

1.1 Emission limits and Emission Masks at the antenna terminals

FCC 15 Para. No.: 2.1053, 2.1057, 90.210, 90.691

RSS-119: Clause 5.8

Measurement Data:

Detector Mode	Peak
Resolution Bandwidth	100Hz
Video Bandwidth	300Hz
Trace mode	Max Hold

Requirements:

The term *displacement frequency*, f_d , used in these sections refers to the difference between the channel frequency and the emission component frequency expressed in kilohertz, and p is the transmitter output power in Watts.

Emission Mask B for Transmitters Equipped With an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 5.

Table 5 – Emission Mask B Displacement	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
Frequency, f_d (kHz)		
$10 < f_d \leq 20$	25	300
$20 < f_d \leq 50$	35	300
$f_d > 50$	$43 + 10 \log_{10}(p)$	Specified in Section 4.2.1

Emission Mask D for Transmitters Equipped With or Without an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 7.

Table 7 – Emission Mask D Displacement	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
Frequency, f_d (kHz)		
$5.625 < f_d \leq 12.5$	$7.27(f_d - 2.88)$	Specified in Section 4.2.2
$f_d > 12.5$	Whichever is the lesser: 70 or $50 + 10 \log_{10}(p)$	Specified in Section 4.2.2

Emission Mask E for Transmitters Equipped With or Without an Audio Low-Pass Filter

The power of any emission shall be attenuated below the transmitter output power P (dBW) as specified in Table 8.

Table 8 – Emission Mask E Displacement	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
Frequency, f_d (kHz)		
$3 < f_d \leq 4.6$	Whichever is the lesser: $30 + 16.67(f_d - 3)$ or $55 + 10 \log_{10}(p)$	Specified in Section 4.2.2
$f_d > 4.6$	Whichever is the lesser: 57 or $55 + 10 \log_{10}(p)$	Specified in Section 4.2.2

Part 90.691 Emission mask requirements for EA-based systems

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

§90.210 Emission masks

(h) *Emission Mask H.* For transmitters that are not 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 center of the authorized bandwidth by a displacement frequency (f_d in kHz) of 4 kHz or less: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 4 kHz, but no more than 8.5 kHz: At least $107 \log(f_d/4)$ dB;

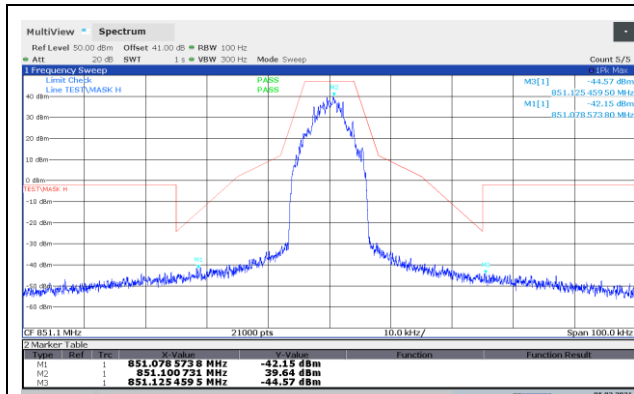
(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 8.5 kHz, but no more than 15 kHz: At least $40.5 \log(f_d/1.16)$ dB;

(4) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 15 kHz, but no more than 25 kHz: At least $116 \log(f_d/6.1)$ dB;

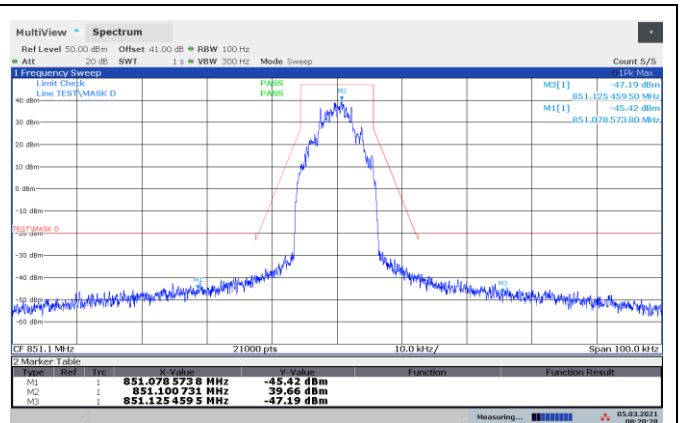
(5) On any frequency removed from the center of the authorized bandwidth by more than 25 kHz: At least $43 + 10 \log(P)$ dB.

Emission Mask Y for Equipment With a 25 kHz Channel Bandwidth and an Occupied Bandwidth Greater Than 20 kHz
Equipment with a 25 kHz channel bandwidth and an occupied bandwidth greater than 20 kHz shall have the power of any emission attenuated below the transmitter output power P (dBW) as specified in Table 17

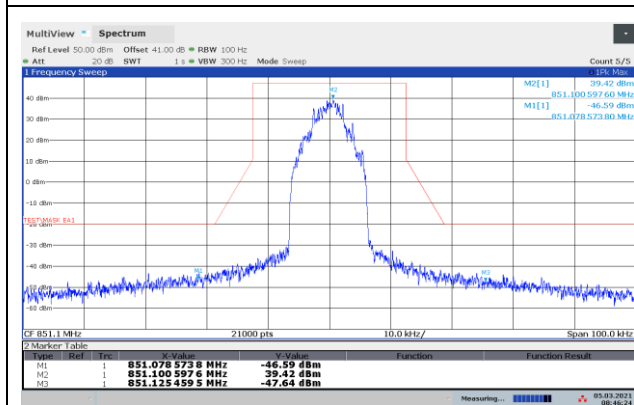
Table 17 – Emission Mask Y Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$12.375 < f_d \leq 13.975$	Whichever is the lesser: $30 + 16.67(f_d - 12.375)$ or $55 + 10 \log_{10}(p)$	Specified in Section 4.2.2
$f_d > 13.975$	Whichever is the lesser: 57 or $55 + 10 \log_{10}(p)$	Specified in Section 4.2.2



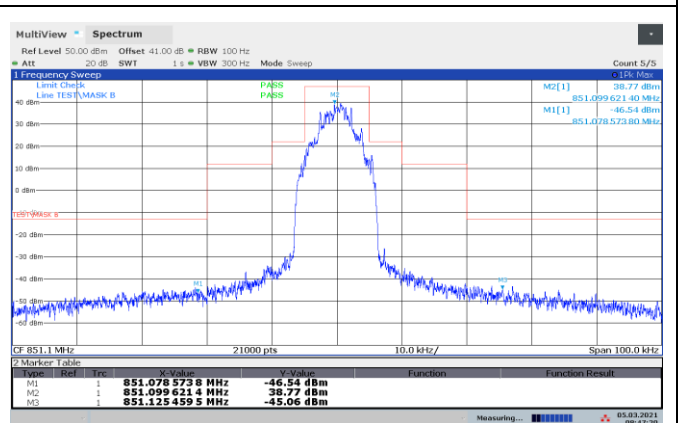
Mask H, TX, 7K60FXW, 50W, 851.1MHz



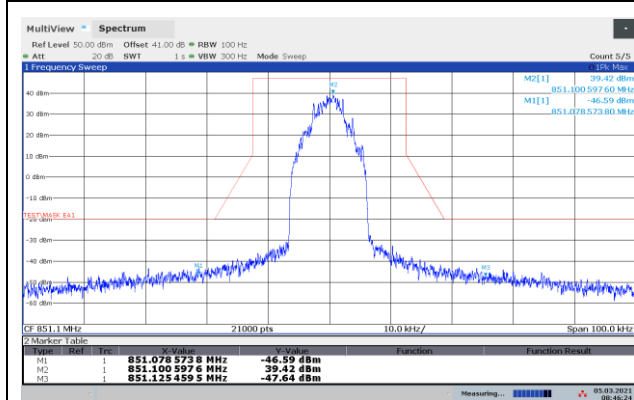
Mask D, TX, 7K60FXW, 50W, 851.1MHz



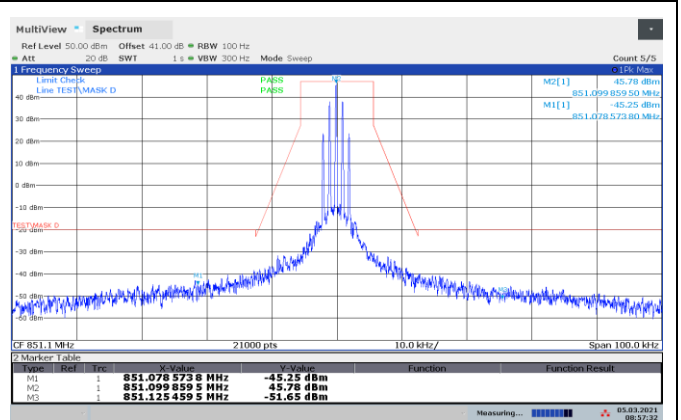
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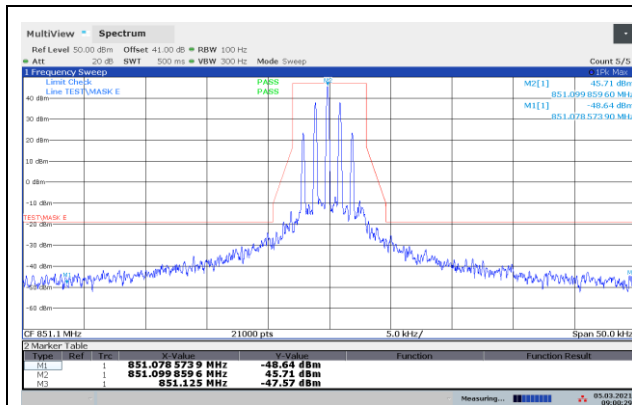
Mask B, TX, 16K0F3E, 50W, 851.1MHz (20kHz)



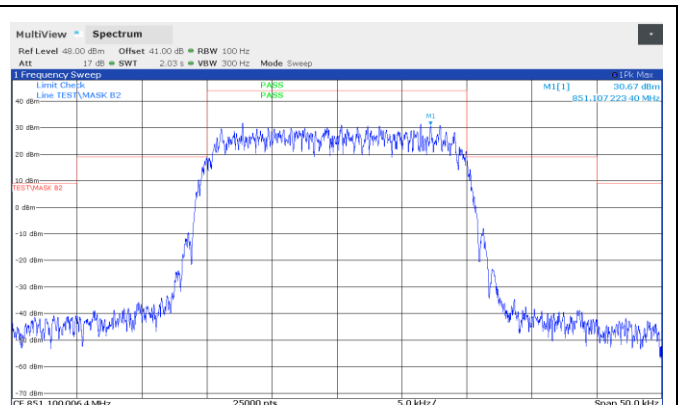
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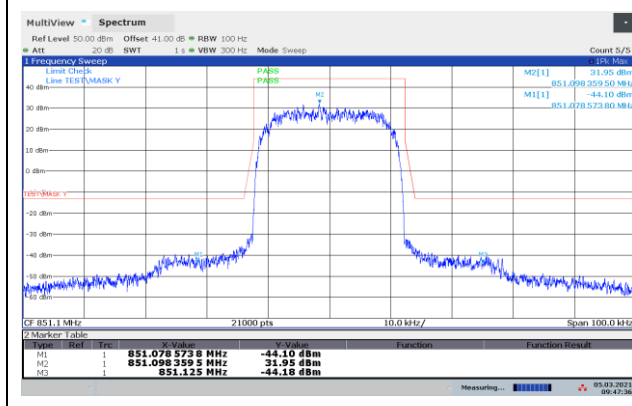
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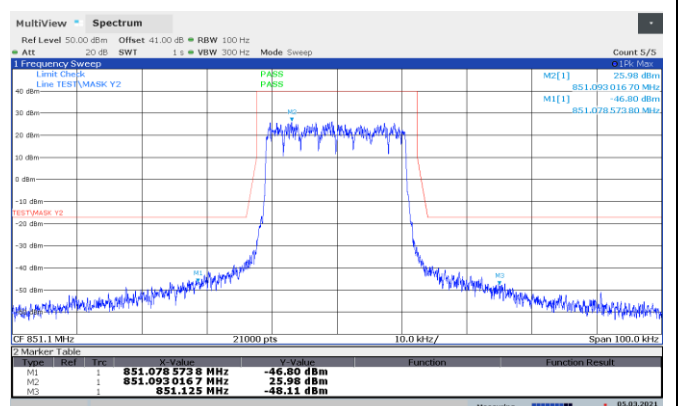
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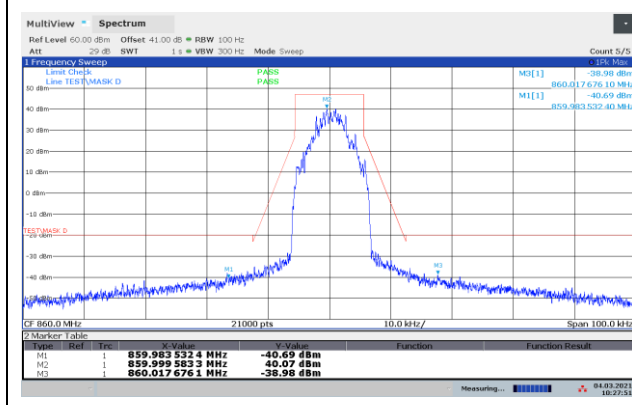
Mask B, TX, 0.20TETRA, 25W, 851.1MHz (20kHz)



