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Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	9-Aug-2018	Khor Wei Loong
Rev. B	Amended on Section 6.10 and 6.11	7-Sep-2018	Khor Wei Loong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, 4FSK

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

ANSI C63.26-2015

2.0 Summary of Test Results

FCC General Rules Part (47CFR)	ISED General Rules Part	Test Item	Result	Remark
2.1046, 22.565, 74.461, 74.534	RSS-119	RF Power Output	Pass	-
2.1055, 90.213, 22.355, 74.464, 74.561	-	Frequency Stability	Pass	-
2.1047, 74.463	RSS-119	Audio Frequency Response	Pass	-
2.1047, 74.463	RSS-119	Audio Low Pass Filter Response	Pass	-
2.1047, 74.463	RSS-119	Modulation limiting	Pass	-
2.1049, 90.210, 22.359, 74.462, 74.535	RSS-119	Occupied Bandwidth	Pass	16K0F3E – 14.9986kHz 11K0F3E – 9.98321kHz 8K10F1D – 7.6974kHz 8K10F1E – 7.7431kHz 8K10F1W – 7.8612kHz
-	-	Band Edge Conducted Spurious Emission	Pass	-
90.214	-	Transient Frequency Behavior	Pass	-
-	-	Adjacent Channel Power	NA	-
2.1053,90.210, 22.359,74.461, 74.861	RSS-119	Conducted Spurious Emissions	Pass	Highest Spur Level -20.02dBm
2.1053,90.210, 22.359,74.461, 74.861	RSS-119	Radiated Spurious Emission	Pass	Highest Radiated Emission Level -40.22dBm
-	-	GNSS (EIRP for 1559 – 1610MHz)	NA	-
-	-	Effective Radiated Power (ERP)	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

4.0 Equipment List

FCC Analog ATE#1: (SW version: 2.4.5 & FCC_Frequency Stability 1.0.3 rev.)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
Audio Analyzer	8903B	3011A10475	9-Jul-18	9-Jul-19
SIGNAL GENERATOR	2042	203001/904	8-Mar-18	9-Mar-19
MODULATION ANALYZER	8901B	3538A03696	3-Apr-18	3-Apr-19
DSA	36570A	MY42506781	6-Jul-18	6-Jul-19
POWER SENSOR	E9031A	MY41498969	17-Apr-18	17-Apr-19
POWER METER	E4416A	MY45101016	16-Jan-18	16-Jan-19
POWER SUPPLY	6031A	2430A00146	09-Apr-18	09-Apr-19
CHAMBER	SH-641	92009188	3-Apr-18	3-Apr-19
SWITCH CONTROL UNIT	3499B	CN40150337	CNR	CNR

FCC Transient ATE #1: (SW version: FCC Transient ATE_R1.1.1)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
POWER SUPPLY	6032A	2818A03549	11-May-17	3-Aug-18
POWER SENSOR	E4412A	MY50290007	11-Oct-17	11-Oct-18
POWER METER	E4416A	GB41293240	2-Mar-18	2-Mar-19
ATTENUATORS/SWITCH DRIVER	11713A	2508A10141	CNR	CNR
STEP ATTENUATOR/11dB	8494G	MY42143006	16-Apr-18	16-Apr-19
STEP ATTENUATOR/110dB	8496G	MY421430125	16-Apr-18	16-Apr-19
OSCILLOSCOPE	MSO8104A	MY45002372	26-Jun-18	26-Jun-19
AUDIO ANALYZER	8903B	3729A17409	18-Jul-18	18-Jul-19
AUDIO ANALYZER	8903B	3413A14586	5-Dec-17	5-Dec-18
MODULATION ANALYZER	8901B	3403A04772	31-Mar-18	31-Mar-19
SIGNAL GENERATOR	8657A	3039A3205	5-Jul-18	5-Jul-19
SPECTRUM ANALYZER	E4440A	MY46185415	16-Aug-17	16-Aug-19
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR

CONDUCTED SPUR EMISSION ATE # 1 (SW version: Conducted Spur ATE_rev 1.23.01)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A32735	CNR	CNR
PSA Series Spectrum Analyzer	E4445A	MY46181732	16-Feb-17	16-Feb-19
POWER SUPPLY	6032A	3232A08203	9-Apr-18	9-Apr-19
HIGH PASS FILTER SWITCH BOX	-	CS001	5-Jul-18	5-Jul-19
Vector Signal Generator	SMU200A	103537	22-Jul-17	22-Jul-20

EMC Chamber 1

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	720	2-Mar-17	2-Mar-19
POWER SUPPLY	6032A	MY41001736	16-May-18	16-May-19
MICROWAVE SIGNAL GENERATOR	SMP04	100127	19-Jul-17	18-Jul-19
EMI TEST RECEIVER	ESIB26	100336	13-Jul-17	12-Jul-19
SIGNAL ANALYZER	FSV40	101103	18-Jul-17	17-Jul-19
5m Semi-anechoic Chamber	S800-HX	J2308	CNR	CNR
BILOG ANTENNA	CBL6112D	25224	22-Jul-17	22-Jul-19
BILOG ANTENNA	CBL6112B	2964	16-Feb-18	16-Feb-20
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	7-Nov-17	7-Nov-18
DATA LOGGER	SDL500	A.016776	18-Mar-17	18-Mar-19
LOOP ANTENNA	6502	208416	27-Jul-17	27-Jul-19
SYSTEM CONTROLLER	SC104V	050806-1	CNR	CNR
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	CNR	CNR
ANTENNA POSITIONING TOWER	TLT2	NA	CNR	CNR
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	002	CNR	CNR
PREAMPLIFIER	PAM-0118P	361	CNR	CNR
Test Software	EMC FCC IC Bluetooth RE Test			
Version	EMC_FCC_RE_v1.5.1			

CNR → Calibration Not Require

5.0 Test Condition

5.1. Transmitter Test Conditions

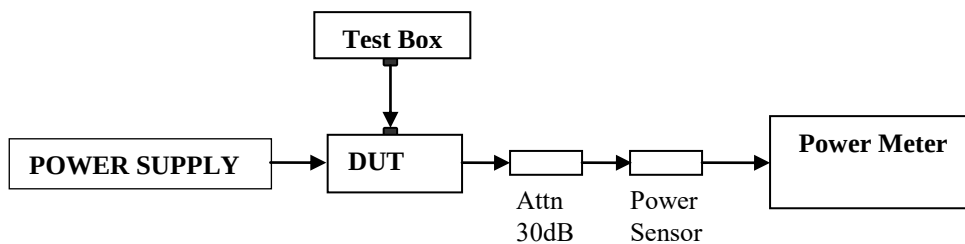
Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By
RF Output Power	Low & Max	Analog	406.2, 450.65, 459.125, 467.775	Khor Wei Loong
Frequency Stability	Max	Analog	467.775	Khor Wei Loong
Audio Frequency Response (12.5kHz / 25kHz)	Max	Analog	467.775	Khor Wei Loong
Audio Low Pass Filter Response (12.5kHz / 25kHz)	Max	Analog	467.775	Khor Wei Loong
Modulation limiting (12.5kHz / 25kHz)	Max	Analog	467.775	Khor Wei Loong
Occupied Bandwidth (12.5kHz)	Max	Analog, 4FSK	406.2, 450.65, 459.125, 467.775	Khor Wei Loong
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	Max	Analog, 4FSK	459.025, 459.65	Khor Wei Loong
Transient Frequency Behavior (UHF & VHF Band) (12.5kHz / 25kHz)	Max	Analog	467.775	Khor Wei Loong
Adjacent Channel Power (700MHz Band) (12.5kHz)	Max	Analog	NA	NA
Conducted Spurious Emissions- (12.5kHz / 25kHz)	Low / Max	Analog, 4FSK	406.2, 450.65, 459.125, 467.775	Khor Wei Loong
Radiated Spurious Emission (12.5kHz / 25kHz)	Low / Max	Analog, 4FSK	406.2, 450.65, 459.125, 467.775	Nazrin & Qawiman
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	Max	Analog	NA	NA
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	Max	Analog	NA	NA

NA → Not Applicable

6.0 Transmitter Test Parameters

6.1. RF Output Power

6.1.1. Test Setup



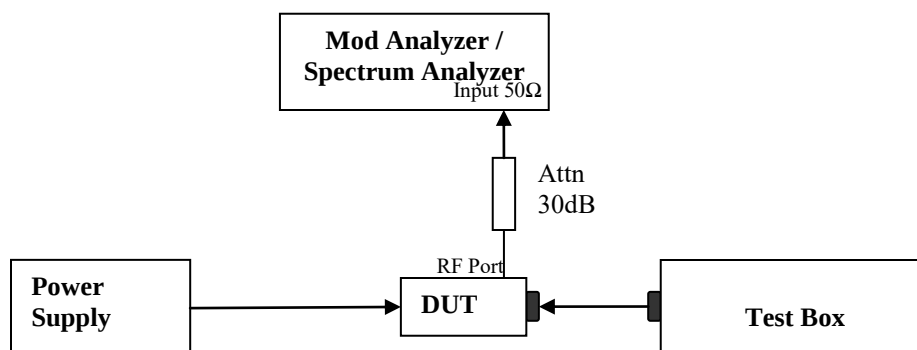
- 1) The DUT transmitter connected to Power Meter using the 30 dB attenuator and power sensor with above setup.
- 2) Path loss for the measurement included.
- 3) All the measurement was done at low, mid, high frequency for each band.
- 4) Record the power into the test report.

6.1.2. Test Result

Temperature	25°C				Remarks
Voltage (V)	13.2V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	
406.2	1.03	2.33	29.3	8.75	
450.65	0.99	2.21	28.9	8.66	
459.125	0.99	2.21	28.8	7.98	
467.775	1	2.14	29	8.35	

6.2. Frequency Stability

6.2.1. Test Setup

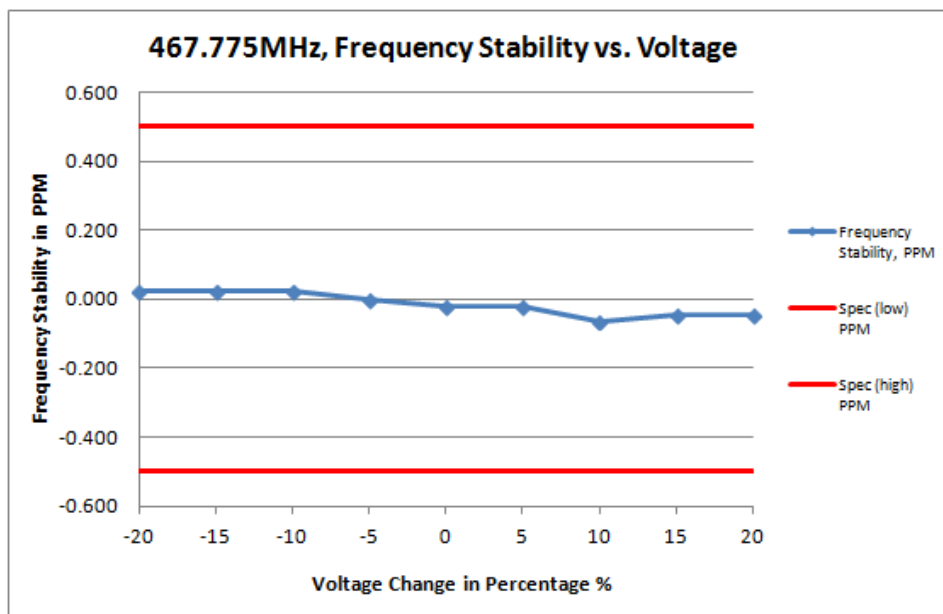


- 1) The DUT transmitter output port was connected to Modulation / Spectrum Analyzer.
- 2) Path loss for the measurement included.
- 3) Transmit the DUT and record the freq in MCF_{MHz} .
- 4) Test in 2 conditions:
 - Temperature: The frequency of the transmitter was measured from -30°C to 50°C.
 - Supply Voltage:
 - Mobile: The frequency of the transmitter was measured from 85% to 115% of the nominal operating input voltage.
 - Portable: The frequency of the transmitter was measured from nominal $\pm x\%$ as specified by the manufacturer
- 5) Calculate the ppm frequency error by the following:

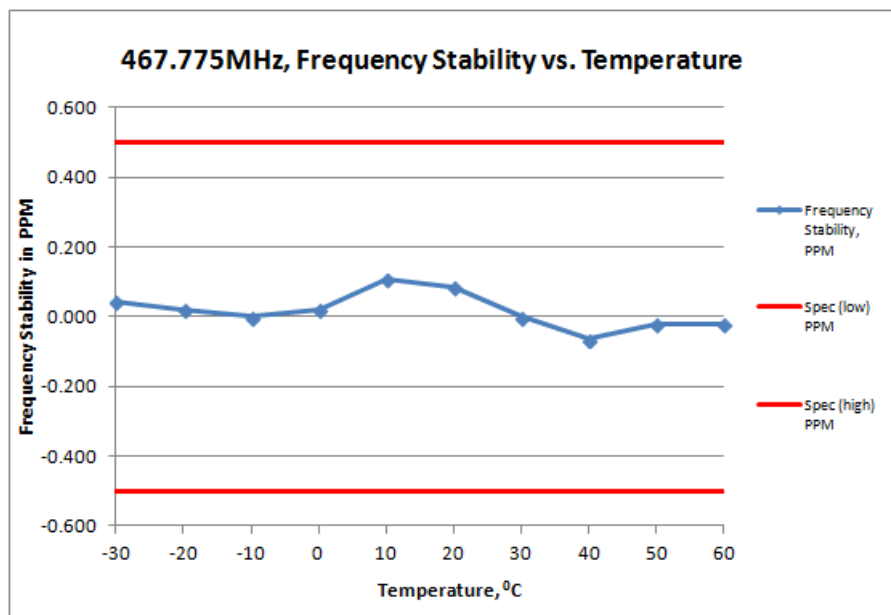
$$ppm\ error = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1 \right) * 10^6$$

Where: MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.2.2. Test Result



Frequency / Channel Spacing	467.775MHz / 12.5kHz				
Temperature, °C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	10.560	467.775010	0.021	-0.500	0.500
-15	11.220	467.775010	0.021	-0.500	0.500
-10	11.880	467.775010	0.021	-0.500	0.500
-5	12.540	467.775000	0.000	-0.500	0.500
0	13.200	467.774990	-0.021	-0.500	0.500
5	13.860	467.774990	-0.021	-0.500	0.500
10	14.520	467.774970	-0.064	-0.500	0.500
15	15.180	467.774980	-0.043	-0.500	0.500
20	15.840	467.774980	-0.043	-0.500	0.500



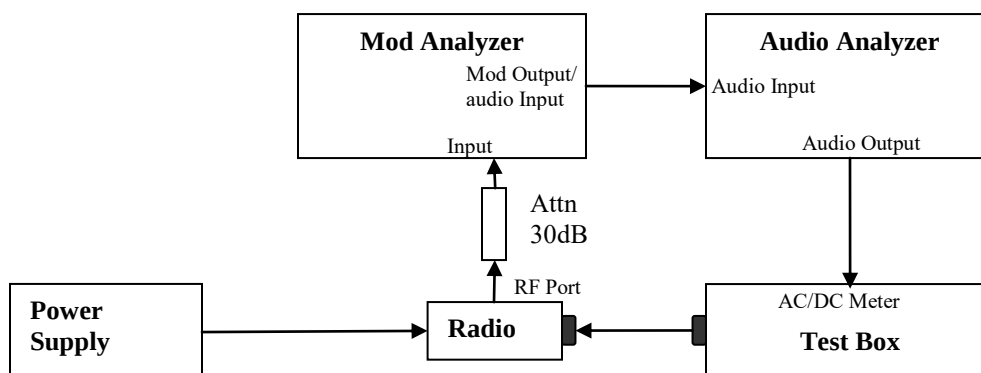
Frequency / Channel Spacing	467.775MHz / 12.5kHz			
Voltage, V	13.2			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	467.775020	0.043	-0.500	0.500
-20	467.775010	0.021	-0.500	0.500
-10	467.775000	0.000	-0.500	0.500
0	467.775010	0.021	-0.500	0.500
10	467.775050	0.107	-0.500	0.500
20	467.775040	0.086	-0.500	0.500
30	467.775000	0.000	-0.500	0.500
40	467.774970	-0.064	-0.500	0.500
50	467.774990	-0.021	-0.500	0.500
60	467.774990	-0.021	-0.500	0.500

6.2.3. Test Limit

As per manufacturer declared spec +/- 0.5ppm

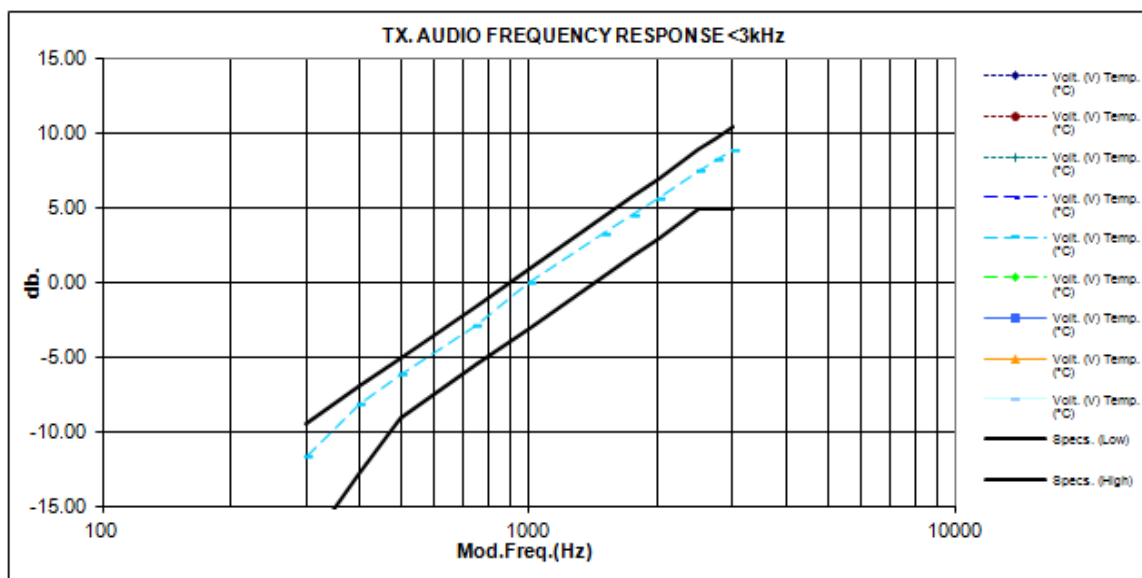
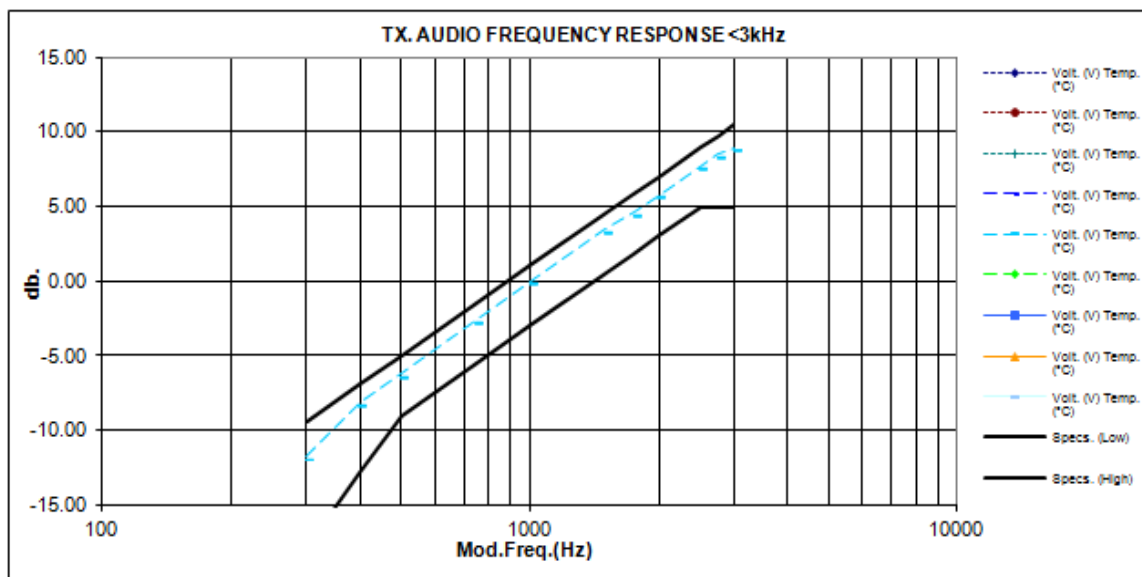
6.3. Audio Frequency Response

6.3.1. Test Setup

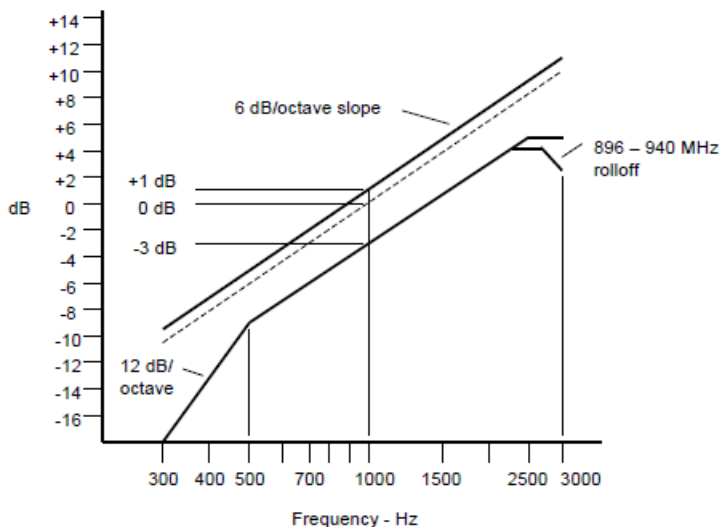


- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
- 5) On audio analyzer, set the rated level as reference to zero.
- 6) Vary the audio frequency from 300 Hz to 3 kHz. Record the change in dB on the audio analyzer.

6.3.2. Test Result



6.3.3. Test Limit

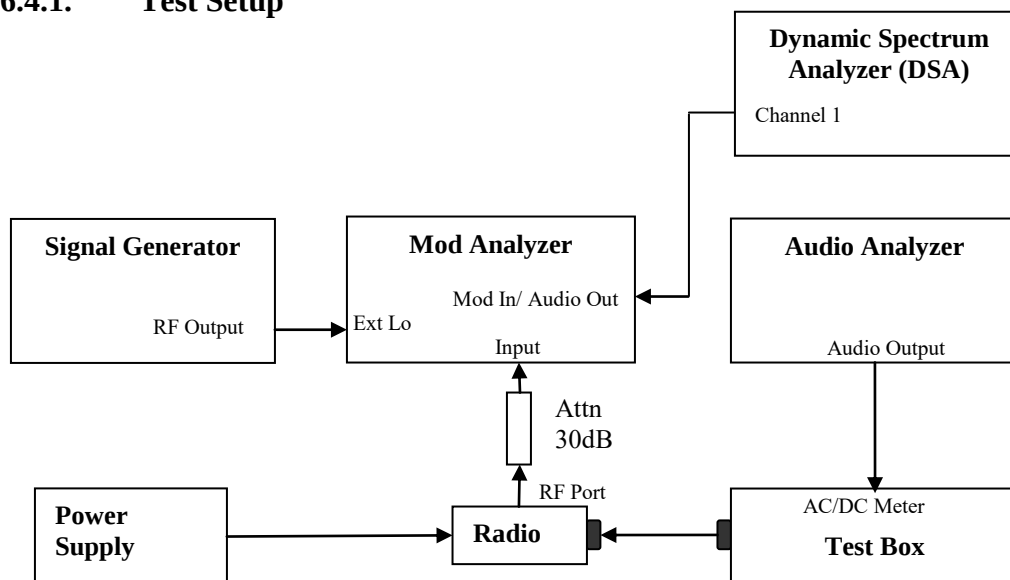


Note:

- o There are additional 6 dB per octave attenuation is allowed from 2.5KHz to 3KHz in equipment 25MHz to 869MHz radio.
- o Additional 6 dB per octave attenuation is allowed from 2.3KHz to 2.7KHz & additional 12 dB per octave attenuation is allowed from 2.7KHz to 3KHz in equipment 896MHz to 940MHz radio.

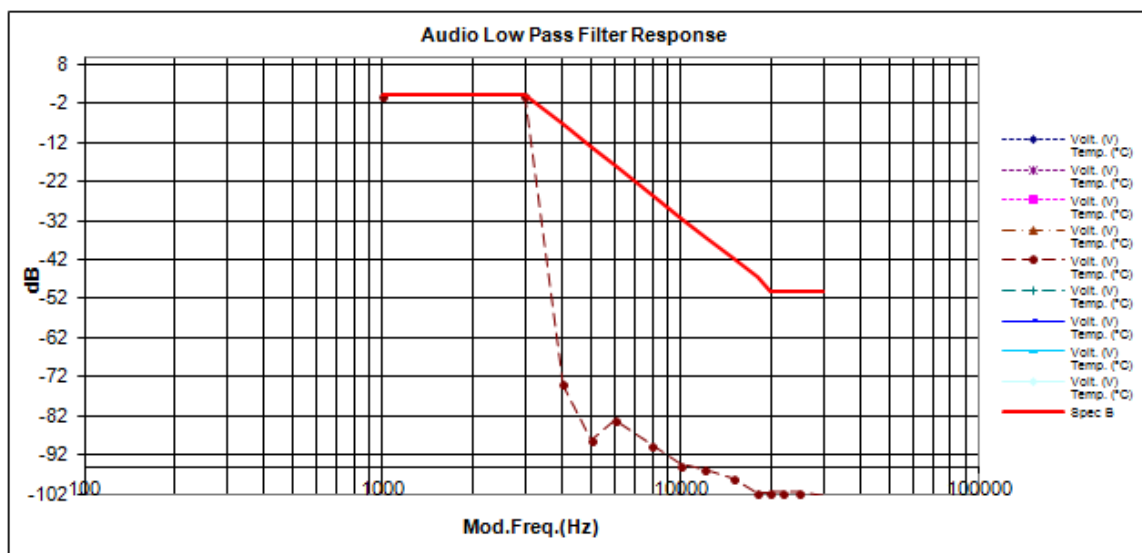
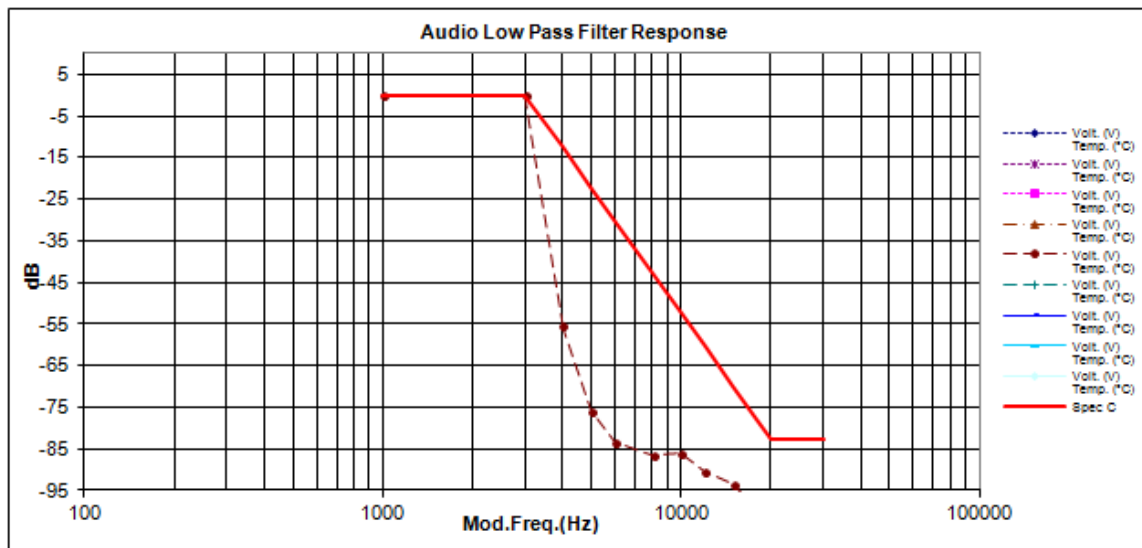
6.4. Audio Low Pass Filter Response

6.4.1. Test Setup

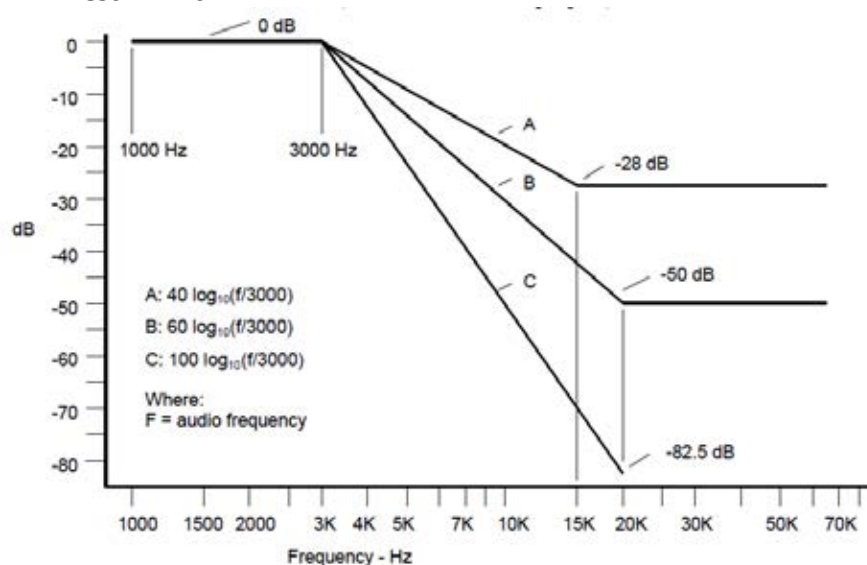


- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
- 4) Set the Sigen frequency to $F_c + 1.5$ MHz, RF output level to 0dBm without modulation.
- 5) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
- 6) Up the amplitude by 20dB.
- 7) On DSA, get the reference point to 0dB.
- 8) Vary the frequency on audio analyzer from 3 kHz to 20 kHz, record the audio tone from DSA.

6.4.2. Test Result



6.4.3. Test Limit



For audio frequencies above 3000 Hz, the audio response of the post limiter low-pass filter shall meet or exceed the following requirements:

- a) For equipment operating on 20, 25 or 30 kHz channel bandwidth in the 25 MHz to 174 MHz range:

At frequencies from 3000 Hz through 15,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $40 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 15,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz, by at least: 28 dB.

- b) For equipment operating with 25 kHz bandwidth channels between 406 and 512 MHz through 896 MHz, and between 929 MHz through 930 MHz:

At frequencies from 3000 Hz through 20,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz by at least: $60 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 50 dB.

