

FCC Report

Mobile Phone

Product Description: MID

Trade Mark: QUO

Model No.: QD3Gm-710-SL, QD3Gm-710-GD

FCC ID: 2ACDE-QD3GM-710-SL

Applicant: Cubix Latin America, LLC

Address: 2841 NW 107th Ave, Doral, FL 33172

Applicable standards:	FCC CFR Title 47 Part 2: 2013
F1	FCC CFR Title 47 Part22 Subpart H: 2013
	FCC CFR Title 47 Part24 Subpart E: 2013
Test Date:	28 ~ 30 July, 2014
Issued Date:	31 July, 2014
Test Result:	Complied

James Wh

James Wu Laboratory Manager

The test result in this test report relate only to the tested samples in this report .

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2 Version

Version No.	Date	Description
00	31 July, 2014	Original

Prepared By:

Date:

31 July, 2014

Young Li Project Engineer

Date:

31 July, 2014

Check By:

Dixon Hao Reviewer



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4 Test Summary

Test Item	Test Method	Result
Conducted Output Power	Part 2.1046	Pass
Effective Radiated Power	Part22.913(a)(2)	Pass
Equivalent Isotropic Radiated Power	Part 24.232(c)	Pass
	Part 2.1049	
Occupied Bandwidth	Part 22.917 (a)	Pass
	Part 24.238 (a)	
	Part 2.1051	
Spurious Emissions at Antenna Terminal	Part 22.917 (a)	Pass
	Part 24.238 (a)	
	Part 2.1053	
Field Strength of Spurious Radiation	Part 22.917 (a)	Pass
	Part 24.238 (a)	
	Part 2.1051	
Out of band emission, Band Edge	Part 22.917 (a)	Pass
	Part 24.238 (a)	
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Complied: The EUT has complied with the essential requirements in the standard.



5 General Information

5.1 Client Information

5.2

Applicant:	Cubix Latin America, LLC			
Address:	2841 NW 107th Ave, Doral, FL 33172			
Manufacturer:	Cubix Latin America, LLC			
Address:	2841 NW 107th Ave, Doral, FL 33172			
General Descriptio	n of EUT			
Product Name:	MID			
Brand Mark:	QUO			
Model No.:	QD3Gm-710-SL, QD3Gm-710-GD			
Test model No.:	QD3Gm-710-SL			
Software Version:	MG723D(B1-2)			
Hardware Version:	V1.0			
Mobile phone				
Support Networks:	GSM/GPRS/WCDMA			
	GSM850/GPRS 850: 824.2MHz ~ 848.8MHz			
	GSM1900/GPRS 1900: 1850.2MHz ~ 1909.8MHz			
TX Frequency.	WCDMA Band V: 826.4MHz ~ 846.6MHz			
	WCDMA Band II: 1852.4MHz ~ 1907.6MHz			
	GSM850/GPRS850: 869.2MHz ~ 893.8MHz			
PV Frequency:	GSM1900/GPRS1900: 1930.2MHz ~ 1989.8MHz			
KA Flequency.	WCDMA Band V: 871.4MHz ~ 891.6MHz			
	WCDMA Band II: 1932.4MHz ~ 1987.6MHz			
Modulation Type:	GSM/GPRS: GMSK			
	WCDMA/HSPA: QPSK			
Antenna Type:	Integral Antenna			
Antenna Gain:	1dBi			
AC Adapter:	Model: JHD-AP012U-050200AB			
	Input: AC 100~240V 50/60Hz 0.35A			
	Output: DC 5.0V 2.0A			
Power supply:	lithium-ion charge battery 3.7V			



Operation Frequency List:

G	SM 850	PC	PCS1900		A Band V WCDMA Band II		MA Band II
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)	Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
128	824.20	512	1850.20	4132	826.40	9262	1852.40
129	824.40	513	1850.40	4133	826.60	9263	1852.60
:		÷		÷		÷	
189	836.40	660	1879.80	4182	836.40	9399	1879.80
190	836.60	661	1880.00	4183	836.60	9400	1880.00
191	836.80	662	1880.20	4184	836.80	9401	1880.20
÷	:	÷	÷	÷	÷	÷	÷
250	848.60	809	1909.60	4232	846.40	9537	1907.40
251	848.80	810	1909.80	4233	846.6	9538	1907.60

