FCC RF Test Report

APPLICANT	:	**Motorola Mobility LLC**
EQUIPMENT	:	**Mobile Cellular Phone**
BRAND NAME	:	**Motorola**
MODEL NAME	:	**XT1926-5**
FCC ID	:	**IHDT56WL3**
STANDARD	:	**FCC Part 15 Subpart C §15.247**
CLASSIFICATION	:	**(DTS) Digital Transmission System**

The product was received on Dec. 28, 2017 and testing was completed on Feb. 13, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.

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TABLE OF CONTENTS

1 GENERAL DESCRIPTION 5

1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 5
1.5 Modification of EUT 5
1.6 Re-use of Measured Data 6
1.7 Specification of Accessory 7
1.8 Testing Location 8
1.9 Applicable Standards 8

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 9

2.1 Carrier Frequency and Channel 9
2.2 Test Mode 10
2.3 Connection Diagram of Test System 11
2.4 EUT Operation Test Setup 11

3 TEST RESULT 12

3.1 Radiated Band Edges and Spurious Emission Measurement 12

4 LIST OF MEASURING EQUIPMENT 16

5 UNCERTAINTY OF EVALUATION 17

APPENDIX A. RADIATED SPURIOUS EMISSION

APPENDIX B. DUTY CYCLE PLOTS

APPENDIX C. SETUP PHOTOGRAPHS

APPENDIX D. REFERENCE REPORT

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7D2702-05C	Rev. 01	Initial issue of report	Mar. 12, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.38 dB at 2483.600 MHz

1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT1926-5
FCC ID	IHDT56WL3
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE/ Bluetooth v4.2 LE/ Bluetooth v5.0 LE
IMEI Code	Radiation: 351855090018252/ 351855090018260
HW Version	DVT1B
SW Version	evert_n-userdebug 8.0.0 OPW27.88 1825 intcfg,test-keys
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Antenna Type / Gain	PIFA Antenna with gain -2.8 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Re-use of Measured Data

1.6.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT1926-5, FCC ID: IHDT56WL3) is electrically identical to the reference device (Model: XT1926-6, XT1926-7, FCC ID: IHDT56WL4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

1.6.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FR7D2702C for the reference device Model: XT1926-6, XT1926-7, FCC ID: IHDT56WL4):

1.6.3 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for conducted power and conducted spurious emission, the test result were consistent with FCC ID: IHDT56WL4 and radiation spurious emission to full re-test.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

1.6.4 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
DSS	IHDT56WL4	Part15C(FR7D2702A)	All sections (except RSE) applicable
DTS (BLE)	IHDT56WL4	Part15C(FR7D2702B)	All sections (except RSE) applicable
DTS (WLAN)	IHDT56WL4	Part15C(FR7D2702C)	All sections (except RSE) applicable
DXX	IHDT56WL4	Part15C(FR7D2702D)	All sections (except RSE) applicable

1.7 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola (Salom)	Model Name	SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(EU)	Brand Name	Motorola (Salom)	Model Name	SC-23
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(UK)	Brand Name	Motorola (Salom)	Model Name	SC-24
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(IN)	Brand Name	Motorola (Salom)	Model Name	SC-25
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1(AU)	Brand Name	Motorola (Salom)	Model Name	SC-26
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 1 (Indonesia)	Brand Name	Motorola (Salom)	Model Name	SC-23
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(US)	Brand Name	Motorola (Chenyang)	Model Name	SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(EU)	Brand Name	Motorola (Chenyang)	Model Name	SC-23
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(UK)	Brand Name	Motorola (Chenyang)	Model Name	SC-24
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(IN)	Brand Name	Motorola (Chenyang)	Model Name	SC-25
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
AC Adapter 2(AU)	Brand Name	Motorola (Chenyang)	Model Name	SC-26
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA		
Battery	Brand Name	Motorola (ATL)	Model Name	JT40
	Power Rating	3.8Vdc,3200mAh	Type	Li-ion Polymer
Earphone 1	Brand Name	Motorola (Jiahe)	Model Name	LS-118M-12
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core		
Earphone 2	Brand Name	Motorola (Lianyun)	Model Name	TS910A-38AMS01WHR-M
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core		
USB Cable	Brand Name	Motorola (Liqi)	Model Name	L32B-053000100-ALL
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		

