

	    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																																				
<table style="width: 100%;"> <tr> <td style="width: 30%;">Date/s Tested</td> <td style="width: 30%;">: 22-SEP-2020 - 01-OCT-2020</td> <td rowspan="10" style="width: 30%; text-align: center; vertical-align: middle;">  </td> </tr> <tr> <td>Report Issue Date</td> <td>: 23-OCT-2020</td> </tr> <tr> <td>Manufacturer</td> <td>: MOTOROLA SOLUTIONS INC. (ELGIN)</td> </tr> <tr> <td>Manufacturer Address</td> <td>: 2540 GALVIN DR ELGIN, IL 60124</td> </tr> <tr> <td>Requestor</td> <td>: TEH TIAN HONG</td> </tr> <tr> <td>Product Type</td> <td>: Base Station</td> </tr> <tr> <td>Product Version (PMN)</td> <td>: GTR 8000</td> </tr> <tr> <td>Model Number (HVIN)</td> <td>: T7039A (HVIN : T7039-VHFB)</td> </tr> <tr> <td>Frequency Band</td> <td>: 136-174MHz</td> </tr> <tr> <td>Max RF Output Power</td> <td>: 100 Watts</td> </tr> <tr> <td>Applicant Name</td> <td>: Motorola Solutions Inc</td> <td rowspan="3"></td> </tr> <tr> <td>Applicant Address</td> <td>: 1303 E Algonquin Road, Room 1043, Schaumburg, IL, 60196</td> </tr> <tr> <td>ISED Registrations</td> <td>: MY0001</td> </tr> <tr> <td>FCC Registrations</td> <td>: 461337</td> <td></td> </tr> <tr> <td>Firmware Version (FVIN)</td> <td>: R35.00.09</td> <td></td> </tr> </table> The equipment was tested accordance to the requirement listed below: <table style="width: 100%;"> <tr> <td style="width: 60%;"> (LMR) FCC 47 CFR Part 22/ 74/ 80/ 90 ISED RSS 119/182 </td> <td style="width: 40%; text-align: center; vertical-align: middle;"> PASS </td> </tr> </table>		Date/s Tested	: 22-SEP-2020 - 01-OCT-2020		Report Issue Date	: 23-OCT-2020	Manufacturer	: MOTOROLA SOLUTIONS INC. (ELGIN)	Manufacturer Address	: 2540 GALVIN DR ELGIN, IL 60124	Requestor	: TEH TIAN HONG	Product Type	: Base Station	Product Version (PMN)	: GTR 8000	Model Number (HVIN)	: T7039A (HVIN : T7039-VHFB)	Frequency Band	: 136-174MHz	Max RF Output Power	: 100 Watts	Applicant Name	: Motorola Solutions Inc		Applicant Address	: 1303 E Algonquin Road, Room 1043, Schaumburg, IL, 60196	ISED Registrations	: MY0001	FCC Registrations	: 461337		Firmware Version (FVIN)	: R35.00.09		(LMR) FCC 47 CFR Part 22/ 74/ 80/ 90 ISED RSS 119/182	PASS
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Prepared By: _____ Gan Boon Teong Test Personnel	Approved Signatory: _____ Vincent Foong Chuen Kit Responsible Engineer																																				

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Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	1-OCT-2020	Gan Boon Teong
Rev. B	Update Manufacturer / Location, Manufacturer Address, Applicant Name and Address	16-OCT-2020	Gan Boon Teong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, C4FM, HDQPSK, LSM, FSK

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
LINECORD PLUG & RECP 3.7 MTRS	MOTOROLA	3082933N20

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, 90.541, 22.565, 74.461, 80.215	RSS-119	RF Power Output	Pass		112CWR0919
2.1055, 90.213, 22.355	RSS-119	Frequency Stability	Pass		112CWR0919
2.1047, 74.463, 80.213	RSS-119	Audio Frequency Response	Pass		112CWR0919
2.1047, 74.463, 80.213	RSS-119	Audio Low Pass Filter Response	Pass		112CWR0919
2.1047, 74.463, 80.213	RSS-119	Modulation limiting	Pass		112CWR0919
2.1049, 90.210, 22.359, 74.462, 74.535, 80.211(c), 80.211 (f)	RSS-119 RSS-182	Occupied Bandwidth	Pass	16K0F3E- 14.8450kHz 16K0F1D- 8.0290kHz 11K0F3E- 9.8981kHz 10K0F1D- 5.5335kHz 9K80D7D- 9.7318kHz 9K80D7E- 9.7657kHz 9K80D7W- 9.7977kHz 8K10F1D- 7.3518kHz 8K10F1E- 7.3534kHz 8K10F1W- 7.3528kHz 8K70D1D- 8.6263kHz 8K70D1E- 8.6659kHz 8K70D1W- 8.6023kHz	112CWR0919
22.359 (a), (b)	RSS-119	Band Edge Conducted Spurious Emission	Pass		112CWR0919
90.214	RSS-119	Transient Frequency Behavior	Pass		112CWR0919
-	-	Adjacent Channel Power	NA		
Low end of the band, 22, 80, 90, 74D, 74H	RSS-119	Conducted Spurious Emissions	Pass	Highest emission: -24.82 dBm	112CWR0919
Low end of the band, 22, 80, 90, 74D, 74H	RSS-119	Radiated Spurious Emission	Pass	Highest emission: -47.09 dBm	112CWR0920
-	-	GNSS (EIRP for 1559 – 1610MHz)	NA		

-	-	Effective Radiated Power (ERP)	NA		
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NA → Not Applicable

3.0 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=1.96) (± dB)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	4.03 dB
	200MHz ~ 1000MHz	4.03 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	4.03 dB
	18GHz ~ 25GHz	4.03 dB
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82 dB
Frequency Stability	9kHz ~ 12.75GHz	0.0085 ppm
Audio Frequency / Low Pass Filter Response	300Hz ~ 20kHz	4.09%
Modulation Limiting	300Hz ~ 3kHz	1.15%
Occupied Bandwidth	9kHz ~ 12.75GHz	2.82 dB
Band Edge Conducted Spurious Emission	9kHz ~ 12.75GHz	2.82 dB
Transient Frequency Behavior	9kHz ~ 12.75GHz	5.4 ms
Adjacent Channel Power	9kHz ~ 12.75GHz	2.82 dB

4.0 Equipment List

FCC Analog ATE#1: (SW version: 2.4.6 & FCC_Frequency Stability 1.0.3 rev.)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92009188	06-Mar-20	06-Mar-21
DSA Dynamic Signal Analyzer	35670A	MY42507095	19-Jun-20	19-Jun-21
ANALYZER AUDIO	8903B	3729A17612	15-Nov-19	15-Nov-20
POWER METER	E4416A	MY45102699	26-Jun-20	26-Jun-21
POWER SENSOR	E9301B	MY41498918	12-Aug-20	12-Aug-21
POWER SUPPLY	6032A	3232A08417	02-Jun-20	02-Jun-21
SIGNAL GENERATOR	2042	119718/063	24-Jun-20	24-Jun-21
ANALYZER MODULATION	8901B	3122A03662	08-Jul-20	08-Jul-21
AC POWER SUPPLY	61604	616040003502	13-Dec-19	13-Dec-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_R1.1.3)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR
ATTENUATOR/ SWITCH DRIVER	11713A	2508A10141	CNR	CNR
POWER METER	E4416A	GB41293866	26-Feb-19	26-Feb-21
POWER SUPPLY	6032A	3232A08417	02-Jun-20	02-Jun-21
SIGNAL GENERATOR	8657A	3250A05137	19-Jun-20	19-Jun-21
STEP ATTENUATOR	8494G	MY42143006	12-Jun-20	12-Jun-21
STEP ATTENUATOR	8496G	MY42143012	13-Jun-20	13-Jun-21
OSCILLOSCOPE	MSO8104A	MY45002372	26-Jun-20	26-Jun-21
ANALYZER MODULATION	8901B	3438A05093	23-Jun-20	23-Jun-21
ANALYZER AUDIO	8903B	3011A12671	11-Mar-20	11-Mar-21
ANALYZER AUDIO	8903B	3011A08952	29-Jul-20	29-Jul-21
SPECTRUM ANALYZER	E4440A	MY46181974	2-Aug-20	2-Aug-21
AC POWER SUPPLY	61604	616040003502	13-Dec-19	13-Dec-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

CONDUCTED SPUR EMISSION ATE # 1 (SW version: Conducted Spur ATE_rev 1.23.03)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A32735	CNR	CNR
ANALYZER SPECTRUM	E4440A	MY46185415	10-Jan-20	10-Jan-22
POWER SUPPLY	6032A	3232A08417	02-Jun-20	02-Jun-21
HIGH PASS FILTER SWITCH BOX	-	CS001	2-Jul-20	2-Jul-21
AC POWER SUPPLY	61604	616040003502	13-Dec-19	13-Dec-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

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	2615A01178	21-MAY-20	21-MAY-21
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	24-Jul-19	24-Sep-20
EMI TEST RECEIVER	ESIB26	100017	19-Jul-19	19-Sep-20
5m Semi-anechoic Chamber	S800-HX	J2308	CNR	CNR
BILOG ANTENNA	CBL6112B	2964	23-Apr-19	23-Apr-21
BILOG ANTENNA	CBL6112B	2950	8-Jul-19	8-Jul-21
DATA LOGGER	SDL500	A.016776	4-Jun-20	4-Jun-21
SYSTEM CONTROLLER	SC104V	050806-1	CNR	CNR
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	CNR	CNR
ANTENNA POSITIONING TOWER	TLT2	NA	CNR	CNR
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	27-Jan-20	27-Jan-21
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	CNR	CNR
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-22
LOOP ANTENNA	6502	00203479	21-Jan-20	21-Jan-21
Test Software	EMC_FCC_IC_Bluetooth_RE_Test			
Version	EMC_FCC_RE_v1.6.2			

5.0 Test Condition

5.1. Transmitter Test Conditions

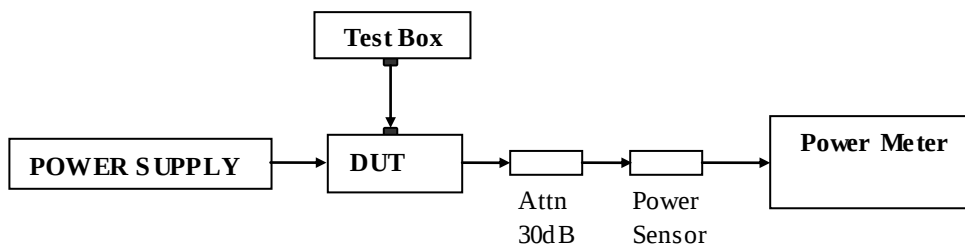
Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By	Environmental conditions
RF Output Power	Low & Max	Analog	138.0125, 152.09, 158.55, 161.7, 173.3875	Gan Boon Teong	25.3°C, 50.3% RH
Frequency Stability	Max	Analog	158.550	Gan Boon Teong	25.1°C, 54.3% RH, 60.3°C, 50% RH, -30.1°C, 51.2% RH
Audio Frequency Response (12.5kHz / 25kHz)	Max	Analog	158.55, 152.09	Gan Boon Teong	25.3°C, 50.3% RH
Audio Low Pass Filter Response (12.5kHz / 25kHz)	Max	Analog	158.55, 152.09	Gan Boon Teong	25.3°C, 50.3% RH
Modulation limiting (12.5kHz / 25kHz)	Max	Analog	158.55, 152.09	Gan Boon Teong	25.3°C, 50.3% RH
Occupied Bandwidth (12.5kHz / 20kHz / 25kHz)	Max	Analog, C4FM, Phase II, LSM, FSK	138.0125, 158.55, 152.09, 161.7, 173.3875	Gan Boon Teong	25.3°C, 50.3% RH
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	Low / Max	Analog, C4FM, Phase II	152.03, 152.81	Gan Boon Teong	25.3°C, 50.3% RH
Transient Frequency Behavior (UHF & VHF Band) (12.5kHz / 25kHz)	Max	Analog, C4FM	158.55	Gan Boon Teong	25.3°C, 50.3% RH
Adjacent Channel Power (700MHz Band) (12.5kHz / 25kHz)	Max	-	NA		NA
Conducted Spurious Emissions- (12.5kHz / 25kHz)	Low / Max	Analog, C4FM, Phase II, LSM, FSK	138.0125, 152.09, 158.55, 161.7, 173.3875	Gan Boon Teong	25.3°C, 50.3% RH
Radiated Spurious Emission (12.5kHz / 25kHz)	Low / Max	Analog, C4FM, Phase II, LSM, FSK	138.0125, 152.09, 158.55, 161.7, 173.3875	Qawiman&Nazrin	23.6 Hum(% RH)
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	Max	-	NA		
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	Max	-	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

Analog 240VAC

Temperature	25°C				Remark
Voltage (V)	240V				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	
138.0125	0.69	1.99	1.6	99.3	Not for FCC review
152.0900	0.7	2.01	1.66	97.6	
158.5500	0.69	2	1.23	48.9	Part 80 (50W)
161.7	0.69	1.95	1.5	97.8	
173.3875	0.68	1.9	1.41	96.2	

Analog 120VAC

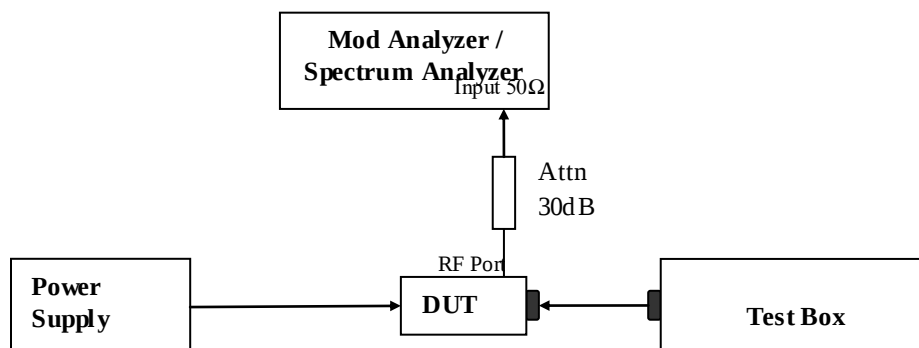
Temperature	25°C				Remark
Voltage (V)	120				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	
138.0125	1.28	2.01	3.24	99.5	Not for FCC review
152.0900	1.3	2.02	3.36	97.6	
158.5500	1.28	1.97	2.42	48.1	Part 80 (50W)
161.7	1.29	1.98	3.19	97.8	
173.3875	1.26	1.9	2.88	96.4	

Analog 48VDC

Temperature	25°C				Remark
Voltage (V)	48V				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	
138.0125	3.03	2.01	7.69	99.6	Not for FCC review
152.0900	3.06	2.02	7.98	97.6	
158.5500	3.04	1.96	5.75	48.6	Part 80 (50W)
161.7	3.03	1.98	7.58	98.5	
173.3875	2.96	1.92	6.84	96.8	

6.2. Frequency Stability

6.2.1. Test Setup

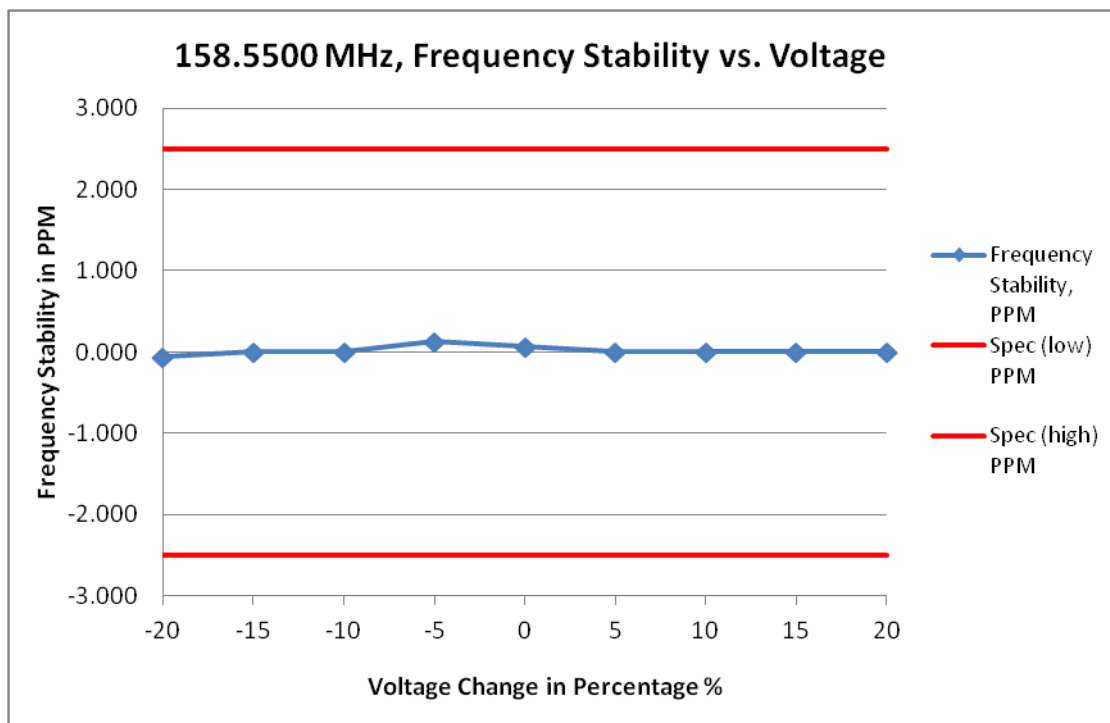


- 1) The DUT transmitter output port was connected to Modulation / Spectrum Analyzer.
- 2) Path loss for the measurement included.
- 3) Transmit the DUT and record the freq in MCF_{MHz} .
- 4) Test in 2 conditions:
 - Temperature: The frequency of the transmitter was measured from -30°C to 50°C.
 - Supply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

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

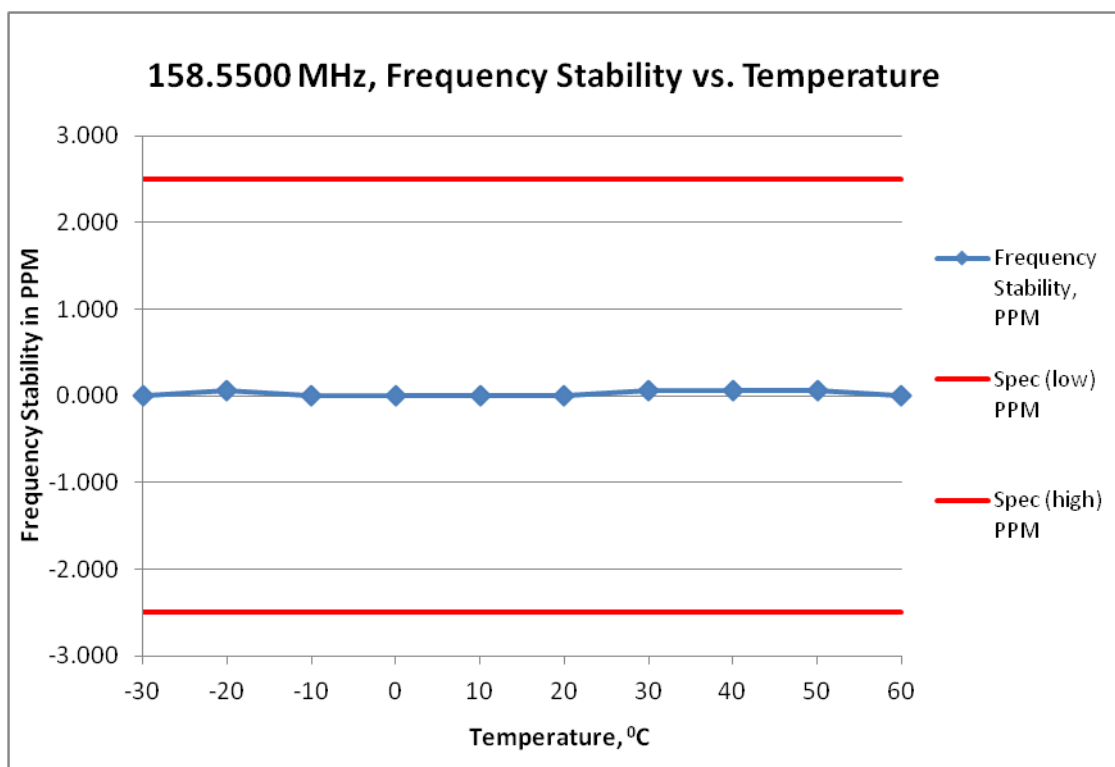
Where: MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.2.2. Test Result



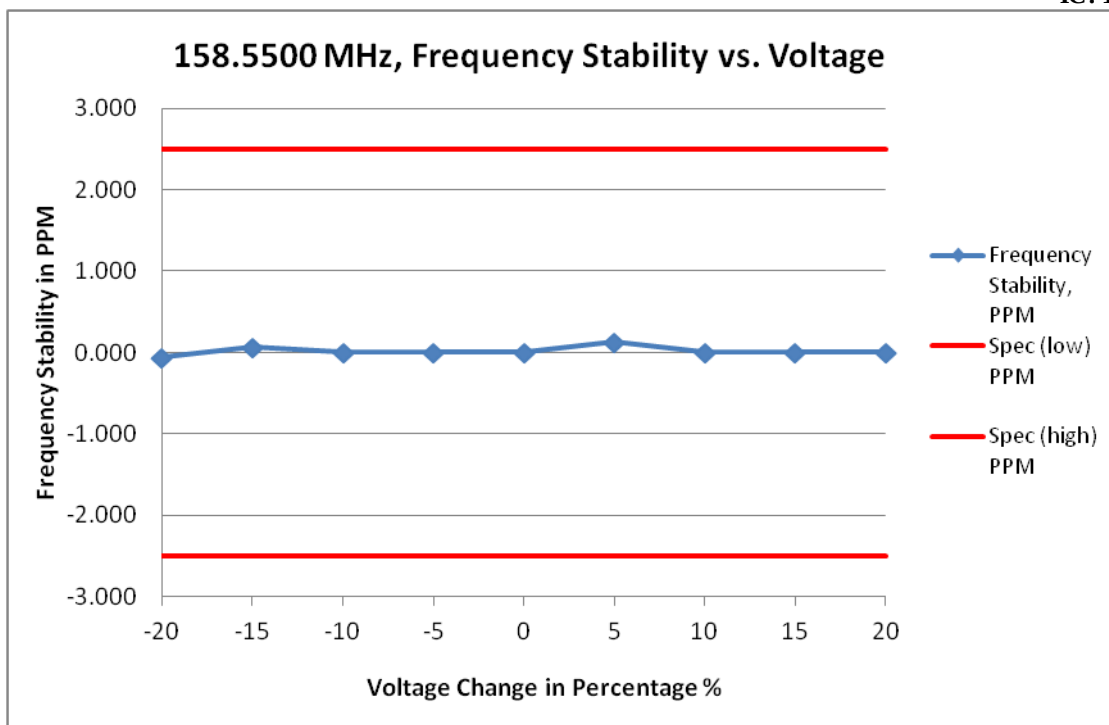
(i) Frequency Stability VS Voltage

Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz				
Temperature, °C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	192.000	158.549990	-0.063	-2.500	2.500
-15	204.000	158.550000	0.000	-2.500	2.500
-10	216.000	158.550000	0.000	-2.500	2.500
-5	228.000	158.550020	0.126	-2.500	2.500
0	240.000	158.550010	0.063	-2.500	2.500
5	252.000	158.550000	0.000	-2.500	2.500
10	264.000	158.550000	0.000	-2.500	2.500
15	276.000	158.550000	0.000	-2.500	2.500
20	288.000	158.550000	0.000	-2.500	2.500



