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Test report

348292-1R4TRFWL

Date of issue: August 24, 2018

Applicant:
Echodyne Corporation

Product:
Security and Surveillance Radar

Model: 700-0005-203_SSR Model variant: N/A

FCC ID: 2ANLB-MESASSR00053 IC Registration number: N/A

Specifications:

- FCC CFR 47 Part 87
  Aviation Services
- FCC CFR 47 Part 2
  Frequency Allocations and Radio Treaty Matters General Rules and Regulations

Test location

Company name:	Nemko USA Inc.
Address:	2210 Faraday Ave, Suite 150
City:	Carlsbad
Province:	California
Postal code:	92008
Country:	USA
Telephone:	+1 760 444 3500
Website:	www.nemko.com
FCC Site Number	Test Firm Registration Number: 392943 Designation Number: US5058
ISED Test Site	2040B-3

Tested by:	Nikolay Shtin, Senior Wireless Engineer
Reviewed by:	Juan Manuel Gonzalez, EMC & Wireless Business Development Manager
Date:	August 24, 2018
Signature:	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

Copyright notification

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name:	Echodyne Corporation
Address:	2380 116th Ave NE
City:	Bellevue
Province/State:	WA
Postal/Zip code:	98004
Country:	U.S.A.

1.2 Test specifications

FCC CFR 47 Part 2 FCC CFR 47 Part 87 NTIA RSEC	Frequency Allocations and Radio Treaty Matters General Rules and Regulations Aviation Services NTIA Manual of Regulations & Procedures for Federal Radio Frequency Management, *May 2013 Edition (Rev. 5/2014)*

1.3 Test methods

ANSI C64.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See “Summary of test results” for full details.

1.5 Exclusions

None

1.6 Test report revision history

Revision #	Details of changes made to test report
TRF	Original report issued
1R1TRF	Minor rules update in page 24
1R2TRF	Figure 8.2 3: EIRP ~~Low~~ channel (24.61 GHz)→ Figure 8.2 3: EIRP **High** channel (24.61 GHz)
1R3TRF	Page 4: NTIA RSEC reference was added to the test specifications section Page 6: Antenna gain was revised from 21 dBi to 22 dBi Page 19: Minor update indicating that 99% OBW has been measured Pages 21 and 27: Test notes were updated adding clarification on the correction factor calculation
1R4TRF	Page 22: Adding details on CF calculation (equations, values, calculations, tabulated data).

Section 2. Summary of test results

2.1 FCC Part 2 and Part 87 test results

Part	Test description	Verdict
§2.1049 and Part 87.135 (a)	Occupied Bandwidth	Pass
§2.1046 (a) and §87.131	RF power output	Pass
§87.139 (a) and NTIA RSEC Criteria A[1]	Spectral mask	Pass
§2.1055 and §87.133 (a)	Frequency Stability	Pass
§2.1051 and §87.139 (a)[2]	Spurious Emissions at Antenna Port	Pass
§2.1053 and §87.139 (a)	Field Strength Of Spurious Radiation	Pass

Notes: [1]NTIA RSEC mask measurement was performed per the manufacturer request.
[2]All testing was performed over the air since the EUT has an integral non-detachable antenna with no access to the conducted port. To show compliance to the Conducted port requirements the measurements were corrected by subtracting the antenna gain of the device.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	March 19, 2018
Nemko sample ID number	N/A

3.2 EUT information

Product name	Security and Surveillance Radar
Model	700-0005-203_SSR
Model variant	N/A
Serial number	SSR-K-000249

3.3 Technical information

Operating band	24.45 GHz to 24.65 GHz
Operating frequency	24.49 GHz to 24.61 GHz
Modulation type	FMCW
Occupied bandwidth (99 %)	47.1 MHz
Emission designator	47M1F3N
Power requirements	9 to 32 VDC
Antenna information	The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator. Antenna nominal peak gain is 22 dBi.

3.4 Product description and theory of operation

The Echodyne Corporation MESA-SSR Radar (Model: 700-0005-203_SSR) is designed as a ground-based radar to aid safe navigation of aircraft compliant with the FCC 24.45-24.65 GHz band designated as RADIO-NAVIGATION. Functionally the radar operates primarily as a Ground-Air doppler ranging radar intended to provide safe operation for small UAS vehicles by providing localized situational awareness for UAS remote pilots and UAS traffic management systems from a fixed ground-based location. Echodyne has also requested a waiver from the FCC to use the radar in the same band on a secondary basis for Ground-Air security surveillance to enable tracking of drone intruders in protected airspace

3.5 EUT exercise details

EUT was configured via TCP/IP (Ethernet) by sending programming commands using SSH/Telnet client application (PuTTY). During the test EUT was set into the SEARCH mode transmitting through its integral antenna on Low, Mid and High channels with max. power. The minimum/maximum azimuthal and elevation beam positions were set to 0 degrees which was found to be a worst-case test configuration.

3.6 EUT setup diagram

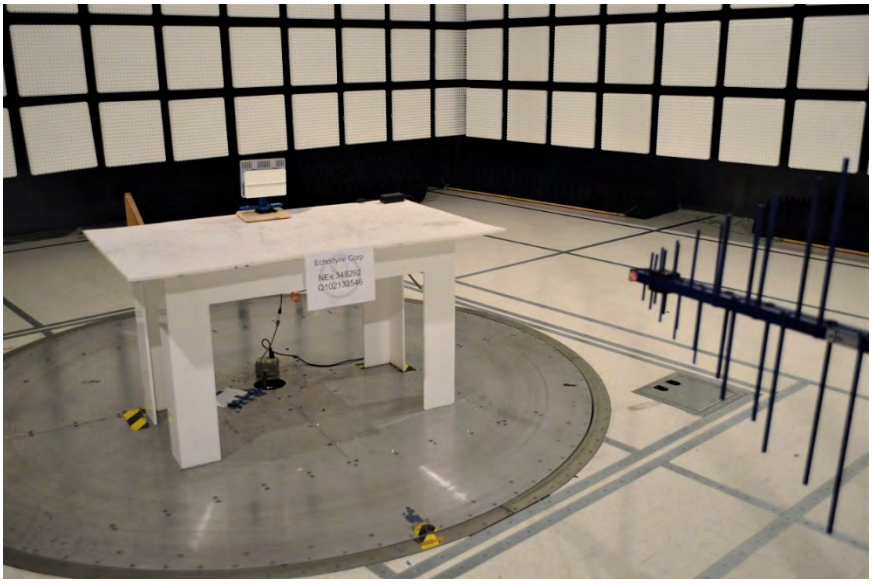


Figure 3.6-1: Radiated Emissions Test Setup – below 1GHz (Front)

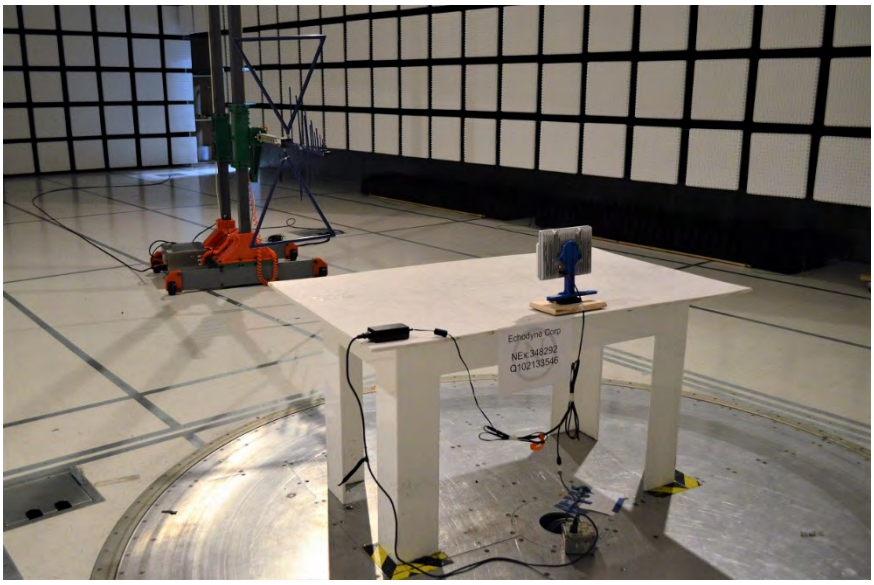


Figure 3.6-2: Radiated Emissions Test Setup – below 1GHz (Back)

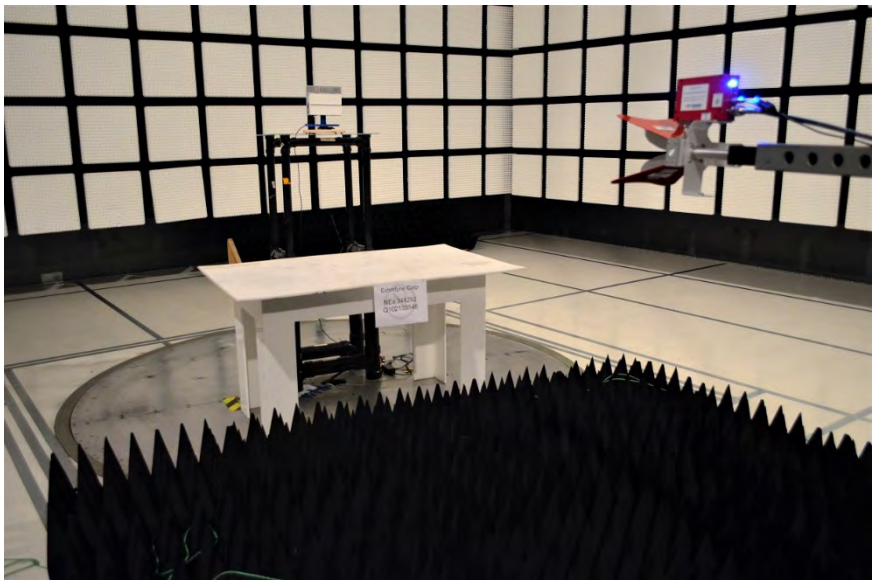


Figure 3.6-3: Radiated Emissions Test Setup – 1-18 GHz (Front)

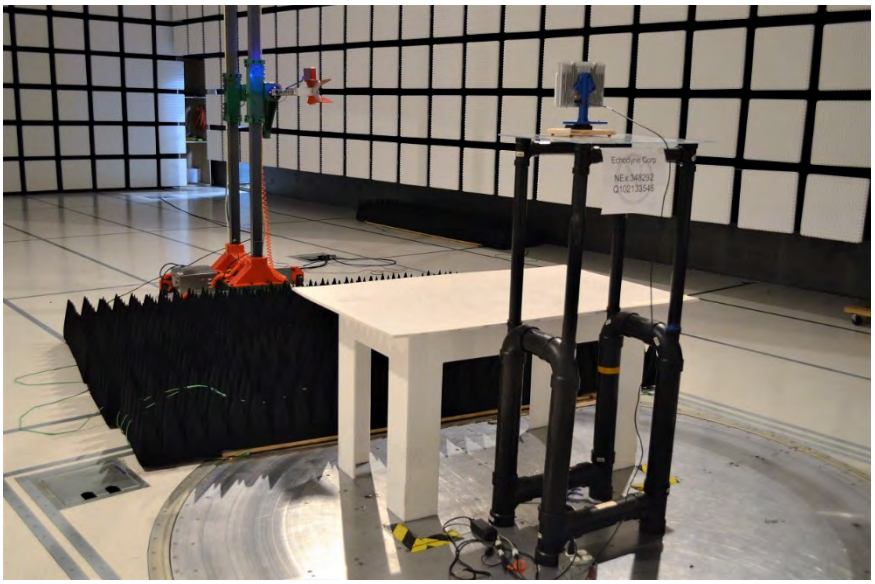


Figure 3.6-4: Radiated Emissions Test Setup – 1-18 GHz (Back)

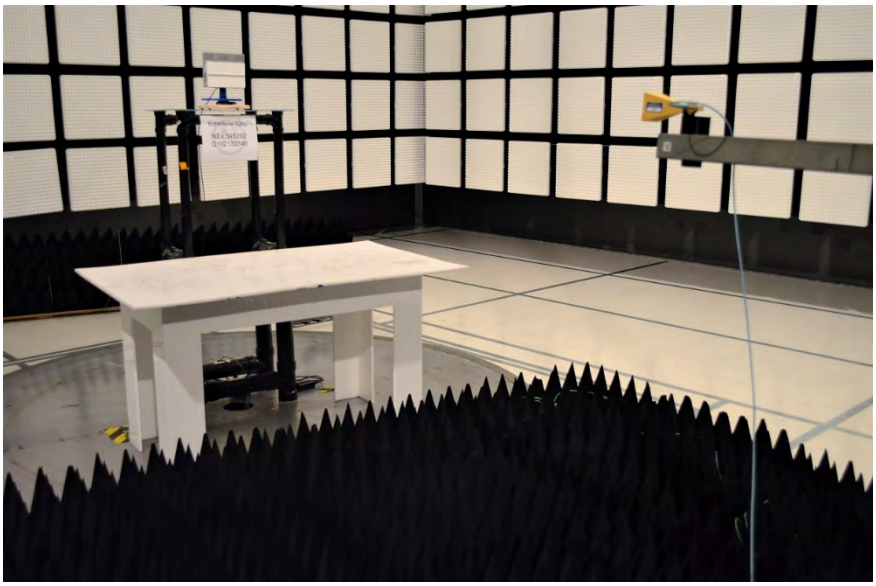


Figure 3.6-5: Radiated Emissions Test Setup – 18-40 GHz (Front)

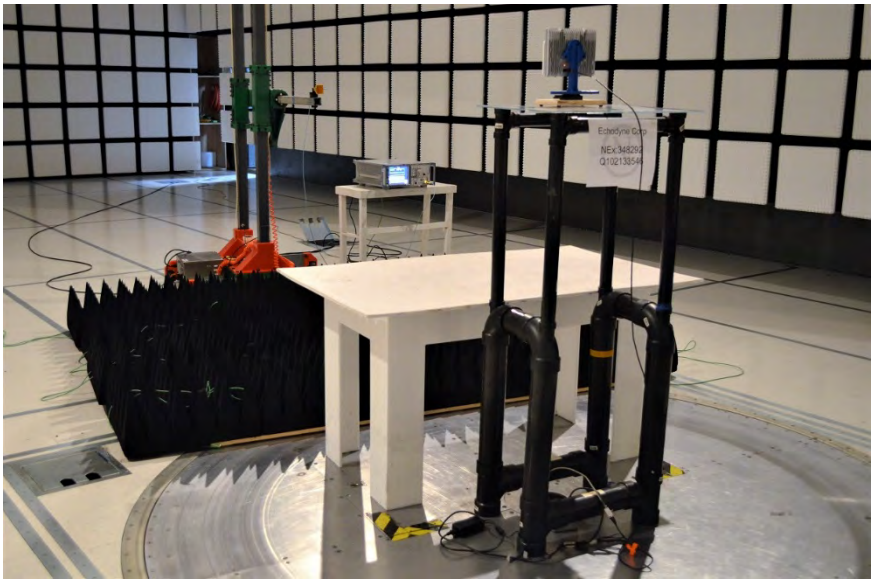


Figure 3.6-6: Radiated Emissions Test Setup – 18-40 GHz (Back)

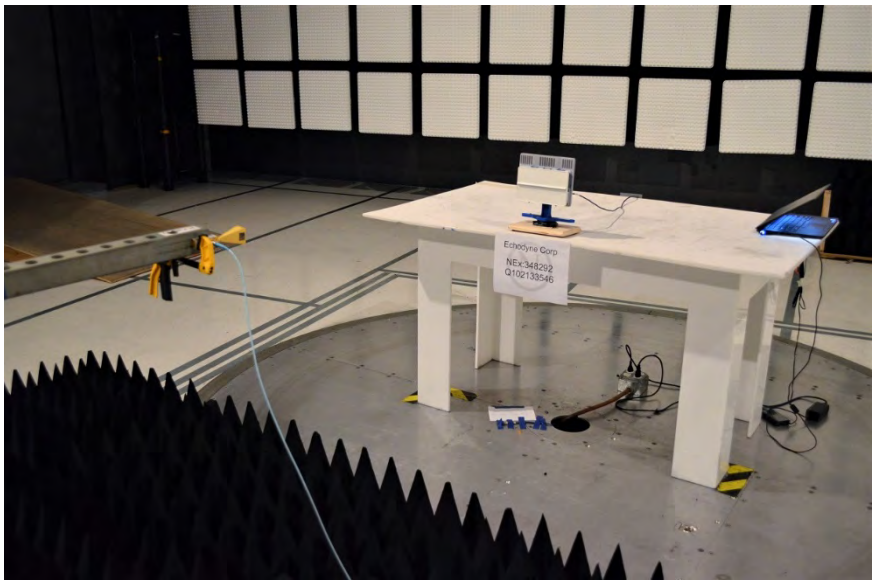


Figure 3.6-7: Radiated Emissions Test Setup – 40-75 GHz (Front)

