

Global United Technology Services Co., Ltd.

Report No.: GTS201812000096F01

FCC REPORT

Applicant: Coral Detection Systems

Address of Applicant: Kibbutz Hahotrim 3087000, Israel

Manufacturer/Factory: **Coral Detection Systems**

Address of Kibbutz Hahotrim 3087000, Israel

Manufacturer/Factory:

Equipment Under Test (EUT)

Product Name: Coral Manta

Model No.: 3000 XX(x=numeric/alphabet, diff.outlook design)

Trade Mark: **Coral Detection Systems**

FCC ID: 2ARX8-MANTA3000

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249

Date of sample receipt: December 12, 2018

Date of Test: December 13-24, 2018

Date of report issued: December 25, 2018

PASS * Test Result:

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

Authorized Signature:

Robinson Lo **Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



2 Version

Version No.	Date	Description
00	December 25, 2018	Original

Prepared By:	Tiger Cha	Date:	December 25, 2018
	Project Engineer		
Check By:	Reviewer	Date:	December 25, 2018



3 Contents

			Page
1	COV	ER PAGE	1
2	VER	RSION	2
3	CON	NTENTS	3
4	TES	ST SUMMARY	4
	4.1	MEASUREMENT UNCERTAINTY	4
5	GEN	NERAL INFORMATION	5
	5.1 5.2	GENERAL DESCRIPTION OF EUT TEST MODE	6
	5.3 5.4	DESCRIPTION OF SUPPORT UNITS TEST FACILITY	6
6	5.5 TES	TEST LOCATION	
7		ST RESULTS AND MEASUREMENT DATA	
•	7.1	ANTENNA REQUIREMENT:	
	7.2	CONDUCTED EMISSIONS	
	7.3	RADIATED EMISSION METHOD	
	7.3.	1 Field Strength of The Fundamental Signal and spurious emissions	
	7.4	20DB OCCUPY BANDWIDTH	
8	TES	ST SETUP PHOTO	21
9	EUT	CONSTRUCTIONAL DETAILS	21

Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960



4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205 15.209	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10: 2013 and ANSI C63.4: 2014.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes		
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)		
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)		
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)		
AC Power Line Conducted Emission 0.15MHz ~ 30MHz ± 3.45dB (1)					
Note (1): The measurement unce	ertainty is for coverage factor of k	=2 and a level of confidence of	95%.		



5 General Information

5.1 General Description of EUT

Product Name:	Coral Manta				
Model No.:	3000 XX(x=numeric/alphabet, diff.outlook design)				
Remark: All above models are differences are model name fo	e identical in the same PCB layout, interior structure and electrical circuits. The r commercial purpose.				
Serial No.:	N/A				
Test sample(s) ID:	GTS201812000096-01				
Sample(s) Status:	Engineer sample				
Hardware version:	Ver 02				
Software version:	1.4.1				
Operation Frequency:	915MHz				
Modulation type:	FSK, MSK, OOK				
Antenna Type:	Integral antenna				
Antenna gain:	2.0dBi				
Power supply:	AC 120V/60Hz				



5.2 Test mode

Transmitting mode

Keep the EUT in continuously transmitting mode.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

5.3 Description of Support Units

Noe

5.4 Test Facility

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

• FCC —Registration No.: 381383

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383.

Industry Canada (IC) —Registration No.: 9079A-2

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

• NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

• CNAS (No. CNAS L5775)

CNAS has accredited Global United Technology Services Co., Ltd., to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960



6 Test Instruments list

Radi	Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)	
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020	
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A	
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019	
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019	
5	Double -ridged waveguide horn			GTS208	June. 27 2018	June. 26 2019	
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019	
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A	
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019	
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019	
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019	
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019	
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019	
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June. 27 2018	June. 26 2019	
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019	
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019	
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019	
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019	
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS588	June. 27 2018	June. 26 2019	
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019	
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019	



Cond	Conducted:							
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 27 2018	June. 26 2019		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019		
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019		
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019		
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019		
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019		
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019		
8	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019		
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019		

Conduc	Conducted Emission							
Item	Test Equipment	Manufacturer Model No.		Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019		
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019		
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019		
5	Coaxial Cable	GTS	N/A	GTS227	June. 27 2018	June. 26 2019		
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
7	Thermo meter	KTJ	TA328	GTS233	June. 27 2018	June. 26 2019		
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019		

Gene	General used equipment:							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date	Cal.Due date		
					(mm-dd-yy)	(mm-dd-yy)		
1	Barometer	ChangChun	DYM3	GTS257	June 27 2018	June 26 2019		



7 Test results and Measurement Data

7.1 Antenna requirement:

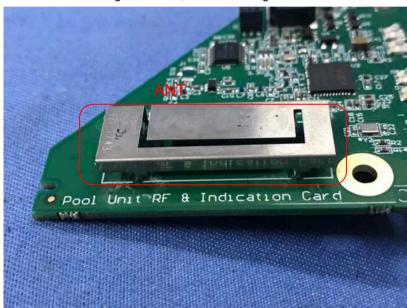
Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integral antenna; the best case gain of the antenna is 2.0dBi.