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	GSM 850		PCS1900		WCDMA Band V		WCDMA Band II	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Lowest	128	824.20	512	1850.20	4132	826.40	9262	1852.40
Middle	190	836.60	661	1880.00	4183	836.60	9400	1880.00
Highest	251	848.80	810	1909.80	4233	846.6	9538	1907.60



5.3 Test Mode

Communicate mdoe (GSM 850)	Keep the EUT in communicating mode on GSM 850 Band.
Data mode	Keep the EUT in data communicating mode on GPRS 850 Band.
(GPRS850)	
Communicate mode (RMC 12.2Kbps)	Keep the EUT in communicating mode on WCDMA Band V
Communicate mdoe (PCS1900)	Keep the EUT in communicating mode on PCS1900 Band.
Data mode	Keep the EUT in data communicating mode on GPRS 1900 Band.
(GPRS1900)	
Communicate mode (RMC 12.2Kbps)	Keep the EUT in communicating mode on WCDMA Band II.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS Registration No.: CNAS L5775
- CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

FCC —Registration No.: 600491

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

Industry Canada (IC) —Registration No.: 9079A-2

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China



6 Test Instruments list

Instrument	Manufacturer	Model No.	Inventory No.	Next Cal. Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 27 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 30 2015
BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015
Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015
Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015
Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015
Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 30 2015
Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 30 2015
Pre-amplifier	Pobdo & Schwarz	AFS33-18002	CTS219	lupo 26 2015
(18-26GHz)	Ronue & Schwarz	650-30-8P-44	913216	Julie 20 2015
Band filter	Amindeon	82346	GTS219	Mar. 28 2015
Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 09 2015
Signal Generator	Rohde & Schwarz	SML03	GTS236	May 09 2015
Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 09 2015
D.C. Power Supply	Instek	PS-3030	GTS232	NA
Splitter	Agilent	11636B	GTS237	May 09 2015

Conducted Emission				
Instrument	Manufacturer	Model No.	Inventory No.	Next Cal. Date
Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 06 2015
EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015
10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jun. 30 2015
Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 30 2015
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jun. 30 2015
Coaxial Cable	GTS	N/A	GTS227	Jun. 30 2015
EMI Test Software	AUDIX	E3	N/A	N/A

7 System test configuration

EUT Configuration

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

EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements

Test Procedure

Conducted Emissions

The EUT is placed on a turn table which is 0.8m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15MHz and 30MHz using CISPR Quasi-Peak and Average detector mode

Radiated Emissions

The EUT is placed on a turn table which is 1.0m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003

Configuration of Tested System



Remote Side



Description of test mode

- 1. The EUT has been tested under operating condition.
- 2. EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
- The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for both GSM/PCS with power adaptors, earphone and Data cable. The worst-case H mode for GSM850, PCS1900, WCDMA Band V and WCDMA Band II.



8 Measurement Data and Test Results

8.1 Conducted Emissions

Standard requirement

FCC Part15 C Section 15.207

Test method

ANSI C63.4:2003

Receiver set

RBW=9KHz, VBW=30KHz, Sweep time=auto

Limit

	Limit (dBuV)			
Frequency range (MHZ)	Quasi-peak	Average		
0.15-0.5	66 to 56*	56 to 46*		
0.5-5	56	46		
5-30	60	50		

Test mode

Refer to section 5.3 for details

Test setup



Remark:

EUT: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m

Test mode

- 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
- The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
- 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Test Result

Complied



12

21.946

20.28

0.79

0.22

21.29

50.00 -28.71 Average















Notes:

6

19.635

1. An initial pre-scan was performed on the line and neutral lines with peak detector.

0.51

0.22

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

32.50

60.00 -27.50 QP

3. Final Level =Receiver Read level + LISN Factor + Cable Loss

31.77



8.2 Conducted Output Power

Standard requirement

FCC part22.913(a) and FCC part24.232(b)

- Test method FCC part2.1046
- Limit
 WCDMA Band V: 7W

WCDMA Band II: 2W

Test setup



Note: Measurement setup for testing on Antenna connector

Test Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a spectrum analysis. Transmitter output was read off the CMU200 in dBm.

