

FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2127-4
FCC ID : IHDT56ZM3
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Oct. 22, 2020 and testing was completed on Dec. 23, 2020. We, Sporton International (ShenZhen) 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.



Reviewed by: Derreck Chen / Supervisor



Approved by: Eric Shih / Manager



Sporton International (ShenZhen) Inc.

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People's Republic of China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR002013-03C	Rev. 01	Initial issue of report	Dec. 25, 2020



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 3.14 dB at 2390.00 MHz
3.2	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Motorola Mobility LLC
222 W,Merchandise Mart Plaza,Chicago,IL60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza,Chicago,IL60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2127-4
FCC ID	IHDT56ZM3
EUT supports Radios application	GSM/WCDMA/LTE WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE FM Receiver and GNSS
IMEI Code	Radiation: 358922320014619/358922320014627
HW Version	DVT2
SW Version	RRB31.30
EUT Stage	Production Unit

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 type with gain -0.50 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 Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola (Acbel)	Model Name	MC-201
AC Adapter 2(US)	Brand Name	Motorola (Chenyang)	Model Name	MC-201
AC Adapter 2(IN)	Brand Name	Motorola (Chenyang)	Model Name	MC-204
Battery	Brand Name	Motorola (ATL)	Model Name	MH60
USB Cable 1	Brand Name	Motorola (Chuangyitong)	Model Name	88806-024
USB Cable 2	Brand Name	Motorola (SUNTOPS)	Model Name	336258

1.7 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sporton International (Shenzhen) Inc.		
Test Location Site	1F., Building B, No. 2, Tengfeng Fourth Rd., 3rd Fenghuang Industrial Park, Fuyong st., Baoan District, Shenzhen, Guangdong, P.R.China TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-SZ	CN1256	421272

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-SZ	AUDIX	E3	6.2009-8-24

1.9 Applicable Standards

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

- ♦ 47 CFR Part 15 Subpart C §15.247
- ♦ FCC KDB 558074 D01 15.247 Meas Guidance v05r02
- ♦ 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.

1.10 Re-use of Measured Data

1.10.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2127-4, FCC ID: IHDT56ZM3) is electrically identical to the reference device (Model: XT2127-2, FCC ID: IHDT56ZM2) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

1.10.2 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. FR002013C for the reference device Model: XT2127-2, FCC ID: IHDT56ZM2).

1.10.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
DSS (BR/EDR)	IHDT56ZM2	Part15C(FR002013A)	All sections applicable except for RSE
DTS (BLE)	IHDT56ZM2	Part15C(FR002013B)	All sections applicable except for RSE
DTS (WLAN)	IHDT56ZM2	Part15C(FR002013C)	All sections applicable except for RSE



1.10.4 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 the following test items, the test result were consistent with FCC ID: IHDT56ZM2 and the RSE to 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.

Test Item	Mode	IHDT56ZM2 Worst Result	IHDT56ZM3 Worst Result	Difference (dB)
Conducted Power (dBm)	BT2.0 DH1 CH39	11.3	11	0.3
	BLE CH19	6.1	5.8	0.3
	802.11b CH11	18.5	18.2	0.3
	802.11g CH1	17.8	17.6	0.2
	802.11g CH1	17.8	17.1	0.7
	802.11n HT20 CH1	17.8	17.6	0.2
	802.11n HT20 CH1	17.8	17.1	0.7

2 Test Configuration of Equipment Under Test

- a. 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: radiation 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 (Z plane) were recorded in this report.

