

Global United Technology Services Co., Ltd.

Report No.: GTSE15070148201

FCC REPORT

Applicant: Computime Limited.

Address of Applicant: 9/F, Tower One, Lippo Centre 89 Queensway, Hong Kong

Equipment Under Test (EUT)

Product Name: ZigBee-Ready RF Transceiver

Model No.: CTL2607

FCC ID: 2AAUQ-CTL2607

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2014

Date of sample receipt: September 06, 2015

Date of Test: September 07-10, 2015

Date of report issued: September 11, 2015

Test Result: PASS *

Authorized Signature:



Robinson Lo 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 GTS 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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^{*} In the configuration tested, the EUT complied with the standards specified above.



2 Version

Version No.	Date	Description
00	September 11, 2015	Original

Prepared By:	Zolward.Pan	Date:	September 11, 2015
	Project Engineer	<u> </u>	
Check By:	hank. yan	Date:	September 11, 2015
	Reviewer		



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4 Test Summary

Test Item	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
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

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

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

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 uncertainty is for coverage factor of k=2 and a level of confidence of 95%.						



5 General Information

5.1 Client Information

Applicant:	Computime Limited.	
Address of Applicant:	9/F, Tower One, Lippo Centre 89 Queensway, Hong Kong	
Manufacturer: Computime Limited.		
Address of Manufacturer:	9/F, Tower One, Lippo Centre 89 Queensway, Hong Kong	
Factory:	Computime Electronics (shenzhen) Company Limited	
Address of Factory:	Computime Technology Park, DanZhuTou Cun, Buji, Longgang	
	Region, Shenzhen, China	

5.2 General Description of EUT

Product Name:	ZigBee-Ready RF Transceiver
Model No.:	CTL2607
Operation Frequency:	2405MHz~2480MHz
Channel numbers:	16
Channel separation:	5MHz
Modulation type:	O-QPSK
Antenna Type:	PCB Antenna
Antenna gain:	-0.32dBi
Power supply:	DC 3.0V

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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	5	2425MHz	9	2445MHz	13	2465MHz
2	2410MHz	6	2430MHz	10	2450MHz	14	2470MHz
3	2415MHz	7	2435MHz	11	2455MHz	15	2475MHz
4	2420MHz	8	2440MHz	12	2460MHz	16	2480 MHz

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, and the selected channel see below:

Channel	Frequency		
The lowest channel	2405MHz		
The middle channel	2440MHz		
The Highest channel	2475MHz and 2480MHz		

5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, 8	35% to 115% input voltage have been adjusted and no influence occur

5.4 Description of Support Units

N/A

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5.5 Test Facility

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

• FCC —Registration No.: 600491

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 600491, June 28, 2013.

• 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, June 26, 2013.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong

Industrial Zone, Xixiang Road, Baoan District, Shenzhen 518102

Tel: 0755-27798480 Fax: 0755-27798960

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



6 Test Instruments list

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	Mar. 27 2015	Mar. 26 2016		
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A		
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 4 2014	Dec. 3 2015		
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 30 2015	June 29 2016		
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 30 2015	June 29 2016		
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 26 2015	June 25 2016		
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016		
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016		
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016		
11	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016		
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016		
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 30 2015	June 29 2016		
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 30 2015	June 29 2016		
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 26 2015	June 25 2016		
16	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016		
17	Power Meter	Anritsu	ML2495A	GTS540	June 30 2015	June 29 2016		
18	Power Sensor	Anritsu	MA2411B	GTS541	June 30 2015	June 29 2016		

Gen	General used equipment:							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Barometer	ChangChun	DYM3	GTS257	July 07 2015	July 06 2016		

Con	Conducted Emission:					
	T 1 F			Inventory	Cal.Date	Cal.Due date
Item	Test Equipment	Manufacturer	Model No.	No.	(mm-dd-yy)	(mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Jun. 30 2015	Jun. 29 2016
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015	Jun. 29 2016
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jun. 30 2015	Jun. 29 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 30 2015	Jun. 29 2016
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jun. 30 2015	Jun. 29 2016
6	Coaxial Cable	GTS	N/A	GTS227	Jun. 30 2015	Jun. 29 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

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7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement: FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

