



CERTIFICATE 2518.08

MS ISO/IEC 17025
TESTING
SAMM.NO. 0825

MOTOROLA PENANG ADV. COMM. LABORATORY

Motorola Solutions Malaysia Sdn Bhd
Plot 2A, Medan Bayan Lepas,
Mukim 12 SWD, 11900 Bayan Lepas
Penang, MALAYSIA

FCC / ISED TEST REPORT

Report Revision : Rev.B

Date/s Tested : 15-JAN-2020 - 3-FEB-2020
Manufacturer : Motorola Solutions Malaysia SDN BHD
Manufacturer Address : Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia
Requestor : TEH TIAN HONG
Product Type : Base Station
Model Number : T7039A (T7039-UHFR1C)
Frequency Band : 380-435 MHz
Firmware Version : 35.00.09
Max RF Output Power : 110 Watts
Applicant Name : Motorola Solution Inc
Applicant Address : 1301 E.Algonquin Road, Room 1043, Schamburg, IL, 60196
ISED Registrations : MY0001
FCC Registrations : 461337



The equipment was tested accordance to the requirement listed below:

(LMR)
FCC 47 CFR Part 15B /
RSS Gen Issue 5

PASS

This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.

Prepared By:

Gan Boon Teong
Test Personnel

Approved Signatory :

Vincent Foong Chuen Kit
Deputy Technical Manager

Table of Contents

1.0. General Information.....	3
2.0. Summary of Test Results	3
3.0. Measurement Uncertainty	3
4.0. Equipment List.....	4
5.0. Test Condition.....	5
5.1 Receiver Test Conditions.....	5
6.0. Receiver Test Parameters.....	6
6.1. Conducted Spurious Output Power.....	6
6.1.1. Test Setup	6
6.1.2. Test Result	7
6.1.3. Test Limit.....	14
6.2. Radiated Spurious Output Power.....	15
6.2.1. Test Setup	15
6.2.2. Test Result	16
6.2.3. Test Limit.....	32
6.3. AC Power Line Conducted Spur Emissions	33
6.3.1. Test Setup	33
6.3.2. Test Results.....	34
6.3.3. Test Limits	39

Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	30-MAR-2020	Gan Boon Teong
Rev. B	Updated Applicant Address and Remove Rated Power on cover page	11-Jun-2020	Gan Boon Teong

1.0. General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, FSK

The EUT was tested with following device/accessory:

Item	Brand	Model or P/N
LINECORD PLUG & RECP 3.7 MTRS	MOTOROLA	3082933N20
DC Power Cable	MOTOROLA	1948691-1

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 C63.26.2015

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	Pass
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) (±)
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 (SW version: Conducted Spur ATE_rev 1.23.02)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A32735	CNR	CNR
PSA Series Spectrum Analyzer	E4445A	MY46181732	12-Mar-19	12-Mar-21
POWER SUPPLY	6032A	2723A02219	2-Jul-19	2-Jul-20
HIGH PASS FILTER SWITCH BOX	-	CS001	4-Jul-19	4-Jul-20
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	SF126/11N/11N	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	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			

5.0. Test Condition

5.1 Receiver Test Conditions

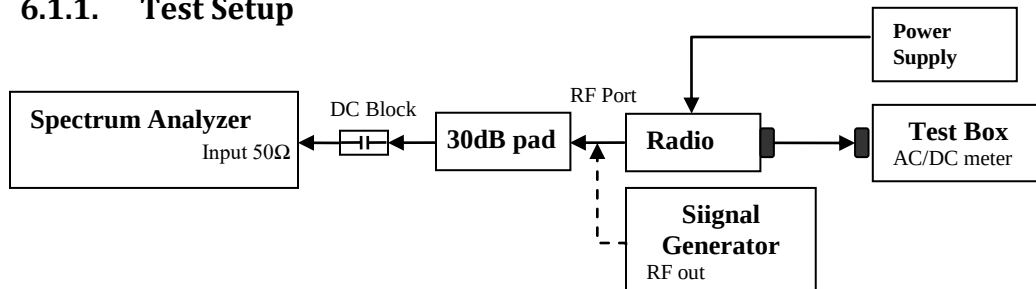
Test Item, (Channel Spacing)	Temperature (°C)	Voltage Supply (V)	Power (W)	Modulation	Test Frequency (MHz)
Conducted Spurious Output Power (12.5kHz / 25kHz)	25°C	Nominal	Max	Analog	380.0125, 406.5, 429.9875, 434.9875
Radiated Spurious Output Power (12.5kHz / 25kHz)	25°C	Nominal	Max	FSK 3600 Trunking	380.0125, 406.5, 429.9875, 434.9875
AC Power Line Conducted Spurious Emissions (12.5kHz / 25kHz)	25°C	Nominal	Max	FSK 3600 Trunking	406.5

NA → Not Applicable

6.0. Receiver Test Parameters

6.1. Conducted Spurious Output Power

6.1.1. Test Setup

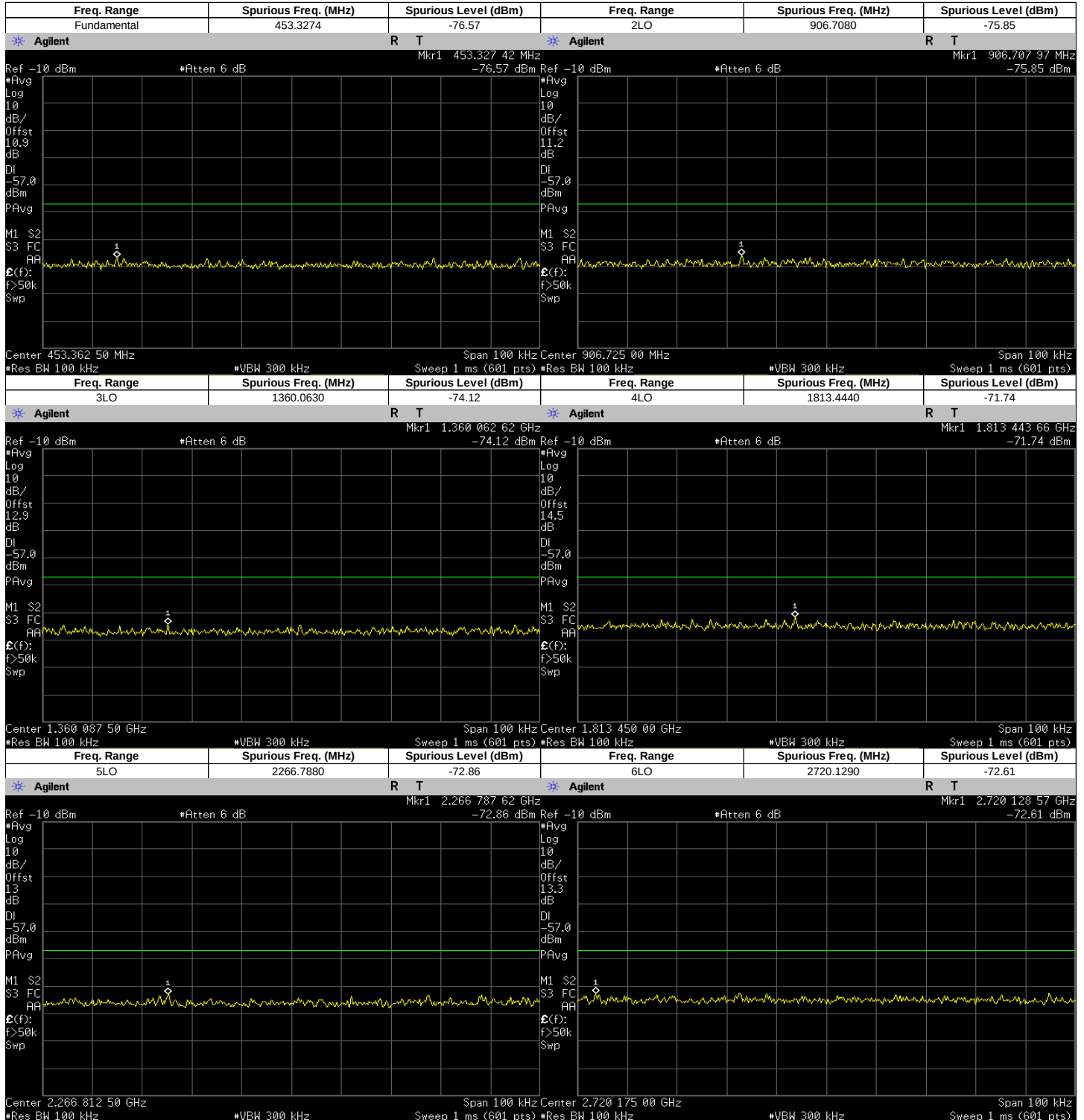


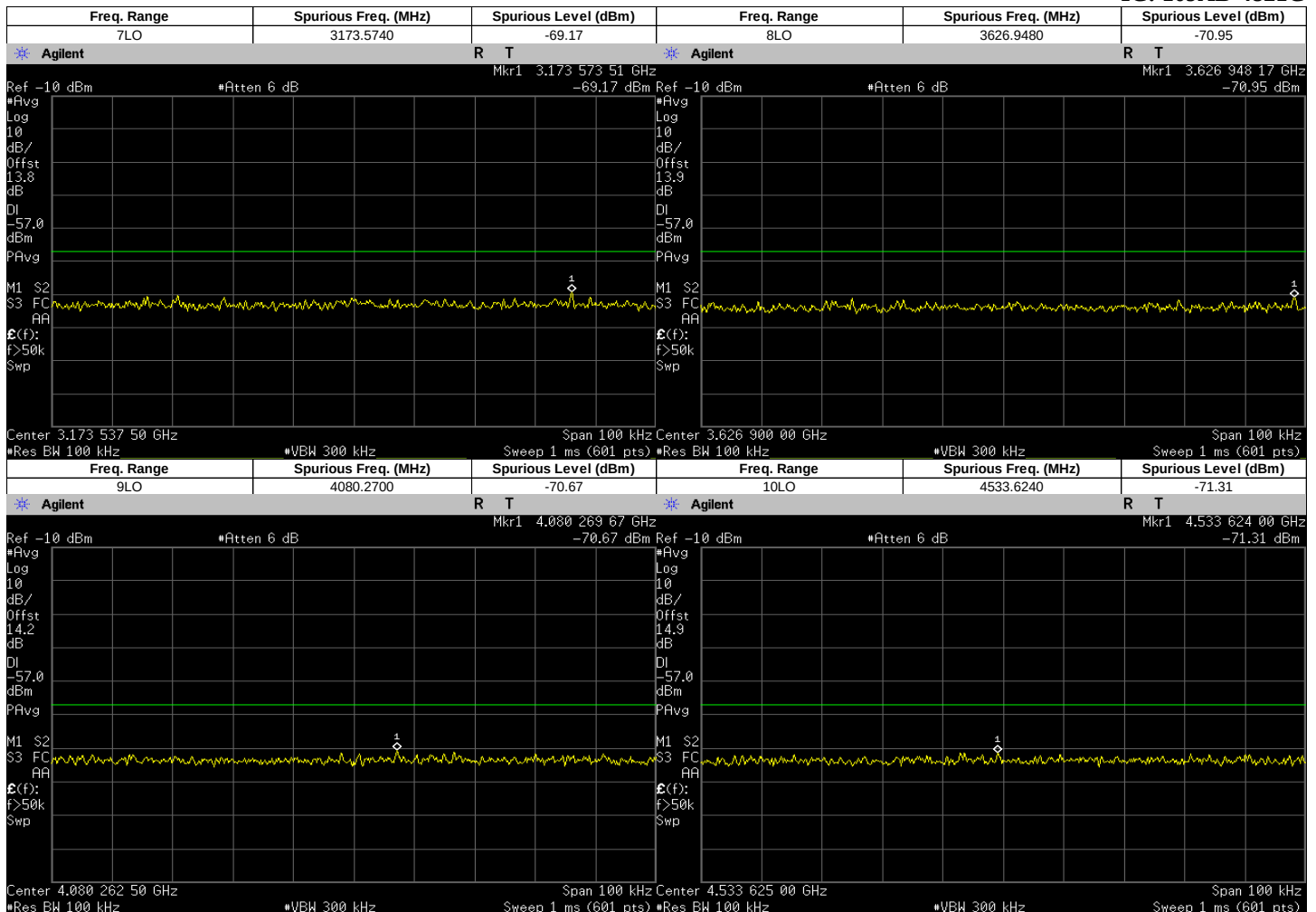
- 1) Identify the radio is high side ($LO = F_c + IF$) or low side injection ($LO = F_c - IF$).
- 2) To get the reference point, set sigen to 1st LO frequency with amplitude level 0dBm.
- 3) Set the LO frequency into PSA. Adjust the PSA RBW = 100 kHz and record the Reference level offset.
- 4) Replace 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.

