


TEST REPORT No.: (5223)268-0793

## TEST REPORT

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Folder No.:	--	Date of Receipt:	2023-09-19
		Test date:	2023-09-19 to 2023-09-20

MANUFACTURER OR SUPPLIER NAME:	--	
MANUFACTURER OR SUPPLIER ADDRESS:	--	
PRODUCT:	PHANTOM FORCE	
MODEL REFERENCE:	20289	
ADDITIONAL MODEL & MODEL DIFFERENCE:	SK17073, see item 2.1	
RATED VOLTAGE:	Remote: 3.0Vd.c. ("AAA" size battery x 2) Car: 3.7Vd.c. (Internal rechargeable battery x 1)	
REMARKS:	--	
SAMPLE NO.:	(5223)268-0793	

The submitted sample of the above equipment has been tested according to the requirements of the following standards:

ETSI EN 300 440 V2.2.1 (2018-07)

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Assistant Manager,  
EMC Department



Name: Size Tsz Man  
Date: October 03, 2023



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RE2309WDG0083	Original release	Sep. 25, 2023



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## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: EN 300 440 V2.2.1 (2018-07)			
Standard Subclause	Test Type and Limit	Result	Remark
	<b>TRANSMITTER PARAMETERS</b>		
4.2.2	Equivalent Isotropic Radiated Power	PASS	Applicable
4.2.3	Permitted range of operating frequency	PASS	Applicable
4.2.4	Unwanted emissions in the spurious domain	PASS	Applicable
4.2.5	Duty Cycle	N/A	Not Applicable
	<b>RECEIVER PARAMETERS</b>		
4.3.3	Adjacent channel selectivity	N/A	Not Applicable
4.3.4	Blocking or desensitization	PASS	Applicable
4.3.5	Radiated spurious emission	PASS	Applicable



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## Receiver categories

Receiver category	Relevant receiver clauses	Risk assessment of receiver performance	The EUT Category
1	4.3.3, 4.3.4 and 4.3.5	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person).	-
2	4.3.4 and 4.3.5	Medium reliable SRD communication media e.g. causing inconvenience to persons, which cannot simply be overcome by other means.	-
3	4.3.4 and 4.3.5	Standard reliable SRD communication media e.g. Inconvenience to persons, which can simply be overcome by other means (e.g. manual).	√

If receiver category 1 or 2 is selected, this shall be stated in both the test report and in the user's manual for the equipment.



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### 1.1 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Spectrum Analyzer	Rohde&Schwarz	FSV3044	101326	July 13, 24
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-555	Jan. 08, 24
Pre-Amplifier	Agilent	8447D	2944A10488	July. 26, 24
3m Semi-anechoic Chamber	ETS-Lindgren	9m*6m*6m	D3040003DG-1	July 30, 24
Coaxial RF Cable	Joinfront	JFAA6-NMNM-8000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAR-NMNCM-2000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAR-BNCM5MM-500	2100033742	July 10, 24
Test software	ADT	ADT Radiated V7.6.15.9.2	N/A	N/A
Horn Antenna	ETS-Lindgren	3117	00240041	May 06, 24
Horn Antenna	SCHWARZBECK	BBHA 9170	01024	Oct. 16, 23
Pre-Amplifier (1GHz-18GHz)	Rohde&Schwarz	SCU18	102265	Apr. 01, 24
Pre-Amplifier (18GHz-40GHz)	Rohde&Schwarz	SCU40	100437	Oct. 27, 23
Coaxial RF Cable	Joinfront	JFAA6-NMSMM-2000	2100033742	July 10, 24
Coaxial RF Cable	Joinfront	JFAA6-NMSMM-800	2100033742	July 10, 24
Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jan. 11, 24
Programmable Temperature&Humidity Chamber	Hongjin	HYC-TH-225DH	DG-180746	Jan. 11, 24
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Agilent	E3640A	MY40004013	Feb. 08, 24
Test software	ADT	ADT_RF Test Software V6.6.5.3	N/A	N/A
Test software	ADT	ADT_RF Test Software V6.6.5.4	N/A	N/A

#### NOTES:

1. The test was performed in 966 Chamber and RF Test Shielding Room.
2. The calibration interval of the above test instruments are 12/24\* months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.



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For Receiver Blocking test and Adjacent channel selectivity test:

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Wireless Connectivity Tester	Rohde&Schwarz	CMW270	101601	Nov. 01, 23
MXA VEXTOR SIGNAL	Agilent	N5182A	MY50140530	Jan. 11, 24
Signal Generator	Agilent	E4421B	US40051152	Oct. 30, 23
Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Jan. 15, 24
Frequency Analyzer	Keysight	N9010B	MY60240432	Nov. 01, 23
Power Sensor(8*8)	Tonscend	JS0806-2	188060112	Apr. 05, 24
DC Source	Agilent	E3640A	MY40004013	Feb. 08, 24
Shield Box	TOJOIN	MS4345-C	SZA18A 3038	N/A
Attenuator	TOJOIN	CHB-8-90-1-B 50SMA	0803002	N/A
COM Power Splitter	TOJOIN	PS-TX-2B	020801	N/A
COM Power Splitter	TOJOIN	PS-TX-2B	020802	N/A
Test software	TonScend	JS1120-3-1	JS-001	N/A

### NOTES:

1. The test was performed in RF Test Shielding Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. Test site: No. 122, Houjie Avenue West Houjie Town, Dongguan City Guangdong Province, 523960, People's Republic of China.





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## 1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

Parameter	Uncertainty
Radio frequency	$\pm 1.06 \times 10^{-8}$
RF power (conducted)	$\pm 0.56$ dB
Radiated emission of transmitter, valid up to 26.5GHz	$\pm 4.84$ dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	$\pm 4.96$ dB
Radiated emission of receiver, valid up to 26.5GHz	$\pm 4.84$ dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	$\pm 4.96$ dB
Temperature	$\pm 0.23$ °C
Humidity	$\pm 0.3$ %
Voltages (DC)	$\pm 0.1$ %
Voltages (AC, <10kHz)	$\pm 0.22$ %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



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### 1.3 MAXIMUM MEASUREMENT UNCERTAINTY

For the test methods, according to ETSI EN 300 440 standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 [7] and shall correspond to an expansion factor (coverage factor)  $k = 1,96$  or  $k = 2$  (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Parameter	Uncertainty
Radio frequency	$\pm 1 \times 10^{-7}$
RF power (conducted)	$\pm 1.5$ dB
Radiated emission of transmitter, valid up to 26.5GHz	$\pm 6.0$ dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	$\pm 8.0$ dB
Radiated emission of receiver, valid up to 26.5GHz	$\pm 6.0$ dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	$\pm 8.0$ dB
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5.0$ %
Voltages (DC)	$\pm 1.0$ %
Voltages (AC, <10kHz)	$\pm 2.0$ %



