Test Report

Report No.: MTi230621033-22E1

Date of issue: 2025-03-03

Applicant: Shenzhen Fuwit Technology Co., Ltd

Product: UHF RFID Reader

Model(s): FU-M6-IN1

FCC ID: 2A9GZ-FUM6IN1

Shenzhen Microtest Co., Ltd.

http://www.mtitest.com

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Test Result Certification		
Applicant	**Shenzhen Fuwit Technology Co., Ltd**	
Applicant Address	3613 Changping Business Building, No. 99, Honghua Road, Futian Free Trade Zone, Shenzhen, China	
Manufacturer	**Shenzhen Fuwit Technology Co., Ltd**	
Manufacturer Address	3613 Changping Business Building, No. 99, Honghua Road, Futian Free Trade Zone, Shenzhen, China	
Product description		
Product name	UHF RFID Reader	
Trademark	FUWIT	
Model name	FU-M6-IN1	
Series Model(s)	N/A	
Standards	47 CFR Part 15.247	
Test method	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02	
Testing Information		
Date of test	2023-01-30 ~ 2023-02-02 2025-02-06 ~ 2025-02-28	
Test Result	Pass	
Prepared by	Letter Lan	Letter. Lan.
Reviewed by	David Lee	David. Lee
Approved by	Lewis Lian	Lewis Lian

1 General Description

1.1 Description of the EUT

Product name:	UHF RFID Reader
Model name:	FU-M6-IN1
Series Model:	N/A
Model difference:	N/A
Electrical rating:	Input: DC 12V 2A
Hardware version:	FU-S7
Software version:	ZEUS_V1.0.4.0
Accessories:	Cable: Lan cable 100cm *1
EUT serial number:	MTi230621033-22-S0001
RF specification:	
Operation frequency:	NA2 mode: 917.4 MHz ~ 927.2 MHz (channel separation: 200 kHz) NA3 mode: 917.5 MHz ~ 922.5 MHz (channel separation: 100 kHz)
Modulation type:	ASK
Antenna designation:	PCB antenna, antenna Gain: 5.82dBi

1.2 Description of test modes

1.2.1 Test channels

For NA2 mode	
Chanel	Frequency
Lowest	917.4 MHz
Middle	922.4 MHz
Highest	927.2 MHz

For NA3 mode	
Chanel	Frequency
Lowest	917.5 MHz
Middle	920 MHz
Highest	922.5 MHz

Note: The test software has been used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

Operation channel list

NA2 mode: 917.4 MHz ~ 927.2 MHz

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	917.4	20	921.2	40	925.2	-	-
1	917.6	21	921.4	41	925.4	-	-
2	917.8	22	921.6	42	925.6	-	-
3	918.0	23	921.8	43	925.8	-	-
4	918.2	24	922.0	44	926.0	-	-
5	918.4	25	922.2	45	926.2	-	-
6	918.6	26	922.4	46	926.4	-	-
7	918.8	27	922.6	47	926.6	-	-
8	919.0	28	922.8	48	926.8	-	-
9	919.2	29	923.0	49	927.0	-	-
10	919.4	30	923.2	50	927.2	-	-
11	919.6	31	923.4	-	-	-	-
12	919.8	32	923.6	-	-	-	-
13	920.0	33	923.8	-	-	-	-
14	920.2	34	924.0	-	-	-	-
15	920.4	35	924.2	-	-	-	-
16	920.6	36	924.4	-	-	-	-
17	920.8	37	924.6	-	-	-	-
18	921.0	38	924.8	-	-	-	-
19	917.4	39	925.0	-	-	-	-

NA3 mode: 917.5 MHz ~ 922.5 MHz

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	917.5	20	919.4	40	921.4	-	-
1	917.6	21	919.5	41	921.5	-	-
2	917.7	22	919.6	42	921.6	-	-
3	917.8	23	919.7	43	921.7	-	-
4	917.9	24	919.8	44	921.8	-	-
5	918.0	25	919.9	45	921.9	-	-
6	918.1	26	920.0	46	922.0	-	-
7	918.2	27	920.1	47	922.1	-	-
8	918.3	28	920.2	48	922.2	-	-
9	918.4	29	920.3	49	922.3	-	-
10	918.5	30	920.4	50	922.4	-	-
11	918.6	31	920.5	-	-	-	-
12	918.7	32	920.6	-	-	-	-
13	918.8	33	920.7	-	-	-	-
14	918.9	34	920.8	-	-	-	-
15	919.0	35	920.9	-	-	-	-
16	919.1	36	921.0	-	-	-	-
17	919.2	37	921.1	-	-	-	-
18	919.3	38	921.2	-	-	-	-
19	917.5	39	921.3	-	-	-	-

1.2.2 Description of support units

Support equipment list			
Description	Model	Serial No.	Manufacturer
/	/	/	/

1.3 Measurement uncertainty

Measurement	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	±3.1dB
Occupied channel bandwidth	±3 %
RF output power, conducted	±1 dB
Time	±1 %
Unwanted Emissions, conducted	±1 dB
Radiated spurious emissions (above 1GHz)	±5.3dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 Summary of Test Result

No.	FCC reference	Description of test	Result
1	§ 15.203	Antenna requirement	Pass
2	§ 15.207	AC power line conducted emissions	Pass
3	15.247(a)(1)	20dB occupied bandwidth	Pass
4	15.247(b)(2)	Conducted peak output power	Pass
5	15.247(a)(1)	Carrier Frequencies Separation	Pass
6	15.247(a)(1)	Average time of occupancy (Dwell time)	Pass
7	15.247(a)(1)	Number of hopping channels	Pass
8	15.247(d)	Conducted emission at the band edge	Pass
9	15.247(d)	Conducted spurious emissions	Pass
10	15.247(d)	Radiated spurious emissions	Pass

Note: N/A means not applicable.

3 Test Facilities and Accreditations

3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573

4 Equipment List

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
20dB Bandwidth Maximum Conducted Output Power Channel Separation Number of Hopping Frequencies Dwell Time Emissions in non-restricted frequency bands						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2024-03-20	2025-03-19
2	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2024-03-21	2025-03-20
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2024-03-21	2025-03-20
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2024-03-21	2025-03-20
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2024-03-21	2025-03-20
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2024-03-21	2025-03-20
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2024-03-20	2025-03-19
9	DC Power Supply	Agilent	E3632A	MY40027695	2024-03-21	2025-03-20
Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	2278	2023-06-17	2025-06-16
3	Amplifier	Agilent	8449B	3008A01120	2024-03-20	2025-03-19
4	MXA signal analyzer	Agilent	N9020A	MY54440859	2024-03-21	2025-03-20
5	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2024-03-21	2025-03-20

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
6	Horn antenna	Schwarzbeck	BBHA 9170	00987	2023-06-17	2025-06-16
7	Pre-amplifier	Space-Dtronics	EWLAN1840G	210405001	2024-03-21	2025-03-20
Emissions in frequency bands (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2024-03-20	2025-03-19
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2024-03-23	2025-03-22
4	Amplifier	Hewlett-Packard	8447F	3113A06184	2024-03-20	2025-03-19

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
MTi-E002	EMI Test Receiver	R&S	ESCI3	101368	2022/06/02	2023/06/01
MTi-E023	Artificial power network	Schwarzbeck	NSLK8127	NSLK8127#841	2022/06/02	2023/06/01
MTi-E025	Artificial power network	Schwarzbeck	NSLK8127	8127183	2022/06/02	2023/06/01
MTI-E043	EMI test receiver	R&S	ESCI7	101166	2022/06/02	2023/06/01
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00044	2021/05/30	2023/05/29
MTI-E044	Broadband antenna	Schwarzbeck	VULB9163	9163-1338	2021/05/30	2023/05/29
MTI-E045	Horn antenna	Schwarzbeck	BBHA9120D	9120D-2278	2021/05/30	2023/05/29
MTI-E047	Pre-amplifier	Hewlett-Packard	8447F	3113A06184	2022/06/02	2023/06/01
MTI-E048	Pre-amplifier	Agilent	8449B	3008A01120	2022/06/02	2023/06/01
MTi-E120	Broadband antenna	Schwarzbeck	VULB9163	9163-1419	2021/05/30	2023/05/29
MTi-E121	Pre-amplifier	Hewlett-Packard	8447D	2944A09365	2022/04/16	2023/04/15
MTi-E123	Pre-amplifier	Agilent	8449B	3008A04723	2022/05/06	2023/05/05
MTi-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2022/06/23	2023/06/22
MTi-E067	RF Control Unit	Tonscend	JS0806-1	19D8060152	2022/06/02	2023/06/01
MTi-E068	RF Control Unit	Tonscend	JS0806-2	19D8060153	2022/06/02	2023/06/01
MTi-E069	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2022/06/02	2023/06/01
MTI-E010S	EMI Measurement Software	Farad	EZ-EMC Ver. EMEC-3A1	/	/	/

MTI-E014S	RF Test System	Tonscend	TS®JS1120 V2.6.88.0330	/	/	/

5 Test Result

5.1 Antenna requirement

15.203 requirement

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 §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Description of the antenna of EUT

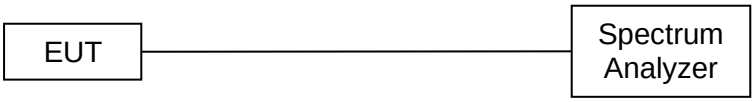
The antenna of EUT is PCB antenna (Antenna Gain: 5.82 dBi). which is no consideration of replacement.

5.2 20dB occupied bandwidth

5.2.1 Limits

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.

5.2.2 Test setup



5.2.3 Test procedures

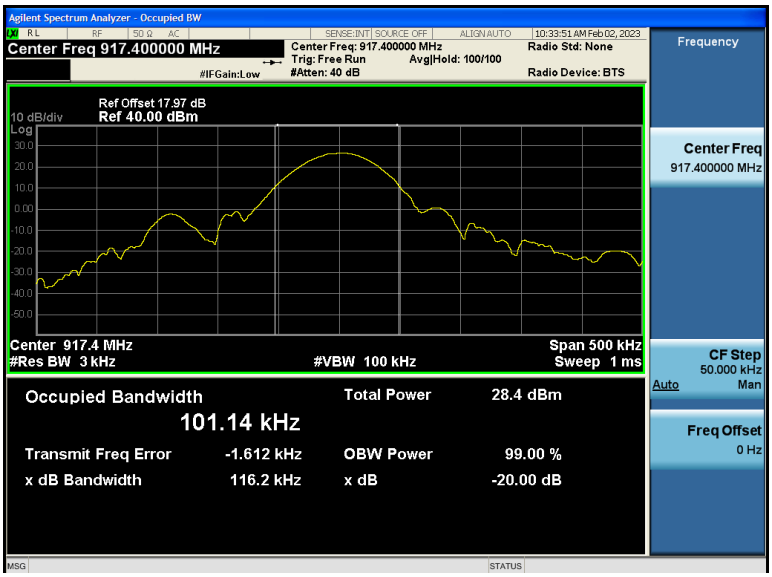
a) Test method: ANSI C63.10-2013 Section 6.9.2.
b) The transmitter output of EUT is connected to the spectrum analyzer.
c) Spectrum analyzer setting:
RBW = 1% ~ 5% of the OWB,
VBW = approximately three times RBW

5.2.4 Test results

Mode	Test channel (MHz)	20dB Bandwidth (MHz)	Limit (kHz)
NA2 mode	917.4	0.1162	≤ 500
	922.4	0.1137	
	927.2	0.1146	
NA3 mode	917.5	0.1149	
	920.0	0.1128	
	922.5	0.1163	