Test mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data



Band		GSM850			PCS1900		
Channel		128	190	251	512	661	810
Frequ	iency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
	GSM (GMSK 1 uplink)	32.67	32.69	32.75	29.88	29.81	29.74
	GPRS 8 (GMSK 1 uplink)	32.64	32.65	32.68	29.84	29.81	29.77
Conducted power	GPRS 10 (GMSK 2 uplink)	31.59	31.61	31.65	28.84	28.77	28.69
	GPRS 11 (GMSK 3 uplink)	29.81	29.77	29.83	27.28	27.22	27.19
	GPRS 12 (GMSK 4 uplink)	28.44	28.46	28.50	25.85	25.81	25.78

Band		WCDMA Band II			WCDMA Band V			
(Channel	9262	9400	9538	4132	4132 4182 4233		
Freq	uency (MHz)	1852.4	1880	1907.6	826.4	836.6	846.6	
	AMR	21.92	22.43	21.72	21.98	22.51	22.29	
	RMC 12.2kbps	21.96	22.51	21.78	22.07	22.58	22.31	
	HSDPA Subtest-1	21.07	21.28	21.02	21.18	21.26	21.33	
	HSDPA Subtest-2	19.64	19.74	19.58	19.59	19.96	19.83	
	HSDPA Subtest-3	18.48	18.53	18.47	18.32	18.81	18.75	
Conducted	HSDPA Subtest-4	17.83	17.88	17.75	17.89	18.04	18.11	
power	HSUPA Subtest-1	19.04	19.24	19.98	19.34	20.05	18.94	
	HSUPA Subtest-2	20.37	19.89	19.52	19.56	19.92	19.78	
	HSUPA Subtest-3	18.44	18.47	18.40	17.89	18.77	18.69	
	HSUPA Subtest-4	20.99	21.46	20.75	20.01	21.53	21.29	
	HSUPA Subtest-5	18.45	19.32	18.11	18.51	19.29	19.08	



8.3 Occupy Bandwidth

Standard requirement

FCC part22.913(a) and FCC part24.232(b)

Test method FCC part2.1049

Limit N/A

Test setup



Note: Measurement setup for testing on Antenna connector

Test Procedure

- 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
- 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.
- 3. -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 mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data



Report No.: TMC1407018804

Mode	Test channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GSM 850 (GSM link)	128	824.20	242.169	309.076
	190	836.60	243.166	317.829
	251	848.80	245.873	315.211
	128	824.20	246.277	317.248
GSM 850 (GPRS 4 link)	190	836.60	245.408	318.921
(GPRS 4 IIIIK)	251	848.80	245.169	317.086
	512	1850.20	249.738	319.962
PCS 1900 (GSM link)	661	1880.00	249.666	323.733
	810	1909.80	245.815	317.635
	512	1850.20	244.122	316.966
PCS 1900 (GPRS 4 link)	661	1880.00	244.243	323.462
	810	1909.80	247.321	318.046
WCDMA Band V	4132	826.40	4157.80	4695.00
(RMC 12.2Kbps	4183	836.60	4160.80	4711.00
link)	4233	846.60	4166.20	4679.00
WCDMA Band II	9262	1852.4	4147.50	4701.00
(RMC 12.2Kbps	9400	1880.0	4154.50	4730.00
link)	9538	1907.6	4152.10	4725.00



Report No.: TMC1407018804

Mode:

GSM 850 (GSM link)



Lowest channel



Middle channel





GSM 850 (GPRS 4 link)



Lowest channel

🔆 Agilent R	TN	leas Setup
Ch Freq 836.6 MHz Trig F Occupied Bandwidth	ree On	Avg Number 10 <u>Off</u>
	Exp	Avg Mode
Ref 35 dBm Atten 40 dB Peak Log 10	<u>0n</u>	Max Hold Off
dB/ Offst 5		0 cc BW % Pwr 99.00 %
dB	MHz 1.	OBW Span 00000000 MHz
•кез Би 10 кн2 •vби 30 кн2 змеер 9.56 ms (601 р Occupied Bandwidth 0сс ВИ 2 Риг 99.00 2 ИЕ ИЛОРО ЦЦ⊐ к dB -26.00	dB	x dB -26.00 dB
Z43.4002 KHZ Transmit Freq Error -485.447 Hz x dB Bandwidth 318.921 kHz		Optimize Ref Level
Copyright 2000-2009 Agilent Technologies		

Middle channel







Lowest channel



Middle channel





PCS 1900 (GPRS 4 link)



