FCC Test Report

Report No.: AGC01039170611FE08

FCC ID	:	PODTYT-A5
TYPE OF AUTHORIZATION	:	Certification
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Analog Transceiver
BRAND NAME	:	TYT
MODEL NAME	:	TYT-A5, TYT-A2, TYT-A4, TYT-A6, TYT-A18, TYT-A28
CLIENT	:	TYT ELECTRONICS CO., LTD
DATE OF ISSUE	:	Jul.07, 2017
STANDARD(S)	:	FCC Part 15 Rules
REPORT VERSION	:	V 1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul.07, 2017	Valid	Original Report

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1. VERIFICATION OF COMPLIANCE

Applicant	TYT ELECTRONICS CO., LTD
Address	Block 39-1,Optoelectronics-information industry base,Nan'an,Quanzhou,Fujian,China
Manufacturer	TYT ELECTRONICS CO., LTD
Address	Block 39-1,Optoelectronics-information industry base,Nan'an,Quanzhou,Fujian,China
Product Designation	Analog Transceiver
Brand name	TYT
Test Model	TYT-A5
Serial Model	TYT-A2, TYT-A4, TYT-A6, TYT-A18, TYT-A28
Serial Model Difference	All the same except for the model name and appearance.
Hardware Version	TY-A18
Software Version	V1.16
Measurement Procedure	ANSI C63.4: 2014
Date of test:	Jul.05, 2017 to Jul.07, 2017
Deviation:	None
Condition of Test Sample	Normal

The above equipment was tested by Attestation Of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by Steven Zhou

Steven Zhou(Zhou Pengyun) Jul.07, 2017

Reviewed by Bart Xie

Bart Xie(Xie Xiaobin) Jul.07, 2017

Approved by Solger Zhang

Solger Zhang(Zhang Hongyi)
Authorized Officer Jul.07, 2017

2. PRODUCT INFORMATION

The EUT is a Analogl Transceiver designed for voice communication. It is designed by way of utilizing the FM modulation achieves the system operating.
A major technical description of EUT is described as following:

Communication Type	Voice / Tone only
Modulation	FM
RX Frequency Range	400MHz -480MHz
Emission Type	F3E
Antenna Designation	Detachable
Antenna Gain	1.5dBi
Power Supply	DC 7.4V 1300mAh
Charger Parameter	INPUT:AC 110-220V~ 50/60Hz ,0.3A OUTPUT:DC 5V , 0.3A

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	**Q'TY**	**Cable**	**Tested with**
DC Input Port	1	0.8m, Unshielded	1
Antenna Connect Port	1	0	1

3. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D, Baoding Technology Park,Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
Description	The test site is constructed and calibrated to meet the FCC requirements in documents TIA/EIA 603
FCC Registration No.	371540

List Of Test Equipment:

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 2, 2017	July 1, 2018
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 2, 2017	July 1, 2018
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 2, 2017	July 1, 2018
RF Cable	SCHWARZBECK	AK9515E	96221	July 2, 2017	July 1, 2018
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 2, 2017	June 1, 2018
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 2, 2017	June 1, 2018
Spectrum analyzer	Agilent	E4407B	MY46185649	June 2, 2017	June 1, 2018
Power Sensor	Agilent	U2021XA	MY55050474	June 2, 2017	June 1, 2018
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	June 2, 2017	June 1, 2018
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 2, 2017	June 1, 2018

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	June 2, 2017	June 1, 2018
Artificial Mains Network	Narda	L2-16B	000WX31025	June 2, 2017	June 1, 2018
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	June 2, 2017	June 1, 2018
RF Cable	SCHWARZBECK	AK9515E	96222	June 2, 2017	June 1, 2018
Shielded Room	CHENGYU	843	PTS-002	June 2, 2017	June 1, 2018

4. SUPPORT EQUIPMENT LIST

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
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5. SYSTEM DESCRIPTION

EUT test procedure:

1. Connect EUT and peripheral devices.
2. Power on the EUT, the EUT begins to work.
3. Running data transmission and make sure the EUT normal working.

EMC TEST MODES

No.	TEST MODES
1	Scanning mode + Receiving mode

Note: Only the result of the worst case was recorded in the report.

6. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.107	Conduction Emission	Compliant
§15.109	Radiated Emission	Compliant
§15.111	Antenna Conducted Power for receivers	Compliant

7. FCC RADIATED EMISSION TEST

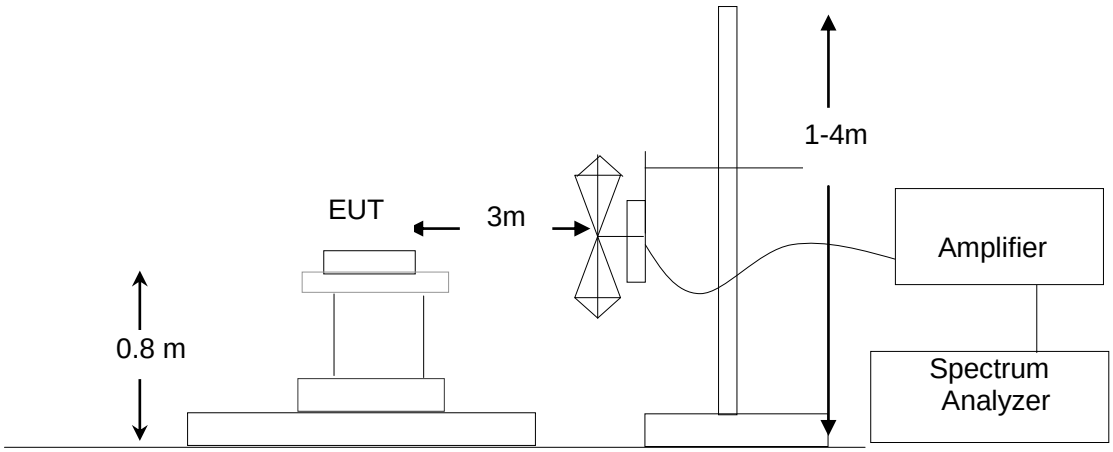
7.1. TEST EQUIPMENT OF RADIATED EMISSION

