TEST REPORT
ETSI EN 300 220-1 V3.1.1 (2017-02)
ETSI EN 300 220-2 V3.2.1 (2018-06)

Report Number.....:	**ZKT-25112527937E-2**
Date of Test.....	Apr. 16, 2024 to Apr. 23, 2024
Date of issue.....:	Dec. 19, 2025
Total number of pages.....	31
Test Result .....:	PASS
Testing Laboratory.....:	**Shenzhen ZKT Technology Co., Ltd.**
Address..... :	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name.....:	**Shenzhen Arvov Technology Co., Ltd**
Address..... :	322 Shenrun Cloud Valley, No. 8 Xieli Road, Longgang District, Shenzhen, Guangdong,China
Manufacturer's name .....:	**Shenzhen Arvov Technology Co., Ltd**
Address ..... :	322 Shenrun Cloud Valley, No. 8 Xieli Road, Longgang District, Shenzhen, Guangdong,China
Test Report Form No.....:	--
Test Standards.....:	ETSI EN 300 220-1 V3.1.1 (2017-02) ETSI EN 300 220-2 V3.2.1 (2018-06)
Test procedure.....:	/
Non-standard test method .....:	N/A
Test Report Form No.....:	TRF-EL-118_V0
Test Report Form(s) Originator.....:	ZKT Testing
Master TRF .....:	Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.2 requirements. And it is applicable only to the tested sample identified in the report.

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Product name.....:	**Tire Pressure Monitoring System Display**
Trademark .....:	ARVOV
Model/Type reference.....:	TDS200 TN600,TN200, CAN100, CAN300, TRP100, TRP400, GPS-AD1, GPS-WW2
Ratings..... :	Input: DC 9-36V

Testing procedure and testing location:

Testing Laboratory.....:	**Shenzhen ZKT Technology Co., Ltd.**
Address.....:	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Tested by (name + signature).....:	Jim Liu
Reviewer (name + signature).....:	Jackson Fang
Approved (name + signature).....:	Lake Xie

TABLE OF CONTENT

1. VERSION

Report No.	Issue Date	Description	Approved
ZKT-25112527937E-2	Dec. 19, 2025	The change report is which is changed under the original report number:ZKT-2404163852E-2. The customer has updated the relevant information of the applicant and manufacturer, as well as the trademark and EUT name. The new case number is ZKT-25112527937E-2.	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
Transmitter Parameters			
1	Operating frequency	4.2.1	PASS
2	Unwanted emissions in the spurious domain	4.2.2	PASS
3	TX effective radiated power	4.3.1	PASS
4	TX Maximum e.r.p. spectral density	4.3.2	N/A
5	TX Duty cycle	4.3.3	PASS
6	TX Occupied bandwidth	4.3.4	PASS
7	TX out of band emissions	4.3.5	PASS
8	TX Transient	4.3.6	PASS
9	TX Adjacent channel power	4.3.7	N/A
10	TX behaviour under low voltage conditions	4.3.8	PASS
11	TX Adaptive power control	4.3.9	N/A
12	TX FHSS	4.3.10	N/A
13	TX Short term behaviour	4.3.11	N/A
Receiver Parameters			
14	RX sensitivity	4.4.1	N/A
15	Clear channel assessment threshold	4.5.2	N/A
16	Polite spectrum access timing parameters	4.5.3	N/A
17	RX Blocking	4.4.2	PASS
18	Adaptive Frequency Agility	4.5.4	N/A
Note: N/A is an abbreviation for Not Applicable and means this test intem is not applicable for this device according to the technology characteristic of device.			

3. MEASUREMENT

3.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add.: ZKT Building & 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
FCC Test Firm Registration Number: 712850
IC Registered No.: 23583

3.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± 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	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
3	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
4	Conducted Adjacent channel power	U=1.38dB
5	Conducted output power uncertainty Above 1G	U=1.576dB
6	Conducted output power uncertainty below 1G	U=1.28dB
7	humidity uncertainty	U=5.3%
8	Temperature uncertainty	U=0.59℃
9	Radiated disturbance(30MHz-1000MHz)	U=4.8dB
10	Radiated disturbance(1GHz-6GHz)	U=4.9dB
11	Radiated disturbance(1GHz-18GHz)	U=5.0dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Product name:	Tire Pressure Monitoring System Display
Model(s):	TDS200
Serial Model	TN600,TN200, CAN100, CAN300, TRP100, TRP400, GPS-AD1, GPS-WW2
Model Description:	Only for different model name
SRD:	433.92MHz
Receiver Category:	2
Hardware Version:	H1.0
Software Version:	S1.0
Type of Modulation:	FSK
Antenna Type:	External Antenna, Maximum Gain is 0dBi Note: the antenna gain is provided by the customer, and the final test result has nothing to do with us.
Ratings:	Input: DC 9-36V
Adapter:	N/A

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	---	---	---	---	---	---

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

N/A

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting	/	433.92MHz	/
Receiving	/	433.92MHz	/

4.6 Test Environment

1.Extreme Test Conditions:

For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	LTLV	LTHV	HTHV	HTLV
Temperature (℃)	-10℃	-10℃	40℃	40℃
Test Voltage (DC)	10.2V	13.8V	10.2V	13.8V

5. TEST INSTRUMENT USED

Conducted emissions Test

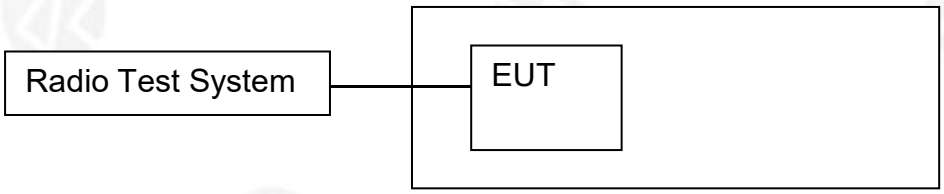
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Nov. 14, 2023	Nov. 13, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Nov. 02, 2023	Nov. 01, 2024
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Nov. 07, 2023	Nov. 06, 2024
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation emissions& Radio Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Nov. 02, 2023	Nov. 01, 2024
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 13, 2023	Nov. 12, 2024
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 13, 2023	Nov. 12, 2024
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Nov. 13, 2023	Nov. 12, 2024
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 16, 2023	Nov. 15, 2024
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Nov. 02, 2023	Nov. 01, 2024
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Nov. 02, 2023	Nov. 01, 2024
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Test Cable	N/A	R-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
12	Test Cable	N/A	R-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
13	Test Cable	N/A	R-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
14	Test Cable	N/A	RF-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
15	Test Cable	N/A	RF-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
16	Test Cable	N/A	RF-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
17	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Nov. 02, 2023	Nov. 01, 2024
18	Signal Generator	Agilent	N5182A	N/A	A.01.87	Nov. 02, 2023	Nov. 01, 2024
19	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 16, 2023	Nov. 15, 2024
20	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Nov. 02, 2023	Nov. 01, 2024
21	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
22	Power Meter	KEYSIGHT	N1912A P	N/A	A.05.00	Nov. 02, 2023	Nov. 01, 2024
23	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
24	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
25	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\
26	Turntable	MF	MF-7802BS	N/A	N/A	\	\
27	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\