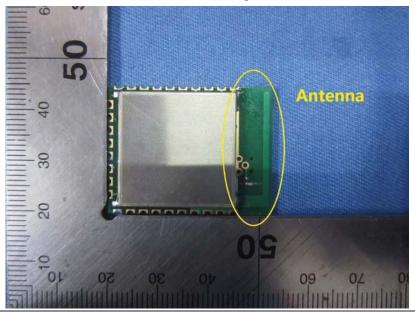
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

EUT Antenna:

The antenna is PCB Antenna, the best case gain of the antenna is -0.32dBi





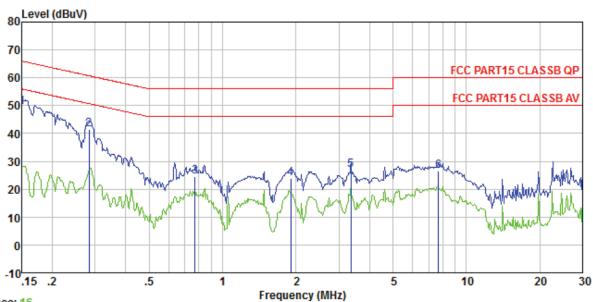
7.2 Conducted Emissions

	T				
Test Requirement:	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, Sweep time=auto				
Limit:	Frequency range (MHz)	Limit (c	lBuV)		
		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 logarithn	n of the frequency.			
Test setup:	Reference Plane				
	AUX Equipment Test table/Insulation plane Remark E.U.T. Equipment Under Test LISN Line Impedence Stabilization Network Test table height=0.8m	Filter — AC pow			
Test procedure:	The E.U.T and simulators a line impedance stabilization 50ohm/50uH coupling impe	n network (L.I.S.N.). Th	nis provides a		
	2. The peripheral devices are also connected to the main power th LISN that provides a 50ohm/50uH coupling impedance with 50o termination. (Please refer to the block diagram of the test setup photographs).				
	3. 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 Instruments:	Refer to section 6.0 for details	i			
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				



Measurement data

Line:



Trace: 16

Site Shielded room

: FCC PART15 CLASSB QP LISN-2013 LINE Condition

1482RF

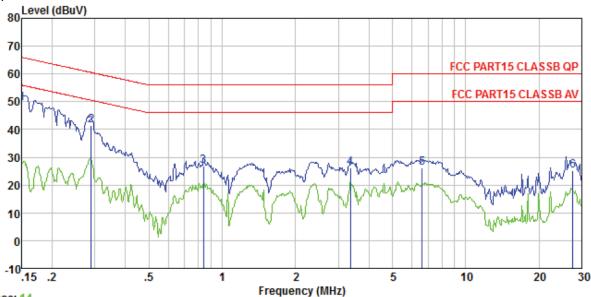
Job No. Test mode : Transmitting mode

Test Engineer: Song

Cat	Dugineer.			C-1.1-	LICH	T : _ : +	0		
		Read			LISN		Over	ъ .	
	۲req	Level	Level	Loss .	Mactor	Line	Limit	Kemark	
									_
	MHz	dBu∀	dBu∀	d₿	dB	dBuV	dB		
1	0.150	49.03	49.30	0.12	0.15	66.00	-16.70	QP	
2	0.283	41.31	41.52		0.11				
3	0.771	24.22	24.49	0.13	0.14	56.00	-31.51	QP	
4	1.908	23.55	23.81	0.14	0.12	56.00	-32.19	QP	
5	3.364	26.39	26.72	0.15	0.18	56.00	-29.28	QP	
6	7.687	26.07	26.52	0.18	0.27	60.00	-33.48	QP	



Neutral:



Trace: 14

Site : Shielded room

Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Job No. : 1482RF

Test mode : Transmitting mode

Test Engineer: Song

	Freq				LISN Factor			Remark
	MHz	dBuV	dBuV	dB	dB	dBuV	dB	
1	0.150	49.38	49.57	0.12	0.07	66.00	-16.43	QP
2	0.289	41.30	41.46	0.10	0.06	60.54	-19.08	QP
3	0.839	26.57	26.77	0.13	0.07	56.00	-29.23	QP
4	3.364	26.01	26.29	0.15	0.13	56.00	-29.71	QP
5	6.627	25.84	26.18	0.16	0.18	60.00	-33.82	QP
6	27.562	24.08	25.16	0.24	0.84	60.00	-34.84	QP

