FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

Telecell Mobile (H.K) Ltd.

RM 801 Metro Ctr II, 21 Lam Hing Street, Kln Bay, Hong Kong

FCC ID: 2ADX3F242

Report Type:	**Product Type:**
Original Report	Mobile phone

Report Number:	RSZ160825007-00C
Report Date:	2016-09-29
Reviewed By:	Oscar Ye Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Telecell Mobile (H.K) Ltd.*'s product, model number: *F242 (FCC ID: 2ADX3F242)* or the "EUT" in this report was a *Mobile phone,* which was measured approximately: 103.0 mm (L) * 52.0 mm (W) * 15 mm (H), rated with input voltage: DC 3.7V rechargeable Li-ion battery or DC 5.0V from adapter.

Adapter Information:
Input: 100-240V 50/60Hz 0.15A
Output: DC 5.0V, 500mA

** All measurement and test data in this report was gathered from production sample serial number: 1603081 (Assigned by BACL, Kunshan. The EUT supplied by the applicant was received on 2016-09-25.*

Objective

This type approval report is prepared on behalf of *Telecell Mobile (H.K) Ltd* in accordance with Part 2, Part 22-Subpart H and Part 24-Subpart E of the Federal Communication Commission's 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: 2ADX3F242

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart 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.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248, Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

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.

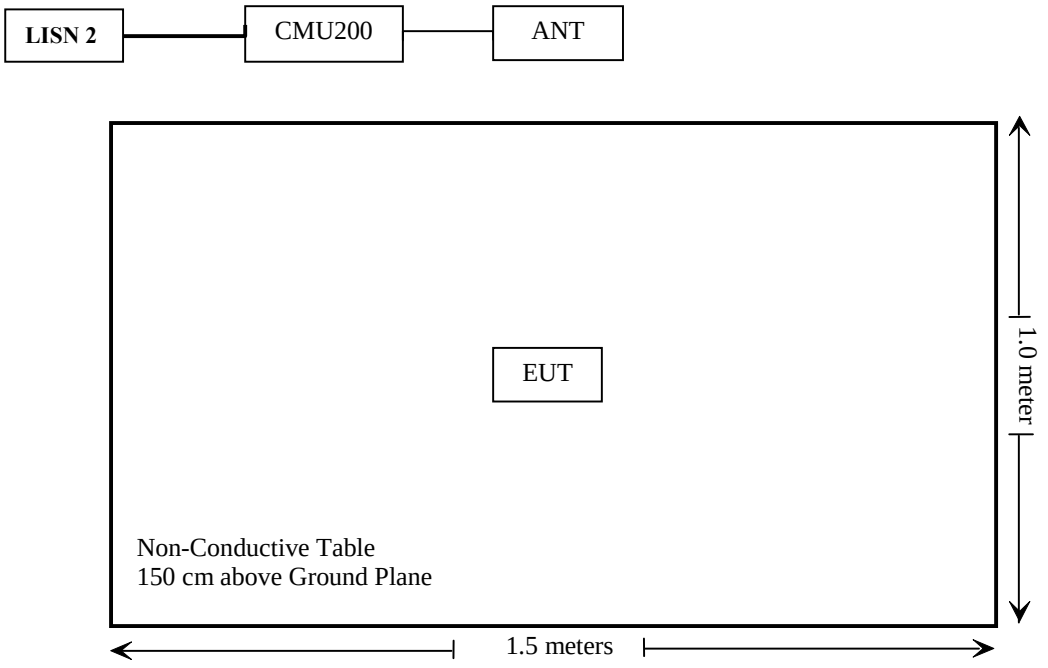
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure Information	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)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a)	Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235	Frequency stability	Compliance

Compliance*: Please refer to SAR report released by BACL, report number: RSZ160825007-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiation test					
Sonoma Instrunent	Amplifier	330	171377	2016-09-16	2017-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2015-11-07	2016-11-06
Mini	Pre-amplifier	ZVA-183-S+	857001418	2016-09-16	2017-09-15
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2016-09-16	2017-09-15
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
HP	Signal Generator	E4421B	3426A01336	2015-11-04	2016-11-03
R&S	Auto test Software	EMC32	V 09.10.0	NCR	NCR
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-06-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted test					
BACL	TS 8997 Cable-01	T-KS-EMC086	T-KS-EMC086	2015-12-10	2016-12-09
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
WEINSCHEL	3dB Attenuator	5326	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131	2016-09-21	2017-09-21
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-11	2016-11-11
HONOVA	Power Splitter	ZFRSC-14-S+	019411452	2016-06-12	2017-06-12
WEINSCHEL	10dB Attenuator	5328	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2016-07-04	2017-07-03

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

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

Applicable Standard

FCC§1.1307, §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ160825007-20

FCC §2.1047 - 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.

