



REPORT No.: SZ18050201W04

# TEST REPORT

**MANUFACTURER** : Shenzhen Chainway Information  
Technology Co.,Ltd.

**PRODUCT NAME** : Mobile Data Terminal

**MODEL NAME** : C75

**BRAND NAME** : CHAINWAY

**STANDARD(S)** : ETSI EN 303 413 V1.1.1 (2017-06)

**TEST DATE** : 2018-07-04 to 2018-07-05

**ISSUE DATE** : 2018-07-06

Tested by: Tu Ya'nan  
Tu Ya'nan (Test Engineer)

Approved by: Peng Huarui  
Peng Huarui ( Supervisor )

**NOTE:** This document is issued by MORLAB, the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.

**MORLAB**

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.  
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





## DIRECTORY

<b>1. Technical Information .....</b>	<b>4</b>
<b>1.1. Manufacturer and Factory Information.....</b>	<b>4</b>
<b>1.2. Equipment Under Test (EUT) Description.....</b>	<b>4</b>
<b>1.3. Test Standards and Results .....</b>	<b>5</b>
<b>1.4. EUT Setup and Operating Conditions.....</b>	<b>6</b>
<b>1.5. Environmental Conditions .....</b>	<b>6</b>
<b>2. Test specifications and results .....</b>	<b>7</b>
<b>2.1. EN 303 413 §4.2.1 GUE adjacent frequency band selectivity .....</b>	<b>7</b>
<b>2.2. EN 303 413 §4.2.2- Spurious emissions .....</b>	<b>14</b>
<b>Annex A Photographs of Test Setup .....</b>	<b>19</b>
<b>Annex B Test Uncertainty.....</b>	<b>20</b>
<b>Annex C Testing Laboratory Information.....</b>	<b>21</b>



REPORT No.: SZ18050201W04

Change History		
Issue	Date	Reason for change
1.0	2018-07-06	First edition

# 1. Technical Information

**Note:** Provide by manufacturer.

## 1.1. Manufacturer and Factory Information

<b>Manufacturer:</b>	Shenzhen Chainway Information Technology Co.,Ltd.
<b>Manufacturer Address:</b>	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen
<b>Factory:</b>	Shenzhen Chainway Information Technology Co.,Ltd.
<b>Factory Address:</b>	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Mobile Data Terminal	
<b>Serial No:</b>	(N/A, marked #1 by test site)	
<b>Hardware Version:</b>	C70_MB_V11	
<b>Software Version:</b>	C75E_MT6737_V1.2_EU_GITe4dc346_201805171136	
<b>Equipment Type:</b>	GNSS Receiver	
<b>Operating Frequency Range:</b>	Refer the Table 1: GNSS, GNSS signals and RNSS frequency bands	
<b>Power Supply:</b>	Battery/AC Adaptor	
<b>Operating voltage:</b>	Normal:	3.8 V
<b>Operating temperature:</b>	Normal:	25°C
	Lowest:	-20°C
	Highest:	50°C

**Note 1:** The EUT contains a GNSS Receiver for Global Navigation Satellite. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

**Note 2:** This test report is updated from report SZ17080130W10, based on the similarity between before, the model name, the software and hardware version, the antenna type and the appearance of EUT are changed. The changes only affect the test results of Spurious emission.

**Table 1: GNSS, GNSS signals and RNSS frequency bands:**

GNSS	GNSS Signal Designations	RNSS Frequency Band (MHz)	Support? (Yes/ No)
BDS	B1I	1 559 to 1 610	No
Galileo	E1	1 559 to 1 610	No
	E5a	1 164 to 1 215	No
	E55b	1 164 to 1 215	No
	E6	1 215 to 1 300	No
GLONASS	G1	1 559 to 1 610	No
	G2	1 215 to 1 300	No
GPS	<b>L1</b>	<b>1 559 to 1 610</b>	<b>Yes</b>
	L2	1 215 to 1 300	No
	L5	1 164 to 1 215	No
SBAS	L1	1 559 to 1 610	No
	L5	1 164 to 1 215	No

### 1.3. Test Standards and Results

The EUT has been tested according to ETSI EN 303 413 V1.1.1 (2017-06)

ETSI EN 303 413 V1.1.1 (2017-06)	Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency bands; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.
----------------------------------	--

Test items and the results are as bellow:

EN Reference		ETSI EN 303 413 V1.1.1 (2017-06) Test Items	Test Engineer	Result
No	Sub clause			
1	4.2.1	Adjacent signal selectivity	Tu Ya'nan	<b>PASS</b> <sup>Note1</sup>
2	4.2.2	Spurious emission	Peng Xuewei	<b>PASS</b>
<b>Note1:</b> The test results of this test items in this report refer to the test report (Report No.: SZ17080130W10).				



