



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
FCC ID : IHDT56XE1
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

This is partial report. The product was received on Mar. 07, 2018 and testing was completed on Mar. 23, 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



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APPENDIX A. AC CONDUCTED EMISSION TEST RESULT	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR811821-09F	Rev. 01	Initial issue of report	Apr. 23, 2018



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 2.96 dB at 0.206 MHz
3.2	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.3	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-



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
FCC ID	IHDT56XE1
IMEI Code	IMEI: 351886090018703
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/GNSS/NFC WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	DVT2
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report by adding WPC Back Cover. All the test cases were performed on original report which can be referred to Sporton Report Number FR811821F. Based on the original report, only worst case was verified.

Accessory List	
WPC Cover	Brand Name : Motorola
	Model Name : MD100W

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5700 MHz
Antenna Type / Gain	<5150 MHz ~ 5250 MHz> Loop Antenna with gain -6.50 dBi <5250 MHz ~ 5350 MHz> Loop Antenna with gain -6.50 dBi <5470 MHz ~ 5725 MHz> Loop Antenna with gain -7.00 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note: The WLAN operation in 5600 MHz ~ 5650 MHz is notched.

1.5 Modification of EUT

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

1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY

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

1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ 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

- 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: conduction emission (150 kHz to 30 MHz),
- b. AC power line Conducted Emission was tested under maximum output power.

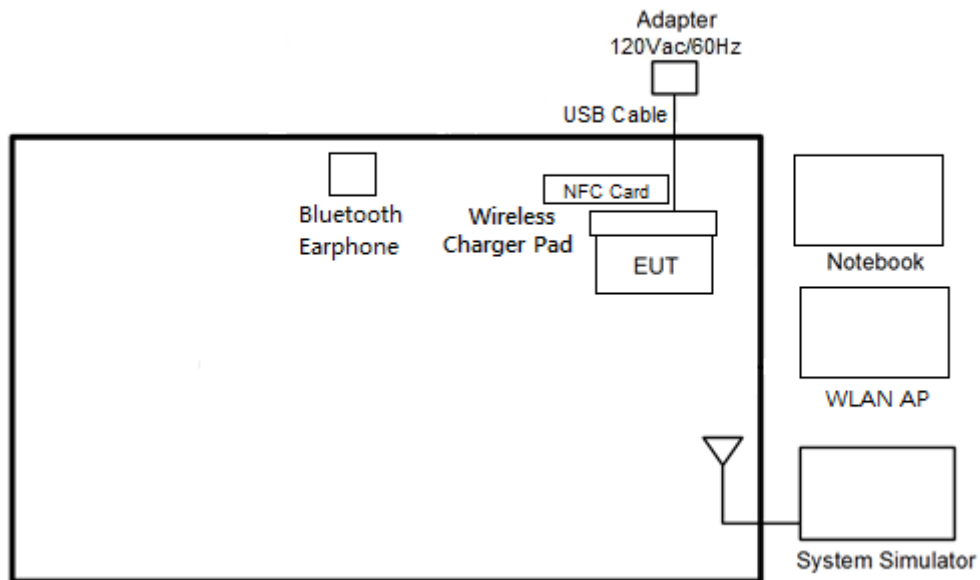
2.1 Test Mode

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

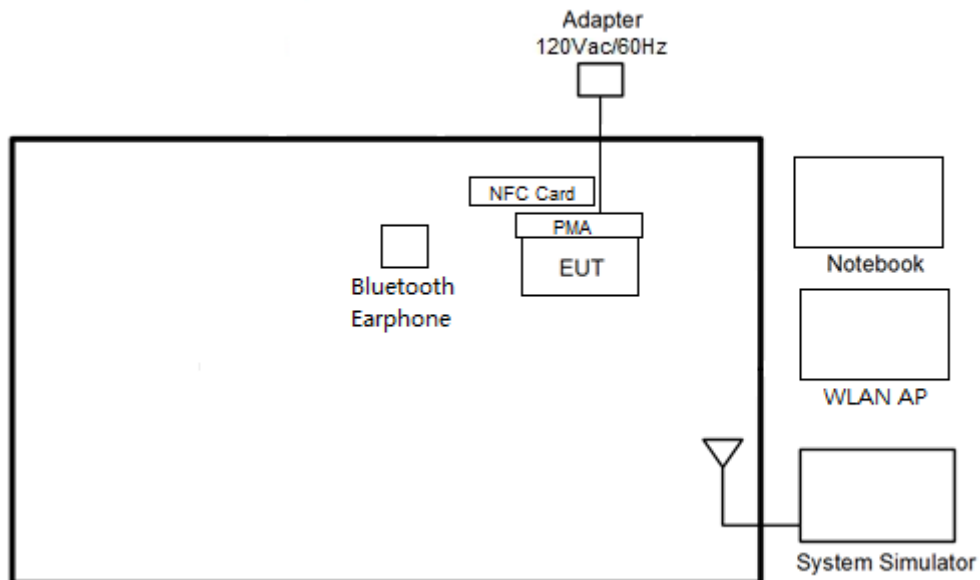
Test Cases	
AC Conducted Emission	Mode 1 : GSM1900 Idle + Bluetooth Link + WLAN (5GHz) Link + Camera + WPC Back cover + Battery + LG Charging pad + USB Cable (Charging from Adapter)
	Mode 2 : WCDMA Band V Idle + Bluetooth Link + WLAN (5GHz) Link + MPEG4 + WPC Back cover + Battery + PMA Charging pad + Adapter
Remark: The worst case of conducted emission is mode 2; only the test data of it was reported.	

