

Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC141395

Page: 1 of 75

FCC Radio Test Report FCC ID: XMF-MID713

Original Grant

Report No. : TB-FCC141395

Applicant: Lightcomm Technology Co., Ltd.

Equipment Under Test (EUT)

EUT Name : MID

Model No. : MID713-L

Series Model : MID721-L, DL701Q, DL701Q(B)

No.

Brand Name : N/A

Receipt Date : 2014-07-25

Test Date : 2014-07-28 to 2014-08-05

Issue Date : 2014-08-13

Standards: FCC Part 15, Subpart C(15.247)

Test Method : ANSI C63.4:2003

Conclusions : PASS

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

The EUT technically complies with the FCC 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



Contents

CONT	ENTS	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	6
	1.4 Description of Support Units	6
	1.5 Description of Test Mode	
	1.6 Description of Test Software Setting	
	1.7 Test Facility	
2.	TEST SUMMARY	9
3.	CONDUCTED EMISSION TEST	10
	3.1 Test Standard and Limit	.10
	3.2 Test Setup	.10
	3.3 Test Procedure	.10
	3.4 Test Equipment Used	
	3.5 EUT Operating Mode	
	3.6 Test Data	
4.	RADIATED EMISSION TEST	.14
	4.1 Test Standard and Limit	.14
	4.2 Test Setup	.15
	4.3 Test Procedure	.16
	4.4 EUT Operating Condition	
	4.5 Test Equipment	
5 .	RESTRICTED BANDS REQUIREMENT	.32
	5.1 Test Standard and Limit	.32
	5.2 Test Setup	.32
	5.3 Test Procedure	.32
	5.4 EUT Operating Condition	.33
	5.5 Test Equipment	
6.	NUMBER OF HOPPING CHANNEL	46
	6.1 Test Standard and Limit	46
	6.2 Test Setup	46
	6.3 Test Procedure	46
	6.4 EUT Operating Condition	46
	6.5 Test Equipment	
	6.6 Test Data	
7 .	AVERAGE TIME OF OCCUPANCY	48
	7.1 Test Standard and Limit	48
	7.2 Test Setup	48
	7.3 Test Procedure	.48



Page: 3 of 75

	7 4 ELIT On anating Open dition	40
	7.4 EUT Operating Condition	
	7.5 Test Equipment	
	7.6 Test Data	
8.	CHANNEL SEPARATION AND BANDWIDTH TEST	61
	8.1 Test Standard and Limit	61
	8.2 Test Setup	61
	8.3 Test Procedure	
	8.4 EUT Operating Condition	61
	8.5 Test Equipment	62
	8.6 Test Data	62
9.	PEAK OUTPUT POWER TEST	70
	9.1 Test Standard and Limit	70
	9.2 Test Setup	70
	9.3 Test Procedure	70
	9.4 EUT Operating Condition	70
	9.5 Test Equipment	
	9.6 Test Data	70
10.	ANTENNA REQUIREMENT	75
	10.1 Standard Requirement	
	10.2 Antenna Connected Construction	
	10.3 Result	



Page: 4 of 75

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.	:	MID713-L , MID721-L, DL701Q, DL701Q(B)			
Model	:	MID721-L with different shells of the same material, the other models are			
Difference		identical in the same PCB layer	out, interior structure and electrical circuits, The		
		only difference is model name	for commercial purpose.		
		Operation Frequency:			
		Bluetooth:2402~2480MHz			
Product		Number of Channel:	Bluetooth:79 Channels see note (2)		
Description	: [Max Peak Output Power:	GFSK: 4.824 dBm (Conducted Power)		
		0 dBi FPC Antenna			
		Modulation Type: GFSK 1Mbps(1 Mbps)			
		π /4-DQPSK(2 Mbps)			
		8-DPSK(3 Mbps)			
Power Supply	:	DC power supplied by AC/DC Adapter			
		DC Voltage supplied from Li-Polymer battery.			
Power Rating	:	USB DC 5V form PC.			
		AC/DC Adapter(TEKA006-0501500UKU):			
		Input: AC 100~240V 50/60Hz 0.35A Max. Output: DC 5V 1.5A			
		DC 3.7V 2100mAh from Li-Polymer battery			
Connecting I/O	:	The equipent have USB port for link with PC, so the equipment is			
Port(S)		considered as a Computing Device Peripheral.			
		Please refer to the User's I	Manual		

Note: The equipment with Bluetooth and Wifi(802.11b/g/n) function, WiFi(802.11b/g/n) have test comply with FCC Part 15C Rules. More detailed features description, please refer to the manufacturer's specifications or the User's Manual.

Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with



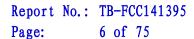
Page: 5 of 75

Public Notice: DA 00-705.

(3) Channel List:

Channel	Frequency	Channel	Frequency	Channel	Frequency
	(MHz)		(MHz)		(MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

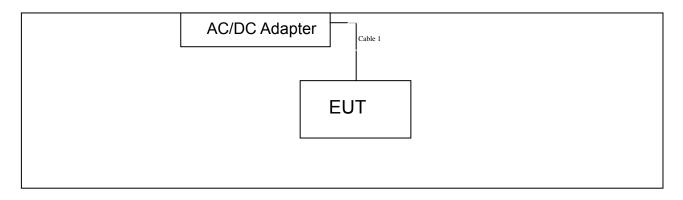
⁽⁴⁾ The Antenna information about the equipment is provided by the applicant.





1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information								
Name Model FCC ID/DOC Manufacturer Used "√"								
	Cable Information							
Number	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 B Mode		

For Radiated Test			
Final Test Mode Description			
Mode 1	AC Charging with TX B Mode		
Mode 2	TX Mode(GFSK) Channel 00/39/78		
Mode 3	TX Mode(π /4-DQPSK) Channel 00/39/78		



Page: 7 of 75

Mode 4	TX Mode(8-DPSK) Channel 00/39/78
Mode 5	Hopping Mode(GFSK)
Mode 6	Hopping Mode(π /4-DQPSK)
Mode 7	Hopping Mode(8-DPSK)

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. We have pretested all the test mode above.

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:

TX Mode: GFSK (1 Mbps)
TX Mode: 8-DPSK (3 Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. 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 Bluetooth mode.

Test Software Version	Test Program: Mediatek Connectivity Combo Tool. apk		
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF
π /4-DQPSK	DEF	DEF	DEF
8-DPSK	DEF	DEF	DEF



Page: 8 of 75

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.



Page: 9 of 75

2. Test Summary

FCC Part 15 Subpart C(15.247)				
Standard Section	Test Item	Judgment	Remark	
15.203	Antenna Requirement	PASS	N/A	
15.207	Conducted Emission	PASS	N/A	
15.205	Restricted Bands	PASS	N/A	
15.247(a)(1)	Hopping Channel Separation	PASS	N/A	
15.247(a)(1)	Dwell Time	PASS	N/A	
15.247(b)(1)	Peak Output Power	PASS	N/A	
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A	
15.247(c)	Radiated Spurious Emission	PASS	N/A	
15.247(c)	Antenna Conducted Spurious Emission	PASS	N/A	
15.247(a)	20dB Bandwidth	PASS	N/A	
Note: N/A is an abbreviation for Not Applicable.				



Page: 10 of 75

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1Test Standard FCC Part 15.207

3.1.2 Test Limit

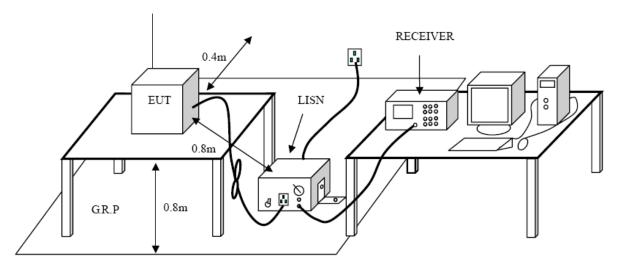
Conducted Emission Test Limit

Eraguanav	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.



Report No.: TB-FCC141395 Page: 11 of 75

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

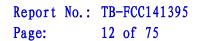
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test	ROHDE&		400004	2013-08-10	2014-08-09
Receiver	SCHWARZ	ESCI	100321	2013-06-10	2014-00-09
50ΩCoaxial	Anritsu	MP59B	X10321	2013-08-10	2014-08-09
Switch	Aillisu	MESSE	X10321	2013-00-10	2014-00-09
L.I.S.N	Rohde & Schwarz	ENV216	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.





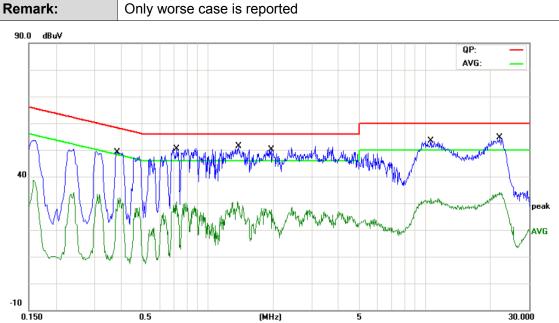
EUT: MID Model Name: MID713-L

Temperature: 25 °C Relative Humidity: 55%

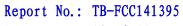
Test Voltage: AC 120V/60 Hz

Terminal: Line

Test Mode: AC Charging with TX GFSK Mode 2402 MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBu∨	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3820	36.34	10.06	46.40	58.23	-11.83	QP	
2		0.3820	18.97	10.06	29.03	48.23	-19.20	AVG	
3		0.7180	33.65	10.03	43.68	56.00	-12.32	QP	
4		0.7180	17.82	10.03	27.85	46.00	-18.15	AVG	
5	*	1.3820	35.56	10.12	45.68	56.00	-10.32	QP	
6		1.3820	18.73	10.12	28.85	46.00	-17.15	AVG	
7		1.9540	33.24	10.06	43.30	56.00	-12.70	QP	
8		1.9540	13.92	10.06	23.98	46.00	-22.02	AVG	
9		10.5860	35.32	10.15	45.47	60.00	-14.53	QP	
10		10.5860	18.40	10.15	28.55	50.00	-21.45	AVG	
11		21.8380	37.55	10.06	47.61	60.00	-12.39	QP	
12		21.8380	21.05	10.06	31.11	50.00	-18.89	AVG	





