



A Test Lab Techno Corp.

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MPE Report

Test Report No.	: 1606FS20
Applicant	: D Link Corporation
Product Type	: 4G LTE M2M modem
Trade Name	: D-Link
Model Number	: DWM-311
Date of Received	: Jul. 28, 2016
Test Period	: Jul. 28, 2016
Date of Issued	: Jul. 01, 2016
Test Specification	: ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013 47 CFR § 2.1091 47 CFR § 1.1310
Location of Test Lab.	: Chang-an Lab.

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Approved By

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Tested By

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1. Description of Equipment under Test (EUT)

Applicant	D Link Corporation 17595 Mt. Herrmann Fountain Valley, CA 92708 United States			
Manufacturer	D Link Corporation 17595 Mt. Herrmann Fountain Valley, CA 92708 United States			
Product Type	4G LTE M2M modem			
Trade Name	D-Link			
Model Number	DWM-311			
FCC ID	KA2WM311A1			
Frequency Range	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
	LTE Band 2	1850.7 ~ 1909.3	1930.7 ~ 1989.3	QPSK, 16QAM
	LTE Band 4	1710.7 ~ 1754.3	2110.7 ~ 2154.3	QPSK, 16QAM
	LTE Band 13	777 ~ 787	746 ~ 756	QPSK, 16QAM
Antenna Type	LTE External Antenna			
Antenna Gain	LTE Band 2	2.87 dBi		
	LTE Band 4	2.02 dBi		
	LTE Band 13	-0.65 dBi		
RF Evaluation	0.084 mW/cm ²			

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



2. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled "Radiofrequency radiation exposure limits", generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. " This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

$$S = \frac{PG}{4\pi R^2}$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna.



3. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	5 MHz	QPSK	18625	1852.5	1	0	23.19	0.208
					1	12	23.04	0.201
					1	24	22.78	0.190
					12	0	22.19	0.166
					12	6	22.13	0.163
					12	13	22.05	0.160
			18900	1880.0	25	0	22.05	0.160
					1	0	23.10	0.204
					1	12	22.91	0.195
					1	24	22.88	0.194
					12	0	22.18	0.165
					12	6	22.15	0.164
					12	13	22.06	0.161
					25	0	22.05	0.160
			19175	1907.5	1	0	23.14	0.206
					1	12	23.08	0.203
					1	24	22.86	0.193
					12	0	22.07	0.161
					12	6	22.05	0.160
					12	13	22.05	0.160
		16QAM	18625	1852.5	25	0	22.01	0.159
					1	0	22.30	0.170
					1	12	22.09	0.162
					1	24	21.96	0.157
					12	0	21.22	0.132
					12	6	21.13	0.130
			18900	1880.0	12	13	21.11	0.129
					25	0	21.05	0.127
					1	0	22.37	0.173
					1	12	22.15	0.164
					1	24	22.02	0.159
					12	0	21.26	0.134
					12	6	21.07	0.128
					12	13	21.01	0.126
					25	0	21.00	0.126
			19175	1907.5	1	0	22.23	0.167
					1	12	22.10	0.162
					1	24	21.91	0.155
					12	0	21.05	0.127
					12	6	21.02	0.126
					12	11	21.02	0.126
					25	0	21.01	0.126

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	10 MHz	QPSK	18650	1855.0	1	0	23.15	0.207
					1	24	22.95	0.197
					1	49	22.48	0.177
					25	0	22.47	0.177
					25	12	22.31	0.170
					25	25	22.25	0.168
			18900	1880.0	50	0	22.22	0.167
					1	0	23.05	0.202
					1	24	22.99	0.199
					1	49	22.65	0.184
					25	0	22.48	0.177
					25	12	22.28	0.169
					25	25	22.27	0.169
			19150	1905.0	50	0	22.19	0.166
					1	0	23.10	0.204
					1	24	22.83	0.192
					1	49	22.73	0.187
					25	0	22.33	0.171
					25	12	22.29	0.169
					25	25	22.19	0.166
			16QAM	18650	50	0	22.12	0.163
					1	0	22.22	0.167
					1	24	22.17	0.165
					1	49	22.05	0.160
					25	0	21.36	0.137
					25	12	21.22	0.132
					25	25	21.20	0.132
					50	0	21.18	0.131
				18900	1	0	22.07	0.161
					1	24	21.84	0.153
					1	49	21.81	0.152
					25	0	21.48	0.141
					25	12	21.33	0.136
					25	25	21.28	0.134
					50	0	21.21	0.132
				19150	1	0	22.15	0.164
					1	24	22.11	0.163
					1	49	21.81	0.152
					25	0	21.23	0.133
					25	12	21.12	0.129
					25	25	21.08	0.128
					50	0	20.99	0.126

