TEST REPORT

APPLICANT	:	Shenzhen Chainway Information Technology Co., Ltd
PRODUCT NAME	:	Fixed Android UHF Reader
MODEL NAME	:	U300-4
BRAND NAME	:	CHAINWAY
FCC ID	:	2AC6AU3004
STANDARD(S)	:	47 CFR Part 15 Subpart C
RECEIPT DATE	:	2023-11-20 and 2024-09-10
TEST DATE	:	2023-11-30 to 2024-11-21
ISSUE DATE	:	2025-01-16

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DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2025-01-16	First edition

1. Summary of Test Result

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	15.247(a) 15.247(h)	Hopping Mechanism	N/A	N/A	PASS	No deviation
3	15.247(a)	Number of Hopping Frequency	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
4	ANSI C63.10	Duty Cycle	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
5	15.247(b)	Maximum Peak Conducted Output Power	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
6	15.247(b)	Maximum Average Conducted Output Power	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
7	15.247(a)	20dB Bandwidth	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
8	15.247(a)	Carrier Frequency Separation	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
9	15.247(a)	Time of Occupancy (Dwell time)	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
10	15.247(d)	Conducted Spurious Emission	Nov. 30, 2023	Su Xiaoxian	PASS	No deviation
11	15.207	Conducted Emission	N/A	N/A	N/A Note1	N/A
12	15.209, 15.247(d)	Radiated Emission	Nov. 13, 2024	Zhong Xiangyun	PASS	No deviation

Note 1: Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power

lines or contain provisions for operation while connected to the AC power lines.

Note 2: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013, KDB 558074 D01 v05r02 and DA 00-075.

Note 3: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.1. Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

• 47 CFR Part 15 Subpart C Radio Frequency Devices

1.2. Test Equipment List

1.2.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2023.02.27	2024.02.26
				2024.02.19	2025.02.18
RF Cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial Cable	CB02	RF02	Morlab	N/A	N/A
SMA Connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.2.3 List of Software Used

Description	Manufacturer	Software Version
Test System	MaiWei	2.0.0.0
Morlab EMCR	Morlab	V1.2
TS+ -[JS32-CE]	Tonscend	V2.5.0.0

1.2.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
				2024.05.30	2025.05.29
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2023.07.01	2024.06.30
				2024.06.22	2025.06.21
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2023.06.26	2024.06.25
				2024.06.03	2025.06.02
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2023.07.01	2024.06.30
				2024.06.22	2025.06.21
Test Antenna – Horn	BBHA9170 #773	BBHA9170	Schwarzbeck	2023.07.01	2024.06.30
				2024.06.22	2025.06.21
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2023.06.27	2024.06.26
				2024.05.30	2025.05.29
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2023.06.27	2024.06.26
				2024.05.30	2025.05.29
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.07.04	2024.07.03
				2024.05.30	2025.05.29
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
				2024.05.30	2025.05.29
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26
				2024.05.30	2025.05.29
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
				2024.05.30	2025.05.29
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2023.07.04	2024.07.03
				2024.07.03	2025.07.02
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2023.07.04	2024.07.03
				2024.07.03	2025.07.02
RF Coaxial Cable (DC-18GHz)	22120181	QA500-18-NN-5	Qualwave	2023.07.04	2024.07.03
				2024.07.03	2025.07.02
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

1.3. Measurement Uncertainty

Test Items	Uncertainty	Remark
Number of Hopping Frequency	±5%	Confidence levels of 95%
Peak Output Power	±2.22dB	Confidence levels of 95%
Bandwidth	±5%	Confidence levels of 95%
Carrier Frequency Separation	±5%	Confidence levels of 95%
Time of Occupancy (Dwell time)	±5%	Confidence levels of 95%
Conducted Spurious Emission	±2.77dB	Confidence levels of 95%
Restricted Frequency Bands	±5%	Confidence levels of 95%
Radiated Emission	±2.95dB	Confidence levels of 95%
Conducted Emission	±2.44dB	Confidence levels of 95%

1.4. Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
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FCC Designation Number:	CN1192
FCC Test Firm Registration Number:	226174

2. General Description

2.1. Information of Applicant and Manufacturer

Applicant:	Shenzhen Chainway Information Technology Co., Ltd
Applicant Address:	9F Building 2, Daqian Industrial Park, District 67, XingDong Community, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Chainway Information Technology Co., Ltd
Manufacturer Address:	9F Building 2, Daqian Industrial Park, District 67, XingDong Community, Xin'an Street, Bao'an District, Shenzhen, Guangdong, China

2.2. Information of EUT

Product Name:	Fixed Android UHF Reader	
Sample No.:	1# 2#	
Hardware Version:	U300-4_Hardware_version	
Software Version:	U300-4_Software_version	
Equipment Type:	FHSS	
Modulation Type:	RFID	
Operating Frequency Range:	902MHz–928MHz	
Antenna Type:	Circularly polarized Antenna	
Antenna Gain:	9.00dBi	
Accessory:	AC Adapter	
	Brand Name:	SHENZHEN SOY TECHNOLOGY CO., LTD
	Model No.:	SOY-2400250-327
	Serial No.:	N/A
	Rated Input:	100-240V~50/60Hz, 1.7A
	Rated Output:	24V⎓2.5A
	Manufacturer:	SHENZHEN SOY TECHNOLOGY CO., LTD

Note 1: We use the dedicated software to control the EUT continuous transmission.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.3. Channel List of EUT

Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
1	**902.75**	14	909.25	27	915.75	40	922.25
2	903.25	15	909.75	28	916.25	41	922.75
3	903.75	16	910.25	29	916.75	42	923.25
4	904.25	17	910.75	30	917.25	43	923.75
5	904.75	18	911.25	31	917.75	44	924.25
6	905.25	19	911.75	32	918.25	45	924.75
7	905.75	20	912.25	33	918.75	46	925.25
8	906.25	21	912.75	34	919.25	47	925.75
9	906.75	22	913.25	35	919.75	48	926.25
10	907.25	23	913.75	36	920.25	49	926.75
11	907.75	24	914.25	37	920.75	**50**	**927.25**
12	908.25	25	914.75	38	921.25		
13	908.75	**26**	**915.25**	39	921.75		

Note 1: The black bold channels were selected for test.

2.4. Test Configuration of EUT

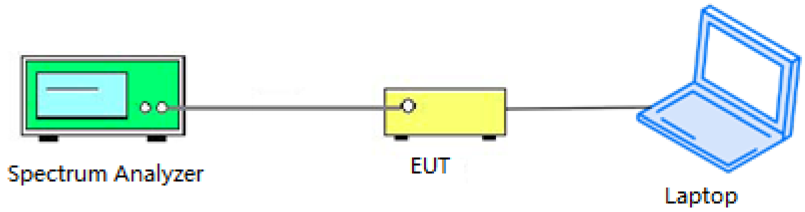
Test mode is used to control the EUT under the maximum power level during test.

2.5. Test Conditions

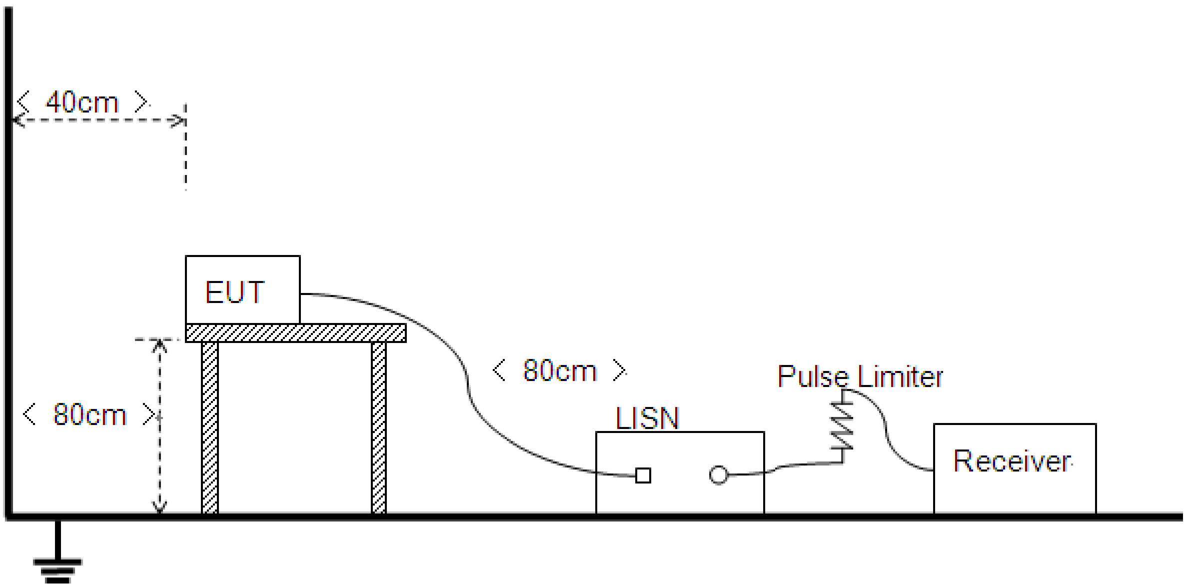
Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106