1.8 Testing Location

SPORTON INTERNATIONAL INC. is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1007 under the FCC-recognized accredited testing laboratories by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.58, Aly. 75, Ln. 564 Wenha 3rd Rd. Guishan Dist. Taoyuan City Taiwan TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	03CH12-HY	214511

Note: The test site complies with ANSI C63.4 2014 requirement.

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

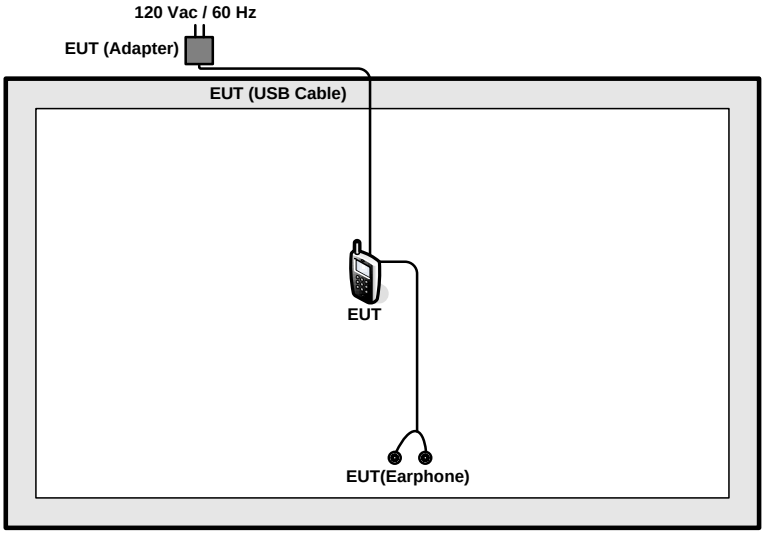
2.2 Test Mode

Final test mode of radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	36 Mbps
802.11n HT20	MCS4

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



2.4 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.1.2 Measuring Instruments

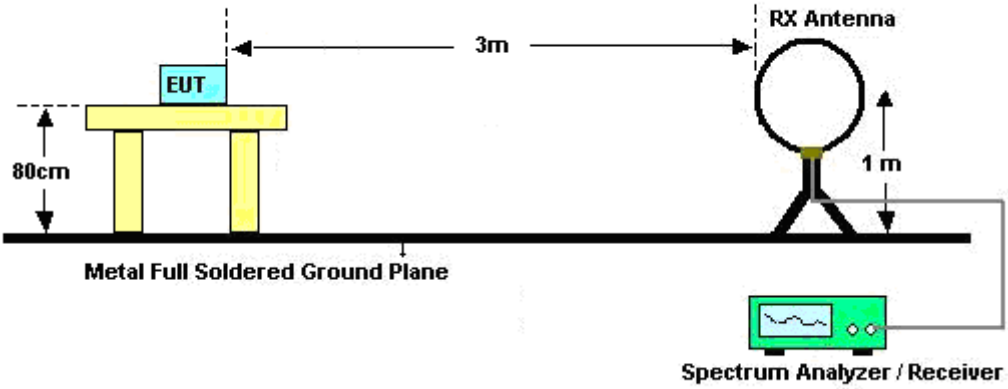
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

