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RADIO TEST REPORT

Report No.: STS2110087W02

Issued for

Mobile Action Technology Inc.

12F, NO.661, Bannan Rd., Zhonghe Dist. New Taipei City,
Taiwan (R.O.C.) 235030

Product Name:	Bluetooth GPS Logger
Brand Name:	Mobile Action
Test Model Name:	GT-120B
Series Model:	N/A
Test Standard:	ETSI EN 303 413 V1.1.1 (2017-06)

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Shenzhen STS Test Services Co., Ltd.

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**TEST REPORT CERTIFICATION**

Applicant's Name..... : Mobile Action Technology Inc.
Address : 12F, NO.661, Bannan Rd., Zhonghe Dist. New Taipei City, Taiwan
(R.O.C.) 235030

Manufacturer's Name : Heisei Technology Co., Ltd.
Address : 3F, No.5, Alley 8, Lane 45, Pao Hsin Rd. Hsin-Tien Dist. New
Taipei City 23145, Taiwan R.O.C.

Product Description

Product Name..... : Bluetooth GPS Logger

Trade Mark : Mobile Action

Test Model Name..... : GT-120B

Series Model..... : N/A

Standards..... : ETSI EN 303 413 V1.1.1 (2017-06)

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Date of Test..... :

Date of receipt of test item : 29 Oct. 2021

Date (s) of performance of tests..... : 29 Oct. 2021 ~ 16 Nov. 2021

Date of Issue..... : 16 Nov. 2021

Test Result..... : **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	16 Nov. 2021	STS2110087W02	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

ETSI EN 303 413 V1.1.1 (2017-06)			
Clause	Description of Test Item	Remarks	Results
4.2.1	Adjacent signal selectivity	Conducted	Pass
4.2.2	Spurious emissions	Radiated	Pass





1.1 TEST FACTORY

Company Name:	SHENZHEN STS TEST SERVICES CO., LTD
Address:	A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
Telephone:	+86-755 3688 6288
Fax:	+86-755 3688 6277
Registration No.:	FCC test Firm Registration Number: 625569; IC test Firm Registration Number: 12108A; A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated below 1GHz	$\pm 2.26\text{dB}$
4	All emissions, radiated 1GHz-18GHz	$\pm 2\text{dB}$
5	All emissions, radiated >18G	$\pm 2.88\text{dB}$



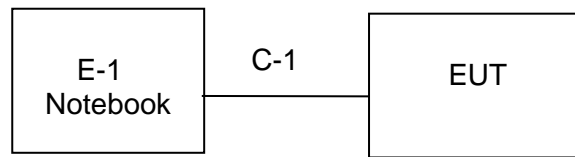
2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Equipment	Bluetooth GPS Logger
Brand Name	Mobile Action
Model Name	GT-120B
Series Model	N/A
Model Difference	N/A
Receiver Frequency	1.57542GHz
Rating	Input: DC 5V
Battery	Rated Voltage: 3.7V Charge Limit Voltage: 4.2V Capacity: 380mAh
Antenna	PIFA
Antenna Gain(Peak)	1dBi
Hardware version number	V1.1
Software version number	V1.0
Extreme Temperature	-10°C – 50°C



2.2 TEST MODE



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-1	Notebook	HP	500-320cx	N/A	N/A
C-1	DC Cable	N/A	N/A	30cm	NO

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Temperature & Humidity	SW-108	SuWei	N/A	2021.03.04	2022.03.03
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	BALUN	BL410-E/15.2.0.399			

RF Connected Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Generator	Agilent	N5182A	MY46240556	2021.09.30	2022.09.29
Signal Analyzer	Agilent	N9020A	MY49100060	2021.09.30	2022.09.29
Wireless Communications Test Set	R&S	CMW 500	133884	2021.03.04	2022.03.03
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Temperature& Humidity test chamber	Safety test	AG80L	171200018	2021.03.04	2022.03.03
Attenuator	HP	8494B	DC-18G	2021.04.28	2022.04.27
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. SPURIOUS EMISSIONS – RECEIVER

3.1 LIMIT

Clause	Frequency(MHz)	Limit	Bandwidth
4.2.2.2	30-1000	-57dBm	100KHz
	1000-8300	-47dBm	1MHz

3.2 TEST PROCEDURES

The following table is the setting of the Spectrum Analyzer.

