





# FCC CFR47 PART 22H, 27 CERTIFICATION TEST REPORT FCC ID: HLZ-ACERONE8T2

**Product:** Tablet

Trade Mark: Acer

Model Number: Acer one 8 T2

Family Model: N/A

Report No.: S20072802602005

# **Prepared for**

Acer Incorporated

8F, 88, Sec. 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, Taiwan

# Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China

Tel.: +86-755-6115 9388 Fax.: +86-755-6115 6599 Website:http://www.ntek.org.cn



Manufacturer's Name.....: Acer Incorporated

Applicant's name .....:

Address....:

Report No.: S20072802602005

# **TEST RESULT CERTIFICATION**

8F, 88, Sec. 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, Taiwan

Acer Incorporated

Address:	8F, 88, Sec. 1, Hsin Tai Wu Rd, Hsichih, Taipei Hsien, Taiwan
Product name:	Tablet
Model and/or type reference:	Acer one 8 T2
Family Model:	N/A
Standards:	FCC CFR 47 Part 22H, Part 27
Test procedure	: ANSI C63.46:2015
	ANSI/TIA-603-E-2016
	been tested by NTEK, and the test results show that the equipment with the FCC requirements. And it is applicable only to the tested
	d except in full, without the written approval of NTEK, this document a, personal only, and shall be noted in the revision of the document.
Date of Test	
Date (s) of performance of tests	28 Jul. 2020 ~ 24 Aug. 2020
Date of Issue	24 Aug. 2020
Test Result	Pass
Testing Engine	eer:
Technical Mar	Justinones
	(Jason Chen)
Authorized Sig	gnatory : Alex
	(Alex Li)

**TABLE OF CONTENTS** 

Report	No ·	S2007	2802	60200!

1. GENERAL INFORMATION	5
1.1 PRODUCT DESCRIPTION	
1.2 RELATED SUBMITTAL(S) / GRANT (S)	6
1.3 TEST METHODOLOGY	
1.4 TEST FACILITY	6
MEASUREMENT UNCERTAINTY	6
1.5 SPECIAL ACCESSORIES	6
1.6 WORST-CASE CONFIGURATION AND MODE	6
1.6 SUMMARY OF TEST RESULTS	7
2. SYSTEM TEST CONFIGURATION	9
2.1 EUT CONFIGURATION	9
2.2 EUT EXERCISE	9
2.3 CONFIGURATION OF EUT SYSTEM	9
2.4 TEST SETUP	
3.TEST AND MEASUREMENT EQUIPMENT	11
4. OUTPUT POWER	13
4.1 OUTPUT POWER MEASUREMENT	13
6. BANDEDGE AND EMISSION MASK	16
7. OUT OF BAND EMISSIONS	17
8. RADIATED MEASUREMENT	19
8.1. RADIATED POWER (ERP & EIRP)	19
8.2 LTE BAND 5	20
8.3 LTE BAND 41	22
9. SPURIOUS RADIATION EMISSION	24
9.3 LTE BAND 5	26
9.4 LTE BAND 41	28
10 EDECLIENCY STABILITY	30



10.3 LTE BAND 5	31
10.4 LTE BAND 41	
11. PEAK-TO-AVERAGE RATIO	35
11.1 Description of the PAR Measurement	
11.2 Measuring Instruments	
11.3 Test Procedures	35
11.4 Test Setup	35



# 1. GENERAL INFORMATION

# 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Tablet				
Trade Mark	Acer				
Model Name	Acer one 8 T2				
Family Model	N/A				
Model Difference	N/A				
FCC ID:	HLZ-ACERONE8T2				
Frequency Bands:	U.S. Bands:				
r requericy barius.					
	LTE FDD Band 5 Uplink: 824MHz-849MHz,				
Frequency Range:	Downlink: 869MHz-894MHz;				
	LTE TDD Band 41 Note2				
Type of Modulation:	QPSK/16QAM				
SIM Card	Only one SIM card				
Antenna:	FPCB Antenna				
Antenna gain:	1.2dBi				
Power Supply:	DC 3.7V, 4000mAh ,14.8Wh from Battery or DC 5V from USB Port				
Adapter:	Model: EE-0501500UZ;Input: 100-240V~50/60Hz;Output: 5V,1500mA				
Extreme Vol. Limits:	DC 3.2V to DC 4.3V (Nominal DC 3.7V) (Note 1)				
HW Version	AL-MT8765-863M-V1.0-17				
SW Version	Acer_one_8_T2_V2.0_08222020				

<sup>\*\*</sup> Note1: The High Voltage 4.3V and Low Voltage 3.2V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

# 2. Frequency Range:

Test Frequency ID	Bandwidth(MHz)	EARFCN	Frequency (UL and DL) (MHz)
	5	40265	2557.5
Low Range	10	40290	2560
Low Range	15	40315	2562.5
	20	40340	2565
Mid Range	5/10/15/20	40740	2605
	5	41215	2652.5
High Range	10	41190	2650
	15	41165	2648.5
	20	41140	2645



#### 1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: HLZ-ACERONE8T2** filing to comply with the FCC Part 22H &27.