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

Applicable Standards

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

According to FCC §2.1046 and §24.232 (c) (d):

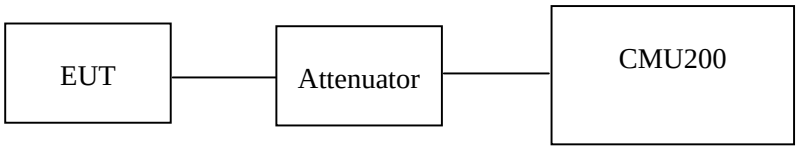
(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

(d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test Procedure

Conducted method:

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



Radiated method:

TIA603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	46 %
ATM Pressure:	101.0 kPa

The testing was performed by Ada Yu on 2016-09-27.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	31.21	38.45
	190	836.6	31.12	38.45
	251	848.8	31.11	38.45

Channel No	Frequency (MHz)	Output power (dBm)			
		1 uplink slot	2 uplink slot	3 uplink slot	4 uplink slot
128	824.2	31.13	30.28	28.48	27.61
190	836.6	31.12	30.21	28.52	27.62
251	848.8	31.11	30.20	28.47	27.58

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.24	33
	661	1880.0	28.97	33
	810	1909.8	28.85	33

Channel No	Frequency (MHz)	Output power (dBm)			
		1 uplink slot	2 uplink slot	3 uplink slot	4 uplink slot
512	1850.2	29.09	27.91	26.21	25.35
661	1880.0	28.98	27.78	26.12	25.38
810	1909.8	28.78	27.70	26.19	25.25

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.34	13
	Middle	0.24	13
	High	0.38	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.36	13
	Middle	0.23	13
	High	0.32	13

Radiated Power

GSM Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Low Channel										
824.20	95.57	205	1.7	H	24.6	0.46	4.75	28.89	38.45	9.56
824.20	93.43	62	1.5	V	22.4	0.46	4.75	26.69	38.45	11.76
EIRP, PCS Band (Part 24E), Low Channel										
1850.20	81.88	282	1.4	H	17.61	0.31	10.40	27.70	33	5.3
1850.20	80.58	279	1.7	V	16.31	0.31	10.40	26.40	33	6.6

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

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

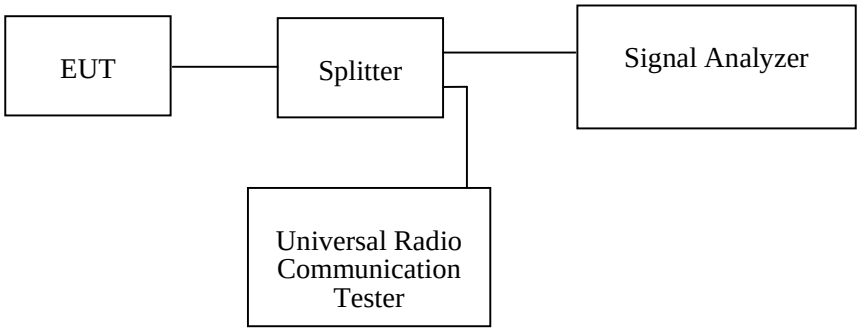
Applicable Standards

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

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 kHz (GSM) and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

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

The testing was performed by Ada Yu on 2016-09-29.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

