MOTOROLA SOLUTIONS

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 S.W.D, 11900 Bayan Lepas,
Penang, Malaysia.

FCC / ISED TEST REPORT
Report Revision : Rev.B

Date/s Tested	:	27-MAR-2020 - 8-APR-2020
Report Issue Date	:	16-APR-2020
Manufacturer	:	Motorola Solutions Malaysia SDN BHD
Manufacturer Address	:	Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia
Requestor	:	TANG, GARY
Product Type	:	Mobile
Product Version (PMN)	:	APX6500
Model Number (HVIN)	:	M25KSS9PW1BN
Frequency Band	:	136-174MHz
Firmware Version (FVIN)	:	D21.15.25
Max RF Output Power	:	60 Watts
Applicant Name	:	Motorola Solutions Inc
Applicant Address	:	8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322
ISED Registrations	:	MY0001
FCC Registrations	:	461337

The equipment was tested accordance to the requirement listed below:

(LMR)
FCC 47 CFR Part 2/ 22 / 24 / 74 / 80 / 90 **PASS**
ISED RSS- Gen Issue 5 / 119 Issue 12/ 182 Issue 5

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

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Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	16-APR-2020	Gan Boon Teong
Rev. B	Removed FXE/D emission designators	5-MAY-2020	Vincent Foong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, C4FM , Phase II

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
Audio Accy (PTT)	MOTOROLA	HMN1089C
Antenna	MOTOROLA	RAD4010ARB
Antenna	MOTOROLA	AN000163A01
Audio Accy (Receive Only)	MOTOROLA	HSN6003C
Cable	MOTOROLA	HKN4192B
Cable	MOTOROLA	HKN6163C

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

No modifications were done to the UUT to facilitate the tests in this report.

Deviation from standard
Not applicable as no deviation from standard test method

2.0 Summary of Test Results

FCC General Rules Part (47CFR)	ISED General Rules Part	Test Item	Result	Remarks	Serial number tested
2.1046, 22.565, 74.461,74.534, 80.215, 22, 74, 80, 90	RSS-119, RSS-182	RF Power Output	Pass		471TWD5456
2.1055, 90.213, 22.355	RSS-119, RSS-182	Frequency Stability	Pass		471TWD5456
2.1047, 74.463, 80.213, 22 , 80 90	RSS-119, RSS-182	Audio Frequency Response	Pass		471TWD5456
2.1047, 74.463, 80.213, 22 , 80 90	RSS-119, RSS-182	Audio Low Pass Filter Response	Pass		471TWD5456
2.1047, 74.463, 80.213, 22 , 80 90	RSS-119, RSS-182	Modulation limiting	Pass		471TWD5456
2.1049, 90.210, 22.359, 80.211(f), 80.211(c), 74.462(c), 22.359(b)	RSS-119, RSS-182	Occupied Bandwidth	Pass	20K0F1E-11.5155kHz 16K0F3E-15.0178kHz 11K0F3E-9.9715kHz 8K10F1D/ 8K10F1E/ 8K10F1W-7.9085kHz	471TWD5456
2.1051, 22.359 (a), (b)	RSS-119	Band Edge Conducted Spurious Emission	Pass		471TWD5456
90.214	RSS-119	Transient Frequency Behavior	Pass		471TWD5456
-	-	Adjacent Channel Power	NA		
Low end of the band, 22, 80, 74D, 74H, 90	RSS-119, RSS-182	Conducted Spurious Emissions	Pass	No spur detected (noise floor)	471TWD5456
Low end of the band, 22, 80, 74D, 74H, 90	RSS-119, RSS-182	Radiated Spurious Emission	Pass	Highest Spur level--44.96dBm	471TWD5475 471TWD5483
-	-	GNSS (EIRP for 1559 – 1610MHz)	NA		
-	-	Effective Radiated Power (ERP)	NA		

NA → **Not Applicable**

3.0 Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±dB)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	4.03
	200MHz ~ 1000MHz	4.03
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.03
	18GHz ~ 25GHz	4.03

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	3729A17612	15-Nov-17	15-Nov-20
SIGNAL GENERATOR	2042	203002/956	20-Aug-19	20-Aug-20
MODULATION ANALYZER	8901B	3538A5696	4-Apr-19	4-Jul-20
DSA Dynamic Signal Analyzer	36570A	MY42506790	4-Apr-19	4-Jul-20
POWER SENSOR	E4412A	MY41502652	31-Jul-19	31-Jul-20
POWER METER	E4416A	GB41293747	19-Nov-18	19-Nov-20
POWER SUPPLY	6032A	MY41002067	22-Feb-20	22-Feb-21
CHAMBER	SH-641	92009188	29-Mar-19	29-Jun-20
N to N RF Cable # 1	M17/128-RG400	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to BNC RF Cable # 7	RG 58	NA	NA	NA
N to SMA RF Cable # 1	RG 58	NA	NA	NA
N to SMA RF Cable # 2	RG 58	NA	NA	NA
N to SMA RF Cable # 3	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-34-LIM	NA	NA	NA

FCC Transient ATE #1: (SW version: FCC Transient ATE_R1.1.2)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
POWER SUPPLY	6031A	2430A00146	5-Apr-19	5-Jul-20
POWER SENSOR	E4412A	MY41498918	31-Jul-19	31-Jul-20
POWER METER	E4416A	GB41293866	26-Feb-19	26-Feb-21
ATTENUATORS/SWITCH DRIVER	11713A	2508A10141	CNR	CNR
STEP ATTENUATOR/11dB	8494G	MY52300223	2-Aug-19	2-Aug-20
STEP ATTENUATOR/110dB	8496G	MY52000176	9-Aug-19	9-Aug-20
OSCILLOSCOPE	MSO8104A	MY45002372	17-Jun-19	17-Jun-20
AUDIO ANALYZER	8903B	3011A08952	5-Jul-19	5-Jul-20
AUDIO ANALYZER	8903B	3729A17409	4-Jul-19	4-Jul-20
MODULATION ANALYZER	8901B	3226A04052	3-Apr-19	3-Jul-20
SIGNAL GENERATOR	8657B	3427U06025	5-Apr-19	5-Jul-20
SPECTRUM ANAYLYZER	E4440A	MY48250517	1-Aug-19	1-Aug-20
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	M17/128-RG400	NA	NA	NA
N to N RF Cable # 3	M17/128-RG400	NA	NA	NA
N to N RF Cable # 4	M17/128-RG400	NA	NA	NA
N to N RF Cable # 5	M17/128-RG400	NA	NA	NA
N to N RF Cable # 6	M17/128-RG400	NA	NA	NA
N to N RF Cable # 7	M17/128-RG400	NA	NA	NA
N to N RF Cable # 8	M17/128-RG400	NA	NA	NA
N to N RF Cable # 9	M17/128-RG400	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 10dB	49-10-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	NA
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR

CNR→Calibration Not Required

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

EMC Chamber 1

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	2950	8-Jul-19	8-Jul-21
DATA LOGGER	SDL500	A.016776	5-Apr-19	5-Apr-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	002	12-Jun-19	12-Jun-22
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-22
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			

5.0 Test Condition

5.1. Transmitter Test Conditions

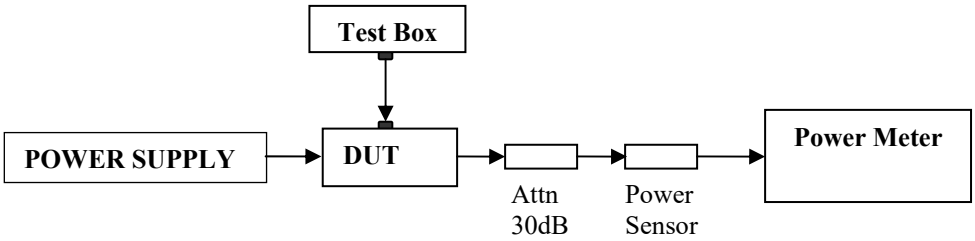
Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By	Environmental conditions
RF Output Power	Low & Max	Analog	136.0125,138.0125, 158.55, 161.7, 173.3875	Gan	25.4°C, 42.8%RH
Frequency Stability	Max	Analog	158.55	Gan	25.1°C, 54.3%RH, 60.3°C, 50%RH, -30.1°C, 50%RH
Audio Frequency Response (12.5kHz / 25kHz)	Max	Analog	158.55	Gan	25.4°C, 42.8%RH
Audio Low Pass Filter Response (12.5kHz / 25kHz)	Max	Analog	158.55	Gan	25.4°C, 42.8%RH
Modulation limiting (12.5kHz / 25kHz)	Max	Analog	158.55	Gan	25.4°C, 42.8%RH
Occupied Bandwidth (12.5kHz / 20kHz / 25kHz)	Max	Analog, C4FM, Phase II	138.0125, 158.55, 161.7, 173.3875	Gan	25.4°C, 42.8%RH
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	Max	Analog, C4FM, Phase II	157.77,158.67	Gan	25.4°C, 42.8%RH
Transient Frequency Behavior *(UHF & VHF Band)* (12.5kHz / 25kHz)	Max	Analog, C4FM, Phase II	158.55	Gan	25.4°C, 42.8%RH
Adjacent Channel Power *(700MHz Band)* (12.5kHz / 25kHz)	Max	Analog, C4FM, Phase II	NA	NA	NA
Conducted Spurious Emissions- (12.5kHz / 25kHz)	Low / Max	Analog, C4FM, Phase II	136.0125,138.0125, 158.55, 161.7, 173.3875	Gan	25.4°C, 42.8%RH
Radiated Spurious Emission (12.5kHz / 25kHz)	Low / Max	Analog, C4FM, Phase II	136.0125,138.0125, 158.55, 161.7, 173.3875	Qawiman	23.1°C,69.58%RH
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	Max	Analog	NA	NA	NA
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	Max	Analog	NA	NA	NA

NA → Not Applicable

6.0 Transmitter Test Parameters

6.1. RF Output Power

6.1.1. Test Setup



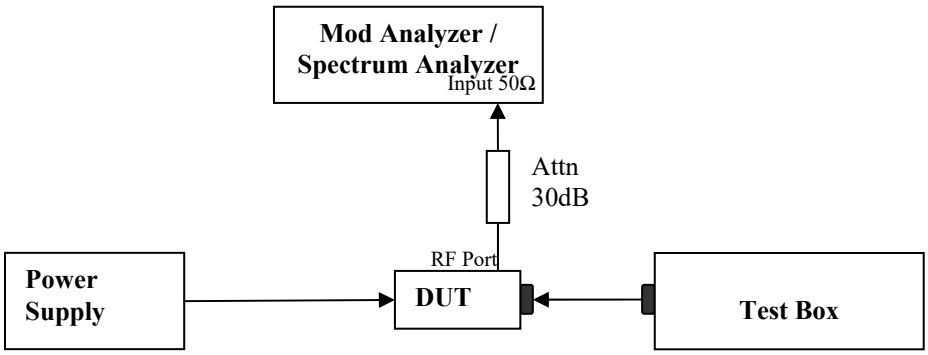
1) The DUT transmitter connected to Power Meter using the 30 dB attenuator and power sensor with above setup.
2) Path loss for the measurement included.
3) All the measurement was done at low, mid, high frequency for each band.
4) Record the power into the test report.

6.1.2. Test Result

Temperature	25˚C				
Voltage (V)	13.6V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	Remarks
136.0125	0.97	1.95	59.00	9.13	
138.0125	0.95	1.92	57.60	9.24	Not For FCC Review
158.55	0.96	1.80	58.30	8.61	
158.55	0.95	1.74	47.50	7.65	Part 80(50W Mobile)
161.7	0.97	1.89	58.60	8.97	
173.3875	0.96	1.95	58.20	9.27	

6.2. Frequency Stability

6.2.1. Test Setup



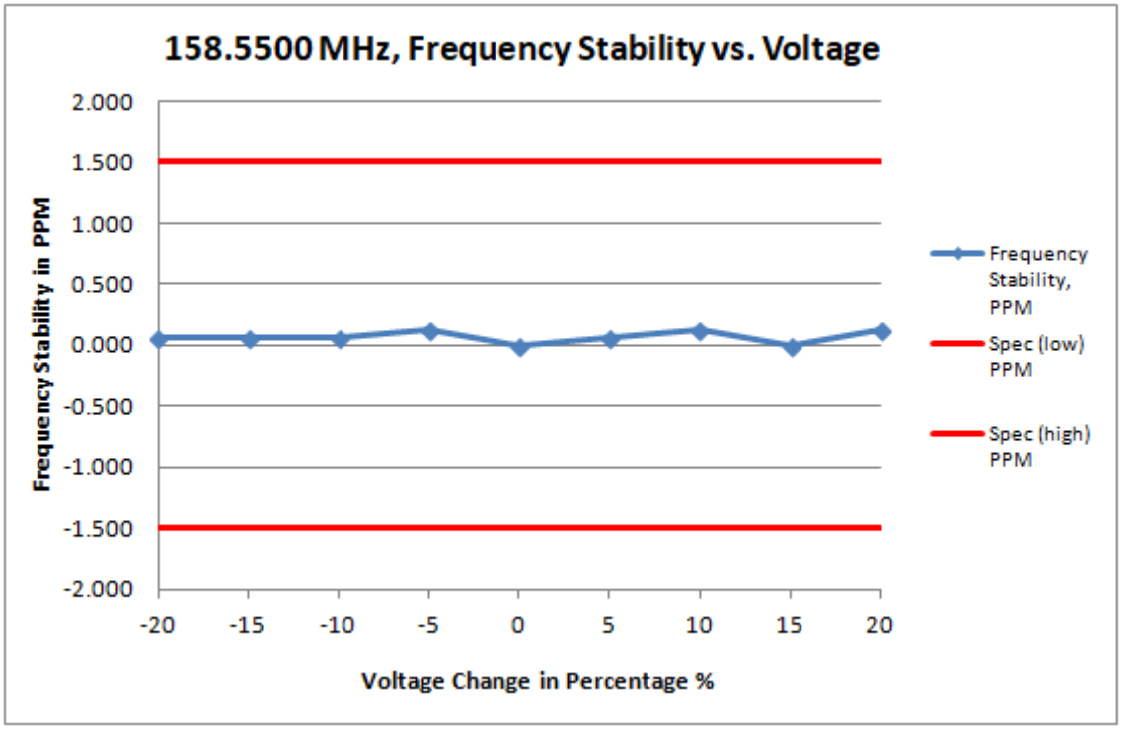
1) The DUT transmitter output port was connected to Modulation / Spectrum Analyzer.
2) Path loss for the measurement included.
3) Transmit the DUT and record the freq in MCF_{MHz}.
4) Test in 2 conditions:
   - Temperature: The frequency of the transmitter was measured from -30°C to 50°C.
   - Supply 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 ± x % as specified by the manufacturer

5) Calculate the ppm frequency error by the following:

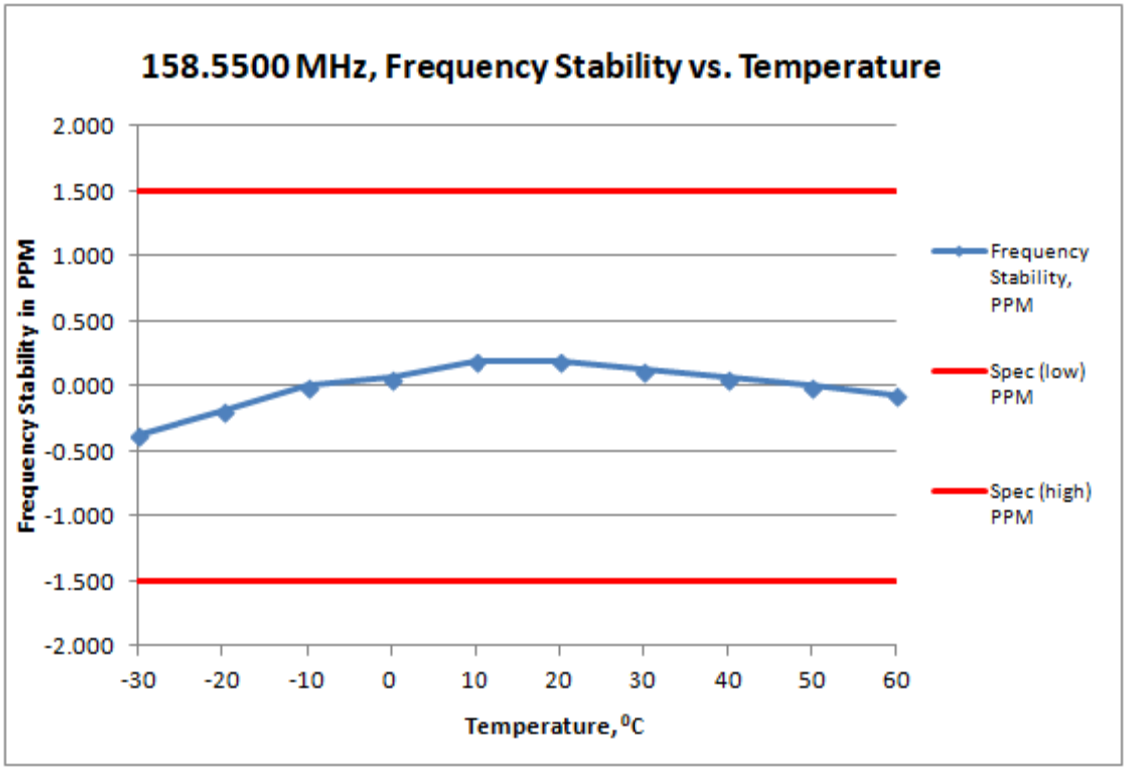
$$ppm\ error = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1\right) * 10^6$$

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	158.5500 MHz / 12.5 kHz				
Temperature, ^{0}C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	10.880	158.550010	0.063	-1.500	1.500
-15	11.560	158.550010	0.063	-1.500	1.500
-10	12.240	158.550010	0.063	-1.500	1.500
-5	12.920	158.550020	0.126	-1.500	1.500
0	13.600	158.550000	0.000	-1.500	1.500
5	14.280	158.550010	0.063	-1.500	1.500
10	14.960	158.550020	0.126	-1.500	1.500
15	15.640	158.550000	0.000	-1.500	1.500
20	16.320	158.550020	0.126	-1.500	1.500



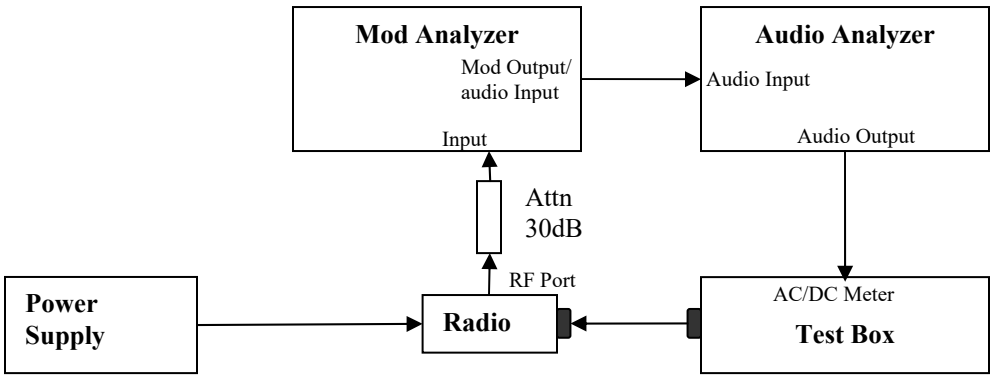
Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz			
Voltage, V	13.6			
Temperature, ^{0}C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	158.549940	-0.378	-1.500	1.500
-20	158.549970	-0.189	-1.500	1.500
-10	158.550000	0.000	-1.500	1.500
0	158.550010	0.063	-1.500	1.500
10	158.550030	0.189	-1.500	1.500
20	158.550030	0.189	-1.500	1.500
30	158.550020	0.126	-1.500	1.500
40	158.550010	0.063	-1.500	1.500
50	158.550000	0.000	-1.500	1.500
60	158.549990	-0.063	-1.500	1.500

6.2.3. Test Limit

As per manufacturer declared spec +/- 1.5ppm

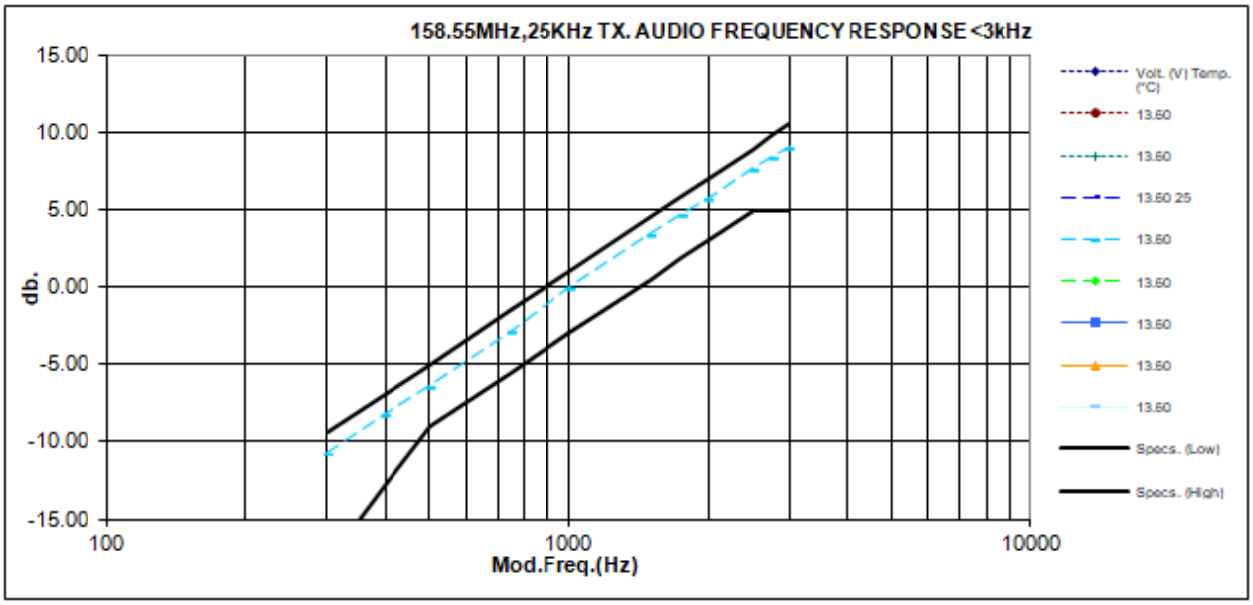
6.3. Audio Frequency Response

6.3.1. Test Setup

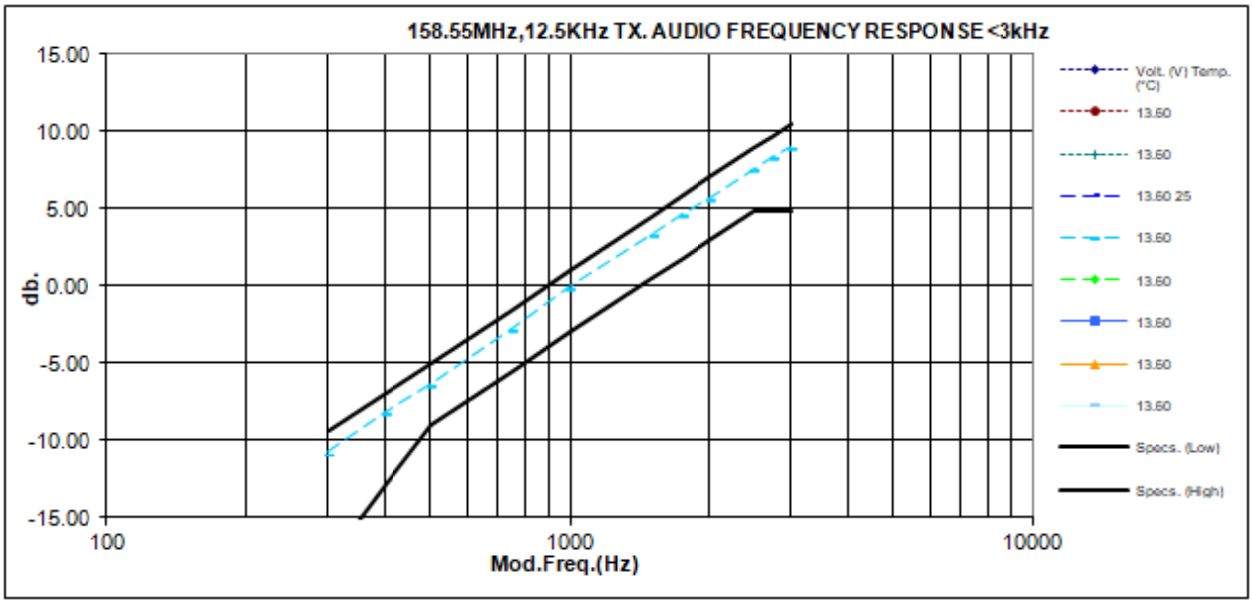


1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
5) On audio 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.

