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.....:	**GTS20190528003-1-1-3**
FCC ID..... :	**2ART3-KH100**
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.....:	June 06, 2019
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 .....:	Room B701.B702.B706.B708.B710.B712.B713, Fuhai Street Bridge Head Community, Baoan District, Shenzhen, China
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 .....:	Full-featured Key Aide
Trade Mark .....:	lonsdor
Manufacturer .....:	Shenzhen Lonsdor Technology Co., Ltd.
Model/Type reference.....:	KH100
Listed Models .....:	N/A
Modulation Type.....:	ASK
Operation Frequency.....:	125KHz
Hardware Version .....:	N/A
Software Version .....:	N/A
Rating .....:	DC 3.70V from battery

TEST REPORT

Test Report No. :	GTS20190528003-1-1-3	June 06, 2019 Date of issue

Equipment under Test	:	Full-featured Key Aide
Model /Type	:	KH100
Listed Models	:	N/A
Applicant	:	**Shenzhen Lonsdor Technology Co., Ltd.**
Address	:	Room B701.B702.B706.B708.B710.B712.B713, Fuhai Street Bridge Head Community, Baoan District, Shenzhen, China
Manufacturer	:	**Shenzhen Lonsdor Technology Co., Ltd.**
Address	:	Room B701.B702.B706.B708.B710.B712.B713, Fuhai Street Bridge Head Community, Baoan 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 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	:	May 10, 2019
Testing commenced on	:	May 11, 2019
Testing concluded on	:	June 06, 2019

2.2 Product Description

Product Name:	Full-featured Key Aide
Model/Type reference:	KH100
Power supply:	DC 3.70V from battery
125KHz	
Operation frequency:	125KHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	Loop Antenna

2.3 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 3.7V from battery

Description of the test mode

Operation Frequency each of channel	
Channel	Frequency
1	125KHz

Operating Mode
The mode is used: Transmitting mode

2.4 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

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	2018/09/20	2019/09/19
LISN	R&S	ESH2-Z5	893606/008	2018/09/20	2019/09/19
Bilog Antenna	Schwarzbeck	VULB9163	976	2016/09/20	2019/09/19
EMI Test Receiver	R&S	ESCI7	101102	2018/09/20	2019/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2018/09/20	2019/09/19
Spectrum Analyzer	R&S	FSP40	100019	2018/06/05	2019/06/04
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2016/09/20	2019/09/19
Active Loop Antenna	SCHWARZBEC K	FMZB1519	1519-037	2016/09/20	2019/09/19
Broadband Horn Antenna	SCHWARZBEC K	BBHA 9170	971	2016/09/20	2019/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2018/09/20	2019/09/19
Amplifier	EMCI	EMC051845B	980355	2018/09/20	2019/09/19
Temperature/Humidi ty Meter	Gangxing	CTH-608	02	2018/09/20	2019/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2018/09/20	2019/09/19
High-Pass Filter	K&L	41H10-1375/U12750-	KL142032	2018/09/20	2019/09/19

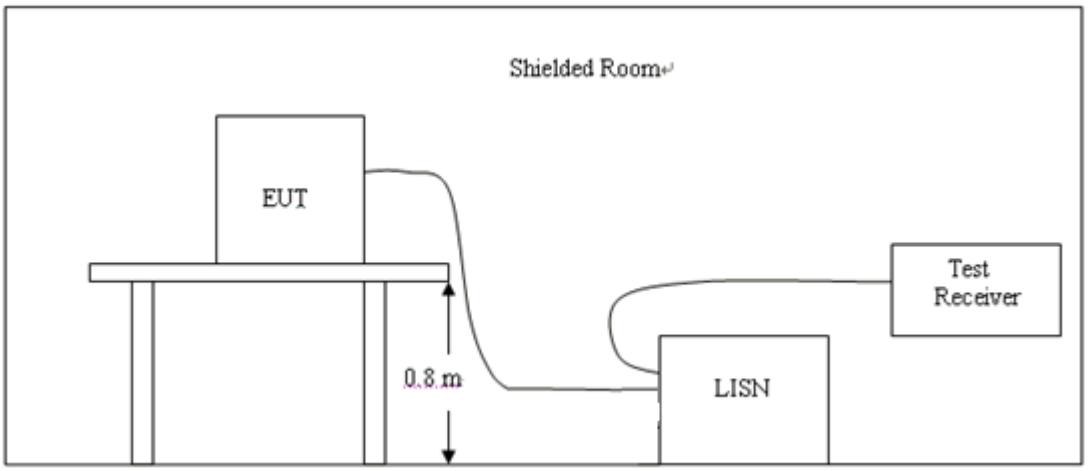
		O/O			
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2018/09/20	2019/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2018/09/20	2019/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2018/09/20	2019/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2018/09/20	2019/09/19
EMI Test Software	R&S	ES-K1	V1.7.1	2018/09/20	2019/09/19
EMI Test Software	JS Tonscend	JS32-RE	2.0.1.5	2018/09/20	2019/09/19
EMI Test Software	Audix	E3	2..1.1	2018/09/20	2019/09/19

