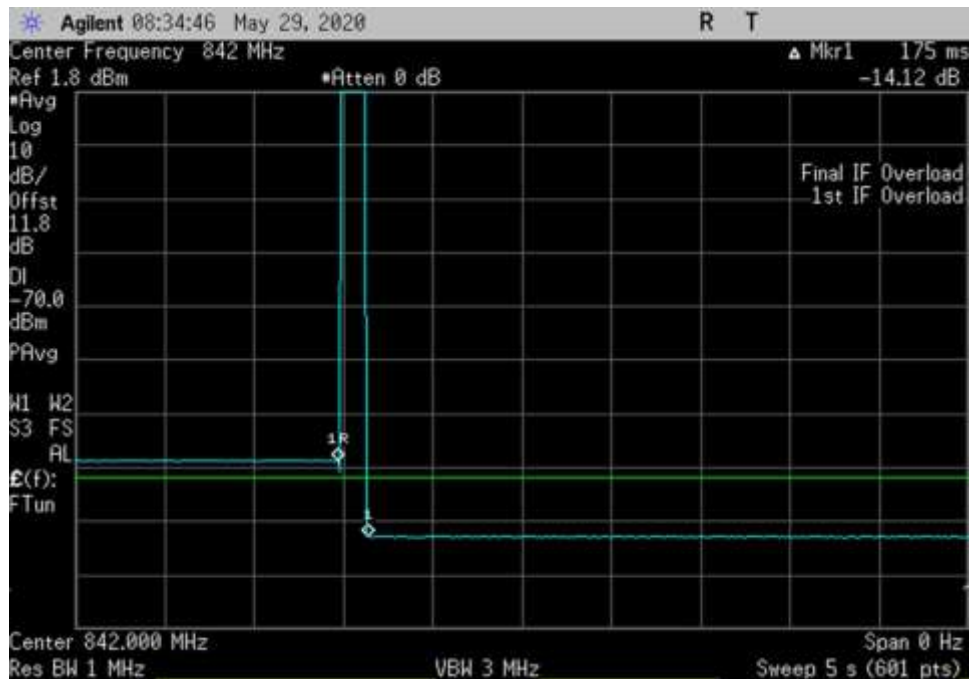
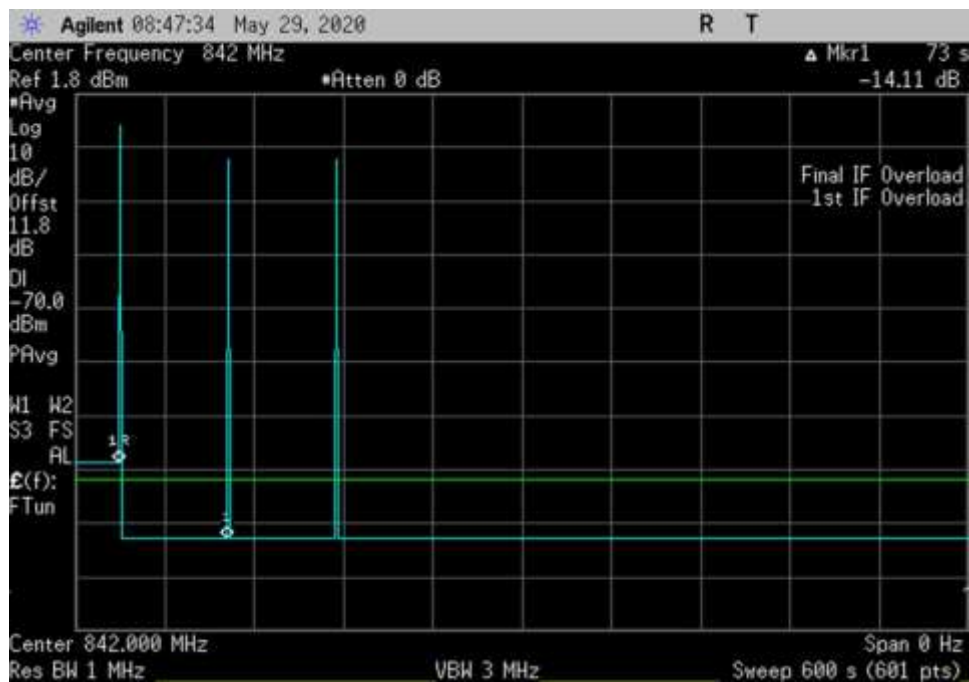
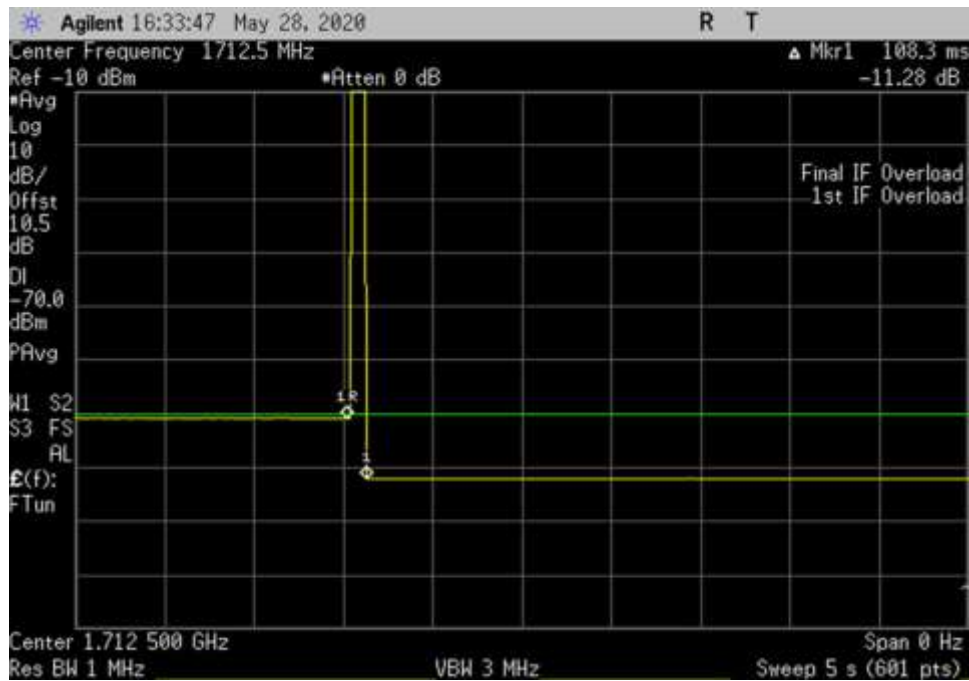