## 1.4. EUT Setup and Operating Conditions

The EUT is activated and controlled by the System Simulator and software. The EUT is powered by a battery.

## 1.5. Environmental Conditions

Ambient temperature: +15~+35°C

Relative humidity: 20~75%

Atmosphere pressure: 86-106kPa

## 2. Test specifications and results

### 2.1. EN 303 413 §4.2.1 GUE adjacent frequency band selectivity

#### 2.1.1. Definition

GUE adjacent frequency band selectivity is the ability of the GUE to achieve the specified performance in the presence of noise produced by signals operating in accordance with the allocation table of the ITU Radio Regulations [i.16] in frequency bands adjacent or near-adjacent to the relevant RNSS band.

#### 2.1.2. Specifications

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  $C/N_0$

$$\Delta C/N_0 \leq 1 \text{ dB} \quad (2-1)$$

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

GNSS	GNSS Signal Designations	RNSS Frequency Band (MHz)
BDS	B1I	1 559 to 1 610
Galileo	E1	1 559 to 1 610
	E5a	1 164 to 1 215
	E5b	1 164 to 1 215
	E6	1 215 to 1 300
GLONASS	G1	1 559 to 1 610
	G2	1 215 to 1 300
GPS	L1	1 559 to 1 610
	L2	1 215 to 1 300
	L5	1 164 to 1 215
SBAS	L1	1 559 to 1 610
	L5	1 164 to 1 215

**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
1 518 to 1 525	1524	-65	MSS (space-to-Earth) band
1 525 to 1 549	1548	-95	MSS (space-to-Earth) band
1 549 to 1 559	1554	-105	MSS (space-to-Earth) band
1 559 to 1 610	GUE RNSS band under test		
1 610 to 1 626	1615	-105	MSS (space-to-Earth) band
1 626 to 1 640	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 1 164	1154	-75	AM(R)S, ARNS band
1 164 to 1 215	GUE RNSS band under test		
1 215 to 1 260	GUE RNSS band under test		
1 260 to 1 300	GUE RNSS band under test		
1 300 to 1 350	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	



Annex B contains details of the adjacent frequency signal and the GNSS signals that shall be used in performing the conformance tests. Annex C contains a detailed explanation of the C/N0 metric. Clause C.3 describes the calculation of the nominal bounding value for the adjacent frequency signal power level at the points closest to the operating band given in table 4-2.

### 2.1.3. Conformance

A GUE utilizing the RNSS band 1 559 MHz to 1 610 MHz shall be presumed to conform to this technical requirements specification if the C/N0, as reported by the GUE for each declared GNSS constellation and GNSS signal, does not degrade by more than the value given in equation 4-1 in the presence of the adjacent frequency signals in table 4-2.

A GUE also utilizing the RNSS band(s) 1 164 MHz to 1 300 MHz shall be presumed to conform to this technical requirements specification if the C/N0, as reported by the GUE for each declared GNSS constellation and GNSS signal, also does not degrade by more than the value given in equation 4-1 in the presence of the adjacent frequency signals in table 4-3.

The testing for conformance with the technical requirements specifications is given in clause 5.4.

### 2.1.4. Test methodology

#### 2.1.4.1 General

For purposes of simplicity, accuracy, and ease of testing, conducted testing is preferred. If this is not feasible then radiated testing may be used.

If special test equipment is used to perform the test, this shall be declared in the test report, for example, custom test fixture, wire harness, or adapter cable.

#### 2.1.4.2 Test equipment

The following test equipment is recommended for performing the tests:

- GNSS signal generator capable of simulating the GNSS constellations and GNSS signals declared as supported by the EUT.
- RF signal generator capable of generating the adjacent frequency signal specified in table 4-4.
- Filter for ensuring the test is not adversely affected by OOB from the RF signal generator into the RNSS band if necessary.
- RF power combiner for combining the GNSS signal(s) and the adjacent frequency signal.
- A means for recording C/N0 as reported by the EUT before and after application of the adjacent frequency signal.
- A means for establishing the RF power of the test signals at the input to the EUT (this may be accomplished by means of a directional coupler and power meter, or by appropriate calibration prior to the test).

