REPORT No.: SZ25050118W01

TEST REPORT

APPLICANT	:	Lierda Science & Technology Group Co., Ltd
PRODUCT NAME	:	K series LoRa gateway module
MODEL NAME	:	LSD4WNC-2K930NE0
BRAND NAME	:	lierda
FCC ID	:	N8N4WNC-2K930NE0
STANDARD(S)	:	47 CFR Part 15 Subpart C
RECEIPT DATE	:	2025-05-19
TEST DATE	:	2025-06-02 to 2025-07-19
ISSUE DATE	:	2025-07-31

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DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2025-07-31	First edition

1. Summary of Test Result

No.	Section	Description	Test Date	Test Engineer	Result	Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	/
2	15.247(a) 15.247(h)	Hopping Mechanism	N/A	N/A	PASS	/
3	15.247(a)	Number of Hopping Frequency	Jun. 11, 2025	Lin Haoyang	PASS	/
4	ANSI C63.10	Duty Cycle	Jun. 02, 2025	Lin Haoyang	PASS	/
5	15.247(b)	Maximum Peak Conducted Output Power	Jun. 02, 2025	Lin Haoyang	PASS	/
6	15.247(b)	Maximum Average Conducted Output Power	Jun. 02, 2025	Lin Haoyang	PASS	/
7	15.247(a)	20dB Bandwidth	Jun. 13, 2025	Lin Haoyang	PASS	/
8	15.247(a)	Carrier Frequency Separation	Jun. 11, 2025	Lin Haoyang	PASS	/
9	15.247(a)	Time of Occupancy (Dwell time)	Jun. 11, 2025	Lin Haoyang	PASS	/
10	15.247(d)	Conducted Spurious Emission	Jun. 02, 2025	Lin Haoyang	PASS	/
11	15.207	Conducted Emission	N/A	N/A	N/A_{Note1}	/
12	15.209, 15.247(d)	Radiated Emission	Jul. 19, 2025	Zhong Xiangyun	PASS	/

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: Any additions, deviation, or exclusions from the method shall be noted in the “Remark".

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 Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2025.01.15	2026.01.14
RF Cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
SMA Connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.2.2 List of Software Used

Description	Manufacturer	Software Version
Test System	MaiWei	2.0.0.0
JS32-RE	Tonscend	5.0.0
TS+ -[JS32-CE]	Tonscend	V2.5.0.0

1.2.3 Radiated Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Signal Analyzer	MY56060145	N9020A	Agilent	2025.05.13	2026.05.12
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2024.06.22	2025.06.21
				2025.06.22	2026.06.21
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2025.05.16	2026.05.15
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2024.06.22	2025.06.21
				2025.06.20	2026.06.19
Test Antenna – Horn	BBHA9170#773	BBHA9170	Schwarzbeck	2024.06.22	2025.06.21
				2025.06.20	2026.06.19
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2025.05.13	2026.05.12
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2025.05.13	2026.05.12
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2025.05.13	2026.05.12
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2025.05.13	2026.05.12

RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2025.05.13	2026.05.12
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2025.05.13	2026.05.12
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2024.09.11	2025.09.10
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2024.09.11	2025.09.10
RF Coaxial Cable (DC-18GHz)	22120181	QA500-18-NN-5	Qualwave	2024.09.11	2025.09.10
Anechoic Chamber	N/A	9m*6m*6m	CRT	2025.04.19	2028.04.18
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.11.30	2025.11.29

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.
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Facsimile	+86 755 36698525
FCC Designation Number	CN1192
FCC Test Firm Registration Number	226174

2. General Description

2.1. Information of Applicant and Manufacturer

Applicant	Lierda Science & Technology Group Co., Ltd
Applicant Address	Building 1#, Lierda IOT park, No.1326 Wenyi Xi Rd, Hangzhou, China
Manufacturer	Lierda Science & Technology Group Co., Ltd
Manufacturer Address	Building 1#, Lierda IOT park, No.1326 Wenyi Xi Rd, Hangzhou, China

2.2. Information of EUT

Product Name:	K series LoRa gateway module
Sample No.:	1#, 2#
Hardware Version:	V01
Software Version:	V01
Equipment Type:	FHSS
Modulation Type:	LoRa
Operating Frequency Range:	902.3MHz–927.7MHz
Antenna Type:	Rod Antenna
Antenna Gain:	3.36dBi

Note 1: The EUT description presented in the report are provided by applicant and/or manufacturer, and the test laboratory is not responsible for the accuracy of the information. 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

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	**902.3**	33	908.7	65	915.1	97	921.5
2	902.5	34	908.9	66	915.3	98	921.7
3	902.7	35	909.1	67	915.5	99	921.9
4	902.9	36	909.3	68	915.7	100	922.1
5	903.1	37	909.5	69	915.9	101	922.3
6	903.3	38	909.7	70	916.1	102	922.5
7	903.5	39	909.9	71	916.3	103	922.7
8	903.7	40	910.1	72	916.5	104	922.9
9	903.9	41	910.3	73	916.7	105	923.1
10	904.1	42	910.5	74	916.9	106	923.3
11	904.3	43	910.7	75	917.1	107	923.5
12	904.5	44	910.9	76	917.3	108	923.7
13	904.7	45	911.1	77	917.5	109	923.9
14	904.9	46	911.3	78	917.7	110	924.1
15	905.1	47	911.5	79	917.9	111	924.3
16	905.3	48	911.7	80	918.1	112	924.5
17	905.5	49	911.9	81	918.3	113	924.7
18	905.7	50	912.1	82	918.5	114	924.9
19	905.9	51	912.3	83	918.7	115	925.1
20	906.1	52	912.5	84	918.9	116	925.3
21	906.3	53	912.7	85	919.1	117	925.5
22	906.5	54	912.9	86	919.3	118	925.7
23	906.7	55	913.1	87	919.5	119	925.9
24	906.9	56	913.3	88	919.7	120	926.1
25	907.1	57	913.5	89	919.9	121	926.3
26	907.3	58	913.7	90	920.1	122	926.5
27	907.5	59	913.9	91	920.3	123	926.7
28	907.7	60	914.1	92	920.5	124	926.9
29	907.9	61	914.3	93	920.7	125	927.1
30	908.1	62	914.5	94	920.9	126	927.3
31	908.3	63	914.7	95	921.1	127	927.5
32	908.5	**64**	**914.9**	96	921.3	**128**	**927.7**

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

2.4. Test Configuration of EUT

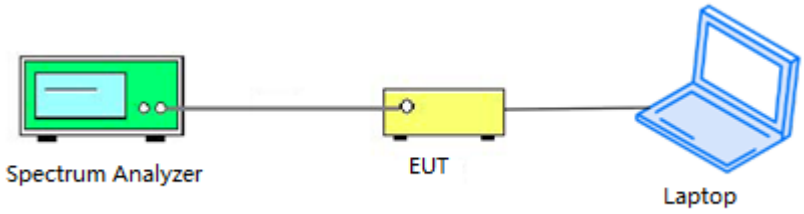
Test mode is used to control the EUT under the maximum power level during test.

2.5. Test Conditions

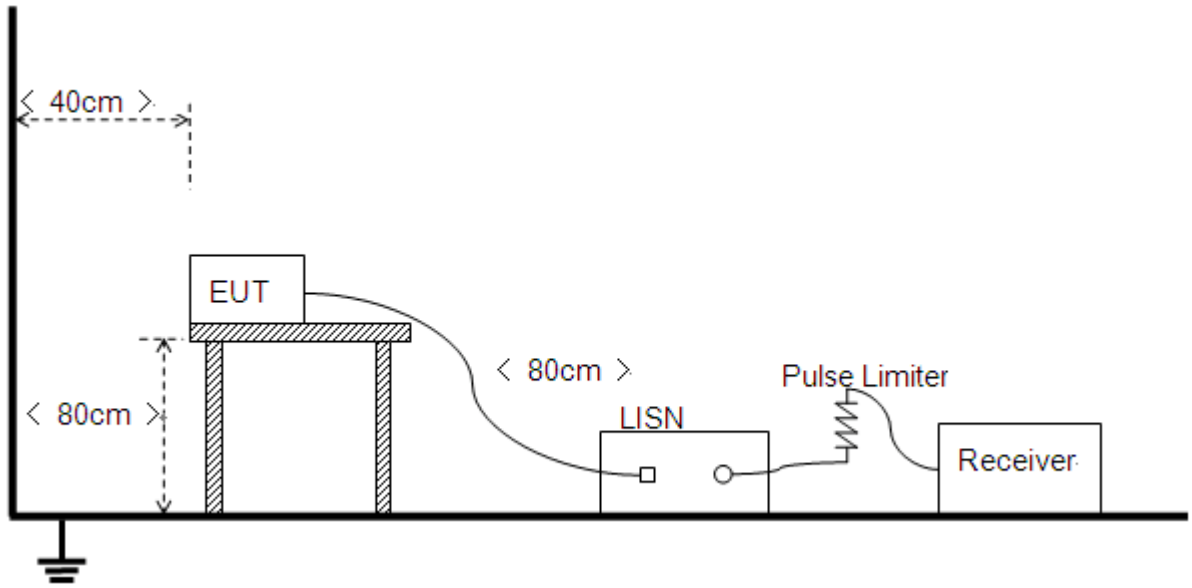
Temperature (°C)	15-35
Relative Humidity (%)	30-60
Atmospheric Pressure (kPa)	86-106

2.6. Test Setup Layout Diagram

2.6.1.Conducted Measurement

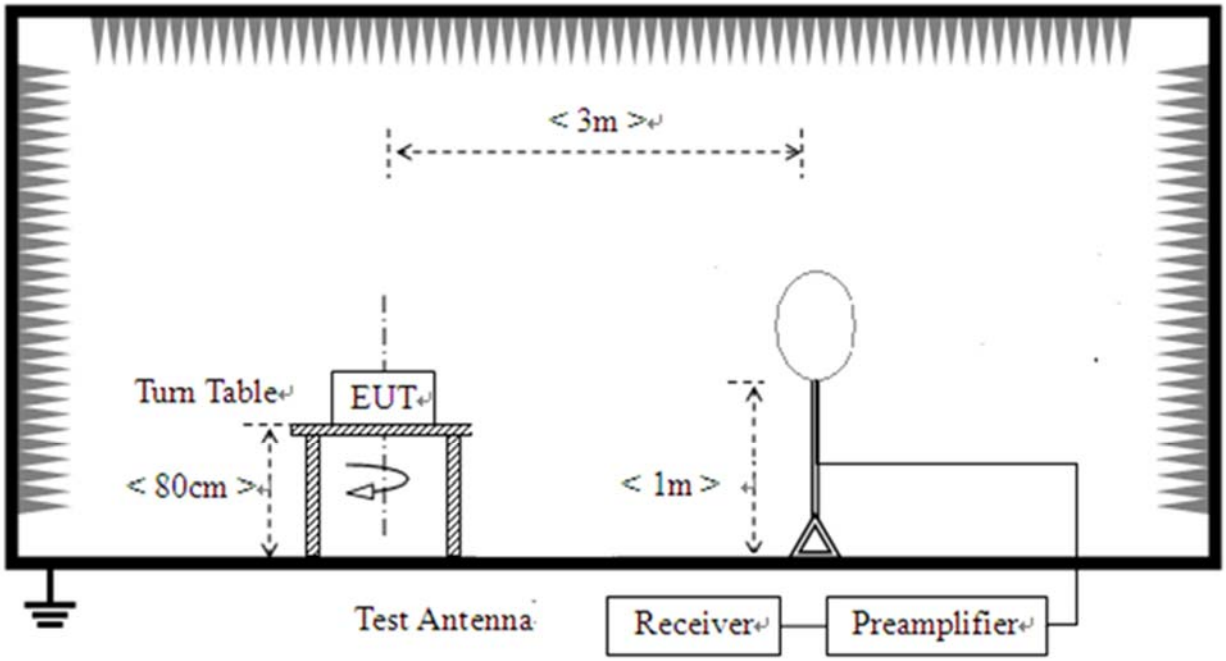


2.6.2.Conducted Emission Measurement

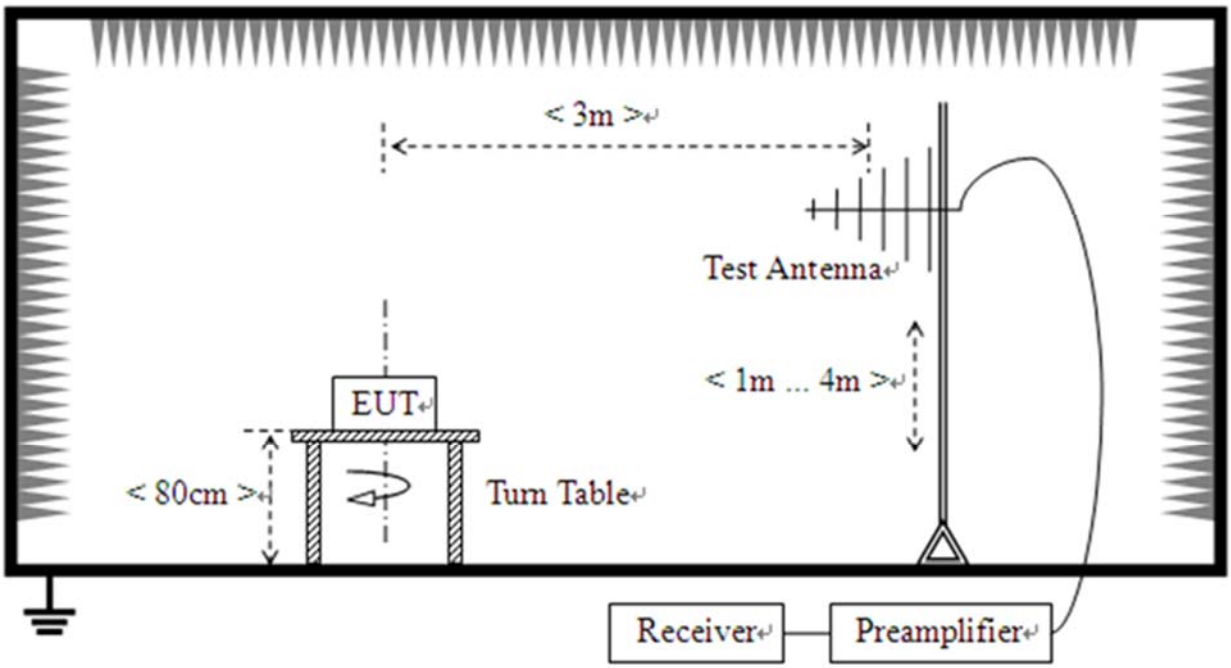


2.6.3.Radiation Measurement

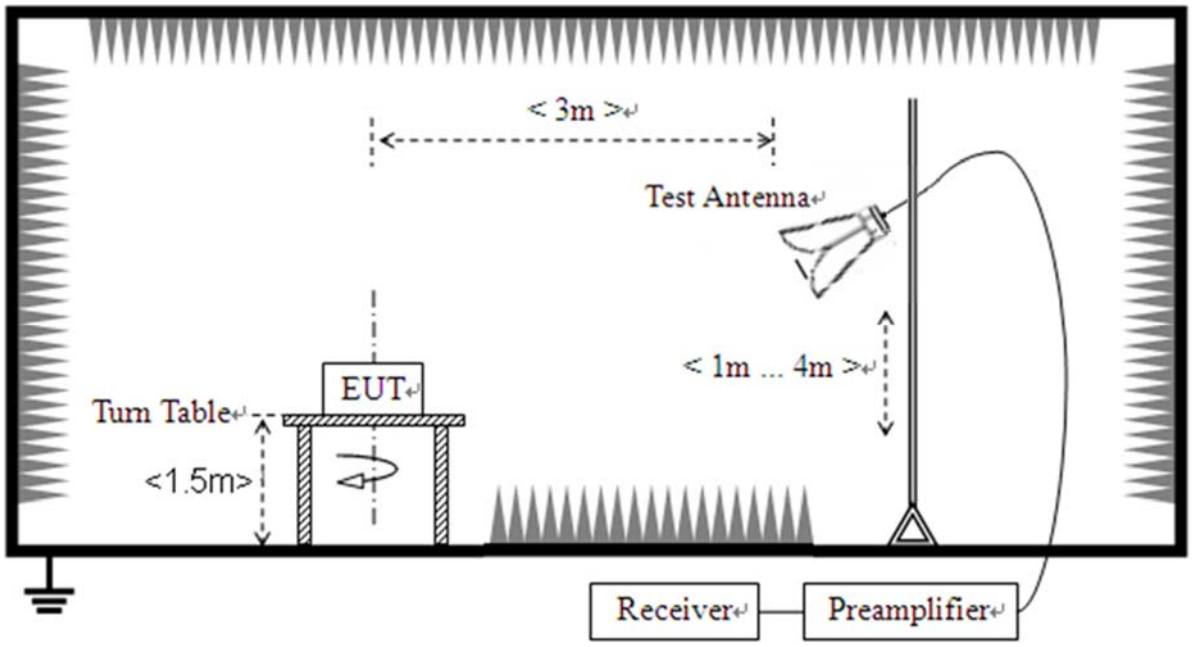
1) For radiated emissions from 9kHz to 30MHz



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 ☒Rod Antenna	☐I-PEX Connector ☐SMA 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 "***LoRaWAN***".