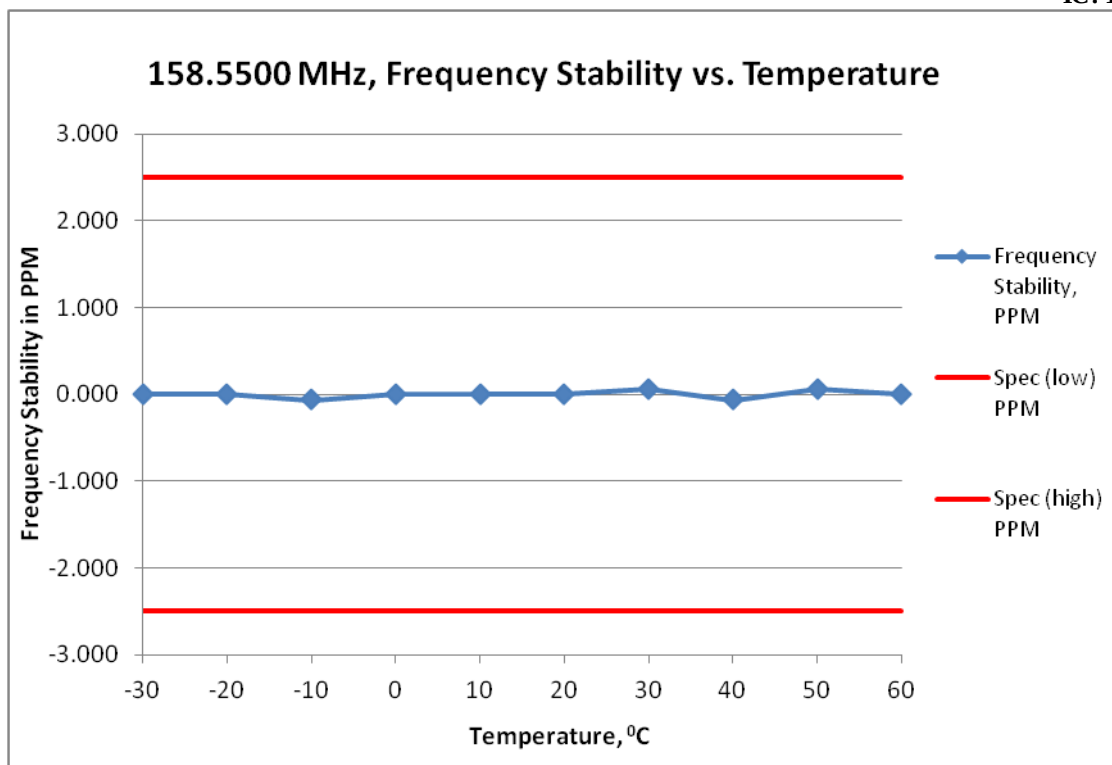
(ii) Frequency Stability VS temperature

Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz			
Voltage, V	240.0			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	158.550000	0.000	-2.500	2.500
-20	158.550010	0.063	-2.500	2.500
-10	158.550000	0.000	-2.500	2.500
0	158.550000	0.000	-2.500	2.500
10	158.550000	0.000	-2.500	2.500
20	158.550000	0.000	-2.500	2.500
30	158.550010	0.063	-2.500	2.500
40	158.550010	0.063	-2.500	2.500
50	158.550010	0.063	-2.500	2.500
60	158.550000	0.000	-2.500	2.500



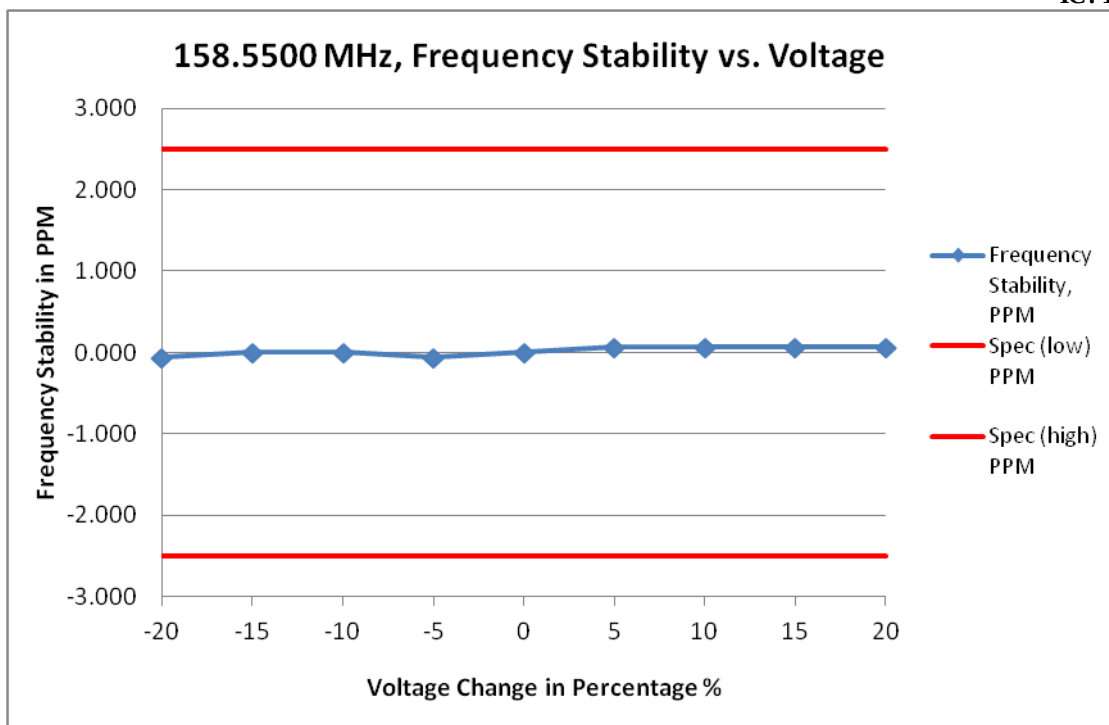
(i) Frequency Stability VS Voltage

Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz				
Temperature, °C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	96.000	158.549990	-0.063	-2.500	2.500
-15	102.000	158.550010	0.063	-2.500	2.500
-10	108.000	158.550000	0.000	-2.500	2.500
-5	114.000	158.550000	0.000	-2.500	2.500
0	120.000	158.550000	0.000	-2.500	2.500
5	126.000	158.550020	0.126	-2.500	2.500
10	132.000	158.550000	0.000	-2.500	2.500
15	138.000	158.550000	0.000	-2.500	2.500
20	144.000	158.550000	0.000	-2.500	2.500



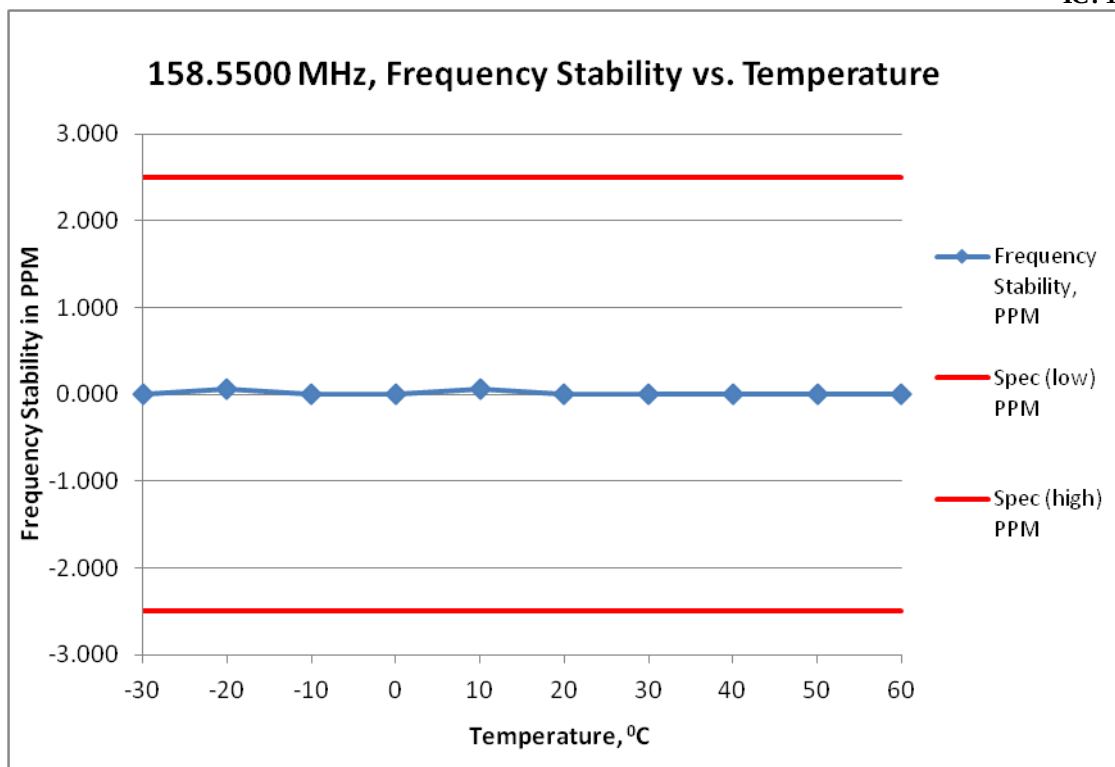
(ii) Frequency Stability VS temperature

Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz			
Voltage, V	120.0			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	158.550000	0.000	-2.500	2.500
-20	158.550000	0.000	-2.500	2.500
-10	158.549990	-0.063	-2.500	2.500
0	158.550000	0.000	-2.500	2.500
10	158.550000	0.000	-2.500	2.500
20	158.550000	0.000	-2.500	2.500
30	158.550010	0.063	-2.500	2.500
40	158.549990	-0.063	-2.500	2.500
50	158.550010	0.063	-2.500	2.500
60	158.550000	0.000	-2.500	2.500



(i) Frequency Stability VS Voltage

Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz				
Temperature, °C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-12.5	42.000	158.550000	0.000	-2.500	2.500
-10	43.200	158.550000	0.000	-2.500	2.500
-5	45.600	158.549990	-0.063	-2.500	2.500
0	48.000	158.550000	0.000	-2.500	2.500
5	50.400	158.550010	0.063	-2.500	2.500
10	52.800	158.550010	0.063	-2.500	2.500
15	55.200	158.550010	0.063	-2.500	2.500
20	57.600	158.550010	0.063	-2.500	2.500



(ii) Frequency Stability VS temperature

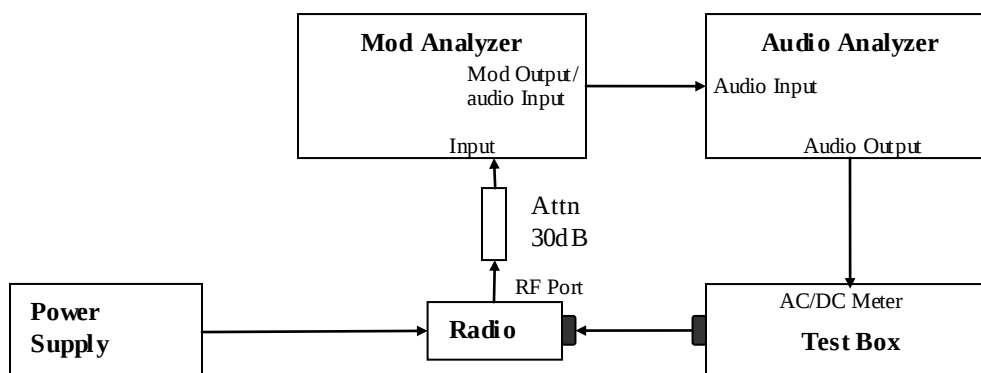
Frequency / Channel Spacing	158.5500 MHz / 12.5 kHz			
Voltage, V	48.0			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	158.550000	0.000	-2.500	2.500
-20	158.550010	0.063	-2.500	2.500
-10	158.550000	0.000	-2.500	2.500
0	158.550000	0.000	-2.500	2.500
10	158.550010	0.063	-2.500	2.500
20	158.550000	0.000	-2.500	2.500
30	158.550000	0.000	-2.500	2.500
40	158.550000	0.000	-2.500	2.500
50	158.550000	0.000	-2.500	2.500
60	158.550000	0.000	-2.500	2.500

6.2.3. Test Limit

As per manufacturer declared spec +/- 2.5ppm

6.3. Audio Frequency Response

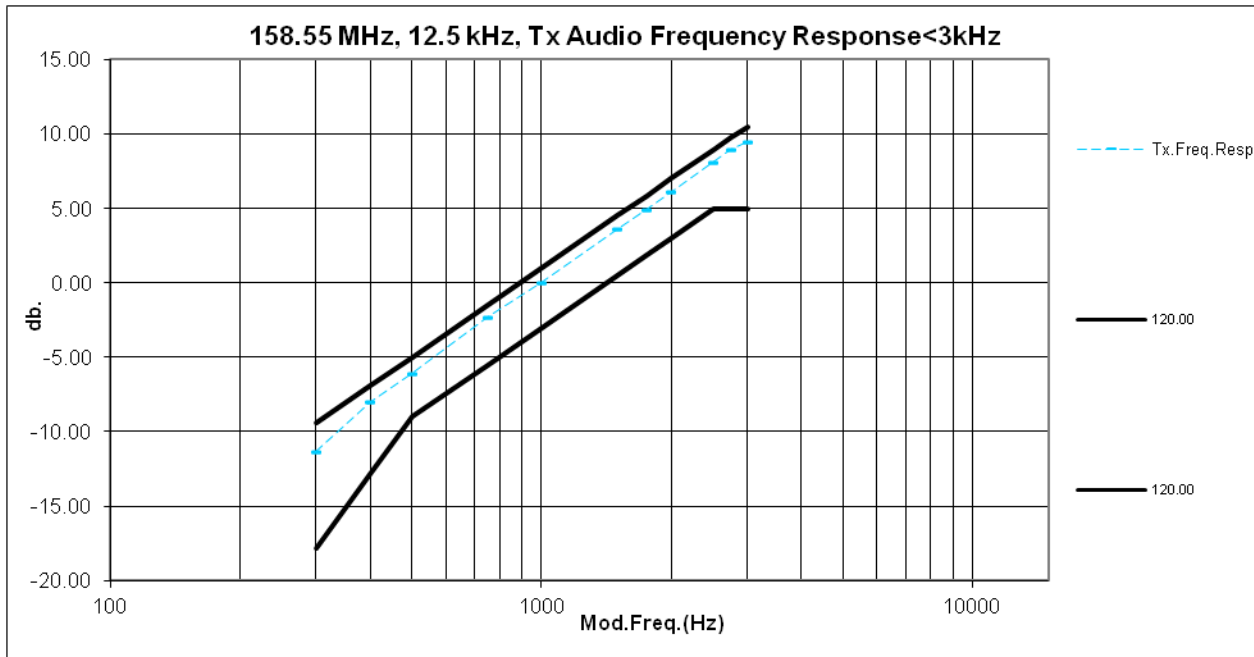
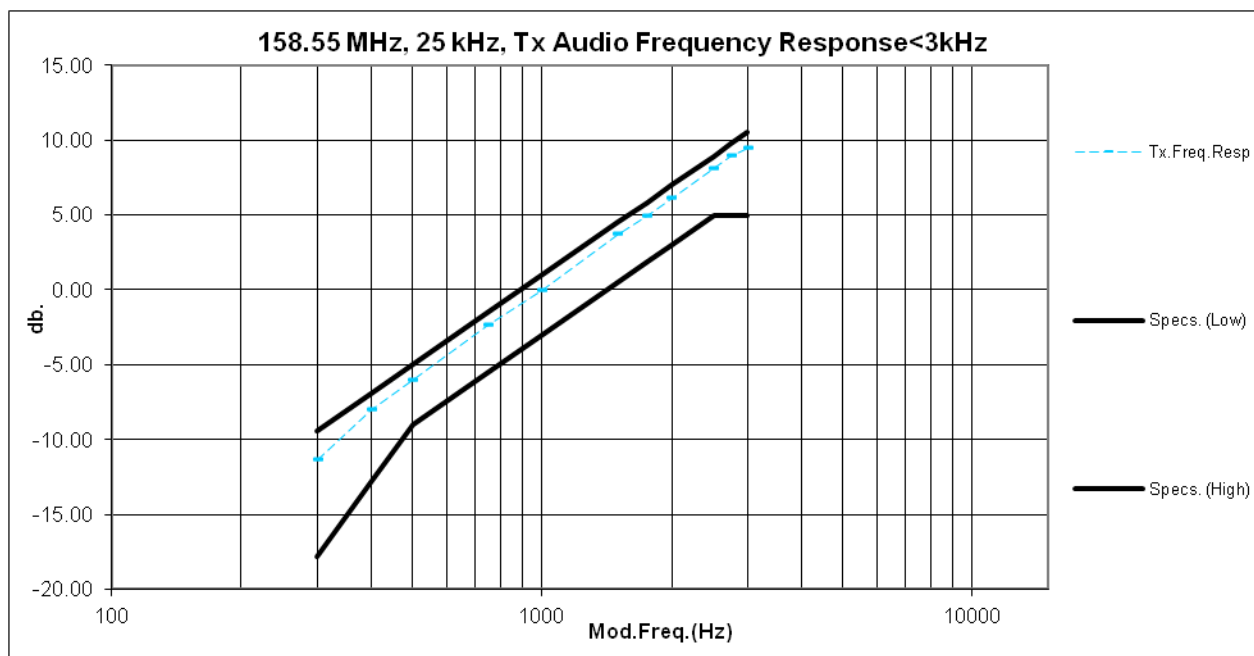
6.3.1. Test Setup



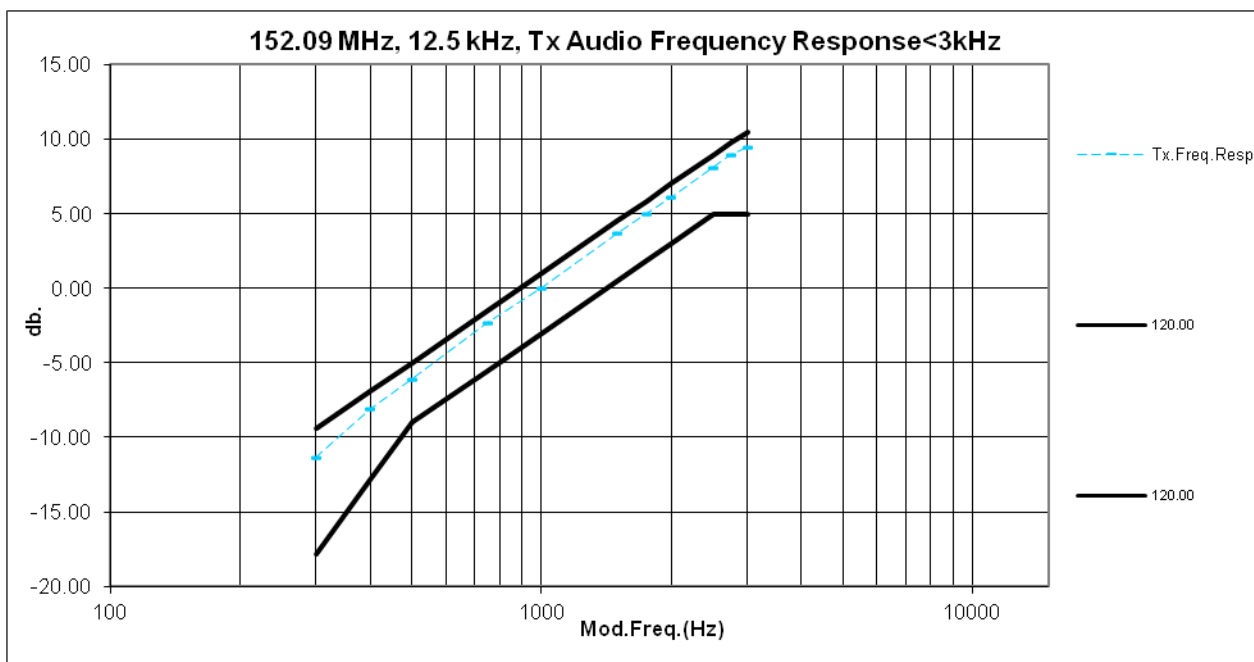
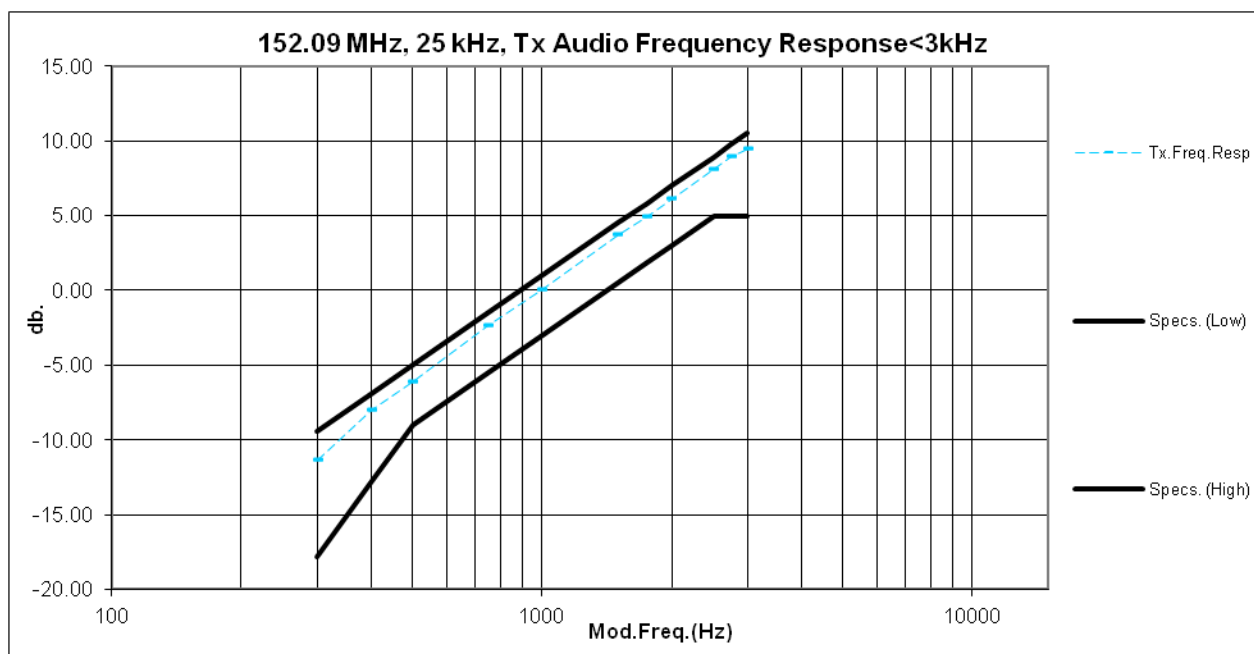
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
- 5)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

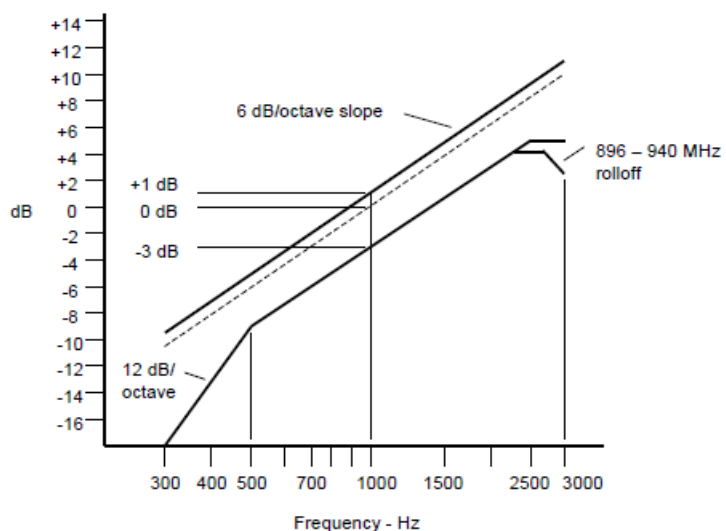
Not for FCC Review



Not for FCC Review



6.3.3. Test Limit

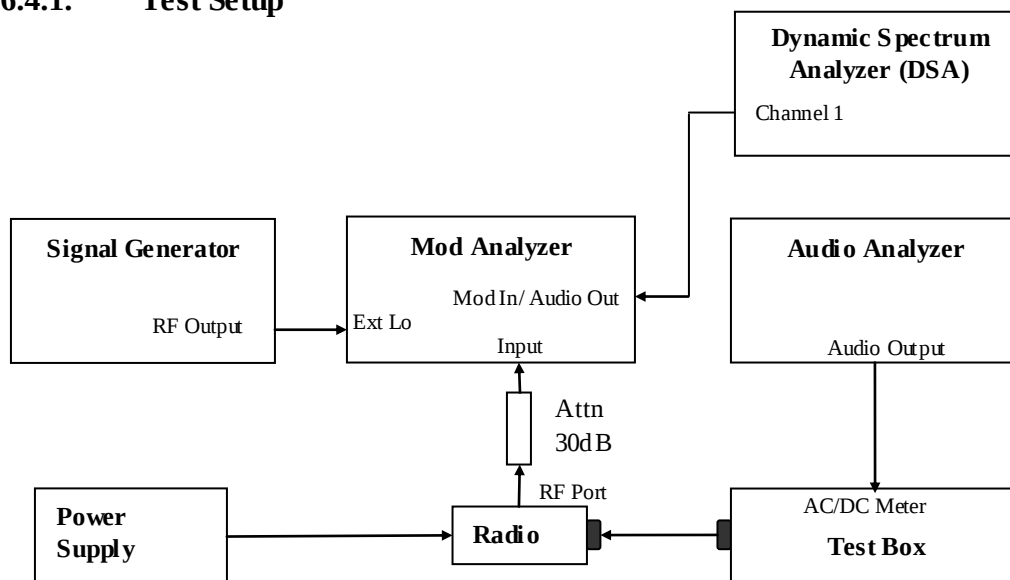


Note:

- 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

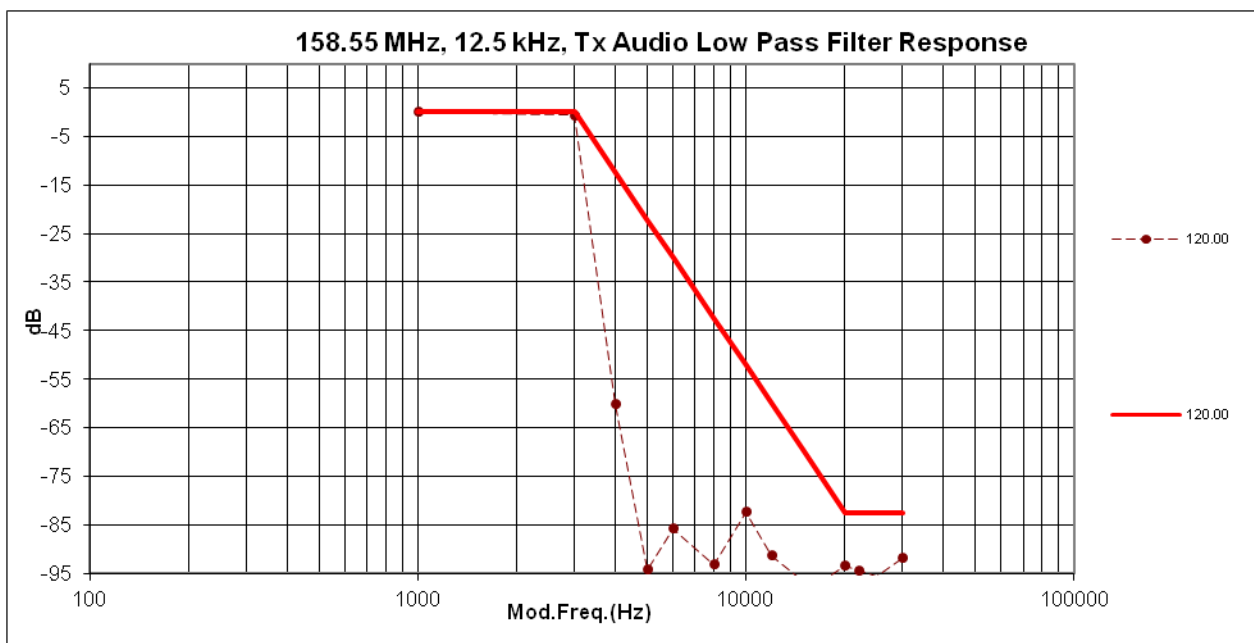
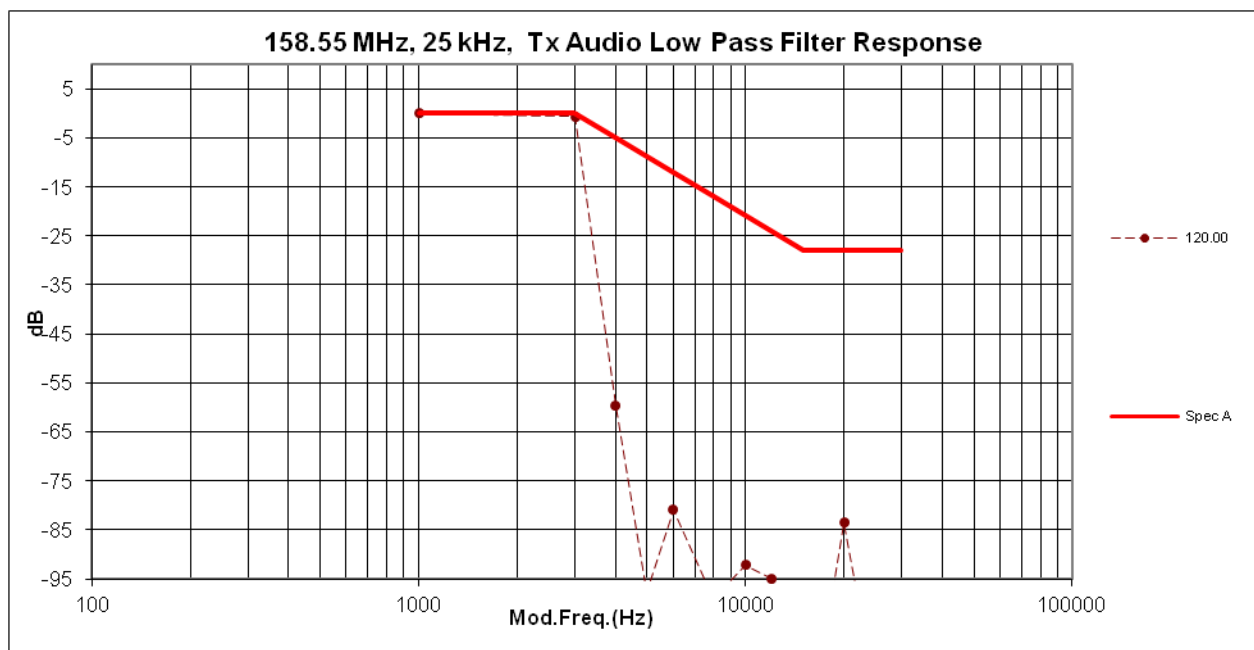
6.4.1. Test Setup



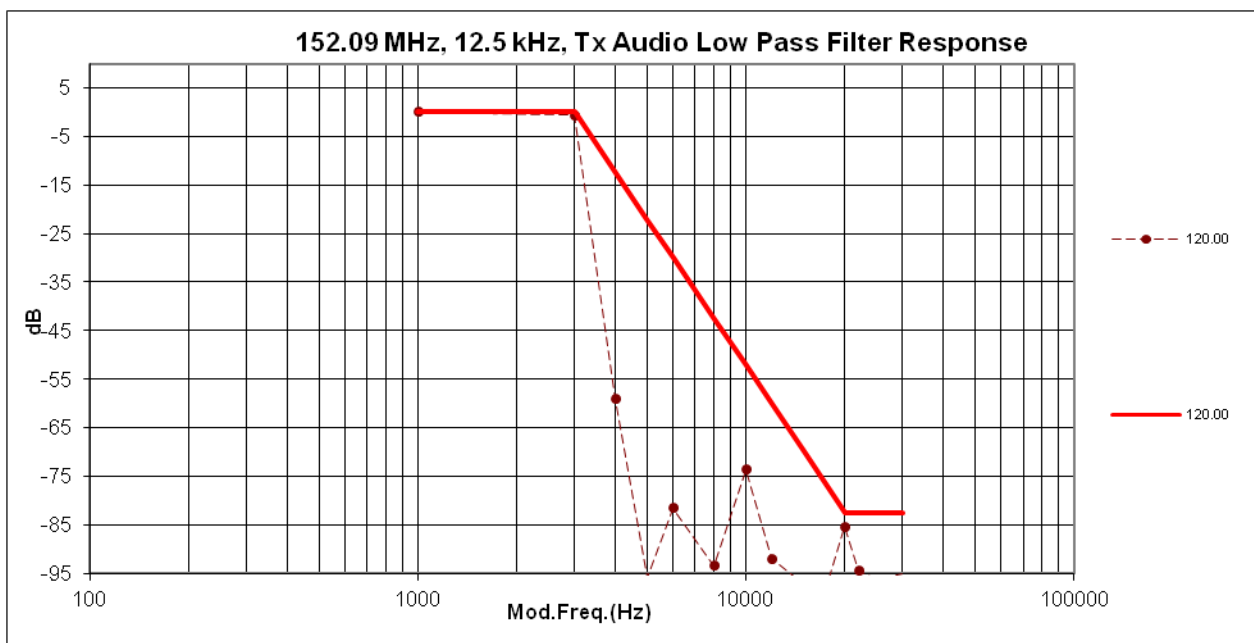
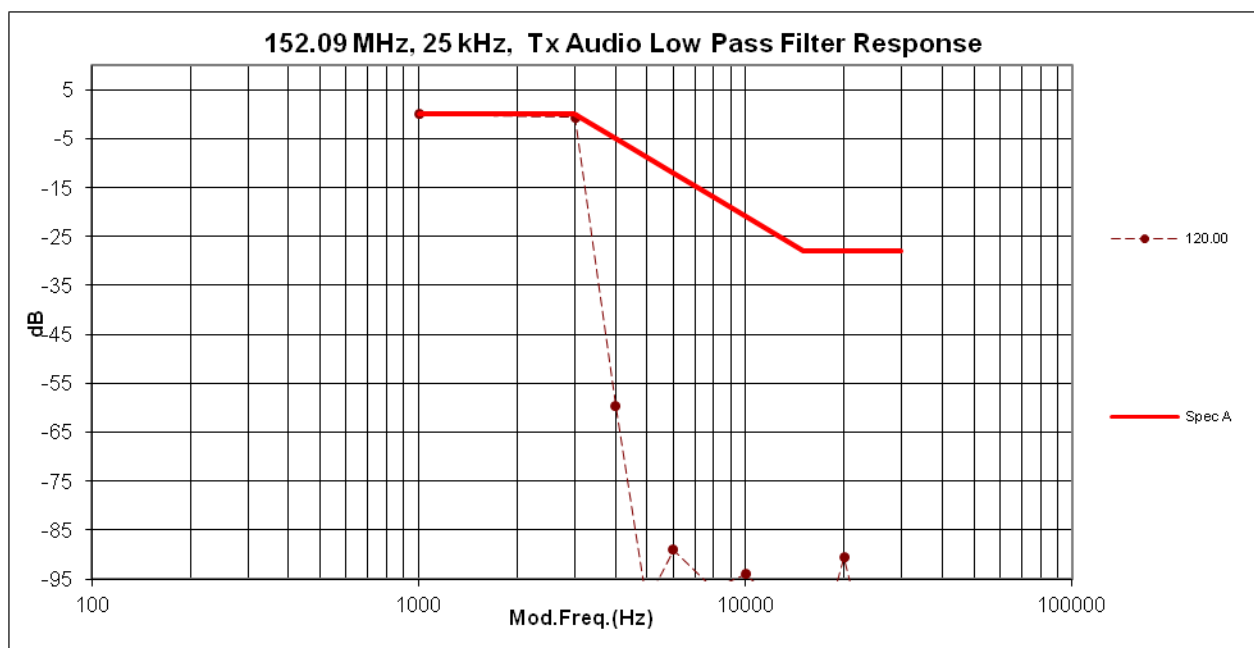
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
- 4) Set the Sigen frequency to $F_c + 1.5$ MHz, RF output level to 0dBm without modulation.
- 5) Transmit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

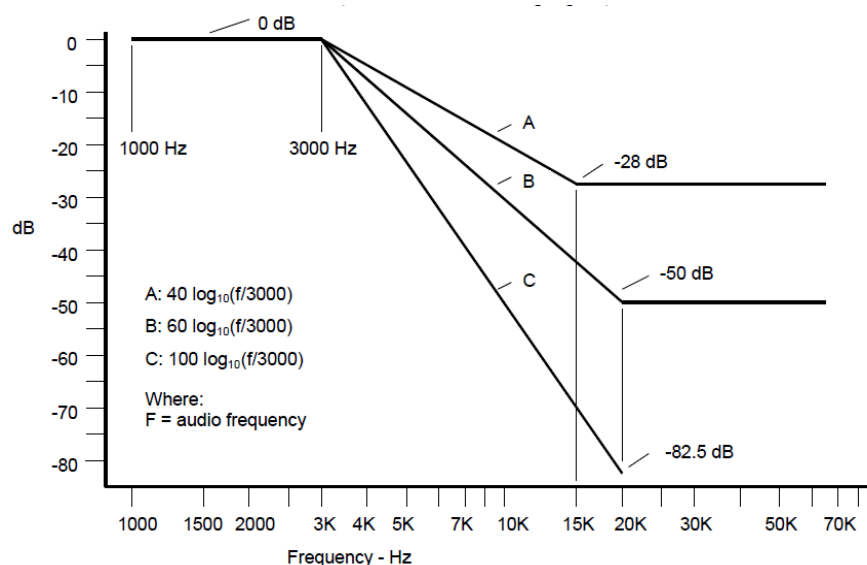
Not for FCC Review



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.

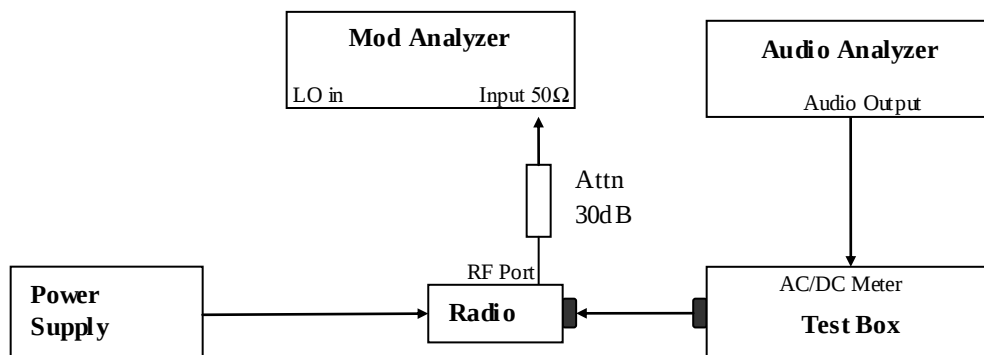
- c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

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

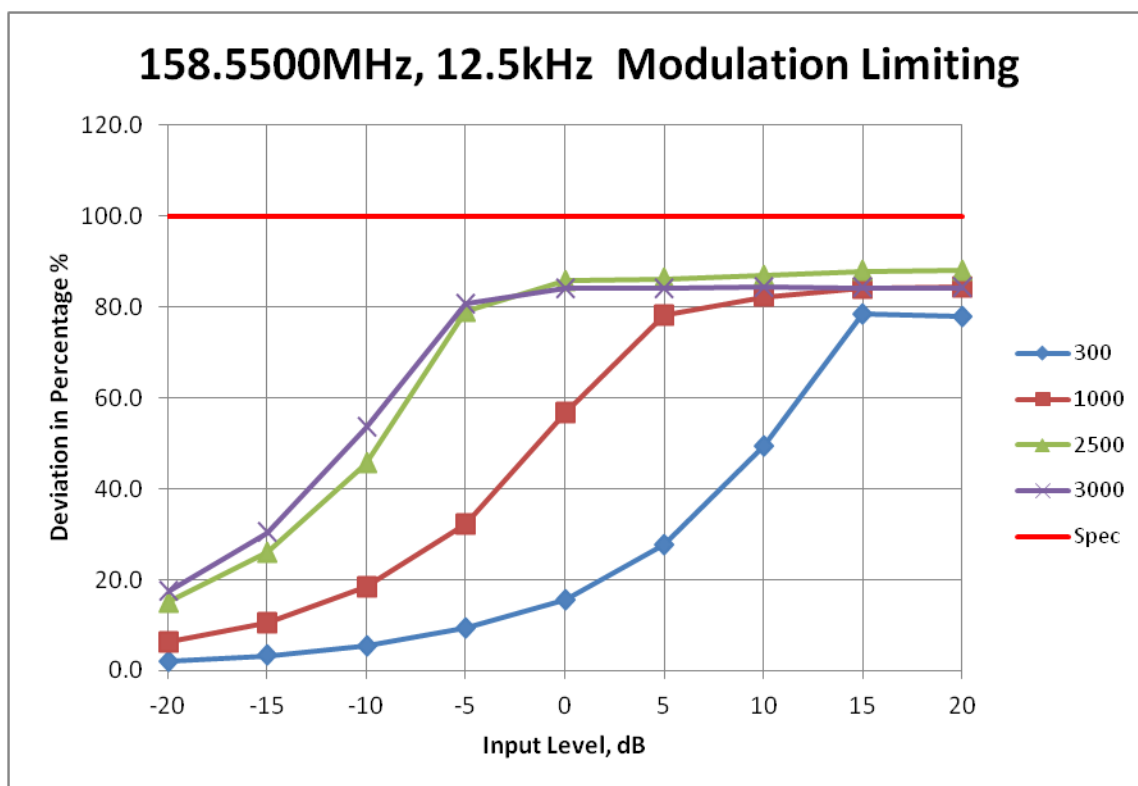
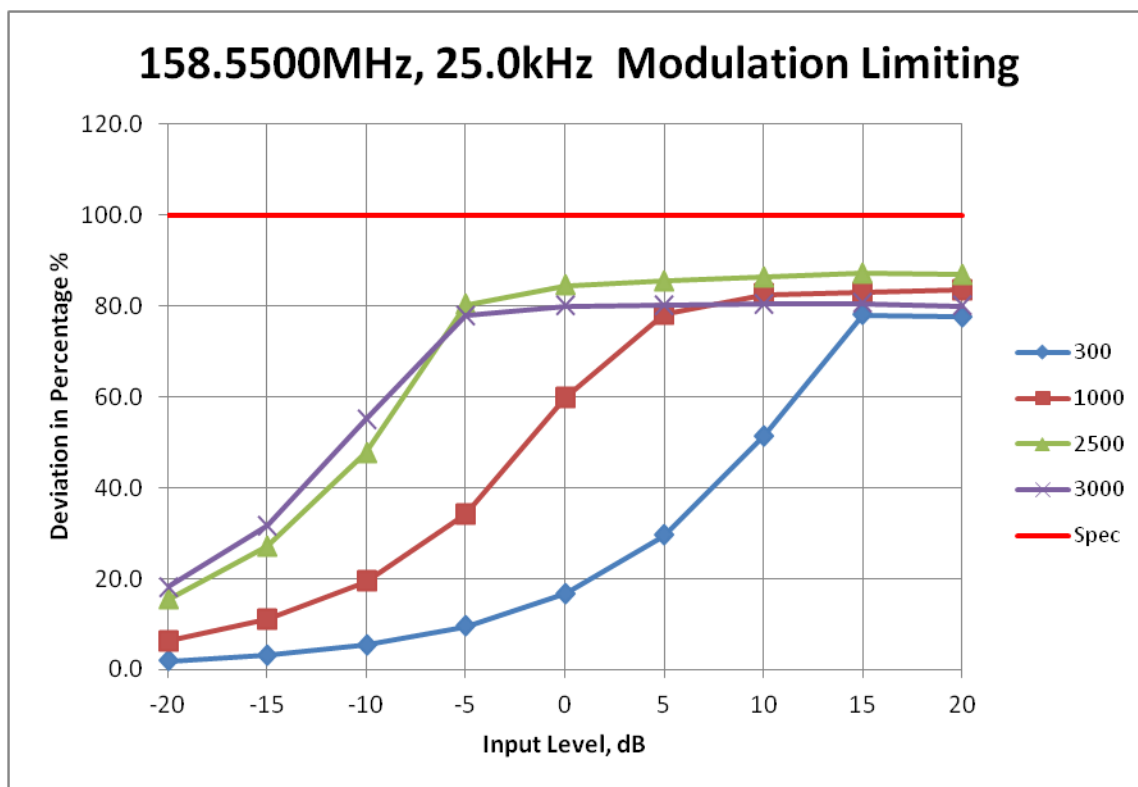
6.5.1. Test Setup



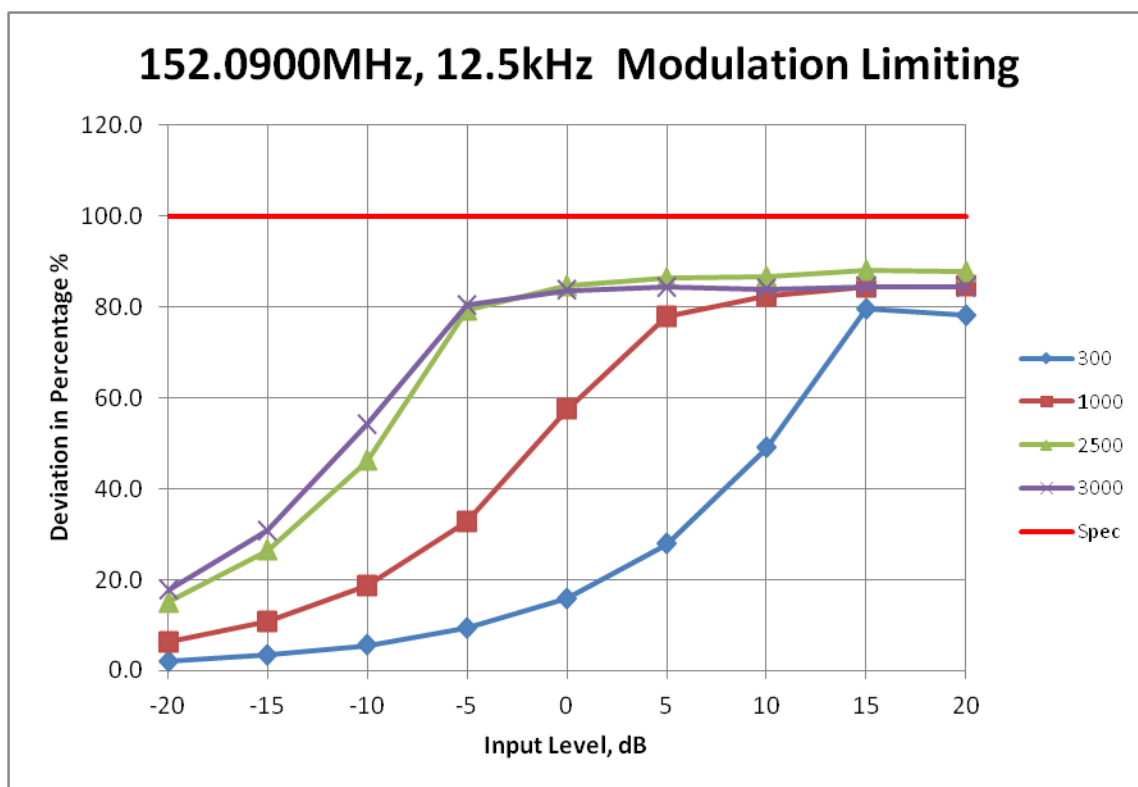
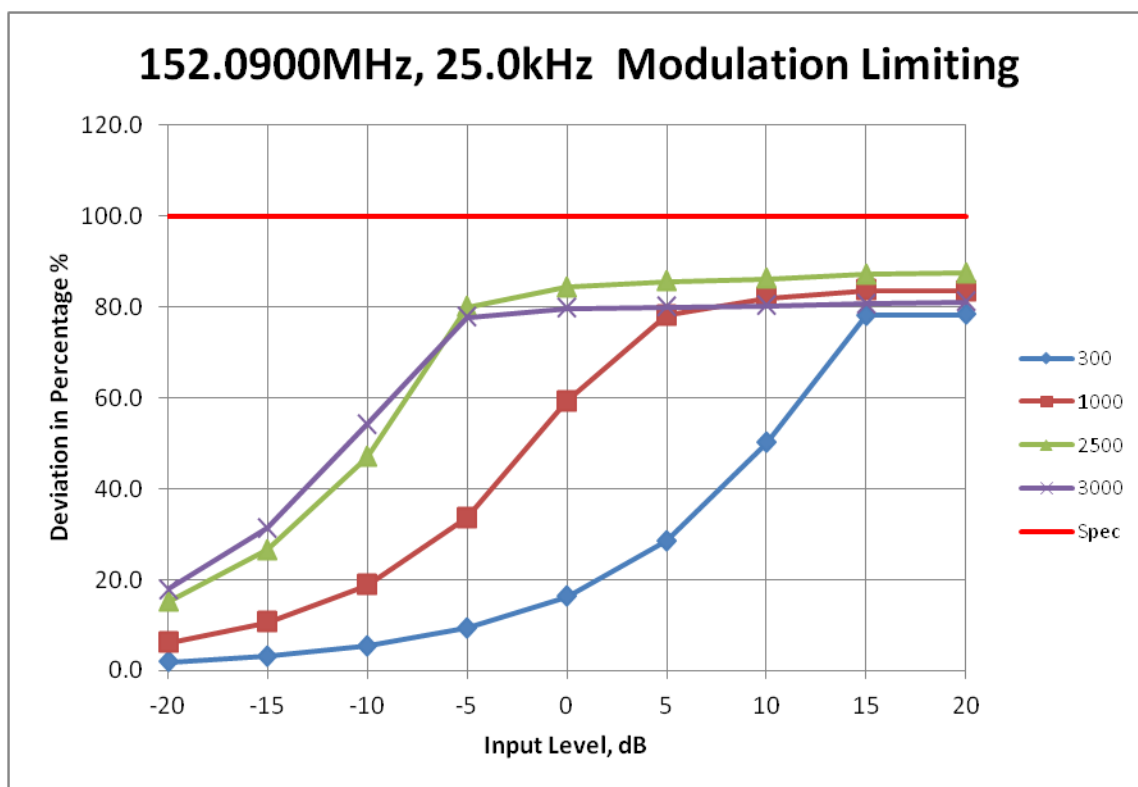
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
- 5) Record the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



Not for FCC Review

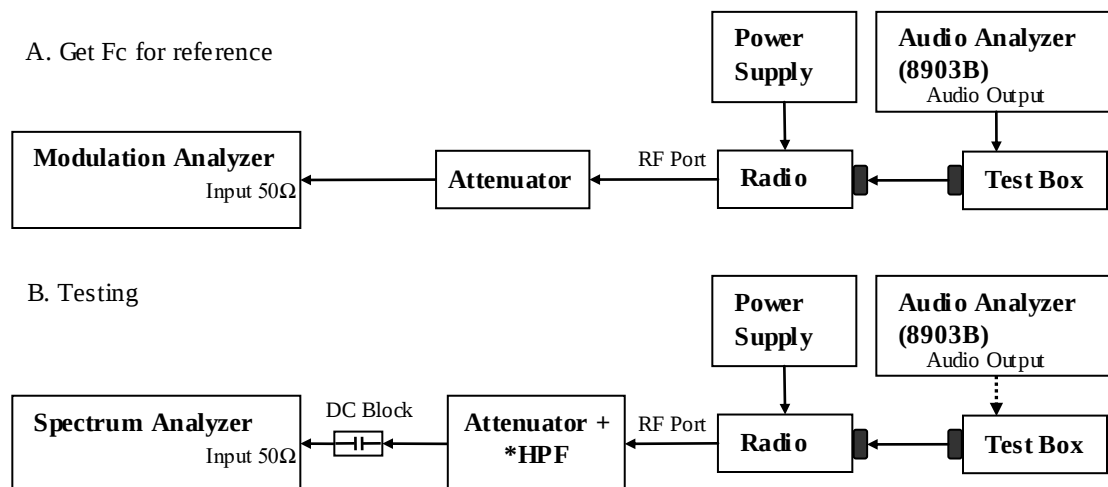


6.5.3. Test Limit

Modulation Limiting shall not exceed 100 percent.