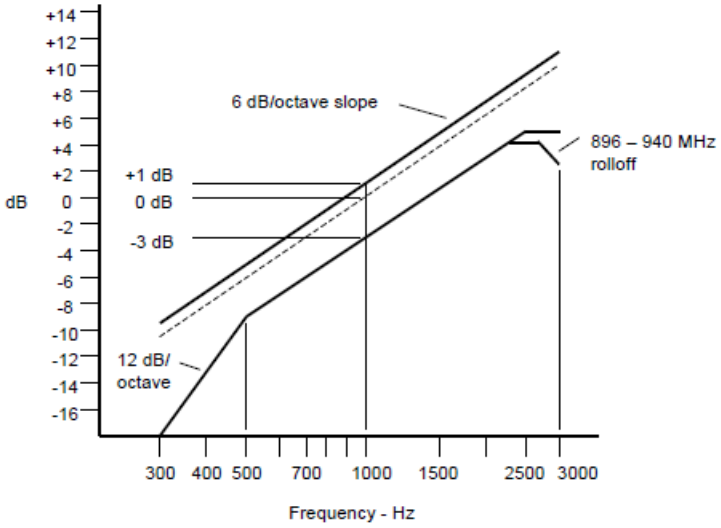
6.3.2. Test Result



Not For FCC Review



6.3.3. Test Limit

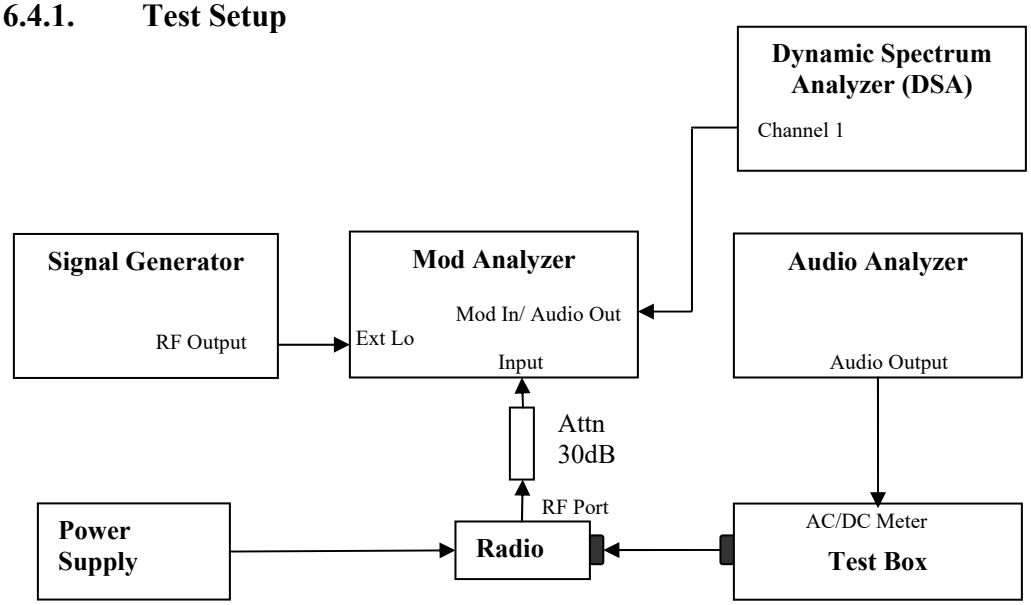


Note:

- *There are additional 6 dB per octave attenuation is allowed from 2.5KHz to 3KHz in equipment 25MHz to 869MHz radio.*
- *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.*

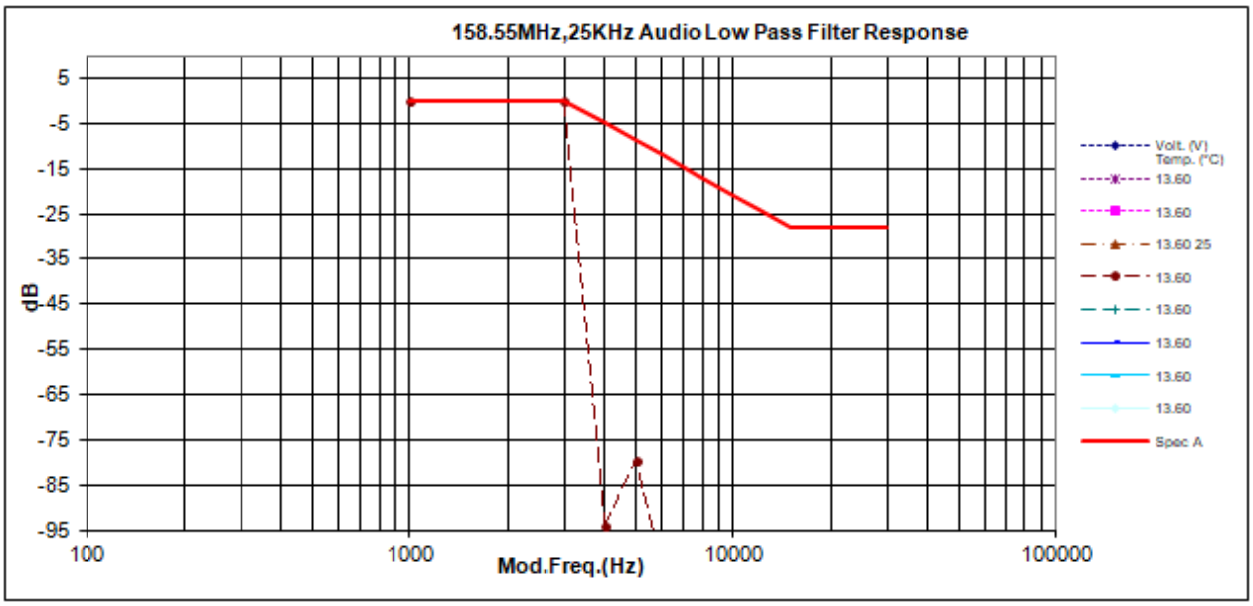
6.4. Audio Low Pass Filter Response

6.4.1. Test Setup

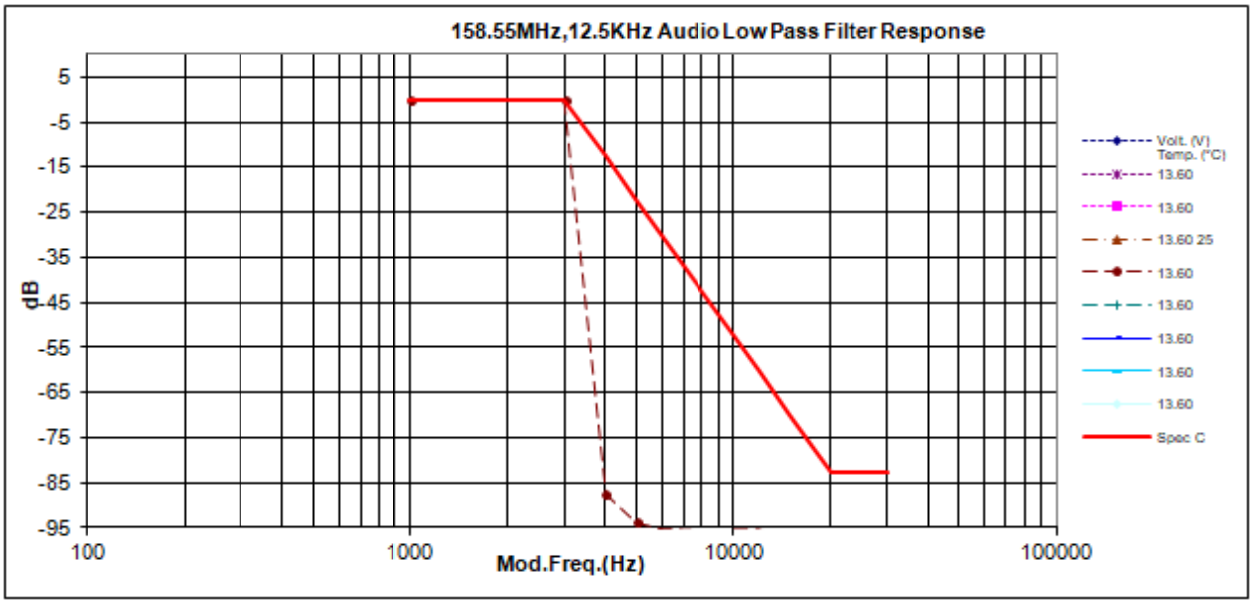


1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
4) Set the Sigen frequency to Fc + 1.5 MHz, RF output level to 0dBm without modulation.
5) Transmit the radio 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.

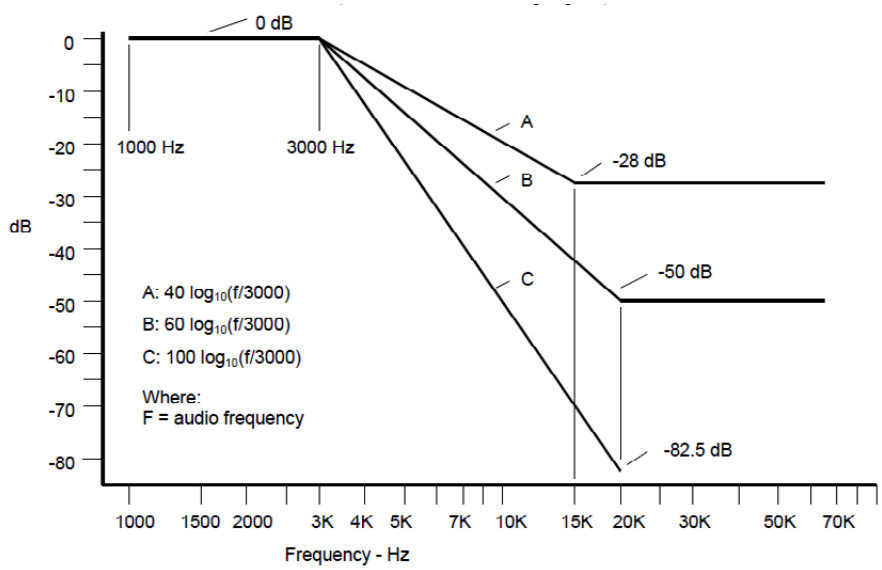
6.4.2. Test Result



Not For FCC Review



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.

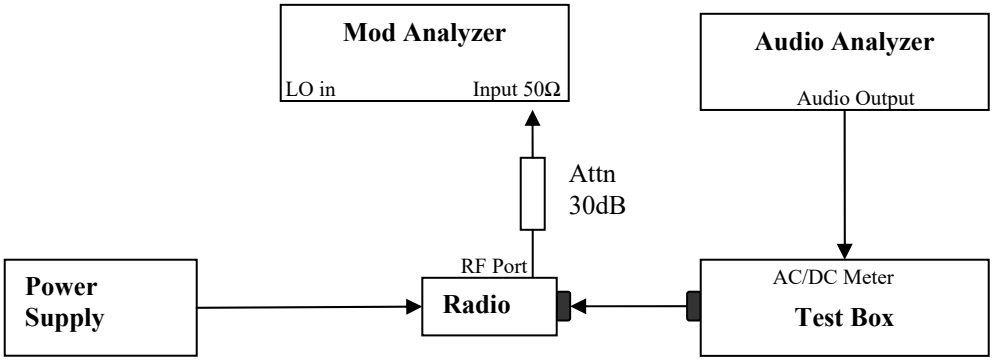
c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

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.

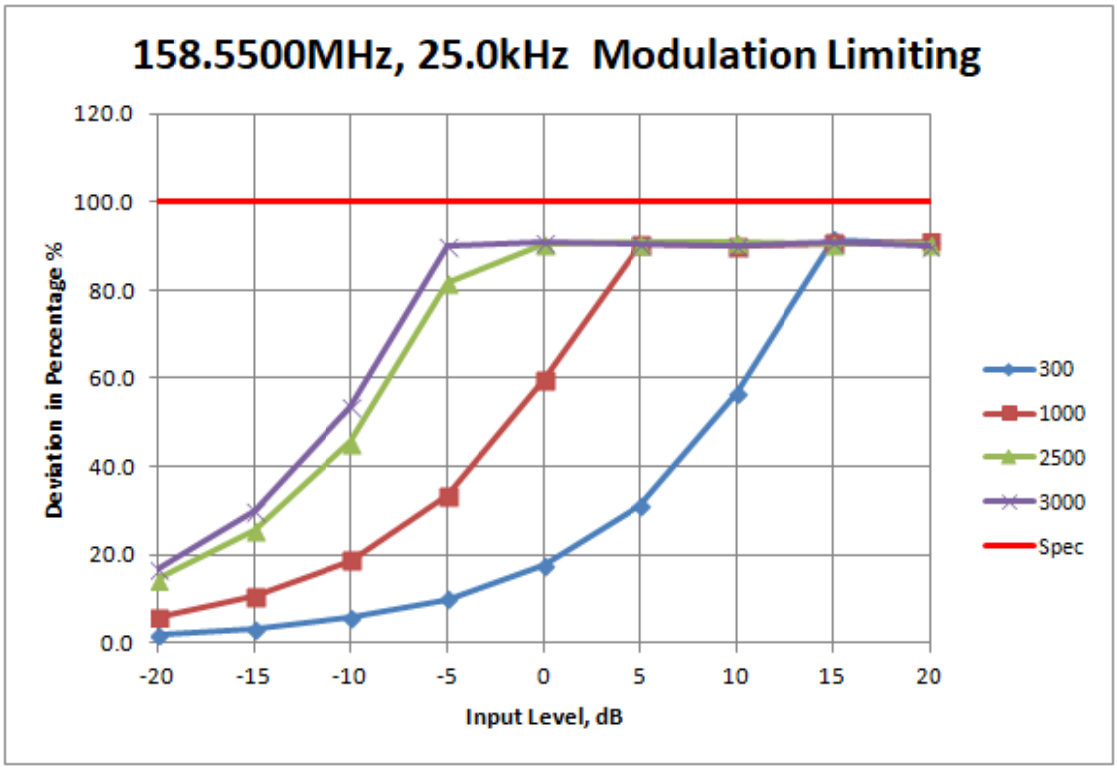
6.5. Modulation Limiting

6.5.1. Test Setup

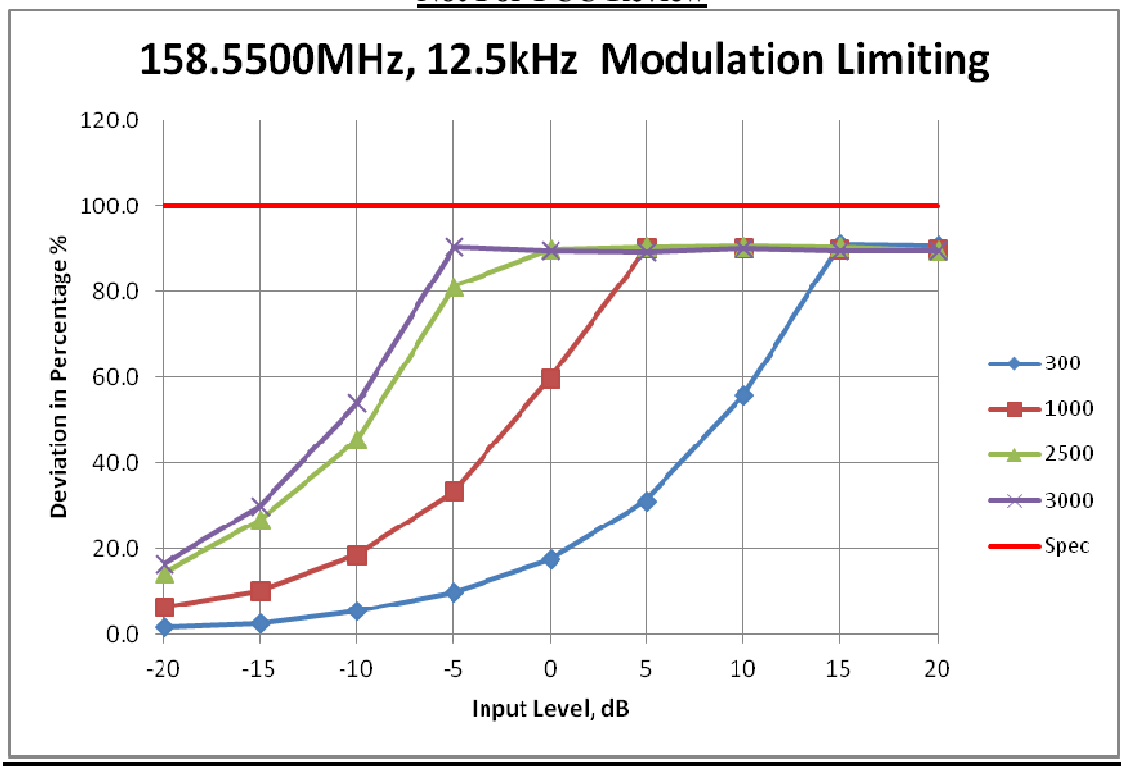


1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
5) Record the frequency 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



Not For FCC Review

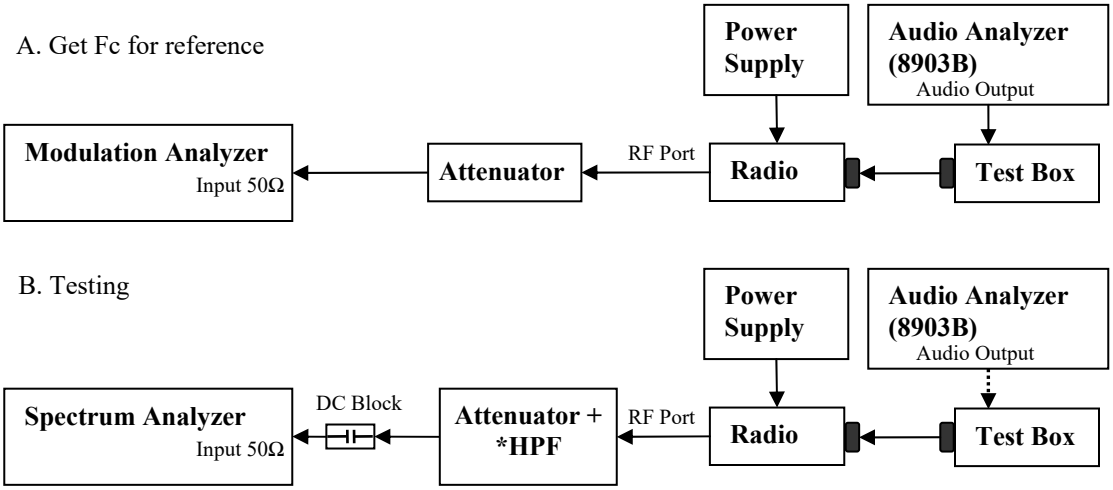


6.5.3. Test Limit

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 Fc 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)

Standard Audio Modulation (12.5 kHz Channelization, Analog Voice):
Emission Designator 11K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz =➔ 11K0
F3E portion of the designator indicates voice.

Therefore, the entire designator for 12.5 kHz channelization analog voice is 11K0F3E.

Standard Audio Modulation (25 kHz Channelization, Analog Voice):
Emission Designator 16K0F3E

In this case, the maximum modulating frequency is 3 kHz with a 5 kHz deviation.

BW = 2(M+D) = 2*(3 kHz + 5 kHz) = 16 kHz =➔ 16K0
F3E portion of the designator indicates voice.

Therefore, the entire designator for 25 kHz channelization analog voice is 16K0F3E

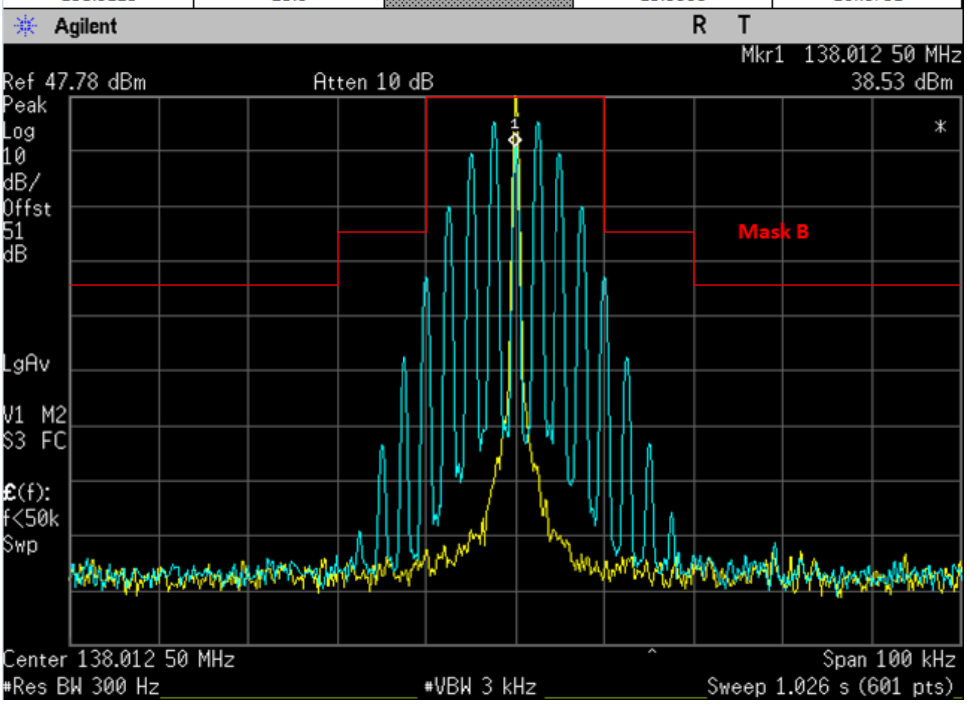
Digital Modulation (20 kHz Channelization, Digital Voice with encryption):
Emission Designator 20K0F1E

In this case, the maximum modulating frequency is 6 kHz with a 4 kHz deviation.

BW = 2(M+D) = 2*(6 kHz + 4 kHz) = 20 kHz =➔ 20K0
F1E portion of the designator indicates digital voice.

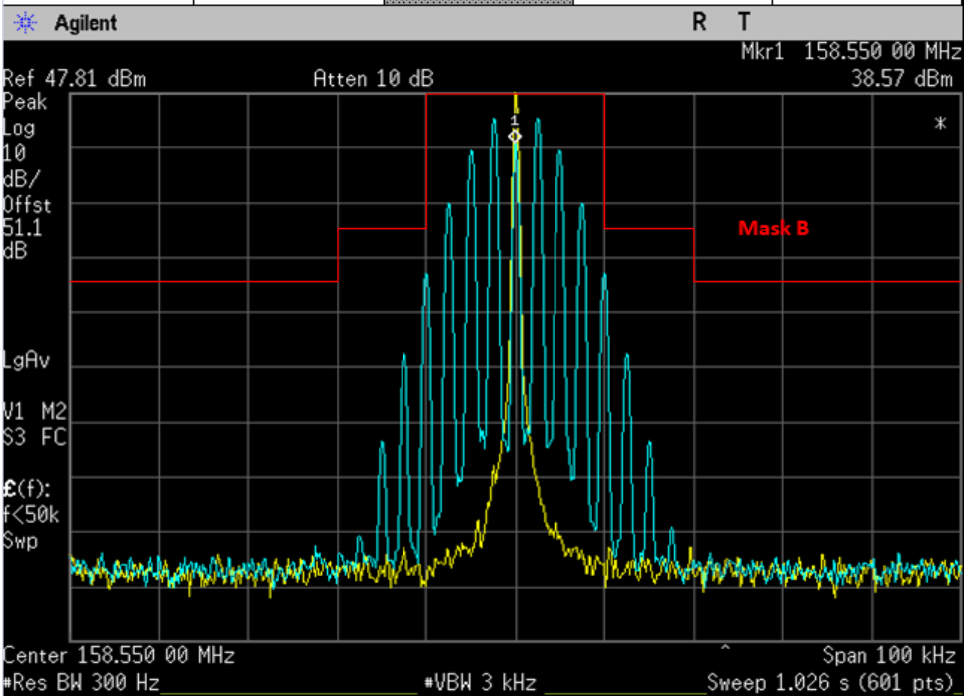
Therefore, the entire designator for 20 kHz channelization analog voice is 20K0F1E.