Page: 13 of 75

	T: MID Model Name :			MID713-L		
Temperature:	25 ℃		Relative Humidity: 55%			
Test Voltage:	AC 120V/60 H	lz				
Terminal:	Neutral					
Test Mode:	AC Charging v	with TX GF	SK Mode	2402 MHz		
Remark:	Only worse ca	se is repoi	ted			
90.0 dBuV		poperation of the second		Mary and have a second	QP: AVG:	peak
-10		T				AVG
	Reading		Measure-	5 Limit Ove	er	30.000
No. Mk. Fre	Reading q. Level					
No. Mk. Fre	Reading eq. Level z dBuV	Correct I	Measure- ment	Limit Ove	Detector	
No. Mk. Fre	Reading Level z dBuV 37.30	Correct I Factor	Measure- ment dBuV	Limit Ove	Detector 6 QP	
No. Mk. Fre	Reading Level z dBuV 37.30 39 27.57	Correct I Factor dB	Measure- ment dBuV 47.42	Limit Ove dBuV dB 65.78 -18.3	Detector 6 QP 9 AVG	
No. Mk. Fre	Reading Level z dBuV 39 37.30 39 27.57 00 33.73	Correct Factor dB 10.12 10.12	Measure- ment dBuV 47.42 37.69	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0	Detector 6 QP 9 AVG 1 QP	
No. Mk. Fre	Reading Level Z dBuV 39 37.30 39 27.57 00 33.73 00 25.72	Correct Factor dB 10.12 10.12 10.11	Measure- ment dBuV 47.42 37.69 43.84	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6	Detector 6 QP 9 AVG 1 QP 2 AVG	
No. Mk. Fre	Reading Level z dBuV 39 37.30 39 27.57 00 33.73 00 25.72 39 37.31	Correct I Factor dB 10.12 10.12 10.11 10.11	Measure- ment dBuV 47.42 37.69 43.84 35.83	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6 52.45 -16.6	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP	
No. Mk. Fre MH. 1 0.153 2 0.153 3 0.230 4 0.230 5 * 0.813	Reading Level Z dBuV 39 37.30 39 27.57 00 33.73 00 25.72 39 37.31 39 23.05	Correct Factor dB 10.12 10.12 10.11 10.11 10.07	Measure- ment dBuV 47.42 37.69 43.84 35.83 47.38	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6 52.45 -16.6 56.00 -8.62	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP 8 AVG	
No. Mk. Fre MH. 1 0.153 2 0.153 3 0.230 4 0.230 5 * 0.813 6 0.813	Reading Level Z dBuV 39 37.30 39 27.57 00 33.73 00 25.72 39 37.31 39 23.05 20 36.01	Correct Factor dB 10.12 10.12 10.11 10.07 10.07	Measure- ment dBuV 47.42 37.69 43.84 35.83 47.38 33.12	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6 52.45 -16.6 56.00 -8.62 46.00 -12.8	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP 8 AVG 7 QP	
No. Mk. Fre MH 1 0.153 2 0.153 3 0.230 4 0.230 5 * 0.813 6 0.813 7 1.383	Reading Level Z dBuV 39 37.30 39 27.57 00 33.73 00 25.72 39 37.31 39 23.05 20 36.01 20 26.17	Correct Factor dB 10.12 10.12 10.11 10.11 10.07 10.07 10.12	Measure- ment dBuV 47.42 37.69 43.84 35.83 47.38 33.12 46.13	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6 52.45 -16.6 56.00 -8.62 46.00 -12.8 56.00 -9.87	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP 8 AVG 7 QP 1 AVG	30.000
No. Mk. Fre MH. 1 0.153 2 0.153 3 0.230 4 0.230 5 * 0.813 6 0.813 7 1.382 8 1.383	Reading Level Z dBuV 39 37.30 39 27.57 00 33.73 00 25.72 39 37.31 39 23.05 20 36.01 20 26.17 30 34.37	Correct Factor dB 10.12 10.12 10.11 10.11 10.07 10.07 10.12	Measure- ment dBuV 47.42 37.69 43.84 35.83 47.38 33.12 46.13 36.29	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -16.6 52.45 -16.6 56.00 -8.62 46.00 -12.8 56.00 -9.87 46.00 -9.71	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP 8 AVG 7 QP 1 AVG 7 QP	
No. Mk. Fre MH. 1 0.153 2 0.153 3 0.230 4 0.230 5 * 0.813 6 0.813 7 1.382 8 1.382 9 10.158	Reading Level z dBuV 39 37.30 39. 27.57 00 33.73 00 25.72 39 37.31 39 23.05 20 36.01 20 26.17 80 34.37 80 21.67	Correct Factor dB 10.12 10.12 10.11 10.07 10.07 10.12 10.12 10.16	Measure- ment dBuV 47.42 37.69 43.84 35.83 47.38 33.12 46.13 36.29 44.53	Limit Ove dBuV dB 65.78 -18.3 55.78 -18.0 62.45 -18.6 52.45 -16.6 56.00 -8.62 46.00 -12.8 56.00 -9.87 46.00 -9.71 60.00 -15.4	Detector 6 QP 9 AVG 1 QP 2 AVG 2 QP 8 AVG 7 QP 1 AVG 7 QP 7 AVG	



Page: 14 of 75

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 Limit (9 kHz~1000MHz)

h	adiated Ellission Ellint (5 kilz	1000111112)
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 B (dBuV/m)(at 3m)			
(MHz)	Peak	Average		
Above 1000	74	54		

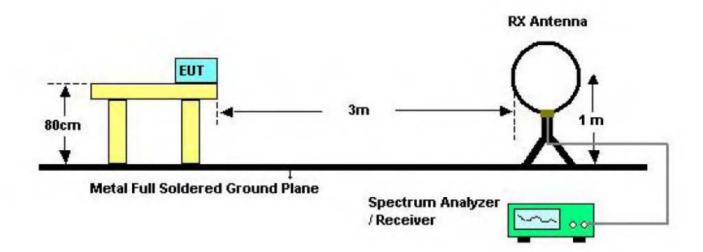
Note:

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

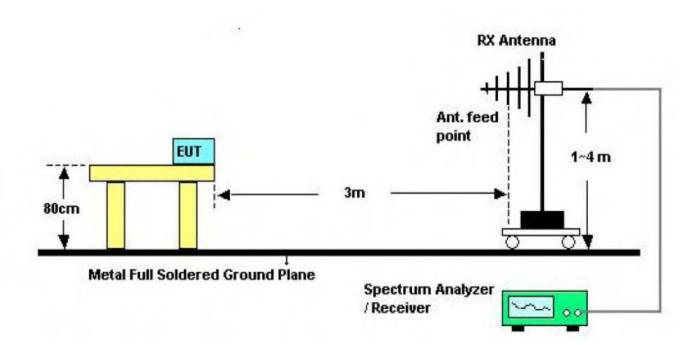


Page: 15 of 75

4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Turntable

EUT

0.8 m lm to 4m

Coaxial Cable

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 below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) 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.
- (7) 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 in TX mode.



Page: 17 of 75

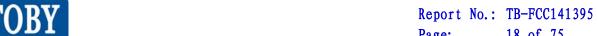
4.5 Test Equipment

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
Horn Antenna	ETS-LINDGREN	3117	00143207	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

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.



Page: 18 of 75

EUT:	MID		Me	odel Name :		MID	713-L	
Temperature:	25	°C	Re	elative Humi	dity:	55%	55%	
Test Voltage:	AC ·	120V/60 Hz						
Ant. Pol.	Hori	orizontal						
Test Mode:	TX (GFSK Mode 2	402MHz					
Remark:	Only	/ worse case is	s reported					
80.0 dBuV/m								
30			3 5		(RE)EC	CC 15C 3I	M Radiation Margin -6	
-20 30.000 40	50 60 70	0 80	(MHz)	300	400	500	600 700	1000.000
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	: (Over	
	MHz	dBuV	dB/m	dBuV/m	dBuV	/m	dB	Detector
1 *	30.5305	51.39	-14.28	37.11	40.0	0	-2.89	peak
2 !	69.8449	58.86	-23.62	35.24	40.0	0	-4.76	peak

No	. Mł	c. Freq.	Level	Factor	ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	30.5305	51.39	-14.28	37.11	40.00	-2.89	peak
2	ļ	69.8449	58.86	-23.62	35.24	40.00	-4.76	peak
3		132.6850	59.63	-22.13	37.50	43.50	-6.00	peak
4		151.5971	56.10	-21.07	35.03	43.50	-8.47	peak
5		197.2000	57.57	-20.54	37.03	43.50	-6.47	peak
6		280.0237	54.41	-17.48	36.93	46.00	-9.07	peak
7	ļ	334.8589	56.11	-15.54	40.57	46.00	-5.43	peak

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



Report No.: TB-FCC141395
Page: 19 of 75

EUT:	MID	Mo	odel Name :	MID713-L		
Temperature:	25 ℃	Re	elative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2	2402MHz				
Remark:	Only worse case	is reported				
80.0 dBuV/m						
-20		4 ************************************	(HF)	FCC 15C 3M Radiation Margin -6		
30.000 40 50	60 70 80	(MHz)	300 400	500 600 700	1000.000	
No. Mk. Fre		Correct Factor	Measure- ment Lim			
MH	Hz dBuV	dB/m	dBuV/m dBu	IV/m dB	Detector	
1 ! 30.42	237 49.52	-14.22	35.30 40	.00 -4.70	peak	
2 ! 42.45	508 57.38	-21.19	36.19 40	.00 -3.81	peak	
3 * 70.09	901 60.47	-23.61	36.86 40	.00 -3.14	peak	
4 133.6	3186 58.68	-22.10	36.58 43	.50 -6.92	peak	
5 171.9	9944 53.02	-21.06	31.96 43	.50 -11.54	peak	

334.8589

6

Emission Level= Read Level+ Correct Factor

53.88

-15.54

38.34

46.00

-7.66

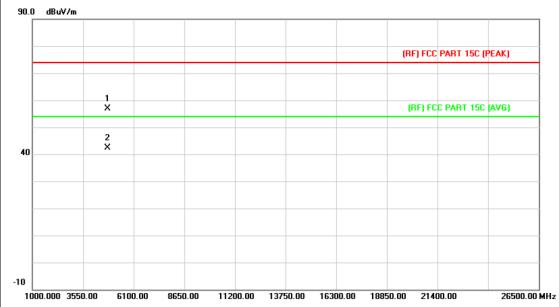
peak

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



Page: 20 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	55%					
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2402MH	z					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