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

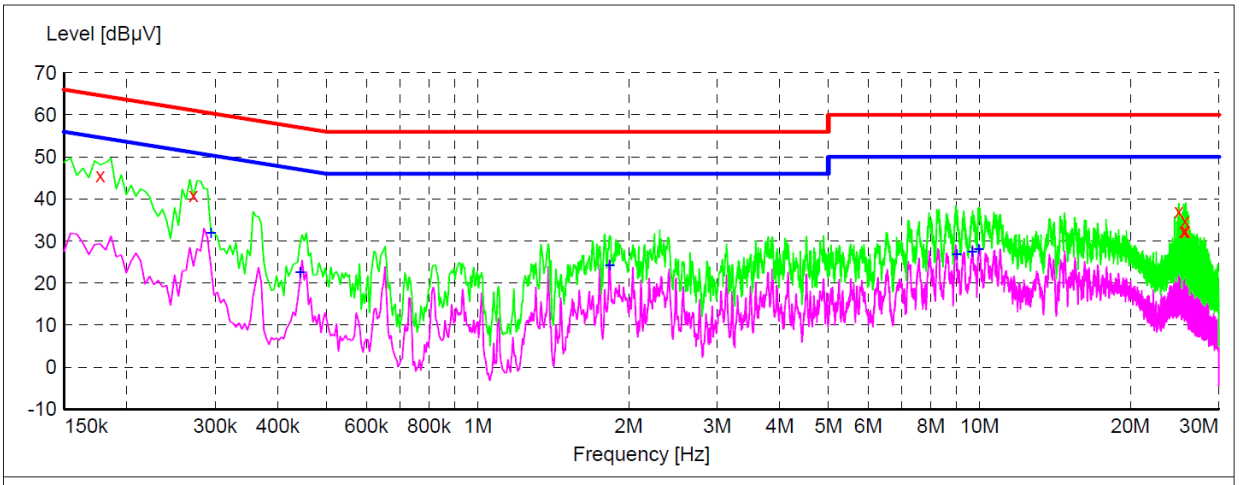
Remark:

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:.

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	L

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



x x x MES GTS190602128_fin

MEASUREMENT RESULT: "GTS190602128_fin"

6/2/2019 11:36AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177001	45.50	10.2	65	19.1	QP	L1	GND
0.271501	40.90	10.2	61	20.2	QP	L1	GND
24.967501	37.00	11.1	60	23.0	QP	L1	GND
25.507501	32.30	11.1	60	27.7	QP	L1	GND
25.692001	34.70	11.1	60	25.3	QP	L1	GND
25.755001	32.30	11.1	60	27.7	QP	L1	GND

MEASUREMENT RESULT: "GTS190602128_fin2"

