

	 MS ISO/IEC 17025 TESTING SAMM No. 0825																												
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia Sdn Bhd, Innoplex, Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D, 11900 Bayan Lepas, Penang, Malaysia.	FCC / ISED TEST REPORT Report Revision : Rev.A																												
<table><tr><td>Date/s Tested</td><td>: 12-April-2019 to 13-April-2019</td></tr><tr><td>Manufacturer/Location</td><td>: Motorola Solutions – Penang</td></tr><tr><td>Requestor</td><td>: LEONG, JUN THYE</td></tr><tr><td>Product Type</td><td>: Portable</td></tr><tr><td>Model Number</td><td>: T460</td></tr><tr><td>Frequency Band</td><td>: 462-467MHz</td></tr><tr><td>Rated RF Output Power</td><td>: 0.4 - 1.5 Watts</td></tr><tr><td>Applicant Name</td><td>: Motorola Solutions Malaysia Sdn Bhd</td></tr><tr><td>Firmware Version</td><td>: NA</td></tr><tr><td>Codeplug Version</td><td>: NA</td></tr><tr><td>ISED Registrations</td><td>: 109AK</td></tr><tr><td>FCC Test Firm Registrations</td><td>: 461337</td></tr><tr><td>Remark</td><td>: Worst Case channel from SR2392-FCCIC-0003 is tested</td></tr></table> The equipment was tested accordance to the requirement listed below: <table><tr><td>FCC 47 CFR Part 95 ISED RSS 210, Issue 9</td><td>PASS</td></tr></table>		Date/s Tested	: 12-April-2019 to 13-April-2019	Manufacturer/Location	: Motorola Solutions – Penang	Requestor	: LEONG, JUN THYE	Product Type	: Portable	Model Number	: T460	Frequency Band	: 462-467MHz	Rated RF Output Power	: 0.4 - 1.5 Watts	Applicant Name	: Motorola Solutions Malaysia Sdn Bhd	Firmware Version	: NA	Codeplug Version	: NA	ISED Registrations	: 109AK	FCC Test Firm Registrations	: 461337	Remark	: Worst Case channel from SR2392-FCCIC-0003 is tested	FCC 47 CFR Part 95 ISED RSS 210, Issue 9	PASS
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Prepared By:  Azil Ezzaddin Khalil Technician	Approved By:  Ho SzeKhan Responsible Engineer																												

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	17-May-2019	Azil Ezzaddin Khalil

1.0. General Information

EUT Description:

Technologies	T461 FRS CONSUMER RADIO 462-467MHZ
Modulation Type	Not Applicable

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
Battery	NA	AA Alkaline

General Description of Applied Standards

The EUT is a Portable Radio. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

ANSI C63.26.2015

2.0. Summary of Test Results

FCC General Rules Part (47CFR)	IC General Rules Part	Test Item	Result	Remark
95.567	RSS 210 E2.4	Effective Radiated Power	Pass	NA
95.579	RSS 210 E.2.5	TX Radiated Spurious Emission	Pass	NA

NA → Not Applicable

3.0. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (±)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

4.0. Equipment List

Radiated Emission Station

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
DRG HORN FREQ.	SAS-571	719	18-Jul-17	18-Jul-19
DRG HORN FREQ.	SAS-571	1143	14-Feb-19	14-Feb-21
POWER SUPPLY	6032A	2615A-01178	13-Jun-18	13-Jun-19
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	25-Jun-18	25-Jun-19
5m Semi-anechoic Chamber	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112D	30991	23-Apr-18	23-Apr-19
BILOG ANTENNA	CBL6112B	2964	16-Feb-18	16-Feb-20
DATA LOGGER	SDL500	A.016800	19-Mar-19	18-Mar-20
SYSTEM CONTROLLER	SC104V	050806-1	No Cal. Req'd	No Cal. Req'd
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	No Cal. Req'd	No Cal. Req'd
ANTENNA POSITIONING TOWER	TLT2	NA	No Cal. Req'd	No Cal. Req'd
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	27-Apr-18	27-Apr-19
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118P	361	No Cal. Req'd	No Cal. Req'd
LOOP ANTENNA	6502	00208416	17-Aug-18	17-Aug-19
Test Software	EMC_FCC_IC_Bluetooth_RE_Test			
Version	EMC_FCC_RE_v1.5.2			