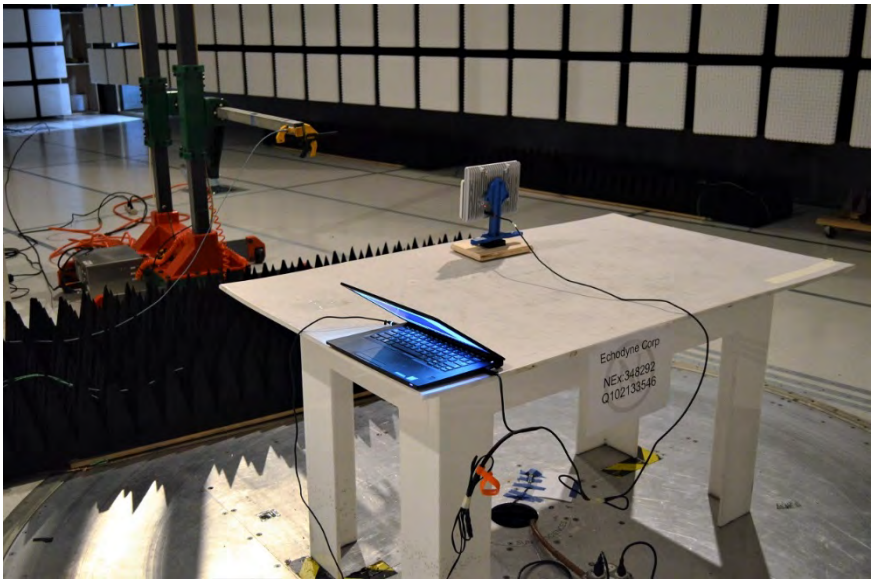


Figure 3.6-8: Radiated Emissions Test Setup – 40-75 GHz (Back)

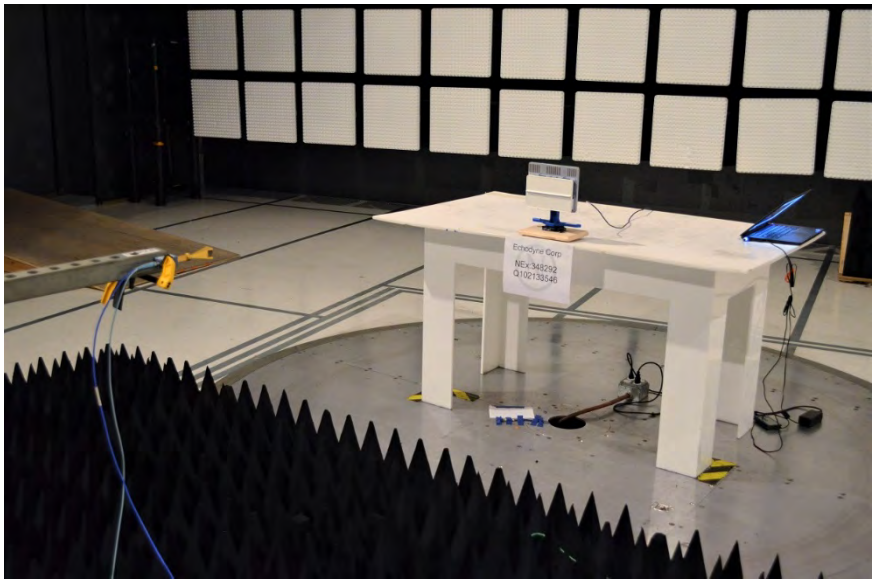


Figure 3.6-9: Radiated Emissions Test Setup – 75-110 GHz (Front)

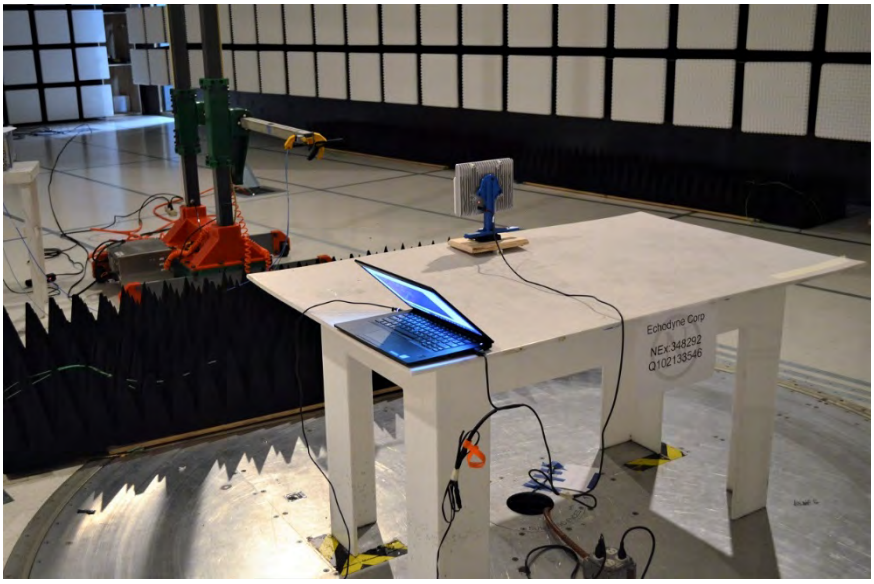


Figure 3.6-10: Radiated Emissions Test Setup – 75-110 GHz (Back)

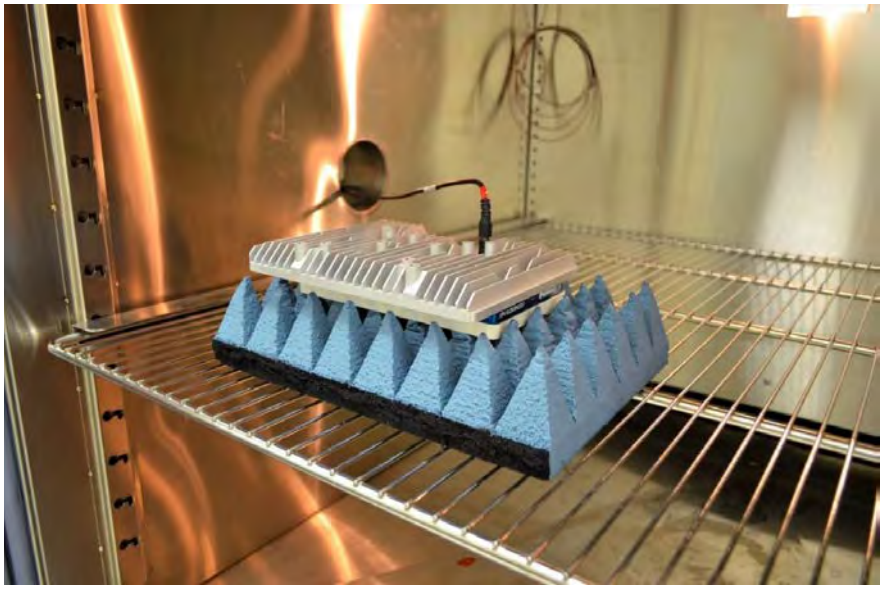


Figure 3.6-11: Frequency stability setup

3.7 EUT sub assemblies and support equipment

Table 3.7-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
Security and Surveillance Radar	Echodyne Corporation	700-0005-203_SSR	SSR-K-000249

Table 3.7-2: Support equipment

Description	Brand name	Model/Part number	Serial number	Rev.
Support Laptop	Dell	Latitude 7480	DJPFMH2	-
AC Adapter	Kaga Electronics Inc.	KTPS65-2430DT-3P-VI	N/A	-

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
Radiated spurious emissions	3.78

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMC Test Receiver	Rohde & Schwarz	ESU 40	E1121	1 yr.	7/28/2018
Antenna, Bilog	Schaffner-Chase	CBL6111C	1480	1 yr.	7/21/2018
Antenna, Horn (1-18 GHz)	ETS Lindgren	3117	1139	1 yr.	1/26/2019
Antenna, Horn (18-26 GHz)	SAGE Millimeter	SAR-2309-42-S2	E1143	2 yr.	3/13/2020
Antenna, Horn (26-40 GHz)	SAGE Millimeter	SAR-2309-28-S2	E1143	2 yr.	3/13/2020
Antenna, Horn (40-60 GHz)	SAGE Millimeter	SAR-2309-19-S2	E1144	N/A	N/A
Antenna, Horn (50-75 GHz)	SAGE Millimeter	SAR-2408-15-S2	E1152	N/A	N/A
Antenna, Horn (75-110 GHz)	SAGE Millimeter	SAR-2507-10-S2	E1146	N/A	N/A
Spectrum Analyzer	Rohde & Schwarz	FSV40	E1120	1 yr.	7/27/2018
Harmonic mixer (40-60 GHz)	Rohde & Schwarz	FS-Z60	E1138	1 yr.	3/07/2019
Harmonic mixer (50-75 GHz)	Rohde & Schwarz	FS-Z75	E1149	1 yr.	3/07/2019
Harmonic mixer (75-110 GHz)	Rohde & Schwarz	FS-Z110	E1154	1 yr.	2/13/2019
Temperature/humidity chamber	CSZ Inc.	ZPH-32-2-2-H/AC	S1179	1 yr.	3/30/2018

Section 8. Testing data

8.1 § 2.1049 and § 87.135 Occupied bandwidth

8.1.1 Definitions and limits

§ 2.1049 Measurements required: Occupied bandwidth.
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

§ 87.135 Bandwidth.

(a) Occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5 percent of the total mean power of a given emission.

(b) The authorized bandwidth is the maximum occupied bandwidth authorized to be used by a station.

(c) The necessary bandwidth for a given class of emission is the width of the frequency band, which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

8.1.2 Test summary

Test date:	March 19, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1003 mbar
Verdict:	Pass	Relative humidity:	47 %

8.1.3 Observations, settings and special notes

Spectrum analyzer settings:

Resolution bandwidth:	2 MHz
Video bandwidth:	≥ RBW
Detector mode:	Peak
Trace mode:	Max Hold

8.1.4 Test data

Table 8.1-1: 99% Occupied bandwidth results

Channel	99% OBW, MHz
Low (24.49 GHz)	47.1
Mid (24.55 GHz)	47.1
High (24.61 GHz)	47.1

Note: none

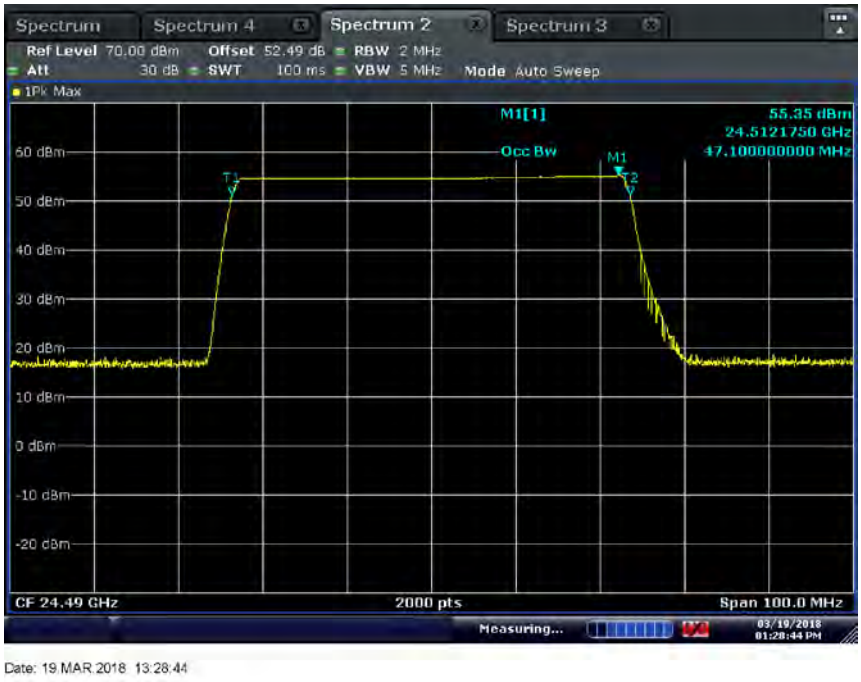


Figure 8.1-1: 99% Occupied bandwidth, Low Channel (24.49 GHz)

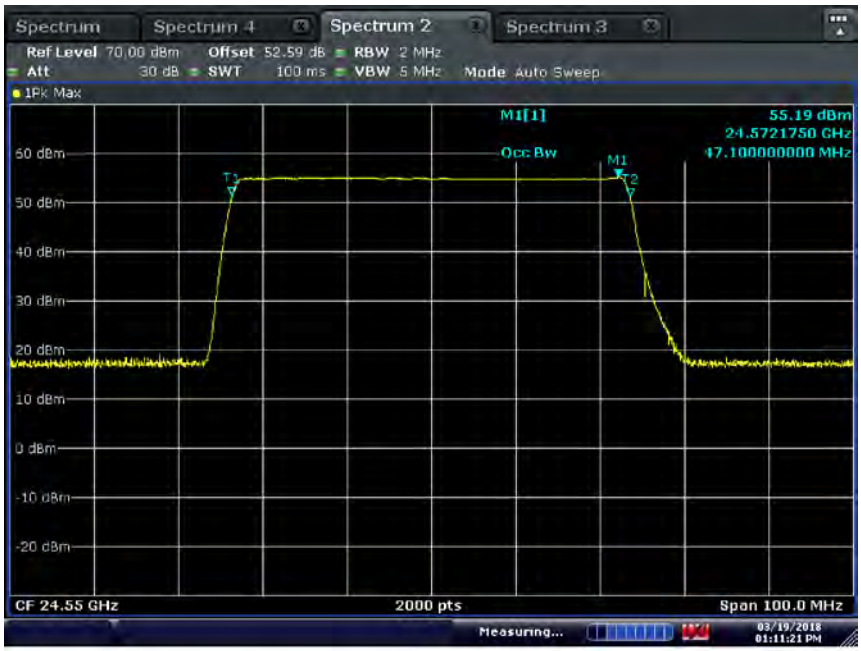


Figure 8.1-2: Occupied bandwidth, Mid Channel (24.55 GHz)

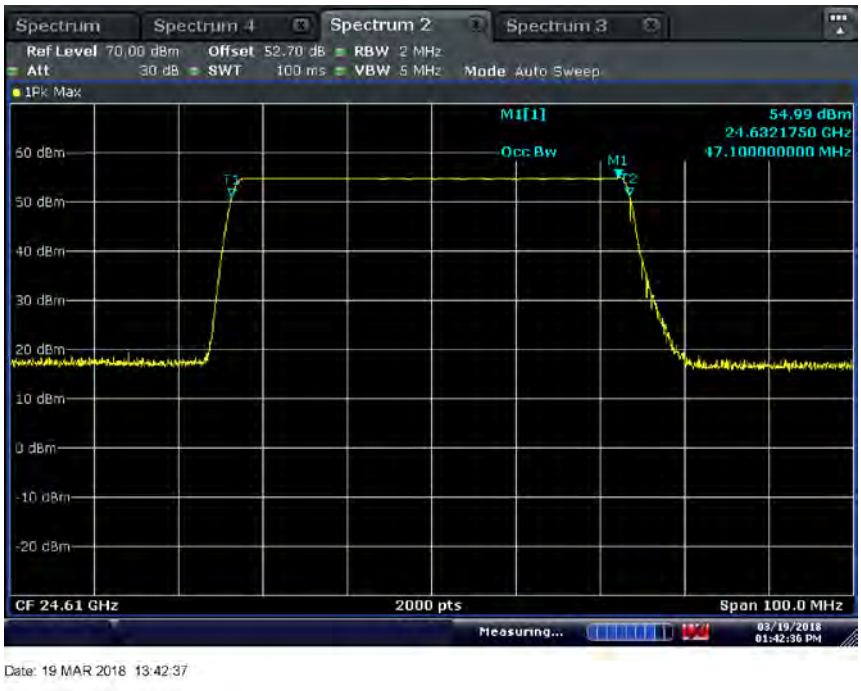


Figure 8.1-3: Occupied bandwidth, High Channel (24.61 GHz)

8.2 §2.1046 (a) and §87.131 RF power output

8.2.1 Definitions and limits

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

§ 87.131 Power and emissions.

The following table lists authorized emissions and maximum power. Power must be determined by direct measurement.