6.6. Occupied Bandwidth

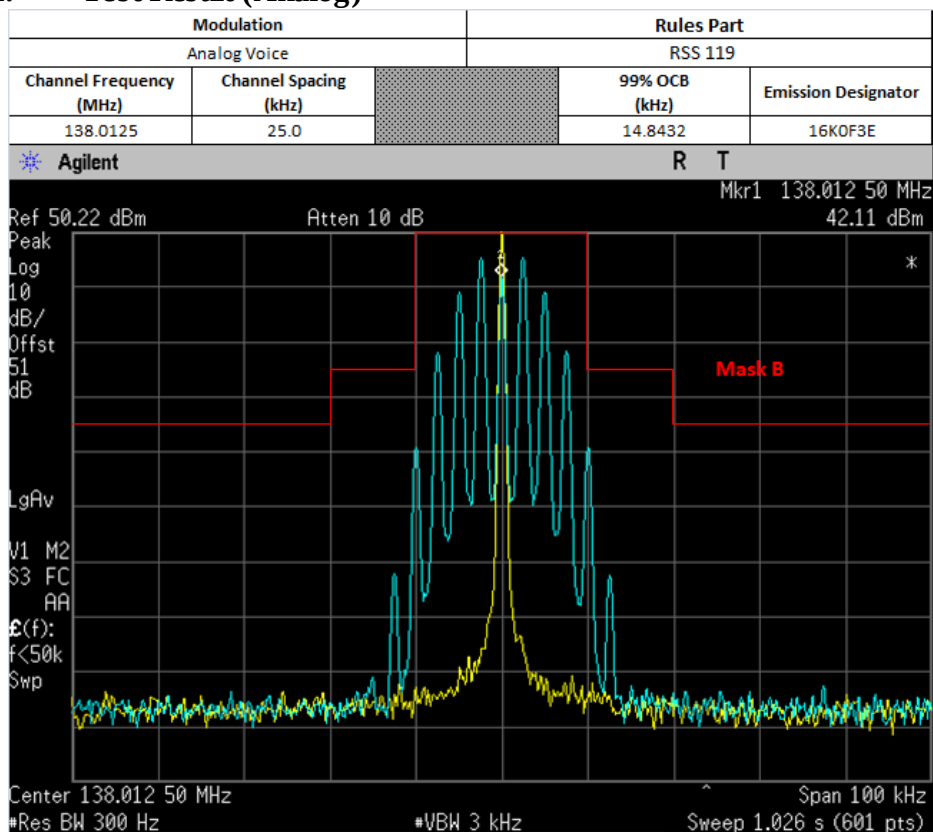
6.6.1. Test Setup (Analog)



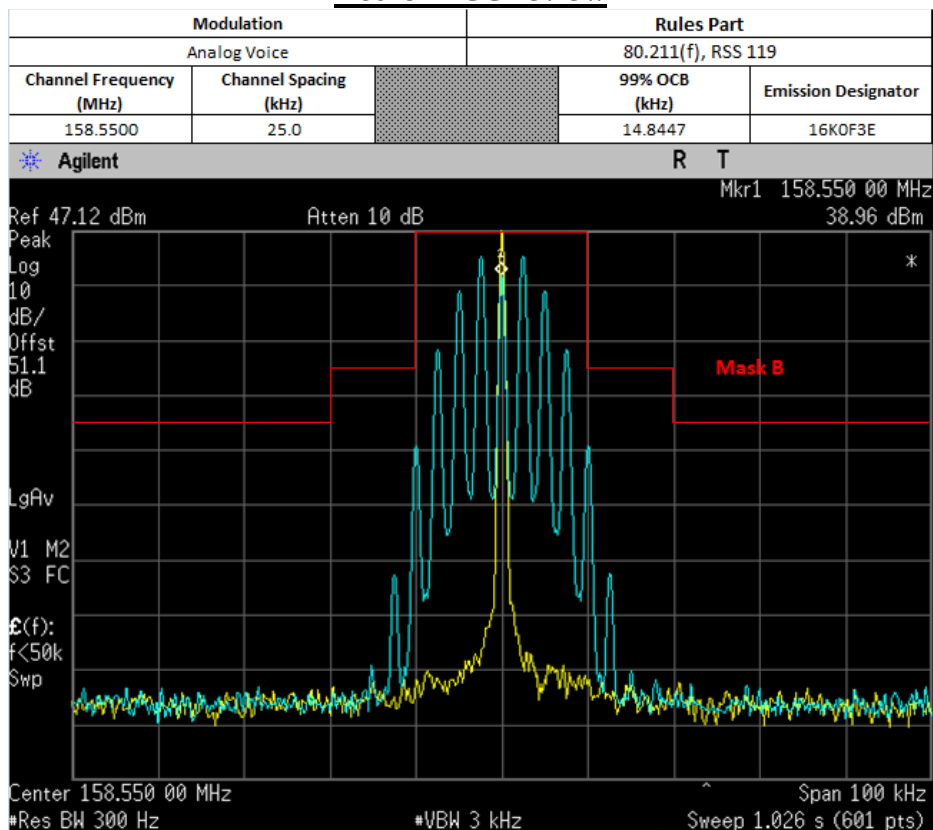
- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. 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.

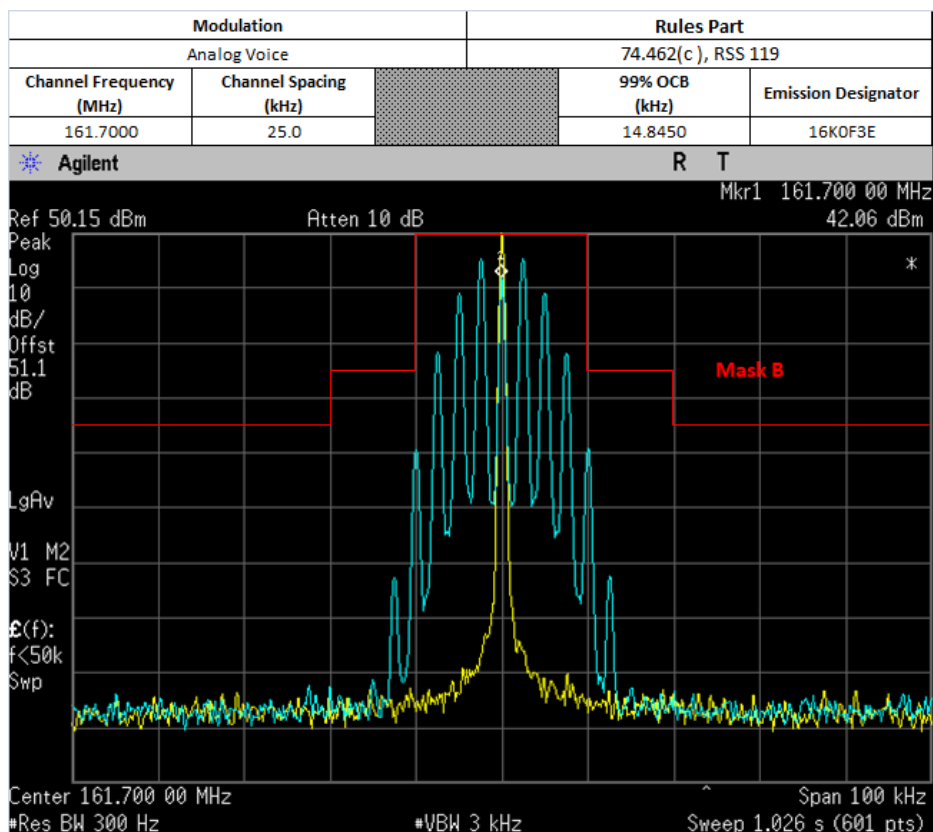
6.6.2. Test Result (Analog)



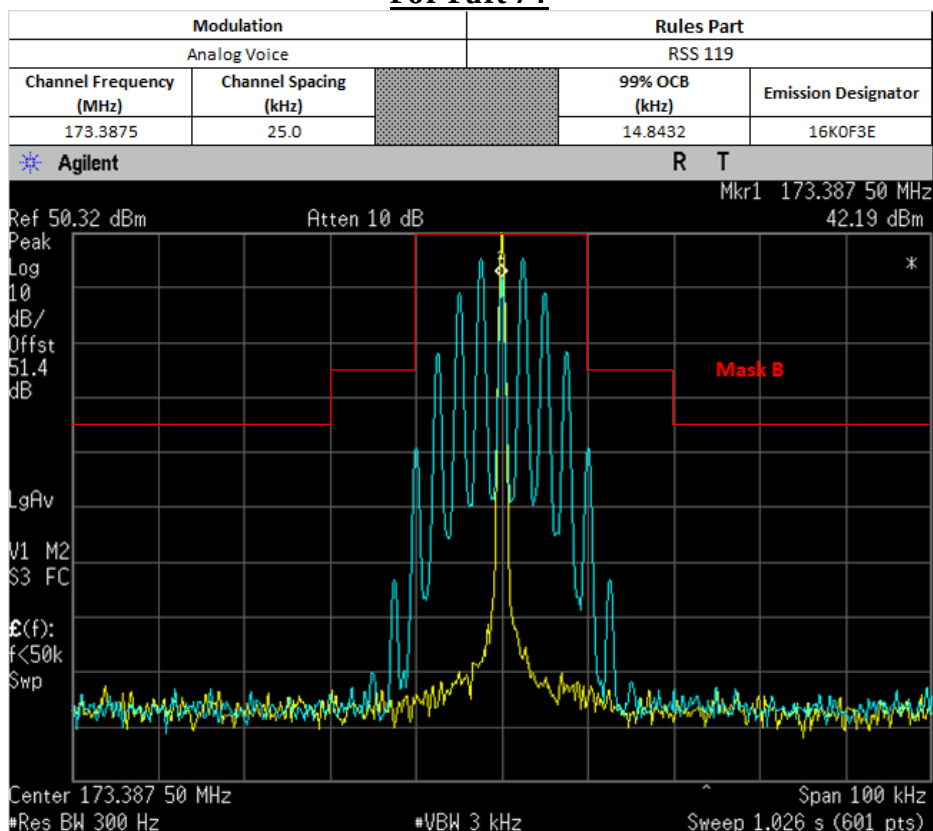
Not for FCC review



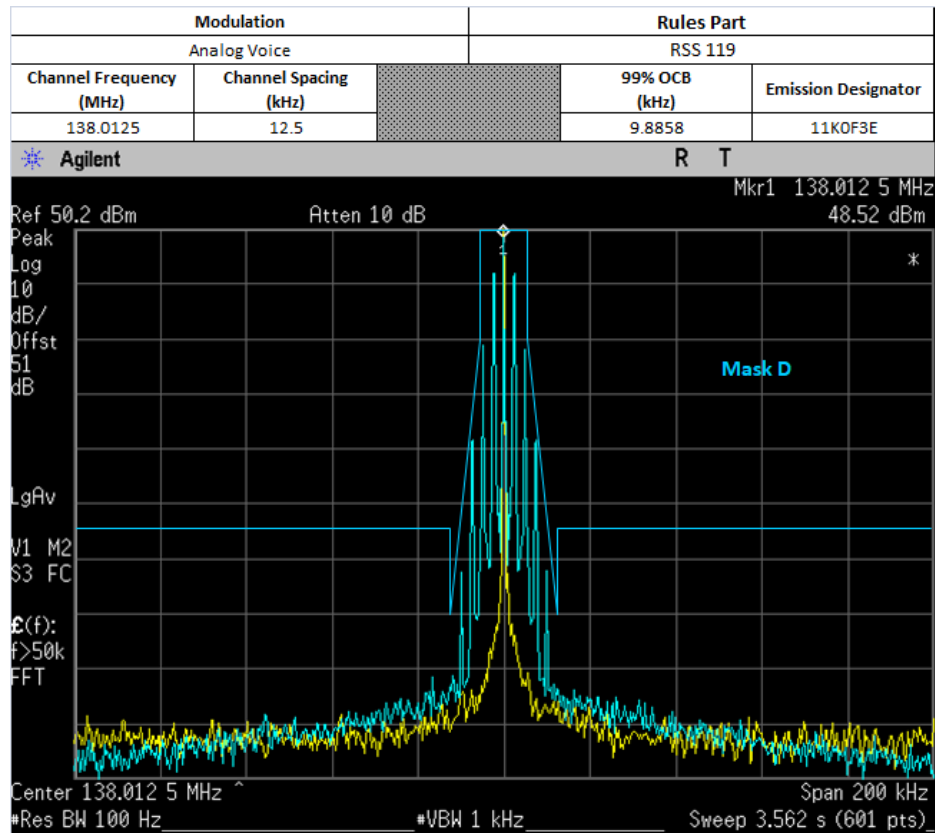
For Part 80



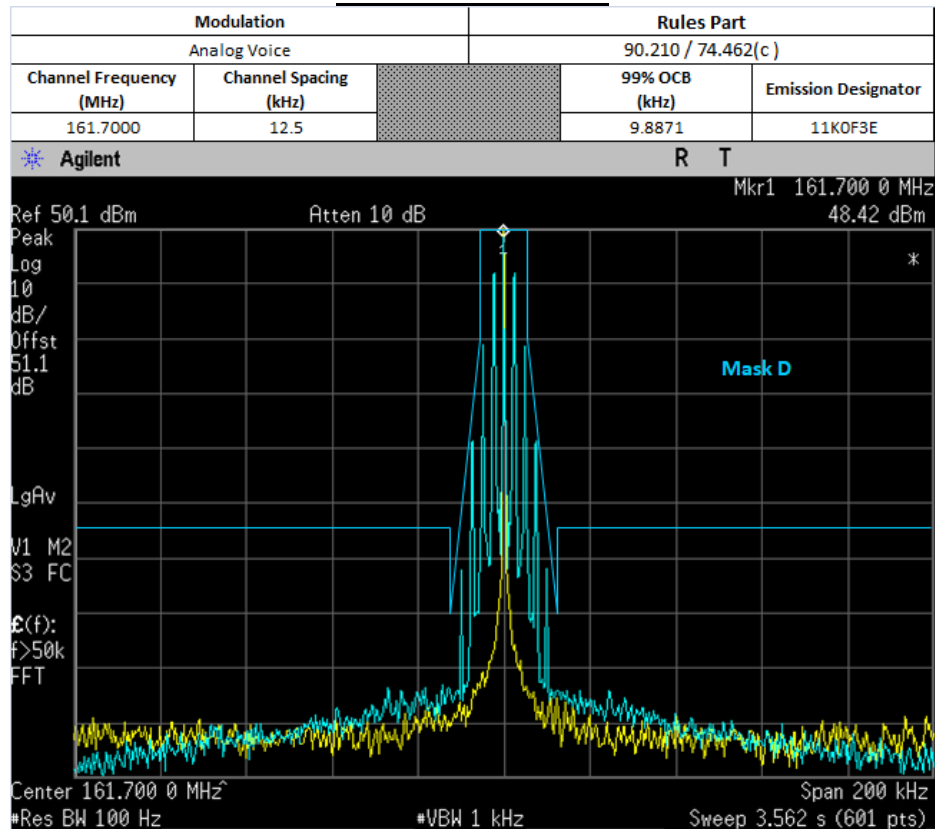
For Part 74

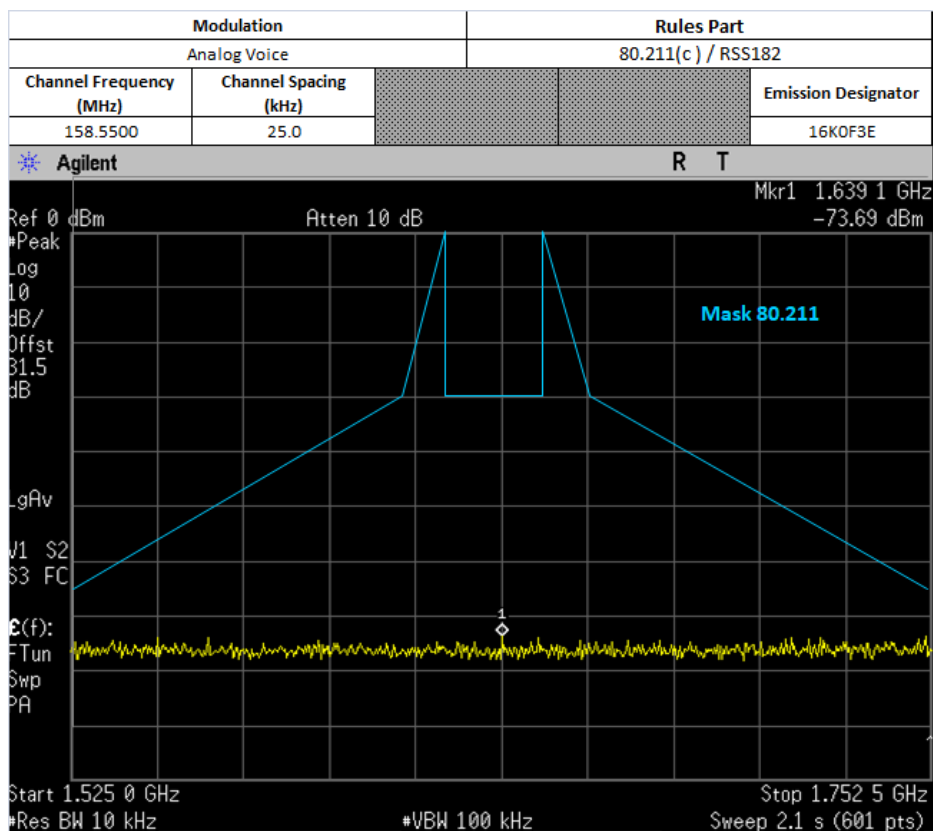
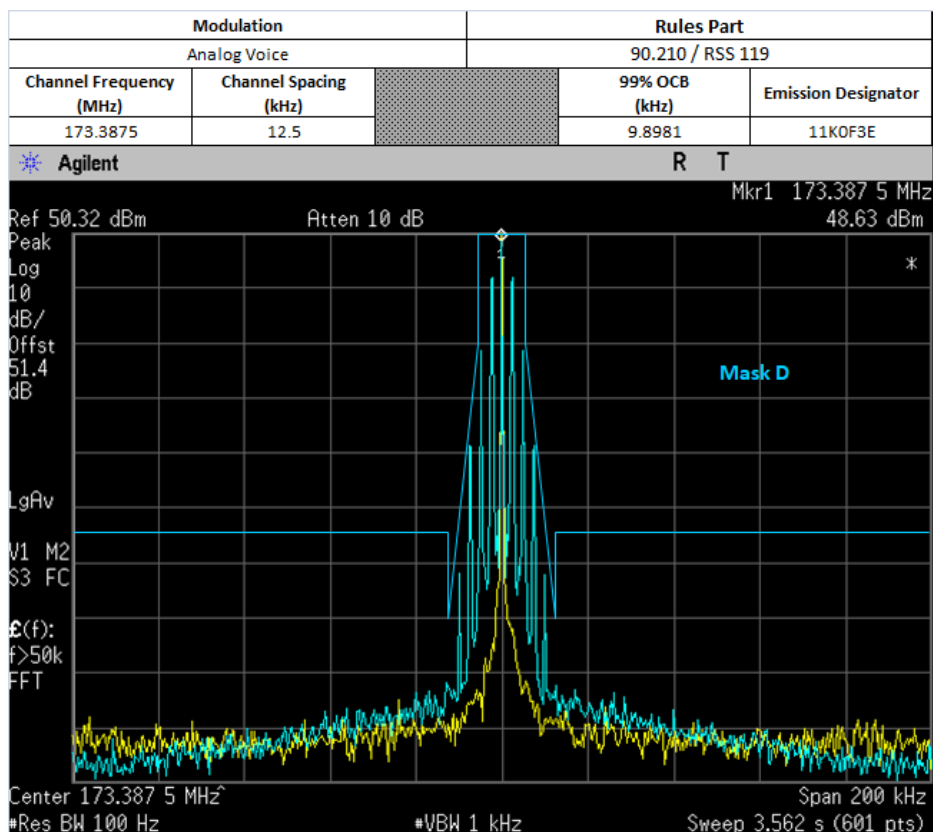