2.6. Test Setup Layout Diagram

2.6.1. Conducted Measurement

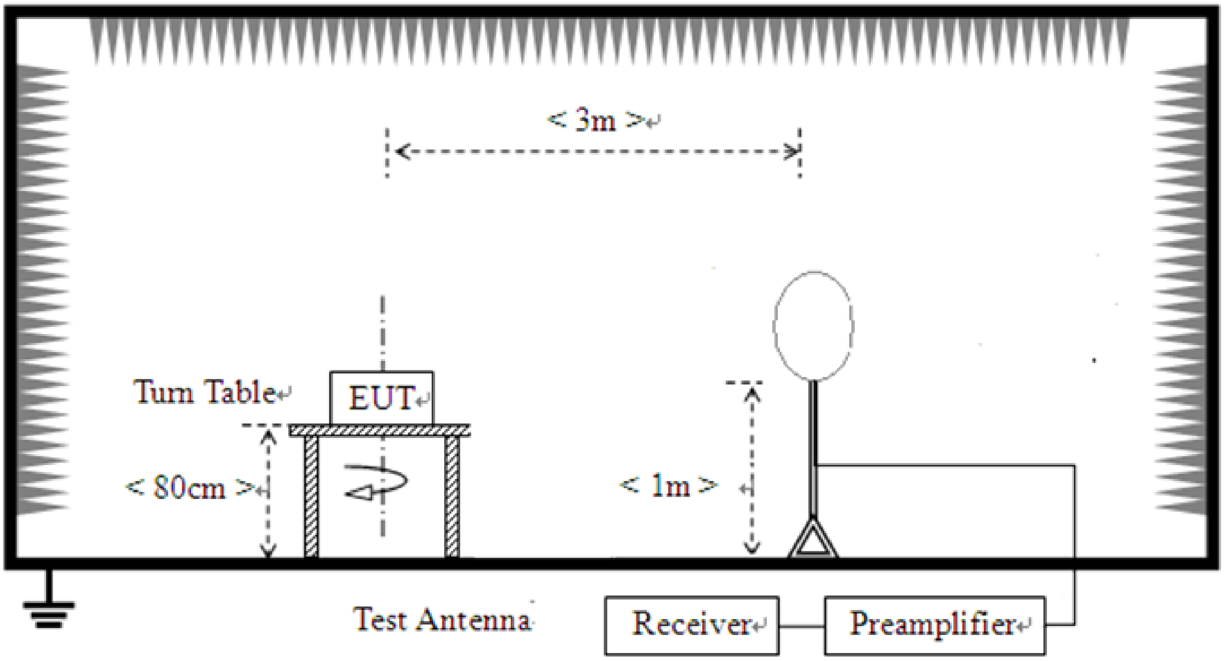


2.6.2. Conducted Emission Measurement

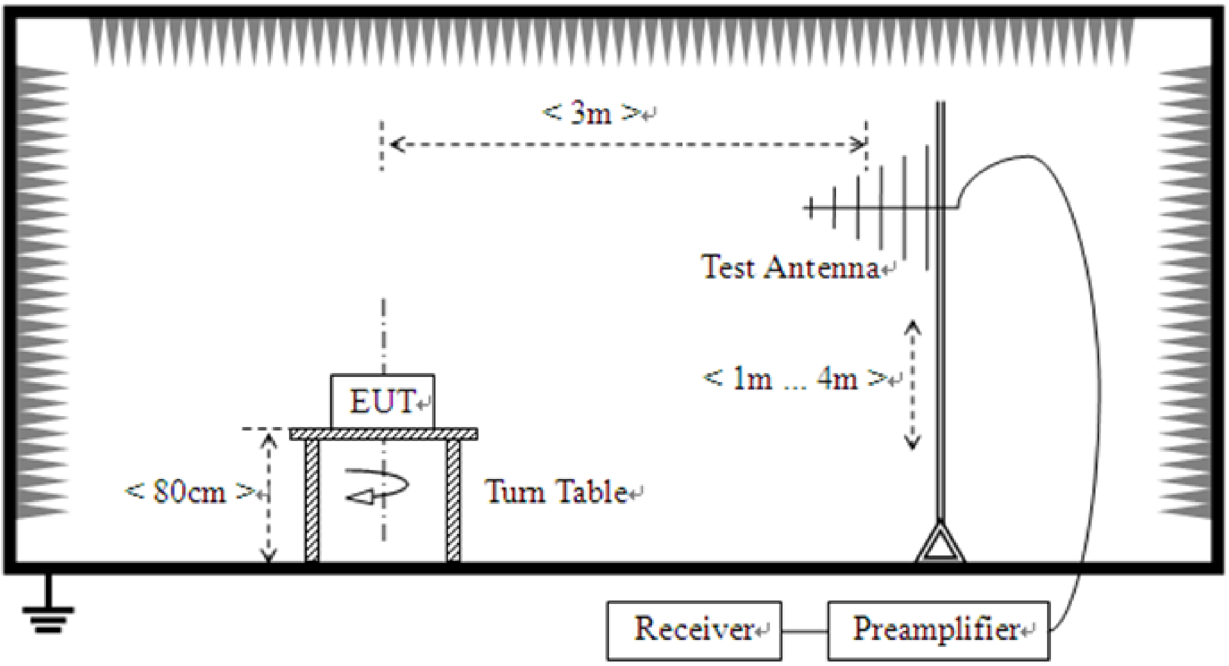


2.6.3.Radiation Measurement

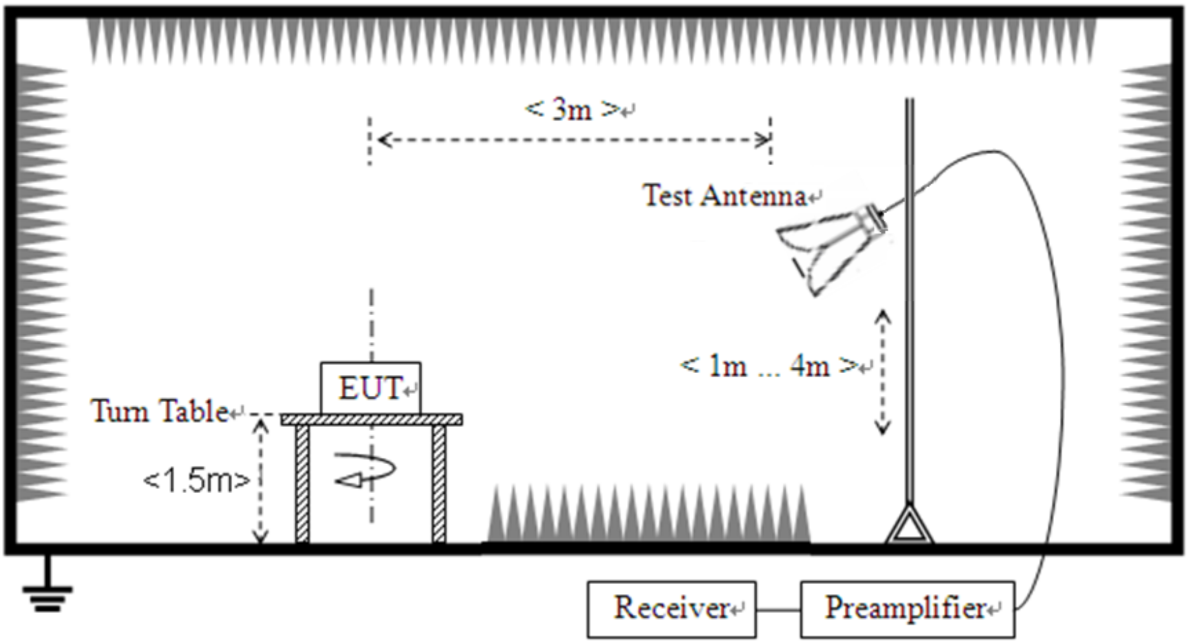
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



3. Test Results

3.1. Antenna Requirement

3.1.1.Requirement

According to FCC 15.203, 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.

3.1.2.Test Result

Antenna location	Antenna Type	Coupling Method
☐Internal ☒External	☐FPC Antenna ☐Spring Antenna ☐Ceramic Antenna ☐Integrated Antenna ☐Dipole Antenna ☐PCB Antenna ☐PIFA Antenna ☐On-board Antenna ☒Circularly polarized Antenna	☐I-PEX Connector ☒RP-SMA Connector ☐Metal Shrapnel ☐Layout

3.2. Hopping Mechanism

3.2.1.Requirement

According to FCC section 15.247(a)(1), a frequency hopping spread spectrum system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to FCC section 15.247(h), the incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hop sets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3.2.2.Test Result

The hopping mechanism of the EUT is based on the protocol that " ***ISO18000-6C*** ".

3.3. Number of Hopping Frequency

3.3.1.Requirement

According to FCC section 15.247(a)(1)(i), frequency hopping systems operating in the 902MHz to 928MHz bands shall use at least 50 hopping frequencies if the 20dB bandwidth of the hopping channel is less than 250KHz; or at least 25 hopping frequencies if the 20dB bandwidth of the hopping channel is 250KHz or greater.

3.3.2.Test Procedures

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold
Allow the trace to stabilize

3.3.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.3.4.Test Result

Refer to Annex A.1 in this report.

3.4. Duty Cycle of Test Signal

3.4.1.Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration(T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e.,no transmitter OFF-time is to be considered).
When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this sub clause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than ±2%; otherwise, the duty cycle is considered to be non constant.

3.4.2.Test Result

Refer to Annex A.2 in this report.

3.5. Maximum Peak Conducted Output Power

3.5.1. Requirement

According to FCC section 15.247(b)(2), for frequency hopping systems that operates in the 902MHz to 928MHz band employing at least 50 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt, and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.
If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.5.2. Test Procedures

KDB 558074 Section 8.3.1 was used in order to prove compliance.

3.5.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.5.4. Test Result

Refer to Annex A.3 in this report.

3.6. Maximum Average Conducted Output Power

3.6.1. Requirement

According to FCC section 15.247(b)(2), for frequency hopping systems that operates in the 902MHz to 928MHz band employing at least 50 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt, and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2. Test Procedures

KDB 558074 Section 8.3.2 was used in order to prove compliance.

3.6.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.6.4. Test Result

Refer to Annex A.4 in this report.

3.7.20 dB Bandwidth

3.7.1.Requirement

According to FCC section 15.247(a)(1), the 20 dB bandwidth is known as the 99% emission bandwidth, or 20 dB bandwidth (10*log1% = 20 dB) taking the total RF output power.

3.7.1.Test Procedures

Use the following spectrum analyzer settings:
Span = between 2 to 5 times the OBW, centered on the test channel
RBW= 1% to 5% of the OBW
VBW ≥ 3 x RBW
Sweep = auto
Detector function = peak
Trace = max hold

3.7.2.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.7.3.Test Result

Refer to Annex A.5 in this report.

3.8. Carried Frequency Separation

3.8.1. Requirement

According to FCC section 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or of the 20dB bandwidth of the hopping channel, whichever is greater.

3.8.2. Test Procedures

The EUT must have its hopping function enabled. According to DA 00-705, use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span

Video (or Average) Bandwidth (VBW) ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.8.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.8.4. Test Result

Refer to Annex A.6 in this report.

3.9. Time of Occupancy (Dwell time)

3.9.1.Requirement

According to FCC §15.247(a) (1) (i), 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.

3.9.2.Test Procedures

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in 10 second scan, to enable resolution of each occurrence.
The average time of occupancy in the specified 20 second period is equal to (# of pulses in 20s) * pulse width.

3.9.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.9.4.Test Result

Refer to Annex A.7 in this report.

3.10. Conducted Spurious Emissions and Band Edge

3.10.1.Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

3.10.2.Test Procedures

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize.

3.10.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.10.4.Test Result

Refer to Annex A.8 and A.9 in this report.

3.11. Conducted Emission

3.11.1.Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.11.2.Test Procedures

The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

3.11.3.Test Setup Layout

Refer to chapter 2.6.2 in this report.

3.11.4.Test Result

Refer to Annex A.10 in this report.

3.12. Radiated Emission

3.12.1.Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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

Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
Note2: For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).

3.12.2.Test Procedures

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz.The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

3.12.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.12.4.Test Result

Refer to Annex A.11 in this report.