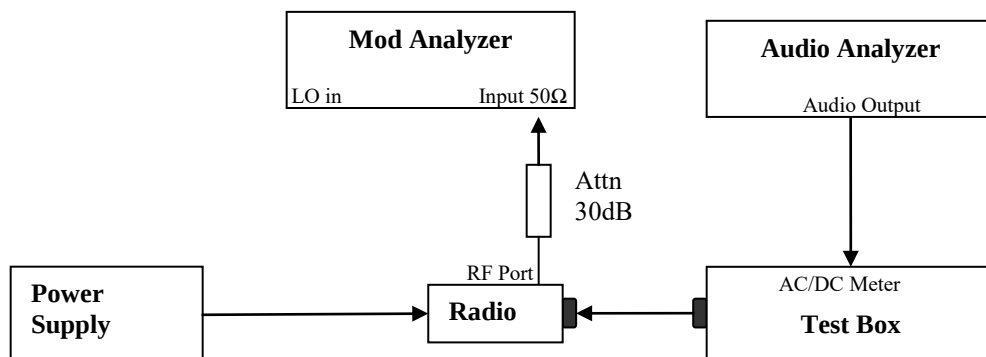
- c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

At frequencies from 3000 Hz through 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $100 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

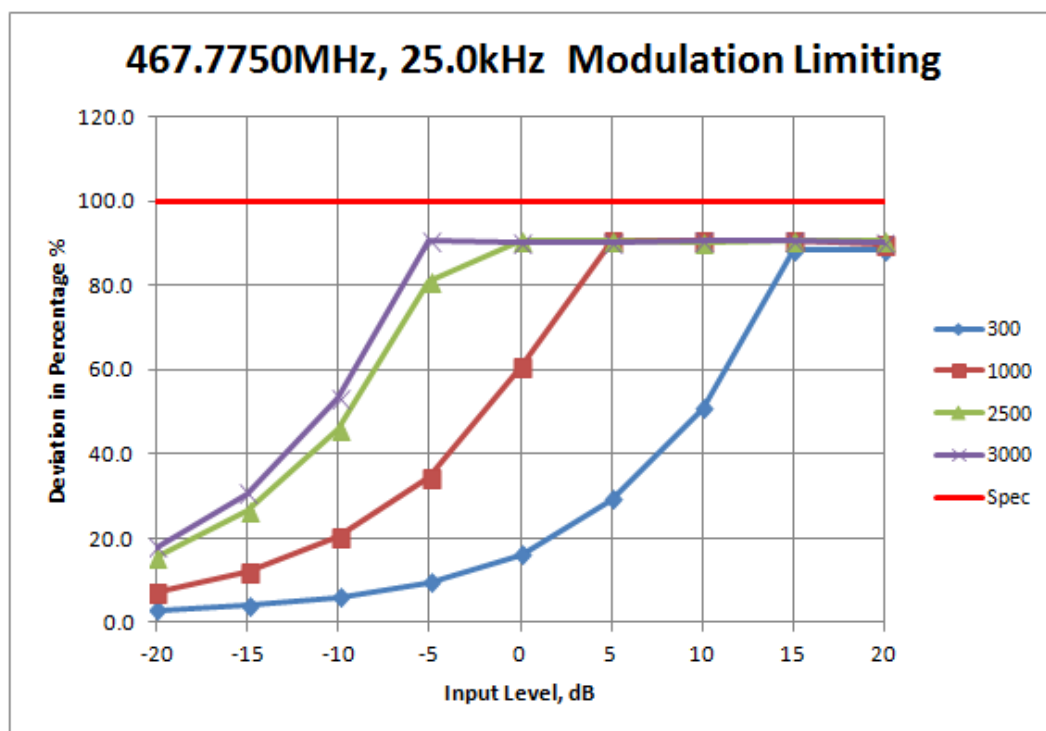
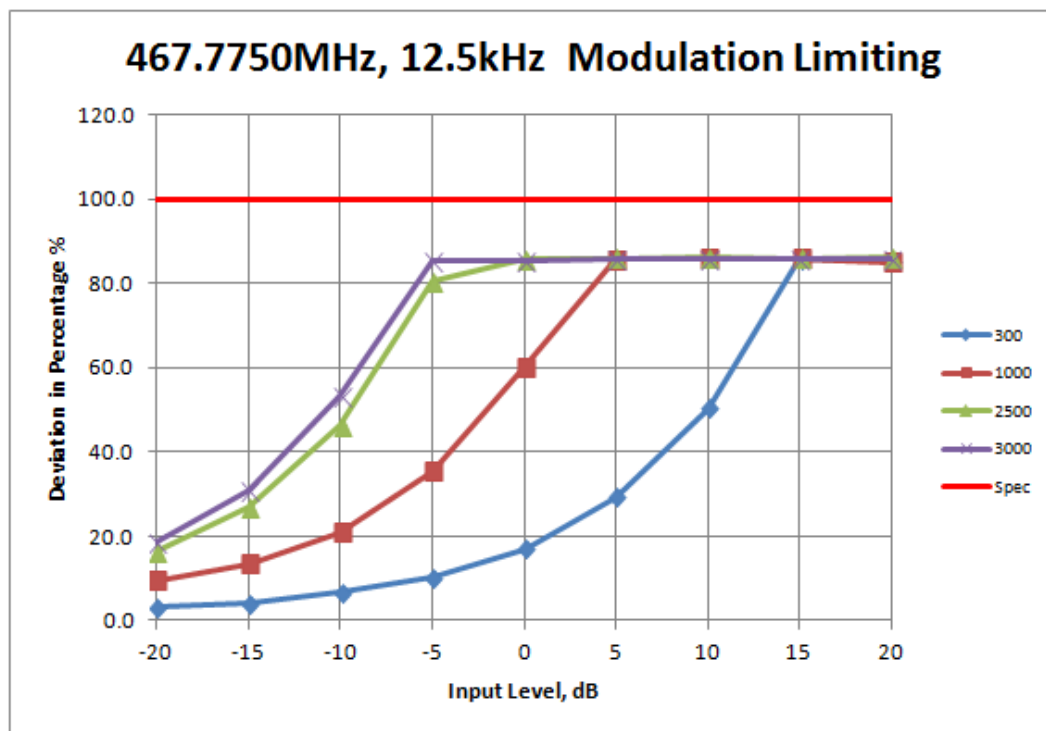
6.5. Modulation Limiting

6.5.1. Test Setup



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
- 5) Record the frequency deviation as 0dB input level at 1kHz audio frequency.
- 6) Repeat the step and record the frequency deviation from -20 dB to 20dB by 5 dB increments and different audio freq 300 Hz, 2.5 kHz and 3 kHz.

6.5.2. Test Result

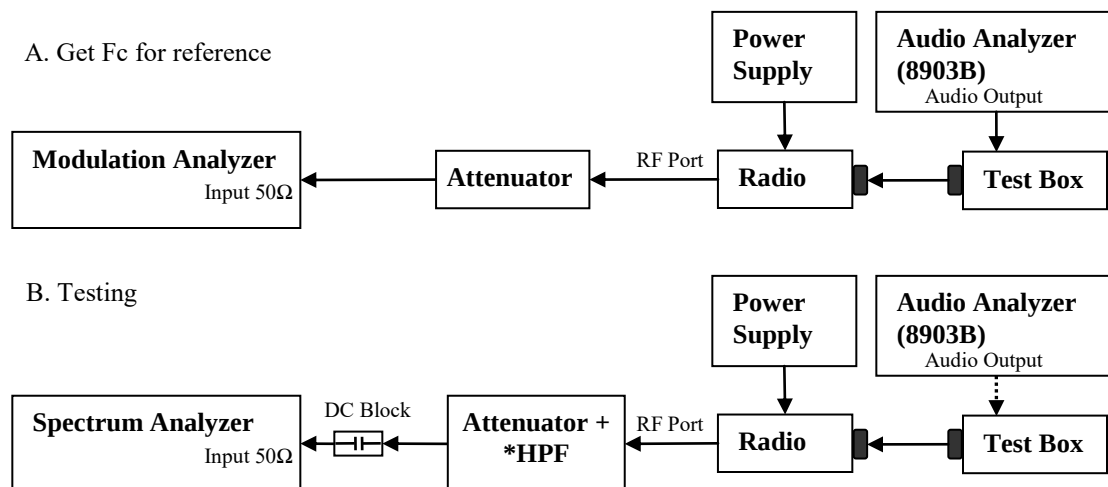


6.5.3. Test Limit

Modulation Limiting shall not exceed 100 percent.

6.6. Occupied Bandwidth

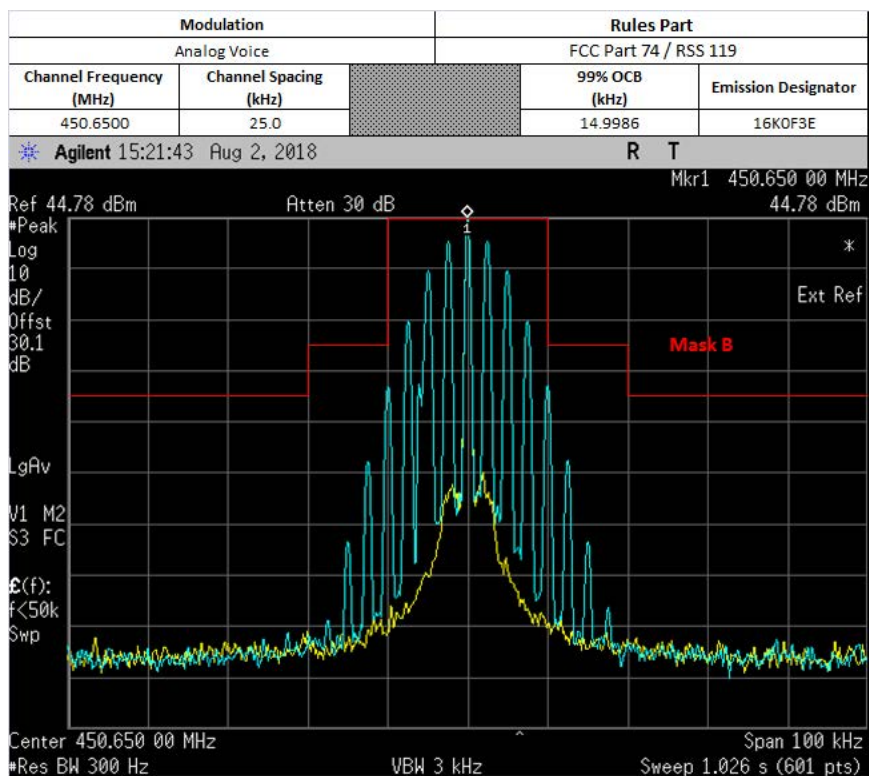
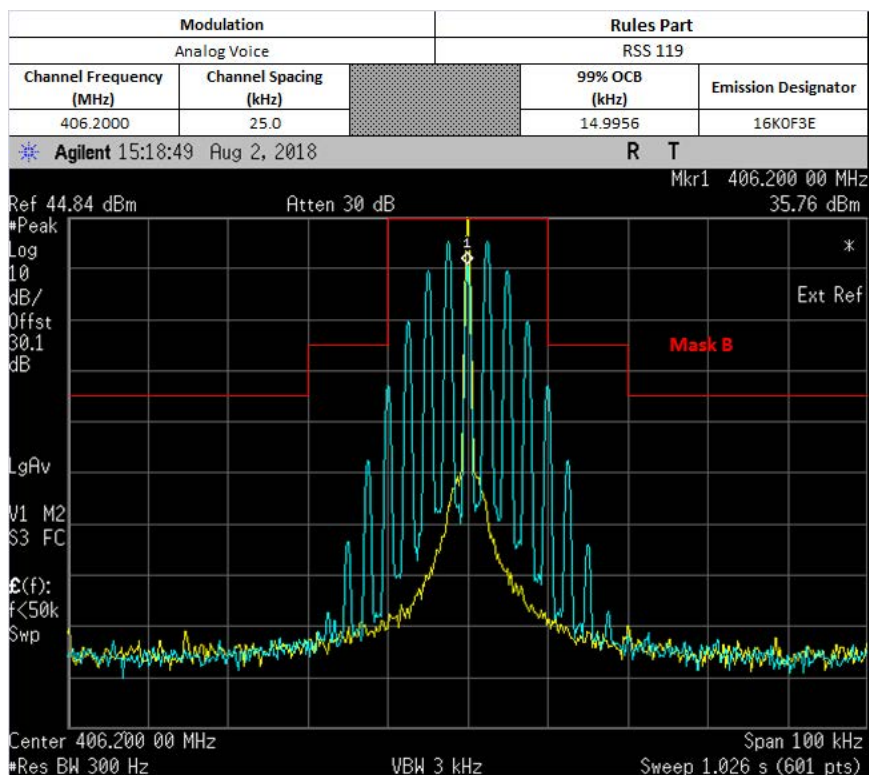
6.6.1. Test Setup (Analog)

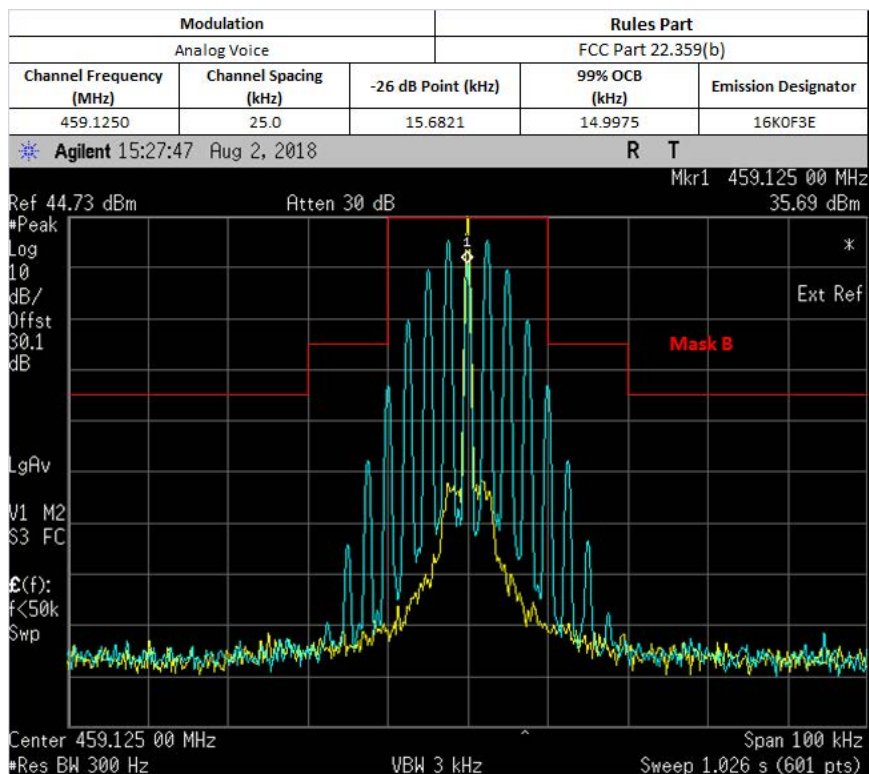
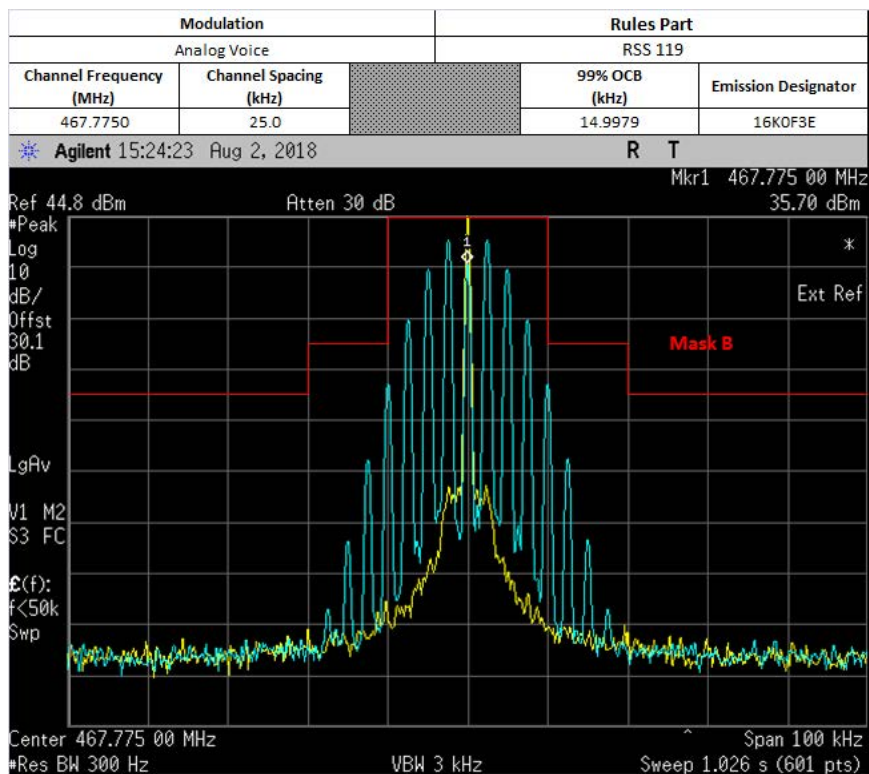


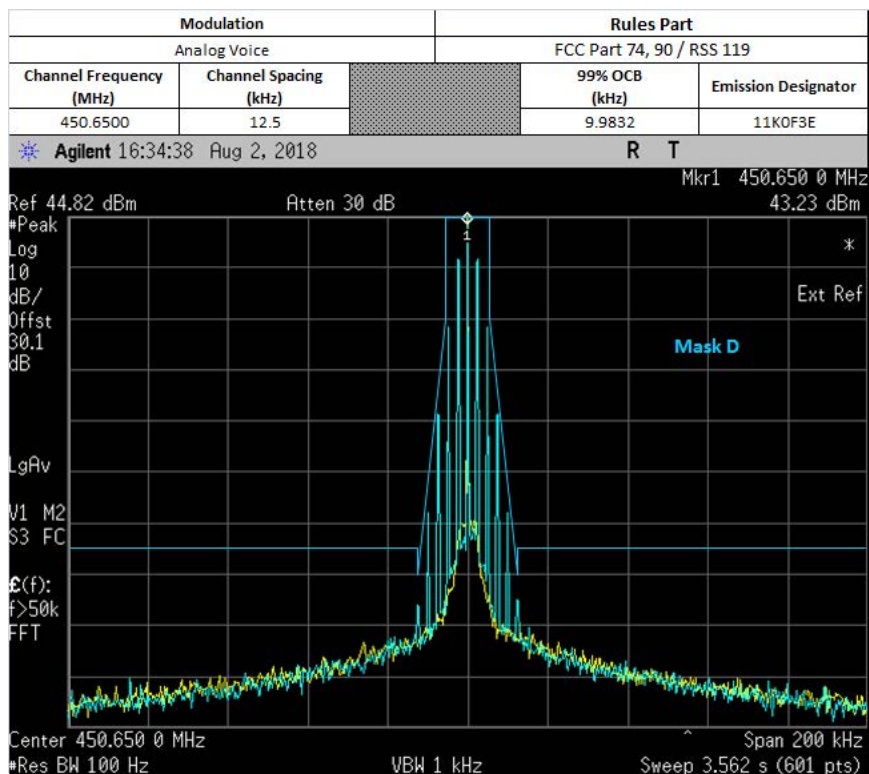
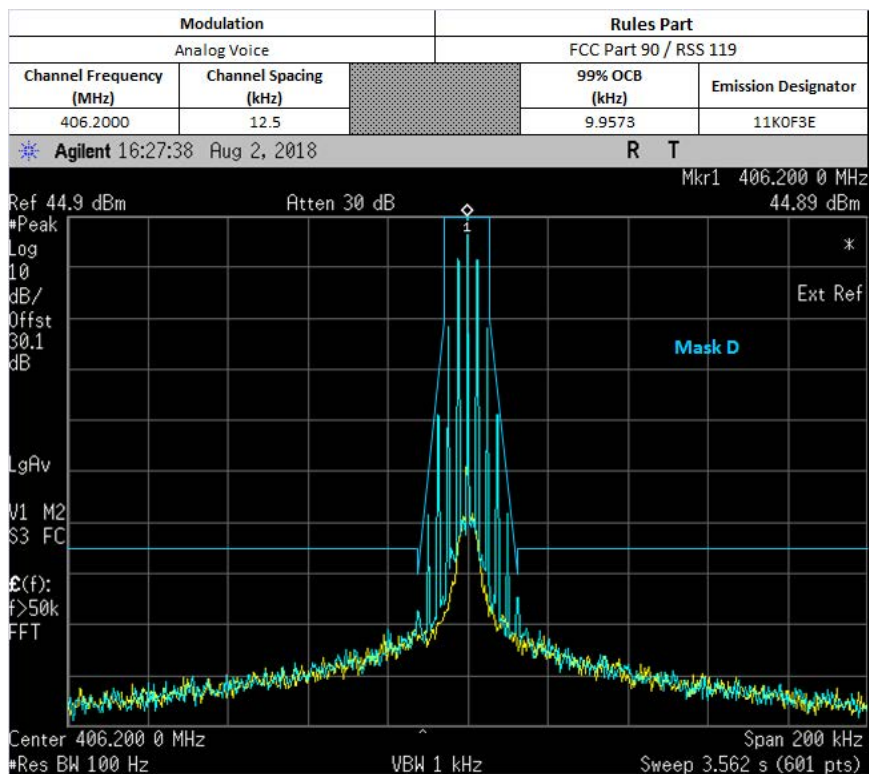
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey the DUT.
- 4) Path loss for the measurement included.
- 5) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
- 6) Key in the F_c and Resolution Bandwidth (1 ~ 5 % of emission designator).
- 7) Transmit the DUT and record the occupied Bandwidth frequency.
- 8) Preset the spectrum analyzer for sideband spectrum measurement.
- 9) Set the span and Resolution Bandwidth (according to FCC/ ISED standard).
- 10) Save the screen shot as modulated signal
- 11) Remove the audio tone from audio analyzer to capture unmodulated signal.

* Only HPF added for Mask 80.211 measurement with attenuator.

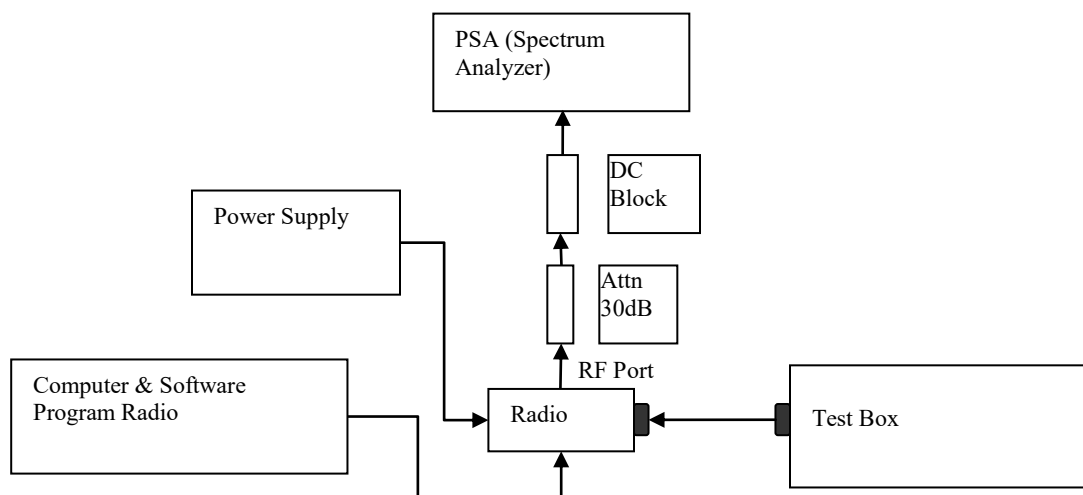
6.6.2. Test Result (Analog)







6.6.3. Test Setup (Digital)

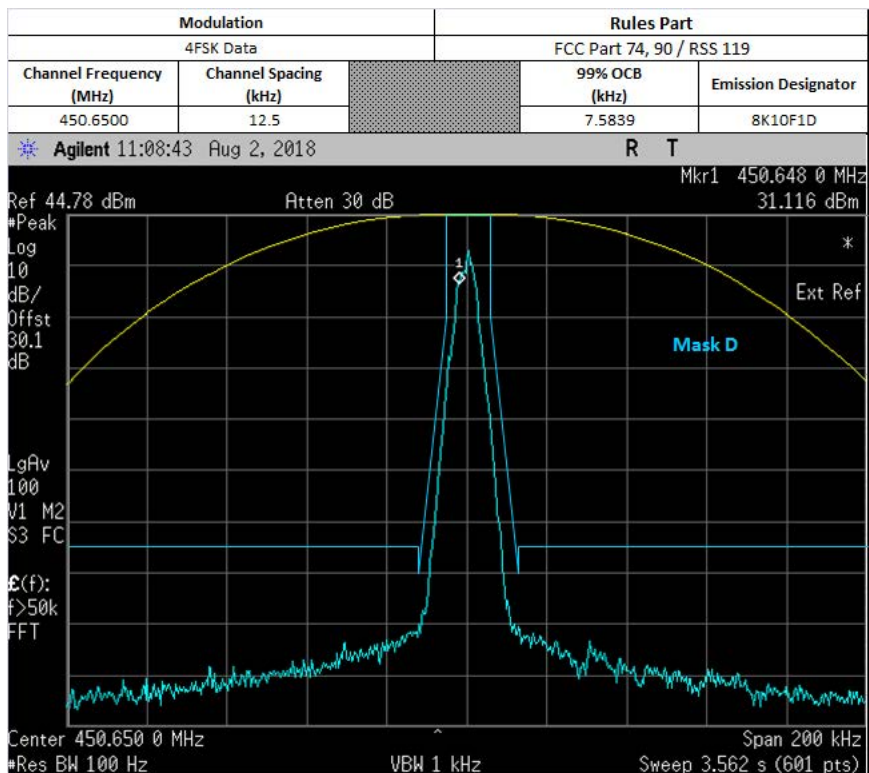
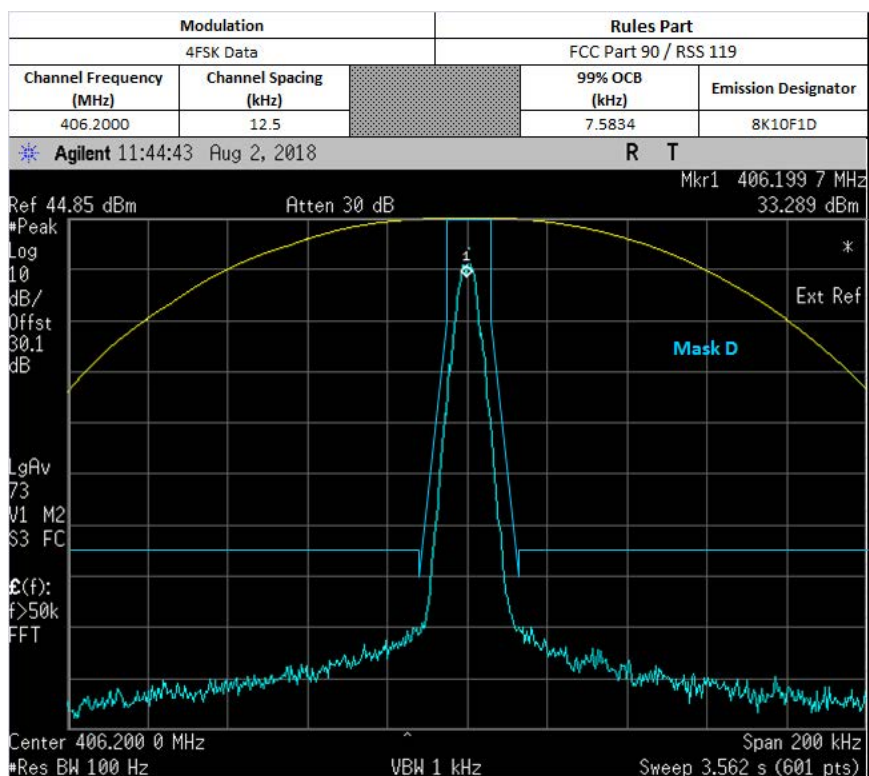


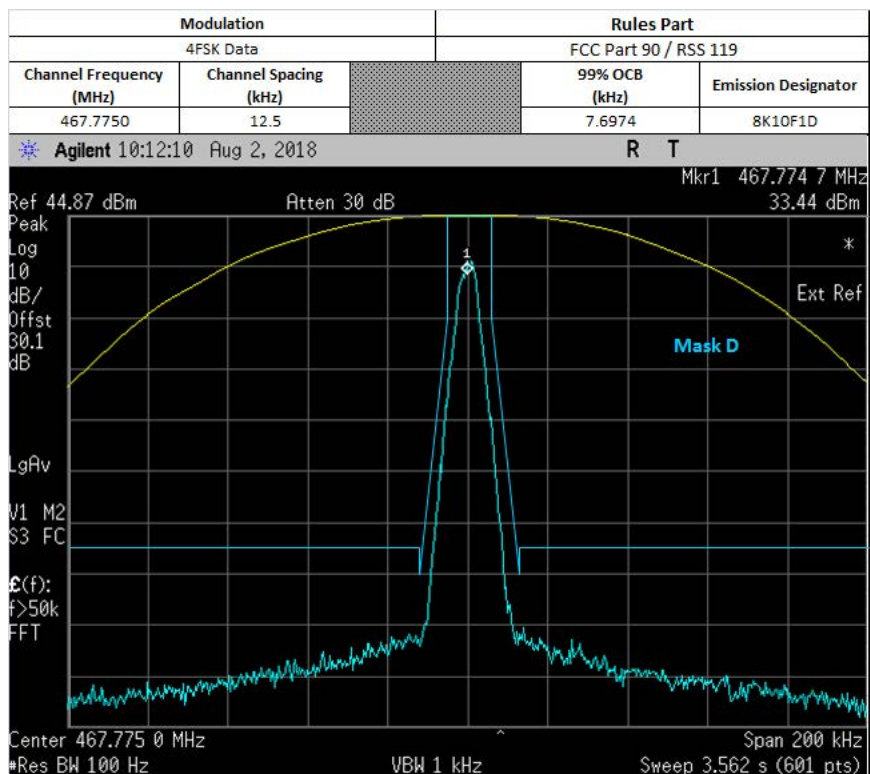
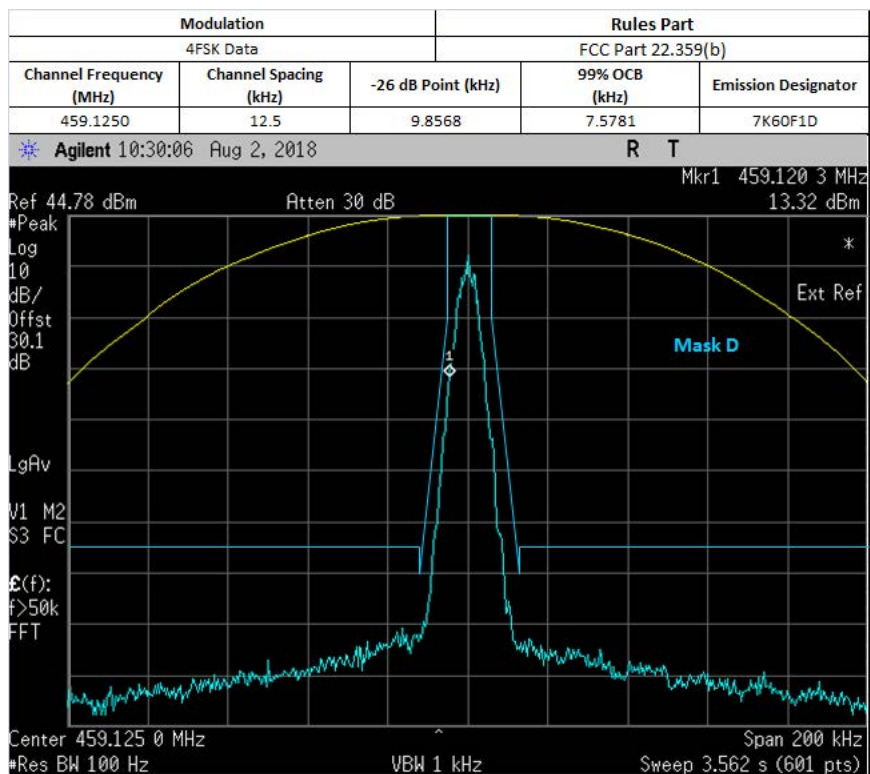
- 1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
- 2) Path loss for the measurement included.
- 3) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
- 4) Key in the Fc and Resolution Bandwidth (1 ~ 5 % of emission designator).
- 5) Transmit the DUT and record the occupied Bandwidth frequency.
- 6) Preset the spectrum analyzer for modulation emission spectrum measurement.
- 7) Set the span and Resolution Bandwidth (according to FCC/ ISED standard).
- 8) Capture the screen shot as modulated signal.

