



FCC PART 15C TEST REPORT No. I14Z45730-SRD01

for

TCT Mobile Limited

HSUPA/HSDPA/UMTS Tri-band/GSM Quad band mobile phone

Model Name: 5138E

With

FCC ID: RAD490

Hardware Version: Proto

Software Version: 6B13

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CONTENTS

CONTENTS	2
1. TEST LABORATORY	10
1.1. TESTING LOCATION.....	10
1.2. PROJECT DATA.....	10
1.3. SIGNATURE	10
2. CLIENT INFORMATION	11
2.1. APPLICANT INFORMATION.....	11
2.2. MANUFACTURER INFORMATION.....	11
3. EQUIPMENT UNDER TEST(EUT) AND ANCILLARY EQUIPMENT(AE)	12
3.1. ABOUT EUT	12
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	12
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	12
3.4. GENERAL DESCRIPTION	12
4. REFERENCE DOCUMENTS	13
4.1. DOCUMENTS SUPPLIED BY APPLICANT	13
4.2. REFERENCE DOCUMENTS FOR TESTING	13
5. LABORATORY ENVIRONMENT	13
6. SUMMARY OF TEST RESULTS.....	13
6.1. SUMMARY OF TEST RESULTS	13
6.2. STATEMENTS.....	14
6.3. TEST CONDITIONS	14
7. TEST EQUIPMENTS UTILIZED	15
ANNEX A: MEASUREMENT RESULTS	16
A.1. MEASUREMENT METHOD	16
A.2. MAXIMUM OUTPUT POWER	17
A.2.1. MAXIMUM PEAK OUTPUT POWER-CONDUCTED	17
A.2.2. MAXIMUM AVERAGE OUTPUT POWER-CONDUCTED.....	18
A.3. PEAK POWER SPECTRAL DENSITY	19
FIG.A.3.1 POWER SPECTRAL DENSITY (802.11B, CH 1).....	20
FIG.A.3.2 POWER SPECTRAL DENSITY (802.11B, CH 6).....	21
FIG.A.3.3 POWER SPECTRAL DENSITY (802.11B, CH 11).....	21
FIG.A.3.4 POWER SPECTRAL DENSITY (802.11B, CH 12).....	22
FIG.A.3.5 POWER SPECTRAL DENSITY (802.11B, CH 13).....	22
FIG.A.3.6 POWER SPECTRAL DENSITY (802.11G, CH 1).....	23
FIG.A.3.7 POWER SPECTRAL DENSITY (802.11G, CH 6).....	23
FIG.A.3.8 POWER SPECTRAL DENSITY (802.11G, CH 11).....	24
FIG.A.3.9 POWER SPECTRAL DENSITY (802.11G, CH 12).....	24

FIG.A.3.10	POWER SPECTRAL DENSITY (802.11G, CH 13)	25
FIG.A.3.11	POWER SPECTRAL DENSITY (802.11N-HT20, CH 1)	25
FIG.A.3.12	POWER SPECTRAL DENSITY (802.11N-HT20, CH 6)	26
FIG.A.3.13	POWER SPECTRAL DENSITY (802.11N-HT20, CH 11).....	26
FIG.A.3.14	POWER SPECTRAL DENSITY (802.11 N-HT20, CH 12).....	27
FIG.A.3.15	POWER SPECTRAL DENSITY (802.11 N-HT20, CH 13).....	27
FIG.A.3.16	POWER SPECTRAL DENSITY (802.11N-HT40, CH 3)	28
FIG.A.3.17	POWER SPECTRAL DENSITY (802.11N-HT40, CH 6)	28
FIG.A.3.18	POWER SPECTRAL DENSITY (802.11N-HT40, CH 9)	29
FIG.A.3.19	POWER SPECTRAL DENSITY (802.11 N-HT40, CH 10).....	29
FIG.A.3.20	POWER SPECTRAL DENSITY (802.11 N-HT40, CH 11).....	30
A.4.	DTS 6-DB SIGNAL BANDWIDTH.....	31
FIG.A.4.1	OCCUPIED 6DB BANDWIDTH (802.11B, CH 1)	32
FIG.A.4.2	OCCUPIED 6DB BANDWIDTH (802.11B, CH 6)	33
FIG.A.4.3	OCCUPIED 6DB BANDWIDTH (802.11B, CH 11).....	33
FIG.A.4.4	OCCUPIED 6DB BANDWIDTH (802.11B, CH 12)	34
FIG.A.4.5	OCCUPIED 6DB BANDWIDTH (802.11B, CH 13)	34
FIG.A.4.6	OCCUPIED 6DB BANDWIDTH (802.11G, CH 1)	35
FIG.A.4.7	OCCUPIED 6DB BANDWIDTH (802.11G, CH 6)	35
FIG.A.4.8	OCCUPIED 6DB BANDWIDTH (802.11G, CH 11).....	36
FIG.A.4.9	OCCUPIED 6DB BANDWIDTH (802.11G, CH 12)	36
FIG.A.4.10	OCCUPIED 6DB BANDWIDTH (802.11G, CH 13)	37
FIG.A.4.11	OCCUPIED 6DB BANDWIDTH (802.11N-20MHZ, CH 1).....	37
FIG.A.4.12	OCCUPIED 6DB BANDWIDTH (802.11N-HT20, CH 6).....	38
FIG.A.4.13	OCCUPIED 6DB BANDWIDTH (802.11N-HT20, CH 11)	38
FIG.A.4.14	OCCUPIED 6DB BANDWIDTH (802.11 N-HT20, CH 12)	39
FIG.A.4.15	OCCUPIED 6DB BANDWIDTH (802.11 N-HT20, CH 13)	39
FIG.A.4.16	OCCUPIED 6DB BANDWIDTH (802.11N-40MHZ, CH 3).....	40
FIG.A.4.17	OCCUPIED 6DB BANDWIDTH (802.11N-HT40, CH 6).....	40
FIG.A.4.18	OCCUPIED 6DB BANDWIDTH (802.11N-HT40, CH 9).....	41
FIG.A.4.19	OCCUPIED 6DB BANDWIDTH (802.11 N-HT40, CH 10)	41
FIG.A.4.20	OCCUPIED 6DB BANDWIDTH (802.11 N-HT40, CH 11).....	42
A.5.	BAND EDGES COMPLIANCE.....	43
FIG.A.5.1	BAND EDGES (802.11B, CH 1)	44
FIG.A.5.2	BAND EDGES (802.11B, CH 11).....	44
FIG.A.5.3	BAND EDGES (802.11B, CH 12)	45
FIG.A.5.4	BAND EDGES (802.11B, CH 13)	45
FIG.A.5.5	BAND EDGES (802.11G, CH 1)	46
FIG.A.5.6	BAND EDGES (802.11G, CH 11).....	46
FIG.A.5.7	BAND EDGES (802.11G, CH 12)	47
FIG.A.5.8	BAND EDGES (802.11G, CH 13)	47
FIG.A.5.9	BAND EDGES (802.11N-HT20, CH 1)	48
FIG.A.5.10	BAND EDGES (802.11N-HT20, CH 11)	48
FIG.A.5.11	BAND EDGES (802.11N-HT20, CH 12)	49

FIG.A.5.12	BAND EDGES (802.11 N-HT20, CH 13)	49
FIG.A.5.13	BAND EDGES (802.11N-HT40, CH 3)	50
FIG.A.5.14	BAND EDGES (802.11N-HT40, CH 9)	50
FIG.A.5.15	BAND EDGES (802.11N-HT40, CH 10)	51
FIG.A.5.16	BAND EDGES (802.11 N-HT40, CH 11)	51
A.6.	TRANSMITTER SPURIOUS EMISSION	52
A.6.1	TRANSMITTER SPURIOUS EMISSION - CONDUCTED	52
FIG.A.6.1.1	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, CENTER FREQUENCY).....	58
FIG.A.6.1.2	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 30 MHz-1 GHz)	58
FIG.A.6.1.3	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 1 GHz-2.5 GHz)	59
FIG.A.6.1.4	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 2.5 GHz-7.5 GHz)	59
FIG.A.6.1.5	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 7.5 GHz-10 GHz)	60
FIG.A.6.1.6	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 10 GHz-15 GHz)	60
FIG.A.6.1.7	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 15 GHz-20 GHz)	61
FIG.A.6.1.8	CONDUCTED SPURIOUS EMISSION (802.11B, CH1, 20 GHz-26 GHz)	61
FIG.A.6.1.9	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, CENTER FREQUENCY).....	62
FIG.A.6.1.10	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 30 MHz-1 GHz)	62
FIG.A.6.1.11	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 1 GHz-2.5 GHz)	63
FIG.A.6.1.12	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 2.5 GHz-7.5 GHz)	63
FIG.A.6.1.13	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 7.5 GHz-10 GHz)	64
FIG.A.6.1.14	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 10 GHz-15 GHz)	64
FIG.A.6.1.15	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 15 GHz-20 GHz)	65
FIG.A.6.1.16	CONDUCTED SPURIOUS EMISSION (802.11B, CH6, 20 GHz-26 GHz)	65
FIG.A.6.1.17	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, CENTER FREQUENCY).....	66
FIG.A.6.1.18	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 30 MHz-1 GHz)	66
FIG.A.6.1.19	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 1 GHz-2.5 GHz).....	67
FIG.A.6.1.20	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 2.5 GHz-7.5 GHz).....	67
FIG.A.6.1.21	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 7.5 GHz-10 GHz).....	68
FIG.A.6.1.22	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 10 GHz-15 GHz).....	68
FIG.A.6.1.23	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 15 GHz-20 GHz).....	69
FIG.A.6.1.24	CONDUCTED SPURIOUS EMISSION (802.11B, CH11, 20 GHz-26 GHz).....	69
FIG.A.6.1.25	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, CENTER FREQUENCY).....	70
FIG.A.6.1.26	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 30 MHz-1 GHz)	70
FIG.A.6.1.27	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 1 GHz-2.5 GHz)	71
FIG.A.6.1.28	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 2.5 GHz-7.5 GHz)	71
FIG.A.6.1.29	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 7.5 GHz-10 GHz)	72
FIG.A.6.1.30	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 10 GHz-15 GHz)	72
FIG.A.6.1.31	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 15 GHz-20 GHz)	73
FIG.A.6.1.32	CONDUCTED SPURIOUS EMISSION (802.11B, CH12, 20 GHz-26 GHz)	73
FIG.A.6.1.33	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, CENTER FREQUENCY).....	74
FIG.A.6.1.34	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 30 MHz-1 GHz)	74
FIG.A.6.1.35	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 1 GHz-2.5 GHz)	75
FIG.A.6.1.36	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 2.5 GHz-7.5 GHz)	75
FIG.A.6.1.37	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 7.5 GHz-10 GHz)	76

