Shenzhen Most Technology Service Co., Ltd.
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.

TEST REPORT

FCC Rules Part 15.236

Report Reference No..... :	**MTEB24110090-R1**
FCC ID..... :	**2BLXP-TK9400**
Compiled by (position+printed name+signature).. :	File administrators Alisa Luo
Supervised by (position+printed name+signature).. :	Test Engineer Sunny Deng
Approved by (position+printed name+signature).. :	Manager Yvette Zhou
Date of issue.....:	**Nov.08,2024**
Representative Laboratory Name. :	**Shenzhen Most Technology Service Co., Ltd.**
Address..... :	No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.
Applicant's name.....:	**TK PRODUCTS LLC**
Address..... :	4109 BLACK OAK DR, CLEBURNE, TX, 76031-0199
Test specification/ Standard.....**:**	**FCC Part15 Subpart C, Section 15.236**
TRF Originator.....:	Shenzhen Most Technology Service Co., Ltd.

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Test item description.....:	Portable Voice Amplifier
Trade Mark.....:	VoiceBooster
Model/Type reference..... :	TK 9400
Listed Models ..... :	MR2500, MR1505, MR1506, MR1700, MR2700, MR2200, MR2800, MRAK28, MRAK38
Modulation Type..... :	pi/4 DQPSK
Operation Frequency..... :	671MHz~687MHz
Hardware version :	MR2500_V6.5
Software version :	AC706N_soundbox_V1.0.0
Rating :	DC 9.5V by Adapter DC 7.4V by Battery
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Portable Voice Amplifier
Model /Type	:	TK 9400
Listed Models	:	MR2500, MR1505, MR1506, MR1700, MR2700, MR2200, MR2800, MRAK28, MRAK38
Remark		Only the product model name is different, the others are the same.
Applicant	:	TK PRODUCTS LLC
Address	:	4109 BLACK OAK DR, CLEBURNE, TX, 76031-0199
Manufacturer	:	TK PRODUCTS LLC
Address	:	4109 BLACK OAK DR, CLEBURNE, TX, 76031-0199

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. Revision History

Revision	Issue Date	Revisions	Revised By
00	2024.11.08	Initial Issue	Alisa Luo

2. TEST STANDARDS

The tests were performed according to following standards:

The tests were performed according to following standards:
FCC Rules Part 15.236: Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz.

RSS-210: Licence-Exempt Radio Apparatus: Category I Equipment
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

3. SUMMARY

3.1. General Remarks

Date of receipt of test sample	:	2024.10.20
Testing commenced on	:	2024.10.21
Testing concluded on	:	2024.11.08

3.2. Product Description

Product Name:	Portable Voice Amplifier
Model/Type reference:	TK 9400
Power Supply：	DC 9.5V by Adapter DC 7.4V by Battery
Testing sample ID：	MTYP07190
pi/4 DQPSK:	
Modulation:	pi/4 DQPSK
Operation frequency:	671MHz~687MHz
Channel number:	17
Declared BW:	100KHz
Channel Spacing:	1MHz
Antenna type:	metal Antenna
Antenna gain:	1dBi

3.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 9.5V by Adapter
DC 7.4V by Battery

3.4. Short description of the Equipment under Test (EUT)

This is a Portable Voice Amplifier For more details, refer to the user's manual of the EUT.

3.5. EUT operation mode

671-687MHz

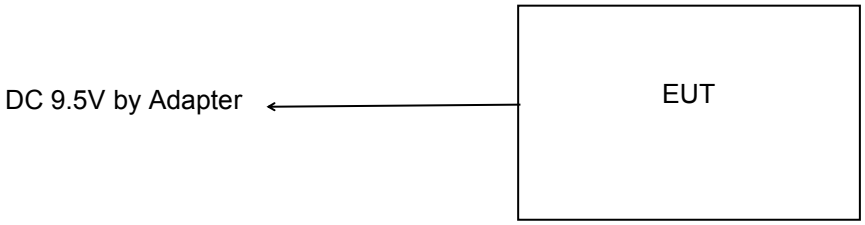
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	671MHz	2	672MHz	3	673MHz	4	674MHz
5	675MHz	6	676MHz	7	677MHz	8	678MHz
9	679MHz	10	680MHz	11	681MHz	12	682MHz
13	683MHz	14	684MHz	15	685MHz	16	686MHz
17	687MHz						

Note:

Remark:The information in this section is provided by the applicant or manufacturer, MOST is not liable to the accuracy, suitability, reliability or/and integrity of the information.

Channel	Frequency
The Lowest channel	671MHz
The Middle channel	679MHz
The Highest channel	687MHz

3.6. Block Diagram of Test Setup



3.7. Test Item (Equipment Under Test) Description*

Short designation	EUT Name	EUT Description	Serial number	Hardware status	Software status
EUT A	Adapter	AK-006	/	/	/
EUT B	/	/	/	/	/

3.8. Auxiliary Equipment (AE) Description

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	/	/	/	/
AE 2	/	/	/	/

3.9. Antenna Information*

Short designation	Antenna Name	Antenna Type	Frequency Range	Serial number	Antenna Peak Gain
Antenna 1	---	metal Antenna	670MHz~679.5MHz	---	1dBi
Antenna 2	/	/	/	/	/

*: declared by the applicant.

3.10. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - Supplied by the lab

●	ADAPTER	M/N:	AK-006
		Manufacturer:	/

3.11. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Shenzhen Most Technology Service Co., Ltd.