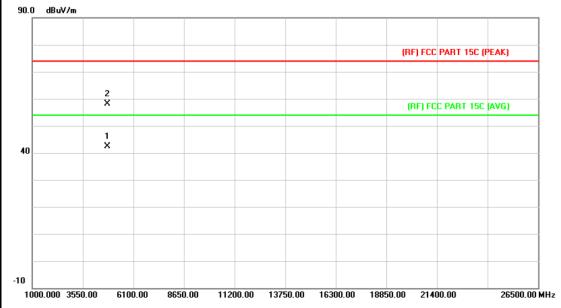


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.410	43.46	13.44	56.90	74.00	-17.10	peak
2	*	4803.890	28.97	13.44	42.41	54.00	-11.59	AVG



Page: 21 of 75

EUT:	MID	Model Name :	MID713-L					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz						
Ant. Pol.	Vertical	Vertical						
Test Mode:	TX GFSK Mode 2402MH	z						
Remark:	No report for the emissio prescribed limit.	n which more than 10 o	dB below the					

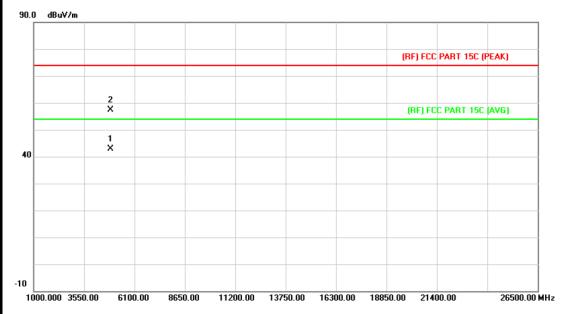


No	o. M	k. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.590	28.90	13.44	42.34	54.00	-11.66	AVG
2		4804.045	44.60	13.44	58.04	74.00	-15.96	peak



Page: 22 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2441MH	z					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

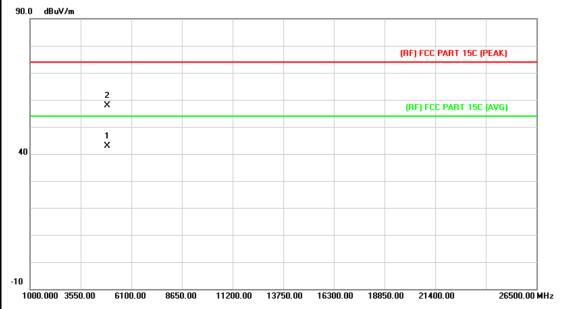


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4880.525	29.03	13.89	42.92	54.00	-11.08	AVG
2		4881.515	43.43	13.90	57.33	74.00	-16.67	peak



Page: 23 of 75

EUT:	MID	Model Name :	MID713-L			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2441MH	z				
Remark:	No report for the emission which more than 10 dB below the					
	prescribed limit.					

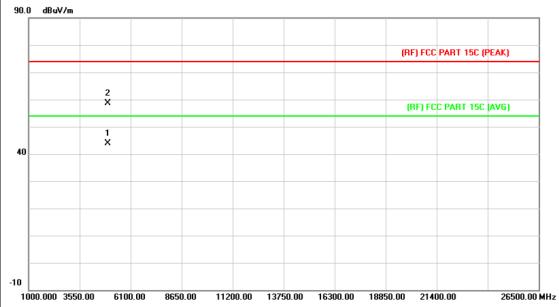


No	o. MI	k. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4880.545	28.99	13.89	42.88	54.00	-11.12	AVG
2		4882.055	44.06	13.90	57.96	74.00	-16.04	peak



Page: 24 of 75

EUT:	MID	Model Name :	MID713-L			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz				
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark: No report for the emission which more than 10 dB below the prescribed limit.						

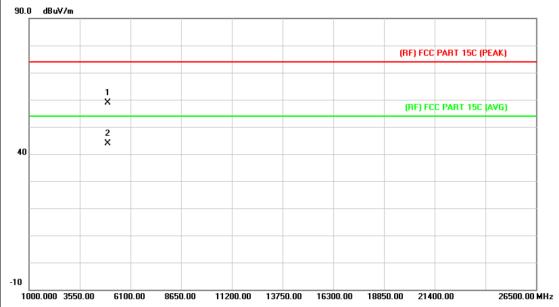


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4958.780	29.52	14.35	43.87	54.00	-10.13	AVG
2		4959.680	44.18	14.36	58.54	74.00	-15.46	peak



Page: 25 of 75

EUT:	MID	Model Name :	MID713-L			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz				
Ant. Pol.	Vertical					
Test Mode:	TX GFSK Mode 2480MH	z				
Remark: No report for the emission which more than 10 dB below the prescribed limit.						

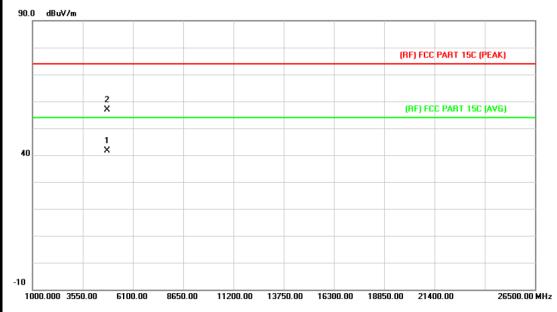


N	lo. Mi	κ. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.823	44.45	14.36	58.81	74.00	-15.19	peak
2	*	4960.552	29.46	14.36	43.82	54.00	-10.18	AVG



Page: 26 of 75

EUT:	MID	Model Name :	MID713-L			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz				
Ant. Pol.	Horizontal					
Test Mode:	TX 8-DPSK Mode 2402N	1Hz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

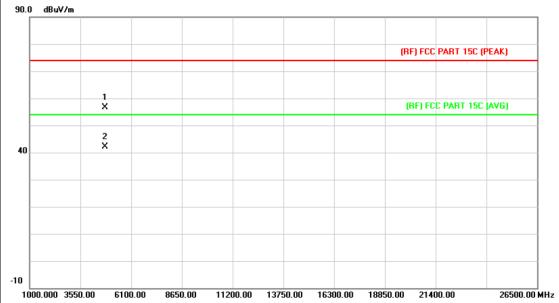


No	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.904	28.26	13.44	41.70	54.00	-12.30	AVG
2		4804.048	43.45	13.44	56.89	74.00	-17.11	peak



Page: 27 of 75

EUT:	MID	Model Name :	MID713-L	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz			
Ant. Pol.	Vertical			
Test Mode:	TX 8-DPSK Mode 2402M	lHz		
Remark: No report for the emission which more than 10 dB below the prescribed limit.				

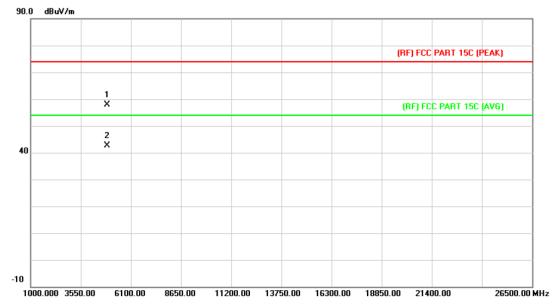


1	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1			4803.448			56.74	74.00	-17.26	peak
2		*	4803.790	28.68	13.44	42.12	54.00	-11.88	AVG



Page: 28 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX 8-DPSK Mode 2441M	1Hz					
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					

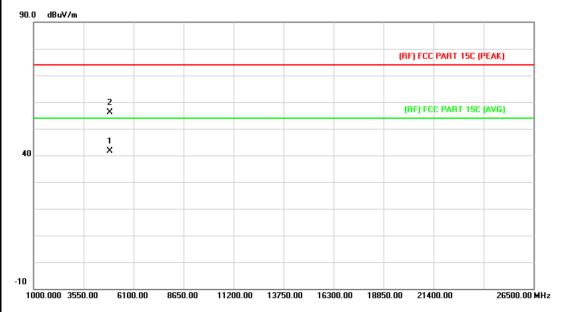


	No.	Mk.	Freq.	_	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1			4882.558	44.04	13.90	57.94	74.00	-16.06	peak
2	-	*	4882.558	28.70	13.90	42.60	54.00	-11.40	AVG



Page: 29 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2441N	1Hz					
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					

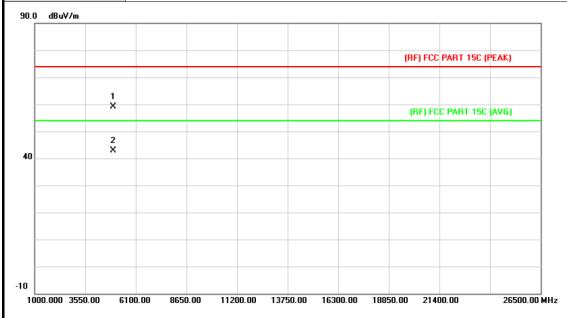


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.424	27.79	13.90	41.69	54.00	-12.31	AVG
2		4882.909	42.31	13.90	56.21	74.00	-17.79	peak



Page: 30 of 75

EUT:	MID	Model Name :	MID713-L			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX 8-DPSK Mode 2480M	1Hz				
Remark:	No report for the emissio prescribed limit.	n which more than 10 c	IB below the			

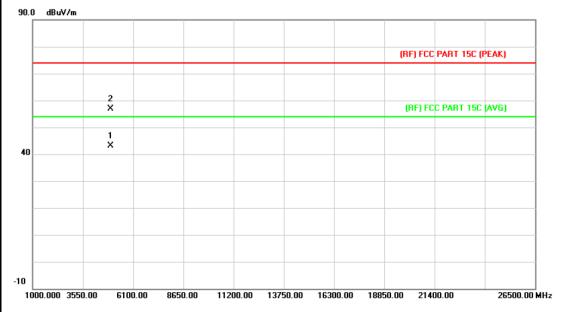


N	o. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4958.890	44.77	14.35	59.12	74.00	-14.88	peak
2	*	4959.619	28.61	14.36	42.97	54.00	-11.03	AVG



Page: 31 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX 8-DPSK Mode 2480N	1Hz					
Remark:	No report for the emissio prescribed limit.	No report for the emission which more than 10 dB below the prescribed limit.					