2.1 Carrier Frequency and Channel

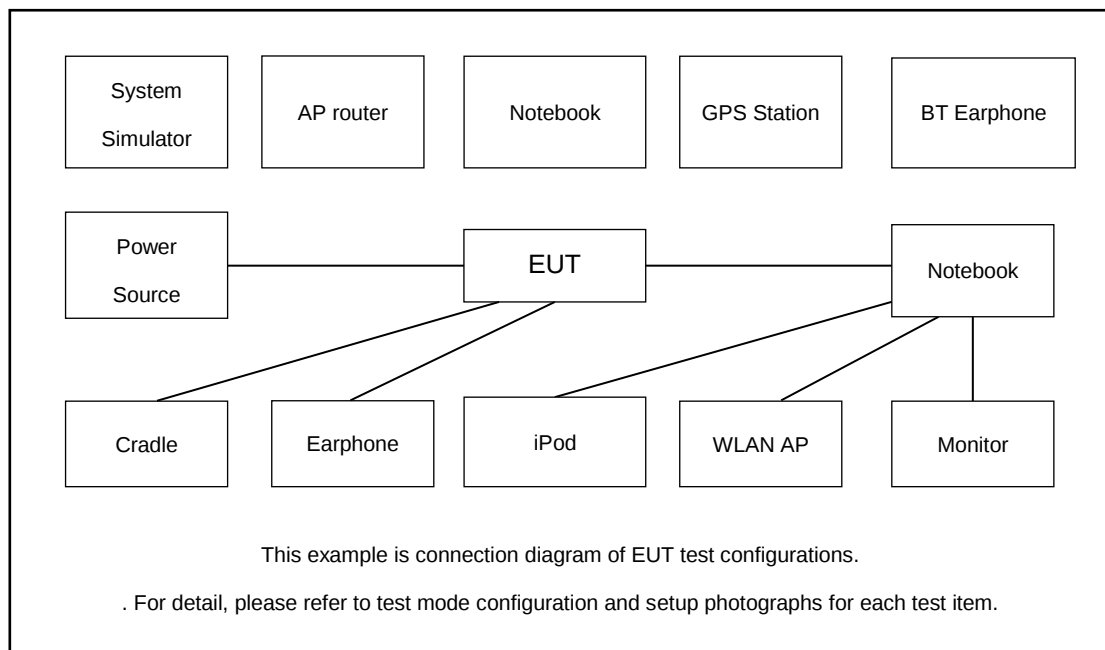
Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Earphone	Apple	MC690ZP/A	N/A	Shielded, 1.0m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an 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

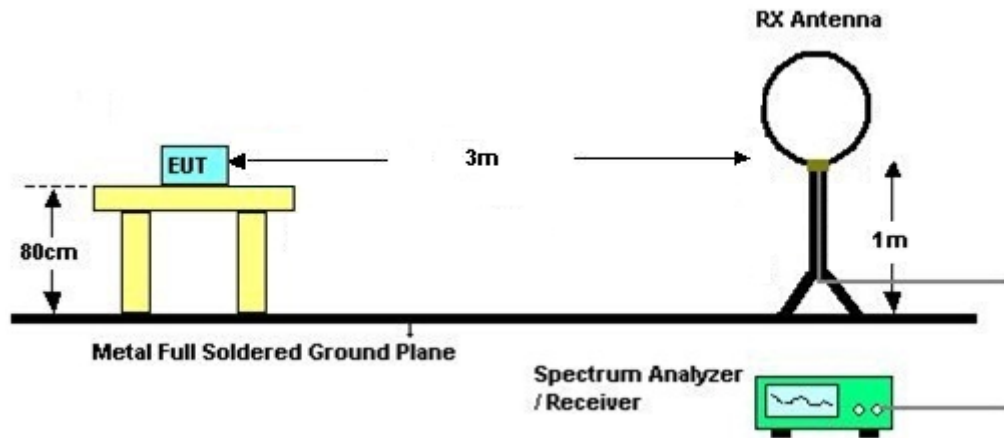
The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

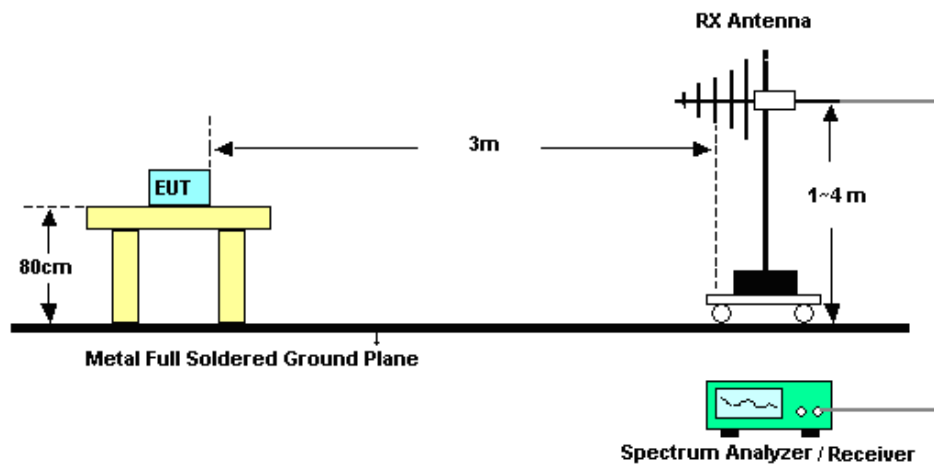
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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 testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. 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 $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, 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