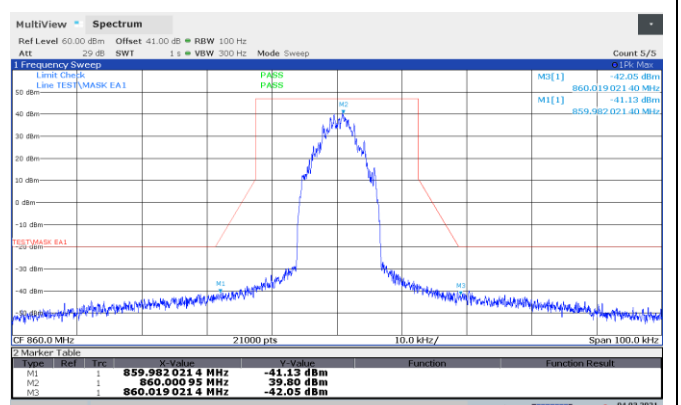
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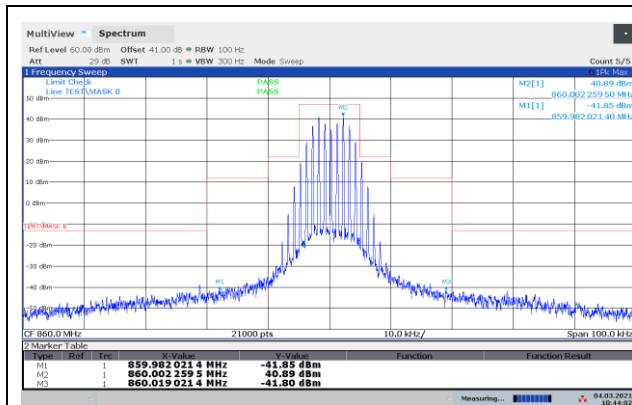
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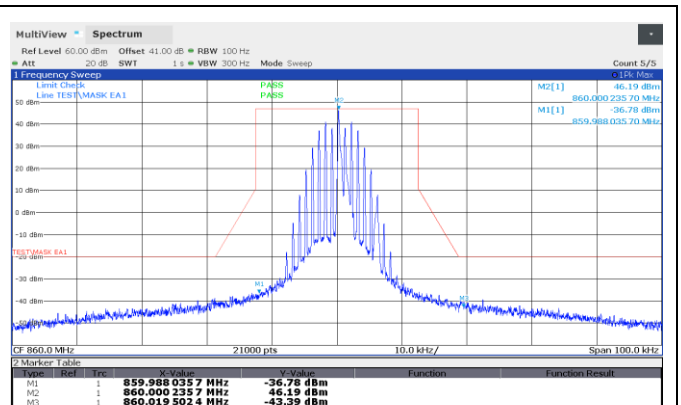
Mask D, TX, 7K60FXW, 50W, 860.0MHz



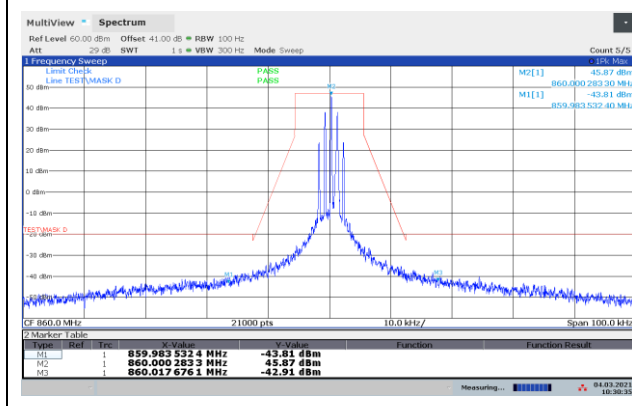
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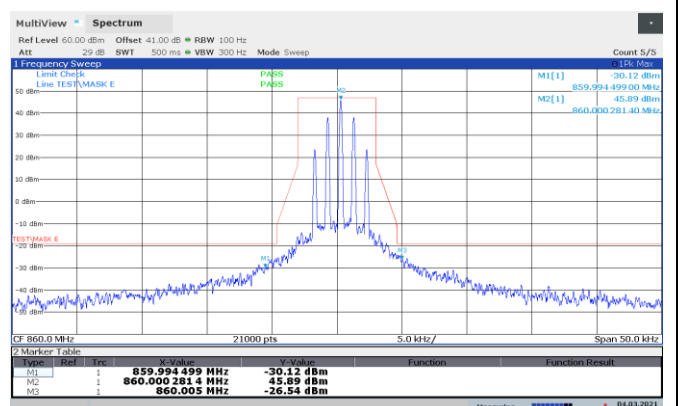
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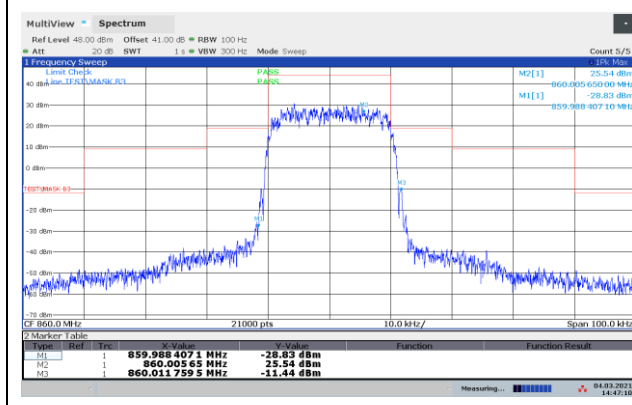
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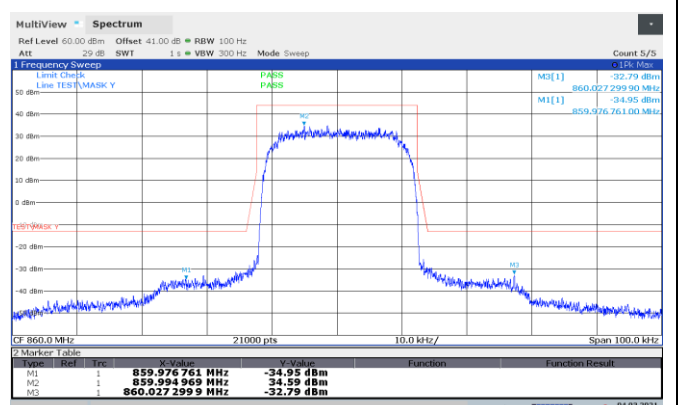
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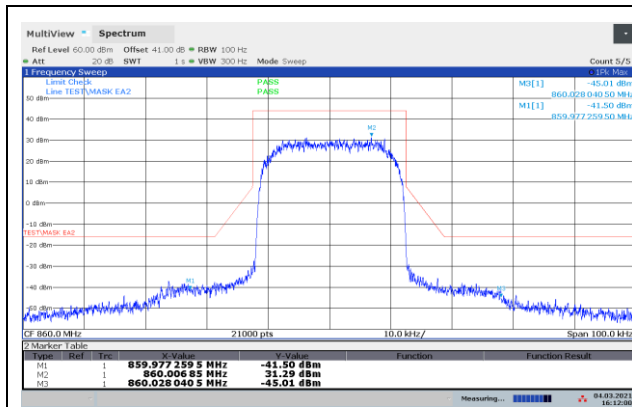
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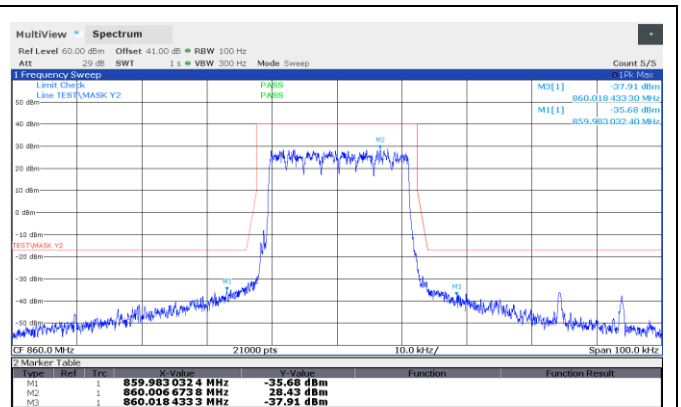
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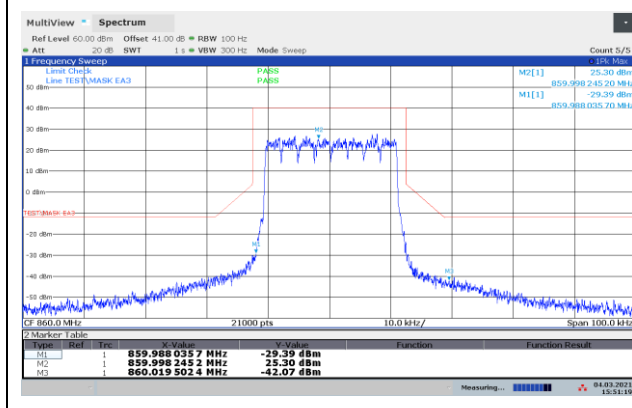
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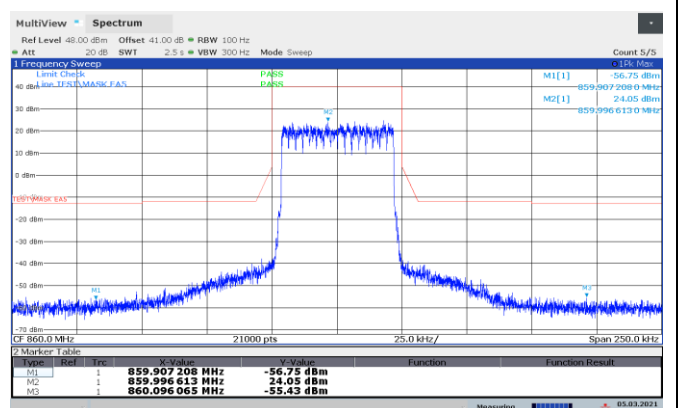
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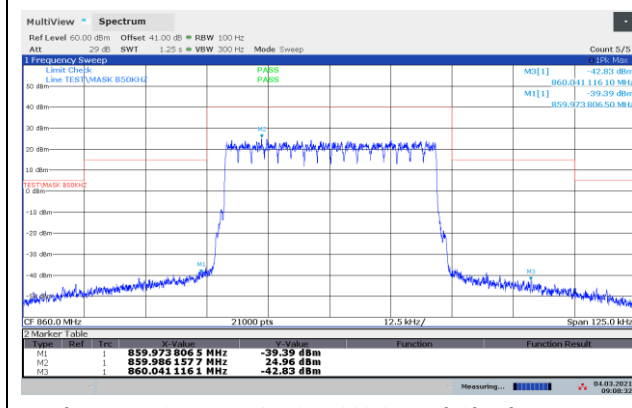
Mask Y, TX, 25KHzTEDS, 10W, 860.0MHz