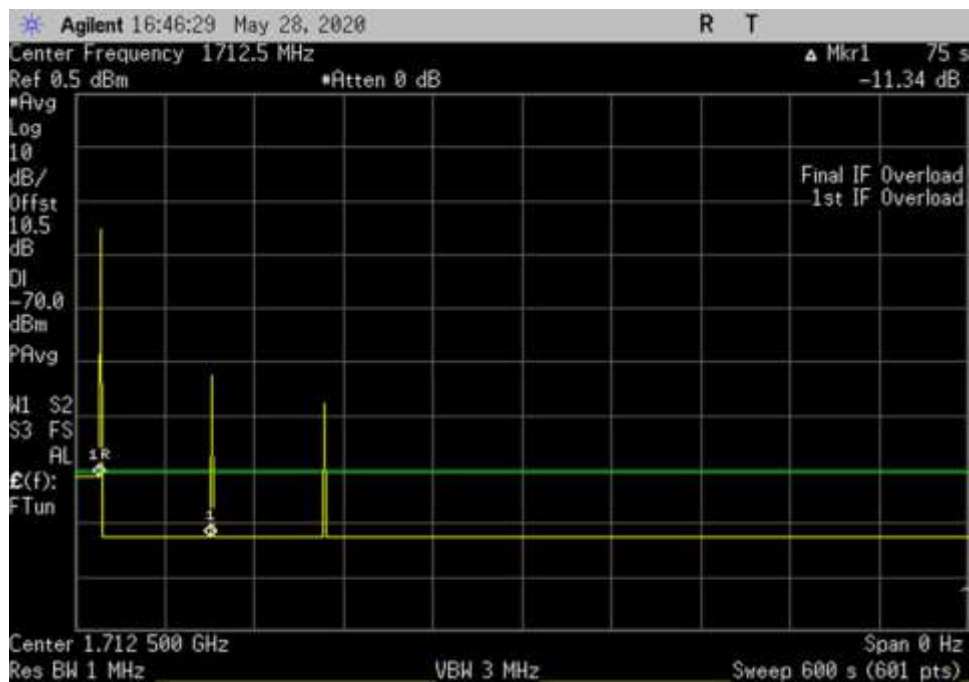
UL_824-849_842MHz



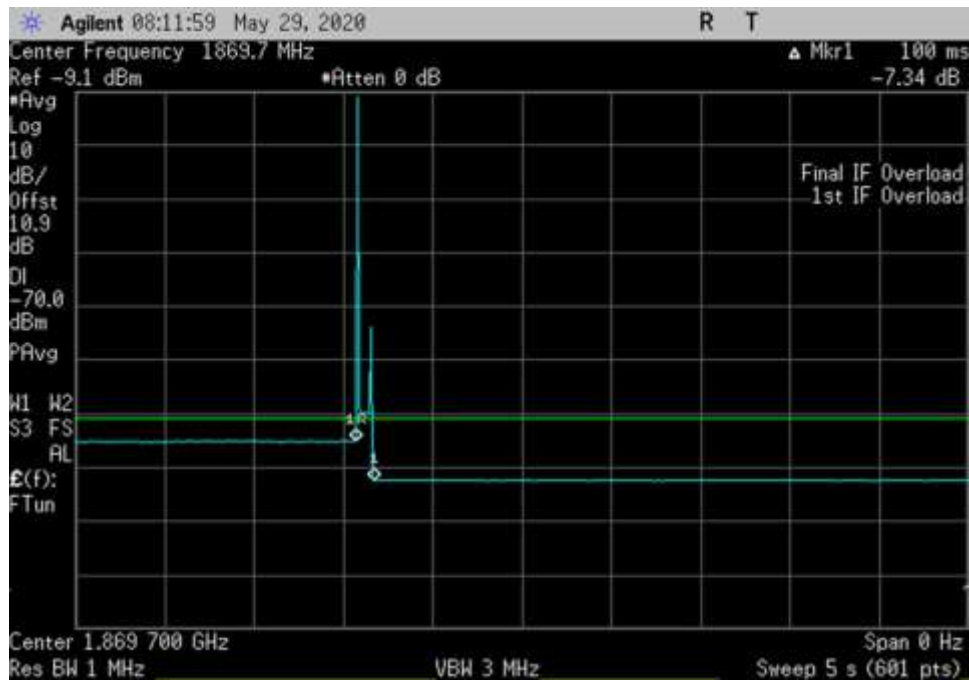
UL_824-849_600sec_842MHz



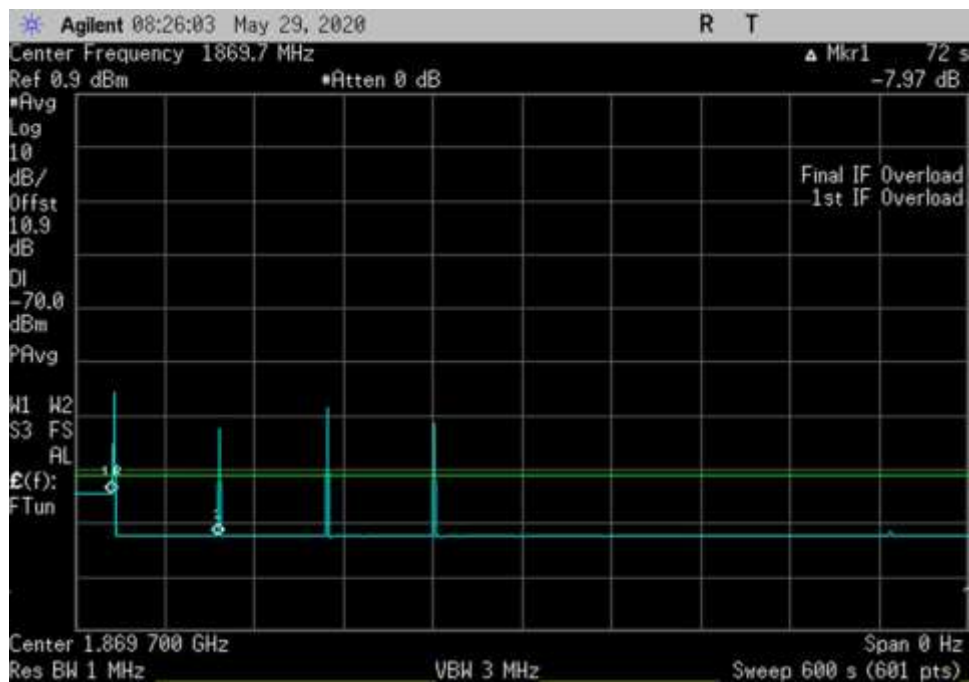
UL_1710-1755_ 1712.5MHz



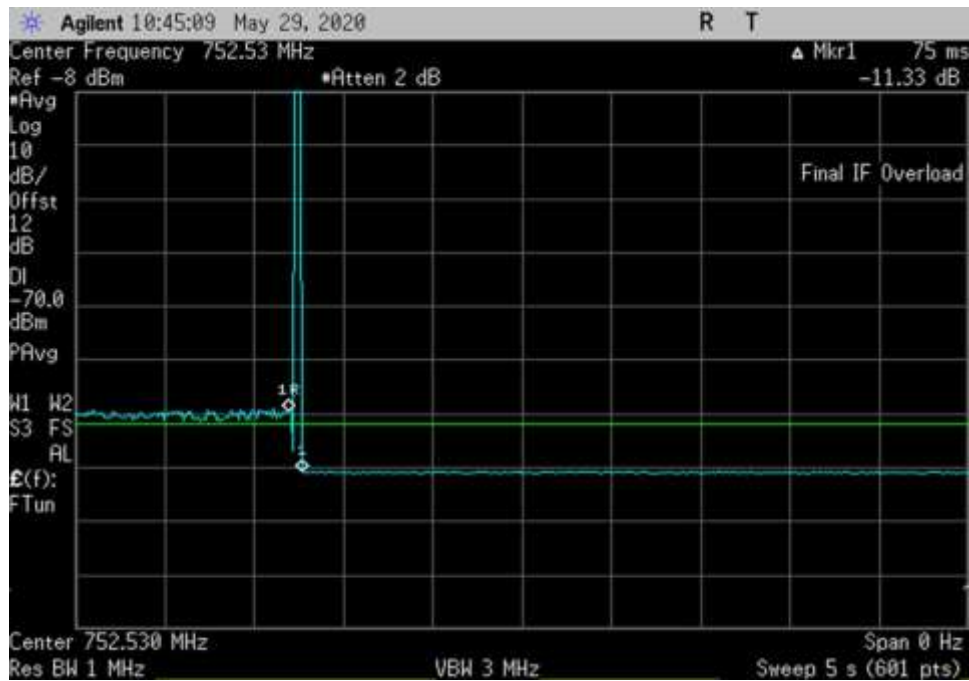
UL_1710-1755_600sec_ 1712.5MHz



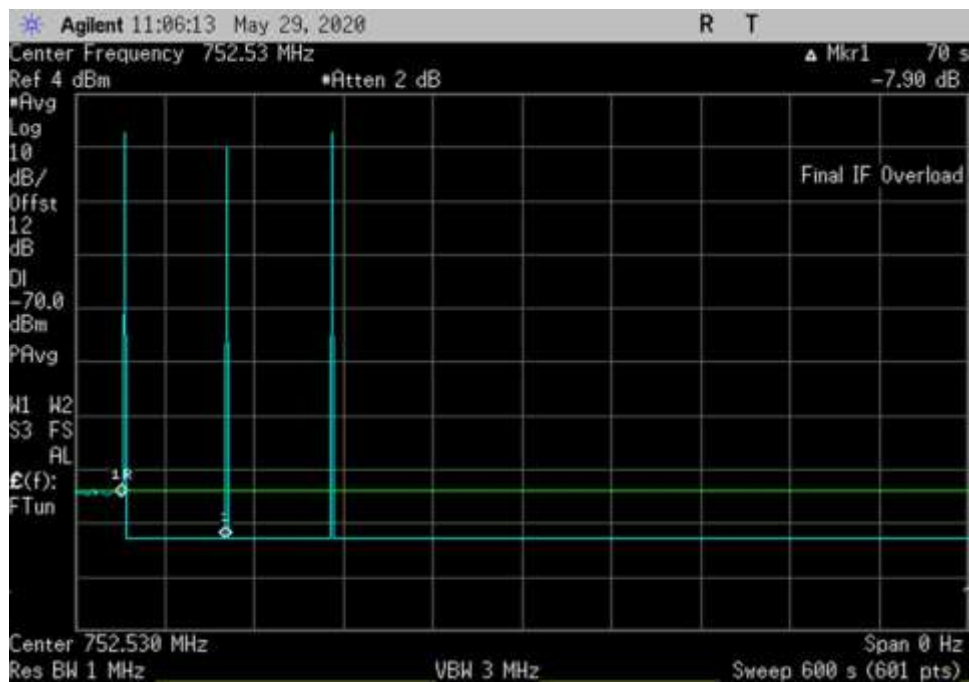