#### 1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 27, ANSI C63.26:2015.

#### 1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R.China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.46:2015& ANSI C63.4: 2014.

FCC Registration No.:463705 IC Registration No.:9270A-1, CNAS Registration No.:L5516

#### **MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB

#### 1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

#### 1.6 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has LTE Bands of: Band 5, Band 41

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.





# 1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part27, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03							
FCC Rule	Test Item	Verdict	Remark				
2.1046	Conducted Output Power	PASS					
22.913(d)							
27.50(d)(5)	Peak-to-Average Ratio	PASS					
KDB 971168 D01 Clause 5.7							
2.1049							
22.917(b)	Occupied Bandwidth	PASS					
KDB 971168 D01 Clause 4.2							
2.1051							
22.917(a)	Band Edge	PASS					
27.53(c), (g), (h)	band Edge	PASS					
KDB 971168 D01 Clause 6							
22.913(a)(2)							
27.50(b)(10), (c)(10)	Effective Radiated Power	PASS					
KDB 971168 D01 Clause 5.6							
27.50(h)(2), (d)(4)	Equivalent leatronic Redicted Dower	PASS					
KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS					
2.1053							
22.917(a)	Field Strength of Spurious Radiation	PASS					
27.53(c)(g)(h)(m)	Field Strength of Spurious Nadiation	PASS					
KDB 971168 D01 Clause 7							
2.1055							
22.355	Frequency Stability for Temperature &	PASS					
27.54	Voltage	FAGG					
KDB 971168 D01 Clause 9							
2.1051							
22.917(a)	Conducted Emission	PASS					
27.53(c)(g)(h)(m)	Conducted Lillission	1 700					
KDB 971168 D01 Clause 6							



# Remark:

- 1. "N/A" denotes test is not applicable in this Test Report.
- 2. All test items were verified and recorded according to the standards and without any deviation during the test.
- 3. No modifications are made to the EUT during all test items.



# 2. SYSTEM TEST CONFIGURATION

#### 2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

#### 2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

#### 2.3 CONFIGURATION OF EUT SYSTEM

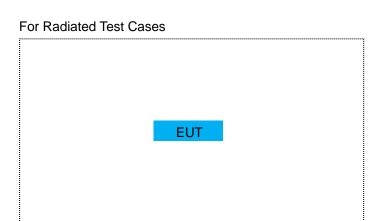
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	Tablet	Acer one 8 T2	FCC ID: HLZ-ACERONE8T2	EUT

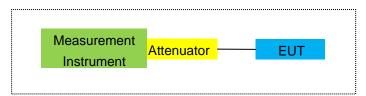
Note: All the accessories have been used during the test. the following "EUT" in setup diagram means EUT system.



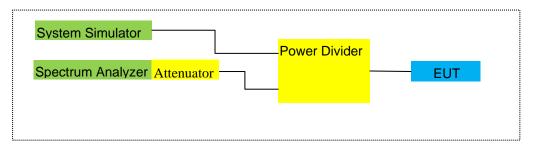
#### 2.4 TEST SETUP



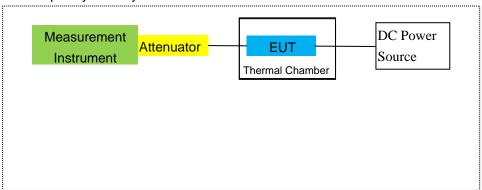
#### For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



# For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

# **3.TEST AND MEASUREMENT EQUIPMENT**

The following test and measurement equipment was utilized for the tests documented in this report:

11101	ollowing test an	ia mododrome	The oquipmon	Wao atmized		1	
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2020.07.13	2021.07.12	1 year
2	Test Receiver	R&S	ESPI	101318	2020.05.11	2021.05.10	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2020.04.11	2021.04.10	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	1 year
5	Horn Antenna	EM	EM-AH-1018 0	2011071402	2020.04.11	2021.04.10	1 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2019.12.10	2020.12.09	1 year
7	Amplifier	EM	EM-30180	060538	2020.07.13	2021.07.12	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2020.05.11	2021.05.10	1 year
9	Power Meter	R&S	NRVS	100696	2020.07.13	2021.07.12	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.0 5	2020.05.11	2021.05.10	1 year
11	Test Cable	N/A	R-01	N/A	2019.08.06	2022.08.05	3 year
12	Test Cable	N/A	R-02	N/A	2020.07.13	2021.07.12	3 year
13	Test Cable	N/A	R-03	N/A	2019.06.28	2022.06.27	3 year
14	Test Receiver	R&S	ESCI	101160	2020.05.11	2021.05.10	1 year
15	LISN	R&S	ENV216	101313	2020.05.11	2021.05.10	1 year
16	LISN	EMCO	3816/2	00042990	2020.05.11	2021.05.10	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2020.05.11	2021.05.10	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2020.04.11	2021.04.10	3 year
19	Test Cable	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
20	Test Cable	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
21	Test Cable	N/A	C03	N/A	2020.05.11	2021.05.10	1 year
22	Attenuator	MCE	24-10-34	BN9258	2020.05.11	2021.05.10	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2020.05.11	2021.05.10	1 year
24	test receiver	R&S	ESCI	a0304218	2020.05.11	2021.05.10	1 year
25	Communication Tester	R&S	CMU200	A0304247	2020.07.13	2021.07.12	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2020.05.11	2021.05.10	1 year