Table 8.2-1: Authorized emissions and maximum power

Class of station	Frequency band/frequency	Authorized emission(s)	Maximum power
Radionavigation	Various [7]	Various [7]	Various [7]

[7]Frequency, emission, and maximum power will be determined by appropriate standards during the certification process per Part 87.131

8.2.2 Test summary

Test date:	March 19, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1003 mbar
Verdict:	Pass	Relative humidity:	47 %

8.2.3 Observations, settings and special notes

- This is a radiated test.
- Test distance of 3 m was used for this measurement.
- In this test EUT power was evaluated in terms of EIRP based on the guidelines for radiated test configuration provided in KDB 412172 D01 v01r01:

Direct calculation from the DUT power measured in a radiated test configuration:

$EIRP = P_R + L_P$.....[412172 D01 v01r01, eq.7]

EIRP = equivalent (or effective) isotropically radiated power, dBm

P_R = received power level, dBm

L_P = basic free space propagation path loss, dB

Received power level $P_R = P_{Meas} – G_R + L_C + L_{Atten} – G_{amp}$.....[412172 D01 v01r01, eq.8]

$P_{Measured}$ = measured power level, dBm

G_R = gain of the receive (measurement) antenna, dBi

L_C = signal loss in the measurement cable, dB

L_{Atten} = value of external attenuation (if used),dB

G_{Amp} = value of external amplification (if used), dB

Combining eq.7 and eq.8

$EIRP = P_{Meas} – G_R + L_C + L_{Atten} – G_{amp} + L_P$

L_{Atten} = 0 dB

G_{amp} = 0 dB

$EIRP = P_{Meas} – G_R + L_C + L_P$

$EIRP = P_{Meas}$ + Correction Factor

Correction Factor = $L_C + L_P - G_R$

The free space propagation path loss $L_P = 20 \text{ Log } F + 20 \text{ Log } D – 27.5$ [412172 D01 v01r01, eq.9]

L_P = basic free space propagation path loss, dB;

F = center frequency of radiated DUT signal, MHz;

D = measurement distance, meters

F	**F**	**G_R**	**L_C**	**D**	**L_P**	**Correction Factor***
GHz	MHz	dBi	dB	m	dB	dB
24.49	24490	22.40	5.07	3	69.82	**52.49**
24.55	24550	22.39	5.14	3	69.84	**52.59**
24.61	24610	22.39	5.23	3	69.86	**52.70**

*Spectrum Analyzer Offset used during measurments

- Detector is RMS. Trace is Max Hold. RBW is 1MHz while VBW was set to 3x RBW.
- Channel Power measurement function of the spectrum analyser (Asset no E1120) was used for this test.

8.2.4 Test data

Table 8.2-2: Output power measurements results

Authorized bandwidth	Channel	EIRP, dBm	EIRP, W
47.1 MHz	Low (24.49 GHz)	54.25	266.07
	Mid (24.55 GHz)	54.44	277.97
	High (24.61 GHz)	54.57	286.42

Note: none

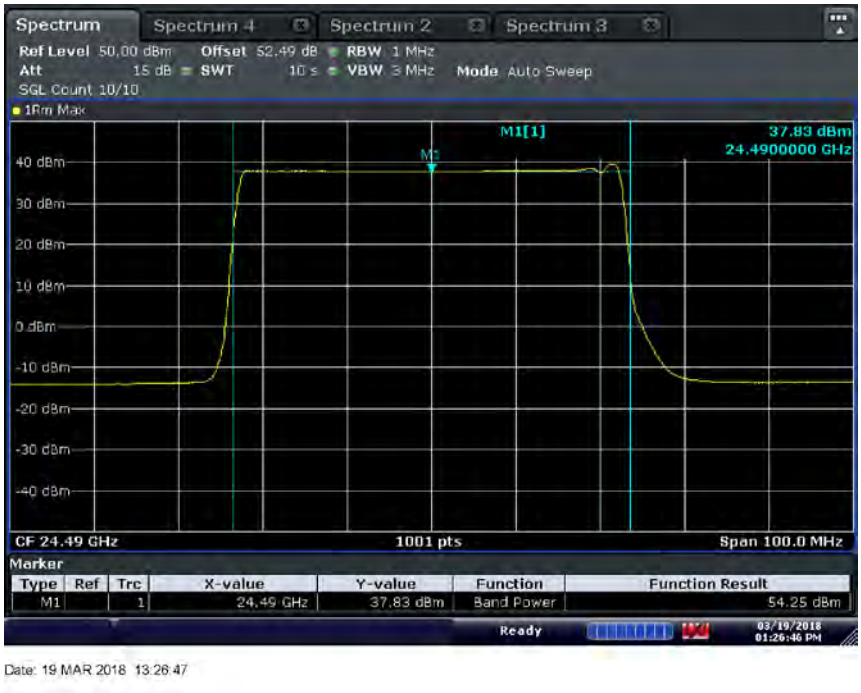


Figure 8.2-1: EIRP Low channel (24.49 GHz)

Figure 8.2-2: EIRP Mid channel (24.55 GHz)

Figure 8.2-3: EIRP High channel (24.61 GHz)

8.3 §87.139(a) and NTIA RSEC Criteria A Spectral mask

8.3.1 Definitions and limits

§ 87.139 Emission limitations.

(a) Except for ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091-5150 MHz band or digital modulation (G7D) for differential GPS, the mean power of any emissions must be attenuated below the mean power of the transmitter (pY) as follows:

(1) When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB;

(2) When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.

(3) When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least 43 +10 $\log_{10}$ pY dB.

5.5.7.1 RSEC Criteria A

RSEC A radar systems that have been submitted to or certified by NTIA before December 31, 2013, are exempt from meeting new RSEC A requirements and shall be "grandfathered". Grandfathered systems shall be certified under the NTIA rules applicable prior to 31 December 2013. Systems certified by NTIA at Stage 3 to Section 5.2.2.2 of the NTIA manual before the date shall be certified at Stage 4 using the same criteria until 31 December 2015. On January 1, 2016 all systems seeking Criteria A certification must meet these requirements.

Criteria A Applicability

Radars shall be grouped into Criteria A that have the following system characteristics: Non-pulsed radars of 40 watts or less rated average power; or Pulsed radars of 1 kW or less rated peak power; or Radars with an operating frequency above 40 GHz; or Man-portable radars; or Man-transportable radars; or as described above; or Expendable, non-recoverable radars on missiles.

Previously certified Criteria A systems must adhere to the revised regulations when any of the following system parameters are changed, including power output, pulse width, pulse repetition rate, chirp rate, chirp bandwidth, rise time, and fall time.

Criteria A Emission Mask

For systems operating in the band 2700 – 2900 MHz
Systems operating in this band must adhere to the RSEC Criteria D standard in section 5.5.2.4.

For Systems operating in other frequency bands
For these types of radars, the emission levels at the antenna input or output (radiated) shall be no greater than the values obtainable from the curve in Figure 5-2.

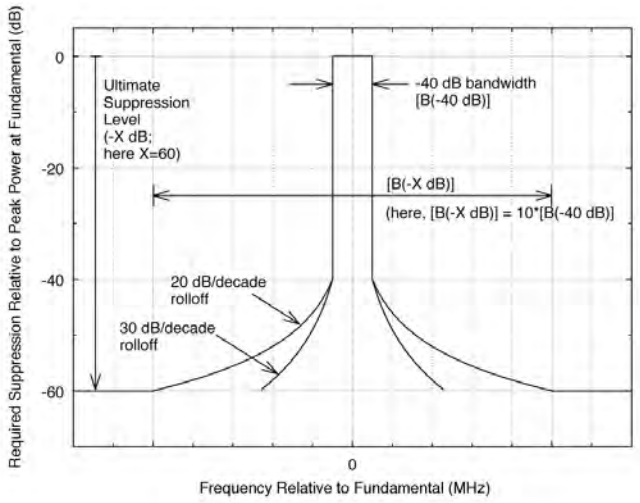


Figure 8.3-1: The RSEC Emission mask (Fig. 5-2, RSEC Criteria A).

-40 dB bandwidth Equations

The -40 dB bandwidth equations are contained in Section 5.5.3.1 for single frequency radars and 5.5.3.2 for frequency hopping radars.

Roll-off in the Out-of–Band (OOB) Domain

At the frequency B(-40dB)/2 displaced from F0, the level shall be at least 40 dB below the maximum value. Between the -40dB and -XdB frequencies the level shall meet a slope (S) of 20 dB per decade (S=20) for all waveforms when the peak power is greater than 1 Watt.

Spurious Domain Limits

At and beyond the frequencies B(-XdB)/2 from F0, the X(dB) level shall be at least the dB value below the maximum spectral power density given by:

For radar systems with peak power above 100 watts: *X(dB)* = 55*dB*
For radar systems with peak power less than 100 watts but more than 1 watt: *X(dB)* = 50*dB*
For radar systems with peak power equal to and less than 1 watt: *X(dB)* = 40*dB*
For radar systems with a duty cycle equal to and greater than 10 percent: *X(dB)* = 55*dB*
All harmonic levels shall be at a level that is at least 55 dB below the maximum power spectral density.
The two figures illustrate the suppression levels and masks for Criteria A systems.

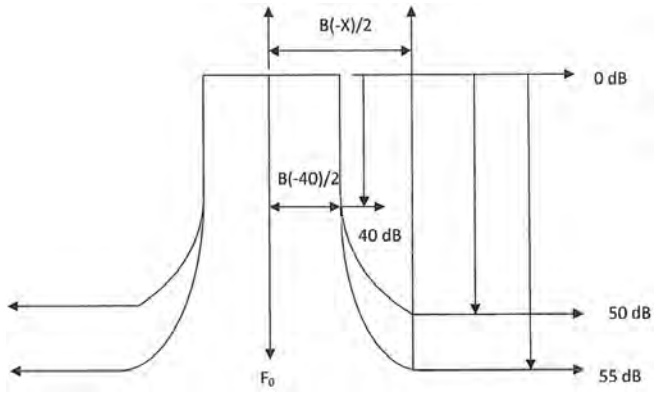


Figure 8.3-2: RSEC A Masks for systems with peak power above 1 watt.

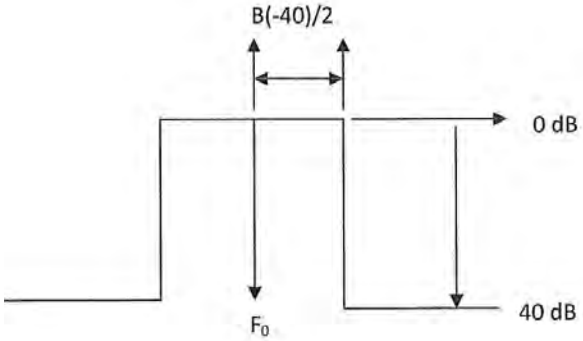


Figure 8.3-3: RSEC A Mask for systems with peak power equal to and below 1 Watt.

8.3.2 Test summary

Test date:	March 19, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1004 mbar
Verdict:	Pass	Relative humidity:	51 %

8.3.3 Observations, settings and special notes

- This is a radiated test.
- Test distance of 3 meter was used for this measurement.
- Power of the evaluated emissions was measured in terms of EIRP.
- Correction factors of 52.49 dB (Low channel), 52.59 dB (Mid channel) and 52.70 dB (High channel) were used to account for free-space loss, test antenna gain and cable loss. See section 8.2.3 of this test report for the sample correction factor calculation.
- Detector is RMS.
- Trace is Max Hold
- RBW is 1MHz
- VBW is 3x RBW
- Emission Mask measurement function of the spectrum analyzer was used for this test.
- FCC Emission Mask is based on the measured 99% occupied bandwidth. NTIA RSEC mask (see Fig. 8.3.2) is based on the calculations provided by the manufacturer. Calculated mask break points are shown in the table below.

Channel	Description	Frequency points	Amplitude	Delta Fc (MHz)
B1-A	Lower -40 dB Edge	24455.1	-40	34.9
	Lower Operating Edge	24467.5	0	22.5
	Center Channel	24490.0	0	0
	Upper Operating Edge	24512.5	0	22.5
	Upper -40 dB Edge	24524.9	-40	34.9
B1-B	Lower -40 dB Edge	24515.1	-40	34.9
	Lower Operating Edge	24527.5	0	22.5
	Center Channel	24550.0	0	0
	Upper Operating Edge	24572.5	0	22.5
	Upper -40 dB Edge	24584.9	-40	34.9
B1-C	Lower -40 dB Edge	24575.1	-40	34.9
	Lower Operating Edge	24587.5	0	22.5
	Center Channel	24610.0	0	0
	Upper Operating Edge	24632.5	0	22.5
	Upper -40 dB Edge	24644.9	-40	34.9

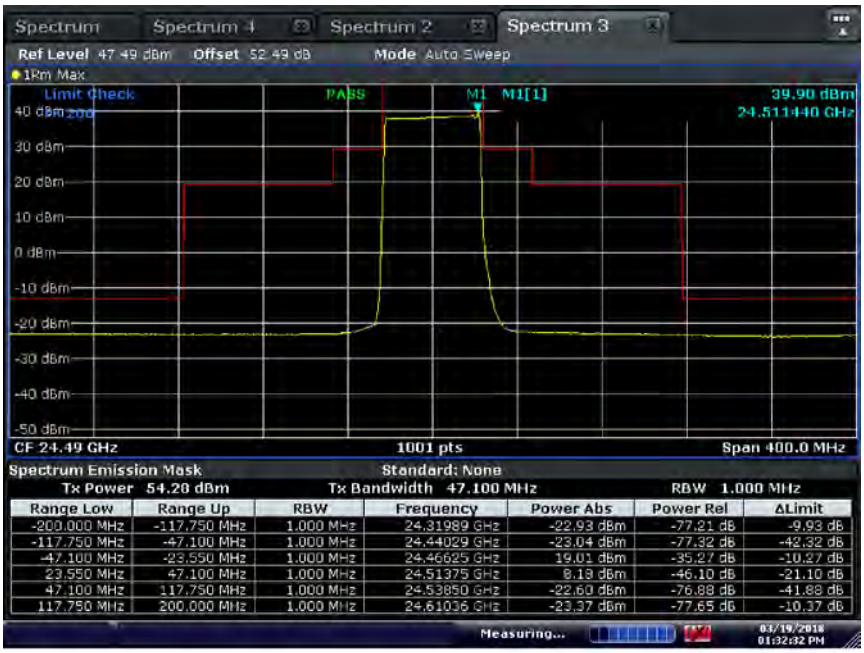
Note: Waveform of this radar is linear FMCW where the chirp down (high to low) covering 45MHz bandwidth is centered on each channel. The duration of the chirp is 100 microseconds with a 10-microsecond reset period where the radar transmitter is blanked while the synthesizer resets. This is repeated 128 times for a complete coherent process interval for each beam direction processed providing both range and doppler.

