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	:	04-MAY-2020 - 27-MAY-2020
Report Issue Date	:	11-JUN-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 (T7039-UHFR2C)
Frequency Band	:	435-524 MHZ
Firmware Version (FVIN)	:	R35.00.09
Max RF Output Power	:	110 Watts
Applicant Name	:	Motorola Solutions Inc
Applicant Address	:	1303 E Algonquin Road, Room 1043, Schaumburg, IL, 60196
ISED Registrations	:	MY0001
FCC Registrations	:	461337

The equipment was tested accordance to the requirement listed below:

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

Prepared By:

Aaron

Aaron Goh Tong Wen
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	27-MAY-2020	Aaron Goh
Rev. B	Updated model to GTR 8000, applicant address	20-JUL-2020	Vincent Foong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, C4FM ,HDPQSK,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
2.1046,22.565, 74.461,74.534, 80.215.74, 22	RSS-119	RF Power Output	Pass		112CWF1611
2.1055, 90.213, 22.355,74.464,74.561	RSS-119	Frequency Stability	Pass		112CWF1611
2.1047, 74.463, 80.213,22,80,90	RSS-119	Audio Frequency Response	Pass		112CWF1611
2.1047, 74.463, 80.213,22,80,90	RSS-119	Audio Low Pass Filter Response	Pass		112CWF1611
2.1047, 74.463, 80.213,22,80,90	RSS-119	Modulation limiting	Pass		112CWF1611
2.1049, 90.210, 22.359, 74.462, 74.535, 74.462(c), 80.211(c), 80.211(f),90, 90.210 (T-band), 22	RSS-119 RSS-182	Occupied Bandwidth	Pass	16K0F3E-14.8246kHz 11K0F3E-9.888kHz 8K10F1E/8K10F1D /8K10F1W-7.3545kHz 9K80D7E/9K80D7D /9K80D7W-9.7794kHz 8K70D1E/8K70D1D /8K70D1W-8.9885kHz 16K0F1D-7.9541kHz 10K0F1D-5.559kHz	112CWF1611
22.359 (a),(b)	RSS-119	Band Edge Conducted Spurious Emission	Pass		112CWF1611
90.214	RSS-119	Transient Frequency Behavior	Pass		112CWF1611
-	-	Adjacent Channel Power	NA		
Federal, Low end of part 90, 74D,74H ,22,80,90, 22E, High end of 90, High end of the band	RSS-119	Conducted Spurious Emissions	Pass	No spur detected (noise floor)	112CWF1611
Federal, Low end of part 90, 74D,74H ,22,80,90, 22E, High end of 90, High end of the band	RSS-119	Radiated Spurious Emission	Pass	Highest Spur Level- -27.29dBm	112CWF1609
-	-	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
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82

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	3216A03949	9-Apr-19	9-Jul-20
DSA Dynamic Signal Analyzer	35670A	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	6031A	3325A02771	13-Mar-20	13-Mar-21
CHAMBER	SH-641	92009188	6-Mar-20	6-Mar-21
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
POWER SUPPLY	6032A	MY41002067	22-FEB-20	22-FEB-21
AC POWER SUPPLY	61604	616040003502	13-Dec-19	13-Dec-20
CHAMBER	PL-3KP	14013886	23-Apr-20	23-Apr-21

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
SPECTRUM ANAYLYZER	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	DSB	16372019	31-Oct-19	31-Oct-20
SYSTEM CONTROLLER	SC104V	050806-1	No Cal. Req'd	No Cal. Req'd
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	No Cal. Req'd	No Cal. Req'd
ANTENNA POSITIONING TOWER	TLT2	NA	No Cal. Req'd	No Cal. Req'd
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	23-Jun-19	23-Jun-20
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	No Cal. Req'd	No Cal. Req'd
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-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

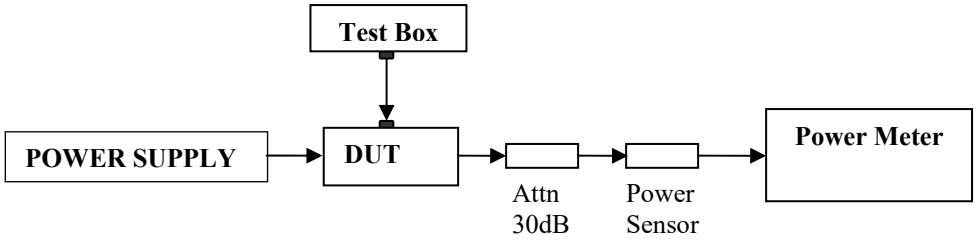
Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By	Environmental conditions
RF Output Power	**Low & Max**	**Analog**	**435.0125,450.025,454.025, 454.125,454.65,457.55, 467.775,469.9875,473.0125, 479.2875,482.0125,511.9875, 523.9875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Frequency Stability	**Max**	**Analog**	**467.775**	**Aaron Goh**	**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**	**454.125,457.55,511.9875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Audio Low Pass Filter Response (12.5kHz / 25kHz)	**Max**	**Analog**	**454.125,457.55,511.9875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Modulation limiting (12.5kHz / 25kHz)	**Max**	**Analog**	**454.125,457.55,511.9875**		**25.3°C, 50.3%RH**
Occupied Bandwidth (12.5kHz / 20kHz / 25kHz)	**Max**	**Analog, C4FM, HDPQSK, LSM, FSK**	**435.0125,450.025,457.55, 473.0125,482.0125,511.9875, 523.9875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	**Max**	**Analog, C4FM, HDPQSK, LSM, FSK**	**454.025,454.65,473.0125, 479.2875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Transient Frequency Behavior *(UHF & VHF Band)* (12.5kHz / 25kHz)	**Max**	**Analog, C4FM**	**467.775**	**Aaron Goh**	**25.3°C, 50.3%RH**
Adjacent Channel Power *(700MHz Band)* (12.5kHz / 25kHz)	**Max**	**NA**	**NA**	**NA**	**NA**
Conducted Spurious Emissions- (12.5kHz / 25kHz)	**Low / Max**	**Analog, C4FM, HDPQSK, LSM, FSK**	**435.0125,450.025,454.125, 457.55,469.9875,482.0125, 511.9875,523.9875**	**Aaron Goh**	**25.3°C, 50.3%RH**
Radiated Spurious Emission (12.5kHz / 25kHz)	**Low / Max**	**Analog, C4FM, HDPQSK, LSM, FSK**	**435.0125,450.025,454.125, 457.55,469.9875,482.0125, 511.9875,523.9875**	**Nazrin&Qawiman&Afendi**	**22.6°C 70.3%RH):**
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	**Max**	**NA**	**NA**	**NA**	**NA**
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	**Max**	**NA**	**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

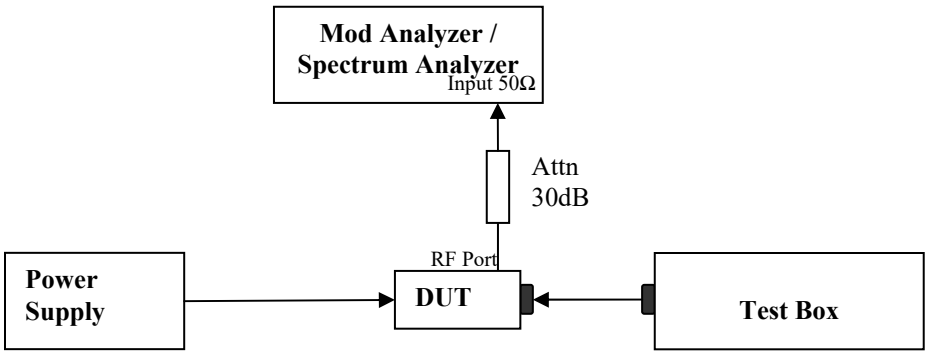
Temperature	25˚C				
Voltage (V)	240 VAC				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	Remark
435.0125	0.66	1.9	1.55	105	
450.0250	0.66	1.96	1.58	110	
454.0250	0.66	1.97	1.58	110	
454.125	0.66	1.97	1.58	110	
454.65	0.66	1.96	1.59	110	
457.55	0.65	1.94	1.14	49.6	Part 80
467.775	0.66	1.9	1.6	110	
469.9875	0.66	1.97	1.6	109	
473.0125	0.66	1.97	1.59	109	
479.2875	0.66	1.95	1.58	107	
482.0125	0.67	1.9	1.54	108	
511.9875	0.67	1.92	1.72	107	
523.9875	0.67	1.92	1.81	105	

Temperature	25˚C				
Voltage (V)	120 VAC				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	Remark
435.0125	1.21	1.9	2.99	105	
450.0250	1.2	1.95	3.04	109	
454.0250	1.2	1.92	3.06	110	
454.125	1.21	1.95	3.06	110	
454.65	1.19	1.95	3.05	109	
457.55	1.2	1.96	2.23	49.7	Part 80
467.775	1.21	1.9	3.08	109	
469.9875	1.21	1.96	3.09	109	
473.0125	1.21	1.97	3.08	108	
479.2875	1.19	1.97	3.06	107	
482.0125	1.21	1.96	3.05	108	
511.9875	1.21	1.91	3.37	106	
523.9875	1.23	1.9	3.6	106	

Temperature	25˚C				
Voltage (V)	48VDC				
Frequency (MHz)	Current (A)	Low Power (W)	Current (A)	Max Power (W)	Remark
435.0125	2.83	1.9	7.05	105	
450.0250	2.84	1.94	7.18	109	
454.0250	2.84	1.95	7.21	109	
454.125	2.85	1.95	7.23	109	
454.65	2.85	1.95	7.23	110	
457.55	2.84	1.96	5.31	49.6	Part 80
467.775	2.85	1.9	7.28	109	
469.9875	2.85	1.96	7.29	109	
473.0125	2.85	1.97	7.26	108	
479.2875	2.84	1.96	7.19	107	
482.0125	2.88	1.95	7.23	108	
511.9875	2.88	1.91	7.94	106	
523.9875	2.91	1.91	8.48	106	

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

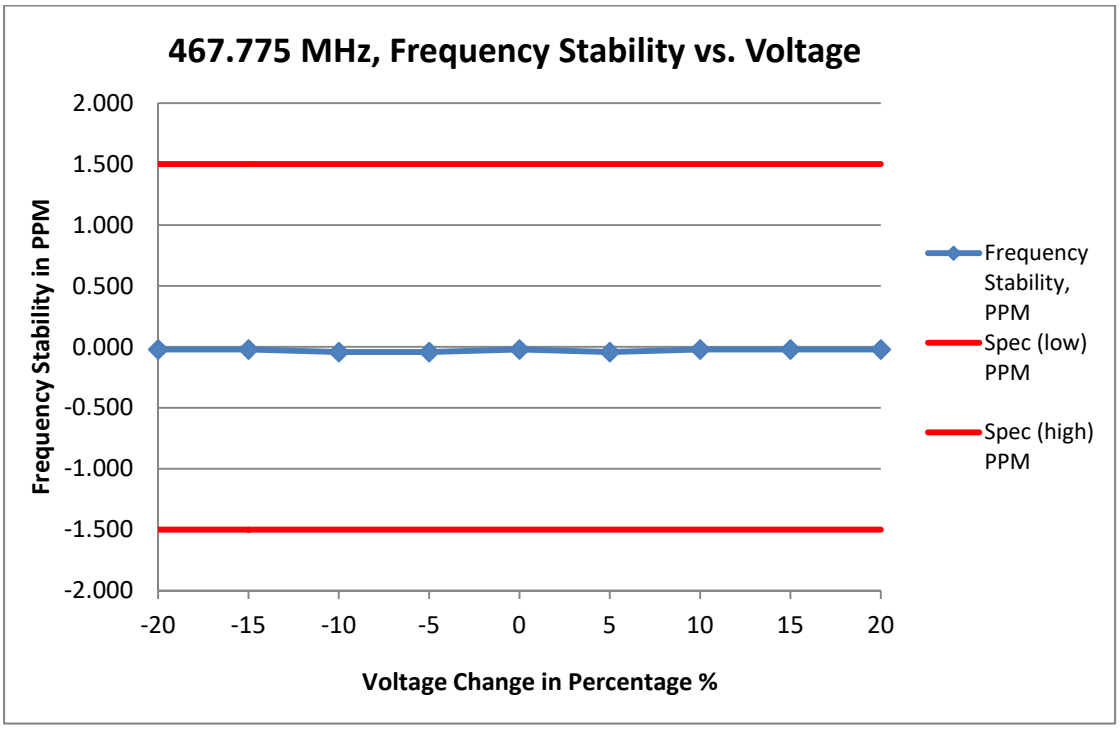
5) Calculate the ppm frequency error by the following:

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

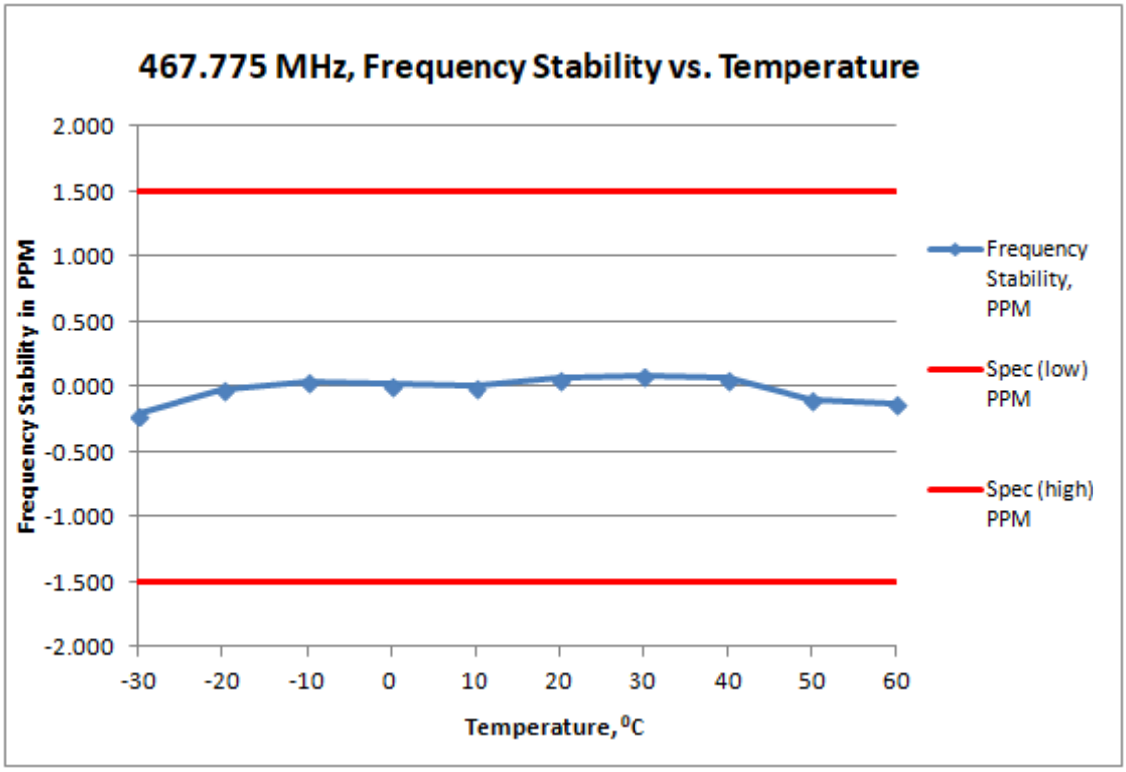
Where: MCF_{MHz} is the Measured Carrier Frequency in MHz
ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.2.2. Test Result

AC240V

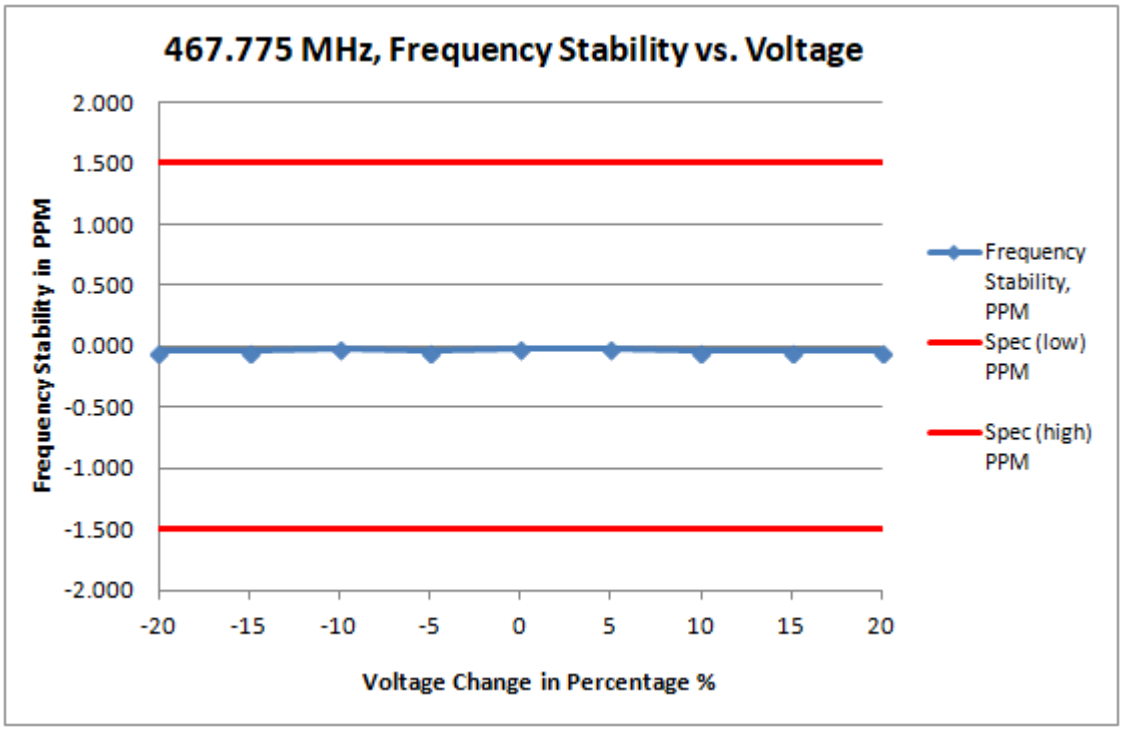


Frequency / Channel Spacing	467.775 MHz / 12.50 kHz				
Temperature, ^{0}C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	192.000	467.774990	-0.021	-1.500	1.500
-15	204.000	467.774990	-0.021	-1.500	1.500
-10	216.000	467.774980	-0.043	-1.500	1.500
-5	228.000	467.774980	-0.043	-1.500	1.500
0	240.000	467.774990	-0.021	-1.500	1.500
5	252.000	467.774980	-0.043	-1.500	1.500
10	264.000	467.774990	-0.021	-1.500	1.500
15	276.000	467.774990	-0.021	-1.500	1.500
20	288.000	467.774990	-0.021	-1.500	1.500

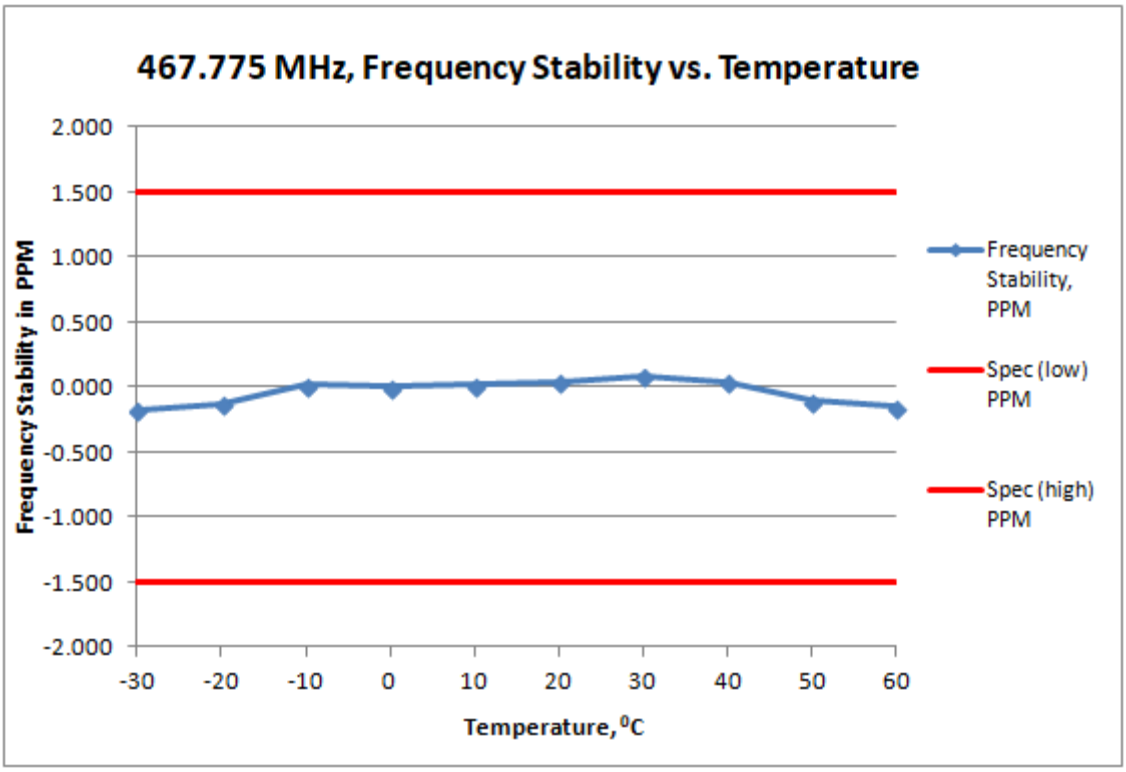


Frequency / Channel Spacing	467.775 MHz / 12.50 kHz			
Voltage, V	240VDC			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	467.774900	-0.214	-1.500	1.500
-20	467.774990	-0.021	-1.500	1.500
-10	467.775020	0.043	-1.500	1.500
0	467.775010	0.021	-1.500	1.500
10	467.775000	0.000	-1.500	1.500
20	467.775030	0.064	-1.500	1.500
30	467.775040	0.086	-1.500	1.500
40	467.775030	0.064	-1.500	1.500
50	467.774954	-0.098	-1.500	1.500
60	467.774940	-0.128	-1.500	1.500

AC120V

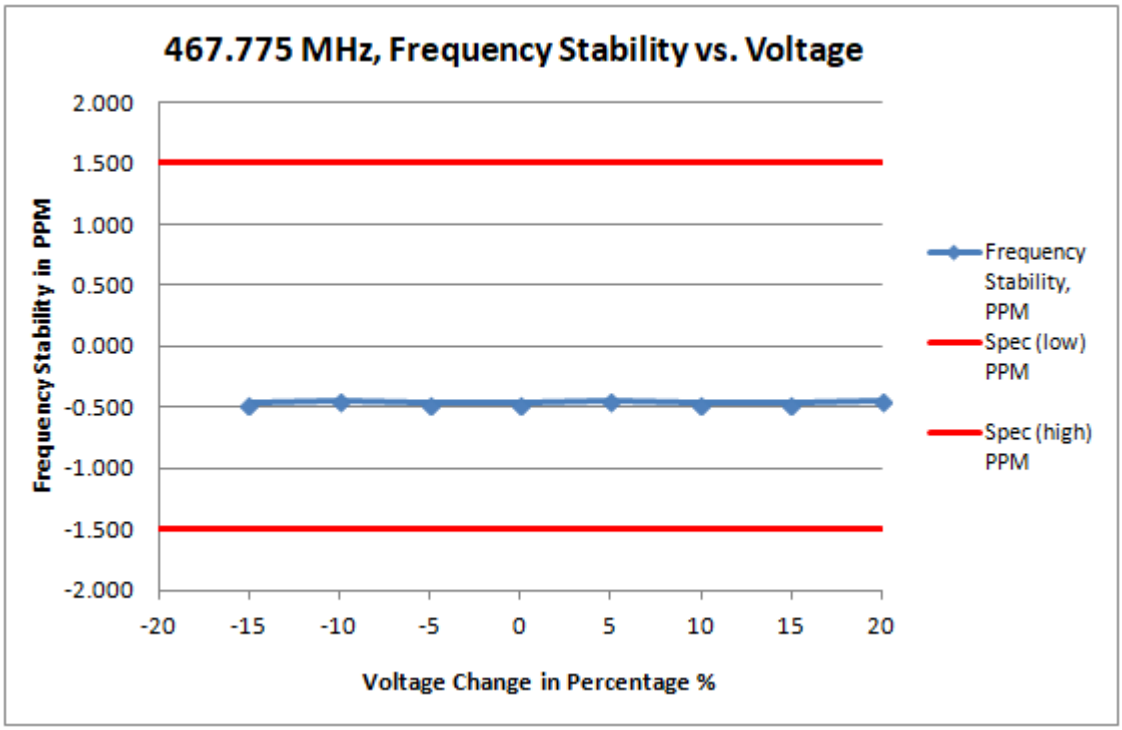


Frequency / Channel Spacing	467.775 MHz / 12.50 kHz				
Temperature, ^{0}C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	96.000	467.774980	-0.043	-1.500	1.500
-15	102.000	467.774980	-0.043	-1.500	1.500
-10	108.000	467.774990	-0.021	-1.500	1.500
-5	114.000	467.774980	-0.043	-1.500	1.500
0	120.000	467.774990	-0.021	-1.500	1.500
5	126.000	467.774990	-0.021	-1.500	1.500
10	132.000	467.774980	-0.043	-1.500	1.500
15	138.000	467.774980	-0.043	-1.500	1.500
20	144.000	467.774980	-0.043	-1.500	1.500

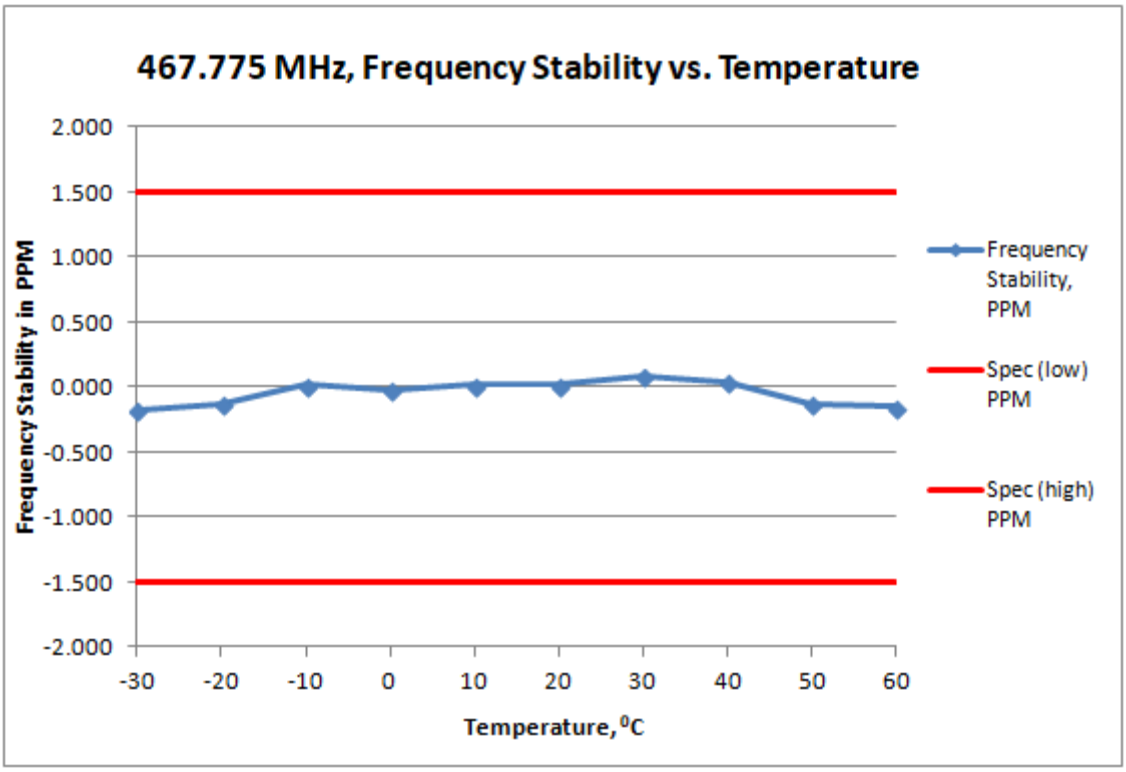


Frequency / Channel Spacing	467.775 MHz / 12.50 kHz			
Voltage, V	120VAC			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	467.774920	-0.171	-1.500	1.500
-20	467.774940	-0.128	-1.500	1.500
-10	467.775010	0.021	-1.500	1.500
0	467.775000	0.000	-1.500	1.500
10	467.775010	0.021	-1.500	1.500
20	467.775020	0.043	-1.500	1.500
30	467.775040	0.086	-1.500	1.500
40	467.775020	0.043	-1.500	1.500
50	467.774950	-0.107	-1.500	1.500
60	467.774930	-0.150	-1.500	1.500

DC48V



Frequency / Channel Spacing	467.55 MHz / 12.50 kHz				
Temperature, ^{0}C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	38.400			-1.500	1.500
-15	42.000	467.774980	-0.470	-1.500	1.500
-10	43.200	467.774990	-0.449	-1.500	1.500
-5	45.600	467.774980	-0.470	-1.500	1.500
0	48.000	467.774980	-0.470	-1.500	1.500
5	50.400	467.774990	-0.449	-1.500	1.500
10	52.800	467.774980	-0.470	-1.500	1.500
15	55.200	467.774980	-0.470	-1.500	1.500
20	57.600	467.774990	-0.449	-1.500	1.500



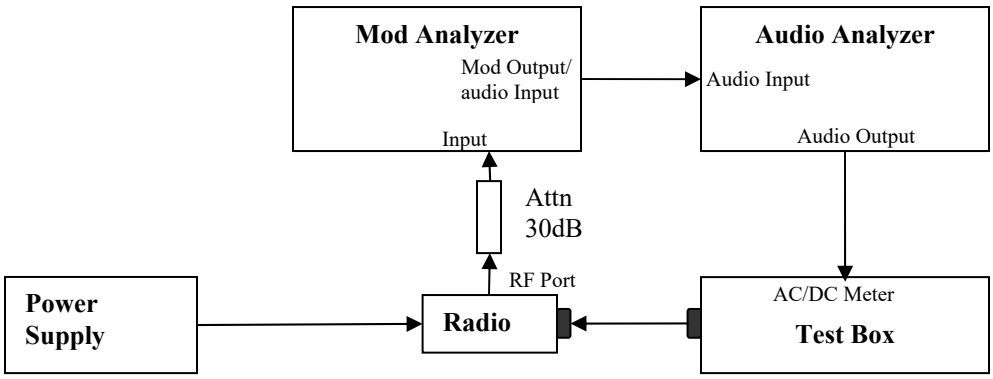
Frequency / Channel Spacing	467.55 MHz / 12.50 kHz			
Voltage, V	48VDC			
Temperature, ^{0}C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	467.774920	-0.171	-1.500	1.500
-20	467.774940	-0.128	-1.500	1.500
-10	467.775010	0.021	-1.500	1.500
0	467.774990	-0.021	-1.500	1.500
10	467.775010	0.021	-1.500	1.500
20	467.775010	0.021	-1.500	1.500
30	467.775040	0.086	-1.500	1.500
40	467.775020	0.043	-1.500	1.500
50	467.774940	-0.128	-1.500	1.500
60	467.774930	-0.150	-1.500	1.500