6.1.2. Test Result

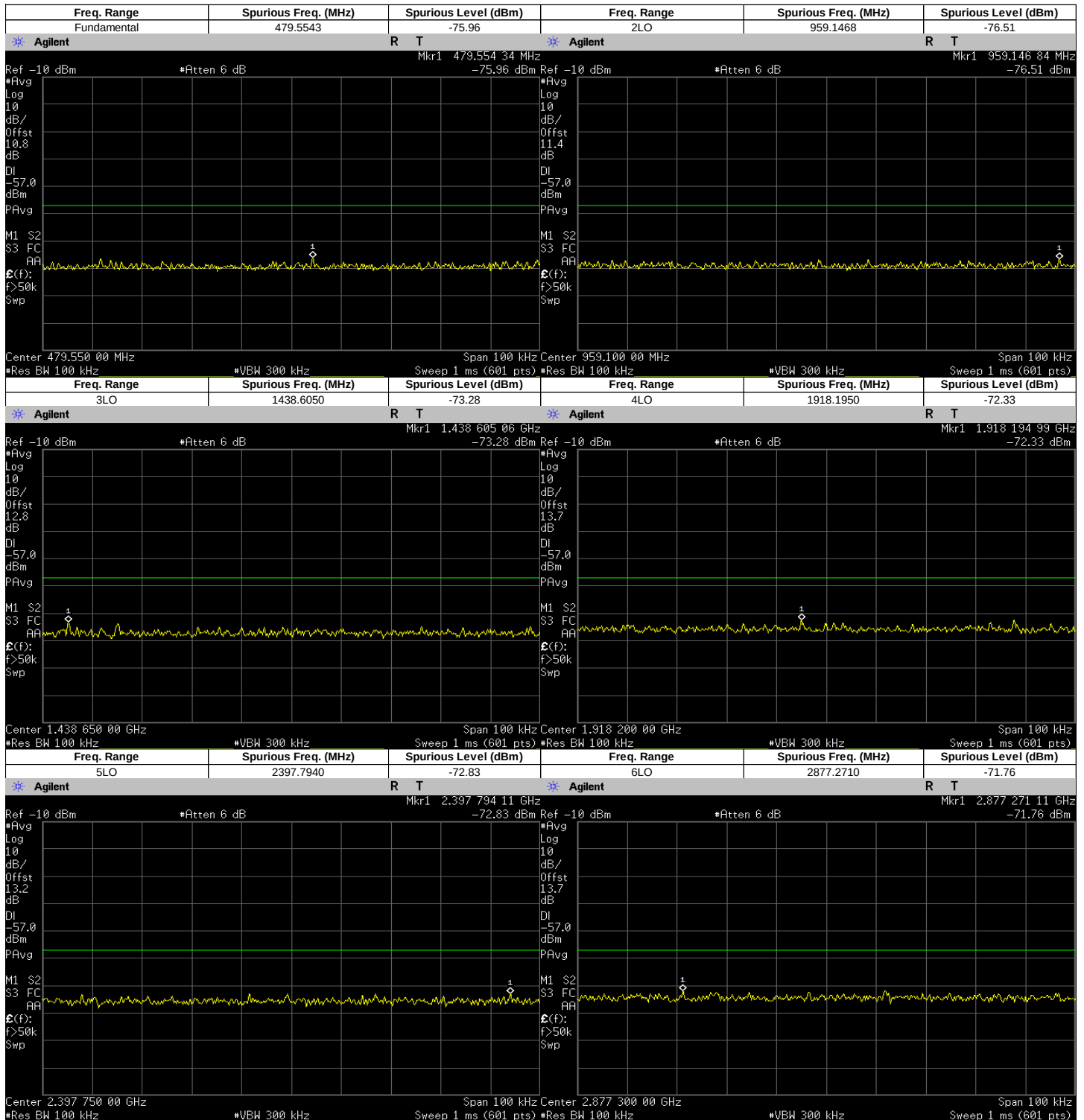
Test Date : 31-Jan-2020
 Operator : Gan

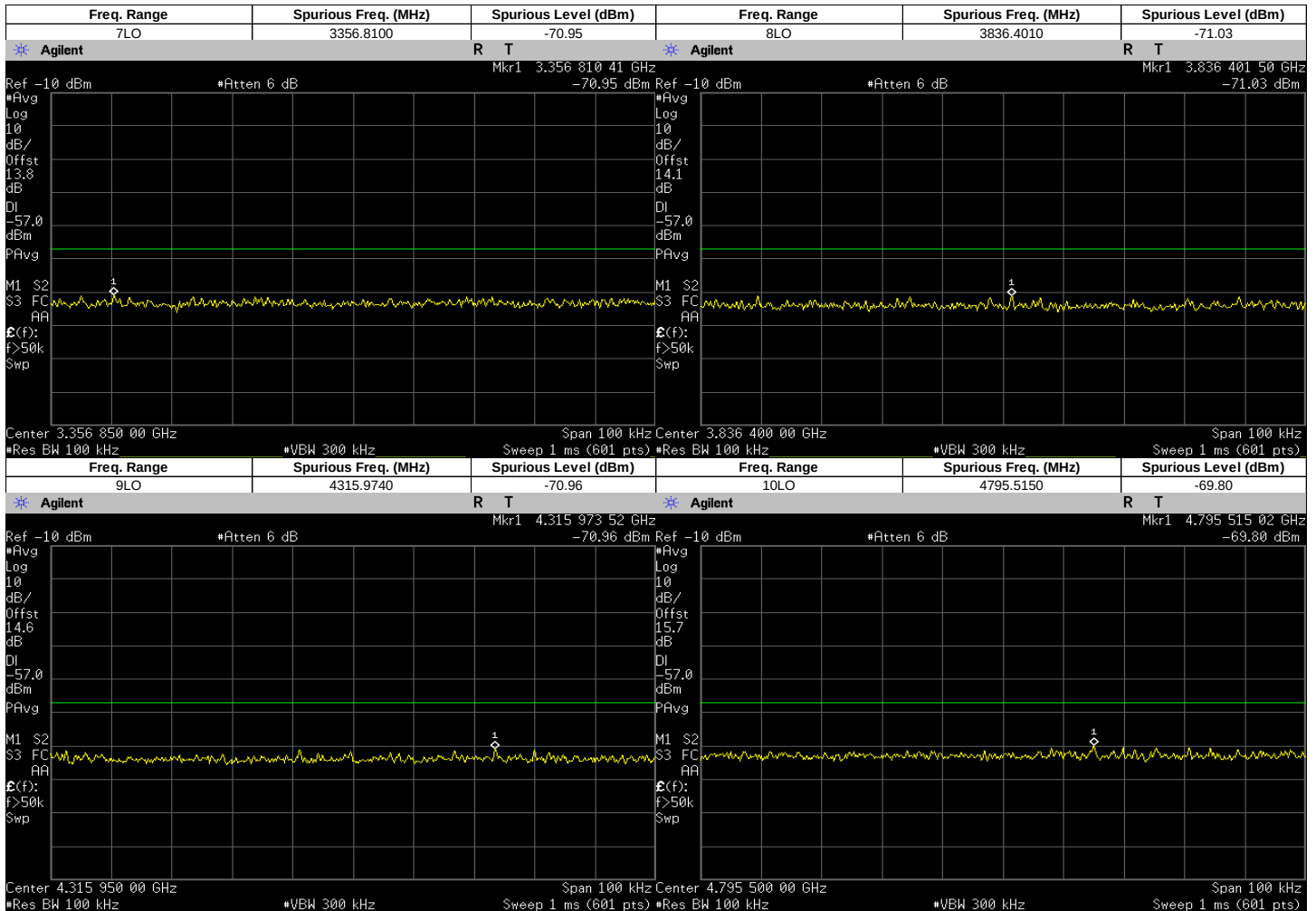
380.0125MHz 12.5kHz



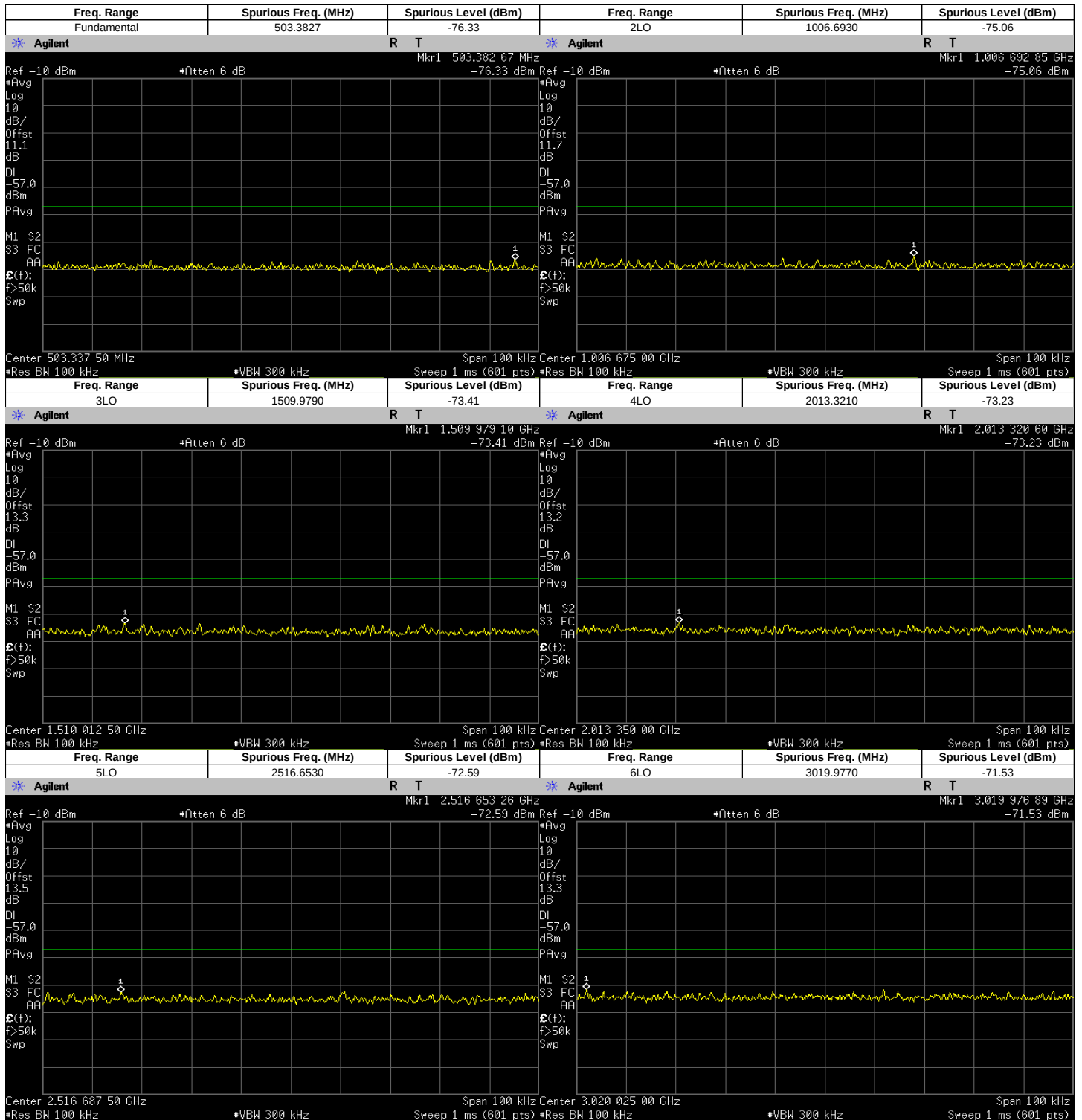


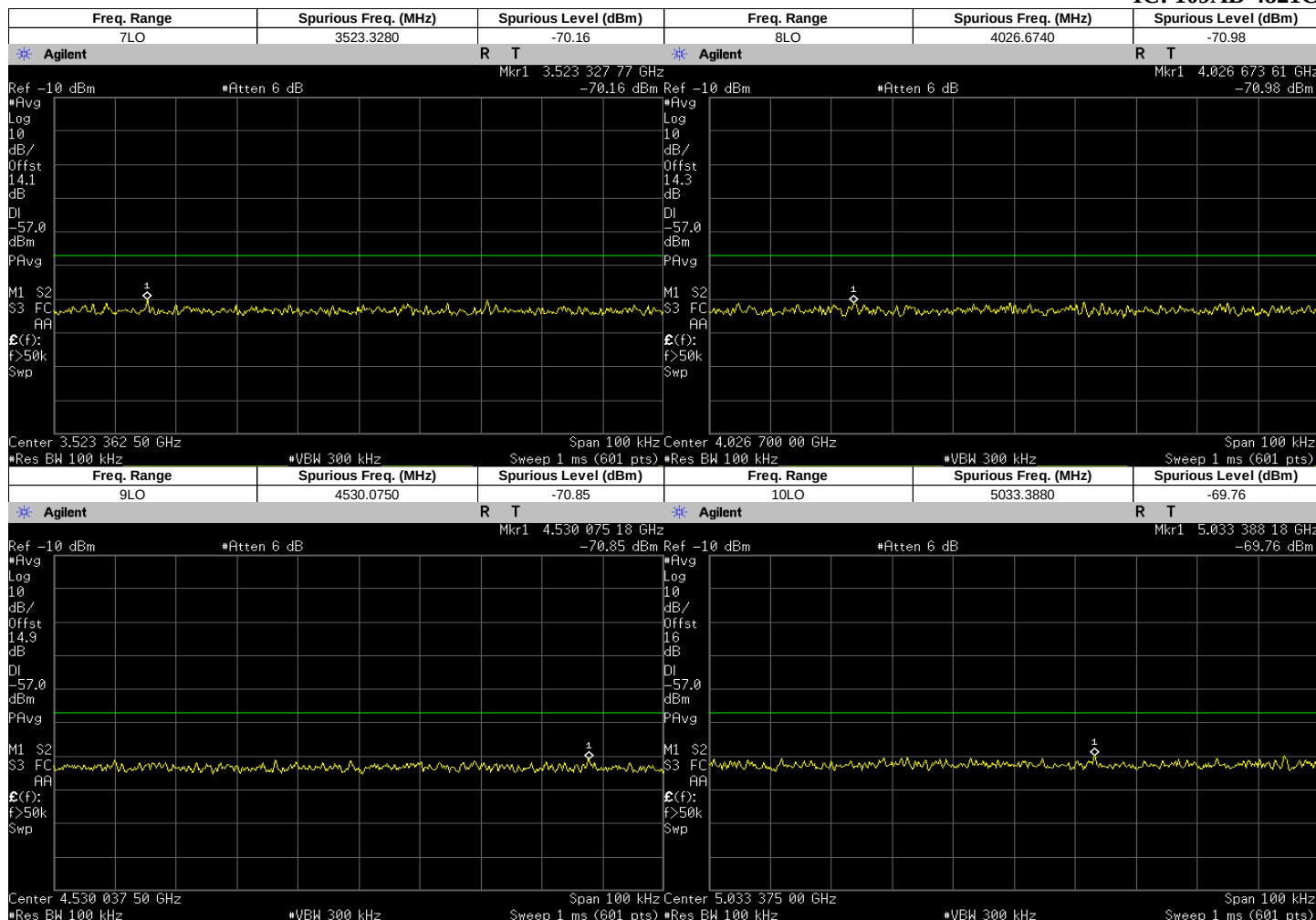
406.5MHz 25kHz



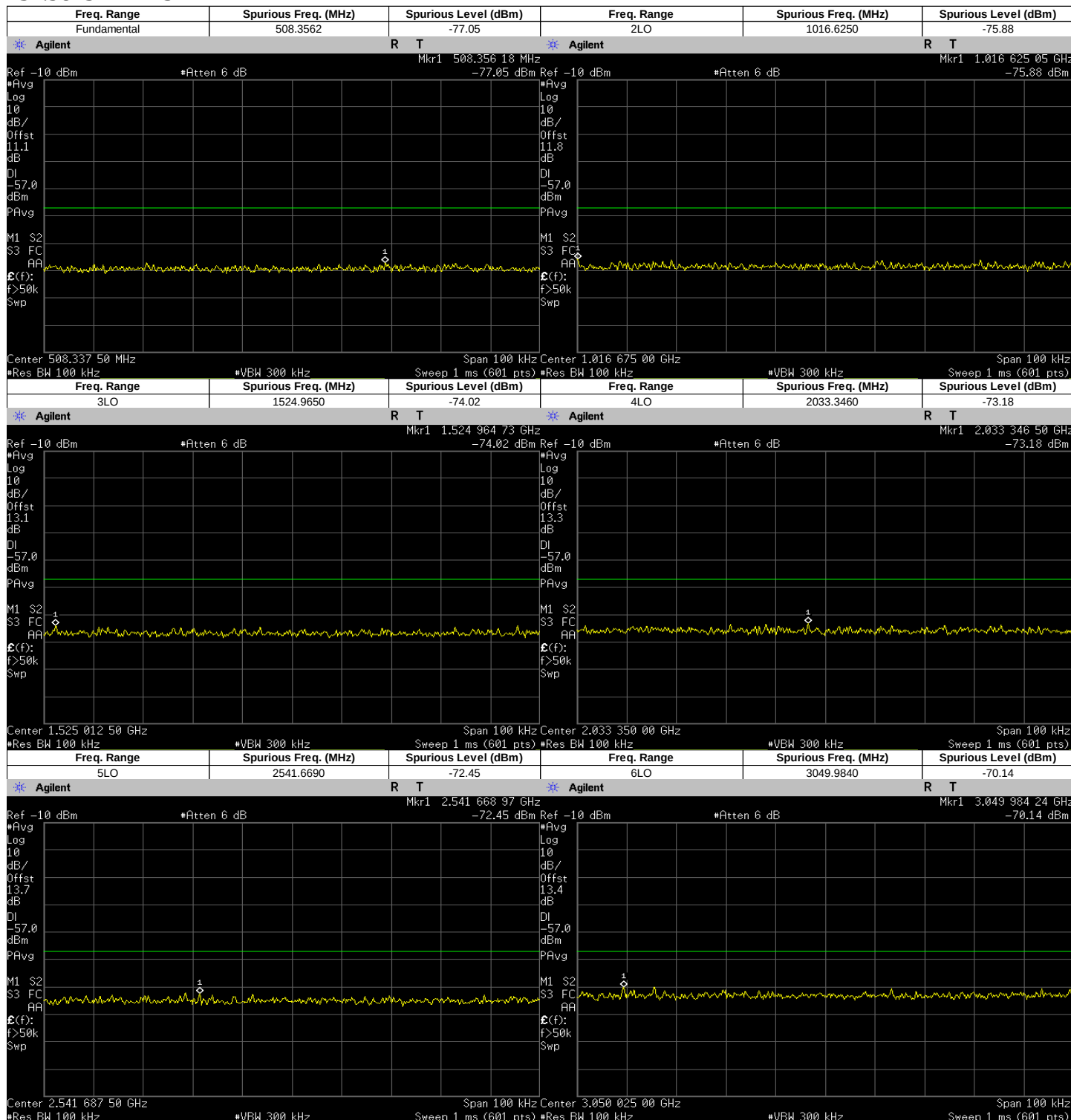


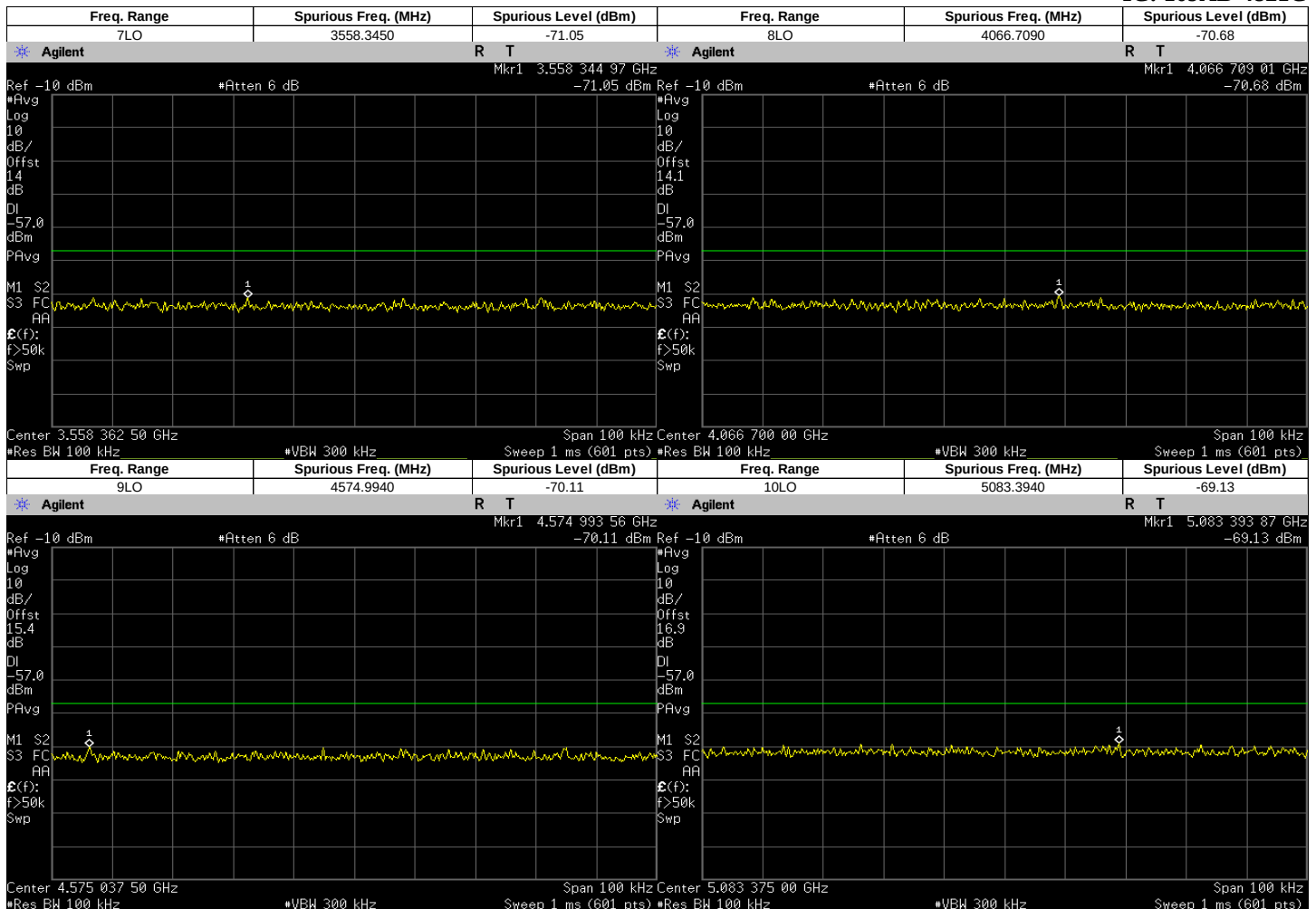
429.9875MHz 12.5kHz





434.9875MHz 25kHz



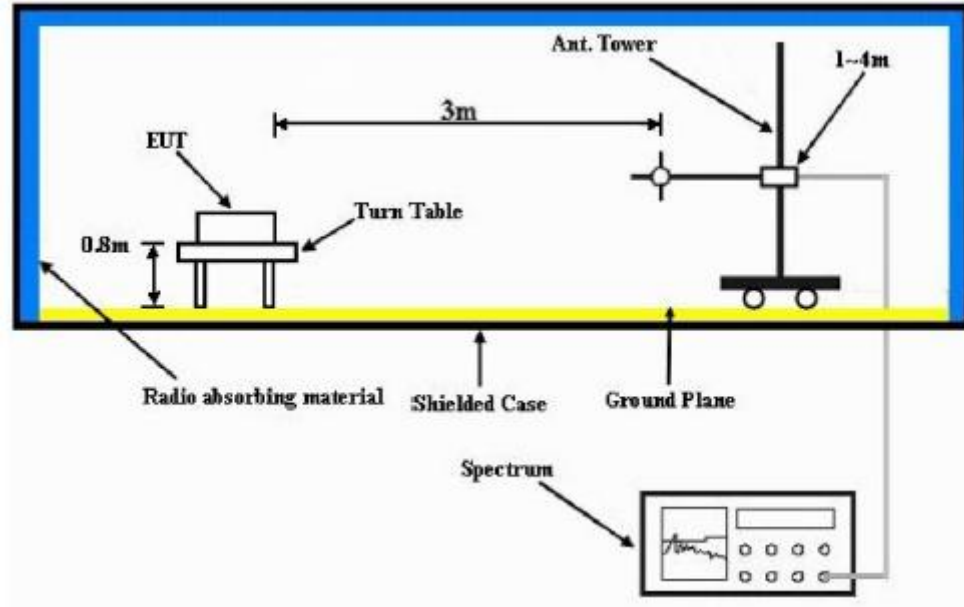


6.1.3. Test Limit

No spurious output appearing at the antenna terminals shall exceed -57dBm across 50Ω.