6. OPERATING FREQUENCY

6.1 Block Diagram Of Test Setup



6.2 Limit

Short Range Devices frequency ranges :433.040 MHz to 434.790 MHz

6.3 Test procedure

N/A

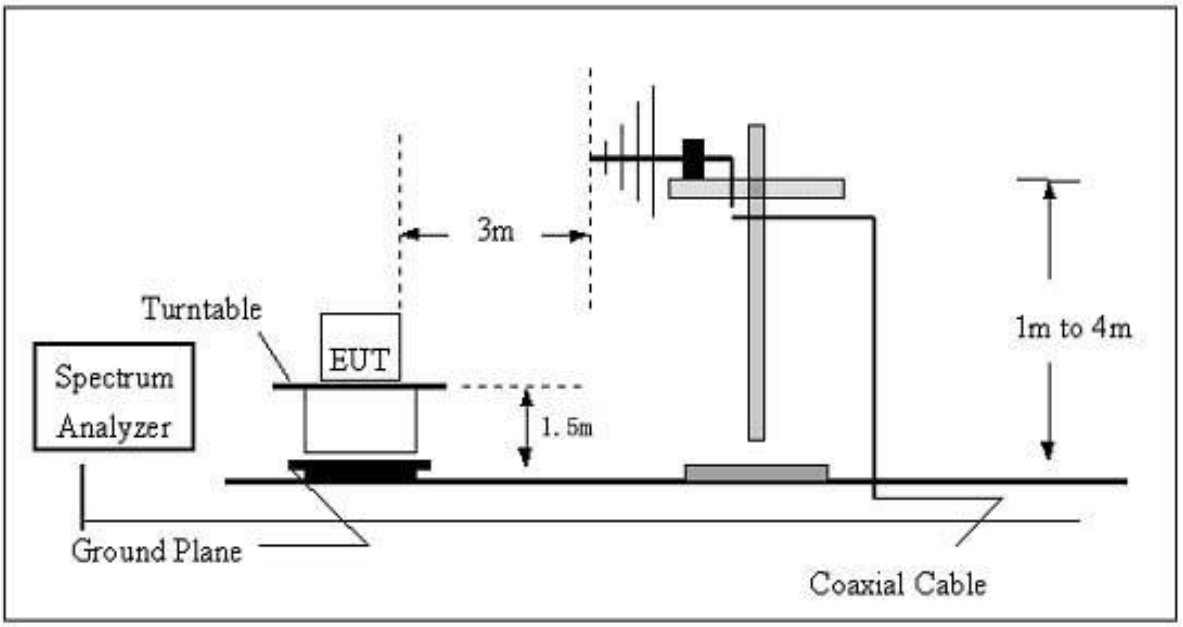
6.4 Test Result

Measurement Conditions		Operating frequency	Nominal Operating Frequency	OCW	Result
T normal: 25°C	V norm: 12Vdc	433.92MHz	433.92MHz	123.65kHz	PASS

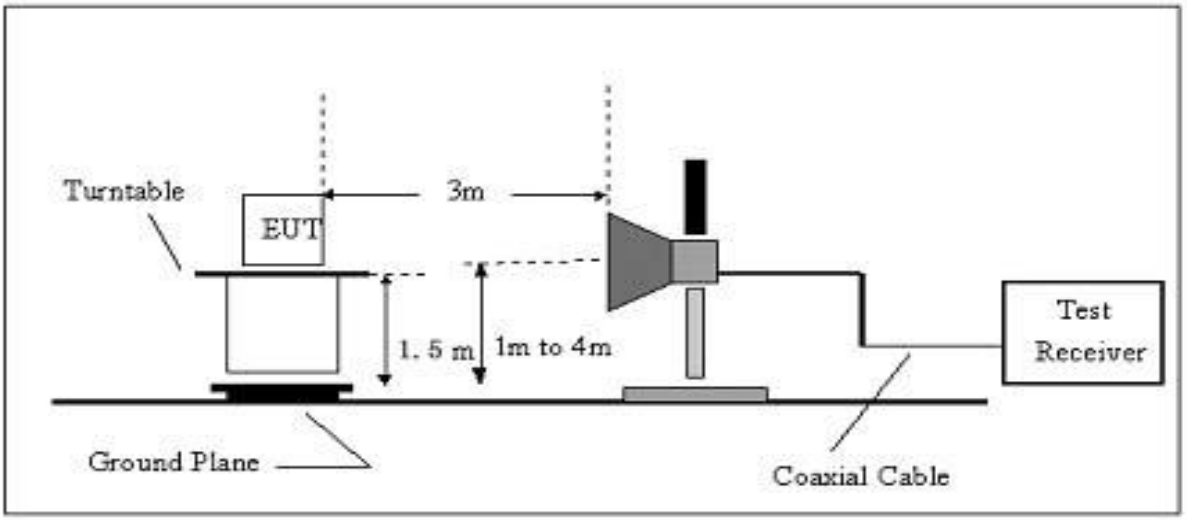
7. UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

7.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



7.2 Limits

Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	RBW/VBW
30 MHz to 47 MHz	-36 dBm	100 kHz/300KHz
47 MHz to 74 MHz	-54 dBm	100 kHz/300KHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz/300KHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz/300KHz
118 MHz to 174 MHz	-36 dBm	100 kHz/300KHz
174 MHz to 230 MHz	-54 dBm	100 kHz/300KHz
230 MHz to 470 MHz	-36 dBm	100 kHz/300KHz
470 MHz to 862 MHz	-54 dBm	100 kHz/300KHz
862 MHz to 1 GHz	-36 dBm	100 kHz/300KHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz/3MHz