6.2.3. Test Limit

As per manufacturer declared spec +/- 1.5ppm

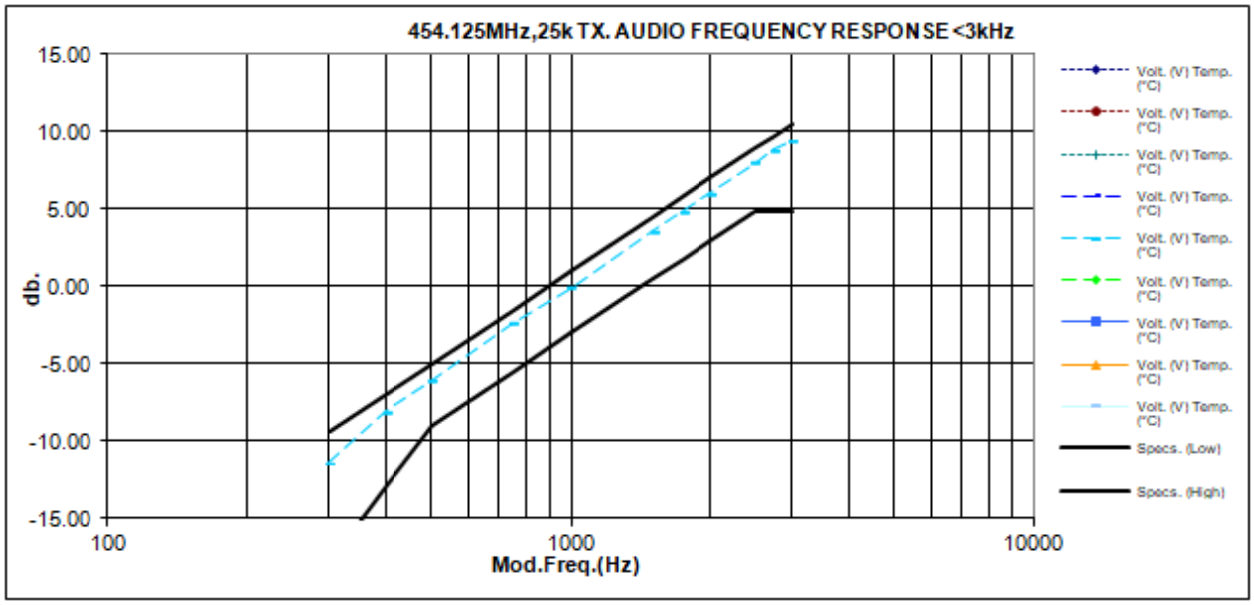
6.3. Audio Frequency Response

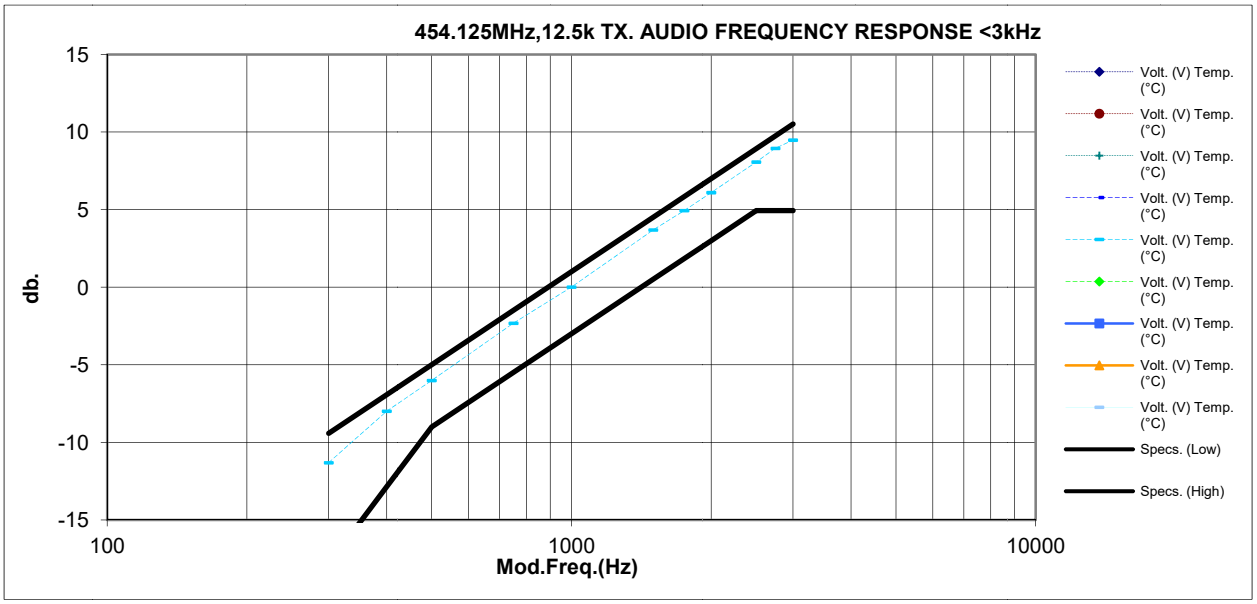
6.3.1. Test Setup

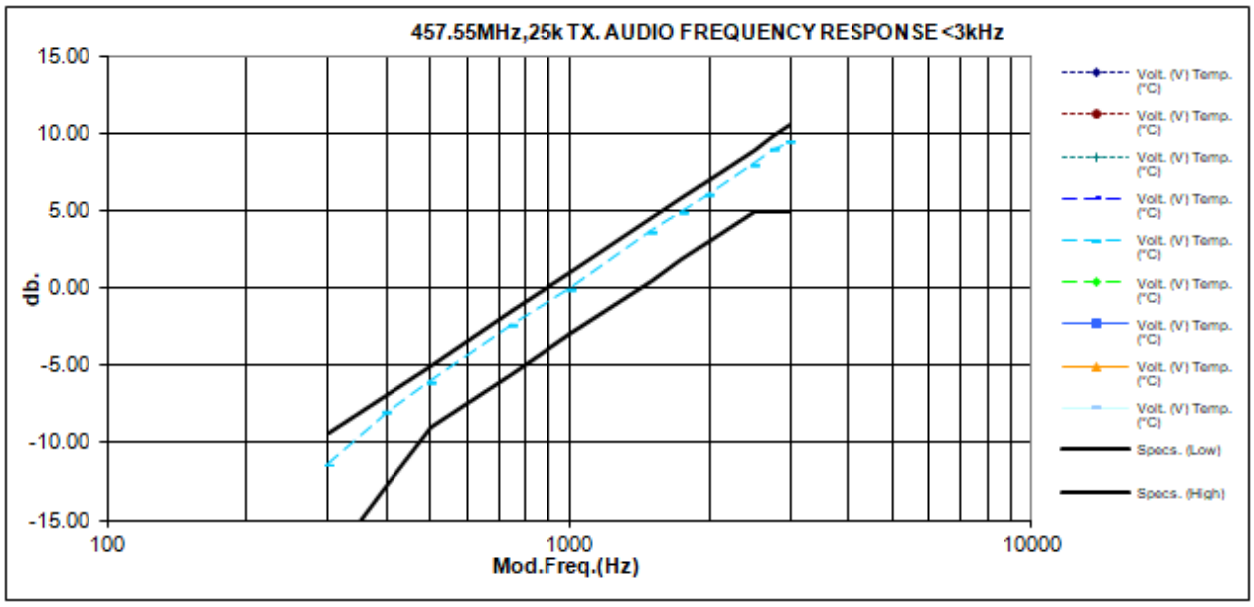


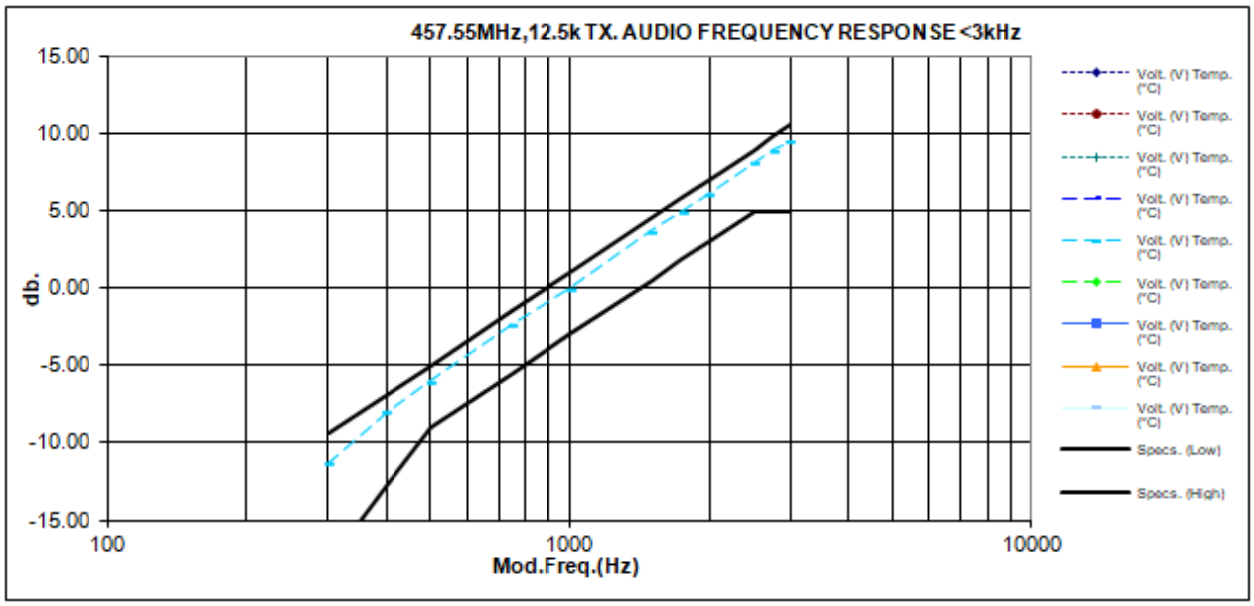
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
5) On audio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

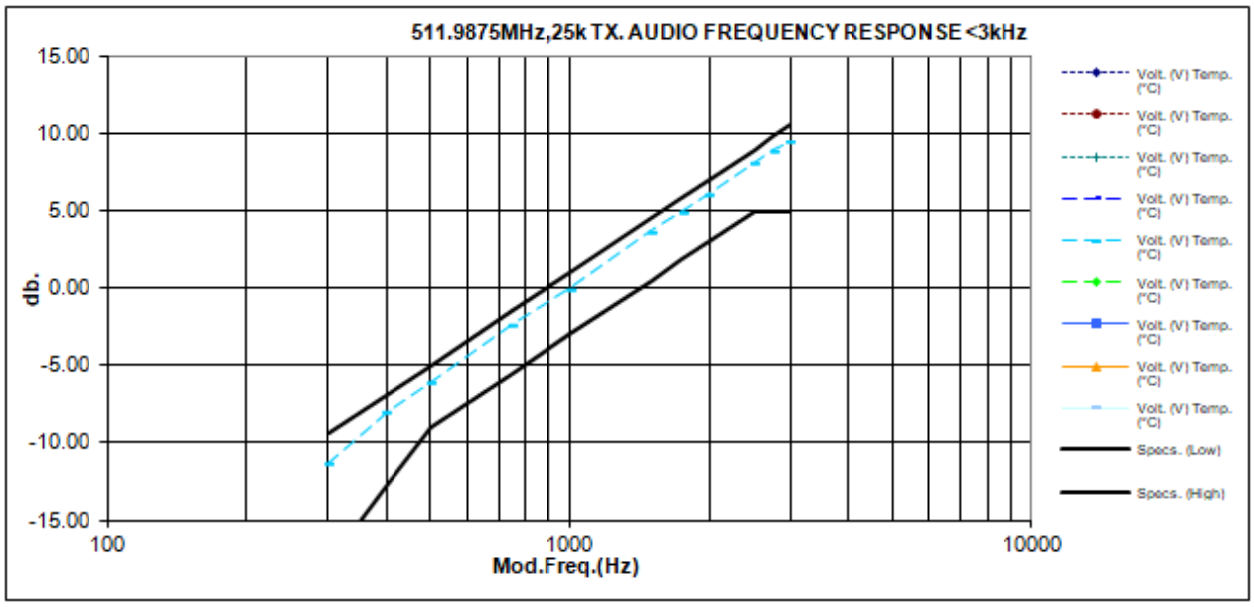
6.3.2. Test Result

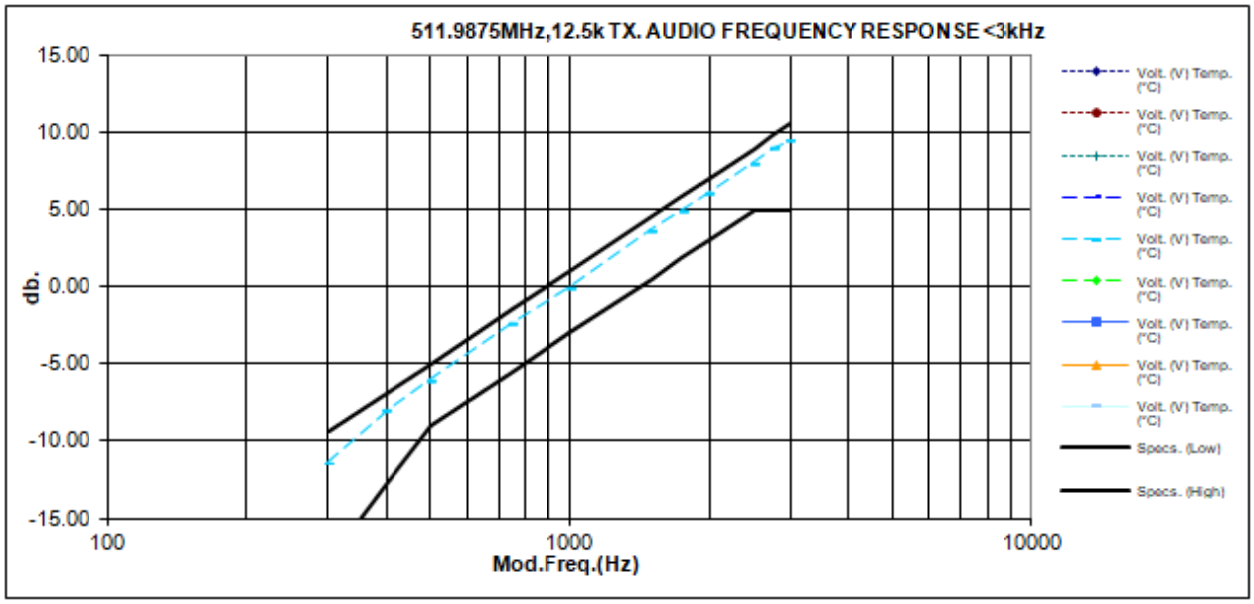




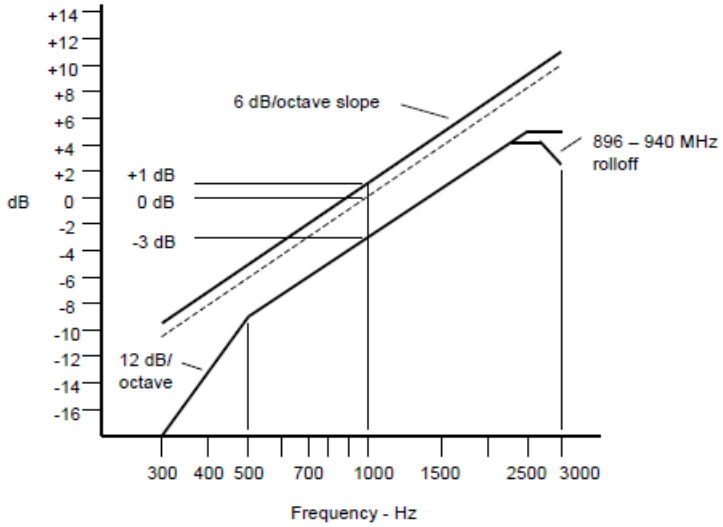

457.55MHz,25k TX. AUDIO FREQUENCY RESPONSE <3kHz
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
db.
100
1000
10000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Specs. (Low)
Specs. (High)


457.55MHz,12.5k TX. AUDIO FREQUENCY RESPONSE <3kHz
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
db.
100
1000
10000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Specs. (Low)
Specs. (High)


511.9875MHz,25k TX. AUDIO FREQUENCY RESPONSE <3kHz
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
db.
100
1000
10000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Specs. (Low)
Specs. (High)


511.9875MHz,12.5k TX. AUDIO FREQUENCY RESPONSE <3kHz
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
db.
100
1000
10000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Specs. (Low)
Specs. (High)

6.3.3. Test Limit

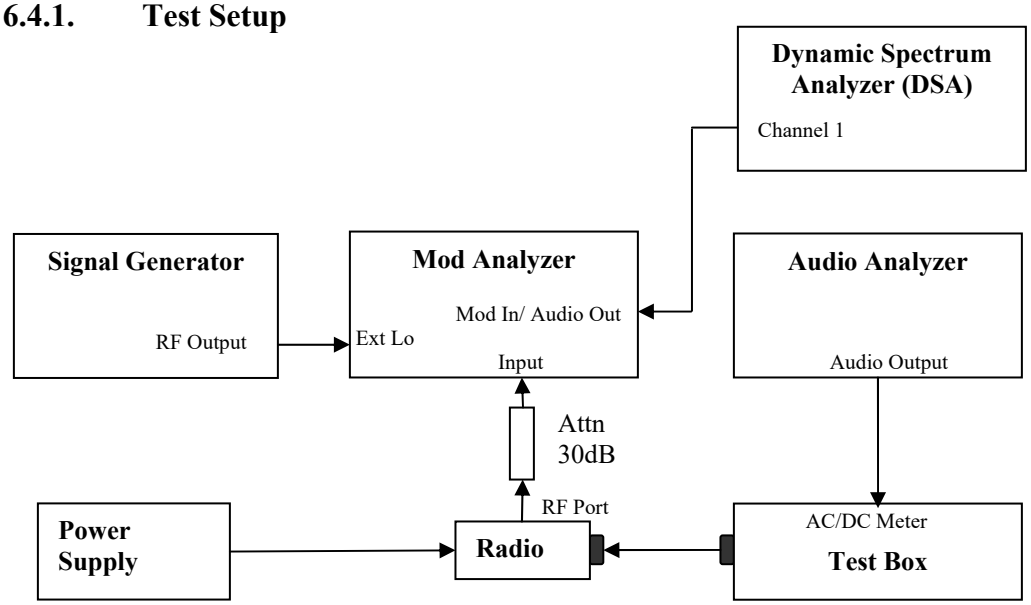


Note:

- *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.*

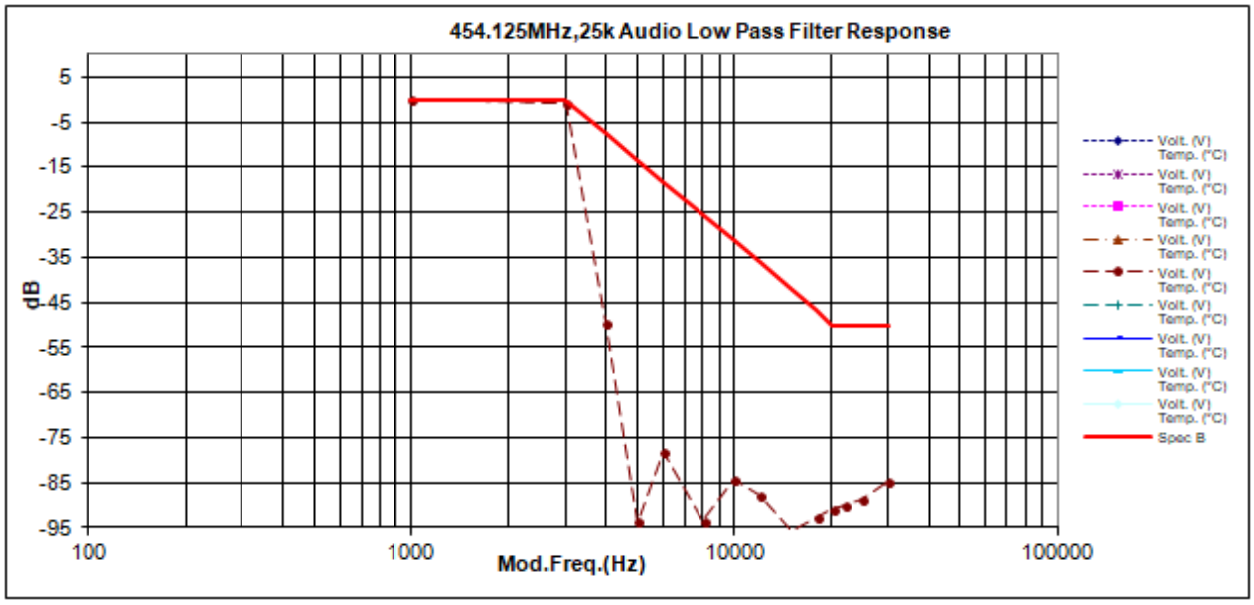
6.4. Audio Low Pass Filter Response

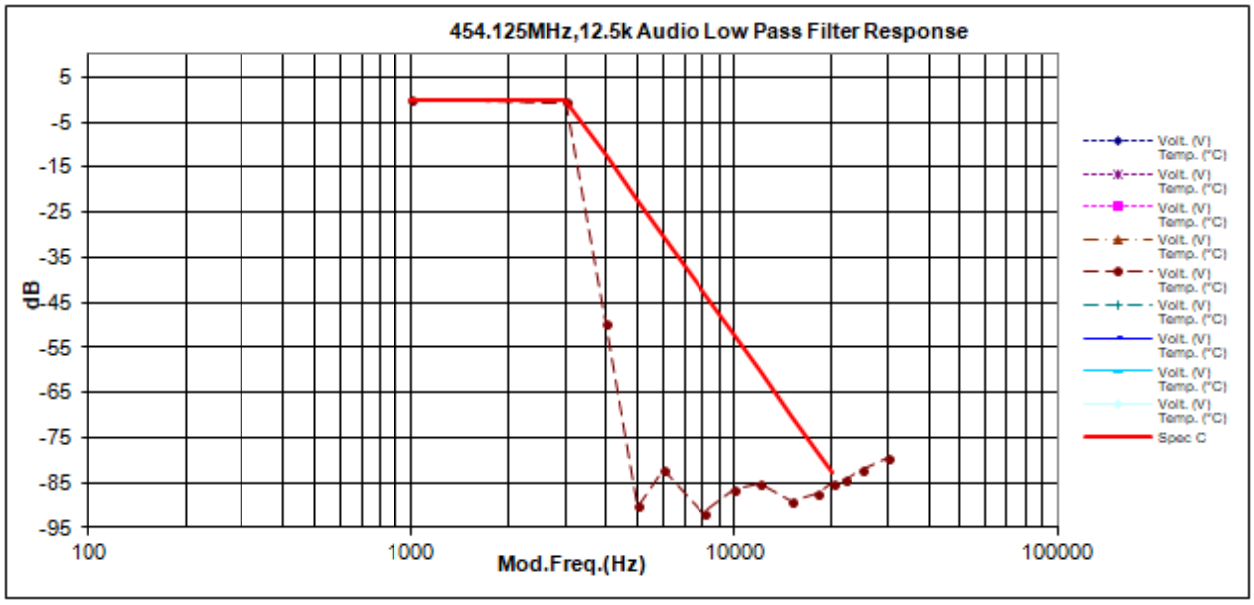
6.4.1. Test Setup

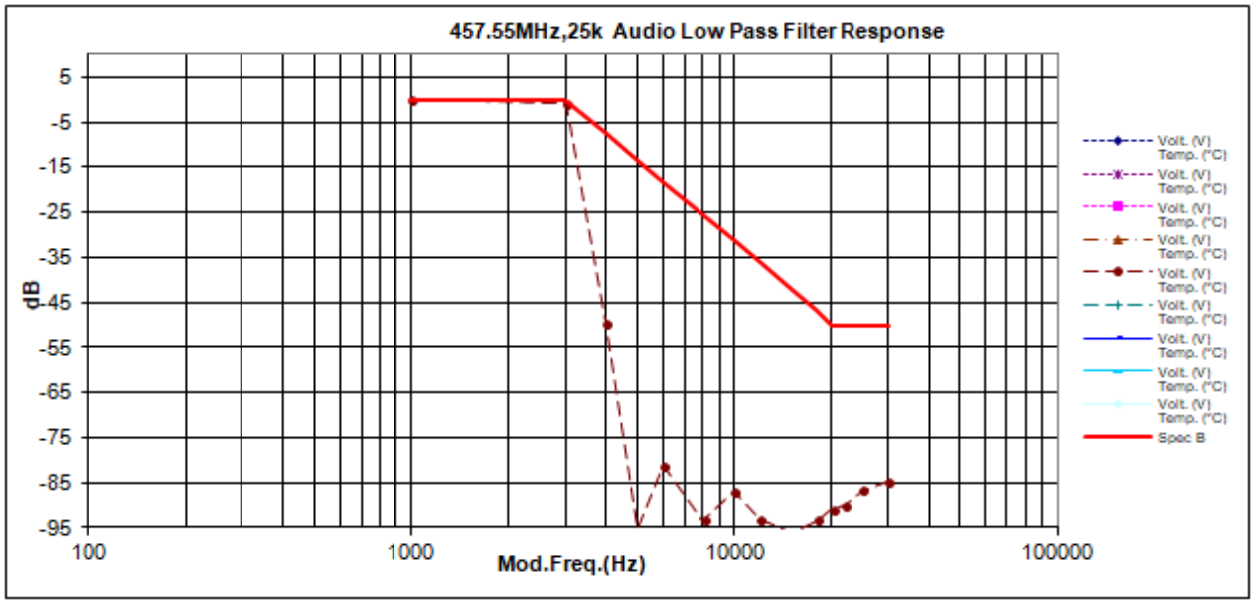


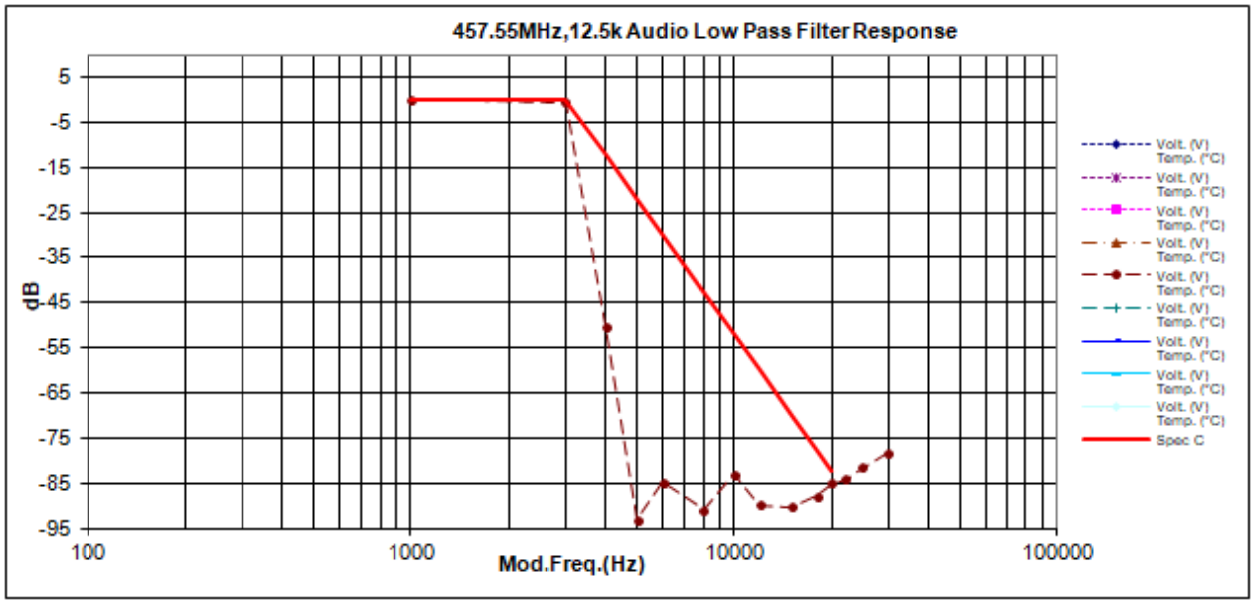
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
4) Set the Sigen frequency to Fc + 1.5 MHz, RF output level to 0dBm without modulation.
5) Transmit the radio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