UL_1850-1915_ 1869.7MHz



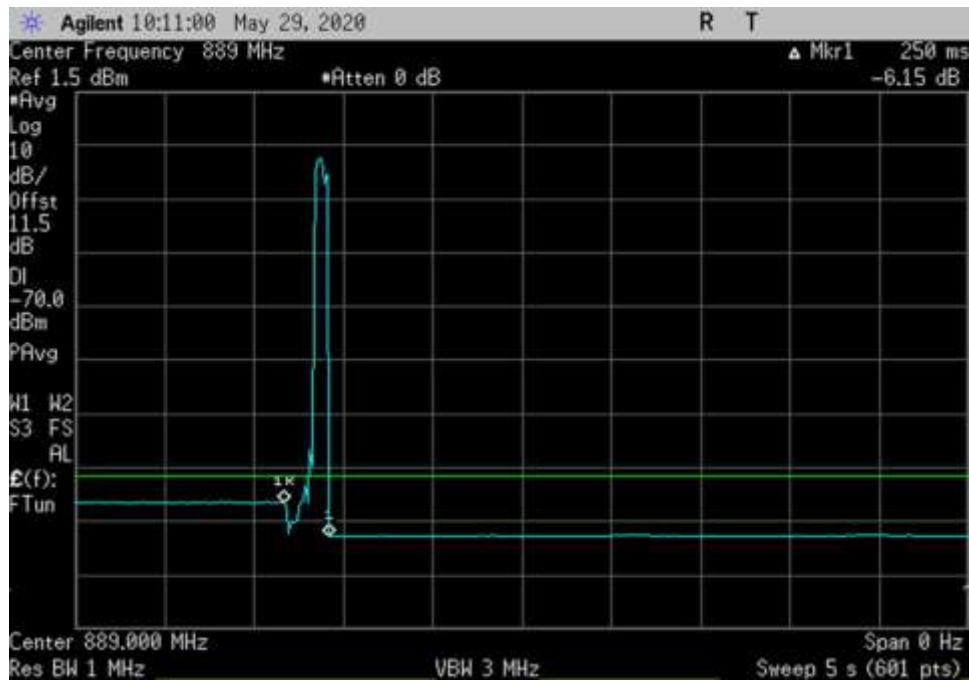
UL_1850-1915_600sec_ 1869.7MHz



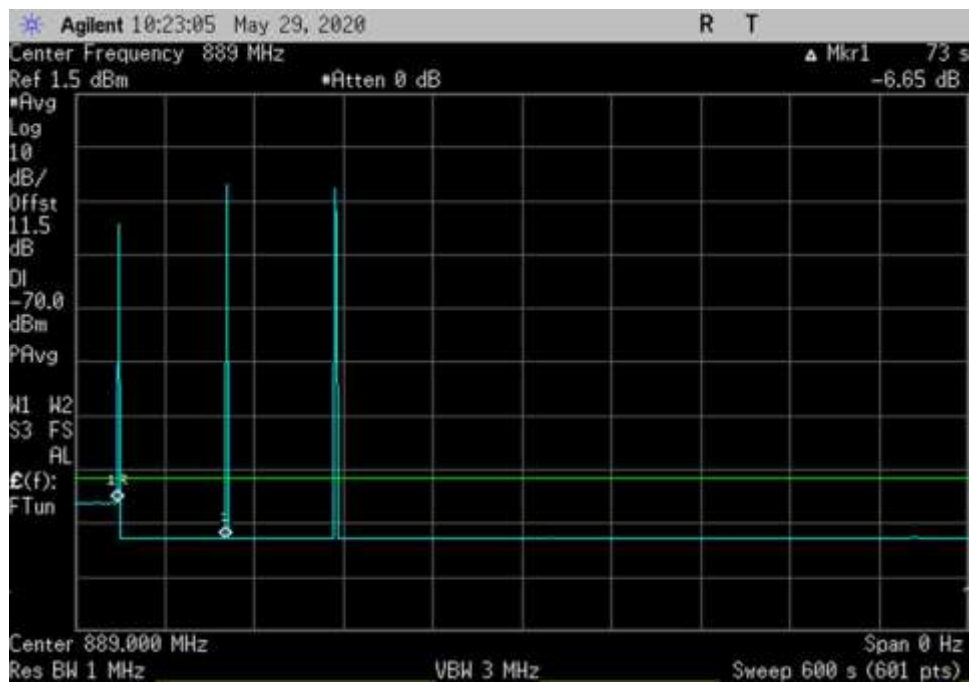
DL_746-757_ 752.53MHz



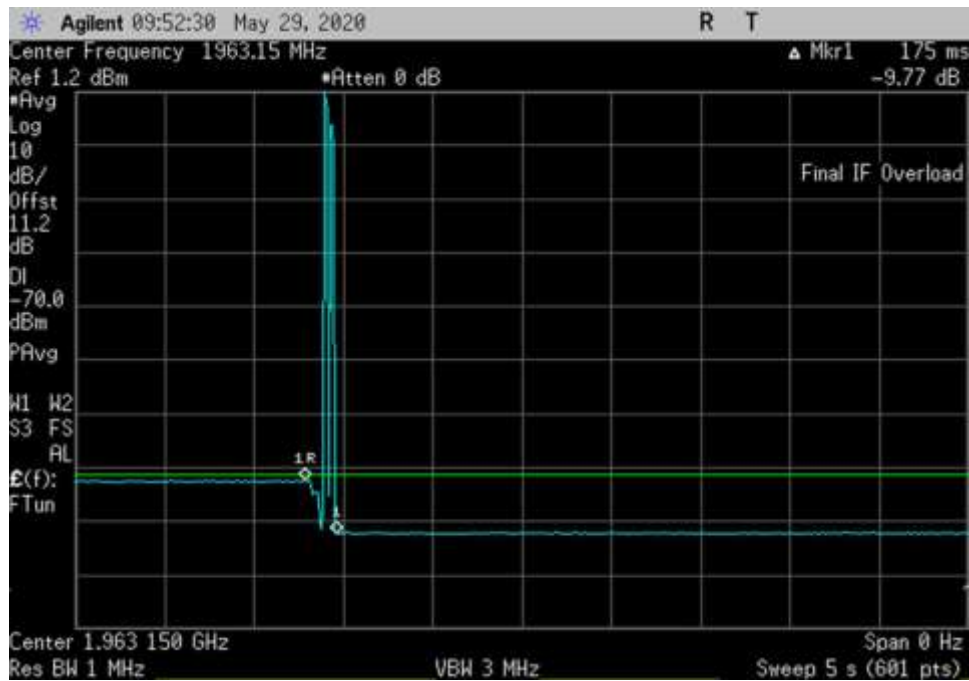
DL_746-757_600sec_ 752.53MHz



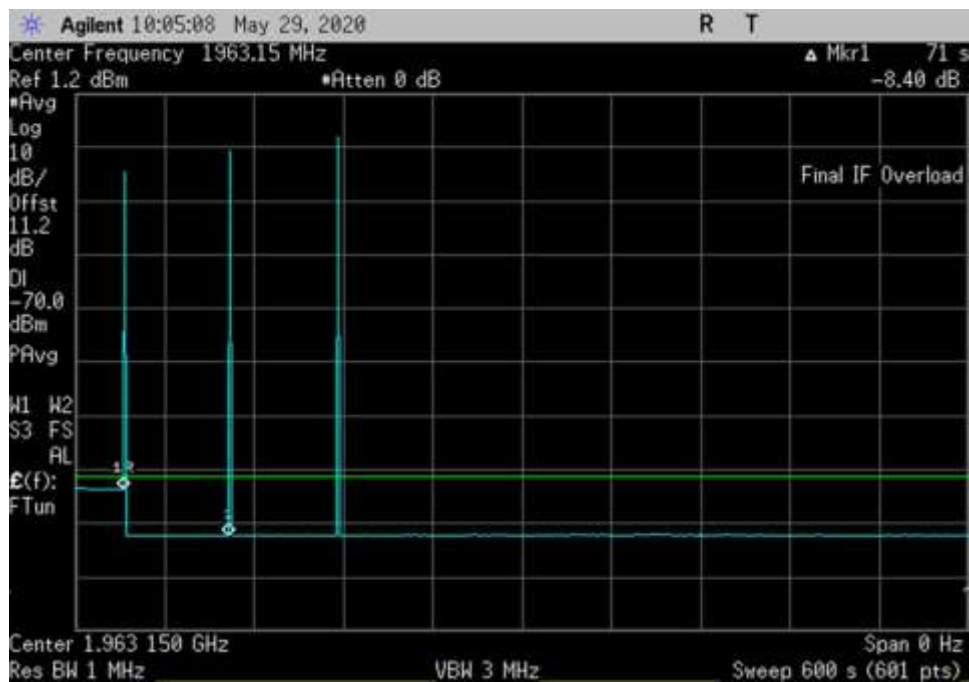
DL_869-894_889MHz



