Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

Report Reference No.....:	**GTS20210721003-1-3**
FCC ID..... :	**2ART3-K518PRO**
Compiled by (position+printed name+signature)..:	File administrators Jimmy Wang
Supervised by (position+printed name+signature)..:	Test Engineer Aaron Tan
Approved by (position+printed name+signature)..:	Manager Jason Hu
Date of issue.....:	Aug. 05, 2021
Representative Laboratory Name .:	**Shenzhen Global Test Service Co., Ltd.**
Address.....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China
Applicant's name.....:	**Shenzhen Lonsdor Technology Co., Ltd.**
Address .....:	No.201-202, Block B3, Zhimei park, Fuhai Industrial Zone, Fuhai Ave, Fuyong St., Bao'an, Shenzhen 518000
Test specification .....:	
Standard .....:	**FCC Rules and Regulations Part 15 Subpart C (Section 15.207 &15.209),** **ANSI C63.10: 2013**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF.....:	Dated 2014-12

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Test item description .....:	K518 PRO Key Programmer
Trade Mark .....:	Lonsdor®
Manufacturer .....:	Shenzhen Lonsdor Technology Co., Ltd.
Model/Type reference.....:	K518PRO
Listed Models .....:	N/A
Modulation Type .....:	ASK
Operation Frequency.....:	125KHz
Hardware Version .....:	K518 PROV5.2
Software Version .....:	V1.0
Rating .....:	12.0V⎓2.0A

TEST REPORT

Test Report No. :	GTS20210721003-1-3	Aug. 05, 2021 Date of issue

Equipment under Test	:	K518 PRO Key Programmer
Model /Type	:	K518PRO
Listed Models	:	N/A
Applicant	:	**Shenzhen Lonsdor Technology Co., Ltd.**
Address	:	No.201-202, Block B3, Zhimei park, Fuhai Industrial Zone, Fuhai Ave, Fuyong St., Bao'an, Shenzhen 518000
Manufacturer	:	**Shenzhen Lonsdor Technology Co., Ltd.**
Address	:	No.201-202, Block B3, Zhimei park, Fuhai Industrial Zone, Fuhai Ave, Fuyong St., Bao'an, Shenzhen 518000

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 TEST STANDARDS

The tests were performed according to following standards:
FCC Rules and Regulations Part 15 Subpart C (Section 15.207): Conducted limits.
FCC Rules and Regulations Part 15 Subpart C (Section 15.209): Radiated emission limits; general requirements.
ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	July 22, 2021
Testing commenced on	:	July 23, 2021
Testing concluded on	:	Aug. 05, 2021

2.2 Product Description

Product Name:	K518 PRO Key Programmer
Model/Type reference:	K518 PRO
Power supply:	DC 3.80V from battery
Adapter information:	Model:JHD-AP024U-120200BA-A Input:100-240V~ 50/60Hz 0.55A Output:12.0V⎓2.0A 24.0W
125KHz	
Operation frequency:	125KHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	Loop Antenna

2.3 Test Sample

The application provides 2 samples to meet requirement.

Sample Number	Description
GTS20210721003-1-1#	Engineer sample – continuous transmit
GTS20210721003-1-2#	Normal sample – Intermittent transmit

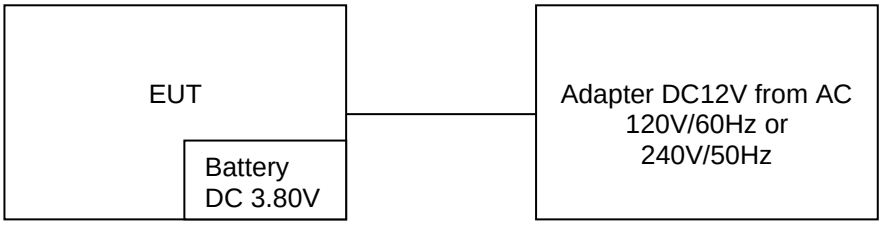
2.4 Equipment under Test

Power supply system utilised

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

DC 3.8V from battery

2.5 Block Diagram of Test Setup



2.6 Description of the test mode

Operation Frequency each of channel	
Channel	Frequency
1	125KHz

Operating Mode
The mode is used: Transmitting mode

2.7 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
/	/	/	/	/	/
/	/	/	/	/	/

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

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.