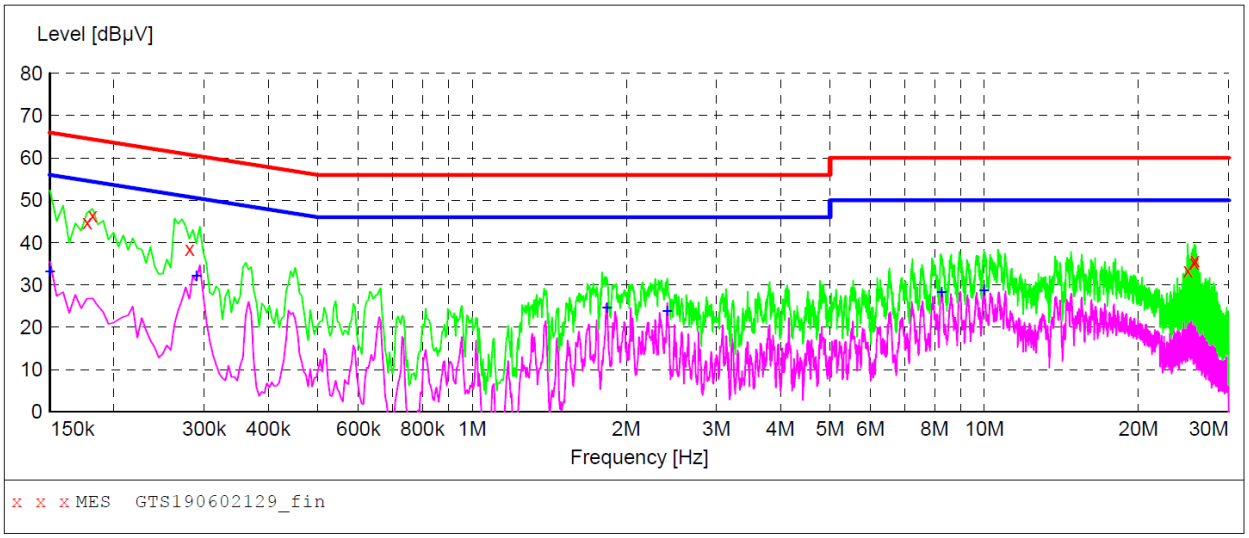
6/2/2019 11:36AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.294001	32.00	10.2	50	18.4	AV	L1	GND
0.442501	22.50	10.2	47	24.5	AV	L1	GND
1.833001	24.20	10.3	46	21.8	AV	L1	GND
9.001501	26.80	10.6	50	23.2	AV	L1	GND
9.663001	27.40	10.6	50	22.6	AV	L1	GND
9.964501	28.00	10.6	50	22.0	AV	L1	GND

Power supply:	DC 5V from Adapter AC 120V/60Hz	Polarization	N

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "GTS190602129_fin"

6/2/2019 11:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177001	44.70	10.2	65	19.9	QP	N	GND
0.181501	46.40	10.2	64	18.0	QP	N	GND
0.280501	38.60	10.2	61	22.2	QP	N	GND
24.972001	33.30	11.1	60	26.7	QP	N	GND
25.692001	35.30	11.1	60	24.7	QP	N	GND
25.750501	35.90	11.1	60	24.1	QP	N	GND

MEASUREMENT RESULT: "GTS190602129_fin2"

6/2/2019 11:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150001	33.20	10.2	56	22.8	AV	N	GND
0.289501	32.10	10.2	51	18.4	AV	N	GND
1.833001	24.70	10.3	46	21.3	AV	N	GND
2.404501	23.80	10.4	46	22.2	AV	N	GND
8.254501	28.40	10.5	50	21.6	AV	N	GND
9.991501	28.70	10.6	50	21.3	AV	N	GND

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.

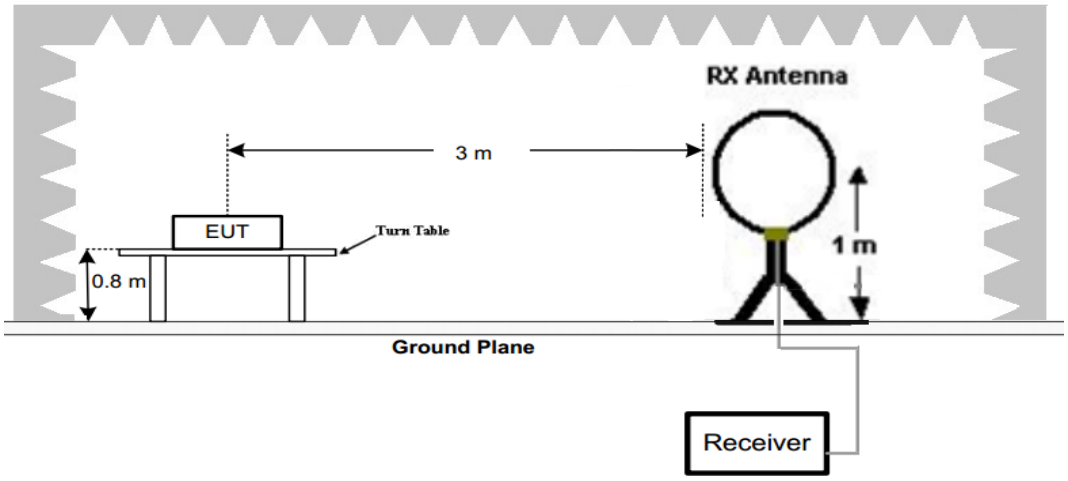
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

