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Report: 08CA48859-FCCP24-A1
Date: Nov. 15, 2011
Model: XT DUAL

FCC Test Report

Satellite/GSM Mobile Hand Held Terminal Model : XT DUAL

For

Asia Pacific Satellite Industries Co., Ltd.

**9FL, Lotte IT Castle 2-Dong,
#550-1, Gasan-Dong, GeumCheon-Gu,
Seoul, Korea, 153-768**

UL Korea Ltd.

33rd Fl. GFC Tower, 737 Yeoksam-Dong, Gangnam-Gu, Seoul, 135-984, Korea

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Annex 1. Test Plots

Annex 2. Test Setup Photos

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Test Report Details :

Tests Performed By:	UL Korea Ltd. 33 rd FL. Star Tower 737 Yeoksam-dong, Kangnam-ku, Seoul, 135-984, Korea
Test Site:	Chungbuk Technopark EMC Center 685-3 Yangcheong-ri, Ochang-eub, Cheongwon-kun, Chungbuk-province, Republic of Korea. FCC Registration No. : 94696
Tests Performed For:	Asia Pacific Satellite Industries Co., Ltd. 9FL, Lotte IT Castle 2-Dong, #550-1, Gasan-Dong, Geumcheon-Gu, Seoul, Korea, 153-768
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Test Report Number:	08CA48859-FCCP24-A1
Test Report Date:	Nov.25, 2009
Equipment Class:	TNE - Licensed Non-Broadcast Transmitter Held to Ear
Product Type:	Sat/GSM Mobile Hand Held Terminal
Model Number:	XT DUAL
FCC ID:	TZ5XT DUAL
Test standards	47 CFR Part 2, Part 24 Subpart E Broadband PCS
Sample Serial Number:	Prototype
Sample Receive Date:	2008-10-04
Testing Start Date:	2008-11-25
Date Testing Complete:	2009-04-02
Test Report Reissue Date:	2011-11-15
Overall Results:	Complied

UL Korea as an affiliate of Underwriters Laboratories Inc. EMC report apply only to the specific test samples and test results submitted for UL's review. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL Korea Ltd. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or any agency of the National Authorities. This report may contain test results that are not covered by the NVLAP or KOLAS accreditation.

Summary of Testing:

The following tests were performed on a sample submitted for evaluation of compliance with 47 CFR Part 22 Subpart H and Part 15 Subpart B.

Test #	Test Name Test Requirement/Specification	Compliant	Not Compliant	See Remark
1	RF Power Output - § 2.1046, § 24.232(b)	X		
2	Occupied Bandwidth - § 2.1049(i)	X		
3	Spurious Emission at antenna terminal - § 2.1051, § 24.238(a)	X		
4	Radiated Spurious Emission - § 2.1053, § 24.238(a)	X		
5	Frequency Stability - § 2.1055, § 24.235	X		
6	Band Edge - § 24.238(a)	X		

Remarks:

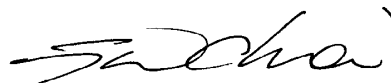
Modifications to EUT required for compliance: NONE.

Conclusion:

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL Korea Ltd. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.



Tested by
Sung Hoon Baek, Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.



Reviewed by
Jeawoon, Choi, Senior Project Engineer
Conformity Assessment Services – 3014ASEO
UL Korea Ltd.

1. G E N E R A L - Product Description

1.1 Equipment Description

XT DUAL is the **Satellite/GSM Mobile Hand Held Terminal** for Thuraya satellite mobile communication service based on GMR-1 and GMPRS-1.

Details of Test Equipment (EUT)

- Equipment Type : Sat/GSM Mobile Hand Held Terminal
- Model No. : XT DUAL
- Trade name : Thuraya
- Type of test Equipment : Portable Equipment
- Operating characteristic : MES(Mobile Earth Station) used in the Satellite Communication Services
- Manufacturer : Asia Pacific Satellite Industries Co., Ltd.
9FL, Lotte IT Castle 2-Dong, #550-1,
Gasam-dong, Geumcheon-gu, Seoul, Korea, 153-768

- Equipment Configuration

The EUT is consisted of the following component provided by the manufacturer.

