Espressif IOT ESP

Bluetooth Auto Test Report

Version 1.0

A2 Report Revision History:

Table 1

Revision	Date	Changes	Author

Module&Test Information

Table 2

Module Name:	ESP32_TestBoard
PCB Version:	V2
Sample number:	#1
Test Engineer:	hujinping
Test Date:	10/29/18 11:17:27
Test Place:	Second floor laboratory
Test Equipment:	WT200
Test Bin	V146
Cable loss/dB:	12.8
Backoff(4=1dB):	
Pi match/s11 smith:	2.0
Note:	

1. Test Item Summary

1.1. Static Performance

1.1.1. Basic rate TX

Table 3

No.	Test Items	Pass/Fail
1	Basic rate TX	**pass**
2	2M EDR TX	**pass**
3	3M EDR TX	**pass**
4	BLE TX	**pass**

2. Test Result

2.1. Test setup

a. Maximum Transmit Power Profile vs. Operation Channel

Test Setup:

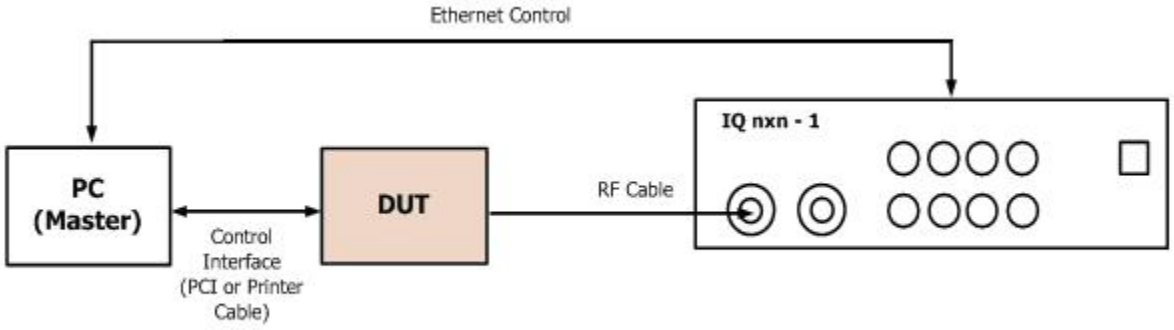


Figure 1: WiFi TX Performance Environment Setup

Note :

1、 Config the instrument setup as above.
2、 Select Tx Rate/Channel/BW as tables specified below.
3、 Run the Test script and record test results.

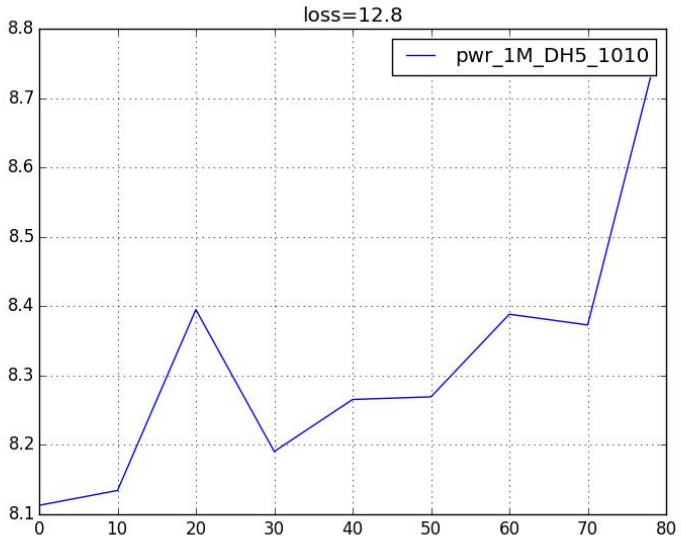
2.2. Basic rate TX

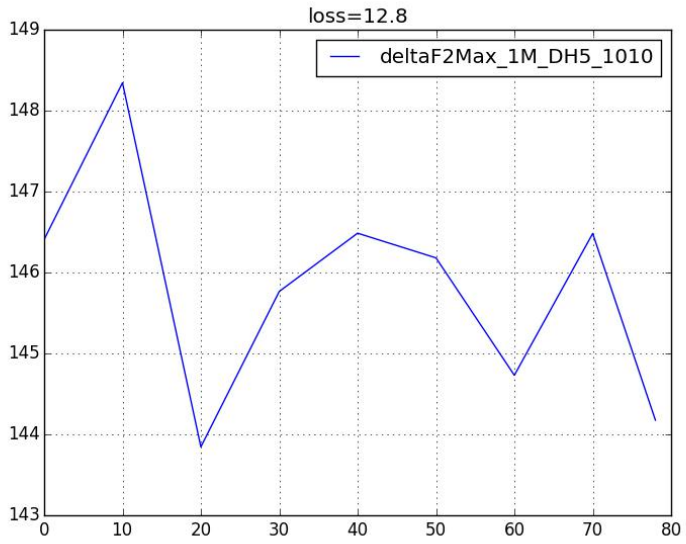
Requirement

Table 5

Specification	Requirement
Frequency range(MHz)	(2400,2483.5)
Output Power(dBm)	(-3, +3) @power_level=4；
Init Freq Error(kHz)	(-75kHz,+75kHz)
Bandwidth20dB(kHz)	≤ 1000kHz
deltaF2Max(kHz)	(115kHz ,500kHz)(at least 99%)
deltaF2Avg(kHz)	(112kHz, 500kHz)
deltaF1Avg(kHz)	(140kH, 175kHz)

Table 6

Data rate	**1M_DH5_1010**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.11	8.13	8.40	8.19	8.27	8.27	8.39	8.37	8.73
Init Freq Error(KHz)	-22.25	-19.09	-20.15	-22.66	-20.19	-20.58	-23.10	-20.12	-20.68
deltaF2Max(kHz)	146.41	148.34	143.85	145.77	146.49	146.18	144.73	146.48	144.18
deltaF2Avg(kHz)	140.05	142.07	138.02	139.51	140.17	139.90	138.68	140.06	138.39
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass
Power by channel									

Init Freq Error by channel	
deltaF2Max by channel	

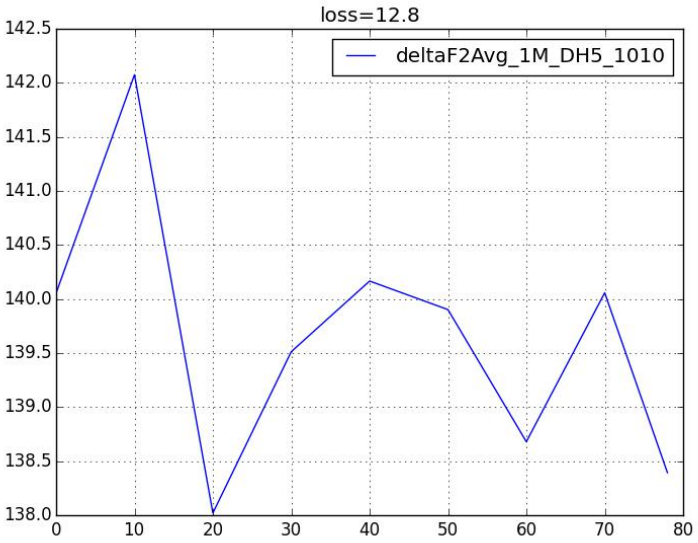
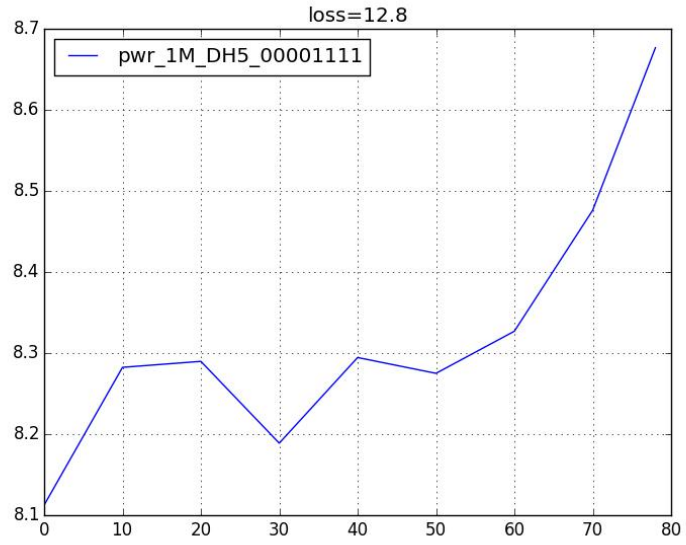
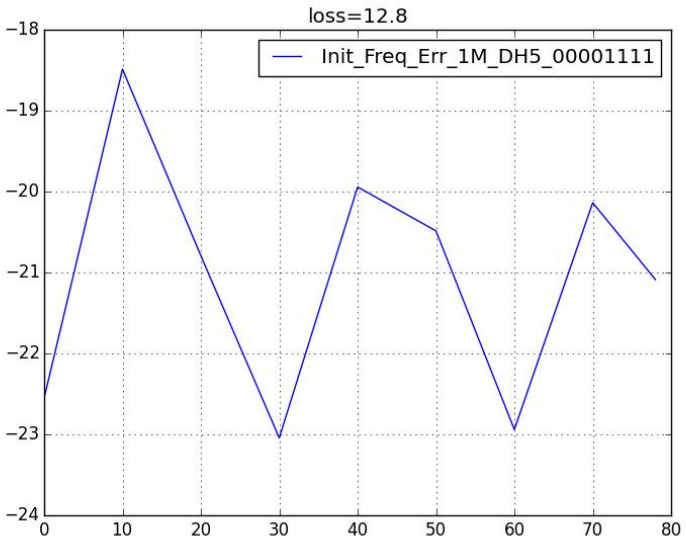
deltaF2Avg by channel	
Note:	**1M_DH5_1010 meets the test requirements**