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## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	PHANTOM FORCE			
<b>MODEL NO.</b>	20289			
<b>ADDITIONAL MODEL</b>	SK17073			
<b>NOMINAL VOLTAGE</b>	Remote control: DC 3V(1.5V*AAA*2) from battery; Car: DC 3.7V Li-ion from battery or DC 5V from USB host unit			
<b>OPERATING VOLTAGE RANGE</b>	Remote Control	Vnom= 3V	Vmin= 2.55V	Vmax= 3V
	Car	Vnom= 3.7V	Vmin= 3.15V	Vmax= 3.7V
<b>OPERATING TEMPERATURE RANGE</b>	-5 ~ +55°C			
<b>MODULATION TYPE</b>	GFSK			
<b>OPERATING FREQUENCY</b>	2418MHz~2462MHz			
<b>EIRP (MAX)</b>	-27.51dBm for Remote Control			
	-1.02dBm for Car			
<b>ANTENNA TYPE</b>	Wire Antenna, with 0dBi gain (Remote); Wire Antenna, with 0dBi gain (Car)			
<b>CABLE SUPPLIED</b>	N/A			
<b>RECEIVER CATEGORY</b>	<input type="checkbox"/> Category 1	<input type="checkbox"/> Category 2	<input checked="" type="checkbox"/> Category 3	

#### NOTES:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2309WDG0083) for detailed product photo.
4. Additional model SK17073 is identical with the test model 20289 except the color of the appearance and model number for trading purpose.



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## 2.2 DESCRIPTION OF TEST MODES

SAMPLE	MODE	FREQUENCY
Remote Control	Transmitting/ Receiving	2418MHz-2462MHz
Car	Transmitting/ Receiving	2418MHz-2462MHz

### Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2418	9	2434	17	2450
2	2420	10	2436	18	2452
3	2422	11	2438	19	2454
4	2424	12	2440	20	2456
5	2426	13	2442	21	2458
6	2428	14	2444	22	2460
7	2430	15	2446	23	2462
8	2432	16	2448		

Channel	Freq. (MHz)
Low	2418
Middle	2440
High	2462

Note: The more detailed channel, please refer to the product specifications



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## **2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF Product, according to the specifications of the manufacturers; it must comply with the requirements of the following standards:

**EN 300 440 V2.2.1 (2018-07)**

All test items have been performed and recorded as per the above standards.

## **2.4 DESCRIPTION OF SUPPORT UNITS**

The EUT has been tested as an independent unit without any other necessary accessories or support units.



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### 3 TEST TYPES AND RESULTS

#### TRANSMITTER PARAMETERS

##### 3.1 EQUIVALENT ISOTROPIC RADIATED POWER

###### 3.1.1 LIMITS OF EQUIVALENT ISOTROPIC RADIATED POWER

Condition	Limit (e.i.r.p)
Generic use	10 mW e.i.r.p.

For Extreme temperature ranges:

Category	Temperature range	The EUT Category
I (General)	-20°C to +55°C	-
II (Portable)	-10°C to +55°C	-
III (Equipment for normal indoor use)	5°C to +35°C	-
Other (Declared by the manufacturer)	-5°C to +55°C	√

###### 3.1.2 TEST PROCEDURES

Refer to chapter 4.2.2.3 of EN 300 440 V2.2.1 (2018-07).

###### 3.1.3 DEVIATION FROM TEST STANDARD

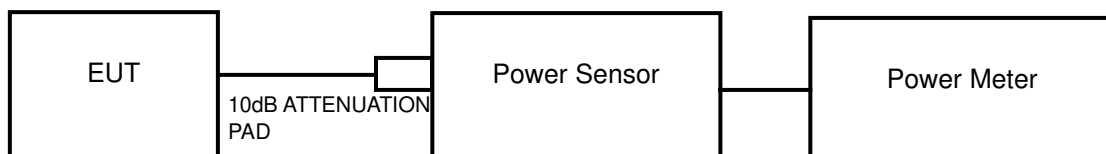
No deviation.



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### 3.1.4 TEST SETUP

1. Ran a test program to control EUT transmit at specific channel
2. A power meter was used to read the response of the power sensor.
3. Record the power level.
4. EIRP = antenna gain + power level of step 3.



The -6dB bandwidth is less than 20 MHz, so determine the appropriate method of measurement: see clauses 4.2.2.3.1



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### 3.1.5 TEST RESULTS

#### Remote Control

TEST CONDITION			EQUIVALENT ISOTROPIC RADIATED POWER (dBm)		
			(Low) 2418MHz	(Middle) 2440MHz	(High) 2462MHz
T <sub>nom</sub> (°C)	+25	V <sub>nom</sub> (V)	-29.68	-28.77	-27.94
T <sub>min</sub> (°C)	-5	V <sub>min</sub> (V)	-29.25	-28.54	<b>-27.51</b>
		V <sub>max</sub> (V)	-29.23	-28.53	-27.53
T <sub>max</sub> (°C)	+55	V <sub>min</sub> (V)	-29.90	-28.93	-28.46
		V <sub>max</sub> (V)	-29.90	-28.95	-28.43

#### Car

TEST CONDITION			EQUIVALENT ISOTROPIC RADIATED POWER (dBm)		
			(Low) 2418MHz	(Middle) 2440MHz	(High) 2462MHz
T <sub>nom</sub> (°C)	+25	V <sub>nom</sub> (V)	-1.52	-1.46	-1.68
T <sub>min</sub> (°C)	-5	V <sub>min</sub> (V)	-1.04	-1.18	-1.20
		V <sub>max</sub> (V)	<b>-1.02</b>	-1.17	-1.22
T <sub>max</sub> (°C)	+55	V <sub>min</sub> (V)	-1.75	-1.63	-2.21
		V <sub>max</sub> (V)	-1.75	-1.65	-2.18





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### 3.2 PERMITTED RANGE OF OPERATING FREQUENCIES

#### 3.2.1 LIMITS OF PERMITTED RANGE OF OPERATING FREQUENCIES

The width of the power envelope is  $f_H - f_L$  for a give operating frequency. In equipment that allow adjustment or selection of different frequencies, the power envelope take up different positions in the allowed band. The frequency range is determined by the lowest value of  $f_L$  and the highest value of  $f_H$  resulting from the adjustment of the equipment to the lowest and highest operating frequency.

CONDITION	LIMIT
Under all test conditions	$F_L > 2400.0\text{MHz}$ $F_H < 2483.5\text{MHz}$

#### 3.2.2 TEST PROCEDURES

Refer to chapter 4.2.3.3 of EN 300 440 V2.2.1 (2018-07).