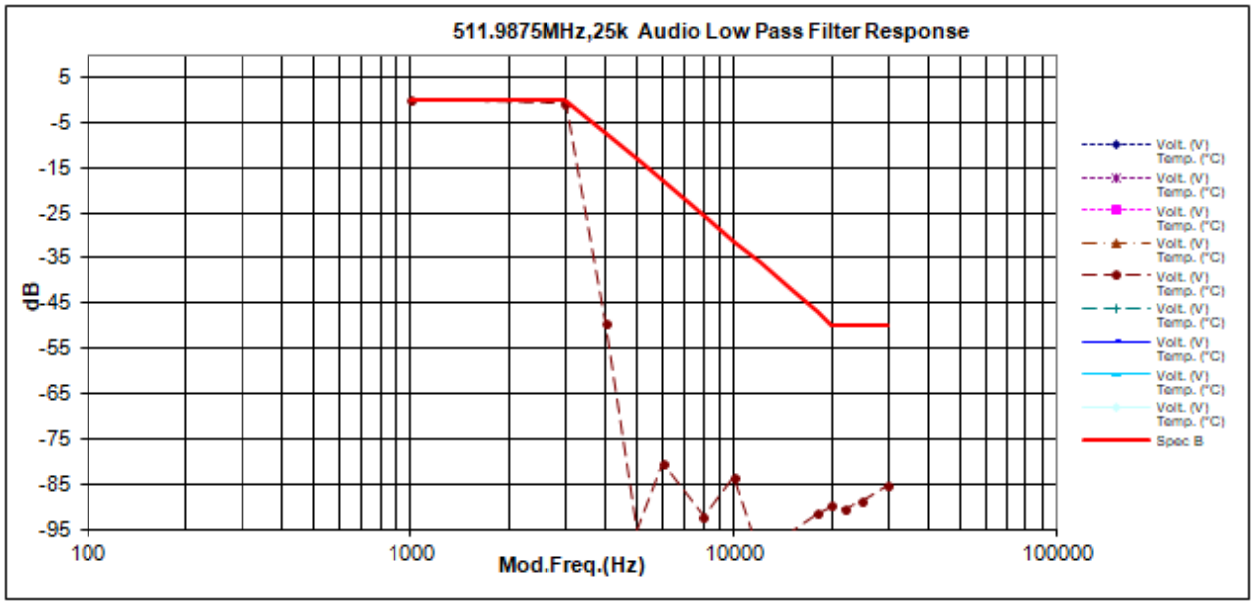
6.4.2. Test Result

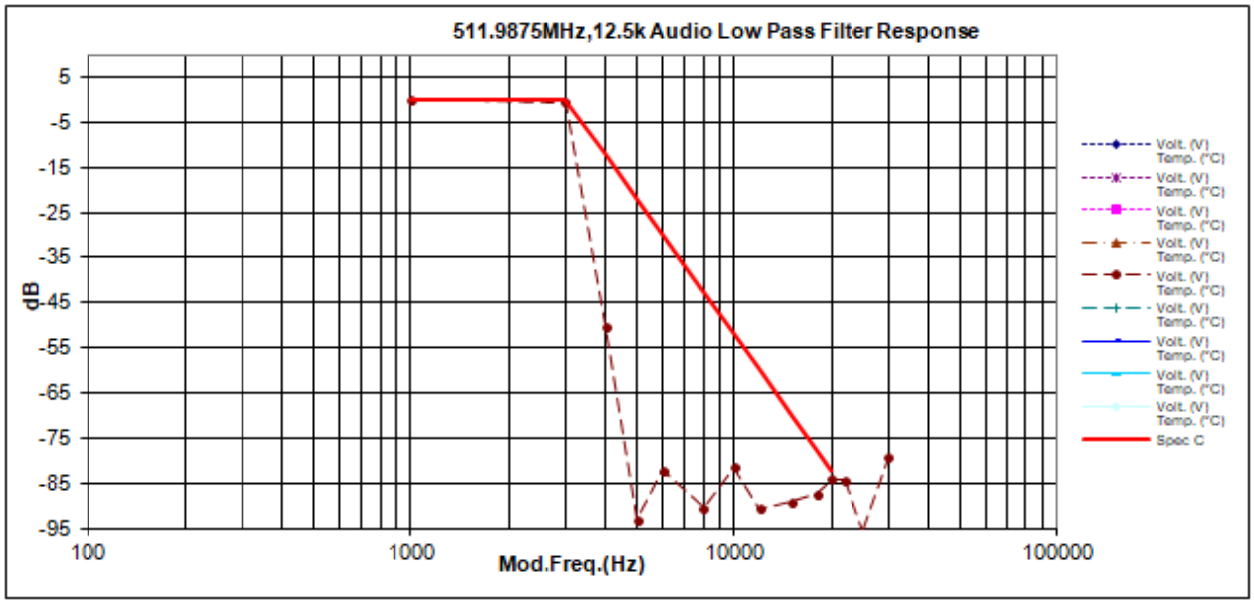




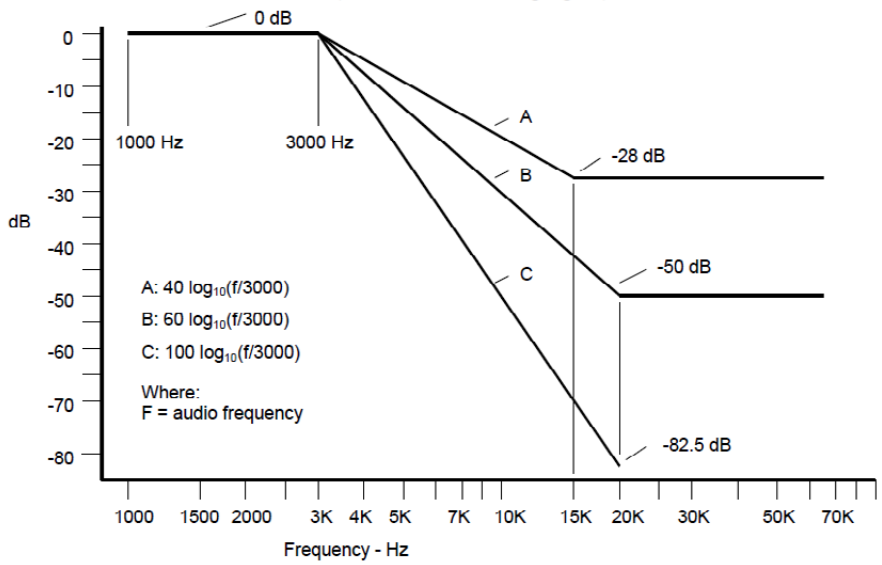

457.55MHz,25k Audio Low Pass Filter Response
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
dB
100
1000
10000
100000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Spec B


457.55MHz,12.5k Audio Low Pass Filter Response
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
dB
100
1000
10000
100000
Mod.Freq.(Hz)
Volt. (V) Temp. (°C)
Spec C


511.9875MHz,25k Audio Low Pass Filter Response
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
dB
100
1000
10000
100000
Mod.Freq.(Hz)
Volt. (V)
Temp. (°C)
Spec B


511.9875MHz,12.5k Audio Low Pass Filter Response
5
-5
-15
-25
-35
-45
-55
-65
-75
-85
-95
dB
100
1000
10000
100000
Mod.Freq.(Hz)
Volt. (V)
Temp. (°C)
Spec C

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.

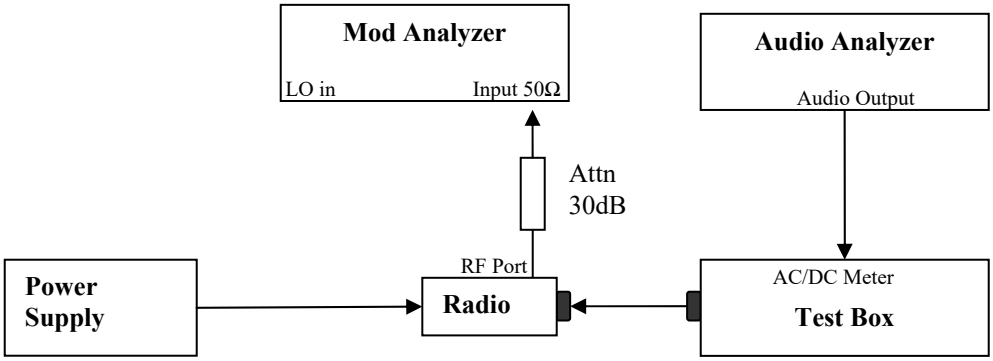
c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

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.

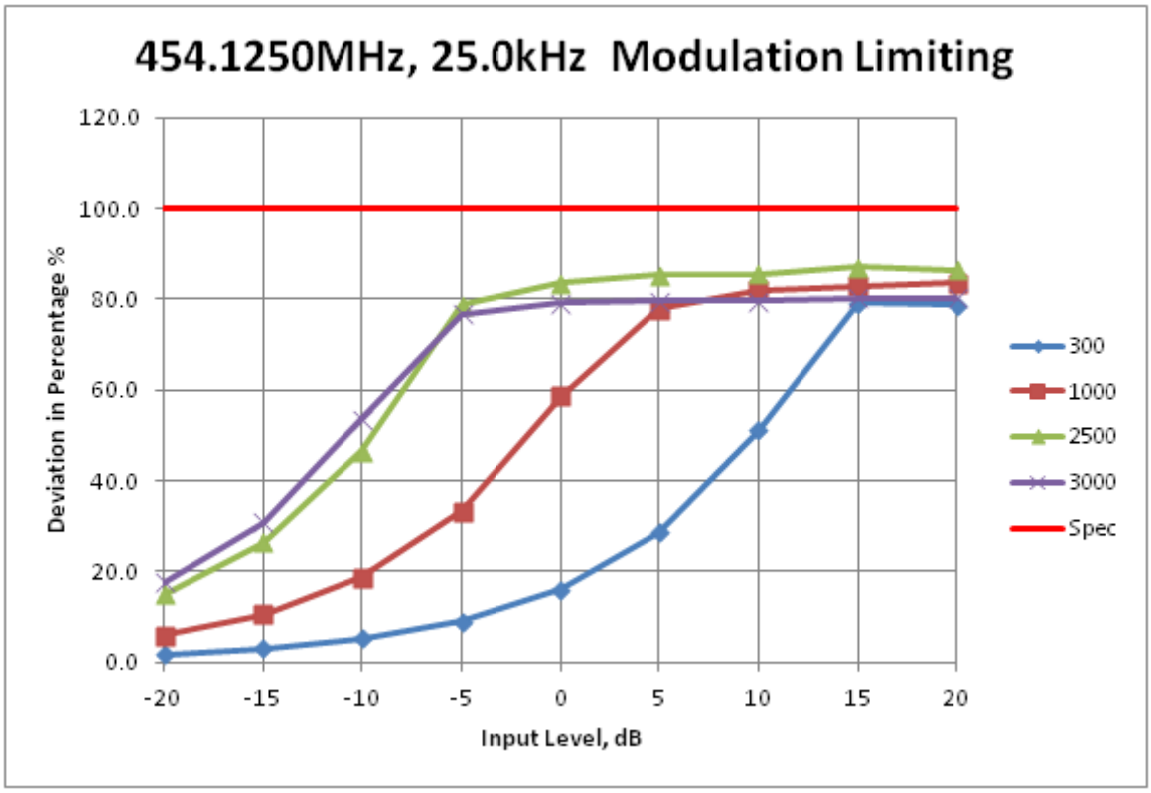
6.5. Modulation Limiting

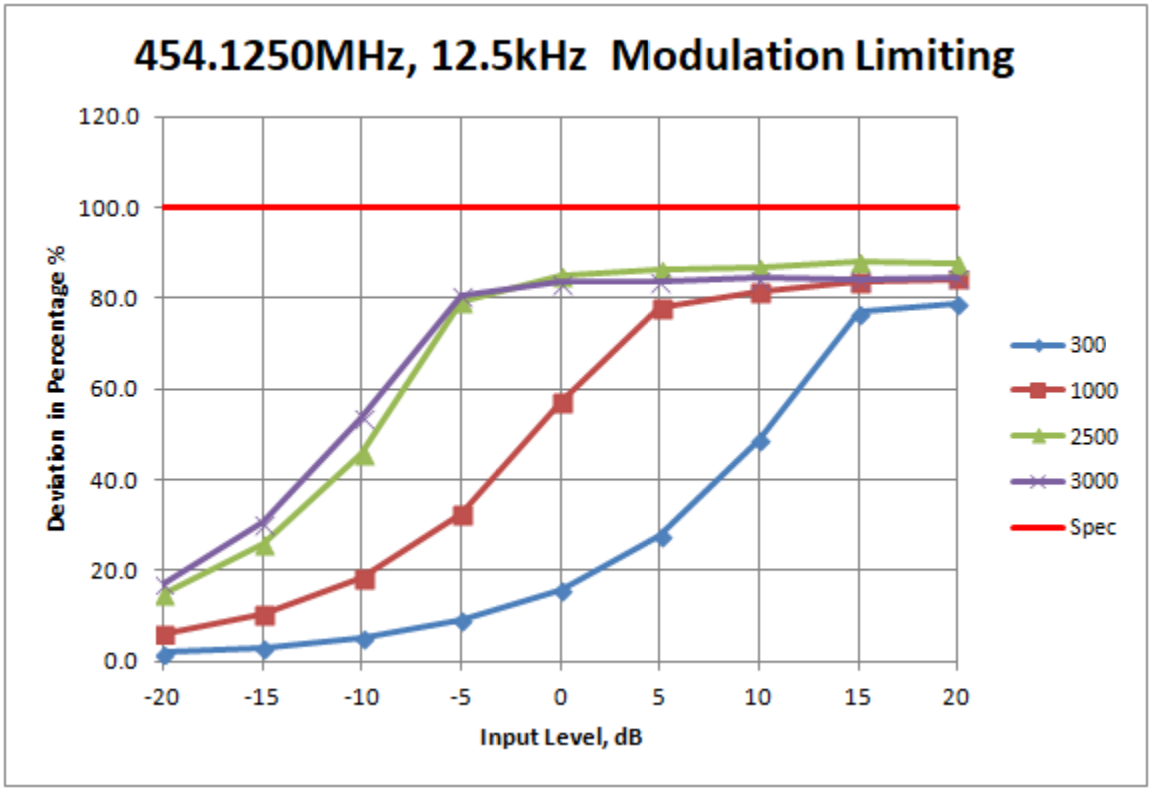
6.5.1. Test Setup

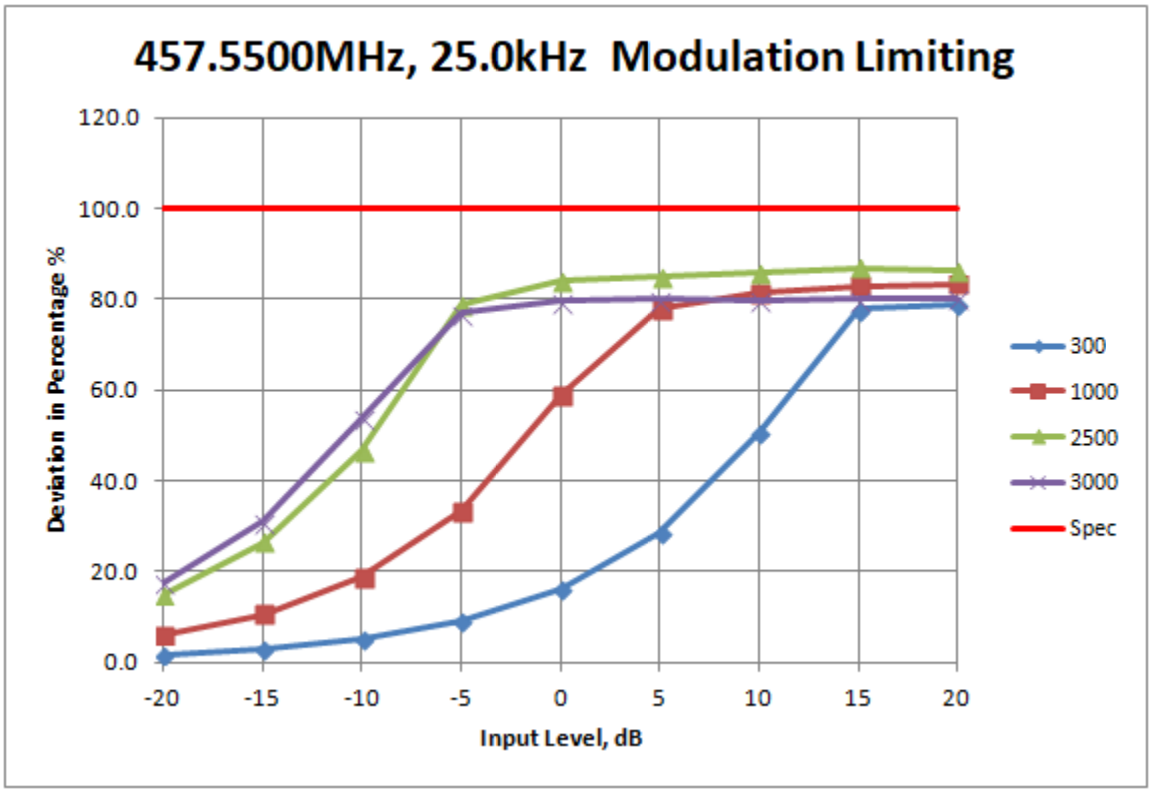


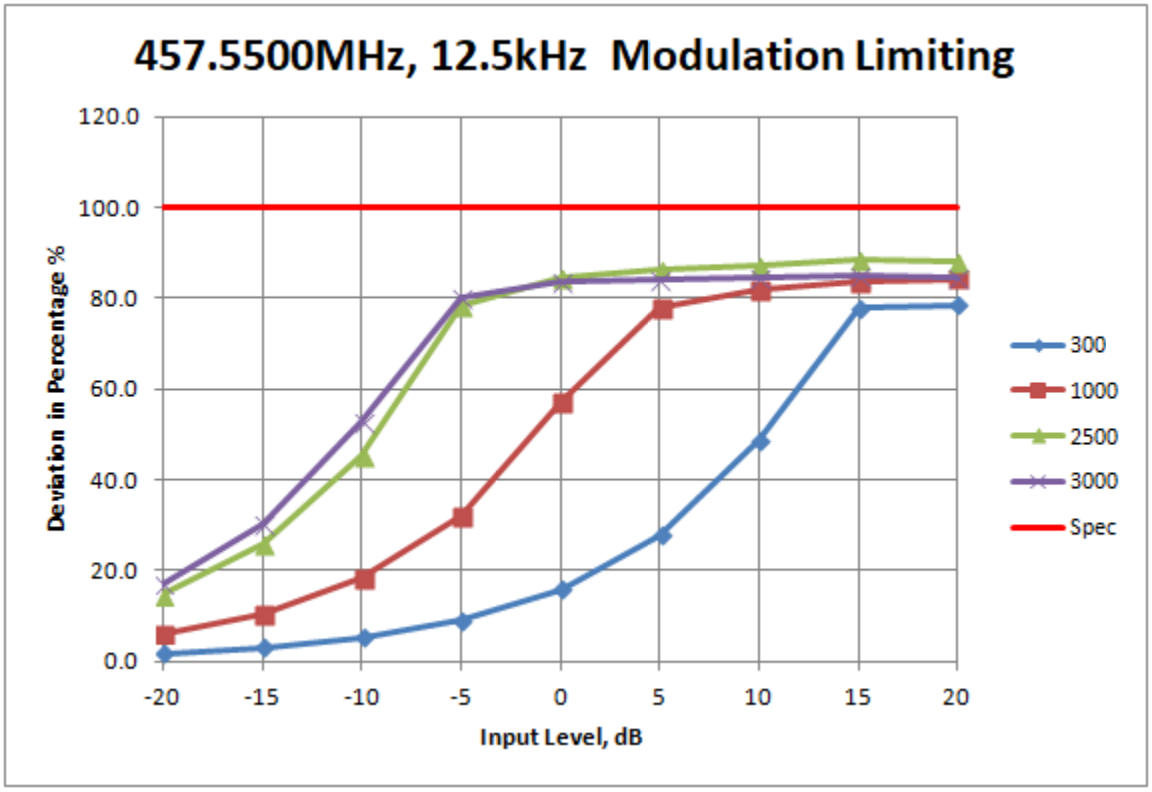
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Path loss for the measurement included.
3) Set the audio bandwidth filter to 15 kHz.
4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
5) Record the frequency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

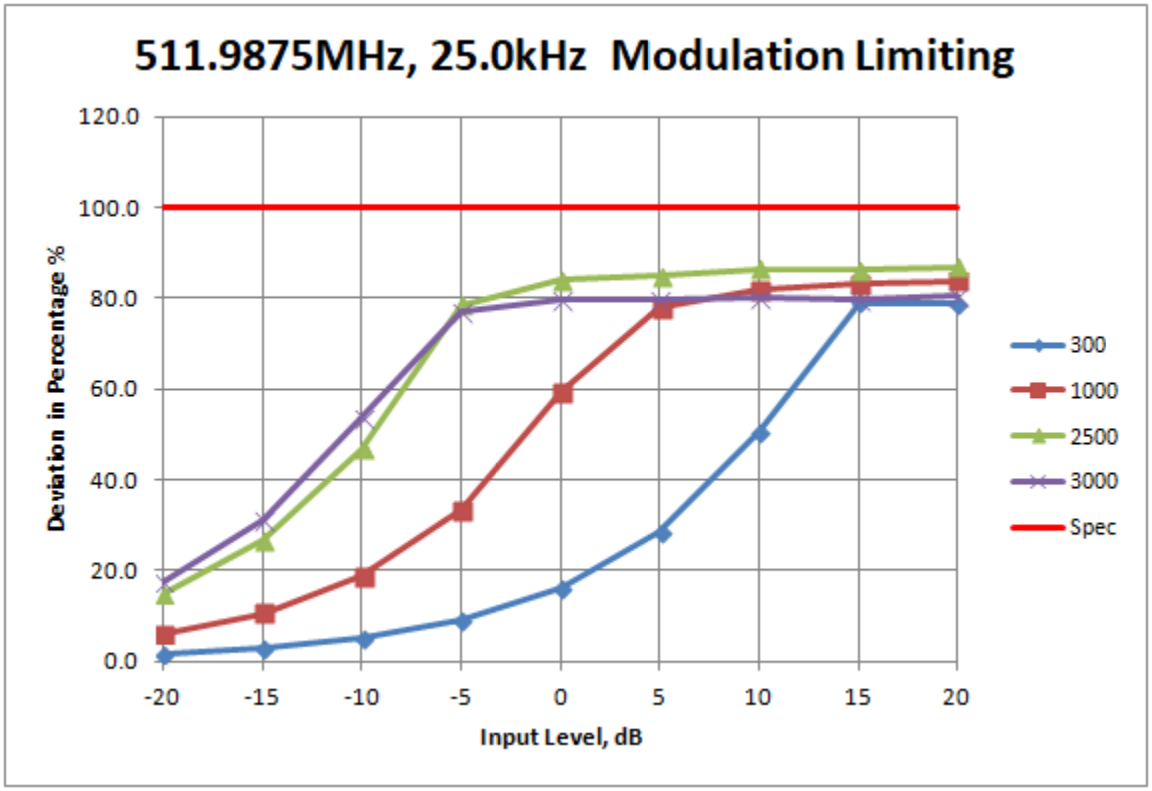
6.5.2. Test Result

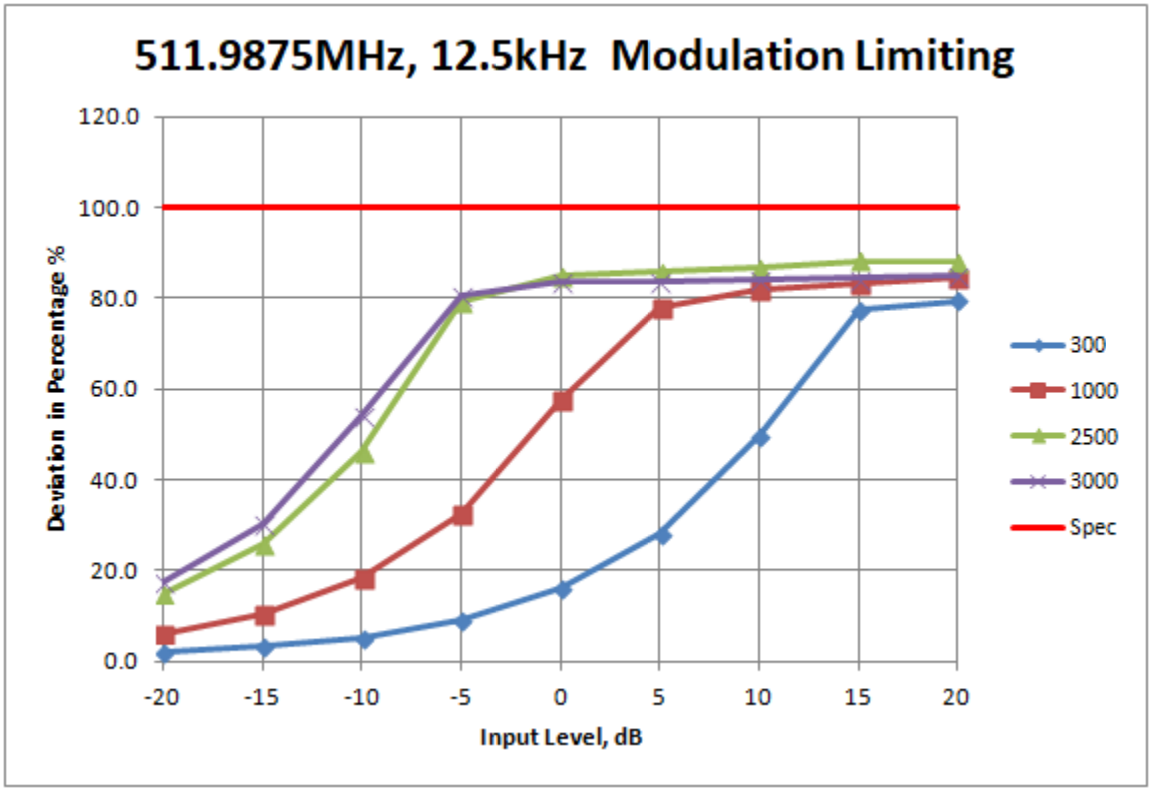





457.5500MHz, 25.0kHz Modulation Limiting
Deviation in Percentage %
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-20
-15
-10
-5
0
5
10
15
20
Input Level, dB
300
1000
2500
3000
Spec


457.5500MHz, 12.5kHz Modulation Limiting
Deviation in Percentage %
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-20
-15
-10
-5
0
5
10
15
20
Input Level, dB
300
1000
2500
3000
Spec





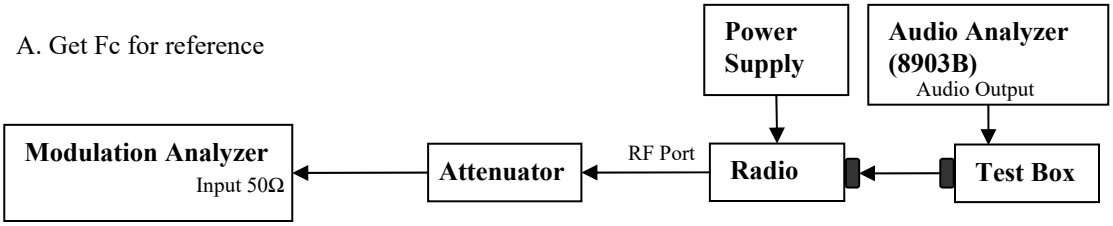
6.5.3. Test Limit

Modulation Limiting shall not exceed 100 percent.

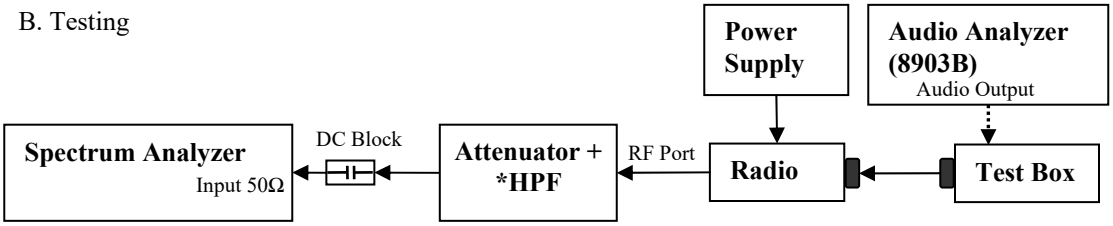
6.6. Occupied Bandwidth

6.6.1. Test Setup (Analog)

A. Get Fc for reference



B. Testing



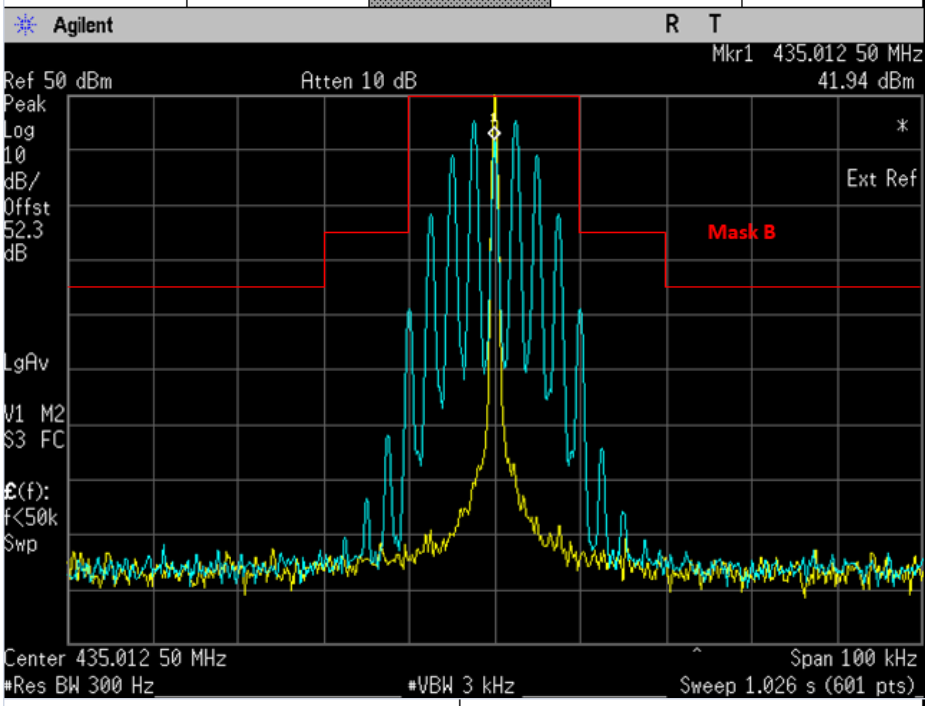
1) The DUT transmitter output port was connected to Modulation Analyzer.
2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey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

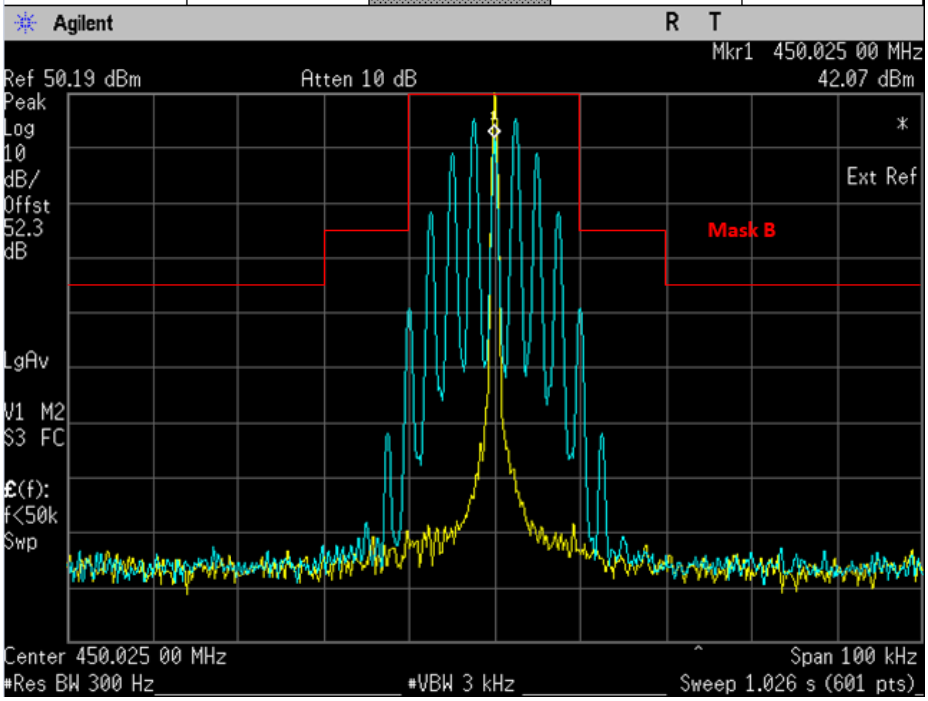
Modulation	Rules Part
Analog Voice	Part 90,RSS 119

Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
435.0125	25.0		14.8216	16K0F3E



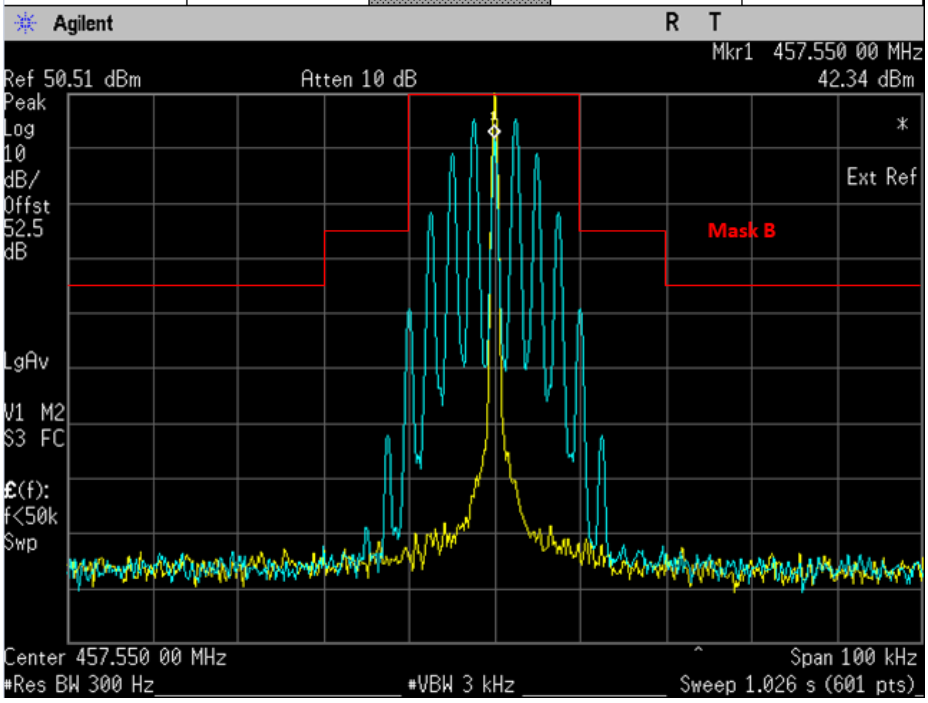
Modulation	Rules Part
Analog Voice	74.462(c),RSS 119

Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	25.0		14.8234	16K0F3E



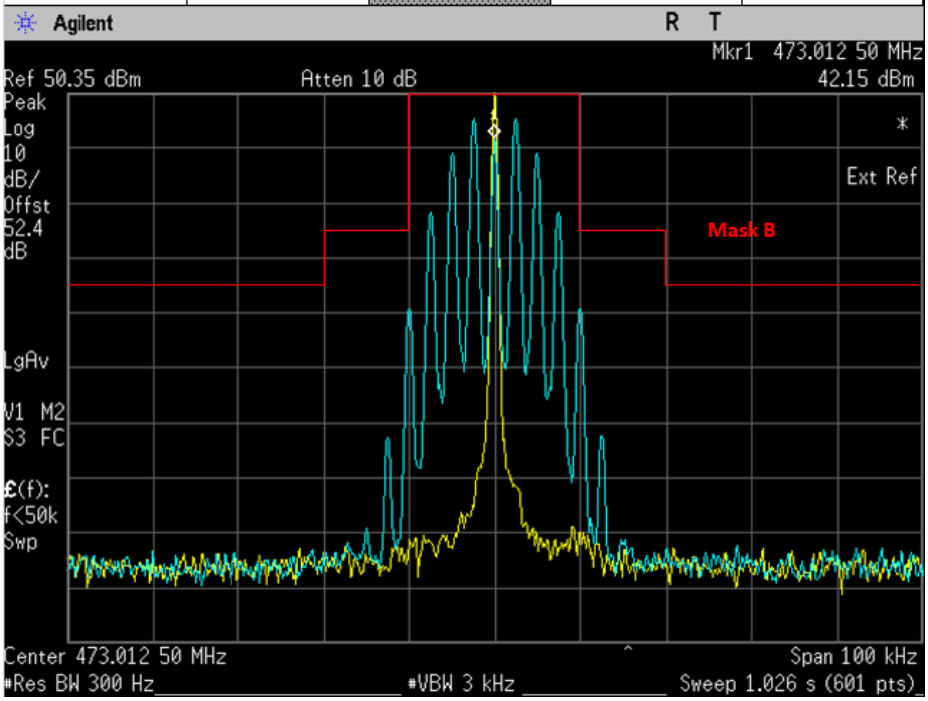
For Part 74

Modulation			Rules Part	
Analog Voice			80.211(f),RSS119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
457.5500	25.0		14.8205	16K0F3E

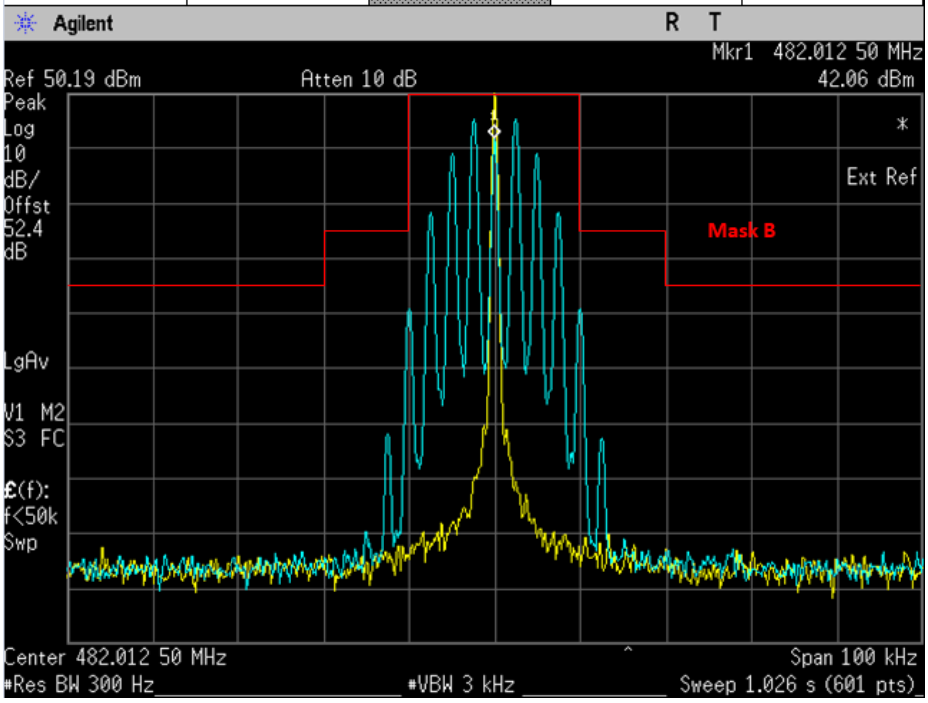


Not For FCC Review

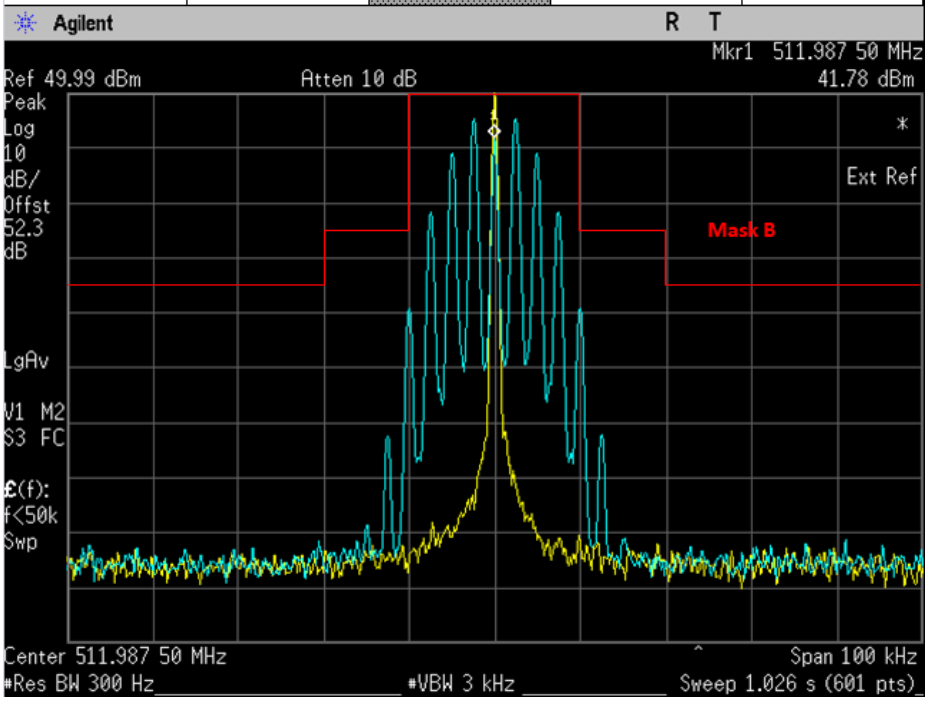
Modulation			Rules Part	
Analog Voice			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	25.0		14.8220	16K0F3E



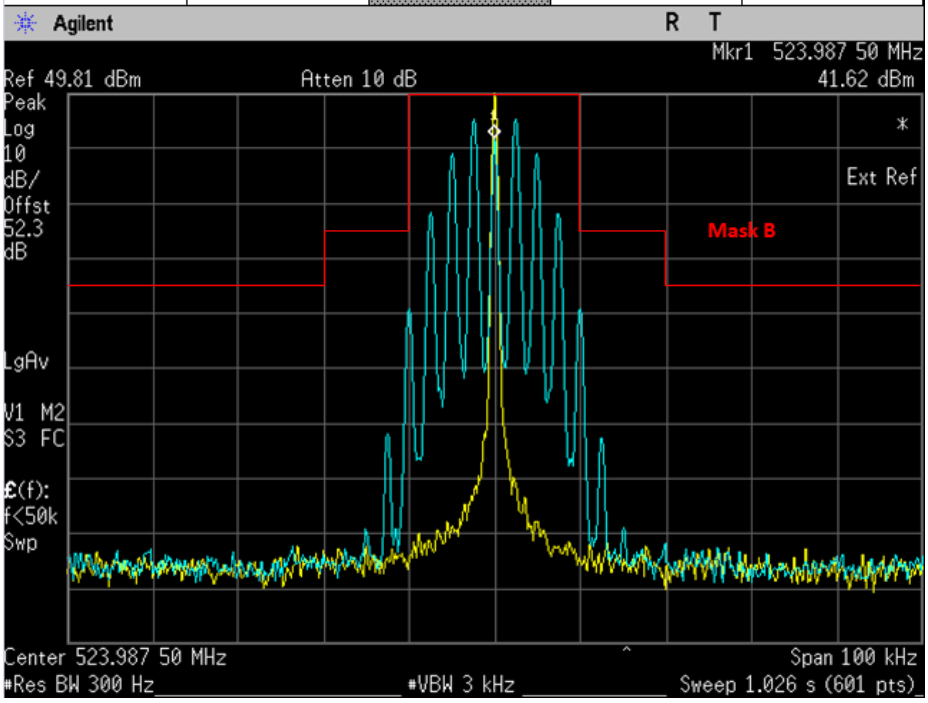
Modulation	Rules Part			
Analog Voice	Part 22,90			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
482.0125	25.0		14.8246	16K0F3E



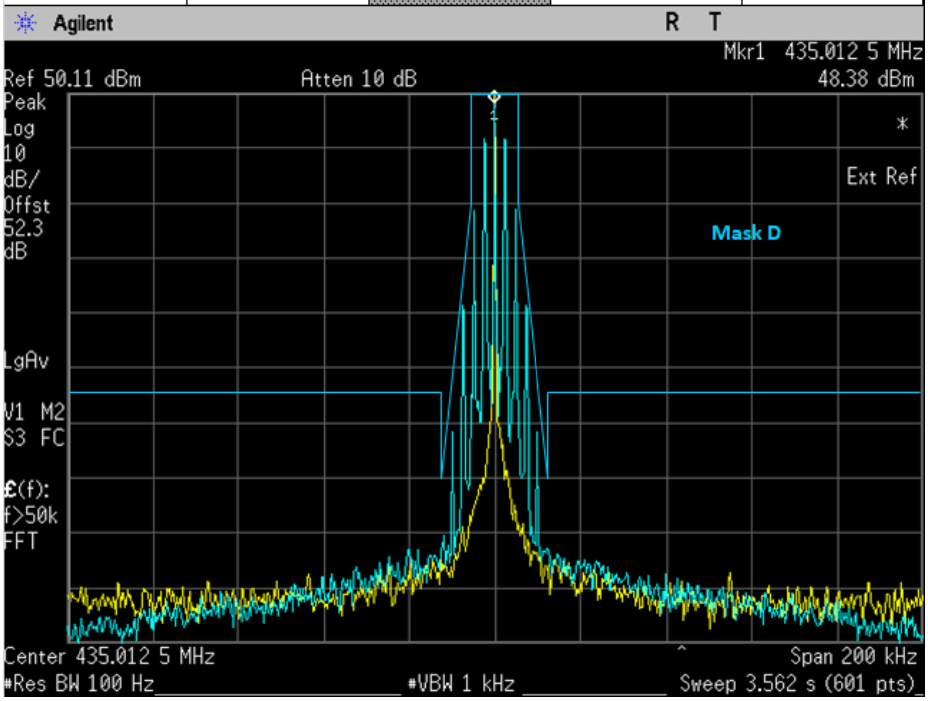
Modulation	Rules Part			
Analog Voice	90.210(T-band)			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
511.9875	25.0		14.8241	16K0F3E



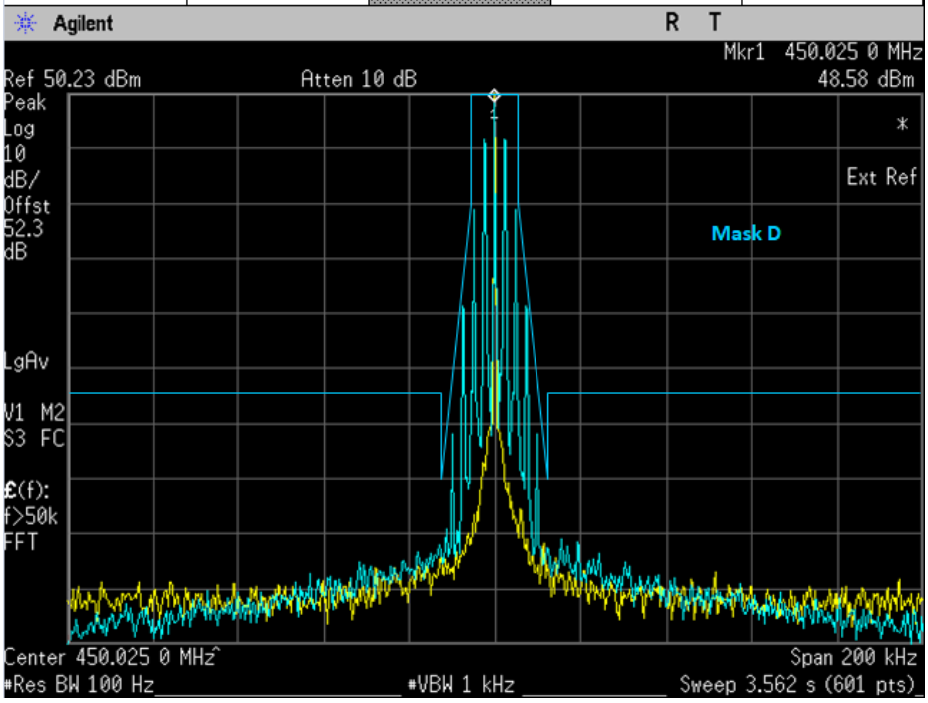
Modulation			Rules Part	
Analog Voice			RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
523.9875	25.0		14.8241	16K0F3E



Modulation			Rules Part	
Analog Voice			Part 90,RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
435.0125	12.5		9.8869	11K0F3E

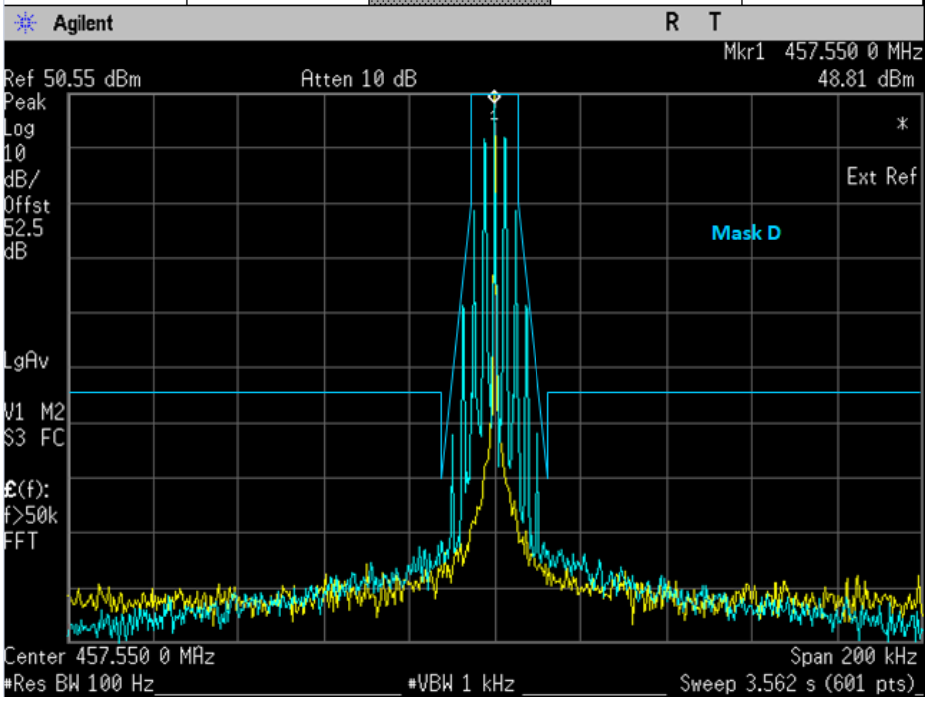


Modulation			Rules Part	
Analog Voice			74.462(c),RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	12.5		9.8864	11K0F3E



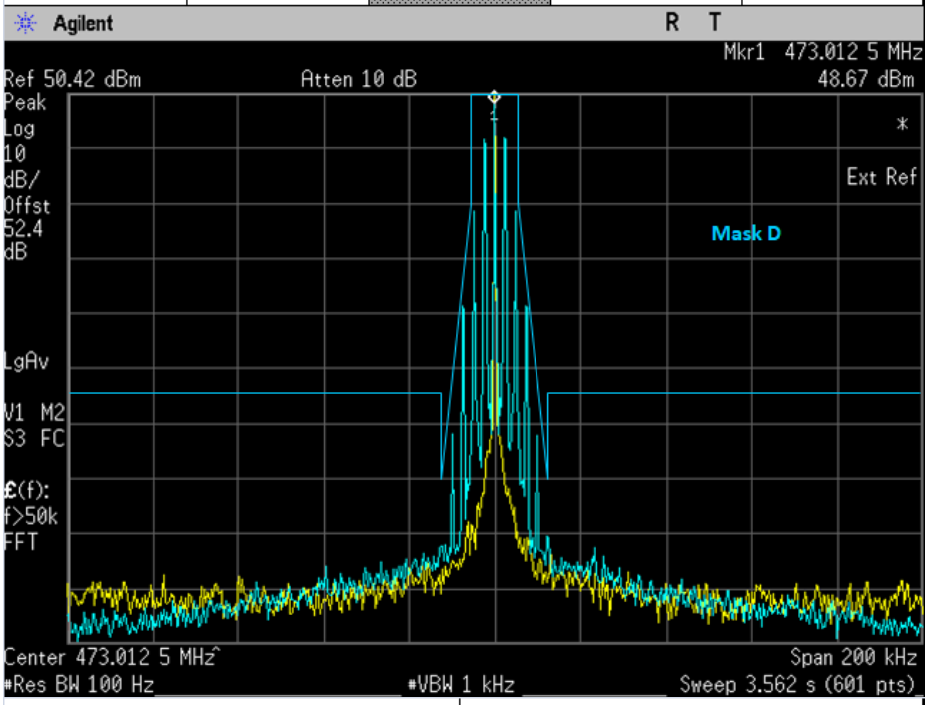
For Part 74

Modulation			Rules Part	
Analog Voice			80.211(f),RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
457.5500	12.5		9.8803	11K0F3E

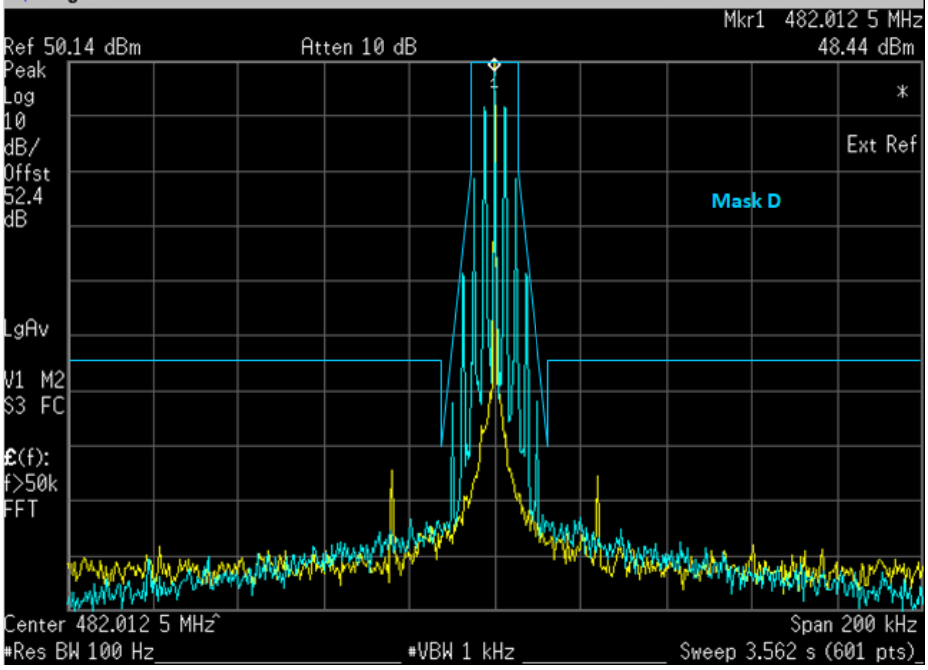


Not For FCC Review

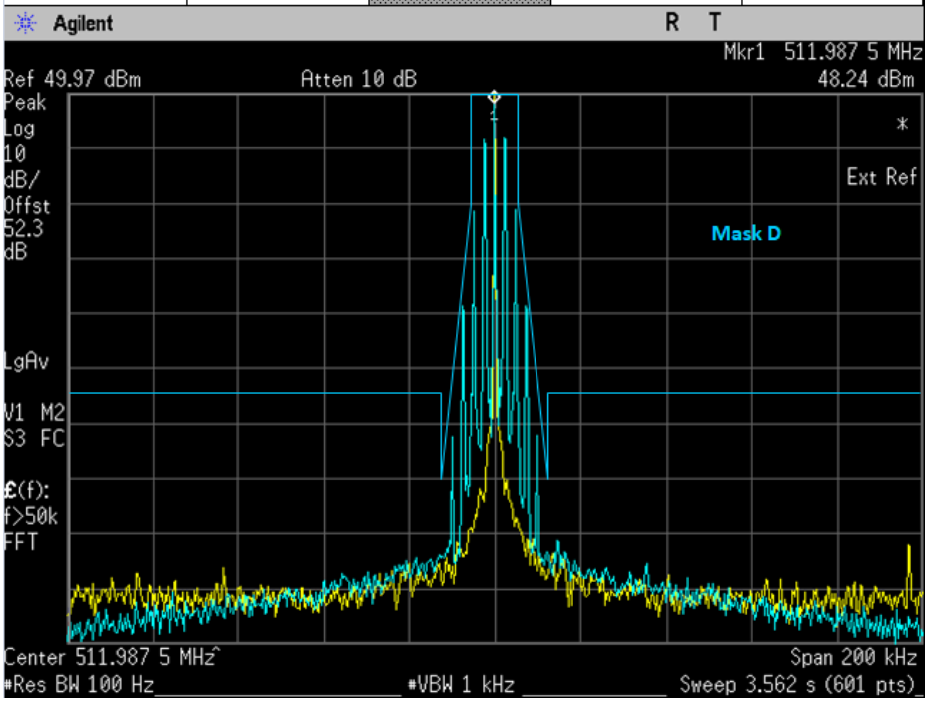
Modulation			Rules Part	
Analog Voice			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	12.5		9.8856	11K0F3E



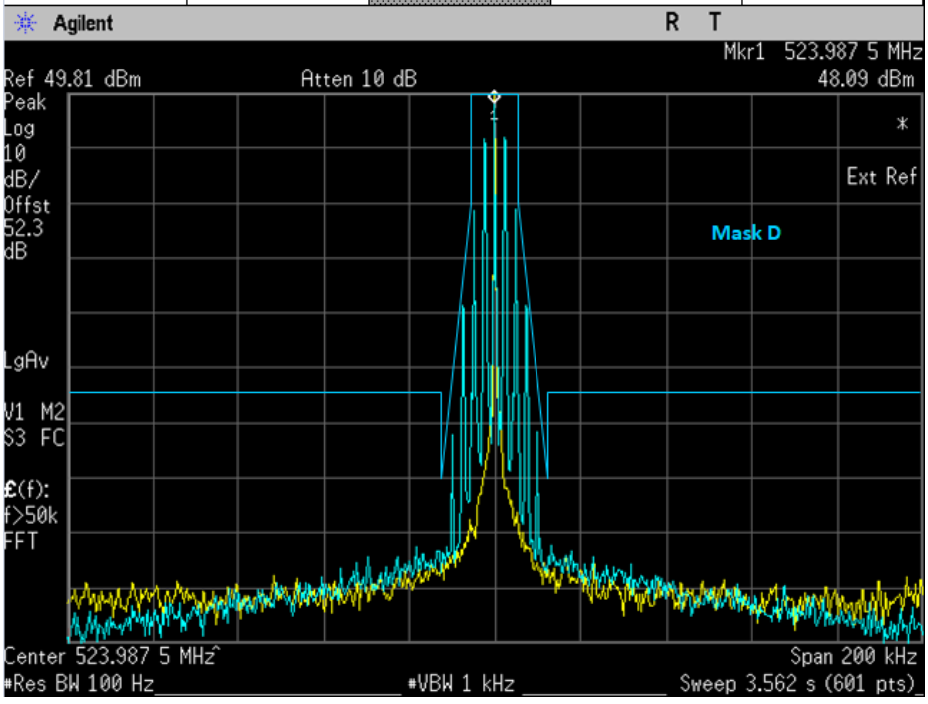
Modulation			Rules Part	
Analog Voice			Part 22,90	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
482.0125	12.5		9.8823	11K0F3E



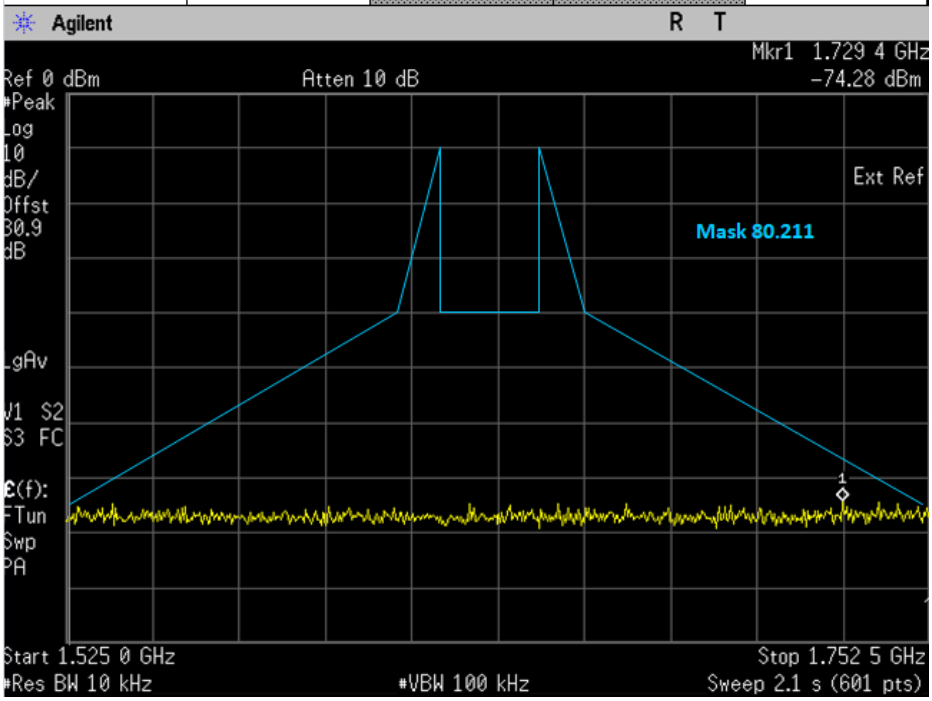
Modulation	Rules Part			
Analog Voice	90.210(T-band)			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
511.9875	12.5		9.8880	11K0F3E



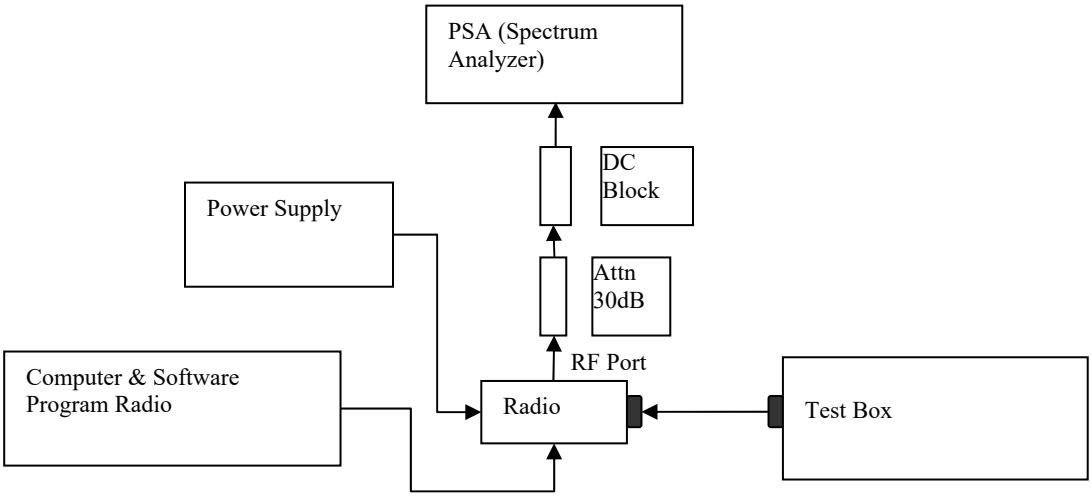
Modulation	Rules Part			
Analog Voice	RSS 119			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
523.9875	12.5		9.8832	11K0F3E



