FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

Group Sense Mobile-Tech Limited

Room 13-24, 2/F, Sino Industrial Plaza, 9 Kai Cheung Road, Kowloon Bay, Kowloon, Hong Kong

FCC ID: VRI-B231

Report Type:	**Product Type:**
Original Report	POS Terminal

Report Number:	RSZ170418017-00D
Report Date:	2017-11-08
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Group Sense Mobile-Tech Limited's* product, model number: *DT-10 (FCC ID: VRI-B231)* or the "EUT" in this report was a *POS Terminal*, which was measured approximately: 28.4 cm (L) × 19.3 cm (W) × 1.9 cm (H), rated with input voltage: DC 3.8 V battery.

**All measurement and test data in this report was gathered from production sample serial number: 1700742 (Assigned by BACL, Shenzhen).The EUT supplied by the applicant was received on 2017-07-20.*

Objective

This type approval report is prepared on behalf of *Group Sense Mobile-Tech Limited* in accordance with Part 2, Part 22-Subpart H, 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 JBC, Part 15.247 DSS & DTS, Part 15.225 DXX and Part 15.407 NII submissions with FCC ID: VRI-B231.

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.

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.

Measurement Uncertainty

Parameter	uncertainty
Occupied Channel Bandwidth	±5%
RF Output Power with Power meter	±0.5dB
RF conducted test with spectrum	±1.5dB
AC Power Lines Conducted Emissions	±1.95dB
All emissions, radiated	±4.88dB
Temperature	±3℃
Humidity	±6%
Supply voltages	±0.4%

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.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

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.

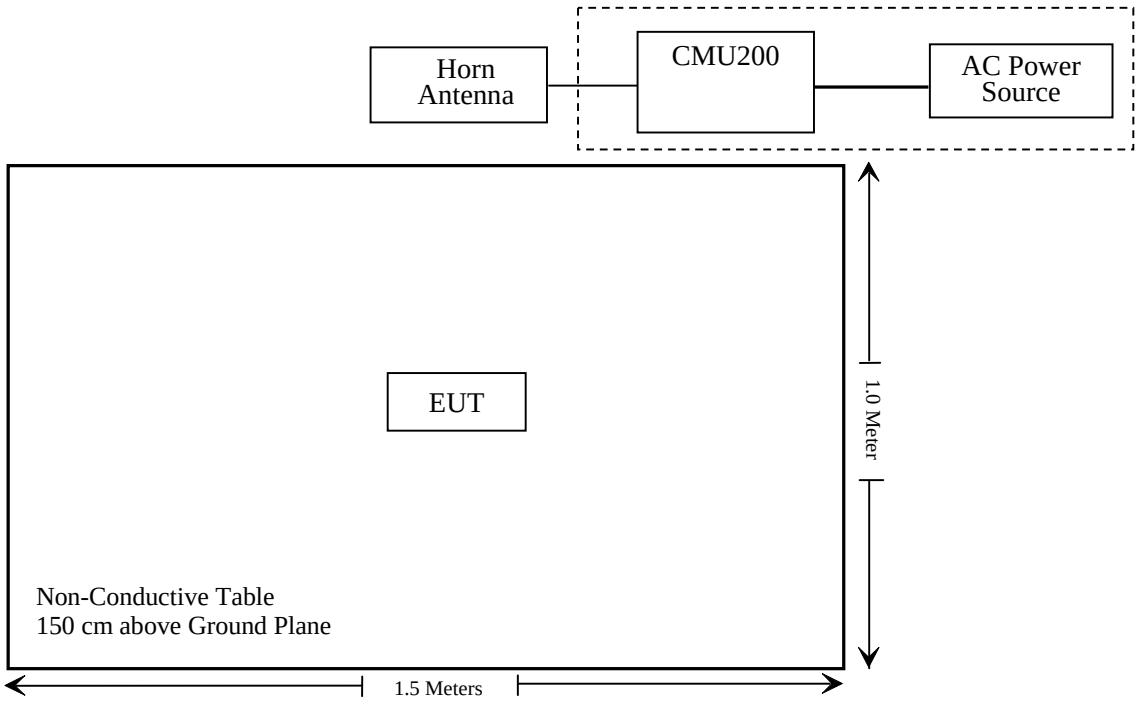
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891

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: RSZ170418017-20.
Compliance*: The device built in a certified single module, model: H380-GL, FCC ID: ZMOH380GL, which has been certified on 2016-05-17, this test items please refer to the module`s report, report No.: RF160330W009-1 & RF160330W009-2, which was tested by Bureau Veritas CPS (H.K.) Ltd. Taoyuan Branch.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
R & S	Wideband Radio Communication Tester	CMW500	146520	2017-02-14	2018-02-14
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2014-12-29	2017-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

*** 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).

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: RSZ170418017-20.