7.2. LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

**Note: The lower limit shall apply at the transition frequency.

7.3 BLOCK DIAGRAM OF RADIATED EMISSION TEST



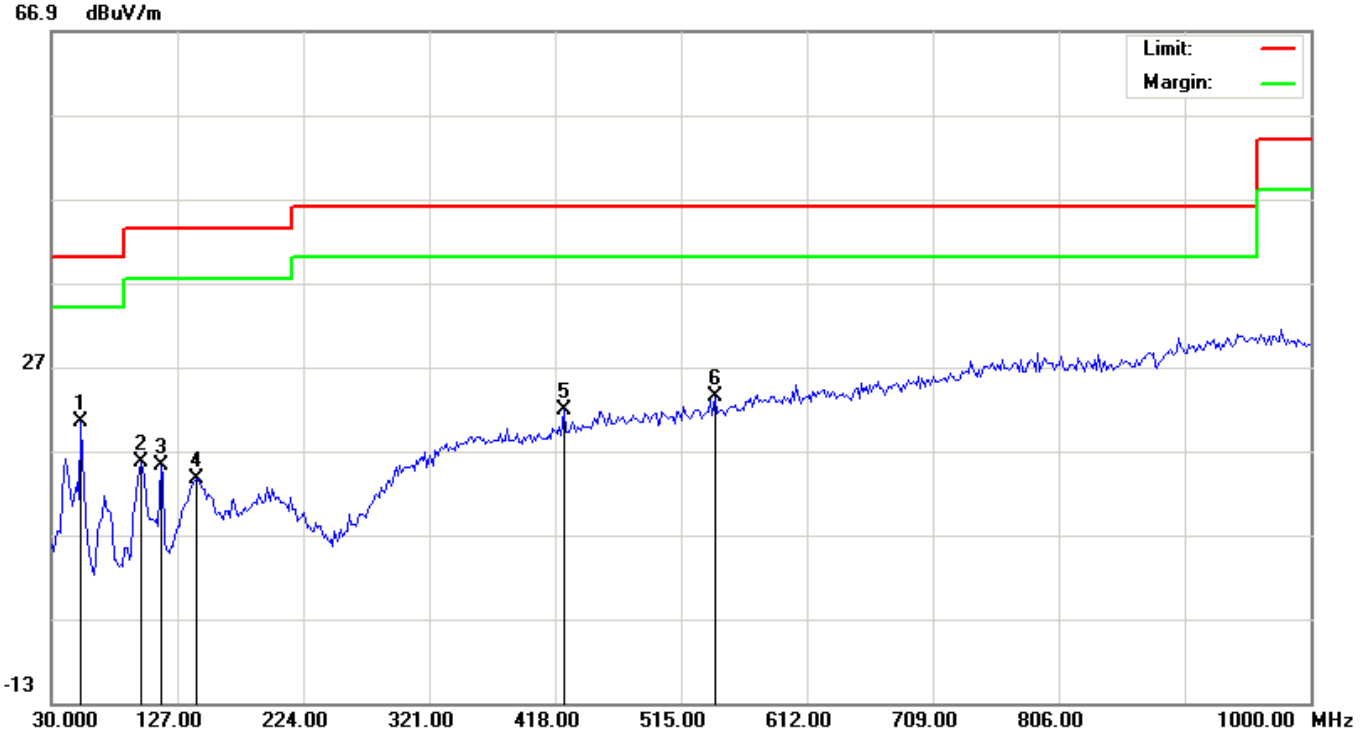
7.4 PROCEDURE OF RADIATED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received power by AC 120V/60Hz.
5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7) The test mode(s) were scanned during the test:
8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

   The test data of the worst case condition (mode 1) was reported on the following Data page

7.5 TEST RESULT OF RADIATED EMISSION TEST

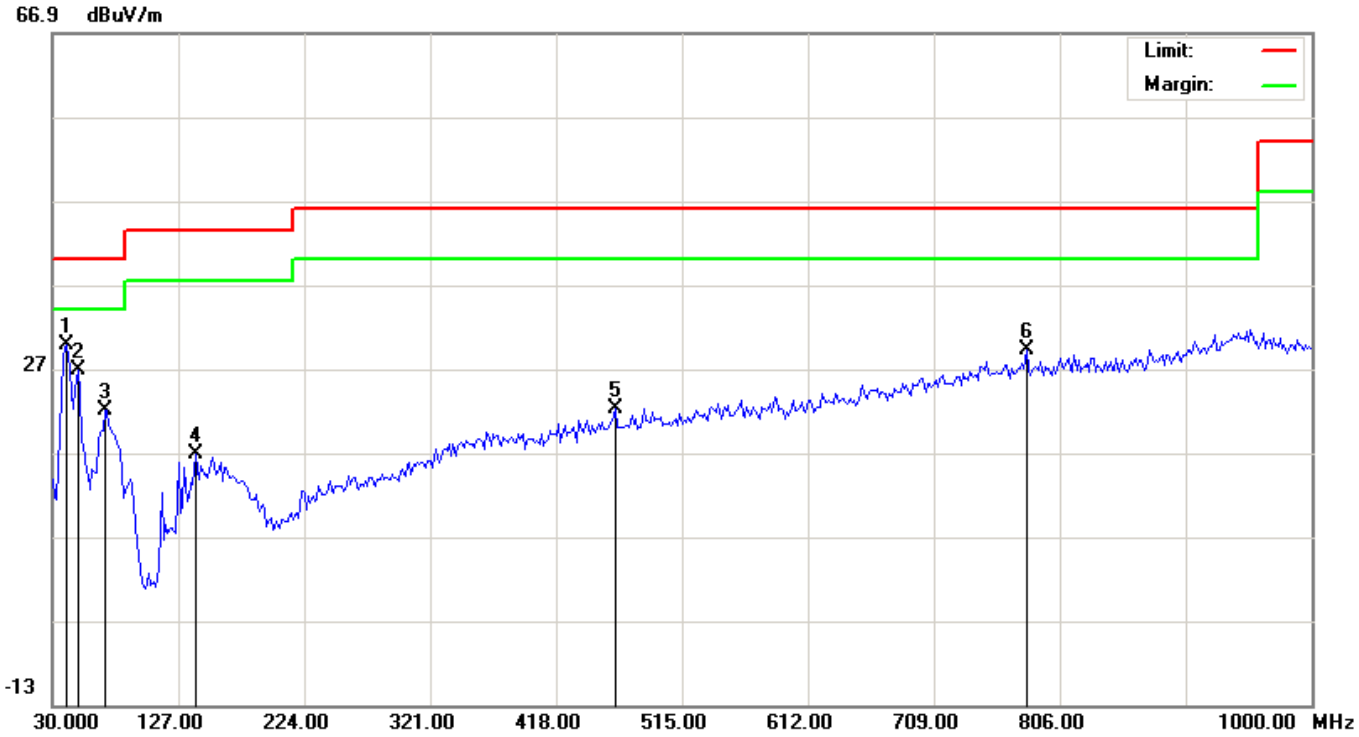
Radiated Emission Test –Horizontal -3m Below 1G



