

Report No.: TB-FCC140888 Page: 1 of 47

FCC Radio Test Report FCC ID: XMF-MID1024

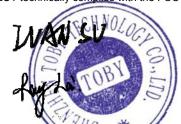
Original Grant

Report No.	:	TB-FCC140888
Applicant	:	Lightcomm Technology Co., Ltd.
Equipment Unc	ler Test	(EUT)
EUT Name	:	MID
Model No.	:	MID1024-Z
Series Model No.	:	TM1088
Brand Name	:	N/A
Receipt Date	:	2014-06-16
Test Date	:	2014-06-17 to 2014-06-24
Issue Date	:	2014-06-24
Standards	:	FCC Part 15, Subpart C (15.247:2012)
Test Method	:	ANSI C63.4:2003
Conclusions	:	PASS
		In the configuration tested, the EUT complied with the standards specified above

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.



Contents

CON	FENTS	2
1.	GENERAL INFORMATION ABOUT EUT	4
	1.1 Client Information	4
	1.2 General Description of EUT (Equipment Under Test)	4
	1.3 Block Diagram Showing the Configuration of System Tested	5
	1.4 Description of Support Units	5
	1.5 Description of Test Mode	6
	1.6 Description of Test Software Setting	6
	1.7 Test Facility	7
2.	TEST SUMMARY	8
3.	CONDUCTED EMISSION TEST	9
	3.1 Test Standard and Limit	9
	3.2 Test Setup	9
	3.3 Test Procedure	9
	3.4 Test Equipment Used	10
	3.5 EUT Operating Mode	10
	3.6 Test Data	10
4.	RADIATED EMISSION TEST	.13
	4.1 Test Standard and Limit	.13
	4.2 Test Setup	.14
	4.3 Test Procedure	15
	4.4 EUT Operating Condition	15
	4.5 Test Equipment	15
	4.6 Test Data	16
5.	RESTRICTED BANDS REQUIREMENT	.25
	5.1 Test Standard and Limit	.25
	5.2 Test Setup	.25
	5.3 Test Procedure	25
	5.4 EUT Operating Condition	26
	5.5 Test Equipment	
	5.6 Test Data	26
6.	BANDWIDTH TEST	.32
	6.1 Test Standard and Limit	.32
	6.2 Test Setup	.32
	6.3 Test Procedure	32
	6.4 EUT Operating Condition	
	6.5 Test Equipment	
	6.6 Test Data	33
7.	PEAK OUTPUT POWER TEST	.35



	7.1 Test Standard and Limit	
	7.2 Test Setup	5
	7.3 Test Procedure	5
	7.4 EUT Operating Condition	5
	7.5 Test Equipment	
	7.6 Test Data	6
8.	POWER SPECTRAL DENSITY TEST	9
	8.1 Test Standard and Limit	9
	8.2 Test Setup	9
	8.3 Test Procedure	
	8.4 EUT Operating Condition	9
	8.5 Test Equipment4	0
	8.6 Test Data4	0
9.	ANTENNA CONDUCTED SPURIOUS EMISSION4	2
	9.1 Test Standard and Limit4	2
	9.2 Test Setup	2
	9.3 Test Procedure	
	9.4 EUT Operating Condition	3
	9.5 Test Equipment	3
	9.6 Test Data4	3
10.	ANTENNA REQUIREMENT4	7
	10.1 Standard Requirement4	7
	10.2 Antenna Connected Construction	
	10.2 Result	7



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	:	MID			
Models No.	:	MID1024-Z, TM1088			
Model Difference	:	All models are identical in the same PCB layout, interior structure and electrical circuits, The only difference is model name for commercial purpose.			
		Operation Frequency: 2402MHz~2480MHz			
		Number of Channel:	Bluetooth 4.0 (BLE): 40 channels see note(3)		
Product Description		RF Output Power:	-1.821 dBm Conducted Power		
Description	•	Antenna Gain:	0 dBi PIFA Antenna		
		Modulation Type:	GFSK		
		Bit Rate of Transmitter:	1Mbps(GFSK)		
Power Supply	:	DC power supplied by A	C/DC Adapter		
		DC Voltage supplied from Li-Polymer battery.			
Power Rating	:	USB DC 5V form PC.			
		AC/DC Adapter(TEKA01	2-0502000UK) (DC Power Jack):		
		Input: AC 100~24	Input: AC 100~240V 50/60Hz 0.35A Max. Output: DC 5V 2A		
		AC 120V/60 HZ 5000mAh from Li-Polymer battery			
Connecting	:	The equipent have USB port for link with PC, so the equipment is			
I/O Port(S)		considered as a Computing Device Peripheral.			
		Please refer to the User's Manual			
Note: The equipment with Bluetooth and Wifi(802.11b/g/n) function, WiFi(802.11b/g/n) have test comply					
with FCC Part 15	С	Rules. More detailed featur	es description, please refer to the manufacturer's		

Note:

specifications or the User's Manual.

- (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.

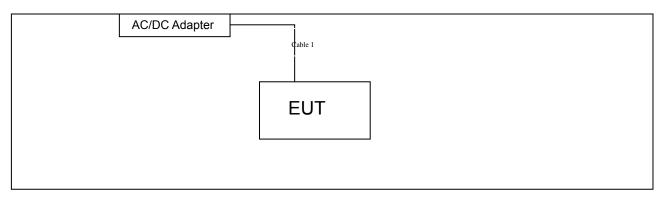
(3) Antenna information provided by the applicant.

(4) Channel List:

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 Cable 1	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						
Name	Name Model S/N Manufacturer Used " $$ "					
Cable Information						



Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	NO	NO	1.0M	Accessories

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	AC Charging with TX Mode (Channel 01/20/39)		

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	Test Program: Mediatek Connectivity Combo Tool. apk				
Channel	CH 01	CH 20	СН 39		
BLE Mode	DEF	DEF	DEF		

1.7 Test Facility

The testing was 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.



2. Test Summary

FCC Part 15 Subpart C(15.247)/RSS-210: 2010					
Standa	rd Section	Test Item	ludament	Remark	
FCC	IC		Judgment	Rellark	
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-210 A.8.2(a)	6dB Bandwidth	PASS	N/A	
15.247(b)	RSS-210 A.8.4(4)	Peak Output Power	PASS	N/A	
15.247(e)	RSS-210 A.8.2(b)	Power Spectral Density	PASS	N/A	
15.247(d)	RSS-210 Annex 8 (A8.5)	Transmitter Radiated Spurious Emission	PASS	N/A	
RSS-210Antenna ConductedPASS15.247(d)Annex 8 (A8.5)Spurious EmissionPASS				N/A	
Note: "/" for no requirement for this test item. N/A is an abbreviation for Not Applicable.					



3. Conducted Emission Test

- 3.1 Test Standard and Limit
 - 3.1.1Test Standard FCC Part 15.207
 - 3.1.2 Test Limit

Frequency	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				

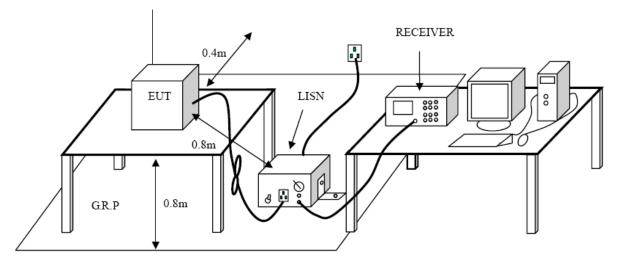
Notes:

(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.

3.2 Test Setup



3.3 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.