27	DC Power Source	N/A	PS-6005D	2017040292 3	2020.07.13	2021.07.12	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2020.07.13	2021.07.12	1 year
29	Communication Tester	R&S	CMW500	148500	2020.05.11	2021.05.10	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.



# 4. OUTPUT POWER

#### 4.1 OUTPUT POWER MEASUREMENT

#### LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Cha	Channel bandwidth / Transmission bandwidth (RB)							
	1.4								
	MHZ	MHz MHz MHz MHz MHz MHz							
QPSK	> 5	> 4	>8	> 12	> 16	> 18	≤ 1		
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1		
16 QAM	> 5	> 4	>8	> 12	> 16	> 18	≤ 2		

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".3



Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

				-	
Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks ( $N_{ m RB}$ )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
			3	>5	≤ 1
			5	>6	≤ 1
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS 04	6.6.2.2.2	41	5	>6	≤ 1
N3_04	0.0.2.2.2	41	10, 15, 20	See Tab	le 6.2.4-4
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS 07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
N3_07	6.6.3.3.2	13		Table 0.2.4-2	Table 0.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
	66004	21		> 40	≤ 1
NS_09	6.6.3.3.4	21	10, 15	> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23'	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
NS_32	-	-	-	-	-
Note 1: A	pplies to the lower	block of Band 23, i.e	a carrier place	d in the 2000-201	10 MHz region.



# 5. OCCUPIED BANDWIDTH

## RULE PART(S)

FCC: §2.1049

# LIMITS

For reporting purposes only

# 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 the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

# MODES TESTED

LTE Band 5 LTE Band 41

#### **RESULTS**

#### **PASS**



# 6. BANDEDGE AND EMISSION MASK

#### RULE PART(S)

FCC: §2.1051,§22.917(a),§27.53(c)(g)(h)(m)

FCC: §2.1046, §22.913, §24.232

#### **LIMITS**

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 - 775MHz and 793 - 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

#### TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

Set a marker to point the corresponding band edge frequency in each test case.

Set display line

Set resolution bandwidth to at least 1% of emission bandwidth.

#### MODES TESTED

☐ LTE Band 5/41

#### RESULTS



### 7. OUT OF BAND EMISSIONS

#### RULE PART(S)

FCC: §2.1051,§22.917(a), §27.53(c)(g)(h)(m)

#### LIMITS

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 - 775MHz and 793 - 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

#### TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

□ Set display line	
$\hfill \square$ Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement	ent
above 1 GHz.	

#### **MODES TESTED**

☐ LTE Band 5 LTE Band 41



# 7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.



#### 8. RADIATED MEASUREMENT

#### 8.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §22.913(a)(2), and §27.50 (h)(2), (b)(10), (c)(10), (d)(4)

#### LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts. 24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

27.50 (h)(2)Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

#### TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

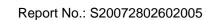
KDB 971168 v02r01 RF power output using broadband peak and average power meter method. KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