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	52.6333	12.04	8.41	20.45	40.00	-19.55	peak			
2		99.5167	5.59	10.00	15.59	43.50	-27.91	peak			
3		114.0667	7.95	7.23	15.18	43.50	-28.32	peak			
4		141.5500	-1.29	14.82	13.53	43.50	-29.97	peak			
5		424.4667	2.05	19.81	21.86	46.00	-24.14	peak			
6		540.8667	1.14	22.23	23.37	46.00	-22.63	peak			

RESULT: PASS

Radiated Emission Test –Vertical -3m Below 1G



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	41.3167	20.95	8.81	29.76	40.00	-10.24	peak			
2		49.4000	18.47	8.28	26.75	40.00	-13.25	peak			
3		70.4167	17.90	4.16	22.06	40.00	-17.94	peak			
4		139.9333	1.60	15.17	16.77	43.50	-26.73	peak			
5		463.2667	1.51	20.73	22.24	46.00	-23.76	peak			
6		780.1333	2.14	27.05	29.19	46.00	-16.81	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Emissions range from 1GHz to 12.5GHz have 20dB margin. No recording in the test report.
4. Only the data of the worst case would be record in this test report.

8. CONDUCTED EMISSION TEST

8.1 PROVISIONS APPLICABLE

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

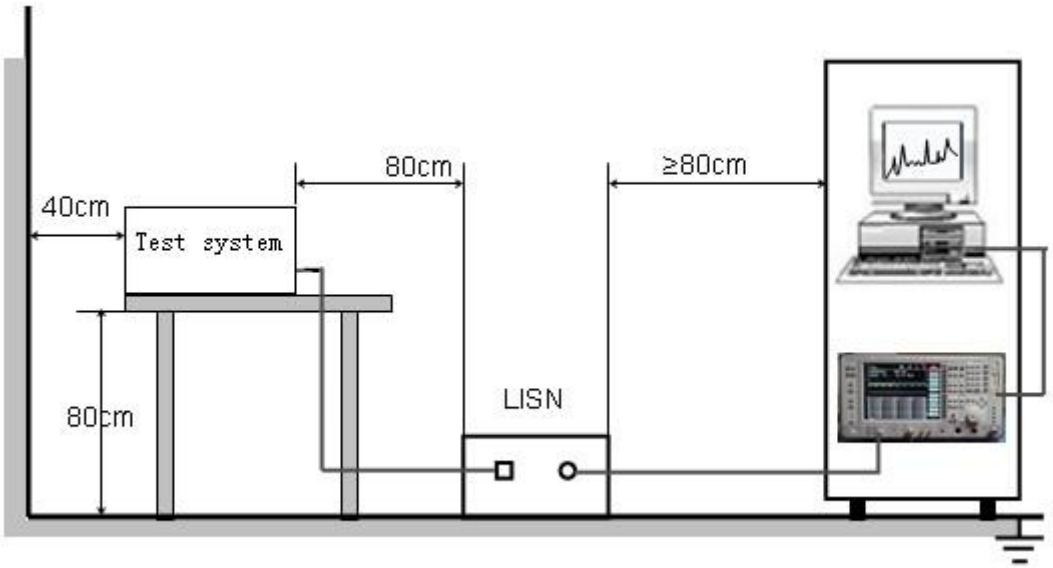
* Decreases with the logarithm of the frequency.

8.2 MEASUREMENT PROCEDURE

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
(2) Support equipment, if needed, was placed as per ANSI C63.4.
(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
(4) The EUT received AC 120V/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.

