



RF TEST REPORT

Product Name: Smart phone

Model Name: Luna

FCC ID: 2AK6CLUNA

Issued For : Shanghai Unihertz E-Commerce Co., Ltd

Room 308, Building C, 508Chundong Rd, Minhang district
Shanghai, China 201108

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Chen Hsong Industrial Park,
No.177 Renmin West Road, Jinsha Community, Kengzi
Street, Pingshan New District, Shenzhen, China

Report Number: LGT23B010RF18

Sample Received Date: Feb. 09, 2023

Date of Test: Feb. 09, 2023 – Mar. 13, 2023

Date of Issue: Mar. 13, 2023

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TEST REPORT CERTIFICATION

Applicant Shanghai Unihertz E-Commerce Co., Ltd
Address Room 308, Building C, 508Chundong Rd, Minhang district
Shanghai, China 201108
Manufacturer Shenzhen OBLUE Communication Technology Co., Ltd.
Address Room 702, Hepingdayou industrial and trade industrial park, No.
41, Yonghe Road, Heping Community, Fuhai Street, Baoan
District, Shenzhen City, China
Product Name Smart phone
Trademark Unihertz, iHunt, 8849
Model Name Luna
Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC Part 22H and 24E, 27, 90 KDB 971168 D01 v03r01, ANSI C63.26(2015)	PASS

Prepared by:

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Technical Director



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Revision History

Rev.	Issue Date	Contents
00	Mar. 13, 2023	Initial Issue

1. TEST FACTORY & MEASUREMENT UNCERTAINTY

1.1 TEST FACTORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177 Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New District, Shenzhen, China
Accreditation Certificate	FCC Registration No.: 746540
	A2LA Certificate No.: 6727.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 3.2 \%$
RF Output Power, Conducted	$\pm 0.87\text{dB}$
Power Spectral Density, Conducted	$\pm 2.11 \text{ dB}$
Unwanted Emission, Conducted	$\pm 0.86\text{dB}$
All Emissions, Radiated (Below 1GHz)	$\pm 3.54\text{dB}$
All Emissions, Radiated (1GHz-18GHz)	$\pm 4.22\text{dB}$
All Emissions, Radiated (18GHz-25GHz)	$\pm 4.81\text{dB}$
Temperature	$\pm 0.5^{\circ}\text{C}$
Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

2.1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Name	Smart phone
Trademark	Unihertz, iHunt, 8849
Model Name	Luna
Series Model	N/A
Model Difference	N/A
Frequency Bands	U.S. Bands: LTE FDD Band 2 LTE FDD Band 4 LTE FDD Band 5 LTE FDD Band 7 LTE FDD Band 12 LTE FDD Band 13 LTE FDD Band 17 LTE FDD Band 25 LTE FDD Band 26 LTE TDD Band 38 LTE TDD Band 40 LTE TDD Band 41 LTE FDD Band 66
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.
Antenna	PIFA
Antenna gain(dBi)	LTE FDD Band 2: 0.6 LTE FDD Band 4:0.7 LTE FDD Band 5:-3.9 LTE FDD Band 7:-1.4 LTE FDD Band 12:-3.7 LTE FDD Band 13:-4.0 LTE FDD Band 17:-2.5 LTE FDD Band 25:0.8 LTE FDD Band 26:-3.9 LTE TDD Band 38:-1 LTE TDD Band 40:-0.2 LTE TDD Band 41: -1 LTE FDD Band 66:0.7

Battery parameter	Capacity: 5000mAh Rated Voltage: 3.87V
Adapter:	Model: HJ-FC010K7-US Input: 100~240V, 50/60Hz, 0.6A Output: 5V, 2A OR 9V, 2A OR 12V, 1.5A
Extreme Vol. Limits	3.55V to 4.45V (Nominal 3.87V)
Extreme Temp. Tolerance	-0°C to +40°C
Hardware version	G68_V1.1
Software version	Luna _2023013113

