Test Report No.: Prüfbericht-Nr.:	**US22DS8P.002**	**Order No.:** Auftrags-Nr.:	**P00847020 234049125**	Page 1 of 64 Seite 1 von 64
Client Reference No.: Kunden-Referenz-Nr.:	2221483	**Order date:** Auftragsdatum:	9/30/2022	
Client: Auftraggeber:	Codonics, Inc. 17991 Englewood Drive Middleburg Heights OH 44130 U.S.A.			
Test item: Prüfgegenstand:	SLS-630i			
Identification/ Type No.: Bezeichnung / Typ-Nr.	SLS-1 with Print Path UHF Antenna: Mikroe-4503.			
Order content: Auftrags-Inhalt:	Electromagnetic Compatibility (EMC) Test Report			
Test specification: Prüfgrundlage:	CFR 47 Part 15.247: 2022 and RSS 247: 2017			
Date of sample receipt: Wareneingangsdatum:	11/14/2022			
Test sample No: Prüfmuster-Nr.:	170C00004C			
Testing period: Prüfzeitraum:	11/14/2022- 11/21/2022			
Testing laboratory: Prüflaboratorium:	TUV Rheinland of North America 5015 Brandin Ct. Fremont, CA 94538			
Test result*: Prüfergebnis*:	Pass			

compiled by: zusammengestellt von: Osvaldo Casorla

Date: January 25, 2023 Datum:

authorized by: genehmigt von: Richard Decker

Date: January 25, 2023 Ausstellungsdatum:

Position / Stellung:	Expert	**Position** / Stellung:	Expert
Others / Sonstiges:			
Condition of the test item at delivery: Zustand des Prüfgegenstandes bei Anlieferung:	Test sample complete and undamaged		

* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet

TÜV Rheinland of North America, Inc., 295 Foster St. Suite 100, Littleton, MA 01460 USA
Mail: info@us.tuv.com · Web: www.tuv.com

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request. Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.
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4	The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA.
5	TUV Rheinland testing laboratories apply the Zero Guard Band rule unless otherwise required by the accreditation, standard, or requested by the customer as part of the quotation. For the Zero Guard Band rule, the measurement uncertainty is not considered and will also not be declared in the test report. Should the measurement uncertainty be used to provide guard band, these values will be declared in the test report.
6	Electromagnetic Compatibility Test Report. The above product was found to be Compliant to the above test standard(s).

1	**Product details:** Produktdetails:	SLS-630i is SLS Gen V with the addition of HF and UHF RFID read and write capability in the media path and on the front cover. Additional changes from
2	**Dimensions / Weight:** Maße / Gewicht:	10.43 " (26.5 cm) W, 15.67" (39.8 cm) D, 16.50 " (41.9 cm) H / 14.5 lbs.
3	**Operating elements:** Bedienelemente:	UHF 900 MHz, HF 13.56 MHz RFID
4	**Equipment / Accessories:** Ausstattung / Zubehör:	NA
5	**Used materials:** Verwendete Materialien:	NA
6	**Other:** Sonstiges:	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	**Test sample obtaining:** Prüfmusterbereitstellung:	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

Revisions

Date mm/dd/yy	Name	Page Number of Change	Describe Change
1/25/2023	US22DS8P.002	Section 1 and 3	Include name of Antenna located at the Print Path UHF Antenna: Mikroe-4503.

TABLE OF CONTENTS

1 General Information

1.1 Scope

This report is intended to document the status of conformance based on the results of testing performed on the SLS-630i, SLS-1, manufactured by Codonics, Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C 63.10 & C63.4	Worse Case (Measured)	Result
Carrier Frequency Separation	15.247(a)(1)/A8.1(b)	251.60 kHz	**Complied**
Number of Hopping Frequencies	15.247(a)(1)/A8.1(d)	50	**Complied**
Time of Occupancy (Dwell Time)	15.247(a)(1)/A8.1(d)	0.56 ms	**Complied**
Maximum Output Power	CFR47 15.247 (a), RSS 247 Sect. 5.4 (c)	21.85 dBm @ 902.75 MHz Channel	**Complied**
20dB Bandwidth	CFR47 15.247 (a)(1), RSS 247 Sect. 5.1 (a)	201.92 kHz @ 915 MHz Channel	**Complied**
Out of Band Emissions: Non-Restricted	CFR47 15.247 (d), RSS 247 Sect.5.5	-43.06 dBc @ 901.99 MHz, Lower Band Edge	**Complied**
Transmitter Spurious Emissions	CFR47 15.247 (d), RSS 247 Sect.5.5	1.31 dB Margin @ 124.74 MHz, QuasiPeak	**Complied**
Conducted Emissions	15/107/15.207/RSS-Gen	Class A	**Complied**

Note 1: This test report covers 902 MHz to 928 MHz band. .

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont Ca., 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Pleasanton Registration No. US1131, Fremont Registration No. US1131). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

2.1.2 A2LA

TUV Rheinland of North America EMC test facilities are accredited by the American Association for Laboratory Accreditation (A2LA). The laboratories have been assessed and accredited by A2LA in accordance with ISO Standard 17025:2017 (Testing Certificate #3331.02). The Scope of Laboratory Accreditation includes emission and immunity testing. The accreditations are updated annually.

2.1.3 Industry Canada

The Pleasanton 5-meter Semi-Anechoic Chamber, Registration No. 2932M, has been accepted by Industry Canada to perform testing to 3 and 5 meters based on the test procedures described in ANSI C63.4-2014. The Fremont 10-meter Semi-Anechoic Chamber, Registration No. 2932D, has been accepted by Industry Canada to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2014.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandid Ct. Fremont Ca., 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0399
VCCI Registration No. for Fremont: A-0398

2.1.1 BSMI

Registration No.: SL2-IN-E-1150R. The BSMI accreditation was obtained by NIST MRA with the BSMI

2.1.2 Korea

(Designation No.: US0185). Recognized by National Radio Research Agency (RRA) as an accredited Conformity Assessment Body (CAB) under the terms for Korea Phase I of the APEC TEL.

2.2 Test Software

Manufacturer	Name	Version	Test
Rohde & Schwarz	EMC32	10.50.00	Radiated & Conducted Emissions
Voltech	IEC61000-3	1.26.13	Harmonic and Flicker Emissions
CEWare	CEWare32	4	Surge, EFT, and VDI
ETS-Lindgren	Tile	V 7.1.4.10	Radiated Immunity

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per ISO Guide To The Expression Of Uncertainty In Measurement, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurement. The fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainty Emissions

Per CISPR 16-4-2	**U_{lab}**	**U_{cispr}**
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2

2.3.3 Measurement Uncertainty Immunity

The estimated expanded uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated expanded uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated expanded uncertainty for EFT fast transient immunity measurements is ± 5.84%.	Per IEC 61000-4-4
The estimated expanded uncertainty for surge immunity measurements is ± 5.84 %.	Per IEC 61000-4-4
The estimated expanded uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated expanded uncertainty for power frequency magnetic field immunity is ± 11.6%.	Per IEC 61000-4-8
The estimated expanded uncertainty for voltage variation and interruption measurements is ± 3.48%.	Per IEC 61000-4-11

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard ISO IEC 17025:2017. Equipment calibration records are kept on file at the test facility.

2.5 Measurement Equipment Identification

Equip.	Description	Model	Manfacturer	Last Date MM/DD/YYY	Due Date MM/DD/YYYY
G1700060	Preamplifier, 9 kHz - 1 GHz (N-type Connector)	310N	Sonoma Instrument	3/2/2022	3/2/2024
G1700040	Antenna, Bilog, 30-3000 MHz; Attenuator	JB3; UNAT-4+	Sunol Sciences; Mini-Circuits	2/18/2021	2/18/2023
9022667	Preamplifier, 1 - 18 GHz; Miteq	AMF700100180030PL	Miteq	3/1/2022	3/1/2023
G1700882	Receiver, EMI, 20 Hz - 40 GHz	ESIB40	Rhode & Schwarz	3/2/2022	3/2/2023
9038282	Antenna, Horn, 1 - 18 GHz	3115	EMCO	7/29/2021	7/29/2023
G1704164	ESW44 EMI Test Receiver 2 Hz to 44 GHz	ESW44	Rhode & Schwarz	12/3/2021	2/3/2023
G1700113	LISN, 150 kHz - 30 MHz	FCC-LISN-50-100-4-02	Fisher Custom Com	3/2/2022	3/2/3023
G1700144	Limiter, Transient, 9 kHz - 30 MHz	LIT-930	Com-Power	3/1/2022	3/1/2023
9024554	Preamplifier 18 GHz - 40 GHz	TS-PR1840	Rhode & Schwarz	4/4/2022	4/4/2023
9024554	Antenna, Horn, 18 GHz - 40 GHz	180-442-KF	L3	6/20/2022	6/20/2024
	2.4 GHz Notch Filter	Micro-Tronics	BRM50702	See Note	
	1 GHz High Pass Filter	Micro-Tronics	HPM50115	See Note	
	1.6 GHz Low Pass Filter	K&L Microwave	8L120-X1600-0/09135-0249	See Note	
	3.5 GHz High Pass Filter	Hewlett Packard	84300-80038	See Note	
	2.4 GHz Notch Filter	Micro-Tronics	BRM50702	See Note	
	900 MHz Notch Filter	Micro-Tronics	BRM50706	See Note	

Note: Equipment is characterized before use.

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

3 Product Information

3.1 Product Description

The Model SLS-1 is a HF and UHF RFID read and write capability in the media path and on the front cover. The EUT will be in compliance with regulatory standards of regions it will be operating in.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing.

3.4 Unique Antenna Connector

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The SLS-1 has internal antennas dedicated RFID at the Print Path UHF Antenna: Mikroe-4503. Antenna that has maximum gain of -23.37 dBi. It is connected via RF connector that is not easily accessible to the end user.

Conversion formula

(PG)/(4πd2) = (E2)/(120π)

Where P is transmitter power in Watts,

G is the numerical gain of the transmitting antenna relative to an isotropic source, d is the distance of the measuring point from the electrical center of the antenna in meters, and

E is the field strength in Volts/meter. 4πd2 is the surface area of the sphere centered at the radiating source whose surface is d meters from the radiating source. 120π is the characteristic impedance of free space in Ohms. E = (S + 145.8)

E.I.R.P. = E0 + 20 log10 D – 104.8

Table 1: Measurement of Gain.

Field Strength @ 3m (dBuV/m)	Field Strength @ 3m (dBm)	Conducted Power (dBm)	Antenna Gain (dBi)
93.71	-1.52	21.85	-23.37

The gain of the antenna is inherently accounted for as a result of the measurement when applicable, example such as a Field strength measurement on a part 15.249 or 15.231 device.

3.5 Duty Cycle

Duty cycles were measured by the spectrum analyzer used for measurements in section 4.1 of this report.

Mode	Measured Duty Cycle	Duty Cycle Correction Factor (dB)
RFID UHF	99%	0.04

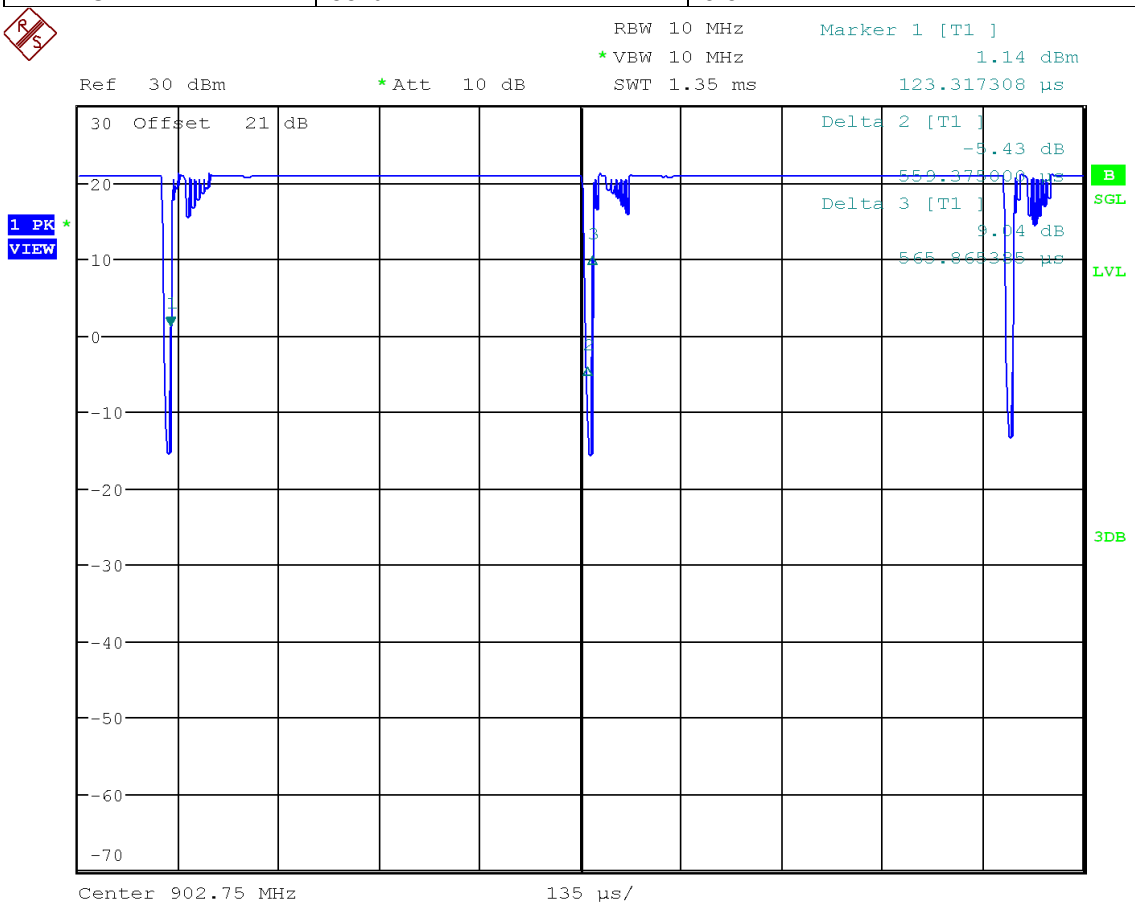


Figure 1: Duty Cycle

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.247: 2022 and RSS 247: 2017. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

4.1 Hopping Frequency Requirements

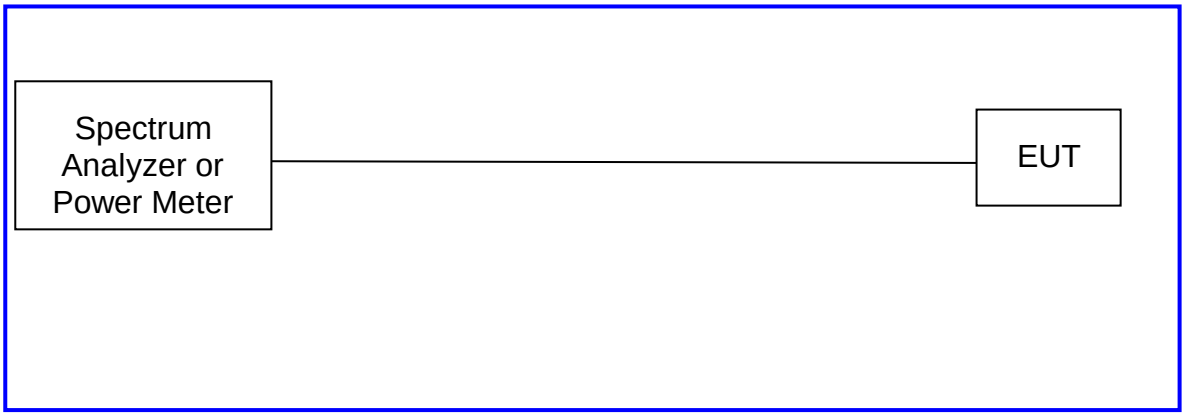
The Frequency Hopping Requirements are applicable to the equipment using Frequency Hopping Spread Spectrum (FHSS) modulation.

47 CFR 15.247(a)(1)(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz. 47 CFR 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.1.1 Test Method

The conducted method were used to measure the carrier frequency separation according to ANSI C63.10:2013 Section 7.8.2, frequency hopping system in Sect. 7.8.3, and time of occupancy in Sect. 7.8.4. The measurement was performed with the EUT set to hop to channel frequencies. Results indicated below.

Test Setup:



4.1.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 2: Frequency Hopping Requirements

Average Occupancy Time						
Packet	**Channel Separation (kHz)**	**Pulse Width (ms)**	**# of Pulses (20s)**	**Ave. Time (ms)**	**Limit (ms)**	**Result**
915	251.60	0.559	15	83.906	< 400	Pass
Note: The system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.						

Minimum Number of Channels		
Range (902MHz -928MHz)	**Min. Channel Limit**	**Result**
50	50	Pass
Note: The system shall use at least 50 hopping frequencies.		