No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China. The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

Test Facility

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

FCC-Registration No.: 0031192610

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

A2LA-Lab Cert. No.: 6343.01

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

4.2. Environmental conditions

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

4.3. Test Description

FCC and IC Requirements		
FCC Part 15.207(a)	AC Power Line Conducted Emission	PASS
FCC Part 15.236(d)	Maximum Conducted Output Power	PASS
FCC Part 15.236(g)	Occupied Bandwidth	PASS
FCC Part 15.236(f)	Frequency Stability	PASS
FCC Part 15.236(g)/EN 300 422-1 V1.4.2	Transmitter unwanted emissions (radiated or conducted)	PASS
FCC Part 15.236(g)/EN 300 422-1 V1.4.2	Necessary bandwidth (BN) for analogue systems	PASS

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

4.4. 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 Most Technology Service 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 Most Technology Service Co., Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

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

4.5. Equipments Used during the Test

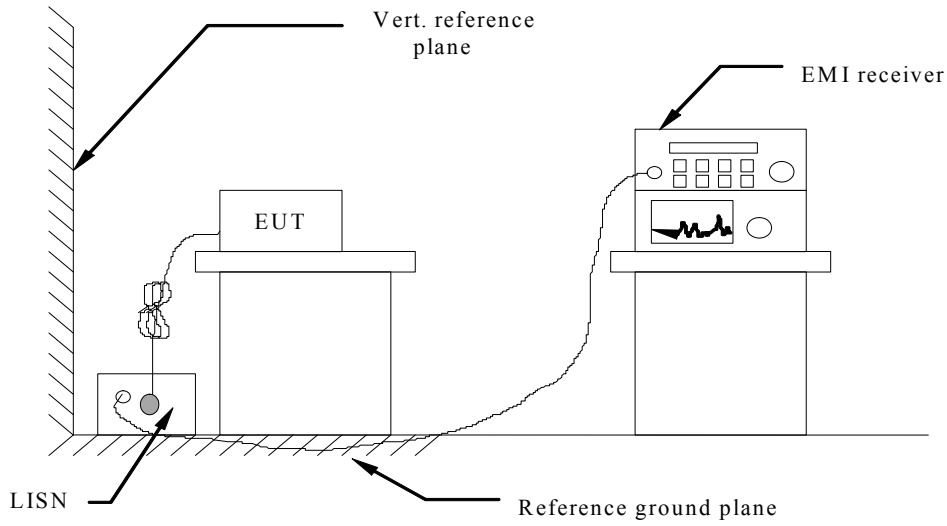
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware versions	Last Cal.
1.	L.I.S.N.	R&S	ENV216	100093	/	2024/03/15
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	/	2024/03/15
3.	Receiver	R&S	ESCI	100492	V3.0-10-2	2024/03/15
4	Receiver	R&S	ESPI	101202	V3.0-10-2	2024/03/15
5	Spectrum analyzer	Agilent	9020A	MT-E306	A14.16	2024/03/15
6	Bilong Antenna	Sunol Sciences	JB3	A121206	/	2024/08/15
7	Horn antenna	HF Antenna	HF Antenna	MT-E158	/	2024/03/15
8	Loop antenna	Beijing Daze	ZN30900B	/	/	2024/03/15
9	Horn antenna	R&S	OBH100400	26999002	/	2024/03/15
10	Wireless Communication Test Set	R&S	CMW500	/	CMW-BASE-3.7.21	2024/03/15
11	Spectrum analyzer	R&S	FSP	100019	V4.40 SP2	2024/03/15
12	High gain antenna	Schwarzbeck	LB-180400KF	MT-E389	/	2024/03/15
13	Preamplifier	Schwarzbeck	BBV 9743	MT-E390	/	2024/03/15
14	Pre-amplifier	EMCI	EMC051845SE	MT-E391	/	2024/03/15
15	Pre-amplifier	Agilent	83051A	MT-E392	/	2024/03/15
16	High pass filter unit	Tonscend	JS0806-F	MT-E393	/	2024/03/15
17	RF Cable(below1GHz)	Times	9kHz-1GHz	MT-E394	/	2024/03/15
18	RF Cable(above 1GHz)	Times	1-40G	MT-E395	/	2024/03/15
19	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	/	2024/03/15
20	Power meter	R&S	NRVS	100444	/	2024/03/15

Note: 1. The Cal.Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC9.5V power, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

