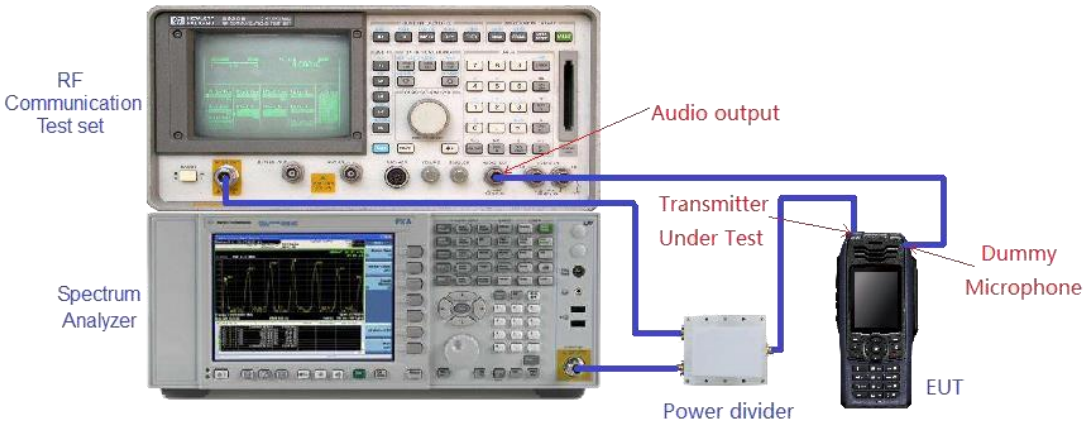
8.5 EMISSION MASK PLOT

The detailed procedure employed for Emission Mask measurements are specified as following:

-Connect the equipment as illustrated.

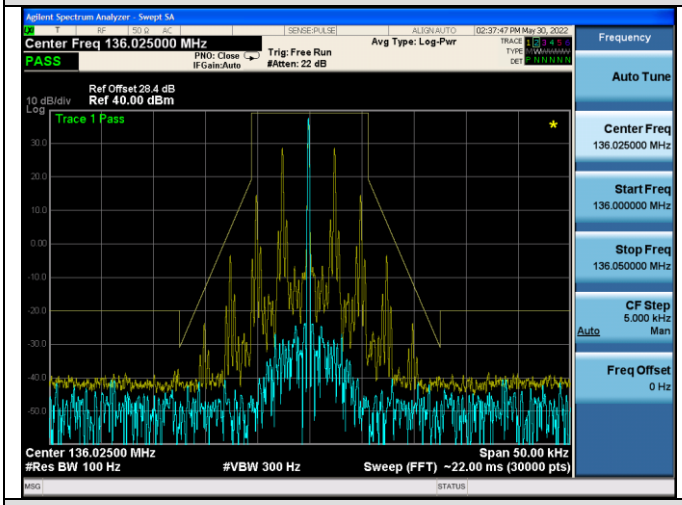
-Spectrum set as follow:

1. Centre frequency = fundamental frequency, Span=50kHz for 12.5kHz and 25kHz channel spacing, RBW=100Hz, VBW=300Hz for 12.5kHz, RBW=300Hz, VBW=1000Hz for 25kHz, Sweep = auto, Detector function = peak, Trace = max hold
2. Key the transmitter, and set the level of the unmodulated carrier to a fullscale reference line. This is the 0dB reference for the measurement.
3. Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation (Rated system deviation is 2.5 kHz for 12.5kHz channel spacing). The input level shall be established at the frequency of maximum response of the audio modulating circuit.
4. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.
5. Measure and record the results in the test report.

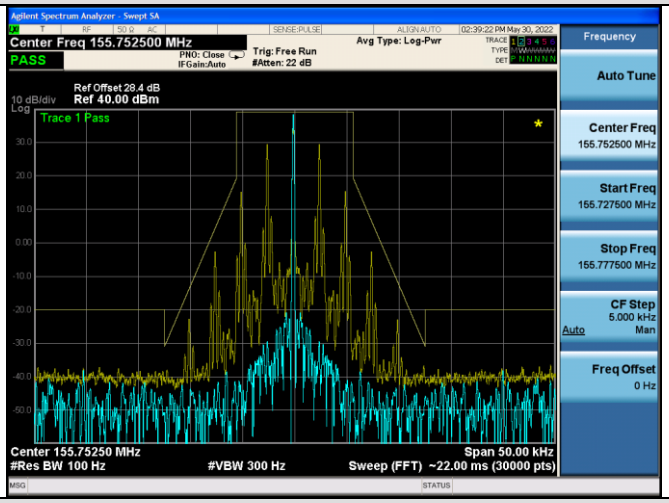


Test plot as follows:

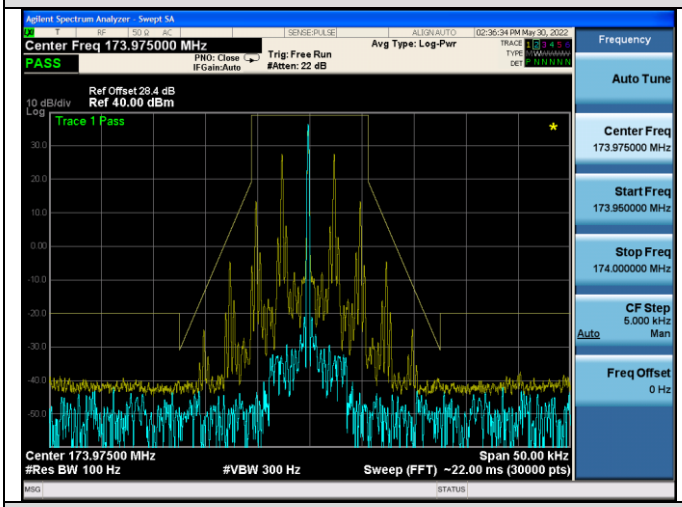
Emission Mask D@136.025MHz-7W-FM



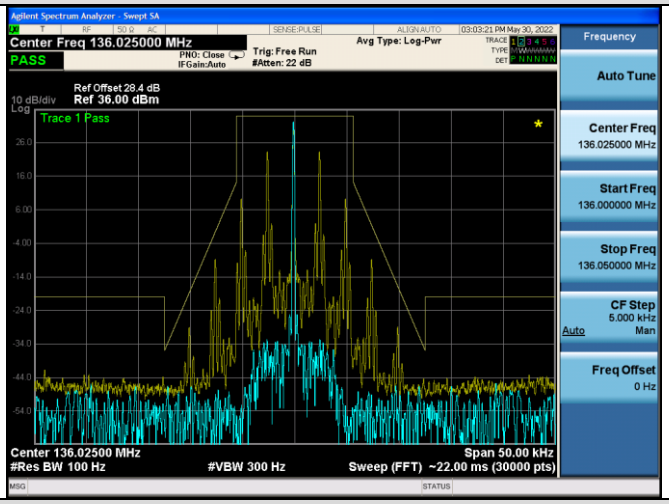
Emission Mask D@155.7525MHz--7W-FM



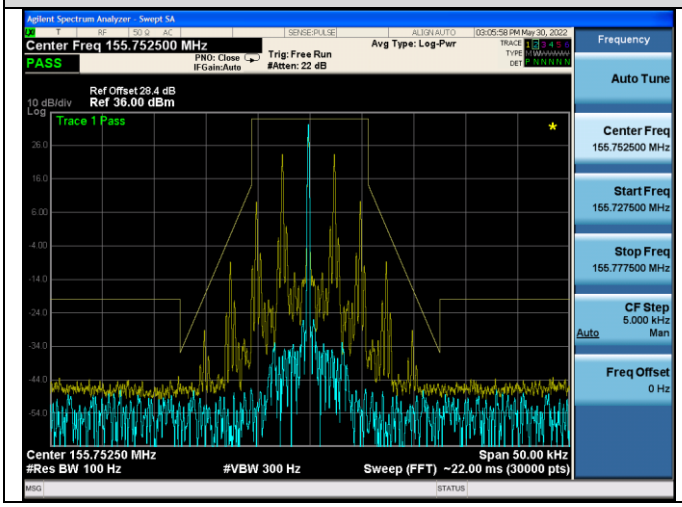
Emission Mask D@173.975MHz--7W-FM



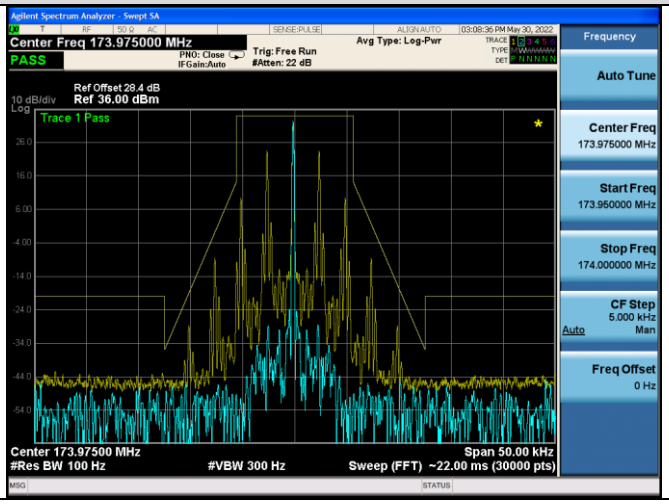
Emission Mask D@136.025MHz-2.5W-FM

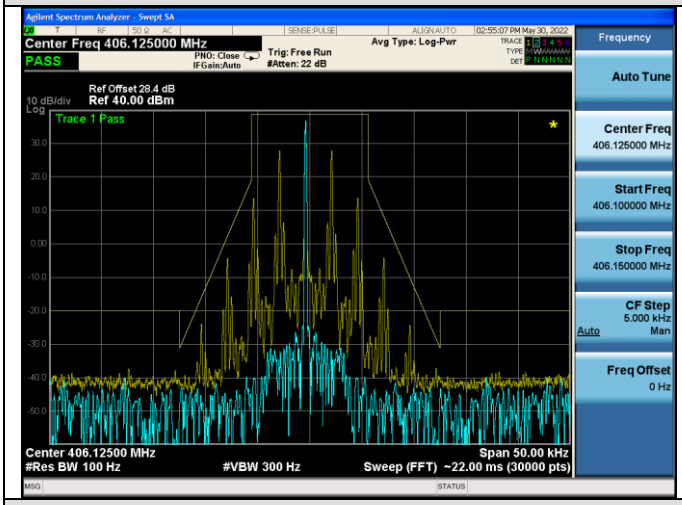
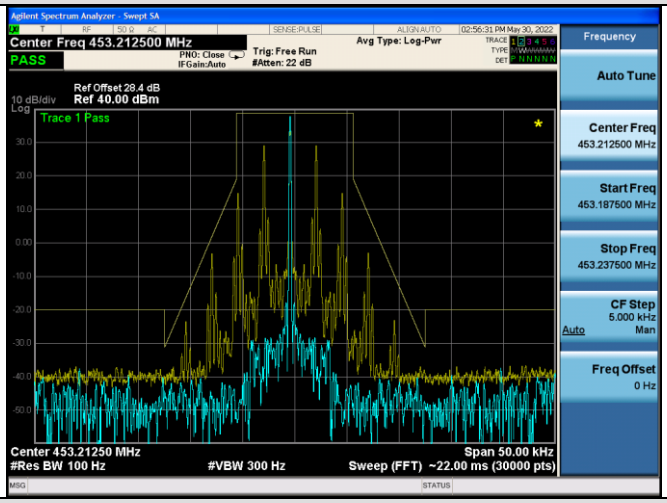
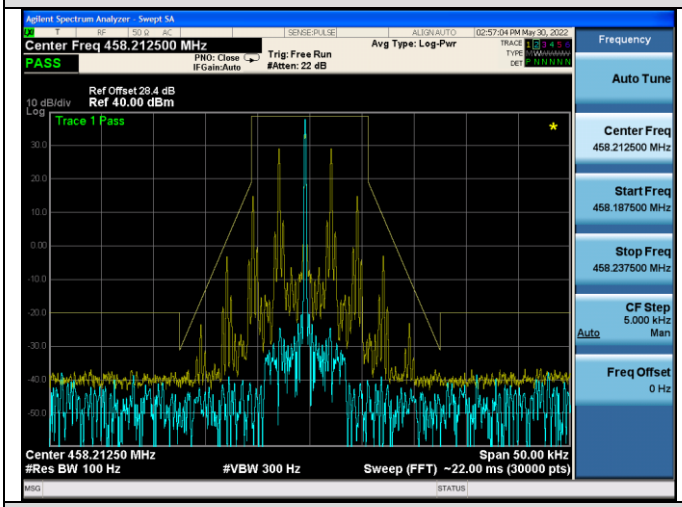
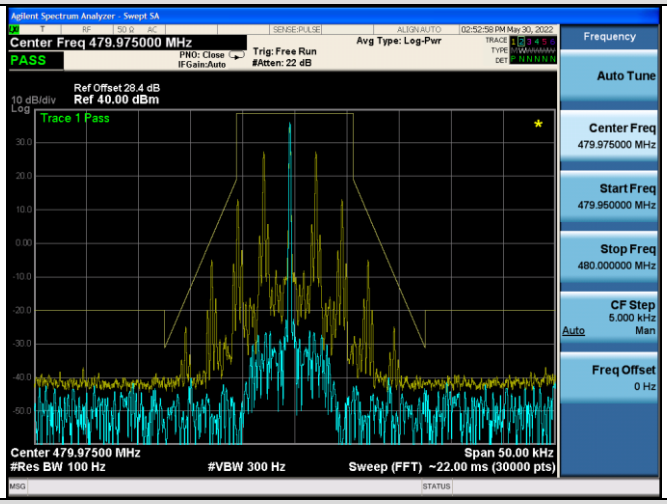
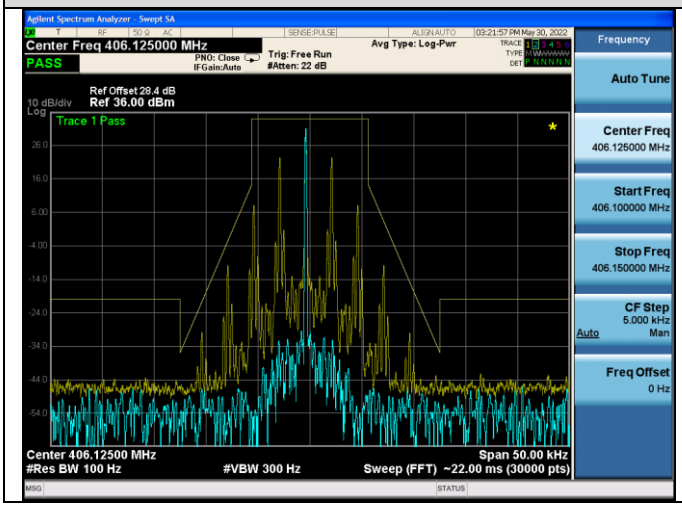
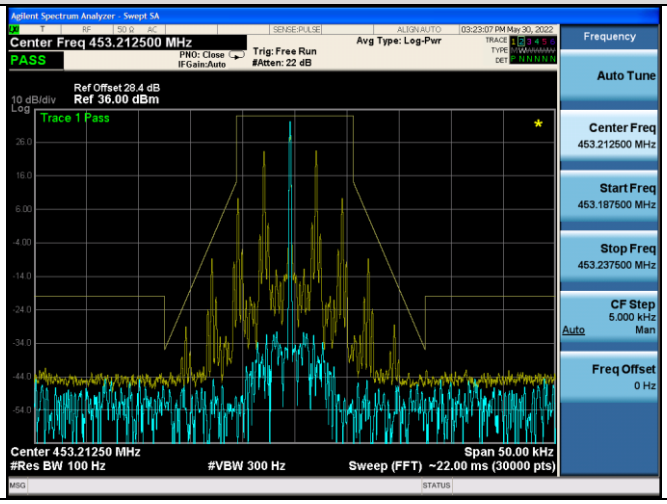


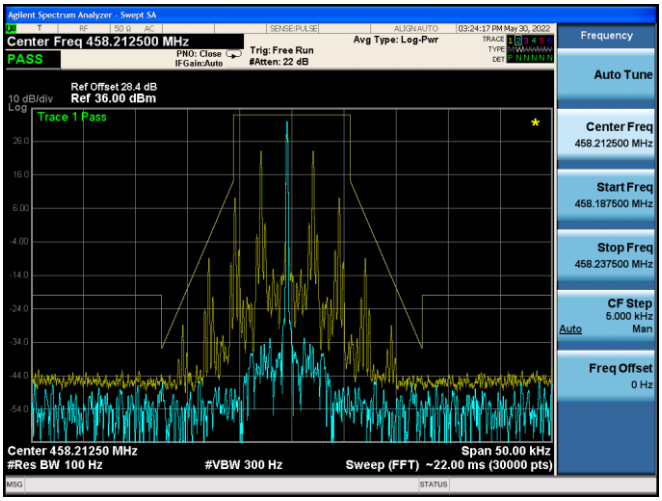
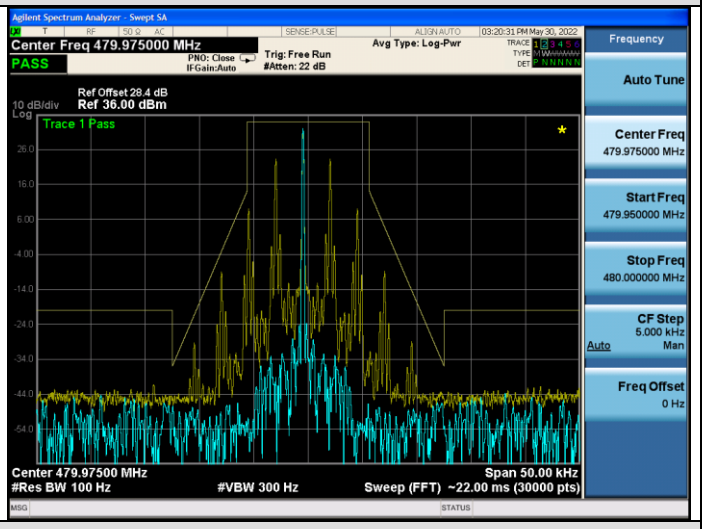
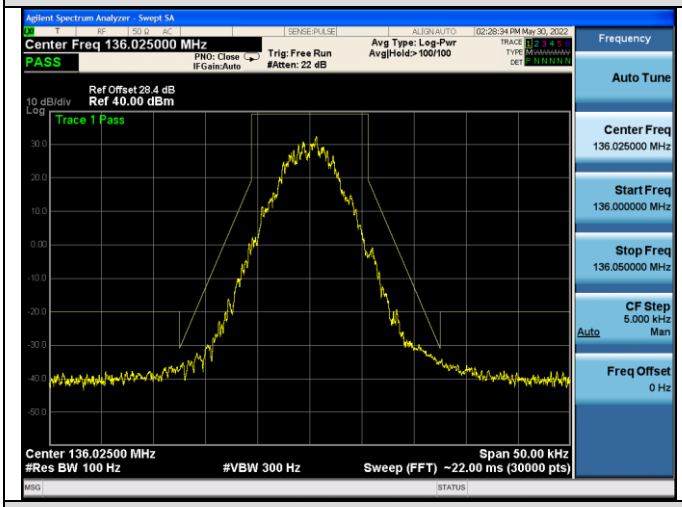
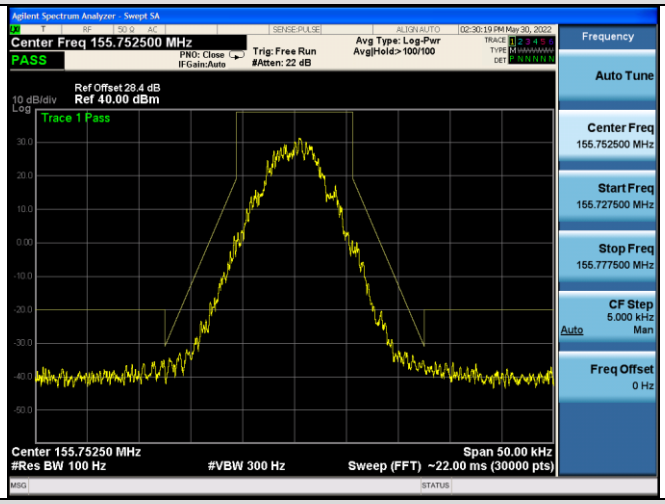
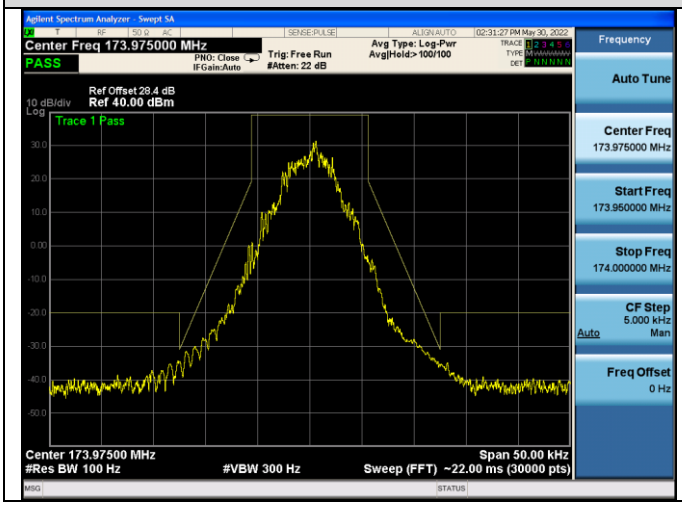
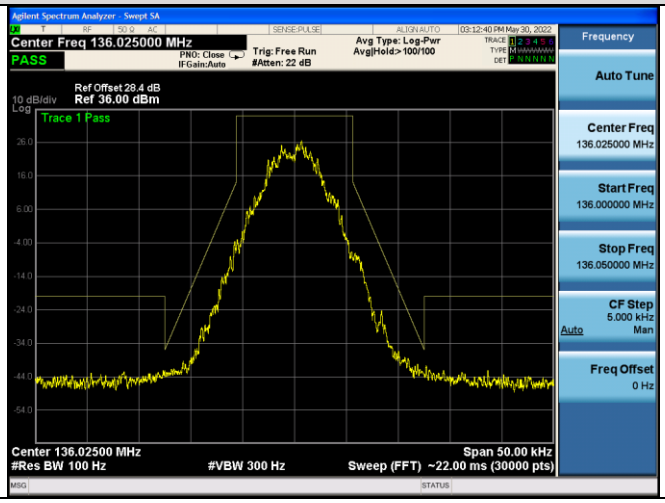
Emission Mask D@155.7525MHz-2.5W -FM

