

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC144494

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FCC Radio Test Report FCC ID: 2ACXK-W86

Original Grant

Report No. TB-FCC144494

Thread Technology Co., Ltd. **Applicant**

Equipment Under Test (EUT)

EUT Name NoteBook

Model No. W86

Series No. Please see the page of 4

Brand Name N/A

Receipt Date 2015-06-11

2015-06-12 to 2015-06-28 **Test Date**

Issue Date 2015-06-30

FCC Part 15, Subpart C (15.247:2014) **Standards**

Test Method ANSI C63.10: 2013

Conclusions PASS

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

The EUT technically complies with the FCC and IC requirements

Test/Witness

Engineer

Approved&

Authorized

the report.

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. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in

TB-RF-074-1.0

Tel: +86 75526509301



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1. General Information about EUT

1.1 Client Information

Applicant: Thread Technology Co., Ltd.

Address : 4F, A Block, CYG, NO.2, Mid GaoXin Rd, NanShan District,

Shenzhen, China

Manufacturer: Thread Technology Co., Ltd.

Address: 4F, A Block, CYG, NO.2, Mid GaoXin Rd, NanShan District,

Shenzhen, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	NoteBook			
Models No.		W86, M412, TH14-N4.128Y10, TH14-N8.256L, TH14-N8.256Y71P TH14-N8.256Y51 (W,M=0-9,A-Z or Blank for marketing differentiation)			
Model Difference		All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name for commercial.			
33	N	Operation Frequency: 2402MHz~2480MHz			
Duedinet		Number of Channel:	Bluetooth 4.0 (BLE): 40 channels see note(3)		
Product Description	(S)	RF Output Power:	8.324 dBm Conducted Power		
		Antenna Gain:	3 dBi Embedded Antenna		
		Modulation Type:	GFSK		
		Bit Rate of Transmitter:	1Mbps(GFSK)		
Power Supply	:	DC Voltage supplied from DC power by Li-ion Batt			
Power Rating		DC 7.4V by 5200mAh/38.48Wh Li-ion Battery. AC/DC Adapter: Input: AC 100~240V, 50/60 Hz, 0.7A Output: DC 12V 2.0A			
Connecting I/O Port(S)		Please refer to the User's Manual			

Note:

- (1) This Test Report is FCC Part 15.247 for Bluetooth BLE, the test procedure follows the FCC KDB 558074 D01 DTS Meas Guidance v03r02.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (3) Antenna information provided by the applicant.
- (4) Channel List:

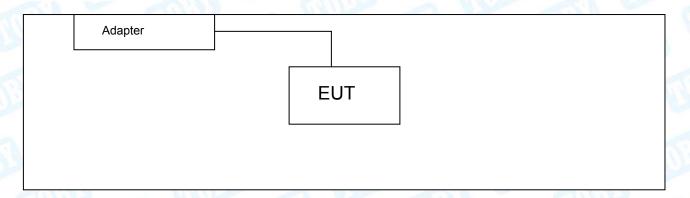


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Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information							
	Equipment information						
Name Model S/N Manufacturer Used " $$ "							
N. W.							
	Cable Information						
Number Shielded Type Ferrite Core Length Note							
	33 _ [1]			non-			





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1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test				
Final Test Mode Description				
Mode 1	AC Charging With TX Mode			

For Radiated Test				
Final Test Mode	Description			
Mode 2	AC Charging With TX Mode			
Mode 3	TX Mode (Channel 00/20/39)			

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

Bluetooth BLE Mode: GFSK Modulation Transmitting mode.

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a mobile unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF setting.

Test Software Version	DRTU-Diag	nostics and Regulatory	Testing Utility
Channel	CH 00	CH 20	CH 39
BLE Mode	DEF	DEF	DEF



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1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
The same of the sa	Level Accuracy:	THE PARTY OF THE
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Radiated Emission	Level Accuracy:	±4.60 dB
Radiated Ellission	9kHz to 30 MHz	±4.00 dB
Radiated Emission	Level Accuracy:	±4.40 dB
Radiated Ellission	30MHz to 1000 MHz	±4.40 UB
Radiated Emission	Level Accuracy:	±4.20 dB
Radiated Ellission	Above 1000MHz	±4.20 UB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

May 22, 2014 certificated by TUV Rheinland(China) Co., Ltd. with TUV certificate No.: UA 50282953 0001 and report No.: 17026822 002. The certificate is valid until the next scheduled audit or up to 18 months, at the discretion of TUV Rhineland.



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2. Test Summary

	FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 1					
Standa	rd Section	Tool Hom	GAILLY			
FCC	IC	Test Item	Judgment	Remark		
15.203	1	Antenna Requirement	PASS	N/A		
15.207	RSS-GEN 7.2.4	Conducted Emission	PASS	N/A		
15.205	RSS-GEN 7.2.2	Restricted Bands	PASS	N/A		
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth	PASS	N/A		
15.247(b)	RSS 247 5.4 (4)	Peak Output Power	PASS	N/A		
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	PASS	N/A		
15.247(d)	RSS 247 5.5	Transmitter Radiated Spurious Emission	PASS	N/A		

Note: "/" for no requirement for this test item.

N/A is an abbreviation for Not Applicable.



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3. Test Equipment

AC Main C	onducted Emis	sion			
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 08, 2014	Aug. 07, 201
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 08, 2014	Aug. 07, 201
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 08, 2014	Aug. 07, 201
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2014	Aug. 07, 201
Radiation Description	Spurious Emiss Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4407B	MY45106456	Sep. 01, 2014	Date Aug. 31, 2019
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 08, 2014	Aug.07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Aug. 08, 2014	Aug.07, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	Sonoma	310N	185903	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 06, 2015	Mar.05, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 06, 2015	Mar.05, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna C	onducted Emis	sion			
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Sep. 01, 2014	Aug. 31, 201
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 08, 2014	Aug. 07, 201



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4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1Test Standard FCC Part 15.207

4.1.2 Test Limit

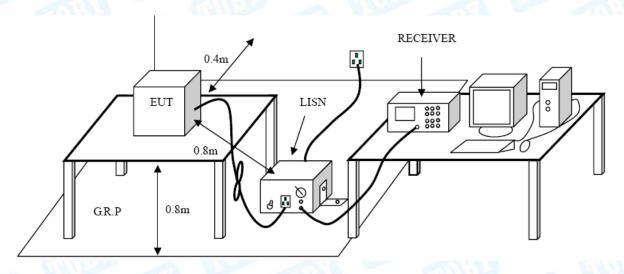
Conducted Emission Test Limit

	Maximum RF Line Voltage (dBμV)		
Frequency	Quasi-peak Level	Average Level	
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *	
500kHz~5MHz	56	46	
5MHz~30MHz	60	50	

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.