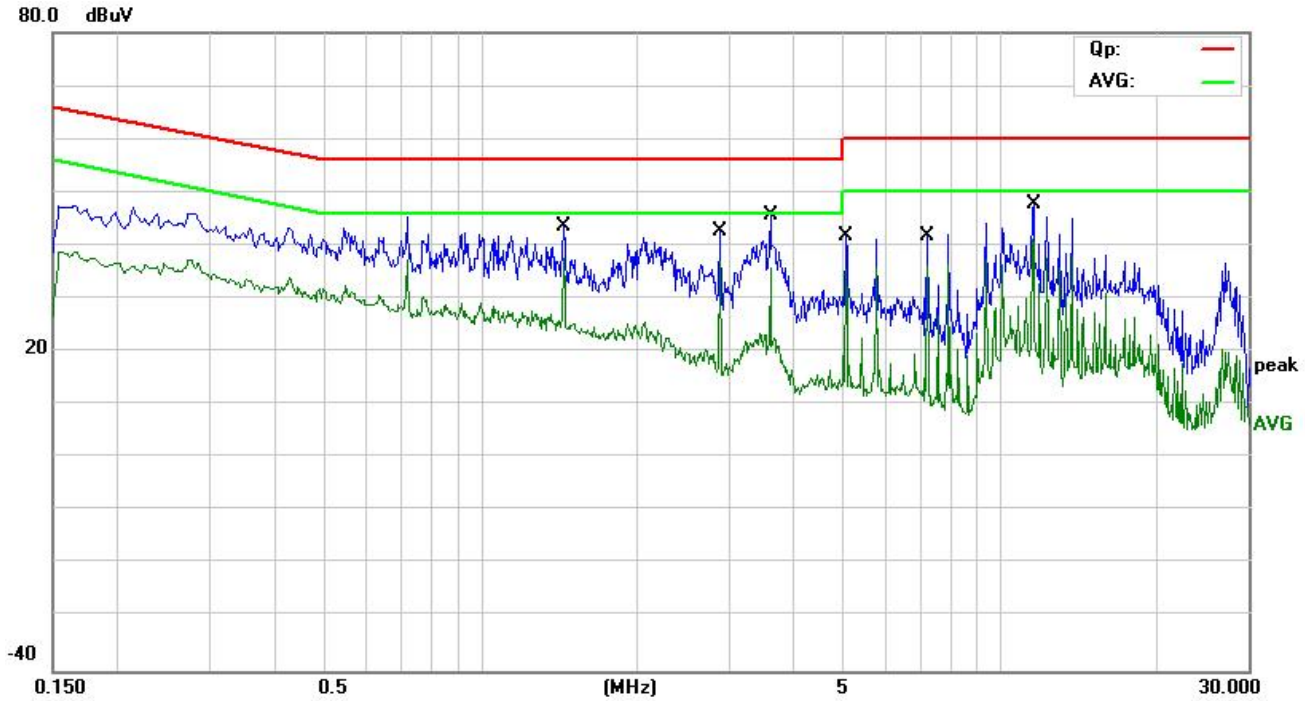
AC Power Conducted Emission Limit

For unintentional device, according to RSS Gen 8.8 and § 15.207(a) Line Conducted Emission Limits is as following:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

TEST RESULTS

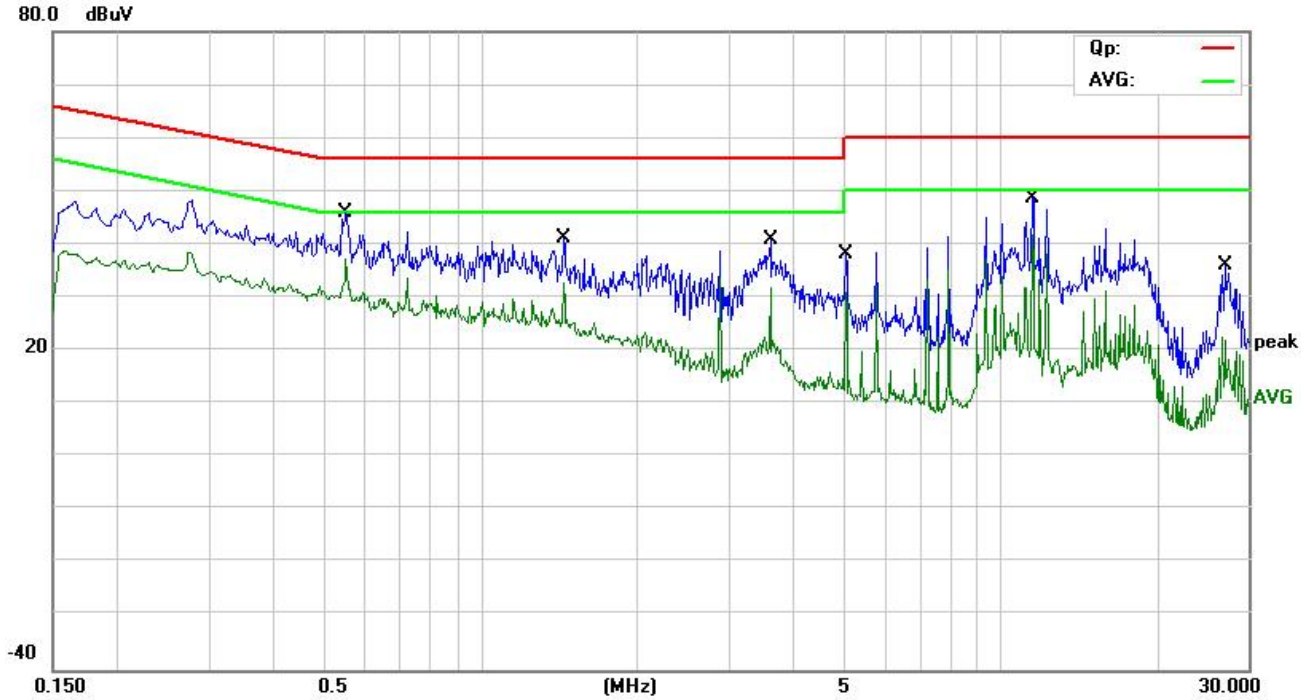
Power supply:	DC 9.5V by Adapter	Polarization	L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		1.4460	33.89	9.60	43.49	56.00	-12.51	QP	
2	*	1.4460	27.91	9.60	37.51	46.00	-8.49	AVG	
3		2.8900	33.02	9.61	42.63	56.00	-13.37	QP	
4		2.8900	27.43	9.61	37.04	46.00	-8.96	AVG	
5		3.6180	36.06	9.62	45.68	56.00	-10.32	QP	
6		3.6180	26.19	9.62	35.81	46.00	-10.19	AVG	
7		5.0580	32.10	9.63	41.73	60.00	-18.27	QP	
8		5.0580	25.69	9.63	35.32	50.00	-14.68	AVG	
9		7.2220	32.19	9.65	41.84	60.00	-18.16	QP	
10		7.2220	26.46	9.65	36.11	50.00	-13.89	AVG	
11		11.5580	31.54	9.69	41.23	50.00	-8.77	AVG	
12		11.5620	37.96	9.69	47.65	60.00	-12.35	QP	