3.2 Test Facility

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

FCC-Registration No.: 165725 Designation Number: CN1234

Shenzhen Global Test 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.: 4758.01

Shenzhen Global Test 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.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

3.3 Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Summary of measurement results

DESCRIPTION OF TEST	RESULT
CONDUCTED EMISSIONS TEST	COMPLIANT
RADIATED EMISSION TEST	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

3.5 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 Global Test 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 GTS laboratory 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.

3.6 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2020/09/19	2021/09/18
LISN	R&S	ESH2-Z5	893606/008	2020/09/19	2021/09/18
EMI Test Receiver	R&S	ESPI3	101841-cd	2020/09/19	2021/09/18
EMI Test Receiver	R&S	ESCI7	101102	2020/09/19	2021/09/18
Spectrum Analyzer	Agilent	N9020A	MY48010425	2020/09/19	2021/09/18
Spectrum Analyzer	R&S	FSV40	100019	2020/09/19	2021/09/18
Vector Signal generator	Agilent	N5181A	MY49060502	2020/09/19	2021/09/18
Signal generator	Agilent	E4421B	3610AO1069	2020/09/19	2021/09/18
Climate Chamber	ESPEC	EL-10KA	A20120523	2020/09/19	2021/09/18
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2020/09/19	2021/09/18
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2020/10/11	2021/10/10
Bilog Antenna	Schwarzbeck	VULB9163	000976	2021/05/25	2022/05/24
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2020/09/19	2021/09/18
Amplifier	Schwarzbeck	BBV 9743	#202	2020/09/19	2021/09/18
Amplifier	Schwarzbeck	BBV9179	9719-025	2020/09/19	2021/09/18
Amplifier	EMCI	EMC051845B	980355	2020/09/19	2021/09/18
Temperature/Humidi	Gangxing	CTH-608	02	2020/09/19	2021/09/18

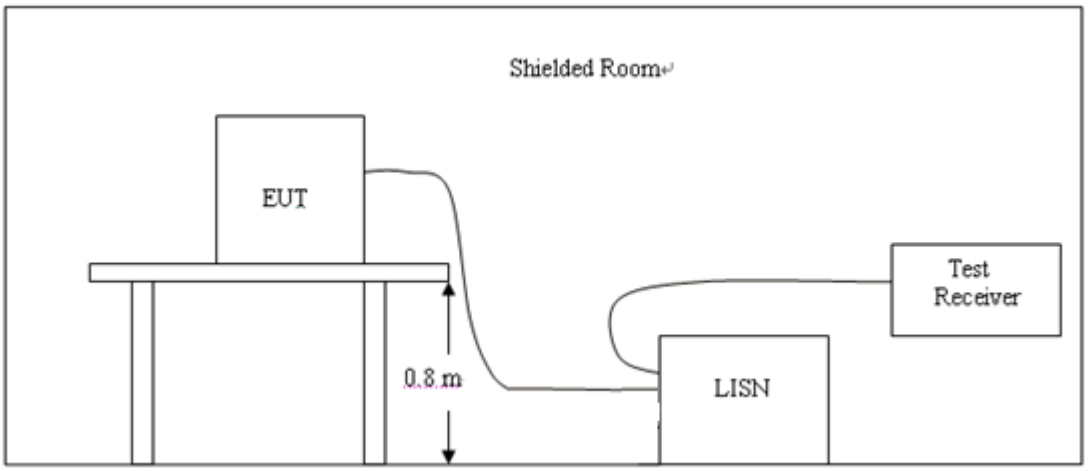
ty Meter					
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2020/09/19	2021/09/18
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2020/09/19	2021/09/18
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2020/09/19	2021/09/18
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2020/09/19	2021/09/18
Data acquisition card	Agilent	WX06610-A531A	TW53323507	2020/09/19	2021/09/18
Power Sensor	Agilent	WX06610-A021XA	MY5365004	2020/09/19	2021/09/18
Test Control Unit	Tonscend	JS0806-1	178060067	2021/06/18	2022/06/17
Automated filter bank	Tonscend	JS0806-F	19F8060177	2021/06/18	2022/06/17
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