Modulation			Rules Part	
Analog Voice			RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
138.0125	25.0		15.0000	16K0F3E

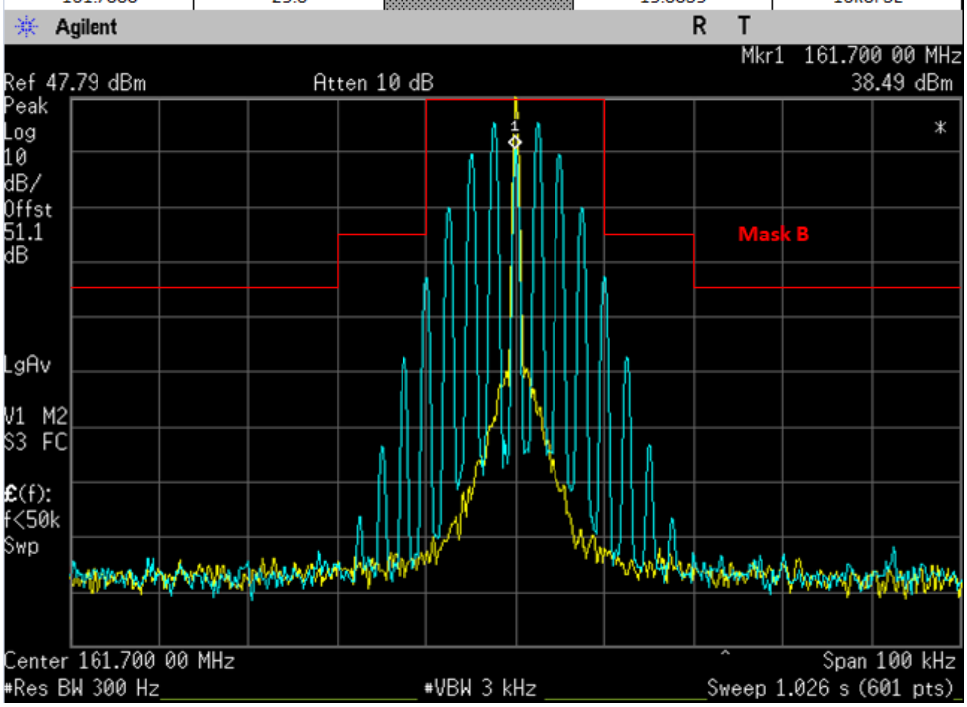


Not For FCC Review

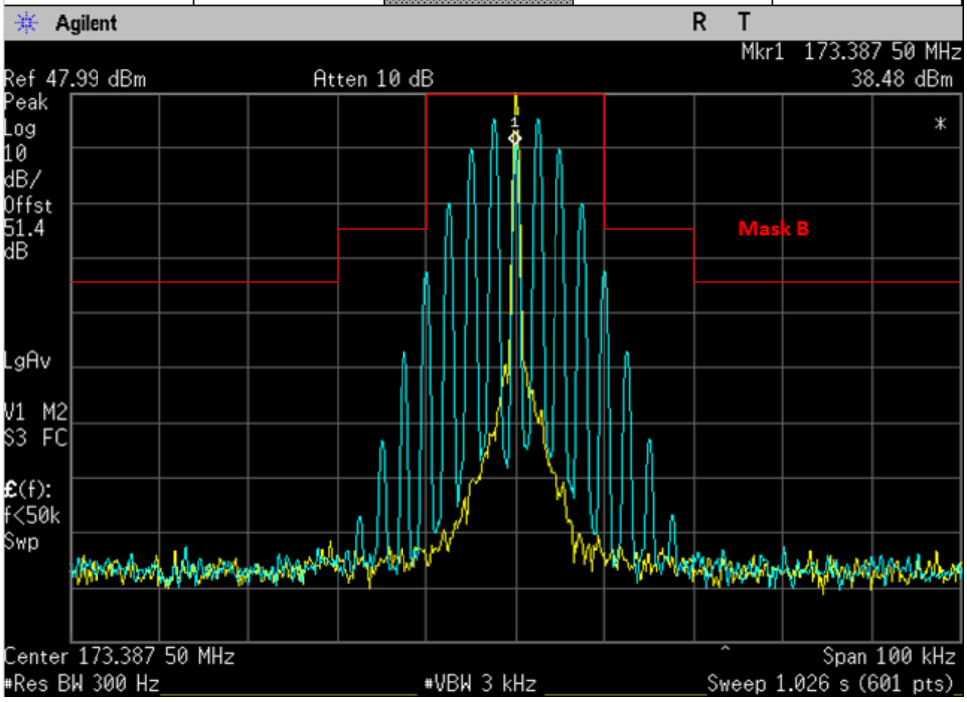
Modulation			Rules Part	
Analog Voice			80.211(f), RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
158.5500	25.0		14.9988	16K0F3E



Modulation			Rules Part	
Analog Voice			74.462(c),RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
161.7000	25.0		15.0035	16K0F3E

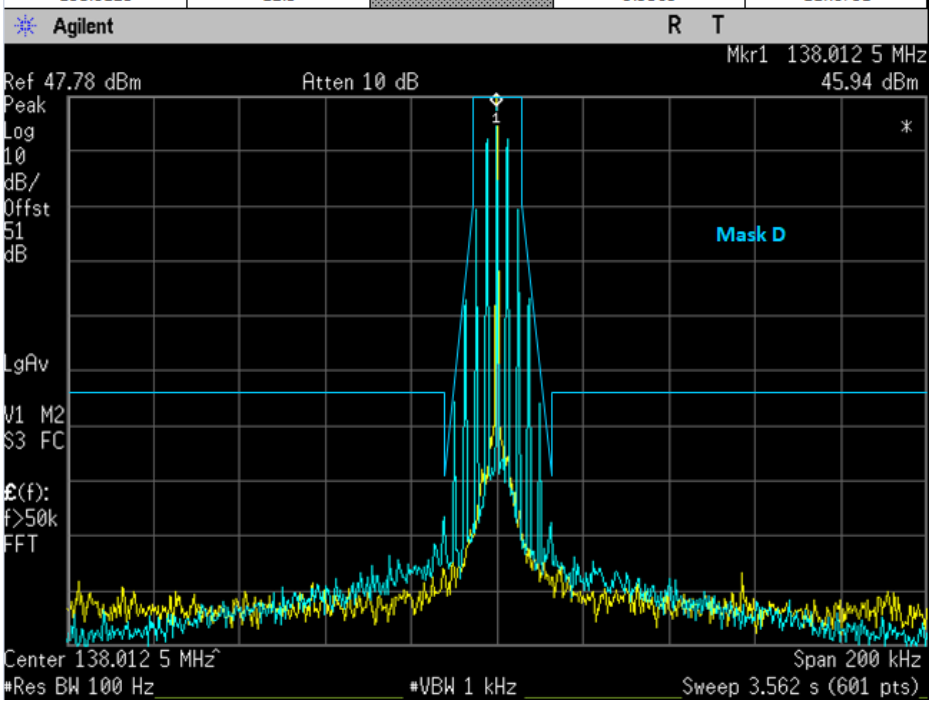


Modulation			Rules Part	
Analog Voice			RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
173.3875	25.0		15.0178	16K0F3E



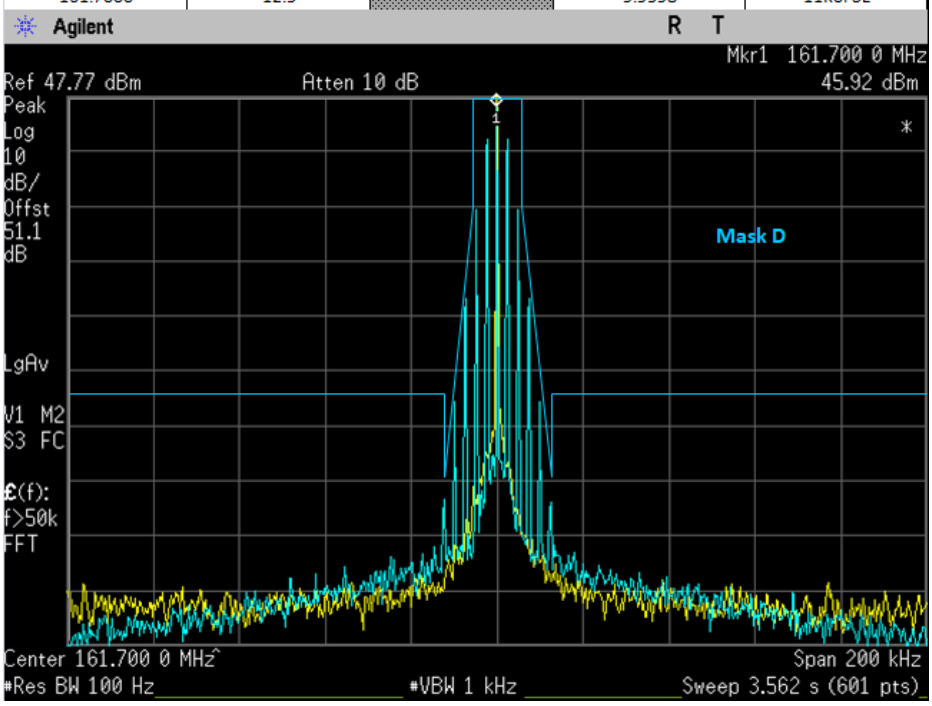
Not For FCC Review

Modulation			Rules Part	
Analog Voice			RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
138.0125	12.5		9.9569	11K0F3E

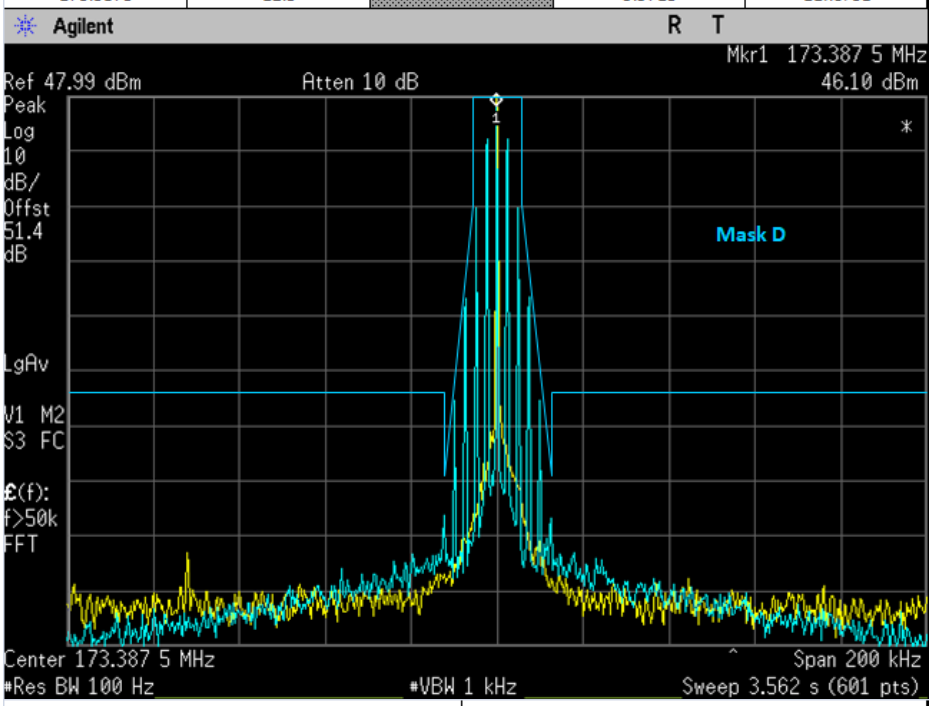


Not For FCC Review

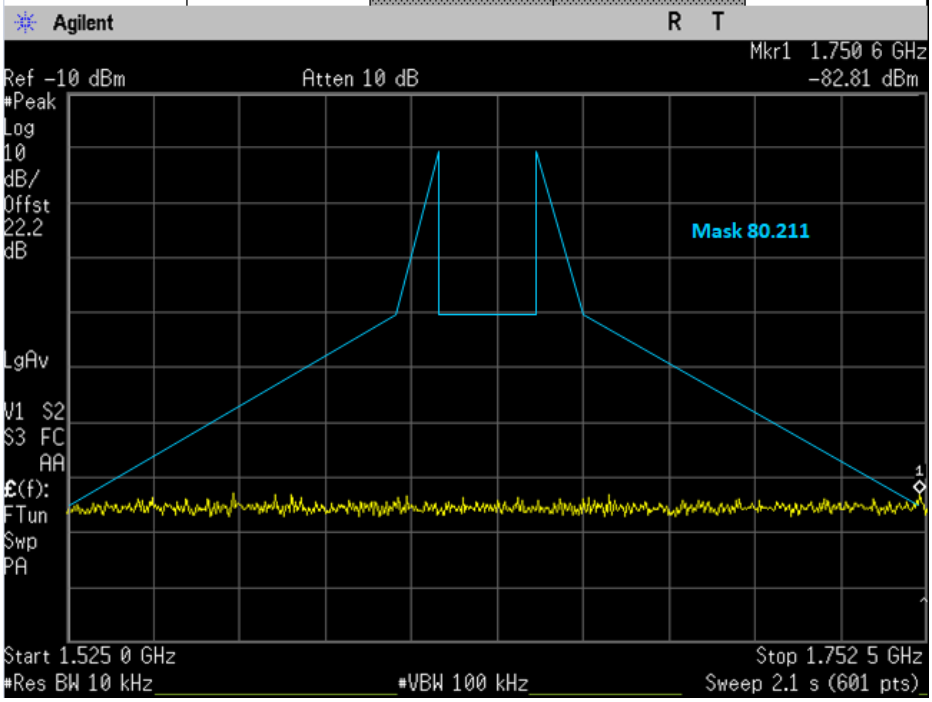
Modulation			Rules Part	
Analog Voice			90.210, 74.462(c), RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
161.7000	12.5		9.9598	11K0F3E



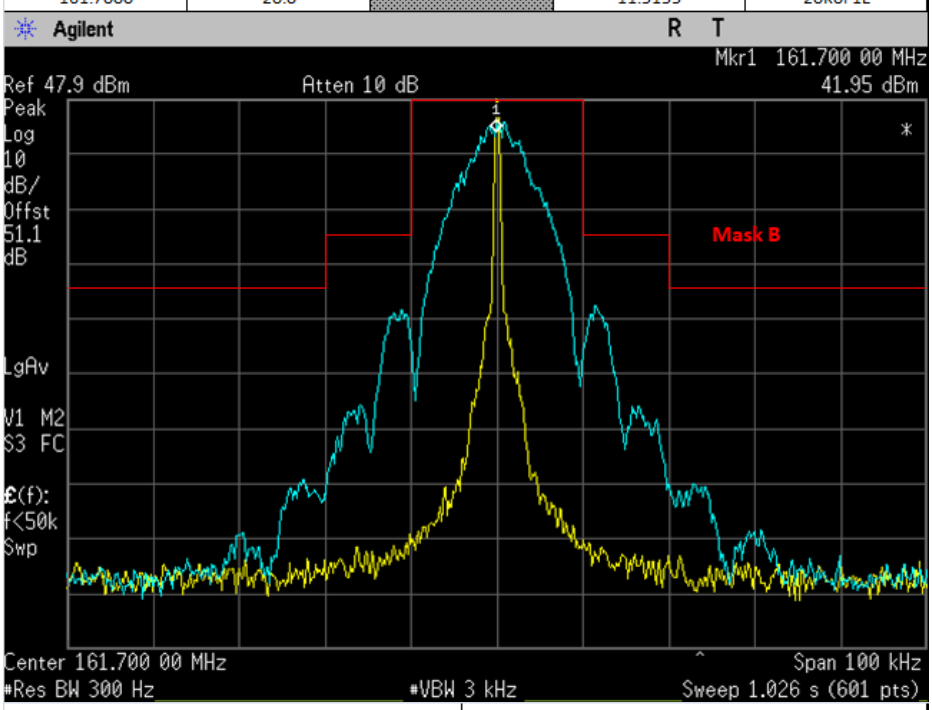
Modulation			Rules Part	
Analog Voice			90.210, RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
173.3875	12.5		9.9715	11K0F3E



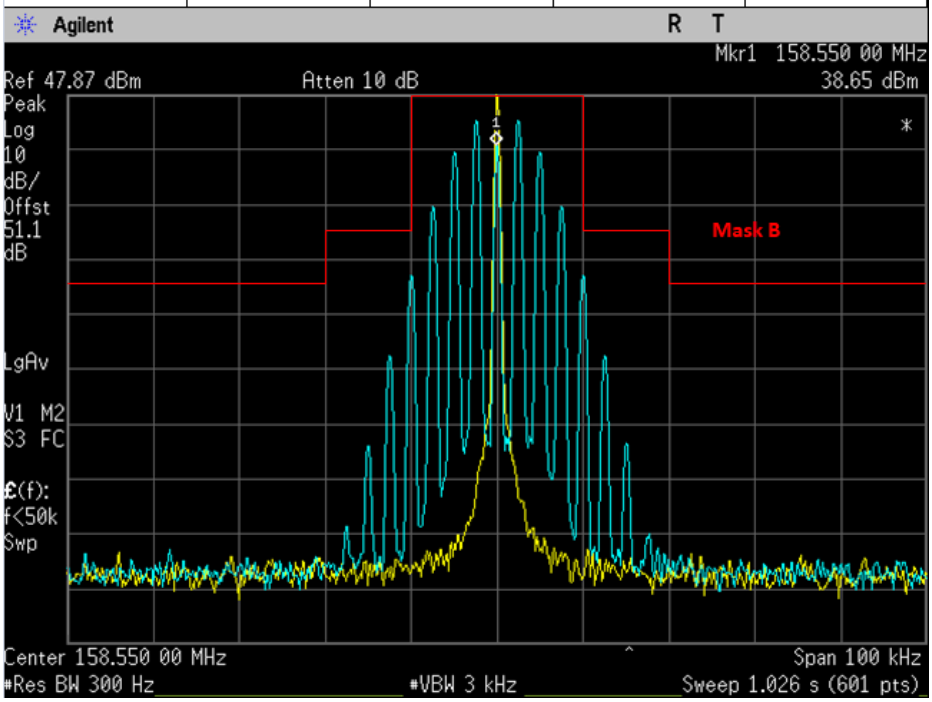
Modulation			Rules Part	
Analog Voice			80.211(c), RSS 182	
Channel Frequency (MHz)	Channel Spacing (kHz)			Emission Designator
158.5500	25.0			16K0F3E



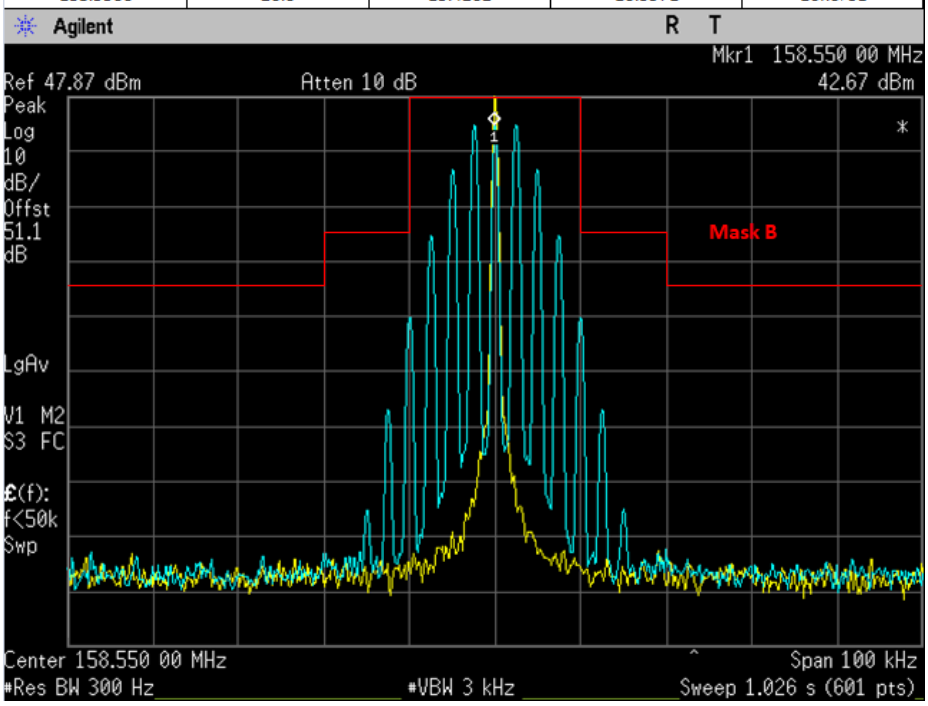
Modulation			Rules Part	
Analog Voice Encyption			74.462(c)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
161.7000	20.0		11.5155	20K0F1E



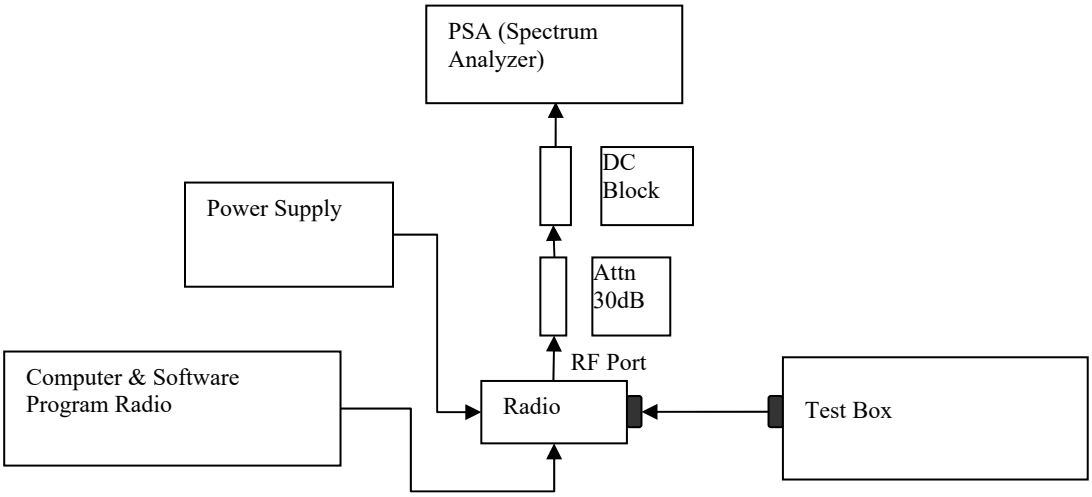
Modulation			Rules Part	
Analog Voice			22.359(b)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**-26 dB Point (kHz)**	**99% OCB (kHz)**	**Emission Designator**
158.5500	25.0	15.5458	14.9965	16K0F3E



Modulation			Rules Part	
Analog Voice			22.359(b)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**-26 dB Point (kHz)**	**99% OCB (kHz)**	**Emission Designator**
158.5500	20.0	15.4202	10.3971	16K0F3E



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)

Digital (12.5 kHz Channelization, Digital Data):
Emission Designator 8K10F1D

The 99% energy rule (title 47CFR 2.989) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy falls within X kHz, in this case, 8.10 kHz Measurements were performed in accordance with TIA/EIA TSB102.CAAB Section 2.2.5.2. The emission mask was obtained from 47CFR 90.210(d).

F1D portion of the designator indicates digital data.

Therefore, the entire designator for 12.5 kHz channelization digital data is 8K10F1D.

Digital (12.5 kHz Channelization, Digital Voice):
Emission Designator 8K10F1E

The 99% energy rule (title 47CFR 2.989) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy falls within X kHz, in this case, 8.10 kHz. Measurements were performed in accordance with TIA/EIA TSB102.CAAB Section 2.2.5.2. The emission mask was obtained from 47CFR 90.210(d).

F1E portion of the designator indicates digital voice.