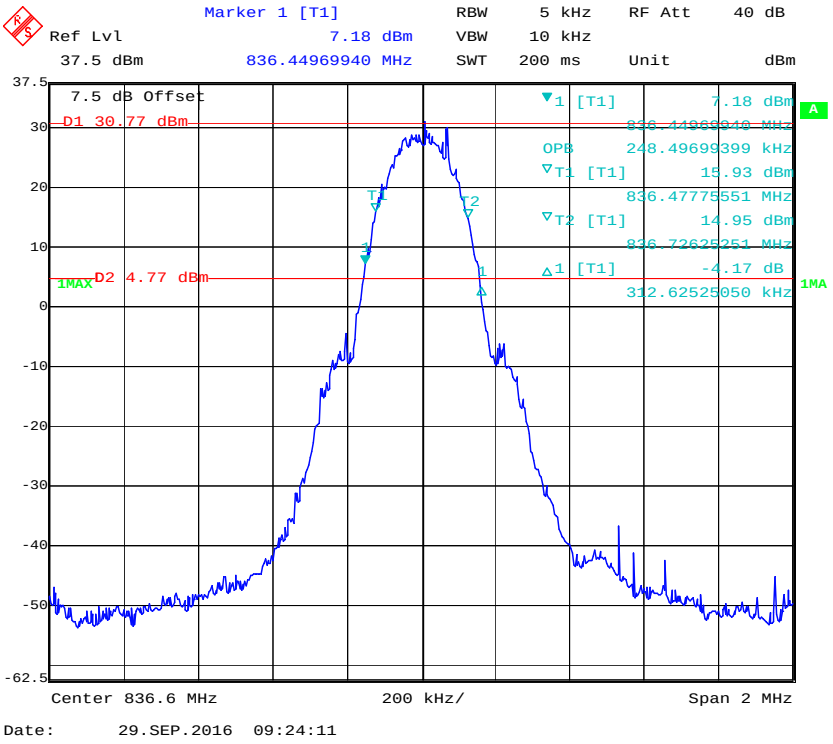
Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	248.50	312.63

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	248.50	312.63

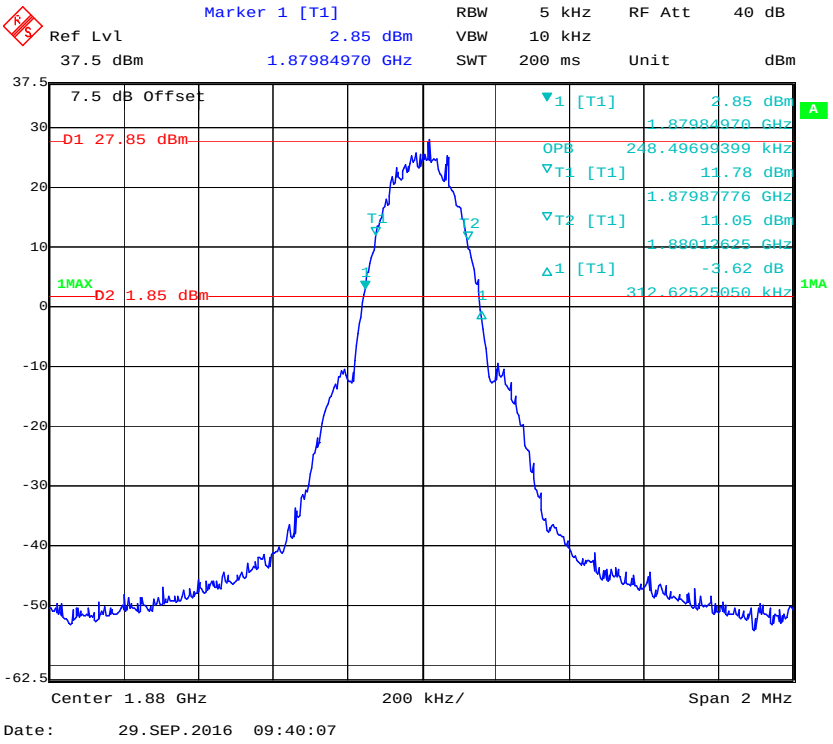
Cellular Band (Part 22H)

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



PCS Band (Part 24E)

99% Occupied Bandwidth for GSM (GMSK) Mode



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

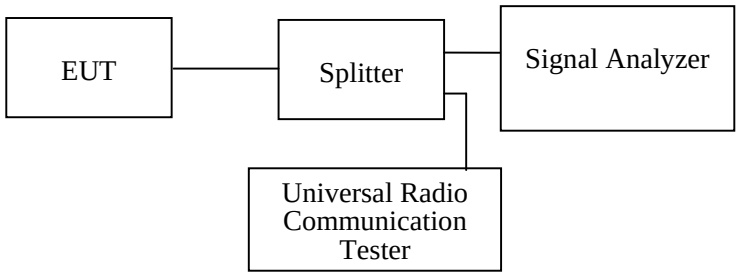
Applicable Standards

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 100 kHz for below 1 GHz and 1 MHz for above 1 GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