Lowest channel

* Agilent R T	Meas Setup
Ch Freq 1.88 GHz Trig Free Occupied Bandwidth	Avg Number 10 On <u>Off</u>
	Avg Mode Exp Repeat
Ref 35 dBm Atten 40 dB •Peak Log • • • • • • • • • • • • • • • • • • •	Max Hold On Off
dB/ Offst 5	Occ BW % Pwr 99.00 %
dBCenter 1.880 000 0 GHzSpan 1 MHz	OBW Span 1.00000000 MHz
Сссиріеd Bandwidth Ссс вн % Риг 99.00 % 2/4 2/29 кн х св % 48 -26.00 dB	x dB –26.00 dB
Transmit Freq Error –346.679 Hz x dB Bandwidth 323.462 kHz	Optimize Ref Level
Copyright 2000–2009 Agilent Technologies	

Middle channel





WCDMA Band V (RMC 12.2Kbps link)

🔆 Agilent R	L Meas Setup
Ch Freq 826.4 MHz Trig Occupied Bandwidth	Free Avg Number 0n 0ff
	Avg Mode Exp Repeat
Ref 35 dbm Htten 40 db #Peak Log 10	0n Max Hold
dB/ Offst 5	Occ BW % Pwr 99.00 %
Center 826.400 MHz Span 1 •Res BW 100 kHz •VBW 300 kHz Sweep 1 ms (601	0BW Span 0 MHz pts)
Occupied Bandwidth Occ BM % Pwr 99. 4.1578 MHz × dB -26.0	00 %
Transmit Freq Error 2.223 kHz x dB Bandwidth 4.695 MHz	Optimize RefLevel
Convergent 2000-2009 Bailent Lechnologies	

Lowest channel



Middle channel





WCDMA Band II (RMC 12.2Kbps link)



Lowest channel

🔆 Agilent	RL	Meas Setup
Ch Freq 1.88 GHz Occupied Bandwidth	Trig Free	Avg Number 10 On <u>Off</u>
		Avg Mode Exp Repeat
Ref 36 dBm Atten 40 dB		Max Hold On Off
dB/ offst 6 → 0	< <	0cc BW % Pwr 99.00 %
dB	Span 10 MHz	OBW Span 10.0000000 MHz
Occupied Bandwidth 4 1545 MHz	Осс ВИ % Риг 99.00 % х dB -26.00 dB	x dB -26.00 dB
Transmit Freq Error -2.278 kHz x dB Bandwidth 4.730 MHz		Optimize Ref Level
Copyright 2000-2009 Agilent Technologie	S	

Middle channel





8.4 Modulation characteristic

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.



8.5 Out of band emission at antenna terminals

Standard requirement

FCC part22.917(a) and FCC part24.238(a)

- Test method FCC part2.1051
- Limit

-13dBm

Test setup



Note: Measurement setup for testing on Antenna connector

Test Procedure

- 1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
- 2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
- 3. For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic.
- 4. Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

Test mode

Refer to section 5.3 for details

Test Result

Complied





30MHz~1GHz

1GHz~9GHz





30MHz~1GHz

1GHz~9GHz





30MHz~1GHz

ologies

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Test item:

Spurious emission



WCDMA Band V (RMC 12.2Kbps link)



Lowest channel

Peak Search RL





Test channel:













1GHz~9GHz

Middle channel



Test item:

Spurious emission



🔆 Agilent

Ref Ø dBm ∎Pea

dB, Nffst

ĀR

13.0

aÂv

f(f)

Tur

wp

Start 1.000 GHz #Res BW 1 MHz

Lowest channel

WCDMA Band II (RMC 12.2Kbps link)

RL

Mkr1 1.653 GHz -63.24 dBm

Stop 9.000 GHz Sweep 13.36 ms (601 pts)

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Min Search

Pk-Pk Search

Mkr → CF

More 1 of 2



Copyright 2000-2009 Agilent Technologies

≢VBW 3 MHz

Atten 10 dB



Copyright 2000-2009 Agilent Technologies

30.0 MHz

Res BW 100 kHz





1GHz~9GHz







#VBW 300 kHz

Stop 1.000 0 GHz 92.72 ms (601 pts)





Next Peak

Next Pk Right

Next Pk Left

Min Search

Mkr→CF

More 1 of 2





Lowest channel





Lowest channel





Lowest channel



8.6 ERP, EIRP Measurement

Standard requirement

FCC part22.913(a) and FCC part24.232(b)

Test method FCC part2.1046

Limit

GSM850 / WCDMA Band V: 7W ERP PCS1900 / WCDMA Band II: 2W EIRP

Test setup

Below 1GHz



Above 1GHz



Substituted method:





Test Procedure

- 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
- 2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
- 3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

Test mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data



GSM850 / GPRS850 Band						
Channel	Mode	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
Lowest			V	32.96		
		П	Н	29.97		
	GSM850	Γ4	V	24.74		
	(GSM link)	El	Н	30.40	38.45	Pass
824.2MHz		F 0	V	24.06		
		E2	Н	28.28		
	GSM850 (GPRS 4 link)	Н	V	28.79		
			V	32.29		Pass
	GSM850 (GSM link)	н	Н	30.43	38.45	
		E1	V	25.31		
Middle			Н	31.01		
836.6MHz		E2	V	25.87		
			Н	29.01		
	GSM850 (GPRS 4 link)	Н	V	28.12		
		Ц	V	32.68		
		П	Н	30.05		
	GSM850	Γ4	V	25.12	00.45	5
Highest	(GSM link)	El	Н	29.77	38.45	Pass
848.8MHz			V	23.67	1	
		EZ	Н	28.18		
	GSM850 (GPRS 4 link)	Н	V	27.96	38.45	Pass



PCS1900 / GPRS1900 Band						
Channel	Mode	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
		Ц	V	29.10		
		П	Н	26.42		
	PCS1900	⊏1	V	21.73		
Lowest	(GSM link)		Н	26.81	33.01	Pass
1850.2MHz		ED	V	21.12		
		E2	Н	24.90		
	PCS1900 (GPRS 4 link)	Н	V	26.93		
		Ц	V	29.45		Pass
	PCS1900 (GSM link)	11	Н	26.88	33.01	
		E1	V	22.30		
Middle			Н	27.41		
1880MHz		E2	V	22.80		
			Н	25.61		
	PCS1900 (GPRS 4 link)	Н	V	26.24		
		Ц	V	29.90		
			Н	26.64		
	PCS1900	⊏1	V	22.23		
Highest	(GSM link)		Н	26.39	33.01	Pass
1909.8MHz		EQ	V	20.93		
		E2	Н	29.01		
	PCS1900 (GPRS 4 link)	Н	V	25.27		



WCDMA Band V Band						
Channel	Mode	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
Lowest			V	25.06		
		н	Н	24.15		
	WCDMA		V	20.80		_
826.4MHz	Band V	El	Н	24.42	38.45	Pass
		F 0	V	20.37		
		E2	Н	23.07		
	WCDMA Band V		V	25.33	38.45	Pass
		Н	Н	24.58		
Middle		WCDMA Band V E1	V	21.31		
836.6MHz			Н	24.95		
		E2	V	21.66		
			Н	23.67		
			V	25.39		
		Н	Н	22.95		
Highest	WCDMA		V	19.79		
846.6MHz	Band V	E1	Н	22.77	- 38.45 - -	Pass
		E2	V	18.87		
			Н	22.39		



WCDMA Band II Band						
Channel	Mode	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest 1852.4MHz			V	23.39		
		П	Н	21.84		
	WCDMA	Γ.	V	20.47		_
	Band II	El	Н	22.96	33.01	Pass
		F 0	V	21.31		
		E2	Н	22.52		
Middle	WCDMA Band II		V	23.74	33.01	Pass
		H	Н	21.38		
		WCDMA Band II E1	V	20.18		
1880MHz			Н	22.84		
		E2	V	20.66		
			Н	22.82		
			V	23.79		
		Н	Н	21.25		
Highest	WCDMA	= /	V	19.94		_
1907.6MHz	Band II	E1	Н	21.57	- 33.01 - -	Pass
			V	18.87		
		E2	Н	21.36		



8.7 Field strength of spurious radiation measurement

Standard requirement

FCC part22.917(a) and FCC part24.238(a)

Test method FCC part2.1053

🖉 Limit

-13dBm

Test setup

Below 1GHz



Above 1GHz



Substituted method:





Test Procedure

- 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
- 2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
- 3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

