

FCC Test Report

(PART 90R)

Report No.: RF180822C04-10

FCC ID: V65E6920

Test Model: E6920

Received Date: Aug. 22, 2018

Test Date: Sep. 20, 2018 ~ Oct. 01, 2018

Issued Date: Oct. 23, 2018

Applicant: Kyocera Corporation c/o Kyocera International, Inc.

Address: 8611 Balboa Avenue, San Diego, CA 92123

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

- Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
- Test Location (1): No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)
- Test Location (2): No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

FCC Registration / 427177 / TW0011 Designation Number:



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Table of Contents

Re	eleas	e Control Record	4
1	Cer	tificate of Conformity	5
2	Sur	nmary of Test Results	6
		Measurement Uncertainty	
		Test Site and Instruments	
_			
3		neral Information	
	3.1	General Description of EUT	8
	3.2	Configuration of System under Test	
	~ ~	3.2.1 Description of Support Units	
		Test Mode Applicability and Tested Channel Detail	
	3.4	EUT Operating Conditions General Description of Applied Standards	.11
_			
4	Tes	t Types and Results	12
	4.1	Output Power Measurement	12
		4.1.1 Limits of Output Power Measurement	
		4.1.2 Test Procedures	
		4.1.3 Test Setup	
	4.0	4.1.4 Test Results Modulation Characteristics Measurement	
	4.2	4.2.1 Limits of Modulation Characteristics	
		4.2.1 Limits of Modulation Characteristics	
		4.2.3 Test Procedure	
		4.2.4 Test Results	
	4.3	Frequency Stability Measurement	19
		4.3.1 Limits of Frequency Stability Measurement	
		4.3.2 Test Procedure	
		4.3.3 Test Setup	
		4.3.4 Test Results	
	4.4	Occupied Bandwidth Measurement	
		4.4.2 Test Procedure	
		4.4.3 Test Setup	
		4.4.4 Test Results	
	4.5	Emission Mask Measurement	24
		4.5.1 Limits of Band Edge Measurement	
		4.5.2 Test Setup	
		4.5.3 Test Procedures	
	4.6	4.5.4 Test Results	
	4.0	Band Edge Measurement 4.6.1 Limits of Band Edge Measurement	
		4.6.2 Test Setup	
		4.6.3 Test Procedures	
		4.6.4 Test Results	
	4.7	Conducted Spurious Emissions	34
		4.7.1 Limits of Conducted Spurious Emissions Measurement	
		4.7.2 Test Setup	
		4.7.3 Test Procedure	
	4 0	4.7.4 Test Results	
	4.8	Radiated Emission Measurement	
		4.8.2 Test Procedure	
		4.8.3 Deviation from Test Standard	
		4.8.4 Test Setup	



	4.8.5 Test Results	39
5	Pictures of Test Arrangements	47
Ap	opendix – Information on the Testing Laboratories	48



Release Control Record

Issue No.	Description	Date Issued
RF180822C04-10	Original Release	Oct. 23, 2018



Certificate of Conformity 1

Product:	Smart Phone
Brand:	Kyocera
Test Model:	E6920
Sample Status:	Identical Prototype
Applicant:	Kyocera Corporation c/o Kyocera International, Inc.
Test Date:	Sep. 20, 2018 ~ Oct. 01, 2018
Standards:	FCC Part 90, Subpart R
	FCC Part 2

The above equipment has been tested by Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :

Grina Lin, Date: Oct. 23, 2018

Oct. 23, 2018

Date:

Gina Liu / Specialist

Approved by :

ho C , No

Dylan Chiou / Project Engineer



Applied Standard: FCC Part 90 & Part 2 (LTE 14)					
FCC Clause	Test Item	Result	Remarks		
2.1046 90.542 (a)(7) Effective Radiated Power		Pass	Meet the requirement of limit.		
2.1047	Modulation Characteristics	Pass	Meet the requirement.		
2.1055 90.539(e) Frequency Stability		Pass	Meet the requirement of limit.		
2.1049 Occupied Bandwidth (*)		Pass	Meet the requirement of limit.		
90.210 (n) Emission Masks		Pass	Meet the requirement of limit.		
2.1053 90.543 (e)(2)(3)	Band Edge Measurements	Pass	Meet the requirement of limit.		
2.1051 90.543 (e)(3)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.		
2.1053 90.543 (e)(f) Radiated Spurious Emissions		Pass	Meet the requirement of limit. Minimum passing margin is -16.64 dB at 1586.00 MHz.		

2 Summary of Test Results

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) (±)
Redicted Emissions up to 1 CHz	30 MHz ~ 200 MHz	2.0153 dB
Radiated Emissions up to 1 GHz	200 MHz ~ 1000 MHz	2.0224 dB
Dedicted Emissions shows 4 CUIs	1 GHz ~ 18 GHz	1.0121 dB
Radiated Emissions above 1 GHz	18 GHz ~ 40 GHz	1.1508 dB



2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 20, 2018	Aug. 19, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Jan. 11, 2018	Jan. 10, 2019
HORN Antenna ETS-Lindgren	3117	00143293	Dec. 13, 2017	Dec. 12, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Dec. 14, 2017	Dec. 13, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 01, 2017	Nov. 30, 2018
Fixed Attenuator Woken	00801A1GGAM02Y	NA	May 17, 2018	May 16, 2019
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier Agilent	310N	187226	Jun. 19, 2018	Jun. 18, 2019
Preamplifier Agilent	83017A	MY39501357	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RF C-SMS-100-SMS- 120+RFC-SMS-1 00-SMS-400)	Jun. 19, 2018	Jun. 18, 2019
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RF C-SMS-100-SMS- 24)	Jun. 19, 2018	Jun. 18, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 28, 2017	Dec. 27, 2018

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The test was performed in HsinTien Chamber 1.
- 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
- 4. The IC Site Registration No. is IC7450I-1.



3 General Information

3.1 General Description of EUT

Product	Smart Phone			
Brand	Kyocera			
Test Model	E6920			
Status of EUT	Identical Prototype			
	3.8 Vdc (Battery)			
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (Adapter)			
	5 Vdc (Host equipment)			
Modulation Type	LTE QPSK, 16QAM, 64QAM			
Frequency Denge	LTE Band 14 (Channel Bandwidth: 5 MHz) 790.5 ~ 795.5 MHz			
Frequency Range	LTE Band 14 (Channel Bandwidth: 10 MHz)	793 MHz		
Emission Designator	LTE Band 14 (Channel Bandwidth: 5 MHz) 4M50W7D			
Emission Designator	LTE Band 14 (Channel Bandwidth: 10 MHz)	8M97W7D		
	LTE Band 14 (Channel Bandwidth: 5 MHz) 129.45 mW			
Max. ERP Power	LTE Band 14 (Channel Bandwidth: 10 MHz) 130.53 mW			
Antenna Type	Fixed Internal Antenna with -0.6 dBi gain			
Accessory Device	Refer to Note as below			
Data Cable Supplied	Refer to Note as below			

Note:

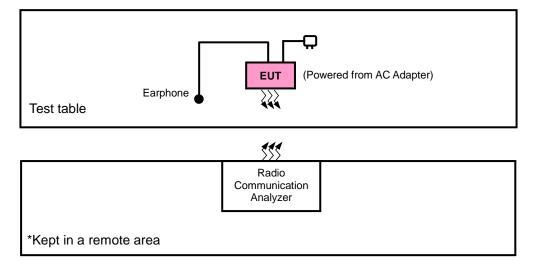
1. The EUT's accessories list refers to Ext. Pho.