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.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test	ROHDE&		100321	2013-08-10	2014-08-09
Receiver	SCHWARZ	ESCI	100321	2013-00-10	2014-00-09
50ΩCoaxial	Anritsu	MP59B	X10321	2013-08-10	2014-08-09
Switch	Annisu	WF 39B	×10321	2013-00-10	2014-00-03
L.I.S.N	Rohde & Schwarz	ENV216	101131	2013-08-10	2014-08-09
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	2013-08-10	2014-08-09

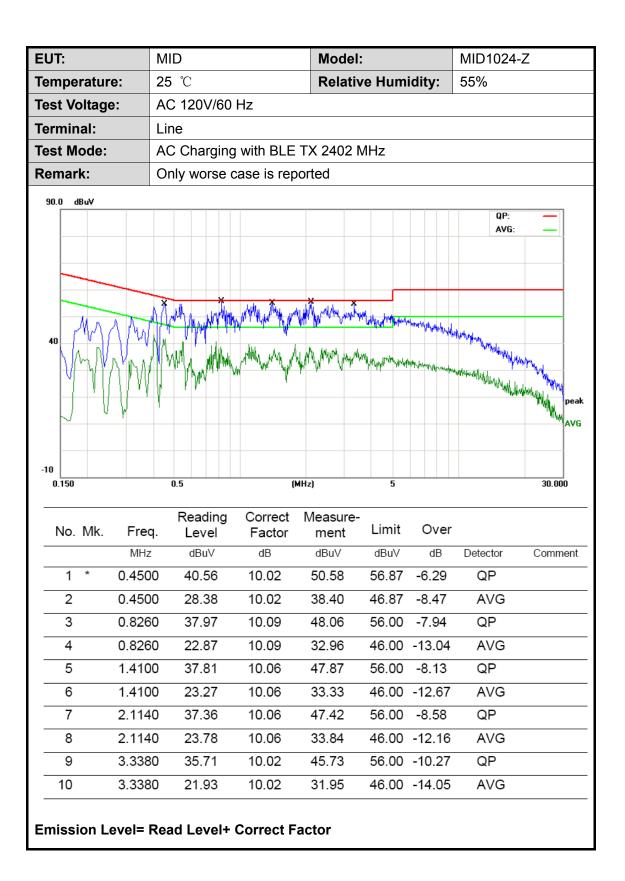
3.5 EUT Operating Mode

Please refer to the description of test mode.

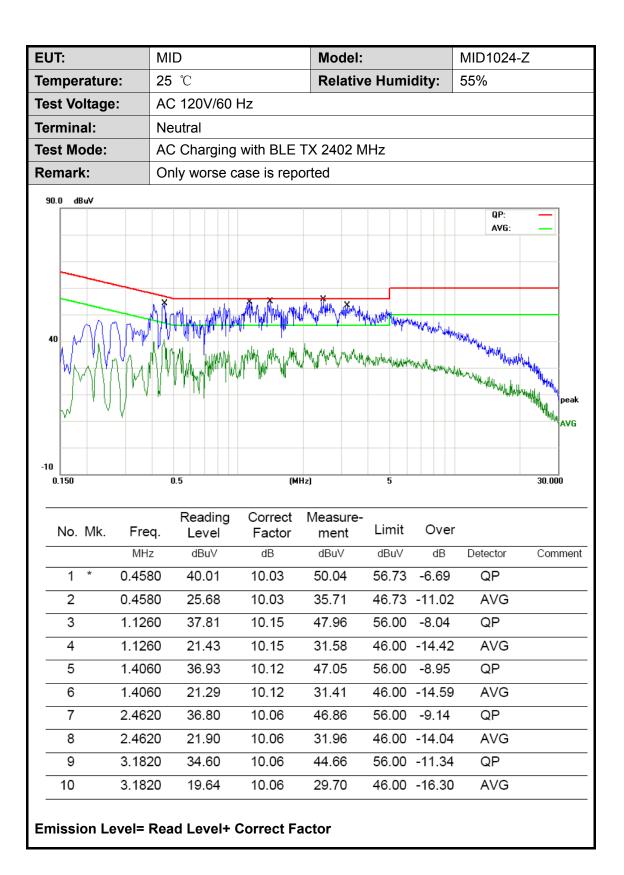
3.6 Test Data

Please see the next page.











4. Radiated Emission Test

- 4.1 Test Standard and Limit
 - 4.1.1 Test Standard
 - FCC Part 15.209
 - 4.1.2 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

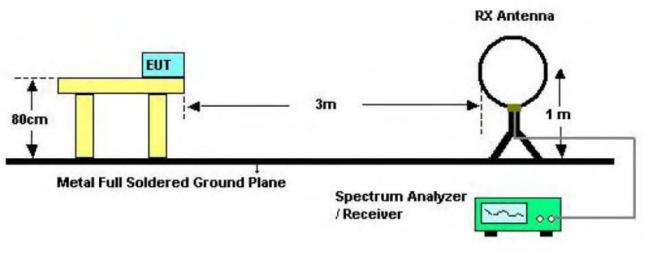
Note:

(1) The tighter limit applies at the band edges.

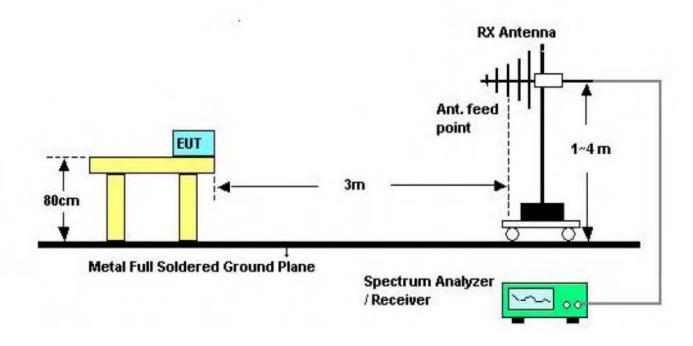
(2) Emission Level(dBuV/m)=20log Emission Level(uV/m)



4.2 Test Setup

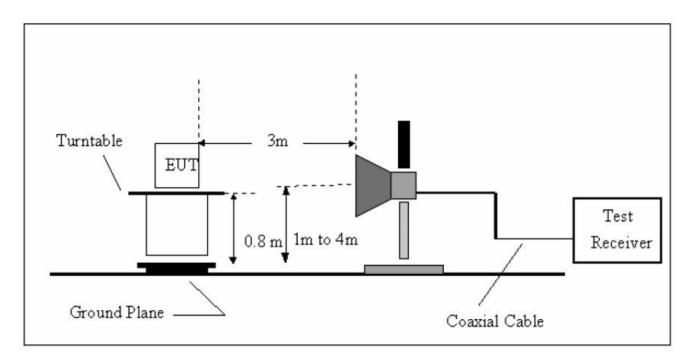


Below 30MHz Test Setup



Below 1000MHz Test Setup





Above 1GHz Test Setup

4.3 Test Procedure

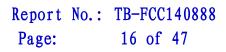
- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) 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.
- (5) 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.
- (6) For the actual test configuration, please see the test setup photo.

4.4 EUT Operating Condition

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

4.5 Test Equipment

Equipment Manufacturer Model No.	Serial No.	Last Cal.	Cal. Due
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					Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNE R	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

4.6 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=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.



