

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC145093

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# **FCC Radio Test Report** FCC ID: XMF-MID8001

## **FCC Class II Permissive Change**

Report No. TB-FCC145093

Lightcomm Technology Co., Ltd. **Applicant** 

**Equipment Under Test (EUT)** 

**EUT Name** MID

Model No. MID8001-IB

Series Model No. DL801W, DL808W

**Brand Name** N/A

**Receipt Date** 2015-08-12

2015-08-12 to 2015-08-17 **Test Date** 

**Issue Date** 2015-08-18

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

**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** 

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 the report.

TB-RF-074-1.0

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# 1. General Information about EUT

#### 1.1 Client Information

**Applicant**: Lightcomm Technology Co., Ltd.

Address: RM 1708-10, 17/F, PROSPERITY CENTRE, 25 CHONG YIP

STREET, KWUN TONG, KOWLOON, HONG KONG

Manufacturer : Huizhou Hengdu Electronics Co.,Ltd.

Address : DIP South Area, Huiao Highway, Huizhou, Guangdong, China

### 1.2 General Description of EUT (Equipment Under Test)

EUT Name	i	MID	MID			
Models No.	:	MID8001-IB, DL801W, DL808W				
Model Difference	5	All models are identical in the same PCB layout, interior structure and electrical circuit, The only difference is model name for commercial purpose.				
13	1	Operation Frequency: 2402MHz~2480MHz				
Dundunt	20 500	Number of Channel:	Bluetooth 4.0 (BLE): 40 channels see note(3)			
Product Description		RF Output Power:	5.778 dBm Conducted Power			
		Antenna Gain:	0 dBi FPC Antenna			
		Modulation Type:	GFSK			
		Bit Rate of Transmitter:	1Mbps(GFSK)			
Power Supply	•	DC power supplied by A DC Voltage supplied from				
Power Rating : Input: AC 100~240V 50/60Hz 0.35A Max. Output: 5V 2A.						
DC 3.7V from 4500mA Li-ion battery.						
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 v03r03.
- (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:

Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)

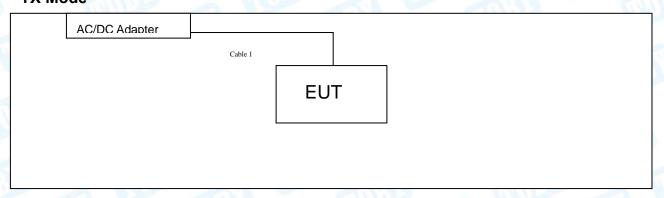


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00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	3	
13	2428	27	2456		

# 1.3 Block Diagram Showing the Configuration of System Tested

#### **TX Mode**



# 1.4 Description of Support Units

Equipment Information						
Name Model S/N Manufacturer Used "√"						
				1		
		Cable Information				
Number Shielded Type Ferrite Core Length Note						
Cable 1	YES	NO	1.1M	Accessories		





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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 C63.10 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	Realtek Bluetooth MPRTK_BT_CHIP_ID_RTL8723B			
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 <sub>Lab</sub> )
	Level Accuracy:	
Conducted Emission	9kHz~150kHz	±3.42 dB
	150kHz to 30MHz	±3.42 dB
Dedicted Emission	Level Accuracy:	. 4 CO dD
Radiated Emission	9kHz to 30 MHz	±4.60 dB
Dadiated Emission	Level Accuracy:	. 4 40 dD
Radiated Emission	30MHz to 1000 MHz	±4.40 dB
Dedicted Emission	Level Accuracy:	. 4.20 dD
Radiated Emission	Above 1000MHz	±4.20 dB

### 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	Took Idom	ludamant	Remark	
FCC	IC	Test Item	Judgment		
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 Note(3)	
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth	PASS	N/A Note(3)	
15.247(b)	RSS 247 5.4 (4)	Peak Output Power	PASS	N/A Note(3)	
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	PASS	N/A Note(3)	
15.247(d)	RSS 247 5.5	Transmitter Radiated Spurious Emission	PASS	N/A	

Note (1): "/" for no requirement for this test item.

- (2): N/A is an abbreviation for Not Applicable.
- (3): This report is Class II change report for the original equipment have changed, the transmitter module itself has not changed. More information about the test data please refer to the original test report.



