



FCC PART 22, 74 and 80

## TEST REPORT

For

### Hytera Communications Corporation Limited

Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen,  
518057 China

**FCC ID: YAMMD78XGVHF**

<b>Report Type:</b> Class II Permissive Change	<b>Product Type:</b> Digital Mobile Radio
<b>Report Number:</b> RDG170907004-00A1	
<b>Report Date:</b> 2017-09-20	
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**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Hytera Communications Corporation Limited's* product, model number: *MD782G VHF* (FCC ID: *YAMMD78XGVHF*) in this report is a *Digital Mobile Radio* which was measured approximately: 140 mm (L) x 65 mm (W) x 40 mm (H), rated input voltage: DC 13.6V.

*Notes: This series products model: MD782G VHF and MD782 VHF are electrically identical. Model MD782G VHF was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the applicant.*

*\* All measurement and test data in this report was gathered from production sample serial number: 170907004 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2017-09-07.*

### Objective

This test report is prepared on behalf of *Hytera Communications Corporation Limited* in accordance with Part 2, and Part 22,74,80 of the Federal Communication Commissions rules.

This is a CIIPC application of the device; the differences between the original device and the current one are as follows:

- (1) Adding standars FCC Part 22, 74, 80.
- (2) Charging the model number to MD782G VHF, MD782 VHF.

### Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 22 – Public Mobile Service

Part 74 – Experimental Radio, Auxiliary, Special Broadcast and other Program Distributonal Service

Part 80 – Stantions in the Maritme Service

Applicable Standards: TIA 603-D.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Measurement Uncertainty**

Parameter	uncertainty
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 1.5\text{dB}$
Unwanted Emission, conducted	$\pm 1.5\text{dB}$
All emissions, radiated	$\pm 4.88\text{dB}$
Temperature	$\pm 1^\circ\text{C}$
Supply voltages	$\pm 0.4\%$

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

### EUT Exercise Software

No exercise software was used.

### Special Accessories

No special accessory was used.

### Equipment Modifications

No modification was made to the EUT tested.

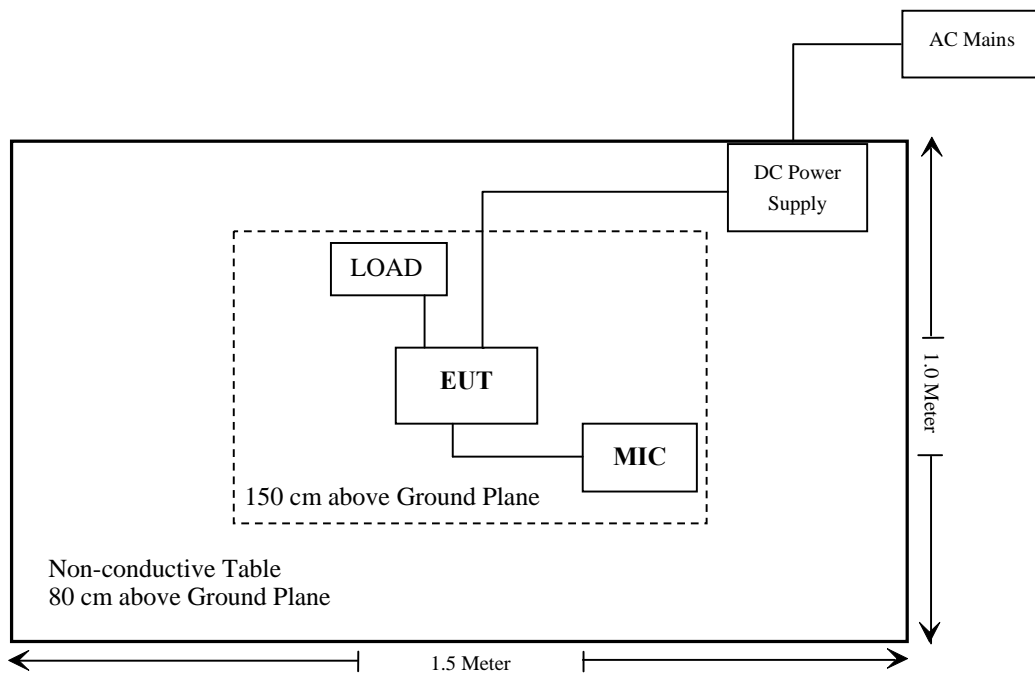
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	Load	N/A	N/A
TDK-Lambda	DC Power Supply	Z60-14-L-C	LOC-645A242-0004

### External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielded DC Power Cable	2.0	DC Power Supply	EUT

## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Results
§1.1307(b), §2.1091	Maximum Permissible exposure (MPE)	Compliance
§2.1046; § 22.727; §74.461; § 80.215;	RF Output Power	Compliance
§2.1047; §74.463; §80.213	Modulation Characteristic	Compliance
§2.1049;§22.357;§ 22.731; §74.462; § 80.205; § 80.207	Occupied Bandwidth & Emission Mask	Compliance
§2.1051; §22.861; §74.462; § 80.211	Spurious Emission at Antenna Terminal	Compliance
§2.1053; §22.861; §74.462; § 80.211	Spurious Radiated Emissions	Compliance
§2.1055; § 22.355; §74.464; § 80.209	Frequency Stability	Compliance



**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Generator	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
<b>RF Conducted Test</b>					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2016-12-05	2017-12-05
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2016-11-22	2017-11-22
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
HP Agilent	RF Communication Test Set	HP8920	3325U00859	2017-05-07	2018-05-07
Ducommun technologies	RF Cable	RG-214	3	2017-05-22	2017-11-22
WEINSCHL	30dB Attenuator	53-30-43	PG633	2017-05-22	2017-11-22

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

#### Limits for General Population/Controlled Exposure

Limits for General Population/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	6
1.34-30	1824/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5.0	6

f = frequency in MHz

\* = Plane-wave equivalent power density

### Result

#### Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency Range (MHz)	Antenna Gain		Conducted Power (mW)	Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Strictest MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)				
136-174	3.5	2.24	28000	100	0.50	1.0

Note: The rated max tune-up output power is 56W, 50% duty cycle was used in evaluation, so the power is 28000mW

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 100cm from nearby persons.

### Result: Compliance

**FCC §2.1046 & § 22.727 & §74.461 & §80.215 - RF OUTPUT POWER****Applicable Standard**

FCC §2.1046, § 22.727, §74.461, § 80.215.

**Test Procedure**

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
100 kHz	300 kHz

**Test Data****Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-10.*

*Test Mode: Transmitting*

**Test Result:** Compliance. Please refer to following table.

Modulation	Channel Separation (kHz)	Frequency (MHz)	Power	Conducted Output Power (dBm)	Conducted Output Power (W)	Note
Analog	12.5	152.15	High	47.39	54.83	For Part 22
			Low	37.26	5.32	
		161.1	High	47.44	55.46	For Part 74
			Low	37.39	5.483	
	25	152.15	High	47.39	54.83	For Part 22
			Low	37.26	5.32	
		156.5	High	47.44	55.46	For Part 80
			Low	37.30	5.37	
		161.1	High	47.44	55.46	For Part 74
			Low	37.28	5.35	

Modulation	Channel Separation (kHz)	Frequency (MHz)	Power	Conducted Output Power (dBm)	Conducted Output Power (W)	Note
Digital	12.5	152.15	H	47.37	54.58	For Part 22
			L	37.20	5.25	
		161.1	H	47.42	55.21	For Part 74
			L	37.22	5.27	

Note: The high rated power is 50W, Limit is 40W-60W.  
The low rated power is 5W, Limit is 4W-6W.

**FCC §2.1047 & §74.463 & §80.213 - MODULATION CHARACTERISTIC****Applicable Standard**

FCC§2.1047, §74.463, §80.213:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

**Test Procedure**

Test Method: TIA/EIA-603 2.2.3

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	57 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-18.*

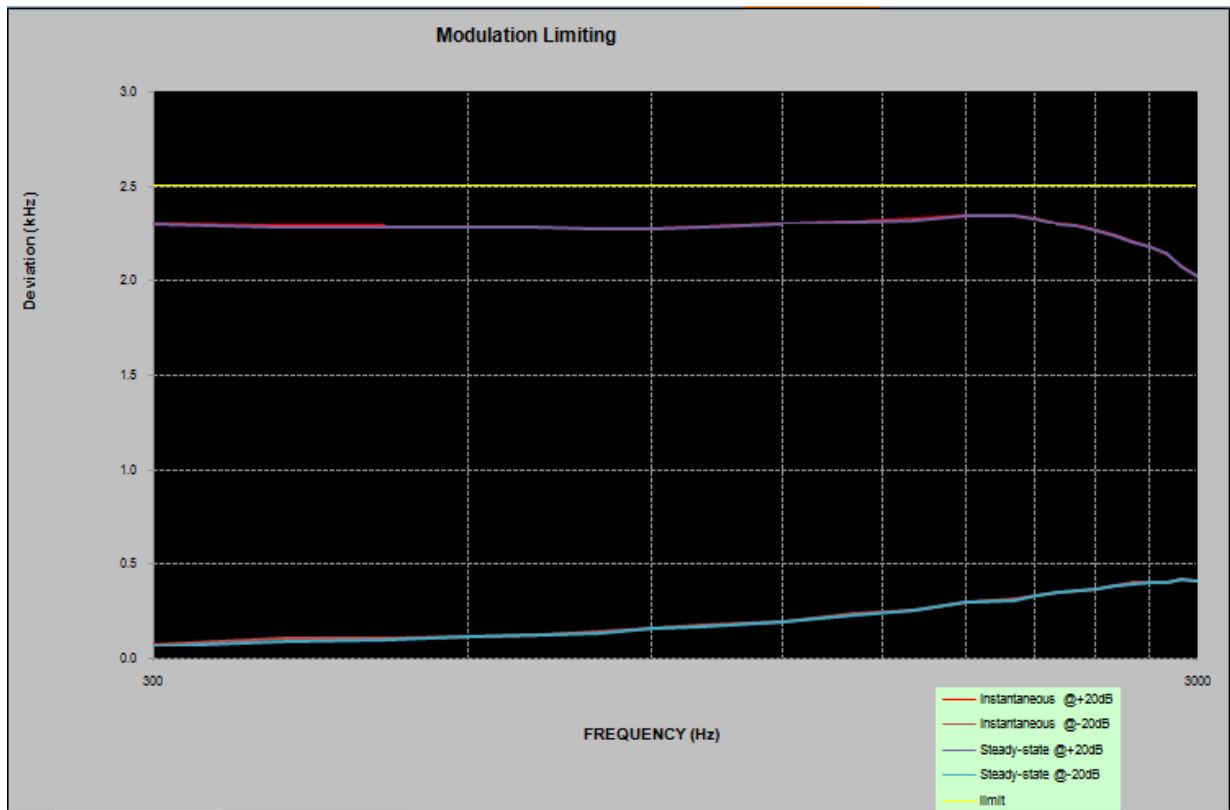
*Test Mode: Transmitting*

**Result:** Compliance.

**Analog Modulation:****MODULATION LIMITING**

Carrier Frequency: 152.15 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	2.302	0.070	2.298	0.065	2.5
400	2.295	0.105	2.282	0.088	2.5
500	2.291	0.102	2.281	0.095	2.5
600	2.287	0.115	2.279	0.113	2.5
700	2.280	0.126	2.277	0.123	2.5
800	2.279	0.135	2.276	0.132	2.5
900	2.276	0.16	2.275	0.154	2.5
1000	2.287	0.172	2.281	0.169	2.5
1200	2.301	0.193	2.298	0.191	2.5
1400	2.309	0.234	2.305	0.23	2.5
1600	2.325	0.254	2.317	0.251	2.5
1800	2.346	0.294	2.341	0.292	2.5
2000	2.347	0.311	2.344	0.307	2.5
2100	2.329	0.333	2.322	0.331	2.5
2200	2.305	0.351	2.301	0.348	2.5
2300	2.297	0.358	2.292	0.355	2.5
2400	2.272	0.365	2.266	0.361	2.5
2500	2.244	0.382	2.239	0.379	2.5
2600	2.211	0.396	2.205	0.392	2.5
2700	2.185	0.398	2.178	0.395	2.5
2800	2.14	0.402	2.138	0.399	2.5
2900	2.081	0.418	2.076	0.415	2.5
3000	2.022	0.412	2.018	0.409	2.5

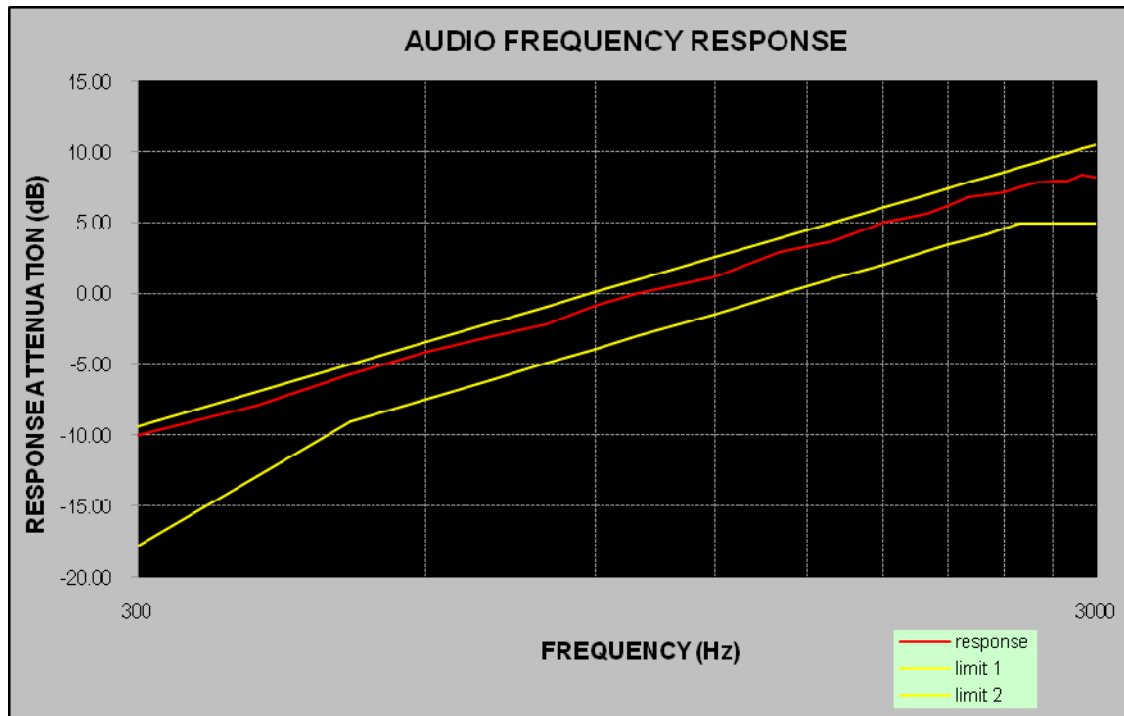


**Audio Frequency Response**

Carrier Frequency: 152.15 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.01
400	-7.87
500	-5.65
600	-4.10
700	-3.05
800	-2.14
900	-0.88
1000	0.00
1200	1.20
1400	2.96
1600	3.72
1800	5.07
2000	5.68
2100	6.24
2200	6.80
2300	6.97
2400	7.13
2500	7.52
2600	7.90
2700	7.93
2800	7.97
2900	8.35
3000	8.25