FIG.A.6.1.38	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 10 GHZ-15 GHZ)	76
FIG.A.6.1.39	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 15 GHZ-20 GHZ)	77
FIG.A.6.1.40	CONDUCTED SPURIOUS EMISSION (802.11B, CH13, 20 GHZ-26 GHZ)	77
FIG.A.6.1.41	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, CENTER FREQUENCY).....	78
FIG.A.6.1.42	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 30 MHZ-1 GHZ)	78
FIG.A.6.1.43	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 1 GHZ-2.5 GHZ)	79
FIG.A.6.1.44	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 2.5 GHZ-7.5 GHZ)	79
FIG.A.6.1.45	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 7.5 GHZ-10 GHZ)	80
FIG.A.6.1.46	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 10 GHZ-15 GHZ)	80
FIG.A.6.1.47	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 15 GHZ-20 GHZ)	81
FIG.A.6.1.48	CONDUCTED SPURIOUS EMISSION (802.11G, CH1, 20 GHZ-26 GHZ)	81
FIG.A.6.1.49	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, CENTER FREQUENCY).....	82
FIG.A.6.1.50	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 30 MHZ-1 GHZ)	82
FIG.A.6.1.51	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 1 GHZ-2.5 GHZ)	83
FIG.A.6.1.52	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 2.5 GHZ-7.5 GHZ)	83
FIG.A.6.1.53	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 7.5 GHZ-10 GHZ)	84
FIG.A.6.1.54	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 10 GHZ-15 GHZ)	84
FIG.A.6.1.55	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 15 GHZ-20 GHZ)	85
FIG.A.6.1.56	CONDUCTED SPURIOUS EMISSION (802.11G, CH6, 20 GHZ-26 GHZ)	85
FIG.A.6.1.57	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, CENTER FREQUENCY).....	86
FIG.A.6.1.58	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 30 MHZ-1 GHZ)	86
FIG.A.6.1.59	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 1 GHZ-2.5 GHZ).....	87
FIG.A.6.1.60	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 2.5 GHZ-7.5 GHZ).....	87
FIG.A.6.1.61	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 7.5 GHZ-10 GHZ).....	88
FIG.A.6.1.62	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 10 GHZ-15 GHZ).....	88
FIG.A.6.1.63	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 15 GHZ-20 GHZ).....	89
FIG.A.6.1.64	CONDUCTED SPURIOUS EMISSION (802.11G, CH11, 20 GHZ-26 GHZ).....	89
FIG.A.6.1.65	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, CENTER FREQUENCY).....	90
FIG.A.6.1.66	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 30 MHZ-1 GHZ)	90
FIG.A.6.1.67	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 1 GHZ-2.5 GHZ)	91
FIG.A.6.1.68	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 2.5 GHZ-7.5 GHZ)	91
FIG.A.6.1.69	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 7.5 GHZ-10 GHZ)	92
FIG.A.6.1.70	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 10 GHZ-15 GHZ)	92
FIG.A.6.1.71	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 15 GHZ-20 GHZ)	93
FIG.A.6.1.72	CONDUCTED SPURIOUS EMISSION (802.11G, CH12, 20 GHZ-26 GHZ)	93
FIG.A.6.1.73	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, CENTER FREQUENCY).....	94
FIG.A.6.1.74	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 30 MHZ-1 GHZ)	94
FIG.A.6.1.75	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 1 GHZ-2.5 GHZ)	95
FIG.A.6.1.76	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 2.5 GHZ-7.5 GHZ)	95
FIG.A.6.1.77	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 7.5 GHZ-10 GHZ)	96
FIG.A.6.1.78	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 10 GHZ-15 GHZ)	96
FIG.A.6.1.79	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 15 GHZ-20 GHZ)	97
FIG.A.6.1.80	CONDUCTED SPURIOUS EMISSION (802.11G, CH13, 20 GHZ-26 GHZ)	97
FIG.A.6.1.81	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, CENTER FREQUENCY) ..	98

FIG.A.6.1.82	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 30 MHz-1 GHz)	98
FIG.A.6.1.83	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 1 GHz-2.5 GHz)	99
FIG.A.6.1.84	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 2.5 GHz-7.5 GHz)	99
FIG.A.6.1.85	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 7.5 GHz-10 GHz)	100
FIG.A.6.1.86	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 10 GHz-15 GHz)	100
FIG.A.6.1.87	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 15 GHz-20 GHz)	101
FIG.A.6.1.88	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH1, 20 GHz-26 GHz)	101
FIG.A.6.1.89	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, CENTER FREQUENCY)	102
FIG.A.6.1.90	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 30 MHz-1 GHz)	102
FIG.A.6.1.91	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 1 GHz-2.5 GHz)	103
FIG.A.6.1.92	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 2.5 GHz-7.5 GHz)	103
FIG.A.6.1.93	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 7.5 GHz-10 GHz)	104
FIG.A.6.1.94	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 10 GHz-15 GHz)	104
FIG.A.6.1.95	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 15 GHz-20 GHz)	105
FIG.A.6.1.96	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH6, 20 GHz-26 GHz)	105
FIG.A.6.1.97	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, CENTER FREQUENCY)	106
FIG.A.6.1.98	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 30 MHz-1 GHz)	106
FIG.A.6.1.99	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 1 GHz-2.5 GHz)	107
FIG.A.6.1.100	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 2.5 GHz-7.5 GHz)....	107
FIG.A.6.1.101	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 7.5 GHz-10 GHz).....	108
FIG.A.6.1.102	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 10 GHz-15 GHz)	108
FIG.A.6.1.103	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 15 GHz-20 GHz)	109
FIG.A.6.1.104	CONDUCTED SPURIOUS EMISSION (802.11N-HT20, CH11, 20 GHz-26 GHz)	109
FIG.A.6.1.105	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, CENTER FREQUENCY)	110
FIG.A.6.1.106	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 30 MHz-1 GHz)	110
FIG.A.6.1.107	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 1 GHz-2.5 GHz)	111
FIG.A.6.1.108	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 2.5 GHz-7.5 GHz) ..	111
FIG.A.6.1.109	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 7.5 GHz-10 GHz) ...	112
FIG.A.6.1.110	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 10 GHz-15 GHz)	112
FIG.A.6.1.111	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 15 GHz-20 GHz)	113
FIG.A.6.1.112	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH12, 20 GHz-26 GHz)	113
FIG.A.6.1.113	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, CENTER FREQUENCY)	114
FIG.A.6.1.114	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 30 MHz-1 GHz)	114
FIG.A.6.1.115	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 1 GHz-2.5 GHz)	115
FIG.A.6.1.116	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 2.5 GHz-7.5 GHz) ..	115
FIG.A.6.1.117	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 7.5 GHz-10 GHz) ...	116
FIG.A.6.1.118	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 10 GHz-15 GHz)	116
FIG.A.6.1.119	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 15 GHz-20 GHz)	117
FIG.A.6.1.120	CONDUCTED SPURIOUS EMISSION (802.11 N-HT20, CH13, 20 GHz-26 GHz)	117
FIG.A.6.1.121	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, CENTER FREQUENCY)	118
FIG.A.6.1.122	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 30 MHz-1 GHz)	118

FIG.A.6.1.123	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 1 GHz-2.5 GHz)	119
FIG.A.6.1.124	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 2.5 GHz-7.5 GHz)	119
FIG.A.6.1.125	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 7.5 GHz-10 GHz)	120
FIG.A.6.1.126	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 10 GHz-15 GHz)	120
FIG.A.6.1.127	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 15 GHz-20 GHz)	121
FIG.A.6.1.128	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH3, 20 GHz-26 GHz)	121
FIG.A.6.1.129	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, CENTER FREQUENCY)	122
FIG.A.6.1.130	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 30 MHz-1 GHz)	122
FIG.A.6.1.131	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 1 GHz-2.5 GHz)	123
FIG.A.6.1.132	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 2.5 GHz-7.5 GHz)	123
FIG.A.6.1.133	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 7.5 GHz-10 GHz)	124
FIG.A.6.1.134	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 10 GHz-15 GHz)	124
FIG.A.6.1.135	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 15 GHz-20 GHz)	125
FIG.A.6.1.136	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH6, 20 GHz-26 GHz)	125
FIG.A.6.1.137	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, CENTER FREQUENCY)	126
FIG.A.6.1.138	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 30 MHz-1 GHz)	126
FIG.A.6.1.139	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 1 GHz-2.5 GHz)	127
FIG.A.6.1.140	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 2.5 GHz-7.5 GHz)	127
FIG.A.6.1.141	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 7.5 GHz-10 GHz)	128
FIG.A.6.1.142	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 10 GHz-15 GHz)	128
FIG.A.6.1.143	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 15 GHz-20 GHz)	129
FIG.A.6.1.144	CONDUCTED SPURIOUS EMISSION (802.11N-HT40, CH9, 20 GHz-26 GHz)	129
FIG.A.6.1.145	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, CENTER FREQUENCY)	130
FIG.A.6.1.146	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 30 MHz-1 GHz)	130
FIG.A.6.1.147	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 1 GHz-2.5 GHz)	131
FIG.A.6.1.148	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 2.5 GHz-7.5 GHz)	131
FIG.A.6.1.149	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 7.5 GHz-10 GHz)	132
FIG.A.6.1.150	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 10 GHz-15 GHz)	132
FIG.A.6.1.151	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 15 GHz-20 GHz)	133
FIG.A.6.1.152	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH10, 20 GHz-26 GHz)	133
FIG.A.6.1.153	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, CENTER FREQUENCY)	134
FIG.A.6.1.154	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 30 MHz-1 GHz)	134
FIG.A.6.1.155	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 1 GHz-2.5 GHz)	135
FIG.A.6.1.156	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 2.5 GHz-7.5 GHz)	135
FIG.A.6.1.157	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 7.5 GHz-10 GHz)	136
FIG.A.6.1.158	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 10 GHz-15 GHz)	136
FIG.A.6.1.159	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 15 GHz-20 GHz)	137
FIG.A.6.1.160	CONDUCTED SPURIOUS EMISSION (802.11 N-HT40, CH11, 20 GHz-26 GHz)	137
A.6.2	TRANSMITTER SPURIOUS EMISSION - RADIATED	138
FIG.A.6.2.1	RADIATED SPURIOUS EMISSION (POWER): 802.11B, CH1, 2.38 GHz – 2.45GHz	147
FIG.A.6.2.2	RADIATED SPURIOUS EMISSION (802.11B, CH1, 1 GHz-3 GHz)	147
FIG.A.6.2.3	RADIATED SPURIOUS EMISSION (802.11B, CH1, 3 GHz-18 GHz)	148