	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
_	1	*	4959.289	28.76	14.36	43.12	54.00	-10.88	AVG
2	2		4960.024	42.62	14.36	56.98	74.00	-17.02	peak



Page: 32 of 75

5. Restricted Bands Requirement

5.1 Test Standard and Limit

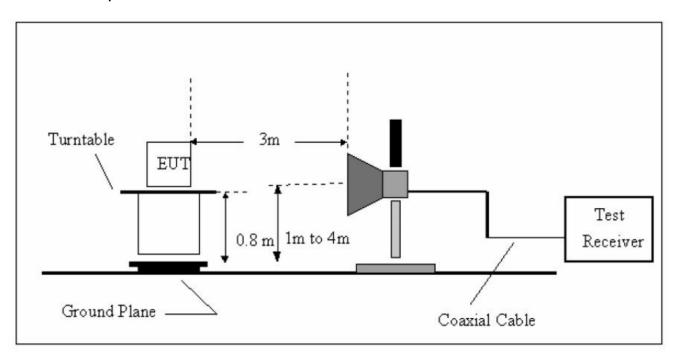
5.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Restricted Frequency	Class B (dBuV/m)(at 3m)					
Band (MHz)	Peak	Average				
2310 ~2390	74	54				
2483.5 ~2500	74	54				
Nata All sastulation bands base	Note: All restriction hands have been tested only the yearst age is remarked					

Note: All restriction bands have been tested, only the worst case is reported.

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



Report No.: TB-FCC141395 Page: 33 of 75

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 below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) 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.
- (7) 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
Horn Antenna	ETS-LINDGREN	3117	00143207	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

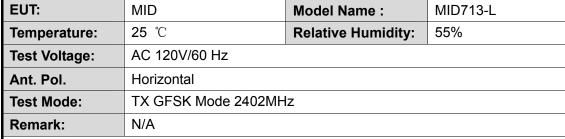
5.6 Test Data

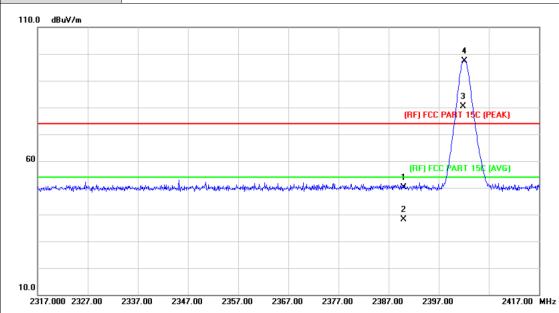
All restriction bands have been tested, only the worst case is reported.



Page: 34 of 75

(1) Radiation Test





No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	49.33	0.77	50.10	74.00	-23.90	peak
2		2390.000	37.28	0.77	38.05	54.00	-15.95	AVG
3	*	2401.900	79.64	0.82	80.46	54.00	26.46	AVG
4	Χ	2402.200	96.48	0.82	97.30	74.00	23.30	peak



Page: 35 of 75

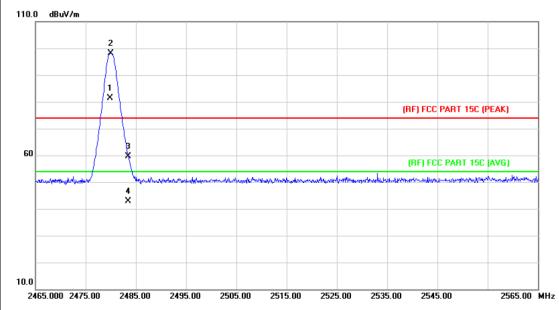
EUT:	MID		M	odel Name :	MID713-L	MID713-L			
Temperature	e: 25 °	C	R	elative Humidity	7: 55%				
Test Voltage	: AC 1	AC 120V/60 Hz							
Ant. Pol.	Verti	cal							
Test Mode:	TX	TX GFSK Mode 2402MHz							
Remark:	Remark: N/A								
110.0 dBuV/m									
60	ahar shika shika shika sheka	north of the What have been a	at many many and a state of the		RF) FCC PART 15C (PEAK) (RF) FCC PART 15C (AVG)				
10.0				2 X					
2317.000 2327	7.00 2337.00	2347.00 235	7.00 2367.00	2377.00 2387.00	2397.00 2417.	.00 MHz			
No. Mk.	Freq.	Reading Level	Correct Factor	ment	mit Over				
	MHz	dBuV	dB/m			etector			
1 2	2390.000	50.54	0.77	51.31 7	4.00 -22.69 p	oeak			
2 2	2390.000	37.27	0.77	38.04 5	4.00 -15.96 A	AVG			
3 * 2	2401.900	79.13	0.82	79.95 5	4.00 25.95 A	AVG			
4 X 2	2402.200	95.96	0.82	96.78 7	4.00 22.78 p	peak			

Emission Level= Read Level+ Correct Factor



Page: 36 of 75

EUT:	MID	Model Name :	MID713-L					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60 Hz							
Ant. Pol.	Horizontal							
Test Mode:	TX GFSK Mode 2480 MHz							
Remark: N/A								
110.0 dBuV/m								

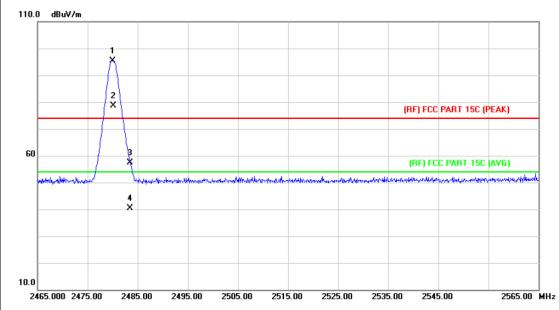


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2479.900	80.23	1.15	81.38	54.00	27.38	AVG
2	Χ	2480.000	97.06	1.15	98.21	74.00	24.21	peak
3		2483.500	58.53	1.17	59.70	74.00	-14.30	peak
4		2483.500	41.69	1.17	42.86	54.00	-11.14	AVG



Page: 37 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2480 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	Χ	2480.000	94.30	1.15	95.45	74.00	21.45	peak
2	*	2480.100	77.47	1.15	78.62	54.00	24.62	AVG
3		2483.500	56.16	1.17	57.33	74.00	-16.67	peak
4		2483.500	39.32	1.17	40.49	54.00	-13.51	AVG

Emission Level= Read Level+ Correct Factor



Page: 38 of 75

EUT:			MID				Model	Name :		MID713-L	
Tempe	eratur	e:	25 °	C			Relativ	e Humi	idity:	55%	
Test V	oltage	e:	AC	120V	/60 Hz						
Ant. P	ol.		Hori	zonta	ıl						
Test M	lode:		TX 8	B-DPS	SK Mod	e 2402M	lHz				
Remai	rk:		N/A	N/A							
110.0	dBuV/m										
60 Julius	have the same	and the second second	agad a co agail a co agail	nggarilly, bully de con	okanika Mandanipi Masa	nga nghungsil, di sakaka ka na na	not week of free all free feet by the	pt the state of the trib tight	(RF)	3 3 CC PART 15C (PE	
10.0 2317.	.000 232	7.00 2	2337.00	2347	7.00 235	57.00 236	7.00 237	7.00 23	87.00 2	397.00	2417.00 MH
No.	. Mk.	Fre	eq.		ading evel	Correc		sure- ent	Limit	Over	
		MH	Ηz	d	lBu∨	dB/m	dB	uV/m	dBuV/r	m dB	Detector
1		2390.	.000	4	9.67	0.77	50).44	74.00	-23.56	peak
2		2390.	.000	3	7.26	0.77	38	3.03	54.00	-15.97	AVG
3	*	2402.	.000	7	8.53	0.82	79	9.35	54.00	25.35	AVG
4	Χ	2402.	200	9:	5.36	0.82	96	5.18	74.00	22.18	peak
											-

Emission Level= Read Level+ Correct Factor



3

4

Report No.: TB-FCC141395

Page: 39 of 75

EUT:		MID	MID Model Name : MID713-L				
Tem	perature:	25 ℃	25 °C Relative Humidity: 55%				
Test	Voltage:	AC 120V	//60 Hz				
Ant.	Pol.	Vertical					
Test	Mode:	TX 8-DP	SK Mode 2402	ИHz			
Rem	ark:	N/A					
110.0	dBuV/m						
60	gers som fragskade i nev om se specialiske fra	dracket de a reperson de la region	nanky nahy nahana a sa	han a distribution of the colored south of a girl france of a resident of a resident	(RF) FCC P	3 PT 15C (PEAK)	
10.0							
	17.000 2327.00			67.00 2377.00 2387.00	2397.00	24	17.00 MHz
Ν	lo. Mk. Fr		eading Corre evel Fact		imit	Over	
	M	Hz	dBuV dB/m	dBuV/m d	lBuV/m	dB I	Detector
1	2390	.000 4	19.67 0.77	50.44	74.00	-23.56	peak
2	2390	.000 3	37.25 0.77	38.02	54.00	-15.98	AVG

Emission Level= Read Level+ Correct Factor

78.31

95.14

0.82

0.82

79.13

95.96

54.00

74.00

2402.100

2402.200

AVG

peak

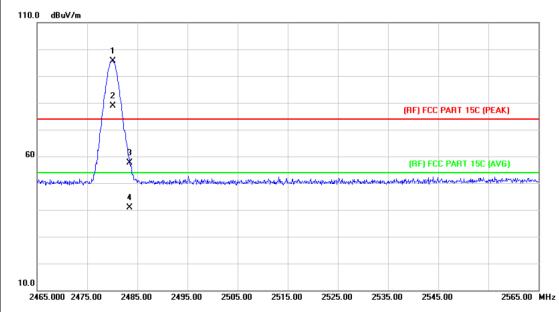
25.13

21.96



Page: 40 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2480MHz						
Remark:	N/A						



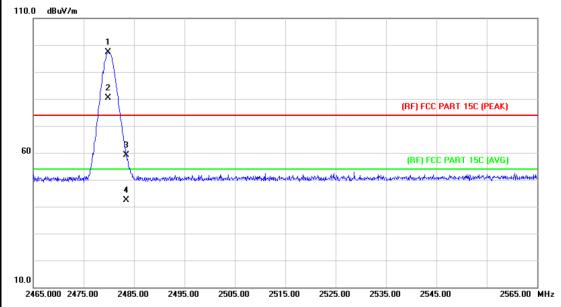
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.100	94.45	1.15	95.60	74.00	21.60	peak
2	*	2480.100	77.61	1.15	78.76	54.00	24.76	AVG
3		2483.500	56.44	1.17	57.61	74.00	-16.39	peak
4		2483.500	39.60	1.17	40.77	54.00	-13.23	AVG

Emission Level= Read Level+ Correct Factor



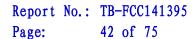
Page: 41 of 75

EUT:	MID	Model Name :	MID713-L				
Temperature:	25 ℃	25 ℃ Relative Humidity:					
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2480M	1Hz					
Remark:	N/A						
110.0 dBuV/m							