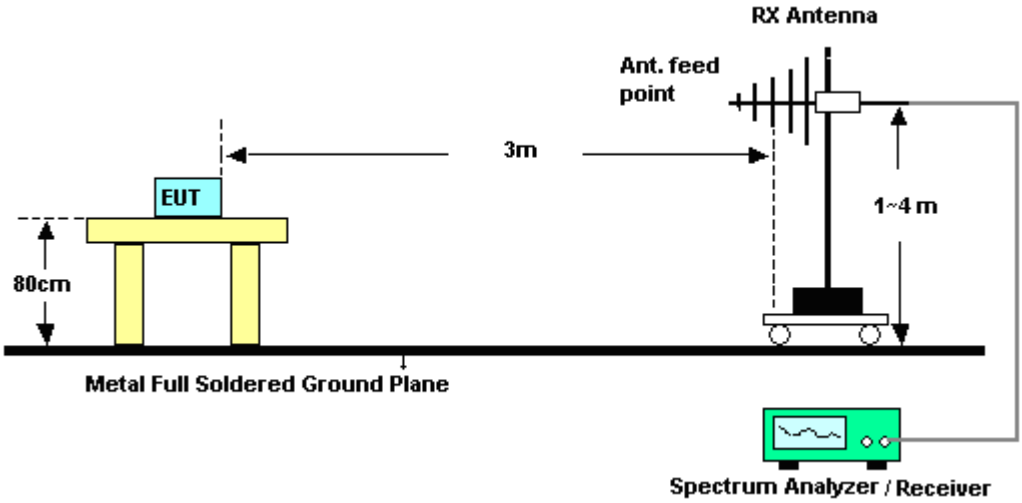
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.1.4 Test Setup

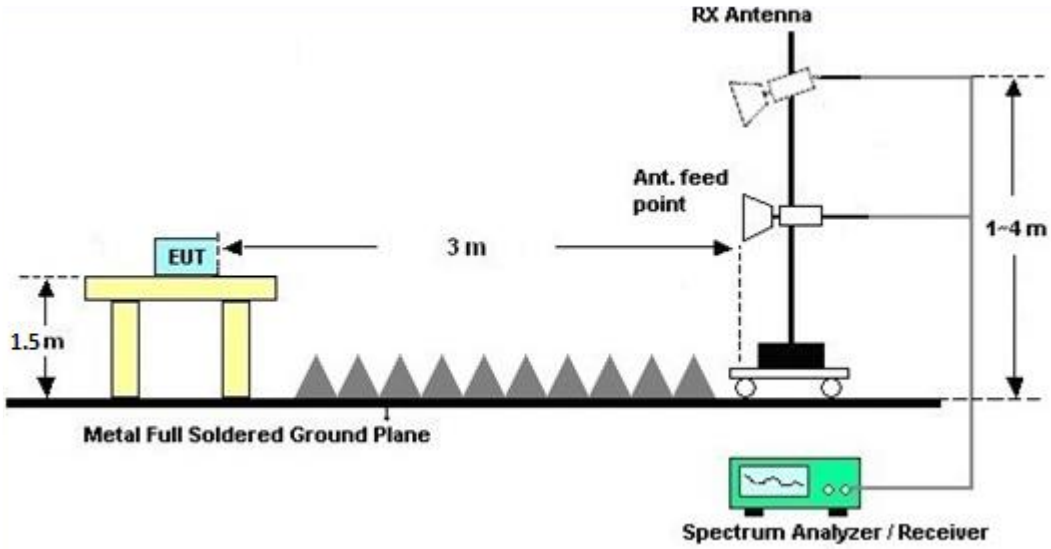
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

3.1.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A.

3.1.7 Duty Cycle

Please refer to Appendix B.