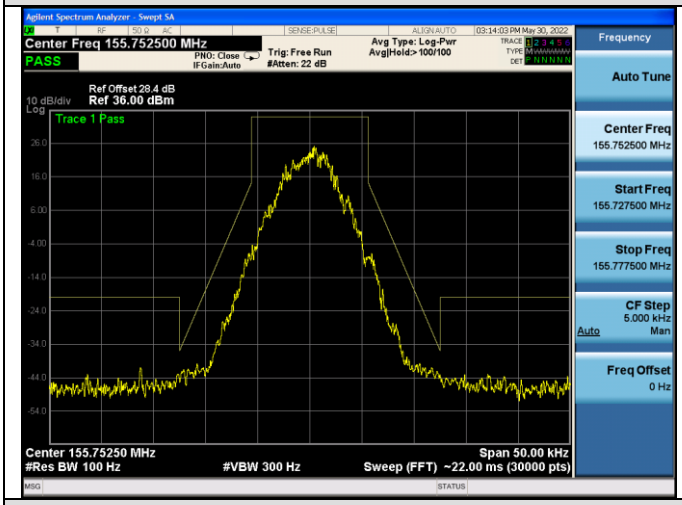
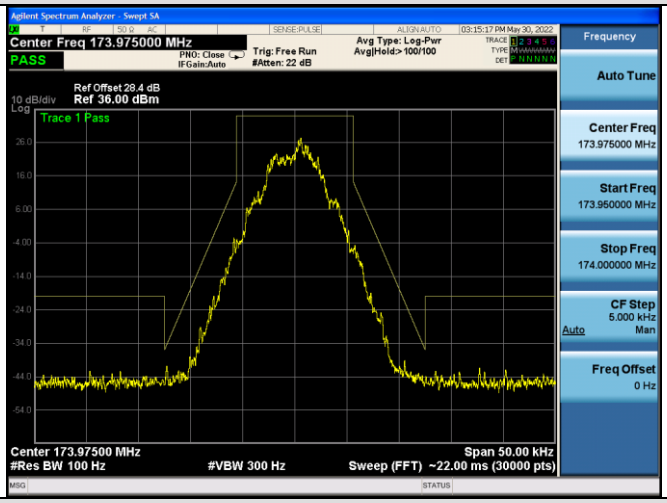
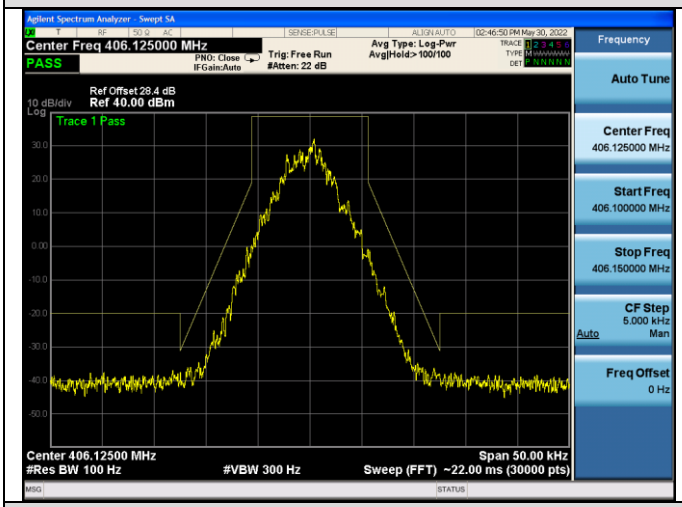
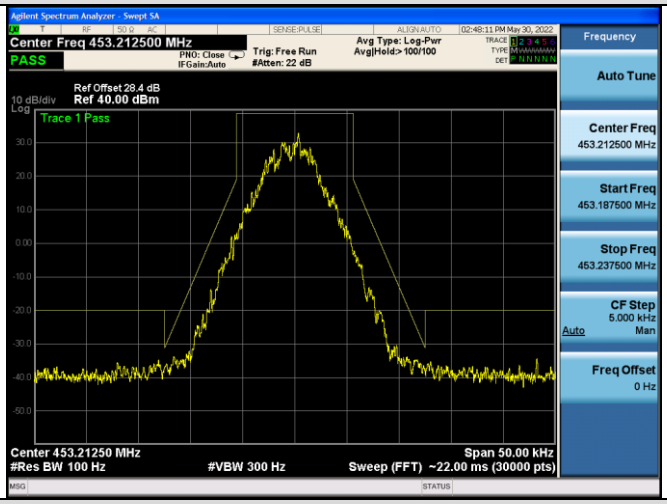
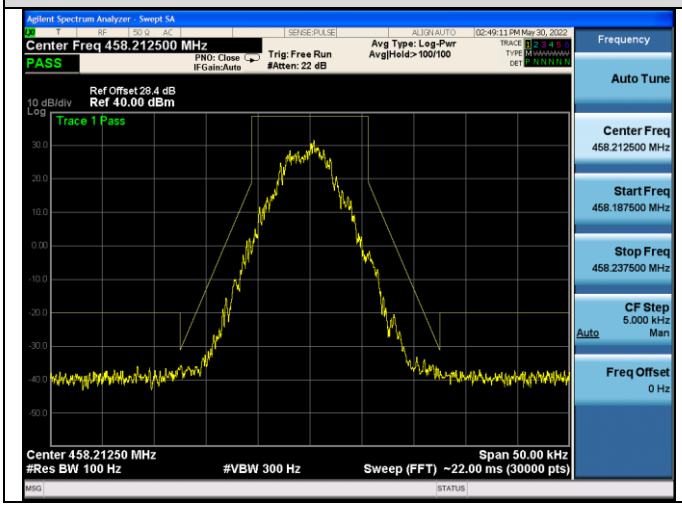
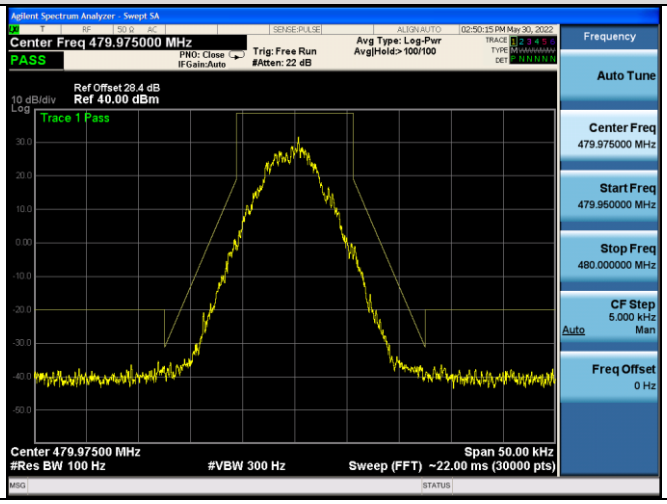


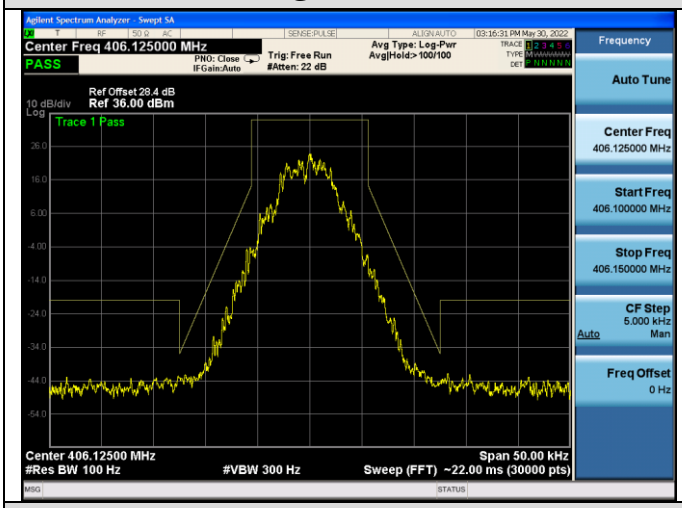
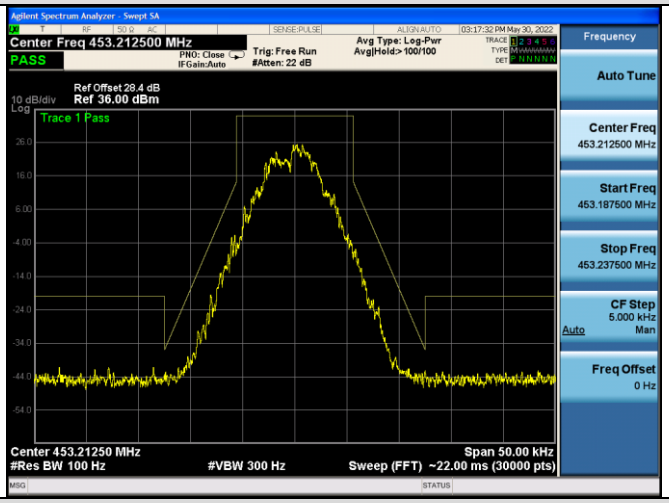
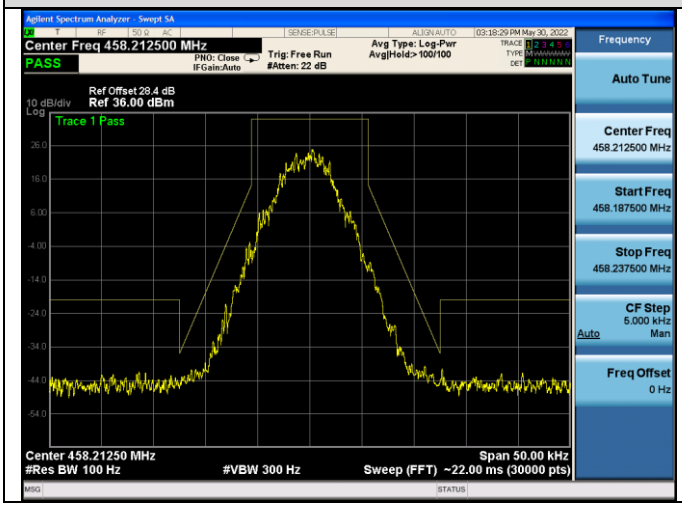
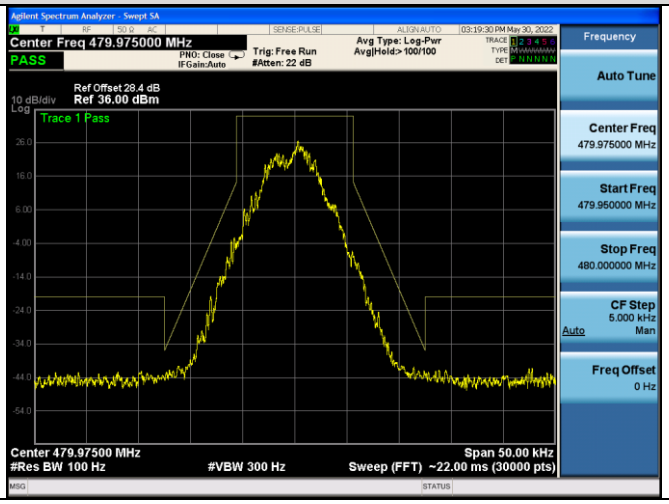
Emission Mask D@173.975MHz-2.5W-FM