Therefore, the entire designator for 12.5 kHz channelization digital data is 8K10F1E

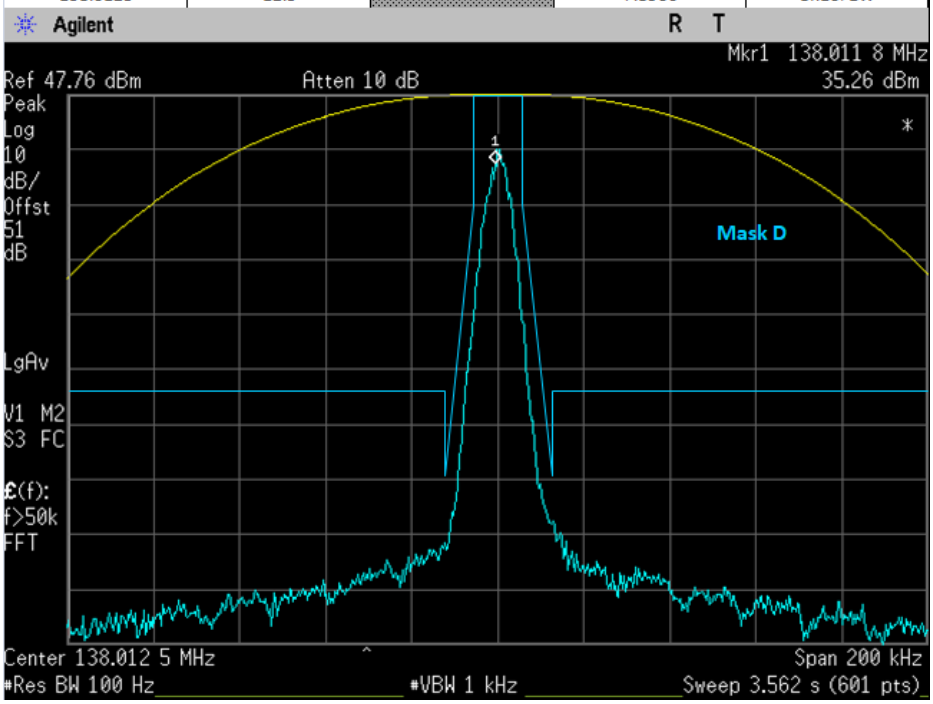
Digital (12.5 kHz Channelization, Digital TDMA):
Emission Designator 8K10F1W

The 99% energy rule (title 47CFR 2.989) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy falls within X kHz, in this case, 8.10 kHz Measurements were performed in accordance with TIA/EIA TSB102.CAAB Section 2.2.5.2. The emission mask was obtained from 47CFR 90.210(d).

F1W portion of the designator indicates digital TDMA.

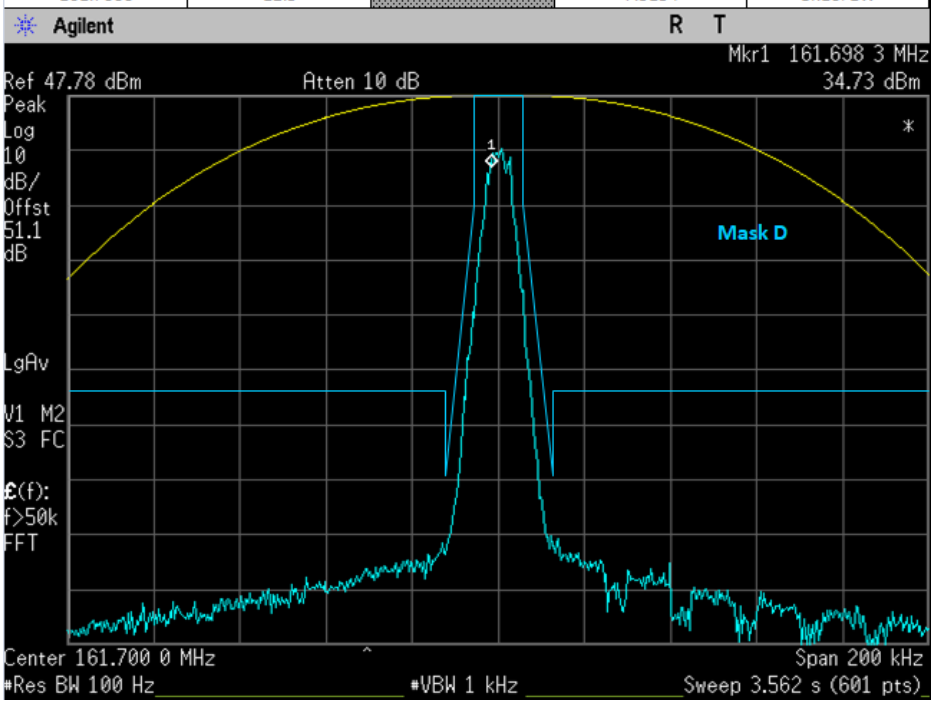
Therefore, the entire designator for 12.5 kHz channelization digital TDMA is 8K10F1W.

Modulation			Rules Part	
Digital TDMA			RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
138.0125	12.5		7.8906	8K10F1W



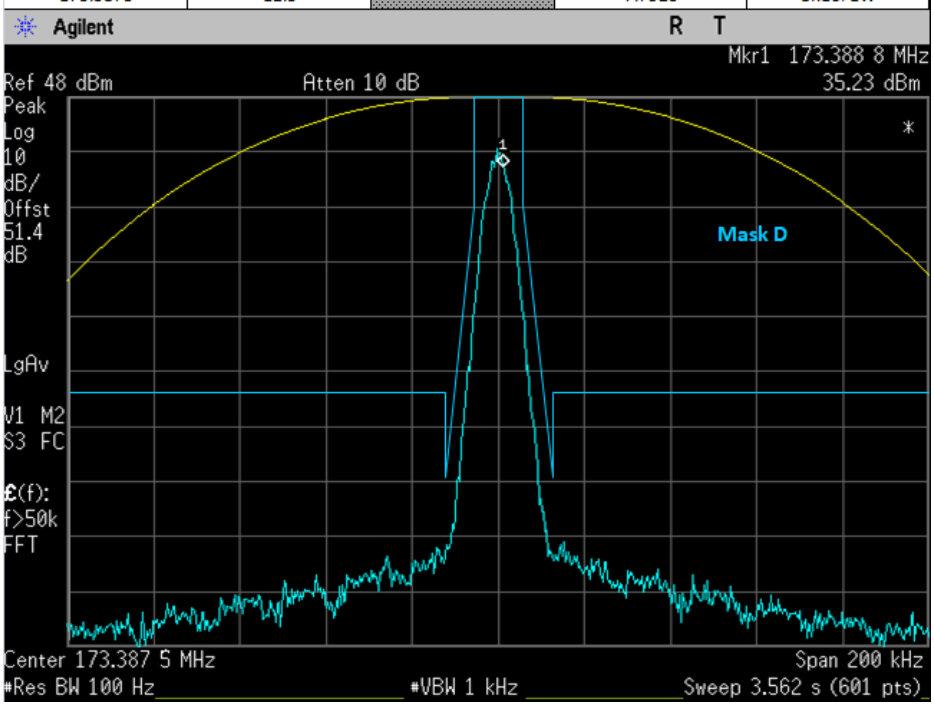
Not For FCC Review(8K10F1D,8K10F1E by similarity with 8K10F1W)

Modulation			Rules Part	
Digital TDMA			90.210, RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
161.7000	12.5		7.3154	8K10F1W



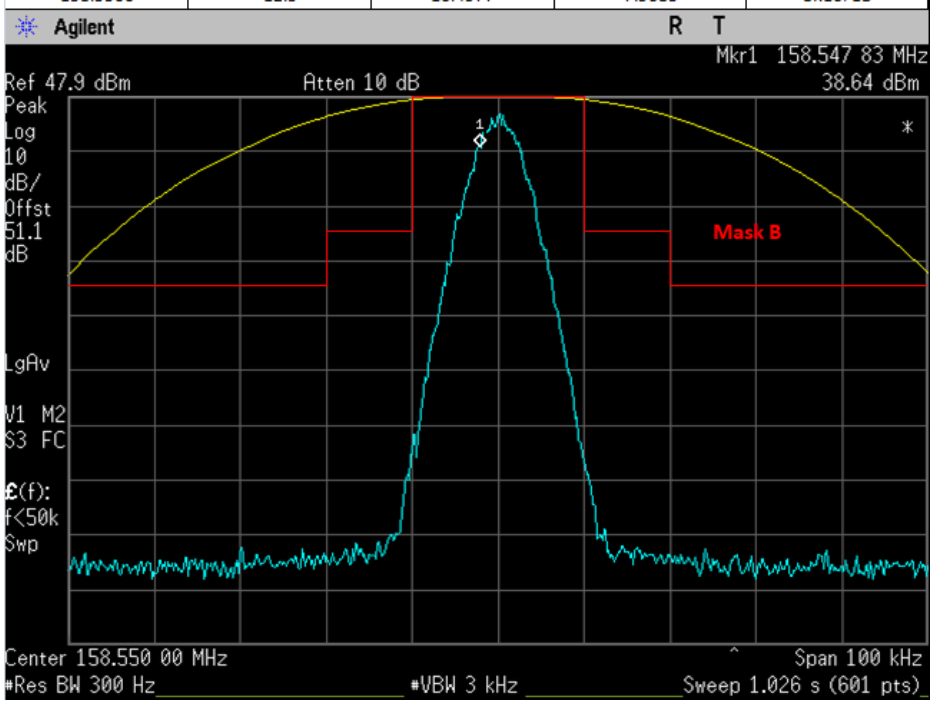
(8K10F1D,8K10F1E by similarity with 8K10F1W)

Modulation			Rules Part	
Digital TDMA			90.210, RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
173.3875	12.5		7.7923	8K10F1W

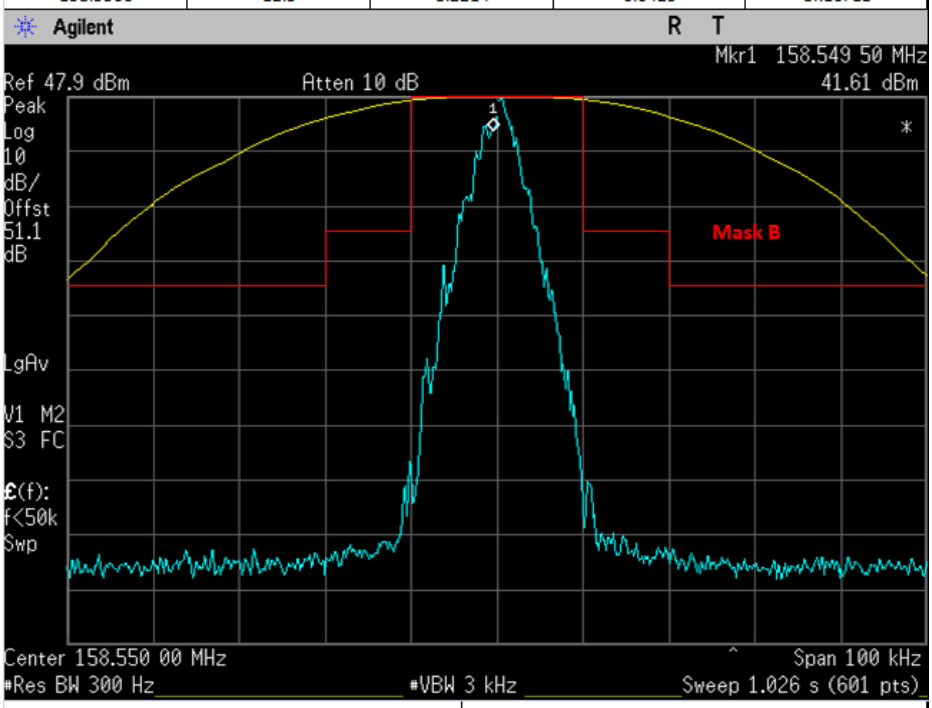


(8K10F1D,8K10F1E by similarity with 8K10F1W)

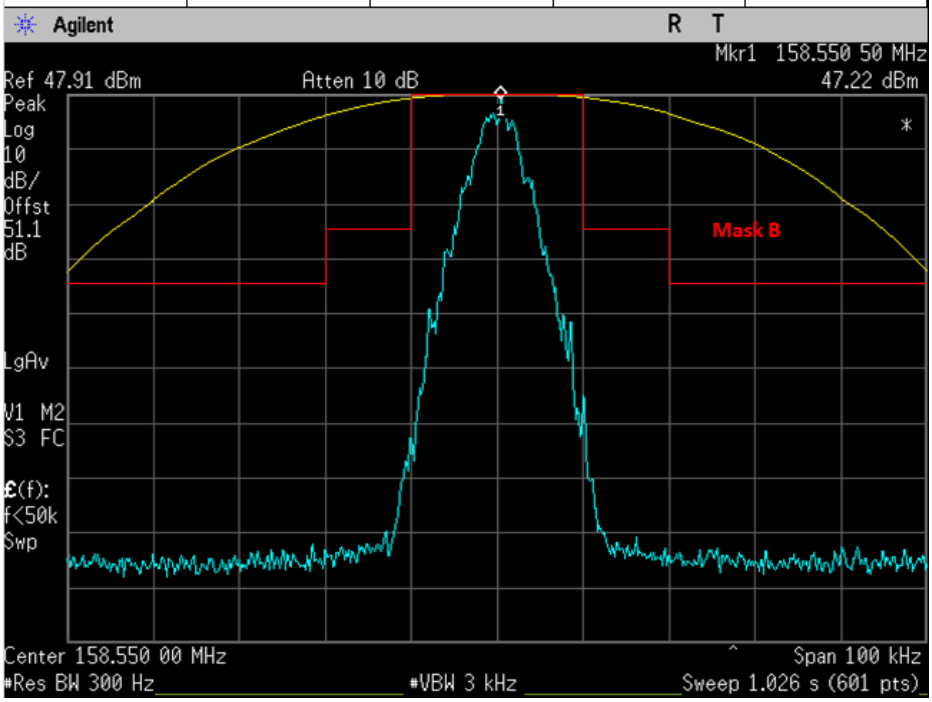
Modulation			Rules Part	
Digital Data			22.359(b)	
Channel Frequency (MHz)	Channel Spacing (kHz)	-26 dB Point (kHz)	99% OCB (kHz)	Emission Designator
158.5500	12.5	10.4977	7.9085	8K10F1D



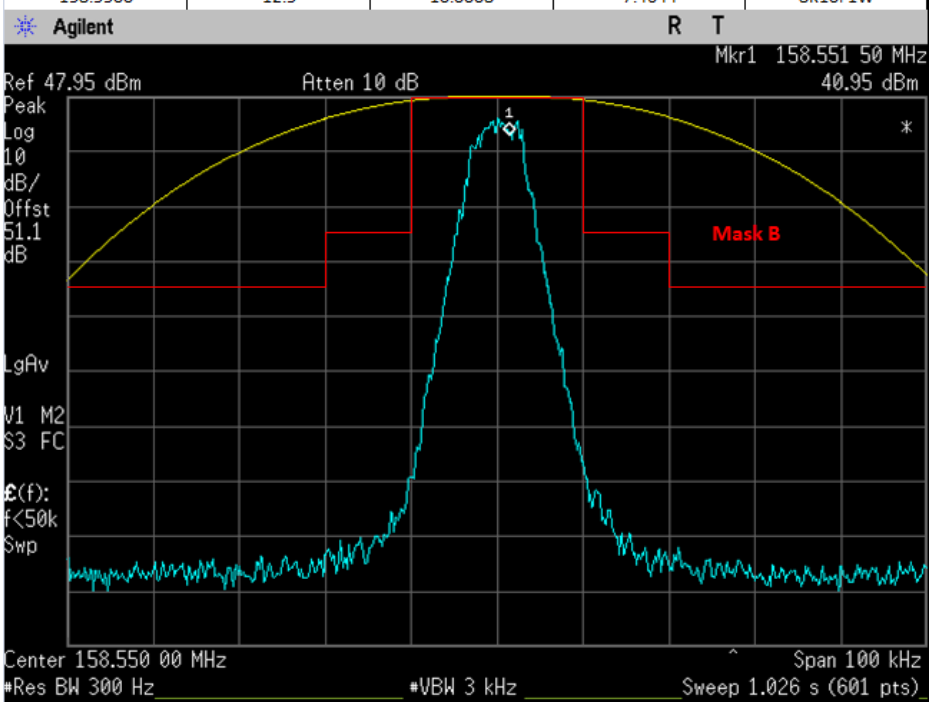
Modulation			Rules Part	
Digital Voice			22.359(b)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**-26 dB Point (kHz)**	**99% OCB (kHz)**	**Emission Designator**
158.5500	12.5	8.2214	6.6429	8K10F1E



Modulation			Rules Part	
Digital Voice Encyption			22.359(b)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**-26 dB Point (kHz)**	**99% OCB (kHz)**	**Emission Designator**
158.5500	12.5	9.7559	7.8741	8K10F1E



Modulation			Rules Part	
Digital TDMA			22.359(b)	
Channel Frequency (MHz)	Channel Spacing (kHz)	-26 dB Point (kHz)	99% OCB (kHz)	Emission Designator
158.5500	12.5	10.0008	7.4644	8K10F1W

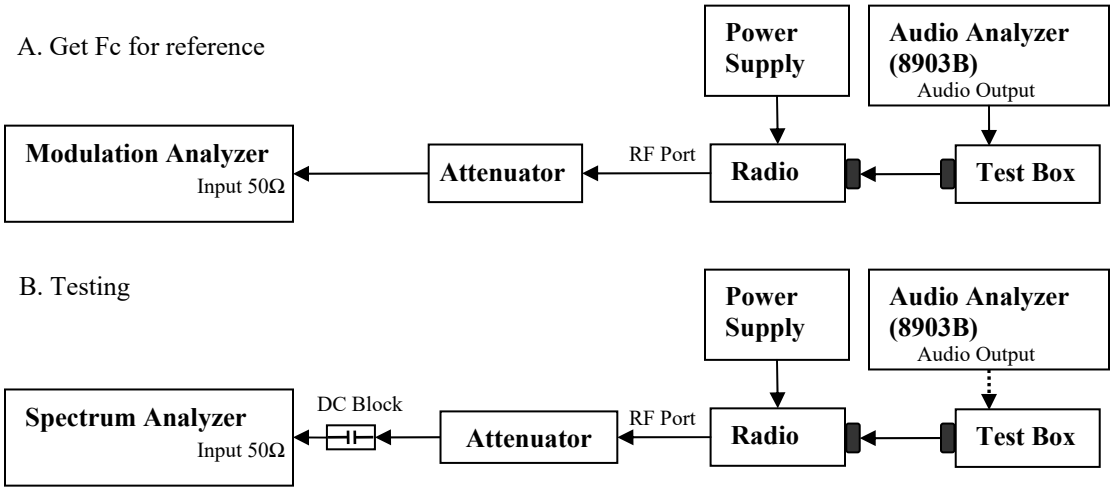


6.6.5. Test Limit

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)



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

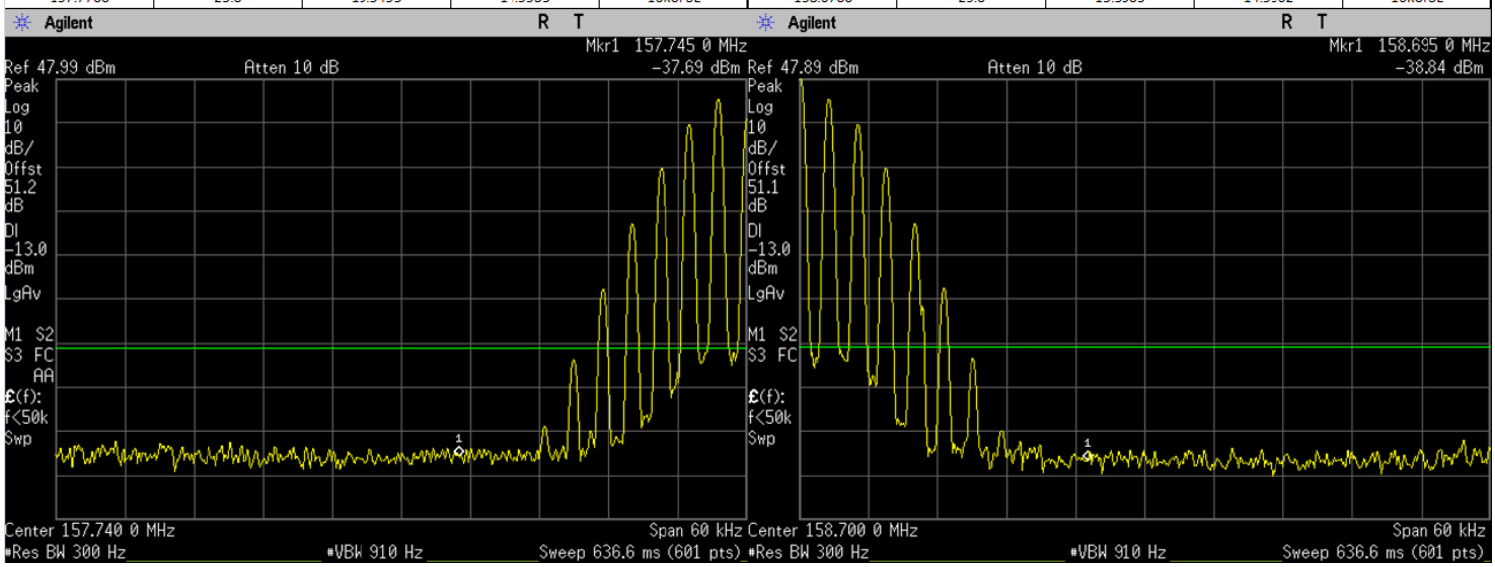
*Note:
- For emission designator ending with F3E, 16K0F3E is the worst case and therefore only 16K0F3E will be shown.