4.1 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.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received 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.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power 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

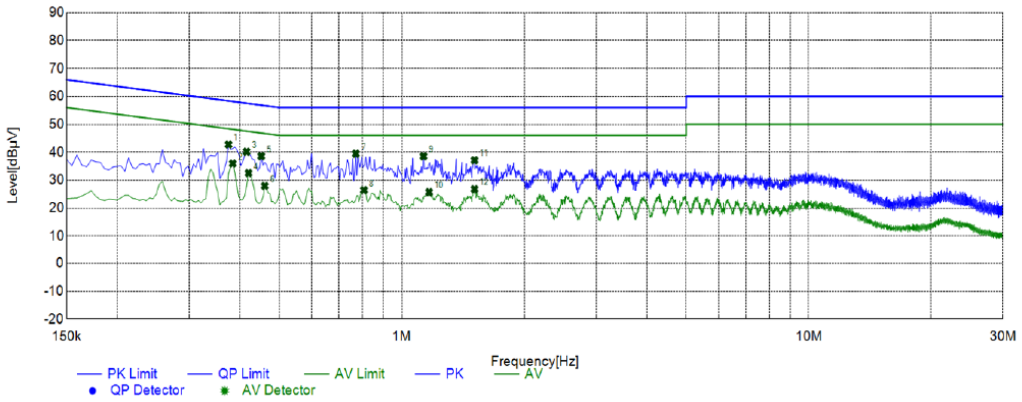
Remark:

1. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:.

Temperature	22.8℃	Humidity	56%
Test Engineer	Moon Tan	Test mode	TX

Power supply:	DC 12V from Adapter AC 120V/60Hz	Polarization	L

Test Graph



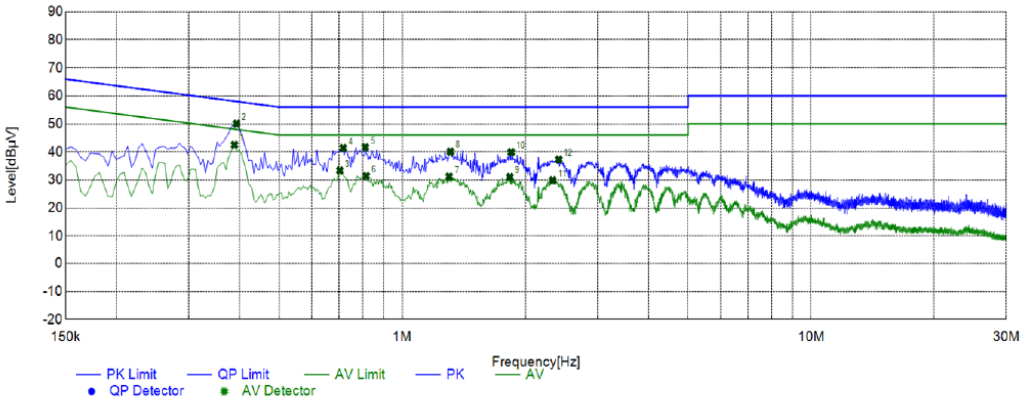
Suspected List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	Result [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Line	Remark
1	0.3750	32.70	10.01	42.71	58.39	15.68	PK	L1	PASS
2	0.3840	25.97	10.02	35.99	48.19	12.20	AV	L1	PASS
3	0.4155	30.14	10.03	40.17	57.54	17.37	PK	L1	PASS
4	0.4200	22.53	10.03	32.56	47.45	14.89	AV	L1	PASS
5	0.4515	28.57	10.04	38.61	56.85	18.24	PK	L1	PASS
6	0.4605	17.91	10.05	27.96	46.68	18.72	AV	L1	PASS
7	0.7710	29.40	10.06	39.46	56.00	16.54	PK	L1	PASS
8	0.8070	16.39	10.07	26.46	46.00	19.54	AV	L1	PASS
9	1.1310	28.48	10.08	38.56	56.00	17.44	PK	L1	PASS
10	1.1670	15.64	10.09	25.73	46.00	20.27	AV	L1	PASS
11	1.5090	27.05	10.11	37.16	56.00	18.84	PK	L1	PASS
12	1.5090	16.68	10.11	26.79	46.00	19.21	AV	L1	PASS