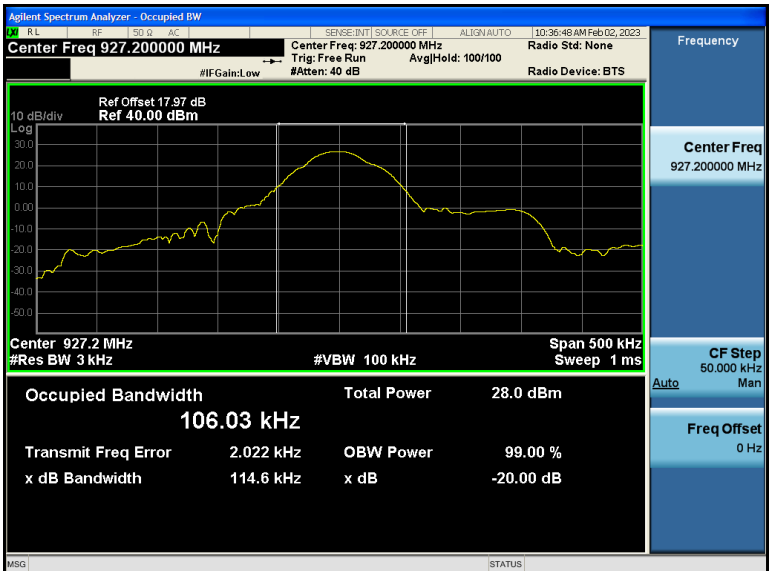
NA2 mode - 20dB occupied bandwidth

917.4 MHz



922.4 MHz

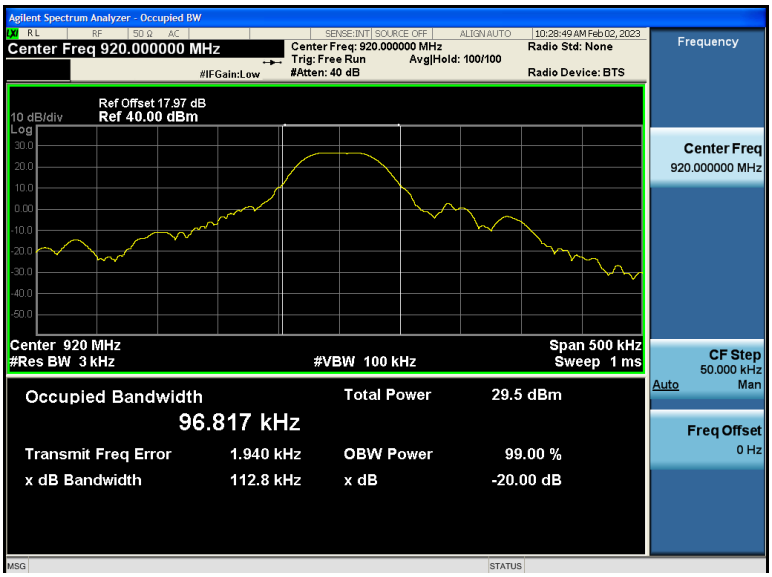
927.2 MHz



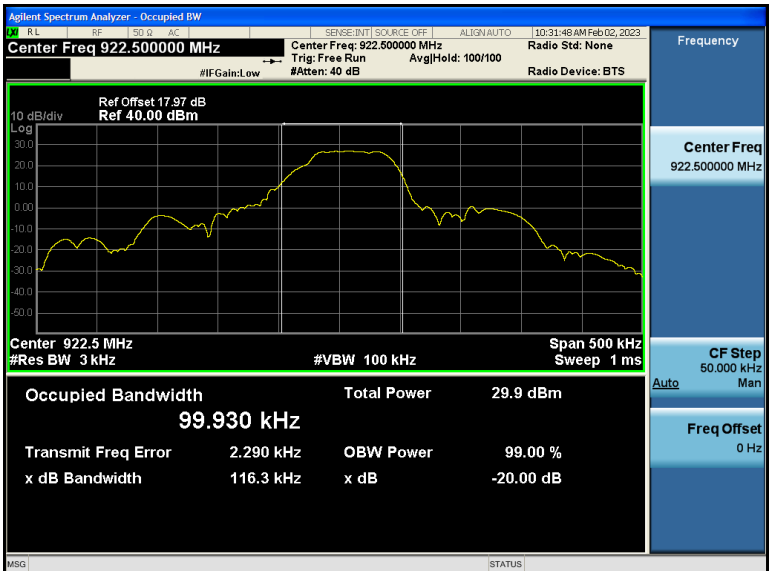
NA3 mode - 20dB occupied bandwidth

917.5 MHz

920.0 MHz



922.5 MHz

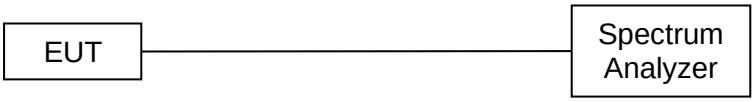


5.3 Conducted peak output power

5.3.1 Limits

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

5.3.2 Test setup



5.3.3 Test procedure

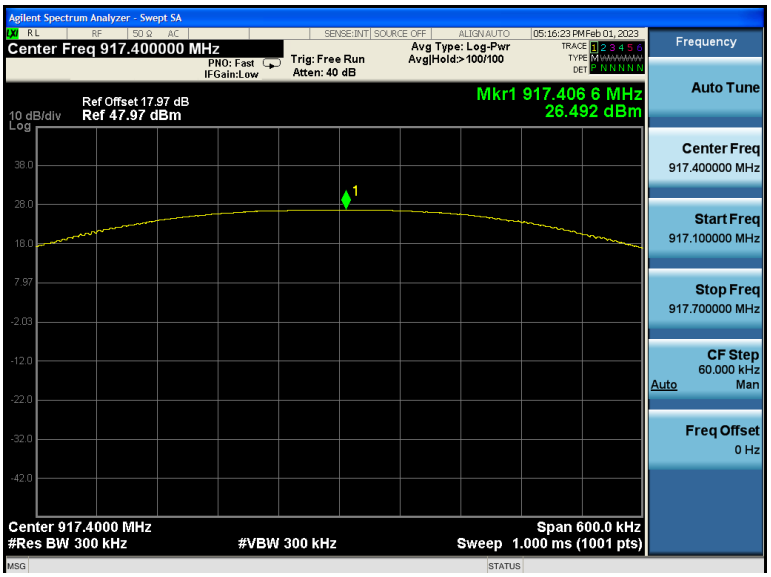
a) Test method: ANSI C63.10-2013 Section 7.8.5.
b) The EUT was set to continuously transmitting in the max power during the test.
c) The transmitter output of EUT is connected to the spectrum analyzer.
d) Spectrum analyzer setting: RBW > 20dB occupied bandwidth, VBW ≥ RBW, detector= Peak

5.3.4 Test results

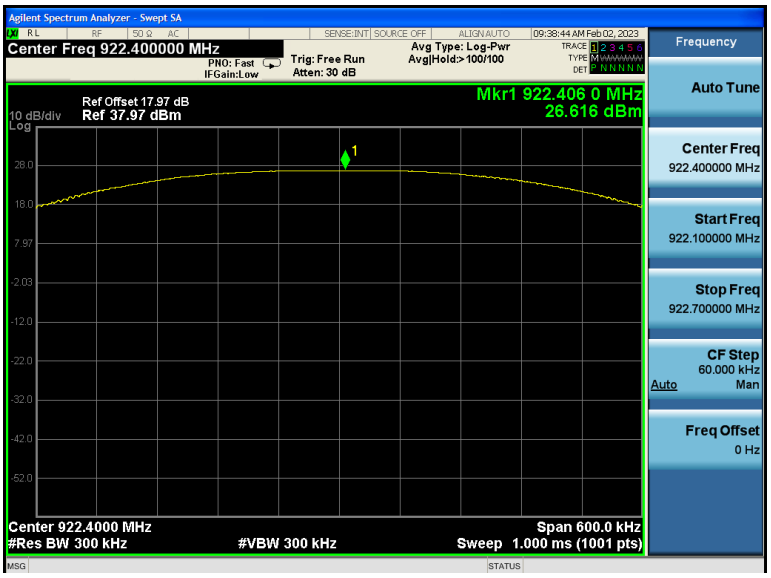
Mode	Test channel (MHz)	Conducted peak output power (dBm)	Limit (dBm)
NA2 mode	917.4	26.492	≤ 30
	922.4	26.616	
	927.2	26.749	
NA3 mode	917.5	26.527	
	920	26.586	
	922.5	26.670	

NA2 mode - peak conducted output power

917.4 MHz



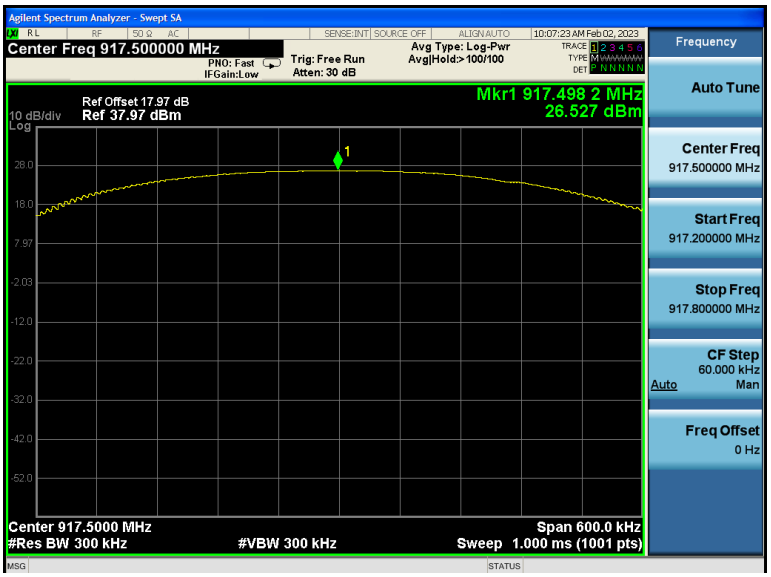
922.4 MHz



927.2 MHz

NA3 mode - peak conducted output power

917.5 MHz



920.0 MHz

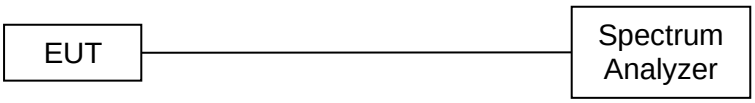
922.5 MHz

5.4 Carrier frequency separation

5.4.1 Limits

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.

5.4.2 Test setup



5.4.3 Test procedure

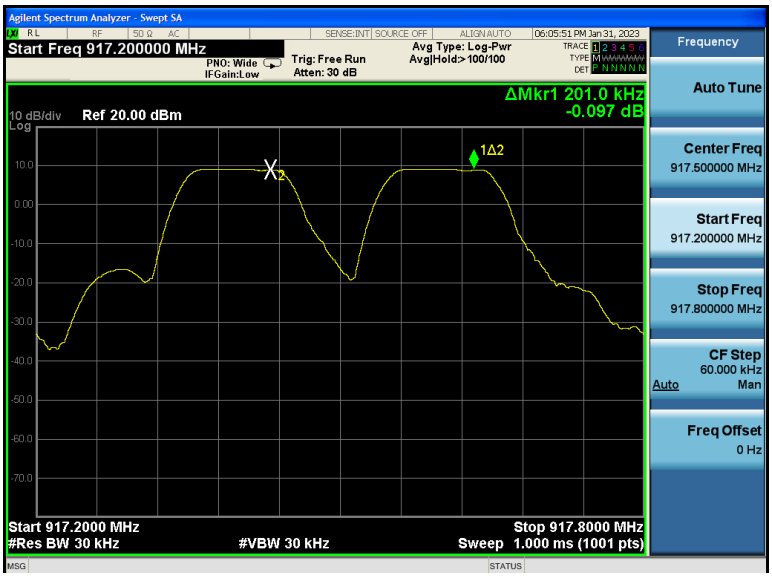
a) Test method: ANSI C63.10-2013 Section 7.8.2.
b) The EUT was set to hopping mode during the test.
c) The transmitter output of EUT is connected to the spectrum analyzer.
d) Spectrum Setting: RBW = 30 kHz, VBW = 30 kHz, detector= Peak.

5.4.4 Test results

Mode	Test channel	Carrier frequency separation (kHz)	Limit (kHz)
NA2 mode	Hop-mode	201.0	>= 20 dB bandwidth
NA3 mode	Hop-mode	180.6	>= 20 dB bandwidth

Carrier frequency separation

NA2 mode



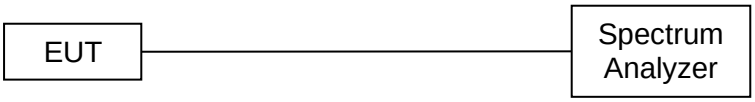
NA3 mode

5.5 Average time of occupancy

5.5.1 Limits

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.