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I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Test data please refer the following pages.



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4 L	1	DV
	U	KY.
_	V	\mathbf{L}

UT:	NoteBook	M	odel Name :		W86	
emperature:	25 ℃	Re	elative Humic	dity:	55%	A Bir
est Voltage:	AC 120V/60Hz	100	11	61	1113	
erminal:	Line	LHAR		1 6		
est Mode:	AC Charging wit	h BLE TX 2	402 Mode	9	- Y	MA
Remark:	Only worse case	is reported	6		33	
80.0 dBuV						
					QP: AVG:	
					ATU.	
						-
X X X			× I www	be with the work to	washed to trade and	
A A Manuel	raphylogy, muchany, promy	John Marind Mari	in the whole with the self-energy	والالمامالية والمامالية والمامالية والمامالية والمامالية والمامالية والمامالية والمامالية والمامالية والمامالية	meelesses and	w
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	יין איין יין	k ,				AVI
20						
0.150	0.5	(MHz)	5			30.000
0.150	Reading	Correct	5 Measure-			30.000
0.150				Limit	Over	30.000
0.150 No. Mk. Fr	Reading	Correct Factor	Measure-	Limit	Over	30.000 Detector
0.150 No. Mk. Fr	Reading Level 1Hz dBuV 548 29.21	Correct Factor	Measure- ment	dBu∀		
0.150 No. Mk. Fr M 1 0.11	Reading req. Level	Correct Factor	Measure- ment	dBu∨ 65.73	dB -26.59	Detector
0.150 No. Mk. Fr M 1 0.11 2 0.11	Reading Level 1Hz dBuV 548 29.21	Correct Factor dB 9.93	Measure- ment dBuV 39.14	dBu∨ 65.73	dB -26.59 -28.02	Detector QP
0.150 No. Mk. Fr 1 0.1 2 0.1 3 0.1	Reading Level 1Hz dBuV 548 29.21 548 17.78	Correct Factor dB 9.93 9.93	Measure- ment dBuV 39.14 27.71	dBuV 65.73 55.73 64.01	dB -26.59 -28.02	Detector QP AVG
0.150 No. Mk. Fr 1 0.1 2 0.1 3 0.1 4 0.1	Reading Level Hz dBuV 548 29.21 548 17.78 904 29.82	Correct Factor dB 9.93 9.93 10.00	Measure- ment dBuV 39.14 27.71 39.82	dBuV 65.73 55.73 64.01 54.01	dB -26.59 -28.02 -24.19	Detector QP AVG QP
0.150 No. Mk. Fr M 1	Reading Level Hz dBuV 548 29.21 548 17.78 904 29.82 904 17.83	Correct Factor dB 9.93 9.93 10.00 10.00	Measure- ment dBuV 39.14 27.71 39.82 27.83	dBuV 65.73 55.73 64.01 54.01 61.75	dB -26.59 -28.02 -24.19 -26.18	Detector QP AVG QP AVG
No. Mk. Fr 1 0.1: 2 0.1: 3 0.1: 4 0.1: 5 0.2: 6 0.2:	Reading Level 1Hz dBuV 548 29.21 548 17.78 904 29.82 904 17.83 500 28.64	Correct Factor dB 9.93 9.93 10.00 10.00	Measure- ment dBuV 39.14 27.71 39.82 27.83 38.66	dBuV 65.73 55.73 64.01 54.01 61.75 51.75	dB -26.59 -28.02 -24.19 -26.18 -23.09	Detector QP AVG QP AVG
0.150 No. Mk. Fr 1 0.1 2 0.1 3 0.1 4 0.1 5 0.2 6 0.2 7 0.8	Reading Level Hz	Correct Factor dB 9.93 9.93 10.00 10.00 10.02 10.02	Measure- ment dBuV 39.14 27.71 39.82 27.83 38.66 23.71	dBuV 65.73 55.73 64.01 54.01 61.75 51.75	dB -26.59 -28.02 -24.19 -26.18 -23.09 -28.04	Detector QP AVG QP AVG QP AVG
0.150 No. Mk. Fr M 1	Reading Level Hz dBuV 548 29.21 548 17.78 904 29.82 904 17.83 500 28.64 500 13.69 220 23.96	Correct Factor dB 9.93 9.93 10.00 10.00 10.02 10.02 10.10	Measurement dBuV 39.14 27.71 39.82 27.83 38.66 23.71 34.06	dBuV 65.73 55.73 64.01 54.01 61.75 51.75 56.00 46.00	dB -26.59 -28.02 -24.19 -26.18 -23.09 -28.04 -21.94	Detector QP AVG QP AVG QP AVG
0.150 No. Mk. Fr 1 0.11 2 0.11 3 0.11 4 0.11 5 0.22 6 0.22 7 0.83 8 0.88 9 2.8	Reading Level 1Hz dBuV 548 29.21 548 17.78 904 29.82 904 17.83 500 28.64 500 13.69 220 23.96 220 11.03	Correct Factor dB 9.93 9.93 10.00 10.00 10.02 10.02 10.10 10.10	Measurement dBuV 39.14 27.71 39.82 27.83 38.66 23.71 34.06 21.13	dBuV 65.73 55.73 64.01 54.01 61.75 51.75 56.00 46.00	-26.59 -28.02 -24.19 -26.18 -23.09 -28.04 -21.94 -24.87	Detector QP AVG QP AVG QP AVG
No. Mk. Fr 1 0.1: 2 0.1: 3 0.1: 4 0.1: 5 0.2: 6 0.2: 7 0.8: 8 0.8: 9 2.8	Reading Level Hz	Correct Factor dB 9.93 9.93 10.00 10.02 10.02 10.10 10.10 10.03	Measurement dBuV 39.14 27.71 39.82 27.83 38.66 23.71 34.06 21.13 32.60	dBuV 65.73 55.73 64.01 54.01 61.75 51.75 56.00 46.00 46.00	dB -26.59 -28.02 -24.19 -26.18 -23.09 -28.04 -21.94 -24.87 -23.40	Detector QP AVG QP AVG QP AVG QP AVG