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.



3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. Test>

Test table				
	444			
Radio Communication Analyzer				
*Kept in a remote area				

3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	Funkey	FK130102	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).



3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP	Radiated Emission	
LTE Band 14	Z-plane	X-axis	

LTE Band 14

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
	ERP	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	LKF	23330	23330	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	23305 to 23355	23330	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
	Frequency	23305 to 23355	23305, 23355	5 MHz	QPSK	1 RB / 0 RB Offset
-	Stability	23330	23330	10 MHz	QPSK	1 RB / 0 RB Offset
	Occupied	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Bandwidth	23330	23330	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
	Emission Mask	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
-	Emission Mask	23330	23330	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		23305 to 23355	23305, 23355	5 MHz	QPSK, 16QAM,	1 RB / 0 RB Offset
	Band Edge	23303 10 23355	23300, 23300		64QAM	25 RB / 0 RB Offset
-	Band Luge	23330	23330	10 MHz	QPSK, 16QAM,	1 RB / 0 RB Offset
		23330	2000		64QAM	50 RB / 0 RB Offset
	Conducted	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK	1 RB / 0 RB Offset
-	Emission	23330	23330	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK	1 RB / 0 RB Offset
	Emission	23330	23330	10 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.



Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	3.8 Vdc	Karl Lee
Frequency Stability	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Occupied Bandwidth	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Peak to Average Ratio	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Emission Mask	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Band Edge	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Conducted Emission	25 deg. C, 65 % RH	3.8 Vdc	Wayne Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2 FCC 47 CFR Part 90 KDB 971168 D01 Power Meas License Digital Systems v03r01 ANSI/TIA/EIA-603-E 2016 ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.



4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 5 MHz for CDMA and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power 2.15 dB.

Conducted Power Measurement:

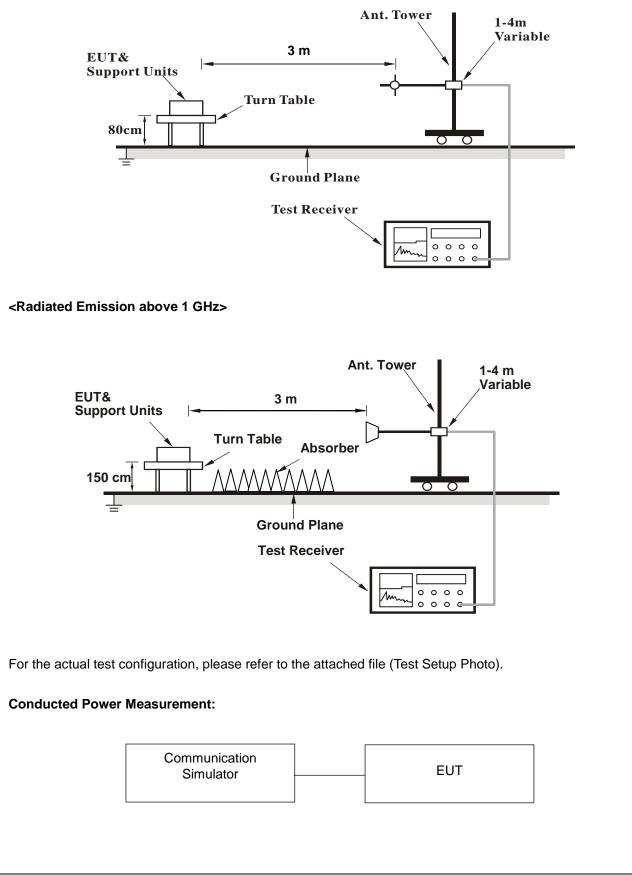
- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.



4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>





4.1.4 Test Results

Conducted Output Power (dBm)

					LTE E	Band 14							
BW	MCS	RB Size	RB Offset	Mid	3GPP MPR	BW	MCS	RB Size	RB Offset	Low	Mid	High	3GPP MPR
DVV	Index	Cha		23330	(dB)	DVV	Index	Cha	nnel	23355	23330	23355	(dB)
		Frequen	cy (MHz)	793	(00)			Frequen	cy (MHz)	795.5	793	795.5	(ub)
		1	0	23.87	0			1	0	23.64	23.75	23.47	0
		1	24	23.86	0			1	12	23.58	23.69	23.41	0
		1	49	23.80	0			1	24	23.40	23.51	23.23	0
	QPSK	25	0	22.82	1		QPSK	12	0	22.53	22.64	22.36	1
		25	12	22.81	1			12	6	22.44	22.55	22.27	1
		25	25	22.85	1			12	13	22.53	22.64	22.36	1
		50	0	22.83	1			25	0	22.51	22.62	22.34	1
		1	0	22.84	1			1	0	22.60	22.72	22.41	1
		1	24	22.80	1			1	12	22.53	22.68	22.38	1
		1	49	22.75	1			1	24	22.38	22.48	22.20	1
10M	16QAM	25	0	21.78	2	5M	16QAM	12	0	21.44	21.55	21.31	2
		25	12	21.80	2			12	6	21.43	21.49	21.18	2
		25	25	21.84	2	_		12	13	21.48	21.57	21.34	2
		50	0	21.76	2			25	0	21.48	21.62	21.28	2
		1	0	21.84	2			1	0	21.55	21.66	21.40	2
		1	24	21.81	2			1	12	21.56	21.68	21.38	2
		1	49	21.79	2			1	24	21.34	21.50	21.13	2
	64QAM	25	0	20.76	3	_	64QAM	12	0	20.45	20.56	20.28	3
		25	12	20.72	3	_		12	6	20.36	20.47	20.25	3
		25	25	20.81	3	_		12	13	20.46	20.60	20.31	3
		50	0	20.76	3			25	0	20.49	20.52	20.24	3



				LTE Band 14			
			Channel Ba	ndwidth: 5 MHz	/ QPSK	_	-
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
	23305	790.5	-9.52	32.771	21.10	128.85	
	23330	793.0	-9.47	32.741	21.12	129.45	Н
z	23355	795.5	-9.66	32.854	21.04	127.17	
2	23305	790.5	-13.28	32.5	17.07	50.93	
	23330	793.0	-13.27	32.52	17.10	51.29	V
	23355	795.5	-13.46	32.62	17.01	50.23	
			Channel Ba	ndwidth: 5 MHz	/ 16QAM		
	23305	790.5	-10.52	32.771	20.10	102.35	
	23330	793.0	-10.48	32.741	20.11	102.59	Н
z	23355	795.5	-10.67	32.854	20.03	100.79	
2	23305	790.5	-14.29	32.5	16.06	40.36	
	23330	793.0	-14.27	32.52	16.10	40.74	V
	23355	795.5	-14.47	32.62	16.00	39.81	
			Channel Ba	ndwidth: 5 MHz	64QAM		
	23305	790.5	-11.53	32.771	19.09	81.11	
	23330	793.0	-11.49	32.741	19.10	81.30	Н
Z	23355	795.5	-11.67	32.854	19.03	80.06	
۷	23305	790.5	-15.30	32.5	15.05	31.99	
	23330	793.0	-15.28	32.52	15.09	32.28	V
	23355	795.5	-15.47	32.62	15.00	31.62	

ERP Power (dBm)

