

	 CERTIFICATE 2518.08																										
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia SDN BHD, Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D, 11900 Bayan Lepas, Penang, Malaysia.	FCC / ISED TEST REPORT Report Revision : Rev.C																										
<table><tr><td>Date/s Tested</td><td>: 14-January-2020 to 16-January-2020</td></tr><tr><td>Manufacturer</td><td>: MOTOROLA SOLUTIONS MALAYSIA SDN BHD</td></tr><tr><td>Manufacturer Address</td><td>: PLOT 2A, MEDAN BAYAN LEPAS MUKIM 12, S.W.D 11900 BAYAN LEPAS PENANG, MALAYSIA</td></tr><tr><td>Requestor</td><td>: KHOO PHAIK HUN</td></tr><tr><td>Product Type</td><td>: Portable</td></tr><tr><td>Model Number</td><td>: T47X</td></tr><tr><td>Frequency Band</td><td>: 462-468MHZ</td></tr><tr><td>Firmware Version</td><td>: V1.110</td></tr><tr><td>Max Output Power</td><td>: 0.5W ERP / 2W ERP</td></tr><tr><td>Applicant Name</td><td>: Motorola Solutions Inc</td></tr><tr><td>ISED Registrations</td><td>: MY0001</td></tr><tr><td>FCC Registrations</td><td>: 461337</td></tr></table> The equipment was tested accordance to the requirement listed below: <table><tr><td>FCC 47 CFR Part 15B / RSS-GEN / ICES-003</td><td>PASS</td></tr></table>		Date/s Tested	: 14-January-2020 to 16-January-2020	Manufacturer	: MOTOROLA SOLUTIONS MALAYSIA SDN BHD	Manufacturer Address	: PLOT 2A, MEDAN BAYAN LEPAS MUKIM 12, S.W.D 11900 BAYAN LEPAS PENANG, MALAYSIA	Requestor	: KHOO PHAIK HUN	Product Type	: Portable	Model Number	: T47X	Frequency Band	: 462-468MHZ	Firmware Version	: V1.110	Max Output Power	: 0.5W ERP / 2W ERP	Applicant Name	: Motorola Solutions Inc	ISED Registrations	: MY0001	FCC Registrations	: 461337	FCC 47 CFR Part 15B / RSS-GEN / ICES-003	PASS
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Prepared By:  Azil Ezzaddin Khalil Technician	Approved By:  Leow Ting Jun Responsible Engineer																										

Table of Contents

1.0. General Information	3
2.0. Summary of Test Results.....	3
3.0. Measurement Uncertainty	4
4.0. Equipment List.....	5
5.0. Test Condition.....	7
5.1 Receiver Test Conditions.....	7
6.0. Receiver Test Parameters	8
6.1. Conducted Spurious Output Power.....	8
6.1.1. Test Setup.....	8
6.1.2. Test Result.....	8
6.1.3. Test Limit	8
6.2. Radiated Spurious Output Power.....	9
6.2.1. Test Setup.....	9
6.2.2. Test Result.....	10
6.2.3. Test Limit	18
6.3. AC Power Line Conducted Spur Emissions	19
6.3.1. Test Setup.....	19
6.3.2. Test Result.....	20
6.3.3. Test Limits	25
7.0. Appendix: Test Setup Photo	26
7.1. Conducted Spur Emission ATE Station Setup	26
7.2. Radiated Spur Emission Station Setup.....	26
7.3. AC Power Line Conducted Emission Station Setup	26
7.4. Photographs – EUT	27

REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	21-January-2020	Azil Ezzaddin Khalil
Rev. B	Update Frequency Band	27-February-2020	Azil Ezzaddin Khalil
Rev. C	Update Frequency Band, Max Output Power & Applicant Name	6-April-2020	Azil Ezzaddin Khalil

1.0. General Information

EUT Description:

Technologies	T470 FRS CONSUMER RADIOS 462-467MHZ, 0.5W-2W
Modulation Type	Analog

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
1300MAH 3XAA NIMH RECHARGEABLE BATTERY PACK	MOTOROLA	1532
POWER SUPPLY ADAPTOR, SWITCH MODE, 3W, L6, 100 V - 240 V, MICRO USB, US/NOM/JP	MOTOROLA	PS000228A01
ACCESSORY KIT, TALKABOUT TWINPACK CHARGING TRAY WITH PSU NA. (This kit contains PMLN7679A - USB Charging Tray Single Slot)	MOTOROLA	PMLN7711AR

General Description of Applied Standards

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

ANSI C63.4.2014

2.0. Summary of Test Results

FCC General Rules Part (47CFR)	IC General Rules Part	Test Item	Result
15.111	RSS-Gen 7.4	Conducted Spurious Output Power	NA
15.109	RSS-Gen 7.3	Radiated Spurious Output Power	Pass
15.107	RSS-Gen 7.2	AC Power Conducted Spurious Emissions	Pass

NA → Not Applicable

3.0. Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) ($\pm$)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	4.25
	200MHz ~ 1000MHz	4.25
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.94
	18GHz ~ 25GHz	4.94
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

4.0. Equipment List

Conducted Spur Emission ATE # 1

NA

Radiated Emission Station

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
DRG HORN FREQ.	SAS-571	720	21-Mar-19	21-Mar-21
DRG HORN FREQ.	SAS-571	1143	14-Feb-19	14-Feb-21
POWER SUPPLY (0-60V / 0-50A, 1000W)	6032A	MY41001736	25-May-19	25-May-20
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	24-Jul-19	24-Jul-20
EMI TEST RECEIVER	ESIB26	100017	19-Jul-19	19-Jul-20
5m Semi-anechoic Chamber	S800-HX	J2308	No Cal. Req'd	No Cal. Req'd
BILOG ANTENNA	CBL6112D	30991	5-Aug-19	5-Aug-20
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	23-Jun-19	23-Jun-20
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-20
LOOP ANTENNA	6502	00208416	5-Sep-19	5-Sep-20
Test Software	EMC_FCC_IC_Bluetooth_RE_Test			
Version	EMC_FCC_RE_v1.6.1			

AC Power Line Conducted Spurious Emission

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
TEMPERATURE & HUMIDITY LOGGER	DSB	16344134	5-Apr-19	5-Apr-20
V-NETWORK 2-LINE	ENV216V	101039	20-Jul-19	20-Jul-20
EMI TEST RECEIVER	ESIB26	827769/009	25-Jul-19	25-Jul-20
PROGRAMMABLE AC SOURCE	61604	ABR000000926	1-Jul-19	1-Jul-20
Test Software	EMC32			
Version	Ver. 10.50.40			

4.1. Test Condition

4.1.1 Receiver Test Conditions

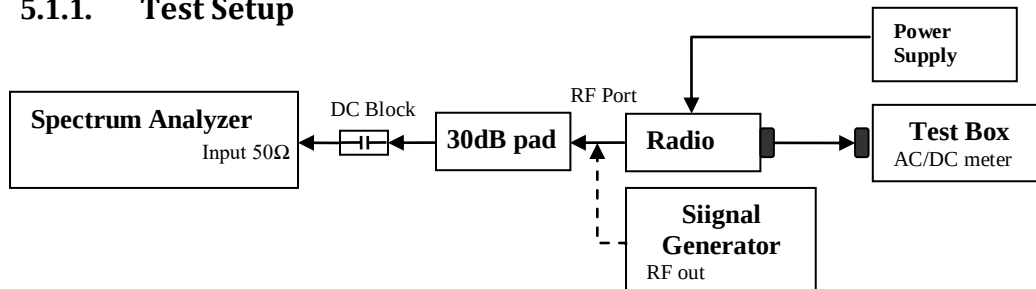
Test Item, (Channel Spacing)	Temperature (°C)	Voltage Supply (V)	Power (W)	Modulation	Test Frequency (MHz)
Conducted Spurious Output Power (12.5kHz / 25kHz)	25°C	NA	NA	NA	NA
Radiated Spurious Output Power (12.5kHz)	23.8°C	120	0.5 & 2	Analog	462.6375 & 467.6375 MHz
AC Power Line Conducted Spurious Emissions (12.5kHz)	21.1°C	120	2	Analog	462.6375 MHz

NA → Not Applicable

5.0. Receiver Test Parameters

5.1. Conducted Spurious Output Power

5.1.1. Test Setup



- 1) Identify the radio is high side ($LO = F_c + IF$) or low side injection ($LO = F_c - IF$).
- 2) To get the reference point, set sigen to 1st LO frequency with amplitude level 0dBm.
- 3) Set the LO frequency into PSA. Adjust the PSA RBW = 100 kHz and record the Reference level offset.
- 4) Replace the Sigen with the UUT.
- 5) At PSA, set the frequency step size to LO frequency to test from 2LO to 10LO.
- 6) Record or screen captures the data in dBm value.