Test mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data



Test mode:	GSM	1850	Test channel:	Lowest	
	Spurious	Emission			
Frequency (MHZ)	Polarization	Level (dBm)	Limit (dBm)	Result	
1648.40	Vertical	-35.29			
2472.60	V	-38.06			
3296.80	V	-40.35	-13.00	Pass	
4121.00	V	-42.52			
4945.20	V				
1648.40	Horizontal	-40.58			
2472.60	Н	-44.49			
3296.80	Н	-46.09	-13.00	Pass	
4121.00	Н	-48.86			
4945.20	Н				
Test mode:	GSN	1850	Test channel:	Middle	
Fraguanay (MHz)	Spurious	Spurious Emission		Popult	
	Polarization	Level (dBm)	Limit (dBm)	Result	
1673.20	Vertical	-36.78			
2509.80	V	-39.08			
3346.40	V	-41.00	-13.00	Pass	
4183.00	V	-42.81			
5019.60	V				
1673.20	Horizontal	-41.19			
2509.80	Н	-44.45		Pass	
3346.40	Н	-45.78	-13.00		
4183.00	Н	-48.09			
5019.60	Н				
Test mode:	GSN	1850	Test channel:	Highest	
Fraguanay (MHz)	Spurious	Emission	Limit (dPm)	Popult	
	Polarization	Level (dBm)		Result	
1697.60	Vertical	-37.11			
2546.40	V	-39.16			
3395.20	V	-40.85	-13.00	Pass	
4244.00	V	-42.47			
5092.80	V				
1697.60	Horizontal	-41.03			
2546.40	Н	-43.93			
3395.20	Н	-45.11	-13.00	Pass	
4244.00	Н	-47.16			
5092.80	Н		7		

Remark :

1. The emission behaviour belongs to narrowband spurious emission.

2. Remark"---" means that the emission level is too low to be measured



Test mode:	PCS1900		Test channel:	Lowest	
	Spurious Emission			Desult	
Frequency (MHZ)	Polarization	Level (dBm)	Limit (dBm)	Result	
3700.40	Vertical	-36.01			
5550.60	V	-38.43			
7400.80	V	-40.45	-13.00	Pass	
9251.00	V	-42.36			
11101.20	V				
3700.40	Horizontal	-40.66			
5550.60	Н	-44.10			
7400.80	Н	-45.49	-13.00	Pass	
9251.00	Н	-47.93			
11101.20	Н				
Test mode:	PCS	1900	Test channel:	Middle	
Frequency (MHz)	Spurious	Emission	Limit (dBm)	Popult	
	Polarization	Level (dBm)		Result	
3760.00	Vertical	-33.17			
5640.00	V	-35.70			
7520.00	V	-37.81	-13.00	Pass	
9400.00	V	-39.80			
11280.00	V				
3760.00	Horizontal	-38.02			
5640.00	Н	-41.59		Pass	
7520.00	Н	-43.08	-13.00		
9400.00	Н	-45.63			
11280.00	Н				
Test mode:	PCS	1900	Test channel:	Highest	
Frequency (MHz)	Spurious	Emission	Limit (dBm)	Result	
	Polarization	Level (dBm)	Linit (dbh)	Result	
3819.60	Vertical	-34.63			
5729.40	V	-37.07			
7639.20	V	-39.11	-13.00	Pass	
9549.00	V	-41.03			
11458.80	V				
3819.60	Horizontal	-39.31			
5729.40	Н	-42.77			
7639.20	Н	-44.19	-13.00	Pass	
9549.00	Н	-46.65			
11458.80	Н		7		

Remark :

1. The emission behaviour belongs to narrowband spurious emission.

2. Remark"---" means that the emission level is too low to be measured



Test mode:	WCDMA Band V		Test channel:	Lowest	
F (111)	Spurious Emission			-	
Frequency (MHZ)	Polarization	Level (dBm)	Limit (dBm)	Kesult	
1652.80	Vertical	-39.73			
2479.20	V	-42.77			
3305.60	V	-45.27	-13.00	Pass	
4132.00	V	-47.71			
4958.40	V				
1652.80	Horizontal	-45.57			
2479.20	Н	-49.87			
3305.60	Н	-51.59	-13.00	Pass	
4132.00	Н	-54.60			
4958.40	Н				
Test mode:	WCDMA	Band V	Test channel:	Middle	
	Spurious	Emission	Limit (dDm)	Result	
Frequency (MHZ)	Polarization	Level (dBm)	Limit (dBm)		
1672.80	Vertical	-40.31			
2509.20	V	-43.20		Pass	
3345.60	V	-45.57	-13.00		
4182.00	V	-47.89			
5018.40	V				
1672.80	Horizontal	-45.86			
2509.20	Н	-49.95		Pass	
3345.60	Н	-51.58	-13.00		
4182.00	Н	-54.44			
5018.40	Н				
Test mode:	WCDMA	Band V	Test channel:	Highest	
	Spurious	Spurious Emission		Deput	
	Polarization	Level (dBm)	Limit (dbm)	Kesult	
1693.20	Vertical	-39.42			
2539.80	V	-42.12		Pass	
3386.40	V	-44.33	-13.00		
4233.00	V	-46.50			
5079.60	V				
1693.20	Horizontal	-44.60			
2539.80	Н	-48.42			
3386.40	Н	-49.94	-13.00	Pass	
4233.00	Н	-52.61			
5079.60	Н				

