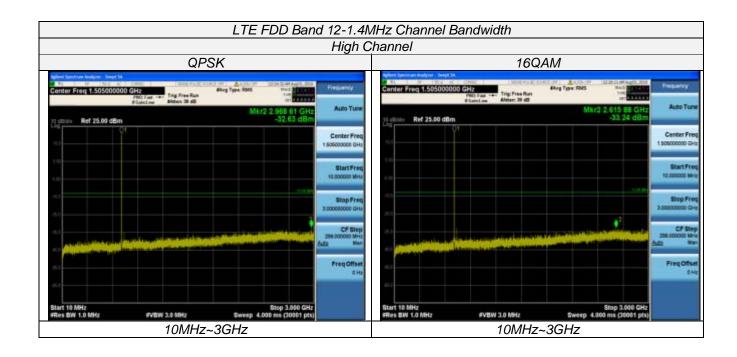












15GHz ~20GHz

1RB#0

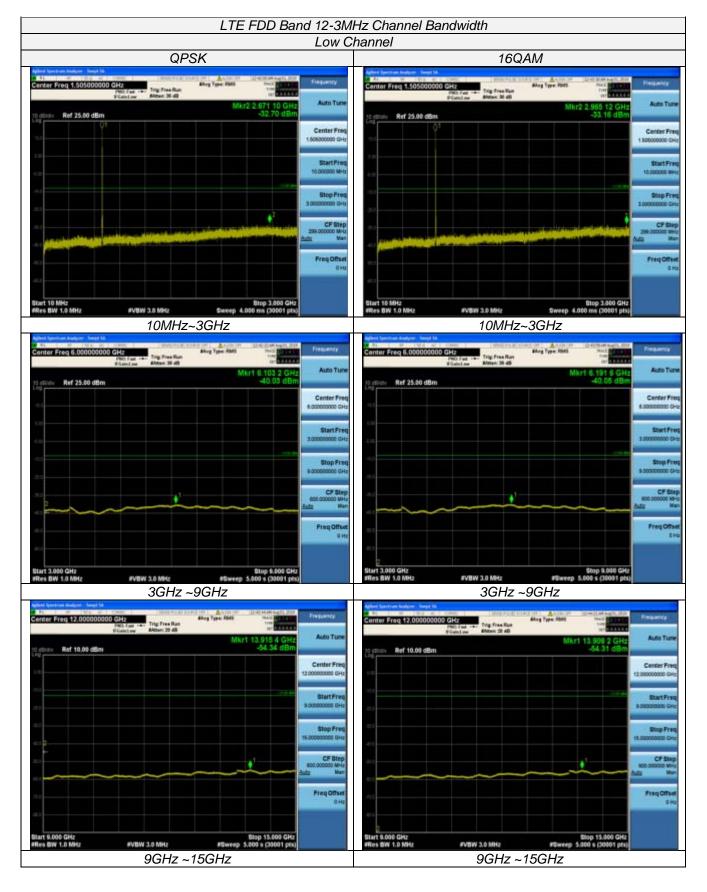
15GHz ~20GHz

1RB#0

* A A *

Auto Tun Ref 25.00 dBm Ref 25.00 dBm Center Fre CF St CF Sie Freq Offse #VBW 3.0 MHz #VBW 3.0 MHz 3GHz ~9GHz 3GHz ~9GHz enter Freq 12.000000000 GHz enter Freq 12.000000000 GHz Ref 10.00 dBm Ref 10.00 dBm 9GHz~15GHz 9GHz ~15GHz Ref 10.00 dSm Start 15,000 GHz #Res BW 1,0 MH 15GHz ~20GHz #VBW 3.0 MHz 15GHz ~20GHz