2.2 Connection Diagram of Test System

<AC Conducted Emission Mode with WPC Charging Mode>



<AC Conducted Emissions with PMA Charging Mode>



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,1.8m
3.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
4.	Bluetooth Earphone	lenovo	LBH 301	FCC DoC	N/A	N/A
5.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	LG Charging pad	LG	WCD-110	FCC DoC	N/A	N/A
7.	PMA Charging pad	Moto	kinxie	FCC DoC	N/A	N/A
8.	Adapter	N/A	N/A	N/A	N/A	N/A
9.	USB Cable	N/A	N/A	N/A	N/A	N/A

3 Test Result

3.1 AC Conducted Emission Measurement

3.1.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

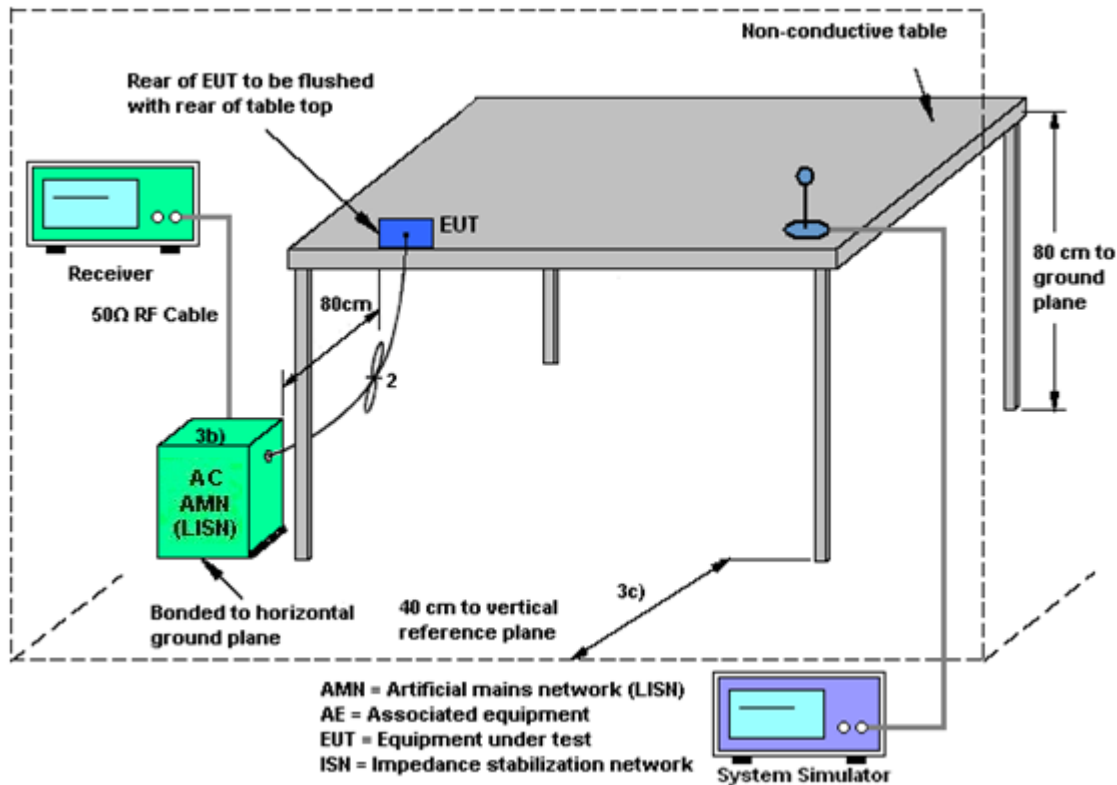
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