5.5.2 Test setup



5.5.3 Test procedure

a) Test method: ANSI C63.10-2013 Section 7.8.4

b) The EUT was set to hopping mode during the test.

c) The transmitter output of EUT is connected to the spectrum analyzer.

d) Spectrum analyzer setting: RBW = 120kHz, VBW = 300kHz, Span = 0Hz, Detector = Peak, weep time: As necessary to capture the entire dwell time per hopping channel.

e) Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

f) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

5.5.4 Test results

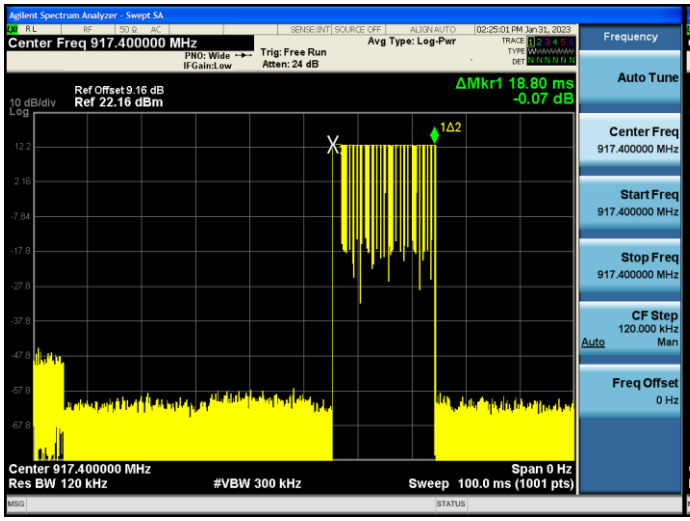
Mode	Test Channel (MHz)	Pulse width (ms)	Number of pulses in 20 s	Average time of occupancy (s)	Limit (s)	Result
NA2 mode	917.4	18.80	17	0.320	<=0.4	Pass
	922.4	18.80	18	0.338	<=0.4	Pass
	927.2	18.80	18	0.338	<=0.4	Pass
NA3 mode	917.5	19.00	17	0.323	<=0.4	Pass
	920.0	18.80	17	0.320	<=0.4	Pass
	922.5	18.80	17	0.320	<=0.4	Pass

Notes:

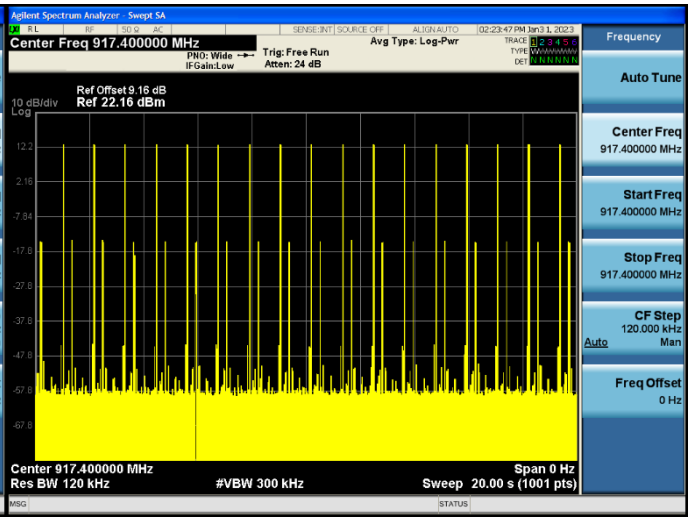
1. Average time of occupancy = Pulse width * Number of pulses in 20s

NA2 mode - Average time of occupancy

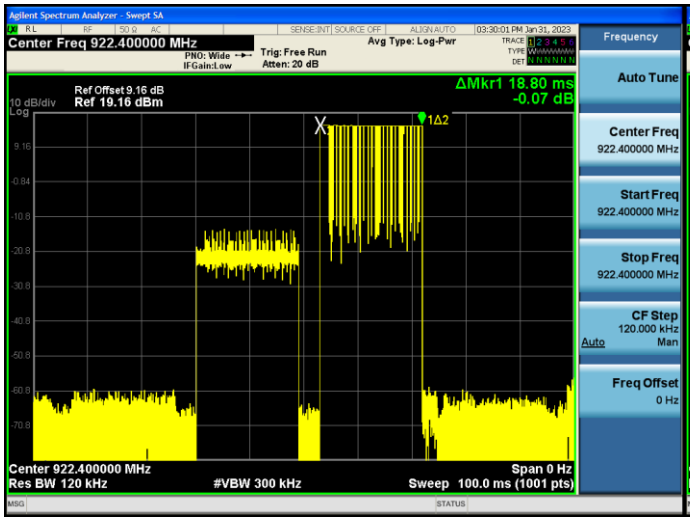
917.4 MHz - Pulse width



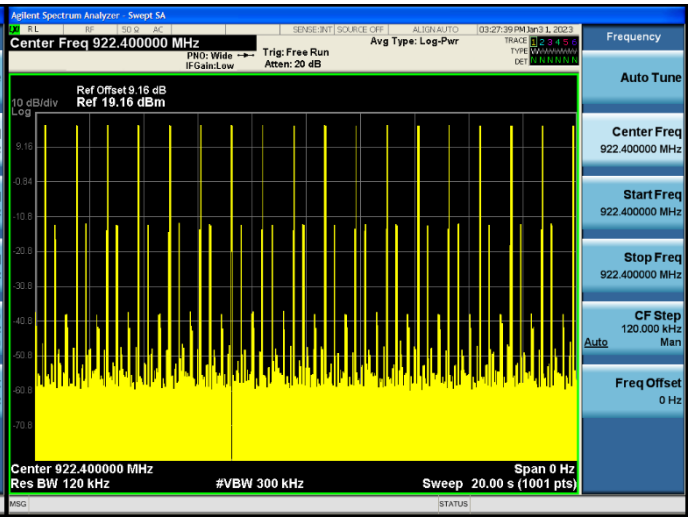
917.4 MHz - Number of pulses in 20 s



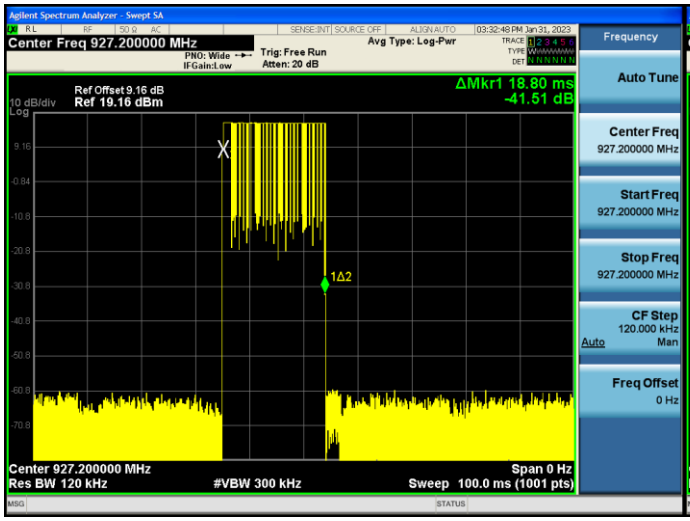
922.4 MHz - Pulse width



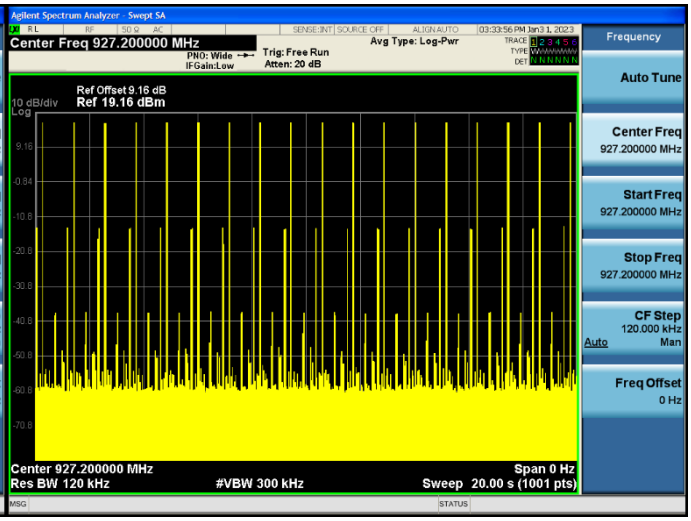
922.4 MHz - Number of pulses in 20 s



927.2 MHz - Pulse width

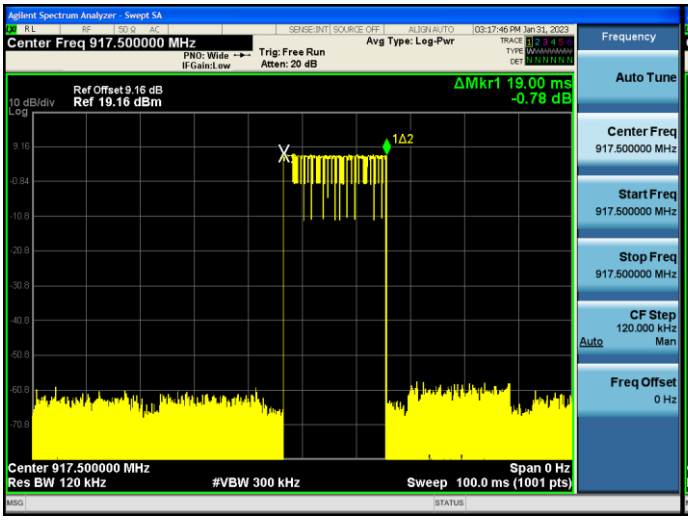


927.2 MHz - Number of pulses in 20 s

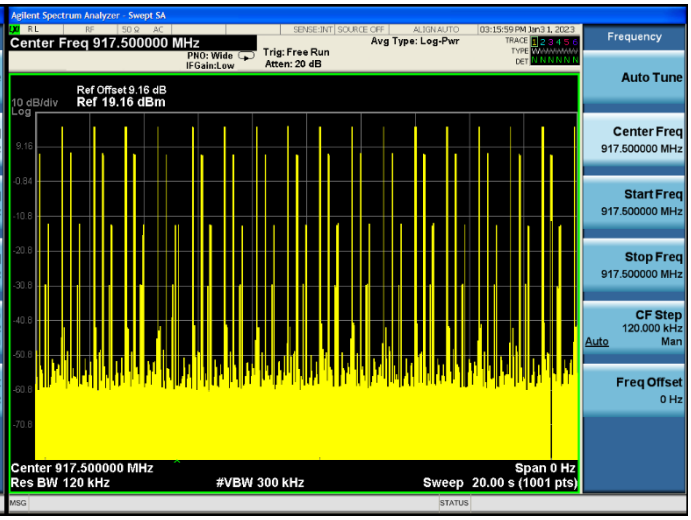


NA3 mode - Average time of occupancy

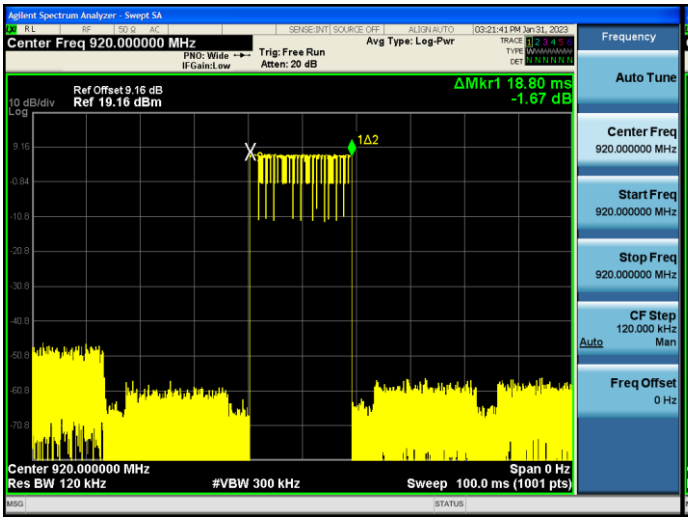
917.5 MHz - Pulse width



917.5 MHz - Number of pulses in 20 s

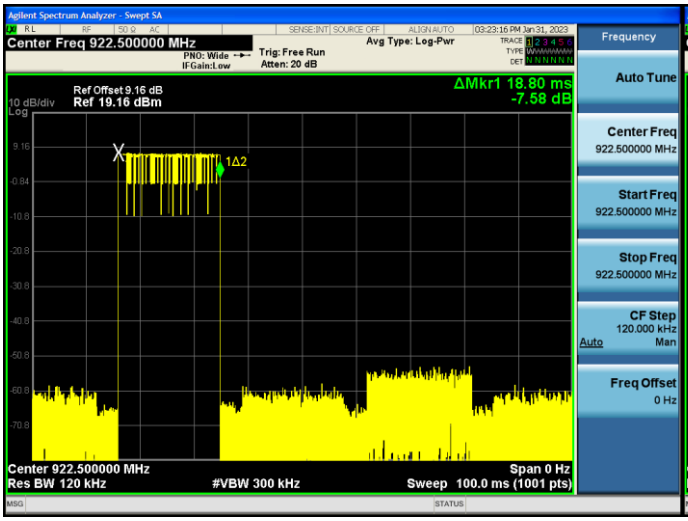


920.0 MHz – Pulse width



920.0 MHz - Number of pulses in 20 s

922.5 MHz - Pulse width



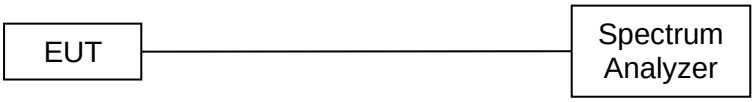
922.5 MHz - Number of pulses in 20 s

5.6 Number of hopping channels

5.6.1 Limit

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.