5.1.2. Test Result

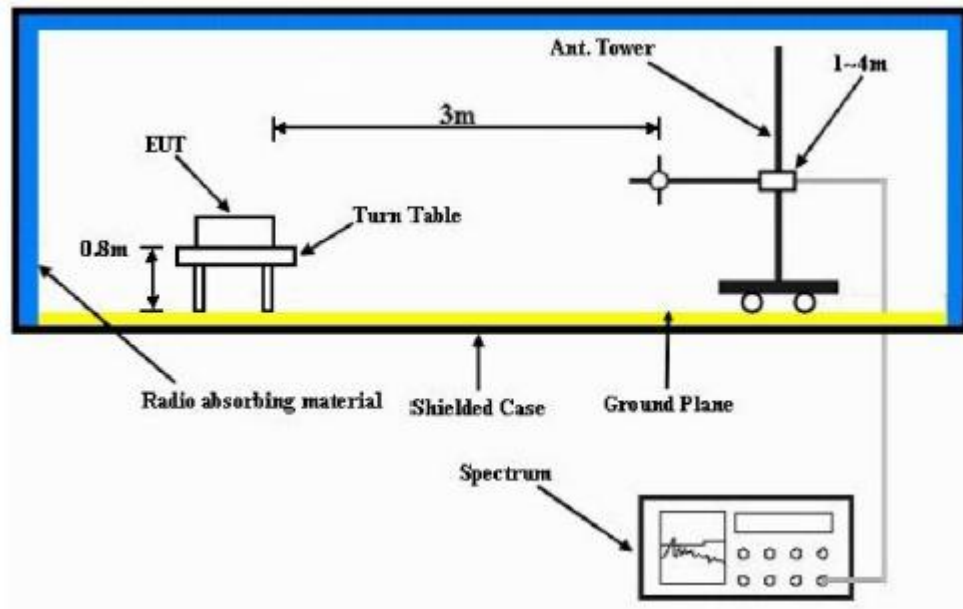
NA

5.1.3. Test Limit

NA

5.2. Radiated Spurious Output Power

5.2.1. Test Setup



a. 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.

b. Final is done using QP Detector (<1Ghz) and Peak and Average Detector (>1Ghz).

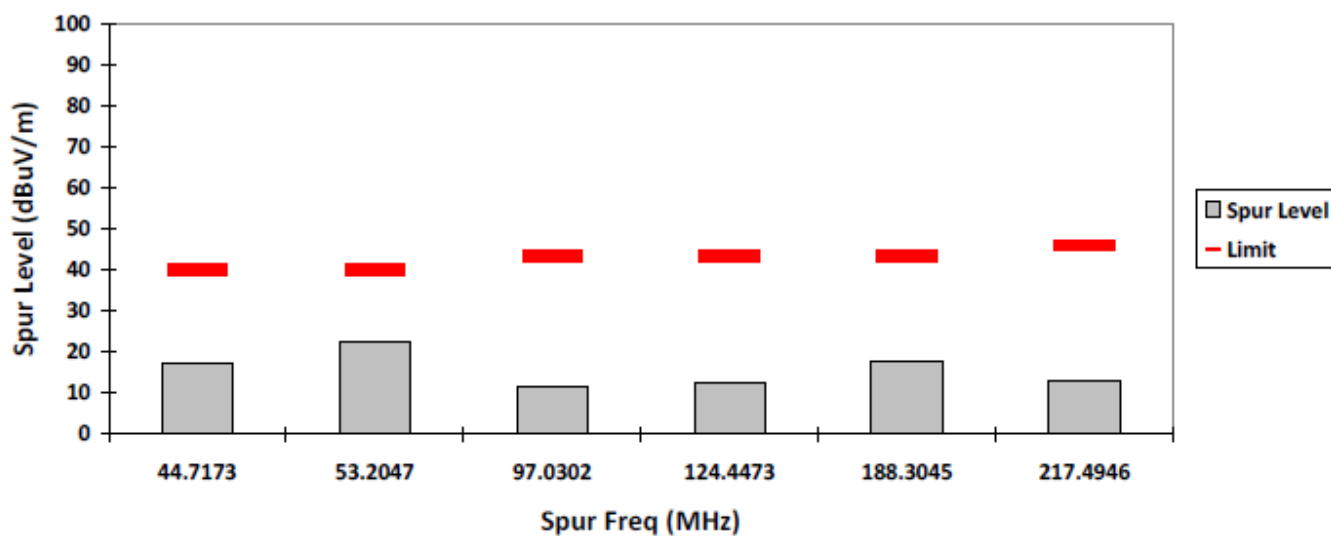
c. In the semi-anechoic chamber, setup as illustrated above the EUT placed on the 0.8m height of Turn table. For each radiated spurious emissions component detected, rotate the turn table around 360 degrees to search the maximum radiated spurious emissions and receiver antenna shall be rotated vertical 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.

d. Final Radiated Spurious Emission (dBuV/m) = "Read Value (dBuV)" + Cable Loss (dB) +Antenna Gain (dB/m)-Pre-amp Gain (dB)

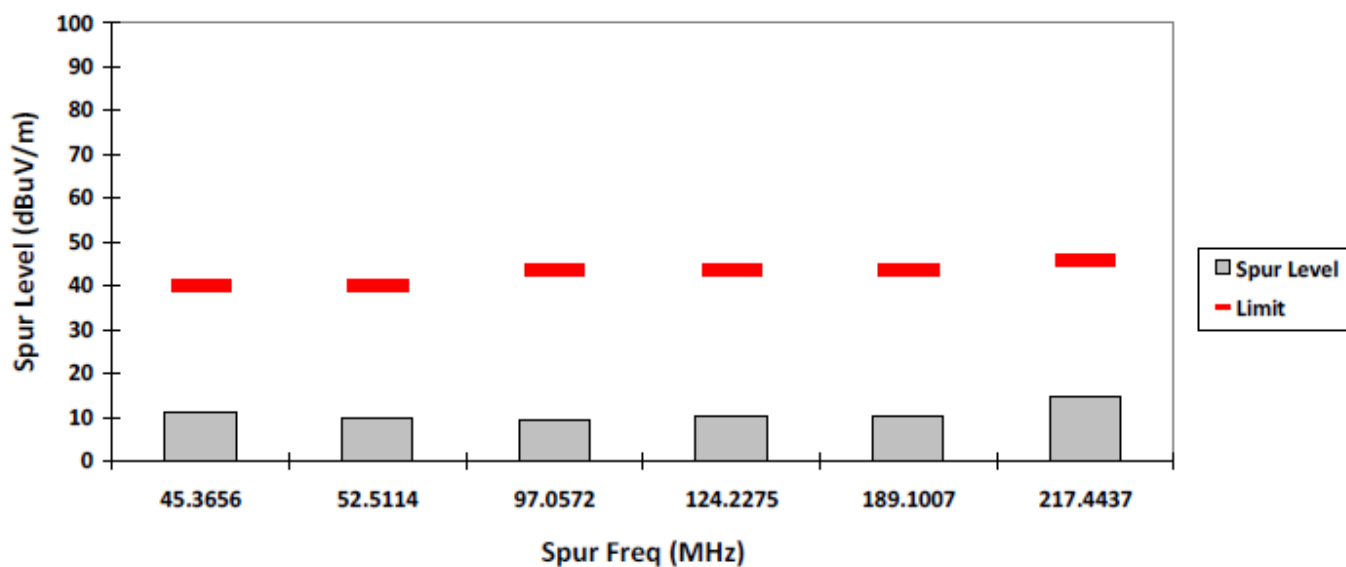
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, QPK



