



EMC TEST REPORT
ETSI EN 301 489-01 V2.1.1(2017-02)
ETSI EN 301 489-17 V3.1.1 (2017-02)
For

Shenzhen Dotogo Technologies Co.Ltd.

Product : Roadtrip In-motion Satellite TV Antenna

Trade Name : Dotogo

Model No : V290/V380

Serial Model : N/A

Prepared By : Shenzhen BEL Technology Co., Ltd.
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Report No. : BEL20210000102152

Date of Test : May. 17- May. 23, 2021

Date of Rep. : May. 23, 2021

TEST RESULT CERTIFICATION

Applicant's name..... Shenzhen Dotogo Technologies Co.Ltd.
Address..... 3rd Floor, Factory No. 13, Minsheng 4th Road, Baoyuan Community,
Shiyan Street, Baoan District, Shenzhen City
Manufacture's Name..... Shenzhen Dotogo Technologies Co.Ltd.
Address..... 3rd Floor, Factory No. 13, Minsheng 4th Road, Baoyuan Community,
Shiyan Street, Baoan District, Shenzhen City

Product description

Product name..... Roadtrip In-motion Satellite TV Antenna
Trademark Dotogo
Model No...... V290/V380
Serial Model : N/A

Standards..... ETSI EN 301 489-01 V21.1(2017-02)
ETSI EN 301 489-17 V3.1.1 (2017-02)

This device described above has been tested by Shenzhen BEL Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU Directive Art.3.1(b) requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests..... May. 17- May. 23, 2021
Date of Issue..... May. 23, 2021
Test Result..... **Pass**

Prepared by:



Testing Engineer

Reviewed by:



Technical Manager

Approved by:



Authorized Signatory



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1. TEST SUMMARY

Test procedures according to the technical standards:

ETSI EN 301 489-01 V2.1.1(2017-02)

ETSI EN 301 489-17 V3.1.1 (2017-02)

EMC Emission			
Standard	Test Item	Result	Remark
EN 55032: 2015/AC: 2016	Conducted Emission	N/A	
	Radiated Emission	PASS	
EN61000-3-2:2014	Harmonic Current Emission	N/A	NOTE (1)
EN 61000-3-3:2013	Voltage Fluctuations & Flicker	N/A	
EMC Immunity			
Section	Test Item	Result	Remark
EN 61000-4-2:2009	Electrostatic Discharge	PASS	
EN 61000-4-3:2006+A1:2008+A2:2010	RF electromagnetic field	PASS	
EN 61000-4-4:2012	Fast transients	N/A	
EN 61000-4-5:2014/A1:2017	Surges	N/A	
EN 61000-4-6:2015	Injected Current	N/A	
EN 61000-4-11:2017	Volt. Interruptions Volt. Dips	N/A	NOTE (2)

NOTE:

- (1) Because of the power of the EUT less than 75W, the limits are not specified in this standard and report.
- (2) Voltage dip: 100% reduction – Performance Criteria **B**
 Voltage dip: 30% reduction – Performance Criteria **C**
 Voltage Interruption: 100% Interruption – Performance Criteria **C**
 N/A: The test does not apply



1.1 TEST FACILITY

Test Firm : Shenzhen BEL Technology CO., LTD.
Address : 3rd Floor, Xingfu Building, Tongfuyu Industrial Zone, Shiyan Town,
Bao'An District, Shenzhen, Guangdong, China.

1.2 MEASUREMENT UNCERTAINTY

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

Conducted Emission Uncertainty = $\pm 2.23\text{dB}$

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

2. GENERAL INFORMATION

GENERAL DESCRIPTION OF EUT

Equipment	Roadtrip In-motion Satellite TV Antenna
	Dotogo
Model Name	V290/V380
Serial Model	N/A
Model Difference	All the model are the same circuit and RF module, Except the appearance and colour.
Frequency Bands:	20Hz-20kHz unlicensed ISM band
Adapter	N/A
Antenna:	N/A
Connecting I/O Port(s)	N/A
Hardware Version	N/A
Software Version	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	BT Mode

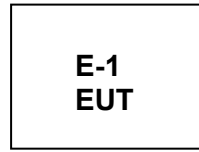
For Conducted Test	
Final Test Mode	Description
Mode 1	BT Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	BT Mode

For EMS Test	
Final Test Mode	Description
Mode 1	BT Mode

NOTE: The test modes were carried out for all operation modes. The final test mode of the EUT was the worst test mode for EMI, and its test data was showed.

2.2 DESCRIPTION OF TEST SETUP



2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Roadtrip In-motion Satellite TV Antenna	N/A	V290/V380	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.4 MEASUREMENT INSTRUMENTS LIST

CONDUCTED EMISSION

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	LISN	R&S	ENV216	101313	Jul. 06, 2020	Jul. 05, 2021	1 year
2	LISN	SCHWARZBECK	NNLK 8129	8129245	Jun. 25, 2019	Jun. 24, 2021	1 year
3	Pulse Limiter	SCHWARZBECK	VTSD 9561F	9716	Jun. 25, 2019	Jun. 24, 2021	1 year
4	50Ω Switch	ANRITSU CORP	MP59B	6200983704	Jul. 06, 2020	Jul. 05, 2021	1 year
5	Test Cable	N/A	C01	011003667	Jul. 06, 2020	Jul. 05, 2021	1 year
6	Test Cable	N/A	C02	011003668	Jul. 06, 2020	Jul. 05, 2021	1 year
7	Test Cable	N/A	C03	011003669	Jul. 06, 2020	Jul. 05, 2021	1 year
8	EMI Test Receiver	R&S	ESCI	101160	Jul. 06, 2020	Jul. 05, 2021	1 year
9	Passive Voltage Probe	ESH2-Z3	R&S	100196	Jul. 06, 2020	Jul. 05, 2021	1 year
10	Triple-Loop Antenna	EVERFINE	LIA-2	11020003	Jul. 06, 2020	Jul. 05, 2021	1 year
11	Absorbing Clamp	R&S	MDS-21	100423	Jul. 08, 2019	Jul. 07, 2021	1 year

RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Bilog Antenna	TESEQ	CBL6111D	31216	Jul. 06, 2020	Jul. 05, 2021	1 year
2	Test Cable	N/A	R-01	0912001	Jun. 25, 2019	Jun. 24, 2021	1 year
3	Test Cable	N/A	R-02	0912002	Jun. 25, 2019	Jun. 24, 2021	1 year
4	EMI Test Receiver	R&S	ESCI-7	101318	Jul. 06, 2020	Jul. 05, 2021	1 year
5	Antenna Mast	EM	SC100_1	N/A	N/A	N/A	N/A
6	Turn Table	EM	SC100	060531	N/A	N/A	N/A
7	50Ω Switch	Anritsu Corp	MP59B	6200983705	Jul. 06, 2020	Jul. 05, 2021	1 year
8	Spectrum Analyzer	Aglient	E4407B	MY45108040	Jul. 06, 2020	Jul. 05, 2021	1 year
9	Horn Antenna	EM	EM-AH-10180	2011071402	Jul. 06, 2020	Jul. 05, 2021	1 year
10	Amplifier	EM	EM-30180	060538	Jul. 06, 2020	Jul. 05, 2021	1 year

HARMONICS AND FILCK

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Harmonic & Flicker	EM TEST	DPA500	0303-04	Jul. 06, 2020	Jul. 05, 2021	1 year
2	AC Power Source	EM TEST	ACS500	0203-01	Jul. 06, 2020	Jul. 05, 2021	1 year



ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	ESD TEST GENERATOR	SCHAFFNER	NSG438	859	Jul. 06, 2020	Jul. 05, 2021	1 year

RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal Generator	R&S	SMT 06	832080/007	Jul. 24, 2020	Jul. 23, 2021	1 year
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	Jul. 24, 2020	Aug. 14, 2021	1 year
3	Power Amplifier	AR	150W1000M1	320946	Sep. 23, 2020	Sep. 22, 2021	1 year
4	Microwave Horn Antenna	AR	AT4002A	321467	Jun. 11, 2020	Jun. 10, 2021	1 year
5	Power Amplifier	AR	25S1G4A	308598	Sep. 23, 2020	Sep. 22, 2021	1 year
14	Field Probe	ETS	HI-6005	121578	May. 19, 2020	May. 18, 2021	1 year
15	Power Meter	R&S	NRVD	100041	Jan. 21, 2020	Jan. 20, 2021	1 year
16	Test Cable	N/A	R-01	0912003	Jun. 16, 2020	Jun. 15, 2021	1 year
17	Test Cable	N/A	R-02	0912004	Jun. 16, 2020	Jun. 15, 2021	1 year
18	directional coupler	Agilent	86205A	20110064	Nov. 29, 2019	Nov. 28, 2021	1 year

SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Surge Generator	EVERFINE	EMS61000-5A	1101002	Jul. 06, 2020	Jul. 05, 2021	1 year
2	DIPS Generator	EVERFINE	EMS61000-11K	1011002	Jul. 06, 2020	Jul. 05, 2021	1 year
3	EFT/B Generator	EVERFINE	EMS61000-4A-V2	1012005	Aug. 04, 2020	Aug. 03, 2021	1 year

INJECTION CURRENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal Generator	IFR	2023A	202301/368	Mar. 31, 2020	Mar. 30, 2021	1 year
2	Power Amplifier	AR	75A250AM1	0320709	Sep. 23, 2020	Sep. 22, 2021	1 year
3	CDN	FCC	FCC-801-M2	06043	Jun. 02, 2020	Jun. 01, 2021	1 year
4	EM Clamp	FCC	F-203I-23MM	504	Jun. 09, 2020	Jun. 08, 2021	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

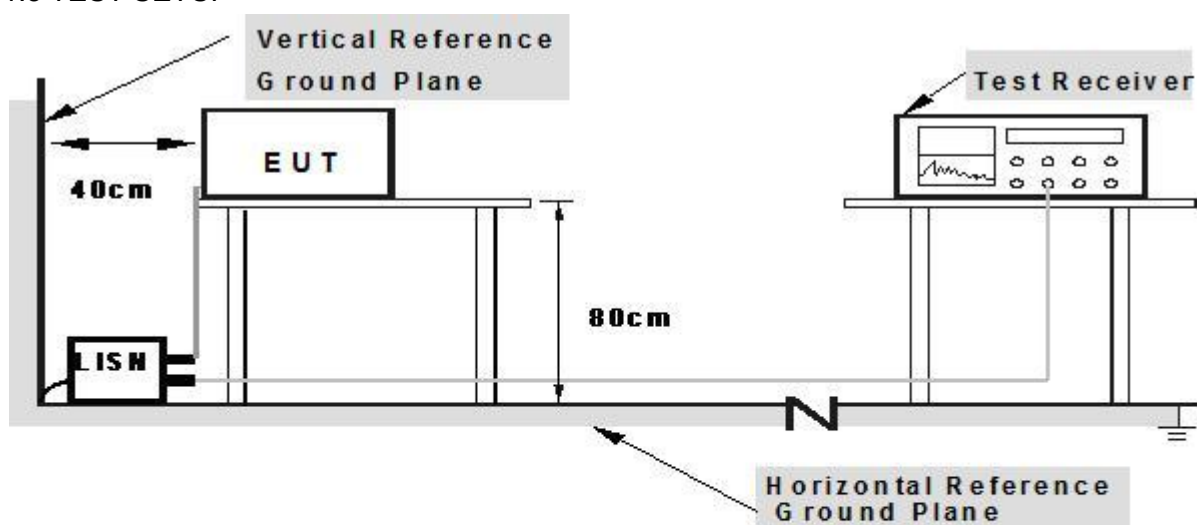
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.2 Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.5 TEST RESULTS

EUT DC Supply, Not Apply This Test

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 – 1000	47	37

3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 10m) dBuV/m		Class B (at 10m) dBuV/m	
	Peak	Avg	Peak	Avg
1000-3000	76	56	70	50
3000-6000	80	60	74	54

Notes:

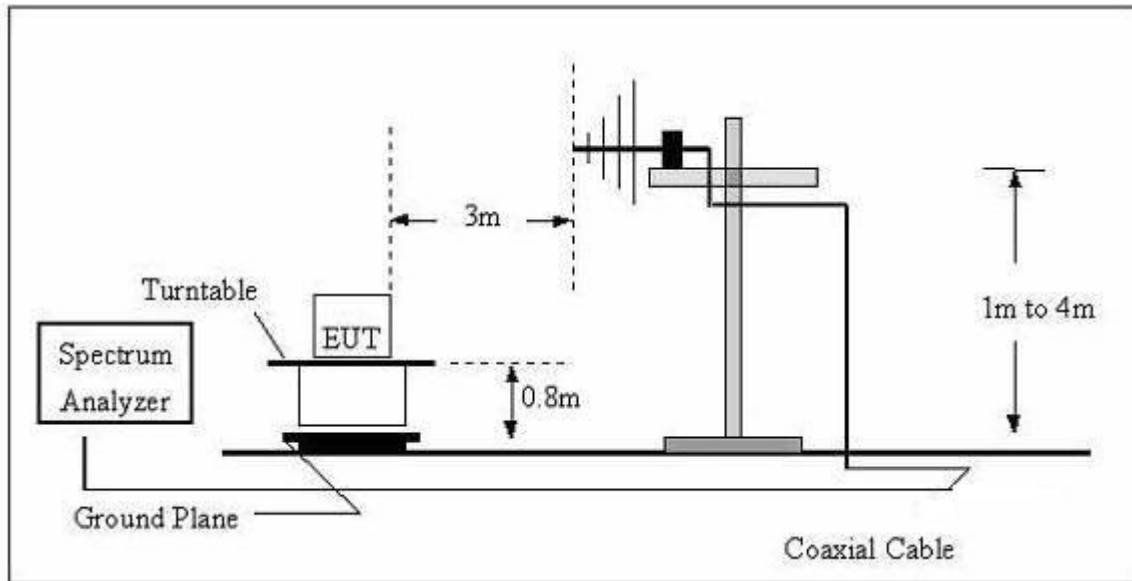
- (1) The limit for radiated test was performed according to as following:
CISPR 22
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

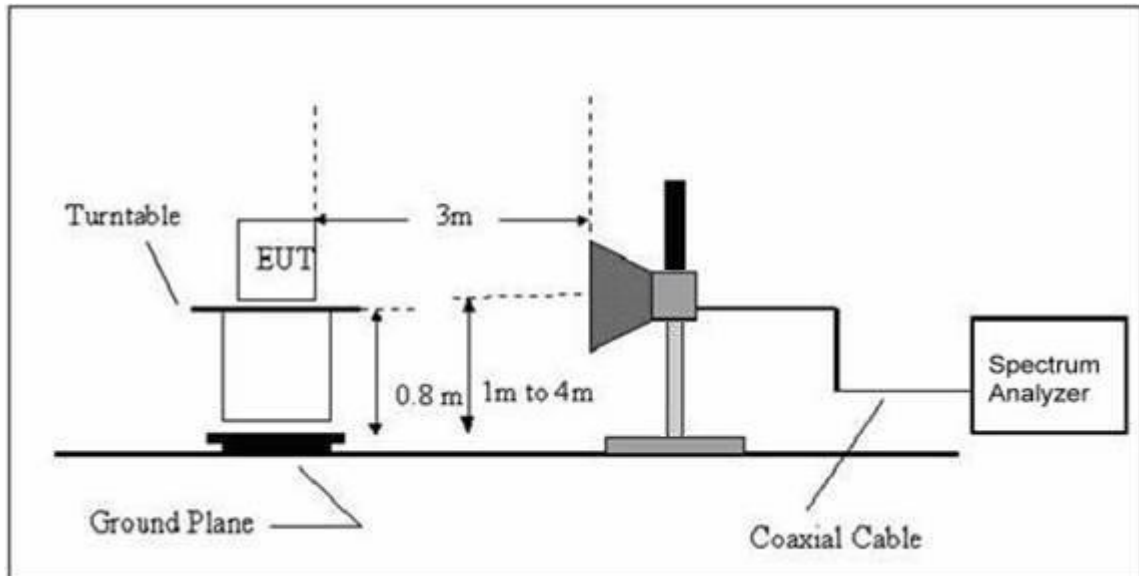
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz

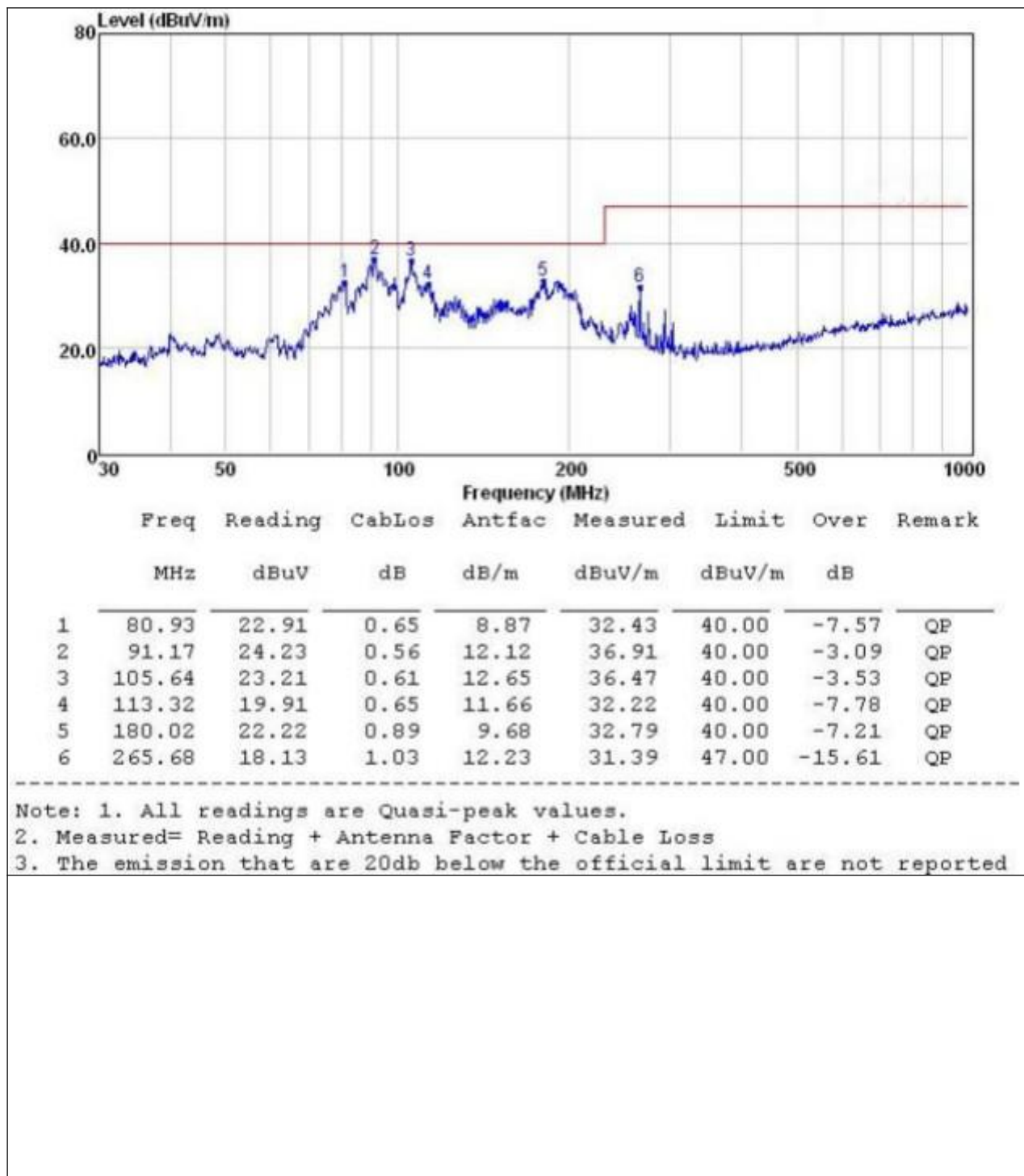


3.2.5 EUT OPERATING CONDITIONS

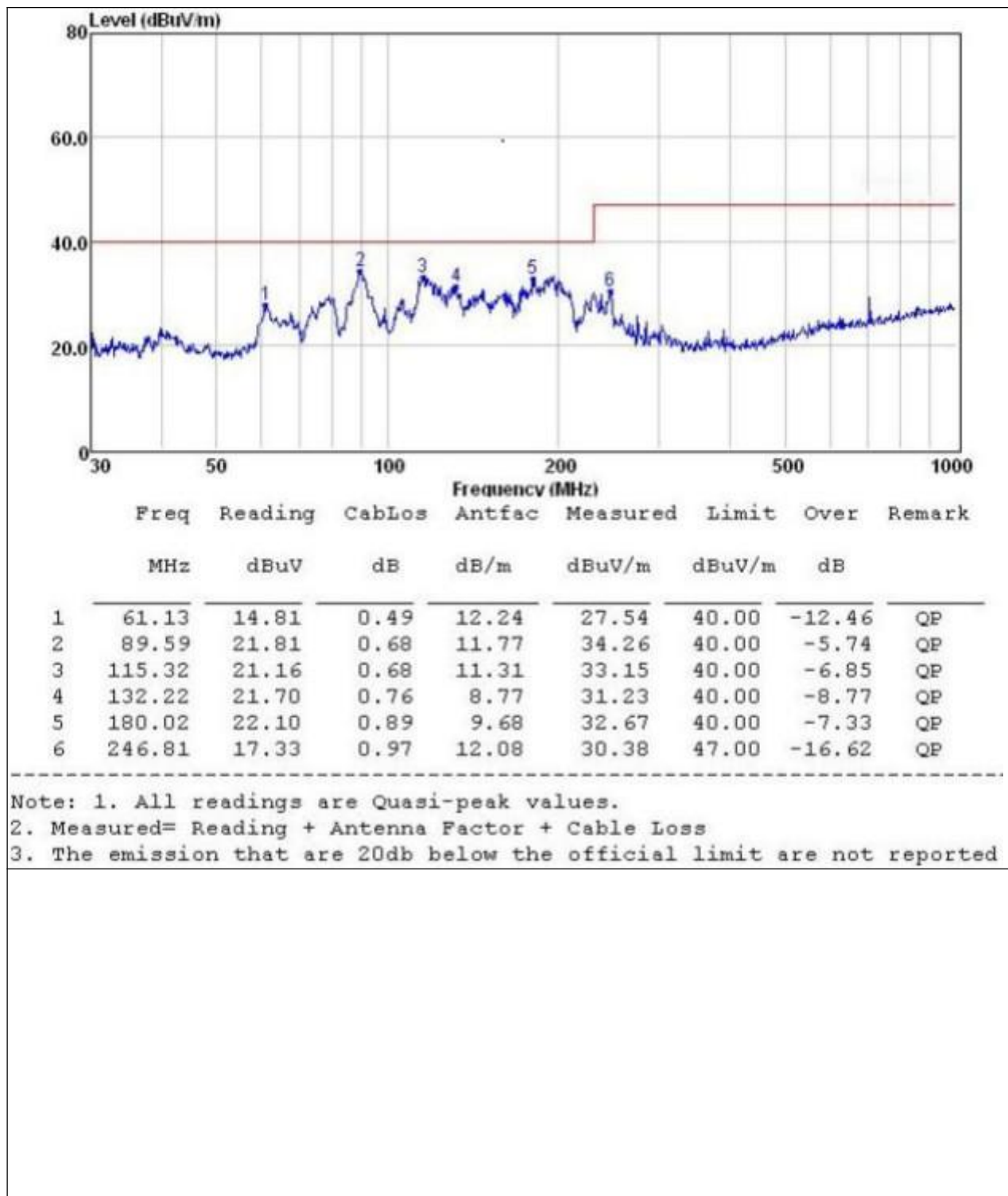
The EUT tested system was configured as the statements of 2.2 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (30-1000MHz)

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Power :	DC9V-30V	Test Mode :	Mode 1



EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Polarization :	Vertical
Test Power :	DC9V-30V	Test Mode :	Mode 1





3.2.7 TEST RESULTS(1000-6000)

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Mode :	Mode 1
Test Power :	DC9V-30V		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
V	1559.486	63.82	-10.96	52.86	70.00	-17.14	QP
V	1559.486	40.80	-10.96	29.84	50.00	-20.16	AVG
V	1714.840	66.95	-10.20	56.75	70.00	-13.25	QP
V	1714.840	45.90	-10.20	35.70	50.00	-14.30	AVG
V	4787.449	55.63	1.56	57.19	74.00	-16.81	QP
V	4787.449	35.03	1.56	36.59	54.00	-17.41	AVG
H	1562.283	61.62	-10.94	50.68	70.00	-19.32	QP
H	1562.283	40.60	-10.94	29.66	50.00	-20.34	AVG
H	1872.203	63.60	-9.44	54.16	70.00	-15.84	QP
H	1885.669	43.60	-9.34	34.26	50.00	-15.74	AVG
H	4821.884	51.90	1.84	53.74	74.00	-20.26	QP
H	4821.884	30.90	1.84	32.74	54.00	-21.26	AVG
Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit							

3.3 VOLTAGE FLUCTUATION AND FLICKERS

3.3.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Test items	Limits(EN61000-3-3)	Descriptions
P_{st}	≤ 1.0 , $T_p=10\text{min}$	short-term flicker indicator
d_c	$\leq 3.3\%$	relative steady-state voltage change
d_{max}	$\leq 4\%$ (or 6% <small>Note(1)</small> , 7% <small>Note(2)</small>)	maximum relative voltage change:
$d_{(t)}$	$\leq 3.3\%$, more than 500ms	relative voltage change characteristic

Note:

1. 6 % for equipment which is:
 - a. switched manually, or
 - b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
2. 7 % for equipment which is
 - a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
 - b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

3.3.1.1 TEST PROCEDURE

a. Fluctuation and Flickers Test:

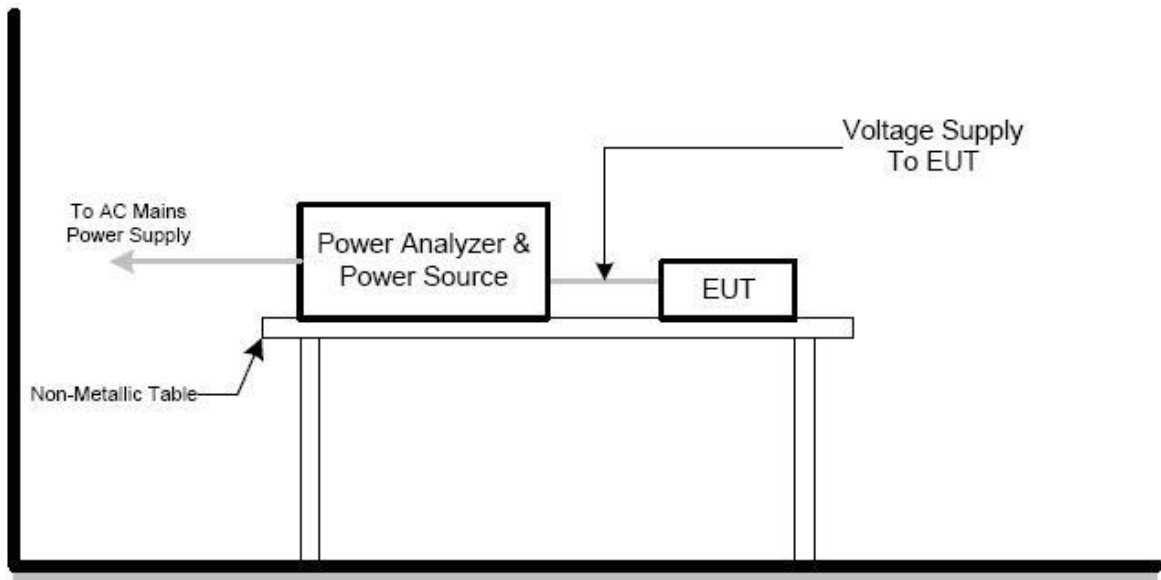
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

- b. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.3.1.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.1.3 TEST SETUP



3.3.2 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	Mode 1		

EUT DC Supply, Not Apply This Test

4. EMC IMMUNITY TEST

4.1 GENERAL PERFORMANCE CRITERIA

4.1.1 PERFORMANCE CRITERIA

According to **EN 301489 -17** standard, the general performance criteria as following:

Criteria	During the test	After the test
A	Shall operate as intended May show degradation of performance (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 1) No unintentional transmissions	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 2) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 2)

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: no degradation of performance after the test is understood as any degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

PERFORMANCE FOR TT

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR TR

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CT

The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an Acknowledgement (ACK) or Not Acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CR