EUT:	MID	Model:	MID1024-Z								
Temperature:	25 ℃	Relative Humidity	r: 55%								
Test Voltage:	AC 120V/60 Hz	√C 120V/60 Hz									
Ant. Pol.	Horizontal										
Test Mode:	BLE TX 2402 Mode	;									
Remark:	Only worse case is	reported									
80.0 dBu∀/m											
30			RFJFCC 15C 3M Radiation Margin -6 dB								
30.000 40 50	60 70 80	(MHz) 300 4	400 500 600 700 1000.000								
No. Mk. Fre	J	Correct Measure- Factor ment Lir	mit Over								
M	Hz dBuV	dB/m dBuV/m dB	suV/m dB Detector								
1 * 145.3	3506 59.68 -	21.55 38.13 43	3.50 -5.37 peak								
2 218.3	3085 54.43 -	19.60 34.83 46	6.00 -11.17 peak								
3 291.0	0360 50.06 -	17.26 32.80 46	6.00 -13.20 peak								
4 510.0	0436 47.94 -	11.07 36.87 46	6.00 -9.13 peak								
5 ! 768.7	7481 47.23	-6.82 40.41 40	6.00 -5.59 peak								
6 875.2	2470 39.80	-6.01 33.79 46	6.00 -12.21 peak								
Emission Level=	Read Level+ Correc	ct Factor									



UT:			MID			N	Model:				MID1024-Z			
empera	ature):	° 25	С		R	Relative Humidity: 55%							
est Vol	tage	:	AC 1	AC 120V/60 Hz										
nt. Pol		Vertical												
est Mo	de:	BLE TX 2402 Mode												
emark			Only	worse	e case	is reported	ł							
80.0 dBu	.₩/m													
									(RF)FC	C 15C :	3M Radiati	on		
			_								Margin	_ H		
	1		2	ſ		3 X				4		×		
30 🔨 🦯	A.	<u> </u>	A	t	4	Man				×	5 X			
30 m h		hunger	Jul .	- yw - 10	"h _n	100m Money	N LA							
		Por -			- mm	pd	July y	when	Well days have	Malanthe	MALAN	(When with of		
					′		· · ·		. A Charlesson					
										_				
20	- 40			0.00				200	100	F00	C00 700	1000.00		
30.000	40	50	60 7	0 80		(MHz)		300	400	500	600 700) 1000.00		
				Re	ading	Correct	Measu	Iro-						
No.	Mk.	Fr	req.		evel	Factor	men		Limit		Over			
		М	Hz	d	BuV	dB/m	dBuV	/m	dBuV/r	n	dB	Detecto		
1	ļ	41.5	670	58	3.06	-20.82	37.2	24	40.00)	-2.76	peak		
2	*	65.3	3432	61	1.96	-24.04	37.9	92	40.00)	-2.08	peak		
2	ļ	145.3	3506	59	9.72	-21.55	38.1	7	43.50)	-5.33	peak		
3			0436	46	6.67	-11.07	35.6	60	46.00) .	-10.40	peak		
4		510.0	0430				04.0	27	46.00) .	-14.63	peak		
			5300	39	9.80	-8.43	31.3	,,						
4	!		5300		9.80 3.12	-8.43	41.3		46.00		-4.70	peak		



EUT:			MID			Model:		M	D1024-Z	
ſempe	eratur	e:	25 ℃			Relative	Humidity:	55	%	
Test V	oltage: AC 120V/60 Hz									
Ant. P	ol.		Horizo	ontal						
lest M	lode:		BLE N	/lode TX 24	02 MHz					
Remar	′k:			port for the ribed limit.	emissior	n which m	ore than 10) dB b	elow the	
100.0	dBu∀/m									
							(RI	F) FCC PA	RT 15C (PEAK	.)
							C C	RF) FCC F	ART 15C (AVE	0
50		1 X								
		2 X								
0.0										
1000.	000 3550	0.00 6	100.00	8650.00 112	00.00 1375	0.00 16300	00 18850.00	21400.0	00 2	6500.00 MHz
 No). Mk.	Fr	eq.	Reading Level	Corre		1.1.	nit	Over	
			Hz	dBuV	dB/m	dBu		uV/m	dB	Detector
1		4804		32.79	13.44			.00	-27.77	peak
2	*	4804		25.35	13.44			.00	-15.21	AVG



EUT:			MID			M	odel:		1	MID1024	-Z	
Tem	peratur	e:	25 °C	Relative Humidity:55%								
Test	Voltage):	AC 12	AC 120V/60 Hz								
Ant.	Pol.		Vertic	Vertical								
Test	Mode:		BLE N	Node T>	(2402 N	/Hz						
Rem	ark:			port for ribed lin		sion w	hich m	nore th	an 10 dB	below th	ne	
100.0	0 dBu∀/m	1										
									(RF) FC	C PART 15C (F	PEAK)	
									(BF) F	CC PART 15C	(AVG)	
50		×										
		2 X										
0.0												
	000.000 355	0.00	6100.00	8650.00	11200.00	13750.0	0 1630	0.00 18	850.00 214	00.00	26500.00 MH	
Ν	lo. Mk.	Fr	eq.	Readii Leve	5	orrect actor	Mea: me		Limit	Over		
		М	Hz	dBuV	d	B/m	dBu	IV/m	dBuV/m	ı dB	Detector	
1		4804	.212	35.6	1 13	3.44	49	.05	74.00	-24.9	5 peak	
2	*	4804	.212	27.43	3 13	3.44	40	.87	54.00	-13.1	3 AVG	
Emis	ssion Le	evel=	Read I	_evel+ (Correct	Factor						



EUT:			MID			Model:		MID1024-Z				
em	peratu	re:	25 °C	Relative Humidity: 55%								
est	Voltag	e:	AC 1	AC 120V/60 Hz								
ht.	Pol.		Horiz	ontal								
est	Mode:		BLE	Mode TX	2442 MHz							
Rem	ark:			port for th		n which more	e than 10 o	dB below th	е			
100.0) dBuV/m											
							(RF)	FCC PART 15C (PI	EAK)			
		1 X					(RF) FCC PART 15C (/	AVG)			
50		2 X										
		^										
0.0												
10	00.000 35	50.00 6	5100.00	8650.00	11200.00 137	50.00 16300.00	18850.00	21400.00	26500.00 MH			
				Readin	a Corre	ct Measur	e-					
Ν	lo. Mk	. Fre	eq.	Level	Facto		Limi	t Over				
		Mł	Ηz	dBu∨	dB/m	dBuV/n	n dBuV	/m dB	Detector			
1		4883	.535	47.46	8.22	55.68	3 74.0	00 -18.32	2 peak			
2	*	4883	.871	36.65	8.21	44.86	54.0	00 -9.14	AVG			
					orrect Fac							



EUT:			MID				Mod	el:			Μ	ID1024-	Z	
Tem	peratur	e:	25 °C	2			Rela	tive l	Humi	dity:	55	5%		
Test	Voltage) :	AC 1	20V/60	HZ									
Ant.	Pol.		Vertic	al										
Test	Mode:		BLE	Mode T	X 2442	2 MHz								
Rem	ark:			port for		nissior	n whic	ch mo	ore tha	an 10	dB k	pelow the	e	
100.0	0 dBu∀/m													
										(RF)	FCC P	ART 15C (PE	AK)	
		2 X								(RF) FCC	PART 15C (A	VG)	
50		1 X												
0.0														
)00.000 355	0.00	6100.00	8650.00	11200.	00 1379	50.00	16300.0	0 188	50.00	21400	.00	26500.00 M	Hz
	No. Mk	. Fr	eq.	Readi	-	Correc		leası mer		Limi	t	Over		
		М	Hz	dBu\	/	dB/m		dBuV	/m	dBu∖	//m	dB	Detecto	or
1	*	4883	.871	38.5	8	8.21		46.7	79	54.0	00	-7.21	AVG	;
2		4884	.261	47.4	5	8.21		55.6	6	74.(00	-18.34	peak	<
Emis	ssion Le	evel=	Read∣	Level+	Corre	ct Fac	tor							