Emission Mask D@406.125MHz-7W-FM	Emission Mask D@453.2125MHz-7W-FM
	
Emission Mask D@458.2125MHz-7W-FM	**Emission Mask D@479.975MHz-7W-FM**
	
Emission Mask D@406.125MHz-2.5W-FM	**Emission Mask D@453.2125MHz-2.5W-FM**
	

Emission Mask D@458.2125MHz-2.5W-FM	Emission Mask D@479.975MHz-2.5W-FM
	
Emission Mask D@136.025MHz-7W-4FSK	**Emission Mask D@155.7525MHz-7W-4FSK**
	
Emission Mask D@173.975MHz-7W-4FSK	**Emission Mask D@136.025MHz-2.5W-4FSK**
	

Emission Mask D@155.7525MHz-2.5W-4FSK	Emission Mask D@173.975MHz-2.5W-4FSK
	
Emission Mask D@406.125MHz-7W-4FSK	**Emission Mask D@453.2125MHz-7W-4FSK**
	
Emission Mask D@458.2125MHz-7W-4FSK	**Emission Mask D@479.975MHz-7W-4FSK**
	

Emission Mask D@406.125MHz-2.5W-4FSK	Emission Mask D@453.2125MHz-2.5W-4FSK
	
Emission Mask D@458.2125MHz-2.5W-4FSK	**Emission Mask D@479.975MHz-2.5W-4FSK**
	

9.MODULATION CHARACTERISTICS

9.1 PROVISIONS APPLICABLE

According to FCC§2.1047 and §90.207, for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

9.2 MEASUREMENT METHOD

9.2.1 Modulation Limit

(1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1kHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

(2). Repeat step 1 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

9.2.2 Audio Frequency Response

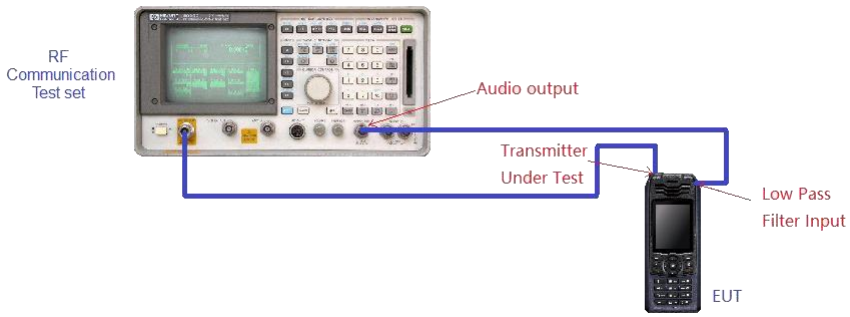
(1). Configure the EUT as shown in figure 1.

(2). Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).

(3). Vary the Audio frequency from 100 Hz to 10 kHz and record the frequency deviation.

(4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 kHz reference).

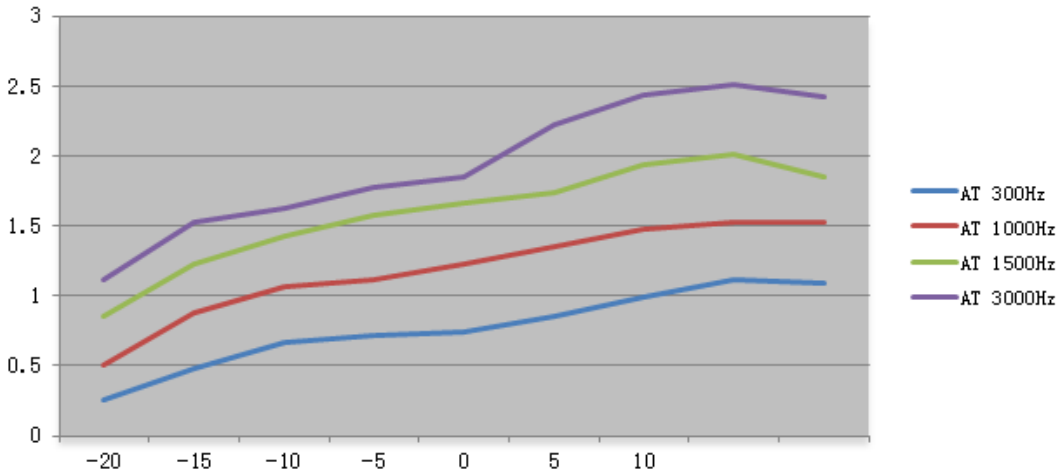
9.3 MEASUREMENT SETUP



9.4 MEASUREMENT RESULTS

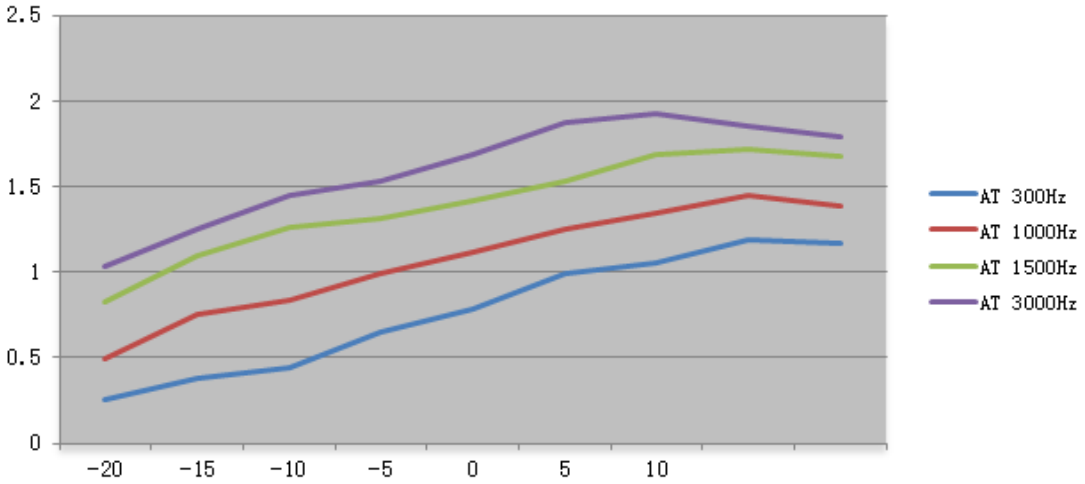
(A). MODULATION LIMIT:

12.5kHz, Analog modulation, Assigned Frequency:136.025MHz-High Power				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.25	0.51	0.85	1.12
-15	0.48	0.88	1.22	1.52
-10	0.66	1.06	1.43	1.63
-5	0.71	1.12	1.58	1.78
0	0.74	1.23	1.66	1.85
+5	0.85	1.35	1.74	2.22
+10	0.99	1.48	1.93	2.43
+15	1.12	1.53	2.01	2.51
+20	1.09	1.52	1.85	2.42



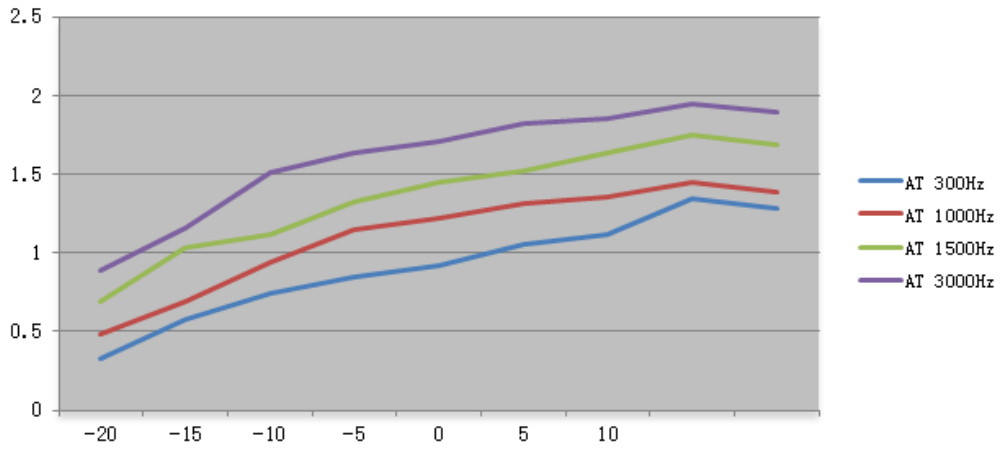
Note: All the modes had been tested, but only the worst data recorded in the report.

12.5kHz, Analog modulation, Assigned Frequency:136.025MHz-Low Power				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.25	0.49	0.82	1.03
-15	0.38	0.75	1.09	1.25
-10	0.44	0.83	1.26	1.45
-5	0.65	0.99	1.31	1.53
0	0.78	1.12	1.42	1.69
+5	0.99	1.25	1.53	1.87
+10	1.05	1.34	1.69	1.92
+15	1.19	1.45	1.72	1.85
+20	1.17	1.39	1.68	1.79



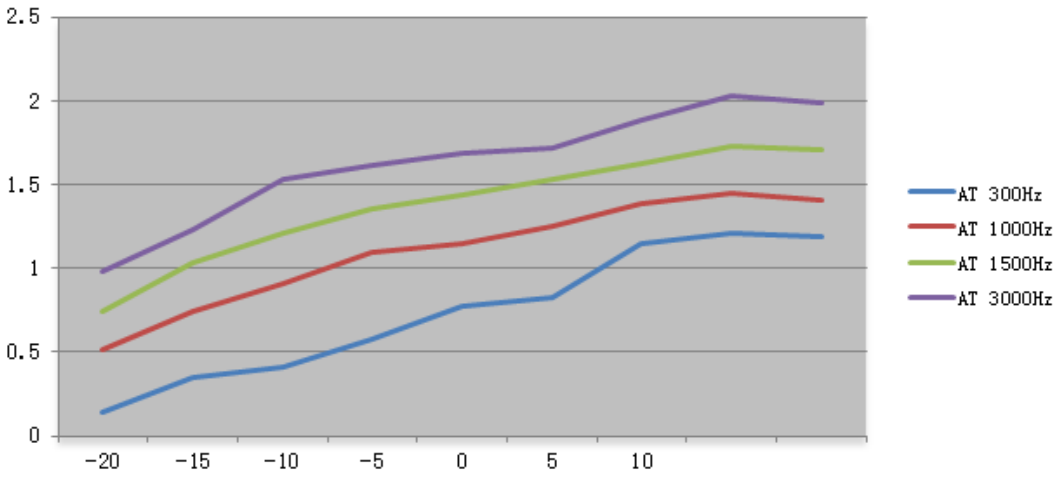
Note: All the modes had been tested, but only the worst data recorded in the report.

