TEST REPORT No.: (5223)306-0362(Revision)
Supersede Technical Report No.: (5223)306-0362

TEST REPORT

To:	**SILVERLIT TOYS MANUFACTORY LTD.**	Fax:	--
Attn:	Mr Edmond Chan Mr Horace Chau	Email:	edmond@silverlit.com horace@silverlit.com wt.angelzhang@silverlit.com
Address:	17F, WORLD TRADE CENTRE, 280 GLOUCESTER ROAD, CAUSEWAY BAY, HONG KONG		
Cc:	--	Fax/Email:	--
Attn:	--		

Folder No.:	--	Date of Receipt:	2023-09-27
		Test date:	2023-09-27 to 2023-10-18

MANUFACTURER OR SUPPLIER NAME:	--
MANUFACTURER OR SUPPLIER ADDRESS:	--
PRODUCT:	BUILD 2 DRIVE RADICAL RACER/BUILD 2 DRIVE SUPER SPORTS, BUILD 2 DRIVE MIGHTY MONSTER, BUILD 2 DRIVE – DUO PACK RACE SET
MODEL REFERENCE:	20700 (including 20701, 20702)
ADDITIONAL MODEL & MODEL DIFFERENCE:	20703, 20704, 20705, 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)306-0362

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 <u>COMPLY</u> with the test requirement

Assistant Manager,
EMC Department

Name: Sze Tsz Man
Date: December 21, 2023

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Supersede Technical Report No.: (5223)306-0362

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RE2309WDG0163	Original release	Oct. 30, 2023

Report Revision & Sample Re-submit History:
Revision: add additional name and model.

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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**
	TRANSMITTER PARAMETERS		
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
	RECEIVER PARAMETERS		
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.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Jan. 10, 24
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jan. 11, 24
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	01282	Aug. 21, 24
Horn Antenna	ETS-Lindgren	3117	00062558	May 21, 24
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	N/A
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 22, 24
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
Test software	ADT	ADT_RF Test Software V6.6.5.3	N/A	N/A
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	May 14, 24
Amplifier	Burgeon	BPA-530	100220	Mar. 06, 24
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	May 12, 24
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Jan. 16, 24
Power Sensor	Keysight	U2021XA	MY57320002	Feb. 23, 24
Digital Multimeter	FLUKE	15B	A1220009DG	Jul. 24, 24
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Apr. 19, 24
Oscilloscope	Agilent	DSO9254A	MY51260160	Jul. 27, 24
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 09, 24
Spectrum Analyzer	Keysight	N9020A	MY55400499	Jan. 11, 24
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Jul. 20, 24
Wireless Connectivity Tester	Rohde&Schwarz	CMW270	100908	May 09, 24
Vector Signal Generator	Rohde&Schwarz	SMBV100A	257579	Nov. 01, 23
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	N/A

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Attenuator	MINI	BW-S10W2+	S130129FGE2	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 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.

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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	102426	Jun. 01, 24
Signal Analyzer	Rohde&Schwarz	FSV7	102331	May 09, 24
Spectrum Analyzer	Keysight	N9020A	MY55400499	Jan. 10, 24
Signal Generator	Agilent	N5183A	MY50140980	Jul. 20, 24
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Jul. 20, 24
Power Sensor	Keysight	U2021XA	MY55060016	Jan. 11, 24
Vector Signal Generator	Rohde&Schwarz	SMBV100A	257579	Nov. 01, 23
Agile Signal Generator	Agilent	8645A	Agilent	N/A
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	V2.6.88.0330	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.

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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	±1.06x10^{-8}
RF power (conducted)	±0.56 dB
Radiated emission of transmitter, valid up to 26.5GHz	±4.84 dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	±4.96 dB
Radiated emission of receiver, valid up to 26.5GHz	±4.84 dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	±4.96 dB
Temperature	±0.23 °C
Humidity	±0.3 %
Voltages (DC)	±0.1 %
Voltages (AC, <10kHz)	±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	±1x10^{-7}
RF power (conducted)	±1.5 dB
Radiated emission of transmitter, valid up to 26.5GHz	±6.0 dB
Radiated emission of transmitter, valid between 26.5GHz and 66GHz	±8.0 dB
Radiated emission of receiver, valid up to 26.5GHz	±6.0 dB
Radiated emission of receiver, valid between 26.5GHz and 66GHz	±8.0 dB
Temperature	±1°C
Humidity	±5.0 %
Voltages (DC)	±1.0 %
Voltages (AC, <10kHz)	±2.0 %

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2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	BUILD 2 DRIVE RADICAL RACER/BUILD 2 DRIVE SUPER SPORTS/BUILD 2 DRIVE MIGHTY MONSTER/ BUILD 2 DRIVE – DUO PACK RACE SET			
MODEL NO.	20700 (including 20701, 20702)			
ADDITIONAL MODEL	20703, 20704, 20705			
NOMINAL VOLTAGE	Remote control: DC 3V(1.5V*AAA*2) from battery Car: DC 3.7V from battery Charging: DC 5V from USB host unit			
OPERATING VOLTAGE RANGE	Remote Control	Vnom= 3V	Vmin= 2.55V	Vmax= 3V
	Car	Vnom= 3.7V	Vmin= 3.15V	Vmax= 3.7V
OPERATING TEMPERATURE RNAGE	0 ~ +40°C			
MODULATION TYPE	GFSK			
OPERATING FREQUENCY	2407MHz~2471MHz			
EIRP (MAX)	2.66dBm for Remote Control			
	0.22dBm for Car			
ANTENNA TYPE	Wire Antenna, with 0dBi gain (Remote control) Wire Antenna, with 0dBi gain (Car)			
CABLE SUPPLIED	Charger cable: Unshielded, Non-detachable, 35cm (20701) Charger cable: Unshielded, Non-detachable, 25cm (20703)			
RECEIVER CATEGORY	☐Category 1	☐Category 2	☒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.: 2309WDG0163) for detailed product photo.
4. The main test model 20700 contains two sub-models, 20701and 20702, which differ only in appearance of the car. Additional model 20703, 20704, 20705 are identical with the main test

model 20700 except the shell, underside of the car, the length of the charger cable and model number for trading purpose. Therefore, the main test model 20701 is fully tested.