Table 7

Data rate	**1M_DH5_00001111**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.11	8.28	8.29	8.19	8.29	8.27	8.33	8.48	8.68
Init Freq Error(KHz)	-22.55	-18.49	-20.79	-23.04	-19.94	-20.49	-22.94	-20.14	-21.09
deltaF1Avg(kHz)	155.68	153.92	155.05	153.92	155.26	155.62	155.76	155.14	154.73
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

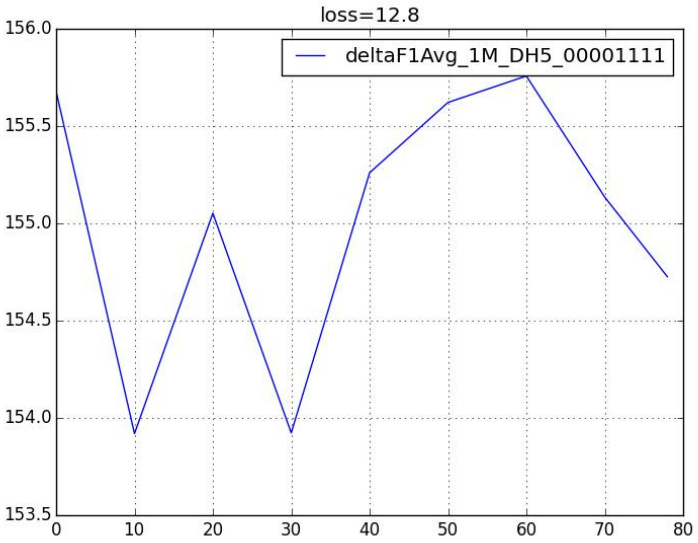
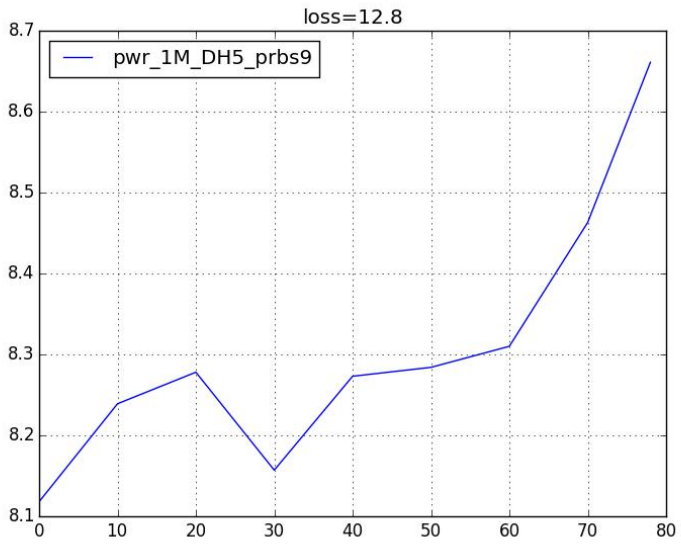
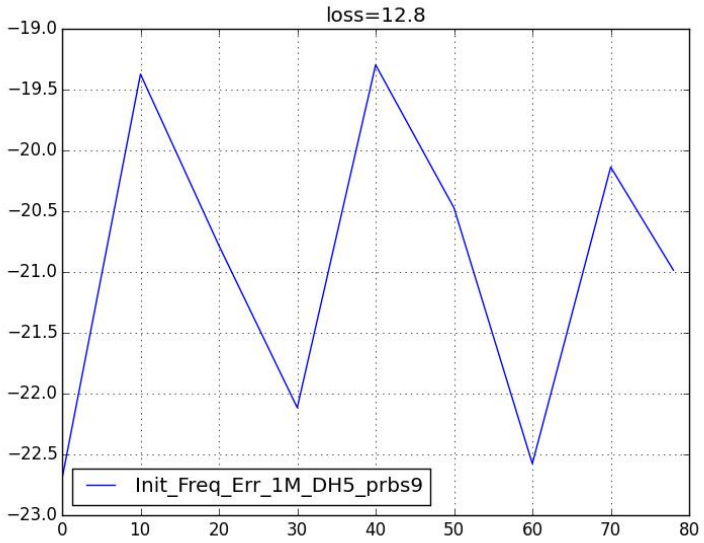
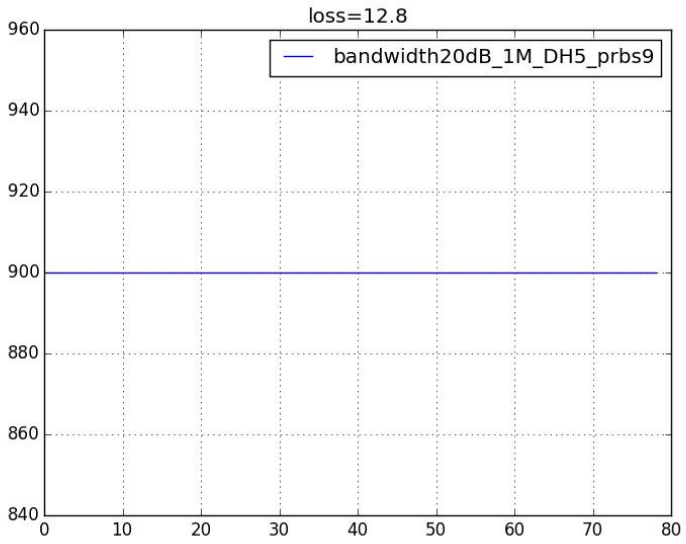
deltaF1Avg by channel	
Note:	**1M_DH5_00001111 meets the test requirements**

Table 8

Data rate	**1M_DH5_prbs9**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.12	8.24	8.28	8.16	8.27	8.28	8.31	8.46	8.66
Init Freq Error(KHz)	-22.70	-19.37	-20.78	-22.12	-19.30	-20.47	-22.58	-20.14	-20.99
Bandwidth20dB(kHz)	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass
Power by channel									

Init Freq Error by channel	
Bandwidth20dB by channel	
Note:	**1M_DH5_prbs9 meets the test requirements**

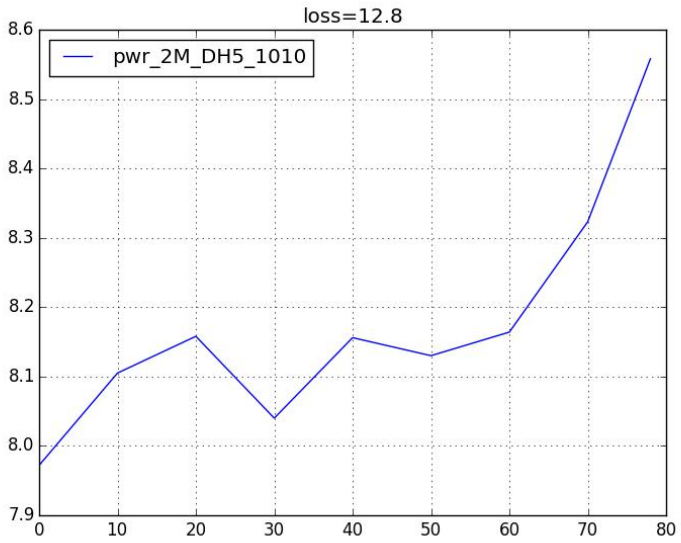
2.3 Enhanced data rate 2M TX

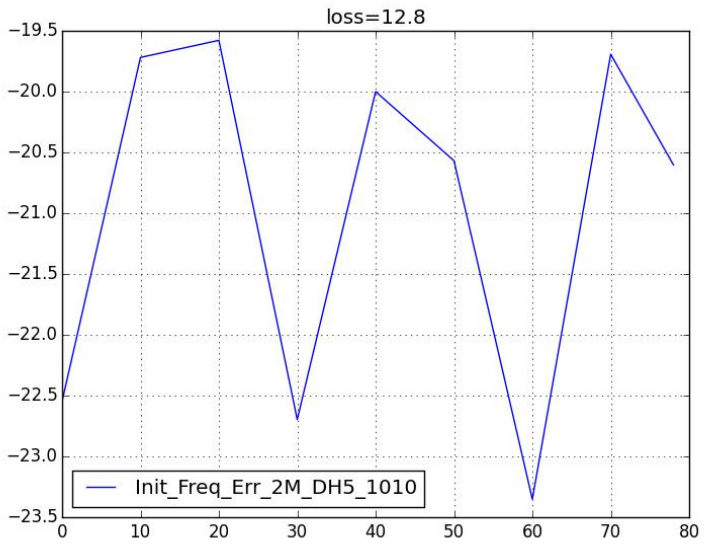
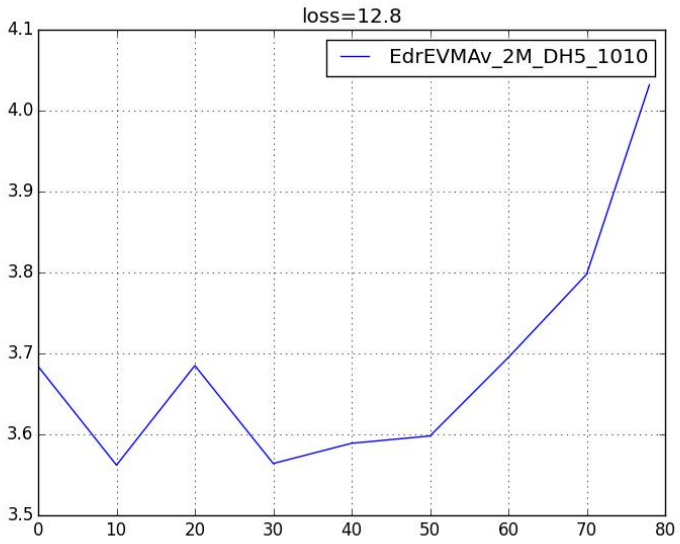
Table 9