7.3 Test Procedure

30MHz ~ 1GHz:

a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

7.4 Test Results

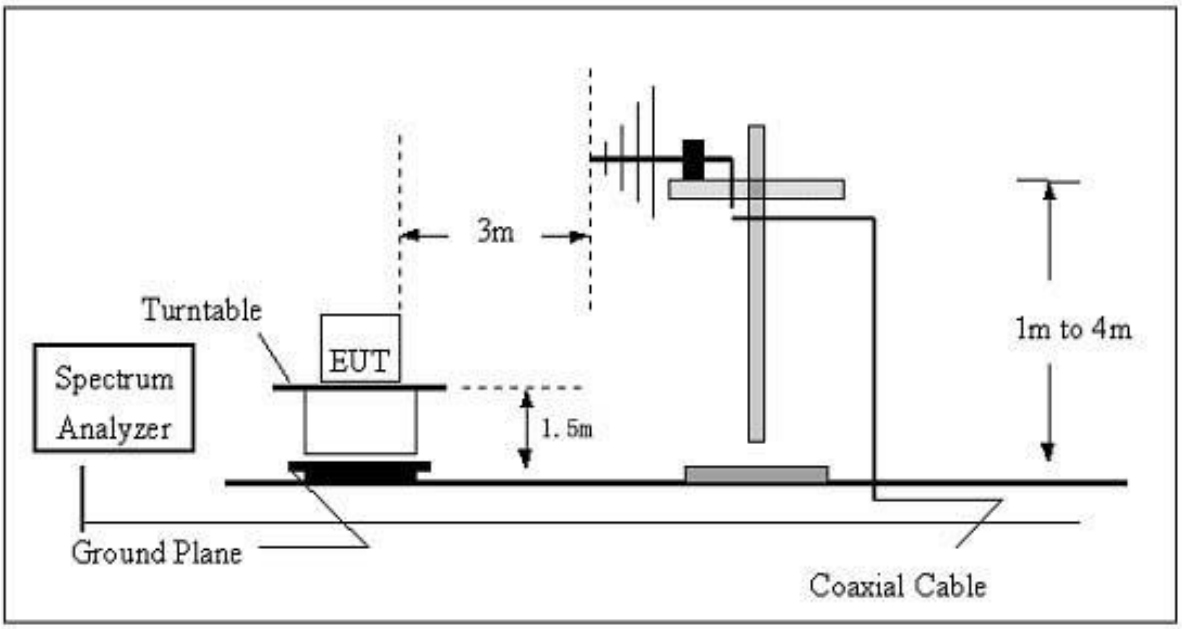
Frequency	Receiver Reading	Turn table Angle	RX Antenna		Substituted			Absolute Level	Result	
			Height	Polar	SG Level	Cable	Antenna Gain		Limit	Margin
(MHz)	(dBμV)	Degree	(m)	(H/V)	(dBm)	(dB)	(dB)	(dBm)	(dBm)	(dB)
867.84	36.15	235	1.4	H	-61.28	0.18	0.00	-61.46	-54.00	-7.46
867.84	33.77	207	1.7	V	-64.73	0.10	0.00	-64.83	-54.00	-10.83
1301.76	51.23	146	1.9	H	-58.27	2.61	12.70	-48.18	-30.00	-18.18
1301.76	49.57	354	1.4	V	-58.69	2.64	12.70	-48.63	-30.00	-18.63
1735.68	47.35	162	1.7	H	-60.25	3.23	11.70	-51.78	-30.00	-21.78
1735.68	45.69	358	2.0	V	-61.84	3.29	11.70	-53.43	-30.00	-23.43

Note: Absolute Level = SG Level - Cable Loss + Antenna Gain
Margin = Absolute Level - Limit

8. TX EFFECTIVE RADIATED POWER

8.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



8.2 Limits

Frequency(MHz)	Limit(ERP,mW)
433.92	10
868.40	25

8.3 Test Procedure

30MHz ~ 1GHz:

1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.
2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.
3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
5. Repeat step 4 for test frequency with the test antenna polarized horizontally.
6. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
8. Repeat step 7 with both antennas horizontally polarized for each test frequency.

9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

ERP(dBm) = Pg(dBm)) + antenna gain (dBd)

where:

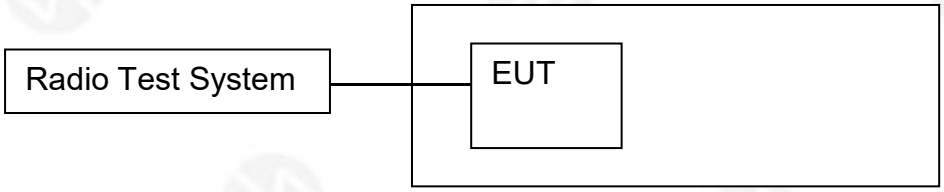
Pg is the generator output power into the substitution antenna.

8.4 Test Results

Measurement Conditions	Operation Frequency	Polarization	ERP (dBm)	ERP (mW)	Limit	Result
TNVN	433.92	H	-3.51	0.45	10mW (i.e. 10.0 dBm)	PASS
	433.92	V	-4.33	0.37	10mW (i.e. 10.0 dBm)	PASS
TLVL	433.92	H	-4.06	0.39	10mW (i.e. 10.0 dBm)	PASS
	433.92	V	-4.37	0.37	10mW (i.e. 10.0 dBm)	PASS
TLVH	433.92	H	-4.01	0.40	10mW (i.e. 10.0 dBm)	PASS
	433.92	V	-4.23	0.38	10mW (i.e. 10.0 dBm)	PASS
THVL	433.92	H	-3.98	0.40	10mW (i.e. 10.0 dBm)	PASS
	433.92	V	-4.15	0.38	10mW (i.e. 10.0 dBm)	PASS
THVH	433.92	H	-3.56	0.44	10mW (i.e. 10.0 dBm)	PASS
	433.92	V	-4.23	0.38	10mW (i.e. 10.0 dBm)	PASS

9. TX DUTY CYCLE

9.1 Block Diagram Of Test Setup



9.2 Limit

Limit: 10%

9.3 Test procedure

Duty cycle is the ratio expressed as a percentage, of the cumulative duration of transmissions Ton_cum within an observation interval $T_{obs.}$ $DC=(T_{on\_cum}/T_{obs})F_{obs}$.

on an observation bandwidth Fobs.