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2.2 DESCRIPTION OF TEST MODES

SAMPLE	MODE	FREQUENCY
Remote Control	Transmitting/ Receiving	2407MHz-2471MHz
Car	Transmitting/ Receiving	2407MHz-2471MHz

Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	**2407**	**2**	2423	**3**	2425
4	2427	**5**	2429	**6**	**2439**
7	2447	**8**	2449	**9**	2451
10	2453	**11**	2461	**12**	2466
13	2468	**14**	**2471**		

Channel	Freq. (MHz)
Low	2407
Middle	2439
High	2471

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)	0°C to +40°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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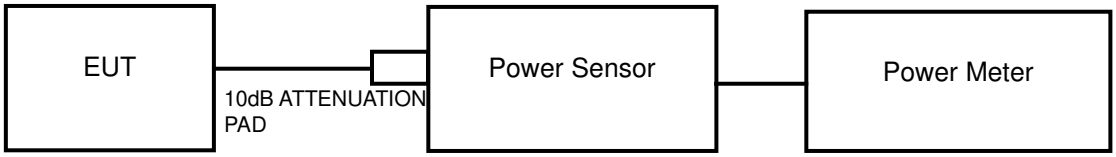
3.1.4 TEST SETUP

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) 2407MHz	(Middle) 2439MHz	(High) 2471MHz
T_{nom}(℃)	+25	V_{nom}(v)	1.76	2.15	2.32
T_{min}(℃)	0	V_{min}(v)	2.10	2.29	**2.66**
		V_{max}(v)	2.12	2.30	2.64
T_{max}(℃)	+40	V_{min}(v)	1.55	2.00	1.81
		V_{max}(v)	1.55	1.98	1.84

Car

TEST CONDITION			EQUIVALENT ISOTROPIC RADIATED POWER (dBm)		
			(Low) 2407MHz	(Middle) 2439MHz	(High) 2471MHz
T_{nom}(℃)	+25	V_{nom}(v)	-0.39	-0.32	-0.12
T_{min}(℃)	0	V_{min}(v)	-0.05	-0.18	**0.22**
		V_{max}(v)	-0.03	-0.17	0.20
T_{max}(℃)	+40	V_{min}(v)	-0.60	-0.47	-0.63
		V_{max}(v)	-0.60	-0.49	-0.60

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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 >2400.0MHz F_H < 2483.5MHz

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}(℃)	+25	V_{nom}(v)	2406.51	2471.40
T_{min}(℃)	0	V_{min}(v)	2406.47	2471.50
		V_{max}(v)	2406.50	2471.52
T_{max}(℃)	+40	V_{min}(v)	2406.60	2471.33
		V_{max}(v)	2406.55	2471.32
Measured frequency (lowest and highest)			FL = 2406.47	FH = 2471.52

Car

TEST CONDITION			FREQUENCY (MHz)	
			LOWEST	HIGHEST
T_{nom}(℃)	+25	V_{nom}(v)	2406.54	2471.37
T_{min}(℃)	0	V_{min}(v)	2406.49	2471.47
		V_{max}(v)	2406.52	2471.49
T_{max}(℃)	+40	V_{min}(v)	2406.62	2471.30
		V_{max}(v)	2406.57	2471.29
Measured frequency (lowest and highest)			FL = 2406.49	FH = 2471.49

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3.3 MEASUREMENT RADIATED SPURIOUS EMISSION

3.3.1 LIMITS OF MEASUREMENT RADIATED SPURIOUS EMISSION

Frequency Range	47MHz to 74MHz 87.5MHz to 108MHz 174MHz to 230MHz 470MHz to 862MHz	Other Frequencies Below 1GHz	>1GHz
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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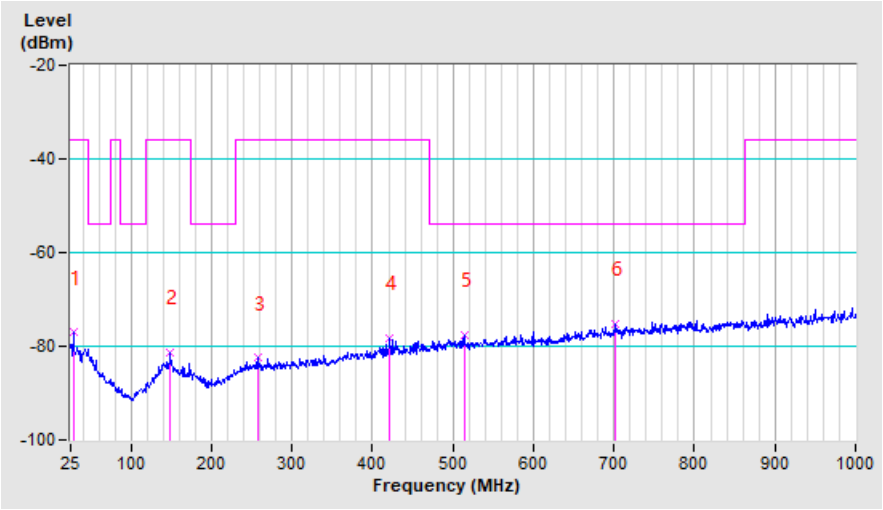
3.3.5 TEST RESULTS