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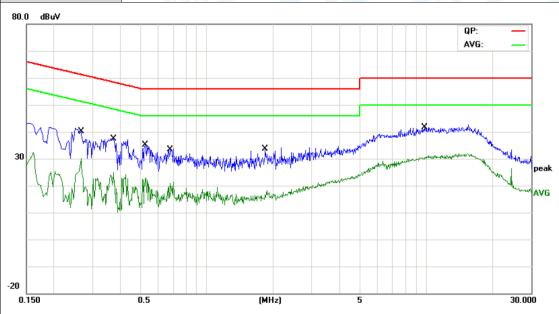
UT:	N	NoteBook	Mo	odel Name :	\	N86	
emperatur	e: 2	25 ℃	Re	lative Humid	dity:	55%	Alexander
est Voltage	e: /	AC 120V/60Hz	-		61	11:33	
erminal:	1	Neutral	A PARTY		1 6		
est Mode:	P	AC Charging wi	th BLE TX 24	02 Mode	7	0 N	N. Land
Remark:	(Only worse case	e is reported				
80.0 dBuV							
						QP: AVG:	
M. M. X		×		× × × × × × × × × × × × × × × × × × ×	Light Market Constitution	Thursday de	
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		Milytolia accompania potro		Although Andrew Andrew All Institute	a constant	and the same of th	×
30 4 44	بال بدار	11. Nu uA	THE ME TO	and the state of t	Landson Market	in a share of mark of	Y pea
\		MAKA ANAMAY AAA	$\sqrt{2}$	VAVA~			per
Y W	יין יין יי	אור, ואלאהו אל.	A w				AV
20			201	5			22.000
0.150		0.5	(MHz)	5			30.000
NI- NAI-		Reading	Correct	Measure-	Limit	O∨er	
No. Mk.			Factor	ment			
	MHz		dB	dBuV	dBuV	dB	Detector
1	0.254		10.10	39.37		-22.25	QP
2	0.254		10.10	25.45	51.62	-26.17	AVG
3	0.458		10.03	35.59	56.73	-21.14	QP
4	0.458		10.03	22.93		-23.80	AVG
5	1.502		10.11	34.06		-21.94	QP
6	1.502		10.11	22.52	46.00	-23.48	AVG
7	6.010		10.06	34.96	60.00	-25.04	QP
8	6.010		10.06	28.29	50.00	-21.71	AVG
9	11.166		10.14	37.85	60.00	-22.15	QP
10 *	11.166		10.14	31.82	50.00	-18.18	AVG
11	24.330		10.06	30.46	60.00	-29.54	QP
	24.330	00 17.17	10.06	27.23	50.00	-22.77	AVG
12							
12 							



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C.	N/Sus	5 160 50	15 55 3
4		T	A A
10.760		IK	
		5 100	

EUT:	NoteBook	Model Name :	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 240V/60Hz		
Terminal:	Line	5733	
Test Mode:	AC Charging with BLE T	X 2402 Mode	
Remark:	Only worse case is report	ted	



No. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBu∀	dB	dBu∨	dBu∨	dB	Detector
1	0.2660	30.05	10.02	40.07	61.24	-21.17	QP
2	0.2660	20.12	10.02	30.14	51.24	-21.10	AVG
3	0.3738	27.25	10.02	37.27	58.41	-21.14	QP
4	0.3738	14.91	10.02	24.93	48.41	-23.48	AVG
5	0.5220	25.16	10.03	35.19	56.00	-20.81	QP
6	0.5220	12.91	10.03	22.94	46.00	-23.06	AVG
7	0.6820	23.27	10.11	33.38	56.00	-22.62	QP
8	0.6820	10.79	10.11	20.90	46.00	-25.10	AVG
9	1.8420	23.62	10.06	33.68	56.00	-22.32	QP
10	1.8420	8.06	10.06	18.12	46.00	-27.88	AVG
11 *	9.8178	31.50	10.15	41.65	60.00	-18.35	QP
12	9.8178	20.37	10.15	30.52	50.00	-19.48	AVG

^{*:}Maximum data x:Over limit !:over margin





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EUT:	NoteBoo	k	Model Name :	W86	an'
Temperature:	25 ℃	Carrier S	Relative Humidity:	55%	ARTH
Test Voltage:	AC 240V	//60Hz	100	TO US	
Terminal:	Neutral	NY WY		Carried Marie	
Test Mode:	AC Char	ging with BLE T.	X 2402 Mode	A V	A Basser
Remark:	Only wor	rse case is repor	ted	11:35	
80.0 dBuV					
				QP: AVG:	
*MMX	Man a	, X	Washing of the state of the sta	and the second second	
30	1. A.M. MANIE	become the french of all had be defined by the first of t	Wally Mary Miles	- House and	"March Applica
	M. M. M. M. A.	HAMPY Shills Aller and the contraction	dividente of the property of the state of th		pea
D at A di	A 1 A Nahai M	La Maria (1) (Mandra Maria 1 a . a			AVE
0.150	0.5	(MHz)	5		30.000
No. Mk.		eading Corre ₋e∨el Fact		ıit O∨er	
	MHz	dBuV dB	dBuV dBu	ıV dB	Detector
1 0	.1620 3	34.33 10.1	2 44.45 65.3	36 -20.91	QP
2 0	.1620 2	24.76 10.1	2 34.88 55.3	36 -20.48	AVG
3 0	.2620 3	34.71 10.1	0 44.81 61.3	36 -16.55	QP
4 0	.2620 2	22.90 10.1	0 33.00 51.0	36 -18.36	AVG
5 0	.3618 3	31.65 10.0	7 41.72 58.6	69 -16.97	QP
6 0	.3618 1	18.68 10.0	7 28.75 48.6	69 -19.94	AVG
7 1	.8935 2	27.16 10.0	7 37.23 56.0	00 -18.77	QP
8 1	.8935	8.83 10.0	7 18.90 46.0	00 -27.10	AVG
9 6	.5457 3	32.87 10.0	6 42.93 60.0	00 -17.07	QP
	.5457 2	21.26 10.0	6 31.32 50.0	00 -18.68	AVG
10 6					QP
	.4899 3	36.33 10.0	9 46.42 60.0	00 -13.58	QF