#### MODES TESTED

☐ LTE Band 5 LTE Band 41

#### **RESULTS**

**Pass** 





#### 8.2 LTE BAND 5

0.2	LIE B/	טאור ט		Radiated	Power (	ERP) for	Band 5			
					•	Res				
Mode	RB Size/ RB	Freque	SG Level	Cable	Anten na	Corre	Max. ERP	Max. ERP	Polarizati on Of	Conclu
	Posi	ncy	(dBm)	(dBm)	Gain	ction	Averag	Averag	Max. ERP	sion
	tion				(dB)	(-ID)	(dD)	e ()*()		
4 4141		004.7	6.70	2.01	10.60	(dB)	(dBm)	(mW)	Llorizontol	Door
1.4MHz	1/#M	824.7	6.78	2.01	19.68	2.15	22.30	169.92	Horizontal	Pass
Band	id	836.5	5.65	2.01	19.77	2.15	21.26	133.67	Horizontal	Pass
QPSK		848.3	6.65	2.02	19.82	2.15	22.30	169.68	Horizontal	Pass
3.0MHz	1/#M	825.5	6.11	2.01	19.70	2.15	21.65	146.22	Horizontal	Pass
Band	id	836.5	5.80	2.01	19.77	2.15	21.41	138.33	Horizontal	Pass
QPSK		847.5	6.52	2.02	19.81	2.15	22.16	164.53	Horizontal	Pass
5.0MHz	1/#M	826.5	6.16	2.01	19.71	2.15	21.71	148.08	Horizontal	Pass
Band	id	836.5	5.26	2.01	19.77	2.15	20.87	122.28	Horizontal	Pass
QPSK		846.5	6.49	2.02	19.79	2.15	22.11	162.69	Horizontal	Pass
10.0MH	1/#M	829	6.03	2.01	19.73	2.15	21.60	144.48	Horizontal	Pass
z Band	id	836.5	6.02	2.01	19.77	2.15	21.63	145.70	Horizontal	Pass
QPSK		844	5.95	2.02	19.78	2.15	21.56	143.10	Horizontal	Pass
1.4MHz	1/#M	824.7	7.01	2.01	19.68	2.15	22.53	179.11	Vertical	Pass
Band	id	836.5	6.79	2.01	19.77	2.15	22.40	173.96	Vertical	Pass
QPSK		848.3	6.95	2.02	19.82	2.15	22.60	182.11	Vertical	Pass
3.0MHz	1/#M	825.5	6.52	2.01	19.70	2.15	22.06	160.76	Vertical	Pass
Band	id	836.5	6.89	2.01	19.77	2.15	22.50	177.84	Vertical	Pass
QPSK		847.5	6.60	2.02	19.81	2.15	22.24	167.35	Vertical	Pass
5.0MHz	1/#M	826.5	6.13	2.01	19.71	2.15	21.68	147.23	Vertical	Pass
Band	id	836.5	7.14	2.01	19.77	2.15	22.75	188.32	Vertical	Pass
QPSK		846.5	6.31	2.02	19.79	2.15	21.93	155.91	Vertical	Pass
10.0MH	1/#M	829	6.02	2.01	19.73	2.15	21.59	144.31	Vertical	Pass
z Band	id	836.5	6.86	2.01	19.77	2.15	22.47	176.57	Vertical	Pass
QPSK	id	844	7.48	2.02	19.78	2.15	23.09	203.48	Vertical	Pass



				Radiated	Power (	ERP) for	Band 5			
					<u>`</u>	Res	ult			
	RB		SG	Cable	Anten		Max.	Max.	Polarizati	
84 . 1 .	Size/	Freque	Level	Loss	na	Corre	ERP	ERP	on Of	Conclu
Mode	RB	ncy	(dBm)	(dBm)	Gain	ction	Averag	Averag	Max. ERP	sion
	Posi				(dB)		е	е		
	tion					(dB)	(dBm)	(mW)		
1.4MHz	1/#M	824.7	6.77	2.01	19.68	2.15	22.29	169.43	Horizontal	Pass
Band 16		836.5	5.75	2.01	19.77	2.15	21.36	136.77	Horizontal	Pass
QAM	id	848.3	5.46	2.02	19.82	2.15	21.11	129.12	Horizontal	Pass
3.0MHz	1/#M	825.5	5.78	2.01	19.70	2.15	21.32	135.52	Horizontal	Pass
Band 16	id	836.5	5.55	2.01	19.77	2.15	21.16	130.62	Horizontal	Pass
QAM	Id	847.5	5.63	2.02	19.81	2.15	21.27	134.05	Horizontal	Pass
5.0MHz	1/#M	826.5	5.45	2.01	19.71	2.15	21.00	125.82	Horizontal	Pass
Band 16	_	836.5	5.83	2.01	19.77	2.15	21.44	139.43	Horizontal	Pass
QAM	id	846.5	5.57	2.02	19.79	2.15	21.19	131.44	Horizontal	Pass
10.0MH	A /#NA	829	5.43	2.01	19.73	2.15	21.00	125.87	Horizontal	Pass
z Band	1/#M id	836.5	5.86	2.01	19.77	2.15	21.47	140.38	Horizontal	Pass
16 QAM	Id	844	5.64	2.02	19.78	2.15	21.25	133.21	Horizontal	Pass
1.4MHz	4/41/14	824.7	6.17	2.01	19.68	2.15	21.69	147.73	Vertical	Pass
Band 16	1/#M id	836.5	6.24	2.01	19.77	2.15	21.85	153.07	Vertical	Pass
QAM	Iu	848.3	6.23	2.02	19.82	2.15	21.88	154.34	Vertical	Pass
3.0MHz	1/#M	825.5	5.37	2.01	19.70	2.15	20.91	123.25	Vertical	Pass
Band 16	id	836.5	5.31	2.01	19.77	2.15	20.92	123.58	Vertical	Pass
QAM	lu	847.5	6.21	2.02	19.81	2.15	21.85	153.24	Vertical	Pass
5.0MHz	1/#M	826.5	6.39	2.01	19.71	2.15	21.94	156.38	Vertical	Pass
Band 16		836.5	5.02	2.01	19.77	2.15	20.63	115.64	Vertical	Pass
QAM	id	846.5	6.18	2.02	19.79	2.15	21.80	151.49	Vertical	Pass
10.0MH	1/#M	829	6.75	2.01	19.73	2.15	22.32	170.61	Vertical	Pass
z Band	id	836.5	6.13	2.01	19.77	2.15	21.74	149.29	Vertical	Pass
16 QAM	iu	844	5.63	2.02	19.78	2.15	21.24	132.95	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)