Remote Control: TX BELOW 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
28.90	H	-77.10	-36.00	-41.10
148.82	H	-81.37	-36.00	-45.37
258.02	H	-82.52	-36.00	-46.52
421.82	H	-78.36	-36.00	-42.36
514.45	H	-77.49	-54.00	-23.49
700.67	H	-75.33	-54.00	-21.33



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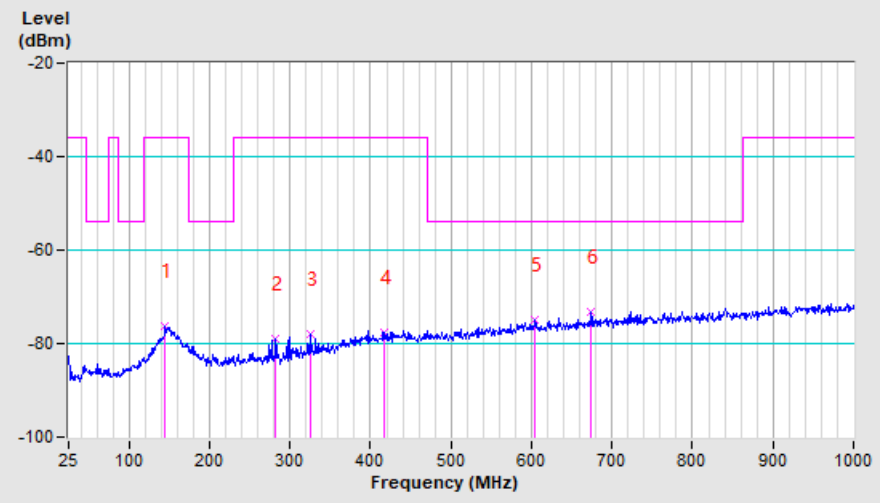
SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
144.93	V	-76.10	-36.00	-40.10
282.40	V	-79.00	-36.00	-43.00
325.30	V	-77.98	-36.00	-41.98
416.95	V	-77.52	-36.00	-41.52
604.15	V	-74.91	-54.00	-20.91
674.35	**V**	**-73.13**	**-54.00**	**-19.13**



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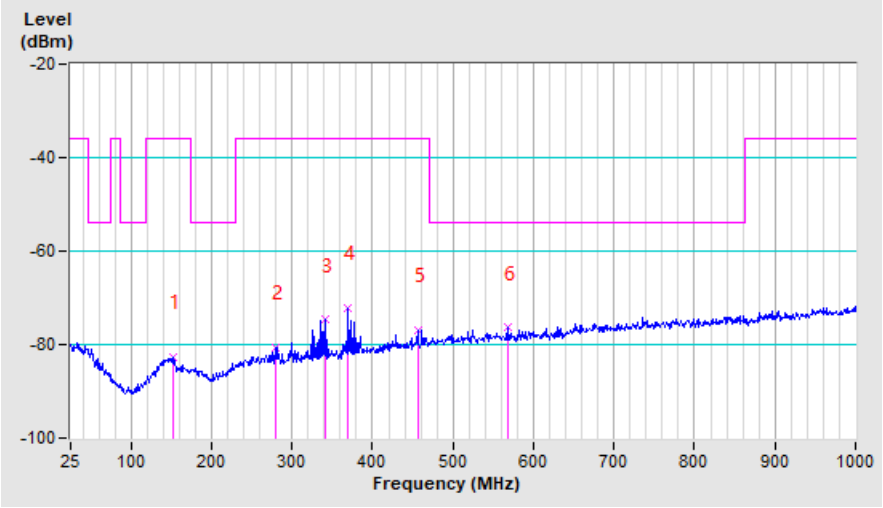
Car: TX BELOW 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
151.75	H	-82.59	-36.00	-46.59
280.45	H	-80.55	-36.00	-44.55
341.87	H	-74.71	-36.00	-38.71
370.15	H	-72.04	-36.00	-36.04
455.95	H	-76.92	-36.00	-40.92
568.08	H	-76.43	-54.00	-22.43



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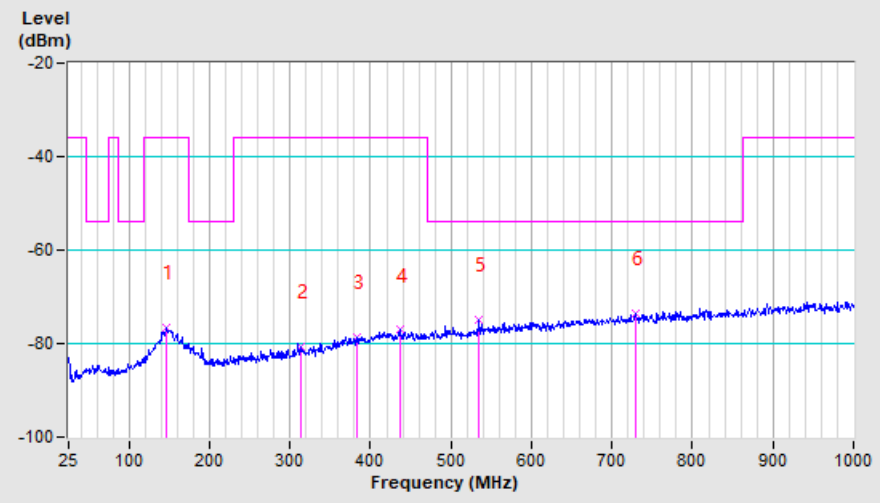
SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
146.87	V	-76.59	-36.00	-40.59
313.60	V	-80.53	-36.00	-44.53
382.82	V	-78.52	-36.00	-42.52
436.45	V	-77.06	-36.00	-41.06
534.92	V	-74.97	-54.00	-20.97
728.95	V	-73.55	-54.00	-19.55