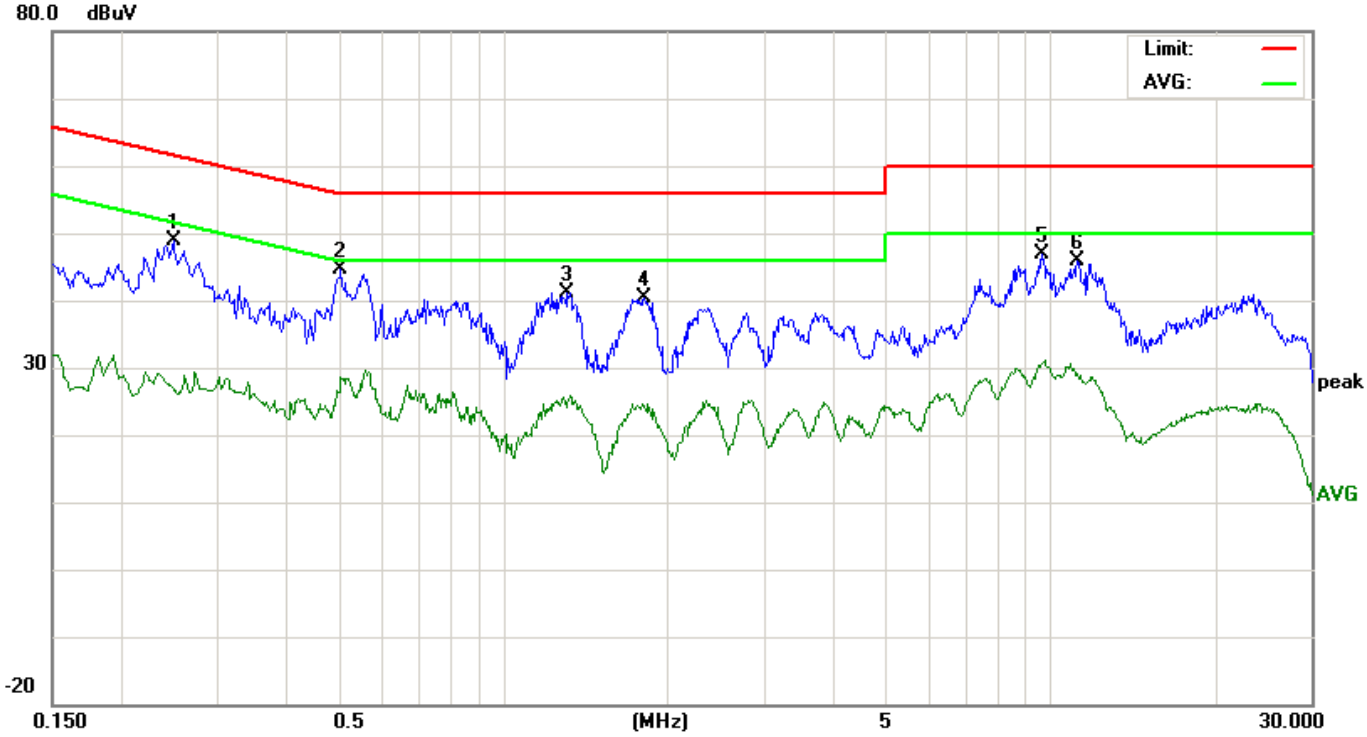
During the above scans, the emissions were maximized by cable manipulation.

8.3 TEST SETUP BLOCK DIAGRAM



8.4 TEST RESULT

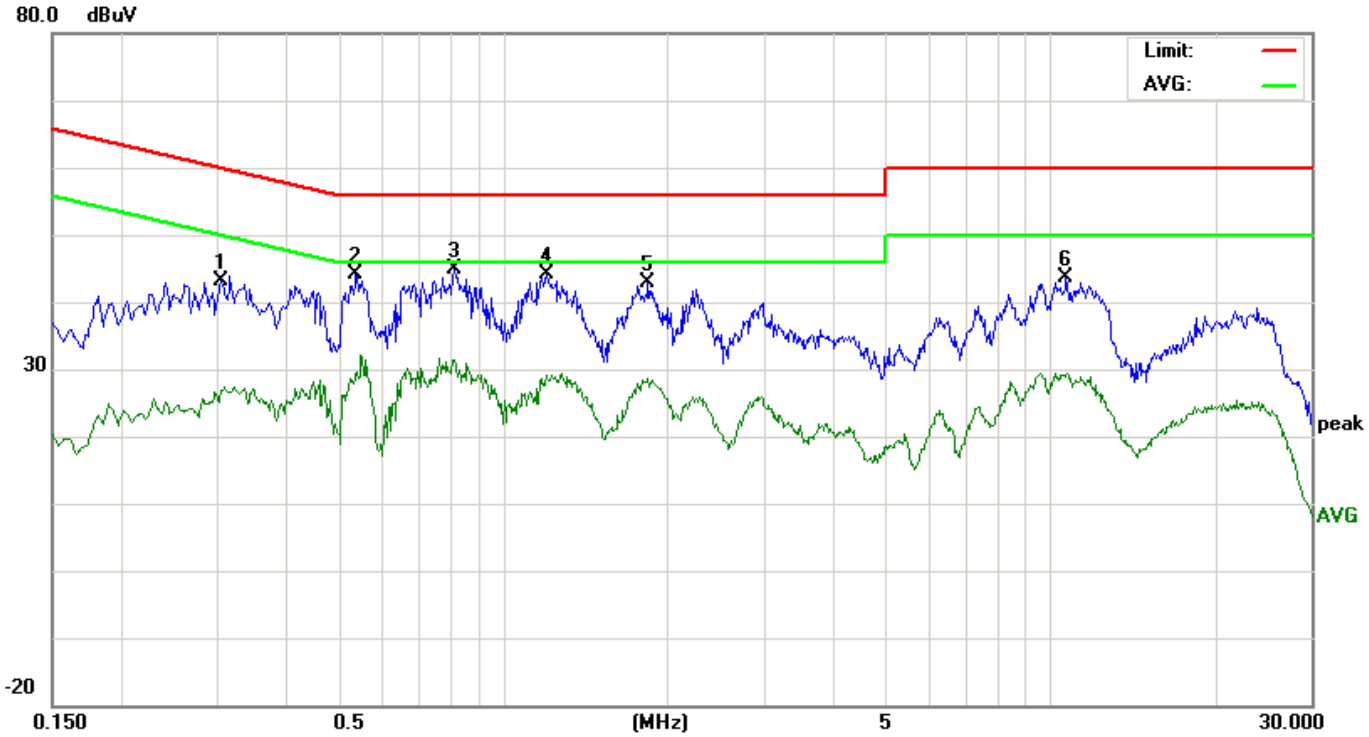
CONDUCTED EMISSION TEST – LINE L



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2500	38.56		16.57	10.27	48.83		26.84	61.75	51.75	-12.92	-24.91	P	
2	0.5060	34.25		18.27	10.39	44.64		28.66	56.00	46.00	-11.36	-17.34	P	
3	1.3099	30.82		14.56	10.38	41.20		24.94	56.00	46.00	-14.80	-21.06	P	
4	1.8140	30.17		14.17	10.28	40.45		24.45	56.00	46.00	-15.55	-21.55	P	
5	9.6699	36.70		20.39	10.28	46.98		30.67	60.00	50.00	-13.02	-19.33	P	
6	11.2018	35.67		18.93	10.11	45.78		29.04	60.00	50.00	-14.22	-20.96	P	

