



FCC TEST REPORT

FCC PART 95

Report Reference No.....: HK2212025449-E

FCC ID.....: 2A9TX-T-388

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Date of issue.....: Dec. 13, 2022

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Applicant's name: Shenzhen Zhongshi Electronic Technology Co.LTD

Address: 601, Building 5, No.51, Gezhen East Road, Pinghu Community,
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Test specification

Standard: FCC Part 95/FCC Part 2

TRF Originator.....: Shenzhen HUAKE Testing Technology Co., Ltd.

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Test item description: Walkie Talkies for Kids

Trade Mark: N/A

Manufacturer.....: Shenzhen Zhongshi Electronic Technology Co.LTD

Model/Type reference.....: T-388

Listed Models: Z-T3, Z-T5, Z-T9, Z-T16

Modulation Type.....: FM

Operation Frequency.....: From 462.5625 MHz-462.7125MHz, 467.5625 MHz-467.7125MHz,
462.5500 MHz-462.7250MHz

Rating: DC 6V From Battery

Hardware version: V2.0

Software version: V2.0

Result.....: PASS

**TEST REPORT****Test Report No. :****HK2212025449-E**

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Equipment under Test : Walkie Talkies for Kids**Model /Type** : T-388**Listed Models** : Z-T3, Z-T5, Z-T9, Z-T16**Applicant** : **Shenzhen Zhongshi Electronic Technology Co.LTD****Address** : 601, Building 5, No.51, Gezhen East Road, Pinghu Community, Pinghu Street, Longgang District, Shenzhen,China**Manufacturer** : **Shenzhen Zhongshi Electronic Technology Co.LTD****Address** : 601, Building 5, No.51, Gezhen East Road, Pinghu Community, Pinghu Street, Longgang District, Shenzhen,China**Test Result:****PASS**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 95](#): Personal Radio Services.

[ANSI/TIA 603 E-2016](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): Frequency Allocations And Radio Treaty Matters; General Rules And Regulations

1.2 Test Description

Test specification clause	Test case	Verdict
FCC Part 95.567	Maximum Transmitter Power	PASS
FCC Part 2.1047, 95.575	Modulation Characteristic	PASS
FCC Part 95.573	Occupied Bandwidth	PASS
FCC Part 95.573	Emission Mask	PASS
FCC Part 95.565	Frequency Stability	PASS
FCC Part 95.565	Transmitter Frequency Behavior	PASS
FCC Part 95.579	Transmitter Radiated Spurious Emission	PASS
FCC Part 95.579	Spurious Emission On Antenna Port	PASS



1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen HUAKE Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen HUAKE Testing Technology Co., Ltd. is reported

Test Items	Measurement Uncertainty	Notes
Frequency error	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Adjacent and alternate channel power Conducted	1.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Intermodulation attenuation	1.00 dB	(1)
Maximum useable receiver sensitivity	2.80 dB	(1)
Co-channel rejection	2.80 dB	(1)
Adjacent channel selectivity	2.80 dB	(1)
Spurious response rejection	2.80 dB	(1)
Intermodulation response rejection	2.80 dB	(1)
Blocking or desensitization	2.80 dB	(1)

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



2 GENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Name of EUT	Walkie Talkies for Kids
Model Number	T-388, Z-T3, Z-T5, Z-T9, Z-T16
Difference Description	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: T-388.
Power Supply	DC 6V from battery
Frequency Range	462.5625 MHz-462.7125MHz, 467.5625 MHz-467.7125MHz, 462.5500 MHz-462.7250MHz
Rate Power	0.5W
Modulation Type	FM
Channel Separation	12.5KHz
Number of Channels	22 Channels
Antenna Type	Internal antenna

Note 1: For more details, please refer to the user's manual of the EUT.

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

Operation Mode No.	Modulation	Channel Separation	Condition	
	FM	12.5KHz	TX	RX
1	☒	☒	☒	
2	☒	☒		☒

Test frequency list:

Modulation Type	Test Channel	Channel Separation	Test Frequency (MHz)
Analog/FM	Ch1	12.5KHz	462.5625
	Ch2		467.5625
	Ch3		462.7250



2.4 Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum analyzer	Agilent	N9020A	HKE-048	2022/02/18	2023/02/17
2	Signal generator	Agilent	N5182A	HKE-029	2022/02/18	2023/02/17
3	Signal generator	Agilent	83630A	HKE-028	2022/02/18	2023/02/17
4	RF automatic control unit	Tonscend	JS0806-2	HKE-060	2022/02/18	2023/02/17
5	Power Sensor	Agilent	E9300A	HKE-086	2022/02/18	2023/02/17
6	Spectrum analyzer	R&S	FSP40	HKE-025	2022/02/18	2023/02/17
7	Wireless Communication Test Set	R&S	CMU200	HKE-026	2022/02/18	2023/02/17
8	Wireless Communication Test Set	R&S	CMW500	HKE-027	2022/02/18	2023/02/17
9	RF automatic control unit	Tonscend	JS0806-2	HKE-060	2022/02/18	2023/02/17
10	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2022/02/18	2023/02/17
11	Horn antenna	Schwarzbeck	9120D	HKE-013	2022/02/18	2023/02/17
12	Receiver	R&S	ESCI 7	HKE-010	2022/02/18	2023/02/17
13	Position controller	Taiwan MF	MF7802	HKE-011	2022/02/18	2023/02/17
14	Preamplifier	EMCI	EMC0518 45SE	HKE-015	2022/02/18	2023/02/17
15	Preamplifier	Agilent	83051A	HKE-016	2022/02/18	2023/02/17
16	High pass filter unit	Tonscend	JS0806-F	HKE-055	2022/02/18	2023/02/17
17	Spectrum analyzer	Agilent	N9020A	HKE-048	2022/02/18	2023/02/17

The calibration interval is 1 year.