3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix A.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Feb. 09, 2018~ Feb. 13, 2018	Jul. 17, 2018	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N0602	30MHz~1GHz	Oct. 14, 2017	Feb. 09, 2018~ Feb. 13, 2018	Oct. 13, 2018	Radiation (03CH12-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Feb. 09, 2018~ Feb. 13, 2018	Nov. 22, 2018	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 25, 2017	Feb. 09, 2018~ Feb. 13, 2018	Dec. 24, 2018	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 20, 2017	Feb. 09, 2018~ Feb. 13, 2018	Oct. 19, 2018	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Oct. 12, 2017	Feb. 09, 2018~ Feb. 13, 2018	Oct. 11, 2018	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 23, 2017	Feb. 09, 2018~ Feb. 13, 2018	Mar. 22, 2018	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 15, 2018	Feb. 09, 2018~ Feb. 13, 2018	Jan. 14, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN2	1.2G Low Pass	Mar. 24, 2017	Feb. 09, 2018~ Feb. 13, 2018	Mar. 23, 2018	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	NCR	Feb. 09, 2018~ Feb. 13, 2018	NCR	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	NCR	Feb. 09, 2018~ Feb. 13, 2018	NCR	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	NCR	Feb. 09, 2018~ Feb. 13, 2018	NCR	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 27, 2017	Feb. 09, 2018~ Feb. 13, 2018	Apr. 26, 2018	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2017	Feb. 09, 2018~ Feb. 13, 2018	Mar. 14, 2018	Radiation (03CH12-HY)

NCR: No Calibration Required

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7dB**

Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2364.39	54.24	-19.76	74	44.71	27.07	14.04	31.58	100	355	P	H
		2390	42.64	-11.36	54	33	27.15	14.06	31.57	100	355	A	H
	*	2412	108.25	-	-	98.55	27.19	14.08	31.57	100	355	P	H
	*	2412	103.96	-	-	94.26	27.19	14.08	31.57	100	355	A	H
		2360.505	53.62	-20.38	74	44.09	27.07	14.04	31.58	269	294	P	V
		2390	41.86	-12.14	54	32.22	27.15	14.06	31.57	269	294	A	V
	*	2412	105.32	-	-	95.62	27.19	14.08	31.57	269	294	P	V
	*	2412	100.96	-	-	91.26	27.19	14.08	31.57	269	294	A	V
802.11b CH 06 2437MHz		2379.72	53.6	-20.4	74	44.01	27.11	14.06	31.58	122	357	P	H
		2388.96	41.6	-12.4	54	31.97	27.15	14.06	31.58	122	357	A	H
	*	2437	106.74	-	-	96.93	27.28	14.1	31.57	122	357	P	H
	*	2437	102.42	-	-	92.61	27.28	14.1	31.57	122	357	A	H
		2496.85	54.35	-19.65	74	44.36	27.4	14.14	31.55	122	357	P	H
		2484.04	42.39	-11.61	54	32.45	27.36	14.14	31.56	122	357	A	H
		2370.76	53.34	-20.66	74	43.77	27.11	14.04	31.58	324	278	P	V
		2389.52	41.52	-12.48	54	31.89	27.15	14.06	31.58	324	278	A	V
	*	2437	104.46	-	-	94.65	27.28	14.1	31.57	324	278	P	V
	*	2437	100.18	-	-	90.37	27.28	14.1	31.57	324	278	A	V
		2498.53	53.68	-20.32	74	43.69	27.4	14.14	31.55	324	278	P	V
		2483.97	42.15	-11.85	54	32.21	27.36	14.14	31.56	324	278	A	V