*:Maximum data x:Over limit !:over margin

Power supply:	DC 9.5V by Adapter	Polarization	N



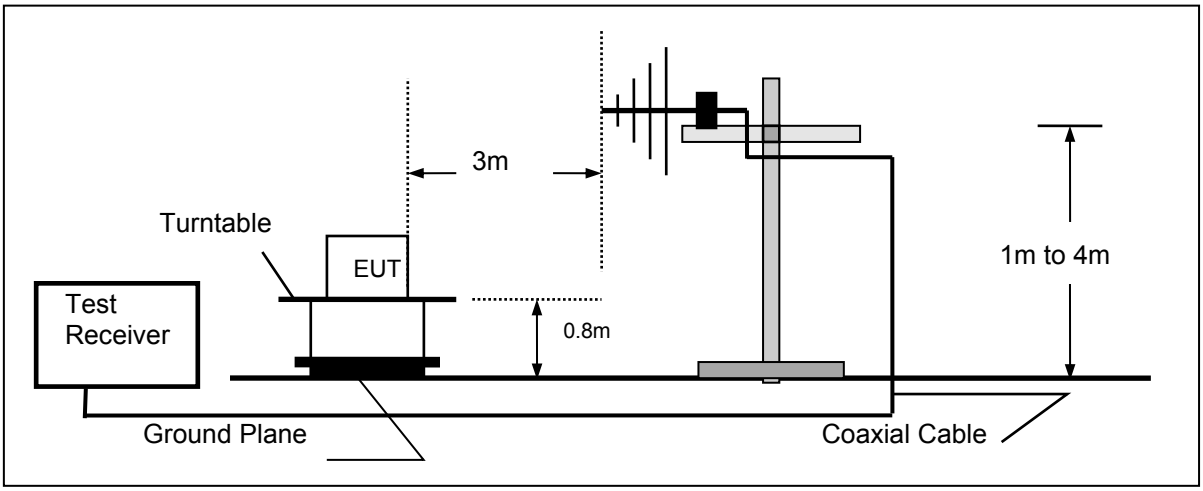
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.5500	36.29	9.59	45.88	56.00	-10.12	QP	
2		0.5500	27.60	9.59	37.19	46.00	-8.81	AVG	
3		1.4460	31.51	9.60	41.11	56.00	-14.89	QP	
4		1.4460	23.27	9.60	32.87	46.00	-13.13	AVG	
5		3.6140	31.22	9.62	40.84	56.00	-15.16	QP	
6		3.6140	22.35	9.62	31.97	46.00	-14.03	AVG	
7		5.0580	28.59	9.63	38.22	60.00	-21.78	QP	
8		5.0580	21.39	9.63	31.02	50.00	-18.98	AVG	
9		11.5580	38.82	9.69	48.51	60.00	-11.49	QP	
10	*	11.5580	32.03	9.69	41.72	50.00	-8.28	AVG	
11		26.7220	12.64	9.76	22.40	50.00	-27.60	AVG	
12		27.0940	26.44	9.76	36.20	60.00	-23.80	QP	

*:Maximum data x:Over limit !:over margin

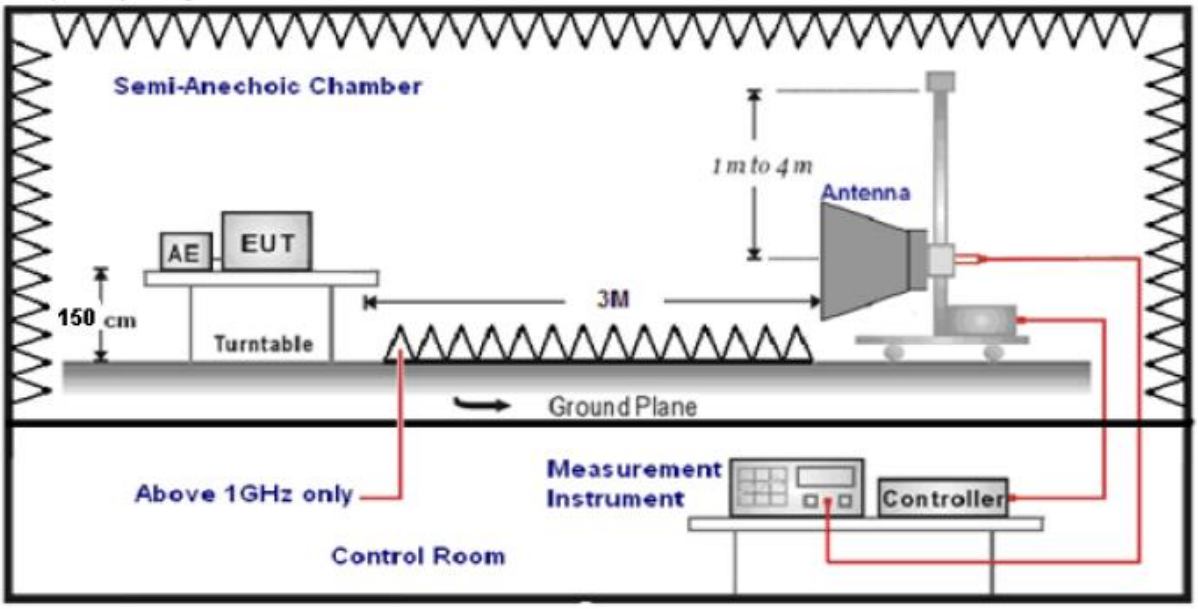
5.2. Radiated Spurious Emissions

TEST CONFIGURATION

Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



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 than 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.