Modulation				Rules Part
Analog Voice				80.211(c)
Channel Frequency (MHz)	**Channel Spacing (kHz)**			**Emission Designator**
467.5500	25.0			16K0F3E



6.6.3. Test Setup (Digital)



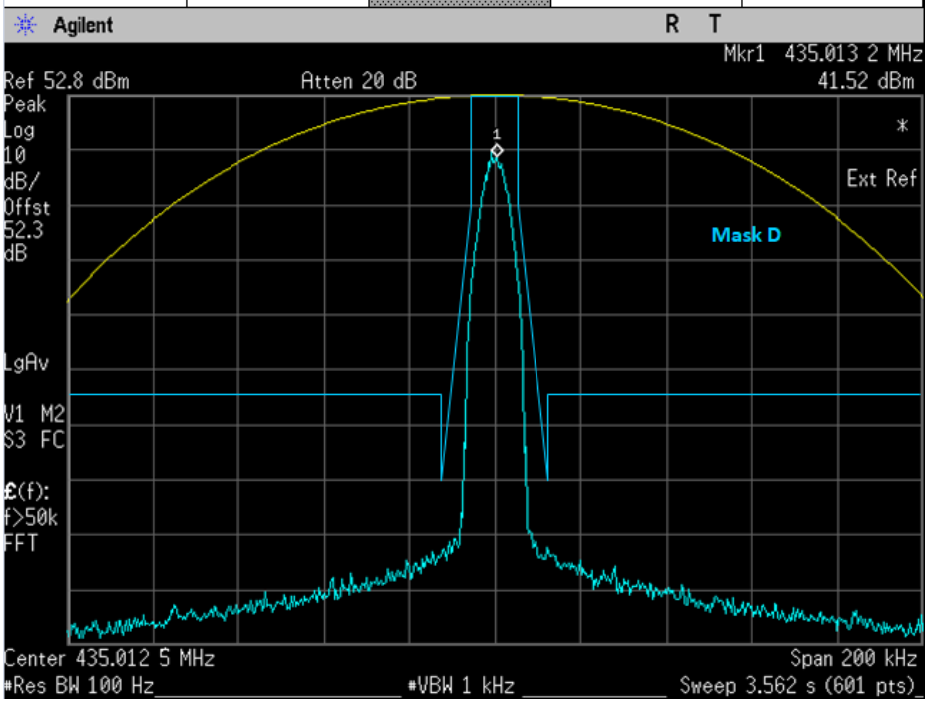
1) Program and set radio to operate in desire test frequency and digital mode with modulation. (*4FSK, C4FM or other digital modulation form).
2) Path loss for the measurement included.
3) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
4) Key in the Fc and Resolution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

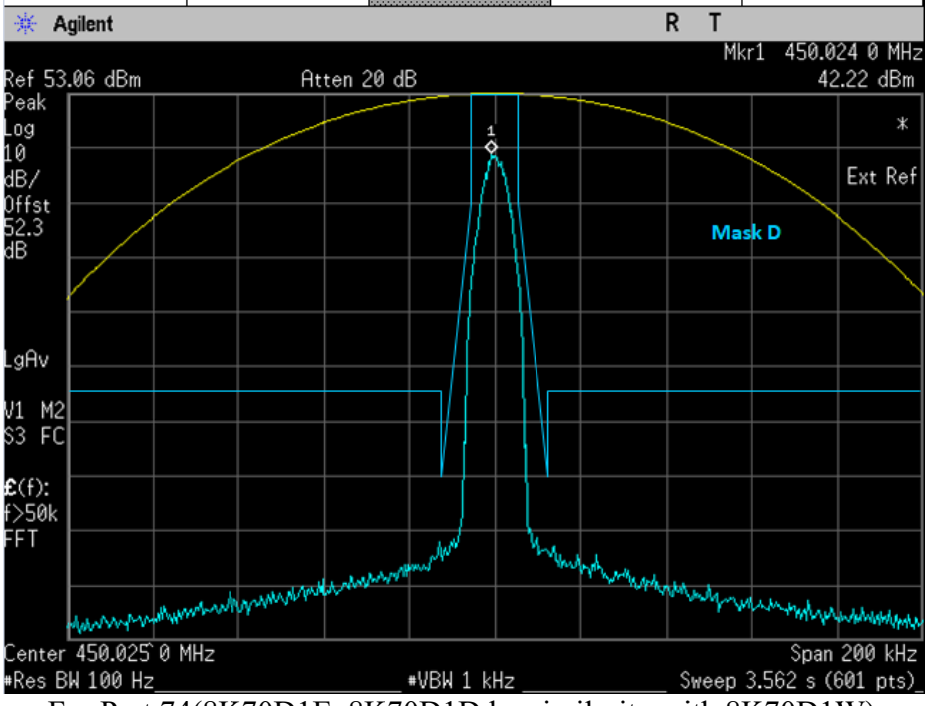
6.6.4. Test Result (Digital)

Modulation			Rules Part	
LSM			Part 90,RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
435.0125	12.5		8.8721	8K70D1W



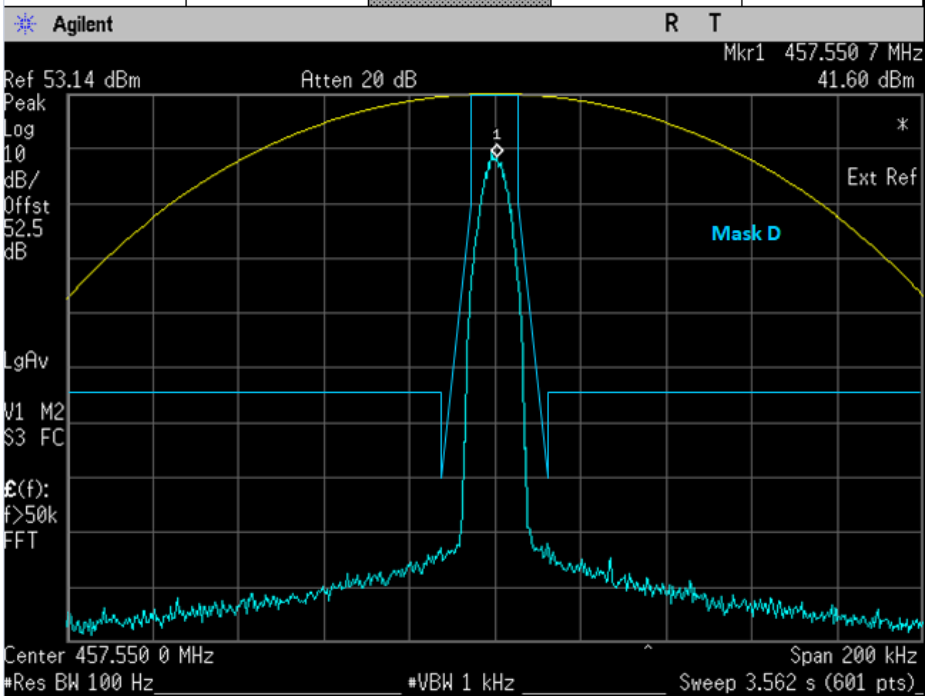
(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation			Rules Part	
LSM			74.462(c),RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
450.0250	12.5		8.9177	8K70D1W



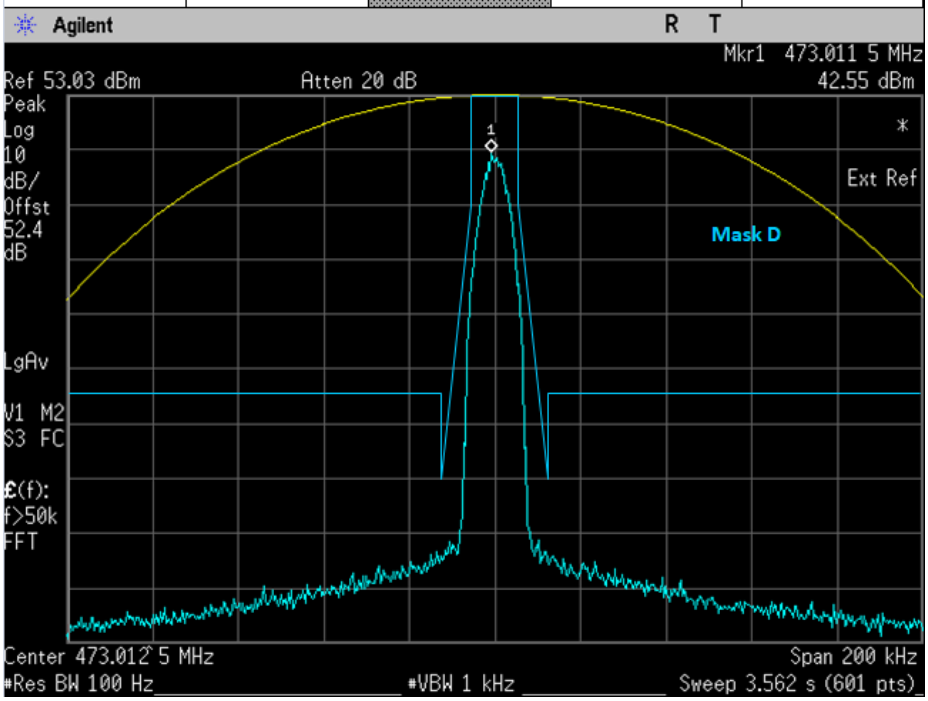
For Part 74(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation			Rules Part	
LSM			80.211(f),RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
457.5500	12.5		8.7944	8K70D1W



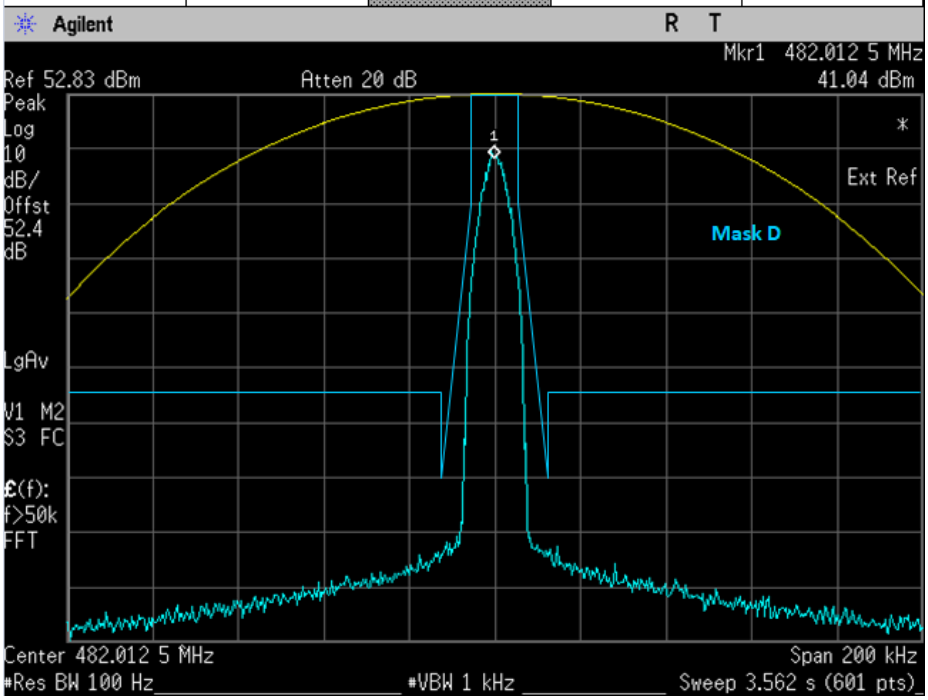
Not For FCC Review (8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation			Rules Part	
LSM			90.210(T-band)	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
473.0125	12.5		8.9885	8K70D1W



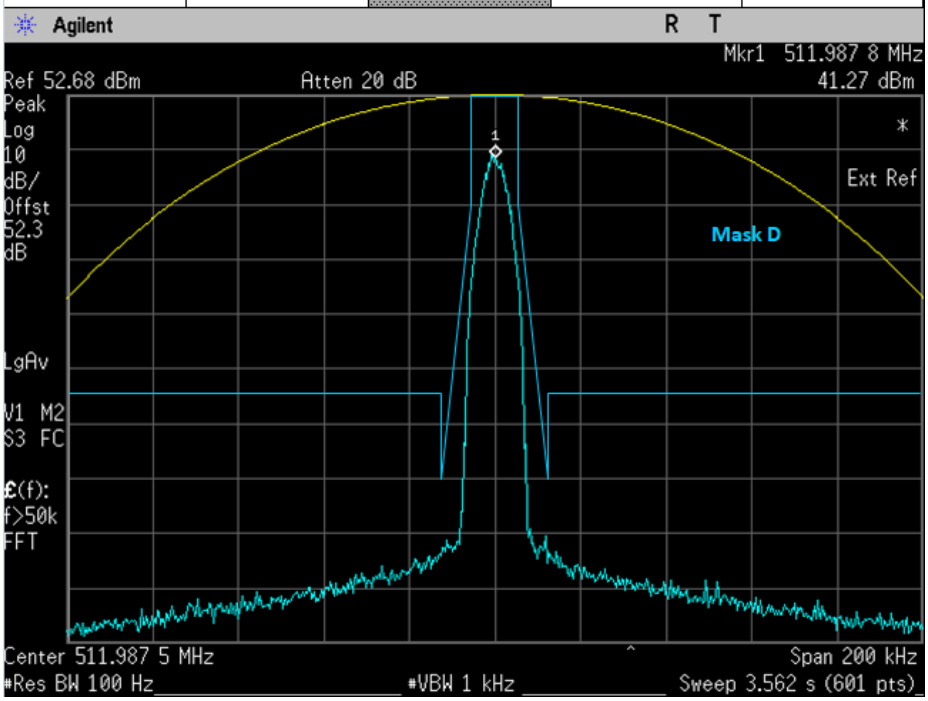
(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation			Rules Part	
LSM			Part 22,90	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
482.0125	12.5		8.7833	8K70D1W



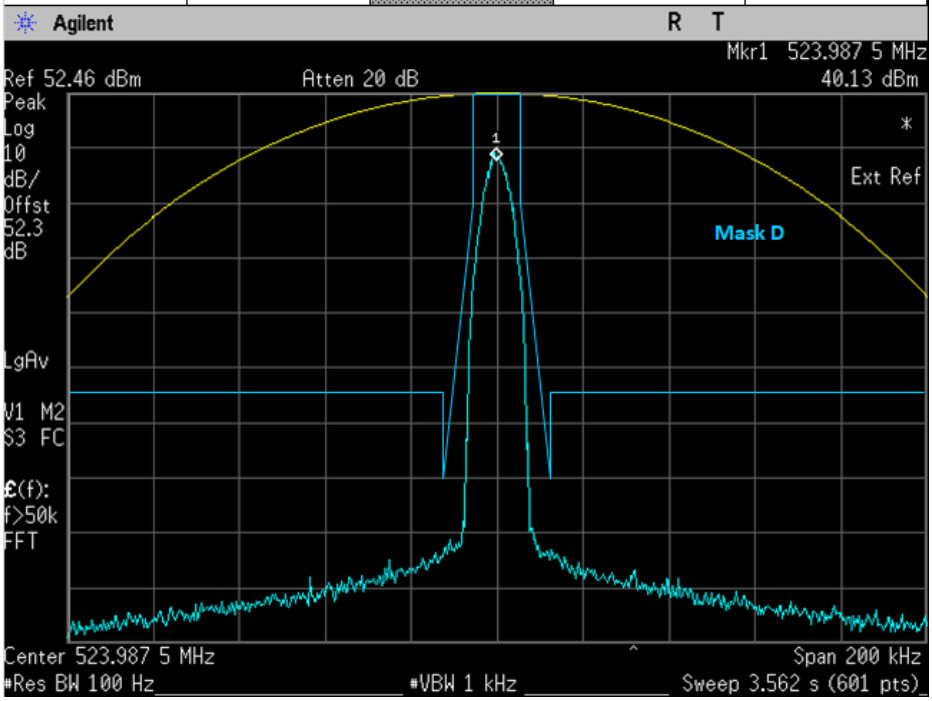
(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation			Rules Part	
LSM			90.210(T-band)	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
511.9875	12.5		8.9340	8K70D1W



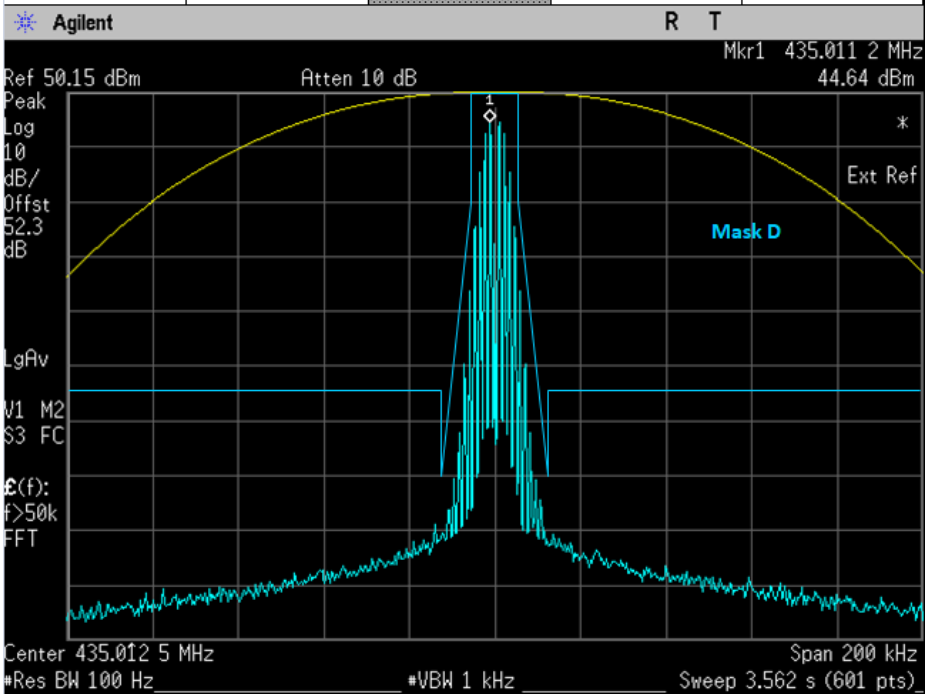
(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation	Rules Part			
LSM	RSS 119			
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
523.9875	12.5		8.8060	8K70D1W



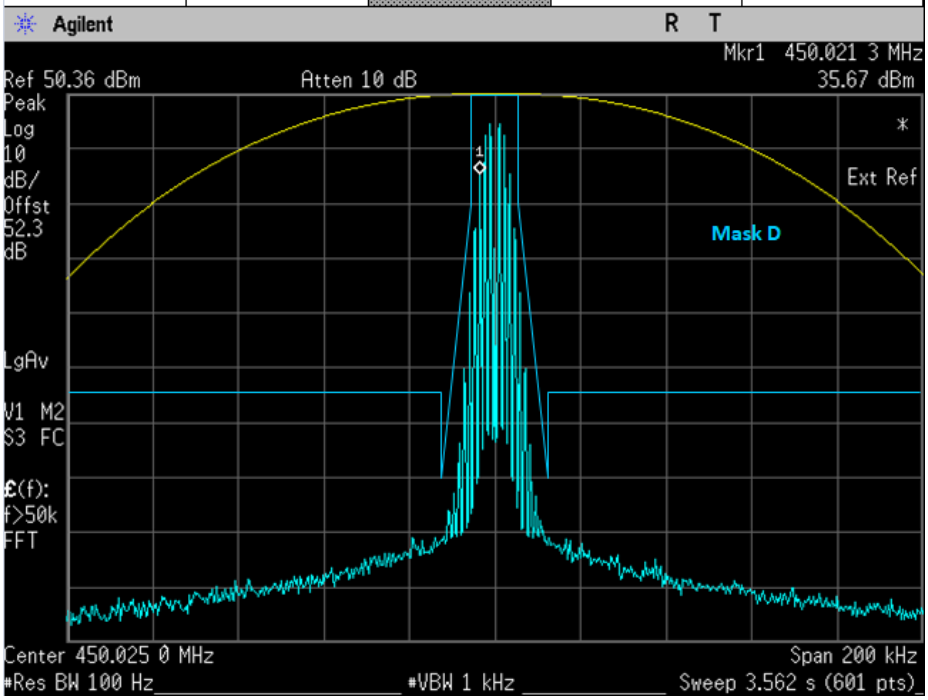
(8K70D1E, 8K70D1D by similarity with 8K70D1W)

Modulation	Rules Part			
C4FM	Part 90,RSS 119			
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
435.0125	12.5		7.3521	8K10F1W



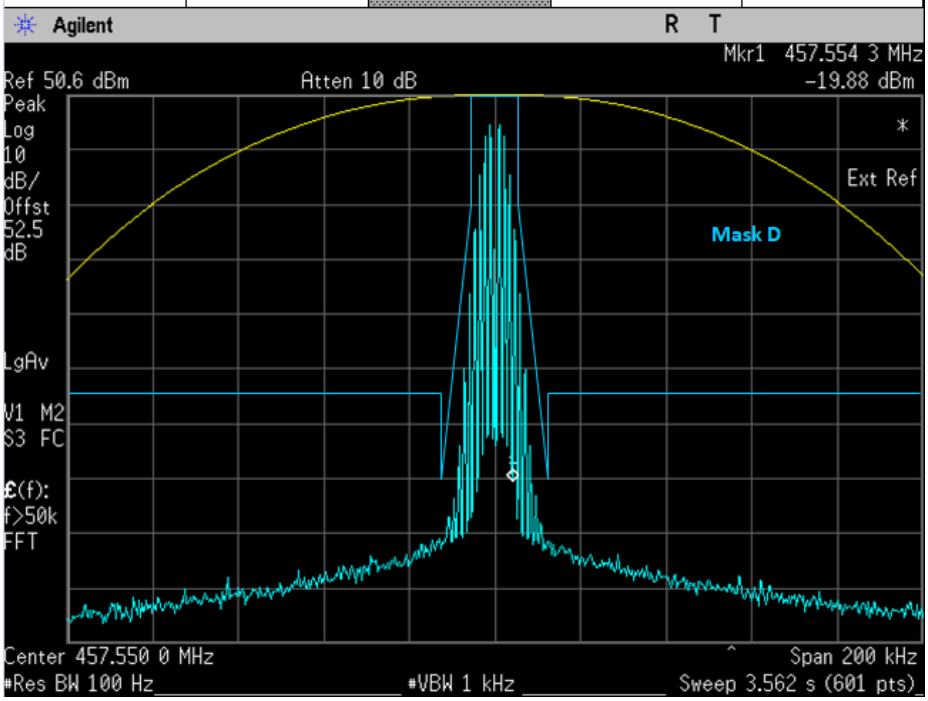
(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			74.462(c),RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	12.5		7.3511	8K10F1E



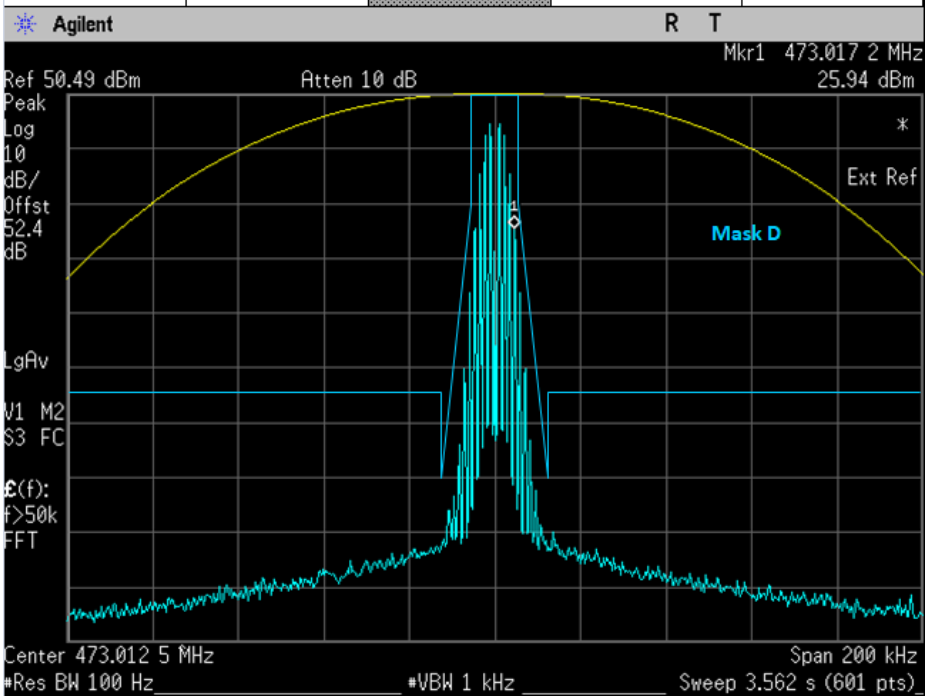
For Part 74(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			80.211(f),RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
457.5500	12.5		7.3518	8K10F1E



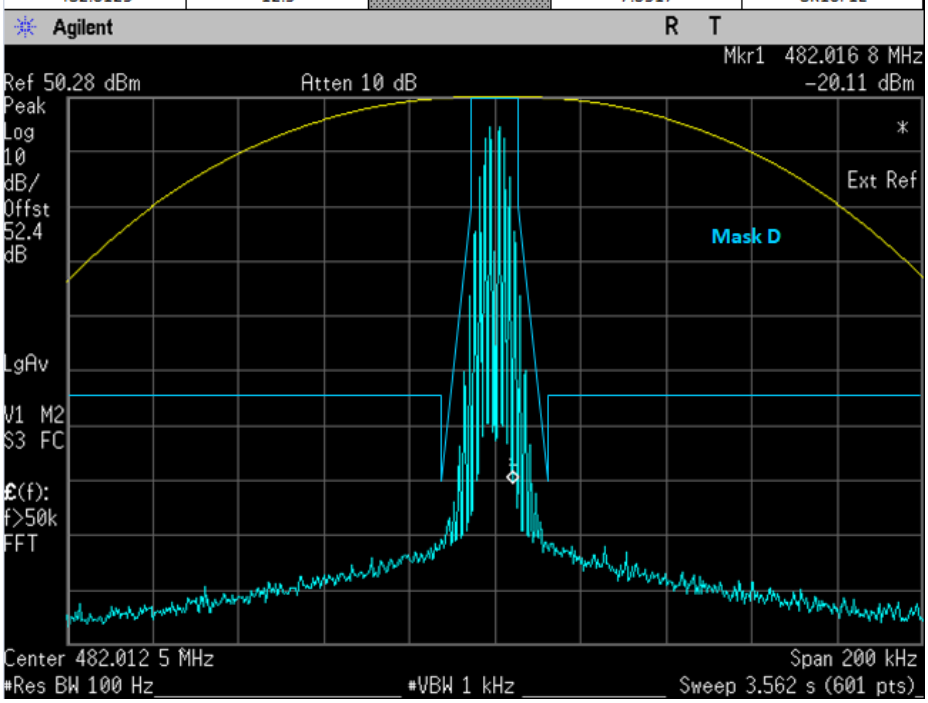
Not For FCC Review (8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	12.5		7.3511	8K10F1E



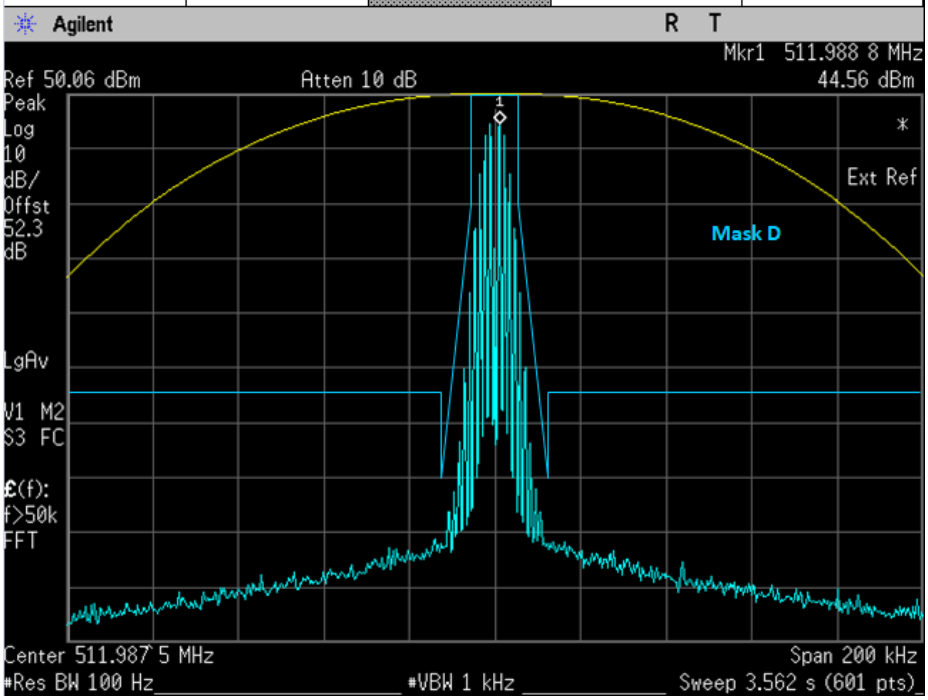
(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			Part 22,90	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
482.0125	12.5		7.3517	8K10F1E



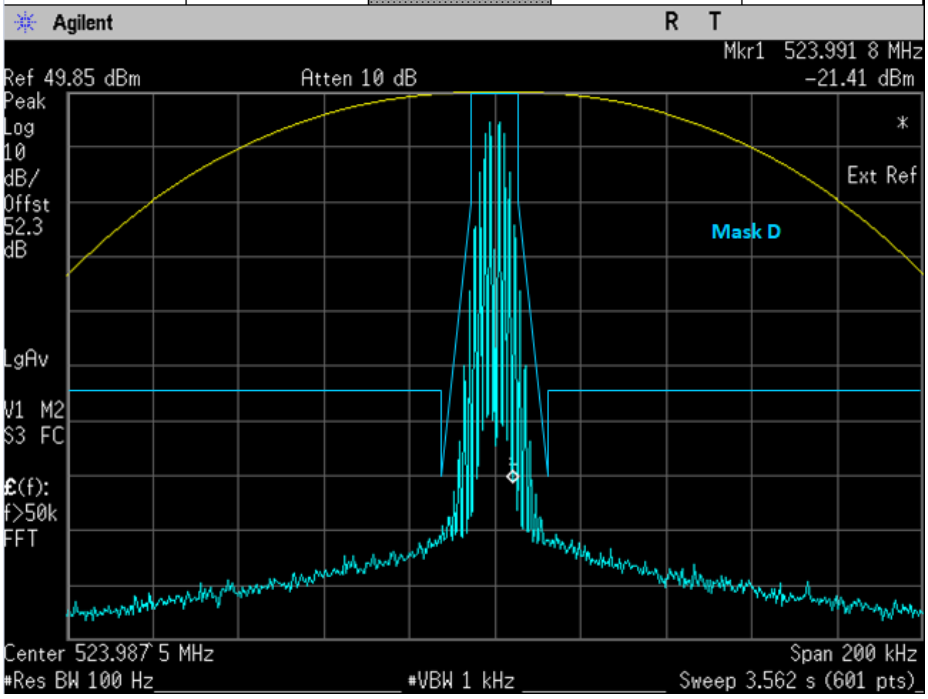
(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
511.9875	12.5		7.3515	8K10F1W