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.

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.

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 two-thirds 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

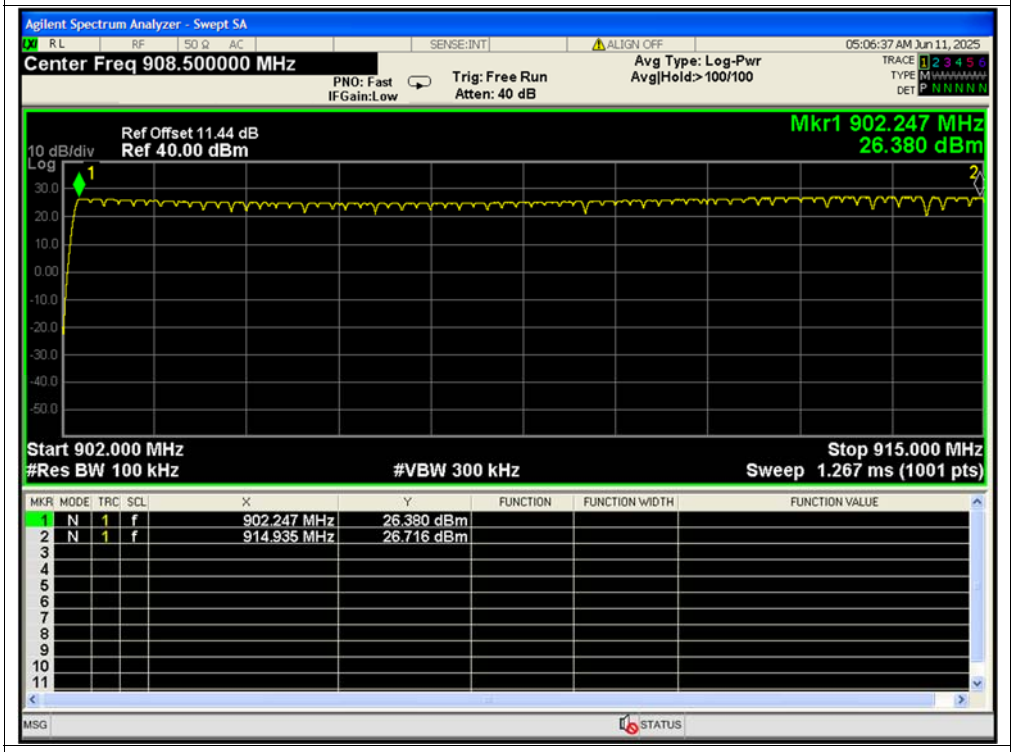
Refer to Annex A.11 in this report.

Annex A Test Data and Result

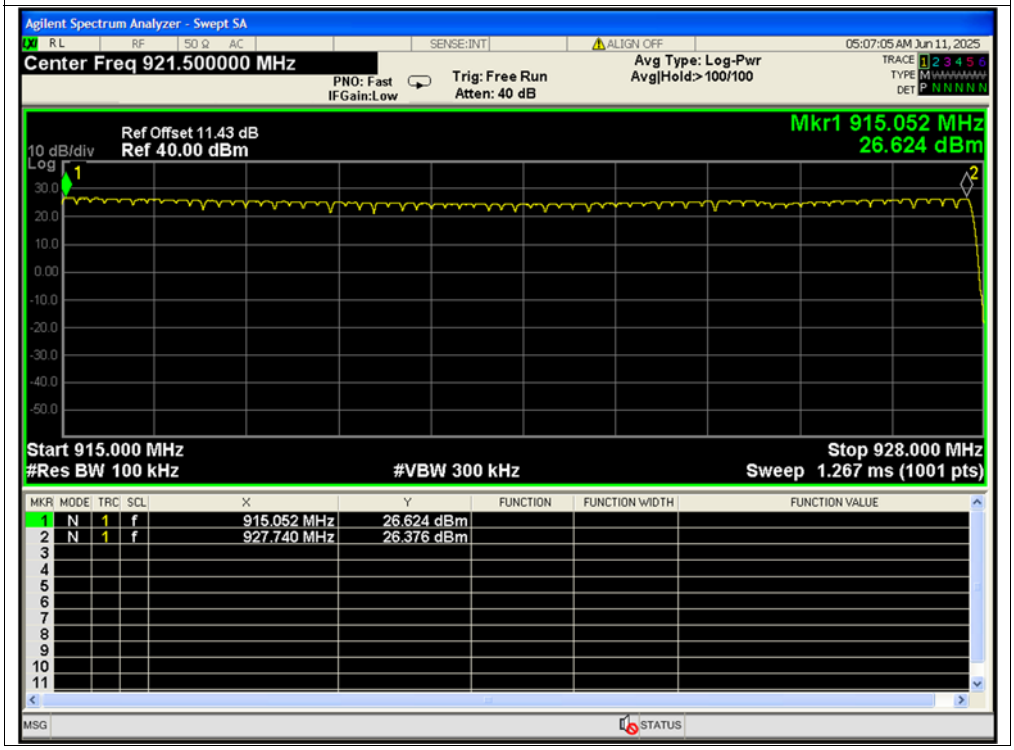
A.1. Number of Hopping Frequency

Condition	Mode/Data Rate	Antenna	Hopping Number	Limit	Verdict
NVNT	900M	Ant1	128	50	Pass

Test Graphs
Hopping No. NVNT 900M Ant1_Lower segment



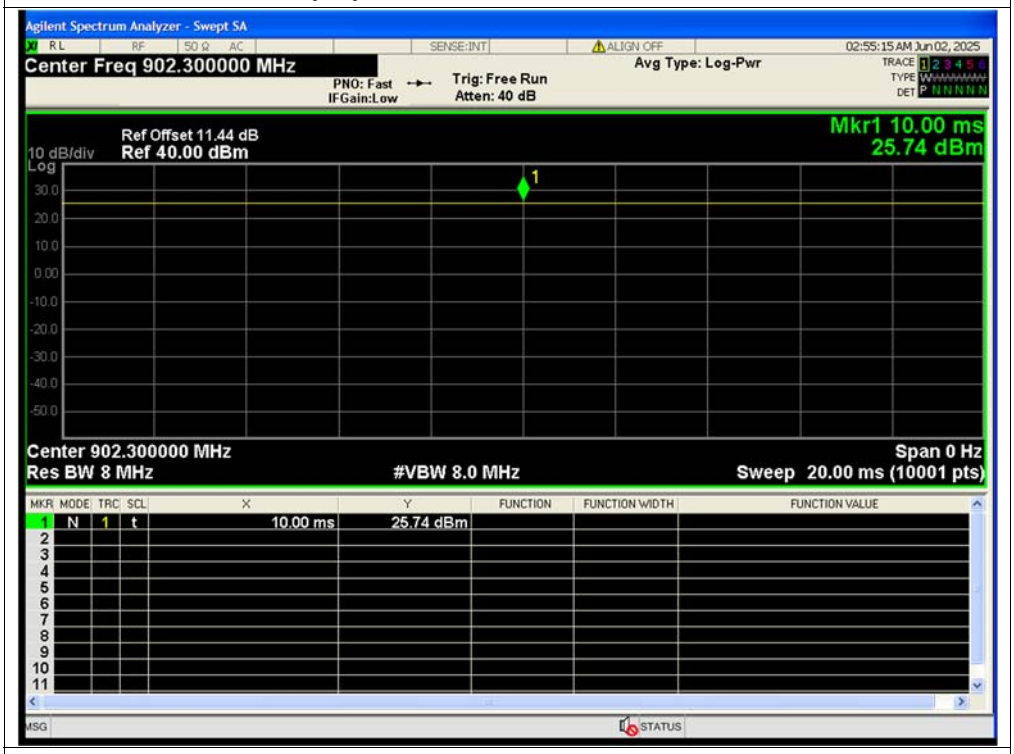
Hopping No. NVNT 900M Ant1_Higher segment



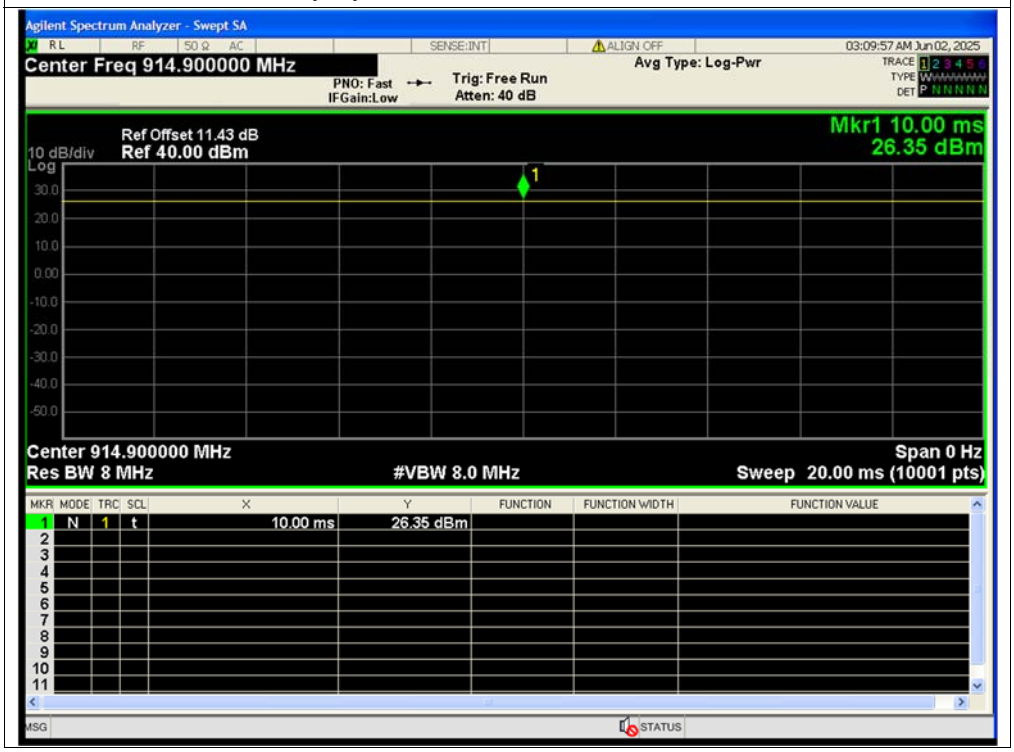
A.2. Duty Cycle of Test Signal

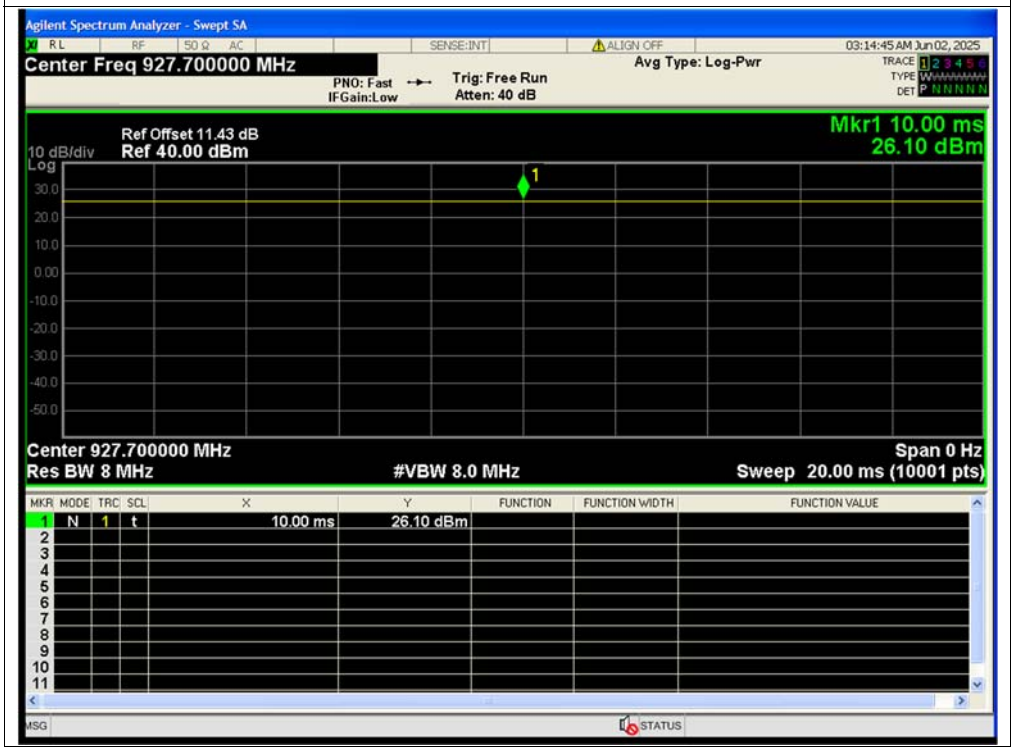
Condition	Mode/Data Rate	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	900M	902.3	Ant1	100	0	0
NVNT	900M	914.9	Ant1	100	0	0
NVNT	900M	927.7	Ant1	100	0	0