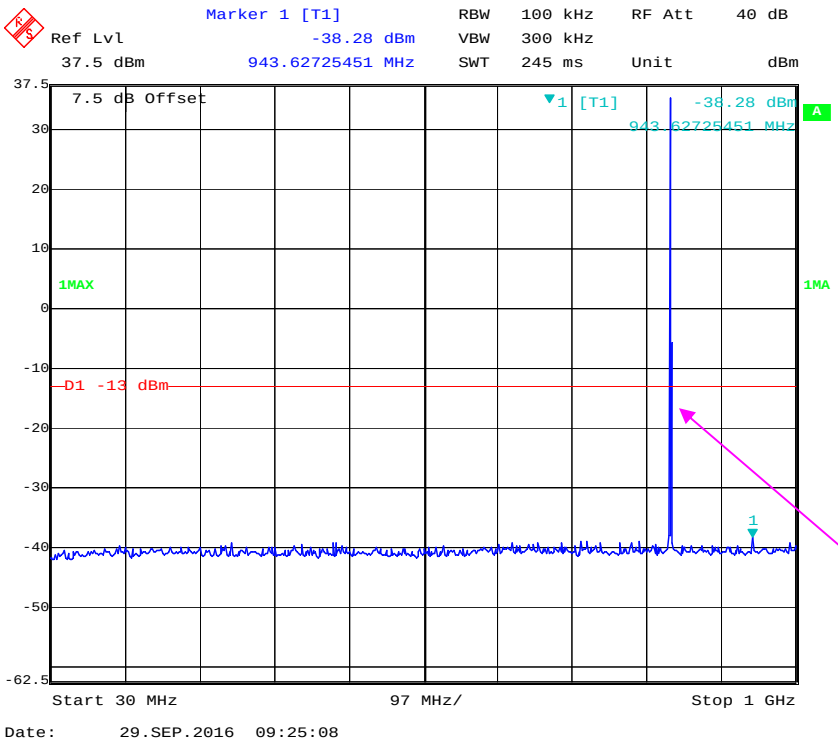
Environmental Conditions

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

The testing was performed by Ada Yu on 2016-09-29.

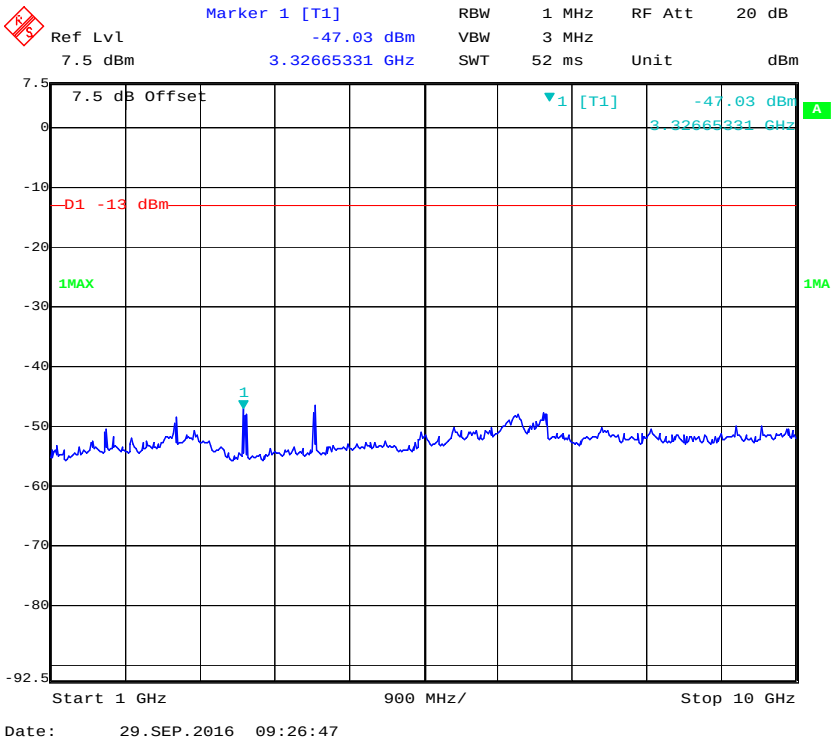
GSM Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)