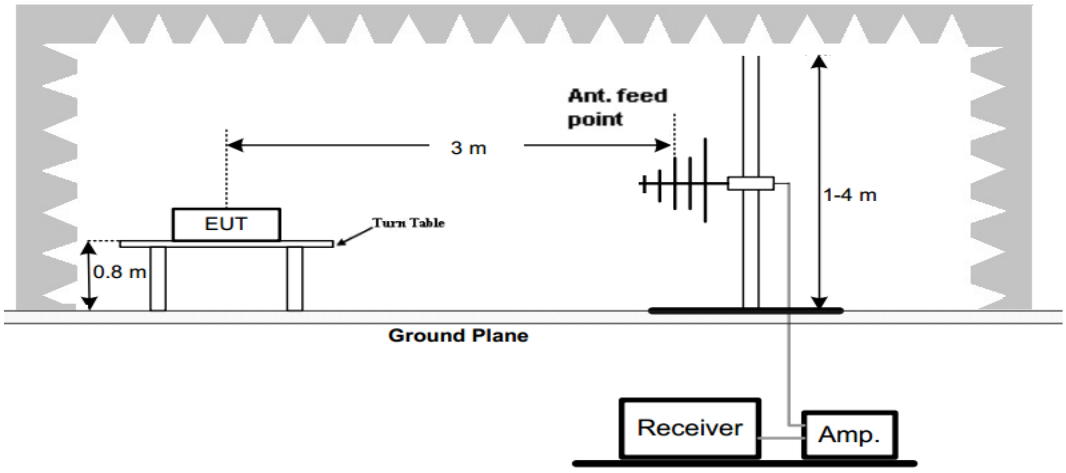
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

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

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)	35.71	Loop	23.64	0.01	59.36	105.67	46.31	PK
0.125(F)	27.57	Loop	23.64	0.01	51.22	85.67	34.45	AV
0.110	25.71	Loop	23.55	0.01	49.27	106.78	57.51	PK
0.110	18.65	Loop	23.55	0.01	42.21	86.78	44.57	AV
0.495	11.68	Loop	23.75	-0.17	35.26	73.71	38.45	QP
1.737	22.45	Loop	24.12	-0.25	46.32	62.81	16.49	QP
2.875	23.35	Loop	24.57	-0.24	47.68	69.54	21.86	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.

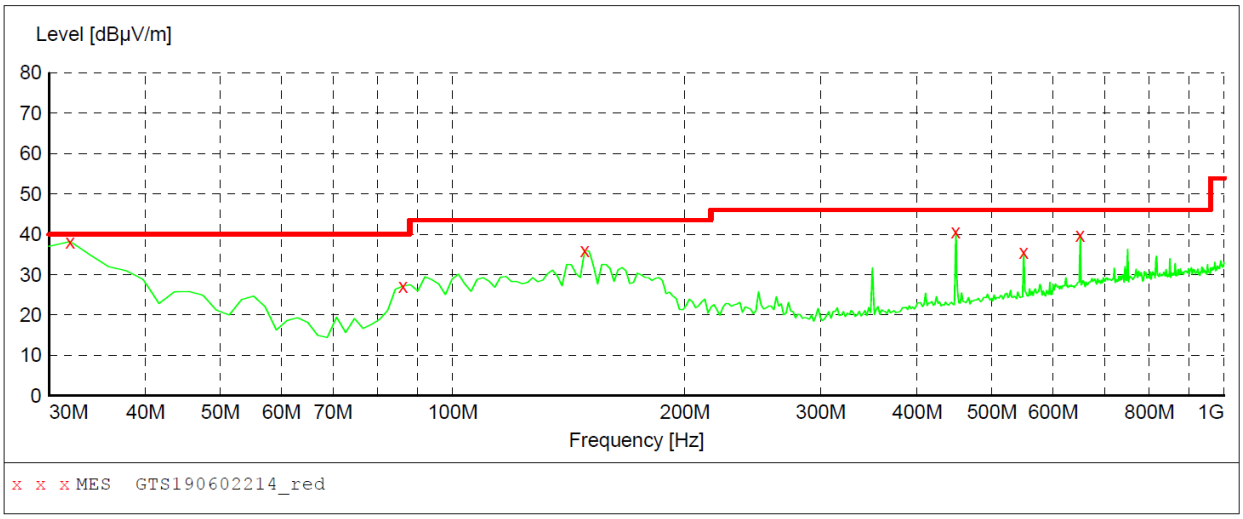
For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	9163