Unless otherwise specified, T_{obs} is 1 hour and the observation bandwidth F_{obs} is the operational frequency band.

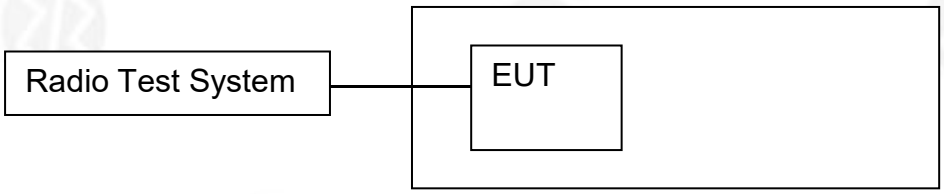
Each transmission consists of an RF emission, or sequence of RF emissions separated by intervals < T_{Dis}.

9.4 Test Result

The Duty cycle is 6%.

10. TX OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limit

The Operating Channel shall be declared and shall reside entirely within the Operational Frequency Band. The Maximum Occupied Bandwidth at 99 % shall reside entirely within the Operating Channel defined by F_{low} and F_{high}.

10.3 Test procedure

Setting	Value	Notes
Centre frequency	The nominal Operating Frequency	The highest or lowest Operating Frequency as declared by the manufacturer
RBW	1 % to 3 % of OCW without being below 100 Hz	
VBW	3 x RBW	Nearest available analyser setting to 3 x RBW
Span	At least 2 x Operating Channel width	Span should be large enough to include all major components of the signal and its side bands
Detector Mode	RMS	
Trace	Max hold	

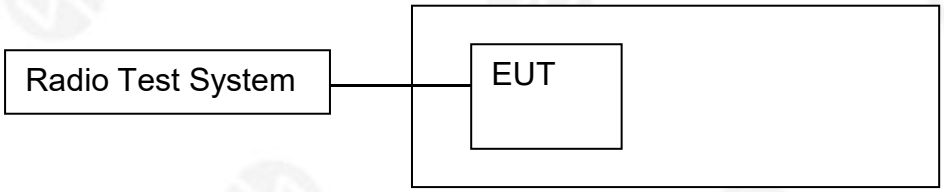
Step 1:
Operation of the EUT shall be started, on the highest operating frequency as declared by the manufacturer, with the appropriate test signal.
The signal attenuation shall be adjusted to ensure that the signal power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals on either side of the power envelope being included in the measurement.
Step 2:
When the trace is completed the peak value of the trace shall be located and the analyser marker placed on this peak.
Step 3:
The 99 % occupied bandwidth function of the spectrum analyser shall be used to measure the occupied bandwidth of the signal.

10.4 Test Result

Frequency (MHz)		99% Occupied Bandwidth (kHz)	Limit	Result
F_L	433.84	156.84	Within the band refer to Anex B or C	Pass
F_H	434.14			

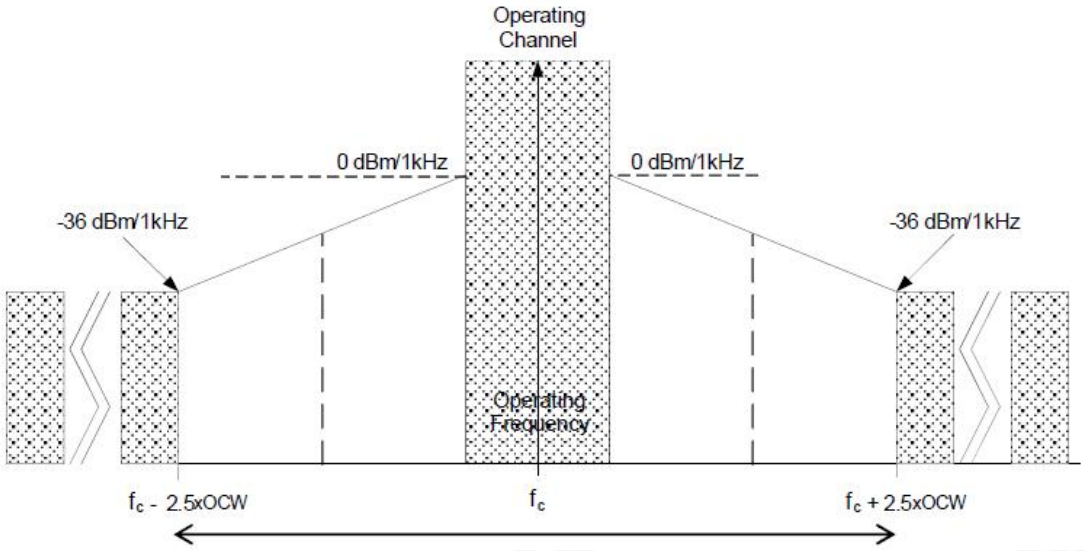
11. TX OUT OF BAND EMISSIONS

11.1 Block Diagram Of Test Setup



11.2 Limit

Domain	Frequency Range	RBW_{REF}	Max power limit
OOB limits applicable to Operational Frequency Band (See Figure 6)	$f \le f_{low\_OFB}$ - 400 kHz	10 kHz	-36 dBm
	F_{low_OFB} - 400 kHz ≤ f ≤ f_{low_OFB} - 200 kHz	1 kHz	-36 dBm
	f_{low} - 200 kHz ≤ f < f_{low_OFB}	1 kHz	See Figure 6
	$f = f_{low\_OFB}$	1 kHz	0 dBm
	$f = f_{high\_OFB}$	1 kHz	0 dBm
	F_{high_OFB} < f ≤ f_{high_OFB} + 200 kHz	1 kHz	See Figure 6
	F_{high_OFB} + 200 kHz ≤ f ≤ f_{high_OFB} + 400 kHz	1 kHz	-36 dBm
	F_{high_OFB} + 400 kHz ≤ f	10 kHz	-36 dBm
OOB limits applicable to Operating Channel (See Figure 5)	$f = f_c$ - 2.5 x OCW	1 kHz	-36 dBm
	f_c - 2,5 x OCW ≤ f ≤ f_c - 0,5 x OCW	1 kHz	See Figure 5
	$f = f_c$ - 0,5 x OCW	1 kHz	0 dBm
	$f = f_c$ + 0,5 x OCW	1 kHz	0 dBm
	f_c + 0,5 x OCW ≤ f ≤ f_c + 2,5 x OCW	1 kHz	See Figure 5
	$f = f_c$ + 2,5 x OCW	1 kHz	-36 dBm
NOTE: f is the measurement frequency. f_c is the Operating Frequency. F_{low_OFB} is the lower edge of the Operational Frequency Band. F_{high_OFB} is the upper edge of the Operational Frequency Band. OCW is the operating channel bandwidth.			