6.7.2. Test Result (Analog)

MAX PWR

Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
157.7700	25.0	15.5495	14.9935	16K0F3E

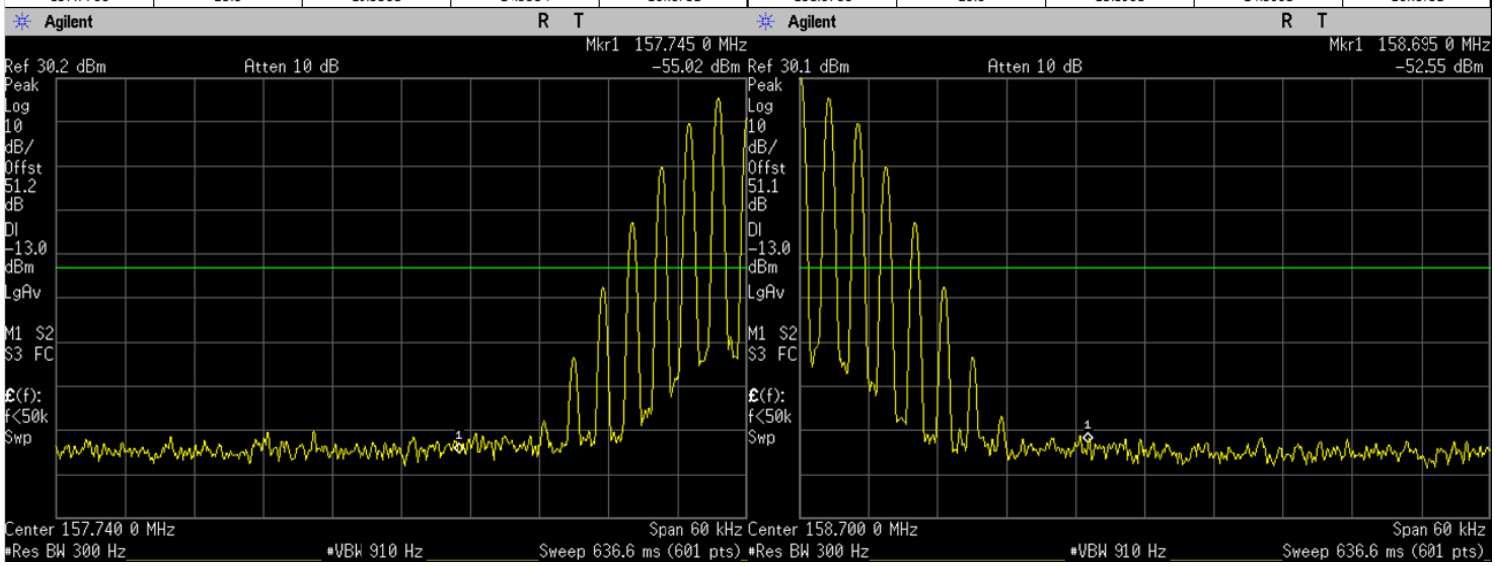
Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
158.6700	25.0	15.5505	14.9962	16K0F3E



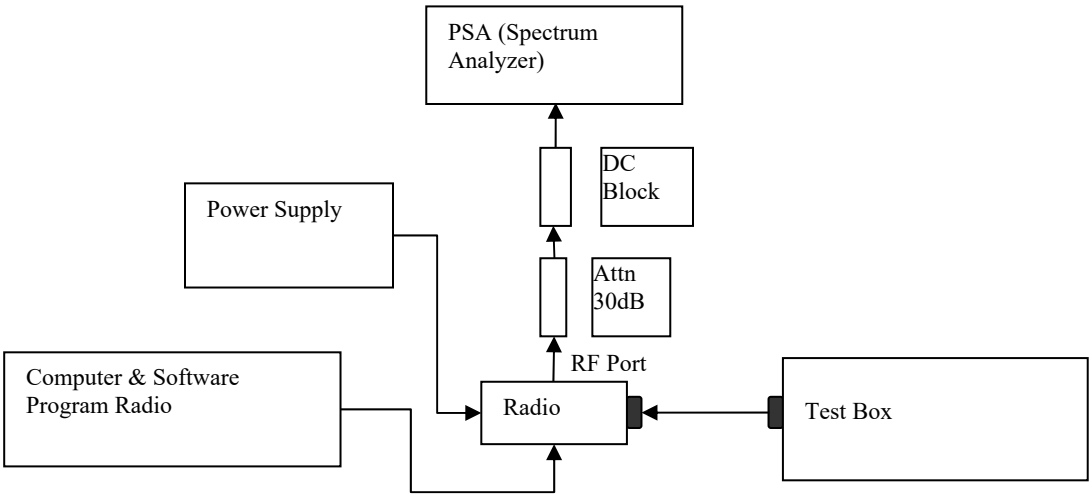
LOW PWR

Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
157.7700	25.0	15.5508	14.9954	16K0F3E

Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
158.6700	25.0	15.5508	14.9968	16K0F3E



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:

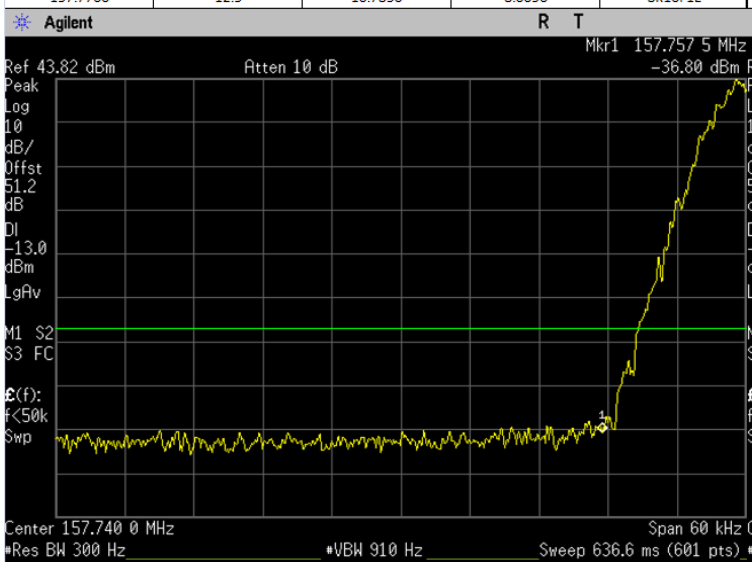
- For Digital Modulation, 12.5 kHz Data F1D & FXD would be the same. Therefore only measurements with F1D modulation shown below.
- For Digital Modulation, 12.5 kHz Data F1E & FXE would be the same. Therefore only measurements with F1E modulation shown below.

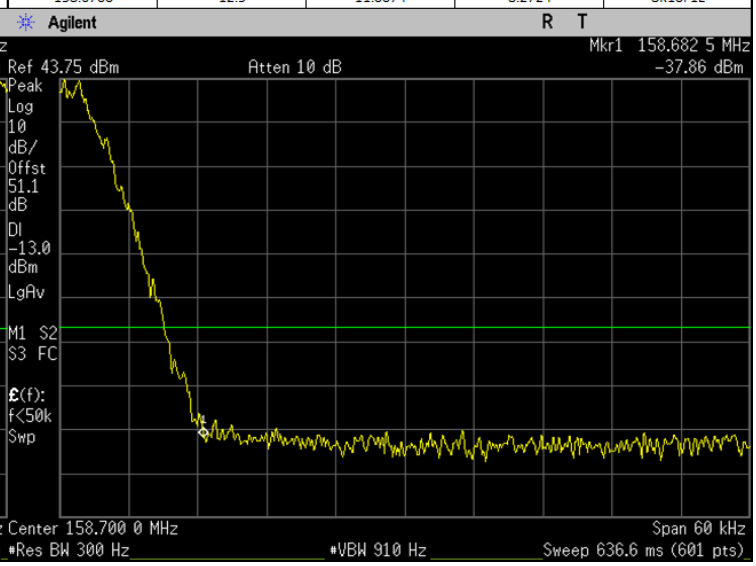
6.7.4. Test Result (Digital)

MAX PWR

Modulation	Rules Part			
C4FM Data	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
157.7700	12.5	10.7850	8.0090	8K10F1E

Modulation	Rules Part			
C4FM Data	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
158.6700	12.5	11.0074	8.2724	8K10F1E

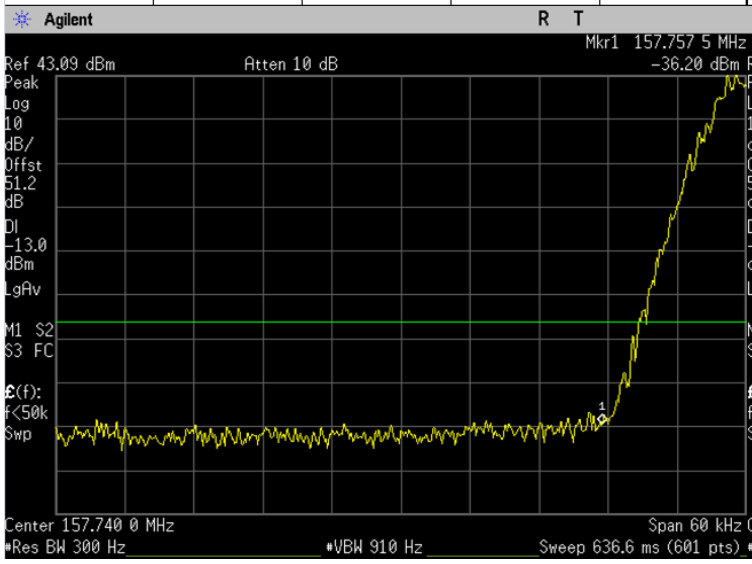


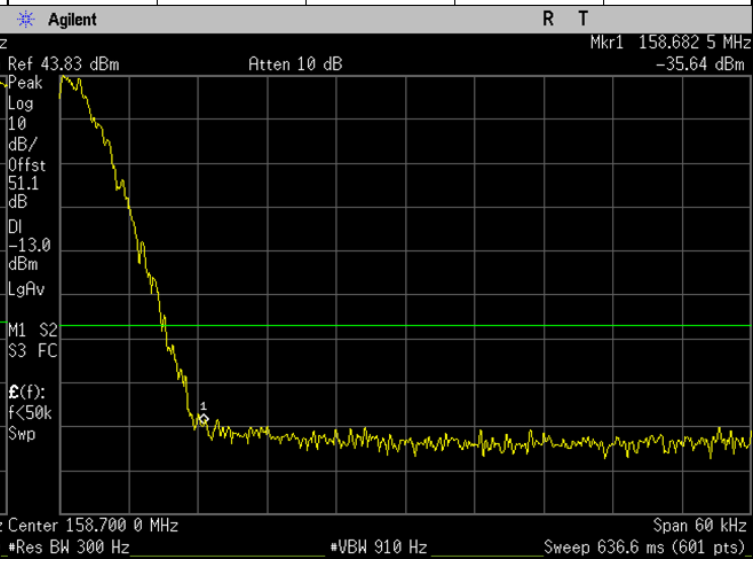


LOW PWR

Modulation	Rules Part			
C4FM Data	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
157.7700	12.5	10.9342	8.0921	8K10F1E

Modulation	Rules Part			
C4FM Data	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
158.6700	12.5	10.8231	7.8654	8K10F1E



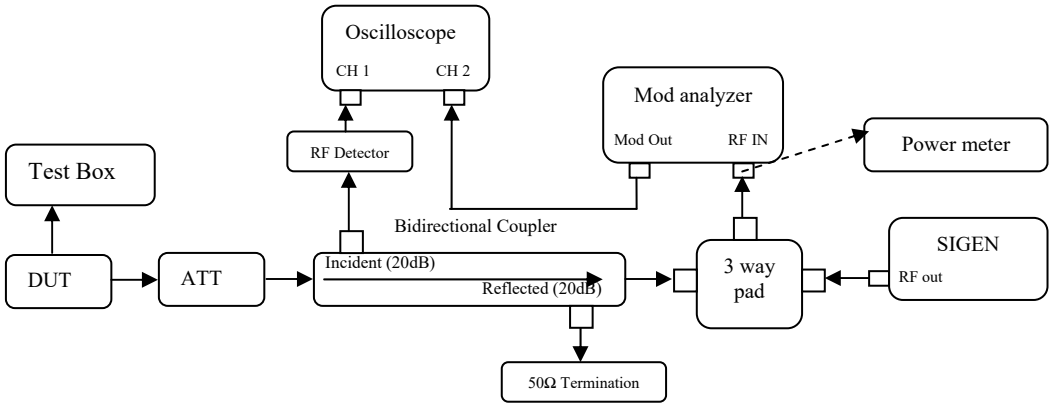


6.7.5. Test Limit

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

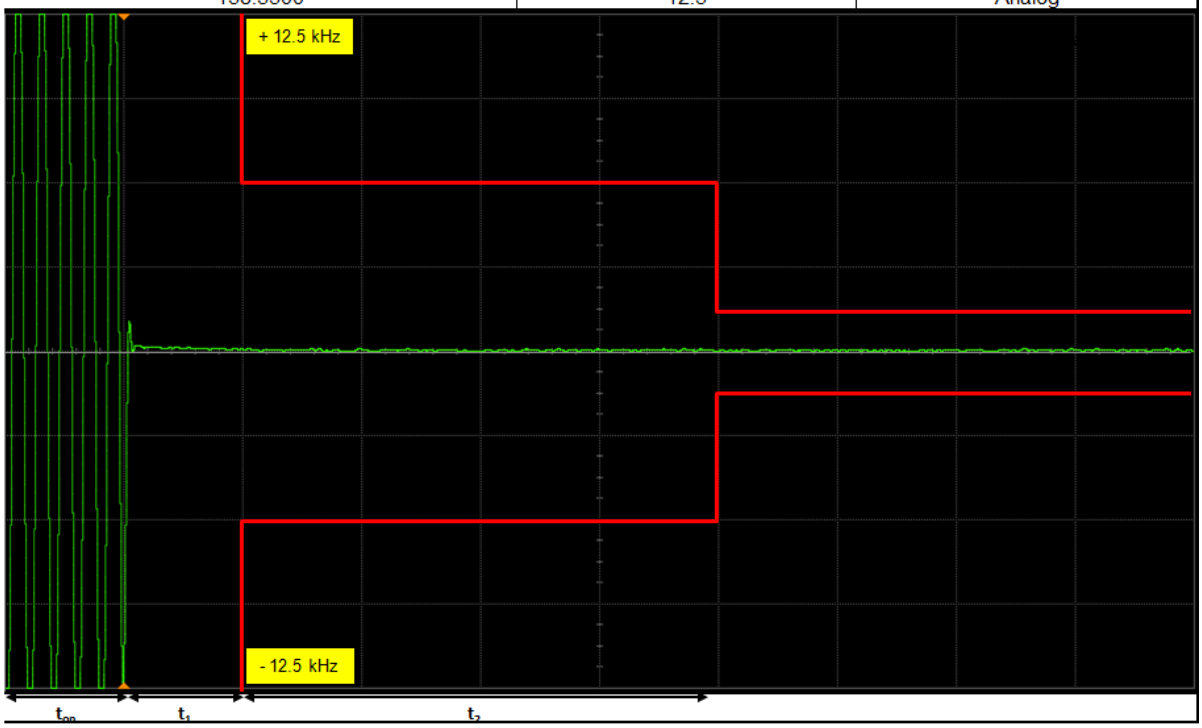
6.8.1. Test Setup



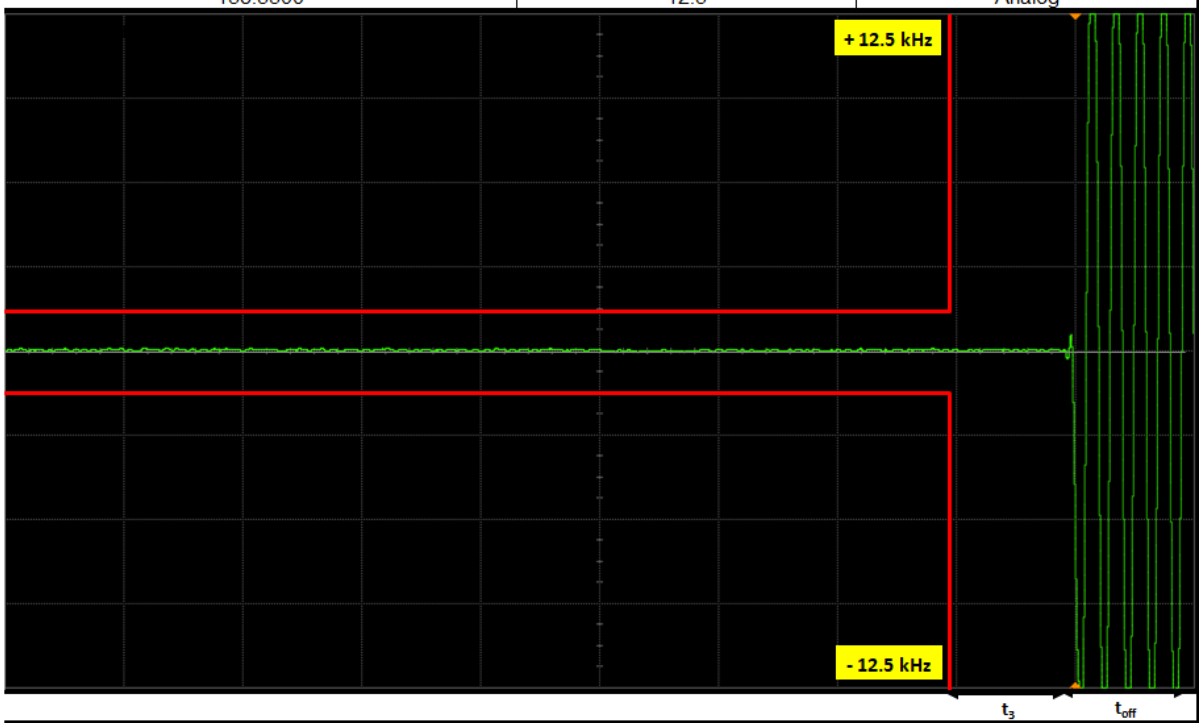
1) Connect the setup as figure above.
2) Path loss for the measurement included.
3) Set on Sigen with the assigned center frequency, internal 1 kHz FM tone.
   FM Deviation: Analog 25kHz Channel Spacing = 25 kHz
   Analog 12.5 kHz Channel Spacing = 12.5 kHz
   C4FM = 12.5 kHz
4) Turn on 50 kHz high pass filter and 15 kHz low pass filter on modulation analyzer.
5) Supply sufficient attenuation ATT to provide the output power of ≤ -11dBm 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

Switch On Condition t_{on}, t_1 and t_2		
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**Mode**
158.5500	12.5	Analog

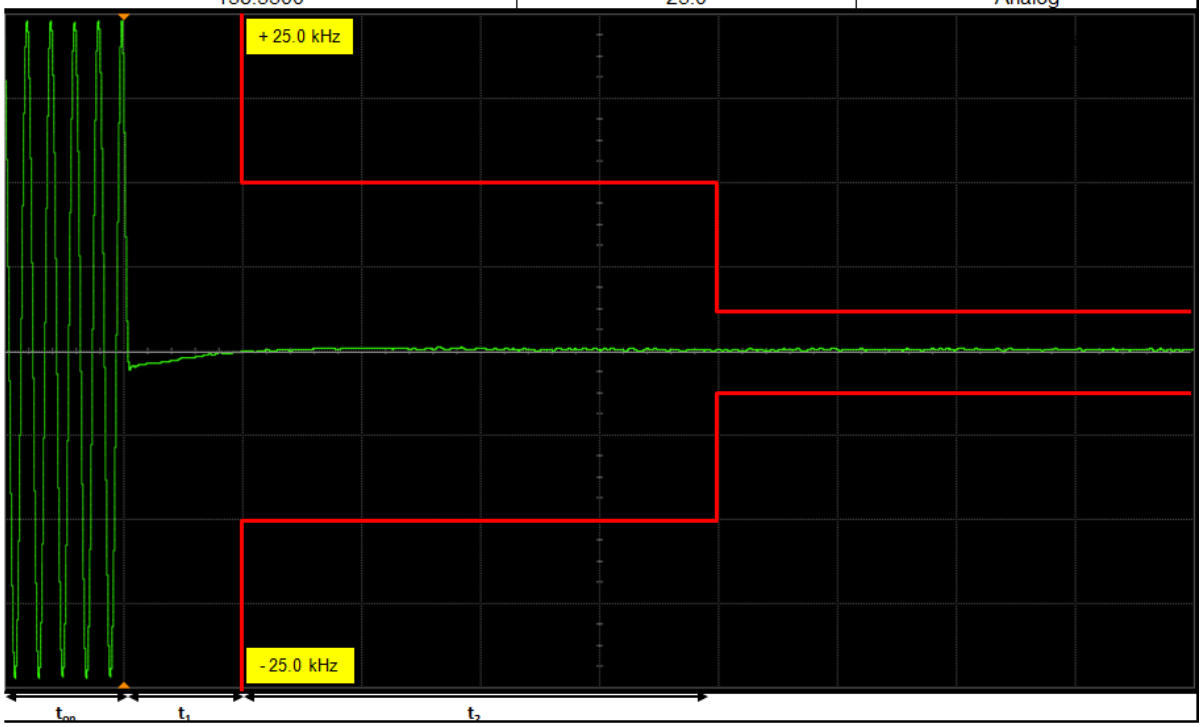


Switch Off Condition t_3 t_{off}		
Channel Frequency (MHz)	**Channel Spacing (kHz)**	**Mode**
158.5500	12.5	Analog



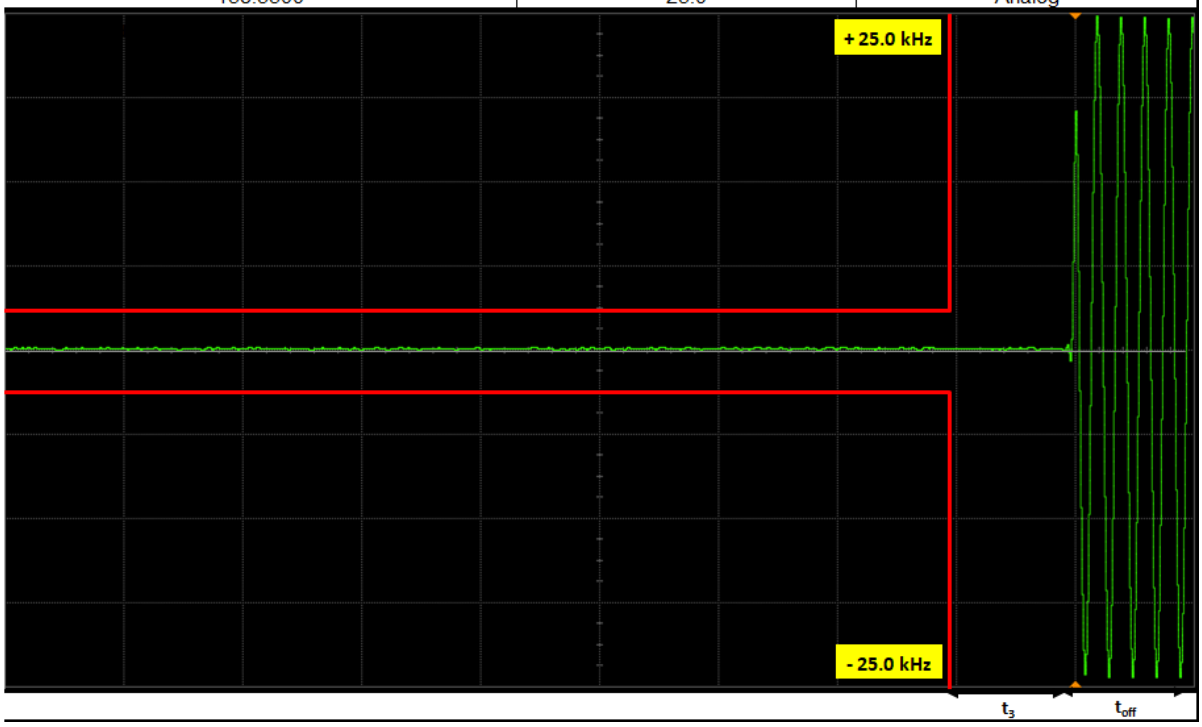
Switch On Condition t_{on}, t_1 and t_2

Channel Frequency (MHz)	Channel Spacing (kHz)	Mode
158.5500	25.0	Analog



Switch Off Condition t_3 t_{off}

Channel Frequency (MHz)	Channel Spacing (kHz)	Mode
158.5500	25.0	Analog



Not For FCC Review

6.8.3. Test Limit

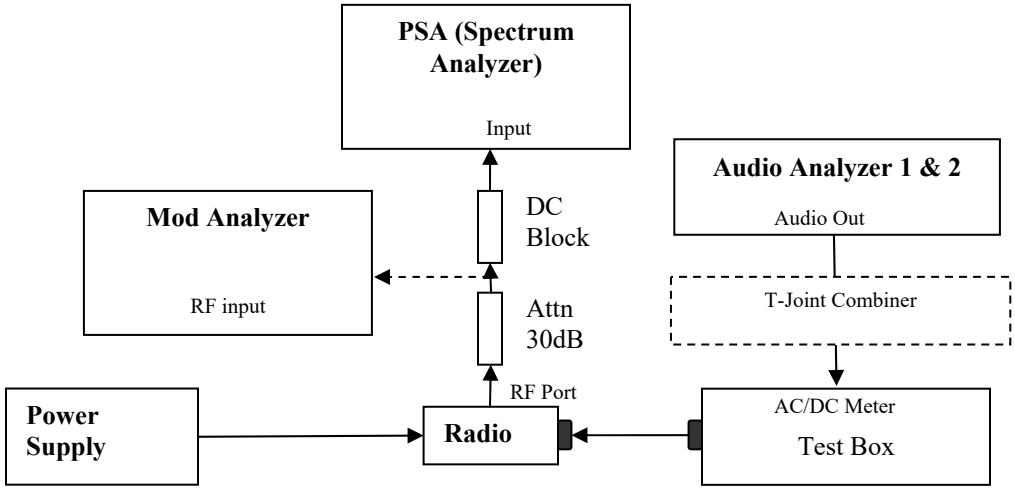
Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

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)

