

Report No: CCISE181101401

FCC REPORT (RFID)

Applicant:	Chengdu Ebyte Electronic Technology Co., Ltd.
Address of Applicant:	Innovation Center D347, 4# XI-XIN road, High-tech district(west), Chengdu, Sichuan, China
Equipment Under Test (E	EUT)
Product Name:	Lora Module
Model No.:	E22-900T22S
Trade mark:	EBYTE
FCC ID:	2ALPH-E22900T22S
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	07 Nov., 2018
Date of Test:	07 Nov., to 21 Nov., 2018
Date of report issued:	22 Nov., 2018
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	22 Nov., 2018	Original

Tested by:

Zora Lee

Date:

22 Nov., 2018

Test Engineer

Reviewed by:

Date:

22 Nov., 2018

Project Engineer



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4 Test Summary

Test Items	Section in CFR 47	Result			
Antenna requirement	15.203/15.247 (c)	Pass			
AC Power Line Conducted Emission	15.207	Pass			
Conducted Peak Output Power	15.247 (b)(3)	Pass			
6dB Emission Bandwidth	15.247 (a)(2)	Pass			
Power Spectral Density	15.247 (e)	Pass			
Band Edge	15.247(d)	Pass			
Conducted and radiated Spurious Emission	15.205/15.209	Pass			
Remark: Pass: Meet the requirement. N/A: Not Applicable for Non-adaptive equipment.					



5 General Information

5.1 Client Information

Applicant:	Chengdu Ebyte Electronic Technology Co., Ltd.
Address:	Innovation Center D347, 4# XI-XIN road, High-tech district(west), Chengdu, Sichuan, China
Manufacturer/Factory:	Chengdu Ebyte Electronic Technology Co., Ltd.
Address:	Innovation Center D347, 4# XI-XIN road, High-tech district(west), Chengdu, Sichuan, China

5.2 General Description of E.U.T.

Product Name:	Lora Module
Model No.:	E22-900T22S
Operation Frequency:	903-927 MHz
Channel numbers:	25
Channel separation:	1 MHz
Modulation technology:	Lora
Antenna Type:	External Antenna
Antenna gain:	3.0 dBi
Power supply:	DC 5V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel						
Frequency	Channel	Frequency	Channel	Frequency		
903MHz	10	913MHz	20	923MHz		
904MHz	11	914MHz	21	924MHz		
905MHz	12	915MHz	22	925MHz		
906MHz	13	916MHz	23	926MHz		
907MHz	14	917MHz	24	927MHz		
908MHz	15	918MHz				
909MHz	16	919MHz				
910MHz	17	920MHz				
911MHz	18	921MHz				
912MHz	19	922MHz				
	Frequency 903MHz 904MHz 905MHz 906MHz 907MHz 908MHz 909MHz 910MHz 911MHz	FrequencyChannel903MHz10904MHz11905MHz12906MHz13907MHz14908MHz15909MHz16910MHz17911MHz18	FrequencyChannelFrequency903MHz10913MHz904MHz11914MHz905MHz12915MHz906MHz13916MHz907MHz14917MHz908MHz15918MHz909MHz16919MHz910MHz17920MHz911MHz18921MHz	Frequency Channel Frequency Channel 903MHz 10 913MHz 20 904MHz 11 914MHz 21 905MHz 12 915MHz 22 906MHz 13 916MHz 23 907MHz 14 917MHz 24 908MHz 15 918MHz 909MHz 16 919MHz 910MHz 17 920MHz 911MHz 18 921MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 12 & 24 were selected as Lowest, Middle and Highest channel.



5.3 Test environment and test mode

Operating Environment:				
Temperature:	24.0 °C			
Humidity:	54 % RH			
Atmospheric Pressure:	1010 mbar			
Test mode:				
Transmitting mode	Keep the EUT in continuous transmitting with modulation			
The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber.				

Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

5.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
EBYTE	Test suite	E15-UTL1	N/A	N/A

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±2.22 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

5.6 Laboratory Facility

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

• FCC - Registration No.: 727551

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

IC - Registration No.: 10106A-1

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• CNAS - Registration No.: CNAS L6048

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

• A2LA - Registration No.: 4346.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <u>https://portal.a2la.org/scopepdf/4346-01.pdf</u>





5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd. Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.8 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-16-2018	03-15-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-16-2018	03-15-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2017	11-20-2018
Hom Antenna	SCHWARZDECK	BBHA 9170	DDHA9170302	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		b
Pre-amplifier	HP	8447D	2944A09358	03-07-2018	03-06-2019
Pre-amplifier	CD	PAP-1G18	11804	03-07-2018	03-06-2019
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-07-2018	03-06-2019
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2017	11-20-2018
Spectrum analyzer	RUIIUE & SCIIWAIZ	F3F40	100303	11-21-2018	11-20-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-07-2018	03-06-2019
Simulated Station	Anritsu	MT8820C	6201026545	03-07-2018	03-06-2019
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2018	03-06-2019
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2018	03-06-2019
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2018	03-06-2019

Conducted Emission:							
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)		
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-07-2018	03-06-2019		
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-07-2018	03-06-2019		
LISN	CHASE	MN2050D	1447	03-19-2018	03-18-2019		
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2019		
Cable	HP	10503A	N/A	03-07-2018	03-06-2019		
EMI Test Software	AUDIX	E3	Version: 6.110919b				



6 Test results and Measurement Data

6.1 Antenna requirement:

Standard requirement:	FCC Part 15 C Section 15.203 /247(c)				
15.203 requirement:	15.203 requirement:				
An intentional radiator shall responsible party shall be us antenna that uses a unique so that a broken antenna ca electrical connector is prohil 15.247(c) (1)(i) requirement (i) Systems operating in the operations may employ tran maximum conducted output	: 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point smitting antennas with directional gain greater than 6dBi provided the power of the intentional radiator is reduced by 1 dB for every 3 dB that the				
directional gain of the anten	directional gain of the antenna exceeds 6dBi.				
E.U.T Antenna:					
The BLE antenna is an Exter antenna is 3 dBi.	nal antenna which cannot replace by end-user, the best-case gain of the				