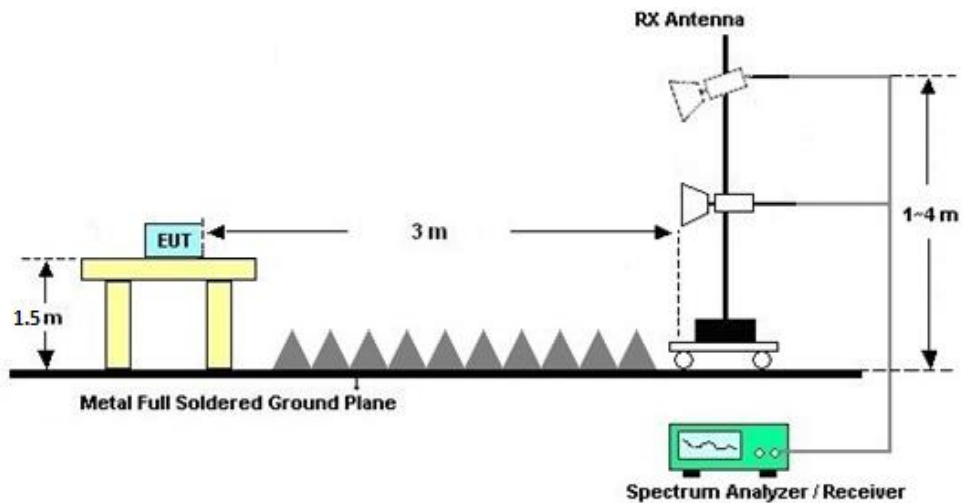
For radiated emissions below 30MHz



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.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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 or 40GHz, whichever is lower)

Please refer to Appendix A.



3.2 Antenna Requirements

3.2.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 17, 2020	Dec. 23, 2020	Apr. 16, 2021	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2019	Dec. 23, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2019	Dec. 23, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 16, 2020	Dec. 09, 2020	Oct. 15, 2021	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 21, 2020	Dec. 09, 2020	Jul. 20, 2021	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Dec. 09, 2020	Jun. 21, 2022	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Nov. 07, 2020	Dec. 09, 2020	Nov. 06, 2021	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	May 23, 2020	Dec. 09, 2020	May 22, 2021	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 26, 2020	Dec. 09, 2020	Jul. 25, 2021	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct. 16, 2020	Dec. 09, 2020	Oct. 15, 2021	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 17, 2020	Dec. 09, 2020	Oct. 16, 2021	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21, 2020	Dec. 09, 2020	Jul. 20, 2021	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Oct. 17, 2020	Dec. 09, 2020	Oct. 16, 2021	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Dec. 09, 2020	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Dec. 09, 2020	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Dec. 09, 2020	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Appendix B. 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	Cable Loss	Preamplifier 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		2389.065	51.65	-22.35	74	50.38	27.82	5.37	31.92	292	136	P	H
		2388.54	40.16	-13.84	54	38.89	27.82	5.37	31.92	292	136	A	H
		2412	106.27	-	-	105.01	27.79	5.37	31.9	292	136	P	H
		2412	103.02	-	-	101.76	27.79	5.37	31.9	292	136	A	H
		2390	53.12	-20.88	74	51.84	27.81	5.37	31.9	124	112	P	V
		2388.96	42.54	-11.46	54	41.27	27.82	5.37	31.92	124	112	A	V
		2412	110.15	-	-	108.89	27.79	5.37	31.9	124	112	P	V
		2412	106.88	-	-	105.62	27.79	5.37	31.9	124	112	A	V
802.11b CH 06 2437MHz		2388.82	53.34	-20.66	74	52.07	27.82	5.37	31.92	288	140	P	H
		2385.6	38.31	-15.69	54	37.04	27.82	5.37	31.92	288	140	A	H
		2437	105.11	-	-	103.8	27.78	5.41	31.88	288	140	P	H
		2437	102.11	-	-	100.8	27.78	5.41	31.88	288	140	A	H
		2485.23	48.76	-25.24	74	47.36	27.76	5.46	31.82	288	140	P	H
		2484.32	38.8	-15.2	54	37.4	27.76	5.46	31.82	288	140	A	H
		2389.8	52.56	-21.44	74	51.27	27.82	5.37	31.9	121	113	P	V
		2389.94	40.37	-13.63	54	39.08	27.82	5.37	31.9	121	113	A	V
		2437	110.29	-	-	108.98	27.78	5.41	31.88	121	113	P	V
		2437	107.07	-	-	105.76	27.78	5.41	31.88	121	113	A	V
		2484.39	51.14	-22.86	74	49.74	27.76	5.46	31.82	121	113	P	V
		2483.97	41.16	-12.84	54	39.76	27.76	5.46	31.82	121	113	A	V