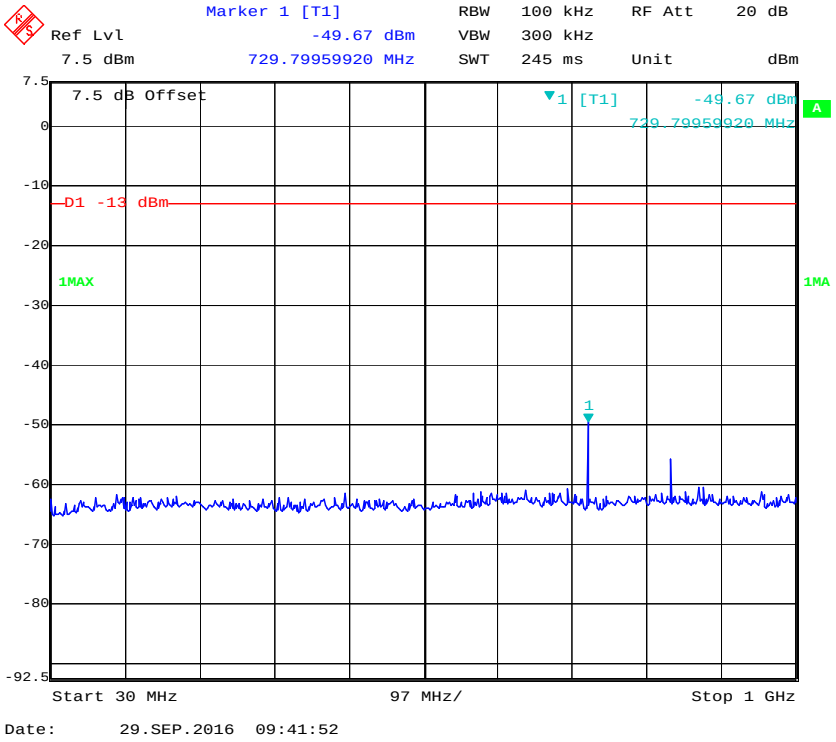
Fundamental test

1 GHz – 10 GHz (GSM Mode)

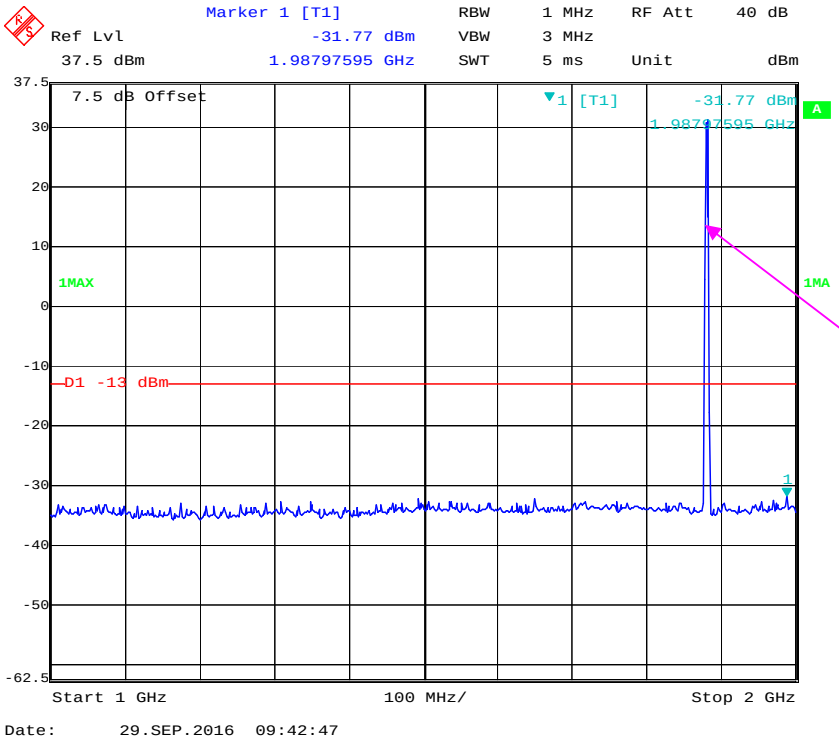


PCS Band (Part 22E)