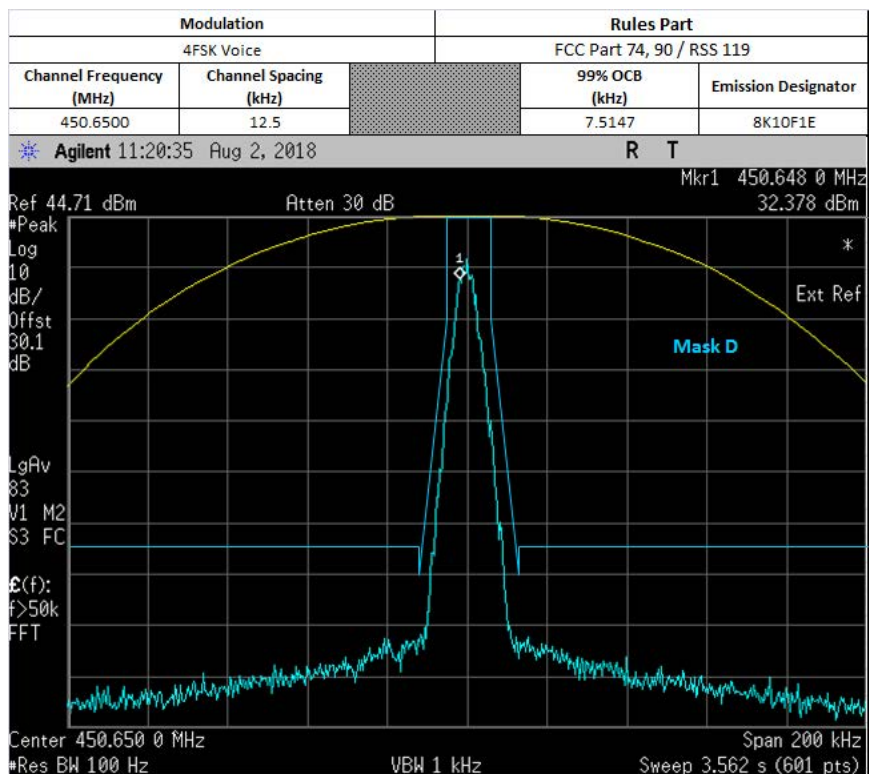
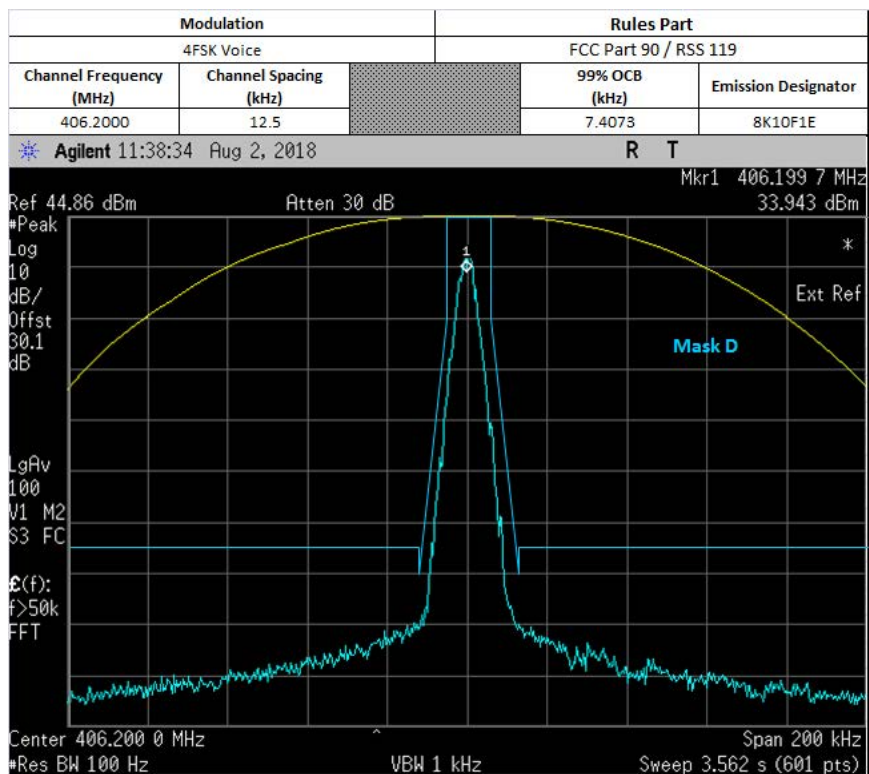
***Note:**

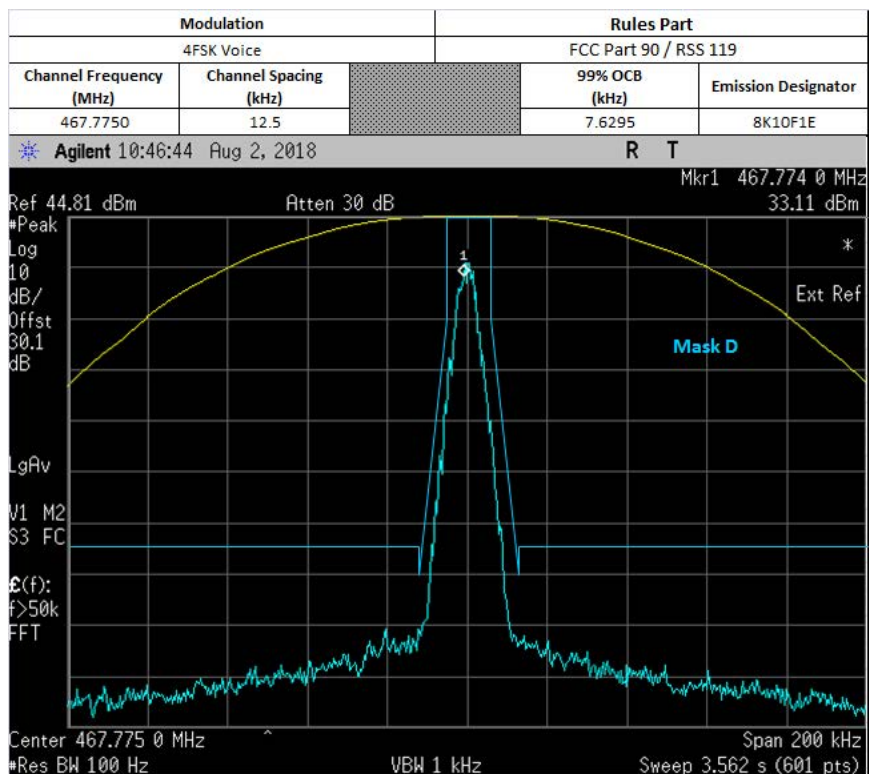
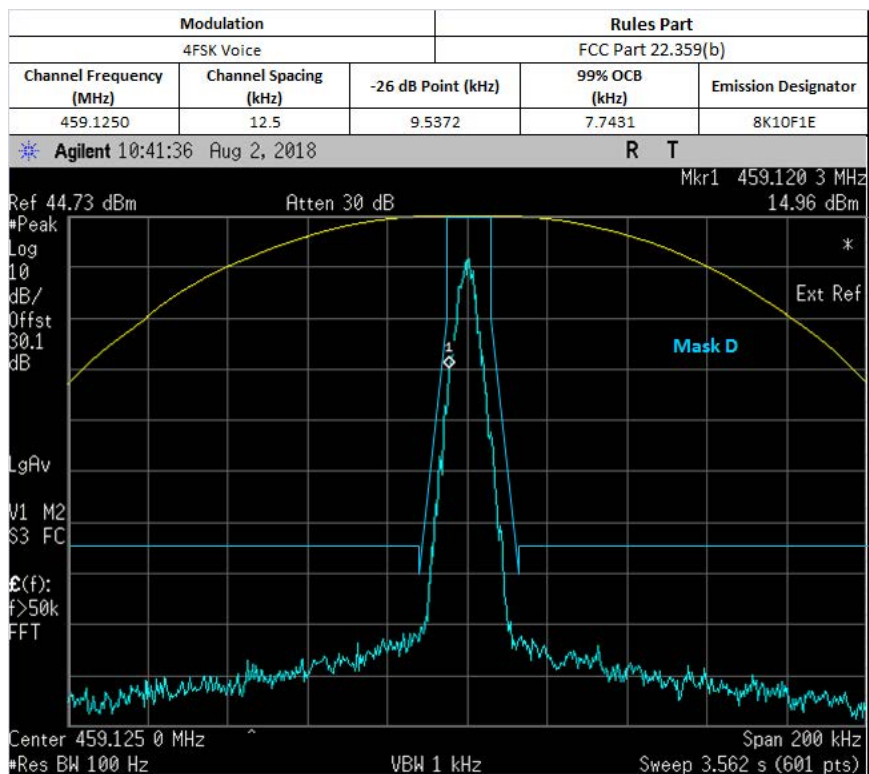
- For Digital Modulation, 12.5 kHz Data F1D & FXD would be the same. Therefore only measurements with F1D modulation shown below.
- For Digital Modulation, 12.5 kHz Data F1E & FXE would be the same. Therefore only measurements with F1E modulation shown below.

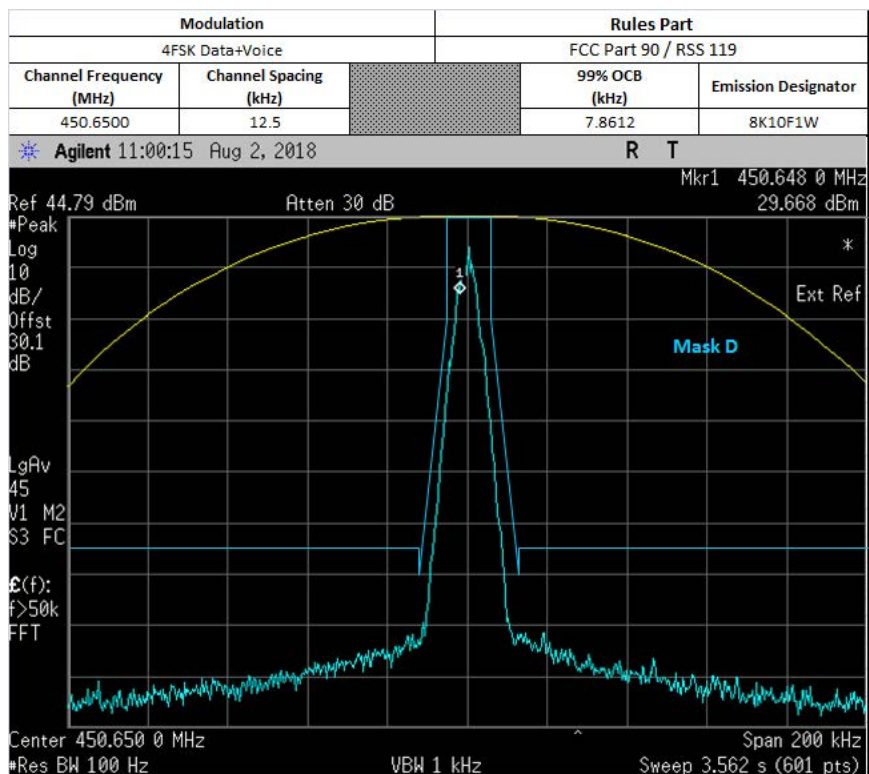
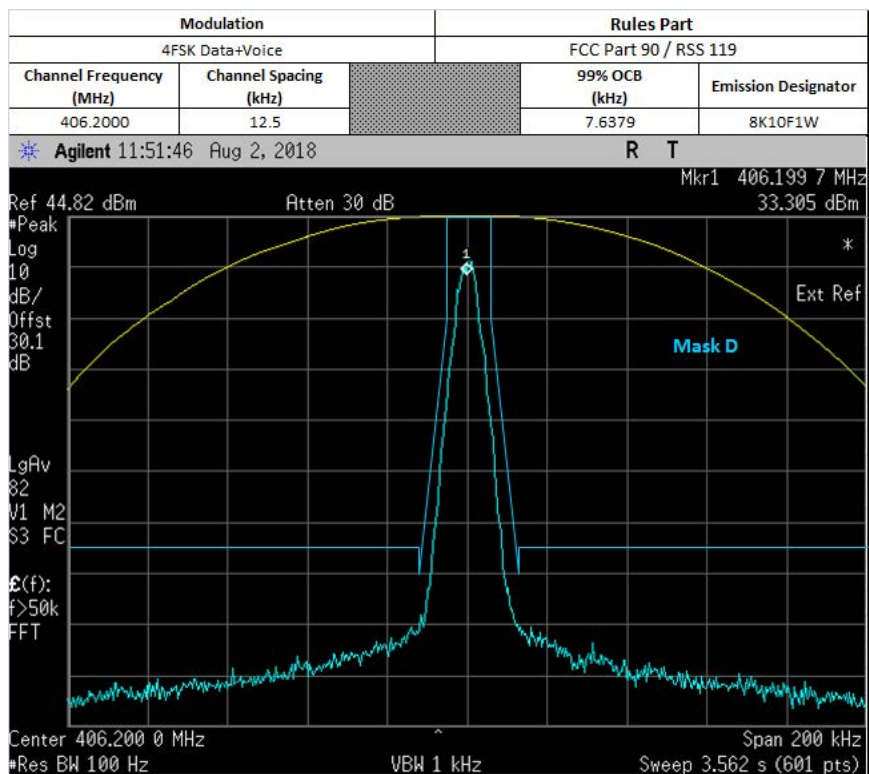
6.6.4. Test Result (Digital)

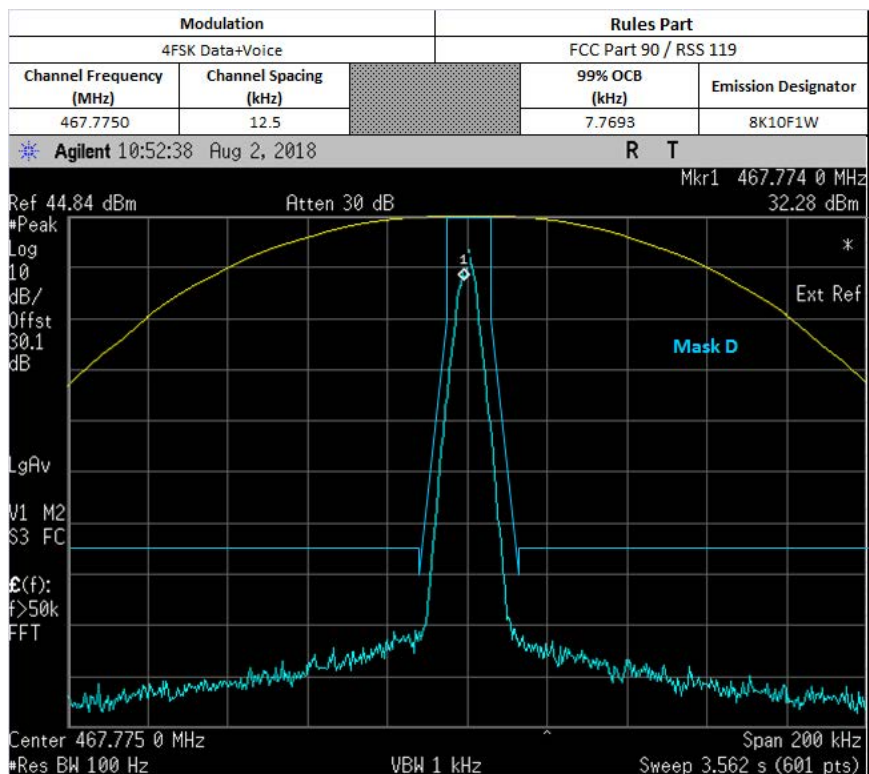
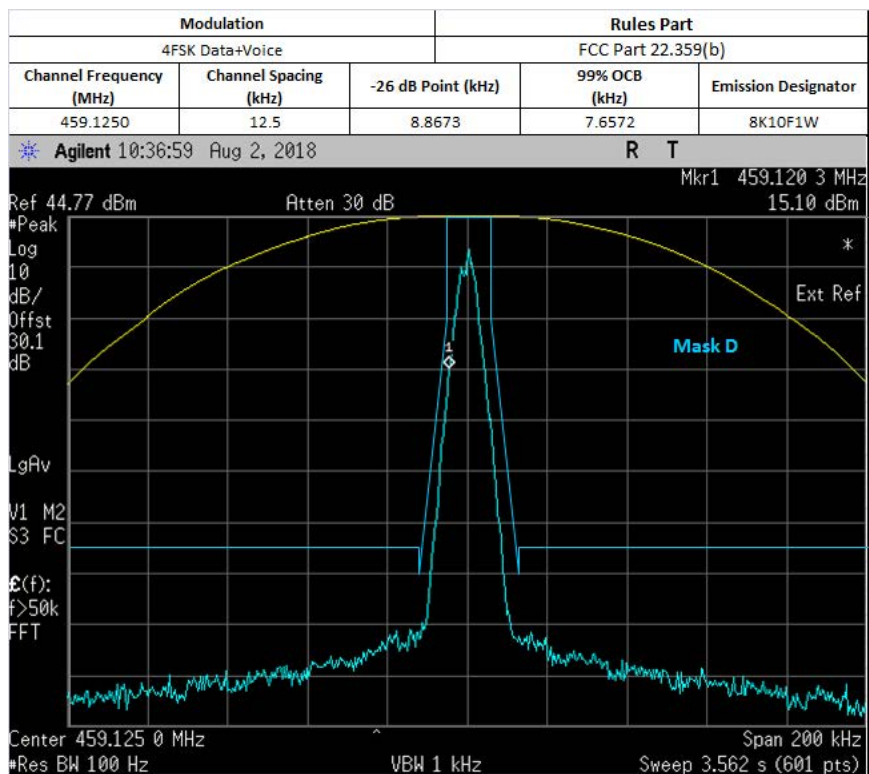










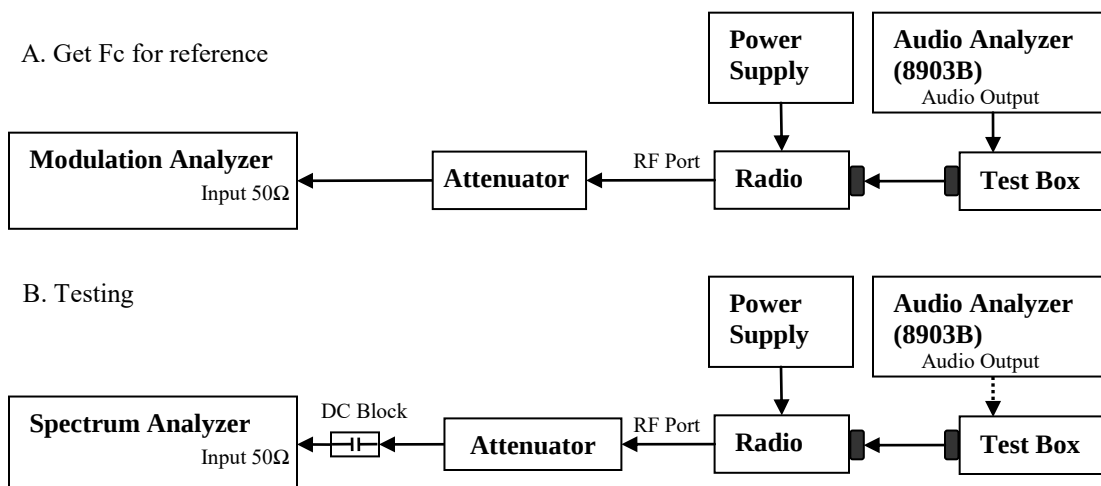


6.6.5. Test Limit

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

6.7. Band Edge Conducted Spurious Emission (Part 22)

6.7.1. Test Setup (Analog)



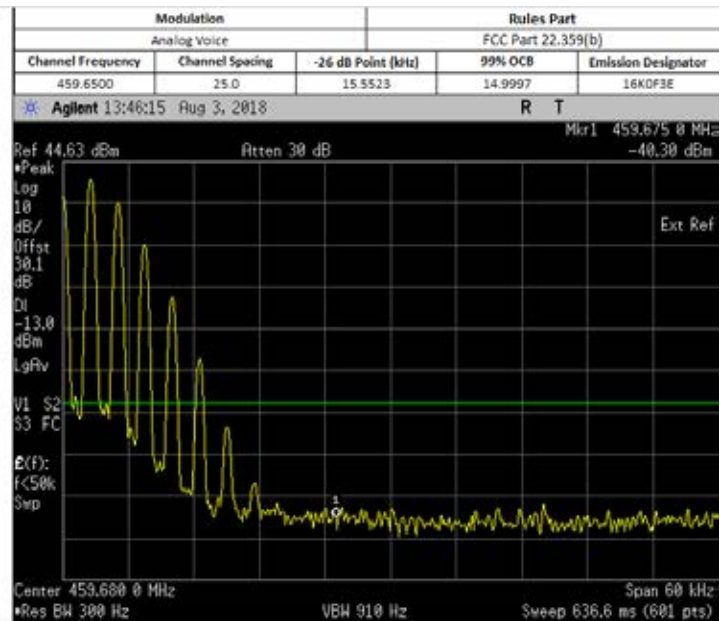
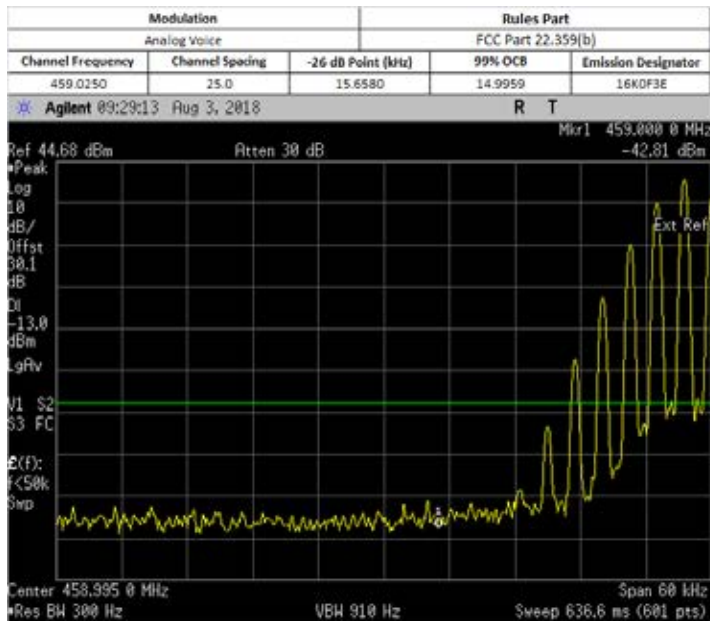
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey the DUT.
- 4) Path loss for the measurement included.
- 5) Select the Occupied Bandwidth measurement for 99% and 26dB Emissions Bandwidth Measurement.
- 6) Key in the Fc and Resolution Bandwidth.
- 7) Transmit the DUT and record the occupied Bandwidth frequencies.
- 8) Preset the spectrum analyzer for band edge measurement.
- 9) The band edges of lowest and highest channels were measured.
- 10) Key in the Lowest and highest channel frequency, span is 60 kHz and Resolution Bandwidth is at least 1% of Emission Bandwidth.
- 11) Save the screen shot as modulated signal.
- 12) Remove the audio tone from audio analyzer to capture unmodulated signal.

*Note:

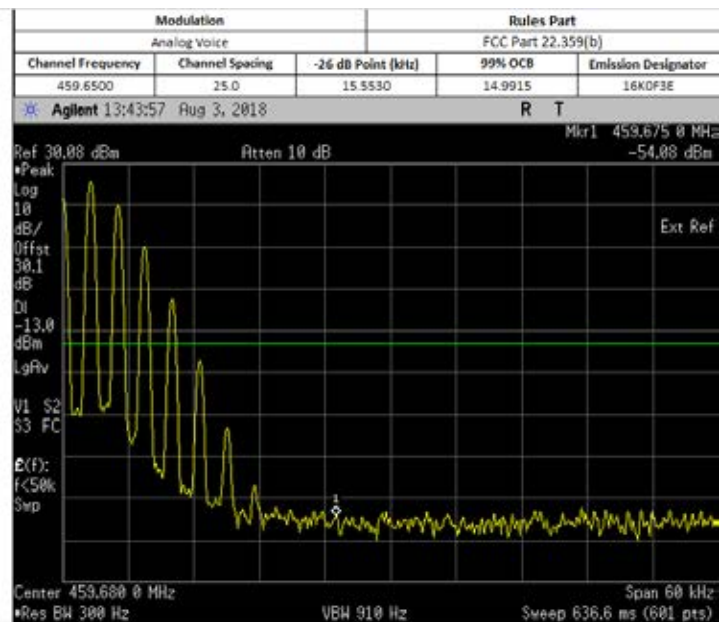
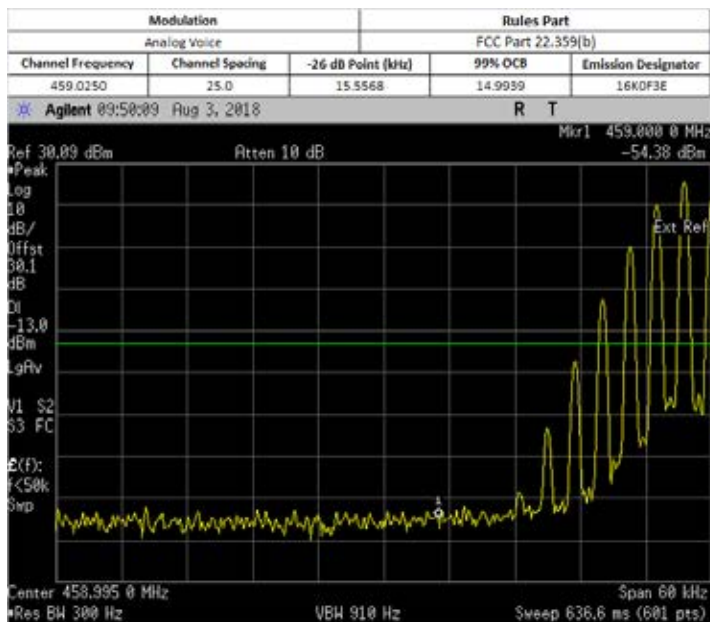
- For emission designator ending with F3E, 16K0F3E is the worst case and therefore only 16K0F3E will be shown.

6.7.2. Test Result (Analog)

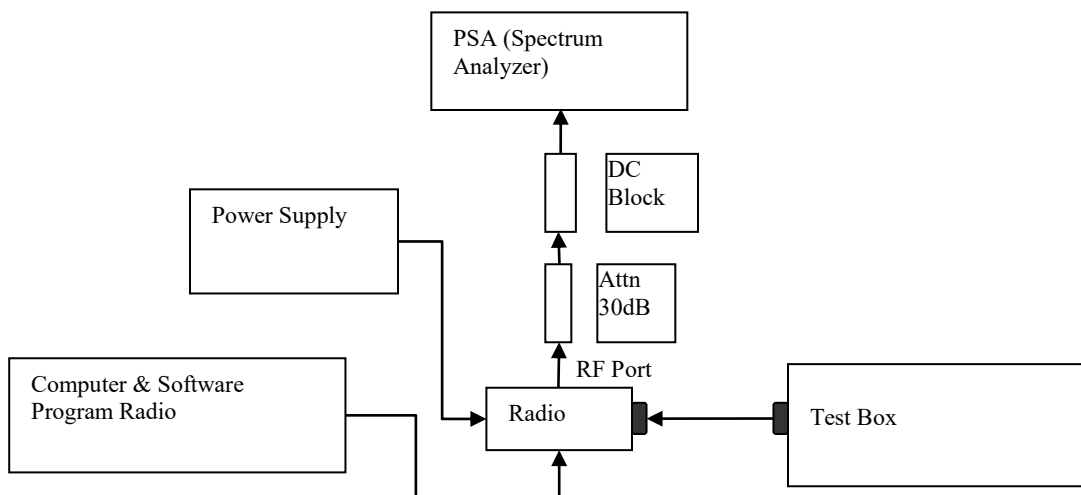
Max Power



Low Power



6.7.3. Test Setup (Digital)



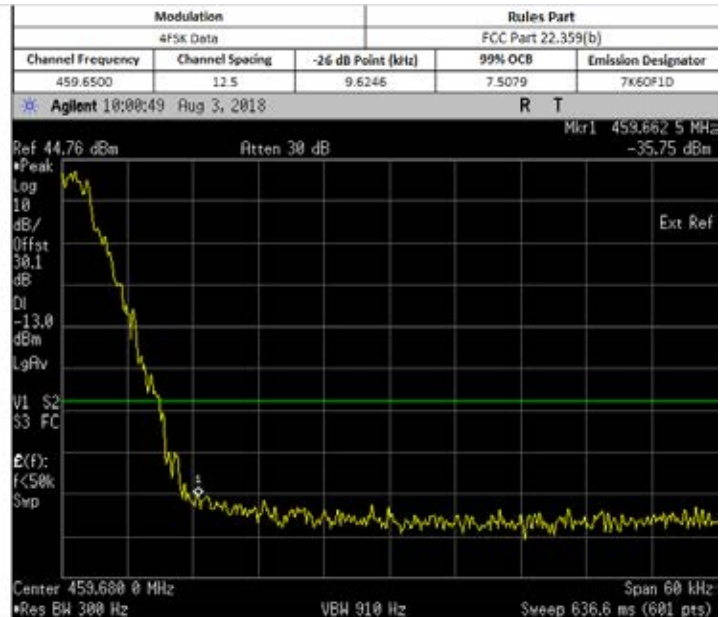
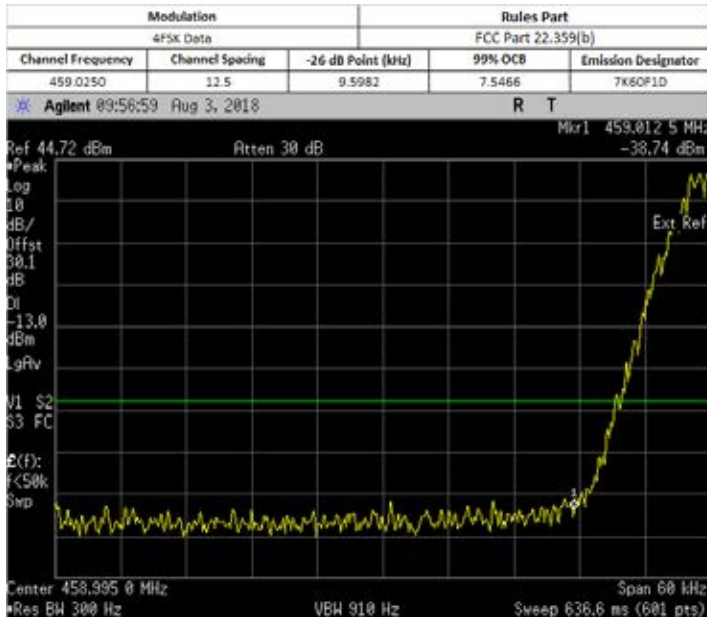
- 1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
- 2) Path loss for the measurement included.
- 3) Select the Occupied Bandwidth measurement for 99% and 26dB Emissions Bandwidth Measurement.
- 4) Key in the Fc and Resolution Bandwidth.
- 5) Transmit radio record the occupied Bandwidth frequencies.
- 6) Preset the spectrum analyzer for band edge measurement.
- 7) Key in the lowest and highest channels frequency, span is 60 kHz and Resolution Bandwidth is at least 1% of Emission Bandwidth.
- 8) Save the screen shot.