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15



				LTE Band 14			
			Channel Ba	ndwidth: 10 MHz	/ QPSK		
Plane	Channel	Frequency (MHz)	Reading (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (mW)	Polarization (H/V)
z	23330	793.0	-9.43	32.737	21.16	130.53	Н
2	23330	793.0	-13.23	32.52	17.14	51.76	V
		(Channel Bar	ndwidth: 10 MHz	/ 16QAM		
z	23330	793.0	-10.44	32.737	20.15	103.44	Н
2	23330	793.0	-14.23	32.52	16.14	41.11	V
		(Channel Bar	ndwidth: 10 MHz	/ 64QAM		
7	23330	793.0	-11.44	32.737	19.15	82.17	Н
Z	23330	793.0	-15.24	32.52	15.13	32.58	V

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

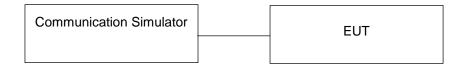


4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

4.2.2 Test Setup

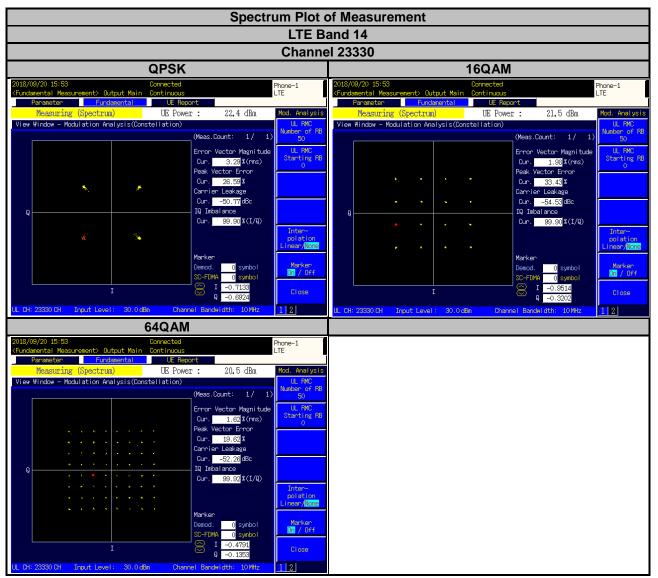


4.2.3 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.



4.2.4 Test Results





4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

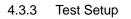
LTE Band 14

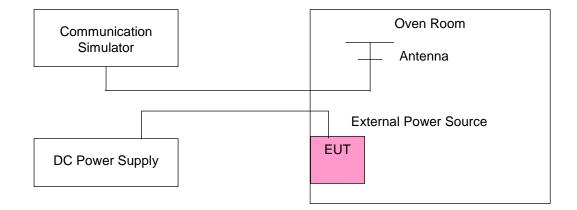
The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

4.3.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.







4.3.4 Test Results

Frequency Error vs. Voltage

		LTE Ba	and 14		
Voltage					
(Volts)	Low C	hannel	High C	hannel	Limit (ppm)
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	·
3.8	790.500003	0.004	795.500004	0.005	2.5
3.23	790.500002	0.003	795.500002	0.003	2.5
4.37	790.500003	0.004	795.500004	0.005	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

		LTE B	and 14		
		Channel Band	dwidth: 5 MHz		
Temp. (℃)	Low C	hannel	High C	hannel	Limit (ppm)
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)	
-30	790.500004	0.005	795.500003	0.003	2.5
-20	790.500002	0.003	795.500003	0.003	2.5
-10	790.500003	0.004	795.500004	0.005	2.5
0	790.500001	0.001	795.500002	0.002	2.5
10	790.500004	0.004	795.500002	0.003	2.5
20	790.499998	-0.003	795.499996	-0.005	2.5
30	790.499997	-0.003	795.499997	-0.004	2.5
40	790.499999	-0.001	795.499999	-0.002	2.5
50	790.499999	-0.001	795.499999	-0.002	2.5
60	790.499999	-0.002	795.499999	-0.002	2.5



Frequency Error vs. Voltage

	LTE Ba	and 14	
Voltage (Volts)	Channel Band	width: 10 MHz	Limit (ppm)
(10113)	Frequency (MHz)	Frequency Error (ppm)	
3.8	793.000001	0.002	2.5
3.23	793.000004	0.004	2.5
4.37	793.000001	0.001	2.5

Note: The applicant defined the normal working voltage of the battery is from 3.23 Vdc to 4.37 Vdc.

Frequency Error vs. Temperature

	LTE B	and 14	
Temp. (℃)	Channel Band	width: 10 MHz	Limit (ppm)
	Frequency (MHz)	Frequency Error (ppm)	
-30	793.000002	0.003	2.5
-20	793.000001	0.002	2.5
-10	793.000003	0.004	2.5
0	793.000003	0.004	2.5
10	793.000001	0.002	2.5
20	792.999997	-0.004	2.5
30	792.999998	-0.003	2.5
40	792.999998	-0.003	2.5
50	792.999998	-0.003	2.5
60	792.999998	-0.003	2.5



4.4 Occupied Bandwidth Measurement

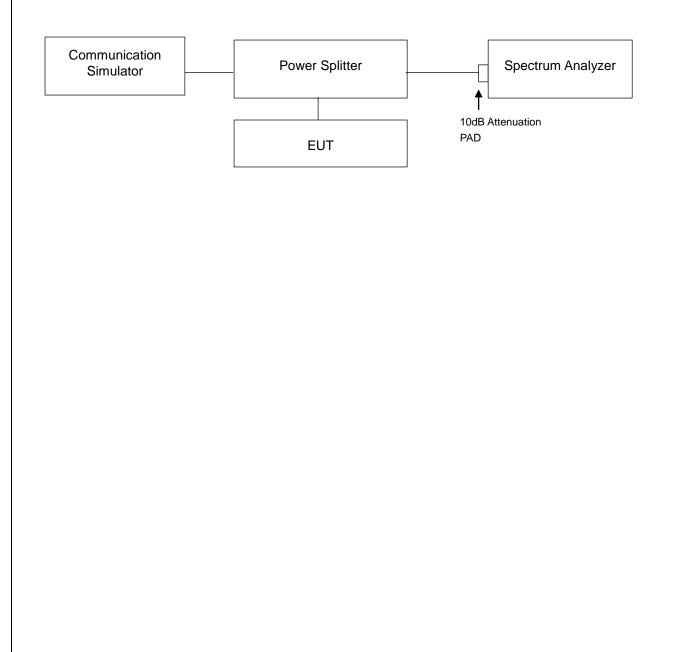
4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.2 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup





4.4.4 Test Results

				LTE Ba	and 14				
(Channel Band	dwidth: 5	MHz		С	hannel Band	width: 1	0 MHz	
Channel	Frequency		% Occup dwidth (I		Channel	Frequency	-	Occupied idth (MHz)	
	(MHz)	QPSK	16QAM	64QAM		(MHZ)	QPSK	16QAM	64QAM
23305	790.5	4.4911	4.4915	4.4931					
23330	793.0	4.4952	4.4955	4.4971	23330	793.0	8.9667	8.9731	8.9651
23355	795.5	4.4970	4.4985	4.4988					