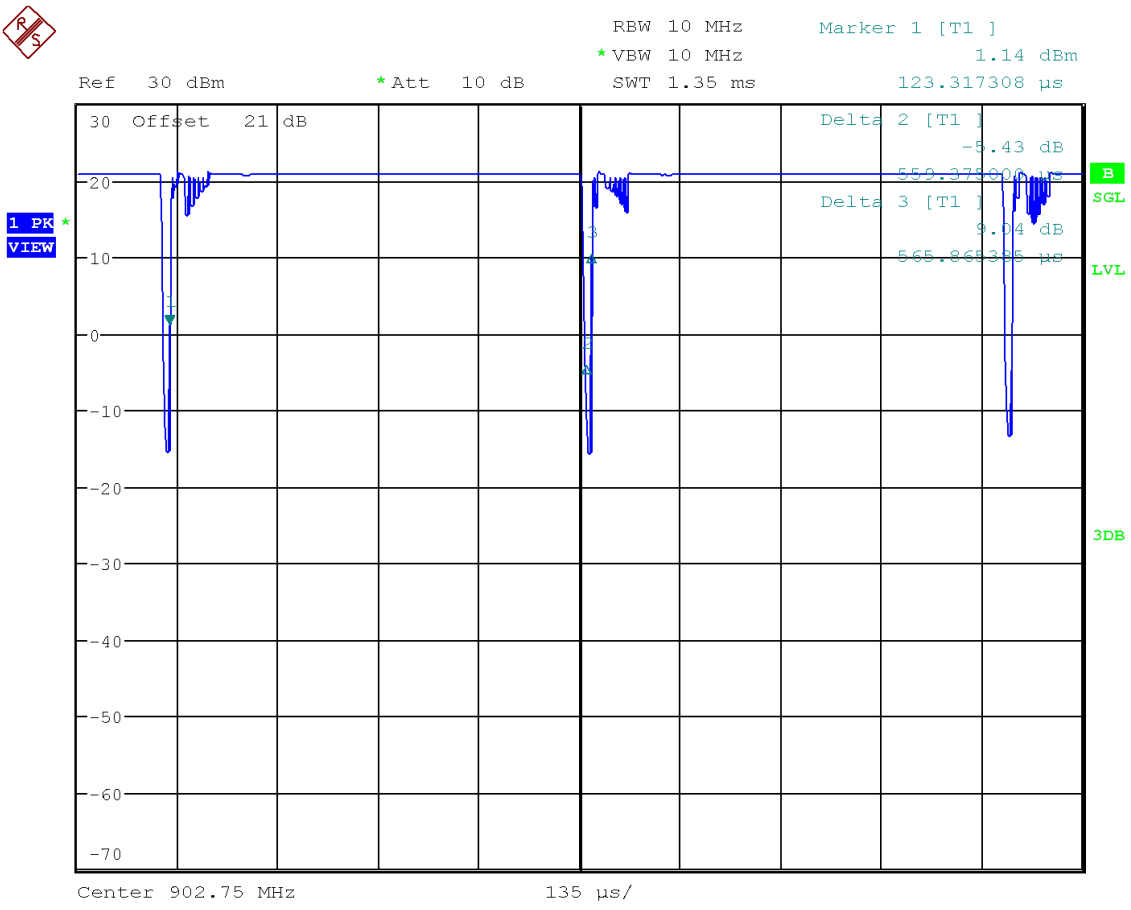
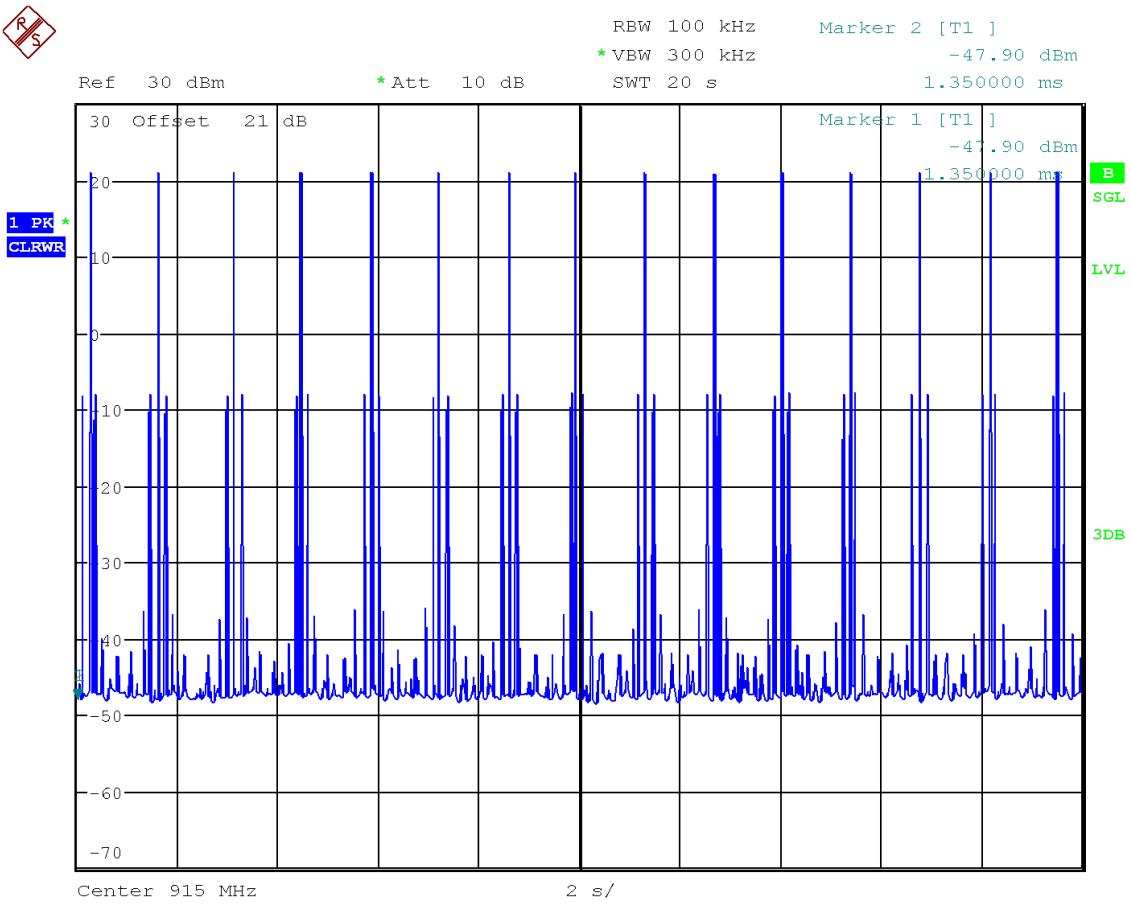


Figure 2. Pulse Width for 902.75 MHz



Note: There are 15 pulses in 20 seconds.

Figure 3. Number of Pulses in 20 sec for 915 MHz

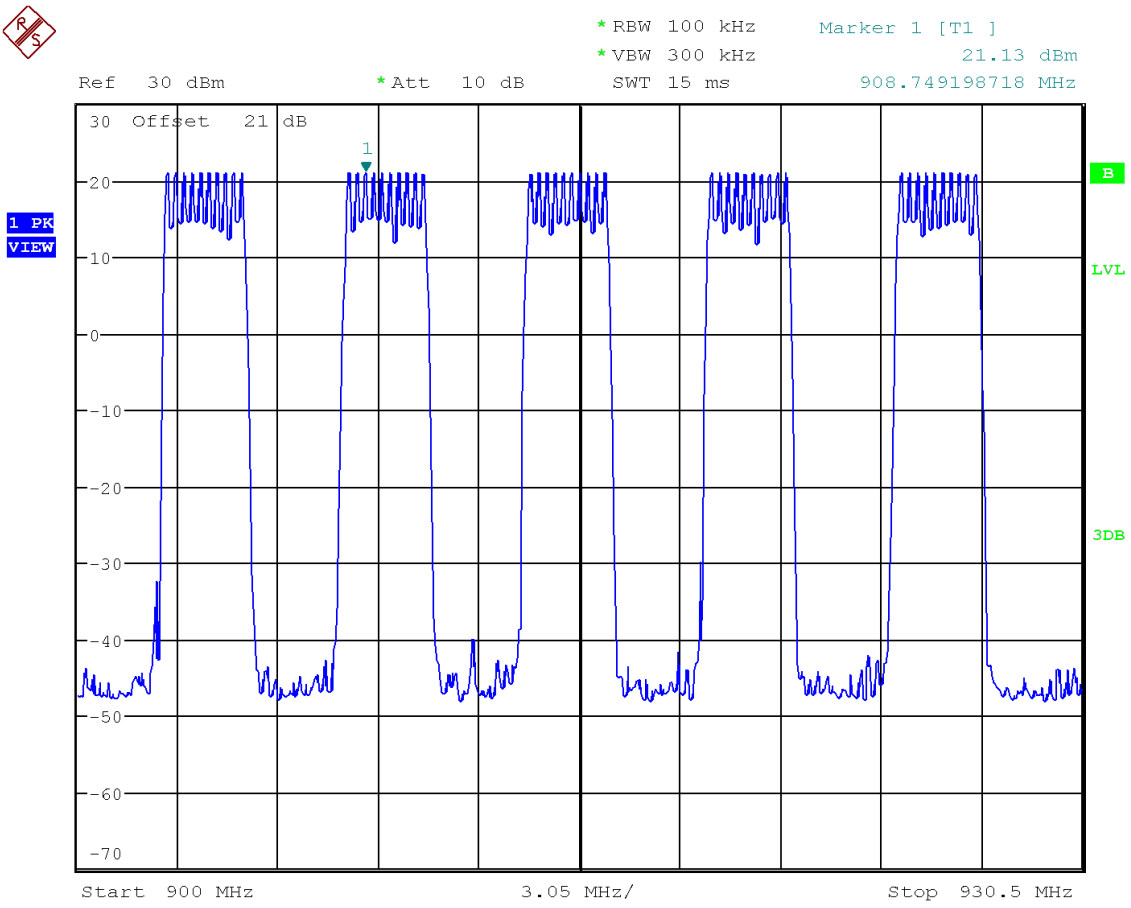


Figure 4. Number of Operating Channels

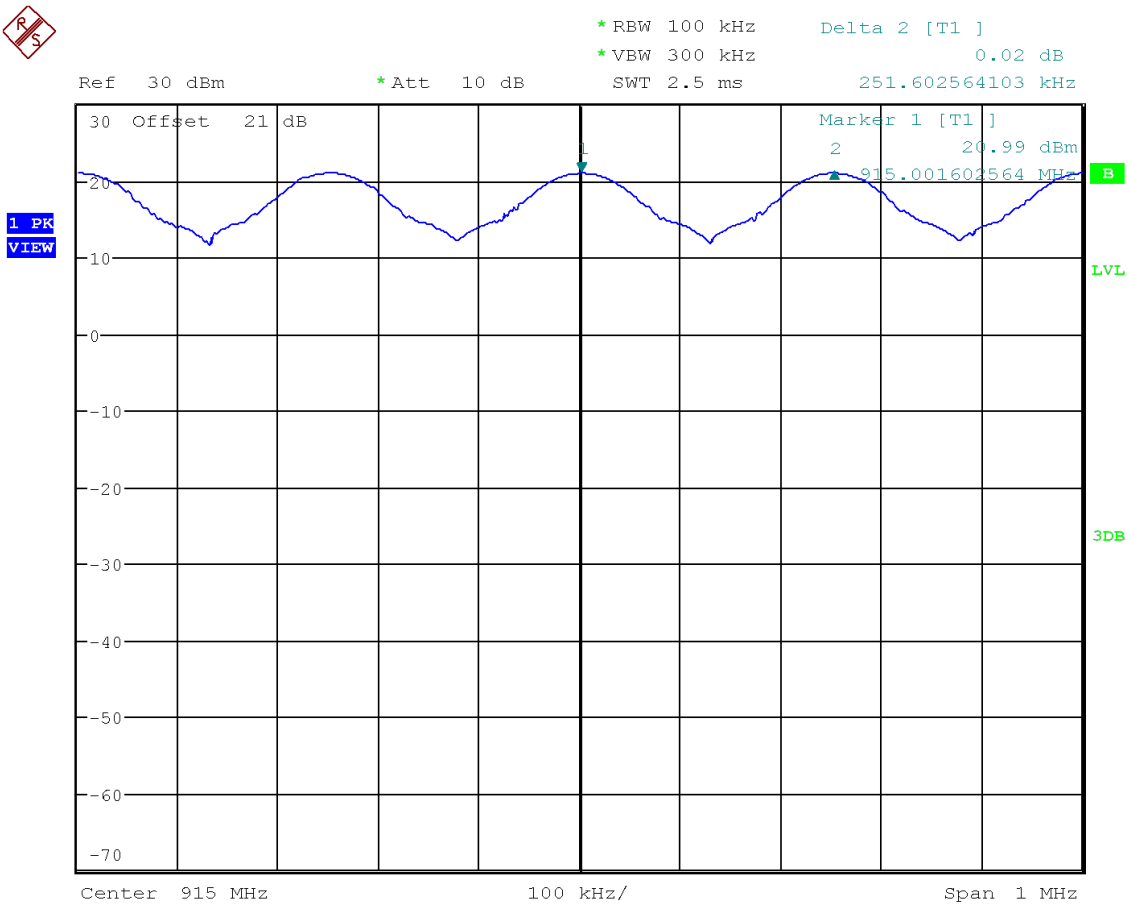


Figure 5. Channel Seperation

4.2 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

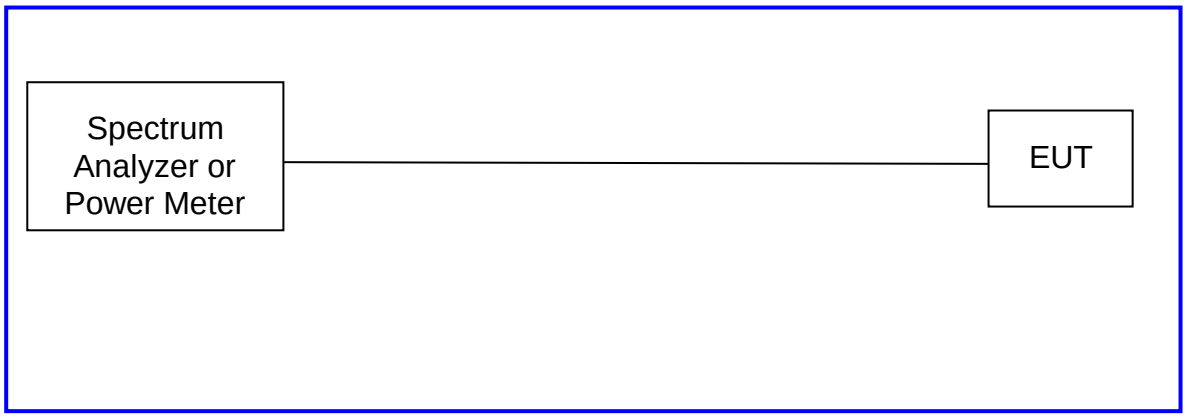
The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b) and RSS 247 5.4 (d).

The maximum transmitted power in the band 900-928 MHz: 1 W

4.2.1 Test Method

Conducted method was used to measure the channel power output. The worst findings were conducted on 3 channels in each operating range per CFR47 Part 15.247(b) and RSS 247 Sect. 5.4(d); 902-928 MHz. The worst mode results indicated below.

Test Setup:



4.2.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s). Worse case data for each mode reported below. Plots of highest power included for low, medium, and high channels.

Table 3: RF Output Power at the Antenna Port – Test Results

Test Conditions: Conducted Measurement, Normal Temperature							
Antenna Type: MIKROE-4503 near-field antenna							
Max. Antenna Gain: -23.37 dBi							
Operating Channel [MHz]	**Mode**	**Limit [dBm]**	**Total Power [dBm]**				**Margin [dB]**
902.75	Print Antenna	30.00	21.85				-8.15
915	Print Antenna	30.00	21.79				-8.21
927.25	Print Antenna	30.00	21.39				-8.61
Note 1: Limits shall reduce by the amount in dB that the directional gain of the antenna exceeds 6 dBi. No Antenna gain entered in the professionally installed software for part 15.247. Note 2: Duty Cycle Correction Factor [10 log (1/duty cycle)] = 0.04 dB included. Note 3: Limit corrected by the amount in dB that the directional gain of the antenna exceeds 6 dBi							