#### 3.2.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.2.4 TEST SETUP

The EUT and probe antenna were placed into the temperature oven. The probe has to be connected with spectrum analyzer. The power source of the EUT has to be connected with the power supply for voltage change. The frequency has to be recorded for the right and left end above threshold of highest and lowest channel respectively.



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### 3.2.5 TEST RESULTS

#### Remote Control

TEST CONDITION			FREQUENCY (MHz)	
			LOWEST	HIGHEST
$T_{nom}(^{\circ}C)$	+25	$V_{nom}(V)$	2417.51	2462.65
$T_{min}(^{\circ}C)$	-5	$V_{min}(V)$	2417.36	2462.74
		$V_{max}(V)$	2417.39	2462.76
$T_{max}(^{\circ}C)$	+55	$V_{min}(V)$	2417.62	2462.52
		$V_{max}(V)$	2417.57	2462.51
Measured frequency (lowest and highest)			FL = 2417.36	FH = 2462.76

#### Car

TEST CONDITION			FREQUENCY (MHz)	
			LOWEST	HIGHEST
$T_{nom}(^{\circ}C)$	+25	$V_{nom}(V)$	2417.71	2462.39
$T_{min}(^{\circ}C)$	-5	$V_{min}(V)$	2417.55	2462.49
		$V_{max}(V)$	2417.58	2462.51
$T_{max}(^{\circ}C)$	+55	$V_{min}(V)$	2417.82	2462.27
		$V_{max}(V)$	2417.77	2462.26
Measured frequency (lowest and highest)			FL = 2417.55	FH = 2462.51



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### **3.3 MEASUREMENT RADIATED SPURIOUS EMISSION**

#### **3.3.1 LIMITS OF MEASUREMENT RADIATED SPURIOUS EMISSION**

<b>Frequency Range</b>	<b>47MHz to 74MHz 87.5MHz to 108MHz 174MHz to 230MHz 470MHz to 862MHz</b>	<b>Other Frequencies Below 1GHz</b>	<b>&gt;1GHz</b>
Limit (Operating)	4nW (-54dBm)	250nW (-36dBm)	1µW (-30dBm)
Limit (Standby)	2nW (-57dBm)	2nW (-57dBm)	20nW (-47dBm)

#### **3.3.2 TEST PROCEDURES**

Refer to chapter 4.2.4.3 of EN 300 440 V2.2.1 (2018-07).

#### **3.3.3 DEVIATION FROM TEST STANDARD**

No deviation.

#### **3.3.4 TEST SETUP**

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.



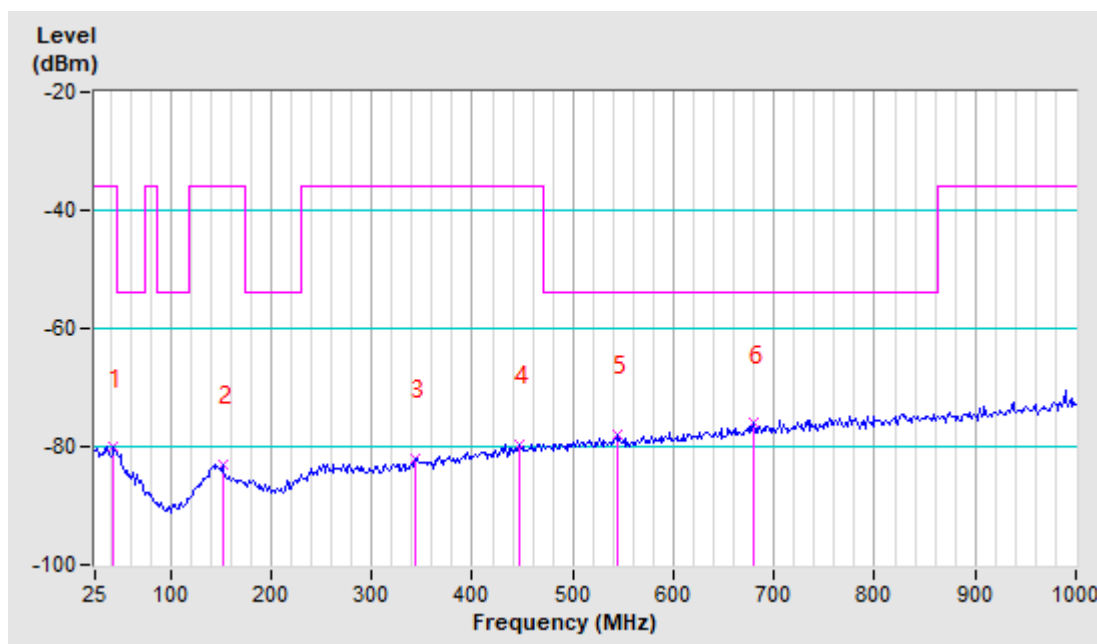
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**3.3.5 TEST RESULTS**

**Remote Control: TX BELOW 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
--	--------------	--------------------------	-----

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
43.75	H	-80.09	-36.00	-44.09
151.56	H	-82.89	-36.00	-46.89
343.75	H	-82.06	-36.00	-46.06
446.87	H	-79.66	-36.00	-43.66
545.31	H	-77.93	-54.00	-23.93
679.69	H	-76.07	-54.00	-22.07



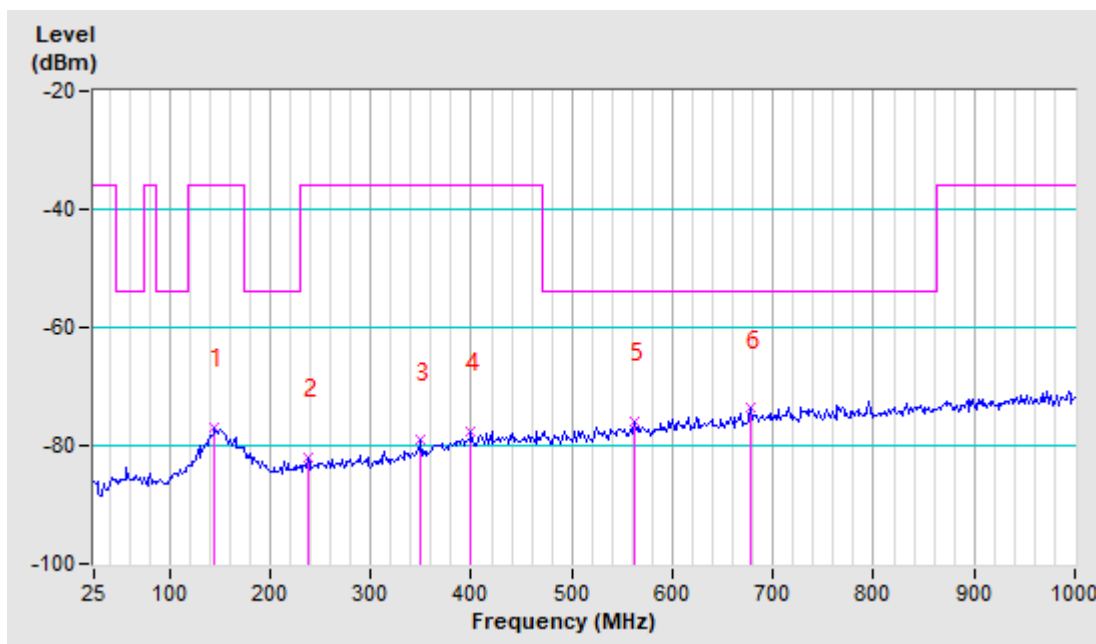


**BUREAU  
VERITAS**

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<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
--	--------------	--------------------------	-----