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	15 MHz	QPSK	18675	1857.5	1	0	23.22	0.210
					1	38	23.15	0.207
					1	74	23.05	0.202
					36	0	22.88	0.194
					36	18	22.82	0.191
					36	39	22.81	0.191
			18900	1880.0	75	0	22.64	0.184
					1	0	23.06	0.202
					1	38	22.95	0.197
					1	74	22.79	0.190
					36	0	22.55	0.180
					36	18	22.50	0.178
					36	39	22.49	0.177
					75	0	22.41	0.174
			19125	1902.5	1	0	23.18	0.208
					1	38	23.16	0.207
					1	74	23.15	0.207
					36	0	23.15	0.207
					36	18	22.96	0.198
					36	39	22.77	0.189
		16QAM	18675	1857.5	75	0	22.76	0.189
					1	0	22.39	0.173
					1	38	22.33	0.171
					1	74	21.90	0.155
					36	0	21.89	0.155
					36	18	21.61	0.145
			18900	1880.0	36	39	21.49	0.141
					75	0	21.43	0.139
					1	0	22.16	0.164
					1	38	22.10	0.162
					1	74	21.67	0.147
					36	0	21.66	0.147
					36	18	21.38	0.137
					36	39	21.26	0.134
			19125	1902.5	75	0	21.20	0.132
					1	0	22.26	0.168
					1	38	22.20	0.166
					1	74	21.77	0.150
					36	0	21.76	0.150
					36	18	21.48	0.141
					36	39	21.36	0.137
					75	0	21.30	0.135

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 2	20 MHz	QPSK	18700	1860.0	1	0	23.17	0.207
					1	49	23.10	0.204
					1	99	23.04	0.201
					50	0	22.31	0.170
					50	25	22.07	0.161
					50	50	22.04	0.160
			18900	1880.0	100	0	22.02	0.159
					1	0	23.06	0.202
					1	49	22.99	0.199
					1	99	22.96	0.198
					50	0	22.37	0.173
					50	25	22.36	0.172
					50	50	22.26	0.168
					100	0	22.24	0.167
			19100	1900.0	1	0	23.10	0.204
					1	49	23.06	0.202
					1	99	23.00	0.200
					50	0	22.61	0.182
					50	25	22.44	0.175
					50	50	22.37	0.173
		16QAM	18700	1860.0	100	0	22.33	0.171
					1	0	22.34	0.171
					1	49	22.12	0.163
					1	99	22.11	0.163
					50	0	21.50	0.141
					50	25	21.42	0.139
			18900	1880.0	50	50	21.30	0.135
					100	0	21.25	0.133
					1	0	22.08	0.161
					1	49	21.97	0.157
					1	99	21.76	0.150
					50	0	21.31	0.135
					50	25	21.21	0.132
					50	50	21.01	0.126
					100	0	21.00	0.126
			19100	1900.0	1	0	22.12	0.163
					1	49	22.01	0.159
					1	99	22.00	0.158
					50	0	21.56	0.143
					50	25	21.31	0.135
					50	50	21.29	0.135
					100	0	21.19	0.132

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	5 MHz	QPSK	19975	1712.5	1	0	23.08	0.203
					1	12	23.06	0.202
					1	24	23.01	0.200
					12	0	22.69	0.186
					12	6	22.59	0.182
					12	13	22.47	0.177
					25	0	22.28	0.169
			20175	1732.5	1	0	23.02	0.200
					1	12	22.94	0.197
					1	24	22.84	0.192
					12	0	22.19	0.166
					12	6	22.12	0.163
					12	13	22.08	0.161
					25	0	21.90	0.155
			20375	1752.5	1	0	22.95	0.197
					1	12	22.81	0.191
					1	24	22.62	0.183
					12	0	21.40	0.138
					12	6	21.40	0.138
					12	13	21.38	0.137
					25	0	21.31	0.135
		16QAM	19975	1712.5	1	0	22.23	0.167
					1	12	22.18	0.165
					1	24	21.84	0.153
					12	0	21.72	0.149
					12	6	21.61	0.145
					12	13	21.59	0.144
					25	0	20.84	0.121
			20175	1732.5	1	0	22.14	0.164
					1	12	22.08	0.161
					1	24	21.85	0.153
					12	0	21.28	0.134
					12	6	21.11	0.129
					12	13	21.05	0.127
					25	0	20.93	0.124
			20375	1752.5	1	0	22.08	0.161
					1	12	22.01	0.159
					1	24	21.56	0.143
					12	0	20.94	0.124
					12	6	20.91	0.123
					12	11	20.91	0.123
					25	0	20.87	0.122