2.5 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended to comply with FCC Part 95 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.



3 TEST CONDITIONS AND RESULTS

3.1 Maximum Transmitter Power

LIMITS

According to 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.

TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

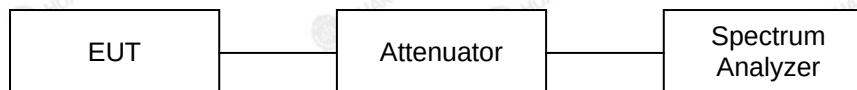
$$\text{Power(EIRP)} = P_{Mea} - P_{Ag} - P_{cl} + G_a$$

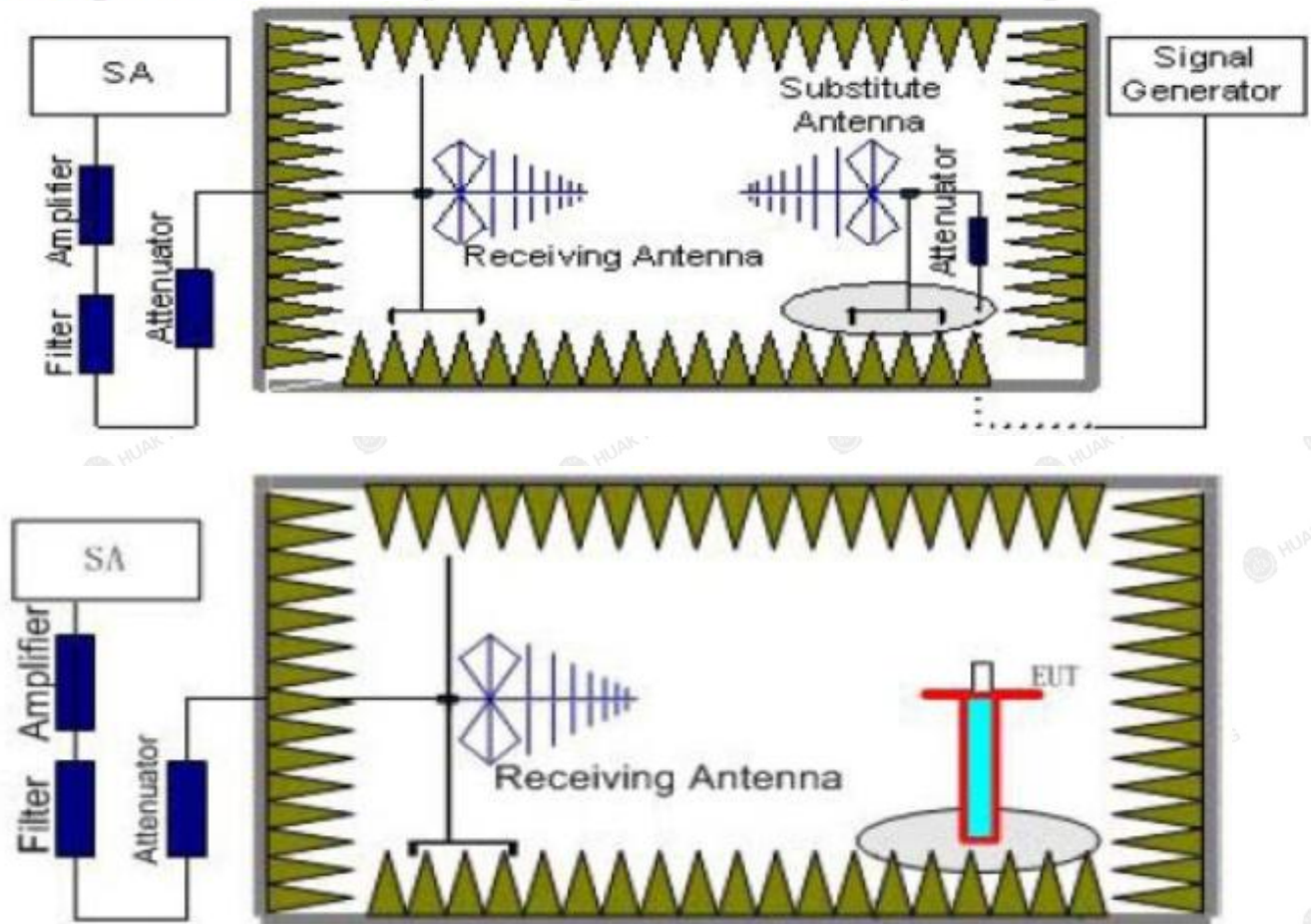
We used SMF100A microwave signal generator which signal level can up to 33dBm, so we not used power Amplifier for substitution test; The measurement results are amend as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{cl} + G_a$$