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5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Emission Limit (Above 1000MHz)

Frequency	Class A (dBu\	//m)(at 3 M)	Class B (dBuV/m)(at 3 M)		
(MHz)	Peak	Average	Peak	Average	
Above 1000	80	60	74	54	

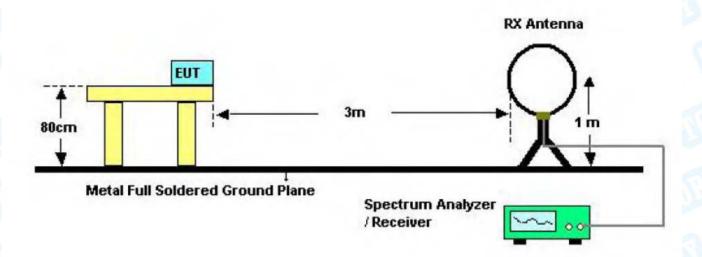
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

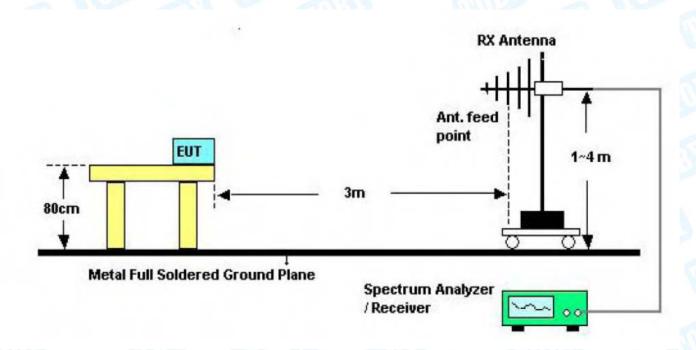


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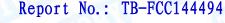
5.2 Test Setup



Below 30MHz Test Setup

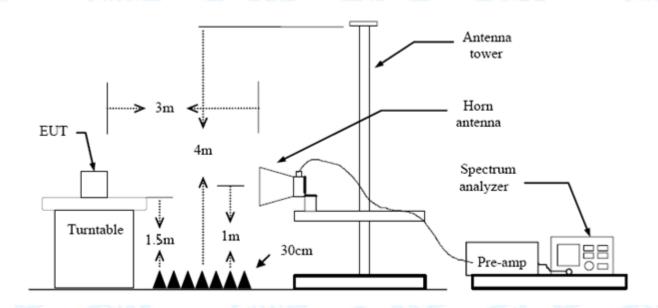


Below 1000MHz Test Setup



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Above 1GHz Test Setup

5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.



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5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.



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	NoteB	JOOK		Model:		W86	
Temperature:	25 ℃	and'	30	Relative Hu	midity:	55%	ARTH
Test Voltage:	AC 12	20V/60Hz		18	6.11	1133	
Ant. Pol.	Horizo	ontal	Alto.		60	A	MAN.
Test Mode:	BLE T	X 2402 Mo	de	CALL DE			Market
Remark:	Only v	worse case	is reported			13	
80.0 dBuV/m							
30			2 3		FCC S	15B 3M Radiati Margin -6 6	
	60 60 70	80	(MHz)	300	400 5	00 600 700	1000.00
-20 30.000 40 !	50 60 70	80 Reading	(MHz)	300 Measure-			1000.00
	50 60 70				400 5 Limit	00 600 700 Over	1000.00
30.000 40 5		Reading	Correct	Measure-			1000.00
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment dBuV/m	Limit dBuV/m	Over	Detecto peak
No. Mk. 1 3 2 ! 13	Freq. MHz 2.4059	Reading Level dBuV 47.70	Correct Factor dB/m -15.45	Measure- ment dBuV/m	Limit dBuV/m 40.00	Over dB -7.75	Detecto peak peak
No. Mk. 1 3 2 ! 13 3 ! 19	Freq. MHz 2.4059 39.8505	Reading Level dBuV 47.70 61.38	Correct Factor dB/m -15.45 -21.99	Measure- ment dBuV/m 32.25 39.39	Limit dBuV/m 40.00 43.50	Over dB -7.75 -4.11	Detecto
No. Mk. 1 3 2 ! 13 3 ! 19 4 ! 24	Freq. MHz 2.4059 39.8505 97.8925	Reading Level dBuV 47.70 61.38 61.14	Correct Factor dB/m -15.45 -21.99 -20.49	Measure- ment dBuV/m 32.25 39.39 40.65	Limit dBuV/m 40.00 43.50 43.50	Over dB -7.75 -4.11 -2.85	Detecto peak peak peak

TB-RF-074-1.0



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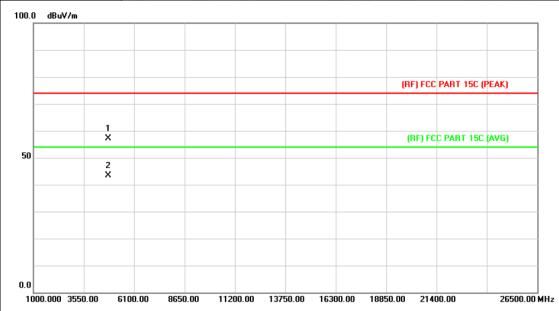


	NoteE	JOOK	IVIC	odel:	W	86	
Temperature:	25 ℃	TIME	Re	lative Humidit	y : 55	5%	
Test Voltage:	AC 12	20V/60Hz	100		611	113.5	
Ant. Pol.	Vertic	al	DAG:		62		
Test Mode:	BLE 7	BLE TX 2402 Mode					Market
Remark:	Only	worse case	is reported		THE STATE	3	
30 dBuV/m	2 X		Sand and beginning the property of the		6 ×	15B 3M Radiation	
.20							
30.000 40	50 60 70		(MHz)	300	400 50	0 600 700	1000.00
	50 60 70 Freq.	Reading Level	(MHz) Correct Factor	Measure-	400 50	0 600 700 Over	1000.00
30.000 40		Reading	Correct	Measure- ment L			1000.00
30.000 40 No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment L	imit	Over	
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement L dBuV/m d 36.22	.imit BuV/m	Over	Detecto
No. Mk. 1 ! 3 2 ! 4	Freq. MHz 30.6372	Reading Level dBuV 50.57	Correct Factor dB/m -14.35	Measurement L dBuV/m d 36.22 4 34.72 4	.imit Bu∀/m 40.00	Over	Detecto peak peak
No. Mk. 1 ! 3 2 ! 4 3 ! 7	Freq. MHz 30.6372	Reading Level dBuV 50.57 58.48	Correct Factor dB/m -14.35 -23.76	Measurement L dBuV/m d 36.22 4 34.72 4 36.64 4	imit Bu√/m 40.00	Over dB -3.78 -5.28	Detecto peak peak peak
No. Mk. 1 ! 3 2 ! 4 3 ! 7 4 ! 13	Freq. MHz 30.6372 8.5016 78.9651	Reading Level dBuV 50.57 58.48 59.96	Correct Factor dB/m -14.35 -23.76 -23.32	Measurement L dBuV/m d 36.22 4 34.72 4 36.64 4 38.89 4	imit BuV/m 40.00 40.00	Over dB -3.78 -5.28 -3.36	Detecto peak