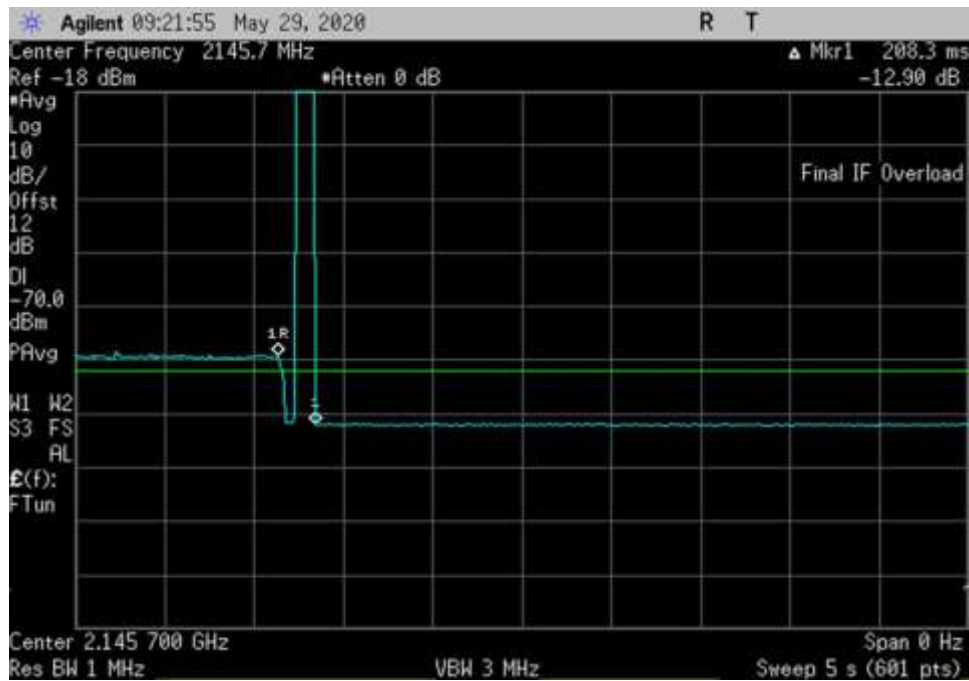
DL_869-894_600sec_889MHz



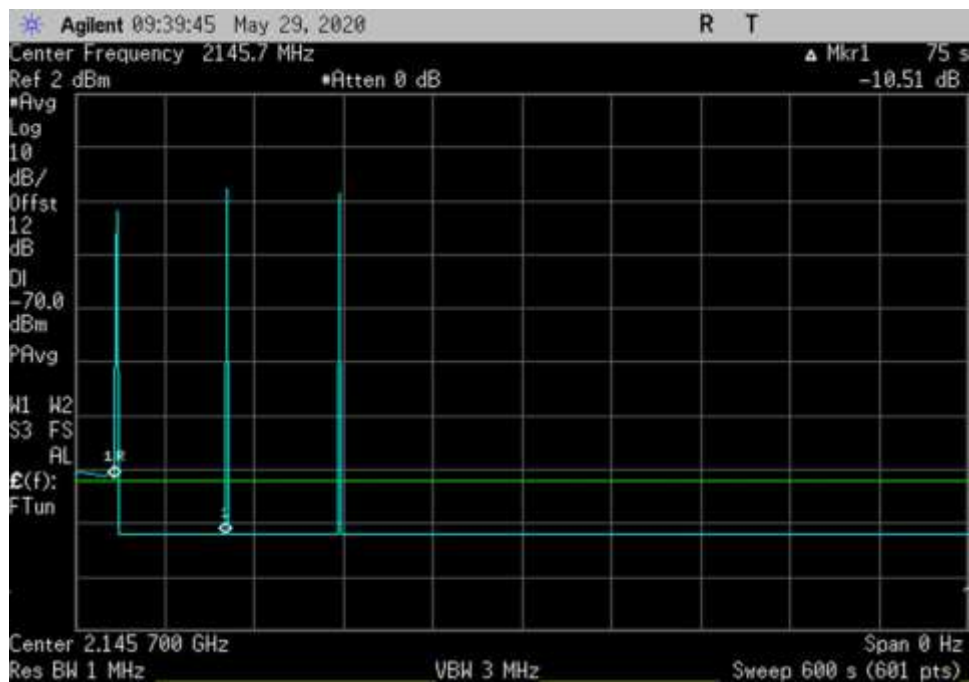
DL_1930-1995_ 1963.15MHz



DL_1930-1995_600sec_ 1963.15MHz



DL_2110-2155_ 2145.7MHz



DL_2110-2155_600sec_ 2145.7MHz

7.12 Radiated Spurious Emissions

Test Setup/Conditions	
Test Engineer:	Hieu Song Nguyenpham
Test Date(s):	6/8/2020
Configuration:	1
Test Setup:	Frequency range of measurement = 9 kHz- 22 GHz. 9 kHz - 150 kHz -> RBW=200 Hz VBW=200 Hz 150 kHz - 30 MHz -> RBW=9 kHz VBW=9 kHz 30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz 1000 MHz-22000MHz -> RBW=1 MHz VBW=1 MHz Note: No spurious emissions were found within 20dB of the limit line. Emissions in the band 1559-1610 MHz were investigated and these were not found within 20dB of the limit line. 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

Environmental Conditions					
Temperature (°C)	21.8	Relative Humidity (%)	38	Pressure: kPa	102.1

