



Test Report No.7112310969

Applicant: Capacicom LTD.

Equipment Under Test:
IoT Repeater- Transceiver Module

Model: NBX-R1000-RF
FCC ID: 2AYPY- NBX-R1000-RF

Issued by:
The Standards Institution of Israel
Industry Division
Electrical & Electronics Laboratory
EMC Branch





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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Applicant:	Capacicom LTD.
Address:	4 Haalon st., 4059300 Kfar Neter Israel
Sample for test selected by:	The customer
The date of test:	10/3, 21/3, 29-30/3, 7-8/4 & 19/4/2021

Description of Equipment

under Test (EUT):	IoT Repeater- Transceiver Module
Model:	NBX-R1000-RF
Software version:	1.0.0
Hardware version:	5
Manufactured by:	Capacicom LTD.

Reference Documents:

- ❖ CFR 47 FCC (2020). Rules and Regulations: Part 15. Radio frequency devices, Subpart C: Intentional radiators. Section 15.247 Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz

Test Results

The EUT was found to be in compliance with the following standard:
CFR47 Part 15 Subpart C
sections: 15.203, 15.205, 15.207, 15.209 and 15.247

This Test Report contains 72 pages
and may be used only in its entirety.

This Test Report applies only to the specimen tested and may not
be applied to other specimens of the same product.



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1. Summary of Test Results

Description of test	FCC Ref. Section	Result
Carrier frequency separation	15.247 (a) (1)	Compliance
Number of hopping frequencies	15.247 (a) (1)	Compliance
Time of occupancy (dwell time)	15.247 (a) (1) (i)	Compliance
Maximum peak conducted output power	15.247 (b) (2)	Compliance
Occupied bandwidth	15.247 (a) (1)	Compliance
Band-edge compliance of RF conducted emission	15.247 (d)	Compliance
Radiated emission in restricted and non-restricted bands	15.247 (d), 15.209, 15.205	Compliance
Unwanted radiated emissions	15.209	Compliance
AC power line conducted emission measurements	15.207	Compliance
Antenna requirements	15.203	Compliance

Name: Eng. Yuri Rozenberg
Position: Head of Branch

Electrical & Electronics
Laboratory

November 7, 2021

Tested by: Alexander Konkov
Position: Testing Technician

Written by: Galit Gorodetsky
Position: Technical Writer



2. EUT Description

Note: All information in this section was provided by the customer.

2.1. General description:

The Equipment under Test (hereinafter: EUT) is a smart IoT LPWAN repeater system with a transceiver Module which operates in the sub-1GHz ISM frequency spectrum and IP M&C over ETH/WiFi/BT.

The transceiver module is based on a LMS-7002M Software Defined Radio from Lime microsystems and Cyclone V SOC FPGA from Intel that repeat IoT messages, using algorithms to reduce the number of repeated messages.

The RF output transmitting power of the transceiver LMS-7002M and power amplifier from SkyWorks SE2435L is 24 dBm and the gain of the detachable antenna is 1.7 dBi.

The transceiver uses D-BPSK and GFSK modulations.

The transmission frequency channel (30KHz) is randomly chosen (frequency hopping) within a narrow frequency band, depending on the country regulation & UL/DL (902.18 – 923.7MHz).

Source description: The EUT has no internal power source. It uses PoE for DC power supply (10-48V).

Oscillator description: The Lime microsystems LMS-7002M transceiver use a 40MHz 1ppm TCXO, providing the main clock.

The test data contained in this report pertains only to the emissions due to the EUT's Transceiver Module which operates in the sub-1GHz ISM frequency spectrum.

Region		2	4
Modulation UL	UL	D-BPSK	D-BPSK
Modulation BW [Hz]		600	600
Center Frequency UL [MHz]		902.185-903.773	920.725-922.37
Modulation/DL	DL	GFSK	GFSK
Modulation BW [Hz]		600	600
Center Frequency DL [MHz]		905.185-906.773	922.22-923.877
Method		Frequency hopping 30KHz channels	Frequency hopping 30KHz channels
Max Power (EIRP) [dBm]		25.7	25.7

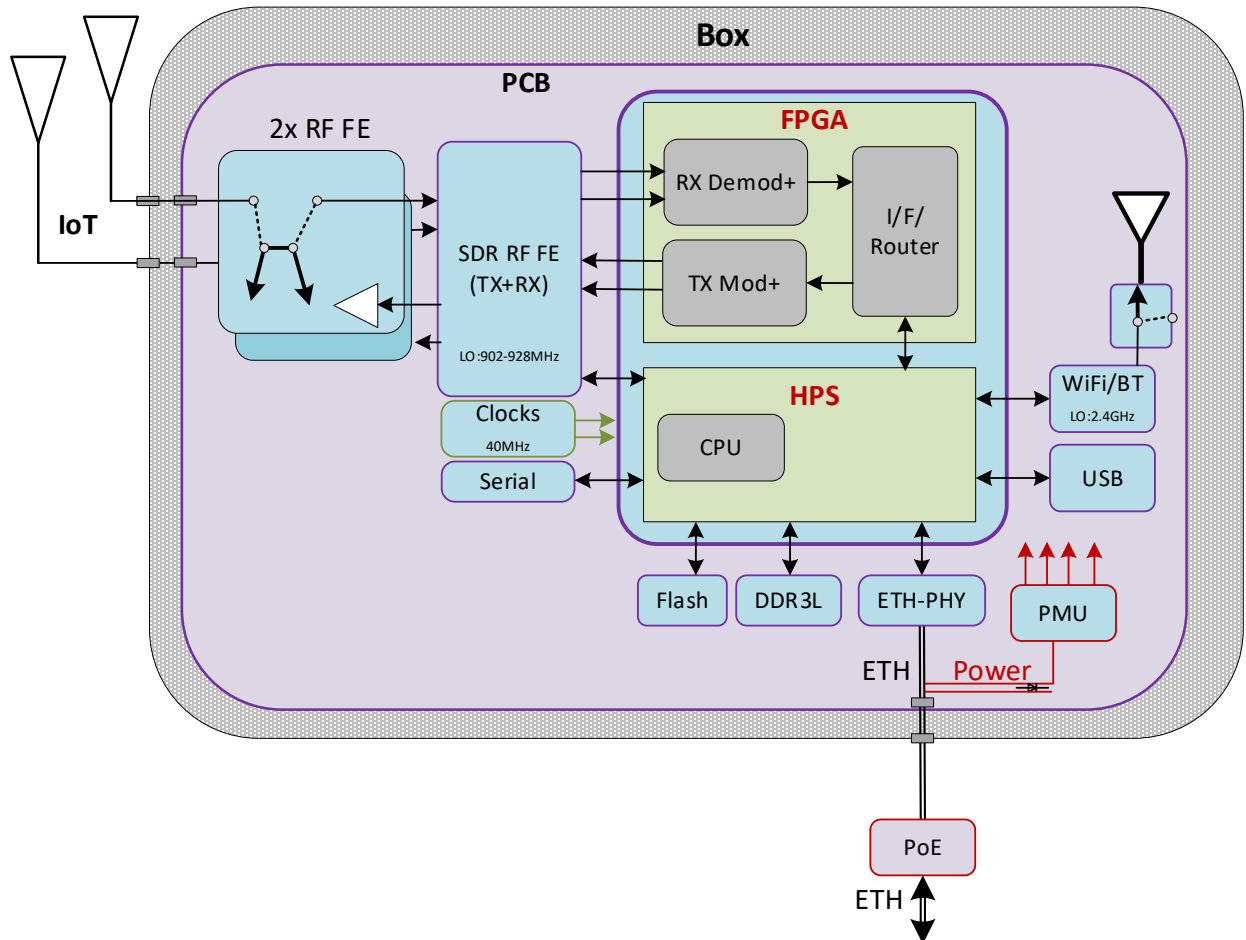


Figure 1. EUT block diagram



Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

2.2. Transmitter description:

Type of equipment
Stand-alone (Equipment with or without its own control provisions)

Intended use	fixed
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Assigned frequency range	from 902MHz to 928MHz (Sub-1GHz)	
Operating frequency range	from 902MHz to 924MHz (Sub-1GHz)	
RF channel spacing	30KHz (Sub-1GHz)	
Maximum rated output power	At transmitter 50 Ω RF output connector.	24dBm (Sub-1GHz)
transmitter output power is variable	minimum RF power	-60dBm (Sub-1GHz)
	maximum RF power	24dBm (Sub-1GHz)

Antenna connection			
RP-SMA connector			
External antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Dipole	Huamai	HAS-915TFH	1.7dBi

Transmitter 99% power bandwidth	
Type of modulation	DBPSK GFSK
Type of multiplexing	Hopping
Modulating test signal (baseband)	PRBS

Maximum transmitter duty cycle in normal use	14%	Tx ON time	350 msec	Period	2500 msec
Transmitter duty cycle supplied for test	1%	Tx ON time	350 msec	Period	35000 msec

Transmitter power source	
Nominal rated voltage	24VDC Min. 10V / Max. 48V

Spread spectrum technique used		Frequency hopping (FHSS)
Spread spectrum parameters for transmitters tested per FCC 15.247 only		
FHSS	total number of hops	54 - 56
	bandwidth per hop	30KHz
	Maximum separation of hops	56x30KHz

2.3. Test setup:

The EUT was tested per the guidance ANSI C63.10: 2013.

The test setup is shown in Figure 2 and 3.

The EUT was connected with auxiliary Laptop via LAN-Power splitter.

Also EUT gets 19VDC power from the AC power adapter via LAN-Power splitter in order to use PoE technology. The EUT configured to transmit continuously, duty cycle $\geq 98\%$.

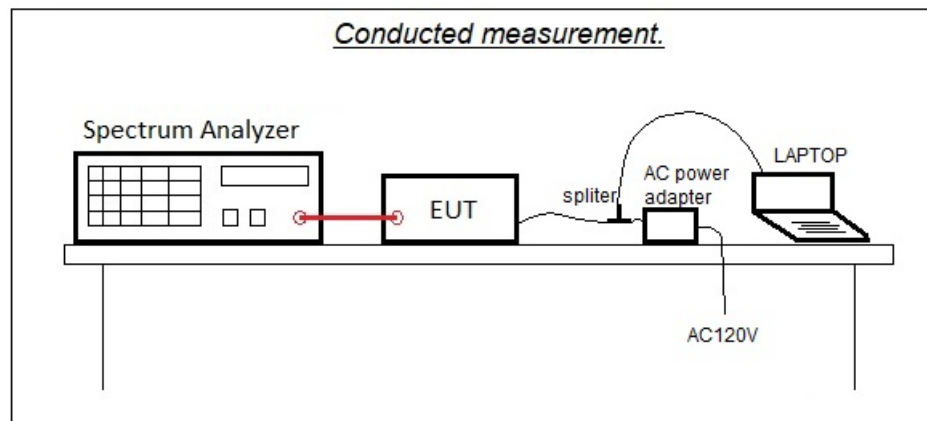


Figure 2. EUT conducted test setup

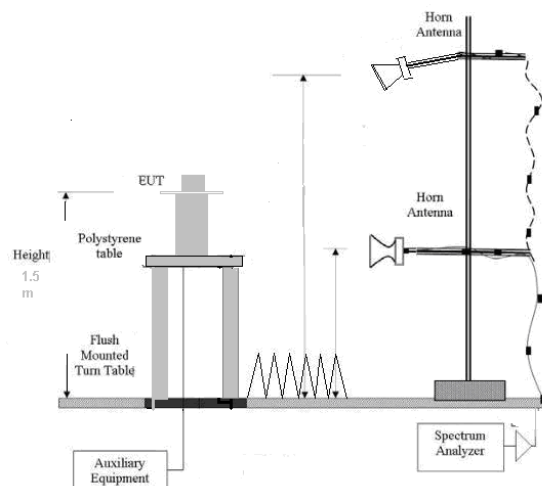


Figure 3. Radiated emission test setup above 1 GHz.



Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

2.4. System test configuration

Zone	RC2		
Freq.	902.2	MHz	
Modulat.	BPSK		
CH	1	902.185	MHz
CH	2	902.215	MHz
CH	3	902.245	MHz
CH	4	902.275	MHz
CH	5	902.305	MHz
CH	6	902.335	MHz
CH	7	902.365	MHz
CH	8	902.395	MHz
CH	9	902.425	MHz
CH	10	902.455	MHz
CH	11	902.485	MHz
CH	12	902.515	MHz
CH	13	902.545	MHz
CH	14	902.575	MHz
CH	15	902.605	MHz
CH	16	902.635	MHz
CH	17	902.665	MHz
CH	18	902.695	MHz
CH	19	902.725	MHz
CH	20	902.755	MHz
CH	21	902.785	MHz
CH	22	902.815	MHz
CH	23	902.845	MHz
CH	24	902.875	MHz
CH	25	902.905	MHz
CH	26	902.935	MHz
CH	27	902.965	MHz
CH	28	902.995	MHz
CH	29	903.025	MHz
CH	30	903.055	MHz
CH	31	903.085	MHz
CH	32	903.115	MHz
CH	33	903.145	MHz

Zone	RC2		
Freq.	905.2	MHz	
Modulate.	GFSK		
CH	1	905.185	MHz
CH	2	905.215	MHz
CH	3	905.245	MHz
CH	4	905.275	MHz
CH	5	905.305	MHz
CH	6	905.335	MHz
CH	7	905.365	MHz
CH	8	905.395	MHz
CH	9	905.425	MHz
CH	10	905.455	MHz
CH	11	905.485	MHz
CH	12	905.515	MHz
CH	13	905.545	MHz
CH	14	905.575	MHz
CH	15	905.605	MHz
CH	16	905.635	MHz
CH	17	905.665	MHz
CH	18	905.695	MHz
CH	19	905.725	MHz
CH	20	905.755	MHz
CH	21	905.785	MHz
CH	22	905.815	MHz
CH	23	905.845	MHz
CH	24	905.875	MHz
CH	25	905.905	MHz
CH	26	905.935	MHz
CH	27	905.965	MHz
CH	28	905.995	MHz
CH	29	906.025	MHz
CH	30	906.055	MHz
CH	31	906.085	MHz
CH	32	906.115	MHz
CH	33	906.145	MHz

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CH	34	903.175	MHz
CH	35	903.205	MHz
CH	36	903.235	MHz
CH	37	903.265	MHz
CH	38	903.295	MHz
CH	39	903.325	MHz
CH	40	903.355	MHz
CH	41	903.385	MHz
CH	42	903.415	MHz
CH	43	903.445	MHz
CH	44	903.475	MHz
CH	45	903.505	MHz
CH	46	903.535	MHz
CH	47	903.565	MHz
CH	48	903.595	MHz
CH	49	903.625	MHz
CH	50	903.655	MHz
CH	51	903.685	MHz
CH	52	903.715	MHz
CH	53	903.745	MHz
CH	54	903.775	MHz

CH	34	906.175	MHz
CH	35	906.205	MHz
CH	36	906.235	MHz
CH	37	906.265	MHz
CH	38	906.295	MHz
CH	39	906.325	MHz
CH	40	906.355	MHz
CH	41	906.385	MHz
CH	42	906.415	MHz
CH	43	906.445	MHz
CH	44	906.475	MHz
CH	45	906.505	MHz
CH	46	906.535	MHz
CH	47	906.565	MHz
CH	48	906.595	MHz
CH	49	906.625	MHz
CH	50	906.655	MHz
CH	51	906.685	MHz
CH	52	906.715	MHz
CH	53	906.745	MHz
CH	54	906.775	MHz

Zone	RC4		
Freq.	920.8	MHz	
Modulat.	BPSK		
CH	1	920.725	MHz
CH	2	920.755	MHz
CH	3	920.785	MHz
CH	4	920.815	MHz
CH	5	920.845	MHz
CH	6	920.875	MHz
CH	7	920.905	MHz
CH	8	920.935	MHz
CH	9	920.965	MHz
CH	10	920.995	MHz
CH	11	921.025	MHz
CH	12	921.055	MHz
CH	13	921.085	MHz
CH	14	921.115	MHz
CH	15	921.145	MHz

Zone	RC4		
Freq.	922.3	MHz	
Modulate.	GFSK		
CH	1	922.225	MHz
CH	2	922.255	MHz
CH	3	922.285	MHz
CH	4	922.315	MHz
CH	5	922.345	MHz
CH	6	922.375	MHz
CH	7	922.405	MHz
CH	8	922.435	MHz
CH	9	922.465	MHz
CH	10	922.495	MHz
CH	11	922.525	MHz
CH	12	922.555	MHz
CH	13	922.585	MHz
CH	14	922.615	MHz
CH	15	922.645	MHz



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CH	16	921.175	MHz
CH	17	921.205	MHz
CH	18	921.235	MHz
CH	19	921.265	MHz
CH	20	921.295	MHz
CH	21	921.325	MHz
CH	22	921.355	MHz
CH	23	921.385	MHz
CH	24	921.415	MHz
CH	25	921.445	MHz
CH	26	921.475	MHz
CH	27	921.505	MHz
CH	28	921.535	MHz
CH	29	921.565	MHz
CH	30	921.595	MHz
CH	31	921.625	MHz
CH	32	921.655	MHz
CH	33	921.685	MHz
CH	34	921.715	MHz
CH	35	921.745	MHz
CH	36	921.775	MHz
CH	37	921.805	MHz
CH	38	921.835	MHz
CH	39	921.865	MHz
CH	40	921.895	MHz
CH	41	921.925	MHz
CH	42	921.955	MHz
CH	43	921.985	MHz
CH	44	922.015	MHz
CH	45	922.045	MHz
CH	46	922.075	MHz
CH	47	922.105	MHz
CH	48	922.135	MHz
CH	49	922.165	MHz
CH	50	922.195	MHz
CH	51	922.225	MHz
CH	52	922.255	MHz
CH	53	922.285	MHz
CH	54	922.315	MHz
CH	55	922.345	MHz
CH	56	922.375	MHz

CH	16	922.675	MHz
CH	17	922.705	MHz
CH	18	922.735	MHz
CH	19	922.765	MHz
CH	20	922.795	MHz
CH	21	922.825	MHz
CH	22	922.855	MHz
CH	23	922.885	MHz
CH	24	922.915	MHz
CH	25	922.945	MHz
CH	26	922.975	MHz
CH	27	923.005	MHz
CH	28	923.035	MHz
CH	29	923.065	MHz
CH	30	923.095	MHz
CH	31	923.125	MHz
CH	32	923.155	MHz
CH	33	923.185	MHz
CH	34	923.215	MHz
CH	35	923.245	MHz
CH	36	923.275	MHz
CH	37	923.305	MHz
CH	38	923.335	MHz
CH	39	923.365	MHz
CH	40	923.395	MHz
CH	41	923.425	MHz
CH	42	923.455	MHz
CH	43	923.485	MHz
CH	44	923.515	MHz
CH	45	923.545	MHz
CH	46	923.575	MHz
CH	47	923.605	MHz
CH	48	923.635	MHz
CH	49	923.665	MHz
CH	50	923.695	MHz
CH	51	923.725	MHz
CH	52	923.755	MHz
CH	53	923.785	MHz
CH	54	923.815	MHz
CH	55	923.845	MHz
CH	56	923.875	MHz



3. Test specification, Methods and Procedures

- ❖ CFR 47 FCC Rules and Regulations: Part 15. Radio frequency devices, Subpart C: Intentional radiators (2020)
- ❖ ANSI C63.4:2014 American National Standard for Method of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range 9 kHz to 40 GHz.
- ❖ ANSI C63.10: 2013 American National Standard for Testing of Unlicensed Wireless Devices

4. Testing Facility:

Laboratory Name: Standards Institution of Israel (SII)

Test site location: 42 Haim Levanon st., Tel-Aviv Israel

Laboratory Accreditations: ANAB: AT-1359

5. Measurement uncertainty

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error.

The laboratory calibrates its standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements.