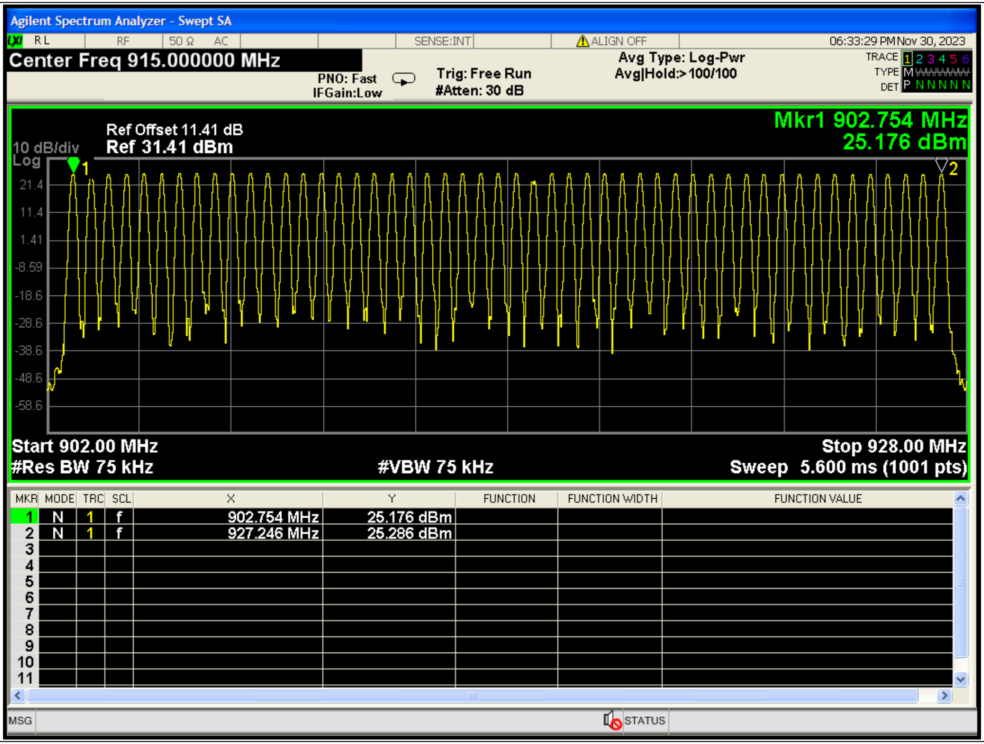
Annex A Test Data and Result

A.1. Number of Hopping Frequency

Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	RFID	Ant1	50	50	Pass

Test Graphs

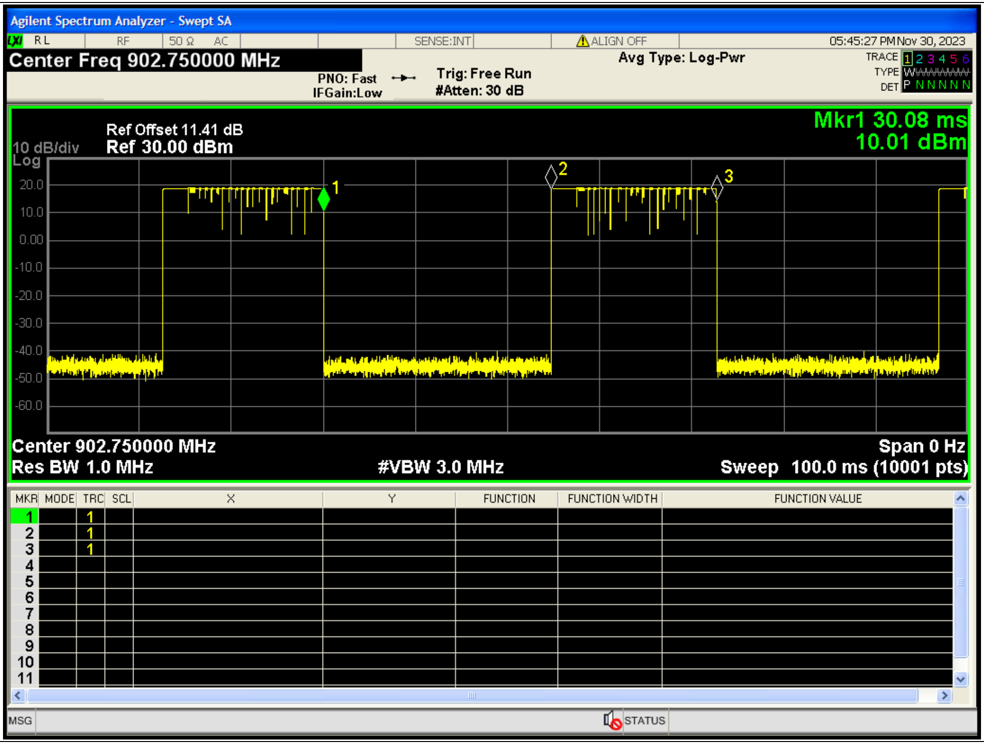
Hopping No. NVNT RFID 902.75MHz Ant1



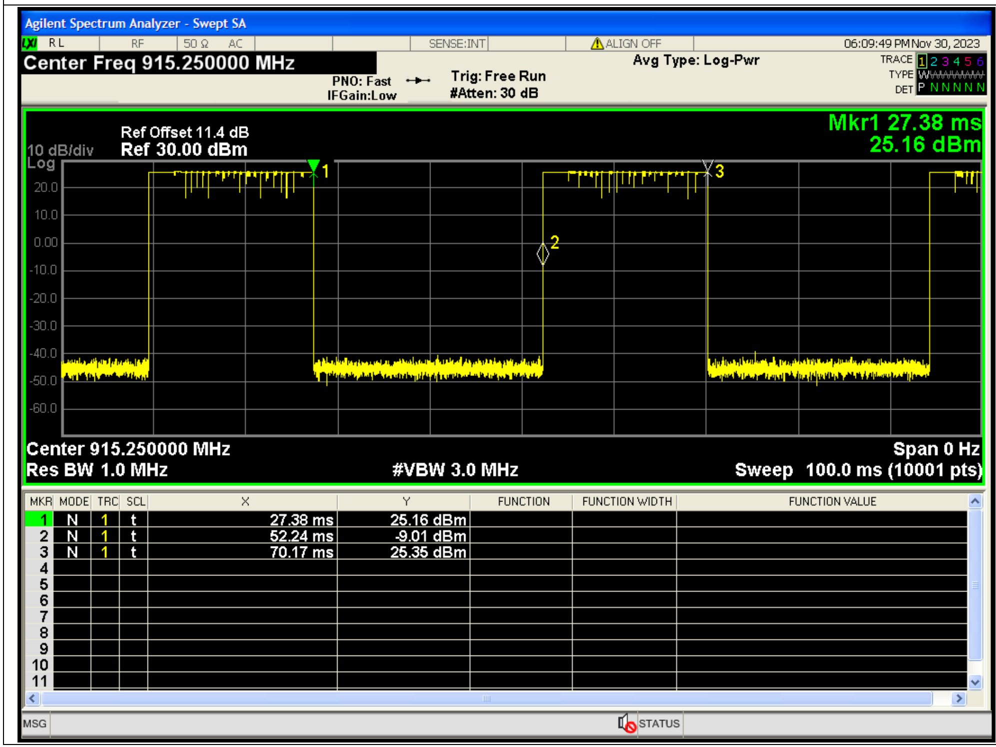
A.2. Duty Cycle of Test Signal

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	RFID	902.75	Ant1	42.06	3.76	0.06
NVNT	RFID	915.25	Ant1	41.9	3.78	0.06
NVNT	RFID	927.25	Ant1	42.26	3.74	0.06

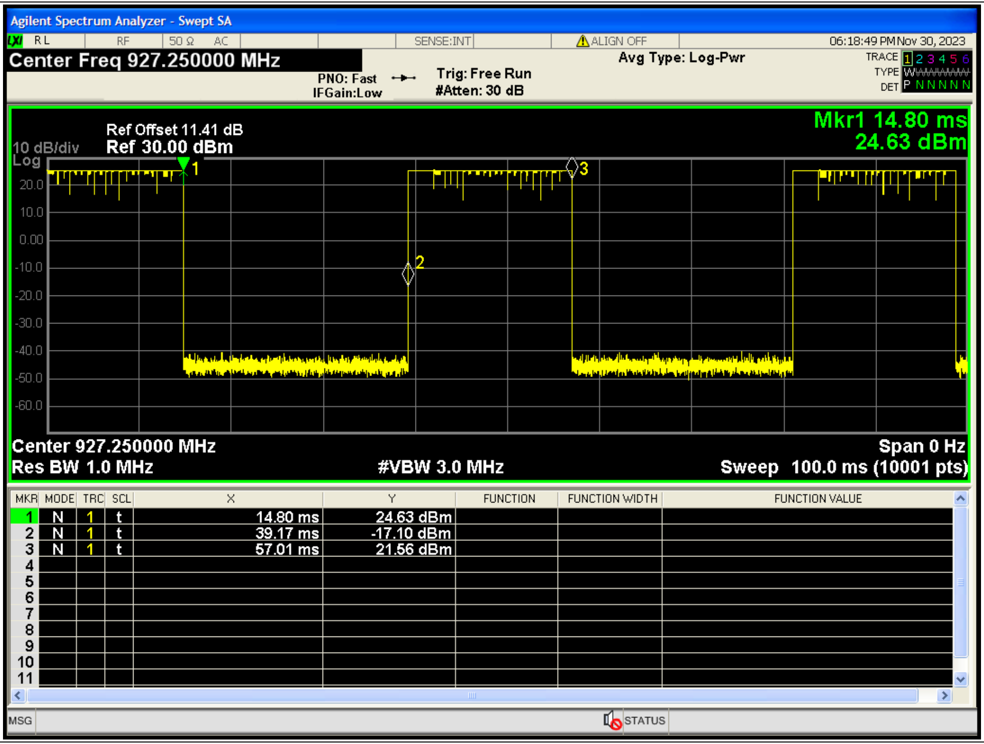
Test Graphs
Duty Cycle NVNT RFID 902.75MHz Ant1



Duty Cycle NVNT RFID 915.25MHz Ant1



Duty Cycle NVNT RFID 927.25MHz Ant1

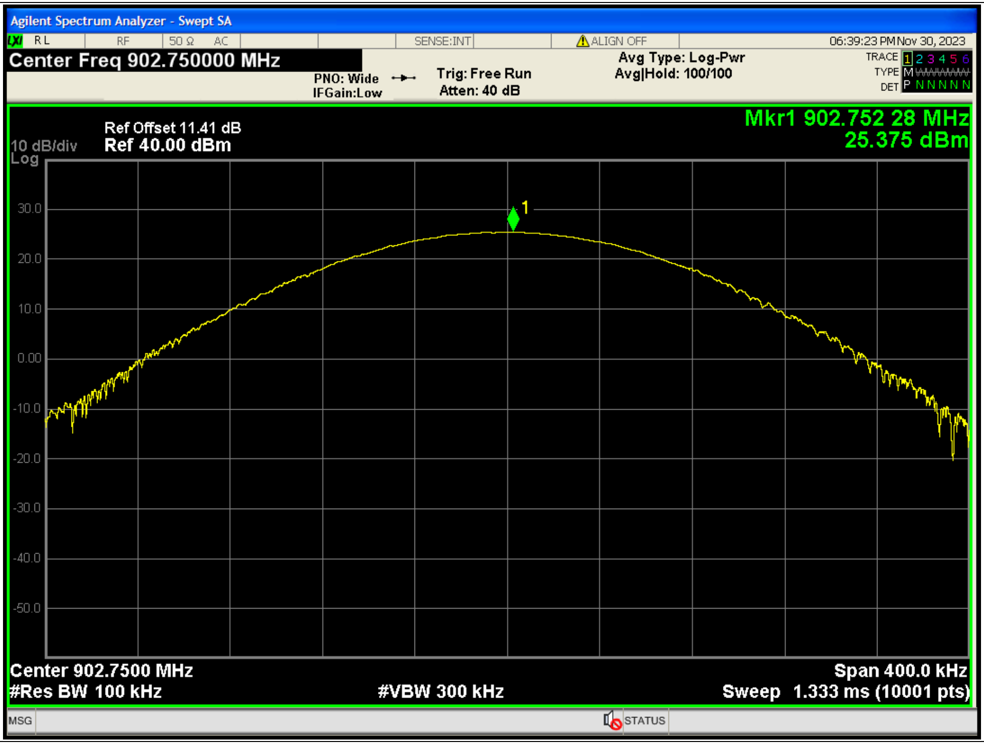


A.3. Maximum Peak Conducted Output Power

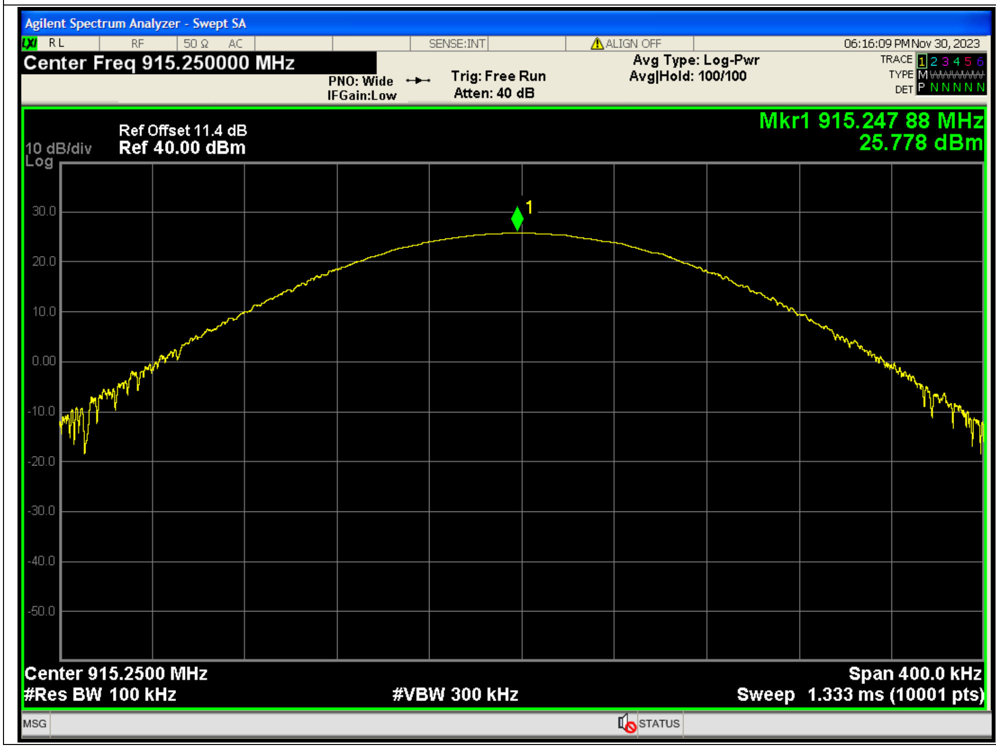
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	RFID	902.75	Ant1	25.38	0	25.38	0.34514	27	Pass
NVNT	RFID	915.25	Ant1	25.78	0	25.78	0.37844	27	Pass
NVNT	RFID	927.25	Ant1	25.43	0	25.43	0.34914	27	Pass