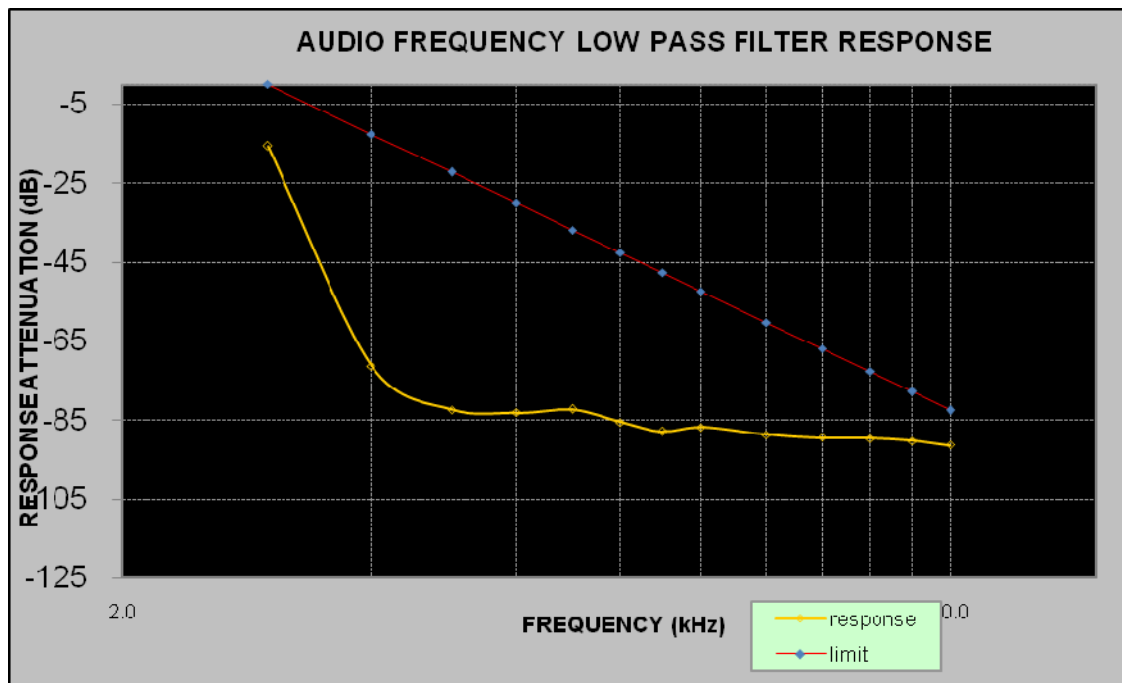




**Audio frequency lows pass filter response**

Carrier Frequency: 152.15 MHz, Channel Separation=12.5 kHz

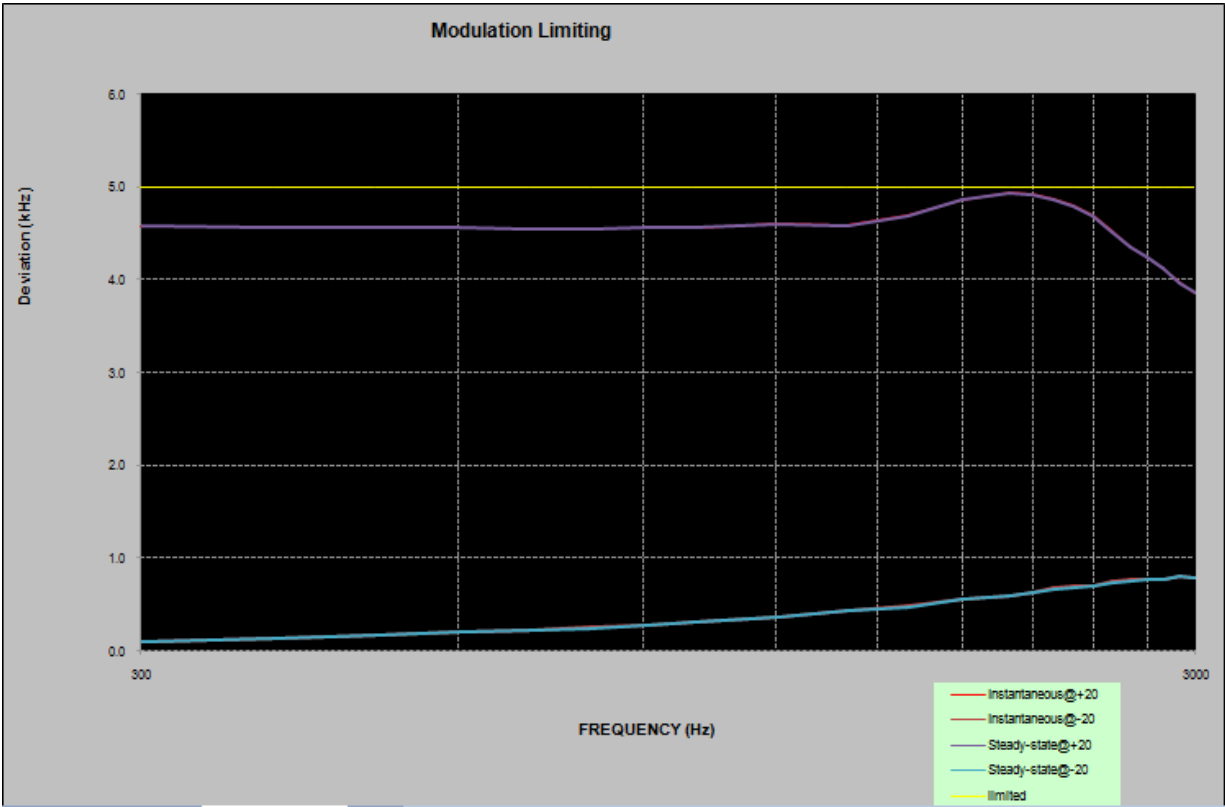
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-15.6	0.0
4.0	-71.3	-12.5
5.0	-82.3	-22.2
6.0	-83.1	-30.1
7.0	-82.2	-36.8
8.0	-85.5	-42.6
9.0	-87.9	-47.7
10.0	-86.7	-52.3
12.0	-88.6	-60.2
14.0	-89.4	-66.9
16.0	-89.6	-72.7
18.0	-90.2	-77.8
20.0	-91.3	-82.5



**MODULATION LIMITING**

Carrier Frequency: 152.15 MHz, Channel Separation= 25 kHz

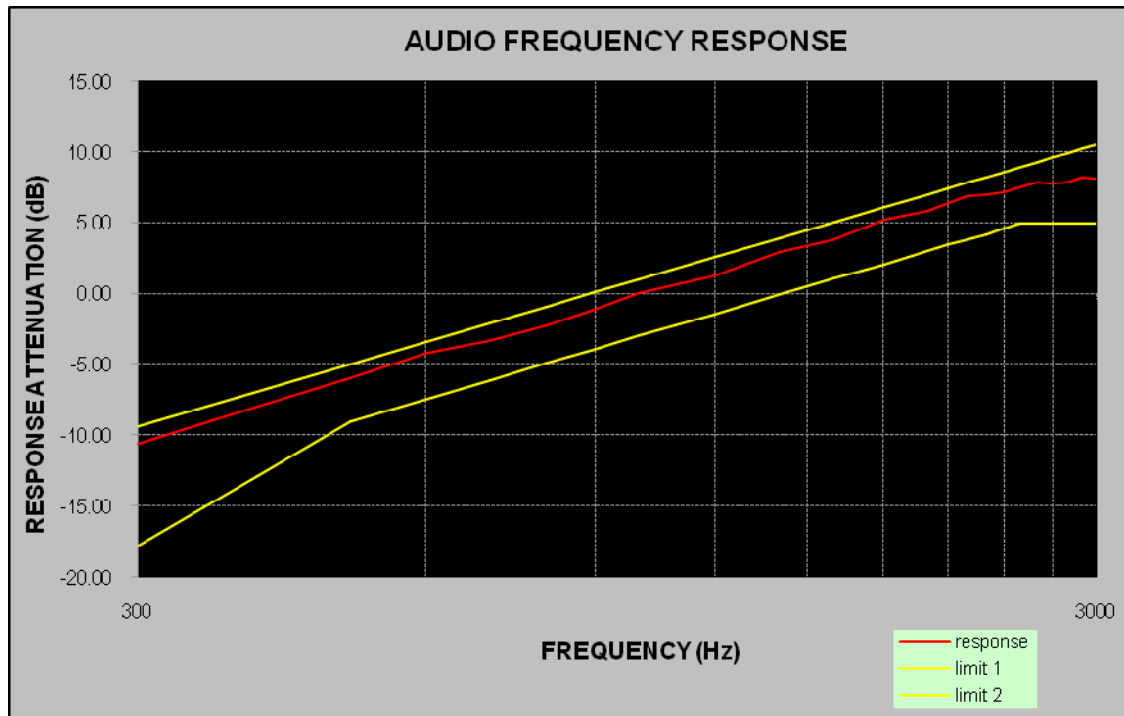
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	4.581	0.107	4.578	0.103	5.000
400	4.571	0.133	4.568	0.131	5.000
500	4.577	0.171	4.571	0.169	5.000
600	4.566	0.206	4.561	0.203	5.000
700	4.554	0.229	4.551	0.225	5.000
800	4.561	0.254	4.557	0.251	5.000
900	4.562	0.286	4.558	0.281	5.000
1000	4.564	0.317	4.560	0.314	5.000
1200	4.609	0.365	4.605	0.362	5.000
1400	4.588	0.437	4.585	0.429	5.000
1600	4.691	0.481	4.688	0.476	5.000
1800	4.865	0.557	4.859	0.554	5.000
2000	4.941	0.601	4.938	0.596	5.000
2100	4.925	0.637	4.921	0.634	5.000
2200	4.876	0.678	4.872	0.675	5.000
2300	4.797	0.696	4.788	0.690	5.000
2400	4.691	0.705	4.687	0.701	5.000
2500	4.533	0.746	4.522	0.741	5.000
2600	4.363	0.767	4.359	0.761	5.000
2700	4.245	0.773	4.241	0.769	5.000
2800	4.121	0.779	4.118	0.775	5.000
2900	3.977	0.815	3.972	0.811	5.000
3000	3.856	0.796	3.852	0.792	5.000



**Audio Frequency Response**

Carrier Frequency: 152.15 MHz, Channel Separation= 25 kHz

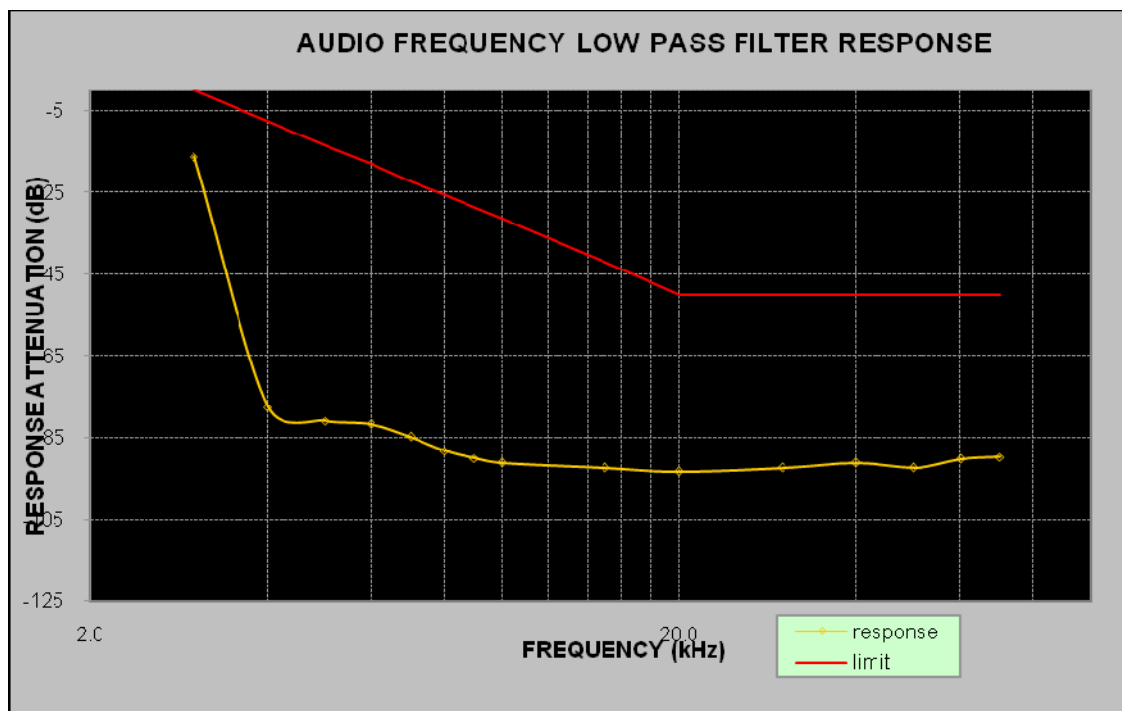
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.63
400	-8.00
500	-5.93
600	-4.18
700	-3.27
800	-2.26
900	-1.08
1000	0.00
1200	1.27
1400	2.95
1600	3.81
1800	5.18
2000	5.81
2100	6.39
2200	6.87
2300	7.02
2400	7.14
2500	7.52
2600	7.85
2700	7.80
2800	7.86
2900	8.22
3000	8.11



**Audio frequency lows pass filter response**

Carrier Frequency: 152.15 MHz, Channel Separation= 25 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-16.2	0.0
4.0	-77.6	-7.5
5.0	-80.9	-13.3
6.0	-81.7	-18.1
7.0	-84.8	-22.1
8.0	-88.3	-25.6
9.0	-90.1	-28.6
10.0	-91.2	-31.4
15.0	-92.4	-41.9
20.0	-93.3	-50.0
30.0	-92.4	-50.0
40.0	-91.2	-50.0
50.0	-92.4	-50.0

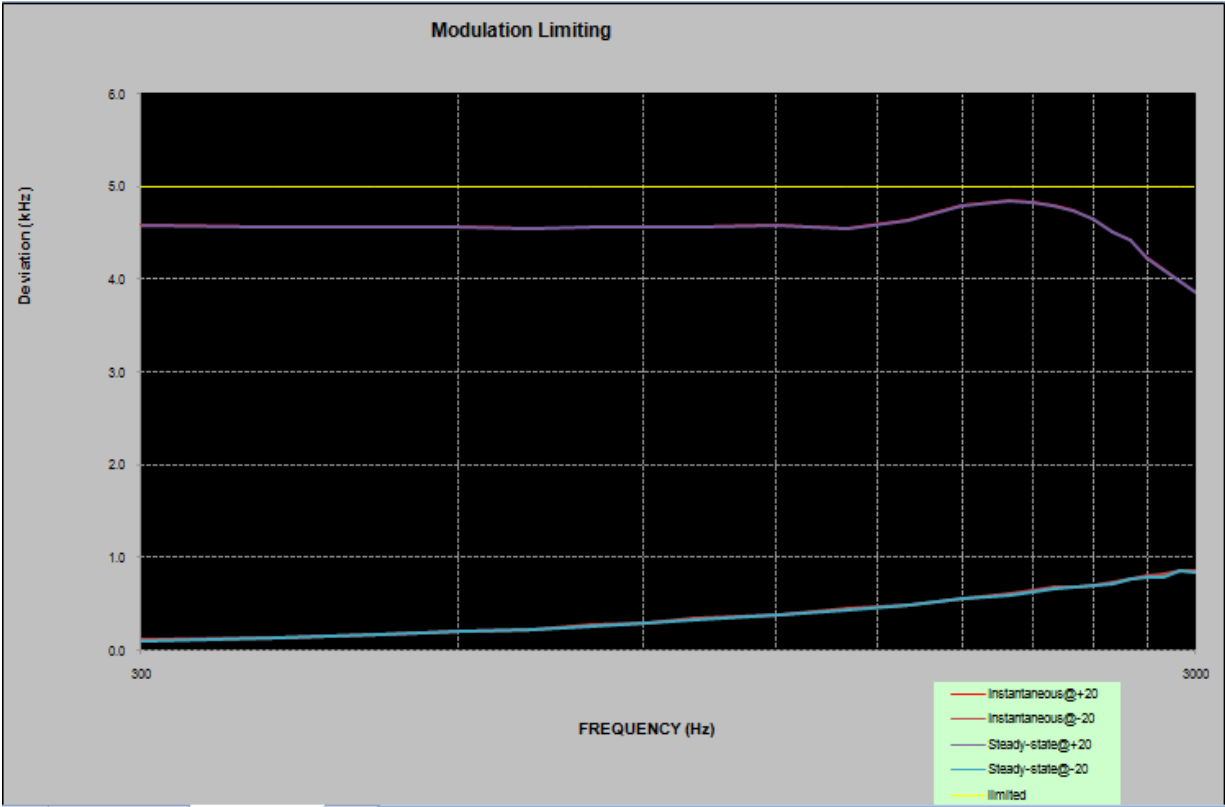


**MODULATION LIMITING**

Carrier Frequency: 156.5 MHz, Channel Separation= 25 kHz

Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	4.585	0.112	4.577	0.108	5.000
400	4.568	0.142	4.562	0.139	5.000
500	4.574	0.172	4.571	0.168	5.000
600	4.568	0.204	4.562	0.199	5.000
700	4.559	0.227	4.554	0.223	5.000
800	4.564	0.274	4.562	0.264	5.000
900	4.571	0.300	4.565	0.296	5.000
1000	4.567	0.342	4.563	0.332	5.000
1200	4.591	0.389	4.586	0.376	5.000
1400	4.562	0.450	4.557	0.443	5.000
1600	4.645	0.491	4.638	0.484	5.000
1800	4.797	0.565	4.792	0.552	5.000
2000	4.854	0.612	4.849	0.590	5.000
2100	4.835	0.645	4.827	0.634	5.000
2200	4.805	0.677	4.798	0.665	5.000
2300	4.745	0.688	4.741	0.682	5.000
2400	4.645	0.709	4.649	0.705	5.000
2500	4.518	0.741	4.512	0.726	5.000
2600	4.432	0.777	4.428	0.769	5.000
2700	4.238	0.806	4.232	0.782	5.000
2800	4.109	0.817	4.104	0.796	5.000
2900	3.984	0.865	3.978	0.860	5.000
3000	3.875	0.852	3.869	0.847	5.000