*Note:

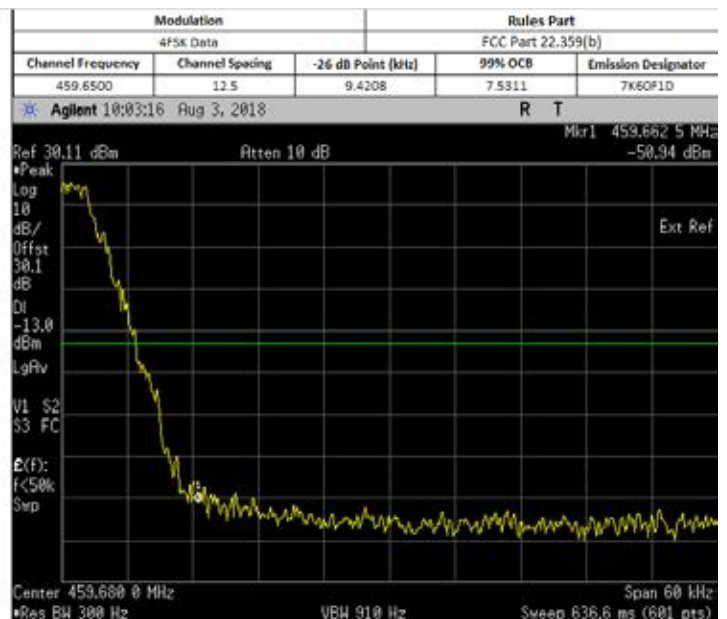
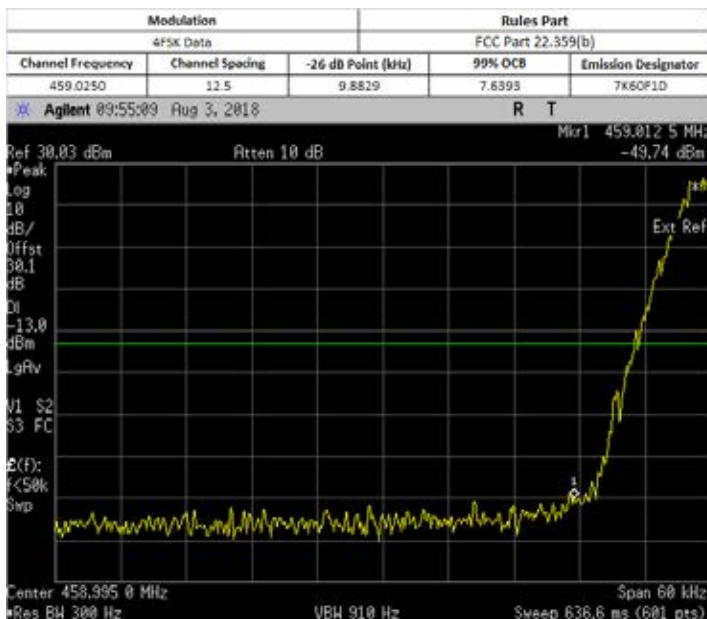
- All digital modulation modes utilize the same high deviation test pattern, and they are therefore identical. Hence, only F1D plots will be shown.

6.7.4. Test Result (Digital)

Max Power



Low Power

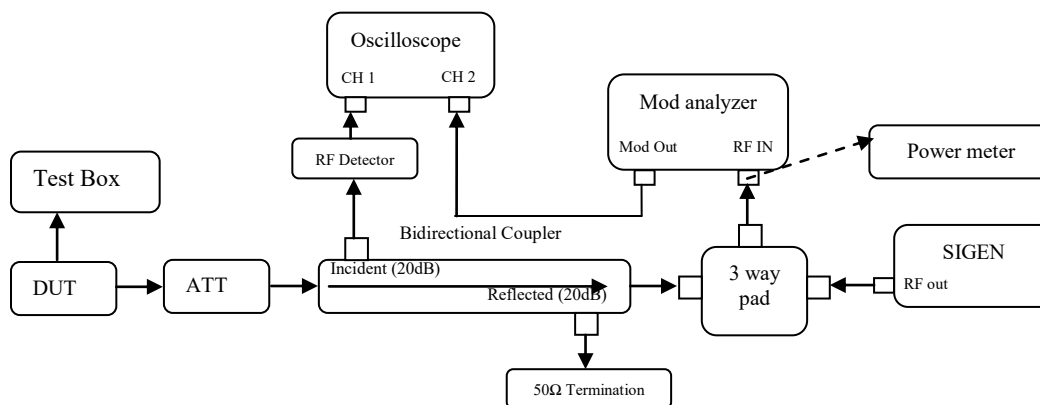


6.7.5. Test Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

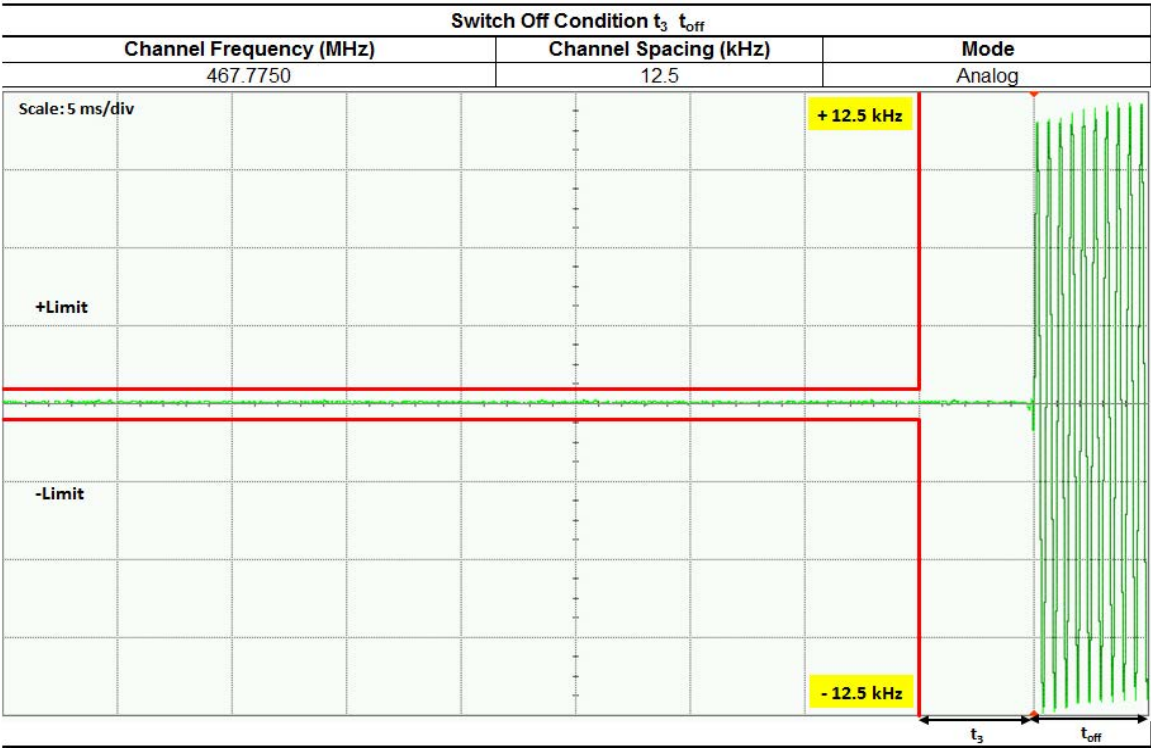
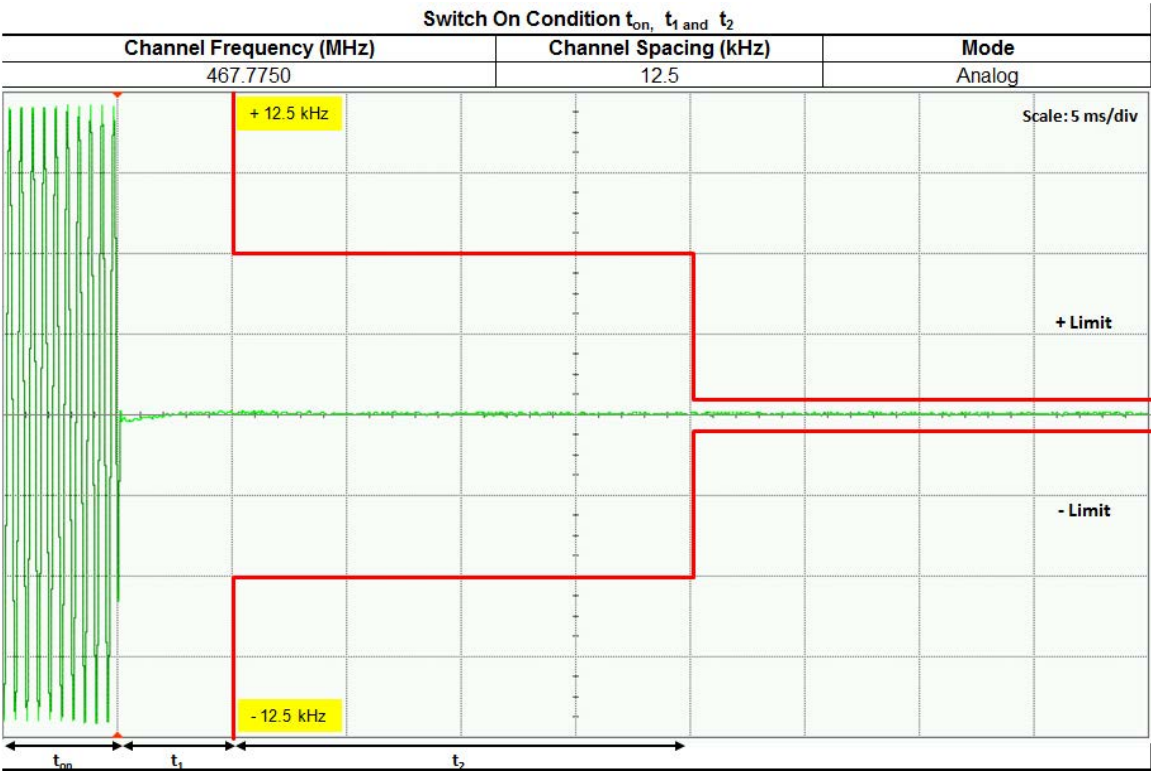
6.8. Transient Frequency Behavior

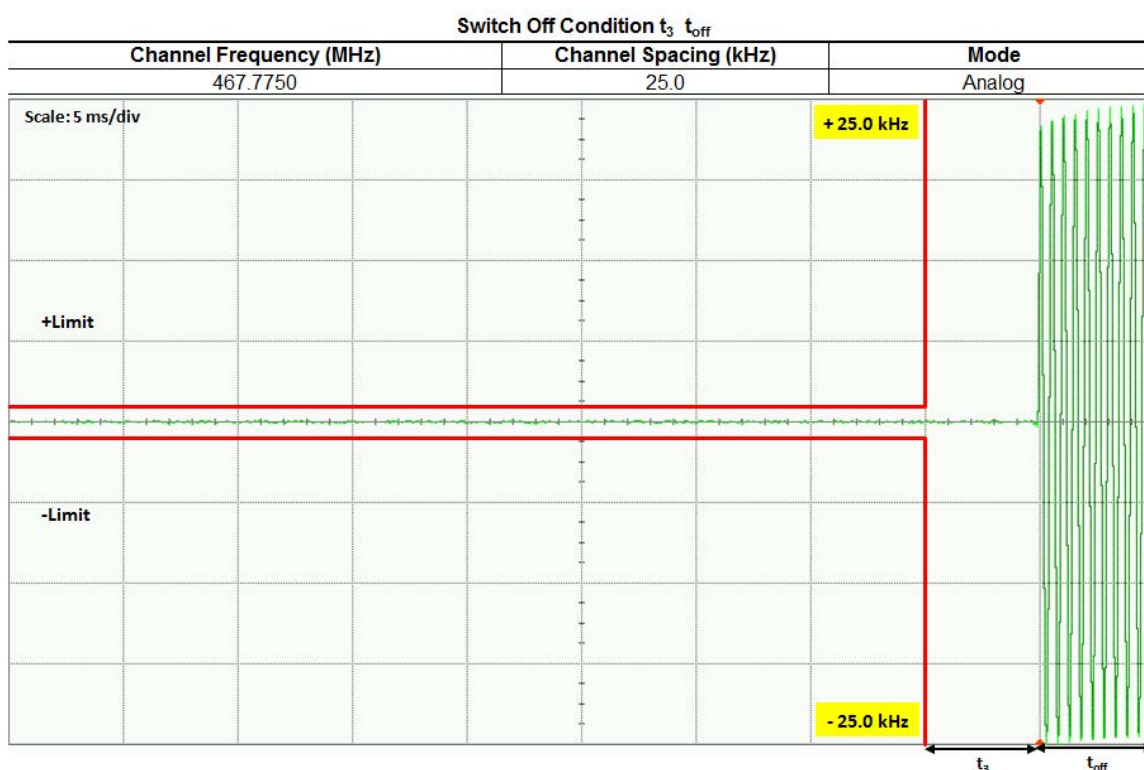
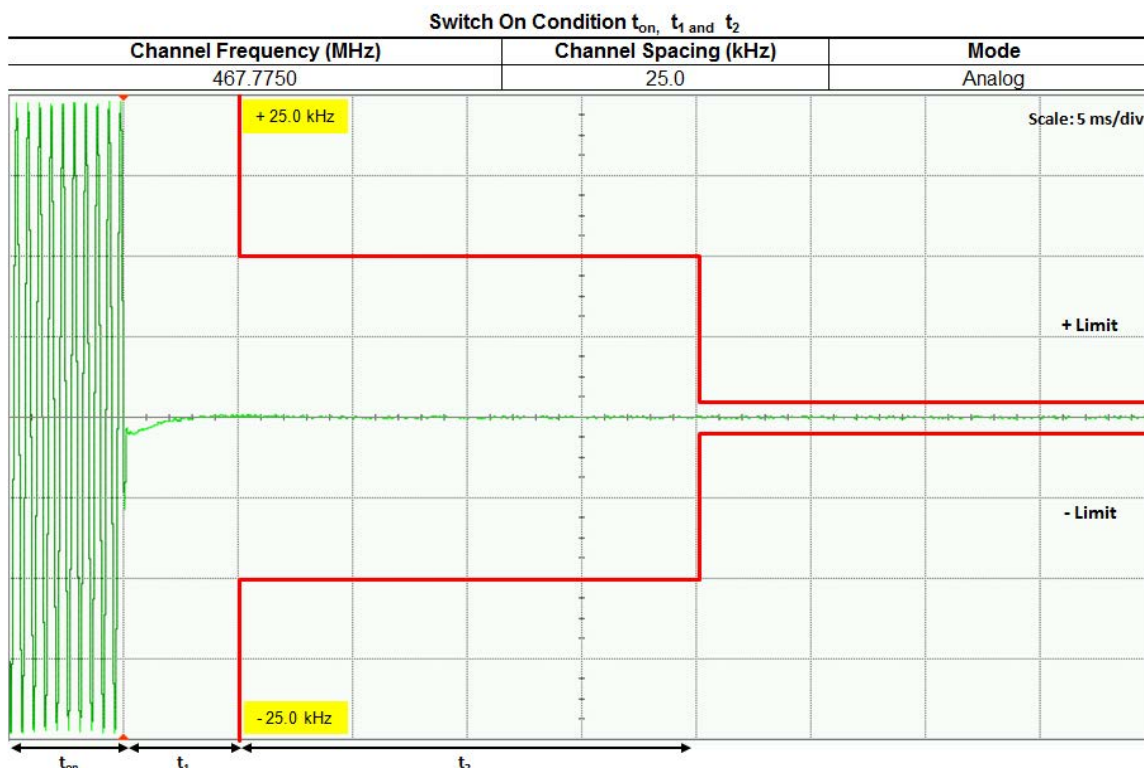
6.8.1. Test Setup

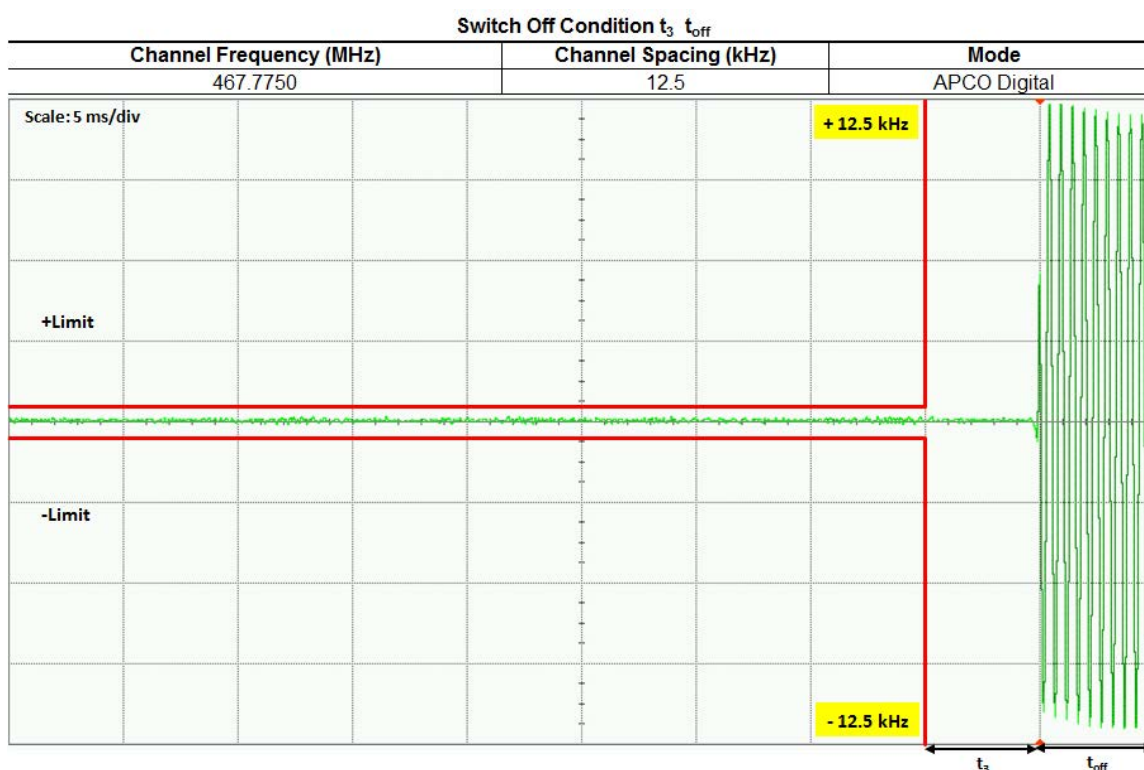
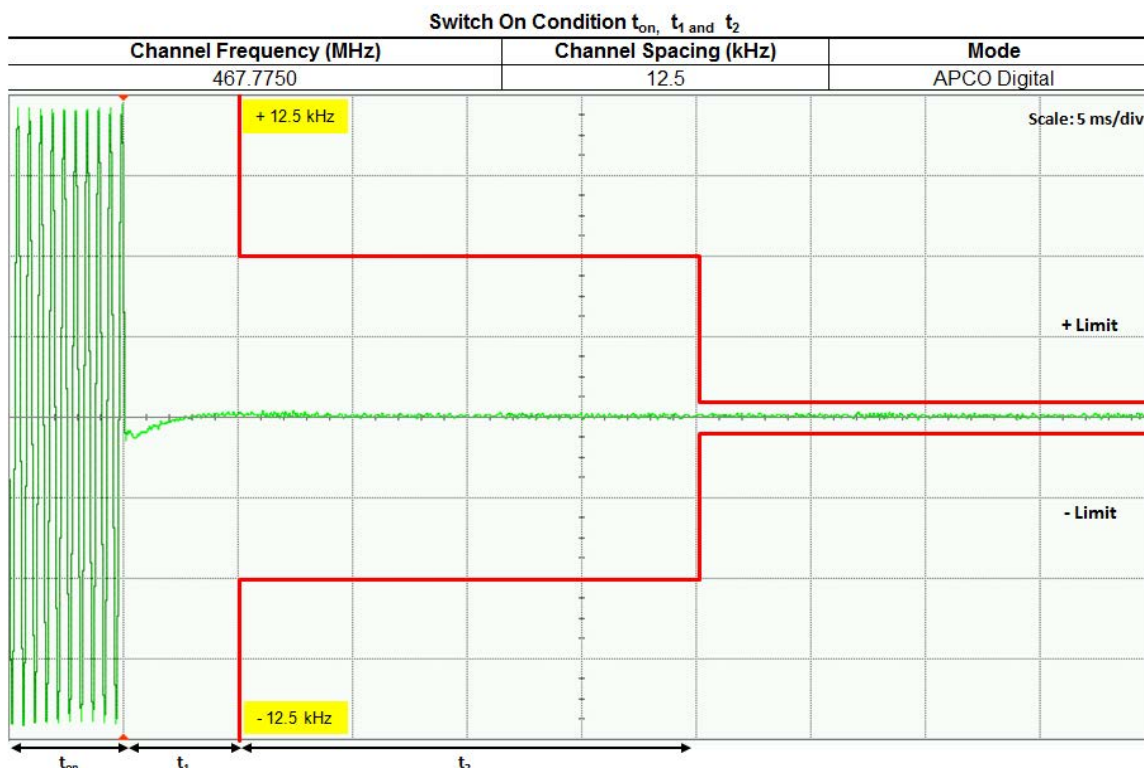


- 1) Connect the setup as figure above.
- 2) Path loss for the measurement included.
- 3) Set on Sigen with the assigned center frequency, internal 1 kHz FM tone.
FM Deviation: Analog 25kHz Channel Spacing = 25 kHz
Analog 12.5 kHz Channel Spacing = 12.5 kHz
C4FM = 12.5 kHz
- 4) Turn on 50 kHz high pass filter and 15 kHz low pass filter on modulation analyzer.
- 5) Supply sufficient attenuation ATT to provide the output power of $\leq -11\text{dBm}$ into power meter when DUT is keying up.
- 6) Note the power level on power meter and dekey the DUT.
- 7) Adjust the amplitude of the signal generator to the level power meter, maintained the amplitude throughout the rest of the measurement.
- 8) Connect the output to modulation analyzer.
- 9) Reduce 30dB attenuation and transmit the radio to get the trigger line.
- 10) Capture the screen shot for key-up (rising edge) and de-key (falling edge) mode.

6.8.2. Test Result







6.8.3. Test Limit

Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals ^{1 2}	Maximum frequency difference ³	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t ₁ ⁴	±25.0 kHz	5.0 ms	10.0 ms
t ₂	±12.5 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t ₁ ⁴	±12.5 kHz	5.0 ms	10.0 ms
t ₂	±6.25 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t ₁ ⁴	±6.25 kHz	5.0 ms	10.0 ms
t ₂	±3.125 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±6.25 kHz	5.0 ms	10.0 ms

¹ t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.

t_1 is the time period immediately following t_{on} .

t_2 is the time period immediately following t_1 .

t_3 is the time period from the instant when the transmitter is turned off until t_{off} .

t_{off} is the instant when the 1 kHz test signal starts to rise.

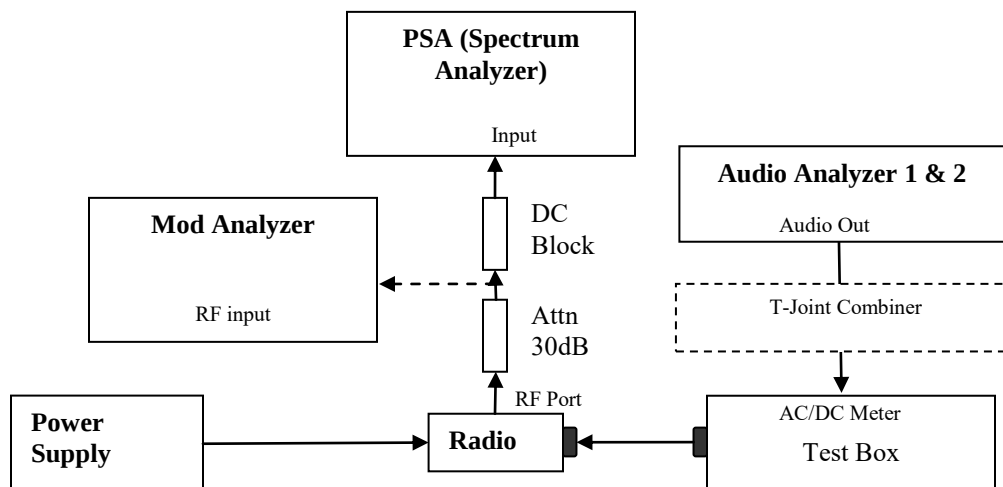
² During the time from the end of t_2 to the beginning of t_3 , the frequency difference must not exceed the limits specified in §90.213.

³ Difference between the actual transmitter frequency and the assigned transmitter frequency.

⁴ If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

6.9. Adjacent Channel Power

6.9.1. Test Setup (Analog)

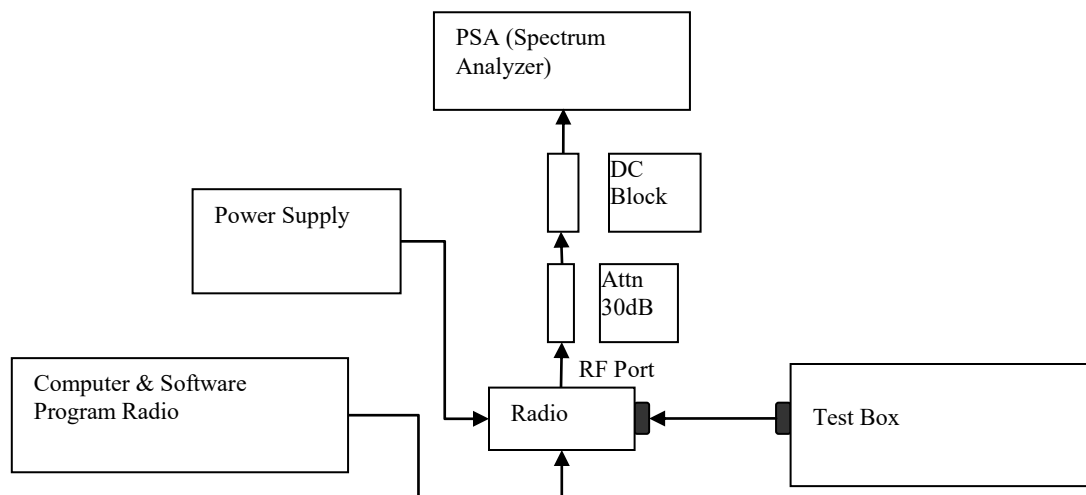


- 1) The DUT transmitter output port was connected to modulation analyzer.
- 2) Transmit the radio and turn on 1st audio analyzer with audio frequency 650Hz, 50% rated deviation, and record the amplitude value as AmpT1.
- 3) Turn off Audio analyzer 1 and turn on audio analyzer 2, set the audio frequency to 2.2 kHz and 50% deviation. Record the amplitude as AmpT2.
- 4) Turn both audio analyzers ON and up 10dB amplitude level.
- 5) Connect the output to PSA and set to assigned center frequency.
- 6) Set Span, Resolution Bandwidth and Video Bandwidth per rules part.
- 7) Transmit the radio and record the Adjacent Channel Power value in dBc.

6.9.2. Test Result

NA → Not Applicable

6.9.3. Test Setup (Digital)



- 1) Program and set radio to operate in desire test frequency and digital mode with modulation. (4FSK, C4FM or other digital modulation form).
- 2) Prepare setup as per picture.
- 3) Turn on the ACP Measurement – Press Measure, ACP.
- 4) Set Span, Resolution Bandwidth and Video Bandwidth as per rules part.
- 5) Transmit the radio and record the Adjacent Channel Power value in dBc.

6.9.4. Test Result

NA → Not Applicable

Test Limit

12.5 kHz MOBILE TRANSMITTER ACP REQUIREMENTS

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.50	25.00	-60
62.50	25.00	-65
87.50	25.00	-65
150.00	100	-65
250.00	100	-65
350.00	100	-65
>400 to 12 MHz	30 (s)	-75
12 MHz to paired receive band	30 (s)	-75
In the paired receive band	30 (s)	-100

25 kHz MOBILE TRANSMITTER ACP REQUIREMENTS

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.50	25	-60
62.50	25	-65
87.50	25	-65
150.00	100	-65
250.00	100	-65
350.00	100	-65
>400 kHz to 12 MHz	30 (s)	-75
12 MHz to paired receive band	30 (s)	-75
In the paired receive band	30 (s)	-100

12.5 kHz BASE TRANSMITTER ACP REQUIREMENTS

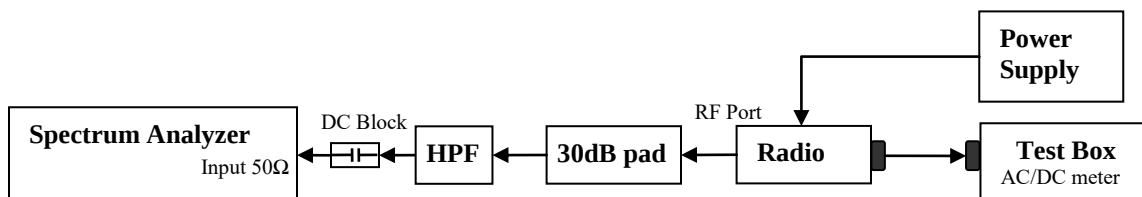
Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350.00	100	-65
>400 kHz to 12 MHz	30 (s)	-80
12 MHz to paired receive band	30 (s)	-80
In the paired receive band	30 (s)	¹ -85

25 kHz BASE TRANSMITTER ACP REQUIREMENTS

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350	100.00	-65
>400 kHz to 12 MHz	30 (s)	-80
12 MHz to paired receive band	30 (s)	-80
In the paired receive band	30 (s)	¹ -85

6.10. Conducted Spurious Emission

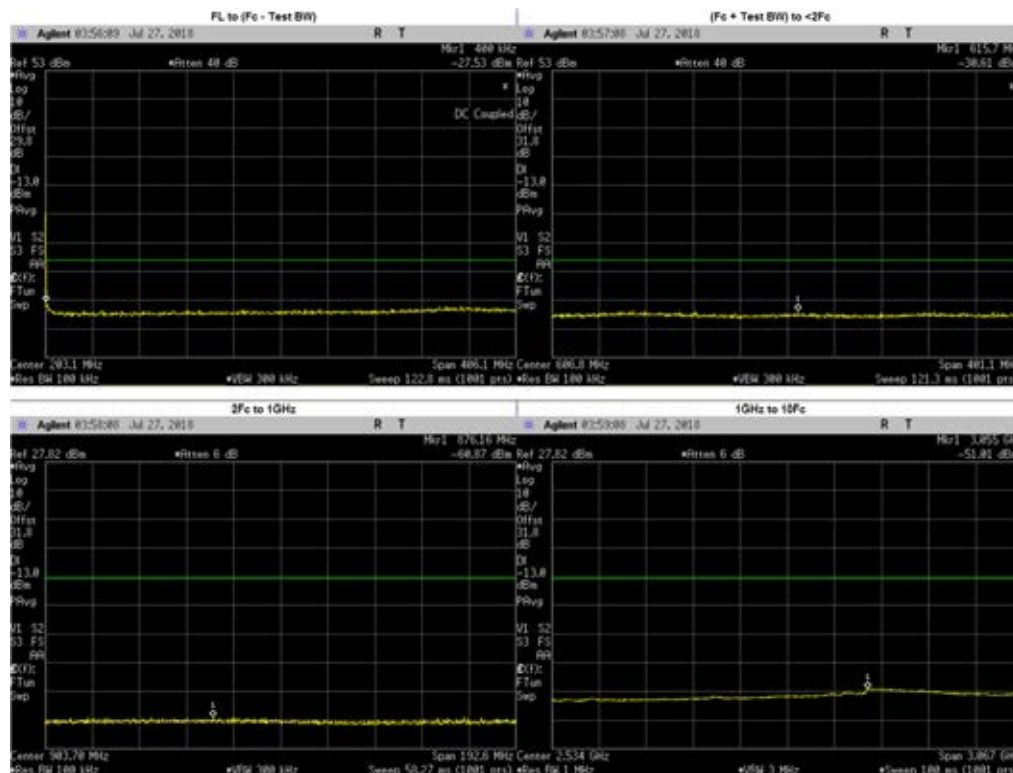
6.10.1. Test Setup



- 1) The DUT transmitter output port was connected to Spectrum Analyzer with above setup.
- 2) Program and set radio to operate in desire test frequency and mode. (Analog / digital modulation form).
- 3) Path loss for the measurement included.
- 4) Set the PSA Resolution Bandwidth as per rules part.
- 5) Set the Ref offset from the pathloss offset calibration file.
- 6) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:
 - a. 9 KHz to $F_c - \text{Test Bandwidth}$
 - b. $F_c + \text{Test Bandwidth}$ to $2F_c - 5\text{MHz}$.
- 7) Key up the DUT, Peak Search the highest Spur and record the levels of spurious emissions
- 8) Dekey the DUT.
- 9) Turn On High Pass Filter path and Key up the DUT.
- 10) Adjust the PSA Freq for incremental coverage of range from $2F_c$ to $10F_c$
- 11) Key up the DUT and record the highest spur levels of spurious emissions.