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# 3. Test Equipment

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Aug. 07, 2015	Aug. 06, 2016
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Aug. 07, 2015	Aug. 06, 2016
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 07, 2015	Aug. 06, 2016
LISN	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015	Aug. 06, 2016
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Date
Radiation	Emission Tes	τ			Cal. Due
Spectrum Analyzer	Agilent	E4407B	MY45106456	Sep. 01, 2014	Aug. 31, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	100010/007	Aug. 07, 2015	Aug. 06, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 28, 2015	Mar. 27, 2016
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 28, 2015	Mar. 27, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 28, 2015	Mar. 27, 2016
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	Sonoma	310N	185903	Mar. 28, 2015	Mar. 27, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 28, 2015	Mar. 27, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 28, 2015	Mar. 27, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A



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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

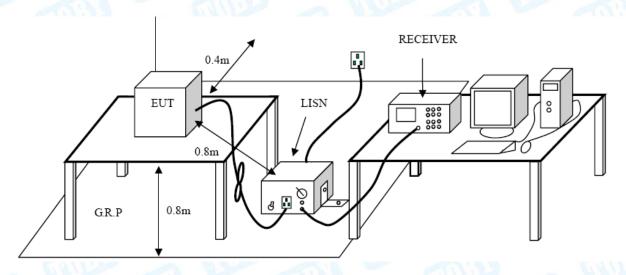
#### **Conducted Emission Test Limit**

	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

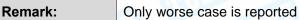
Please see the next page.

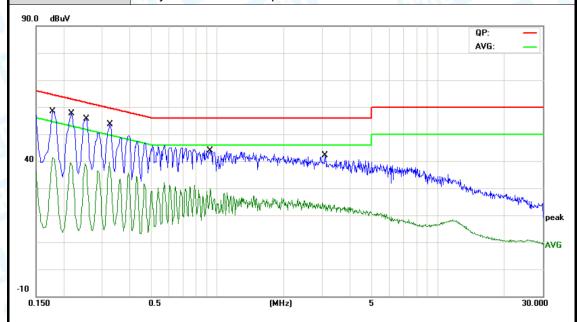


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N. C.		1	CITIES .		MUL	
	Million		13:m	Time I		W. Committee
EUT:		MID	1	Model:		MID8001-IB

Temperature:	: 25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60 Hz							
Terminal:	Line							
Test Mode:	AC Charging with BLE	AC Charging with BLE TX 2402 MHz						
Romark:	Only worse case is re	norted						





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB	dBu∨	dBu∀	dB	Detector
1		0.1780	43.94	9.98	53.92	64.57	-10.65	QP
2		0.1780	29.14	9.98	39.12	54.57	-15.45	AVG
3		0.2180	42.84	10.02	52.86	62.89	-10.03	QP
4		0.2180	26.48	10.02	36.50	52.89	-16.39	AVG
5		0.2540	41.83	10.02	51.85	61.62	-9.77	QP
6		0.2540	25.51	10.02	35.53	51.62	-16.09	AVG
7	*	0.3260	40.04	10.02	50.06	59.55	-9.49	QP
8		0.3260	26.49	10.02	36.51	49.55	-13.04	AVG
9		0.9260	31.66	10.07	41.73	56.00	-14.27	QP
10		0.9260	17.27	10.07	27.34	46.00	-18.66	AVG
11		3.0740	24.60	10.02	34.62	56.00	-21.38	QP
12		3.0740	12.68	10.02	22.70	46.00	-23.30	AVG

<sup>\*:</sup>Maximum data x:Over limit !:over margin



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( )	and the second
	DV
- 2	$\mathbf{D}\mathbf{I}$

