

Report No.: SZEM200700595001  
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## **TEST REPORT**

**Application No.:**

SZEM2007005950CR

**Applicant:**

ZHONGRUN ELECTRON & TOYS CO.LTD

**Address of Applicant:**

Laimei Industrial Chenghai Borough, Shan Tou City Guangdong, 515825 China.

**Manufacturer:**

ZHONGRUN ELECTRON & TOYS CO.LTD

**Address of Manufacturer:**

Laimei Industrial Chenghai Borough, Shan Tou City Guangdong, 515825 China.

**Equipment Under Test (EUT):**

**EUT Name:** Walkie talkie series

**Model No.:**

ZR304, ZR303, ZR305, ZR301, ZR306A, ZR300, ZR304AB, ZR305AB, ZR307, ZR308, ZR309, ZR312, ZR313, ZR314, ZR315, ZR316, ZR317, ZR318, ZR319, ZR320, ZR321, ZR322, ZR323, ZR324, ZR325, ZR326, ZR327, ZR302AB, ZR328, ZR329, ZR330



\* Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

**FCC ID:**

XCQZR304305306

**Standard(s) :**

47 CFR Part 95, Subpart B

**Date of Receipt:** 2020-07-02

**Date of Test:** 2020-07-02 to 2020-07-09

**Date of Issue:** 2020-07-13

<b>Test Result:</b>	Pass*
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\* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu  
EMC Laboratory Manager



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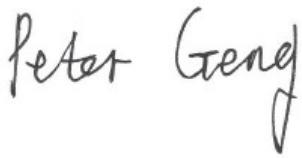
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<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2020-07-13		Original

Authorized for issue by:			
		Peter Geng/Project Engineer	
		Eric Fu /Reviewer	

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## 2 Test Summary

<b>Radio Spectrum Technical Requirement</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Antenna Requirement	47 CFR Part 95, Subpart B	N/A	47 CFR Part 95, Subpart B 95.587(b)	Pass

<b>Radio Spectrum Matter Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Frequency Stability	47 CFR Part 95, Subpart B	ANSI/TIA-603-D:2010	47 CFR FCC Part95.565 & FCC Part2.1055;	Pass
Effective Radiated Power (ERP)	47 CFR Part 95, Subpart B	ANSI/TIA-603-D:2010	47 CFR FCC Part95.567 & FCC Part2.1046;	Pass
Occupied Bandwidth	47 CFR Part 95, Subpart B	ANSI/TIA-603-D:2010	47 CFR FCC Part 95.573 & FCC Part2.1049;	Pass
Modulation characteristics	47 CFR Part 95, Subpart B	ANSI/TIA-603-D:2010	47 CFR FCC Part 95.575 & FCC Part2.1047;	Pass
Radiated Spurious Emissions	47 CFR Part 95, Subpart B	ANSI/TIA-603-D:2010	47 CFR FCC Part 95.579 & FCC Part2.1053;	Pass

### Declaration of EUT Family Grouping:

Model No.: ZR304, ZR303, ZR305, ZR301, ZR306A, ZR300, ZR304AB, ZR305AB, ZR307, ZR308, ZR309, ZR312, ZR313, ZR314, ZR315, ZR316, ZR317, ZR318, ZR319, ZR320, ZR321, ZR322, ZR323, ZR324, ZR325, ZR326, ZR327, ZR302AB, ZR328, ZR329, ZR330

Only the model ZR304 was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model No. and colour.

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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 4.5V by 3x1.5V "AAA" batteries
Frequency Range:	462.5625MHz~462.5625MHz
Modulation Type:	FM
Emission Type:	F3E
Antenna Type:	Integral
Antenna Gain:	1.5dBi

### 4.2 Description of Support Units

The EUT has been tested independent unit.

### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	Conduction emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
5	RF conducted power	$\pm 0.75\text{dB}$
6	RF power density	$\pm 2.84\text{dB}$
7	Conducted Spurious emissions	$\pm 0.75\text{dB}$
8	RF Radiated power	$\pm 4.5\text{dB}$ (Below 1GHz) $\pm 4.8\text{dB}$ (Above 1GHz)
9	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz) $\pm 4.8\text{dB}$ (Above 1GHz)
10	Temperature test	$\pm 1^\circ\text{C}$
11	Humidity test	$\pm 3\%$
12	Supply voltages	$\pm 1\%$
13	Time	$\pm 3\%$

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#### **4.4 Test Location**

All tests were performed at:

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Address 1: No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Address 2: Room 105, Building A, Xinlong Technology Industrial Park, No. 50 Fengtang Road, Xintian Community, Fuyong Street, Bao'an District, Shenzhen, China

Tel: +86 755 2601 2053      Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.5 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None

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## 5 Equipment List

ERP					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019-09-24	2020-09-23
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-04-30
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10
Audio Analyzer	Rohde & Schwarz	UPL	SEM008-02	2020-04-13	2021-04-12
Substitution Antenna	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Signal Generator	R&S	SMA100A	102174	2019-07-11	2020-07-10