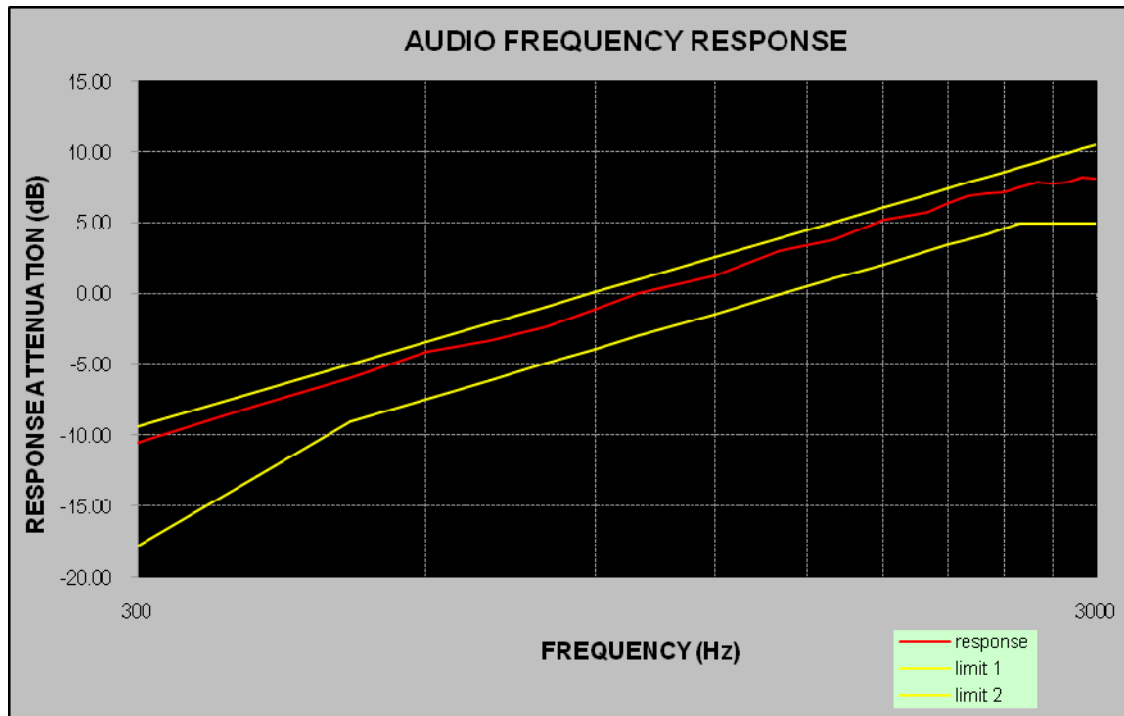




**Audio Frequency Response**

Carrier Frequency: 156.5 MHz, Channel Separation= 25 kHz

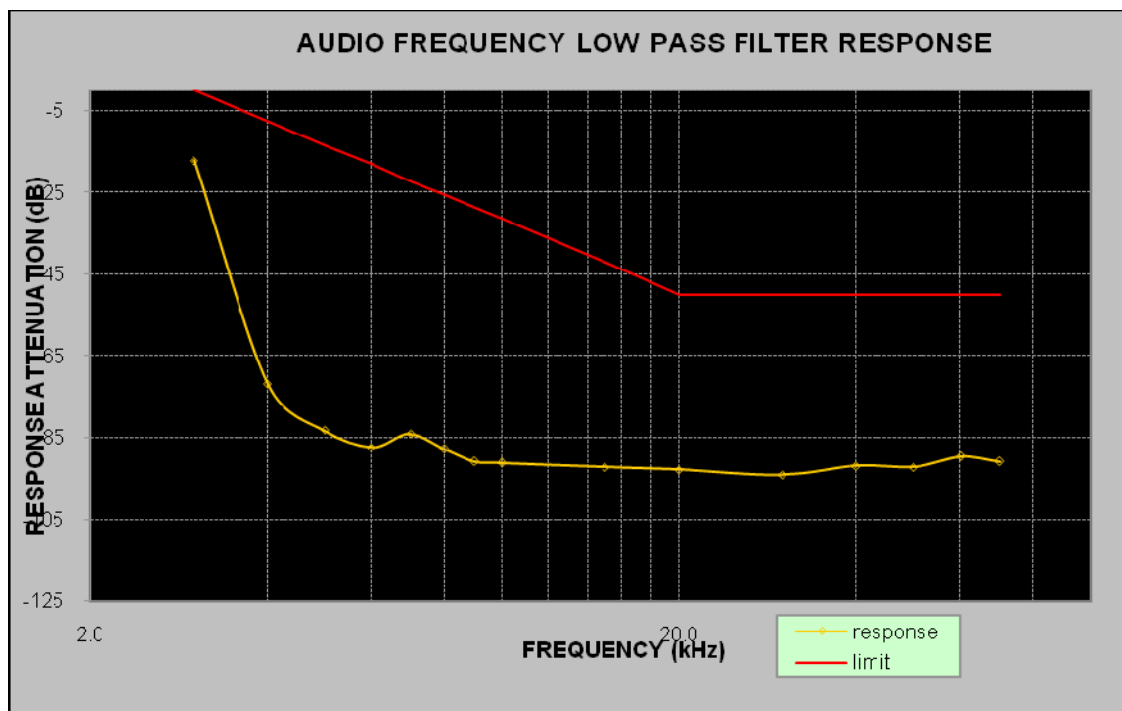
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.49
400	-7.89
500	-5.93
600	-4.10
700	-3.32
800	-2.32
900	-1.11
1000	0.00
1200	1.27
1400	2.98
1600	3.80
1800	5.21
2000	5.80
2100	6.40
2200	6.88
2300	7.03
2400	7.12
2500	7.52
2600	7.83
2700	7.79
2800	7.88
2900	8.21
3000	8.11



**Audio frequency lows pass filter response**

Carrier Frequency: 156.5 MHz, Channel Separation= 25 kHz

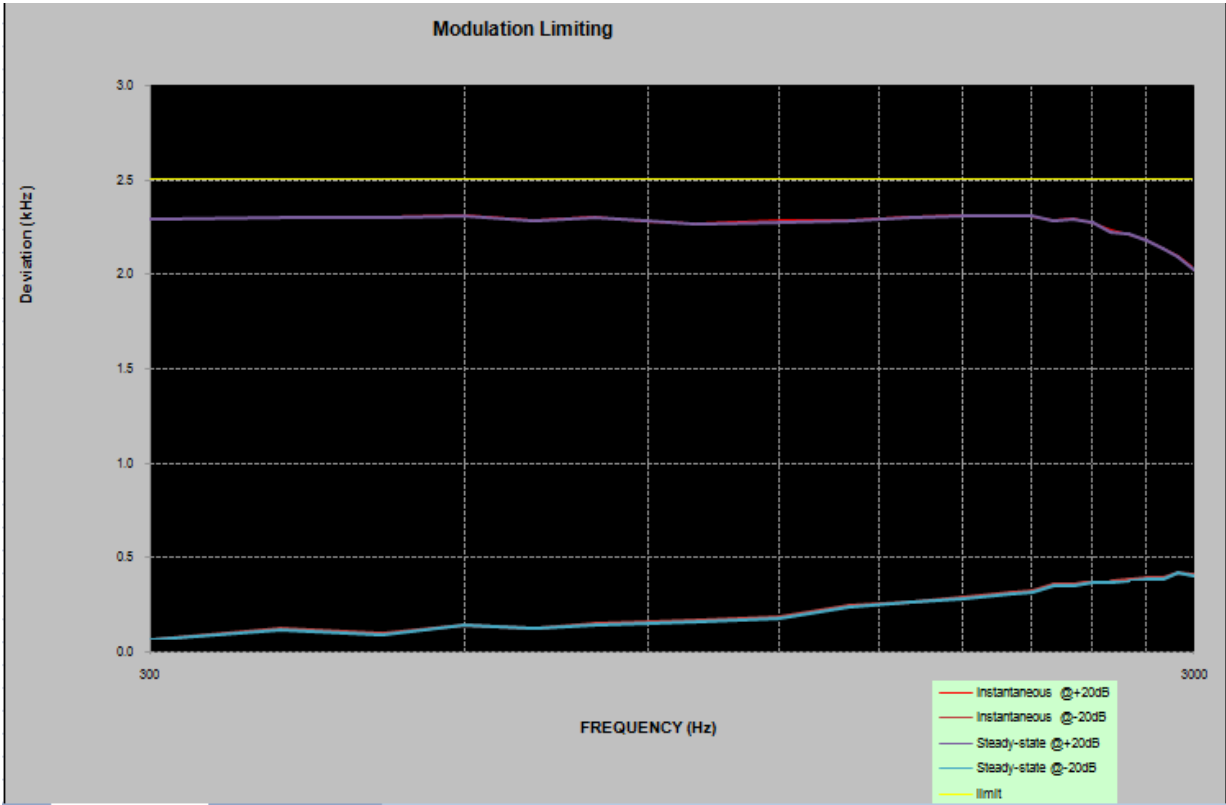
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-17.1	0.0
4.0	-71.9	-7.5
5.0	-83.2	-13.3
6.0	-87.4	-18.1
7.0	-84.1	-22.1
8.0	-87.8	-25.6
9.0	-90.9	-28.6
10.0	-91.2	-31.4
15.0	-92.3	-41.9
20.0	-92.9	-50.0
30.0	-94.1	-50.0
40.0	-91.9	-50.0
50.0	-92.2	-50.0



**MODULATION LIMITING**

Carrier Frequency: 161.1MHz, Channel Separation=12.5 kHz

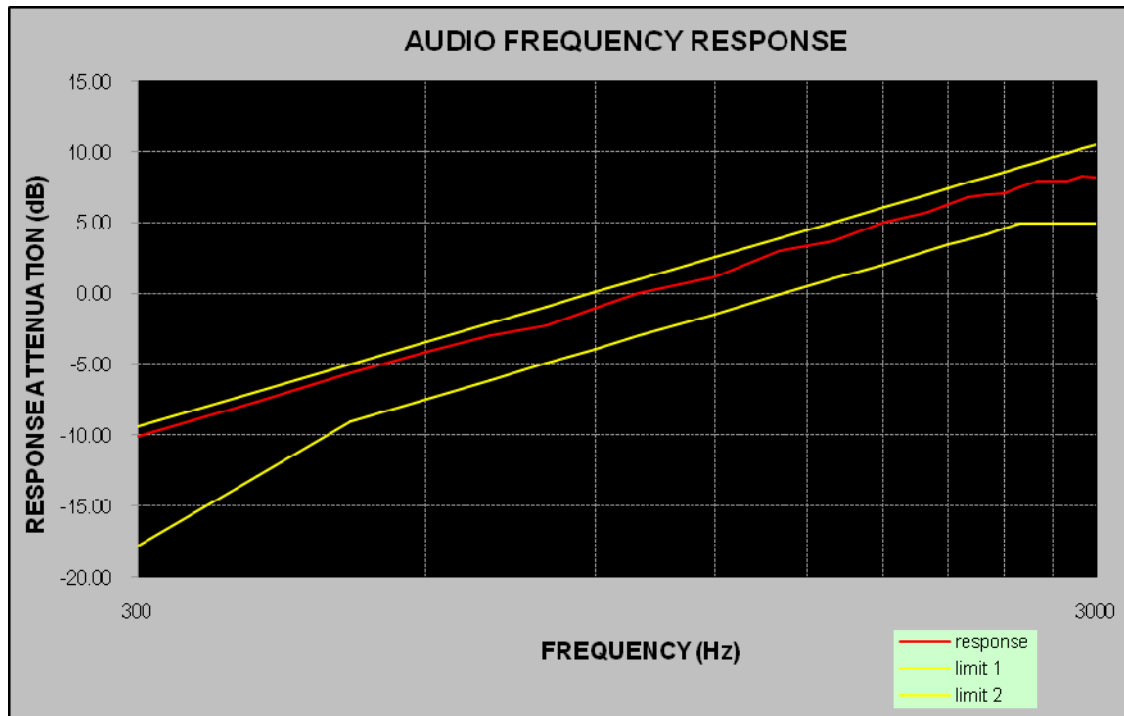
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	2.296	0.064	2.286	0.062	2.5
400	2.298	0.123	2.297	0.114	2.5
500	2.302	0.093	2.298	0.089	2.5
600	2.309	0.143	2.305	0.139	2.5
700	2.286	0.123	2.278	0.118	2.5
800	2.302	0.148	2.301	0.141	2.5
900	2.280	0.158	2.279	0.152	2.5
1000	2.270	0.168	2.267	0.159	2.5
1200	2.283	0.185	2.274	0.175	2.5
1400	2.287	0.242	2.283	0.235	2.5
1600	2.305	0.264	2.298	0.260	2.5
1800	2.314	0.283	2.304	0.279	2.5
2000	2.307	0.310	2.304	0.306	2.5
2100	2.304	0.321	2.303	0.312	2.5
2200	2.285	0.352	2.280	0.350	2.5
2300	2.293	0.358	2.292	0.349	2.5
2400	2.271	0.371	2.271	0.367	2.5
2500	2.232	0.374	2.223	0.368	2.5
2600	2.210	0.383	2.210	0.376	2.5
2700	2.180	0.392	2.176	0.385	2.5
2800	2.136	0.388	2.133	0.382	2.5
2900	2.093	0.418	2.086	0.413	2.5
3000	2.033	0.412	2.025	0.403	2.5



**Audio Frequency Response**

Carrier Frequency: 161.1 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.06
400	-7.66
500	-5.58
600	-4.10
700	-3.00
800	-2.29
900	-0.99
1000	0.00
1200	1.15
1400	3.03
1600	3.69
1800	5.02
2000	5.72
2100	6.24
2200	6.82
2300	6.98
2400	7.11
2500	7.48
2600	7.92
2700	7.93
2800	7.98
2900	8.35
3000	8.24

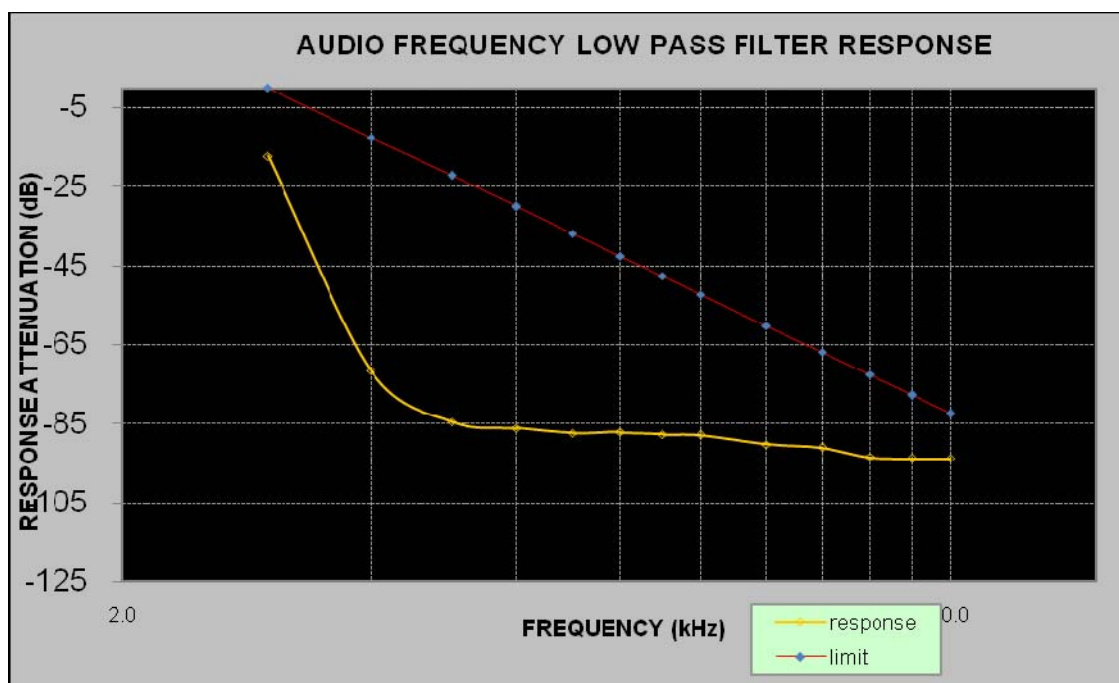




**Audio frequency lows pass filter response**

Carrier Frequency: 161.1 MHz, Channel Separation=12.5 kHz

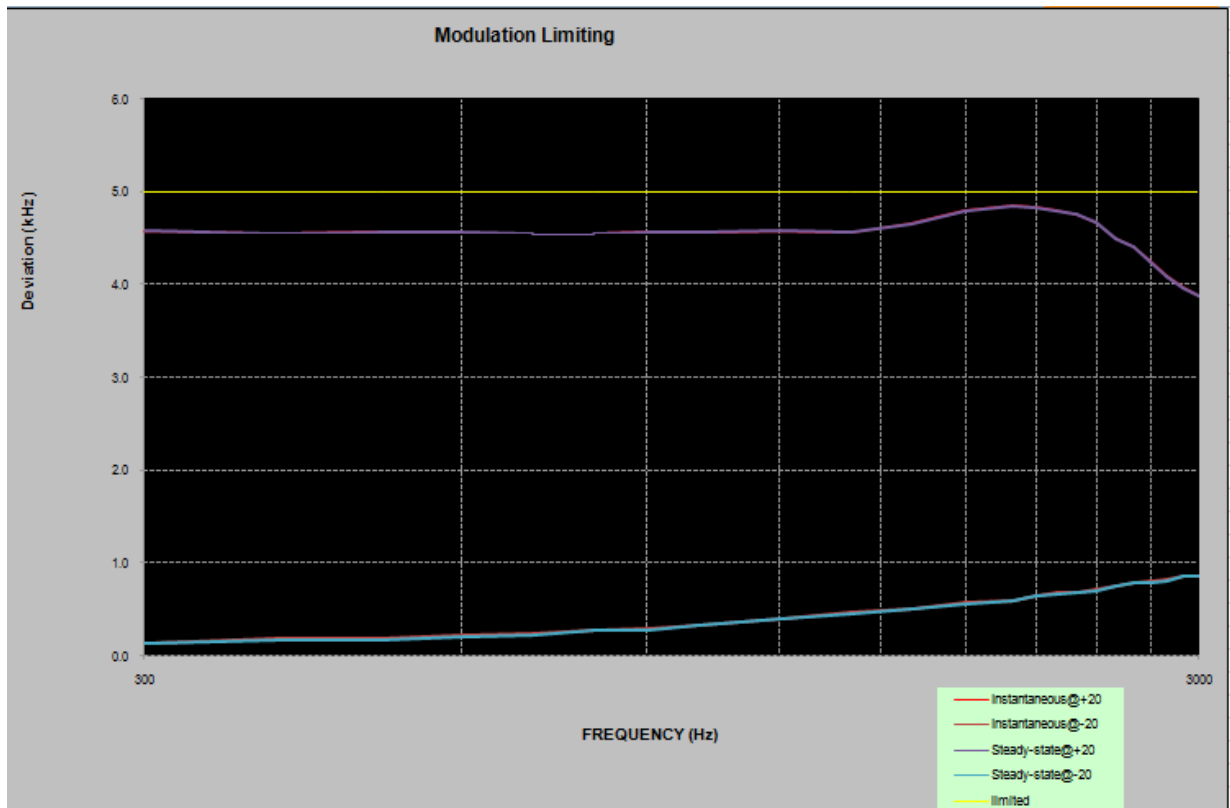
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-17.2	0.0
4.0	-71.7	-12.5
5.0	-84.5	-22.2
6.0	-86.2	-30.1
7.0	-87.4	-36.8
8.0	-87.2	-42.6
9.0	-87.7	-47.7
10.0	-87.9	-52.3
12.0	-90.2	-60.2
14.0	-91.1	-66.9
16.0	-93.5	-72.7
18.0	-93.9	-77.8
20.0	-93.8	-82.5