6.2. Radiated Spurious Output Power

6.2.1. Test Setup

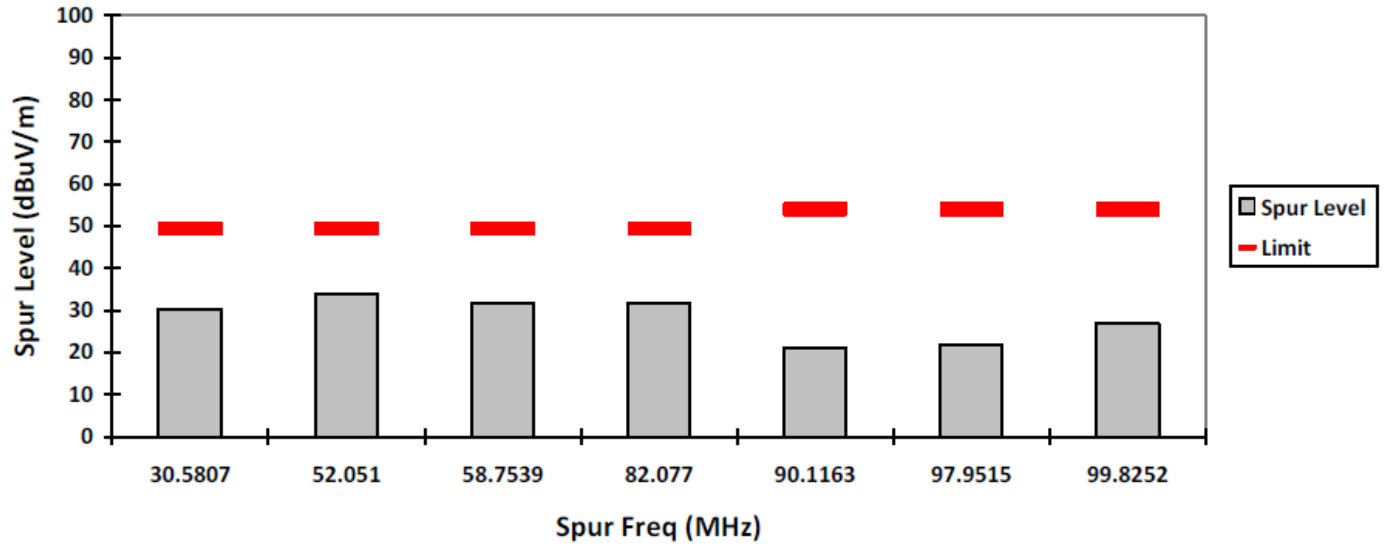


- 1) The spectrum setting for scanning Radiated Emission below 1 GHz is RBW = 100 kHz, VBW = 300 kHz and above 1 GHz is RBW = 1MHz, VBW = 3MHz. Detector mode is positive peak.
- 2) In the semi-anechoic chamber, setup as illustrated above the EUT placed on the 0.8m height of Turn Table, rotated the table 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 EUT 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.