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EUT:	NoteBook	Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	The Property	LID A
Ant. Pol.	Horizontal		
Test Mode:	BLE Mode TX 2402 MHz		a William
Remark:	No report for the emission	which more than 10 dB b	pelow the
	prescribed limit.	المال المراد	



No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.688	43.69	13.44	57.13	74.00	-16.87	peak
2	*	4803.907	29.92	13.44	43.36	54.00	-10.64	AVG



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EUT:	NoteBook	Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2402 MHz		
Remark:	No report for the emission	n which more than 10	dB below the
	prescribed limit.	لا مر مر	

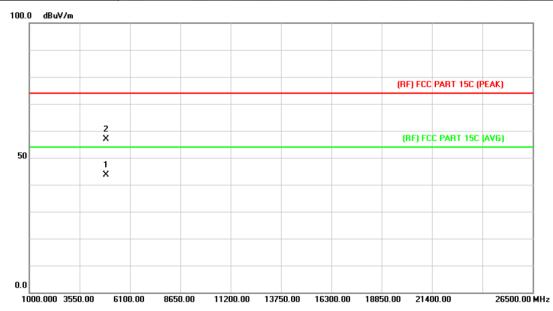


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.652	29.95	13.44	43.39	54.00	-10.61	AVG
2		4804.159	42.99	13.44	56.43	74.00	-17.57	peak



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NoteBook	Model:	W86
25 ℃	Relative Humidity:	55%
AC 120V/60Hz	01 - 6	
Horizontal		
BLE Mode TX 2442 MHz		
No report for the emissio prescribed limit.	n which more than 10 o	dB below the
	25 °C AC 120V/60Hz Horizontal BLE Mode TX 2442 MHz No report for the emissio	25 °C Relative Humidity: AC 120V/60Hz Horizontal BLE Mode TX 2442 MHz No report for the emission which more than 10 or

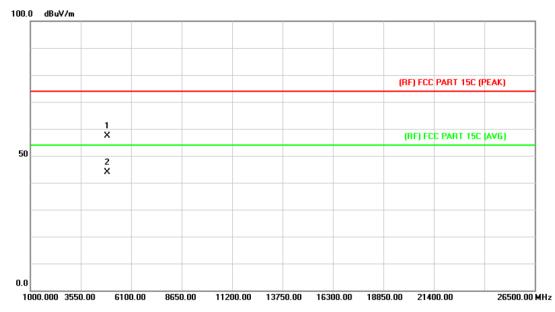


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4883.618	29.82	13.92	43.74	54.00	-10.26	AVG
2		4884.429	43.03	13.92	56.95	74.00	-17.05	peak



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EUT:	NoteBook	Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2442 MHz		
Remark:	No report for the emission	n which more than 10	dB below the
	prescribed limit.	22 00 13	

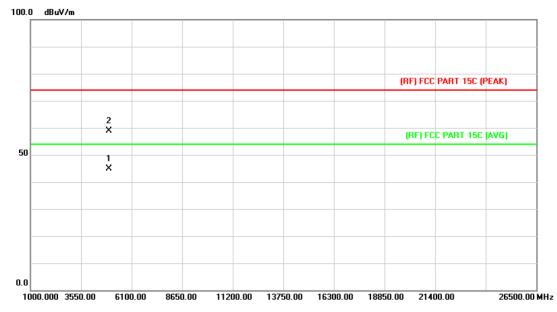


N	o. M	k. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4884.178	43.53	13.92	57.45	74.00	-16.55	peak
2	*	4884.179	29.86	13.92	43.78	54.00	-10.22	AVG



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NoteBook		
1101020011	Model:	W86
25 ℃	Relative Humidity:	55%
AC 120V/60Hz	01 - 6	
Horizontal		
BLE Mode TX 2480 MHz		THE PARTY OF THE P
No report for the emissio prescribed limit.	n which more than 10 o	dB below the
	AC 120V/60Hz Horizontal BLE Mode TX 2480 MHz No report for the emissio	AC 120V/60Hz Horizontal BLE Mode TX 2480 MHz No report for the emission which more than 10 or

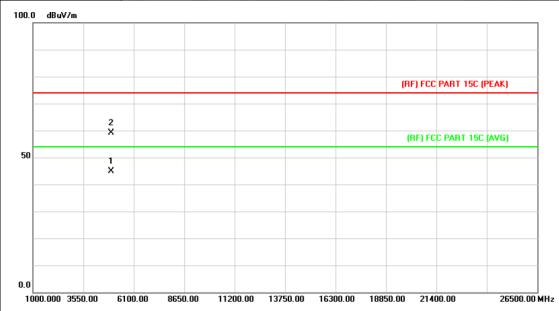


No	. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.557	30.56	14.36	44.92	54.00	-9.08	AVG
2		4959.780	44.47	14.36	58.83	74.00	-15.17	peak



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EUT:	NoteBook	Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	000	THE
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2480 MHz		
Remark:	No report for the emissio	n which more than 10	dB below the
	prescribed limit.	ولا مر الا	



No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.229	30.64	14.36	45.00	54.00	-9.00	AVG
2		4960.255	44.71	14.36	59.07	74.00	-14.93	peak



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6. Restricted Bands Requirement

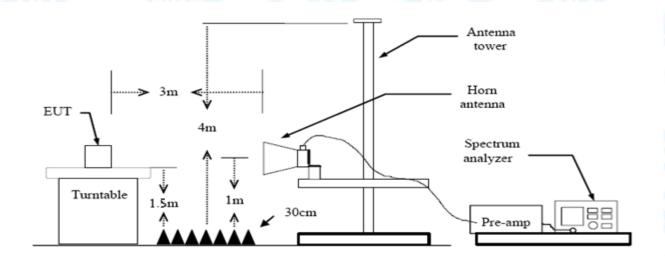
6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency	Class B (dB	BuV/m)(at 3 M)
Band (MHz)	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked



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and then Quasi Peak detector mode re-measured.

- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 KHz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=1 kHz with Peak Detector for Average Values.

Test data please refer the following pages.

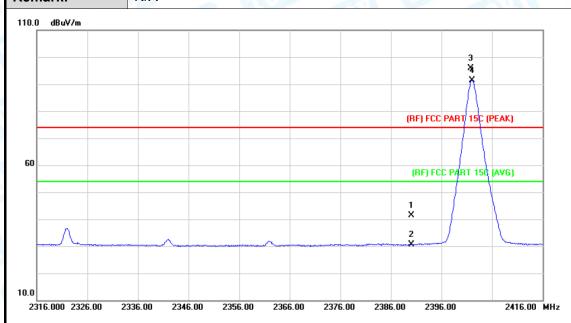




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(1) Radiation Test

EUT:	NoteBook	Model:	W86		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60Hz				
Ant. Pol.	Horizontal		MILL		
Test Mode:	BLE Mode TX 2402 MHz				
Remark:	N/A	A MALL			



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	40.64	0.77	41.41	74.00	-32.59	peak
2		2390.000	29.97	0.77	30.74	54.00	-23.26	AVG
3	Х	2401.800	94.98	0.82	95.80	Fundamental	Frequency	peak
4	*	2402.000	90.64	0.82	91.46	Fundamental	Frequency	AVG



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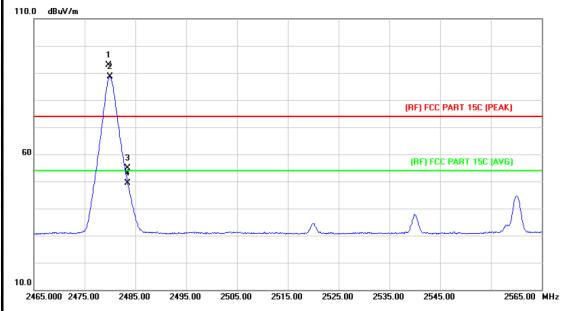


EUT:			Note	Book		a 1		Mod	el:			W	86		10
Гетр	eratur	e:	25 °C	C		13		Relative Humidity: 55%			imidity: 55%				
Test \	Voltag	e:	AC 1	20V/60	Hz		T)			16	all	13.3			h.
Ant. F	Pol.		Verti	cal		W			4		0		4		
Test I	Mode:		BLE	Mode 7	X 24	02 MHz		1	M	200		١.		Med	
Rema	ark:		N/A	AB	100			N. P.			111				-
110.0	dBuV/m														_
												4 8			
												Ă			
										(RF	FCC PA	RT 15C (PEAK)	1
												\mathcal{T}			-
60										(B)	E) ECC E	ART 15C	IAVG	1	-
											,	<i></i>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	'	
	_									1 X					
	$\mathcal{N}_{\mathcal{L}}$			Λ						2 X			1		
	•														
10.0															
	.000 2326	5.00 2	336.00	2346.00	2356	.00 236	6.00	2376.00) 23	386.00	2396.00	D	24	116.00	_ MH₂
				Read	lina	Corre	ect	Meas	ure-						
No	o. Mk	. Fr	eq.	Lev		Fact	or	me	nt	Lim	ıit	Ove	er		
		М	Hz	dBu	V	dB/m		dBu\	V/m	dBu	ıV/m	dB		Dete	ecto
1		2390	.000	41.8	38	0.77	,	42.	65	74	.00	-31.	35	ре	ak
2		2390	.000	29.8	32	0.77	•	30.	59	54	.00	-23.	41	Α١	/G
3	*	2402	.000	88.2	24	0.82	?	89.	06	Fundan	nental	Frequen	су	Α۱	/G
	Х	2402		92.3		0.82		93.				Frequen			ak



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EUT:	NoteBook	Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE Mode TX 2480 MHz		
Remark:	N/A		1:33
110.0 dBuV/m			

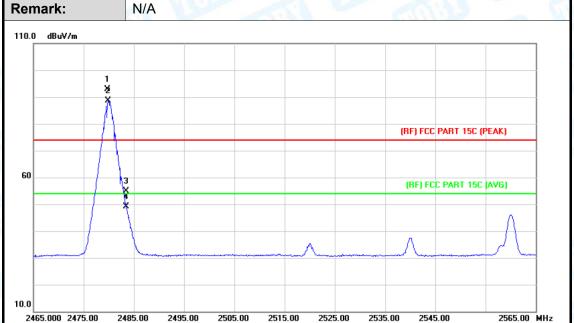


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2479.700	91.61	1.15	92.76	Fundamental	Frequency	peak
2	*	2480.000	87.43	1.15	88.58	Fundamental	Frequency	AVG
3		2483.500	53.73	1.17	54.90	74.00	-19.10	peak
4		2483.500	48.19	1.17	49.36	54.00	-4.64	AVG



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ì	EUT:	NoteBook	Model:	W86
	Temperature:	25 ℃	Relative Humidity:	55%
	Test Voltage:	AC 120V/60Hz	01 -	THE STATE OF THE S
	Ant. Pol.	Vertical		
	Test Mode:	BLE Mode TX 2480 MHz		THE RESERVE TO SERVE
		A-1/A		



No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.700	91.63	1.15	92.78	Fundamental	Frequency	peak
2	*	2479.900	87.45	1.15	88.60	Fundamental	Frequency	AVG
3		2483.500	53.68	1.17	54.85	74.00	-19.15	peak
4		2483.500	48.05	1.17	49.22	54.00	-4.78	AVG