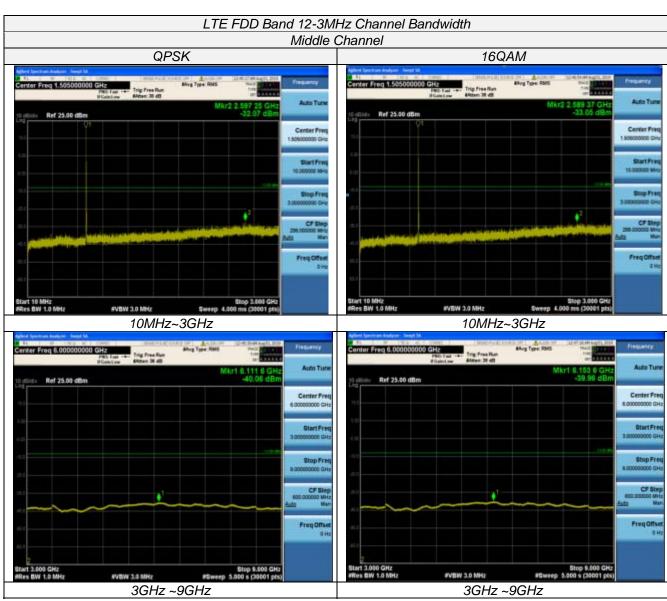
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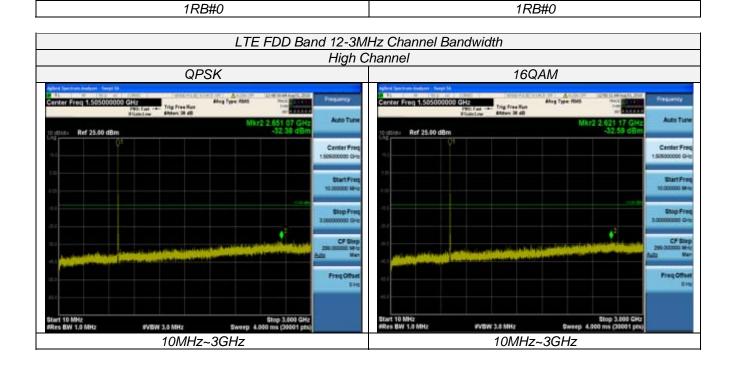