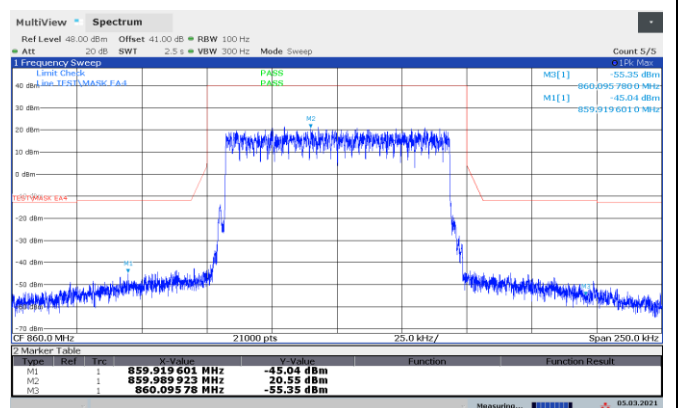
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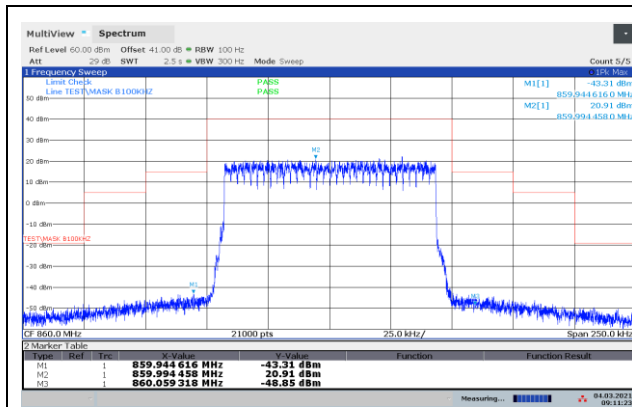
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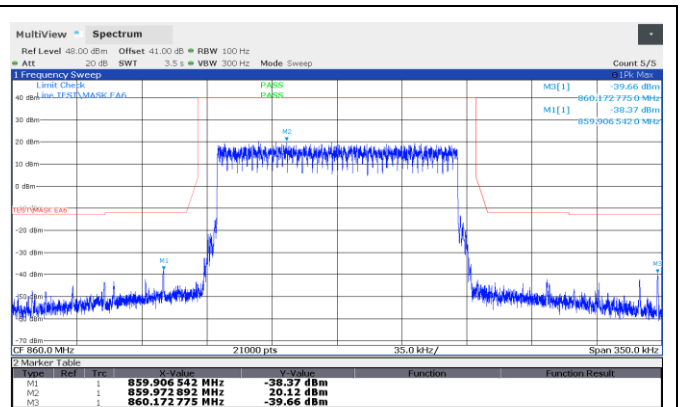
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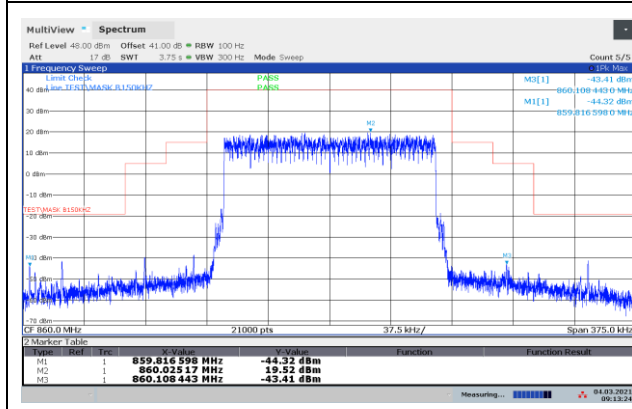
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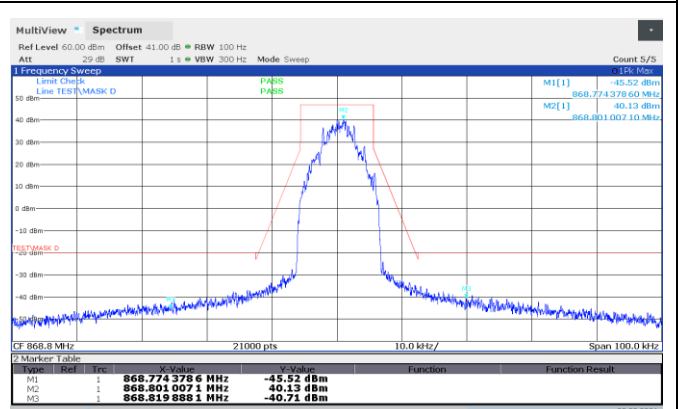
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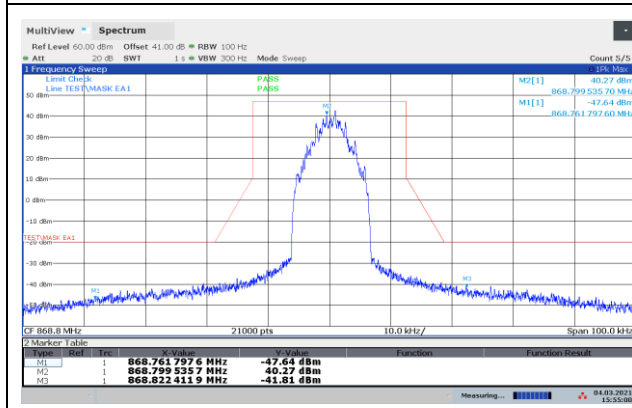
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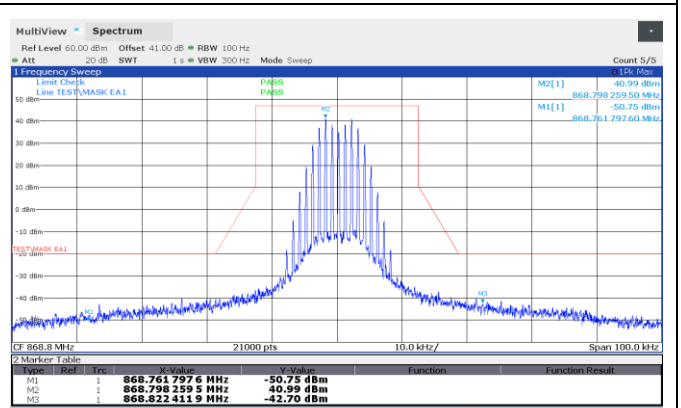
Mask B, TX, 150KHzTEDS, 10W, 860.0MHz



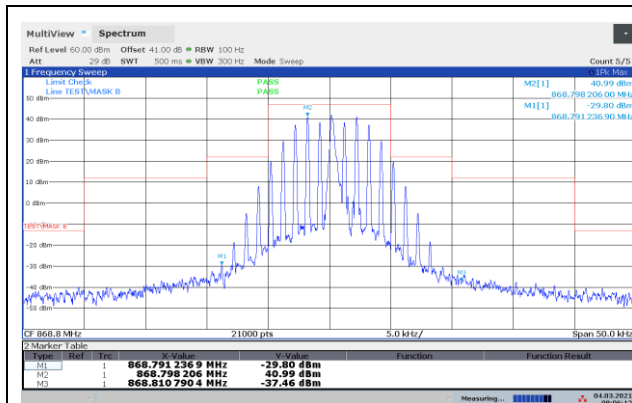
Mask D, TX, 7K60FXW, 50W, 868.8MHz



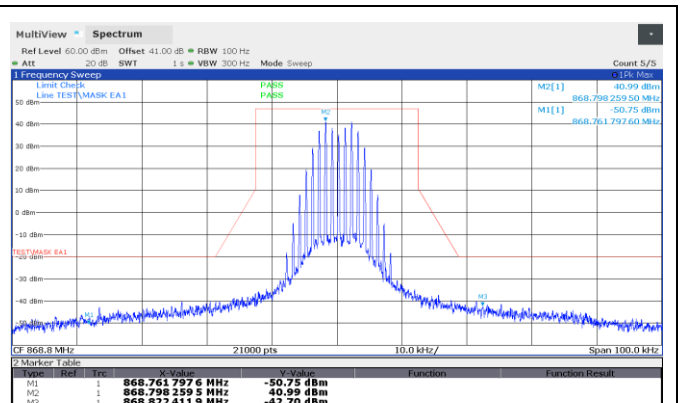
Mask EA-25, TX, 7K60FXW, 50W, 868.8MHz



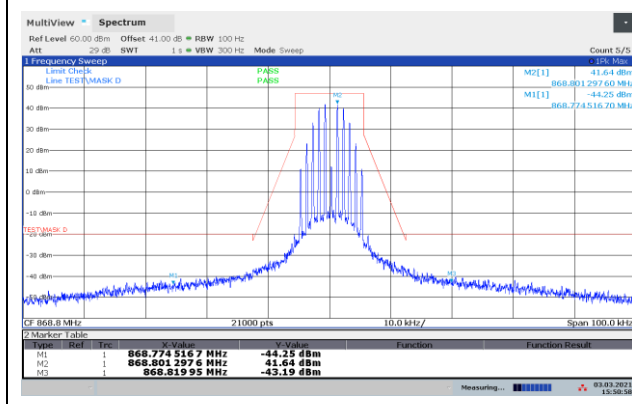
Mask B, TX, 16K0F3E, 50W, 868.8MHz



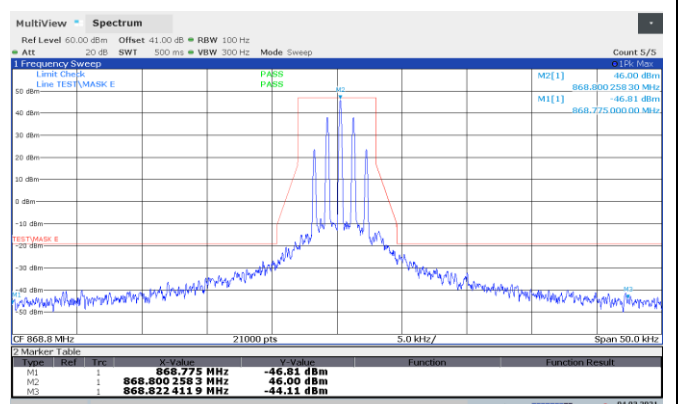
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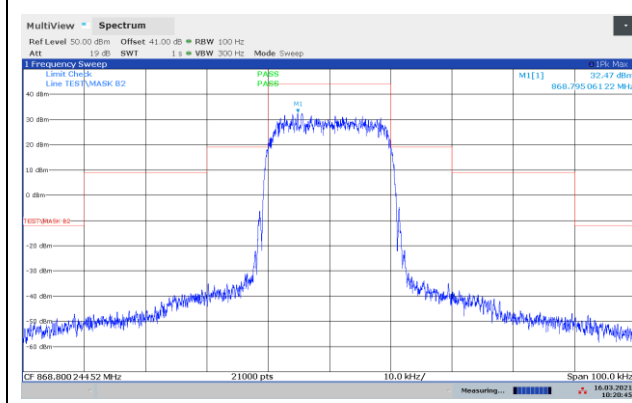
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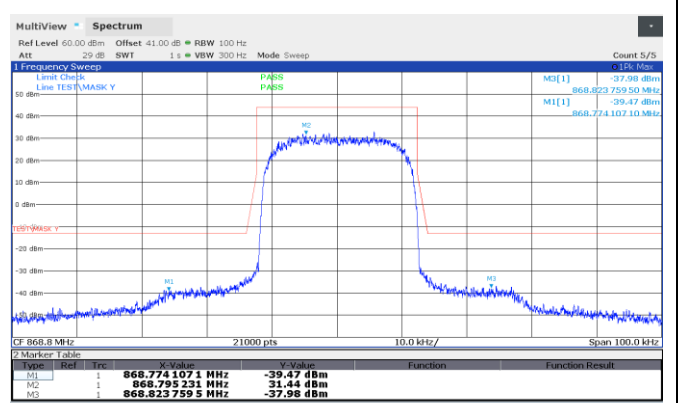
Mask D, TX, 11K0F3E, 50W, 868.8MHz



