



FCC PART 22H, PART 24E MEASUREMENT AND TEST REPORT

For

Amgoo Telecom Co., Ltd.

3/F, Block R2-A(North), Gaoxin S. Ave. 4th, Hi-Tech Industrial Park, Nanshan District, Shenzhen, China

FCC ID: UOSUNIKO3

Report Type: **Product Type:** Mobile Phone Original Report Report Number: RSZ180807003-00C **Report Date:** 2018-08-20 Simon wang Simon Wang Reviewed By: RF Engineer **Prepared By:** Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Amgoo Telecom Co.*, *Ltd.*'s product, model number: UNIKO3 (*FCC ID: UOSUNIKO3*) or the "EUT" in this report was a *Mobile Phone*, which was measured approximately: 111.0 mm (L) * 47.0mm (W) * 15.0mm (H), rated with input voltage: DC 3.7V from battery or DC 5V from adapter.

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Adapter Information: Model: UNIKO 3

Input: AC 100-240V, 50/60Hz, 0.15A

Output: DC 5V, 500mA

Objective

This test report is prepared on behalf of *Amgoo Telecom Co.*, *Ltd.* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E of the Federal Communication Commissions rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP, Part 15.247 DSS submissions with FCC ID: UOSUNIKO3.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-Part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-D and KDB 971168 D01 v03.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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^{*}All measurement and test data in this report was gathered from production sample serial number: 1801256. (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-08-07.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Char	nnel Bandwidth	±5%
RF output power, conducted		±1.5dB
Unwanted Emission, conducted		±1.5dB
Emissions,	Below 1GHz	±4.70dB
radiated	Above 1GHz	±4.80dB
Temperature		±1℃
Supply	voltages	±0.4%

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Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

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SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

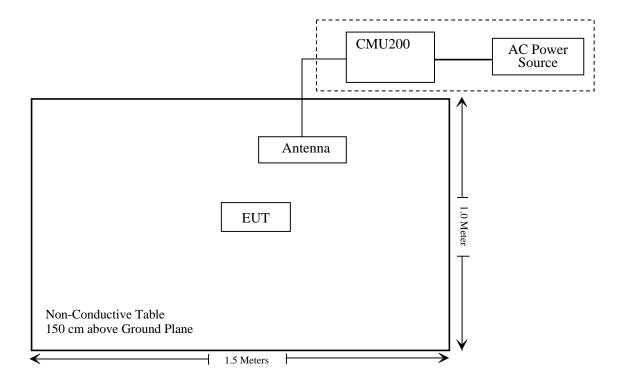
No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605

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Block Diagram of Test Setup



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SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	Compliance*
\$2.1046; \$ 22.913 (a); \$ 24.232 (c);	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
\$ 2.1049; \$ 22.905; \$ 22.917; \$ 24.238;	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a);§ 24.238 (a);	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a);	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a);§ 24.238 (a);	Band Edge	Compliance
§ 2.1055; § 22.355;§ 24.235;	Frequency stability	Compliance

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Compliance*: Please refer to SAR report released by BACL, report number: RSZ180807003-20.

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TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
		Radiated Emission	on Test	•	
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-04-24	2019-04-24
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-05-21	2019-05-21
HP	Amplifier	HP8447E	1937A01046	2018-05-21	2018-11-19
Anritsu	Signal Generator	68369B	004114	2017-12-24	2018-12-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362- 100100	MFR64639 231029-003	2018-04-01	2018-10-01
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	1	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-05-22	2018-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2018-08-03	2019-08-03

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Manufacturer	Description	Model Serial Number		Calibration Date	Calibration Due Date			
	RF Conducted Test							
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-24	2018-12-24			
ESPEC	Temperature & Humidity Chamber	EL-10KA	EL-10KA 09107726 20		2018-12-21			
Long Wei	DC Power Supply	TPR-6420D	TPR-6420D 398363		NCR			
Aglient	ESG Vector Signal Generator	E4438C MY42080875		2018-05-09	2019-05-09			
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200 106891		2017-12-14	2018-12-14			
Ducommun technologies	RF Cable	RG-214	3	Each Time				
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each Time				
N/A	Power Splitter	N/A	N/A	2018-05-21	2019-05-21			

^{*} Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

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Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ180807003-20.

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FCC §2.1047 - MODULATION CHARACTERISTIC

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

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FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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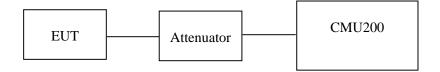
According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMU200 through sufficient attenuation.



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08.