12.5kHz, Analog modulation, Assigned Frequency:406.125MHz- High Power				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.33	0.48	0.69	0.89
-15	0.58	0.69	1.03	1.16
-10	0.74	0.94	1.12	1.51
-5	0.85	1.15	1.32	1.63
0	0.92	1.22	1.45	1.71
+5	1.05	1.31	1.52	1.82
+10	1.12	1.35	1.63	1.85
+15	1.34	1.45	1.75	1.94
+20	1.28	1.39	1.69	1.89



Note: All the modes had been tested, but only the worst data recorded in the report.

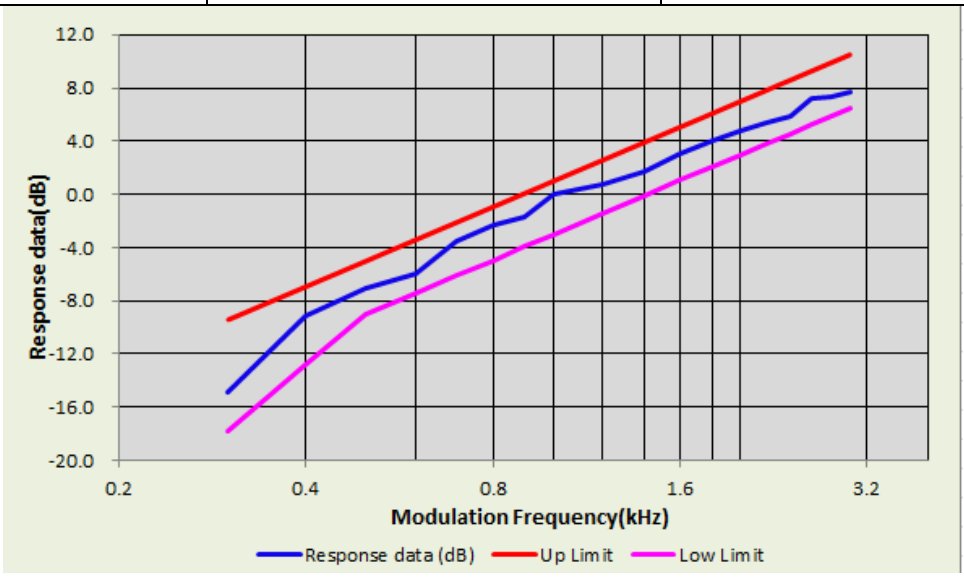
12.5kHz, Digital modulation, Assigned Frequency:406.125MHz-Low Power				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.14	0.51	0.74	0.98
-15	0.35	0.74	1.03	1.23
-10	0.41	0.91	1.21	1.53
-5	0.58	1.09	1.35	1.61
0	0.77	1.15	1.44	1.69
+5	0.82	1.25	1.53	1.72
+10	1.15	1.38	1.62	1.88
+15	1.21	1.45	1.73	2.03
+20	1.19	1.41	1.71	1.99



Note: All the modes had been tested, but only the worst data recorded in the report.

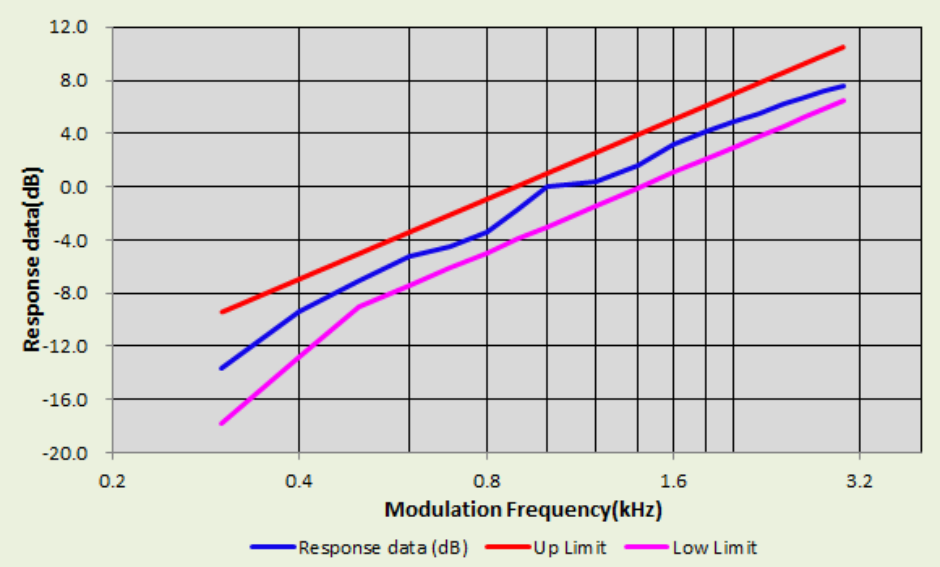
(B). AUDIO FREQUENCY RESPONSE:

12.5kHz, Analog modulation, Assigned Frequency:136.025MHz-High Power		
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.13	-14.87
400	0.25	-9.19
500	0.32	-7.04
600	0.36	-6.02
700	0.48	-3.52
800	0.55	-2.34
900	0.59	-1.73
1000	**0.72**	0.00
1200	0.79	0.81
1400	0.88	1.74
1600	1.03	3.11
1800	1.15	4.07
2000	1.25	4.79
2400	1.34	5.40
2500	1.41	5.84
2800	1.66	7.26
3000	1.67	7.31



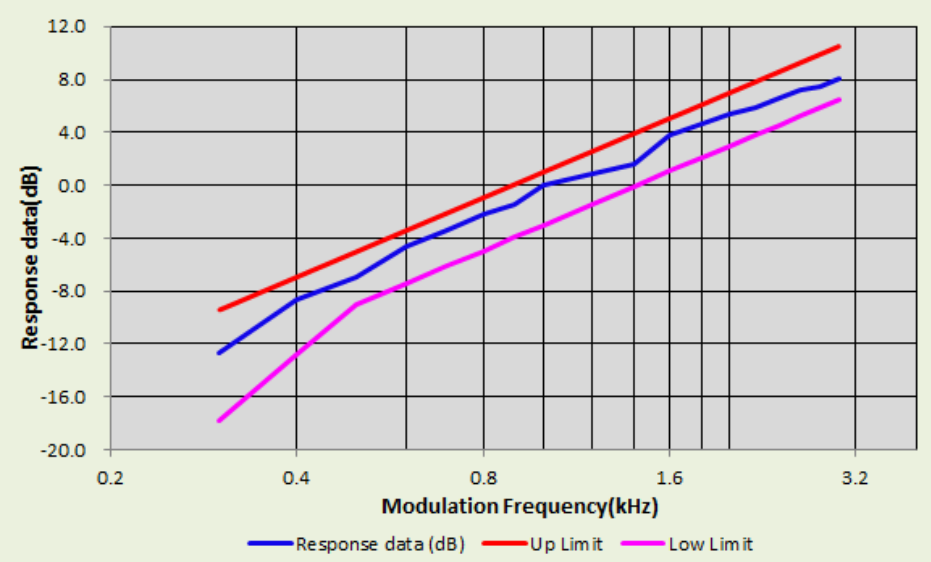
Note: All the modes had been tested, but only the worst data recorded in the report.

12.5kHz, Analog modulation, Assigned Frequency:136.025MHz-Low Power		
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.16	-13.65
400	0.26	-9.43
500	0.34	-7.10
600	0.42	-5.26
700	0.46	-4.47
800	0.52	-3.41
900	0.63	-1.74
1000	**0.77**	0.00
1200	0.81	0.44
1400	0.92	1.55
1600	1.11	3.18
1800	1.25	4.21
2000	1.36	4.94
2400	1.46	5.56
2500	1.58	6.24
2800	1.66	6.67
3000	1.78	7.28



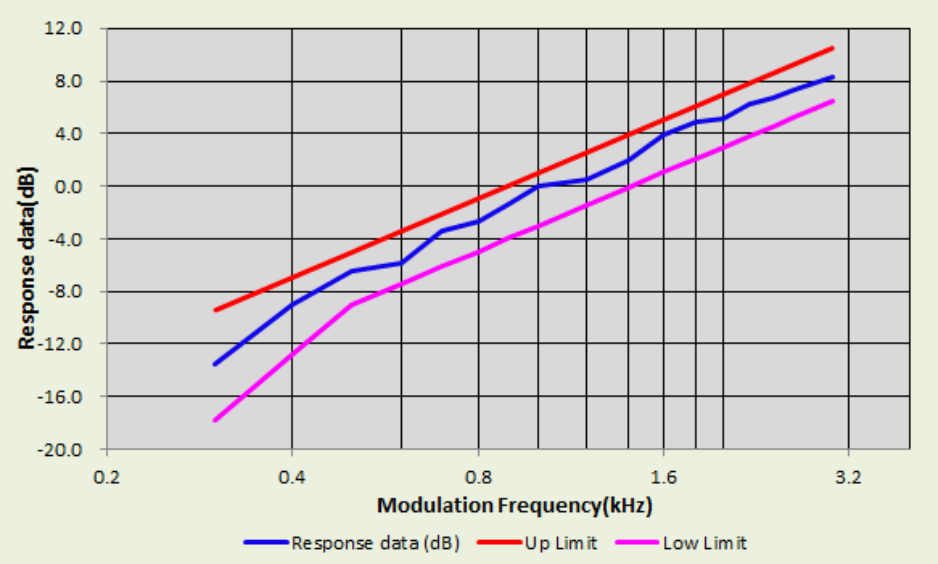
Note: All the modes had been tested, but only the worst data recorded in the report.

12.5kHz, Analog modulation, Assigned Frequency:406.125MHz-High Power		
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.18	-12.74
400	0.29	-8.59
500	0.35	-6.96
600	0.46	-4.59
700	0.53	-3.36
800	0.61	-2.14
900	0.66	-1.45
1000	**0.78**	0.00
1200	0.86	0.85
1400	0.94	1.62
1600	1.21	3.81
1800	1.33	4.64
2000	1.46	5.45
2400	1.53	5.85
2500	1.68	6.66
2800	1.78	7.17
3000	1.85	7.50



Note: All the modes had been tested, but only the worst data recorded in the report.

12.5kHz, Analog modulation, Assigned Frequency:406.125MHz-Low Power		
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.15	-13.50
400	0.25	-9.07
500	0.34	-6.40
600	0.36	-5.90
700	0.48	-3.40
800	0.52	-2.71
900	0.61	-1.32
1000	**0.71**	0.00
1200	0.75	0.48
1400	0.89	1.96
1600	1.11	3.88
1800	1.25	4.91
2000	1.29	5.19
2400	1.45	6.20
2500	1.53	6.67
2800	1.66	7.38
3000	1.74	7.79



Note: All the modes had been tested, but only the worst data recorded in the report.