Specification	Requirement
Output Power(dBm)	(-3, +3) @power_level=4；
Init Freq Error(kHz)	(-75,+75)
OMEGA_I(kHz)	(-75kHz, +75kHz)， for all packets

OMEGA_O(kHz)	(-10kHz, 10kHz)，for all block
OMEGA_IO(kHz)	(-75kHz, +75kHz)，for all block
DEVM Average(%)	(0, 20) @ 2M
DEVM Peak(%)	(0, 35) @ 2M
EdrprobEVM99pass(%)	(0, 30) @ 2M
EdrPowDiffdB(dB)	(-4dBm, 1dBm)

Table 10

Data rate	**2M_DH5_1010**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	7.97	8.11	8.16	8.04	8.16	8.13	8.16	8.32	8.56
Init Freq Error(kHz)	-22.55	-19.72	-19.58	-22.70	-20.00	-20.57	-23.35	-19.69	-20.60
OMEGA_I(kHz)	-20.80	-20.27	-20.75	-21.01	-20.77	-20.72	-21.35	-20.73	-20.82
OMEGA_O(kHz)	-1.90	-2.45	-2.18	-2.54	-1.84	-2.08	-2.10	-1.88	-2.41
OMEGA_IO(kHz)	-22.69	-22.72	-22.94	-23.55	-22.61	-22.80	-23.45	-22.62	-23.22
DEVM Average(%)	3.68	3.56	3.68	3.56	3.59	3.60	3.70	3.80	4.03
DEVM Peak(%)	5.82	5.77	5.78	5.81	6.11	5.93	5.98	6.48	6.68
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.19	-0.20	-0.20	-0.21	-0.21	-0.22	-0.19	-0.23	-0.24
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass
Power by channel									

Init Freq Error by channel	
DEVM Average(%) by channel	

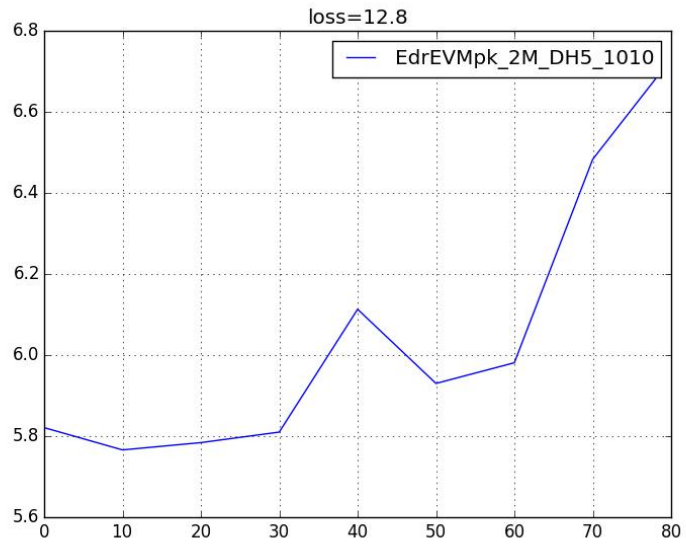
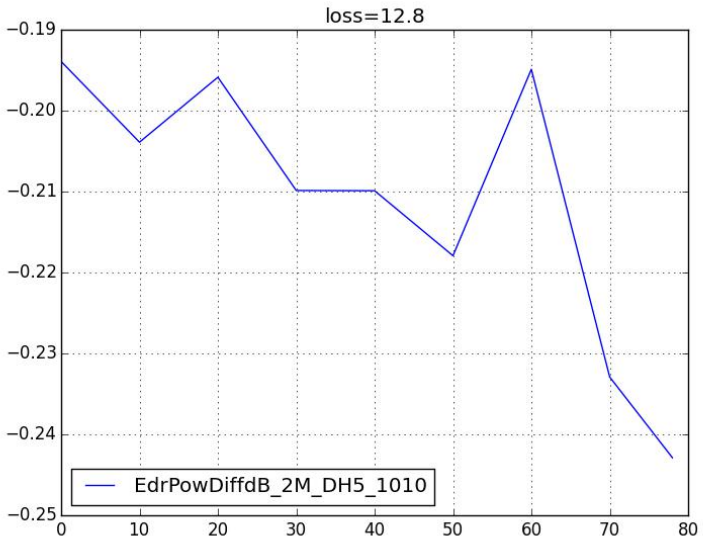
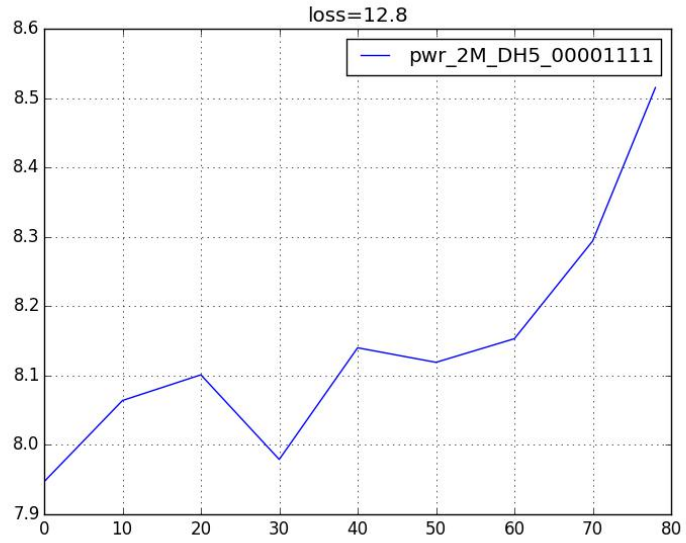
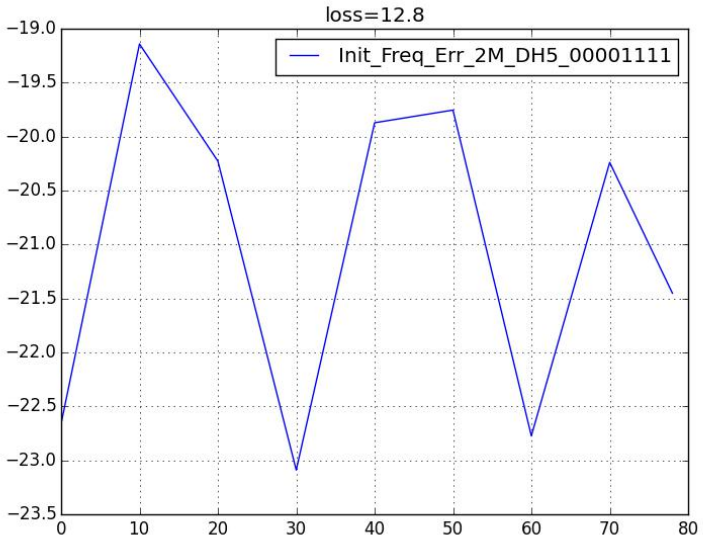
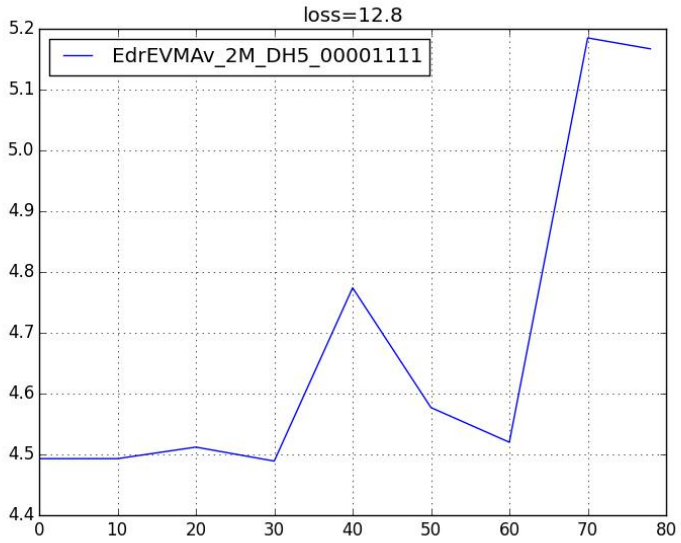
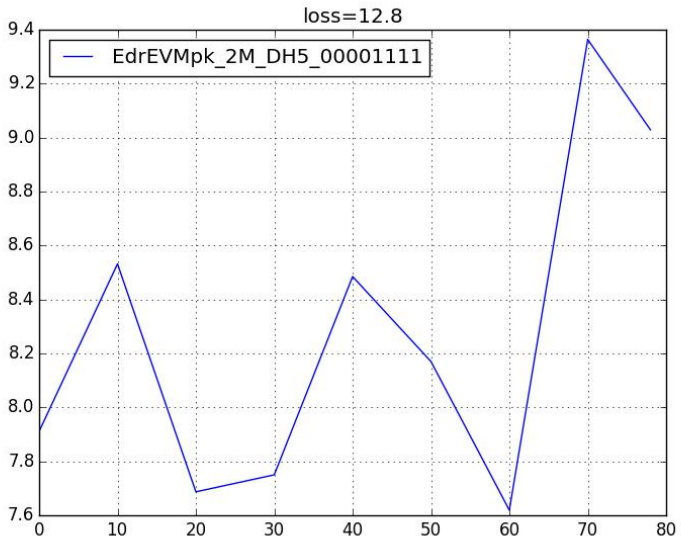
DEVM Peak(%)	
EdrPowDiffdB by channel	
Note:	**2M_DH5_1010 meets the test requirements**