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

4.2 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

4.3 ESD TESTING

4.3.1 TEST SPECIFICATION

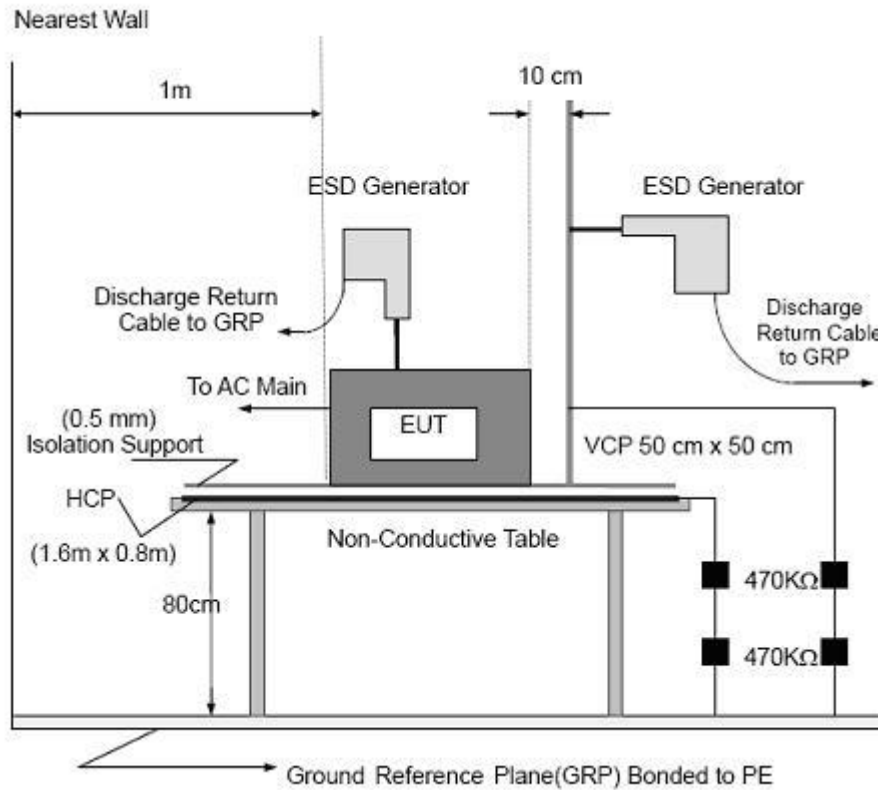
Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Required Performance	TT/TR
Discharge Voltage:	Air Discharge : 2kV/4kV/8kV Contact Discharge : 4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	A/C Discharge
Discharge Period:	1 second minimum

4.3.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.
During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second.
Vertical Coupling Plane (VCP):
The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.
The four faces of the EUT will be performed with electrostatic discharge.
Horizontal Coupling Plane (HCP):
The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.
The four faces of the EUT will be performed with electrostatic discharge.
- b. Air discharges at insulation surfaces of the EUT.
It was at least ten single discharges with positive and negative at the same selected point.
- c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.3.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



4.3.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	Mode1		

Mode	Contact Discharge (Indirect)						Criterion	Result	
Test level (kV)	Test Point	2		4		6			
Test Location		+	-	+	-	+			-
HCP	Front			P	P			TT,TR (Note 3)	Complies
	Rear			P	P				
	Left			P	P				
	Right			P	P				
VCP	Front			P	P				
	Rear			P	P				
	Left			P	P				
	Right			P	P				

Mode	Air Discharge								Contact Discharge								Criterion	Result	
Test level (kV)	2		4		8		15		2		4		6		8				
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
plastic	P	P	P	P	P	P												TT,TR (Note 3)	Complies
shell	P	P	P	P	P	P													
metal									P	P	P	P							

Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) The EUT performance complies with the performance criteria for TT and TR.
EUT is working properly, No data transmission error.

4.4 RS TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	CT/CR
Frequency Range:	80 MHz - 1000 MHz ,1400MHz-2700MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

4.4.2 TEST PROCEDURE

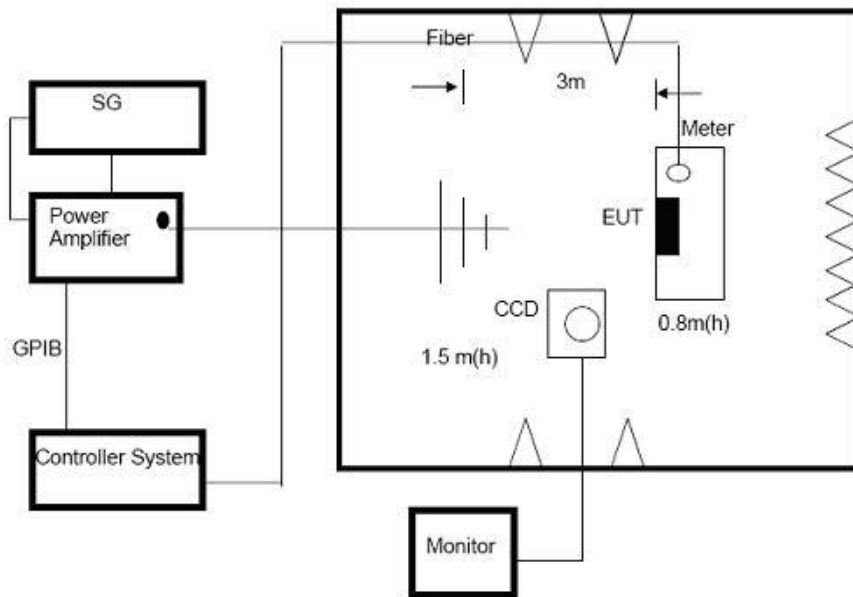
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- a. The field strength level was 3V/m.
- b. The frequency range is swept from 80 MHz to 1000 MHz, & 1400MHz - 2700MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5x 10⁻³ decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- c. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
- d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.4.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	Mode1		

TEST RESULT

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results
80~1000 1000-6000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	CT,CR (Note 4)	P
			Rear		
			Left		
			Right		

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Note:

- 1) N/A - denotes test is not applicable in this test report.
- 2) There was not any unintentional transmission in standby mode
- 3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 4) The EUT performance complies with the performance criteria for CT and CR.
EUT is working properly, No data transmission error.

4.5 EFT/BURST TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	TT/TR
Test Voltage:	Power Line : 1 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