802.11b CH 11 2462MHz	*	2462	108.36	-	-	98.49	27.32	14.11	31.56	141	357	P	H
	*	2462	104.37	-	-	94.5	27.32	14.11	31.56	141	357	A	H
		2489.12	54.67	-19.33	74	44.69	27.4	14.14	31.56	141	357	P	H
		2484.96	43.3	-10.7	54	33.36	27.36	14.14	31.56	141	357	A	H
	*	2462	105.81	-	-	95.94	27.32	14.11	31.56	289	280	P	V
	*	2462	101.76	-	-	91.89	27.32	14.11	31.56	289	280	A	V
		2484	54.31	-19.69	74	44.37	27.36	14.14	31.56	289	280	P	V
		2484	43.12	-10.88	54	33.18	27.36	14.14	31.56	289	280	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	45.12	-28.88	74	71.8	31.36	6.7	64.74	100	0	P	H
		4824	45.89	-28.11	74	72.57	31.36	6.7	64.74	100	0	P	V
802.11b CH 06 2437MHz		4874	42.44	-31.56	74	68.95	31.46	6.73	64.7	100	0	P	H
		7311	43.55	-30.45	74	64.19	36.11	8.07	64.82	100	0	P	H
		4874	41.54	-32.46	74	68.05	31.46	6.73	64.7	100	0	P	V
		7311	45.02	-28.98	74	65.66	36.11	8.07	64.82	100	0	P	V
802.11b CH 11 2462MHz		4924	46.3	-27.7	74	72.67	31.56	6.73	64.66	100	0	P	H
		7386	44.6	-29.4	74	65.12	36.33	8.01	64.86	400	0	P	H
		4924	43.58	-30.42	74	69.95	31.56	6.73	64.66	100	0	P	V
		7386	43.81	-30.19	74	64.33	36.33	8.01	64.86	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.905	59.92	-14.08	74	50.28	27.15	14.06	31.57	149	336	P	H
		2390	47.8	-6.2	54	38.16	27.15	14.06	31.57	149	336	A	H
	*	2412	107.67	-	-	97.97	27.19	14.08	31.57	149	336	P	H
	*	2412	97.98	-	-	88.28	27.19	14.08	31.57	149	336	A	H
		2389.065	57.2	-16.8	74	47.57	27.15	14.06	31.58	349	265	P	V
		2390	45.54	-8.46	54	35.9	27.15	14.06	31.57	349	265	A	V
	*	2412	105.35	-	-	95.65	27.19	14.08	31.57	349	265	P	V
	*	2412	95.5	-	-	85.8	27.19	14.08	31.57	349	265	A	V
802.11g CH 06 2437MHz		2338.84	53.78	-20.22	74	44.32	27.03	14.01	31.58	118	357	P	H
		2389.94	42.91	-11.09	54	33.27	27.15	14.06	31.57	118	357	A	H
	*	2437	107.45	-	-	97.64	27.28	14.1	31.57	118	357	P	H
	*	2437	96.95	-	-	87.14	27.28	14.1	31.57	118	357	A	H
		2483.97	55.52	-18.48	74	45.58	27.36	14.14	31.56	118	357	P	H
		2483.55	44.62	-9.38	54	34.68	27.36	14.14	31.56	118	357	A	H
		2367.96	53.57	-20.43	74	44.04	27.07	14.04	31.58	326	300	P	V
		2387.14	42.52	-11.48	54	32.89	27.15	14.06	31.58	326	300	A	V
	*	2437	104.73	-	-	94.92	27.28	14.1	31.57	326	300	P	V
	*	2437	94.61	-	-	84.8	27.28	14.1	31.57	326	300	A	V
		2489.36	54.88	-19.12	74	44.9	27.4	14.14	31.56	326	300	P	V
		2485.3	44.13	-9.87	54	34.19	27.36	14.14	31.56	326	300	A	V