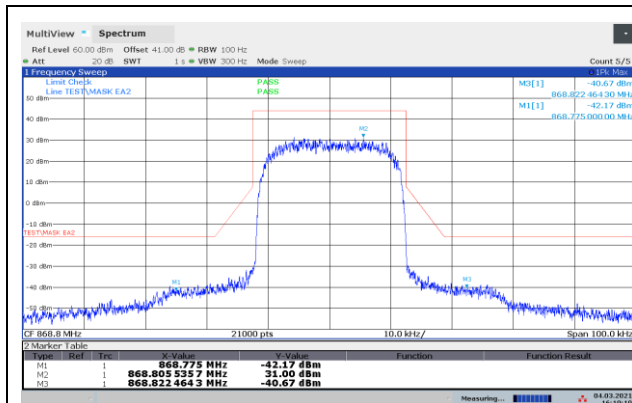
Mask E, TX, 6K00F3E, 50W, 868.8MHz



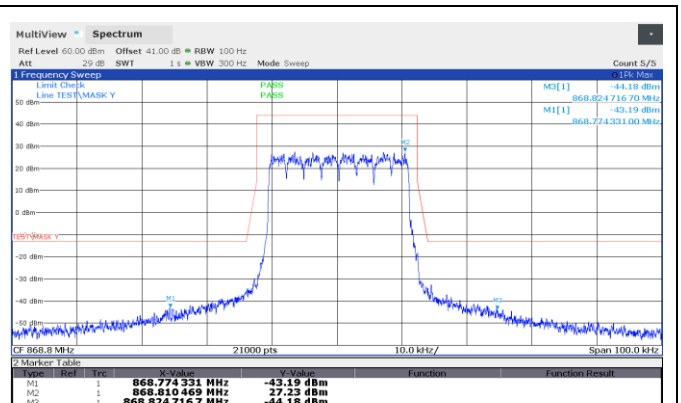
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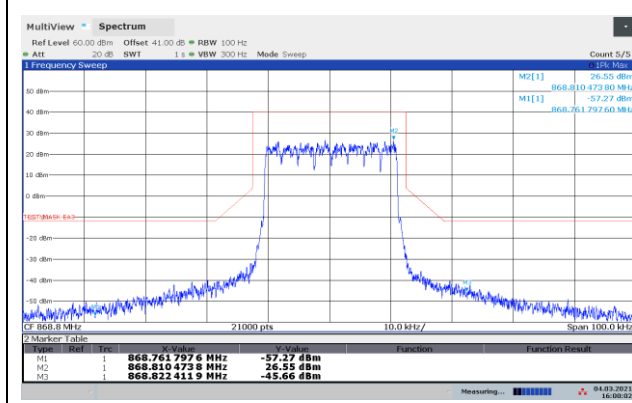
Mask Y, TX, 0.35TETRA, 25W, 868.8MHz



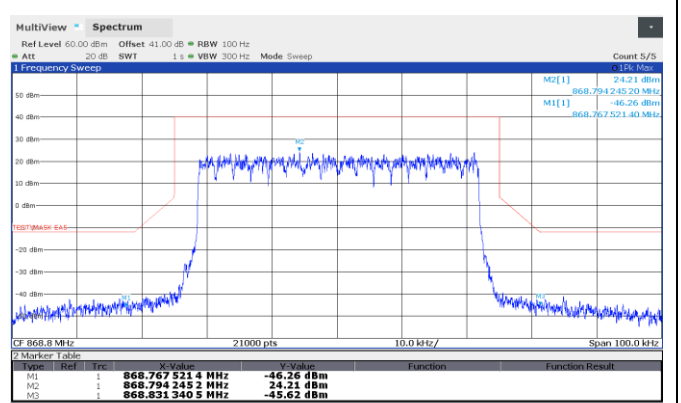
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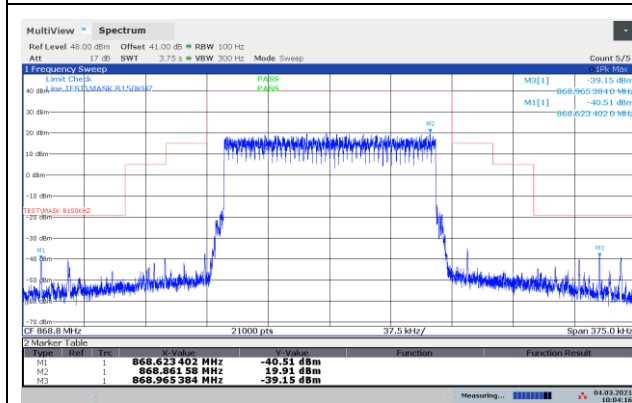
Mask Y, TX, 25KHzTEDS, 10W, 868.8MHz



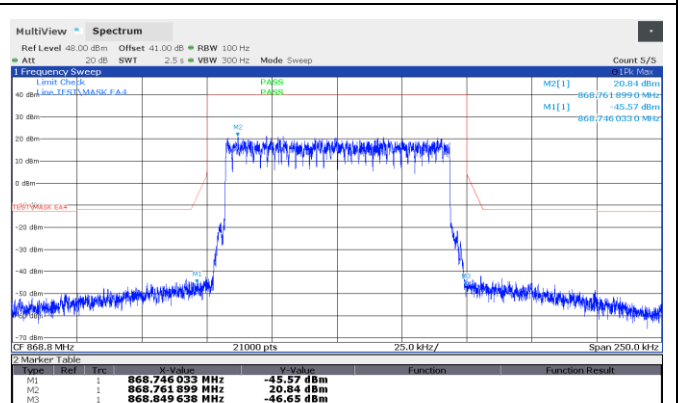
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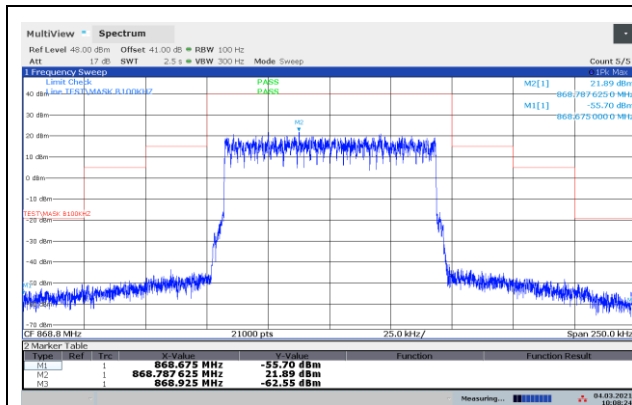
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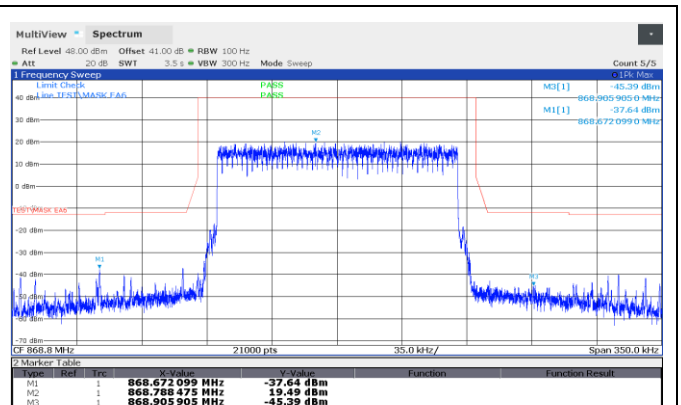
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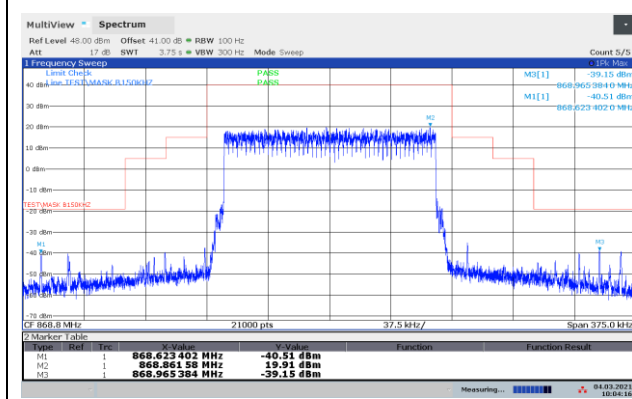
Mask EA-100, TX, 100KHzTEDS, 10W, 868.8MHz



Mask B, TX, 100KHzTEDS, 10W, 868.8MHz



Mask EA-150, TX, 150KHzTEDS, 10W, 868.8MHz



Mask B, TX, 150KHzTEDS, 10W, 868.8MHz

1.2 Conducted emissions at Antenna terminals

FCC 15 Para. No.: 2.1053, 2.1057, 90.210

RSS-119: 5.8

Measurement Data:

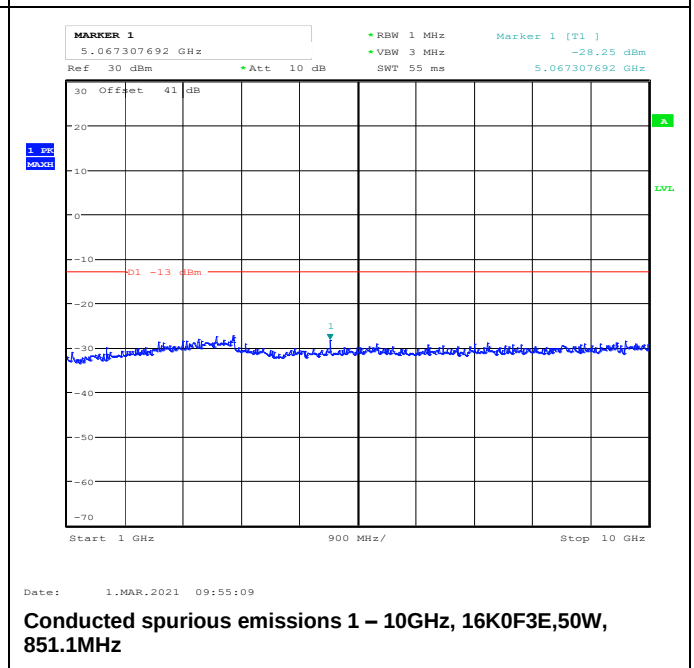
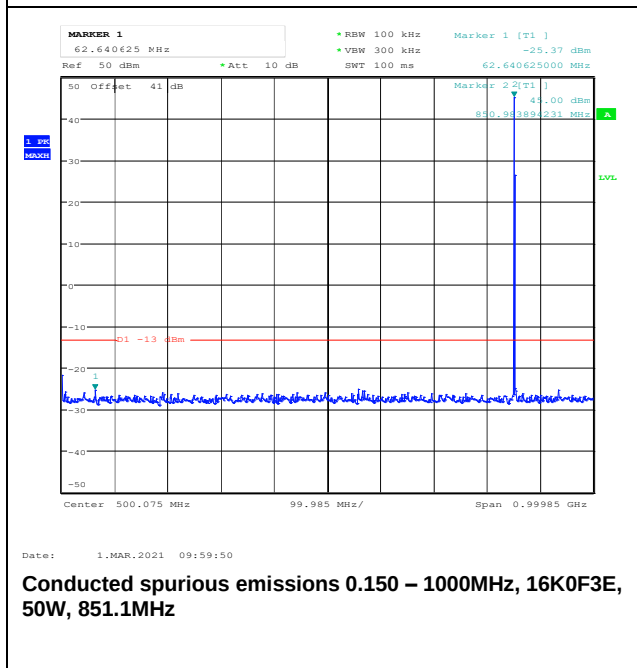
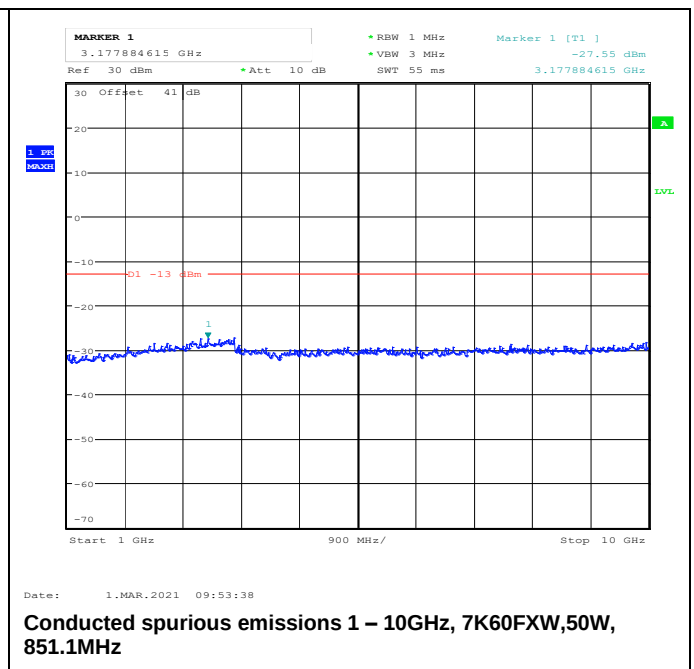
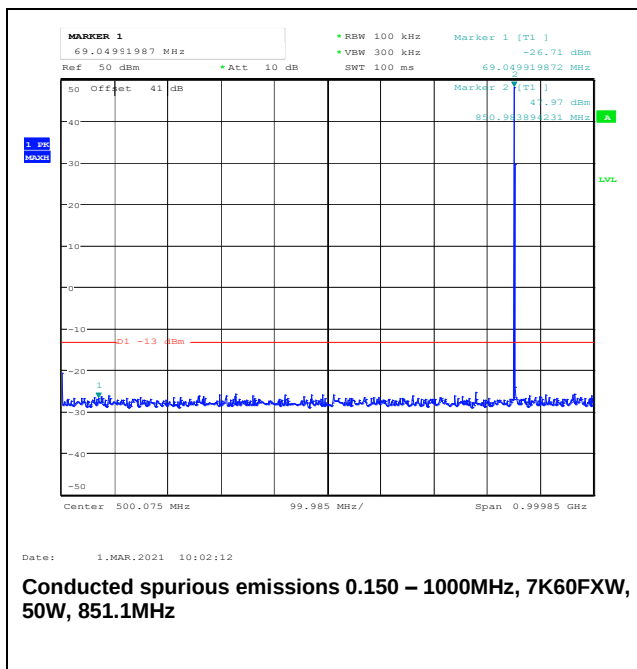
Detector Mode	Peak
Resolution Bandwidth	100kHz below 1GHz, 1MHz above 1GHz and 100Hz for Multi carrier (Intermodulation)
Video Bandwidth	300Hz, 300KHz and 3MHz
Trace mode	Max Hold
Span (intermodulation)	1MHz

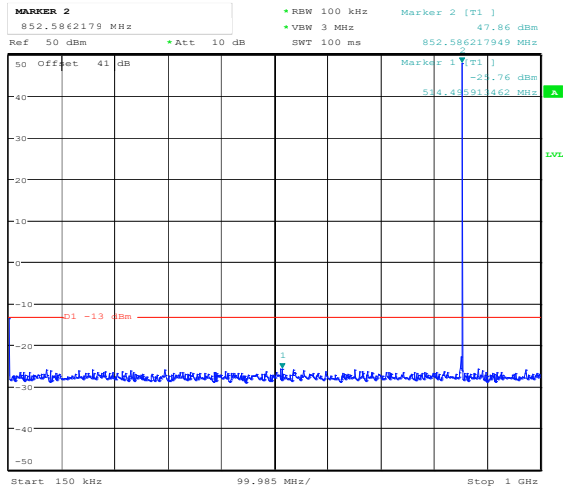
Modulation type	Channel frequency MHz	Output power W	Conducted emission frequency range	Measured Value (dBm)	Limit dBm	
7K60FXW	851.1	50	150KHz – 10GHz	< -13	-13	
16K0F3E	851.1	50	150KHz – 10GHz	< -13	-13	
0.35TETRA	851.1	25	150KHz – 10GHz	< -13	-13	
25kHzTEDS	851.1	10	150KHz – 10GHz	< -13	-13	
7K60FXW	860.0	50	150KHz – 10GHz	< -13	-13	
16K0F3E	860.0	50	150KHz – 10GHz	< -13	-13	
0.35TETRA	860.0	25	150KHz – 10GHz	< -13	-13	
25kHzTEDS	860.0	10	150KHz – 10GHz	< -13	-13	
150kHzTEDS	860.0	10	150KHz – 10GHz	< -13	-13	
7K60FXW	868.8	50	150KHz – 10GHz	< -13	-13	
16K0F3E	868.8	50	150KHz – 10GHz	< -13	-13	
0.35TETRA	868.8	25	150KHz – 10GHz	< -13	-13	
25kHzTEDS	868.8	10	150KHz – 10GHz	< -13	-13	
150kHzTEDS	868.8	10	150KHz – 10GHz	< -13	-13	

Modulation type	Center frequency MHz	Output power W	Intermodulation frequencies (MHz)	Measured Value (dBm)	Limit dBm	
7K60FXW	851.2	2x15	851.1 & 851.3	< -13	-13	
16K0F3E	851.2	2x15	851.1 & 851.3	< -13	-13	
0.35TETRA	851.2	2x10	851.1 & 851.3	< -13	-13	
25kHzTEDS	851.2	2x3.7	851.1 & 851.3	< -13	-13	
7K60FXW	860.1	2x15	860.0 & 860.2	< -13	-13	
16K0F3E	860.1	2x15	860.0 & 860.2	< -13	-13	
0.35TETRA	860.1	2x10	860.0 & 860.2	< -13	-13	
25kHzTEDS	860.1	2x3.7	860.0 & 860.2	< -13	-13	
150kHzTEDS	860.0	2x3.7	860 & 861	< -13	-13	
7K60FXW	868.8	2x15	868.7 & 868.9	< -13	-13	
16K0F3E	868.8	2x15	868.7 & 868.9	< -13	-13	
0.35TETRA	868.8	2x10	868.7 & 868.9	< -13	-13	
25kHzTEDS	868.8	2x3.7	868.7 & 868.9	< -13	-13	
150kHzTEDS	868.8	2x3.7	867 & 868	< -13	-13	

Requirements:

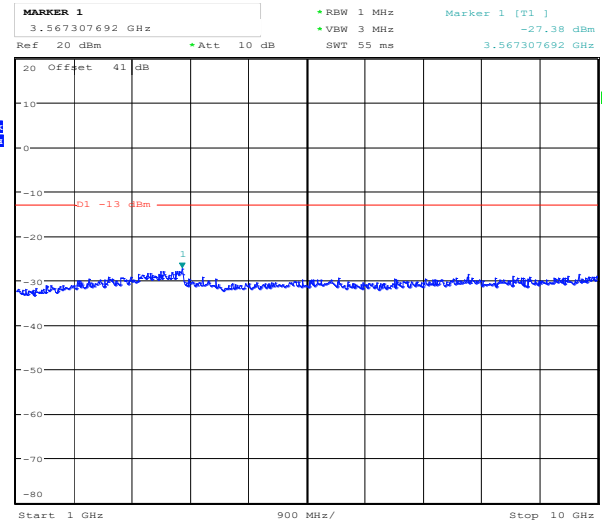
The conducted Spurious emissions shall be below -13 dBm.