Test Graphs
Duty Cycle NVNT 900M 902.3MHz Ant1



Duty Cycle NVNT 900M 914.9MHz Ant1

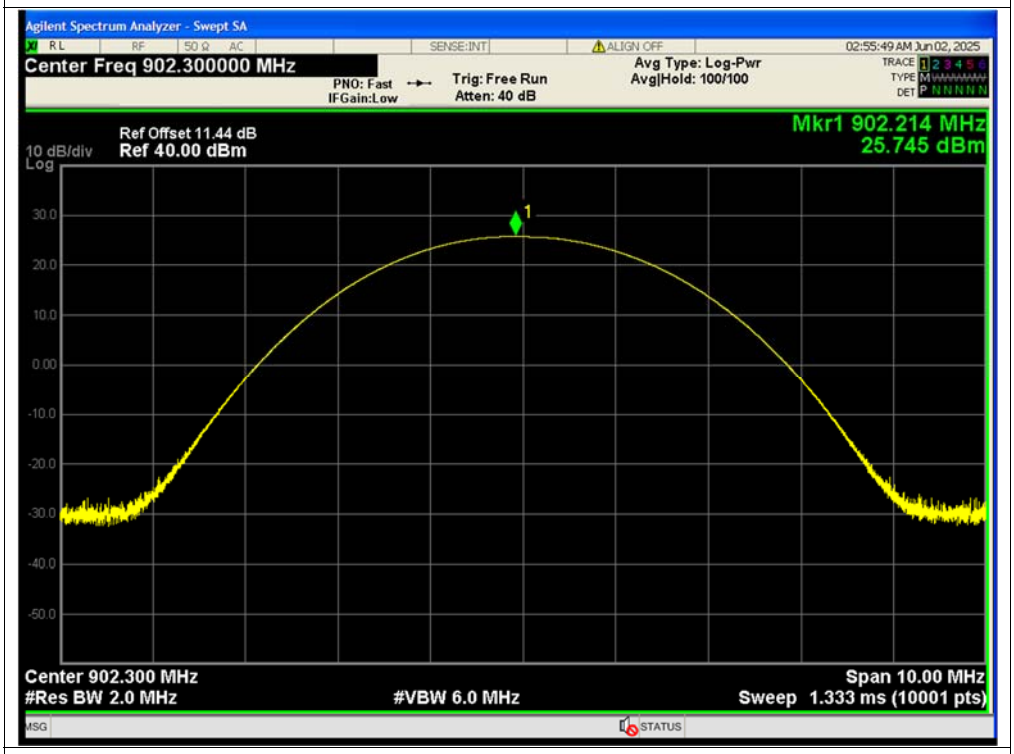


Duty Cycle NVNT 900M 927.7MHz Ant1


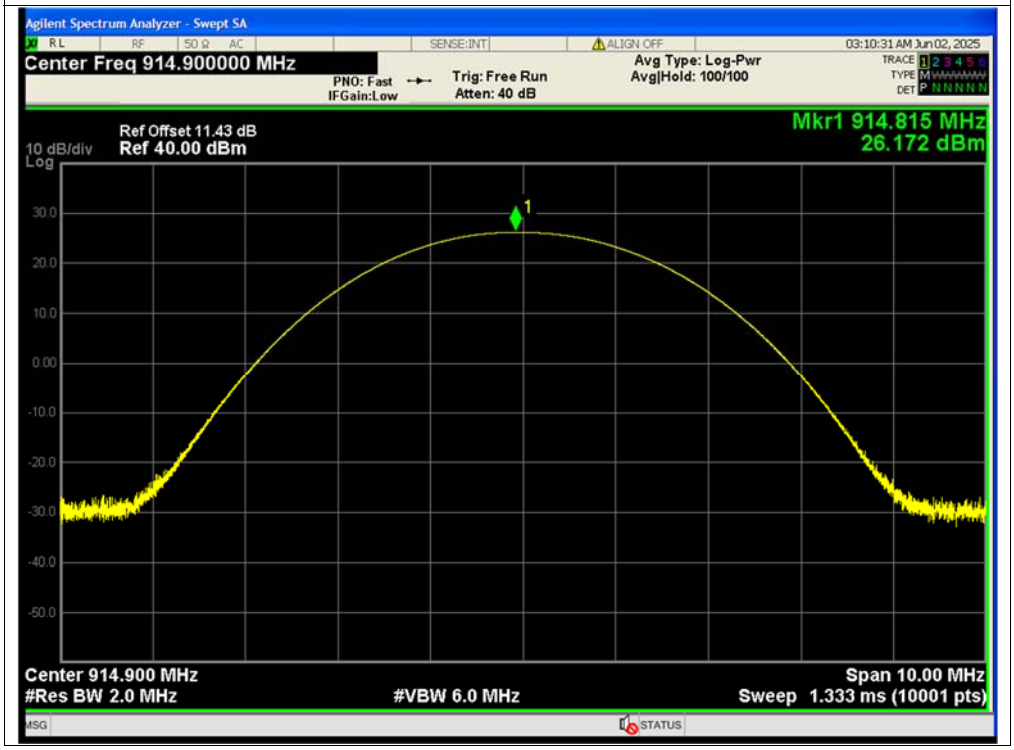
A.3. Maximum Peak Conducted Output Power

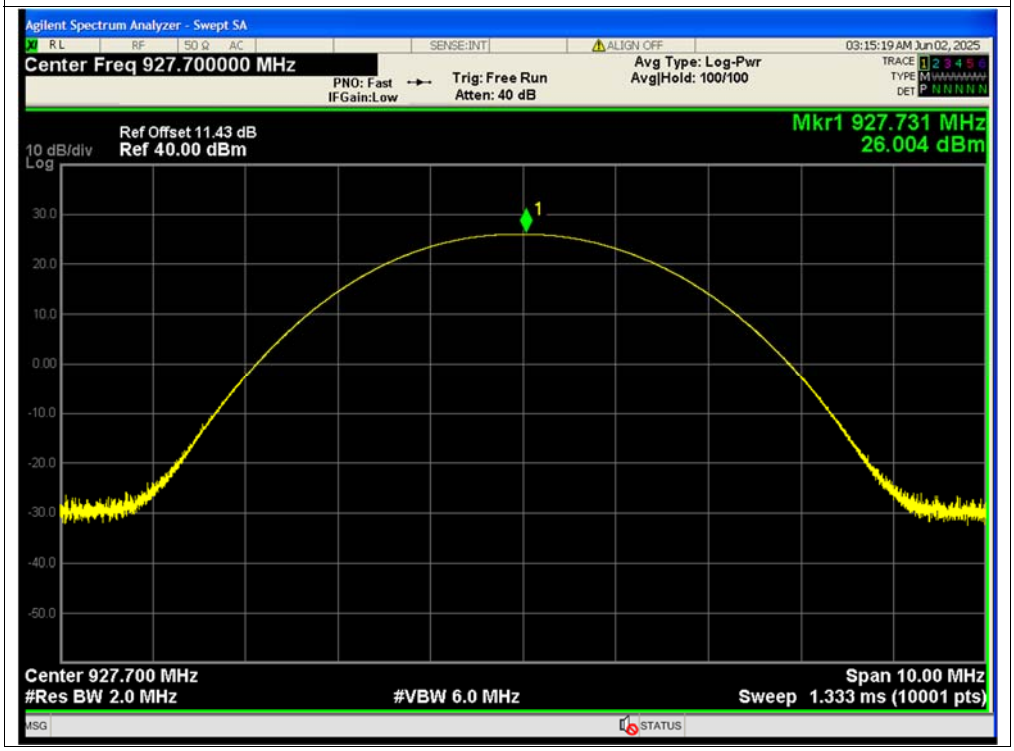
Condition	Mode/Data Rate	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit (dBm)	Verdict
NVNT	900M	902.3	Ant1	25.75	0	25.75	0.37584	30	Pass
NVNT	900M	914.9	Ant1	26.17	0	26.17	0.4140	30	Pass
NVNT	900M	927.7	Ant1	26.00	0	26.00	0.39811	30	Pass

Test Graphs
Peak Power NVNT 900M 902.3MHz Ant1



Peak Power NVNT 900M 914.9MHz Ant1

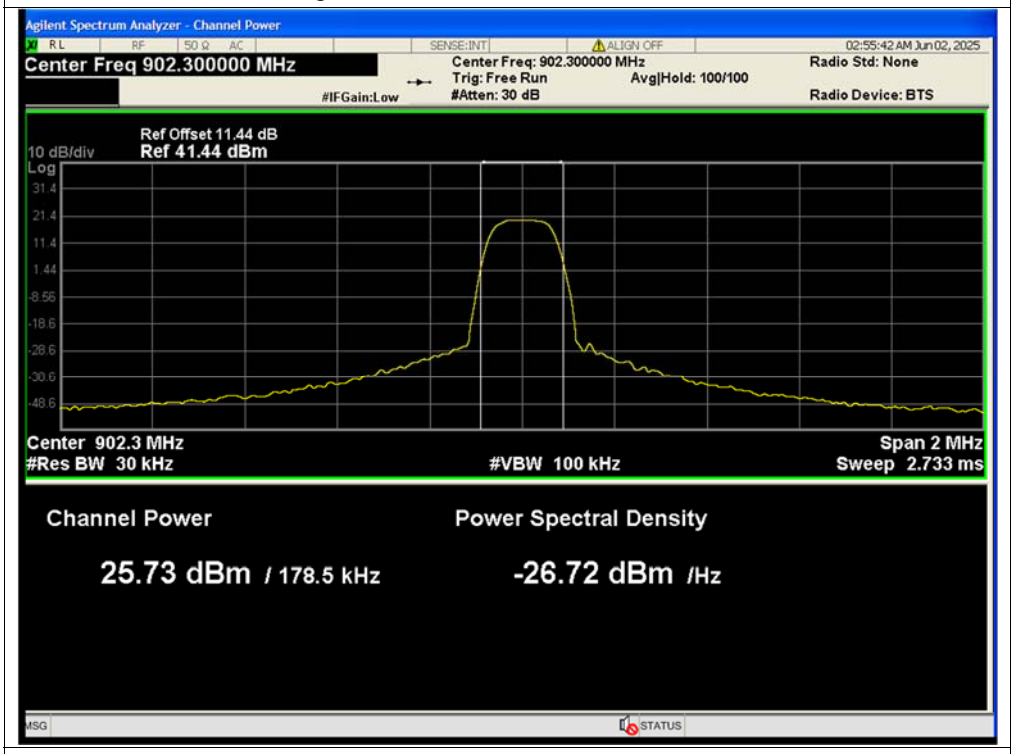


Peak Power NVNT 900M 927.7MHz Ant1


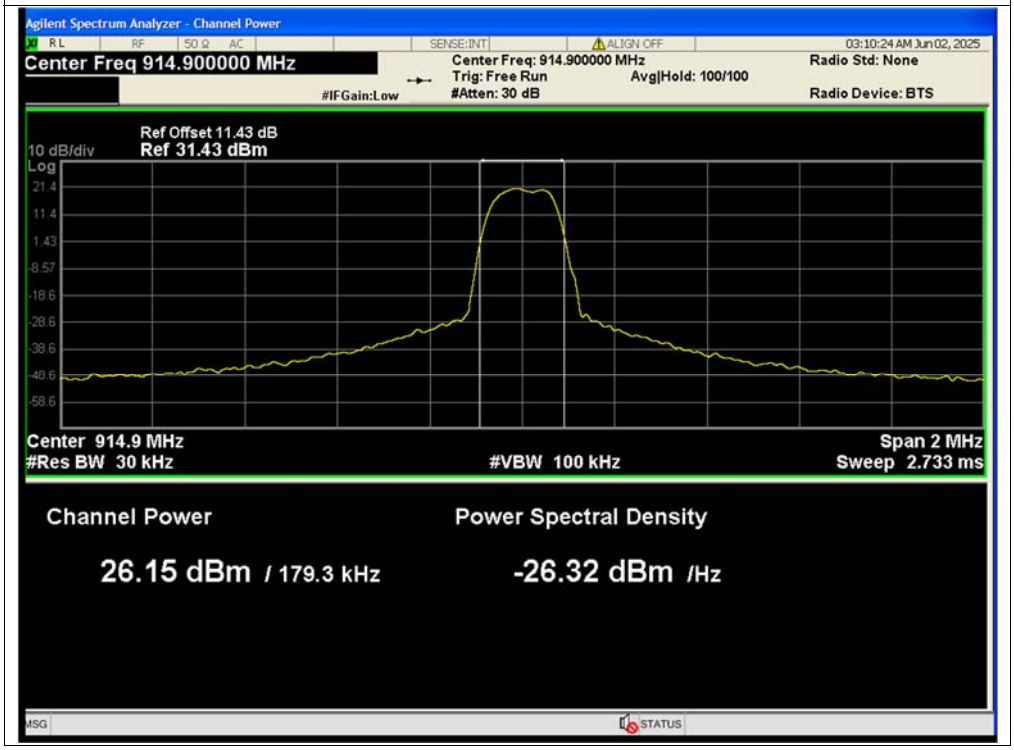
A.4. Maximum Average Conducted Output Power

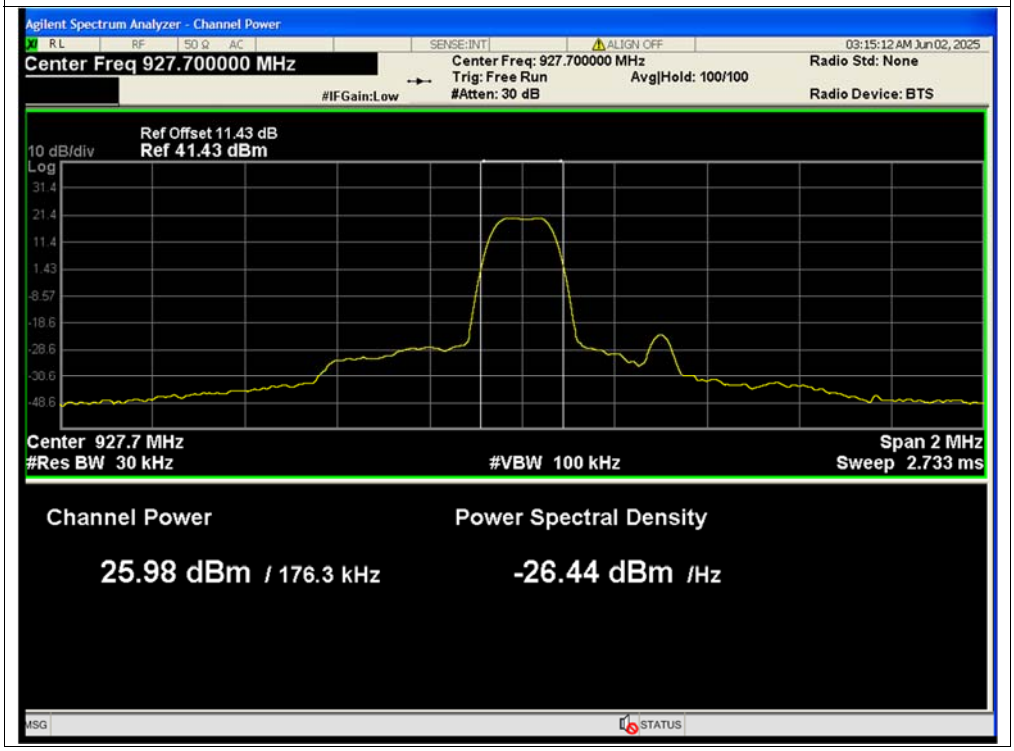
Condition	Mode/Data Rate	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit (dBm)	Verdict
NVNT	900M	902.3	Ant1	25.73	0	25.73	0.37411	30	Pass
NVNT	900M	914.9	Ant1	26.15	0	26.15	0.4121	30	Pass
NVNT	900M	927.7	Ant1	25.98	0	25.98	0.39628	30	Pass

Test Graphs
Average Power NVNT 900M 902.3MHz Ant1



Average Power NVNT 900M 914.9MHz Ant1



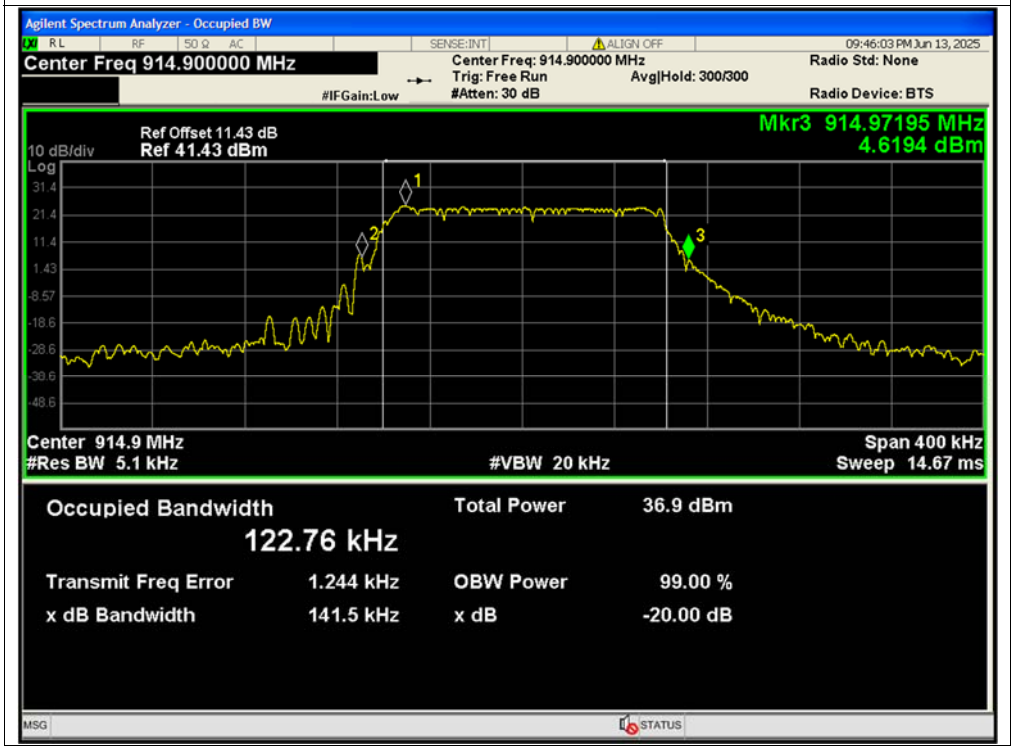
Average Power NVNT 900M 927.7MHz Ant1


A.5. 20 dB Bandwidth

Condition	Mode/Data Rate	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)
NVNT	900M	902.3	Ant1	0.1371
NVNT	900M	914.9	Ant1	0.1415
NVNT	900M	927.7	Ant1	0.1421