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

TEST CONFIGURATION



**TEST RESULTS****Conducted:**

Modulation Type	Test Channel	Test Frequency (MHz)	Test Results (dBm)
GMRS TX	Ch1	462.5625	26.65
	Ch2	467.5625	26.23
	Ch3	462.7250	26.46

Radiated:

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
462.5625	-7.96	3.06	6.24	33.6	26.67	33.01	6.34	V
462.5625	-8.57	3.06	6.24	33.6	26.06	33.01	6.95	H
467.5625	-10.86	3.22	6.24	33.6	23.61	26.99	3.38	V
467.5625	-11.32	3.22	6.24	33.6	23.15	26.99	3.84	H
462.5500	-8.65	3.17	6.24	33.6	25.87	33.01	7.14	V
462.5500	-8.23	3.17	6.24	33.6	26.29	33.01	6.72	H

Remark:

1. EIRP= P_{Mea}- P_{Ag} - P_{cl}+ G_a
2. ERP = EIRP- 2. 15dBi as EIRP by subtracting the gain of the dipole.



3.2 Occupied Bandwidth and Emission Mask

TEST APPLICABLE

According to FCC 95.573: .

Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

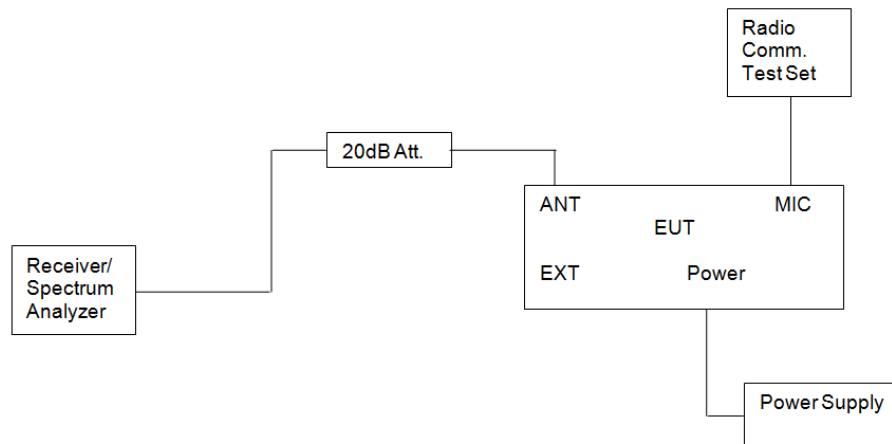
According to FCC 95.579: .

At least 25dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50 % up to and including 100 % of the authorized bandwidth.

At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100 % up to and including 250 % of the authorized bandwidth.

At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250 %.

TEST CONFIGURATION



TEST PROCEDURE

- 1 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).
- 2 Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW= 3 KHz, span =50 KHz.
- 3 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

TEST RESULTS

Occupied Bandwidth:

Modulation	Channel	99% OBW (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	CH1	10.005	10.18	12.5	Pass
	CH2	10.010	10.33		
	CH3	10.011	10.54		



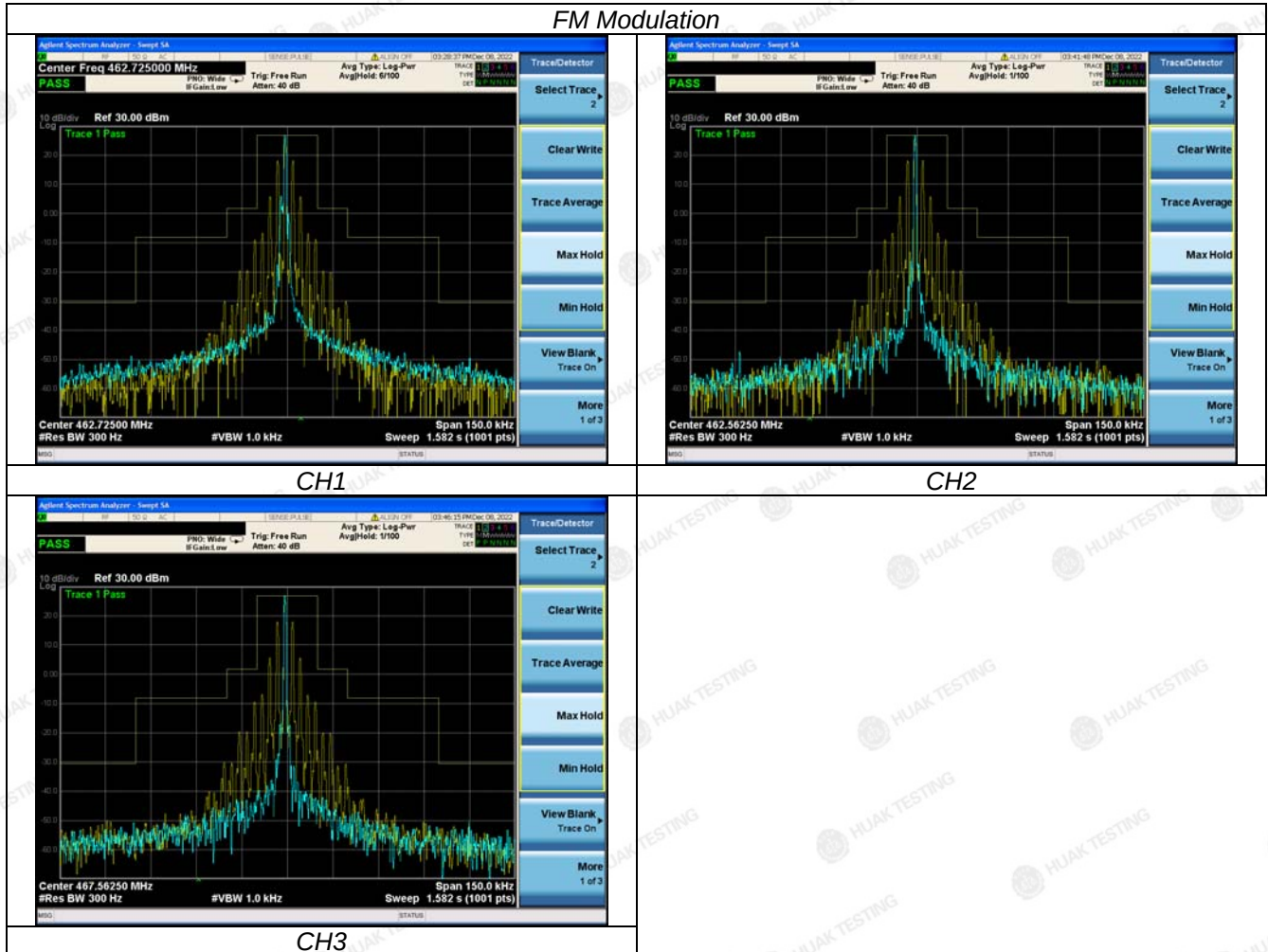
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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FM Modulation