<b>SPURIOUS EMISSION LEVEL</b>				
<b>Frequency (MHz)</b>	<b>Antenna Polarization</b>	<b>Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
145.31	V	-76.79	-36.00	-40.79
237.50	V	-81.87	-36.00	-45.87
350.00	V	-79.12	-36.00	-43.12
400.00	V	-77.53	-36.00	-41.53
562.50	V	-75.96	-54.00	-21.96
678.12	V	-73.71	-54.00	-19.71



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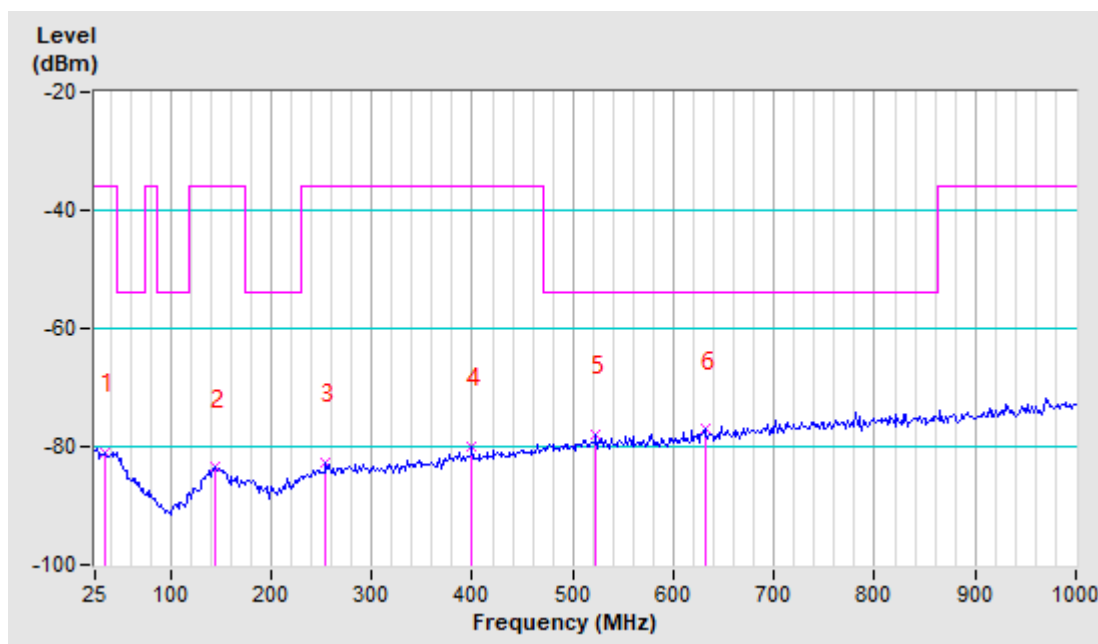
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## TEST REPORT No.: (5223)268-0793

Car: TX BELOW 1GHz DATA

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
--	--------------	--------------------------	-----

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
34.37	H	-81.05	-36.00	-45.05
143.75	H	-83.52	-36.00	-47.52
254.69	H	-82.64	-36.00	-46.64
400.00	H	-80.01	-36.00	-44.01
523.44	H	-77.89	-54.00	-23.89
631.25	H	-77.07	-54.00	-23.07



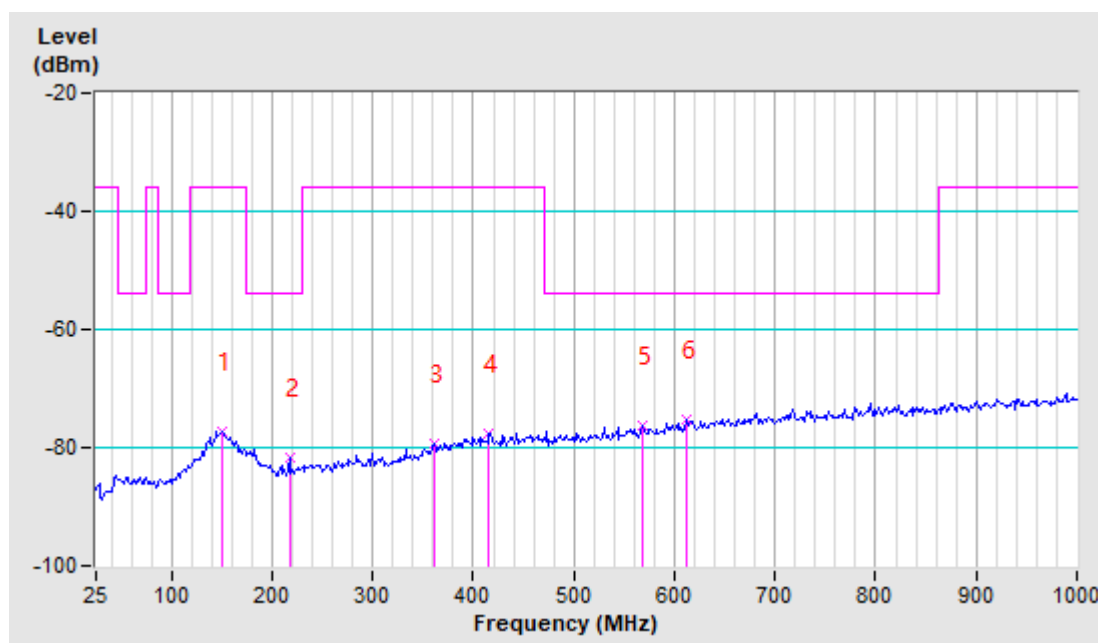


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VERITAS**

**TEST REPORT No.: (5223)268-0793**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
--	--------------	--------------------------	-----

<b>SPURIOUS EMISSION LEVEL</b>				
<b>Frequency (MHz)</b>	<b>Antenna Polarization</b>	<b>Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
150.00	V	-77.25	-36.00	-41.25
217.19	V	-81.74	-54.00	-27.74
360.94	V	-79.26	-36.00	-43.26
415.62	V	-77.49	-36.00	-41.49
568.75	V	-76.27	-54.00	-22.27
612.50	V	-75.18	-54.00	-21.18