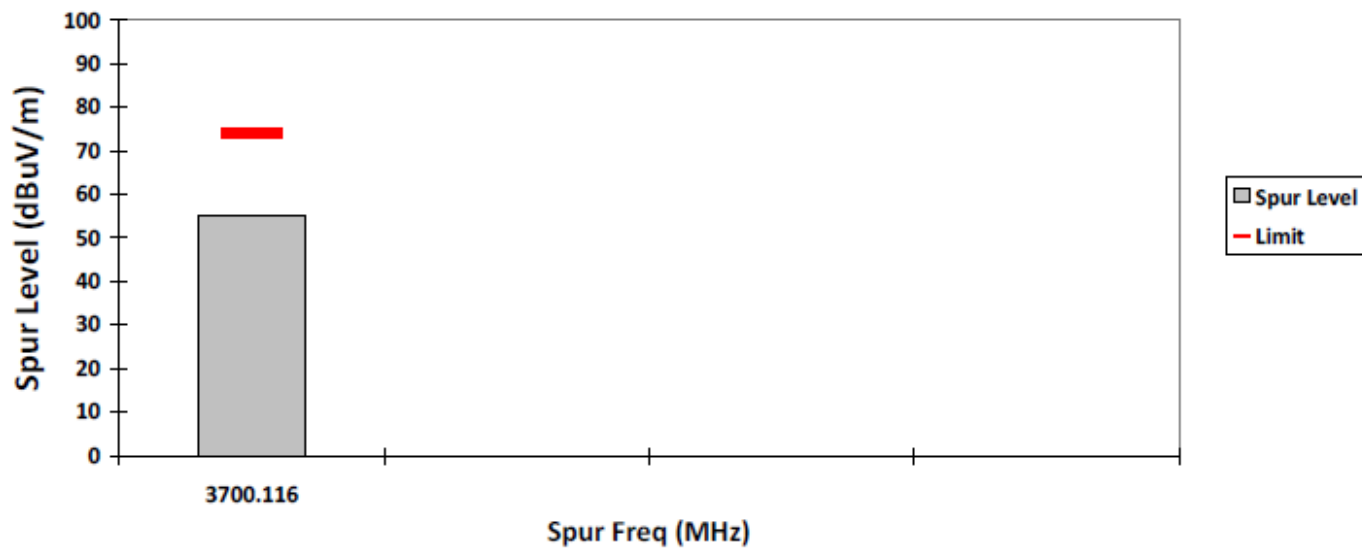
HORIZONTAL, QPK



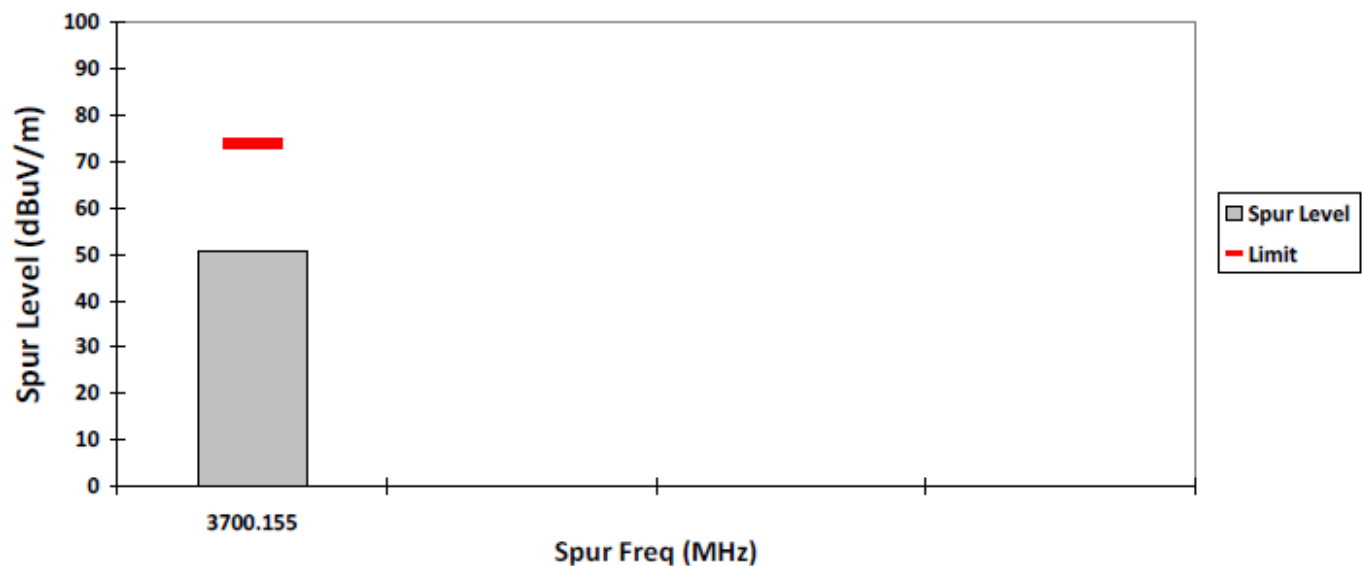
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, PK