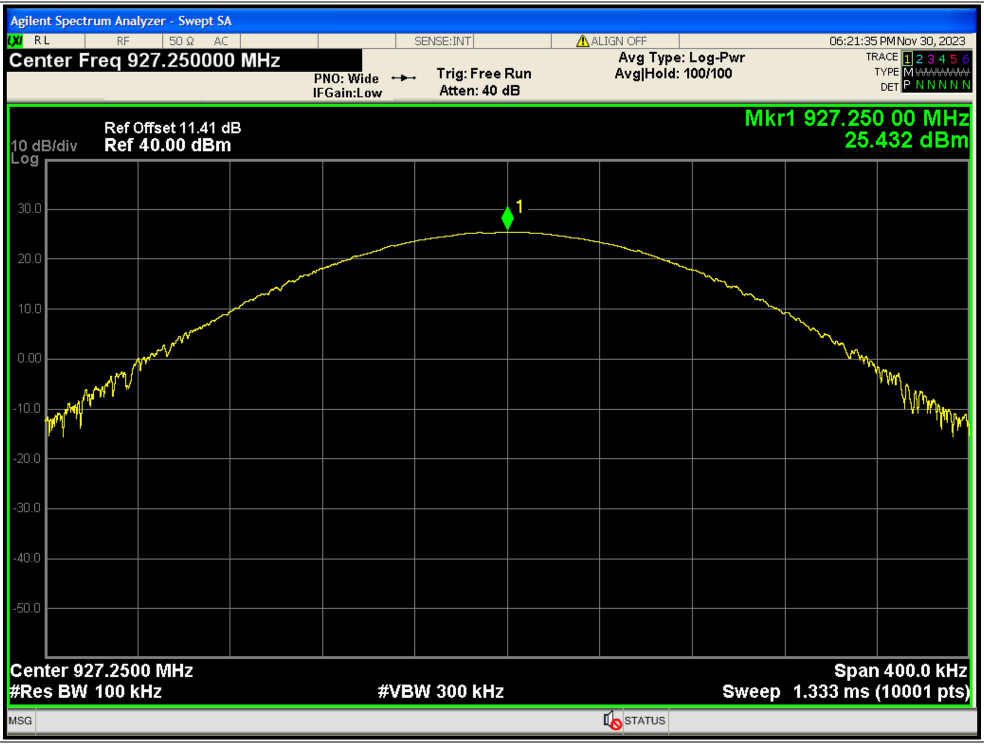
Test Graphs

Peak Power NVNT RFID 902.75MHz Ant1



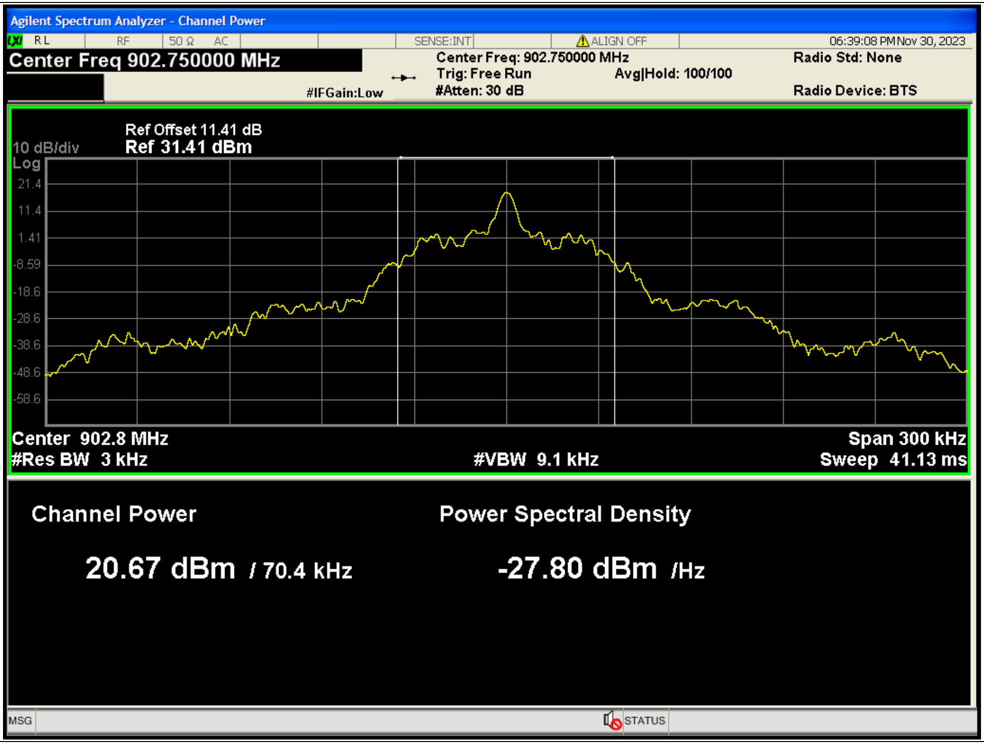
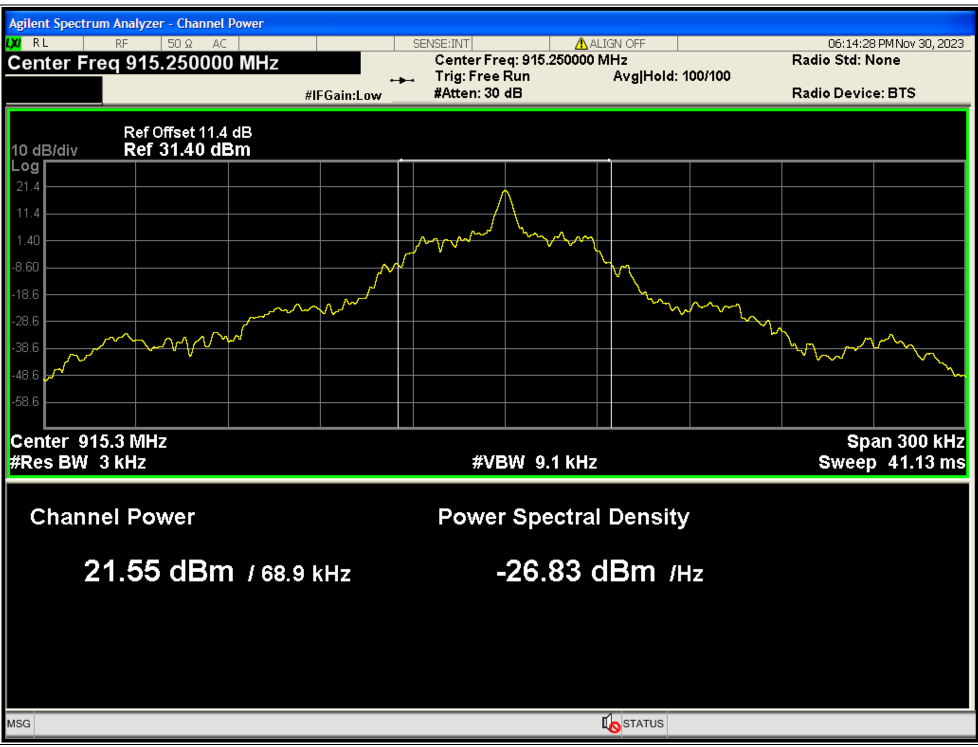
Peak Power NVNT RFID 915.25MHz Ant1



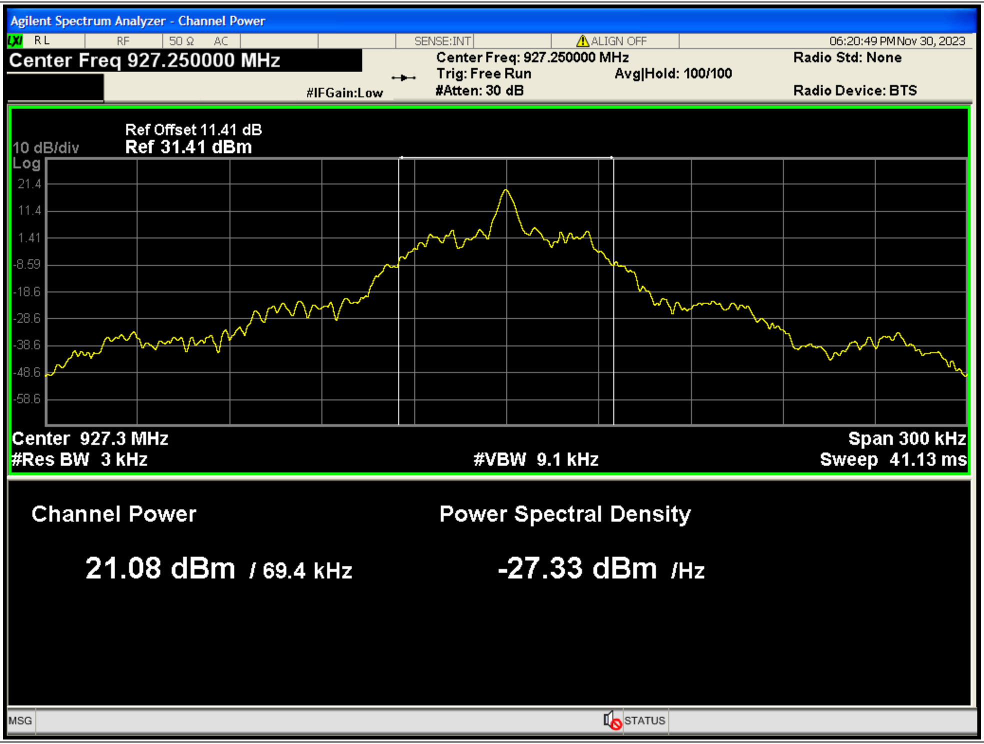
Peak Power NVNT RFID 927.25MHz Ant1


A.4. Maximum Average Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	RFID	902.75	Ant1	20.67	3.76	24.43	0.27733	27	Pass
NVNT	RFID	915.25	Ant1	21.55	3.78	25.33	0.34119	27	Pass
NVNT	RFID	927.25	Ant1	21.08	3.74	24.82	0.30339	27	Pass

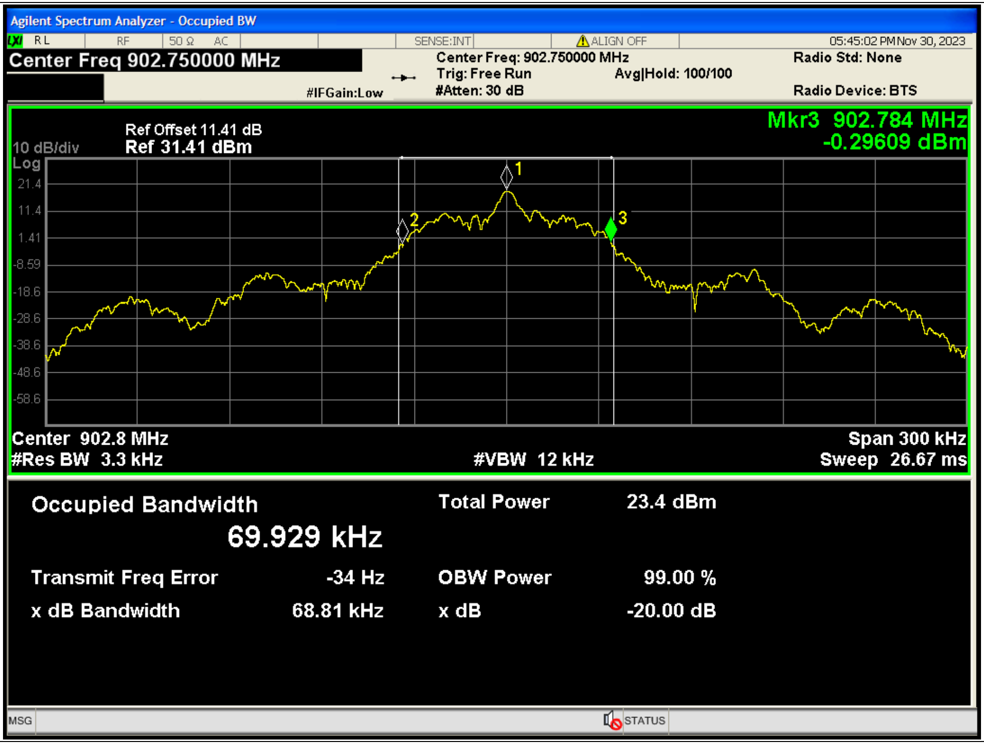
Test Graphs
Average Power NVNT RFID 902.75MHz Ant1

Average Power NVNT RFID 915.25MHz Ant1


Average Power NVNT RFID 927.25MHz Ant1



A.5. 20 dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)
NVNT	RFID	902.75	Ant1	0.069
NVNT	RFID	915.25	Ant1	0.069
NVNT	RFID	927.25	Ant1	0.069