11.3 Test procedure

Spectrum Analyser Setting	Value	Notes
Centre frequency	Operating Frequency	
Span	6 x Operating Channel width	
RBW	1 kHz (see note)	Resolution bandwidth for Out Of Band domain measurements
Detector Function	RMS	
Trace Mode	Linear AVG	Applies only for EUT generating D-M2 test signal. An appropriate number of samples should be averaged to give a stable reading
	Max Hold	Applies only for EUT generating D-M2a or D-M3 test signal.
NOTE: If the value of RBW used is different from RBW_{REF} in clause 5.8.2, use the bandwidth correction in clause 4.3.10.1.		

Step 1:
Operation of the EUT shall be started, on the highest operating frequency as declared by the manufacturer, with the appropriate test signal.
The signal shape is recorded when stable and shall be below the spectrum mask Out Of Band for operating channel.
Step 2:
The test equipment shall be reconfigured as appropriate for the parameter shown below.

Spectrum Analyser Setting	Value	Notes
Centre frequency	fc_{low}	The lowest Operating Frequency in the band
Span	2 x (500 kHz + fc_{low} - f_{low_OFB})	Ensures that the left most mask specification remains within the span
NOTE: f_{low_OFB} is the lower edge of the Operational Frequency Band.		

Operation of the EUT is restarted, with the appropriate test signal, on the lowest operating frequency as declared by the manufacturer.
If the equipment is using only one operating Frequency in the operational Frequency Band, measurement shall be performed the nominal operating frequency.
The signal shape is recorded when stable; and shall be below the spectrum mask for operating channel and the spectrum mask for operational frequency band.

Step 3:
The test equipment shall be reconfigured as appropriate for the parameter shown below.

Spectrum Analyser Setting	Value	Notes
Centre frequency	fc_{high}	the highest Operating Frequency in the band
Span	2 x (500 kHz + f_{high_OFB} - fc_{high})	Ensures that the rightmost mask specification remains within the span
NOTE: f_{high_OFB} is the higher edge of the operational frequency Band.		

Operation of the EUT is restarted, with the appropriate test signal, on the highest Operating Frequency as declared by the manufacturer.
If the equipment is using only one Operating Frequency in the Operational Frequency Band, measurement shall be performed at the nominal Operating Frequency
The signal shape is recorded when stable and shall be below the spectrum mask for Out Of Band emissions for operating channel and for operational Frequency Band.

Step 4:
For frequency agile devices, the measurement shall be repeated in each Operational Frequency Band.

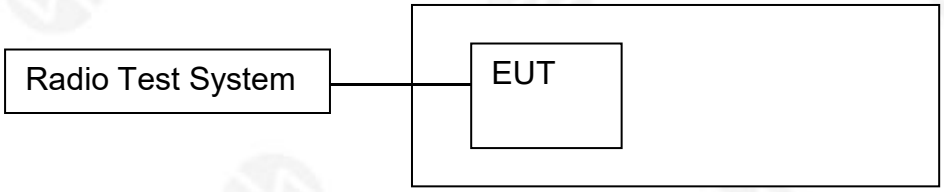
Step 5:
Where required (see clause 5.8.3.1 condition 1), the measurements in step 1 to step 5 shall be repeated under extreme test conditions.

11.4 Test Result

Frequency Range	Test Result (dBm)	Max power limit (dBm)
f ≤ flow_OFB - 400 kHz	-42.43	-36
Flow_OFB - 400 kHz ≤ f ≤ flow_OFB - 200 kHz	-43.44	-36
flow - 200 kHz ≤ f < flow_OFB	-25.22	See Figure 6
f = flow_OFB	-1.25	0
f = fhigh_OFB	-1.12	0
Fhigh_OFB < f ≤ fhigh_OFB + 200 kHz	-24.43	See Figure 6
Fhigh_OFB + 200 kHz ≤ f ≤ fhigh_OFB + 400 kHz	-41.24	-36
Fhigh_OFB + 400 kHz ≤ f	-45.12	-36
Remark: The limits decrease linearly with the logarithm .		

12. TX TRANSIENT

12.1 Block Diagram Of Test Setup



12.2 Limit

Absolute offset from centre frequency	RBW_{REF}	Peak power limit applicable at measurement points
≤ 400 kHz	1 kHz	0 dBm
> 400 kHz	1 kHz	-27 dBm

12.3 Test procedure

The output of the EUT shall be connected to a spectrum analyser or equivalent measuring equipment.

The measurement shall be undertaken in zero span mode. The analyser's centre frequency shall be set to an offset from the operating centre frequency. These offset values and their corresponding RBW configurations are listed below.

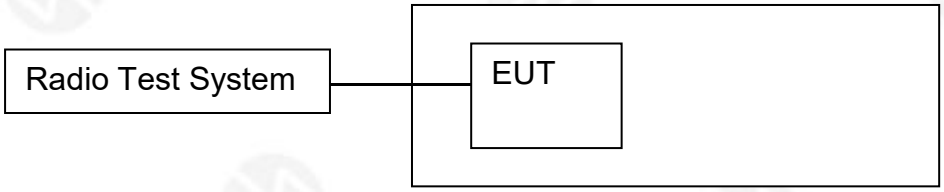
Measurement points: offset from centre frequency	Analyser RBW	RBW_{REF}
-0,5 x OCW - 3 kHz 0,5 x OCW + 3 kHz Not applicable for OCW < 25 kHz	1 kHz	1kHz
±12,5 kHz or ±OCW whichever is the greater	Max (RBW pattern 1, 3, 10 kHz) ≤ Offset frequency/6 (see note)	1 kHz
-0,5 x OCW - 400 kHz 0,5 x OCW + 400 kHz	100 kHz	1 kHz
-0,5 x OCW -1 200 kHz 0,5 x OCW + 1 200 kHz	300 kHz	1 kHz
NOTE: Max (RBW pattern 1, 3, 10 kHz) means the maximum bandwidth that falls into the commonly implemented 1, 3, 10 kHz RBW filter bandwidth incremental pattern of spectrum analysers. EXAMPLE: If OCW is 25 kHz then the RBW value corresponding to one OCW offset frequency is 3 kHz. The rest of the analyser settings are listed in Table 25, and if OCW is 250 kHz then the RBW value corresponding to one OCW offset frequency is 30 kHz.		