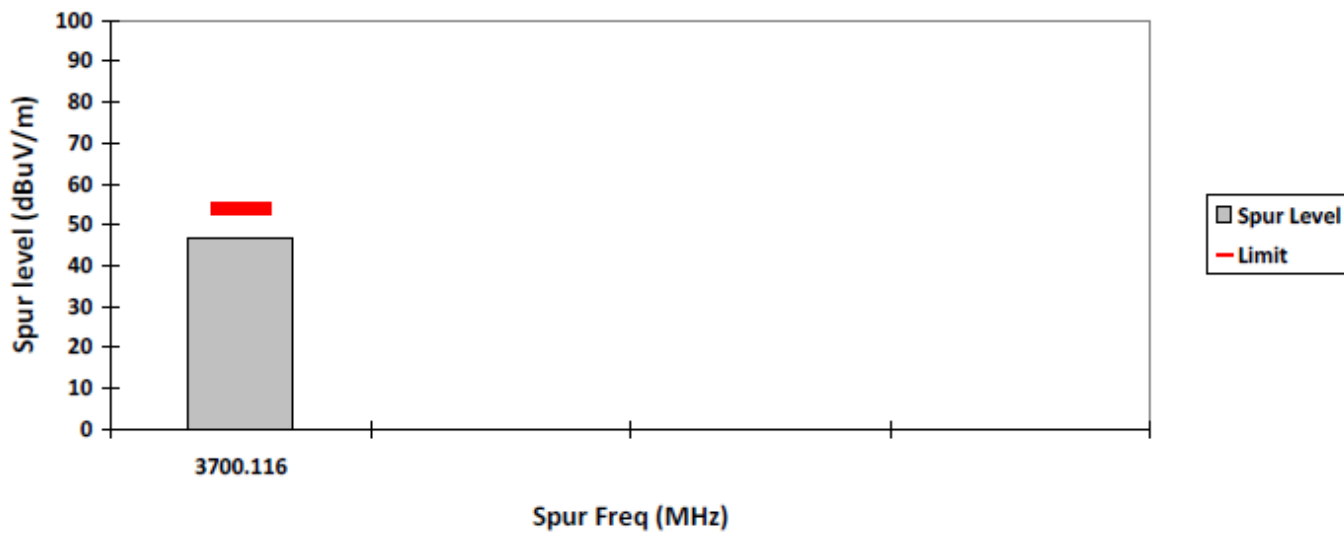
HORIZONTAL, PK



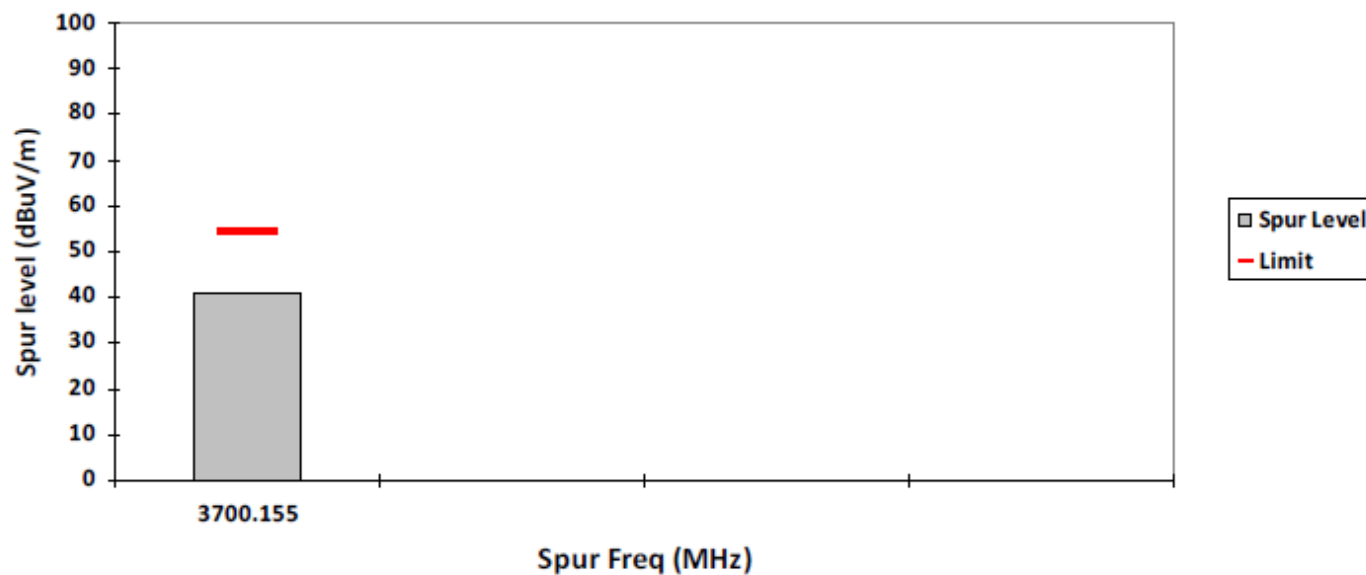
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, AV



HORIZONTAL, AV



FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

Model#: T47X
 Battery: 1532
 Test Mode: RX Analog

Test: SAC Receiver Radiated Emission
 S/N: 16514VY559
 Accessory: 8372-PS000228A01-1, PMLN7679A-C1
 Test Frequency: 467.6375 MHz 12.5 kHz 0.500 Watt(s) /Max Power
 Test Standard: ANSI C63.4-2014

Vertical Radiated Emission Result

Remarks: Pass Result	Marginal Result	Fail Result
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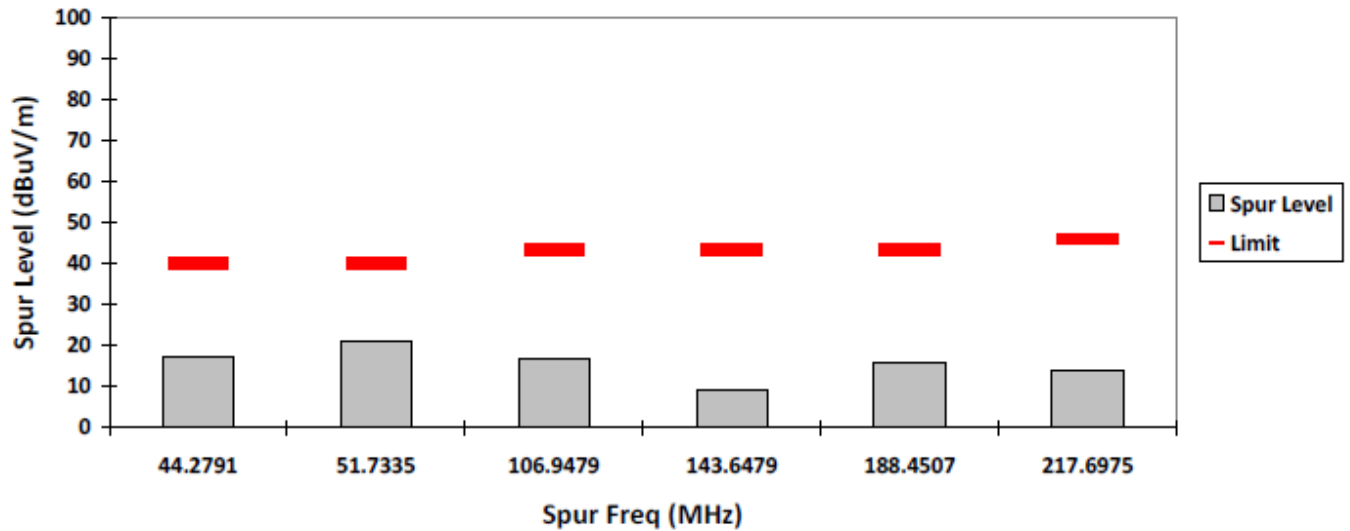
Temperature (degC): 23.8 Humidity (%): 70.2
Test Performed by: Nazrin&Qawiman Test Date: Tue, Jan 14, 2020
System MU: 4.25 dB (30-1000MHz), 4.94 dB (1000-18000MHz)

Remarks: ** Indicates the spurious emission could not be detected due to noise limitations or ambient.
***Pursuant to CFR 47 Part 2.1057 (c), emissions attenuated more than 20 dB below the permissible limit are not reported.**

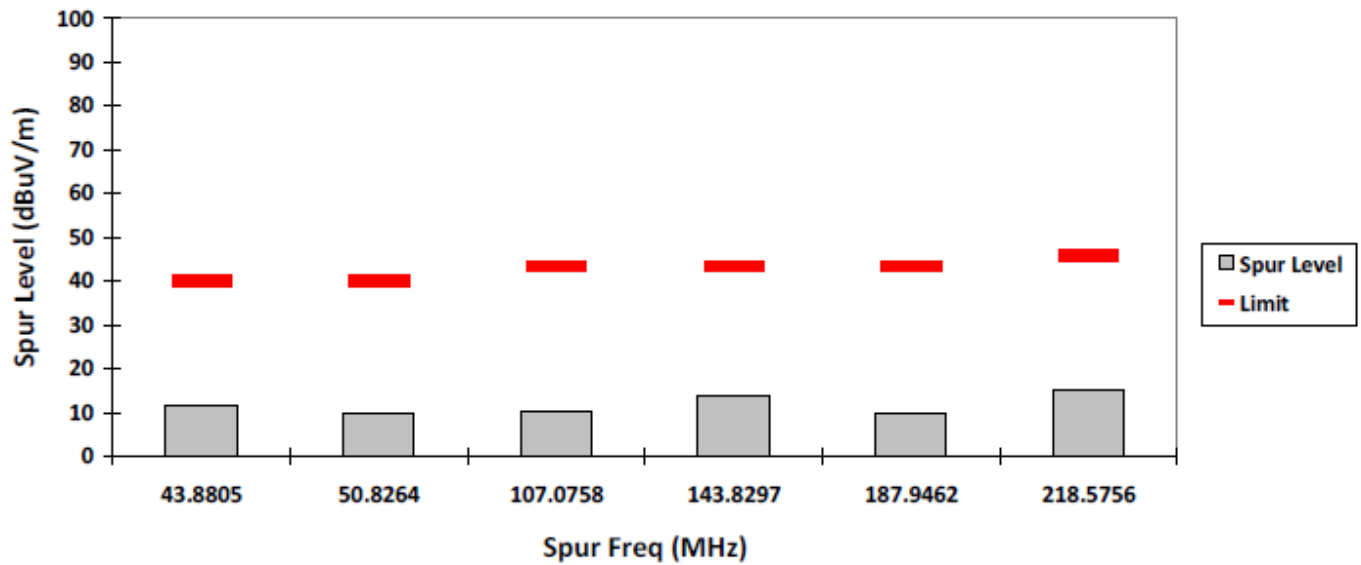
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, QPK