Modulation characteristics					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	ZhaoXin	PS-3005D	SEM011-05	2019-09-24	2020-09-23
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2020-04-01	2021-03-31
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2019-09-28	2020-09-27
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Audio Analyzer	Rohde & Schwarz	UPL	SEM008-02	2020-04-13	2021-04-12
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	N/A	N/A
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2020-03-25	2021-03-24

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## Frequency Stability

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	ZhaoXin	PS-3005D	SEM011-05	2019-09-24	2020-09-23
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2020-04-01	2021-03-31
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2019-09-28	2020-09-27
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	N/A	N/A
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2020-03-25	2021-03-24

## Occupied Bandwidth

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	ZhaoXin	PS-3005D	SEM011-05	2019-09-24	2020-09-23
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2020-04-01	2021-03-31
Signal Generator (9kHz-40GHz)	KEYSIGHT	N5173B	SEM006-05	2019-09-28	2020-09-27
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.6	N/A	N/A	N/A
Audio Analyzer	Rohde & Schwarz	UPL	SEM008-02	2020-04-13	2021-04-12
Coaxial Cable	SGS	N/A	SEM031-01	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	N/A	N/A
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2020-03-25	2021-03-24

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Report No.: SZEM200700595001  
Page: 10 of 30**Radiated Emissions**

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI receiver(3Hz-3.6GHz)	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
Audio Analyzer	Rohde & Schwarz	UPL	SEM008-02	2020-04-13	2021-04-12
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09

**Radiated Emissions**

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Audio Analyzer	Rohde & Schwarz	UPL	SEM008-02	2020-04-13	2021-04-12
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23

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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

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## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 95, Subpart B 95.587(b)

#### 6.1.2 Conclusion

95.587(b) Requirement:

The antenna of each FRS transmitter type must meet the following requirements.

- (1) The antenna must be a non-removable integral part of the FRS transmitter type.
- (2) The gain of the antenna must not exceed that of a half-wave dipole antenna.
- (3) The antenna must be designed such that the electric field of the emitted waves is vertically polarized when the unit is operated in the normal orientation.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The antenna gain is 1.5dBi (as compared to a half-wave dipole) and with vertically polarized.

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## 7 Radio Spectrum Matter Test Results

### 7.1 Frequency Stability

Test Requirement 47 CFR FCC Part 95.565

Test Method: ANSI/TIA-603-D:2010

Limit: For FCC Part 95.565:

Each FRS transmitter type must be designed such that the carrier frequencies remain within  $\pm 2.5$  parts-per-million of the channel center frequencies specified in §95.563 during normal operating conditions.

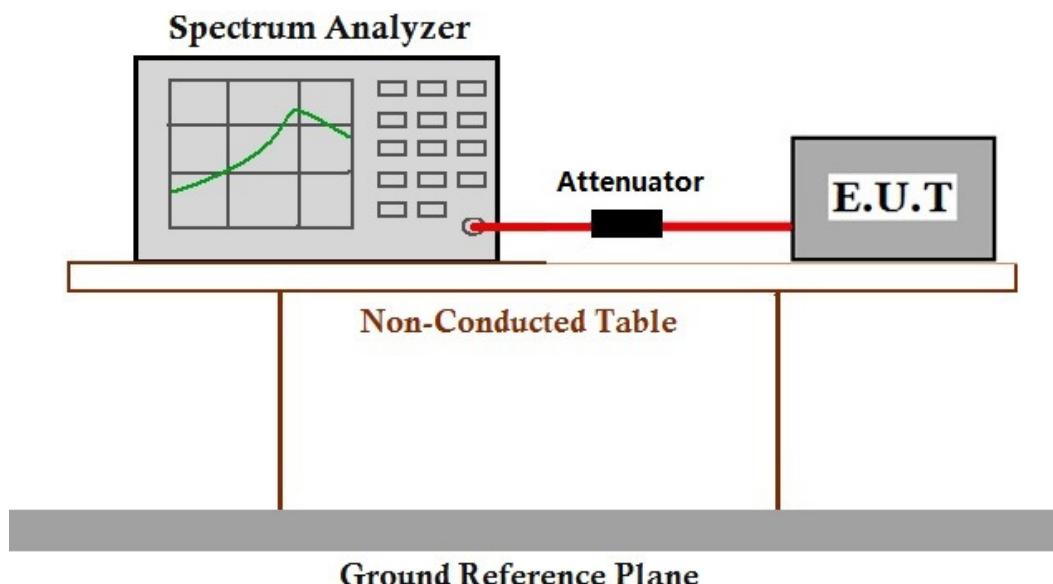
#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C Humidity: 49.2 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Tx mode, Keep the EUT in transmitting mode.