Spectrum Analyzer	Setting
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	9000MHz
Detector	Positive Peak
Sweep Time	Auto
RB / VB	100 kHz / 300 kHz(below 1GHz) 1MHz/3MHz(Above 1GHz)

- The EUT was placed on the top of the turntable in open test site area.
- The test shall be made in the receiving mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- For 30MHz~16 GHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable.
- The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
- Replace the EUT by standard antenna and feed the RF port by signal generator.
- Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
- Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
- The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBi and minus the loss of the cable used between the signal generator and the standard antenna.
- The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

3.3 EUT OPERATION DURING TEST

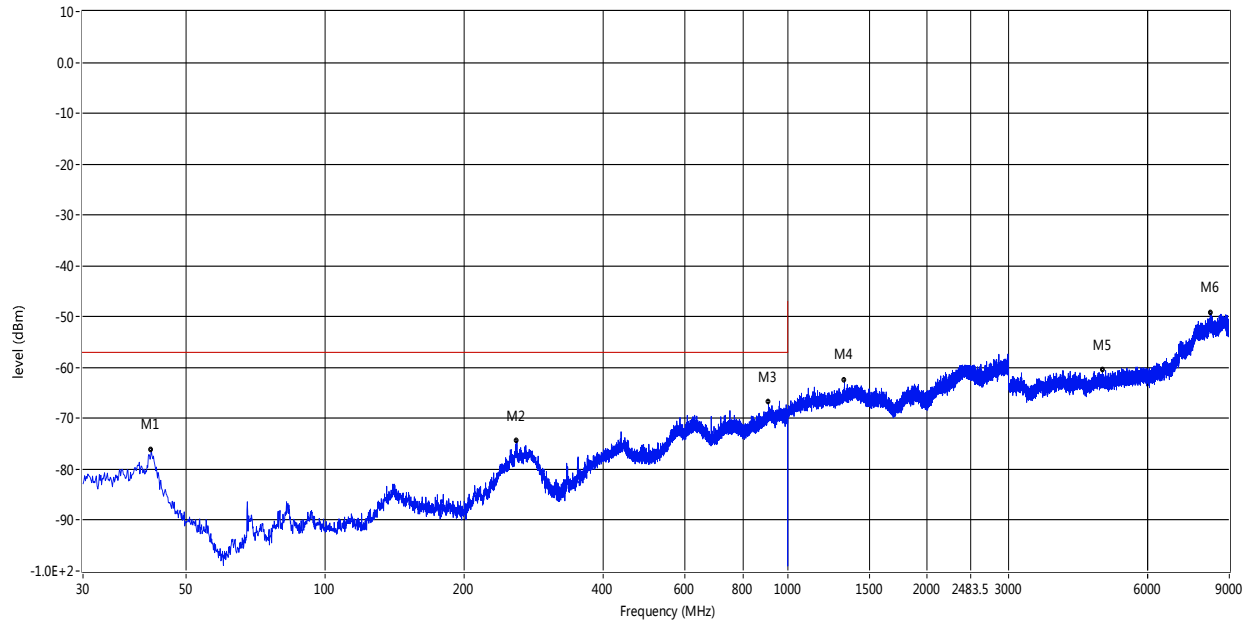
The EUT was programmed to be in continuously receiving mode.