Notes:

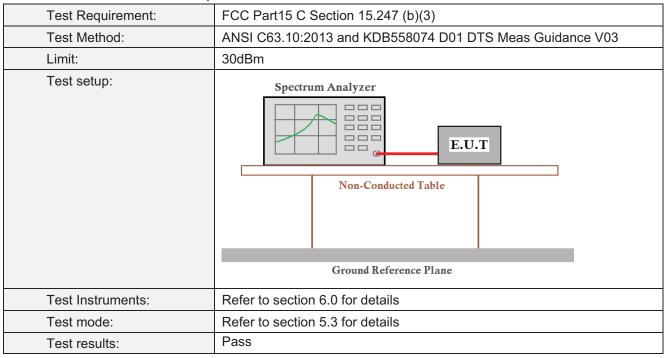
- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss

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.

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7.3 Conducted Peak Output Power



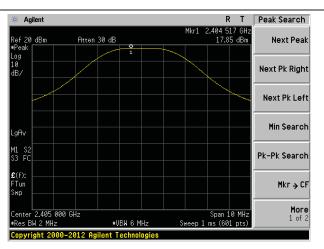
Measurement Data

Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)	Result	
2405	17.85			
2440	17.56	20	DACC	
2475	16.06	30	PASS	
2480	-19.81			

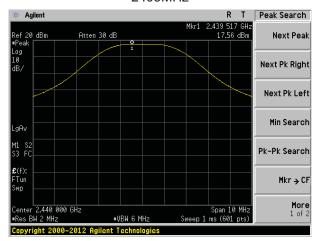
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Test plot as follows:

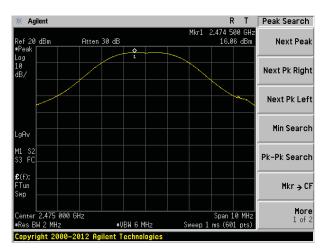


2405MHz

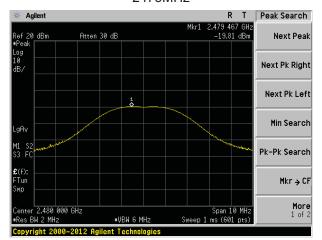


2440MHz





2475MHz



2480MHz



7.4 Channel Bandwidth

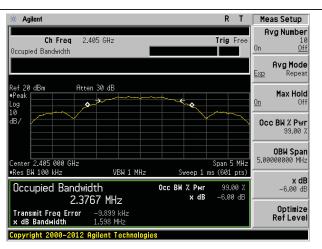
Test Requirement:	FCC Part15 C Section 15.247 (a)(2)	
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03	
Limit:	>500KHz	
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane	
Test Instruments:	Refer to section 6.0 for details	
Test mode:	Refer to section 5.3 for details	
Test results:	Pass	

Measurement Data

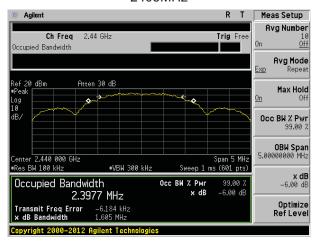
Frequency (MHz)	Channel Bandwidth (MHz)	Limit(KHz)	Result	
2405	1.598			
2440	1.605	>E00	Door	
2475	1.585	>500	Pass	
2480	1.630			

Test plot as follows:



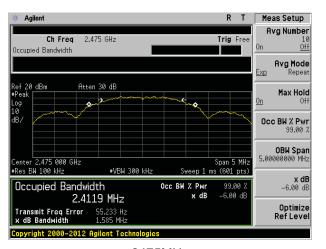


2405MHz

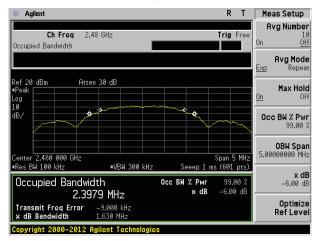


2440MHz





2475MHz



2480MHz



7.5 Power Spectral Density

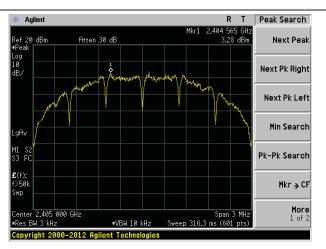
Test Requirement:	FCC Part15 C Section 15.247 (e)	
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03	
Limit:	8dBm/3kHz	
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane	
Test Instruments:	Refer to section 6.0 for details	
Test mode:	Refer to section 5.3 for details	
Test results:	Pass	