EUT				MID			I	Model:			MIE	01024-Z	
Гem	pera	ature	e:	25 ℃	1		I	Relativ	e Hun	nidity:	55%	6	
Test	t Vol	tage):	AC 12	20V/60 I	ΗZ							
Ant.	Pol	-		Horiz	ontal								
Test	t Mo	de:		BLE I	Mode TX	K 2480	MHz						
Rem	hark	:			port for ribed lin		ission	which	more t	han 10	dB be	elow the	
100.	0 dBu	uV/m											
										(RF)	FCC PA	rt 15C (peak)
										(RF) FCC P/	ART 15C (AVE	i)
50			1 X										
			2 X										
0.0													
10	000.000) 3550).00 E	5100.00	8650.00	11200.00) 13750	.00 163	00.00 1	8850.00	21400.0	D 2	6500.00 MHz
	No.	Mk.	. Fi	req.	Readi Leve	-	Correc Facto		asure- nent	- Limi	t	Over	
			Μ	Hz	dBu\	/	dB/m	dE	3uV/m	dBu\	//m	dB	Detector
1			4960	.524	32.1	9	14.36	4	6.55	74.	00	-27.45	peak
2		*	4960	.524	25.0	5	14.36	3	9.41	54.	00	-14.59	AVG
Emi	ssio	n Le	evel=	Read I	_evel+ (Correc	t Facto	or					



EUT	:		MID				Μ	odel:			Ν	/ID1024-2	7
Tem	peratui	re:	25 °C	2			R	elativ	e Hu	midit	y: 5	5%	
Test	Voltag	e:	AC 1	20V/	60 HZ								
Ant.	Pol.		Vertio	al									
Test	Mode:		BLE	Mode	e TX 2	2480 N	lHz						
Rem	nark:			•	for the d limit.		sion w	/hich r	nore	than	10 dB	below the	e
100.0	0 dBu∀/m												
											(RF) FCC	PART 15C (PE	AK)
											(RF) FC	C PART 15C (A	(VG)
50		1 X											
		2 X											
0.0 10	000.000 35	50.00	6100.00	8650	.00 1	1200.00	13750.0	00 163	00.00	18850.0	0 214	00.00	26500.00 MHz
N	lo. Mk	. Fr	eq.		ading evel		rrect	Mea	isure ent		imit	Over	
		M	Hz	d	Bu∨	dE	3/m	dB	uV/m	d	BuV/m	dB	Detector
1		4960	.524	34	4.33		.36	48	8.69	7	4.00	-25.31	peak
2	*	4960	.524	25	5.85	14	.36	40).21	5	54.00	-13.79	AVG
Emi	ssion L	.evel=	Read	Leve	el+ Co	rrect l	Factor	r					



5. Restricted Bands Requirement

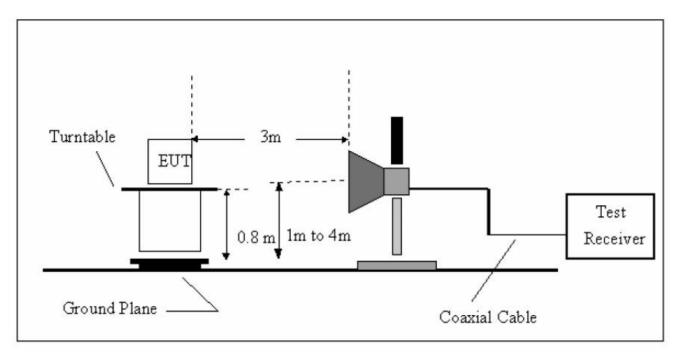
- 5.1 Test Standard and Limit
 - 5.1.1 Test Standard

FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

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

5.2 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) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) 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.

- (5) 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.
- (6) 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.

5.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 10, 2013	Aug.09, 2014
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

5.6 Test Data

Please see the next page.



(1) Radiation Test

UT:			MI	D					Mc	del:				Ν	/ID1	024	I-Z		
Temper	ature	e:	25	°C					Re	lativ	e Hu	umic	dity:	5	5%				
est Vo	Itage	:	AC	2120	V/60	ΗZ													
Ant. Po	I.		Но	rizon	tal														
lest Mo	ode:		BL	E Mo	de T	X 24	02 M	IHz											
Remark	(:		N//	A															
100.0 d	dBu∀/m																		_
																3			1
													(RF)	FCC F	PART 1	5C (P	EAK)		
																4			
													(BI	E) FCC	PART/	X HC (AVGI		-
50													1	jie	-				
													x						
			_										2 X						
																			1
																_			
														_		_			
0.0	000 232	E 00	2335.	00 2	345.00	225	5.00	2365	00	2375	00	2385	00	2395.	00		2416	: 00	MHz
2313.0	000 2.32	.5.00	2333.	00 2	343.00	233	5.00	2303.	.00	2373		2303		2333.	00		2413		MUZ
No.	. Mk	. F	req.		Reac Lev	-		orrec acto		Mea m	asur ent	e-	Lim	it	0	ve	r		
		N	1Hz		dBu	V	d	B/m		dB	uV/m	۱	dBu	V/m		dB	C)ete	ctor
1		2390	0.00)0	44.6	52	0	.77		4	5.39		74	.00	-2	8.6	61	ре	ak
2		2390	0.00	0	32.6	62	0	.77		33	3.39		54	.00	-2	20.6	61	A١	/G
3	Х	2401	1.80	0	79.′	13	0	.82		79	9.95		74	.00	5	5.9	5	pe	ak
4	*	2402	2.20	0	61.0	08	0	.82		6	1.90		54	.00	7	7.90	C	A١	/G
Emissio	on Le	evel=	Rea	id Lev	vel+	Corr	ect I	-act	or										



EUT:	:		MID				Мс	odel:				Ν	1ID10	24-Z		
Tem	peratu	ire:	25 ℃				Re	lativ	e Hu	umic	dity:	5	5%			
Test	Voltag	ge:	AC 12	20V/60 I	ΗZ											
Ant.	Pol.		Vertic	al												
Test	Mode	:	BLE N	/lode T>	(2480	MHz										
Rem	ark:		N/A													
100.0) dBu¥/ı	m														7
														3 X		
											(RF)	FCC P	ART 15C	(PEAK)	
														4 ×		
50											(R		PART 19)	
												1 X 2				
										-		×		`		
0.0																
23	313.000 2	323.00 2	2333.00	2343.00	2353.00	2363	1.00	2373	3.00	2383.	.00	2393.0	DO	24	413.00	MHz
1	No. M	lk. Fi	req.	Readi Leve	-	Corre Facto			asur nent		Lim	nit	Ov	er		
		Μ	Hz	dBu∖	/	dB/m		dE	Bu∀/n	n	dBu	ıV/m	d	В	Dete	ector
1		2390	0.000	44.4	4	0.77		4	5.21		74	.00	-28	.79	pe	eak
2		2390	0.000	32.6	3	0.77		3	3.40)	54	.00	-20	.60	A	VG
3	*	2401	.700	85.4	1	0.82		8	6.23	3	74	.00	12	.23	pe	eak
4	Х	2402	2.200	65.2	7	0.82		6	6.09)	54	.00	12	.09	A	VG
Emis	ssion	Level=	Read L	.evel+ (Correc	t Fac	tor									



UT:		Ν	/ID				Мо	del:			Μ	IID1024-2	2	
empera	ture:	2	5 ℃				Re	lative	e Hu	midity	5	5%		
est Volt	age:	Α	C 12	0V/60	HZ									
nt. Pol.		F	lorizo	ntal										
est Mod	le:	E	BLE M	lode TX	X 2480) MHz								
emark:		Ν	I/A											
100.0 dBu	iV/m													
	2	2												
	,	×								(F	IF) FCC	PART 15C (PE	AK)	
	1	1												
	1	1									(RF) FCC	: PART 15C (A	VG)	
50	-/	3 X												
		4												
		2												
0.0														
2468.000	2478.0	0 248	8.00	2498.00	2508.0	0 2518	3.00	2528	3.00	2538.00	2548.	.00	2568.00 M	IHz
				Read	lina	Corre	ct	Mea	asure	e-				
No.	Mk.	Fre	eq.	Lev	-	Fact			ent		nit	Over		
		MH	Z	dBu	V	dB/m		dB	uV/m	dB	uV/m	dB	Detect	or
1	*	2480.	100	60.4	47	1.15		6	1.62	54	4.00	7.62	AVG	3
2	X	2480.2	200	78.′	13	1.15		79	9.28	74	4.00	5.28	peal	<
3	:	2483.	500	46.8	33	1.17		48	8.00	74	4.00	-26.00	peal	<
4		2483.	500	35.9	95	1.17		3	7.12	54	4.00	-16.88	AVC	3