**MODULATION LIMITING**

Carrier Frequency: 161.1 MHz, Channel Separation= 25 kHz

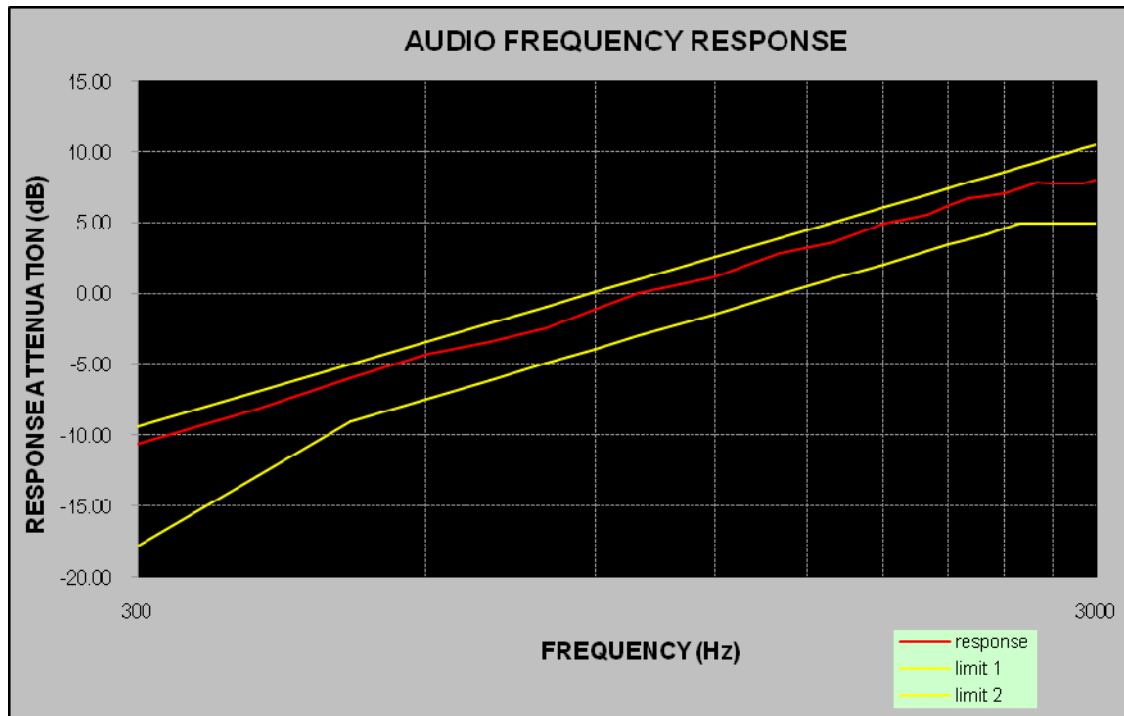
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	4.581	0.144	4.579	0.137	5.000
400	4.556	0.182	4.548	0.174	5.000
500	4.579	0.187	4.573	0.177	5.000
600	4.566	0.219	4.564	0.213	5.000
700	4.553	0.235	4.547	0.232	5.000
800	4.557	0.283	4.548	0.273	5.000
900	4.571	0.287	4.563	0.283	5.000
1000	4.56	0.328	4.558	0.324	5.000
1200	4.583	0.398	4.58	0.397	5.000
1400	4.566	0.465	4.558	0.457	5.000
1600	4.66	0.504	4.66	0.501	5.000
1800	4.805	0.577	4.796	0.568	5.000
2000	4.852	0.597	4.847	0.596	5.000
2100	4.838	0.649	4.83	0.641	5.000
2200	4.8	0.68	4.793	0.674	5.000
2300	4.759	0.688	4.754	0.681	5.000
2400	4.664	0.715	4.664	0.706	5.000
2500	4.505	0.755	4.498	0.749	5.000
2600	4.422	0.792	4.415	0.786	5.000
2700	4.252	0.799	4.243	0.793	5.000
2800	4.106	0.819	4.098	0.815	5.000
2900	3.976	0.859	3.974	0.854	5.000
3000	3.881	0.866	3.873	0.862	5.000



**Audio Frequency Response**

Carrier Frequency: 161.1 MHz, Channel Separation= 25 kHz

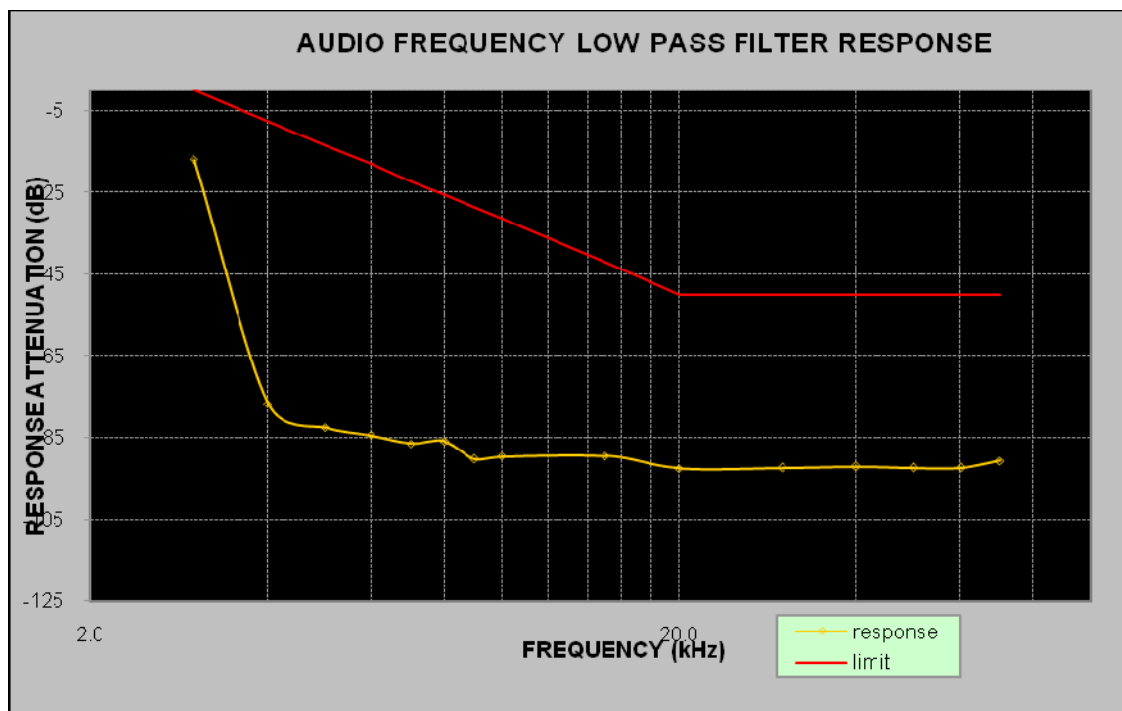
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.60
400	-8.11
500	-5.97
600	-4.31
700	-3.39
800	-2.41
900	-1.13
1000	0.00
1200	1.15
1400	2.84
1600	3.63
1800	4.98
2000	5.60
2100	6.19
2200	6.72
2300	6.88
2400	7.10
2500	7.46
2600	7.83
2700	7.80
2800	7.76
2900	7.81
3000	8.08



**Audio frequency lows pass filter response**

Carrier Frequency: 161.1 MHz, Channel Separation= 25 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-16.9	0.0
4.0	-76.7	-7.5
5.0	-82.5	-13.3
6.0	-84.4	-18.1
7.0	-86.5	-22.1
8.0	-85.9	-25.6
9.0	-90.3	-28.6
10.0	-89.6	-31.4
15.0	-89.5	-41.9
20.0	-92.5	-50.0
30.0	-92.4	-50.0
40.0	-92.1	-50.0
50.0	-92.4	-50.0



## FCC §2.1049 & §22.357 & § 22.731 & §74.462 & § 80.205 & § 80.207 – OCCUPIED BANDWIDTH & EMISSION MASK

### Applicable Standard

FCC §2.1049, §22.357, § 22.731, §74.462, § 80.205, § 80.207

Emission Mask D - 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ , 0dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least  $7.27 (f_d - 2.88 \text{ kHz})$  dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz at least: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.

Emission Mask B - 25 kHz channel bandwidth equipment. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P)$  dB.

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 Hz and the spectrum was recorded in the frequency band  $\pm 50$  kHz from the carrier frequency.

### Test Data

#### Environmental Conditions

Temperature:	24~27 °C
Relative Humidity:	50~57 %
ATM Pressure:	100.0~101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-15 to 2017-09-20.*

Modulation	Channel Separation (kHz)	Frequency (MHz)	Power Level	99% Occupied Bandwidth (kHz)	26 dB Emissions Bandwidth (kHz)	Note
Digital	12.5	152.15	High	7.61	9.86	For Part 22
	12.5		Low	7.37	9.29	
	12.5	161.1	High	7.61	9.54	For Part 74
	12.5		Low	7.29	9.86	

***For Digital Mode (Channel Spacing: 12.5 kHz)****Emission Designator 7K60FXD and 7K60FXW*

*The 99% energy rule (title 47CFR 2.1049) was used for digital mode. It basically states that 99% of the modulation energy falls within X kHz, in this case, 7.61 kHz. The emission mask was obtained from 47CFR 90.210(d).*

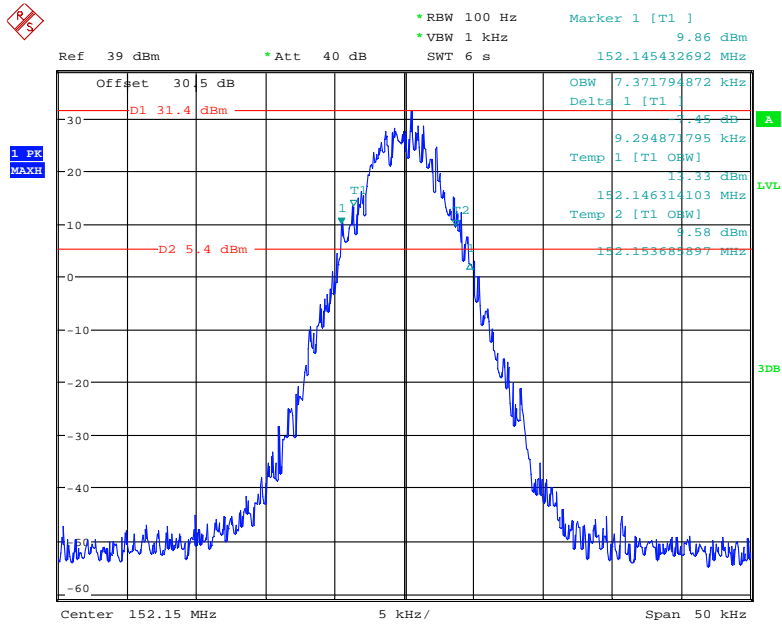
*FXD and FXW portion of the designator indicates digital information.*

*Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60FXD and 7K60FXW.*



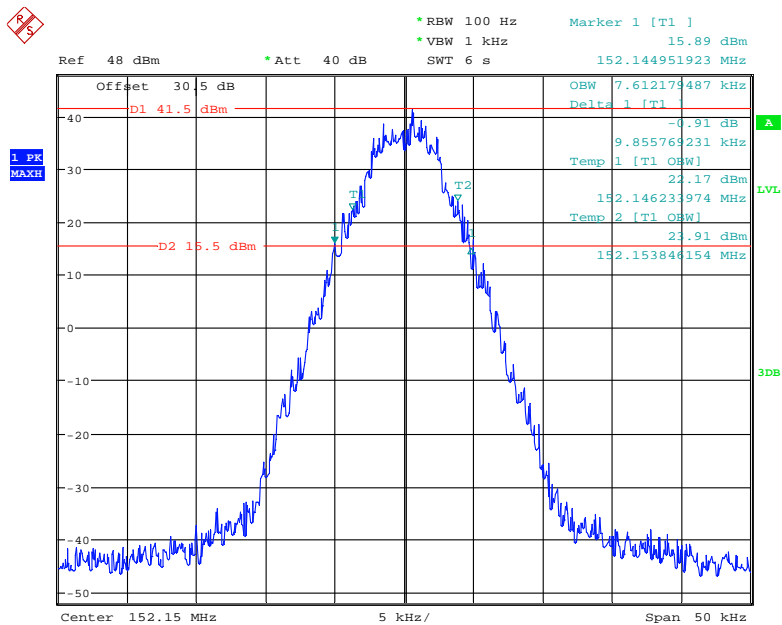
# Digital Modulation:

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



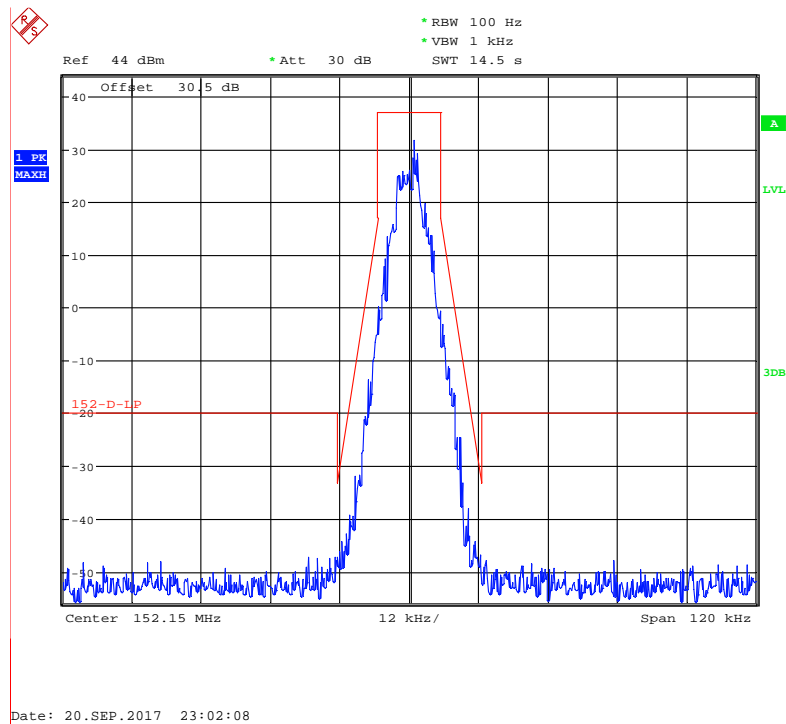
Date: 15.SEP.2017 22:44:31

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, High Power

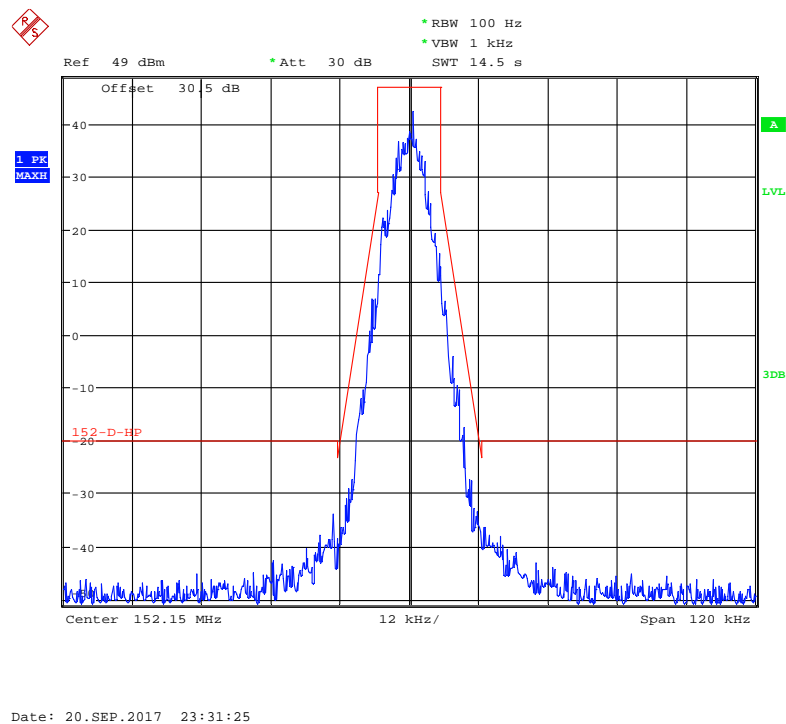


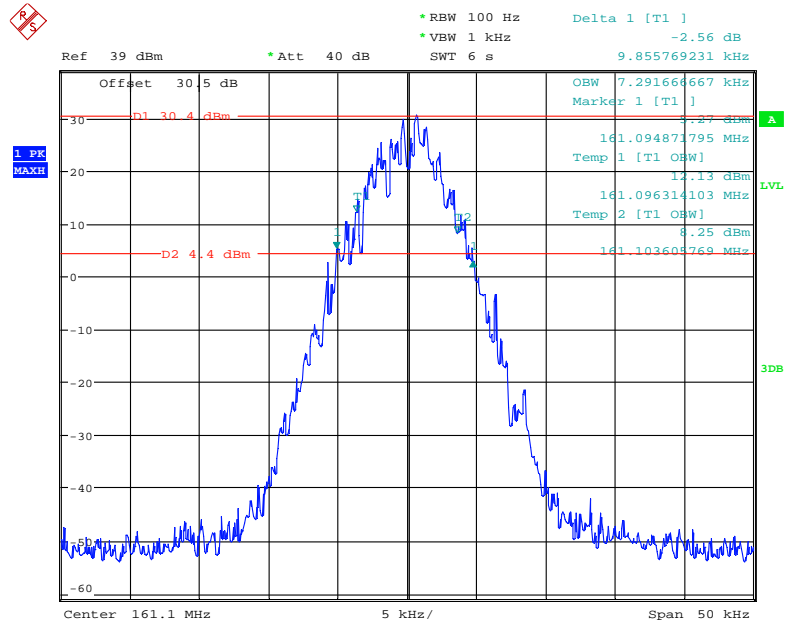
Date: 15.SEP.2017 22:46:18

### Frequency 152.15 MHz: Emission Mask D, Low Power

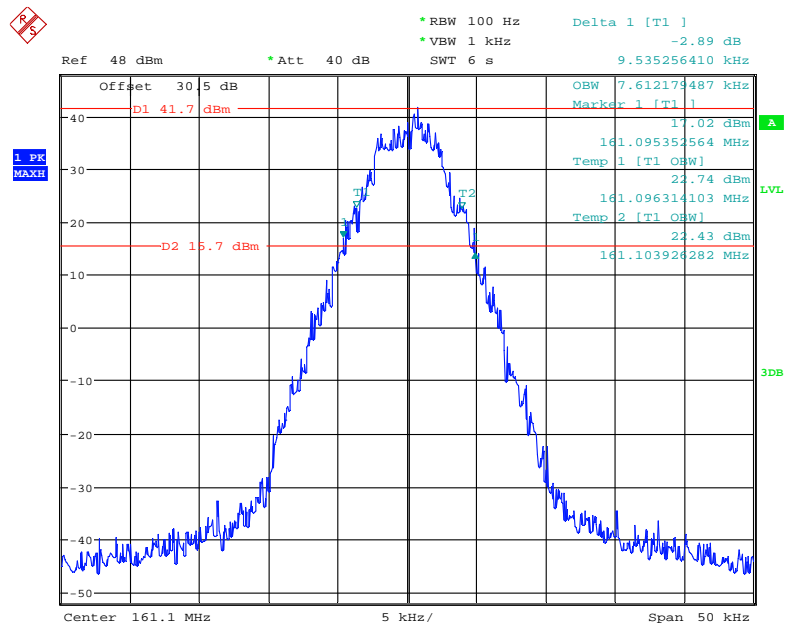


### Frequency 152.15 MHz: Emission Mask D, High Power



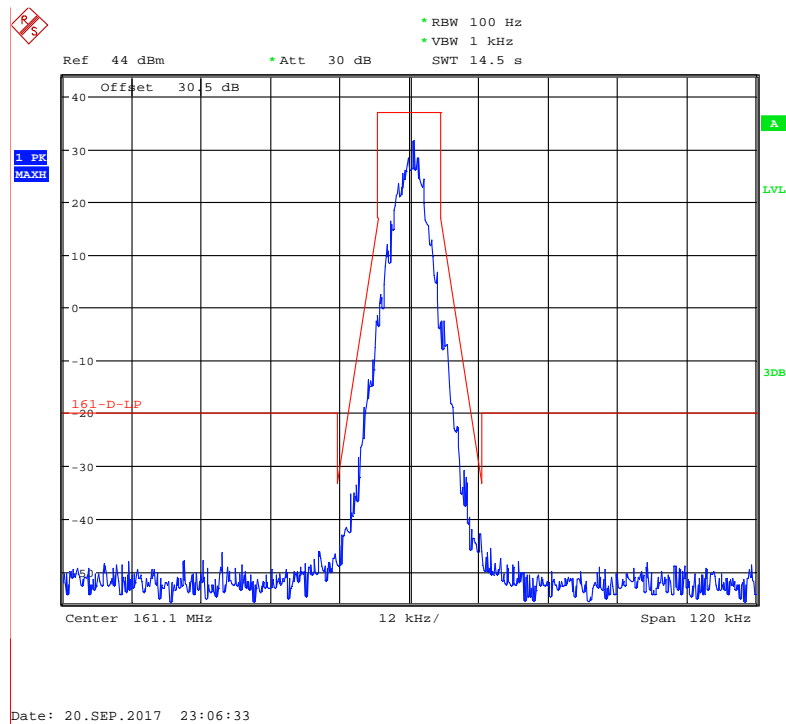
**Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, Low Power**

