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FCC RF TEST REPORT

Application No:	SZEM1502000801HR
Applicant:	Aspenta International FZ-LLC
Product Name:	GPS Tracker
Mode No.(EUT):	CIT-002
Trade Mark:	aspenta Redefining Connectivity
FCC ID:	2ADTO-CIT-001
Standards:	47 CFR Part 2（2014）
	47 CFR Part 22 subpart H（2014）
	47 CFR Part 24 subpart E（2014）(only for Effective Isotropic Radiated Power Output Data and Field strength of spurious radiation)
Test Method:	FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

NOTE: In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2015-07-07		Original

Authorized for issue by:				
Tested By		Chris Zhong **(Chris Zhong) /Project Engineer**		2015-01-08 **Date**
Prepared By		Jade Chen **(Jade Chen) /Clerk**		2015-07-07 **Date**
Checked By		Emen_Li **(Emen Li) /Reviewer**		2015-07-07 **Date**

3 Notice

3.1 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

  The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

3.2 Deviation from Standards

None.

3.3 Abnormalities from Standard Conditions

None.

3.4 Other Information Requested by the Customer

None.

3.5 Test Location

Applicant:	SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab
Address:	No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057. Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

NOTE: No tests were sub-contracted.

3.6 Test Environment Condition

Ambient Temperature:	19.5 to 25 ℃
Ambient Relative Humidity:	40 to 55 %
Atmospheric Pressure:	1005

3.7 Test Date

Date of Receipt	2015-02-12
Date of Start Test	2015-03-12
Date of End Test	2015-06-26
Date of Issue:	2015-07-07

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5 Test Summary

5.1 Cellular Band (824-849 MHz Paired With 869-894 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046(a), § 22.913(a)	FCC: ERP ≤ 7 W.	Appendix A	PASS
Field strength of spurious radiation	§2.1053, §22.917(a)(b）	FCC: ≤ -13dBm/100 kHz,	Appendix B	PASS

5.2 PCS Band (1850-1910 MHz Paired With 1930-1990 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective Isotropic Radiated Power Output Data	§2.1046(a), § 24.232	EIRP ≤ 2 W.	Appendix A	PASS
Field strength of spurious radiation	§2.1053, §24.238	≤ -13dBm/1MHz,	Appendix B	PASS

Remark:
Model No.: CIT-001, CIT-002
This test report (Ref. No.: SZEM141100609004) is only valid with the original test report (Ref. No.: SZEM141100609002).
Review this report and original report, this report just changed the model formation.
According to the declaration from the applicant, the model in this report and model in original report was identical, only difference with being the model no., and only GSM and GPS antenna and enclosure is different. CIT-001(2ADTO-CIT-001) has internal antenna, and CIT-002(2ADTO-CIT-002) has external antenna.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report Effective Isotropic Radiated Power Output Data and Field strength of spurious radiation were fully retested on Model CIT-002 and shown the data in this report, other tests please refer to original report SZEM141100609002.

6 Description of the Equipment under Test (EUT)

6.1 Client Information

Applicant:	Aspenta International FZ-LLC
Address of Applicant:	Premises:155 Floor:01 building:17 Dubai, United Arab Emirates

6.2 Boared

Product Name:	GPS Tracker
Model No.:	CIT-001
Trade Mark:	aspenta Redefining Connectivity
Antenna Gain:	GSM850:2.5dBi
	GSM1900:2.5dBi
IMEI:	N/A

6.3 Sub-Assembly

Sub-Assembly	
Sub-Assembly Name	Description
N/A	N/A

Sub-Assembly	
Sub-Assembly Name	Description
Battery	Li recharge battery 3.7V 300mAh

6.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

6.5 Technical Specification

Characteristics	Description	
Radio System Type	☒ GSM	
	☐ UMTS	
Supported Frequency Range	GSM850	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	GSM1900	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
Target TX Output Power	GSM850: 33dBm GSM1900 31dBm	
Supported Channel Bandwidth	GSM system:	☒200 kHz
	UMTS system:	☐5 MHz
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM850: GSM1900: UMTS850: UMTS1900:	247KGXW, 252KG7W 249KGXW, 247KG7W 4M16F9W 4M15F9W