UT:	MID		I	lodel:		MID8001	-IB		
Temperature:	25 °C		Relative Humidity: 55%						
Test Voltage:	AC 1	AC 120V/60 Hz							
Terminal:	Neuti	Neutral							
Test Mode:	AC C	AC Charging with BLE TX 2402 MHz							
Remark: Only worse case is reported									
90.0 dBuV	1								
						QP: AVG:			
XXX	X								
	MALANA	An hanan	Manufe and a second						
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0.150	0.5		(MHz)	5		No State Contract	30.000		
0.150		Reading	Correct	Measure-		**************************************			
	Freq.	Level	Correct Factor	Measure- ment	Limit	Over	30.000		
0.150 No. Mk.	Freq.	<b>Level</b> dBuV	Correct Factor	Measure- ment	dBu∨	dB	30.000		
0.150 No. Mk.	Freq. MHz 0.1819	dBuV 42.43	Correct Factor dB 9.98	Measure- ment dBuV 52.41	dBu∨ <b>64.39</b>	dB -11.98	30.000  Detector  QP		
0.150 No. Mk.	Freq. MHz 0.1819 0.1819	dBuV 42.43 26.05	Correct Factor dB 9.98	Measure- ment dBuV 52.41 36.03	dBu√ 64.39 54.39	dB -11.98 -18.36	30.000  Detector  QP  AVG		
0.150 No. Mk.	Freq. MHz 0.1819	dBuV 42.43	Correct Factor dB 9.98	Measure- ment dBuV 52.41	dBu√ 64.39 54.39	dB -11.98	30.000  Detector  QP		
0.150  No. Mk.  1 (2 (3 )	Freq. MHz 0.1819 0.1819	dBuV 42.43 26.05	Correct Factor dB 9.98	Measure- ment dBuV 52.41 36.03	dBuV 64.39 54.39 62.89	dB -11.98 -18.36	30.000  Detector  QP  AVG		
0.150  No. Mk.  1 (2 (3 4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (	Freq. MHz 0.1819 0.1819 0.2180	dBuV 42.43 26.05 41.02	Correct Factor dB 9.98 9.98 10.02	Measure- ment  dBuV  52.41  36.03  51.04	dBuV 64.39 54.39 62.89 52.89	dB -11.98 -18.36 -11.85	30.000  Detector  QP  AVG		
0.150  No. Mk.  1	Freq. MHz 0.1819 0.1819 0.2180	dBuV 42.43 26.05 41.02 24.34	Correct Factor dB 9.98 9.98 10.02 10.02	Measure- ment  dBuV  52.41  36.03  51.04  34.36	dBuV 64.39 54.39 62.89 52.89 61.62	dB -11.98 -18.36 -11.85 -18.53	Detector QP AVG QP AVG		
0.150  No. Mk.  1	Freq.  MHz  0.1819  0.1819  0.2180  0.2180  0.2540	dBuV 42.43 26.05 41.02 24.34 39.91	Correct Factor  dB  9.98  9.98  10.02  10.02	Measure- ment  dBuV  52.41  36.03  51.04  34.36  49.93	dBuV 64.39 54.39 62.89 52.89 61.62	dB -11.98 -18.36 -11.85 -18.53 -11.69 -17.95	30.000  Detector  QP  AVG  QP  AVG		
0.150  No. Mk.  1	Freq. MHz 0.1819 0.1819 0.2180 0.2180 0.2540 0.2540	dBuV 42.43 26.05 41.02 24.34 39.91 23.65	Correct Factor  dB  9.98  9.98  10.02  10.02  10.02	Measurement  dBuV  52.41  36.03  51.04  34.36  49.93  33.67	dBuV 64.39 54.39 62.89 52.89 61.62 51.62 59.55	dB -11.98 -18.36 -11.85 -18.53 -11.69 -17.95	30.000  Detector  QP  AVG  QP  AVG  QP  AVG		
0.150  No. Mk.  1	Freq.  MHz  0.1819  0.2180  0.2180  0.2540  0.2540  0.3260	Level  dBuV  42.43  26.05  41.02  24.34  39.91  23.65  39.68	Correct Factor  dB  9.98  9.98  10.02  10.02  10.02  10.02	Measurement  dBuV  52.41  36.03  51.04  34.36  49.93  33.67  49.70	dBuV 64.39 54.39 62.89 52.89 61.62 51.62 59.55 49.55	dB -11.98 -18.36 -11.85 -18.53 -11.69 -17.95 -9.85	Journal Street, 1987 AVG QP AVG QP AVG QP		
0.150  No. Mk.  1	Freq. MHz 0.1819 0.1819 0.2180 0.2180 0.2540 0.2540 0.3260 0.3260	dBuV 42.43 26.05 41.02 24.34 39.91 23.65 39.68 25.81	Correct Factor  dB  9.98  9.98  10.02  10.02  10.02  10.02  10.02	Measurement  dBuV  52.41  36.03  51.04  34.36  49.93  33.67  49.70  35.83	dBuV 64.39 54.39 62.89 52.89 61.62 51.62 59.55 49.55 58.06	dB -11.98 -18.36 -11.85 -18.53 -11.69 -17.95 -9.85 -13.72	30.000  Detector QP AVG QP AVG QP AVG		
0.150  No. Mk.  1	Freq.  MHz  0.1819  0.2180  0.2180  0.2540  0.2540  0.3260  0.3260  0.3899	dBuV 42.43 26.05 41.02 24.34 39.91 23.65 39.68 25.81 35.50	Correct Factor  9.98  9.98  10.02  10.02  10.02  10.02  10.02  10.02  10.02	Measurement  dBuV  52.41  36.03  51.04  34.36  49.93  33.67  49.70  35.83  45.52	dBuV 64.39 54.39 62.89 52.89 61.62 51.62 59.55 49.55 58.06 48.06	dB -11.98 -18.36 -11.85 -18.53 -11.69 -17.95 -9.85 -13.72 -12.54	30.000  Detector QP AVG QP AVG QP AVG QP AVG		