5.6.2 Test setup



5.6.3 Test procedure

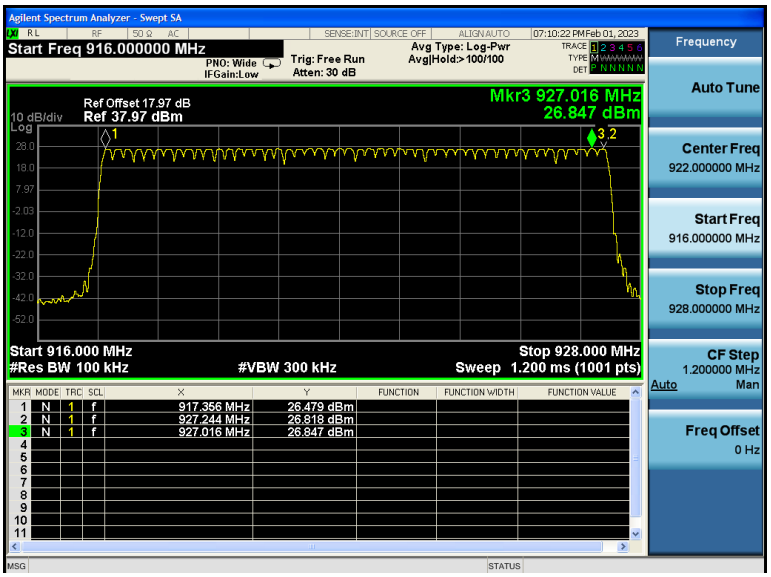
a) Test method: ANSI C63.10-2013 Section 7.8.3
b) The EUT was set to hopping mode during the test.
c) The transmitter output of EUT is connected to the spectrum analyzer.
d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

5.6.4 Test results

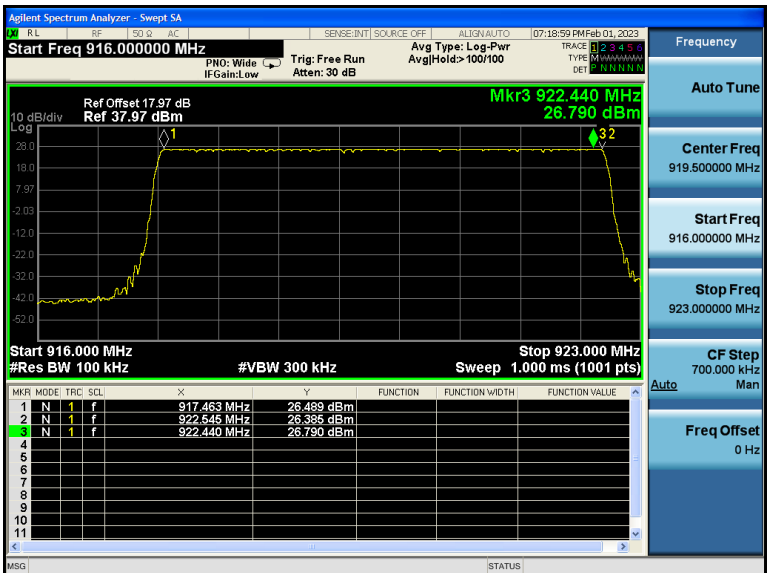
Mode	Quantity of Hopping Channel	Limit	Results
NA2 mode	50	≥ 50	Pass
NA3 mode	51		Pass

Number of hopping channels

NA2 mode



NA3 mode

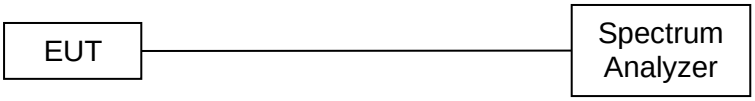


5.7 Conducted emissions at the band edge

5.7.1 Limits

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.7.2 Test setup



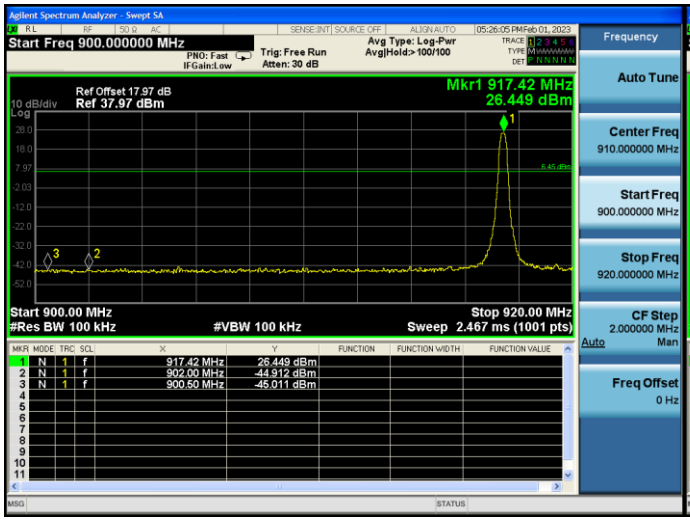
5.7.3 Test procedure

a) Test method: ANSI C63.10-2013 Section 6.10.4
b) The EUT was set to non-hopping mode & hopping mode during the test.
c) The transmitter output of EUT is connected to the spectrum analyzer.
d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

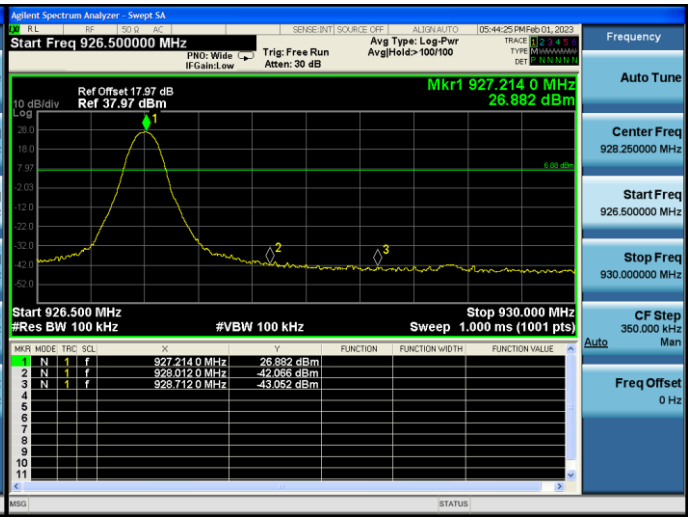
5.7.4 Test results

NA2 mode - conducted emissions at the band edge

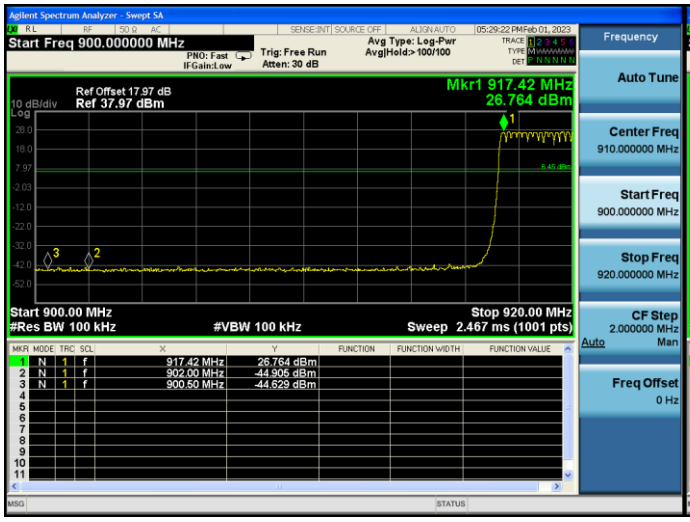
Low band-edge (no-hopping mode mode)



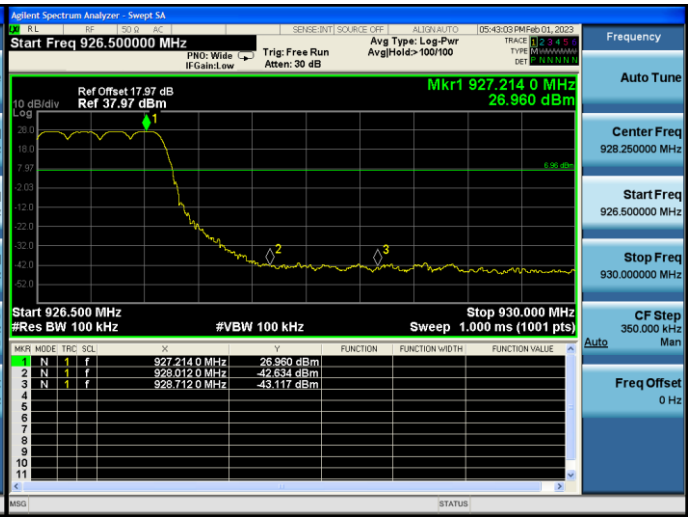
High band-edge (non-hopping mode)



Low band-edge (hopping mode)

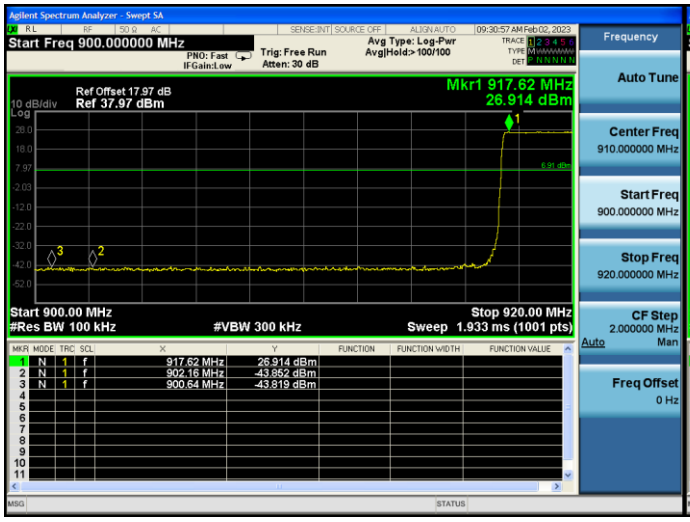


High band-edge (hopping mode)

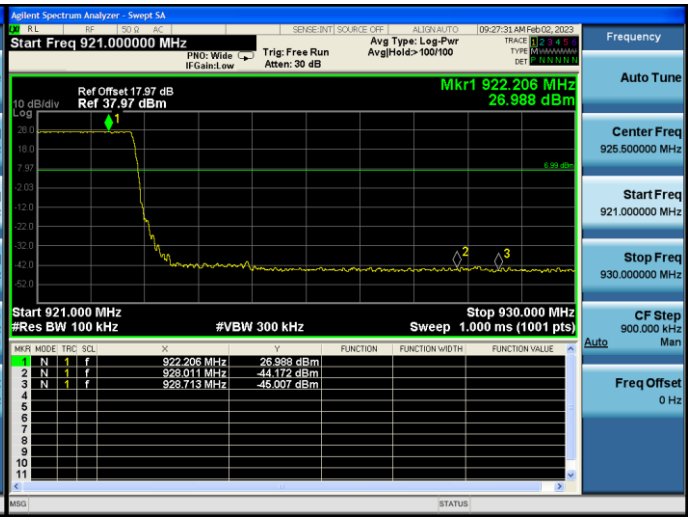


NA3 mode - conducted emissions at the band edge

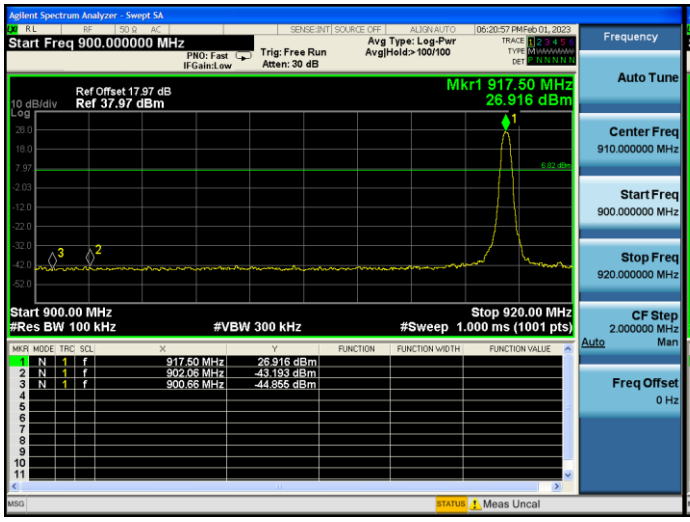
Low band-edge (no-hopping mode mode)