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Remote Control: TX ABOVE 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 25GHz	OPERATING CHANNEL	Low, High

SPURIOUS EMISSION LEVEL					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
Low	4814.00	H	-41.44	-30.00	-11.44
	4814.00	V	-35.19	-30.00	-5.19
	7221.00	H	-46.21	-30.00	-16.21
	7221.00	V	-41.81	-30.00	-11.81
High	4942.00	H	-42.46	-30.00	-12.46
	4942.00	V	-38.28	-30.00	-8.28
	7413.00	H	-47.81	-30.00	-17.81
	7413.00	V	-45.43	-30.00	-15.43

Car: TX ABOVE 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 25GHz	OPERATING CHANNEL	Low, High

SPURIOUS EMISSION LEVEL					
Channel	**Frequency (MHz)**	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
Low	4814.00	H	-37.97	-30.00	-7.97
	4814.00	V	-38.76	-30.00	-8.76
	7221.00	H	-45.62	-30.00	-15.62
	7221.00	V	-45.80	-30.00	-15.80
High	4942.00	H	-36.94	-30.00	-6.94
	4942.00	V	-36.23	-30.00	-6.23
	7413.00	H	-45.01	-30.00	-15.01
	7413.00	V	-46.94	-30.00	-16.94

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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.

3.4.5 TEST RESULTS

This product does not apply.

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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 dBm + k

Receiver category	Limit
1	-30dBm + K

The correction factor, k, is as follows:

k = -20logf -10logBW

Where:

f is the frequency in GHz;

BW is the channel bandwidth in MHz.

The factor k is limited within the following:

-40 dB < k < 0 dB

3.5.2 TEST PROCEDURES

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

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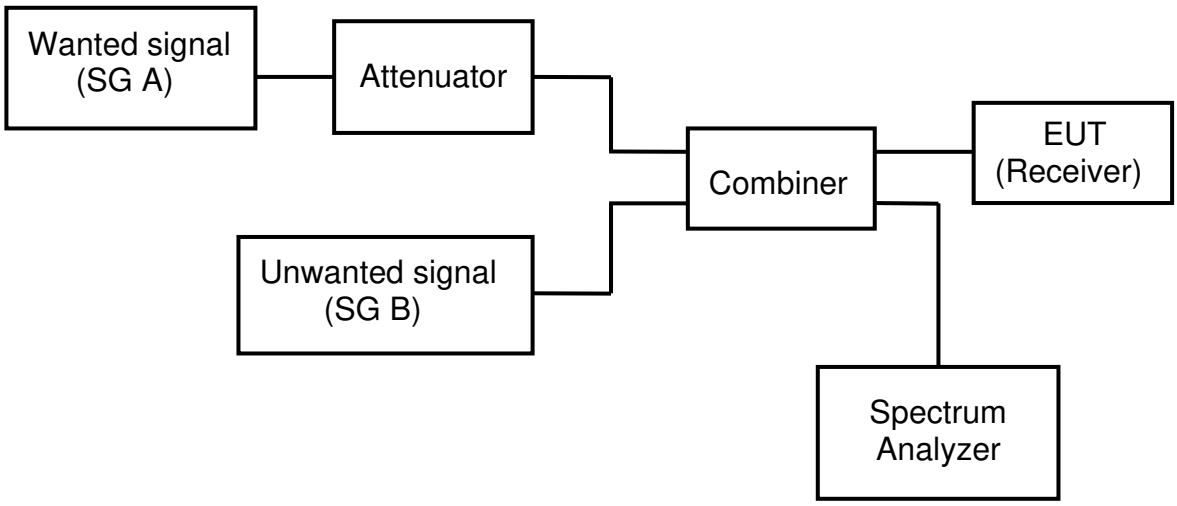
3.5.3 TEST SETUP



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3.5.4 TEST RESULTS

This product does not apply.

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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 = -20logf -10logBW

Where:

f is the frequency in GHz;

BW is the channel bandwidth in MHz.