Not for FCC review

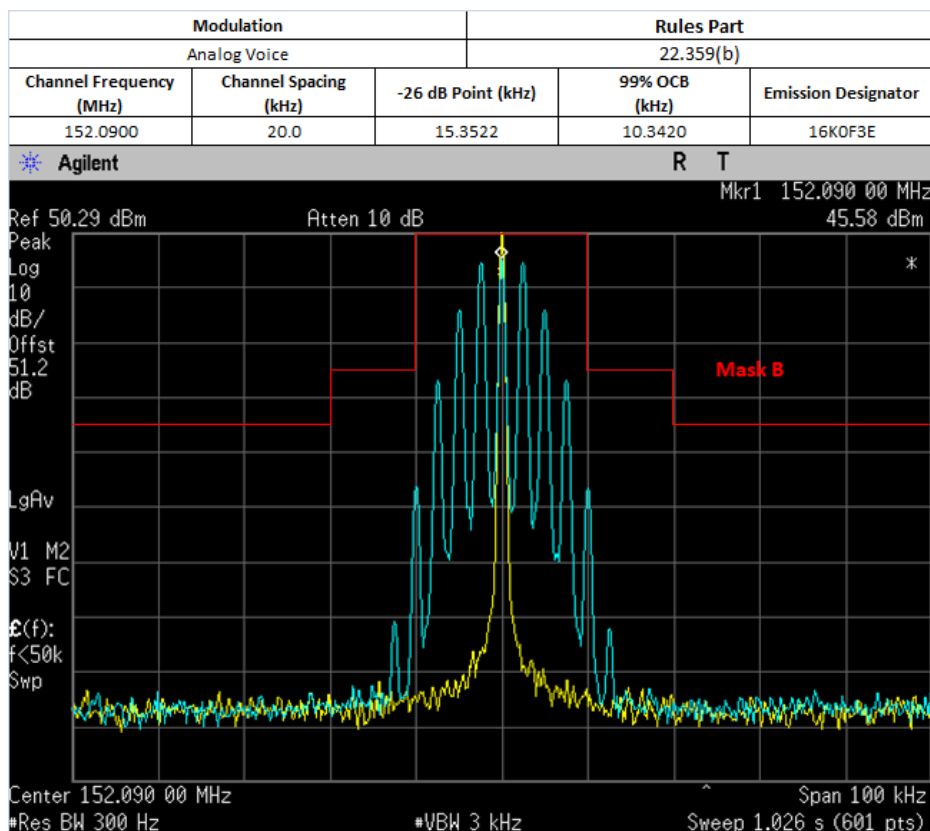
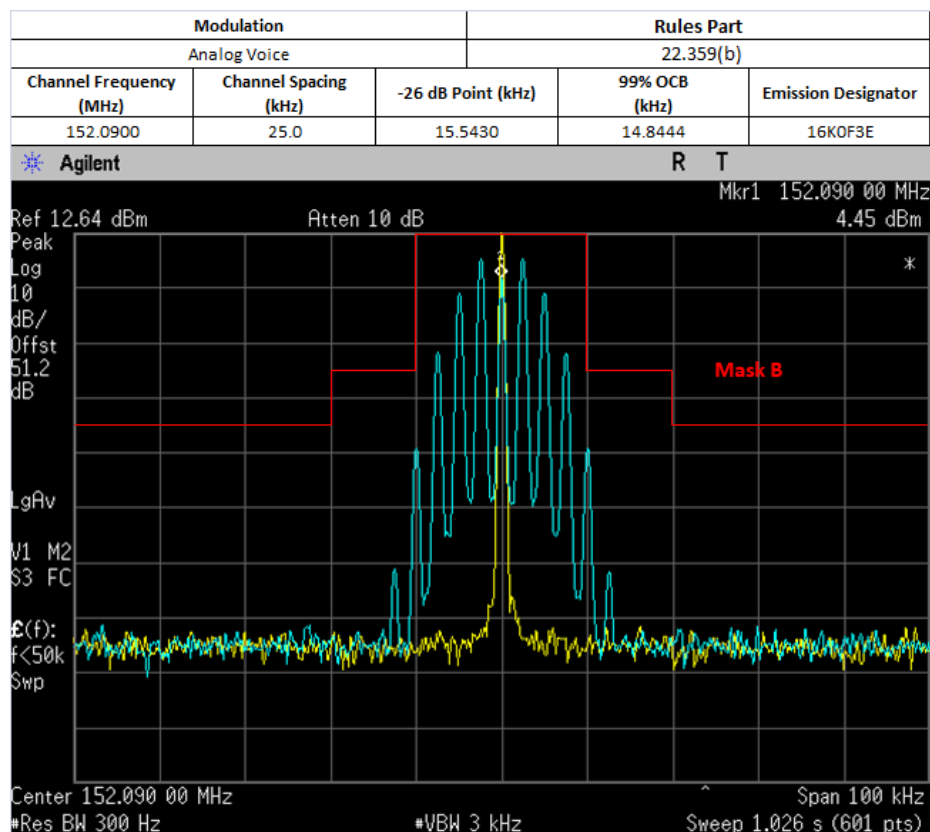


Not for FCC review

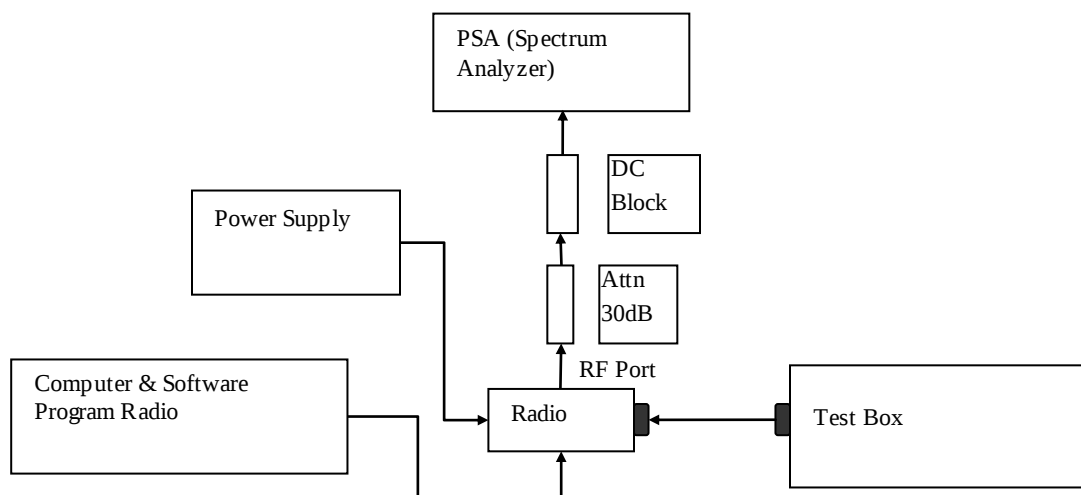




Part 80 only



6.6.3. Test Setup (Digital)

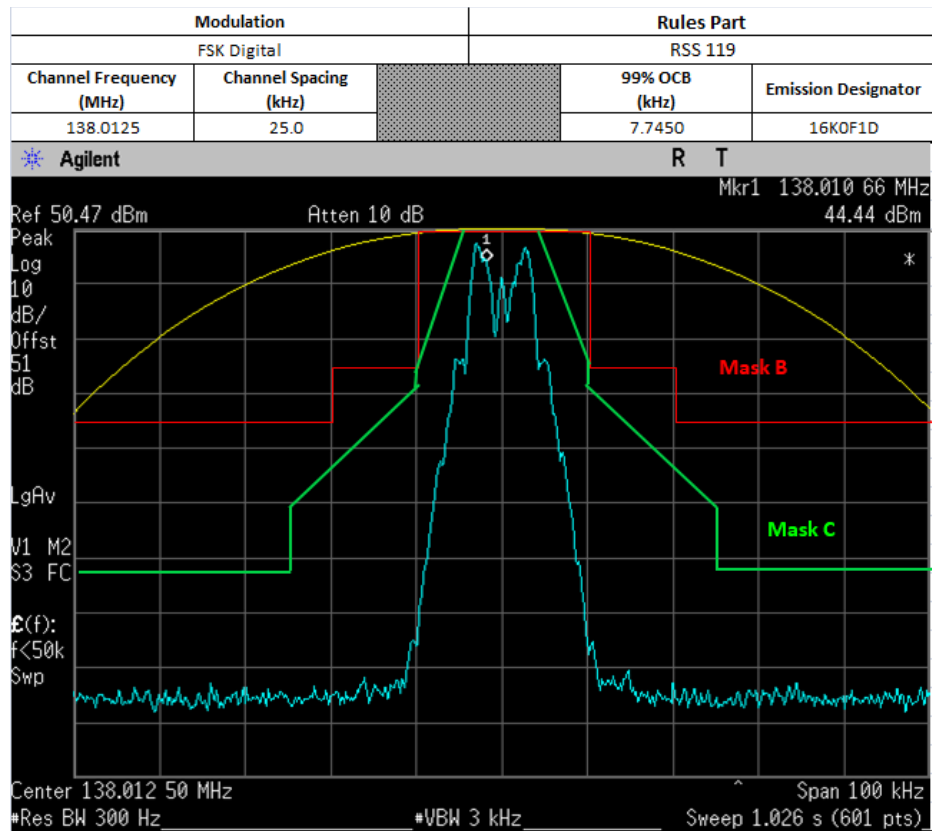


- 1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
- 2) Path loss for the measurement included.
- 3) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
- 4) Key in the Fc and 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.

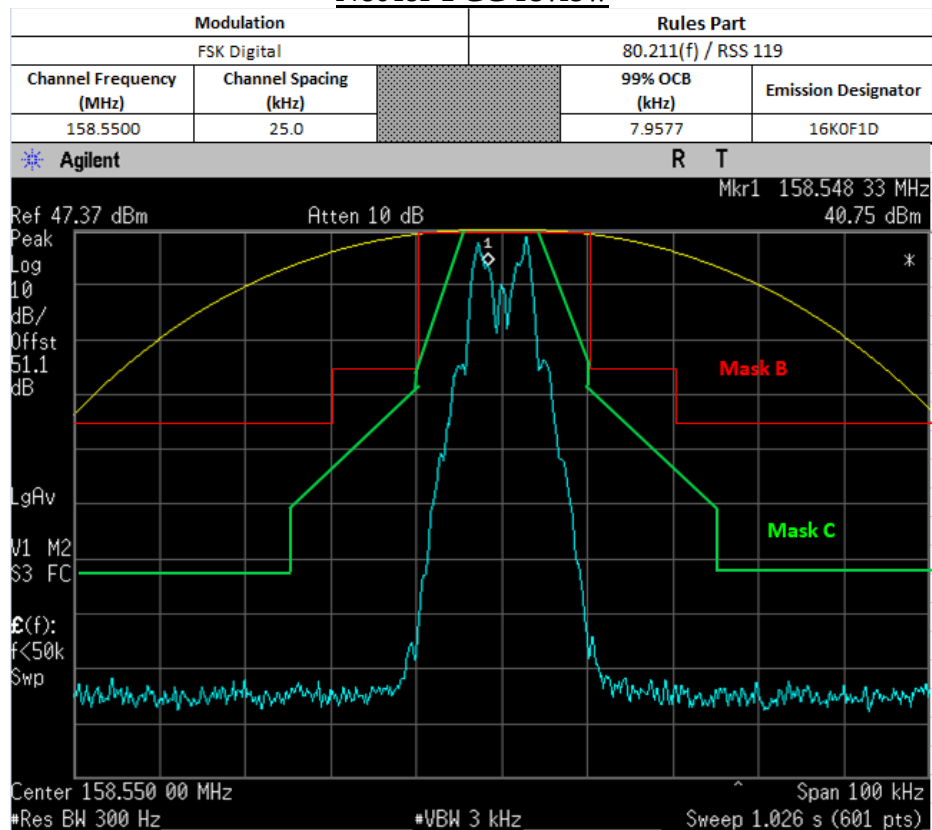
***Note:**

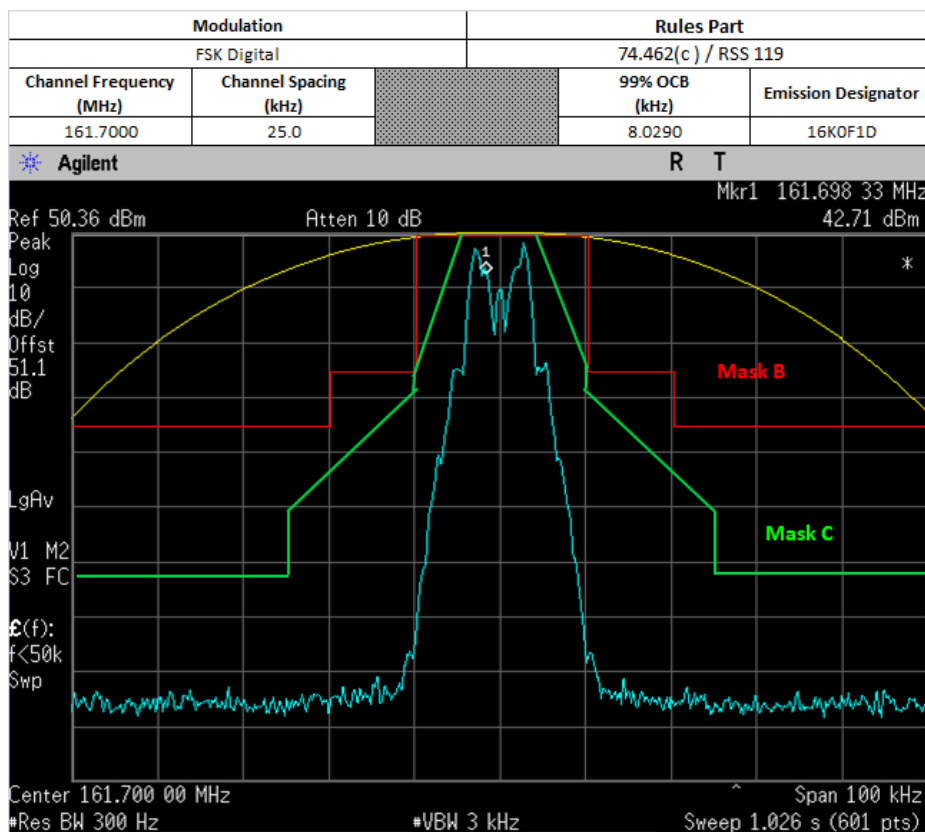
- For Digital Modulation, 12.5 kHz Data F1D & FXD would be the same. Therefore only measurements with F1D modulation shown below.
- For Digital Modulation, 12.5 kHz Data F1E & FXE would be the same. Therefore only measurements with F1E modulation shown below.