802.11g CH 11 2462MHz	*	2462	105.49	-	-	95.62	27.32	14.11	31.56	144	338	P	H
	*	2462	95.79	-	-	85.92	27.32	14.11	31.56	144	338	A	H
		2483.56	66.63	-7.37	74	56.69	27.36	14.14	31.56	144	338	P	H
		2483.6	50.62	-3.38	54	40.68	27.36	14.14	31.56	144	338	A	H
	*	2462	103.42	-	-	93.55	27.32	14.11	31.56	352	290	P	V
	*	2462	93.24	-	-	83.37	27.32	14.11	31.56	352	290	A	V
		2483.52	63.93	-10.07	74	53.99	27.36	14.14	31.56	352	290	P	V
		2483.52	49.5	-4.5	54	39.56	27.36	14.14	31.56	352	290	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	40.51	-33.49	74	67.19	31.36	6.7	64.74	100	0	P	H
		4824	41	-33	74	67.68	31.36	6.7	64.74	100	0	P	V
802.11g CH 06 2437MHz		4874	41.83	-32.17	74	68.34	31.46	6.73	64.7	100	0	P	H
		7311	44.44	-29.56	74	65.08	36.11	8.07	64.82	100	0	P	H
		4874	39.37	-34.63	74	65.88	31.46	6.73	64.7	100	0	P	V
		7311	44.83	-29.17	74	65.47	36.11	8.07	64.82	100	0	P	V
802.11g CH 11 2462MHz		4924	40.84	-33.16	74	67.21	31.56	6.73	64.66	100	0	P	H
		7386	44.48	-29.52	74	65	36.33	8.01	64.86	100	0	P	H
		4924	40.31	-33.69	74	66.68	31.56	6.73	64.66	100	0	P	V
		7386	44.39	-29.61	74	64.91	36.33	8.01	64.86	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.485	55.28	-18.72	74	45.65	27.15	14.06	31.58	100	351	P	H
		2389.695	44.95	-9.05	54	35.32	27.15	14.06	31.58	100	351	A	H
	*	2412	107.53	-	-	97.83	27.19	14.08	31.57	100	351	P	H
	*	2412	96.88	-	-	87.18	27.19	14.08	31.57	100	351	A	H
		2389.485	53.91	-20.09	74	44.28	27.15	14.06	31.58	259	260	P	V
		2390	43.46	-10.54	54	33.82	27.15	14.06	31.57	259	260	A	V
	*	2412	105.92	-	-	96.22	27.19	14.08	31.57	259	260	P	V
	*	2412	95.48	-	-	85.78	27.19	14.08	31.57	259	260	A	V
802.11n HT20 CH 06 2437MHz		2346.12	53.51	-20.49	74	44.03	27.03	14.03	31.58	118	355	P	H
		2389.94	42.77	-11.23	54	33.13	27.15	14.06	31.57	118	355	A	H
	*	2437	105.27	-	-	95.46	27.28	14.1	31.57	118	355	P	H
	*	2437	95.02	-	-	85.21	27.28	14.1	31.57	118	355	A	H
		2483.9	55.65	-18.35	74	45.71	27.36	14.14	31.56	118	355	P	H
		2483.62	44.3	-9.7	54	34.36	27.36	14.14	31.56	118	355	A	H
		2381.96	54.13	-19.87	74	44.54	27.11	14.06	31.58	326	300	P	V
		2389.52	42.41	-11.59	54	32.78	27.15	14.06	31.58	326	300	A	V
	*	2437	102.37	-	-	92.56	27.28	14.1	31.57	326	300	P	V
	*	2437	92.05	-	-	82.24	27.28	14.1	31.57	326	300	A	V
		2484.04	55.21	-18.79	74	45.27	27.36	14.14	31.56	326	300	P	V
		2484.95	43.74	-10.26	54	33.8	27.36	14.14	31.56	326	300	A	V