AC Power Line Conducted Spurious Emission

Not Applicable

5.0. Test Condition

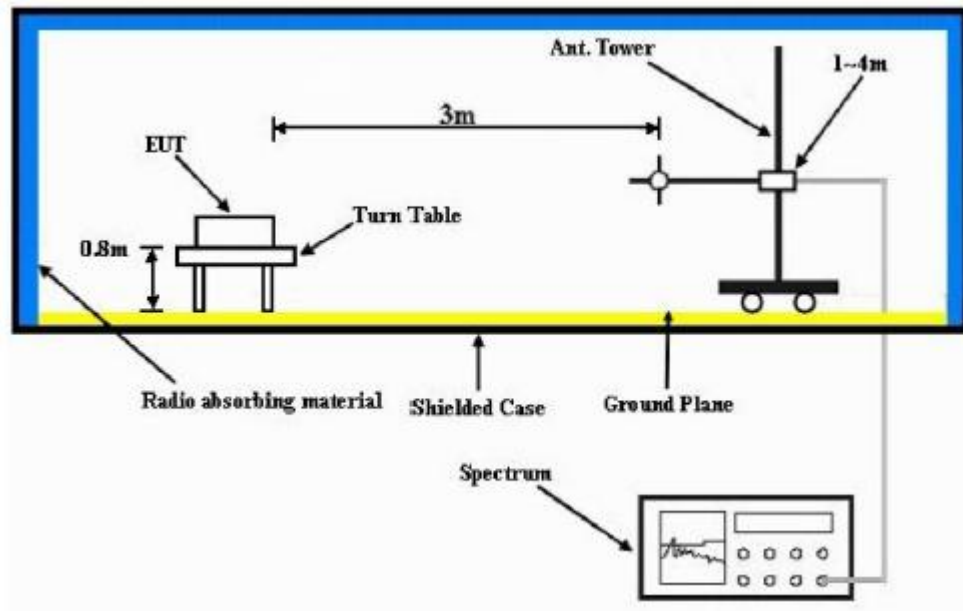
5.1 Test Conditions

Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By
Conducted Spurious Emissions (12.5kHz / 20kHz / 25kHz)	Low / Max	Analog, 4FSK	NA	NA
Radiated Spurious Emission (12.5kHz)	Max	Analog, 4FSK	Tx(MHz) 467.6375	Nazrin & Qawiman