The factor k is limited within the following:

-40 dB < k < 0 dB

3.6.2 TEST PROCEDURES

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

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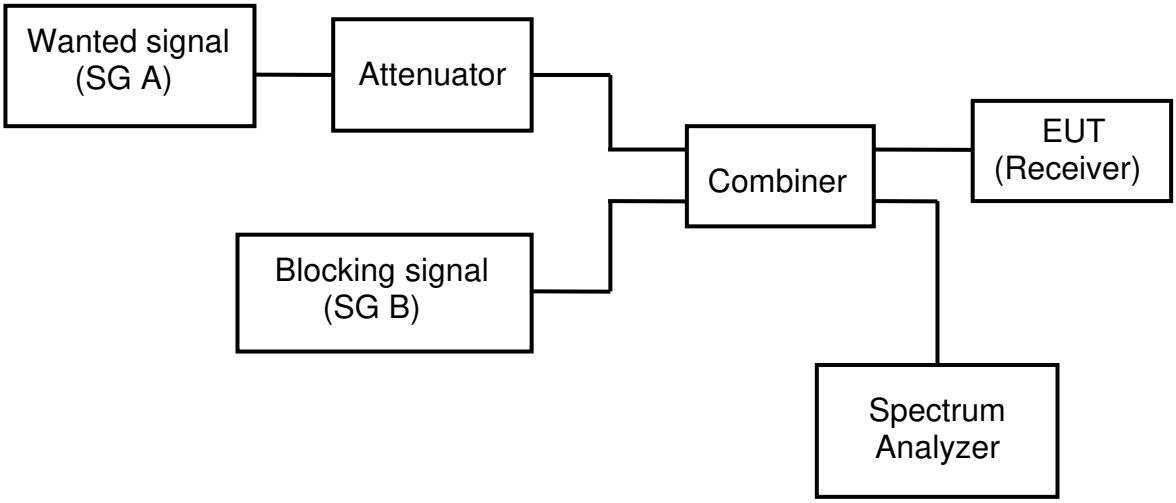
3.6.3 TEST SETUP



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3.6.4 TEST RESULTS

Remote Control

Receiver Category 3 Equipment

Blocking measure of the capability		
P_{min}: -74.31dBm		
The actual blocking signal power (Note)	☒ at the antenna connector	
	☐ 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	2407	-71.31	-10	2399.298123	-49.64	-66.26
			-20	2392.004346	-45.39	
			-50	2370.123015	-46.39	
	2471		10	2478.499273	-52.46	-66.42
			20	2485.677276	-42.13	
			50	2507.211285	-43.61	

Notes:

Lower Channel: K=-20logf -10logBW=-6.259047
Upper Channel: K=-20logf -10logBW=-6.417491

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Car

Receiver Category 3 Equipment

Blocking measure of the capability	
P_{min}: -76.38dBm	
The actual blocking signal power (Note)	☒ at the antenna connector
	☐ 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	2407	-73.38	-10	2399.489144	-48.62	-66.15
			-20	2392.369028	-43.36	
			-50	2371.008681	-45.39	
	2471		10	2478.319822	-51.9	-66.31
			20	2485.324163	-42.13	
			50	2506.337188	-42.66	

Note:
Lower Channel: K=-20logf -10logBW= -6.15439
Upper Channel: K=-20logf -10logBW= -6.31113

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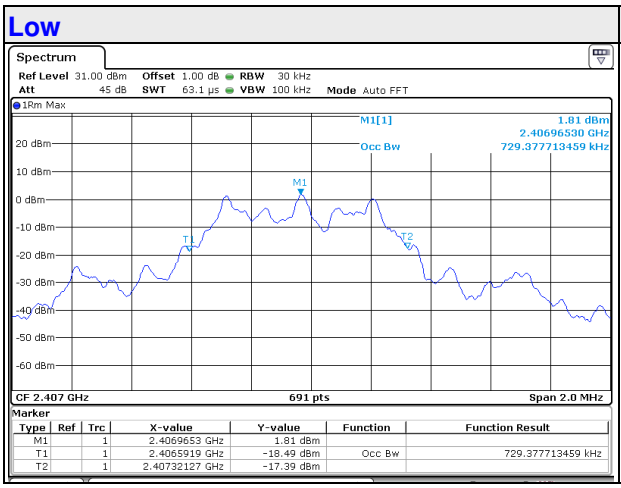
OCCUPIED BANDWIDTH (FOR REFERENCE)

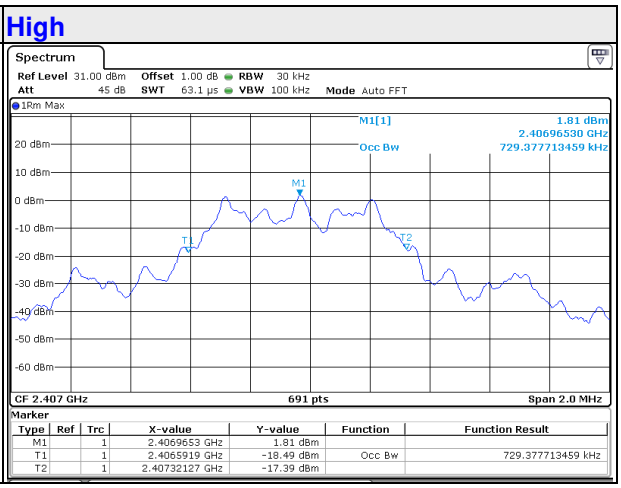
Remote Control

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
Low	2407	0.7294
High	2471	0.7294

Low



High



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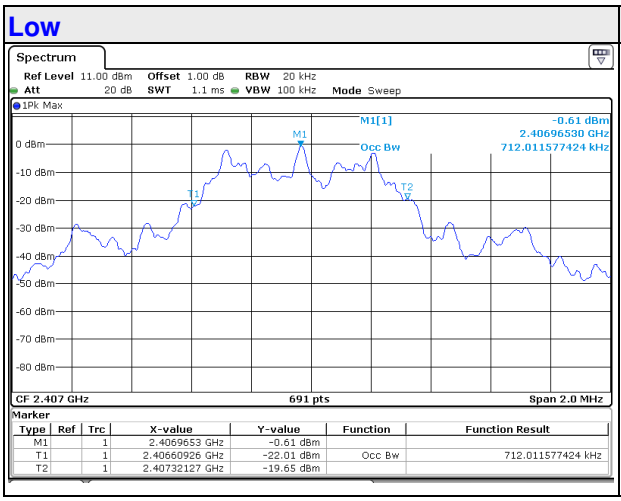
OCCUPIED BANDWIDTH (FOR REFERENCE)