30 MHz – 1 GHz (GSM Mode)

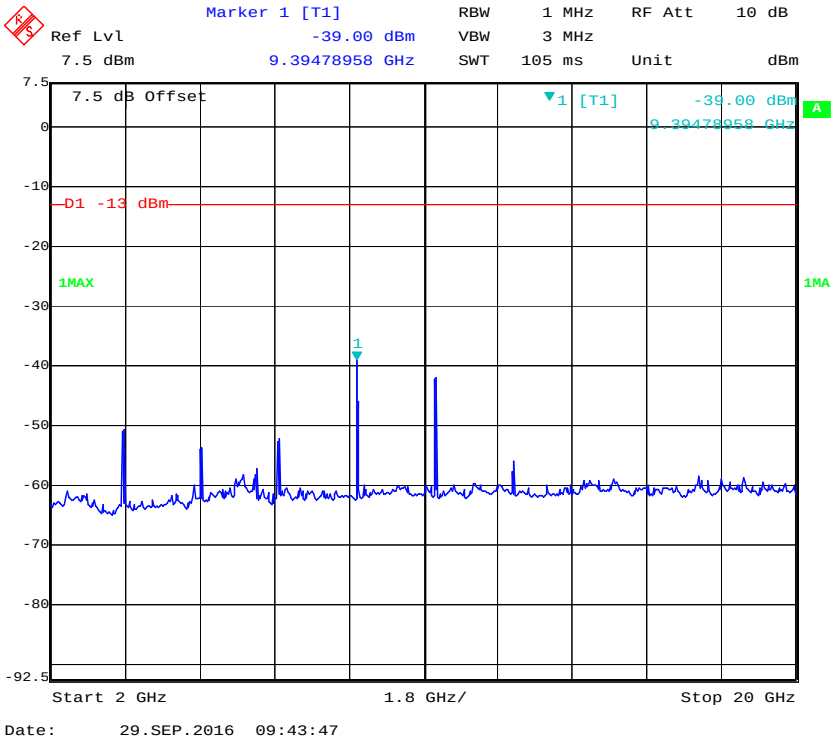


1 GHz – 2 GHz (GSM Mode)



Fundamental test

2 GHz – 20 GHz (GSM Mode)



FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC § 2.1053, §22.917 and § 24.238.

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.

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 (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Ada Yu on 2016-09-28.

Test mode: Transmitting

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data as below)

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 850 Mode low channel										
1648.40	61.62	174	1.3	H	-43.8	0.30	9.40	-34.70	-13	21.70
1648.40	63.82	82	2.2	V	-41.6	0.30	9.40	-32.50	-13	19.50
2472.60	56.28	321	2.3	H	-43.1	0.43	10.60	-32.90	-13	19.90
2472.60	58.98	2	1.9	V	-40.4	0.43	10.60	-30.20	-13	17.20

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 1900 Mode low channel										
3700.40	50.63	207	1.4	H	-42.1	2.42	12.60	-31.90	-13	18.90
3700.40	58.73	64	1.3	V	-34.0	2.42	12.60	-23.80	-13	10.80
5550.60	48.53	201	1.9	H	-40.8	2.61	12.70	-30.70	-13	17.70
5550.60	54.63	189	2.1	V	-34.7	2.61	12.70	-24.60	-13	11.60

Note:
1) Absolute Level = SG Level - Cable loss + Antenna Gain
2) Margin = Limit- Absolute Level

FCC § 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standards

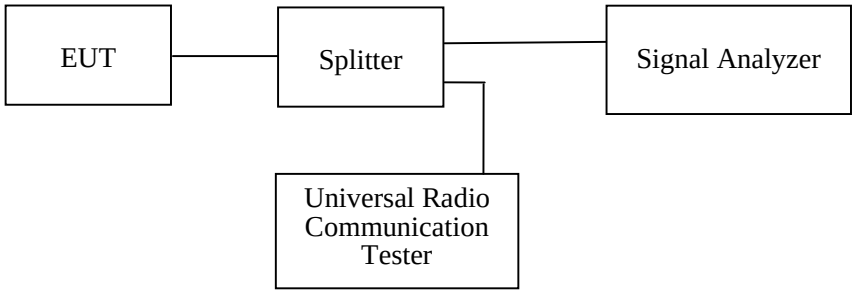
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