3.3 Modulation Characteristic

TEST APPLICABLE

FCC Part 95.575, FCC Part 2.1047(b) 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.

TEST PROCEDURE

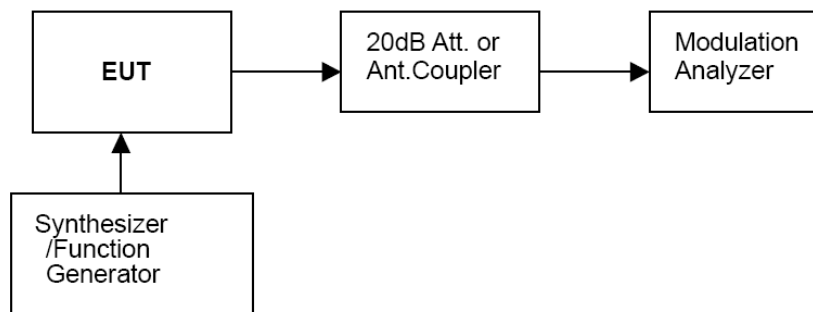
Modulation Limit

- 1 Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0dB) and vary the input level from -20 to +20dB. Record the frequency deviation obtained as a function of the input level.
- 2 Repeat step 1 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

Audio Frequency Response

- 1 Configure the EUT as shown in figure 1.
- 2 Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).
- 3 Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.
- 4 Audio Frequency Response = $20\log_{10} (\text{Deviation of test frequency} / \text{Deviation of 1 KHz reference})$.

TEST CONFIGURATION



TEST RESULTS

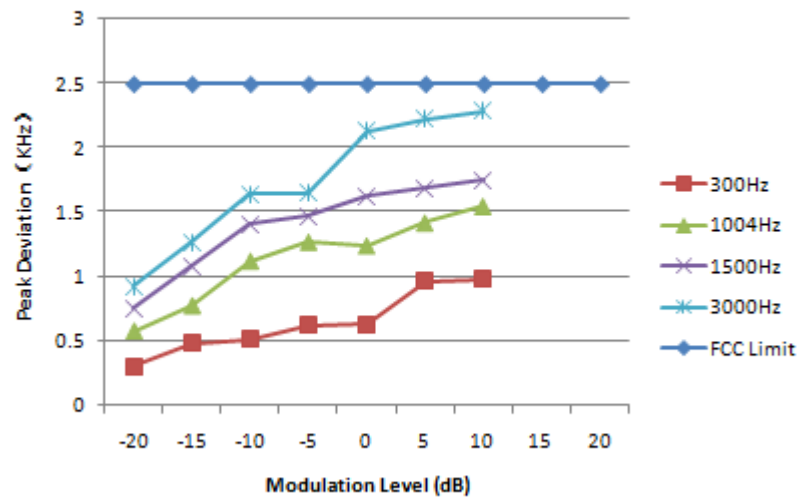
Modulation Limit:

12.5 KHz Channel Separations:462.5625MHz

Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 Hz(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 3000 Hz(KHz)
-20	0.31	0.42	0.57	0.65
-15	0.37	0.32	0.64	0.49
-10	0.30	0.57	0.75	0.92
-5	0.48	0.77	1.08	1.27
0	0.51	1.12	1.40	1.64
+5	0.62	1.27	1.47	1.65
+10	0.63	1.24	1.62	2.14
+15	0.97	1.42	1.68	2.22
+20	0.98	1.55	1.75	2.29