RADIATION LIMIT

Limit:

Frequency range	**Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)**	**Bandwidth**
25 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87,5 MHz	-36dBm	100 kHz
87,5 MHz to 137 MHz	-54dBm	100 kHz
137 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 862 MHz	-54dBm	100 kHz
862 MHz to 1 GHz	-36dBm	100 kHz
Above 1GHz	-30dBm	1MHz

Test Results

Radiated Spurious Emissions

671MHz

Maximum Frequency	Spurious Emission position and Level		Limit	Over Limit
MHz	Polarity	dBm	dBm	dB
50.057	V	-57.61	-54	-21.61
106.013	V	-79.89	-54	-43.89
148.963	V	-84.33	-36	-48.33
236.645	V	-82.41	-36	-46.41
607.787	V	-79.72	-54	-43.72
912.862	V	-68.3	-36	-32.3
1324.34	V	-56.8	-30	-26.8
5199.96	V	-50.71	-30	-20.71
8433.35	V	-42.46	-30	-12.46
48.332	H	-79.96	-54	-43.96
104.17	H	-85.17	-54	-31.17
168.414	H	-81.92	-36	-45.92
251.18	H	-78.51	-36	-42.51
511.835	H	-64.93	-54	-28.93
912.862	H	-56.18	-36	-26.18
1297.18	H	-50.04	-30	-20.04
5382.7	H	-41.78	-30	-11.78
9494.19	H	-79.89	-30	-43.89

679MHz

Maximum Frequency	Spurious Emission position and Level		Limit	Over Limit
MHz	Polarity	dBm	dBm	dB
37.129	V	-55.69	-36	-19.69
49.885	V	-73.69	-54	-19.69
65.621	V	-70.12	-54	-16.12
97.754	V	-70.26	-54	-16.26
198.872	V	-82.98	-54	-28.98
550.263	V	-76.98	-54	-22.98
1288.25	V	-54.24	-30	-24.24
3664.38	V	-47.26	-30	-17.26
9571.94	V	-42.06	-30	-22.06
45.445	H	-70.94	-36	-16.94
98.157	H	-83.12	-54	-29.12
158.329	H	-77.98	-54	-41.98
303.177	H	-75.48	-36	-39.48
867.329	H	-72.4	-36	-18.4
942.131	H	-64.89	-36	-28.89
1282.33	H	-54.8	-30	-24.8
5466.84	H	-46.83	-30	-16.83
9440.61	H	-41.95	-30	-11.95

697MHz

Maximum Frequency	Spurious Emission position and Level		Limit	Over Limit
MHz	Polarity	dBm	dBm	dB
38.129	V	-53.28	-36	-17.28
49.985	V	-71.23	-54	-17.23
65.321	V	-69.12	-54	-15.12
97.654	V	-68.24	-54	-14.24
198.872	V	-80.62	-54	-26.62
550.263	V	-75.78	-54	-21.78
1330.241	V	-52.68	-30	-22.68
5460.289	V	-47.12	-30	-17.12
9264.231	V	-42.64	-30	-12.64
38.654	H	-54.96	-36	-18.96
48.965	H	-67.68	-54	-13.68
63.267	H	-74.67	-54	-20.67
98.658	H	-76.89	-54	-22.89
543.265	H	-73.12	-54	-19.32
690.245	H	-72.36	-54	-18.36
1330.278	H	-50.21	-30	-20.21
5456.289	H	-44.16	-30	-14.16
9270.612	H	-42.52	-30	-12.52

5.3. Transmitter output power

TEST CONFIGURATION

TEST PROCEDURE

a) The output of the EUT was connected to an RF average power meter through fixed attenuation.
b) The EUT was set to transmit on the low, middle, and high frequencies in each power level.
c) Measure the average power of the transmitter. This EUT's duty cycle is 100%.

TEST RESULTS

Frequency [MHz]	Conducted output power [dBm]	Antenna gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
671	-10.164	1	-9.164	13.00	pass
679	-9.653	1	-8.653	13.00	pass
687	-8.672	1	-7.672	13.00	pass

1.EIRP=Conducted output power+Antenna gain;
2.ERP=EIRP-2.15;