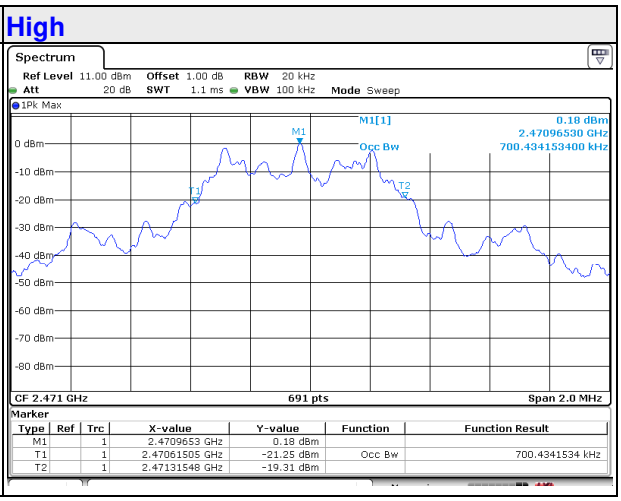
Car

CHANNEL	CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (MHz)
Low	2407	0.7120
High	2471	0.7004

Low



High



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3.7 RECEIVER SPURIOUS EMISSIONS

3.7.1 LIMITS OF RECEIVER SPURIOUS EMISSIONS

Frequency range	Frequencies below 1GHz	Frequencies above 1GHz
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.

3.7.5 TEST RESULTS

Remote Control: RX BELOW 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	**Antenna Polarization**	**Level (dBm)**	**Limit (dBm)**	**Margin (dB)**
145.90	V	-75.38	-57.00	-18.38
147.85	H	-82.83	-57.00	-25.83
369.18	H	-80.20	-57.00	-23.20
396.48	V	-77.48	-57.00	-20.48
423.77	H	-79.41	-57.00	-22.41
475.45	V	-77.55	-57.00	-20.55
539.80	H	-78.07	-57.00	-21.07
559.30	V	-75.78	-57.00	-18.78
638.27	H	-76.55	-57.00	-19.55
661.67	V	-74.53	-57.00	-17.53
707.50	H	-69.88	-57.00	-12.88
782.58	V	-72.91	-57.00	-15.91

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TEST REPORT No.: (5223)306-0362(Revision)
Supersede Technical Report No.: (5223)306-0362

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Car: RX BELOW 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	25MHz ~ 1GHz	OPERATING CHANNEL	Low

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
34.75	H	-79.37	-57.00	-22.37
144.93	H	-82.74	-57.00	-25.74
148.82	V	-76.48	-57.00	-19.48
205.37	V	-79.10	-57.00	-22.10
339.93	H	-81.36	-57.00	-24.36
394.52	V	-76.72	-57.00	-19.72
434.50	H	-79.11	-57.00	-22.11
533.95	V	-75.19	-57.00	-18.19
541.75	H	-77.24	-57.00	-20.24
576.85	V	-74.98	-57.00	-17.98
645.10	H	-75.52	-57.00	-18.52
744.55	V	-73.00	-57.00	-16.00

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Remote Control: RX ABOVE 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 25GHz	OPERATING CHANNEL	Low, High

SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4812.00	H	-48.96	-47.00	-1.96
	4814.00	**V**	**-47.30**	**-47.00**	**-0.30**
	7221.00	H	-52.08	-47.00	-5.08
	7221.00	V	-53.11	-47.00	-6.11
High	4941.00	H	-49.02	-47.00	-2.02
	4942.00	V	-49.39	-47.00	-2.39
	7413.00	H	-52.26	-47.00	-5.26
	7413.00	V	-52.19	-47.00	-5.19

Car: RX ABOVE 1GHz DATA

SPURIOUS EMISSION FREQUENCY RANGE	1GHz ~ 25GHz	OPERATING CHANNEL	Low, High

SPURIOUS EMISSION LEVEL					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
Low	4812.00	V	-47.44	-47.00	-0.44
	4814.00	H	-51.14	-47.00	-4.14
	7216.00	H	-51.79	-47.00	-4.79
	7221.00	V	-52.39	-47.00	-5.39
High	4942.00	H	-49.50	-47.00	-2.50
	4942.00	V	-48.71	-47.00	-1.71
	7413.00	H	-51.97	-47.00	-4.97
	7413.00	V	-51.39	-47.00	-4.39