No.	Product Type	Manufacturer	Model	Comments
1	Satellite Mobile Terminal	Asia Pacific Satellite Industries Co., Ltd.	XT DUAL	EUT
2	Travel Charger	Phihong Technology Co Ltd.	PSC11R-050	EUT
3	Ear Set	Cresylin	EMB-ATS 106TKA	EUT

2.1 Technical Data

- Frequency Ranges : GSM 1900 Transmitter 1850.2 – 1909.8 MHz
- Emission Designation : 250KGXW
- Number of Channel : 300 (PCS1900)
- Output power : Max. 30.0 dBm (Peak) Power Class 1 (1W)
- Kind of modulation (s) : GMSK
- Kind of base-band signal : Voice & Data
- Antenna : Integral
- Working temperature : -20°C ~ 60°C
- Supply Voltage : Battery 3.7 V, 2520mAh
- Charger Power Rating : Input 100 - 240 Vac, 50/60 Hz, 0.3A Output 5-12 Vdc, 2 - 0.71 A

Note ;

1. All the technical data described above were provided by the manufacturer.

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3.1 Equipment Type :

- ☐ Radio and ancillary equipment for fixed or semi-fixed use
☐ Radio and ancillary equipment for vehicular mounted use
☒ Radio and ancillary equipment for portable or handheld use
- ☒ Stand alone ☐ Host connected ☐ Host connected
- ☒ Self contained single unit ☐ Module with associated connection or interface

4.1 FCC ID Label Info

Equipment Marking Plate



2. Test Conditions

2.1 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	Satellite Phone	Asia Pacific Satellite Industries Co., Ltd.	XT DUAL	
EUT	AC Adapter	Phihong Technology Co Ltd.	PSC11R-050	
SIM	Universal Radio Communication tester	National Instruments	CMU200	GSM Signal generator

2.2 Input/Output Ports

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	-	-	-	Non-metal enclosure
1	DC Input port	DC	< 3m	Unshield	Connected to Charger
2	Ear set	I/O	< 3m	Unshield	Connected to Mono Ear set

Note:

- AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
- I/O = Signal Input or Output Port (Not Involved in Process Control)
- All the interface cables and Power Cable have been provided by the manufacturer
- UDC port is not user interface port for data download purpose only.

2.3 Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	3.7 V	-	-	DC	-	Internal Battery Rating
1	3.7 V	-	-	DC	-	Normal operating voltage
2	3.5 V	-	-	DC	-	Battery End Point
3	4.2 V	-	-	DC	-	Battery Full charged voltage

Note

- For Input voltage change, dummy battery pack which was connected to external dc power supply was used.

2.4 EUT Operating Mode and Frequencies

Mode #	Description
1	GSM 1900 : 3 frequencies (Low, Mid, High channels) for assigned frequency band -. Bottom channel : 1850.2 MHz -. Mid channel : 1880.2 MHz -. Top channel : 1909.8 MHz

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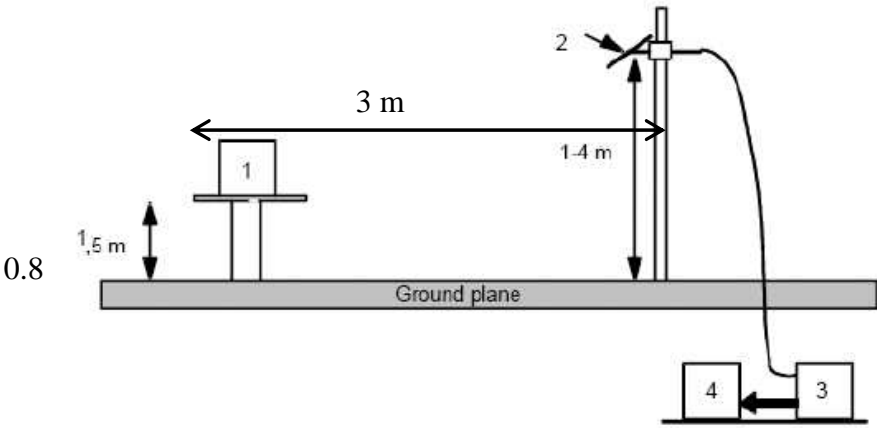
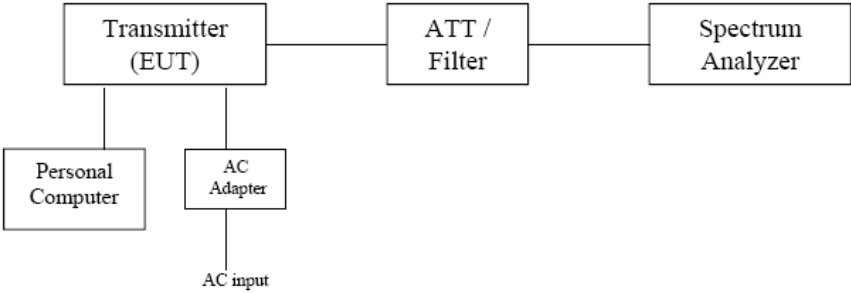
2.5 Test Signal Source