Test description	Calculated uncertainty, U_{LAB}
Conducted measurements	
Frequency error	37.6 Hz
Spurious emission	± 2.98 dB
Radiated measurements	
Electric field strength in a SAR at 3 m distance 30 MHz – 1.0 GHz	± 4.32 dB
Electric field strength in a FAR at 3 m distance 1.0 GHz – 18 GHz	± 4.47
Substitution measurements	
In a FAR at 3 m distance 1.0 GHz – 18 GHz	± 3.41 dB



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Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

6. Transmitter characteristics - test results

6.1. Carrier frequency separation

Limits & methods:

FCC requirements	15.247(a)(1)		
Test procedure	ANSI 63.10 Section 7.8.2. Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

Operating frequency range, MHz	Channel carrier frequency separation limit
902 - 928	25 kHz or 20 dB, whichever is greater. Maximum allowed 20 dB bandwidth is 500 kHz

Results:

Antenna A

Frequency/ Modulation	Limit	Result	Verdict	Plot #
902.2 MHz / DBPSK	minimum 25 kHz	29.94 kHz	Pass	1,2
920.8MHz/ DBPSK		29.97 kHz	Pass	3,4
922.3MHz/ GFSK		29.60 kHz	Pass	5,6
905.2MHz/ GFSK		29.94 kHz	Pass	7,8

Antenna B

Frequency/ Modulation	Limit	Result	Verdict	Plot #
902.2 MHz / DBPSK	minimum 25 kHz	29.94 kHz	Pass	9,10
920.8MHz/ DBPSK		29.97 kHz	Pass	11,12
922.3MHz/ GFSK		29.09 kHz	Pass	13,14
905.2MHz/ GFSK		30.35 kHz	Pass	15,16



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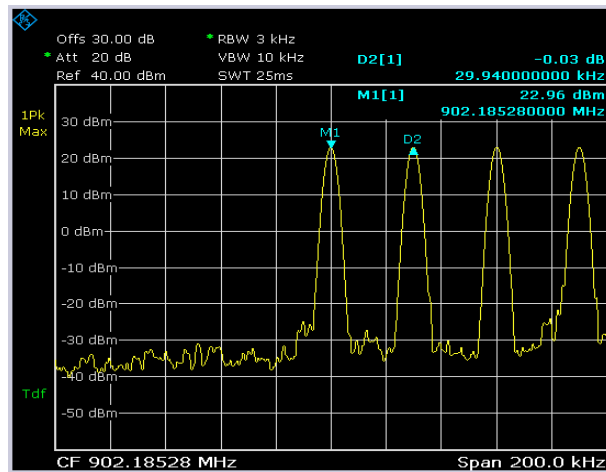
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Model: NBX-R1000-RF

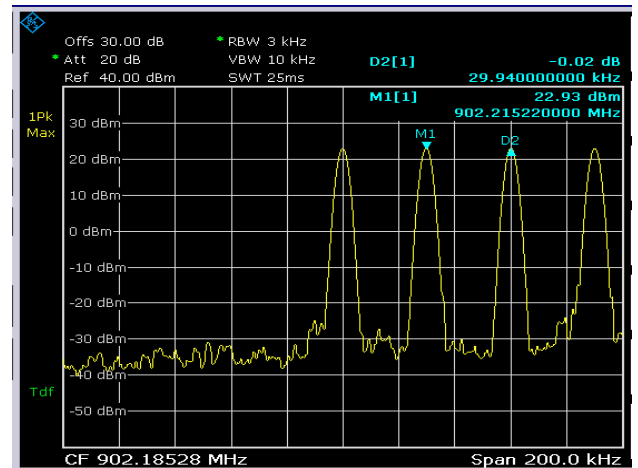
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC2 902.2 MHz



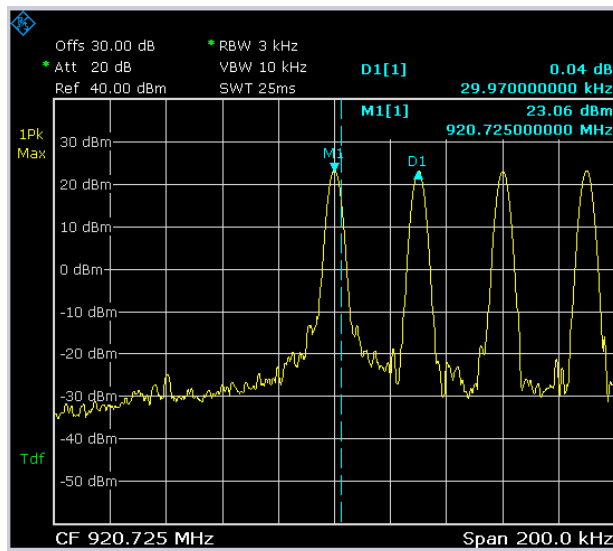
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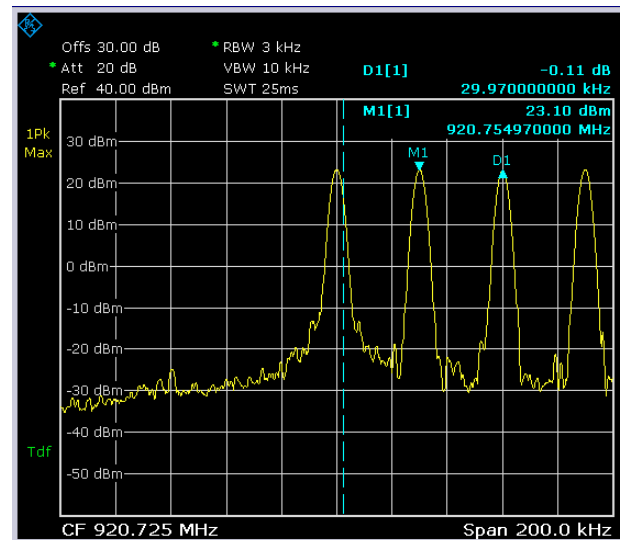
Plot 2

Antenna A

RC4 920.8 MHz



Plot 3



Plot 4



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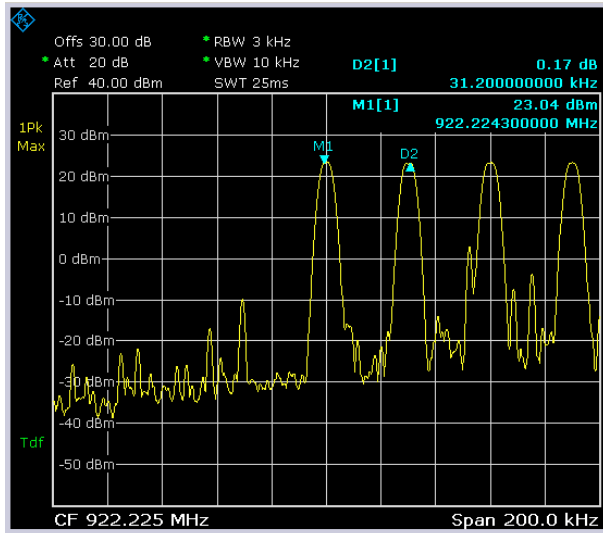
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Model: NBX-R1000-RF

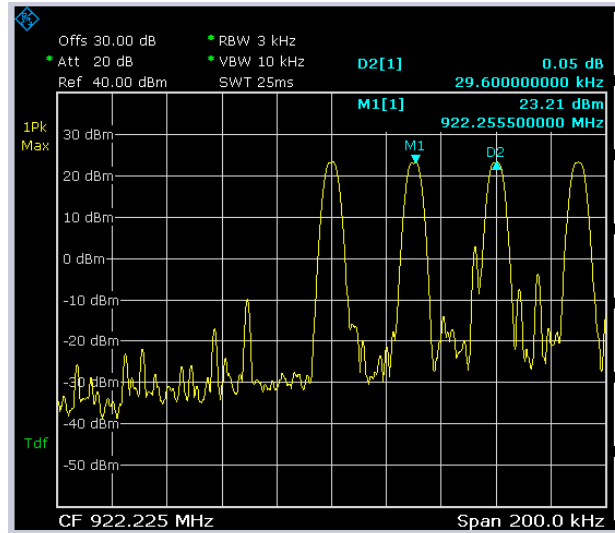
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC4 922.3 MHz



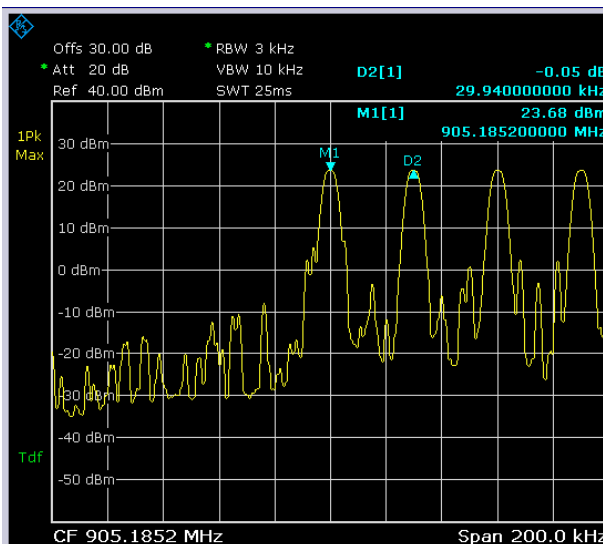
Plot 5



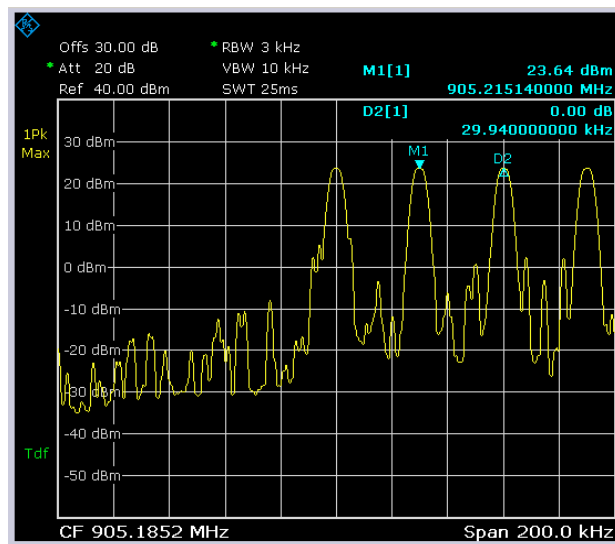
Plot 6

Antenna A

RC2 905.2 MHz



Plot 7



Plot 8



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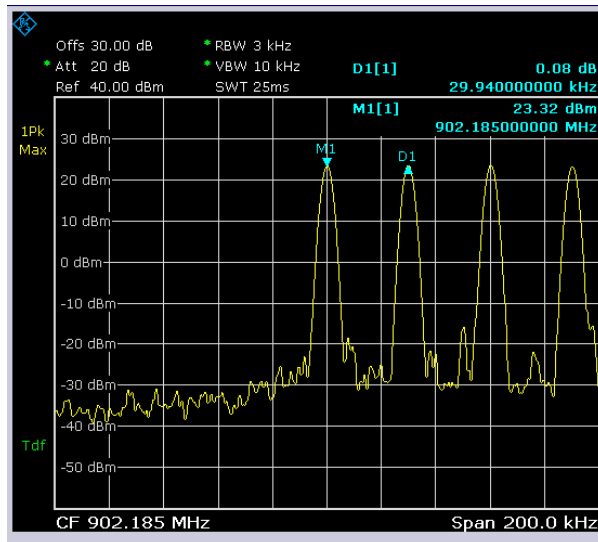
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Model: NBX-R1000-RF

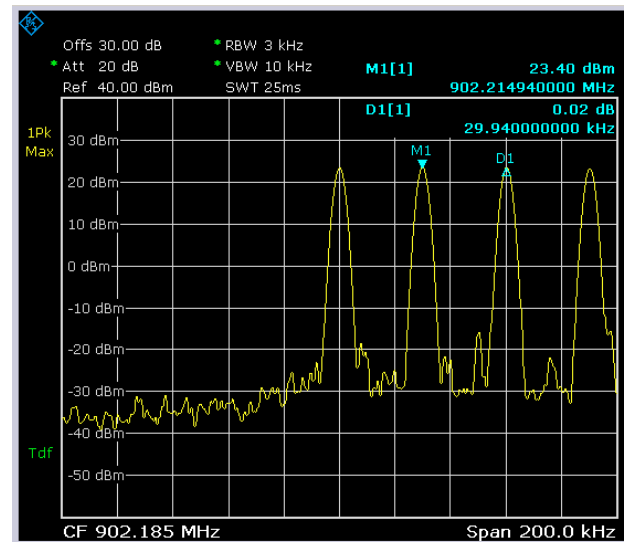
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC2 902.2 MHz



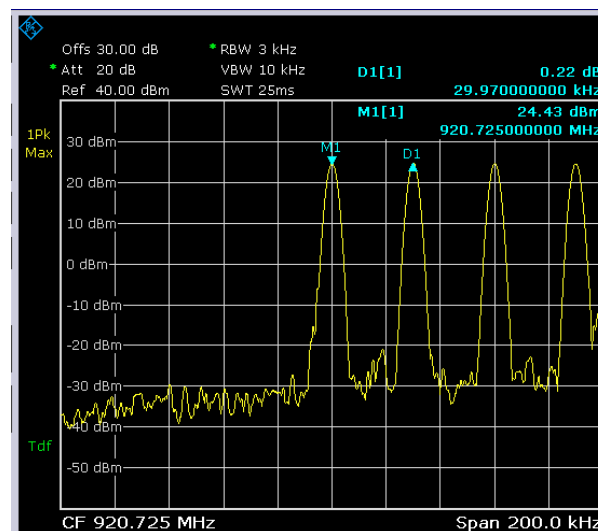
Plot 9



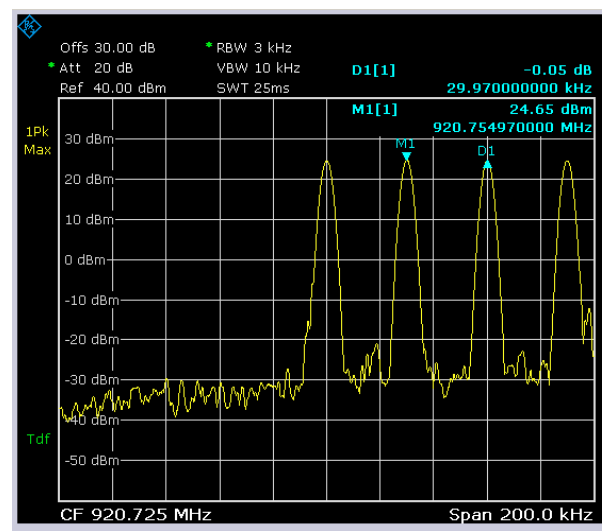
Plot 10

Antenna B

RC4 920.8 MHz



Plot 11



Plot 12



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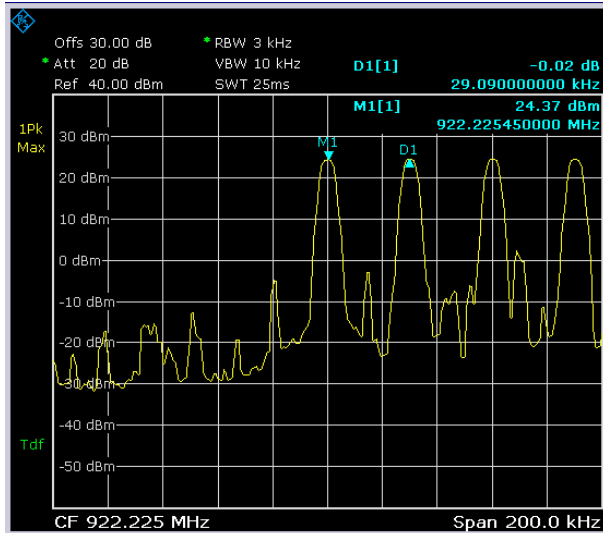
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Model: NBX-R1000-RF

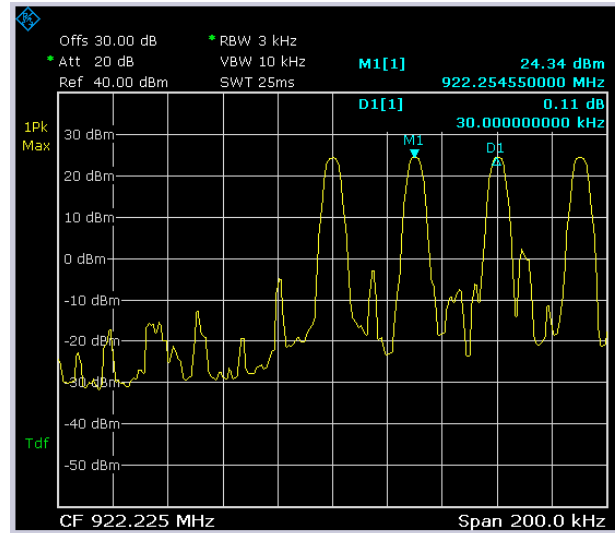
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 922.3 MHz



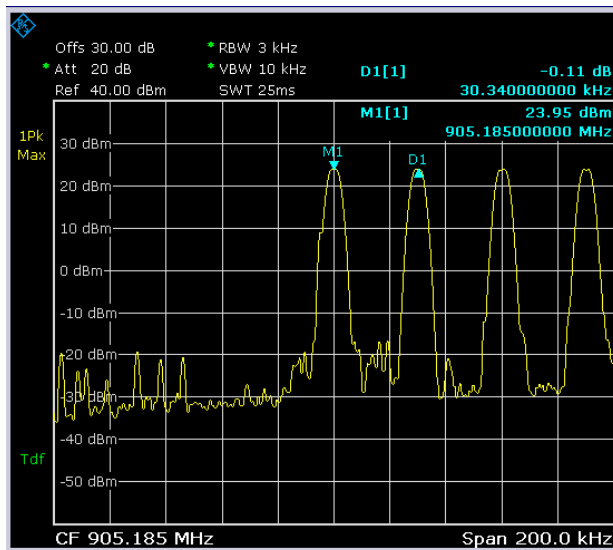
Plot 13



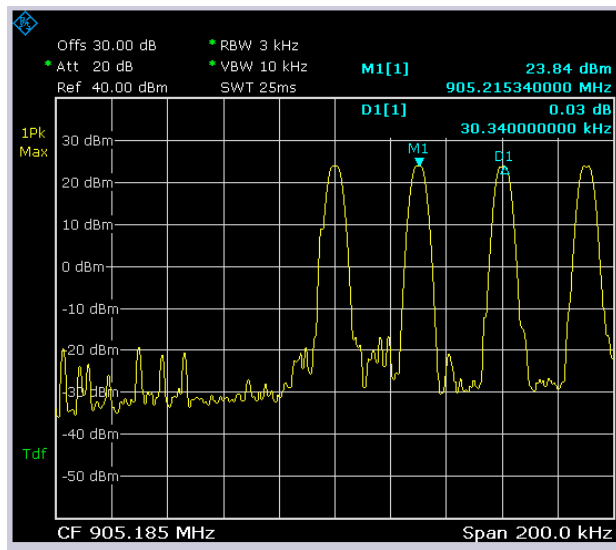
Plot 14

Antenna B

RC2 905.2 MHz



Plot 15



Plot 16

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FCC requirements	15.247(a)(1) (i)		
Test procedure	ANSI 63.10 section 7.8.3. Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature 22°C	Relative Humidity 46%	Air Pressure 1006hPa	

Limit

902 – 928 MHz band	Number of hopping channels
OBW < 250 kHz	≥50 channels

Results:Antenna A

Carrier frequency/ Modulation	Limit	Result	Verdict	Plot #
902.2 MHz / DBPSK	minimum 50	54	Pass	17,18
920.8MHz/ DBPSK		56	Pass	19,20,
922.3MHz/ GFSK		56	Pass	21, 22
905.2MHz/ GFSK		54	Pass	23, 24

Antenna B

Carrier frequency/ Modulation	Limit	Result	Verdict	Plot #
902.2 MHz / DBPSK	minimum 50	54	Pass	25, 26
920.8MHz/ DBPSK		56	Pass	27, 28
922.3MHz/ GFSK		56	Pass	29, 30
905.2MHz/ GFSK		54	Pass	31, 32



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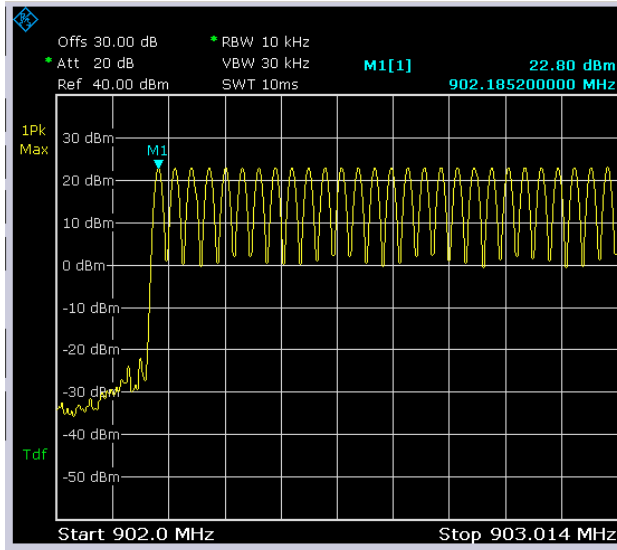
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