RESULT: PASS

CONDUCTED EMISSION TEST – LINE N



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.3059	32.94		16.49	10.29	43.23		26.78	60.08	50.08	-16.85	-23.30	P	
2	0.5380	33.69		19.11	10.37	44.06		29.48	56.00	46.00	-11.94	-16.52	P	
3	0.8139	34.48		20.98	10.30	44.78		31.28	56.00	46.00	-11.22	-14.72	P	
4	1.2019	33.88		18.76	10.37	44.25		29.13	56.00	46.00	-11.75	-16.87	P	
5	1.8460	32.50		18.29	10.27	42.77		28.56	56.00	46.00	-13.23	-17.44	P	
6	10.7218	33.51		18.93	10.10	43.61		29.03	60.00	50.00	-16.39	-20.97	P	

RESULT: PASS

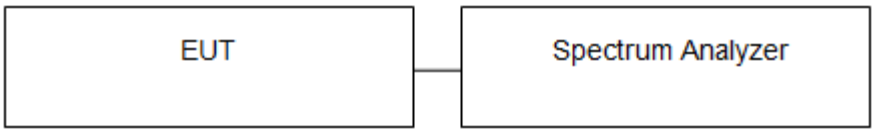
9. ANTENNA CONDUCTED POWER FOR RECEIVERS

LIMIT

The antenna conducted power of the receiver as defined in §15.111 shall not exceed the values given in the following tables

Frequency Range	9 KHz to 2GHz
Limit	2.0 nW (-57 dBm)