#### 2.1.4.3 EUT configuration

For an EUT with an external, detachable, antenna, the EUT shall be connected to the test bed by

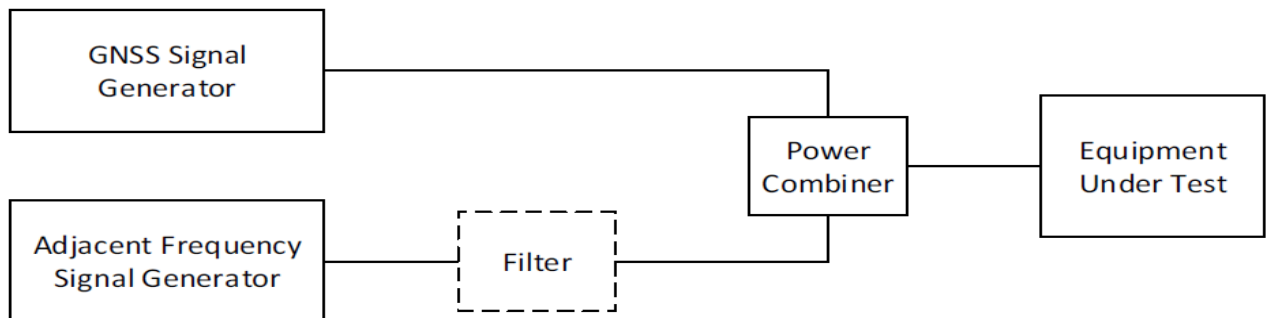
means of the antenna port. Alternatively, the EUT may be connected in the same manner as an EUT with an integrated antenna, described below.

For an EUT with an integrated antenna, the antenna element shall be removed and a connection from the antenna to the test bed shall be made in place of the antenna element.

A conceptual block diagram for conducted measurements is shown in figure 5-1.

An equipment list and block diagram shall be provided if the test setup differs from the diagram in figure 5-1.

The test bed shall be calibrated so that the adjacent frequency signal power levels of the test signals specified in table 4-2 and/or, as applicable, table 4-3 are presented to the input of the EUT.



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

## 2.1.5. GUE adjacent frequency band selectivity test

### 2.1.5.1 General

Clause 5.4 contains the procedure for testing the GUE adjacent frequency band selectivity performance.

It is recognized that alternative test methods may exist. If an alternate test method is chosen to demonstrate conformance, then it shall be ensured and declared in the test report that any alternative test method used yields results identical to those described in the present document.

### 2.1.5.2 Test conditions

The test equipment and EUT shall be configured according to figure 5-1 for conducted measurements or figure 5-2 if radiated measurements are to be performed.

The test shall be performed in a clean RF environment, free from other sources of noise or interference that may affect the test results.

### 2.1.5.3 Test method for GUE utilizing the 1 559 MHz to 1610 MHz RNSS band

- 1) Configure the GNSS signal generator to simulate those GNSS and GNSS signals from table 4-1 declared as supported by the GUE, with power levels and other details as specified in clause B.2.
- 2) With the adjacent frequency signal switched off, the EUT shall be given sufficient time to acquire all simulated satellites from the declared GNSS system(s).
- 3) Record the baseline  $C/N_0$  value(s) reported by the EUT. Sufficient filtering shall be used to

obtain a stable value.  $C/N_0$  may be averaged across all the satellites in view for each GNSS constellation. However,  $C/N_0$  shall not be averaged across satellite signals in different GNSS constellations. For a multi-GNSS EUT, there shall be a separate  $C/N_0$  value recorded for each GNSS constellation and each GNSS signal supported.

