

RF TEST REPORT

Application No. : LH-230702312134

Applicant : Shenzhen Cheyang Technology Co., Ltd.

Equipment Under Test (EUT)

EUT Name : Car radio

Model No. : Z0625

Serial No. : See page 3

Brand Name : N/A

Receipt Date : 2023-07-21

Test Date : 2023-07-21 to 2023-08-02

Issue Date : 2023-08-02

Standards : ETSI EN 300 328 V2.2.2

Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above. The EUT technically complies with the RED Directive of 2014/53/EU requirements.

Test/Witness Engineer : *York xin*

Approved & Authorized : *Jack su*



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1 General Information

1.1 Client Information

Applicant	:	Shenzhen Cheyang Technology Co., Ltd.
Address	:	369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen
Manufacturer	:	Shenzhen Cheyang Technology Co., Ltd.
Address	:	369 Bulong Road, Ma'antang Community, Bantian Street, Longgang District, Shenzhen

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Car radio
Model No.	:	Z0625
Serial No.	:	Z0625C1, Q3366, Q3371, Q3161, Q3221KT, A2618KT, Q3461, A2769, Q3336, Q3203, K0129, A2516KT, Q3162KT, A2308KT, Q3217KT, AP019, Q3150, A2628KT, K0126, A2818, A2065, A2718, N3000KT, N2052, A2749, A2420F3, A2422F3, A2424F3, A2426F3, A2428F3, CY-1001, A3018, N2042, A3012, A3019, A3013, A3107, A2319, A2798, A3061, A2795, A2181, A2222, Q3570, A2905, A2799, Q3516, M1520, A2742, A3040, A3041, A3011, A2797, A2748, A3032, Q3300, A2772, A3017, A3091, A3056, A3195, Q3508, Z2085, A3215, A3080, A2666, A2915, A2743, A3039, A2796, A3049, A2773, A2893, Q3184, A2207, A3196, A3194, A2761, A3037, A2071, A2747, A2950, A2184, A3067, A3021, A3048, A2787, A3197, A2794, A2762, A3054, A2638, A3216, A3079, A3066, A3047, A3100, A2112, W5087, Q3306, A2900, A3082, A3038, A2882, A3084, A2740, A2806, Q3196, A3110, Q3521, A3065
Model Difference	:	The different models are identical in schematic and critical component, the only different is the appearance.
Product Description	:	Operation Frequency: 2412MHz~2472MHz
		Modulation Type: 802.11b: CCK, QPSK, BPSK 802.11g: OFDM 802.11n: OFDM
		Bit Rate of Transmitter 802.11b:11/5.5/2/1Mbps 802.11g:54/48/36/24/18/12/9/6 Mbps 802.11n: up to 150Mbps
		Number of Channel: Please see Note(2)
		Antenna Designation: Please see Note(3)
		EIRP Power: 802.11b:12.86 dBm 802.11g: 12.35dBm 802.11n: 11.82 dBm
Power Source	:	DC 12V, 1A
Connecting I/O Port(S)	:	Please refer to the User's Manual

Note:

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

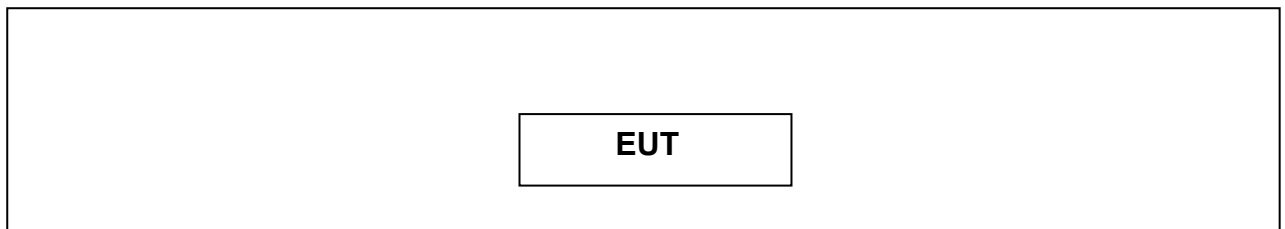
(2) Channel List:

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

(3) Antenna description

Ant.	Brand	Model Name	Antenna Type	Gain (dBi)
1	N/A	N/A	Embedded Ant.	0

1.3 Block Diagram Showing the Configuration of System Tested



1.4 Description of Support Units

The EUT has been tested as an independent unit.

Name	Model	S/N	Manufacturer	Used "√"

1.5 Description of Operating Mode

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

Test Items	Mode	Data Rate	Channel	Note
Maximum Transmit Power Maximum E.I.R.P. Spectral Density	11b/BPSK	1Mbps	01/07/13	P
	11g/BPSK	6Mbps	01/07/13	P
	11n/20MHz	6.5Mbps	01/07/13	P
Frequency Range	11b/BPSK	1Mbps	01/13	P
	11g/BPSK	6Mbps	01/13	P
	11n/20MHz	6.5Mbps	01/13	P
Transmitter Spurious Emissions (30MHz~1GHz)	11b/BPSK	1Mbps	01	P
	11g/BPSK	6Mbps	01	P
	11n/20MHz	6.5Mbps	01	P
Receiver Spurious Emissions (30M~1GHz)	11b/BPSK	1Mbps	01	P
	11g/BPSK	6Mbps	01	P
	11n/20MHz	6.5Mbps	01	P
Transmitter Spurious Emissions (1GHz~12.75GHz)	11b/BPSK	1Mbps	01/13	P
	11g/BPSK	6Mbps	01/13	P
	11n/20MHz	6.5Mbps	01/13	P
Receiver Spurious Emissions (1GHz~12.75GHz)	11b/BPSK	1Mbps	01/13	P
	11g/BPSK	6Mbps	01/13	P
	11n/20MHz	6.5Mbps	01/13	P

Note:

The “P” denotes the test item have been test, and the “N” denote the test item is not applicable.

1.6 Description of Operating Mode

Normal Temperature(NT):	+15 °C to +30 °C
Relative Humidity:	25% to 75%
Air Pressure:	980-1020 hPa
Extreme Temperature	Low Temperature (LT)= -10°C High Temperature (HT)= +55°C
Normal Voltage of EUT (NV):	AC 230V
Extreme Voltage of the EUT	Low Voltage(LV)= 207 V High Voltage(HV)=253 V

Mains voltage:

The extreme test voltage for equipment to be connected to an AC mains source shall be the nominal mains voltage $\pm 10\%$.

Lead-acid battery power sources used on vehicles:

When radio equipment is intended for operation from the usual type of alternator fed lead-acid

battery power source used on vehicles, then extreme test voltage shall be 1,3 and 0,9 times the nominal voltage of the battery (6 V, 12 V, etc.).

Power sources using other types of batteries:

The lower extreme test voltages for equipment with power sources using the following types of battery shall be:

- for the Leclanché or lithium type battery: 0,85 times the nominal voltage of the battery;
 - for the mercury or nickel-cadmium type of battery: 0,9 times the nominal voltage of the battery.
- In both cases, the upper extreme test voltage shall be 1,15 times the nominal voltage of the battery.