802.11b CH 11 2462MHz		2462	106.26	-	-	104.93	27.77	5.41	31.85	291	139	P	H
		2462	103.03	-	-	101.7	27.77	5.41	31.85	291	139	A	H
		2485.56	49.82	-24.18	74	48.42	27.76	5.46	31.82	291	139	P	H
		2487.84	38.7	-15.3	54	37.3	27.76	5.46	31.82	291	139	A	H
		2462	110.31	-	-	108.98	27.77	5.41	31.85	104	115	P	V
		2462	107.11	-	-	105.78	27.77	5.41	31.85	104	115	A	V
		2483.68	54.03	-19.97	74	52.63	27.76	5.46	31.82	104	115	P	V
		2488.4	40.86	-13.14	54	39.46	27.76	5.46	31.82	104	115	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	44.91	-29.09	74	53.97	31.32	8.88	49.26	141	214	P	H
		4824	48.3	-25.7	74	57.36	31.32	8.88	49.26	158	320	P	V
802.11b CH 06 2437MHz		4874	43.56	-30.44	74	52.43	31.37	8.76	49	217	201	P	H
		7311	46.03	-27.97	74	51.45	36.21	10.18	51.81	100	140	P	H
		4874	47.13	-26.87	74	56	31.37	8.76	49	125	326	P	V
		7311	45.61	-28.39	74	51.03	36.21	10.18	51.81	139	192	P	V
802.11b CH 11 2462MHz		4924	44.18	-29.82	74	52.97	31.42	8.53	48.74	150	269	P	H
		7386	45.41	-28.59	74	50.84	36.29	10.18	51.9	189	238	P	H
		4924	48.25	-25.75	74	57.04	31.42	8.53	48.74	142	285	P	V
		7386	45.87	-28.13	74	51.3	36.29	10.18	51.9	129	225	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2390	55.1	-18.9	74	53.82	27.81	5.37	31.9	296	128	P	H
		2390	45.59	-8.41	54	44.31	27.81	5.37	31.9	296	128	A	H
		2412	106.21	-	-	104.95	27.79	5.37	31.9	296	128	P	H
		2412	98.92	-	-	97.66	27.79	5.37	31.9	296	128	A	H
		2390	60.9	-13.1	74	59.62	27.81	5.37	31.9	109	113	P	V
		2390	50.25	-3.75	54	48.97	27.81	5.37	31.9	109	113	A	V
		2412	110.73	-	-	109.47	27.79	5.37	31.9	109	113	P	V
		2412	103.08	-	-	101.82	27.79	5.37	31.9	109	113	P	V
802.11g CH 06 2437MHz		2389.8	54.76	-19.24	74	53.47	27.82	5.37	31.9	298	139	P	H
		2389.94	39.51	-14.49	54	38.22	27.82	5.37	31.9	298	139	A	H
		2437	106.85	-	-	105.54	27.78	5.41	31.88	298	139	P	H
		2437	99.28	-	-	97.97	27.78	5.41	31.88	298	139	A	H
		2484.74	49.47	-24.53	74	48.07	27.76	5.46	31.82	298	139	P	H
		2483.62	39.69	-14.31	54	38.29	27.76	5.46	31.82	298	139	A	H
		2389.66	54.49	-19.51	74	53.22	27.82	5.37	31.92	113	113	P	V
		2389.94	41.87	-12.13	54	40.58	27.82	5.37	31.9	113	113	A	V
		2437	110.76	-	-	109.45	27.78	5.41	31.88	113	113	P	V
		2437	103.39	-	-	102.08	27.78	5.41	31.88	113	113	A	V
		2485.23	52.62	-21.38	74	51.22	27.76	5.46	31.82	113	113	P	V
		2483.55	42.48	-11.52	54	41.08	27.76	5.46	31.82	113	113	A	V