10. MAXIMUMN TRANSMITTER POWER

10.1 PROVISIONS APPLICABLE

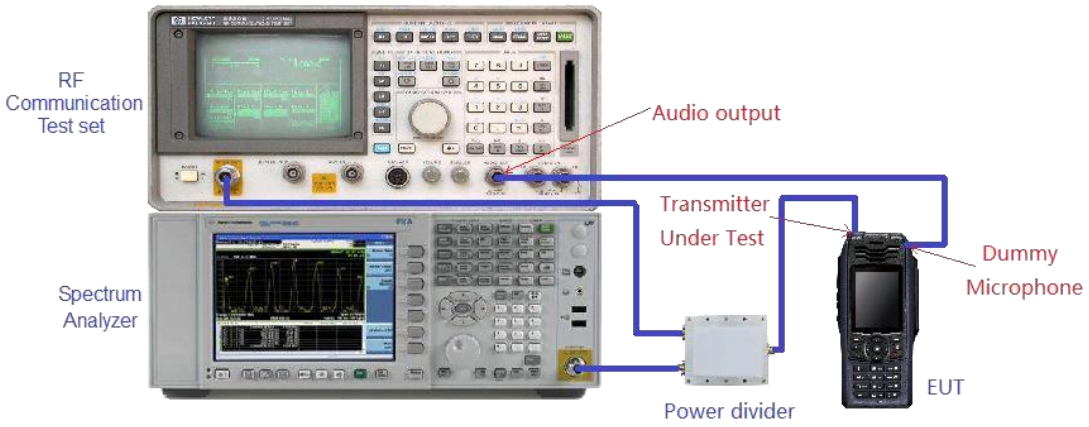
Per FCC §2.1046. § 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

10.2 MEASUREMENT METHOD

The RF output of Two-way Radio was conducted to a spectrum analyzer through an appropriate attenuator.
In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power for each degree interval. The "Read Value" is the spectrum reading of maximum power value.
The substitution antenna is substituted for DUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum.
So, the Measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.
EIRP = "Read Value" + Measured substitution value + 2.15.

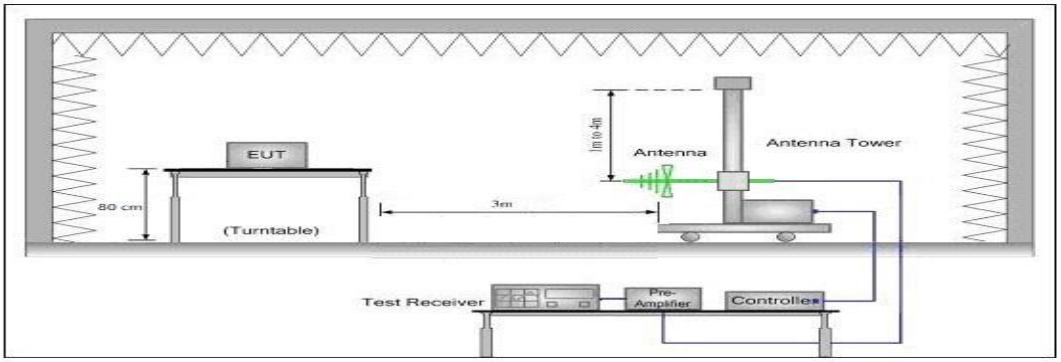
10.3 MEASUREMENT METHOD

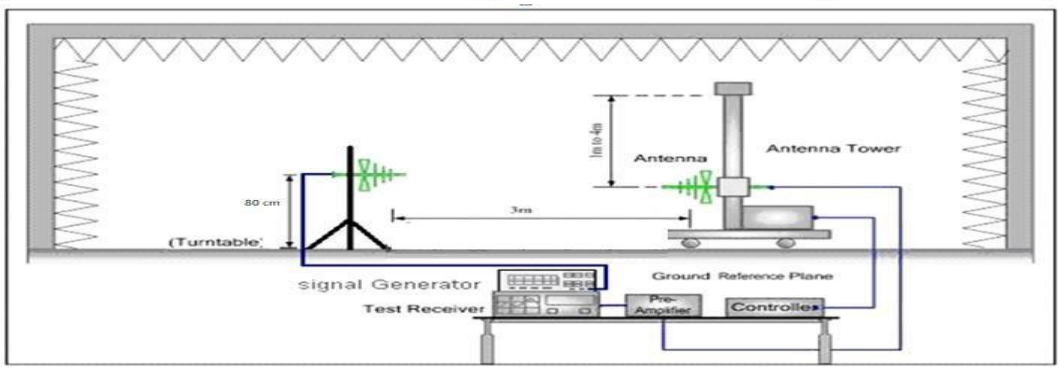
CONDUCTED OUTPUT POWER:



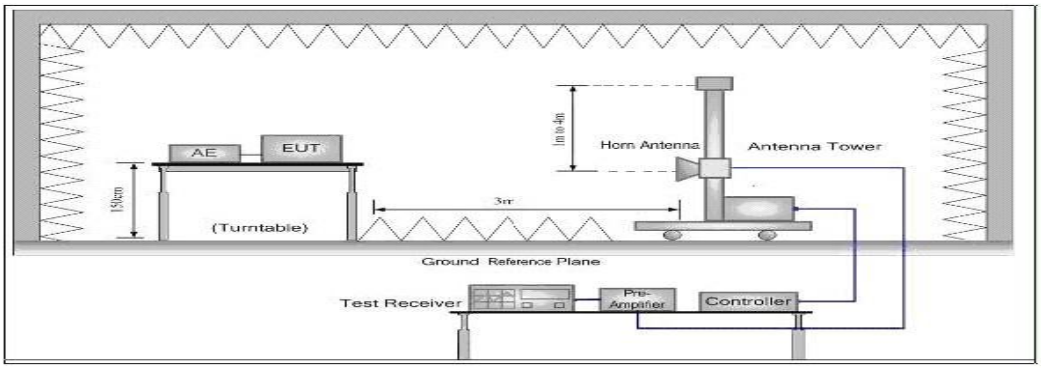
EFFECTIVE RADIATED POWER:

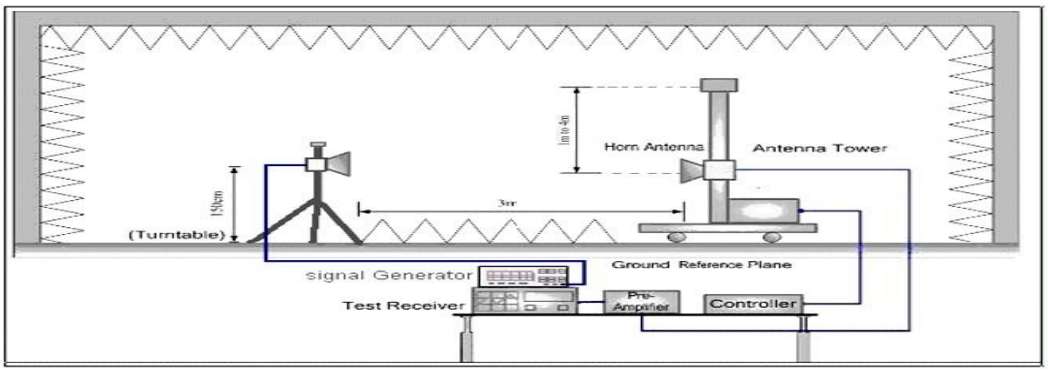
Radiated Below1GHz





Radiated Above 1 GHz





10.4 MEASUREMENT RESULTS

Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 38.45dBm(7W)
Analog +Vioce	12.5 kHz	Bottom(406.125MHz)	37.95
		Middle(453.2125MHz)	**38.27**
		Middle(458.2125MHz)	37.98
		Top (479.975MHz)	37.90

Radiated Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 38.45dBm(7W)
Analog +Vioce	12.5 kHz	Bottom(406.125MHz)	37.88
		Middle(453.2125MHz)	37.89
		Middle(458.2125MHz)	37.85
		Top (479.975MHz)	37.83

Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 33.98dBm(2.5W)
Analog +Vioce	12.5 kHz	Bottom(406.125MHz)	32.54
		Middle(453.2125MHz)	**32.71**
		Middle(458.2125MHz)	32.48
		Top (479.975MHz)	32.41

Radiated Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 33.98dBm(2.5W)
Analog +Vioce	12.5 kHz	Bottom(406.125MHz)	32.39
		Middle(453.2125MHz)	32.35
		Middle(458.2125MHz)	32.40
		Top (479.975MHz)	32.33

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Digital +Vioce	12.5 kHz	Bottom(406.125MHz)	38.20
		Middle(453.2125MHz)	**38.41**
		Middle(458.2125MHz)	38.20
		Top (479.975MHz)	38.23
Digital+ Data	12.5 kHz	Bottom(406.125MHz)	38.20
		Middle(453.2125MHz)	38.19
		Middle(458.2125MHz)	38.18
		Top (479.975MHz)	38.19

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Digital +Vioce	12.5 kHz	Bottom(406.125MHz)	38.15
		Middle(453.2125MHz)	38.11
		Middle(458.2125MHz)	38.09
		Top (479.975MHz)	38.12
Digital+ Data	12.5 kHz	Bottom(406.125MHz)	38.00
		Middle(453.2125MHz)	37.96
		Middle(458.2125MHz)	37.89
		Top (479.975MHz)	37.91

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Digital +Vioce	12.5 kHz	Bottom(406.125MHz)	33.62
		Middle(453.2125MHz)	**33.96**
		Middle(458.2125MHz)	33.58
		Top (479.975MHz)	33.48
Digital+ Data	12.5 kHz	Bottom(406.125MHz)	33.41
		Middle(453.2125MHz)	33.55
		Middle(458.2125MHz)	33.43
		Top (479.975MHz)	33.34

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Digital +Vioce	12.5 kHz	Bottom(406.125MHz)	33.30
		Middle(453.2125MHz)	33.29
		Middle(458.2125MHz)	33.16
		Top (479.975MHz)	33.25
Digital+ Data	12.5 kHz	Bottom(406.125MHz)	33.12
		Middle(453.2125MHz)	33.15
		Middle(458.2125MHz)	33.20
		Top (479.975MHz)	33.18

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Analog +Vioce	12.5 kHz	Bottom(136.025MHz)	37.78
		Middle(155.7525MHz)	**38.40**
		Top (173.975MHz)	37.76

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Analog +Vioce	12.5 kHz	Bottom(136.025MHz)	37.69
		Middle(155.7525MHz)	37.45
		Top (173.975MHz)	37.52

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Analog +Vioce	12.5 kHz	Bottom(136.025MHz)	32.67
		Middle(155.7525MHz)	32.64
		Top (173.975MHz)	**32.87**

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Analog +Vioce	12.5 kHz	Bottom(136.025MHz)	32.49
		Middle(155.7525MHz)	32.53
		Top (173.975MHz)	32.57

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Digital +Vioce	12.5 kHz	Bottom(136.025MHz)	38.17
		Middle(155.7525MHz)	**38.38**
		Top (173.975MHz)	38.27
Digital+ Data	12.5 kHz	Bottom(136.025MHz)	38.19
		Middle(155.7525MHz)	38.23
		Top (173.975MHz)	38.14

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 38.45dBm(7W)
Digital +Vioce	12.5 kHz	Bottom(136.025MHz)	38.11
		Middle(155.7525MHz)	38.09
		Top (173.975MHz)	37.98
Digital+ Data	12.5 kHz	Bottom(136.025MHz)	37.85
		Middle(155.7525MHz)	37.91
		Top (173.975MHz)	37.96