Spectrum analyzer settings for conducted measurements:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	RMS
Trace mode:	Max Hold

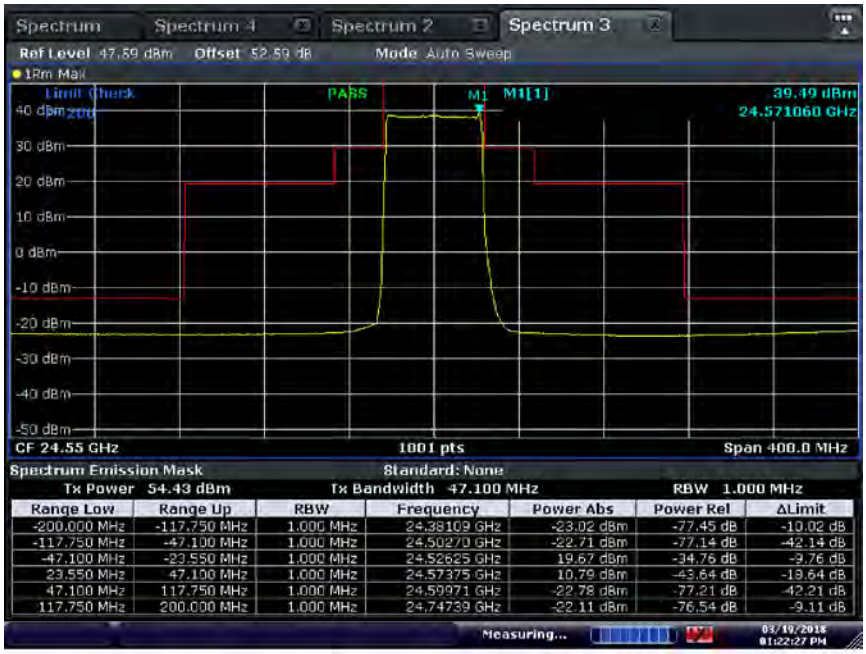
Note: None

8.3.4 Test data



Date: 19.MAR.2018 13:32:32

Figure 8.3-4: FCC Part 87 Emission mask (LC, 24.49 GHz)



Date: 19.MAR.2018 13:22:27

Figure 8.3-5: FCC Part 87 Emission mask (MC, 24.55 GHz)

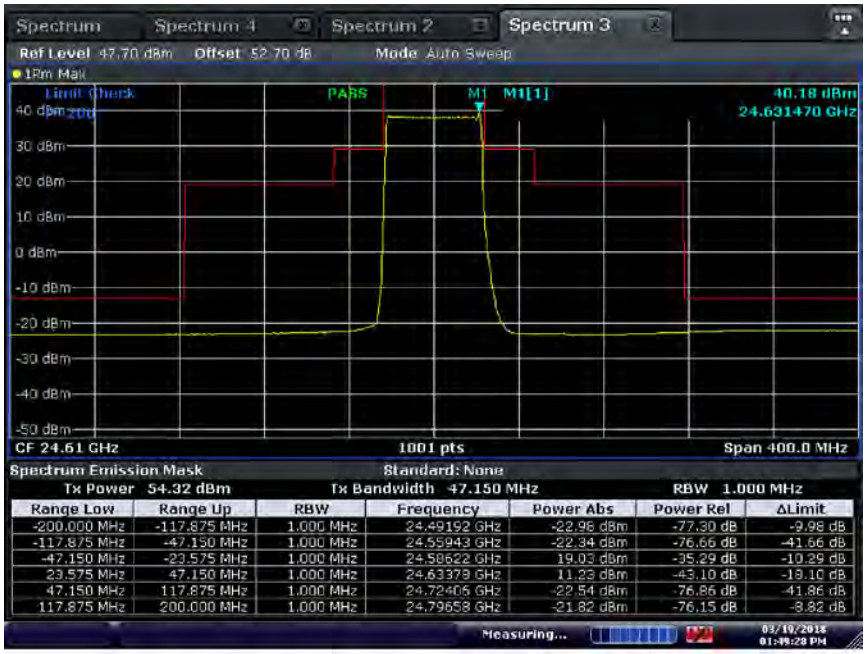


Figure 8.3-6: FCC Part 87 Emission mask (HC, 24.61 GHz)

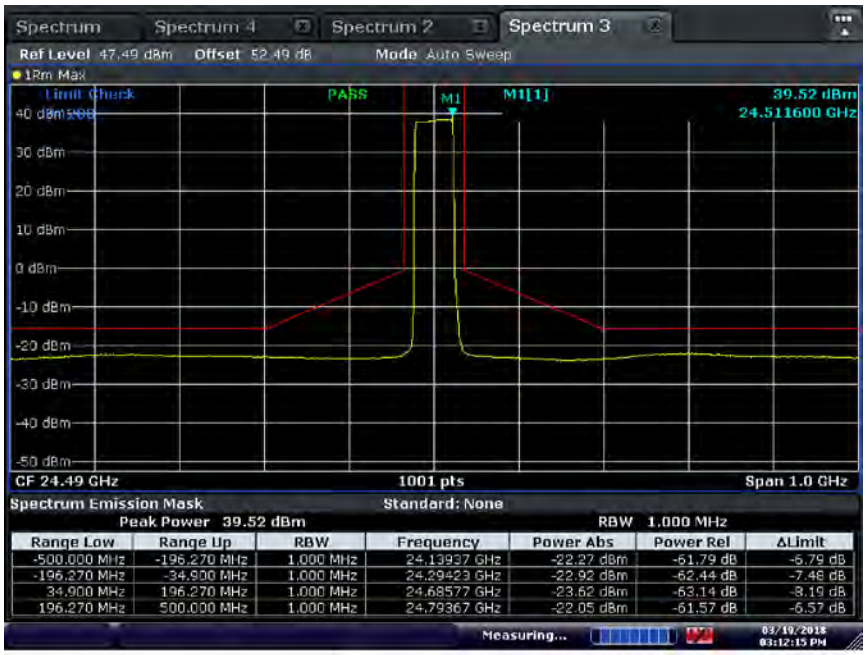


Figure 8.3-7: NTIA RSEC Criteria A Emission (LC, 24.49 GHz)

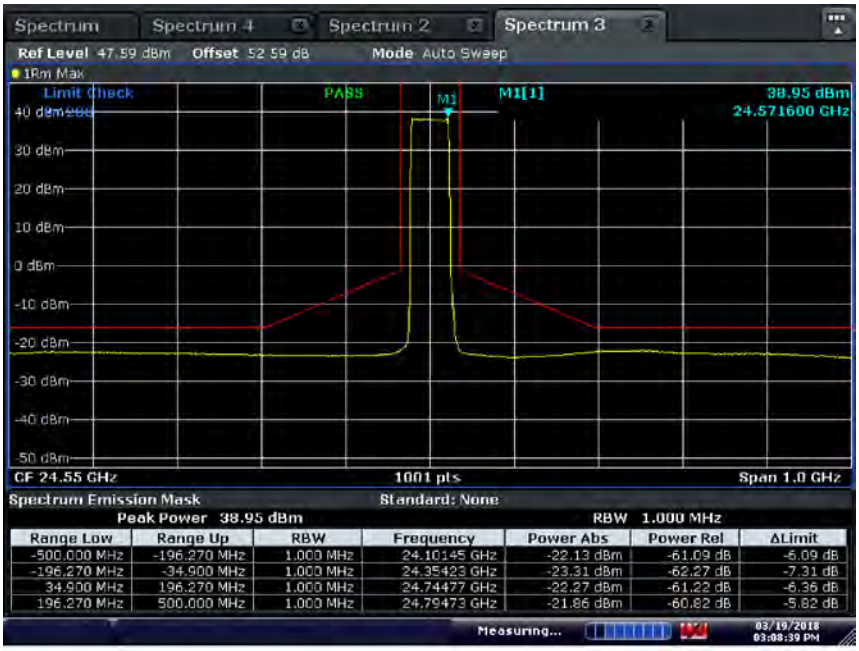


Figure 8.3-8: NTIA RSEC Criteria A Emission (MC, 24.55 GHz)

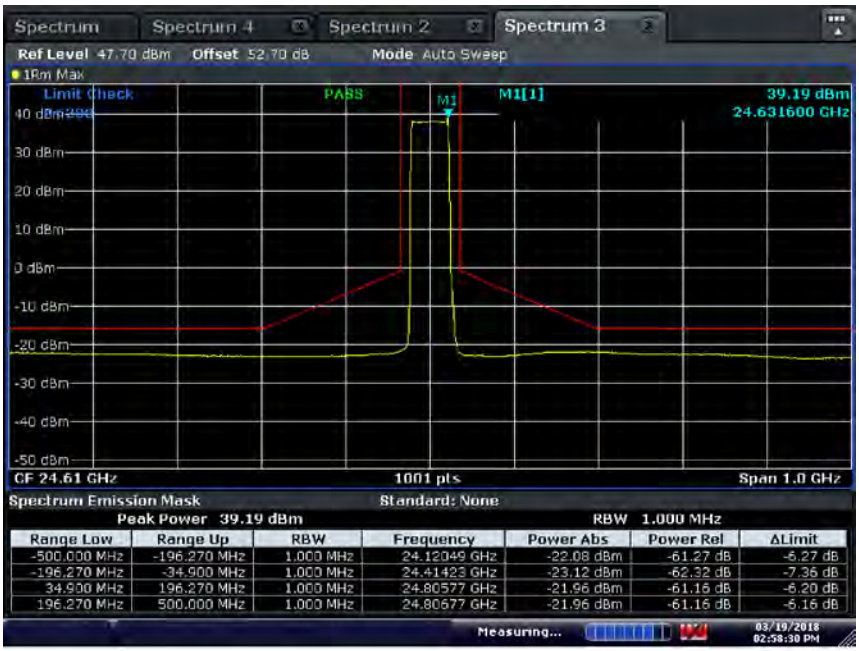


Figure 8.3-9: NTIA RSEC Criteria A Emission (HC, 24.61 GHz)

8.4 § 2.1055 and § 87.133 (a) Frequency stability

8.4.1 Definitions and limits

§ 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

§ 87.133 Frequency stability.

(a) Except as provided in paragraphs (c), (d), (f), and (g) of this section, the carrier frequency of each station must be maintained within these tolerances:

Frequency band (lower limit exclusive, upper limit inclusive), and categories of stations	Tolerance [1]	Tolerance [2]
(9) Band-10.5 GHz to 40 GHz: Radionavigation stations	5000	5000

[1] This tolerance is the maximum permitted until January 1, 1990, for transmitters installed before January 2, 1985, and used at the same installation. Tolerance is indicated in parts in 10^{-6} unless shown as Hertz (Hz).

[2] This tolerance is the maximum permitted after January 1, 1985 for new and replacement transmitters and to all transmitters after January 1, 1990. Tolerance is indicated in parts in 10^{-6} unless shown as Hertz (Hz).

8.4.2 Test summary

Test date:	March 27 and March 29, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1003 mbar
Verdict:	Pass	Relative humidity:	47 %

8.4.3 Observations, settings and special notes

For this test EUT was configured to transmit CW signal on Mid channel (24.551 GHz).
Spectrum analyzer settings:

Resolution bandwidth:	500 Hz
Video bandwidth:	≥ RBW
Detector mode:	RMS
Trace mode:	Avg

8.4.4 Test data

Table 8.4-1: Frequency stability results

Voltage (VDC)	Temp (°C)	Frequency (GHz)	Max. Frequency Deviation (ppm)	Limit (ppm)
24.0	-45	24.55099760	-0.0977	5000
	-40	24.55099974	-0.0108	
	-30	24.55100123	0.0500	
	-20	24.55099793	-0.0844	
	-10	24.55099638	-0.1473	
	0	24.55099772	-0.0927	
	+10	24.55100077	0.0313	
	+20	24.55100469	0.1910	
	+30	24.55100293	0.1193	
	+40	24.55100049	0.0200	
	+50	24.55099939	-0.0250	
	+60	24.55101491	0.6073	
	+70	24.55107009	2.8549	
	+75	24.55110391	4.2324	
9.0	+20	24.55100451	0.1837	
32.0	+20	24.55100488	0.1987	

Note: none

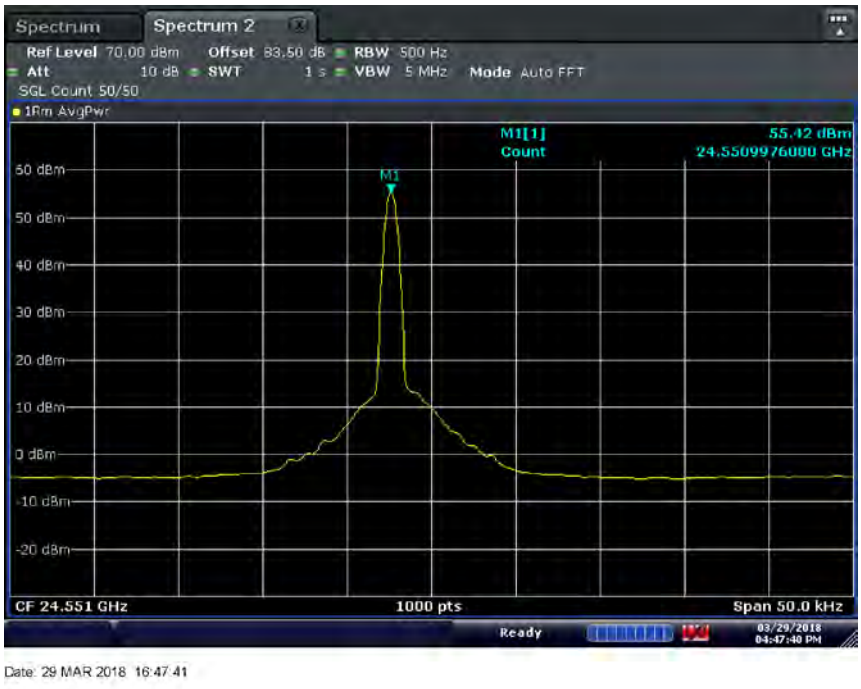


Figure 8.4-1: -45°C (Nominal Voltage)

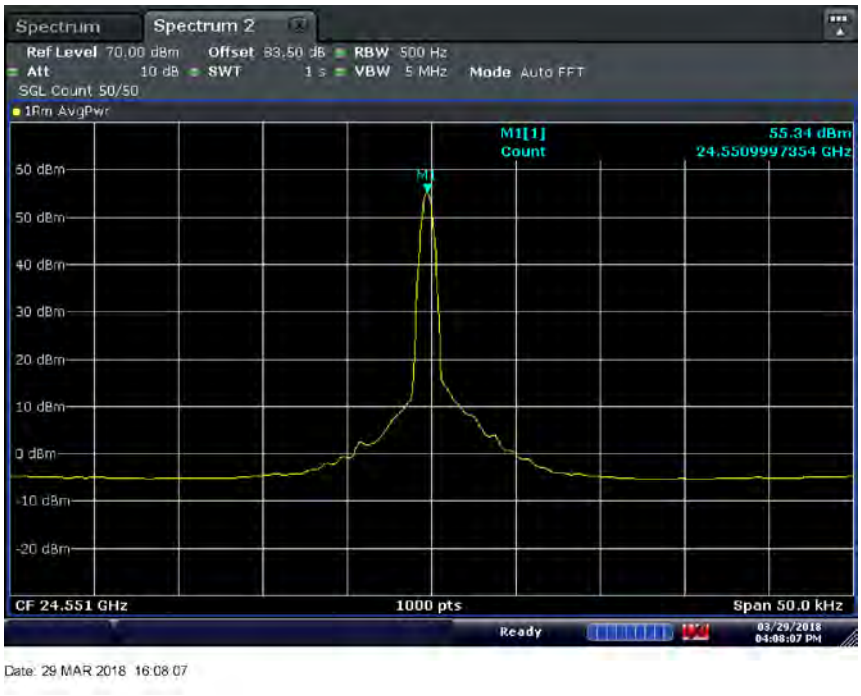


Figure 8.4-2: -40°C (Nominal Voltage)

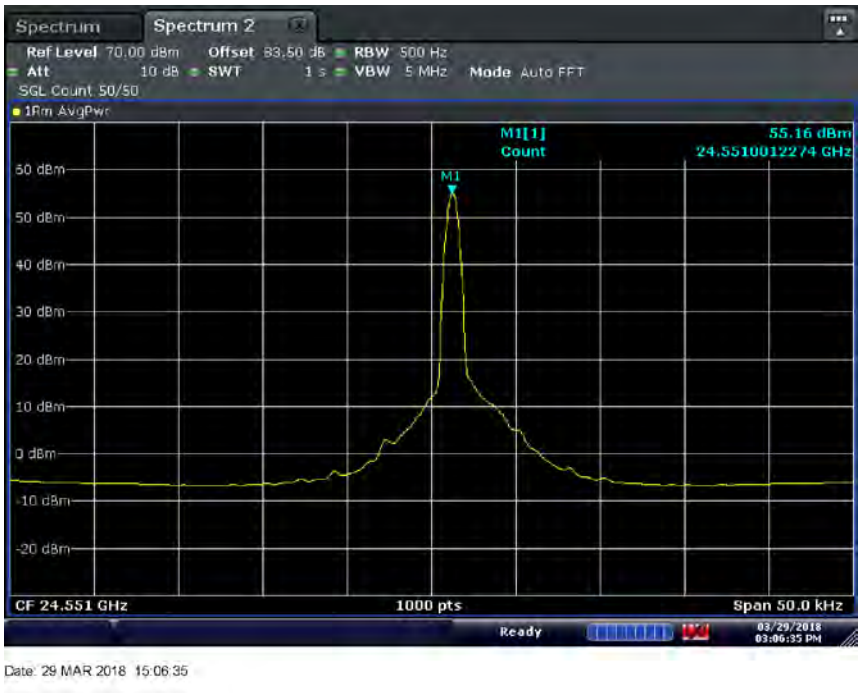


Figure 8.4-3: -30°C (Nominal Voltage)

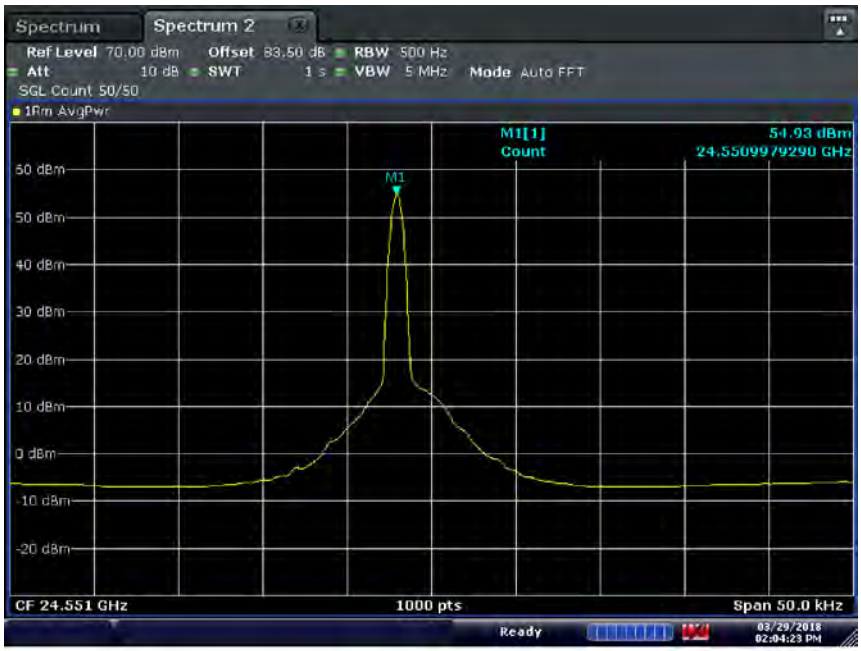


Figure 8.4-4: -20°C (Nominal Voltage)