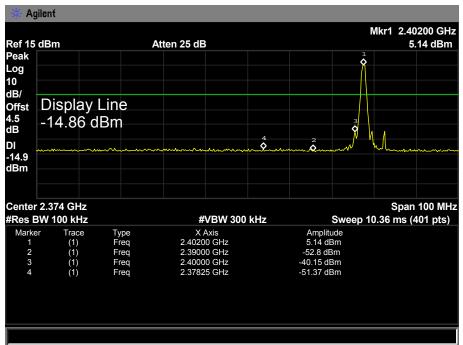


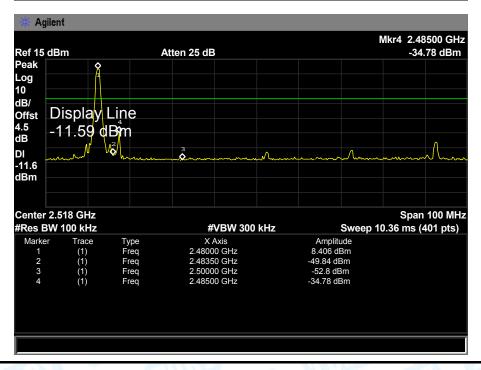


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(2) Conducted Test

EUT:	NoteBook	Model:	W86			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60Hz	AC 120V/60Hz				
Test Mode:	BLE Mode TX 2402MHz / B	BLE Mode TX 2402MHz / BLE Mode TX 2480MHz				
Remark:	The EUT is programed in co	ontinuously transmitting r	mode			







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7. Bandwidth Test

7.1 Test Standard and Limit

7.1.1 Test Standard FCC Part 15.247 (a)(2)

7.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210							
Test Item	Test Item Limit Frequency Range(MHz)						
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5					

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (3)Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:100 kHz, and Video Bandwidth:300 kHz, Detector: Peak, Sweep Time set auto.

7.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, middle and high channel for the test.



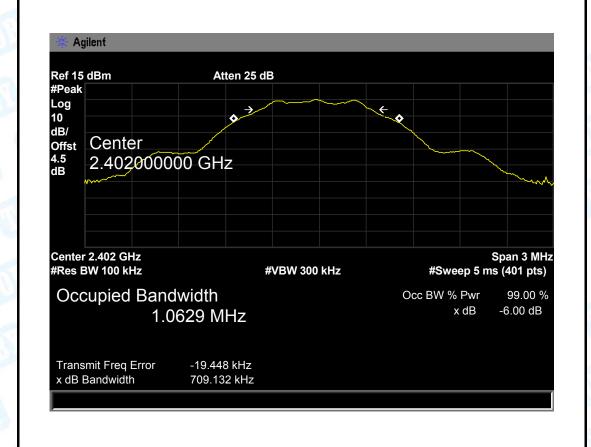
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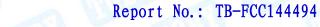
7.5 Test Data

EUT: NoteBook		Model:	W86
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz	THURS .	
Test Mode:	BLE TX Mode		11:33
Channel frequer	ncy 6dB Bandwidth	99% Bandwidth	Limit
(MHz)	(kHz)	(kHz)	(kHz)
2402	709.132	1062.90	
2442	707.395	1063.80	>=500
2480	724.118	1062.90	
		BA	-1

BLE Mode

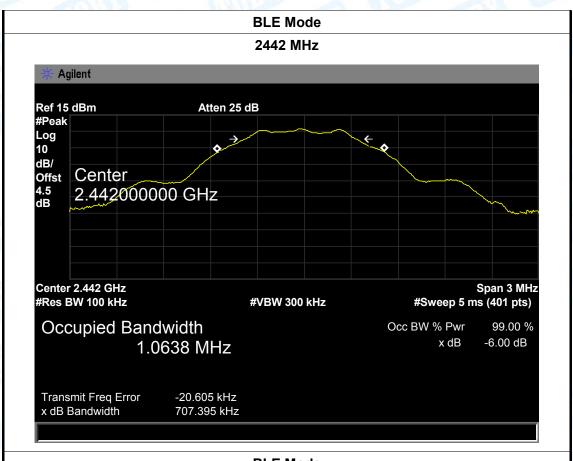
2402 MHz

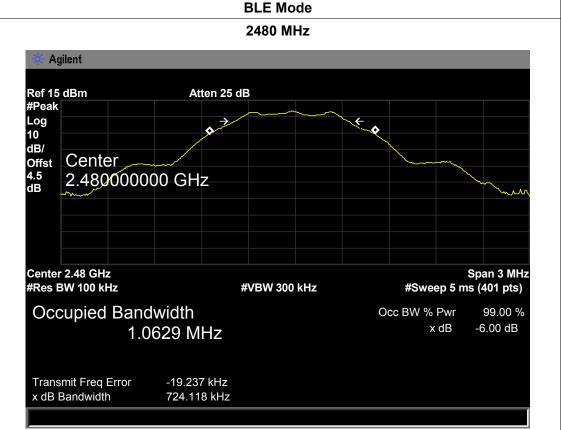




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8. Peak Output Power Test

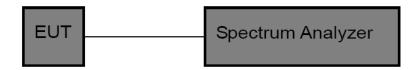
8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247 (b)

8.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210						
Test Item	Test Item Limit Frequency Range(MHz)					
Peak Output Power 1 Watt or 30 dBm 2400~2483.5						

8.2 Test Setup



8.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to section 9.1.1 of KDB 558074 D01 DTS Meas Guidance v03r02.

- (1) Set the RBW≥DTS Bandwidth
- (2) Set VBW≥3*RBW
- (3) Set Span≥3*RBW
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

8.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

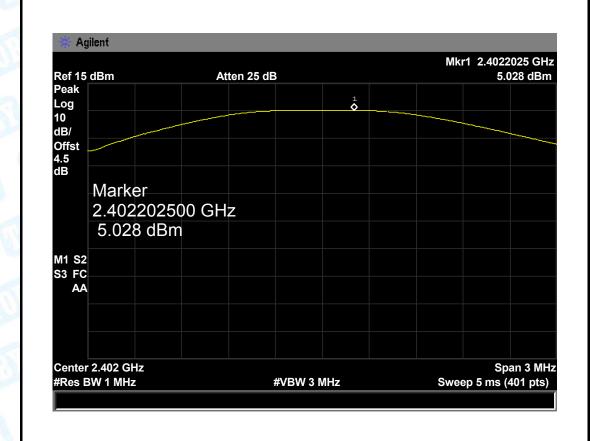


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8.5 Test Data

EUT:	NoteBook		Model:	·	W86
Temperature:	25 ℃		Relative Humidity:		55%
Test Voltage:	AC 120V/	60Hz	Will to		0
Test Mode:	BLE TX M	lode			100
Channel frequen	cy (MHz)	Test Resul	t (dBm)	L	_imit (dBm)
2402		5.02	8		
2442		6.40	6.404		30
2480		8.32	4		
		BLE M	ode	-	