MEASUREMENT RESULT: "GTS190602214_red"

6/2/2019 9:14AM

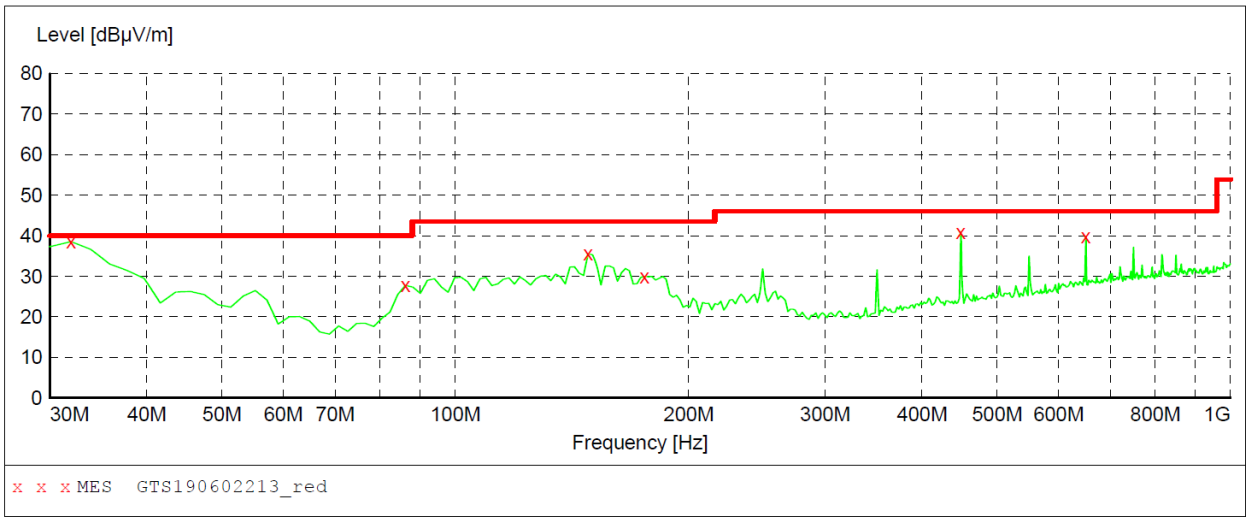
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	38.20	19.2	40.0	1.8	---	0.0	0.00	HORIZONTAL
86.260000	27.10	9.0	40.0	12.9	---	0.0	0.00	HORIZONTAL
148.340000	36.00	13.8	43.5	7.5	---	0.0	0.00	HORIZONTAL
449.040000	40.70	19.1	46.0	5.3	---	0.0	0.00	HORIZONTAL
549.920000	35.60	21.0	46.0	10.4	---	0.0	0.00	HORIZONTAL
650.800000	39.80	22.8	46.0	6.2	---	0.0	0.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	9163



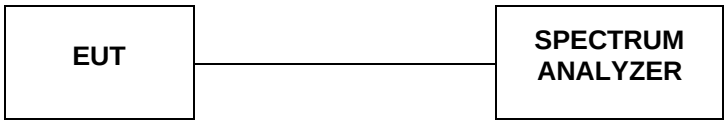
MEASUREMENT RESULT: "GTS190602213_red"

6/2/2019 9:07AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	38.50	19.2	40.0	1.5	---	0.0	0.00	VERTICAL
86.260000	27.70	9.0	40.0	12.3	---	0.0	0.00	VERTICAL
148.340000	35.50	13.8	43.5	8.0	---	0.0	0.00	VERTICAL
175.500000	29.90	12.9	43.5	13.6	---	0.0	0.00	VERTICAL
449.040000	40.90	19.1	46.0	5.1	---	0.0	0.00	VERTICAL
650.800000	39.80	22.8	46.0	6.2	---	0.0	0.00	VERTICAL