Modulation Limit for 12.5 KHz



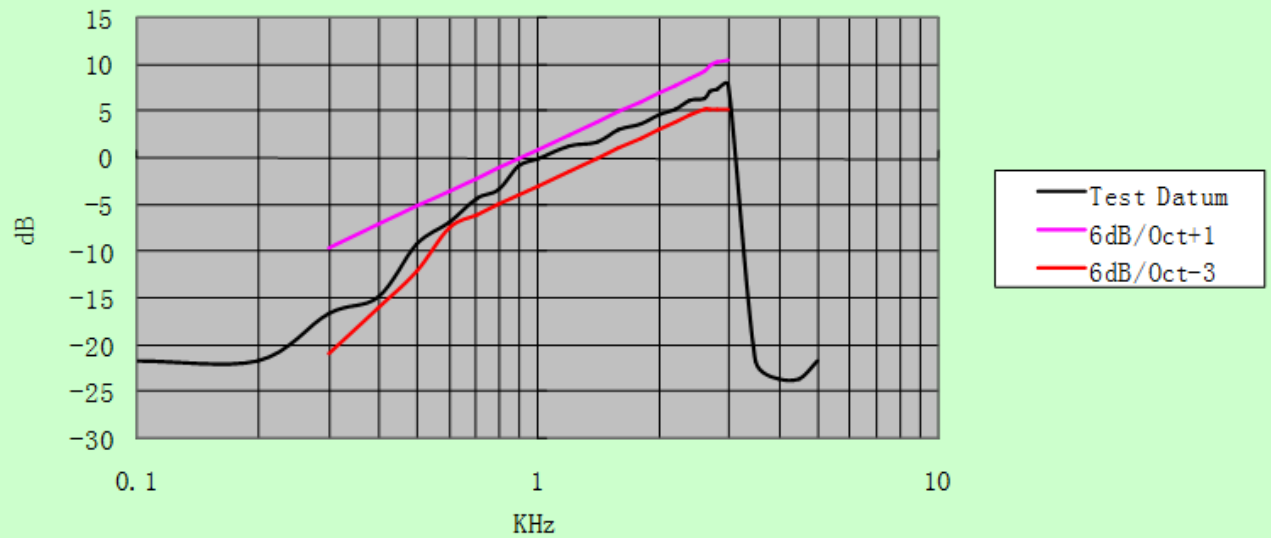
Audio Frequency Response:

12.5 KHz Channel Separation

Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.05	0.60	-21.58
0.2	0.05	0.60	-21.58
0.3	0.09	0.60	-16.48
0.4	0.11	0.60	-14.74
0.5	0.21	0.60	-9.12
0.6	0.27	0.60	-6.94
0.7	0.37	0.60	-4.20
0.8	0.41	0.60	-3.31
0.9	0.55	0.60	-0.76
1.0	0.60	0.60	0.00
1.2	0.70	0.60	1.34
1.4	0.73	0.60	1.70
1.6	0.85	0.60	3.03
1.8	0.91	0.60	3.62
2.0	1.03	0.60	4.69
2.2	1.10	0.60	5.26
2.4	1.22	0.60	6.16
2.6	1.25	0.60	6.38
2.7	1.38	0.60	7.23
2.8	1.42	0.60	7.48
3.0	1.50	0.60	7.96
3.5	0.05	0.60	-21.58
4.0	0.04	0.60	-23.52
4.5	0.04	0.60	-23.52
5.0	0.05	0.60	-21.58



Audio Frequency Response for 12.5KHz





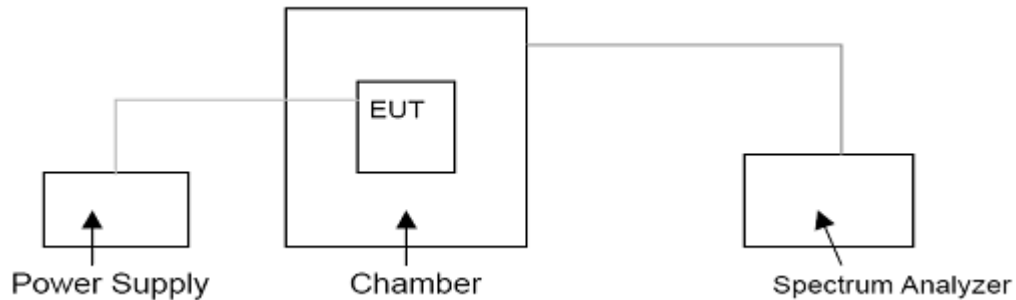
3.4 Frequency Stability

LIMITS

According to FCC 95.565

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

TEST CONFIGURATION



TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.



Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(°C)	462.5625	467.5625	462.7250		
6	-30	0.77	1.05	1.04	2.5	Pass
	-20	0.51	0.34	0.73		
	-10	0.50	0.74	0.99		
	0	0.77	0.42	0.39		
	10	1.06	1.10	0.42		
	20	0.63	0.44	0.43		
	30	0.30	0.57	0.76		
	40	0.25	0.52	0.78		
	50	0.23	0.47	0.89		
5.1 (85% Rated)	20	0.14	0.77	0.78	2.5	Pass
6.9(115% Rated)	20	0.37	0.43	0.39		