1.7 Test Facility

The testing report were performed by the Shenzhen LH Testing Technology Co., Ltd., in their facilities located at 106 and 107, building B15, Yintian Industrial Zone, Yantian community, Xixiang street, Bao'an District, Shenzhen

2 Test Results Summary

ETSI EN 300 328 V2.2.2							
Essential Requirement			Requirement Conditionality		Test Specification		
No	Description	Reference: Clause No	U/C	Condition	E/O	Reference: Clause No	Observations
1	Equivalent isotropic radiated power	4.3.1	U		E	5.7.2	PASS
2	Maximum spectral power density	4.3.2	C	Only for modulations other than FHSS	E	5.7.3	PASS
3	Frequency range	4.3.3	U		E	5.7.4	PASS
4	Dwell time	4.3.4.1	C	Only for FHSS			N/A
5	Hopping Channel	4.3.4.2	C	Only for FHSS			N/A
6	Hopping sequence	4.3.4.3	C	Only for FHSS			N/A
7	Medium Access Protocol	4.3.5	U				NOTE(2)
8	Transmitter spurious emissions	4.3.6	U		E	5.7.5	PASS
9	Receiver spurious emissions	4.3.7	U		E	5.7.6	PASS

Note:

- (1) "U/C": indicates whether the requirement is to be unconditionally applicable (U) or is conditional upon the manufacturers claimed functionality of the equipment (C).
 "E/O": indicates whether the test specification forms part of the Essential Radio Test Suite (E) or whether it is one of the Other Test Suite (O).
 "X": indicates there is no test specified corresponding to the requirement.
 "N/A": indicates test is not applicable in this Test Report.
- (2) The equipment must be complied with as a necessary condition for presumption of conformity, although conformance with the requirement may be claimed by an equivalent test or by manufacturer's assertion supported by appropriate entries in the technical construction file.
- (3) Equipment within the band 2454-2483.5 MHz, but capable also of operating at 100 mW across the whole of the frequency band is not to be considered a class 1 device. They can be operated in the EU without restrictions indoor, but cannot be operated outdoors in France in the whole of the band until further notice. They have to be marked with the alert sign accordingly. Member States have however agreed, that they do not need to be notified to Member States under Article 6.4 of Directive 1999/5/EC, provided that users are informed about the restrictions of use.

3 Maximum Transmit Power

3.1 Test Standard and Limit

3.1.1 Test Standard

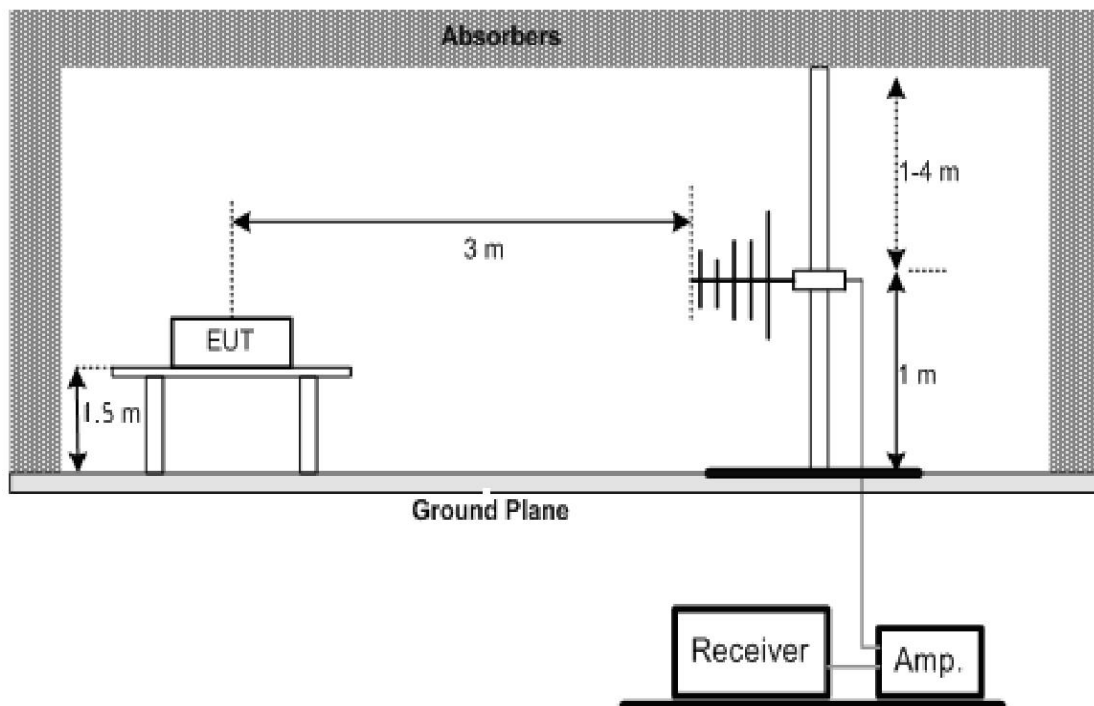
ETSI EN 300 328 V2.2.2 clause 4.3.1

3.1.2 Test Limit

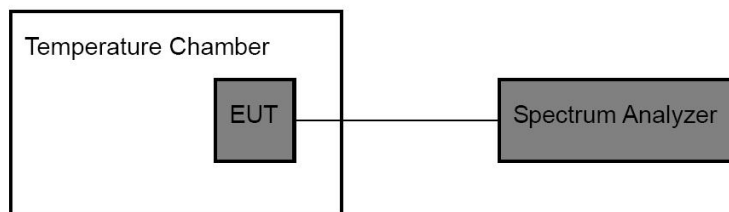
Test Item	Limit
Equivalent isotropic radiated power	-10 dBW (20 dBm)

3.2 Test Setup

Normal Condition



Extreme Condition



3.3 Test Procedure

1. The EUT was placed on the top of the turntable in chamber.
2. The test shall be made in the transmitting mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. This measurement shall be repeated with the transmitter in standby mode where applicable.
4. The receiver shall be set the center frequency equal to the EUT transmit, and the Resolution Bandwidth equal to the Video Bandwidth is set to 1 MHz for the frequency below 1 GHz, and the frequency is above 1 GHz the Resolution Bandwidth equal to the Video Bandwidth is set to 3MHz.
5. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
6. Replace the EUT by standard antenna and feed the RF port by signal generator.
7. The $EIRP = A + G + 10 \cdot \log(1/x)$, the A is the power measured in the above, and G is the gain of the antenna of the EUT in dBi and x is the duty cycle of the EUT in continuously transmitting mode.
8. The measurement shall be repeated at the lowest, the middle, and the highest channel of the stated frequency range. These measurements shall also be performed at the normal and the extreme test conditions.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	Dec. 29, 2022	1 Year
Positioning Controller	C&C	CC-C-1F	N/A	Dec. 29, 2022	1 Year
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	Dec. 29, 2022	1 Year
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	Dec. 29, 2022	1 Year
RF Switch	EM	EMSW18	SW060023	Dec. 29, 2022	1 Year
Amplifier	Agilent	8447F	3113A06717	Dec. 29, 2022	1 Year
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	Dec. 29, 2022	1 Year

3.5 Test Data

EUT: Car radio			Model: Z0625		
Test Voltage: DC 12V					
Test Conditions: 802.11b Continuous transmitting					
Duty Cycle: 100 %					
Rel.Humidity: 60%			Test Results		
Pressure: 1010 hPa			EIRP (dBm)	EIRP Limit (dBm)	Result
Test Frequency: 2412 MHz					
Tnom 26°C	Vnom 230 V		12.78	20	Pass
Tmin 0°C	Vmax 253 V		12.82	20	Pass
	Vmin 207 V		12.86	20	Pass
Tmax 50°C	Vmax 253 V		12.80	20	Pass
	Vmin 207 V		12.84	20	Pass
Test Frequency: 2442 MHz					
Tnom 26°C	Vnom 230 V		12.58	20	Pass
Tmin 0°C	Vmax 253 V		12.65	20	Pass
	Vmin 207 V		12.70	20	Pass
Tmax 50°C	Vmax 253 V		12.62	20	Pass
	Vmin 207 V		12.68	20	Pass
Test Frequency: 2472 MHz					
Tnom 26°C	Vnom 230 V		12.62	20	Pass
Tmin 0°C	Vmax 253 V		12.69	20	Pass
	Vmin 207 V		12.76	20	Pass
Tmax 50°C	Vmax 253 V		12.67	20	Pass
	Vmin 207 V		12.72	20	Pass