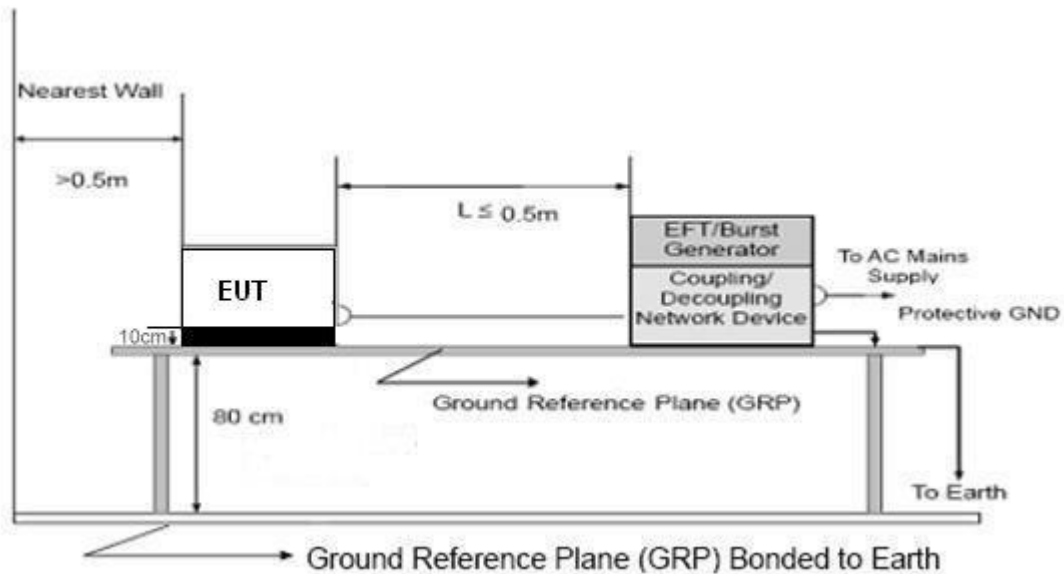
4.5.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

- a. The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- b. Both positive and negative polarity discharges were applied.
- c. The duration time of each test sequential was 1 minute
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.5.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	N/A		

EUT DC Supply, Not Apply This Test

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) The EUT performance complies with the performance criteria for TT and TR.
EUT is working properly, No data transmission error.

4.6 SURGE TESTING

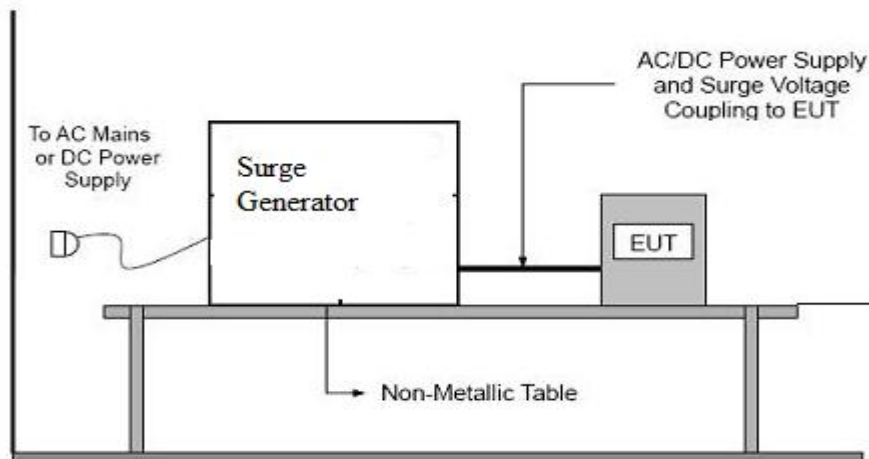
4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance	TT/TR
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line : 1 kV
Surge Input/Output:	L-N
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.6.2 TEST PROCEDURE

1. Both positive and negative polarity discharges are applied.
2. The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1m.
3. The duration time of each test sequential is 1min.
4. The transient / burst waveform is in accordance with IEC 61000-4-4, 5/50ns.
5. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.6.3 TEST SETUP



4.6.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	N/A		

EUT DC Supply, Not Apply This Test

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) The EUT performance complies with the performance criteria for TT and TR.
EUT is working properly, No data transmission error.

4.7 INJECTION CURRENT TESTING

4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance	CT/CR
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

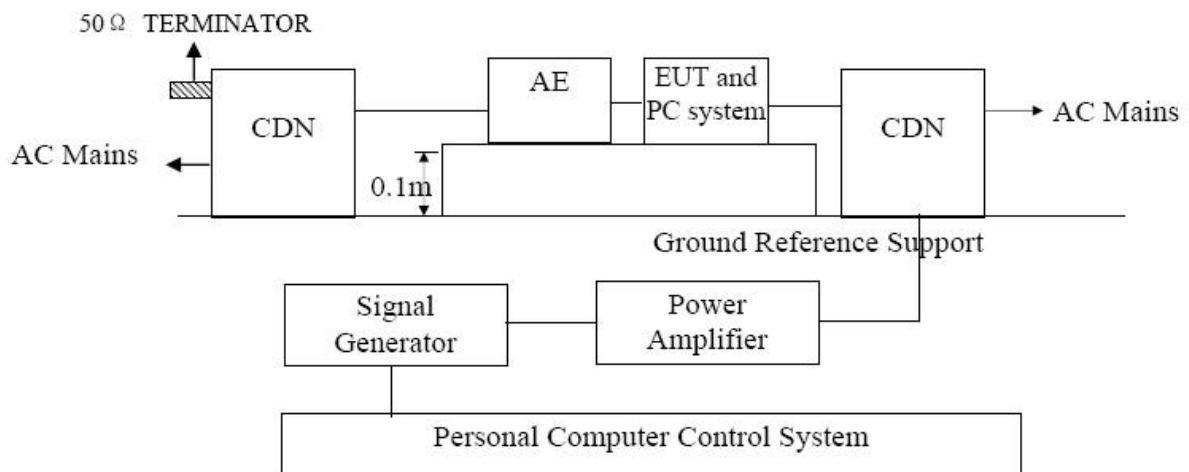
4.7.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

- a. The field strength level was 3V.
- b. The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.7.3 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.



4.7.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	N/A		

EUT DC Supply, Not Apply This Test

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) The EUT performance complies with the performance criteria for CT and CR.
EUT is working properly, No data transmission error.