#### 7.1.2 Test Setup Diagram



#### 7.1.3 Measurement Procedure and Data

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Assigned Frequency:462.5625MHz						
Voltage(V)	Temperature (°C)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	IC Limit (ppm)	Result
4.5	-30	462.5619	-1.30	±2.5	±5	Pass
	-20	462.5622	-0.65			
	-10	462.5621	-0.86			
	0	462.5624	-0.22			
	10	462.5619	-1.30			
	20	462.5618	-1.51			
	30	462.5625	0.00			
	40	462.5626	0.22			
	50	462.5622	-0.65			
	5.175	462.5625	0			
3.825	25	462.5625	0			

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## 7.2 Effective Radiated Power (ERP)

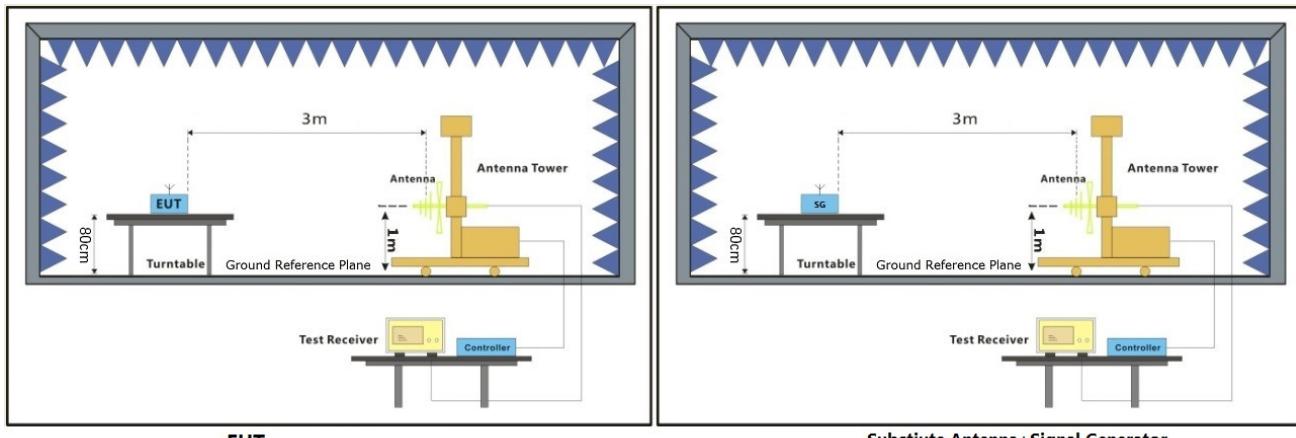
Test Requirement	47 CFR FCC Part95.567 & FCC Part2.1046;
Test Method:	ANSI/TIA-603-D:2010
Measurement Distance:	3m
	Test instrumentation resolution bandwidth 100 kHz (30 MHz - 1000 MHz)
Limit:	For FCC Part 95.567: Each FRS transmitter type must be designed such that the effective radiated power (ERP) on channels 8 through 14 does not exceed 0.5 Watts and the ERP on channels 1 through 7 and 15 through 22 does not exceed 2.0 Watts.

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C      Humidity: 49.3 % RH      Atmospheric Pressure: 1020 mbar  
Test mode: a: Tx mode, Keep the EUT in transmitting mode.

### 7.2.2 Test Setup Diagram



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### 7.2.3 Measurement Procedure and Data

The technique used to find the output power of the transmitter was the antenna substitution method. The following test procedure was followed:

- 1). The EUT was powered ON and placed on a 0.8m high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by lowering 1m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6). The output power into the substitution antenna was then measured.
- 7). Steps 5) and 6) were repeated with both antennas polarized.
- 8). Calculate power in dBm by the following formula:

$$\text{ERP (dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

Where:

Pg is the generator output power into the substitution antenna.

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**Test result:****Effective Radiated Power of Transmitter (ERP)**

Freq. (MHz)	Meas. Level (dBm)	SGP (dBm)	Substitutio n Gain(dBd)	Cable Loss (dB)	Substitution Level(ERP) / dBm	Substitution Level(ERP) / W	FCC Limit (W)	IC Limit (W)	Result
462.5625	6.3	11.68	-4.9	0.6	6.18	0.0041	2.0	0.5	Pass

Note:

a: For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it:

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

b: SGP=Signal Generator Level

c: RBW > emission bandwidth, VBW > 3 x RBW, Detector: RMS

d: Per FCC part95.563 & RSS-210 E.2.1 FRS channel 1 is 462.5625MHz.