802.11n HT20 CH 11 2462MHz	*	2462	105.3	-	-	95.43	27.32	14.11	31.56	140	357	P	H
	*	2462	95.06	-	-	85.19	27.32	14.11	31.56	140	357	A	H
		2484.32	59.58	-14.42	74	49.64	27.36	14.14	31.56	140	357	P	H
		2483.52	47.76	-6.24	54	37.82	27.36	14.14	31.56	140	357	A	H
	*	2462	102.98	-	-	93.11	27.32	14.11	31.56	353	303	P	V
	*	2462	92.27	-	-	82.4	27.32	14.11	31.56	353	303	A	V
		2483.68	57.66	-16.34	74	47.72	27.36	14.14	31.56	353	303	P	V
		2483.68	46.15	-7.85	54	36.21	27.36	14.14	31.56	353	303	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	41.12	-32.88	74	67.8	31.36	6.7	64.74	100	0	P	H
		4824	40.56	-33.44	74	67.24	31.36	6.7	64.74	100	0	P	V
802.11n HT20 CH 06 2437MHz		4874	40.78	-33.22	74	67.29	31.46	6.73	64.7	100	0	P	H
		7311	44.15	-29.85	74	64.79	36.11	8.07	64.82	100	0	P	H
		4874	41.06	-32.94	74	67.57	31.46	6.73	64.7	100	0	P	V
		7311	44.38	-29.62	74	65.02	36.11	8.07	64.82	100	0	P	V
802.11n HT20 CH 11 2462MHz		4924	40.93	-33.07	74	67.3	31.56	6.73	64.66	100	0	P	H
		7386	43.76	-30.24	74	64.28	36.33	8.01	64.86	100	0	P	H
		4924	39.62	-34.38	74	65.99	31.56	6.73	64.66	100	0	P	V
		7386	43.53	-30.47	74	64.05	36.33	8.01	64.86	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		31.62	23.47	-16.53	40	30	23.24	0.44	30.21	-	-	P	H
		175.8	26.95	-16.55	43.5	41.03	14.96	1.26	30.3	-	-	P	H
		295.41	22.43	-23.57	46	32.1	18.99	1.49	30.15	-	-	P	H
		439.3	27.45	-18.55	46	32.81	22.78	1.76	29.9	-	-	P	H
		862.1	32.8	-13.2	46	30.49	29.05	2.49	29.23	100	0	P	H
		962.2	34.33	-19.67	54	29.51	31.12	2.74	29.04	-	-	P	H
		34.59	31.38	-8.62	40	39.34	21.84	0.45	30.25	100	0	P	V
		175.53	21.34	-22.16	43.5	35.42	14.96	1.26	30.3	-	-	P	V
		297.3	20.48	-25.52	46	30.09	19.04	1.49	30.14	-	-	P	V
		424.6	25.07	-20.93	46	30.72	22.58	1.7	29.93	-	-	P	V
		779.5	30.18	-15.82	46	29.18	28	2.38	29.38	-	-	P	V
		978.3	34.82	-19.18	54	29.96	31.1	2.76	29	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

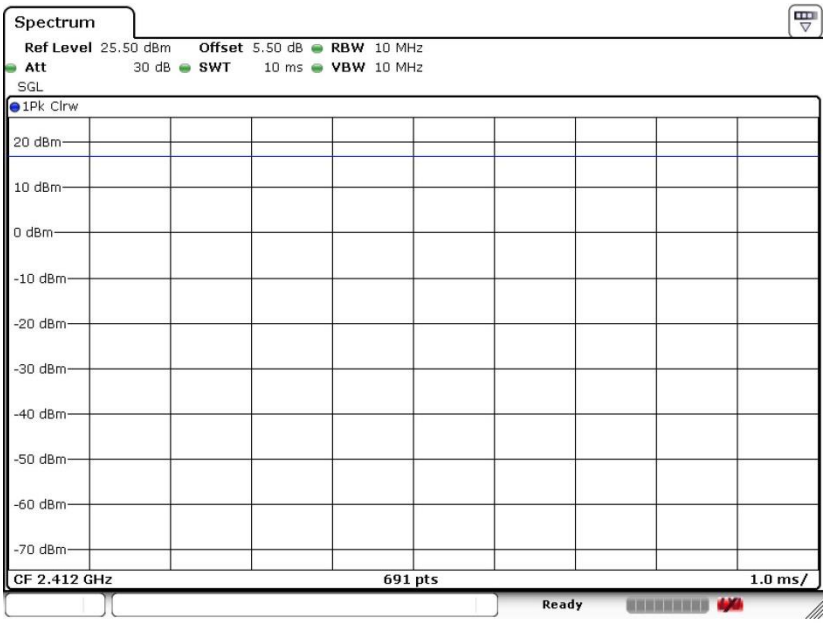
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