Test Equipment				
Asset #	Description	Model	Calibration Date	Cal Due Date
03471	Spectrum Analyzer	E4440A	2/11/2020	2/11/2022
00852	Biconilog Antenna	CBL 6111C	4/14/2020	4/14/2022
P06049	Attenuator	PE7002-6	5/11/2020	5/11/2022
P06691	Cable	PE3062-180	3/25/2020	3/25/2022
P00880	Cable	RG214U	3/25/2020	3/25/2022
P07508	Preamp	310N	10/15/2018	10/15/2020
P01187	Cable	CNT-195	8/20/2018	8/20/2020
02157	Horn Antenna	3115	1/15/2019	1/15/2021
P06897	Cable	32022-29094K-29094K-48TC	3/25/2020	3/25/2022
P01210	Cable	FSJ1P-50A-4A	12/18/2018	12/18/2020
03713	Preamp	01001800-221055-202525	5/22/2019	5/22/2021
03302	Cable	32026-29094K-29094K-72TC	1/9/2020	1/9/2022
P06899	Cable	32022-29094K-29094K-72TC	1/7/2020	1/7/2022
P06126	Cable	32022-29094K-29094K-168TC	4/29/2020	4/29/2022
00432	Loop Antenna	6502	2/19/2019	2/19/2021
P00928	Cable	various	1/9/2020	1/9/2022
P00929	Cable	various	1/9/2020	1/9/2022
02693	Active Horn Antenna	AMFW-5F-12001800-20-10P	8/15/2019	8/15/2021
02694	Horn Antenna	AMFW-5F-18002650-20-10P	8/15/2019	8/15/2021

Summary of Results

Pass: All Radiated Spurious Emissions were found with more than 20dB margin of the limit line.

Frequency Range of measurement 9kHz – 22GHz

LIMIT LINE FOR SPURIOUS RADIATED EMISSION

$$\text{REQUIRED ATTENUATION} = 43 + 10 \log P \text{ (dB)}$$

For radiated spurious emission measured at 3 meter test distance,

$$\text{Required attenuation} = 43 + 10 \log P_{t \text{ at 3 meter}} \text{ dB}$$

$$\text{Limit line (dBuV)} = E_{\text{dBuV}} - \text{Attenuation}$$

E_{dBuV} = Measured field strength at 3 meter in dBuV/m

Power Density (Isotropic)

$$P_D = \frac{P_t}{4\pi r^2}$$

P_D = Power Density in Watts /m²

P_t = Average Transmit Power

r = Test distance

Field Intensity E (V/m)

$$E = \sqrt{P_D \times 377}$$

$$E = \frac{\sqrt{P_t \times 377}}{4\pi r^2}$$

$$E = \sqrt{\frac{P_t \times 30}{r^2}}$$

$$P_t = \left(\frac{E^2 \times r^2}{30} \right)$$

$$10 \log P_t = 10 \log E^2 (\text{V/m}) + 10 \log r^2 - 10 \log 30$$

$$10 \log P_t = 20 \log E (\text{V/m}) + 20 \log r - 10 \log 30$$

At 3 meter, $r = 3 \text{ m}$

$$10 \log P_t = 20 \log E (\text{V/m}) + 20 \log 3 - 10 \log 30$$

$$10 \log P_t = 20 \log E (\text{V/m}) + 9.54 - 14.77$$

$$10 \log P_t = 20 \log E (\text{V/m}) - 5.23$$

Since $20 \log E (\text{V/m}) = 20 \log E (\mu\text{V/m}) - 120$

$$10 \log P_t = 20 \log E (\mu\text{V/m}) - 120 - 5.23$$

$$10 \log P_t = 20 \log E (\mu\text{V/m}) - 125.23$$

$$\begin{aligned} \text{Limit line (dBuV) at 3 meter} &= E_{\text{dBuV}} - \text{Attenuation} \\ &= E_{\text{dBuV}} - (43 + 10 \log P_t \text{ at 3 meter}) \\ &= E_{\text{dBuV}} - 43 - 10 \log P_t \text{ at 3 meter} \\ &= E_{\text{dBuV}} - 43 - (20 \log E (\mu\text{V/m}) - 125.23) \\ &= E_{\text{dBuV}} - 43 - 20 \log E (\mu\text{V/m}) + 125.23 \\ &= E_{\text{dBuV}} - 20 \log E (\mu\text{V/m}) + 82.23 \end{aligned}$$

$$\text{Since } 20 \log E (\mu\text{V/m}) = E \text{ in dBuV/m} = E_{\text{dBuV}} - E_{\text{dBuV}} + 82.23$$

$$\text{Radiated Emission limit 3 meter} = 82.23 \text{ dBuV at any power level measured in dBuV}$$