5.4. Occupied bandwidth

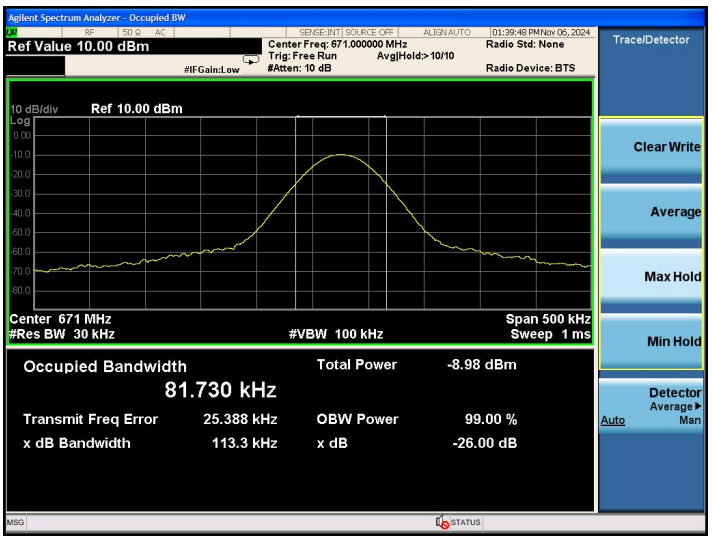
TEST CONFIGURATION

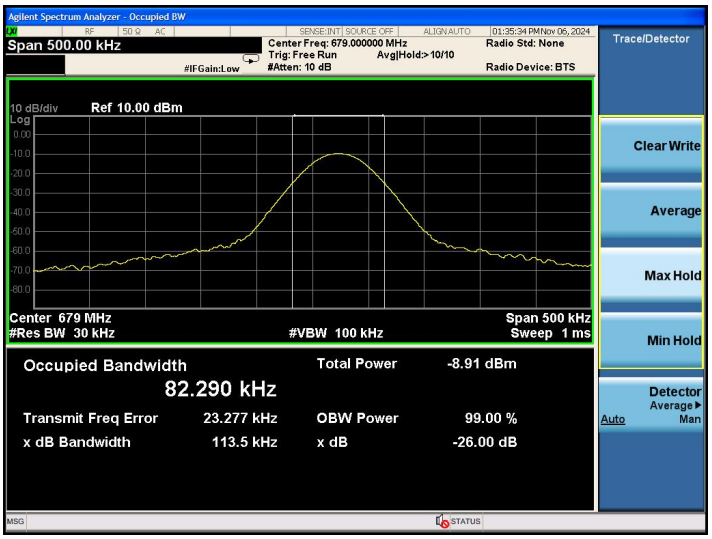
TEST PROCEDURE

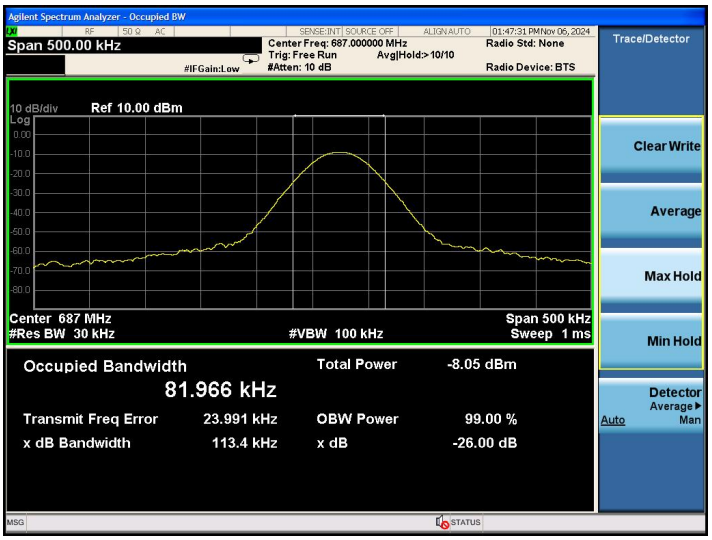
a) The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b) Set RBW⩾1% to 5% of the OBW.
c) VBW = Approximately three times RBW.
d) Detector = Peak.
e) Trace mode = Max hold.
f) Sweep = Auto couple.
g) Allow the trace to stabilize.
h) Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

TEST RESULTS

Frequency [MHz]	99% Occupied Bandwidth [kHz]	Limit [kHz]	Verdict
671	81.730	200	PASS
679	82.290	200	PASS
687	81.966	200	PASS

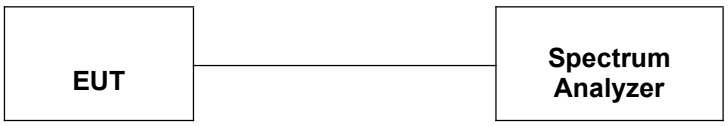



Agilent Spectrum Analyzer - Occupied BW
01:35:34 PM Nov 05, 2024
Span 500.00 kHz
Center Freq: 679.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Trace/Detector
10 dB/div
Ref 10.00 dBm
Log
Clear Write
Average
Max Hold
Min Hold
Center 679 MHz
#Res BW 30 kHz
#VBW 100 kHz
Span 500 kHz
Sweep 1 ms
Occupied Bandwidth
82.290 kHz
Total Power -8.91 dBm
Transmit Freq Error 23.277 kHz
OBW Power 99.00 %
x dB Bandwidth 113.5 kHz
x dB -26.00 dB
Detector
Auto
Man
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
01:47:31 PM Nov 05, 2024
Span 500.00 kHz
Center Freq: 687.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Trace/Detector
10 dB/div
Ref 10.00 dBm
Log
Clear Write
Average
Max Hold
Min Hold
Center 687 MHz
#Res BW 30 kHz
#VBW 100 kHz
Span 500 kHz
Sweep 1 ms
Occupied Bandwidth
81.966 kHz
Total Power -8.05 dBm
Transmit Freq Error 23.991 kHz
OBW Power 99.00 %
x dB Bandwidth 113.4 kHz
x dB -26.00 dB
Detector
Auto
Man
MSG
STATUS

5.5. Frequency Stability

TEST CONFIGURATION



TEST PROCEDURE

The frequency tolerance of the carrier signal shall be maintained within ±0.005% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage,and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Battery operated equipment shall be tested using a new battery.

TEST RESULTS

Assigned Frequency: 671MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
120	-30	671.00032	0.48	±50	Pass
	-20	671.00031	0.47		
	-10	671.00048	0.72		
	0	671.00045	0.67		
	10	671.00021	0.31		
	20	671.00043	0.64		
	30	671.00012	0.18		
	40	671.00025	0.37		
	50	671.00048	0.72		
102	25	671.00024	0.36		
138	25	671.00033	0.49		

Assigned Frequency: 679MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
120	-30	679.00018	0.26	±50	Pass
	-20	679.00040	0.60		
	-10	679.00020	0.30		
	0	679.00020	0.30		
	10	679.00045	0.67		
	20	679.00043	0.64		
	30	679.00029	0.43		
	40	679.00045	0.66		
	50	679.00041	0.60		
102	25	679.00035	0.53		
138	25	679.00019	0.28		

AssignedFrequency: 687MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
120	-30	687.00018	0.26	±50	Pass
	-20	687.00040	0.60		
	-10	687.00020	0.30		
	0	687.00020	0.30		
	10	687.00045	0.67		
	20	687.00043	0.64		
	30	687.00029	0.43		
	40	687.00045	0.66		
	50	687.00041	0.60		
102	25	687.00035	0.53		
138	25	687.00019	0.28		

5.6. Necessary bandwidth (BN) for analogue systems

TEST CONFIGURATION

TEST PROCEDURE

The EUT was powered up and the transmit frequency & power output of the EUT were selected.
The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.
According to EN 300 422-1 V1.4.2 clause 8.3.2.2, the transmitter output
spectrum shall be within the mask defined as below figure.