Test Graphs
-20dB Bandwidth NVNT RFID 902.75MHz Ant1

-20dB Bandwidth NVNT RFID 915.25MHz Ant1

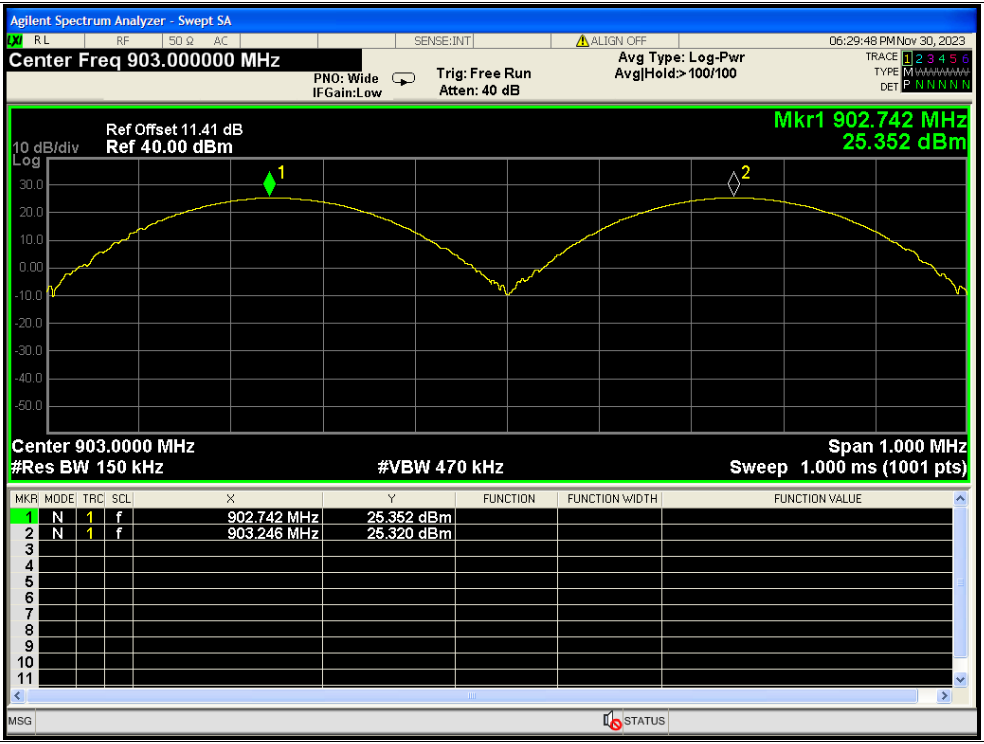

-20dB Bandwidth NVNT RFID 927.25MHz Ant1

A.6. Carried Frequency Separation

Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	RFID	Ant1	902.742	903.246	0.504	0.069	Pass

Test Graphs

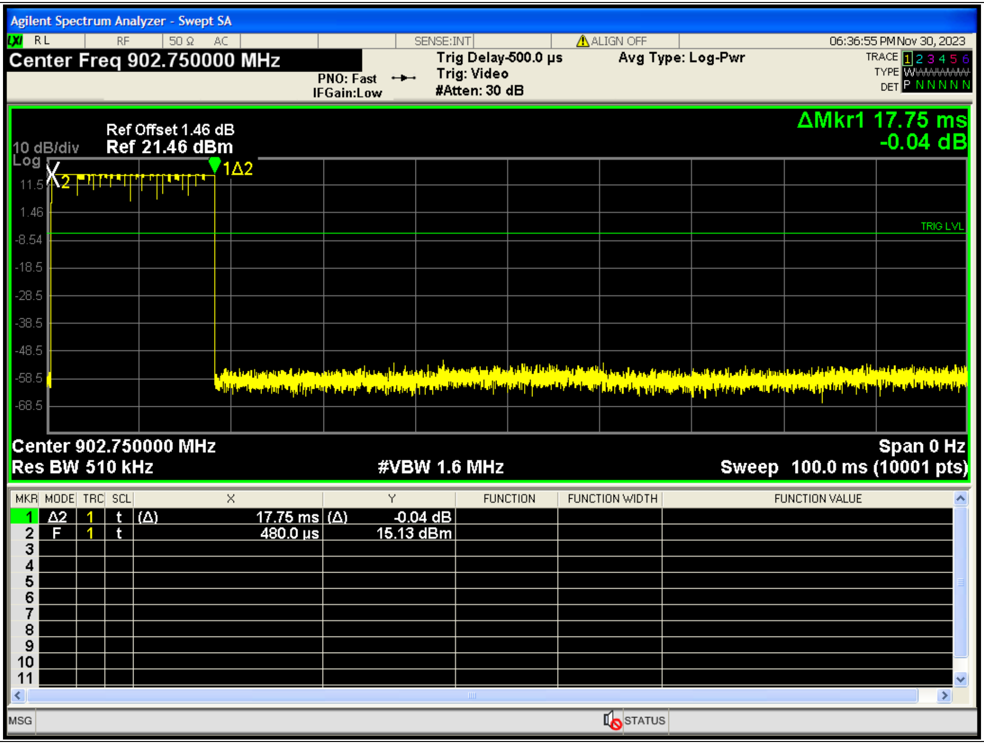
CFS NVNT RFID 902.75MHz Ant1



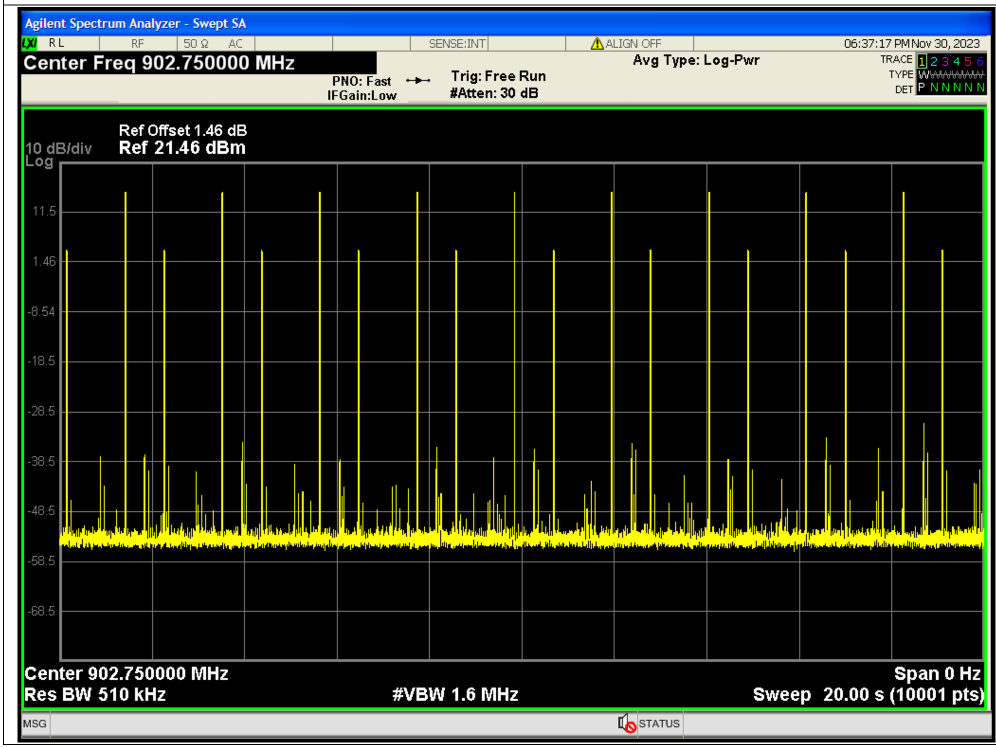
A.7. Time of Occupancy (Dwell time)

Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	RFID	902.75	Ant1	17.75	159.75	9	20000	400	Pass

Test Graphs
Dwell NVNT RFID 902.75MHz Ant1 One Burst



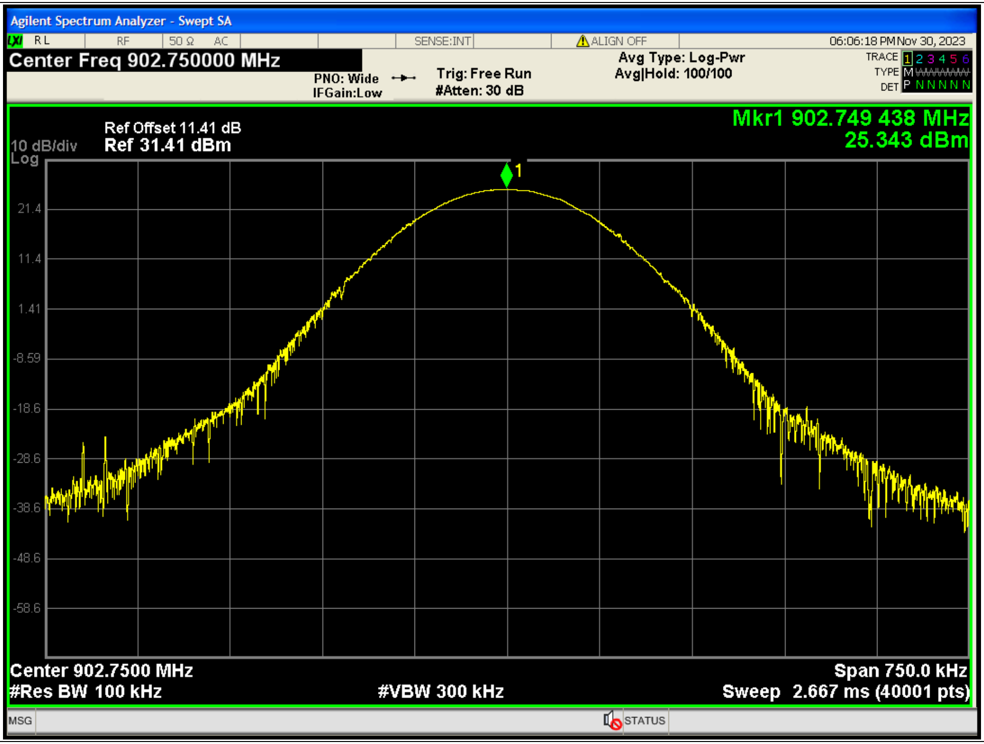
Dwell NVNT RFID 902.75MHz Ant1 Accumulated



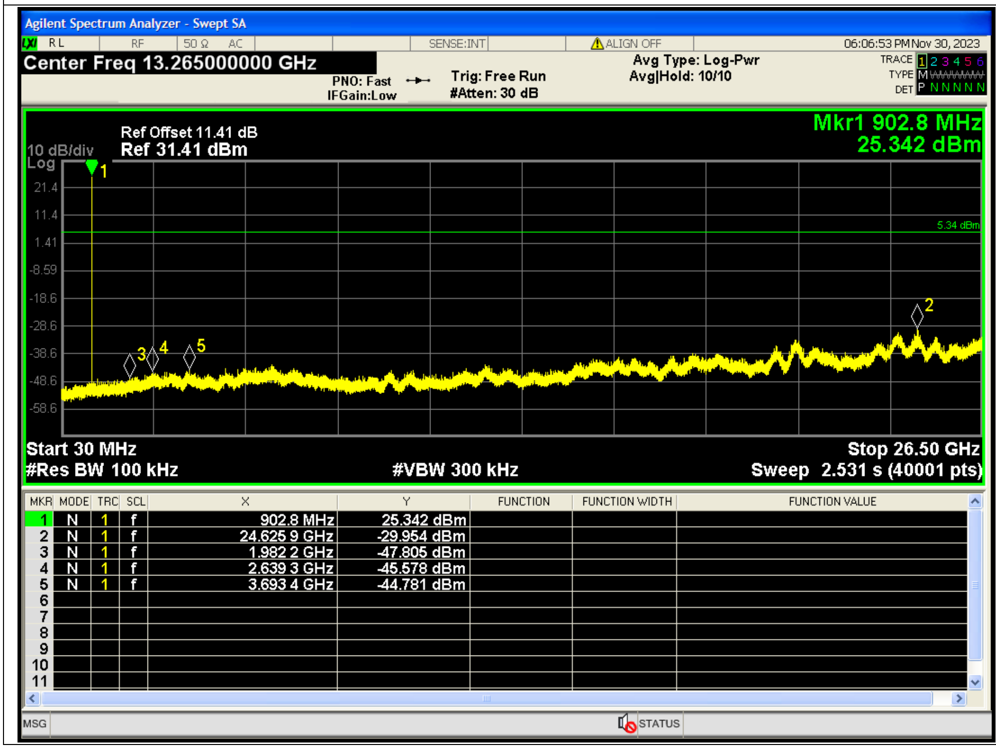
A.8. Conducted Spurious Emissions

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	RFID	902.75	Ant1	-55.29	-20	Pass
NVNT	RFID	915.25	Ant1	-56.24	-20	Pass
NVNT	RFID	927.25	Ant1	-56.59	-20	Pass