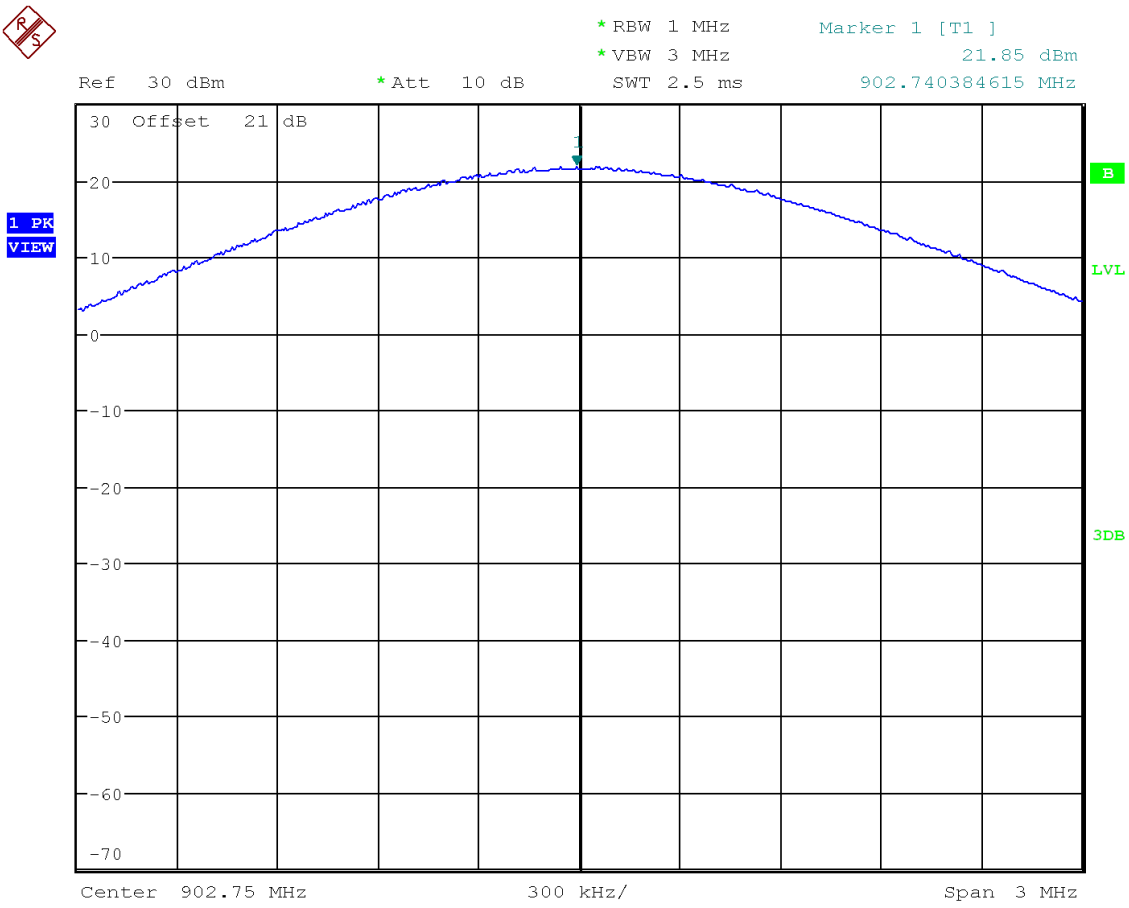


Figure 6. Maximum Conducted Power, 902.75 MHz

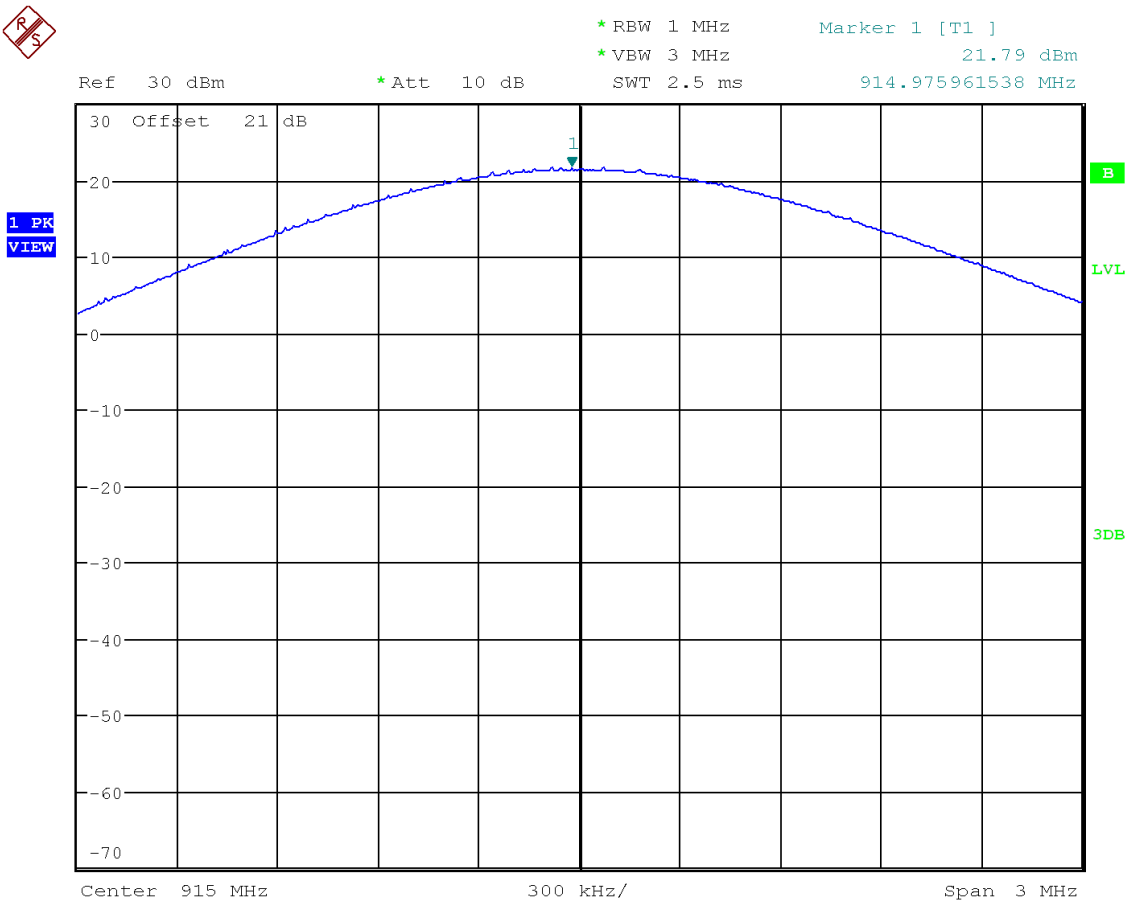


Figure 7. Maximum Conducted Power, 915 MHz

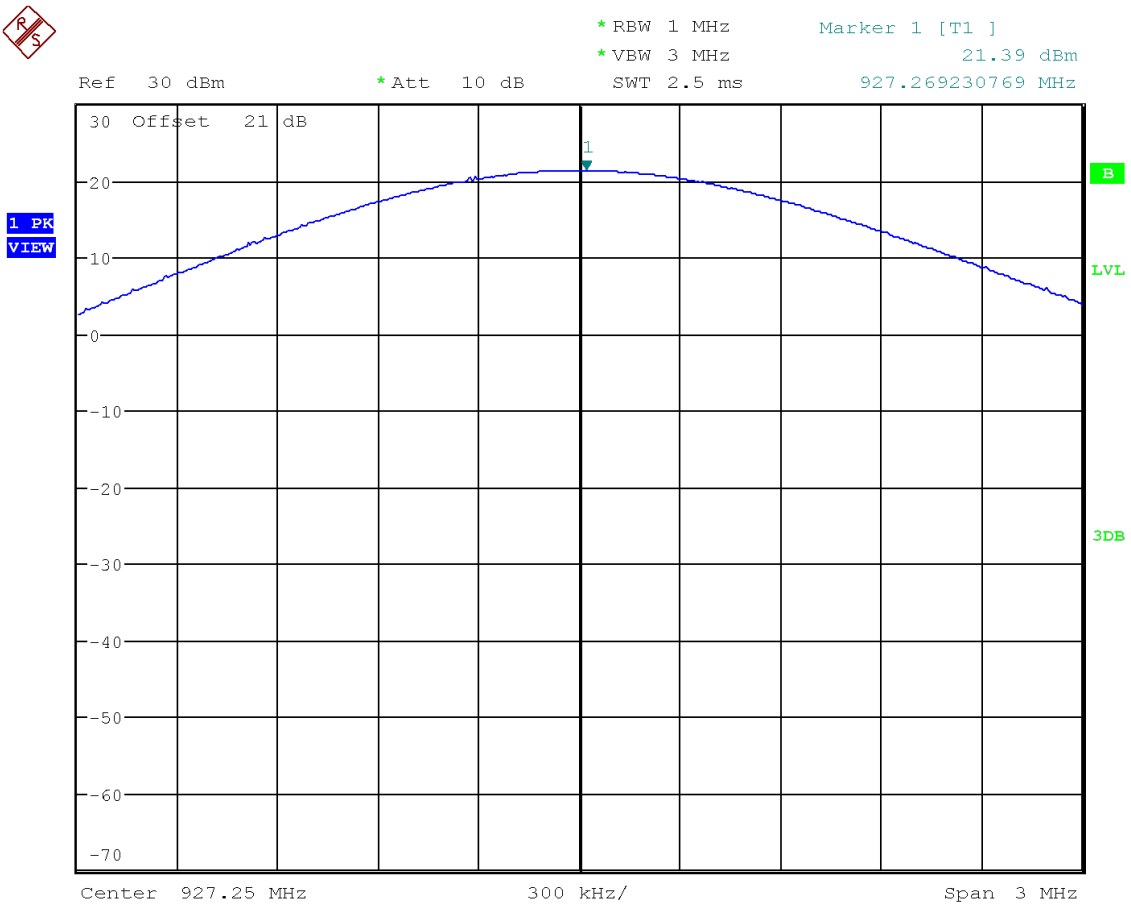


Figure 8. Maximum Conducted Power, 927.25 MHz

4.3 20 Bandwidth and Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

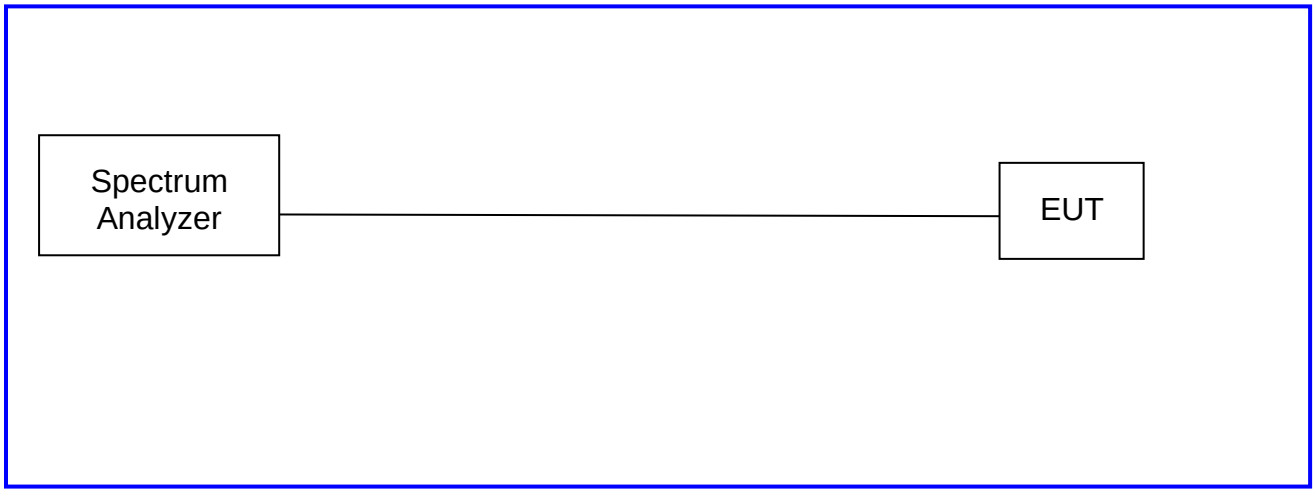
The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

The maximum 20 dB bandwidth shall be less than 500 kHz.

4.3.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2013 Section 11.8. The measurement was performed with modulation per CFR47 15.247 (a) (2) and RSS Gen Sect. 6.6. Measurements were performed on the low, middle and high channels of the operating frequency range; 902-928 MHz.

Test Setup:



Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 4: Occupied Bandwidth – Test Results

Test Conditions: Conducted Measurement, Normal Temperature

Bandwidth		
Freq. (MHz)	**99% Bandwidth**	**20dB Bandwidth**
	(kHz)	**(kHz)**
902.75	216.35	201.92
915	217.95	201.92
927.25	224.36	201.92
Note:		