4.3 Occupied Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

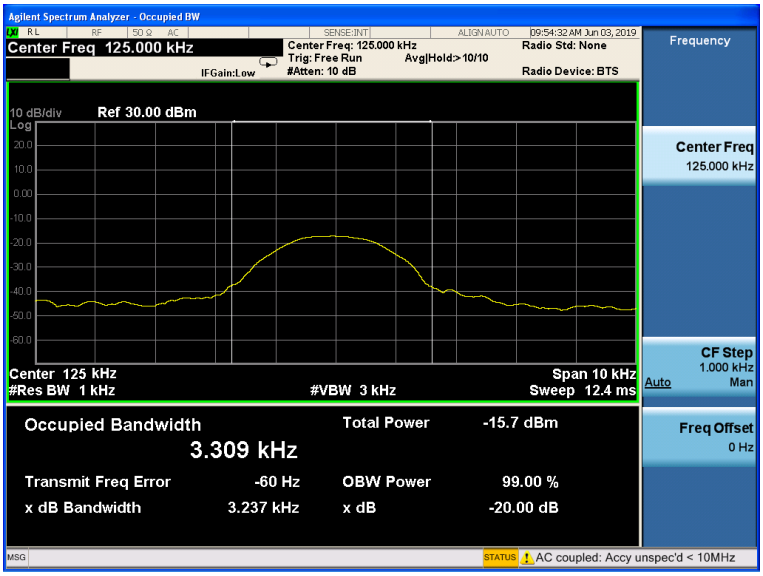
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule 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

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Conclusion
Tx Mode	125	3.237	3.309	PASS



4.4 Antenna Requirement

Standard Applicable

Standard Applicable

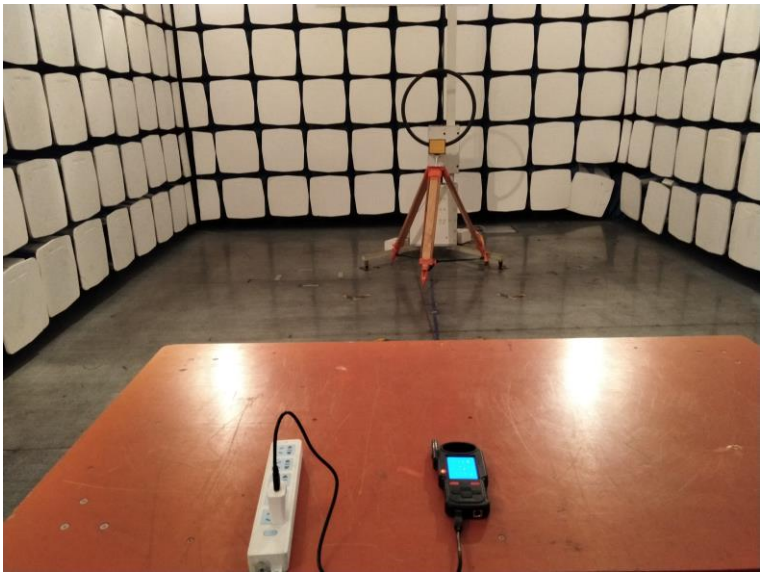
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

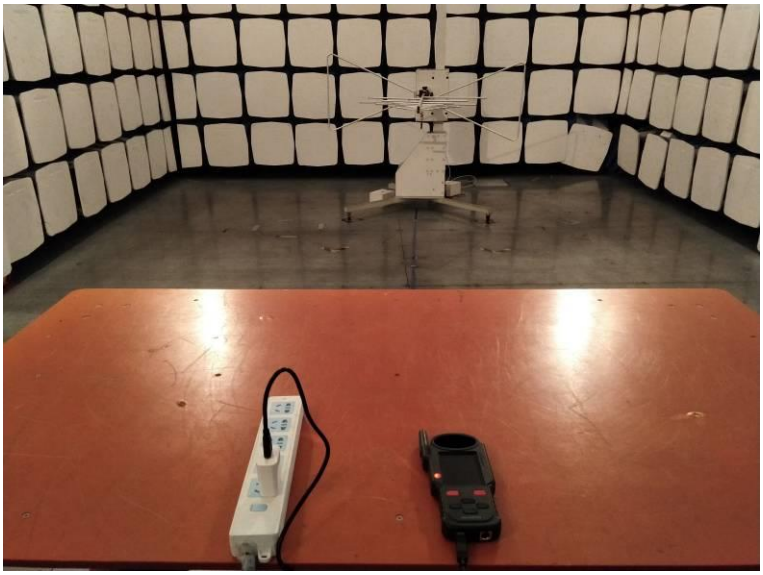
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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. GTS20190528003-1-1

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