Table 11

Data rate	**2M_DH5_00001111**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	7.95	8.06	8.10	7.98	8.14	8.12	8.15	8.29	8.52
Init Freq Error(kHz)	-22.66	-19.14	-20.23	-23.09	-19.87	-19.75	-22.77	-20.24	-21.45
OMEGA_I(kHz)	-21.23	-20.39	-20.56	-21.10	-20.77	-20.77	-21.29	-20.69	-21.26

OMEGA_O(kHz)	-2.86	-1.53	-2.17	-2.13	-1.63	-2.42	-2.90	-1.44	-2.73
OMEGA_IO(kHz)	-24.09	-21.92	-22.73	-23.23	-22.40	-23.19	-24.19	-22.14	-23.99
DEVM Average(%)	4.49	4.49	4.51	4.49	4.77	4.58	4.52	5.18	5.17
DEVM Peak(%)	7.91	8.53	7.69	7.75	8.48	8.17	7.62	9.36	9.03
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.24	-0.26	-0.25	-0.25	-0.27	-0.27	-0.25	-0.27	-0.26
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass
Power by channel									
Init Freq Error by channel									

DEVM Average(%) by channel	
DEVM Peak(%)	

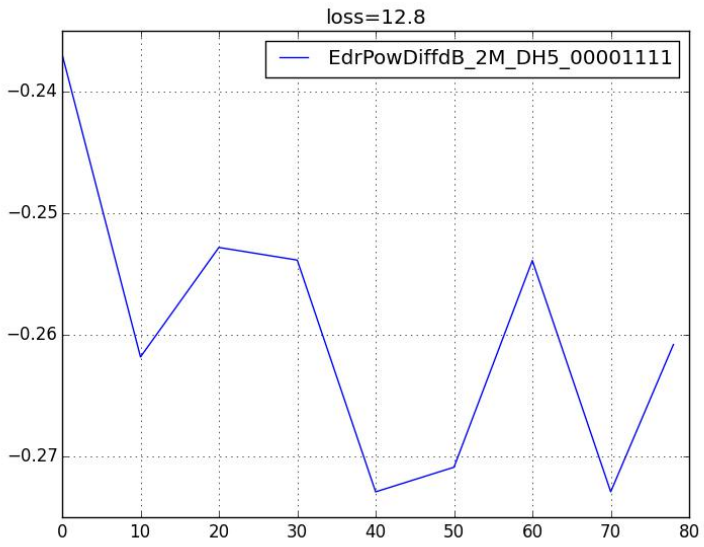
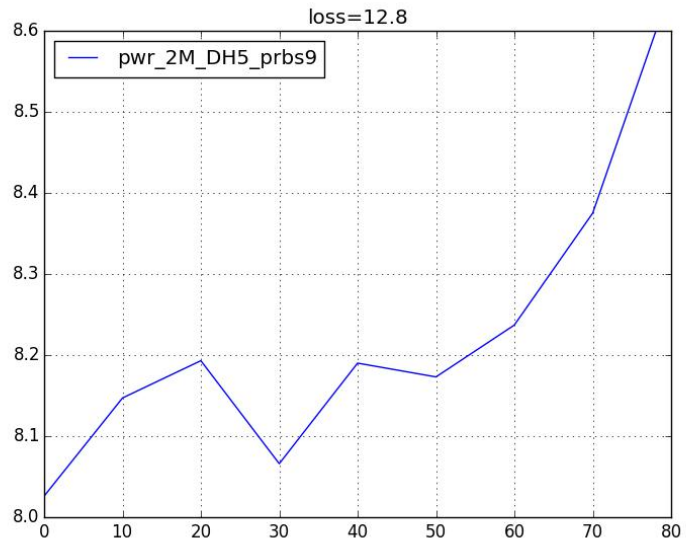
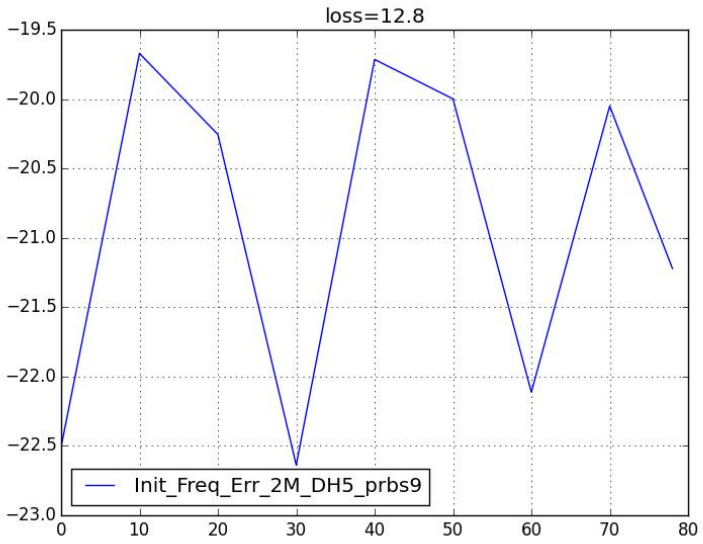
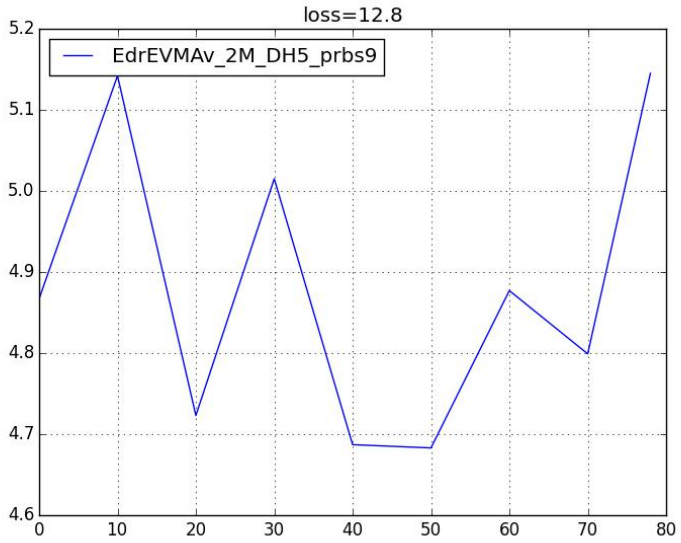
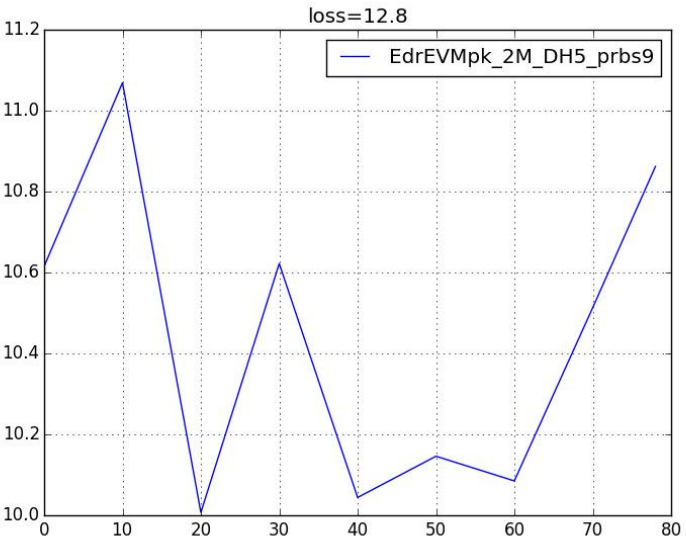
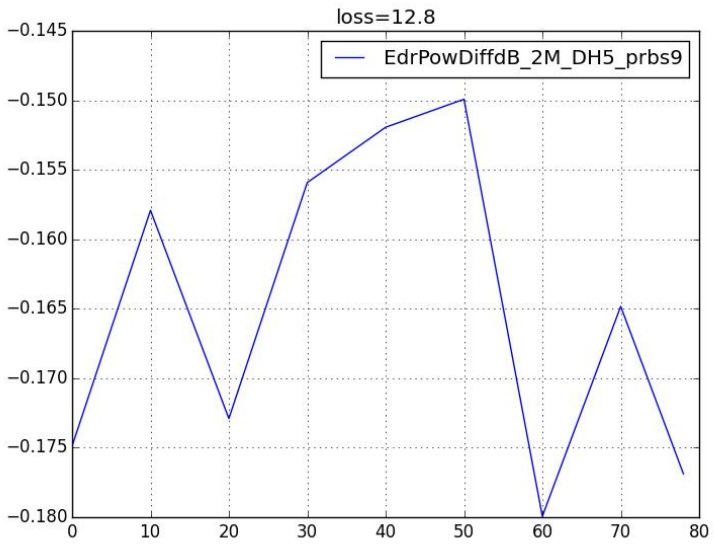
EdrPowDiffdB by channel	
Note:	**2M_DH5_00001111 meets the test requirements**