3.4 TEST RESULTS

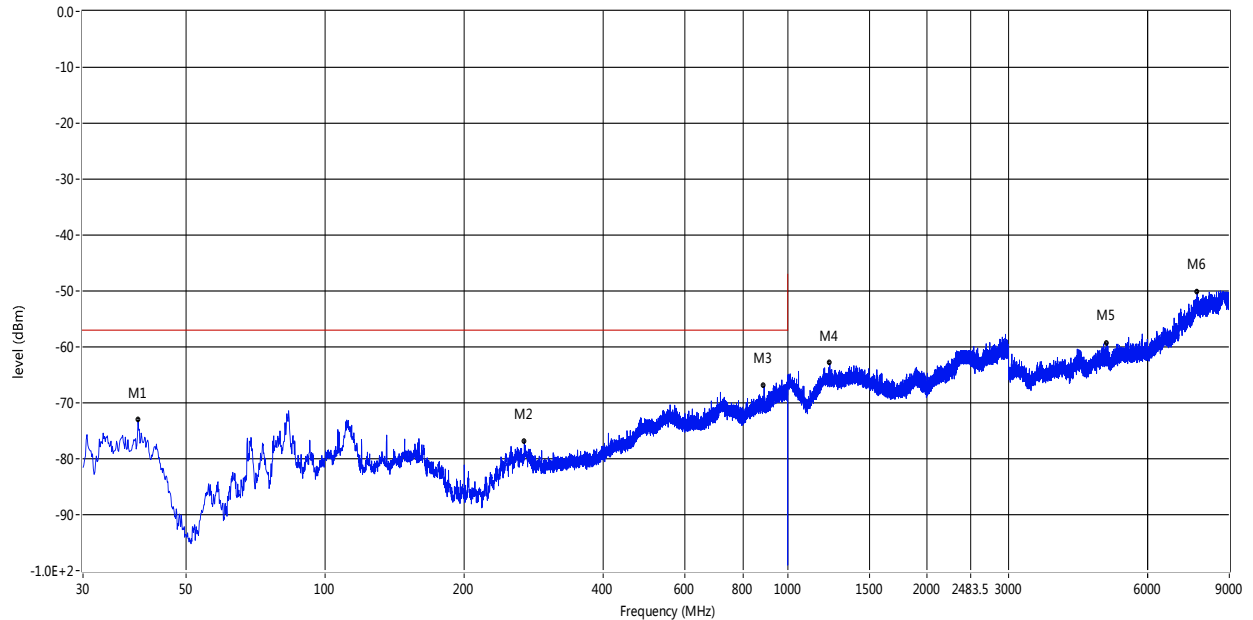
Horizontal

RSE-EN RX-TX TEST Case_EN303413_EN300 413-RX_30M-8.3G_H



Vertical

RSE-EN RX-TX TEST Case_EN303413_EN300 413-RX_30M-8.3G_V





4. ADJACENT SIGNAL SELECTIVITY

4.1 LIMIT

The C/N_0 metric reported by the GUE for all GNSS and GNSS signals given in table 4-1 and supported by the GUE shall not degrade by more than the value given in equation 4-1 when an adjacent frequency signal is applied. The adjacent frequency signal is defined in table 4-4, with the frequencies and power levels defined in table 4-2 and/or in table 4-3 depending on the RNSS bands supported by the GUE. Equation 4-1: Maximum degradation in C/N_0

$$\Delta C/N_0 \leq 1 \text{ dB}$$

Table 4-1: GNSS, GNSS signals and RNSS frequency bands

GNSS	GNSS Signal Designations	RNSS Frequency Band (MHz)
BDS	B1I	1559 to 1610
Galileo	E1	1559 to 1610
	E5a	1164 to 1215
	E5b	1164 to 1215
	E6	1215 to 1300
GLONASS	G1	1559 to 1610
	G2	1215 to 1300
GPS	L1	1559 to 1610
	L2	1215 to 1300
	L5	1164 to 1215
SBAS	L1	1559 to 1610
	L5	1164 to 1215