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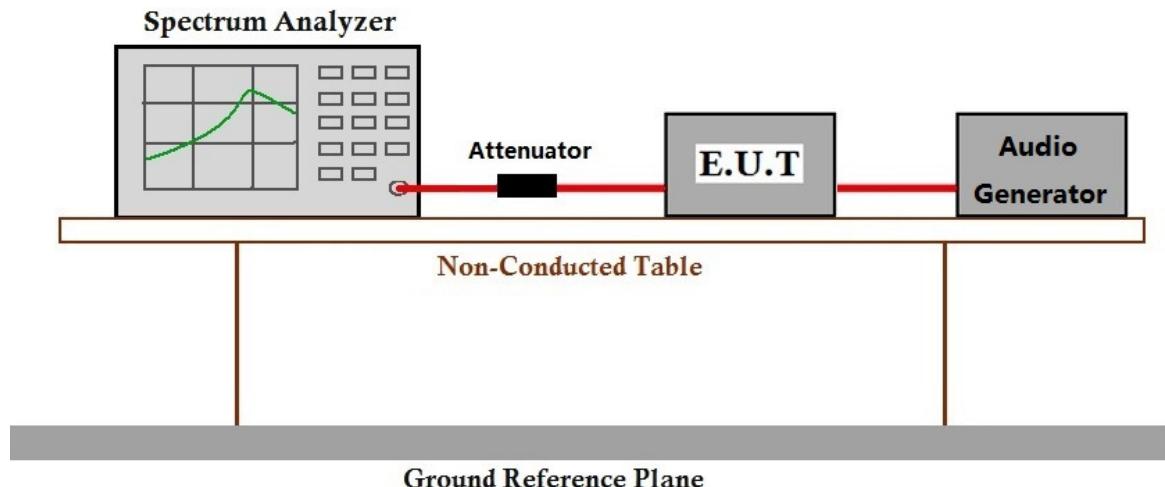
### 7.3 Occupied Bandwidth

Test Requirement 47 CFR FCC Part 95.573 & FCC Part2.1049;  
Test Method: ANSI/TIA-603-D:2010  
Limit: For FCC Part 95.567:  
Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

#### 7.3.1 E.U.T. Operation

Operating Environment:  
Temperature: 24.8 °C      Humidity: 49.2 % RH      Atmospheric Pressure: 1020 mbar  
Test mode: a: Tx mode, Keep the EUT in transmitting mode.

#### 7.3.2 Test Setup Diagram



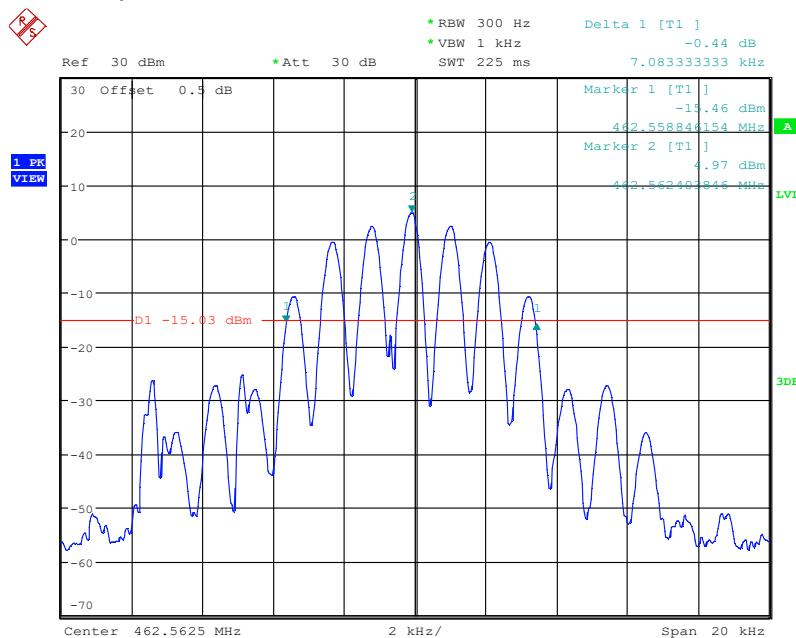
#### 7.3.3 Measurement Procedure and Data

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### Test result:

The occupied Bandwidth is measured to be 7.08 kHz for FRS.



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## 7.4 Modulation characteristics

Test Requirement 47 CFR FCC Part 95.575 & FCC Part2.1047;  
Test Method: ANSI/TIA-603-D:2010  
Limit: For FCC Part 95.575:  
Each FRS transmitter type must be designed such that the peak frequency deviation does not exceed 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