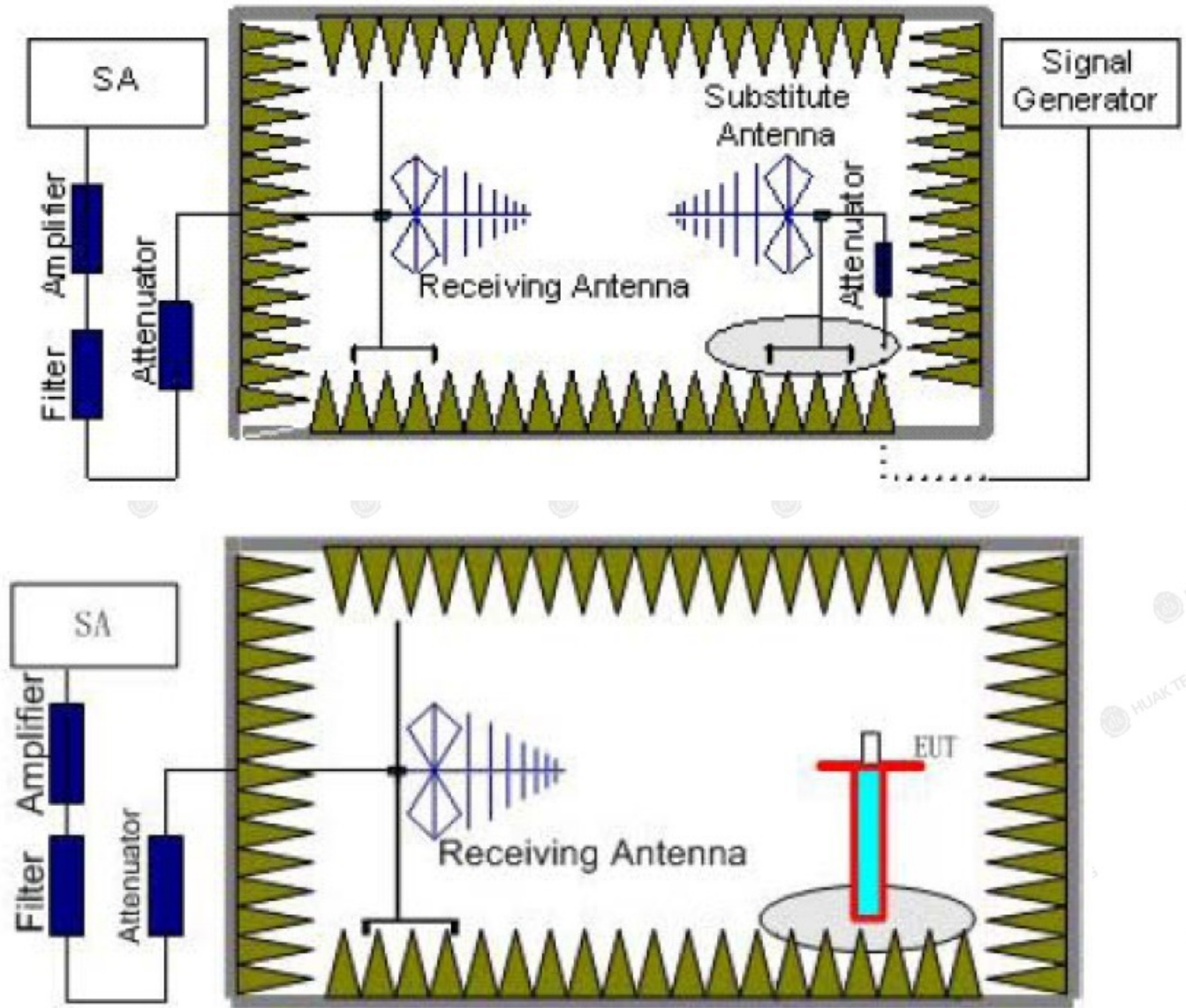


3.5 Transmitter Radiated Spurious Emission

Limit

According to FCC section 95.579, the unwanted emission should be attenuated below TP by at least $43+10 \log (\text{Transmit Power}) \text{ dB}$

TEST CONFIGURATION





- a. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all test transmit frequencies were measured with peak detector.
- b. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
- c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as (P_r).
- d. The EUT then replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization. The measurement results are obtained as described below:

$$\text{Power}_{(EIRP)} = P_{Mea} - P_{cl} + G_a$$

Where;

- P_{Mea} is the recorded signal generator level
 P_{cl} is the cable loss connect between instruments
 G_a Substitution Antenna Gain

- e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- f. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.
- g. Test site anechoic chamber refer to ANSI C63.



Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test Frequency (MHz)	Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	Distance (m)	G _a Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Pol.
462.5625	813.0	-34.78	3.54	3	12.87	-25.45	-13	12.45	V
	1219.5	-37.78	4.21	3	15.48	-26.51	-13	13.51	V
	1626.0	-44.96	4.52	3	17.32	-32.16	-13	19.16	V
	2023.5	-48.50	5.24	3	18.76	-34.98	-13	21.98	V
	--	--	--	--	--	--	--	--	--
467.5625	870.0	-35.81	3.54	3	12.87	-26.48	-13	13.48	V
	1305.0	-35.55	4.21	3	15.48	-24.28	-13	11.28	V
	1740.0	-41.32	4.52	3	17.32	-28.52	-13	15.52	V
	2175.0	-46.22	5.24	3	18.76	-32.7	-13	19.7	V
	--	--	--	--	--	--	--	--	--
462.7250	939.0	-34.36	3.54	3	12.87	-25.03	-13	12.03	V
	1408.5	-40.21	4.21	3	15.48	-28.94	-13	15.94	V
	1878.0	-44.23	4.52	3	17.32	-31.43	-13	18.43	V
	2347.5	-45.86	5.24	3	18.76	-32.34	-13	19.34	V
	--	--	--	--	--	--	--	--	--

Remark:

1. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
2. -- Means other points for values lower than limits and not recorded.
3. $Margin = Limit - EIRP$



3.6 Spurious Emission on Antenna Port

Limit

Please refer to FCC 47 CFR 2.1051, 2.1057, 95.579 for specification details.