					IV	odel:			MID102	4-Z	
atur	e:	25 °C	1		R	elativ	e Hui	midity:	55%		
Itage	e:	AC 1	20V/60 I	ΗZ							
J.		Vertic	al								
ode:		BLE I	Node T>	K 2480 I	MHz						
c :		N/A									
Bu¥/m											_
	$ \rangle \rangle$	4			·····						
00 247	6.00 2	2486.00	2496.00	2506.00	2516.00	2526	.00 2	2536.00 254	46.00	2566.00	MHz
Mk.	Fre	eq.						- Limit	Ove	er	
	MH	Ηz	dBuV	C	lB/m	dB	uV/m	dBuV/i	m dB	Det	ector
*	2480.	200	81.37	7 1	.15	82	2.52	74.00	0 8.5	2 pe	eak
Х	2480.	.200	61.35	5 1	1.15	62	2.50	54.00	0 8.5	0 A	VG
	2483.	.500	45.89	91	.17	47	7.06	74.00) -26 .	94 pe	eak
	2483.	.500	36.48	3 1	.17	37	7.65	54.00	0 -16.	35 A	VG
	0 de: (: 8u√/m 00 247 Mk. *	ode: (: BuV/m 1 2 2 2 3 2 1 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3	I. Vertic pde: BLE I R: N/A BuV/m 1 X 2 2 X 4 4 4 4 4 4 4 4 4 4 4 4 4	I. Vertical Dde: BLE Mode TX SUV/m BUV/m 1 X 2 2 2 X 4 4 4 4 4 4 4 4 4 4 4 4 4	I. Vertical Dde: BLE Mode TX 2480 f N/A BuV/m 1 X 2 2 X 4 4 4 4 4 4 4 4 4 4 4 4 4	I. Vertical Dde: BLE Mode TX 2480 MHz K: N/A BuV/m Image: Constraint of the second	I. Vertical Dode: BLE Mode TX 2480 MHz N/A N/A BuV/m Image: Constraint of the second seco	I. Vertical Dode: BLE Mode TX 2480 MHz N/A N/A Buv/m Image: Constraint of the second seco	I. Vertical Dde: BLE Mode TX 2480 MHz x: N/A buv/m (RF) FC 2 (RF) FC 3 (RF) FC 3 (RF) FC 2 (RF) FC 3 (RF) FC 2 (RF) FC 3 (RF) FC 2 (RF) FC 3 (RF) FC 4 (RF) FC 3 (RF) FC 4 (RF) FC 4 (RF) FC	I. Vertical Dode: BLE Mode TX 2480 MHz I. N/A BuV/m (RF) FCC PART 15C (1 (RF) FCC PART 15C (2 (RF) FCC PART 15C (3 (RF) FCC PART 15C (3 (RF) FCC PART 15C (4 (RF) FCC PART 15C (3 (RF) FCC PART 15C (4 (RF) FCC PART 15C (3 (RF) FCC PART 15C (4 (RF) FCC PART 15C (3 (RF) FCC PART 15C (4 (RF) FCC PART 15C (4 (RF) FCC PART 15C (3 (RF) FCC PART 15C (3 (RF) FCC PART 15C (4 (RF) FCC PART 15C (5 (RF) FCC PART 15C (6 (RF) FCC PART 15C (7 (RF) FCC PART 15C (8 (RF) FCC PART 15C (8	I. Vertical pde: BLE Mode TX 2480 MHz c: N/A swv/m (RF) FCC PART 15C (PEAK) 1 (RF) FCC PART 15C (PEAK) 2 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (AVG) 3 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 2 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 3 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 4 (RF) FCC PART 15C (PEAK) 5 (RF) FCC PART 15C (PEAK) 5 (RF) FCC PART 15C (PEAK) 6 (RF) FCC PART 15C (PEAK) 7 (RF) FCC PART 15C (PEAK)