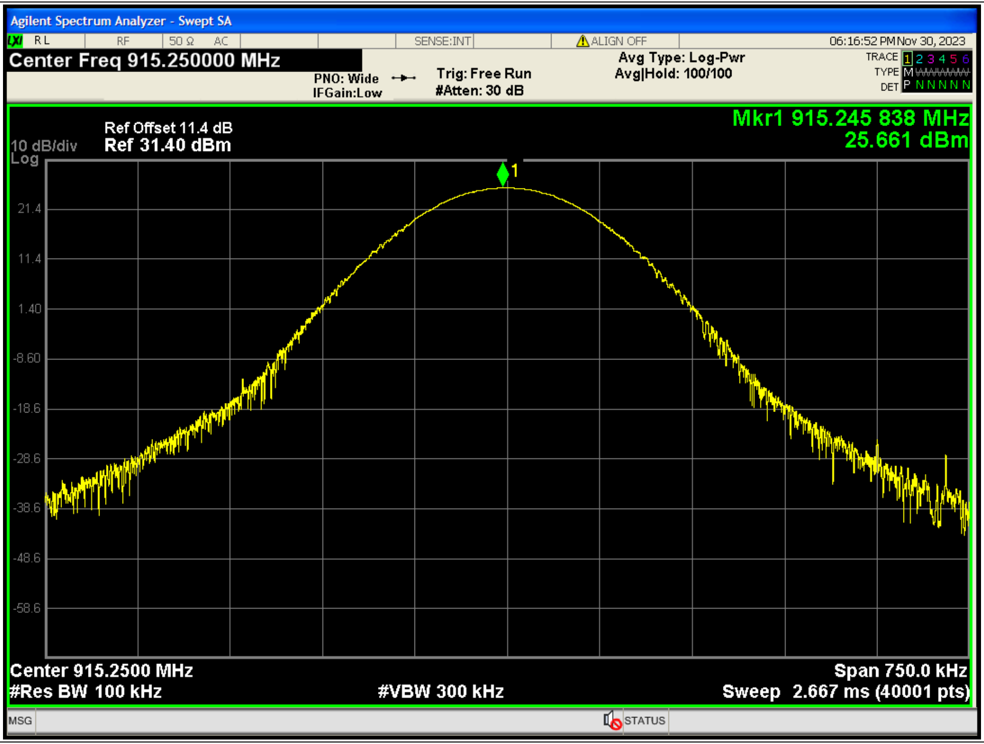
Test Graphs
Tx. Spurious NVNT RFID 902.75MHz Ant1 Ref



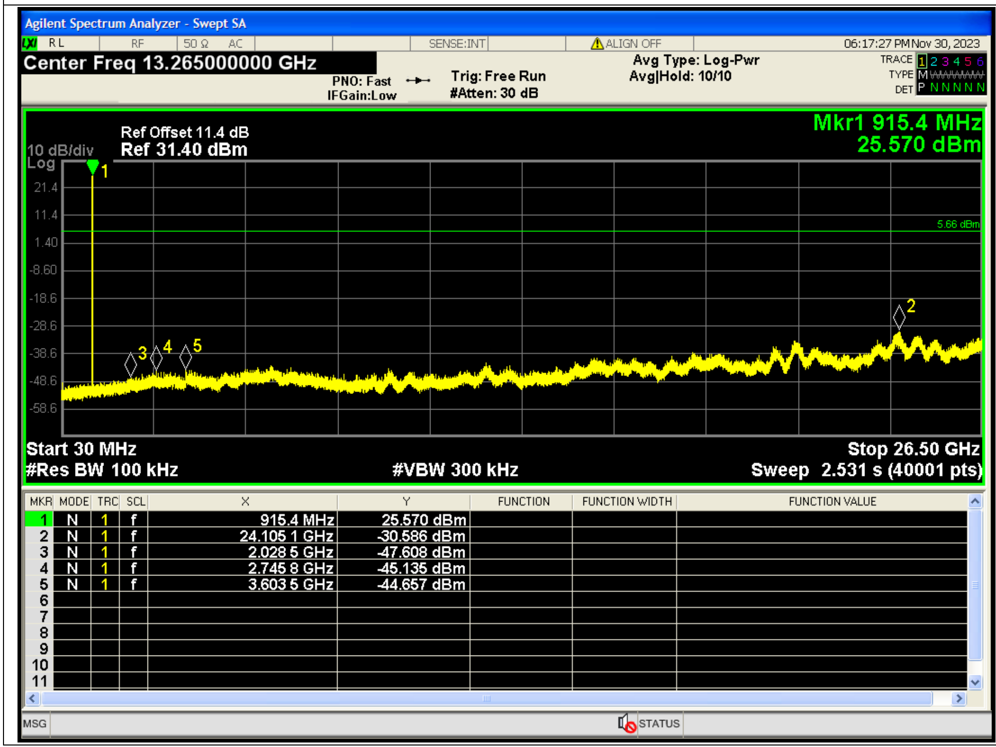
Tx. Spurious NVNT RFID 902.75MHz Ant1 Emission



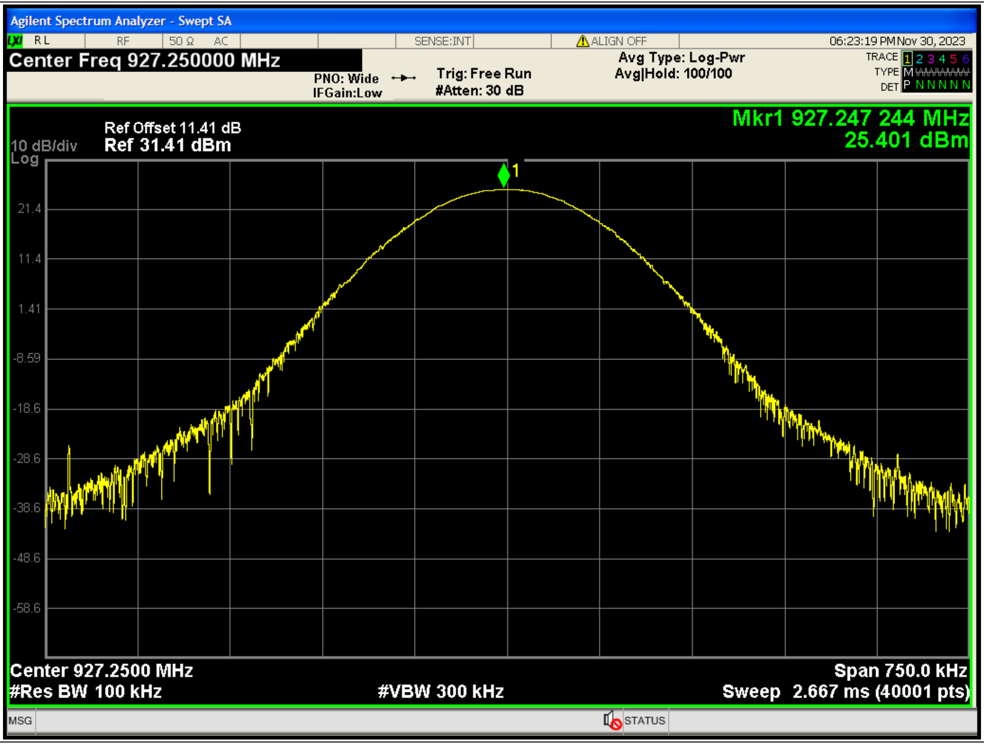
Tx. Spurious NVNT RFID 915.25MHz Ant1 Ref



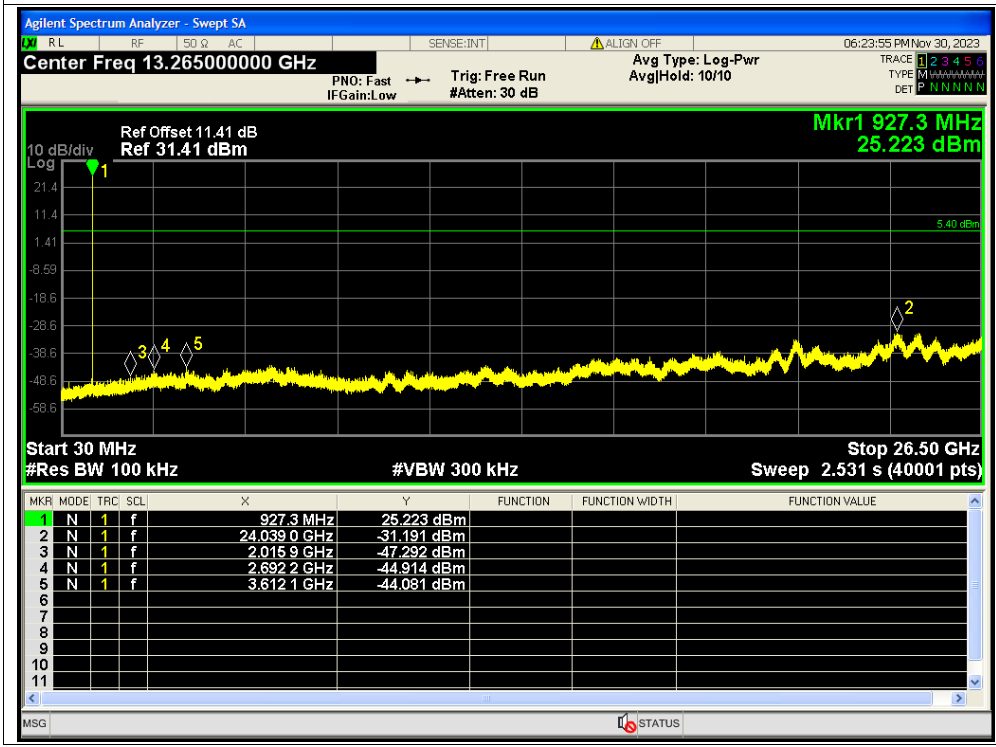
Tx. Spurious NVNT RFID 915.25MHz Ant1 Emission