Table 12

Data rate	**2M_DH5_prbs9**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.03	8.15	8.19	8.07	8.19	8.17	8.24	8.38	8.60
Init Freq Error(kHz)	-22.51	-19.67	-20.26	-22.64	-19.71	-20.00	-22.11	-20.05	-21.22
OMEGA_I(kHz)	-20.50	-20.87	-20.52	-21.58	-21.19	-21.33	-20.74	-21.05	-21.07
OMEGA_O(kHz)	-2.36	-2.74	-2.00	-3.35	-1.58	-2.06	-1.32	-1.74	-2.28
OMEGA_IO(kHz)	-22.86	-23.61	-22.52	-24.94	-22.77	-23.38	-22.06	-22.80	-23.36
DEVM Average(%)	4.87	5.14	4.72	5.02	4.69	4.68	4.88	4.80	5.15
DEVM Peak(%)	10.62	11.07	10.01	10.62	10.04	10.15	10.08	10.51	10.86
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.17	-0.16	-0.17	-0.16	-0.15	-0.15	-0.18	-0.16	-0.18
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

DEVM Average(%) by channel	
DEVM Peak(%)	

EdrPowDiffdB by channel	
Note:	**2M_DH5_prbs9 meets the test requirements**

2.4Enhanced data rate 3M TX

Table 13

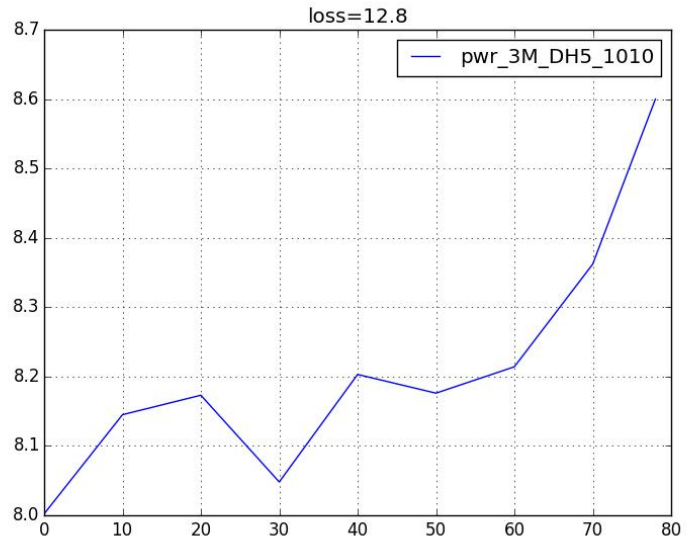
Specification	Requirement
Output Power(dBm)	(-3, +3) @power_level=4；
Init Freq Error(kHz)	(-75,+75)
OMEGA_I(kHz)	(-75kHz, +75kHz)， for all packets
OMEGA_O(kHz)	(-10kHz, 10kHz)， for all block
OMEGA_IO(kHz)	(-75kHz, +75kHz)， for all block
DEVM Average(%)	(0, 13)@ 3M
DEVM Peak(%)	(0, 25)@ 3M
EdrprobEVM99pass(%)	(0, 20)@ 3M
EdrPowDiffdB(dB)	(-4dBm, 1dBm)

Table 14

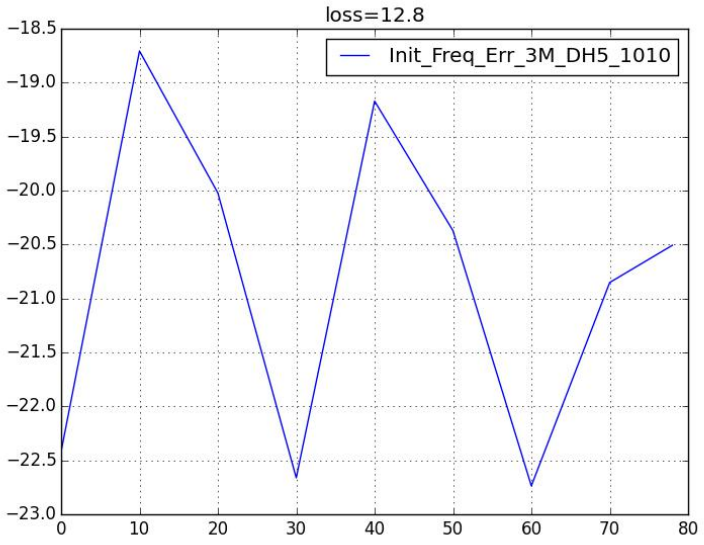
Data rate	**3M_DH5_1010**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480

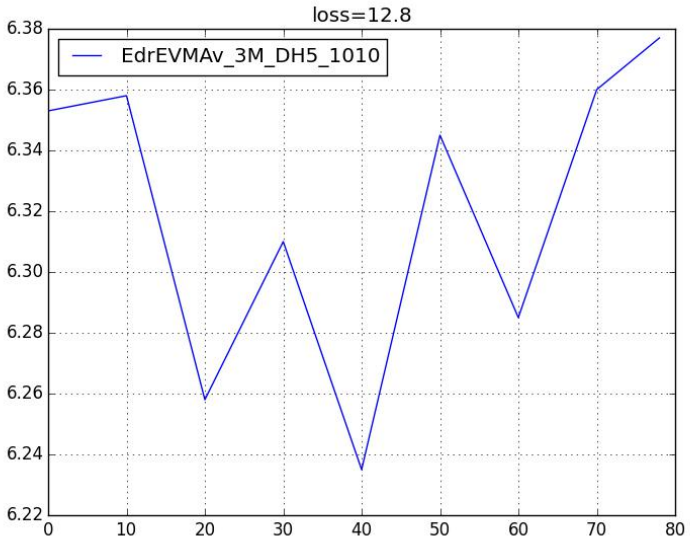
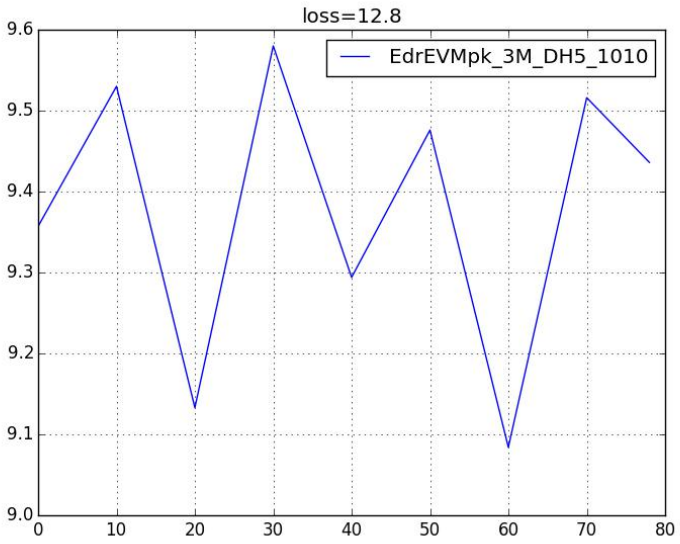
Output Power(dBm)	8.00	8.15	8.17	8.05	8.20	8.18	8.21	8.36	8.60
Init Freq Error(kHz)	-22.42	-18.71	-20.02	-22.66	-19.17	-20.37	-22.74	-20.85	-20.51
OMEGA_I(kHz)	-20.62	-20.01	-20.53	-20.79	-20.04	-20.19	-20.77	-20.81	-20.79
OMEGA_O(kHz)	-1.90	-1.57	-1.29	-2.30	-2.42	-2.48	-1.53	-2.40	-0.96
OMEGA_IO(kHz)	-22.51	-21.59	-21.83	-23.09	-22.46	-22.67	-22.30	-23.21	-21.74
DEVM Average(%)	6.35	6.36	6.26	6.31	6.24	6.35	6.29	6.36	6.38
DEVM Peak(%)	9.36	9.53	9.13	9.58	9.29	9.48	9.08	9.52	9.44
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.18	-0.19	-0.17	-0.17	-0.19	-0.18	-0.20	-0.19	-0.19
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel



Init Freq Error by channel



DEVM Average(%) by channel	
DEVM Peak(%)	