Date: 15.SEP.2017 22:39:16

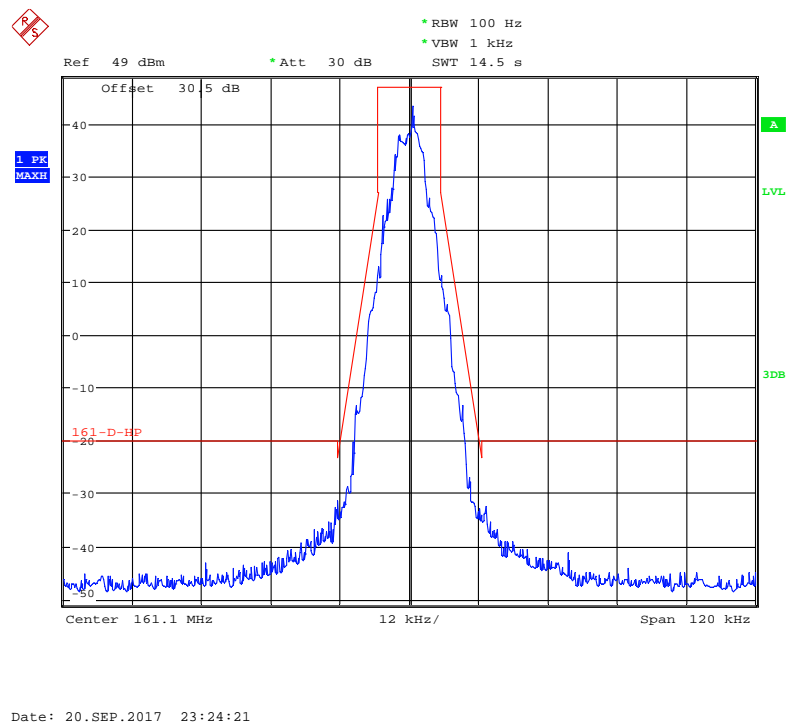
**Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, High Power**

Date: 15.SEP.2017 22:50:19

### Frequency 161.1 MHz: Emission Mask D, Low Power



### Frequency 161.1 MHz: Emission Mask D, High Power



Modulation	Channel Separation (kHz)	Frequency (MHz)	Power Level	99% Occupied Bandwidth (kHz)	26 dB Emissions Bandwidth (kHz)	Note
Analog	12.5	152.15	High	10.02	10.02	For Part 22
	12.5		Low	10.02	10.34	
	12.5	161.1	High	10.02	10.34	For Part 74
	12.5		Low	10.02	10.02	

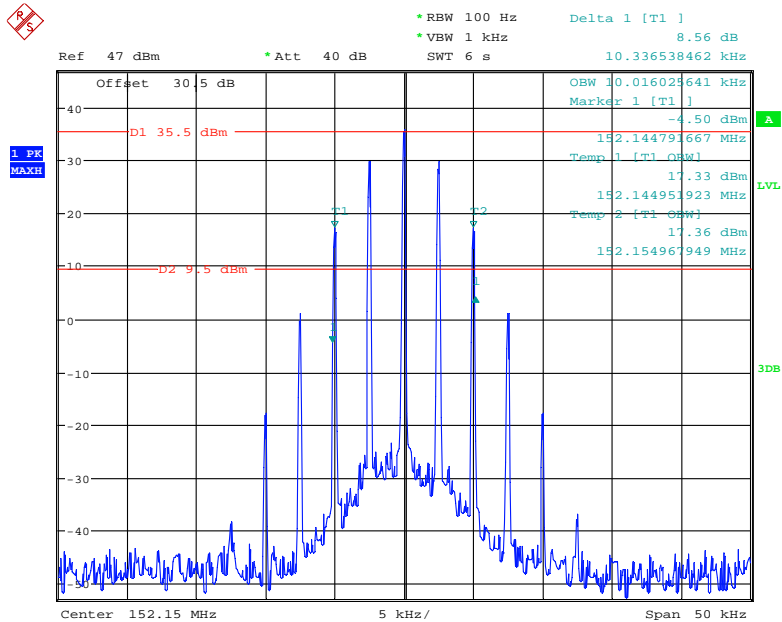
**For FM Mode (Channel Spacing: 12.5 kHz)**

*Emission Designator 11K0F3E In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.  $BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \rightarrow 11K0$*

*F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.*

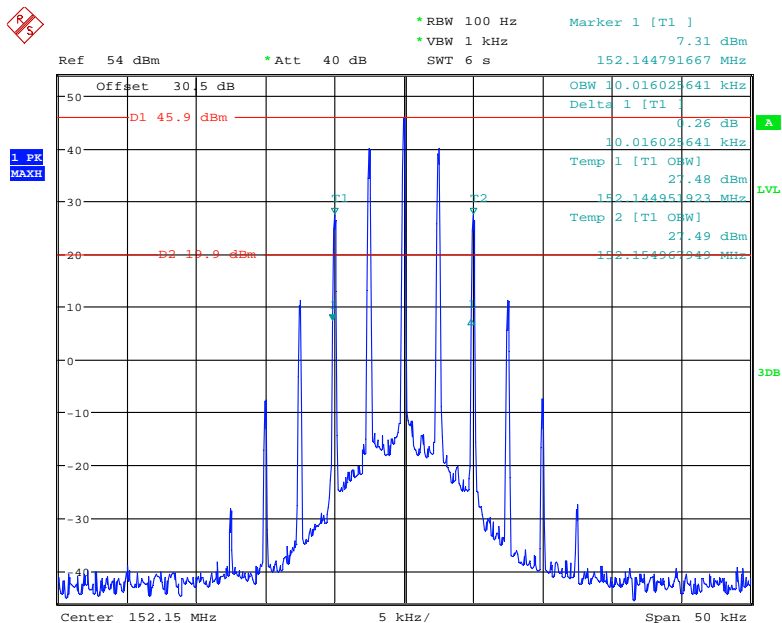
# Analog Modulation:

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



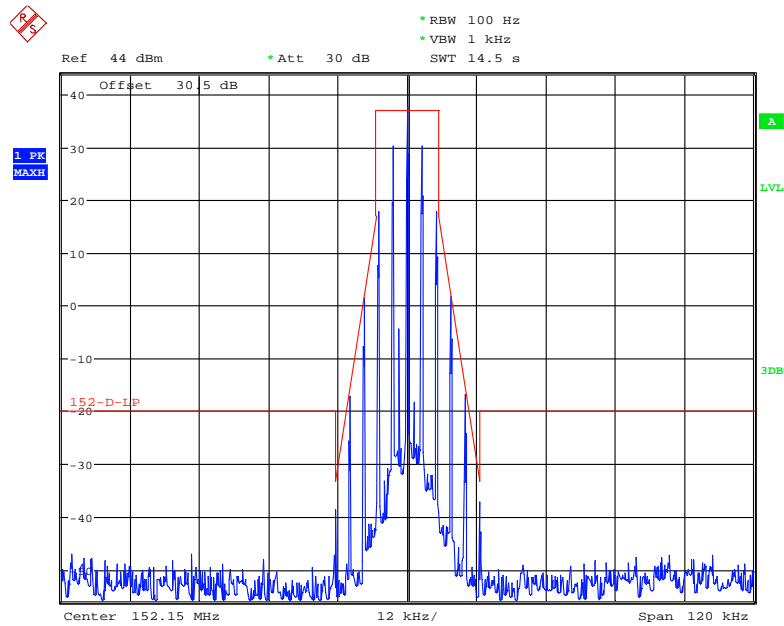
Date: 15.SEP.2017 20:39:31

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, High Power



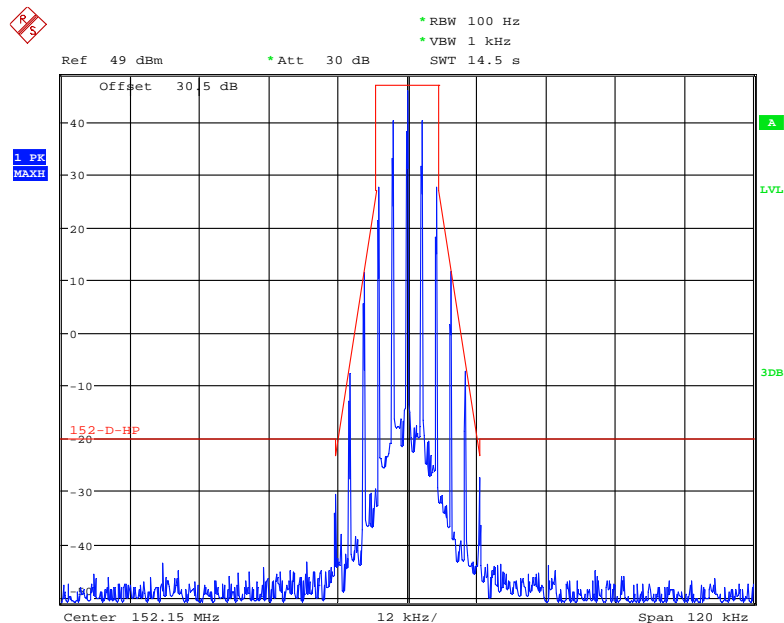
Date: 15.SEP.2017 20:11:24

### Frequency 152.15 MHz: Emission Mask D, Low Power



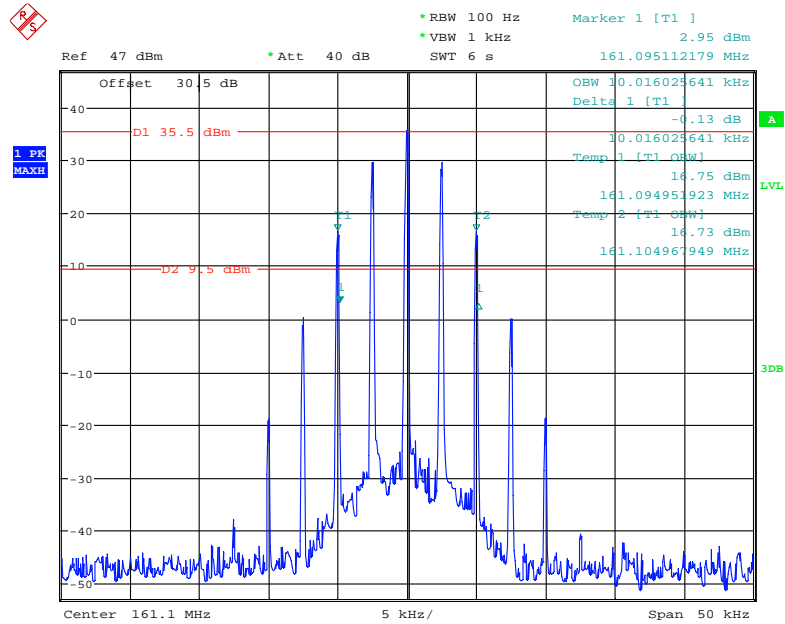
Date: 20.SEP.2017 22:53:49

### Frequency 152.15 MHz: Emission Mask D, High Power



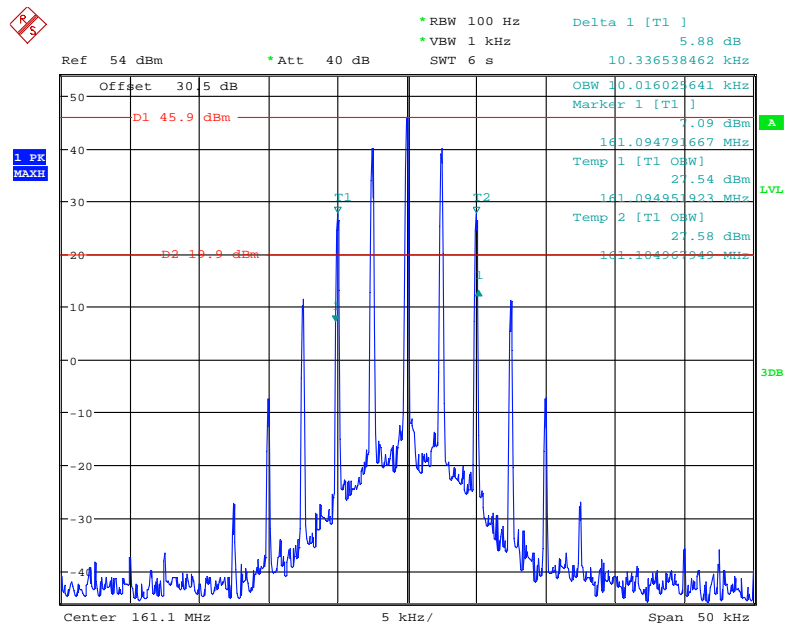
Date: 20.SEP.2017 23:32:30

### Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



Date: 15.SEP.2017 20:51:02

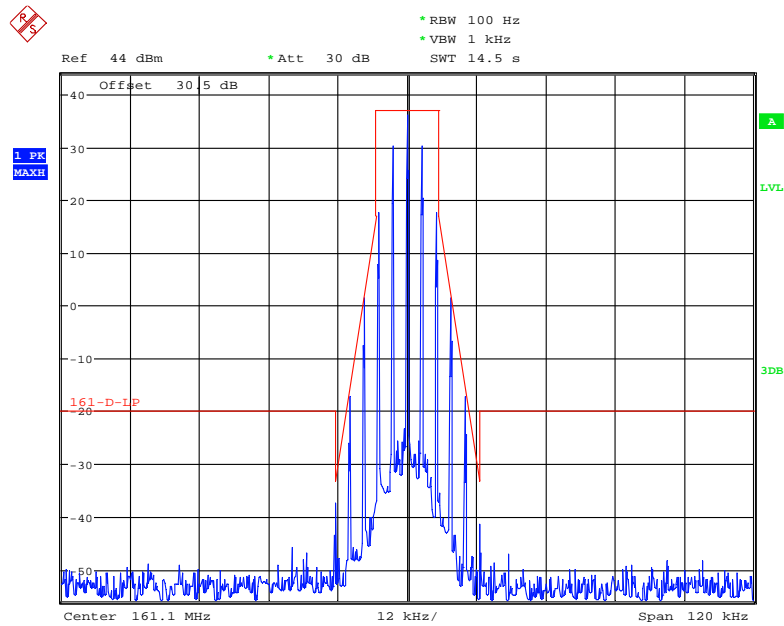
### Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, High Power



Date: 15.SEP.2017 20:18:59

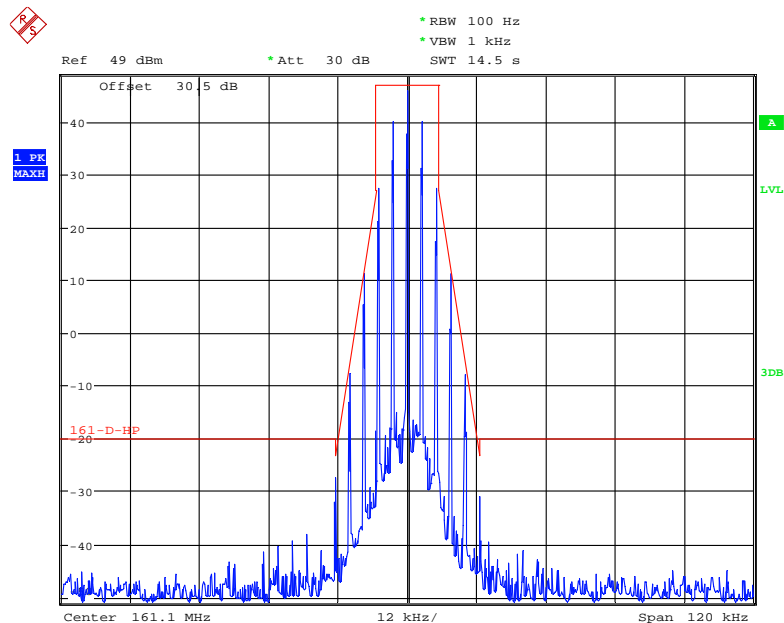


### Frequency 161.1 MHz: Emission Mask D, Low Power



Date: 20.SEP.2017 22:58:20

### Frequency 161.1 MHz: Emission Mask D, High Power



Date: 20.SEP.2017 23:34:57

Modulation	Channel Separation (kHz)	Frequency (MHz)	Power Level	99% Occupied Bandwidth (kHz)	26 dB Emissions Bandwidth (kHz)	Note
Analog	25	152.15	High	15.06	15.71	For Part 22
	25		Low	15.06	15.71	
	25	156.5	High	15.06	15.71	For Part 80
	25		Low	15.06	15.71	
	25	161.1	High	15.06	15.71	For Part 74
	25		Low	15.06	15.71	