Note:1. Result (dBµV) = Reading (dBµV) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Power supply:	DC 12V from Adapter AC 120V/60Hz	Polarization	N

Test Graph



Suspected List									
NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	Result [dBμV]	Limit [dBμV]	Margin [dB]	Detector	Line	Remark
1	0.3885	32.47	10.02	42.49	48.10	5.61	AV	N	PASS
2	0.3930	40.03	10.02	50.05	58.00	7.95	PK	N	PASS
3	0.7035	23.35	10.05	33.40	46.00	12.60	AV	N	PASS
4	0.7170	31.28	10.05	41.33	56.00	14.67	PK	N	PASS
5	0.8115	31.54	10.07	41.61	56.00	14.39	PK	N	PASS
6	0.8160	21.35	10.07	31.42	46.00	14.58	AV	N	PASS
7	1.3020	21.16	10.09	31.25	46.00	14.75	AV	N	PASS
8	1.3110	29.99	10.09	40.08	56.00	15.92	PK	N	PASS
9	1.8330	20.94	10.13	31.07	46.00	14.93	AV	N	PASS
10	1.8465	29.77	10.13	39.90	56.00	16.10	PK	N	PASS
11	2.3325	19.70	10.20	29.90	46.00	16.10	AV	N	PASS
12	2.4135	27.10	10.21	37.31	56.00	18.69	PK	N	PASS

Note:1. Result (dBμV) = Reading (dBμV) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

4.2 Radiated Emission

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

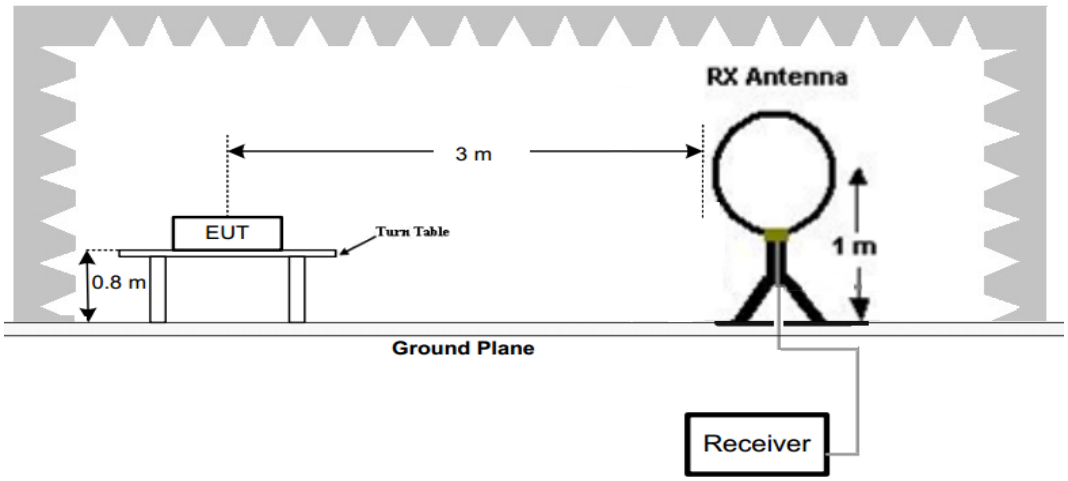
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