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**TEST REPORT No.: (5223)268-0793**

**Remote Control: TX ABOVE 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	1GHz ~ 25GHz	<b>OPERATING CHANNEL</b>	Low, High
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4836.00	H	-41.75	-30.00	-11.75
	7254.00	H	-47.21	-30.00	-17.21
	4836.00	V	-41.62	-30.00	-11.62
	7254.00	V	-46.28	-30.00	-16.28
High	4924.00	H	-43.29	-30.00	-13.29
	7386.00	H	-46.51	-30.00	-16.51
	4924.00	V	-43.38	-30.00	-13.38
	7386.00	V	-47.11	-30.00	-17.11

**Car: TX ABOVE 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	1GHz ~ 25GHz	<b>OPERATING CHANNEL</b>	Low, High
--	--------------	--------------------------	-----------

SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4836.00	H	-40.27	-30.00	-10.27
	7254.00	H	-45.49	-30.00	-15.49
	4836.00	V	-35.36	-30.00	-5.36
	7254.00	V	-45.34	-30.00	-15.34
High	4924.00	H	-35.52	-30.00	-5.52
	7386.00	H	-45.86	-30.00	-15.86
	4924.00	V	-37.52	-30.00	-7.52
	7386.00	V	-45.79	-30.00	-15.79





## TEST REPORT No.: (5223)268-0793

### 3.4 DUTY CYCLE (NOT APPLY)

#### 3.4.1 LIMITS OF DUTY CYCLE

Frequency Band	Duty Cycle	Application
2400MHz to 2483.5MHz	No Restriction	Generic use
2400MHz to 2483.5MHz	No Restriction	Detection, movement and alert applications
(a) 2446MHz to 2454MHz	No Restriction	RFID
(b) 2446MHz to 2454MHz	15%	RFID
5725MHz to 5875MHz	No Restriction	Generic use
9200MHz to 9500MHz	No Restriction	Detection, movement and alert applications
9500MHz to 9975MHz	No Restriction	Detection, movement and alert applications
10.5GHz to 10.6GHz	No Restriction	Detection, movement and alert applications
13.4GHz to 14.0GHz	No Restriction	Detection, movement and alert applications
17.1GHz to 17.3GHz	DDA or equivalent techniques	GBSAR detecting and movement and alert applications
24.00GHz to 24.25GHz	No Restriction	Detection, movement and alert applications

#### 3.4.2 TEST PROCEDURES

Refer to chapter 4.2.5.3 of EN 300 440 V2.2.1 (2018-07).

#### 3.4.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.4.4 TEST SETUP

The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.



## TEST REPORT No.: (5223)268-0793

### 3.4.5 TEST RESULTS

This product does not apply.



TEST REPORT No.: (5223)268-0793

## RECEIVER PARAMETERS

### 3.5 ADJACENT CHANNEL SELECTIVITY

#### 3.5.1 LIMITES OF ADJACENT CHANNEL SELECTIVITY

The adjacent channel selectivity of the equipment under specified conditions shall not be less than  $-30 \text{ dBm} + k$

Receiver category	Limit
1	$-30 \text{ dBm} + K$

The correction factor,  $k$ , is as follows:

$$k = -20 \log f - 10 \log BW$$

Where:

$f$  is the frequency in GHz;

$BW$  is the channel bandwidth in MHz.

The factor  $k$  is limited within the following:

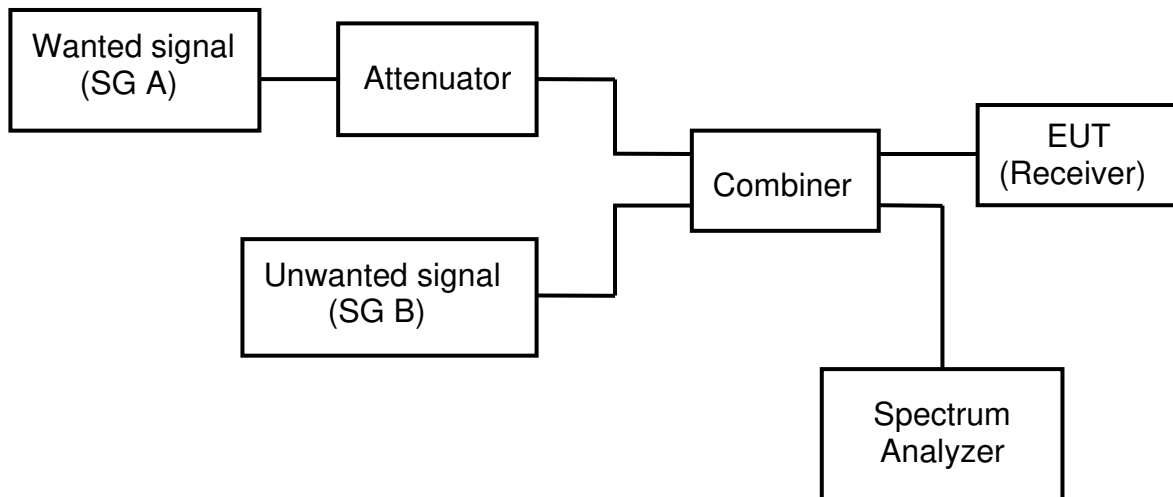
$$-40 \text{ dB} < k < 0 \text{ dB}$$

#### 3.5.2 TEST PROCEDURES

Refer to chapter 4.3.3.3 of EN 300 440 V2.2.1 (2018-07).

**TEST REPORT No.: (5223)268-0793**

### 3.5.3 TEST SETUP





**TEST REPORT No.: (5223)268-0793**

### 3.5.4 TEST RESULTS

This product does not apply.



TEST REPORT No.: (5223)268-0793

### 3.6 BLOCKING OR DESENSITIZATION

#### 3.6.1 LIMITES OF RECEIVER BLOCKING

The blocking level, shall not be less than the values given in table

Receiver category	Limit
1	-30dBm + K
2	-45dBm + K
3	-60dBm + K

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:

f is the frequency in GHz;

BW is the channel bandwidth in MHz.