Table 4-2: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 559 MHz to 1 610 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
1518 to 1525	1524	-65	MSS (space-to-Earth) band
1525 to 1549	1548	-95	MSS (space-to-Earth) band
1549 to 1559	1554	-105	MSS (space-to-Earth) band
1559 to 1610	GUE RNSS band under test		
1610 to 1626	1615	-105	MSS (space-to-Earth) band
1626 to 1640	1627	-85	MSS (space-to-Earth) band



Table 4-3: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 164 MHz to 1 300 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
960 to 1164	1154	-75	AM(R)S, ARNS band
1164 to 1215	GUE RNSS band under test		
1215 to 1260	GUE RNSS band under test		
1260 to 1300	GUE RNSS band under test		
1300 to 1350	1310	-85	Radiolocation, ARNS, RNSS (Earth-to-space) band

Table 4-4: Adjacent frequency signal

Parameter	Value	Comments
Frequency	See table 4-2 and table 4-3	
Power level	See table 4-2 and table 4-3	
Bandwidth	1 MHz	See clause B.1 for details
Format	AWGN	

4.2 TEST PROCEDURES

1. Please refer to ETSI EN 303 413 (V1.1.1) clause 5.4.2. for the test conditions.
2. Please refer to ETSI EN 303 413 (V1.1.1) clause 5.4.3 for the measurement method.

4.3 TEST SETUP

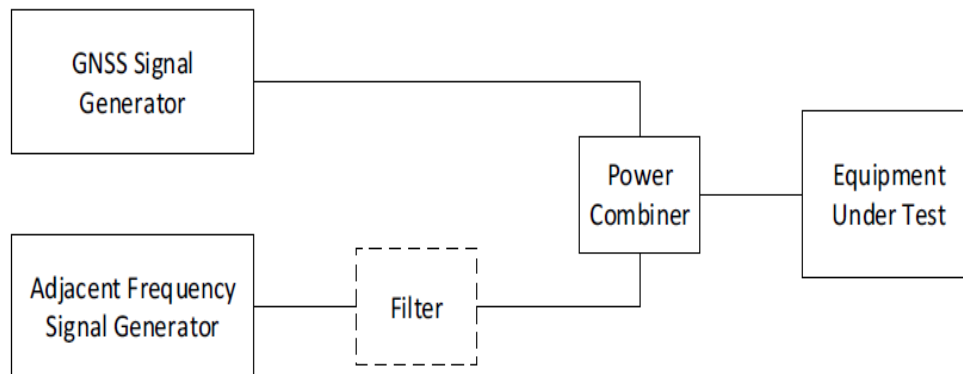


Figure 5-1: Conducted measurement setup for EUT adjacent frequency band selectivity