7 General Test Conditions / Configurations

7.1 Test Mode

Test Mode	Test Modes Description
GSM/TM1	GSM system, GSM/GPRS, GMSK modulation

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

7.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Humidity:	52 % RH	
Temperature	TN	Ambient
Voltage :	VL	3.6V
	VN	3.7V
	VH	4.2V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

7.3 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 192	Channel 251
		824.2MHz	836.6MHz	848.8MHz
	RX	Channel 128	Channel 192	Channel 251
		869.2MHz	881.6MHz	893.8MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM1900	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz

7.4 Description of Tests

7.4.1 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure:

Below 1GHz test procedure as below:

1). The EUT was powered ON and placed on a 0.8m high table in the chamber. The antenna of the transmitter was extended to its maximum length.

2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.

3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.

4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.

5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.

6). The output power into the substitution antenna was then measured.

7). Steps 5) and 6) were repeated with both antennas polarized.

8). Calculate power in dBm by the following formula:

ERP (dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)

Where:

Pg is the generator output power into the substitution antenna.

Above 1GHz test procedure as below:

1). Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber

2). Calculate power in dBm by the following formula:

EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

EIRP=ERP+2.15dB

Where:

Pg is the generator output power into the substitution antenna.

3). Test the EUT in the lowest channel, the middle channel the Highest channel

4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.

5). Repeat above procedures until all frequencies measured was complete.

Note: Reference test setup 1

7.4.2 Field Strength of Spurious Radiation

Measurement Procedure:

Below 1GHz test procedure as below:

1). The EUT was powered ON and placed on a 80cm high table in the chamber. The antenna of the transmitter was extended to its maximum length.

2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.

3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.

4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.

5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.

6). The output power into the substitution antenna was then measured.

7). Steps 5) and 6) were repeated with both antennas polarized.

8) Calculate power in dBm by the following formula:

ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)

Where:

Pd is the dipole equivalent power, Pg is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to Pg [dBm] – cable loss [dB]. The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log10(Power [Watts]).

Above 1GHz test procedure as below:

1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber

2) Calculate power in dBm by the following formula:

EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)

EIRP=ERP+2.15dB

Where:

Pg is the generator output power into the substitution antenna.

3. Test the EUT in the lowest channel, the middle channel the Highest channel

4. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.