EUT: Car radio			Model: Z0625		
Test Voltage: DC 12V					
Test Conditions: 802.11g Continous transmitting					
Duty Cycle: 100 %					
Rel.Humidity: 60%			Test Results		
Pressure: 1010 hPa			EIRP (dBm)	EIRP Limit (dBm)	Result
Test Frequency: 2412 MHz					
Tnom 26° C	Vnom 230 V		12.23	20	Pass
Tmin 0° C	Vmax 253 V		12.28	20	Pass
	Vmin 207 V		12.35	20	Pass
Tmax 50° C	Vmax 253 V		12.26	20	Pass
	Vmin 207 V		12.31	20	Pass
Test Frequency: 2442 MHz					
Tnom 26° C	Vnom 230 V		12.10	20	Pass
Tmin 0° C	Vmax 253 V		12.16	20	Pass
	Vmin 207 V		12.21	20	Pass
Tmax 50° C	Vmax 253 V		12.15	20	Pass
	Vmin 207 V		12.19	20	Pass
Test Frequency: 2472 MHz					
Tnom 26° C	Vnom 230 V		12.05	20	Pass
Tmin 0° C	Vmax 253 V		12.11	20	Pass
	Vmin 207 V		12.15	20	Pass
Tmax 50° C	Vmax 253 V		12.08	20	Pass
	Vmin 207 V		12.13	20	Pass

EUT: Car radio			Model: Z0625		
Test Voltage: DC 12V					
Test Conditions: 802.11n Continuous transmitting					
Duty Cycle: 100 %					
Rel.Humidity: 60%			Test Results		
Pressure: 1010 hPa			EIRP (dBm)	EIRP Limit (dBm)	Result
Test Frequency: 2412 MHz					
Tnom 26° C	Vnom 230 V		11.68	20	Pass
Tmin 0° C	Vmax 253 V		11.75	20	Pass
	Vmin 207 V		11.82	20	Pass
Tmax 50° C	Vmax 253 V		11.72	20	Pass
	Vmin 207 V		11.79	20	Pass
Test Frequency: 2442 MHz					
Tnom 26° C	Vnom 230 V		11.62	20	Pass
Tmin 0° C	Vmax 253 V		11.69	20	Pass
	Vmin 207 V		11.76	20	Pass
Tmax 50° C	Vmax 253 V		11.65	20	Pass
	Vmin 207 V		11.72	20	Pass
Test Frequency: 2472 MHz					
Tnom 26° C	Vnom 230 V		11.58	20	Pass
Tmin 0° C	Vmax 253 V		11.65	20	Pass
	Vmin 207 V		11.70	20	Pass
Tmax 50° C	Vmax 253 V		11.62	20	Pass
	Vmin 207 V		11.68	20	Pass

4 Frequency Range

4.1 Test Standard and Limit

4.1.1 Test Standard

ETSI EN 300 328 V2.2.2 clause 4.3.3

4.1.2 Test Limit

Test Item	Limit
Frequency Range	-80 dBm/Hz (the e.i.r.p. spectral density)

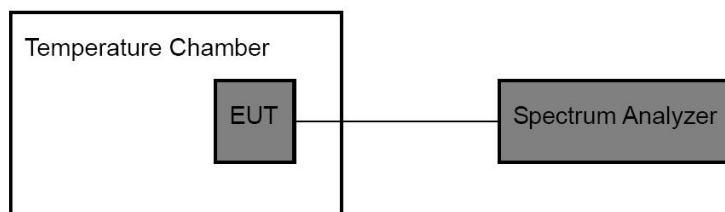
The frequency range of the equipment is determined by the lowest and highest frequencies occupied by the spectrum envelope.

f_H is the highest frequency of the spectrum envelope: it is the frequency furthest above the frequency of maximum power where the e.i.r.p. spectral density drops below the level of -80 dBm/Hz (-30 dBm if measured in a 100 kHz bandwidth).

f_L is the lowest frequency of the spectrum envelope; it is the frequency furthest below the frequency of maximum power where the e.i.r.p. spectral density drops below the level of -80 dBm/Hz (or -30 dBm if measured in a 100 kHz bandwidth).

For a given operating frequency, the width of the spectrum envelope is (f_H - f_L). In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allocated 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 frequencies.

4.2 Test Setup



4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Added [x] dBi of the EUT antenna gain on the spectrum analyzer.
3. Set the spectrum analyzer as following:
 - Resolution BW : 100kHz.
 - Resolution BW : 100kHz.
 - Detector : Average,
 - Trace Mode : Max Hold.
 - Sweep time : ≥ 60 s.

- Span : wide enough to capture the complete power envelope, including all sidebands.
- 4. Select lowest operating frequency of the EUT.
- 5. Find lowest frequency below the operating frequency at which spectral power density drops below -80 dBm/Hz e.i.r.p. (-30 dBm if measured in a 100kHz bandwidth). This frequency shall be recorded (fL).
- 6. Select the highest operating frequency of the EUT, and repeat the step 3.
- 7. Find the highest operating frequency at which the spectral power density drops below -80 dBm/Hz e.i.r.p. (-30 dBm if measured in a 100 kHz bandwidth). This frequency shall be recorded (fH).
- 8. These measurements shall also be performed at normal and extreme test conditions.

4.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	Dec. 29, 2022	1 Year
DC power supply	GVE	PL0825	N/A	N/A	N/A
Temp. & Humid. Chamber	GIANT	IHT-550	IKW682-054	Dec. 29, 2022	1 Year

4.5 Test Data

Please refer to the following pages.

EUT:	Car radio			Model:	Z0625
Temperature:	26°C			Relative Humidity:	60%
Pressure:	1010 hPa			Test Voltage :	DC 12V
Test Mode :	802.11b Channel 01/2412MHz				
Test Conditions				Frequency Range(MHz) (fL CH 01)	
Norm (°C)	20.0	V nom (V)	230.0	2401.9100	
T min (°C)	0.0	V max (V)	257.0	2401.7300	
		V min (V)	207.0	2401.5200	
T max (°C)	55.0	V max (V)	257.0	2401.8500	
		V min (V)	207.0	2401.6200	
Min. fL Band Edges				2401.5200	
Indoor Use Limit				fL>2400.0MHz	
Result				PASS	

EUT:	Car radio			Model:	Z0625
Temperature:	26°C			Relative Humidity:	60%
Pressure:	1010 hPa			Test Voltage :	DC 12V
Test Mode :	802.11b Channel 13/2472MHz				
Test Conditions				Frequency Range(MHz) (fH CH 13)	
Norm (°C)	20.0	V nom (V)	230.0	2482.2500	
T min (°C)	0.0	V max (V)	257.0	2482.6300	
		V min (V)	207.0	2482.8600	
T max (°C)	55.0	V max (V)	257.0	2482.4500	
		V min (V)	207.0	2482.7300	
Max. fH Band Edges				2482.8600	
Indoor Use Limit				fH<2483.5MHz	
Result				PASS	

EUT:	Car radio			Model:	Z0625
Temperature:	26°C			Relative Humidity:	60%
Pressure:	1010 hPa			Test Voltage:	DC 12V
Test Mode :	802.11g Channel 01/2412MHz				
Test Conditions				Frequency Range(MHz) (fL CH 01)	
Norm (°C)	20.0	V nom (V)	230.0	2400.6300	
T min (°C)	0.0	V max (V)	257.0	2400.4500	
		V min (V)	207.0	2400.3600	
T max (°C)	55.0	V max (V)	257.0	2400.5500	
		V min (V)	207.0	2400.4900	
Min. fL Band Edges				2400.3600	
Indoor Use Limit				fL>2400.0MHz	
Result				PASS	