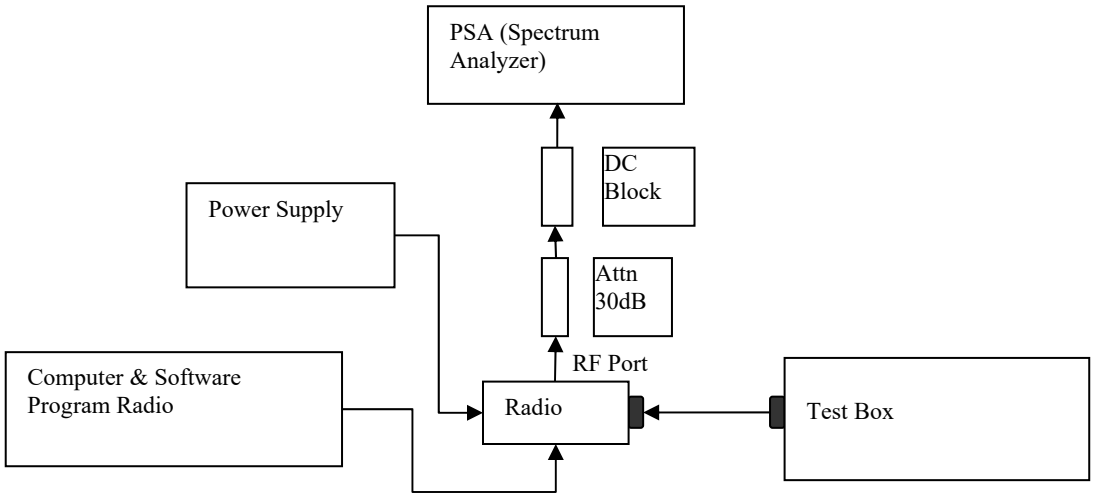


1) The DUT transmitter output port was connected to modulation analyzer.
2) Transmit the radio and turn on 1st audio analyzer with audio frequency 650Hz, 50% rated deviation, and record the amplitude value as AmpT1.
3) Turn off Audio analyzer 1 and turn on audio analyzer 2, set the audio frequency to 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

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

Not Applicable

6.9.5. 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

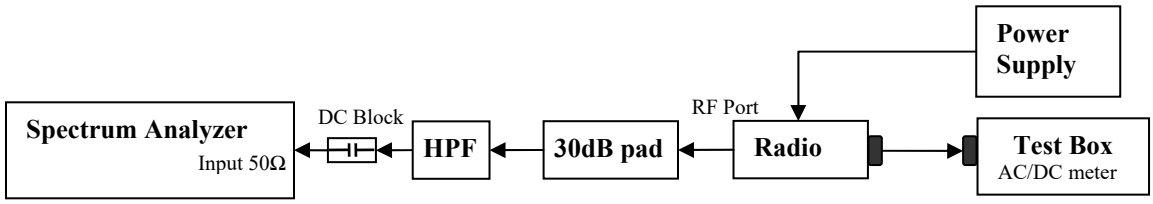
Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP (dBc)
9.375	6.25	−40
15.625	6.25	−60
21.875	6.25	−60
37.5	25	−60
62.5	25	−65
87.5	25	−65
150	100	−65
250	100	−65
350.00	100	−65
>400 kHz to 12 MHz	30 (s)	−80
12 MHz to paired receive band	30 (s)	−80
In the paired receive band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

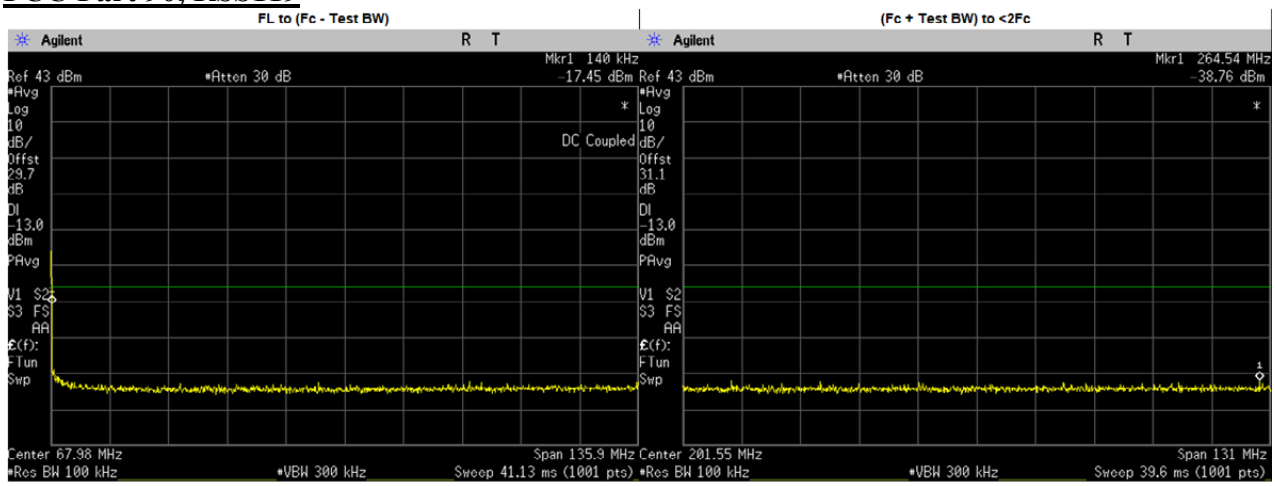
6.10.1. Test Setup

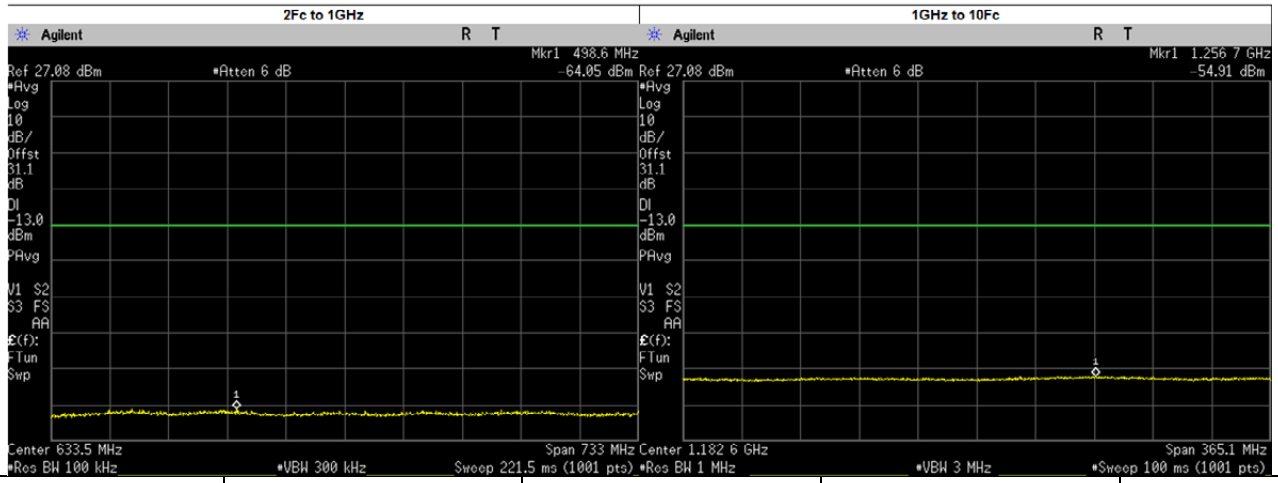


1) The DUT transmitter output port was connected to Spectrum Analyzer with above setup.
2) Program and set radio to operate in desire test frequency and mode. (Analog / digital modulation form).
3) Path loss for the measurement included.
4) Set the PSA Resolution Bandwidth as per rules part.
5) Set the 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 Fc – Test Bandwidth
    b. Fc + Test Bandwidth to 2Fc – 5MHz.
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 2Fc to 10Fc
11) Key up the DUT and record the highest spur levels of spurious emissions.

6.10.2. Test Result (Analog)

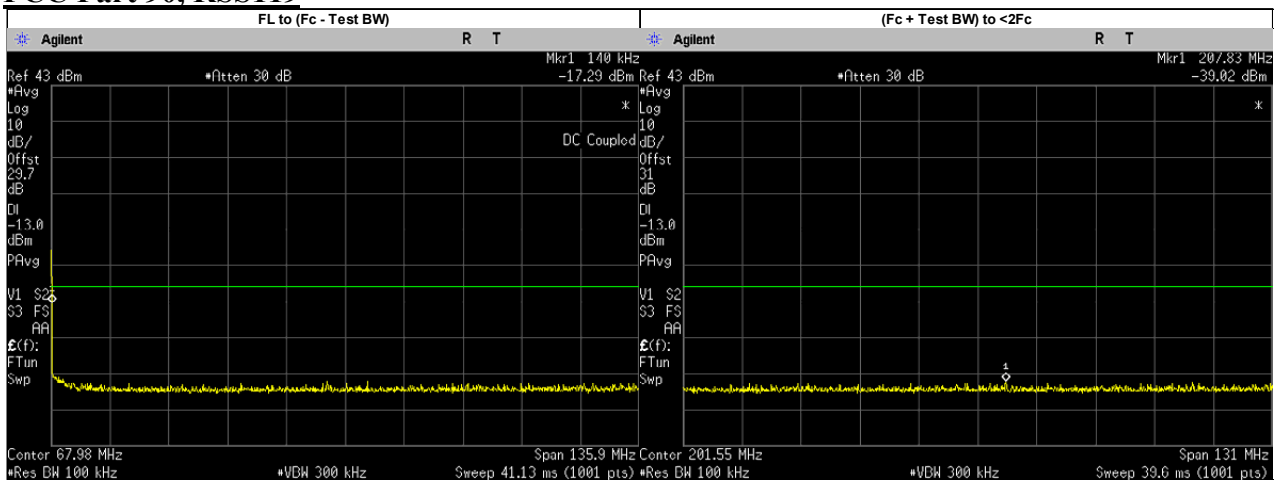
<u>Analog:</u> 136.0125 MHz, 25.0kHz Channel Spacing, Max Power
<u>FCC Part 90, RSS119</u>

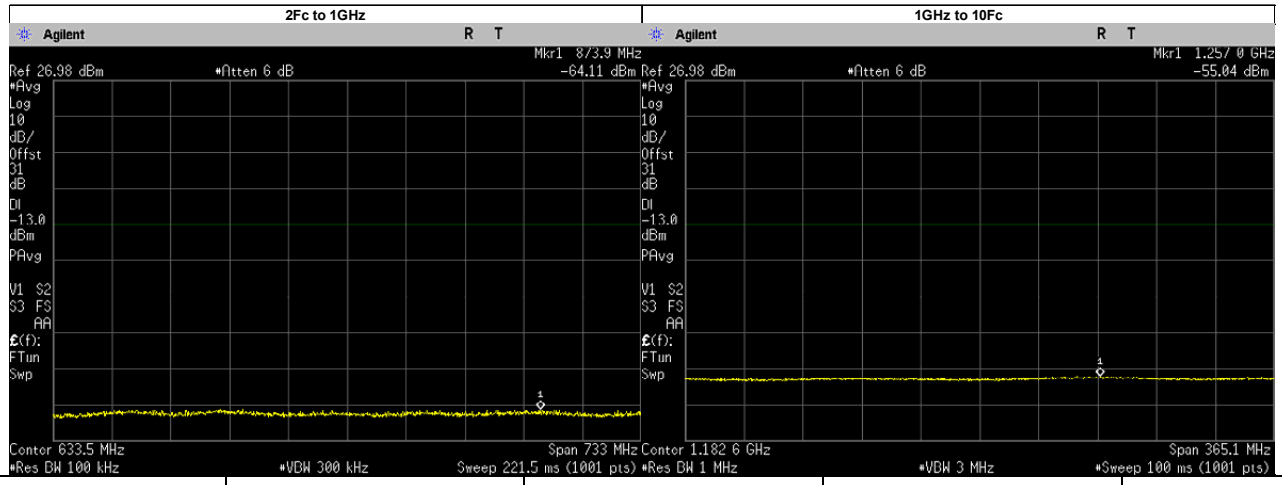




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	0.6887	-35.8800	-13.00	PASS
(Fc + Test BW) to <2Fc	264.5368	-38.7600	-13.00	PASS
2Fc to 1GHz	498.6451	-64.0500	-13.00	PASS
	272.0250	-66.2516	-13.00	PASS
	408.0375	-65.1406	-13.00	PASS
	544.0500	-65.3835	-13.00	PASS
	680.0625	-65.7167	-13.00	PASS
	816.0750	-65.6126	-13.00	PASS
	952.0875	-65.9294	-13.00	PASS
1GHz to 10Fc	1256.6830	-54.9100	-13.00	PASS
	1088.1000	-55.7758	-13.00	PASS
	1224.1120	-55.3981	-13.00	PASS
	1360.1250	-55.6518	-13.00	PASS

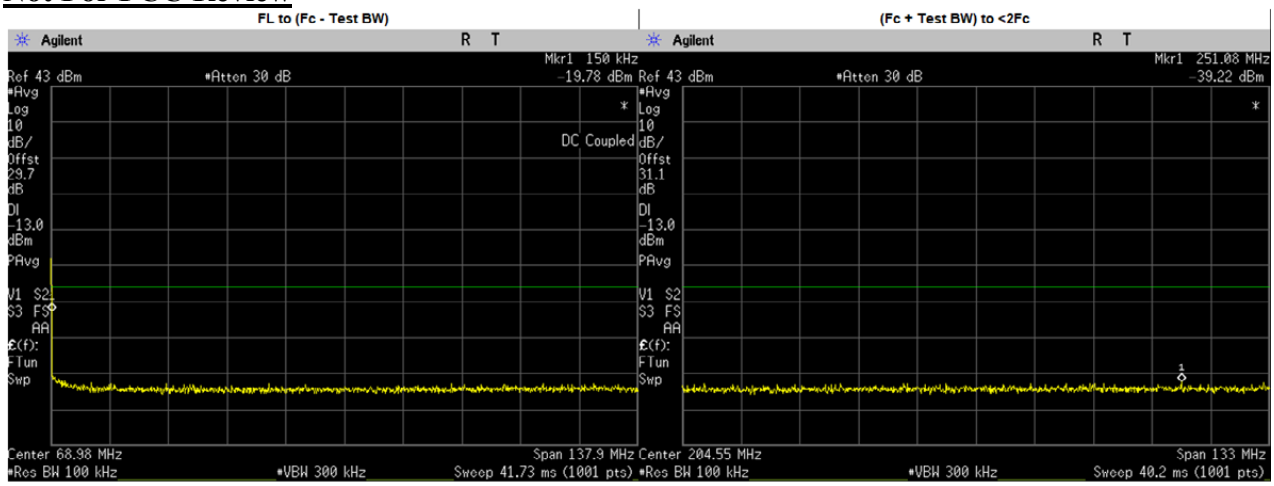
Analog: 136.0125 MHz, 25.0kHz Channel Spacing, Low Power
FCC Part 90, RSS119

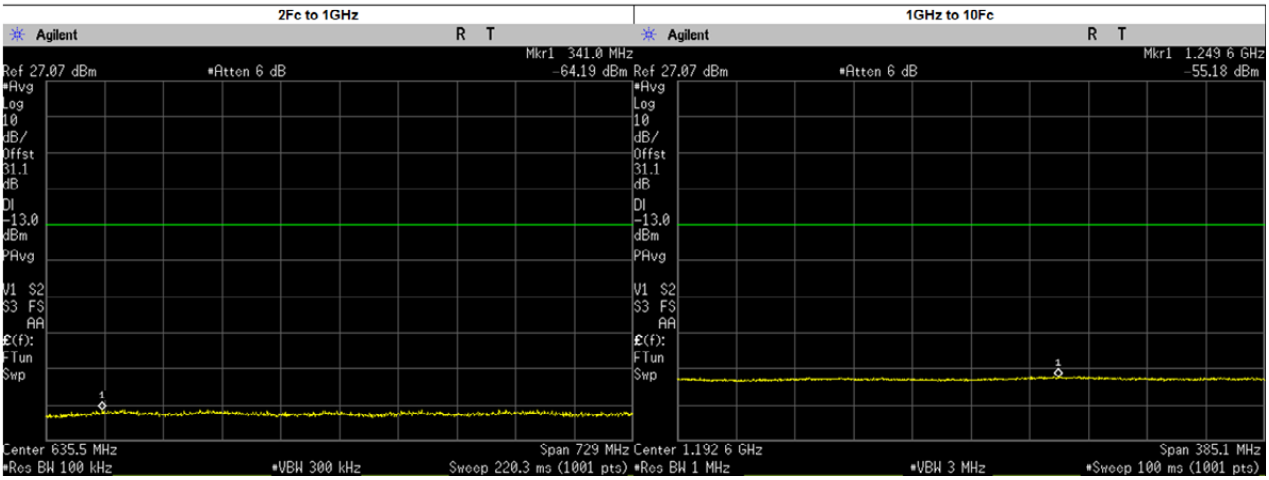




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.2325	-37.9600	-13.00	PASS
(Fc + Test BW) to <2Fc	207.8325	-39.0200	-13.00	PASS
2Fc to 1GHz	873.9283	-64.1100	-13.00	PASS
	821.8871	-64.3400	-13.00	PASS
	272.0250	-66.2361	-13.00	PASS
	408.0375	-65.5259	-13.00	PASS
	544.0500	-65.4062	-13.00	PASS
	680.0625	-65.7078	-13.00	PASS
	816.0750	-65.4059	-13.00	PASS
	952.0875	-65.8979	-13.00	PASS
1GHz to 10Fc	1257.0480	-55.0400	-13.00	PASS
	1088.1000	-55.7457	-13.00	PASS
	1224.1120	-55.8632	-13.00	PASS
	1360.1250	-55.8301	-13.00	PASS

<u>Analog:</u> 138.0125 MHz, 25.0kHz Channel Spacing, Max Power
<u>Not For FCC Review</u>

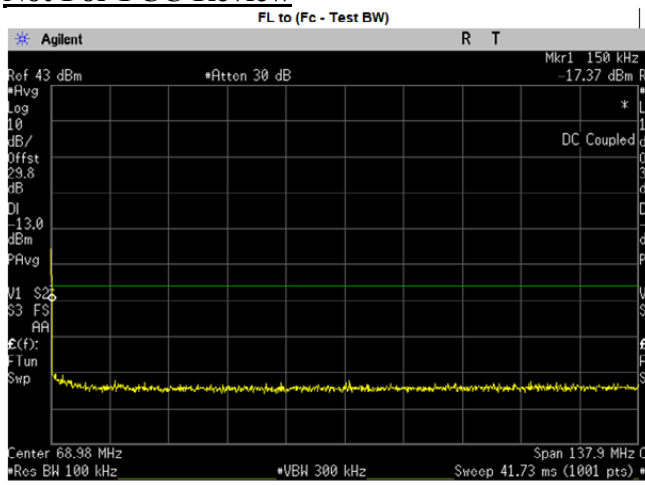




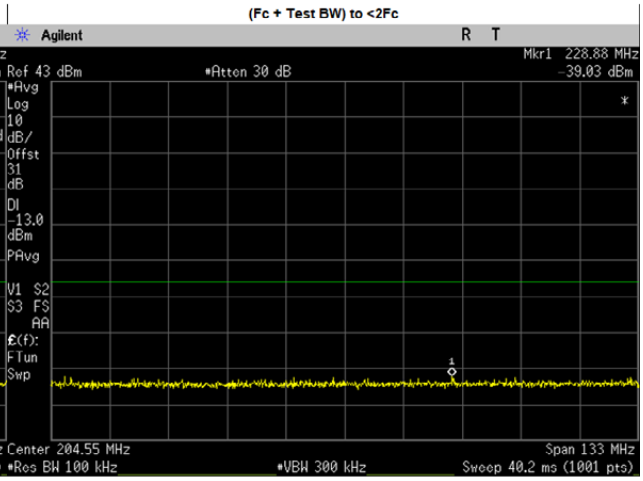
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.2505	-38.7700	-13.00	PASS
(Fc + Test BW) to <2Fc	251.0815	-39.2200	-13.00	PASS
2Fc to 1GHz	341.0066	-64.1900	-13.00	PASS
	276.0250	-65.5821	-13.00	PASS
	414.0375	-65.6358	-13.00	PASS
	552.0500	-65.6911	-13.00	PASS
	690.0625	-65.4853	-13.00	PASS
	828.0750	-65.4017	-13.00	PASS
	966.0875	-65.6533	-13.00	PASS
1GHz to 10Fc	1249.5610	-55.1800	-13.00	PASS
	1104.1000	-55.6611	-13.00	PASS
	1242.1120	-55.4249	-13.00	PASS
	1380.1250	-55.6805	-13.00	PASS

Analog: 138.0125 MHz, 25.0kHz Channel Spacing, Low Power
Not For FCC Review

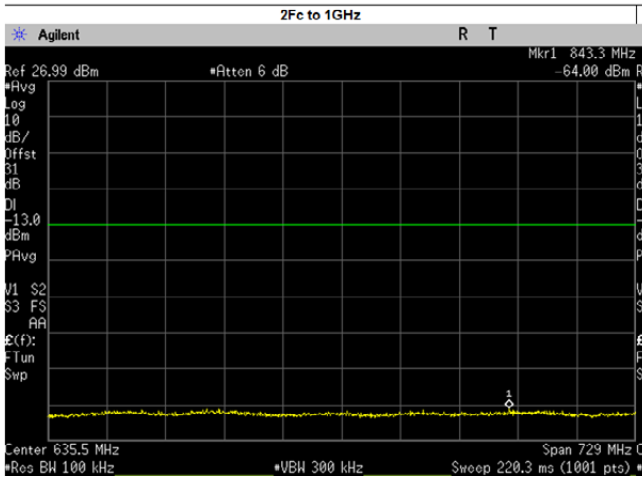
FL to (Fc - Test BW)



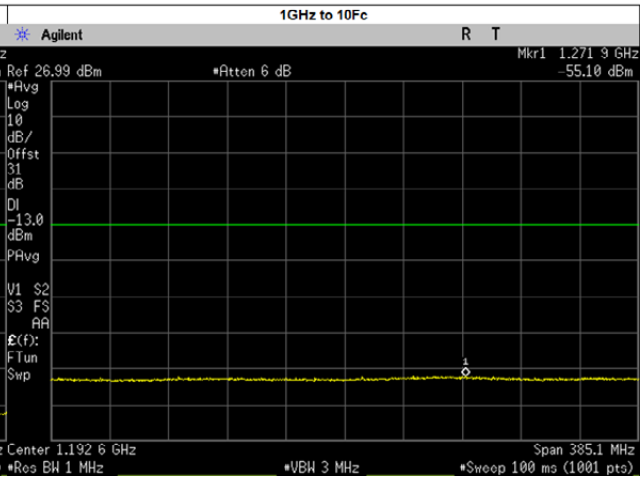
(Fc + Test BW) to <2Fc



2Fc to 1GHz

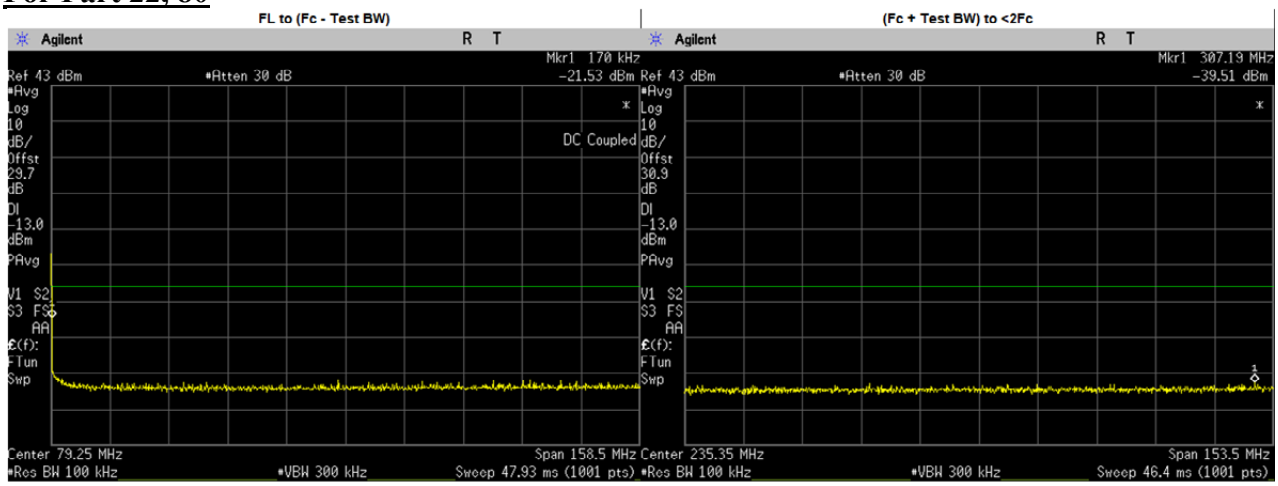


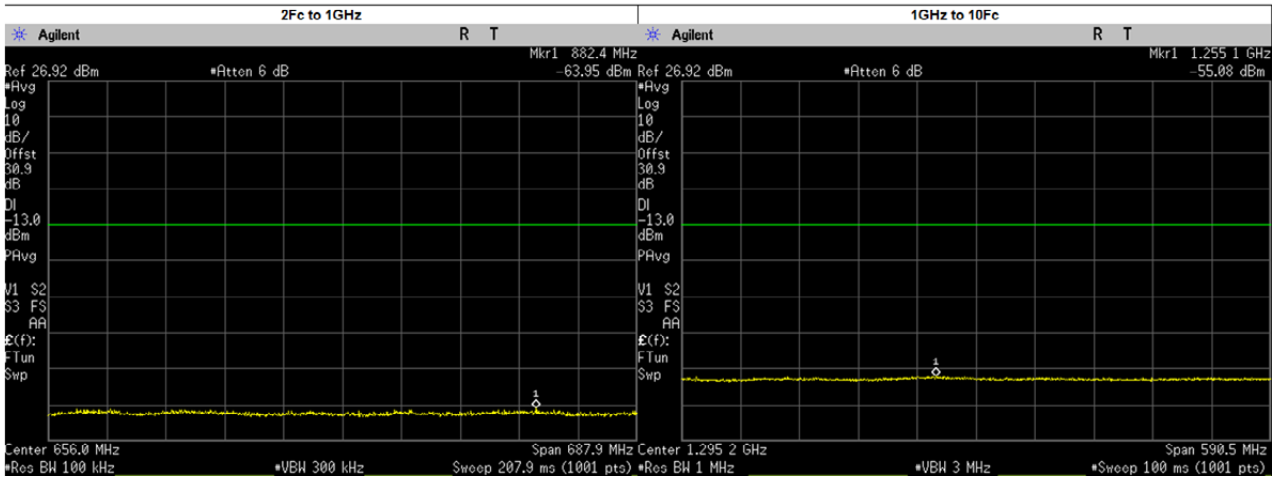
1GHz to 10Fc



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.1126	-37.3400	-13.00	PASS
(Fc + Test BW) to <2Fc	228.8777	-39.0300	-13.00	PASS
2Fc to 1GHz	843.2704	-64.0000	-13.00	PASS
	276.0250	-66.2718	-13.00	PASS
	414.0375	-65.6122	-13.00	PASS
	552.0500	-65.7501	-13.00	PASS
	690.0625	-65.8762	-13.00	PASS
	828.0750	-65.2090	-13.00	PASS
	966.0875	-65.8380	-13.00	PASS
1GHz to 10Fc	1271.8980	-55.1000	-13.00	PASS
	1104.1000	-55.7190	-13.00	PASS
	1242.1120	-55.6582	-13.00	PASS
	1380.1250	-55.7077	-13.00	PASS