The carrier from the signal generator applied to the repeater was standard signal.

GSM

- . Data format : Pattern , Bits/Symbol :1, Data : PN23
- . Modulation Type : MSK, Sym rate : 270.833333 kSPS
- . GSM : Standard
- . Filter : 0.3 Gaussian
- . I/Q Scaling : 100%

2.6 EUT Configurations

Mode #	Description
1	<div><p>The diagram shows a test setup on a 'Ground plane'. A box labeled '1' (equipment under test) is on a stand 1.5 m high. A horizontal distance of 3 m is marked between the equipment and a vertical antenna labeled '2'. The antenna is 1.4 m high. A cable connects the antenna to a box labeled '3' (high pass filter or spectrum analyzer), which is connected to a box labeled '4' (spectrum analyzer or measuring receiver).</p></div> <p>1) equipment under test; 2) test antenna; 3) high pass filter (if necessary); 4) spectrum analyser or measuring receiver.</p> <p>Test Configuration of Radiated Measurement</p>
2	<div><p>The diagram shows a block diagram of a conducted measurement setup. A 'Transmitter (EUT)' is connected to an 'ATT / Filter', which is connected to a 'Spectrum Analyzer'. The 'Transmitter (EUT)' is also connected to a 'Personal Computer' and an 'AC Adapter'. The 'AC Adapter' is connected to an 'AC input'.</p></div> <p>Test Configuration of Conducted Measurement</p>

2.7 Test Lab Environmental Condition

Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C
	Relative Humidity	10 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	20 °C
	Relative Humidity	40 %

2.8 Test Specifications

Standard Number	Standard Name	Standard Date
CFR 47 Part 24 Subpart E	Personal Communications Services – Broadband PCS	2008
ANSI C63.4-2003	Methods of Measurements of Radio-Noise Emission from Low voltage and electrical equipment in the range of 9kHz~40GHz	2003
EIA/TIA-603 Edition C 2004	Land Mobile FM or PM communication equipment measurement and performance standards	2004

2.9 Test Laboratory Details

All the testing has been performed by UL Korea engineer at both test laboratories described below. The radiated spurious emission measurements were performed in a 10 meter open site which has been filed to the commission in accordance with section 2.948 at Chungbuk Technopark EMC Center.

Persons who have been presented during the test : Wonjae-Jung / Senior Engineer from APSI.

Measurement Uncertainties

Test	Uncertainty
Radiated Emissions	± 2.93 [dB], k=2 (Trust level 95%)
Conducted Emissions	± 2.93 [dB], k=2 (Trust level 95%)

3. Overview of Technical requirements

The following test items show that the correspondence of test items and the performance of output power and its spectrum transmission are in accordance to the technical description.

The test results shows

- ☒ No deviations to the technical requirements were ascertained during the tests performed.
☐ Deviations as specified in this report were ascertained during the tests performed.

3.1 RF Output Power

Reference : FCC 47 CFR Part 24 Subpart E Personal Communications Services – Broadband PCS _Oct. 01, 2008

Clause : Section 24.232(c) Power Limit
Section 2.1046

Technical requirements

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

Result of test

- ☒ Pass
☐ Fail
☐ Already tested(refer to test report no. _____)
☐ Not applicable

Remarks : None

3.2 Occupied Bandwidth

Reference : FCC 47 CFR Part 24 Subpart E Personal Communications Services – Broadband PCS _Oct. 01, 2008

Clause : Section 24.238(b) Emission limitations
Section 2.1049

Technical requirements

Measurement bandwidth of at least 1% of the occupied bandwidth. For ca. 300.0 kHz, this equates to a resolution bandwidth of at least 3.0 kHz. For this testing, a resolution bandwidth 3.0 kHz was used. No technical Requirement exist. Just reference report purpose.