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EUT:	MID		Mo	odel:	N	1ID8001-	IB	
Temperature:	25 ℃	Call'	Re	lative Humidit	<b>y</b> : 5	55%		
Test Voltage:	AC 24	10V/60 Hz	-	1.0	611	11.30		
Terminal:	Line							
Test Mode:	AC C	harging with	BLE TX 24	102 MHz		0 1	NO.	
Remark:	Only	worse case	is reported		100	131		
90.0 dBuV								
40				Annound Man	Market Ma	QP: AVG:	peak	
-10 0.150	0.5		(MHz)	5			30.000	
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment L	imit	Over		
	MHz	dBuV	dB		dBuV	dB	Detector	
	0.1740	46.16	9.97		4.76	-8.63	QP	
	0.1740	32.98	9.97			-11.81	AVG	
	0.2100	43.34	10.02		3.20	-9.84	QP	
	0.2100	30.82	10.02			-12.36	AVG	
	0.2420	40.98	10.02			-11.02	QP	
-	0.2420	31.59	10.02			-10.41	AVG	
	0.3180	41.03	10.02		9.76	-8.71	QP	
	0.3180	29.81	10.02		9.76	-9.93	AVG	
	0.7980	38.21	10.10		6.00	-7.69	QP	
	0.7980	29.57	10.10		6.00	-6.33	AVG	
	1.1539	37.21	10.06		6.00	-8.73	QP	
12	1.1539	25.65	10.06	35.71 4	6.00	-10.29	AVG	

**Emission Level= Read Level+ Correct Factor** 

x:Over limit !:over margin

\*:Maximum data



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EUT:	MID		Model:	MID8001	-IB				
Temperature:	25 ℃		Relative Humidity:	55%	ABOVE				
Test Voltage:	AC 240V/60 Hz								
Terminal:	Neutral	Neutral							
Test Mode:	AC Chargin	g with BLE TX	2402 MHz	- N	I DE				
Remark:	Only worse case is reported								
40 ADDIV			Management and the second seco	QP: AVG:	peak				
-10 0.150	0.5	(MHz)	5		30.000				
	Read	ding Correc	t Measure-	t Over					
0.150 No. Mk. F	Read	ding Correc el Factor	t Measure-						
0.150 No. Mk. F	Read Freq. Lev	ding Correct rel Factor	t Measure- r ment Limi	/ dB	30.000				
0.150  No. Mk. F  1 0.1	Read Freq. Lev	ding Correct rel Factor	t Measure- r ment Limi dBuV dBuV 57.77 64.7	/ dB	30.000 Detector				
0.150  No. Mk. F  1 0.1 2 0.1	Read Freq. Lev MHz dBu 1740 47.0	ding Correct rel Factor of dB 65 10.12	t Measure- r ment Limi dBuV dBuV 57.77 64.7	/ dB 6 -6.99 6 -12.22	30.000  Detector  QP				
0.150  No. Mk. F  1 0.1  2 0.1  3 0.2	Read Lev MHz dBu 1740 47.4	ding Correct Factor   dB   65	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3	/ dB 6 -6.99 6 -12.22	30.000  Detector  QP  AVG				
0.150  No. Mk. F  1 0.1  2 0.1  3 0.2  4 0.2	Read Lev MHz dBu 1740 47.0 1740 32.4 2060 44.6	ding Correct Factor   dB   65	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3	dB 6 -6.99 6 -12.22 6 -9.14	Joetector  QP  AVG  QP				
No. Mk. F  1 0.1  2 0.1  3 0.2  4 0.2  5 0.2	Read Lev MHz dBu 1740 47.0 1740 32.0 2060 44.0 2060 30.0	ding Correct rel Factor 1V dB 65 10.12 42 10.12 10 10.12 22 10.12 25 10.11	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02	30.000  Detector  QP  AVG  QP  AVG				
0.150  No. Mk. F  1 0.1  2 0.1  3 0.2  4 0.2  5 0.2  6 0.2	Read Lev MHz dBu 1740 47.0 1740 32.0 2060 44.0 2060 42.0 2420 42.0	ding Correct Factor   /el Facto	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02 2 -9.66 2 -10.31	Journal Street, 1987 AVG QP AVG QP				
0.150  No. Mk. F  1 0.1  2 0.1  3 0.2  4 0.2  5 0.2  6 0.2  7 0.3	Read Lev  MHz dBu  1740 47.4  1740 32.4  2060 44.6  2060 30.6  2420 42.6  2420 31.6	ding Correct Factor   dB   65	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0 41.71 52.0	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02 2 -9.66 2 -10.31 6 -8.01	Detector QP AVG QP AVG QP AVG				
0.150  No. Mk. F  1 0.1 2 0.1 3 0.2 4 0.2 5 0.2 6 0.2 7 0.3 8 * 0.3	Read Lev MHz dBu 1740 47.0 1740 32.0 2060 44.0 20420 42.0 31.0 3140 41.0 314	ding Correct Factor	t Measurement dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0 41.71 52.0 51.85 59.8	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02 2 -9.66 2 -10.31 6 -8.01 6 -5.99	Journal Journa				
0.150  No. Mk. F  1	Read Lev MHz dBu 1740 47.0 1740 32.0 2060 44.0 2060 30.0 2420 42.0 31.0 3140 33.0 33.0 33.0 33.0 33.0 33.0 33.0 33	ding Correct Factor   7el Facto	t Measurement dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0 41.71 52.0 51.85 59.8 43.87 49.8	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02 2 -9.66 2 -10.31 6 -8.01 6 -5.99 0 -9.60	JOURN				
0.150  No. Mk. F  1	Read Lev MHz dBL 1740 47.4 1740 32.4 2060 44.2 2420 31.4 3140 33.3 3380 36.3	ding Correct Factor   7el Facto	t Measurement Limit dBuV dBuV 57.77 64.7 42.54 54.7 54.22 63.3 40.34 53.3 52.36 62.0 41.71 52.0 51.85 59.8 43.87 49.8 46.40 56.0 35.04 46.0	dB 6 -6.99 6 -12.22 6 -9.14 6 -13.02 2 -9.66 2 -10.31 6 -8.01 6 -5.99 0 -9.60	Journal Street, 1987 and 1987				