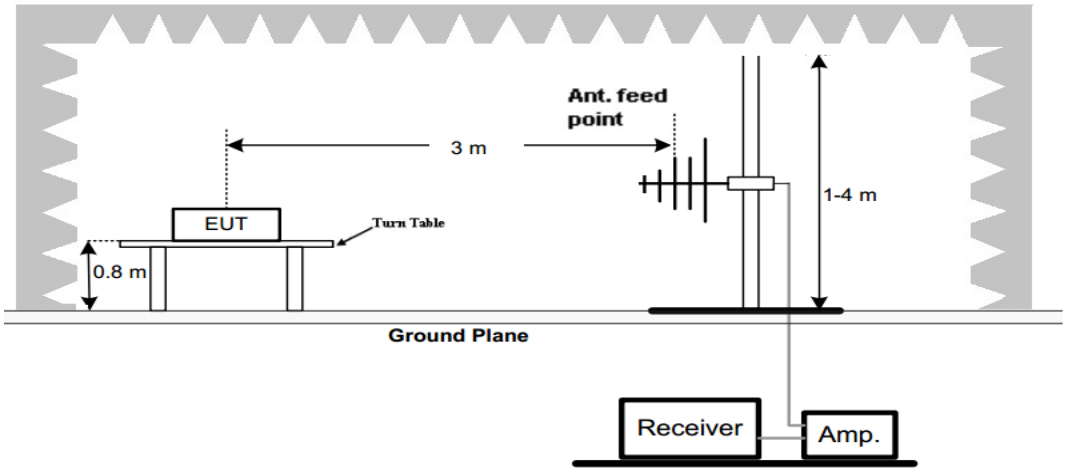
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

1. Radiated Emission Test Set-Up, Frequency Below 30MHz



2. Radiated Emission Test Set-Up, Frequency below 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1000MHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP

TEST RESULTS

Temperature	22.8℃	Humidity	56%
Test Engineer	Moon Tan	Test mode	TX

For 9 KHz-30MHz

WORST-CASE RADIATED EMISSION BELOW 30 MHz

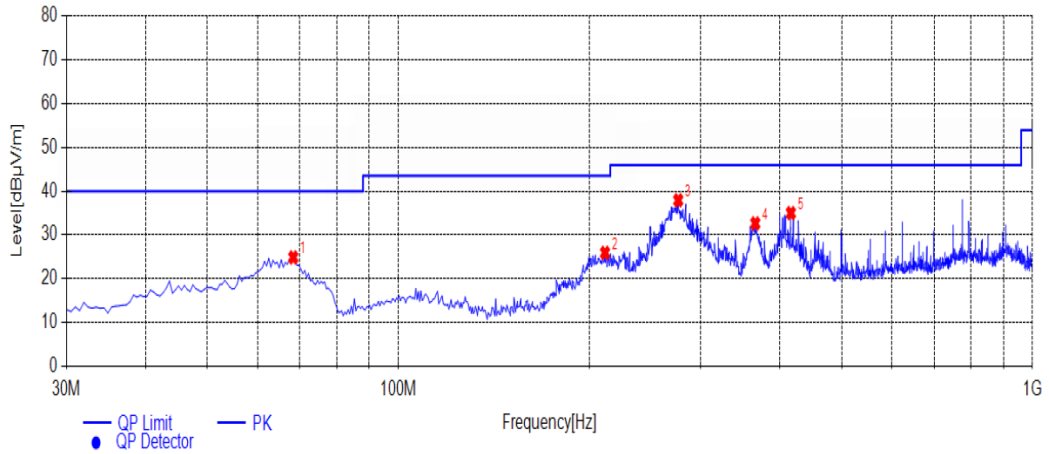
Frequency	Reading	Polar	Antenna Factor	Cable Loss	Emission Levels	Limits at 3m	Margin	Detector Mode
(MHz)	(dBμV/m)	Loop	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
0.125(F)	41.60	Loop	23.64	0.01	65.25	105.67	40.42	PK
0.125(F)	24.60	Loop	23.64	0.01	48.25	85.67	37.42	AV
0.110	30.66	Loop	23.55	0.01	54.22	106.78	52.56	PK
0.110	22.26	Loop	23.55	0.01	45.82	86.78	40.96	AV
0.25	26.78	Loop	23.75	-0.17	50.36	99.65	49.29	QP
0.375	22.38	Loop	24.12	-0.25	46.25	96.12	49.87	QP
2.525	19.36	Loop	24.57	-0.24	43.69	69.54	25.85	QP
––	––	––	––	––	––	––		––

Remark:
1. Data of measurement within this frequency range shown "-- in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits and not recorded.
2. The test limit distance is 3m limit.
3. PK means Peak Value, QP means Quasi Peak Value, AV means Average Value.
4. F means Fundamental Frequency.
5. Emission level (dBuV/m) =Reading + Antenna Factor + Cable Loss.
6. Margin value = Limit value- Emission level.