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	LTE Band 2:1850~1910MHz LTE Band 4:1710~1755MHz LTE Band 5: 824~849MHz LTE Band 7:2500~2570MHz LTE Band 12: 699-716MHz LTE Band 13: 777-787MHz LTE Band 17:704~716MHz LTE Band 25: 1850-1915MHz LTE Band 26: 814-824MHz LTE Band 26: 824-849MHz LTE Band 38: 2570-2620MHz LTE Band 40: 2305-2315/2350-2360MHz LTE Band 41: 2555-2655MHz LTE Band 66: 1710-1780MHz
Rx Frequency	LTE Band 2: 1930-1990MHz LTE Band 4: 2110-2155MHz LTE Band 5: 869-894MHz LTE Band 7: 2620-2690MHz LTE Band 12: 729-746MHz LTE Band 13: 746-756MHz LTE Band 17: 734-746MHz LTE Band 25: 1930-1995MHz LTE Band 26: 859-869MHz LTE Band 26: 869-894MHz LTE Band 38: 2570-2620MHz LTE Band 40: 2305-2315MHz 2350-2360MHz LTE Band 41: 2496-2690MHz LTE Band 66: 2110-2200MHz
Bandwidth	LTE Band 2: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz LTE Band 5: 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7: 5MHz / 10MHz / 15MHz /20MHz LTE Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13: 5MHz / 10MHz LTE Band 17: 5MHz / 10MHz LTE Band 25: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz LTE Band 26: 1.4MHz / 3MHz / 5MHz / 10MHz/15MHz LTE Band 38: 5MHz / 10MHz / 15MHz /20MHz LTE Band 40: 5MHz / 10MHz LTE Band 41: 5MHz / 10MHz / 15MHz /20MHz LTE Band 66: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz
Type of Modulation	QPSK /16QAM

2.1.3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Remark:

1. The mark 'v' means that this configuration is chosen for testing
2. The mark '-' means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated.

ITEMS	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	7			v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v
	13			v	v			v	v	v	v	v		v	
	17			v	v			v	v	v	v	v	v	v	v
	25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v		v	v	v	v	v	v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v	v	v	v	v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak&Avera Ratio	2						v	v	v	v		v	v	v	v
	4						v	v	v	v		v	v	v	v
	5				v			v	v	v		v	v	v	v
	7						v	v	v	v		v	v	v	v
	12				v			v	v	v		v	v	v	v
	13				v			v	v	v		v		v	
	17				v			v	v	v		v	v	v	v
	25						v	v	v	v		v	v	v	v
	26					v		v	v	v		v	v	v	v
	38						v	v	v	v		v	v	v	v
	40				v			v	v	v		v		v	
	41						v	v	v	v		v	v	v	v
	66						v	v	v	v		v	v	v	v

26dB&99% Bandwidth	2	v	v	v	v	v	v	v	v			v	v	v	v
	4	v	v	v	v	v	v	v	v			v	v	v	v
	5	v	v	v	v			v	v			v	v	v	v
	7			v	v	v	v	v	v			v	v	v	v
	12	v	v	v	v			v	v			v	v	v	v
	13			v	v			v	v			v		v	
	17			v	v			v	v			v	v	v	v
	25	v	v	v	v	v	v	v	v			v	v	v	v
	26	v	v	v	v	v		v	v			v	v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v	v			v	v	v	v
	66	v	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v		v	v	v	v
	4	v	v	v	v	v	v	v	v	v		v	v	v	v
	5	v	v	v	v			v	v	v		v	v	v	v
	7			v	v	v	v	v	v	v		v	v	v	v
	12	v	v	v	v			v	v	v		v	v	v	v
	13			v	v			v	v	v		v		v	
	17			v	v			v	v	v		v	v	v	v
	25	v	v	v	v	v	v	v	v	v		v	v	v	v
	26	v	v	v	v	v		v	v	v		v	v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v	v	v		v	v	v	v
	66	v	v	v	v	v	v	v	v	v		v	v	v	v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v			v	v	v
	4	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v			v	v	v			v	v	v
	7			v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v			v	v	v			v	v	v
	13			v	v			v	v	v				v	
	17			v	v			v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v		v	v	v			v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v	v	v			v	v	v
	66	v	v	v	v	v	v	v	v	v			v	v	v