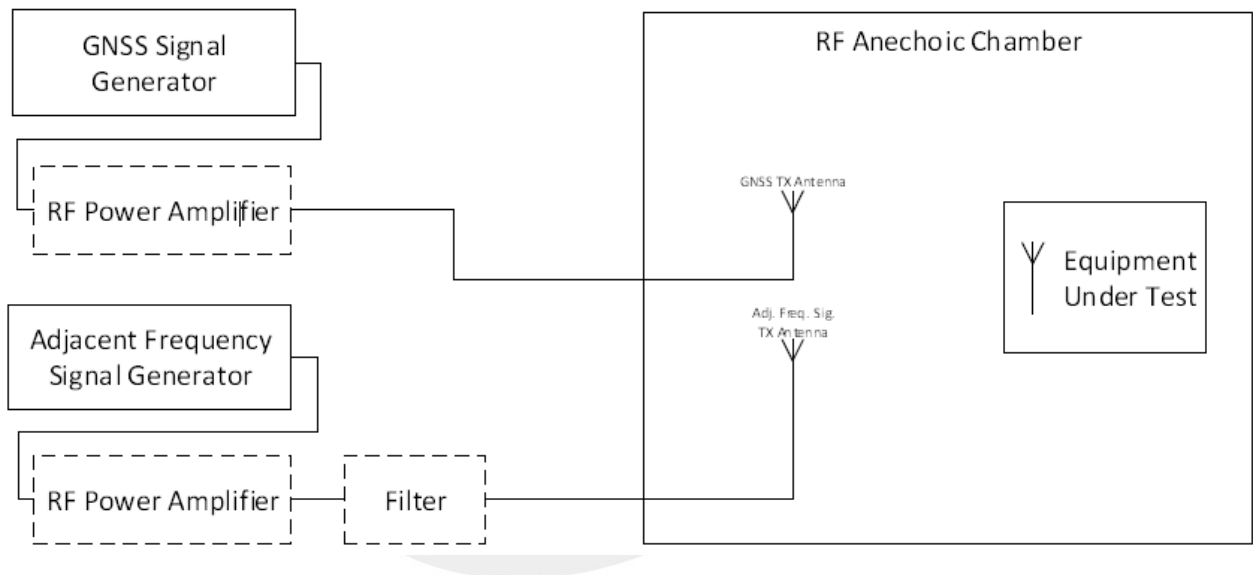


Figure 5-2: Radiated measurement setup for EUT adjacent frequency band selectivity performance

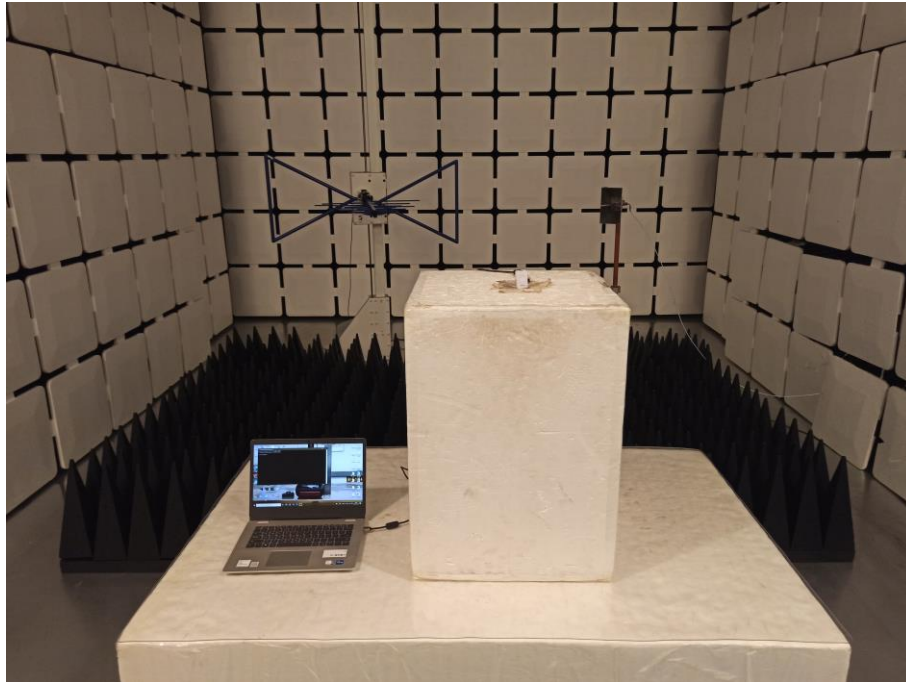
The EUT was programmed to be in continuously receive mode.

4.4 TEST RESULTS

Frequency (MHz)	C/N0 (dB/Hz)	Adjacent frequency (MHz)	Adjacent frequency signal power level (dBm)	Add adjacent channel signals C/N0 (dB/Hz)	Δ C/N0 Result (dB)	Δ C/N0 Limit (dB)
1575.42	36.0	1524	-65	36.3	-0.3	≤ 1
		1548	-95	36.4	-0.4	
		1554	-105	36.1	-0.1	
		1615	-105	36.2	-0.2	
		1627	-85	36.2	-0.2	



Measurement Photos



※※※※※END OF THE REPORT※※※※※