EUT:	Car radio			Model:	Z0625
Temperature:	26°C			Relative Humidity:	60%
Pressure:	1010 hPa			Test Voltage:	DC 12V
Test Mode :	802.11g Channel 13/2472MHz				
Test Conditions				Frequency Range(MHz) (fH CH 13)	
Norm	(°C)	20.0	V nom (V)	230.0	2482.4800
T min	(°C)	0.0	V max (V)	257.0	2482.6300
			V min (V)	207.0	2482.8700
T max	(°C)	55.0	V max (V)	257.0	2482.5600
			V min (V)	207.0	2482.7400
Max. fH Band Edges				2482.8700	
Indoor Use Limit				fH<2483.5MHz	
Result				PASS	

EUT:	Car radio				Model:	Z0625
Temperature:	26°C				Relative Humidity:	60%
Pressure:	1010 hPa				Test Voltage:	DC 12V
Test Mode :	802.11n Channel 01/2412MHz					
Test Conditions					Frequency Range(MHz) (fL CH 01)	
Norm	(°C)	20.0	V nom	(V)	230.0	2401.2600
T min	(°C)	0.0	V max	(V)	257.0	2400.9200
			V min	(V)	207.0	2400.7700
T max	(°C)	55.0	V max	(V)	257.0	2401.1100
			V min	(V)	207.0	2400.8700
Min. fL Band Edges					2400.7700	
Indoor Use Limit					fL>2400.0MHz	
Result					PASS	

EUT:	Car radio			Model:	Z0625
Temperature:	26°C			Relative Humidity:	60%
Pressure:	1010 hPa			Test Voltage:	DC 12V
Test Mode :	802.11n Channel 13/2472MHz				
Test Conditions				Frequency Range(MHz) (fH CH 13)	
Norm	(°C)	20.0	V nom (V)	230.0	2482.6300
T min	(°C)	0.0	V max (V)	257.0	2482.8900
			V min (V)	207.0	2482.9800
T max	(°C)	55.0	V max (V)	257.0	2482.7600
			V min (V)	207.0	2482.9200
Max. fH Band Edges				2482.9800	
Indoor Use Limit				fH<2483.5MHz	
Result				PASS	

5 Maximum Spectral Power Density

5.1 Test Standard and Limit

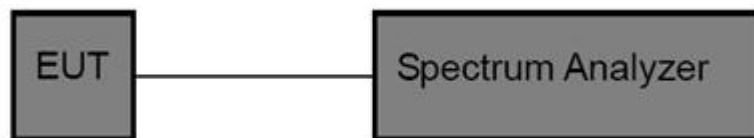
5.1.1 Test Standard

ETSI EN 300 328 V2.2.2 clause 4.3.2.

5.1.2 Limits

Test Item	Limit
Peak Power Density	FHSS N/A
	DSSS/OFDM, Other Modulation 10 mW/MHz

5.2 Test Setup



5.3 Test Procedure

1. Pre-calibration for the spectrum analyzer has to be done first through a CW signal of the measured carrier frequency with 10dBm power strength.
2. Connect the EUT to the output port of the spectrum analyzer.
3. Adjust the spectrum analyzer to have the center frequency the same with the measured carrier. RBW=VBW=1MHz, detector mode is positive peak. Span enough to cover the complete power envelope of the signal of the EUT. And the trace mode is max hold.
4. When the trace is complete, find the peak value of the power envelope and record the frequency.
5. Set the center frequency of the spectrum analyzer equal to frequency recorded in step d. Using the following settings of the spectrum analyzer : RBW & VBW: 1 MHz; detector mode: averaging or RMS Average; span: 3 M; sweep time:1 minute; trace mode: max hold.
6. When the trace is complete, capture the trace for example using the “view” function on the spectrum analyzer. Find the peak value of the trace and place the analyzer maker on this peak. This level is record as the highest mean power(spectral power density)D in a 1 MHz band.
7. The maximum spectral power density e.i.r.p. is calculated from the above measured power density (D), the observed duty cycle factor(x), and the applicable antenna assembly gain "G" in dBi, according to the formula: $PD = D + G + 10 \log (1/x)$.
8. The measurement shall be repeated at the lowest, the middle, and the highest channel of the stated frequency range.

5.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	Dec. 29, 2022	1 Year
DC power supply	GVE	PL0825	N/A	N/A	N/A

5.5 Test Data

Please see the following pages.

EUT:		Car radio		Model:		Z0625			
Temperature:		26°C		Relative Humidity:		60%			
Pressure:		1010 hPa		Test Voltage:		DC 12V			
Test Mode: TX 802.11b Channel 01/07/13									
Note: Duty cycle of the equipment during the test: x=1.									
Test Conditions				EIRP Spectral Power Density (dBm / MHz)					
				CH01		CH07		CH13	
T nom (°C)		20	V nom(V)	230.00	-3.25		-3.42	-3.67	
Limits				10dBm / MHz					
Result				Complies					

EUT:		Car radio		Model:		Z0625					
Temperature:		26°C		Relative Humidity:		60%					
Pressure:		1010 hPa		Test Voltage:		DC 12V					
Test Mode: TX 802.11g Channel 01/07/13											
Note: Duty cycle of the equipment during the test: x=1.											
Test Conditions				EIRP Spectral Power Density (dBm / MHz)							
				CH01		CH07		CH13			
T nom (°C)		20	V nom(V)		230.00		-5.25	-5.67		-5.52	
Limits				10dBm / MHz							
Result				Complies							

EUT:		Car radio		Model:		Z0625					
Temperature:		26°C		Relative Humidity:		60%					
Pressure:		1010 hPa		Test Voltage:		DC 12V					
Test Mode: TX 802.11n Channel 01/07/13											
Note: Duty cycle of the equipment during the test: x=1.											
Test Conditions				EIRP Spectral Power Density (dBm / MHz)							
				CH01		CH07		CH13			
T nom (°C)		20	V nom(V)		230.00		-5.74	-5.87		-5.91	
Limits				10dBm / MHz							
Result				Complies							

6 Spurious Emissions-TRANSMITTER

6.1 Test Standard and Limit

6.1.1 Test Standard

ETSI EN 300 328 V2.2.2 clause 4.3.6

6.1.2 Limits

Transmitter limits for narrowband spurious emissions

Frequency Range	Limit when Operating	Limit when in Standby
30MHz to 1 GHz	-36 dBm	-57 dBm
Above 1 GHz to 12.75 GHz	-30 dBm	-47 dBm
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	-47 dBm	-47 dBm

The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to achieve a reliable measurement result.

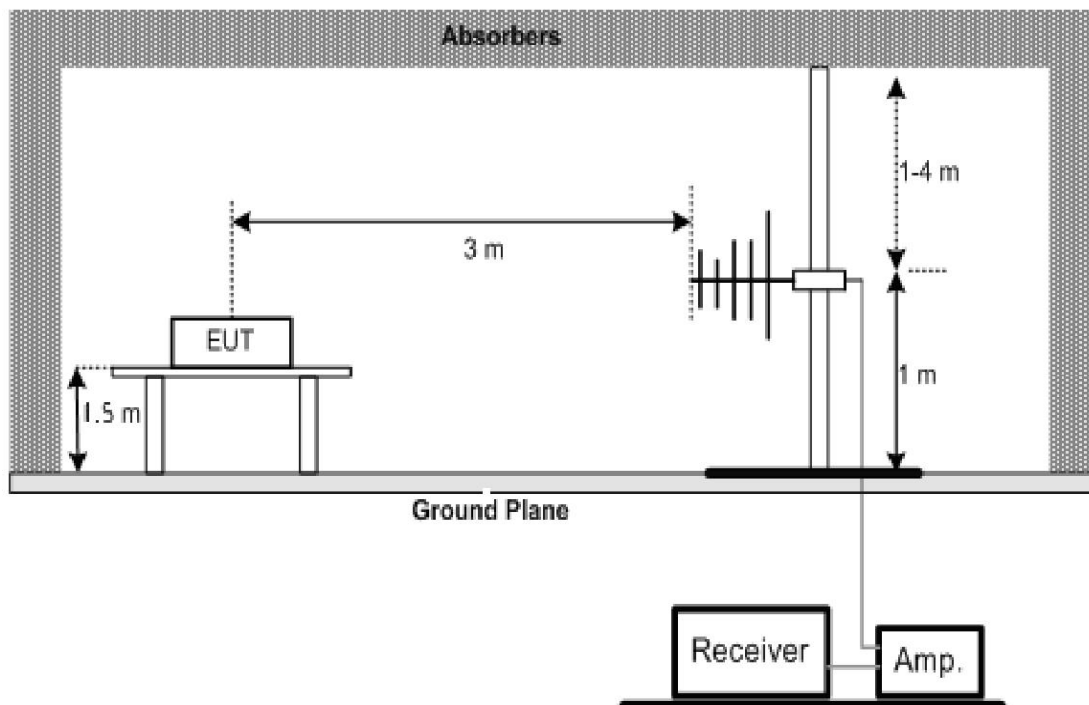
Wideband emissions shall not exceed the values given as follows:

Transmitter limits for wideband spurious emissions

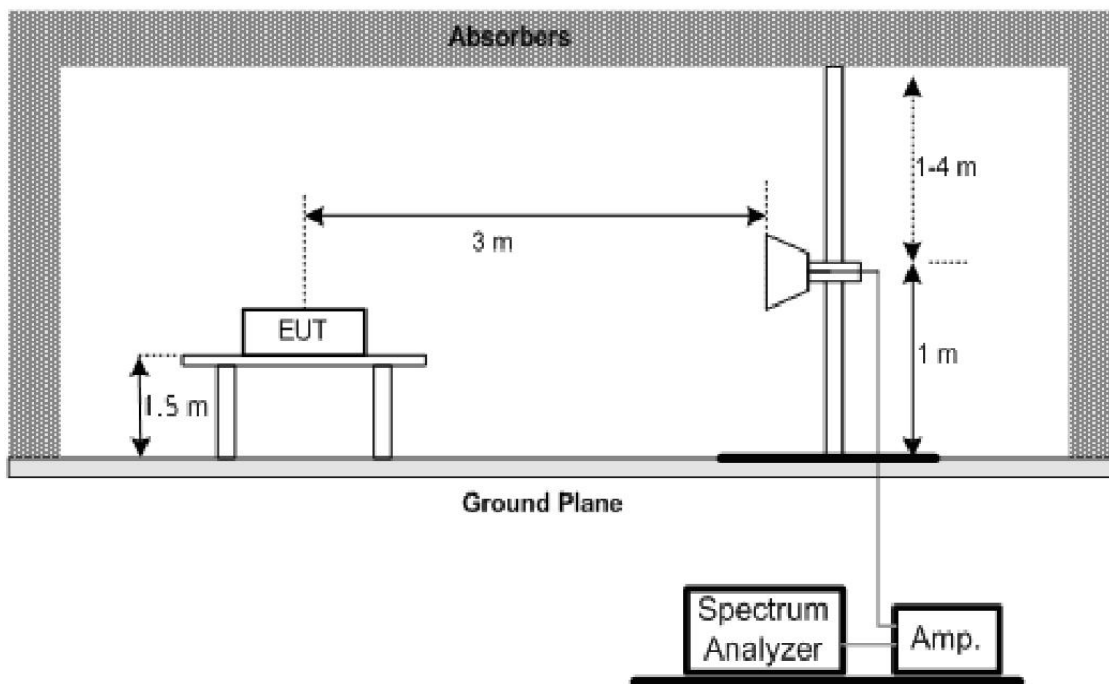
Frequency Range	Limit when Operating	Limit when in Standby
30MHz to 1 GHz	-86 dBm/Hz	-107 dBm/Hz
Above 1 GHz to 12.75 GHz	-80 dBm/Hz	-97 dBm/Hz
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	-97 dBm/Hz	-97 dBm/Hz

6.2 Test Setup

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



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



6.3 Test Procedure

1. The EUT was placed on the top of the turntable in chamber.
2. The test shall be made in the transmitting mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. Set the spectrum analyzer as follows to measure the emissions:
 - Resolution BW : 100 kHz.
 - Resolution BW :30 kHz.
 - Detector : Peak.
 - Trace Mode : Max Hold.
 - Sweep time : 1s.
 - Span :100M.
 - Amplitude :Adjust for middle of the instrument's range.
4. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. .
5. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
6. Replace the EUT by standard antenna and feed the RF port by signal generator.
7. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
8. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
9. The level of the spurious emission is the power level of (g) plus the gain of the standard antenna in dBi and minus the loss of the cable used between the signal generator and the standard antenna.
10. If the measuring emissions that exceed the level of 6 dB below the applicable limit, the resolution bandwidth shall be switched to 30 kHz and the span shall be adjusted accordingly. If the level does not change by more than 2 dB, it is a narrowband emission; the observed value shall be recorded. If the level changes by more than 2 dB, the emission is a wideband emission and its level shall be measured and recorded.
11. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

6.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	Dec. 29, 2022	1 Year
Positioning Controller	C&C	CC-C-1F	N/A	Dec. 29, 2022	1 Year
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	Dec. 29, 2022	1 Year
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	Dec. 29, 2022	1 Year
RF Switch	EM	EMSW18	SW060023	Dec. 29, 2022	1 Year
Amplifier	Agilent	8447F	3113A0671	Dec. 29, 2022	1 Year
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	Dec. 29, 2022	1 Year

6.5 Test Data

Please refer the follow page.

(1) Bellow 1 G

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode :	Transmit 802.11b CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
37.3000	V	TX	-64.63	-36.00	28.63	
165.2000	V	TX	-55.23	-36.00	19.23	
199.7000	V	TX	-59.63	-36.00	23.63	
224.9000	V	TX	-59.71	-36.00	23.71	
367.1000	V	TX	-61.47	-36.00	25.47	
541.7000	V	TX	-59.96	-36.00	23.96	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
100.3000	H	TX	-64.31	-36.00	28.31	
168.8000	H	TX	-59.08	-36.00	23.08	
240.7000	H	TX	-65.48	-36.00	29.48	
311.6000	H	TX	-66.03	-36.00	30.03	
395.1000	H	TX	-61.23	-36.00	25.23	
463.8000	H	TX	-62.54	-36.00	26.54	

(2) Above 1 G

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode:	Transmit 802.11b CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	V	TX	-56.19	-30.00	26.19	
7236.000	V	TX	-64.86	-30.00	34.86	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	H	TX	-52.31	-30.00	22.31	
7236.000	H	TX	-62.08	-30.00	32.08	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode:	Transmit 802.11b CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.000	V	TX	-55.26	-30.00	25.26	
7419.600	V	TX	-63.72	-30.00	33.72	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.000	H	TX	-51.29	-30.00	21.29	
7419.800	H	TX	-61.30	-30.00	31.30	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode:	Transmit 802.11g CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	V	TX	-56.92	-30.00	26.92	
7242.000	V	TX	-65.20	-30.00	35.20	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	H	TX	-54.38	-30.00	24.38	
7240.000	H	TX	-62.78	-30.00	32.78	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode:	Transmit 802.11g CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.000	V	TX	-55.27	-30.00	25.27	
7414.000	V	TX	-64.16	-30.00	34.16	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.000	H	TX	-52.10	-30.00	-22.10	
7412.200	H	TX	-61.49	-30.00	-31.49	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode:	Transmit 802.11n (20 MHz) CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	V	TX	-58.21	-30.00	28.21	
7242.100	V	TX	-68.43	-30.00	38.43	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4824.000	H	TX	-55.62	-30.00	25.62	
7240.600	H	TX	-65.06	-30.00	35.06	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Transmit 802.11n (20 MHz) CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.000	V	TX	-57.21	-30.00	27.21	
7414.600	V	TX	-67.75	-30.00	37.75	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
4944.800	H	TX	-54.96	-30.00	-24.96	
7419.600	H	TX	-65.70	-30.00	-35.70	

7 Spurious Emissions-RECEIVER

7.1 Test Standard and Limit

7.1.1 Test Standard

ETSI EN 300 328 V2.2.2 clause 4.3.7

7.1.2 Limits

Receiver limits for narrowband spurious emissions

Frequency Range	Limit
30MHz to 1 GHz	-57 dBm
Above 1 GHz to 12.75 GHz	-47 dBm

The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to achieve a reliable measurement result.