8.3.2.2 Limits

The transmitter output spectrum shall be within the mask defined in figure 4. This mask may also be used for analogue.

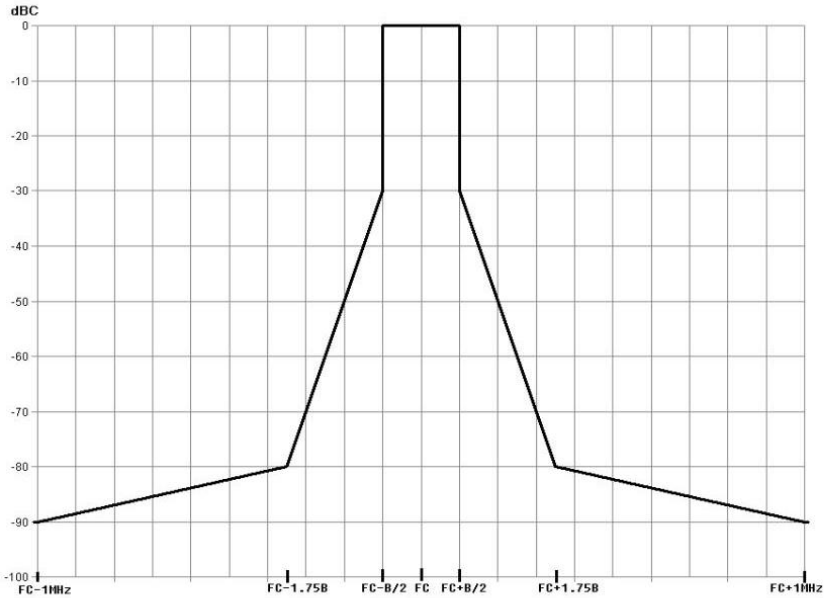
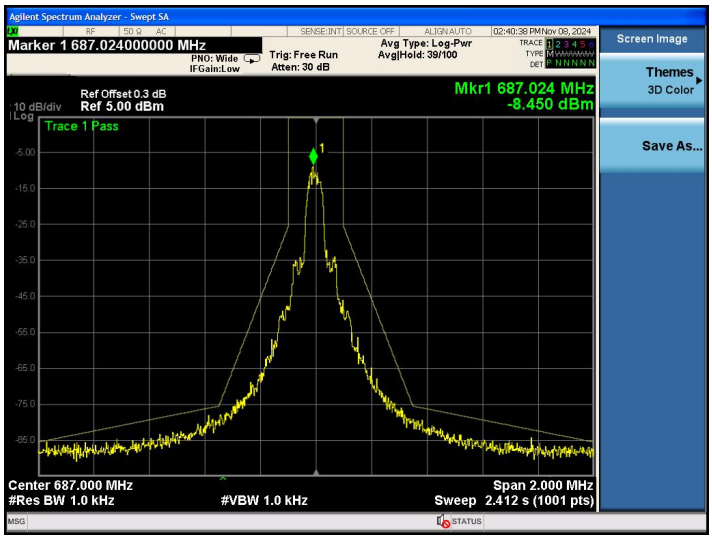
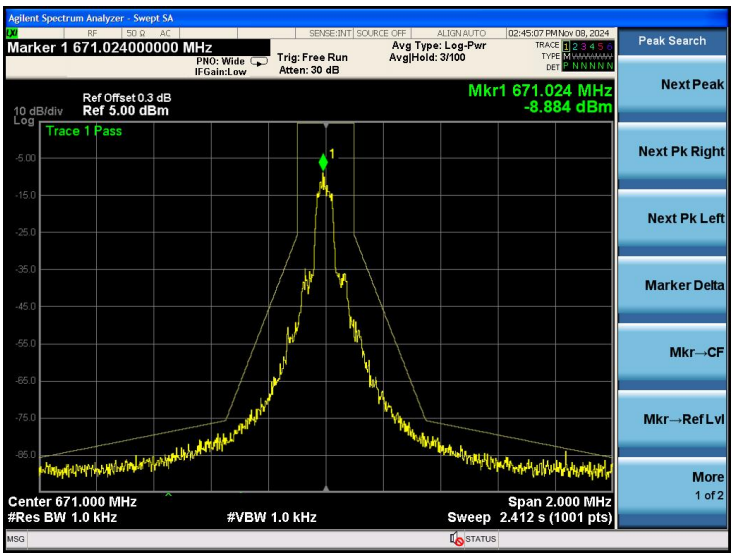


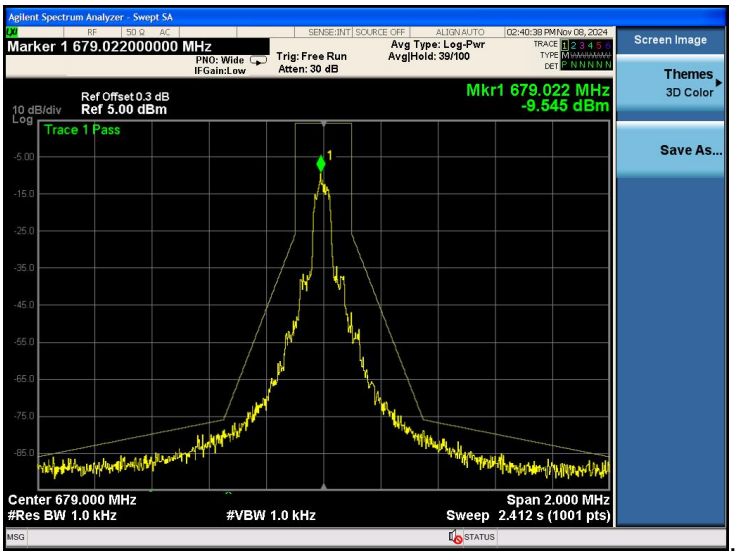
Figure 4: Spectrum mask for digital systems below 1 GHz

For the measurement uncertainty, see clause 10. The -90 dBc point shall be ±1 MHz from fc measured with an average detector.