TEST CONFIGURATION

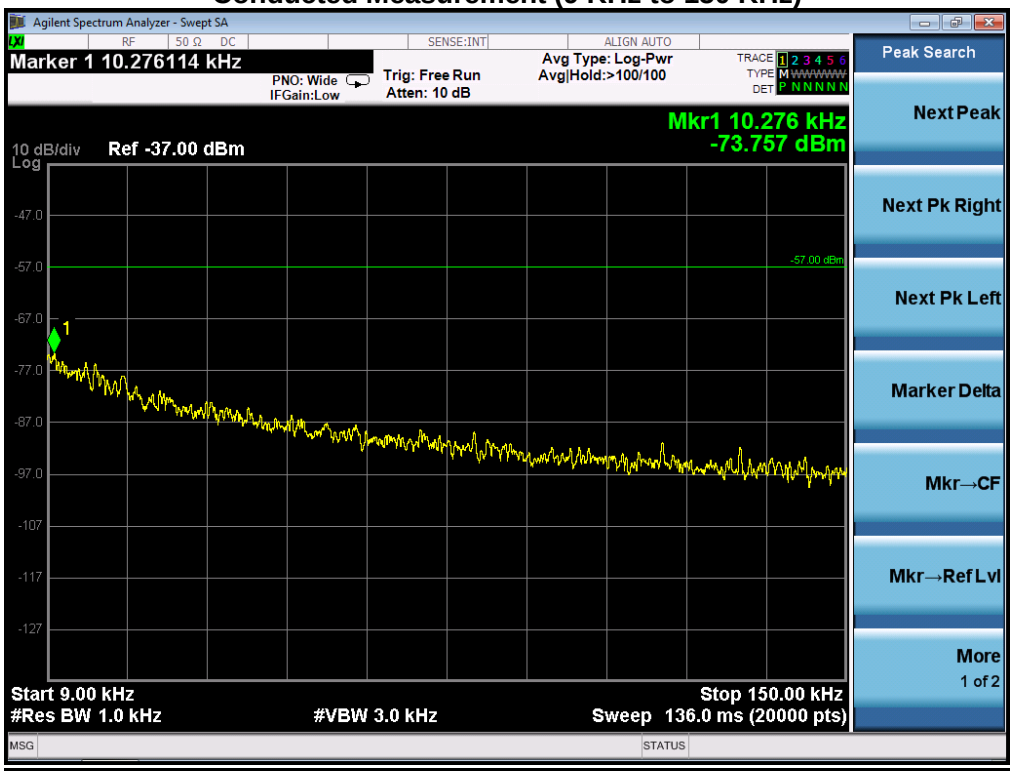


TEST PROCEDURE

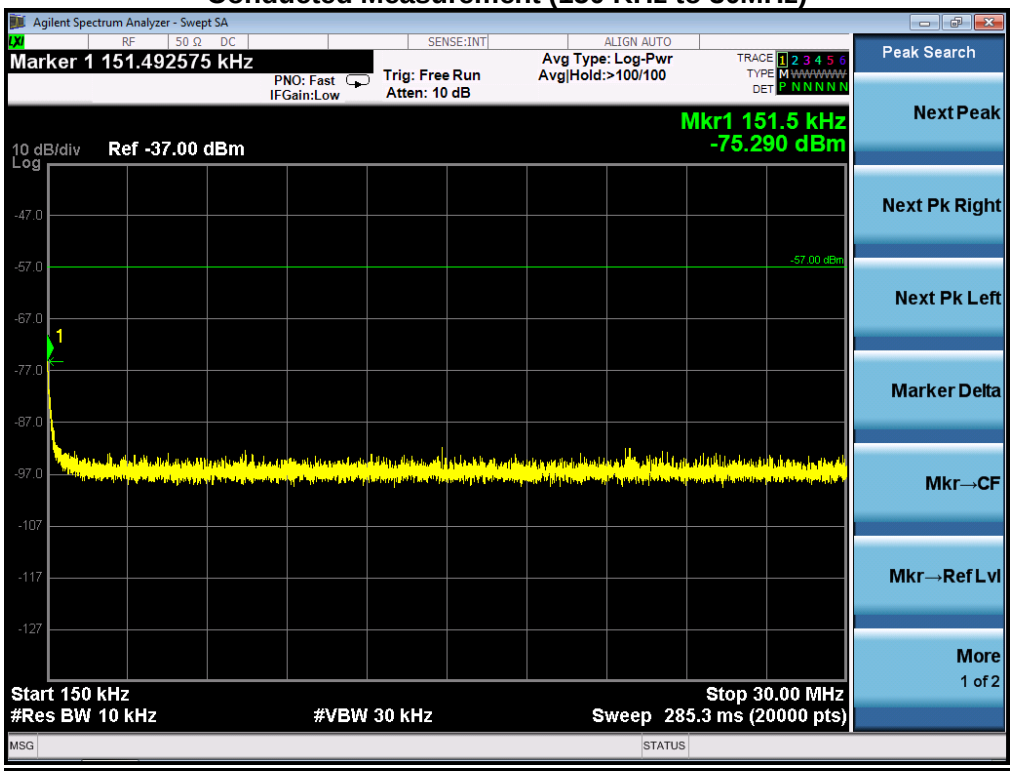
1. The receiver antenna terminal connected to a spectrum analyzer.
2. The test data of the worst case condition (mode 1) was reported on the following Data page.

TEST RESULTS

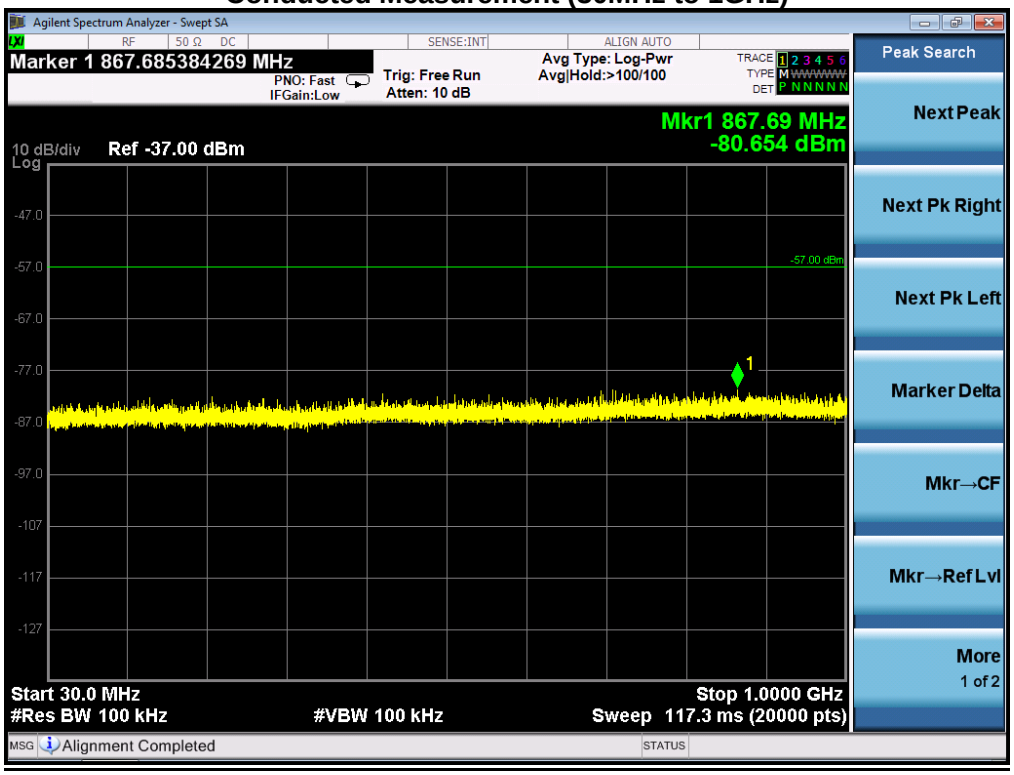
Conducted Measurement (9 KHz to 150 KHz)



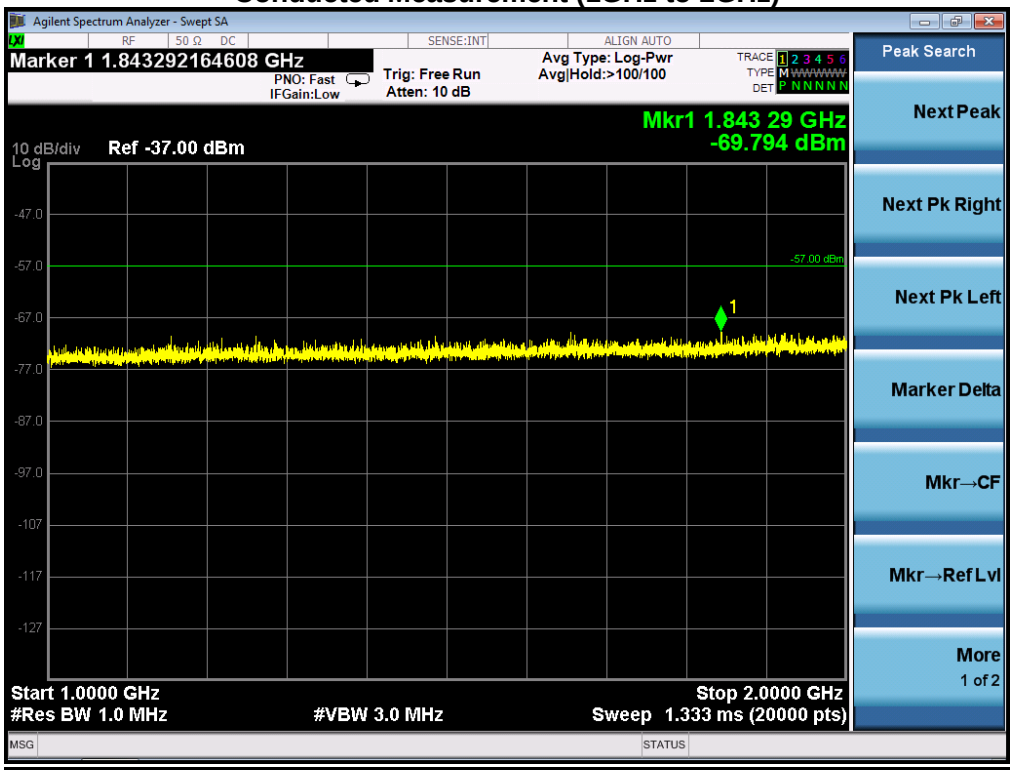
Conducted Measurement (150 KHz to 30MHz)