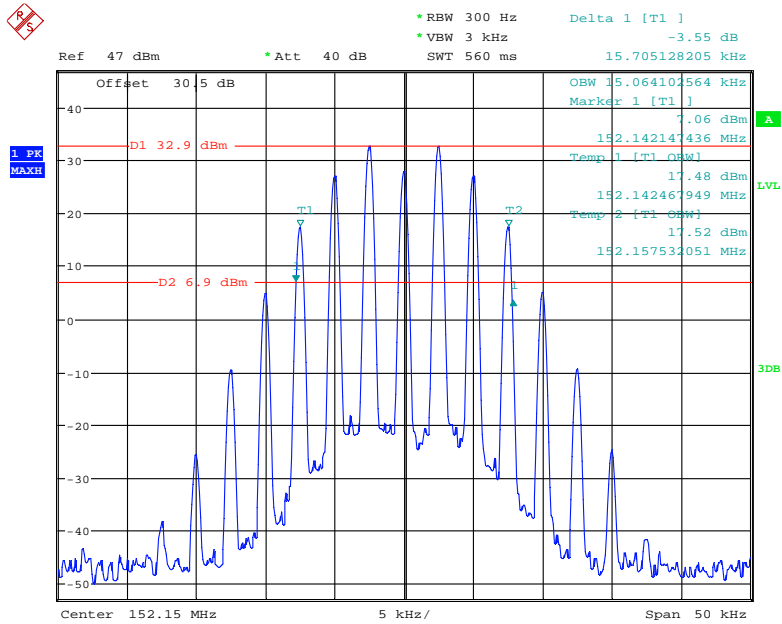
**For FM Mode (Channel Spacing: 25 kHz)**

*Emission Designator 16K0F3E In this case, the maximum modulating frequency is 5.0 kHz with a 3.0 kHz deviation.  $BW = 2(M+D) = 2*(5.0 \text{ kHz} + 3.0 \text{ kHz}) = 16 \text{ kHz} \rightarrow 16K0$*

*F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 25 kHz channel spacing FM mode is 16K0F3E.*

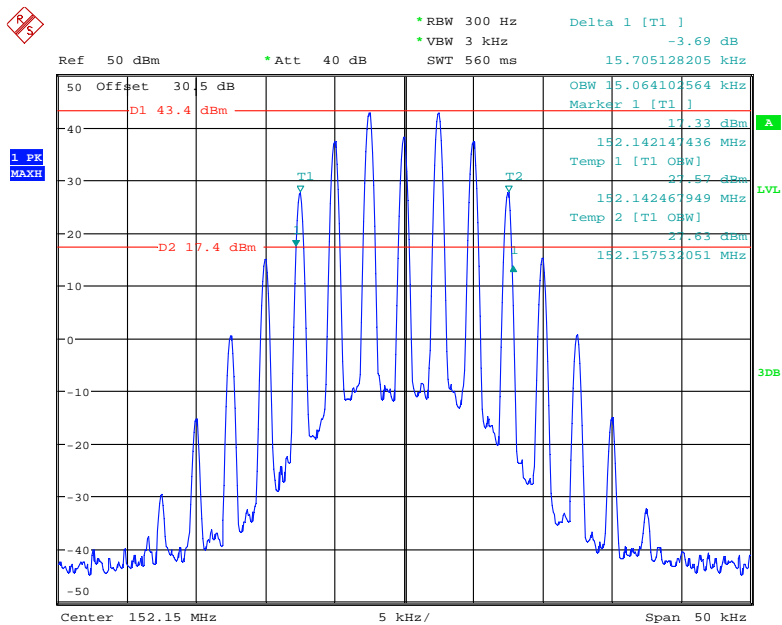
# Analog Modulation:

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



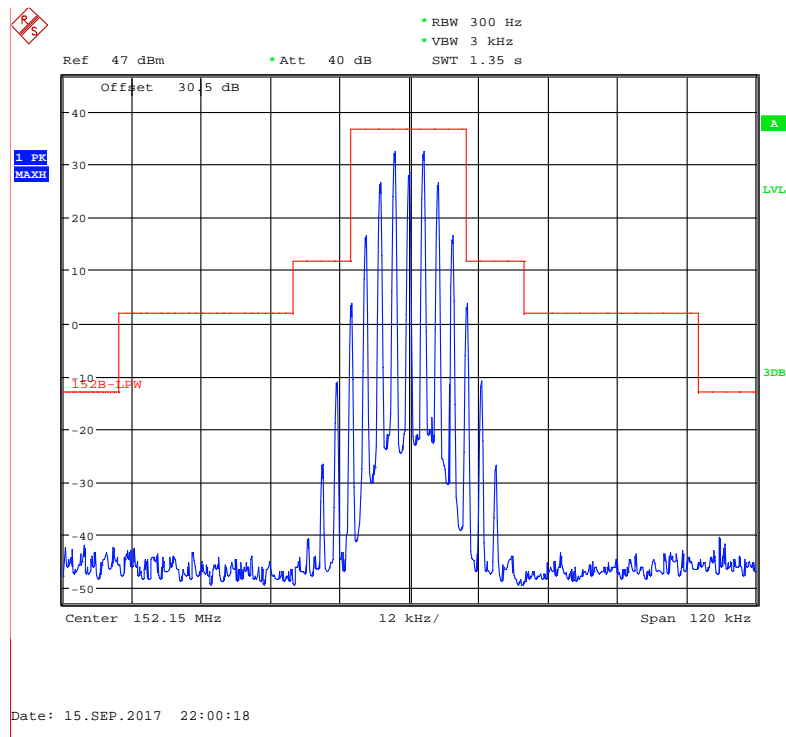
Date: 15.SEP.2017 20:35:23

## Frequency 152.15 MHz: 99% Occupied & 26 dB Bandwidth, High Power

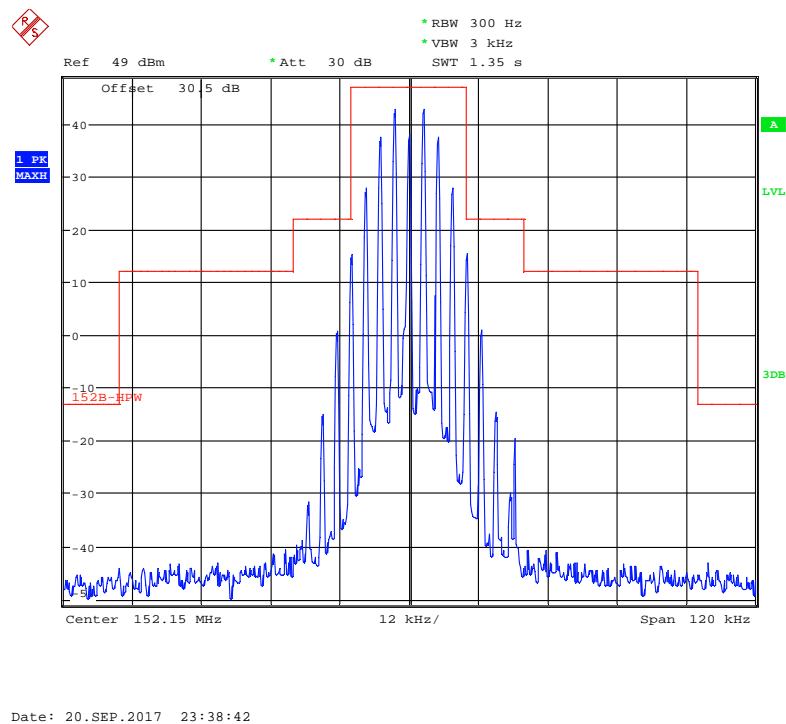


Date: 15.SEP.2017 20:26:52

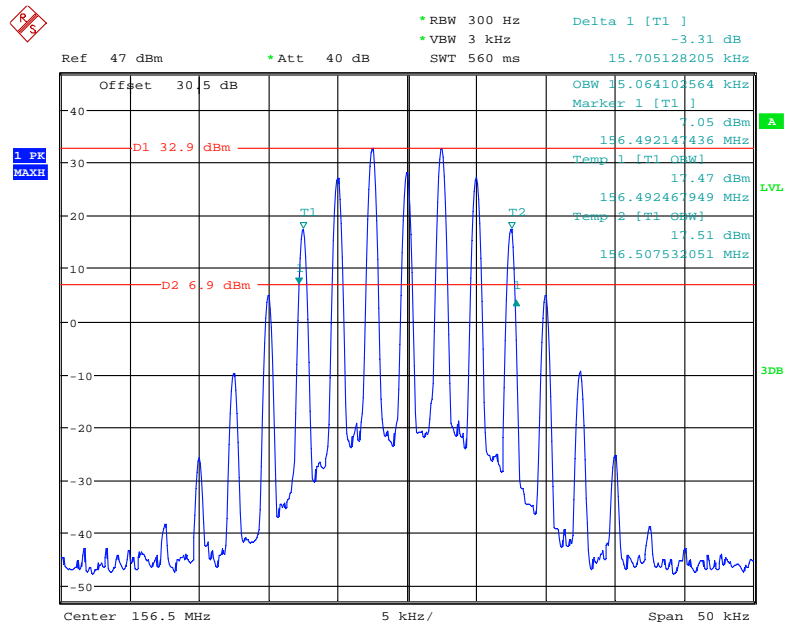
### Frequency 152.15 MHz: Emission Mask B, Low Power