Exhibit A: Test Setup Photos



Section 7.1 UL Test Setup



Section 7.1 DL Test Setup



Section 7.2-7.3 UL Test Setup



Section 7.2-7.3 UL Test Setup, Max Power



Section 7.2-7.3 UL Test Setup, Max Power Input Signal



Section 7.2-7.3 DL Test Setup



Section 7.4 UL Test Setup



Section 7.4 DL Test Setup



Section 7.5 UL Test Setup



Section 7.5 DL Test Setup



Section 7.6 UL Test Setup



Section 7.6 DL Test Setup



Section 7.7 Max Noise Test Setup



Section 7.7 Variable Max Noise Test Setup



Section 7.8 Test Setup



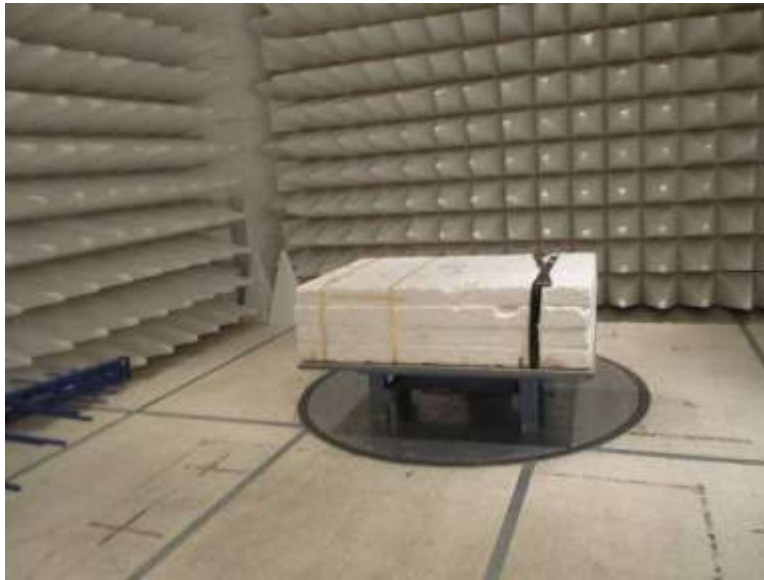
Section 7.9 Test Setup



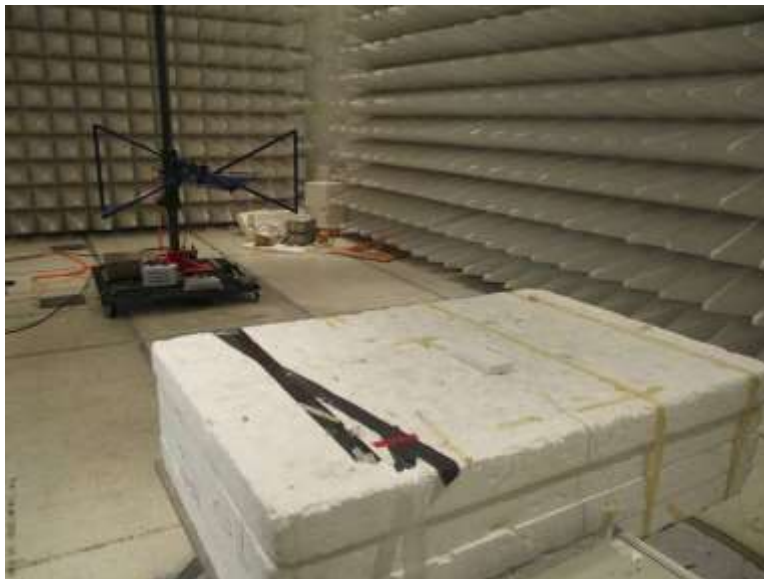
Section 7.10 Test Setup



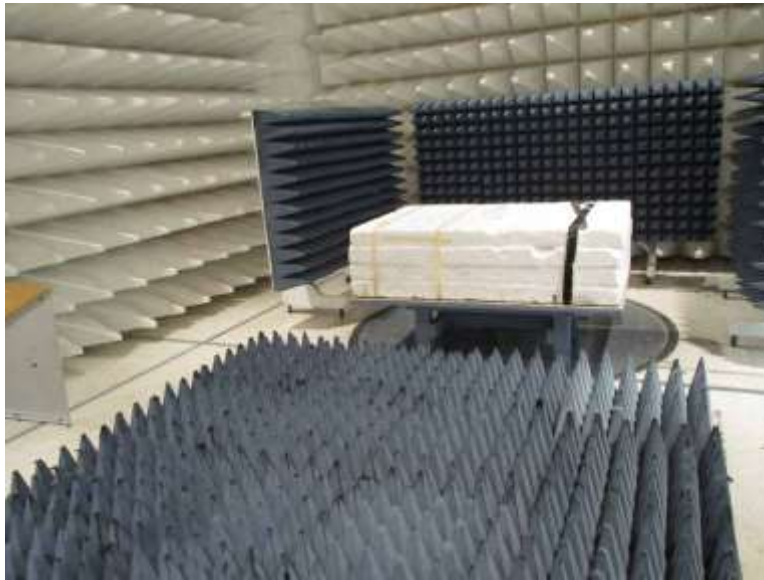
Section 7.11 Test Setup



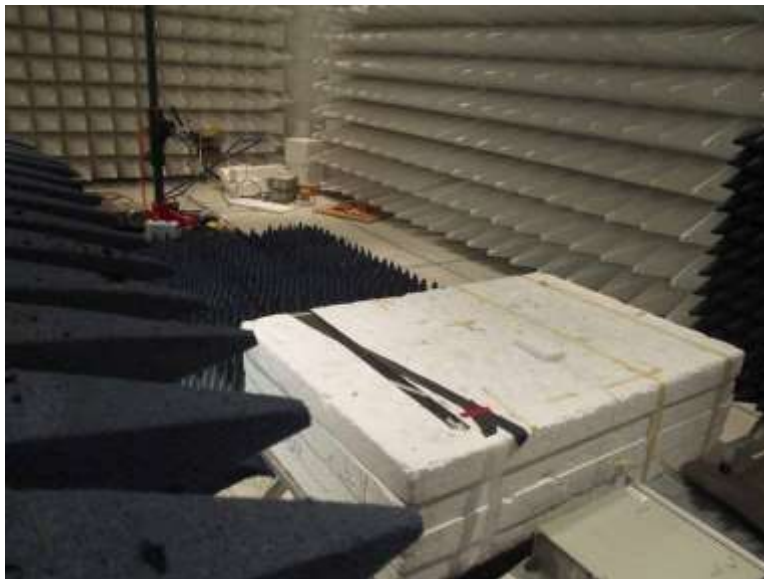
Section 7.12 Below 1GHz



Section 7.12 Below 1GHz



Section 7.12 Above 1GHz



Section 7.12 Above 1GHz