Conducted Measurement (30MHz to 1GHz)



Conducted Measurement (1GHz to 2GHz)

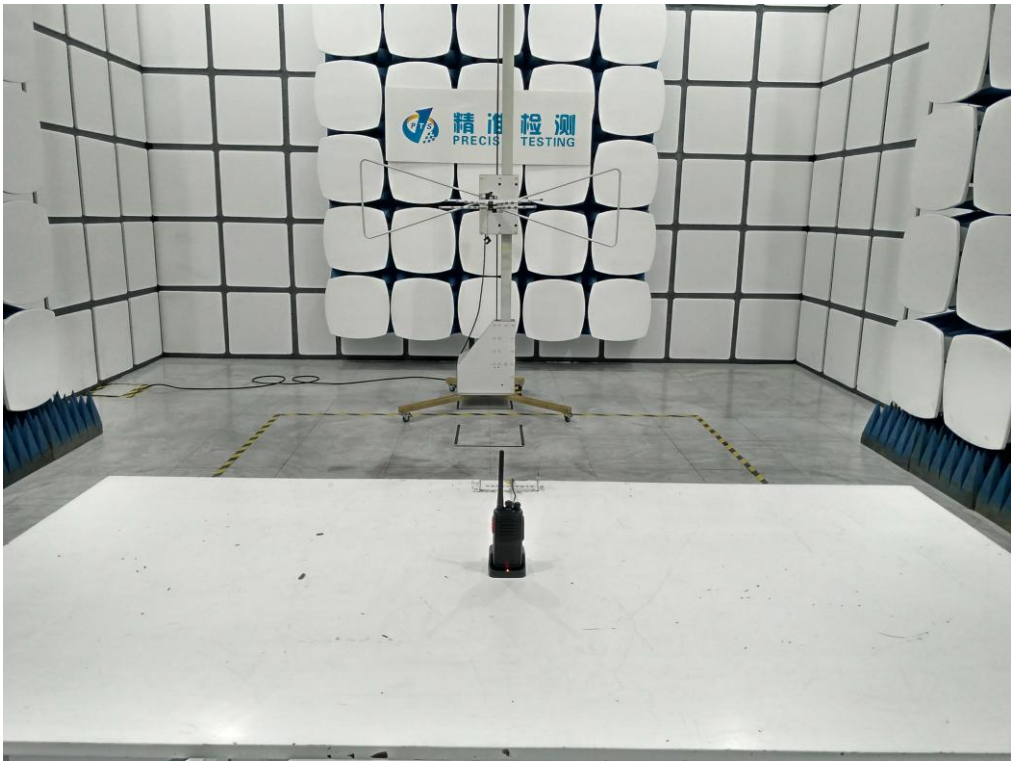


PASS

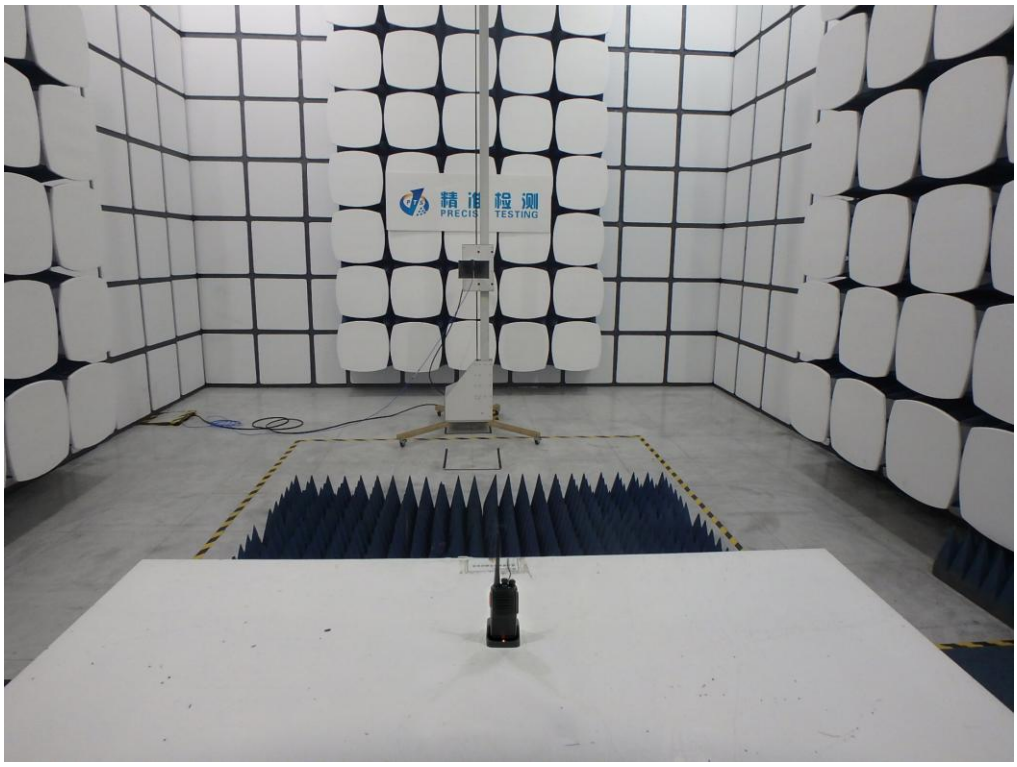
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