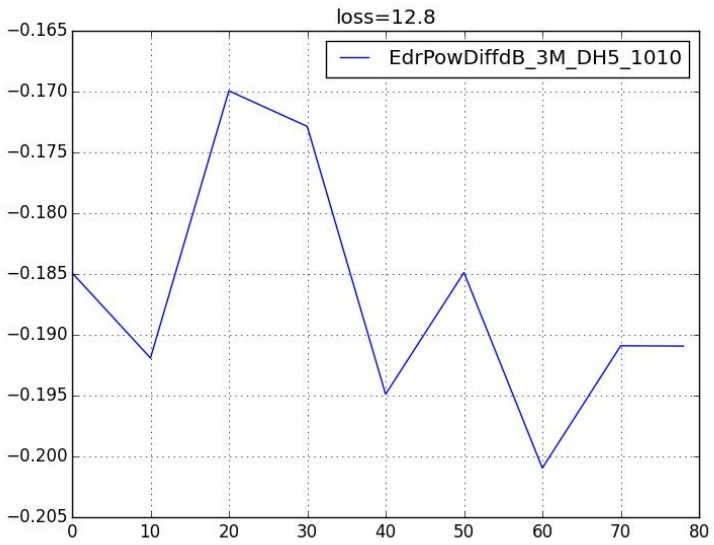
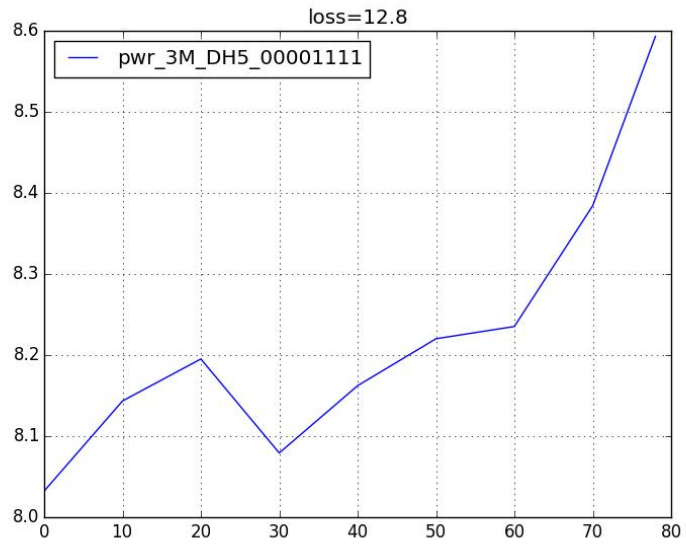
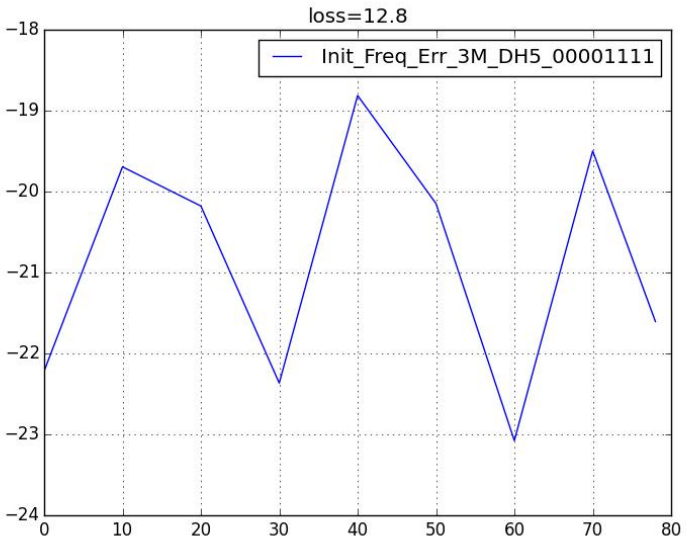
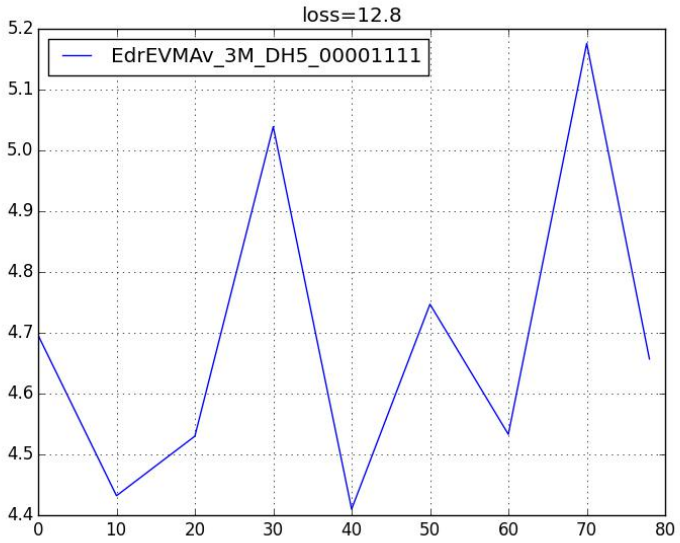
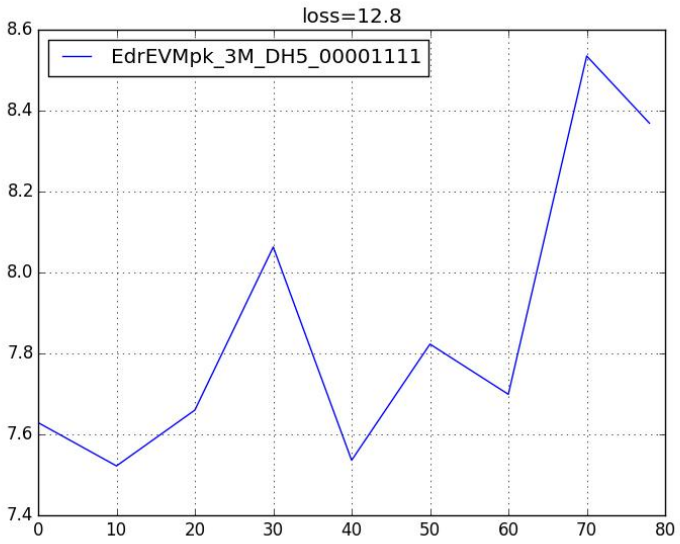
EdrPowDiffdB by channel	
Note:	**3M_DH5_1010 meets the test requirements**

Table 15

Data rate	**3M_DH5_00001111**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.03	8.14	8.20	8.08	8.16	8.22	8.24	8.38	8.59
Init Freq Error(kHz)	-22.22	-19.69	-20.18	-22.37	-18.81	-20.15	-23.08	-19.50	-21.61
OMEGA_I(kHz)	-20.35	-20.16	-20.46	-20.20	-20.92	-20.27	-20.36	-20.46	-20.72
OMEGA_O(kHz)	-1.55	-1.68	-2.49	-1.56	-1.78	-2.11	-1.87	-2.02	-1.81
OMEGA_IO(kHz)	-21.90	-21.84	-22.95	-21.76	-22.70	-22.38	-22.24	-22.48	-22.53
DEVM Average(%)	4.70	4.43	4.53	5.04	4.41	4.75	4.53	5.18	4.66
DEVM Peak(%)	7.63	7.52	7.66	8.06	7.54	7.82	7.70	8.54	8.37
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.16	-0.17	-0.18	-0.17	-0.18	-0.16	-0.15	-0.17	-0.18
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

DEVM Average(%) by channel	
DEVM Peak(%)	