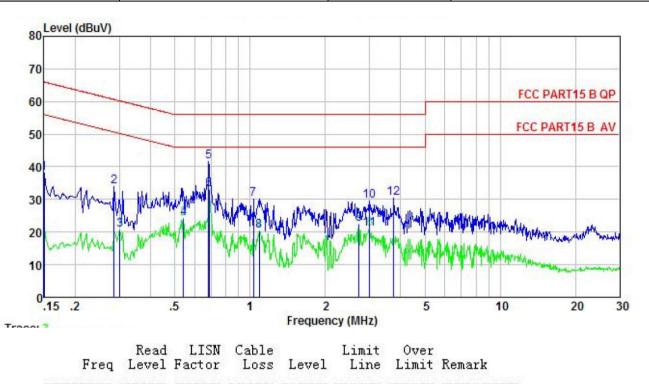
6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.	.207			
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	150 kHz to 30 MHz				
Class / Severity:	Class B				
Receiver setup:	RBW=9kHz, VBW=30kHz				
Limit:	Limit (dBu\/)				
	Frequency range (MHz)	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 logar				
Test procedure	 The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement. 				
Test setup:	LISN 40cm]— AC power		
Test Instruments:	Refer to section 5.8 for det	tails			
Test mode:	Refer to section 5.3 for det	tails			
Test results:	Passed				



Measurement Data:

Product name:	Lora Module	Product model:	E22-900T22S
Test by:	Zora	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
-	MHz	 dBuV		₫₿	 dBu₹	 dBu∛	āē	
1	0.150	27.23	0.18	10.78	38.19	66.00	-27.81	QP
2	0.286	23.15	0.13	10.74	34.02	60.63	-26.61	QP
2 3	0.302	9.84	0.13	10.74	20.71	50.19	-29.48	Average
4	0.541	13.32	0.12	10.76	24.20	46.00	-21.80	Average
5	0.683	30.76	0.13	10.77	41.66	56.00	-14.34	QP
6	0.686	22.20	0.13	10.77	33.10	46.00	-12.90	Average
4 5 6 7 8 9	1.032	19.22	0.13	10.87	30.22		-25.78	
8	1.088	9.27	0.13	10.88	20.28			Average
9	2.721	11.26	0.16	10.93	22.35			Average
10	3.009	18.36	0.16	10.92	29.44		-26.56	
11	3.009	9.88	0.16	10.92	20.96			Average
12	3.759	19.30	0.18	10.90	30.38		-25.62	

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. Final Level =Receiver Read level + LISN Factor + Cable Loss.