			Spectri	um Plot	of Worst Value				
	5 MH	z / 64QAN	Λ			10 M	IHz / 16QAN	N	
Reysight Spectrum Analyzer - Occupied BW RL 8F 58.0 DC Center Freq 795.500000 MH2 #F Ref Offset 15 d6 0 dB/dIV Ref 35.00 dBm			Radio Std: None	Frequency	Keysight Spectrum Analyzer - Occupied BW RL RF 50 D DC Center Freq 793.000000 MHz #FG Ref Offset 15 dB 10 dB/dly Ref 35.00 dBm	Center Trig: F	SENSE:INT ALIG Ir Freq: 793.000000 MHz Free Run Avg Hold: 1/1 n: 30 dB	N OFF 11:05:16 AM Sep 21, 2018 Radio Std: None Radio Device: BTS	Frequency
0 deglaw ref 30.00 deglam 64				Center Freq 795.500000 MHz	10 distant Ref. 33.00 (dbm) 250				Center Fre 793.000000 MH
Center 795.5 MHz #Res BW 100 kHz	#VI	300 kHz	Span 10 MHz #Sweep 300 ms	1.000000 MHz	Center 793 MHz #Res BW 200 kHz	#	VBW 1 MHz	Span 20 MHz #Sweep 300 ms	CF Ste 2.000000 Mi
Occupied Bandwidth 4.49	88 MHz	Total Power	23.0 dBm	Auto Man Freq Offset	Occupied Bandwidth 8.97	31 MHz	Total Power	22.8 dBm	Auto Ma Freq Offs
Transmit Freq Error x dB Bandwidth	1.067 kHz 4.808 MHz	% of OBW Power x dB	99.00 % -26.00 dB	0 Hz		-5.896 kHz 9.513 MHz	% of OBW Power x dB	99.00 % -26.00 dB	01



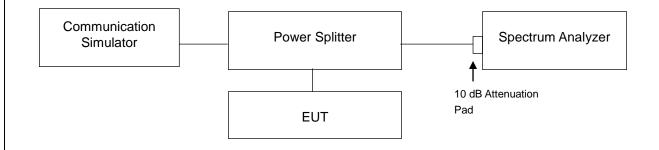
4.5 Emission Mask Measurement

4.5.1 Limits of Band Edge Measurement

LTE Band 14

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) Db

4.5.2 Test Setup

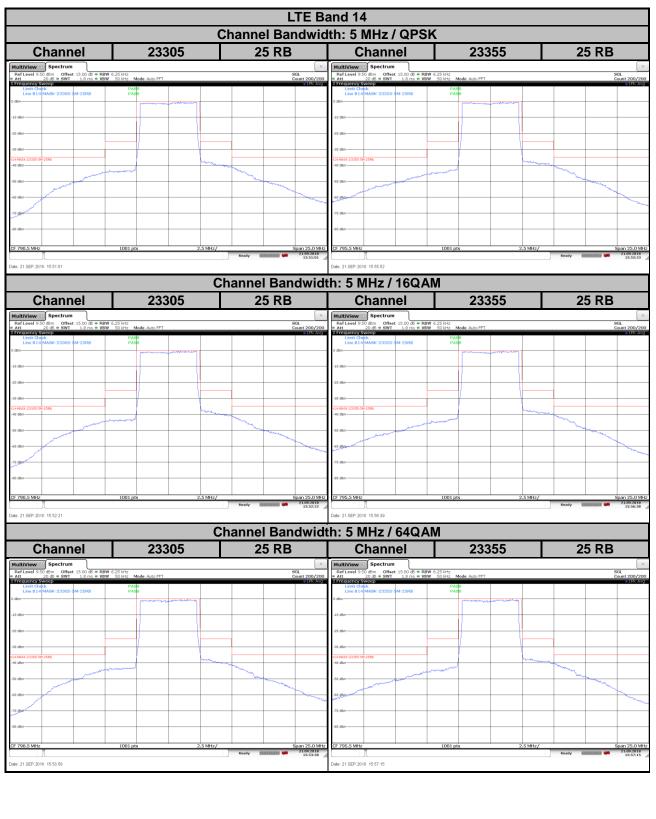


4.5.3 Test Procedures

- a. The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Record the test plot.



4.5.4 Test Results





		LTE B	and 14		
Channel I	Bandwidth: 10 M	Hz / QPSK	Channel B	andwidth: 10 MH	z / 16QAM
Channel	23330	50 RB	Channel	23330	50 RB
ltiView 🗉 Spectrum			MultiView 🗄 Spectrum		
ef Level 9.50 dBm Offset 15.00 dB = RBW 6 tt 20 dB = SWT 3.6 ms = VBW equency Sweep	6.25 kHz 50 kHz Mode Auto FFT	SGL Count 200/200 1Ek Ave	Ref Level 9.50 dBm Offset 15.00 dB = RBW 6 Att 20 dB = SWT 3.6 ms = VBW 1 Frequency Sweep 3.6 ms = VBW 3.6 ms = VBW	-25 kHz 50 kHz Mode Auto FFT	
Limit Check Line B14 MASK-23330-10M-50RB	PASS PASS		Limit Check Line B14 MASK-23330-10M-50RB	PASS PASS	
	and the state of t		0 dBm-	and the second s	
im			-10 dBm-		
m			-20 d8m		
ten			-30 dBm		
ASK-23330-10M-50R8 Bm			814-MASK-23330-10M-50P8		~~~~
8m			-50 dBm		
Bro		man	-60 dBm		- The second
Ro			-70 dBm		
3m			-80 d8m		
93.0 MHz	1001 pts 5.0 MHz	/ Span 50.0 MHz	CF 793.0 MHz	1001 pts 5.0 MHz/	
21.SEP.2018 15:58:33		Ready 21.09.2018	Date: 21.SEP.2018 15:59:31		Ready 🗰
			Date: 21.5EP.2018 15:59:31		
	andwidth: 10 MI				1
Channel	23330	50 RB			
ItiView Spectrum	6 98 I.U	SGL	4		
Level 9.50 dBm Offset 15.00 dB = RBW (20 dB = SWT 3.6 ms = VBW quency Sweep		SoL Count 200/200 • 1Ek Avg			
Lime B14-MASK-23330-10M-50RB	PASS PASS				
8m			1		
			1		
IBm			1		
MASK-23330-10M-50P8		m			
18m					
iem					
dem					
8m					

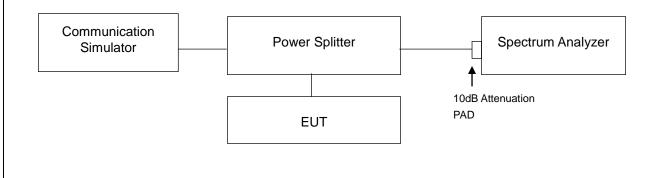


4.6 Band Edge Measurement

4.6.1 Limits of Band Edge Measurement

- (1) On all frequencies between 769 775 MHz and 799 805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769 775 MHz and 799 805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775–788MHz, above 805 MHz, and below 758MHz, by at least 43 + 10 log (P) dB