#VBW 3.0 MHz

15GHz ~20GHz

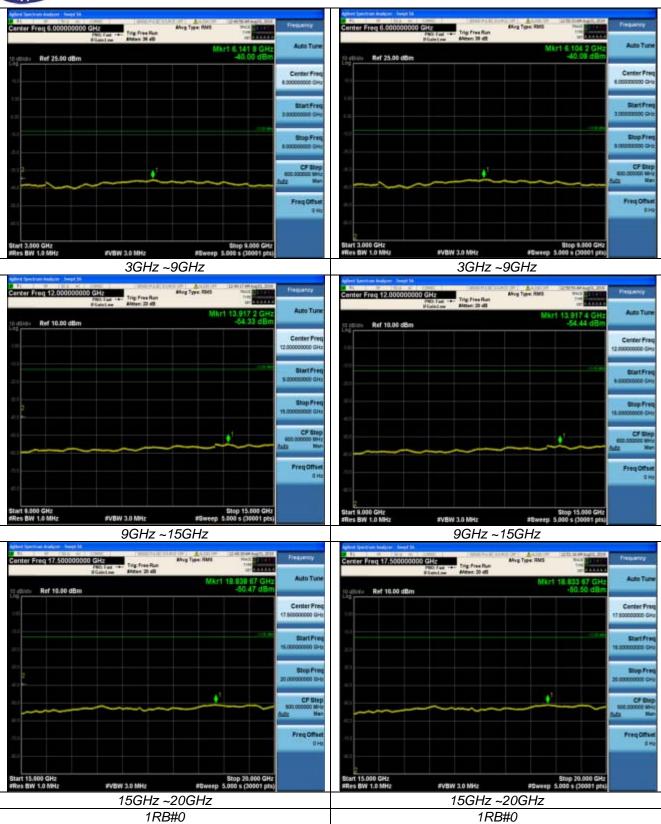




#VBW 3.0 MHz

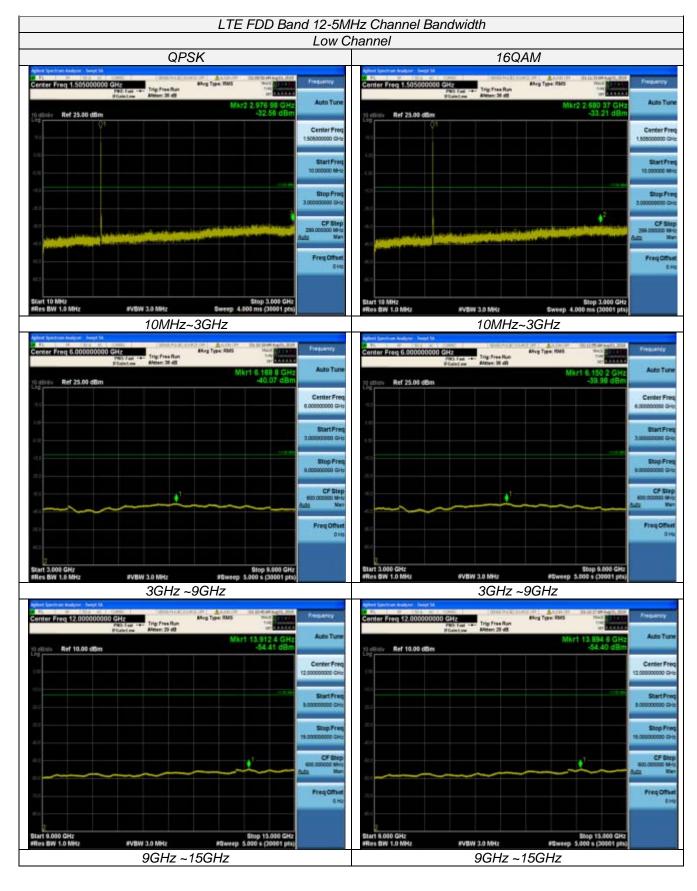
15GHz ~20GHz

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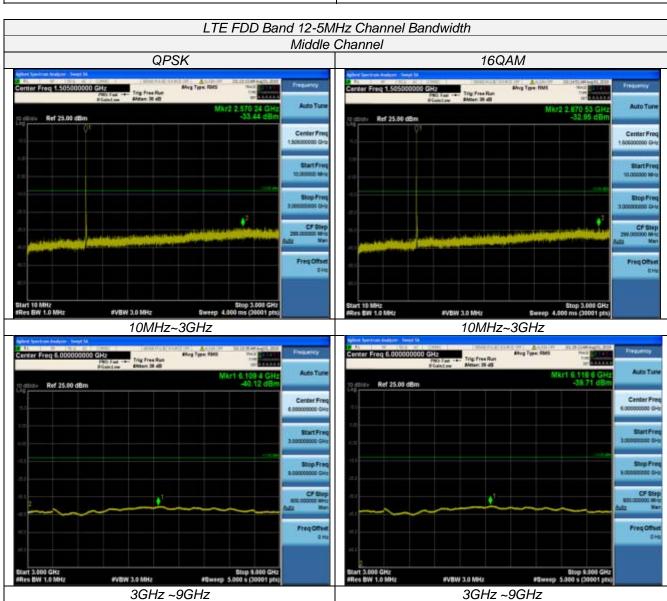
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*ATA *