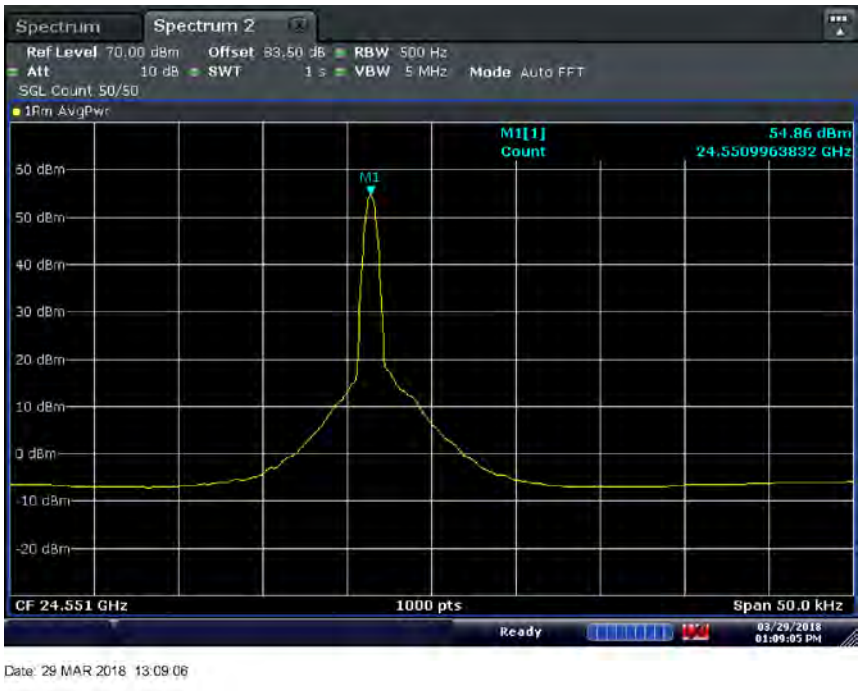


Figure 8.4-5: -10°C (Nominal Voltage)

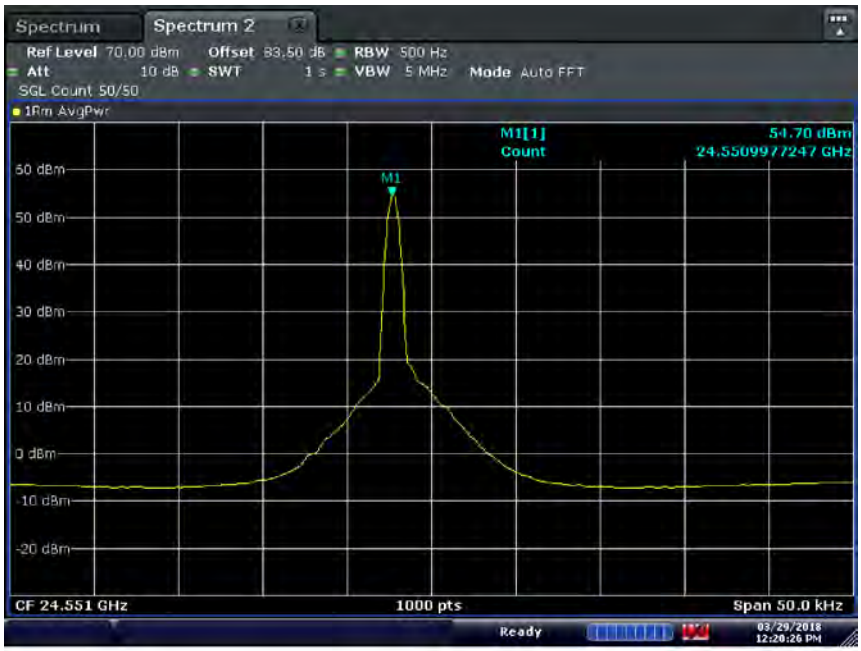


Figure 8.4-6: 0°C (Nominal Voltage)

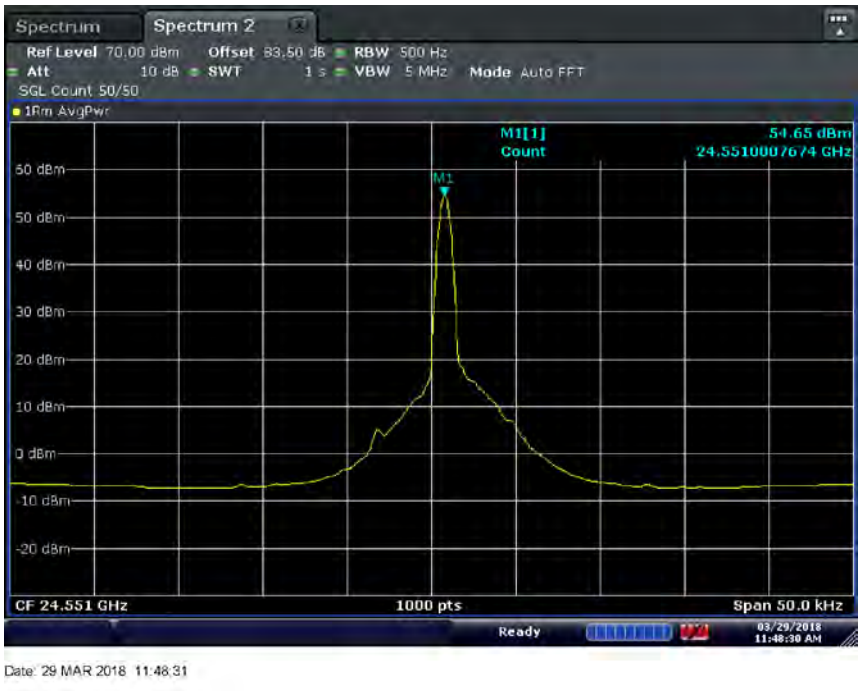


Figure 8.4-7: 10°C (Nominal Voltage)

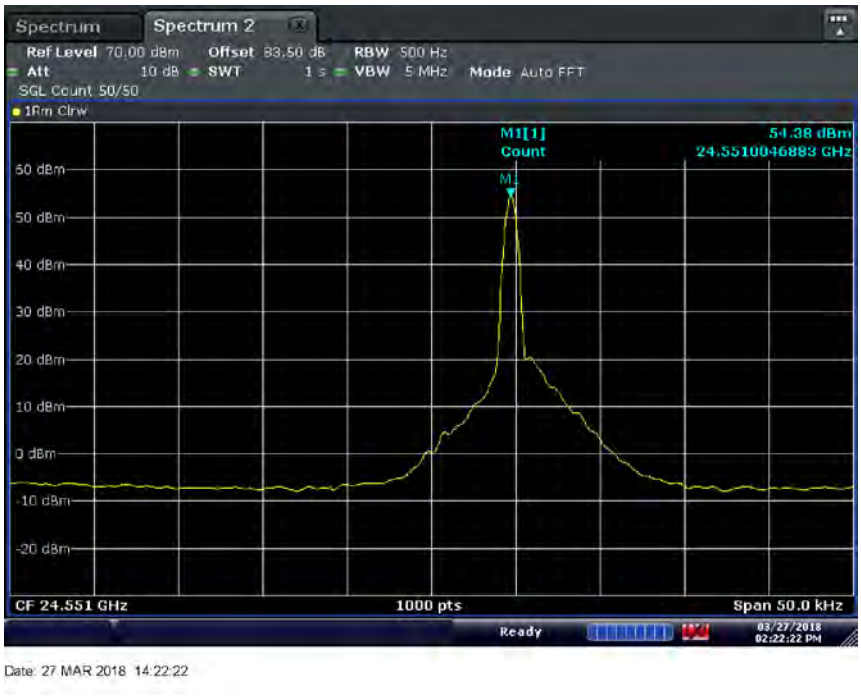


Figure 8.4-8: 20°C (Nominal Voltage)

Figure 8.4-9: 20°C (9VDC Voltage)

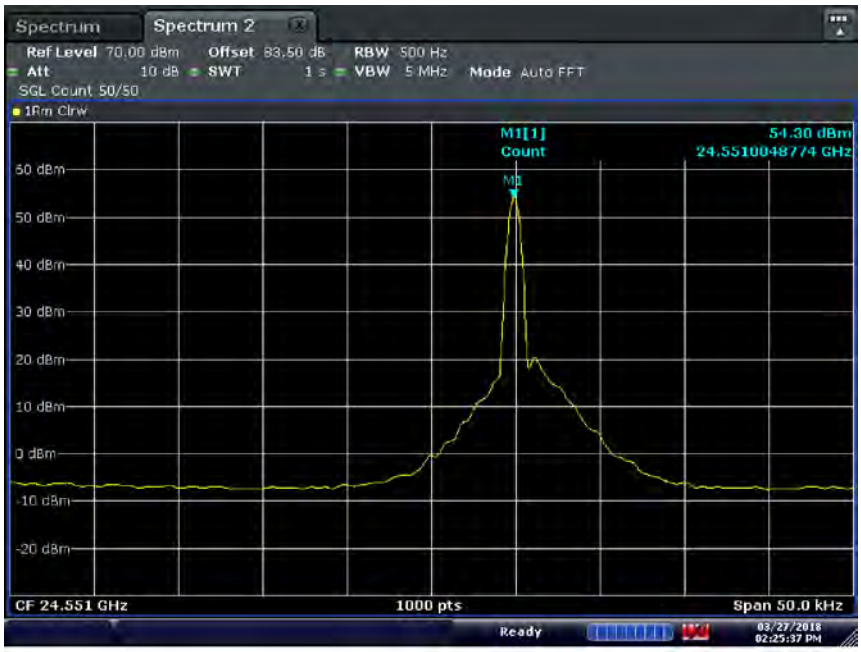


Figure 8.4-10: 20°C (32VDC Voltage)

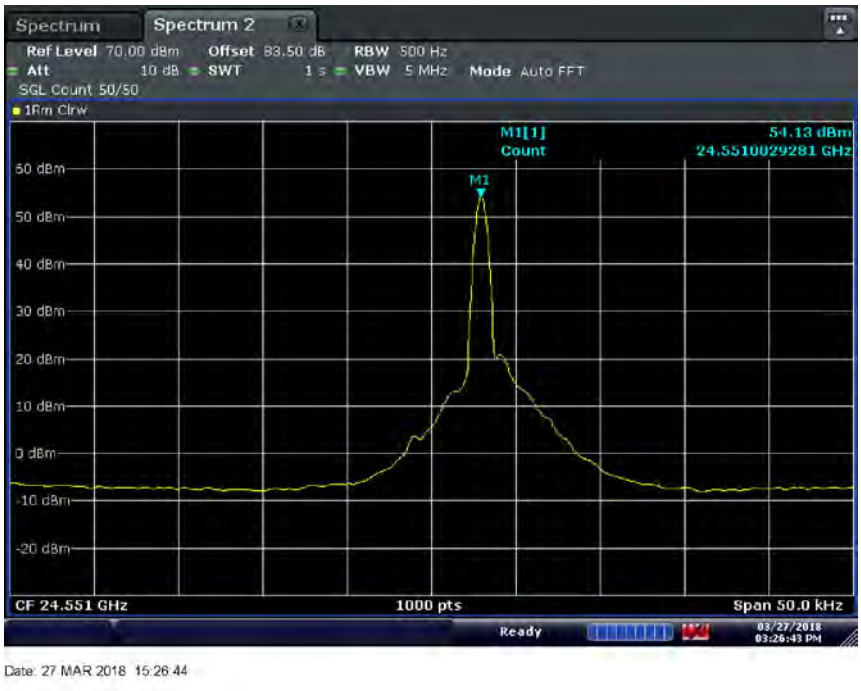
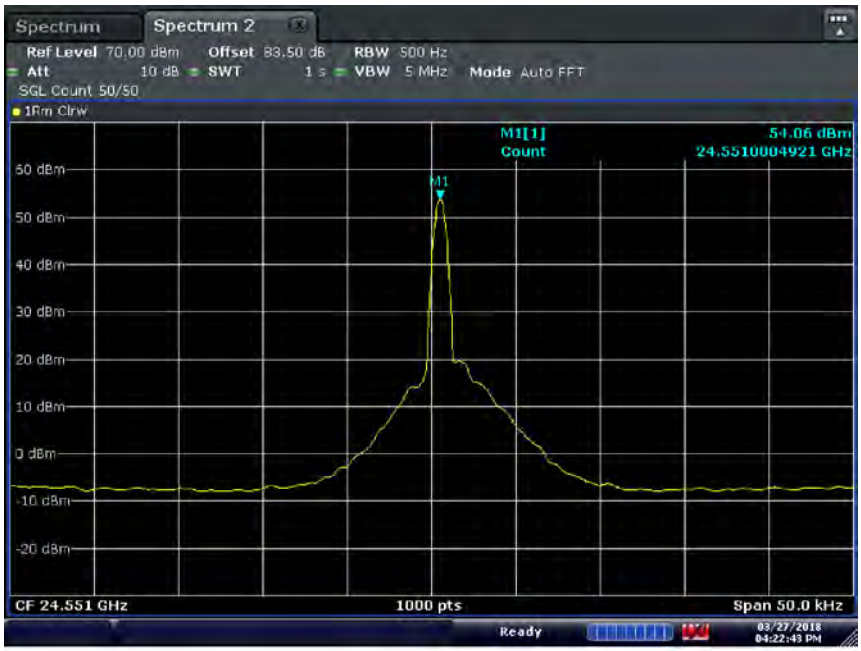


Figure 8.4-11: 30°C (Nominal Voltage)



Date: 27 MAR 2018 16:22:44

Figure 8.4-12: 40°C (Nominal Voltage)

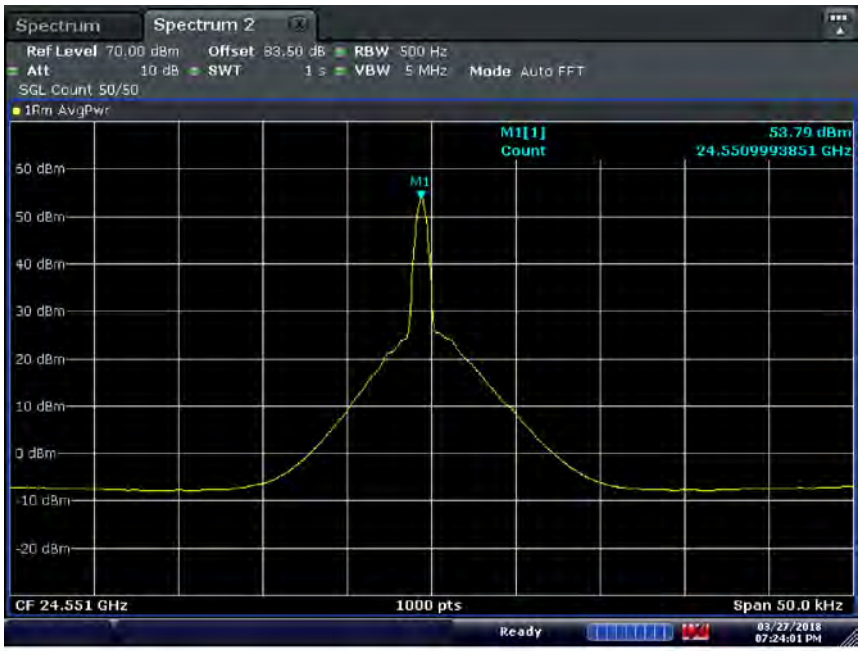


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Figure 8.4-13: 50°C (Nominal Voltage)