Test Graphs
-20dB Bandwidth NVNT 900M 902.3MHz Ant1

-20dB Bandwidth NVNT 900M 914.9MHz Ant1



-20dB Bandwidth NVNT 900M 927.7MHz Ant1

A.6. Carried Frequency Separation

Condition	Mode/Data Rate	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	900M	Ant1	902.2968	902.5008	0.204	0.1371	Pass
NVNT	900M	Ant1	914.9040	915.1008	0.1968	0.1415	Pass
NVNT	900M	Ant1	927.5100	927.7104	0.2004	0.1421	Pass

Test Graphs
CFS NVNT 900M 902.3MHz Ant1

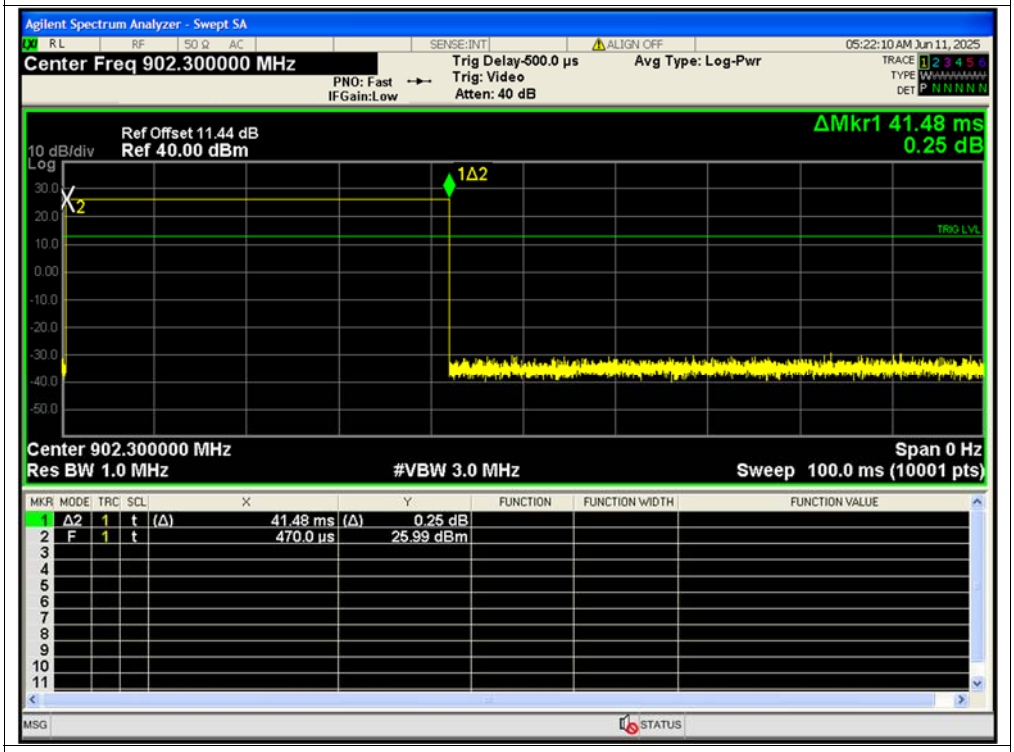
CFS NVNT 900M 914.9MHz Ant1

CFS NVNT 900M 927.7MHz Ant1

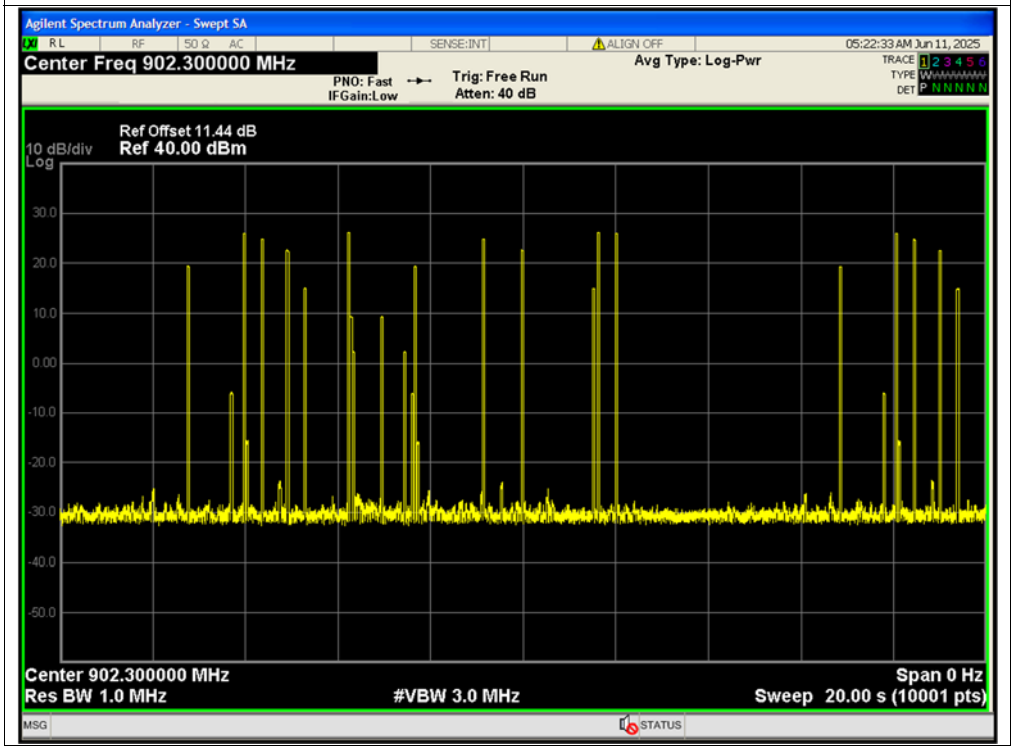
A.7. Time of Occupancy (Dwell time)

Condition	Mode/ Data Rate	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Maximum Equal-amplitude Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	900M	902.3	Ant1	41.48	207.4	5	20000	400	Pass

Test Graphs
Dwell NVNT 900M 902.3MHz Ant1 One Burst



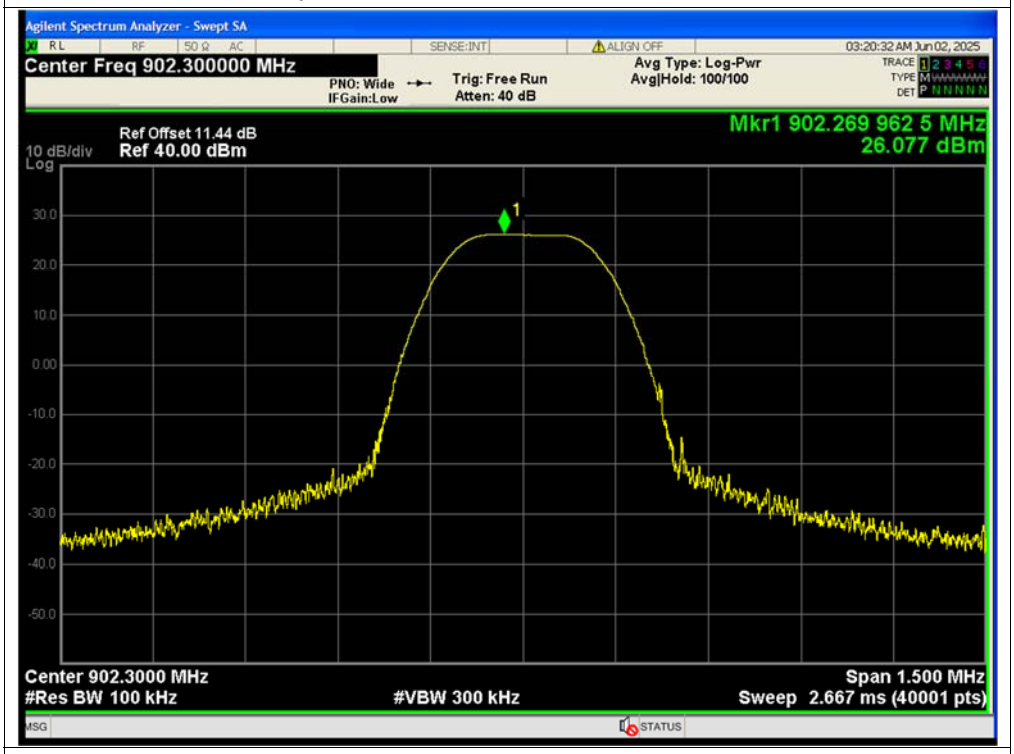
Dwell NVNT 900M 902.3MHz Ant1 Accumulated



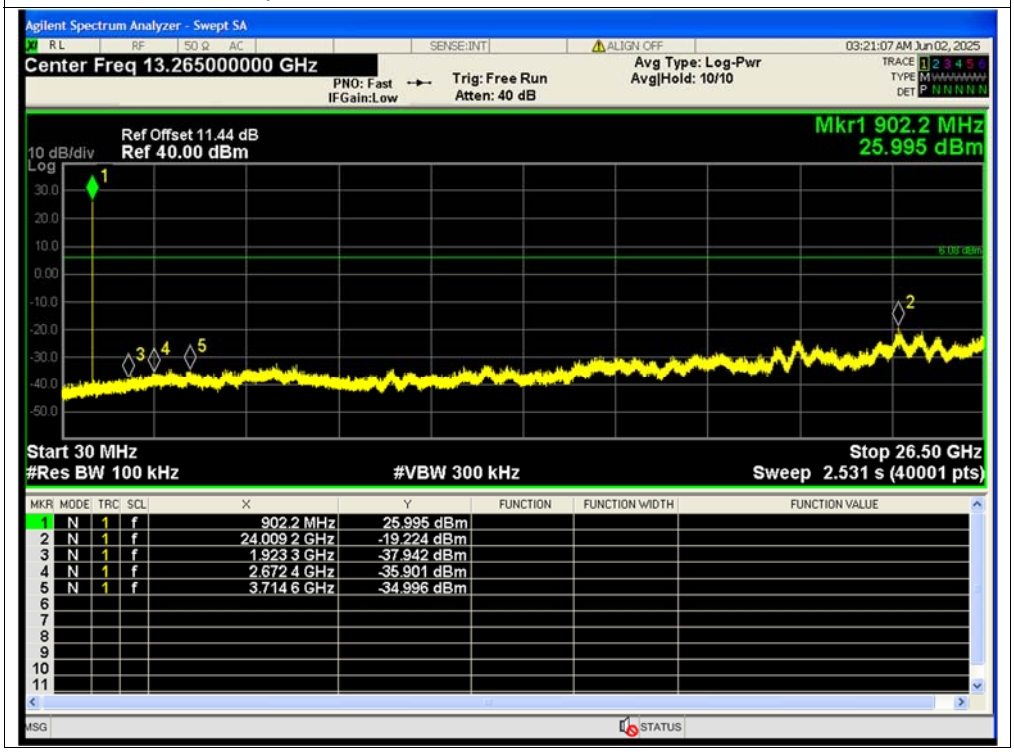
A.8. Conducted Spurious Emissions

Condition	Mode/ Data Rate	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	900M	902.3	Ant1	-45.3	-20	Pass
NVNT	900M	914.9	Ant1	-46.89	-20	Pass
NVNT	900M	927.7	Ant1	-47.26	-20	Pass

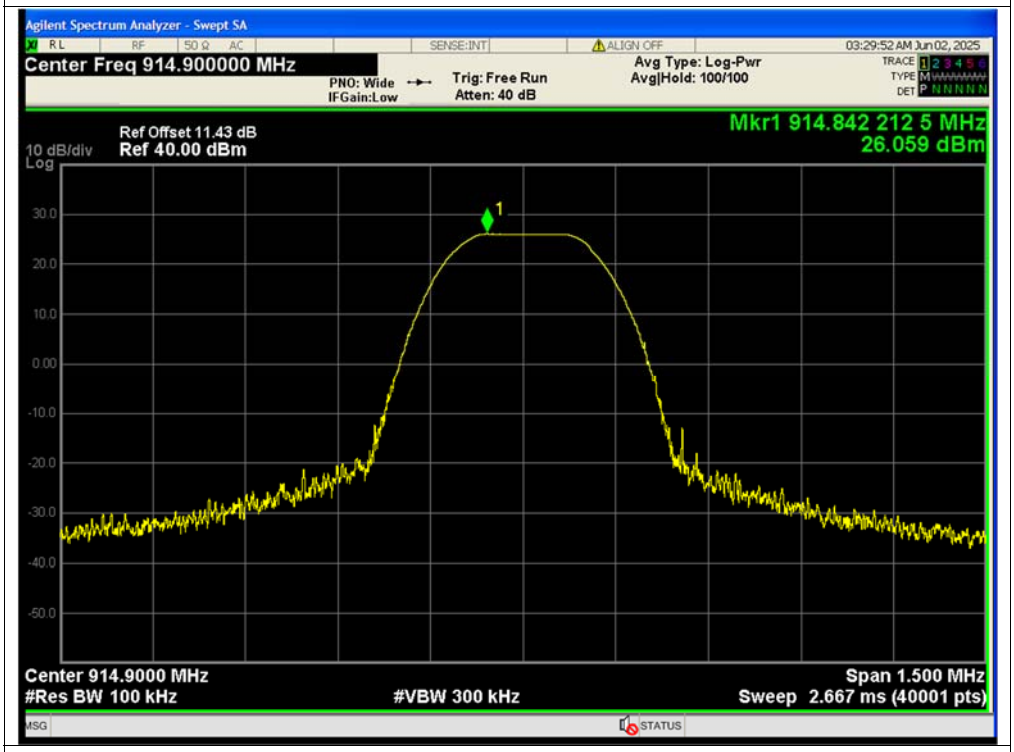
Test Graphs
Tx. Spurious NVNT 900M 902.3MHz Ant1 Ref