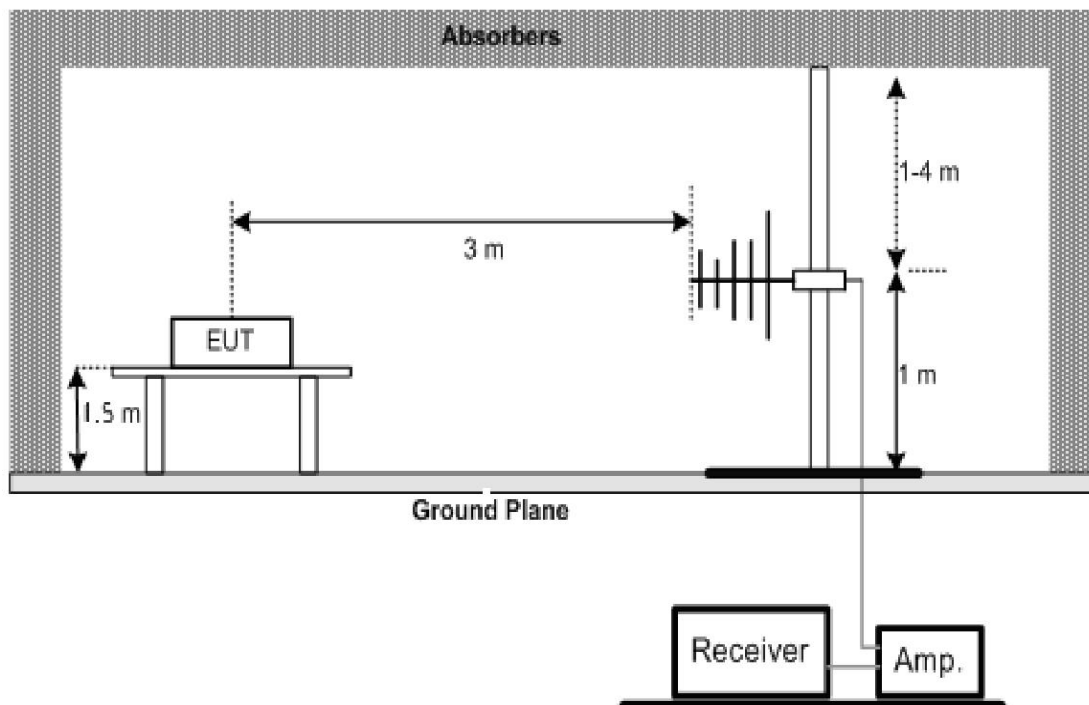
Wideband emissions shall not exceed the values given as follows:

Receiver limits for wideband spurious emissions

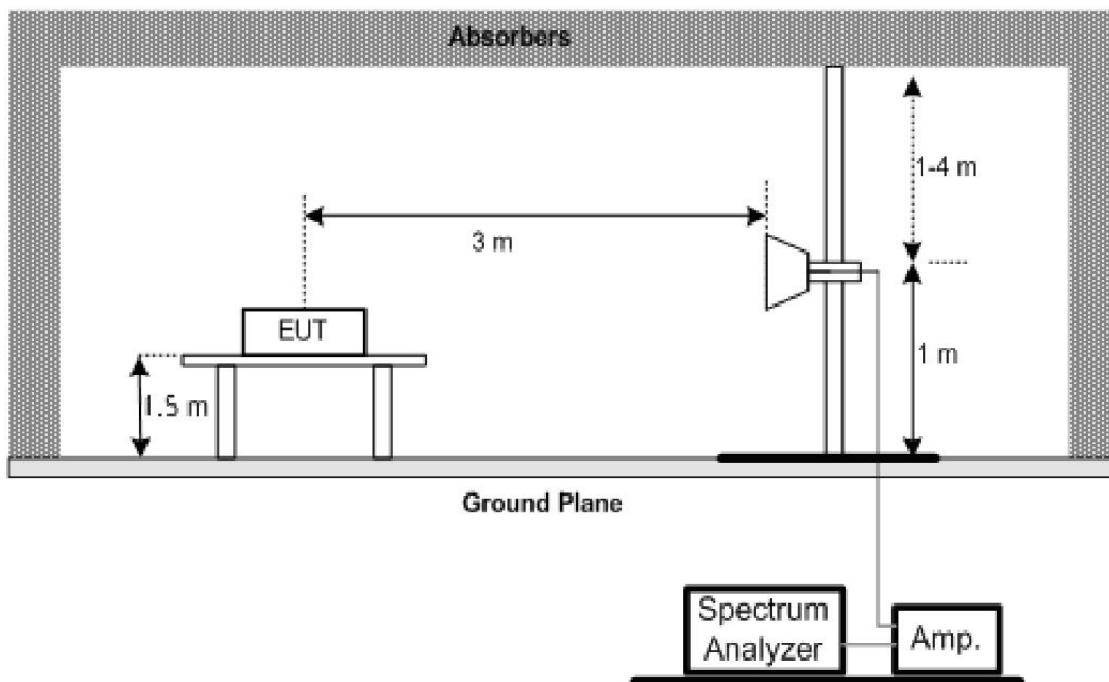
Frequency Range	Limit when Operating
30MHz to 1 GHz	-107 dBm/Hz
Above 1 GHz to 12.75 GHz	-97 dBm/Hz

7.2 Test Setup

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



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



7.3 Test Procedure

1. The EUT was placed on the top of the turntable in chamber.
2. The test shall be made in the transmitting mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. Set the spectrum analyzer as follows to measure the emissions:
 - Resolution BW: 100 kHz.
 - Resolution BW: 30 kHz.
 - Detector: Peak.
 - Trace Mode: Max Hold.
 - Sweep time: 1s.
 - Span: 100M.
 - Amplitude: Adjust for middle of the instrument's range.
4. For 30~1000MHz spurious emissions measurement, the broad band bi-log receiving antenna was placed 3 meters far away from the turntable. .
5. The broadband receiving antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization. Each recorded suspected value is indicated as Read Level (Raw).
6. Replace the EUT by standard antenna and feed the RF port by signal generator.
7. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
8. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
9. The level of the spurious emission is the power level of (g) plus the gain of the standard antenna in dBi and minus the loss of the cable used between the signal generator and the standard antenna.
10. If the measuring emissions that exceed the level of 6 dB below the applicable limit, the resolution bandwidth shall be switched to 30 kHz and the span shall be adjusted accordingly. If the level does not change by more than 2 dB, it is a narrowband emission; the observed value shall be recorded. If the level changes by more than 2 dB, the emission is a wideband emission and its level shall be measured and recorded.
11. The measurement shall be repeated at the lowest and the highest channel of the stated frequency range.