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	10 MHz	QPSK	2000	1715.0	1	0	23.06	0.202
					1	24	23.01	0.200
					1	49	22.91	0.195
					25	0	22.83	0.192
					25	12	22.75	0.188
					25	25	22.71	0.187
			20175	1732.5	50	0	21.95	0.157
					1	0	23.01	0.200
					1	24	22.96	0.198
					1	49	22.94	0.197
					25	0	22.50	0.178
					25	12	22.50	0.178
					25	25	22.36	0.172
					50	0	22.16	0.164
			20350	1750.0	1	0	22.93	0.196
					1	24	22.86	0.193
					1	49	22.81	0.191
					25	0	21.80	0.151
					25	12	21.64	0.146
					25	25	21.63	0.146
		16QAM	2000	1715.0	50	0	21.62	0.145
					1	0	22.12	0.163
					1	24	22.08	0.161
					1	49	21.57	0.144
					25	0	21.31	0.135
					25	12	21.23	0.133
			20175	1732.5	25	25	21.08	0.128
					25	0	21.05	0.127
					50	0	21.05	0.127
					1	0	21.91	0.155
					1	24	21.82	0.152
					1	49	21.80	0.151
			20350	1750.0	25	0	21.51	0.142
					25	12	21.49	0.141
					25	25	21.35	0.136
					50	0	21.13	0.130
					1	0	21.83	0.152
					1	24	21.75	0.150
					1	49	21.68	0.147
					25	0	20.95	0.124
					25	12	20.88	0.122
					25	25	20.86	0.122
					50	0	20.81	0.121

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	15 MHz	QPSK	20025	1717.5	1	0	23.05	0.202
					1	38	23.03	0.201
					1	74	22.81	0.191
					36	0	22.55	0.180
					36	18	22.54	0.179
					36	39	22.47	0.177
			20175	1732.5	75	0	22.05	0.160
					1	0	23.03	0.201
					1	38	23.01	0.200
					1	74	22.86	0.193
					36	0	22.78	0.190
					36	18	22.72	0.187
					36	39	22.46	0.176
					75	0	21.93	0.156
			20325	1747.5	1	0	22.88	0.194
					1	38	22.82	0.191
					1	74	22.76	0.189
					36	0	22.71	0.187
					36	18	22.67	0.185
					36	39	22.65	0.184
		16QAM	20025	1717.5	75	0	21.84	0.153
					1	0	22.19	0.166
					1	38	22.13	0.163
					1	74	21.72	0.149
					36	0	21.69	0.148
					36	18	21.57	0.144
			20175	1732.5	36	39	21.48	0.141
					36	0	21.21	0.132
					1	0	22.13	0.163
					1	38	22.09	0.162
					1	74	21.96	0.157
					36	0	21.93	0.156
					36	18	21.86	0.153
					36	39	21.74	0.149
			20325	1747.5	75	0	21.66	0.147
					1	0	22.06	0.161
					1	38	22.01	0.159
					1	74	21.78	0.151
					36	0	21.38	0.137
					36	18	21.13	0.130
					36	39	21.12	0.129
					75	0	21.04	0.127

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 4	20 MHz	QPSK	20050	1720.0	1	0	23.08	0.203
					1	49	23.01	0.200
					1	99	22.77	0.189
					50	0	22.71	0.187
					50	25	22.46	0.176
					50	50	22.39	0.173
			20175	1732.5	100	0	22.01	0.159
					1	0	22.94	0.197
					1	49	22.88	0.194
					1	99	22.69	0.186
					50	0	22.57	0.181
					50	25	22.52	0.179
					50	50	22.34	0.171
					100	0	21.94	0.156
			20300	1745.0	1	0	22.84	0.192
					1	49	22.76	0.189
					1	99	22.54	0.179
					50	0	22.46	0.176
					50	25	22.37	0.173
					50	50	22.25	0.168
		16QAM	20050	1720.0	100	0	21.86	0.153
					1	0	22.29	0.169
					1	49	22.25	0.168
					1	99	21.84	0.153
					50	0	21.14	0.130
					50	25	20.98	0.125
			20175	1732.5	50	50	20.95	0.124
					100	0	20.92	0.124
					1	0	22.26	0.168
					1	49	22.21	0.166
					1	99	21.89	0.155
					50	0	21.61	0.145
					50	25	20.99	0.126
					50	50	20.92	0.124
			20300	1745.0	100	0	20.87	0.122
					1	0	22.22	0.167
					1	49	22.16	0.164
					1	99	21.97	0.157
					50	0	20.95	0.124
					50	25	20.91	0.123
					50	50	20.88	0.122
					100	0	20.86	0.122