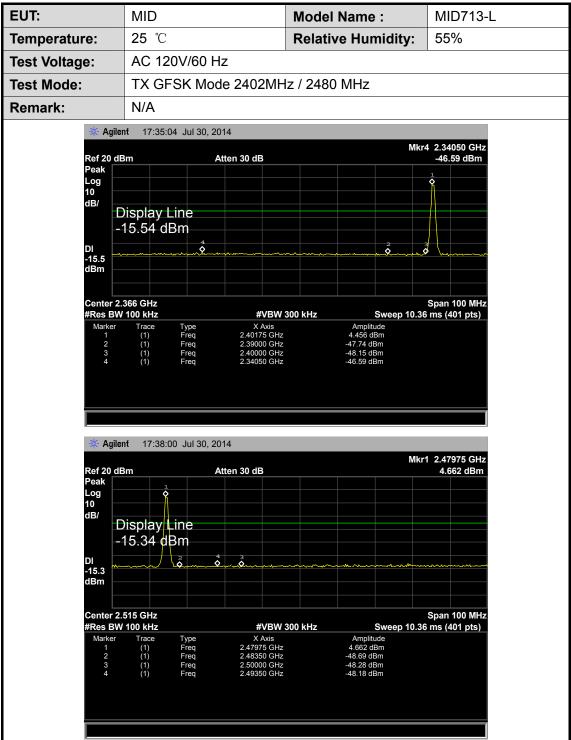
No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2479.900	96.18	1.15	97.33	74.00	23.33	peak
2	*	2479.900	79.34	1.15	80.49	54.00	26.49	AVG
3		2483.500	57.96	1.17	59.13	74.00	-14.87	peak
4		2483.500	41.12	1.17	42.29	54.00	-11.71	AVG

Emission Level= Read Level+ Correct Factor





(2) Conducted Test





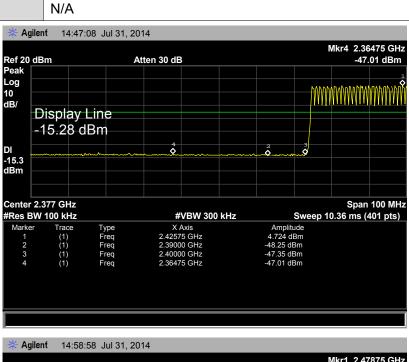
EUT: MID Model Name : MID713-L

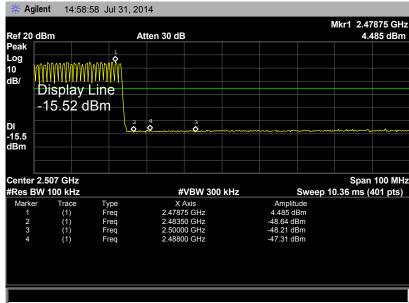
Temperature: 25 °C Relative Humidity: 55%

Test Voltage: AC 120V/60 Hz

Test Mode: GFSK Hopping Mode

Remark: N/A







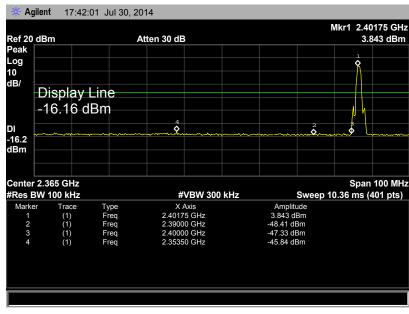
EUT: MID Model Name : MID713-L

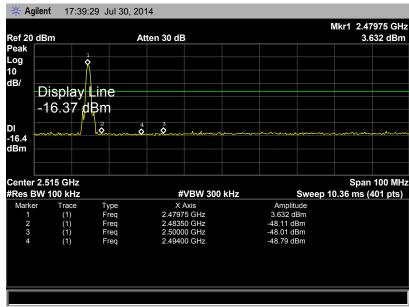
Temperature: 25 ℃ Relative Humidity: 55%

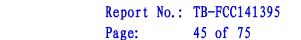
Test Voltage: AC 120V/60 HZ

Test Mode: TX 8-DPSK Mode 2402MHz / 2480 MHz

Remark: N/A









EUT: MID **Model Name:** MID713-L 25 ℃ **Relative Humidity:** Temperature: 55% **Test Voltage:** AC 120V/60 HZ **Test Mode:** 8-DPSK Hopping Mode Remark: N/A * Agilent 15:13:15 Jul 31, 2014 Mkr1 2.41575 GHz Ref 20 dBm Peak Atten 30 dB 3.893 dBm Log 10 dB/ Display Line -16.11 dBm 2 -16.1 dBm Center 2.369 GHz #Res BW 100 kHz Span 100 MHz **#VBW 300 kHz** Sweep 10.36 ms (401 pts) X Axis 2.41575 GHz 2.39000 GHz 2.40000 GHz 2.36850 GHz Amplitude 3.893 dBm -48.11 dBm -47.84 dBm -46.71 dBm Type Freq Freq Freq Freq (1) (1) (1) (1) (1) Agilent 15:20:09 Jul 31, 2014 Mkr4 2.49025 GHz Ref 20 dBm Peak Atten 30 dB -46.9 dBm MWWW Log 10 dB/ Display Line -16.42 dBm DI -16.4 dBm \$ Center 2.512 GHz #Res BW 100 kHz Span 100 MHz **#VBW 300 kHz** Sweep 10.36 ms (401 pts) X Axis 2.47175 GHz 2.48350 GHz 2.50000 GHz 2.49025 GHz Amplitude 3.584 dBm -47.4 dBm -48.54 dBm Type Freq Freq Freq Freq (1) (1) (1) (1)



Page: 46 of 75

6. Number of Hopping Channel

6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

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) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

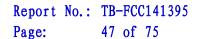
6.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

6.5 Test Equipment

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

6.6 Test Data

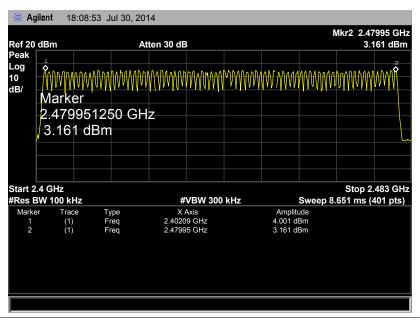




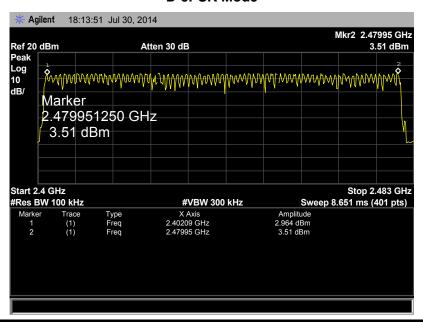
EUT:MIDModel:MID713-LTemperature:25 °CRelative Humidity:55%Test Voltage:AC 120V/60 HZTest Mode:Hopping Mode (GFSK/ 8-DPSK)

	•	
Frequency Range	Quantity of Hopping Channel	Limit
2402MHz~2480MHz	79	>15
2402WII 12**240UWITIZ	79	~15

GFSK Mode



D-8PSK Mode





Page: 48 of 75

7. Average Time of Occupancy

7.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210	Average Time of	0.4.000
Annex 8(A8.1d)	Occupancy	0.4 sec

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) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

7.5 Test Equipment

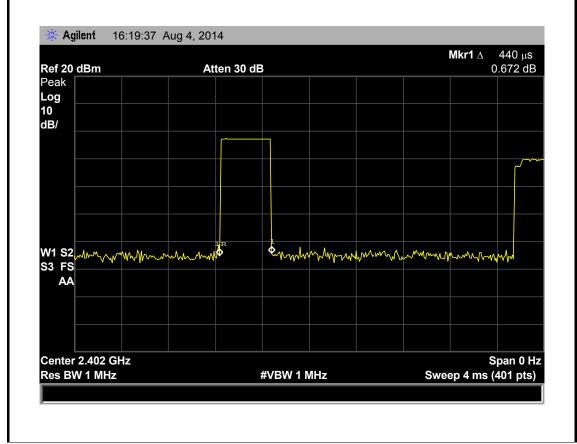
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

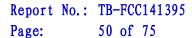


Page: 49 of 75

7.6 Test Data

EUT:		MID	MID Model : N			MID71	13-L
Temperature:		25 °C Relative Humidity: 55%					
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (GFSK D	H1)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		0.440	140.80				
2441		0.440	140.80	31.60	40	00	PASS
2480		0.440 140.80					
GFSK Hopping Mode DH1							





Span 0 Hz

Sweep 4 ms (401 pts)



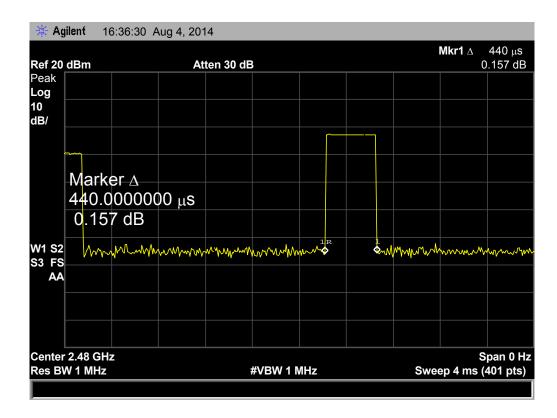
Center 2.441 GHz

Res BW 1 MHz

GFSK Hopping Mode DH1 2441 MHz Agilent 16:22:32 Aug 4, 2014 Mkr1 Δ 440 μ s -1.181 dB Ref 20 dBm Atten 30 dB Peak Log 10 dB/ Marker ∆ 440.000000 μs -1.18<mark>1 dB</mark> W1 S2 & manufacture Marine manus Marine S3 FS AA

GFSK Hopping Mode DH1

#VBW 1 MHz

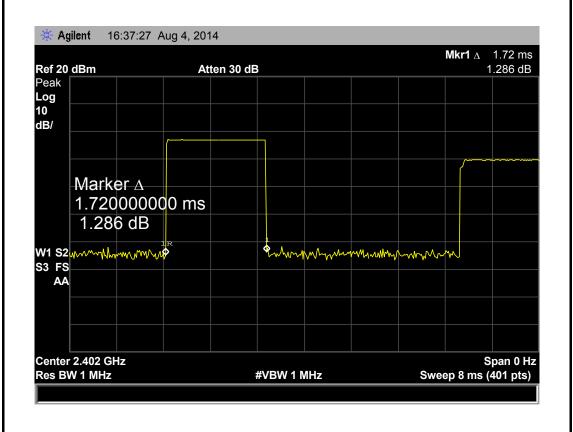


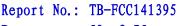


Page: 51 of 75

EUT:		MID	MID Model: MID713-			3-L	
Temperature		25 ℃	25 °C Relative Humidity: 55%				
Test Voltage:		AC 120V/60 HZ					
Test Mode:		Hopping I	Mode (GFSK D	DH3)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.720	275.20				
2441		1.720	275.20	31.60	400	PASS	
2480		1.720	275.20				
GESK Hopping Mode DH3							