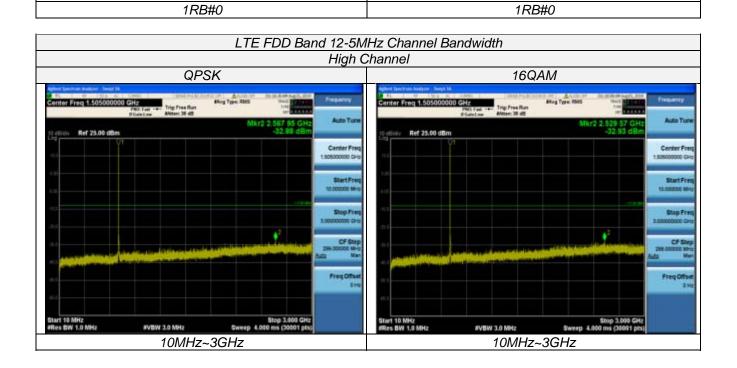




FVBW 3.0 MHz

15GHz ~20GHz



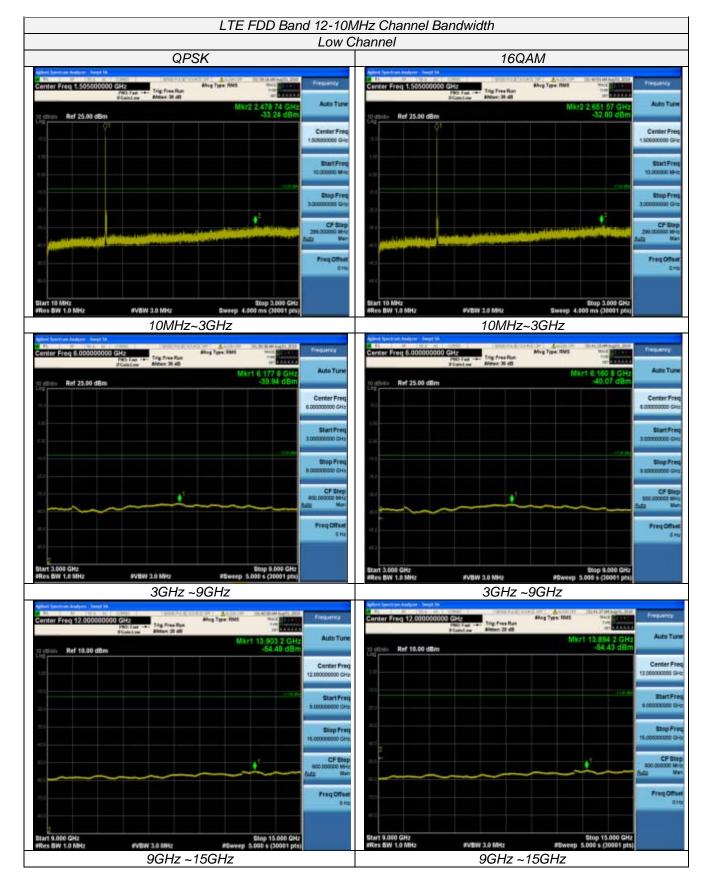


15GHz ~20GHz

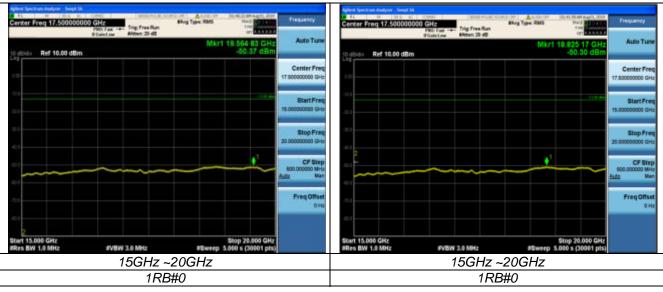
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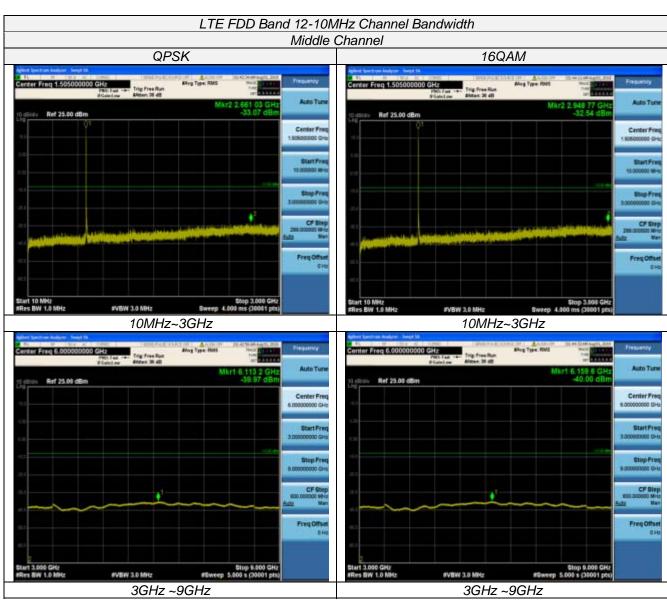


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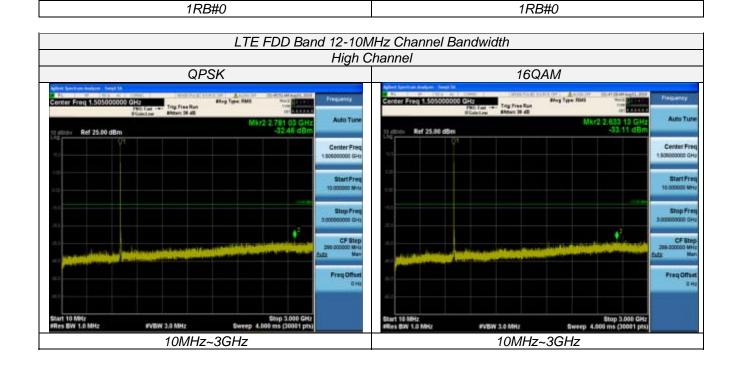