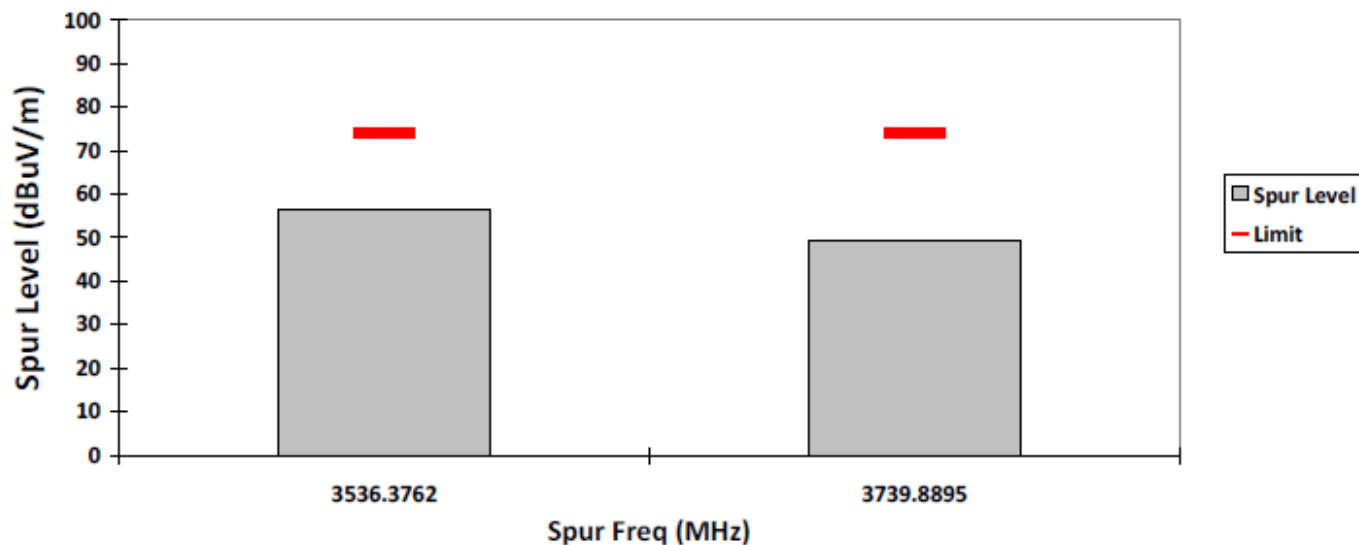
HORIZONTAL, QPK



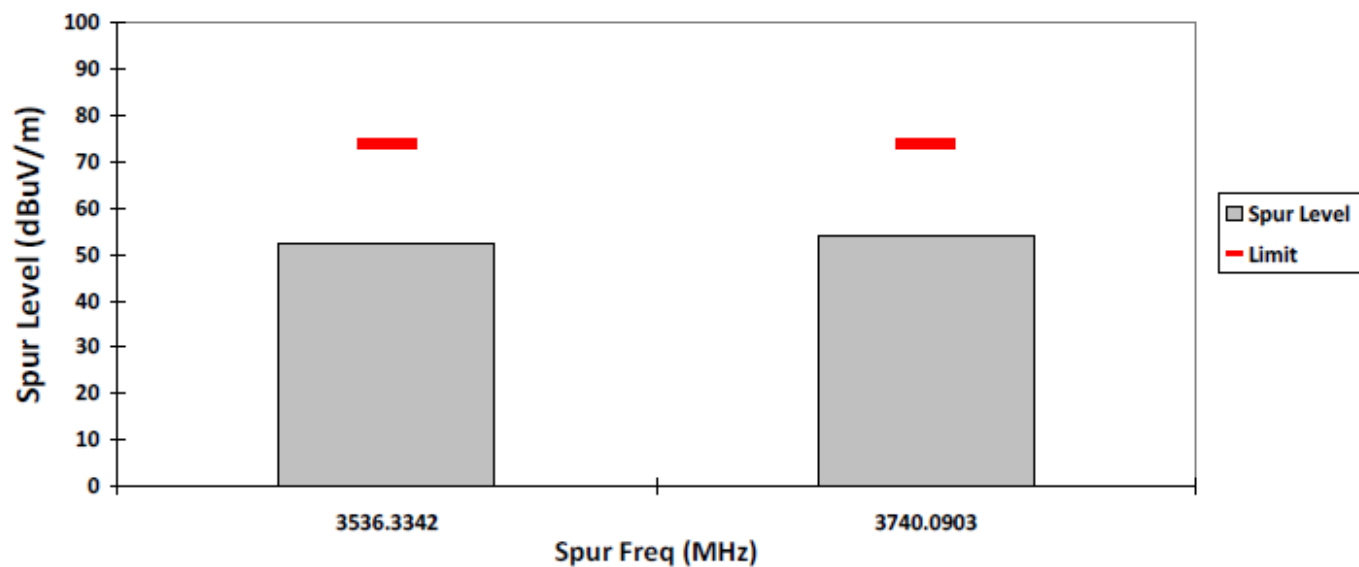
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, PK