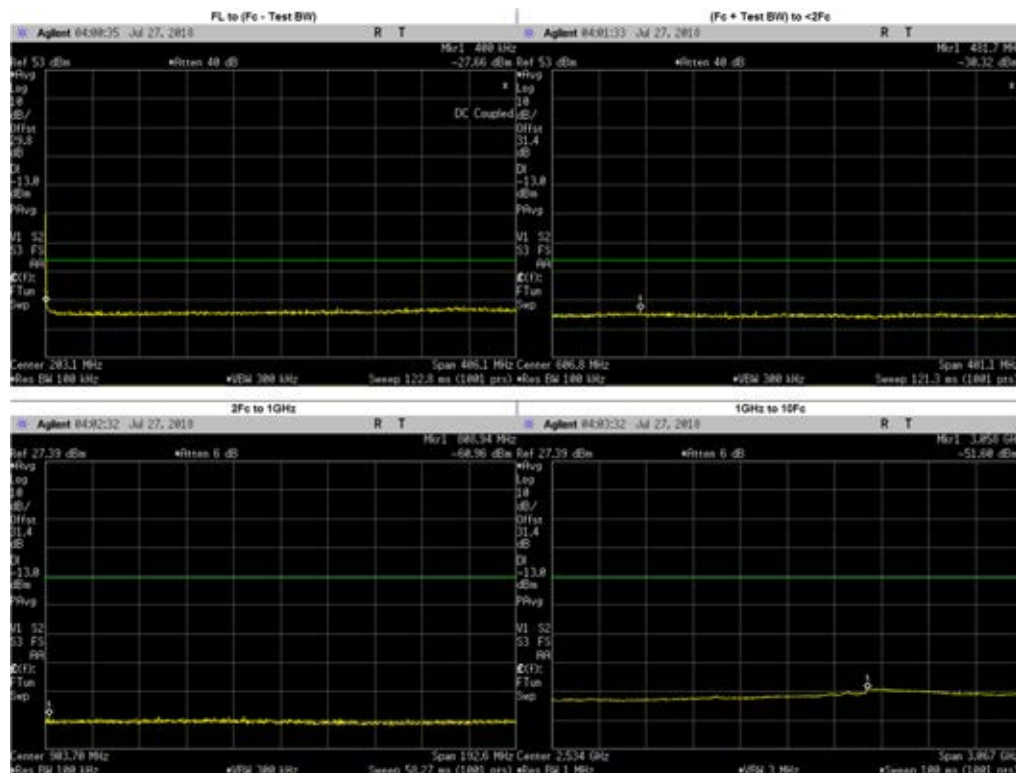
6.10.2. Test Result (Analog)

**Analog: 406.2 MHz, 25.0kHz Channel Spacing, Max Power
(Not For FCC Review)**



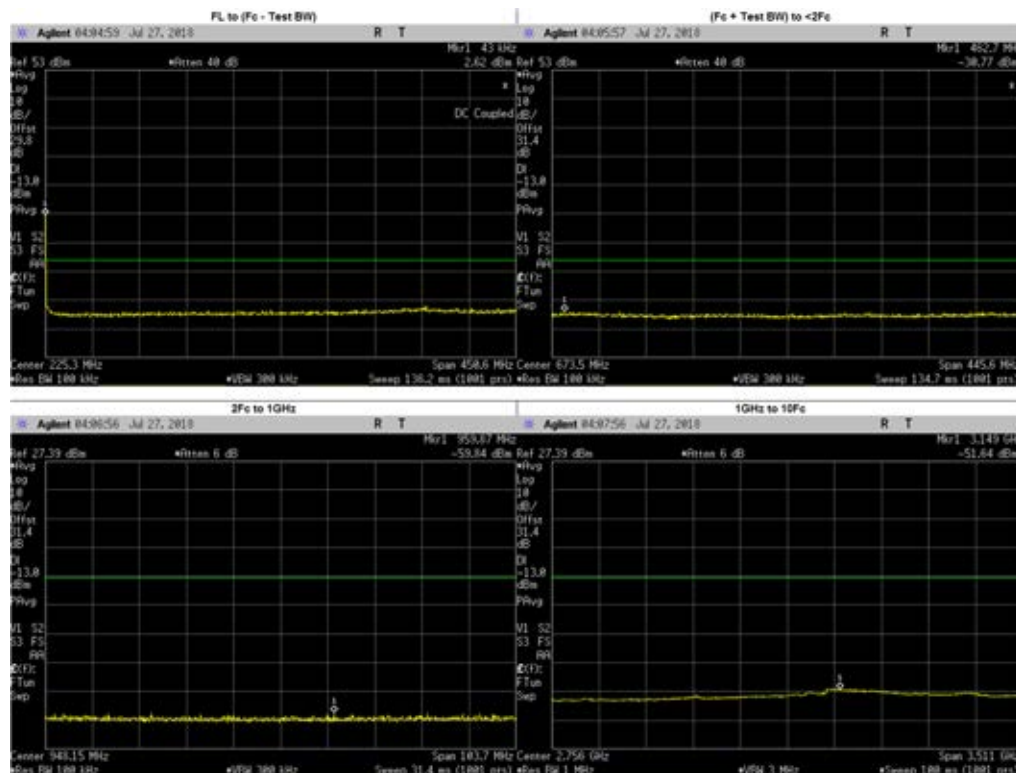
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	358.6265	-27.48	-13	PASS
(Fc + Test BW) to <2Fc	615.6530	-30.61	-13	PASS
2Fc to 1GHz	876.1582	-60.87	-13	PASS
	812.4000	-62.16	-13	PASS
1GHz to 10Fc	3054.8900	-51.01	-13	PASS
	1218.6000	-55.16	-13	PASS
	1624.8000	-54.87	-13	PASS
	2031.0000	-54.42	-13	PASS
	2437.2000	-54.06	-13	PASS
	2843.4000	-53.32	-13	PASS
	3249.6000	-51.88	-13	PASS
	3655.8000	-53.07	-13	PASS
	4062.0000	-52.87	-13	PASS

Analog: 406.2 MHz, 25.0kHz Channel Spacing, Low Power
(Not For FCC Review)



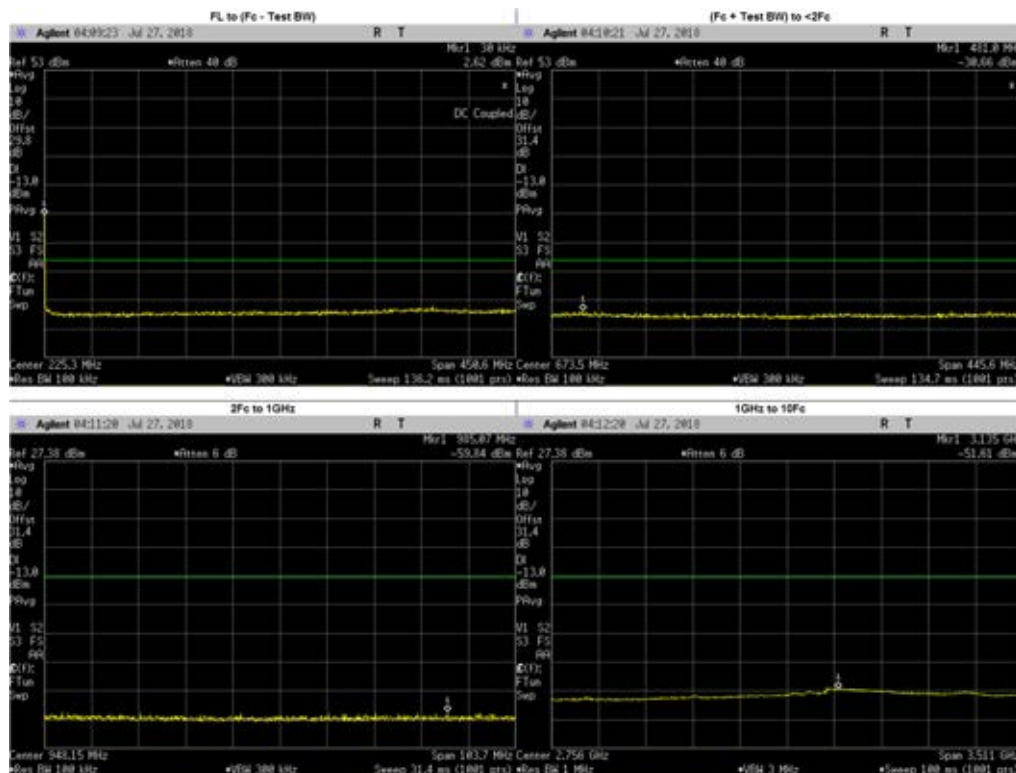
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	361.0633	-27.54	-13	PASS
(Fc + Test BW) to <2Fc	481.6708	-30.32	-13	PASS
2Fc to 1GHz	808.9408	-60.96	-13	PASS
	812.4000	-63.41	-13	PASS
1GHz to 10Fc	3057.9570	-51.60	-13	PASS
	1218.6000	-55.39	-13	PASS
	1624.8000	-55.50	-13	PASS
	2031.0000	-54.86	-13	PASS
	2437.2000	-54.54	-13	PASS
	2843.4000	-53.79	-13	PASS
	3249.6000	-52.18	-13	PASS
	3655.8000	-53.37	-13	PASS
	4062.0000	-53.22	-13	PASS

Analog: 450.65 MHz, 25.0kHz Channel Spacing, Max Power
FCC Part 74



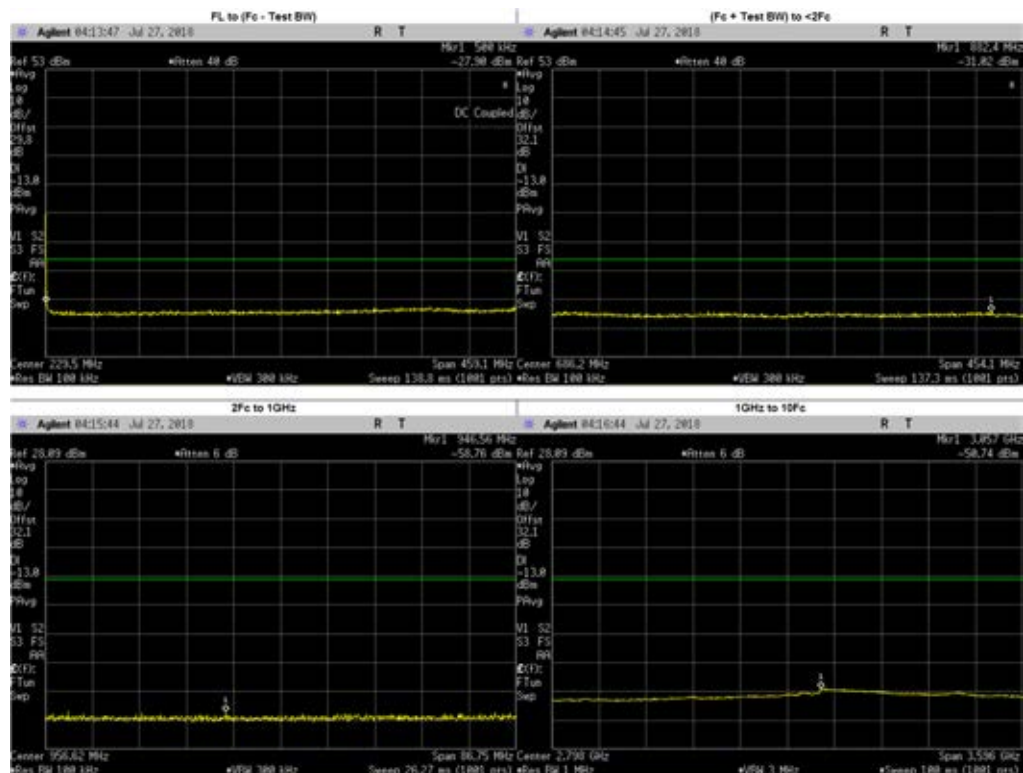
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	364.9822	-27.63	-13	PASS
(Fc + Test BW) to <2Fc	462.7378	-30.77	-13	PASS
2Fc to 1GHz	959.8681	-59.84	-13	PASS
	901.3000	-61.63	-13	PASS
1GHz to 10Fc	3149.0380	-51.64	-13	PASS
	1351.9500	-55.65	-13	PASS
	1802.6000	-55.31	-13	PASS
	2253.2500	-54.96	-13	PASS
	2703.9000	-54.17	-13	PASS
	3154.5500	-51.87	-13	PASS
	3605.2000	-53.39	-13	PASS
	4055.8500	-53.23	-13	PASS
	4506.5000	-54.34	-13	PASS

Analog: 450.65 MHz, 25.0kHz Channel Spacing, Low Power
FCC Part 74



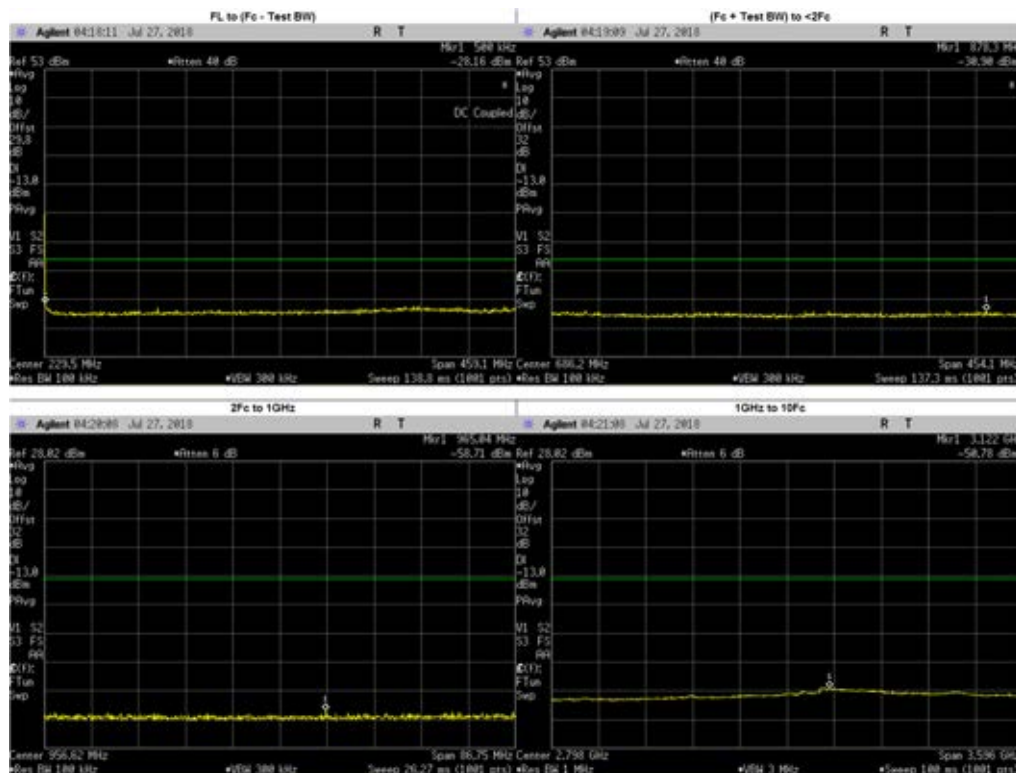
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	371.2904	-27.42	-13	PASS
(Fc + Test BW) to <2Fc	481.0071	-30.66	-13	PASS
2Fc to 1GHz	985.0672	-59.84	-13	PASS
	901.3000	-61.72	-13	PASS
1GHz to 10Fc	3134.9920	-51.61	-13	PASS
	1351.9500	-55.52	-13	PASS
	1802.6000	-55.22	-13	PASS
	2253.2500	-54.91	-13	PASS
	2703.9000	-54.12	-13	PASS
	3154.5500	-51.86	-13	PASS
	3605.2000	-53.22	-13	PASS
	4055.8500	-53.28	-13	PASS
	4506.5000	-54.31	-13	PASS

Analog: 459.125 MHz, 25.0kHz Channel Spacing, Max Power
FCC Part 22



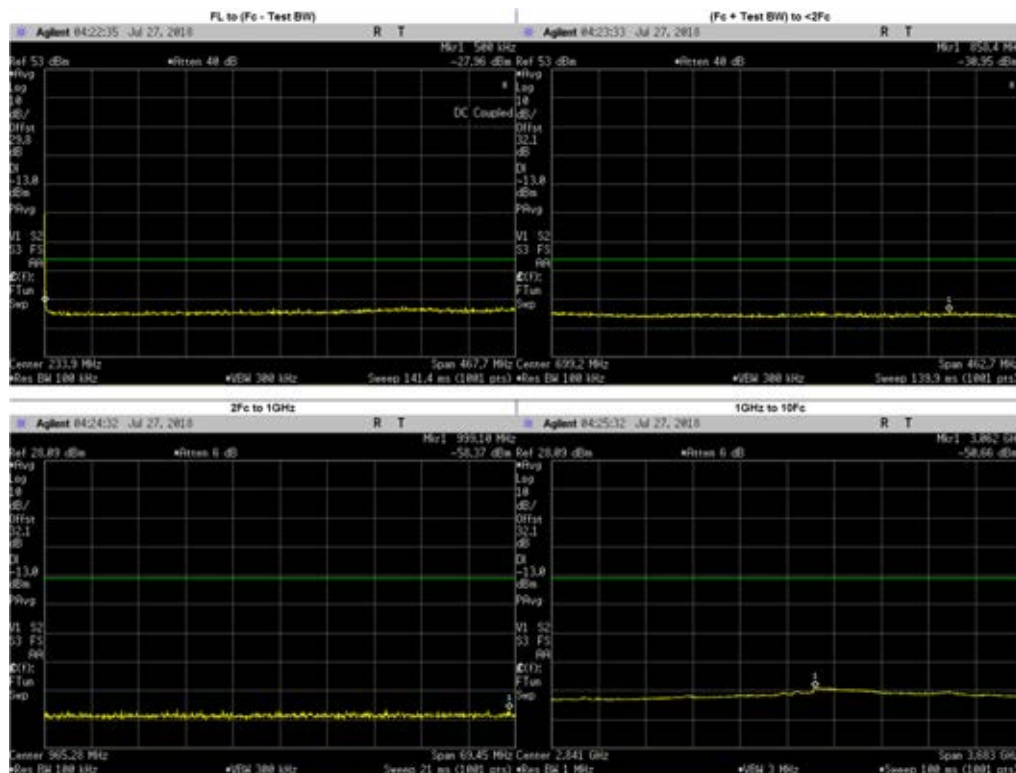
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	374.6013	-27.99	-13	PASS
(Fc + Test BW) to <2Fc	882.3734	-31.02	-13	PASS
2Fc to 1GHz	946.5620	-58.76	-13	PASS
	918.2500	-60.54	-13	PASS
1GHz to 10Fc	3057.0550	-50.74	-13	PASS
	1377.3750	-54.93	-13	PASS
	1836.5000	-54.51	-13	PASS
	2295.6250	-54.22	-13	PASS
	2754.7500	-53.45	-13	PASS
	3213.8750	-51.50	-13	PASS
	3673.0000	-52.80	-13	PASS
	4132.1250	-52.55	-13	PASS
	4591.2500	-53.89	-13	PASS

Analog: 459.125 MHz, 25.0kHz Channel Spacing, Low Power
FCC Part 22



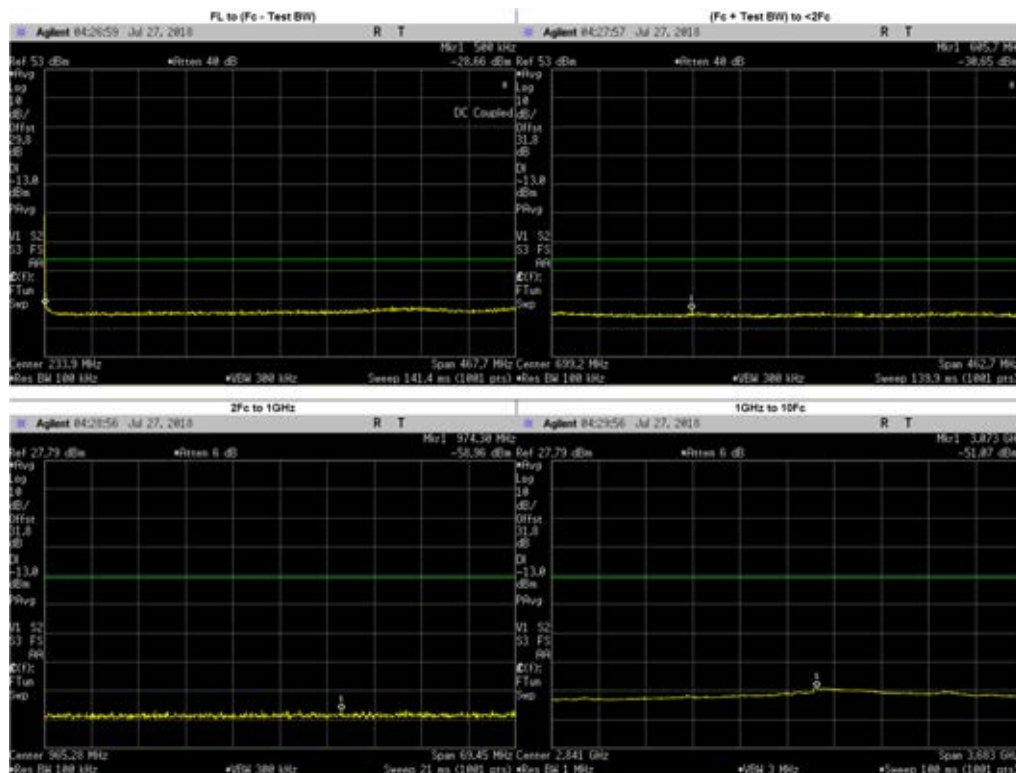
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	364.9611	-27.82	-13	PASS
(Fc + Test BW) to <2Fc	878.2867	-30.90	-13	PASS
2Fc to 1GHz	965.0398	-58.71	-13	PASS
	918.2500	-61.75	-13	PASS
1GHz to 10Fc	3121.7870	-50.78	-13	PASS
	1377.3750	-54.93	-13	PASS
	1836.5000	-54.62	-13	PASS
	2295.6250	-54.11	-13	PASS
	2754.7500	-53.28	-13	PASS
	3213.8750	-51.40	-13	PASS
	3673.0000	-52.96	-13	PASS
	4132.1250	-52.57	-13	PASS
	4591.2500	-53.98	-13	PASS

**Analog: 467.775 MHz, 25.0kHz Channel Spacing, Max Power
RSS-119**



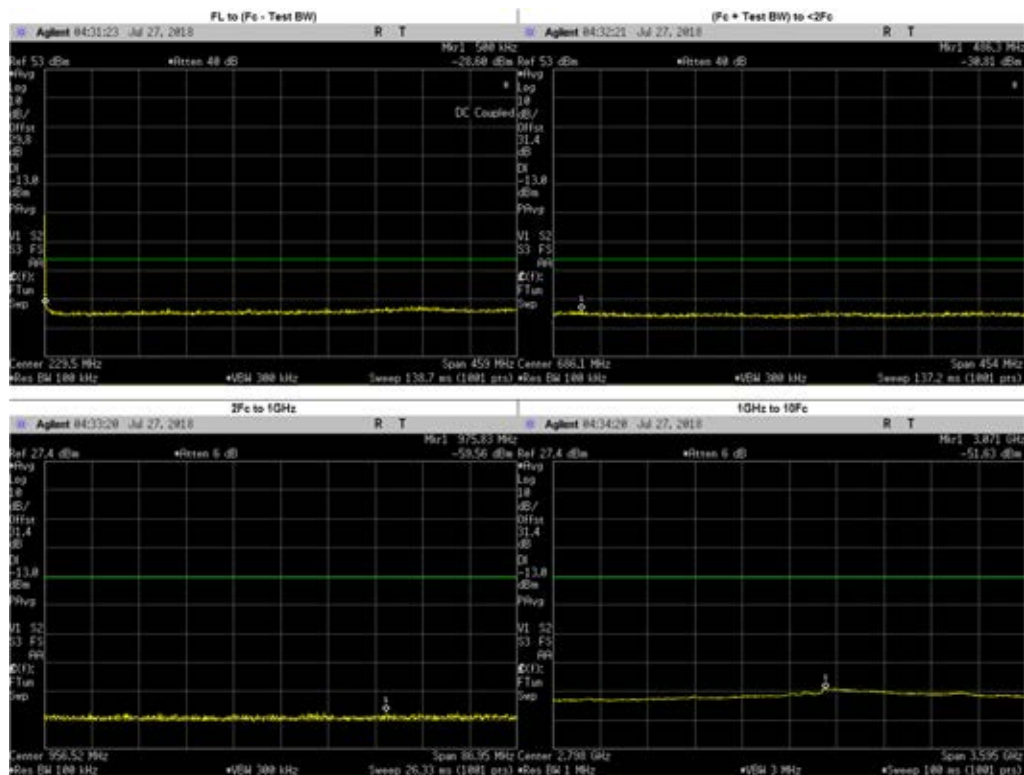
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	355.0003	-27.85	-13	PASS
(Fc + Test BW) to <2Fc	858.3660	-30.95	-13	PASS
2Fc to 1GHz	999.0972	-58.37	-13	PASS
	935.5500	-61.08	-13	PASS
1GHz to 10Fc	3062.3400	-50.66	-13	PASS
	1403.3250	-54.62	-13	PASS
	1871.1000	-54.62	-13	PASS
	2338.8750	-54.07	-13	PASS
	2806.6500	-52.75	-13	PASS
	3274.4250	-51.71	-13	PASS
	3742.2000	-52.81	-13	PASS
	4209.9750	-53.04	-13	PASS
	4677.7500	-53.75	-13	PASS

Analog: 467.775 MHz, 25.0kHz Channel Spacing, Low Power
RSS-119



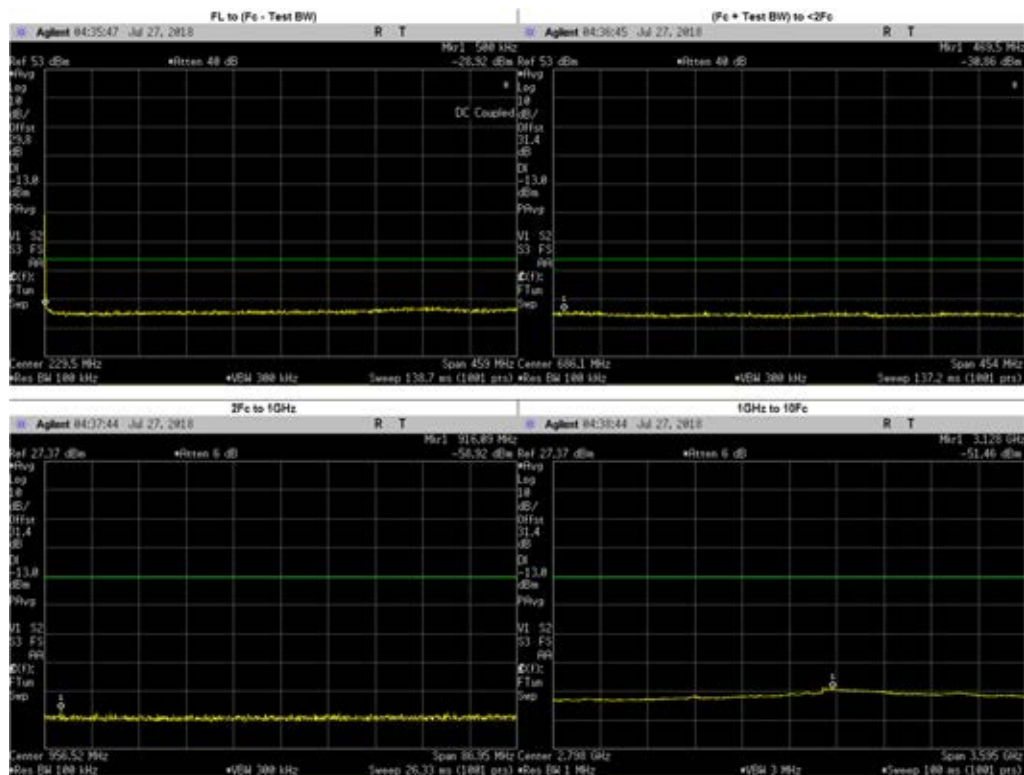
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	372.3055	-27.90	-13	PASS
(Fc + Test BW) to <2Fc	605.7218	-30.65	-13	PASS
2Fc to 1GHz	974.3035	-58.96	-13	PASS
	935.5500	-61.04	-13	PASS
1GHz to 10Fc	3073.3880	-51.07	-13	PASS
	1403.3250	-55.20	-13	PASS
	1871.1000	-54.87	-13	PASS
	2338.8750	-54.31	-13	PASS
	2806.6500	-53.23	-13	PASS
	3274.4250	-52.04	-13	PASS
	3742.2000	-53.14	-13	PASS
	4209.9750	-53.40	-13	PASS
	4677.7500	-54.14	-13	PASS

Analog: 459.025 MHz, 25.0kHz Channel Spacing, Max Power
FCC Part 22



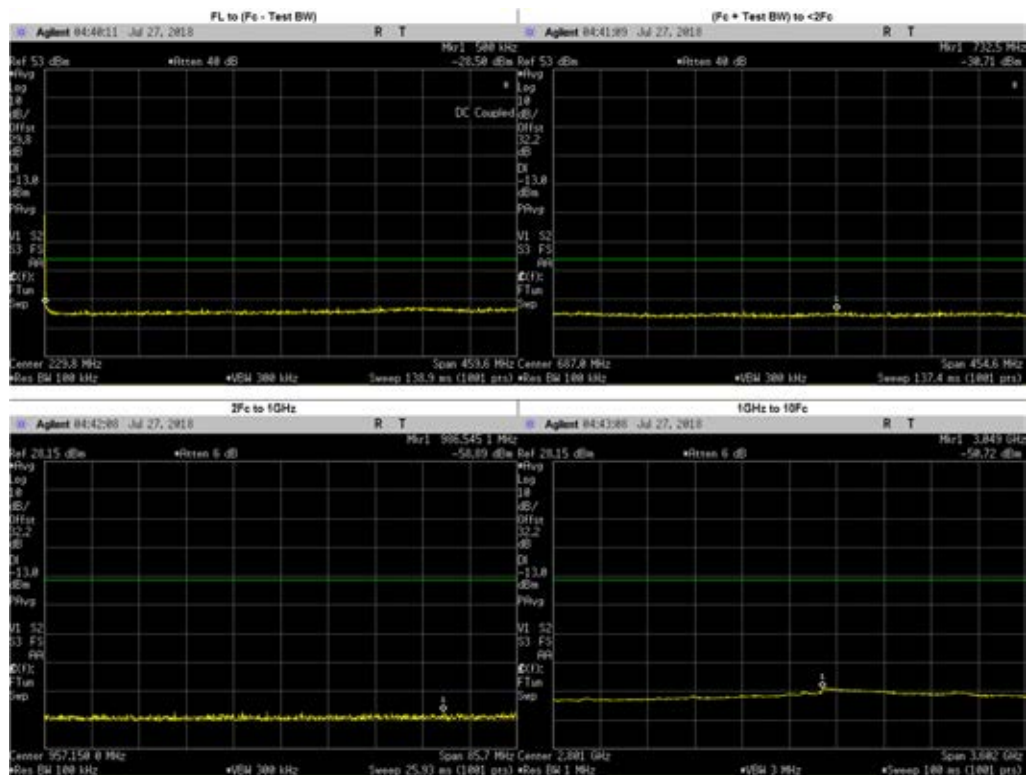
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	364.4226	-27.80	-13	PASS
(Fc + Test BW) to <2Fc	486.3199	-30.81	-13	PASS
2Fc to 1GHz	975.8279	-59.56	-13	PASS
	918.0500	-61.81	-13	PASS
1GHz to 10Fc	3070.8640	-51.63	-13	PASS
	1377.0750	-55.52	-13	PASS
	1836.1000	-55.30	-13	PASS
	2295.1250	-54.85	-13	PASS
	2754.1500	-54.08	-13	PASS
	3213.1750	-52.05	-13	PASS
	3672.2000	-53.49	-13	PASS
	4131.2250	-53.29	-13	PASS
	4590.2500	-54.33	-13	PASS