802.11g CH 11 2462MHz		2462	107.17	-	-	105.84	27.77	5.41	31.85	293	138	P	H
		2462	99.49	-	-	98.16	27.77	5.41	31.85	293	138	A	H
		2484.48	56.38	-17.62	74	54.98	27.76	5.46	31.82	293	138	P	H
		2484.48	49.75	-4.25	54	48.35	27.76	5.46	31.82	293	138	A	H
		2462	109.78	-	-	108.45	27.77	5.41	31.85	113	116	P	V
		2462	102.6	-	-	101.27	27.77	5.41	31.85	113	116	A	V
		2485.12	58.26	-15.74	74	56.86	27.76	5.46	31.82	113	116	P	V
		2483.64	48.24	-5.76	54	46.84	27.76	5.46	31.82	113	116	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	43.23	-30.77	74	52.29	31.32	8.88	49.26	158	320	P	H
		4824	44.82	-29.18	74	53.88	31.32	8.88	49.26	141	214	P	V
802.11g CH 06 2437MHz		4874	43.55	-30.45	74	52.42	31.37	8.76	49	217	201	P	H
		7311	46.37	-27.63	74	51.79	36.21	10.18	51.81	100	140	P	H
		4874	43.46	-30.54	74	52.33	31.37	8.76	49	125	326	P	V
		7311	45.99	-28.01	74	51.41	36.21	10.18	51.81	139	192	P	V
802.11g CH 11 2462MHz		4924	44.48	-29.52	74	53.27	31.42	8.53	48.74	150	269	P	H
		7386	46.05	-27.95	74	51.48	36.29	10.18	51.9	189	238	P	H
		4924	44.24	-29.76	74	53.03	31.42	8.53	48.74	142	285	P	V
		7386	45.47	-28.53	74	50.9	36.29	10.18	51.9	129	225	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2390	57.07	-16.93	74	55.79	27.81	5.37	31.9	271	138	P	H
		2390	48.01	-5.99	54	46.73	27.81	5.37	31.9	271	138	A	H
		2412	107.67	-	-	106.41	27.79	5.37	31.9	271	138	P	H
		2412	100.05	-	-	98.79	27.79	5.37	31.9	271	138	A	H
		2389.90	62.48	-11.52	74	61.19	27.82	5.37	31.9	111	112	P	V
		2390	50.86	-3.14	54	49.58	27.81	5.37	31.9	111	112	P	V
		2412	110.32	-	-	109.06	27.79	5.37	31.9	111	112	P	V
		2412	102.36	-	-	101.1	27.79	5.37	31.9	111	112	A	V
802.11n HT20 CH 06 2437MHz		2389.94	54.15	-19.85	74	54.3	27.82	5.37	33.34	257	325	P	H
		2389.24	43.18	-10.82	54	43.34	27.82	5.37	33.35	257	325	A	H
		2437	106.14	-	-	106.28	27.78	5.41	33.33	257	325	P	H
		2437	98.39	-	-	98.53	27.78	5.41	33.33	257	325	A	H
		2483.97	49.64	-24.36	74	49.73	27.76	5.46	33.31	257	325	P	H
		2484.46	39.98	-14.02	54	40.07	27.76	5.46	33.31	257	325	A	H
		2389.94	51.89	-22.11	74	50.6	27.82	5.37	31.9	110	111	P	V
		2389.94	41.8	-12.2	54	40.51	27.82	5.37	31.9	110	111	A	V
		2437	109.84	-	-	108.53	27.78	5.41	31.88	110	111	P	V
		2437	102.49	-	-	101.18	27.78	5.41	31.88	110	111	A	V
		2483.5	53.36	-20.64	74	51.96	27.76	5.46	31.82	110	111	P	V
		2483.5	42	-12	54	40.6	27.76	5.46	31.82	110	111	A	V