3.2 Automatically Discontinue Transmission

3.2.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.2.2 Measuring Instruments

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

3.2.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.3 Antenna Requirements

3.3.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 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
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Mar. 23, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Mar. 23, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Mar. 23, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Mar. 23, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Mar. 23, 2018	Jan. 02, 2019	Conduction (CO05-HY)



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.70
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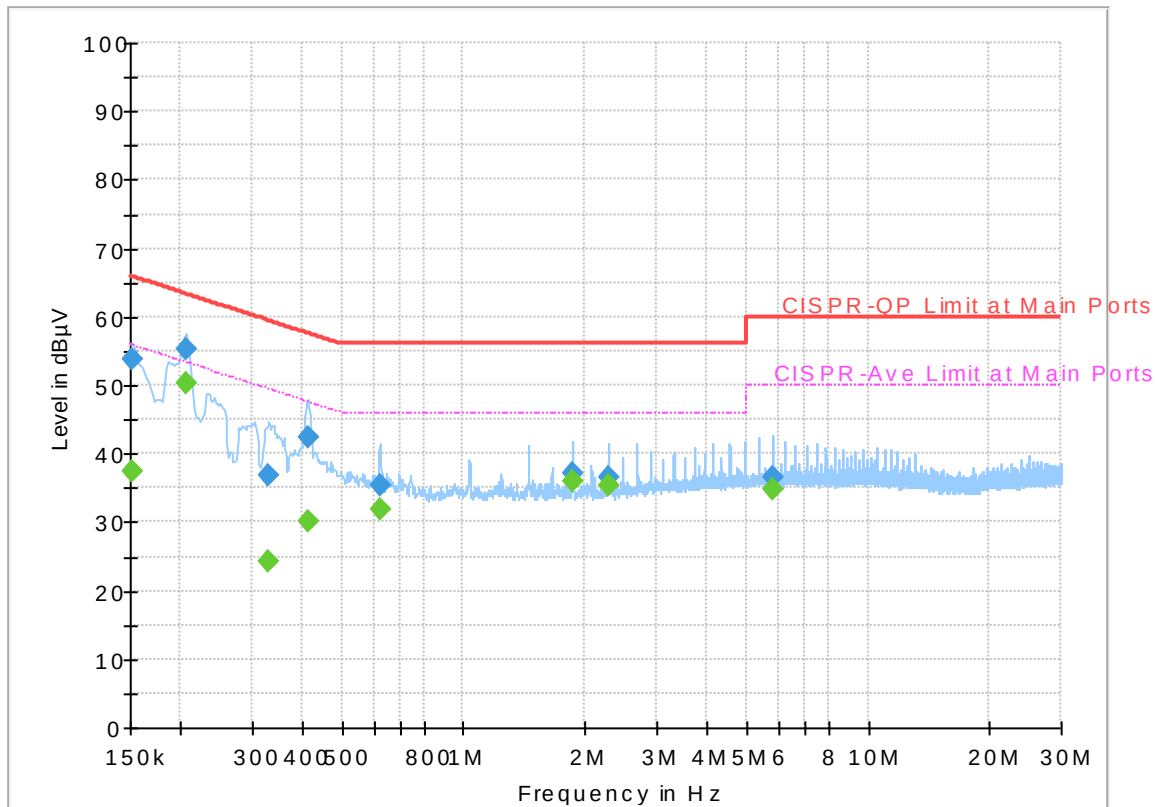
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Blue Lan	Temperature :	23~26℃
		Relative Humidity :	53~56%

EUT Information

Report NO : 811821-09
 Test Mode : Mode 2
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