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Conducted Power

Cellular Band (Part 22H)

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Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
	128	824.2	32.20	38.45
GSM	190	836.6	32.33	38.45
	251	848.8	32.34	38.45

Mode	Channel	Frequency	Av	erage Outpu	t Power (dI	Bm)	Limit
Mode	Channel	(MHz)	1 slot	2 slots	3 slots	4 slots	(dBm)
	128	824.2	32.17	30.27	28.41	26.22	38.45
GPRS	190	836.6	32.28	30.57	28.49	26.48	38.45
	251	848.8	32.32	30.76	28.69	26.64	38.45

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
	512	1850.2	28.91	33
GSM	661	1880.0	29.06	33
	810	1909.8	29.12	33

Mode	Tode Channel Frequency Average Output Power (dBm)					Limit	
Mode	Channel	(MHz)	1 slot	2 slots	3 slots	4 slots	(dBm)
	512	1850.2	28.86	26.45	24.73	22.98	33
GPRS	661	1880.0	28.62	26.56	24.72	22.75	33
	810	1909.8	28.74	26.54	24.84	22.86	33

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Peak-to-average ratio (PAR)

Cellular Band

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Mode	Channel	PAR (dB)	Limit (dB)
	Low	1.48	13
GSM	Middle	1.41	13
	High	1.43	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)		
	Low	1.38	13		
GSM	Middle	1.45	13		
	High	1.42	13		

Radiated Power

GSM Mode:

	Receiver	Turntable	Rx An	tenna	tenna Substituted Absolute FCC Part 22H			Substituted Absolute FCC Par		
Frequency (MHz)	Reading (dBµV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)	Level (dBm)	Limit (dBm)	Margin (dB)
	ERP for Cellular Band (Part 22H), Middle Channel									
836.6	92.34	171	1.0	Н	20.3	0.7	0.0	29.60	38.45	8.85
836.6	93.41	11	1.6	V	33.0	0.7	0.0	32.30	38.45	6.15
		EI	RP for PC	CS Band	(Part 24E)	, Middle	Channel			
1880.00	88.85	319	1.7	Н	18.8	1.30	9.40	26.90	33	6.10
1880.00	89.46	356	2.0	V	19.2	1.30	9.40	27.30	33	5.70

Note:

All above data were tested with no amplifier. Absolute Level = Substituted Level - Cable loss + Antenna Gain Margin = Limit- Absolute Level

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FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

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Applicable Standard

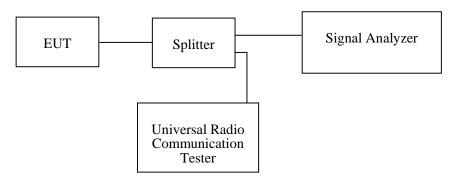
FCC 47 §2.1049, §22.917, §22.905, §24.238.

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Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at $5~\rm kHz$ (GSM) & $100~\rm kHz$ (WCDMA) and the $26~\rm dB$ & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08 and 2018-08-09.

EUT operation mode: Transmitting

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Test Result: Compliance. Please refer to the following tables and plots.

Cellular Band (Part 22H)

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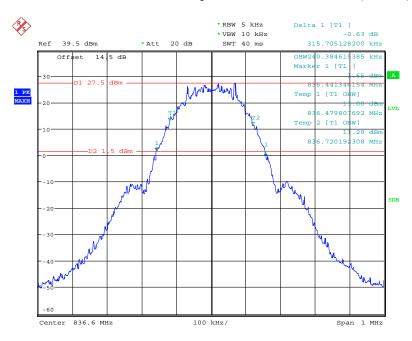
Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	240.385	315.705

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	246.975	312.500

Cellular Band (Part 22H)

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode

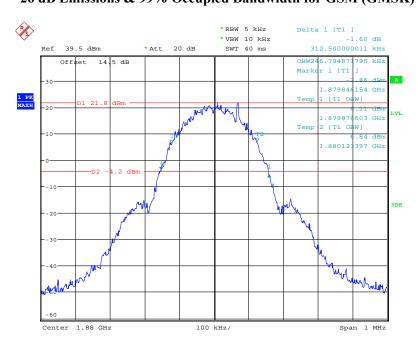


Date: 8.AUG.2018 23:57:10

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PCS Band (Part 24E) 26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode

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Date: 9.AUG.2018 00:15:49

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FCC §2.1051, §22.917(a) & §24.238(a); - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

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Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a)).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08 and 2018-08-09.

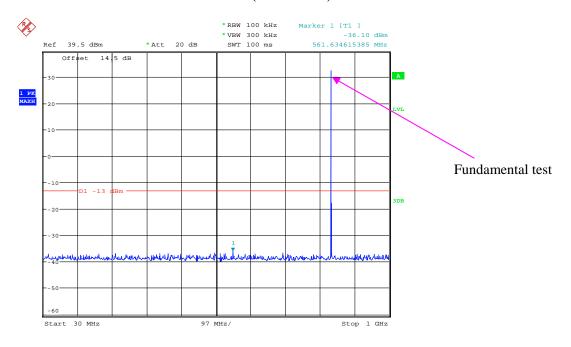
EUT operation mode: Transmitting

Test result: Compliance, please refer to the following plots.