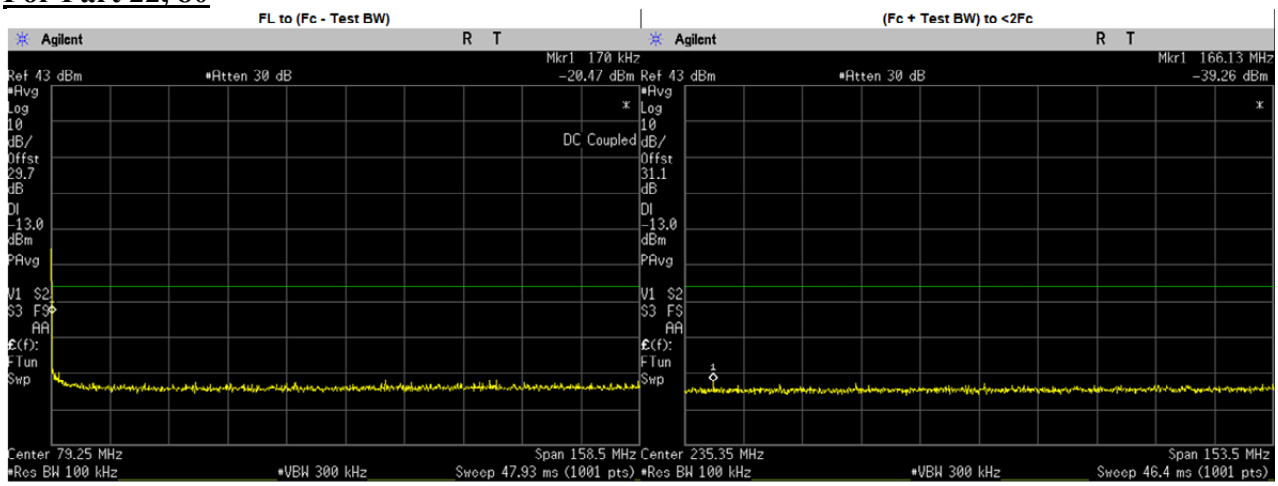
<u>Analog:</u> 158.55 MHz, 25.0kHz Channel Spacing, Max Power <u>For Part 22, 80</u>

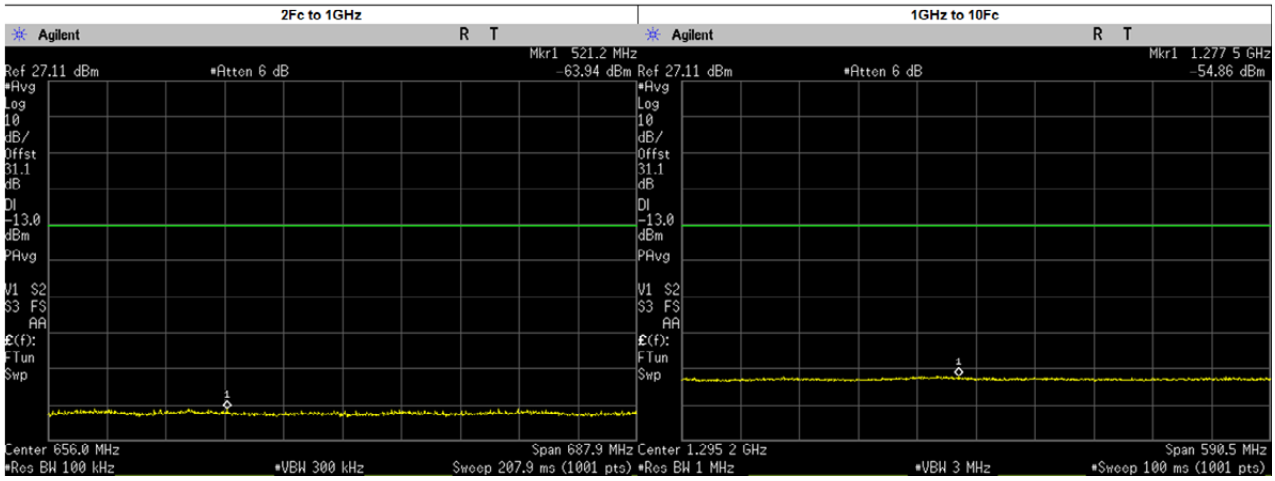




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.1184	-37.9900	-13.00	PASS
(Fc + Test BW) to <2Fc	307.1882	-39.5100	-13.00	PASS
2Fc to 1GHz	882.3691	-63.9500	-13.00	PASS
	317.1000	-65.8609	-13.00	PASS
	475.6500	-64.9798	-13.00	PASS
	634.2000	-65.6839	-13.00	PASS
	792.7500	-65.7930	-13.00	PASS
	951.3000	-65.9649	-13.00	PASS
1GHz to 10Fc	1255.0960	-55.0800	-13.00	PASS
	1109.8500	-55.8665	-13.00	PASS
	1268.4000	-55.7560	-13.00	PASS
	1426.9500	-55.9746	-13.00	PASS
	1585.5000	-55.9628	-13.00	PASS

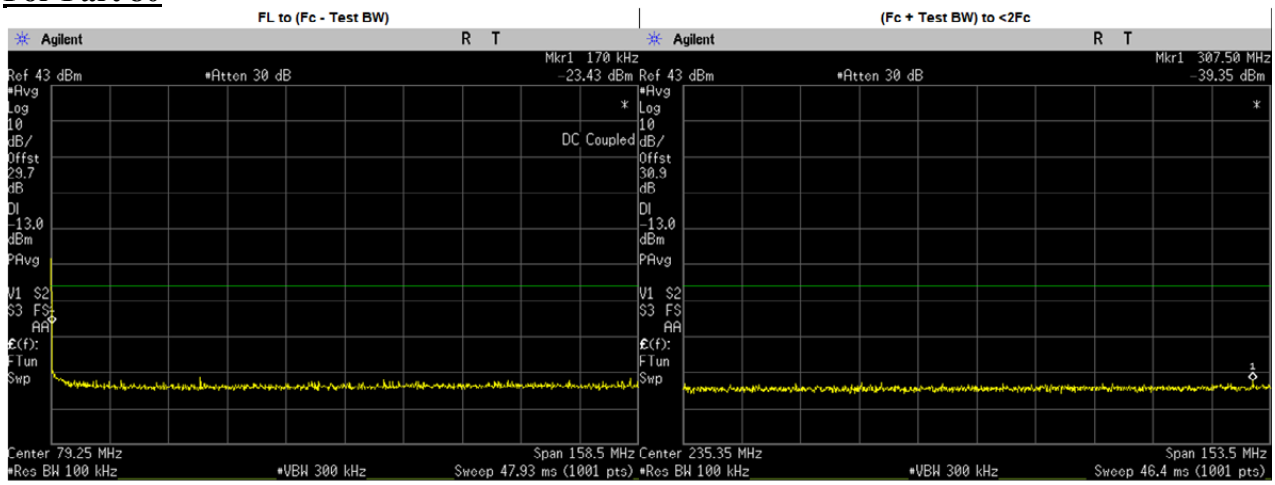
<u>Analog:</u> 158.55 MHz, 25.0kHz Channel Spacing, Low Power
<u>For Part 22, 80</u>

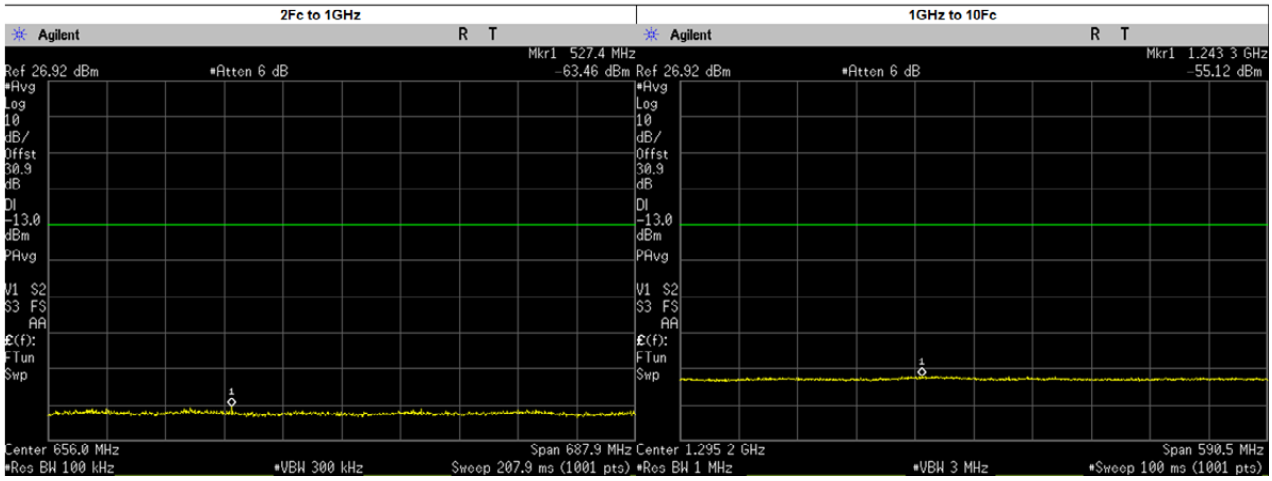




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.4354	-37.7000	-13.00	PASS
(Fc + Test BW) to <2Fc	166.1268	-39.2600	-13.00	PASS
2Fc to 1GHz	521.2216	-63.9400	-13.00	PASS
	317.1000	-65.0878	-13.00	PASS
	475.6500	-64.4726	-13.00	PASS
	634.2000	-65.4683	-13.00	PASS
	792.7500	-65.4036	-13.00	PASS
	951.3000	-65.6622	-13.00	PASS
1GHz to 10Fc	1277.5350	-54.8600	-13.00	PASS
	1109.8500	-55.5768	-13.00	PASS
	1268.4000	-55.5010	-13.00	PASS
	1426.9500	-55.7717	-13.00	PASS
	1585.5000	-55.5761	-13.00	PASS

<u>Analog:</u> 158.55 MHz, 25.0kHz Channel Spacing, Max Power 50W
<u>For Part 80</u>

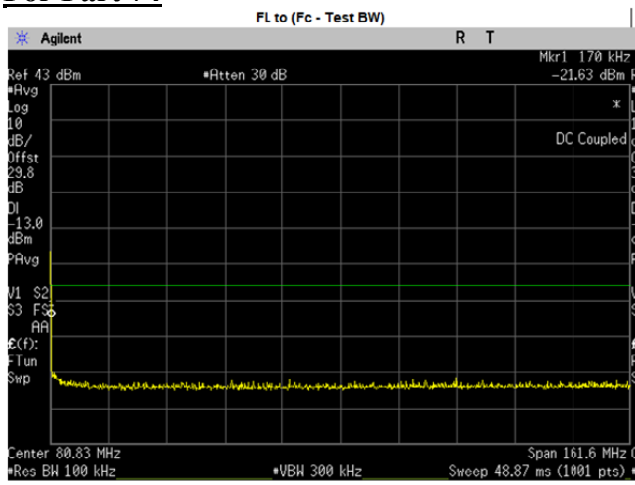




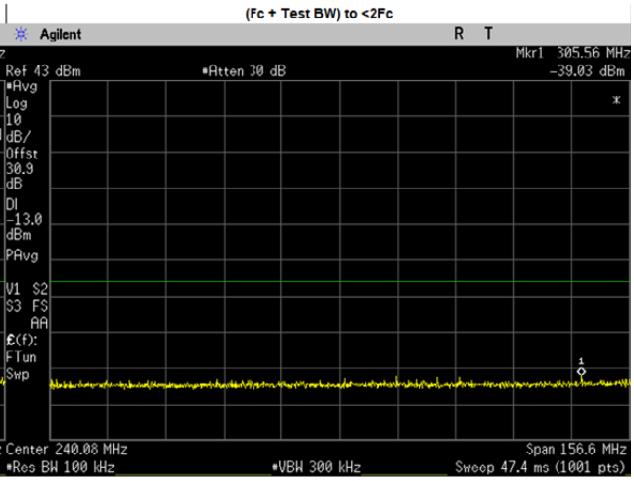
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	40.2643	-38.1100	-13.00	PASS
(Fc + Test BW) to <2Fc	307.4952	-39.3500	-13.00	PASS
2Fc to 1GHz	527.4127	-63.4600	-13.00	PASS
	317.1000	-65.4982	-13.00	PASS
	475.6500	-64.9778	-13.00	PASS
	634.2000	-65.2020	-13.00	PASS
	792.7500	-65.5715	-13.00	PASS
	951.3000	-65.7597	-13.00	PASS
1GHz to 10Fc	1243.2860	-55.1200	-13.00	PASS
	1109.8500	-55.8282	-13.00	PASS
	1268.4000	-55.5559	-13.00	PASS
	1426.9500	-55.8808	-13.00	PASS
	1585.5000	-55.9745	-13.00	PASS

Analog: 161.7 MHz, 25.0kHz Channel Spacing, Max Power For Part 74

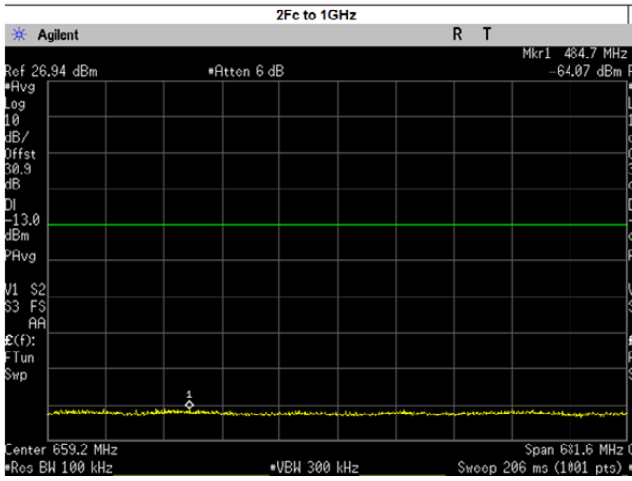
FL to (Fc - Test BW)



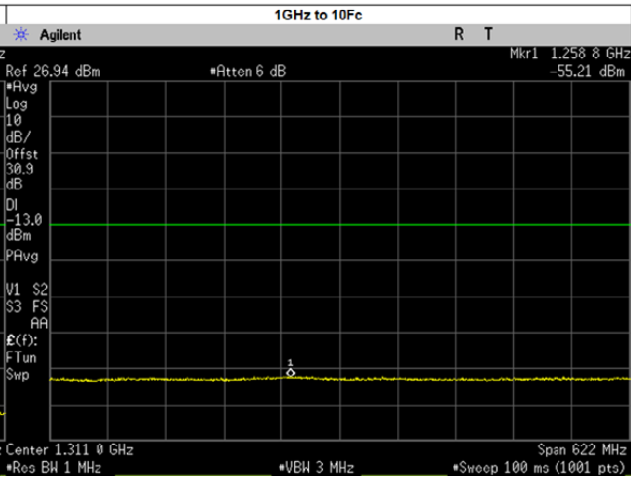
(Fc + Test BW) to <2Fc



2Fc to 1GHz

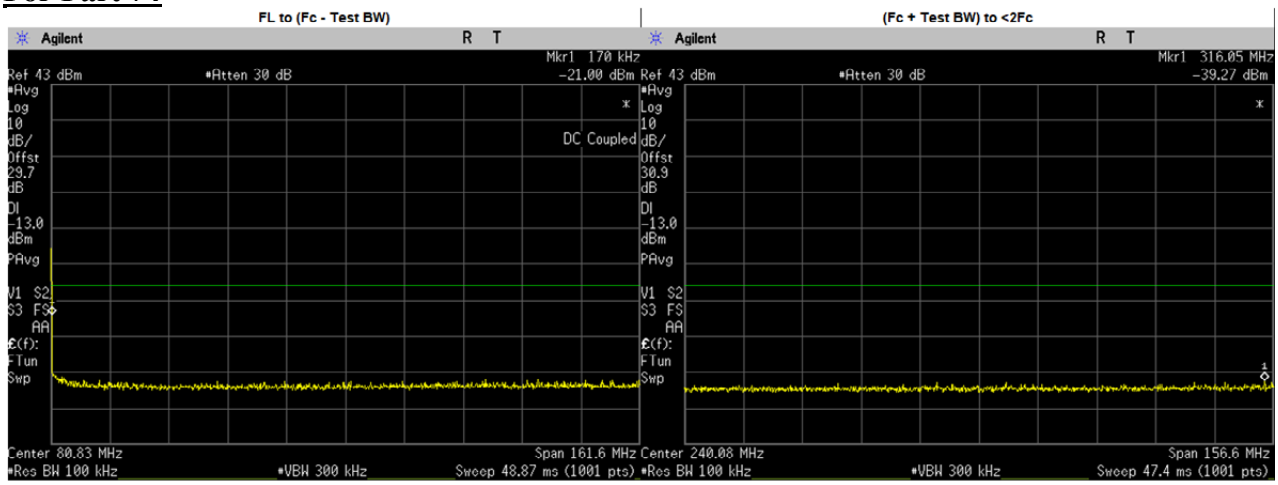


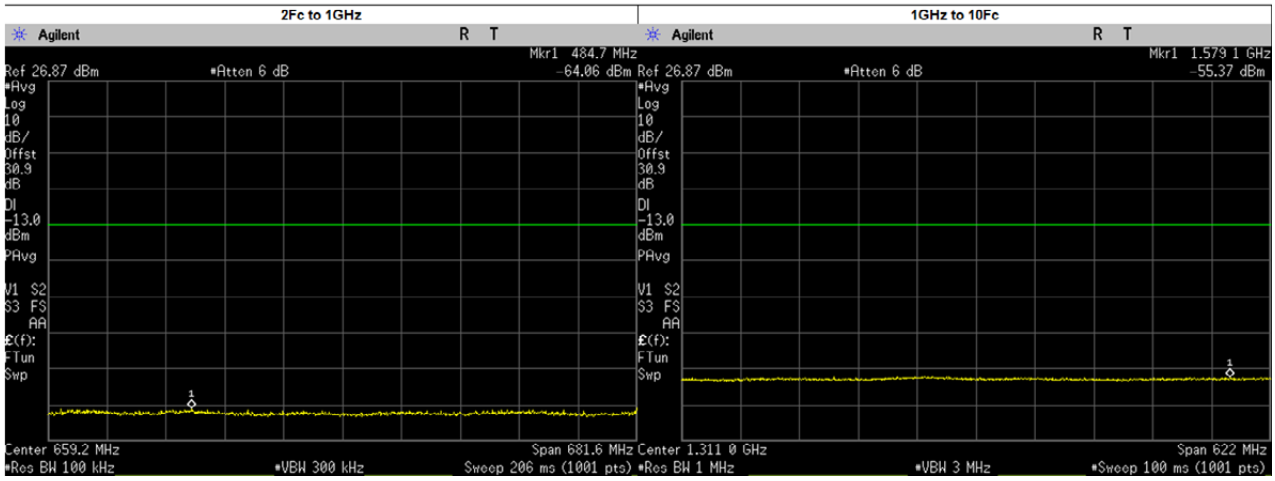
1GHz to 10Fc



Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.4637	-37.7400	-13.00	PASS
(Fc + Test BW) to <2Fc	305.5552	-39.0200	-13.00	PASS
2Fc to 1GHz	484.7104	-64.0700	-13.00	PASS
	323.4000	-65.6646	-13.00	PASS
	485.1000	-64.5812	-13.00	PASS
	646.8000	-65.6380	-13.00	PASS
	808.5000	-65.5590	-13.00	PASS
	970.2000	-65.5840	-13.00	PASS
1GHz to 10Fc	1258.7520	-55.2100	-13.00	PASS
	1131.9000	-55.9688	-13.00	PASS
	1293.6000	-55.9718	-13.00	PASS
	1455.3000	-56.0963	-13.00	PASS
	1617.0000	-55.8422	-13.00	PASS

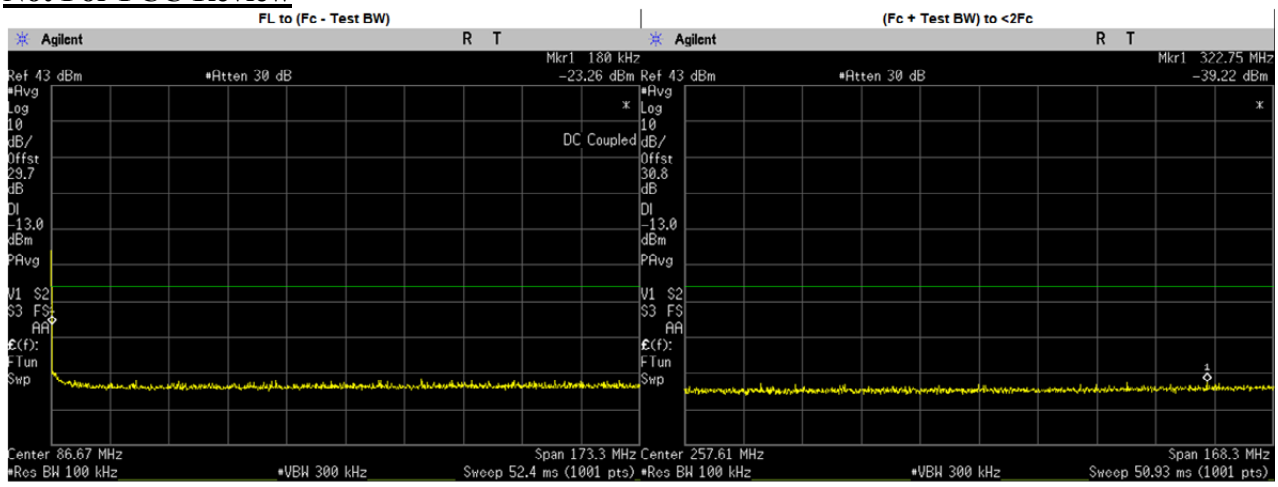
Analog: 161.7 MHz, 25.0kHz Channel Spacing, Low Power For Part 74