6.6.4. Test Result (Digital)

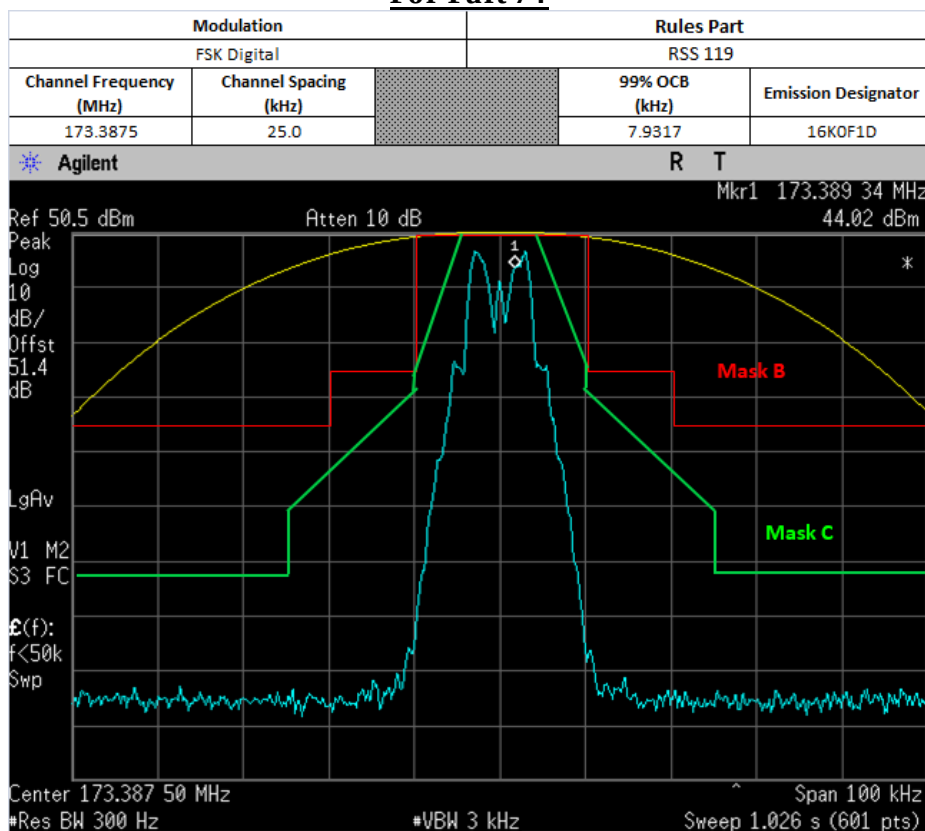


Not for FCC review

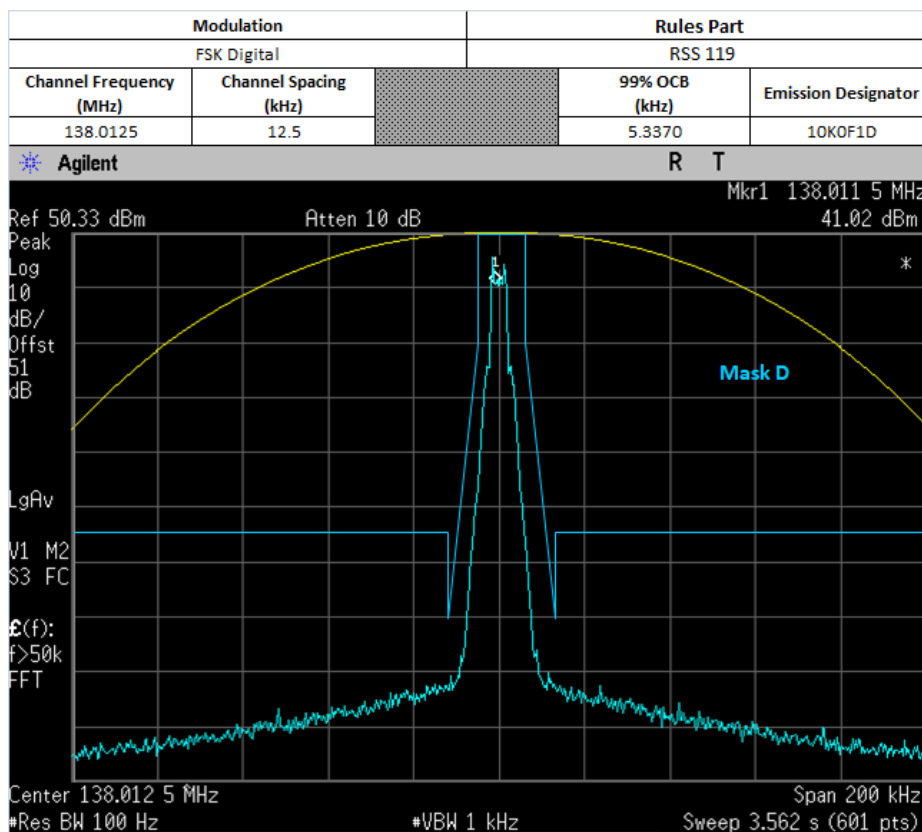




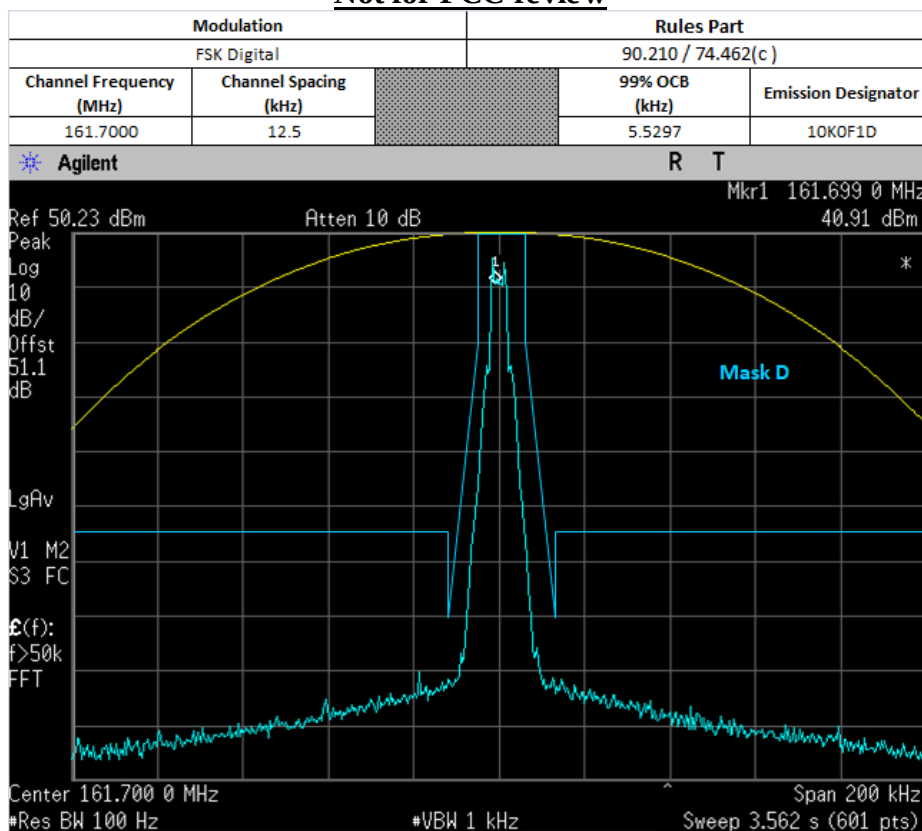
For Part 74



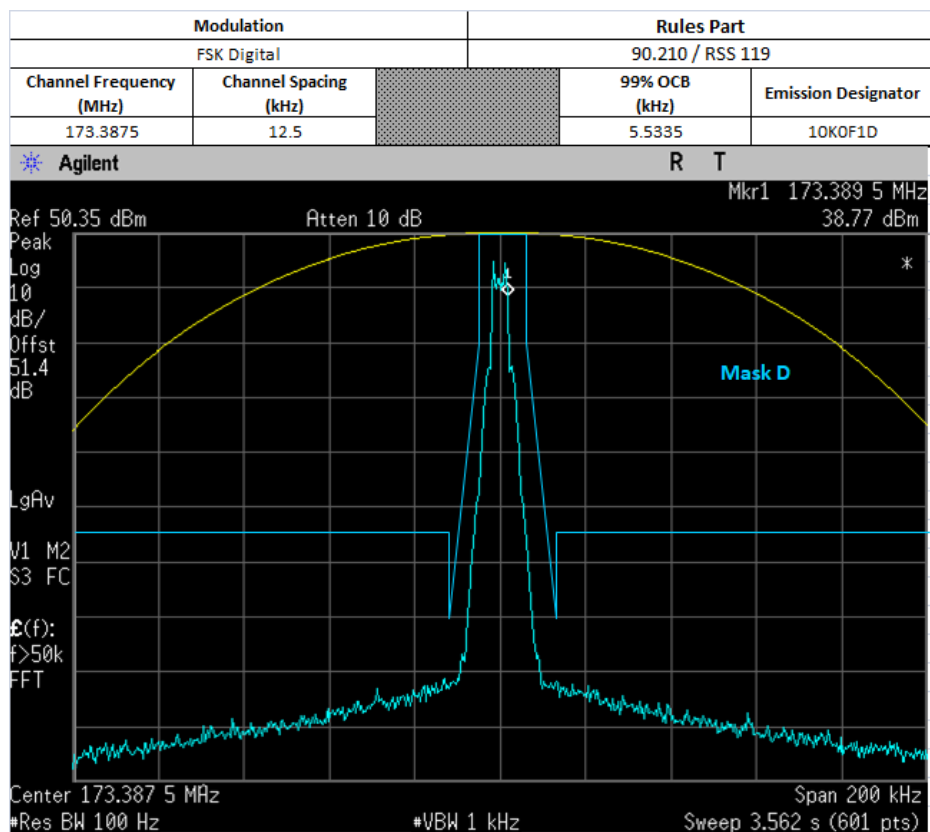
Not for FCC review



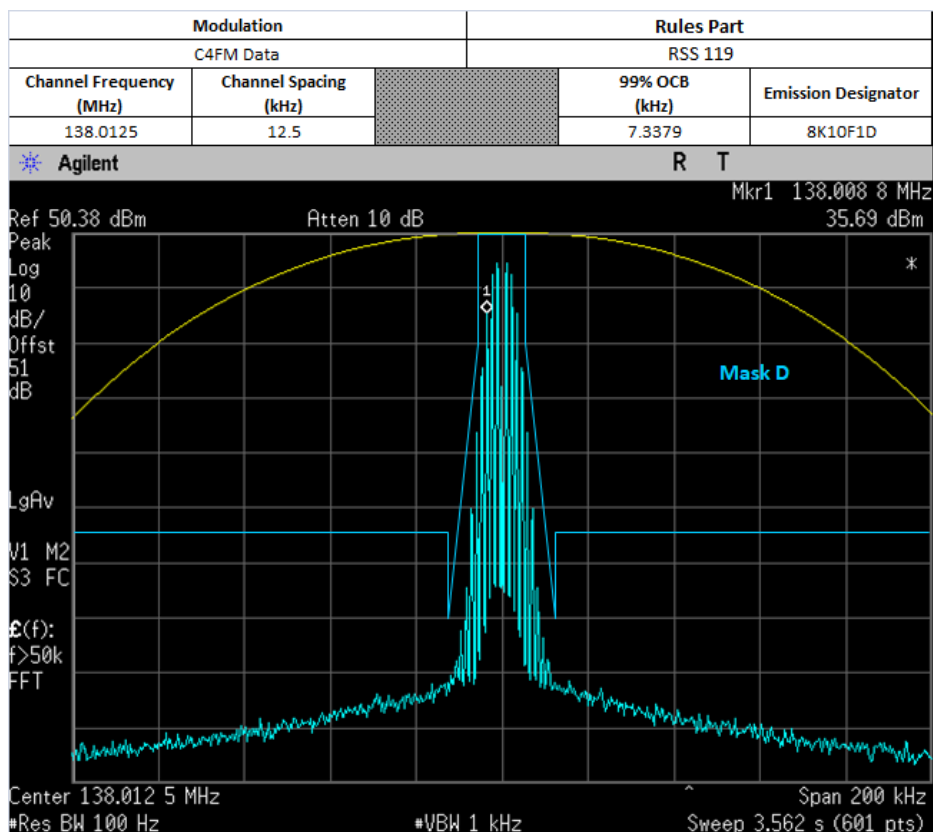
Not for FCC review



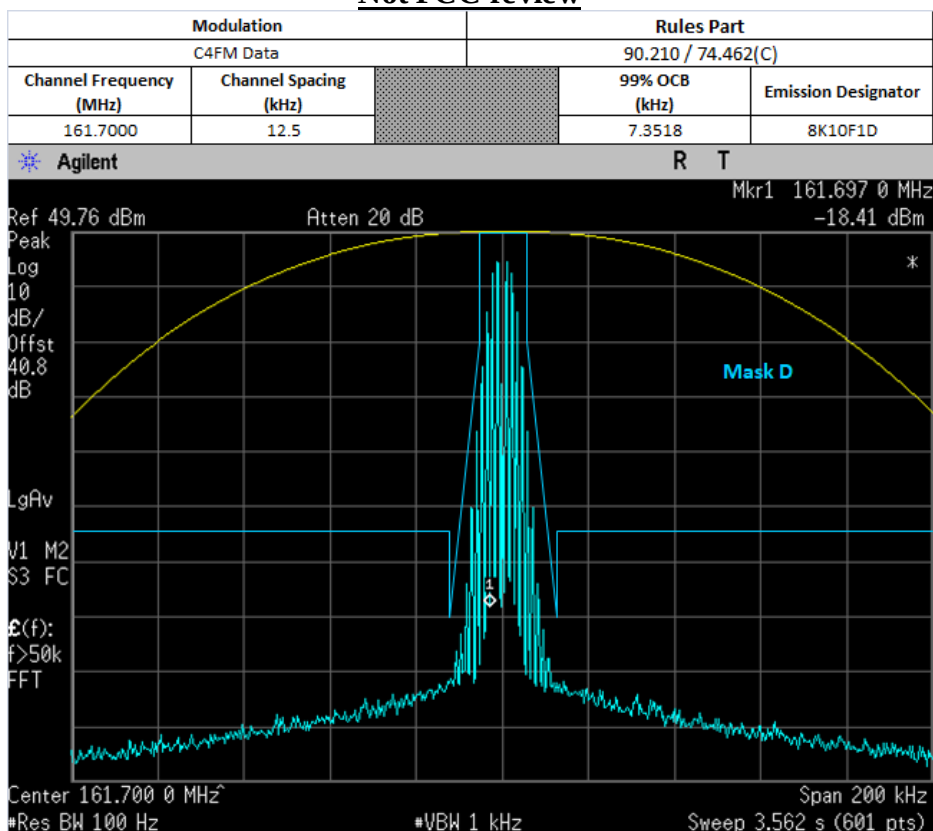
For Part 74

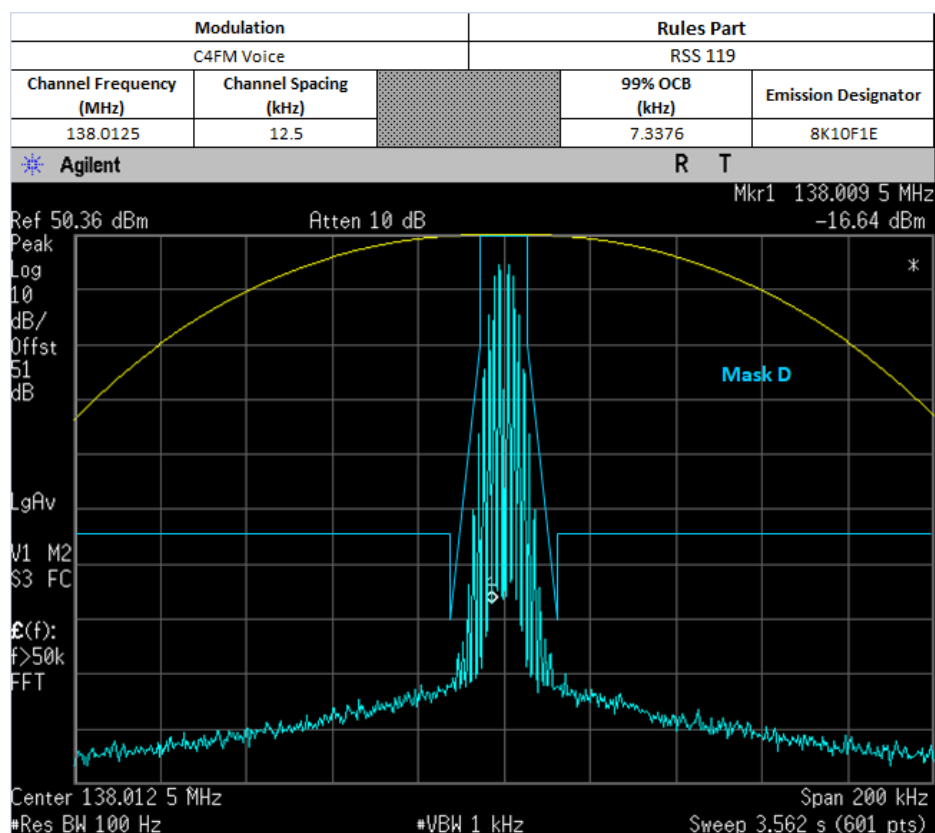
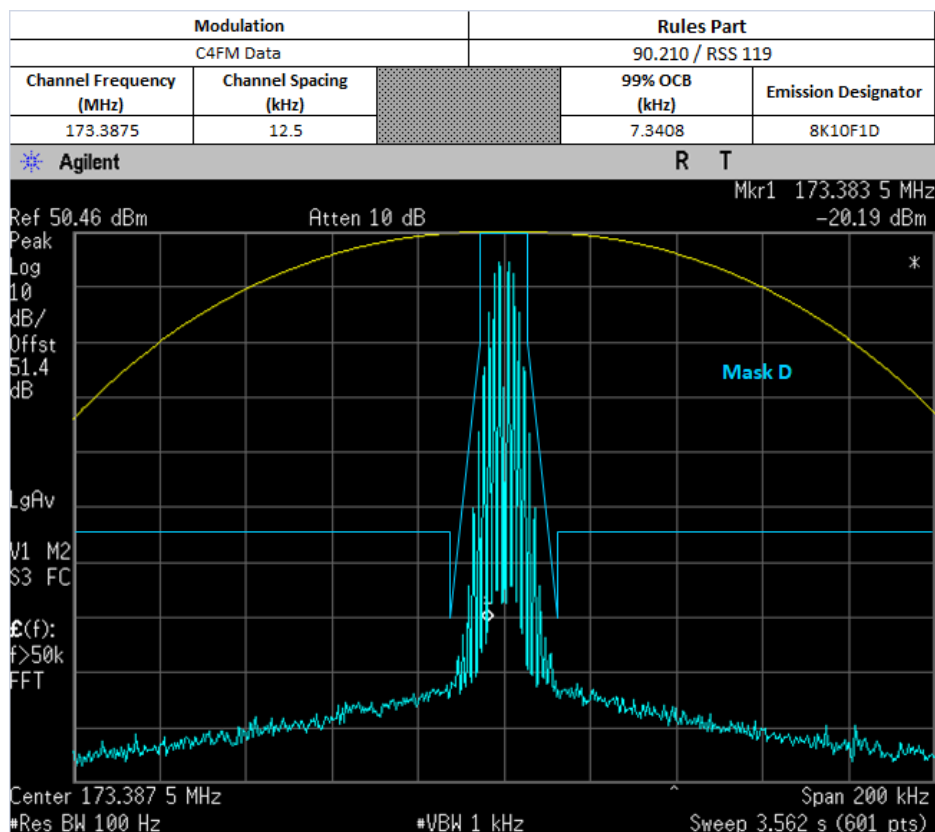


Not for FCC review

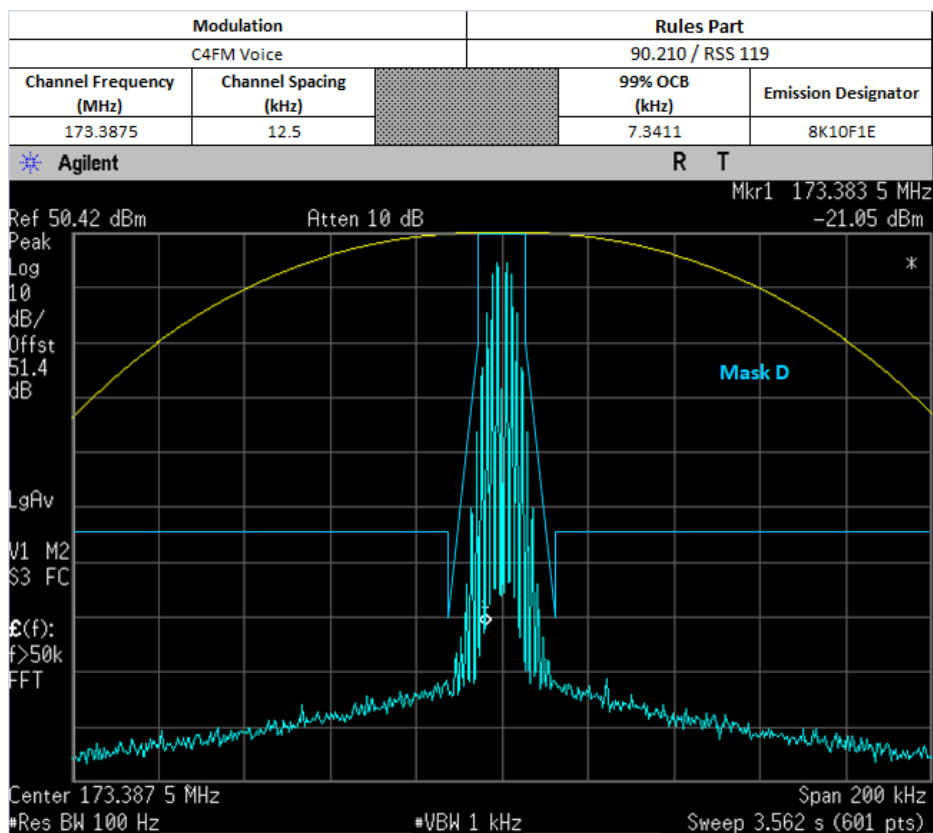
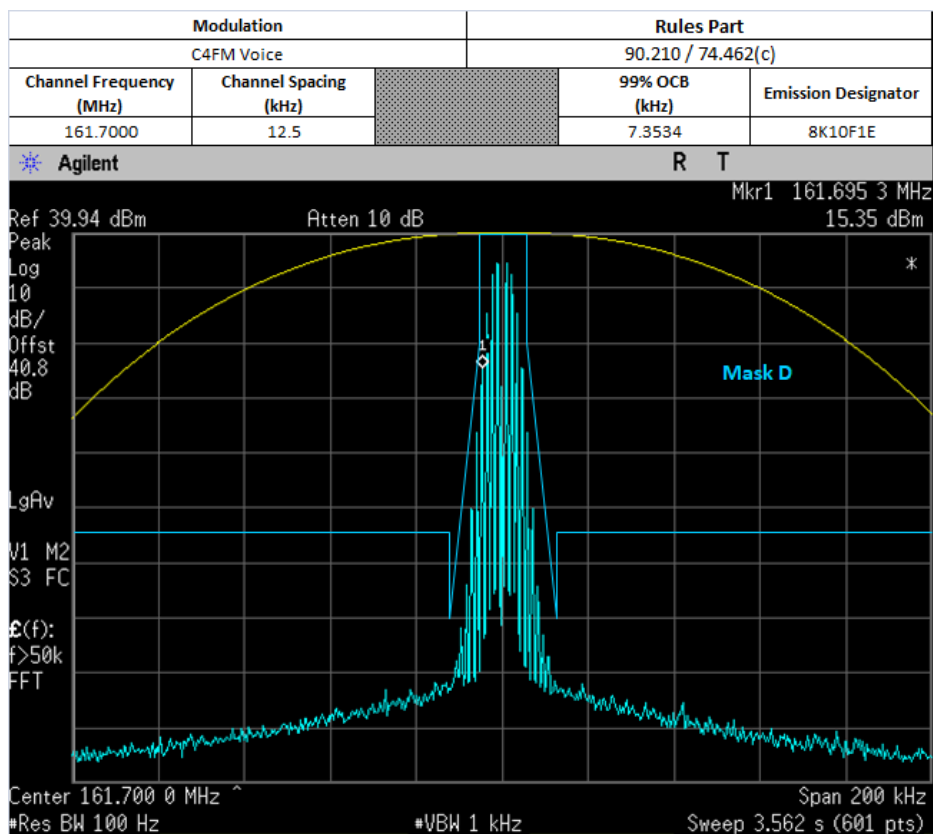


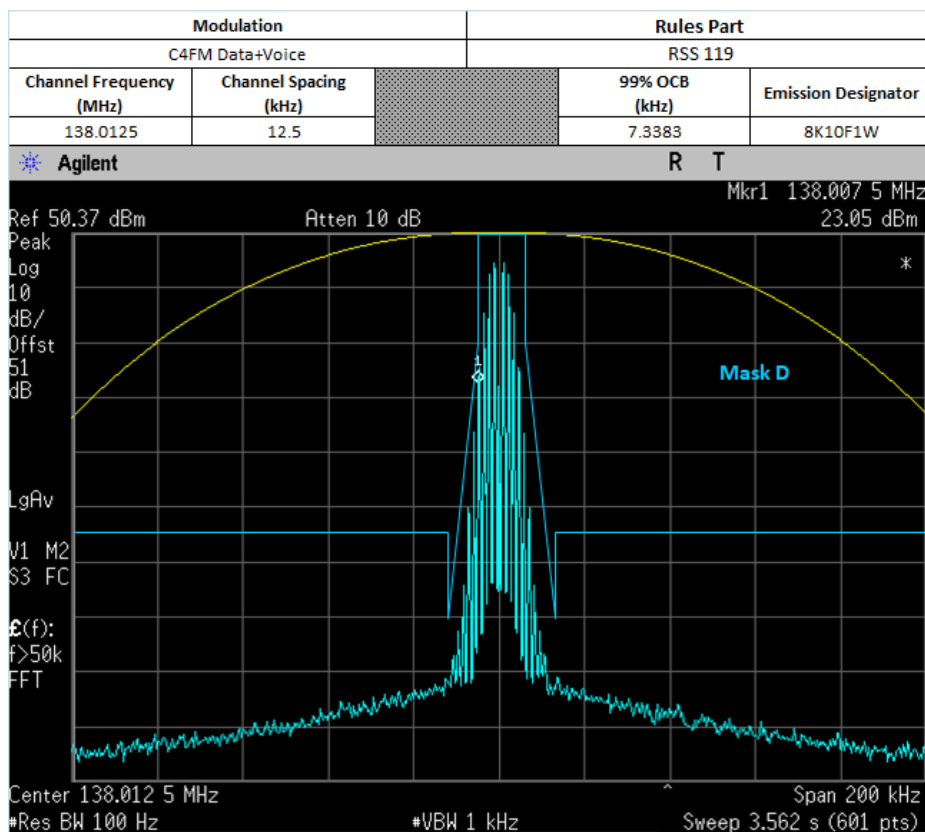
Not FCC review



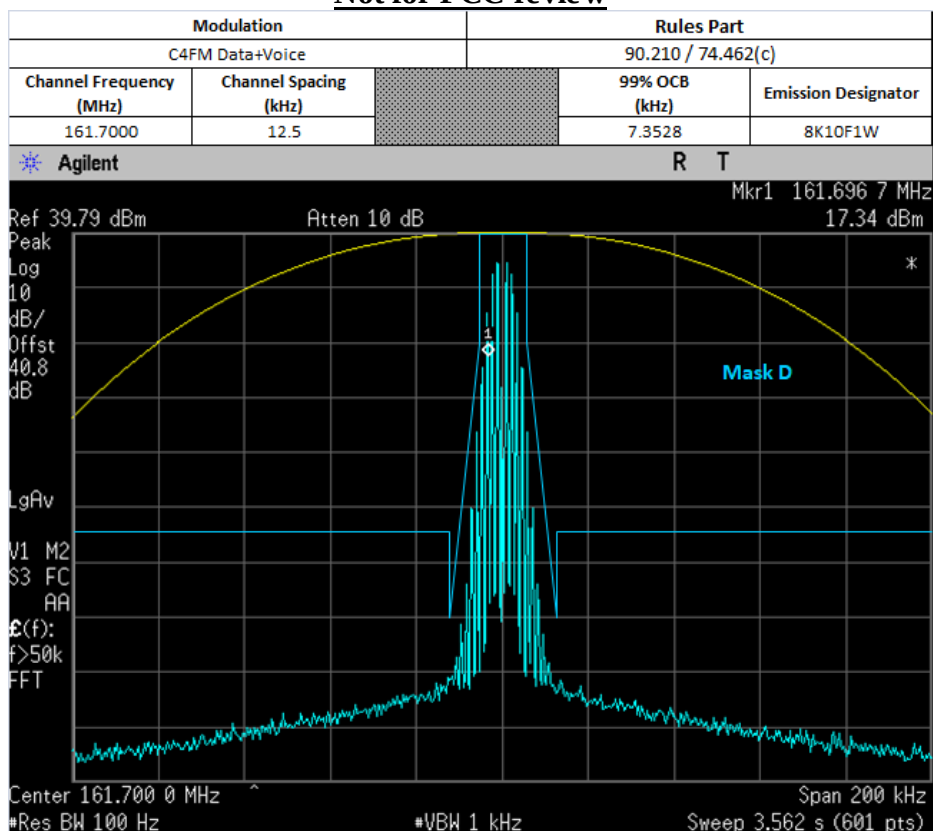


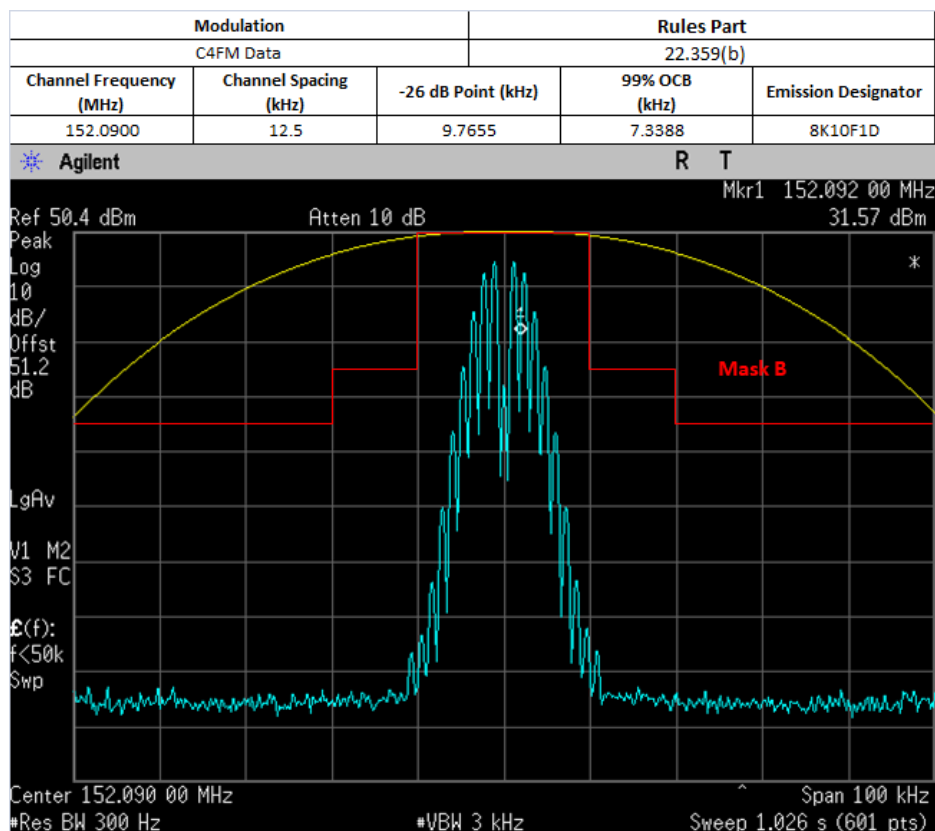
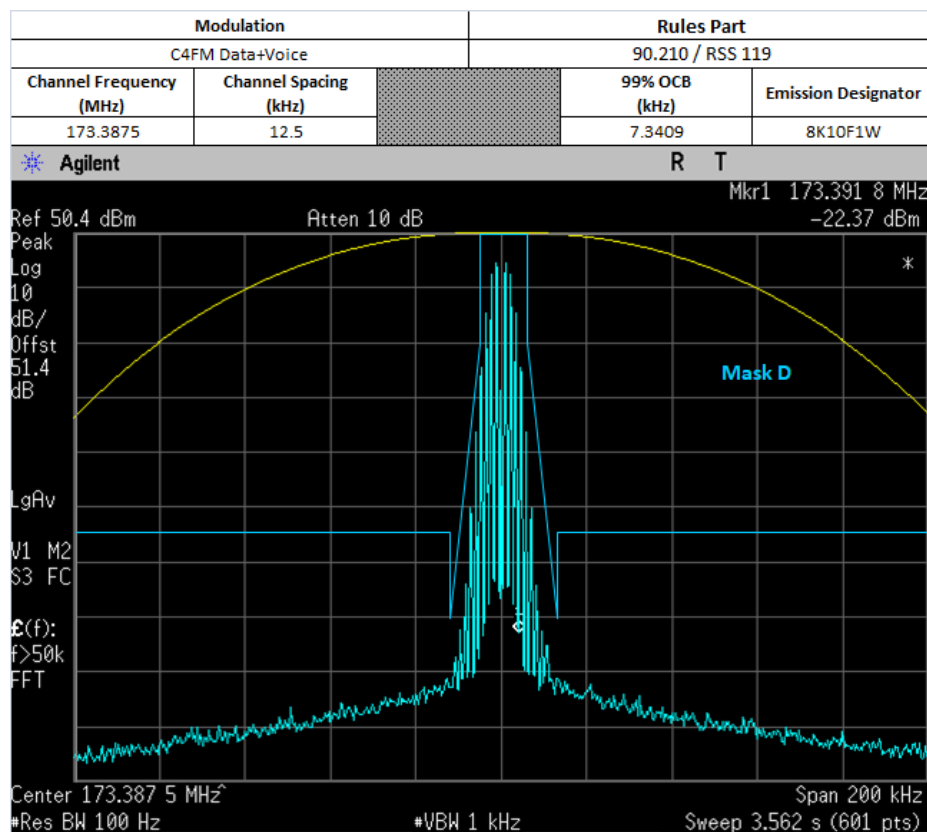
Not for FCC review