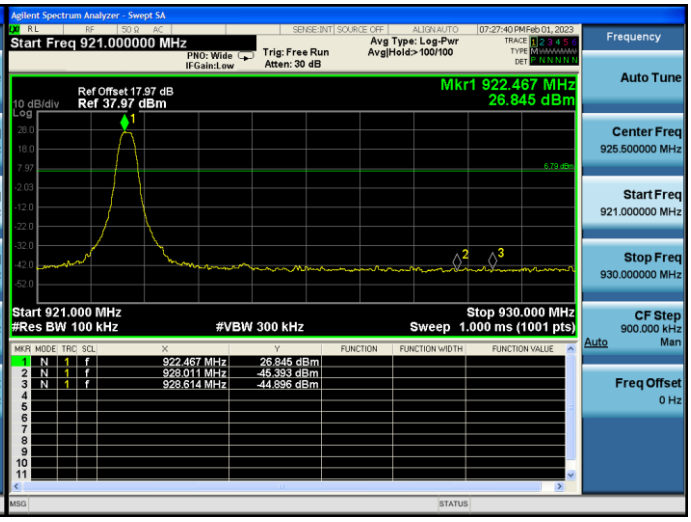
High band-edge (non-hopping mode)



Low band-edge (hopping mode)



High band-edge (hopping mode)

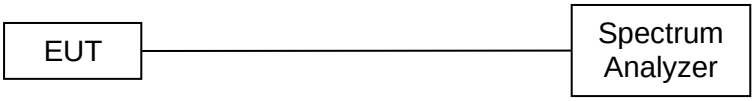


5.8 Conducted spurious emissions

5.8.1 Limits

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.8.2 Test setup



5.8.3 Test procedure

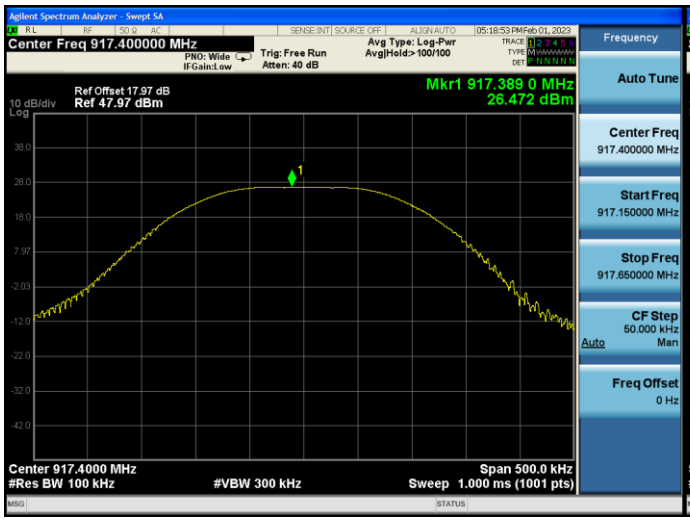
a) Test method: ANSI C63.10-2013 Section 6.10.4
b) The EUT was set to non-hopping mode & hopping mode during the test.
c) The transmitter output of EUT is connected to the spectrum analyzer.
d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

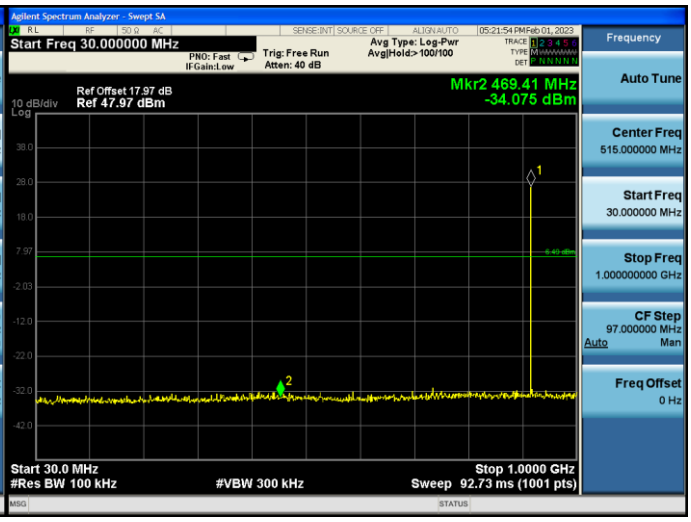
5.8.4 Test results

Notes:
All modes of operation of the EUT were investigated, and only the worst-case results are reported.