Measurement Data

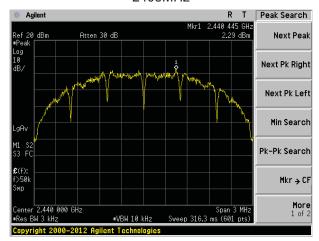
Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm/3kHz)	Result	
2405	3.28			
2440	2.29	9.00	Pass	
2475	0.49	8.00	Pass	
2480	-23.39			



Test plot as follows:

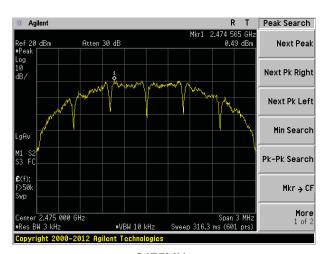


2405MHz

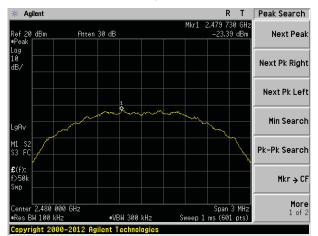


2440MHz





2475MHz



2480MHz



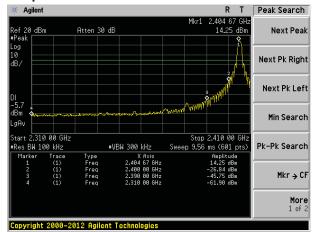
7.6 Band edges

7.6.1 Conducted Emission Method

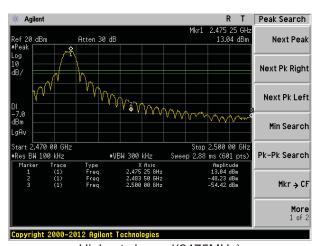
Test Requirement:	FCC Part15 C Section 15.247 (d)	
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03	
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional 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. Spectrum Analyzer Non-Conducted Table Ground Reference Plane	
Test setup:		
Test Instruments:	Refer to section 6.0 for details	
Test mode:	Refer to section 5.3 for details	
Test results:	Pass	

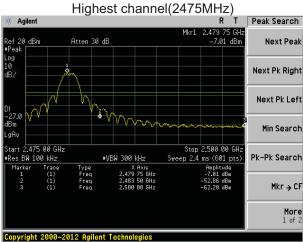


Test plot as follows:



Lowest channel





Highest channel(2480MHz)

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7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	All of the restric	t bands were t	ested, only	the worst ba	and's (2310MHz to
, , ,	2500MHz) data	was showed.			
Test site:	Measurement D	istance: 3m			
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
	Above IGIIZ	RMS	1MHz	3MHz	Average
Limit:	Freque	ency	Limit (dBuV	/m @3m)	Value
	Above 1	GH ₇	54.0	0	Average
	Above	OFIZ	74.0	0	Peak
Test setup:	Turn V V 1.5m A A	4m	Antenna Horn Ante Spectrum Analyzer Amplifi	nna	
Test Procedure:	the ground a determine the 2. The EUT was antenna, whi tower. 3. The antenna ground to de horizontal an measuremer 4. For each sus and then the and the rota the maximun 5. The test-rece Specified Ba 6. If the emission the limit specified by the EUT where the test in the specified by the EUT where the test in the specified by the EUT where the test in the limit specified by the EUT where the test in the test	t a 3 meter came position of the set 3 meters a ch was mounted the made the	aber. The tall highest race way from the don the top of the top of the tall highest race way from the top of the tall highest results and to height as set to Pear aximum Hole to the tall highest results are performing which is a recognition of the tall highest results are performing which is a recognition of the tall highest results are performing which is a recognition of the tall highest results are performing which is a recognition of the tall highest results are performing which is a recognition of the tall highest recognition of the tall highest recognition of the tall highest race ways are performed to the tall highest race ways are performed to the tall highest race ways are tall highlight race ways are tall highest race ways are tall highlighter ways are tall highligh	ble was rotated attion. The interference of a variable of a variable of the field of the antenna at the was arrange of the from 1 mgrees to 360 at Detect Fund Mode. The mode was 1 stopped and the emission of the emission of the mode was 1 stopped and the mode was 2 stopped and the mode was 2 stopped and the mode was 2 stopped and the mode was 3 stopped and the mode was 4 stopped and the mode was 3 stopped and the mode was 4 stopped and the was	meters above the strength. Both are set to make the d to its worst case leter to 4 meters degrees to find anction and d the peak values ons that did not sing peak, quasi-
Test Instruments:	worst case mode is recorded in the report. Refer to section 6.0 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Pass				