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.

§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.

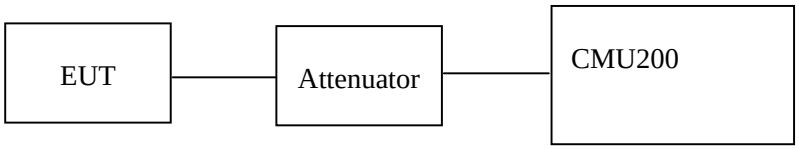
According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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:

TIA603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

The testing was performed by Bibo Zhang on 2017-11-08.

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)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	88.85	125	1.5	H	28.8	0.6	0	29.4	38.45	9.05
836.6	81.68	55	1.3	V	21.7	0.6	0	22.3	38.45	16.15
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	92.16	181	2.4	H	22.1	1.30	8.50	29.3	33	3.7
1880.00	88.86	28	1.8	V	18.6	1.30	8.50	25.8	33	7.2

EDGE mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	85.85	276	1.6	H	25.8	0.6	0	25.2	38.45	13.25
836.6	91.06	81	1.4	V	20.8	0.6	0	20.2	38.45	18.25
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	87.96	115	2.1	H	17.9	1.30	8.50	25.1	33	7.9
1880.00	84.56	202	1.5	V	14.3	1.30	8.50	21.5	33	11.5

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, WCDMA Band V (Part 22H), Middle Channel										
836.6	82.35	254	1.8	H	22.3	0.6	0	21.7	38.45	16.75
836.6	78.48	24	1.6	V	18.5	0.6	0	17.9	38.45	20.55
EIRP, WCDMA Band II (Part 24E), Middle Channel										
1880.00	86.06	136	1.2	H	16	1.30	8.50	23.2	33	9.8
1880.00	83.56	48	1.6	V	13.3	1.30	8.50	20.5	33	12.5

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

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

Applicable Standard

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 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.

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Bibo Zhang on 2017-08-14.

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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 850 Mode										
218.45	37.52	170	1.2	H	-59.5	0.30	0	-59.80	-13	46.80
218.45	35.42	315	2.3	V	-61.6	0.30	0	-61.90	-13	48.90
1673.20	52.54	328	2.2	H	-54.5	1.30	9.10	-46.70	-13	33.70
1673.20	51.48	222	1.9	V	-55.0	1.30	9.10	-47.20	-13	34.20
2509.80	50.15	39	1.7	H	-53.4	2.60	9.30	-46.70	-13	33.70
2509.80	48.52	83	2.3	V	-54.4	2.60	9.30	-47.70	-13	34.70
3346.40	45.47	141	1.4	H	-54.9	1.50	9.60	-46.80	-13	33.80
3346.40	41.42	340	1.7	V	-59.0	1.50	9.60	-50.90	-13	37.90
WCDMA 850 Mode										
235.65	37.59	272	1.2	H	-59.4	0.31	0	-59.71	-13	46.71
235.65	35.27	241	2.4	V	-61.7	0.31	0	-62.01	-13	49.01
1693.20	45.32	246	1.2	H	-61.8	1.30	9.10	-54.00	-13	41.00
1693.20	43.45	83	1.1	V	-63.0	1.30	9.10	-55.20	-13	42.20
2539.80	42.12	132	1.2	H	-61.4	2.60	9.30	-54.70	-13	41.70
2539.80	40.53	12	1.9	V	-62.4	2.60	9.30	-55.70	-13	42.70

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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 1900 Mode										
218.45	37.24	199	1.5	H	-59.8	0.30	0	-60.10	-13	47.10
218.45	35.13	56	2.1	V	-61.9	0.30	0	-62.20	-13	49.20
3819.60	56.25	310	2.0	H	-46.0	1.50	9.70	-37.80	-13	24.80
3819.60	52.65	86	2.1	V	-49.2	1.50	9.70	-41.00	-13	28.00
WCDMA 1900 Mode										
235.65	37.72	252	2.3	H	-59.3	0.31	0	-59.61	-13	46.61
235.65	35.43	173	2.0	V	-61.6	0.31	0	-61.91	-13	48.91
3704.80	47.58	346	1.2	H	-53.5	1.60	9.80	-45.30	-13	32.30
3704.80	45.43	52	1.5	V	-55.1	1.60	9.80	-46.90	-13	33.90

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

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