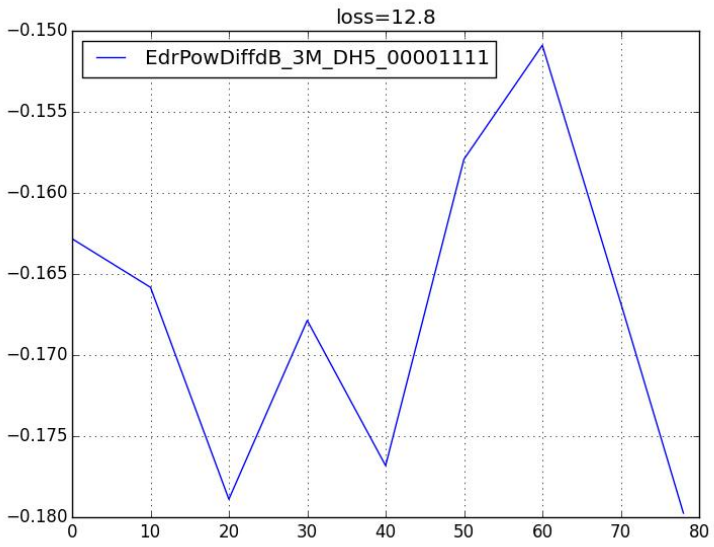
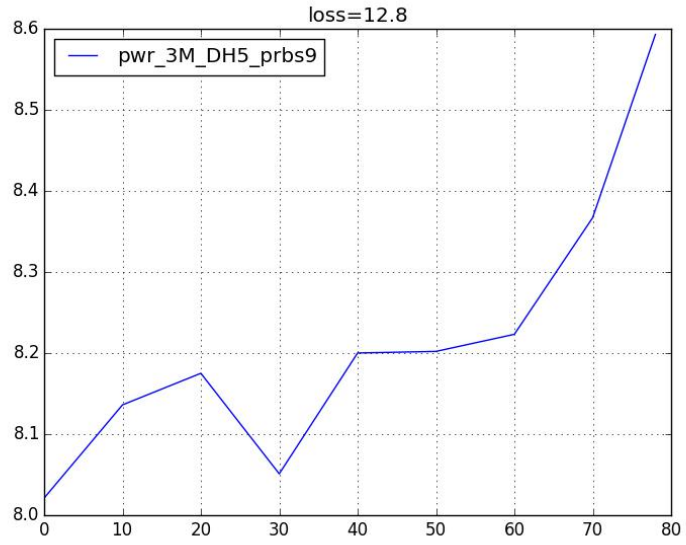
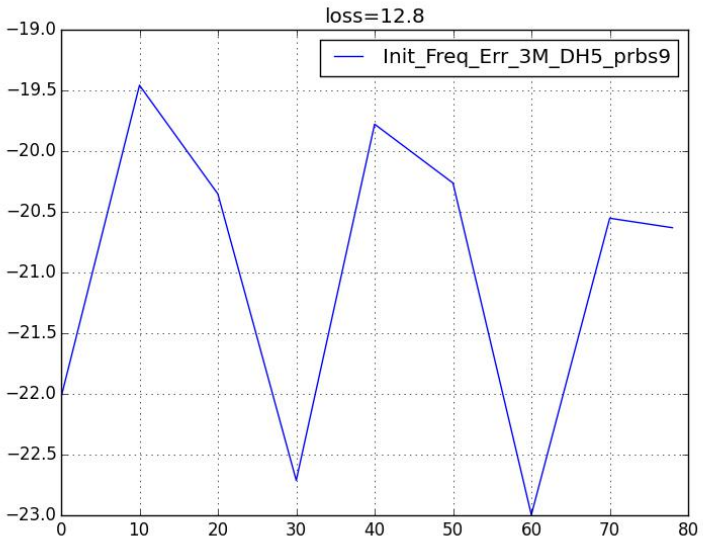
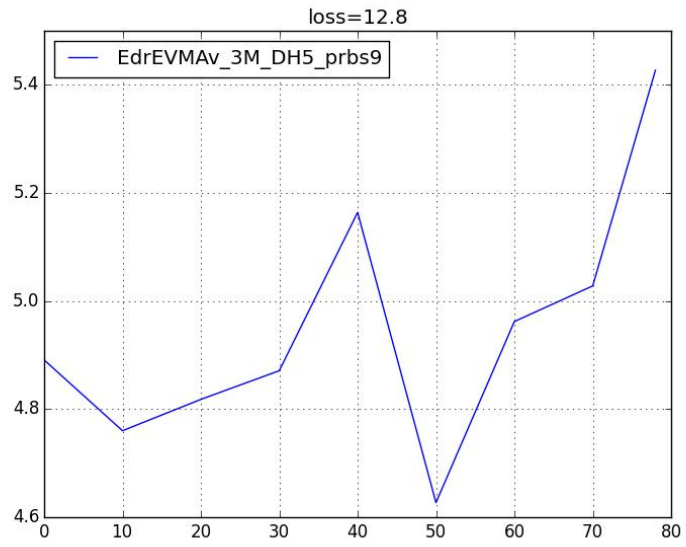
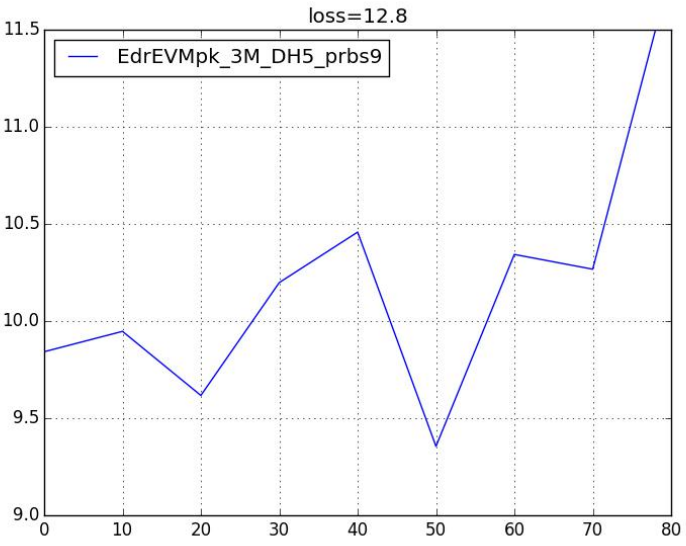
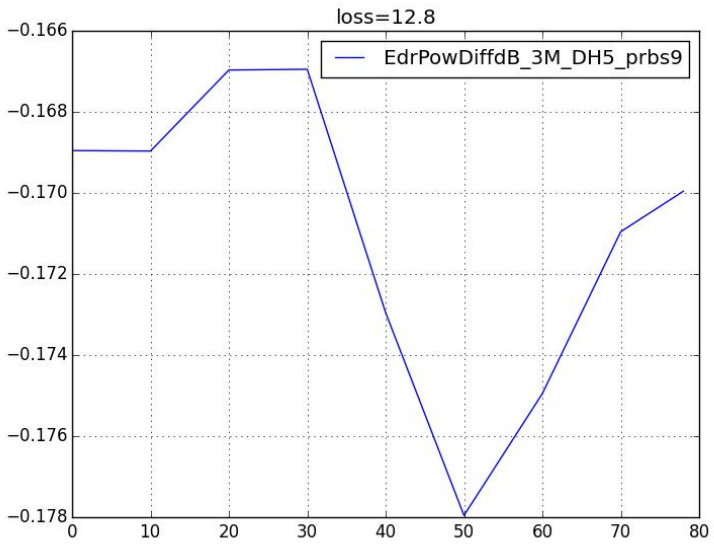
EdrPowDiffdB by channel	
Note:	**3M_DH5_00001111 meets the test requirements**

Table 16

Data rate	**3M_DH5_prbs9**								
Channel	0	10	20	30	40	50	60	70	78
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	8.02	8.14	8.18	8.05	8.20	8.20	8.22	8.37	8.59
Init Freq Error(kHz)	-22.03	-19.46	-20.35	-22.71	-19.78	-20.26	-23.00	-20.55	-20.63
OMEGA_I(kHz)	-20.40	-20.07	-19.99	-20.62	-20.51	-20.69	-20.72	-20.79	-20.54
OMEGA_O(kHz)	-1.88	-2.00	-2.18	-1.48	-1.98	-1.71	-1.61	-1.98	-2.35
OMEGA_IO(kHz)	-22.28	-22.07	-22.17	-22.10	-22.50	-22.39	-22.33	-22.77	-22.89
DEVM Average(%)	4.89	4.76	4.82	4.87	5.16	4.63	4.96	5.03	5.43
DEVM Peak(%)	9.84	9.95	9.62	10.20	10.46	9.35	10.34	10.27	11.50
EdrprobEVM99pass(%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
EdrPowDiffdB(dB)	-0.17	-0.17	-0.17	-0.17	-0.17	-0.18	-0.17	-0.17	-0.17
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

DEVM Average(%) by channel	
DEVM Peak(%)	

EdrPowDiffdB by channel	
Note:	**3M_DH5_prbs9 meets the test requirements**

2.5 BLE TX

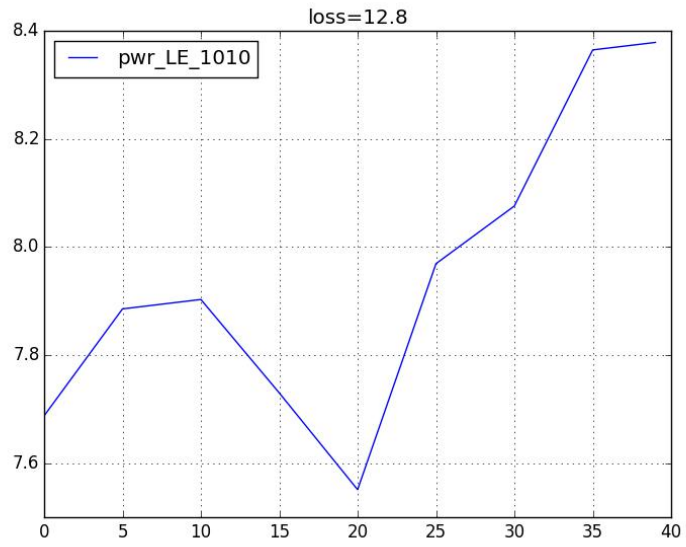
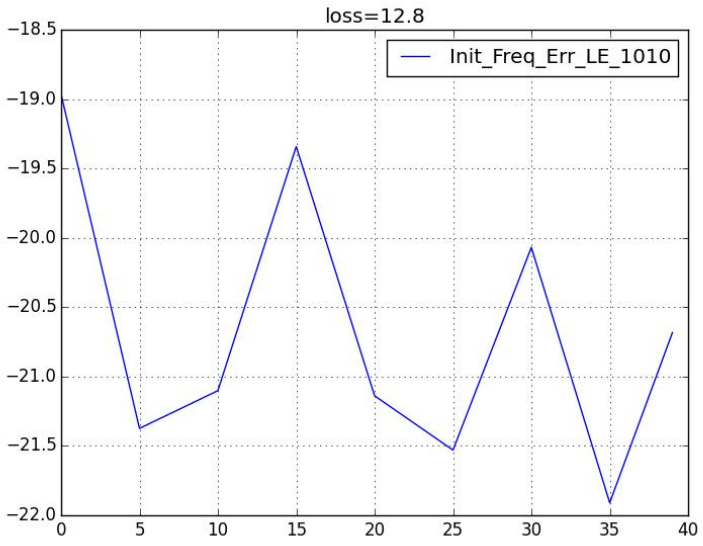
Requirement

Table 17

Specification	Requirement
Frequency range(MHz)	(2400,2483.5)
Output Power(dBm)	(-3, +3) @power_level=4；
Init Freq Error(kHz)	(-150kHz,+150kHz)
deltaF2Max(kHz)	(185kHz ,500kHz)(at least 99%)
deltaF2Avg(kHz)	(180kHz, 500kHz)
deltaF1Avg(kHz)	(225kH, 275kHz)

Table1 18

Data rate	**LE_1010**								
Channel	0	5	10	15	20	25	30	35	39
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	7.69	7.89	7.90	7.73	7.55	7.97	8.08	8.36	8.38
Init Freq Error(kHz)	-18.97	-21.37	-21.10	-19.34	-21.14	-21.53	-20.07	-21.91	-20.68
deltaF2Max(kHz)	229.13	225.04	225.52	227.65	229.33	223.06	226.23	222.32	227.40
deltaF2Avg(kHz)	222.04	218.56	219.69	220.32	222.72	216.81	220.39	215.85	221.31
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