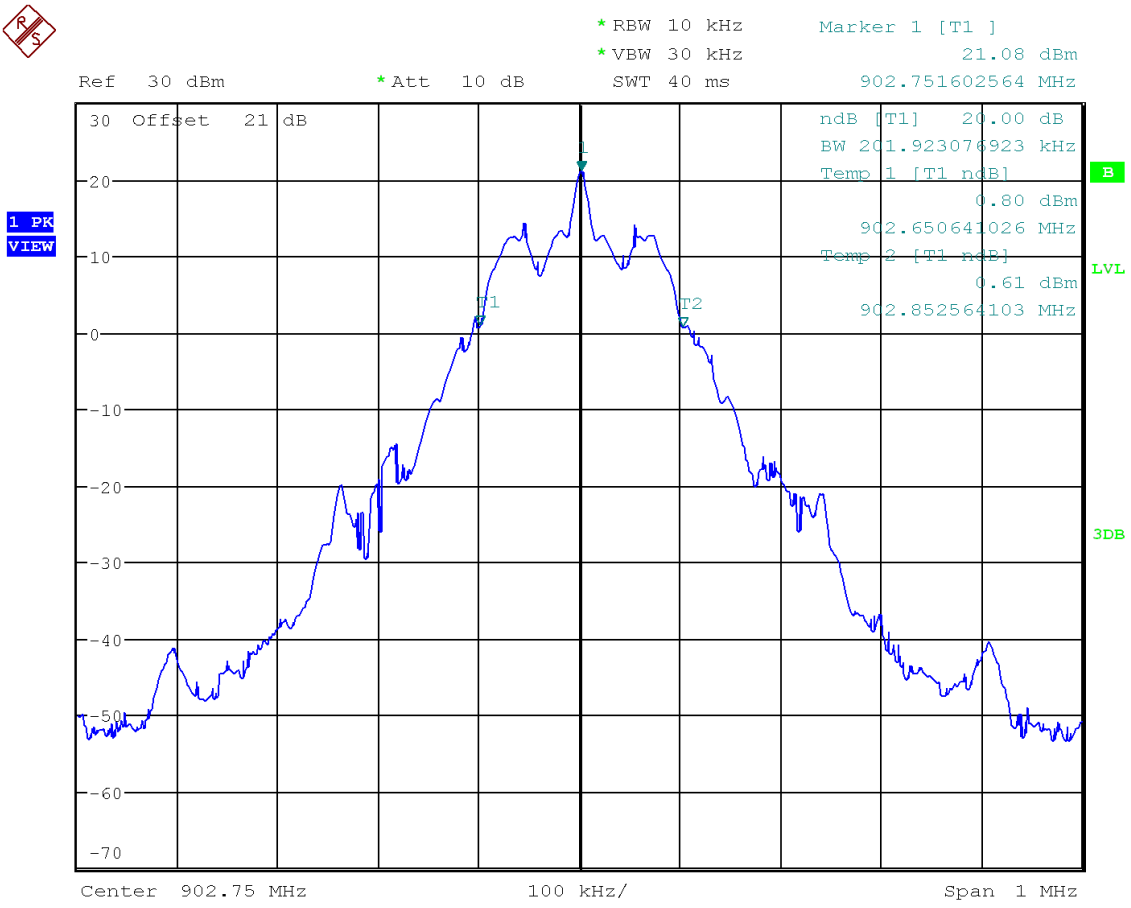


Figure 9. 902.75 MHz, 20dB Bandwidth

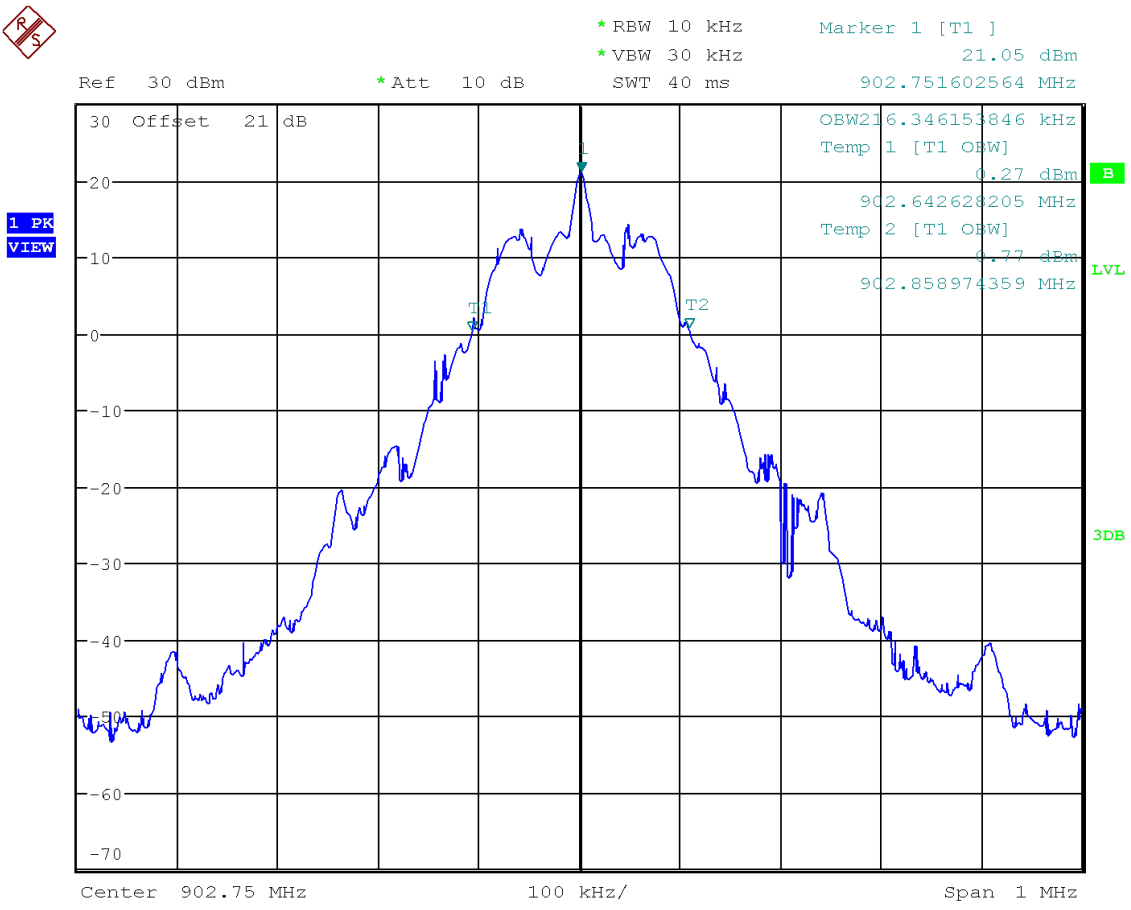


Figure 10. 902.75 MHz, 99% Bandwidth

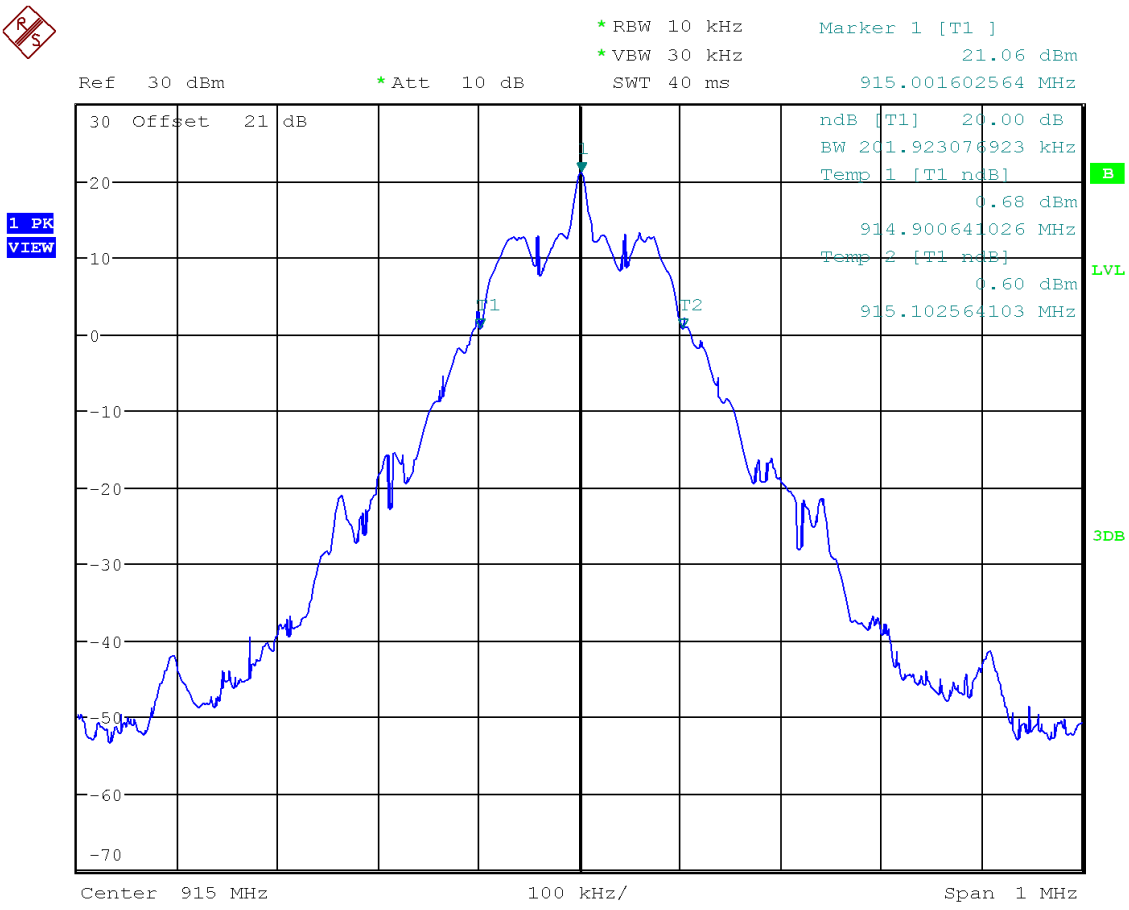


Figure 11. 915 MHz, 20dB Bandwidth

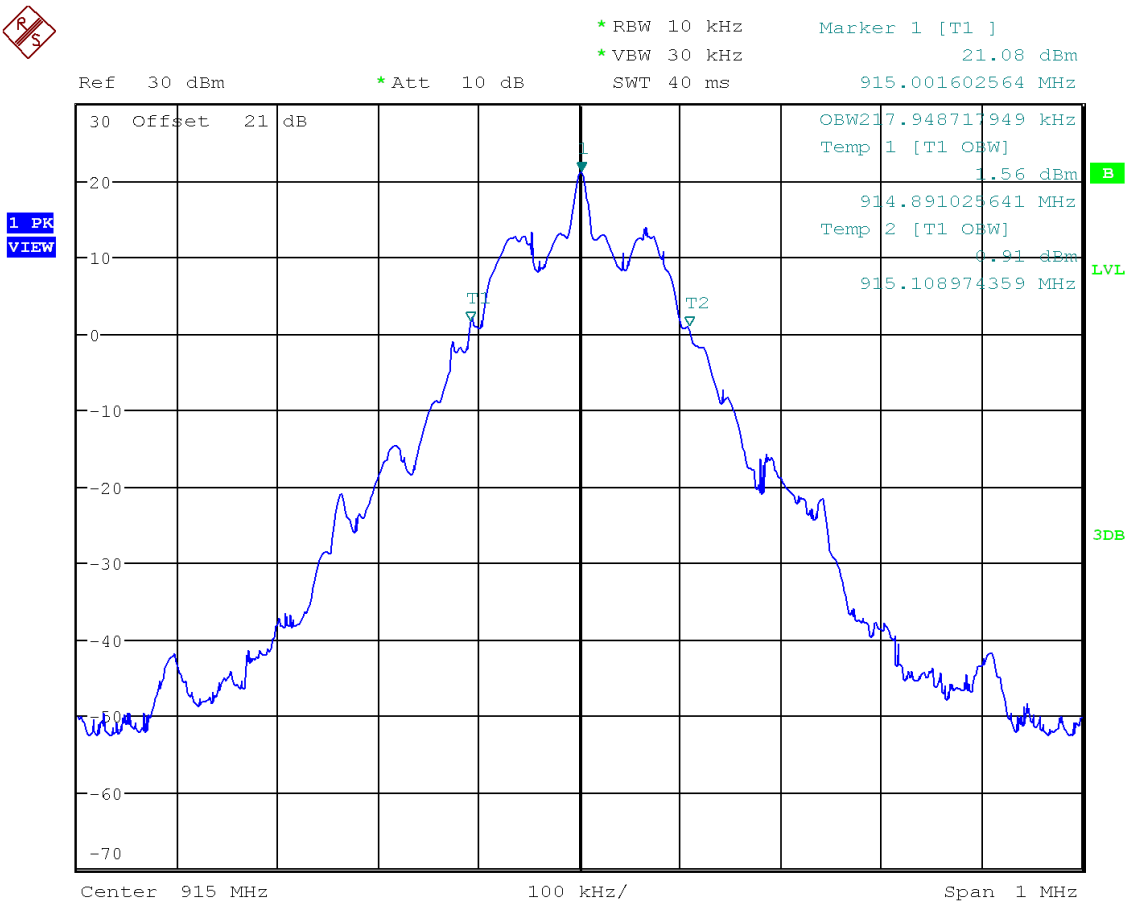


Figure 12. 915 MHz, 99% Bandwidth

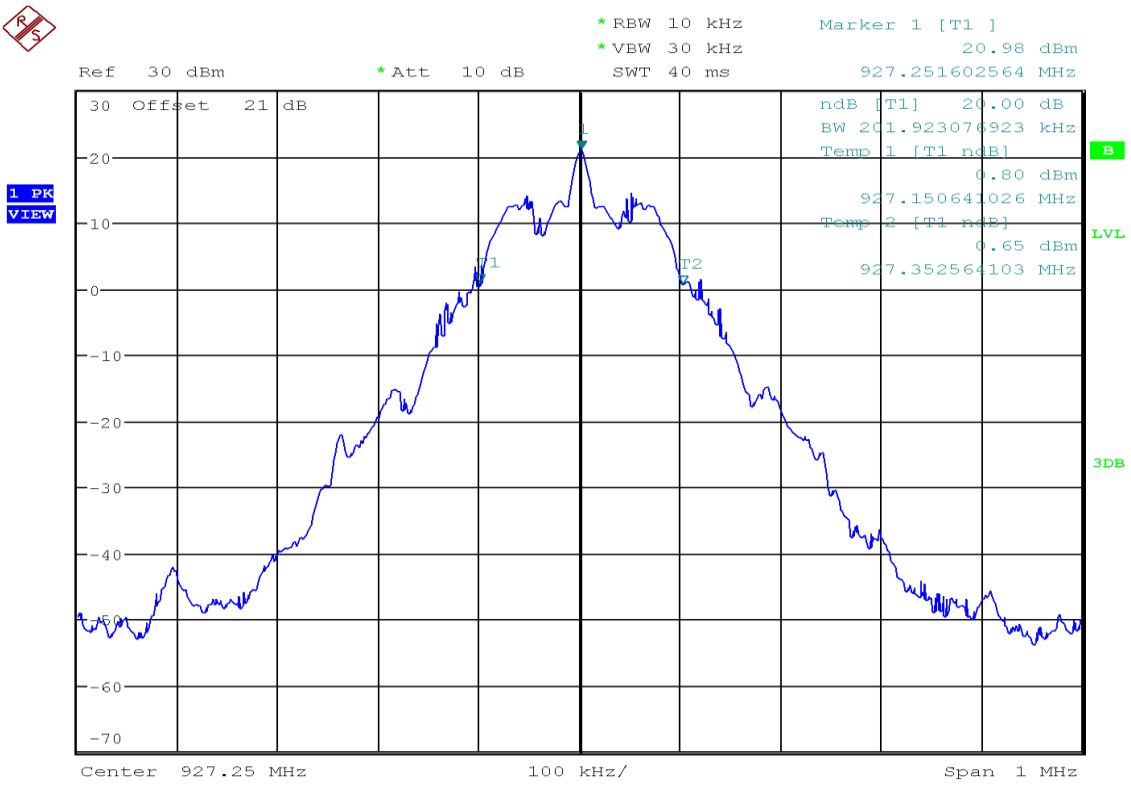


Figure 13. 927.25 MHz, 20dB Bandwidth

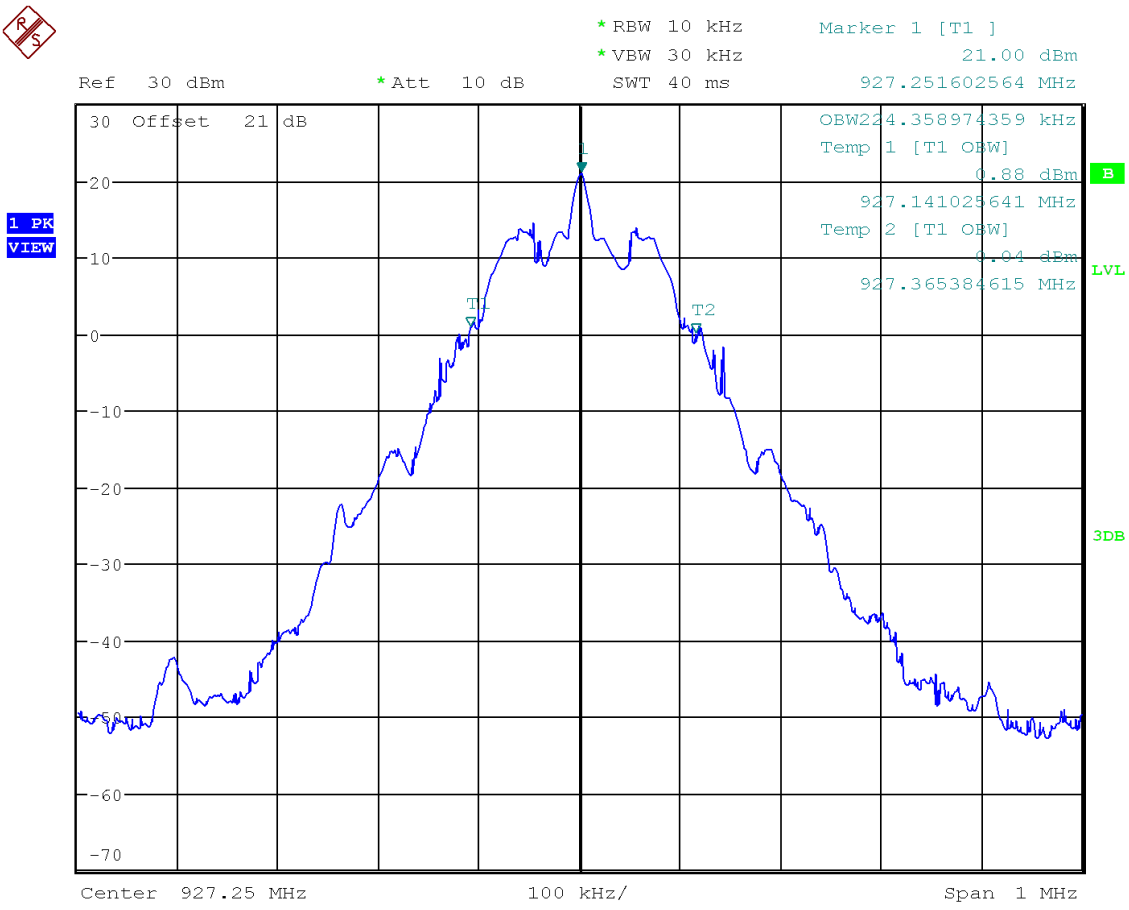


Figure 14 927.25 MHz, 99% Bandwidth

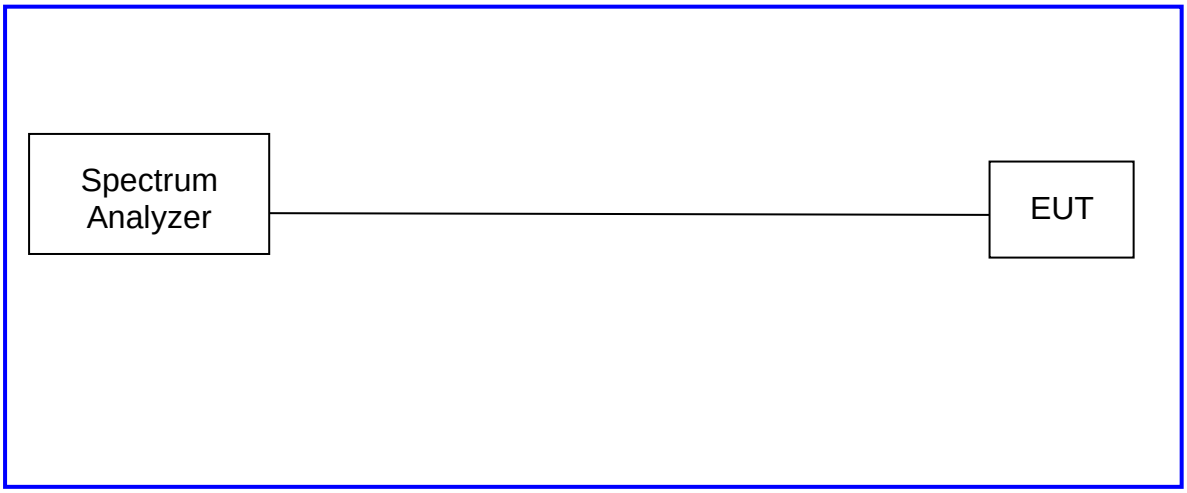
4.4 Out of Band Emissions: Non-Restricted Bands

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmitting mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS-247 Sect. 5.5, RSS-GEN Sect. 8.9 and 8.10.

4.4.1 Test Method

Conducted measurements per ANSI C63.10-2013 Sections 6.10, 11.11, 14.3.3 were used to measure the undesirable emission requirement in non-restricted bands. The measurement was performed with modulation. The measurement was conducted from 30MHz to 10GHz on 3 channels in each mode on the EUT. Reference level was established on the channel with highest measured PSD (915 MHz) as stated in ANSI C63.10-2013 Section 11.11.2. Band edge tests were conducted on the low and high channel of each mode. The worst case measurement of each mode is recorded in this report.

Test Setup:



4.4.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Emissions at the Band-Edge – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only					
Non-Restricted Frequency Band Edge Emissions – Worse Case					
Band Edge	**Center Freq (MHz)**	**Measured (dBc)**	**Limit (dBc)**	**Freq (MHz)**	**Results**
Low	902.75	-43.06	20	901.99	Pass
High	927.25	-43.92	20	928.28	Pass
Note:					