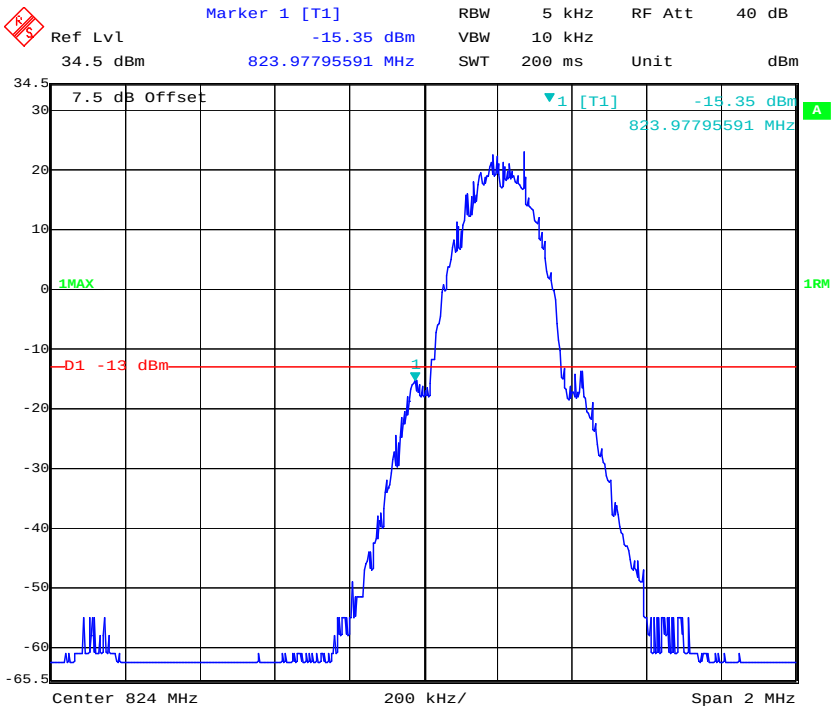
Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Ada Yu on 2016-09-29.

EUT operation mode: Transmitting

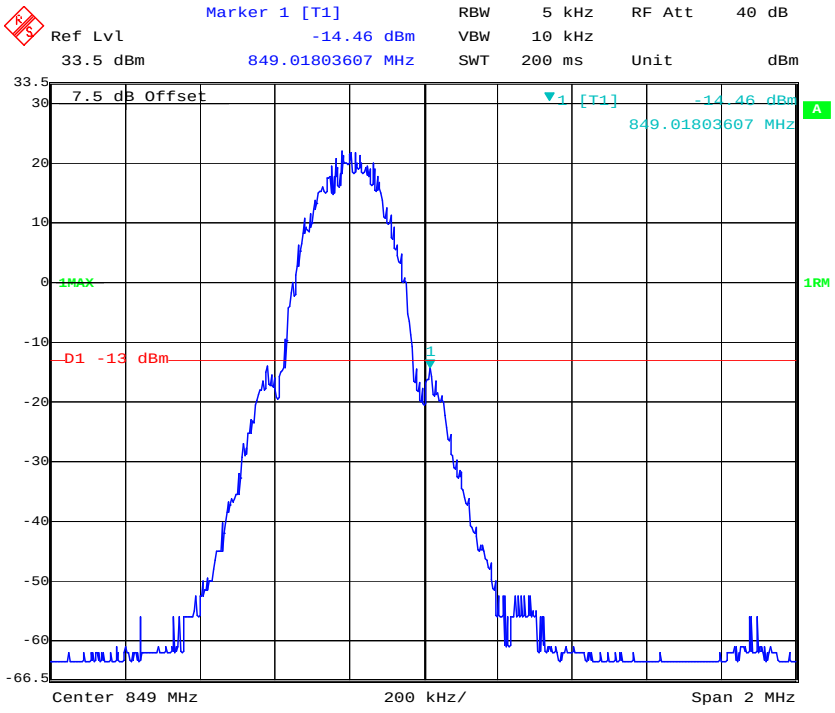
Test Result: Compliance. Please refer to the following plots.