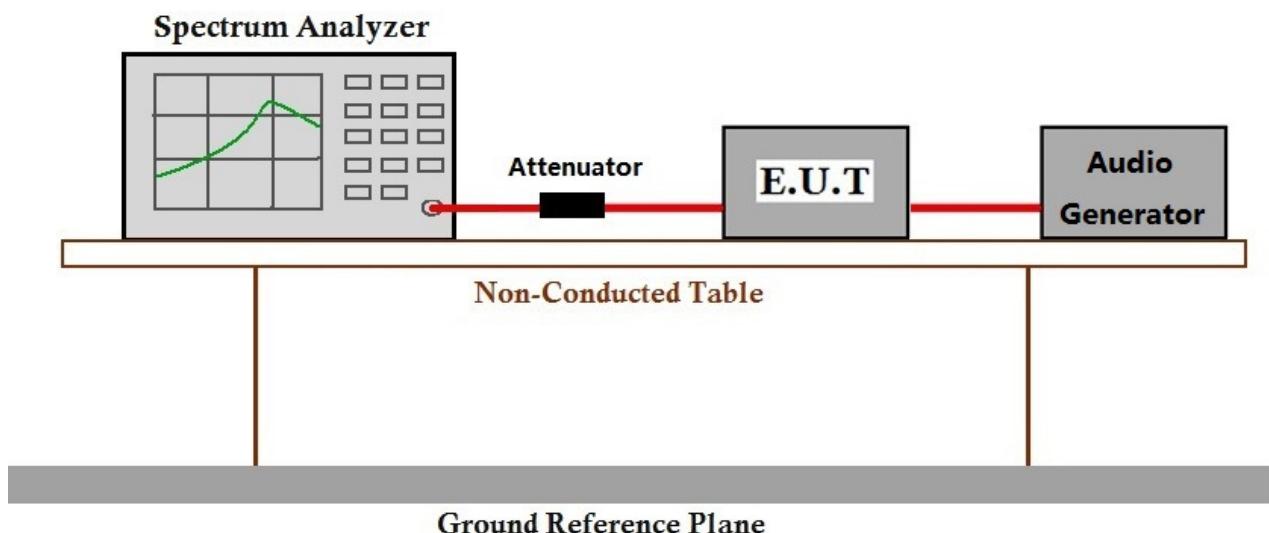
### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24.8 °C Humidity: 49.2 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Tx mode, Keep the EUT in transmitting mode.

### 7.4.2 Test Setup Diagram



### 7.4.3 Measurement Procedure and Data

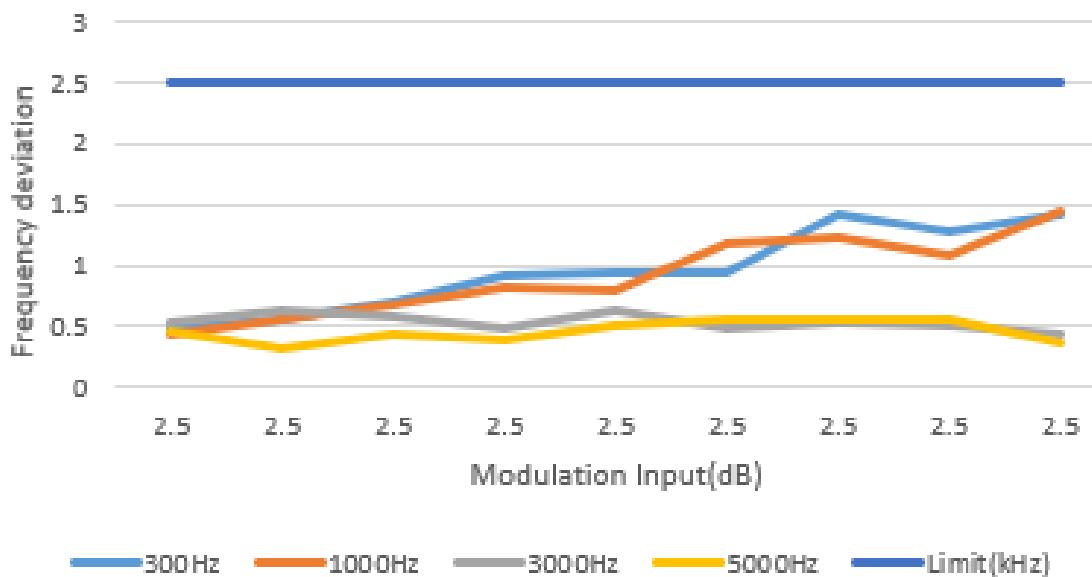
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**Test result:**

## a. Frequency deviation:

Channel 1: 462.5625MHz FRS					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
-20	0.48	0.43	0.53	0.47	2.50
-15	0.55	0.55	0.62	0.32	2.50
-10	0.71	0.67	0.57	0.45	2.50
-5	0.91	0.83	0.49	0.38	2.50
0	0.93	0.79	0.64	0.51	2.50
5	0.94	1.18	0.49	0.56	2.50
10	1.43	1.22	0.54	0.55	2.50
15	1.27	1.08	0.52	0.56	2.50
20	1.43	1.44	0.43	0.37	2.50

**Modulation characteristics**

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## b. Audio Frequency Response

Channel 1 for FRS

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)	Limit (KHz)
100	0.45	3.125
200	0.83	3.125
300	0.84	3.125
400	1.2	3.125
500	1.35	3.125
600	1.53	3.125
700	1.3	3.125
800	1.36	3.125
900	1.49	3.125
1000	1.47	3.125
1250	1.42	3.125
1500	1.54	3.125
1750	1.42	3.125
2000	1.48	3.125
2250	1.24	3.125
2500	1.55	3.125
2750	1.44	3.125
3000	1.17	3.125
3125	1.12	3.125
3250	0.68	3.125
3500	0.53	3.125
4000	0.43	3.125
5000	0.51	3.125