roduct name:	Lora Module				Product	model:	E22-9	00T22S		
est by:	Zora 150 kHz ~ 30 MHz			Zora Test mode:		de:	Tx mode			
est frequency:					Phase:		Neutral			
est voltage:	AC 120	AC 120 V/60 Hz			Environ	ment:	Temp	: 22.5 ℃	Huni	: 55%
Lovel (dDu)/)										
80 Level (dBuV)										
70										
60								FCC	PART1	5 B QP
00								ECC	PART15	DAV
50								ru	PARTIS	DAV
40		2 .	1	-						
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20 Lung Mary	www.www.www.w	WIT BY			Lading Have		Manhapata Manhapata	ANNA PANA ANNA Anna Anna Anna Anna Anna Anna Anna Ann	high hyperson	NA Houter
20 10	www.www.www.www.www.www.www.www.www.ww	Wind Bull		AMM /	Ladin Hang		Mananan Mananan	Ania Managana Ania Managana Ania Managana	hynnynynyn Mangeranne	N. B. Houters
20 Lung Mary	WW WWW/W WW WWW/W WW WWW/W/ WW WW/W/ WW WW/W/ WW WW/W/ WW W/ WW W/ W/ W/ W/ W/ W/ W/ W/ W/ W/ W/ W/ W/ W	Wind By				5	Madapatha Madapatha			at he Water and
20 10 10				2 Frequence			Maryaphy Maryaphy	a on the first of	N. A. M. Manadaria	at he Water and
20 10	Read			_	y (MHz)	Over	Remark	a on the first of	N. A. M. Manadaria	at he Water and
20 10 0.15 .2	Read eq Level	LISN	Cable	Frequenc	Limit	Over	- W W W	a on the first of	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 Fra	Read eq Level Hz dBuV	LISN Factor dB	Cable Loss dB	Frequenc Level dBuV	Limit Line dBuV	Over Limit dB	Remark	10	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 From 10, 5'	Read eq Level Hz dBuV 73 11.98 33 24.14	LISN Factor dB 0.97 0.97	Cable Loss 	Frequenc Level 	Limit Line dBuV 46.00 56.00	Over Limit 	Remark Averag	10 e	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 From 10.5 2 0.63 3 0.69 4 0.83	Read eq Level Hz dBuV 73 11.98 33 24.14 90 13.89 22 22.57	LISN Factor dB 0.97 0.97 0.97 0.97 0.97	Cable Loss dB 10.76 10.77 10.77 10.82	Frequenc Level 	Limit Line dBuV 46.00 56.00 46.00 56.00	Over Limit 	Remark Averag QP Averag QP	10 e e	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 From 10 1 0.5 2 0.6 3 0.6 4 0.8 5 1.2	Read eq Level Hz dBuV 73 11.98 83 24.14 90 13.89 22 22.57 29 10.77	LISN Factor dB 0.97 0.97 0.97 0.97 0.97 0.97	Cable Loss dB 10.76 10.77 10.77 10.82 10.90	Frequenc Level dBuV 23.71 35.88 25.63 34.36 22.64	Limit Line dBuV 46.00 56.00 46.00 56.00 46.00	Over Limit -22.29 -20.12 -20.37 -21.64 -23.36	Remark Averag QP Averag QP Averag	10 e e	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 From 10 1 0.5° 2 0.6° 3 0.6° 4 0.8° 5 1.2° 6 1.2° 7 1.5°	Read eq Level Hz dBuV 73 11.98 83 24.14 90 13.89 22 22.57 29 10.77 36 20.93 27 20.67	LISN Factor dB 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.98	Cable Loss dB 10.76 10.77 10.77 10.82 10.90 10.90 10.93	Frequenc Level dBuV 23.71 35.88 25.63 34.36 22.64 32.80 32.58	Limit Line dBuV 46.00 56.00 46.00 56.00 46.00 56.00 56.00	Over Limit -22.29 -20.12 -20.37 -21.64 -23.36 -23.20 -23.42	Remark Averag QP Averag QP Averag QP QP QP	10 e e	N. A. M. Malanasis	at he Water and
20 10 0.15 .2 From 10 1 0.57 2 0.67 3 0.69 4 0.87 5 1.27 6 1.27 7 1.57 8 1.6 9 2.87	Read eq Level Hz dBuV 73 11.98 33 24.14 90 13.89 22 22.57 29 10.77 36 20.93 27 20.67 10 9.43 34 10.90	LISN Factor dB 0.97 0.97 0.97 0.97 0.97 0.97 0.98 0.98 0.98 0.99	Cable Loss dB 10.76 10.77 10.77 10.82 10.90 10.90 10.93 10.93 10.92	Frequenc Level dBuV 23.71 35.88 25.63 34.36 22.64 32.80 32.58 21.34 22.81	Limit Line dBuV 46.00 56.00 46.00 56.00 46.00 56.00 56.00 46.00 46.00	Over Limit -22.29 -20.12 -20.37 -21.64 -23.36 -23.20 -23.42 -24.66 -23.19	Remark Averag QP Averag QP Averag QP Averag QP Averag Averag	10 e e e	N. A. M. Malanasis	at he Water and
20 10 0 .15 .2 From 1 0.5 2 0.6 3 0.6 4 0.8 5 1.2 6 1.2 7 1.5 8 1.6	Read eq Level Hz dBuV 73 11.98 83 24.14 90 13.89 22 22.57 29 10.77 36 20.93 27 20.67 10 9.43 34 10.90 99 19.89	LISN Factor dB 0.97 0.97 0.97 0.97 0.97 0.97 0.98 0.98	Cable Loss dB 10.76 10.77 10.77 10.82 10.90 10.90 10.93 10.93	Frequenc Level dBuV 23.71 35.88 25.63 34.36 22.64 32.80 32.58 21.34	Limit Line dBuV 46.00 56.00 46.00 56.00 56.00 56.00 46.00 56.00 46.00 56.00	Over Limit -22.29 -20.12 -20.37 -21.64 -23.36 -23.20 -23.42 -24.66	Remark Averag QP Averag QP Averag QP Averag QP Averag QP	10 e e e e	N. A. M. Malanasis	at he Water and
20 10 0 .15 .2 From 1 0.57 2 0.63 3 0.69 4 0.83 5 1.22 6 1.22 7 1.55 8 1.6 9 2.83 10 3.75	Read eq Level Hz dBuV 73 11.98 83 24.14 90 13.89 22 22.57 29 10.77 36 20.93 27 20.67 10 9.43 34 10.90 99 19.89 99 9.10	LISN Factor dB 0.97 0.97 0.97 0.97 0.97 0.97 0.98 0.98 0.98 0.99 1.00	Cable Loss dB 10.76 10.77 10.77 10.82 10.90 10.90 10.93 10.93 10.92 10.90	Frequenc Level dBuV 23.71 35.88 25.63 34.36 22.64 32.80 32.58 21.34 22.81 31.79	Limit Line dBuV 46.00 56.00 46.00 56.00 56.00 56.00 46.00 46.00 46.00 46.00 46.00	Over Limit -22.29 -20.12 -20.37 -21.64 -23.36 -23.20 -23.42 -24.66 -23.19 -24.21	Remark Averag QP Averag QP Averag QP Averag QP Averag QP Averag Averag	10 e e e e	N. A. M. Malanasis	at he Water and

3. Final Level =Receiver Read level + LISN Factor + Cable Loss.



6.3 Conducted Output Power

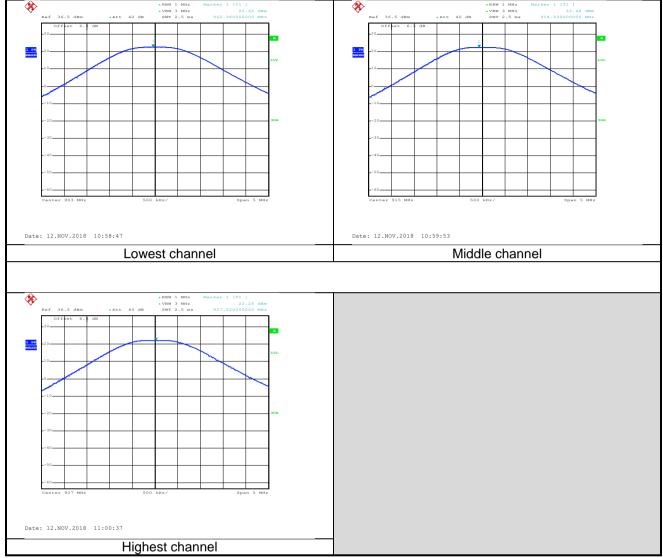
Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)		
Test Method:	ANSI C63.10:2013 and KDB558074		
Limit:	30dBm		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data:

Test CH	Maximum Conducted Output Power (dBm)	Limit(dBm)	Result
Lowest	22.62		
Middle	22.48	30.00	Pass
Highest	22.25		



Test plot as follows:





6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)		
Test Method:	ANSI C63.10:2013 and KDB558074		
Limit:	>500kHz		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 5.8 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

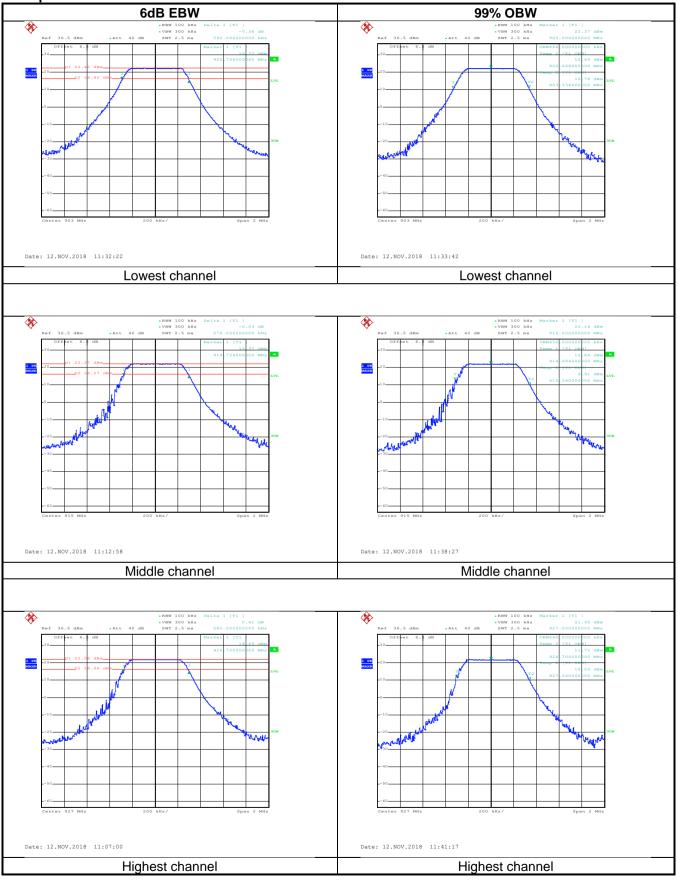
Measurement Data:

Test CH	6dB Emission Bandwidth (MHz)	Limit(kHz)	Result
Lowest	0.592		
Middle	0.576	>500	Pass
Highest	0.580		
Test CH	99% Occupy Bandwidth (MHz)	Limit(kHz)	Result
Lowest	0.668		
Middle	0.656	N/A	N/A
Highest	0.640		



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Test plot as follows:



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6.5 Power Spectral Density

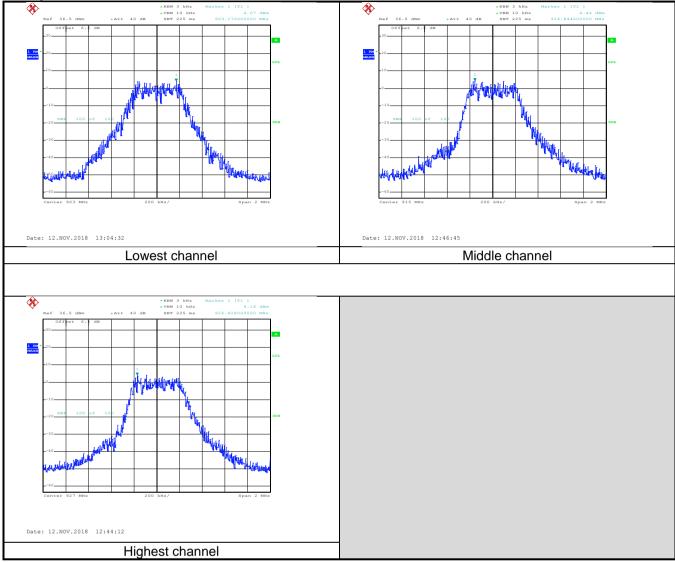
Test Requirement:	FCC Part 15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074
Limit:	8 dBm
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Test CH	Power Spectral Density (dBm)	Limit(dBm)	Result
Lowest	4.07		
Middle	4.44	8.00	Pass
Highest	4.16		



Test plots as follow:





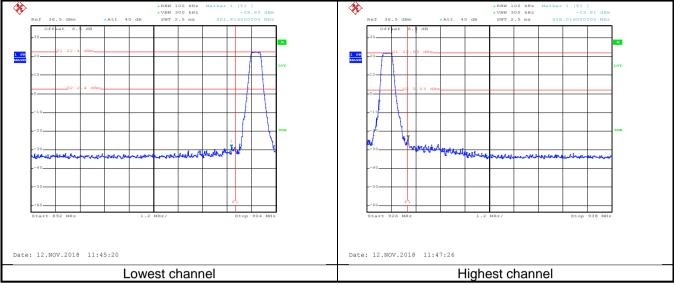
6.6 Band Edge

6.6.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)			
Test Method:	ANSI C63.10:2013 and KDB558074			
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.			
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table			
Test beste see ste	Ground Reference Plane			
Test Instruments:	Refer to section 5.8 for details			
Test mode:	Refer to section 5.3 for details			
Test results:	Passed			



Test plots as follow:





Test Requirement:	FCC Part15 C Se	ction 15.209	and 15.205				
Test Method:	ANSI C63.10: 202	13 and KDB	558074				
Test Frequency Range:	960MHz to 1.240	GHz					
Test site:	Measurement Dis	tance: 3m					
Receiver setup:	Frequency Detector RBW VBW Rema						
Receiver Setup.	960MHz-1GHz	Quasi-peal		-	kHz	Quasi-peak Value	
		Peak	1MHz		Hz		
	Above 1GHz	RMS	1MHz	3M	Hz	Average Value	
Limit:	Frequency	Remark					
	960MHz-1GH	lz	54.00		G	Quasi-peak Value	
	Above 1GH	-	54.00			Average Value	
Test Procedure:			74.00			Peak Value 8m(below 1GHz)	
	 was rotated 3 radiation. 2. The EUT was antenna, whi tower. 3. The antenna ground to de horizontal an measuremen 4. For each sus and thenthe the rotatable maximum rea 5. The test-rece SpecifiedBar 6. If the emission limitspecified EUT wouldbe margin would 	360 degrees s set 3 meter chwas mour height is var termine the r d vertical po t. spected emis antenna was was turned f ading. eiver system dwidth with on level of the then testing e reported. C	todetermine the s away from t ted on the top ied from one r haximum valu arizations of t sion, the EUT tuned to heig om 0 degrees was set to Pea Maximum Hole EUT in peak could be stop	he position he interior of a vain neter to e of the he anter was arr to 360 ak Dete d Mode mode wo ped an emission sing pea	ion of ference riable four r field s nna an rangeo 1 me degre ct Fur was 10 d the ns that ak, qu	ce-receiving -height antenna meters above the strength. Both re set to make the d to its worst case eter to 4 meters and ees to find the action and DdB lower than the peak values of the t did not have 10dB lasi-peak or	
Test setup:	Below 1GHz	> 3m < 4m				Antenna Tower Search Antenna est	

6.6.2 Radiated Emission Method



Report No: CCISE181101401

	Above 1GHz
	AE EUT Horn Antenna Tower Horn Antenna Tower Ground Reference Plane Test Receiver Test Receiver Controller
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



Below 1GHz:

oduct Name:	Lora Mo	odule			Product Model: E22-900T22S				
est By:	Zora				Test mo	de:	Tx m	ode	
est Channel:	Highest	channel			Polariza	tion:	Vertio	cal	
est Voltage:	AC 120	V/60Hz			Environ	ment:	Temp	ɔ: 24 ℃	Huni: 57%
	25								
100 Level (dBuV/m)							Date: 2	018-11-15
90									
80									
70									
60							FCC	PART15	CLASS D
50		-					ruu	PARTIS	CLASS D
40			5	1		12	1.591	10 16 10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
40 30	manipastran	horizona	whentermost	man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	when	mandown	upitured	hannon
mannowww	n an som som and and a	horner	NHAMMAN	min	www.www.	and the second	mandonium	montand	hannandarith
30	างการใหญ่สามาให	hormony	when any and	hump		and the second	mandrewup	northand	have a second
30 20 10		harmon	whenterment	human		and for the second s		nontroad	
30		harman		equency (P		when		ndertweed	hore-19900/25 1000
30 20 10	5		Fr	equency (f	ИНZ)			nder handed	
30 20 10 960 96	5	Antenna	Fr Cable	equency (f	MHz)	Limit	Over Limit		1000
30 20 10 960 96	5 Read. q Level	Antenna Factor	Fr Cable	equency (P Preamp Factor	MHz)	Limit Line	Over Limit		1000
30 20 10 960 96 Fre	5 Read. eq Level Iz dBuV	Antenna Factor	Fr Cable Loss	equency (Preamp Factor dB	MHz) Level	Limit Line dBuV/m	Over Limit 		1000

2. The emission levels of other frequencies are very lower than the limit and not show in test report.





oduct l	Name:	Lora Module				ame: Lora Module Product Model				Model:	E22-900T22S			
st By:		Zora				Test mod	de:	Tx mode						
st Cha	nnel:	Highest	channel			Polarizat	ion:	Horizo	ntal					
st Volt	age:	AC 120	V/60Hz			Environr	nent:	Temp:	24 ℃	Huni: 57%				
									-					
100 Lev	vel (dBuV/m)								Da	te: 2018-11-1				
90														
80														
70														
823										and the second second				
60									FCC PAR	T15 CLASS B				
60 50														
50														
50 40	margan	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hand	- Antonia Mar	m. Margana	man	Your Madas	- Munipul						
50 40 30	man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	here the terms	- alternations	1 marine	ungrad syddraed	www.www.www.	-Merrian						
50 40	manna	~~~~~	han de la companya de	- and the second se	1 Marian	wayna triyddinand	yan na may n	-menton						
50 40 30	man		lendertenang	- and the second se	1 - Annora	waynad byddinand	un and an	-Menopol						
50 40 30 20				- Jan Star	1 Mary Mary Mary Mary Mary Mary Mary Mary	unayaan hay dadaaan d	Yalan yalangi Masaya P			MAR - Martin Martin Martin				
50 40 30 20 10					Frequence		har an			MAR - Martin Martin Martin				
50 40 30 20 10) 965	Read/	Antenna Factor	Cable	Frequence	cy (MHz)	Limit	Over Limit						
50 40 30 20 10) 965	Read/	Antenna Factor	Cable	Frequence Preamp Factor	cy (MHz)	Limit Line	Over						

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



Above 1GHz:

Name:	Lora M	Lora Module				luct Mod	el:	E22-900T22	S	
	Zora				Test	mode:		Tx mode		
nnel:	Highes	st channe	I		Pola	rization:		Vertical		
age:	AC 120	0V/60Hz			Envi	ronment	:	Temp: 24 ℃	Huni: 57%	
el (dBuV/m)								Date:	2018-11-15	
								FCC PA	RT 15 (PK)	
	_							FCC PA	RT 15 (AV)	
								1		
mon	mound	month	munit	Mound	and the second	Manuth	and my the	mound	- Alan Mart	
00 1020	105	0		1100				1200	1240	
5	Readú	ntenna	Cable			I imi+	Ûtter			
Freq	Level	Factor	Loss	Factor	Level			Remark		
MHz	 dBu∛		āē	āā	dBuV/m	dBuV/m	āB		-	
1191.879 1191.879	18.26 9.85	24.29 24.29	3.30 3.30	0.00 0.00	45.85 37.44	74.00 54.00	-28.15 -16.56	Peak Average		
	nnel: age: rel (dBuV/m) (dBuV/	Zora nnel: Highes age: AC 120 rel (dBuV/m) rel (dBuV/m) nmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	Zora nnel: Highest channe age: AC 120V/60Hz rel (dBuV/m) AC 120V/60Hz rel (dBuV/m) 0 1020 1050 ReadAnt enna Freq Level Factor MHz dBuV dB/m	Zora nnel: Highest channel age: AC 120V/60Hz rel (dBuV/m) rel (dBuV/m) 0 100 0 1020 ReadAntenna Cable Freq Level MHz dBuV	Zora Zora nnel: Highest channel age: AC 120V/60Hz rel (dBuV/m) Image: Market Image: Image: Image: Imarket Imarket <t< td=""><td>Zora Test nnel: Highest channel Pola age: AC 120V/60Hz Envi rel (dBuV/m) Image: Image: age: AC 120V/60Hz Image: age: Image: Image: Image: age: Image: Image: Image: age: Image: Image:</td><td>Zora Test mode: nnel: Highest channel Polarization: age: AC 120V/60Hz Environment rel (dBuV/m) Image: Image: with the second seco</td><td>Zora Test mode: nnel: Highest channel Polarization: age: AC 120V/60Hz Environment: rel (dBuV/m) Image: Image: vel (dBuV) Im</td><td>Zora Test mode: Tx mode nnel: Highest channel Polarization: Vertical age: AC 120V/60Hz Environment: Temp: 24°C rel (dBuV/m) Date: FCC PA age: AC 120V/60Hz FCC PA age: AC 120V/60Hz FCC PA rel (dBuV/m) Date: FCC PA age: AC 120V/60Hz FCC PA age: Ac 120V/m FCC PA age: Age: FCC PA</td></t<>	Zora Test nnel: Highest channel Pola age: AC 120V/60Hz Envi rel (dBuV/m) Image: Image: age: AC 120V/60Hz Image: age: Image: Image: Image: age: Image: Image: Image: age: Image: Image:	Zora Test mode: nnel: Highest channel Polarization: age: AC 120V/60Hz Environment rel (dBuV/m) Image: Image: with the second seco	Zora Test mode: nnel: Highest channel Polarization: age: AC 120V/60Hz Environment: rel (dBuV/m) Image: Image: vel (dBuV) Im	Zora Test mode: Tx mode nnel: Highest channel Polarization: Vertical age: AC 120V/60Hz Environment: Temp: 24°C rel (dBuV/m) Date: FCC PA age: AC 120V/60Hz FCC PA age: AC 120V/60Hz FCC PA rel (dBuV/m) Date: FCC PA age: AC 120V/60Hz FCC PA age: Ac 120V/m FCC PA age: Age: FCC PA	





	-900T22S	: E22	t Model:	Produc			odule	Lora M	ne:	t Nam	roduc
	node	Zora Test mode: Tx mode					/:	est By			
	izontal	Hori	ation:	Polariz			t channel	Highest	el:	annel	est Ch
Huni: 57%	יר: 24℃	Terr	nment:	Enviro)V/60Hz	AC 120	:	ltage:	est Vo
2018-11-15	Da								d <mark>Bu</mark> V/m)	evel (d	100
											90
-	10000										80
RT 15 (PK)	FCC										_
											70
RT 15 (AV)	FCC										60
manufala	mar and the second	pontor	mortan	www	mun	many	ngan	man	mm	home	50 / 40
										_	30
											20
										_	10
1240	1200			ncy (MHz)	1100 Freque		50	10	1020	000 1	0
1240		Over Limit	Limit		Freque Preamp	Cable	50 Antenna Factor	ReadA			0
1240			Limit Line		Freque Preamp Factor	Cable Loss dB	Intenna	ReadA Level			0

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



6.7 Spurious Emission

6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)						
Test Method:	ANSI C63.10:2013 and KDB558074						
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequence power that is produced by the intentional radiator shall be at least 20 d below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement.						
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane						
Test Instruments:	Refer to section 5.8 for details						
Test mode:	Refer to section 5.3 for details						
Test results:	Passed						



Test plot as follows:

Lowest channel	Middle channel
-RENW 100 kHz Marker 1 [Ti] -VENW 300 kHz30.28 dHm Ref 36.5 dHm - Att 40 dH SWT 1 s 5.872420000 dHz	*RBW 100 kHz Marker i [T1] *VBW 300 kHz -30.39 dBm Ref 36.5 dBm *Att 40 dB SWT 1 a 6.61020000 GHz
Ref 36.5 dBm + Att 40 dB SWT 1 x 5.8/2420000 GHz	Ref 36.5 dBm *Att 40 dB SWT 1 * 6.8020000 GHz
	-30 p1 22.79 dbm
1 27 p1 21,1 dm	
-10	-10
27 D2=1,1_dBm	-0 / 9 dmm
-10	-10
20	-20 300
- 30	- 10 10
40	-40
50	so
Start 30 MHz 997 MHz/ Stop 10 GHz	Start 30 MHz 997 MHz/ Stop 10 GHz
Date: 12.NOV.2018 12:21:22	Date: 12.NOV.2018 12:16:42
30MHz~25GHz	
301VINZ~23GNZ	3011112~236112
Lighaat abannal	
Highest channel ************************************	-
Ref 36.5 dBm +Att 40 dB SWT 1 s 8.624140000 GHz	
-30	
1 02	
10	
-0 dmm	
-10	
20	
-22 - The second and and and a margan and and a strate of the second and the seco	
40	
60	
Start 30 MHz 997 MHz/ Stop 10 GHz	
Date: 12.NOV.2018 12:04:26	
30MHz~25GHz	