Frequency Stability	2				v			v				v		v	
	4				v			v				v		v	
	5				v			v				v		v	
	7				v			v				v		v	
	12				v			v				v		v	
	13				v			v				v		v	
	17				v			v				v		v	
	25				v			v				v		v	
	26				v			v				v		v	
	38						v	v	v	v		v	v	v	v
	40				v			v	v	v		v		v	
	41				v			v				v		v	
	66				v			v				v		v	
E.R.P.& E.I.R.P.	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	7			v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v
	13			v	v			v	v	v	v	v		v	
	17			v	v			v	v	v	v	v	v	v	v
	25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v		v	v	v	v	v	v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v	v	v	v	v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	2	v	v	v	v	v	v	v		v			v	v	v
	4	v	v	v	v	v	v	v		v			v	v	v
	5	v	v	v	v			v		v			v	v	v
	7			v	v	v	v	v		v			v	v	v
	12	v	v	v	v			v		v			v	v	v
	13			v	v			v		v				v	
	17			v	v			v		v			v	v	v
	25	v	v	v	v	v	v	v		v			v	v	v
	26	v	v	v	v	v		v		v			v	v	v
	38			v	v	v	v	v	v	v	v	v	v	v	v
	40			v	v			v	v	v	v	v	v	v	v
	41			v	v	v	v	v		v			v	v	v
	66	v	v	v	v	v	v	v		v			v	v	v

2.1.4 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the 47 CFR Part 2, 24(E), 27.

2.1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

2.1.6 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.1.7 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.1.8 CONFIGURATION OF EUT SYSTEM

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

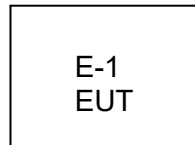


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Length	Note
N/A				N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “with core”; “NO” is means “without core”.

2.1.9 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ANSI C63.26 2015 and FCC CFR 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

Radiated Test equipment					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU8	100372	2022.04.12	2023.04.11
Active loop Antenna	R&S	HFH2-Z2	POS871398181	2022.06.02	2024.06.01
Spectrum Analyzer	Kesight	N9010B	MY60242508	2022.04.29	2023.04.28
Bilog Antenna	SCHAFFNER	CBL6112B	2705	2022.06.05	2024.06.04
Horn Antenna	SCHWARZBECK	3115	10SL0060	2022.06.02	2024.06.01
Pre-amplifier(0.1M-3GHz)	HP	8447D	2727A05655	2022.04.11	2023.04.10
Pre-amplifier(1-26.5G)	Agilent	8449B	3008A4722	2022.04.13	2023.04.12
RE Cable (9K-1G)	N.A	R01	N.A	2022.05.05	2023.05.04
RE Cable (1-26G)	N.A	R02	N.A	2022.05.05	2023.05.04
Wireless Communications Test Set	R&S	CMW 500	137737	2022.04.29	2023.04.28
Temperature & Humidity	KTJ	TA218B	N.A	2022.05.05	2023.05.04
Testing Software	EMC-I_V1.4.0.3_SKET				

Conducted Test equipment					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Signal Analyzer	keysight	N9010B	MY60242508	2022.04.29	2023.04.28
Wireless Communications Test Set	R&S	CMW 500	137737	2022.04.29	2023.04.28
MXG Vector Signal Generator	keysight	N5182B	MY59100717	2022.06.02	2023.06.01
RF Automatic Test system	MW	MW100-RFCB	MW220324LG-33	2022.04.29	2023.04.28
Temperature & Humidity	KTJ	TA218B	N.A	2022.05.05	2023.05.04
Temperature& Humidity test chamber	AISRY	LX-1000L	171200018	2022.05.10	2023.05.09
Attenuator	eastsheep	90db	N.A	2022.04.29	2023.04.28
Testing Software	MTS8200_V2.0.0.0				

3. CONDUCTED OUTPUT POWER

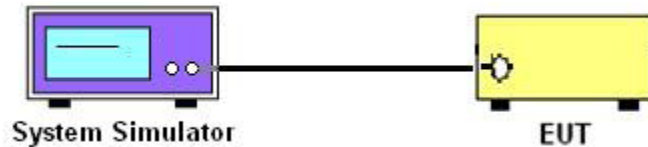
3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

A system simulator was used to establish communication with the eut. Its parameters were set to force the eut transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Configuration follows KDB 971168 D01 v03r01.

3.1.2 TEST SETUP



3.1.3 TEST PROCEDURES

1. The transmitter output port was connected to system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest/middle/highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 TEST RESULTS

Note: Test chart See Appendix II

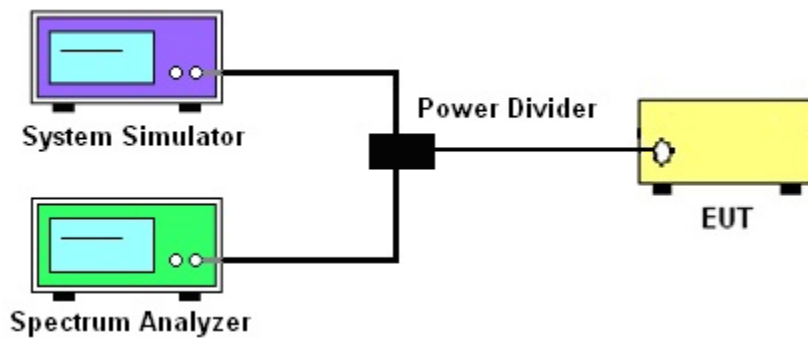
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as P_{Pk}. Use one of the applicable procedures presented 4.1.3 to measure the total average power and record as P_{Avg}. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
 $PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm)$.