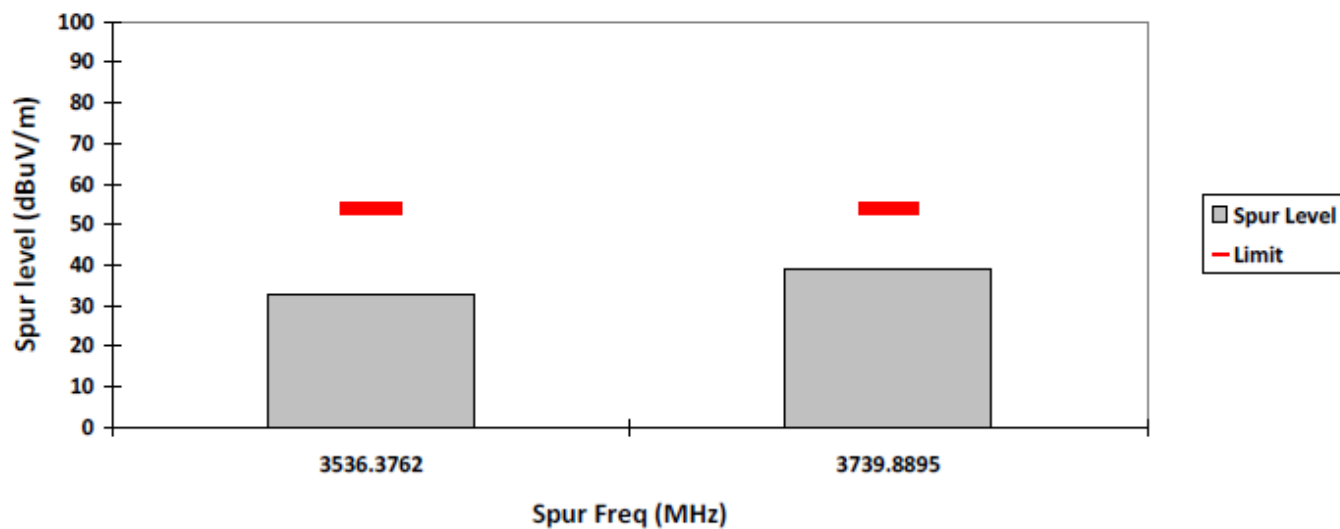
HORIZONTAL, PK



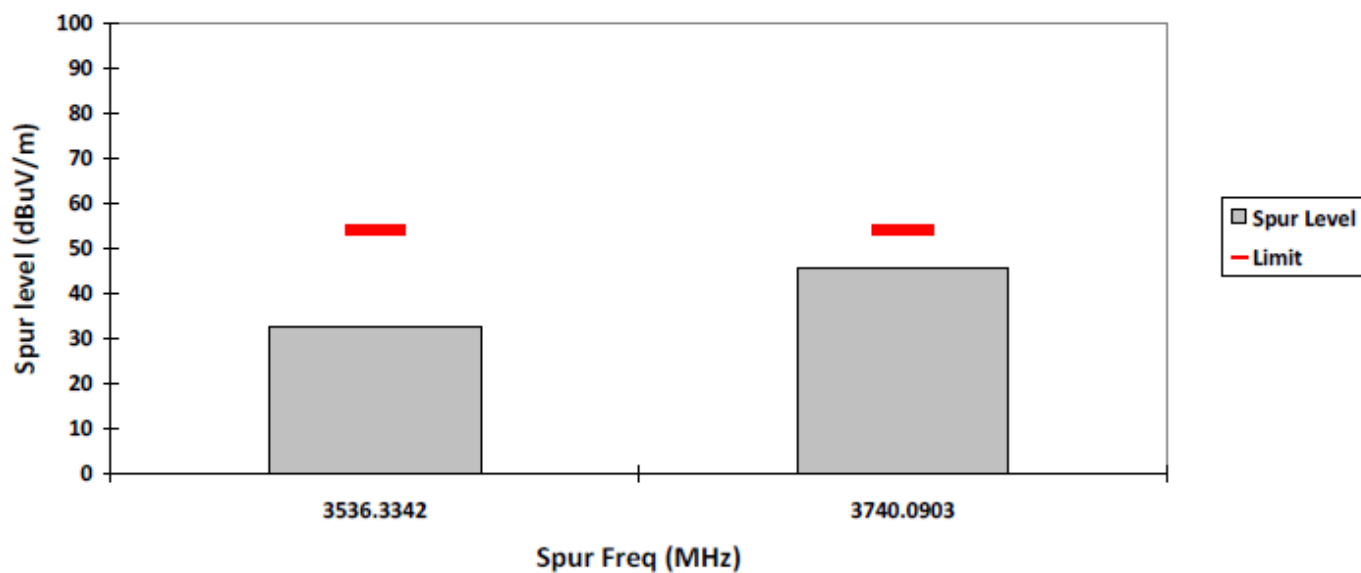
Motorola Solutions.

FCC ID: AZ489FT4959, IC ID: 109U-89FT4959

VERTICAL, AV



HORIZONTAL, AV



5.2.3. Test Limit

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

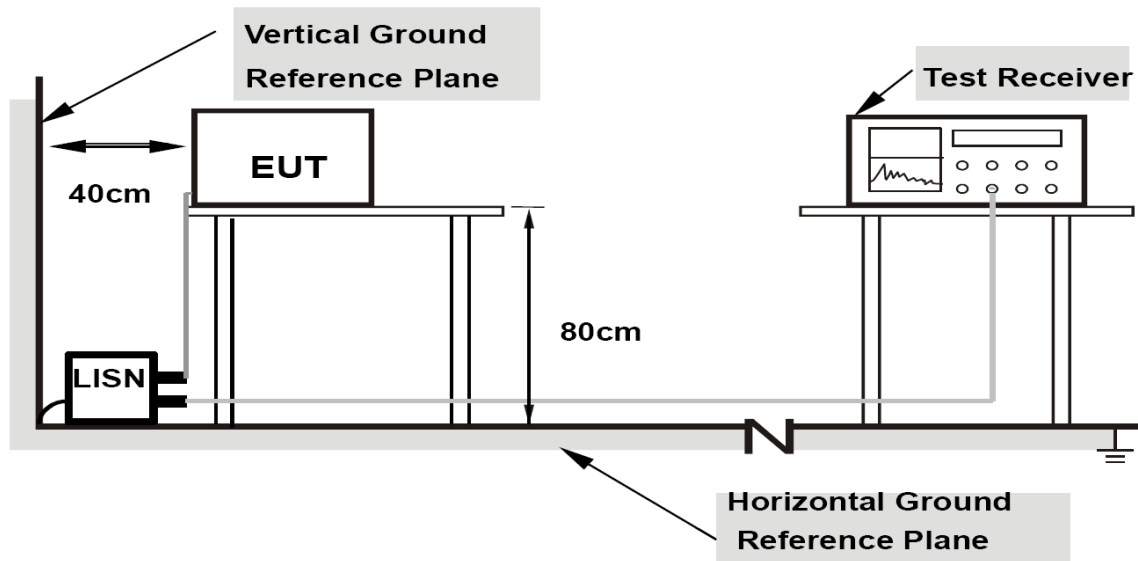
Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	90
88-216	150
216-960	210
Above 960	300

5.3. AC Power Line Conducted Spur Emissions

5.3.1. 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.

5.3.2. Test Result

Report ID.:	: 20002-EMC-00009
Ambient Temperature:	: 21.1 °C
Humidity:	: 69.9 %
Tester:	: Iskandar/Dean
Date of test:	: 16 January 2020

EMI Auto Test Template: Voltage with 2-Line-LISN

Hardware Setup:	Voltage with 2-Line-LISN
Measurement Type:	2 Line LISN
Frequency Range:	150 kHz - 30 MHz
Graphics Level Range:	0 dBµV - 90 dBµV

Preview Measurements:	
Scan Test Template:	Voltage with 2-Line-LISN pre

Data Reduction:	
Limit Line #1:	FCC Part 15 Class B Voltage on Mains QP
Limit Line #2:	FCC Part 15 Class B Voltage on Mains AV
Peak Search:	6 dB , Maximum Results: 20
Subrange Maxima:	10 Subranges , Maxima per Subrange: 1
Acceptance Offset:	-20 dB
Maximum Number of Results:	20

Maximization Measurements:	
Template for Single Meas.:	Voltage with 2-Line-LISN max

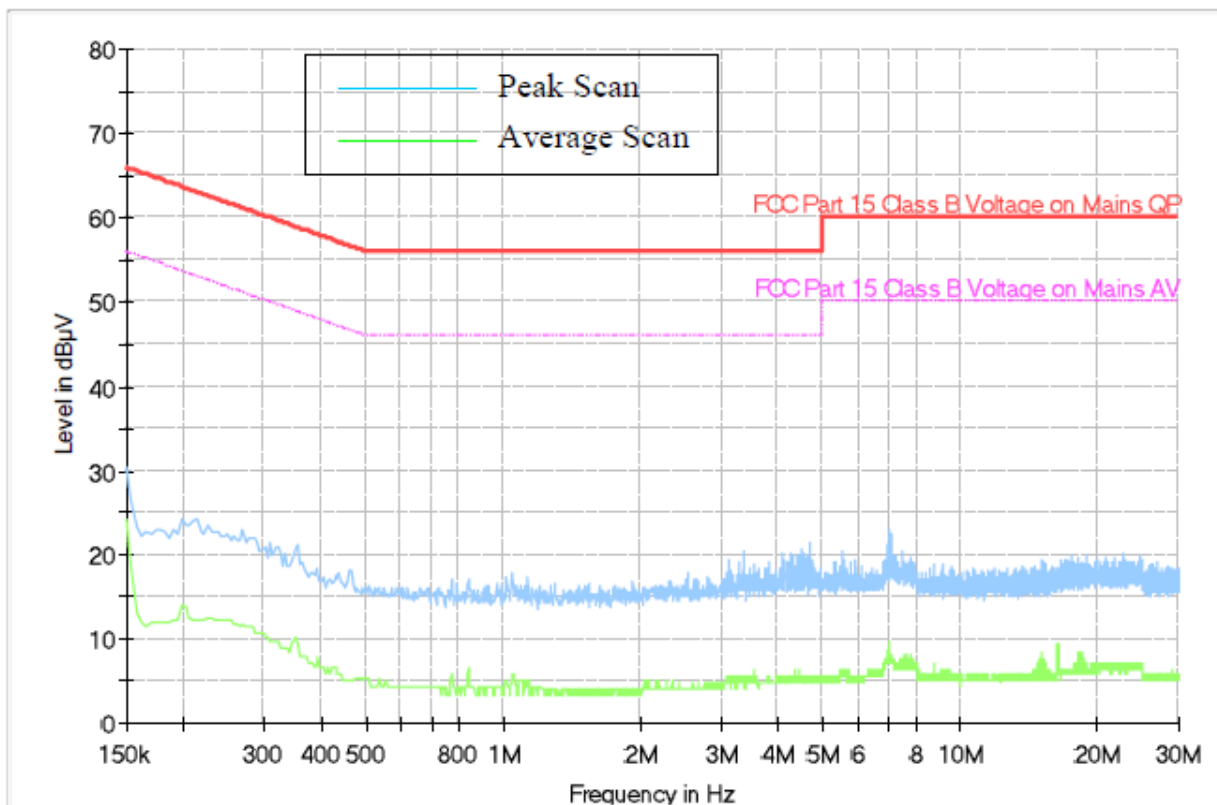
Final Measurements:	
Template for Single Meas.:	Voltage with 2-Line-LISN fin