12.4 Test Result

Frequency offset	Peak Power level (dBm)	Limit (dBm)	Result
F_c-0.5*OCW-1200kHz	-63.72	-27	Pass
F_c-0.5*OCW-400kHz	-57.25	-27	
F_c-OCW	-41.82	0	
F_c-0.5*OCW-3kHz	-37.05	0	
F_c+0.5*OCW+3kHz	-36.48	0	
F_c+OCW	-40.39	0	
F_c+0.5*OCW+400kHz	-57.24	-27	
F_C+0.5*OCW+1200kHz	-63.39	-27	

13. TX BEHAVIOUR UNDER LOW VOLTAGE CONDITIONS

13.1 Block Diagram Of Test Setup



13.2 Limit

The equipment shall either:
a) remain in the Operating Channel OC without exceeding any applicable limits (e.g. Duty Cycle); or
b) reduce its effective radiated power below the Spurious Emission limits without exceeding any applicable limits (e.g. Duty Cycle); or
c) shut down, (ceasing function);
as the voltage falls below the manufacturers declared operating voltage.

13.3 Test procedure

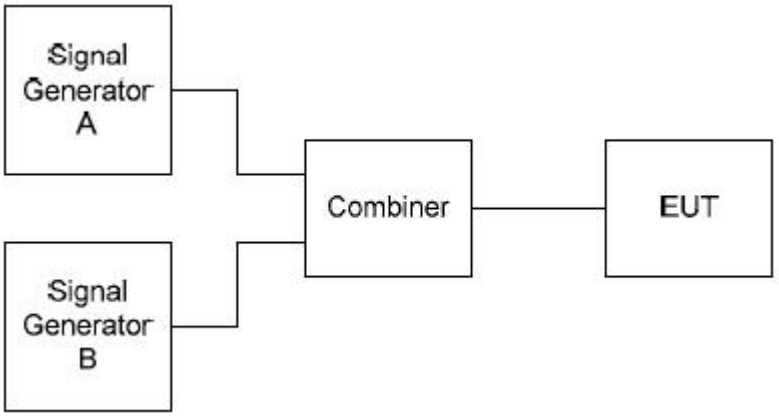
Step 1:
Operation of the EUT shall be started, on Operating Frequency as declared by the manufacturer, with the appropriate test signal and with the EUT operating at nominal operating voltage.
The centre frequency of the transmitted signal shall be measured and noted.
Step 2:
The operating voltage shall be reduced by appropriate steps until the voltage reaches zero.
The centre frequency of the transmitted signal shall be measured and noted.
Any abnormal behaviour shall be noted.

13.4 Test Result

Test Voltage	Test result
DC 12V	ok
DC 10.2V	ok
DC 13.8V	ok

14. RX BLOCKING

14.1 Block Diagram Of Test Setup



14.2 Limit

RX category 3

Requirement	Limits
	Receiver category 3
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -80 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -60 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -60 dBm

RX category 2

Requirement	Limits
	Receiver category 2
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -69 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -44 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -44 dBm

RX category 1.5

Requirement	Limits
	Receiver category 1.5
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -43 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -33 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -33 dBm

RX category 1

Requirement	Limits
	Receiver category 1
Blocking at ±2 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±10 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -20 dBm

14.3 Test procedure

Signal generator A shall be set to an appropriate modulated test signal at the operating frequency of the EUT receiver.

Signal generator B shall be unmodulated.

Measurements shall be carried out at frequencies of the unwanted signal at approximately the frequency(ies) offset(s) defined in technical requirement avoiding those frequencies at which spurious responses occur. Additional

measurement points may be requested by technical requirements clause.

If several operational frequency bands are used by the equipment, at least one blocking measurement by bands has to be performed.

Step 1:

Signal generator B shall be powered off. Signal generator A shall be set to the minimum level which gives the wanted performance criterion of EUT or the reference level in Table 32, whichever is the higher The output level of generator A shall then be increased by 3 dB unless otherwise specified in technical requirement.

Step 2:

Signal generator B is powered on and set to operate at the nominal operating frequency - offset frequency.

Signal generator B is then switched on and the signal amplitude is adjusted to the minimum level at which the wanted performance criterion is not achieved.

With signal generator B settings unchanged, the receiver shall be replaced with a suitable RF power measuring equipment. The power into the measuring equipment shall be measured and noted.

The blocking level is then the conducted power received from generator B at the EUT antenna connector.

This can either be measured on the antenna connector for conducted test or be calculated for radiated test (see clause C.5.4).

The blocking level shall be higher or equal to the blocking power level requested in the technical requirement clause.

Step 3:

The measurement in steps 1 to 3 shall be repeated with signal offsets at required frequencies.

Step 4:

The information shown in below Table shall be recorded in the test report for each measured signal level and unwanted signal offset.