802.11n HT20 CH 11 2462MHz		2462	106.14	-	-	106.28	27.77	5.41	33.32	169	328	P	H
		2462	98.13	-	-	98.27	27.77	5.41	33.32	169	328	A	H
		2484.28	55.37	-18.63	74	55.46	27.76	5.46	33.31	169	328	P	H
		2483.68	45.2	-8.8	54	45.29	27.76	5.46	33.31	169	328	A	H
		2462	109.69	-	-	108.36	27.77	5.41	31.85	108	114	P	V
		2462	101.74	-	-	100.41	27.77	5.41	31.85	108	114	A	V
		2484.04	59.1	-14.9	74	57.7	27.76	5.46	31.82	108	114	P	V
		2483.52	47.59	-6.41	54	46.19	27.76	5.46	31.82	108	114	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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4924	44.26	-29.74	74	53.05	31.42	8.53	48.74	150	269	P	H
		7386	46.14	-27.86	74	51.57	36.29	10.18	51.9	189	238	P	H
		4924	43.74	-30.26	74	52.53	31.42	8.53	48.74	142	285	P	V
		7386	46.04	-27.96	74	51.47	36.29	10.18	51.9	129	225	P	V
802.11n HT20 CH 06 2437MHz		4874	44.04	-29.96	74	52.91	31.37	8.76	49	217	201	P	H
		7311	45.97	-28.03	74	51.39	36.21	10.18	51.81	100	140	P	H
		4874	44.72	-29.28	74	53.59	31.37	8.76	49	125	326	P	V
		7311	46.2	-27.8	74	51.62	36.21	10.18	51.81	139	192	P	V
802.11n HT20 CH 11 2462MHz		4924	44.32	-29.68	74	53.11	31.42	8.53	48.74	150	269	P	H
		7386	45.6	-28.4	74	51.03	36.29	10.18	51.9	189	238	P	H
		4924	44.77	-29.23	74	53.56	31.42	8.53	48.74	142	285	P	V
		7386	45.91	-28.09	74	51.34	36.29	10.18	51.9	129	225	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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)
2.4GHz 802.11n HT20 LF		30	26.35	-13.65	40	33.03	25.19	0.53	32.4	-	-	P	H
		86.26	27.1	-12.9	40	44.33	14.24	0.93	32.4	133	264	P	H
		153.19	26.78	-16.72	43.5	41.16	16.55	1.26	32.19	-	-	P	H
		288.02	27.1	-18.9	46	37.89	19.17	1.76	31.72	-	-	P	H
		438.37	29.22	-16.78	46	35.68	22.68	2.18	31.32	-	-	P	H
		618.79	30.05	-15.95	46	32.77	25.43	2.59	30.74	-	-	P	H
		34.85	30.2	-9.8	40	39.66	22.37	0.57	32.4	155	178	P	V
		83.35	29.51	-10.49	40	47.45	13.6	0.91	32.45	-	-	P	V
		151.25	30.83	-12.67	43.5	45.06	16.7	1.26	32.19	-	-	P	V
		270.56	27.18	-18.82	46	38.33	18.9	1.71	31.76	-	-	P	V
		349.13	27.86	-18.14	46	37.05	20.53	1.98	31.7	-	-	P	V
		584.84	31.04	-14.96	46	34.15	25.12	2.53	30.76	-	-	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	Cable	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		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable 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) + Cable 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)

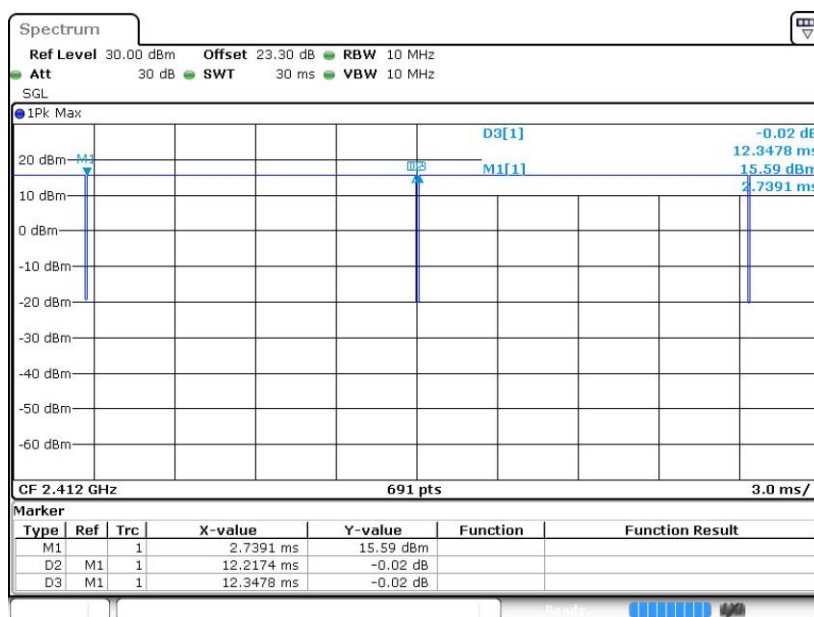
= -10.46(dB)