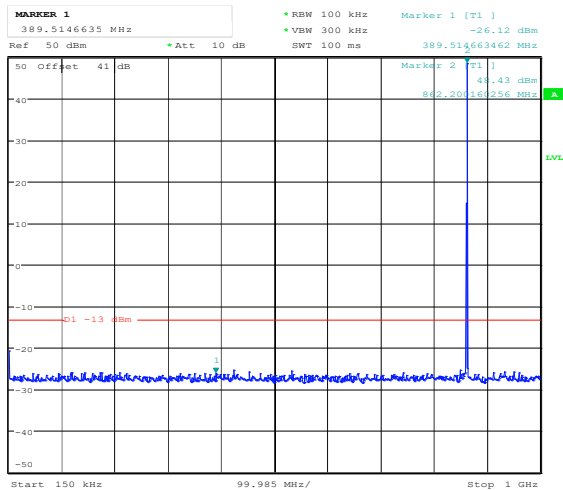
Date: 1.MAR.2021 09:58:29

Conducted spurious emissions 0.150 – 1000MHz,
0.35TETRA, 25W, 851.1MHz



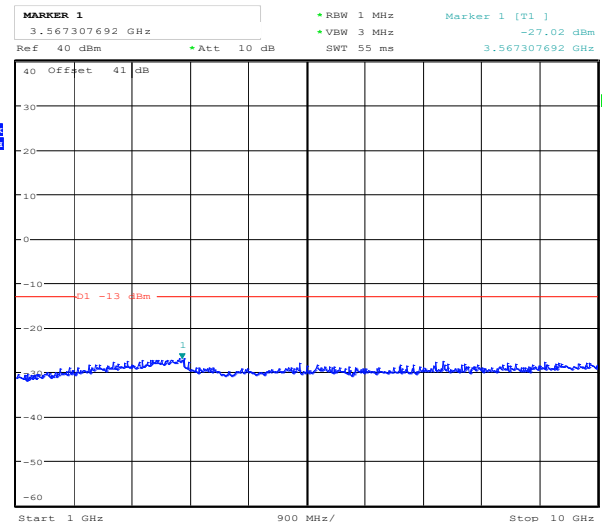
Date: 1.MAR.2021 09:56:50

Conducted spurious emissions 1 – 10GHz, 0.35TETRA,25W,
851.1MHz



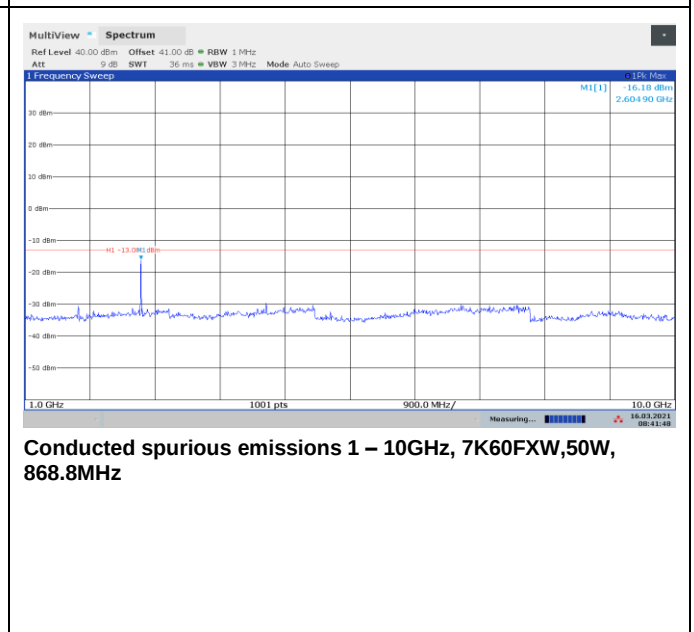
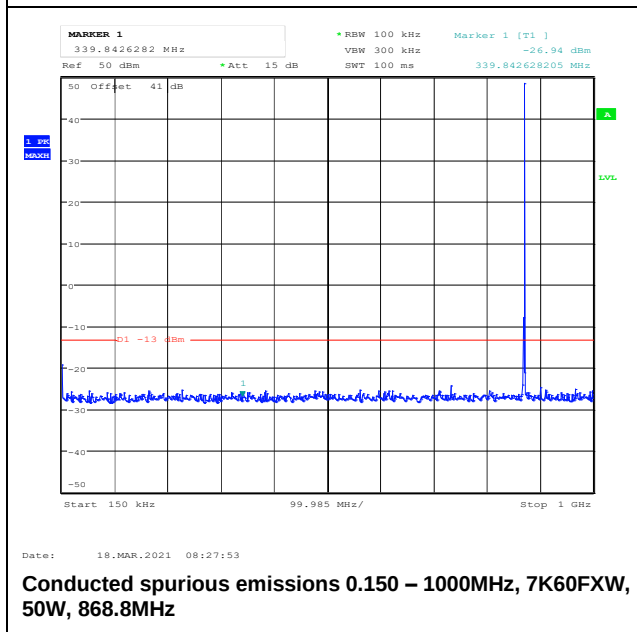
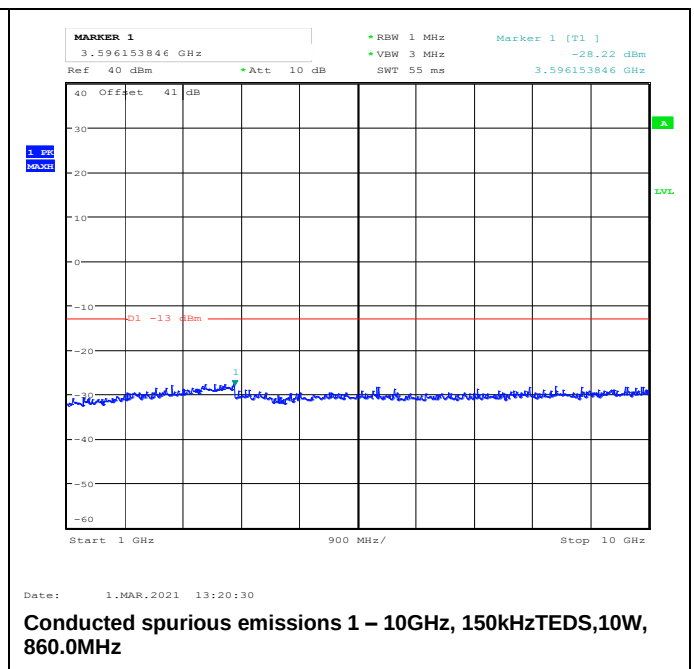
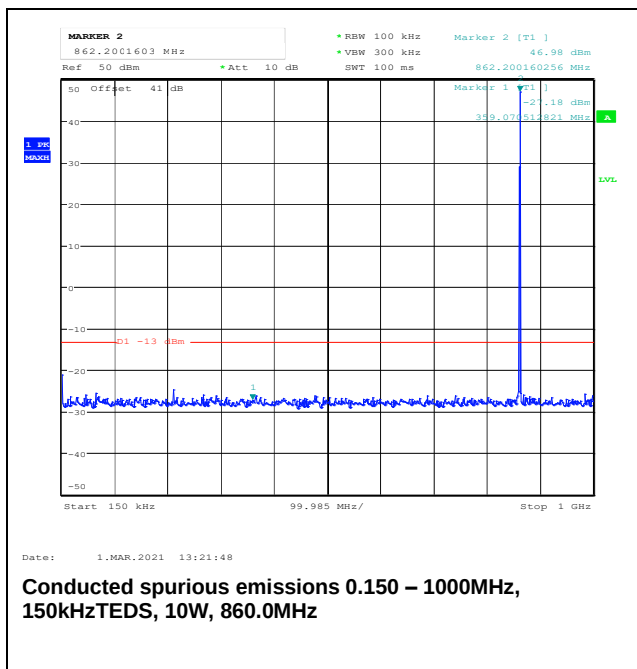
Date: 1.MAR.2021 13:23:37

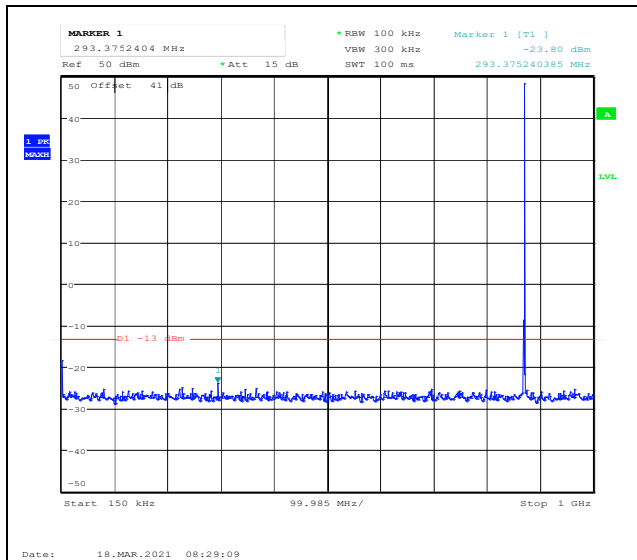
Conducted spurious emissions 0.150 – 1000MHz,
25kHzTEDS, 10W, 860.0MHz



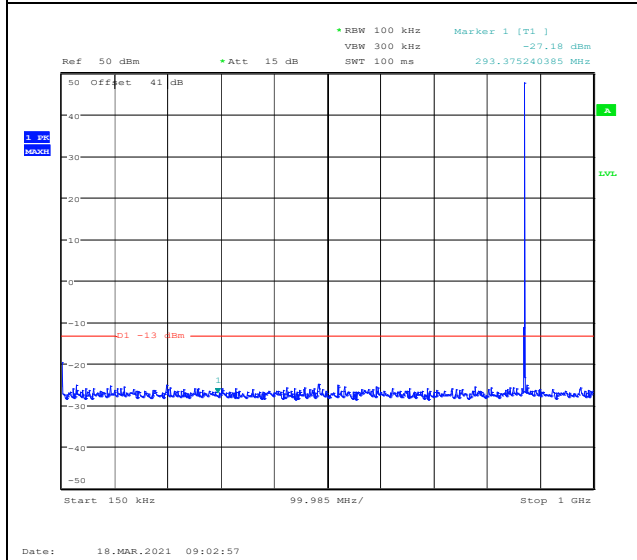
Date: 1.MAR.2021 12:54:30

Conducted spurious emissions 1 – 10GHz, 25kHzTEDS,10W,
860.0MHz

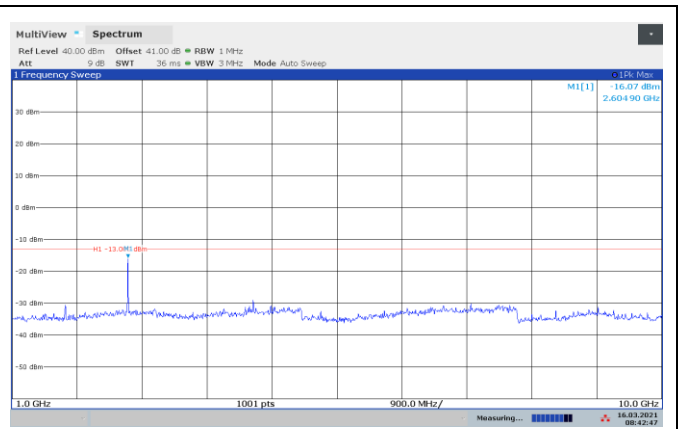




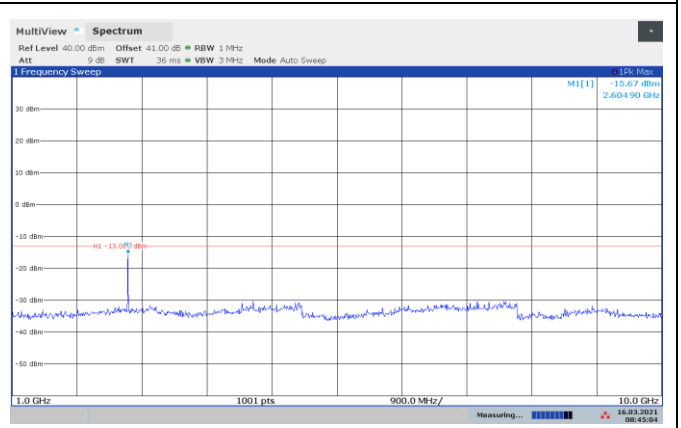
Conducted spurious emissions 0.150 – 1000MHz, 16K0F3E, 50W, 868.8MHz