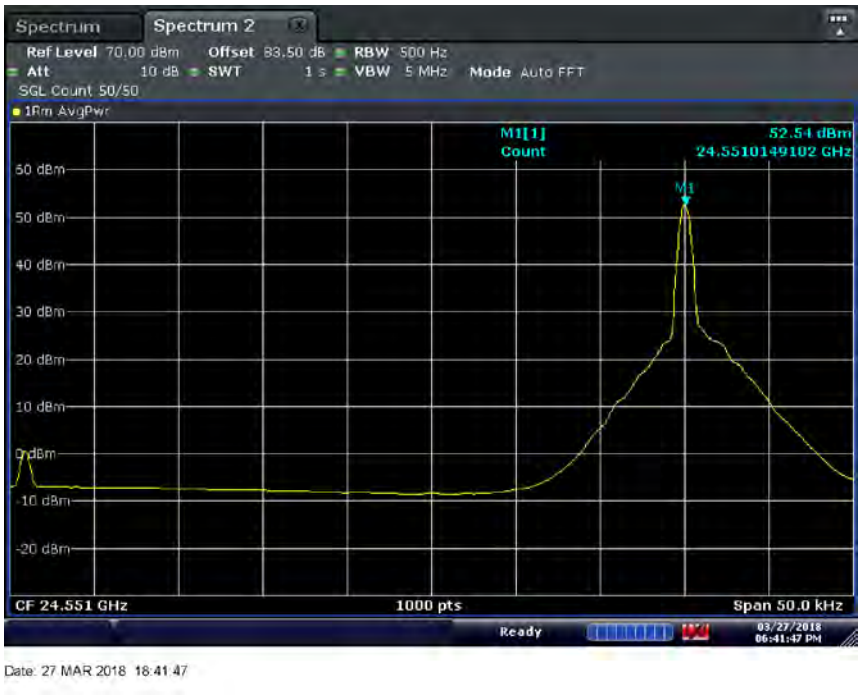


Figure 8.4-14: 60°C (Nominal Voltage)

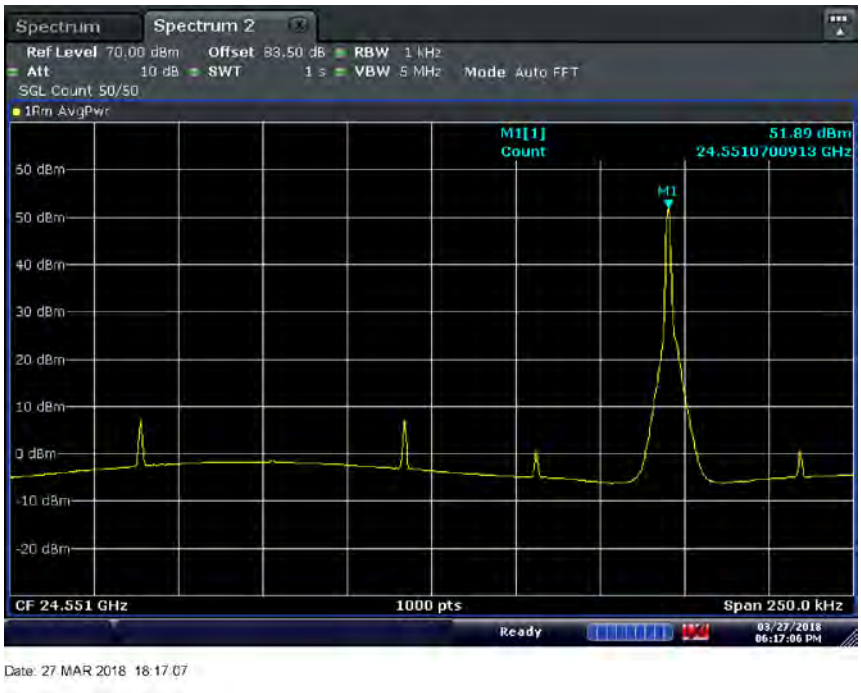


Figure 8.4-15: 70°C (Nominal Voltage)

Figure 8.4-16: 75°C (Nominal Voltage)

8.5 §2.1051 and §87.139 Spurious emissions at antenna terminals.

8.5.1 Definitions and limits

§2.1051 The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 87.139 Emission limitations.

(a) Except for ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091-5150 MHz band or digital modulation (G7D) for differential GPS, the mean power of any emissions must be attenuated below the mean power of the transmitter (pY) as follows:

(1) When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB;

(2) When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.

(3) When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least 43 +10 $\log_{10}$ pY dB.

8.5.2 Test summary

Test date:	March 21, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1005 mbar
Verdict:	Pass	Relative humidity:	51 %

8.5.3 Observations, settings and special notes

- This is a radiated test.
- Only harmonics and other spurious emissions above 40 GHz were measured in this test.
- The measured EUT harmonic emissions were referenced to the transmitter output as explained in the test addendum provided by the manufacturer (Special Test Addendum FCC Harmonic Emission Testing Sections 87.139 and 2.1051" by Echodyne issued on 5/24/2018). In order to derive the output power, the measured EIRP level was corrected by the EUT antenna gain, which was assumed to be equal to the nominal antenna gain of 22 dBi. The obtained output power results were evaluated against the limit for the transmitter mean power given in § 87.139 (a)(3). EUT complies.
- The spectrum was searched from 40 GHz to 110 GHz.
- A test distance of 1.5 meter was used.
- EUT was evaluated operating Low (24.49 GHz), Mid (24.55 GHz) and High (24.61 GHz) channels.

Spectrum analyzer/receiver settings for radiated measurements above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	RMS or Peak
Trace mode:	Max Hold

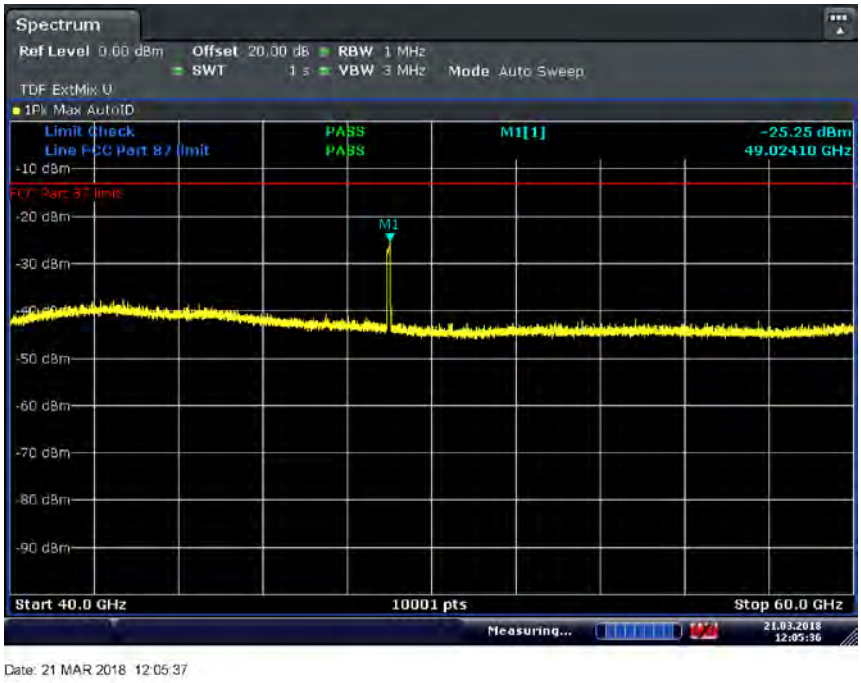


Figure 8.5.1: 40-60 GHz (Low channel, 24.49 GHz)

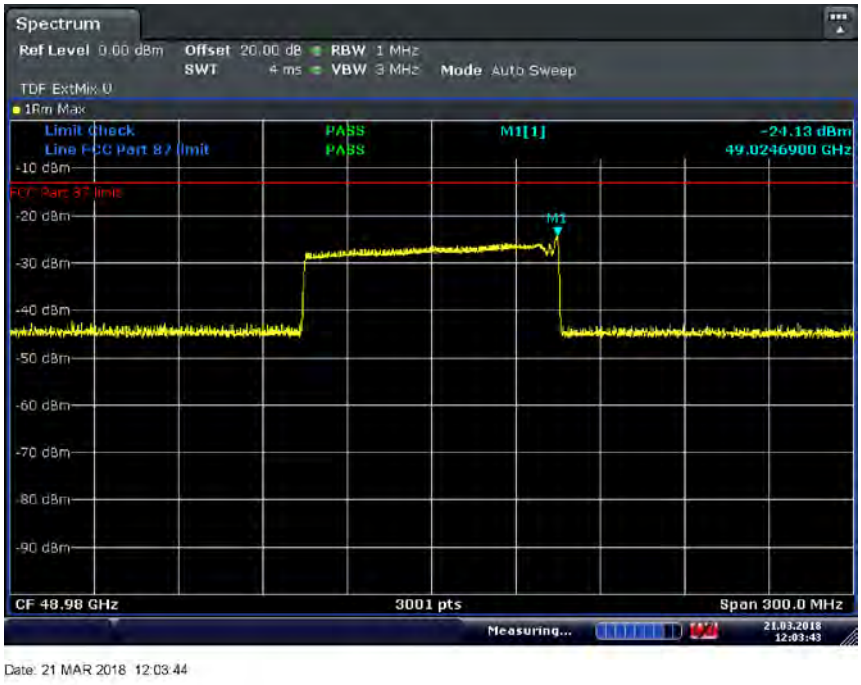


Figure 8.5.2: Zoom @ 48.98 GHz (Low channel, 24.49 GHz)

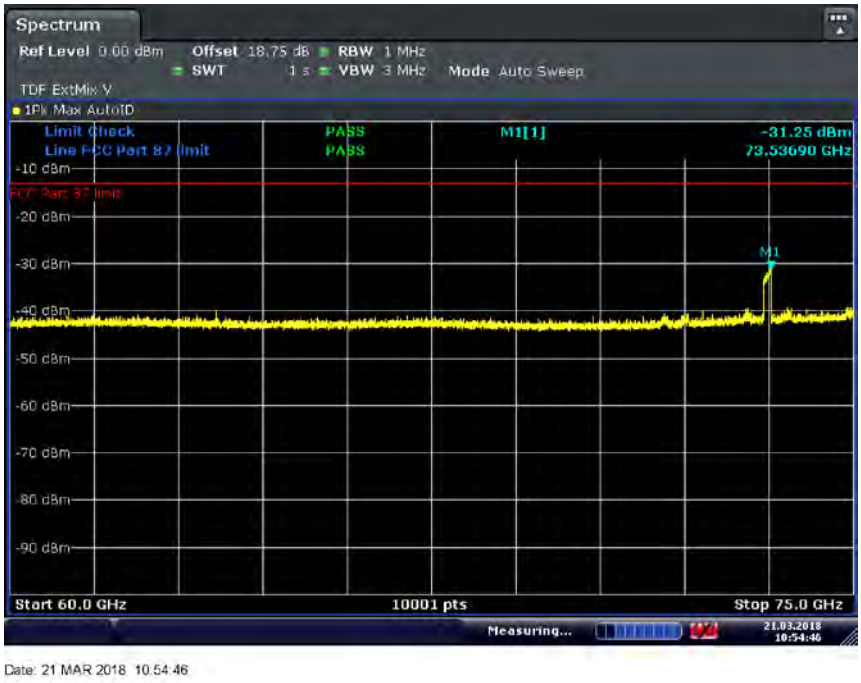


Figure 8.5.3: 60-75 GHz (Low channel, 24.49 GHz)

Figure 8.5.4: Zoom @ 73.47 GHz (Low channel, 24.49 GHz)

Figure 8.5.5: 75-110 GHz (Low channel, 24.49 GHz)

Figure 8.5.6: Zoom @ 97.96 GHz (Low channel, 24.49 GHz)

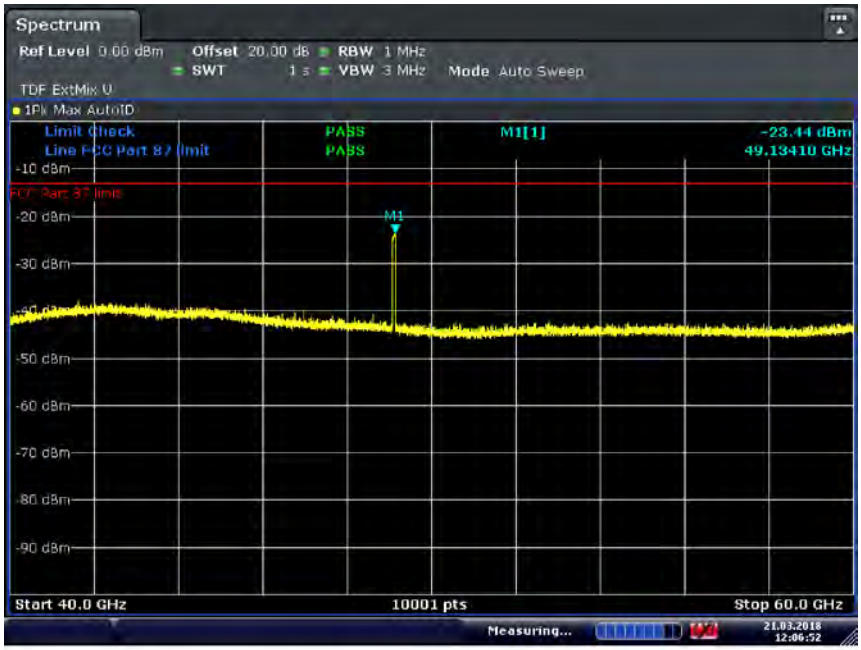


Figure 8.5.7: 40-60 GHz (Mid channel, 24.55 GHz)

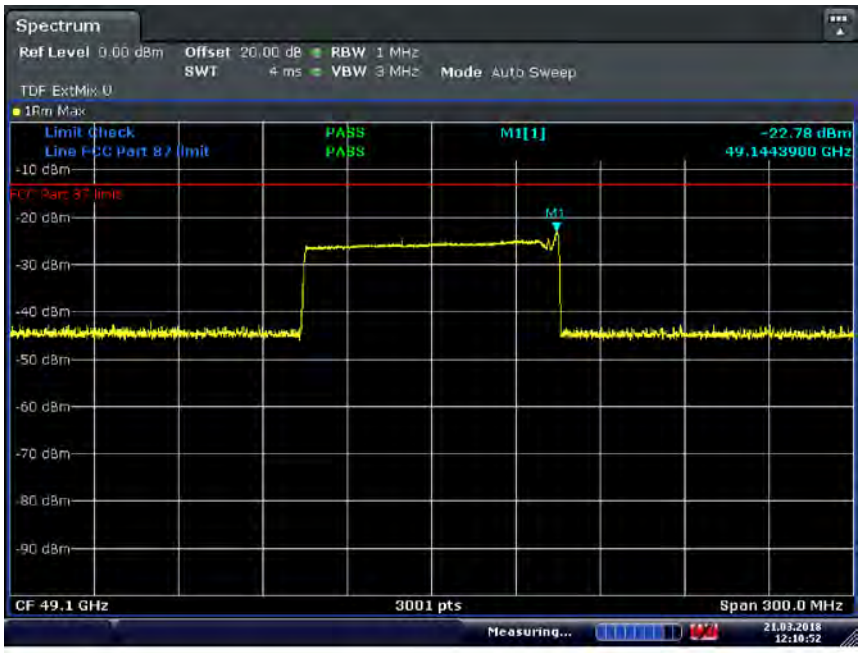
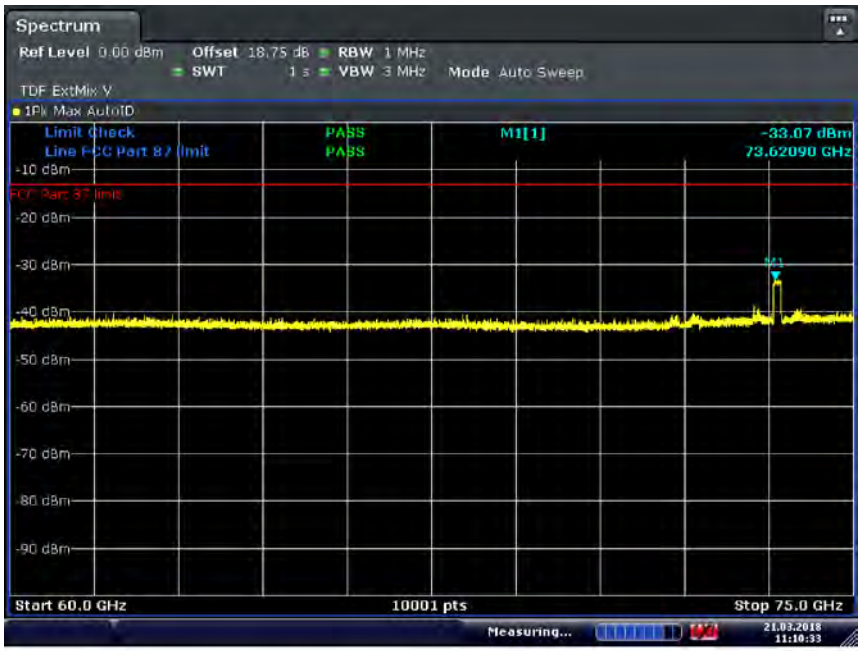