FIG.A.6.2.4	RADIATED SPURIOUS EMISSION (802.11B, CH6, 30 MHz-1 GHz)	148
FIG.A.6.2.5	RADIATED SPURIOUS EMISSION (802.11B, CH6, 1 GHz-3 GHz)	149
FIG.A.6.2.6	RADIATED SPURIOUS EMISSION (802.11B, CH6, 3 GHz-18 GHz)	149
FIG.A.6.2.7	RADIATED SPURIOUS EMISSION (802.11B, CH6, 18GHz – 26.5GHz).....	150
FIG.A.6.2.8	RADIATED SPURIOUS EMISSION (POWER): 802.11B, CH11, 2.45 GHz - 2.50GHz	150
FIG.A.6.2.9	RADIATED SPURIOUS EMISSION (802.11B, CH11, 1 GHz-3 GHz).....	151
FIG.A.6.2.10	RADIATED SPURIOUS EMISSION (802.11B, CH11, 3 GHz-18 GHz).....	151
FIG.A.6.2.11	RADIATED SPURIOUS EMISSION (802.11B, CH12, 1 GHz-3 GHz)	152
FIG.A.6.2.12	RADIATED SPURIOUS EMISSION (802.11B, CH12, 3 GHz-18 GHz)	152
FIG.A.6.2.13	RADIATED SPURIOUS EMISSION (POWER): 802.11B, CH13, 2.45 GHz - 2.50GHz	153
FIG.A.6.2.14	RADIATED SPURIOUS EMISSION (802.11B, CH13, 1 GHz-3 GHz)	153
FIG.A.6.2.15	RADIATED SPURIOUS EMISSION (802.11B, CH13, 3 GHz-18 GHz)	154
FIG.A.6.2.16	RADIATED SPURIOUS EMISSION (POWER): 802.11G, CH1, 2.38 GHz - 2.45GHz..	154
FIG.A.6.2.17	RADIATED SPURIOUS EMISSION (802.11G, CH1, 1 GHz-3 GHz)	155
FIG.A.6.2.18	RADIATED SPURIOUS EMISSION (802.11G, CH1, 3 GHz-18 GHz)	155
FIG.A.6.2.19	RADIATED SPURIOUS EMISSION (802.11G, CH6, 30 MHz-1 GHz)	156
FIG.A.6.2.20	RADIATED SPURIOUS EMISSION (802.11G, CH6, 1 GHz-3 GHz)	156
FIG.A.6.2.21	RADIATED SPURIOUS EMISSION (802.11G, CH6, 3 GHz-18 GHz)	157
FIG.A.6.2.22	RADIATED SPURIOUS EMISSION (802.11G, CH6, 18GHz – 26.5GHz).....	157
FIG.A.6.2.23	RADIATED SPURIOUS EMISSION (POWER): 802.11G, CH11, 2.45 GHz - 2.50GHz	158
FIG.A.6.2.24	RADIATED SPURIOUS EMISSION (802.11G, CH11, 1 GHz-3 GHz).....	158
FIG.A.6.2.25	RADIATED SPURIOUS EMISSION (802.11G, CH11, 3 GHz-18 GHz).....	159
FIG.A.6.2.26	RADIATED SPURIOUS EMISSION (802.11G, CH12, 1 GHz-3 GHz)	159
FIG.A.6.2.27	RADIATED SPURIOUS EMISSION (802.11G, CH12, 3 GHz-18 GHz)	160
FIG.A.6.2.28	RADIATED SPURIOUS EMISSION (POWER): 802.11G, CH13, 2.45 GHz - 2.50GHz	160
FIG.A.6.2.29	RADIATED SPURIOUS EMISSION (802.11G, CH13, 1 GHz-3 GHz)	161
FIG.A.6.2.30	RADIATED SPURIOUS EMISSION (802.11G, CH13, 3 GHz-18 GHz)	161
FIG.A.6.2.31	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT20, CH1, 2.38 GHz - 2.45GHz	162
FIG.A.6.2.32	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH1, 1 GHz-3 GHz)	162
FIG.A.6.2.33	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH1, 3 GHz-18 GHz)	163
FIG.A.6.2.34	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH6, 30 MHz-1 GHz)	163
FIG.A.6.2.35	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH6, 1 GHz-3 GHz)	164
FIG.A.6.2.36	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH6, 3 GHz-18 GHz)	164
FIG.A.6.2.37	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH6, 18GHz – 26.5GHz).....	165
FIG.A.6.2.38	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT20, CH11, 2.45 GHz - 2.50GHz	165
FIG.A.6.2.39	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH11, 1 GHz-3 GHz).....	166
FIG.A.6.2.40	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH11, 3 GHz-18 GHz).....	166
FIG.A.6.2.41	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH12, 1 GHz-3 GHz)	167
FIG.A.6.2.42	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH12, 3 GHz-18 GHz)	167
FIG.A.6.2.43	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT20, CH13, 2.45 GHz - 2.50GHz	168
FIG.A.6.2.44	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH13, 1 GHz-3 GHz)	168

FIG.A.6.2.45	RADIATED SPURIOUS EMISSION (802.11N-HT20, CH13, 3 GHz-18 GHz)	169
FIG.A.6.2.46	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT40, CH3, 2.38 GHz -	
2.45GHz	169	
FIG.A.6.2.47	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH3, 1 GHz-3 GHz).....	170
FIG.A.6.2.48	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH3, 3 GHz-18 GHz).....	170
FIG.A.6.2.49	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH6, 30 MHz-1 GHz)	171
FIG.A.6.2.50	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH6, 1 GHz-3 GHz)	171
FIG.A.6.2.51	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH6, 3 GHz-18 GHz)	172
FIG.A.6.2.52	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH6, 18GHz – 26.5GHz).....	172
FIG.A.6.2.53	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT40, CH9, 2.45 GHz -	
2.50GHz	173	
FIG.A.6.2.54	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH9, 1 GHz-3 GHz).....	173
FIG.A.6.2.55	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH9, 3 GHz-18 GHz).....	174
FIG.A.6.2.56	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH10, 1 GHz-3 GHz)	174
FIG.A.6.2.57	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH10, 3 GHz-18 GHz)	175
FIG.A.6.2.58	RADIATED SPURIOUS EMISSION (POWER): 802.11N-HT40, CH11, 2.45 GHz -	
2.50GHz	175	
FIG.A.6.2.59	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH11, 1 GHz-3 GHz).....	176
FIG.A.6.2.60	RADIATED SPURIOUS EMISSION (802.11N-HT40, CH11, 3 GHz-18 GHz).....	176
A.7. AC POWERLINE CONDUCTED EMISSION		177
FIG.A.7.1	AC POWERLINE CONDUCTED EMISSION-802.11B.....	178
FIG.A.7.2	AC POWERLINE CONDUCTED EMISSION-IDLE.....	179

1. TEST LABORATORY

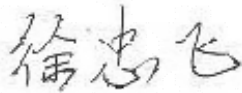
1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China
Postal Code: 100191
Telephone: 008610623046332046
Fax: 008610623046332063

1.2. Project Data

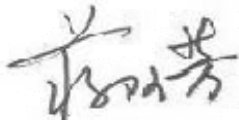
Testing Start Date: 2014-04-18
Testing End Date: 2014-04-24

1.3. Signature



Xu Zhongfei

(Prepared this test report)



Jiang Afang

(Reviewed this test report)



Xiao Li

Deputy Director of the laboratory

(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

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2.2. Manufacturer Information

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Email: zhizhou.gong@jrdcom.com
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

3. EQUIPMENT UNDER TEST(EUT) AND ANCILLARY EQUIPMENT(AE)

3.1. About EUT

Description	HSUPA/HSDPA/UMTS Tri-band/GSM Quad band mobile phone
Model name	5138E
FCC ID	RAD490
IC ID	/
With WLAN Function	Yes
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	13
Antenna	Integral Antenna
MAX Conducted Power	24.16dBm(OFDM)
GPRS Class	Class 12
GPRS operation mode	Class B
Power Supply	3.8V DC by Battery

3.2. Internal Identification of EUT Used During the Test

EUT ID*	IMEI	HW Version	SW Version
EUT1	/	Proto	6B13
EUT2	/	Proto	6B13

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE Used During the Test

AE ID*	Description	Type	SN
AE1	Battery	TLi018D1	/
AE2	Charger	CBA3007AG0C1	/

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

Equipment Under Test (EUT) is a model of HSUPA/HSDPA/UMTS Tri-band/GSM Quad band mobile phone with integrated antenna. It consists of normal options: Battery and Charger. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. REFERENCE DOCUMENTS FOR TESTING

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	Oct,
	15.209 Radiated emission limits, general requirements;	2012
	15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2003
KDB558074 v03r01	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247	2013

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by TMC
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. Statements

TMC has evaluated the test cases requested by the client/manufacture as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

This model is a variant product which market name is 5038E; all the test result has been derived from test report of 5038E.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.8V (By battery)
Humidity	44%

7. TEST EQUIPMENTS UTILIZED

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2013-07-08	2014-07-07
2	Test Receiver	ESS	847151/015	Rohde & Schwarz	2013-11-29	2014-11-28
3	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-4-15	2015-4-14
4	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2013-11-6	2014-11-5
2	BiLog Antenna	VULB9163	9163-514	Schwarzbeck	2011-11-11	2014-11-10
3	Dual-Ridge Waveguide Horn Antenna	3117	00119024	ETS-Lindgren	2011-4-20	2015-4-19
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2011-7-1	2014-06-30
5	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2011-12-21	2014-12-20
6	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

Connect the EUT to the test system as Fig.A.1.1.1 shows.

Set the EUT to the required work mode.

Set the EUT to the required channel.

Set the Vector Signal Analyzer and start measurement.

Record the values. Vector Signal Analyzer

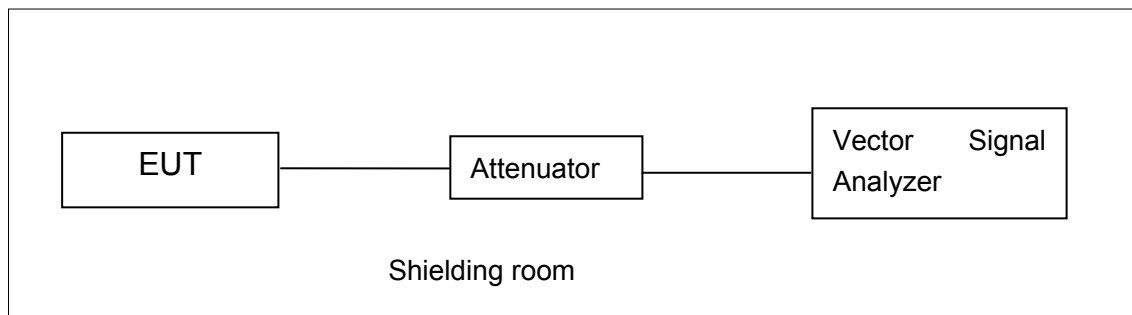


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;

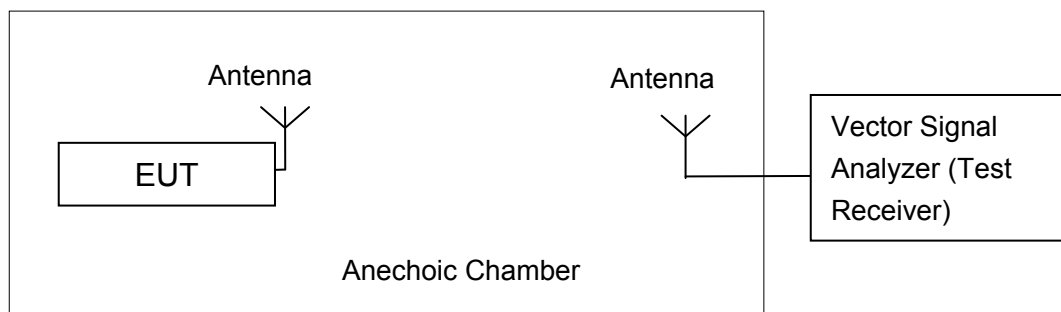


Fig.A.1.2.1: Test Setup Diagram for Radiated Measurements

A.2. Maximum Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

Note: The Duty cycle of EUT is 98.1%, so all measurements of maximum conducted output power will be performed with the EUT transmitting continuously.

A.2.1. Maximum Peak Output Power-conducted

Method of Measurement: See KDB558074 section 9.1.2.

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)				
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2467 MHz (Ch12)	2472 MHz (Ch13)
802.11b	1	20.11	/	/	/	/
	2	20.25	/	/	/	/
	5.5	21.81	/	/	/	/
	11	23.21	23.63	24.03	14.46	14.38
802.11g	6	23.21	/	/	/	/
	9	23.25	/	/	/	/
	12	23.12	/	/	/	/
	18	22.98	/	/	/	/
	24	23.40	/	/	/	/
	36	23.38	/	/	/	/
	48	23.43	/	/	/	/
	54	23.45	23.68	24.16	16.02	15.92

The data rate 11Mbps and 54Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)				
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2467 MHz (Ch12)	2472 MHz (Ch13)
802.11n (20MHz)	MCS0	21.24	/	/	/	/
	MCS1	21.04	/	/	/	/
	MCS2	21.13	/	/	/	/
	MCS3	21.49	21.91	22.34	13.46	13.57
	MCS4	21.31	/	/	/	/
	MCS5	21.38	/	/	/	/
	MCS6	21.35	/	/	/	/
	MCS7	21.22	/	/	/	/

The data rate MCS3 is selected as worse condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)				
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2457 MHz (Ch10)	2462 MHz (Ch11)
802.11n (40MHz)	MCS0	19.11	/	/	/	/
	MCS1	18.95	/	/	/	/
	MCS2	18.97	/	/	/	/
	MCS3	19.37	19.48	19.91	17.82	17.97
	MCS4	19.34	/	/	/	/
	MCS5	19.18	/	/	/	/
	MCS6	19.04	/	/	/	/
	MCS7	19.07	/	/	/	/

The data rate MCS3 is selected as worse condition, and the following cases are performed with this condition.