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 13	5 MHz	QPSK	23205	779.5	1	0	23.03	0.201
					1	12	23.01	0.200
					1	24	22.92	0.196
					12	0	22.17	0.165
					12	6	22.06	0.161
					12	13	21.98	0.158
			23230	782.0	25	0	21.94	0.156
					1	0	22.93	0.196
					1	12	22.90	0.195
					1	24	22.85	0.193
					12	0	21.97	0.157
					12	6	21.87	0.154
					12	13	21.84	0.153
			23255	784.5	25	0	21.77	0.150
					1	0	22.91	0.195
					1	12	22.88	0.194
					1	24	22.15	0.164
					12	0	21.93	0.156
					12	6	21.77	0.150
					12	13	21.72	0.149
					25	0	21.38	0.137
		16QAM	23205	779.5	1	0	22.13	0.163
					1	12	21.73	0.149
					1	24	21.55	0.143
					12	0	21.12	0.129
					12	6	21.08	0.128
					12	13	20.98	0.125
			23230	782.0	25	0	20.97	0.125
					1	0	21.72	0.149
					1	12	21.67	0.147
					1	24	21.56	0.143
					12	0	20.96	0.125
					12	6	20.87	0.122
					12	13	20.83	0.121
			23255	784.5	25	0	20.81	0.121
					1	0	21.71	0.148
					1	12	21.41	0.138
					1	24	21.06	0.128
					12	0	20.83	0.121
					12	6	20.74	0.119
					12	13	20.71	0.118
					25	0	20.63	0.116

Band	Channel Bandwidth	Modulation	Channel	Frequency (MHz)	RB Configuration		Average Power	
					Size	Offset	(dBm)	(W)
LTE Band 13	10 MHz	QPSK	23230	782.0	1	0	22.94	0.197
					1	24	22.81	0.191
					1	49	22.45	0.176
					25	0	22.37	0.173
					25	12	22.16	0.164
					25	25	22.05	0.160
					50	0	21.82	0.152
		16QAM	23230	782.0	1	0	22.20	0.166
					1	24	22.05	0.160
					1	49	21.42	0.139
					25	0	21.32	0.136
					25	12	21.26	0.134
					25	25	21.04	0.127
					50	0	20.98	0.125

4. Test Result

Band	Channel Bandwidth	Modulation	Frequency (MHz)	Limit (mw/cm ²)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dB)	Numeric Gain [G]	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm ²)
LTE Band 2	15MHz	QPSK	1857.5	1.00	20	23.40	2.87	1.94	1	424.426	0.084
		QPSK	1880.0	1.00	20	23.40	2.87	1.94	1	424.426	0.084
		QPSK	1902.5	1.00	20	23.40	2.87	1.94	1	424.426	0.084
		16-QAM	1857.5	1.00	20	22.50	2.87	1.94	1	344.986	0.069
		16-QAM	1880.0	1.00	20	22.50	2.87	1.94	1	344.986	0.069
		16-QAM	1902.5	1.00	20	22.50	2.87	1.94	1	344.986	0.069
LTE Band 4	5MHz	QPSK	1712.5	1.00	20	23.20	2.02	1.59	1	332.198	0.066
		QPSK	1732.5	1.00	20	23.20	2.02	1.59	1	332.198	0.066
		QPSK	1752.5	1.00	20	23.20	2.02	1.59	1	332.198	0.066
		16-QAM	1712.5	1.00	20	22.40	2.02	1.59	1	276.310	0.055
		16-QAM	1732.5	1.00	20	22.40	2.02	1.59	1	276.310	0.055
		16-QAM	1752.5	1.00	20	22.40	2.02	1.59	1	276.310	0.055
LTE Band 13	5MHz	QPSK	887.5	0.59	20	23.20	-0.65	0.86	1	179.679	0.036
		QPSK	900.0	0.60	20	23.20	-0.65	0.86	1	179.679	0.036
		QPSK	912.5	0.61	20	23.20	-0.65	0.86	1	179.679	0.036
		16-QAM	887.5	0.59	20	22.30	-0.65	0.86	1	146.049	0.029
		16-QAM	900.0	0.60	20	22.30	-0.65	0.86	1	146.049	0.029
		16-QAM	912.5	0.61	20	22.30	-0.65	0.86	1	146.049	0.029

Note: The Power [P] is max tune-up power (upper limit).