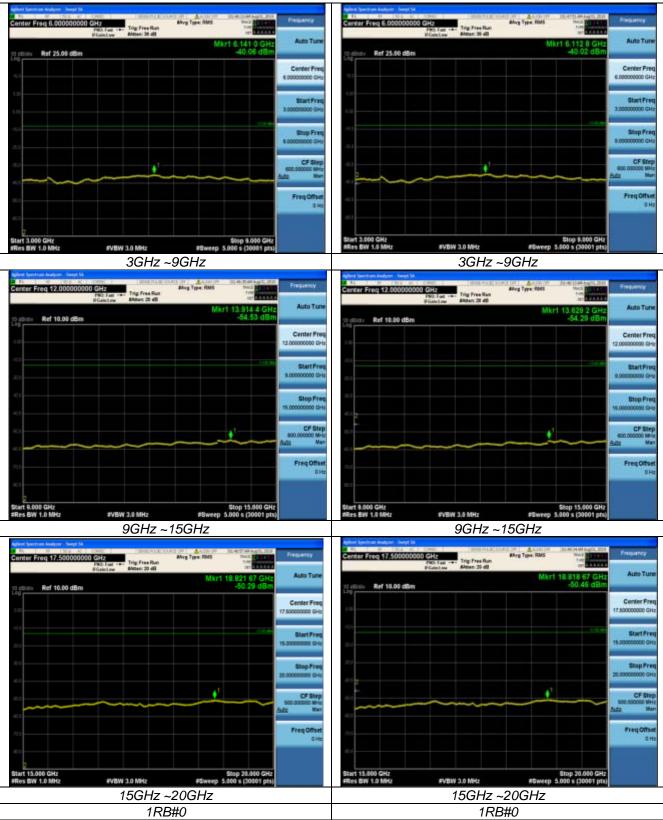


15GHz ~20GHz

FVBW 3.0 MHz

15GHz ~20GHz

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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. $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+G_a(dBi)$
- 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

LILIDDD	ETET DD Bana 12_Ghanner Banawath 1.4mn2_QT GIV_ Low Ghanner											
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization				
1399.4	-35.69	2.86	3.00	7.25	-31.3	-13.00	18.30	Н				
2099.1	-43.21	2.94	3.00	9.53	-36.62	-13.00	23.62	Н				
1399.4	-44.42	2.86	3.00	7.25	-40.03	-13.00	27.03	V				
2099.1	-47.13	2.94	3.00	9.53	-40.54	-13.00	27.54	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	-33.97	2.86	3.00	7.25	-29.58	-13.00	16.58	Н
2122.5	-40.06	2.94	3.00	9.53	-33.47	-13.00	20.47	Н
1415.0	-41.45	2.86	3.00	7.25	-37.06	-13.00	24.06	V
2122.5	-48.84	2.94	3.00	9.53	-42.25	-13.00	29.25	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	-40.48	2.86	3.00	7.82	-35.52	-13.00	22.52	Н
2145.9	-45.01	2.94	3.00	9.35	-38.6	-13.00	25.60	Н
1430.6	-49.53	2.86	3.00	7.82	-44.57	-13.00	31.57	V
2145.9	-53.2	2.94	3.00	9.35	-46.79	-13.00	33.79	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	-35.08	2.86	3.00	7.25	-30.69	-13.00	17.69	Н
2101.5	-42.9	2.94	3.00	9.53	-36.31	-13.00	23.31	Н
1401.0	-42.87	2.86	3.00	7.25	-38.48	-13.00	25.48	V
2101.5	-47.11	2.94	3.00	9.53	-40.52	-13.00	27.52	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	-34.99	2.86	3.00	7.25	-30.6	-13.00	17.60	Н
2122.5	-39.15	2.94	3.00	9.53	-32.56	-13.00	19.56	Н
1415.0	-41.32	2.86	3.00	7.25	-36.93	-13.00	23.93	V
2122.5	-48.51	2.94	3.00	9.53	-41.92	-13.00	28.92	V