Conclusion: Pass

A.2.2. Maximum Average Output Power-conducted

Method of Measurement: See KDB558074 section 9.2.1.2.

802.11b/g mode

Mode	Test Result (dBm)				
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2467 MHz (Ch12)	2472 MHz (Ch13)
802.11b	16.67	16.89	17.25	9.17	9.07
802.11g	14.54	14.76	15.05	6.94	7.06

802.11n-HT20 mode

Mode	Test Result (dBm)				
	2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)	2467 MHz (Ch12)	2472 MHz (Ch13)
802.11n (20MHz)	12.44	12.94	13.46	4.57	4.66

802.11n-HT40 mode

Mode	Test Result (dBm)				
	2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)	2457 MHz (Ch10)	2462 MHz (Ch11)
802.11n (40MHz)	10.43	10.49	10.66	8.61	8.48

Conclusion: Pass

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

A.3. Peak Power Spectral Density

Method of Measurement: See KDB558074 section 10.2.

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

Modulation type and data rate tested:

802.11b	802.11g	802.11n-HT20	802.11n-HT40
11Mbps(CCK)	54Mbps(OFDM)	MCS3(OFDM)	MCS3(OFDM)

Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11b	1	Fig.A.3.1	-6.25	P
	6	Fig.A.3.2	-6.90	P
	11	Fig.A.3.3	-5.70	P
	12	Fig.A.3.4	-14.34	P
	13	Fig.A.3.5	-15.30	P
802.11g	1	Fig.A.3.6	-11.86	P
	6	Fig.A.3.7	-10.02	P
	11	Fig.A.3.8	-10.04	P
	12	Fig.A.3.9	-18.09	P
	13	Fig.A.3.10	-17.42	P

802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (HT20)	1	Fig.A.3.11	-10.85	P
	6	Fig.A.3.12	-11.11	P
	11	Fig.A.3.13	-10.79	P
	12	Fig.A.3.14	-20.35	P
	13	Fig.A.3.15	-18.62	P

802.11n-HT40 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (HT40)	3	Fig.A.3.16	-17.42	P
	6	Fig.A.3.17	-17.55	P
	9	Fig.A.3.18	-17.10	P
	10	Fig.A.3.19	-16.81	P
	11	Fig.A.3.20	-16.98	P

Conclusion: Pass

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
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Test graphs as below:

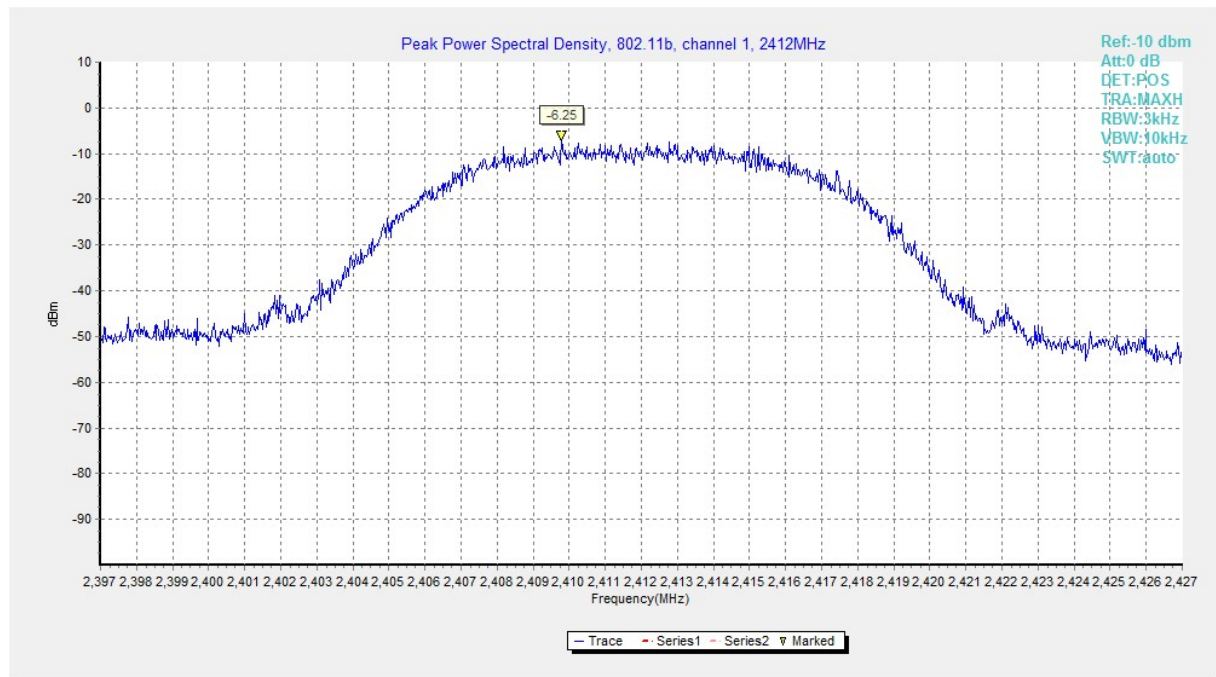


Fig.A.3.1 Power Spectral Density (802.11b, Ch 1)

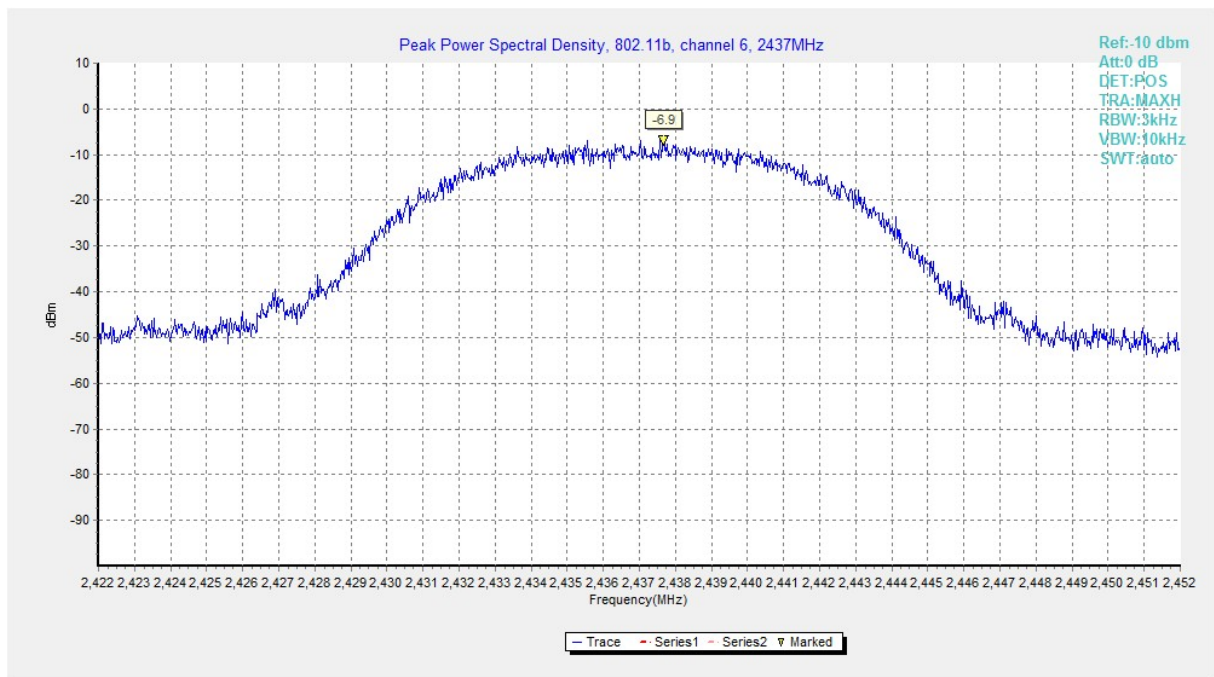


Fig.A.3.2 Power Spectral Density (802.11b, Ch 6)

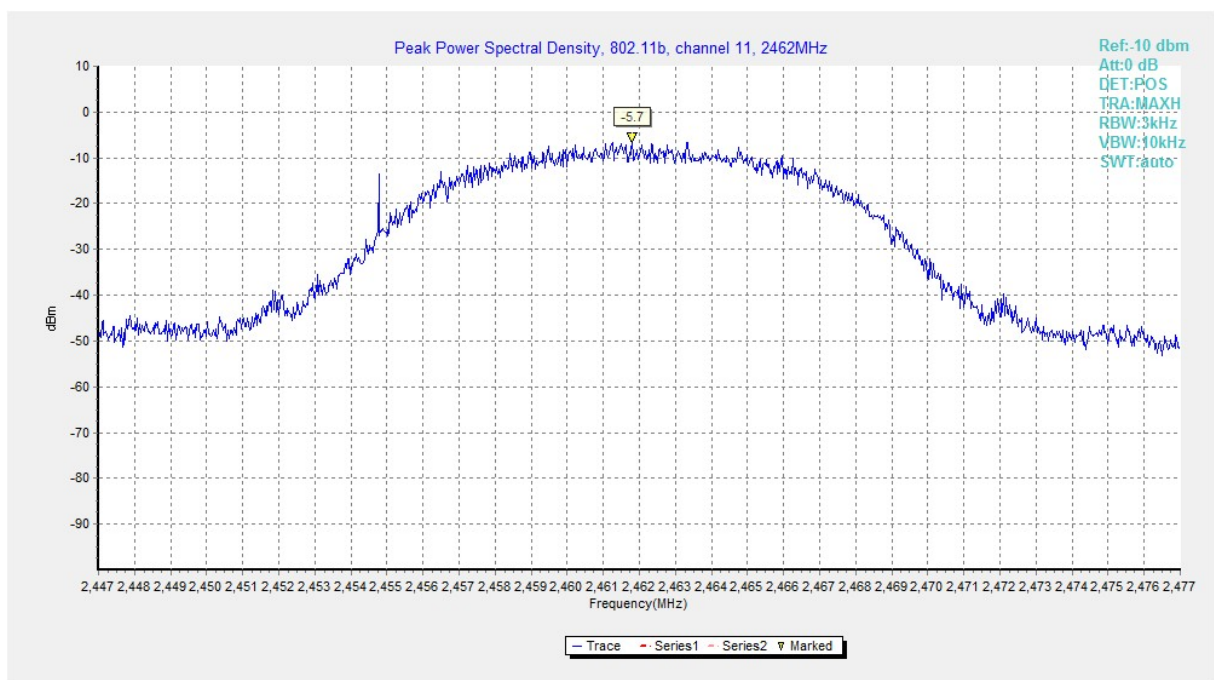


Fig.A.3.3 Power Spectral Density (802.11b, Ch 11)