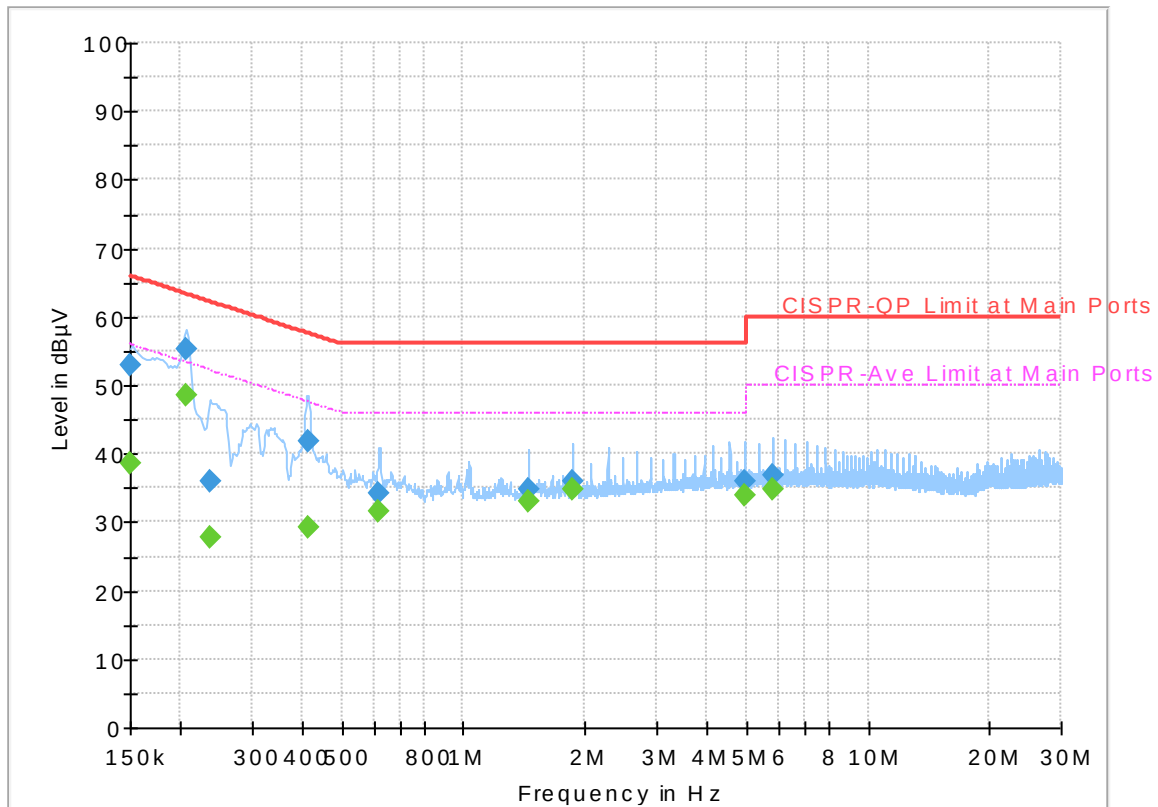
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	37.32	55.88	18.56	L1	OFF	19.5
0.152250	53.67	---	65.88	12.21	L1	OFF	19.5
0.206250	---	50.40	53.36	2.96	L1	OFF	19.5
0.206250	55.40	---	63.36	7.96	L1	OFF	19.5
0.330000	---	24.35	49.45	25.10	L1	OFF	19.5
0.330000	36.90	---	59.45	22.55	L1	OFF	19.5
0.413250	---	30.05	47.58	17.53	L1	OFF	19.5
0.413250	42.31	---	57.58	15.27	L1	OFF	19.5
0.620250	---	31.76	46.00	14.24	L1	OFF	19.5
0.620250	35.49	---	56.00	20.51	L1	OFF	19.5
1.862250	---	35.92	46.00	10.08	L1	OFF	19.6
1.862250	37.27	---	56.00	18.73	L1	OFF	19.6
2.274000	---	35.40	46.00	10.60	L1	OFF	19.5
2.274000	36.60	---	56.00	19.40	L1	OFF	19.5
5.793000	---	34.87	50.00	15.13	L1	OFF	19.6
5.793000	36.65	---	60.00	23.35	L1	OFF	19.6

EUT Information

Report NO : 811821-09
 Test Mode : Mode 2
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	38.51	56.00	17.49	N	OFF	19.5
0.150000	52.99	---	66.00	13.01	N	OFF	19.5
0.206250	---	48.55	53.36	4.81	N	OFF	19.5
0.206250	55.31	---	63.36	8.05	N	OFF	19.5
0.235500	---	27.79	52.25	24.46	N	OFF	19.5
0.235500	35.95	---	62.25	26.30	N	OFF	19.5
0.413250	---	29.10	47.58	18.48	N	OFF	19.5
0.413250	41.93	---	57.58	15.65	N	OFF	19.5
0.618000	---	31.58	46.00	14.42	N	OFF	19.5
0.618000	34.08	---	56.00	21.92	N	OFF	19.5
1.446000	---	32.90	46.00	13.10	N	OFF	19.5
1.446000	34.90	---	56.00	21.10	N	OFF	19.5
1.860000	---	34.70	46.00	11.30	N	OFF	19.6
1.860000	36.10	---	56.00	19.90	N	OFF	19.6
4.962750	---	33.79	46.00	12.21	N	OFF	19.6
4.962750	35.82	---	56.00	20.18	N	OFF	19.6
5.790750	---	34.77	50.00	15.23	N	OFF	19.6
5.790750	36.80	---	60.00	23.20	N	OFF	19.6