Emissions shall be attenuated below the mean output power of the transmitter as follows:

- (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.

$43 + 10 \log (P_{\text{watts}})$

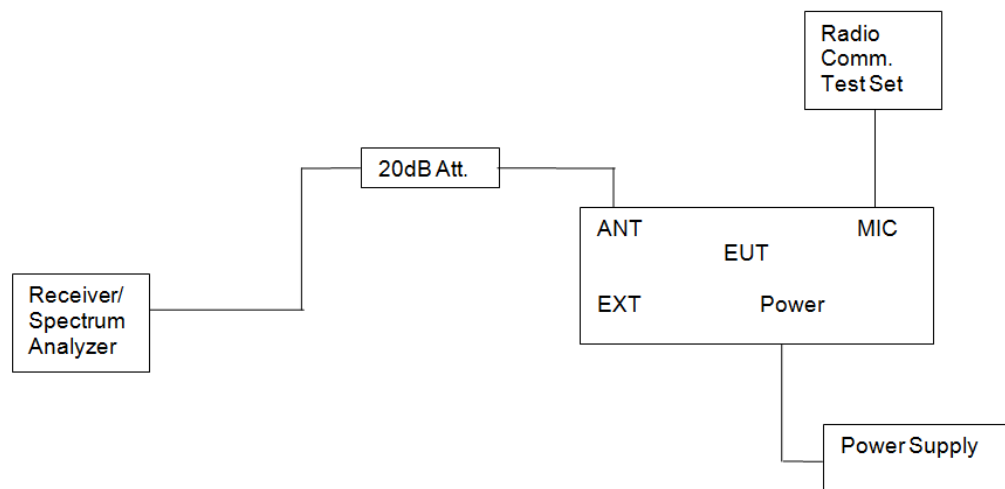
Calculation: Limit (dBm) = EL - $43 - 10 \log_{10} (TP)$

Notes: EL is the emission level of the Output Power expressed in dBm,

In this application, the EL is P (dBm).

Limit (dBm) = P (dBm) - $43 - 10 \log (P_{\text{watts}})$ = -13 dBm

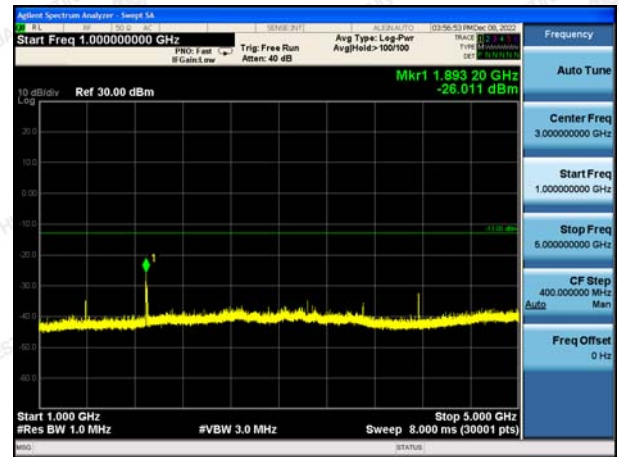
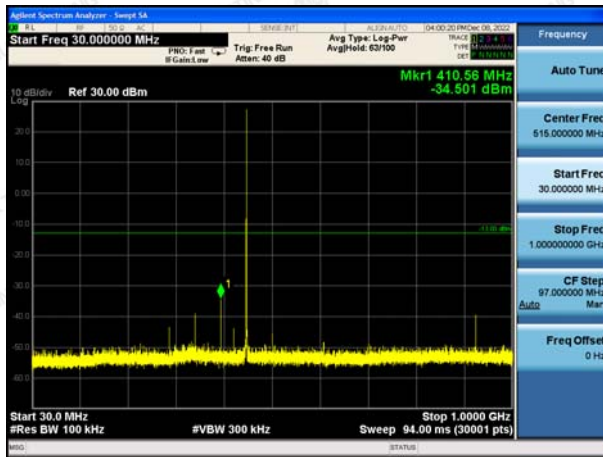
TEST CONFIGURATION