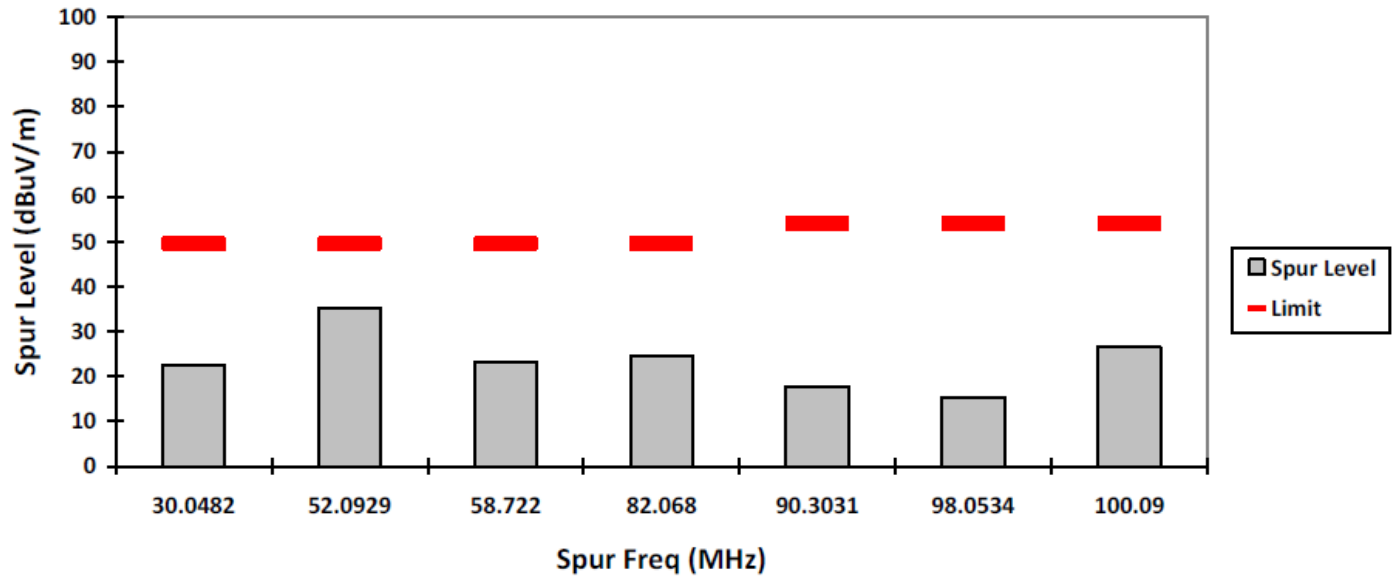
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, QPK



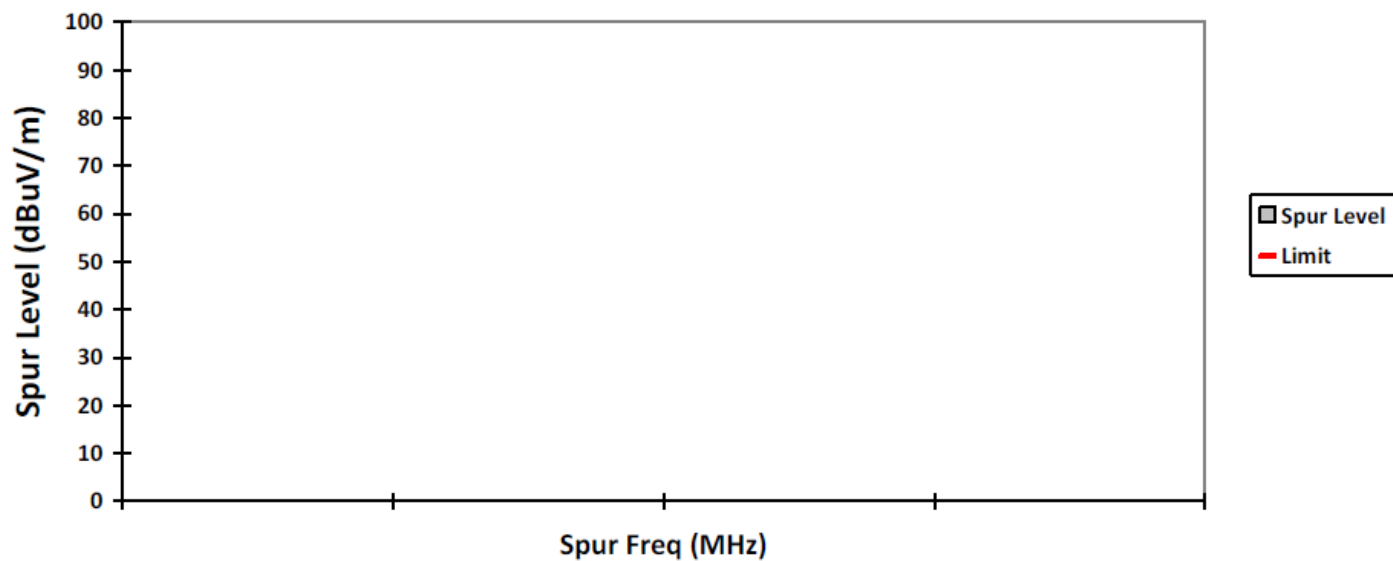
HORIZONTAL, QPK



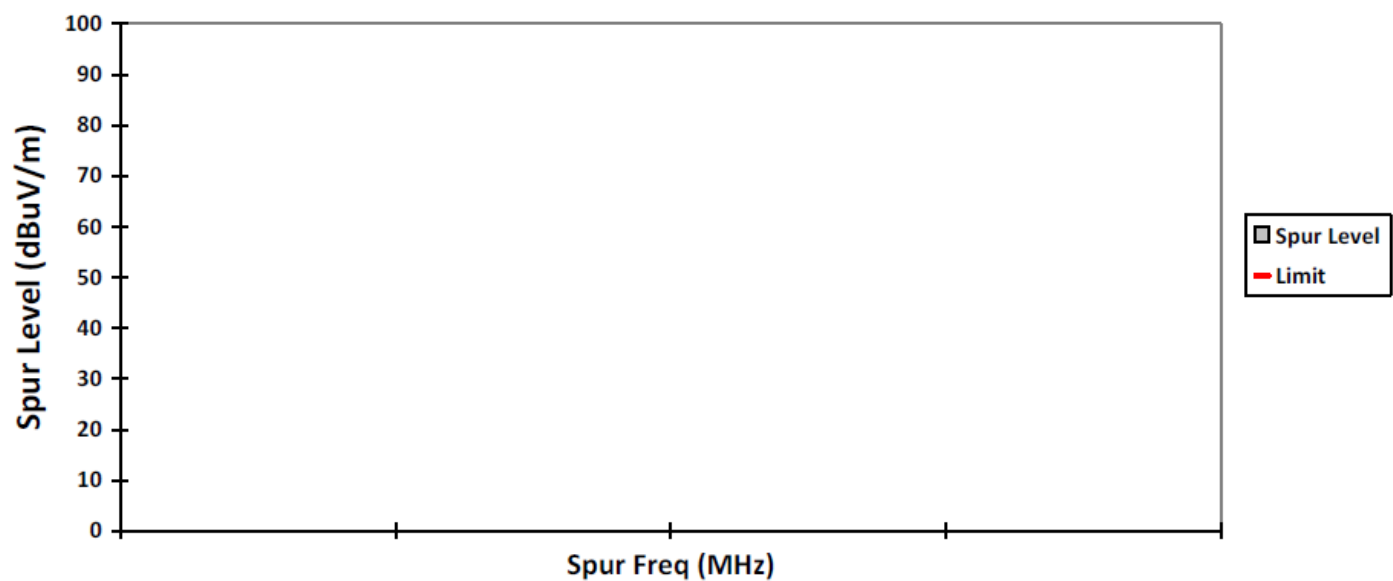
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, PK



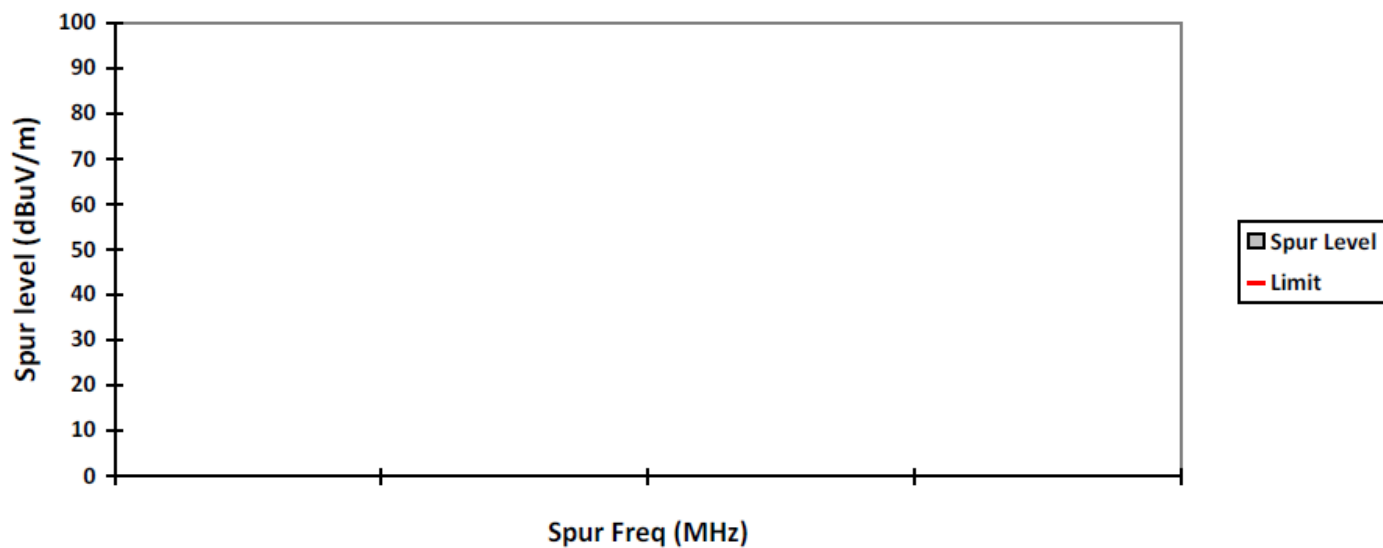
HORIZONTAL, PK



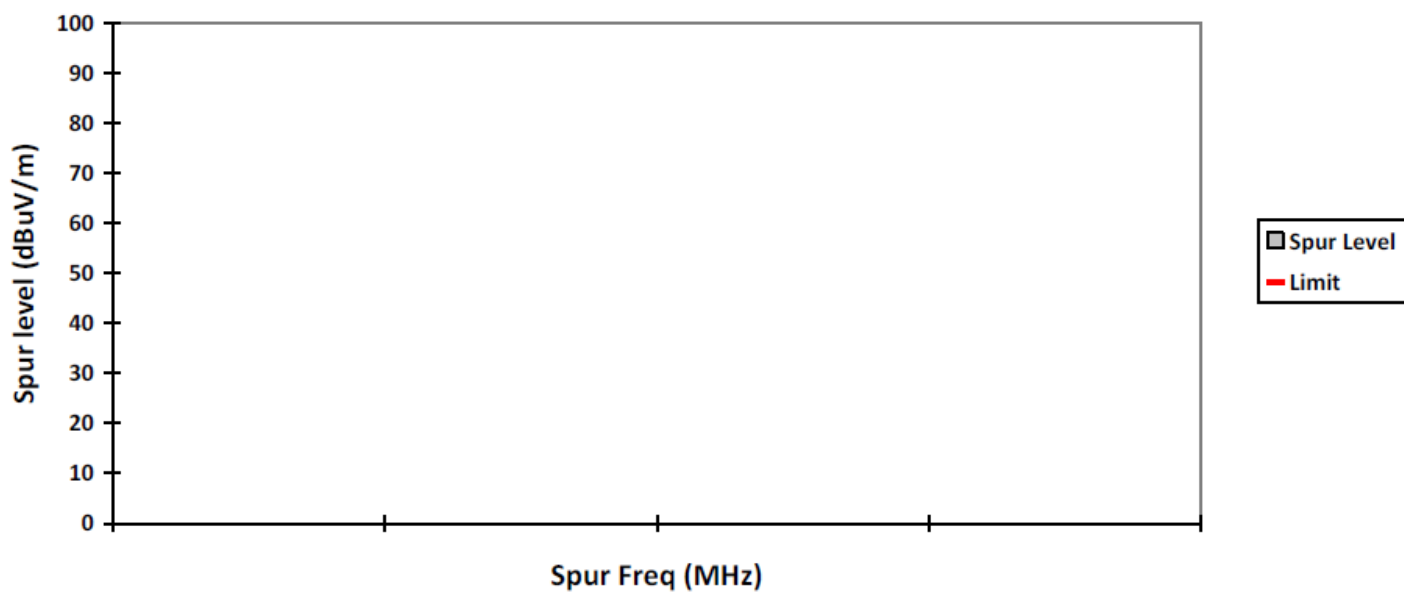
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, AV