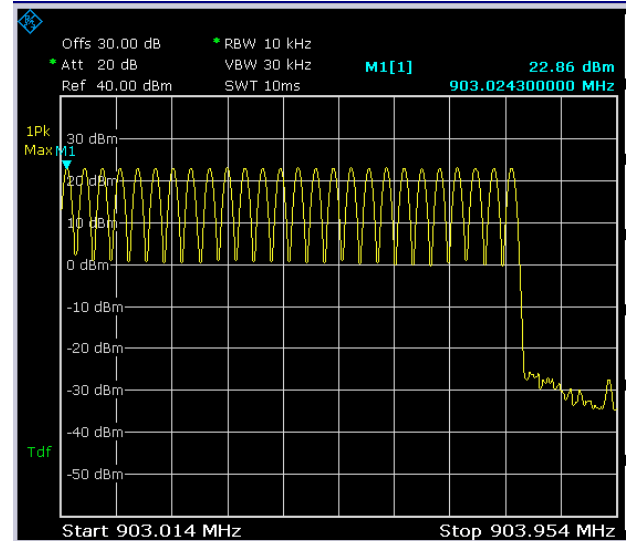
Antenna A

RC2 902.2 MHz



28 Hopping, Span 902MHz-903.014MHz

Plot 17

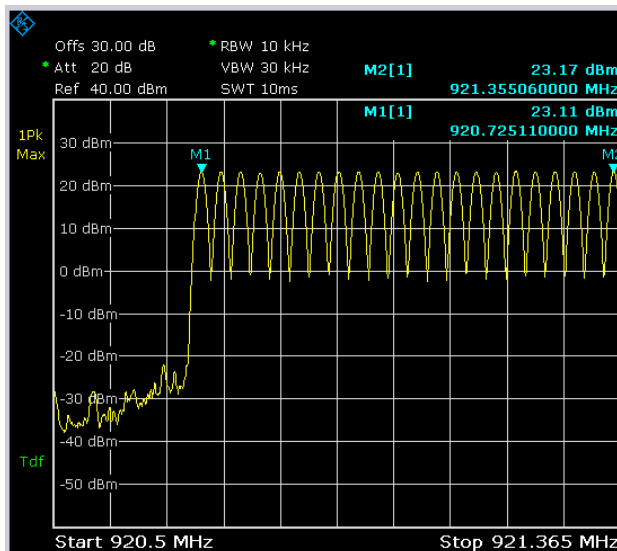


26 Hopping , Span 903.014MHz-903.954MHz

Plot 18

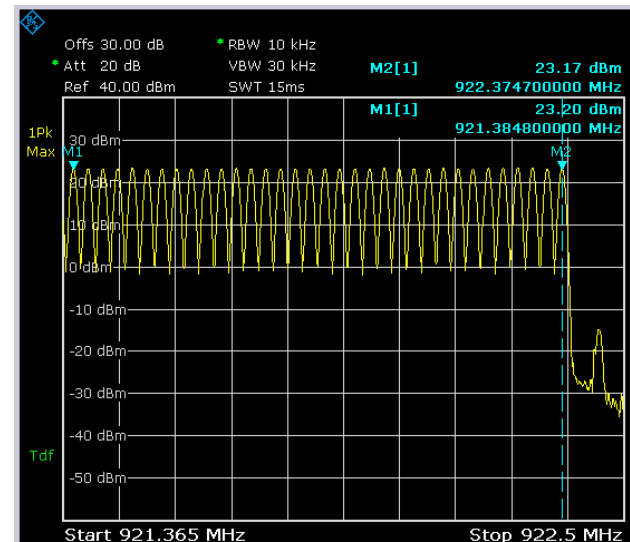
Antenna A

RC4 920.8 MHz



22 Hopping, Span 920.5MHz-921.365MHz

Plot 19



34 Hopping , Span 921.365MHz-922.5MHz

Plot 20



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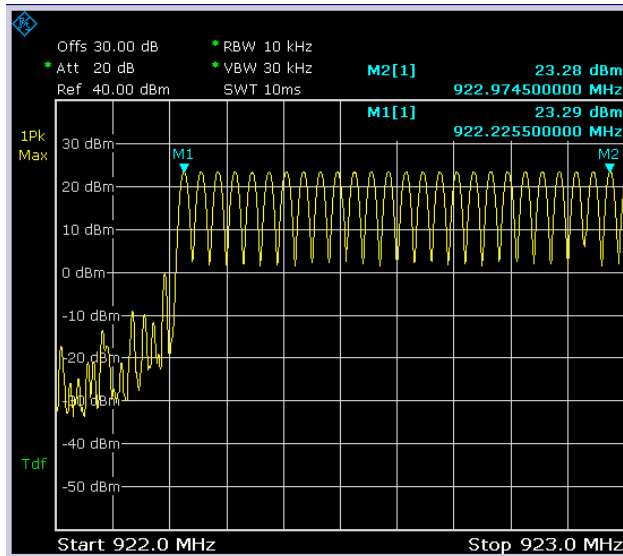
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

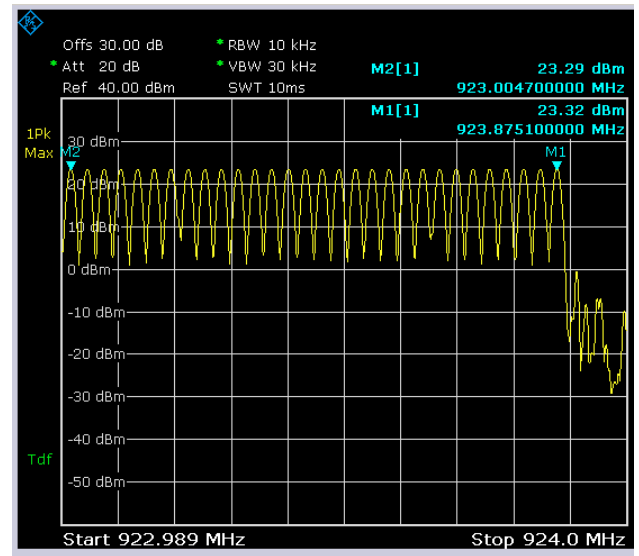
Antenna A

RC4 922.3 MHz



26 Hopping, Span 922MHz-923MHz

Plot 21

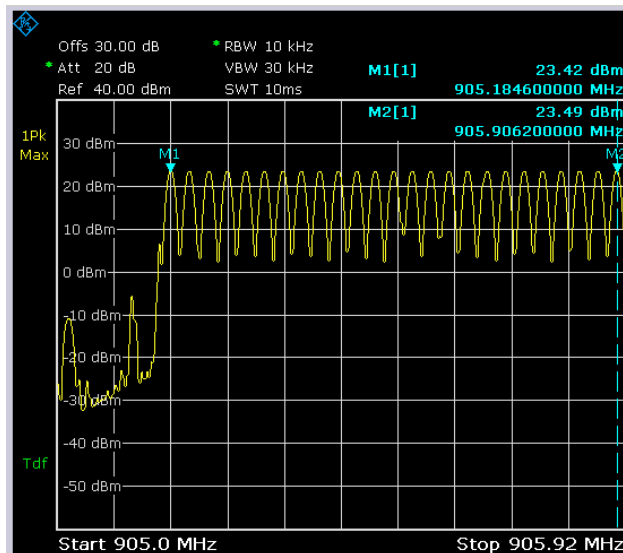


30 Hopping, Span 922.989MHz-924MHz

Plot 22

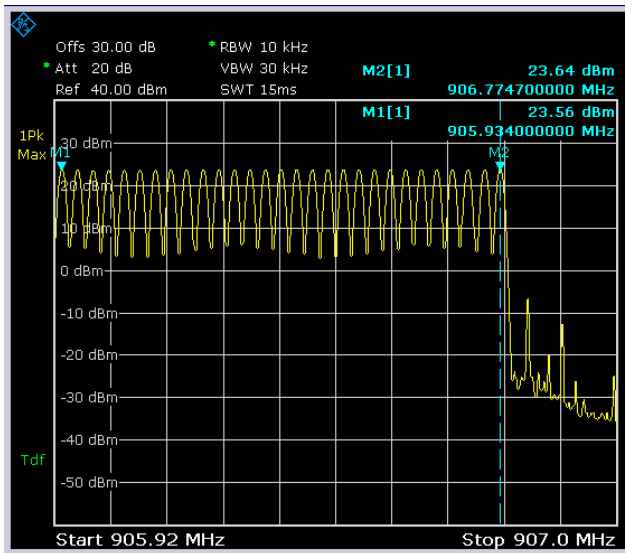
Antenna A

RC2 905.2 MHz



25 Hopping, Span 905MHz-905.23MHz

Plot 23



29 Hopping, Span 905.92MHz-907MHz

Plot 24



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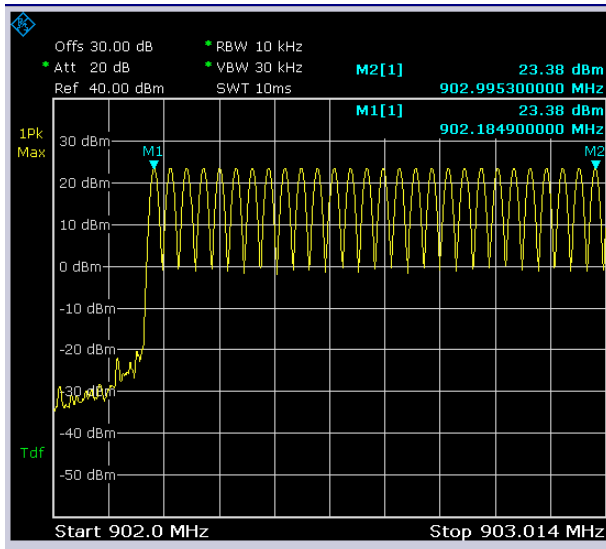
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

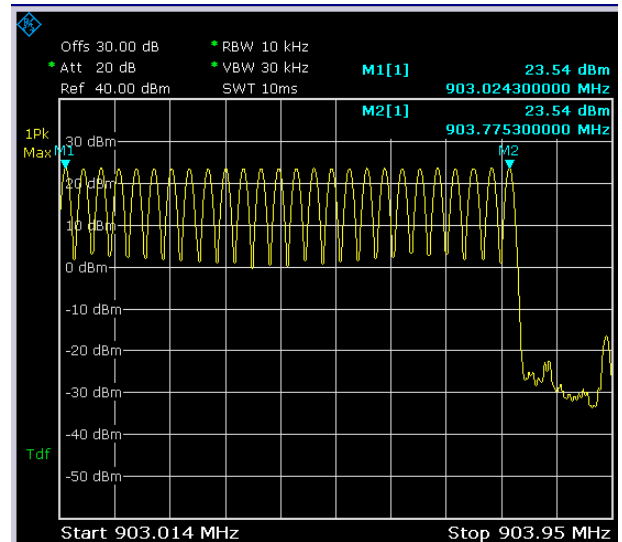
Antenna B

RC2 902.2 MHz



28 Hopping, Span 902MHz-903.014MHz

Plot 25

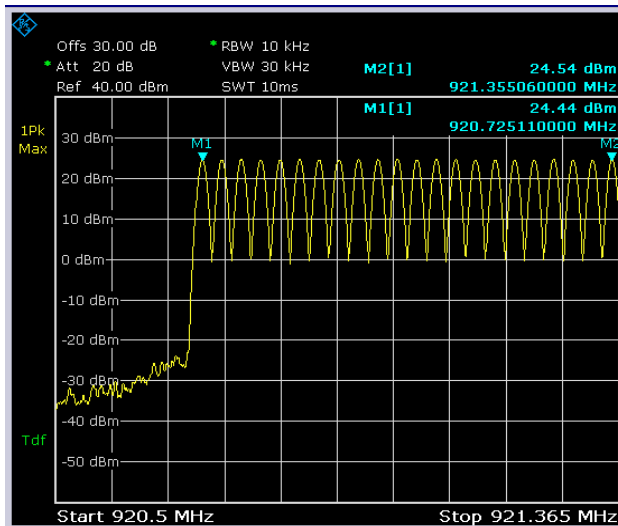


26 Hopping , Span 903.014MHz-903.954MHz

Plot 26

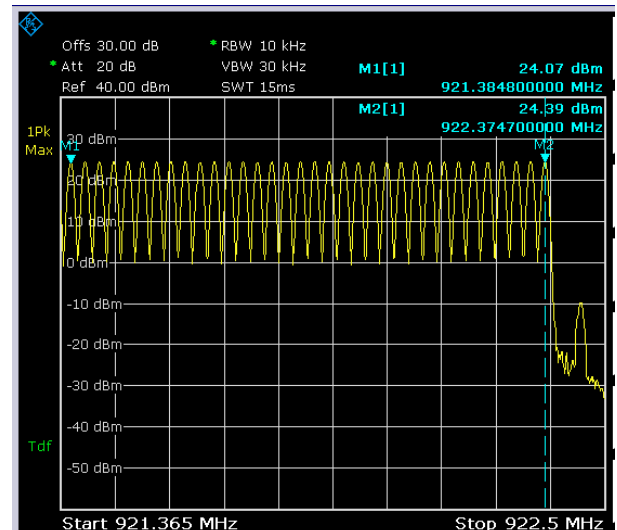
Antenna B

RC4 920.8 MHz



22 Hopping, Span 920.5 MHz-921.365 MHz

Plot 27



34 Hopping , Span 921.365 MHz-922.5 MHz

Plot 28



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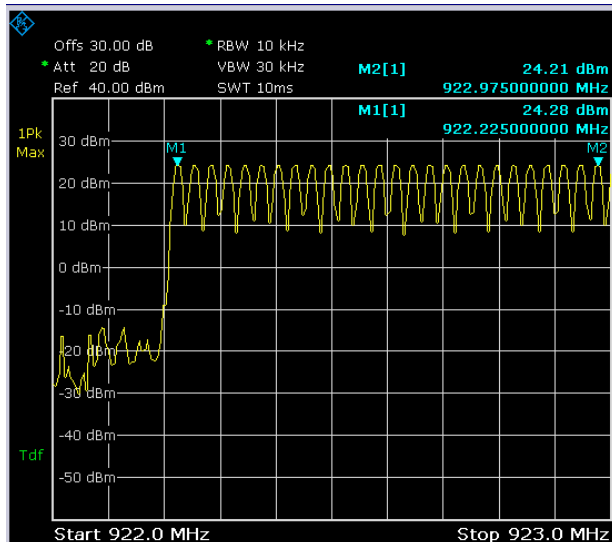
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

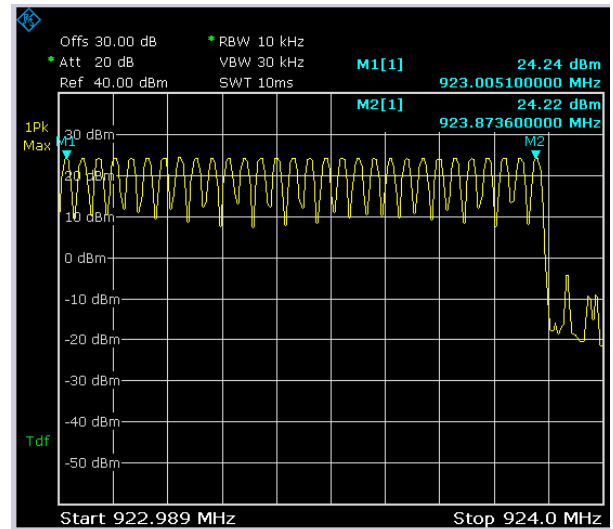
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 922.3 MHz



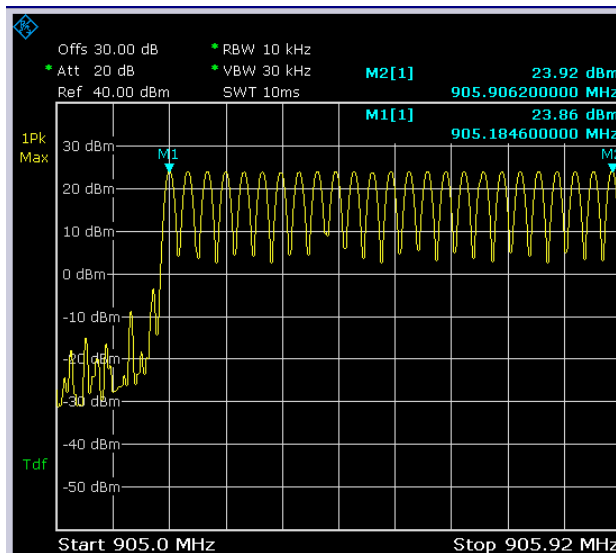
26 Hopping, Span 922 MHz-923 MHz
Plot 29



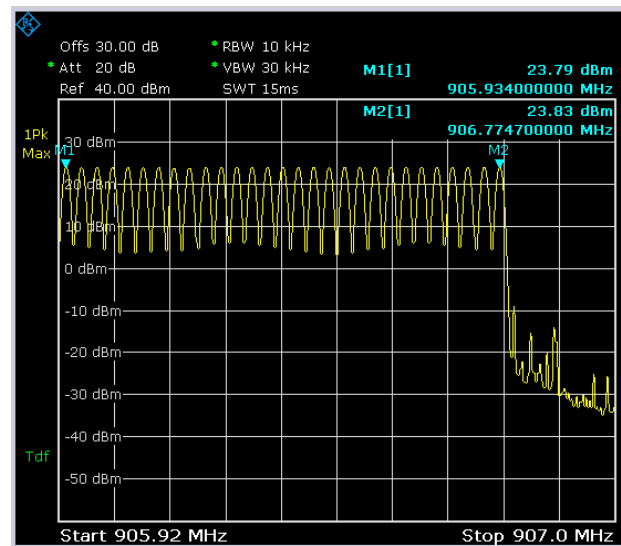
30 Hopping, Span 922.989MHz-924MHz
Plot 30

Antenna B

RC2 905.2 MHz



25 Hopping, Span 905 MHz-905.92 MHz
Plot 31



29 Hopping, Span 905.92 MHz-907 MHz
Plot 32



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

6.3. Averaged time of occupancy (dwell time)**Limits & methods:**

FCC requirements	15.247(a)(1) (i)		
Test procedure	ANSI 63.10 Section 7.8.4 Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

902 – 928 MHz band	Average time of occupancy
OBW < 250 kHz	≤ 0.4 sec within the period of 20 sec

Results:Antenna A

Carrier frequency/ Modulation	Limit	Result		Verdict	Plot #
902.2 MHz / DBPSK	Maximum 0.4 sec within avg period of 20 sec	194.7ms	Once every 29.4 s	Pass	33, 34
920.8MHz/ DBPSK		193 ms	Once every 23 s	Pass	35, 36
922.3MHz/ GFSK		383 ms	Once every 23.4 s	Pass	37, 38
905.2MHz/ GFSK		384 ms	Once every 29.7 s	Pass	39, 40

Antenna B

Carrier frequency/ Modulation	Limit	Result		Verdict	Plot #
902.2 MHz / DBPSK	Maximum 0.4 sec within avg period of 20 sec	194 ms	Once every 20.7 s	Pass	41, 42
920.8MHz/ DBPSK		192 ms	Once every 26.8 s	Pass	43, 44
922.3MHz/ GFSK		390 ms	Once every 34 s	Pass	45, 46
905.2MHz/ GFSK		384 ms	Once every 34 s	Pass	47, 48

Test procedure

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.