- 4) The adjacent frequency signal generator shall be configured to generate the signal defined in table 4-4, at the first test point centre frequency and signal power level as specified in table 4-2.
- 5) The adjacent frequency signal shall be switched on, and the EUT's  $C/N_0$  value(s) recorded as in step 3) to measure the degradation with respect to the baseline value(s) recorded in step 3).
- 6) Test point Pass/Fail Criteria: If the  $C/N_0$  degradation from step 5) does not exceed the value in equation 4-1, then this test point is set to "pass". If the  $C/N_0$  degradation exceeds the value in equation 4-1, then this test point is set to "fail." For a multi-GNSS and multi-signal EUT, there shall be a separate pass/fail determination for each GNSS and for each GNSS signal supported. If the  $C/N_0$  degradation exceeds the value in equation 4-1 for any supported GNSS or supported GNSS signal, then this test point is set to "fail".
- 7) Step 1) through step 6) shall be repeated for all test point centre frequencies (and associated signal power level) specified in table 4-2.

If the EUT passes the  $C/N_0$  degradation test for all test points for all GNSS constellations and all GNSS signals declared as supported from table 4-1, the EUT shall be deemed to "pass". If the  $C/N_0$  degradation test fails for any GNSS constellation or GNSS signal at any of the test points, the EUT shall be deemed to "fail".

#### **2.1.5.4 Test method for GUE utilizing the 1 164 MHz to 1 300 MHz RNSS band**

For a GUE also utilizing the RNSS bands in the 1 164 MHz to 1 300 MHz range, the test method in clause 5.4.3 (step 1) through step 7), inclusive), shall be repeated using the adjacent frequency test point centre frequencies and associated signal power levels specified in table 4-3.

If the EUT passes the  $C/N_0$  degradation tests as defined in both clause 5.4.3 and clause 5.4.4, the EUT shall be deemed to "pass". If the  $C/N_0$  degradation test fails tests as defined in either or both of clause 5.4.3 or clause 5.4.4, the EUT shall be deemed to "fail".

#### **2.1.6. Result**



### 2.1.6.1 Test results for 1 559 MHz to 1 610 MHz RNSS band:

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Measured C/N <sub>0</sub> (dB-Hz)				
	From table 4-2	From table 4-2	GNSS signals	No interfering signal	With interfering signal	Decrease of C/N <sub>0</sub>	Decrease ≤ 1 dB
1518 to 1525	1524	-65	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	28	28	0	PASS
			SBAS	N/A	N/A	N/A	N/A
1525 to 1549	1548	-95	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	28	28	0	PASS
			SBAS	N/A	N/A	N/A	N/A
1549 to 1559	1554	-105	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	28	28	0	PASS
			SBAS	N/A	N/A	N/A	N/A
1610 to 1626	1615	-105	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	28	28	0	PASS
			SBAS	N/A	N/A	N/A	N/A
1626 to 1640	1627	-85	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	28	28	0	PASS
			SBAS	N/A	N/A	N/A	N/A

Final test results for 1 559 MHz to 1 610 MHz RNSS band:

■ Pass

□ Fail

**2.1.6.2 Test results for 1 164 MHz to 1 300 MHz RNSS band:**

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Measured C/N <sub>0</sub> (dB-Hz)				
	From table 4-2	From table 4-2	GNSS signals	No interfering signal	With interfering signal	Decrease of C/N <sub>0</sub>	Decrease ≤ 1 dB
960 to 1164	1154	-65	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	N/A	N/A	N/A	N/A
			SBAS	N/A	N/A	N/A	N/A
1300 to 1350	1310	-95	BDS	N/A	N/A	N/A	N/A
			Galileo	N/A	N/A	N/A	N/A
			GLONASS	N/A	N/A	N/A	N/A
			GPS	N/A	N/A	N/A	N/A
			SBAS	N/A	N/A	N/A	N/A

Final test results for 1 164 MHz to 1 300 MHz RNSS band:

☐ Pass☐ Fail**Note: The EUT doesn't support 1 164 MHz to 1 300 MHz RNSS band.**

## 2.2. EN 303 413 §4.2.2- Spurious emissions

### 2.2.1. Definition

Receiver spurious emissions are emissions at any frequency when the GUE is in receive-only operating mode.

### 2.2.2. Limit

The spurious emissions of the GUE shall not exceed the values given in table 4-5.

In case of a GUE with an external antenna connector, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or for emissions radiated by a GUE with an integral antenna (without an antenna connector), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz..

**Table 4-5: Spurious emission limits**

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz

### 2.2.3. Conformance

The conformance tests for this requirement are defined in clause 5.5

### 2.2.4. Test conditions

See clause 5.1 for the environmental test conditions. These measurements shall only be performed at the normal test conditions stated in clause 5.1.