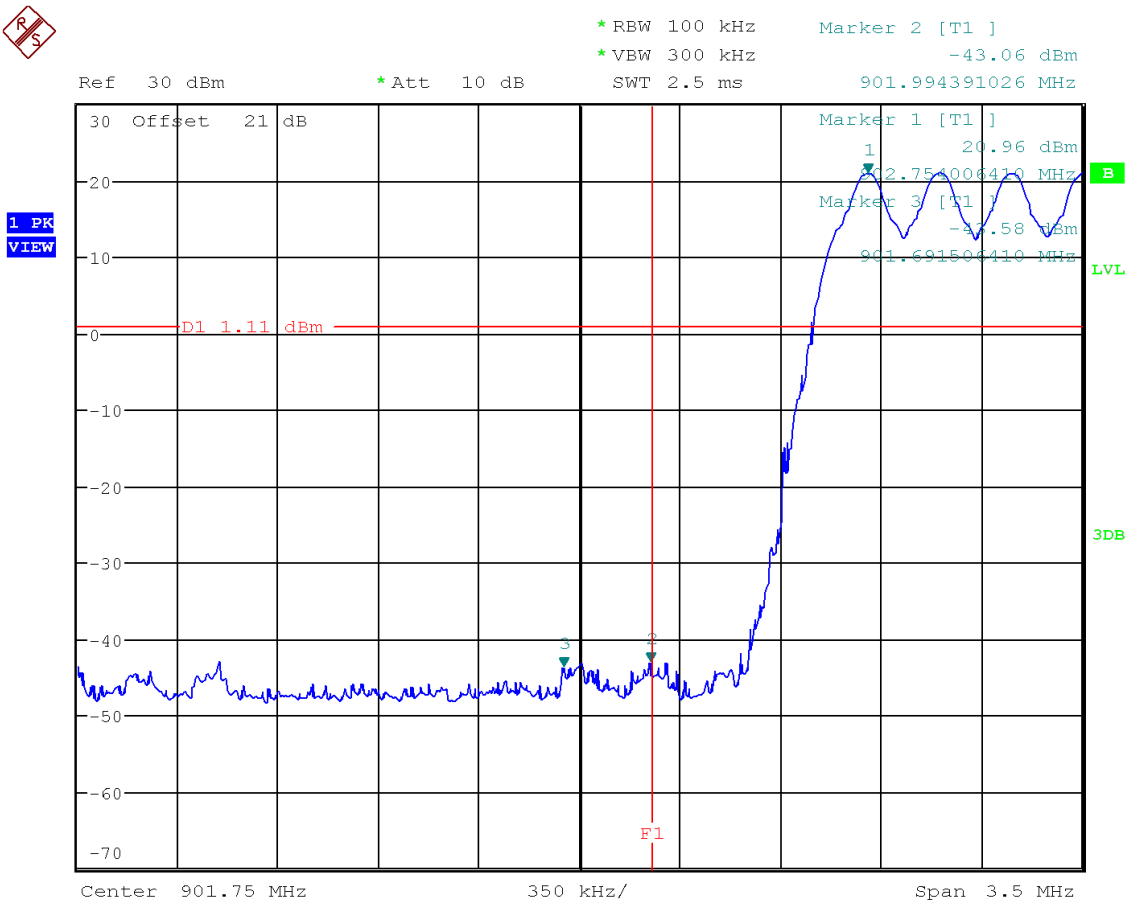


Figure 15. 902.75 MHz Lower Band Edge

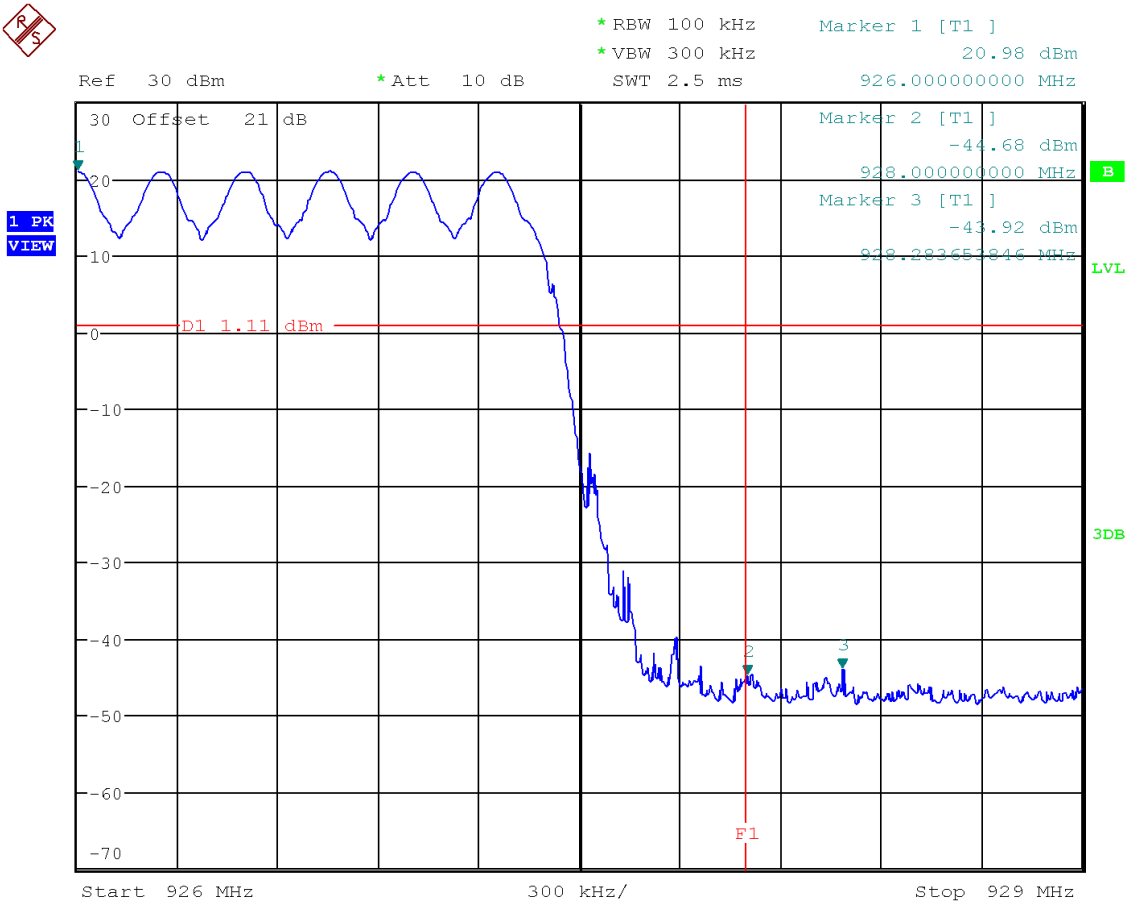


Figure 16. 927.25 MHz Upper Band Edge

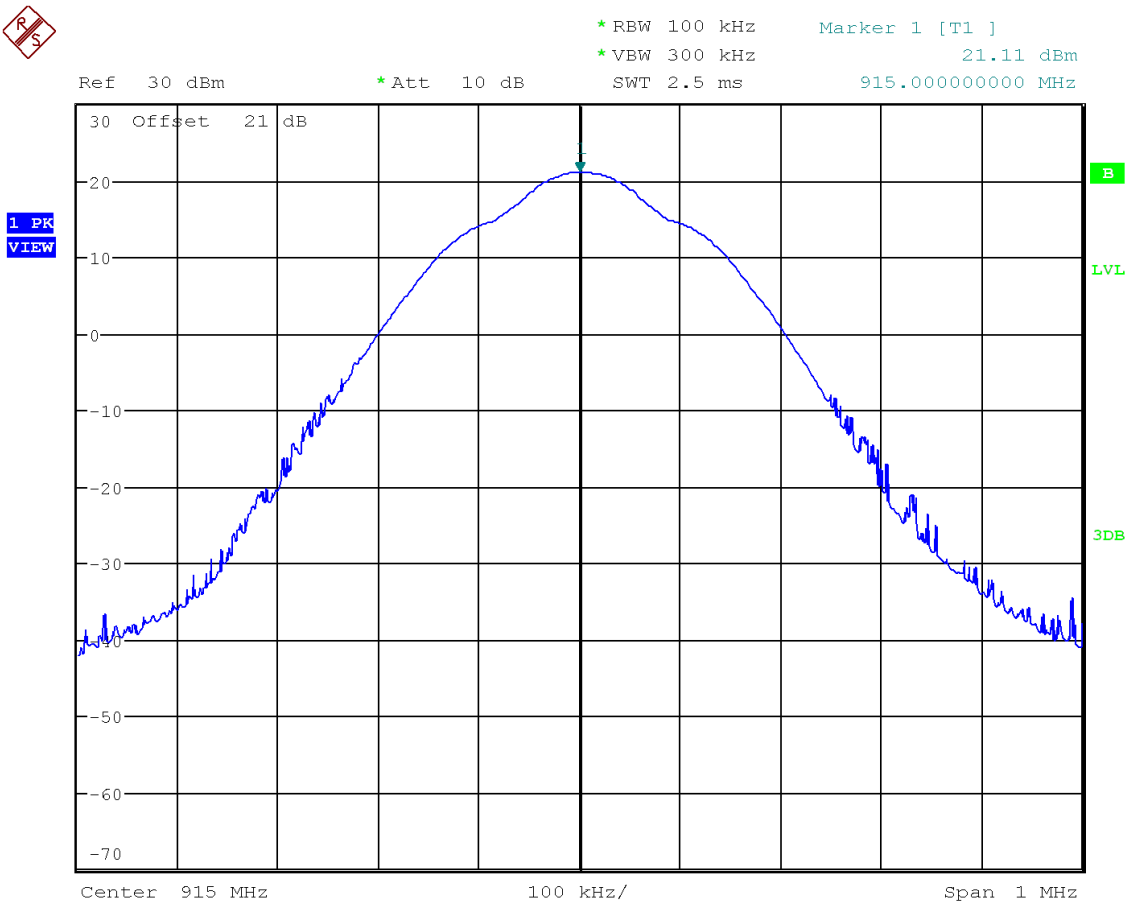


Figure 17. 915 MHz Reference

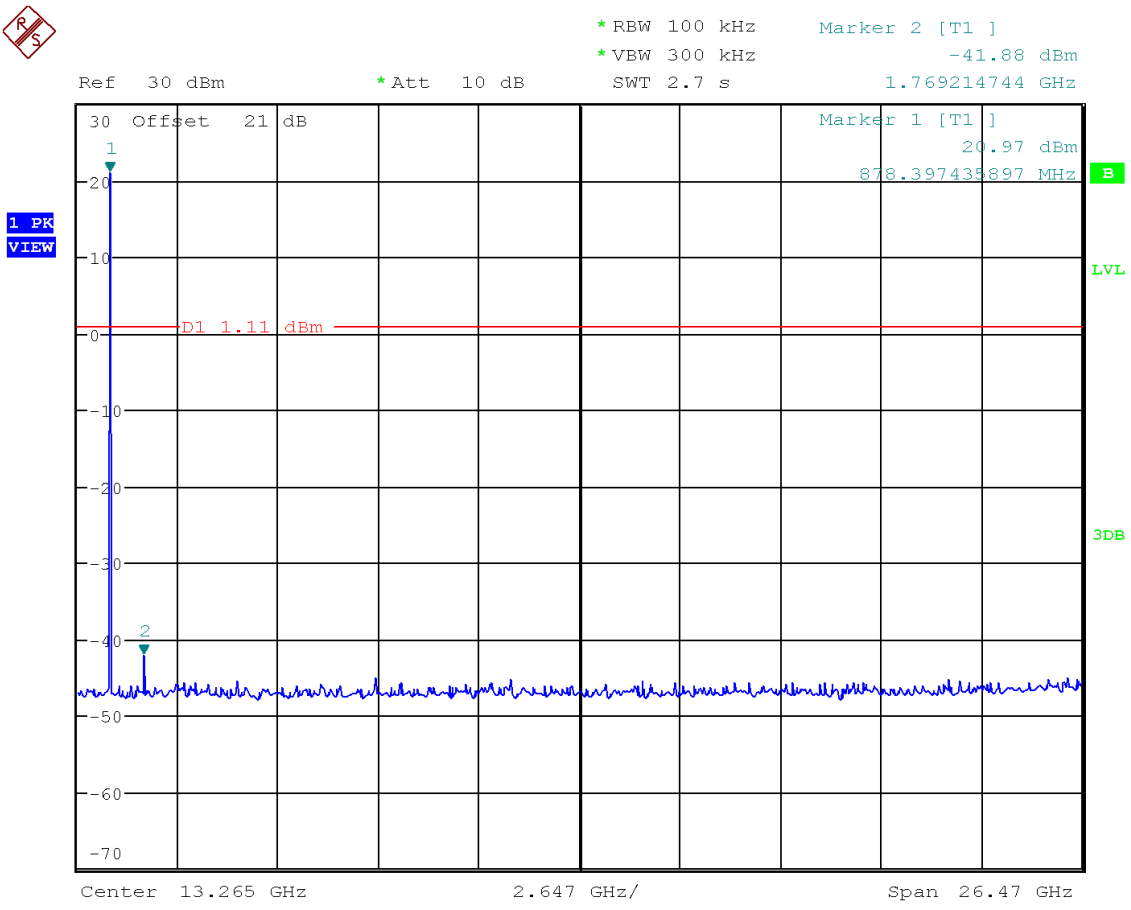


Figure 18. 902.75 MHz 30MHz-26.5GHz Spurious

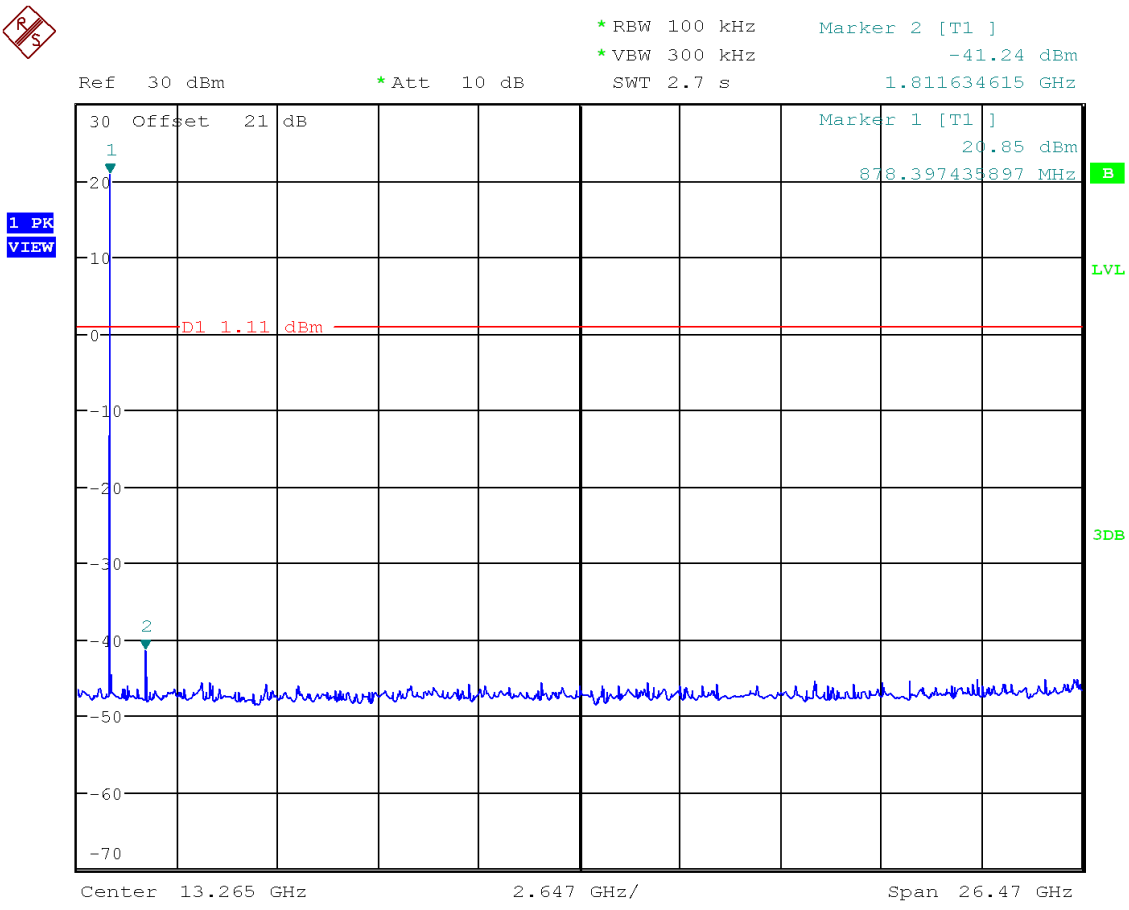


Figure 19. 915 MHz 30MHz-26.5GHz Spurious

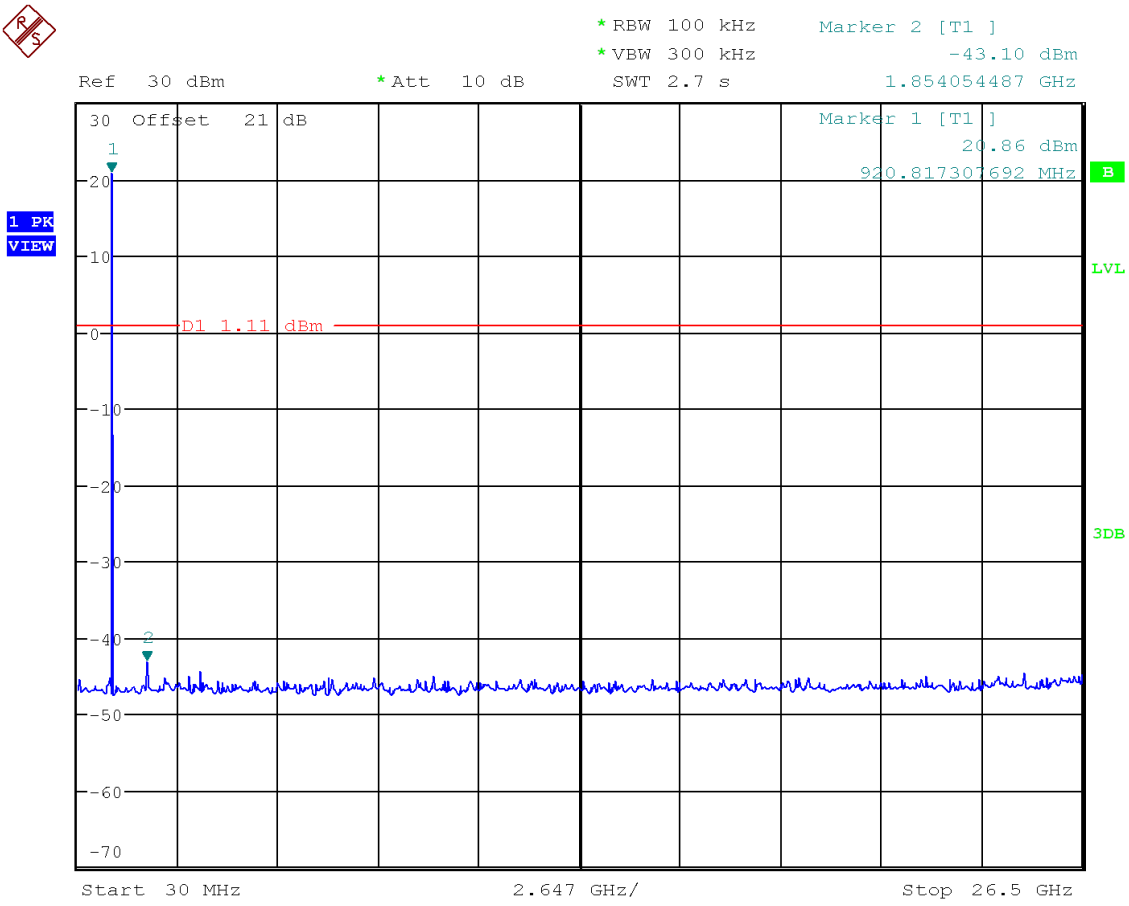


Figure 20. 927.25 MHz 30MHz-26.5GHz Spurious

4.5 Transmitter Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS 247 Sect.5.5, RSS-GEN Sect. 8.9 and 8.10.

4.5.1 Test Methodology

4.5.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pre-scans were performed to determine the worst data rate / chains.

4.5.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

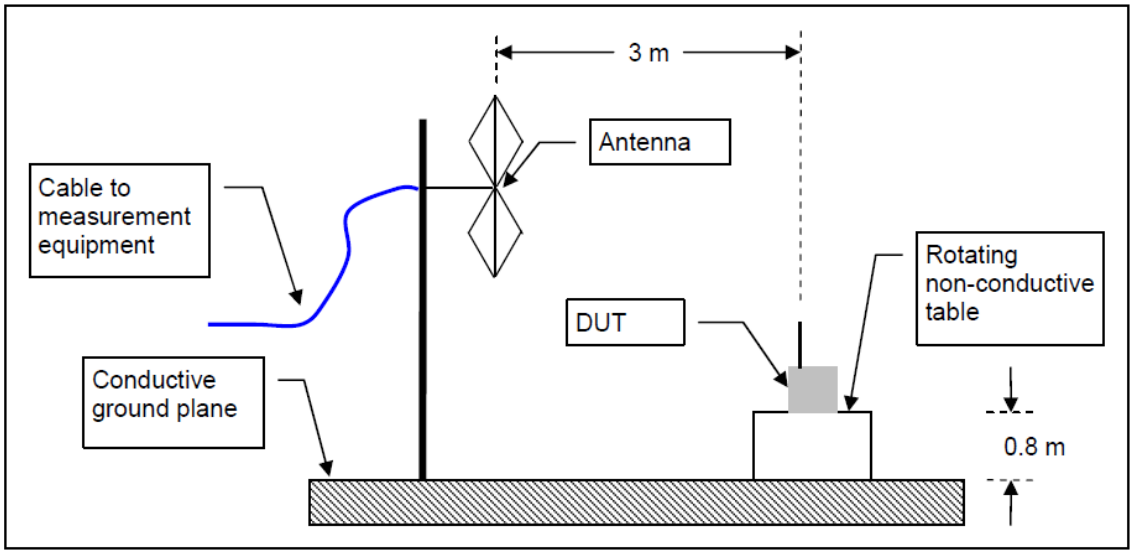
4.5.1.3 Deviations

None.

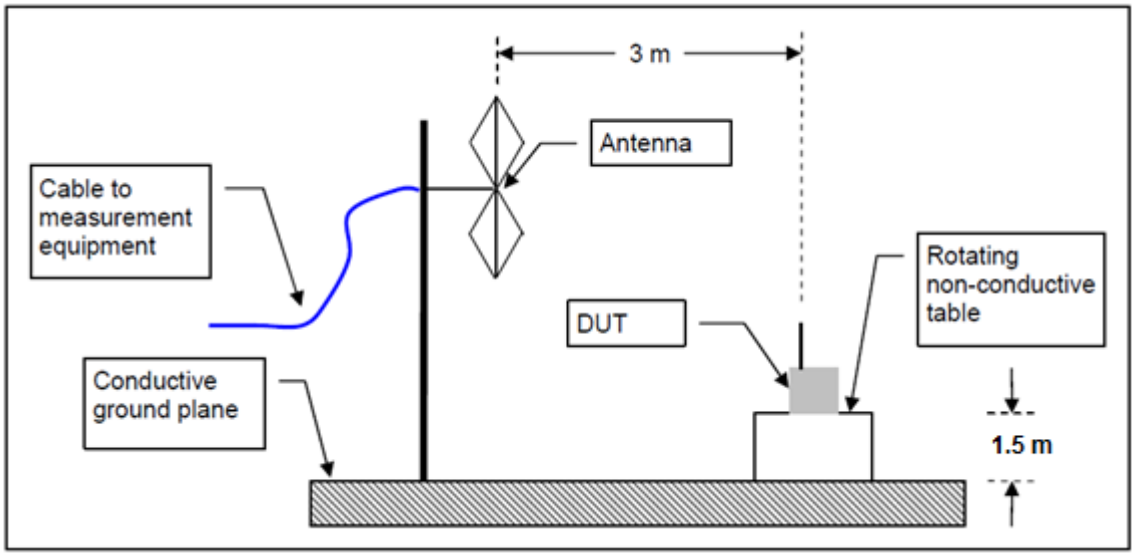
4.5.2 Test Setup:

All tests were conducted at full power on low, middle, and high channels. The DUT was stimulated by manufacturer provided test software that is not available to the end user.

30MHz-1GHz



>1GHz



4.5.3 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2015 and RSS Gen Sect. 8.9 and 8.10: 2014.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

4.5.2 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories if any noted listed in Sections 1.4 of this report and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Note: The 0.9 GHz notch filter used for below 1 GHz scans and 1 GHz High Pass Filter for above 1GHz scans to protect the front end of the pre-amp.