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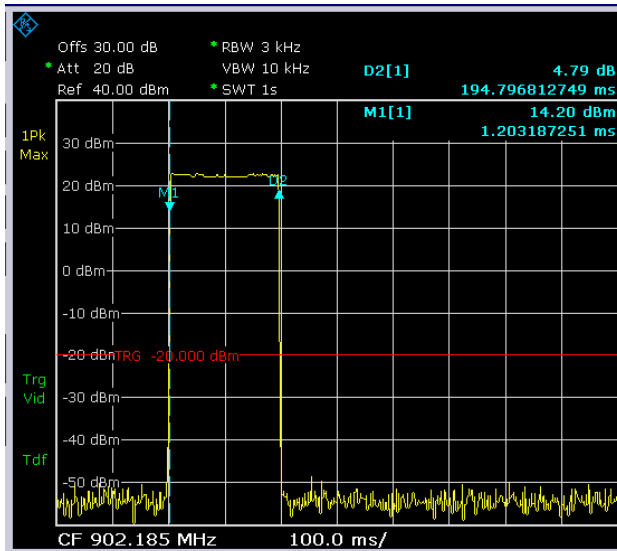
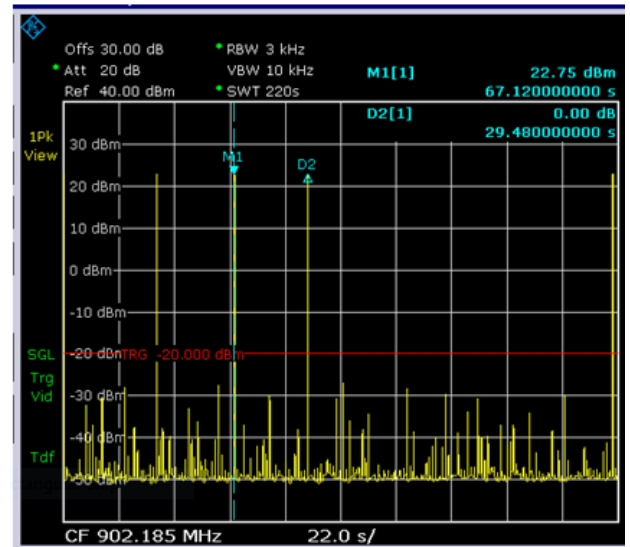
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

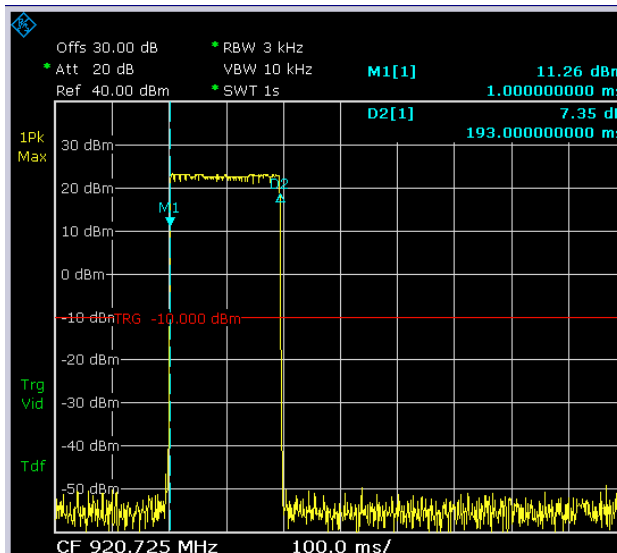
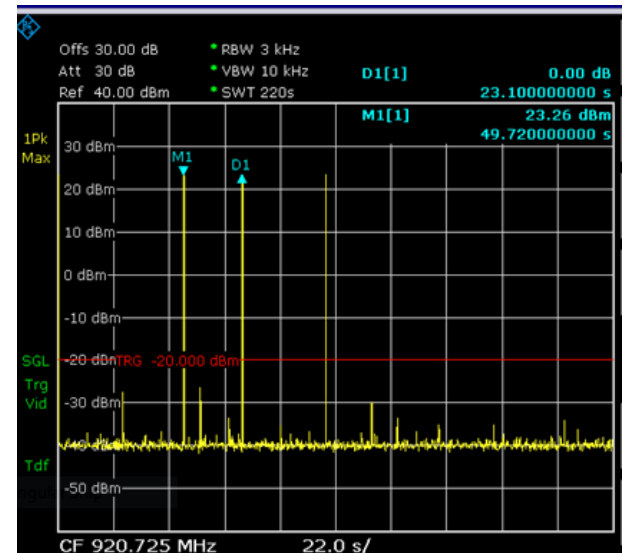
Antenna A

RC2 902.2 MHz

One transmission duration
Plot 33Average time of occupancy
Plot 34

Antenna A

RC4 920.8 MHz

One transmission duration
Plot 35Average time of occupancy
Plot 36



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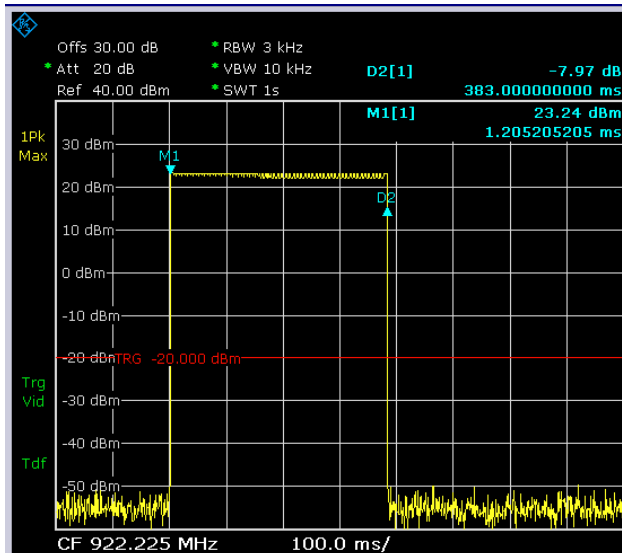
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

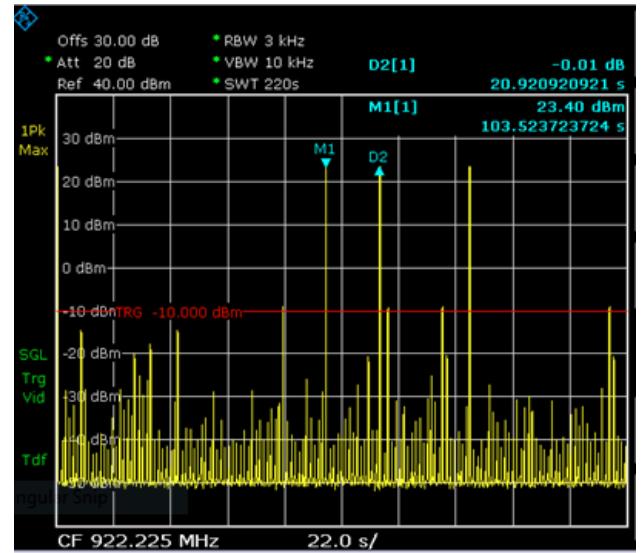
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC4 922.3 MHz



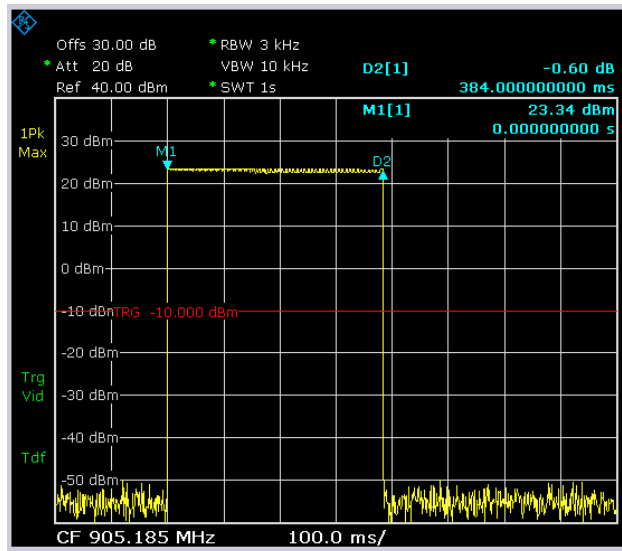
One transmission duration
Plot 37



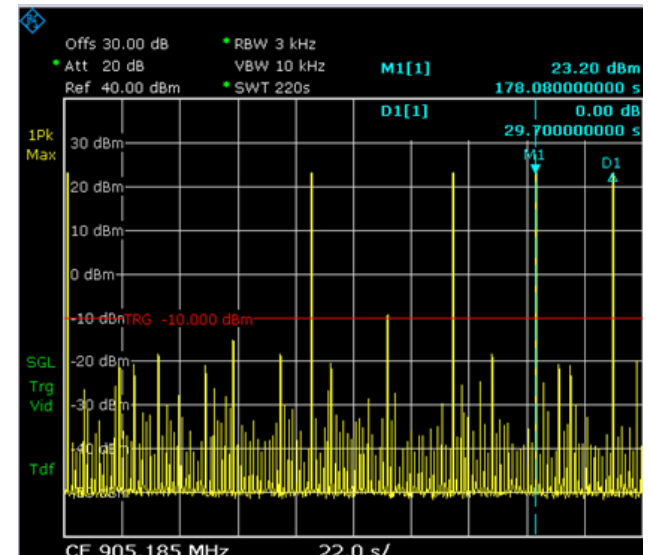
Average time of occupancy
Plot 38

Antenna A

RC2 905.2 MHz



One transmission duration
Plot 39



Average time of occupancy
Plot 40



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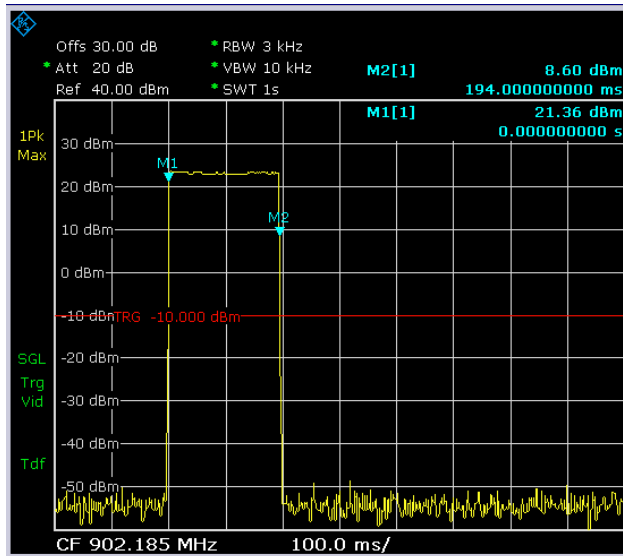
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

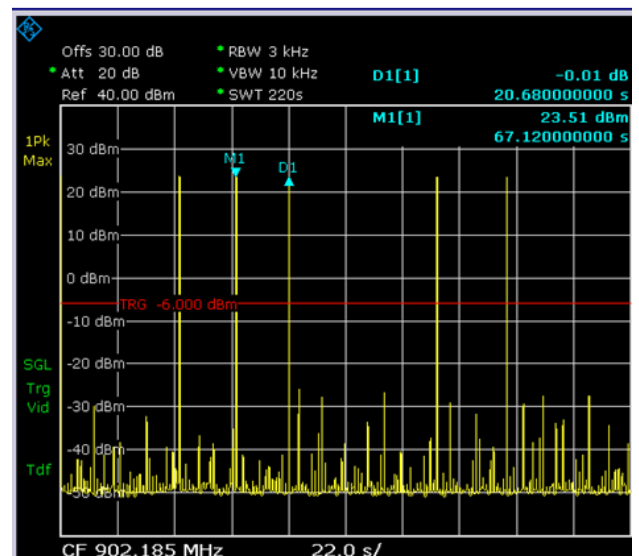
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC2 902.2 MHz



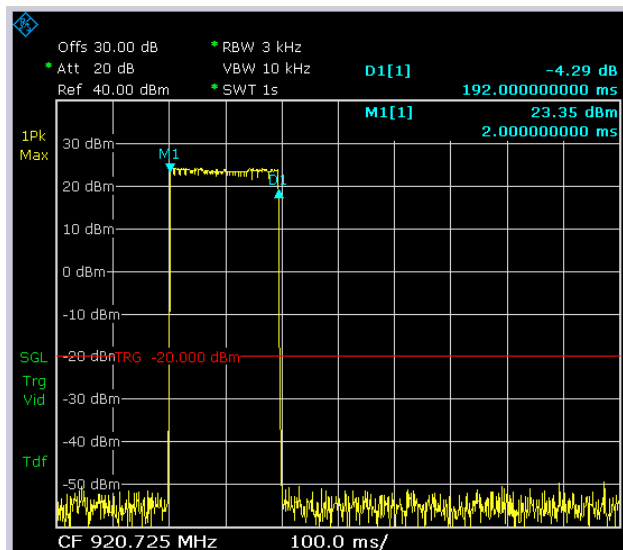
One transmission duration
Plot 41



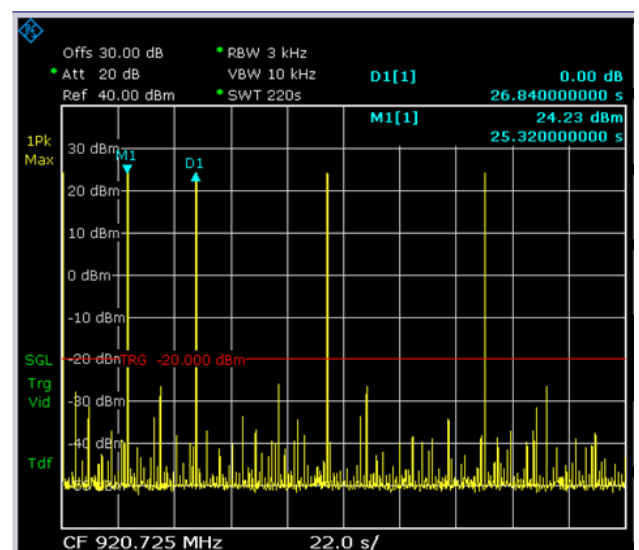
Average time of occupancy
Plot 42

Antenna B

RC4 920.8 MHz



One transmission duration
Plot 43



Average time of occupancy
Plot 44



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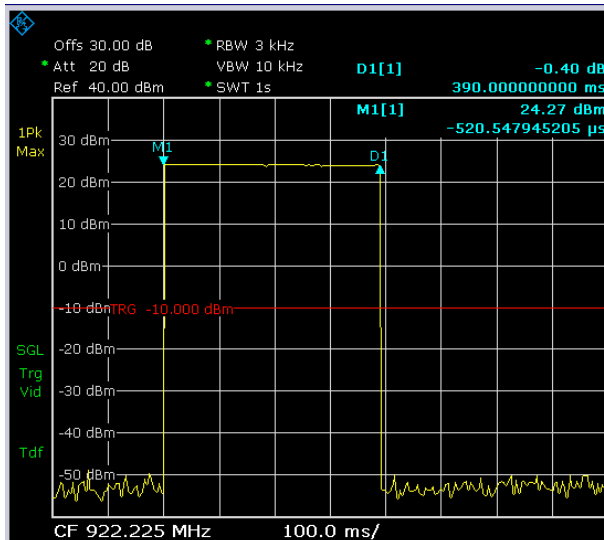
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

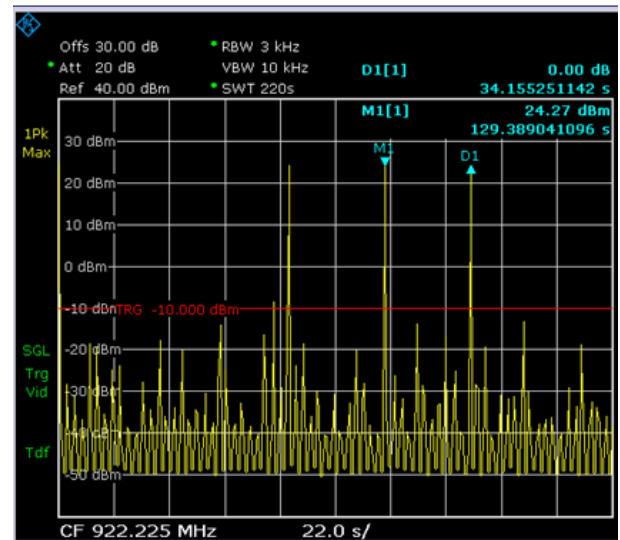
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 922.3 MHz



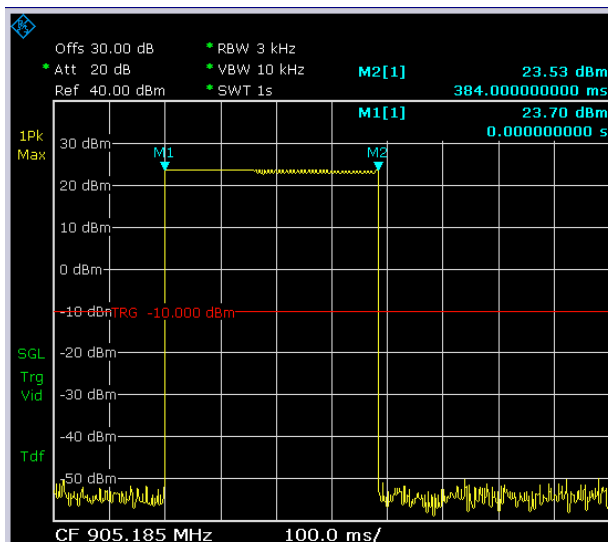
One transmission duration
Plot 45



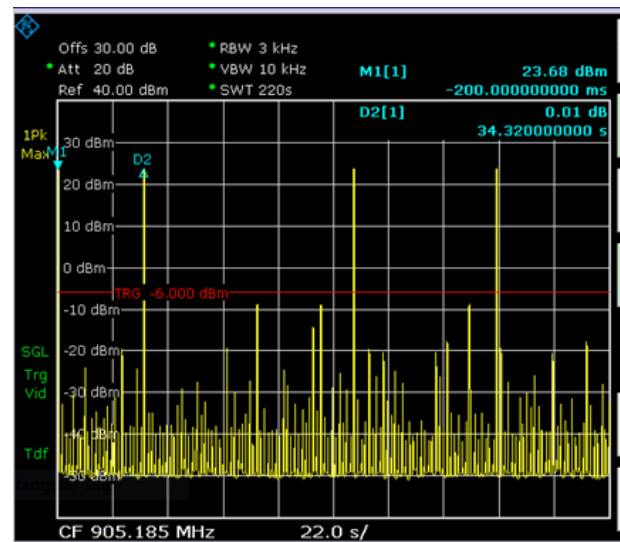
Average time of occupancy
Plot 46

Antenna B

RC2 905.2 MHz



One transmission duration
Plot 47



Average time of occupancy
Plot 48



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

6.4. Output power test for frequency hopping spread spectrum (FHSS) devices

Limits & methods:

FCC requirements	15.247(b)(2)		
Test procedure	ANSI 63.10 Section 7.8.5 Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

Operating frequency range, MHz	Maximum Peak conducted output power
902 - 928	1W (30dBm) for systems employing at least 50 hopping channels

Note: $P_{(W)} = 1W * 10^{(P(dBm) / 10)} / 1000 = 10^{((P(dBm) - 30) / 10)}$

Results:

Antenna A

Carrier freq/Mod.	Channel #	Frequency, MHz	Measured Power, dBm	Calculated Power, mW	Limit mW	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	22.55	179.9	1000	Pass	49
	54	903.775	22.71	186.6		Pass	50
920.8MHz/ DBPSK	1	920.725	23.15	206.5		Pass	51
	56	922.375	23.13	205.6		Pass	52
922.3MHz/ GFSK	1	922.225	23.02	200.4		Pass	53
	56	923.875	22.75	188.4		Pass	54
905.2MHz/ GFSK	1	905.184	23.41	219.3		Pass	55
	54	906.776	23.12	205.1		Pass	56

Antenna B

Carrier freq/Mod.	Channel #	Frequency, MHz	Measured Power, dBm	Calculated Power, mW	Limit mW	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	23.47	222.3	1000	Pass	57
	54	903.775	23.06	202.3		Pass	58
920.8MHz/ DBPSK	1	920.725	24.29	268.5		Pass	59
	56	922.375	23.73	236.0		Pass	60
922.3MHz/ GFSK	1	922.225	23.8	239.9		Pass	61
	56	923.875	23.59	228.6		Pass	62
905.2MHz/ GFSK	1	905.185	23.02	200.4		Pass	63
	54	906.755	23.05	201.8		Pass	64



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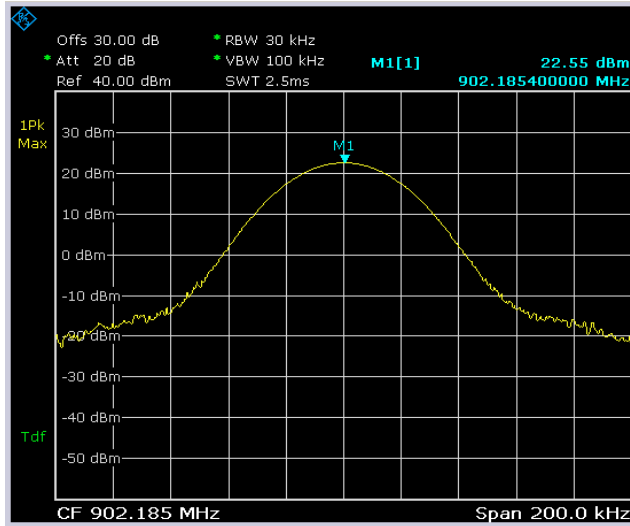
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