Conducted Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Digital +Vioce	12.5 kHz	Bottom(136.025MHz)	33.48
		Middle(155.7525MHz)	33.53
		Top (173.975MHz)	**33.77**
Digital+ Data	12.5 kHz	Bottom(136.025MHz)	33.39
		Middle(155.7525MHz)	33.41
		Top (173.975MHz)	33.42

Radiated Power Measurement Results			
Mode	**Channel Separation**	**Test Channel**	**Measurement Result (dBm)**
			For 33.98dBm(2.5W)
Digital +Vioce	12.5 kHz	Bottom(136.025MHz)	33.25
		Middle(155.7525MHz)	33.30
		Top (173.975MHz)	33.36
Digital+ Data	12.5 kHz	Bottom(136.025MHz)	33.19
		Middle(155.7525MHz)	33.28
		Top (173.975MHz)	33.17

Note: Calculation Formula: CP = R + A + L
(1) CP: The final Conducted Power
(2) R : The reading value from spectrum analyzer
(3) A : The attenuation value of the used attenuator
(4) L : The loss of all connection cables
(5) Measurement Result=Peak Power(Max)
(6) All polarities of radiated power have been evaluated, and only the worst vertical polarity data is recorded in the report

11. SPURIOUS EMISSION ON ANTENNA PORT

11.1 PROVISIONS APPLICABLE

Please refer to FCC 47 CFR 2.1051, 2.1057 & 90.210 for specification details.
Emissions shall be attenuated below the mean output power of the transmitter as follows:

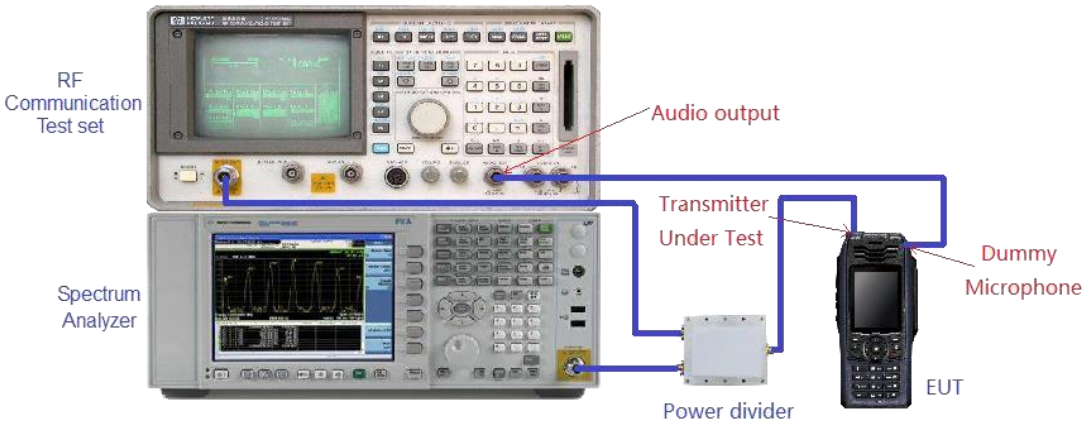
FCC Rules	Attenuation Limit (dBc)
§ 90.210	At least 50 + 10 log (P) dB

50 +10 log (Pwatts)
Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)
EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is P(dBm)
Limit (dBm) = P(dBm)-50-10 log (Pwatts) = -20dBm

11.2 MEASUREMENT METHOD

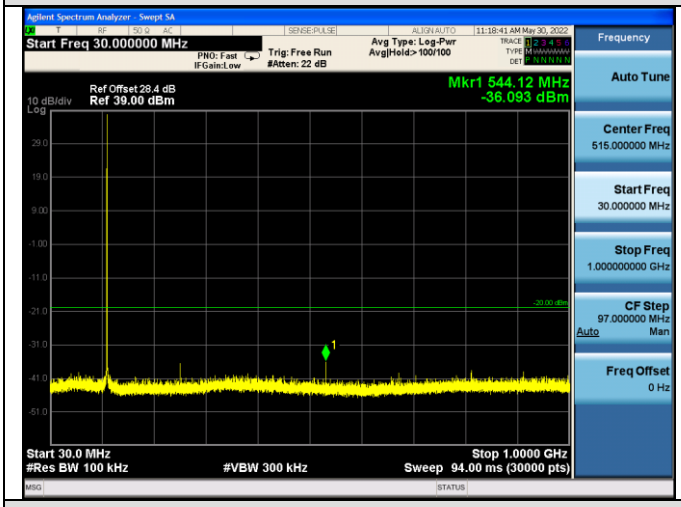
1. The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th . Harmonic for the lower and the highest frequency range.
3. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz,while set RBW=1MHz.VBW=3MHz from the 1GHz to 10th Harmonic.
4. The audio input was set the unmodulated carrier, the resulting picture is print out for each channel separation.

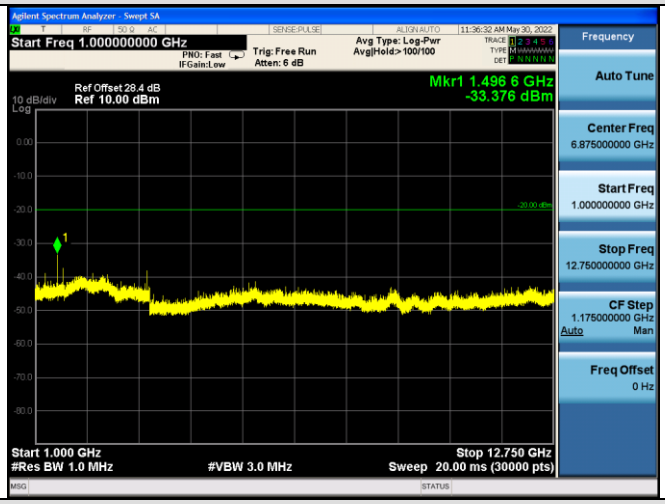
11.3 MEASUREMENT SETUP



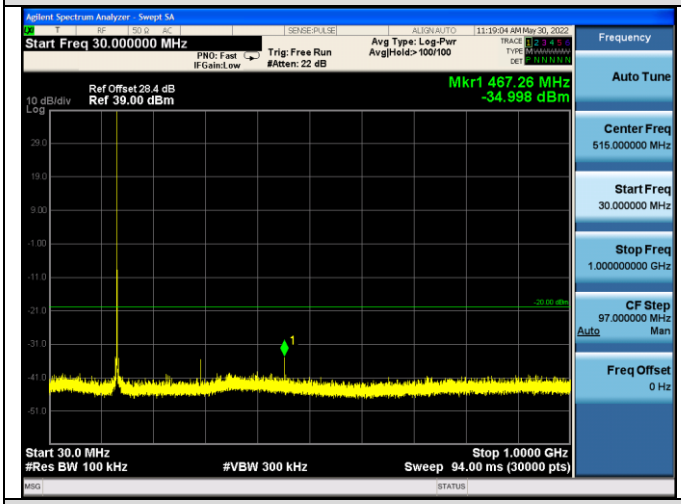
11.4 MEASUREMENT RESULTS

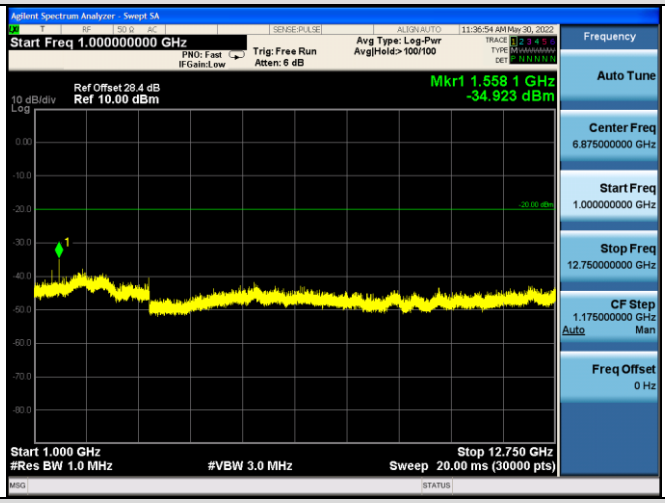
12.5kHz, Analog modulation, Assigned Frequency:136.025MHz, High Power



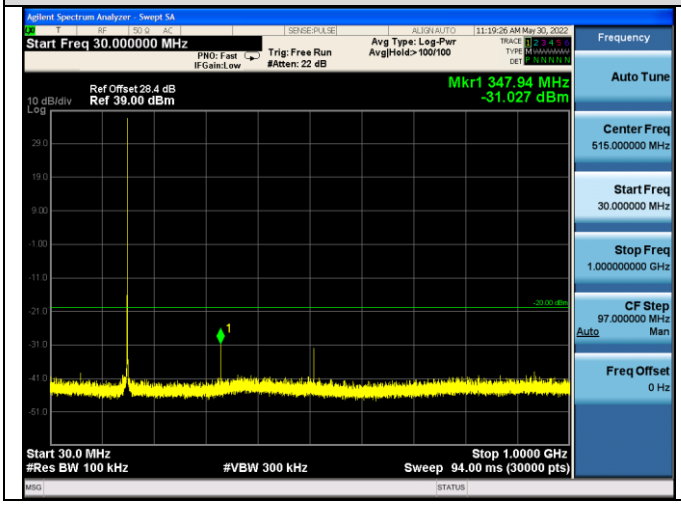


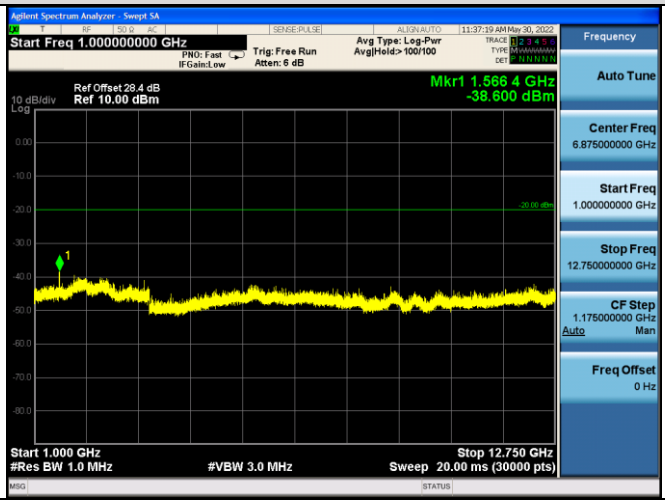
12.5kHz, Analog modulation, Assigned Frequency:155.7525MHz, High Power