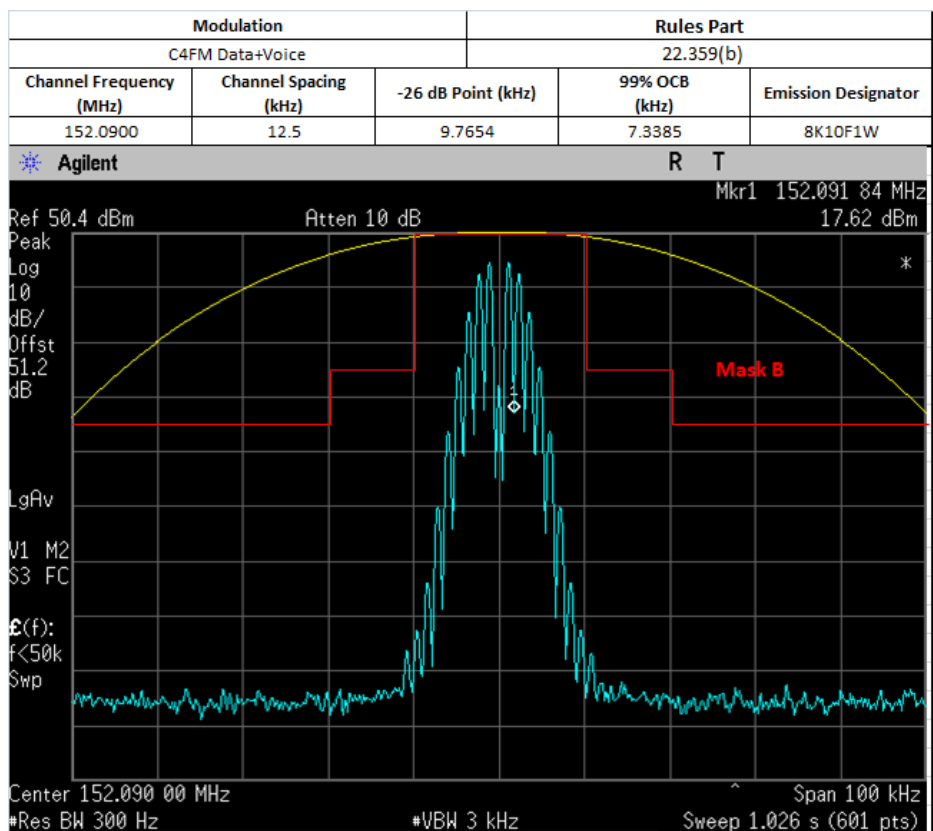
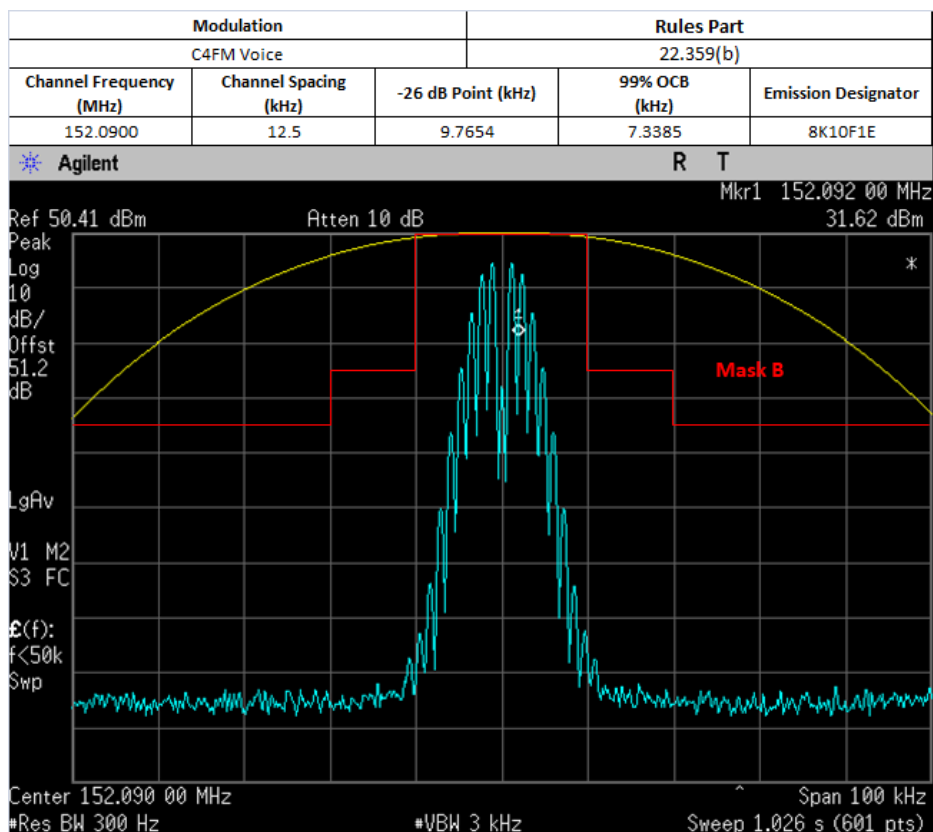


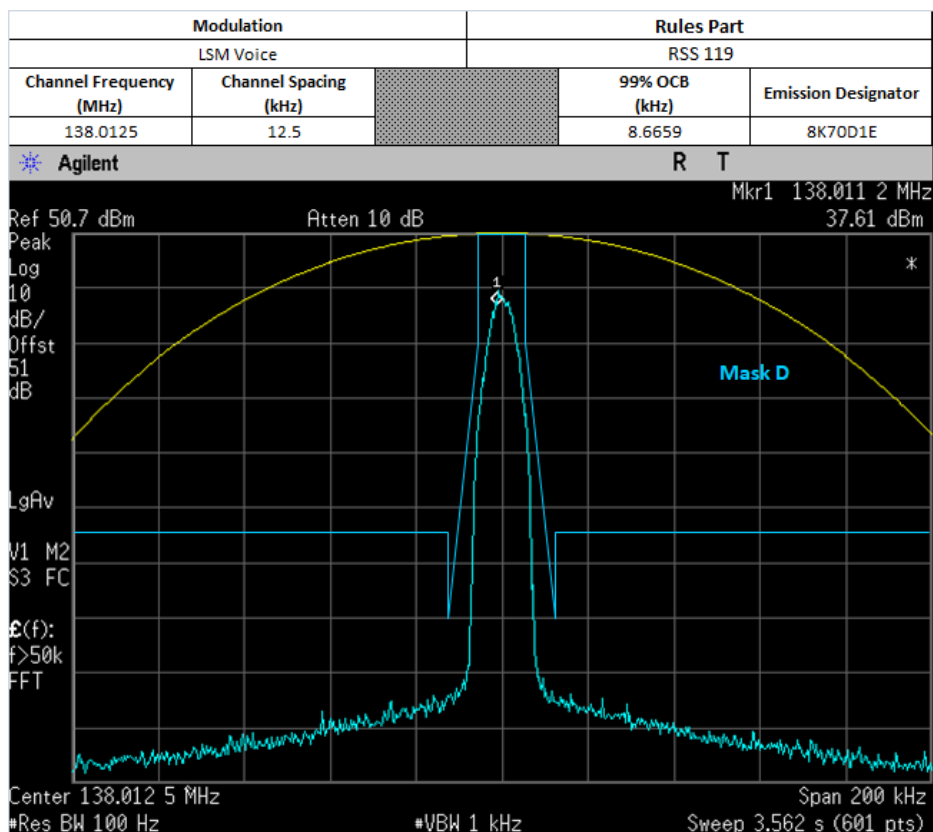


Not for FCC review

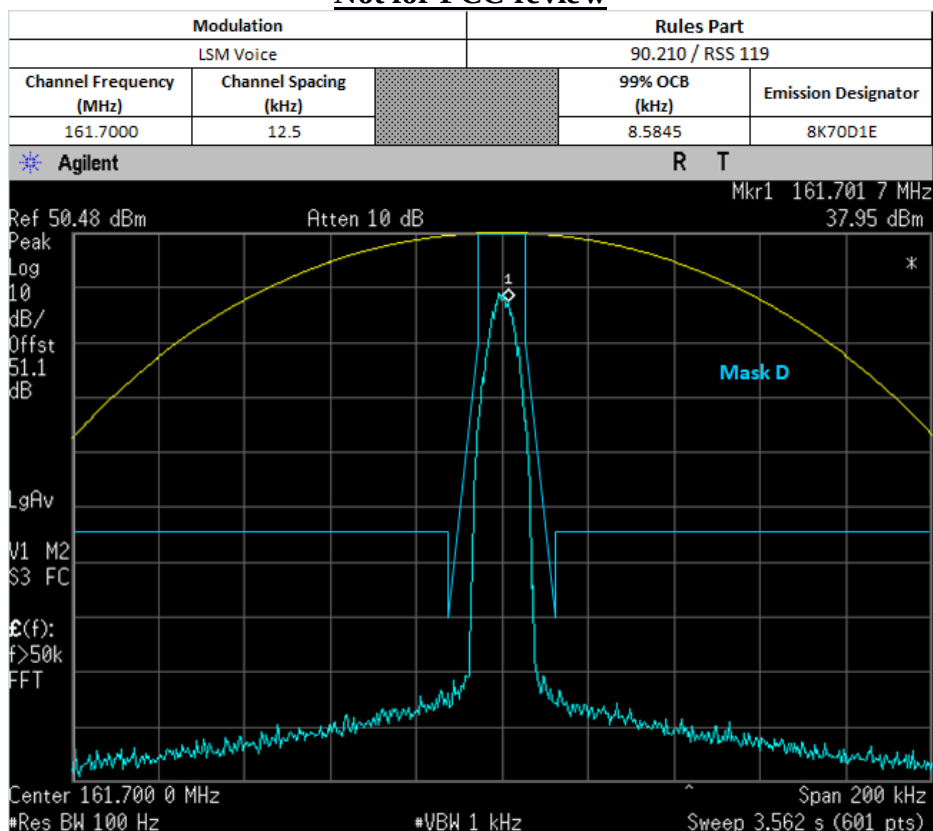


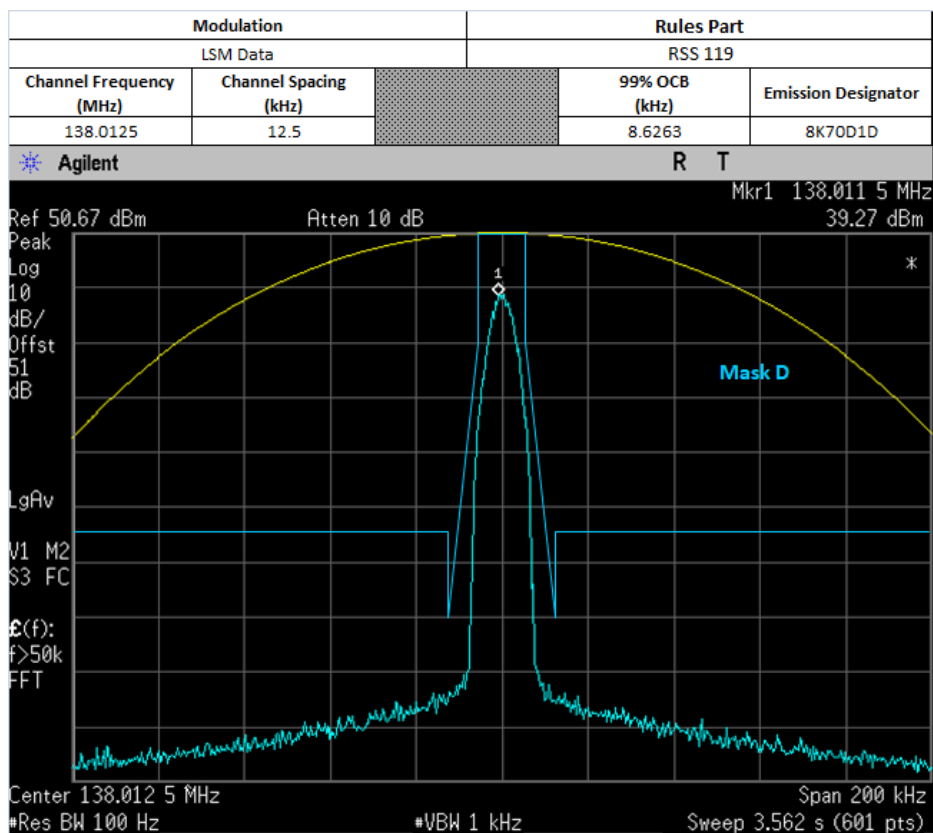
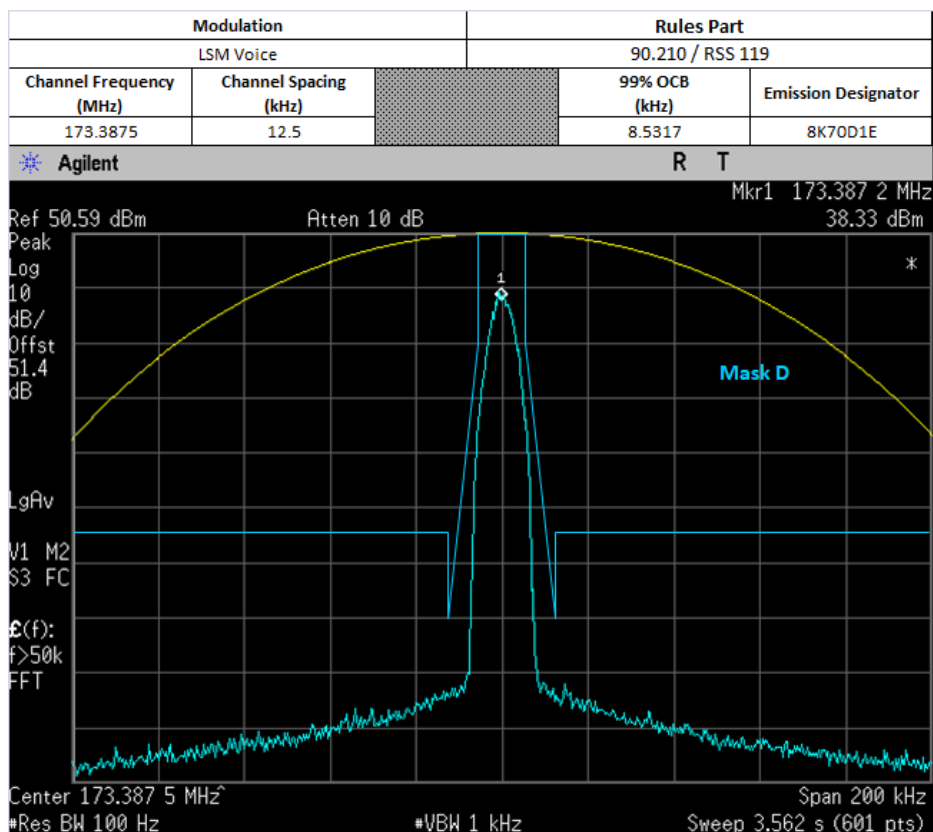




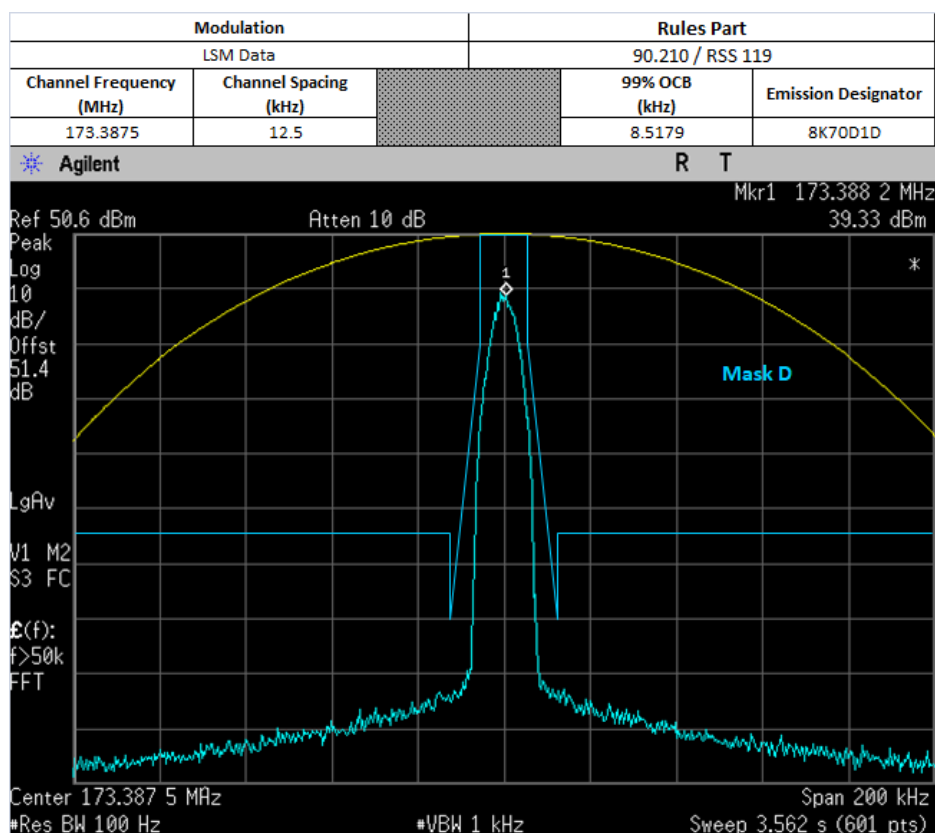
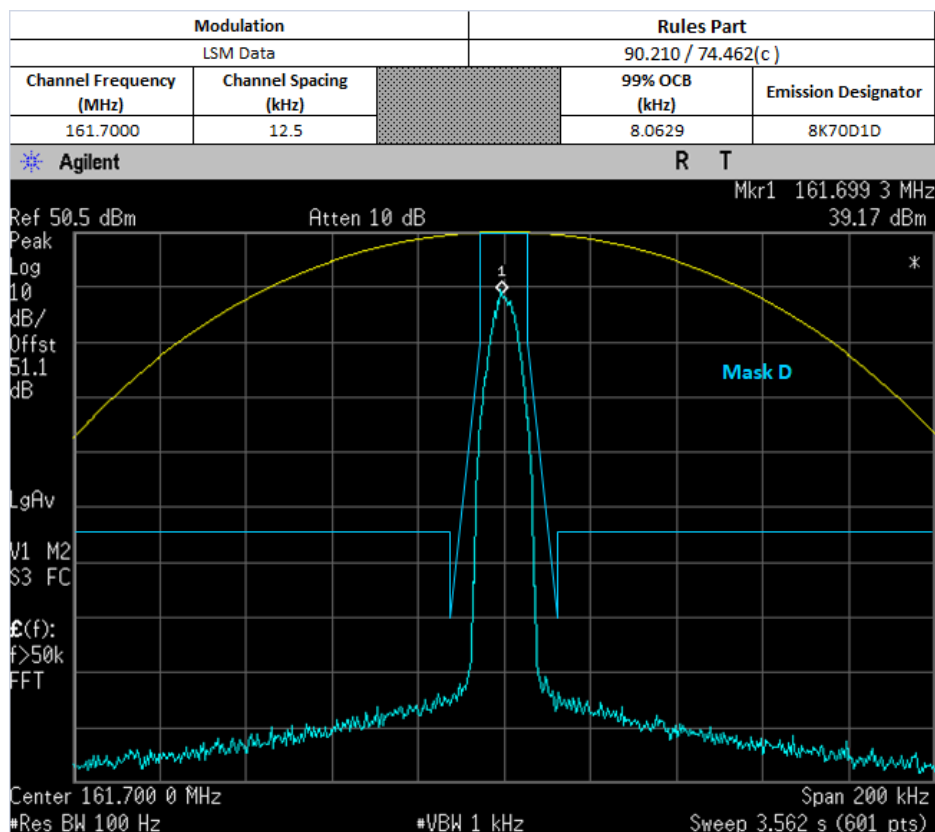


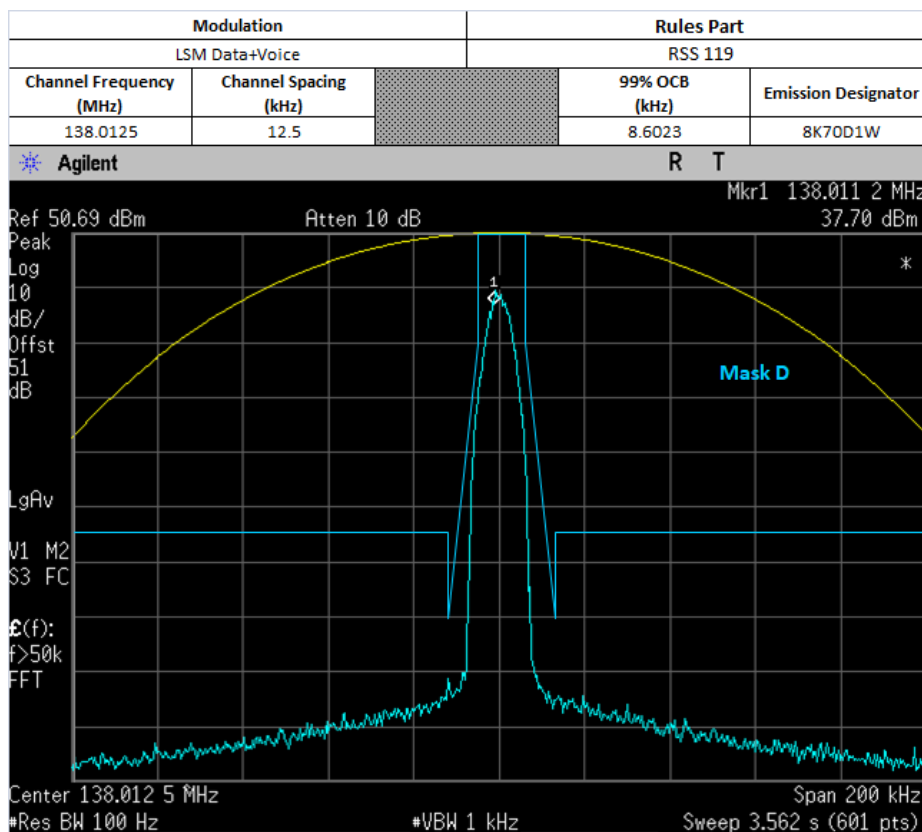
Not for FCC review



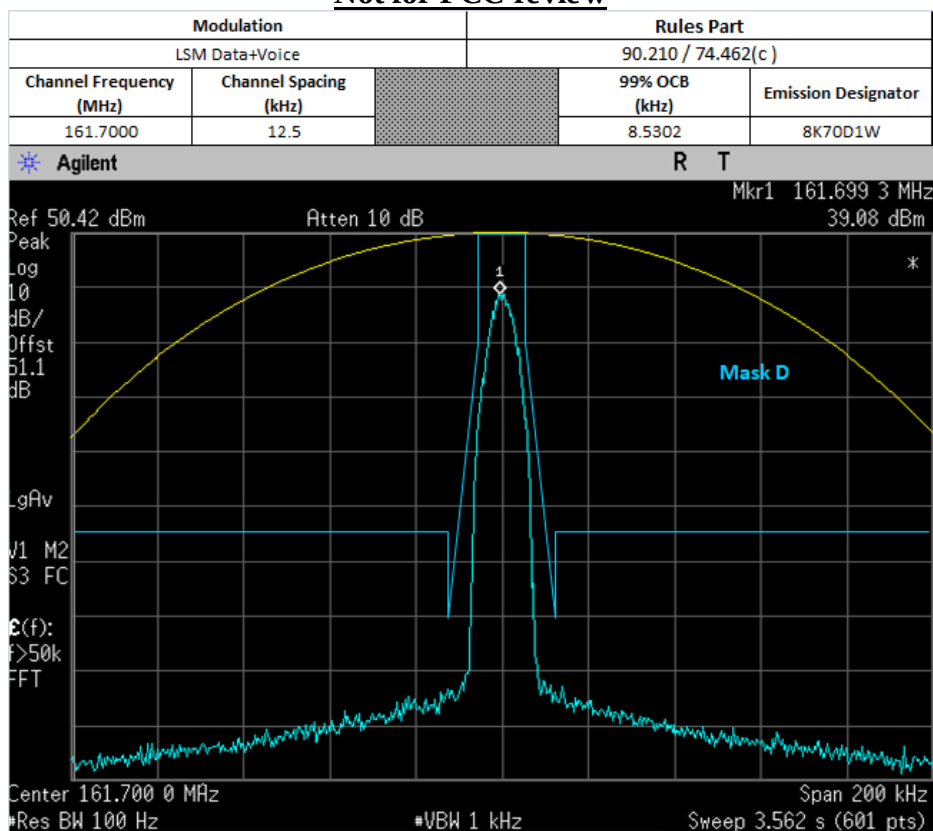


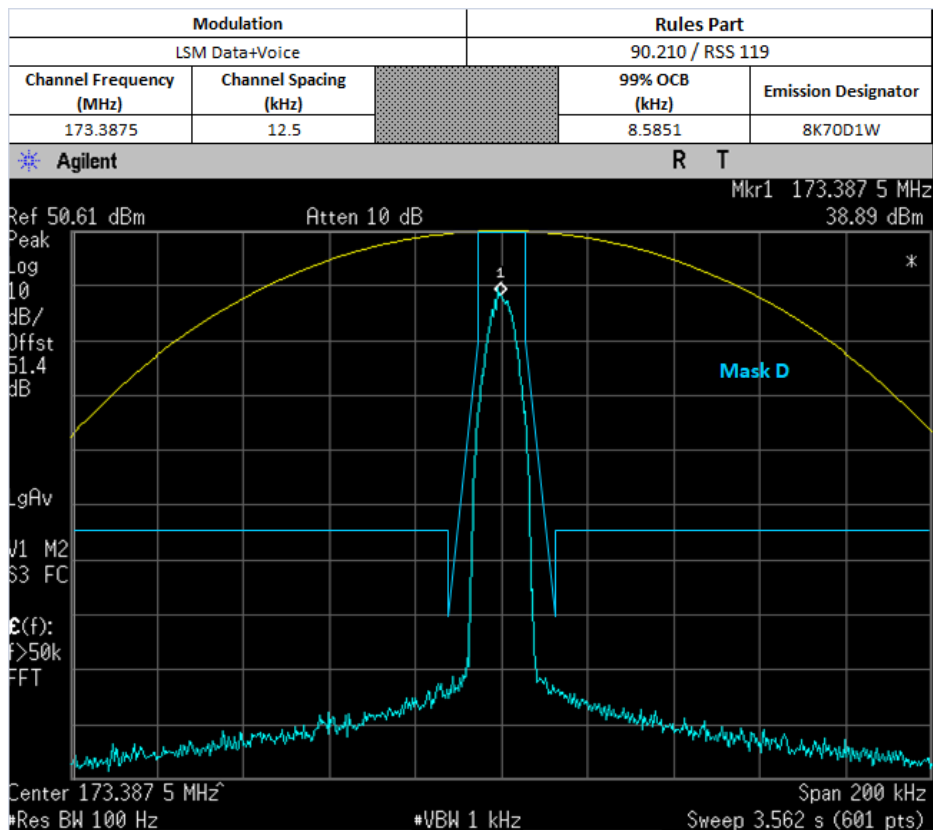
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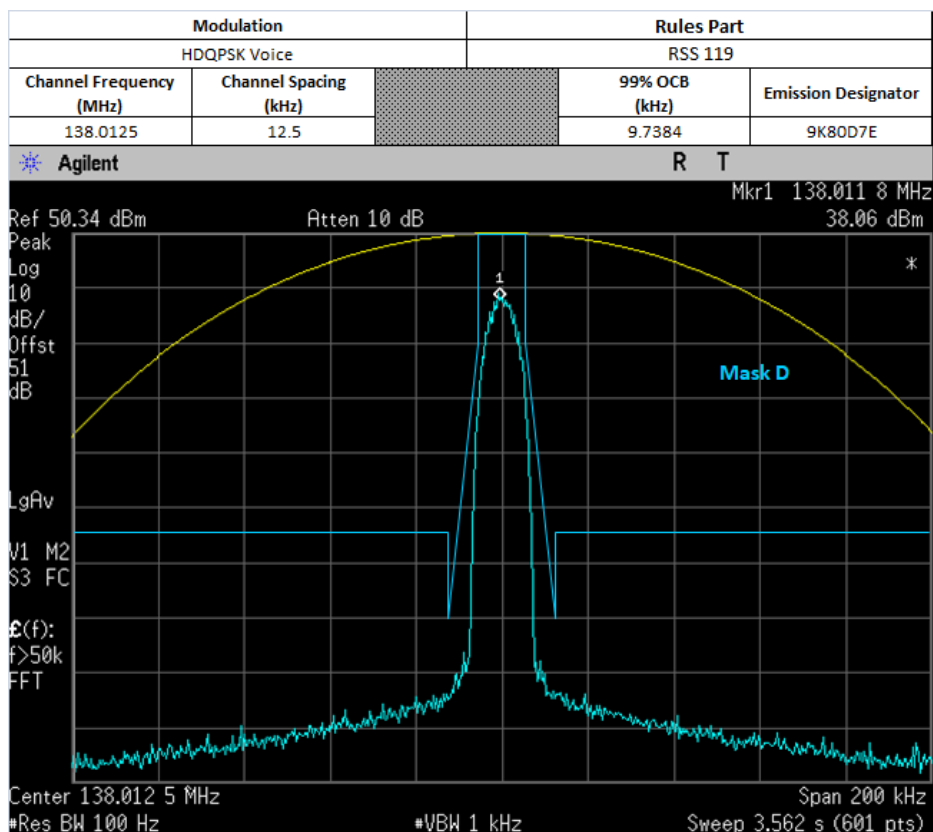