Emission Level= Read Level+ Correct Factor

x:Over limit !:over margin

\*:Maximum data



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

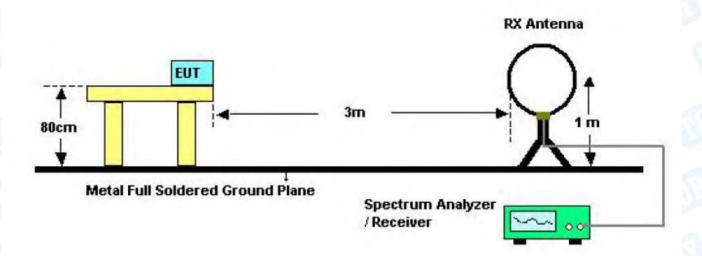
#### Note:

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

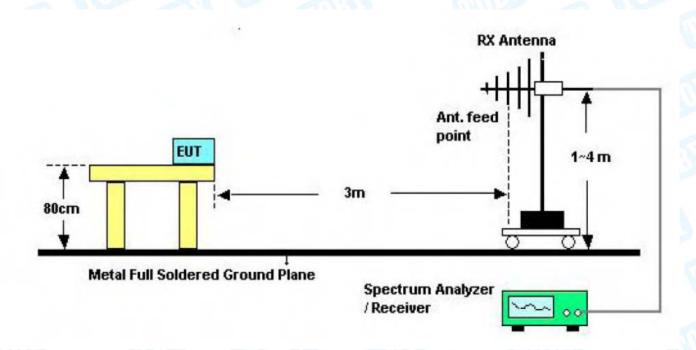


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# 5.2 Test Setup



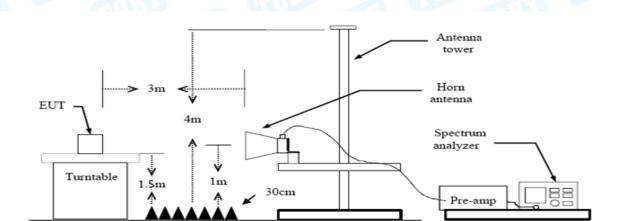
Below 30MHz Test Setup



Below 1000MHz Test Setup



17 of 33 Page:



Above 1GHz Test Setup

#### 5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the 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.

## 5.4 EUT Operating Condition

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



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## 5.5 Test Data

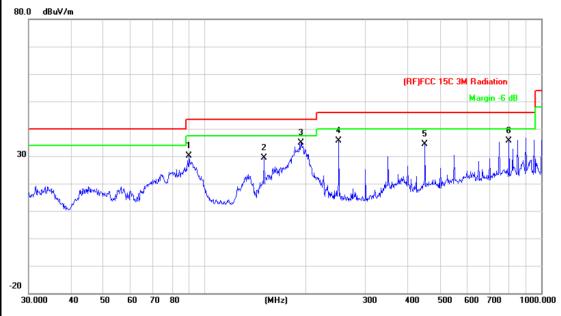
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10Hz with Peak Detector for Average Values.

Test data please refer the following pages.