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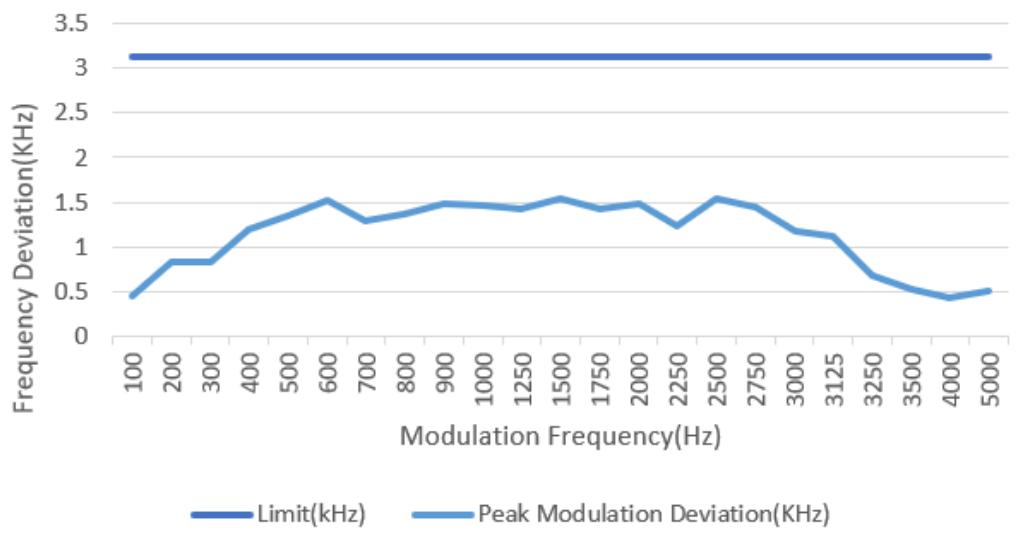
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### Audio Frequency Response



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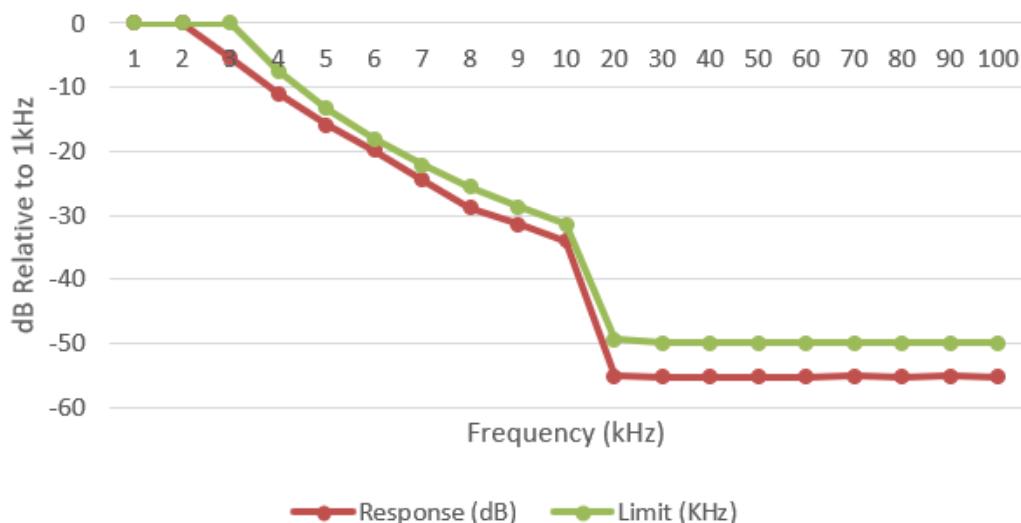
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## c. Audio Low Pass Filter Frequency Response

Channel 1 for FRS

Frequency(KHz)	Response (dB)	Limit (KHz)
1	0.00	0.00
2	0.00	0.00
3	-5.37	0.00
4	-10.98	-7.50
5	-15.94	-13.31
6	-19.77	-18.06
7	-24.42	-22.08
8	-28.89	-25.56
9	-31.45	-28.63
10	-34.04	-31.37
20	-55.18	-49.43
30	-55.25	-50.00
40	-55.22	-50.00
50	-55.23	-50.00
60	-55.19	-50.00
70	-55.16	-50.00
80	-55.25	-50.00
90	-55.17	-50.00
100	-55.22	-50.00