(2) Conducted Test

Temperature: 25 °C Relative Humidity: 55% Test Voltage: AC 120V/60 Hz BLE Mode TX 2402MHz / BLE Mode TX 2480MHz Test Mode: BLE Mode TX 2402MHz / BLE Mode TX 2480MHz The EUT is programed in continuously transmitting mode Remark: The EUT is programed in continuously transmitting mode Image: Context 2.3125 GHz Ref 10 dBm #Atten 30 dB 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	T:	MID		Model	:	MID1024-Z
BLE Mode TX 2402MHz / BLE Mode TX 2480MHz The EUT is programed in continuously transmitting mode Aglent 17.64.38 Jun 20, 2014 Ref 10 dbm Marker 2.381250000 GHz 3.65.65 dbm 2.381250000 GHz 3.65.65 dbm 2.381250000 GHz 3.67.97 dbm 3.67.97 Freq 2.30000 dbm Marker 2.38125 0bm 2.38125 0bm 3.68.97 dbm 3.67.97 Freq 2.3000 dbm Marker 2.3000 dbm 3.67.97 Freq 2.3000 dbm Marker 2.3000 dbm 2.3000 dbm 3.7.58 dbm 4.69 4.7.44 dbm 4.99 4.99 4.99 4.99 3.67.97 Bdbm 5.53 dbm 9.7.58 dbm 5.7.58 dbm 9.7.58 dbm 5.7.58 dbm 9.7.58 dbm 5.7.58 dbm 10 dbm 2	mperature:	25 ℃		Relativ	ve Humidity:	55%
The EUT is programed in continuously transmitting mode Aglent 17:54:38 Jun 20, 2014 Mark 2:381/25 Gifr Pack Aglent 17:54:38 Jun 20, 2014 Mark 2:381/25 Gifr Offen Aglent 10 d/m #Atten 30 d/B Span 100 MHz Span 100 MHz Span 100 MHz Center 2:374 GHz Span 100 MHz Span 100 MHz Span 100 MHz Center 2:374 GHz Span 100 MHz Swan 100 MHz Swan 100 MHz Swan 100 MHz <t< th=""><th>st Voltage:</th><th>AC 120V</th><th>//60 Hz</th><th></th><th></th><th></th></t<>	st Voltage:	AC 120V	//60 Hz			
Aglient 17:54:38 Jun 20, 2014 Mk/3 2:38125 GHz Ref 10 dBm #Atten 30 dB \$6.55 dBm 10 Marker 2.381250000 GHz 2.381250000 GHz ************************************	st Mode:	BLE Mod	le TX 2402M	Hz / BLE M	ode TX 2480N	/Hz
Mkr3 2.38125 GHz 55.65 dBm Peak Log 10 dB/ dB/ dB/ dB/ dB/ dB/ dB/ dB/ dB/ dB/	mark:	The EUT	is programe	d in continu	ously transmit	ting mode
Ref 10 dBm #Atten 30 dB 55.65 dBm Log 10 dB/ dB/ dB/ 2.381250000 GHz Image: Content of the second sec	🔆 Agile	nt 17:54:38 Ju	in 20, 2014			
Log 10 10 10 10 10 10 10 10 10 10 10 10 10	Ref 10 dB	m	#Atten 30 dB		Mki	
BB/ 0 mist BB/ 2,381250000 GHz Marker 2,381250000 GHz 0						
Marker Sast 250000 GHz 28.381250000 GHz -56.65 dBm -56.65 dBm - 28.88 - 29.90 - 20.00 -	10 dB/					
01 22.8 dBm -56.65 dBm -3 -	Offst	/larker				
22.8 dBm x<	ab				2	
Center 2.374 GHz Span 100 MHz #Res BW 100 kHz #VBW 300 kHz Anultude 1 1 Freq 2.40176 OHz -2.668 dBm 2 (1) Freq 2.30100 OHz -37.44 dBm 2 (1) Freq 2.30126 OHz -2.668 dBm 3 (1) Freq 2.30126 OHz -57.54 dBm 3 (1) Freq 2.30126 OHz -57.54 dBm 7 Mtr3 2.500000 GHz -57.58 dBm 9 4Atten 30 dB -57.58 dBm -57.58 dBm 1 2.500000000 GHz -57.58 dBm -57.58 dBm 23.31 -57.58 dBm -57.58 dBm -57.58 dBm 23.31 -57.58 dBm -57.58 dBm -57.58 dBm 1 1 1 1 -57.58 dBm 1 1 709 2.43076 OHz -3343 dBm 2 57.58 dBm -57.58 dBm -57.58 dBm 1 1 1 1 1 2 1	-22.8		······	Ŷ		
#Res BW 100 kHz #VDW 300 kHz Sweep 10.36 ms (401 pts) Maker Trave Yaker AAvid Amplitude 2 (1) Freq 2.39000 0Hz 457.44 dBm 3 (1) Freq 2.39125 0Hz 456.65 dBm 3 (1) Freq 2.39125 0Hz 456.65 dBm #Atten 30 dB Strate Strate Strate Peak 17:52:44 Jun 20, 2014 Mkr3 2.50000 GHz 57.58 dBm 0 Atten 30 dB Strate 57.58 dBm 0 Atten 30 dB Strate Strate 0 Arker 2.500000000 GHz 57.58 dBm 0 Arker 2.500000000 GHz 57.58 dBm 0 Arker 2.500000000 GHz 57.58 dBm 0 Arker Strate Strate Strate 0 Strate Strate Strate Strate </th <th>dBm</th> <th></th> <th></th> <th></th> <th></th> <th></th>	dBm					
Marker Trace Type X Avis Amplitude 1 (1) Freq 2.30000 Hz -57.44 dBm 3 (1) Freq 2.38126 GHz -56.66 dBm 3 (1) Freq 2.38126 GHz -56.66 dBm Agilent 17.52:44 Jun 20, 2014 Mkr3 2.50000 GHz 57.58 dBm Peak #Atten 30 dB 57.58 dBm 57.58 dBm 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Center 2.	374 GHz				Span 100 MHz
1 (1) Freq 2.30175 0Hz -2.553 dBm 3 (1) Freq 2.38000 0Hz -50.65 dBm 3 (1) Freq 2.38125 0Hz -50.65 dBm 3 (1) Freq 2.38125 0Hz -50.65 dBm 4 17:52:44 Jun 20, 2014 Mkr3 2.50000 GHz -57.58 dBm 7 Freq 30 dB 57.58 dBm 9 10 10 10 10 0 0 0 0 0 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <th></th> <th></th> <th></th> <th></th> <th>· · · ·</th> <th>5 ms (401 pts)</th>					· · · ·	5 ms (401 pts)
Agilent 17:52:44 Jun 20, 2014 Mkr3 2.50000 GHz Ref 10 dBm #Atten 30 dB 57.58 dBm Peak 3 3 3 Iog 3 3 3 3 Iog 3 3 3 3 Iog 3 3 3 3 3 Iog 3 3 3 3 3 3 Iog 3 3 3 3 3 3 3 3 3 3 3 3 3 3 4 5 6 6 6 6 6 6 6 6 6 7 7 6 7 7 <th7< th=""><th>Marker</th><th></th><th></th><th></th><th></th><th></th></th7<>	Marker					
Mkr3 2.50000 GHz Peak * Log * - 10 * - - 01 * - - 01 * - - - 23.3 dBm * - - - 23.3 dBm * - - - - Center 2.517 GHz KVBW 300 kHz Sweep 10.36 ms (401 pts) Market Trace Type XAxis Amplitude 1 (1) Freq 2.47975 6Hz -3.343 dBm -3.343 dBm	1	(1) Fre (1) Fre	eq 2.40175 eq 2.39000	€Hz	-57.44 dBm	
Ref 10 dBm #Atten 30 dB .57.58 dBm Peak	1 2 3	(1) Fra (1) Fra (1) Fra	eq 2.40175 eq 2.39000	€Hz	-57.44 dBm	
Log 10 dB/ Offst 2 dB DI -57.58 dBm -57.58 dBm	1 2 3	(1) Fra (1) Fra (1) Fra	eq 2.40175 eq 2.39000 eq 2.38125	€Hz	-57.44 dBm -56.65 dBm	3 2.50000 GHz
dB/ offst 2 B B D -23.3 dBm Marker Image: Construction of the state of th	1 2 3 X Agile Ref 10 dB	(1) Fro (1) Fr	eq 2.40175 eq 2.39000 eq 2.38125	€Hz	-57.44 dBm -56.65 dBm	
2 dB DI -57.58 dBm -57.58	1 2 3	(1) Fra (1) Fra (1) Fra nt 17:52:44 Ju Dm	eq 2.40175 eq 2.39000 eq 2.38125	€Hz	-57.44 dBm -56.65 dBm	
do -57.58 dBm - 23.3 -57.58 dBm - 23.3 - - Center 2.517 GHz Span 100 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 10.36 ms (401 pts) Marker Trace Type X Axis 1 (1) Freq 2.47975 GHz -3.343 dBm 2 (1) Freq 2.48950 GHz -5.25 dBm	1 2 3 ★ Agile Ref 10 dB Peak Log 10 dB/	(1) Fra (1) Fra (1) Fra nt 17:52:44 Ju	eq 2.40175 eq 2.39000 eq 2.38125	€Hz	-57.44 dBm -56.65 dBm	
Z3.3 dBm Image: Second se	1 2 3 Ref 10 dB Peak Log 10 dB/ Offst 2	(1) Fra (1) Fra (1) Fra nt 17:52:44 Ju	eq 2.40175 eq 2.39000 eq 2.38125 in 20, 2014 #Atten 30 dB	€Hz	-57.44 dBm -56.65 dBm	
#Res BW 100 kHz #VBW 300 kHz Sweep 10.36 ms (401 pts) Marker Trace Type X Axis 1 (1) Freq 2.47975 0Hz -3.343 dBm 2 (1) Freq 2.48360 GHz -56.25 dBm	1 2 3 Ref 10 dB Peak Log 10 dB/ Offist 2 dB DI	(1) Fre (1) Fre (1) Fre (1) Fre 1	eq 2.40175 eq 2.39000 eq 2.38125 in 20, 2014 #Atten 30 dB	€Hz	-57.44 dBm -56.65 dBm	
#Res BW 100 kHz #VBW 300 kHz Sweep 10.36 ms (401 pts) Marker Trace Type X Axis 1 (1) Freq 2.47975 0Hz -3.343 dBm 2 (1) Freq 2.48360 GHz -56.25 dBm	1 2 3 Ref 10 dE Peak Log 10 dB/ Offst 2 dB DI -23.3	(1) Fre (1) Fre (1) Fre (1) Fre 1	eq 2.40175 eq 2.39000 eq 2.38125 in 20, 2014 #Atten 30 dB	€Hz	-57.44 dBm -56.65 dBm	
Marker Trace Type X Axis Amplitude 1 (1) Freq 2.47975 GHz -3.343 dBm 2 (1) Freq 2.48350 GHz -56.25 dBm	1 2 3 Ref 10 dE Peak Log 10 dB/ Offst 2 dB DI -23.3	(1) Fre (1) Fre (1) Fre (1) Fre 1	eq 2.40175 eq 2.39000 eq 2.38125 in 20, 2014 #Atten 30 dB	€Hz	-57.44 dBm -56.65 dBm	
2 (1) Freq 2.48350 GHz -56.25 dBm	1 2 3 Ref 10 dB Peak Log 10 dB/ Offst 2 dB DI -23.3 dBm Center 2.	(1) Fr (1) Fr	eq 2.40175 eq 2.39000 eq 2.38125 m 20, 2014 #Atten 30 dB	HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ	-57.44 dBm -56.85 dBm Mkr 20000 2000000	-57.58 dBm
	1 2 3 Ref 10 dE Peak Log 10 dB/ Offst 2 dB DI -23.3 dBm Center 2. #Res BW Marker	(1) Fro (1) Fr	eq 2.40175 eq 2.39000 eq 2.38125 in 20, 2014 #Atten 30 dB 0 GHz 0 GHz ↓ ↓ ↓ ↓	HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ	-57.44 dBm -56.65 dBm	-57.58 dBm
	1 2 3 Ref 10 dE Peak Log 10 dB/ Offst 2 dB DI 23,3 dBm Center 2. #Res BW Marker 1 2	(1) Fr (1) Fr	eq 2.40175 eq 2.39000 eq 2.39000 eq 2.38125 m 20, 2014 #Atten 30 dB 0 GHz #V #V pe 2.47975 eq 2.47975 eq 2.47975	HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ	-57.44 dBm -56.65 dBm Mkr -56.95 dB -56.95 dB	-57.58 dBm
	1 2 3 Ref 10 dE Peak Log 10 dB/ Offst 2 dB DI 23,3 dBm Center 2. #Res BW Marker 1 2	(1) Fr (1) Fr	eq 2.40175 eq 2.39000 eq 2.39000 eq 2.38125 m 20, 2014 #Atten 30 dB 0 GHz #V #V pe 2.47975 eq 2.47975 eq 2.47975	HIZ HIZ HIZ HIZ HIZ HIZ HIZ HIZ	-57.44 dBm -56.65 dBm Mkr -56.95 dB -56.95 dB	-57.58 dBm