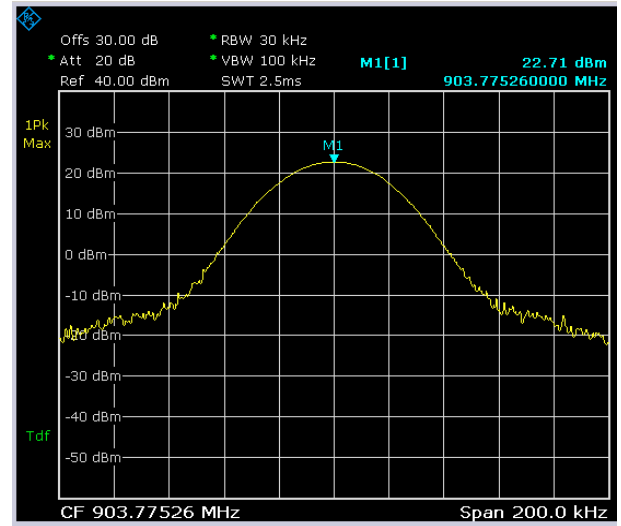
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC2 902.2 MHz



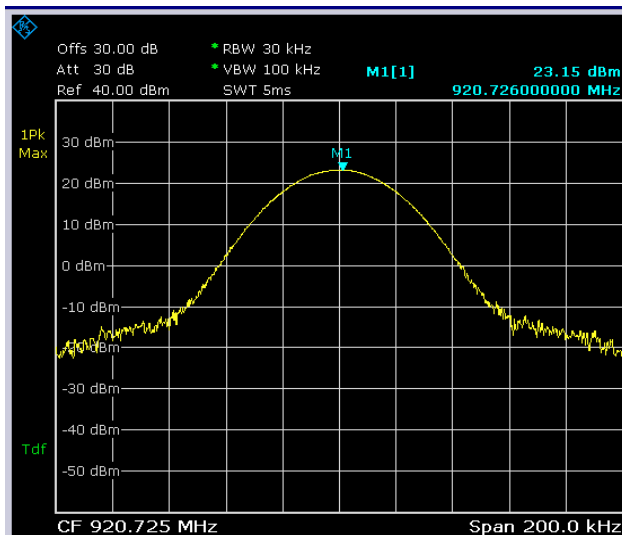
CH 1 – 902.185 MHz
Plot 49



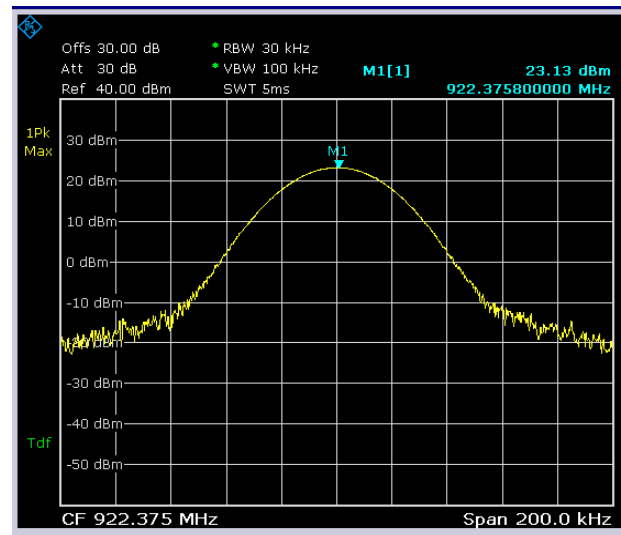
CH 54 – 903.775 MHz
Plot 50

Antenna A

RC4 920.8 MHz



CH 1 – 920.725 MHz
Plot 51



CH 56 – 922.375 MHz
Plot 52



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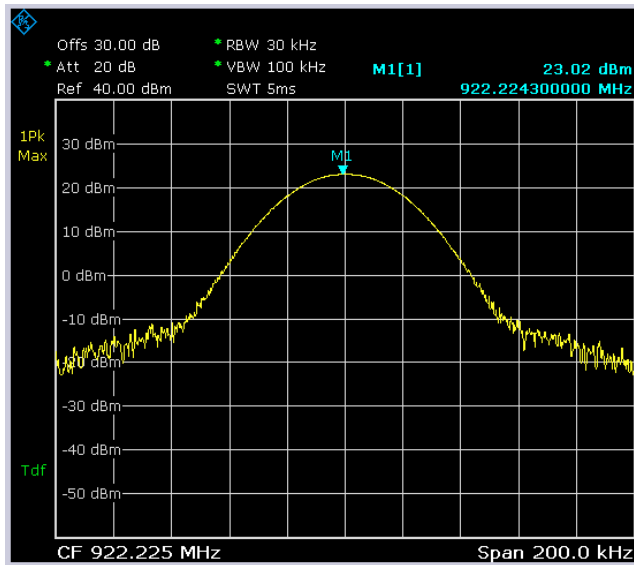
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

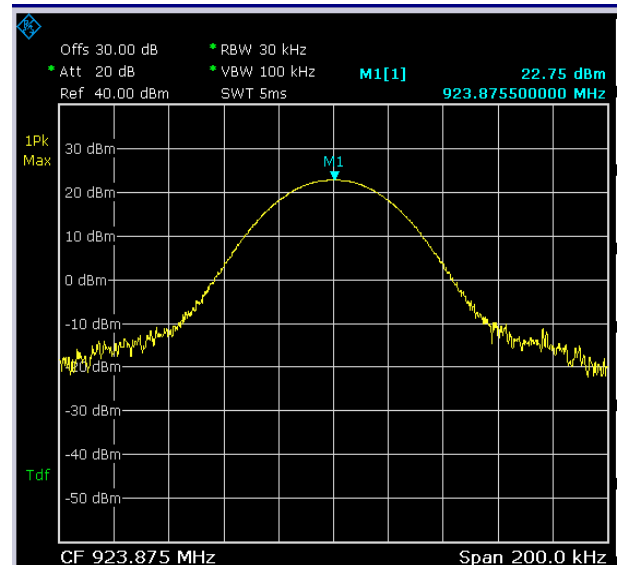
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC4 922.3 MHz



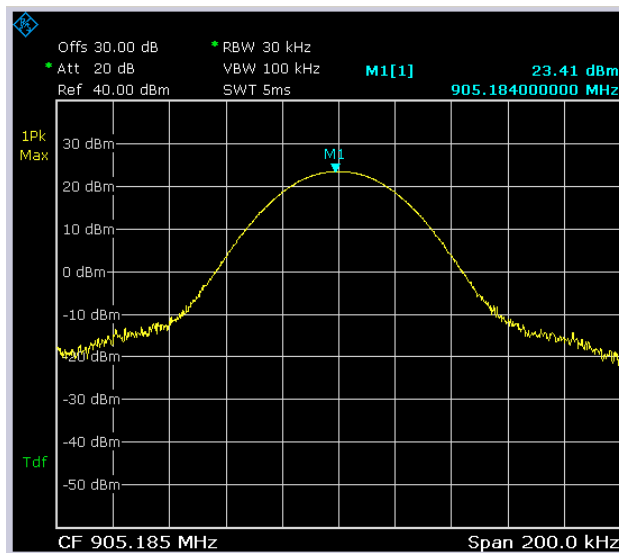
CH 1 – 922.225 MHz
Plot 53



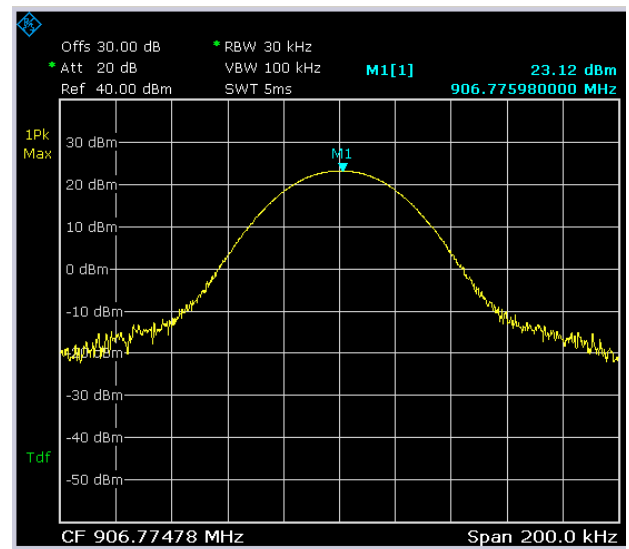
CH 54 – 923.815 MHz
Plot 54

Antenna A

RC2 905.2 MHz



CH 1 – 905.185 MHz
Plot 55



CH 54 – 906.755 MHz
Plot 56



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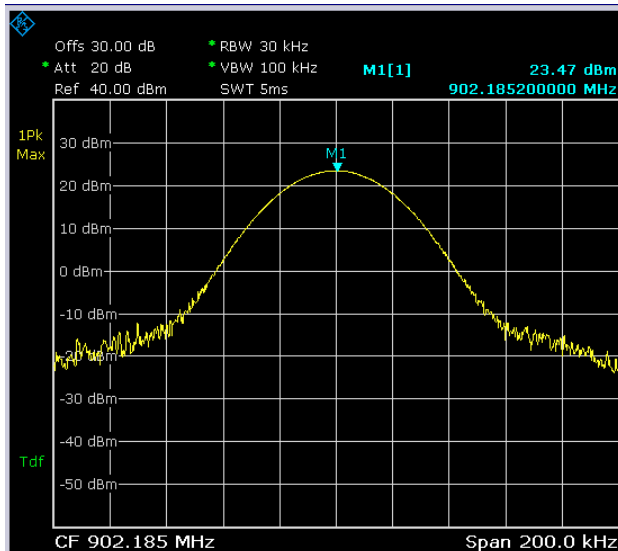
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

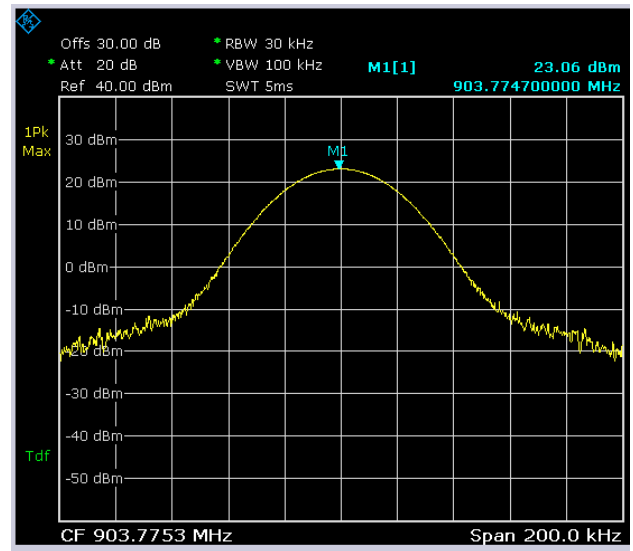
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC2 902.2 MHz



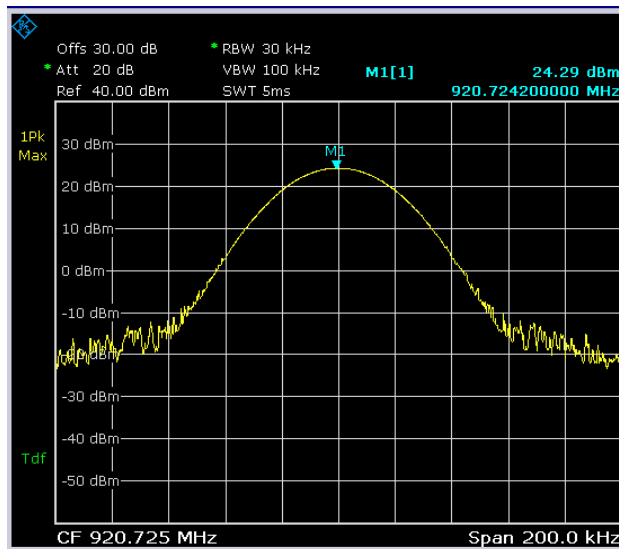
CH 1 – 902.185 MHz
Plot 57



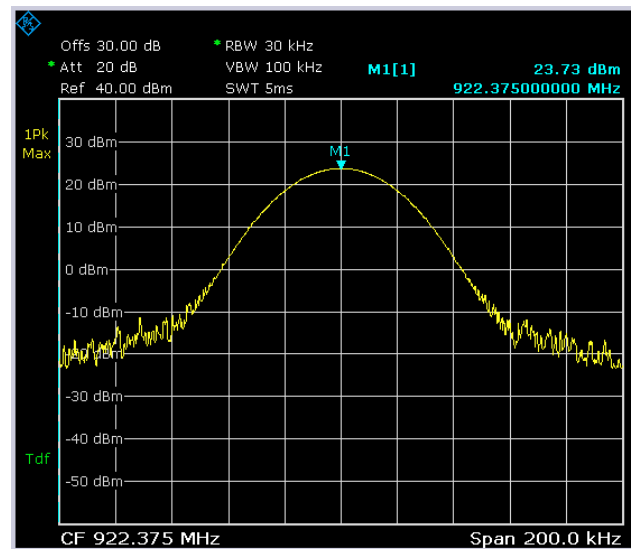
CH 54 – 903.775 MHz
Plot 58

Antenna B

RC4 920.8 MHz



CH 1 – 920.725 MHz
Plot 59



CH 56 – 922.375 MHz
Plot 60



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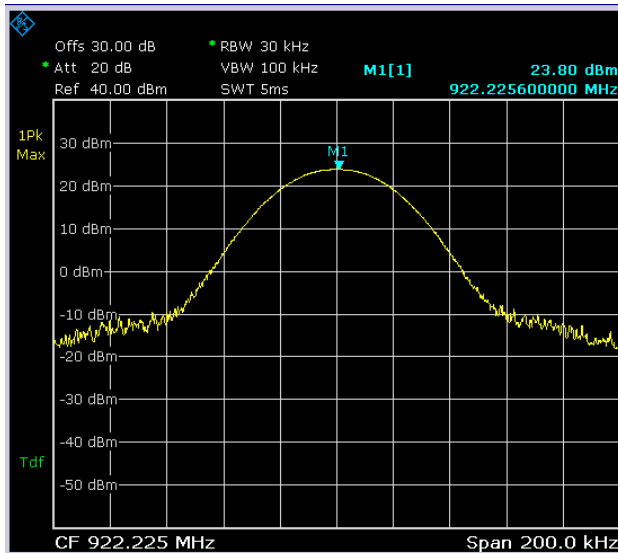
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

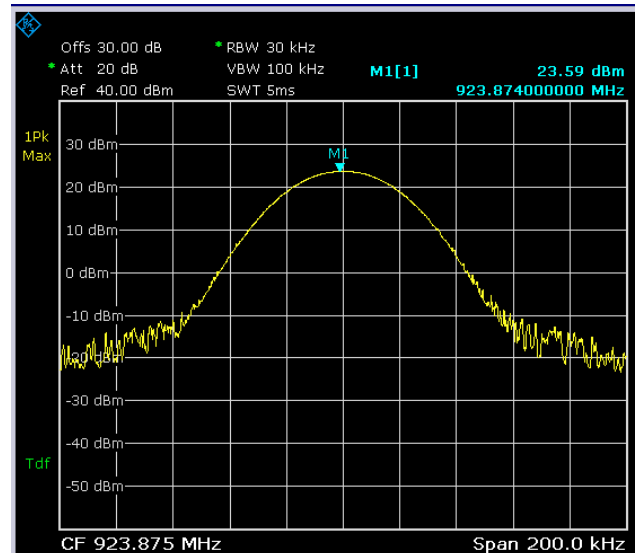
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 922.3 MHz



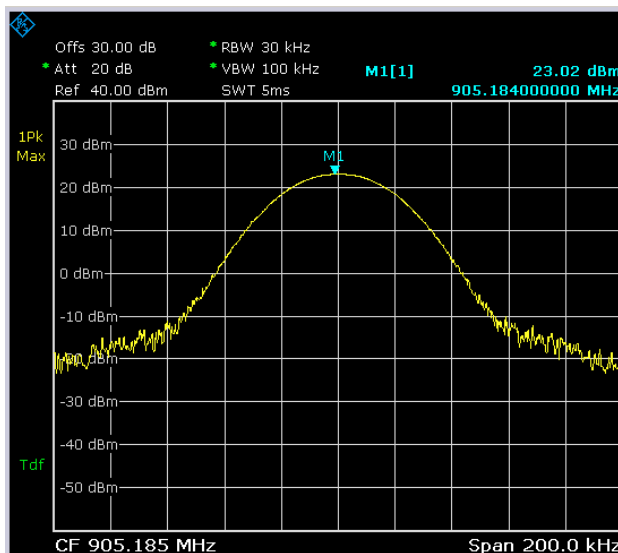
CH 1 – 922.225 MHz
Plot 61



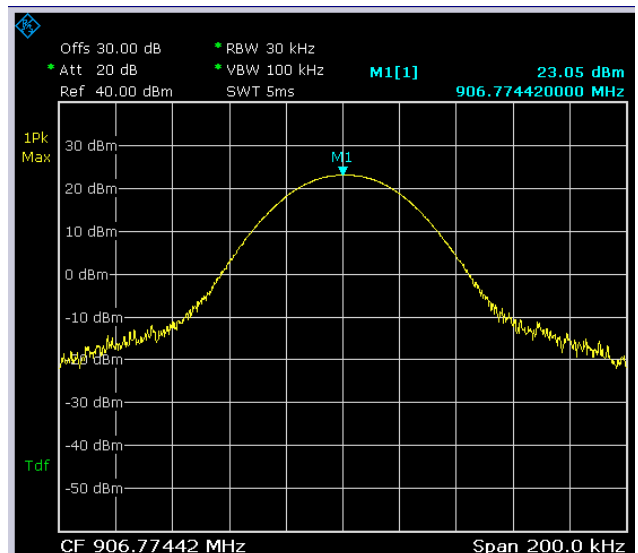
CH 54 – 923.815 MHz
Plot 62

Antenna B

RC2 905.2 MHz



CH 1 – 905.185 MHz
Plot 63



CH 54 – 906.793 MHz
Plot 64



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

6.5. Occupied bandwidth**Limits & methods:**

FCC requirements	15.247(a)(1) (i)		
Test procedure	ANSI 63.10 Section 7.8.7 Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

Operating frequency range, MHz	Occupied bandwidth limit
902 - 928	Maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz

Results:Antenna A

Carrier freq/Mod.	Channel #	Frequency, MHz	Measured 20 dB BW, kHz	Limit 20 dB BW, kHz	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	8.191	Max 500	Pass	65
	54	903.775	8.299		Pass	66
920.8MHz/ DBPSK	1	902.725	8.17		Pass	67
	56	922.375	8.11		Pass	68
922.3MHz/ GFSK	1	922.225	9.84		Pass	69
	56	923.875	9.87		Pass	70
905.2MHz/ GFSK	1	905.185	9.73		Pass	71
	54	906.775	9.76		Pass	72

Antenna B

Carrier freq/Mod.	Channel #	Frequency, MHz	Measured 20 dB BW, kHz	Limit 20 dB BW, kHz	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	8.065	Max 500	Pass	73
	54	903.775	8.118		Pass	74
920.8MHz/ DBPSK	1	902.725	8.33		Pass	75
	56	922.375	8.3		Pass	76
922.3MHz/ GFSK	1	922.225	9.56		Pass	77
	56	923.875	9.86		Pass	78
905.2MHz/ GFSK	1	905.185	9.92		Pass	79
	54	906.775	9.79		Pass	80



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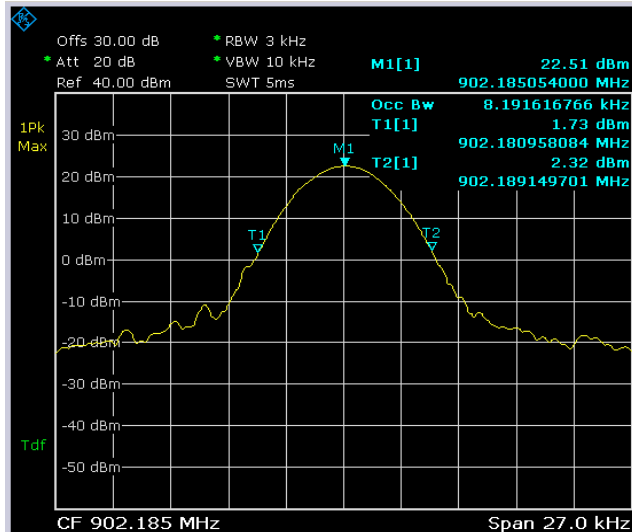
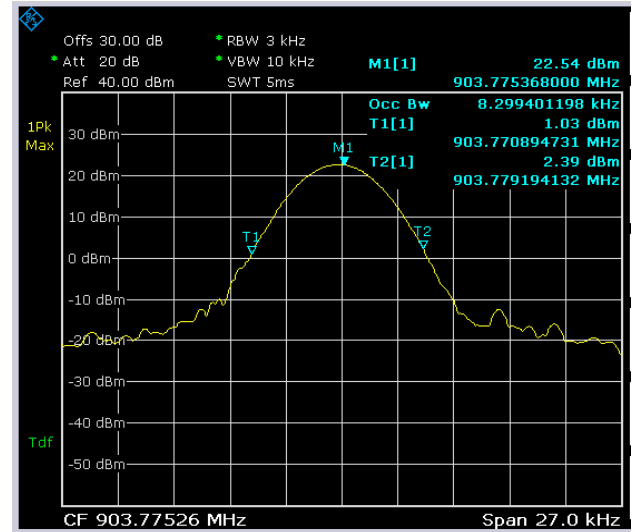
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