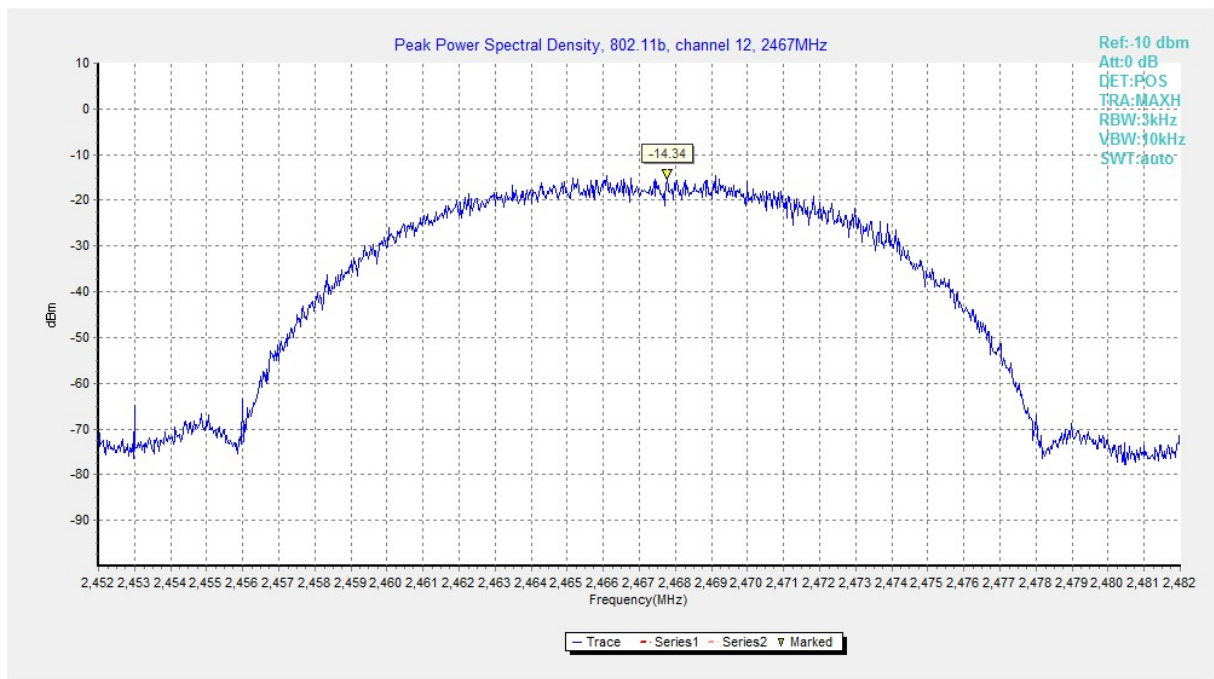


Fig.A.3.4 Power Spectral Density (802.11b, Ch 12)

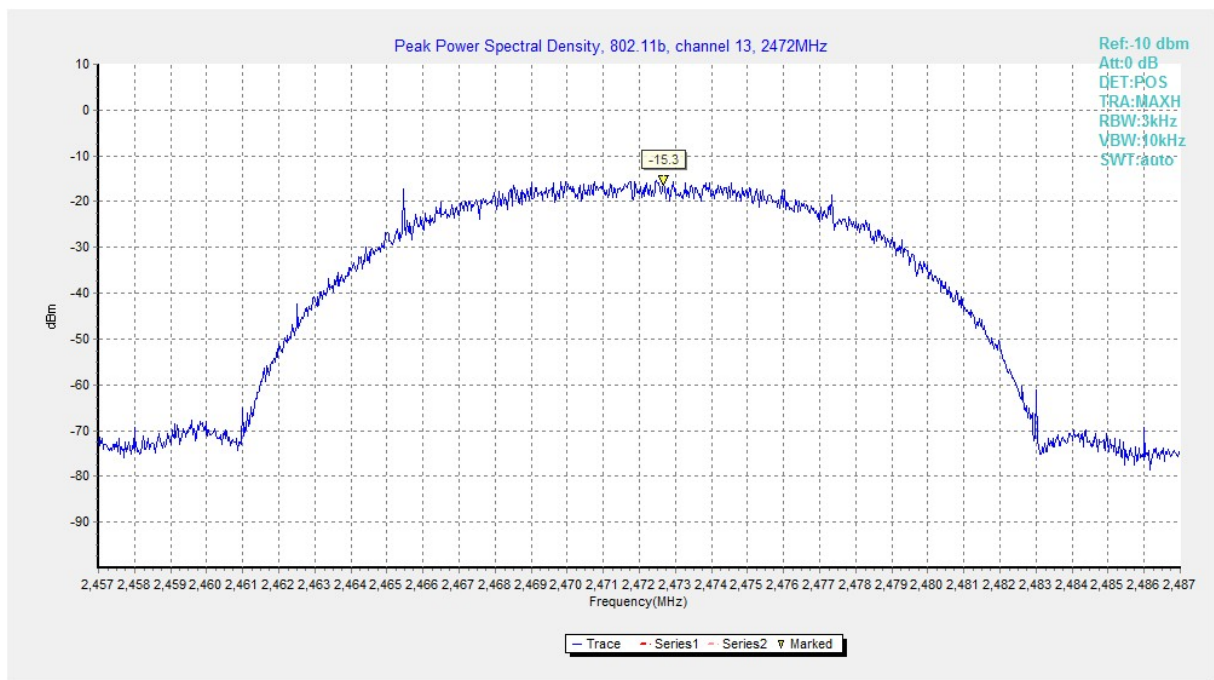


Fig.A.3.5 Power Spectral Density (802.11b, Ch 13)

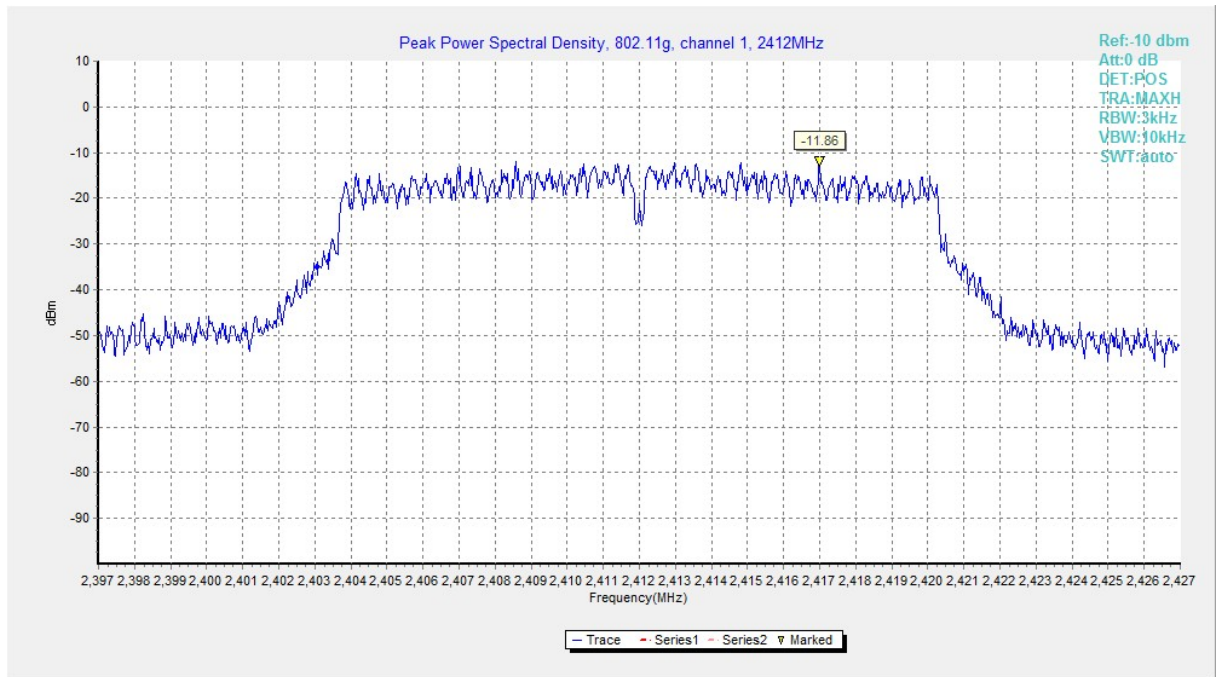


Fig.A.3.6 Power Spectral Density (802.11g, Ch 1)

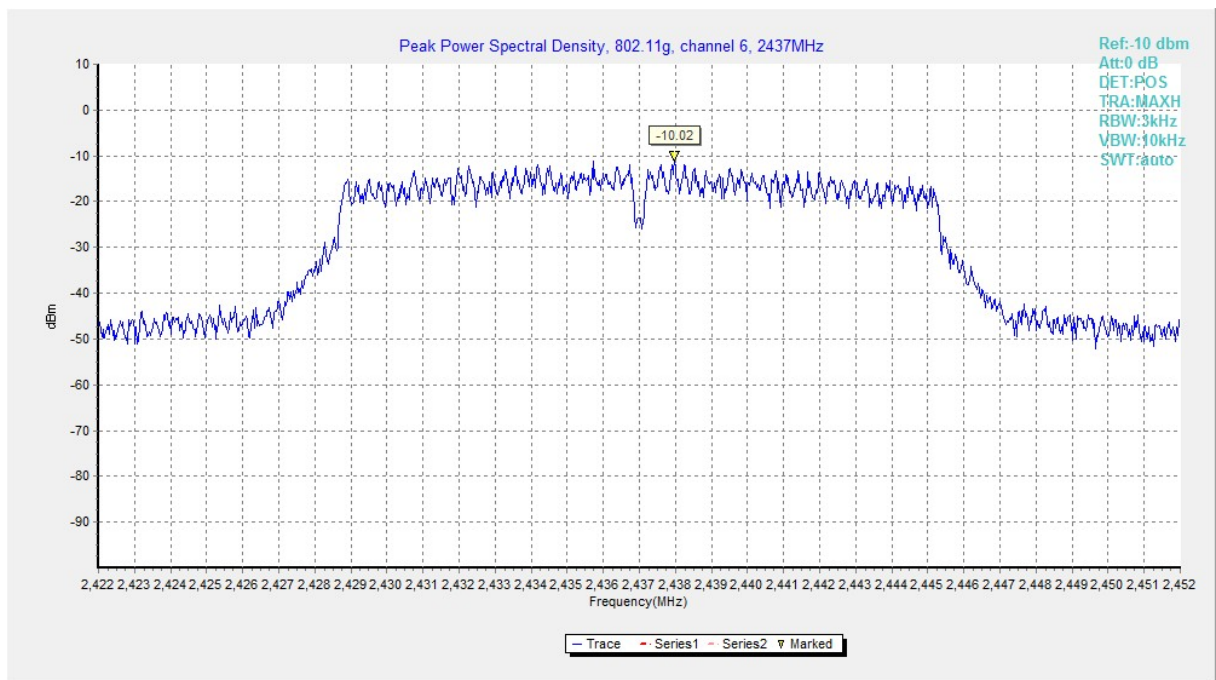


Fig.A.3.7 Power Spectral Density (802.11g, Ch 6)