5. Repeat above procedures until all frequencies measured was complete

Note: Reference test setup 2

7.5 Test Setups

7.5.1 Test Setup 1

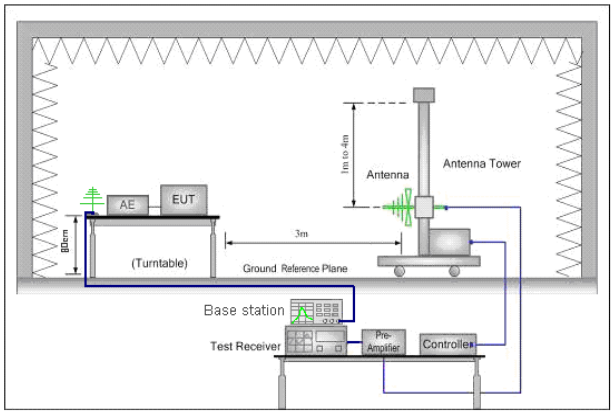

Figure 1. 30MHz to 1GHz

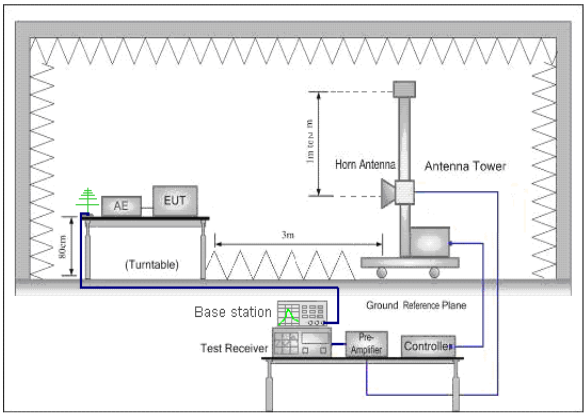

Figure 2. above 1GHz

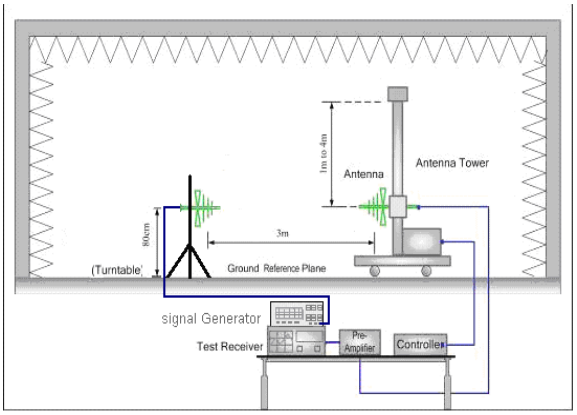

Figure 1. 30MHz to 1GHz

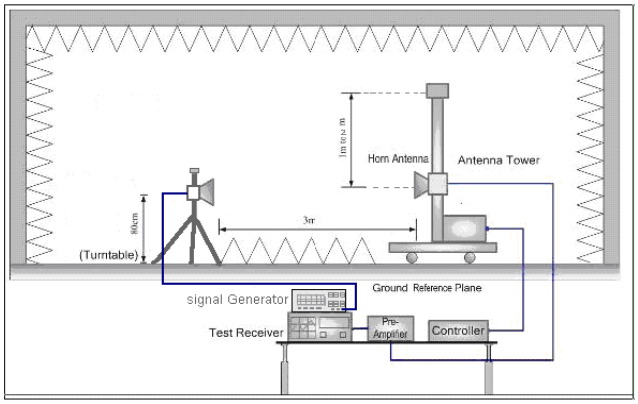

Figure 2. above 1GHz

7.5.2 Test Setup 2

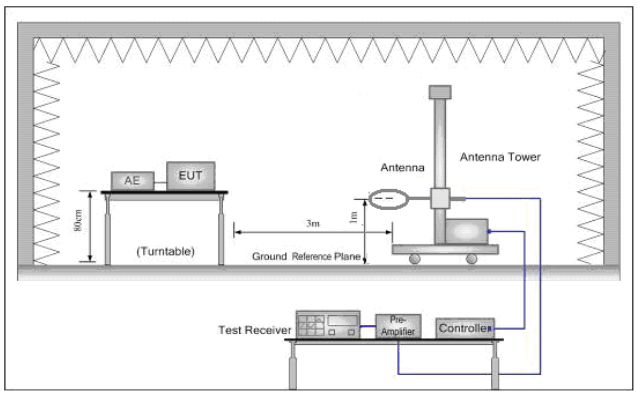

Figure 1. Below 30MHz

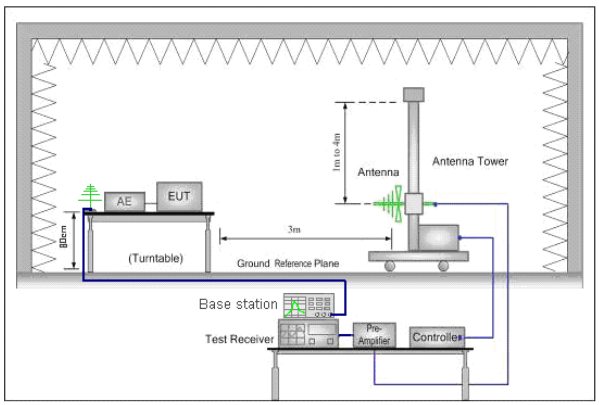

Figure 2. 30MHz to 1GHz

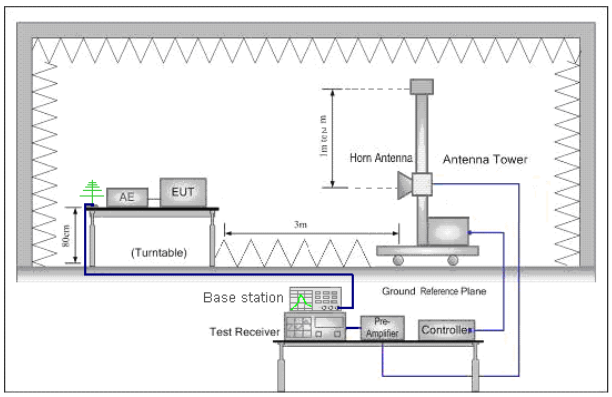

Figure 3. above 1GHz

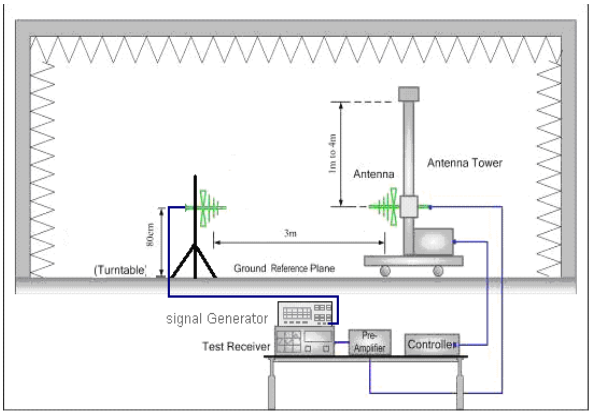

Figure 2. 30MHz to 1GHz

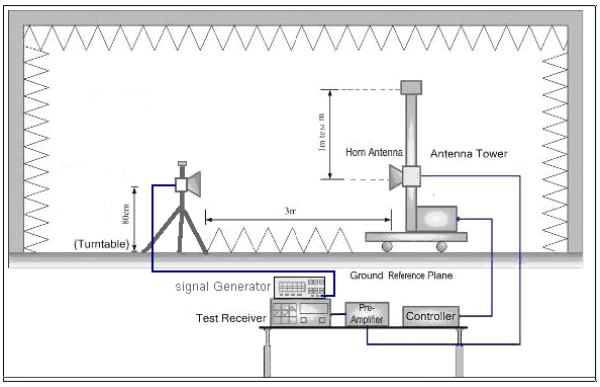

Figure 3. above 1GHz

7.6 Test Conditions

Test Case		Test Conditions	
Transmit Output Power Data	Average Power, Total	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1
	Average Power, Spectral Density (if required)	Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
		Test Mode	GSM/TM1
Field Strength of Spurious Radiation		Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 2
		Test Mode	GSM/TM1 NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)

8 Main Test Instruments

RE in Chamber					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2016-05-13
2	EMI Test Receiver	Agilent Technologies	N9038A	SEL0312	2015-09-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2015-10-24