CONDUCTED EMISSION TEST SETUP

RADIATED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



APPENDIX 2 PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

BACK VIEW OF EUT

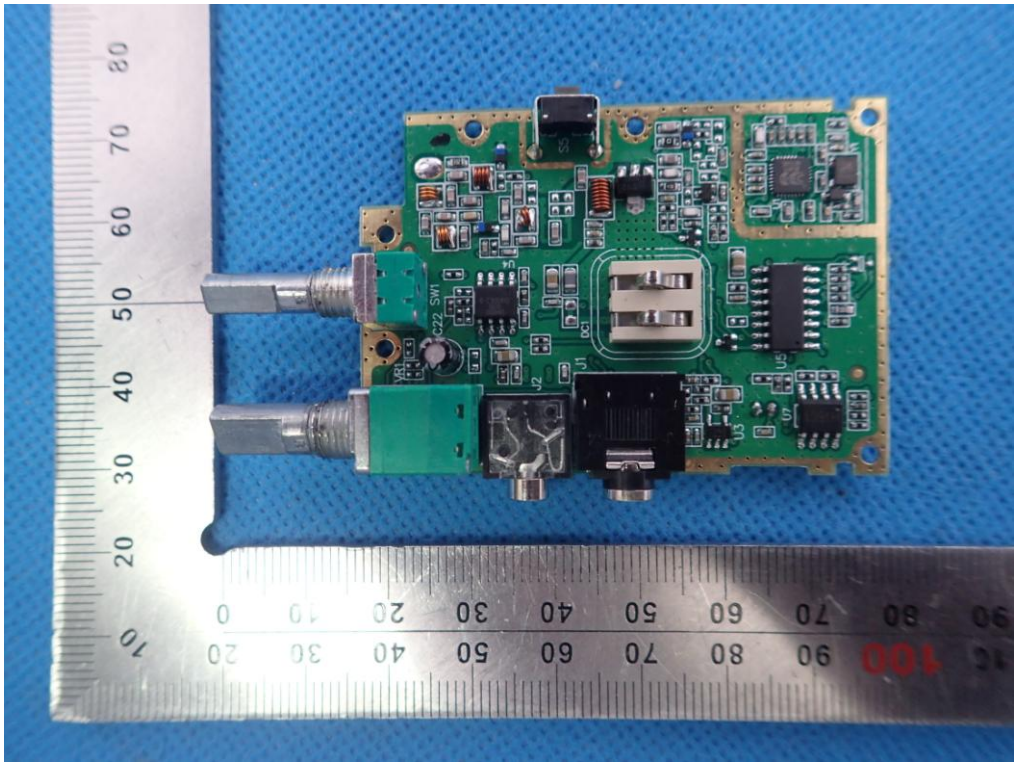
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

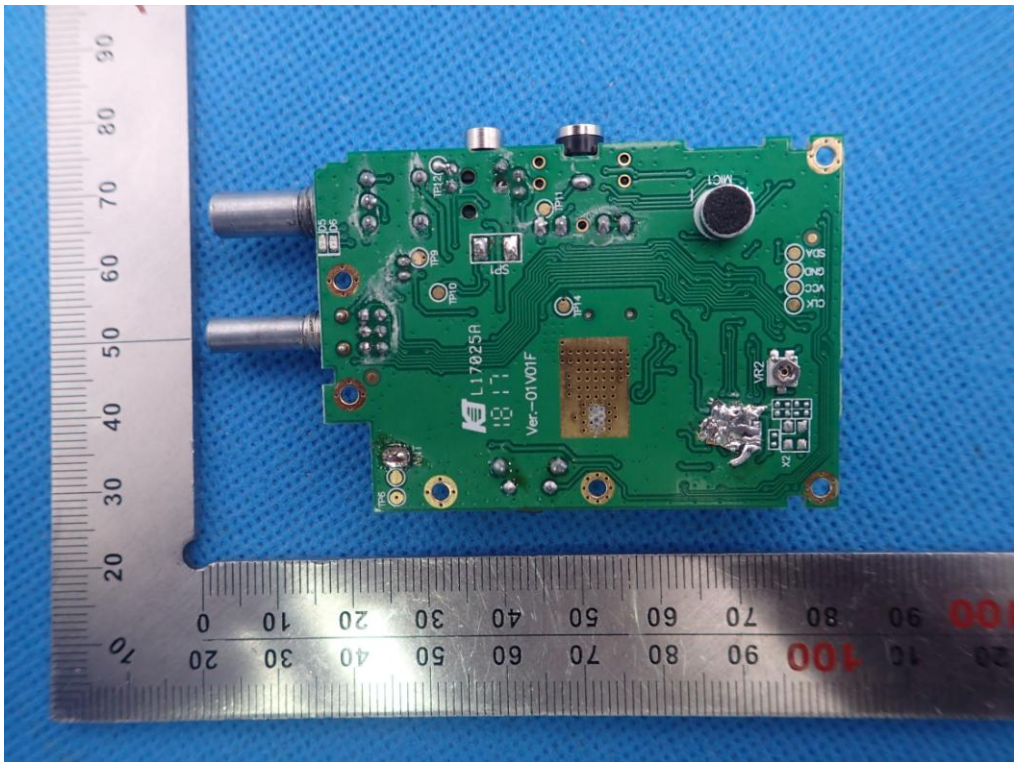
OPEN VIEW-1 OF EUT

OPEN VIEW-2 OF EUT

INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT



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