# 8.3 LTE BAND 41

			F	Radiated P	ower (EIRP) f	or Band 41			
						Result			
	RB	<b>F</b>	SG	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	0
Mode	Size/RB Position	Frequency	Level	Loss	Gain	Average	Average	Of Max. ERP	Conclusion
	Position		(dBm)	(dBm)	(dB)	(dBm)	(mW)		
5.0MHz		2557.5	0.69	4.54	27.75	22.49	177.487	Horizontal	Pass
Band	1/#Mid	2605	0.46	4.69	27.72	23.49	223.212	Horizontal	Pass
QPSK		2652.5	0.32	4.71	27.71	23.32	214.815	Horizontal	Pass
10.0MHz		2557.5	-0.54	4.54	27.75	22.67	184.725	Horizontal	Pass
Band	1/#Mid	2605	-0.38	4.69	27.72	22.65	184.267	Horizontal	Pass
QPSK		2652.5	-0.77	4.71	27.71	22.23	166.949	Horizontal	Pass
15.0MHz		2560	0.36	4.55	27.76	23.57	227.625	Horizontal	Pass
Band	1/#Mid	2605	0.41	4.69	27.72	23.44	220.617	Horizontal	Pass
QPSK		2650	0.92	4.72	27.7	23.90	245.522	Horizontal	Pass
20.0MHz		2560	-0.72	4.55	27.76	23.9	245.687	Horizontal	Pass
Band	1/#Mid	2605	-0.61	4.69	27.72	22.42	174.401	Horizontal	Pass
QPSK		2650	-0.43	4.72	27.7	22.55	179.708	Horizontal	Pass
5.0MHz		2562.5	0.78	4.55	27.77	24.00	250.910	Vertical	Pass
Band	1/#Mid	2605	0.49	4.69	27.72	23.52	224.949	Vertical	Pass
QPSK		2647.5	0.56	4.72	27.69	23.53	225.242	Vertical	Pass
10.0MHz		2562.5	-0.31	4.55	27.77	22.91	195.505	Vertical	Pass
Band	1/#Mid	2605	-0.10	4.69	27.72	22.93	196.322	Vertical	Pass
QPSK		2647.5	-0.28	4.72	27.69	22.69	185.678	Vertical	Pass
15.0MHz		2565	0.38	4.57	27.78	23.59	228.740	Vertical	Pass
Band	1/#Mid	2605	0.73	4.73	27.72	23.72	235.624	Vertical	Pass
QPSK		2645	1.12	4.75	27.68	23.39	218.273	Vertical	Pass
20.0MHz		2565	0.80	4.57	27.78	24.01	251.768	Vertical	Pass
Band	1/#Mid	2605	0.26	4.73	27.72	23.25	211.349	Vertical	Pass
QPSK		2645	0.46	4.75	27.68	24.05	253.893	Vertical	Pass



	Radiated Power (EIRP) for Band 41										
_						Result					
Mada	RB	F	SG	Cable	Antenna	Max. EIRP	Max. EIRP	Polarization	Camaluaian		
Mode	Size/RB Position	Frequency	Level	Loss	Gain	Average	Average	Of Max.	Conclusion		
	Position		(dBm)	(dBm)	(dB)	(dBm)	(mW)	ERP			
5.0MHz		2557.5	0.23	4.54	27.75	23.44	220.914	Horizontal	Pass		
Band 16	1/#Mid	2605	-0.14	4.69	27.72	22.89	194.394	Horizontal	Pass		
QAM		2652.5	0.48	4.71	27.71	23.48	222.982	Horizontal	Pass		
10.0MHz		2557.5	-0.96	4.54	27.75	22.25	167.837	Horizontal	Pass		
Band 16	1/#Mid	2605	-0.78	4.69	27.72	22.25	167.843	Horizontal	Pass		
QAM		2652.5	-0.59	4.71	27.71	22.41	174.036	Horizontal	Pass		
15.0MHz		2560	-0.03	4.55	27.76	23.18	208.126	Horizontal	Pass		
Band 16	1/#Mid	2605	0.58	4.69	27.72	23.61	229.780	Horizontal	Pass		
QAM		2650	0.35	4.72	27.7	23.33	215.316	Horizontal	Pass		
20.0MHz		2560	-1.11	4.55	27.76	22.10	162.118	Horizontal	Pass		
Band 16	1/#Mid	2605	0.11	4.69	27.72	23.14	205.907	Horizontal	Pass		
QAM		2650	-0.23	4.72	27.7	22.75	188.413	Horizontal	Pass		
5.0MHz		2562.5	0.71	4.55	27.77	23.93	247.321	Vertical	Pass		
Band 16	1/#Mid	2605	0.31	4.69	27.72	23.34	215.777	Vertical	Pass		
QAM		2647.5	0.10	4.72	27.69	23.07	202.554	Vertical	Pass		
10.0MHz		2562.5	-0.86	4.55	27.77	22.36	172.384	Vertical	Pass		
Band 16	1/#Mid	2605	-0.67	4.69	27.72	22.36	172.135	Vertical	Pass		
QAM		2647.5	-0.04	4.72	27.69	22.93	196.384	Vertical	Pass		
15.0MHz		2565	0.88	4.57	27.78	24.09	256.448	Vertical	Pass		
Band 16	1/#Mid	2605	0.48	4.73	27.72	23.47	222.320	Vertical	Pass		
QAM		2645	0.61	4.75	27.68	23.54	226.173	Vertical	Pass		
20.0MHz		2565	0.90	4.57	27.78	24.11	257.632	Vertical	Pass		
Band 16	1/#Mid	2605	0.73	4.73	27.72	23.72	235.505	Vertical	Pass		
QAM		2645	0.51	4.75	27.68	23.44	220.800	Vertical	Pass		