The factor k is limited within the following:

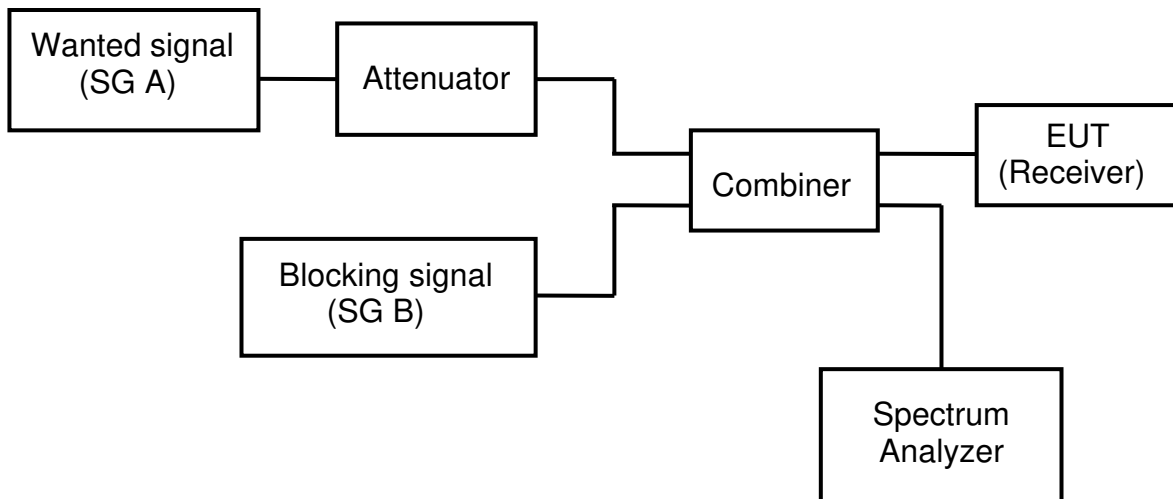
$$-40 \text{ dB} < k < 0 \text{ dB}$$

#### 3.6.2 TEST PROCEDURES

Refer to chapter 4.3.4.3 of EN 300 440 V2.2.1 (2018-07).

**TEST REPORT No.: (5223)268-0793**

### 3.6.3 TEST SETUP





## TEST REPORT No.: (5223)268-0793

### 3.6.4 TEST RESULTS

#### Remote Control

#### Receiver Category 3 Equipment

Blocking measure of the capability						
P <sub>min</sub> : -77.46dBm						
The actual blocking signal power (Note)					<input checked="" type="checkbox"/> at the antenna connector	
					<input type="checkbox"/> in front of the antenna	
Note: For the conducted measurements, the same level should be used at the antenna connector irrespective of antenna gain.						
Operation mode	Operation frequency (MHz)	Wanted signal power (dBm)	Offset of the bandwidth (times)	Blocking signal frequency (MHz)	Blocking signal Power (dBm)	Minimum Limit (dBm)
Normal working	2418	-74.46	-10	2406.219	-48.63	-68.20
			-20	2394.929	-46.55	
			-50	2361.059	-48.03	
	2462		10	2474.157	-51.18	-68.44
			20	2485.667	-48.29	
			50	2520.197	-43.41	

#### Notes:

Lower Channel:  $K=-20\log f - 10\log BW = -8.19607$

Upper Channel:  $K=-20\log f - 10\log BW = -8.43651$





**TEST REPORT No.: (5223)268-0793**

**Car**

**Receiver Category 3 Equipment**

Blocking measure of the capability						
P <sub>min</sub> : -77.35dBm						
The actual blocking signal power (Note)					<input checked="" type="checkbox"/> at the antenna connector	
					<input type="checkbox"/> in front of the antenna	
Note: For the conducted measurements, the same level should be used at the antenna connector irrespective of antenna gain.						
Operation mode	Operation frequency (MHz)	Wanted signal power (dBm)	Offset of the bandwidth (times)	Blocking signal frequency (MHz)	Blocking signal Power (dBm)	Minimum Limit (dBm)
Normal working	2418	-77.35	-10	2410.805	-48.65	-66.06
			-20	2403.905	-46.04	
			-50	2383.205	-48.23	
	2462		10	2469.273	-51.68	-66.20
			20	2476.153	-48.27	
			50	2496.793	-43.31	

Note:

Lower Channel:  $K=-20\log f -10\log BW= -6.05762$

Upper Channel:  $K=-20\log f -10\log BW= -6.20165$



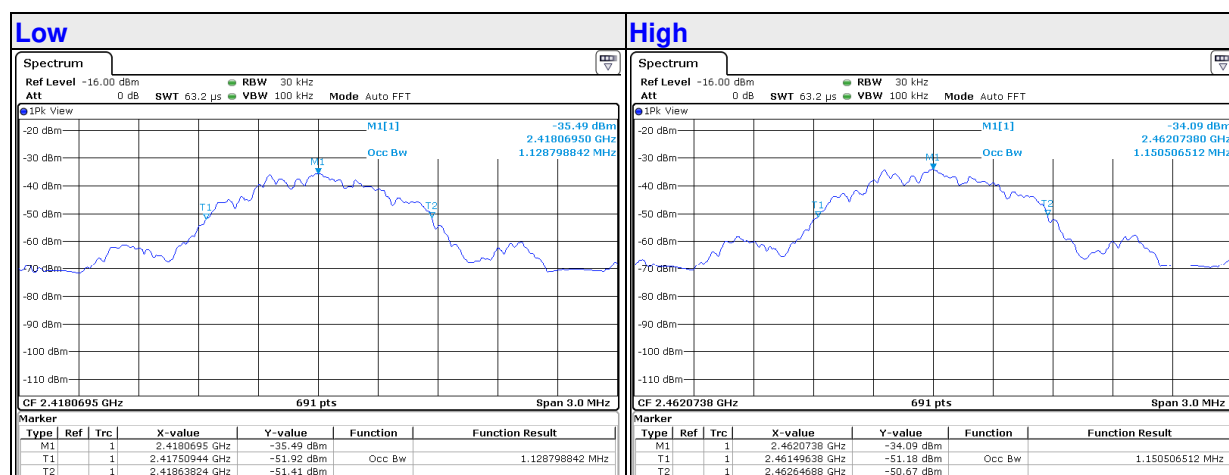
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**TEST REPORT No.: (5223)268-0793**

**OCCUPIED BANDWIDTH (FOR REFERENCE)**

**Remote Control**

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
Low	2418	1.1288
High	2462	1.1505