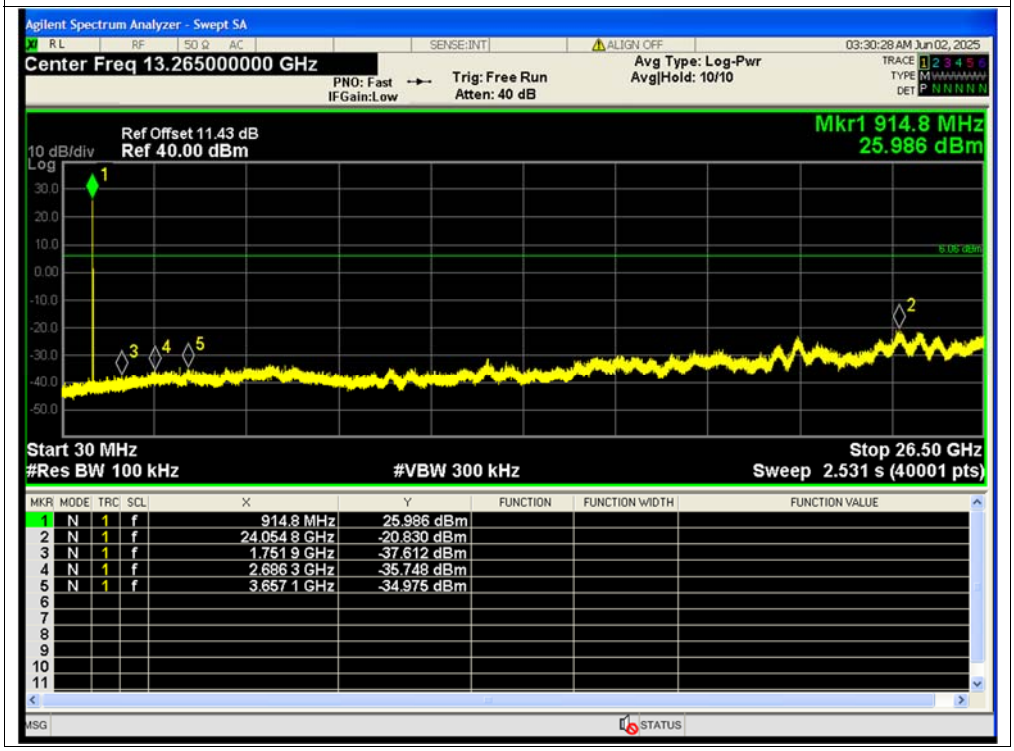
Tx. Spurious NVNT 900M 902.3MHz Ant1 Emission



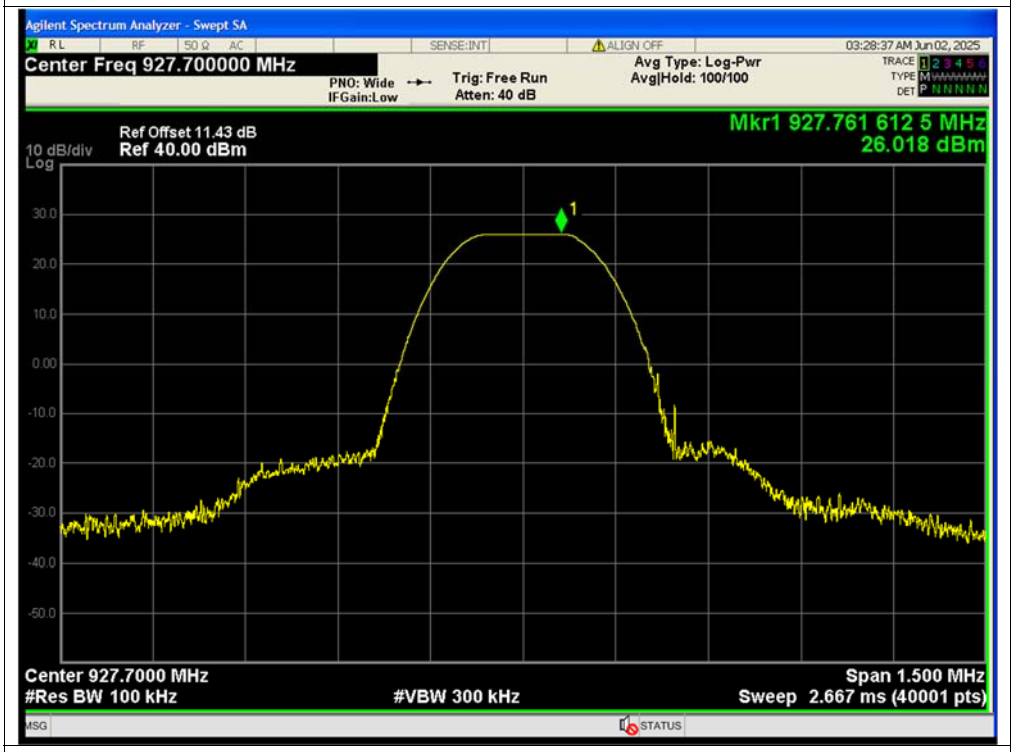
Tx. Spurious NVNT 900M 914.9MHz Ant1 Ref



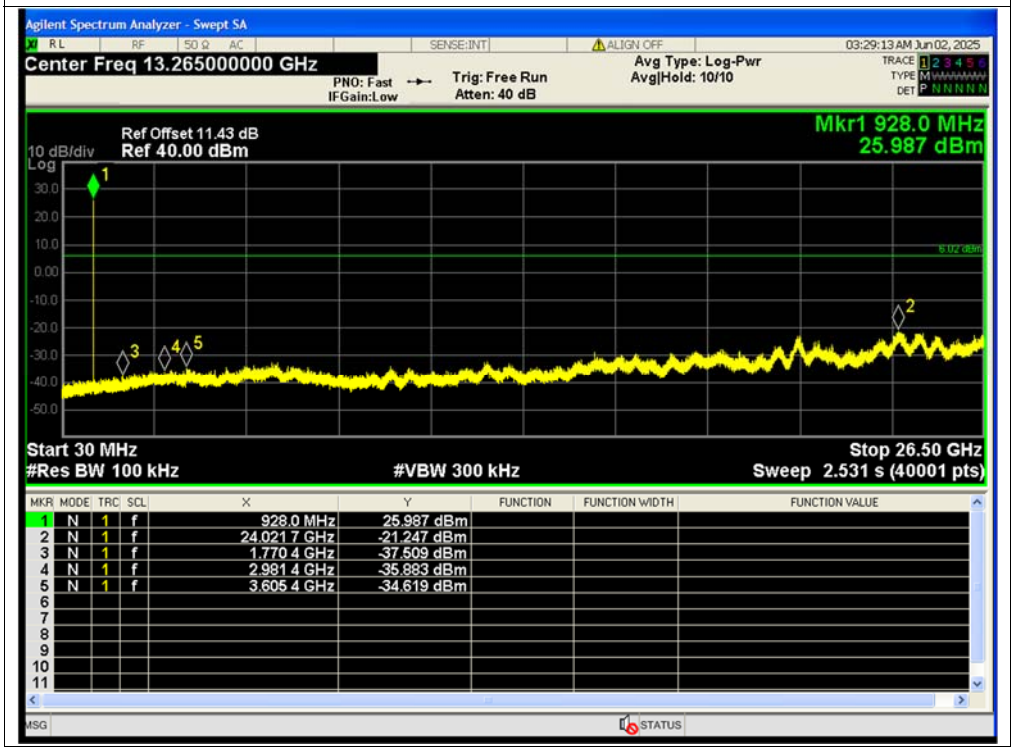
Tx. Spurious NVNT 900M 914.9MHz Ant1 Emission



Tx. Spurious NVNT 900M 927.7MHz Ant1 Ref



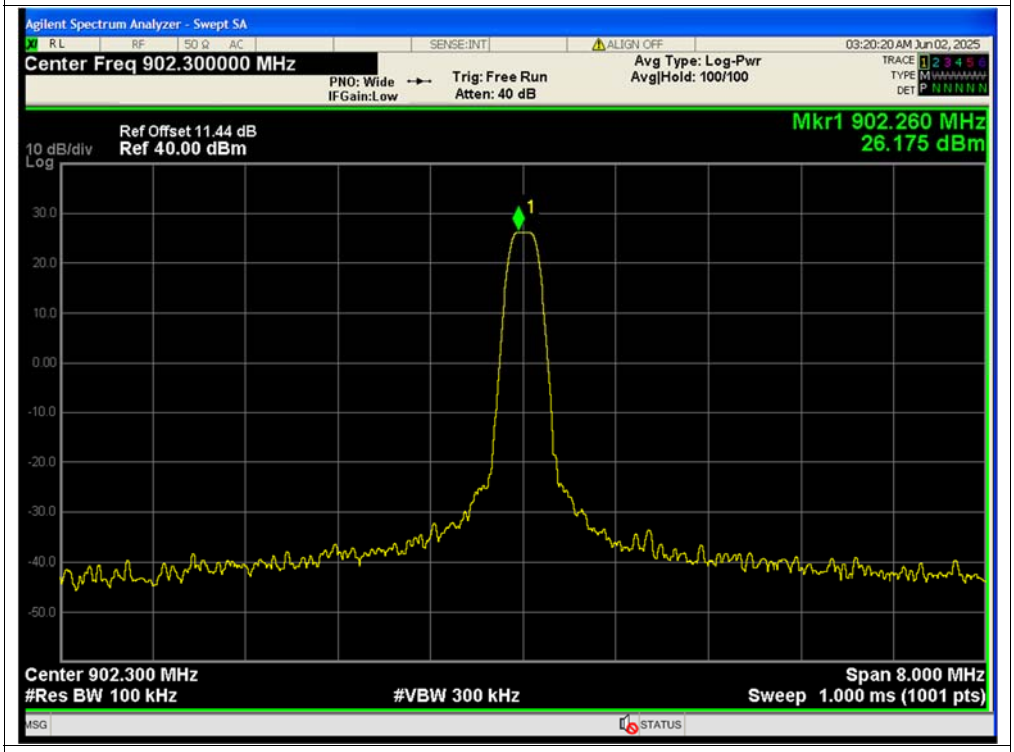
Tx. Spurious NVNT 900M 927.7MHz Ant1 Emission



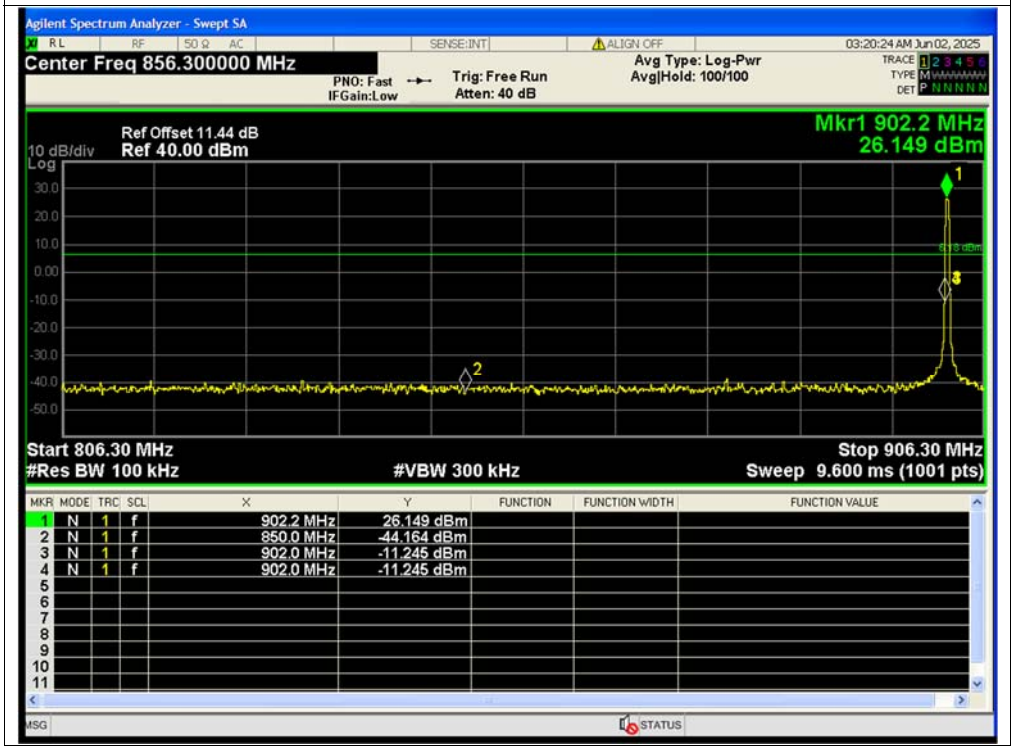
A.9. Band Edge

Condition	Mode/ Data Rate	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	900M	902.3	Ant1	No-Hopping	-37.42	-20	Pass
NVNT	900M	927.7	Ant1	No-Hopping	-32.51	-20	Pass
NVNT	900M	902.3	Ant1	Hopping	-45.53	-20	Pass
NVNT	900M	927.7	Ant1	Hopping	-37.57	-20	Pass

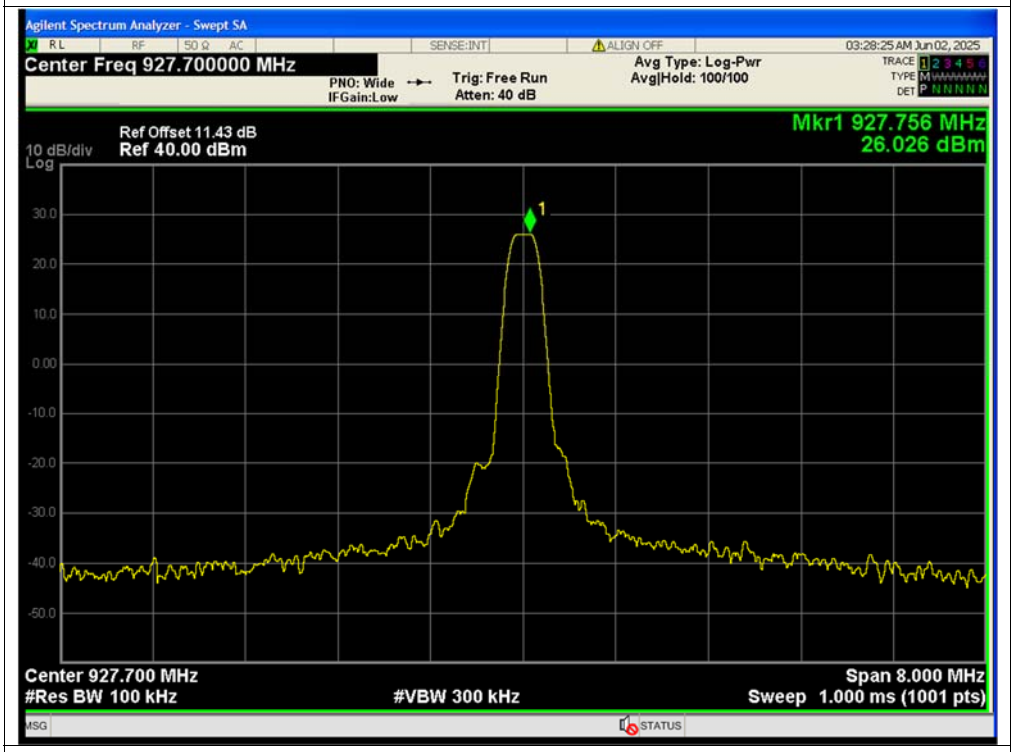
Test Graphs
Band Edge NVNT 900M 902.3MHz Ant1 No-Hopping Ref



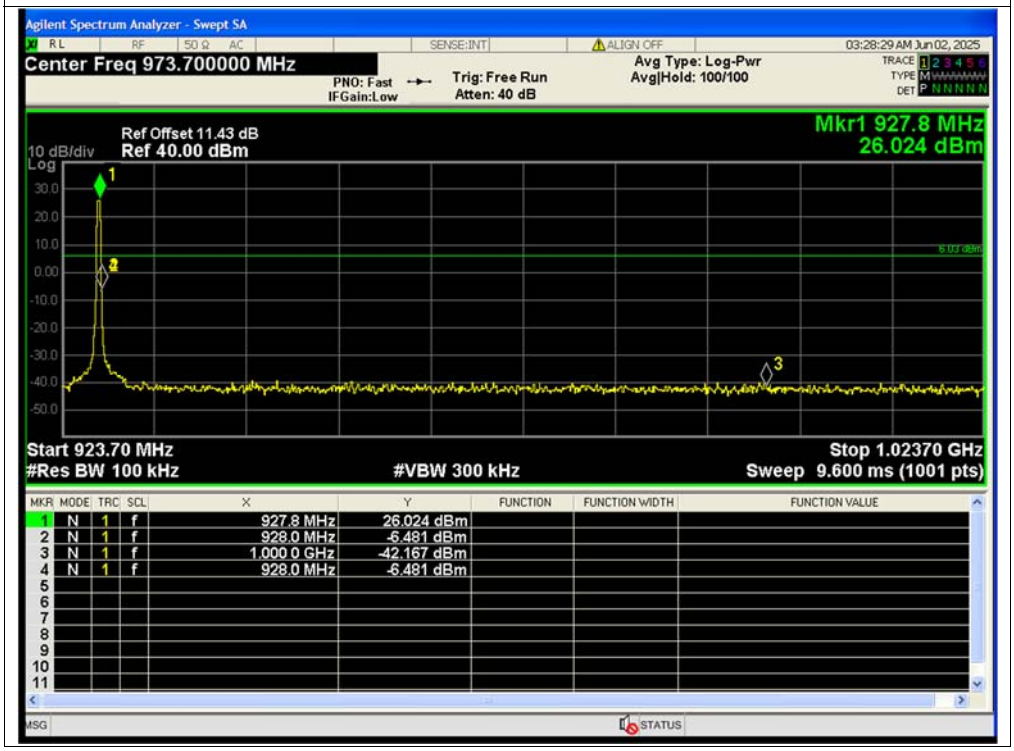
Band Edge NVNT 900M 902.3MHz Ant1 No-Hopping Emission