4.5.3.1 Plots

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.03	---	63.51	118.92	55.41	10000.00	0.20	155.00	V	343.00	14.30
0.05	---	58.67	112.91	54.24	10000.00	0.20	155.00	V	-1.00	12.10
0.09	---	44.09	108.83	64.74	10000.00	0.20	155.00	V	-5.00	11.80
1.02	50.09	---	67.40	17.31	10000.00	9.00	155.00	V	40.00	11.80

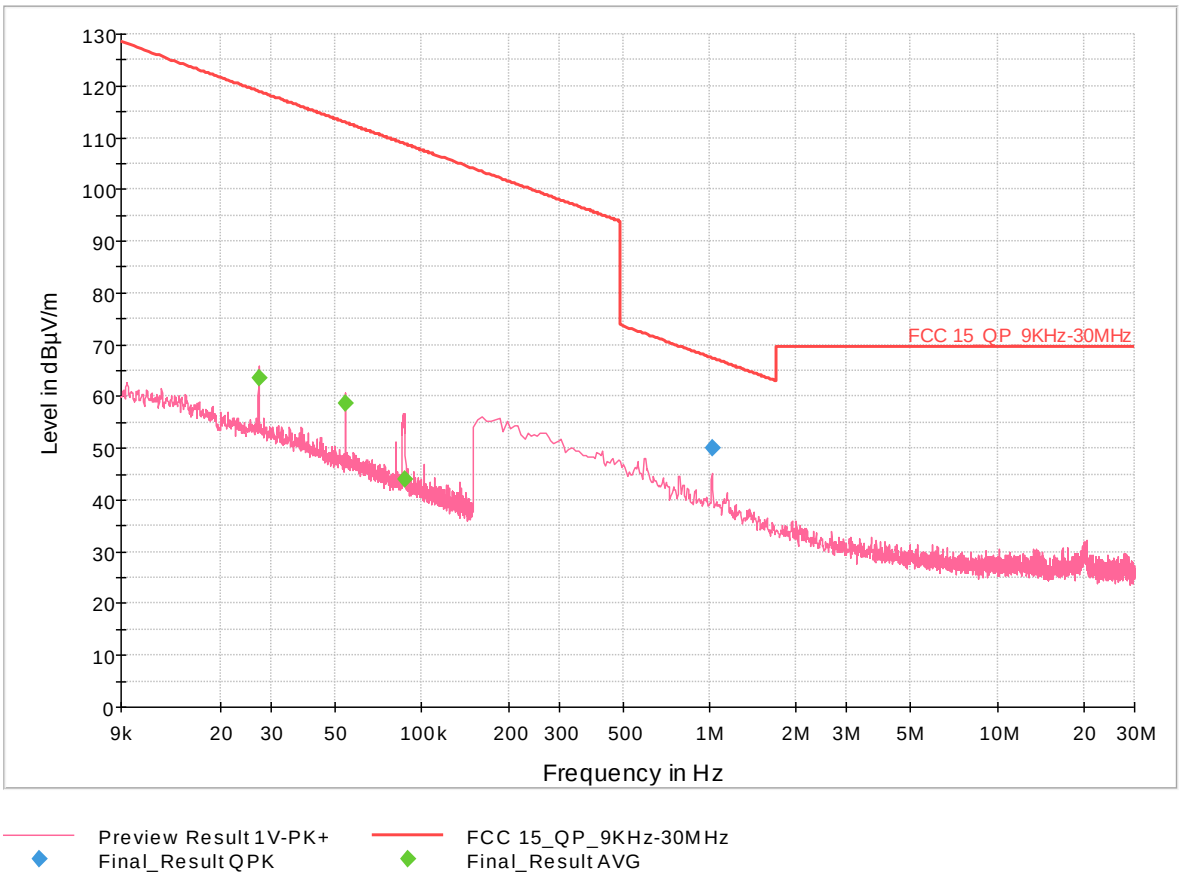


Figure 21. 9 kHz-30 MHz, 902.75 MHz, 0 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.09	---	45.44	108.85	63.41	10000.00	0.20	155.00	V	256.00	11.80
1.03	49.78	---	67.39	17.61	10000.00	9.00	155.00	V	341.00	11.80

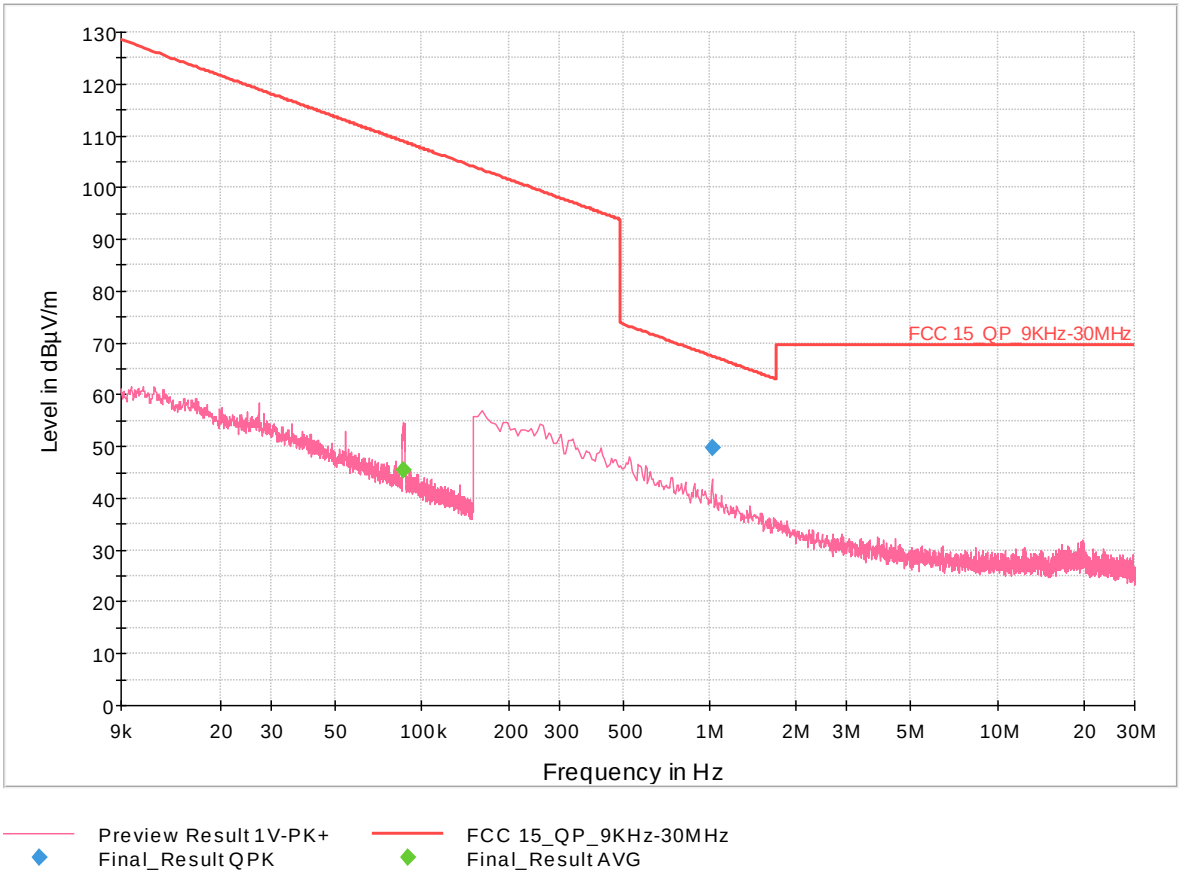


Figure 22. 9 kHz-30 MHz, 902.75 MHz, 90 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.03	---	63.50	118.92	55.42	10000.00	0.20	155.00	V	275.00	14.30
0.05	---	58.76	112.90	54.14	10000.00	0.20	155.00	V	-1.00	12.10
1.02	50.03	---	67.39	17.36	10000.00	9.00	155.00	V	76.00	11.80

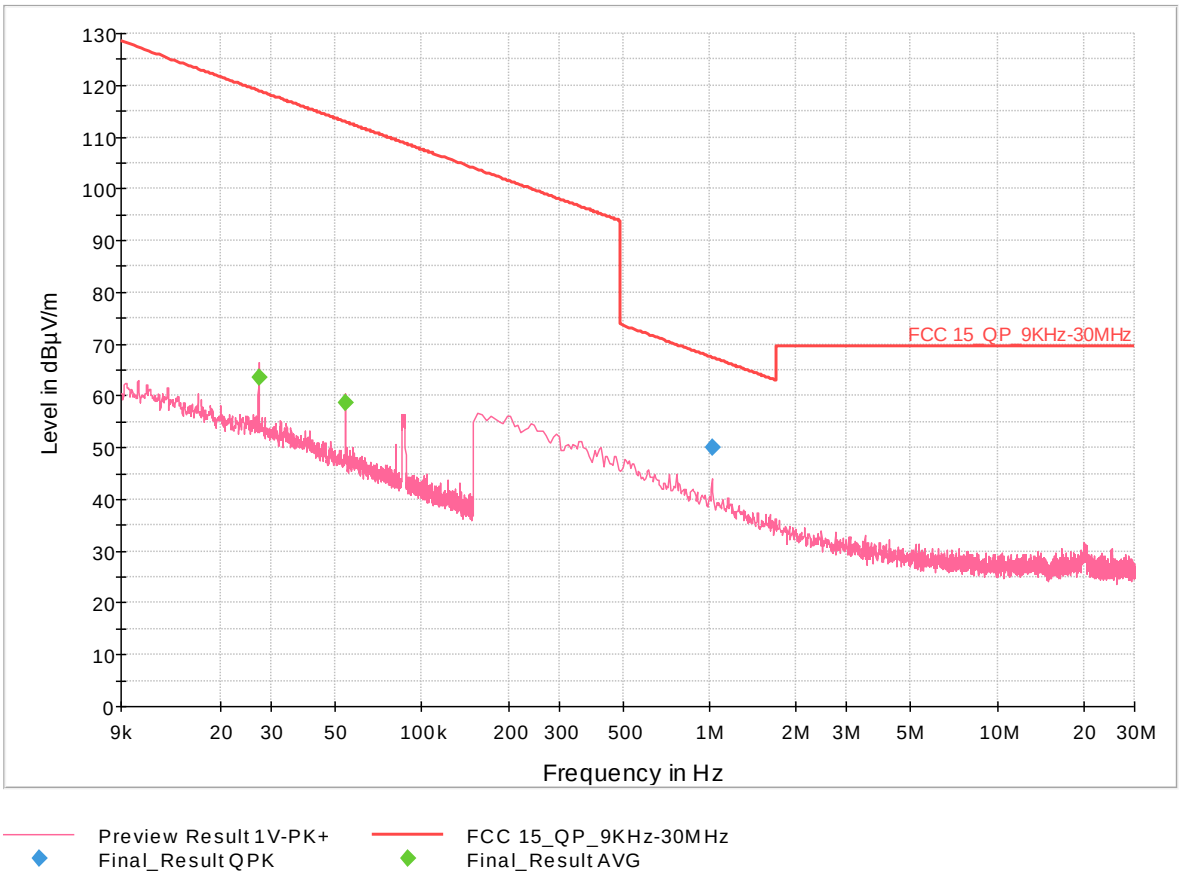


Figure 23. 9 kHz-30 MHz, 915 MHz, 0 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.09	---	43.09	108.81	65.72	10000.00	0.20	155.00	V	255.00	11.80
0.49	---	43.56	93.87	50.31	10000.00	9.00	155.00	V	110.00	11.40

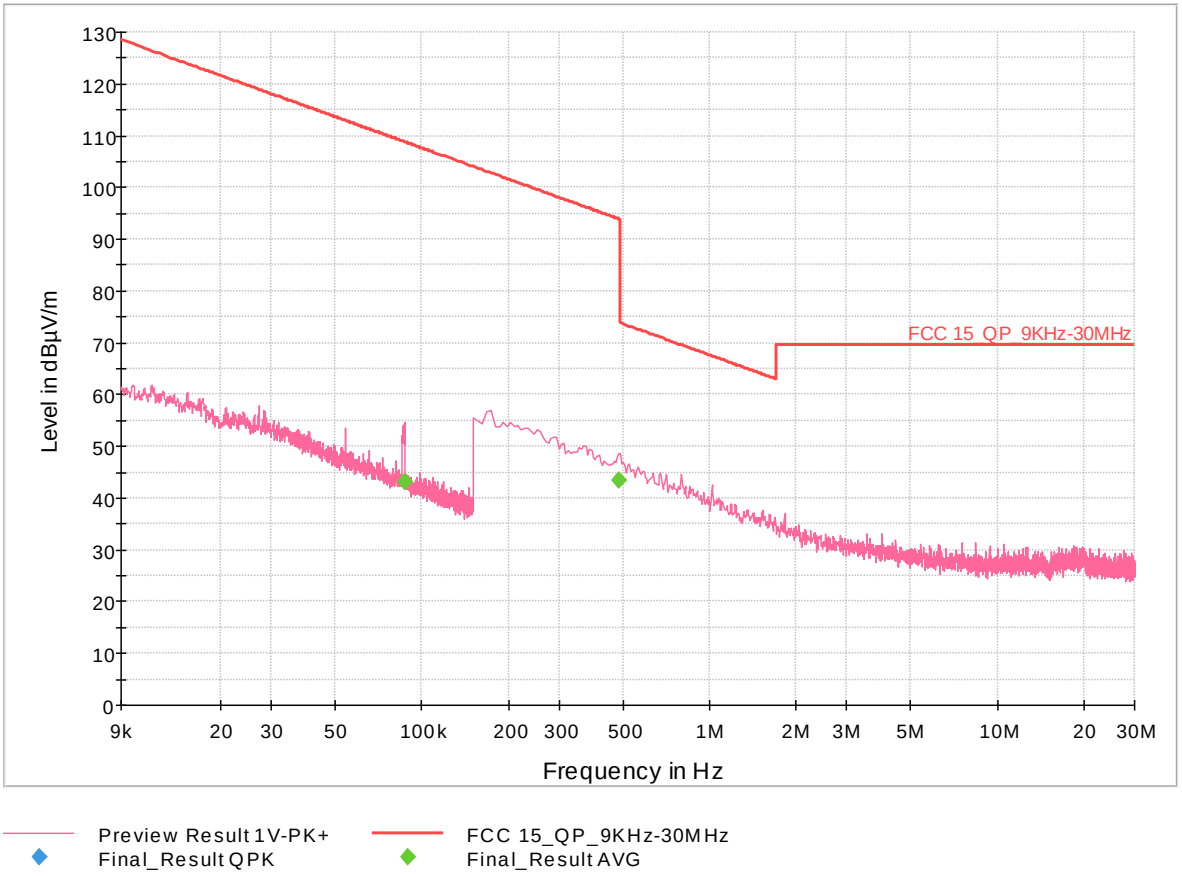


Figure 24. 9 kHz-30 MHz, 915 MHz, 90 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.03	---	63.46	118.92	55.46	10000.00	0.20	155.00	V	18.00	14.30
1.02	50.08	---	67.40	17.32	10000.00	9.00	155.00	V	46.00	11.80

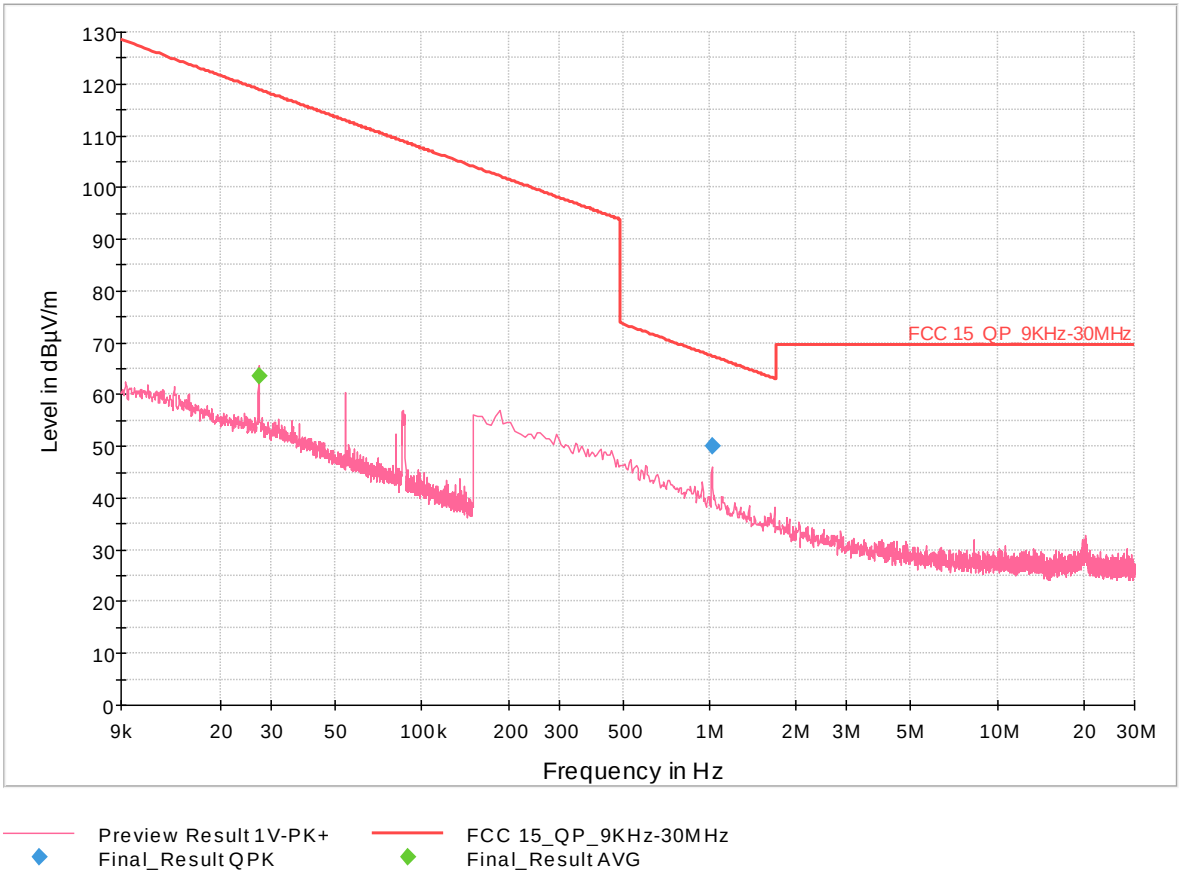


Figure 25. 9 kHz-30 MHz, 927.25 MHz, 0 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.09	---	45.31	108.90	63.59	10000.00	0.20	155.00	V	239.00	11.80
0.82	49.06	---	69.38	20.32	10000.00	9.00	155.00	V	282.00	11.50

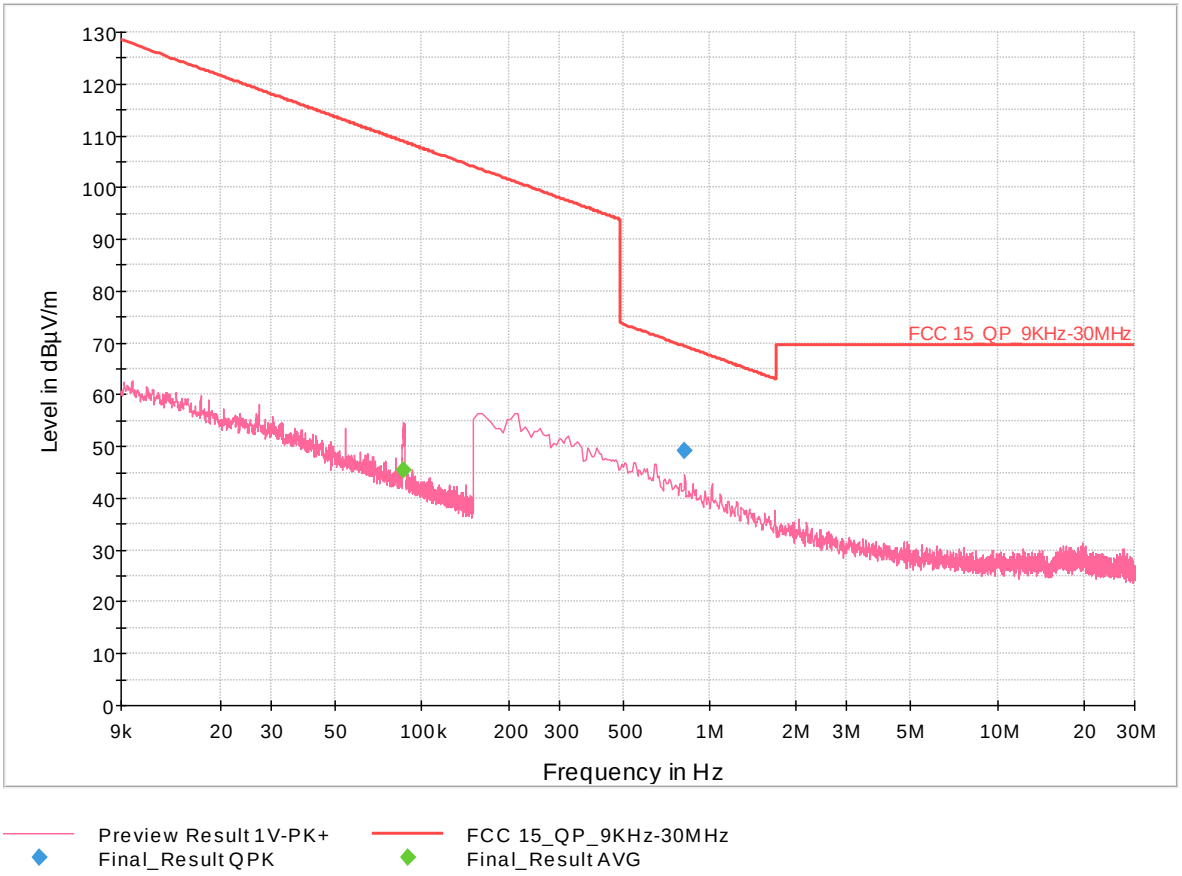


Figure 26. 9 kHz-30 MHz, 927.25 MHz, 90 Degrees

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
121.28	---	47.31	---	---	10000.00	120.00	100.00	V	-5.00	-14.40	
121.28	39.04	---	43.52	4.48	10000.00	120.00	100.00	V	-5.00	-14.40	
124.74	42.21	---	43.52	1.31	10000.00	120.00	100.00	V	353.00	-15.20	
124.74	---	50.87	---	---	10000.00	120.00	100.00	V	353.00	-15.20	
133.17	34.29	---	43.52	9.23	10000.00	120.00	100.00	V	-5.00	-16.00	
133.17	---	41.93	---	---	10000.00	120.00	100.00	V	-5.00	-16.00	
103.72	--	43.22	--	--	10000.00	120.00	300.00	V	17.00	-12.90	NRB
111.29	--	42.22	--	--	10000.00	120.00	400.00	V	44.00	-13.20	NRB
145.14	--	56.18	--	--	10000.00	120.00	100.00	V	204.00	-16.40	NRB
218.08	--	60.31	--	--	10000.00	120.00	400.00	H	252.00	-13.50	NRB
502.68	--	45.18	--	--	10000.00	120.00	300.00	V	356.00	-5.80	NRB