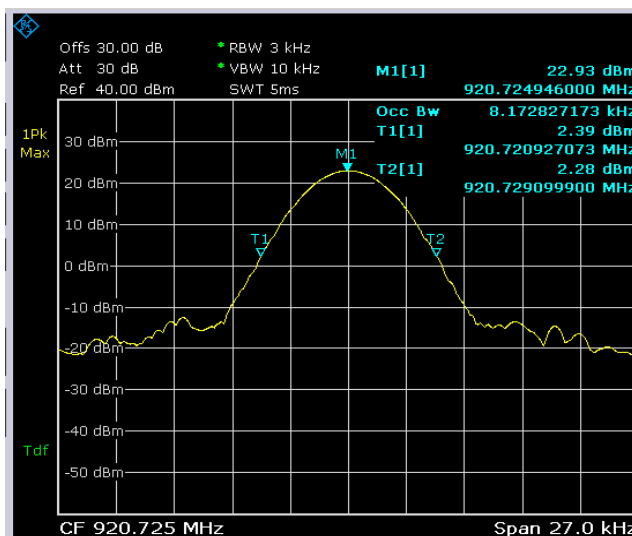
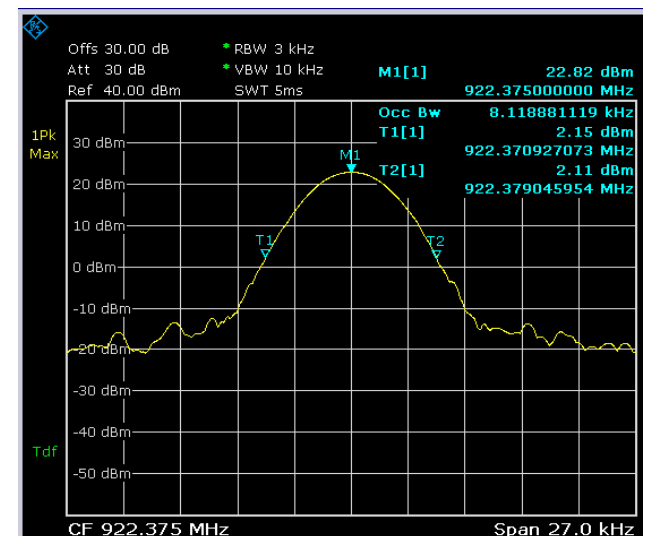
Antenna A

RC2 902.2 MHz

CH 1 – 902.185 MHz
Plot 65CH 54 – 903.775 MHz
Plot 66

Antenna A

RC4 920.8 MHz

CH 1 – 920.725 MHz
Plot 67CH 56 – 922.375 MHz
Plot 68



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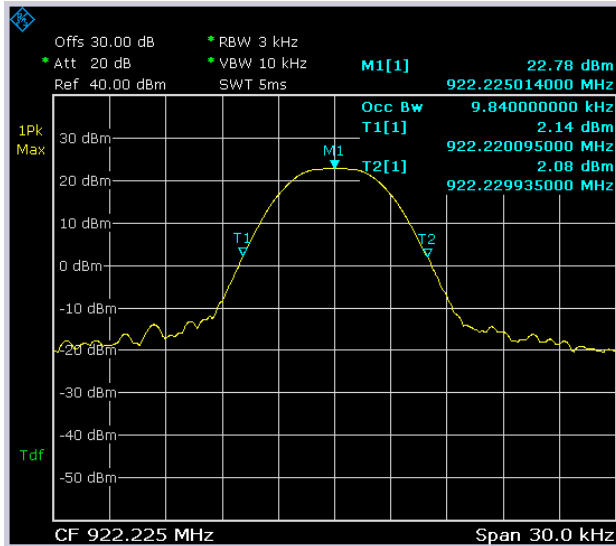
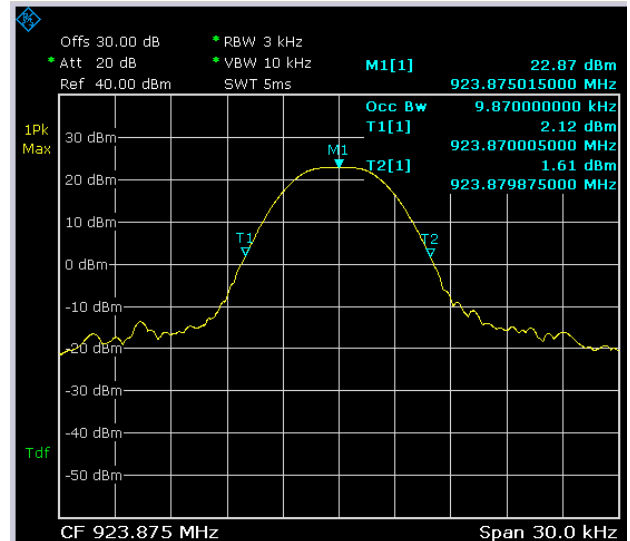
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

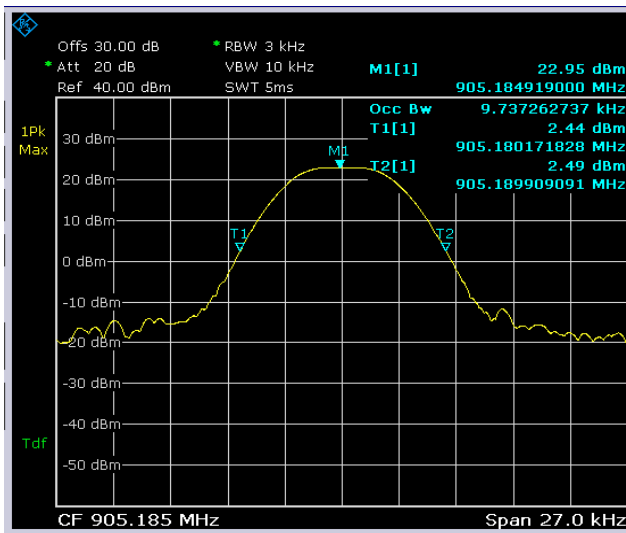
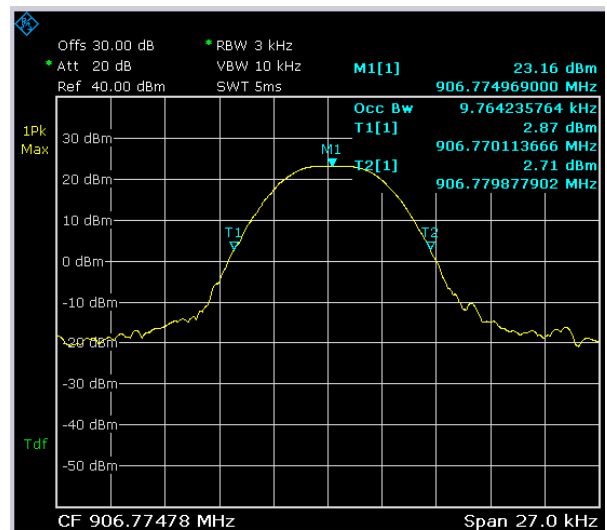
Antenna A

RC4 922.3 MHz

CH 1 – 922.225 MHz
Plot 69CH 56 – 923.875 MHz
Plot 70

Antenna A

RC2 905.2 MHz

CH 1 – 905.185 MHz
Plot 71CH 54 – 906.775 MHz
Plot 72



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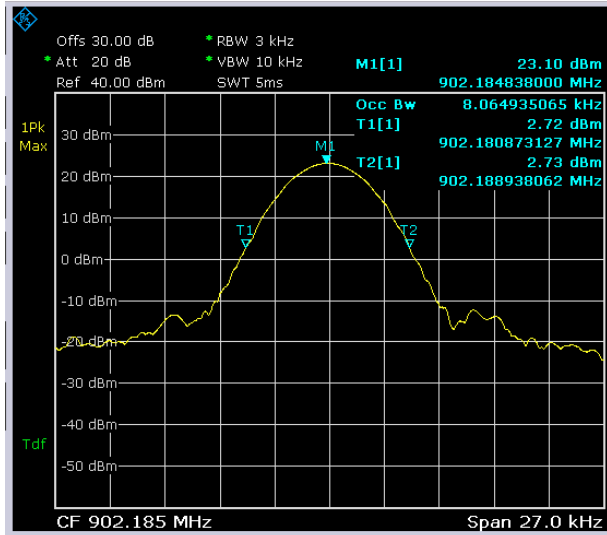
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Title: Test on IoT Repeater- Transceiver Module

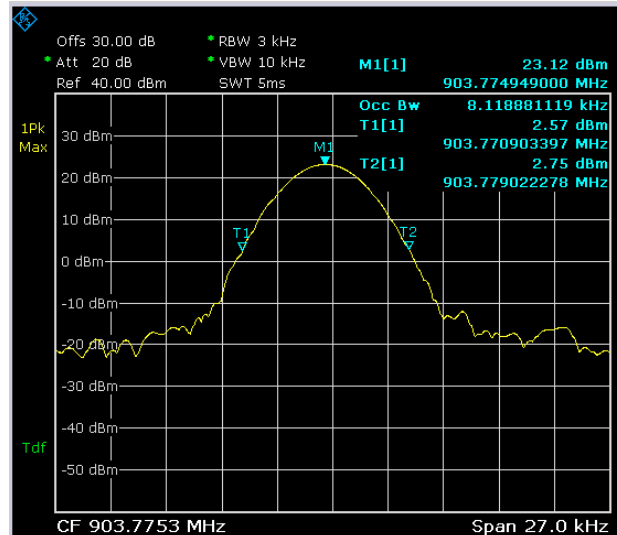
Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC2 902.2 MHz



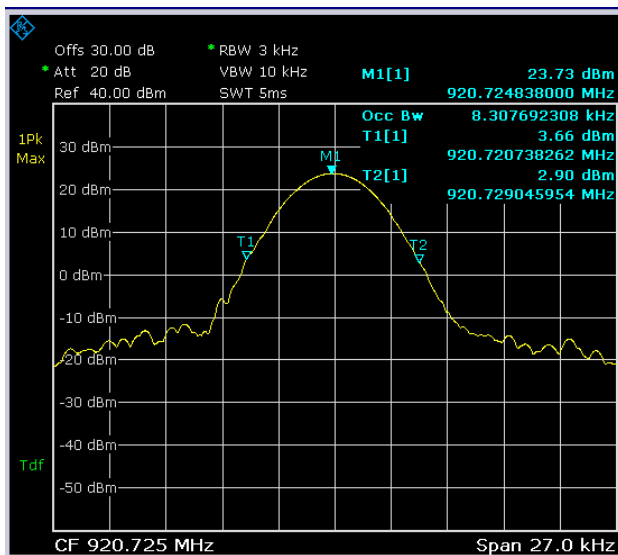
CH 1 – 902.185 MHz
Plot 73



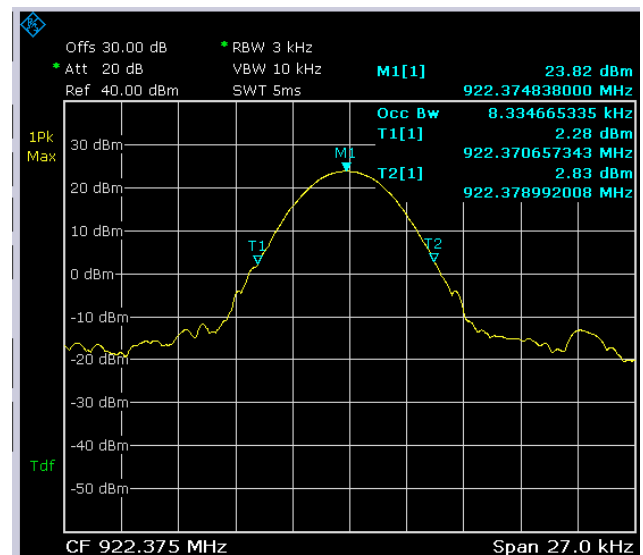
CH 56 – 903.775 MHz
Plot 74

Antenna B

RC4 920.8 MHz



CH 1 – 920.725 MHz
Plot 75



CH 56 – 922.375 MHz
Plot 76



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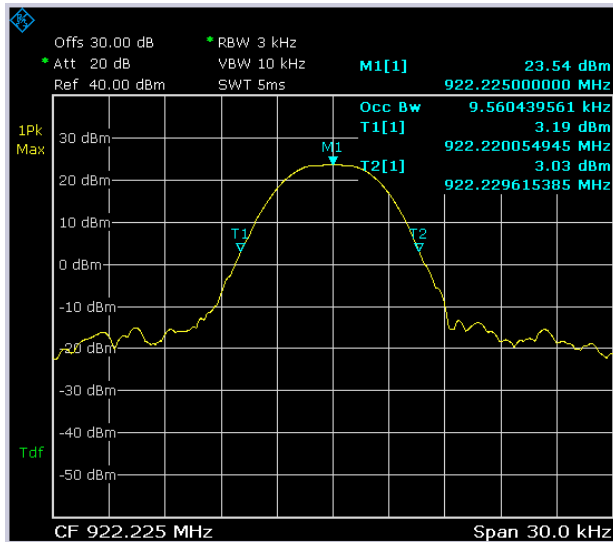
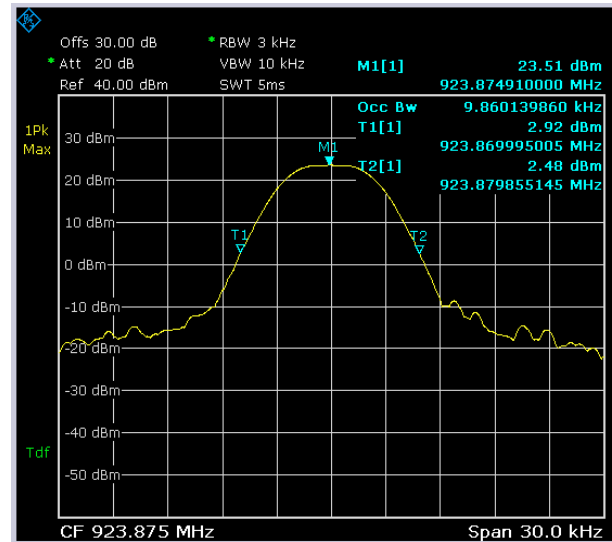
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

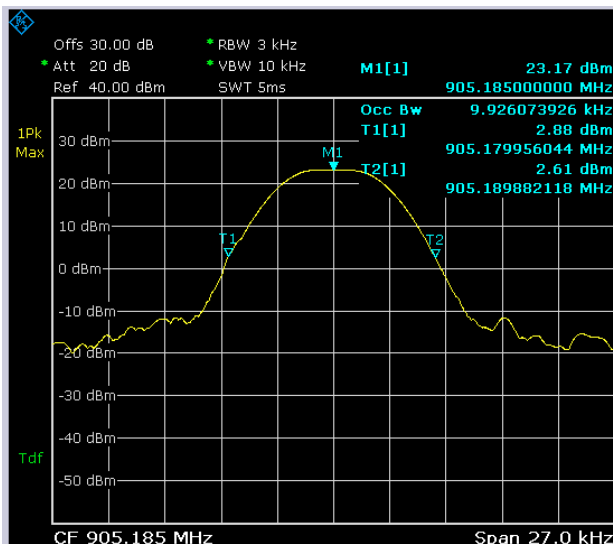
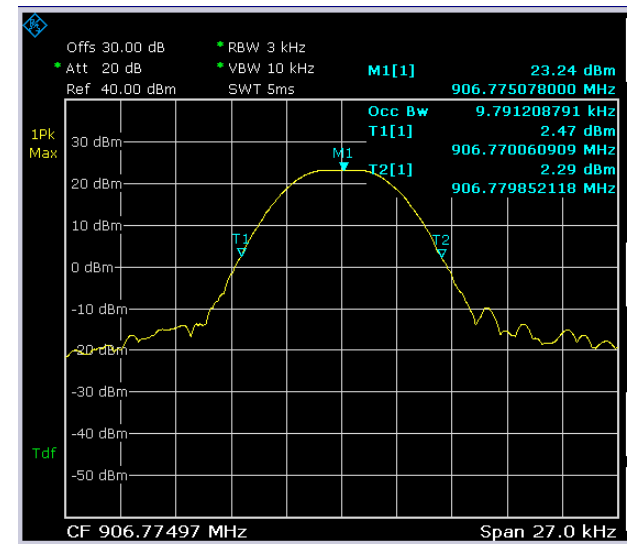
Antenna B

RC4 922.3 MHz

CH 1 – 922.225 MHz
Plot 77CH 56 – 923.875 MHz
Plot 78

Antenna B

RC2 905.2 MHz

CH 1 – 905.185 MHz
Plot 79CH 54 – 906.775 MHz
Plot 80



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

6.6. Band-edge compliance for RF conducted emissions**Limits & methods:**

FCC requirements	15.247(d)		
Test procedure	ANSI 63.10 Section 7.8.6 Conducted measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit

Operating frequency range, MHz	RF conducted emission limit
902 - 928	In any 100 kHz bandwidth outside the frequency band the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band

Results:Antenna A

Carrier freq/ Mod.	Channel #	Frequency, MHz	Measured result, dBm	Left border 902 MHz, dbm	Right border 928 MHz, dbm	Min. Limit in any 100kHz band, dBc	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	22.69	-12.99	-	-20	Pass	81
	Hopping	-	22.76	-14.05	-		Pass	82
	54	903.775	22.85	-	-33		Pass	83,84
	Hopping	-	22.95	-	-34		Pass	85,86
920.8MHz/ DBPSK	1	920.725	22.77	-24	-	-20	Pass	87
	Hopping	-	23	-23.5	-		Pass	88
	56	922.375	23.02	-	-24.4		Pass	89
	Hopping	-	23.23	-	-23.7		Pass	90
922.3MHz/ GFSK	1	922.225	22.72	-34	-	-20	Pass	91
	Hopping	-	23.19	-34	-		Pass	92
	56	923.875	22.97	-	-32		Pass	93
	Hopping	-	23.21	-	-33		Pass	94
905.2MHz/ GFSK	1	905.1818	22.85	-33	-	-20	Pass	95
	Hopping	-	23.21	-33	-		Pass	96
	54	923.875	23.23	-	-35		Pass	97
	Hopping	-	23.41	-	-34		Pass	98

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Carrier freq/ Mod.	Channel #	Frequency, MHz	Measured result, dBm	Left border 902 MHz, dbm	Right border 928 MHz, dbm	Min. Limit in any 100kHz band, dBc	Verdict	Plot #
902.2 MHz / DBPSK	1	902.185	23.38	-13.14	-	-20	Pass	99
	Hopping	-	23.55	-14.40	-		Pass	100
	54	903.775	23.46	-	-35		Pass	101
	Hopping	-	23.67	-	-34		Pass	102
920.8MHz/ DBPSK	1	920.725	23.56	-34	-	-20	Pass	103
	Hopping	-	24.11	-34	-		Pass	104
	56	922.375	23.83	-	-33		Pass	105
	Hopping	-	24.11	-	-34		Pass	106
922.3MHz/ GFSK	1	922.225	24.02	-33	-	-20	Pass	107
	Hopping	-	24.11	-35	-		Pass	108
	56	923.875	24.11	-	-34		Pass	109
	Hopping	-	24.17	-	-32		Pass	110
905.2MHz/ GFSK	1	905.185	23.04	-32	-	-20	Pass	111
	Hopping	-	23.86	-34	-		Pass	112
	54	923.875	23.52	-	-34		Pass	113
	Hopping	-	23.89	-	-33		Pass	114