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	-40.3	2.86	3.00	7.82	-35.34	-13.00	22.34	Н
2143.5	-44.57	2.94	3.00	9.35	-38.16	-13.00	25.16	Н
1429.0	-48.17	2.86	3.00	7.82	-43.21	-13.00	30.21	V
2143.5	-51.73	2.94	3.00	9.35	-45.32	-13.00	32.32	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	-35.51	2.86	3.00	7.25	-31.12	-13.00	18.12	Н
2104.5	-42.67	2.94	3.00	9.53	-36.08	-13.00	23.08	Н
1403.0	-43.46	2.86	3.00	7.25	-39.07	-13.00	26.07	V
2104.5	-47.47	2.94	3.00	9.53	-40.88	-13.00	27.88	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	-34.35	2.86	3.00	7.25	-29.96	-13.00	16.96	Н
2122.5	-40.19	2.94	3.00	9.53	-33.6	-13.00	20.60	Н
1415.0	-40.9	2.86	3.00	7.25	-36.51	-13.00	23.51	V
2122.5	-47.52	2.94	3.00	9.53	-40.93	-13.00	27.93	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	-39.24	2.86	3.00	7.82	-34.28	-13.00	21.28	Н
2140.5	-44.36	2.94	3.00	9.35	-37.95	-13.00	24.95	Н
1427.0	-48.83	2.86	3.00	7.82	-43.87	-13.00	30.87	V
2140.5	-52.9	2.94	3.00	9.35	-46.49	-13.00	33.49	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	-35.28	2.86	3.00	7.25	-30.89	-13.00	17.89	Н
2112.0	-42.94	2.94	3.00	9.53	-36.35	-13.00	23.35	Н
1408.0	-43.29	2.86	3.00	7.25	-38.9	-13.00	25.90	V
2112.0	-46.77	2.94	3.00	9.53	-40.18	-13.00	27.18	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	-33.9	2.86	3.00	7.25	-29.51	-13.00	16.51	Н			
2122.5	-40.38	2.94	3.00	9.53	-33.79	-13.00	20.79	Н			
1415.0	-42.18	2.86	3.00	7.25	-37.79	-13.00	24.79	V			
2122.5	-47.66	2.94	3.00	9.53	-41.07	-13.00	28.07	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	-39.13	2.86	3.00	7.82	-34.17	-13.00	21.17	Н
2133.0	-43.24	2.94	3.00	9.35	-36.83	-13.00	23.83	Н
1422.0	-49.26	2.86	3.00	7.82	-44.3	-13.00	31.30	V
2133.0	-52.47	2.94	3.00	9.35	-46.06	-13.00	33.06	V





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	-35.54	2.86	3.00	7.25	-31.15	-13.00	18.15	Н
2099.1	-42.61	2.94	3.00	9.53	-36.02	-13.00	23.02	Н
1399.4	-43.9	2.86	3.00	7.25	-39.51	-13.00	26.51	V
2099.1	-46.42	2.94	3.00	9.53	-39.83	-13.00	26.83	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	-34.17	2.86	3.00	7.25	-29.78	-13.00	16.78	Н
2122.5	-40.36	2.94	3.00	9.53	-33.77	-13.00	20.77	Н
1415.0	-41.71	2.86	3.00	7.25	-37.32	-13.00	24.32	V
2122.5	-47.24	2.94	3.00	9.53	-40.65	-13.00	27.65	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	-38.92	2.86	3.00	7.82	-33.96	-13.00	20.96	Н
2145.9	-44.07	2.94	3.00	9.35	-37.66	-13.00	24.66	Н
1430.6	-49.79	2.86	3.00	7.82	-44.83	-13.00	31.83	V
2145.9	-52.4	2.94	3.00	9.35	-45.99	-13.00	32.99	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	-35.92	2.86	3.00	7.25	-31.53	-13.00	18.53	Н
2101.5	-42.87	2.94	3.00	9.53	-36.28	-13.00	23.28	Н
1401.0	-43.44	2.86	3.00	7.25	-39.05	-13.00	26.05	V
2101.5	-46.17	2.94	3.00	9.53	-39.58	-13.00	26.58	V

LTE FDD Band 12_Channel Bandwidth 3MHz_16QAM _ Middle Channel

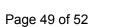
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Diatance	G _a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1415.0	-33.95	2.86	3.00	7.25	-29.56	-13.00	16.56	Н
2122.5	-39.55	2.94	3.00	9.53	-32.96	-13.00	19.96	Н
1415.0	-42.3	2.86	3.00	7.25	-37.91	-13.00	24.91	V
2122.5	-47.43	2.94	3.00	9.53	-40.84	-13.00	27.84	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	-39.31	2.86	3.00	7.82	-34.35	-13.00	21.35	Н				
2143.5	-43.67	2.94	3.00	9.35	-37.26	-13.00	24.26	Н				
1429.0	-49.22	2.86	3.00	7.82	-44.26	-13.00	31.26	V				
2143.5	-51.66	2.94	3.00	9.35	-45.25	-13.00	32.25	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	-35.87	2.86	3.00	7.25	-31.48	-13.00	18.48	Н
2104.5	-42.81	2.94	3.00	9.53	-36.22	-13.00	23.22	Н
1403.0	-43.36	2.86	3.00	7.25	-38.97	-13.00	25.97	V
2104.5	-46.06	2.94	3.00	9.53	-39.47	-13.00	26.47	V