Measurement data:

Remark: The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

1	Test shamed	0405MU
	rest channel:	2405MHZ

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
2310.00	46.05	27.91	5.30	30.37	48.89	74.00	-25.11	Horizontal
2390.00	50.16	27.59	5.38	30.18	52.95	74.00	-21.05	Horizontal
				-	_			
2310.00	44.71	27.91	5.30	30.37	47.55	74.00	-26.45	Vertical
2390.00	47.11	27.59	5.38	30.18	49.90	74.00	-24.10	Vertical

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
2310.00	35.84	27.91	5.30	30.37	38.68	54.00	-15.32	Horizontal
2390.00	40.01	27.59	5.38	30.18	42.80	54.00	-11.20	Horizontal
2310.00	35.75	27.91	5.30	30.37	38.59	54.00	-15.41	Vertical
2390.00	37.13	27.59	5.38	30.18	39.92	54.00	-14.08	Vertical

Test channel: 2475MHz		Test channel:	2475MHz
-----------------------	--	---------------	---------

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)	Polarizatio n
2483.50	58.20	27.53	5.47	29.93	61.27	74.00	-12.73	Horizontal
2500.00	46.74	27.55	5.49	29.93	49.85	74.00	-24.15	Horizontal
2483.50	58.67	27.53	5.47	29.93	61.74	74.00	-12.26	Vertical
2500.00	48.25	27.55	5.49	29.93	51.36	74.00	-22.64	Vertical

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)	Polarizatio n
2483.50	49.50	27.53	5.47	29.93	52.57	54.00	-1.43	Horizontal
2500.00	37.43	27.55	5.49	29.93	40.54	54.00	-13.46	Horizontal
2483.50	50.29	27.53	5.47	29.93	53.36	54.00	-0.64	Vertical
2500.00	37.61	27.55	5.49	29.93	40.72	54.00	-13.28	Vertical

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



Test channel:	2480MHz
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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
2483.50	52.93	27.53	5.47	29.93	56.00	74.00	-18.00	Horizontal
2500.00	45.71	27.55	5.49	29.93	48.82	74.00	-25.18	Horizontal
2483.50	50.75	27.53	5.47	29.93	53.82	74.00	-20.18	Vertical
2500.00	46.55	27.55	5.49	29.93	49.66	74.00	-24.34	Vertical

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
2483.50	45.19	27.53	5.47	29.93	48.26	54.00	-5.74	Horizontal
2500.00	35.23	27.55	5.49	29.93	38.34	54.00	-15.66	Horizontal
2483.50	42.70	27.53	5.47	29.93	45.77	54.00	-8.23	Vertical
2500.00	35.32	27.55	5.49	29.93	38.43	54.00	-15.57	Vertical

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.



7.7 Spurious Emission

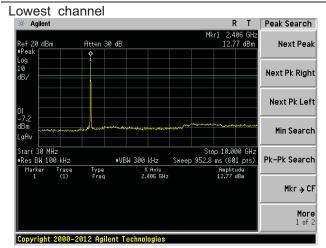
7.7.1 Conducted Emission Method

	T					
Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V03					
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 Ground Reference Plane					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

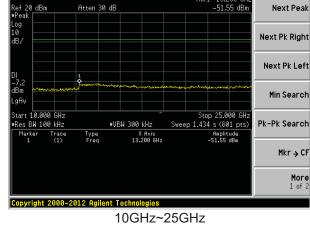


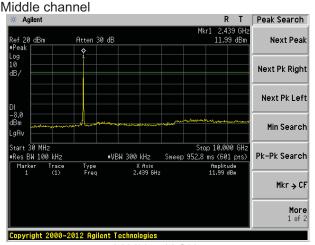
Peak Search

Test plot as follows:

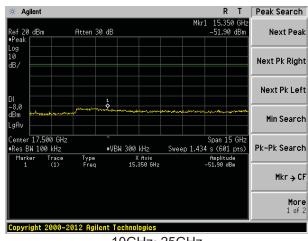


30MHz~10GHz





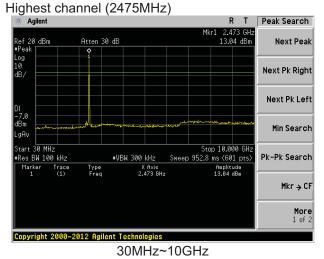
30MHz~10GHz



10GHz~25GHz

R T Peak Search

Agilent



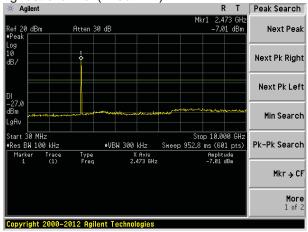
14.400 GH Atten 30 dB Next Peak Next Pk Right Next Pk Left Min Search Start 10.000 GH2 Res BW 100 kHz Stop 25.000 GHz Sweep 1.434 s (601 pts) Pk-Pk Search #VBW 300 kHz Mkr → CF

10GHz~25GHz

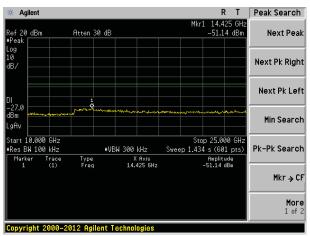
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Highest channel (2480MHz)







10GHz~25GHz



7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209							
Test Method:	ANSI C63.10: 20	13						
Test Frequency Range:	30MHz to 25GHz	<u>.</u>						
Test site:	Measurement Dis	stance: 3m						
Receiver setup:	Frequency	Detector	RBW	VBW	Value			
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak			
	Above 1GHz	Peak	1MHz	3MHz	Peak			
	Above 10112	Average						
Limit:	Frequency Limit (dBuV/m @3m) Value							
	30MHz-88	MHz	40.0	0	Quasi-peak			
	88MHz-216	6MHz	43.5	0	Quasi-peak			
	216MHz-96	0MHz	46.0	0	Quasi-peak			
	960MHz-1	GHz	54.0	0	Quasi-peak			
	Above 10	SH ₇	54.0	0	Average			
	Above TOTIZ		74.0	0	Peak			
	Below 1GHz Tum Table Ground Plane Above 1GHz Turn Table 1.5m A	4m		Antenna Tower Search Antenna RF Test Receiver Antenna Tower Horn Antenna Spectrum Analyzer Amplifier				



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8 meters 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.
	3. 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.
	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, quasipeak or average method as specified and then reported in a data sheet.
	7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.



Measurement Data

■ Below 1GHz

	0112							
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
37.68	27.73	15.01	0.64	30.06	13.32	40.00	-26.68	Vertical
51.48	30.94	15.19	0.79	29.99	16.93	40.00	-23.07	Vertical
95.09	24.97	14.84	1.15	29.72	11.24	43.50	-32.26	Vertical
104.17	27.86	14.78	1.23	29.67	14.20	43.50	-29.30	Vertical
236.65	24.98	13.93	2.05	29.54	11.42	46.00	-34.58	Vertical
562.66	24.38	19.83	3.57	29.30	18.48	46.00	-27.52	Vertical
36.77	29.79	14.77	0.63	30.06	15.13	40.00	-24.87	Horizontal
51.48	30.52	15.19	0.79	29.99	16.51	40.00	-23.49	Horizontal
104.17	29.25	14.78	1.23	29.67	15.59	43.50	-27.91	Horizontal
124.13	29.39	11.80	1.39	29.54	13.04	43.50	-30.46	Horizontal
282.00	25.21	14.70	2.28	29.88	12.31	46.00	-33.69	Horizontal
747.48	26.81	21.43	4.27	29.20	23.31	46.00	-22.69	Horizontal



■ Above 1GHz

Test channel:

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	
4810.00	40.29	31.78	8.60	32.09	48.58	74.00	-25.42	Vertical	
7215.00	31.18	36.28	11.69	31.94	47.21	74.00	-26.79	Vertical	
9620.00	30.72	37.80	14.06	31.74	50.84	74.00	-23.16	Vertical	
12025.00	*					74.00		Vertical	
14430.00	*					74.00		Vertical	
4810.00	37.62	31.78	8.60	32.09	45.91	74.00	-28.09	Horizontal	
7215.00	31.14	35.99	11.62	32.07	46.68	74.00	-27.32	Horizontal	
9620.00	30.36	38.13	14.18	31.54	51.13	74.00	-22.87	Horizontal	
12025.00	*					74.00		Horizontal	
14430.00	*					74.00		Horizontal	

Lowest

Average value:

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
4810.00	34.29	31.78	8.60	32.09	42.58	54.00	-11.42	Vertical
7215.00	17.18	36.28	11.69	31.94	33.21	54.00	-20.79	Vertical
9620.00	14.72	37.80	14.06	31.74	34.84	54.00	-19.16	Vertical
12025.00	*					54.00		Vertical
14430.00	*					54.00		Vertical
4810.00	28.62	31.78	8.60	32.09	36.91	54.00	-17.09	Horizontal
7215.00	17.14	35.99	11.62	32.07	32.68	54.00	-21.32	Horizontal
9620.00	13.36	38.13	14.18	31.54	34.13	54.00	-19.87	Horizontal
12025.00	*					54.00		Horizontal
14430.00	*					54.00		Horizontal

Remark:

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

^{2. &}quot;*", means this data is the too weak instrument of signal is unable to test.



Test channel	:			Midd	dle			
Peak value:		1	1		1		1	
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
4880.00	37.66	31.85	8.66	32.12	46.05	74.00	-27.95	Vertical
7320.00	30.59	36.66	11.82	31.73	47.34	74.00	-26.66	Vertical
9760.00	29.22	38.72	14.33	31.80	50.47	74.00	-23.53	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	34.83	31.85	8.66	32.12	43.22	74.00	-30.78	Horizontal
7320.00	31.26	36.04	11.64	32.04	46.90	74.00	-27.10	Horizontal
9760.00	29.51	38.90	14.38	31.88	50.91	74.00	-23.09	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal
Average val	ue:							
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
4880.00	24.66	31.85	8.66	32.12	33.05	54.00	-20.95	Vertical
7320.00	17.59	36.66	11.82	31.73	34.34	54.00	-19.66	Vertical
9760.00	13.22	38.72	14.33	31.80	34.47	54.00	-19.53	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	25.83	31.85	8.66	32.12	34.22	54.00	-19.78	Horizontal
7320.00	18.26	36.04	11.64	32.04	33.90	54.00	-20.10	Horizontal
9760.00	12.51	38.90	14.38	31.88	33.91	54.00	-20.09	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remark:

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

^{2. &}quot;*", means this data is the too weak instrument of signal is unable to test.



Test channe	l:			Hi	Highest (2475MHz)				
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	
4950.00	39.06	31.13	8.26	31.90	46.55	74.00	-27.45	Vertical	
7425.00	34.30	36.28	11.69	31.94	50.33	74.00	-23.67	Vertical	
9900.00	31.14	39.18	14.47	32.12	52.67	74.00	-21.33	Vertical	
12375.00	*					74.00		Vertical	
14850.00	*					74.00		Vertical	
4950.00	35.94	31.91	8.71	32.16	44.40	74.00	-29.60	Horizontal	
7425.00	30.55	36.63	11.80	31.76	47.22	74.00	-26.78	Horizontal	
9900.00	30.01	38.43	14.29	31.68	51.05	74.00	-22.95	Horizontal	
12375.00	*					74.00		Horizontal	
14850.00	*					74.00		Horizontal	
Average val	ue:								
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	
4950.00	23.06	31.13	8.26	31.90	30.55	54.00	-23.45	Vertical	
7425.00	18.30	36.28	11.69	31.94	34.33	54.00	-19.67	Vertical	
9900.00	11.14	39.18	14.47	32.12	32.67	54.00	-21.33	Vertical	
12375.00	*					54.00		Vertical	
14850.00	*					54.00		Vertical	
4950.00	21.94	31.91	8.71	32.16	30.40	54.00	-23.60	Horizontal	
7425.00	15.55	36.63	11.80	31.76	32.22	54.00	-21.78	Horizontal	
9900.00	15.01	38.43	14.29	31.68	36.05	54.00	-17.95	Horizontal	
12375.00	*					54.00		Horizontal	
14850.00	*					54.00		Horizontal	