Note: NRB = Non Restricted Band

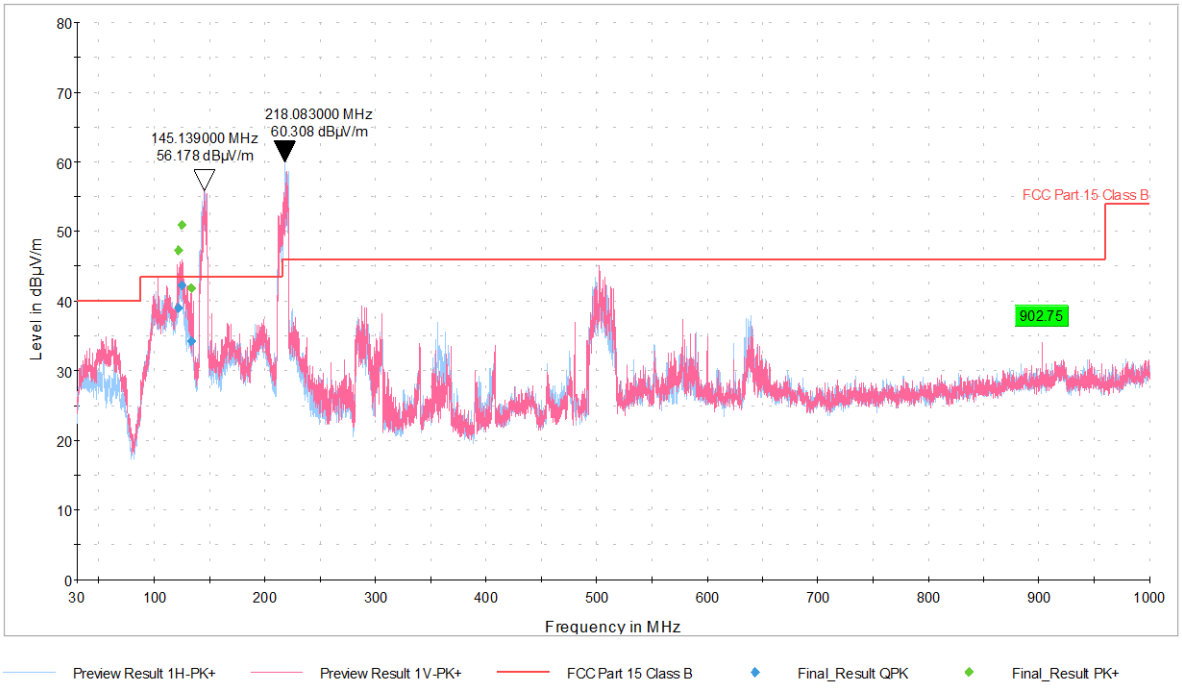


Figure 27. 30MHz-1GHz, 902.75 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
37.76	---	39.41	---	---	10000.00	120.00	100.00	H	8.00	-11.80	
37.76	26.86	---	40.00	13.14	10000.00	120.00	100.00	H	8.00	-11.80	
125.35	41.33	---	43.52	2.19	10000.00	120.00	150.00	V	332.00	-15.30	
125.35	---	49.25	---	---	10000.00	120.00	150.00	V	332.00	-15.30	
130.11	39.53	---	43.52	3.99	10000.00	120.00	100.00	H	12.00	-15.90	
130.11	---	45.72	---	---	10000.00	120.00	100.00	H	12.00	-15.90	
65.11	---	35.28	---	---	10000.00	120.00	100.00	V	69.00	-13.40	NRB
101.00	---	42.47	---	---	10000.00	120.00	100.00	H	112.00	-13.10	NRB
146.98	---	59.12	---	---	10000.00	120.00	100.00	H	133.00	-16.30	NRB
219.93	---	57.02	---	---	10000.00	120.00	300.00	V	310.00	-13.40	NRB
495.70	---	45.27	---	---	10000.00	120.00	200.00	V	82.00	-7.10	NRB
505.40	---	46.14	---	---	10000.00	120.00	300.00	V	353.00	-6.10	NRB

Note: NRB = Non Restricted Band

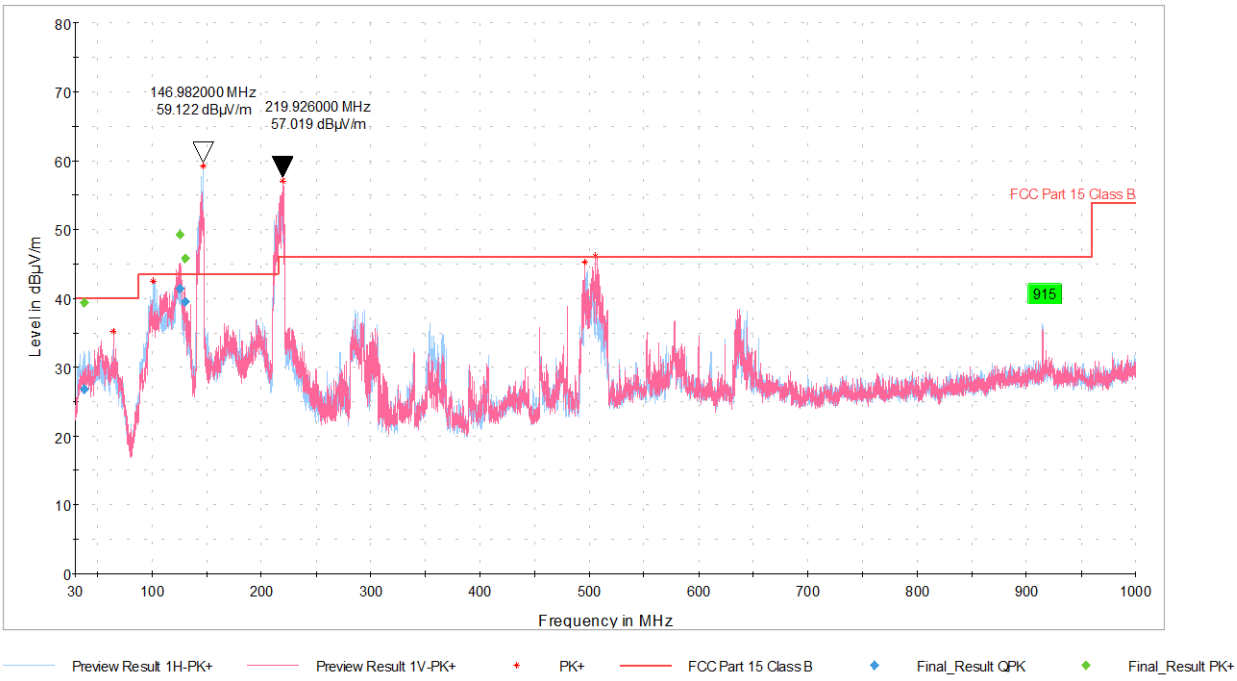


Figure 28. 30MHz-1GHz, 915 MHz

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
112.06	38.60	---	43.52	4.92	10000.00	120.00	242.00	V	66.00	-13.30	
112.06	---	46.23	---	---	10000.00	120.00	242.00	V	66.00	-13.30	
123.85	41.23	---	43.52	2.29	10000.00	120.00	100.00	H	165.00	-14.80	
123.85	---	49.98	---	---	10000.00	120.00	100.00	H	165.00	-14.80	
98.58	---	42.64	---	---	10000.00	120.00	200.00	H	62.00	-13.40	NRB
146.89	---	59.71	---	---	10000.00	120.00	100.00	H	125.00	-16.30	NRB
220.41	---	58.25	---	---	10000.00	120.00	400.00	V	253.00	-13.40	NRB
370.47	---	41.61	---	---	10000.00	120.00	200.00	H	352.00	-9.00	NRB
502.39	---	46.16	---	---	10000.00	120.00	300.00	V	162.00	-5.80	NRB
511.02	---	45.26	---	---	10000.00	120.00	100.00	V	108.00	-6.50	NRB

Note: NRB = Non Restricted Band

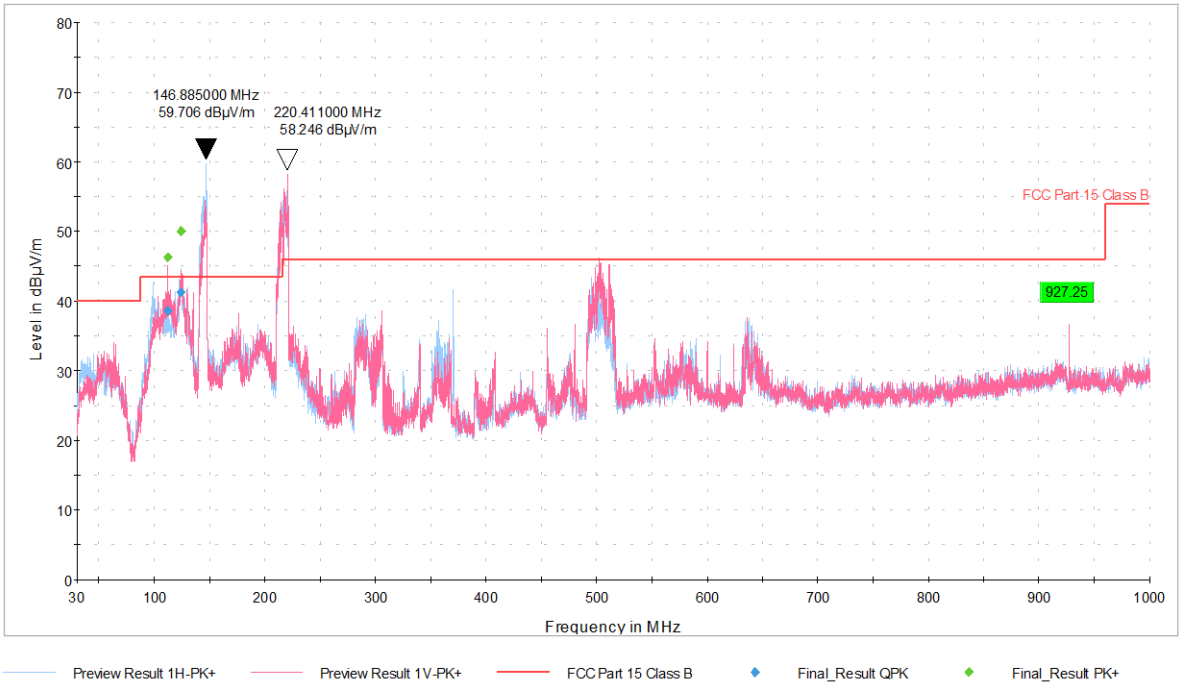


Figure 29. 30MHz-1GHz, 927.25 MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1018.13	---	26.26	54.00	27.74	1000.00	255.00	V	179.00	-7.40
1018.13	51.13	---	74.00	22.87	1000.00	255.00	V	179.00	-7.40
2030.73	50.49	---	74.00	23.51	1000.00	100.00	H	180.00	-4.20
2030.73	---	25.62	54.00	28.38	1000.00	100.00	H	180.00	-4.20
2138.59	---	28.19	54.00	25.81	1000.00	100.00	H	166.00	-4.00
2138.59	53.51	---	74.00	20.49	1000.00	100.00	H	166.00	-4.00
7033.51	44.49	---	74.00	29.51	1000.00	335.00	H	239.00	7.80
7033.51	---	29.78	54.00	24.22	1000.00	335.00	H	239.00	7.80
9892.50	---	35.28	54.00	18.72	1000.00	100.00	H	230.00	12.80
9892.50	48.86	---	74.00	25.14	1000.00	100.00	H	230.00	12.80
13602.98	57.15	---	74.00	16.85	1000.00	350.00	H	-5.00	18.20
13602.98	---	43.20	54.00	10.80	1000.00	350.00	H	-5.00	18.20
17872.01	64.67	---	74.00	9.33	1000.00	105.00	H	170.00	26.80
17872.01	---	50.92	54.00	3.08	1000.00	105.00	H	170.00	26.80

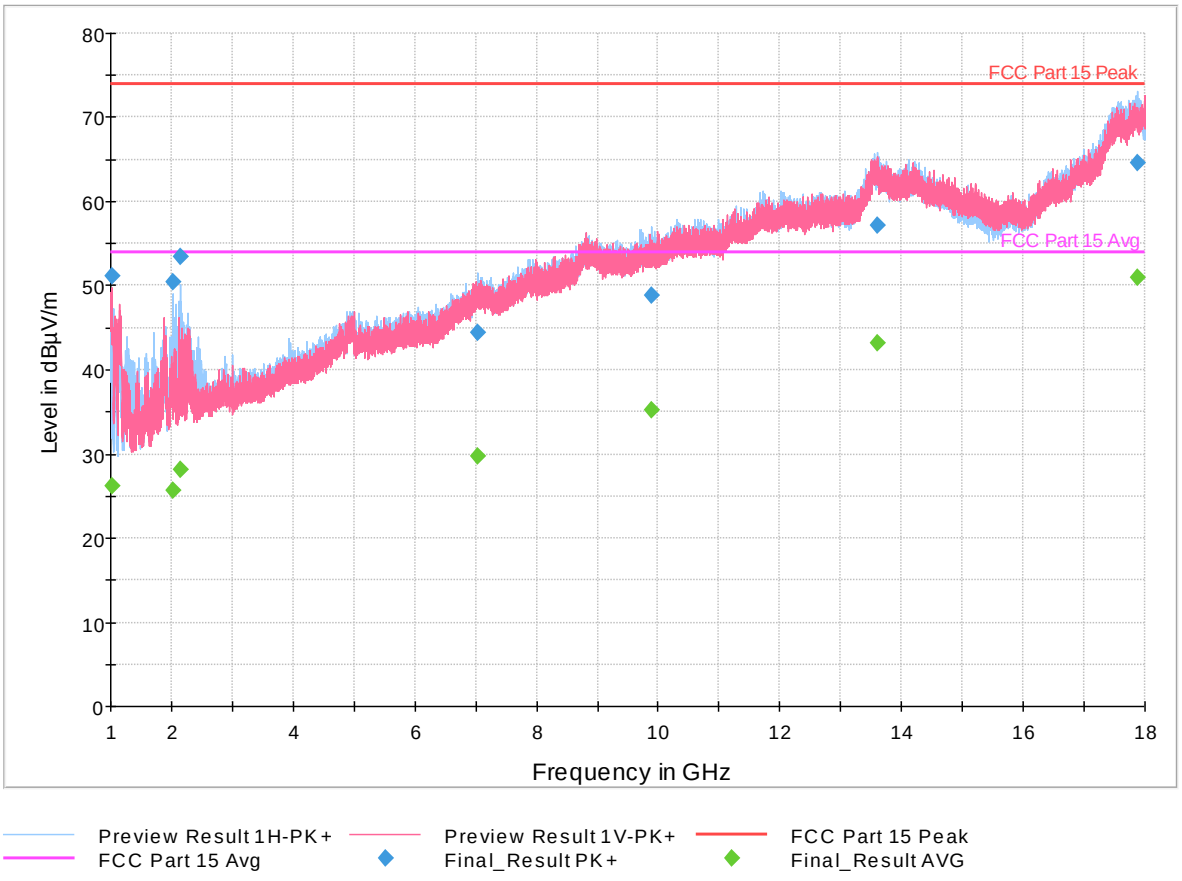


Figure 30. 1-18GHz, 902.75 MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1026.75	50.70	---	74.00	23.30	1000.00	253.00	V	191.00	-7.40
1026.75	---	25.97	54.00	28.03	1000.00	253.00	V	191.00	-7.40
1144.62	48.61	---	74.00	25.39	1000.00	155.00	V	180.00	-7.50
1144.62	---	24.45	54.00	29.56	1000.00	155.00	V	180.00	-7.50
2134.59	52.61	---	74.00	21.39	1000.00	150.00	H	138.00	-4.10
2134.59	---	27.52	54.00	26.48	1000.00	150.00	H	138.00	-4.10
2137.71	---	28.51	54.00	25.49	1000.00	100.00	H	160.00	-4.00
2137.71	53.76	---	74.00	20.24	1000.00	100.00	H	160.00	-4.00
7207.67	---	29.58	54.00	24.42	1000.00	255.00	V	100.00	8.00
7207.67	43.76	---	74.00	30.24	1000.00	255.00	V	100.00	8.00
9814.40	49.32	---	74.00	24.68	1000.00	237.00	H	290.00	12.70
9814.40	---	35.11	54.00	18.89	1000.00	237.00	H	290.00	12.70
13580.23	---	43.44	54.00	10.56	1000.00	235.00	H	-1.00	18.20
13580.23	57.05	---	74.00	16.95	1000.00	235.00	H	-1.00	18.20
17838.53	---	51.16	54.00	2.84	1000.00	103.00	H	340.00	26.80
17838.53	64.36	---	74.00	9.64	1000.00	103.00	H	340.00	26.80