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Cellular Band (Part 22H)

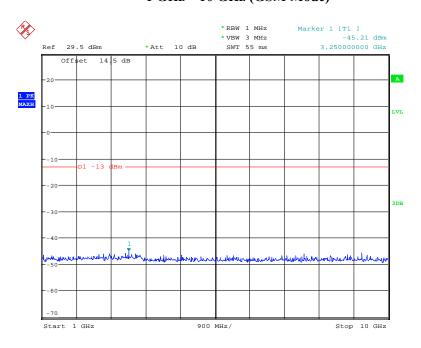
30 MHz – 1 GHz (GSM Mode)



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Date: 8.AUG.2018 23:59:08

1 GHz - 10 GHz (GSM Mode)



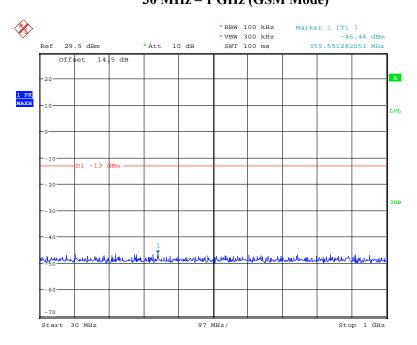
Date: 9.AUG.2018 00:02:57

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PCS Band (Part 24E)

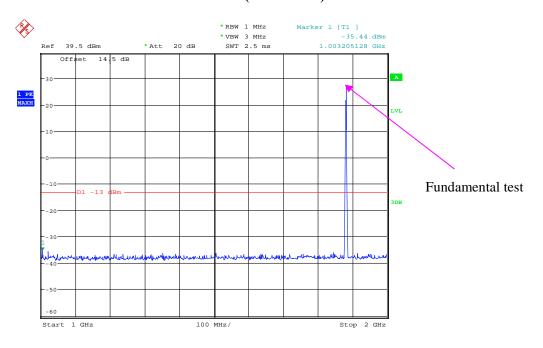
Report No.: RSZ180807003-00C

30 MHz - 1 GHz (GSM Mode)



Date: 9.AUG.2018 00:12:37

1 GHz – 2 GHz (GSM Mode)

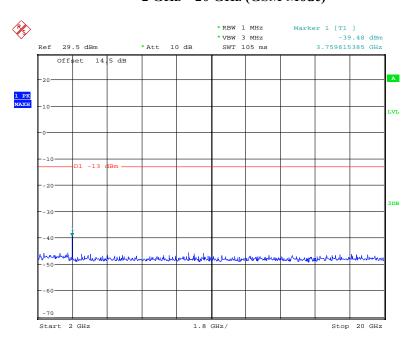


Date: 9.AUG.2018 00:13:55

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2 GHz – 20 GHz (GSM Mode)

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Date: 9.AUG.2018 00:14:22

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FCC § 2.1053; § 22.917 (a); § 24.238 (a) - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a) and § 24.238(a).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

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The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in $dB = 10 \lg (TX \text{ pwr in Watts}/0.001) - \text{the absolute level}$

Spurious attenuation limit in $dB = 43 + 10 \text{ Log}_{10}$ (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08.

EUT operation mode: Transmitting

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Pre-scan with Low, Middle and High channel, the worst case as below:

30 MHz ~ **10 GHz**:

Cellular Band (Part 22H)

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			Rx An	tenna	Substituted						
Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Loss Gain		Limit (dBm)	Margin (dB)	
	Cellular Band, Middle channel										
169.18	33.49	138	1.4	Н	-63.5	0.28	0	-63.78	-13	50.78	
169.18	33.27	116	2.4	V	-63.7	0.28	0	-63.98	-13	50.98	
1673.20	70.04	324	1.9	Н	-37.0	1.30	8.90	-29.40	-13	16.40	
1673.20	72.55	22	2.1	V	-33.9	1.30	8.90	-26.30	-13	13.30	
2509.80	64.19	286	2.0	Н	-39.3	2.60	10.20	-31.70	-13	18.70	
2509.80	64.37	7	2.5	V	-38.5	2.60	10.20	-30.90	-13	17.90	
4183.00	58.39	332	1.9	Н	-43.0	1.50	11.80	-32.70	-13	19.70	
4183.00	63.29	28	2.0	V	-37.3	1.50	11.80	-27.00	-13	14.00	

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

	Receiver	Turntable	Rx An	tenna	,	Substitut	ed	Absolute			
Frequency (MHz)	Reading (dBµV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Antenna Loss Gain (dB) (dB)		Level (dBm)	Limit (dBm)	Margin (dB)	
	PCS Band, middle channel										
169.18	33.31	321	1.1	Н	-63.7	0.28	0	-63.98	-13	50.98	
169.18	33.10	49	2.4	V	-63.9	0.28	0	-64.18	-13	51.18	
3760.00	53.96	216	1.7	Н	-47.3	1.50	11.80	-37.00	-13	24.00	
3760.00	55.43	302	1.3	V	-45.3	1.50	11.80	-35.00	-13	22.00	

Note

1) Absolute Level = Substituted Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

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FCC § 22.917 (a); § 24.238 (a) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions 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.