HORIZONTAL, AV



FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

Test: SAC Receiver Radiated Emission			
Model#: T7039A	S/N: 112CVX1806	EMC SR ID#: 19587-EMC-00014	
Battery: NA	Accessory: 3082933N20-C3		
Test Mode: RX FSK	Test Frequency: 406.5000 MHz	12.5 kHz	110.000 Watt(s) /Max Power
Test Standard: ANSI C63.4-2014			

Vertical Radiated Emission Result

Horizontal Radiated Emission Result

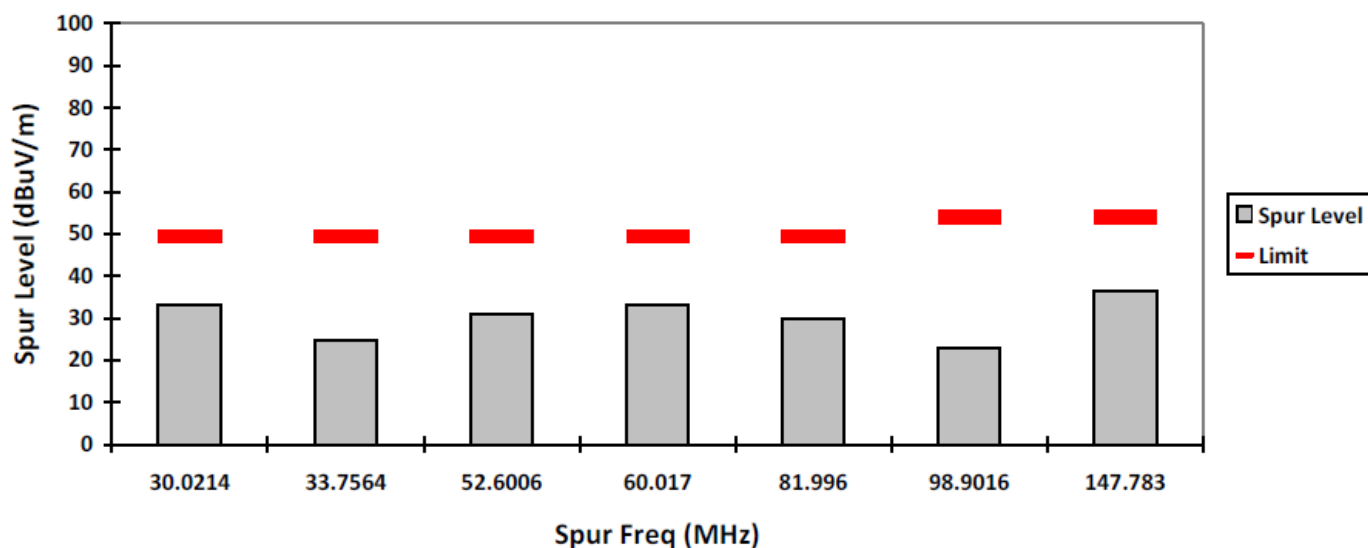
Temperature (degC): 23.6 Humidity (%): 69.7
Test Performed by: Nazrin&Qawiman Test Date: Sat, Jan 25, 2020
System MU: 4.25 dB (30-1000MHz), 4.94 dB (1000-18000MHz)

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.**

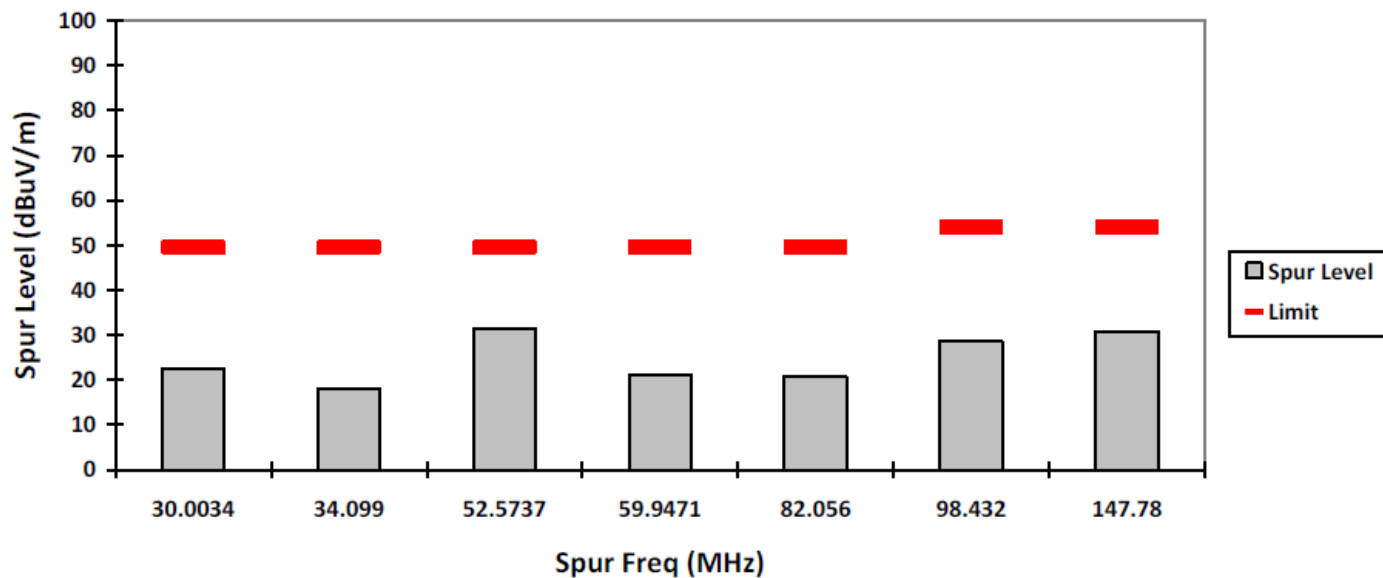
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, QPK



HORIZONTAL, QPK



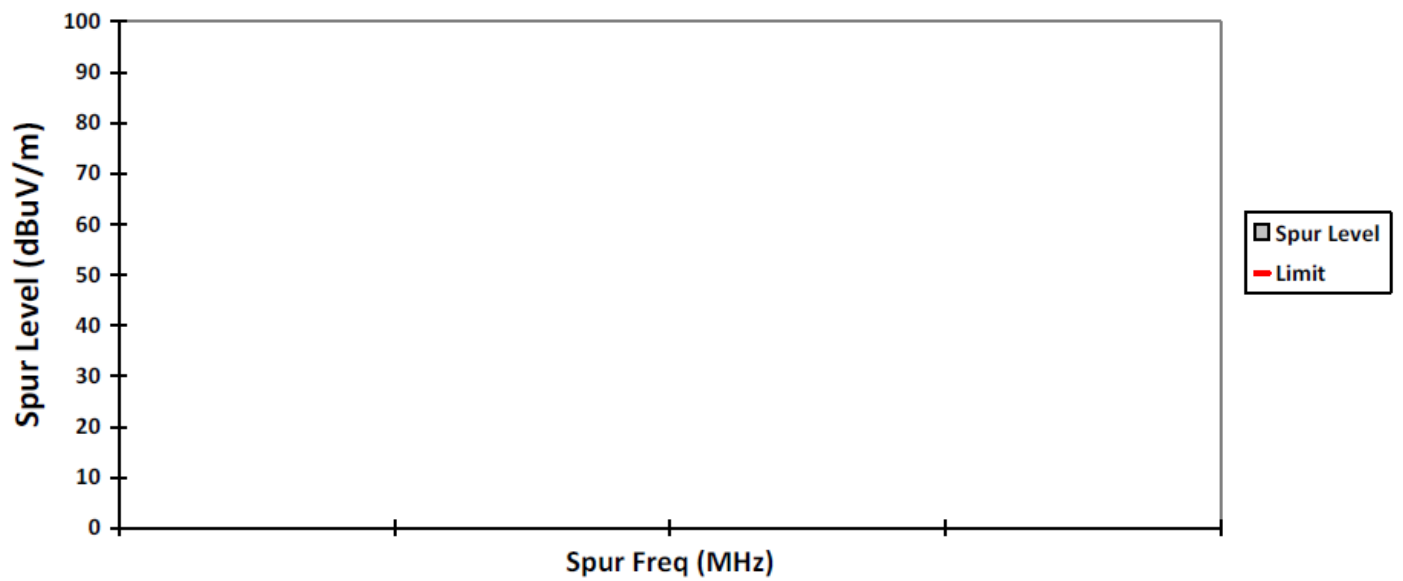
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, PK