Result of test

- ☒ Pass
☐ Fail
☐ Already tested(refer to test report no. _____)
☐ Not applicable

Remarks : None

3.3 Emission Limitations – Spurious Emission at Antenna Terminal

Reference : FCC 47 CFR Part 24 Subpart E Personal Communications Services – Broadband PCS _Oct. 01, 2008

Clause : Section 25.238(a) Emission limitations
Section 2.1051

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Technical requirements

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Result of test

- ☒ Pass
☐ Fail
☐ Already tested(refer to test report no._____)
☐ Not applicable

Remarks : None

3.4 Emission Limitations – Radiated Spurious Emission

Reference : FCC 47 CFR Part 24 Subpart E Personal Communications Services – Broadband PCS _Oct. 01, 2008

Clause : Section 25.238(a) Emission limitations
Section 2.1053

Technical requirements

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Result of test

- ☒ Pass
☐ Fail
☐ Already tested(refer to test report no._____)
☐ Not applicable

Remarks : None

3.5 Frequency Stability

Reference : FCC 47 CFR Part 24 Subpart E Personal Communications Services – Broadband PCS _Oct. 01, 2008

Clause : Section 24.235
Section 2.1055

Technical requirements

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Result of test

- ☒ Pass
☐ Fail
☐ Already tested(refer to test report no._____)
☐ Not applicable

Remarks : None

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4. Test Results

4.1 Test Conditions and Results – RF Power Output

Test Description	Measurements were made in the laboratory environment and 10meter semi anechoic chamber . For conducted measurement, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. The EUT was adjusted to produce maximum power rating of the product specification. The measurements were made at the EUT RF output ports in downlink transmit operation mode at B,M,T channels. For radiated measurement, the substitution measurement method in accordance with in TIA/EIA-603-A-2003 was used.	
Basic Standard		47 CFR § 2.1046, § 24.232(c)
RF Power output Limit		
§ 24.232(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.		
Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C
	Relative Humidity	10 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	23 °C
	Relative Humidity	42 %

RF output power Configuration Settings

Power Interface Mode # (See Section 2.3)	EUT Configurations Mode # (See Section 2.6)	EUT Operation Mode # (See 2.4)
1	1 , 2	1
Supplementary information: None		

Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Due
Spectrum Analyzer	Agilent Technologies	E4440A	MY46186519	2009.03.29
RF Power Meter	Agilent Technologies	E4418B	MY45105913	2009.03.29
Power Sensor	Agilent Technologies	8481H	MY41092319	2009.03.29
Coaxial Attenuator	Agilent Technologies	8491B	90466	2009.03.29
High Pass Filter	Wainwright	WHK3.3/18G-10EF	10Z	2009.08.20
Test Receiver	Rohde & Schwarz	ESIB26	100359	2009.05.26
Horn Antenna	EMCO	3115	00056768	2010.03.24
Horn Antenna	Rohde & Schwarz	BBHA9120D	539	2009.03.24
Position controller	Inn-co	CO 2000	11261105/L	-
Antenna Mast	Inn-co	MA 4000	-	-
Turntable	Inn-co	DT 3000	-	-

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RF output power data – Conducted Measurement

Modulation	Frequency (MHz)	Voice (dBm)	GPRS Data 1 TX Slot (dBm)	GPRS Data 2 TX Slot (dBm)	GPRS Data 3 TX Slot (dBm)	GPRS Data 4 TX Slot (dBm)
GSM 1900 (GMSK)	1850.2	29.75	29.65	29.63	29.62	29.61
	1880.2	29.78	29.72	29.71	29.69	29.67
	1909.8	29.72	29.70	29.67	29.65	29.63
Supplementary information: -. Tx mode -. Modulated RF output power -. Power measurement : Channel power w/ peak value -. Before the measurement, the system calibration for compensation of cable loss and attenuator has been made and included as an offset value in every measurement.						