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)



#### 9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1051,§22.917(a), §27.53(c)(g)(h)(m)

#### LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is 55 + log10 (P [Watts]).

The minimum permissible attenuation level of any spurious emission is 43 + log10 (P [Watts]), where P is the transmitter power in Watts.

#### TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.



The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

#### **MODES TESTED**

LTE Band 5 LTE Band 41

#### **RESULTS**

**PASS** 



# 9.3 LTE BAND 5

# **QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)**

TOK EINT TOWERTON ETE BAND 3 (1.4MI)2 BANDWIDTH)											
	Test Results for Low Channel 824.7MHz										
Frequency(MHz)	SG	Cable	Antenna	Absolute	Limit	Margin(dBm)	Polarity				
Frequency(MHZ)	Level(dBm)	Loss(dB)	Gain(dB)	Level(dBm)	(dBm)	Margin(dbin)	1 Glarity				
1649.4	-50.02	2.78	27.50	-25.30	-13	-12.30	Horizontal				
1649.4	-55.20	2.78	27.50	-30.48	-13	-17.48	Vertical				
2474.1	-54.14	2.90	27.80	-29.24	-13	-16.24	Vertical				
2474.1	-52.83	2.90	27.80	-27.93	-13	-14.93	Horizontal				
Test Results For Mid Channel 836.5MHz											
1673	-50.74	2.78	27.48	-26.04	-13	-13.04	Horizontal				
1673	-49.11	2.78	27.48	-24.41	-13	-11.41	Vertical				
2509.5	-51.27	2.91	27.70	-26.48	-13	-13.48	Vertical				
2509.5	-51.30	2.91	27.70	-26.51	-13	-13.51	Horizontal				
		Test Resu	lts for High	n Channel 84	8.3MHz						
1696.6	-51.72	2.78	27.43	-27.07	-13	-14.07	Horizontal				
1696.6	-53.22	2.78	27.43	-28.57	-13	-15.57	Vertical				
2544.9	-49.73	2.92	27.74	-24.91	-13	-11.91	Vertical				
2544.9	-51.65	2.92	27.74	-26.83	-13	-13.83	Horizontal				



# **QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)**

	Test Results for Low Channel 829MHz										
Fraguanov(MHz)	SG	Cable	Antenna	Absolute	Limit	Margin(dBm)	Polarity				
Frequency(MHz)	Level(dBm)	Loss(dB)	Gain(dB)	Level(dBm)	(dBm)	Margin(dbin)	Polatily				
1658	-53.98	2.78	27.50	-29.26	-13	-16.26	Horizontal				
1658	-50.70	2.78	27.50	-25.98	-13	-12.98	Vertical				
2487	-55.15	2.90	27.80	-30.25	-13	-17.25	Vertical				
2487	-52.90	2.90	27.80	-28.00	-13	-15.00	Horizontal				
Test Results for Mid Channel 836.5MHz											
1673	-50.95	2.78	27.48	-26.25	-13	-13.25	Horizontal				
1673	-51.04	2.78	27.48	-26.34	-13	-13.34	Vertical				
2509.5	-54.90	2.91	27.70	-30.11	-13	-17.11	Vertical				
2509.5	-52.15	2.91	27.70	-27.36	-13	-14.36	Horizontal				
		Test Resu	ılts for Hig	h Channel 8	44MHz						
1688	-54.45	2.78	27.43	-29.80	-13	-16.80	Horizontal				
1688	-49.13	2.78	27.43	-24.48	-13	-11.48	Vertical				
2532	-49.76	2.92	27.74	-24.94	-13	-11.94	Vertical				
2532	-51.13	2.92	27.74	-26.31	-13	-13.31	Horizontal				

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : PMea(dBm)-Limit(dBm)

Other emissions are attenuated 20dB below the limit, so it does not recorded.