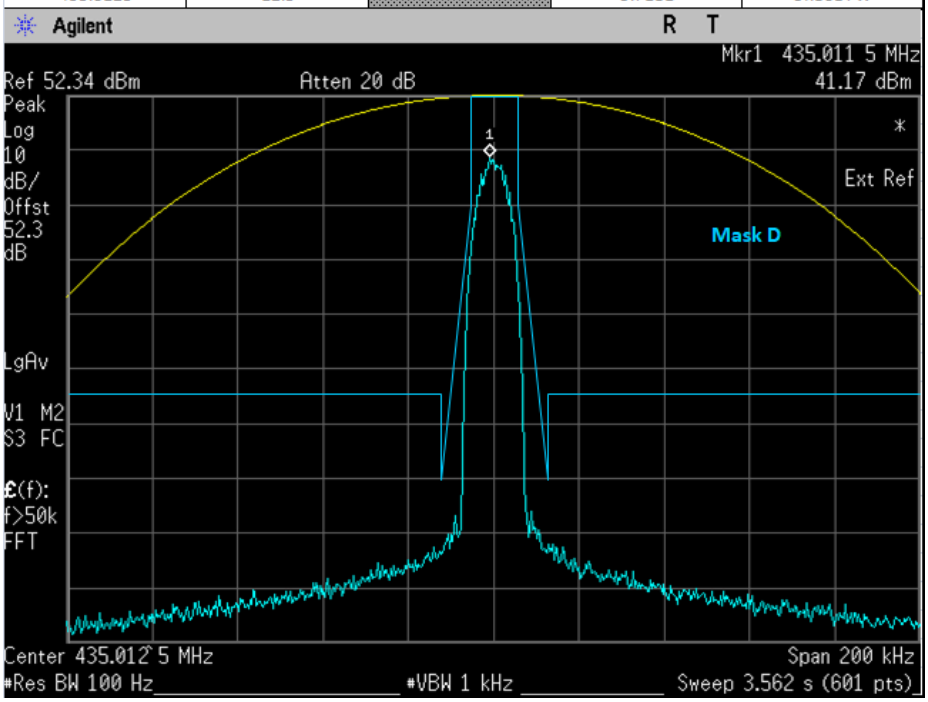
(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
C4FM			RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
523.9875	12.5		7.3545	8K10F1W



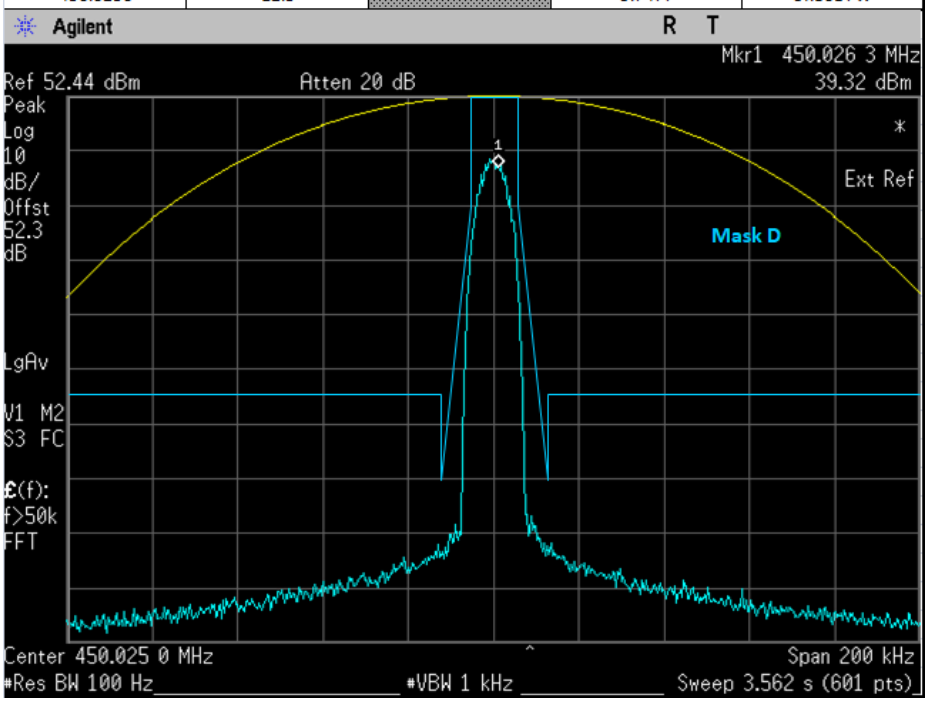
(8K10F1E, 8K10F1D by similarity with 8K10F1W)

Modulation			Rules Part	
HPDQSK			Part 90,RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
435.0125	12.5		9.7181	9K80D7W



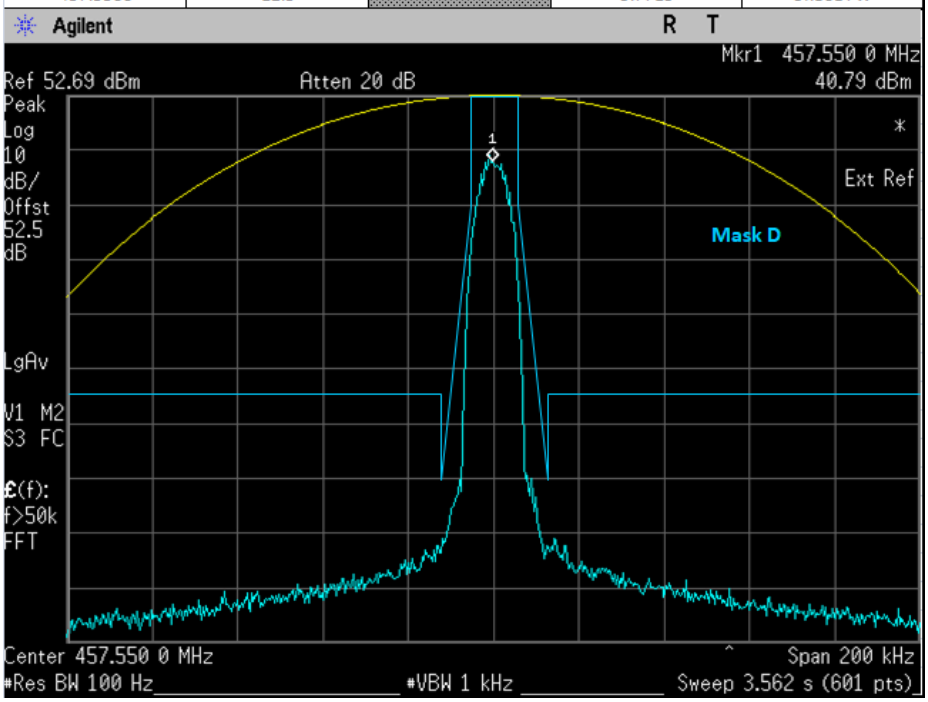
(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation			Rules Part	
HPDQSK			74.462(c),RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	12.5		9.7477	9K80D7W



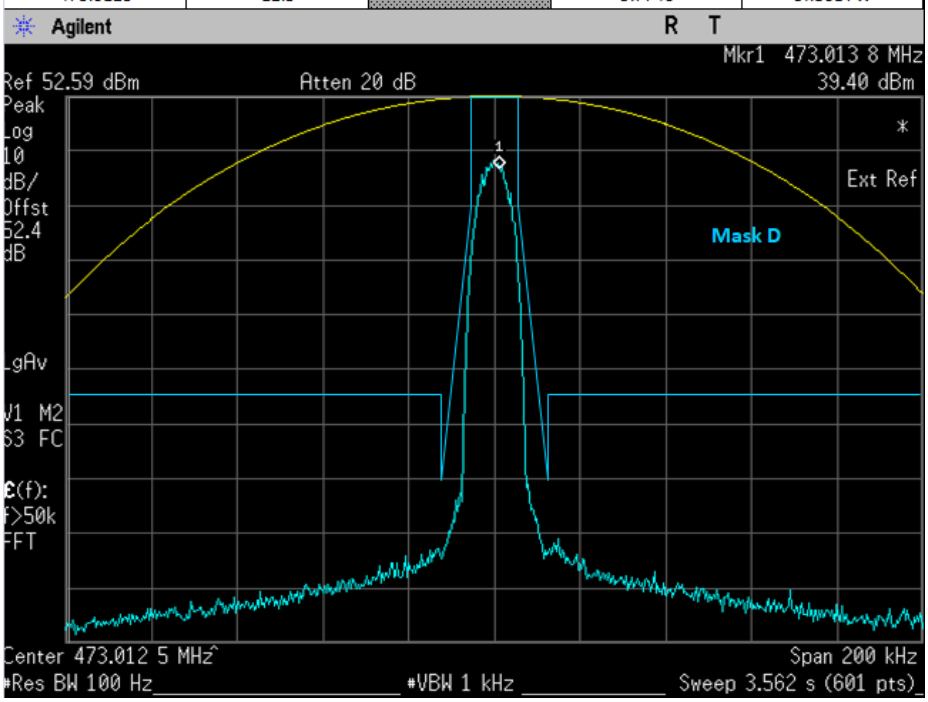
For Part 74(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation			Rules Part	
HPDQSK			80.211(f),RSS119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
457.5500	12.5		9.7719	9K80D7W



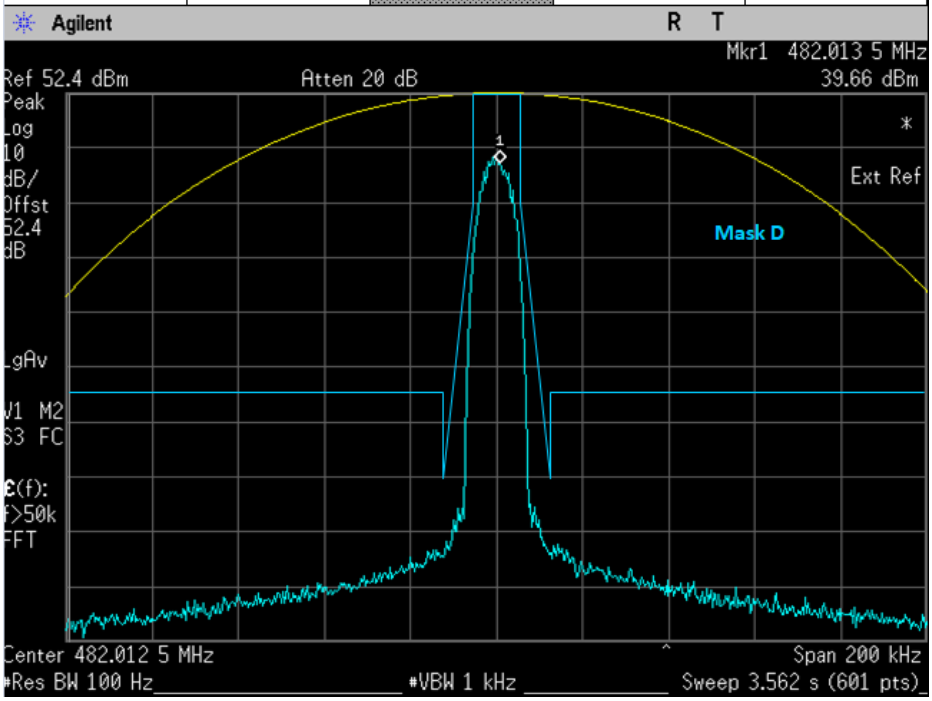
Not For FCC Review(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation			Rules Part	
HPDQSK			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	12.5		9.7740	9K80D7W



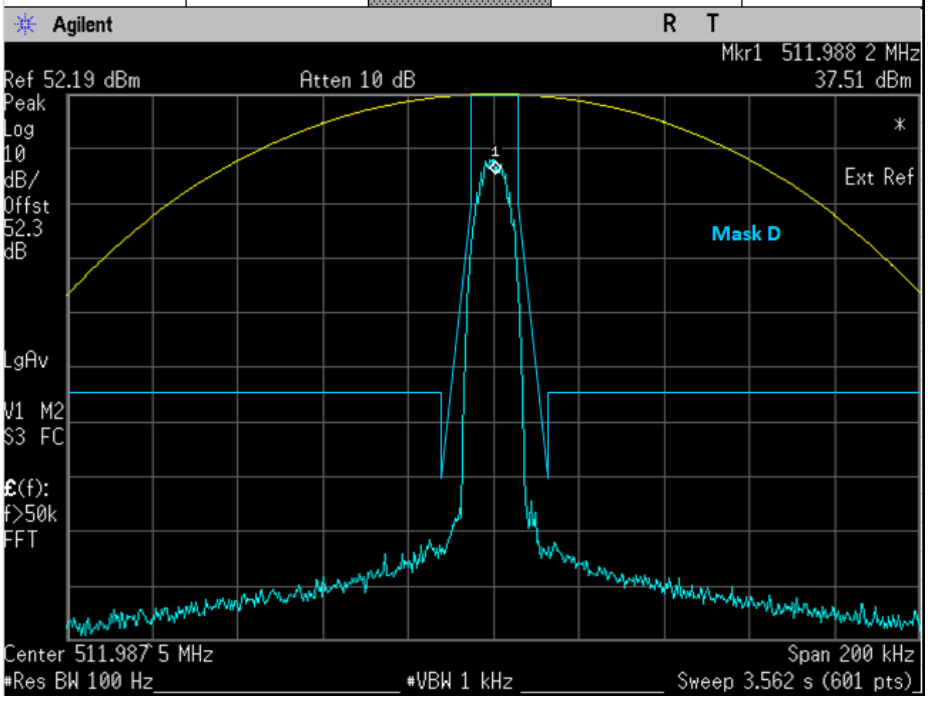
(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation	Rules Part			
HPDQSK	Part 22,90			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
482.0125	12.5		9.7616	9K80D7W



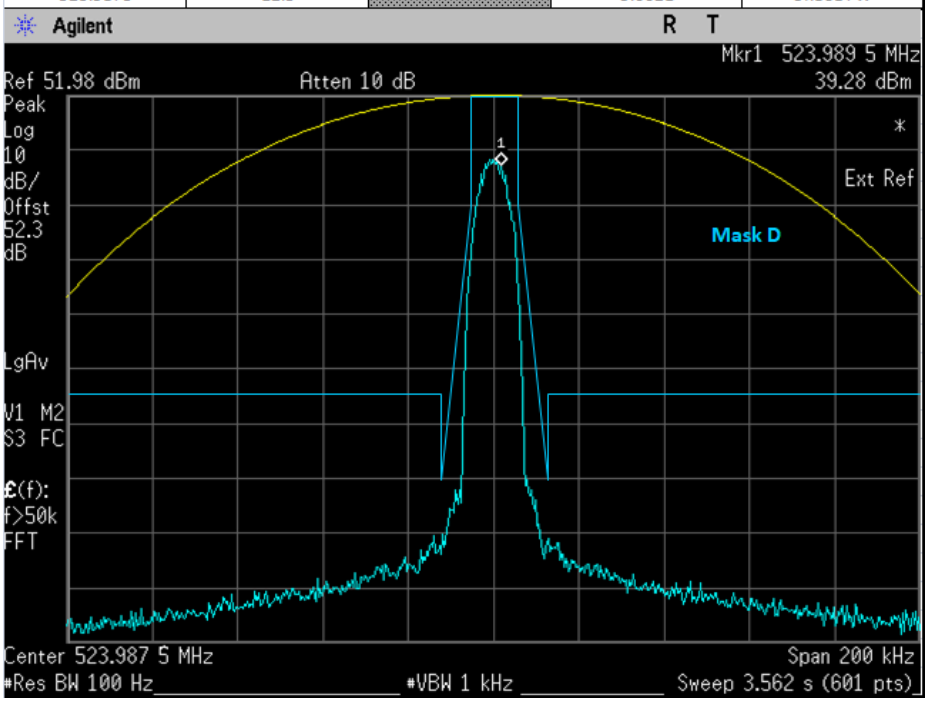
(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation	Rules Part			
HPDQSK	90.210(T-band)			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
511.9875	12.5		9.7794	9K80D7W



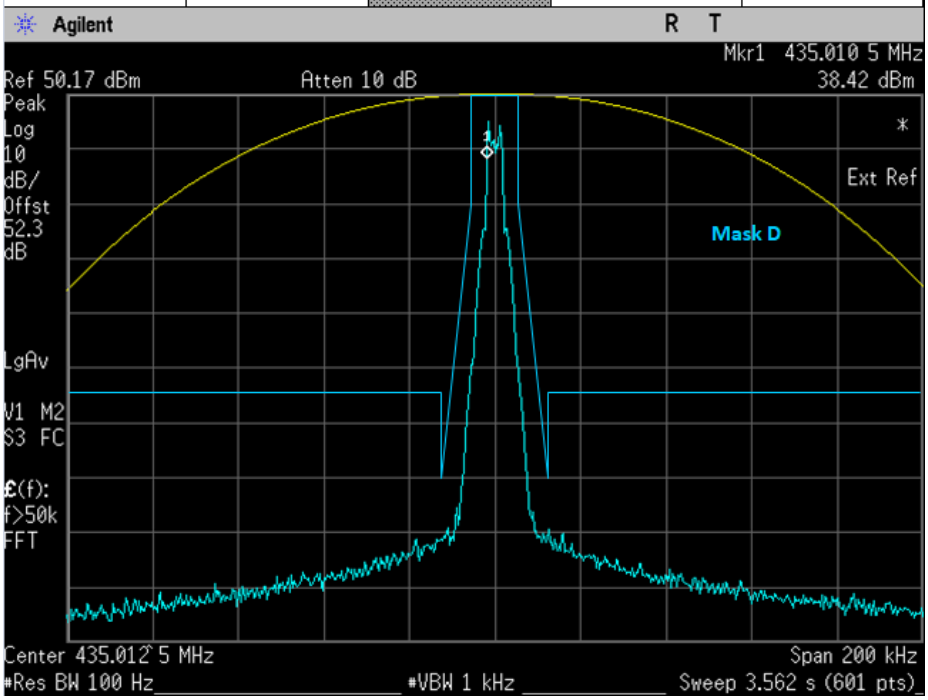
(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation			Rules Part	
HPDQSK			RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
523.9875	12.5		9.6621	9K80D7W

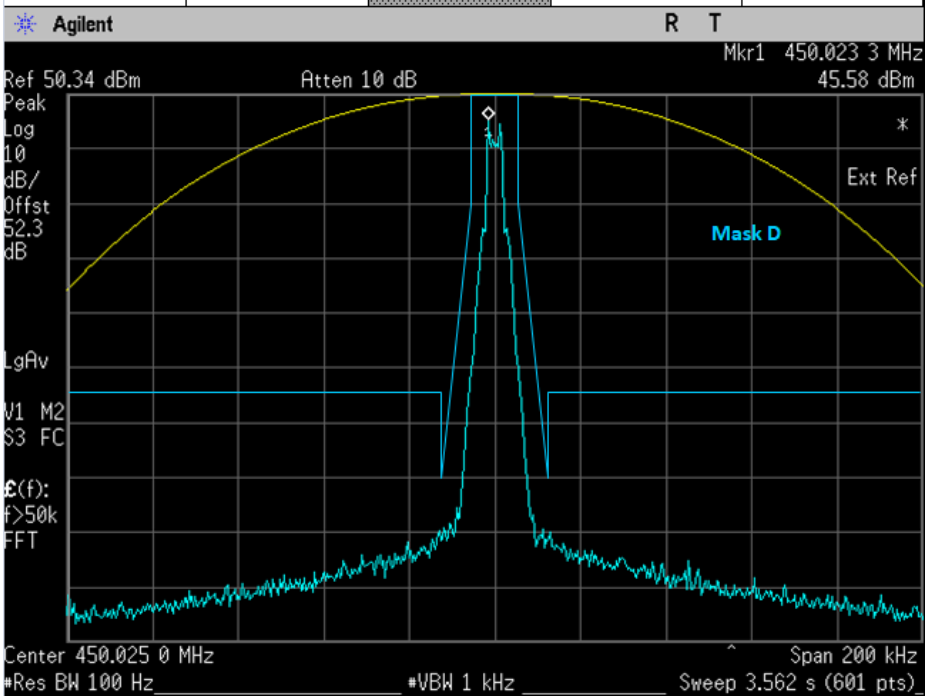


(9K80D7E, 9K80D7D by similarity with 9K80D7W)

Modulation			Rules Part	
FSK			Part 90,RSS 119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
435.0125	12.5		5.4337	10K0F1D

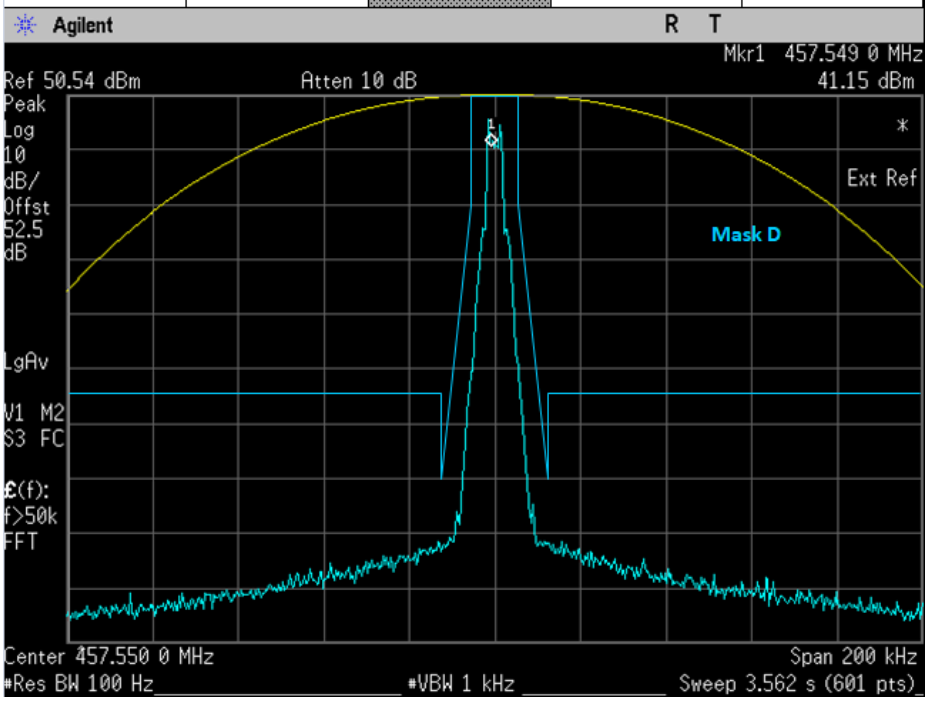


Modulation			Rules Part	
FSK			74.462(c),RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	12.5		5.5590	10K0F1D



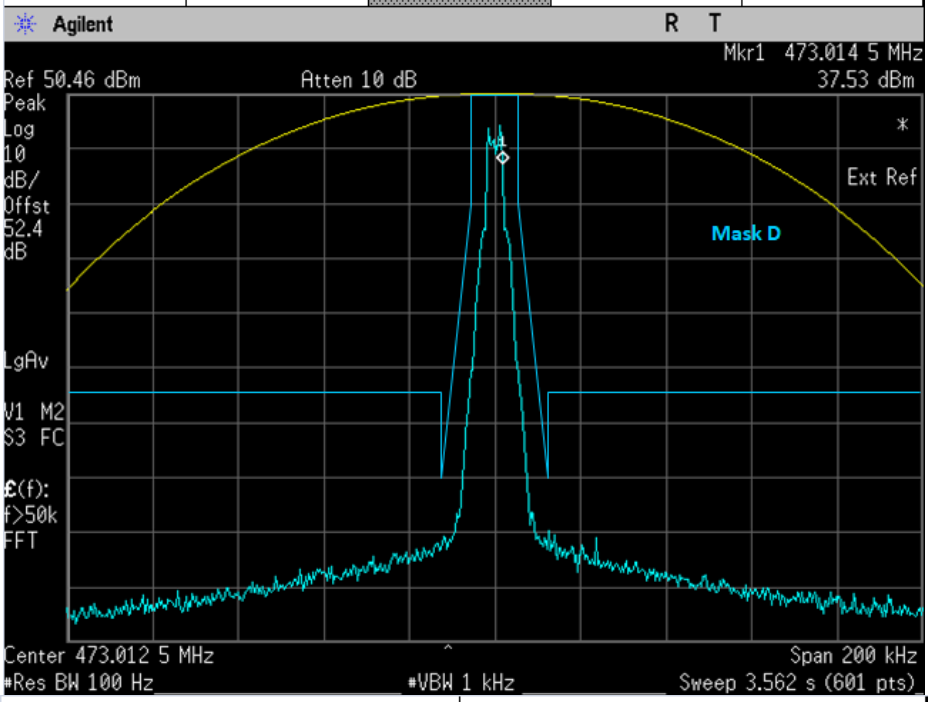
For Part 74

Modulation			Rules Part	
FSK			80.211(f),RSS119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
457.5500	12.5		5.4083	10K0F1D

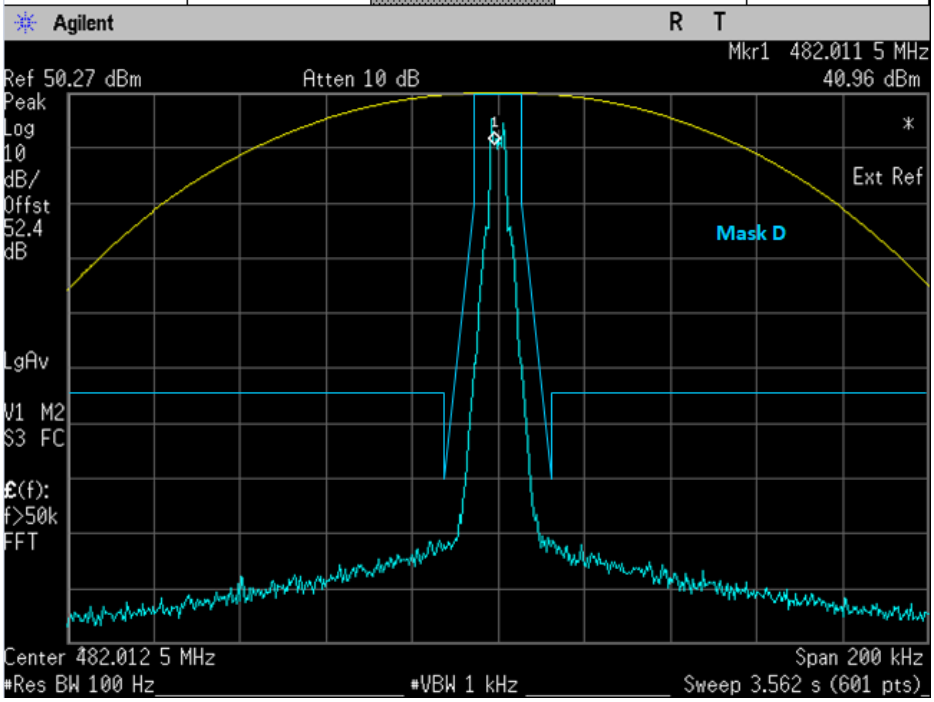


Not For FCC Review

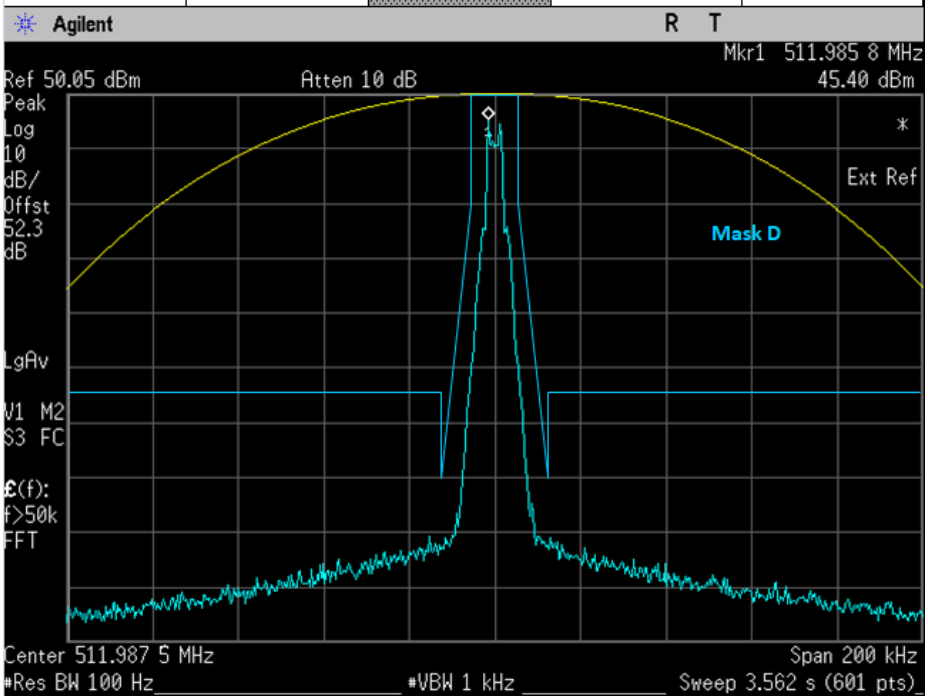
Modulation	Rules Part			
FSK	90.210(T-band)			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	12.5		5.3880	10K0F1D



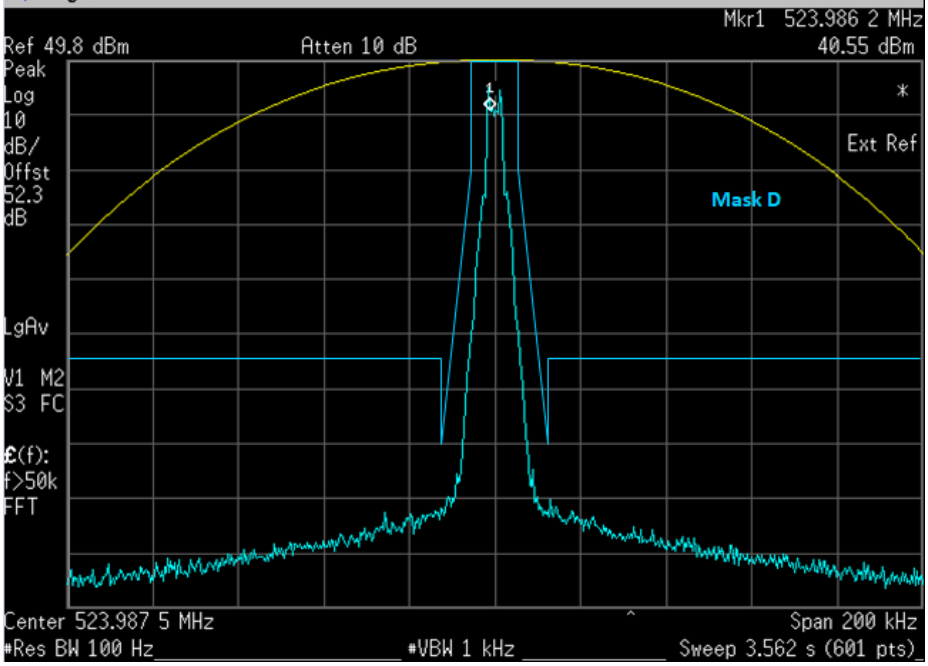
Modulation	Rules Part			
FSK	Part 22,90			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
482.0125	12.5		5.4031	10K0F1D