RF output power data – Radiated Measurement (EIRP)

Frequency (MHz)	Ant. Polarity	S.G Level (dBm)	Cable loss (dB)	Ant. Gain (dB)	EIRP Level (dBm)	EIRP Level (W)
1850.2	V	25.95	5.50	9.10	29.55	0.901
1880.2	V	26.46	5.60	9.20	30.06	1.164
1909.8	V	26.25	5.70	9.30	29.85	0.966
Supplementary information: -. EIRP Level = Signal Generator output level - Cable loss + Antenna Gain(Substitution) -. EIRP measurement has been performed with three orthogonal position of the EUT. The reported data is the worst case position of Z axis(phone vertical position). -. Voice call mode was selected as a worst case operating mode which was the highest RF output power at the conducted measurement.						

Remarks : None**Result of test**

In accordance with Technical requirement of FCC Rules section 47 CFR § 2.1046, § § 24.232(c)

☒ Complied☐ Failed**FCC Test Report**

4.2 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The modulated carrier signal with maximum RF level was applied to the up and down link input of the repeater and resulting output was compared against the original signal.	
Basic Standard		47 CFR § 2.1049
Occupied Bandwidth Limits		
Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C
	Relative Humidity	10 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	23 °C
	Relative Humidity	40 %

Occupied Bandwidth Configuration Settings

Power Interface Mode # (See Section 2.3)	EUT Configurations Mode # (See Section 2.6)	EUT Operation Mode # (See 2.4)
1	2	1
Supplementary information: None		

Occupied Bandwidth Spectrum Analyzer Settings

Span	Resolution Bandwidth	Occupied Bandwidth Requirements	
		dBc	%
2 MHz (GSM)	3 kHz	-26	99
Supplementary information: 99% bandwidth was applied.			

Occupied Bandwidth Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Signal Generator	Agilent	E4438C	MY45095542	2008-11-28	2009-11-28
Signal Generator	Agilent	E4438C	MY45093570	2009-04-24	2010-04-30
Spectrum Analyzer	Agilent	E4440A	MY42510388	2009-11-11	2010-11-11
Fixed Attenuator	HP	8496A - 30 dB	3318A07585	-	-
Fixed Attenuator	INMET	30 dB	992310-29	-	-

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Occupied Bandwidth results

Modulation	Occupied bandwidth		
	Frequency (MHz)	99%	26dB
GSM	1850.2	250.9 kHz	324.8 kHz
	1880.2	246.9.kHz	321.1 kHz
	1909.8	245.5 kHz	317.1 kHz
Supplementary information: -. Modulated RF signal applied, 99% bandwidth -. Part 24.238 (a) requires a measurement bandwidth of at least 1% of the occupied bandwidth. For ca. 300.0 kHz, This equates to a resolution bandwidth of at least 3.0 kHz.			

Remarks : Refer to the Measurement Plots provided in Annex 1 no. : 1 - 2

Result of test

In accordance with Technical requirement of FCC Rules section 47 CFR § 2.1049

☒ Complied

☐ Failed

4.3 Test Conditions and Results – Spurious Emission at Antenna Terminal

Test Description	Measurements were made in the laboratory environment. Conducted spurious emission measurement was made using a direct connection between RF output of the EUT and spectrum analyzer via RFattenuator. A modulated carrier signal from the donor was applied to the optic input port of the EUT. Measurement has been performed with the EUT set to maximum output level at low, mid and high channel frequencies. The spectrum was investigated from 30 MHz to up to 10 th harmonics of the carrier frequencies.	
Basic Standard		47 CFR § 2.1051, § 24.238(a)
Emission Limits		
§ 24.238 Emission limitations for broadband PCS equipment		
(a) Out of band emissions : The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.		

Emission Mask Configuration Settings

Power Interface Mode # (See Section 2.3)	EUT Configurations Mode # (See Section 2.6)	EUT Operation Mode # (See 2.4)
1	2	1
Supplementary information: None		

Conducted spurious emission Spectrum Analyzer Settings

Frequency Range (MHz)	Resolution Bandwidth	Video Bandwidth
30 MHz ~ 1 GHz	100 kHz	300 kHz
1 GHz ~ 10 GHz	1 MHz	3 MHz
Supplementary information:		

Conducted Spurious Emission Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Due
Spectrum Analyzer	Agilent Technologies	E4440A	MY46186519	2009.03.29
RF Power Meter	Agilent Technologies	E4418B	MY45105913	2009.03.29
Power Sensor	Agilent Technologies	8481H	MY41092319	2009.03.29
Coaxial Attenuator	Agilent Technologies	8491B	90466	2009.03.29
High Pass Filter	Wainwright	WHK3.3/18G-10EF	10Z	2009.08.20
Test Receiver	Rohde & Schwarz	ESIB26	100359	2009.05.26