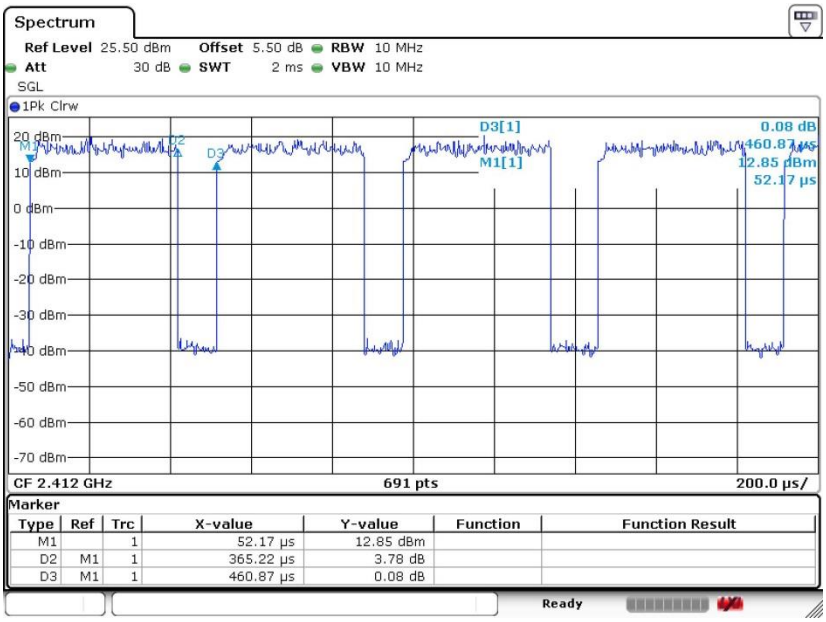
Appendix B. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100.00	-	-	10Hz
802.11g (36Mbps)	79.25	0.365	2.738	3kHz
802.11n HT20 (MCS4)	75.78	0.354	2.828	3kHz

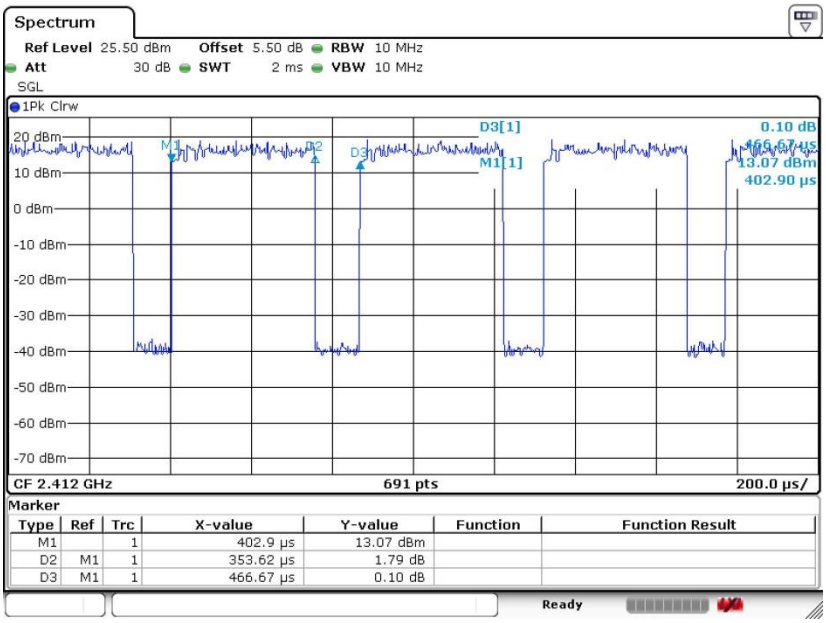
802.11b



802.11g



802.11n HT20


Spectrum
Ref Level 25.50 dBm Offset 5.50 dB RBW 10 MHz
Att 30 dB SWT 2 ms VBW 10 MHz
SGL
1Pk Clrw
D3[1] 0.10 dB
466.67 µs
M1[1] 13.07 dBm
402.90 µs
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 2.412 GHz 691 pts 200.0 µs/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 402.9 µs 13.07 dBm
D2 M1 1 353.62 µs 1.79 dB
D3 M1 1 466.67 µs 0.10 dB
Ready

Appendix D. Reference Report

Please refer to Sporton report number FR7D2702C which is issued separately.