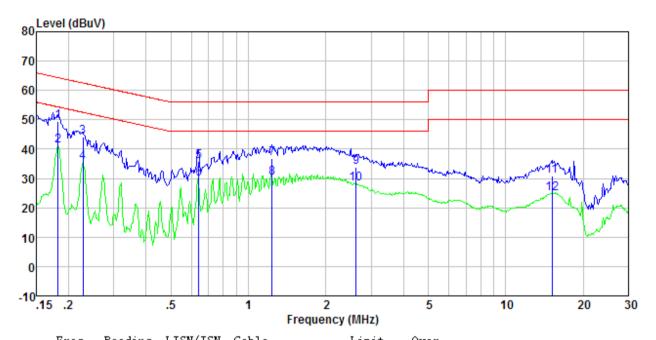
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207	FCC Part15 C Section 15.207				
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, S	weep time=auto				
Limit:	Fraguency ronge (MHz)	Limit	(dBuV)			
	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 logarithr	m of the frequency.	_			
Test setup:	Reference Plane	:	<u></u>			
	AUX Equipment E.U.T EMI Receiver Remark E.U.T Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m					
Test procedure:	 The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This 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 C63.10: 2013 on conducted measurement. 					
Test environment:	Temp.: 25 °C Hur	mid.: 52%	Press.: 1012mbar			
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

Measurement data:

Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960

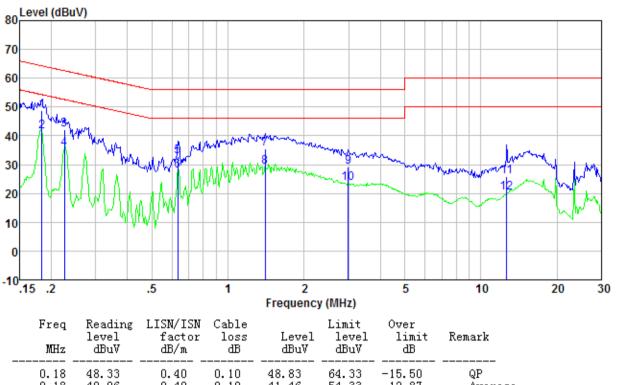




Freq MHz	Reading level dBuV	factor dB/m	loss dB	Level dBuV	level dBuV	Over limit dB	Remark
0.18 0.18 0.23 0.23 0.64 0.64 1.24 1.24 2.62 2.62 15.15	48.89 40.57 43.50 34.92 35.55 29.31 36.46 29.80 33.54 27.77 30.54 24.48	0.40 0.40 0.40 0.40 0.27 0.27 0.20 0.20 0.20 0.20 0.20	0.10 0.10 0.11 0.11 0.12 0.12 0.16 0.16 0.19 0.19	49. 39 41. 07 44. 01 35. 43 35. 94 29. 70 36. 82 30. 16 33. 93 28. 16 30. 95 24. 89	64.37 54.37 62.52 52.52 56.00 46.00 56.00 46.00 60.00 50.00	-14.98 -13.30 -18.51 -17.09 -20.06 -16.30 -19.18 -15.84 -22.07 -17.84 -29.05 -25.11	QP Average



Test mode: transmitting mode	Phase Polarity:	Neutral
------------------------------	-----------------	---------



rreq MHz	Reading level dBuV	factor dB/m	loss dB	Level dBuV	level dBuV	limit dB	Remark
0.18 0.18 0.23 0.23 0.63 0.63 1.40 1.40 2.99 2.99	48.33 40.96 41.56 34.83 32.51 27.55 35.12 28.79 28.88 23.11 25.54	0. 40 0. 40 0. 40 0. 40 0. 28 0. 28 0. 20 0. 20 0. 20 0. 20	0.10 0.10 0.11 0.11 0.12 0.12 0.16 0.16 0.19 0.19	48.83 41.46 42.07 35.34 32.91 27.95 35.48 29.15 29.27 23.50 25.95	64.33 54.33 62.61 52.61 56.00 46.00 56.00 46.00 56.00 60.00	-15.50 -12.87 -20.54 -17.27 -23.09 -18.05 -20.52 -16.85 -26.73 -22.50 -34.05	QP Average
12.65	19.69	0.20	0.21	20.10	50.00	-29.90	Average

Notos

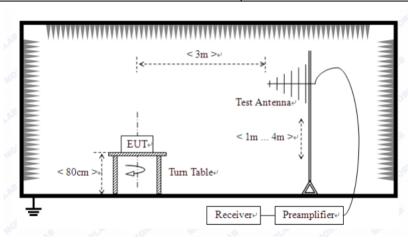
- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.