<sup>.</sup> Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.



# 9.4 LTE BAND 41 QPSK EIRP POWER FOR LTE BAND 41 (5.0MHZ BANDWIDTH)

	Test Results for Low Channel 2502.5MHz											
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity					
5005.0	-63.51	5.23	35.81	-32.93	-25	-7.93	Horizontal					
5005.0	-59.17	5.23	35.81	-28.59	-25	-3.59	Vertical					
7507.5	-59.69	5.67	36.85	-28.51	-25	-3.51	Vertical					
7507.5	-64.39	5.67	36.85	-33.41	-25	-8.21	Horizontal					
196.7	-44.67	1.73	17.97	-28.43	-25	-3.43	Vertical					
266.2	-48.52	1.38	15.11	-34.79	-25	-9.79	Horizontal					
Test Results for Mid Channel 2535MHz												
5070.0	-64.86	5.23	35.82	-34.27	-25	-9.27	Horizontal					
5070.0	-64.78	5.23	35.82	-34.19	-25	-9.19	Vertical					
7605.0	-61.13	5.67	36.85	-29.95	-25	-4.95	Vertical					
7605.0	-62.42	5.67	36.85	-31.24	-25	-6.24	Horizontal					
199.3	-44.12	1.77	16.17	-29.71	-25	-4.71	Vertical					
372.7	-48.36	1.63	15.21	-34.78	-25	-9.78	Horizontal					
		Test Resul	ts for High	Channel 2567	7.5MHz							
5135.0	-62.90	5.24	35.83	-32.31	-25	-7.31	Horizontal					
5135.0	-63.72	5.24	35.83	-33.13	-25	-8.13	Vertical					
7702.5	-64.61	5.68	36.87	-33.42	-25	-8.42	Vertical					
7702.5	-60.68	5.68	36.87	-29.49	-25	-4.49	Horizontal					
188.4	-45.00	1.58	17.56	-29.02	-25	-4.02	Vertical					
258.9	-46.61	1.45	16.58	-31.48	-25	-6.48	Horizontal					



# **QPSK EIRP POWER FOR LTE BAND 12 (5MHZ BANDWIDTH)**

	Test Results for Low Channel 699.7MHz										
Fraguenov(MHz)	SG	Cable	Antenna	Absolute	Limit	Morgin(dPm)	Dolority				
Frequency(MHz)	Level(dBm)	Loss(dB)	Gain(dB)	Level(dBm)	(dBm)	Margin(dBm)	Polarity				
5115	-52.77	2.63	27.26	-28.14	-13	-15.14	Horizontal				
5115	-50.71	2.63	27.26	-26.08	-13	-13.08	Vertical				
7672.5	-53.91	2.67	27.58	-29.00	-13	-16.00	Vertical				
7672.5	-55.80	2.67	27.58	-30.89	-13	-17.89	Horizontal				
Test Results For Mid Channel 707.5MHz											
5210	-44.34	2.62	27.28	-19.68	-13	-6.68	Horizontal				
5210	-48.81	2.62	27.28	-24.15	-13	-11.15	Vertical				
7815	-52.60	2.85	27.62	-27.83	-13	-14.83	Vertical				
7815	-50.16	2.85	27.62	-25.39	-13	-12.39	Horizontal				
		Test Resu	lts for High	Channel 715	.3MHz						
5305	-44.21	2.64	27.28	-19.57	-13	-6.57	Horizontal				
5305	-51.30	2.64	27.28	-26.66	-13	-13.66	Vertical				
7957.5	-51.08	2.85	27.70	-26.23	-13	-13.23	Vertical				
7957.5	-49.47	2.85	27.70	-24.62	-13	-11.62	Horizontal				

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)

Other emissions are attenuated 20dB below the limit, so it does not recorded.

<sup>.</sup> Over Limit= : PMea(dBm)-Limit(dBm)

<sup>.</sup> Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the



#### 10. FREQUENCY STABILITY

## **RULE PART(S)**

FCC: §2.1055, §22.355,§27.54

#### **LIMITS**

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

#### **TEST PROCEDURE**

Use CMW 500 with Frequency Error measurement capability.

- □ Temp. =  $-30^{\circ}$  to  $+50^{\circ}$ C
- □ Voltage =low voltage, DC 3.2V, Normal, DC 3.7V and High voltage, DC 4.3V.

# **Frequency Stability vs Temperature:**

The EUT is place inside a temperature chamber. The temperature is set to -30°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

# Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

#### **MODES TESTED**

П

LTE Band 5

LTE Band 41

#### **RESULTS**

See the following pages.