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; AVG	9 kHz	1 s	0 dB
Receiver:	[ESIB 26]				

Test Data

1) Ambient Noise

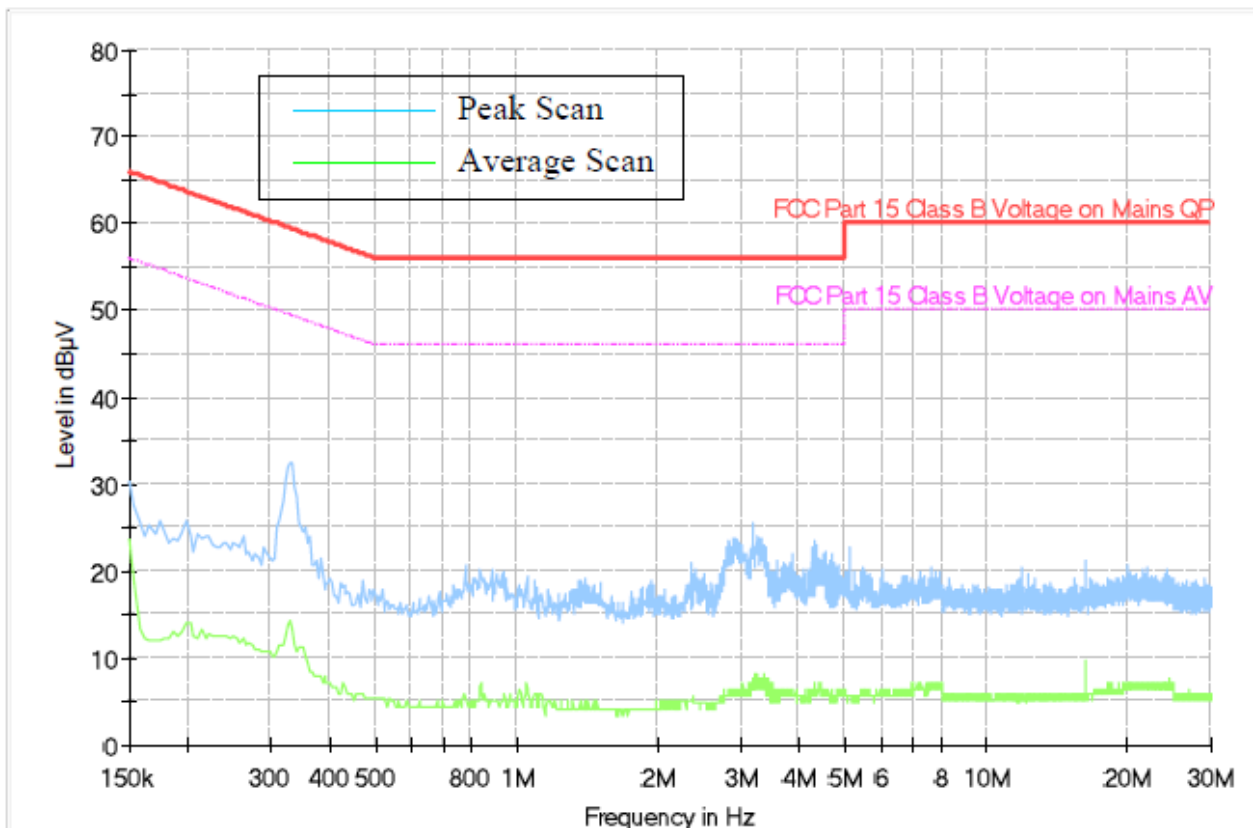
Full Spectrum



120 VAC/60 Hz

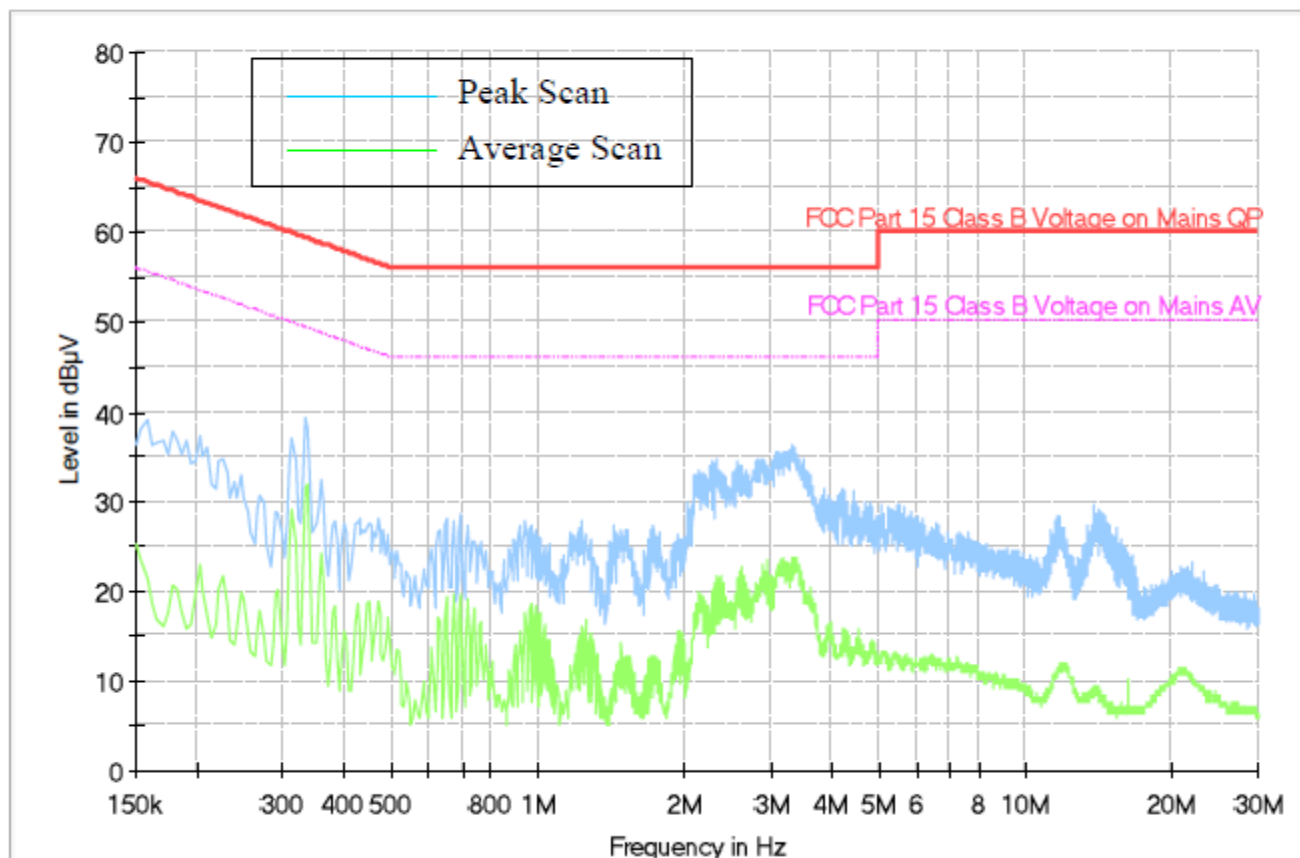
1) Charger Alone

Full Spectrum



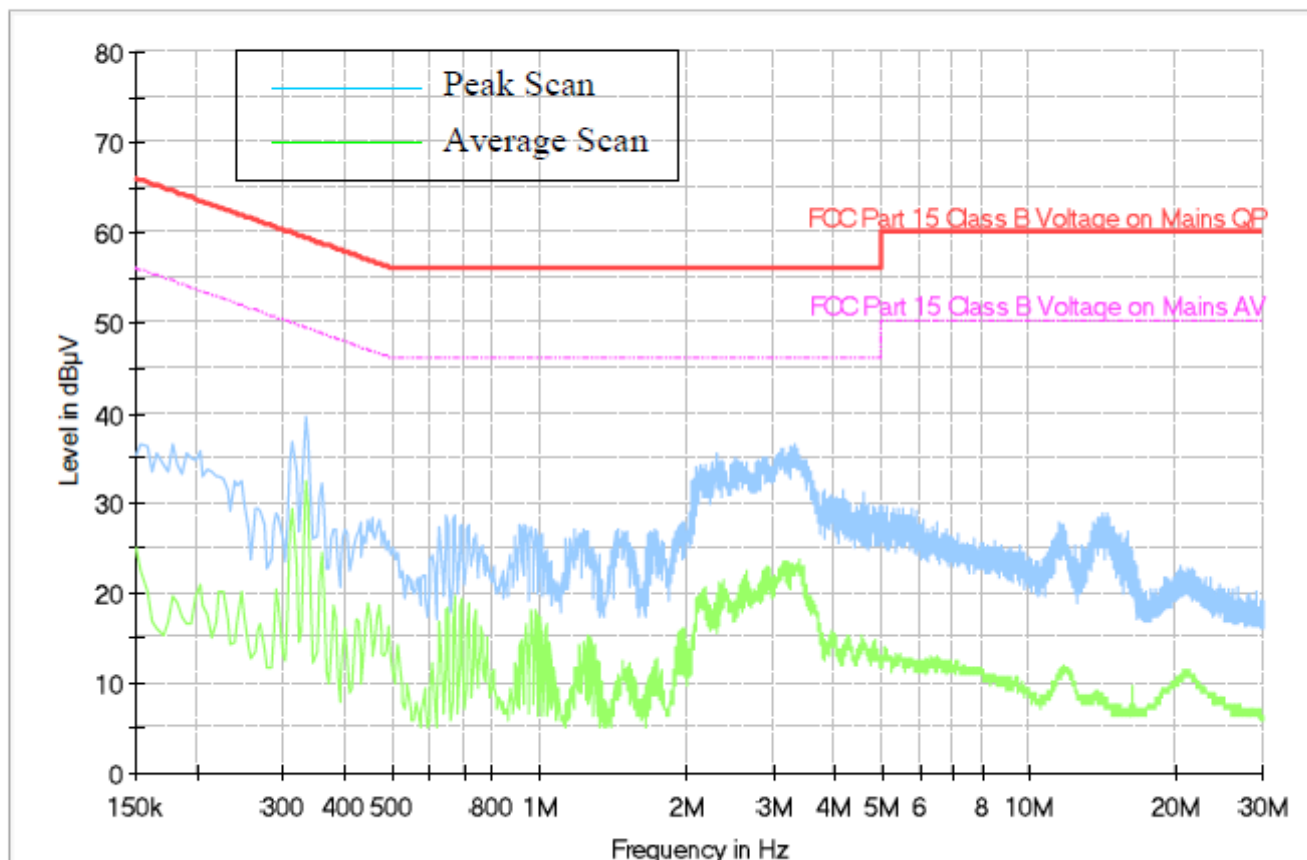
2) Charger with Radio off

Full Spectrum



3) Charger with Radio Standby Mode

Full Spectrum



5.3.3. 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