19 of 33 Page:

EUT:	MID	Model:	MID8001-IB
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz	11	م ورزا
Ant. Pol.	Horizontal	U	
Test Mode:	BLE TX 2402 Mode		A WILL
Remark:	Only worse case is reported		73 _ 0
80.0 dBuV/m			



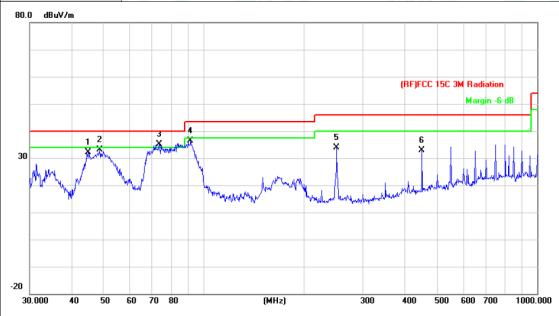
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		89.9047	52.77	-22.69	30.08	43.50	-13.42	peak
2		150.0107	50.56	-21.17	29.39	43.50	-14.11	peak
3	*	193.0945	55.75	-20.75	35.00	43.50	-8.50	peak
4		250.3009	53.79	-18.11	35.68	46.00	-10.32	peak
5		451.1349	46.70	-12.41	34.29	46.00	-11.71	peak
6		801.7862	42.21	-6.49	35.72	46.00	-10.28	peak

<sup>\*:</sup>Maximum data x:Over limit !:over margin



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EUT:	MID	Model:	MID8001-IB			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	01 - 6	THE STATE OF THE S			
Ant. Pol.	Vertical					
Test Mode:	BLE TX 2402 Mode					
Remark:	Only worse case is repor	ted	1:35			



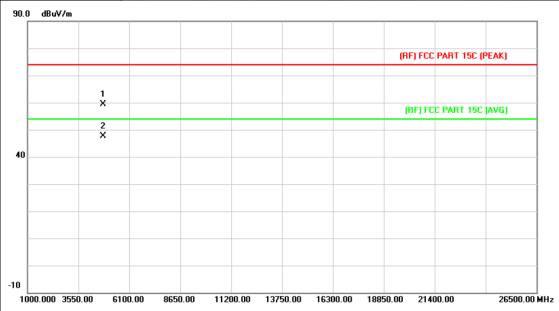
No	o. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		44.9004	54.31	-22.23	32.08	40.00	-7.92	peak
2		48.6719	56.87	-23.84	33.03	40.00	-6.97	peak
3	*	73.3593	58.55	-23.50	35.05	40.00	-4.95	peak
4		91.1744	58.86	-22.59	36.27	43.50	-7.23	peak
5		250.3009	51.93	-18.11	33.82	46.00	-12.18	peak
6		451.1349	45.27	-12.41	32.86	46.00	-13.14	peak

<sup>\*:</sup>Maximum data x:Over limit !:over margin



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EUT:	MID	Model:	MID8001-IB			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	BLE Mode TX 2402 MHz		2 110			
Remark:	No report for the emission which more than 10 dB below the					
	prescribed limit.					

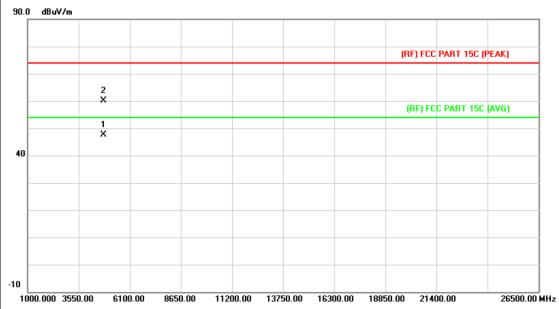


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.985	46.01	13.44	59.45	74.00	-14.55	peak
2	*	4804.075	34.10	13.44	47.54	54.00	-6.46	AVG



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EUT:	MID	Model:	MID8001-IB				
Temperature:	<b>25</b> ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	01 - 6	THE STATE OF				
Ant. Pol.	Vertical						
Test Mode:	BLE Mode TX 2402 MHz						
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

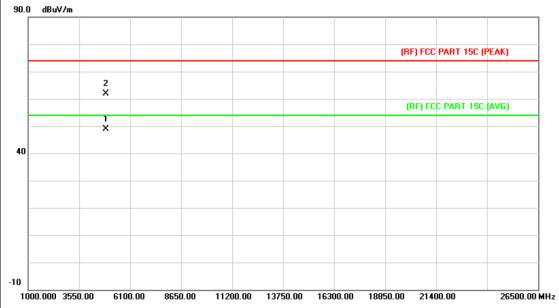


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	O∨er	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.954	34.14	13.44	47.58	54.00	-6.42	AVG
2		4803.974	46.68	13.44	60.12	74.00	-13.88	peak



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EUT:	MID	Model:	MID8001-IB				
Temperature:	<b>25</b> ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	(1) T	THE STATE OF				
Ant. Pol.	Horizontal						
Test Mode:	BLE Mode TX 2442 MHz						
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						
4							