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



Date: 29.SEP.2016 09:29:51

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



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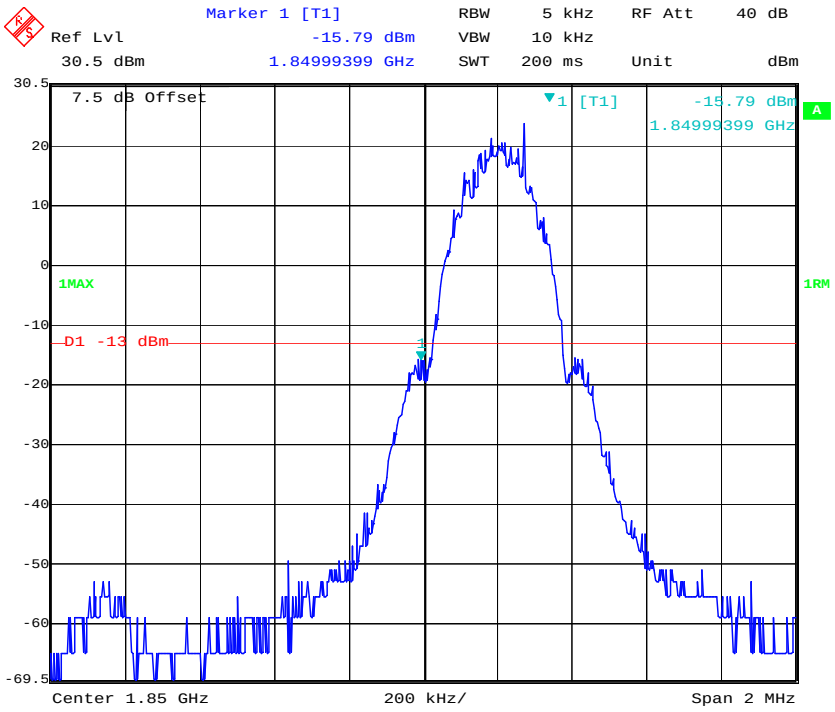
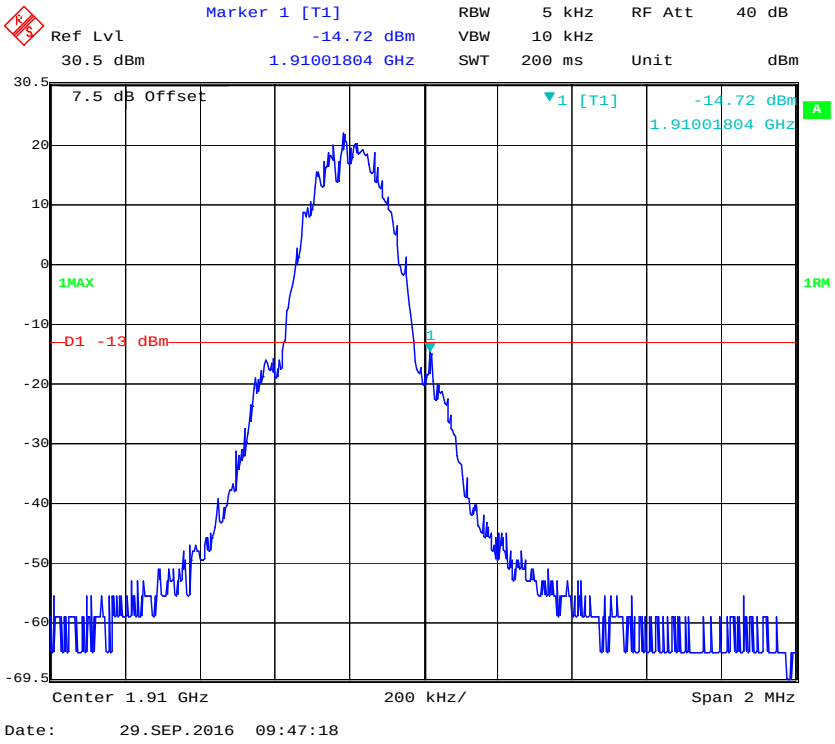
Cellular Band, Left Band Edge for GSM (GMSK) Mode



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



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

Applicable Standards

FCC § 2.1055, §22.355, §24.235

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 Tolerance for Transmitters in the Public Mobile Services

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

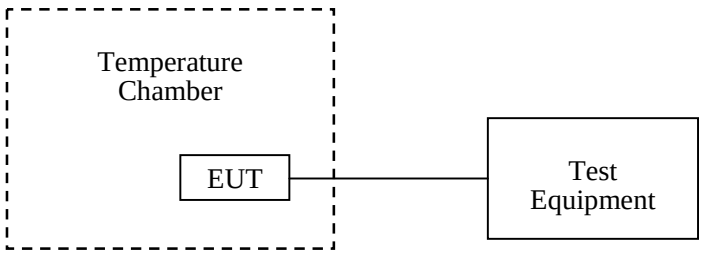
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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.



Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Ada Yu on 2016-09-28.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	25	0.02988	2.5
-20		25	0.02988	2.5
-10		22	0.01793	2.5
0		21	0.01793	2.5
10		21	0.01793	2.5
20		21	0.01793	2.5
30		22	0.01793	2.5
40		22	0.02391	2.5
50		22	0.02391	2.5
20	$V_{min.}$= 3.5	25	0.02988	2.5
	$V_{max.}$= 4.2	25	0.02988	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	32	0.01702	pass
-20		32	0.01702	pass
-10		30	0.01489	pass
0		25	0.01489	pass
10		25	0.01489	pass
20		25	0.01489	pass
30		25	0.01489	pass
40		30	0.01489	pass
50		30	0.01489	pass
20	$V_{min.}$= 3.5	32	0.01702	pass
	$V_{max.}$= 4.2	32	0.01702	pass

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