# 10.3 LTE BAND 5

# QPSK, (10MHz BANDWIDTH)

# Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]			Limit [ppm]					
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)									
3.2	836.5	-0.5	-0.000538	2.5					
3.7	836.5	-3.9	-0.004638	2.5					
4.3	836.5	5.7	0.006802	2.5					

Temperature	Frequency	Frequency*	Frequency	Limit						
[°C]	[MHz]	Error[Hz]	Error[ppm]	[ppm]						
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)										
Normal (25C)	836.5	-1.0	-0.001168	2.5						
Extreme (50C)	836.5	-4.0	-0.004764	2.5						
Extreme (40C)	836.5	-3.0	-0.003572	2.5						
Extreme (30C)	836.5	-2.0	-0.002385	2.5						
Extreme (10C)	836.5	2.5	0.003004	2.5						
Extreme (0C)	836.5	3.6	0.004333	2.5						
Extreme (-10C)	836.5	6.0	0.007116	2.5						
Extreme (-20C)	836.5	-3.2	-0.003835	2.5						
Extreme (-30C)	836.5	-5.7	-0.006764	2.5						



# 16QAM, (10MHz BANDWIDTH)

# Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]	
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)					
3.2	836.5	-1.2	-0.001413	2.5	
3.7	836.5	-4.0	-0.004763	2.5	
4.3	836.5	-5.4	-0.006402	2.5	

Temperature	Frequency	Frequency*	Frequency	Limit
[°C]	[MHz]	Error[Hz]	Error[ppm]	[ppm]
BAI	ND 5 16QAM, (CH 205	25 RB size 50 RB Offs	et 0 10MHz BANDWID	TH)
Normal (25C)	836.5	-2.4	-0.002863	2.5
Extreme (50C)	836.5	-4.8	-0.005696	2.5
Extreme (40C)	836.5	-2.9	-0.003493	2.5
Extreme (30C)	836.5	8.5	0.010117	2.5
Extreme (10C)	836.5	5.4	0.006437	2.5
Extreme (0C)	836.5	4.6	0.005475	2.5
Extreme (-10C)	836.5	-2.9	-0.003509	2.5
Extreme (-20C)	836.5	-3.5	-0.004199	2.5
Extreme (-30C)	836.5	-3.5	-0.004180	2.5

<sup>\*</sup>Note: Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.



# 10.4 LTE BAND 41 QPSK, (20MHz BANDWIDTH

# Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]	
Band 41 QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)					
3.2	728	4.0	0.005495	2.5	
3.7	728	5.9	0.008104	2.5	
4.3	728	-2.4	-0.003297	2.5	

Temperature	Frequency	Frequency*	Frequency	Limit
[°C]	[MHz]	Error[Hz]	Error[ppm]	[ppm]
Ban	d 41 QPSK, (CH 4074	0 RB size 100 RB Offs	set 0 20MHz BANDWII	OTH)
Normal (25C)	2605	-5.5	-0.002111	2.5
Extreme (50C)	2605	-4.4	-0.001689	2.5
Extreme (40C)	2605	-4.6	-0.001766	2.5
Extreme (30C)	2605	3.4	0.001305	2.5
Extreme (10C)	2605	2.5	0.000974	2.5
Extreme (0C)	2605	-6.8	-0.002616	2.5
Extreme (-10C)	2605	-5.3	-0.002035	2.5
Extreme (-20C)	2605	-3.9	-0.001497	2.5
Extreme (-30C)	2605	-2.7	-0.001036	2.5



# 16QAM, (20MHz BANDWIDTH)

# Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]	
Band 41 16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)					
3.2	2605	3.7	0.001420	2.5	
3.7	2605	-4.7	-0.001804	2.5	
4.3	2605	4.4	0.001689	2.5	

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Band	d 41 16QAM, (CH 4074	10 RB size 100 RB Off	set 0 20MHz BANDWI	DTH)
Normal (25C)	2605	-5.6	-0.002150	2.5
Extreme (50C)	2605	-6.3	-0.002418	2.5
Extreme (40C)	2605	-3.8	-0.001459	2.5
Extreme (30C)	2605	-5.6	-0.002150	2.5
Extreme (10C)	2605	4.3	0.001651	2.5
Extreme (0C)	2605	5.5	0.002111	2.5
Extreme (-10C)	2605	6.0	0.002303	2.5
Extreme (-20C)	2605	3.2	0.001228	2.5
Extreme (-30C)	2605	-2.3	-0.000883	2.5

<sup>\*</sup>Note: Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.



# 11. Peak-to-Average Ratio

#### 11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

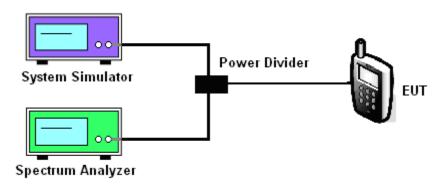
#### 11.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 11.3 Test Procedures

- 1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
- 4. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

#### 11.4 Test Setup



#### **MODES TESTED**

- □ LTE Band 5/41
- ☐ Test data refer see attachement
- ----END OF REPORT----