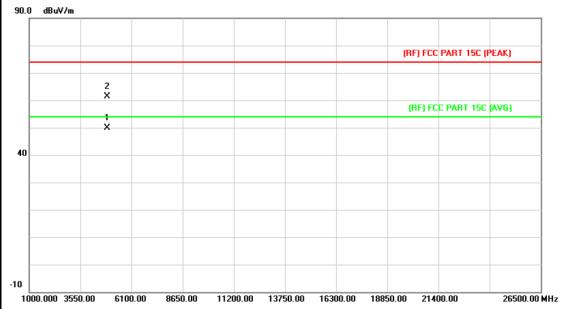


No	o. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4883.964	35.05	13.92	48.97	54.00	-5.03	AVG
2		4883.987	47.92	13.92	61.84	74.00	-12.16	peak



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EUT:	MID	Model:	MID8001-IB			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	01 - 6				
Ant. Pol.	Vertical					
Test Mode:	BLE Mode TX 2442 MHz					
Remark:	No report for the emission which more than 10 dB below the					
	prescribed limit.					
00 0 ID VI						

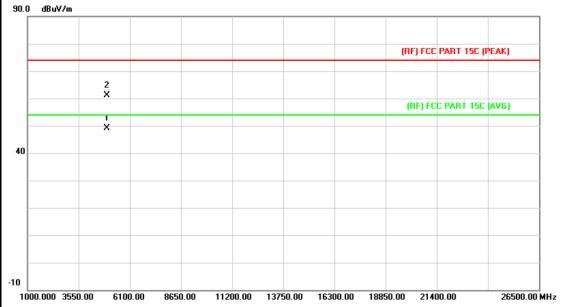


No	. Mk	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4883.967	35.95	13.92	49.87	54.00	-4.13	AVG
2		4884.084	47.53	13.92	61.45	74.00	-12.55	peak



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EUT:	MID	Model:	MID8001-IB				
Temperature:	<b>25</b> ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	01					
Ant. Pol.	Horizontal						
Test Mode:	BLE Mode TX 2480 MHz						
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						
			·				

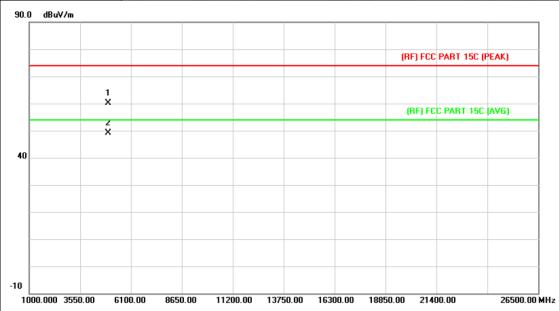


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4960.035	34.68	14.36	49.04	54.00	-4.96	AVG
2		4960.045	46.86	14.36	61.22	74.00	-12.78	peak



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EUT:	MID	Model:	MID8001-IB			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	01 - 6				
Ant. Pol.	Vertical					
Test Mode:	BLE Mode TX 2480 MHz					
Remark:	No report for the emission which more than 10 dB below the					
	prescribed limit.					



No	o. Mk	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.966	45.75	14.36	60.11	74.00	-13.89	peak
2	*	4959.987	34.77	14.36	49.13	54.00	-4.87	AVG



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# 6. Restricted Bands Requirement

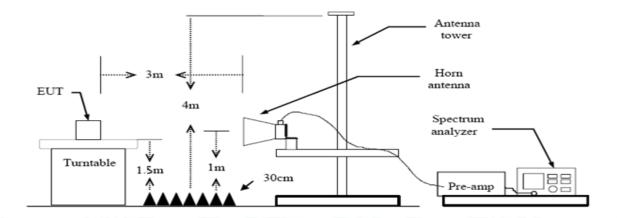
#### 6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

6.1.2 Test Limit

Restricted Frequency	Class B (dBuV/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. The EUT was placed on a rotating 0.8m high above the 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



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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.

### 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=10Hz with Peak Detector for Average Values.

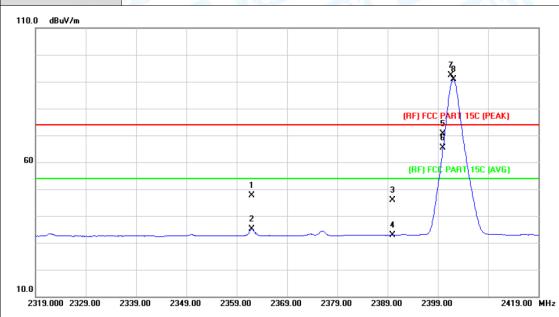
Test data please refer the following pages.