Test channel	l: Highest (2480MHz)								
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	
4960.00	36.32	31.57	8.46	32.01	44.34	74.00	-29.66	Vertical	
7440.00	30.52	36.84	11.88	31.62	47.62	74.00	-26.38	Vertical	
9920.00	29.97	38.72	14.33	31.80	51.22	74.00	-22.78	Vertical	
12400.00	*					74.00		Vertical	
14880.00	*					74.00		Vertical	
4960.00	36.32	31.57	8.46	32.01	44.34	74.00	-29.66	Horizontal	
7440.00	30.52	36.84	11.88	31.62	47.62	74.00	-26.38	Horizontal	
9920.00	29.97	38.72	14.33	31.80	51.22	74.00	-22.78	Horizontal	
12400.00	*					74.00		Horizontal	
14880.00	*					74.00		Horizontal	
Average val	ue:								
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	
4960.00	27.32	31.57	8.46	32.01	35.34	54.00	-18.66	Vertical	
7440.00	16.52	36.84	11.88	31.62	33.62	54.00	-20.38	Vertical	
9920.00	13.97	38.72	14.33	31.80	35.22	54.00	-18.78	Vertical	
12400.00	*					54.00		Vertical	
14880.00	*					54.00		Vertical	
4960.00	24.32	31.57	8.46	32.01	32.34	54.00	-21.66	Horizontal	
7440.00	16.52	36.84	11.88	31.62	33.62	54.00	-20.38	Horizontal	
9920.00	13.97	38.72	14.33	31.80	35.22	54.00	-18.78	Horizontal	
12400.00	*					54.00		Horizontal	
14880.00	*					54.00		Horizontal	

Remark:

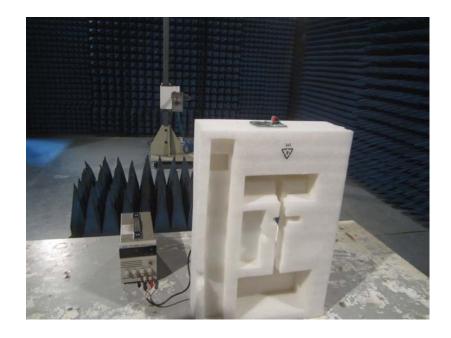
- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. "*", means this data is the too weak instrument of signal is unable to test.



8 Test Setup Photo

Radiated Emission





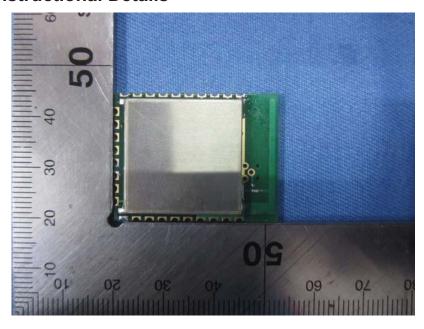


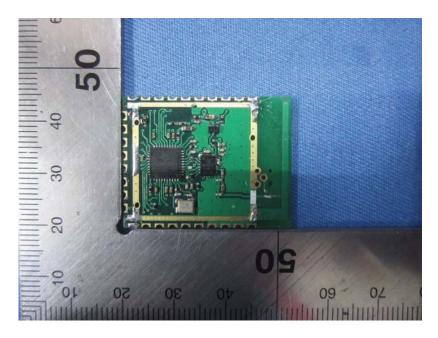
Conducted Emission



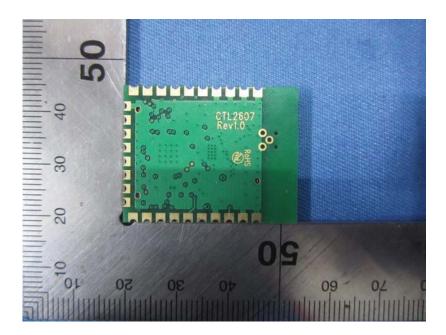


9 EUT Constructional Details









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