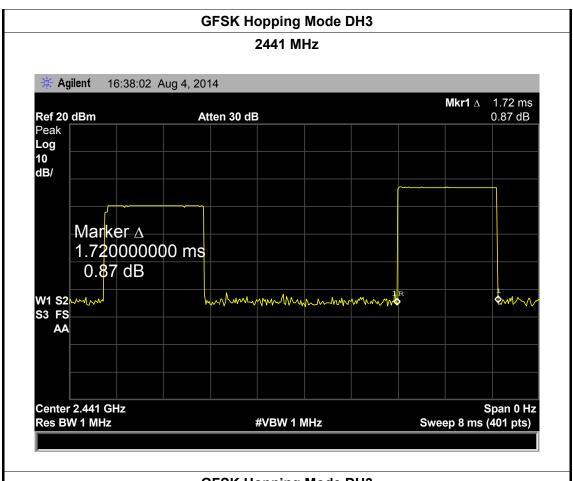
GFSK Hopping Mode DH3

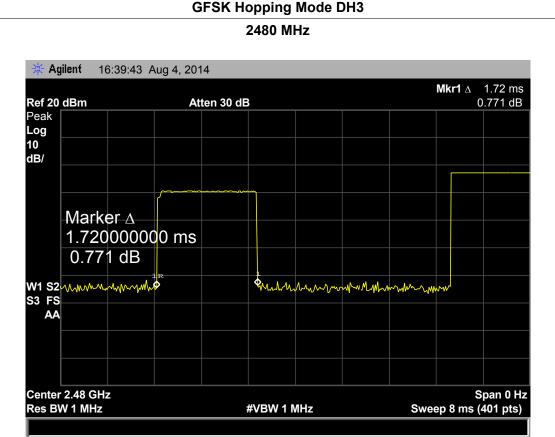






Page: 52 of 75



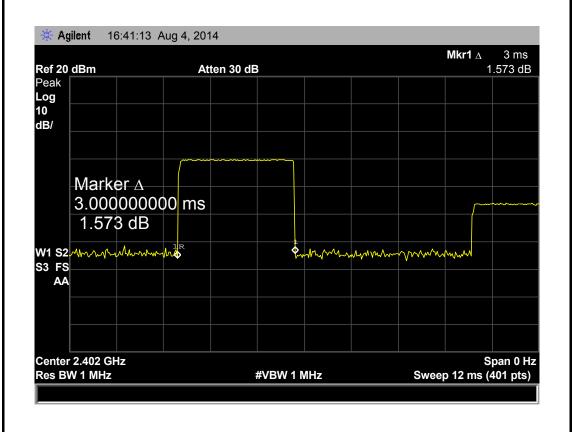




Page: 53 of 75

EUT:		MID		Model: MII		MID71	3-L	
Temperature:		25 ℃	25 °C Relative Humidity: 55%					
Test Voltage:		AC 120V/	AC 120V/60 HZ					
Test Mode:		Hopping I	Mode (GFSK D	lode (GFSK DH5)				
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result	
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result	
2402		3.000	320.00					
2441		3.000	320.00	31.60	31.60 40		PASS	
2480		3.000	320.00	00				
GFSK Hopping Mode DH5								

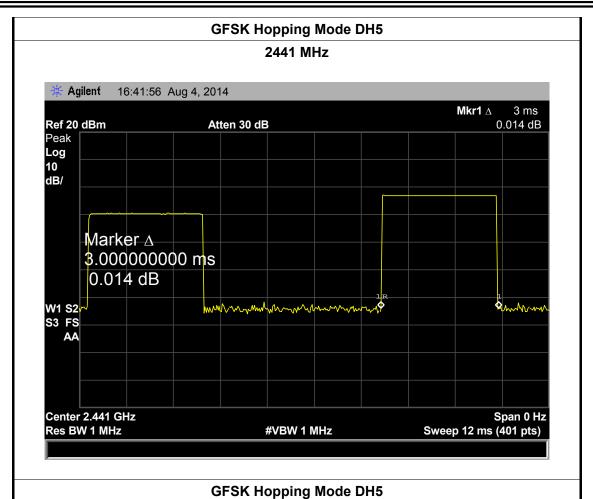
GFSK Hopping Mode DH5

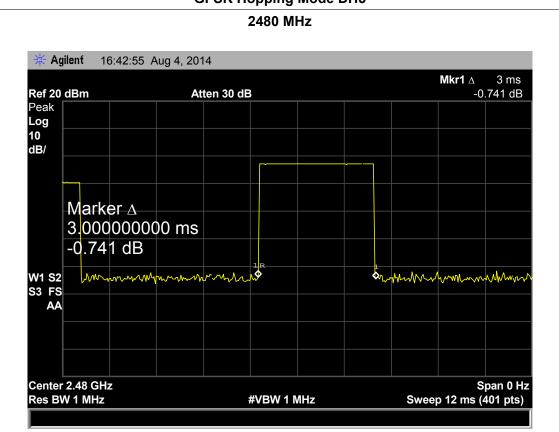






Page: 54 of 75



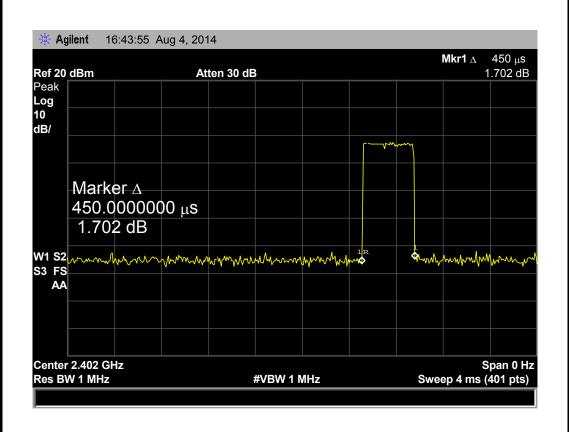




Page: 55 of 75

EUT:		MID Model: MID713-L			3-L		
Temperature		25 ℃	5 °C Relative Humidity: 55%				
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (8-DPSK	CDH1)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		0.450	144.00				
2441		0.450	144.00	31.60	40	00	PASS
2480		0.450	144.00				
8-DPSK Hopping Mode DH1							

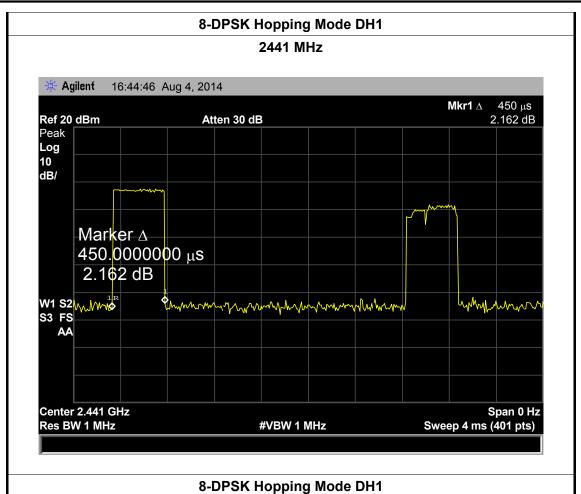
8-DPSK Hopping Mode DH1

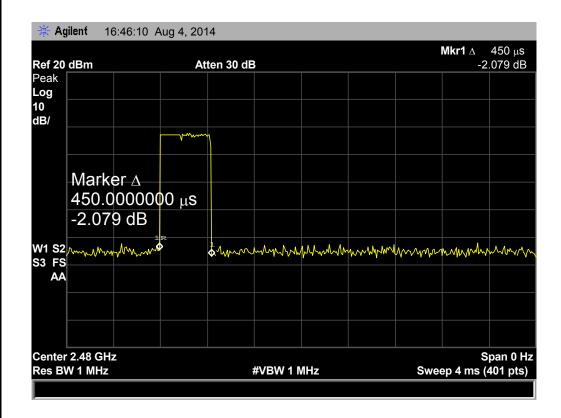






Page: 56 of 75

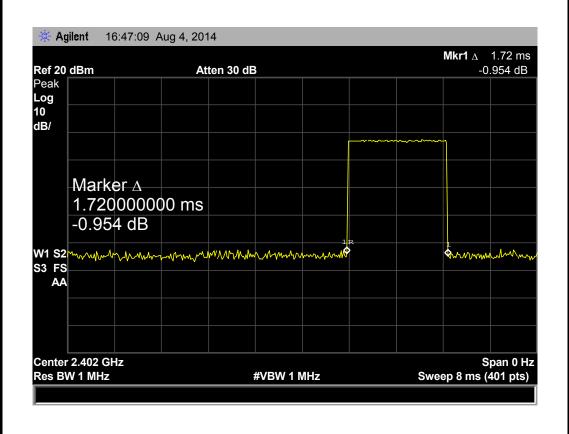


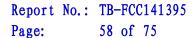




Page: 57 of 75

EUT:		MID	MID Model: MID713-L			3-L	
Temperature:		25 ℃	5 °C Relative Humidity: 55%				
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (8-DPSK	K DH3)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.720	275.20				
2441		1.720	275.20	31.60	31.60 40		PASS
2480	2480 1.720 275.20						
8-DPSK Hopping Mode DH3							







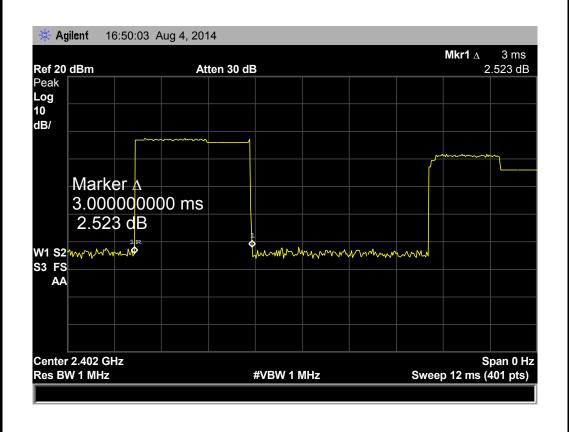
8-DPSK Hopping Mode DH3 2441 MHz Agilent 16:47:51 Aug 4, 2014 **Mkr1** △ 1.72 ms -0.771 dB Ref 20 dBm Atten 30 dB Peak Log 10 dB/ Marker ∆ 1.720000000 ms -0.771 dB W1 S2 mm hummhy &Wm Munmmung Monday man S3 FS AA Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 8 ms (401 pts) 8-DPSK Hopping Mode DH3 2480 MHz