Testing shall be performed when the EUT is in receive-only operating mode and the manufacturer shall ensure that the receiver remains active for the duration of the test. For this reason, GNSS signals may be required for this test. The manufacturer shall indicate whether GNSS signals were present or not in the test report.

The level of spurious emissions shall be measured as, either:

- their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the EUT (cabinet radiation); or
- the effective radiated power when radiated by cabinet and antenna in case of an EUT with integral antenna and with no temporary antenna connector.

## 2.2.5. Test method

### 2.2.5.1 Introduction

In case of conducted measurements, the EUT shall be connected to the measuring equipment via an attenuator.

If required, the necessary GNSS signals shall be applied to the EUT.

The spectrum in the spurious domain shall be searched for emissions that exceed the limit values given in table 4-5 or that come to within 6 dB below these limits. Each occurrence shall be recorded.

The measurement procedure contains 2 parts.

### 2.2.5.2 Pre-scan

The procedure in step 1) to step 4) below shall be used to identify potential unwanted emissions of the EUT:

- 1) The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in table 4-5.
- 2) The emissions over the range 30 MHz to 1 000 MHz shall be identified.

Spectrum analyser settings:

- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points:  $\geq 19\,400$  (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.5.2.1.3 and compared to the limits given in table 4-5.

- 3) The emissions over the range 1 GHz to 8,3 GHz shall be identified.

Spectrum analyser settings:

- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points:  $\geq 14\,600$  (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above that fall within the

6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.5.2.1.3 and compared to the limits given in table 4-5.

- 4) In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), step 2) and step 3) shall be repeated for each of the active receive chains,  $A_{ch}$ .

The limits used to identify emissions during this pre-scan shall be reduced by  $10 \times \log_{10}(A_{ch})$ .

### 2.2.5.3 Measurement of the emissions identified during the pre-scan

The procedure in step 1) to step 4) below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

- 1) The level of the emissions shall be measured using the following spectrum analyser settings:
  - Measurement Mode: Time Domain Power.
  - Centre Frequency: Frequency of the emission identified during the pre-scan.
  - Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz).
  - Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz).
  - Frequency Span: Zero Span.
  - Sweep mode: Single Sweep.
  - Sweep time: 30 ms.
  - Sweep points:  $\geq 30\,000$ .
  - Trigger: Video (for burst signals) or Manual (for continuous signals).
  - Detector: RMS.
- 2) Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the RMS value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to the start and stop times of the sweep.
- 3) In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), step 2) shall be repeated for each of the active receive chains,  $A_{ch}$ .  
Sum the measured power (within the observed window) for each of the active receive chains.
- 4) The value defined in step 3) shall be compared to the limits defined in table 4-5.

### 2.2.6. Result

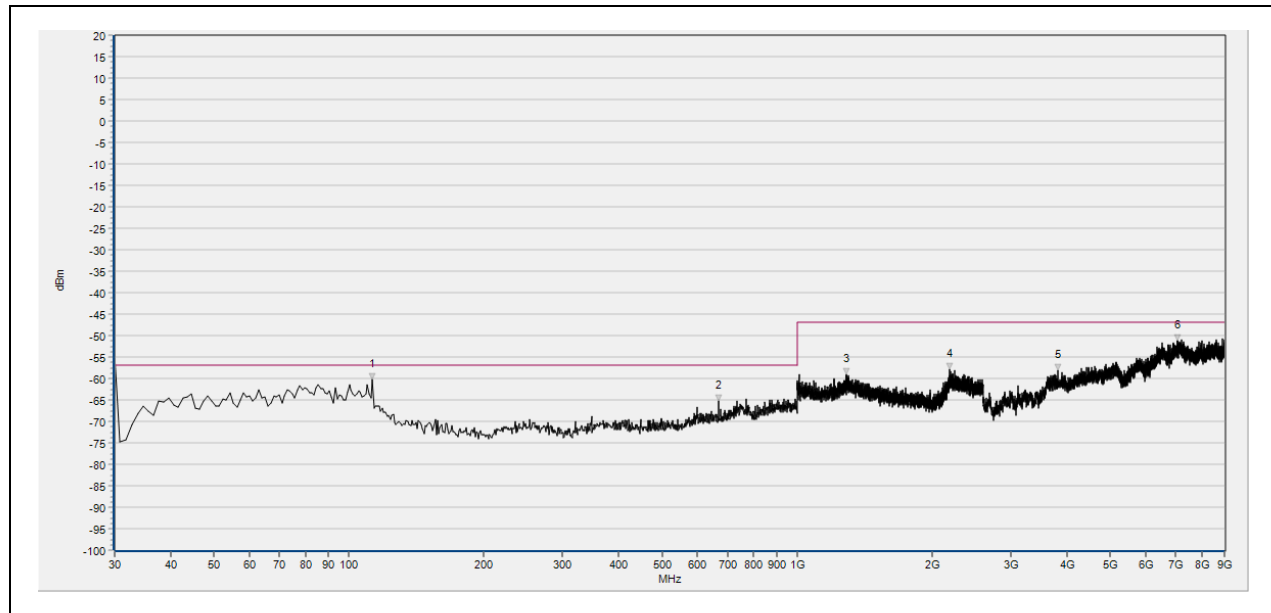
GNSS signal(s) present or absent:

- ☒ Present  
☐ Absent

Receiver Spurious Emissions test result:

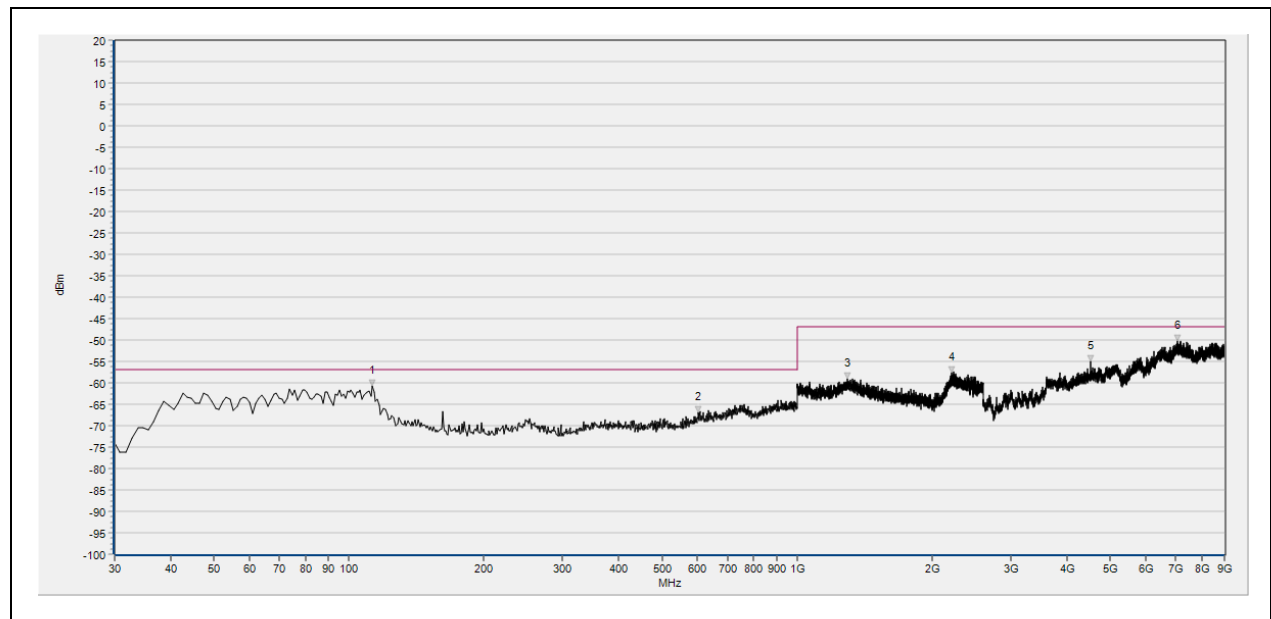
- ☒ Pass  
☐ Fail  
☐ N/A





(GPS, 30MHz to 8.3 GHz, Antenna Horizontal)

Test frequency range 30MHz to 8.3 GHz	Receiving Mode (GPS)				
	Frequency (MHz)	Peak (dBm)	Limit(PK)	Antenna	Verdict
	112.838	-60.15	-57.00	Horizontal	PASS
	668.168	-65.28	-57.00	Horizontal	PASS
	1285.867	-58.96	-47.00	Horizontal	PASS
	2187.200	-57.86	-47.00	Horizontal	PASS
	3826.120	-57.98	-47.00	Horizontal	PASS
	7059.910	-51.25	-47.00	Horizontal	PASS