Tx. Spurious NVNT RFID 927.25MHz Ant1 Ref



Tx. Spurious NVNT RFID 927.25MHz Ant1 Emission

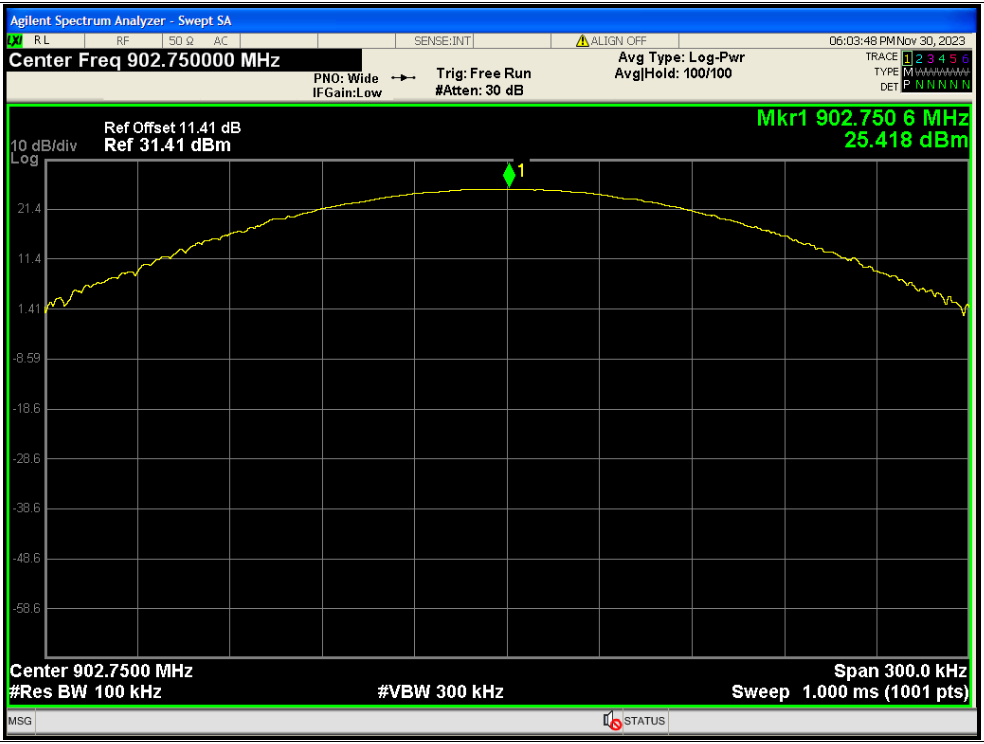


A.9. Band Edge

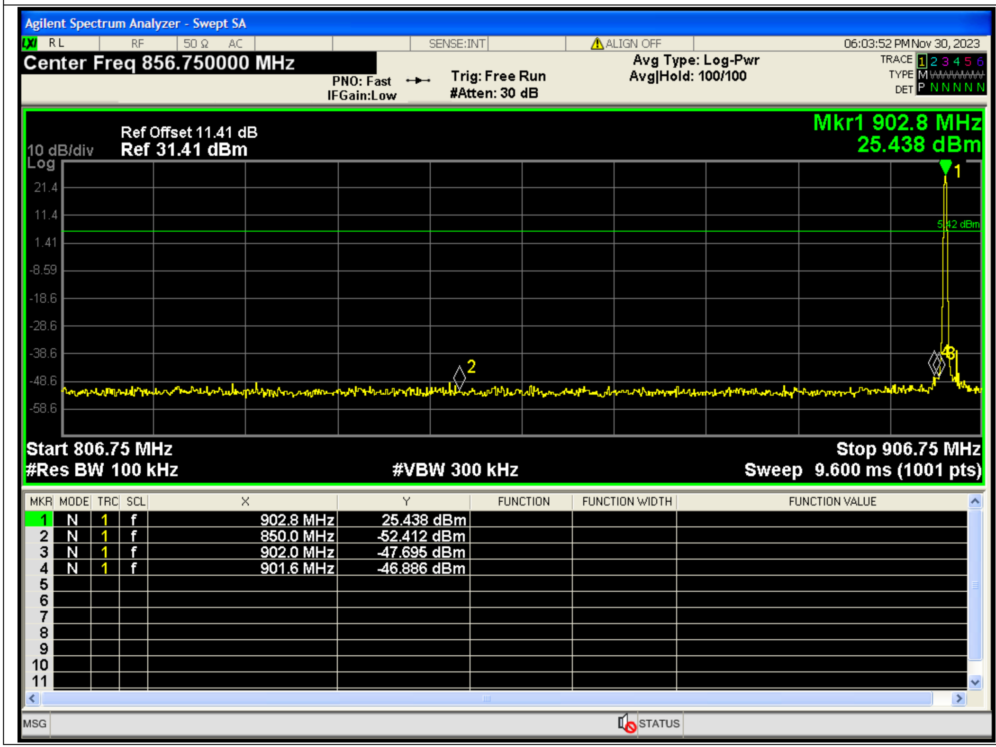
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	RFID	902.75	Ant1	No-Hopping	-65.11	-20	Pass
NVNT	RFID	927.25	Ant1	No-Hopping	-66.18	-20	Pass
NVNT	RFID	902.75	Ant1	Hopping	-65.11	-20	Pass
NVNT	RFID	927.25	Ant1	Hopping	-66.18	-20	Pass

Test Graphs

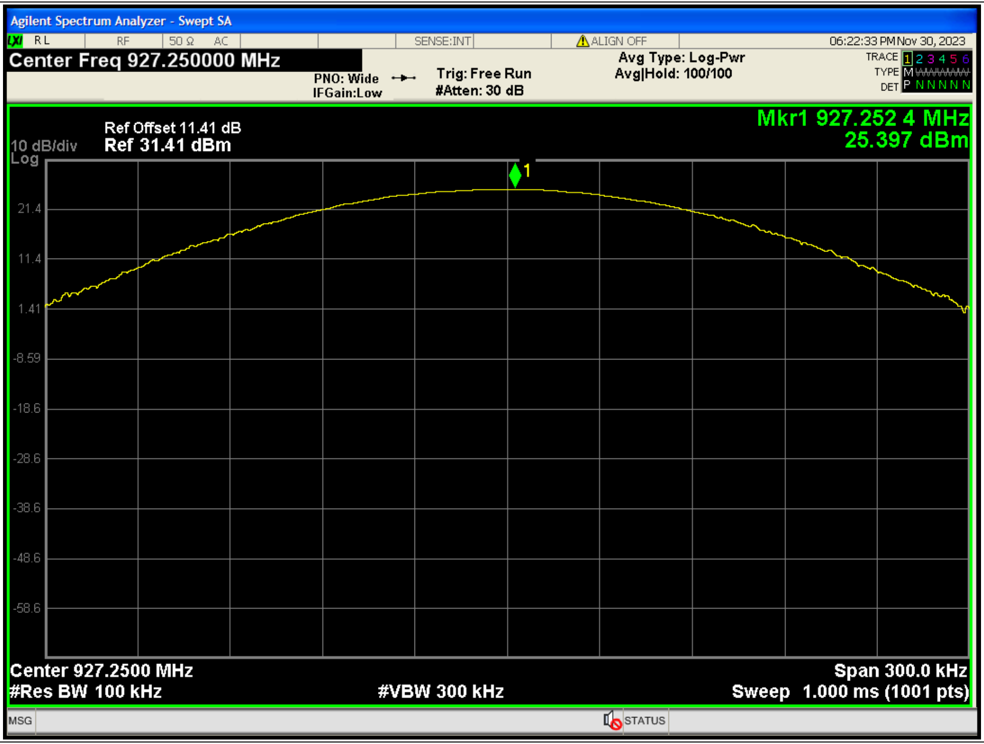
Band Edge NVNT RFID 902.75MHz Ant1 No-Hopping Ref



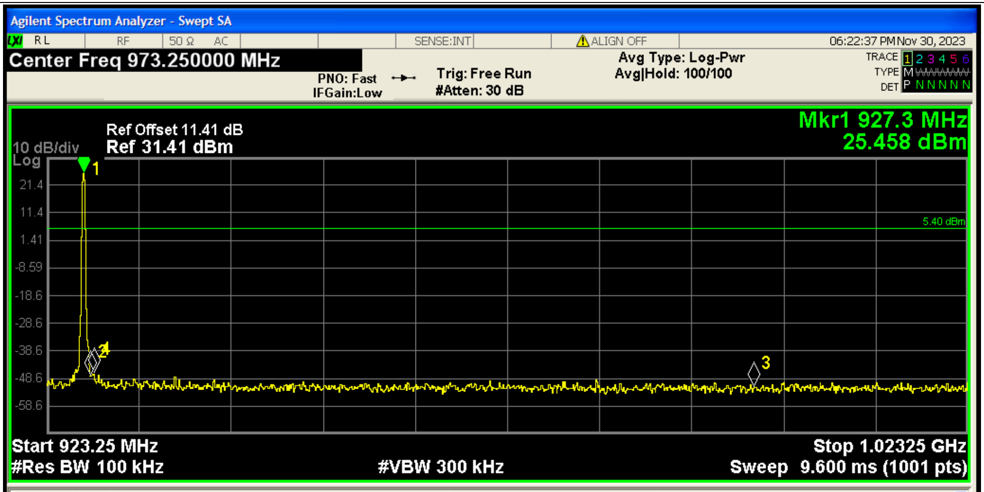
Band Edge NVNT RFID 902.75MHz Ant1 No-Hopping Emission



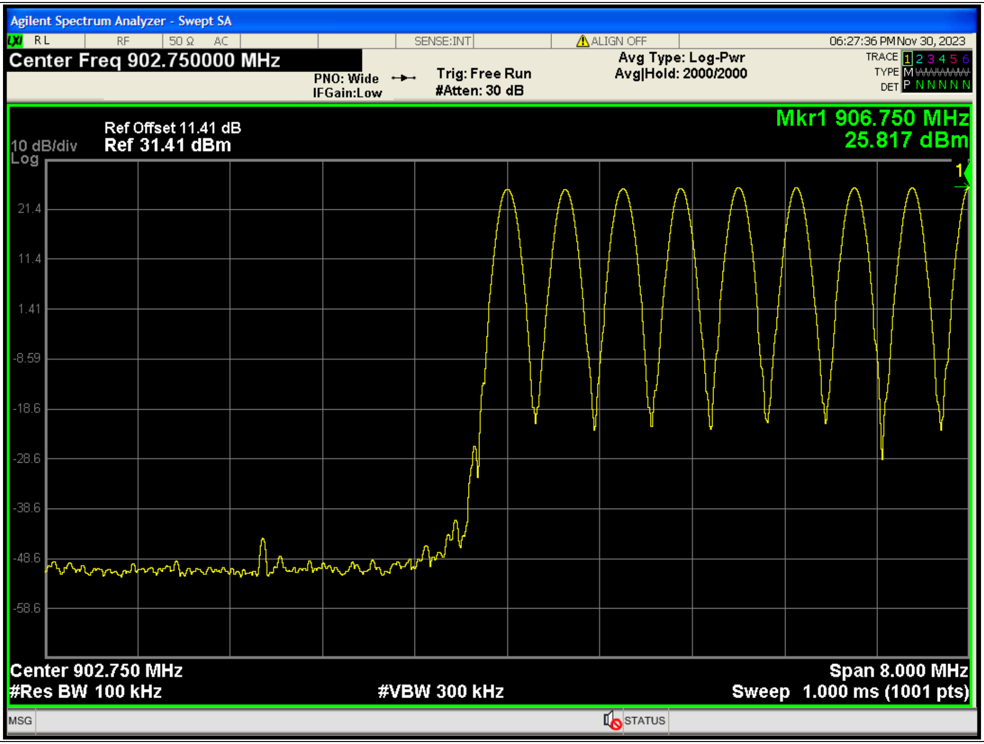
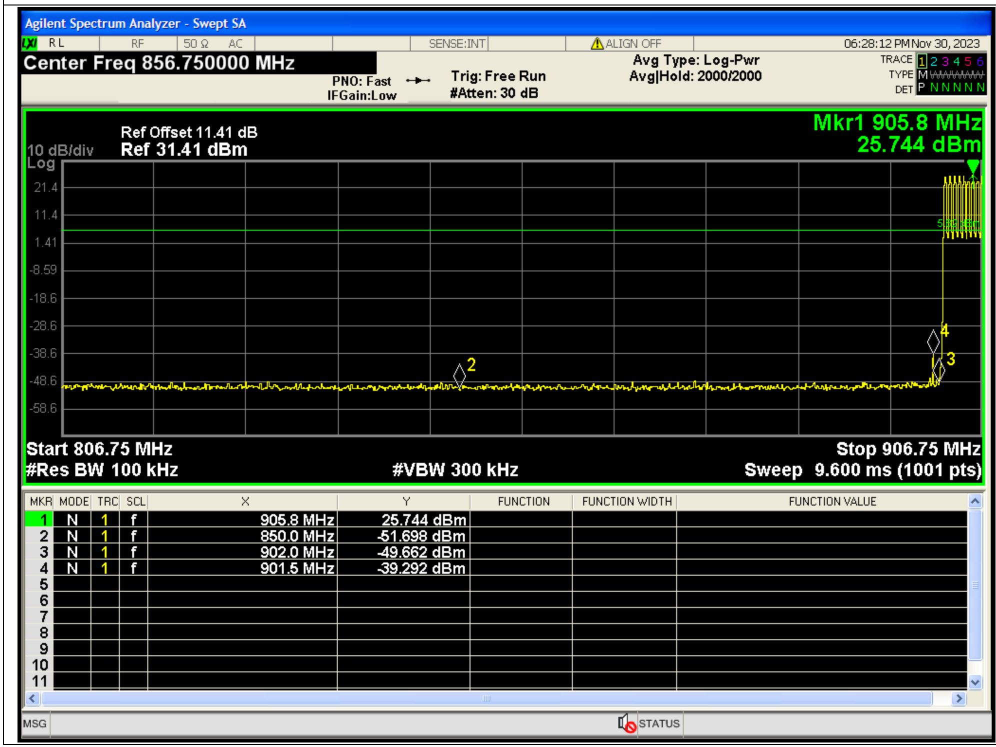
Band Edge NVNT RFID 927.25MHz Ant1 No-Hopping Ref