LTE FDD Band 12 Channel Bandwidth 5MHz 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	-34.31	2.86	3.00	7.25	-29.92	-13.00	16.92	Н
2122.5	-39.78	2.94	3.00	9.53	-33.19	-13.00	20.19	Н
1415.0	-42.36	2.86	3.00	7.25	-37.97	-13.00	24.97	V
2122.5	-47.83	2.94	3.00	9.53	-41.24	-13.00	28.24	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	-38.6	2.86	3.00	7.82	-33.64	-13.00	20.64	Н
2140.5	-43.5	2.94	3.00	9.35	-37.09	-13.00	24.09	Н
1427.0	-49.51	2.86	3.00	7.82	-44.55	-13.00	31.55	V
2140.5	-52.11	2.94	3.00	9.35	-45.7	-13.00	32.70	V

LTE FDD Band 12_Channel Bandwidth 10MHz_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
1408.0	-35.54	2.86	3.00	7.25	-31.15	-13.00	18.15	Н
2112.0	-42.33	2.94	3.00	9.53	-35.74	-13.00	22.74	Н
1408.0	-44.1	2.86	3.00	7.25	-39.71	-13.00	26.71	V
2112.0	-46.72	2.94	3.00	9.53	-40.13	-13.00	27.13	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	-34.65	2.86	3.00	7.25	-30.26	-13.00	17.26	Н
2122.5	-39.96	2.94	3.00	9.53	-33.37	-13.00	20.37	Н
1415.0	-42.14	2.86	3.00	7.25	-37.75	-13.00	24.75	V
2122.5	-47 31	2 94	3.00	9 53	-40 72	-13 00	27 72	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	-38.93	2.86	3.00	7.82	-33.97	-13.00	20.97	Н
2133.0	-43.69	2.94	3.00	9.35	-37.28	-13.00	24.28	Н
1422.0	-49.66	2.86	3.00	7.82	-44.7	-13.00	31.70	V
2133.0	-51.78	2.94	3.00	9.35	-45.37	-13.00	32.37	V

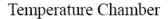
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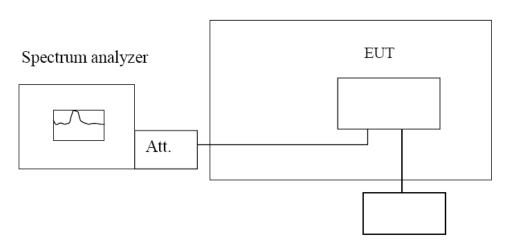
3.7 Frequency Stability under Temperature & Voltage Variations

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.



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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.

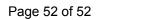
LTE Band 12, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage	Frequency error (Hz)		Frequency error (ppm)		Limit			
(V)	QPSK	16QAM	QPSK	16QAM	(ppm)			
3.40	-15.08	-18.55	-0.008138	-0.009870	2.50			
3.60	-11.46	-22.48	-0.006186	-0.011955	2.50			
4.20	-15.15	-21.10	-0.008180	-0.011225	2.50			

Frequency Error vs Temperature

Frequency Error vs. remperature							
Temperature	Frequency error (Hz)		Frequency error (ppm)		Limit		
(℃)	QPSK	16QAM	QPSK	16QAM	(ppm)		
-30°	-17.15	-17.93	-0.009123	-0.009399	2.50		
-20°	-12.76	-16.25	-0.006785	-0.008519	2.50		
-10°	-16.56	-15.17	-0.008806	-0.007951	2.50		
0°	-18.16	-15.88	-0.009658	-0.008327	2.50		
10°	-13.99	-11.95	-0.007443	-0.006263	2.50		
20°	-22.38	-17.04	-0.011907	-0.008935	2.50		
30°	-16.17	-20.49	-0.008603	-0.010743	2.50		
40°	-20.17	-15.38	-0.010730	-0.008063	2.50		
50°	-14.04	-12.95	-0.007467	-0.006791	2.50		





4 Test Setup Photos of the EUT