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# (1) Radiation Test

EUT:	MID	Model:	MID8001-IB				
Temperature:	<b>25</b> ℃	Relative Humidity:	55%				
Test Voltage: AC 120V/60 Hz							
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	: BLE Mode TX 2402 MHz						
Remark:	N/A						



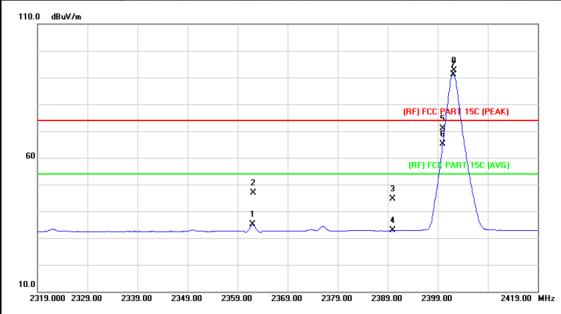
No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2362.000	46.99	0.65	47.64	74.00	-26.36	peak
2		2362.000	34.41	0.65	35.06	54.00	-18.94	AVG
3		2390.000	45.07	0.77	45.84	74.00	-28.16	peak
4		2390.000	32.12	0.77	32.89	54.00	-21.11	AVG
5		2400.000	69.73	0.81	70.54	Fundamental	Frequency	peak
6	Χ	2400.000	64.61	0.81	65.42	Fundamental	Frequency	AVG
7	Χ	2401.600	91.63	0.82	92.45	74.00	18.45	peak
8	*	2402.100	90.01	0.82	90.83	54.00	36.83	AVG





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EUT:	MID	Model:	MID8001-IB		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz		79		
Ant. Pol.	Vertical				
Test Mode:	BLE Mode TX 2480 MHz				
Remark:	N/A				



No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2362.000	34.36	0.65	35.01	54.00	-18.99	AVG
2		2362.100	46.22	0.65	46.87	74.00	-27.13	peak
3		2390.000	43.97	0.77	44.74	74.00	-29.26	peak
4		2390.000	32.03	0.77	32.80	54.00	-21.20	AVG
5		2400.000	70.03	0.81	70.84	Fundamental	Frequency	peak
6	Χ	2400.000	64.41	0.81	65.22	Fundamental	Frequency	AVG
7	*	2402.100	90.41	0.82	91.23	54.00	37.23	AVG
8	Х	2402.300	91.81	0.82	92.63	74.00	18.63	peak



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q	EUT:	MID	Model:	MID8001-IB		
	Temperature:	25 ℃	Relative Humidity:	55%		
	Test Voltage:	AC 120V/60 Hz	01 - 6	THE STATE OF		
	Ant. Pol.	Horizontal				
Í	Test Mode:	Mode: BLE Mode TX 2480 MHz				
	Remark:	N/A		1:33		
	440.0 ID VI					



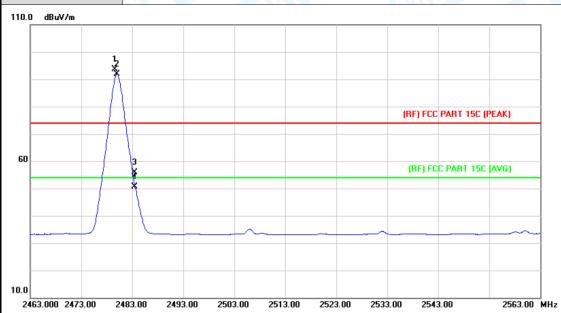
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	O∨er	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2480.000	89.19	1.15	90.34	Fundamental	Frequency	AVG
2	Х	2480.200	90.77	1.15	91.92	Fundamental	Frequency	peak
3		2483.500	53.47	1.17	54.64	74.00	-19.36	peak
4		2483.500	48.49	1.17	49.66	54.00	-4.34	AVG



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EUT:	MID	Model:	MID8001-IB
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	BLE Mode TX 2480 MHz		A HILL





No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.600	92.42	1.15	93.57	Fundamenta	al Frequency	peak
2	*	2480.000	90.73	1.15	91.88	Fundamenta	l Frequency	AVG
3		2483.500	54.73	1.17	55.90	74.00	-18.10	peak
4		2483.500	49.54	1.17	50.71	54.00	-3.29	AVG



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# 7. Antenna Requirement

## 7.1 Standard Requirement

7.1.1 Standard FCC Part 15.203

#### 7.1.2 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.

#### 7.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

The EUT antenna is a FPC Antenna. It complies with the standard requirement.

	Antenna Type
D Fine	▼ Permanent attached antenna
mOBY	□ Unique connector antenna
	☐ Professional installation antenna