For 30MHz-1GHz

Horizontal

Test Graph



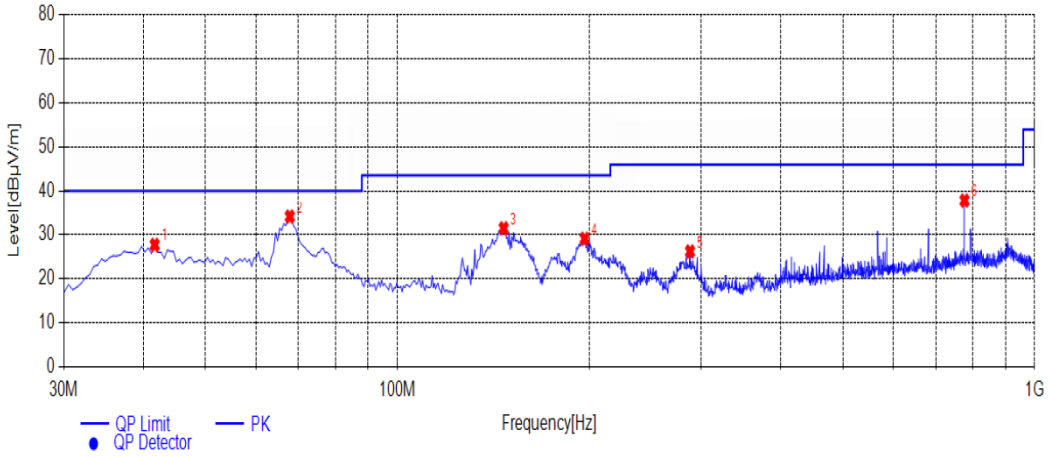
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	68.3150	34.41	-9.56	24.85	40.00	15.15	100	100	PK	Horizonta	PASS
2	211.8750	35.06	-9.15	25.91	43.50	17.59	100	120	PK	Horizonta	PASS
3	276.3800	45.77	-7.84	37.93	46.00	8.07	100	100	PK	Horizonta	PASS
4	365.6200	38.21	-5.57	32.64	46.00	13.36	100	80	PK	Horizonta	PASS
5	416.0600	39.43	-4.43	35.00	46.00	11.00	100	310	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



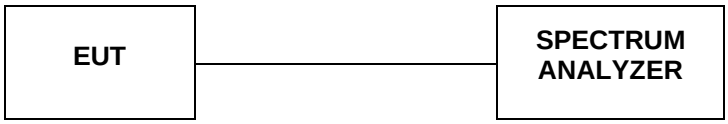
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.6400	35.83	-8.13	27.70	40.00	12.30	100	270	PK	Vertical	PASS
2	67.8300	43.62	-9.46	34.16	40.00	5.84	100	190	PK	Vertical	PASS
3	146.8850	43.94	-12.47	31.47	43.50	12.03	100	210	PK	Vertical	PASS
4	196.8400	38.28	-9.18	29.10	43.50	14.40	100	20	PK	Vertical	PASS
5	288.0200	33.36	-7.15	26.21	46.00	19.79	100	220	PK	Vertical	PASS
6	776.4150	36.25	1.56	37.81	46.00	8.19	100	200	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