NA → Not Applicable

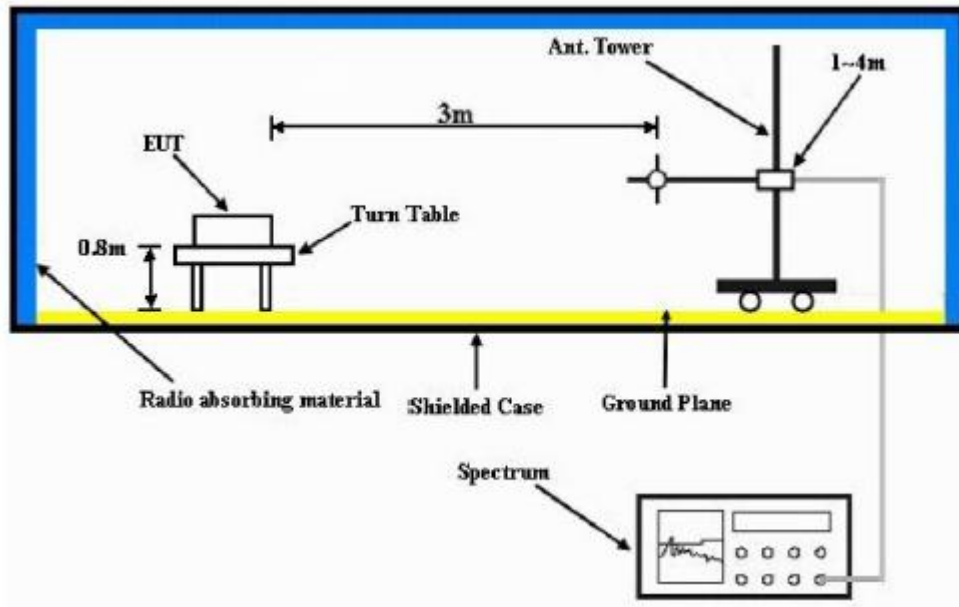
6.0. Radiated Spurious Emissions

6.0.1. Test Setup (ANSI C63.26)



- 1) The Resolution Bandwidth for scanning Radiated Emission below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector mode is positive peak.
- 2) In the semi- anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height (<1Ghz) and 1.5m height (>1Ghz) of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- 3) The substitution antenna is substituted for DUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
- 4) Final Radiated Spurious Emission = “Read Value” + Measured substitution value.

6.0.2. Test Setup (ANSI C63.4)



- 1) The spectrum setting for scanning Radiated Emission below 1 GHz is RBW = 100 kHz, VBW = 300 kHz and above 1 GHz is RBW = 1MHz, VBW = 3MHz. Detector mode is positive peak. For exploratory testing.
- 2) Final is done using QP Detector (<1Ghz) and Peak and Average Detector (>1Ghz).
- 3) In the semi-anechoic chamber, setup as illustrated above the EUT placed on the 0.8m height of Turn table. For each radiated spurious emissions component detected, rotate the turn table around 360 degrees to search the maximum radiated spurious emissions and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiated spurious emissions. The “Read Value” is the spectrum reading the maximum radiated spurious emissions.
- 4) Final Radiated Spurious Emission (dBuV/m) = “Read Value (dBuV)” + Cable Loss (dB) + Antenna Gain (dB/m)- Pre-amp Gain (dB)

Motorola Solutions.

FCC ID: AZ489FT4924
IC ID: 109U-89FT4924

EIRP/ERP

S/N: 1658VC0039

Tx Power: 0.5 Watts

Channel Spacing : 12.5 kHz

Modulation: FM

Accessory: NA

Antenna Polarization	Frequency (MHz)	EIRP (dBm)	ERP (dBm)
Horiz.	467.6375	13.26	11.11
Vert.	467.6375	25.56	23.41

6.0.4. Test Limit

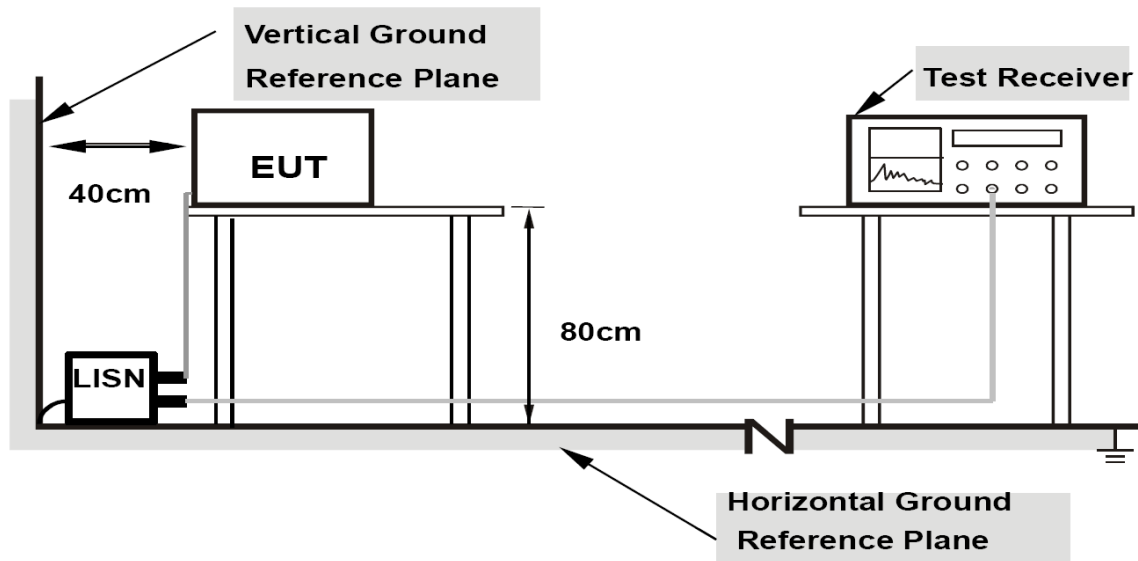
Table below summarized the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least