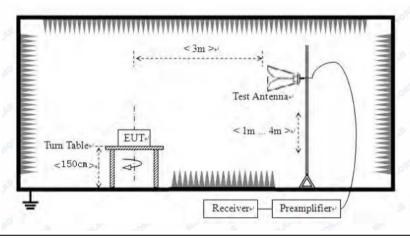
7.3 Radiated Emission Method

7.3	Radiated Emission Me	etnoa						
	Test Requirement:	FCC Part15 C Section	on 15.2	:09				
	Test Method:	ANSI C63.10:2013						
	Test Frequency Range:	9kHz to 6GHz						
	Test site:	Measurement Distan	ice: 3m	1				
	Receiver setup:							
		Frequency	Det	tector	RBW	3W VB\		Value
		30MHz-1GHz	Quas	si-peak	120KHz	z 300k	(Hz	Quasi-peak
		AL 4011	Р	eak	1MHz	ЗМІ	Hz	Peak
		Above 1GHz	Р	Peak		10H	Ηz	Average
	Limit:	Frequency Limit (dB			(dBuV/m	@3m)		Remark
	(Field strength of the	902-928MHz	,		94.00		A	verage Value
	fundamental signal)	902-920101112	=		114.00			Peak Value
	Limit: (Spurious Emissions)							
		Frequency Limit (uV/m)		V/m)	Value		Measurement Distance	
		30MHz-88MHz		100		QP		
		88MHz-216MHz	<u> </u>	150		QP		
		216MHz-960MH	z	200		QP		3m
		960MHz-1GHz		500	QP			OIII
		Above 1GHz		500	,	Average		
		7.00.0 . 0		5000)	Peak		
	Limit: (band edge)	Emissions radiated of harmonics, shall be fundamental or to the whichever is the less	attenua e gene	ated by at ral radiate	t least 50	dB belov	w the	level of the
	Test setup:	Below 30MHz						
		Turntable 3m O.8 m Test Receiver Coaxial Cable						
		Below 1GHz						





Above 1GHz



Test Procedure:

- The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or



	average method as specified and then reported in a data sheet.						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar	
Test Instruments:	Refer to section 6.0 for details						
Test mode:	Refer to see	ction 5.2 for c	letails				
Test results:	Pass						

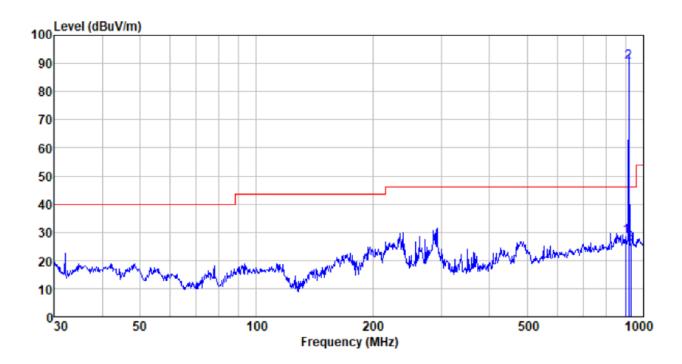
Measurement data:

■ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.



7.3.1 Field Strength of The Fundamental Signal and spurious emissions



Field Strength:

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)	Polarity	Remark
915	100.69	22.43	4.91	37.59	90.44	94	-3.56	Horizontal	QP

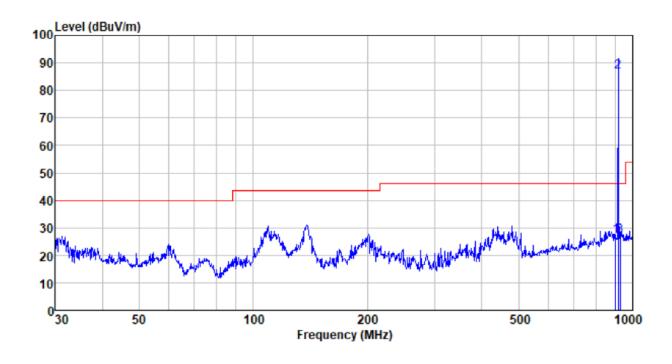
Band Edge:

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)	Polarity	Remark
902	38.72	22.40	4.87	37.60	28.39	46	-17.61	Horizontal	QP
928	35.84	22.46	4.96	37.57	25.69	46	-20.31	Horizontal	QP

Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960



Test mode: transmitting mode	Antenna Polarity:	Vertical	
------------------------------	-------------------	----------	--



Field Strength:

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)	Polarity	Remark
915	96.88	22.43	4.91	37.59	86.63	94	-7.37	Vertical	QP

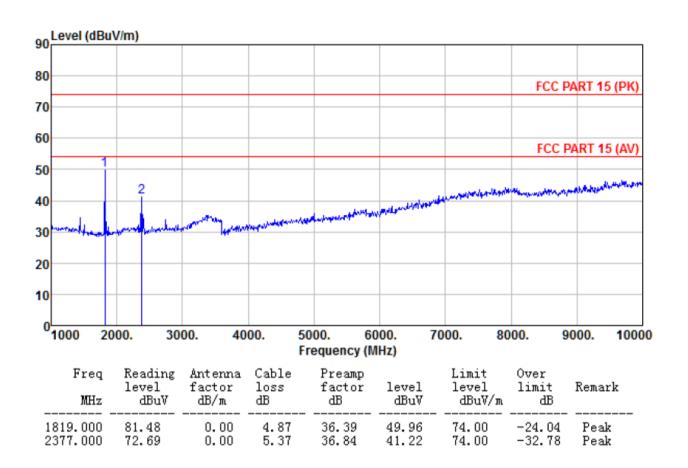
Band Edge:

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)	Polarity	Remark
902	37.33	22.40	4.87	37.60	27.00	46	-19.00	Vertical	QP
928	37.02	22.46	4.96	37.57	26.87	46	-19.13	Vertical	QP



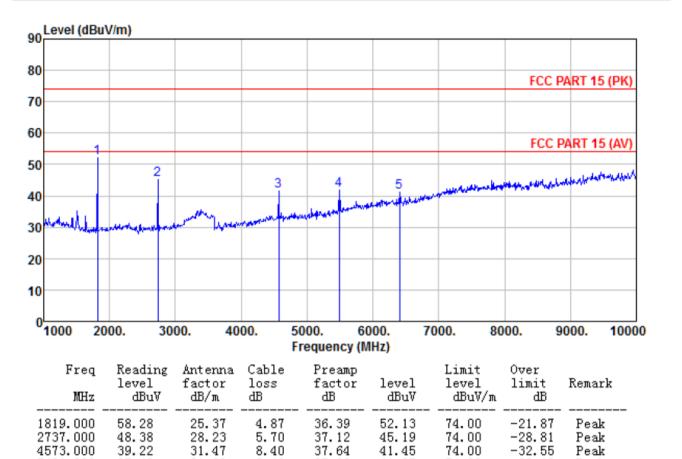
Above 1GHz

Test mode: transmitting mode	Antenna Polarity:	Horizontal
------------------------------	-------------------	------------





rest mode. I transmitting mode Antenna Polanty. Vertical	Test mode:	Insmitting mode	Antenna Polarity:	Vertical		
--	------------	-----------------	-------------------	----------	--	--



37.09

36.10

41.87

41.20

74.00

74.00

Remark:

5491.000

6409.000

37.49

33.03

31.98

33.49

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

9.49

10.78

-32.13

-32.80

Peak

Peak



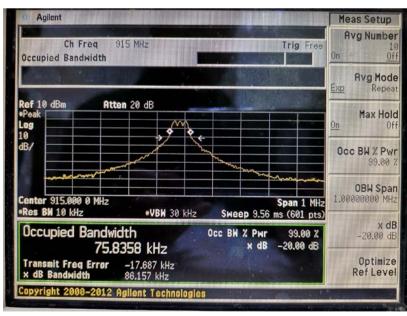
7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215		
Test Method:	ANSI C63.10:2013		
Limit:	Operation Frequency range 902MHz~928MHz		
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.2 for details		
Test results:	Pass		

Measurement Data

Operation Frequency	20dB bandwidth(MHz)	Result
915	0.08616	Pass

Test plot as follows:





8 Test Setup Photo

Reference to the appendix I for details.

9 EUT Constructional Details

Reference to the appendix II for details.

-----End-----