Analog: 459.025 MHz, 25.0kHz Channel Spacing, Low Power
FCC Part 22



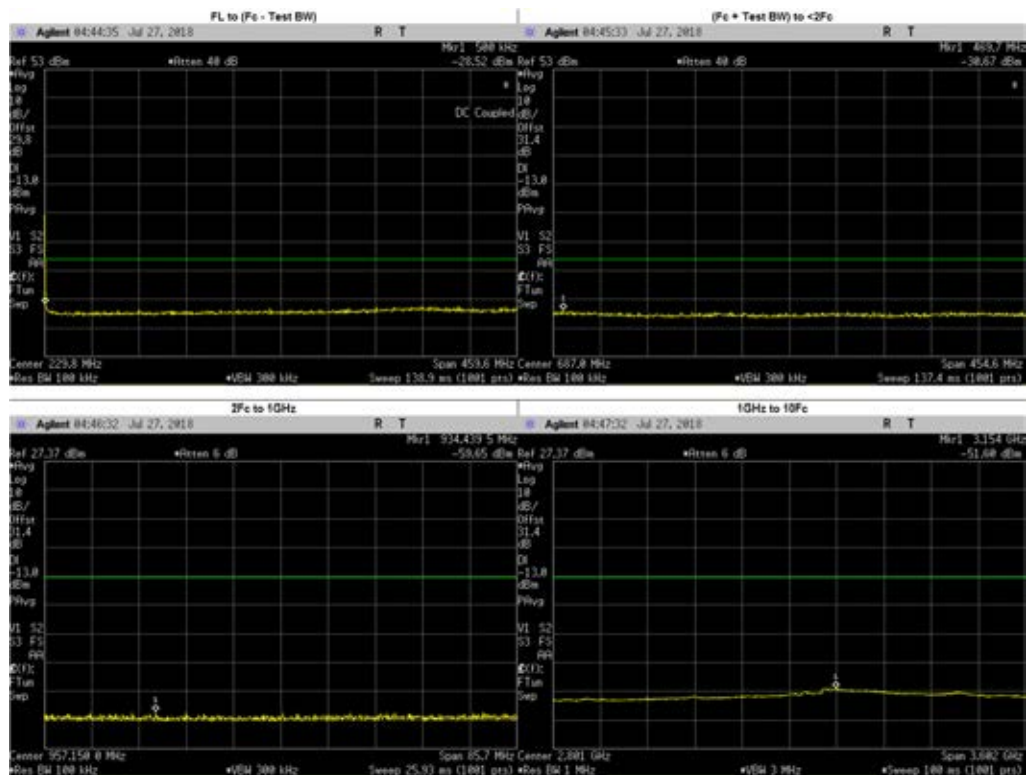
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dbm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	376.8145	-27.86	-13	PASS
(Fc + Test BW) to <2Fc	469.5231	-30.86	-13	PASS
2Fc to 1GHz	916.0933	-58.92	-13	PASS
	918.0500	-62.22	-13	PASS
1GHz to 10Fc	3128.3880	-51.46	-13	PASS
1GHz to 10Fc	1377.0750	-55.42	-13	PASS
	1836.1000	-55.29	-13	PASS
	2295.1250	-54.83	-13	PASS
	2754.1500	-54.18	-13	PASS
	3213.1750	-52.09	-13	PASS
	3672.2000	-53.40	-13	PASS
	4131.2250	-53.39	-13	PASS
	4590.2500	-54.56	-13	PASS

Analog: 459.65 MHz, 25.0kHz Channel Spacing, Max Power
FCC Part 22



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	358.9443	-27.93	-13	PASS
(Fc + Test BW) to <2Fc	732.4627	-30.71	-13	PASS
2Fc to 1GHz	986.5451	-58.89	-13	PASS
	919.3000	-60.86	-13	PASS
1GHz to 10Fc	3049.2530	-50.72	-13	PASS
	1378.9500	-54.90	-13	PASS
	1838.6000	-54.62	-13	PASS
	2298.2500	-54.09	-13	PASS
	2757.9000	-53.24	-13	PASS
	3217.5500	-51.50	-13	PASS
	3677.2000	-52.81	-13	PASS
	4136.8500	-52.41	-13	PASS
	4596.5000	-53.71	-13	PASS

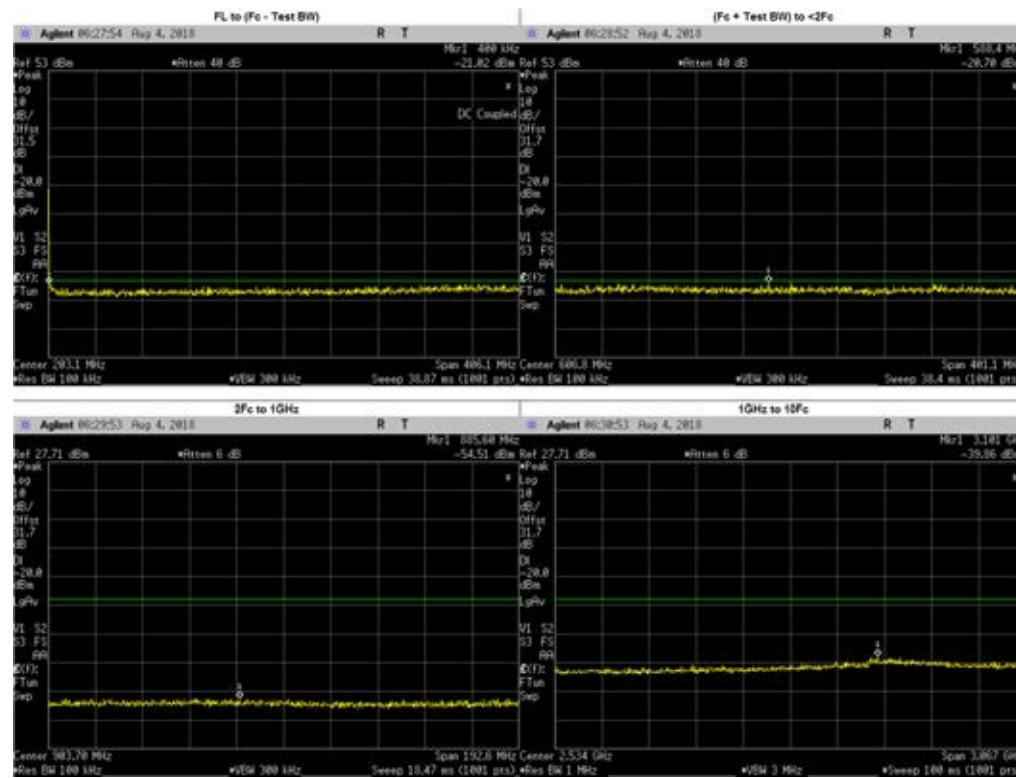
Analog: 459.65 MHz, 25.0kHz Channel Spacing, Low Power
FCC Part 22



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	402.6048	-27.65	-13	PASS
(Fc + Test BW) to <2Fc	469.7079	-30.67	-13	PASS
2Fc to 1GHz	934.4395	-59.65	-13	PASS
	919.3000	-61.73	-13	PASS
1GHz to 10Fc	3153.6970	-51.60	-13	PASS
	1378.9500	-55.28	-13	PASS
	1838.6000	-55.16	-13	PASS
	2298.2500	-54.97	-13	PASS
	2757.9000	-54.10	-13	PASS
	3217.5500	-52.36	-13	PASS
	3677.2000	-53.40	-13	PASS
	4136.8500	-53.30	-13	PASS
	4596.5000	-54.32	-13	PASS

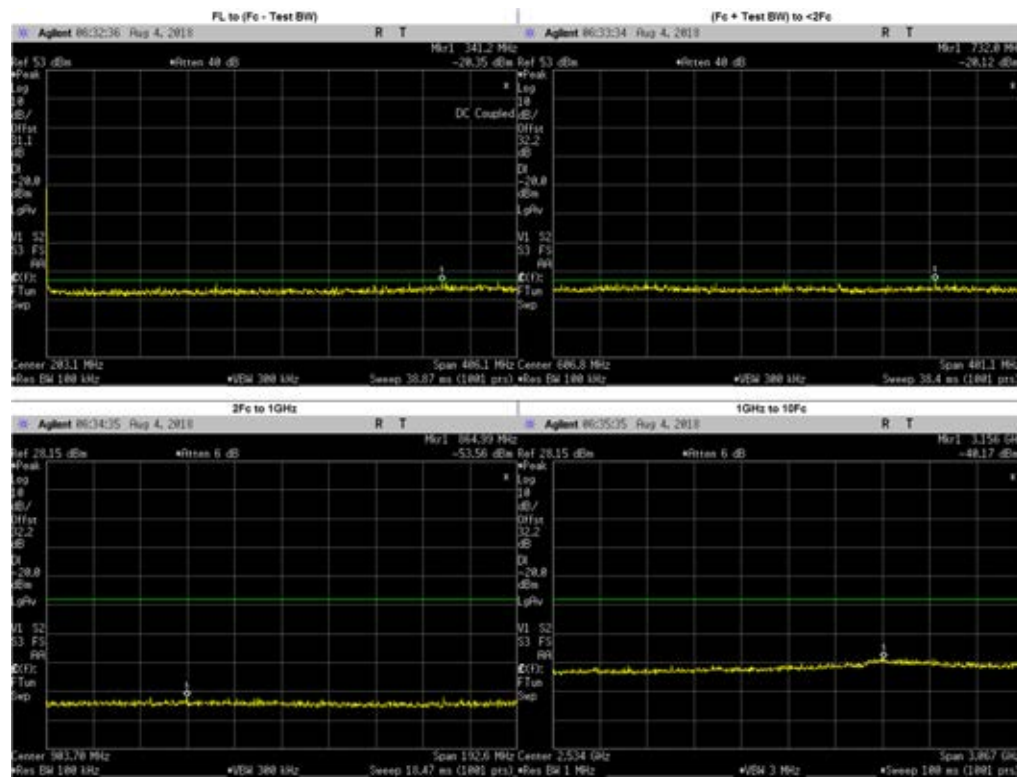
6.10.3. Test Result (Digital)

Digital: 406.2 MHz, 12.5kHz Channel Spacing, Max Power FCC Part 90



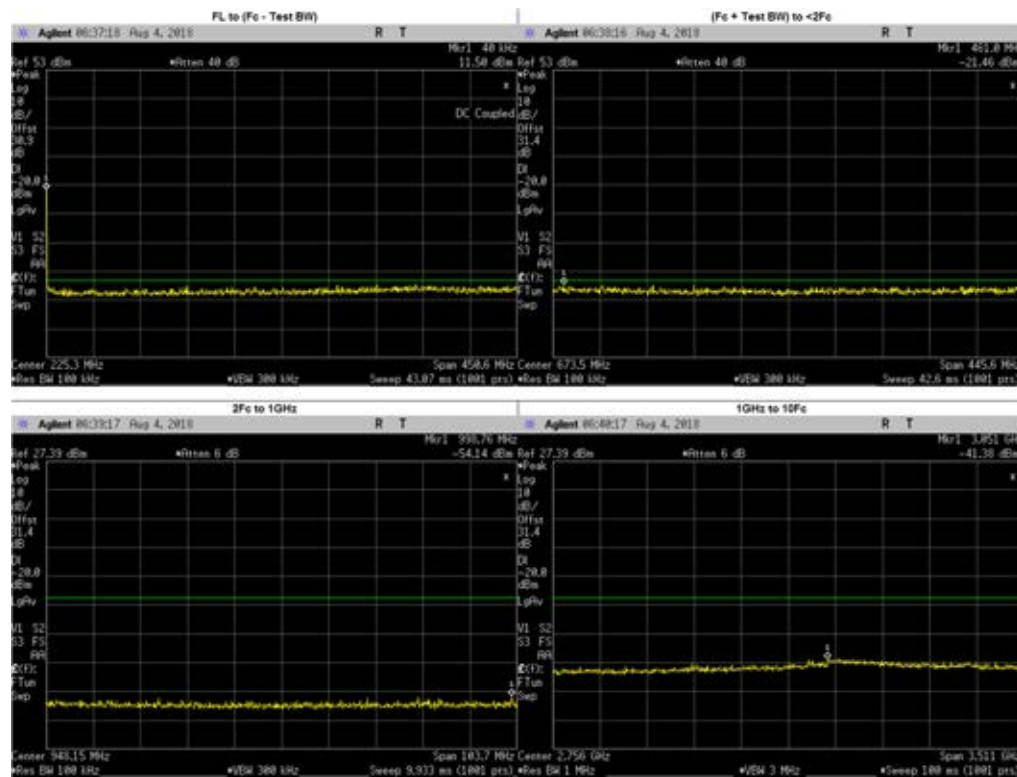
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	371.2167	-21.33	-20	PASS
(Fc + Test BW) to <2Fc	588.3752	-20.70	-20	PASS
2Fc to 1GHz	885.5956	-54.51	-20	PASS
	812.4000	-57.08	-20	PASS
1GHz to 10Fc	3061.0240	-40.41	-20	PASS
	1218.6000	-45.23	-20	PASS
	1624.8000	-45.48	-20	PASS
	2031.0000	-44.82	-20	PASS
	2437.2000	-44.42	-20	PASS
	2843.4000	-43.42	-20	PASS
	3249.6000	-42.17	-20	PASS
	3655.8000	-43.23	-20	PASS
	4062.0000	-42.60	-20	PASS
	3100.8950	-50.64	-20	PASS

Digital: 406.2 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 90



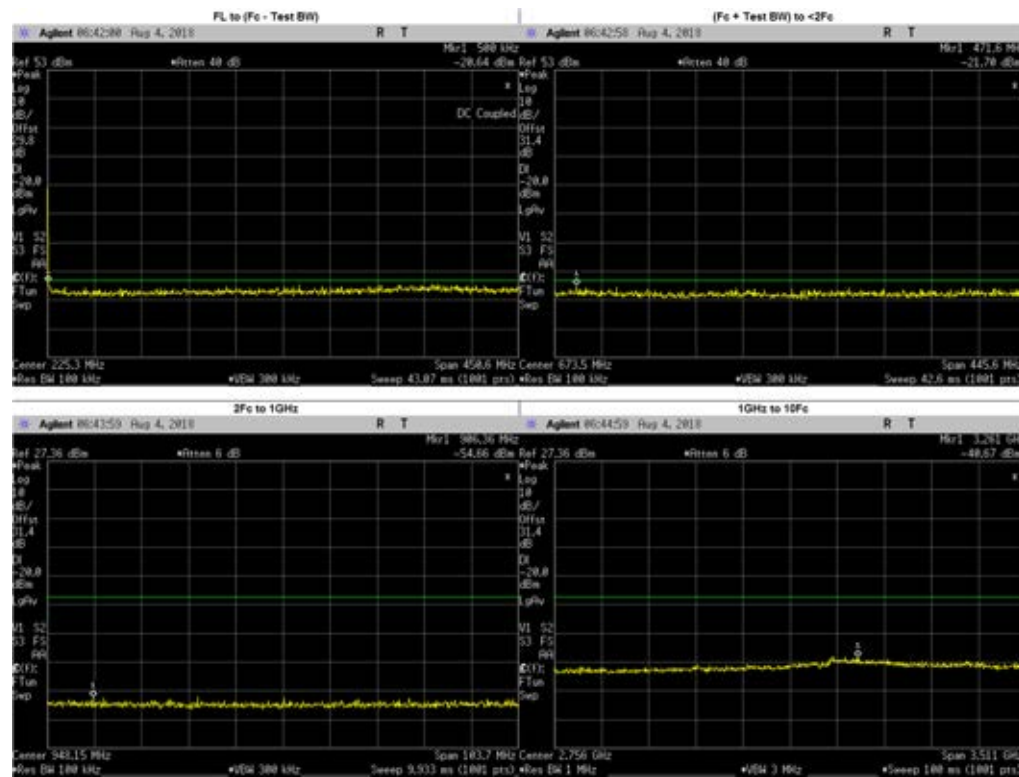
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	341.1627	-20.35	-20	PASS
(Fc + Test BW) to <2Fc	731.9849	-20.12	-20	PASS
2Fc to 1GHz	864.9874	-53.56	-20	PASS
	812.4000	-57.13	-20	PASS
1GHz to 10Fc	3156.1010	-40.17	-20	PASS
	1218.6000	-44.99	-20	PASS
	1624.8000	-45.48	-20	PASS
	2031.0000	-44.32	-20	PASS
	2437.2000	-43.98	-20	PASS
	2843.4000	-43.15	-20	PASS
	3249.6000	-41.11	-20	PASS
	3655.8000	-43.17	-20	PASS
	4062.0000	-42.61	-20	PASS

**Digital: 450.65 MHz, 12.5kHz Channel Spacing, Max Power
FCC Part 74, 90**



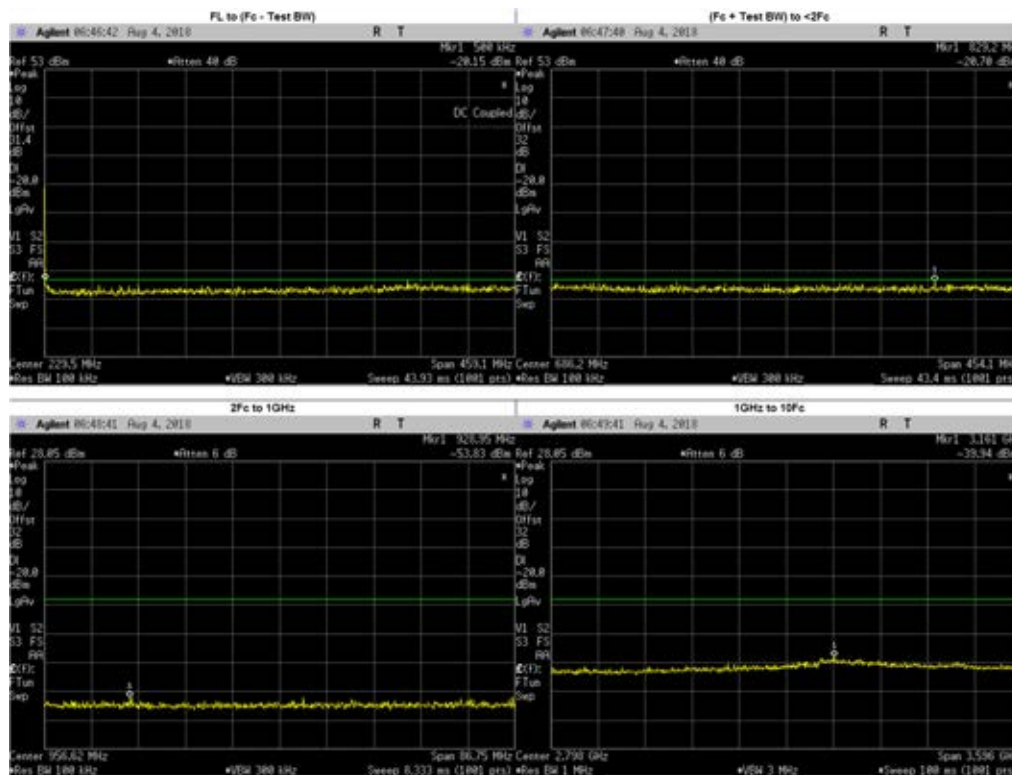
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	353.7176	-21.14	-20	PASS
(Fc + Test BW) to <2Fc	460.9554	-21.46	-20	PASS
2Fc to 1GHz	998.7556	-54.14	-20	PASS
	901.3000	-56.91	-20	PASS
1GHz to 10Fc	3050.7160	-41.38	-20	PASS
	1351.9500	-45.45	-20	PASS
	1802.6000	-45.52	-20	PASS
	2253.2500	-45.44	-20	PASS
	2703.9000	-44.82	-20	PASS
	3154.5500	-42.27	-20	PASS
	3605.2000	-43.87	-20	PASS
	4055.8500	-43.69	-20	PASS
	4506.5000	-44.40	-20	PASS

Digital: 450.65 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 74, 90



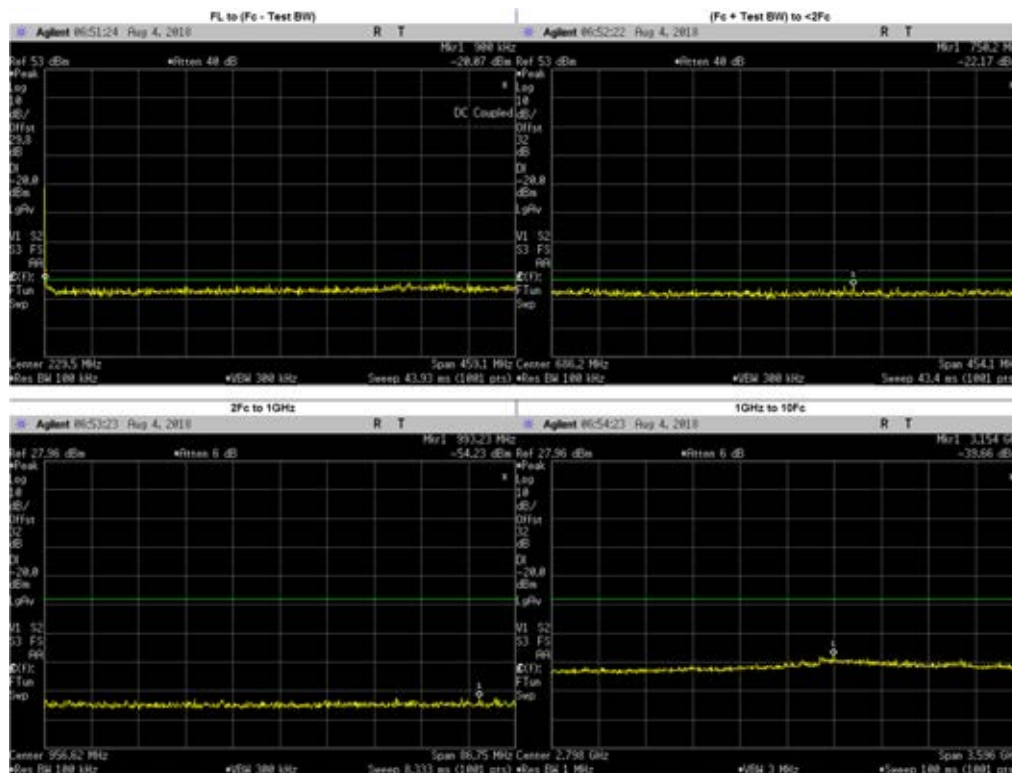
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	367.2351	-20.02	-20	PASS
(Fc + Test BW) to <2Fc	471.6497	-21.70	-20	PASS
2Fc to 1GHz	906.3589	-54.66	-20	PASS
	901.3000	-57.08	-20	PASS
1GHz to 10Fc	3261.4060	-40.67	-20	PASS
	1351.9500	-46.12	-20	PASS
	1802.6000	-45.05	-20	PASS
	2253.2500	-45.36	-20	PASS
	2703.9000	-44.65	-20	PASS
	3154.5500	-42.31	-20	PASS
	3605.2000	-42.92	-20	PASS
	4055.8500	-43.16	-20	PASS
	4506.5000	-44.44	-20	PASS

Digital: 459.125 MHz, 12.5kHz Channel Spacing, Max Power
FCC Part 22, 90



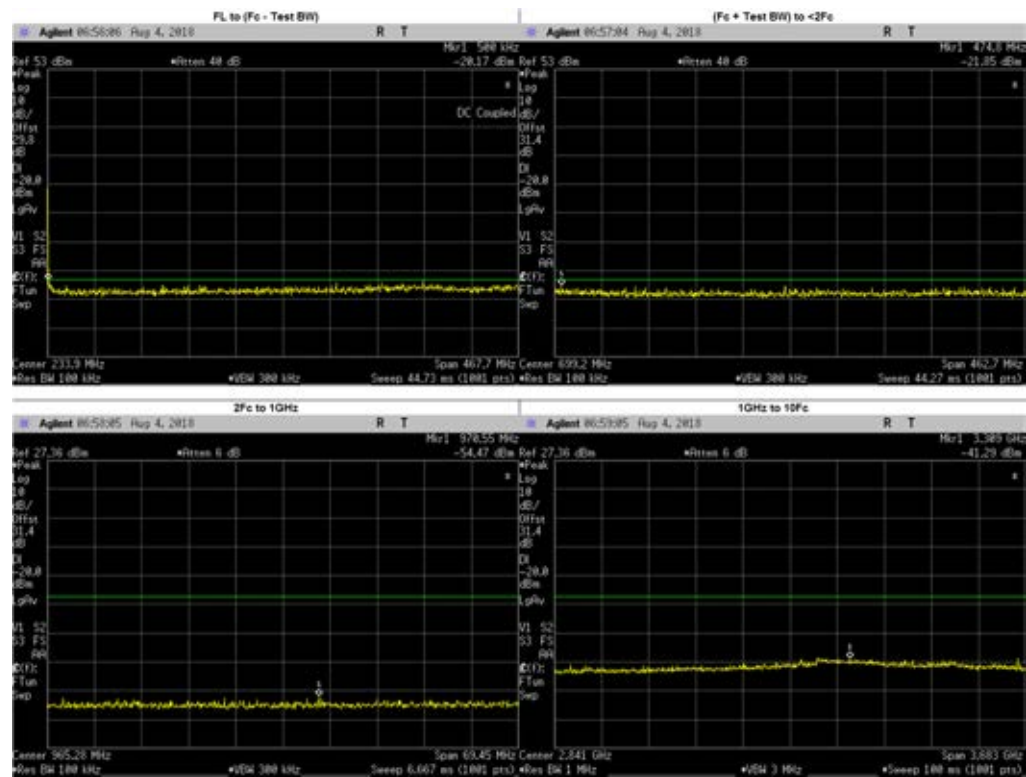
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	354.4027	-20.66	-20	PASS
(Fc + Test BW) to <2Fc	829.2474	-20.70	-20	PASS
2Fc to 1GHz	928.9517	-53.83	-20	PASS
	918.2500	-55.36	-20	PASS
1GHz to 10Fc	3064.2470	-40.46	-20	PASS
	1377.3750	-44.94	-20	PASS
	1836.5000	-44.80	-20	PASS
	2295.6250	-44.93	-20	PASS
	2754.7500	-43.71	-20	PASS
	3213.8750	-41.91	-20	PASS
	3673.0000	-43.02	-20	PASS
	4132.1250	-42.76	-20	PASS
	4591.2500	-44.15	-20	PASS
	3161.3460	-50.92	-20	PASS

Digital: 459.125 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 22, 90



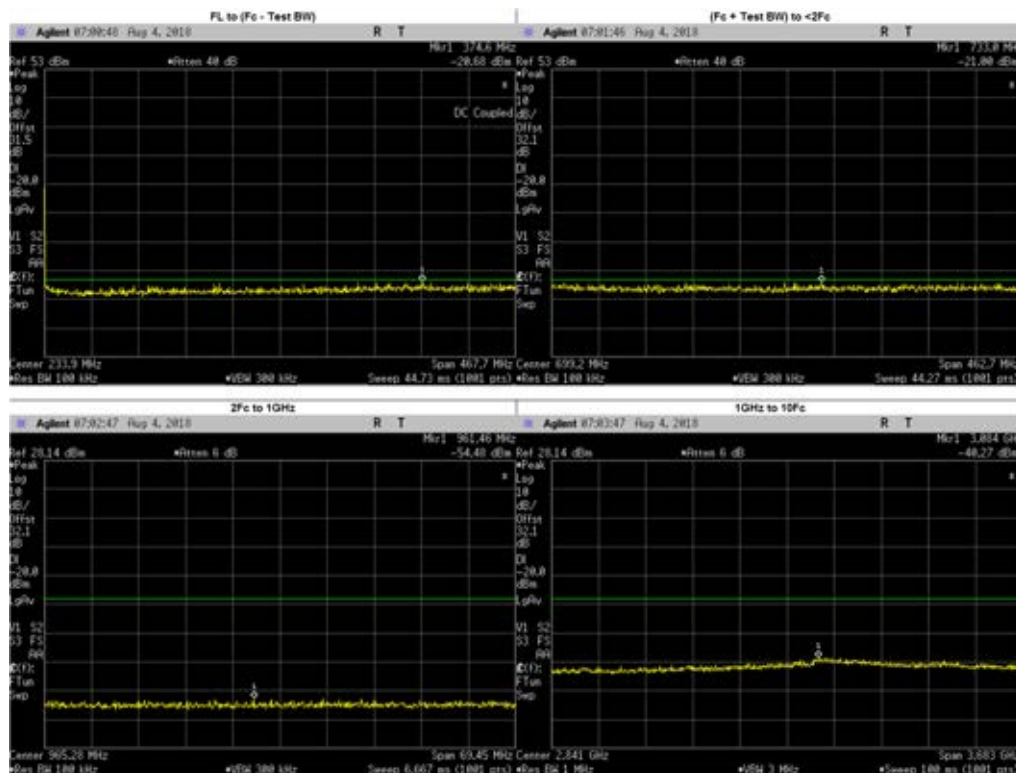
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	0.9271	-20.13	-20	PASS
(Fc + Test BW) to <2Fc	750.2395	-22.17	-20	PASS
2Fc to 1GHz	993.2335	-54.23	-20	PASS
	918.2500	-56.91	-20	PASS
1GHz to 10Fc	3075.0360	-40.25	-20	PASS
	1377.3750	-45.59	-20	PASS
	1836.5000	-44.83	-20	PASS
	2295.6250	-44.78	-20	PASS
	2754.7500	-43.68	-20	PASS
	3213.8750	-42.02	-20	PASS
	3673.0000	-43.12	-20	PASS
	4132.1250	-43.30	-20	PASS
	4591.2500	-44.03	-20	PASS
	3154.1540	-39.66	-20	PASS

**Digital: 467.775 MHz, 12.5kHz Channel Spacing, Max Power
FCC Part 90**



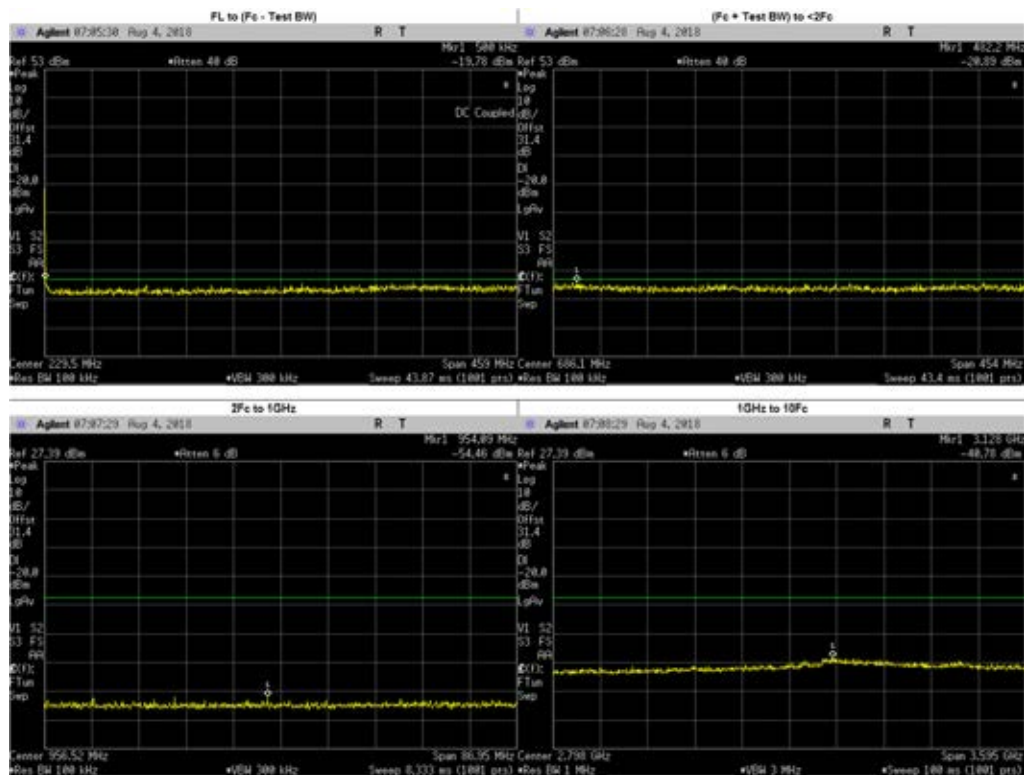
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	331.6148	-20.24	-20	PASS
(Fc + Test BW) to <2Fc	474.7726	-21.85	-20	PASS
2Fc to 1GHz	970.5532	-54.47	-20	PASS
	935.5500	-58.27	-20	PASS
1GHz to 10Fc	3309.0840	-41.29	-20	PASS
	1403.3250	-46.00	-20	PASS
	1871.1000	-45.98	-20	PASS
	2338.8750	-45.33	-20	PASS
	2806.6500	-43.62	-20	PASS
	3274.4250	-42.63	-20	PASS
	3742.2000	-42.91	-20	PASS
	4209.9750	-44.10	-20	PASS
	4677.7500	-44.78	-20	PASS