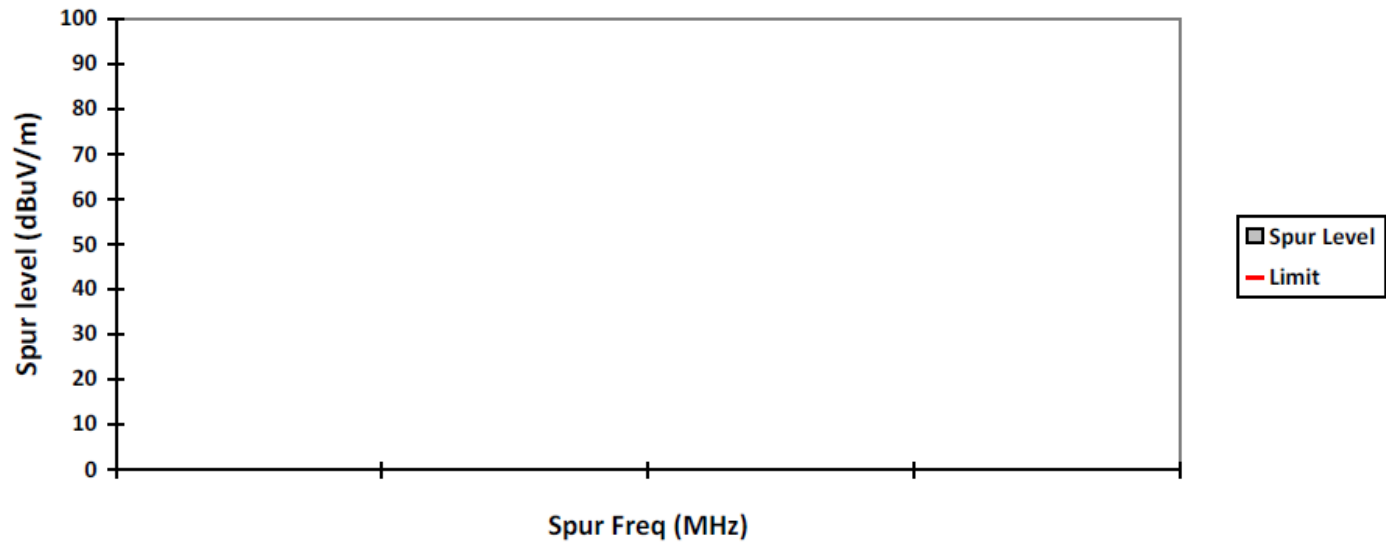
HORIZONTAL, PK



Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, AV



HORIZONTAL, AV



FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

Test: SAC Receiver Radiated Emission

S/N: 112CVX1806

EMC SR ID#: 19587-EMC-00014

Accessory: 3082933N20-C3

Test Frequency: 429.9875 MHz

12.5 kHz

110.000 Watt(s) /Max Power

Test Standard: ANSI C63.4-2014

Vertical Radiated Emission Result

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

Humidity (%): 69.7

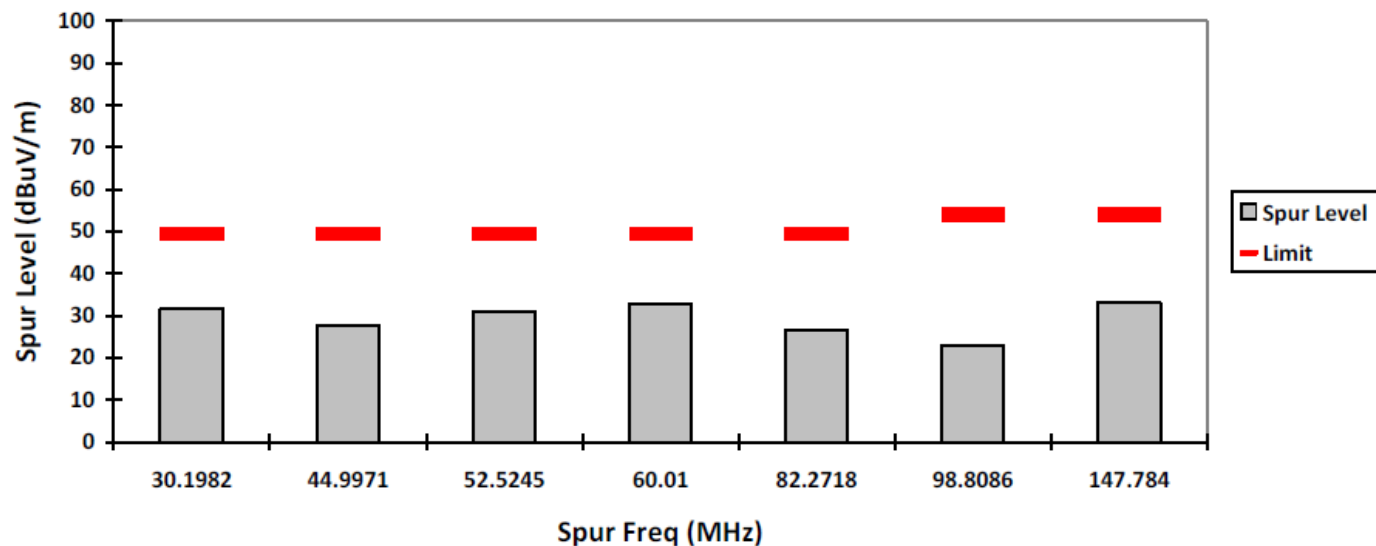
Test Date: Sat, Jan 25, 2020

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.**

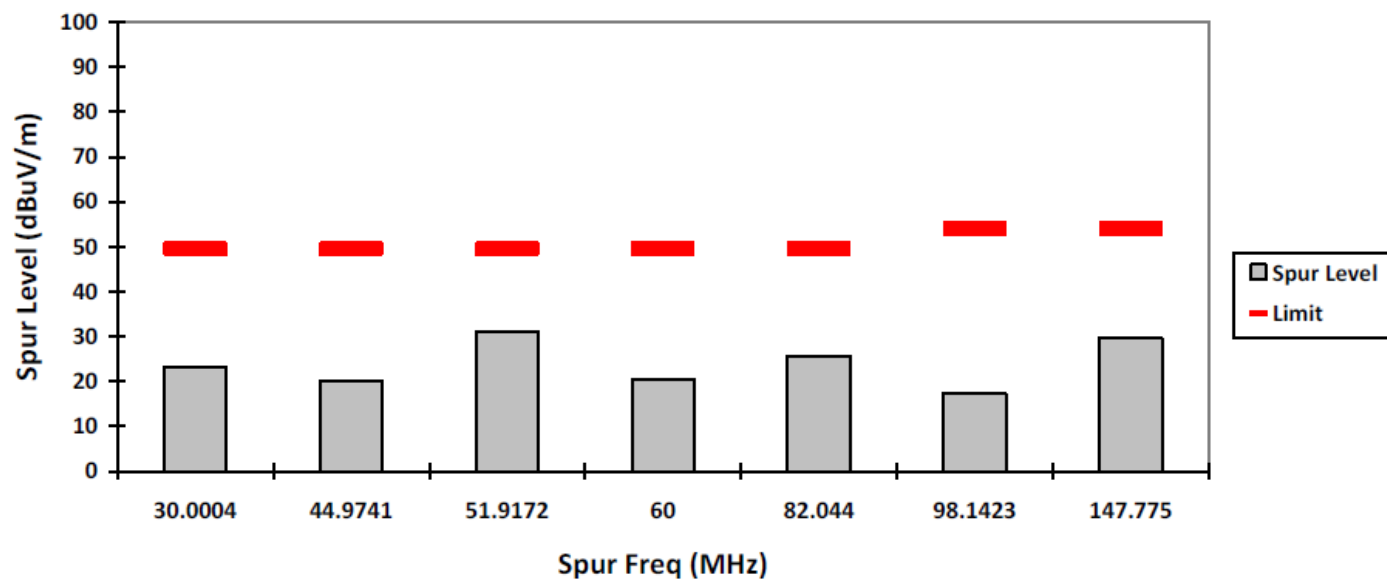
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, QPK



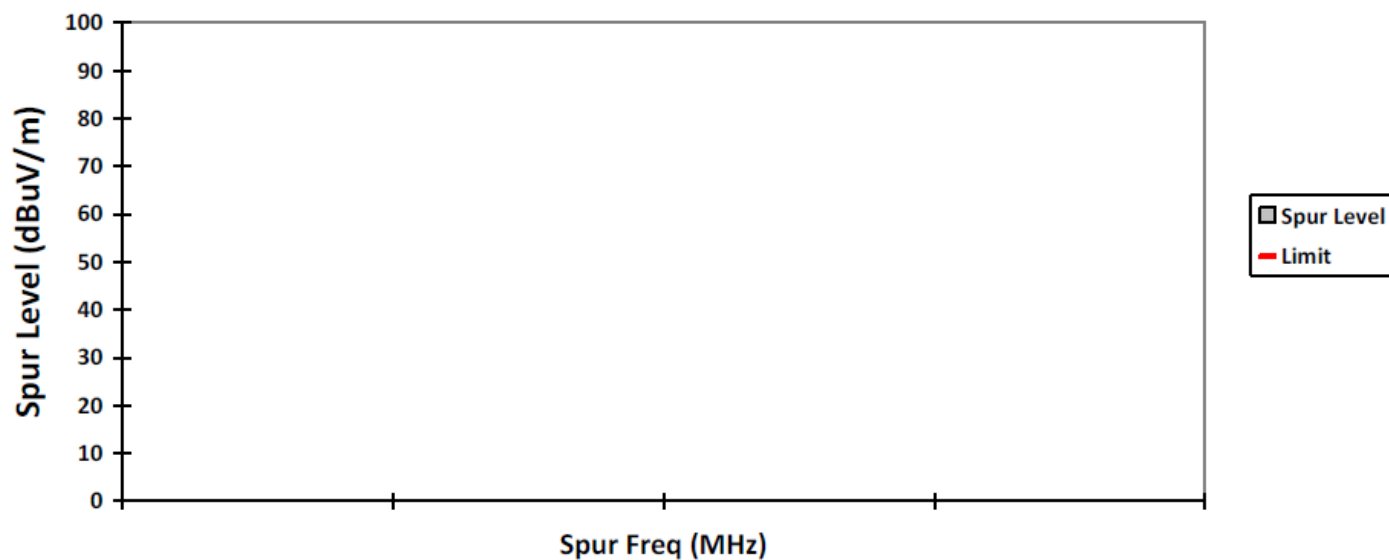
HORIZONTAL, QPK



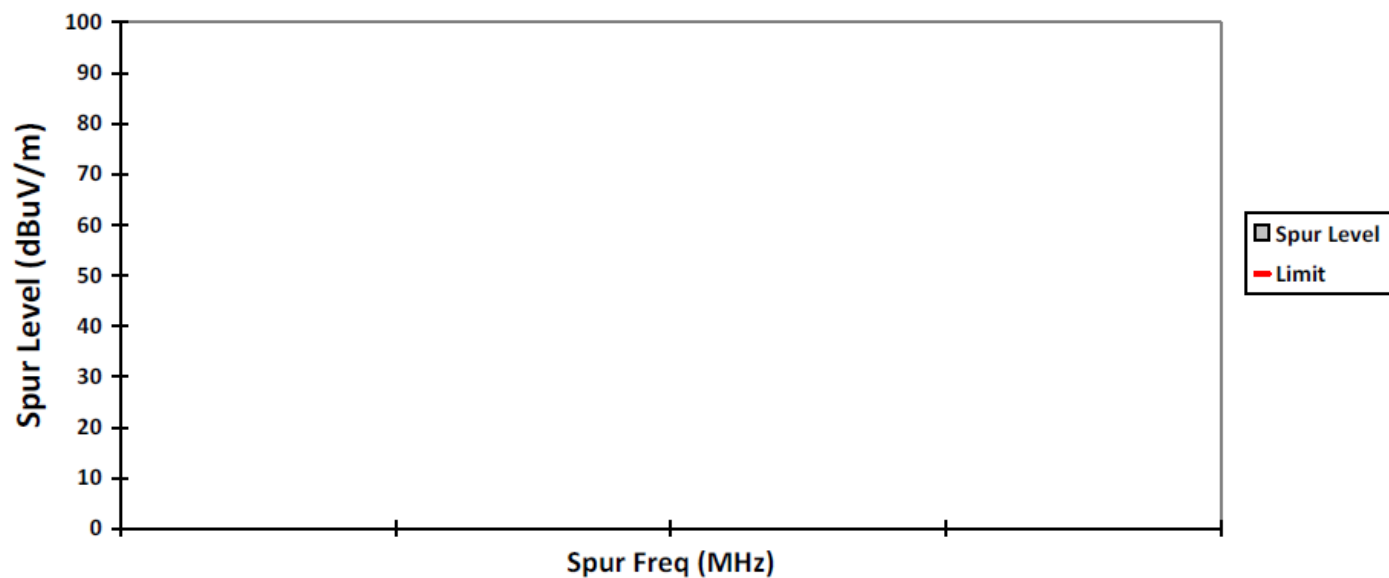
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, PK



HORIZONTAL, PK



Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, AV



HORIZONTAL, AV



FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

Test: SAC Receiver Radiated Emission			
Model#: T7039A	S/N: 112CVX1806	EMC SR ID#: 19587-EMC-00014	
Battery: NA	Accessory: 3082933N20-C3		
Test Mode: RX FSK	Test Frequency: 434.9875 MHz	12.5 kHz	110.000 Watt(s) /Max Power
Test Standard: ANSI C63.4-2014			

Radiated Emission tabular data

[illegible]

Remarks: Pass Result	Marginal Result	Fail Result
-------------------------	-----------------	-------------

Temperature (degC): 23.6 Humidity: 65.2
Test Performed by: Nazrin&Qawiman Test Date: 11/11/2023
System MU: 4.25 dB (30-1000MHz), 4.94 dB (1000-18000MHz)

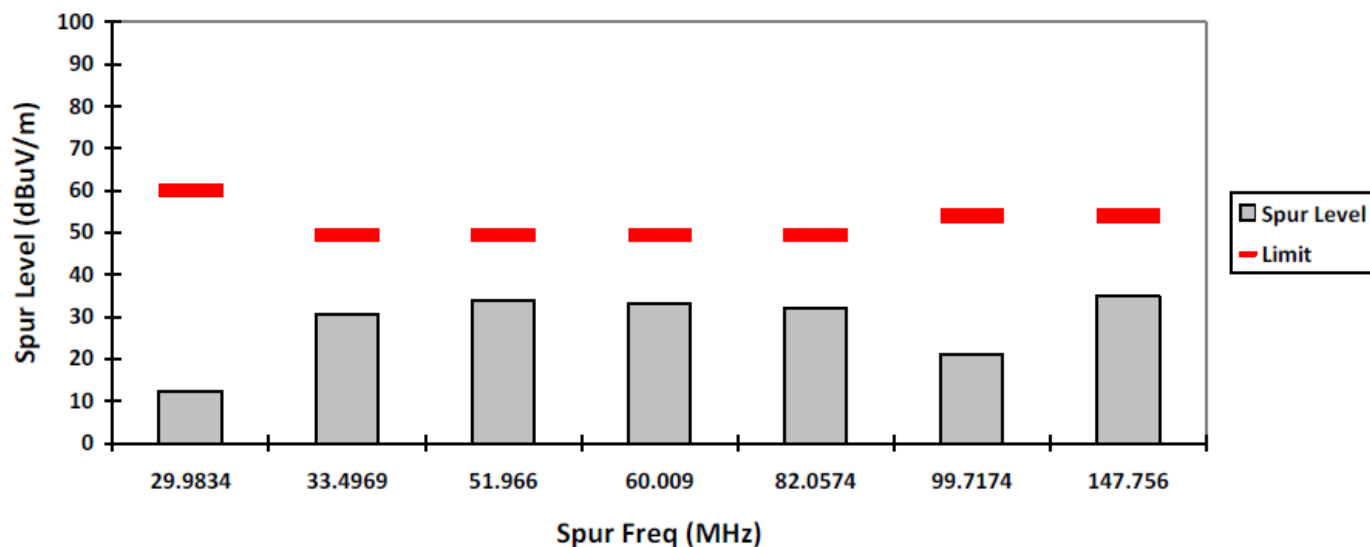
Humidity (%): 69.7
Test Date: Sat, Jan 25, 2020

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.**

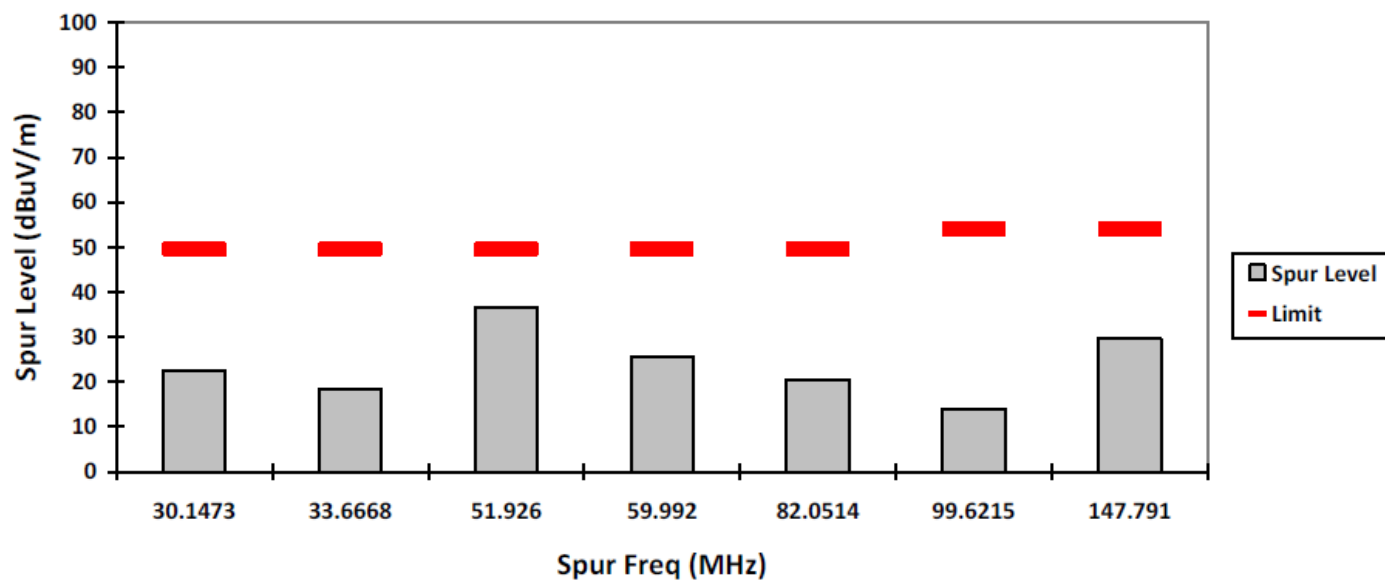
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, QPK