4.8 VOLTAGE INTERRUPTION/DIPS TESTING

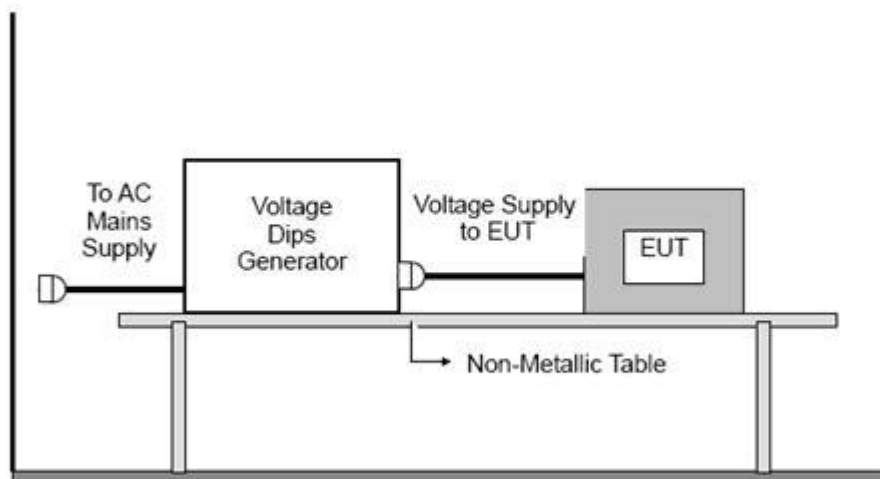
7.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance	100% reduction, 0.5 Cycle 100% reduction, 1.0 Cycle 30% reduction, 25 Cycles
Voltage Interruptions:	100% reduction, 250 Cycles
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

4.8.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.8.3 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.8.4 TEST RESULTS

EUT :	Roadtrip In-motion Satellite TV Antenna	Model Name :	V290/V380
Temperature :	25°C	Relative Humidity :	45%
Pressure :	1010 hPa	Test Power :	DC9V-30V
Test Mode	N/A		

EUT DC Supply, Not Apply This Test

Note:

- 1) There was not any unintentional transmission in standby mode
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) The EUT performance complies with the performance criteria for TT and TR.
EUT is working properly, No data transmission error.

5. EUT TEST PHOTOS

EUT Photo 1



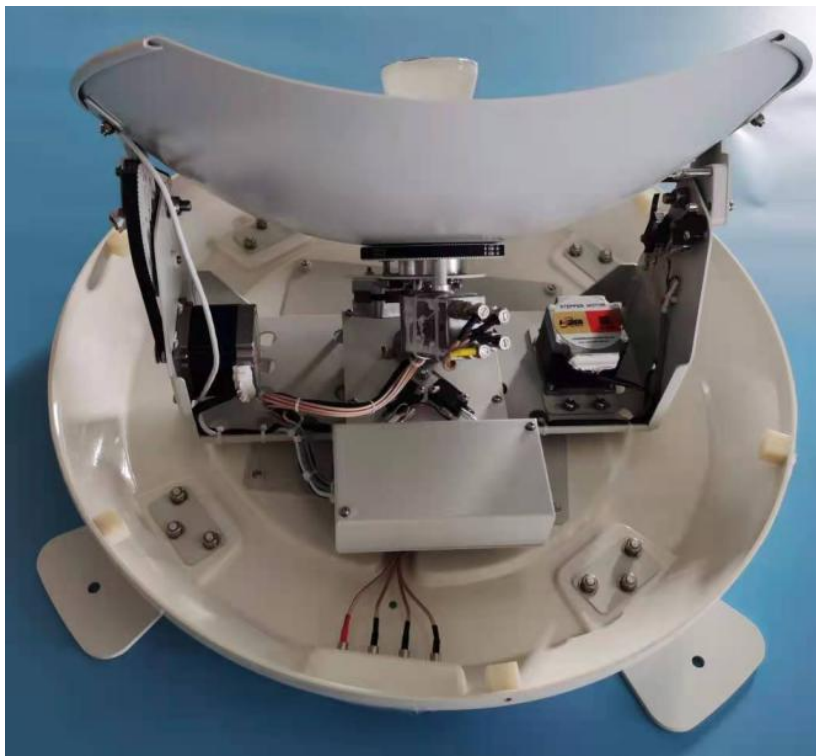
EUT Photo 2



EUT Photo 3



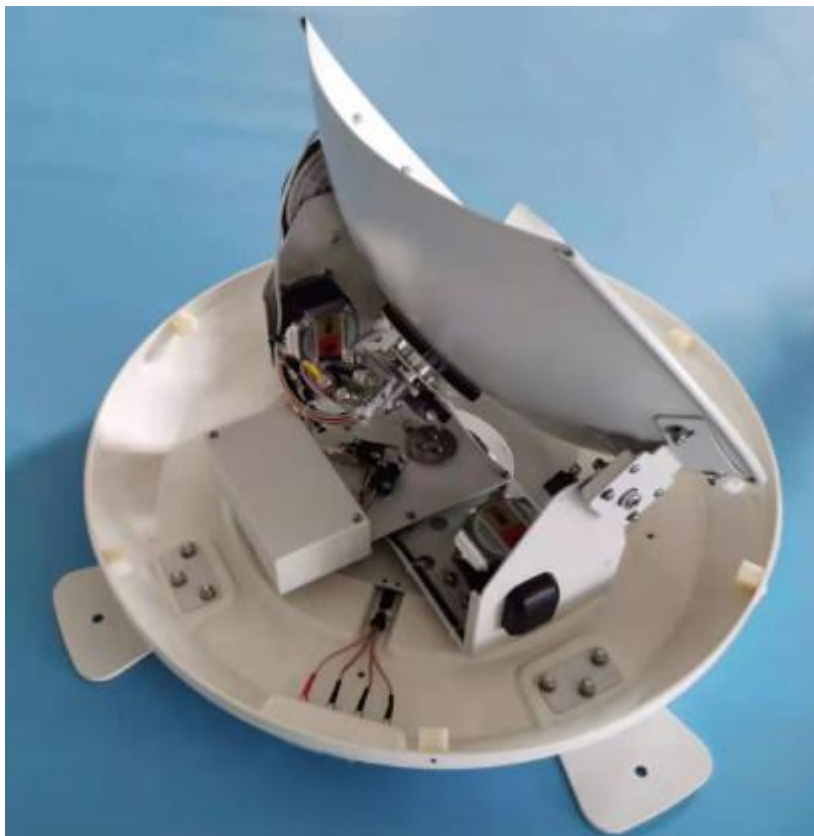
EUT Photo 4



EUT Photo 5



EUT Photo 6



EUT Photo 7



EUT Photo 8



EUT Photo 9



EUT Photo 10



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