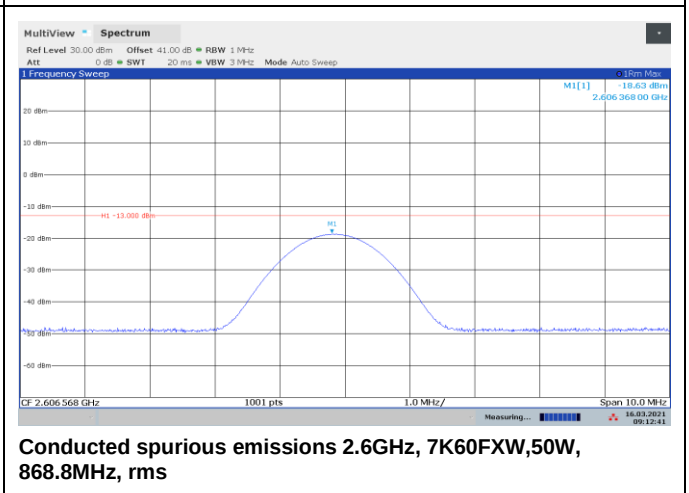
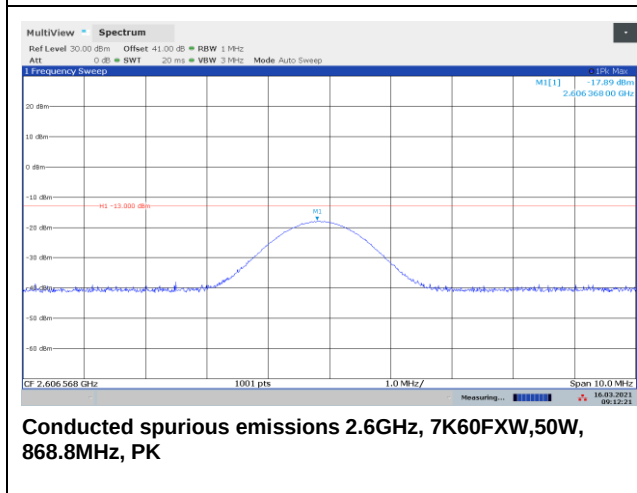
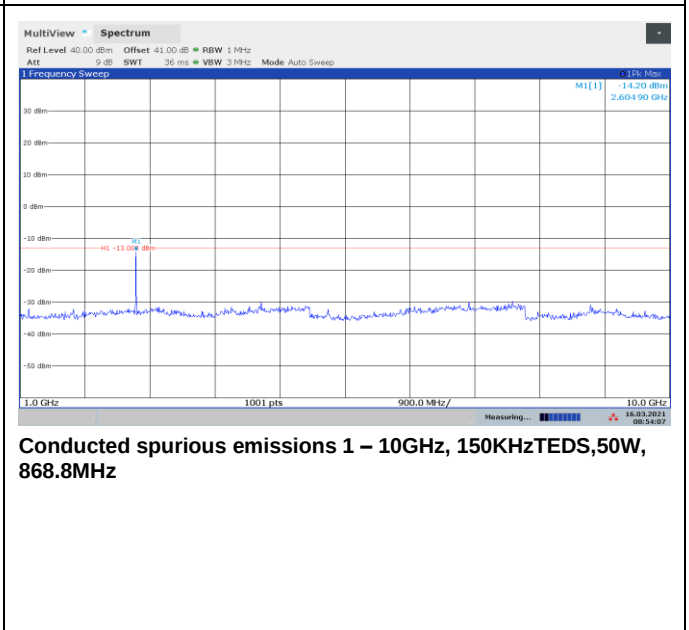
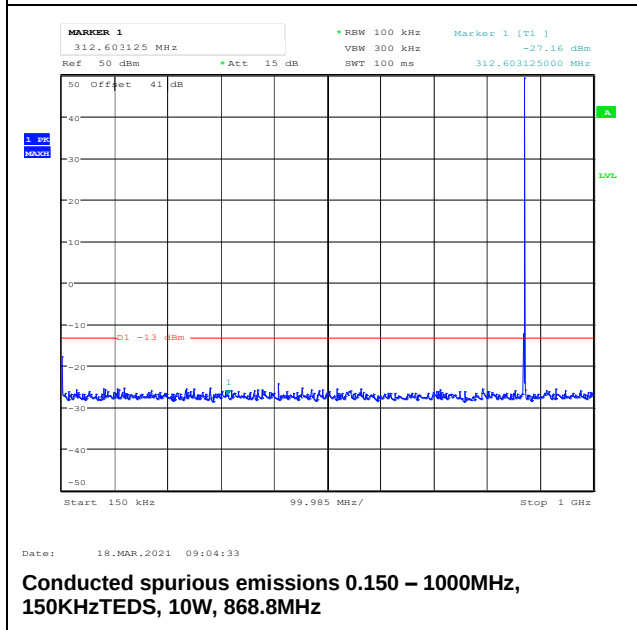
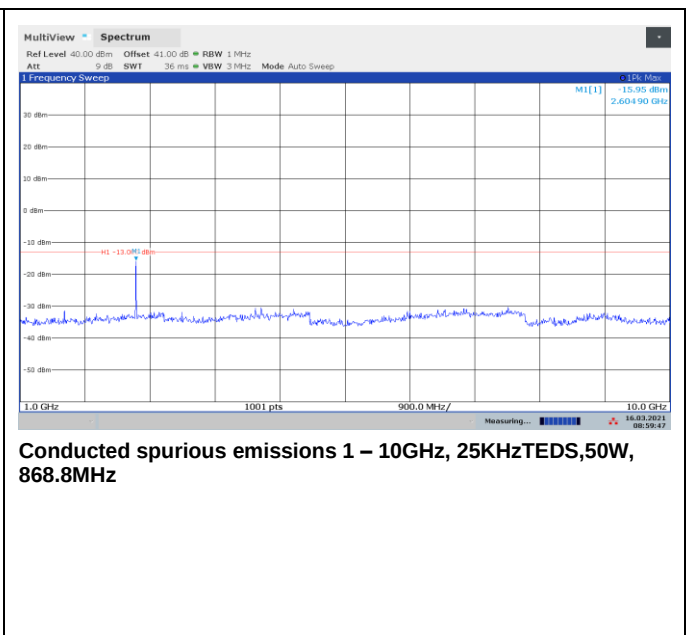
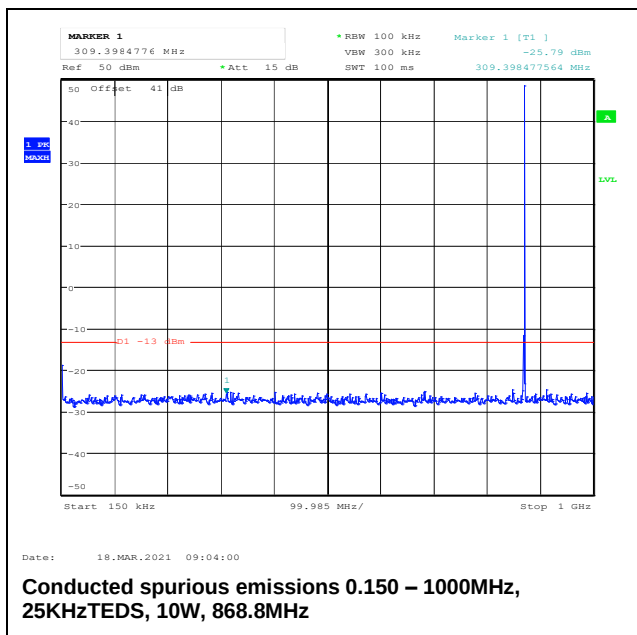
Conducted spurious emissions 0.150 – 1000MHz, 0.35TETRA, 25W, 868.8MHz

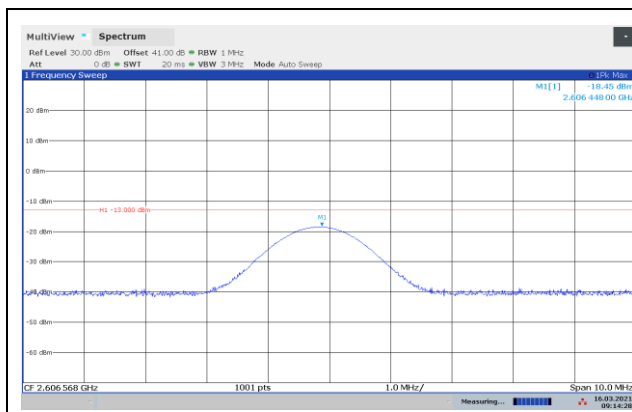


Conducted spurious emissions 1 – 10GHz, 16K0F3E, 50W, 868.8MHz

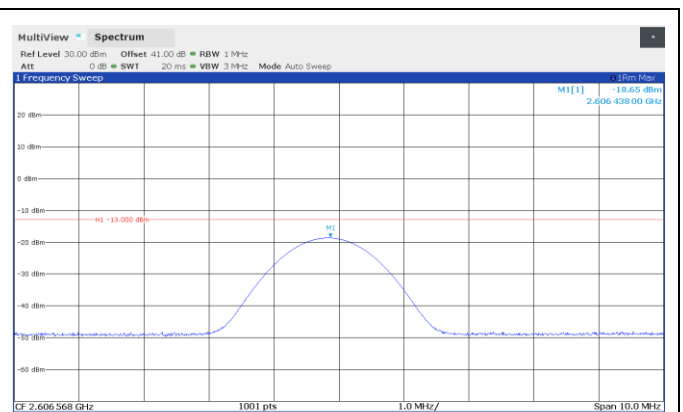


Conducted spurious emissions 1 – 10GHz, 0.35TETRA, 25W, 868.8MHz

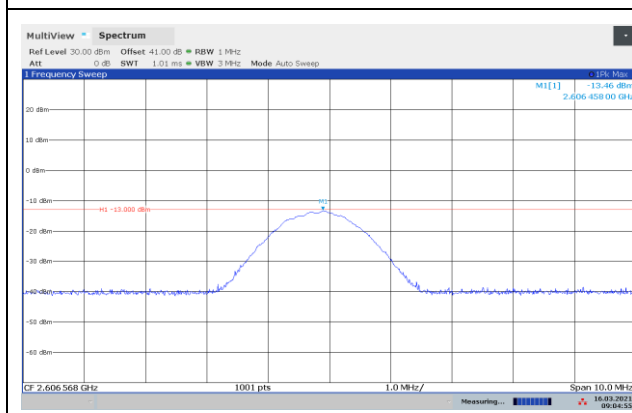




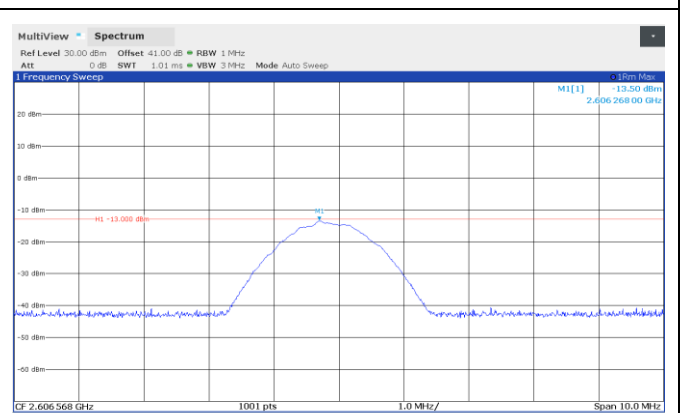
Conducted spurious emissions 2.6GHz, 16K0F3E,50W, 868.8MHz, pk



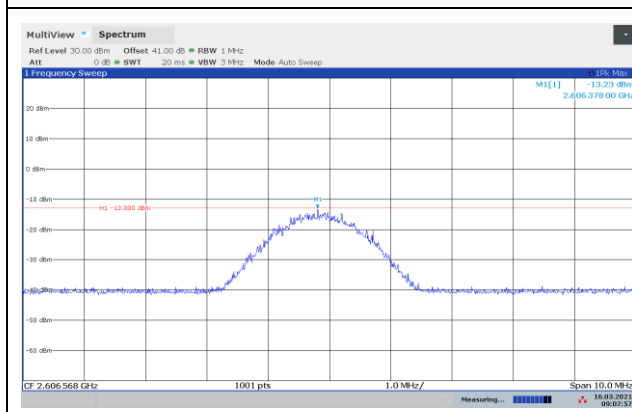
Conducted spurious emissions 2.6GHz, 16K0F3E,50W, 868.8MHz, rms



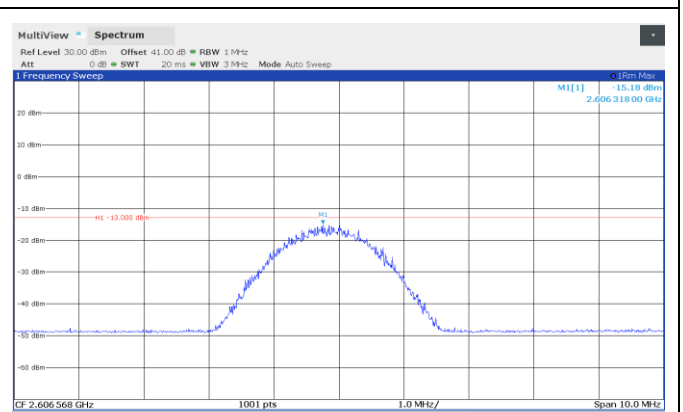
Conducted spurious emissions 2.6GHz, 25KHzTEDS,50W, 868.8MHz, pk



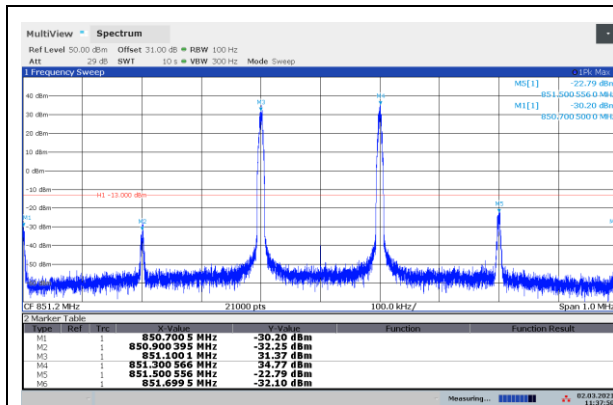
Conducted spurious emissions 2.6GHz, 25KHzTEDS,50W, 868.8MHz, rms



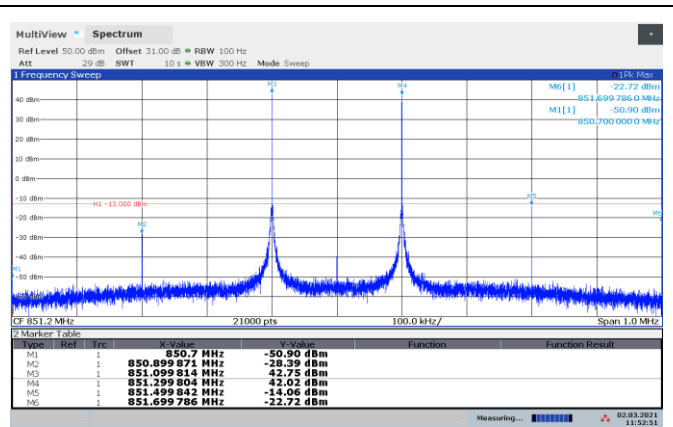
Conducted spurious emissions 2.6GHz, 150KHzTEDS,50W, 868.8MHz, PK