Figure 8.5.8: Zoom @ 49.1 GHz (Mid channel, 24.55 GHz)



Date: 21 MAR 2018 11:10:33

Figure 8.5.9: 60-75 GHz (Mid channel, 24.55 GHz)

Date: 21 MAR 2018 11:08:21

Figure 8.5.10: Zoom @ 73.65 GHz (Mid channel, 24.55 GHz)

Figure 8.5.11: 75-110 GHz (Mid channel, 24.55 GHz)

Figure 8.5.12: Zoom @ 98.2 GHz (Mid channel, 24.55 GHz)

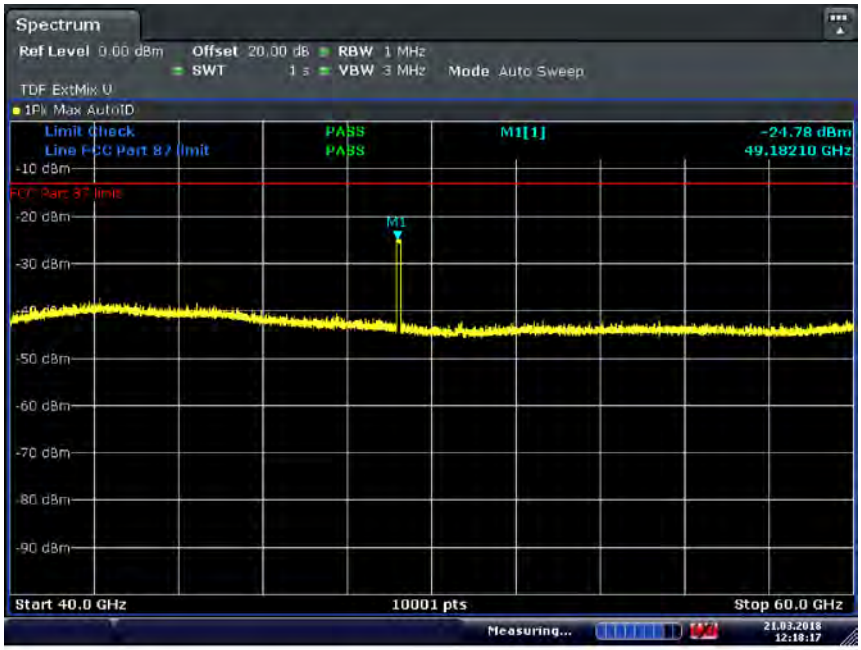


Figure 8.5.13: 40-60 GHz (High channel, 24.61 GHz)

Figure 8.5.14: Zoom @ 49.22 GHz (High channel, 24.61 GHz)

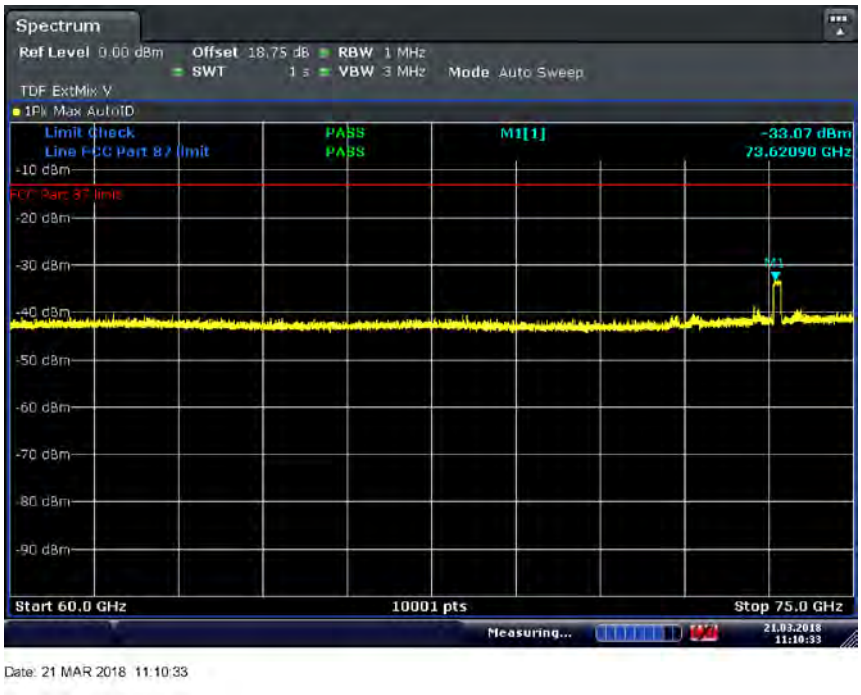


Figure 8.5.15: 60-75 GHz (High channel, 24.61 GHz)

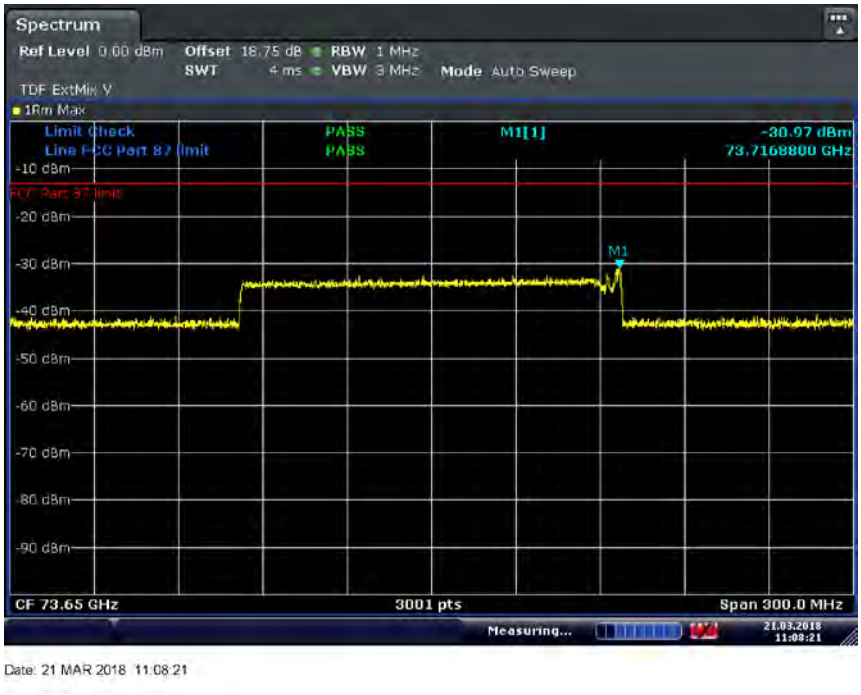


Figure 8.5.16: Zoom @ 73.65 GHz (High channel, 24.61 GHz)

Figure 8.5.17: 75-110 GHz (High channel, 24.61 GHz)

8.6 §2.1053 and §87.139 Field strength of spurious radiation.

8.6.1 Definitions and limits

§2.1053 (a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

§ 87.139 Emission limitations.

(a) Except for ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091-5150 MHz band or digital modulation (G7D) for differential GPS, the mean power of any emissions must be attenuated below the mean power of the transmitter (pY) as follows:

(1) When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB;

(2) When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.

(3) When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least 43 +10 $\log_{10}$ pY dB.

8.6.2 Test summary

Test date:	March 21, 2018	Temperature:	22 °C
Test engineer:	Nikolay Shtin	Air pressure:	1005 mbar
Verdict:	Pass	Relative humidity:	51 %

8.6.3 Observations, settings and special notes

- The spectrum was searched from 30 MHz to 110 GHz.
- Below 40 GHz radiated measurements were performed at the distance of 3m. Above 40 GHz a test distance of 1.5 meter was used.
- EUT was evaluated operating on Low (24.49 GHz), Mid (24.55 GHz) and High (24.61 GHz) channels.
- Above 40 GHz the measured EUT emissions were referenced to the transmitter output as explained in the test addendum provided by the manufacturer (Special Test Addendum FCC Harmonic Emission Testing Sections 87.139 and 2.1051 by Echodyne issued on 5/24/2018).
- All measurements above 40GHz were noise figure measurements (only data from 30MHz-40GHz presented.)

Spectrum analyzer/receiver settings for radiated measurements below 1 GHz:

Resolution bandwidth:	120 kHz
Detector mode:	QP
Trace mode:	Max Hold

Spectrum analyzer/receiver settings for radiated measurements above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	RMS or Peak
Trace mode:	Max Hold

8.6.4 Test data

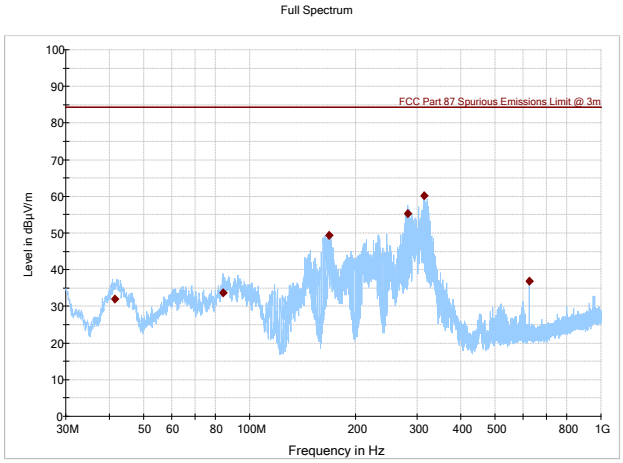


Figure 8.6.1: Radiated spurious emissions, 30-1000 MHz Low Channel

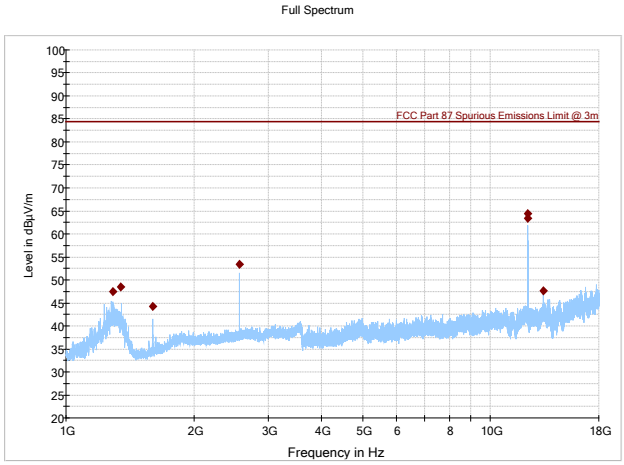


Figure 8.6.2: Radiated spurious emissions, 1-18 GHz Low Channel

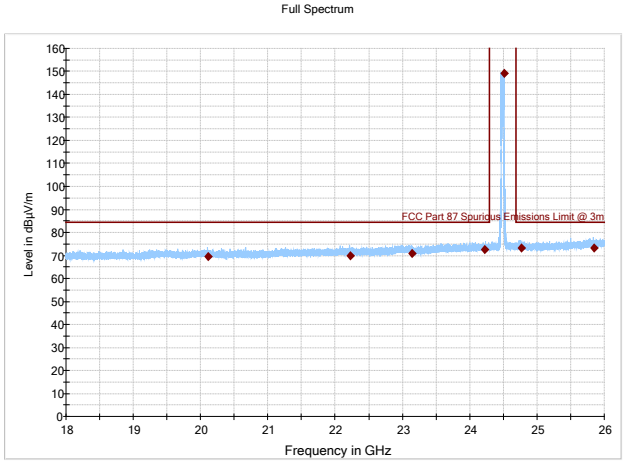


Figure 8.6.3: Radiated spurious emissions, 18-26 GHz Low Channel

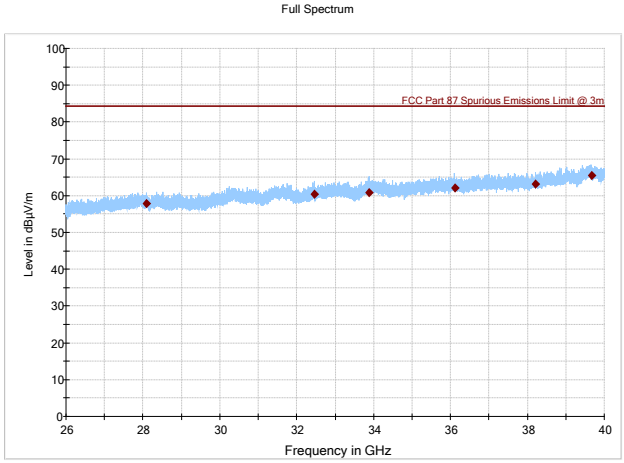


Figure 8.6.4: Radiated spurious emissions, 26-40 GHz Low Channel

Notes: The spectral plot is a summation of a vertical and horizontal scans. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).
Emissions in the range from 24.24 GHz to 24.74 GHz will be ignored in this evaluation. Test results of section 8.3 apply to that frequency range.

Table 8.6-1: Radiated field strength measurement results, Low channel (24.49 GHz)

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.278500	31.97	84.40	52.43	5000.0	120.000	109.3	V	132.0
84.172000	33.70	84.40	50.70	5000.0	120.000	149.7	V	270.0
168.020000	49.30	84.40	35.10	5000.0	120.000	109.3	V	25.0
282.046000	55.34	84.40	29.06	5000.0	120.000	109.4	V	160.0
314.016000	60.27	84.40	24.13	5000.0	120.000	109.3	H	162.0
624.998000	36.88	84.40	47.52	5000.0	120.000	147.2	V	-1.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1288.966667	47.43	84.40	36.97	5000.0	1000.000	232.9	V	0.0
1345.633333	48.54	84.40	35.86	5000.0	1000.000	179.6	V	357.0
1599.933333	44.20	84.40	40.20	5000.0	1000.000	192.6	V	33.0
2560.033333	53.38	84.40	31.02	5000.0	1000.000	199.3	V	353.0
12233.766667	63.40	84.40	21.00	5000.0	1000.000	170.9	V	353.0
12247.066667	64.47	84.40	19.93	5000.0	1000.000	144.0	H	346.0
13320.133333	47.66	84.40	36.74	5000.0	1000.000	178.0	H	55.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20108.950000	69.56	84.40	14.84	10.0	1000.000	100.0	H	113.0
22223.566667	69.82	84.40	14.58	10.0	1000.000	209.9	H	23.0
23140.650000	70.94	84.40	13.46	10.0	1000.000	214.3	H	2.0
24228.266667	72.55	84.40	11.85	10.0	1000.000	116.3	V	293.0
24511.950000	149.22	Fundamental		10.0	1000.000	160.9	H	-1.0
24769.083333	73.30	84.40	11.10	10.0	1000.000	125.0	V	-7.0
25845.216667	73.37	84.40	11.03	10.0	1000.000	180.3	V	86.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
28083.783333	57.77	84.40	26.63	10.0	1000.000	117.0	V	270.0
32468.100000	60.45	84.40	23.95	10.0	1000.000	114.1	V	139.0
33878.600000	60.83	84.40	23.57	10.0	1000.000	137.7	V	221.0
36117.466667	62.04	84.40	22.36	10.0	1000.000	167.7	H	-22.0
38215.350000	63.21	84.40	21.19	10.0	1000.000	164.7	V	-22.0
39671.266667	65.53	84.40	18.87	10.0	1000.000	124.2	V	227.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB) − amplifier gain (dB)
[3] The maximum measured value observed over a period of 15 seconds was recorded.