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2015-10-24
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2015-10-24
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2016-05-13
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2015-10-24
9	Coaxial cable	SGS	N/A	SEL0027	2016-05-13
10	Coaxial cable	SGS	N/A	SEL0189	2016-05-13
11	Coaxial cable	SGS	N/A	SEL0121	2016-05-13
12	Coaxial cable	SGS	N/A	SEL0178	2016-05-13
13	Band filter	Amindeon	82346	SEL0094	2016-05-13
14	Barometer	Chang Chun	DYM3	SEL0088	2016-05-13
15	Universal radio communication tester	Rohde & Schwarz	CMU200	SEL0091	2015-10-24
16	Universal radio communication tester	Rohde & Schwarz	CMU200	SEL0194	2015-10-24
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2016-05-13
18	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2015-10-24
19	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2015-10-24
20	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24

Note: The calibration interval is one year, all the instruments are valid.

9 Measurement Uncertainty

For a 95% confidence level (k = 2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item	Extended Uncertainty	Data
Transmit Output Power Data	Power [dBm]	U = 0.37 dB
Field Strength of Spurious Radiation	ERP [dBm]	For 3 m Chamber: U = 4.5 dB (30 MHz to 1GHz) U = 3.3 dB (above 1 GHz) For 10 m Chamber: U = 4.5 dB (30 MHz to 1GHz) U = 3.2 dB (above 1 GHz)

10 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1502000801HR.

The End