Remark :

1. The emission behaviour belongs to narrowband spurious emission.

2. Remark"---" means that the emission level is too low to be measured



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Test mode:	WCDMA Band II		Test channel:	Lowest	
	Spurious Emission		Linsit (dDns)		
Frequency (MHZ)	Polarization	Level (dBm)	Limit (dBm)	Kesuit	
3704.80	Vertical	-39.73			
5557.20	V	-42.77			
7409.60	V	-45.27	-13.00	Pass	
9262.00	V	-47.71			
11114.40	V				
3704.80	Horizontal	-45.57			
5557.20	Н	-49.87			
7409.60	Н	-51.59	-13.00	Pass	
9262.00	Н	-54.60			
11114.40	Н				
Test mode:	WCDMA	Band II	Test channel:	Middle	
	Spurious	Spurious Emission		Deput	
	Polarization	Level (dBm)	Limit (abm)	Result	
3760.00	Vertical	-40.31			
5640.00	V	-43.20		Pass	
7520.00	V	-45.57	-13.00		
9400.00	V	-47.89			
11280.00	V				
3760.00	Horizontal	-45.86			
5640.00	Н	-49.95		Pass	
7520.00	Н	-51.58	-13.00		
9400.00	Н	-54.44			
11280.00	Н				
Test mode:	WCDMA	Band II	Test channel:	Highest	
Fraguanay (MHz)	Spurious	Spurious Emission		Popult	
	Polarization	Level (dBm)		Result	
3815.20	Vertical	-39.42			
5722.80	V	-42.12		Pass	
7630.40	V	-44.33	-13.00		
9538.00	V	-46.50			
11445.60	V				
3815.20	Horizontal	-44.60			
5722.80	Н	-48.42			
7630.40	Н	-49.94	-13.00	Pass	
9538.00	Н	-52.61			
11445.60	H				

Remark :

1. The emission behaviour belongs to narrowband spurious emission.

2. Remark"----" means that the emission level is too low to be measured



8.8 Frequency stability V.S. Temperature measurement

- Standard requirement FCC Part2.1055(a)(1)(b)
- Test method FCC Part2.1055(a)(1)(b)
- Limit
 2.5ppm
- Test setup



Note : Measurement setup for testing on Antenna connector

Test Procedure

- 1. The equipment under test was connected to an external DC power supply and input rated voltage.
- 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
- 3. The EUT was placed inside the temperature chamber.
- 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
- 5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
- 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Test mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data



Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz						
Power supplied ()/do)	Temperature (°C)	Frequency error		Limit (nom)	Deput	
Power supplied (Vdc)	remperature (C)	Hz	ppm	Limit (ppm)	Result	
	-30	25	0.0295		Pass	
	-20	28	0.0332			
	-10	24	0.0284			
	0	20	0.0244			
3.70	10	23	0.0273	2.5		
	20	20	0.0234			
	30	32	0.0385			
	40	29	0.0346			
	50	28	0.0332			
Reference	e Frequency: GSM850) (GPRS 4 link) Mi	ddle channel=190	channel=836.6M	Hz	
Power supplied (V/dc)	Temperature (℃)	Frequency error		Limit (ppm)	Result	
	remperature (C)	Hz	ppm	сппп (ррпп)	Result	
3.70	-30	21	0.0247	2.5	Pass	
	-20	23	0.0281			
	-10	20	0.0238			
	0	18	0.0210			
	10	19	0.0231			
	20	17	0.0204			
	30	28	0.0331			
	40	24	0.0292			
	50	23	0.0277			



Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Power supplied ()/do)	Temperature (℃)	Frequency error		Limit (nom)	Deput
Power supplied (Vdc)		Hz	ppm	Limit (ppm)	Result
	-30	35	0.0189		Pass
	-20	41	0.0220		
	-10	35	0.0185		
	0	30	0.0158		
3.70	10	35	0.0188	2.5	
	20	31	0.0164		
	30	48	0.0254		
	40	42	0.0225		
	50	42	0.0221		
Reference	e Frequency: PCS190	0 (GPRS 4 link) Mi	ddle channel=661	channel=1880M	Hz
Power supplied (V/dc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
Power supplied (vdc)	Temperature (C)	Hz	ppm	Linit (ppin)	Result
	-30	34	0.0179	2.5	Pass
	-20	39	0.0210		
3.70	-10	32	0.0172		
	0	27	0.0142		
	10	33	0.0173		
	20	27	0.0146		
	30	44	0.0234		
	40	37	0.0197		
			0.0137		



Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz					
Power supplied ()/do)	Temperature (°C)	Frequency error		Limit (nom)	Deput
Power supplied (vdc)	remperature (C)	Hz	ppm	Limit (ppm)	Result
	-30	32	0.0384		Pass
	-20	28	0.0340		
	-10	24	0.0291		
	0	23	0.0271		
3.70	10	21	0.0247	2.5	
	20	18	0.0212		
	30	23	0.0271		
	40	26	0.0306		
	50	24	0.0291		
Referer	nce Frequency: WCDM	MA Band II Middle	channel=9400 cha	annel=1880.0MHz	-
Power supplied (V/de)	Temperature (°C)	Frequency error		Limit (ppm)	Result
Power supplied (vdc)	remperature (C)	Hz	ppm	сили (ррп)	Result
3.70	-30	86	0.0456		
	-20	77	0.0410	2.5	Pass
	-10	67	0.0354		
	0	63	0.0335		
	10	58	0.0307		
	20	51	0.0270		
	30	63	0.0335		
	40	70	0.0372		



8.9 Frequency stability V.S. Voltage measurement

- Standard requirement FCC Part2.1055(d)(1)(2)
- Test method
 FCC Part2.1055(d)(1)(2)
- Limit
 2.5ppm
- Test setup



Note: Measurement setup for testing on Antenna connector

Test Procedure

- 1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
- 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
- 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

Test mode

Refer to section 5.3 for details

Test Result

Complied

Measurement Data

Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz						
Temperature (℃)	Power supplied	Frequency error		Limit (ppm)	Result	
	(Vdc)	Hz	ppm	,		
	4.25	16	0.0187	_		
25	3.70	18	0.0212	2.5	Pass	
	3.40	20	0.0235			
Reference	e Frequency: GSM850) (GPRS 4 link) Mi	ddle channel=19	0 channel=836.6M	Hz	
Temperature (°C)	Power supplied	Frequer	Frequency error		Result	
	(VdC)	Hz	ppm	,		
	4.25	25	0.0298	_		
25	3.70	19	0.0226	2.5	Pass	
	3.40	21	0.0248			
Referen	ce Frequency: PCS19	00 (GSM link) Mid	dle channel=661	channel=1880MH	z	
Temperature (°0)	Power supplied	Frequer	ncy error	Limit (ppm)	Result	
	(Vdc)	Hz	ppm	(pp)	litooun	
	4.25	26	0.0141	2.5	Pass	
25	3.70	31	0.0164			
	3.40	31	0.0164			
Reference	Frequency: PCS190	0 (GPRS 4 link) Mi	ddle channel=66	1 channel=1880M	Hz	
Temperature (°O	Power supplied	Frequency error		Limit (ppm)	Result	
	(Vdc)	Hz	ppm		Result	
	4.25	42	0.0222	_		
25	3.70	32	0.0168	2.5	Pass	
	3.40	34	0.0179			
Referei	nce Frequency: WCD	MA Band V Middle	channel=4183 c	hannel=836.6MHz		
Temperature (°0	Power supplied	Frequency error		Limit (ppm)	Result	
	(Vdc)	Hz	ppm		Result	
	4.25	24	0.0286			
25	3.70	21	0.0251	2.5	Pass	
	3.40	23	0.0271			
Reference Frequency: WCDMA Band II Middle channel=940 channel=1880.0MHz						
Temperature (°C)	Power supplied	Frequer	ncy error	Limit (ppm)	Result	
	(Vdc)	Hz	ppm		Rooun	
	4.25	51	0.0271	_		
25	3.70	44	0.0231	2.5	Pass	
	3.40	48	0.0255			



9 Test Setup Photo

Conducted emissions:



Radiated emissions:







10 EUT Constructional Details

Reference to the test report No.: TMC1407018801

-----End-----