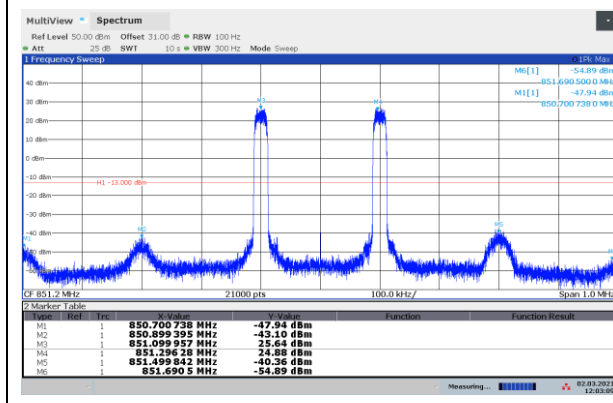
Conducted spurious emissions 2.6GHz, 150KHzTEDS,50W, 868.8MHz, rms



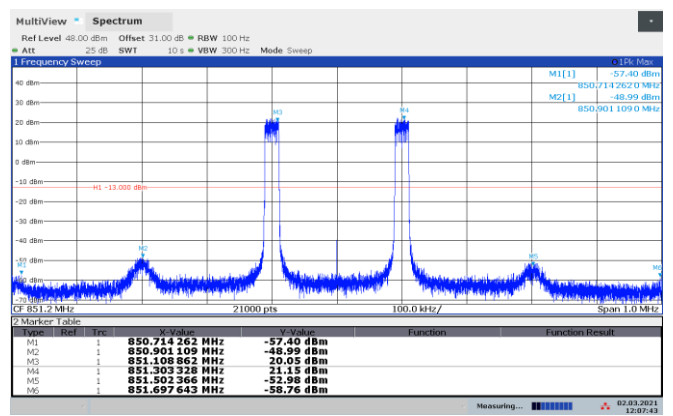
Conducted spurious emissions from intermodulation products, 7K60FXW, 851.1 & 851.3 MHz, 2x15W



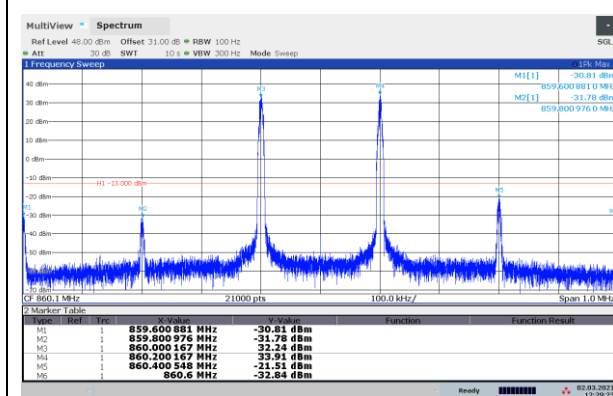
Conducted spurious emissions from intermodulation products, 16K0F3E, 851.1 & 851.3 MHz, 2x15W



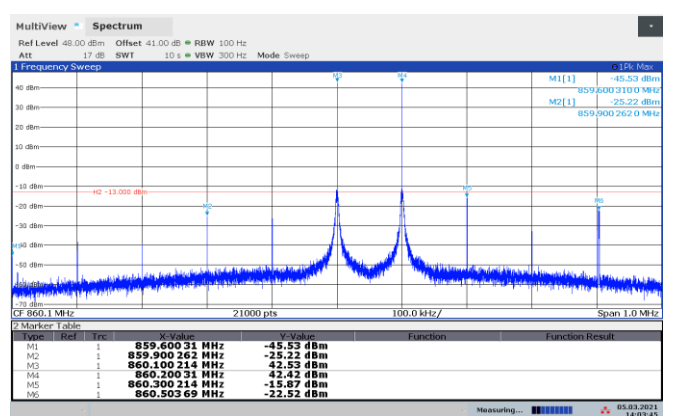
Conducted spurious emissions from intermodulation products, 0.35TETRA, 851.1 & 851.3 MHz, 2x10W



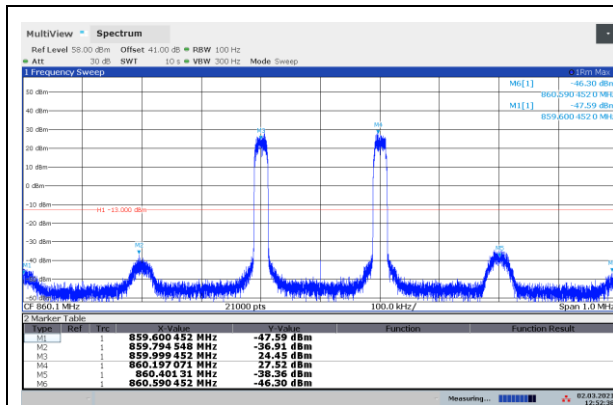
Conducted spurious emissions from intermodulation products, 25kHzTEDS, 851.1 & 851.3 MHz, 2x3.7W



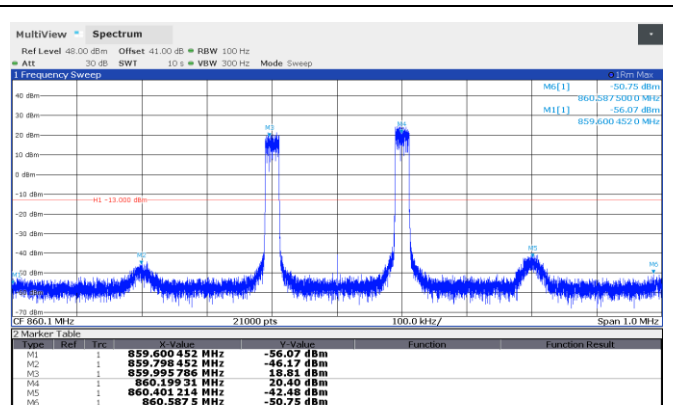
Conducted spurious emissions from intermodulation products, 7K60FXW, 860.0 & 860.2 MHz, 2x15W



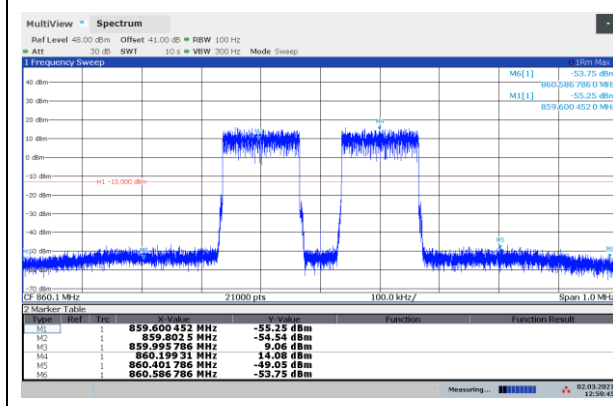
Conducted spurious emissions from intermodulation products, 16K0F3E, 860.0 & 860.2 MHz, 2x15W



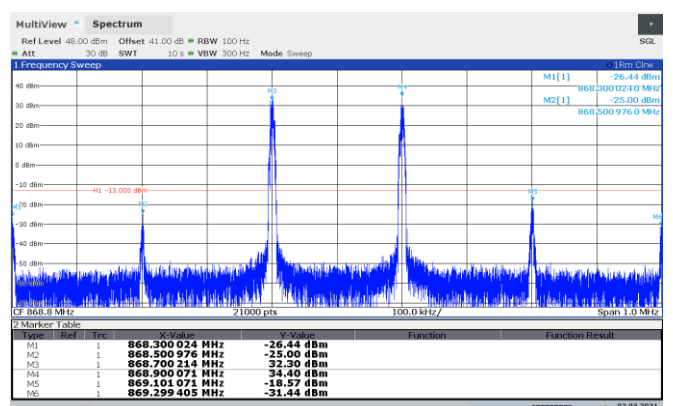
Conducted spurious emissions from intermodulation products, 0.35TETRA, 860.0 & 860.2 MHz, 2x10W



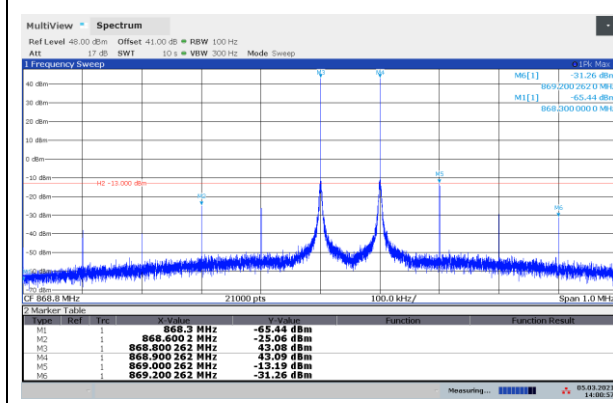
Conducted spurious emissions from intermodulation products, 25kHzTEDS, 860.0 & 860.2 MHz, 2x3.7W



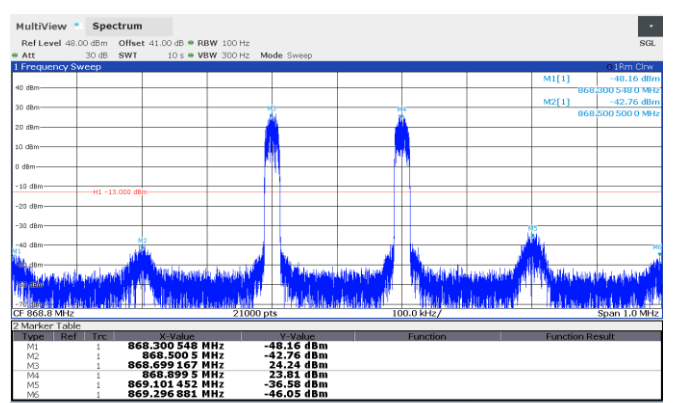
Conducted spurious emissions from intermodulation products, 150KHZTEDS, 860.0 & 861 MHz, 2x3.7W



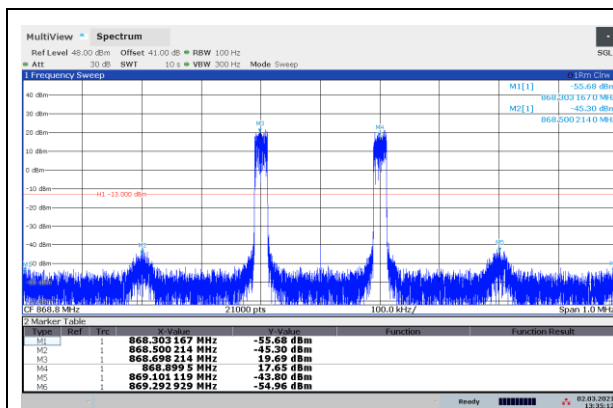
Conducted spurious emissions from intermodulation products, 7K60FXW, 868.7 & 868.9 MHz, 2x15W



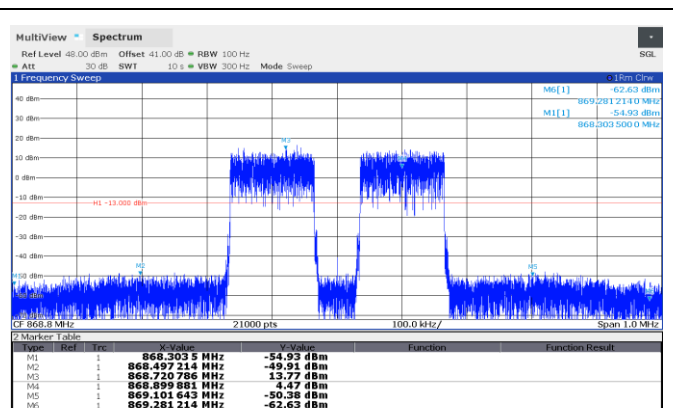
Conducted spurious emissions from intermodulation products, 16K0F3E, 868.7 & 868.9 MHz, 2x15W



Conducted spurious emissions from intermodulation products, 0.35TETRA, 868.7 & 868.9 MHz, 2x10W



Conducted spurious emissions from intermodulation products, 25KHzTEDS, 868.7 & 868.9 MHz, 2x3.7W



Conducted spurious emissions from intermodulation products, 150KHzTEDS, 867 & 868 MHz, 2x3.7W