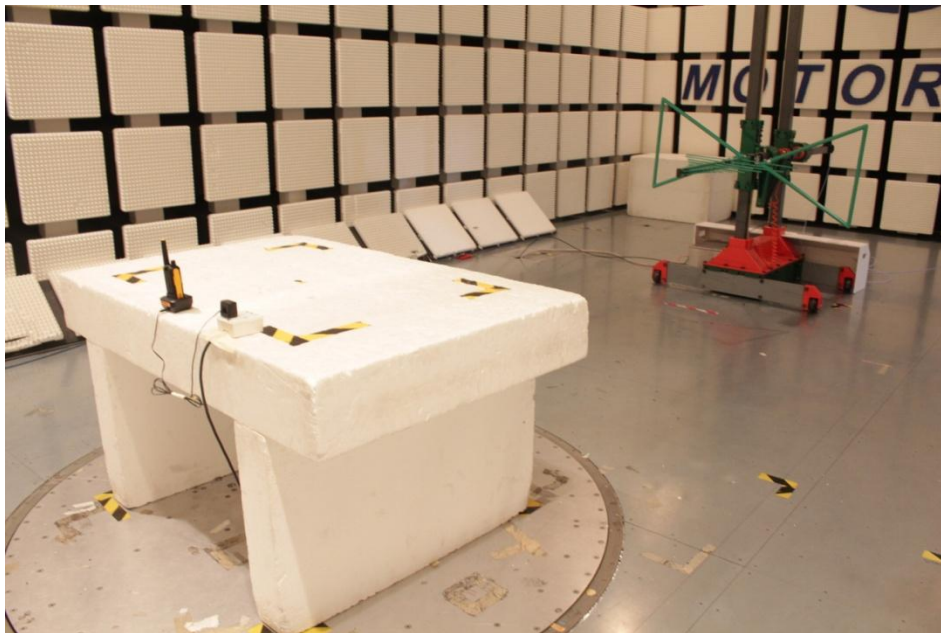
Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.		
NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

6.0. Appendix: Test Setup Photo

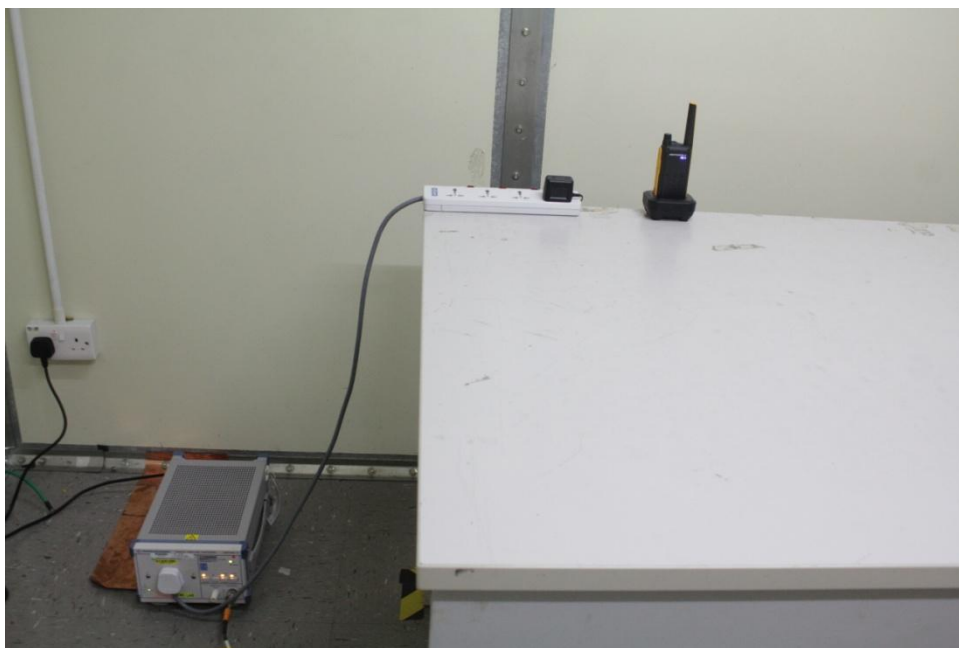
6.1. Conducted Spur Emission ATE Station Setup

NA

6.2. Radiated Spur Emission Station Setup



6.3. AC Power Line Conducted Emission Station Setup



6.4. Photographs - EUT



Radio + Battery + Charger + Power Supply

~ End of Test Report ~