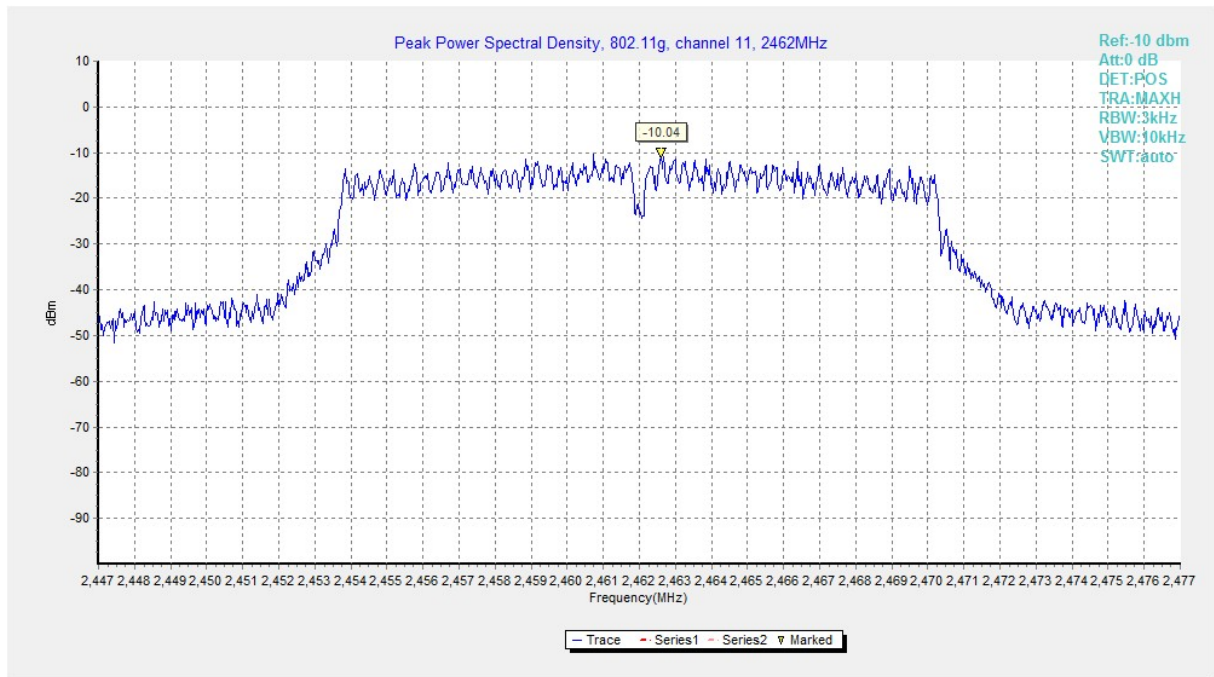


Fig.A.3.8 Power Spectral Density (802.11g, Ch 11)

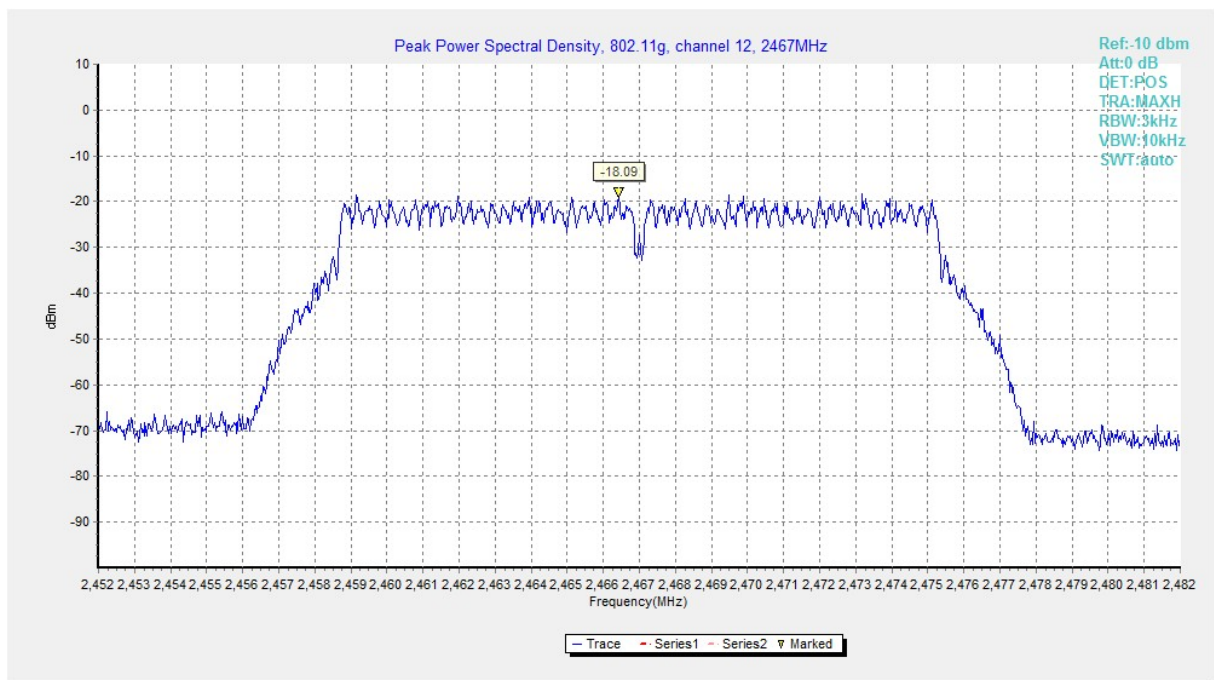


Fig.A.3.9 Power Spectral Density (802.11g, Ch 12)

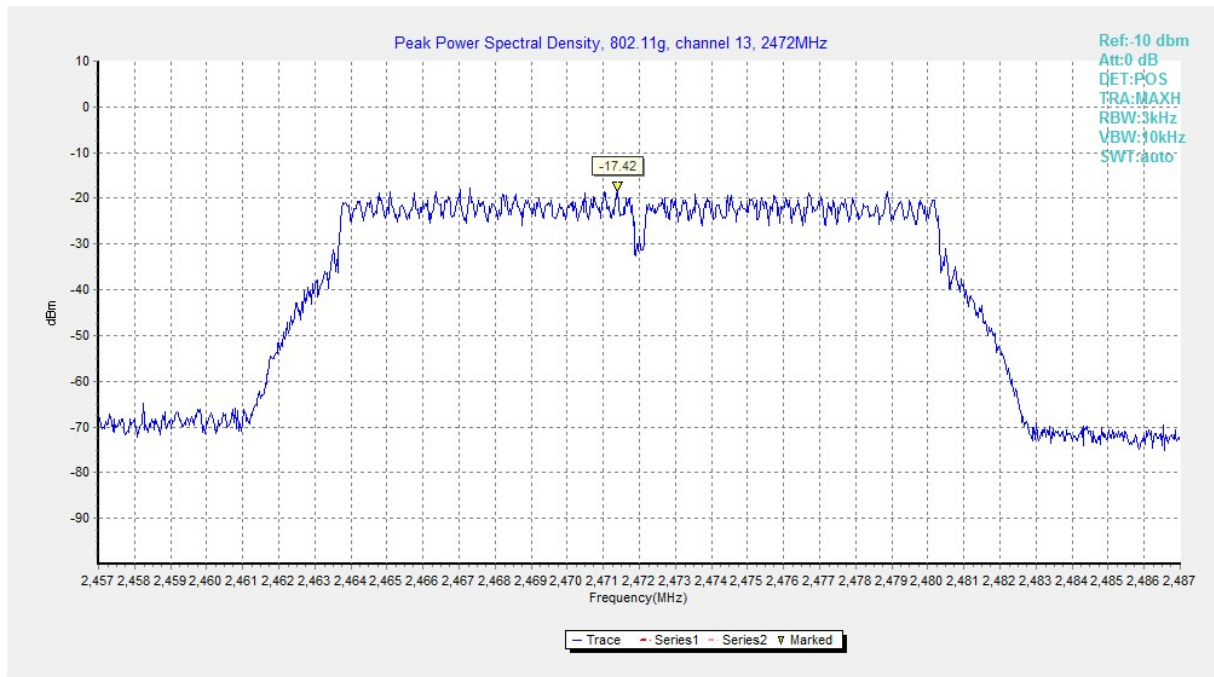


Fig.A.3.10 Power Spectral Density (802.11g, Ch 13)

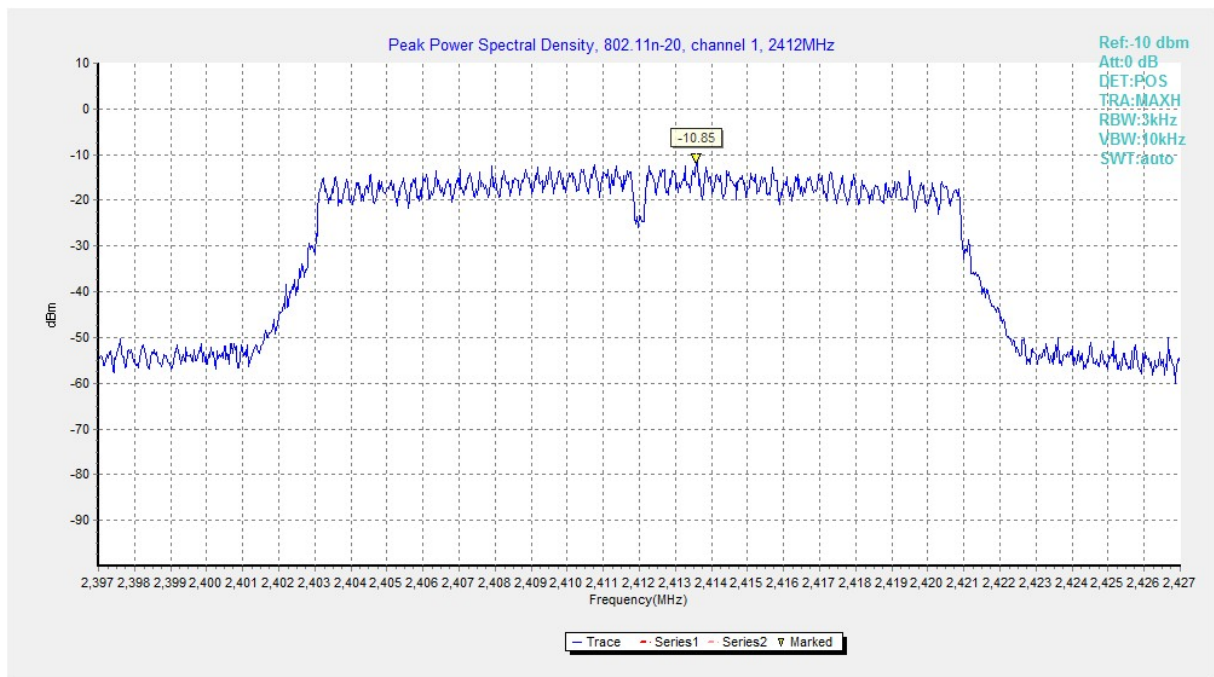


Fig.A.3.11 Power Spectral Density (802.11n-HT20, Ch 1)

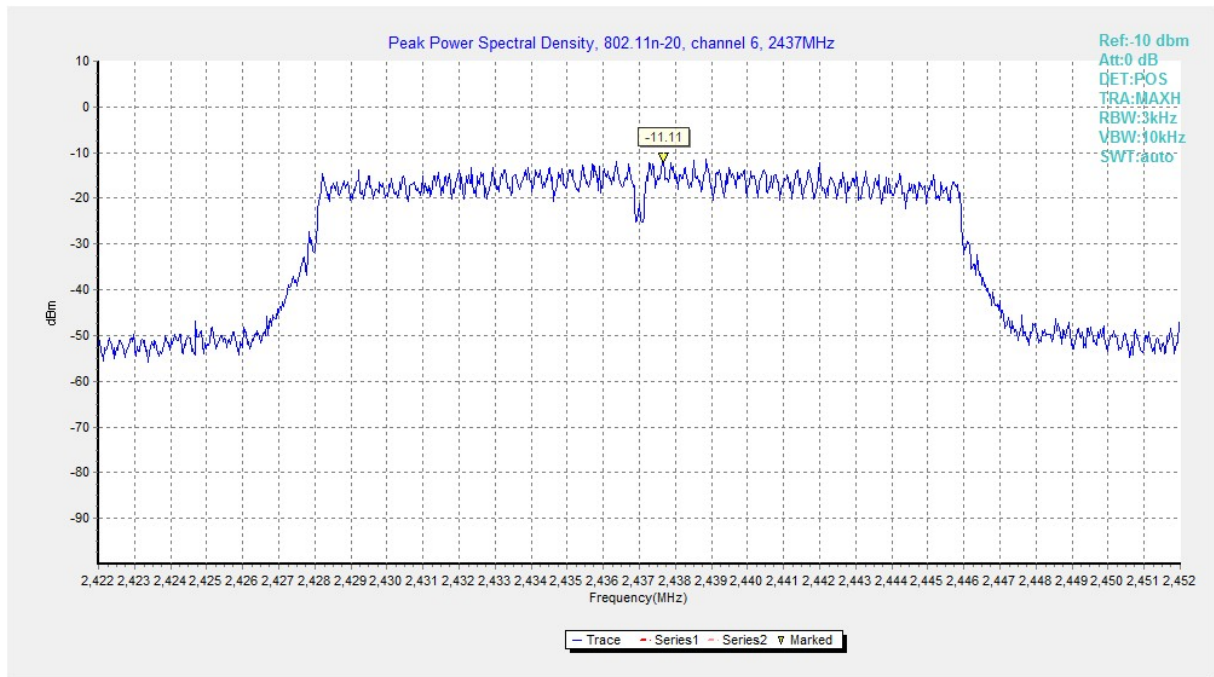


Fig.A.3.12 Power Spectral Density (802.11n-HT20, Ch 6)