4.6.2 Test Setup

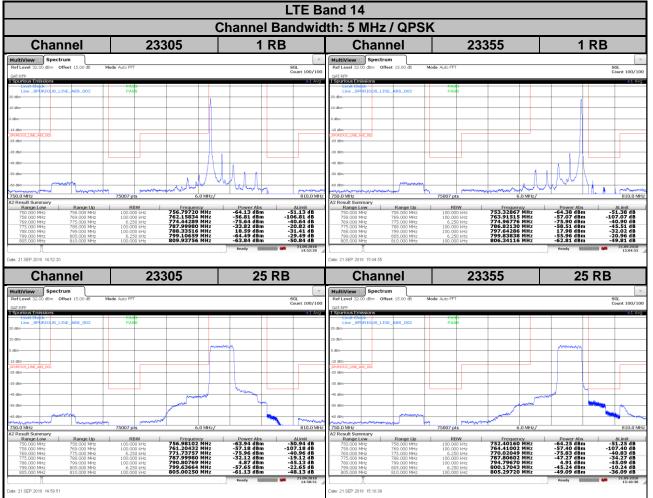


4.6.3 Test Procedures

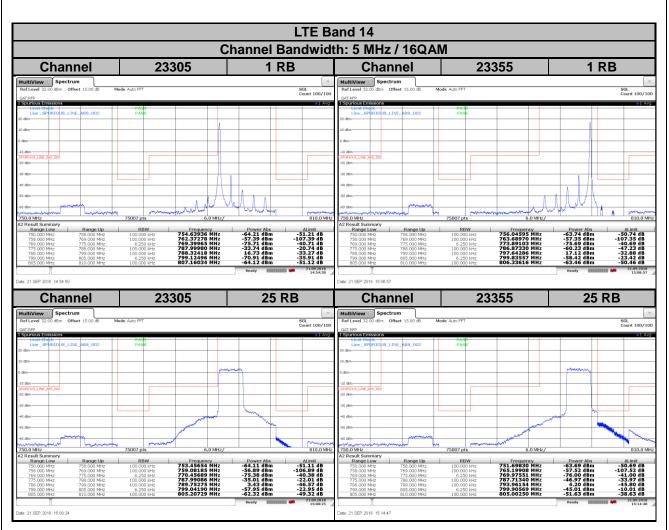
- a. All measurements were done at low and high operational frequency range.
- b. The band edge measurement used the power splitter via EUT RF power connector between signal generator and spectrum analyzer. This splitter loss, attenuator loss and cable loss are the worst loss 15 dB in the transmitted path track.
- c. Record the max trace plot into the test report.



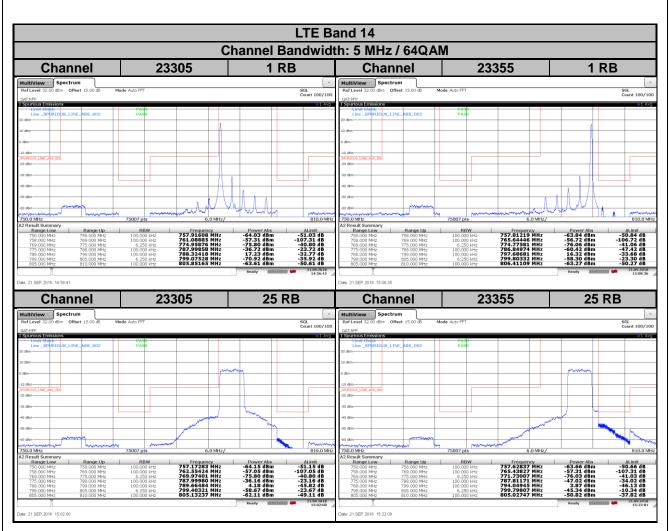
4.6.4 Test Results













LTE Band 14 Channel Bandwidth: 10 MHz / QPSK								
Channel	23330	1 RB	Channel	23330	1 RB49			
tiView 🗉 Spectrum		- V	MultiView 🗉 Spectrum					
RFP	Mode Auto FFT	SGL Count 100/100	GAT: RFP	Mode Auto FFT	SGL Count 100/			
Inious Emissions Limit Ohjuk Line _SPURIOUS_LINE_ABS_002	PAS9 PASS	●1 Avg	1 Spurious Emissions Limit Check Line _SPURIOJS_LINE_ABS_002	PA99 PASS	•1			
n			20 d8m-		1			
)			10 dBm-					
n			-10 dBm					
US_LINE_ABS_002			SPURIOUS_LINE_A85_002					
			-30 dBm					
n			-40 dBm-					
		mile 1	-50 dBm					
MHz	75007 pts 6.0 MHz	/ 810.0 MHz	750.0 MHz	75007 pts 6.0 MHz	810.0			
esult Summary Range Low Range Up			A2 Result Summary Range Low Range Up					
750.000 MHz 758.000 MHz 758.000 MHz 769.000 MHz 769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz	RBW Frequency 100.000 kHz 757.83616 MHz 100.000 kHz 764.67671 MHz 6.250 kHz 774.16396 MHz 100.000 kHz 787.99980 MHz	Power Abs Alimit -64,47 dBm -51,47 dB -56,52 dBm -106,52 dB -75,76 dBm -40,76 dB -42,11 dBm -29,11 dB	750.000 MHz 758.000 MHz 758.000 MHz 769.000 MHz 769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz	RBW Frequency 100.000 kHz 752.25774 MHz 100.000 kHz 762.29305 MHz 6.250 kHz 774.98725 MHz 100.000 kHz 784.15720 MHz	Power Abs ALimit -64.26 dBm -51.26 d -57.04 dBm -107.04 d -75.98 dBm -40.98 d			
788.000 MHz 799.000 MHz	100.000 kHz 787.99980 MHz 100.000 kHz 788.56593 MHz	-42.11 dBm -29.11 dB 17.67 dBm -32.33 dB -55.25 dBm -20.25 dB	788.000 MHz 799.000 MHz	100.000 kHz 784.15720 MHz 100.000 kHz 797.37912 MHz	-48.64 dBm -35.64 d 18.03 dBm -31.97 d -56.71 dBm -21.71 d			
799.000 MHz 805.000 MHz 805.000 MHz 810.000 MHz	6.250 kHz 801.80144 MHz 100.000 kHz 806.27622 MHz	-49.02 dBm -36.02 dB Ready 21.09.2018 15:26:11	799.000 MHz 805.000 MHz 805.000 MHz 810.000 MHz	6.250 kHz 801.82882 MHz 100.000 kHz 806.20130 MHz	-55.12 dBm -42.12 dl			
1.SEP.2018 15:26:10		15:26:11	Date: 21.SEP.2018 15:32:48		Ready 15:32			
Channel	23330	50 RB						
tiView 🖽 Spectrum		♥						
RFP	Mode Auto FFT	SGL Count 100/100						
Inious Emissions	PASS	•1 Avg						
h								
		server with some server						
n								
DUS_LINE_ABS_002								
n								
m	manuser	m m						
		Manual Manual Andrews						
	75007 pts 6.0 MHz	/ 810.0 MHz						
esult Summary		Devuer the Atlant						
Range Low Range Up	100.000 kHz 757.18881 MHz 100.000 kHz 762.02362 MHz	Power Abs ALimit -63.91 dBm -50.91 dB -57.12 dBm -107.12 dB -75.82 dBm -40.82 dB -34.62 dBm -21.62 dB 2.82 dBm -47.18 dB 4.65 dBm -47.18 dB						
Range Low Range Up 750.000 MHz 758.000 MHz 758.000 MHz 769.000 MHz								
Range Low Range Up 750.000 MHz 758.000 MHz	6.250 kHz 774.99325 MHz 100.000 kHz 787.99980 MHz 100.000 kHz 793.24725 MHz 6.250 kHz 799.25002 MHz 100.000 kHz 805.00749 MHz	-34.62 dBm -21.62 dB 2.82 dBm -47.18 dB -45.55 dBm -10.55 dB -42.21 dBm -29.21 dB						