4.3 Occupied Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be.deomonstrated by measuring the radiated emissions.

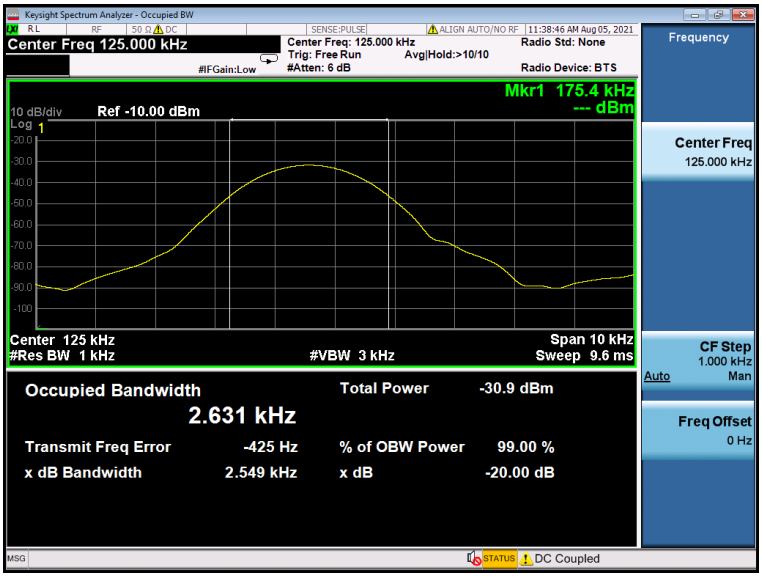
LIMIT

The 20dB bandwidth shall be less than 80% of the permitted frequency band.

TEST RESULTS

Temperature	22.8℃	Humidity	56%
Test Engineer	Moon Tan	Test mode	TX

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Conclusion
Tx Mode	125	2.549	2.631	PASS



4.4 Antenna Requirement

Standard Applicable

Standard Applicable

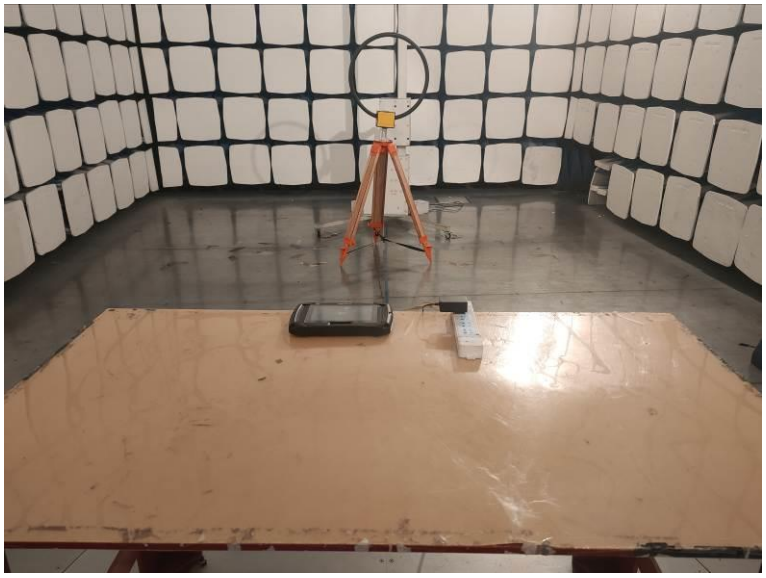
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

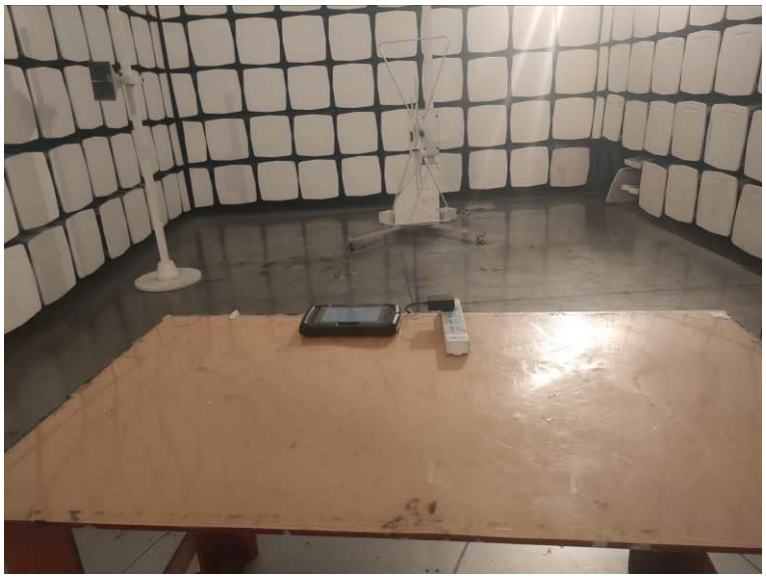
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Information

The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.

5 Test Setup Photos of the EUT





6 PHOTOS OF THE EUT

Reference to the test report No. GTS20210721003-1-1

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