6.7.2	Radiated	Emission	Method
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Test Requirement:	FCC Part 15 C	Section 15.	.209	and 15.205 and				
Test Method:	ANSI C63.10:20)13						
Test Frequency Range:	9kHz to 25GHz							
Test Distance:	3m							
Receiver setup:	Frequency	Detector	r	RBW	VB	W Remark		
	30MHz-1GHz	Quasi-pea	ak	120KHz	300ł	0KHz Quasi-peak Valu		
	Above 1GHz	Peak		1MHz	ЗM			
		RMS		1MHz	3M			
Limit:	Frequency		Lim	nit (dBuV/m @3m) Remark				
	30MHz-88MHz 40.0 Quasi-peak Val							
	88MHz-216M 216MHz-960			43.5			uasi-peak Value	
	960MHz-1G			<u>46.0</u> 54.0			uasi-peak Value uasi-peak Value	
	30010112-10	112		54.0			Average Value	
	Above 1GF	lz		74.0			Peak Value	
Test Procedure:	1. The EUT	was place	ed o	-	f a rot	ating	table 0.8m(below	
	1GHz)/1.5r	n(above 10	GHz	z) above the	groun	d at a	3 meter camber. he position of the	
	highest rad		u 00	lo dogroco a				
	2. The EUT antenna, w	was set 3					rference-receiving ble-height antenna	
Test setup:	 the ground Both horize make the n 4. For each s case and t meters and to find the n 5. The test-re Specified E 6. If the emiss the limit sp of the EUT have 10 dE peak or av sheet. 	I to determ ontal and w neasureme suspected hen the and the rota ta maximum r eceiver system andwidth w sion level of ecified, the would be margin wo	nine verticent. emin nteni able read sterr with of the report ould	the maximu cal polarizat ssion, the E na was tune was turned ing. n was set t Maximum H e EUT in pea sting could b orted. Other be re-tested	um valu ions of UT wa d to he from 0 oo Pea old Mo ak mod be stopp wise th I one by	ue of the a the a s arra bights to degree k Detrode. le was ped an e emis y one to	our meters above the field strength. Intenna are set to inged to its worst from 1 meter to 4 es to 360 degrees ect Function and 10 dB lower than id the peak values ssions that did not using peak, quasi- eported in a data	
	EUT Turn Table 0.8				Sean Anten RF T est Receiver			
	Above 1GHz							



Report No: CCISE181101401

	Horn Antenna Tower Horn Antenna Tower Ground Reference Plane Test Receiver Aresting Controller
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	 Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.



Measurement Data (worst case):

Product	Name:	Lora Mo	odule			Produ	uct Mode	el:	E22-900T22S		
Fest By:		Zora				Test I	Test mode: Tx mod				
Fest Fred	quency:	30 MHz	z ~ 1 GHz	Iz Polarization:					Vertical		
Fest Volt	age:	AC 120	V/60Hz			Envir	onment:		Temp: 24	°C	Huni: 57%
Lev	/el (dBuV/m)	in.							Dat	e: 201	8-11-15
100	or (abarrin)							-1			
90							Fun	dament	al wave		
80		_				_				-	
70											
60						_			FCC PART	TAFCI	ACCD
50									FUL PARI	115 CI	ASSB
			2					Sundappen Appendice			
40		-	1	1.2.1.68	3	4			a Moder and an add		
30	adore the future of the	anthermore	an entry	- more le a	hild	Mulphan	mentioner	-And Phile A			
20			and a	and the second should be	HAR WALKER						
10											
0 30	50	l.	1	00	and the second	200	44. 		500		1000
				ł	requency	(MHZ)					
								100.000			
	Freq	ReadA Level	ntenna Factor	Cable H Loss H	Preamp Factor	Level	Limit Line	Over Limit	r t Remark		
;	Freq MHz	ReadA Level 1 dBuV	ntenna Factor 	Cable H Loss H dB	Factor				t Remark		
1 2 3 4	MHz 71.832 96.099 143.830	Level 3 dBuV 22.02 24.72 24.29	Eactor <u>dB/m</u> 8.91 11.06 8.30	Loss I dB 1.56 2.00 2.44	actor <u> </u>	⊞uV/m 32.49 37.78 35.03	Line dBuV/m 40.00 43.50 43.50	Limit dI -7.51 -5.72 -8.4	t Remark 3 1 QP 2 QP 7 QP		
1 2 3 4 5 6	MHz 71.832 96.099	Level 3 dBuV 22.02 24.72	Factor _	Loss I dB 1.56 2.00	actor <u> </u>	∃BuV/m 32.49 37.78	Line dBuV/m 40.00 43.50	Limit dI -7.51 -5.72	t Remark 3 2 QP 2 QP 7 QP 3 QP 2 QP 2 QP		