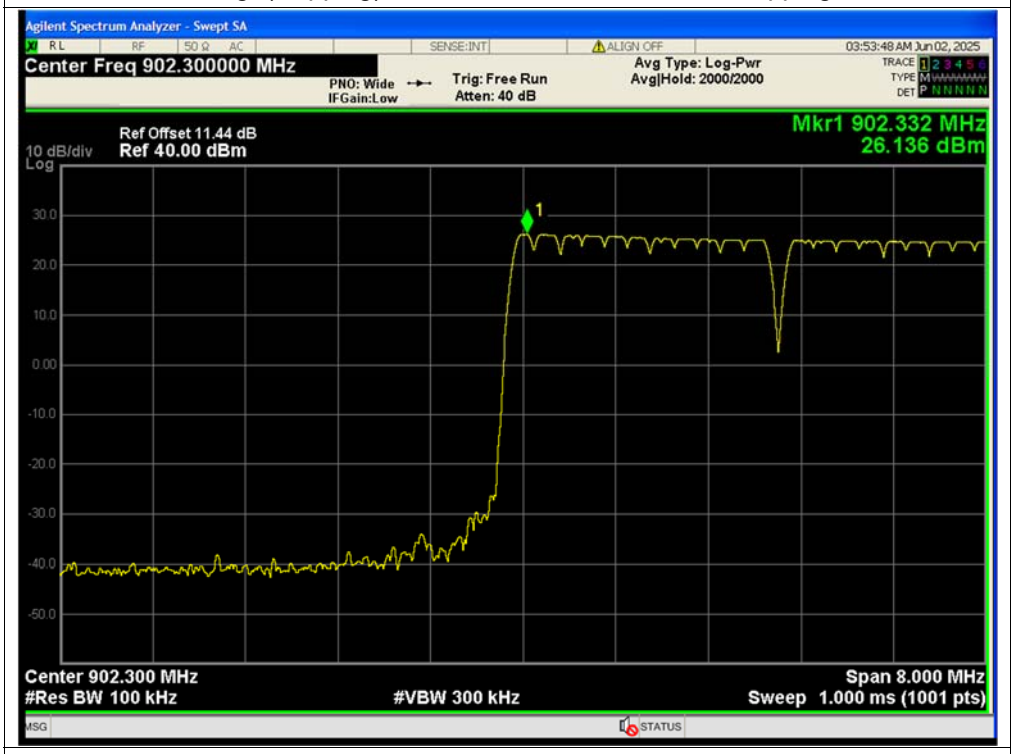
Band Edge NVNT 900M 927.7MHz Ant1 No-Hopping Ref



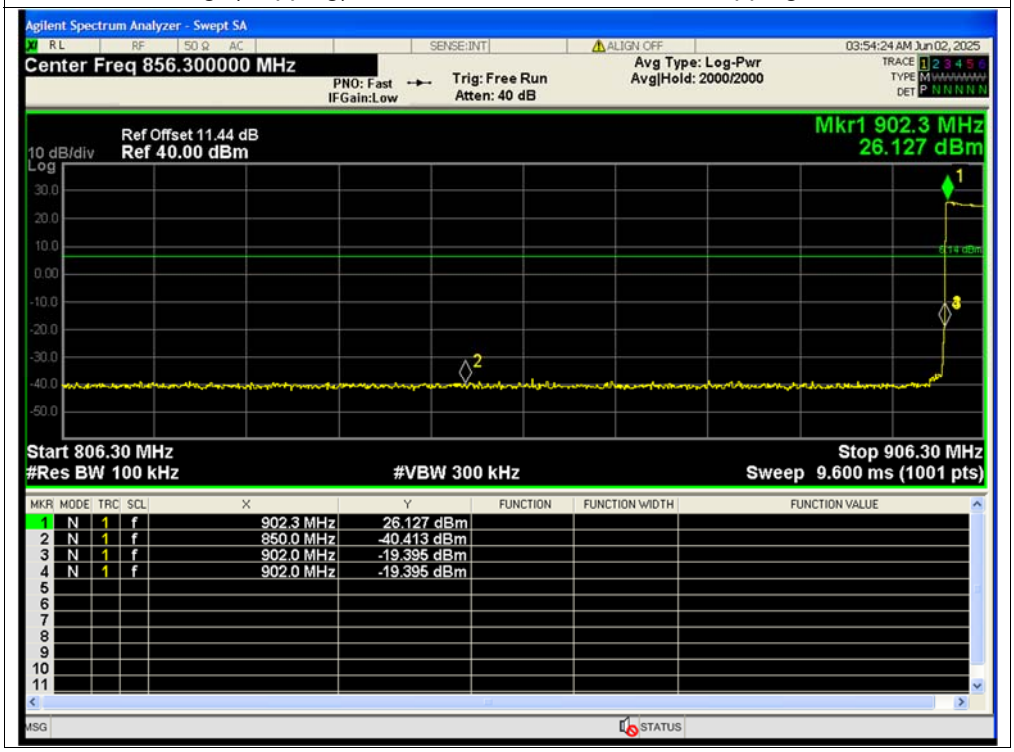
Band Edge NVNT 900M 927.7MHz Ant1 No-Hopping Emission



Test Graphs
Band Edge(Hopping) NVNT 900M 902.3MHz Ant1 Hopping Ref

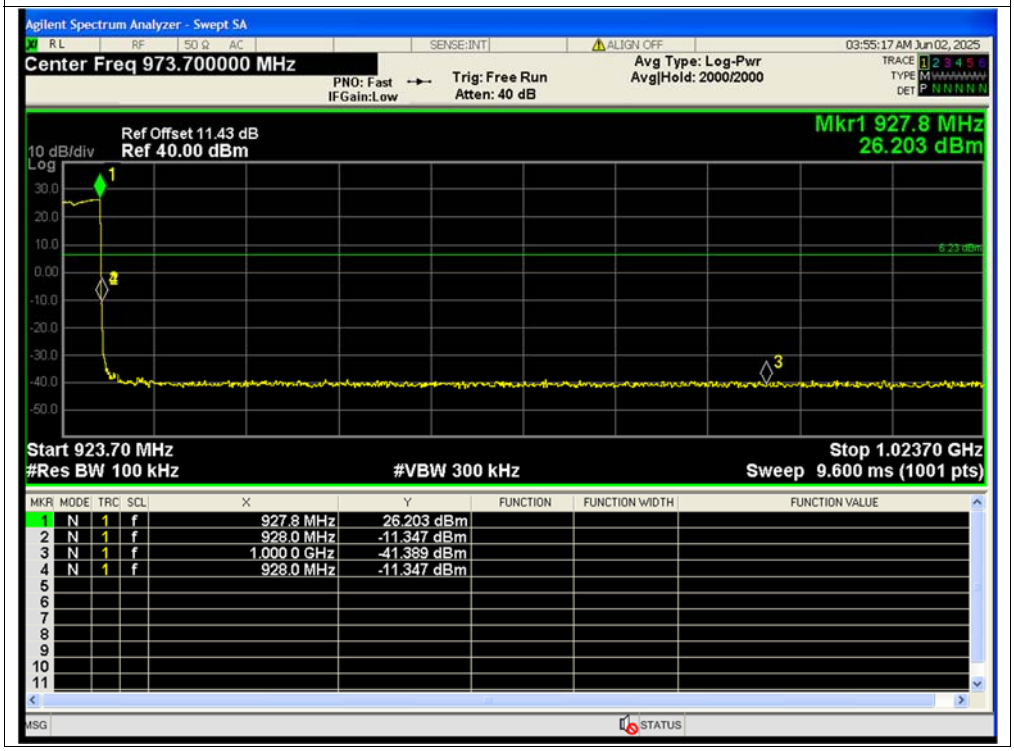


Band Edge(Hopping) NVNT 900M 902.3MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 900M 927.7MHz Ant1 Hopping Ref

Band Edge(Hopping) NVNT 900M 927.7MHz Ant1 Hopping Emission



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:

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

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 (Y 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.

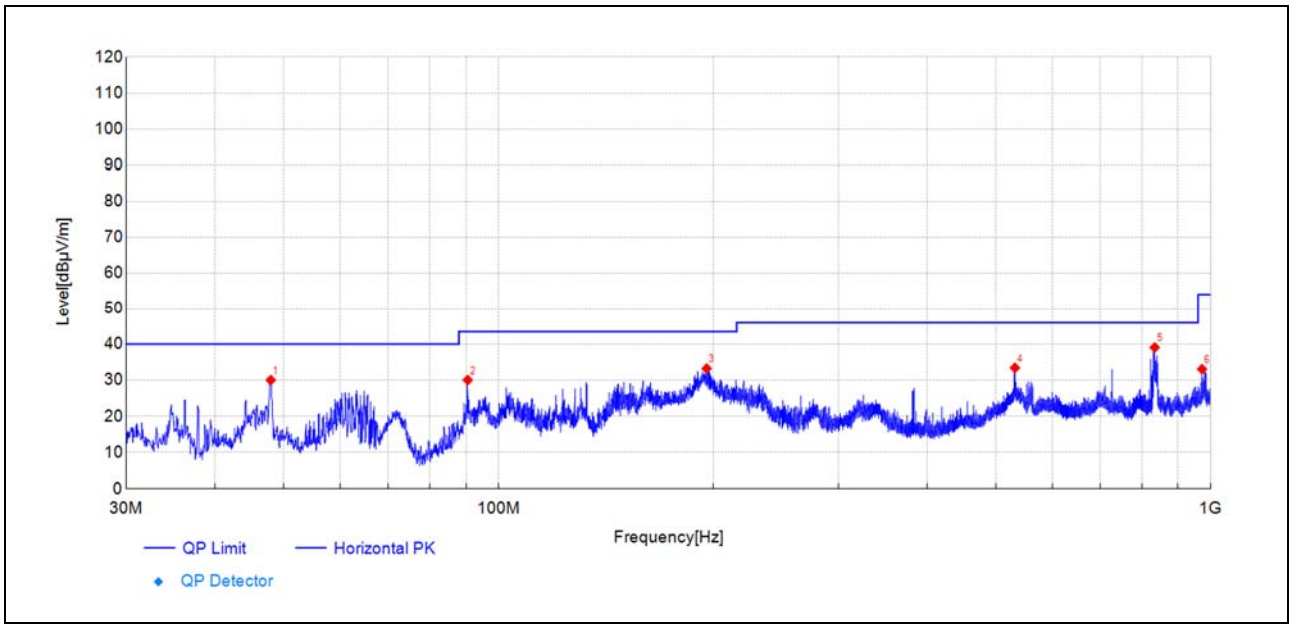
Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Field strength of fundamental:

Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Detector	Antenna Polarity
902.22	92.8	120.90	28.100	PK	Horizontal
902.32	95.0	123.06	28.100	PK	Vertical

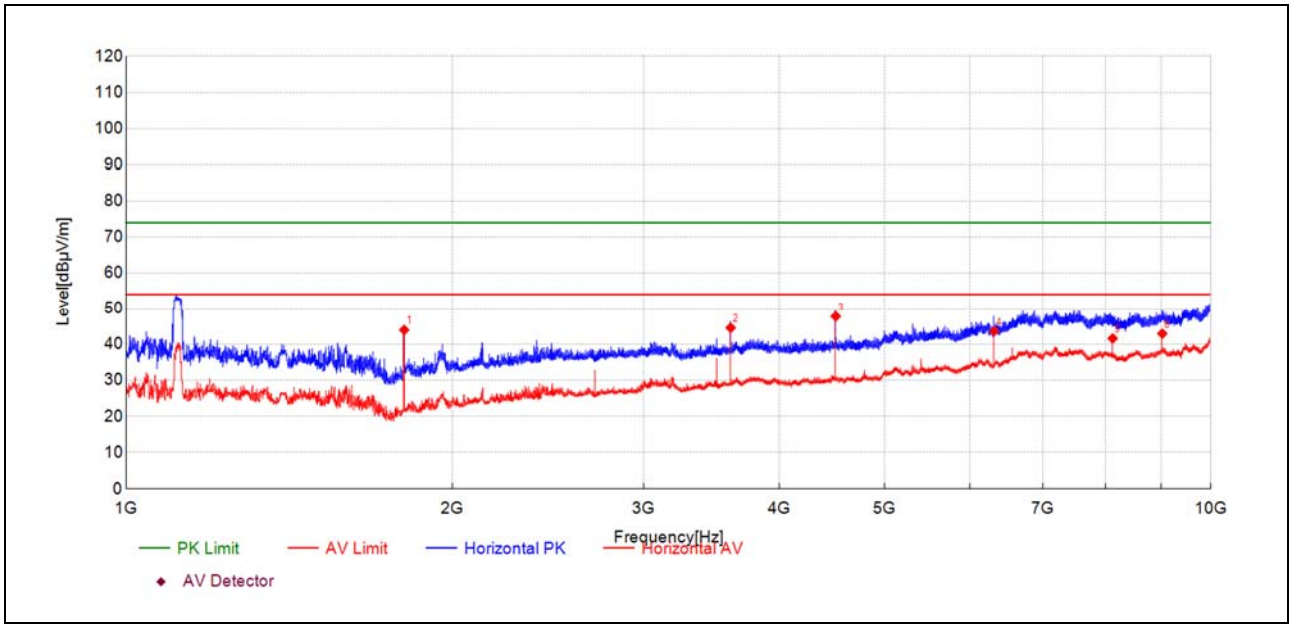
The field strength (the lowest) of fundamental is more than 20dB higher than the unwanted emissions, in accordance with FCC part 15.215(b).