**Digital: 467.775 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 90**



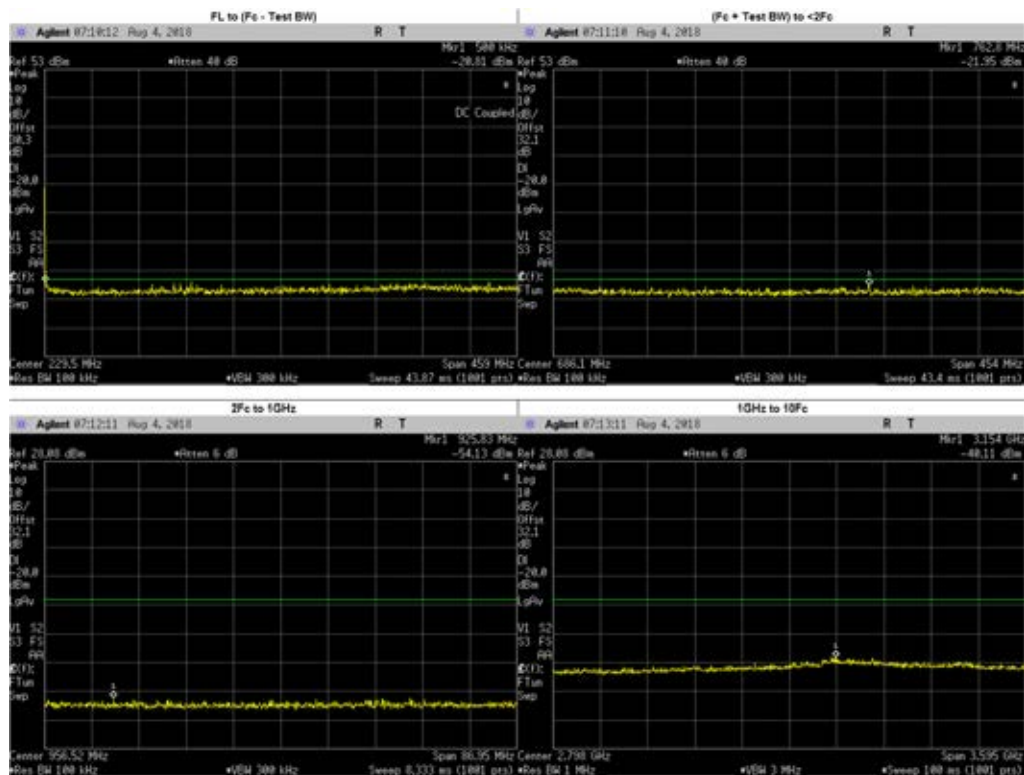
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	374.6441	-20.86	-20	PASS
(Fc + Test BW) to <2Fc	732.9693	-21.00	-20	PASS
2Fc to 1GHz	961.4552	-54.48	-20	PASS
	935.5500	-57.22	-20	PASS
1GHz to 10Fc	3084.4360	-40.27	-20	PASS
	1403.3250	-44.72	-20	PASS
	1871.1000	-45.19	-20	PASS
	2338.8750	-44.44	-20	PASS
	2806.6500	-43.09	-20	PASS
	3274.4250	-42.01	-20	PASS
	3742.2000	-42.83	-20	PASS
	4209.9750	-42.88	-20	PASS
	4677.7500	-44.00	-20	PASS

Digital: 459.025 MHz, 12.5kHz Channel Spacing, Max Power
FCC Part 22



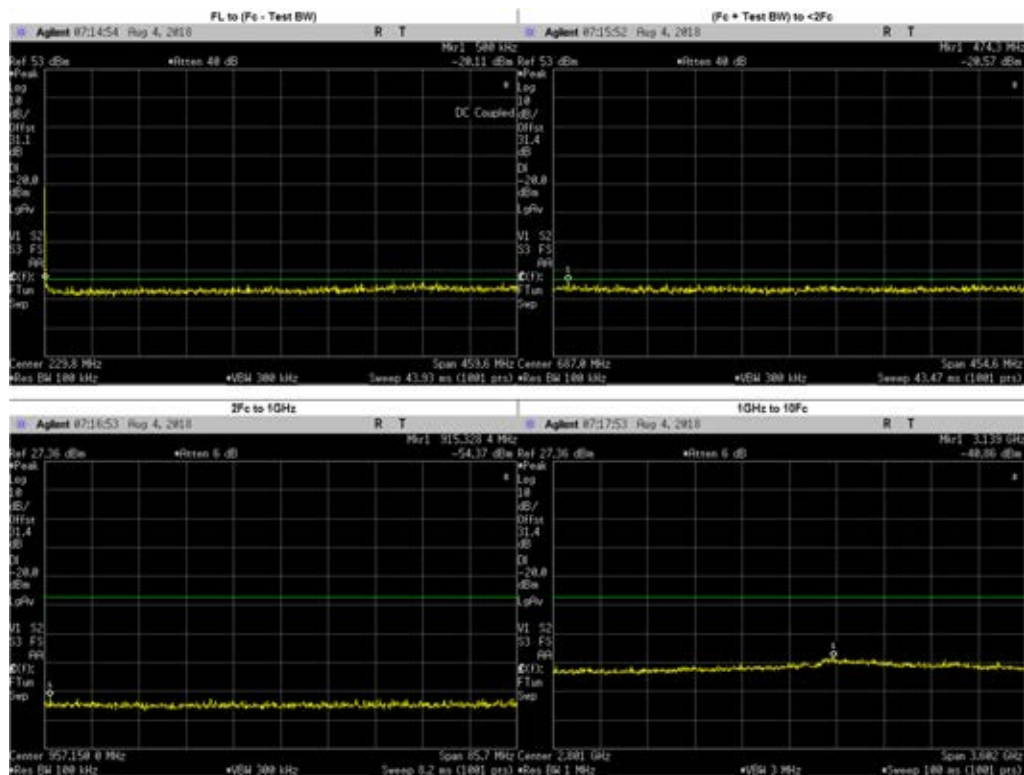
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	357.9972	-21.41	-20	PASS
(Fc + Test BW) to <2Fc	482.2342	-20.89	-20	PASS
2Fc to 1GHz	954.0904	-54.46	-20	PASS
	918.0500	-57.96	-20	PASS
1GHz to 10Fc	3128.3880	-40.78	-20	PASS
	1377.0750	-46.04	-20	PASS
	1836.1000	-45.97	-20	PASS
	2295.1250	-44.88	-20	PASS
	2754.1500	-44.58	-20	PASS
	3213.1750	-42.27	-20	PASS
	3672.2000	-43.14	-20	PASS
	4131.2250	-44.00	-20	PASS
	4590.2500	-44.70	-20	PASS

Digital: 459.025 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 22



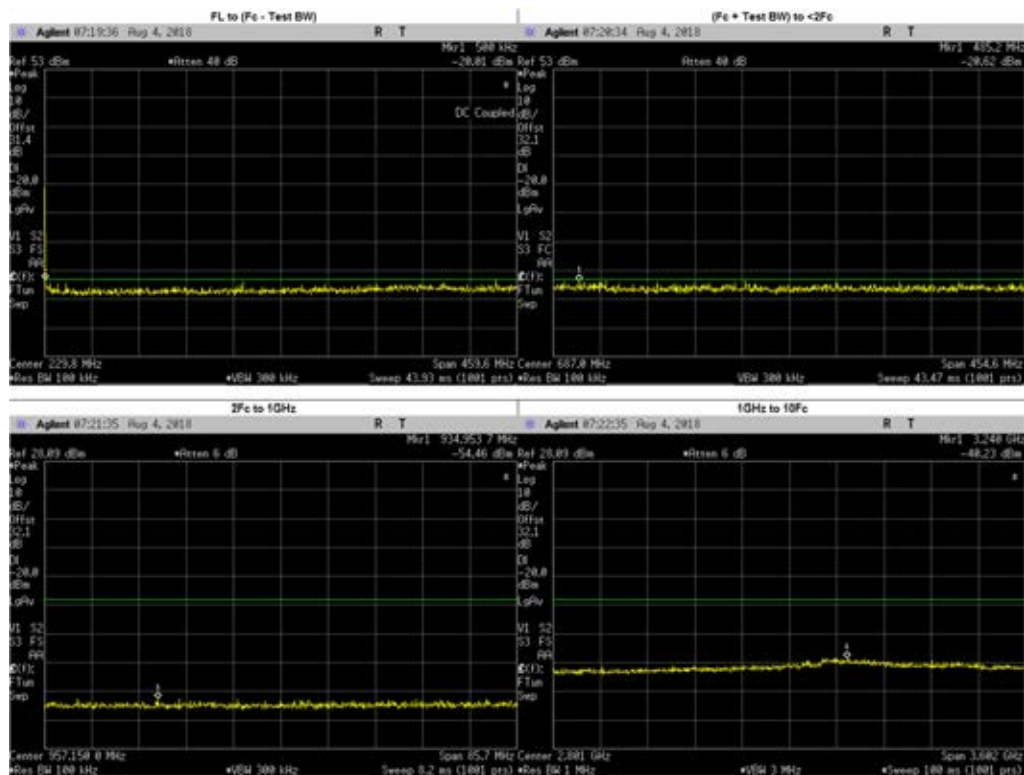
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	369.9301	-20.21	-20	PASS
(Fc + Test BW) to <2Fc	762.7865	-21.95	-20	PASS
2Fc to 1GHz	925.8316	-54.13	-20	PASS
	918.0500	-57.40	-20	PASS
1GHz to 10Fc	3153.5550	-40.11	-20	PASS
	1377.0750	-45.37	-20	PASS
	1836.1000	-44.98	-20	PASS
	2295.1250	-44.37	-20	PASS
	2754.1500	-43.79	-20	PASS
	3213.1750	-41.88	-20	PASS
	3672.2000	-42.57	-20	PASS
	4131.2250	-42.83	-20	PASS
	4590.2500	-44.18	-20	PASS

**Digital: 459.65 MHz, 12.5kHz Channel Spacing, Max Power
FCC Part 22**



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	381.9235	-20.60	-20	PASS
(Fc + Test BW) to <2Fc	474.2538	-20.57	-20	PASS
2Fc to 1GHz	915.3284	-54.37	-20	PASS
	919.3000	-57.53	-20	PASS
1GHz to 10Fc	3139.2910	-40.86	-20	PASS
	1378.9500	-45.01	-20	PASS
	1838.6000	-45.18	-20	PASS
	2298.2500	-45.00	-20	PASS
	2757.9000	-44.33	-20	PASS
	3217.5500	-42.03	-20	PASS
	3677.2000	-43.03	-20	PASS
	4136.8500	-43.20	-20	PASS
	4596.5000	-45.06	-20	PASS

**Digital: 459.65 MHz, 12.5kHz Channel Spacing, Low Power
FCC Part 22**



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	438.9119	-20.50	-20	PASS
(Fc + Test BW) to <2Fc	485.2	-20.62	-20	PASS
2Fc to 1GHz	934.9537	-54.46	-20	PASS
	919.3000	-57.49	-20	PASS
1GHz to 10Fc	3240.1330	-40.23	-20	PASS
	1378.9500	-45.21	-20	PASS
	1838.6000	-44.92	-20	PASS
	2298.2500	-44.59	-20	PASS
	2757.9000	-42.87	-20	PASS
	3217.5500	-41.90	-20	PASS
	3677.2000	-42.72	-20	PASS
	4136.8500	-43.10	-20	PASS
	4596.5000	-43.72	-20	PASS

6.10.4. Test Limit

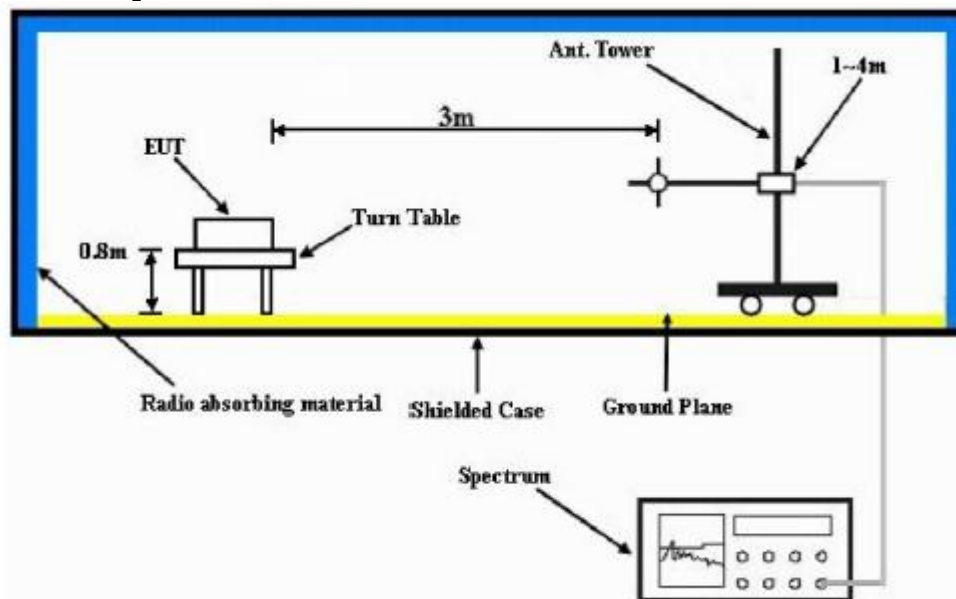
Table below summarized the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least

Channel Spacing	Part 22	Part 24D	Part 74	Part 80	Part 90 (UHF, VHF, 800, 900)	Part 90 (700)
12.5kHz	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz		Not Applicable		43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

Channel Spacing	RSS 134	RSS 182	RSS 119 (UHF, VHF, 800, 900)	RSS 119 (700)
12.5kHz	43 + log10(P) (-13 dBm)	Not Applicable	50 + log10(P) (-20 dBm)	43 + log10(P) (-13 dBm)
25kHz	Not Applicable	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)	43 + log10(P) (-13 dBm)

6.11. Radiated Spurious Emission

6.11.1. Test Setup

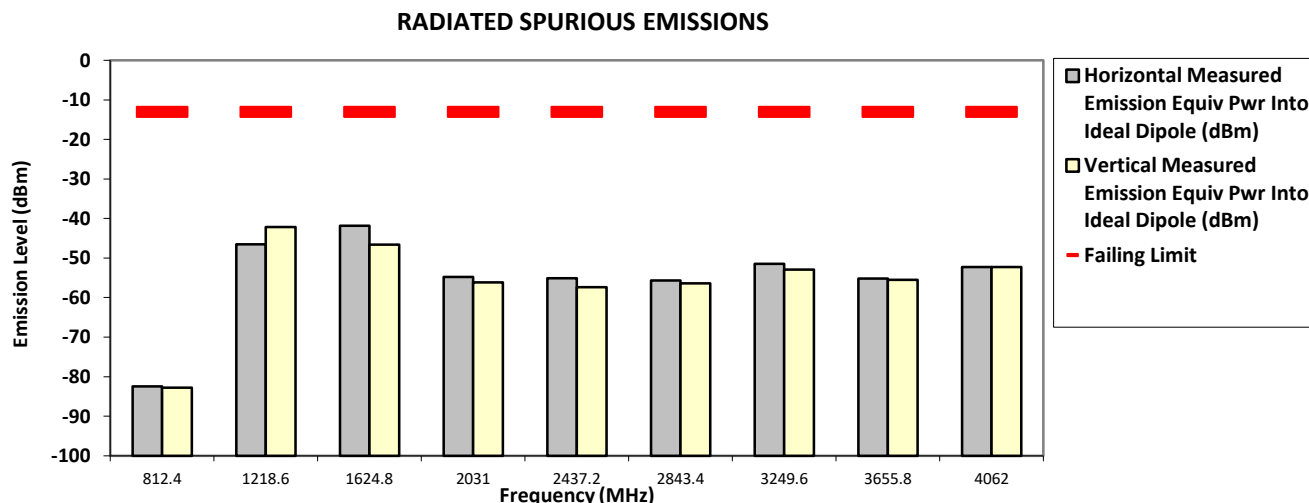


- 1) The Resolution Bandwidth for scanning Radiated Emission below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector mode is positive peak.
- 2) In the semi- anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height (for frequencies < 1GHz) or 1.5m (for frequencies > 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.

6.11.2. Test Result (Analog)

Model Number: AAM02QNH9JA1AN SAC Transmitter Radiated Emission: S/N: 776TUK4068 SR:12850-EMC-00001
Battery Part No: NA Accy Part No: 1175-PMMN4089A-2, HKN4192B
Test Mode: TX Analog
406.200000 MHz 25 kHz 30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
812.4000	-13.0000	-82.4468 **	-82.7541 **
1218.6000	-13.0000	-46.5200 *	-42.1800 *
1624.8000	-13.0000	-41.8300 *	-46.6400 *
2031.0000	-13.0000	-54.7807 **	-56.1494 **
2437.2000	-13.0000	-55.1281 **	-57.3897 **
2843.4000	-13.0000	-55.7051 **	-56.4038 **
3249.6000	-13.0000	-51.4980 **	-52.9213 **
3655.8000	-13.0000	-55.1542 **	-55.4770 **
4062.0000	-13.0000	-52.2548 **	-52.2344 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman Fri, Jun 29, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

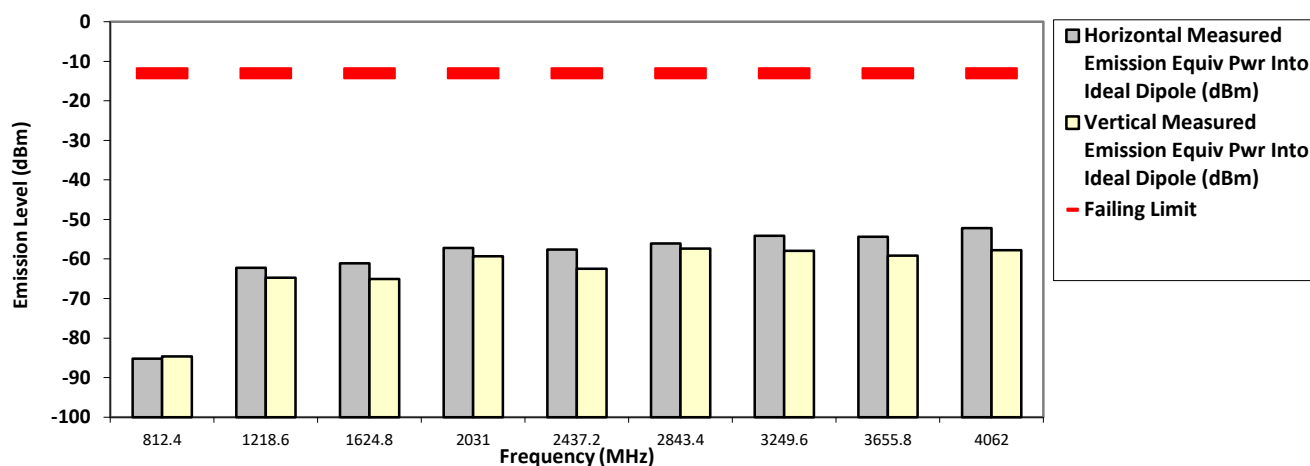
406.200000 MHz

25 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
812.4000	-13.0000	-85.2119 **	-84.6115 **
1218.6000	-13.0000	-62.2447 **	-64.7574 **
1624.8000	-13.0000	-61.1266 **	-65.0809 **
2031.0000	-13.0000	-57.2439 **	-59.3228 **
2437.2000	-13.0000	-57.5879 **	-62.4424 **
2843.4000	-13.0000	-56.0751 **	-57.4105 **
3249.6000	-13.0000	-54.1100 **	-57.9263 **
3655.8000	-13.0000	-54.3708 **	-59.1224 **
4062.0000	-13.0000	-52.1555 **	-57.7600 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

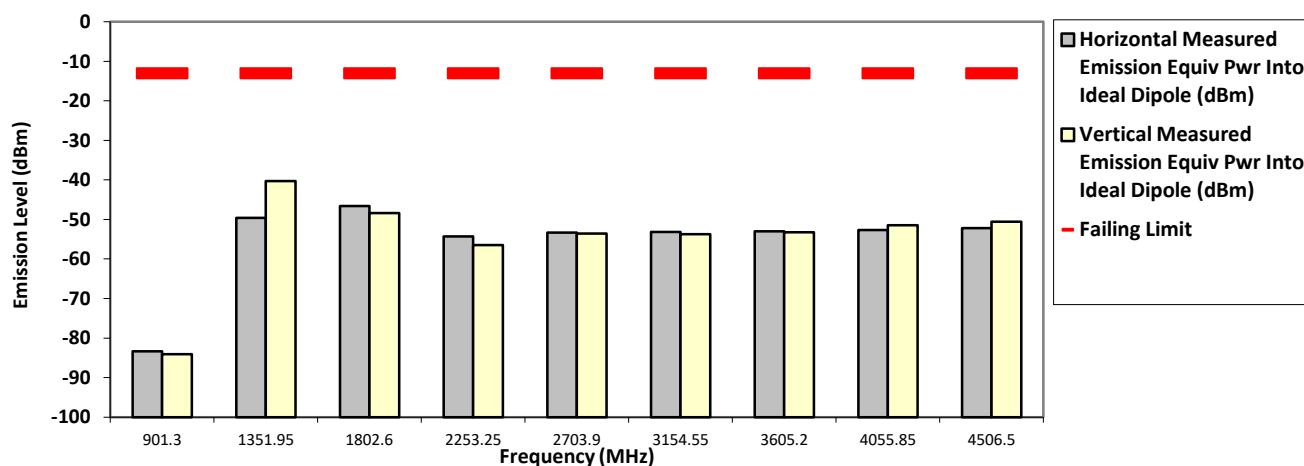
450.650000 MHz

25 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
901.3000	-13.0000	-83.3758 **	-84.0606 **
1351.9500	-13.0000	-49.5700 *	-40.2600 *
1802.6000	-13.0000	-46.5800 *	-48.4200 *
2253.2500	-13.0000	-54.2998 **	-56.5156 **
2703.9000	-13.0000	-53.3523 **	-53.5375 **
3154.5500	-13.0000	-53.1824 **	-53.7612 **
3605.2000	-13.0000	-53.0055 **	-53.2063 **
4055.8500	-13.0000	-52.6703 **	-51.4574 **
4506.5000	-13.0000	-52.1708 **	-50.5984 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Fri, Jun 29, 2018

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

Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
 Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

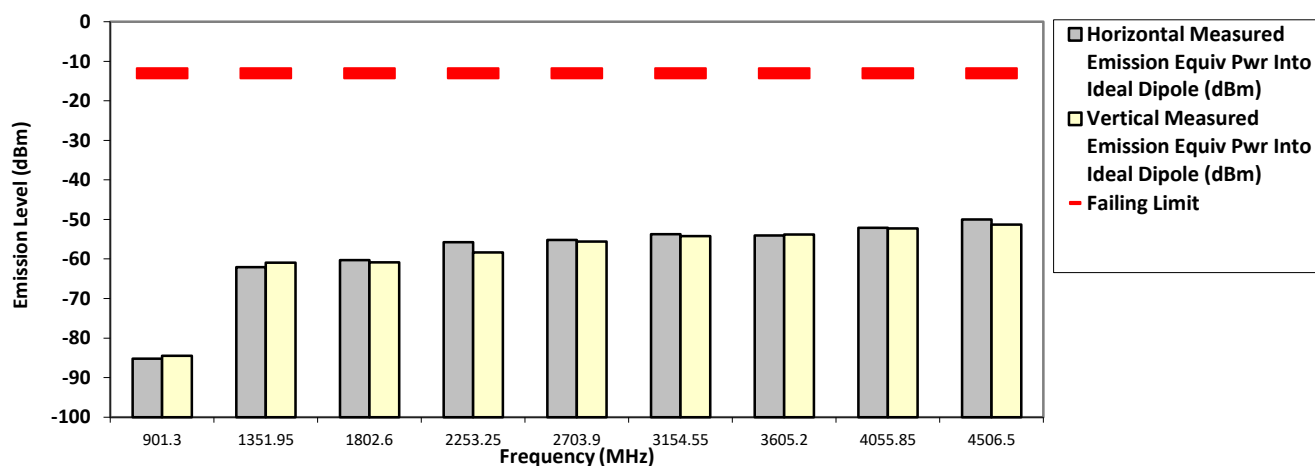
450.650000 MHz

25 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
901.3000	-13.0000	-85.2278 **	-84.4453 **
1351.9500	-13.0000	-62.0779 **	-60.9471 **
1802.6000	-13.0000	-60.2855 **	-60.8390 **
2253.2500	-13.0000	-55.7359 **	-58.3605 **
2703.9000	-13.0000	-55.1761 **	-55.5833 **
3154.5500	-13.0000	-53.7634 **	-54.2443 **
3605.2000	-13.0000	-54.0866 **	-53.7980 **
4055.8500	-13.0000	-52.0892 **	-52.2805 **
4506.5000	-13.0000	-49.9946 **	-51.3038 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
 Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

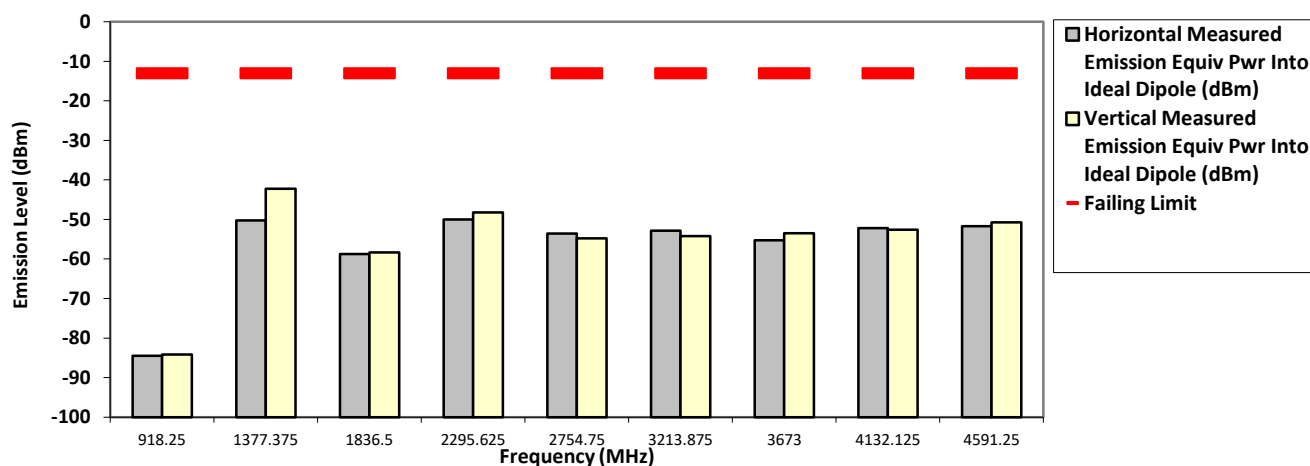
459.125000 MHz

25 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
918.2500	-13.0000	-84.4767 **	-84.1693 **
1377.3750	-13.0000	-50.2300 *	-42.2700 *
1836.5000	-13.0000	-58.7741 **	-58.3348 **
2295.6250	-13.0000	-49.9700 *	-48.2200 *
2754.7500	-13.0000	-53.5565 **	-54.7849 **
3213.8750	-13.0000	-52.8276 **	-54.1829 **
3673.0000	-13.0000	-55.2649 **	-53.5071 **
4132.1250	-13.0000	-52.1603 **	-52.5822 **
4591.2500	-13.0000	-51.6856 **	-50.7617 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Fri, Jun 29, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

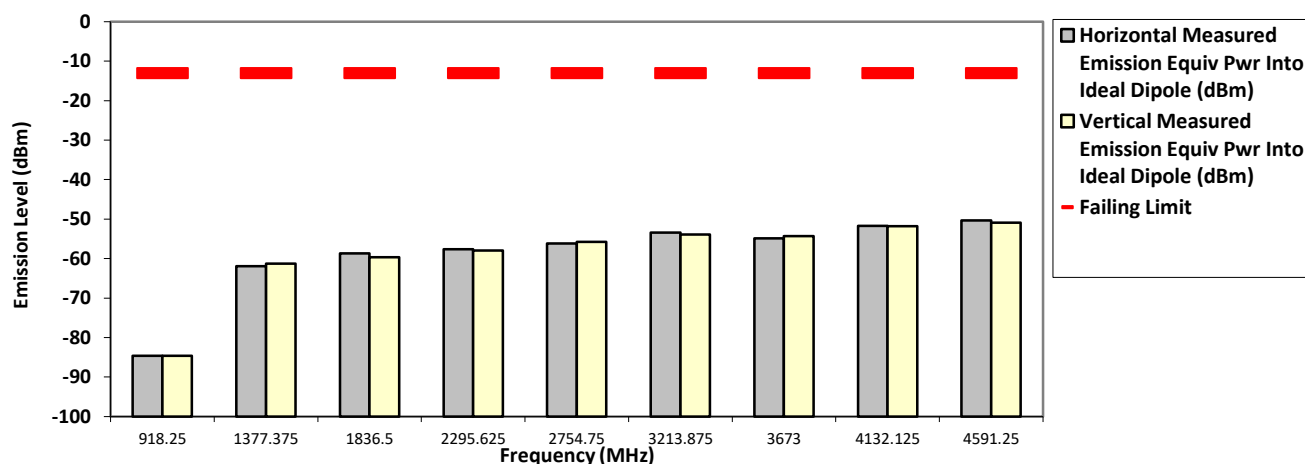
459.125000 MHz

25 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
918.2500	-13.0000	-84.6114 **	-84.5847 **
1377.3750	-13.0000	-61.9312 **	-61.2421 **
1836.5000	-13.0000	-58.6894 **	-59.6137 **
2295.6250	-13.0000	-57.6213 **	-57.9438 **
2754.7500	-13.0000	-56.1726 **	-55.7321 **
3213.8750	-13.0000	-53.3977 **	-53.8737 **
3673.0000	-13.0000	-54.8825 **	-54.2749 **
4132.1250	-13.0000	-51.7312 **	-51.8053 **
4591.2500	-13.0000	-50.3676 **	-50.9259 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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

Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

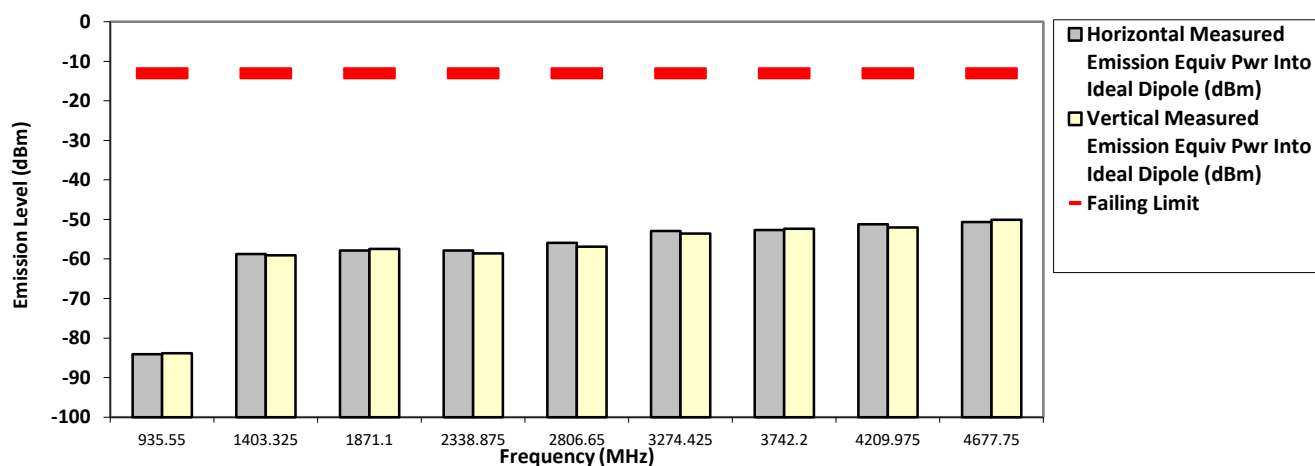
467.775000 MHz

25 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
935.5500	-13.0000	-84.0985 **	-83.8398 **
1403.3250	-13.0000	-58.7571 **	-59.1058 **
1871.1000	-13.0000	-57.8277 **	-57.4219 **
2338.8750	-13.0000	-57.8904 **	-58.5610 **
2806.6500	-13.0000	-55.9273 **	-56.8752 **
3274.4250	-13.0000	-52.9202 **	-53.5350 **
3742.2000	-13.0000	-52.6943 **	-52.3518 **
4209.9750	-13.0000	-51.1841 **	-52.0396 **
4677.7500	-13.0000	-50.6513 **	-50.0704 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Analog

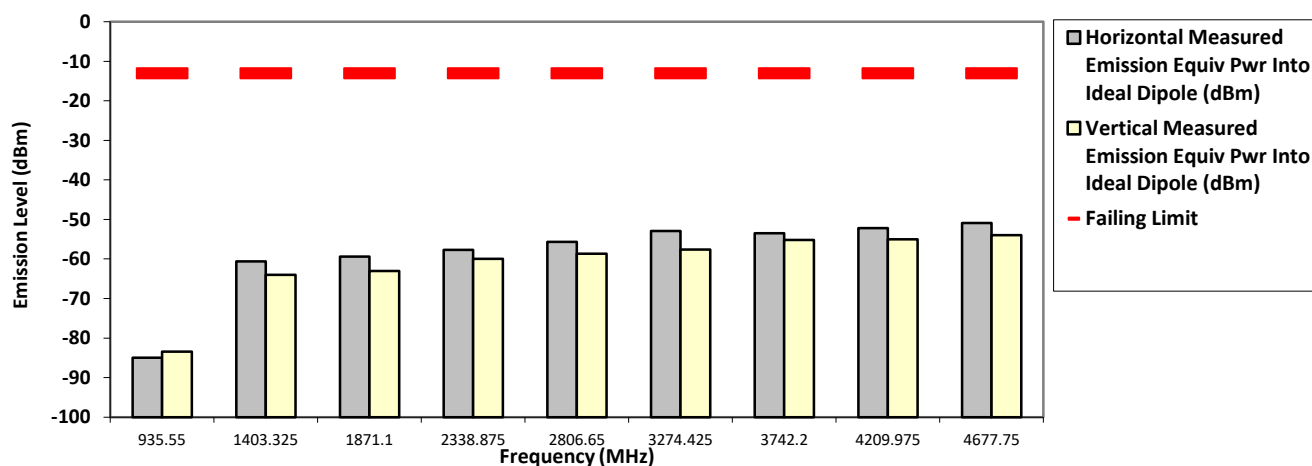
467.775000 MHz

25 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
935.5500	-13.0000	-84.9468 **	-83.4538 **
1403.3250	-13.0000	-60.6115 **	-64.0223 **
1871.1000	-13.0000	-59.4183 **	-63.0629 **
2338.8750	-13.0000	-57.6676 **	-59.9861 **
2806.6500	-13.0000	-55.6480 **	-58.6347 **
3274.4250	-13.0000	-52.9171 **	-57.6391 **
3742.2000	-13.0000	-53.4861 **	-55.1644 **
4209.9750	-13.0000	-52.1795 **	-55.0620 **
4677.7500	-13.0000	-50.8936 **	-53.9566 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

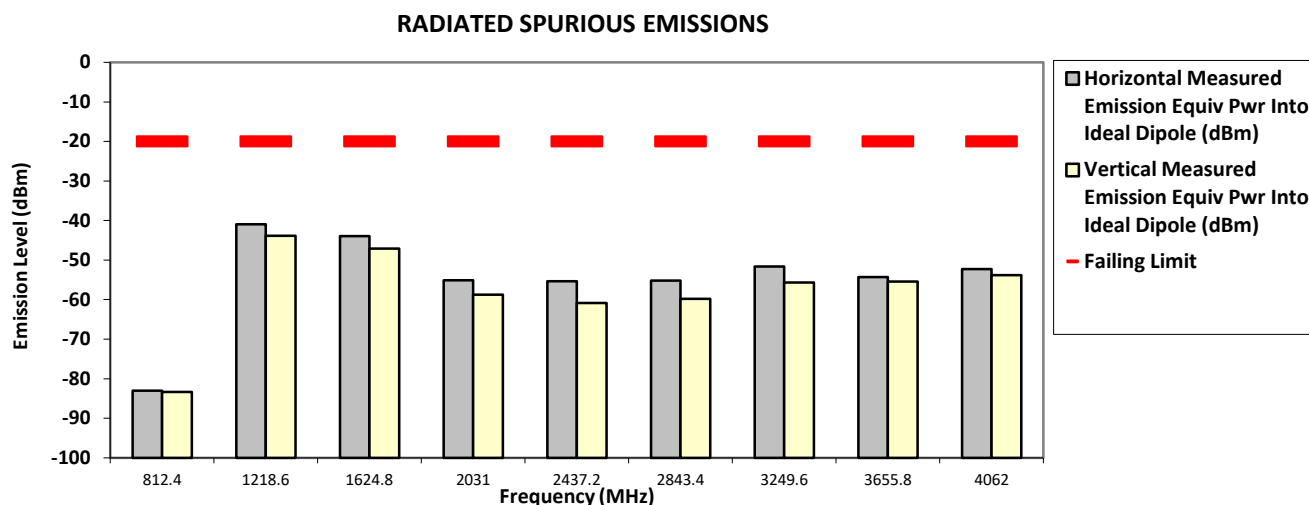
Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

6.11.3. Test Result (Digital)

Model Number: AAM02QNH9JA1AN SAC Transmitter Radiated Emission: S/N: 776TUK4068 SR:12850-EMC-00001
 Battery Part No: NA Accy Part No: 1175-PMMN4089A-2, HKN4192B
 Test Mode: TX Digital
 406.200000 MHz 12.5 kHz 30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
812.4000	-20.0000	-83.0604 **	-83.3316 **
1218.6000	-20.0000	-40.9300 *	-43.8600 *
1624.8000	-20.0000	-43.9000 *	-47.0800 *
2031.0000	-20.0000	-55.1300 **	-58.7208 **
2437.2000	-20.0000	-55.3328 **	-60.8333 **
2843.4000	-20.0000	-55.1990 **	-59.7871 **
3249.6000	-20.0000	-51.6187 **	-55.6377 **
3655.8000	-20.0000	-54.3302 **	-55.3910 **
4062.0000	-20.0000	-52.2421 **	-53.8087 **



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.
 Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman Fri, Jun 29, 2018

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
 Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

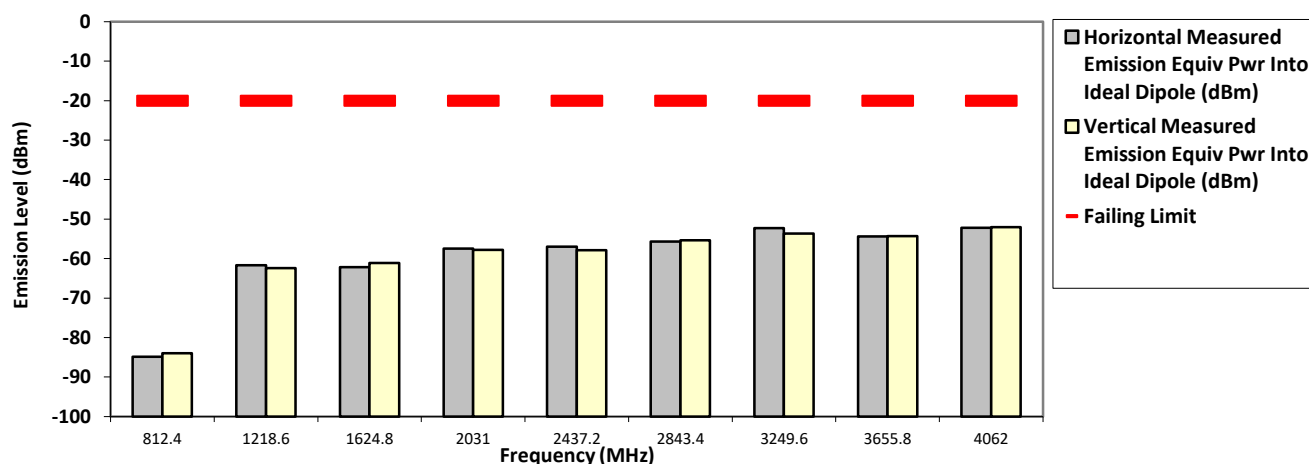
406.200000 MHz

12.5 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
812.4000	-20.0000	-84.8597 **	-83.9352 **
1218.6000	-20.0000	-61.6414 **	-62.4334 **
1624.8000	-20.0000	-62.1840 **	-61.1430 **
2031.0000	-20.0000	-57.4961 **	-57.8078 **
2437.2000	-20.0000	-56.9779 **	-57.8620 **
2843.4000	-20.0000	-55.6652 **	-55.3725 **
3249.6000	-20.0000	-52.2411 **	-53.6766 **
3655.8000	-20.0000	-54.4049 **	-54.3401 **
4062.0000	-20.0000	-52.1906 **	-52.0402 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

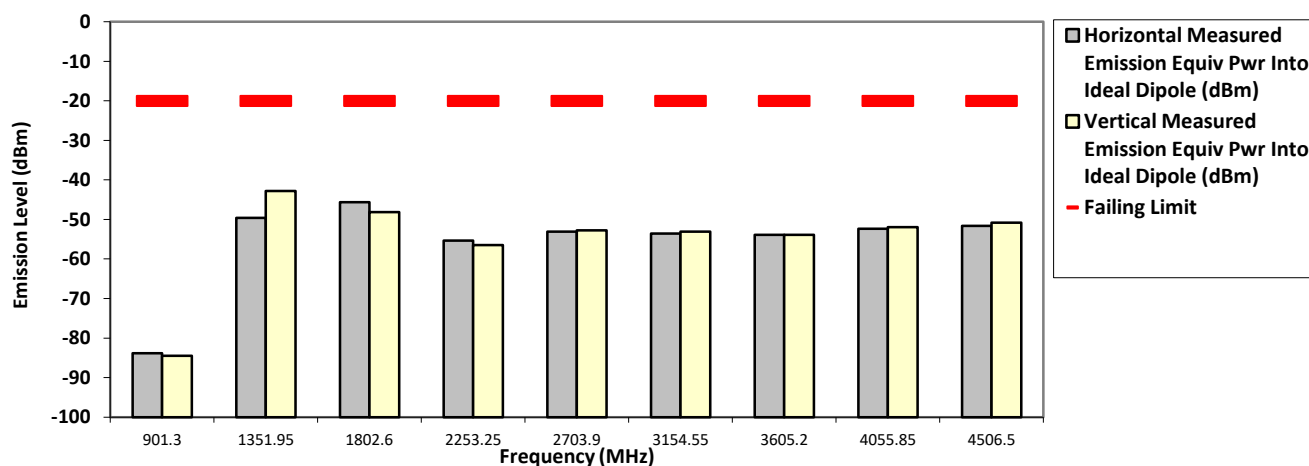
450.650000 MHz

12.5 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
901.3000	-20.0000	-83.8165 **	-84.4821 **
1351.9500	-20.0000	-49.6000 *	-42.8400 *
1802.6000	-20.0000	-45.6600 *	-48.1600 *
2253.2500	-20.0000	-55.3709 **	-56.4747 **
2703.9000	-20.0000	-53.0419 **	-52.7229 **
3154.5500	-20.0000	-53.5593 **	-53.0871 **
3605.2000	-20.0000	-53.9212 **	-53.9139 **
4055.8500	-20.0000	-52.3134 **	-51.9128 **
4506.5000	-20.0000	-51.5915 **	-50.7873 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Fri, Jun 29, 2018

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

Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

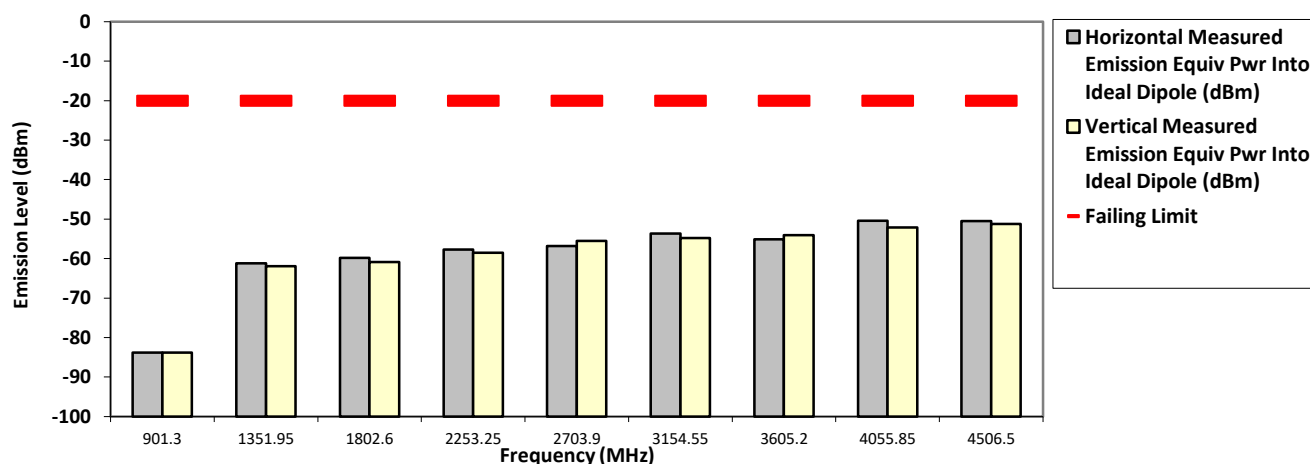
450.650000 MHz

12.5 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
901.3000	-20.0000	-83.7711 **	-83.7873 **
1351.9500	-20.0000	-61.2214 **	-61.9440 **
1802.6000	-20.0000	-59.7888 **	-60.8303 **
2253.2500	-20.0000	-57.7139 **	-58.5089 **
2703.9000	-20.0000	-56.7876 **	-55.4928 **
3154.5500	-20.0000	-53.6245 **	-54.8233 **
3605.2000	-20.0000	-55.1334 **	-54.0825 **
4055.8500	-20.0000	-50.4048 **	-52.1331 **
4506.5000	-20.0000	-50.4821 **	-51.1915 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

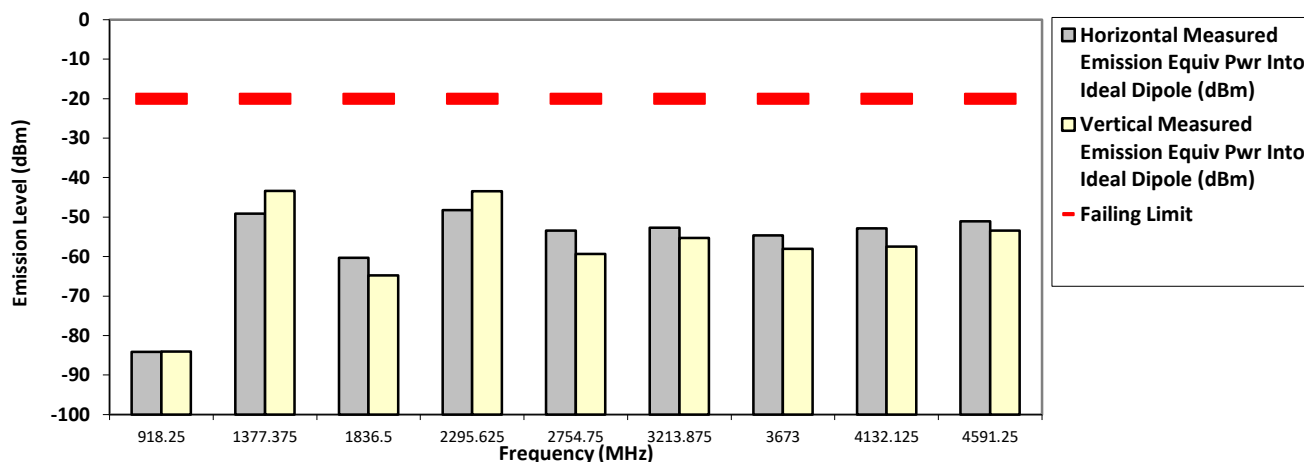
459.125000 MHz

12.5 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
918.2500	-20.0000	-84.1659 **	-84.0346 **
1377.3750	-20.0000	-49.1000 *	-43.3900 *
1836.5000	-20.0000	-60.2750 **	-64.7663 **
2295.6250	-20.0000	-48.1900 *	-43.4500 *
2754.7500	-20.0000	-53.4334 **	-59.3659 **
3213.8750	-20.0000	-52.6809 **	-55.2865 **
3673.0000	-20.0000	-54.6547 **	-58.0548 **
4132.1250	-20.0000	-52.8782 **	-57.4686 **
4591.2500	-20.0000	-51.0786 **	-53.4080 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Fri, Jun 29, 2018

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

Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
----------------	------------------	----------------

Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

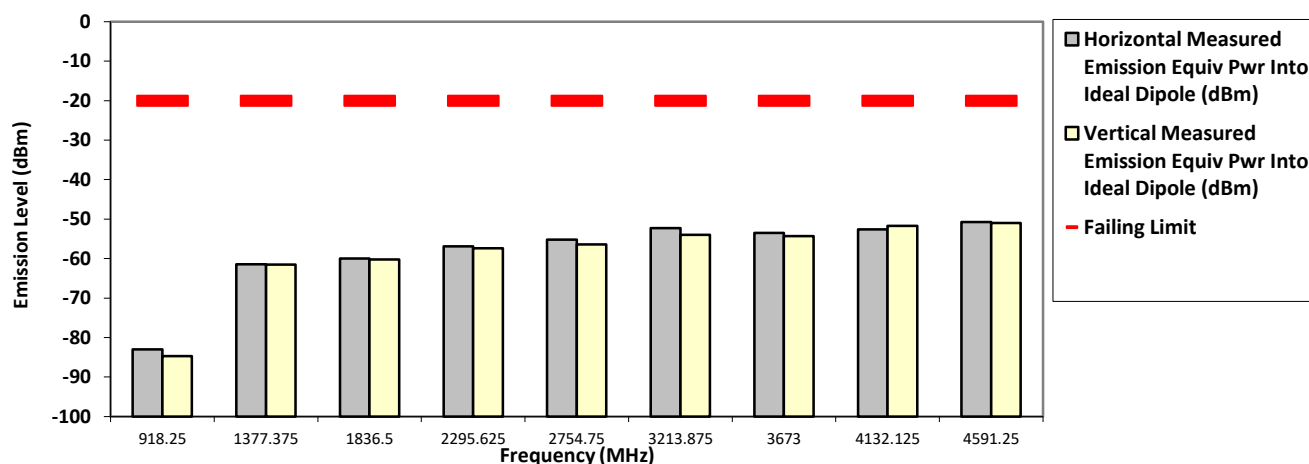
459.125000 MHz

12.5 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
918.2500	-20.0000	-82.9830 **	-84.6958 **
1377.3750	-20.0000	-61.4580 **	-61.5504 **
1836.5000	-20.0000	-59.9800 **	-60.1816 **
2295.6250	-20.0000	-56.9278 **	-57.4249 **
2754.7500	-20.0000	-55.2323 **	-56.4001 **
3213.8750	-20.0000	-52.2576 **	-54.0085 **
3673.0000	-20.0000	-53.4739 **	-54.3264 **
4132.1250	-20.0000	-52.6433 **	-51.6953 **
4591.2500	-20.0000	-50.7296 **	-50.9823 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
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Model Number: AAM02QNH9JA1AN
Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

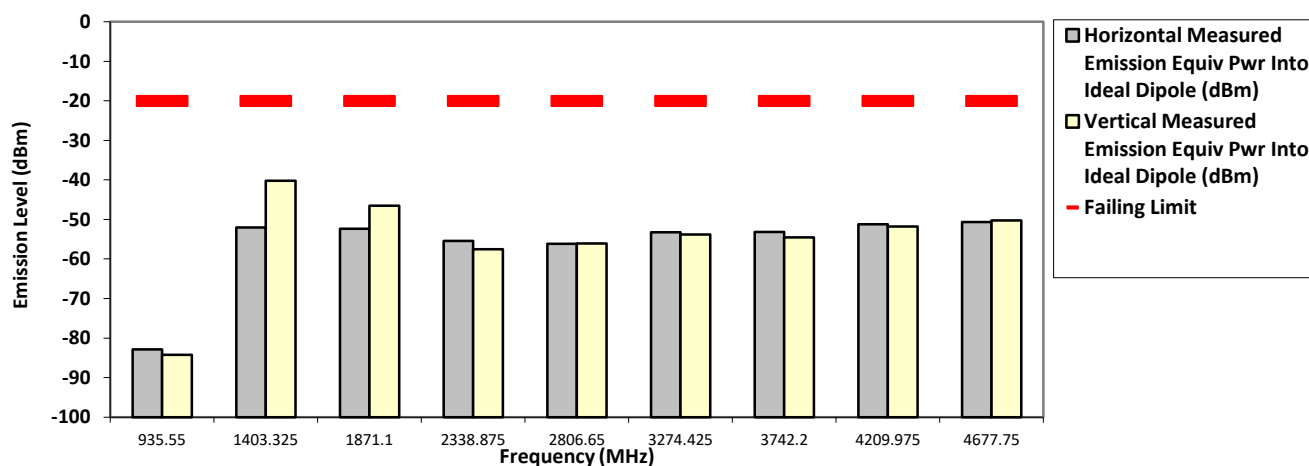
467.775000 MHz

12.5 kHz

30.000 Watt(s) /Max Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
935.5500	-20.0000	-82.8537 **	-84.2038 **
1403.3250	-20.0000	-52.0200 *	-40.2200 *
1871.1000	-20.0000	-52.3400 *	-46.5200 *
2338.8750	-20.0000	-55.3904 **	-57.5631 **
2806.6500	-20.0000	-56.1251 **	-56.1081 **
3274.4250	-20.0000	-53.2221 **	-53.7711 **
3742.2000	-20.0000	-53.1781 **	-54.5050 **
4209.9750	-20.0000	-51.2027 **	-51.7991 **
4677.7500	-20.0000	-50.6181 **	-50.2201 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Fri, Jun 29, 2018

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
Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
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Model Number: AAM02QNH9JA1AN
 Battery Part No: NA

SAC Transmitter Radiated Emission:

S/N: 776TUK4068

SR:12850-EMC-00001

Accy Part No: 1175-PMMN4089A-2, HKN4192B

Test Mode: TX Digital

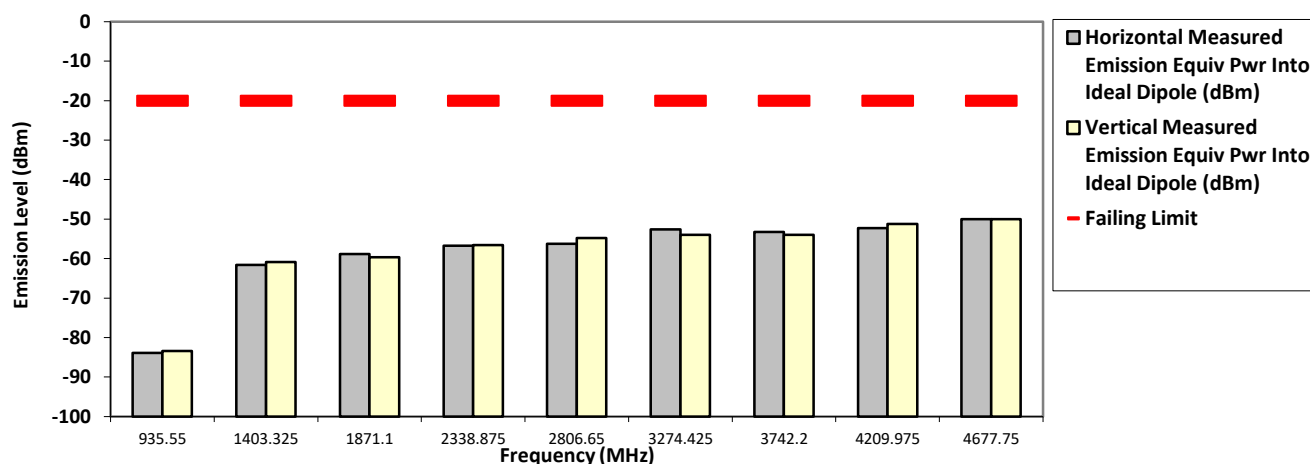
467.775000 MHz

12.5 kHz

1.000 Watt(s) /Low Power

Frequency (MHz)	Limit	Horizontal Measured Emission Equiv Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into ideal Dipole (dBm)
935.5500	-20.0000	-83.8966 **	-83.4331 **
1403.3250	-20.0000	-61.5698 **	-60.8443 **
1871.1000	-20.0000	-58.8447 **	-59.6692 **
2338.8750	-20.0000	-56.7272 **	-56.5493 **
2806.6500	-20.0000	-56.2351 **	-54.7584 **
3274.4250	-20.0000	-52.5942 **	-53.9574 **
3742.2000	-20.0000	-53.2869 **	-53.9580 **
4209.9750	-20.0000	-52.2988 **	-51.1968 **
4677.7500	-20.0000	-50.0488 **	-50.0453 **

RADIATED SPURIOUS EMISSIONS



The data presented here was taken using the substitution method as found in the ANSI C63.26-2015 document.

Motorola Penang EMC Lab - Test Performed by: Nazrin&Qawiman

Thu, Jun 28, 2018

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
 Temp(Deg): 23.6 Hum(%RH): 69.3

System MU: 5.01 dB

Remarks:

Passed Results	Marginal Results	Failed Results
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6.11.4. Test Limit

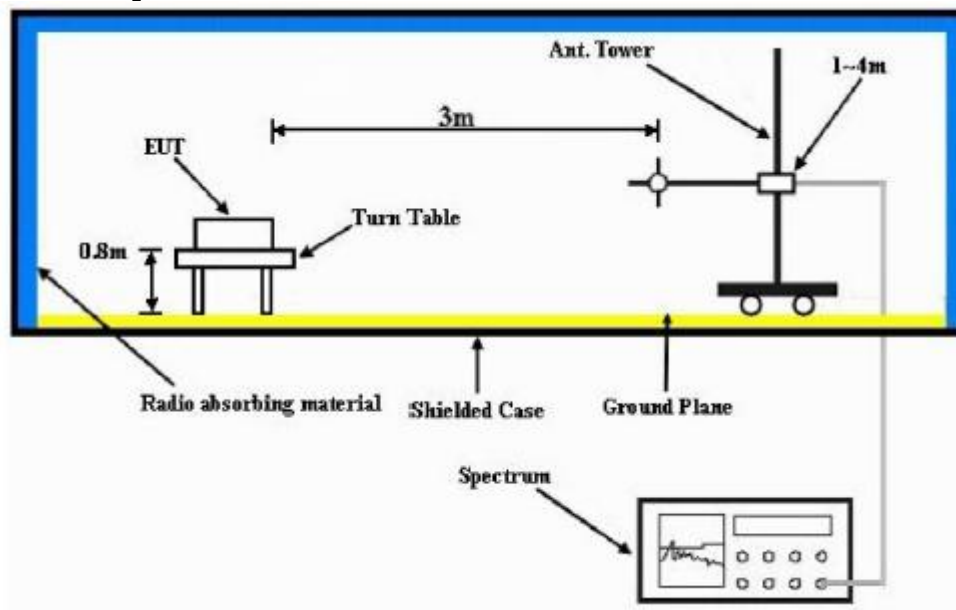
Table below summarized the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least

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)

6.12. Effective Radiated Power (ERP)

6.12.1. Test Setup



- 1) The Resolution Bandwidth for Equivalent Radiated Power (ERP) below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for EIRP above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector Mode is RMS.
- 2) In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval 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 for each degree interval. The "Read Value" is the spectrum reading of 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.

6.12.2. Test Result

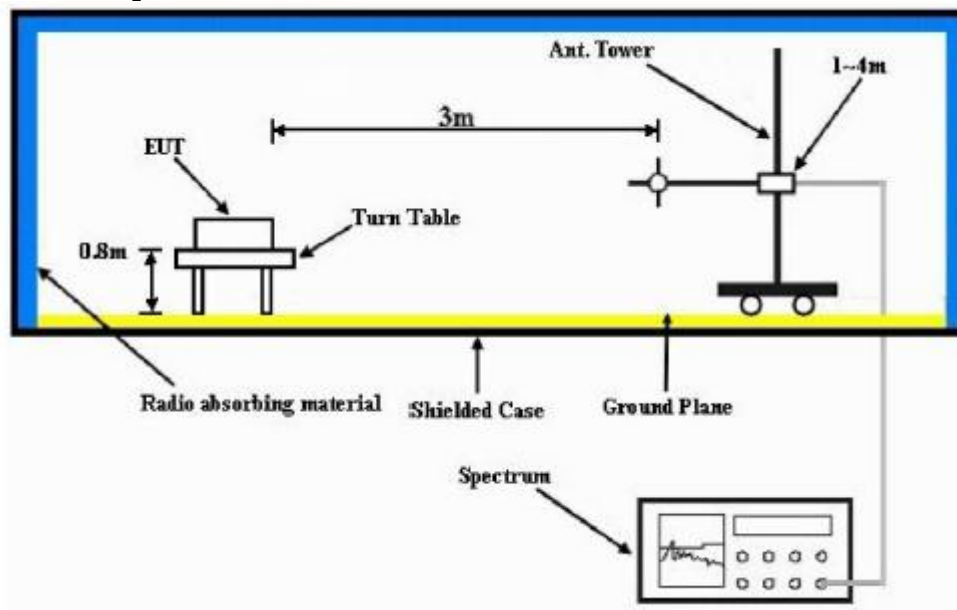
NA → Not Applicable

6.12.3. Test Limit

The maximum output power of the transmitter for mobile stations is 100 watts (20 dB). Power is given in terms of effective radiated power (ERP).

6.13. GNSS (EIRP for 1559 - 1610MHz)

6.13.1. Test Setup



- 4) The Resolution Bandwidth for Equivalent Isotropically Radiated Power (EIRP) below 1 GHz is 100 kHz with Video Bandwidth = 300 kHz and Resolution Bandwidth for EIRP above 1 GHz is 1 MHz with Video Bandwidth = 3 MHz. Detector Mode is RMS.
- 5) In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval 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 for each degree interval. The “Read Value” is the spectrum reading of maximum power value.
- 6) 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.
- 7) $EIRP = \text{“Read Value”} + \text{Measured substitution value} + 2.15$.

6.13.1. Test Result

NA → Not Applicable

6.13.2. Test Limit

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

~ End of Report ~