### Frequency 152.15 MHz: Emission Mask B, High Power

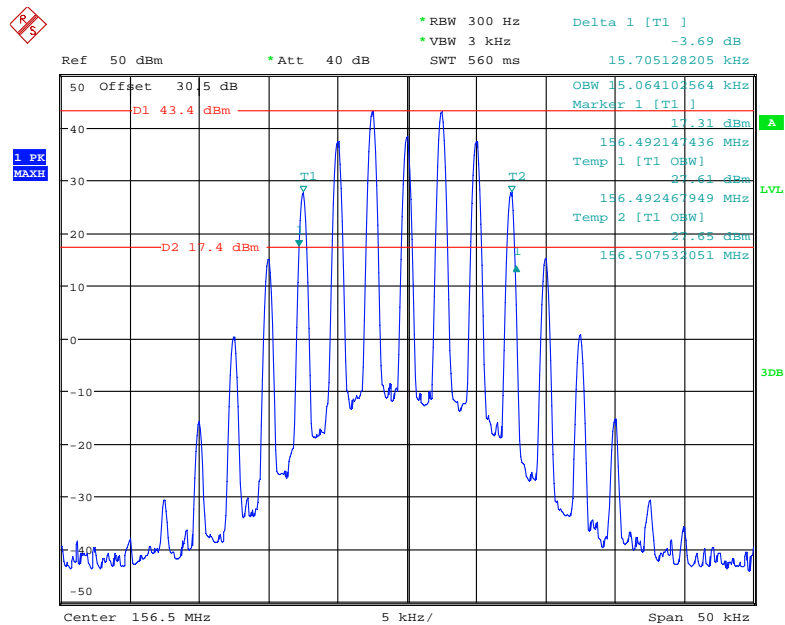


### Frequency 156.5 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



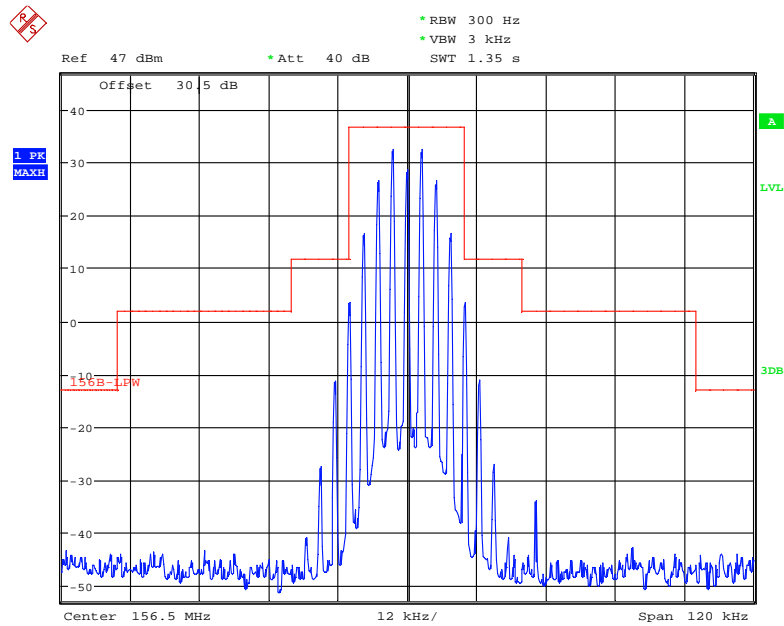
Date: 15.SEP.2017 20:34:22

### Frequency 156.5 MHz: 99% Occupied & 26 dB Bandwidth, High Power



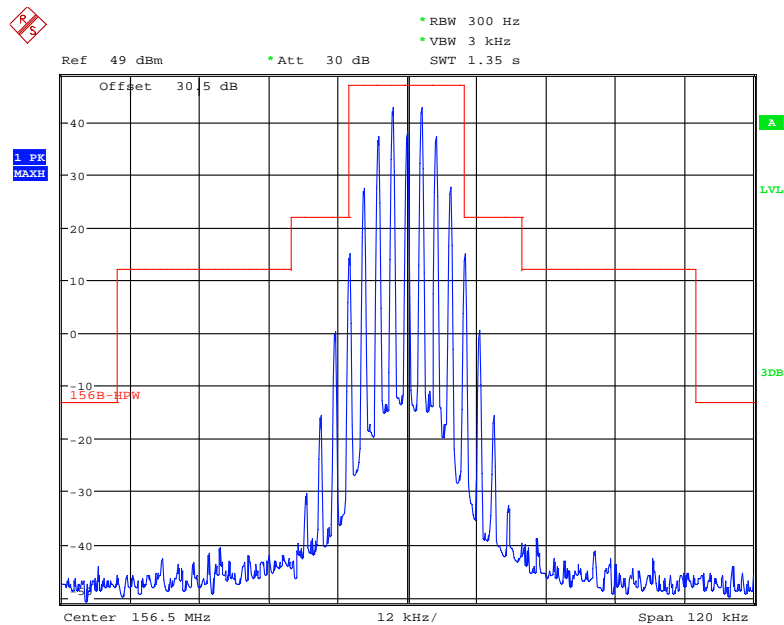
Date: 15.SEP.2017 20:25:39

### Frequency 156.5 MHz: Emission Mask B, Low Power



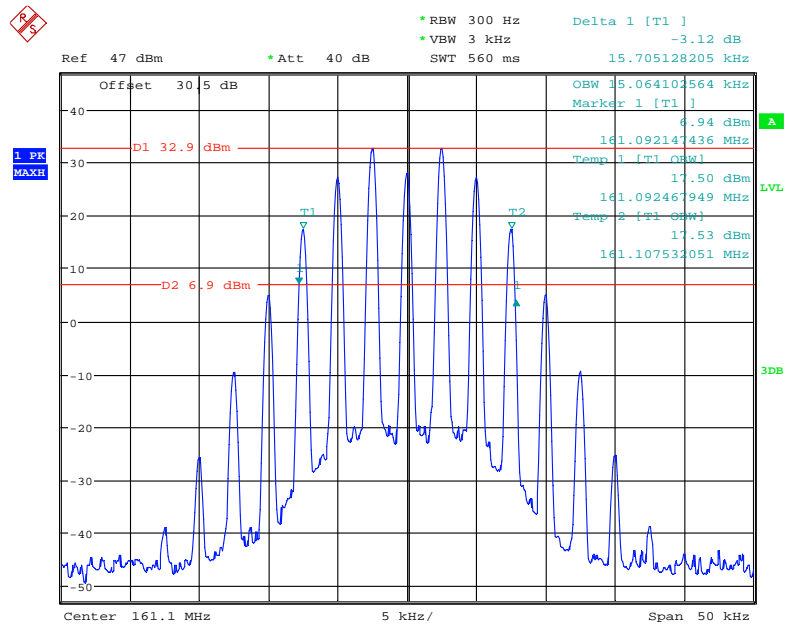
Date: 15.SEP.2017 21:57:38

### Frequency 156.5 MHz: Emission Mask B, High Power



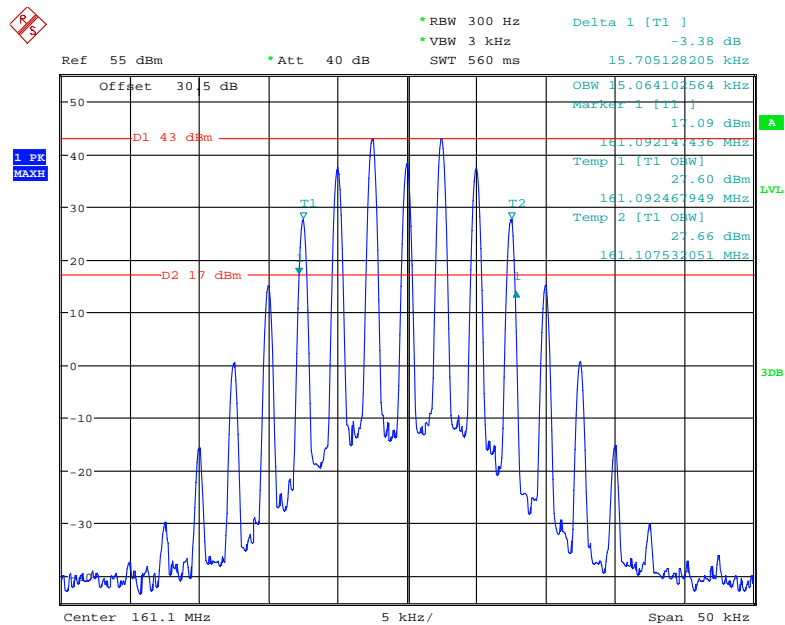
Date: 20.SEP.2017 23:40:17

### Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



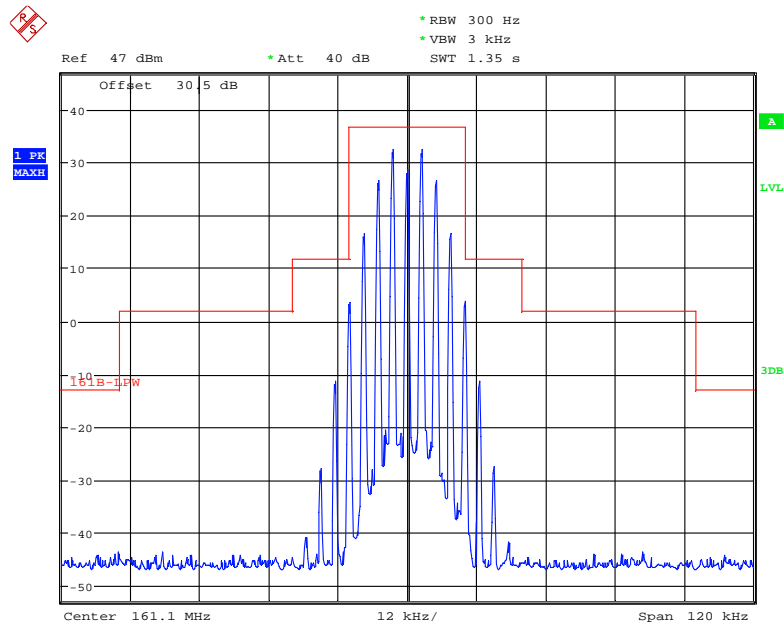
Date: 15.SEP.2017 20:33:17

### Frequency 161.1 MHz: 99% Occupied & 26 dB Bandwidth, High Power



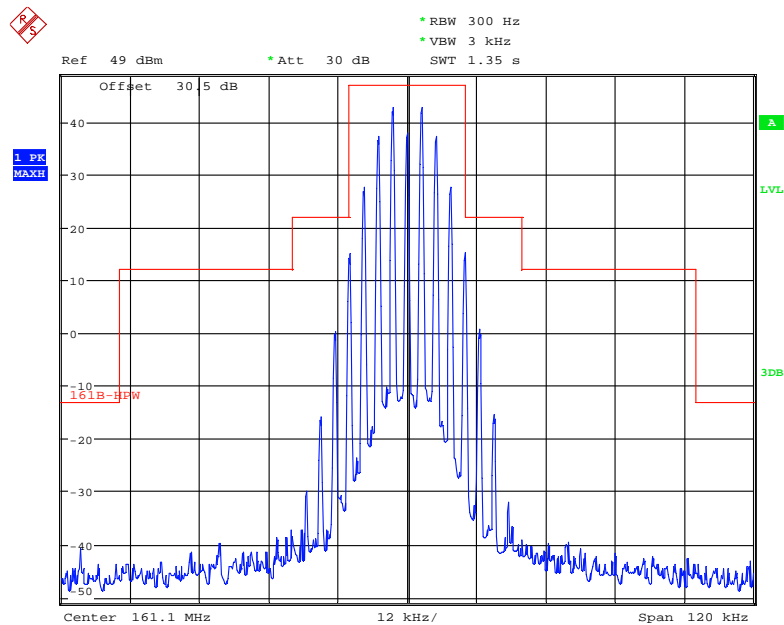
Date: 15.SEP.2017 20:30:38

### Frequency 161.1 MHz: Emission Mask B, Low Power



Date: 15.SEP.2017 21:50:15

### Frequency 161.1 MHz: Emission Mask B, High Power



Date: 20.SEP.2017 23:41:26



## FCC §2.1051 & §22.861 & §74.462 & § 80.211 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ , 0 dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least  $7.27 (f_d - 2.88 \text{ kHz})$  dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.

Emission Mask B - 25 kHz channel bandwidth equipment. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P)$  dB.

### Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.

### Test Data

#### Environmental Conditions

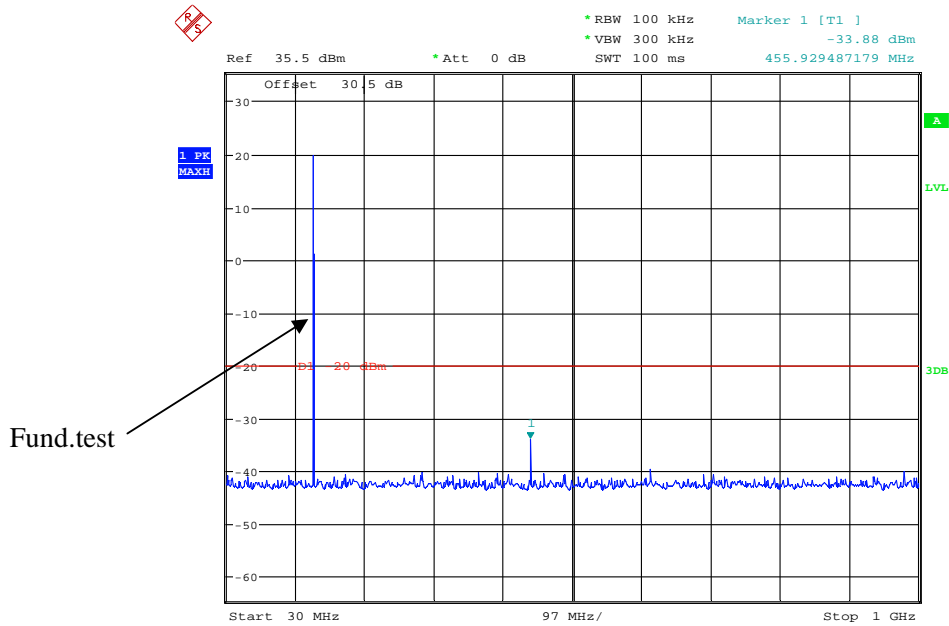
Temperature:	24~27 °C
Relative Humidity:	50~57 %
ATM Pressure:	100.0~101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-15.*

*Test Mode: Transmitting, please refer to the following plots.*

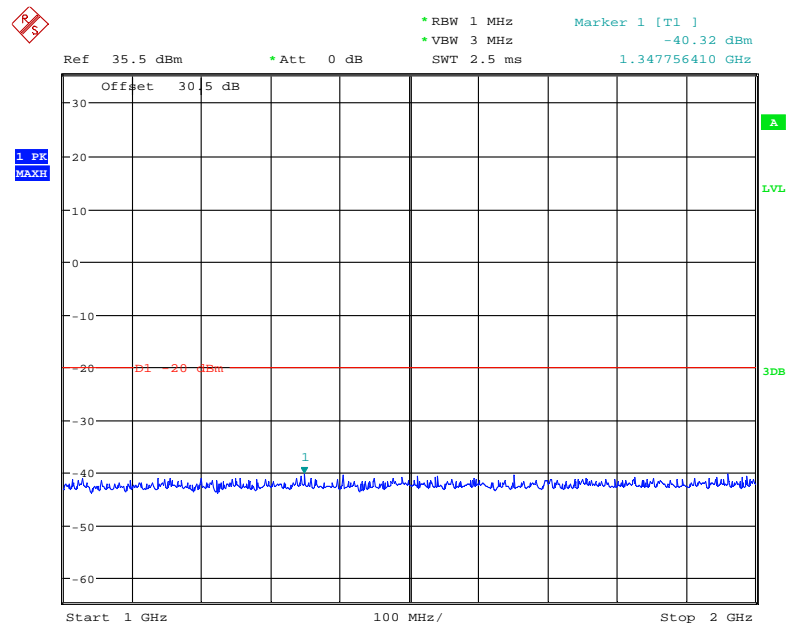
**Digital Modulation:**

**30MHz – 1 GHz, Channel Spacing 12.5 kHz, 152.15 MHz**



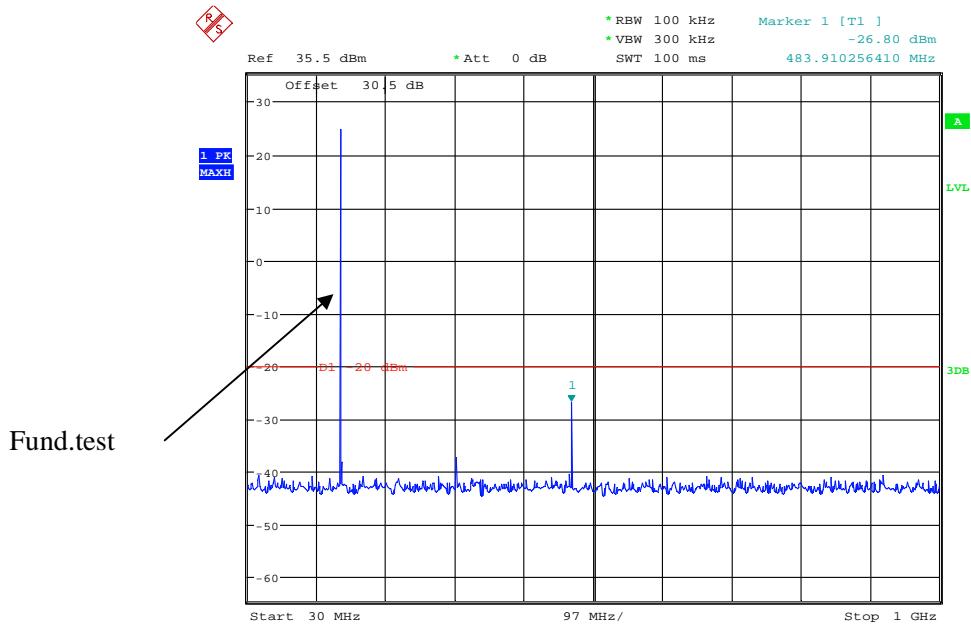
Date: 15.SEP.2017 23:09:17

**1 GHz – 2 GHz, Channel Spacing 12.5 kHz, 152.15 MHz**



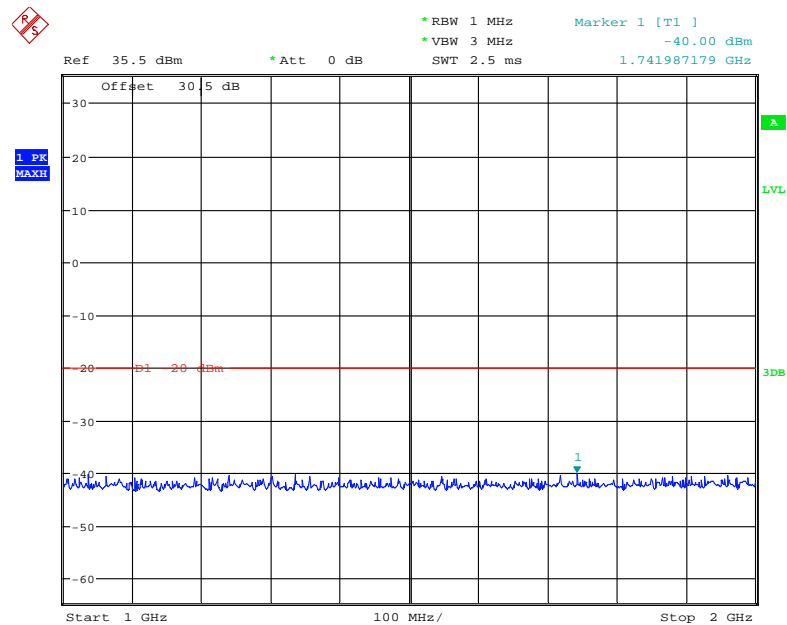
Date: 15.SEP.2017 23:10:56

### 30MHz – 1 GHz, Channel Spacing 12.5 kHz, 161.1 MHz



Date: 15.SEP.2017 23:12:38

### 1 GHz – 2 GHz, Channel Spacing 12.5 kHz, 161.1 MHz



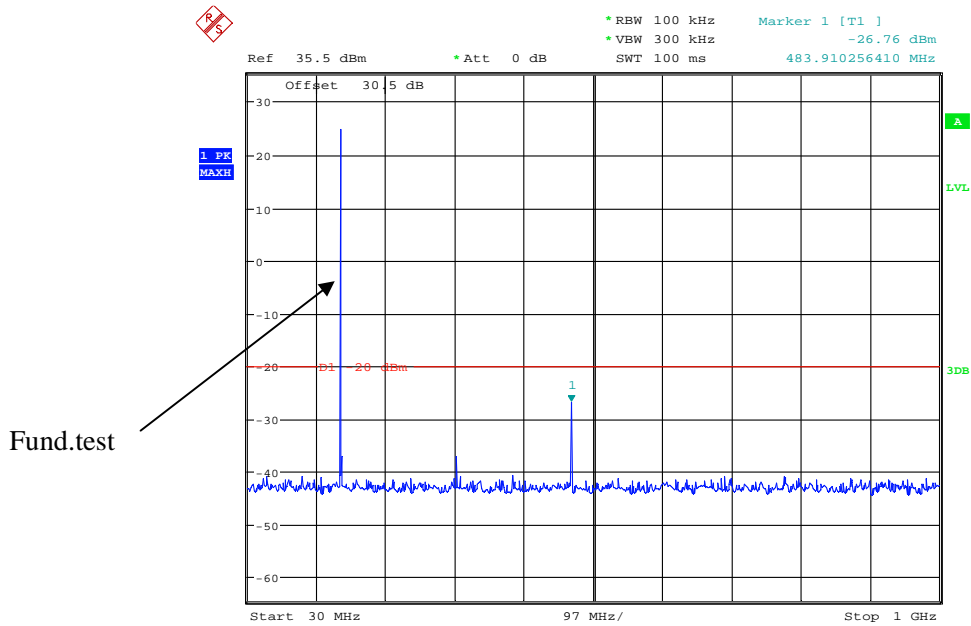
Date: 15.SEP.2017 23:13:05

### 30MHz – 1 GHz, Channel Spacing 12.5 kHz, 152.15 MHz



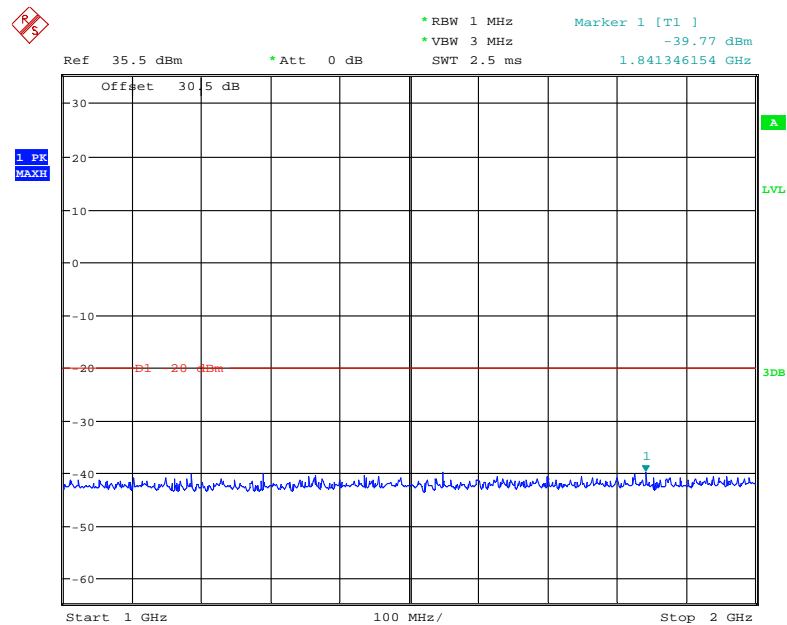
Date: 15.SEP.2017 23:14:15

### 30MHz – 1 GHz, Channel Spacing 12.5 kHz, 161.1 MHz



Date: 15.SEP.2017 23:17:52

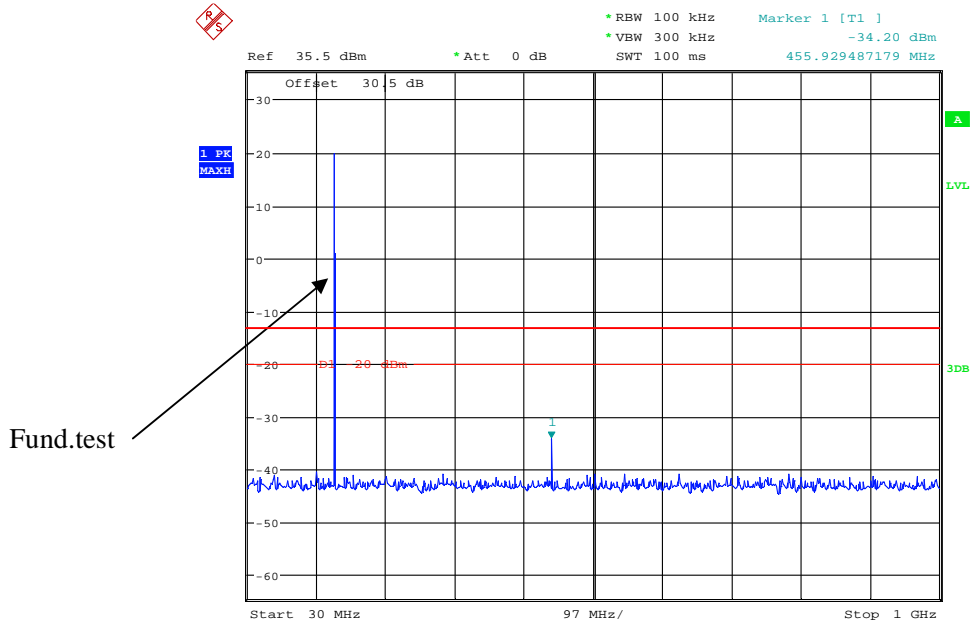
### 1 GHz – 2 GHz, Channel Spacing 12.5 kHz, 161.1 MHz