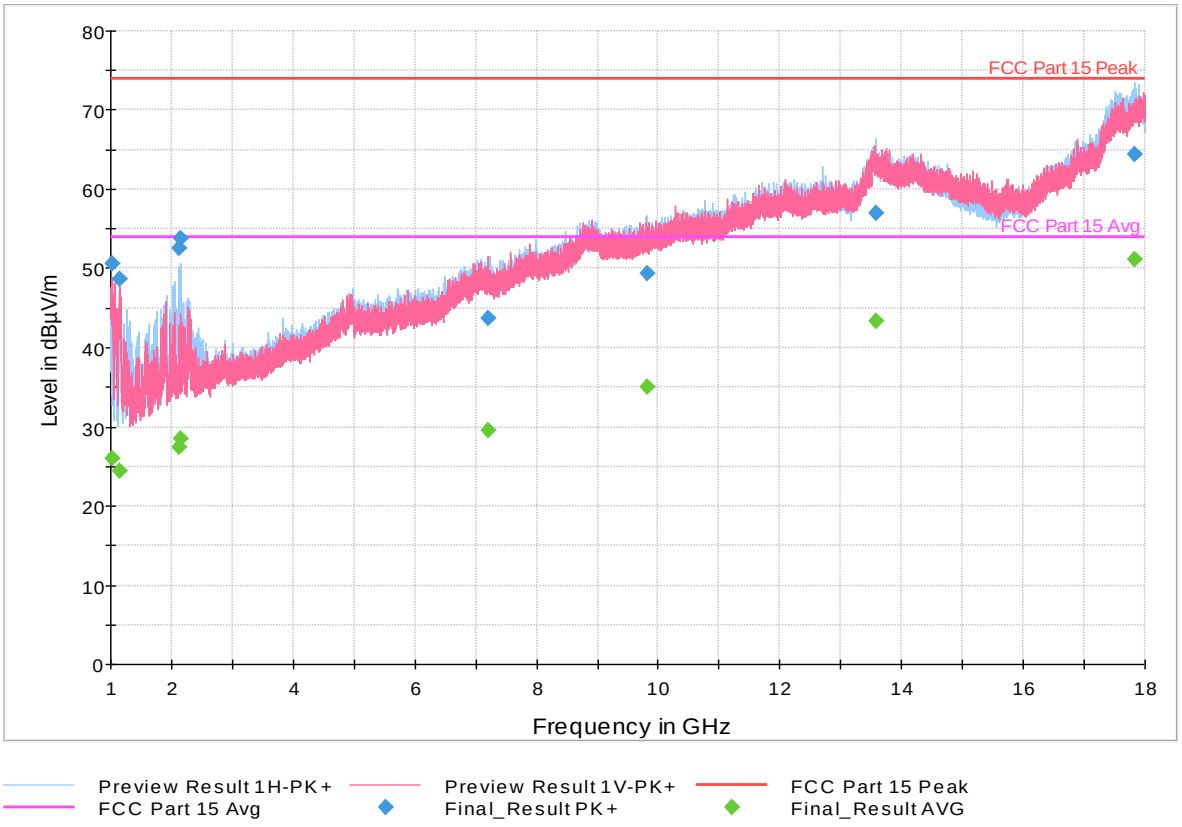


Figure 31. 1-18GHz, 915 MHz

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1854.49	---	44.86	54.00	9.14	1000.00	156.00	H	80.00	-4.80
1854.49	52.12	---	74.00	21.88	1000.00	156.00	H	80.00	-4.80
2059.05	---	27.89	54.00	26.11	1000.00	104.00	H	165.00	-4.10
2059.05	53.18	---	74.00	20.82	1000.00	104.00	H	165.00	-4.10
2137.17	55.18	---	74.00	18.82	1000.00	105.00	H	151.00	-4.00
2137.17	---	29.96	54.00	24.04	1000.00	105.00	H	151.00	-4.00
8805.79	---	34.85	54.00	19.15	1000.00	150.00	V	9.00	11.50
8805.79	48.09	---	74.00	25.91	1000.00	150.00	V	9.00	11.50
13526.58	---	44.07	54.00	9.93	1000.00	350.00	H	88.00	18.20
13526.58	57.48	---	74.00	16.52	1000.00	350.00	H	88.00	18.20
17881.16	64.82	---	74.00	9.18	1000.00	154.00	H	22.00	26.70
17881.16	---	51.09	54.00	2.91	1000.00	154.00	H	22.00	26.70

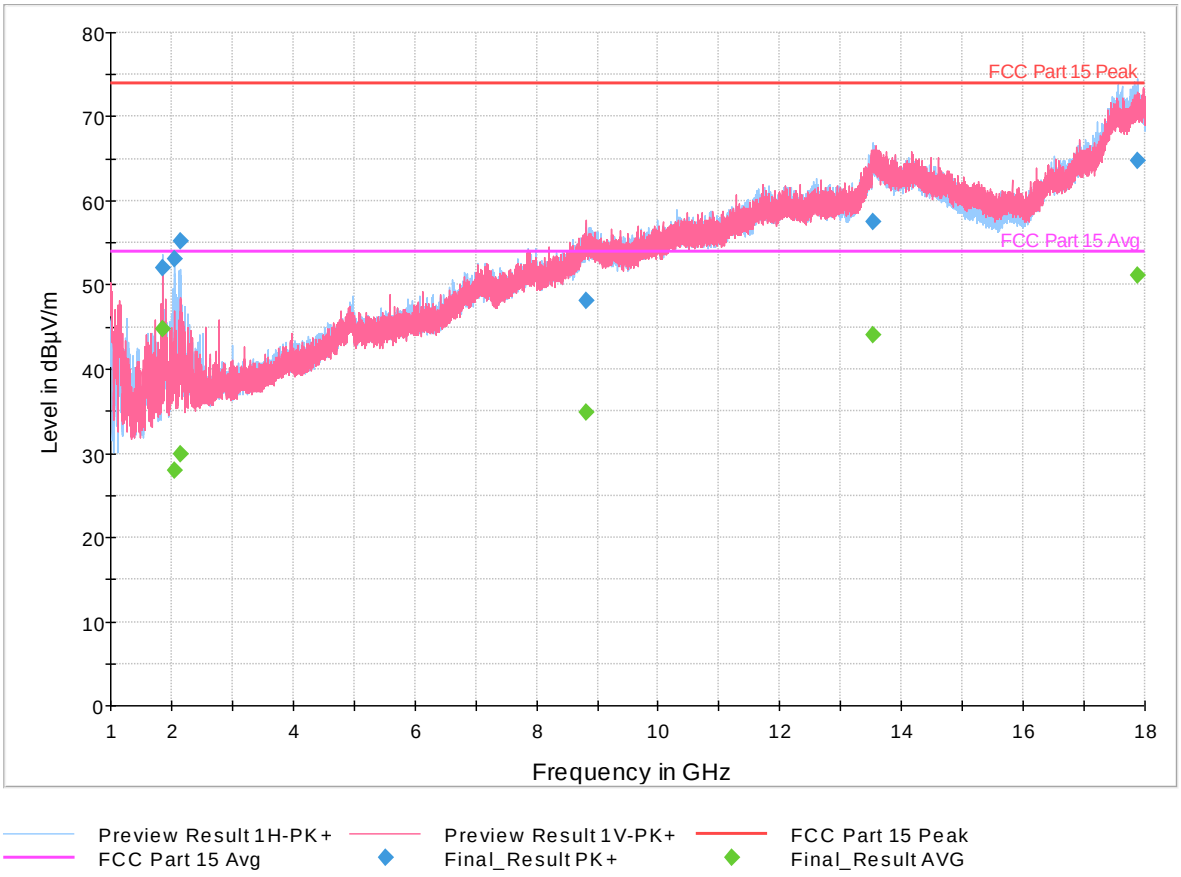


Figure 32. 1-18GHz, 927.25 MHz

4.6 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.4: 2003. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207: 2010 and RSS 210: 2010.

4.6.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50μH / 50Ω LISNs.

Testing is either performed in 5m Chamber. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.6.1.1 Deviations

There were no deviations from this test methodology.

4.6.2 Test Results

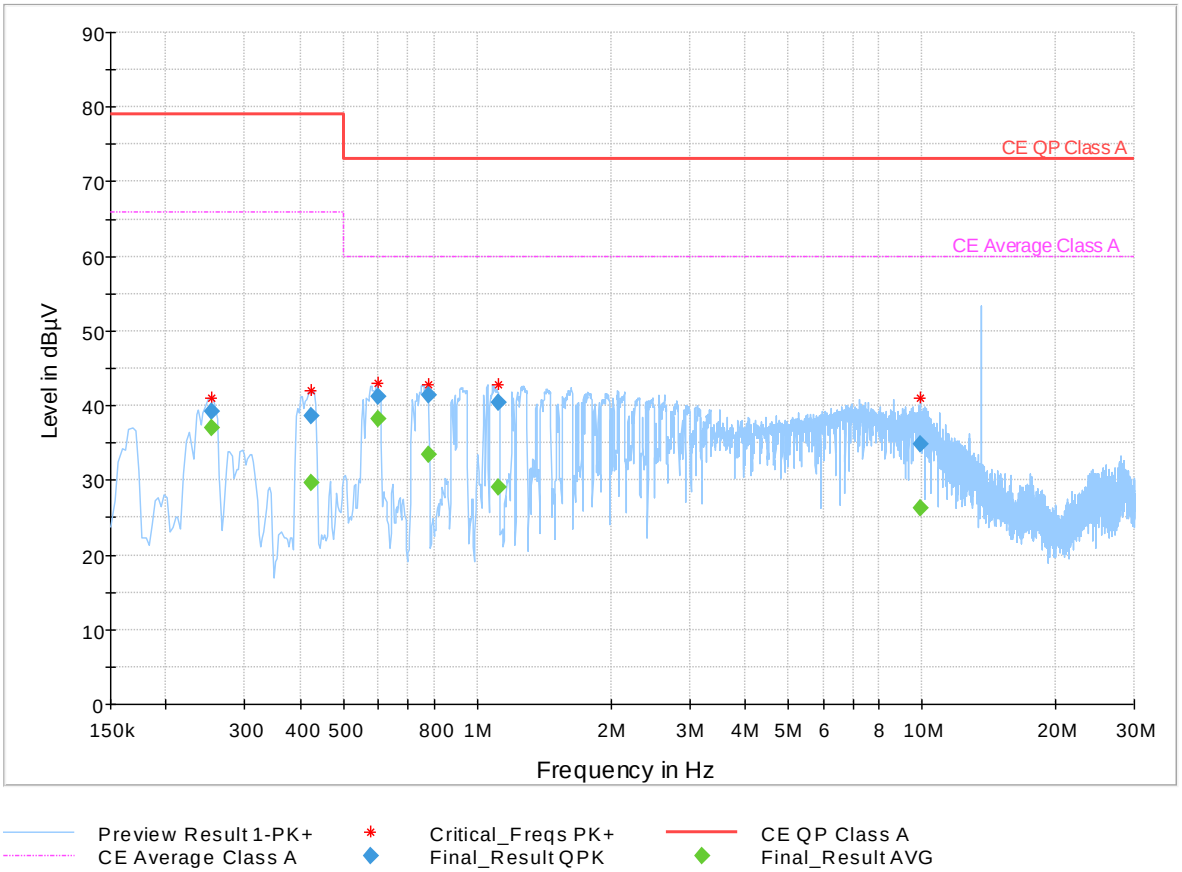
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only		
AC Power: 120 Vac/60 Hz	**Configuration:** Tabletop	
Configuration	**Frequency Range**	**Test Result**
Line 1 (Live)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

4.5.2.1 Live Line

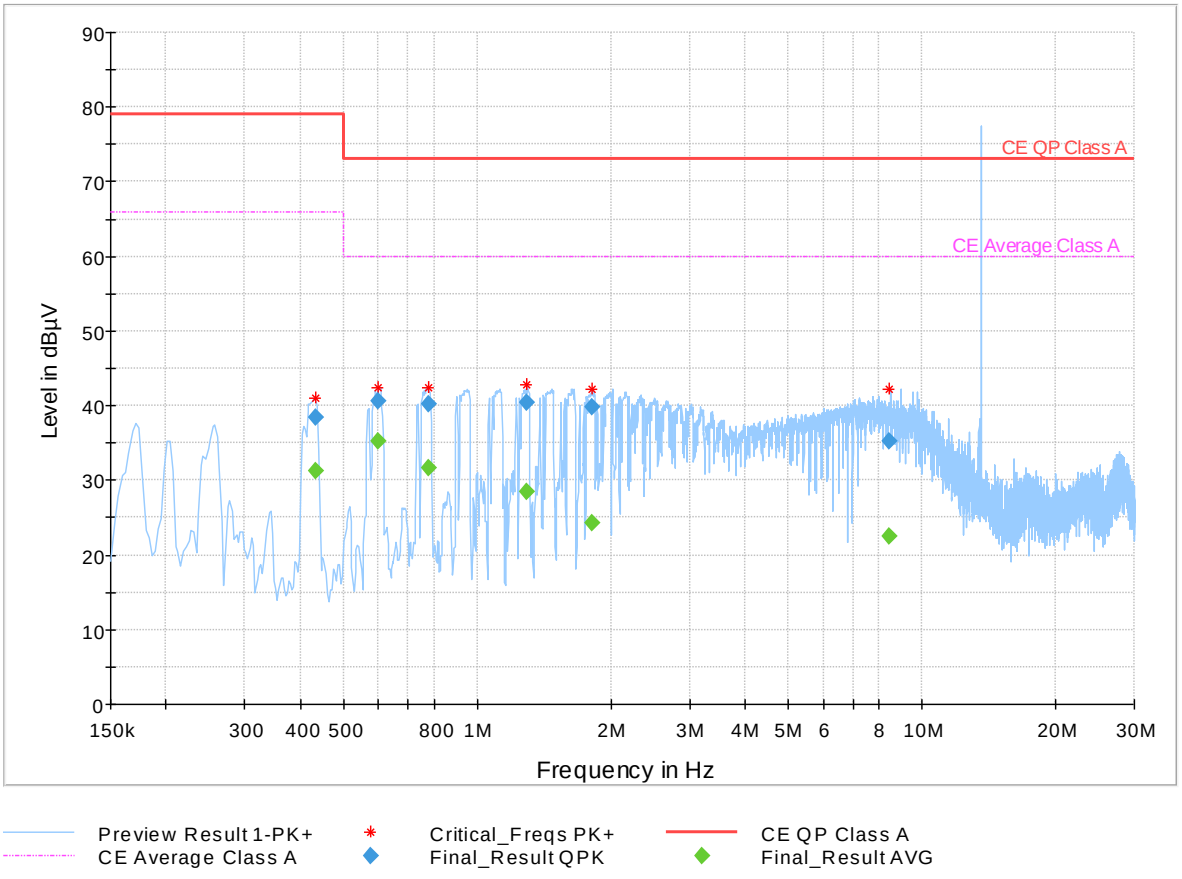
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)	Comment
0.25	---	37.04	66.00	28.96	1000.00	9.00	L1	GND	10.00	
0.25	39.22	---	79.00	39.78	1000.00	9.00	L1	GND	10.00	
0.42	---	29.69	66.00	36.31	1000.00	9.00	L1	GND	9.90	
0.42	38.66	---	79.00	40.34	1000.00	9.00	L1	GND	9.90	
0.60	---	38.16	60.00	21.84	1000.00	9.00	L1	GND	9.90	
0.60	41.29	---	73.00	31.71	1000.00	9.00	L1	GND	9.90	
0.78	---	33.49	60.00	26.51	1000.00	9.00	L1	GND	9.90	
0.78	41.45	---	73.00	31.55	1000.00	9.00	L1	GND	9.90	
1.12	---	29.17	60.00	30.83	1000.00	9.00	L1	GND	9.80	
1.12	40.38	---	73.00	32.62	1000.00	9.00	L1	GND	9.80	
9.94	---	26.31	60.00	33.69	1000.00	9.00	L1	GND	9.80	
9.94	34.80	---	73.00	38.20	1000.00	9.00	L1	GND	9.80	



Notes: The emission over average and quasi peak limit is in-band emission at 13.56 MHz. Meet FCC Class A limit.

4.5.2.2 Neutral Line

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)	Comment
0.43	---	31.31	66.00	34.69	1000.00	9.00	N	GND	9.90	
0.43	38.38	---	79.00	40.62	1000.00	9.00	N	GND	9.90	
0.60	---	35.32	60.00	24.68	1000.00	9.00	N	GND	9.90	
0.60	40.60	---	73.00	32.40	1000.00	9.00	N	GND	9.90	
0.78	---	31.60	60.00	28.40	1000.00	9.00	N	GND	9.90	
0.78	40.16	---	73.00	32.84	1000.00	9.00	N	GND	9.90	
1.29	---	28.40	60.00	31.60	1000.00	9.00	N	GND	9.80	
1.29	40.41	---	73.00	32.59	1000.00	9.00	N	GND	9.80	
1.81	---	24.36	60.00	35.64	1000.00	9.00	N	GND	9.80	
1.81	39.72	---	73.00	33.28	1000.00	9.00	N	GND	9.80	
8.45	---	22.44	60.00	37.56	1000.00	9.00	N	GND	9.90	
8.45	35.31	---	73.00	37.69	1000.00	9.00	N	GND	9.90	



Notes: The emission over average and quasi peak limit is in-band emission at 13.56 MHz. Meet FCC Class A limit.

Appendix A

5 Test Plan

This test report is intended to follow the test plan outlined herein unless otherwise stated. The test plan provides product information, reference standards, and testing details. The product information below came via client, product manual, product itself and or the internet. Test procedure information will reference standards or internal TUV Rheinland NA procedures.

5.1 General Information

Client	Codonics, Inc.
Address 1	17991 Englewood Drive
Address 2	Middleburg Heights OH 44130
Contact Person	Christopher Tainer
Telephone	(440) 243-1198-232
e-mail	cmt@codonics.com

5.2 Model(s) Name

SLS-1

5.3 Type of Product

HF and UHF RFID read and write capability.

5.4 Product Specifications

Table 7: EUT Specifications *

EUT Specifications	
AC, DC Input	AC Input: 100/240 VAC, 1.4 / 0.7A , 47 - 63Hz
Environment	Outdoor/ Indoor
Operating Temperature Range:	15°C –30°C
Multiple Feeds:	Yes and how many 1 No
Product Marketing Name (PMN)	SLS-630i
Hardware Version Identification Number (HVIN)	The units tested were serial numbers 170C00004C, 170C00005C
Firmware Version Identification Number (FVIN)	SLS SW 4.0.0-dev
RF Test Software Version	SLS SW 4.0.0-dev
Operating Modes	UHF, HF RFID
Transmitter Frequency Band	13.56 MHz, 902 - 928 MHz
Antenna	Print Path UHF Antenna: Mikroe-4503
Power Setting @ Operating Channel	Print antenna: 21dBm at 902-928MHz, Front antenna: 30dBm at 902-928MHz
Modulation	ASK modulation for 13.56 MHz, PR-ASK modulation for 902-928 MHz
TX/RX Chain (s)	1
Type of Equipment	Table Top
Note: EUT will be on / transmitted at all times with the highest power levels and antenna gains per channel. Power level is installation site specific. Worse case is full power.	

Table 8: EUT Channel Power Specifications

Freq. (MHz)	Print Antenna								
FCC/IC Power Setting									
902.75	21								
915	21								
927.25	21								

5.5 Equipment Under Test (EUT) Description

Every time a drug barcode is scanned, the system will:

- print a label.
- inventory 900 MHz tag on COVER, frequency hopping.
- inventory 900 MHz tag in PRINT PATH, frequency hopping.
- inventory 13.56 MHz tag on COVER.
- inventory 13.56 MHz tag in PRINT PATH.

5.6 Wireless

☒	**Yes**	☐	**No**

5.7 Modifications

None.

5.8 EUT Electrical Power Information

5.8.1 Electrical Power Type

☒	**AC**	☐	**DC**	☐	**Batteries**	☐	**Host -**

5.8.2 Electrical Power Information

Name	Type	Voltage		FrequencyHz	Current Amps	Notes
		min	max			
Mains Power US	AC	100	240	47 - 63Hz	1.4 / 0.7A	
Notes						

5.9 Electrical Support Equipment

Type	Manufacturer	Model	Connected To
Laptop	Lenovo	-	Sets commands for Radios

5.10 Non - Electrical Support Equipment

Item	Notes
-	

5.11 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Length	Shielded / Unshielded
Ethernet Port	Laptop port	Rear	15 ft	Unshielded

5.12 EUT Configuration

Configuration	Description
1	Continously Tx, UHF RFID
Notes	

--- Ende des Prüfberichts / End of Test Report ---