Channel Spacing	Part 22	Part 24D	Part 74	Part 80	Part 90 (UHF, VHF, 800, 900)	Part 90 (700)
12.5kHz	43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)	Not Applicable	50 + log ₁₀ (P) (-20 dBm)	43 + log ₁₀ (P) (-13 dBm)
25kHz		Not Applicable		43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)

Channel Spacing	RSS 134	RSS 182	RSS 119 (UHF, VHF, 800, 900)	RSS 119 (700)
12.5kHz	43 + log ₁₀ (P) (-13 dBm)	Not Applicable	50 + log ₁₀ (P) (-20 dBm)	43 + log ₁₀ (P) (-13 dBm)
25kHz	Not Applicable	43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)	43 + log ₁₀ (P) (-13 dBm)

6.1. AC Power Line Conducted Spur Emissions

6.1.1. Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

6.1.2. Test Results

Not Applicable

6.1.3. Test Limits

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

**Limits for conducted disturbance at the mains ports
of class A ITE**

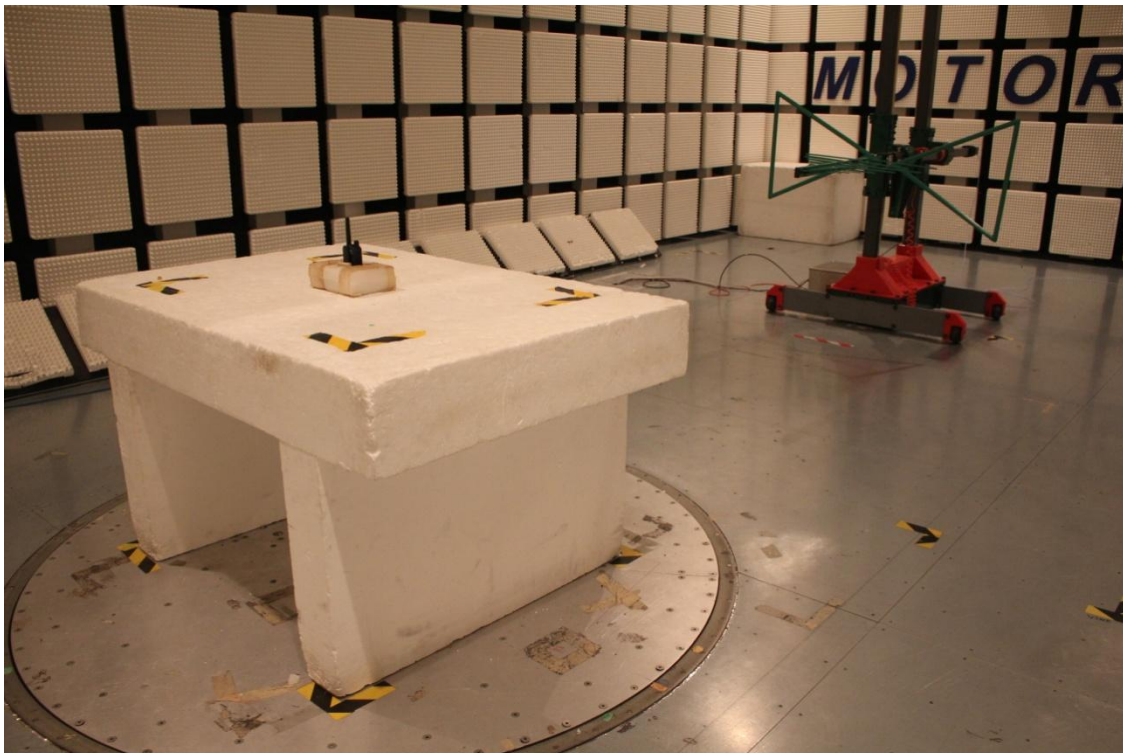
Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60
NOTE The lower limit shall apply at the transition frequency.		

**Limits for conducted disturbance at the mains ports
of class B ITE**

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.		
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

7.0. Appendix: Test Setup Photo

7.1. Radiated Spur Emission Station Setup



7.2. AC Power Line Conducted Emission Station Setup

Not Applicable

7.3. Photographs - EUT



~ End of Report ~