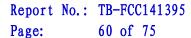
Agilent 16:48:33 Aug 4, 2014 Mkr1 A 1.72 ms Ref 20 dBm Atten 30 dB 0.79 dB Peak Log 10 dB/ Marker ∆ 1.720000000 ms 0.79 dB W1 S2 ~~~ mymymm my S3 FS AΑ Center 2.48 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 8 ms (401 pts)



Page: 59 of 75

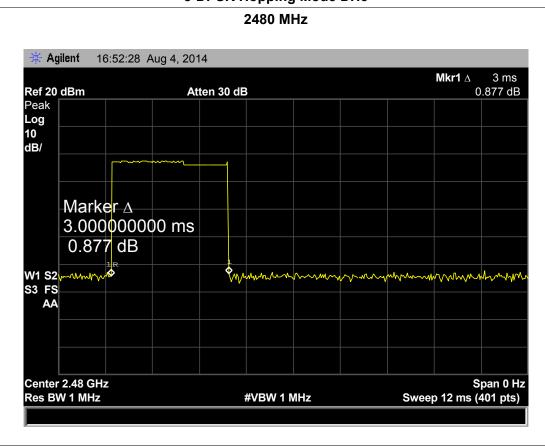
EUT:		MID		Model:	MID MID		3-L
Temperature:		25 ℃	Relative Humidity: 55%				
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (8-DPSK	K DH5)			
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		3.000	320.00				
2441		3.000	320.00	31.60	40	00	PASS
2480	480 3.000 320.00						
8-DPSK Hopping Mode DH5							







8-DPSK Hopping Mode DH5 2441 MHz Agilent 16:51:07 Aug 4, 2014 Mkr1 Δ 3 ms -0.379 dB Ref 20 dBm Atten 30 dB Peak Log 10 dB/ Marker ∆ 3.000000000 ms -0.379 dB W1 S2 S3 FS AA Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 12 ms (401 pts) 8-DPSK Hopping Mode DH5 2480 MHz Agilent 16:52:28 Aug 4, 2014 Mkr1 Δ 3 ms Ref 20 dBm Atten 30 dB 0.877 dB Peak





Report No.: TB-FCC141395 Page: 61 of 75

8. Channel Separation and Bandwidth Test

8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)	
Bandwidth	<=1 MHz	2400~2483.5	
	(20dB bandwidth)		
	>25KHz or >two-thirds of		
Channel Separation	the 20 dB bandwidth	2400~2483.5	
	Which is greater		

8.2 Test Setup



8.3 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:

Channel Separation: RBW=30 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB 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.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

8.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

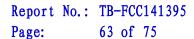


8.5 Test Equipment

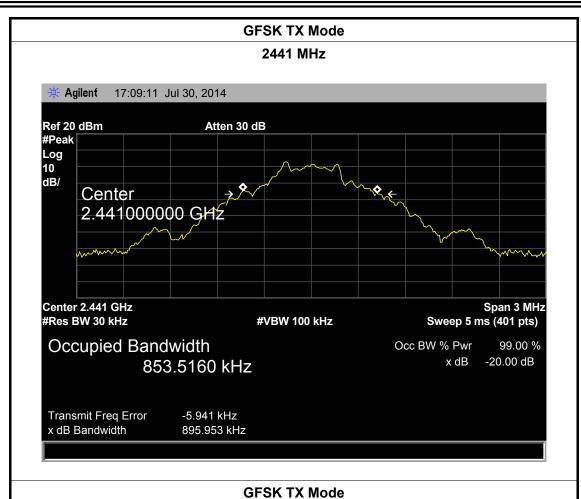
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

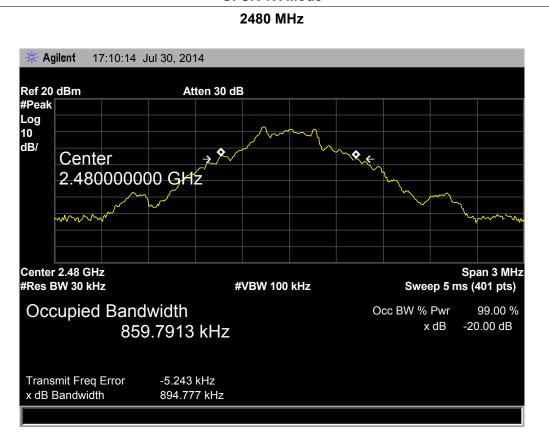
8.6 Test Data

EUT:	MID	Model:	MID713-L				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 HZ	AC 120V/60 HZ					
Test Mode:	Mode: TX Mode (GFSK)						
Channel frequence	cy 99% OBW (kHz)	20dB Bandwidth					
(MHz)		(kHz)					
2402	853.9293	891.702					
2441	853.5160	895.953					
2480	859.7913	894.777					
	GFSK 1	TX Mode					
* Agilent 17:	* Agilent 17:08:09 Jul 30, 2014						
Ref 20 dBm #Peak	Atten 30 dB						
Log 10 dB/ Center		~~~					
2.4020	000000 GHZ						
Center 2.402 GHz			Span 3 MHz				
#Res BW 30 kHz							
Occupied Bandwidth 853.9293 kHz Transmit Freq Error x dB Bandwidth 891.702 kHz							
x dB Bandwidth 891.702 kHz							









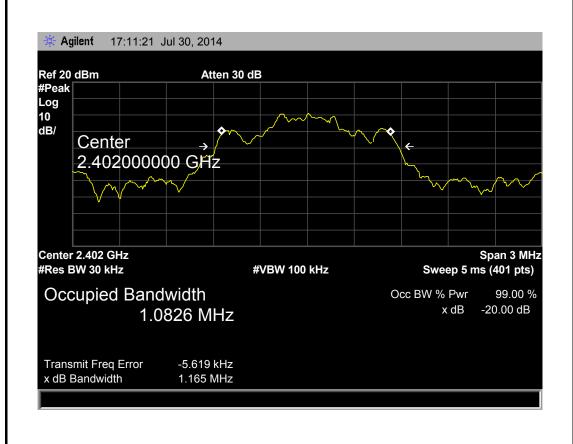


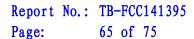
EUT:MIDModel:MID713-LTemperature:25 °CRelative Humidity:55%Test Voltage:AC 120V/60 HZ

Test Mode: TX Mode (8-DPSK)

rest mede.	TX Wode (o Bi Git)		
Channel frequence	y 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth
(MHz)		(kHz)	*2/3 (kHz)
2402	1082.60	1165.00	776.67
2441	1084.70	1166.00	777.33
2480	1080.20	1167.00	778.00

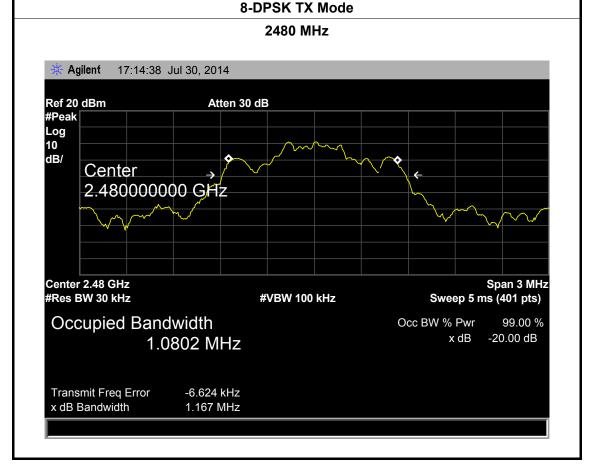
8-DPSK TX Mode 2402 MHz







8-DPSK TX Mode 2441 MHz 17:13:14 Jul 30, 2014 Agilent Ref 20 dBm Atten 30 dB #Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth 99.00 % Occ BW % Pwr x dB -20.00 dB 1.0847 MHz Transmit Freq Error -6.470 kHz x dB Bandwidth 1.166 MHz





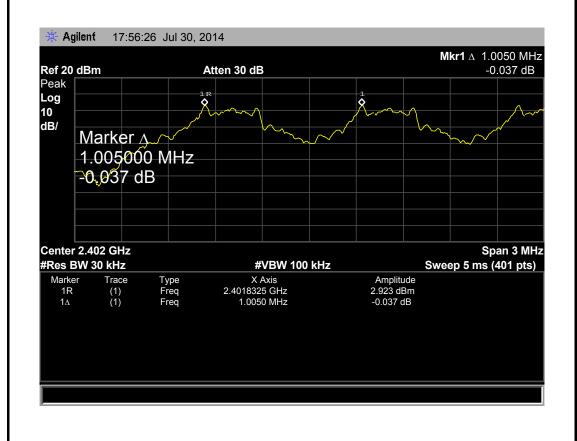
Page: 66 of 75

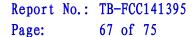
EUT:	MID	Model:	MID713-L
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 HZ		

Test Mode: Hopping Mode (GFSK)

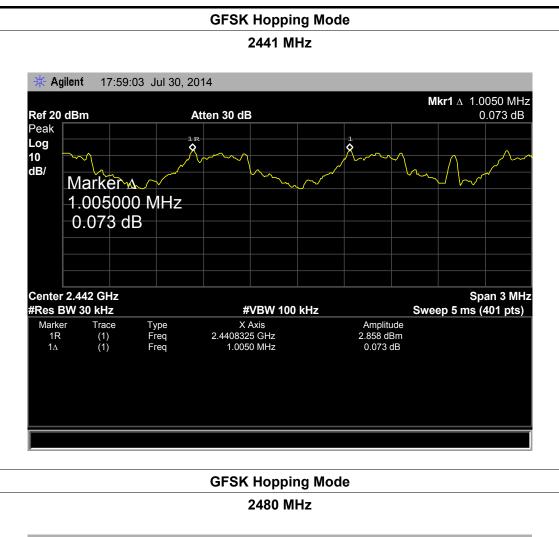
Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)		
2402	1005.00	891.702		
2441	1005.00	895.953		
2480	1005.00	894.777		