Value	Notes
Operating Frequency	Nominal centre frequency of the receiver
Signal generator A	Power level of signal generator A
Blocking level	Power level of signal generator B

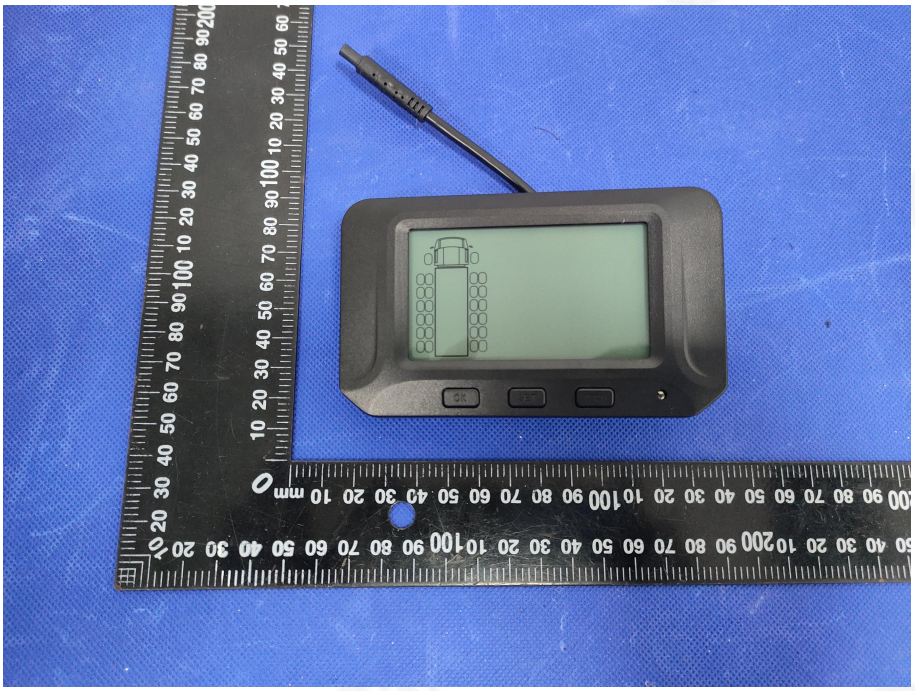
14.4 Test Result

Requirement (MHz)	Result (dBm)	Limit Receiver category 2 (dBm)
Blocking at -2 MHz from OC edge f_{low}	-43	≥ -69
Blocking at +2 MHz from OC edge f_{high}	-51	≥ -69
Blocking at -10 MHz from OC edge f_{low}	-34	≥ -44
Blocking at +10 MHz from OC edge f_{high}	-36	≥ -44
Blocking at -5 % of Centre Frequency edge f_{low}	-37	≥ -44
Blocking at +5 % of Centre Frequency edge f_{high}	-36	≥ -44