Date: 15.SEP.2017 23:15:16

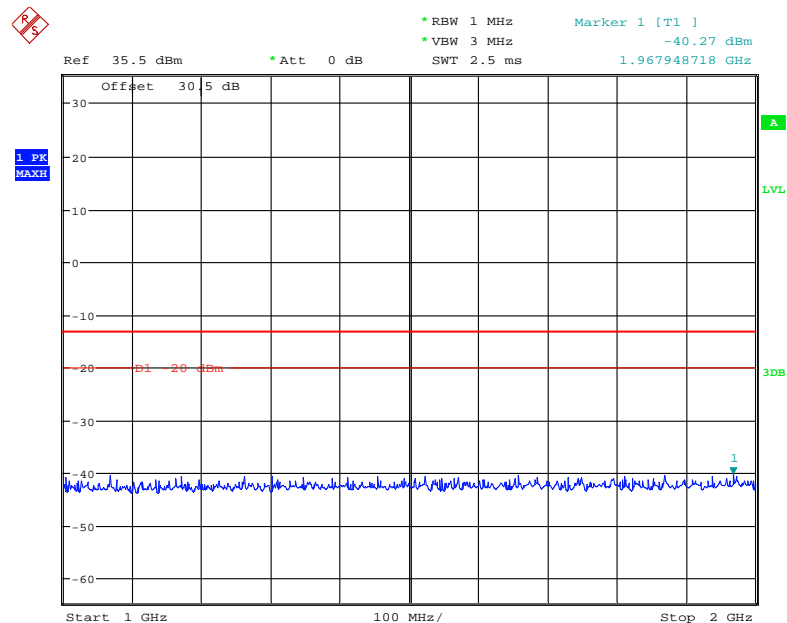
**Analog Modulation:**

**30MHz – 1 GHz, Channel Spacing 25 kHz, 152.15 MHz**



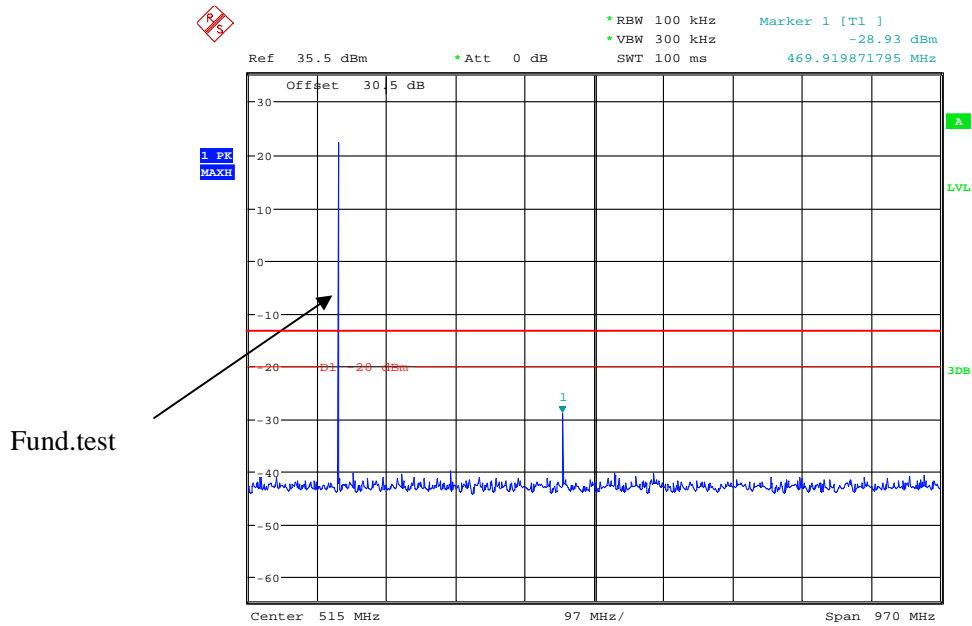
Date: 15.SEP.2017 23:18:15

**1 GHz – 2 GHz, Channel Spacing 25 kHz, 152.15 MHz**



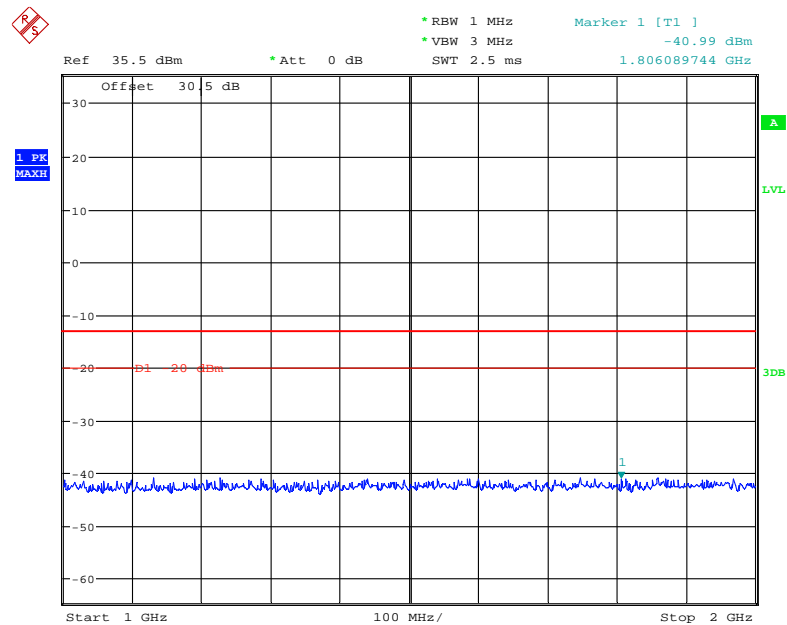
Date: 15.SEP.2017 23:16:25

### 30MHz – 1 GHz, Channel Spacing 25 kHz, 156.5 MHz



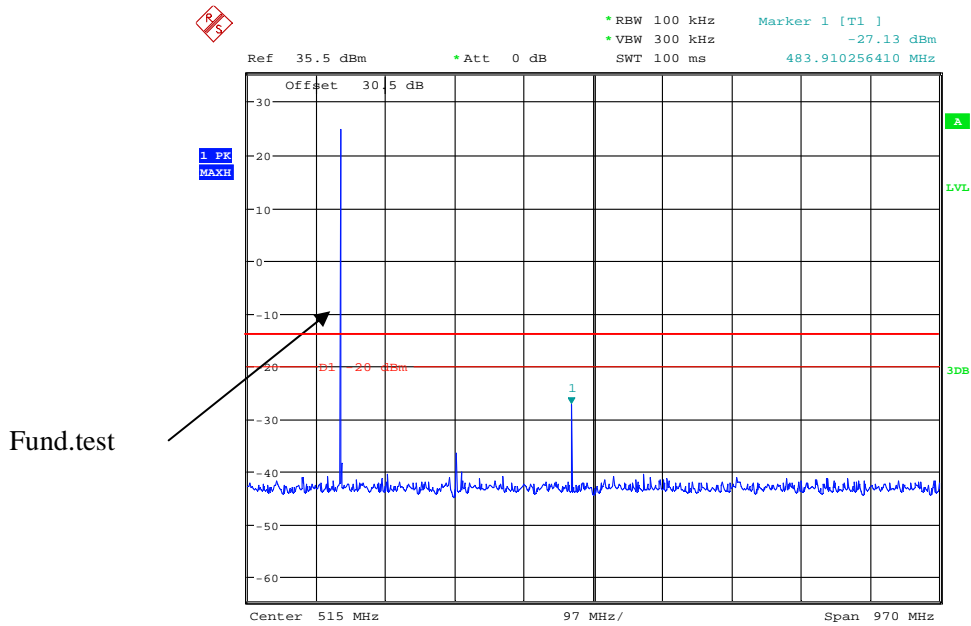
Date: 15.SEP.2017 23:18:42

### 1 GHz – 2 GHz, Channel Spacing 25 kHz, 156.5 MHz



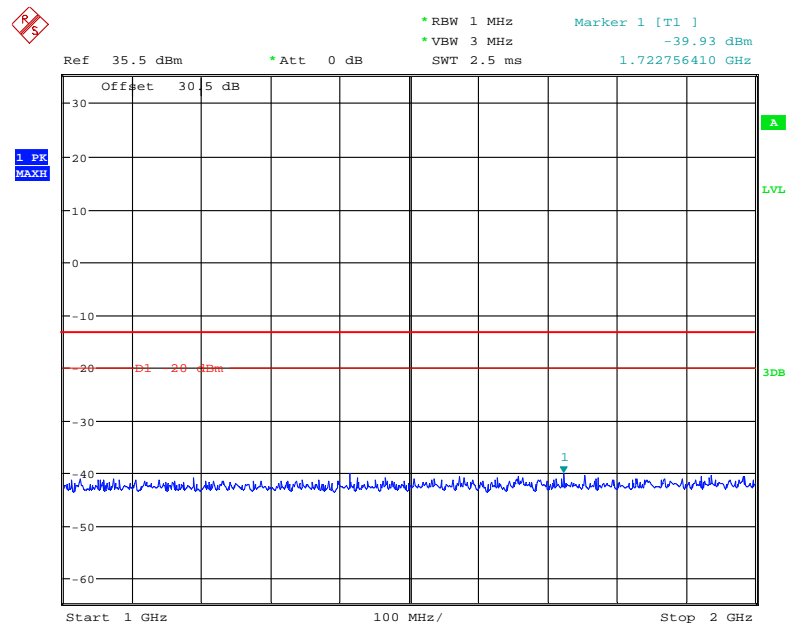
Date: 15.SEP.2017 23:16:06

### 30MHz – 1 GHz, Channel Spacing 25 kHz, 161.1 MHz



Date: 15.SEP.2017 23:19:05

### 1 GHz – 5 GHz, Channel Spacing 25 kHz, 161.1 MHz



Date: 15.SEP.2017 23:15:47



## FCC §2.1053 & §22.861 & §74.462 & § 80.211 - RADIATED SPURIOUS EMISSIONS

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### Applicable Standard

FCC §2.1053, §22.861, §74.462, § 80.211

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 50 + 10 Log<sub>10</sub> (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

### Test Data

#### Environmental Conditions

Temperature:	24~27 °C
Relative Humidity:	50~57 %
ATM Pressure:	100.0~101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-15.*

*Test Mode: Transmitting*

**30MHz - 2GHz:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Analog 152.15MHz-12.5 kHz										
304.30	34.16	126	1.8	H	-62.8	0.36	0	-63.16	-20	43.16
304.30	29.37	129	1.2	V	-67.6	0.36	0	-67.96	-20	47.96
1217.20	44.65	288	1.5	H	-63.3	1.50	7.20	-57.60	-20	37.60
1217.20	45.28	107	2.4	V	-62.4	1.50	7.20	-56.70	-20	36.70
Analog 161.1MHz-12.5 kHz										
322.20	44.08	217	1.6	H	-52.9	0.36	0	-53.26	-20	34.26
322.20	33.34	257	1.8	V	-63.7	0.36	0	-64.06	-20	44.06
483.30	50.73	336	1.5	H	-46.3	0.47	0	-46.77	-20	26.77
483.30	47.90	49	1.8	V	-49.1	0.47	0	-49.57	-20	29.57
1611.00	44.26	203	2.1	H	-64.1	1.40	8.90	-56.60	-20	36.60
1611.00	45.83	274	2.2	V	-62.3	1.40	8.90	-54.80	-20	34.80
Analog 152.15MHz-25 kHz										
456.45	33.43	74	1.6	H	-63.6	0.47	0	-64.07	-13	51.07
456.45	30.33	10	1.6	V	-66.7	0.47	0	-67.17	-13	54.17
1521.50	44.88	172	1.3	H	-63.9	1.60	8.70	-56.80	-13	43.80
1521.50	45.06	274	1.9	V	-64.0	1.60	8.70	-56.90	-13	43.90
Analog 156.5MHz-25 kHz										
313.00	34.12	269	2.3	H	-62.9	0.36	0	-63.26	-13	50.26
313.00	31.78	320	1.4	V	-65.2	0.36	0	-65.56	-13	52.56
1408.50	46.21	61	1.1	H	-61.7	1.60	8.30	-55.00	-13	42.00
1408.50	45.38	21	1.6	V	-62.8	1.60	8.30	-56.10	-13	43.10

Frequency (MHz)	Receiver Reading (dBμV)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Analog 161.1MHz-25 kHz										
483.30	35.27	79	2.0	H	-61.7	0.47	0	-62.17	-13	49.17
483.30	33.14	85	1.5	V	-63.9	0.47	0	-64.37	-13	51.37
1449.90	44.22	188	2.2	H	-63.7	1.60	8.30	-57.00	-13	44.00
1449.90	45.31	300	1.4	V	-62.9	1.60	8.30	-56.20	-13	43.20
Digital 152.15MHz-12.5 kHz										
304.30	31.73	241	1.1	H	-65.3	0.36	0	-65.66	-20	45.66
304.30	28.44	86	1.9	V	-68.6	0.36	0	-68.96	-20	48.96
1521.50	45.25	180	2.0	H	-63.5	1.60	8.70	-56.40	-20	36.40
1521.50	43.68	35	1.2	V	-65.4	1.60	8.70	-58.30	-20	38.30
Digital 161.1MHz-12.5 kHz										
324.20	30.15	338	1.0	H	-66.8	0.36	0	-67.16	-20	47.16
324.20	29.85	37	2.5	V	-67.1	0.36	0	-67.46	-20	47.46
1611.00	44.86	242	1.8	H	-63.5	1.40	8.90	-56.00	-20	36.00
1611.00	42.97	16	1.6	V	-65.1	1.40	8.90	-57.60	-20	37.60

**Note:**

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

**FCC §2.1055 & § 22.355 & §74.464 & § 80.209 - FREQUENCY STABILITY****Applicable Standard**

FCC §2.1055, § 22.355, §74.464, § 80.209

**Test Procedure**

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	24~27 °C
<b>Relative Humidity:</b>	50~57 %
<b>ATM Pressure:</b>	100.0~101.0 kPa

*The testing was performed by Jacob Kong on 2017-09-15.*

*Test Mode: Transmitting*

Digital Modulation, Reference Frequency: 152.15 MHz, Limit: $\pm 5.0$ ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	152.1498320	-1.104
40	13.6	152.1498773	-0.806
30	13.6	152.1498063	-1.273
20	13.6	152.1499312	-0.452
10	13.6	152.1499480	-0.342
0	13.6	152.1499612	-0.255
-10	13.6	152.1499163	-0.550
-20	13.6	152.1498391	-1.058
-30	13.6	152.1499631	-0.242
Frequency Stability versus Input Voltage			
20	11.6	152.1499229	-0.506

Digital Modulation, Reference Frequency: 161.1 MHz, Limit: $\pm 5.0$ ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	161.0998989	-0.627
40	13.6	161.0999607	-0.244
30	13.6	161.099907	-0.577
20	13.6	161.099926	-0.459
10	13.6	161.0999915	-0.053
0	13.6	161.0999599	-0.249
-10	13.6	161.0998527	-0.915
-20	13.6	161.0998083	-1.190
-30	13.6	161.0998009	-1.236
Frequency Stability versus Input Voltage			
20	11.6	161.099872	-0.795

Analog Modulation, Reference Frequency: 152.15 MHz, Limit: $\pm 5.0$ ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	152.14993	-0.460
40	13.6	152.14996	-0.263
30	13.6	152.14998	-0.131
20	13.6	152.14993	-0.460
10	13.6	152.14983	-1.117
0	13.6	152.14980	-1.314
-10	13.6	152.14984	-1.052
-20	13.6	152.14997	-0.197
-30	13.6	152.14995	-0.329
Frequency Stability versus Input Voltage			
20	11.6	152.14989	-0.723

Analog Modulation, Reference Frequency: 161.1 MHz, Limit: $\pm 5.0$ ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	161.0999321	-0.421
40	13.6	161.0999368	-0.392
30	13.6	161.0998919	-0.671
20	13.6	161.0999391	-0.378
10	13.6	161.0999641	-0.223
0	13.6	161.0999031	-0.602
-10	13.6	161.0998743	-0.780
-20	13.6	161.0999448	-0.343
-30	13.6	161.0999008	-0.616
Frequency Stability versus Input Voltage			
20	11.6	161.0999665	-0.208

Analog Modulation, Reference Frequency: 152.15 MHz, Limit: $\pm 5.0$ ppm, 25 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	152.1499939	-0.040
40	13.6	152.1499665	-0.220
30	13.6	152.1498385	-1.061
20	13.6	152.1499885	-0.075
10	13.6	152.149992	-0.053
0	13.6	152.1498812	-0.781
-10	13.6	152.1499018	-0.645
-20	13.6	152.149829	-1.124
-30	13.6	152.1498885	-0.733
Frequency Stability versus Input Voltage			
20	11.6	152.149919	-0.532

Analog Modulation, Reference Frequency: 156.5 MHz, Limit: $\pm 5.0$ ppm, 25 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	156.499934	-0.421
40	13.6	156.4998184	-1.161
30	13.6	156.4999317	-0.437
20	13.6	156.49987	-0.831
10	13.6	156.4999382	-0.395
0	13.6	156.4998785	-0.776
-10	13.6	156.4998045	-1.249
-20	13.6	156.49994	-0.383
-30	13.6	156.4998571	-0.913
Frequency Stability versus Input Voltage			
20	11.6	156.4998128	-1.196

Analog Modulation, Reference Frequency: 161.1 MHz, Limit: $\pm 5.0$ ppm, 25 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Voltage Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	13.6	161.0999528	-0.293
40	13.6	161.0998419	-0.982
30	13.6	161.0998209	-1.112
20	13.6	161.0998699	-0.808
10	13.6	161.0998889	-0.690
0	13.6	161.0999549	-0.280
-10	13.6	161.0998007	-1.237
-20	13.6	161.0998535	-0.909
-30	13.6	161.0999015	-0.612
Frequency Stability versus Input Voltage			
20	11.6	161.0999302	-0.433

\*\*\*\*\* END OF REPORT \*\*\*\*\*