4.1.2 TEST SETUP



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7 and ANSI C63.26 2015 Section 5.2.6.
2. The EUT was connected to spectrum and system simulator via a power divider
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the peak and average power of the spectrum analyzer
5. Record the deviation as Peak to Average Ratio.

	LTE					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	30kHz	100kHz	100kHz	300kHz	300kHz
VBW	100kHz	100kHz	300kHz	300kHz	1000kHz	1000kHz
Detector	PK/AVG	PK/AVG	PK/AVG	PK/AVG	PK/AVG	PK/AVG
Trace	Max	Max	Max	Max	Max	Max
Sweep Count	Auto	Auto	Auto	Auto	Auto	Auto

4.1.4 TEST RESULTS

Note: Test chart See Appendix II

5. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

5.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

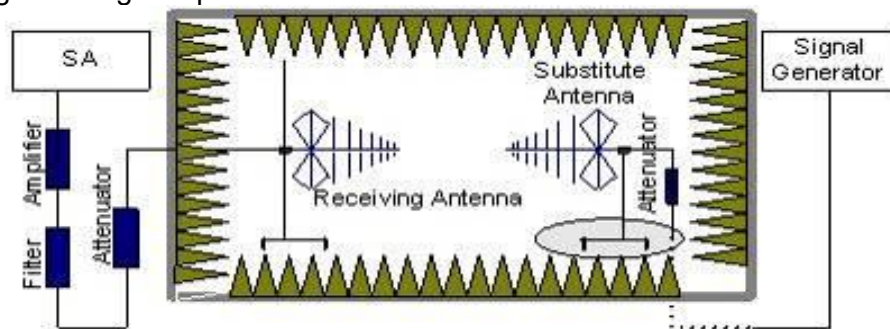
5.1.1 MEASUREMENT METHOD

Effective radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems. Mobile and portable (hand-held) stations operating are limited to average ERP, Equivalent isotropic radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas, Mobile and portable (hand-held) stations operating are limited to average EIRP.

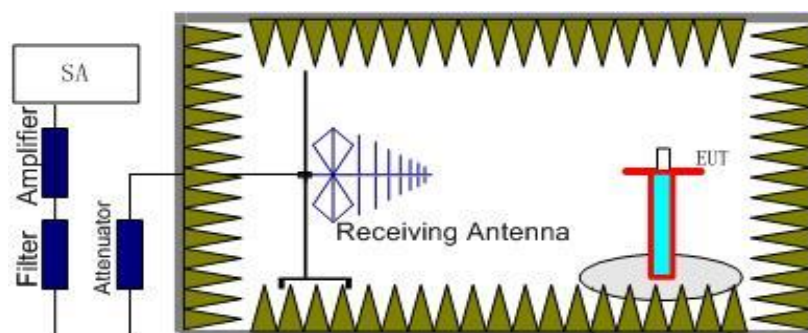
5.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = R_x \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + \text{Gain (dBi)} - 107 \text{ (dBuV to dBm)}$ The SA is calibrated using following setup.



b) EUT was placed on a 1.5m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:

$\text{Power} = \text{PMea} + \text{ARpl}$

5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01v03r01 Section 5.6 and ANSI C63.26 2015 Section 5.2.
2. The EUT was placed on a non-conductive rotating platform 1.5 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with Peak detector.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 m in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26 2015. The EUT was replaced by dipole antenna (substitution antenna) at same location and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. $EIRP = S.G \text{ Level} + \text{Gain} - \text{Cable loss}$; $ERP = S.G \text{ Level} + \text{Gain} - \text{Cable loss} - 2.15$.
5. RB Set greater than bandwidth, VB Set spectrum analyzer Maximum support.

5.1.4 TEST RESULTS

Note: Test is divided into three directions, X/Y/Z. X pattern for the worst.

Note: Test chart See Appendix II