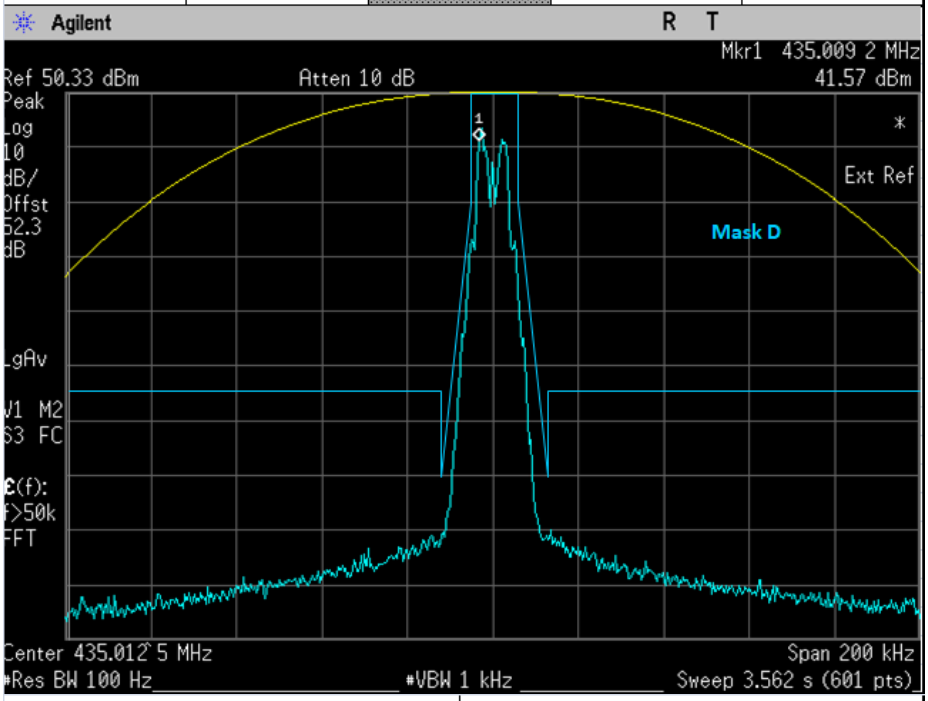
Modulation	Rules Part			
FSK	90.210(T-band)			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
511.9875	12.5		5.3624	10K0F1D



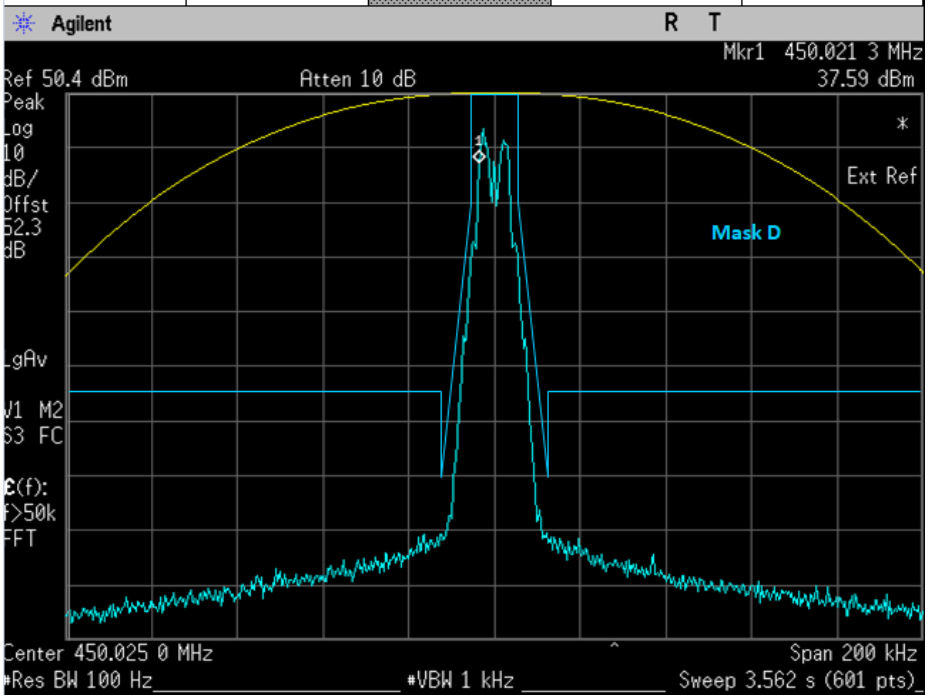
Modulation	Rules Part			
FSK	RSS 119			
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
523.9875	12.5		5.4691	10K0F1D



Modulation			Rules Part	
FSK			Part 90,RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
435.0125	25.0		7.8165	16K0F1D

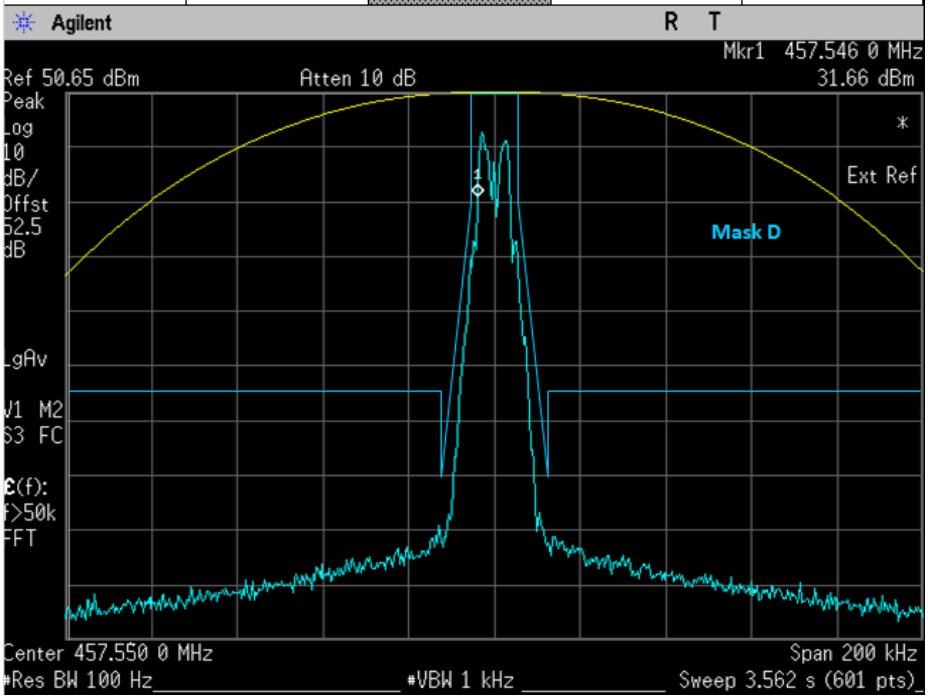


Modulation			Rules Part	
FSK			74.462(c),RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
450.0250	25.0		7.8157	16K0F1D



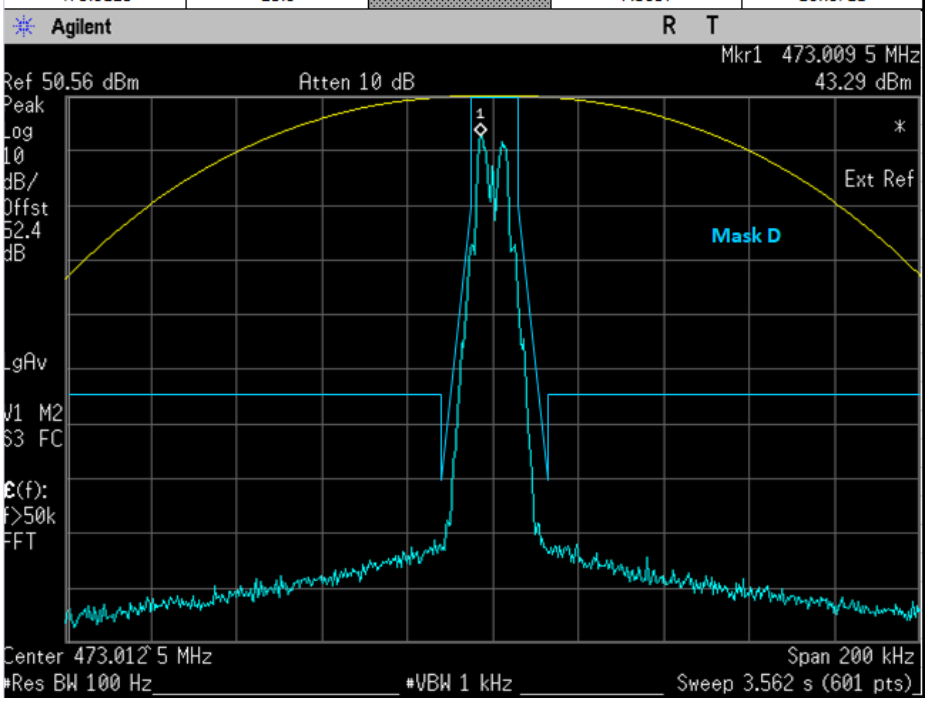
For Part 74

Modulation			Rules Part	
FSK			80.211(f),RSS119	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
457.5500	25.0		7.9541	16K0F1D

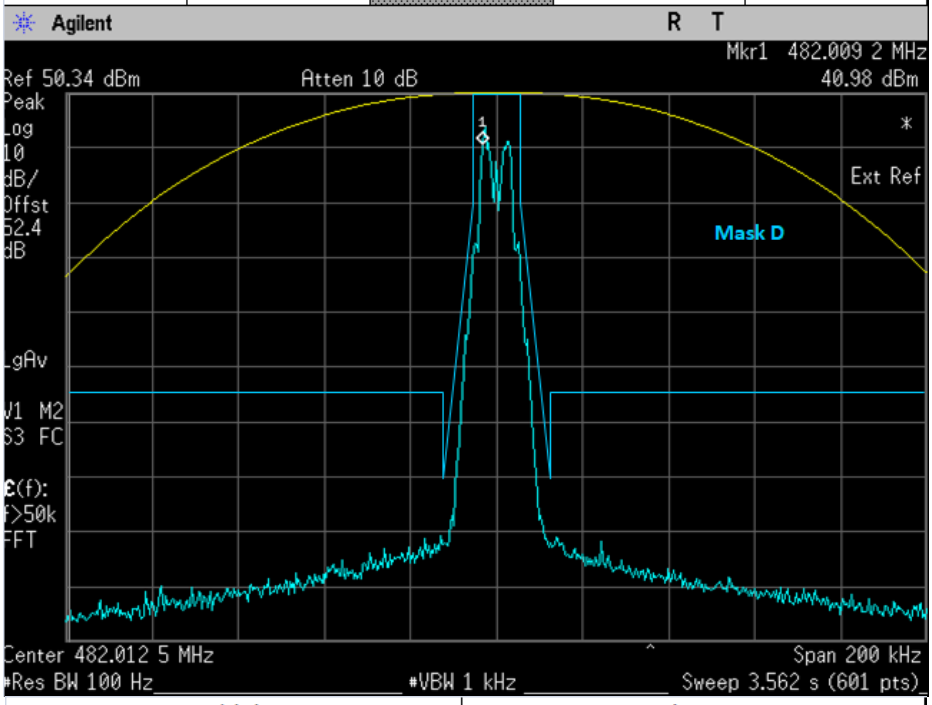


Not For FCC Review

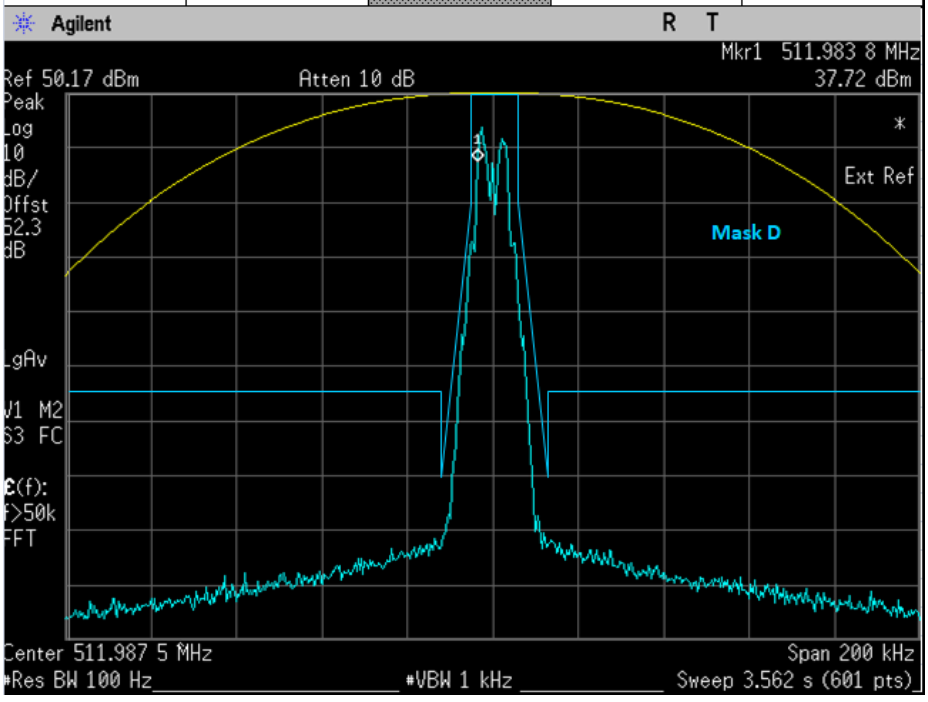
Modulation			Rules Part	
FSK			90.210(T-band)	
Channel Frequency (MHz)	**Channel Spacing (kHz)**		**99% OCB (kHz)**	**Emission Designator**
473.0125	25.0		7.8057	16K0F1D



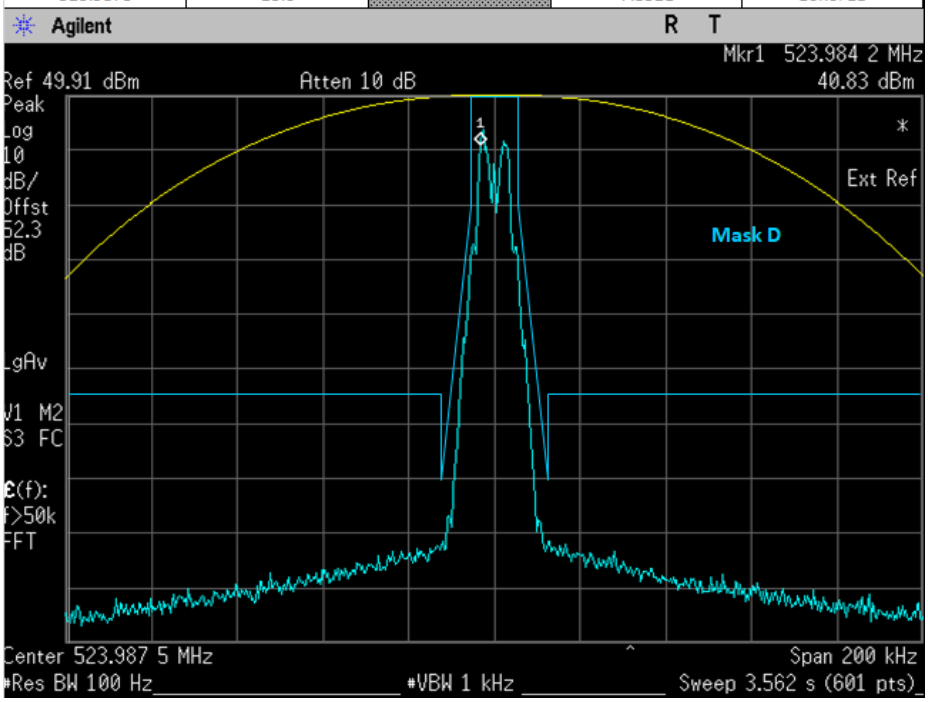
Modulation			Rules Part	
FSK			Part 22,90	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
482.0125	25.0		7.7182	16K0F1D



Modulation			Rules Part	
FSK			90.210(T-band)	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
511.9875	25.0		7.9131	16K0F1D



Modulation			Rules Part	
FSK			RSS 119	
Channel Frequency (MHz)	Channel Spacing (kHz)		99% OCB (kHz)	Emission Designator
523.9875	25.0		7.8521	16K0F1D

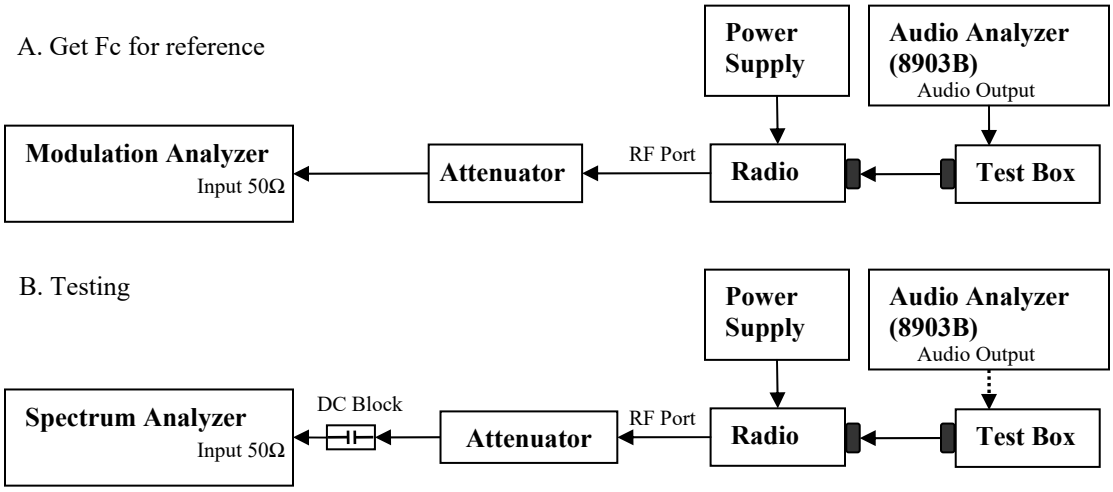


6.6.5. Test Limit

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)



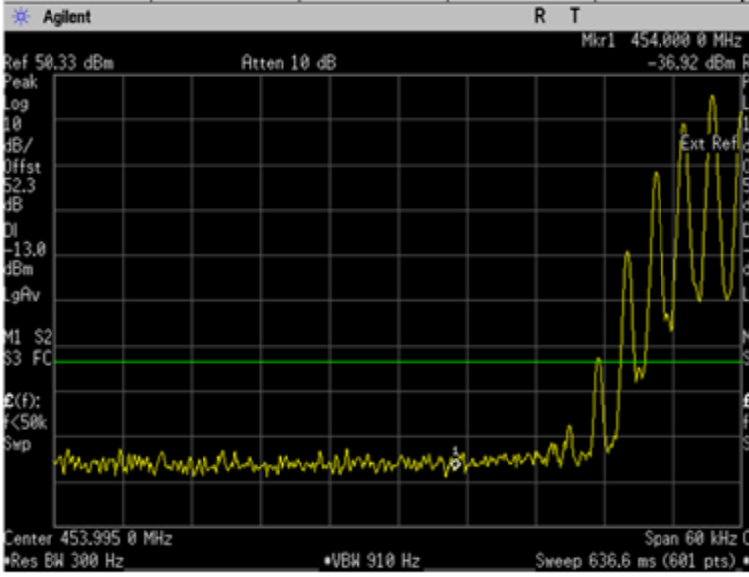
2) The DUT transmitter output port was connected to Modulation Analyzer.
3) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
4) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey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

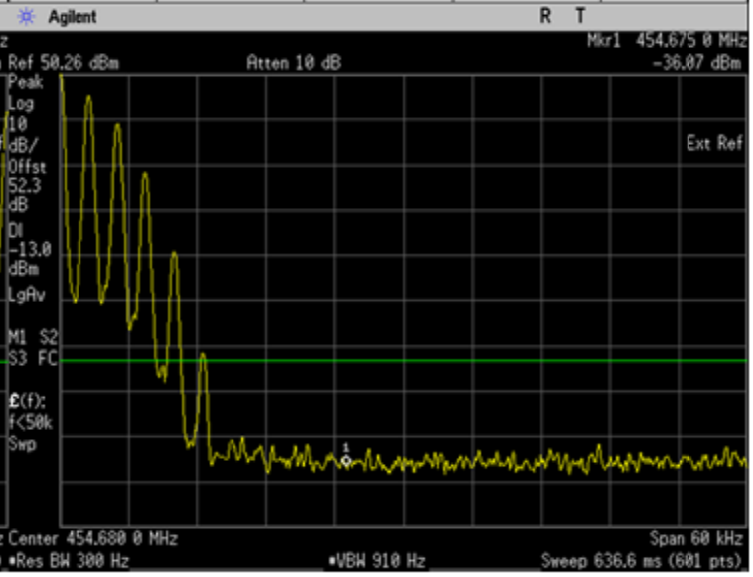
6.7.2. Test Result (Analog)

MAX PWR

Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.0250	25.0	15.5188	14.8244	16K0F3E

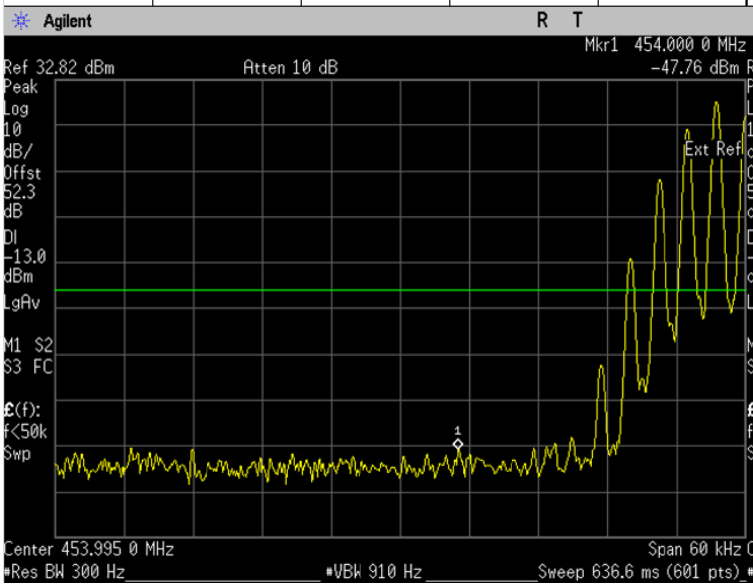


Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.6500	25.0	15.5202	14.8247	16K0F3E

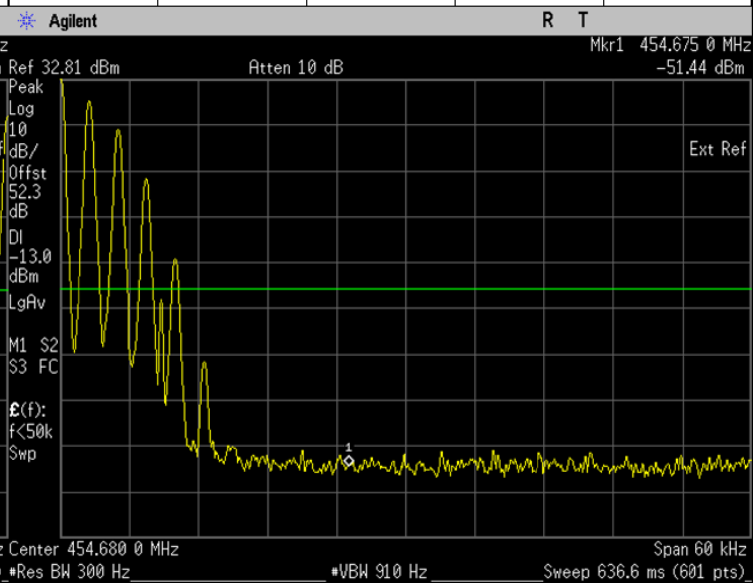


LOW PWR

Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.0250	25.0	15.5139	14.8216	16K0F3E

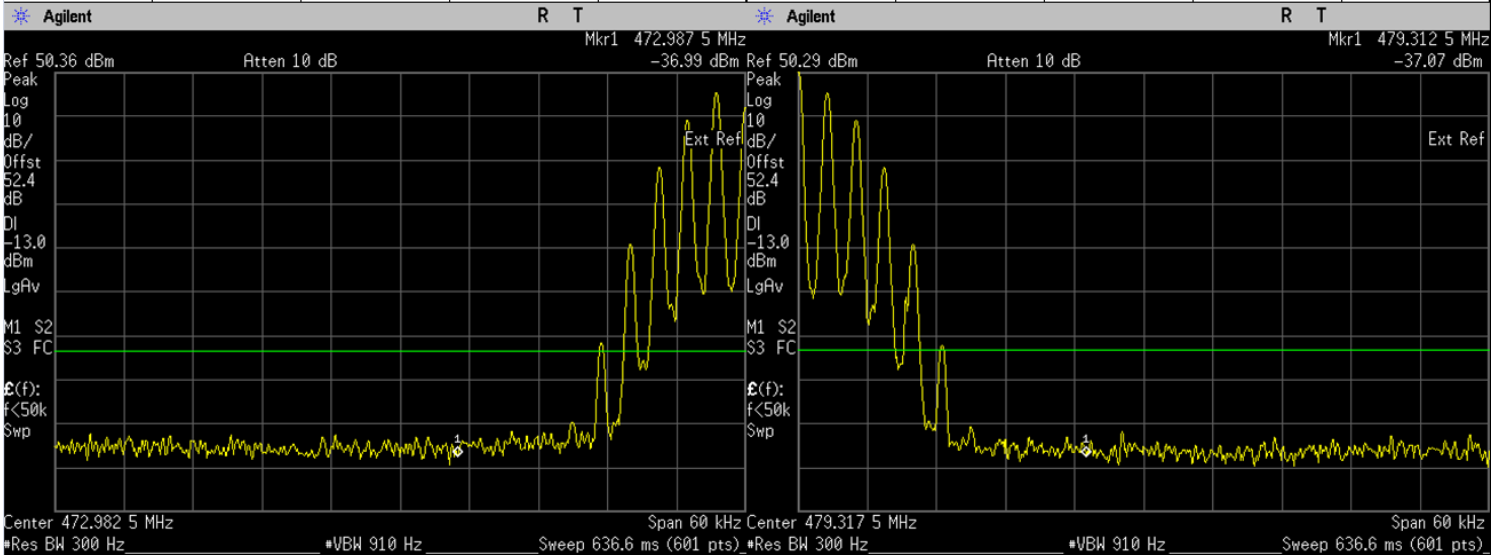


Modulation	Rules Part			
Analog Voice	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.6500	25.0	15.5196	14.8242	16K0F3E



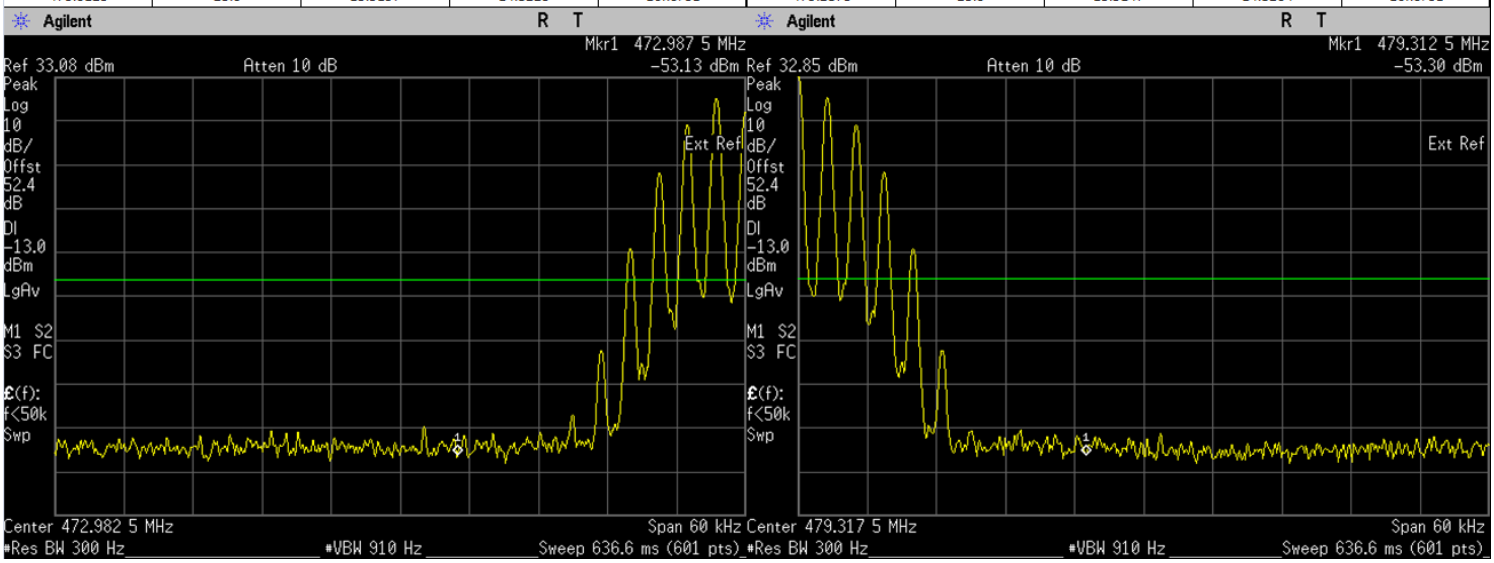
MAX PWR

Modulation		Rules Part			Modulation		Rules Part		
Analog Voice		FCC Part 22.359(b)			Analog Voice		FCC Part 22.359(b)		
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator	Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
473.0125	25.0	15.5186	14.8216	16K0F3E	479.2875	25.0	15.5136	14.8200	16K0F3E

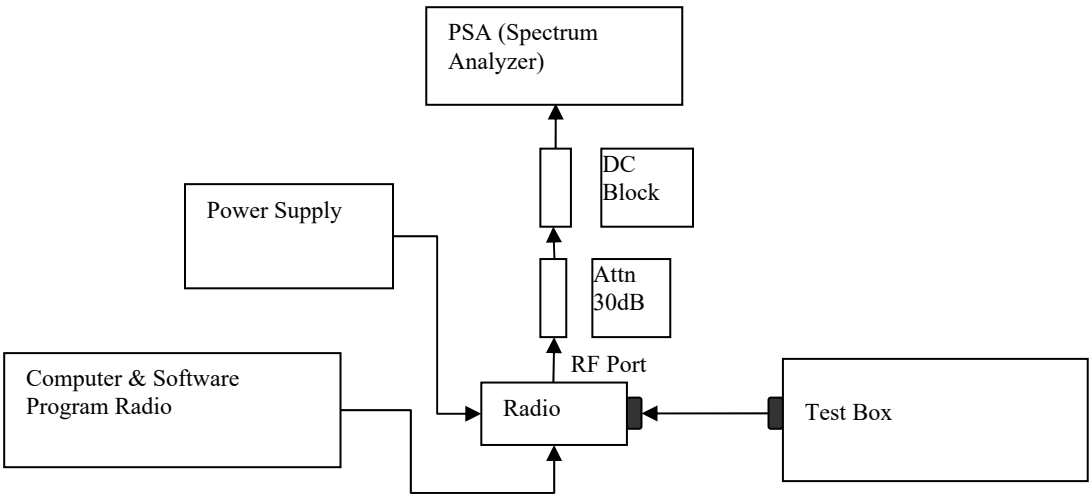


LOW PWR

Modulation		Rules Part			Modulation		Rules Part		
Analog Voice		FCC Part 22.359(b)			Analog Voice		FCC Part 22.359(b)		
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator	Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
473.0125	25.0	15.5197	14.8223	16K0F3E	479.2875	25.0	15.5147	14.8204	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.