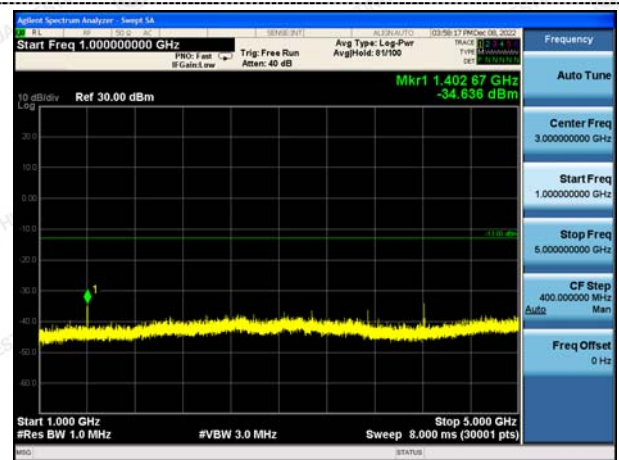
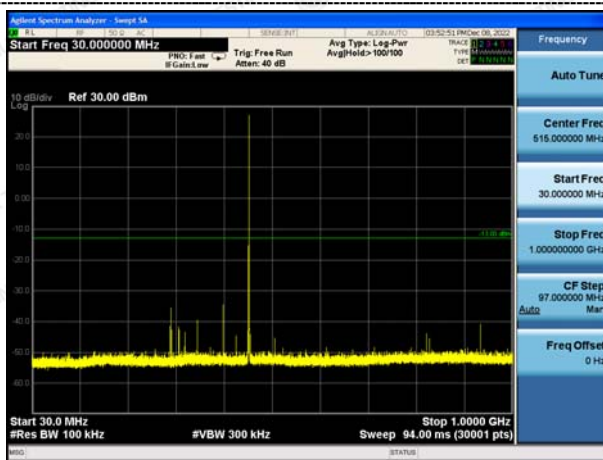
TEST PROCEDURE

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set to 10 kHz/1MHz. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz, while set RBW=1MHz, VBW=3MHz from the 1GHz to 10th Harmonic.

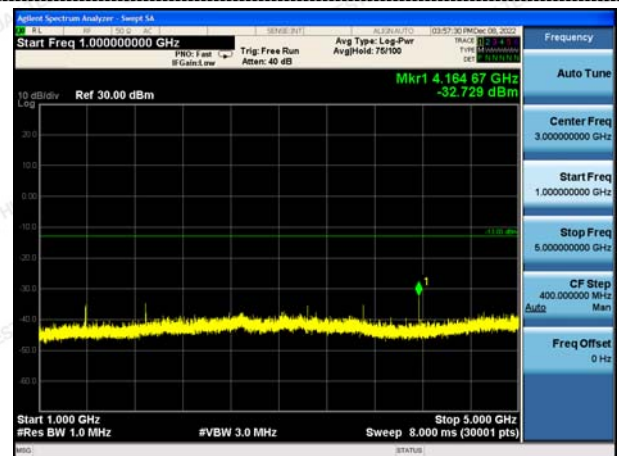
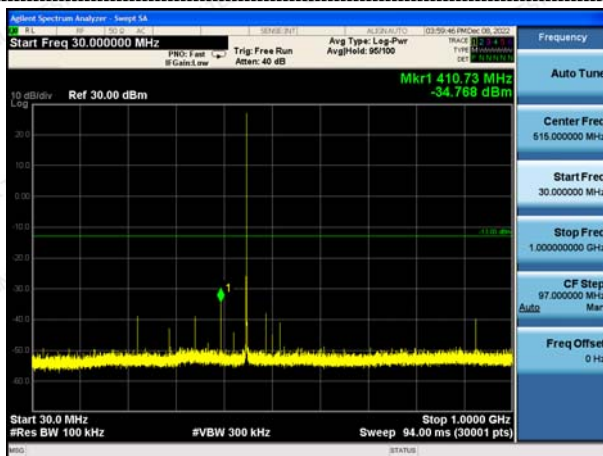
TEST RESULTS



CH1



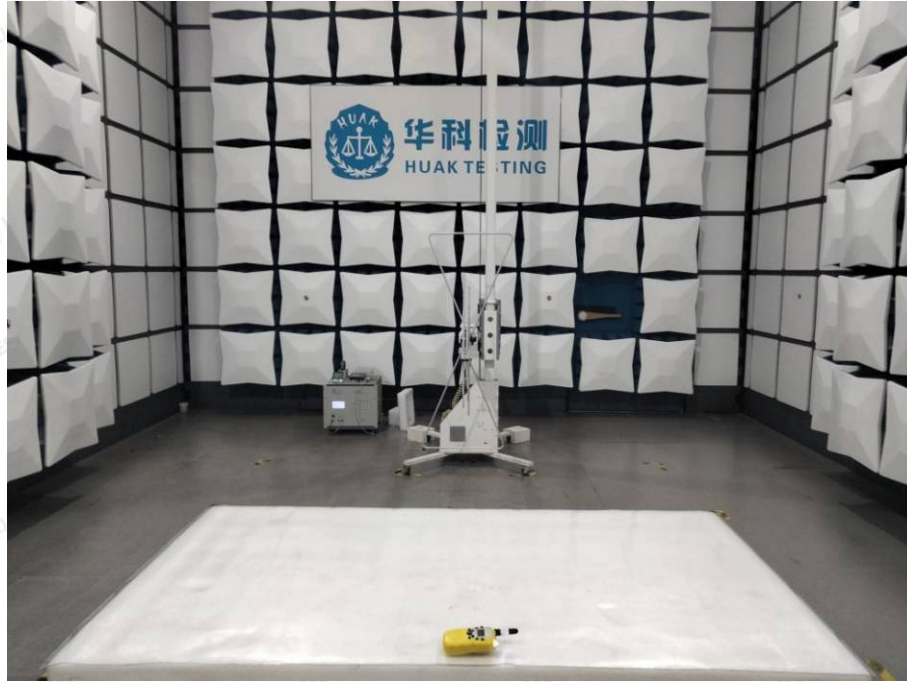
CH2



CH3



4 Test Setup Photos of the EUT



***** End of Report *****