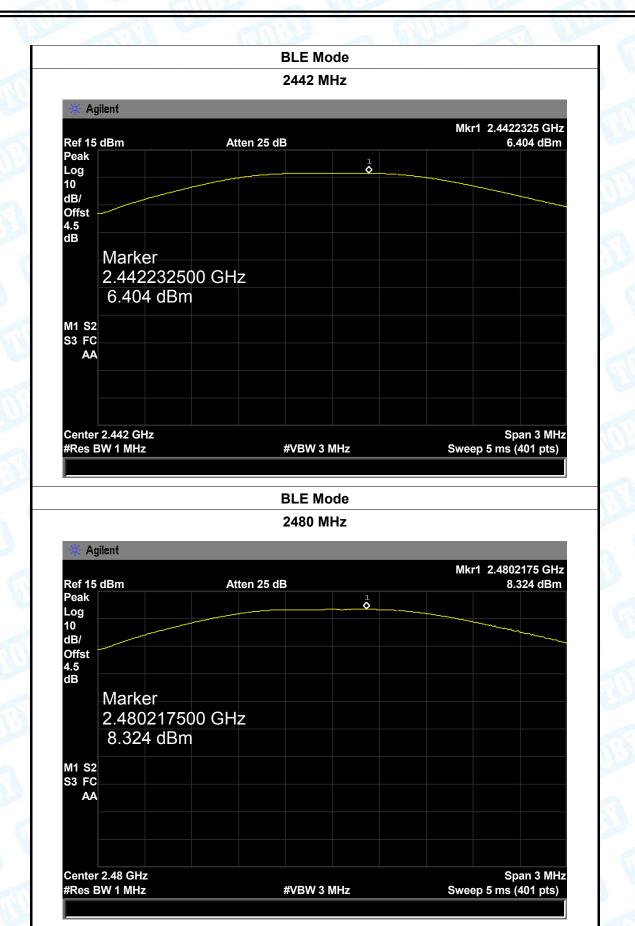
2402 MHz





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9. Power Spectral Density Test

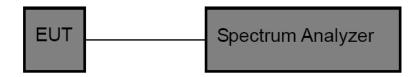
9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (e)

9.1.2 Test Limit

FCC Part 15 Subpart C(15.247)				
Test Item	Limit	Frequency Range(MHz)		
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5		

9.2 Test Setup



9.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v03r02.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser center frequency to DTS channel center frequenyc.
- (3) Set the span to 1.5 times the DTS bandwidth.
- (4) Set the RBW to: 3 kHz(5) Set the VBW to: 10 kHz
- (6) Detector: peak(7) Sweep time: auto
- (8) Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

9.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, Midle and high channel for the test.

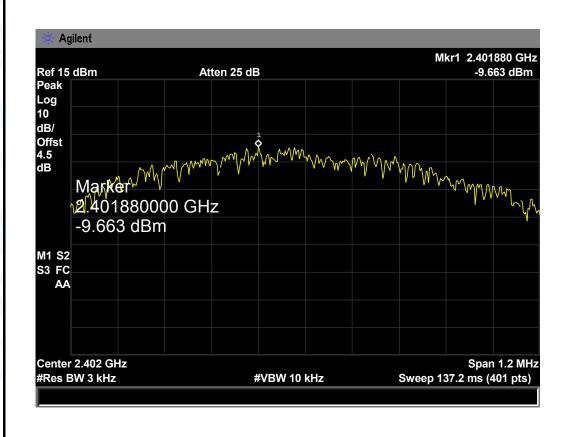


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8.5 Test Data

EUT:	NoteBook		Model:	W86	
Temperature:	25 ℃		Relative Humidity	: 55%	
Test Voltage:	AC 120V/	60Hz			
Test Mode:	BLE TX Mode				
Channel Frequency Po		Power	Density	Limit	
(MHz)		(3 kHz/dBm)		(dBm)	
2402		-9.663			
2442		-8.533		8	
2480		-6.653			
		BLE	Mode		

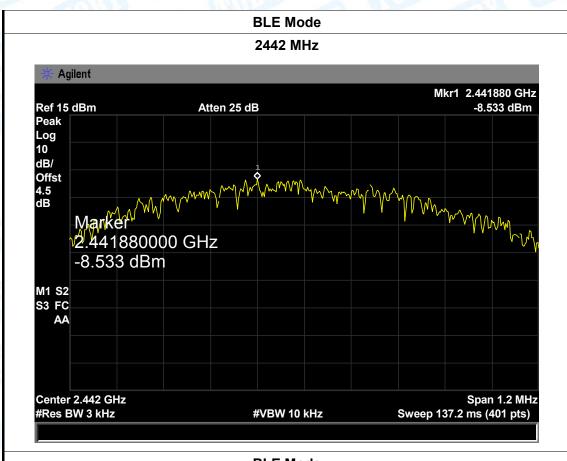
2402 MHz

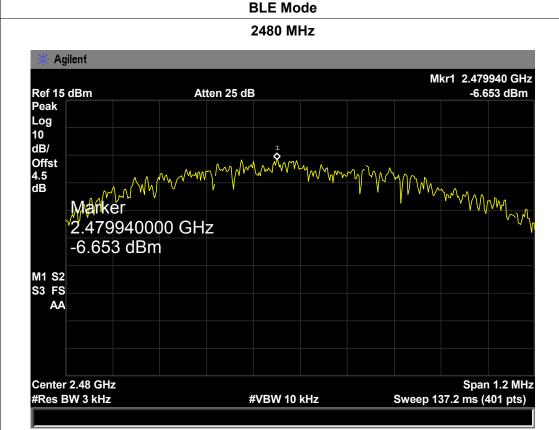






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10. Antenna Requirement

10.1 Standard Requirement

10.1.1 Standard FCC Part 15.203

10.1.2 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 shall be considered sufficient to comply with the provisions of this Section. 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.

10.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 3 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

Result

The EUT antenna is an Embedded Antenna. It complies with the standard requirement.

Antenna Type		
3 m	▼ Permanent attached antenna	
	□ Unique connector antenna	
	□ Professional installation antenna	