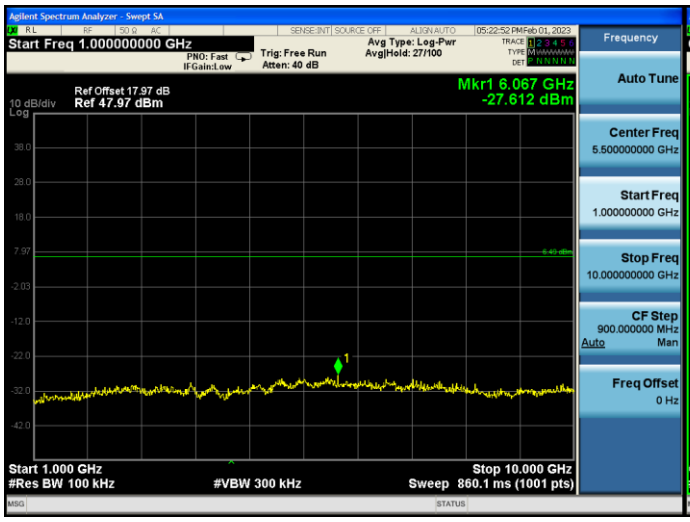
Conducted spurious emissions – NA2 mode

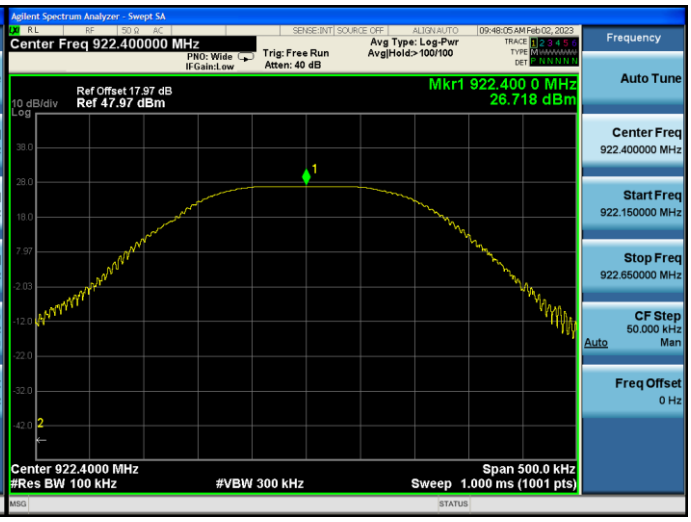
917.4 MHz **917.4 MHz**



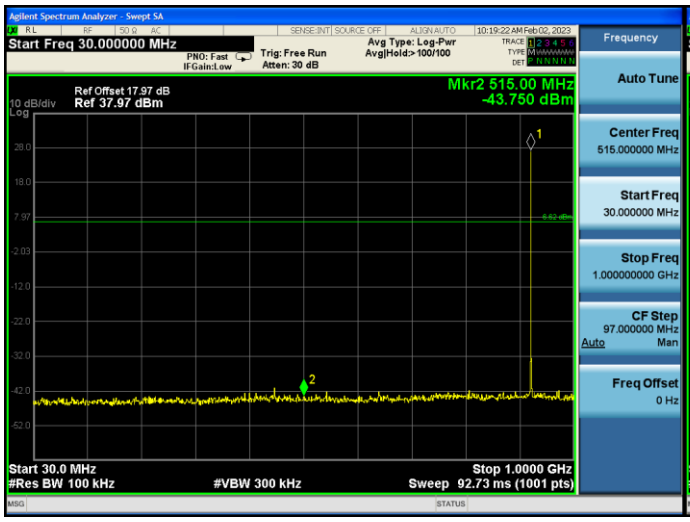


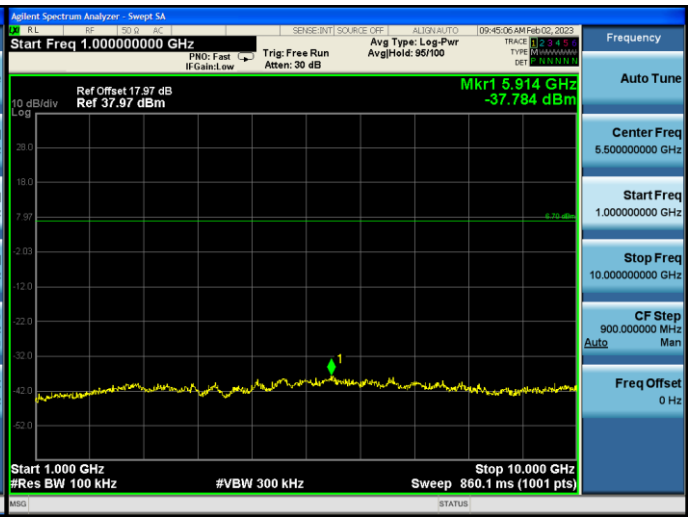
917.4 MHz **922.4 MHz**



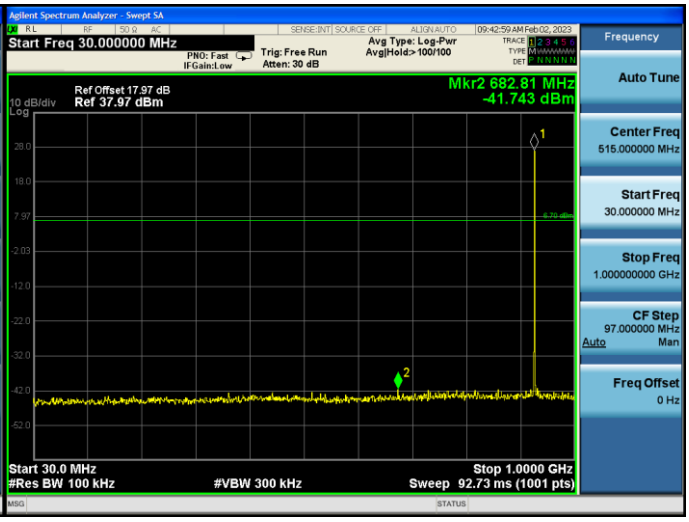


922.4 MHz **922.4 MHz**





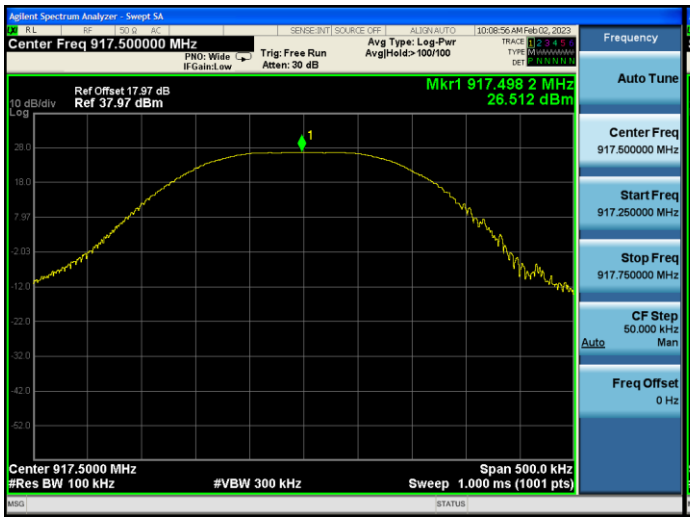
927.2 MHz **927.2 MHz**

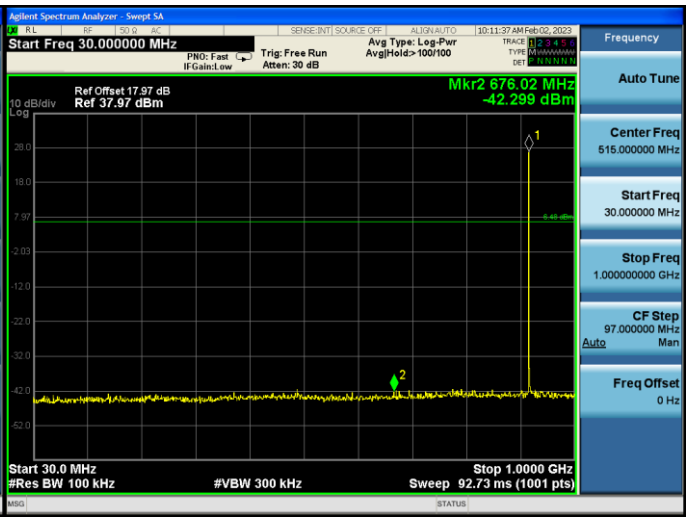


927.2 MHz

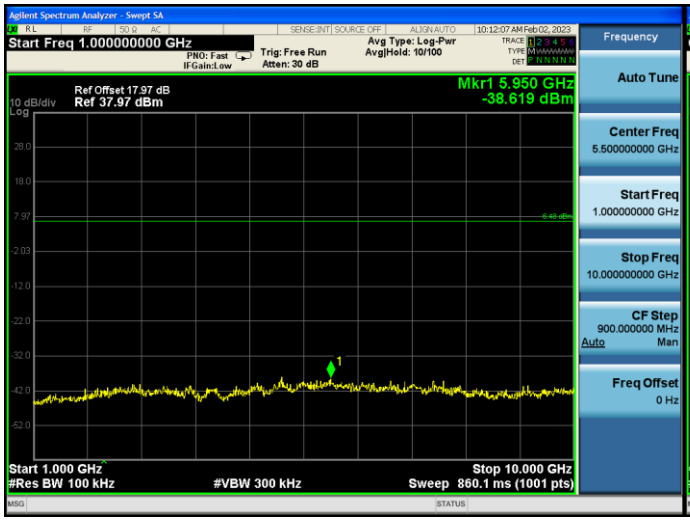
Conducted spurious emissions – NA3 mode

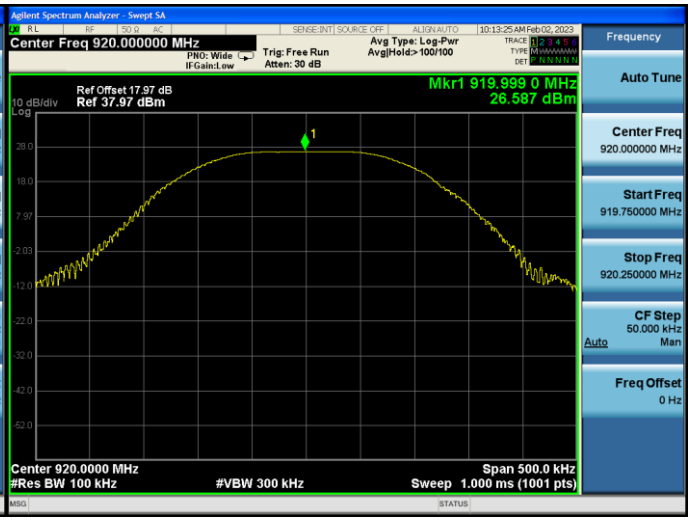
917.5 MHz **917.5 MHz**



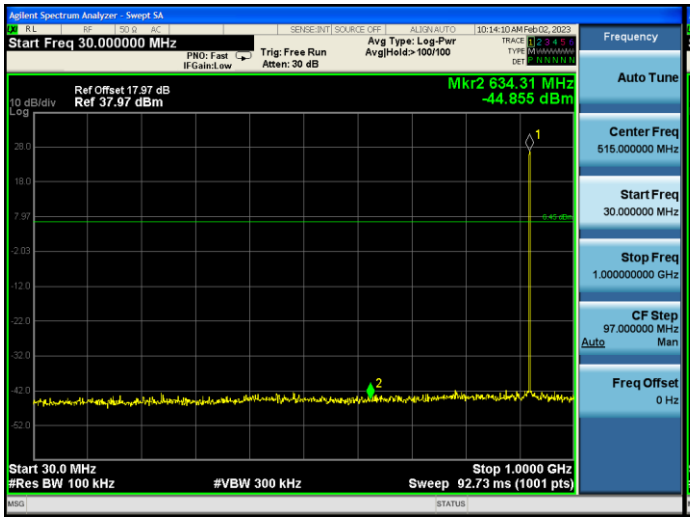


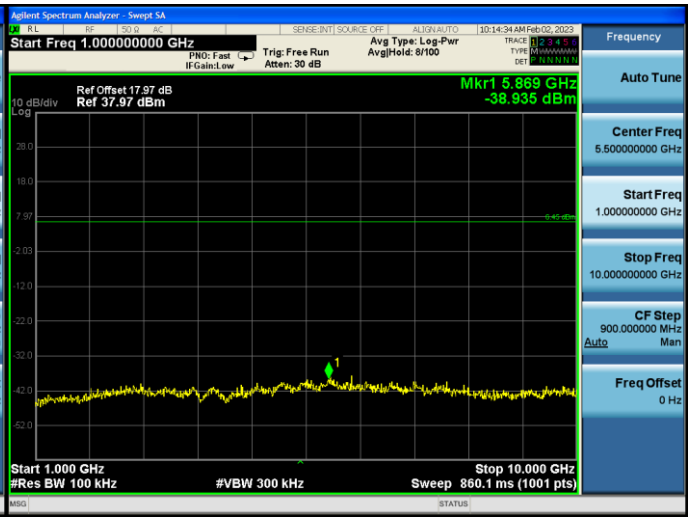
917.5 MHz **920.0 MHz**



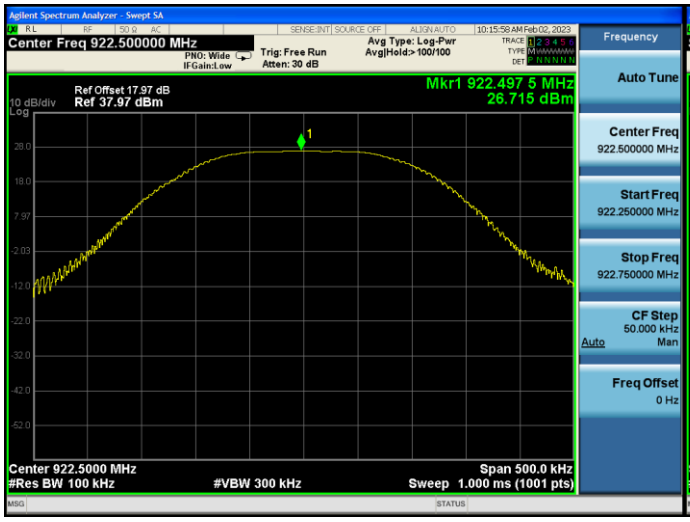


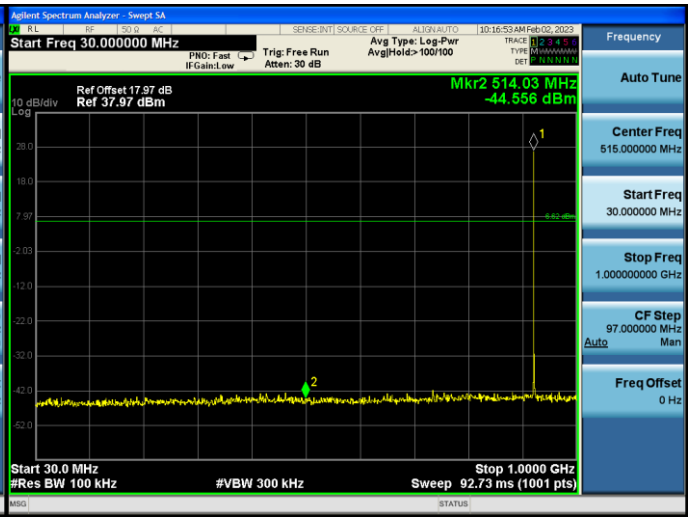
920.0 MHz **920.0 MHz**



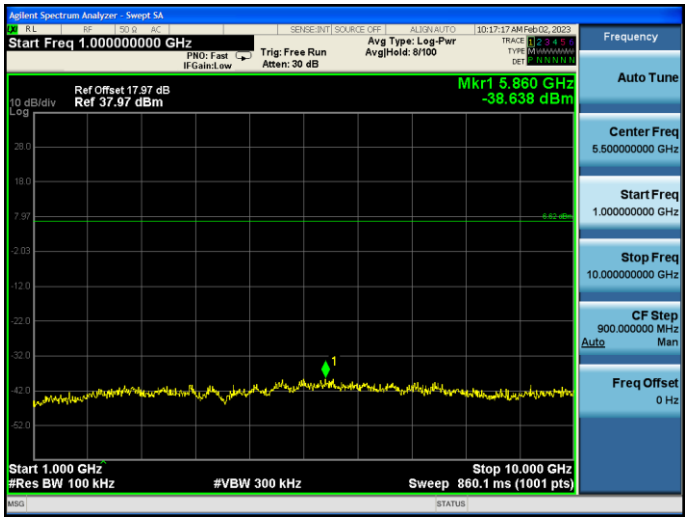


922.5 MHz **922.5 MHz**





922.5 MHz


Agilent Spectrum Analyzer - Swept SA
Start Freq 1.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 8/100
10:17:17 AM Feb 02, 2023
Ref Offset 17.97 dB
10 dB/div
Log
Ref 37.97 dBm
Mkr1 5.860 GHz
-38.638 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 860.1 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.500000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
10.000000000 GHz
CF Step
900.000000 MHz
Auto
Man
Freq Offset
0 Hz

5.9 Radiated spurious emissions

5.9.1 Limits

§ 15.247 (d) In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

§ 15.209 Radiated emission limits; general requirements.

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

Note 1: the tighter limit applies at the band edges.
Note 2: the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

§ 15.35 (b) requirements:
When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§ 15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

According to ANSI C63.10-2013, the tests shall be performed in the frequency range shown in the following table:

Frequency range of measurements for unlicensed wireless device

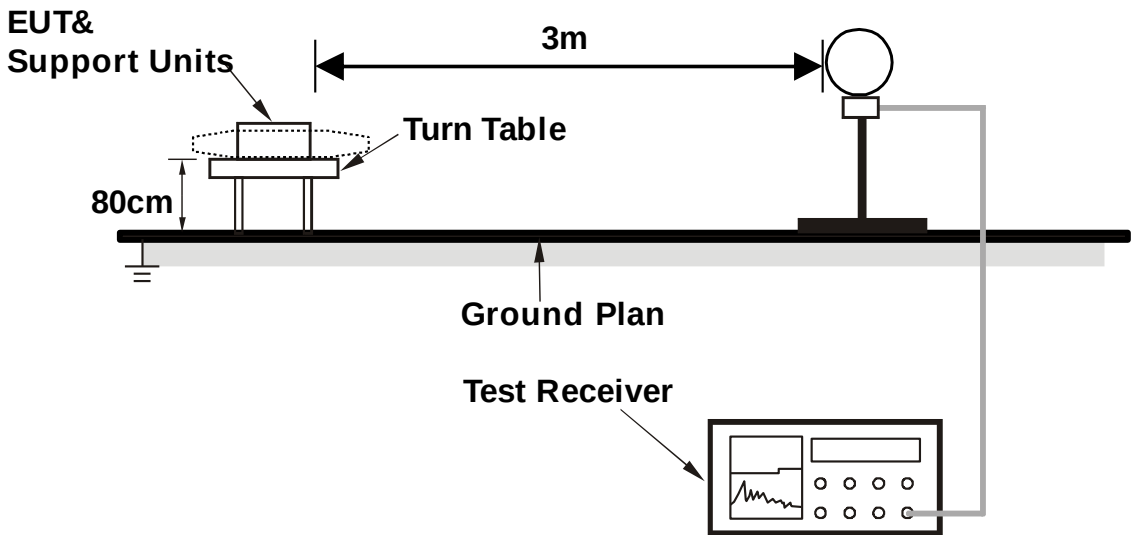
Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Frequency range of measurements for unlicensed wireless device with digital device