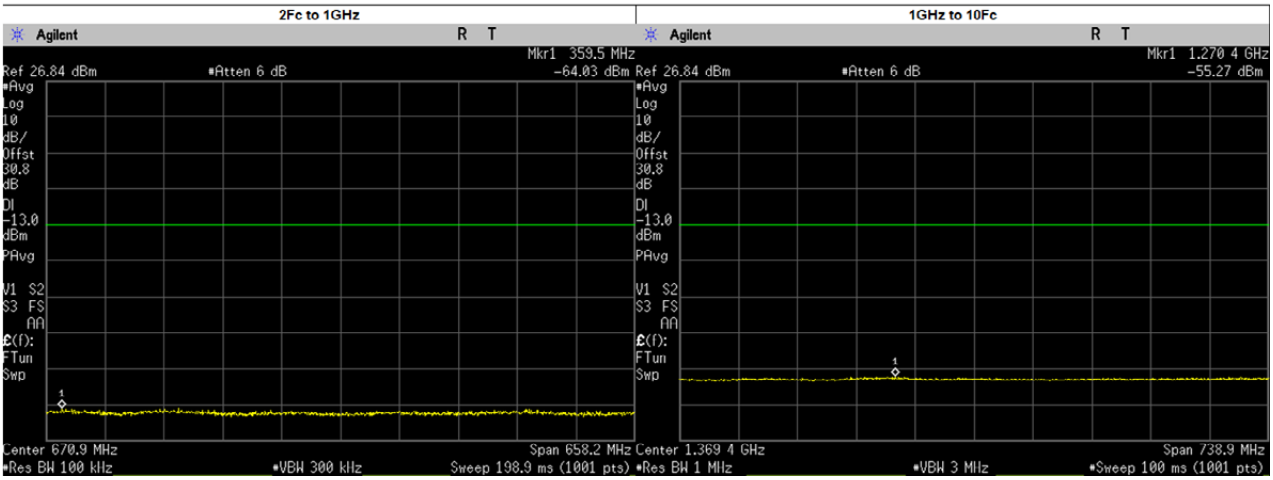




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.3021	-38.0200	-13.00	PASS
(Fc + Test BW) to <2Fc	316.0503	-39.2700	-13.00	PASS
2Fc to 1GHz	484.7104	-64.0600	-13.00	PASS
	323.4000	-65.3220	-13.00	PASS
	485.1000	-64.4963	-13.00	PASS
	646.8000	-65.5770	-13.00	PASS
	808.5000	-65.3757	-13.00	PASS
	970.2000	-65.4699	-13.00	PASS
1GHz to 10Fc	1579.0820	-55.3700	-13.00	PASS
	1131.9000	-55.8671	-13.00	PASS
	1293.6000	-55.8902	-13.00	PASS
	1455.3000	-56.1037	-13.00	PASS
	1617.0000	-55.8695	-13.00	PASS

<u>Analog:</u> 173.3875 MHz, 25.0kHz Channel Spacing, Max Power
<u>Not For FCC Review</u>

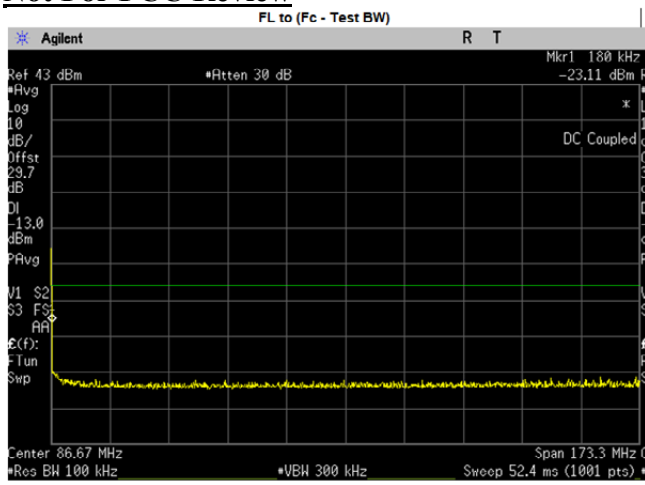




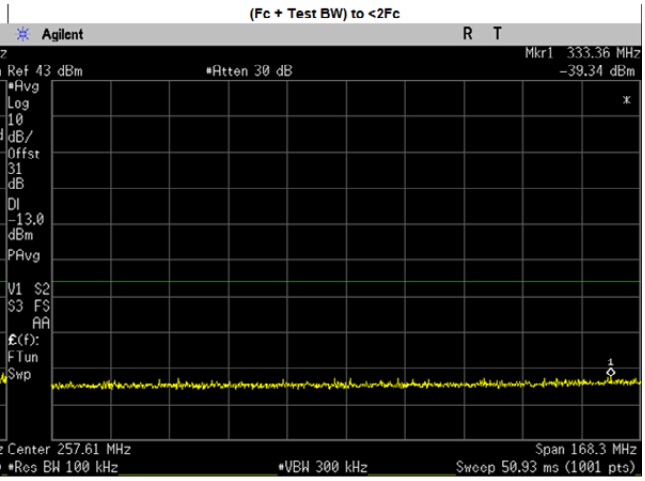
Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.0489	-36.9800	-13.00	PASS
(Fc + Test BW) to <2Fc	322.7535	-39.2300	-13.00	PASS
2Fc to 1GHz	359.5471	-64.0300	-13.00	PASS
	346.7750	-64.8871	-13.00	PASS
	520.1625	-65.4200	-13.00	PASS
	693.5500	-65.5141	-13.00	PASS
	866.9375	-64.8760	-13.00	PASS
1GHz to 10Fc	1270.4280	-55.2700	-13.00	PASS
	1040.3250	-56.3113	-13.00	PASS
	1213.7130	-55.9324	-13.00	PASS
	1387.1000	-56.2639	-13.00	PASS
	1560.4870	-56.1381	-13.00	PASS
	1733.8750	-55.6534	-13.00	PASS

Analog: 173.3875 MHz, 25.0kHz Channel Spacing, Low Power
Not For FCC Review

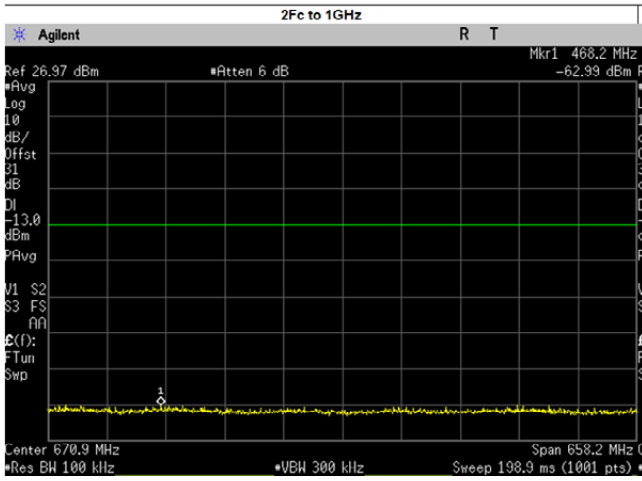
FL to (Fc - Test BW)



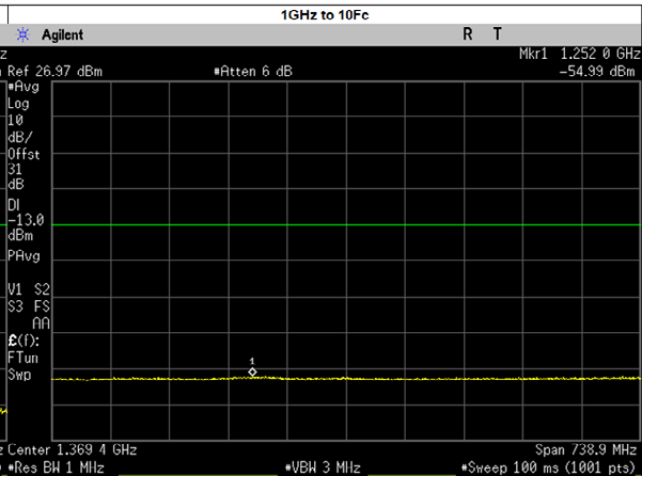
(Fc + Test BW) to <2Fc



2Fc to 1GHz



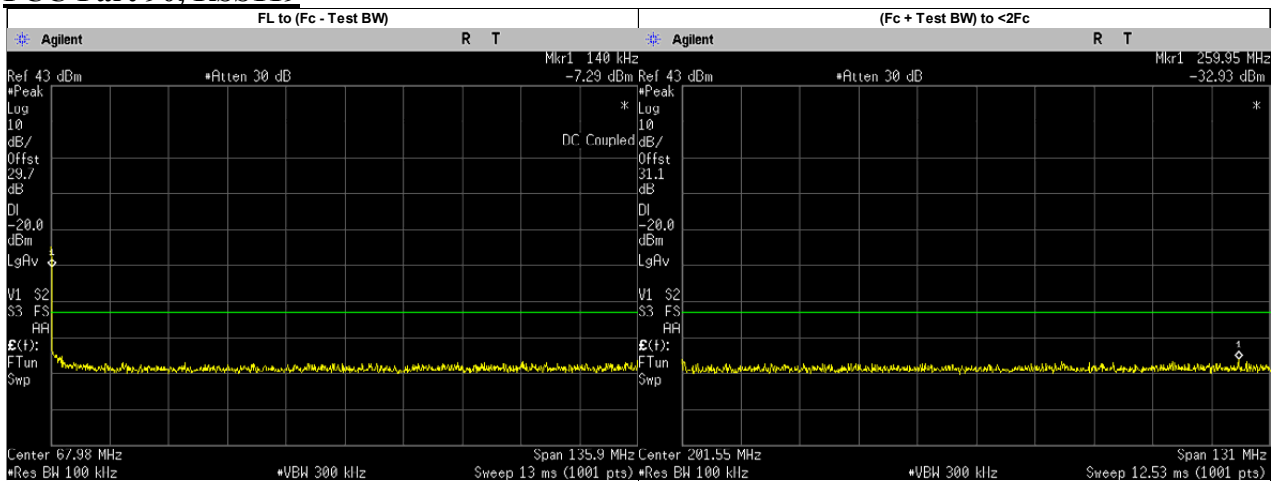
1GHz to 10Fc

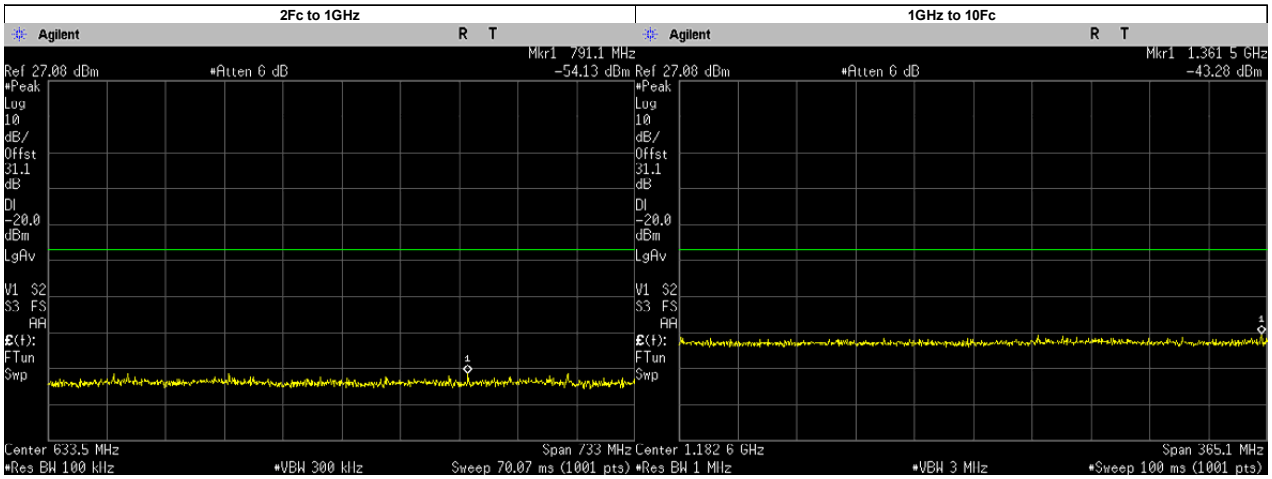


Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.0489	-37.4600	-13.00	PASS
(Fc + Test BW) to <2Fc	333.3584	-39.3400	-13.00	PASS
2Fc to 1GHz	468.1542	-62.9900	-13.00	PASS
	346.7750	-64.5608	-13.00	PASS
	520.1625	-64.4979	-13.00	PASS
	693.5500	-65.3481	-13.00	PASS
	866.9375	-64.6169	-13.00	PASS
1GHz to 10Fc	1251.9560	-54.9900	-13.00	PASS
	1040.3250	-55.9974	-13.00	PASS
	1213.7130	-55.6245	-13.00	PASS
	1387.1000	-55.8107	-13.00	PASS
	1560.4870	-55.7358	-13.00	PASS
	1733.8750	-55.5164	-13.00	PASS

6.10.3. Test Result (Digital)

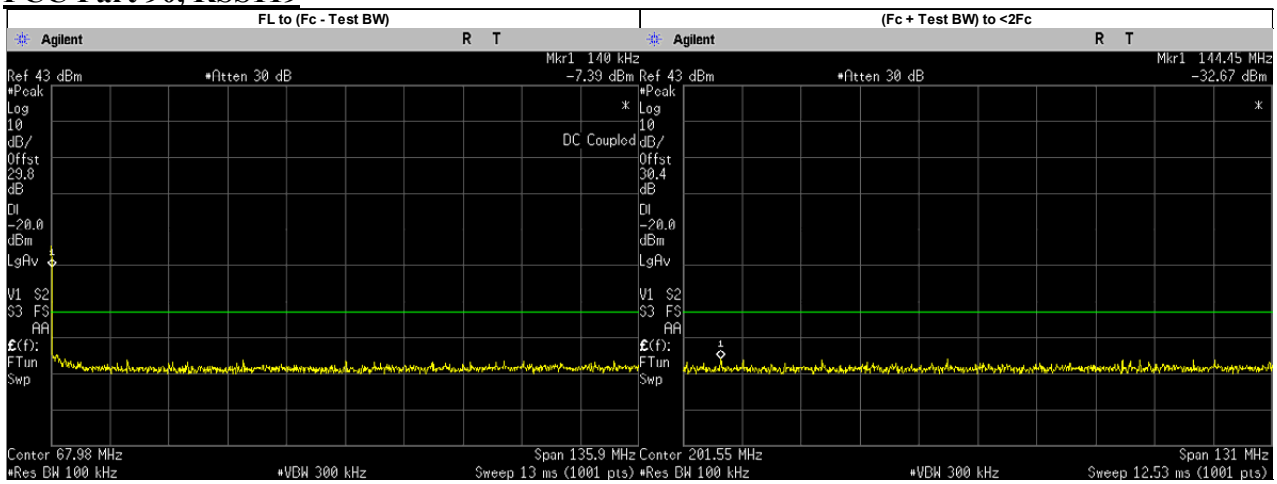
C4FM: 136.0125 MHz, 12.5 kHz Channel Spacing, Max Power
FCC Part 90, RSS119

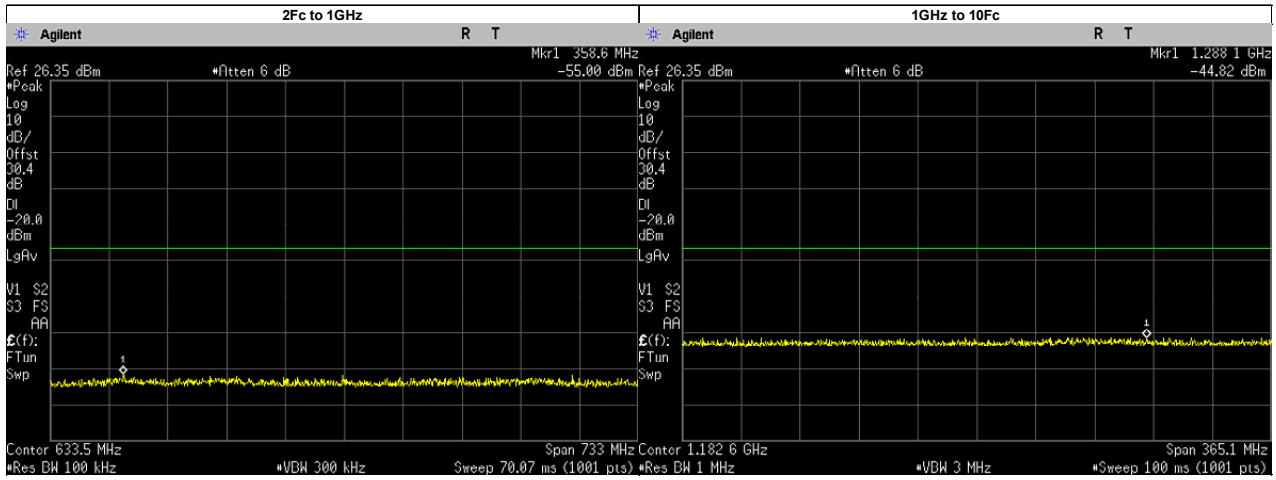




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	0.5528	-31.4689	-20.00	PASS
(Fc + Test BW) to <2Fc	259.9533	-32.9300	-20.00	PASS
2Fc to 1GHz	791.1021	-54.1300	-20.00	PASS
	272.0250	-57.4962	-20.00	PASS
	408.0375	-56.6710	-20.00	PASS
	544.0500	-57.5547	-20.00	PASS
	680.0625	-57.1762	-20.00	PASS
	816.0750	-56.9343	-20.00	PASS
	952.0875	-56.9334	-20.00	PASS
1GHz to 10Fc	1361.4740	-43.2800	-20.00	PASS
	1088.1000	-45.6183	-20.00	PASS
	1224.1120	-45.8030	-20.00	PASS
	1360.1250	-45.8645	-20.00	PASS

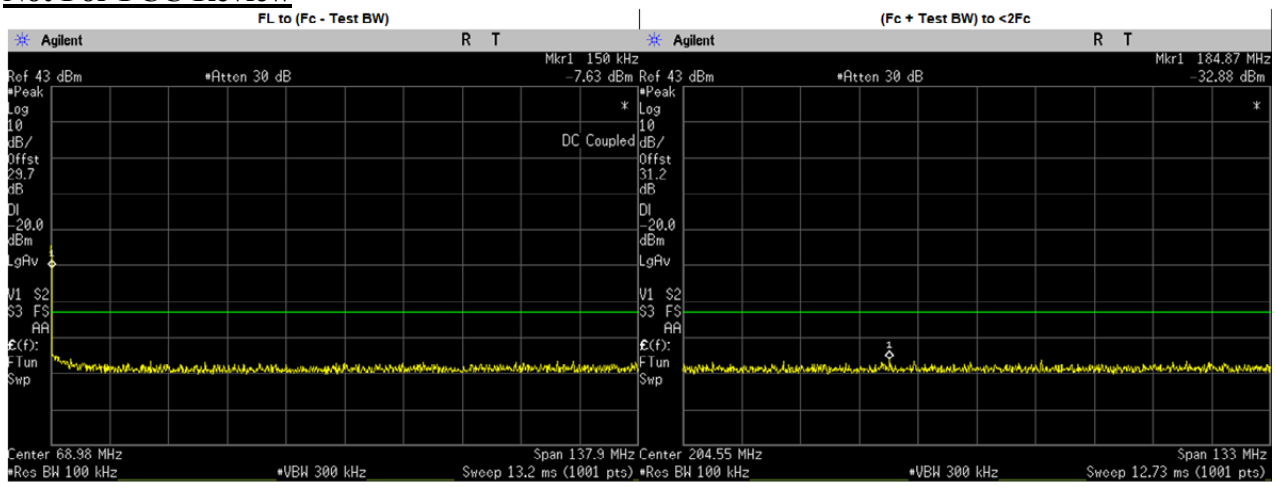
C4FM: 136.0125 MHz, 12.5 kHz Channel Spacing, Low Power FCC Part 90, RSS119

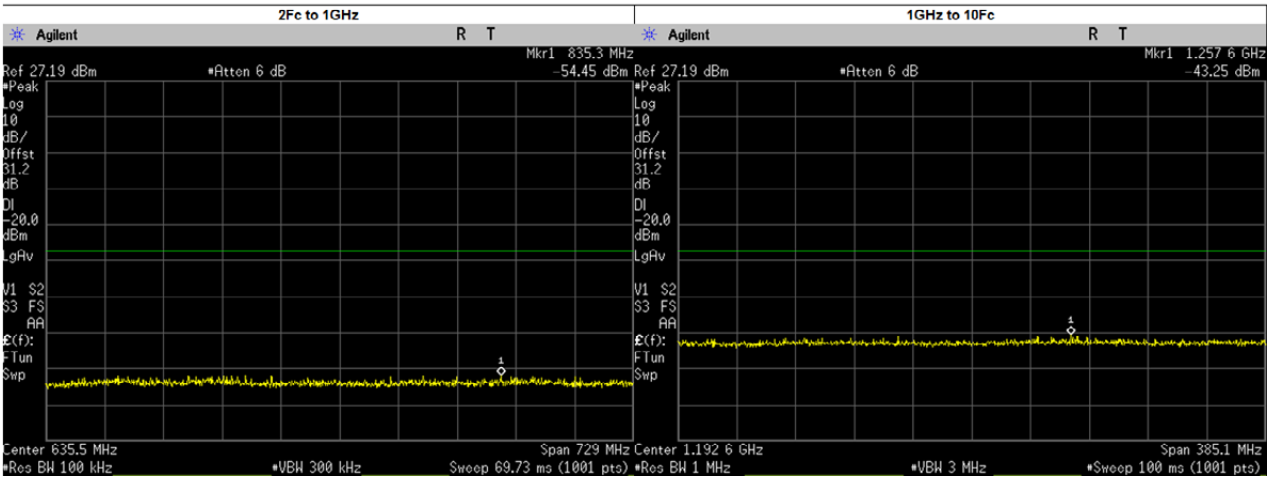




Frequency Range	Highest Spur Frequency (MHz)	Spurious Level (dBm)	Failing Limit (dBm)	Results
FL to (Fc - Test BW)	1.3685	-31.7958	-20.00	PASS
(Fc + Test BW) to <2Fc	144.4494	-32.6700	-20.00	PASS
2Fc to 1GHz	358.6469	-55.0000	-20.00	PASS
	272.0250	-57.7007	-20.00	PASS
	408.0375	-57.4505	-20.00	PASS
	544.0500	-56.9458	-20.00	PASS
	680.0625	-57.7029	-20.00	PASS
	816.0750	-57.7596	-20.00	PASS
	952.0875	-57.6929	-20.00	PASS
1GHz to 10Fc	1288.0840	-44.8200	-20.00	PASS
	1088.1000	-46.5494	-20.00	PASS
	1224.1120	-46.2962	-20.00	PASS
	1360.1250	-46.4039	-20.00	PASS

C4FM: 138.0125 MHz, 12.5 kHz 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)	1.2505	-32.0396	-20.00	PASS
(Fc + Test BW) to <2Fc	184.8689	-35.3267	-20.00	PASS
2Fc to 1GHz	835.2517	-54.4500	-20.00	PASS
	276.0250	-57.4256	-20.00	PASS
	414.0375	-56.5070	-20.00	PASS
	552.0500	-56.4540	-20.00	PASS
	690.0625	-56.8163	-20.00	PASS
	828.0750	-55.9109	-20.00	PASS
	966.0875	-57.1088	-20.00	PASS
1GHz to 10Fc	1257.6490	-43.2500	-20.00	PASS
	1104.1000	-45.4748	-20.00	PASS
	1242.1120	-45.4303	-20.00	PASS
	1380.1250	-46.1273	-20.00	PASS