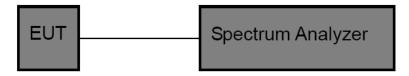


6. Bandwidth Test

- 6.1 Test Standard and Limit
 - 6.1.1 Test Standard
 - FCC Part 15.247 (a)(2)
 - 6.1.2 Test Limit

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

6.2 Test Setup



6.3 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.

6.4 EUT Operating Condition

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

6.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014



6.6 Test Data

EUT:	MI	D		Model:		MID1024	1-Z			
Temperature:	25	°C		Relative	Humidity:	55%				
Test Voltage:	AC	C 120V/60 Hz								
Test Mode:	BL	E TX Mode	e							
Channel frequer	су	6dB Ba	ndwidth	99% Ba	andwidth	L	.imit			
(MHz)		(kl	Hz)	(k	(Hz)	(kHz)			
2402		754	.576	10	85.1	_				
2442		750	.655	10	85.1	>	=500			
2480		750	.077	10	80.5					
			BLE	Mode						
	49:29	Jun 20, 2014	20.10		-	-				
Ref 10 dBm #Peak		#Atte	en 30 dB							
Log 10			\$ `		÷.					
dB/ Offst RBW			*							
2 100 0	000	000 kHz								
dB										
Center 2.402 GHz #Res BW 100 kHz			#VBW :	800 kHz		Sweep 5 ms (
Occupied		dwidth 0851 M⊦	łz		Occ B\	N%Pwr xdB -⊓	99.00 % 6.00 dB			
Transmit Freq En x dB Bandwidth	or	-13.918 754.576								





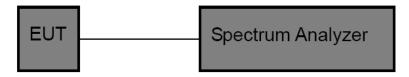


7. Peak Output Power Test

- 7.1 Test Standard and Limit
 - 7.1.1 Test Standard
 - FCC Part 15.247 (b)
 - 7.1.2 Test Limit

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

7.2 Test Setup



7.3 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.

7.4 EUT Operating Condition

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

7.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014



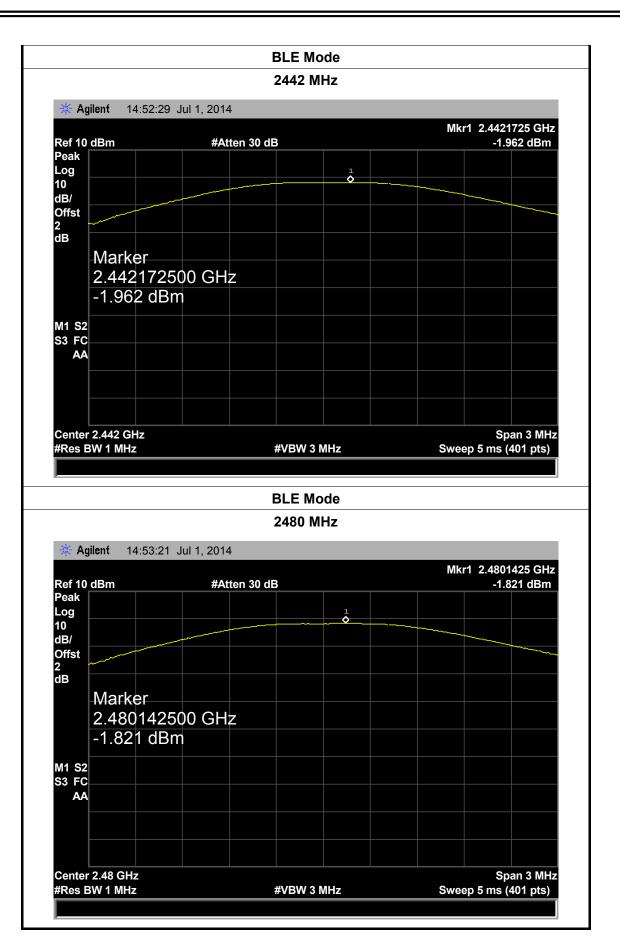
Analyzer

7.6 Test Data



JT:		MID			Model:			MID102	4-Z	
mperature	:	25 ℃			Relative Humidity: 55%					
st Voltage:		AC 120	V/60 HZ	0 HZ						
st Mode:		BLE TX	Mode							
hannel free	quen	cy (MHz)	Т	est Res	ult (dBm)			Limit (d	lBm)	
24	102			-2.	559					
24	142			-1.9	962			30		
24	480			-1.8	321					
				BLE	Mode					
				2402	MHz					
🔆 Agilent	14:	52:53 Jul 1	, 2014							
Ref 10 dBm	ı		#Atten 3	0 dB				Mkr1 2.402 -2.	559 dBm	
Peak Log										
10										
dB/ Offst										
2 dB										
	arke	r								
		80000	GHz							
-2.	559	dBm								
M1 S2										
S3 FC AA										
Center 2.40 #Res BW 1				#VBW	3 MHz		S	Si weep 5 ms	pan 3 MHz (401 pts)	





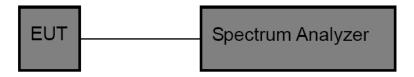


8. Power Spectral Density Test

- 8.1 Test Standard and Limit
 - 8.1.1 Test Standard
 - FCC Part 15.247 (e)
 - 8.1.2 Test Limit

FCC Part 15 Subpart C(15.247)						
Test Item Limit Frequency Ran						
Power Spectral Density	8dBm(in any 3 kHz)	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 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.