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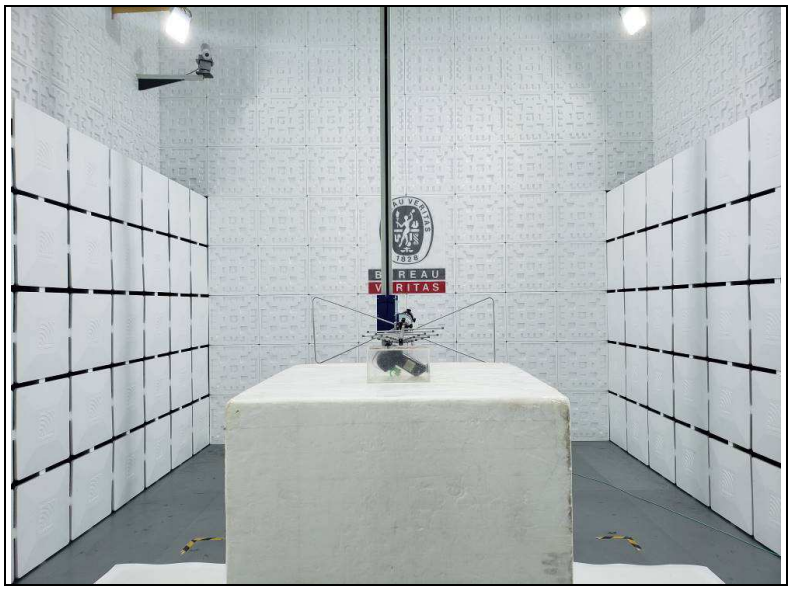
4 PHOTOGRAPHS OF THE TEST CONFIGURATION

REMOTE CONTROL SPURIOUS EMISSION TEST BELOW 1GHz



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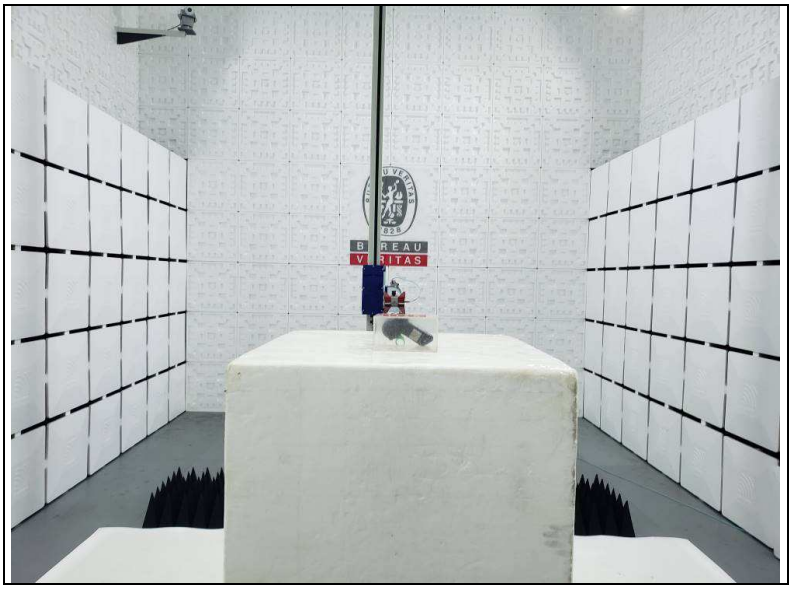
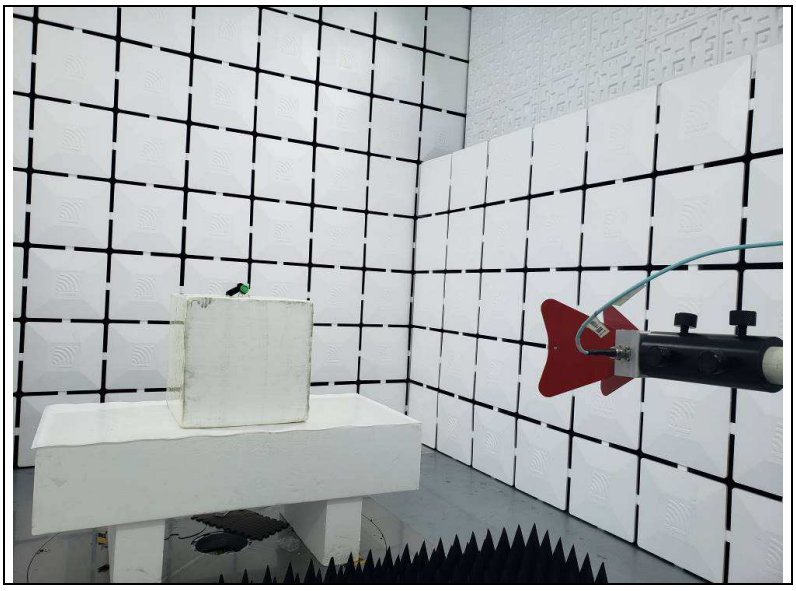
REMOTE CONTROL SPURIOUS EMISSION TEST ABOVE 1GHz