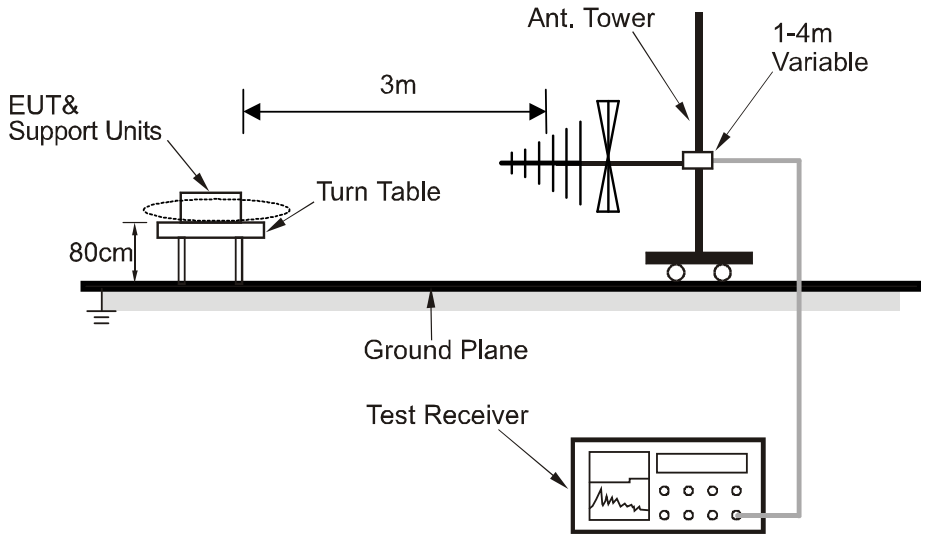
Highest frequency generated or used in the device or on which the device operates or tunes	Upper frequency range of measurement
Below 1.705 MHz	30 MHz
1.705 MHz to 108 MHz	1000 MHz
108 MHz to 500 MHz	2000 MHz
500 MHz to 1000 MHz	5000 MHz
Above 1000 MHz	5th harmonic of the highest frequency or 40 GHz, whichever is lower

5.9.2 Test setup

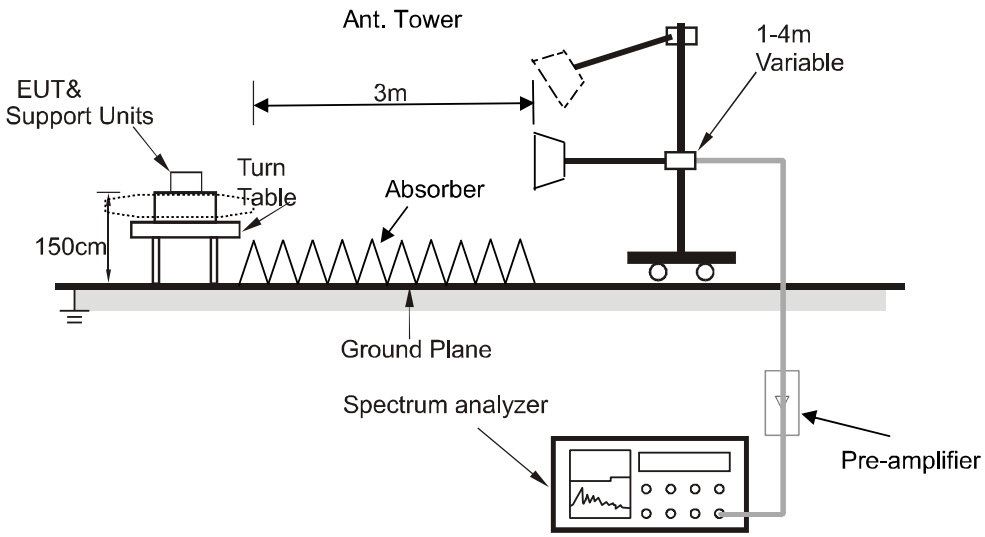
Below 30MHz



30MHz~1GHz



Above 1GHz



For the actual test configuration, please refer to the related item – Photographs of the test setup.

5.9.3 Test procedure

a) Test method: ANSI C63.10-2013 Section 6.3, 6.4, 6.5, 6.6, 6.10.
b) The EUT is placed on an on-conducting table 0.8 meters above the ground plane for measurement below 1GHz, 1.5 meters above the ground plane for measurement above 1GHz.
c) Emission blew 18 GHz were measured at a 3 meters test distance, above 18 GHz were measured at 1.5-meter test distance with the application of a distance correction factor
d) The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. 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.

KDB 558074 D01 15.247 Meas Guidance v05r02
The use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the unwanted emission limit is subject to an average field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

Test instrument setup

Frequency	Test receiver / Spectrum analyzer setting
9 kHz ~ 150 kHz	Quasi Peak / RBW: 200 Hz
150 kHz ~ 30 MHz	Quasi Peak / RBW: 9 kHz
30 MHz ~ 1 GHz	Quasi Peak / RBW: 120 kHz
Above 1 GHz	Peak / RBW: 1 MHz, VBW: 3MHz, Peak detector AVG / RBW: 1 MHz, VBW: 1/T, Peak detector

5.9.4 Test results

Notes:

The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported.

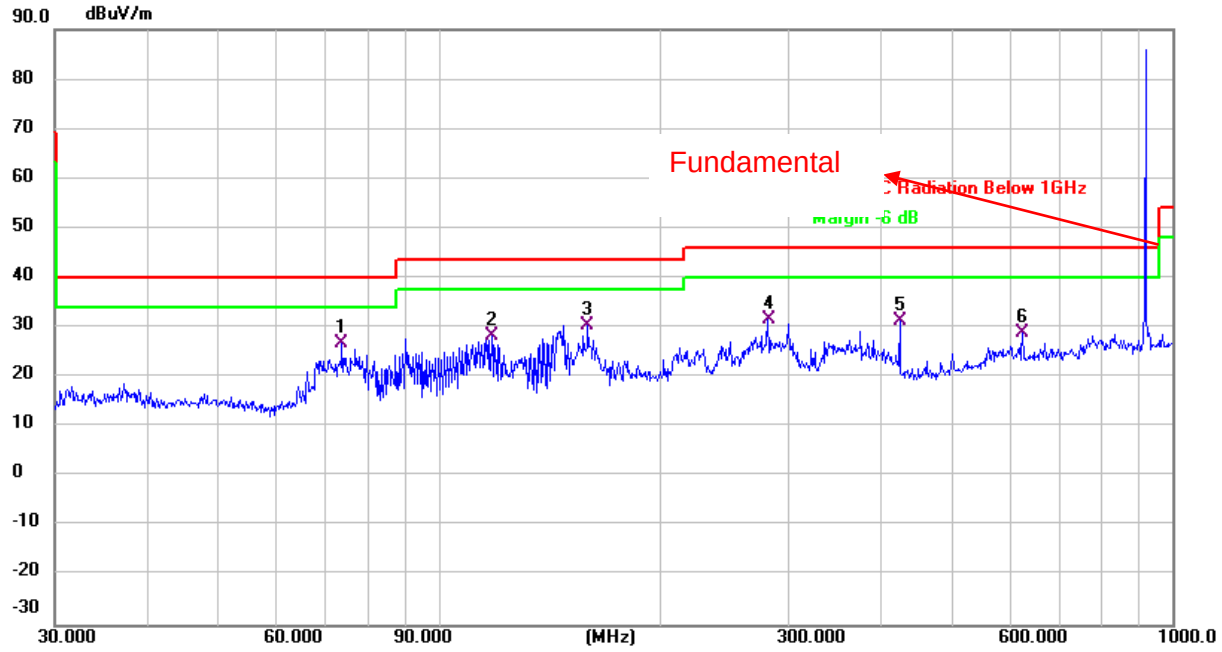
All modes of operation of the EUT were investigated, and only the worst-case results are reported.

There were no emissions found below 30MHz within 20dB of the limit.

Calculation formula:
Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB/m)
Over (dB) = Measurement (dBμV/m) – Limit (dBμV/m)

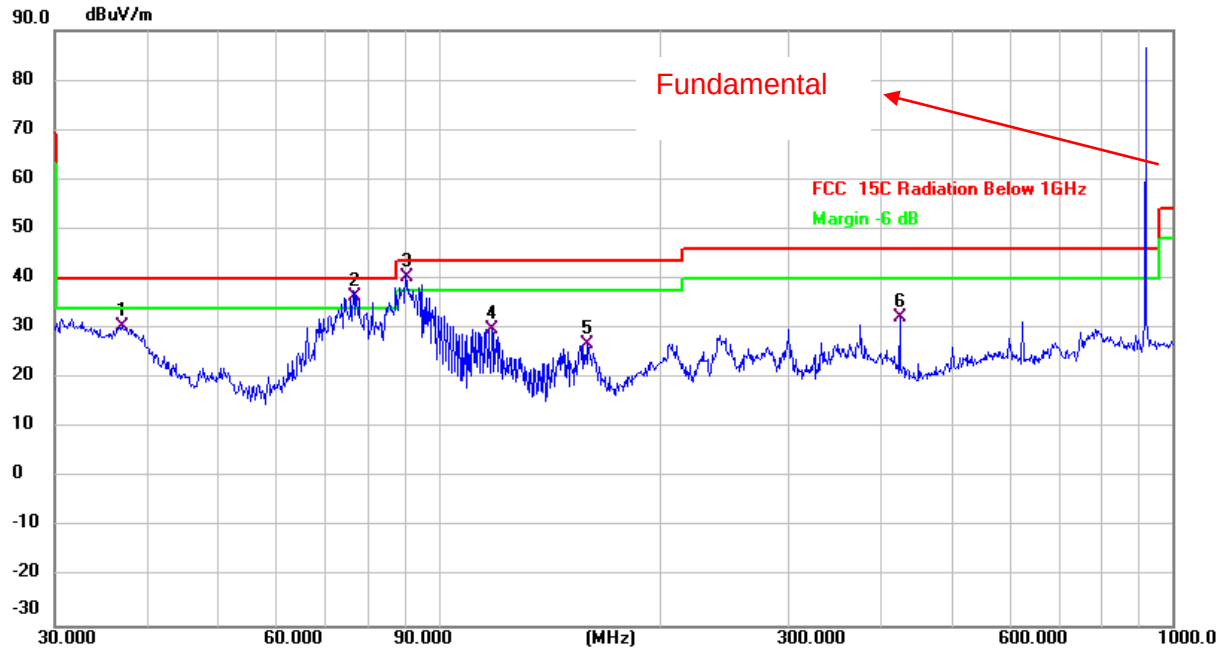
For NA2 mode - Radiated emissions between 30MHz – 1GHz

Test mode:	TX(Highest channel)	Polarization:	Horizontal
Power supply:	Power by DC 12	Test site:	RE chamber 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		73.8756	38.47	-11.68	26.79	40.00	-13.21	QP
2		118.1862	40.23	-11.96	28.27	43.50	-15.23	QP
3	*	159.7844	42.29	-11.89	30.40	43.50	-13.10	QP
4		281.0075	39.52	-7.98	31.54	46.00	-14.46	QP
5		425.0280	37.05	-5.77	31.28	46.00	-14.72	QP
6		625.0780	32.01	-2.93	29.08	46.00	-16.92	QP