8.4 EUT Operating Condition

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

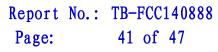


8.5 Test Equipment

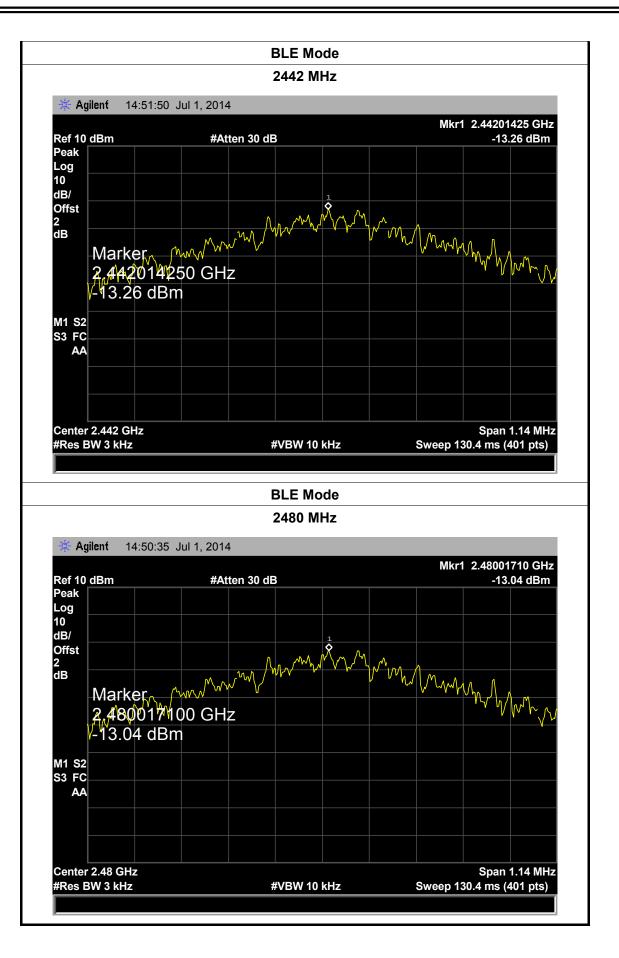
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 10, 2013	Aug.09, 2014

8.6 Test Data

JT:	MID		Model:		MID1024-Z
mperature:	25 ℃		Relative Hum	55%	
st Voltage:	AC 120V/	/60 Hz			
st Mode:	BLE TX M	lode			
Channel Freq	uency	Power	Density		Limit (dBm)
(MHz)		(3 kHz	/dBm)		
2402		-13	.66		
2442		-13	.26		8
2480		-13	.04		
		BLE	Mode		
		2402	MHz		
Log 10 dB/ Offst 2 dB Marke 2 /10/20		WW MW	M. Mary	h./[./h./	MANA ANT N
- 1 3.66	dBm				
M1 S2 S3 FC AA					
Center 2.402 GHz	2		40141		Span 1.14 MHz
#Res BW 3 kHz		#VBW	10 kHz	Swee	p 130.4 ms (401 pts) I









9. Antenna Conducted Spurious Emission

9.1 Test Standard and Limit

10.1.1 Test Standard

FCC Part 15.247 (d)

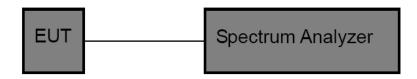
10.1.2 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (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

(2)If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3) requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

9.2 Test Setup



9.3 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.



- (2) Spectrum Setting: RBW=100 KHz, VBW=300 KHz. Frequency range: from 30MHz to 26.5 GHz.
- 9.4 EUT Operating Condition

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

9.5 Test Equipment

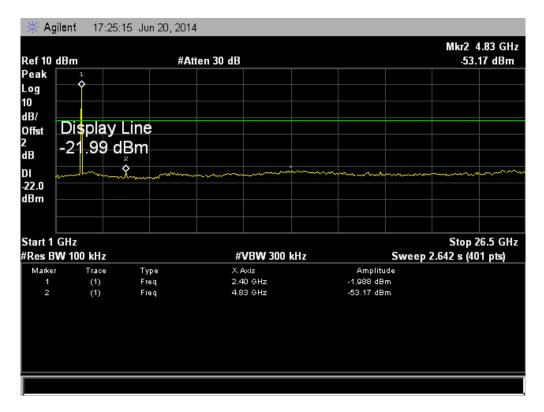
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

9.6 Test Data



BLE Mode TX CH 00 2402MHz

Above 1 GHz



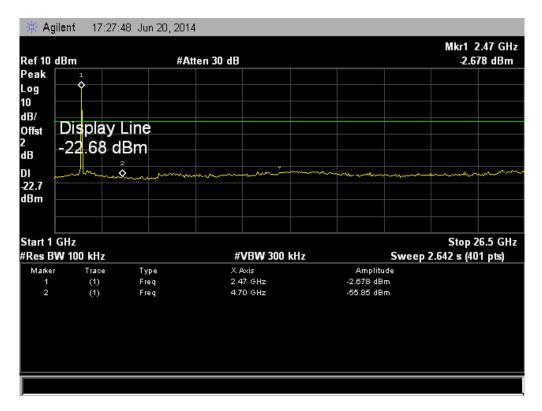
Below 1 GHz

🔆 Ag	jilent 17	:25:59 Ju	n 20, 2014							
Ref 10	dBm		#Att	en 30 dB	m 30 dB -54.61 dB					
Peak Log										
10 dB/ Offst	Marke	er								
2 dB	638.6	75000								
DI -22.0	-54.6	l dBm	~~~~~~				~~~			
dBm										
Start 30 #Res B	0 MHz W 100 kH;	z		#1	VBW 300	kHz		Sweep 1	Sto 00.5 ms (40	op 1 GHz)1 pts)
Marker 1	r Traci (1)	e Ty Fre			∿xis 7 MHz		Amplit -54.61 de	ude		



BLE Mode TX CH 20 2442MHz

Above 1 GHz



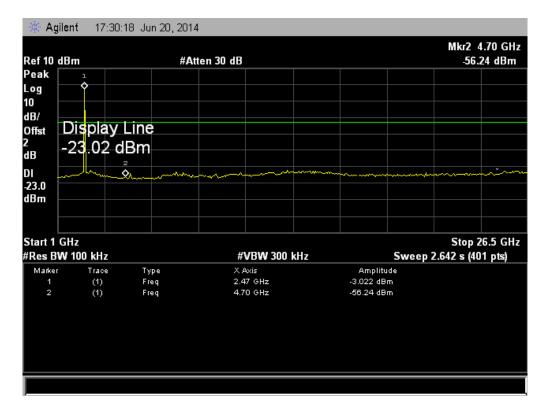
Below 1 GHz

🔆 Ag	jilent 17	:28:34 Ju	n 20, 2014						
Ref 10	dBm		#Att	en 30 dB -54.33 dB					
Peak Log 10									
dB/ Offst	Marke	er							
2 dB		25000 3 dBm				1			
DI -22.7 dBm	-04.0		·····		^	~~~~^ X ~~	·····		
C11-21								<u></u>	
Start 30 #Res B	UMHZ W 100 kHz	z		#VBW 3	300 kHz	S	weep 100.5	Stop 1 GH ms (401 pts)	
Marker 1	r Trac (1)	e Tyj Fre		X Axis 692.0 MHz		Amplitude -54.33 dBm			



BLE Mode TX CH 39 2480MHz

Above 1 GHz



Below 1 GHz

									2.47 GHz
Ref 10 dB	m	#Atten 30 dB				-2.678 dBm			
Peak	1								
Log	Ŷ								
10 🔶									
dB/									
Offst 🗌	Display	/ Line							
2 _'	22.68								
dB [–] '	22.00								
DI 🔔	uthe.	2 . 🔷 🔛				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			m
-22.7		man and -							
dBm —									
Start 1 GI	lz							Stop 2	6.5 GHz
#Res BW 100 kHz				#VBW 300 kHz			Sweep 2.642 s (401 pts)		
Marker	Trace	Туре		X Axis		Amplitu			
1	(1)	Freq		2.47 GHz		-2.678 dBr			
2	(1)	Freq		4.70 GHz		-55.85 dBr	n		



10. Antenna Requirement

10.1 Standard Requirement

11.1.1 Standard

FCC Part 15.203

11.1.2 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 0 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

10.2 Result

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