## Audio Low Pass Filter Frequency Response



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## d. Modulation Limiting

Channel 1 for FRS

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB) (KHz)	Deviation (-20dB) (KHz)	Deviation (+20dB) (KHz)	Deviation (-20dB) (KHz)	
300	0.845	0.313	0.453	0.344	2.5
400	0.998	0.278	0.826	0.196	2.5
500	0.949	0.044	0.506	0.189	2.5
600	0.538	0.129	0.672	0.402	2.5
700	0.792	0.091	0.91	0.005	2.5
800	0.838	0.239	1.031	0.259	2.5
900	0.949	0.173	0.988	0.489	2.5
1000	1.276	0.126	0.976	0.116	2.5
1200	0.998	0.192	1.256	0.112	2.5
1400	1.303	0.232	1.481	0.173	2.5
1600	0.835	0.043	1.504	0.353	2.5
1800	0.194	0.415	0.699	0.062	2.5
2000	1.139	0.488	1.638	0.157	2.5
2200	1.83	0.174	1.802	0.49	2.5
2200	1.517	0.189	2.032	0.191	2.5
2300	1.585	0.296	1.563	0.347	2.5
2400	1.398	0.113	1.93	0.449	2.5
2500	1.003	0.127	1.518	0.202	2.5
2600	1.89	0.361	1.868	0.531	2.5
2700	1.063	0.364	1.676	0.276	2.5
2800	1.448	0.192	1.617	0.002	2.5
2900	1.352	0.165	1.601	0.106	2.5
3000	1.555	0.351	1.039	0.147	2.5

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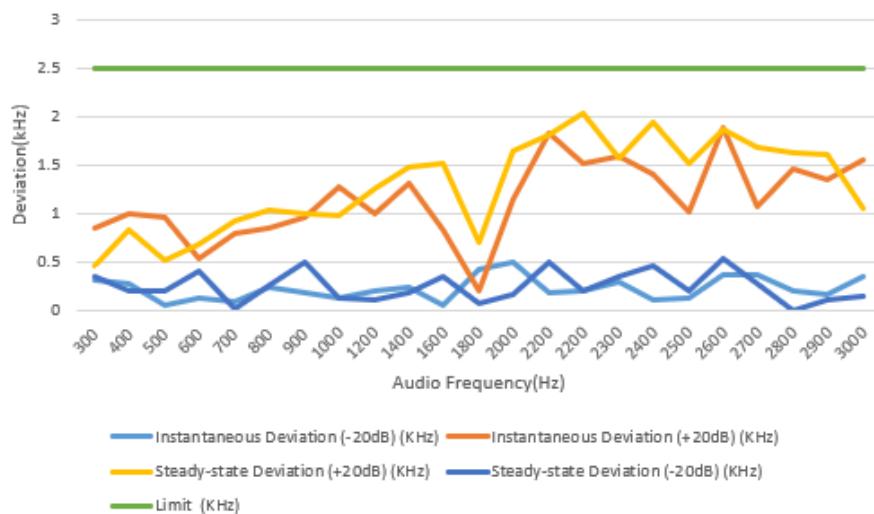
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### Modulation Limiting



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## 7.5 Radiated Unwanted Emissions

Test Requirement 47 CFR FCC Part 95.579 & FCC Part2.1053;

Test Method: ANSI/TIA-603-D:2010

Measurement Distance: 3m

Resolution bandwidth =10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

Limit:

For FCC Part 95.579

Each FRS transmitter type must be designed to satisfy the applicable unwanted emissions limits in this paragraph.

(a) Attenuation requirements. The power of unwanted emissions must be attenuated below the carrier power output in Watts (P) by at least:

- (1) 25 dB (decibels) in the frequency band 6.25 kHz to 12.5 kHz removed from the channel center frequency.
- (2) 35 dB in the frequency band 12.5 kHz to 31.25 kHz removed from the channel center frequency.
- (3)  $43 + 10 \log (P)$  dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.

(b) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) and (2) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (a)(3) is measured with a reference bandwidth of at least 30 kHz.

(c) Measurement conditions. The requirements in this section apply to each FRS transmitter type both with and without the connection of permitted attachments, such as an external speaker, microphone and/or power cord.

### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.1 °C      Humidity: 48 % RH      Atmospheric Pressure: 1020 mbar

Test mode: a: Tx mode, Keep the EUT in transmitting mode.