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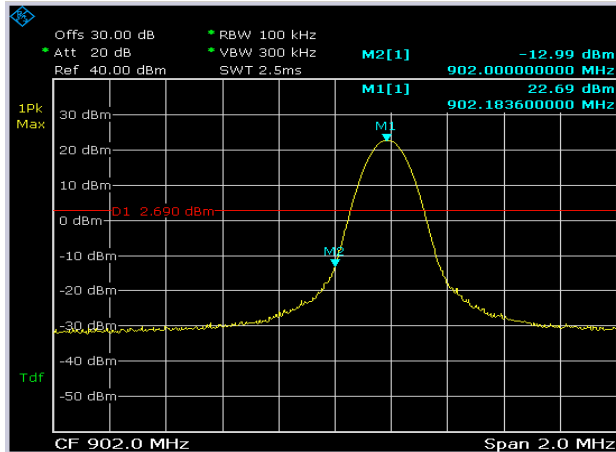
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

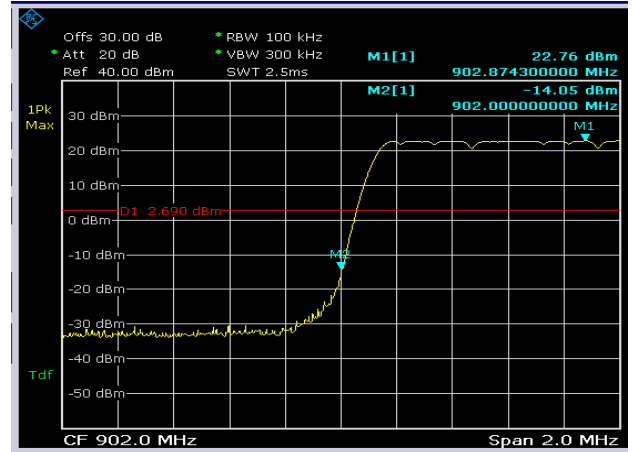
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

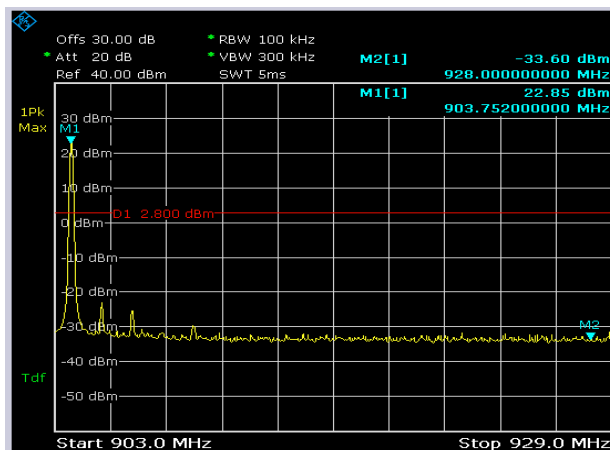
RC2 902.2 MHz



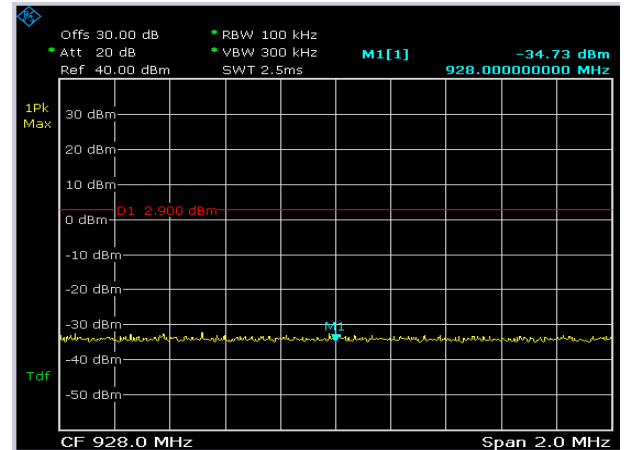
902 MHz Band-Edge, Single channel
Plot 81



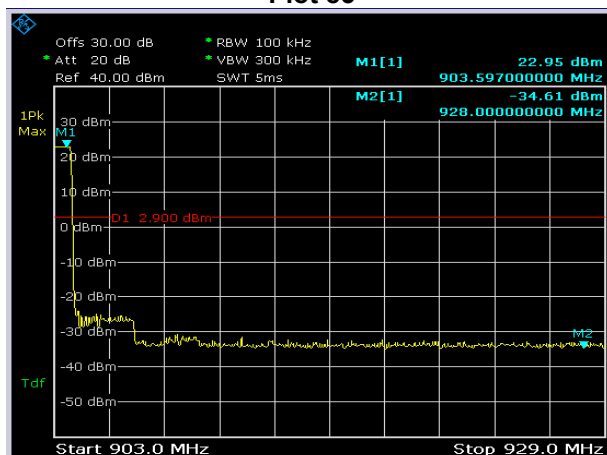
902 MHz Band-Edge, Hopping
Plot 82



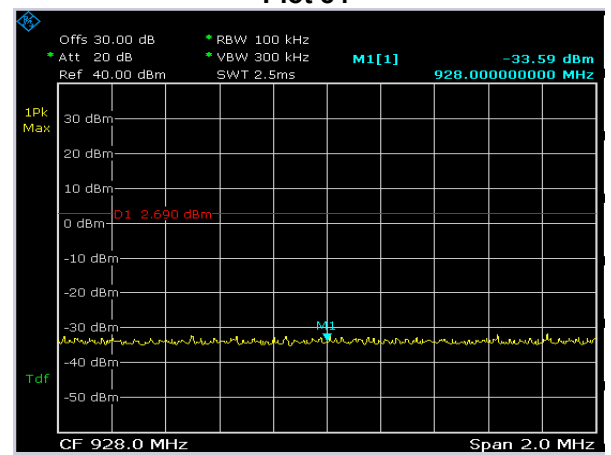
928 MHz Band-Edge, Single channel
Plot 83



928 MHz Band-Edge, Single channel
Plot 84



928 MHz Band-Edge, Hopping
Plot 85



928 MHz Band-Edge, Hopping
Plot 86



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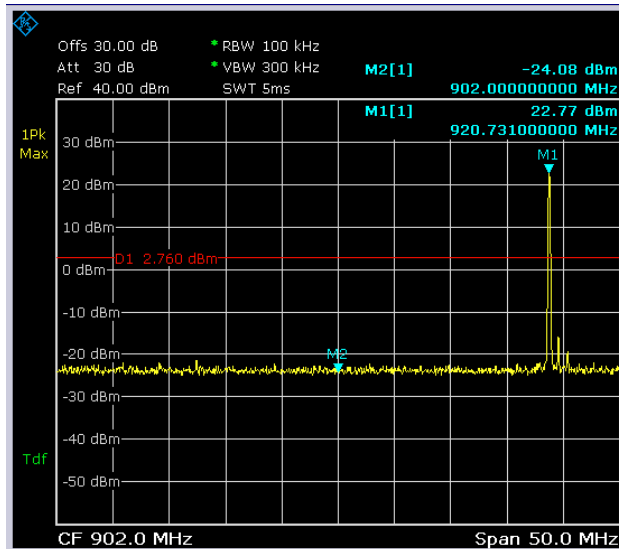
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

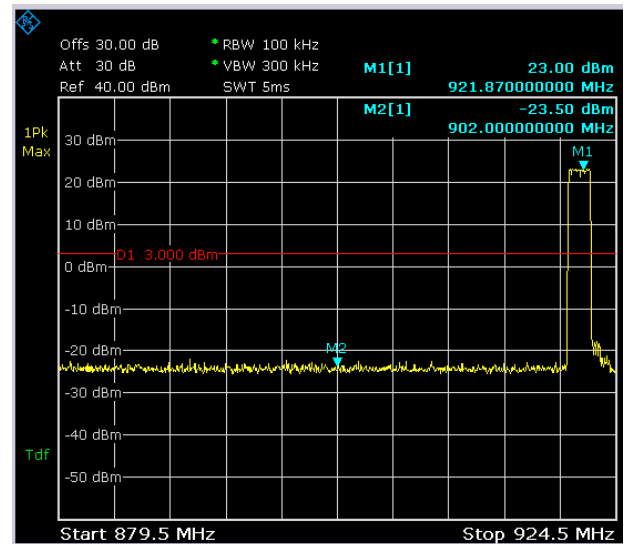
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

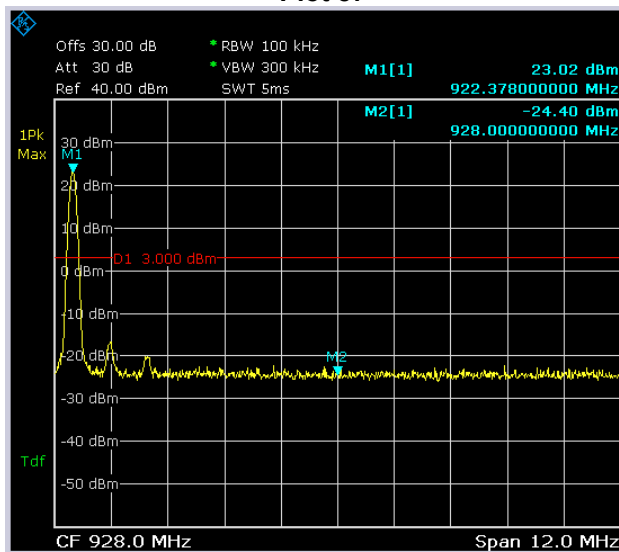
RC4 920.8 MHz



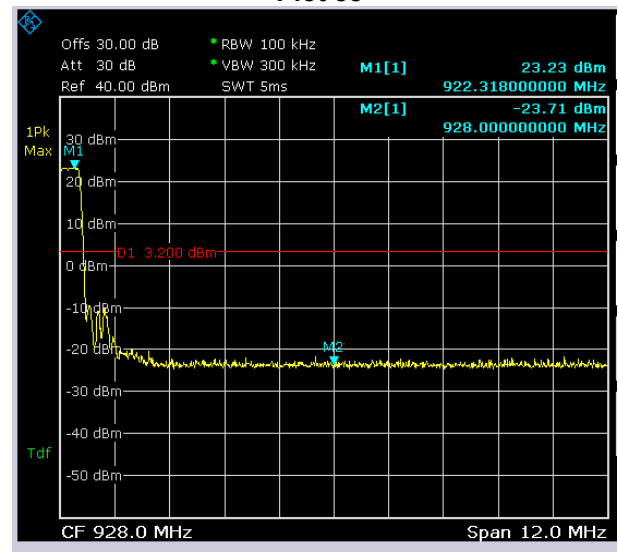
902 MHz Band-Edge, Single channel
Plot 87



902 MHz Band-Edge, Hopping
Plot 88



928 MHz Band-Edge, Single channel
Plot 89



928 MHz Band-Edge, Hopping
Plot 90



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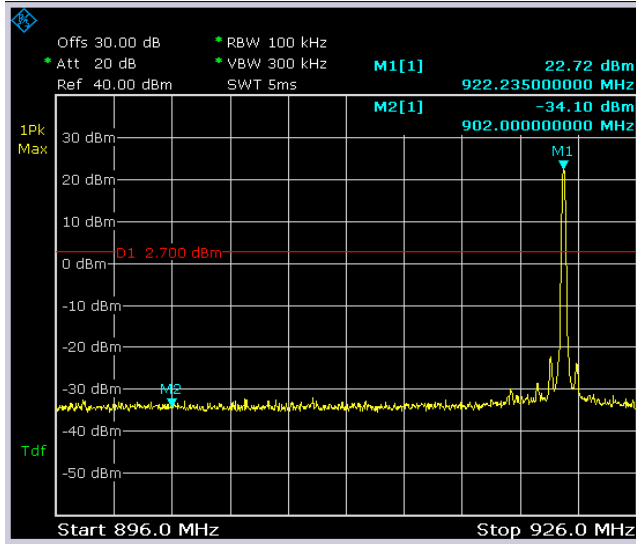
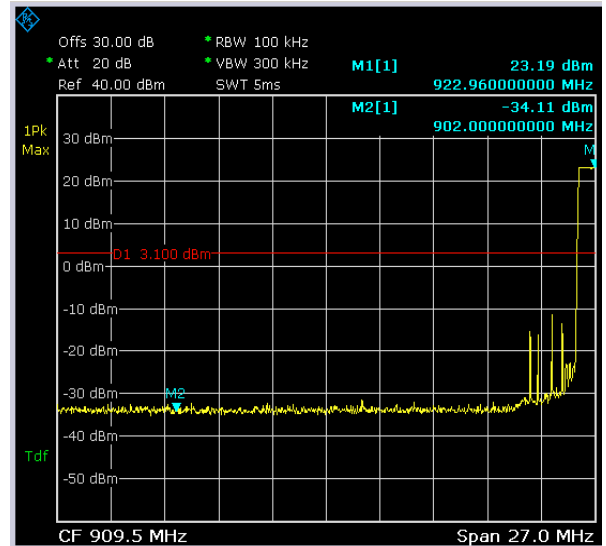
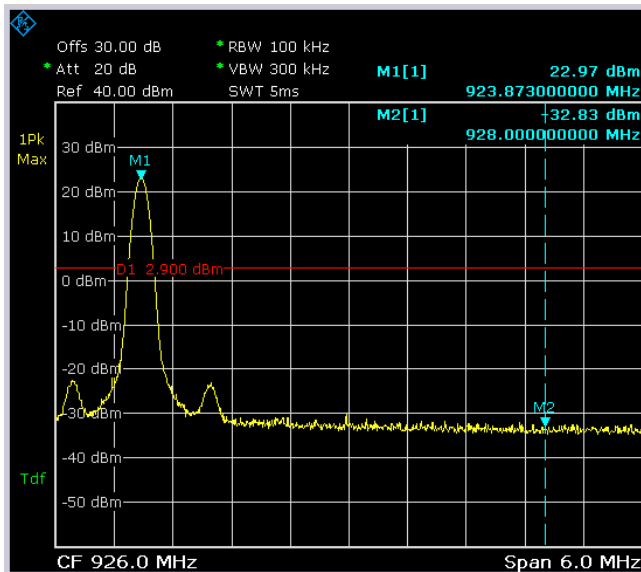
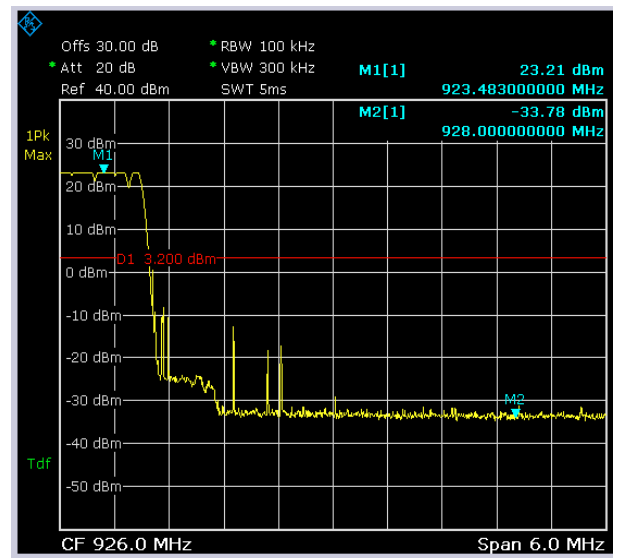
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

RC4 922.3 MHz

902 MHz Band-Edge, Single channel
Plot 91902 MHz Band-Edge, Hopping
Plot 92928 MHz Band-Edge, Single channel
Plot 93928 MHz Band-Edge, Hopping
Plot 94



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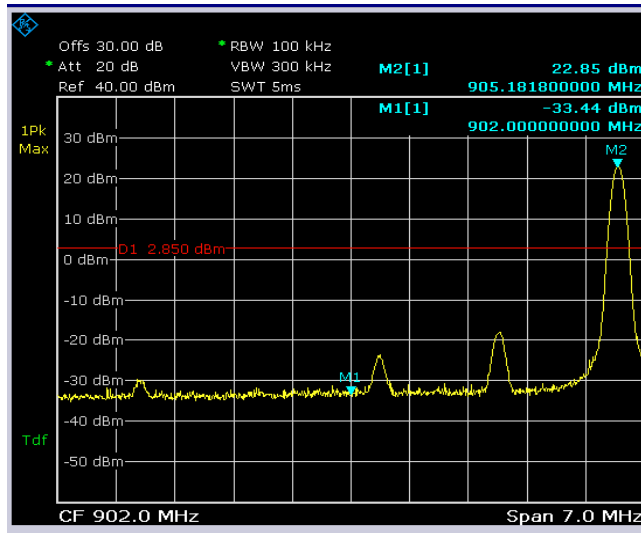
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

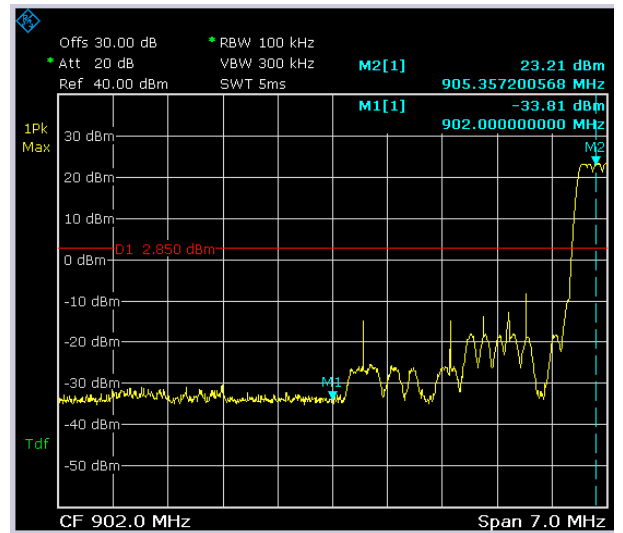
FCC ID: 2AYPY- NBX-R1000-RF

Antenna A

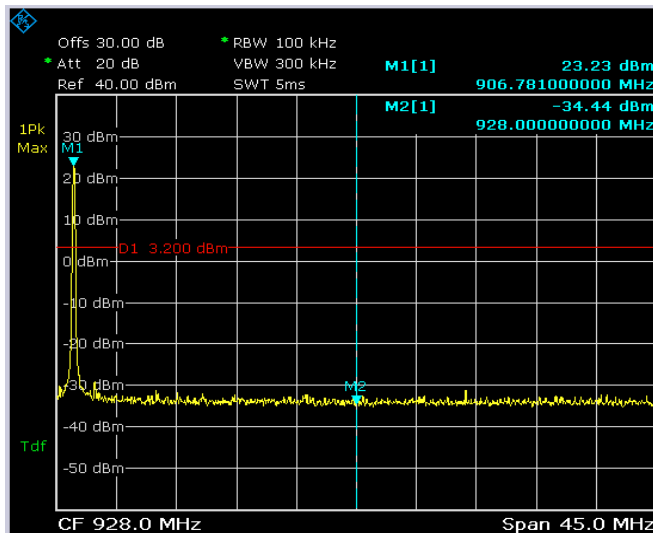
RC2 905.2 MHz



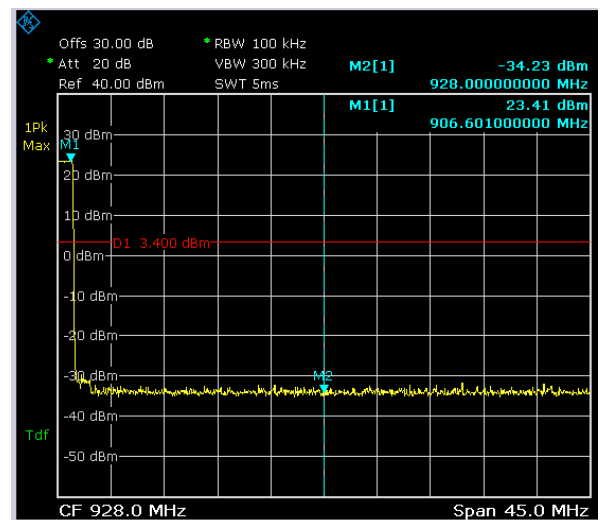
902 MHz Band-Edge, Single channel
Plot 95



902 MHz Band-Edge, Hopping
Plot 96



928 MHz Band-Edge, Single channel
Plot 97



928 MHz Band-Edge, Hopping
Plot 98



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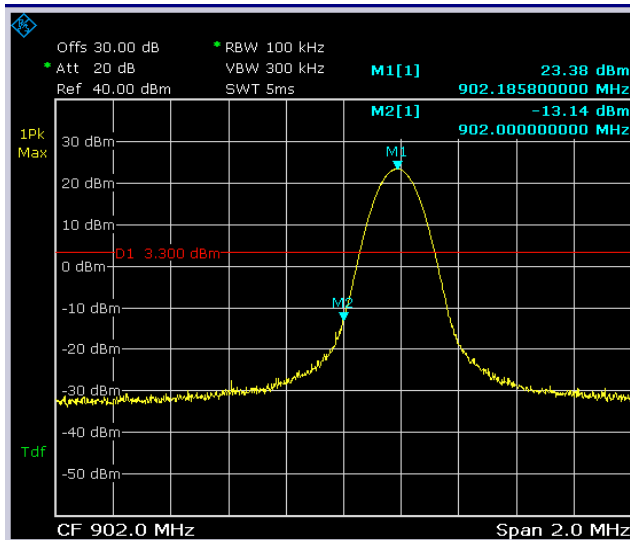
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