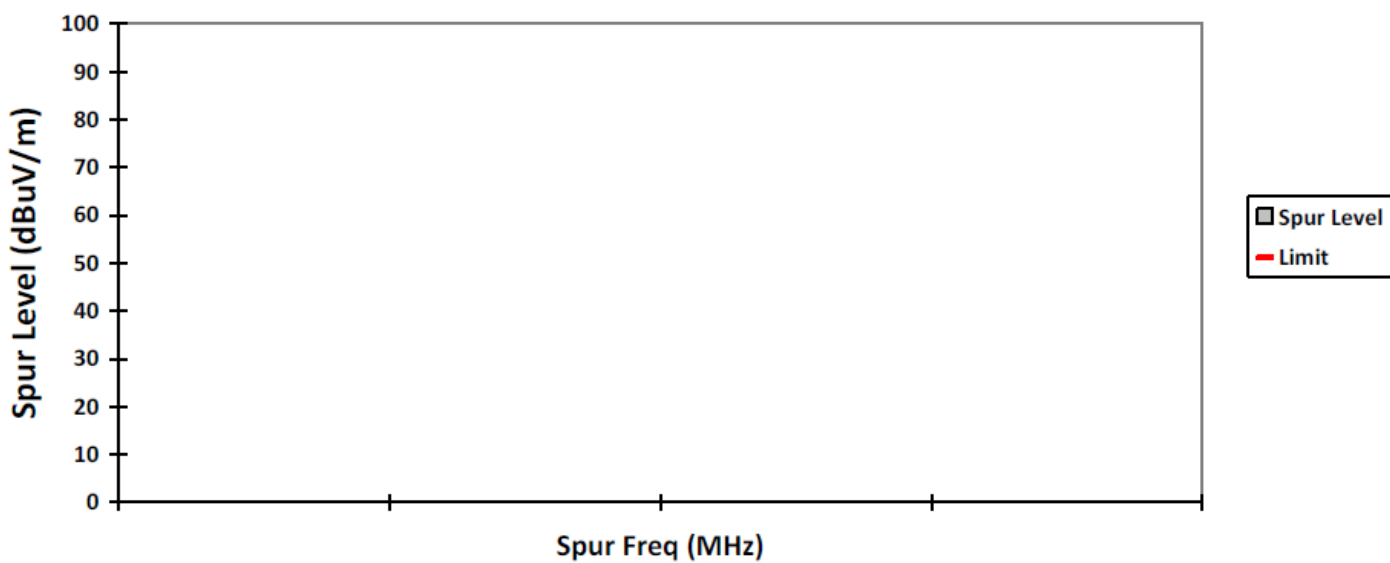
HORIZONTAL, QPK



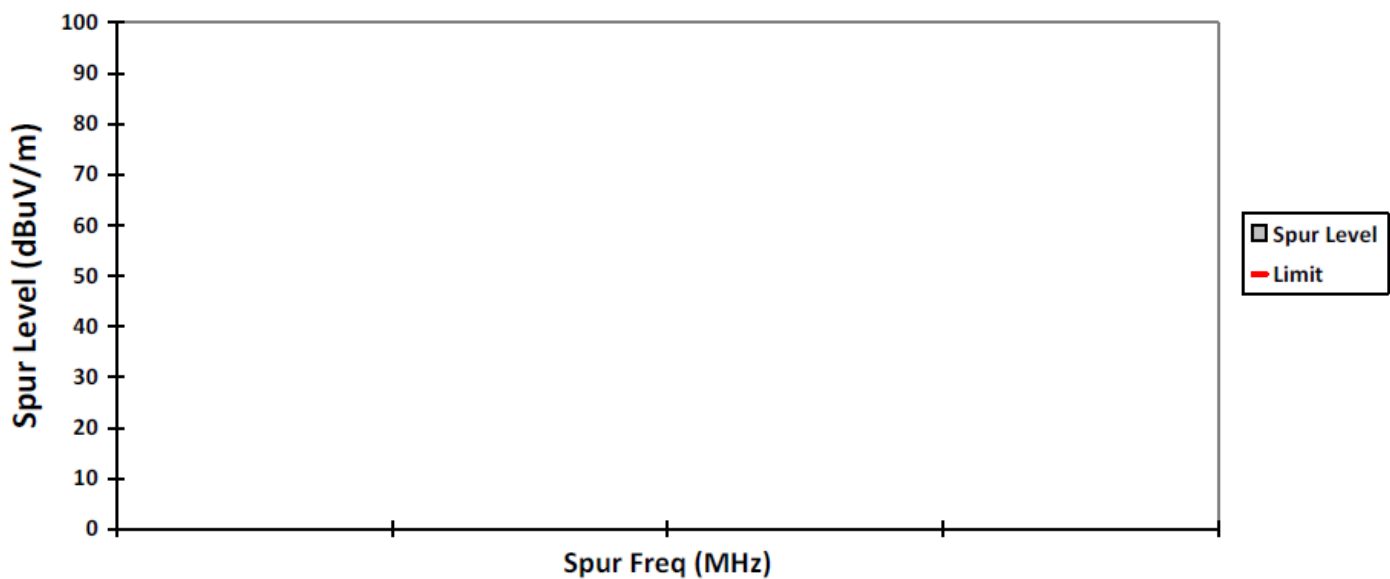
Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, PK



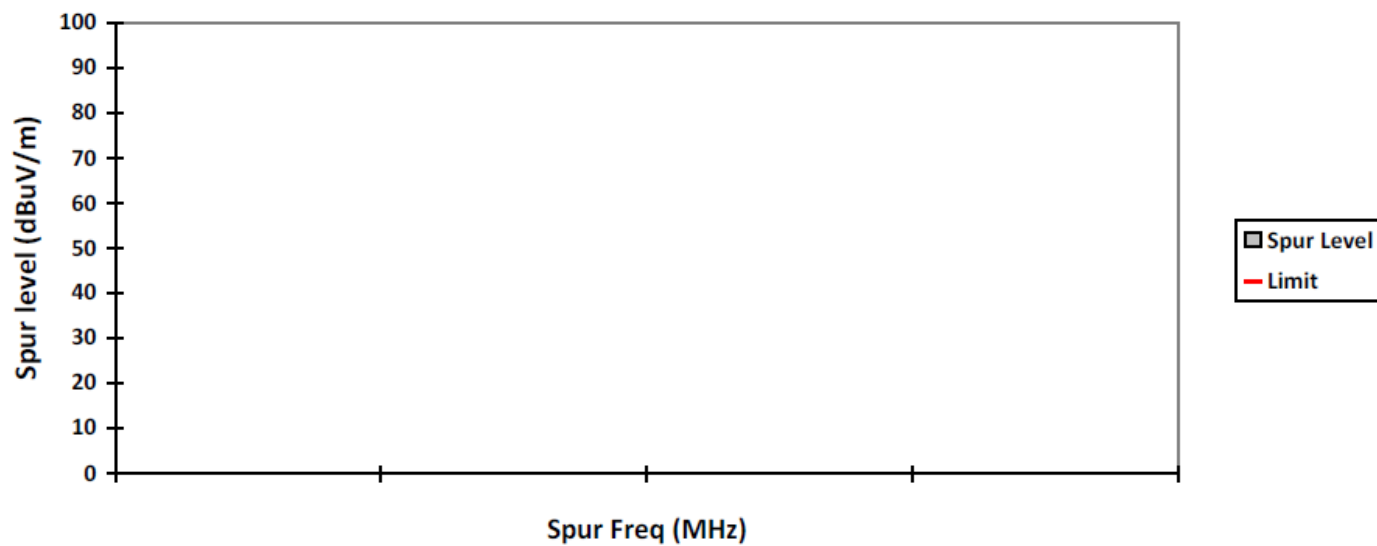
HORIZONTAL, PK



Motorola Solutions.

FCC ID: ABZ89FC4821C, IC ID: 109AB-4821C

VERTICAL, AV



HORIZONTAL, AV



6.2.3. 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:

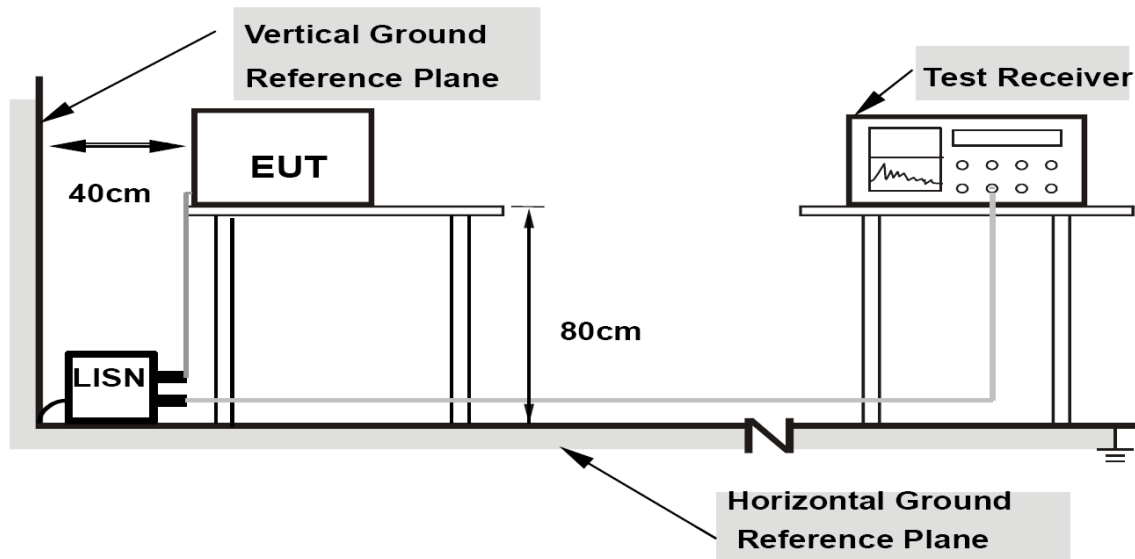
Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

(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

6.3. AC Power Line Conducted Spur Emissions

6.3.1. 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.

6.3.2. Test Results

Report ID.:	: 19587-EMC-00014
Ambient Temperature:	: 22.1 °C
Humidity:	: 68.5 %
Tester:	: Amaluddin
Date of test:	: 27 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 A Voltage on Mains QP
Limit Line #2:	FCC Part 15 Class A 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

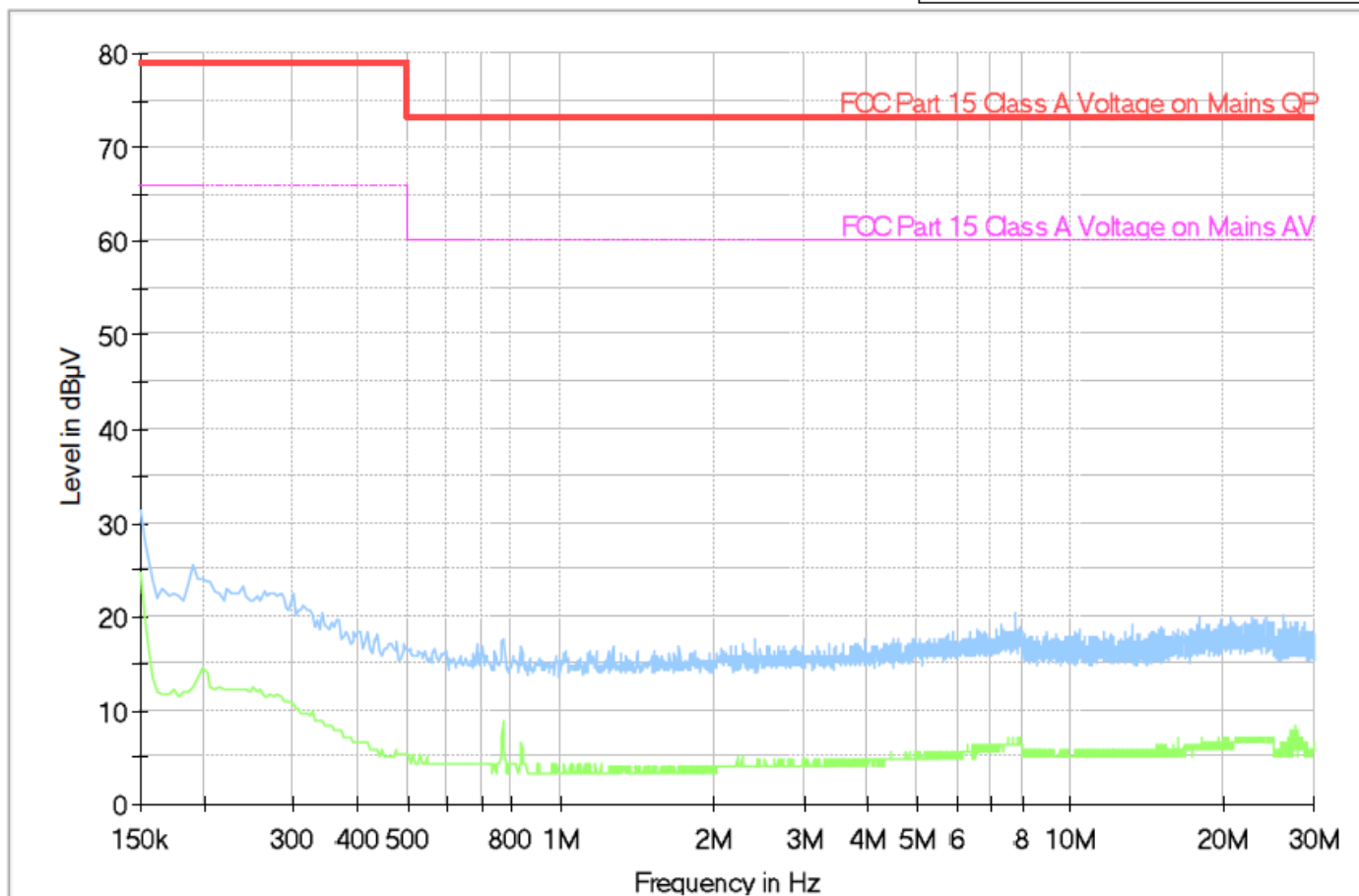
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; AVG	9 kHz	1 s	0 dB