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



roduct Name: est By: est Frequency:			Lora Module Zora 30 MHz ~ 1 GHz				Produc	Product Model:		E22-900T22S Tx mode Horizontal			
							Test mode: Polarization:		T				
		:							Н				
est Voltage:			AC 120V/60Hz				Environment:		Т	Temp: 24℃ Huni: 57%			
1	Level (dBu	W/m)								ſ)ate: 1	2018-	11-15
100	Loron (aba	a nun											
90					_		_	Fun	damenta	l wave			
80													
70												\sim	
60													
										FCC PA	RT15	5 CLA	SSB
50								5			6		
								31		100	1	10.00	A STATE OF THE OWNER
40					1		III I	L. It	in	distant and	apparter	ar (Videntin	AN THE REAL PROPERTY AND A DECIMAL PROPERTY A
30	والمعاد والمعاد والم	dumbert	whenterman				Malul	lilloum	some had	al al conference	miner	ar Vinderica	
30	glistation has the	emburk	en and a subserver of the	ulmation	mounter		filled	d d d d d d d d d d d d d d d d d d d	sammand freed	Asherman	minte	er (regener	
30 20	phatash-university	denskark	and an adaption of the	uhmahro	hurdrandy	Infulution	Lalphand	d Hadrison	remarking	d'alexandre	and a second		
30 20 10		der skart	erender verget	whenester	houtente	Intuitutu	folghand	d d d d d d d d d d d d d d d d d d d	have made by the	disking and the	and and		
30 20 10		4		uhmaline	1 1 100		200	d bladeter		500			1000
30 20		umbur 5(and	when where the	100	Frequence		l l l l l l l l l l l l l l l l l l l					1000
30 20 10	30		Read		Cable	Preamp	y (MHz)	Limit	Over	500			1000
30 20 10	30		Read	Antenna Factor	Cable	6	y (MHz)	Limit		500			1000
30 20 10	30 F		Read		Cable Loss	Preamp Factor	y (MHz)	Limit Line	Over	500			1000
30 20 10 0- 3	30 F	req MHz	Read/ Level	Factor	Cable Loss	Preamp Factor dB	y (MHz) Level dBuV/m	Limit Line	Over Limit dB	500 Rema:			1000
30 20 10 0 3	30 F 95. 143.	req MHz 762 830	Read/ Level dBuV 25.83 28.57	Factor 	Cable Loss dB 2.01 2.44	Preamp Factor dB 0.00 0.00	y (MHz) Level dBuV/m 38.84 39.31	Limit Line dBuV/m 43.50 43.50	Over Limit -4.66 -4.19	500 Rema: 			1000
30 20 10 0- 3 3	30 F 143. 167.	req MHz 762 830 824	Read/ Level dBuV 25.83 28.57 27.72	Factor 	Cable Loss dB 2.01 2.44 2.64	Preamp Factor dB 0.00 0.00 0.00	Level dBuV/m 38.84 39.31 39.70	Limit Line dBuV/m 43.50 43.50 43.50	Over Limit -4.66 -4.19 -3.80	500 Rema: QP QP QP QP			1000
30 20 10 0- 3 1 2 3 4	30 F 95. 143. 167. 191.	req MHz 762 830 824 745	Read/ Level dBuV 25.83 28.57 27.72 26.23	Factor <u>dB/m</u> 11.00 8.30 9.34 11.25	Cable Loss dB 2.01 2.44 2.64 2.81	Preamp Factor dB 0.00 0.00 0.00 0.00	ty (MHz) Level dBuV/m 38.84 39.31 39.70 40.29	Limit Line dBuV/m 43.50 43.50 43.50 43.50 43.50	Over Limit -4.66 -4.19 -3.80 -3.21	500 Rema: QP QP QP QP QP QP			1000
30 20 10 0- 3 3	30 F 143. 167.	req MHz 762 830 824 745 990	Read/ Level dBuV 25.83 28.57 27.72	Factor 	Cable Loss dB 2.01 2.44 2.64	Preamp Factor dB 0.00 0.00 0.00 0.00 0.00 0.00	Level dBuV/m 38.84 39.31 39.70 40.29 40.45	Limit Line dBuV/m 43.50 43.50 43.50	Over Limit -4.66 -4.19 -3.80 -3.21	500 Rema: QP QP QP QP QP QP QP QP QP			1000

2. The emission levels of other frequencies are very lower than the limit and not show in test report.



Above 1GHz:

			Test ch	annel: Lowe	est channel					
			De	tector: Peak	Value					
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1806.00	45.01	25.98	4.12	41.22	33.89	74.00	-40.11	Vertical		
1806.00	44.77	25.98	4.12	41.22	33.65	74.00	-40.35	Horizontal		
			Dete	ctor: Averag	je Value					
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1806.00	39.62	25.98	4.12	41.22	28.50	54.00	-25.50	Vertical		
1806.00	38.21	25.98	4.12	41.22	28.23	54.00	-25.77	Horizontal		
			Test ch	annel: Midd	le channel					
			Det	tector: Peak	Value					
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1830.00	45.21	26.02	4.15	41.27	34.11	74.00	-39.89	Vertical		
1830.00	44.78	26.02	4.15	41.27	33.68	74.00	-40.32	Horizontal		
Detector: Average Value										
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1830.00	39.68	26.02	4.15	41.27	28.58	54.00	-25.42	Vertical		
1830.00	38.57	26.02	4.15	41.27	28.23	54.00	-25.77	Horizontal		
			Taskak	en en la la Beler	at shares a					
				annel: Highe						
	Read	Antenna		tector: Peak	value			[
Frequency (MHz)	Level (dBuV)	Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1854.00	45.36	26.08	4.17	41.32	40.33	74.00	-33.67	Vertical		
1854.00	44.80	26.08	4.17	41.32	43.09	74.00	-30.91	Horizontal		
			Dete	ctor: Averag	je Value					
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
1854.00	39.56	26.08	4.17	41.32	37.44	54.00	-16.56	Vertical		
1854.00	38.26	26.08	4.17	41.32	28.23	54.00	-25.77	Horizontal		
					Loss – Prean the limit and r	nplifier Factor. not show in tes	t report.			