LTE Band 14 Channel Bandwidth: 10 MHz / 16QAM								
Channel	23330	1 RB	Channel	23330	1 RB49			
tiView 🗉 Spectrum		Ÿ	MultiView 🗄 Spectrum					
Level 32.00 dBm Offset 15.00 dB 1 RFP inious Emissions	Mode Auto FFT	SGL Count 100/100	Ref Level 32.00 dBm Offset 15.00 dB GAT:RPP 1 Spurious Emissions	Mode Auto FFT	SGL Count 100/			
Limit Chuck Line _SPURIOUS_LINE_ABS_002	PASS PASS	1 AV9	Limit Chuck Line _SPURIOUS_LINE_ABS_002	PASS PASS				
n	1		20 d8m					
			0 d8m					
NS_LINE_485_002			-10 dBm					
			-20 dBm-					
n			-30 dBm					
1			-40 dBm					
		have almost	-50 dBm		- Am			
MH2	75007 pts 6.0 MHz		750.0 MHz	75007 pts 6.0 MHz	810.0			
Summary Range Low Range Up 750.000 MHz 758.000 MHz 758.000 MHz 758.000 MHz 769.000 MHz 769.000 MHz	RBW Frequency 100.000 kHz 754.92707 MHz 100.000 kHz 763.36803 MHz	Power Abs ALimit -64,43 dBm -51,43 dB -56,83 dBm -106,83 dB -75,65 dBm -40,65 dB	A2 Result Summary Range Low Range Up 750.000 MHz 758.000 MHz	RBW Frequency 100.000 kHz 756.46953 MHz	Power Abs ΔLimit -63.99 dBm -50.99 d -56.68 dBm -106.68 d			
758.000 MHz 769.000 MHz 769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz	100.000 kHz 763.36803 MHz 6.250 kHz 774.48188 MHz 100.000 kHz 787.99980 MHz	-56.83 dBm -106.83 dB -75.65 dBm -40.65 dB -43.00 dBm -30.00 dB	758.000 MHz 769.000 MHz 769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz	100.000 kHz 761.96313 MHz	Power Abs ΔLimit -63.99 dBm -50.99 d -56.68 dBm -106.68 d -75.98 dBm -40.98 d -49.75 dBm -36.75 d			
788.000 MHz 799.000 MHz 789.000 MHz 799.000 MHz 805.000 MHz 805.000 MHz 305.000 MHz 810.000 MHz	100.000 kHz 788.58791 MHz 6.250 kHz 801.80238 MHz	-43.00 dBm -30.00 dB 16.50 dBm -33.50 dB -57.85 dBm -22.85 dB	768.000 MHz 799.000 MHz 799.000 MHz 805.000 MHz 805.000 MHz 810.000 MHz	100.000 kHz 784.16370 MHz 100.000 kHz 797.40110 MHz 6.250 kHz 801.83276 MHz 100.000 kHz 806.23127 MHz	-58.60 dBm -23.60 d			
805.000 MHz 810.000 MHz	100.000 kHz 806.26623 MHz	-53.34 dBm -40.34 dB Ready 21.09.2018 15:28:31	805.000 MHz 810.000 MHz	100.000 kHz 806.23127 MHZ	-56.96 dBm -43.96 dl Ready # 21.09.20 15:34:			
1.SEP.2018 15:28:30			Date: 21.SEP.2018 15:34:34					
Channel	23330	50 RB						
tiView B Spectrum	Mode Auto FFT	SGL						
3FP	Mode Abto PP1	Count 100/100						
inious Emissions Limit-Ohyck Line_SPURIOUS_LINE_ABS_002	PASS PASS	•1 Avg						
n								
		Law manage						
m								
OUS_LINE_ABS_002								
m								
n								
n		Contraction of the second seco						
0 MHz	75007 pts 6.0 MHz	/ 810.0 MHz						
esult Summary Range Low Range Up								
750.000 MHz 758.000 MHz 758.000 MHz 769.000 MHz 769.000 MHz 725.000 MHz	100.000 kHz 750.61139 MHz 100.000 kHz 759.56298 MHz	Power Abs Allimit -63.80 dBm -50.80 dB -57.30 dBm -107.30 dB -75.60 dBm -40.60 dB -40.08 dBm -27.08 dB						
	100 000 kHz 787.01020 MHz	-40.08 dBm -27.08 dB						
769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz 788.000 MHz 799.000 MHz 799.000 MHz 805.000 MHz 805.000 MHz 810.000 MHz	100.000 kHz 790.10440 MHz 6.250 kHz 799.08372 MHz 100.000 kHz 805.00250 MHz	1.61 dBm -48.39 dB -45.92 dBm -10.92 dB						



LTE Band 14 Channel Bandwidth: 10 MHz / 64QAM								
Channel	23330	1 RB	Channel	23330	1 RB49			
AT: RFP	Mode Auto FFT	SGL Count 100/100	GAT: RFP	Mode Auto FFT	SGL Count 100/10			
Open Does of Instations Same of lange, some of lange	PA08 PA08 PA08 PA08 PA08 PA08 PA08 PA08		Statistics Finalsion Law Child Statistics Law Child Statistics	PAGE PASE	-55.85 dBm -25.85 dBm			
Channel ItiView Spectrum	23330	50 RB						
f Level 32:00 dBm Offset 15:00 dB ERPP Unious Emissions Emit Childs Line SPURIO US_LINE_ABS_002 Im-	PAGS PASS	SGL Count 100/100 • 1 AV9						
In a set of the set of	75007 pts 6.0 MEZ							
Range Low Range Up Range Low 755.000 MHz 755.000 MHz 755.000 MHz 755.000 MHz 769.000 MHz 769.000 MHz 775.000 MHz 775.000 MHz 788.000 MHz 786.000 MHz 789.000 MHz 786.000 MHz 789.000 MHz 799.000 MHz 789.000 MHz 805.000 MHz 805.000 MHz 805.000 MHz 805.000 MHz	RBW Frequency 100.000 Hrz 757.69231 MHz 100.000 Hrz 762.29855 MHz 6.250 Hrz 774.84629 MHz 100.000 Hrz 787.97542 MHz 100.000 Hrz 787.97542 MHz 100.000 Hrz 789.08242 MHz 100.000 Hrz 799.17708 MHz 100.000 Hrz 785.29720 MHz	Power Abs Alimit -63.88 dBm -50.88 dB -55.55 dBm -106.55 dB -75.76 dBm -40.76 dB -35.28 dBm -26.28 dB -100.04 dBm -12.50 dBm -40.49 dBm -31.49 dB						

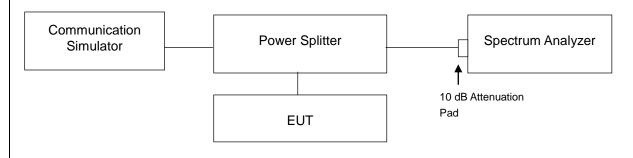


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission is equal to -13 dBm.