Receiver:	[ESIB 26]
-----------	-----------

Ambient Noise

Full Spectrum

Peak Scan
Average Scan

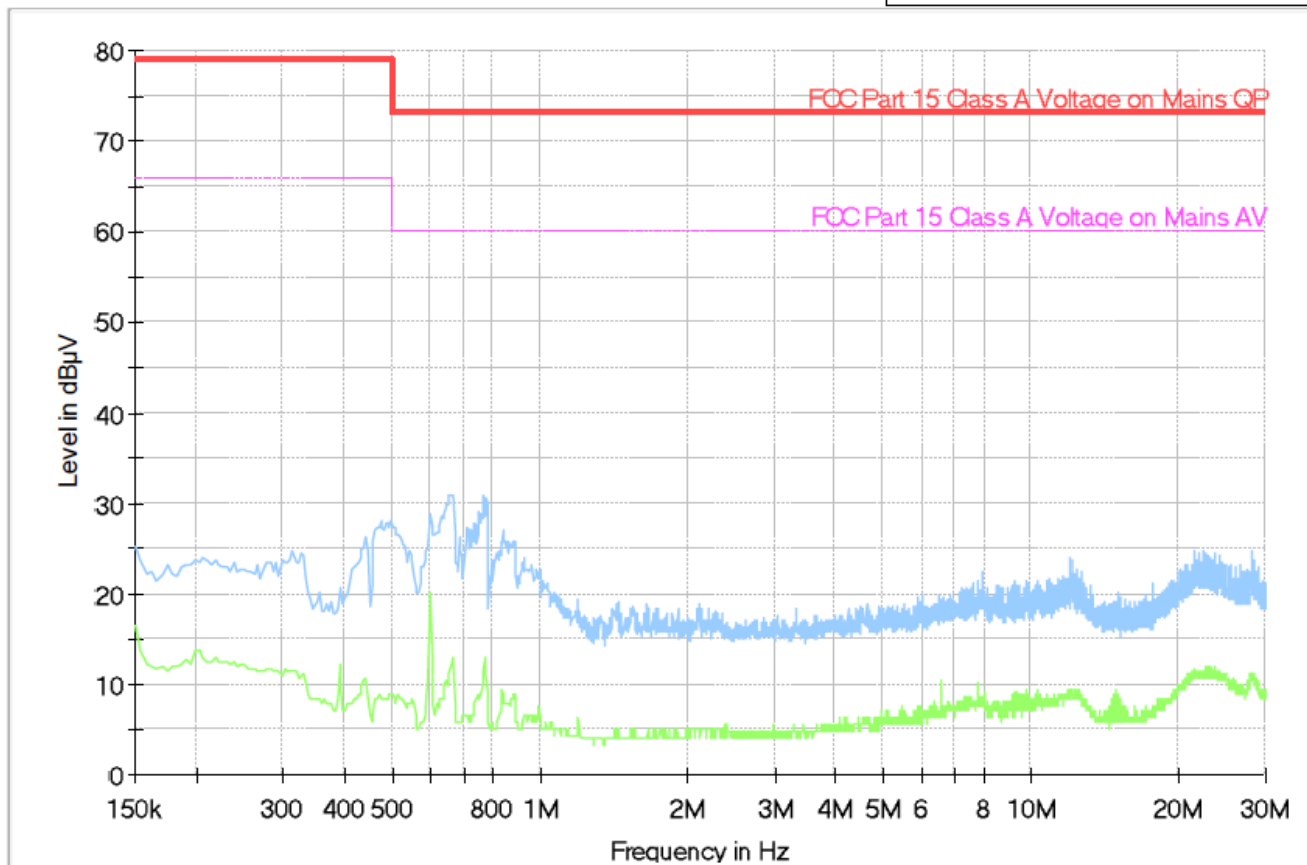


120 VAC/60 Hz

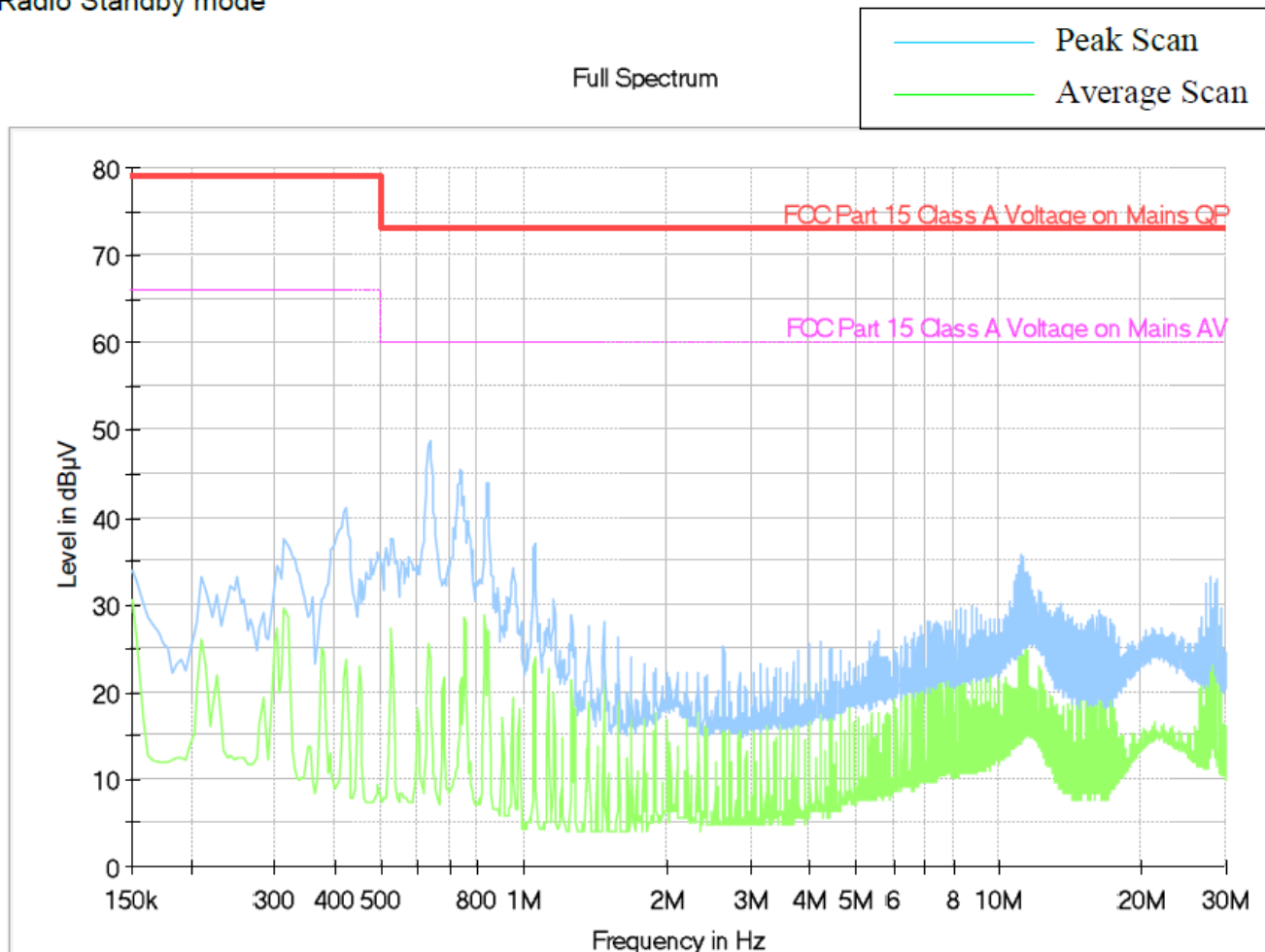
1) Radio Off

Full Spectrum

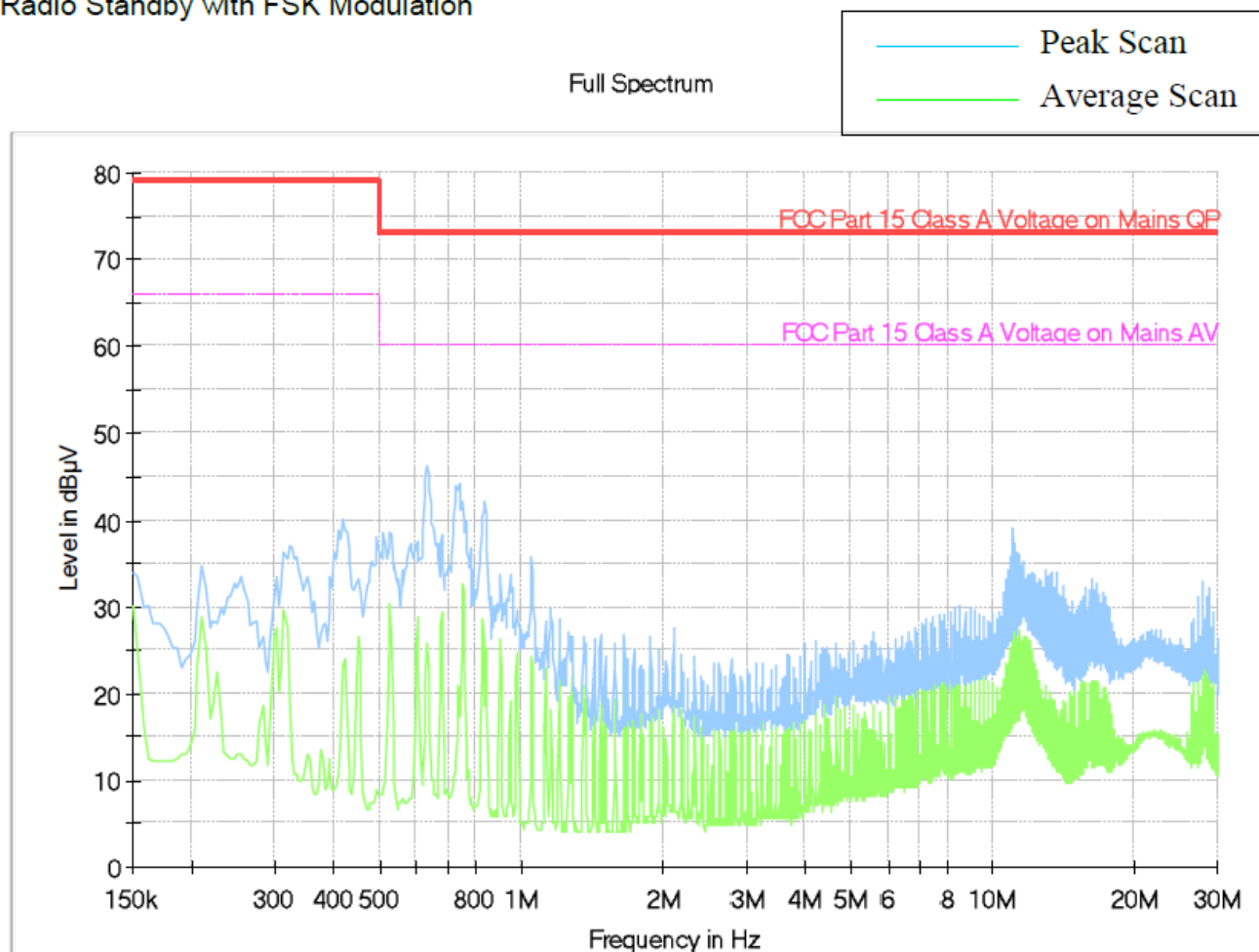
— Peak Scan
— Average Scan



2) Radio Standby mode



3) Radio Standby with FSK Modulation



6.3.3. 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.		

~ End of Test Report ~