Plot for Channel 1



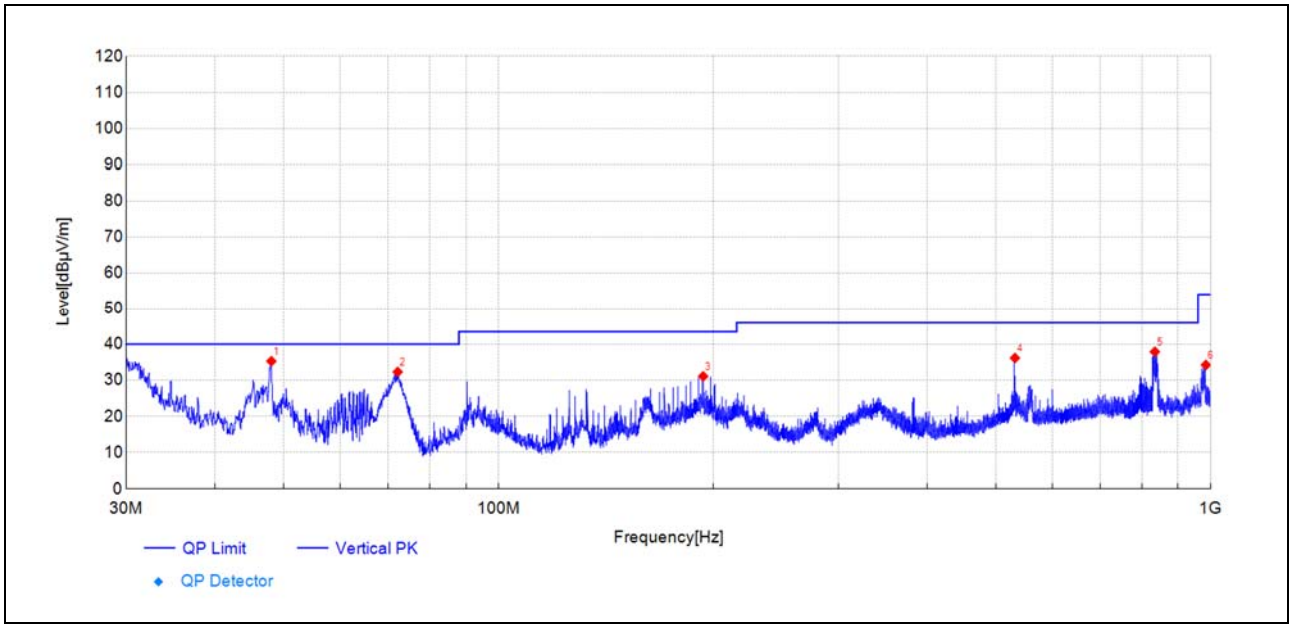
(Antenna Horizontal, 30MHz to 1GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
47.90	58.6	30.04	-28.520	40.00	9.96	PK	PK	PASS
90.53	61.4	30.05	-31.330	43.50	13.45	PK	PK	PASS
196.02	62.3	33.24	-29.100	43.50	10.26	PK	PK	PASS
531.08	52.0	33.43	-18.600	46.00	12.57	PK	PK	PASS
834.32	52.6	39.08	-13.500	46.00	6.92	PK	PK	PASS
972.40	44.5	33.07	-11.470	54.00	20.93	PK	PK	PASS



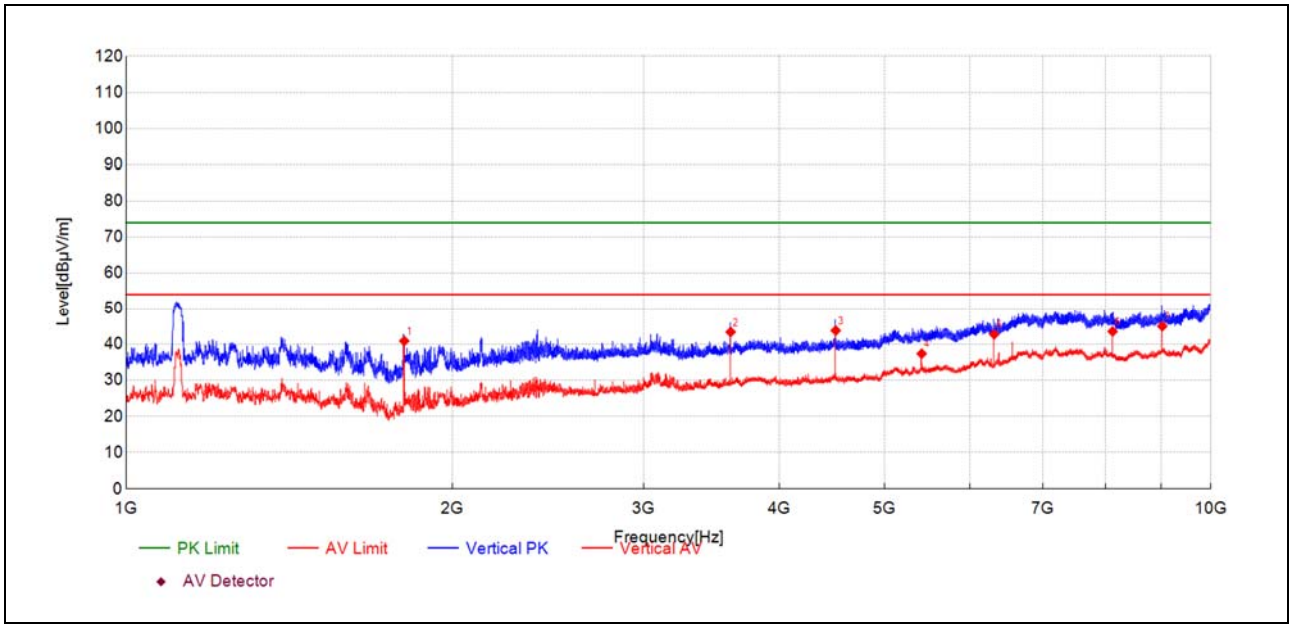
(Antenna Horizontal, 1GHz to 10GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
1804.96	62.5	43.97	-18.510	54.00	10.03	275	AV	PASS
3609.51	53.6	44.58	-9.040	54.00	9.42	256	AV	PASS
4511.63	54.2	47.78	-6.400	54.00	6.22	272	AV	PASS
6316.35	42.9	43.67	0.800	54.00	10.33	296	AV	PASS
8121.54	36.4	41.61	5.180	54.00	12.39	247	AV	PASS
9023.67	36.2	42.95	6.790	54.00	11.05	343	AV	PASS



(Antenna Vertical, 30MHz to 1GHz)

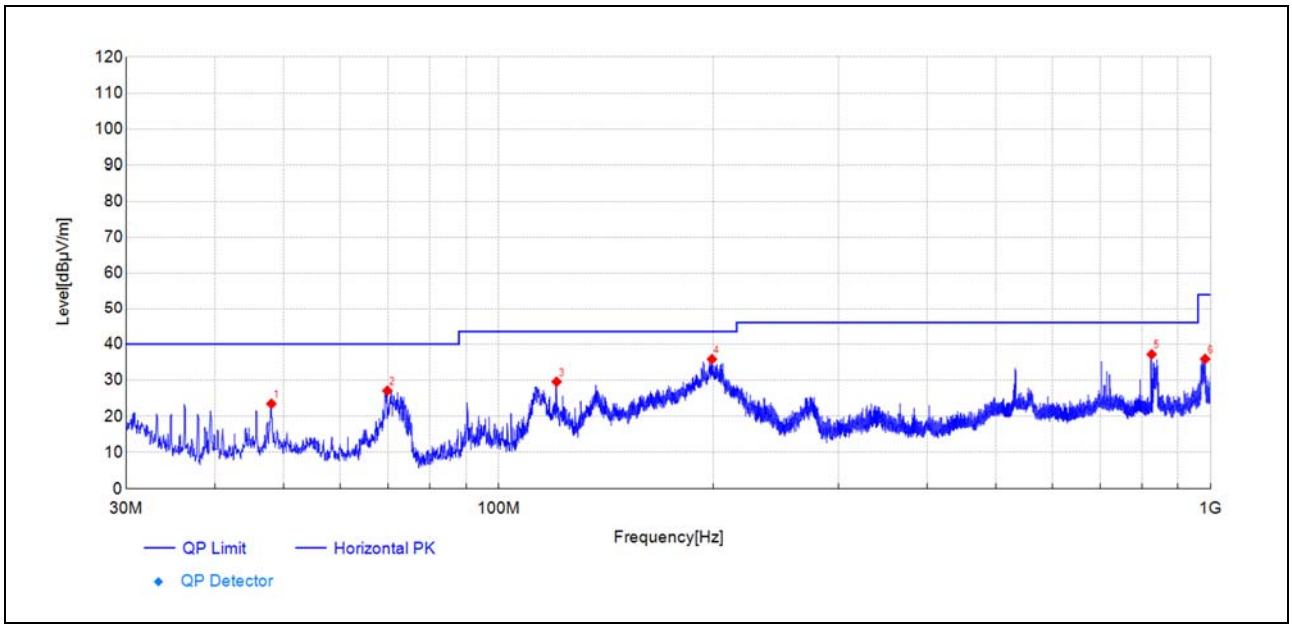
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
47.99	63.8	35.29	-28.540	40.00	4.71	9	PK	PASS
72.20	63.7	32.31	-31.370	40.00	7.69	179	PK	PASS
193.84	61.0	31.09	-29.940	43.50	12.41	170	PK	PASS
531.08	54.8	36.19	-18.600	46.00	9.81	188	PK	PASS
834.75	51.3	37.91	-13.430	46.00	8.09	115	PK	PASS
984.67	45.6	34.24	-11.400	54.00	19.76	9	PK	PASS



(Antenna Vertical, 1GHz to 10GHz)

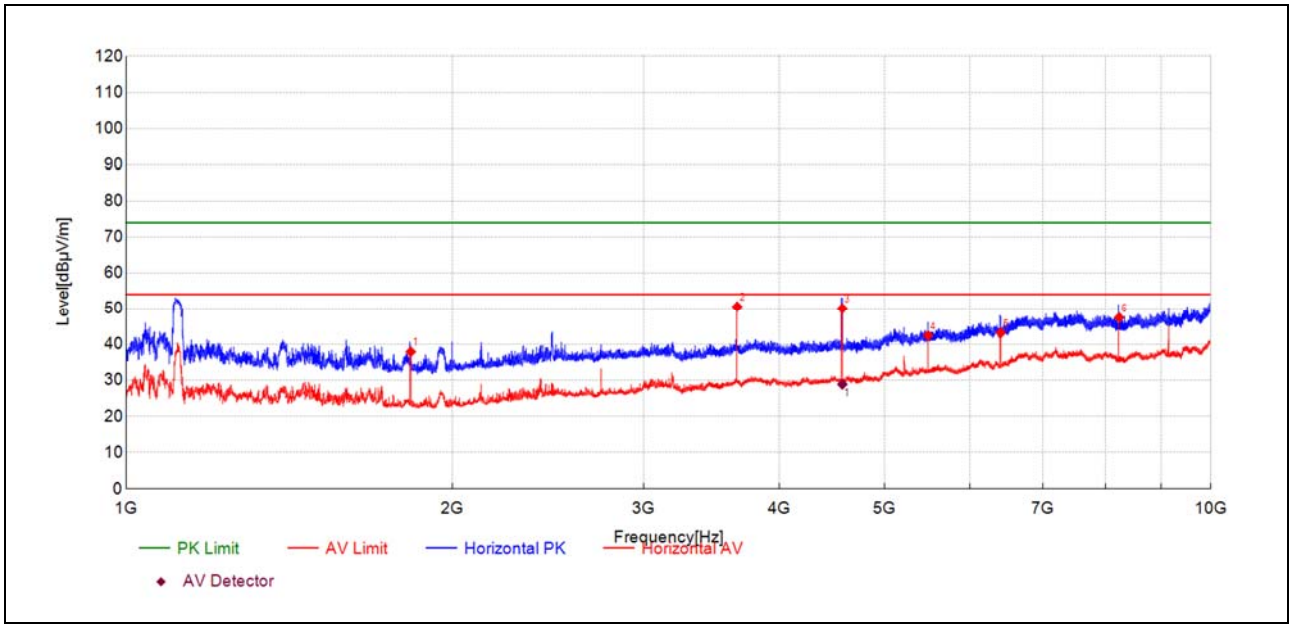
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
1804.96	59.4	40.90	-18.510	54.00	13.10	26	AV	PASS
3609.51	52.4	43.40	-9.040	54.00	10.60	183	AV	PASS
4511.63	50.2	43.80	-6.400	54.00	10.20	302	AV	PASS
5414.23	39.1	37.38	-1.740	54.00	16.62	25	AV	PASS
6315.89	42.0	42.75	0.800	54.00	11.25	104	AV	PASS
8120.61	38.4	43.56	5.180	54.00	10.44	72	AV	PASS
9023.67	38.2	45.00	6.790	54.00	9.00	120	AV	PASS

Plot for Channel 64



(Antenna Horizontal, 30MHz to 1GHz)

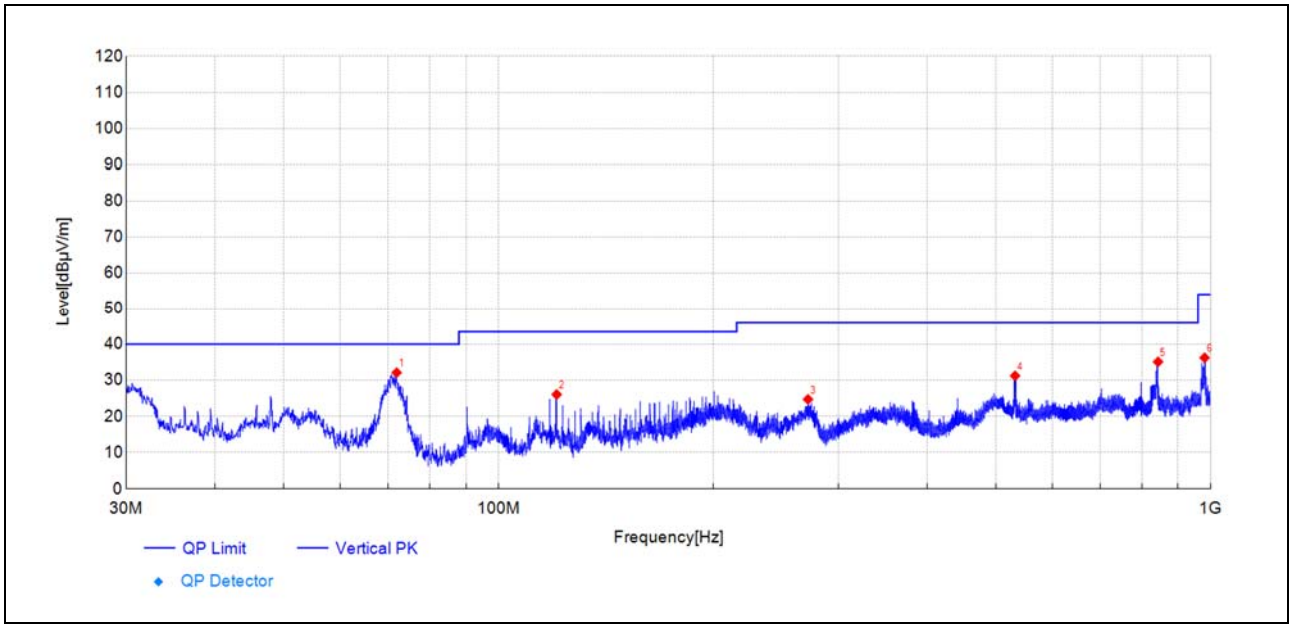
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
47.99	52.0	23.45	-28.540	40.00	16.55	131	PK	PASS
69.82	58.1	27.07	-31.050	40.00	12.93	20	PK	PASS
120.70	60.0	29.56	-30.470	43.50	13.94	30	PK	PASS
199.42	64.6	35.83	-28.730	43.50	7.67	121	PK	PASS
826.26	51.1	37.18	-13.920	46.00	8.82	359	PK	PASS
982.35	47.4	35.89	-11.520	54.00	18.11	110	PK	PASS



(Antenna Horizontal, 1GHz to 10GHz)