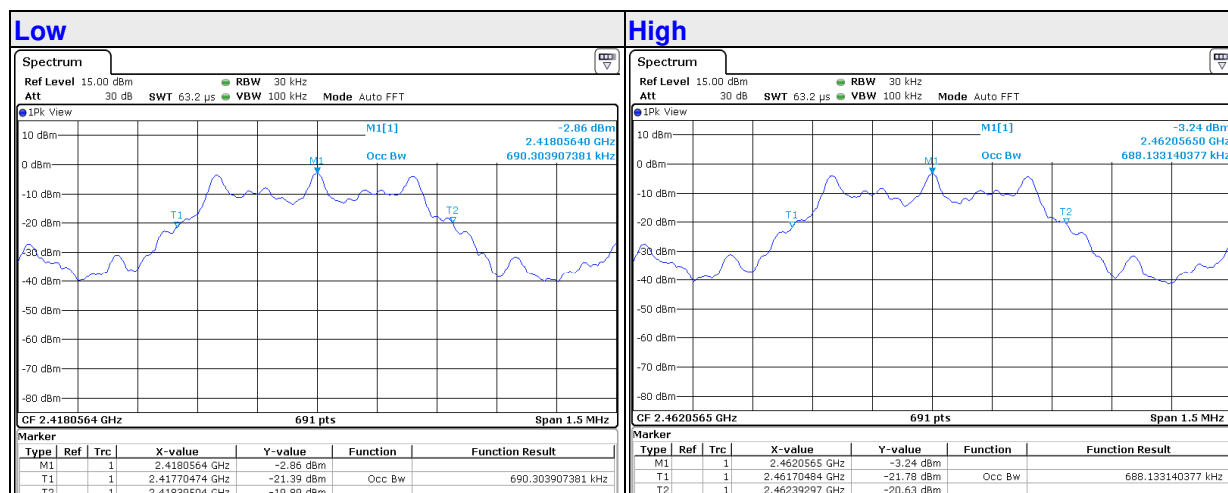
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**TEST REPORT No.: (5223)268-0793**

**OCCUPIED BANDWIDTH (FOR REFERENCE)**

Car

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
Low	2418	0.6903
High	2462	0.6881





**TEST REPORT No.: (5223)268-0793**

### **3.7 RECEIVER SPURIOUS EMISSIONS**

#### **3.7.1 LIMITS OF RECEIVER SPURIOUS EMISSIONS**

<b>Frequency range</b>	<b>Frequencies below 1GHz</b>	<b>Frequencies above 1GHz</b>
Limit	2nW or -57dBm	20nW or -47dBm

#### **3.7.2 TEST PROCEDURES**

Refer to chapter 4.3.5.3 of EN 300 440 V2.2.1 (2018-07).

#### **3.7.3 DEVIATION FROM TEST STANDARD**

No deviation.

#### **3.7.4 TEST SETUP**

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The test setup has been constructed as the normal use condition. Controlling software (provided by manufacturer) has been activated to set the EUT on specific status.



**TEST REPORT No.: (5223)268-0793**

**3.7.5 TEST RESULTS**

**Remote Control: RX BELOW 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
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<b>SPURIOUS EMISSION LEVEL</b>				
<b>Frequency (MHz)</b>	<b>Antenna Polarization</b>	<b>Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
43.75	H	-79.97	-57.00	-22.97
145.31	H	-82.37	-57.00	-25.37
253.12	H	-82.26	-57.00	-25.26
309.37	H	-81.25	-57.00	-24.25
428.12	H	-79.45	-57.00	-22.45
460.94	H	-78.03	-57.00	-21.03
156.25	V	-76.51	-57.00	-19.51
307.81	V	-81.03	-57.00	-24.03
404.69	V	-76.72	-57.00	-19.72
501.56	V	-76.78	-57.00	-19.78
589.06	V	-75.27	-57.00	-18.27
728.12	V	-72.38	-57.00	-15.38



**TEST REPORT No.: (5223)268-0793**

**Car: RX BELOW 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	25MHz ~ 1GHz	<b>OPERATING CHANNEL</b>	Low
--	--------------	--------------------------	-----

<b>SPURIOUS EMISSION LEVEL</b>				
<b>Frequency (MHz)</b>	<b>Antenna Polarization</b>	<b>Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
43.75	H	-78.89	-57.00	-21.89
146.87	H	-81.85	-57.00	-24.85
325.00	H	-80.94	-57.00	-23.94
409.37	H	-79.56	-57.00	-22.56
525.00	H	-76.92	-57.00	-19.92
621.87	H	-75.87	-57.00	-18.87
143.75	V	-77.07	-57.00	-20.07
287.50	V	-81.03	-57.00	-24.03
320.31	V	-80.50	-57.00	-23.50
395.31	V	-77.85	-57.00	-20.85
568.75	V	-75.80	-57.00	-18.80
676.56	V	-73.99	-57.00	-16.99



**TEST REPORT No.: (5223)268-0793**

**Remote Control: RX ABOVE 1GHz DATA**

<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	1GHz ~ 25GHz	<b>OPERATING CHANNEL</b>	Low, High
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SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4836.00	H	-55.47	-47.00	-8.47
	7254.00	H	-53.69	-47.00	-6.69
	4836.00	V	-53.20	-47.00	-6.20
	7254.00	V	-52.85	-47.00	-5.85
High	4924.00	H	-54.11	-47.00	-7.11
	7386.00	H	-52.96	-47.00	-5.96
	4924.00	V	-54.34	-47.00	-7.34
	7386.00	V	-53.33	-47.00	-6.33

**Car: RX ABOVE 1GHz DATA**

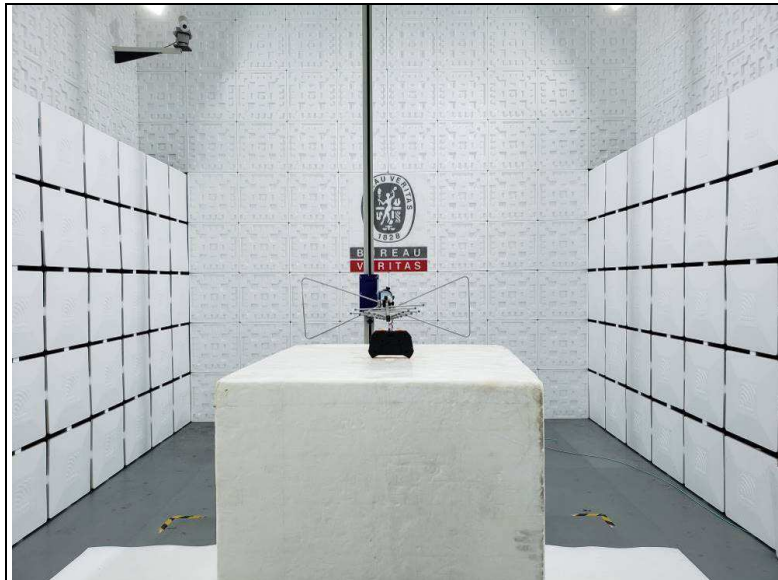
<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	1GHz ~ 25GHz	<b>OPERATING CHANNEL</b>	Low, High
--	--------------	--------------------------	-----------

SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4836.00	H	-55.34	-47.00	-8.34
	7254.00	H	-54.06	-47.00	-7.06
	4836.00	V	-54.10	-47.00	-7.10
	7254.00	V	-53.68	-47.00	-6.68
High	4924.00	H	-53.06	-47.00	-6.06
	7386.00	H	-53.20	-47.00	-6.20
	4924.00	V	-53.52	-47.00	-6.52
	7386.00	V	-53.73	-47.00	-6.73