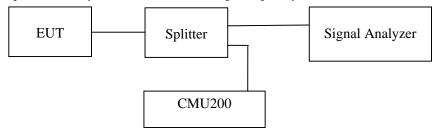
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According to \$24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P) \, dB$.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08.

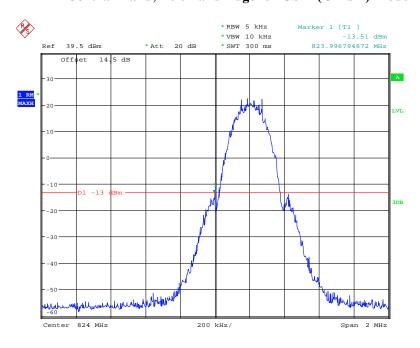
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following plots.

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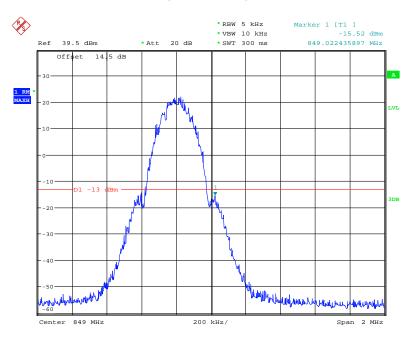
Cellular Band, Left Band Edge for GSM (GMSK) Mode

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Date: 8.AUG.2018 23:54:13

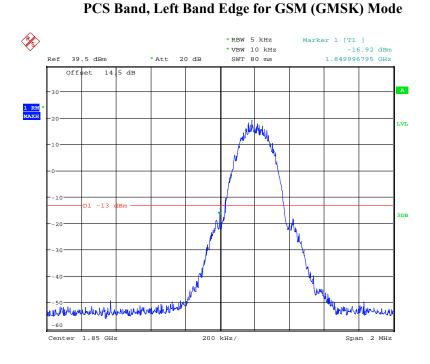
Cellular Band, Right Band Edge for GSM (GMSK) Mode



Date: 8.AUG.2018 23:55:06

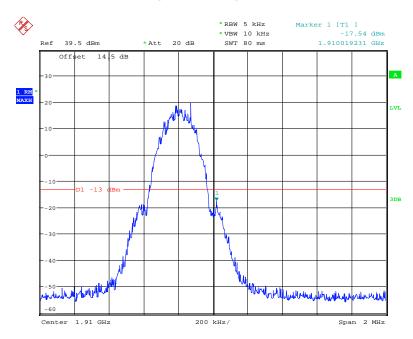
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Date: 9.AUG.2018 00:16:58

PCS Band, Right Band Edge for GSM (GMSK) Mode



Date: 9.AUG.2018 00:17:43

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FCC § 2.1055; § 22.355; § 24.235 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055, §22.355, §24.235.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency	To	lerance i	for '	Transmi	tters	in 1	the 1	Pub	lic	N.	[o	bil	e S	Service	es
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Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



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Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2018-08-08.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

Cellular Band (Part 22H)

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GSM Mode

Middle Channel, f _o =836.6MHz					
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	
-30		-7	-0.0084	2.5	
-20		-4	-0.0048	2.5	
-10		-1	-0.0012	2.5	
0		1	0.0012	2.5	
10	3.7	4	0.0048	2.5	
20		8	0.0096	2.5	
30		7	0.0084	2.5	
40		5	0.0060	2.5	
50		6	0.0072	2.5	
25	V min.= 3.5	9	0.0108	2.5	
25	V max.= 4.2	11	0.0131	2.5	

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PCS Band (Part 24E)

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GSM Mode

Middle Channel, f _o =1880.0 MHz					
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result	
-30	3.7	19	0.0101	pass	
-20		17	0.0090	pass	
-10		15	0.0080	pass	
0		21	0.0112	pass	
10		22	0.0117	pass	
20		24	0.0128	pass	
30		25	0.0133	pass	
40		23	0.0122	pass	
50		20	0.0106	pass	
25	V min.= 3.5	16	0.0085	pass	
25	V max.= 4.2	14	0.0074	pass	

***** END OF REPORT *****

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