4.7.2 Test Setup

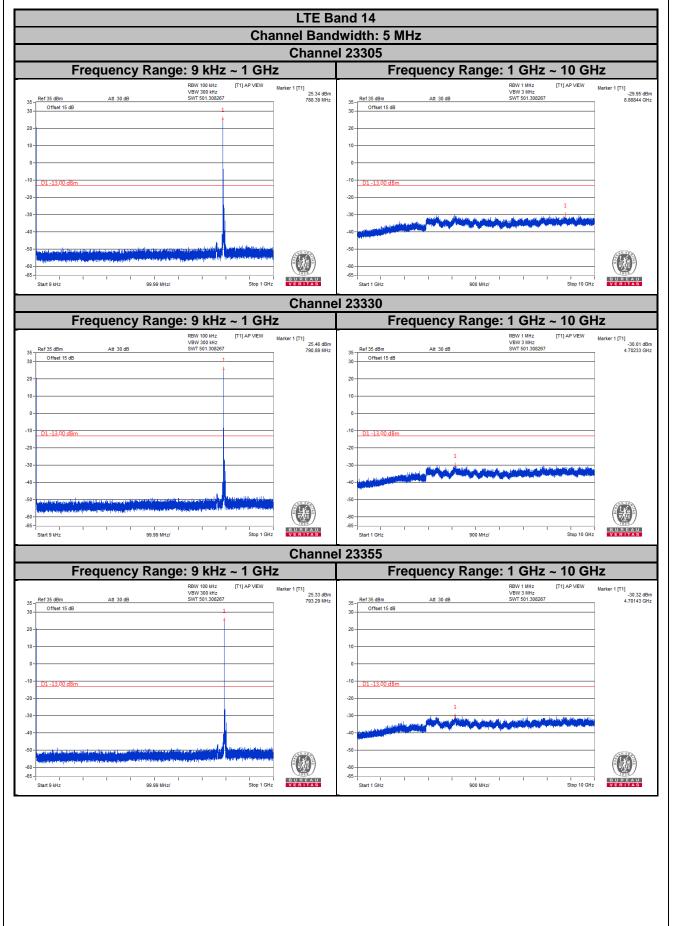


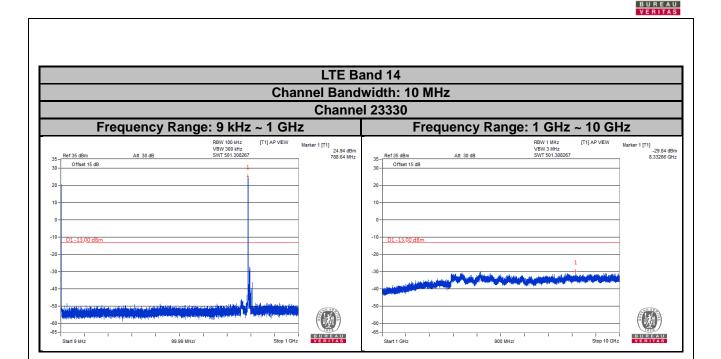
4.7.3 Test Procedure

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 10 GHz. 10 dB attenuation pad is connected with spectrum.
 RBW = 100 kHz and VBW = 300 kHz are used for conducted emission measurement.



4.7.4 Test Results







4.8 Radiated Emission Measurement

- 4.8.1 Limits of Radiated Emission Measurement
- (1) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission is equal to -13 dBm.
- (2) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

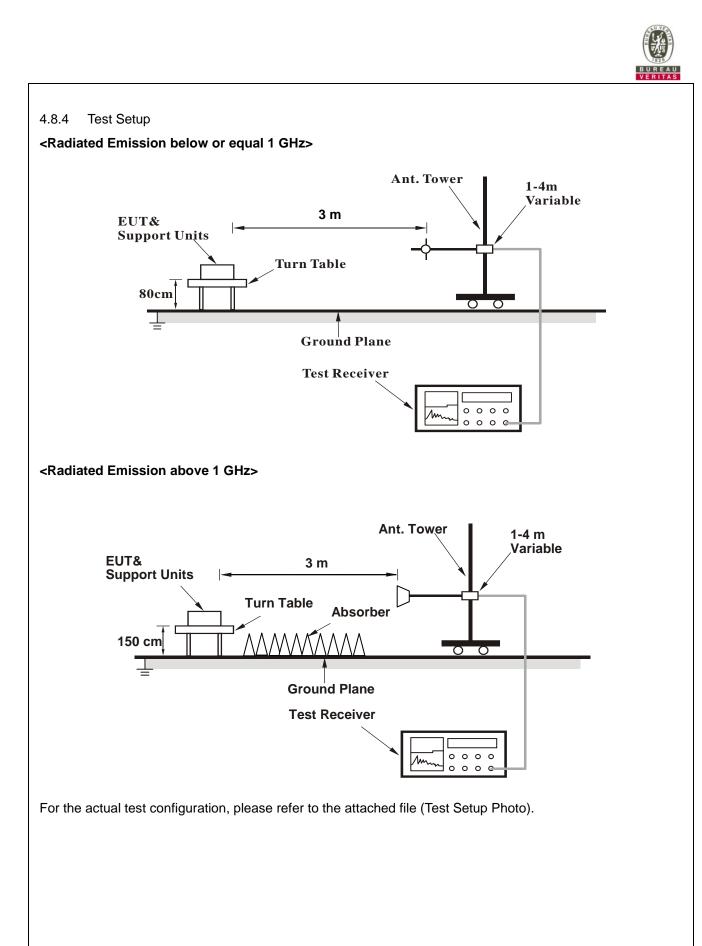
4.8.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- c. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power 2.15 dB.

Note: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.8.3 Deviation from Test Standard

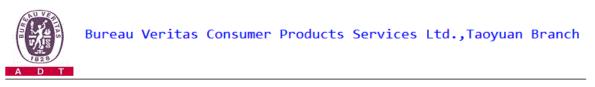
No deviation.

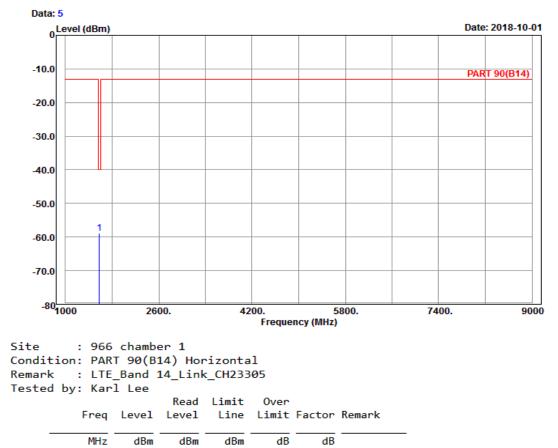




4.8.5 Test Results

LTE Band 14 Channel Bandwidth: 5 MHz / QPSK Low Channel

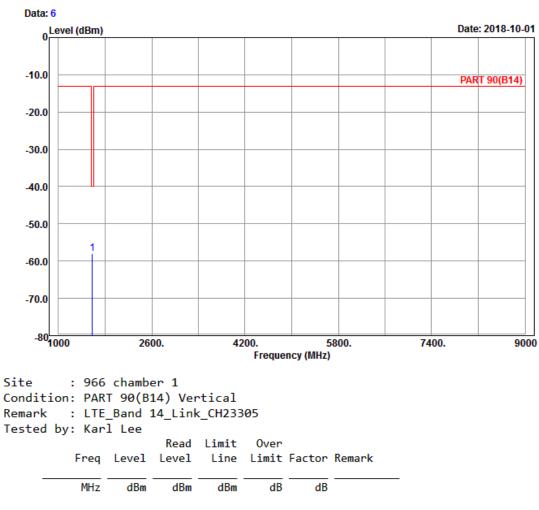




1 pp 1581.00 -58.89 -65.93 -40.00 -18.89 7.04 Peak







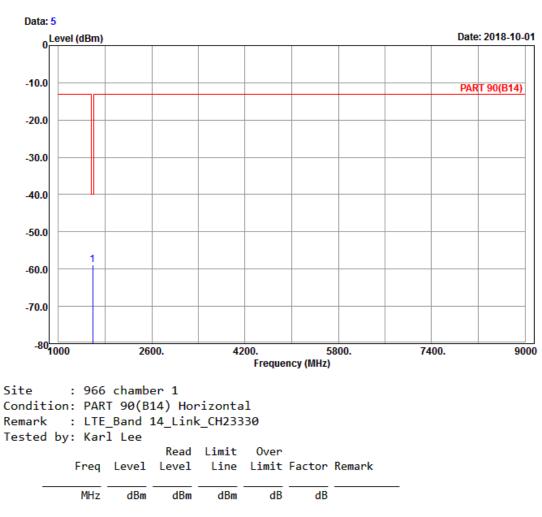
1 pp 1581.00 -57.89 -64.93 -40.00 -17.89 7.04 Peak