TEST REPORT No.: (5223)268-0793

#### 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

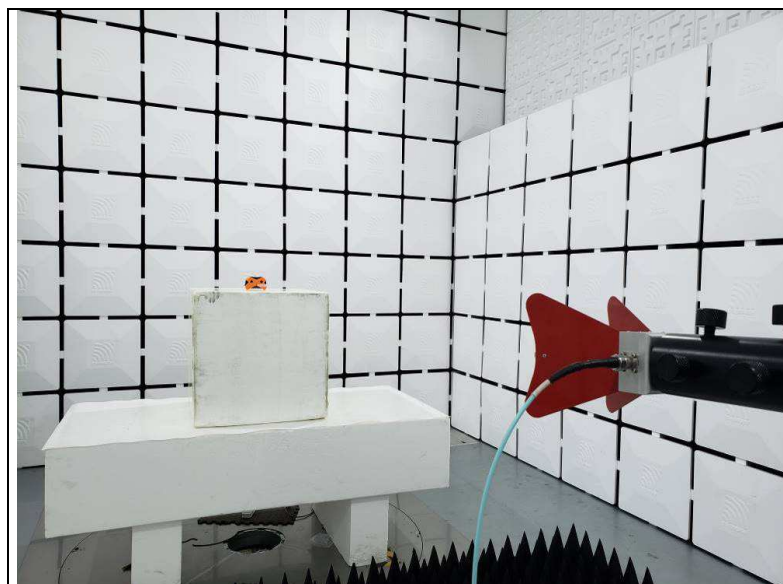
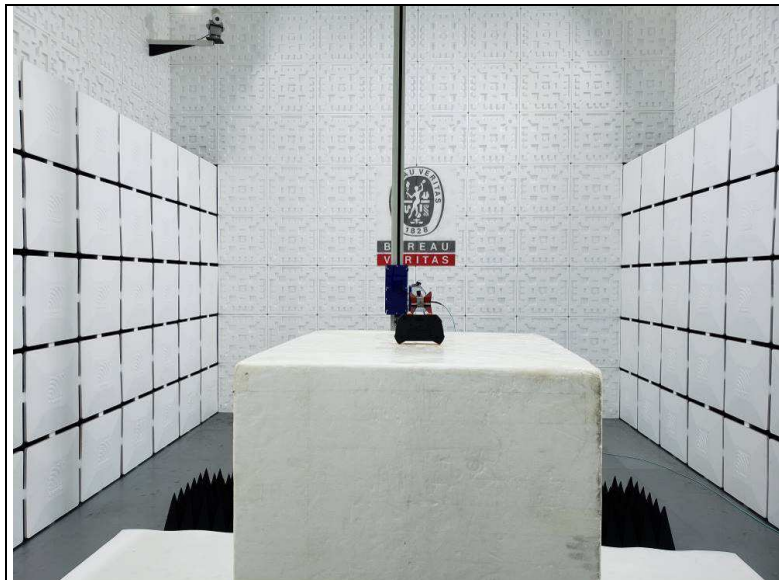
##### REMOTE SPURIOUS EMISSION TEST BELOW 1GHZ





**TEST REPORT No.: (5223)268-0793**

**REMOTE SPURIOUS EMISSION TEST ABOVE 1GHz**



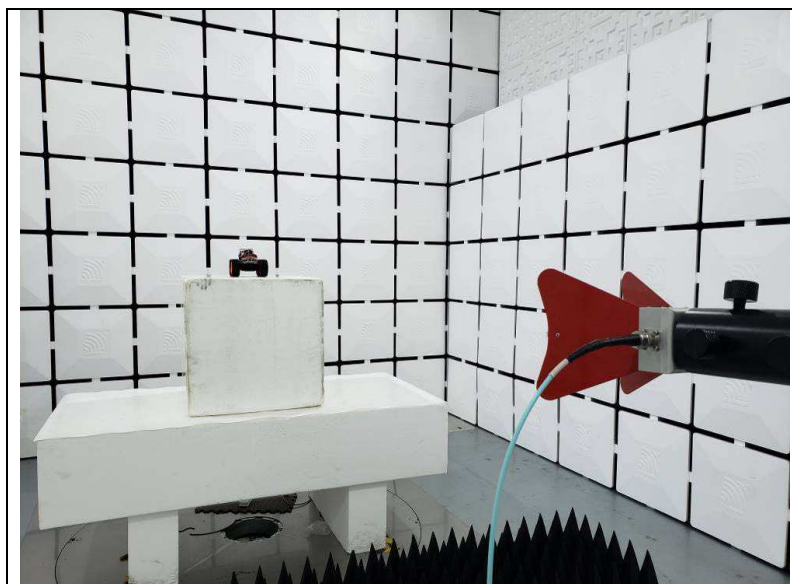
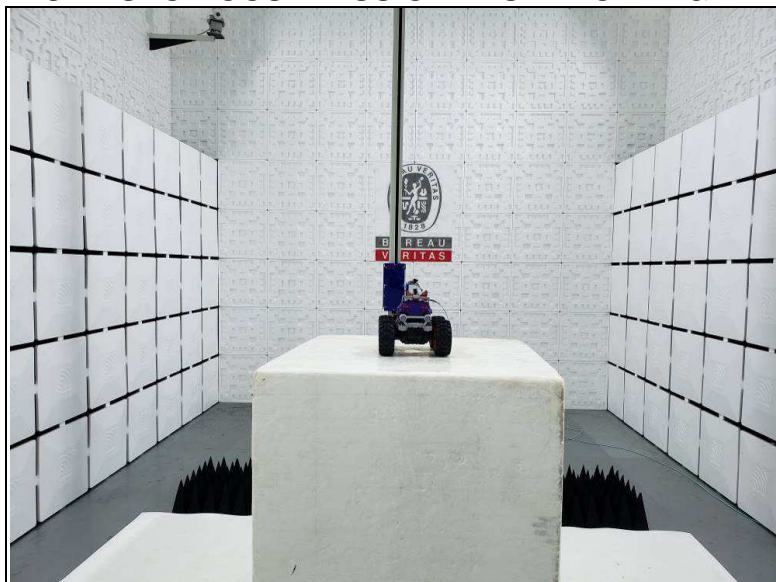
**TEST REPORT No.: (5223)268-0793**

**CAR SPURIOUS EMISSION TEST BELOW 1GHz**



**TEST REPORT No.: (5223)268-0793**

**CAR SPURIOUS EMISSION TEST ABOVE 1GHz**





TEST REPORT No.: (5223)268-0793

## 5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---