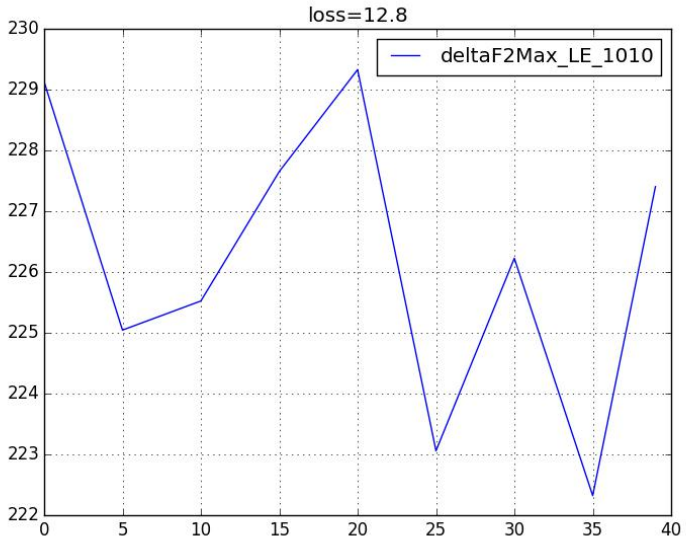
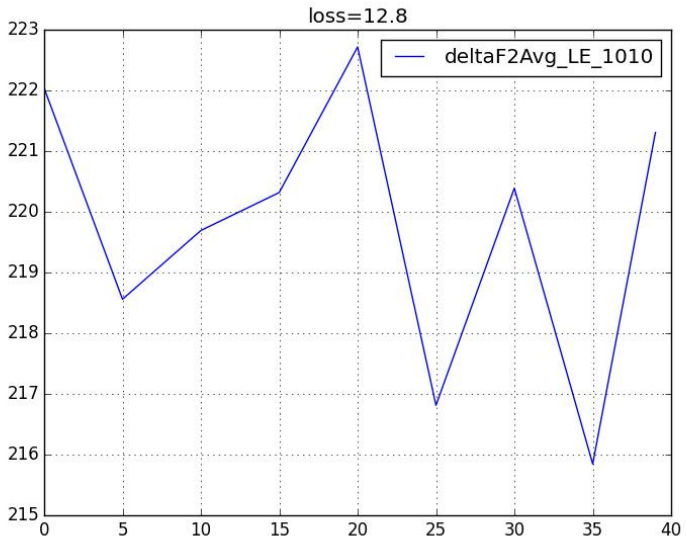
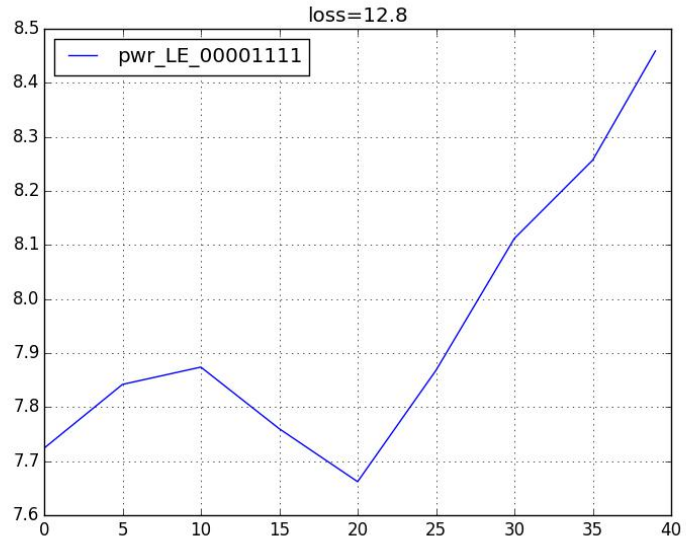
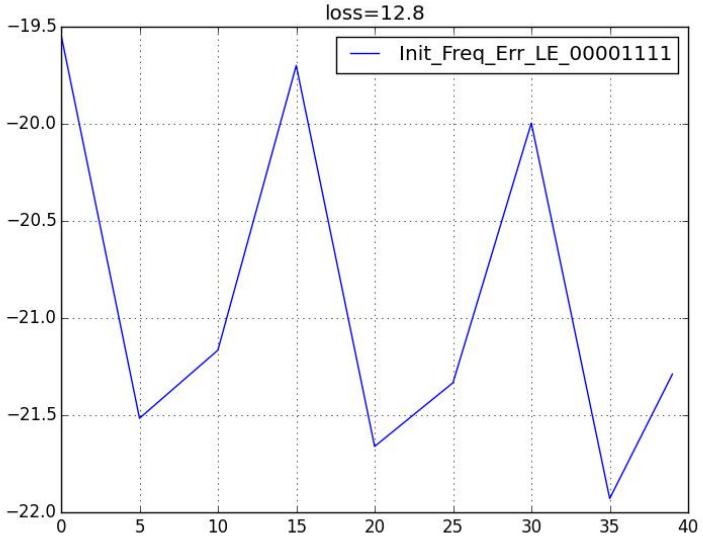
deltaF2Max by channel	
deltaF2Avg by channel	
Note:	**LE_1010 meets the test requirements**

Table1 19

Data rate	**LE_00001111**								
Channel	0	5	10	15	20	25	30	35	39
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	7.72	7.84	7.87	7.76	7.66	7.87	8.11	8.26	8.46
Init Freq Error(kHz)	-19.54	-21.52	-21.17	-19.70	-21.66	-21.33	-20.00	-21.93	-21.29
deltaF1Avg(kHz)	244.47	242.19	244.65	243.07	245.62	242.84	244.48	241.80	245.24
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass

Power by channel	
Init Freq Error by channel	

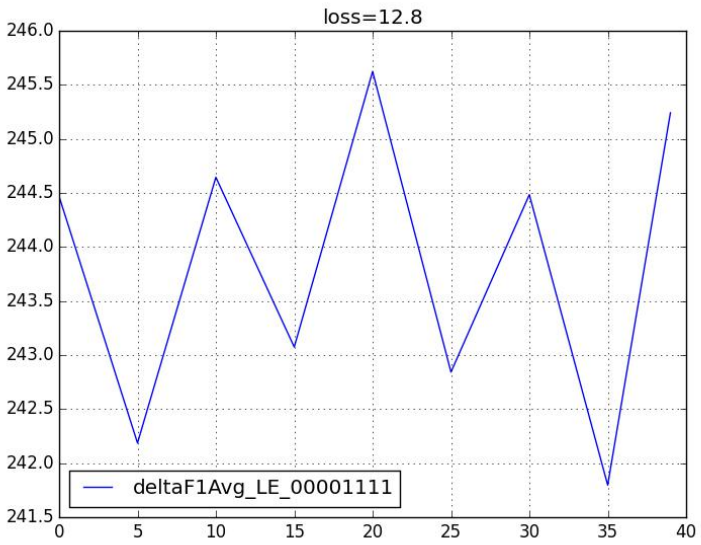
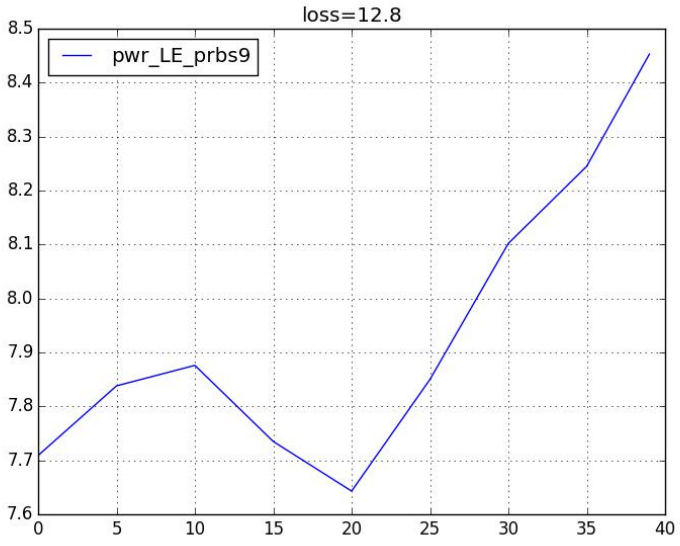
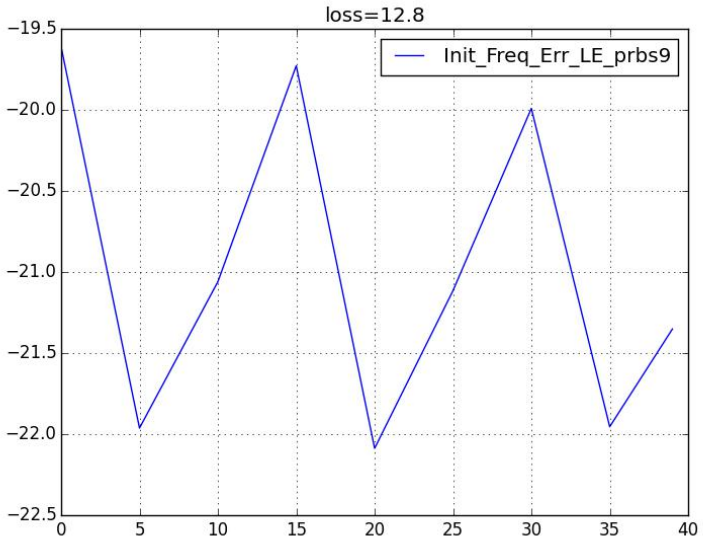
deltaF1Avg by channel	
Note：	**LE_00001111 meets the test requirements**

Table1 20

Data rate	**LE_prbs9**								
Channel	0	5	10	15	20	25	30	35	39
Frequency	2402	2412	2422	2432	2442	2452	2462	2472	2480
Output Power(dBm)	7.71	7.84	7.88	7.74	7.64	7.85	8.10	8.25	8.45
Init Freq Error(kHz)	-19.61	-21.96	-21.06	-19.73	-22.09	-21.12	-19.99	-21.95	-21.35
Pass/Fail	pass	pass	pass	pass	pass	pass	pass	pass	pass
Power by channel									

Init Freq Error by channel	
Note:	**LE_prbs9 meets the test requirements**