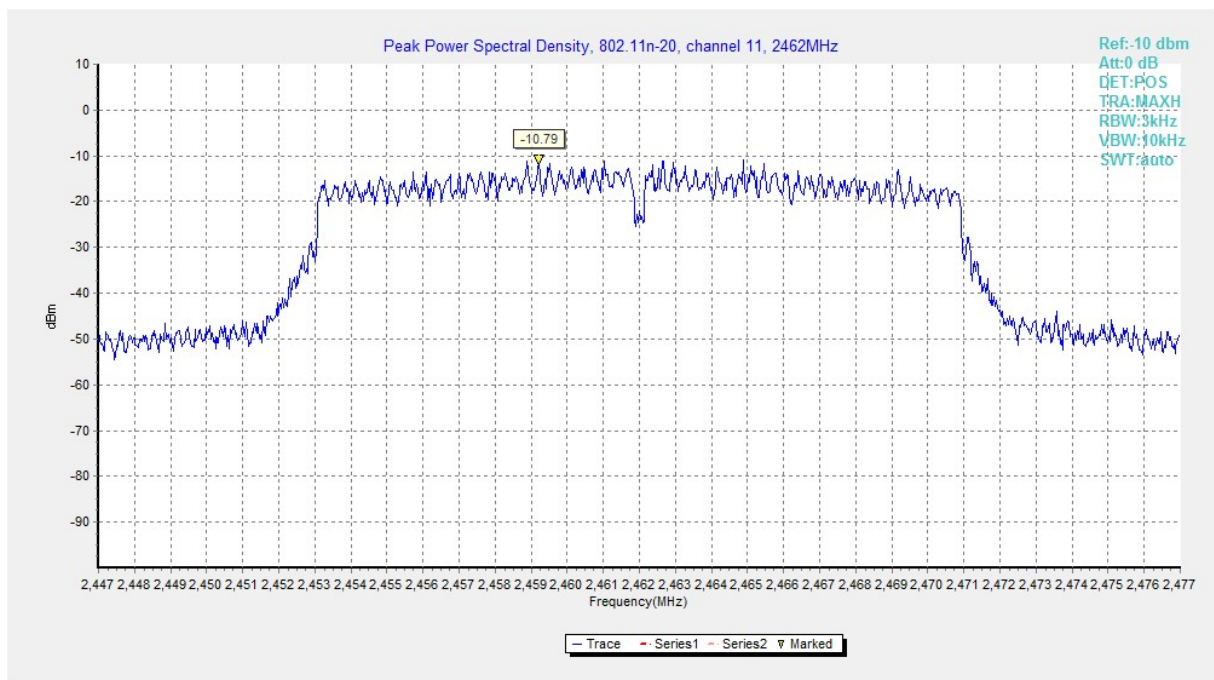


Fig.A.3.13 Power Spectral Density (802.11n-HT20, Ch 11)

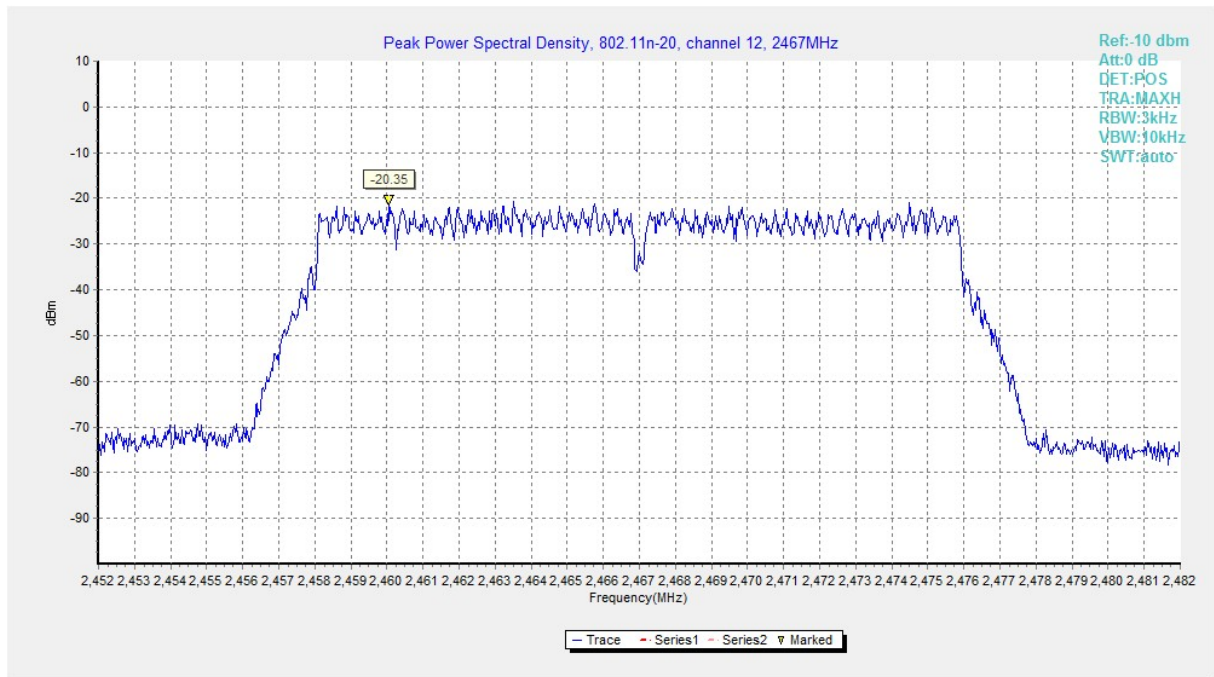


Fig.A.3.14 Power Spectral Density (802.11 n-HT20, Ch 12)

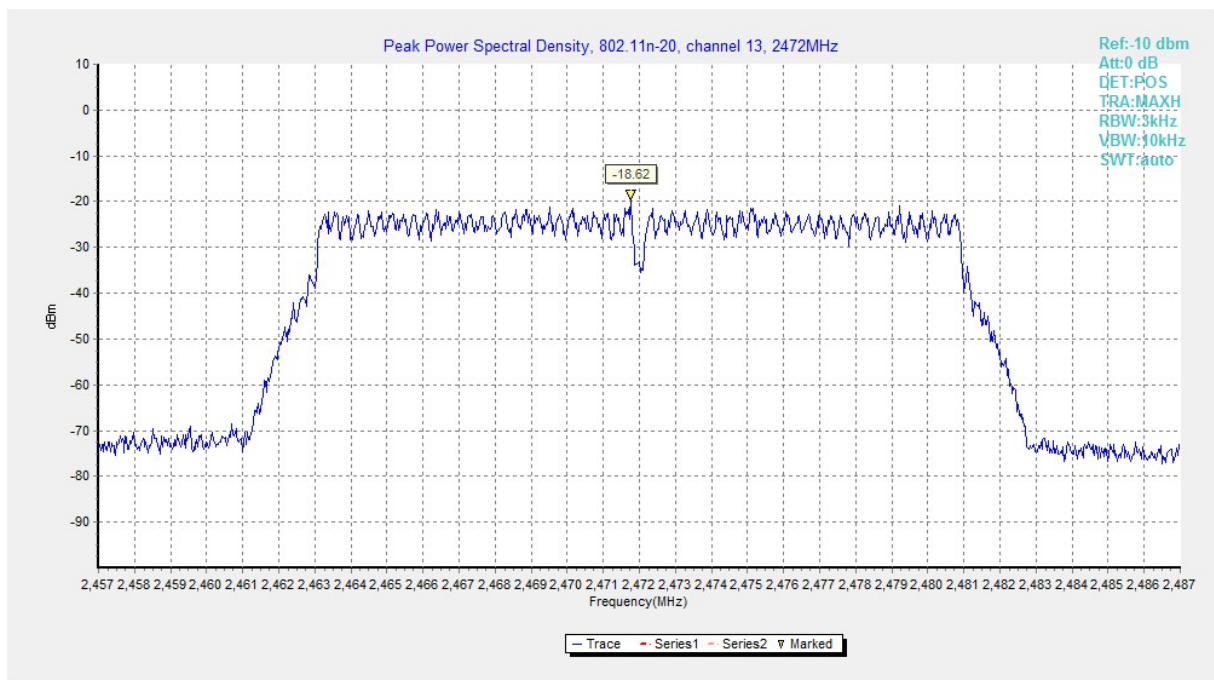


Fig.A.3.15 Power Spectral Density (802.11 n-HT20, Ch 13)

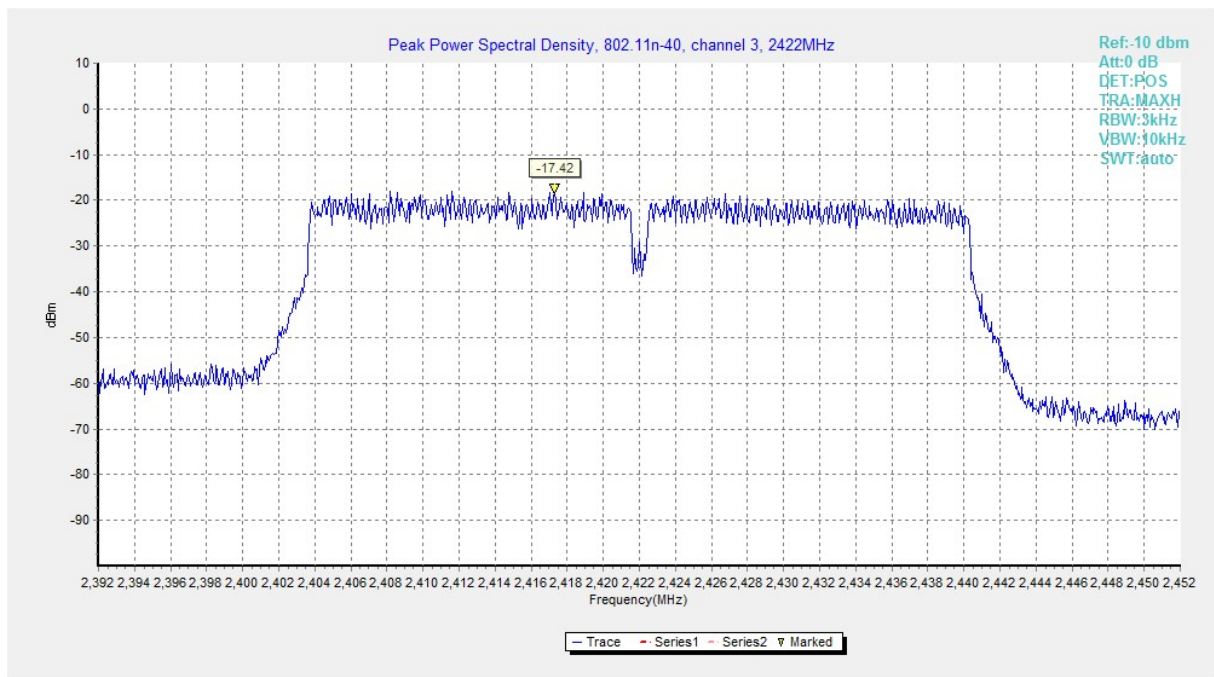


Fig.A.3.16 Power Spectral Density (802.11n-HT40, Ch 3)