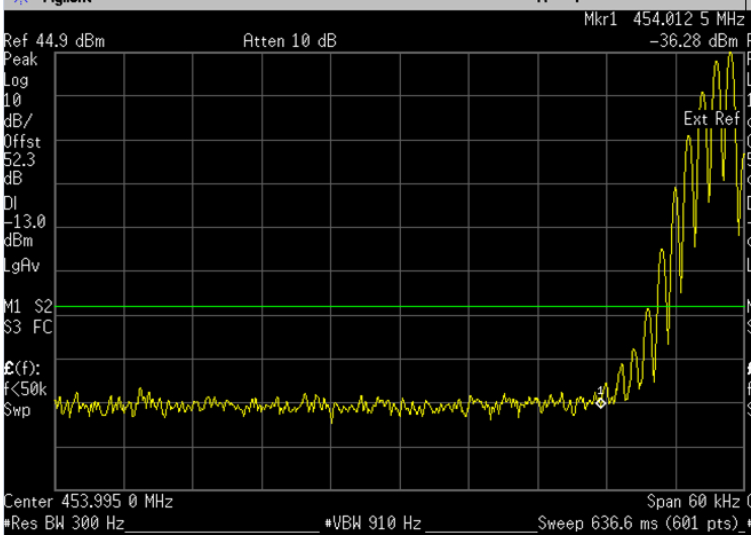
*Note:

- 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.

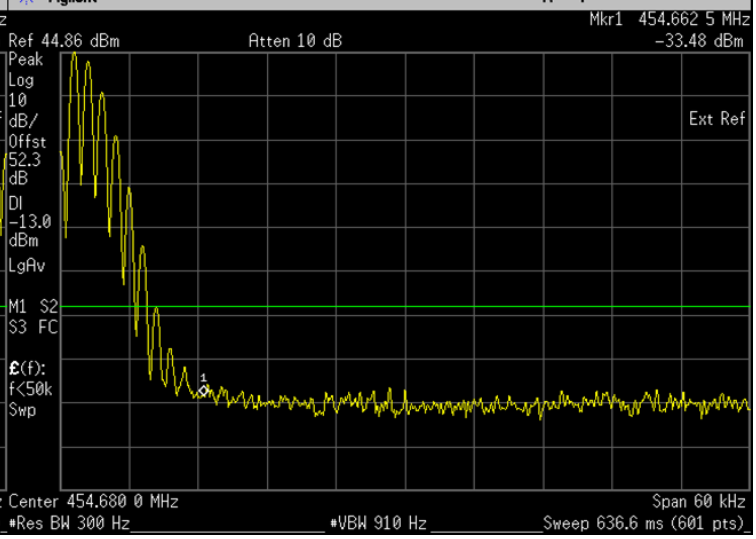
6.7.4. Test Result (Digital)

MAX PWR

Modulation	Rules Part			
C4FM	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.0250	12.5	10.0471	7.6261	8K10F1W

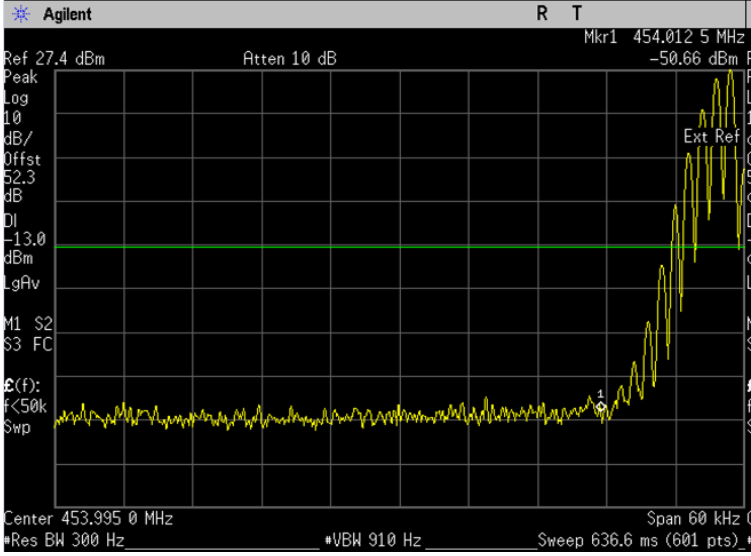


Modulation	Rules Part			
C4FM	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.6500	12.5	10.0485	7.6282	8K10F1W

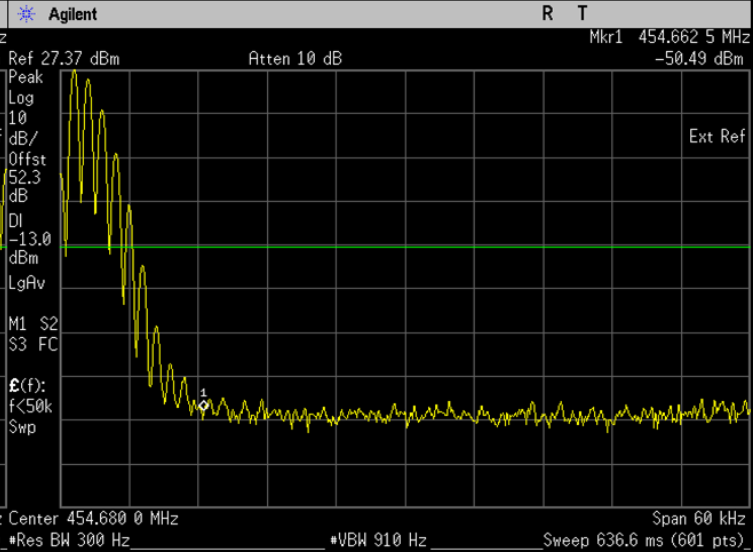


LOW PWR

Modulation	Rules Part			
C4FM	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.0250	12.5	10.0503	7.6309	8K10F1W



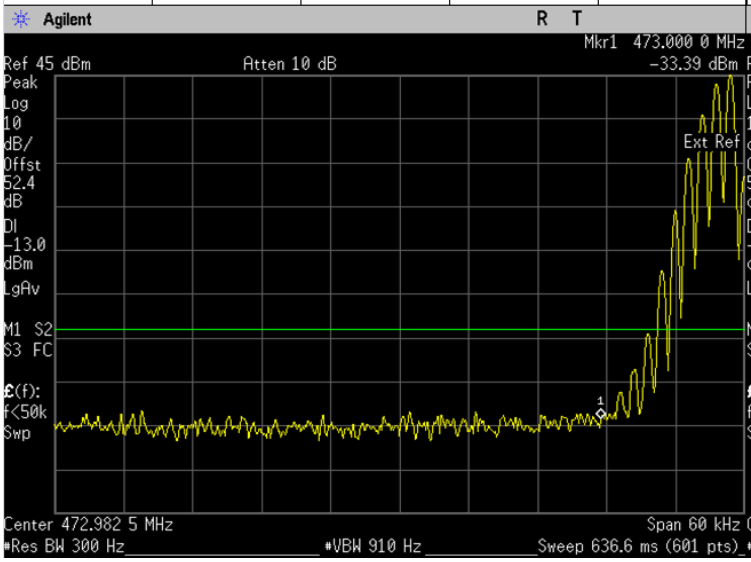
Modulation	Rules Part			
C4FM	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
454.6500	12.5	10.0484	7.6291	8K10F1W



MAX PWR

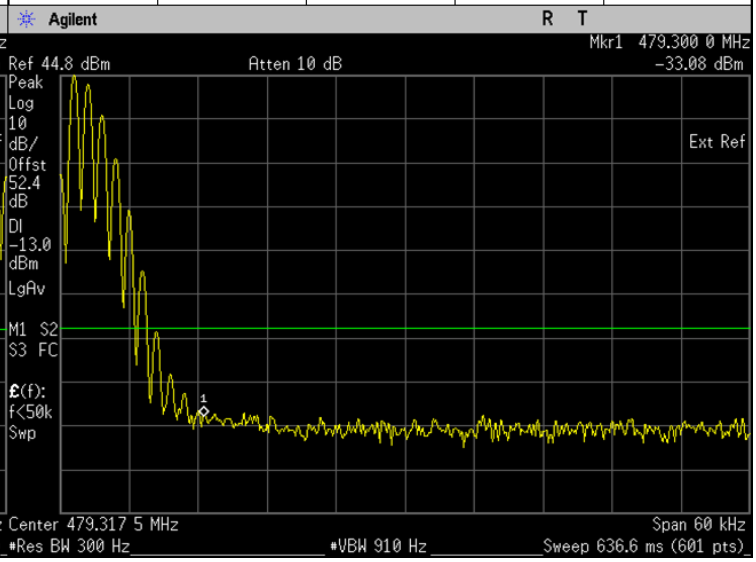
Modulation	Rules Part
C4FM	FCC Part 22.359(b)

Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
473.0125	12.5	10.0498	7.6308	8K10F1W



Modulation	Rules Part
C4FM	FCC Part 22.359(b)

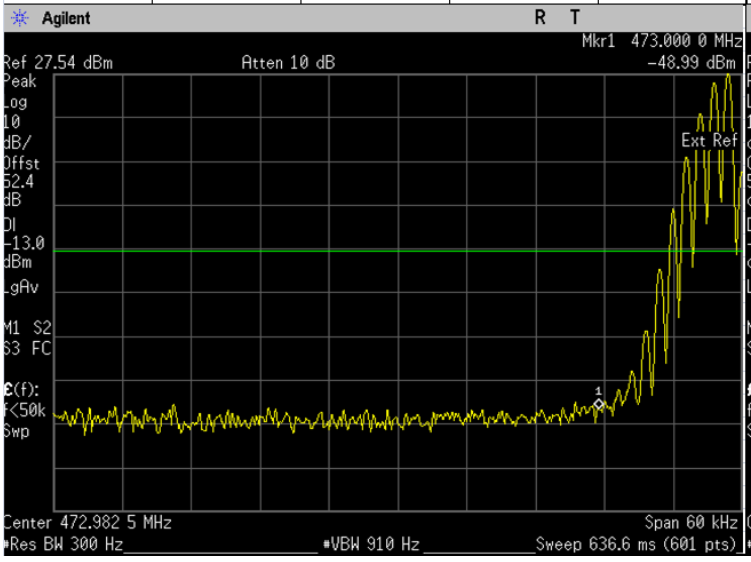
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
479.2875	12.5	10.0489	7.6286	8K10F1W



LOW PWR

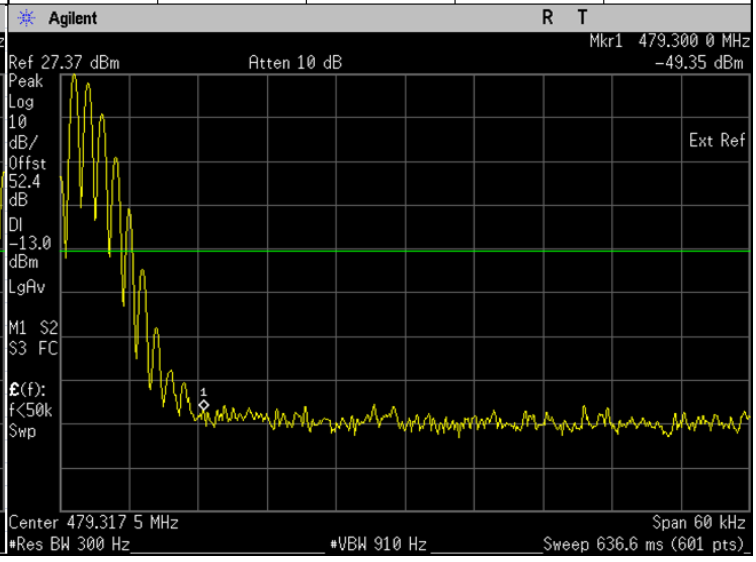
Modulation	Rules Part
C4FM	FCC Part 22.359(b)

Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
473.0125	12.5	10.0493	7.6300	8K10F1W



Modulation	Rules Part
C4FM	FCC Part 22.359(b)

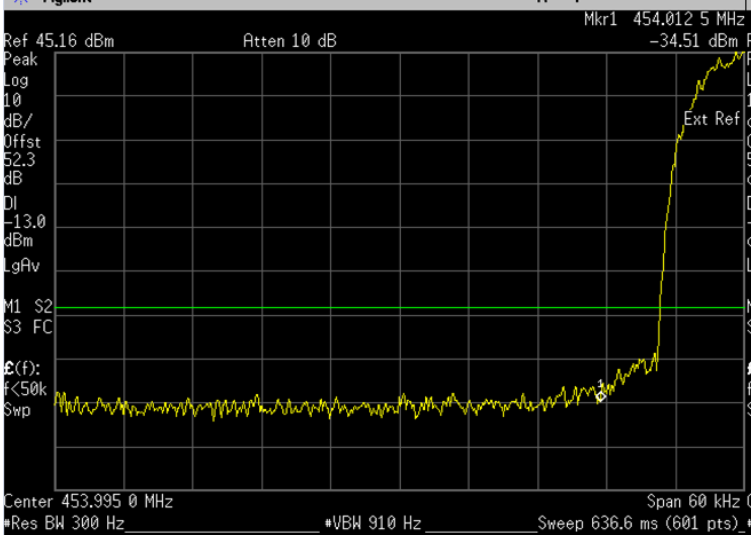
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
479.2875	12.5	10.0494	7.6293	8K10F1W



MAX PWR

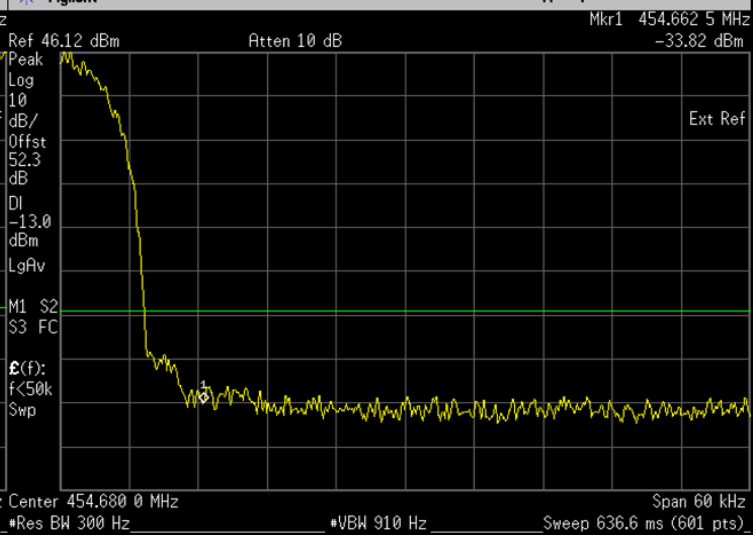
Modulation	Rules Part
HPDQSK	FCC Part 22.359(b)

Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
454.0250	12.5	12.1863	9.7449	9K80D7W



Modulation	Rules Part
HPDQSK	FCC Part 22.359(b)

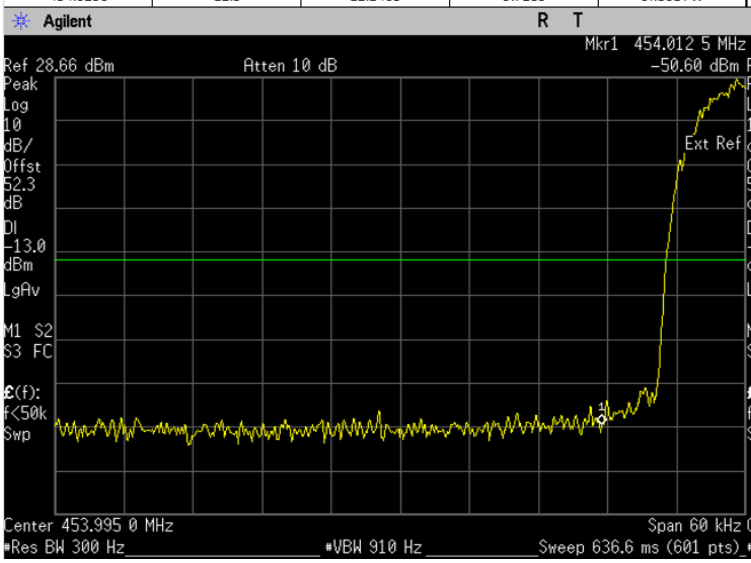
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
454.6500	12.5	12.0199	9.7965	9K80D7W



LOW PWR

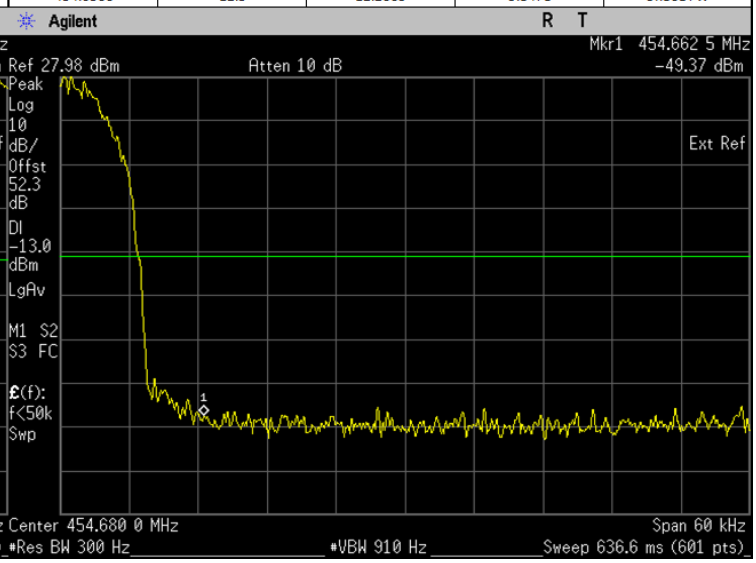
Modulation	Rules Part
HPDQSK	FCC Part 22.359(b)

Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
454.0250	12.5	12.2465	9.7289	9K80D7W



Modulation	Rules Part
HPDQSK	FCC Part 22.359(b)

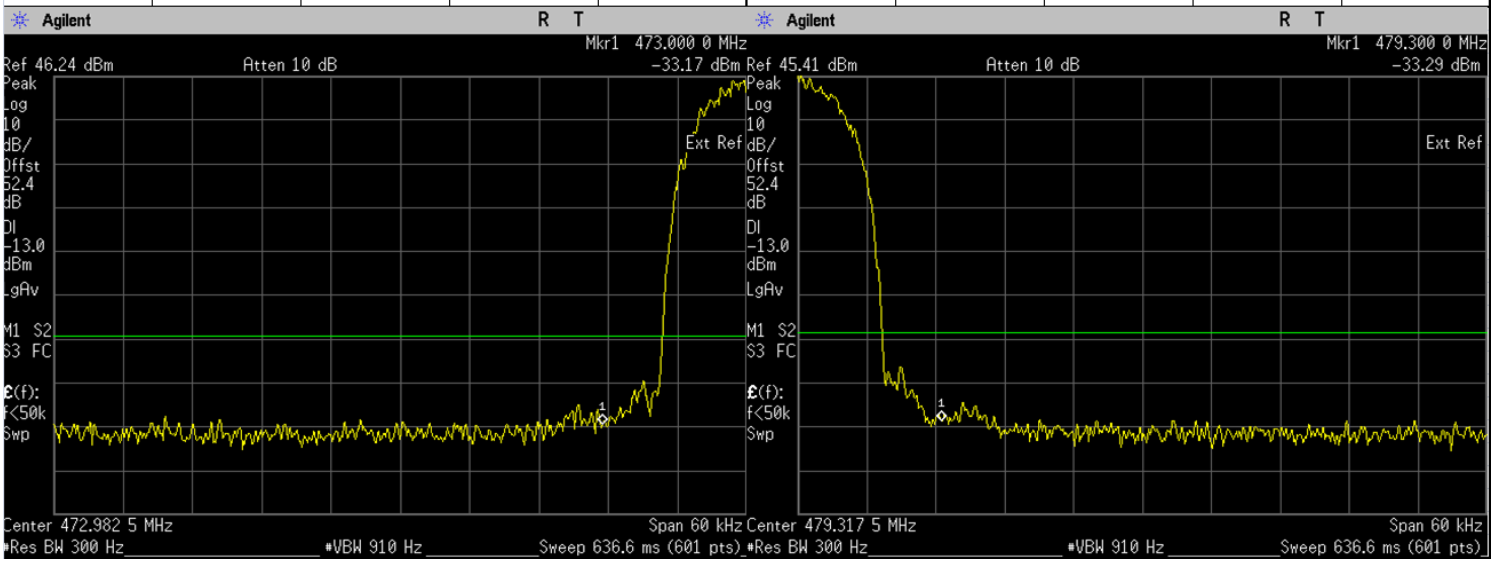
Channel Frequency	Channel Spacing	-26 dB Point (kHz)	99% OCB	Emission Designator
454.6500	12.5	12.2009	9.8478	9K80D7W



MAX PWR

Modulation	Rules Part			
HPDQSK	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
473.0125	12.5	12.2038	9.8153	9K80D7W

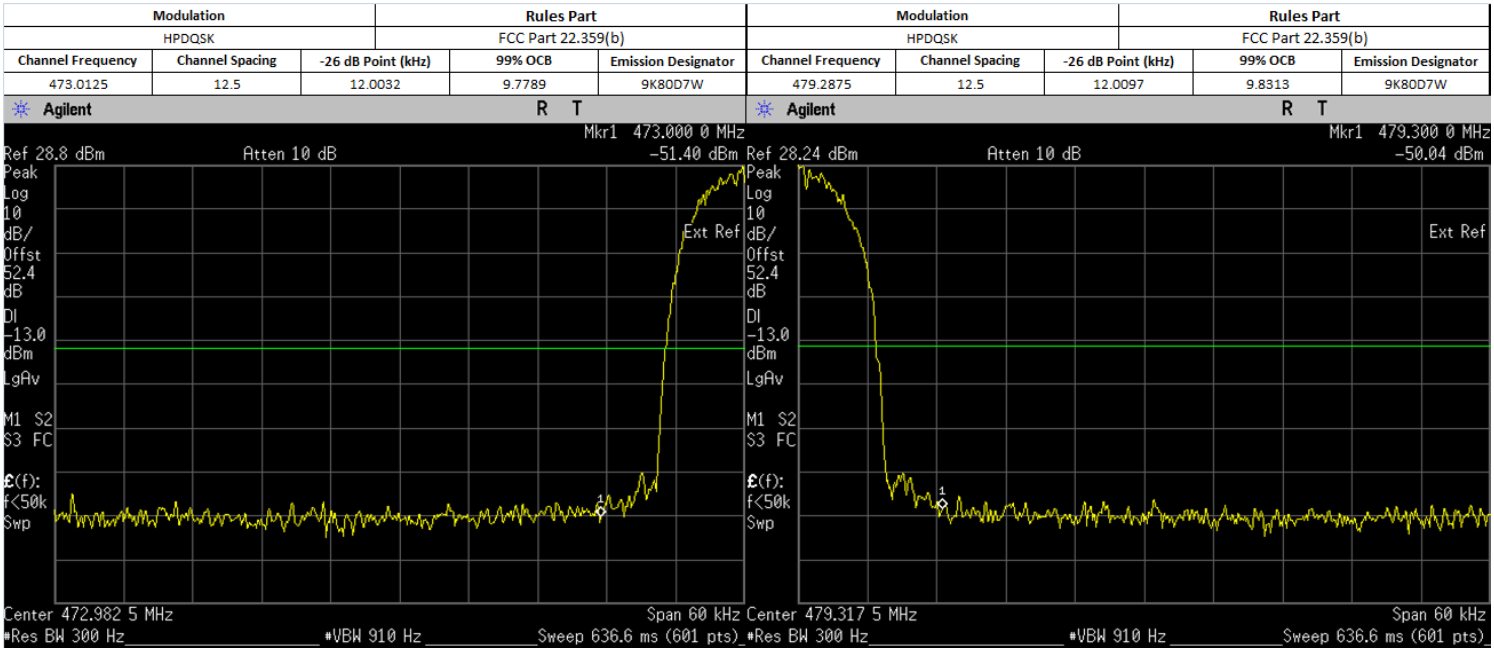
Modulation	Rules Part			
HPDQSK	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
479.2875	12.5	12.2459	9.8525	9K80D7W



LOW PWR

Modulation	Rules Part			
HPDQSK	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
473.0125	12.5	12.0032	9.7789	9K80D7W

Modulation	Rules Part			
HPDQSK	FCC Part 22.359(b)			
Channel Frequency	**Channel Spacing**	**-26 dB Point (kHz)**	**99% OCB**	**Emission Designator**
479.2875	12.5	12.0097	9.8313	9K80D7W

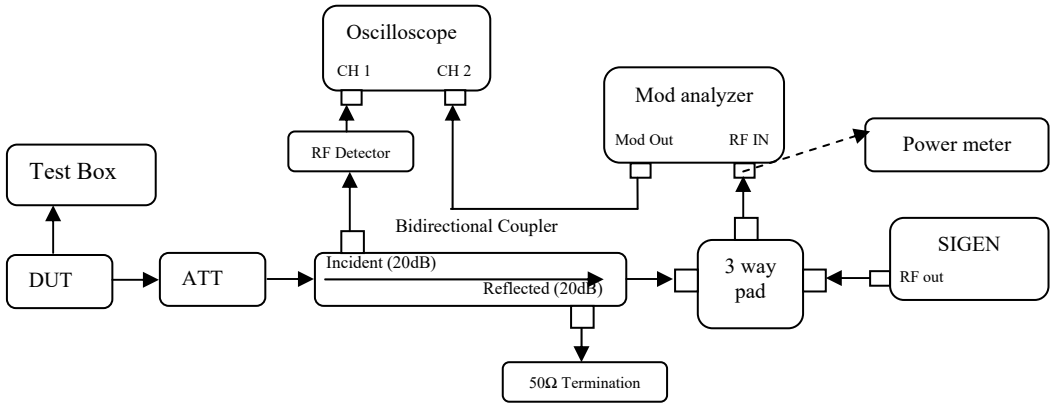


6.7.5. Test Limit

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

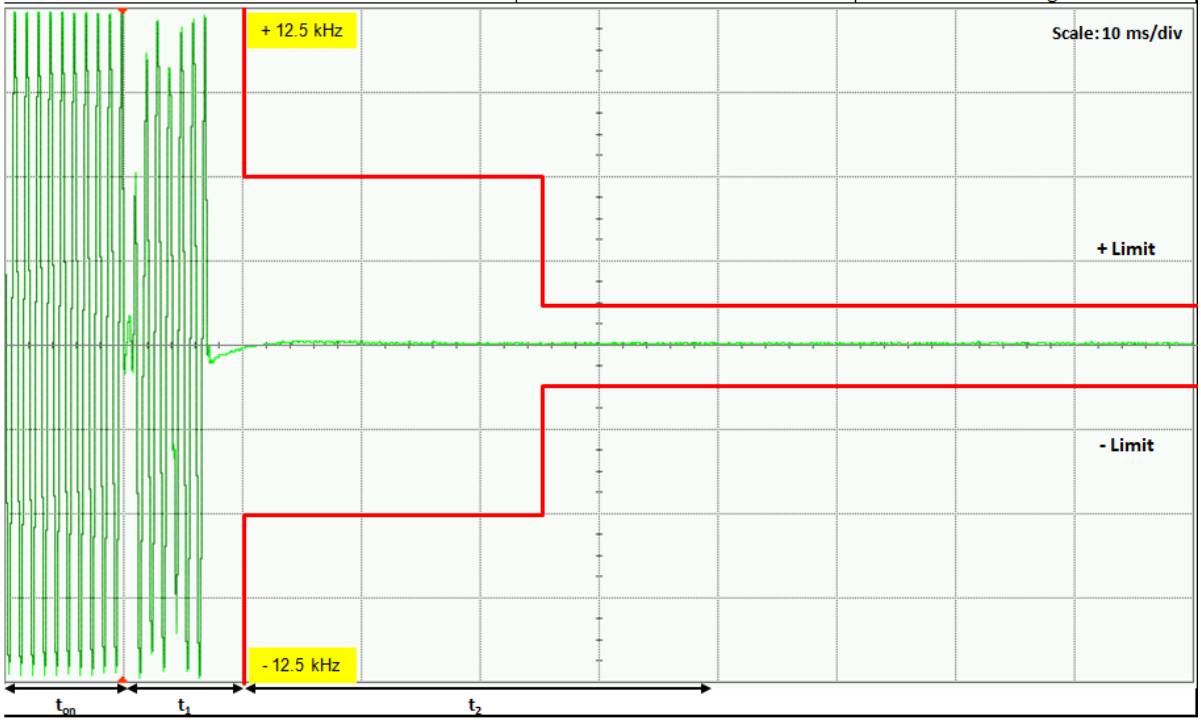


1) Connect the setup as figure above.
2) Path loss for the measurement included.
3) Set on Sigen with the assigned center frequency, internal 1 kHz FM tone.
   FM Deviation: Analog 25kHz Channel Spacing = 25 kHz
   Analog 12.5 kHz Channel Spacing = 12.5 kHz
   C4FM = 12.5 kHz
4) Turn on 50 kHz high pass 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
467.7750	12.5	Analog



Switch Off Condition t_3 t_{off}

Channel Frequency (MHz)	Channel Spacing (kHz)	Mode
467.7750	12.5	Analog