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

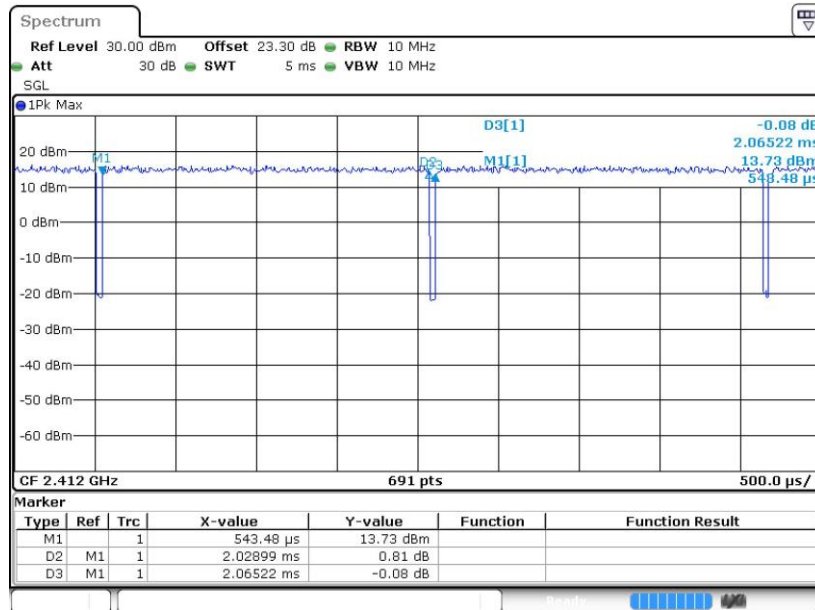
Appendix B. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	98.94	-	-	10Hz
802.11g	98.25	-	-	10Hz
802.11n HT20	97.74	1.884	0.531	1kHz

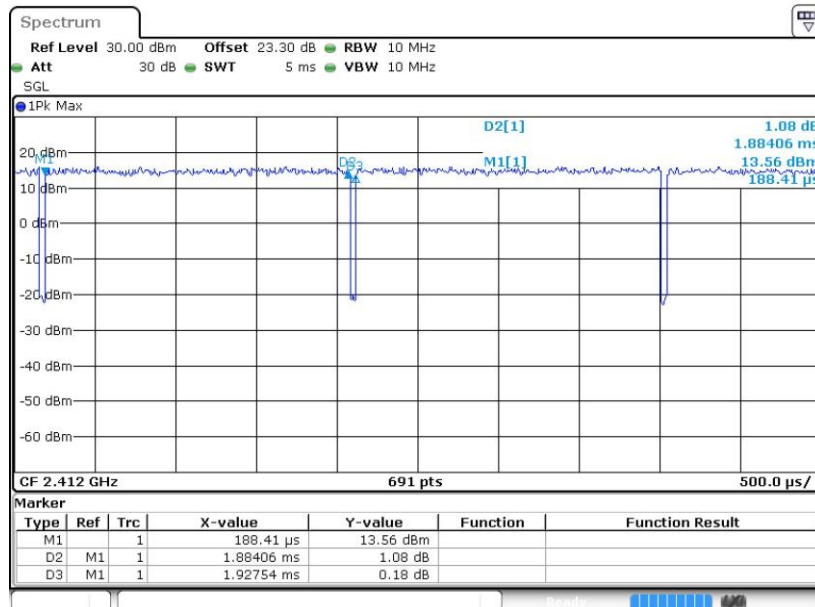
802.11b



802.11g



802.11n HT20





Appendix D. Reference Report

Please refer to Sporton report number FR002013C which is issued separately.