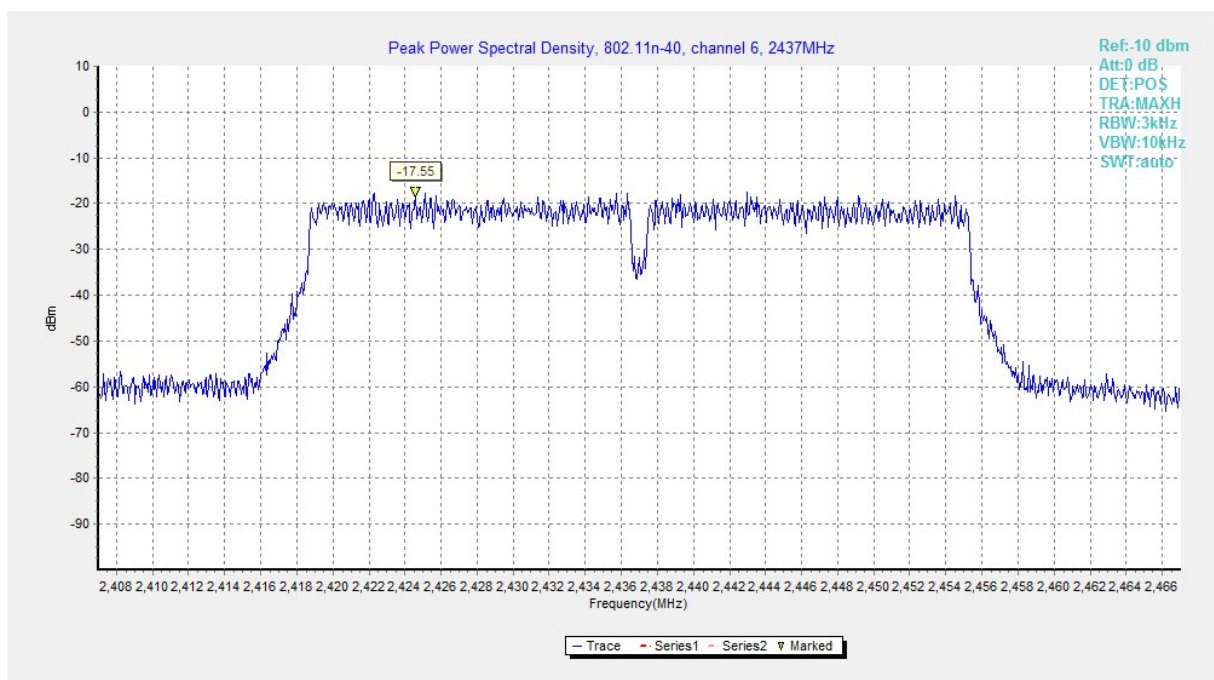


Fig.A.3.17 Power Spectral Density (802.11n-HT40, Ch 6)

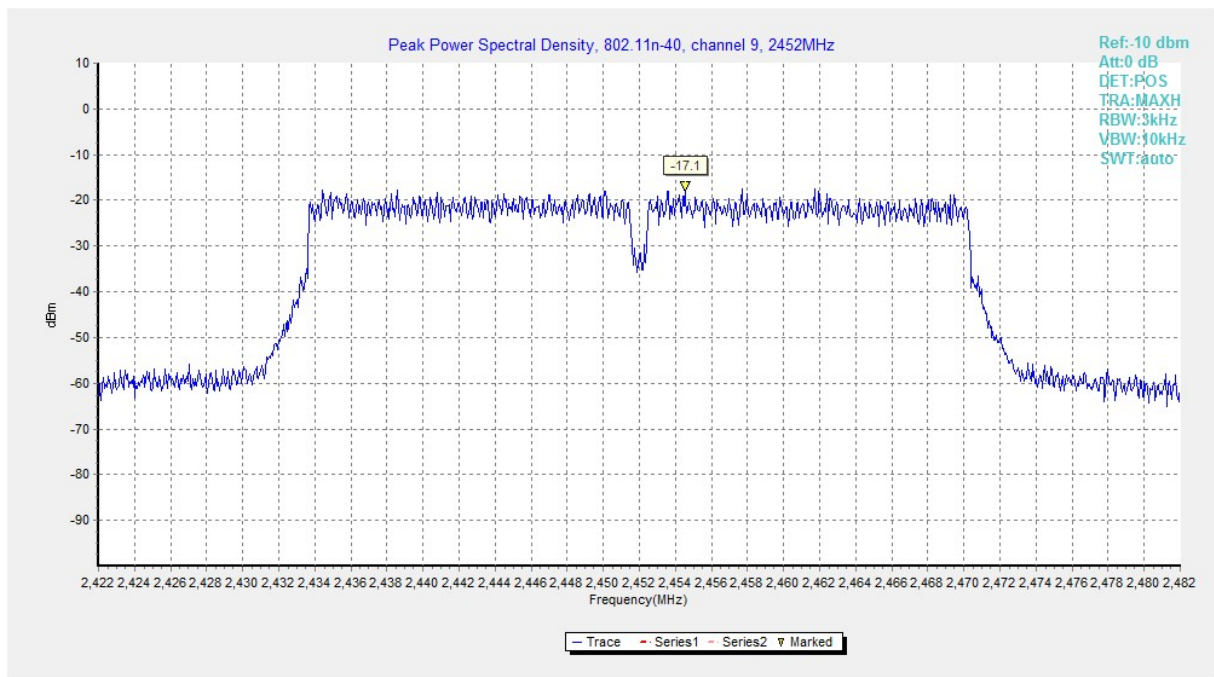


Fig.A.3.18 Power Spectral Density (802.11n-HT40, Ch 9)

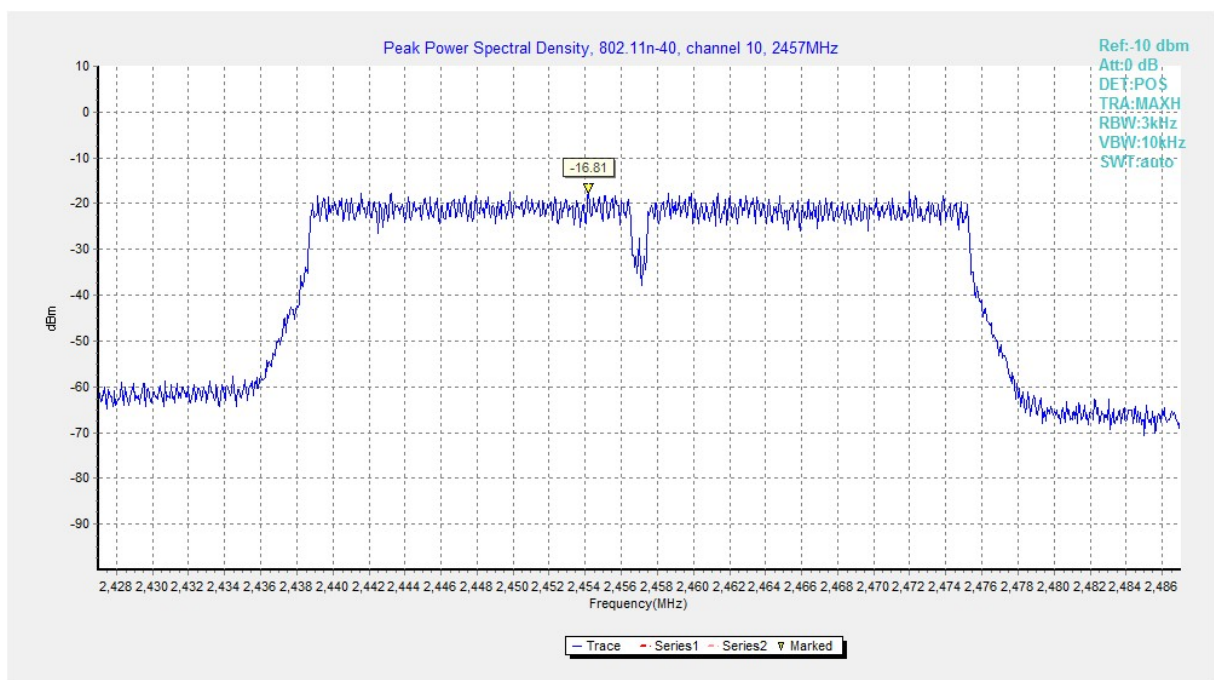


Fig.A.3.19 Power Spectral Density (802.11 n-HT40, Ch 10)

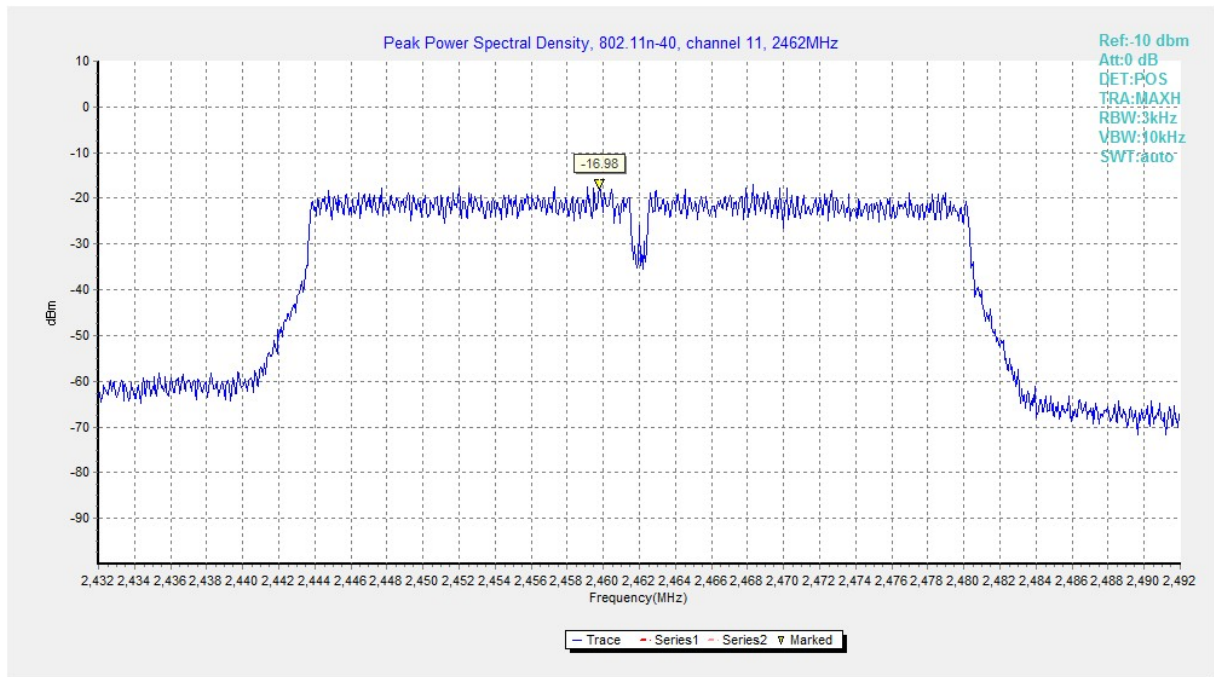


Fig.A.3.20 Power Spectral Density (802.11 n-HT40, Ch 11)