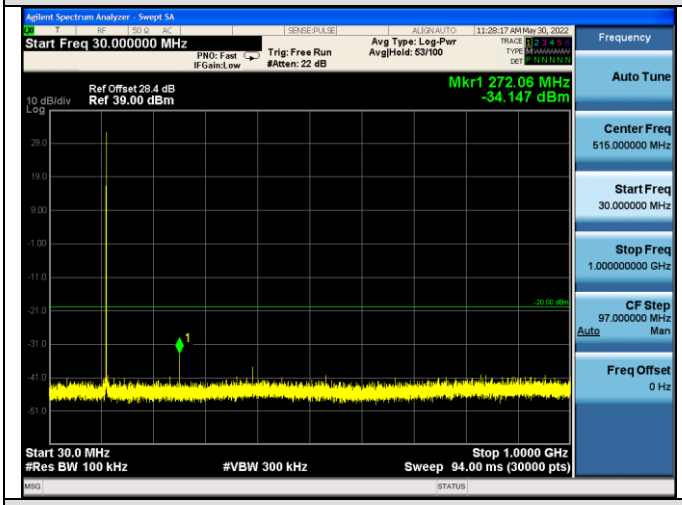


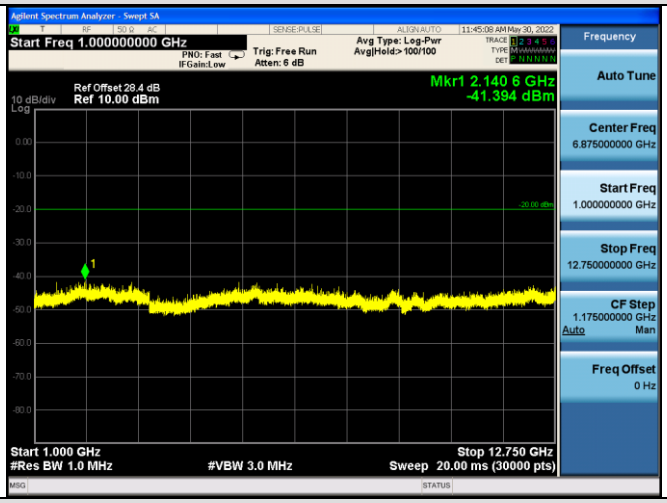
12.5kHz, Analog modulation, Assigned Frequency:173.975MHz, High Power



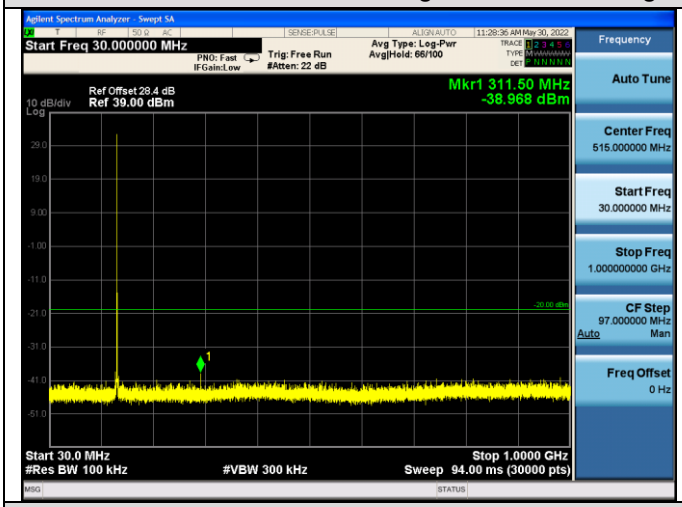


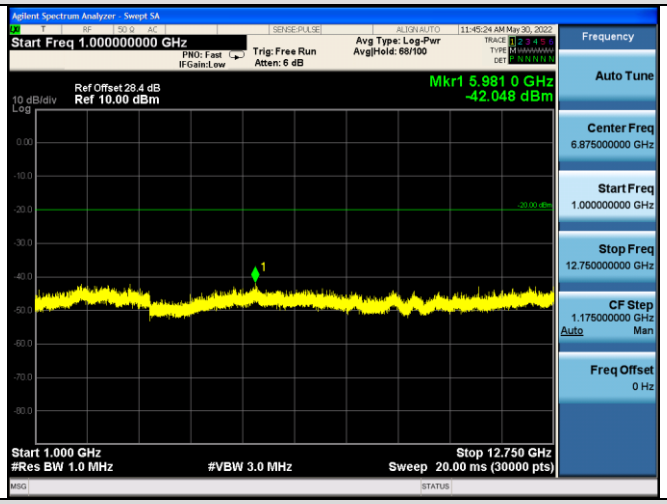
12.5kHz, Analog modulation, Assigned Frequency:136.025MHz, Low Power



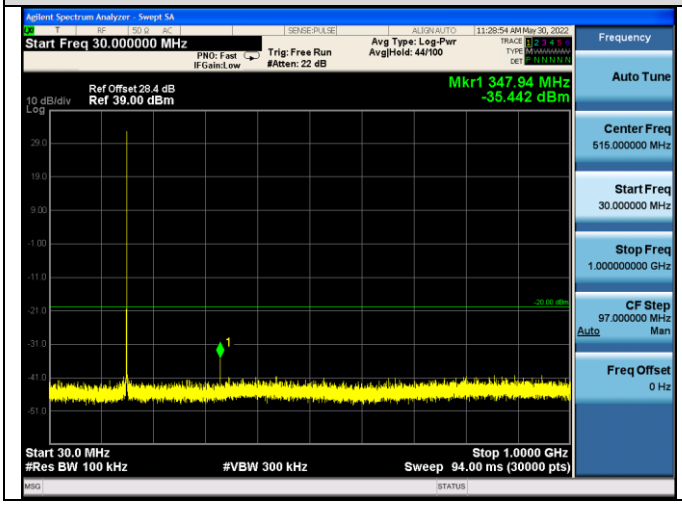


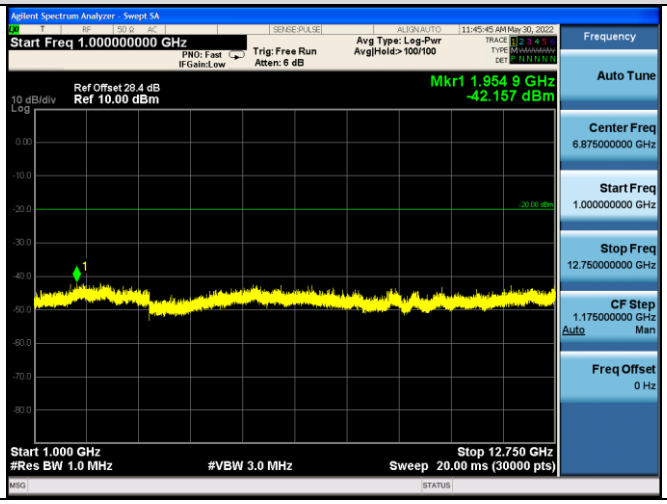
12.5kHz, Analog modulation, Assigned Frequency:155.7525MHz, Low Power



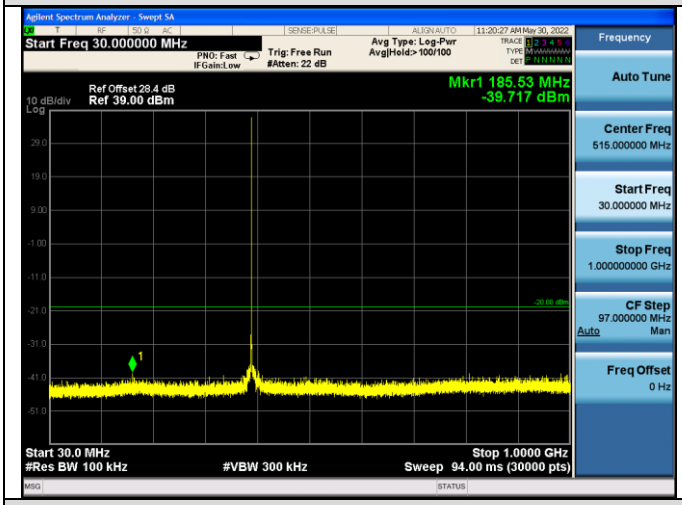


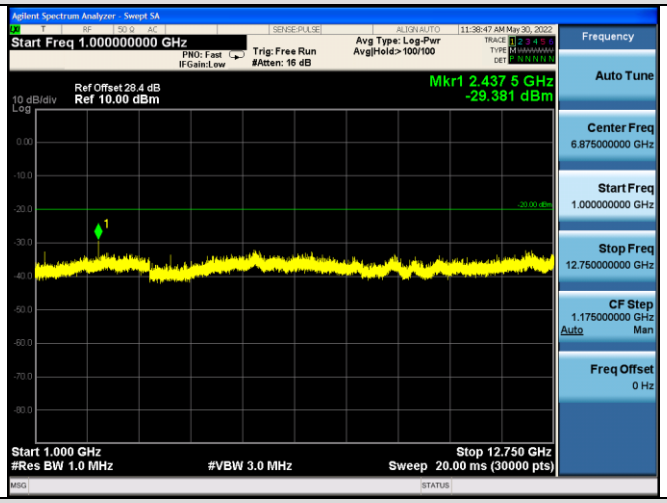
12.5kHz, Analog modulation, Assigned Frequency:173.975MHz, Low Power



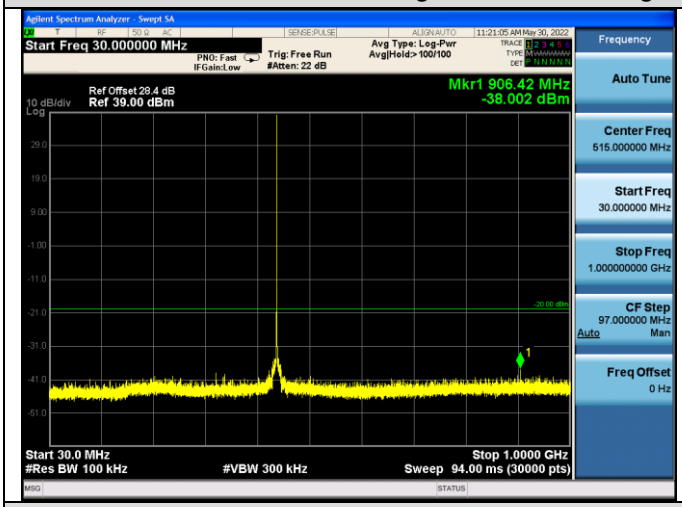


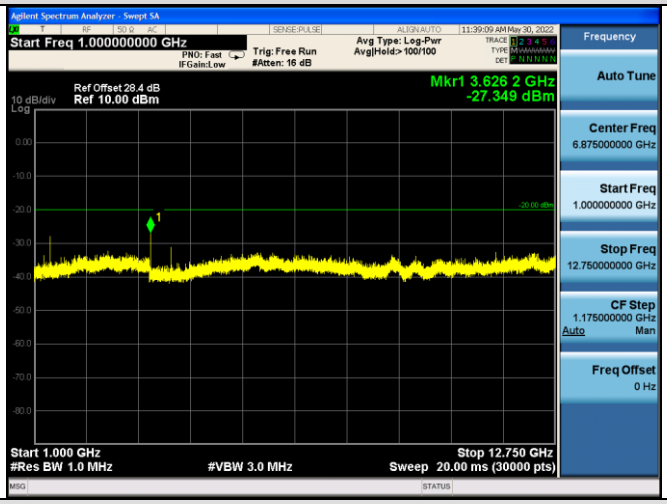
12.5kHz, Analog modulation, Assigned Frequency:406.125MHz, High Power





12.5kHz, Analog modulation, Assigned Frequency:453.2125MHz, High Power





12.5kHz, Analog modulation, Assigned Frequency:458.2125MHz, High Power