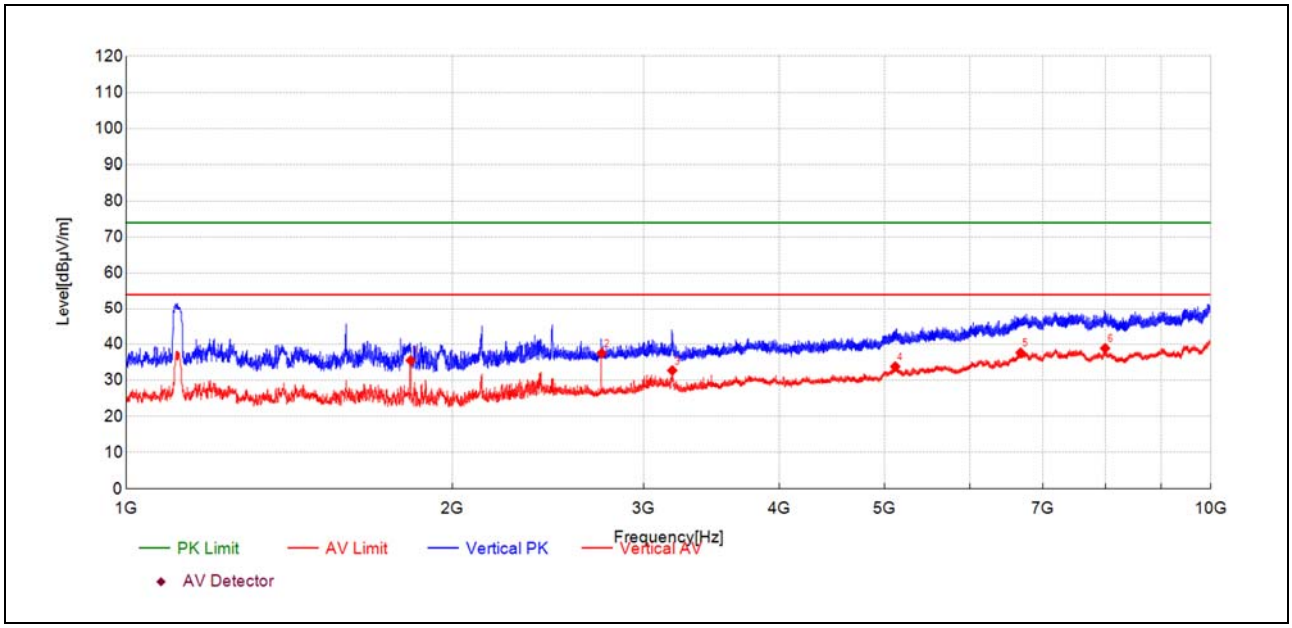
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
1830.17	56.3	37.91	-18.380	54.00	16.09	201	AV	PASS
3659.91	59.5	50.57	-8.890	54.00	3.43	144	AV	PASS
4575.11	56.7	50.06	-6.590	54.00	3.94	166	AV	PASS
5489.37	44.4	42.44	-2.000	54.00	11.56	188	AV	PASS
6405.03	42.1	43.20	1.060	54.00	10.80	199	AV	PASS
8234.02	42.4	47.47	5.120	54.00	6.53	264	AV	PASS

Frequency [MHz]	Factor [dB/m]	AV Reading [dBµV]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Angle [°]	Polarity	Verdict
4575.46	-6.59	35.46	28.87	54.00	25.13	65	Horizontal	PASS



(Antenna Vertical, 30MHz to 1GHz)

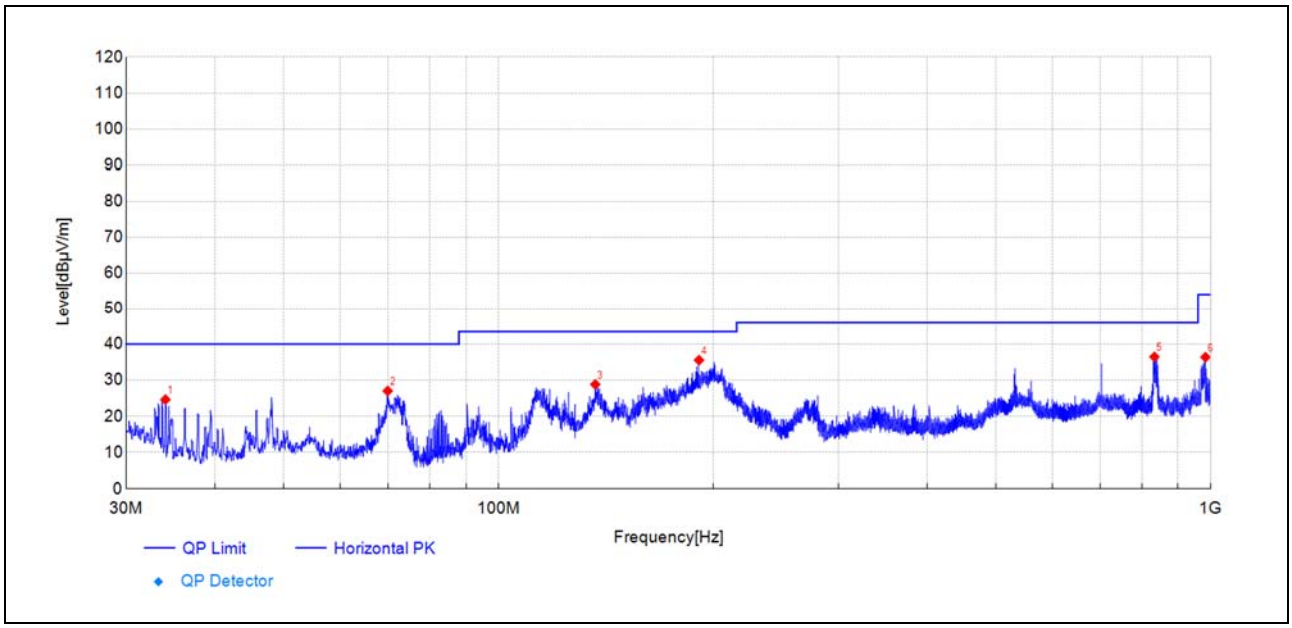
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
71.95	63.4	32.12	-31.230	40.00	7.88	140	PK	PASS
120.70	56.5	26.05	-30.470	43.50	17.45	135	PK	PASS
272.03	51.2	24.70	-26.520	46.00	21.30	292	PK	PASS
531.32	49.9	31.23	-18.620	46.00	14.77	214	PK	PASS
843.48	48.4	35.12	-13.250	46.00	10.88	62	PK	PASS
980.41	47.8	36.25	-11.590	54.00	17.75	93	PK	PASS



(Antenna Vertical, 1GHz to 10GHz)

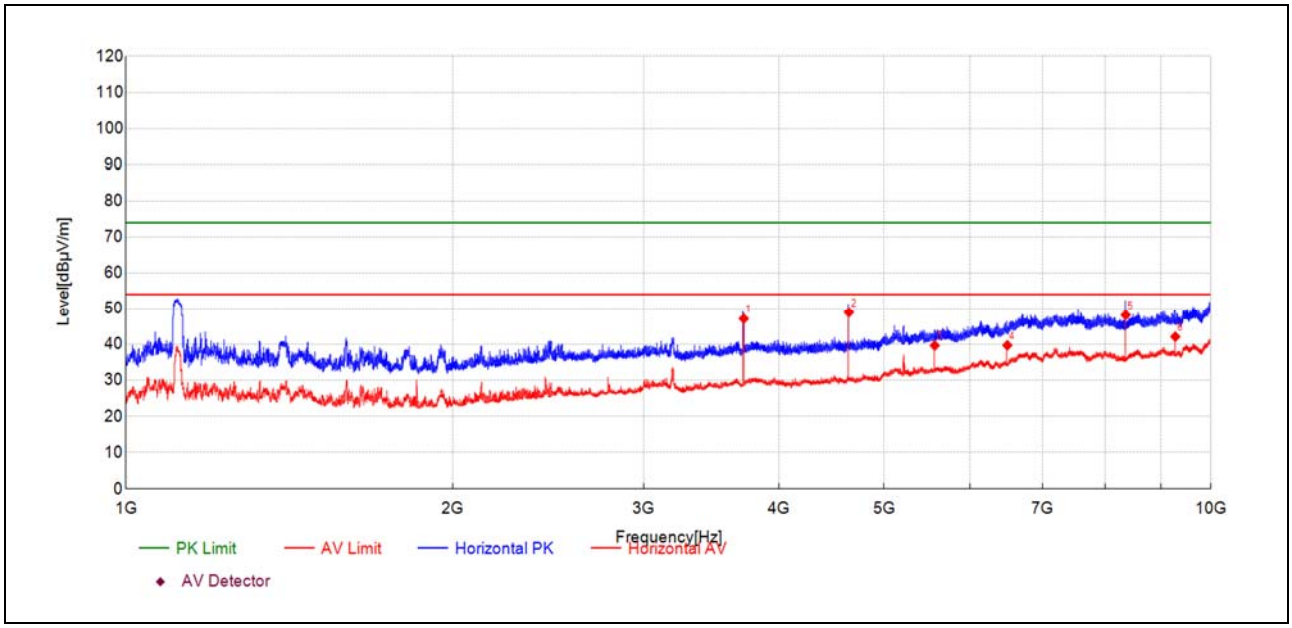
Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
1830.17	53.9	35.48	-18.380	54.00	18.52	340	AV	PASS
2745.15	50.3	37.48	-12.790	54.00	16.52	53	AV	PASS
3188.55	43.5	32.71	-10.750	54.00	21.29	264	AV	PASS
5119.27	36.8	33.80	-3.030	54.00	20.20	1	AV	PASS
6679.91	33.8	37.63	3.880	54.00	16.37	254	AV	PASS
7991.80	33.8	38.87	5.040	54.00	15.13	143	AV	PASS

Plot for Channel 128



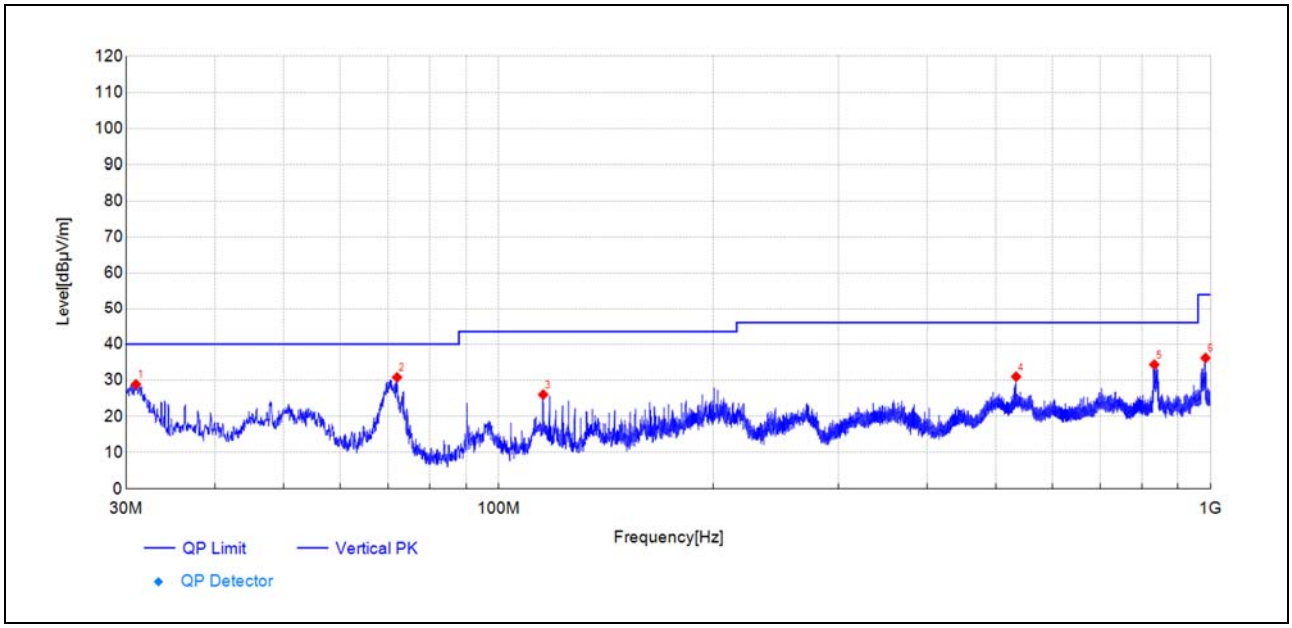
(Antenna Horizontal, 30MHz to 1GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
34.07	54.4	24.62	-29.770	40.00	15.38	225	PK	PASS
69.92	58.1	27.02	-31.100	40.00	12.98	360	PK	PASS
136.75	60.8	28.83	-31.930	43.50	14.67	57	PK	PASS
191.27	65.5	35.56	-29.940	43.50	7.94	110	PK	PASS
833.69	50.1	36.48	-13.600	46.00	9.52	142	PK	PASS
983.12	47.9	36.39	-11.480	54.00	17.61	36	PK	PASS



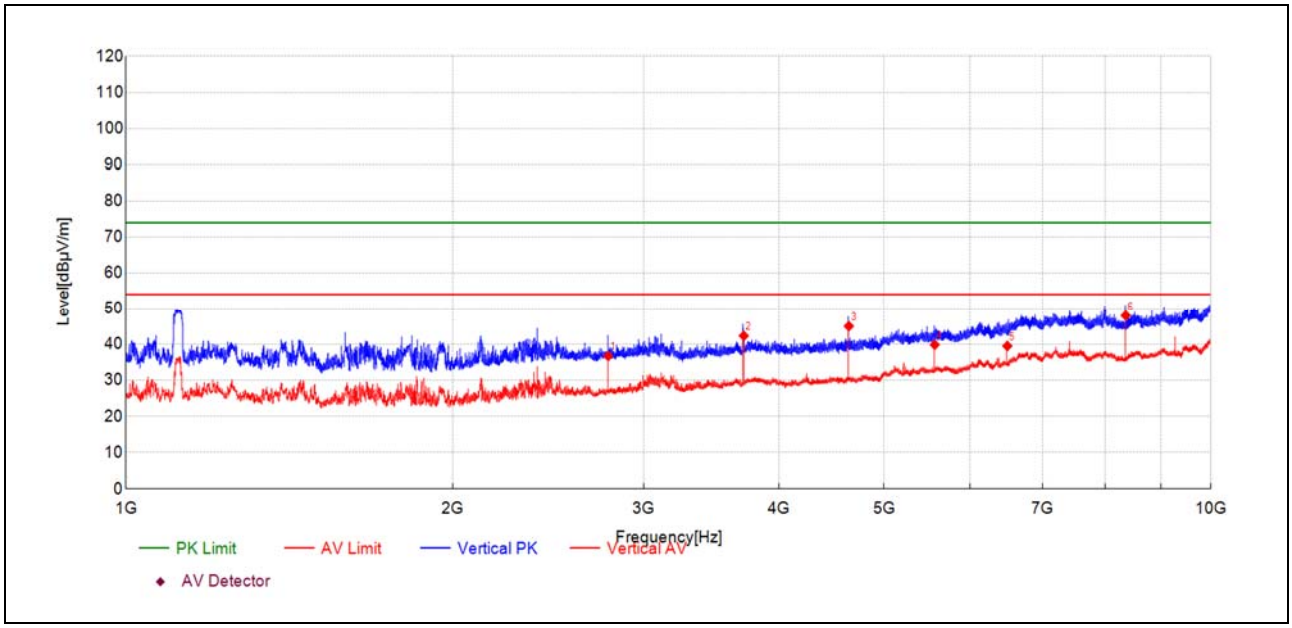
(Antenna Horizontal, 1GHz to 10GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
3711.25	56.3	47.15	-9.110	54.00	6.85	232	AV	PASS
4639.04	55.3	48.95	-6.320	54.00	5.05	242	AV	PASS
5566.37	41.7	39.66	-2.020	54.00	14.34	265	AV	PASS
6494.17	37.8	39.71	1.920	54.00	14.29	330	AV	PASS
8349.29	43.4	48.18	4.740	54.00	5.82	340	AV	PASS
9277.09	34.6	42.11	7.480	54.00	11.89	330	AV	PASS



(Antenna Vertical, 30MHz to 1GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
30.97	59.5	28.86	-30.610	40.00	11.14	36	PK	PASS
72.05	62.1	30.80	-31.250	40.00	9.20	0	PK	PASS
115.56	56.0	26.01	-30.020	43.50	17.49	88	PK	PASS
533.16	49.7	31.00	-18.720	46.00	15.00	234	PK	PASS
833.39	48.0	34.34	-13.650	46.00	11.66	72	PK	PASS
983.46	47.7	36.19	-11.460	54.00	17.81	93	PK	PASS



(Antenna Vertical, 1GHz to 10GHz)

Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Detector	Verdict
2783.56	49.5	36.73	-12.750	54.00	17.27	135	AV	PASS
3711.25	51.5	42.34	-9.110	54.00	11.66	175	AV	PASS
4639.04	51.4	45.04	-6.320	54.00	8.96	44	AV	PASS
5566.37	41.9	39.86	-2.020	54.00	14.14	297	AV	PASS
6494.17	37.6	39.51	1.920	54.00	14.49	351	AV	PASS
8349.29	43.3	48.02	4.740	54.00	5.98	22	AV	PASS

END OF REPORT