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Out of band emission – Spurious emissions results

Tuned Frequency (MHz)	Emission Frequency (MHz)	Loss offset (dB)	Spurious emission measured (dBm)	Limit (dBm)	Margin (dB)
Low Channel (1850.2 MHz)	3700.4	-	-	-13	-
	5550.6	-	-	-13	-
	7400.8	-	-	-13	-
	-	-	-	-13	-
Mid Channel (1880.2 MHz)	869.4	-	-	-13	-
	880.2	-	-	-13	-
	891.4	-	-	-13	-
	-	-	-	-13	-
High Channel (1909.8 MHz)	869.4	-	-	-13	-
	880.2	-	-	-13	-
	891.4	-	-	-13	-
	-	-	-	-13	-
Supplementary information:					
-. no spurious or more than 20 dB under limit					
-. Power measurement : Peak power measured					
-. For each tuned carrier frequency, the maximum spurious emission detected was recorded.					

Remarks :

Refer to the Measurement Plots provided in Annex 1 no. : 13 - 66

Result of test

In accordance with Technical requirement of FCC Rules section 47 CFR § 2.1051 & § 24.238(a)

☒ Complied

☐ Failed

4.4 Test Conditions and Results – Radiated Spurious Emission

Test Description	Measurements were made in a 10-meter open field test site that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at semi-anechoic chamber with an antenna to EUT separation distance of 3 meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. The EUT’s RF output port was terminated with 50 ohm load. The EUT was set to transmit at low, mid and high channel frequencies with max output power condition. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT about 360° and adjusting the receive antenna height from 1 to 4-meters in accordance with procedure of substitution method specified in TIA/EIA-603-A-2003. All frequencies up to 10 GHz were investigated in both horizontal and vertical antenna polarity, where applicable. The maximum EIRP of the emissions were reported.	
Basic Standard		§ 2.1053 , § 24.238(a)
Radiated Spurious Emission LIMITS		
§ 22.917 Emission limitations for cellular equipment (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.		
Parameters required prior to the test	Laboratory Ambient Temperature	10 to 40 °C
	Relative Humidity	10 to 90 %
Parameters recorded during the test	Laboratory Ambient Temperature	27 °C
	Relative Humidity	47 %
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	1GHz – 20GHz	(3 meter measurement distance)
Limits – EIRP		
Frequency (MHz)	Limit (dBm EIRP)	
	Peak	Average
Harmonics up to 10 th Harmonics	-13 dBm	NA
Supplementary information: -(43+10LogP) = -43.65dBc		

Spectrum Analyzer Settings

Frequency Range (MHz)	Resolution Bandwidth	Video Bandwidth
1 GHz ~ 20 GHz	1 MHz	3 MHz
Supplementary information: Peak measurement		

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Radiated Emissions EUT Configuration Settings

Power Interface Mode # (See Section 2.3)	EUT Configurations Mode # (See Section 2.6)	EUT Operation Mode # (See 2.4)
1	1	1
Supplementary information:		

Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Due
Spectrum Analyzer	Agilent Technologies	E4440A	MY46186519	2009.03.29
Signal Generator	Agilent	E4438C	MY45095542	2009.04.24
High Pass Filter	Wainwright	WHK3.3/18G-10EF	10Z	2009.08.20
Test Receiver	Rohde & Schwarz	ESIB26	100359	2009.05.26
Horn Antenna	EMCO	3115	00056768	2010.03.24
Horn Antenna	Rohde & Schwarz	BBHA9120D	539	2009.03.24
Position controller	Inn-co	CO 2000	11261105/L	-
Antenna Mast	Inn-co	MA 4000	-	-
Turntable	Inn-co	DT 3000	-	-

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Table 6 Spurious Radiated Emissions Data Points