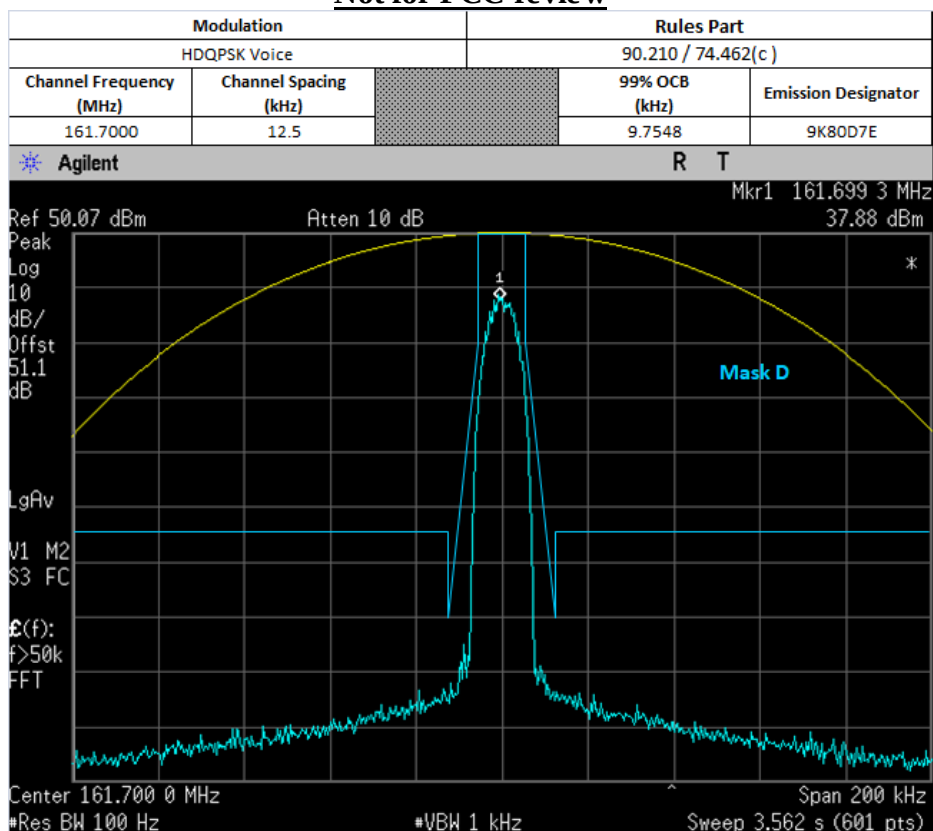
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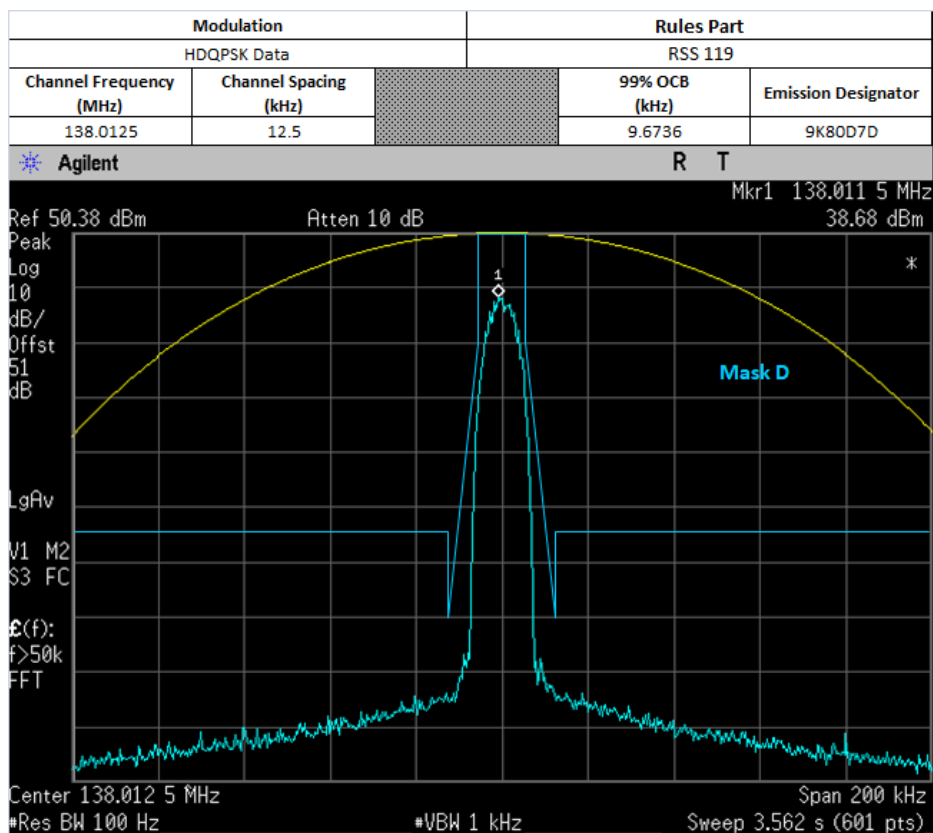
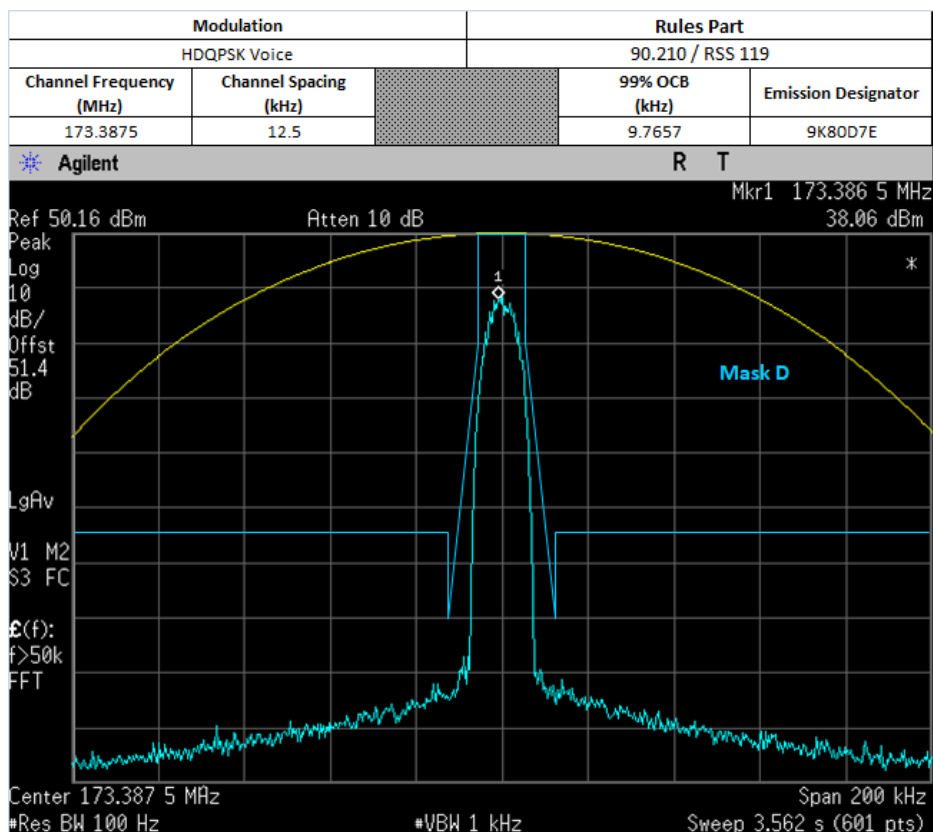




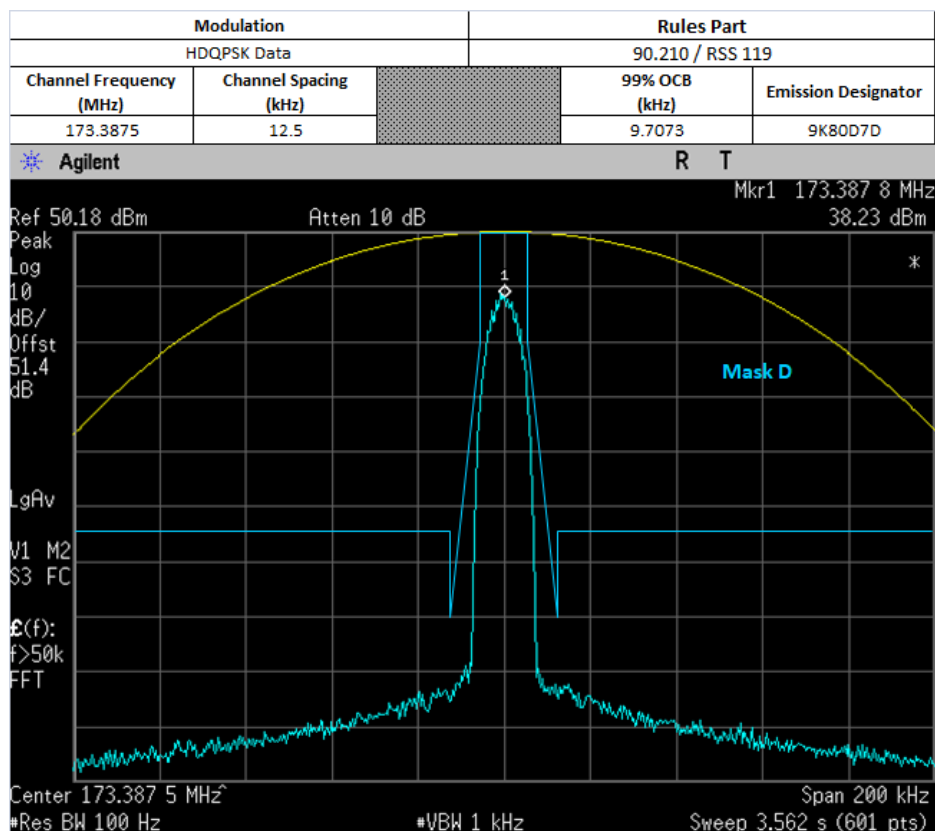
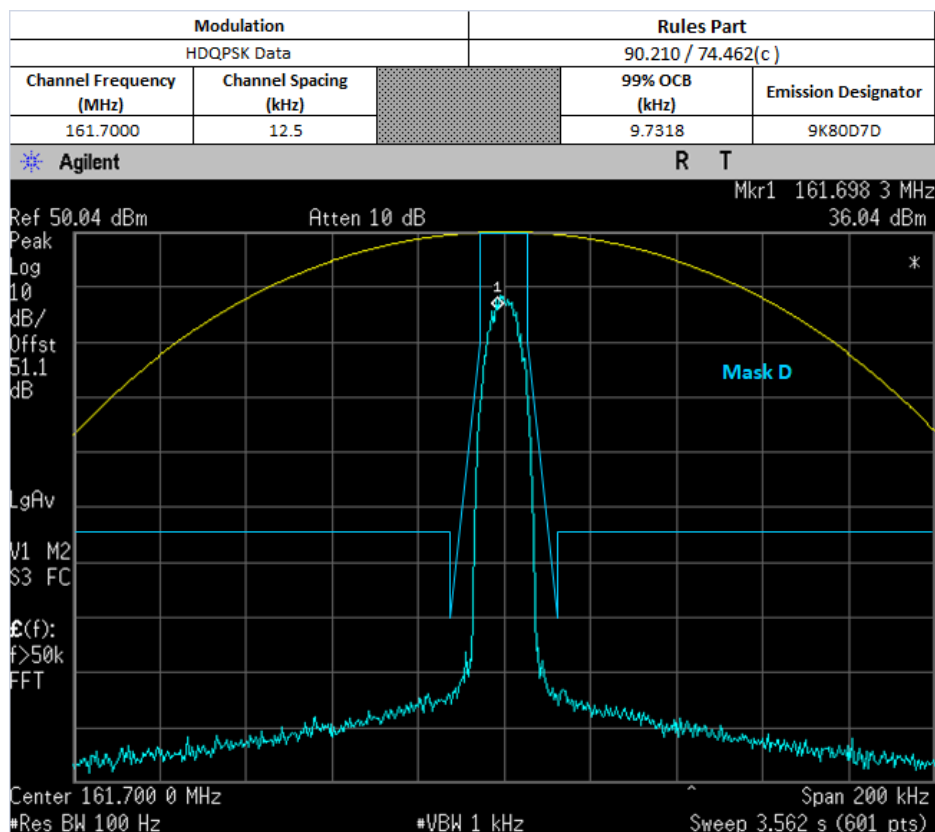


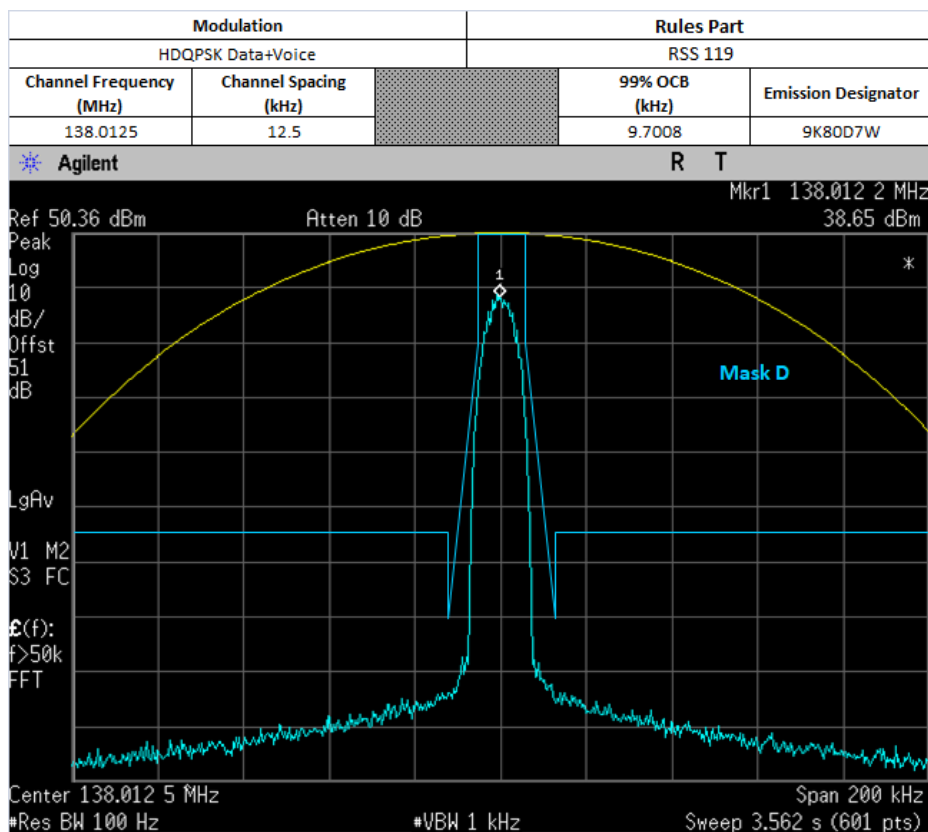
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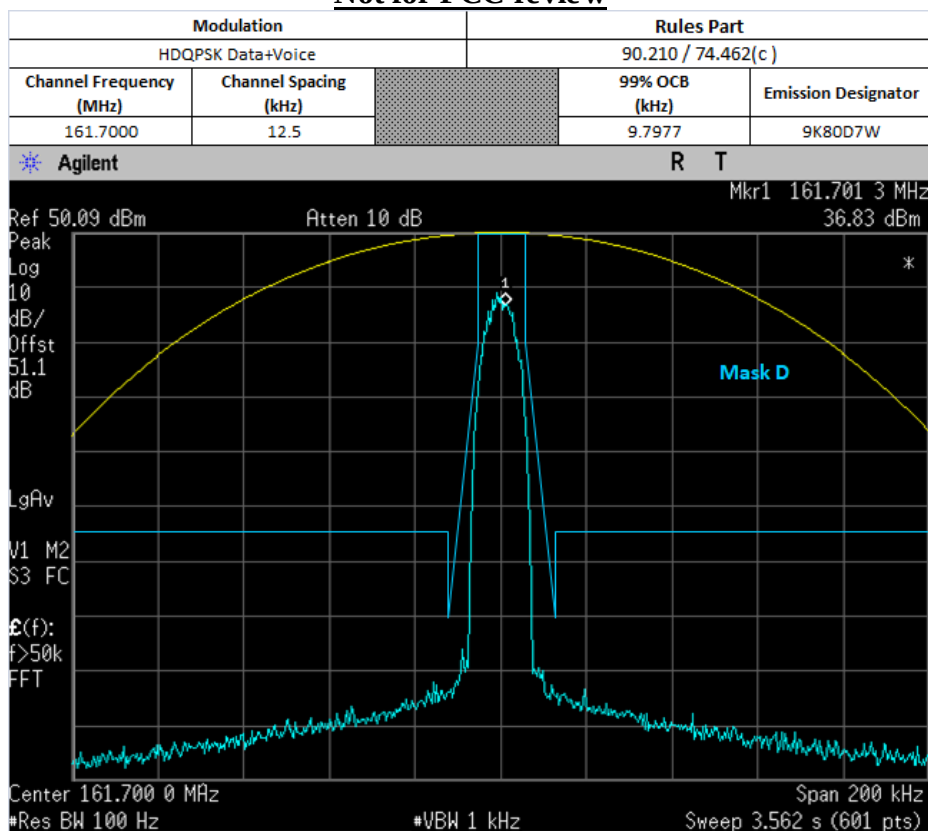


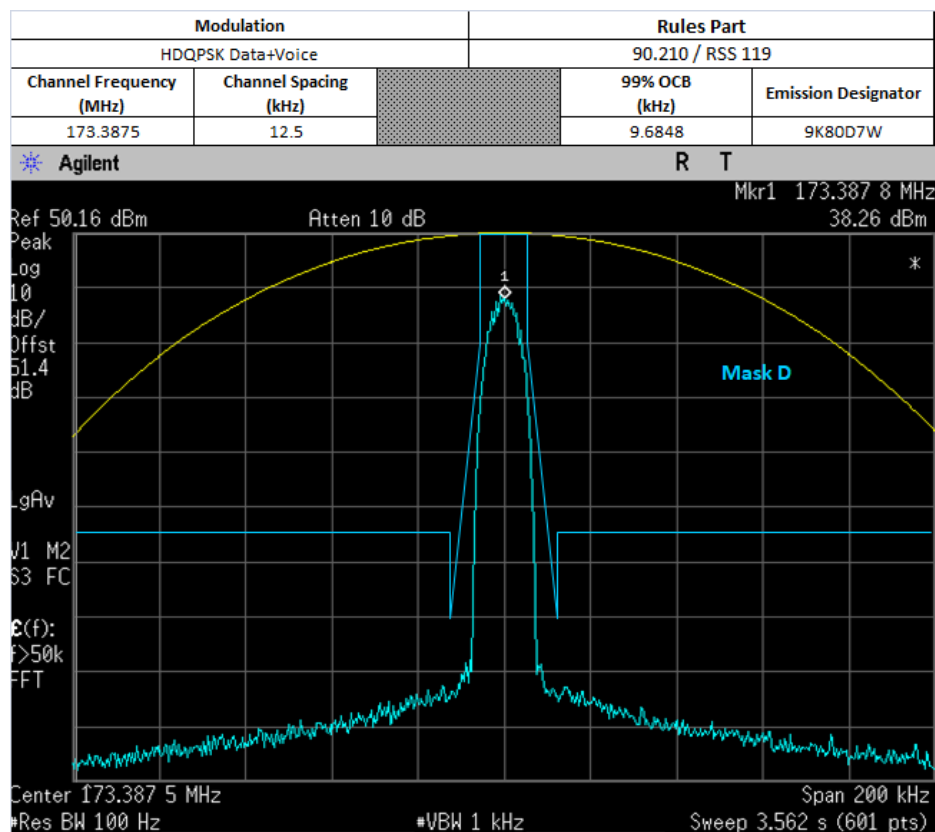
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Not for FCC review



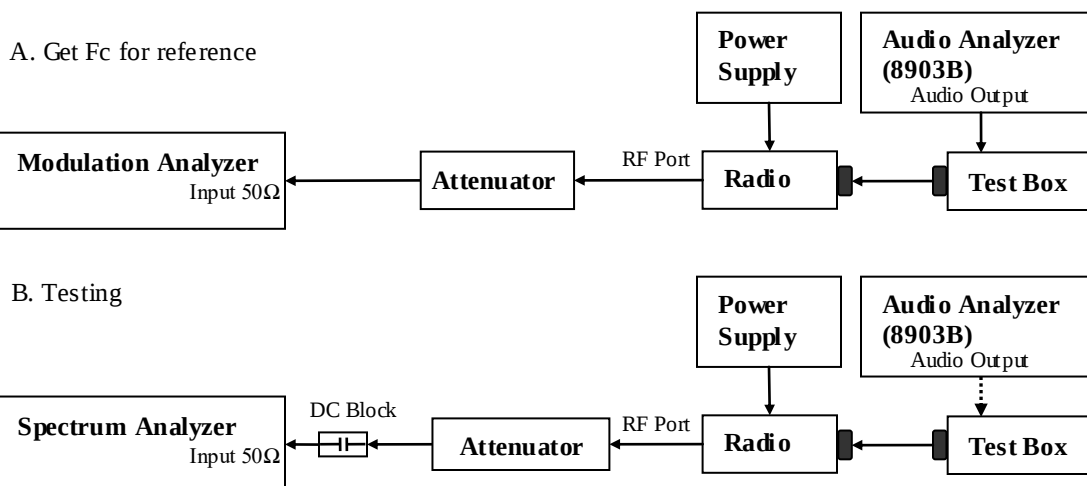


6.6.5. Test Limit

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.