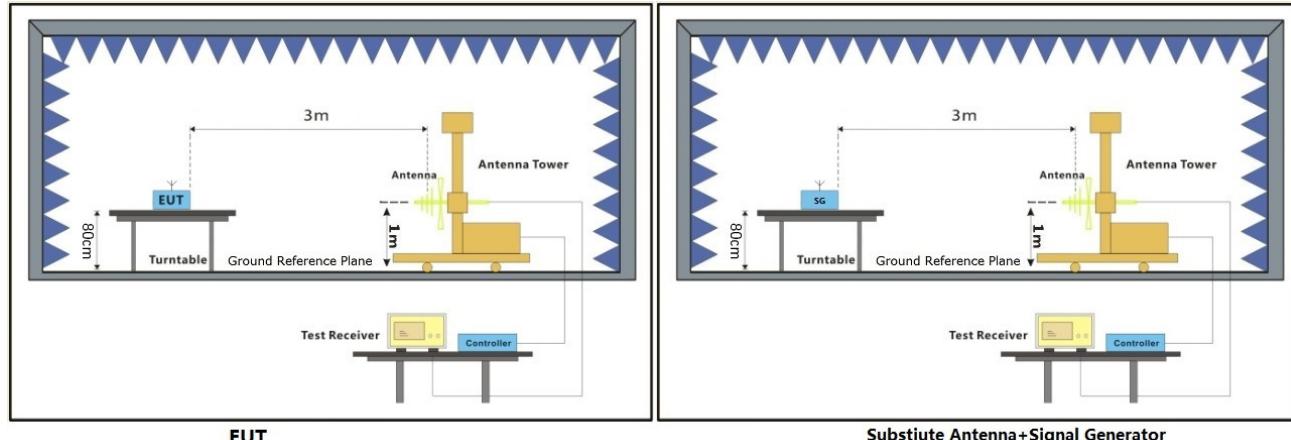
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### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

#### Test Procedure:

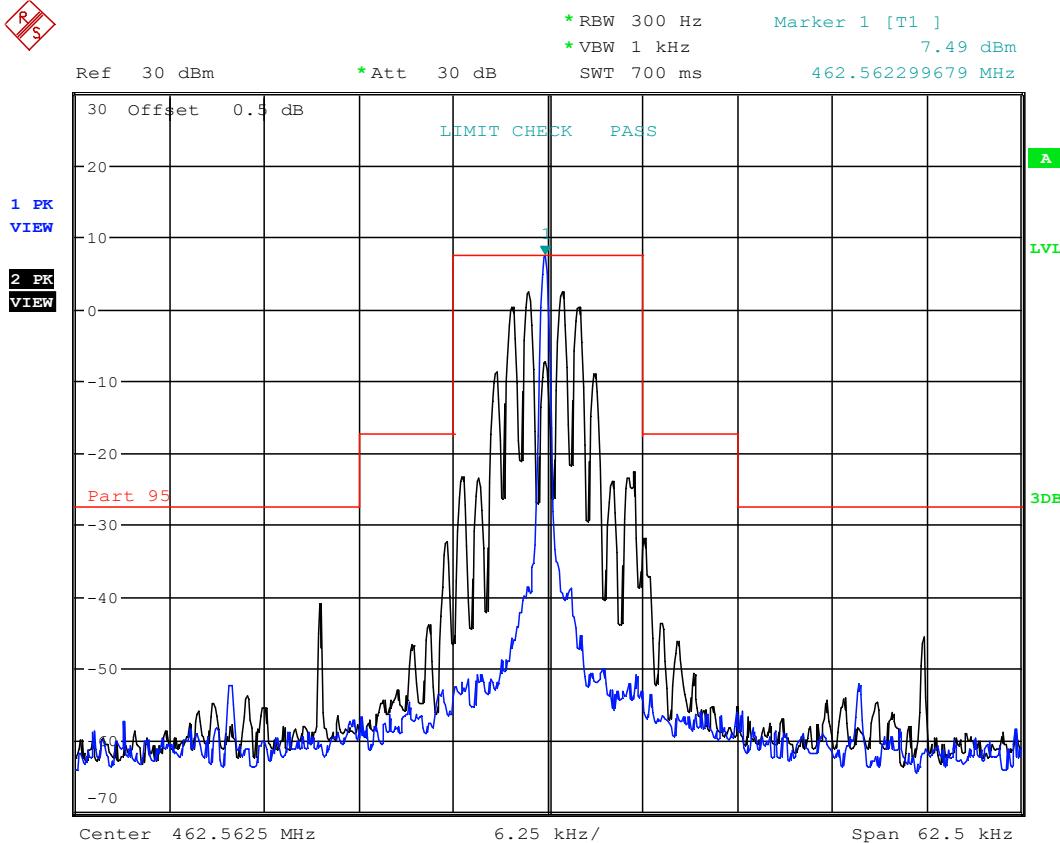
- (1) On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

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RS



Frequency MHz	Polarity H/V	Emission Level dBm	Limit dBm	Margin dBm
925.143	V	-18.95	-13.00	-5.25
1387.434	V	-30.23	-13.00	-17.23
1850.286	V	-35.27	-13.00	-22.27
2312.456	V	-39.71	-13.00	-26.71
2775.542	V	-36.64	-13.00	-23.64
925.452	H	-22.19	-13.00	-9.19
1387.436	H	-40.85	-13.00	-27.85
1850.541	H	-37.03	-13.00	-24.03
2312.457	H	-39.11	-13.00	-26.11
2775.652	H	-38.27	-13.00	-25.27

Note: Margin = Emission level – Limit.

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## **8 Photographs**

### **8.1 Test Setup**

Refer to test setup photos.

### **8.2 EUT Constructional Details**

Refer to external and internal photos.

- End of the Report -



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