7.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	Dec. 29, 2022	1 Year
Positioning Controller	C&C	CC-C-1F	N/A	Dec. 29, 2022	1 Year
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	Dec. 29, 2022	1 Year
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	Dec. 29, 2022	1 Year
RF Switch	EM	EMSW18	SW060023	Dec. 29, 2022	1 Year
Amplifier	Agilent	8447F	3113A0671	Dec. 29, 2022	1 Year
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	Dec. 29, 2022	1 Year
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	Dec. 29, 2022	1 Year

7.5 Test Data

(1) Bellow 1 G

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode :	Receive 802.11b CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
100.3000	V	RX	-68.66	-57.00	11.66	
165.8000	V	RX	-62.65	-57.00	5.65	
299.1000	V	RX	-61.73	-57.00	4.73	
432.5000	V	RX	-63.60	-57.00	6.60	
500.6000	V	RX	-64.40	-57.00	7.40	
699.7000	V	RX	-65.24	-57.00	8.24	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
72.2000	H	RX	-62.70	-57.00	5.70	
165.8000	H	RX	-62.56	-57.00	5.56	
248.3000	H	RX	-64.11	-57.00	7.11	
364.7000	H	RX	-62.96	-57.00	5.89	
432.6000	H	RX	-62.35	-57.00	5.35	
695.700	H	RX	-64.40	-57.00	7.40	

(2) Above 1 G

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Receive 802.11b CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.200	H	RX	-56.02	-47.00	9.02	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.200	V	RX	-60.30	-47.00	13.30	
---	V	RX	---	-47.00	---	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage:	DC 12V
Test Mode :	Receive 802.11b CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.020	H	RX	-58.60	-47.00	11.60	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.020	V	RX	-60.20	-47.00	13.20	
---	V	RX	---	-47.00	---	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Receive 802.11g CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.300	H	RX	-56.20	-47.00	9.20	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.300	V	RX	-58.34	-47.00	11.34	
---	V	RX	---	-47.00	---	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Receive 802.11g CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.500	H	RX	-57.05	-47.00	10.05	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1500.500	V	RX	-59.70	-47.00	12.70	
---	V	RX	---	-47.00	---	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Receive 802.11n (20 MHz) CH01		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1505.100	H	RX	-59.24	-47.00	12.24	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1505.100	V	RX	-61.36	-47.00	14.36	
---	V	RX	---	-47.00	---	

EUT:	Car radio	Model:	Z0625
Temperature:	26°C	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	Receive 802.11n (20 MHz) CH13		

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1507.700	H	RX	-58.71	-47.00	11.71	
---	H	RX	---	-47.00	---	

Frequency (MHz)	Ant H / V	TX/RX	Measured (dBm)	Limits (dBm)	Margins	Note
1507.700	V	RX	-59.06	-47.00	12.06	
---	V	RX	---	-47.00	---	