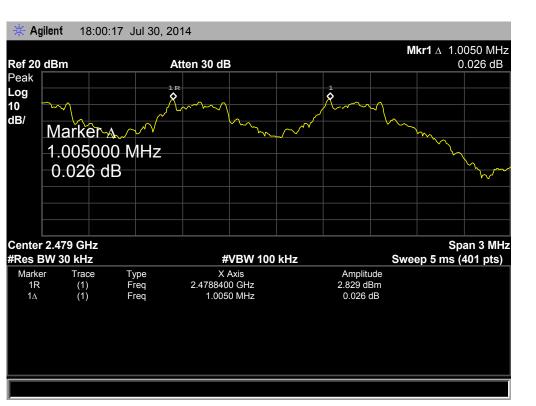
GFSK Hopping Mode







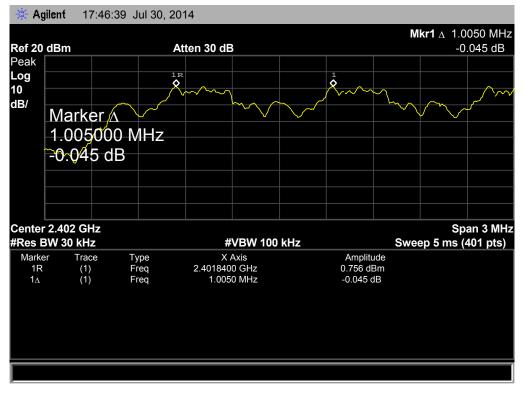


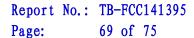




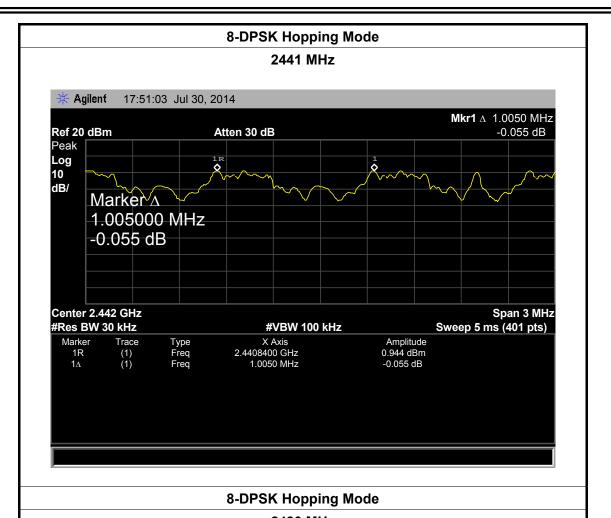
Page: 68 of 75

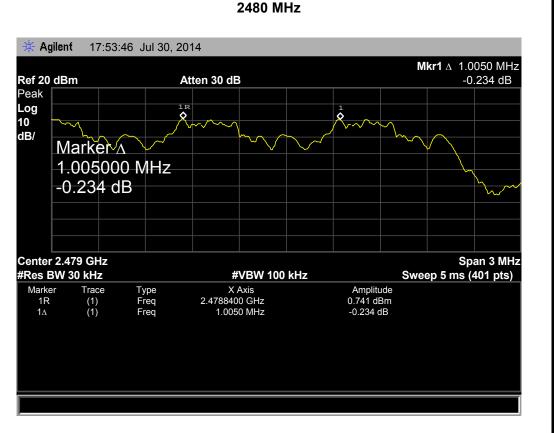
EUT:	MID	Model:			MID713-L
Temperature:	25 ℃	25 ℃		nidity:	55%
Test Voltage:	AC 120V/	C 120V/60 HZ			
Test Mode:	Hopping I	Mode (8-DPSK)			
Channel frequen	cy (MHz)	Separation Read Value Separation Limit (kH			
		(kHz)			
2402	2402		1005.00		776.67
2441	41 1005.00			777.33	
2480		1005.00 778.00		778.00	
		8-DPSK Ho	pping Mode		
		2402	MHz		
* Agilent 17:	46:39 Jul 30,	2014			
					Mkr1 \triangle 1.0050 MHz













Page: 70 of 75

9. Peak Output Power Test

9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (b) (1)

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm)	2400~2483.5
	Other <125 mW(21dBm)	

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:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

9.4 EUT Operating Condition

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

9.5 Test Equipment

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

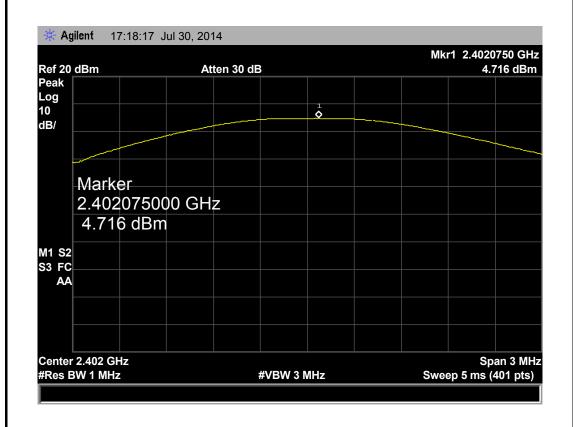
9.6 Test Data

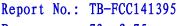


Page: 71 of 75

EUT:	MID		Model:	MID713-	MID713-L	
Temperature:	25 ℃		Relative Humidit	/: 55%		
Test Voltage:	AC 120V/60 HZ					
Test Mode:	TX Mode	de (GFSK)				
Channel frequen	Channel frequency (MHz) Test Result (dBm) Limit (dBm)			Bm)		
2402	2402		4.716			
2441		4.8	.824 30			
2480 4.803						
GFSK TX Mode						

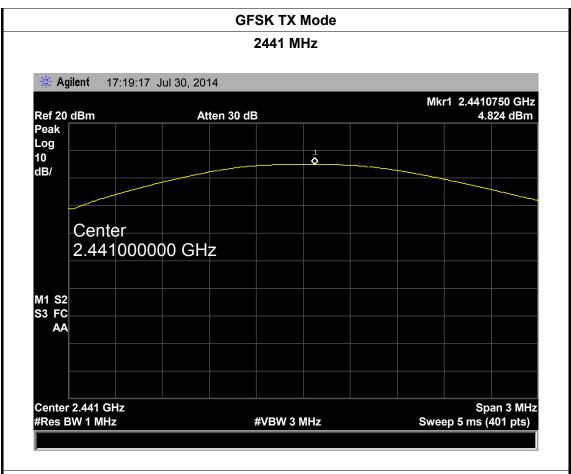
OI OIL IX IIIO



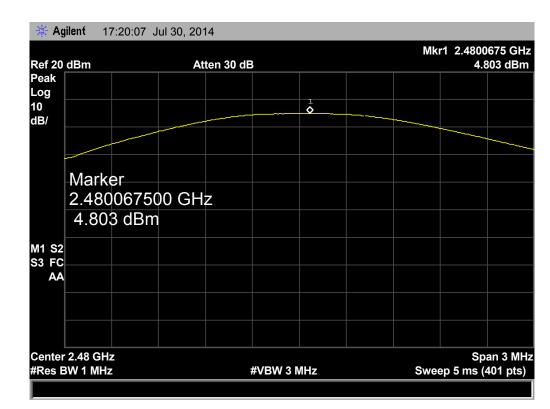




72 of 75 Page:



GFSK TX Mode

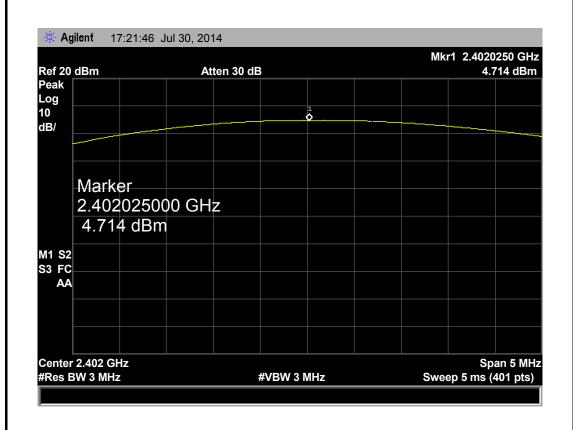


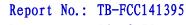


Page: 73 of 75

EUT:	MID		Model:		MID713-L	
Temperature:	25 ℃		Relative Humidity:		55%	
Test Voltage:	AC 120V/60 HZ					
Test Mode:	TX Mode	ode (8-DPSK)				
Channel frequency (MHz) Test Result (dBm)			Limit (dBm)			
2402		4.7	714			
2441		4.819			21	
2480		4.808		4.808		

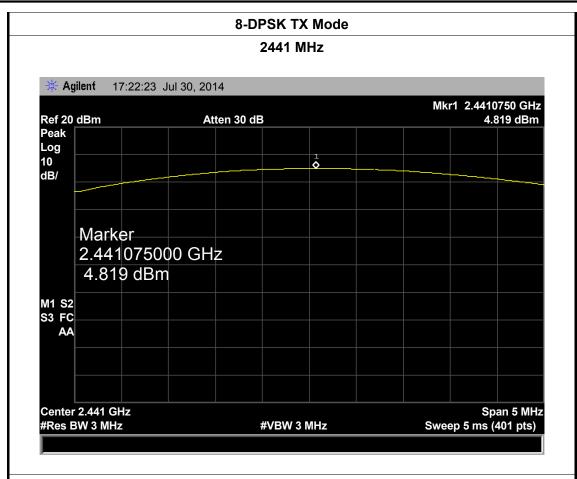
8-DPSK TX Mode



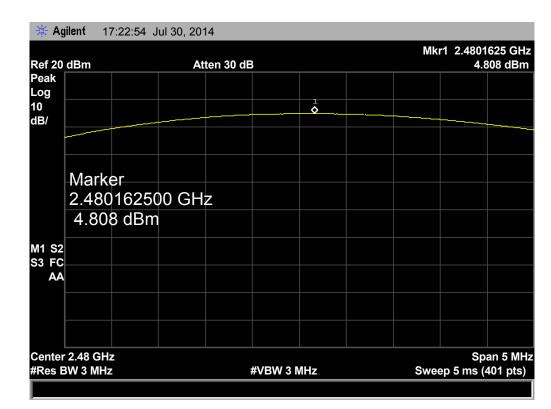




Page: 74 of 75



8-DPSK TX Mode





Page: 75 of 75

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

10.3 Result

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