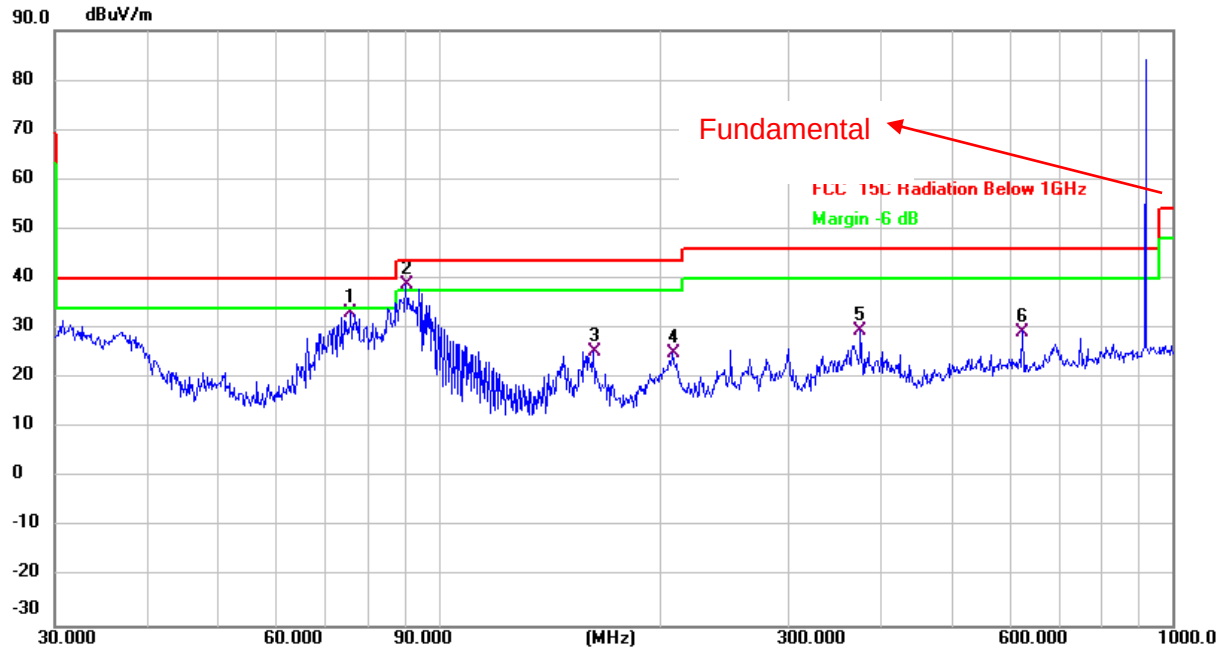
Test mode:	TX(Highest channel)	Polarization:	Vertical
Power supply:	Power by AC/DC adapter (AC 120V/60Hz)	Test site:	RE chamber 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		37.0248	40.48	-10.07	30.41	40.00	-9.59	QP
2	!	76.5121	48.12	-11.72	36.40	40.00	-3.60	QP
3	*	90.2205	50.88	-10.68	40.20	43.50	-3.30	QP
4		118.1862	41.82	-11.96	29.86	43.50	-13.64	QP
5		159.7844	38.71	-11.89	26.82	43.50	-16.68	QP
6		425.0280	38.08	-5.77	32.31	46.00	-13.69	QP

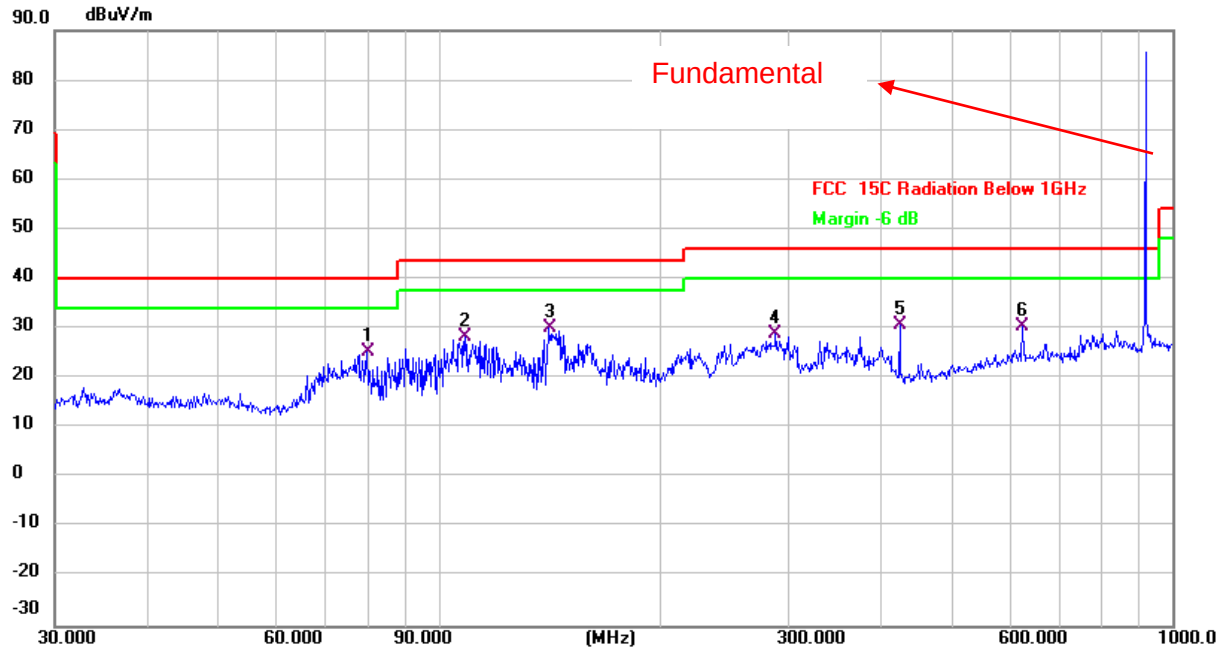
For NA3 mode - Radiated emissions between 30MHz – 1GHz

Test mode:	TX(Highest channel)	Polarization:	Horizontal
Power supply:	Power by AC/DC adapter (AC 120V/60Hz)	Test site:	RE chamber 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		75.9773	44.91	-11.71	33.20	40.00	-6.80	QP
2	*	90.2205	49.59	-10.68	38.91	43.50	-4.59	QP
3		162.6106	37.17	-11.84	25.33	43.50	-18.17	QP
4		208.5803	34.69	-9.56	25.13	43.50	-18.37	QP
5		375.9385	36.39	-6.93	29.46	46.00	-16.54	QP
6		625.0780	32.33	-2.93	29.40	46.00	-16.60	QP

Test mode:	TX(Highest channel)	Polarization:	Vertical
Power supply:	Power by AC/DC adapter (AC 120V/60Hz)	Test site:	RE chamber 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		79.8003	36.99	-11.76	25.23	40.00	-14.77	QP
2		108.6470	39.06	-10.70	28.36	43.50	-15.14	QP
3	*	141.3298	42.88	-12.83	30.05	43.50	-13.45	QP
4		287.9904	37.00	-8.07	28.93	46.00	-17.07	QP
5		425.0280	36.60	-5.77	30.83	46.00	-15.17	QP
6		625.0780	33.32	-2.93	30.39	46.00	-15.61	QP

For NA2 mode - Radiated emissions 1 GHz ~ 10 GHz

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
917.4 MHz							
1834.800	46.53	-6.83	39.70	74.00	-34.30	Peak	V
1834.800	40.30	-6.83	33.47	54.00	-20.53	AVG	V
2752.200	43.85	-3.77	40.08	74.00	-33.92	Peak	V
2752.200	37.89	-3.77	34.12	54.00	-19.88	AVG	V
3669.600	43.48	-1.90	41.58	74.00	-32.42	Peak	V
3669.600	37.59	-1.90	35.69	54.00	-18.31	AVG	V
1834.800	52.87	-6.83	46.04	74.00	-27.96	Peak	H
1834.800	47.10	-6.83	40.27	54.00	-13.73	AVG	H
2752.200	43.78	-3.77	40.01	74.00	-33.99	Peak	H
2752.200	38.09	-3.77	34.32	54.00	-19.68	AVG	H
3669.600	43.09	-1.90	41.19	74.00	-32.81	Peak	H
3669.600	37.59	-1.90	35.69	54.00	-18.31	AVG	H
922.4 MHz							
1844.800	52.54	-6.73	45.81	74.00	-28.19	Peak	V
1844.800	46.41	-6.73	39.68	54.00	-14.32	AVG	V
2767.200	45.24	-3.76	41.48	74.00	-32.52	Peak	V
2767.200	39.23	-3.76	35.47	54.00	-18.53	AVG	V
3689.600	42.53	-2.03	40.50	74.00	-33.50	Peak	V
3689.600	36.29	-2.03	34.26	54.00	-19.74	AVG	V
1844.800	49.72	-6.73	42.99	74.00	-31.01	Peak	H
1844.800	43.32	-6.73	36.59	54.00	-17.41	AVG	H
2767.200	43.83	-3.76	40.07	74.00	-33.93	Peak	H
2767.200	38.23	-3.76	34.47	54.00	-19.53	AVG	H
3689.600	42.16	-2.03	40.13	74.00	-33.87	Peak	H
3689.600	36.29	-2.03	34.26	54.00	-19.74	AVG	H
927.2 MHz							
1854.400	48.38	-6.68	41.70	74.00	-32.30	Peak	V
1854.400	42.37	-6.68	35.69	54.00	-18.31	AVG	V
2781.600	43.23	-3.76	39.47	74.00	-34.53	Peak	V
2781.600	37.02	-3.76	33.26	54.00	-20.74	AVG	V
3708.800	42.52	-2.03	40.49	74.00	-33.51	Peak	V
3708.800	36.60	-2.03	34.57	54.00	-19.43	AVG	V

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
1854.400	52.48	-6.68	45.80	74.00	-28.20	Peak	H
1854.400	46.36	-6.68	39.68	54.00	-14.32	AVG	H
2781.600	47.02	-3.76	43.26	74.00	-30.74	Peak	H
2781.600	41.02	-3.76	37.26	54.00	-16.74	AVG	H
3708.800	42.36	-2.03	40.33	74.00	-33.67	Peak	H
3708.800	36.72	-2.03	34.69	54.00	-19.31	AVG	H

For NA3 mode - Radiated emissions 1 GHz ~ 10 GHz

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
917.5 MHz							
1835.000	46.56	-6.83	39.73	74.00	-34.27	Peak	V
1835.000	40.42	-6.83	33.59	54.00	-20.41	AVG	V
2752.500	44.16	-3.77	40.39	74.00	-33.61	Peak	V
2752.500	38.03	-3.77	34.26	54.00	-19.74	AVG	V
3670.000	43.93	-1.89	42.04	74.00	-31.96	Peak	V
3670.000	38.03	-1.89	36.14	54.00	-17.86	AVG	V
1835.000	52.83	-6.83	46.00	74.00	-28.00	Peak	H
1835.000	47.06	-6.83	40.23	54.00	-13.77	AVG	H
2752.500	44.28	-3.77	40.51	74.00	-33.49	Peak	H
2752.500	38.03	-3.77	34.26	54.00	-19.74	AVG	H
3670.000	43.86	-1.89	41.97	74.00	-32.03	Peak	H
3670.000	37.36	-1.89	35.47	54.00	-18.53	AVG	H
920.0 MHz							
1840.000	51.88	-6.77	45.11	74.00	-28.89	Peak	V
1840.000	46.34	-6.77	39.57	54.00	-14.43	AVG	V
2760.000	45.35	-3.76	41.59	74.00	-32.41	Peak	V
2760.000	39.12	-3.76	35.36	54.00	-18.64	AVG	V
3680.000	42.97	-1.97	41.00	74.00	-33.00	Peak	V
3680.000	37.44	-1.97	35.47	54.00	-18.53	AVG	V
1840.000	46.99	-6.77	40.22	74.00	-33.78	Peak	H
1840.000	41.34	-6.77	34.57	54.00	-19.43	AVG	H
2760.000	43.59	-3.76	39.83	74.00	-34.17	Peak	H
2760.000	37.01	-3.76	33.25	54.00	-20.75	AVG	H
3680.000	42.92	-1.97	40.95	74.00	-33.05	Peak	H
3680.000	36.66	-1.97	34.69	54.00	-19.31	AVG	H
922.5 MHz							
1845.000	47.99	-6.73	41.26	74.00	-32.74	Peak	V
1845.000	41.96	-6.73	35.23	54.00	-18.77	AVG	V
2767.500	43.93	-3.76	40.17	74.00	-33.83	Peak	V
2767.500	38.12	-3.76	34.36	54.00	-19.64	AVG	V
3690.000	43.24	-2.03	41.21	74.00	-32.79	Peak	V
3690.000	37.50	-2.03	35.47	54.00	-18.53	AVG	V
1845.000	52.84	-6.73	46.11	74.00	-27.89	Peak	H

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
1845.000	47.05	-6.73	40.32	54.00	-13.68	AVG	H
2767.500	46.06	-3.76	42.30	74.00	-31.70	Peak	H
2767.500	40.01	-3.76	36.25	54.00	-17.75	AVG	H
3690.000	42.12	-2.03	40.09	74.00	-33.91	Peak	H
3690.000	36.15	-2.03	34.12	54.00	-19.88	AVG	H

For NA2 mode - Radiated emissions at band edge

PASS
Note：The adjacent to the restricted frequency band (608-614MHz and 960-1240MHz) is far away the fundamental, it is noise only. Please refer to section 5.10 for the test data

For NA3 mode - Radiated emissions at band edge

PASS
Note：The adjacent to the restricted frequency band (608-614MHz and 960-1240MHz) is far away the fundamental, it is noise only. Please refer to section 5.10 for the test data

Photographs of the Test Setup

See the appendix – Test Setup Photos.

Photographs of the EUT

See the appendix - EUT Photos.

Statement

1. This report is invalid without the seal and signature of the laboratory.
2. The test results of this report are only responsible for the samples submitted.Client shall be responsible for representativeness of the sample and authenticity of the material.
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6. Any objection to this report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

****** END OF REPORT ******