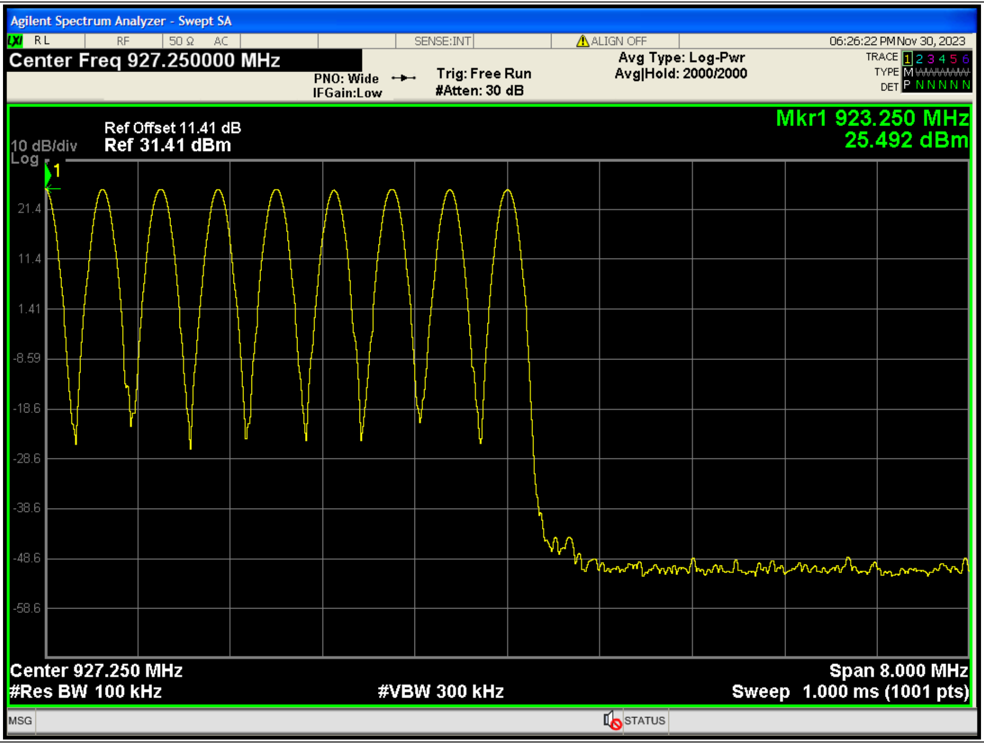
Band Edge NVNT RFID 927.25MHz Ant1 No-Hopping Emission



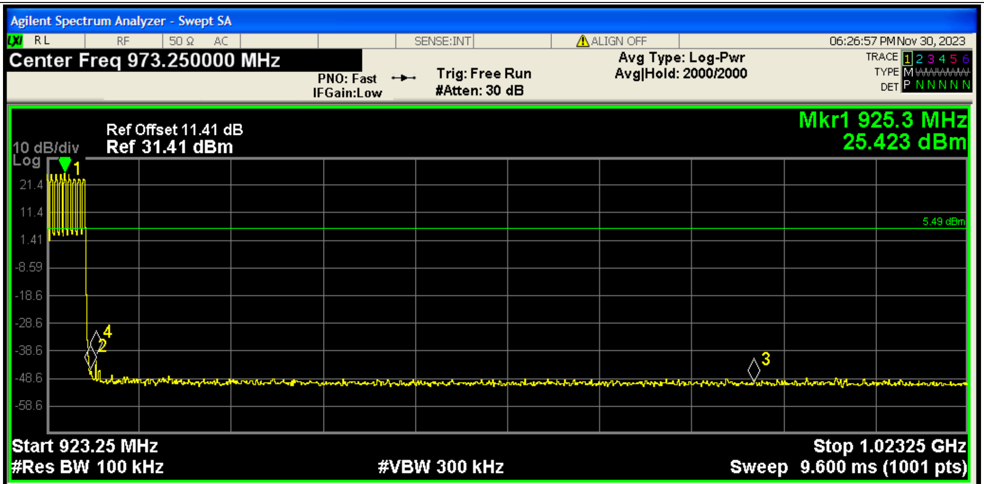
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	927.3 MHz	25.458 dBm			
2	N	1	f	928.0 MHz	-47.870 dBm			
3	N	1	f	1.000 0 GHz	-51.977 dBm			
4	N	1	f	928.4 MHz	-46.918 dBm			
5								
6								
7								
8								
9								
10								
11								

Test Graphs
Band Edge(Hopping) NVNT RFID 902.75MHz Ant1 Hopping Ref

Band Edge(Hopping) NVNT RFID 902.75MHz Ant1 Hopping Emission


Band Edge(Hopping) NVNT RFID 927.25MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT RFID 927.25MHz Ant1 Hopping Emission



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	925.3 MHz	25.423 dBm			
2	N	1	f	928.0 MHz	-45.958 dBm			
3	N	1	f	1.000 0 GHz	-50.502 dBm			
4	N	1	f	928.7 MHz	-40.694 dBm			
5								
6								
7								
8								
9								
10								
11								

A.10. Conducted Emission

This test case does not apply this kind of EUT.

A.11. Radiated Emission

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

E [dBμV/m] $=U_R + A_T + A_{Factor}$ [dB]; $A_T = L_{Cable\ loss}$ [dB]-G_{preamp} [dB]

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

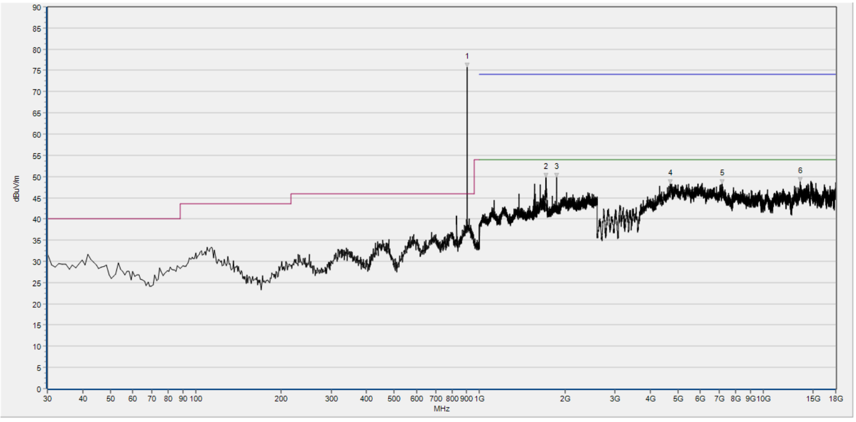
During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

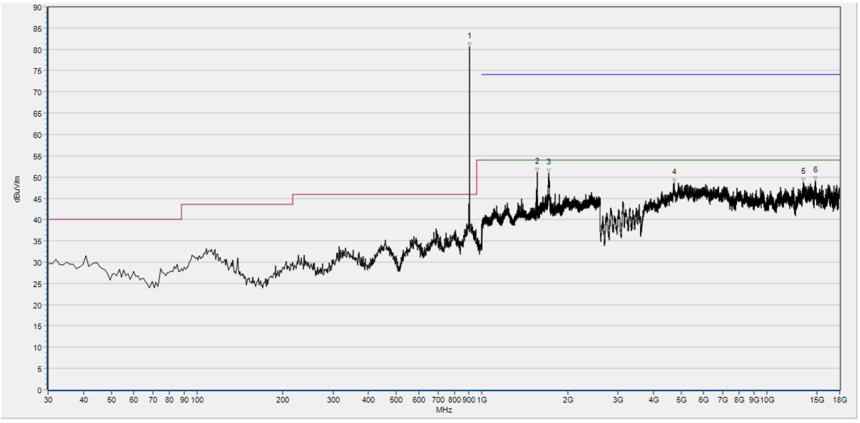
Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Plots for Channel 1



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
903.000	75.88	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1714.133	49.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
1872.000	49.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4706.720	48.22	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7170.720	48.33	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
13484.720	48.79	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

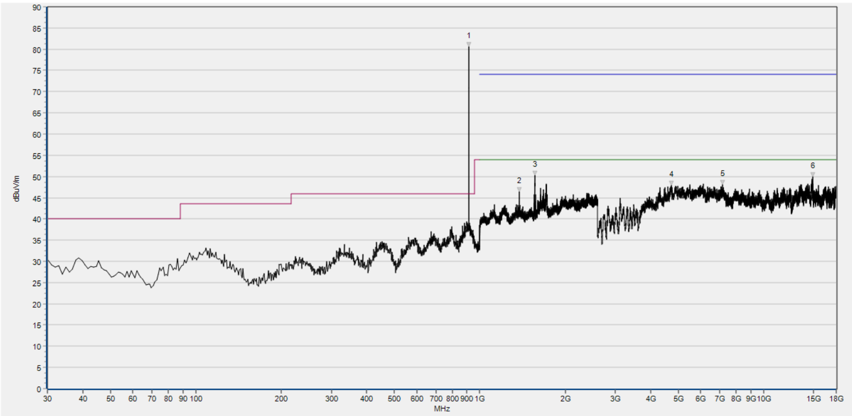
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
903.000	80.55	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1559.467	51.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
1714.133	50.89	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4715.960	48.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
13435.440	48.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14772.160	49.10	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

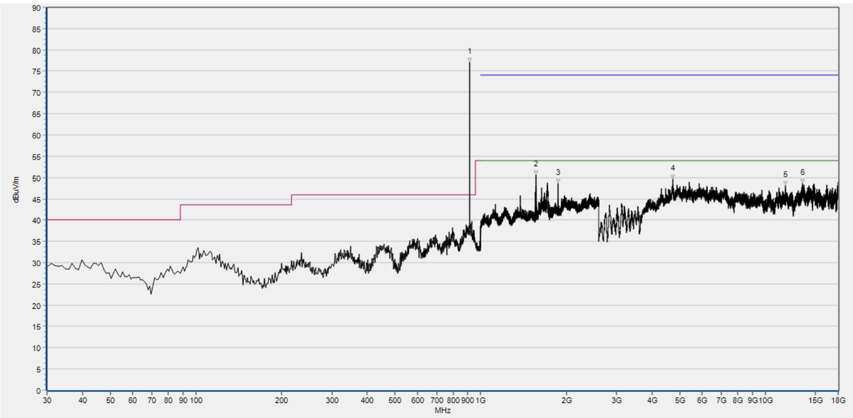
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 26



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
915.610	80.90	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1374.933	46.37	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
1558.933	50.22	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4731.360	47.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7155.320	48.12	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
14867.640	49.98	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

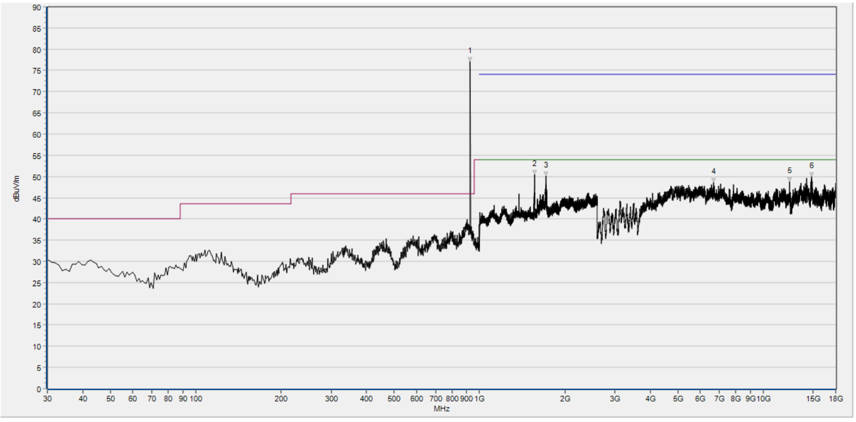
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
915.610	77.04	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1560.000	50.64	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
1872.000	48.58	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4734.440	49.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11775.320	48.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
13490.880	48.65	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

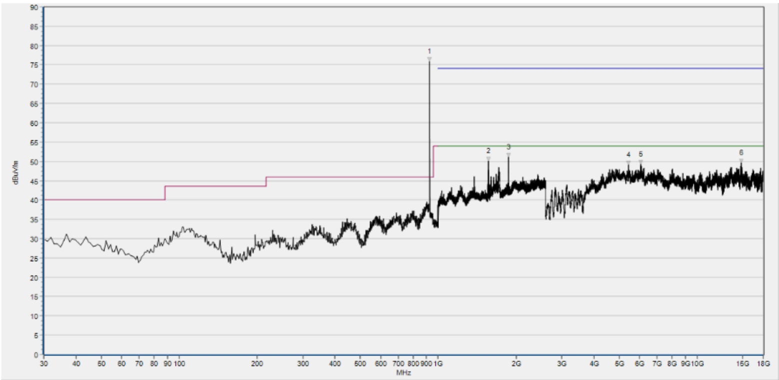
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 50



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
927.250	77.23	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1559.467	50.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
1710.400	50.16	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
6671.760	48.58	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12388.240	48.80	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
14806.040	49.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
927.250	75.91	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1560.000	50.13	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
1872.000	51.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5436.680	49.11	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
6046.520	49.32	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14787.560	49.68	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

END OF REPORT