Sample calculation: 46.02 dBµV/m (field strength) = 44.82 dBµV (receiver reading) + 1.2 dB (Correction factor)

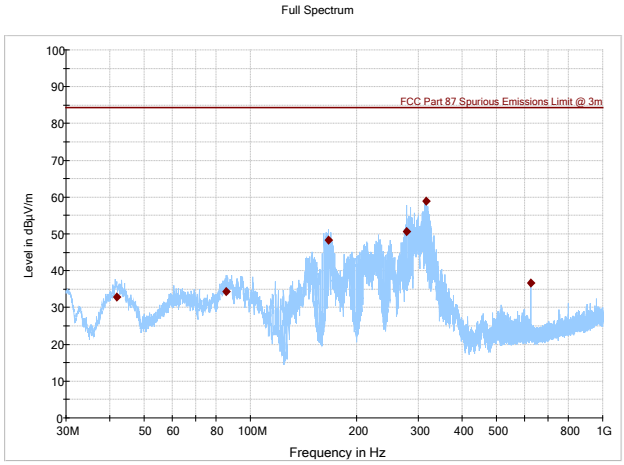


Figure 8.6.5: Radiated spurious emissions, 30-1000 MHz Mid Channel

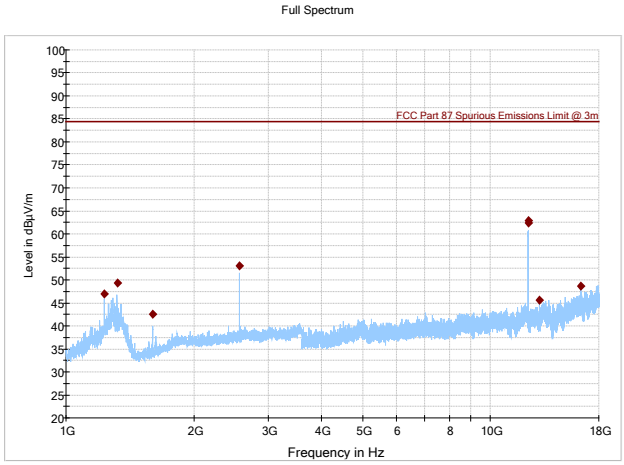


Figure 8.6.6: Radiated spurious emissions, 1-18 GHz Mid Channel

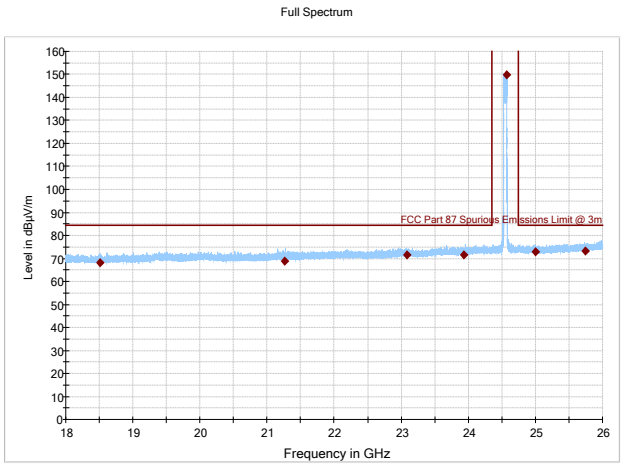


Figure 8.6.7: Radiated spurious emissions, 18-26 GHz Mid Channel

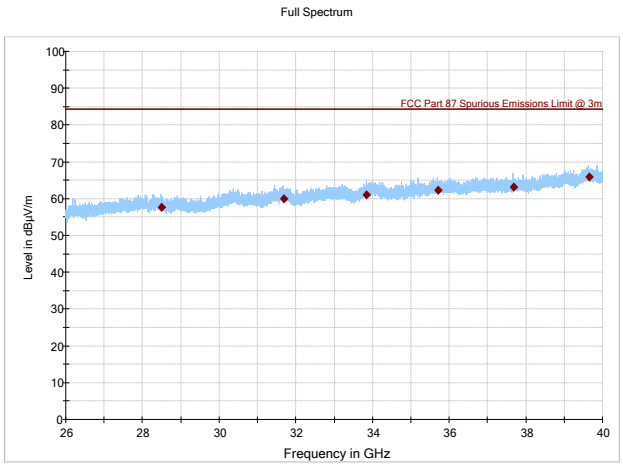


Figure 8.6.8: Radiated spurious emissions, 26-40 GHz Mid Channel

Notes: The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).
Emissions in the range from 24.30 GHz to 24.80 GHz will be ignored in this evaluation. Test results of section 8.3 apply to that frequency range.

Table 8.6-2: Radiated field strength measurement results, Mid channel (24.55 GHz)

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.837500	32.74	84.40	51.66	5000.0	120.000	100.0	V	128.0
85.537500	34.41	84.40	49.99	5000.0	120.000	109.3	V	152.0
166.325000	48.22	84.40	36.18	5000.0	120.000	109.2	V	0.0
278.083500	50.54	84.40	33.86	5000.0	120.000	125.0	V	184.0
315.975500	58.81	84.40	25.59	5000.0	120.000	109.2	H	154.0
625.006500	36.69	84.40	47.71	5000.0	120.000	100.0	V	352.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1230.300000	46.93	84.40	37.47	5000.0	1000.000	171.5	V	0.0
1320.000000	49.30	84.40	35.10	5000.0	1000.000	225.3	V	0.0
1599.766667	42.49	84.40	41.91	5000.0	1000.000	160.9	V	42.0
2559.866667	53.03	84.40	31.37	5000.0	1000.000	197.3	V	351.0
12280.900000	62.43	84.40	21.97	5000.0	1000.000	143.3	H	0.0
12285.000000	62.91	84.40	21.49	5000.0	1000.000	148.8	H	352.0
13024.300000	45.65	84.40	38.75	5000.0	1000.000	314.7	H	344.0
16342.800000	48.70	84.40	35.70	5000.0	1000.000	331.3	H	274.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
18513.416667	68.22	84.40	16.18	10.0	1000.000	213.0	V	110.0
21267.733333	68.92	84.40	15.48	10.0	1000.000	198.9	V	-7.0
23087.050000	71.37	84.40	13.03	10.0	1000.000	159.0	H	214.0
23936.716667	71.61	84.40	12.79	10.0	1000.000	111.5	V	343.0
24567.983333	149.87	Fundamental		10.0	1000.000	159.8	H	-1.0
25001.816667	72.97	84.40	11.43	10.0	1000.000	125.0	V	153.0
25739.150000	73.19	84.40	11.21	10.0	1000.000	106.2	V	6.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
28490.300000	57.57	84.40	26.83	10.0	1000.000	204.7	H	135.0
31685.850000	59.89	84.40	24.51	10.0	1000.000	179.4	V	221.0
33835.583333	61.00	84.40	23.40	10.0	1000.000	217.7	V	358.0
35702.983333	62.25	84.40	22.15	10.0	1000.000	129.2	V	133.0
37675.516667	63.04	84.40	21.36	10.0	1000.000	178.8	V	19.0
39646.583333	65.81	84.40	18.59	10.0	1000.000	125.0	V	225.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB) − amplifier gain (dB)
[3] The maximum measured value observed over a period of 15 seconds was recorded.

Sample calculation: 46.02 dBµV/m (field strength) = 44.82 dBµV (receiver reading) + 1.2 dB (Correction factor)

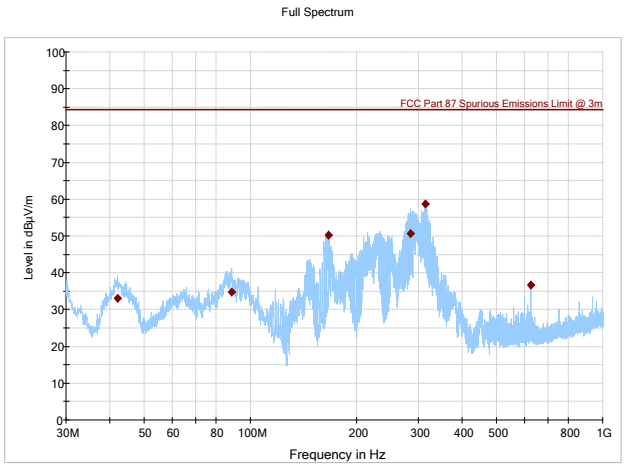


Figure 8.6.9: Radiated spurious emissions, 30-1000 MHz High Channel

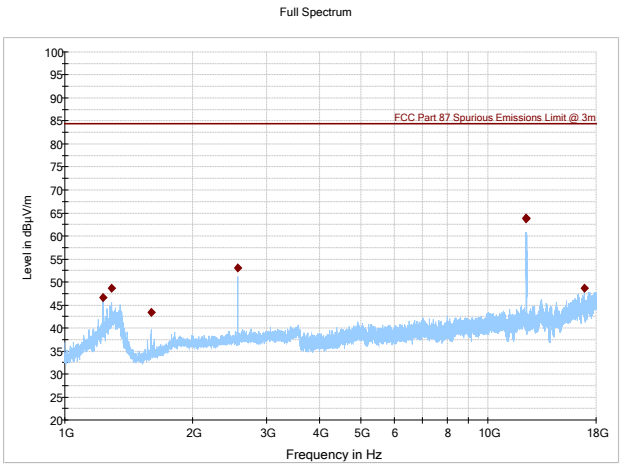


Figure 8.6.10: Radiated spurious emissions, 1-18 GHz High Channel

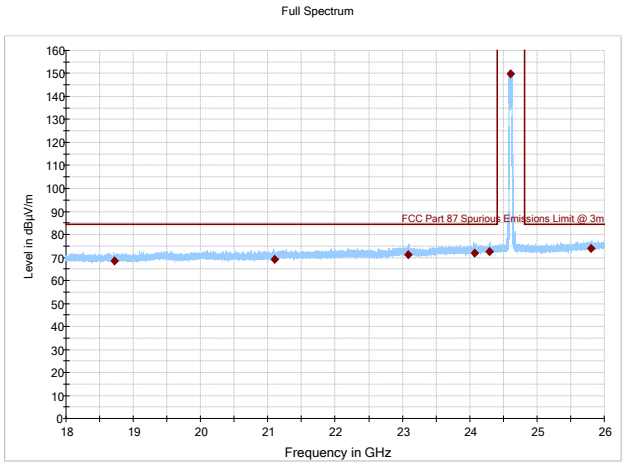


Figure 8.6.11: Radiated spurious emissions, 18-26 GHz High Channel

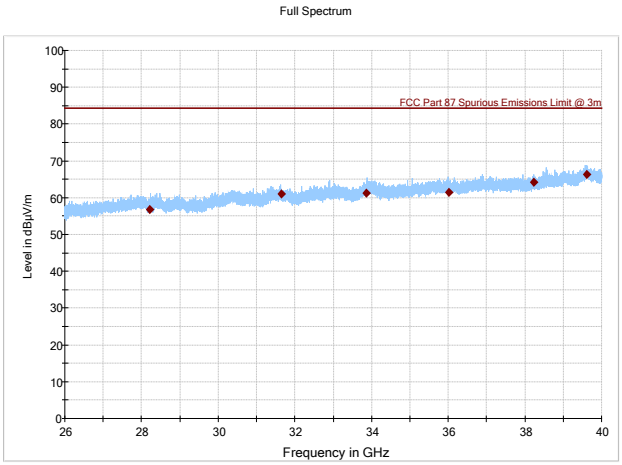


Figure 8.6.12: Radiated spurious emissions, 26-40 GHz High Channel

Notes: The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).
Emissions in the range from 24.36 GHz to 24.86 GHz will be ignored in this evaluation. Test results of section 8.3 apply to that frequency range.

Table 8.6-3: Radiated field strength measurement results, High channel (24.61 GHz)

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
41.948000	33.01	84.40	51.39	5000.0	120.000	109.2	V	356.0
88.611000	34.66	84.40	49.74	5000.0	120.000	126.3	V	122.0
166.559000	50.16	84.40	34.24	5000.0	120.000	100.1	V	0.0
284.214000	50.54	84.40	33.86	5000.0	120.000	113.7	V	333.0
313.994000	58.66	84.40	25.74	5000.0	120.000	108.7	H	157.0
624.998000	36.62	84.40	47.78	5000.0	120.000	149.7	V	0.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1229.900000	46.61	84.40	37.79	5000.0	1000.000	214.1	V	26.0
1289.966667	48.57	84.40	35.83	5000.0	1000.000	239.7	V	342.0
1599.533333	43.42	84.40	40.98	5000.0	1000.000	228.2	V	0.0
2559.866667	53.02	84.40	31.38	5000.0	1000.000	197.3	V	346.0
12308.233333	63.96	84.40	20.44	5000.0	1000.000	138.5	H	0.0
12315.766667	63.65	84.40	20.75	5000.0	1000.000	143.6	H	0.0
16915.966667	48.69	84.40	35.71	5000.0	1000.000	174.6	H	244.0

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
18720.300000	68.59	84.40	15.81	10.0	1000.000	128.7	V	24.0
21096.066667	69.03	84.40	15.37	10.0	1000.000	134.2	V	296.0
23083.983333	71.05	84.40	13.35	10.0	1000.000	175.0	H	106.0
24077.950000	71.74	84.40	12.66	10.0	1000.000	159.9	H	102.0
24290.250000	72.68	84.40	11.72	10.0	1000.000	203.9	V	12.0
24607.683333	149.71	Fundamental		10.0	1000.000	157.4	H	-1.0
25806.800000	73.75	84.40	10.65	10.0	1000.000	207.7	H	318.0

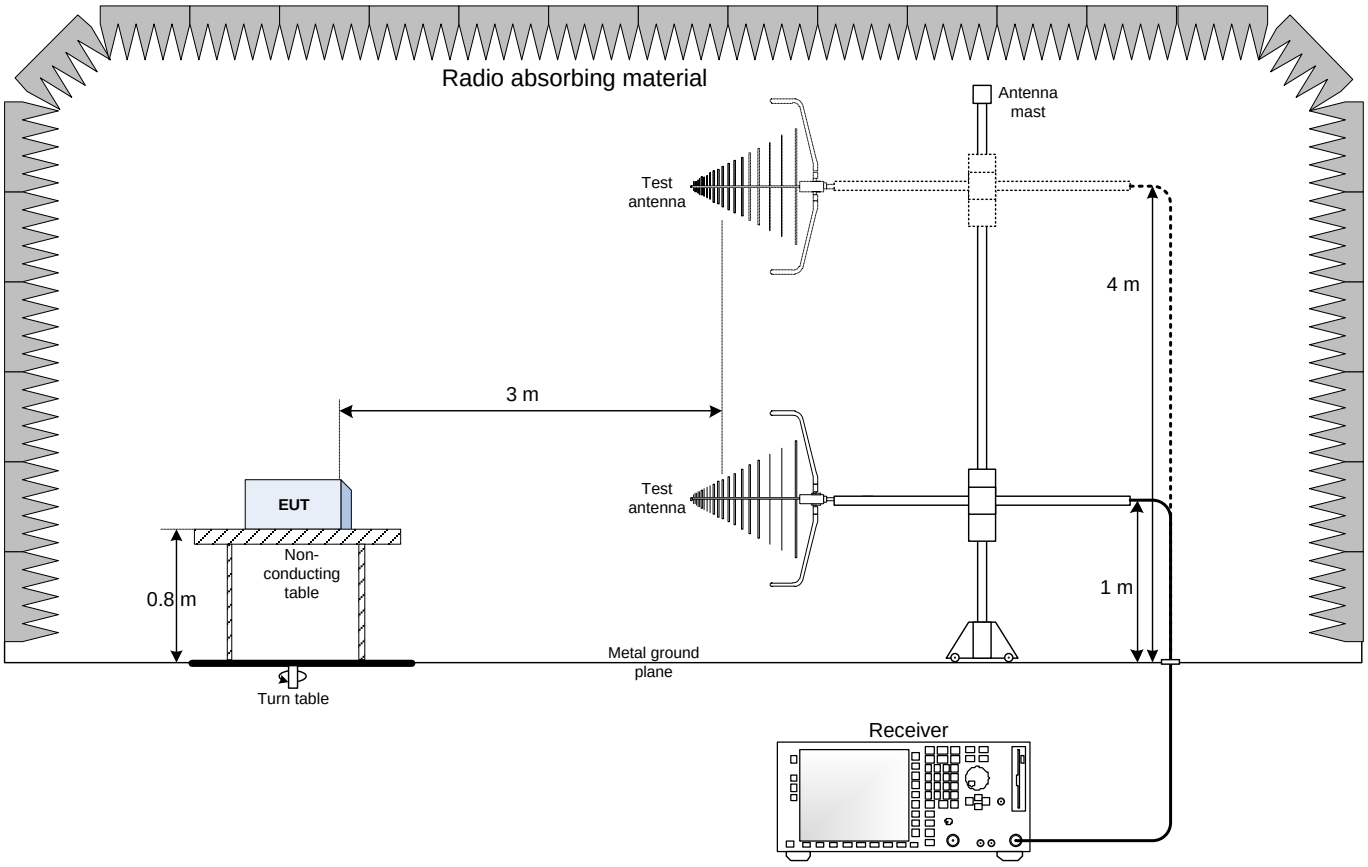
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
28223.166667	56.72	84.40	27.68	10.0	1000.000	213.7	H	289.0
31643.083333	60.94	84.40	23.46	10.0	1000.000	191.2	H	289.0
33870.533333	61.30	84.40	23.10	10.0	1000.000	224.2	H	20.0
36011.866667	61.53	84.40	22.87	10.0	1000.000	109.4	H	173.0
38231.950000	64.28	84.40	20.12	10.0	1000.000	171.5	H	17.0
39621.683333	66.33	84.40	18.07	10.0	1000.000	156.9	H	163.0

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB) − amplifier gain (dB)
[3] The maximum measured value observed over a period of 15 seconds was recorded.

Sample calculation: 46.02 dBµV/m (field strength) = 44.82 dBµV (receiver reading) + 1.2 dB (Correction factor)

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up



9.2 Radiated emissions set-up – Above 1GHz