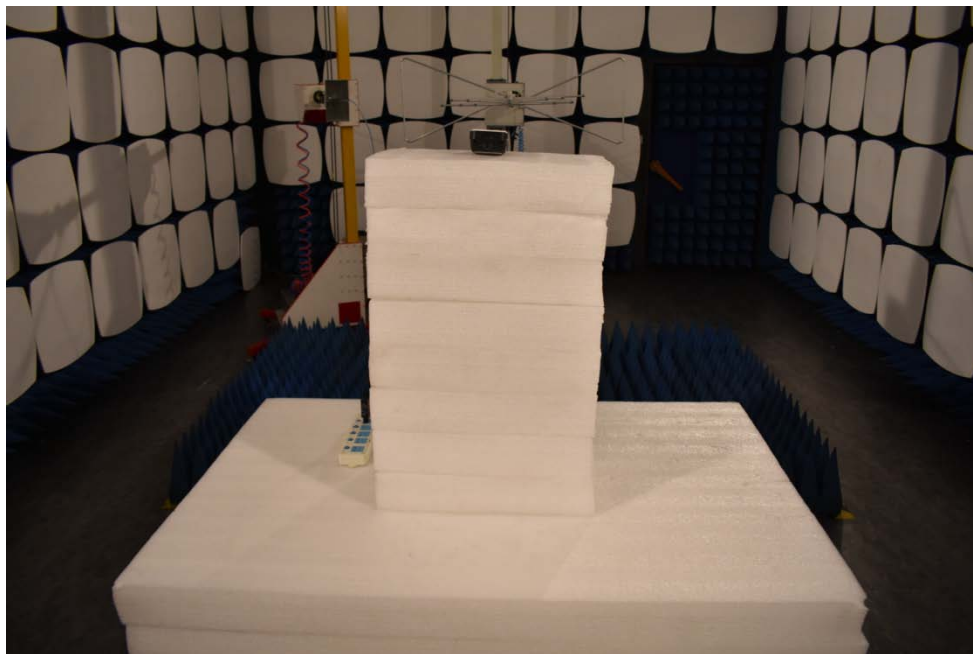


(GPS, 30MHz to 8.3 GHz, Antenna Vertical)

Test frequency range 30MHz to 8.3 GHz	Receiving Mode (GPS)				
	Frequency (MHz)	Peak (dBm)	Limit(PK)	Antenna	Verdict
	112.838	-60.72	-57.00	Vertical	PASS
	602.778	-66.90	-57.00	Vertical	PASS
	1293.867	-59.13	-47.00	Vertical	PASS
	2218.133	-57.67	-47.00	Vertical	PASS
	4520.380	-54.93	-47.00	Vertical	PASS
	7051.790	-50.30	-47.00	Vertical	PASS

## Annex A Photographs of Test Setup

### 1. Radiated Measurement Setup



### 2. Conducted Measurement Setup





## Annex B Test Uncertainty

Parameter	Uncertainty
Uncertainty in conducted measurements	$\pm 1$ dB
Uncertainty in radiated measurements	$\pm 6$ dB
Spurious emissions	$\pm 6$ dB



## Annex C Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Company Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Department:</b>	Morlab Laboratory
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China
<b>Responsible Test Lab Manager:</b>	Mr. Su Feng
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China



### 3. Test Equipments Utilized

#### 3.1 Conducted Test System

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Power Combiner	Mini-Circuits	ZFRSC-183+	SF808201417	2018.04.17	2019.04.16
Attenuator 1	Resnet	20dB	(N/A)	2018.04.17	2019.04.16
MXG Vector Signal Generator	Angilent	N5182B	MY53050961	2018.04.17	2019.04.16
EXG Analog Signal Generator	Angilent	N5171B	MY53050558	2018.04.17	2019.04.16
EXA Signal analyzer	Angilent	N9010A	MY53470836	2017.12.02	2018.12.01

#### 3.2 List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8

#### 3.3 RSE Test System

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal.Due Date
MXE EMI Receiver	MY54130016	N9038A	Agilent	2018.05.08	2019.05.07
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2018.05.08	2019.05.07
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2017.09.13	2018.09.12
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

\_\_\_\_\_ END OF REPORT \_\_\_\_\_