Middle Channel



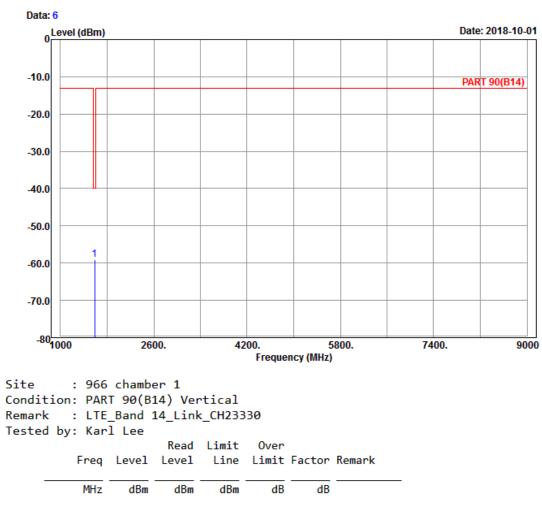
Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



1 pp 1586.00 -58.90 -66.11 -40.00 -18.90 7.21 Peak







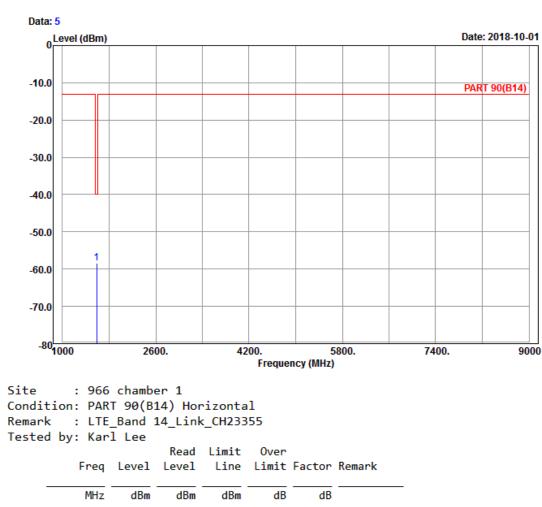
1 pp 1586.00 -59.11 -66.32 -40.00 -19.11 7.21 Peak



High Channel



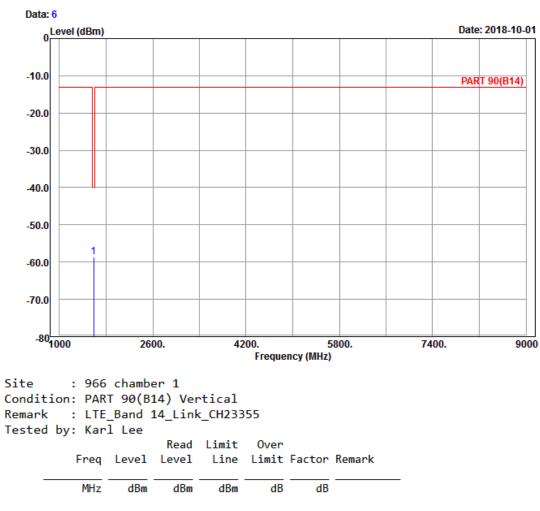
Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



1 pp 1591.00 -58.49 -65.70 -40.00 -18.49 7.21 Peak



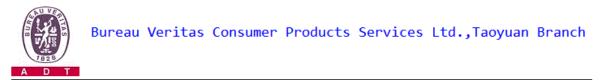


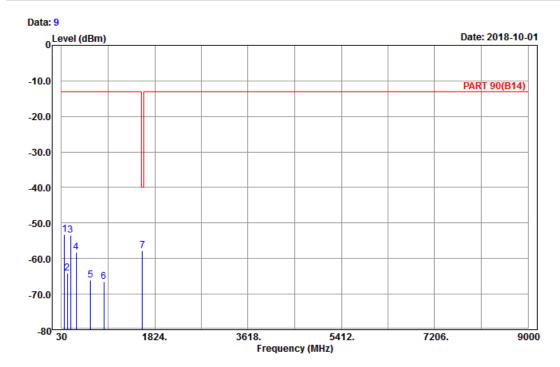


1 pp 1591.00 -58.54 -65.75 -40.00 -18.54 7.21 Peak



Channel Bandwidth: 10 MHz / QPSK **Middle Channel**





Site : 966 chamber 1 Condition: PART 90(B14) Horizontal Remark : LTE_Band 14_Link_CH23330 Tested by: Karl Lee Read Limit Over

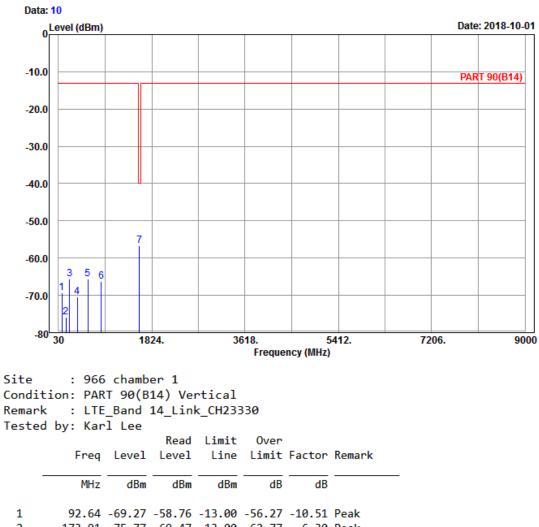
	Freq	Level	Level	Limit		Factor	Remark	
-	MHz	dBm	dBm	dBm	dB	dB		
			-42.56 -56.14					
	207.12	-53.50	-47.42	-13.00	-40.50	-6.08	Peak	
	317.50	-58.29	-52.53	-13.00	-45.29	-5.76	Peak	
	589.80	-66.10	-66.09	-13.00	-53.10	-0.01	Peak	

845.30 -66.51 -68.00 -13.00 -53.51 1.49 Peak 7 pp 1586.00 -57.83 -65.04 -40.00 -17.83 7.21 Peak

6







1	92.64	-69.27	-58.76	-13.00	-56.27	-10.51 Peak
2	173.91	-75.77	-69.47	-13.00	-62.77	-6.30 Peak
3	241.95	-65.63	-60.02	-13.00	-52.63	-5.61 Peak
4	395.90	-70.47	-67.52	-13.00	-57.47	-2.95 Peak
5	591.90	-65.57	-65.64	-13.00	-52.57	0.07 Peak
6	854.40	-66.35	-67.94	-13.00	-53.35	1.59 Peak
7 pp	1586.00	-56.64	-63.85	-40.00	-16.64	7.21 Peak



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).



Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF/Telecom Lab Tel: 886-3-6668565 Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Tel: 886-3-3183232 Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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