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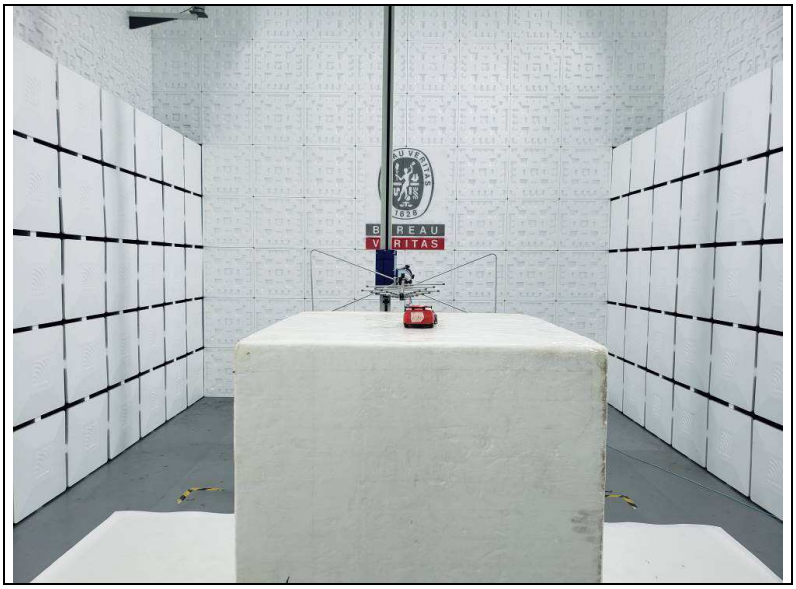
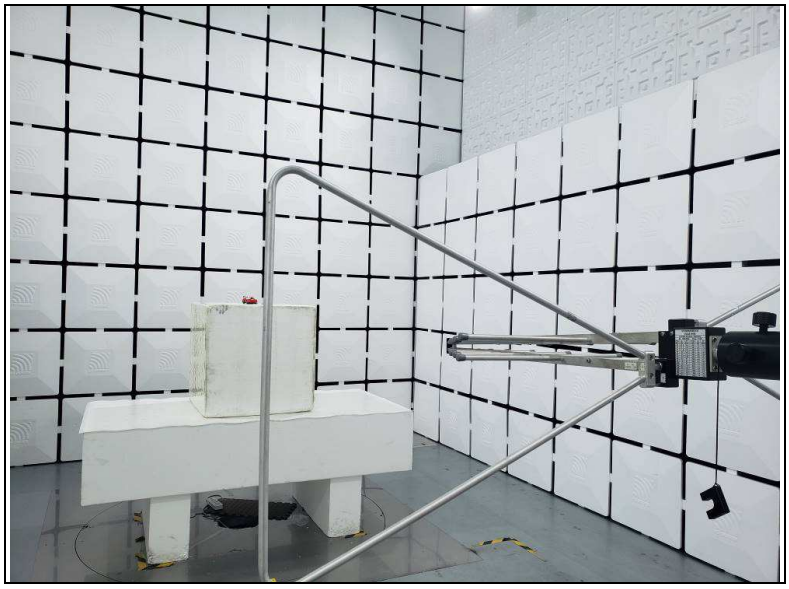
CAR SPURIOUS EMISSION TEST BELOW 1GHz





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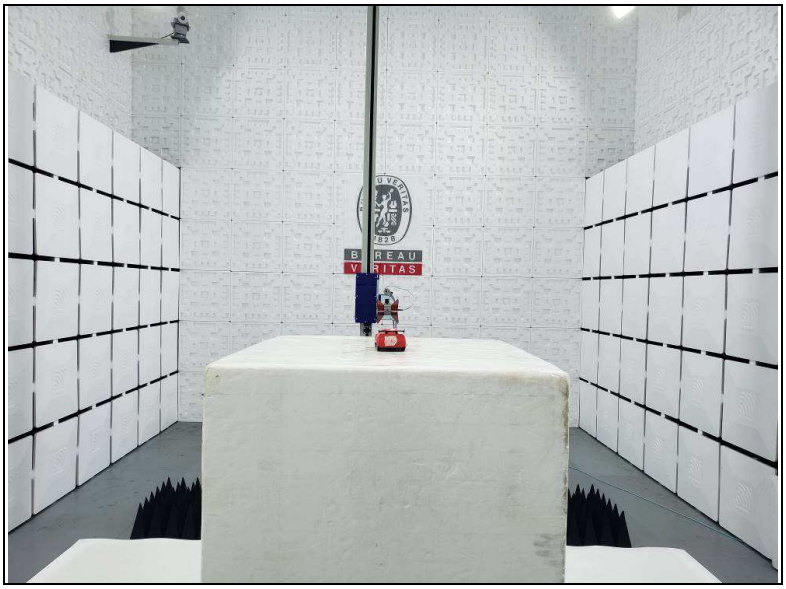
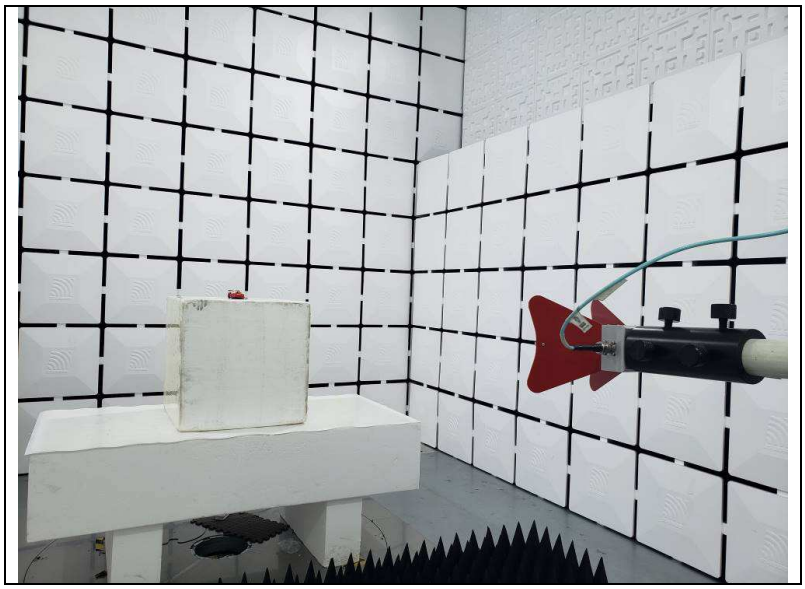
CAR SPURIOUS EMISSION TEST ABOVE 1GHz





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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---

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