Frequency (MHz)	Ant. Polarity	S.G Level (dBm)	Cable loss (dB)	Ant. Gain (dB)	EIRP Level (dBm)	dBc
Low Channel (1850.2 MHz)						
3700.4	V	-48.5	9.5	11.8	-46.2	-76.2
3700.4	H	-46.4	9.5	11.8	-44.1	-74.1
Mid Channel (1880.2 MHz)						
3760.0	V	-46.5	9.5	11.8	-44.2	-74.2
3760.0	H	-45.6	9.5	11.8	-43.3	-73.3
High Channel (1909.8 MHz)						
3819.6	V	-44.8	9.5	12.0	-42.3	-72.3
3819.6	H	-45.2	9.5	12.0	-42.7	-72.7
Supplementary information: -. EIRP Level = Signal Generator output level - Cable loss + Antenna Gain(Substitution) -. EIRP measurement has been performed with three orthogonal position of the EUT. The reported data is the worst case position of Z axis(phone vertical position). -. Voice call mode was selected as a worst case operating mode which was the highest RF output power at the conducted measurement.						

Result of test

In accordance with Technical requirement of FCC Rules section 47 CFR § 2.1053 & § 24.238(a)

☒ Complied☐ Failed

4.5 Test Conditions and Results – Frequency Stability

Test Description	For Temperature Frequency Stability, measurements were made with the product placed in an environmental chamber and the temperature varied from –30°C to +50°C at the normal supply voltage. The frequency drift of the fundamental frequency was measured with a spectrum analyzer. For Power Supply Frequency Stability, measurements were made in a laboratory environment and the supply voltage varied from 85% to 115%. The ambient temperature was 20°C.
Basic Standard	47 CFR § 2.1055, § 24.235
Frequency Stability Limits	
§ 24.235 Frequency stability (a) The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.	

Frequency Stability Configuration Settings

Power Interface Mode # (See Section 2.3)	EUT Configurations Mode # (See Section 2.6)	EUT Operation Mode # (See 2.4)
1,2,3	2	1
Supplementary information: None		

Frequency Stability Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Due
SpectrumAnalyzer	Agilent Technologies	E4440A	MY46186519	2009.03.29
Rf Power Meter	Agilent Technologies	E4418B	MY45105913	2009.03.29
Power Sensor	Agilent Technologies	8481H	MY41092319	2009.03.29
Coaxial Attenuator	Agilent Technologies	8491B	90466	2009.03.29
High Pass Filter	Wainwright	WHK3.3/18G-10EF	10Z	2009.08.20
Programmable DC Power Supply	GW Instek	PSH-2050A	EH160824	2009.03.30
Temp & Humid Test Chamber	Climats	EX2213-HA	7558	2009.06.23

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Table 7 Frequency Stability Test results

Frequency Stability with variation of Ambient Temperature

Carrier Band	Temperature (°C)	Assigned Frequency (Hz)	Measured Frequency (Hz)	Drift (ppm)	Limit (ppm)
GSM	50	1,880,200,000.000	1,880,200,015.000	0.000798	2.5
	40	1,880,200,000.000	1,880,200,010.000	0.000532	2.5
	30	1,880,200,000.000	1,880,200,020.000	0.001064	2.5
	20	Reference			
	10	1,880,200,000.000	1,880,200,025.000	0.001330	2.5
	0	1,880,200,000.000	1,880,200,005.000	0.000266	2.5
	-10	1,880,200,000.000	1,880,200,010.000	0.000532	2.5
	-20	1,880,200,000.000	1,880,200,010.000	0.000532	2.5
	-30	1,880,200,000.000	1,880,200,015.000	0.000798	2.5

Supplementary information:

- No modulation,
- Before the testing, the signal generator and spectrum analyzer were synchronized by using the external sync. Frequency measurement was made by spectrum analyzer
- Reference input voltage : 3.7Vdc

Frequency Stability with variation of Input voltage

Carrier Band	Input voltage (V)	Assigned Frequency (Hz)	Measured Frequency (Hz)	Drift (ppm)	Limit (ppm)
GSM	3.5 Vdc	1,880,200,000.000	1,880,200,005.000	0.002659	2.5
	4.2 Vdc	1,880,200,000.000	1,880,200,005.000	0.002659	2.5

Supplementary information:

- No modulation,
- Before the testing, the signal generator and spectrum analyzer were synchronized by using the external sync. Frequency measurement was made by spectrum analyzer
- Reference temperature : 20°C

Result of test

In accordance with Technical requirement of FCC Rules section 47 CFR § 2.1055, § 24.235

☒ Complied ☐ Failed