15. EUT PHOTOGRAPHS

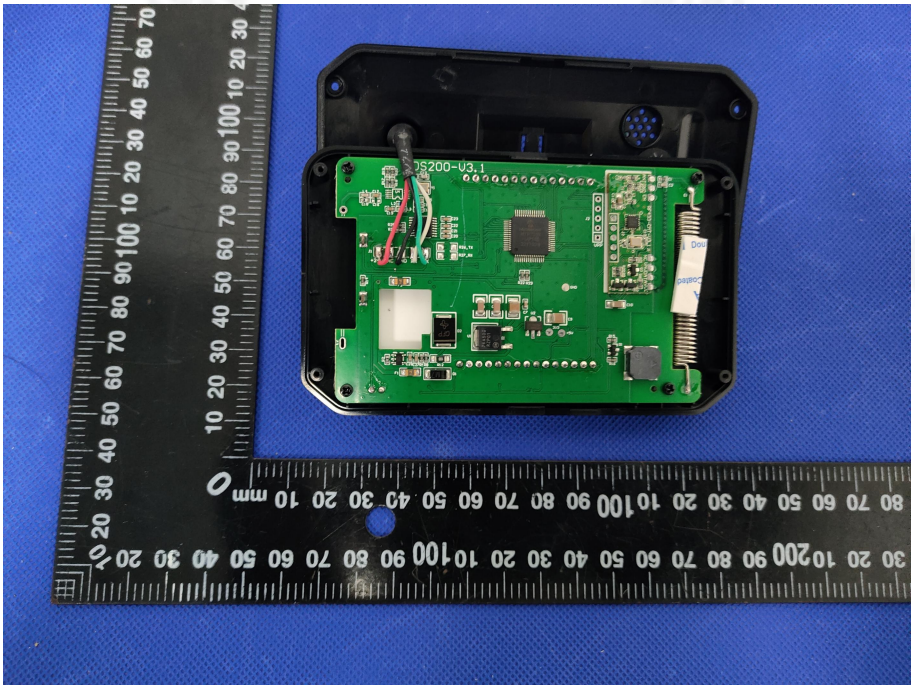
EUT Photo 1

EUT Photo 2

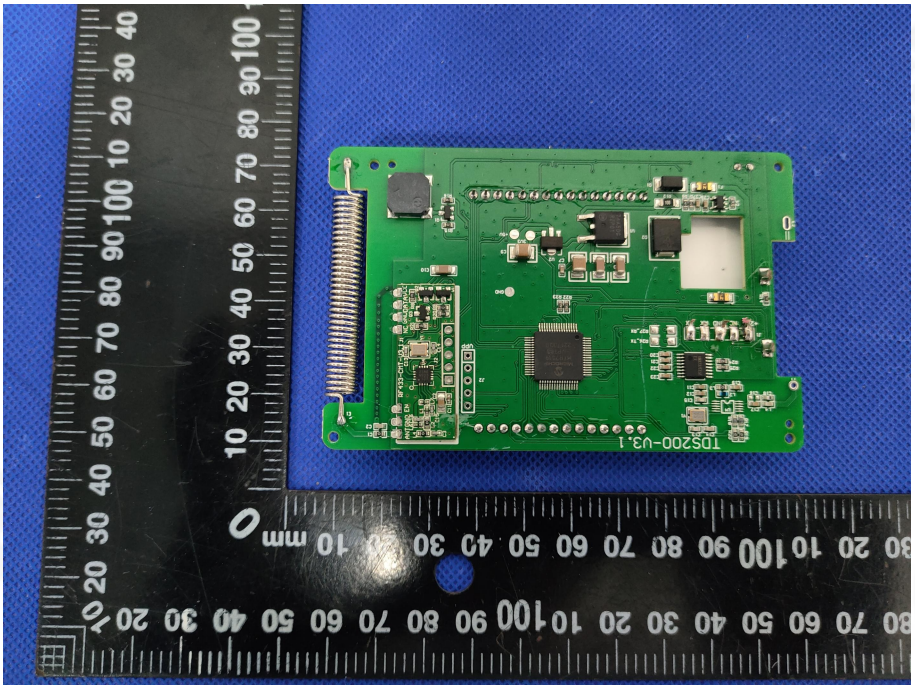


EUT Photo 3

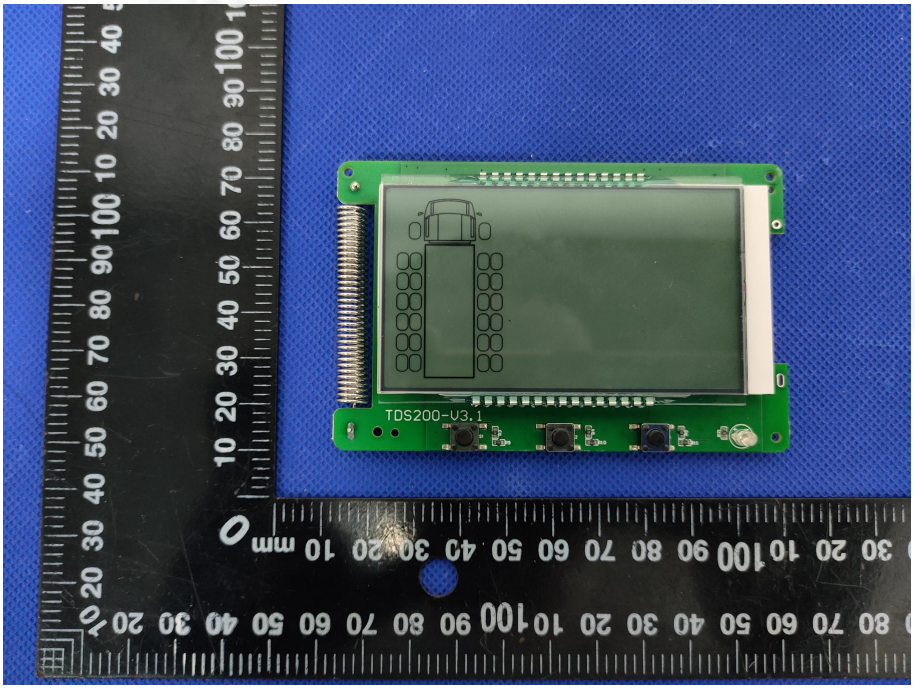
EUT Photo 4



EUT Photo 5

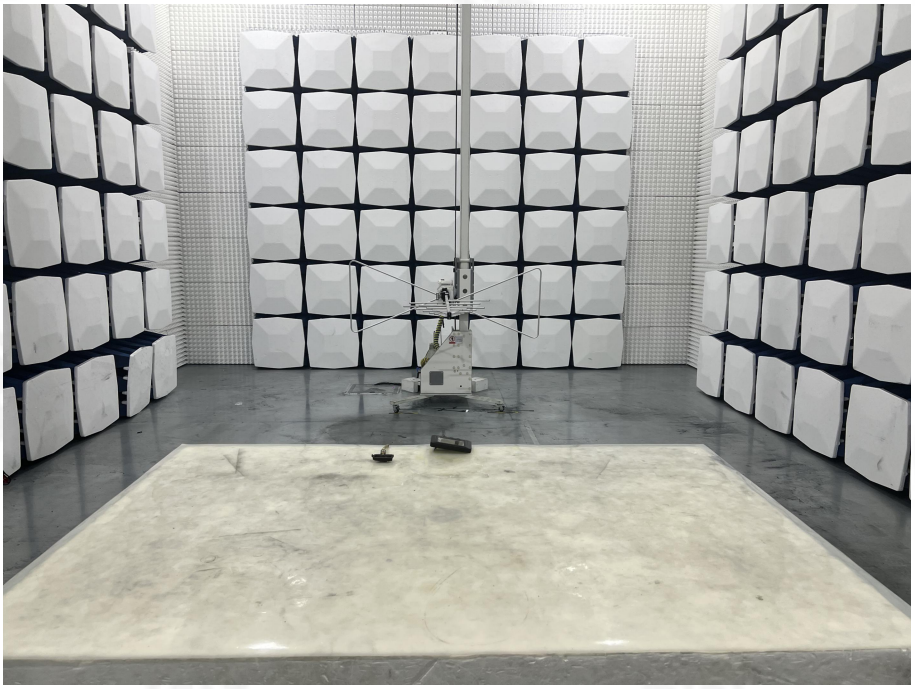


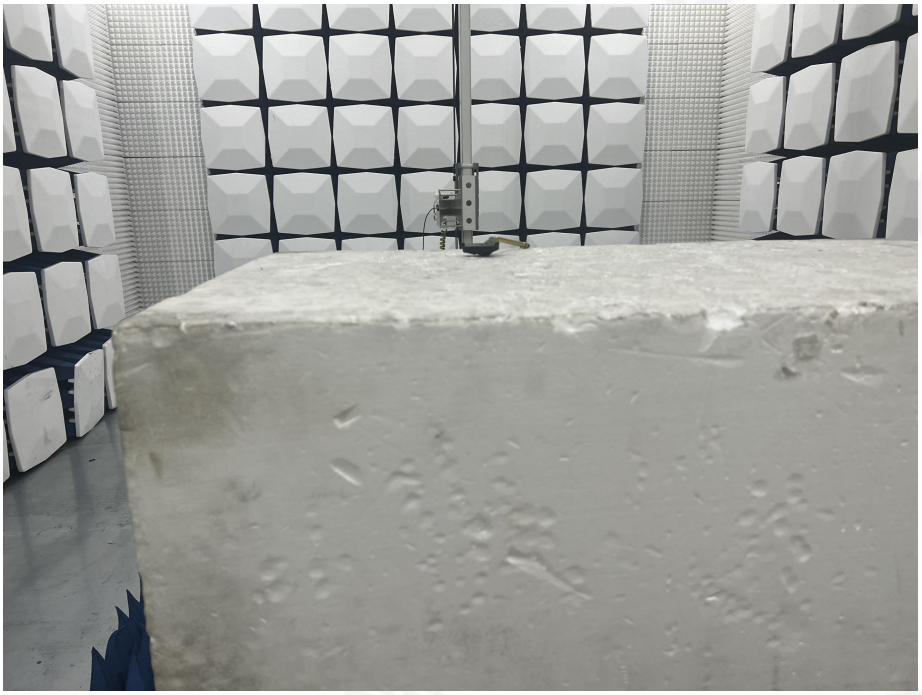
EUT Photo 6



16. EUT TEST SETUP PHOTOGRAPHS

SPURIOUS EMISSIONS





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