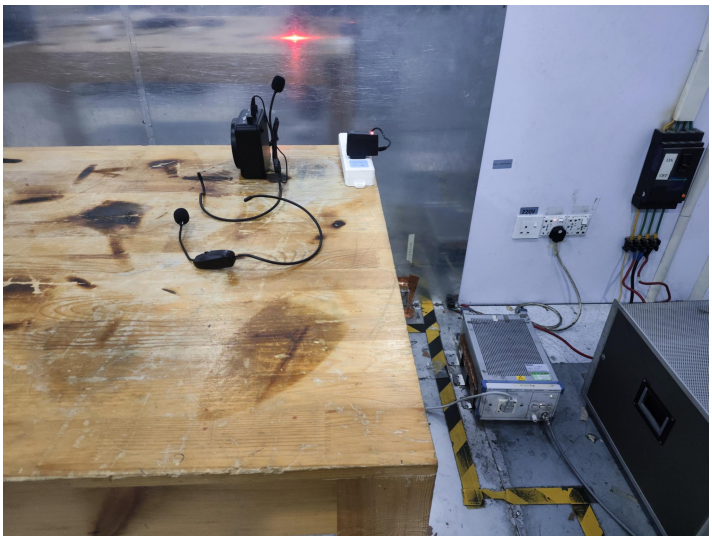
TEST RESULTS

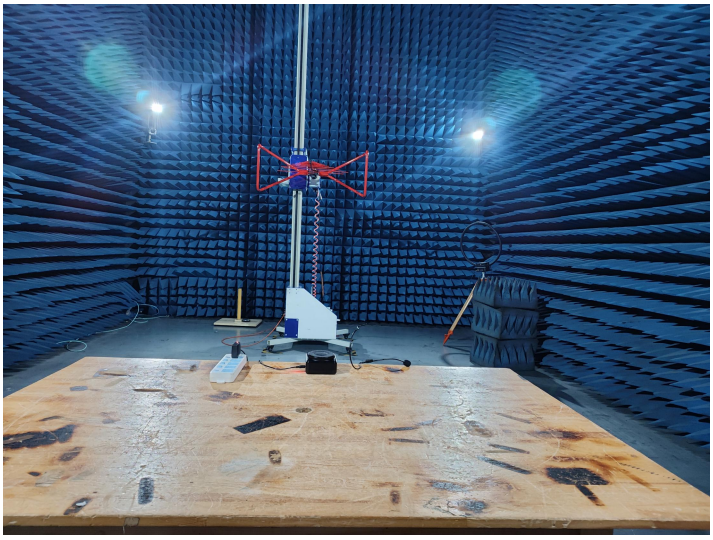

Agilent Spectrum Analyzer - Swept SA
Marker 1 687.024000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 39/100
02:40:38 PM Nov 08, 2024
Ref Offset 0.3 dB
10 dB/div Ref 5.00 dBm
Log
Trace 1 Pass
Mkr1 687.024 MHz
-8.450 dBm
Screen Image
Themes
3D Color
Save As...
Center 687.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
Sweep 2.412 s (1001 pts)

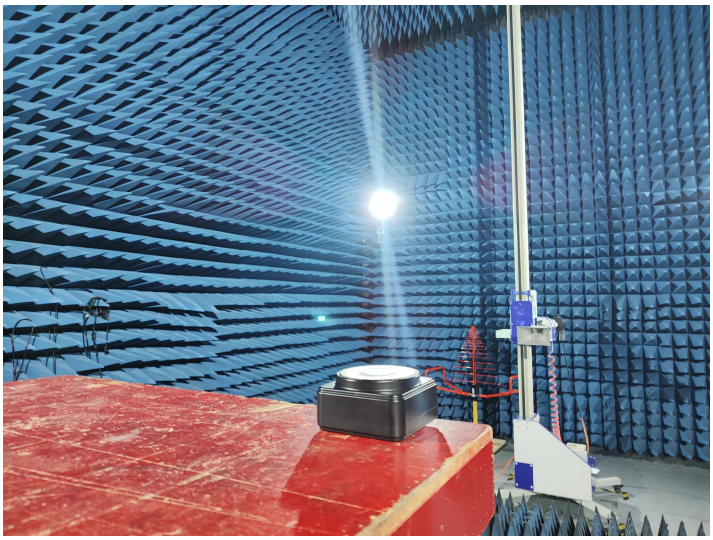

Agilent Spectrum Analyzer - Swept SA
Marker 1 671.024000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 3/100
02:45:07 PM Nov 08, 2024
Ref Offset 0.3 dB
10 dB/div Ref 5.00 dBm
Log
Trace 1 Pass
Mkr1 671.024 MHz
-8.884 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Center 671.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
Sweep 2.412 s (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Marker 1 679.022000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 39/100
02:40:38 PM Nov 08, 2024
Ref Offset 0.3 dB
10 dB/div Ref 5.00 dBm
Log
Trace 1 Pass
Mkr1 679.022 MHz
-9.545 dBm
Screen Image
Themes
3D Color
Save As...
Center 679.000 MHz
#Res BW 1.0 kHz
#VBW 1.0 kHz
Span 2.000 MHz
Sweep 2.412 s (1001 pts)

6. Test Setup Photos of the EUT







7. External and Internal Photos of the EUT

See related photo report.

.....End of Report.....