8 Photographs - Constructional Details

Photo 1 Appearance of EUT

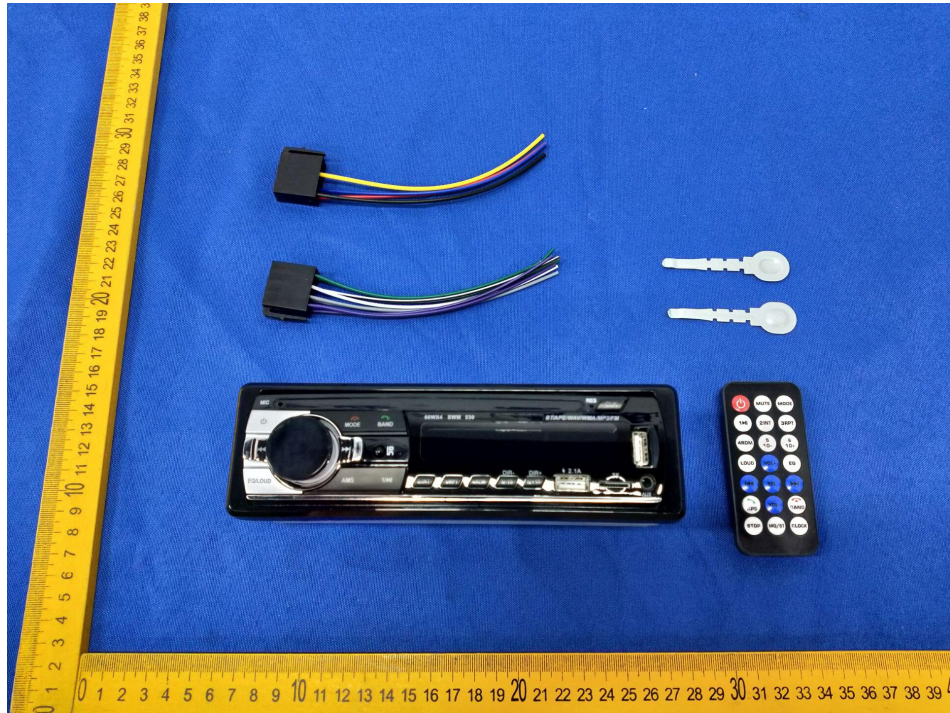


Photo 2 Appearance of EUT

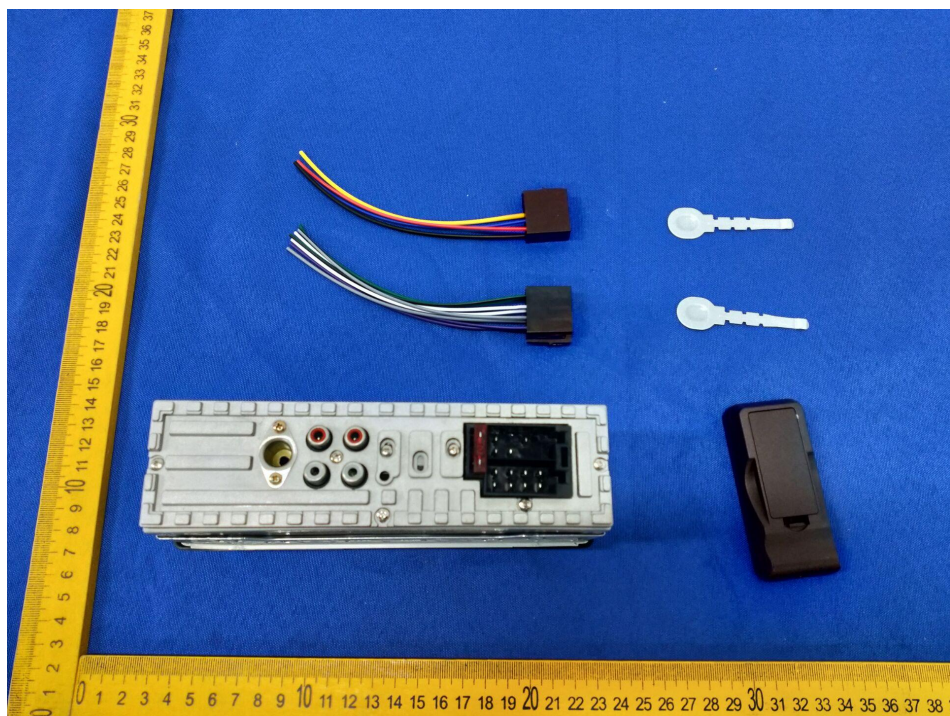


Photo 3 Appearance of EUT

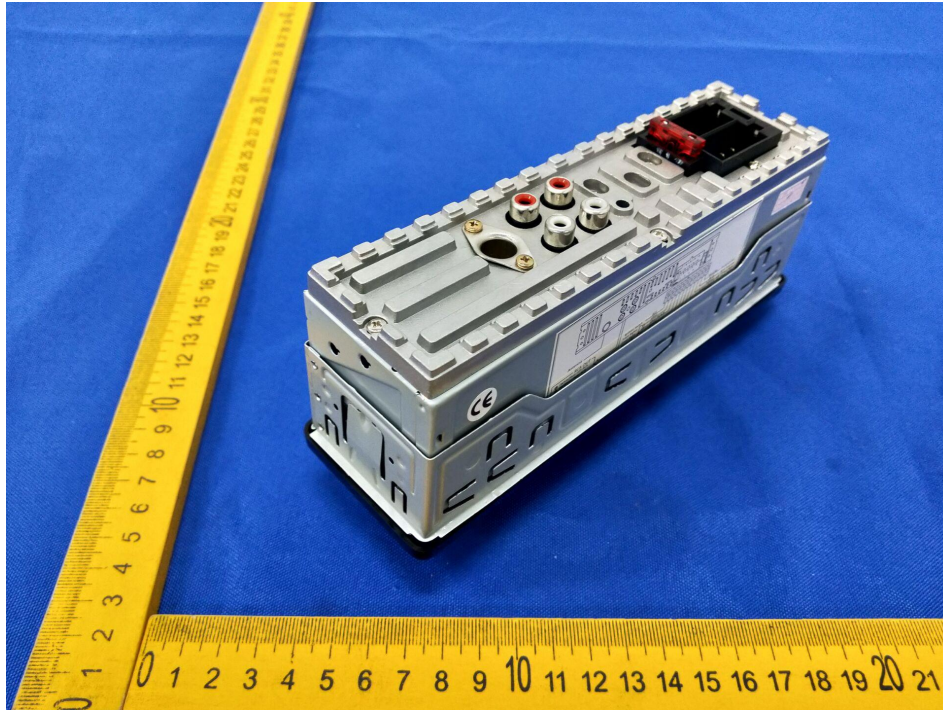


Photo 4 Inside of EUT

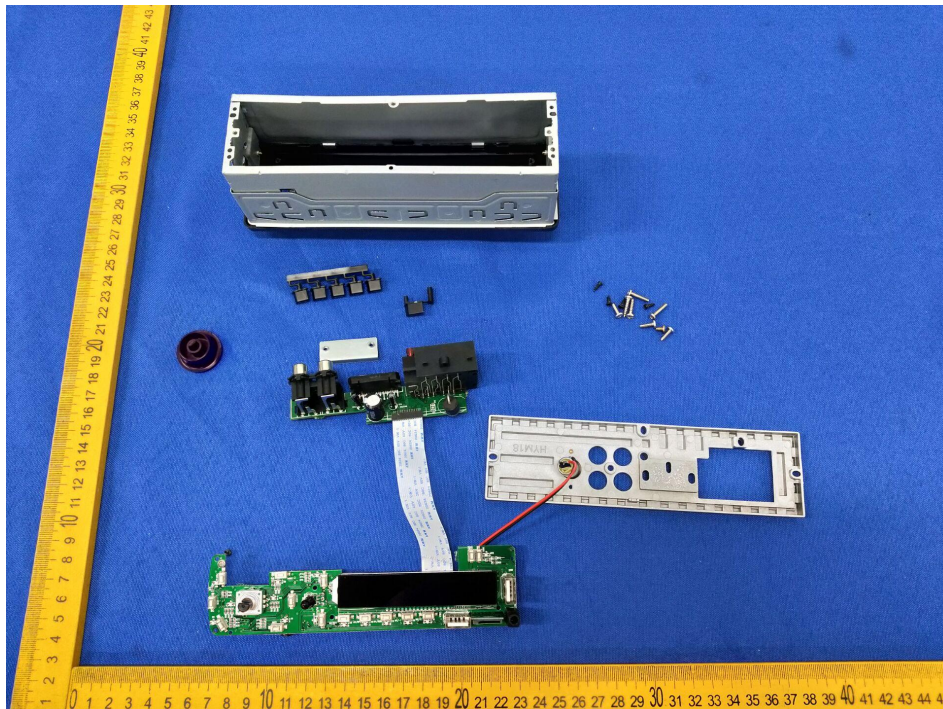


Photo 5 Appearance of PCB

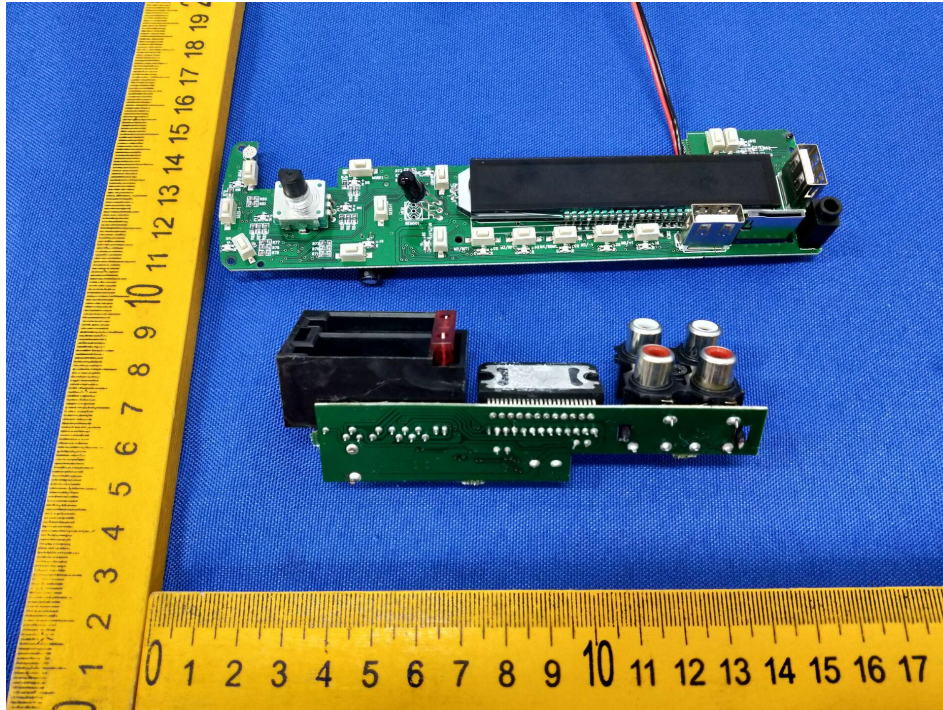
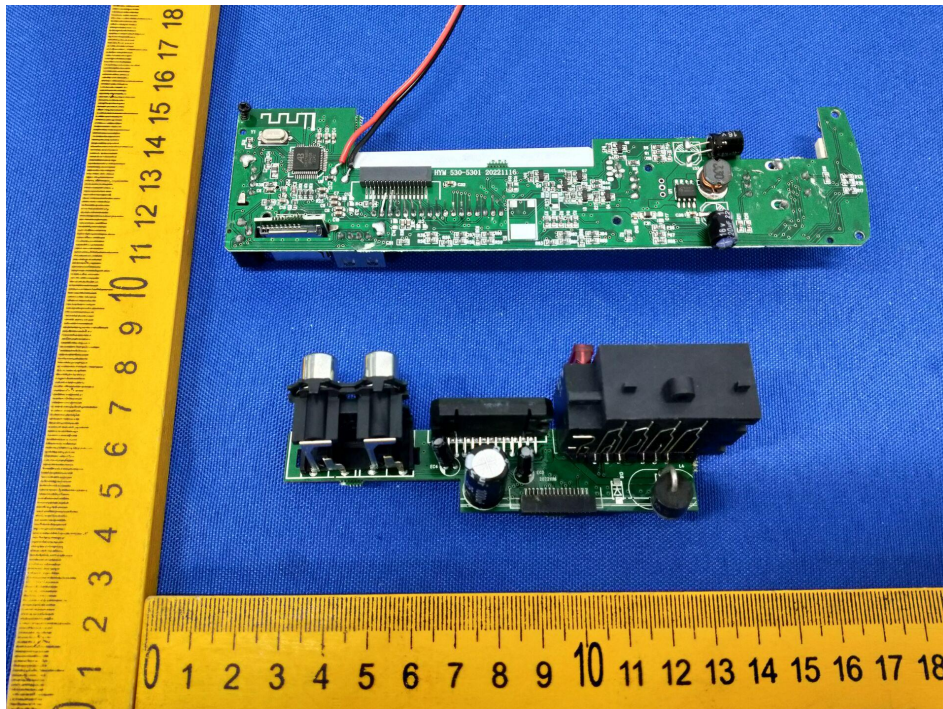


Photo 6 Appearance of PCB



END OF REPORT