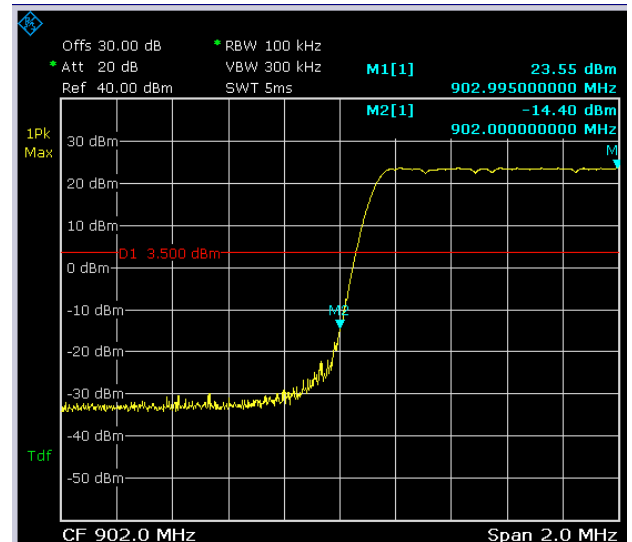
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

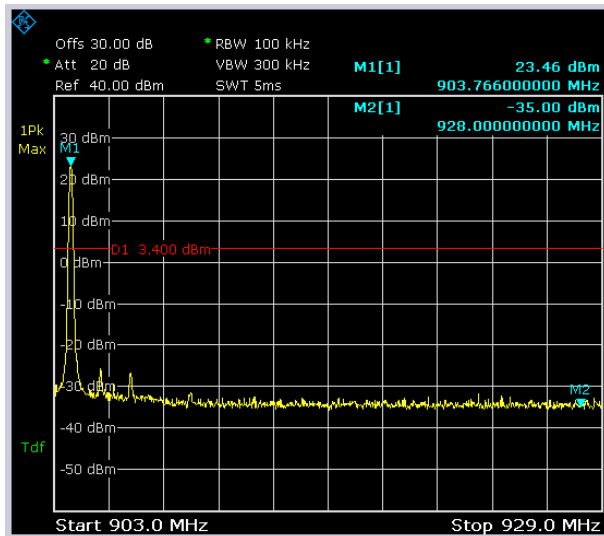
RC2 902.2 MHz



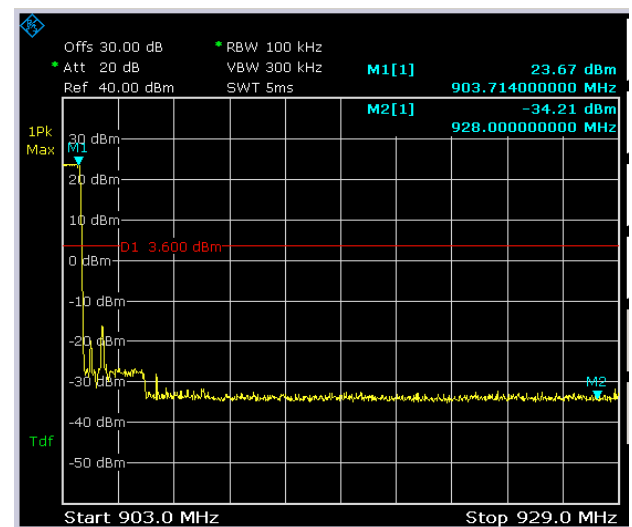
902 MHz Band-Edge, Single channel
Plot 99



902 MHz Band-Edge, Hopping
Plot 100



928 MHz Band-Edge, Single channel
Plot 101



928 MHz Band-Edge, Hopping
Plot 102



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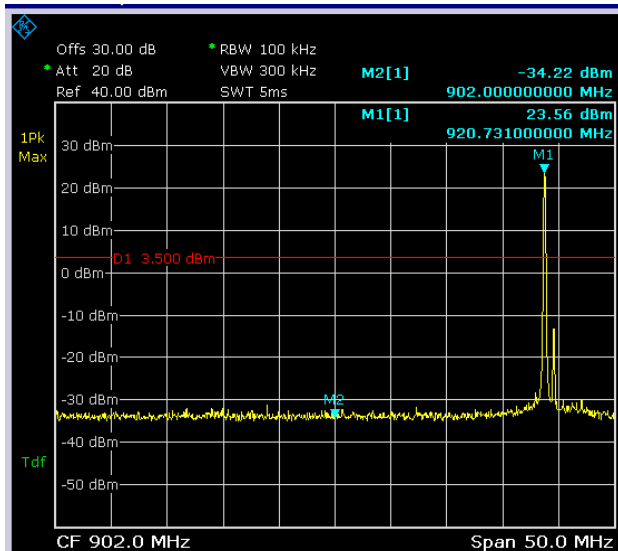
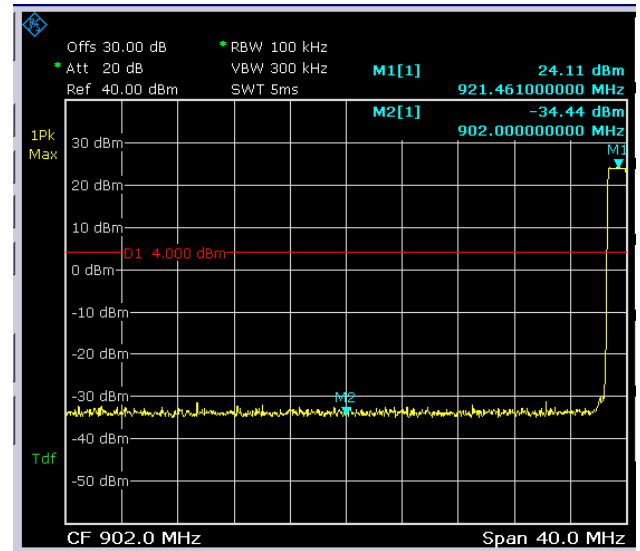
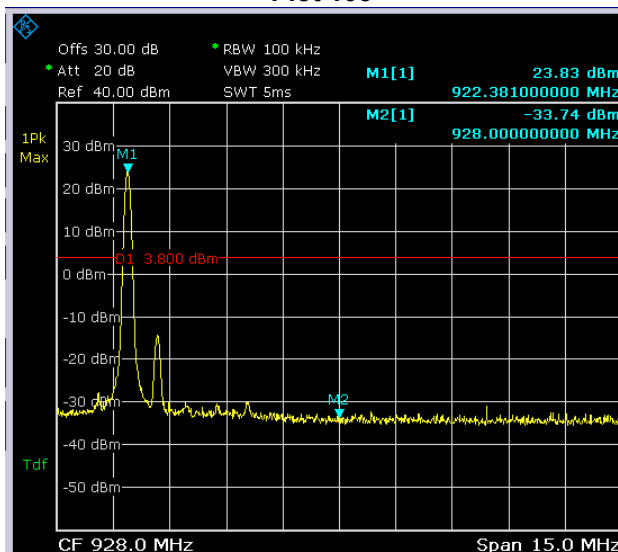
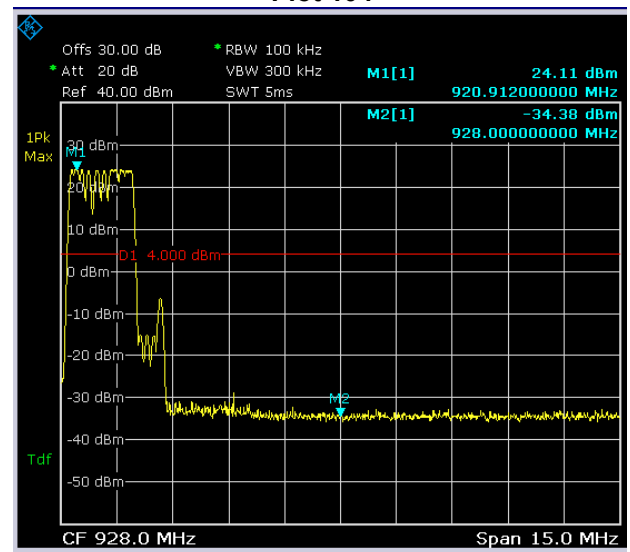
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 920.8 MHz

902 MHz Band-Edge, Single channel
Plot 103902 MHz Band-Edge, Hopping
Plot 104928 MHz Band-Edge, Single channel
Plot 105928 MHz Band-Edge, Hopping
Plot 106



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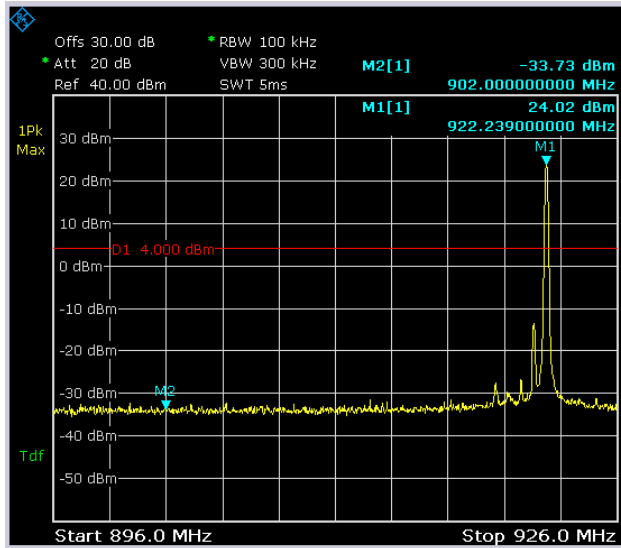
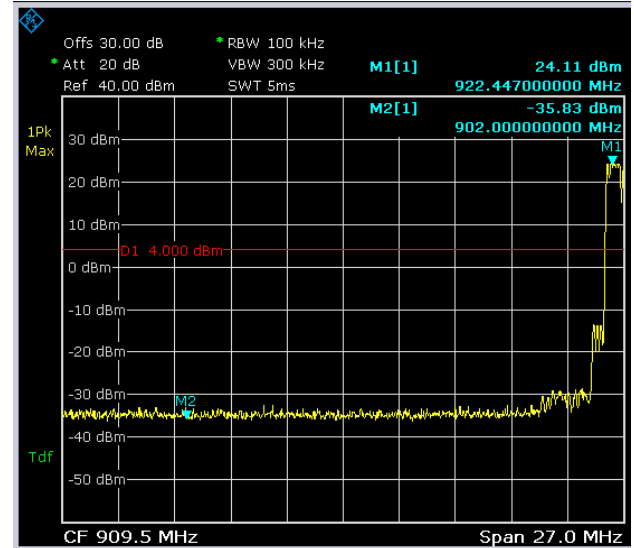
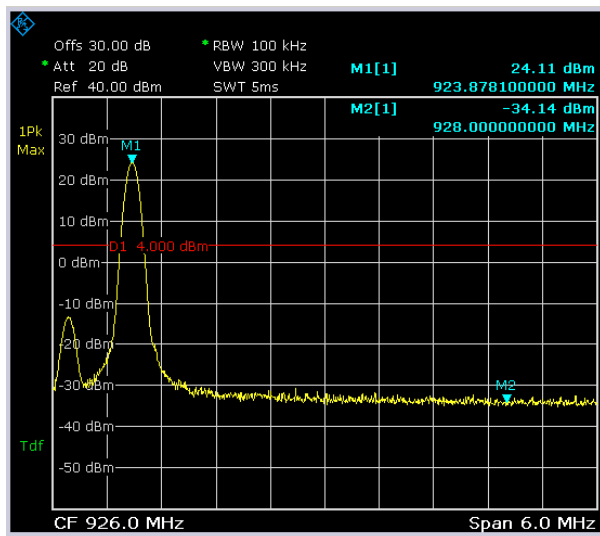
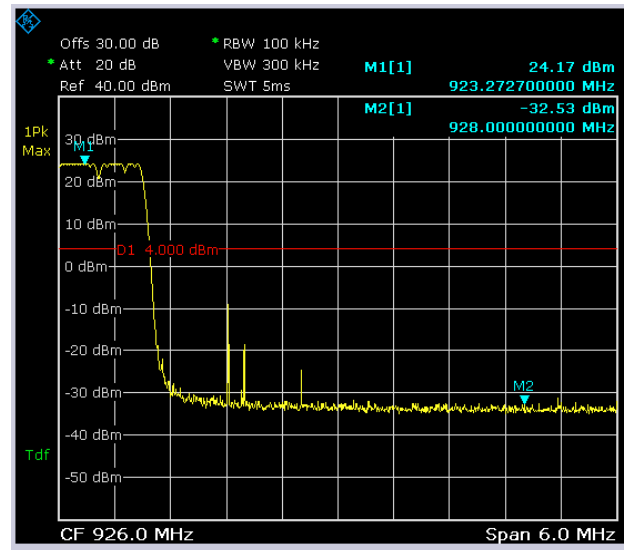
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

RC4 922.3 MHz

902 MHz Band-Edge, Single channel
Plot 107902 MHz Band-Edge, Hopping
Plot 108928 MHz Band-Edge, Single channel
Plot 109928 MHz Band-Edge, Hopping
Plot 110



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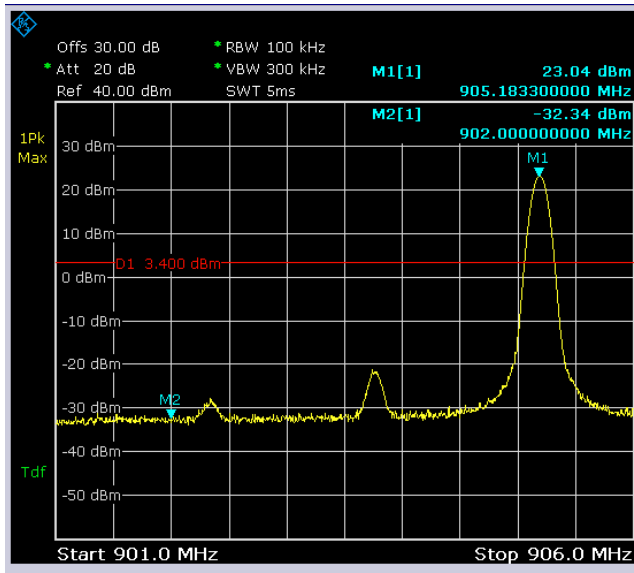
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

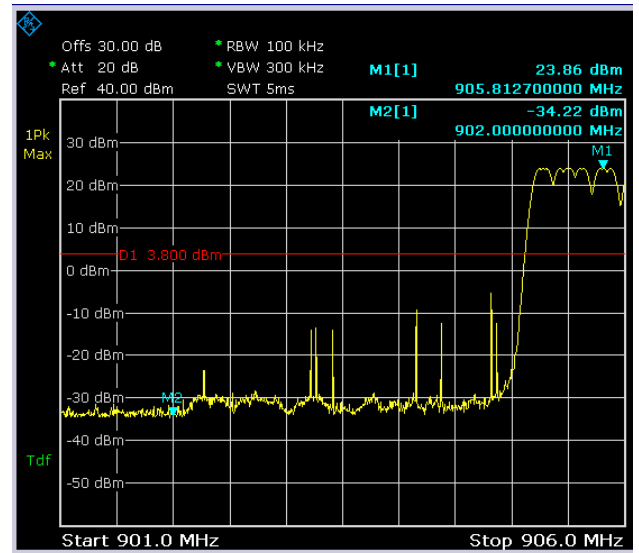
FCC ID: 2AYPY- NBX-R1000-RF

Antenna B

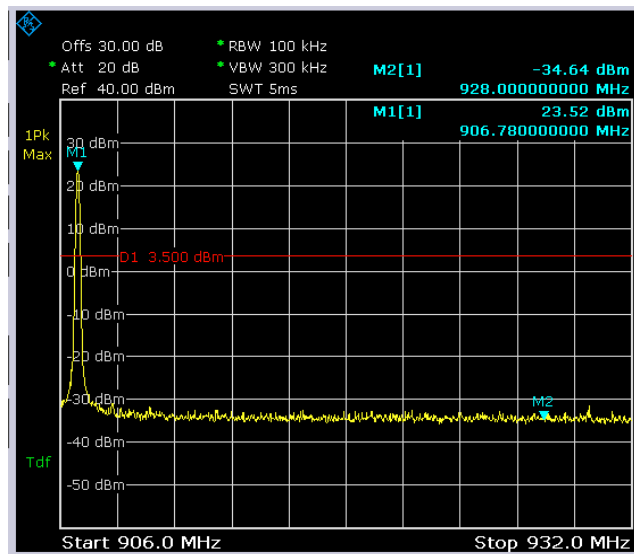
RC2 905.2 MHz



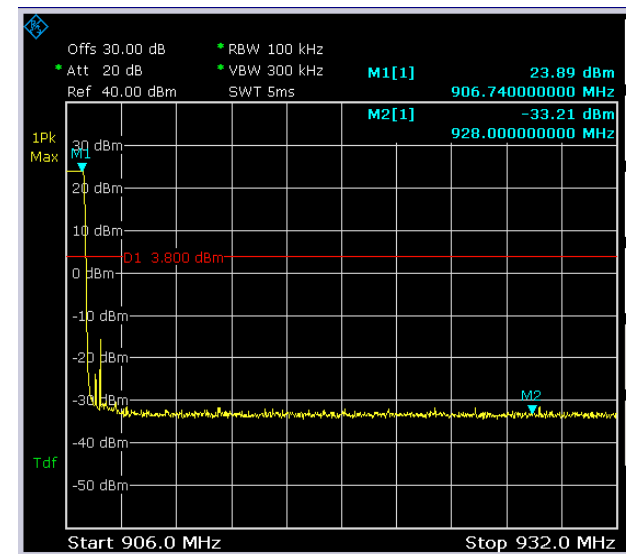
902 MHz Band-Edge, Single channel
Plot 111



902 MHz Band-Edge, Hopping
Plot 112



928 MHz Band-Edge, Single channel
Plot 113



928 MHz Band-Edge, Hopping
Plot 114

**6.7. Radiated Emission in Restricted and non-Restricted bands****Limits & methods:**

FCC requirements	15.247(d), 15.209, 15.205		
Test procedure	ANSI 63.10 Sections 6.5 (below 1GHz) & 6.6 (above 1GHz). Radiated measurement		
Operating Freq. Band/ Modulation	902.2 MHz / DBPSK 920.8MHz/ DBPSK 922.3MHz/ GFSK 905.2MHz/ GFSK		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit:

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.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see below)

FREQUENCIES (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

Test procedure

The measurements were performed in semi-anechoic chamber at a distance of 3m.

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment and up to ten harmonics. The test was performed for both antenna 1 and antenna 2 separately. For the test results refer to tables and plots in this section.

To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antenna polarization was changed from vertical to horizontal. For emission measurements above 1 GHz, the EUT was placed at a height of 1.5 m above the floor on a support that is RF transparent for the frequencies of interest.



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Results:**Antenna A RC2 902.2 MHz****CH 1 902.185 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
276.67	43.615	-	46	-	-2.4	Peak values less than QP limit	Pass	115
324.49	44.162	-	46	-	-1.8	Peak values less than QP limit	Pass	
4920	49.368	74	-	-	-24.6	Detector Pk	Pass	116
4920	35.933	-	-	54	-18.1	Detector Avg	Pass	
8475	54.272	74	-	-	-19.7	Detector Pk	Pass	117
8475	42.375	-	-	54	-11.6	Detector Avg	Pass	

CH 54 903.7755 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
249.97	43.491	-	46	-	-2.5	Peak values less than QP limit	Pass	118
324.31	44.635	-	46	-	-1.4	Peak values less than QP limit	Pass	
3575	49.854	74	-	-	-24.1	Detector Pk	Pass	119
3575	38.402	-	-	54	-15.6	Detector Avg	Pass	
8496	53.823	74	-	-	-20.2	Detector Pk	Pass	120
8496	42.412	-	-	54	-11.6	Detector Avg	Pass	

Antenna A RC4 920.8 MHz**CH 1 920.725 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
249.73	44.044	-	46	-	-2.0	Peak values less than QP limit	Pass	121
340.09	44.219	-	46	-	-1.8	Peak values less than QP limit	Pass	
5235.0	46.924	74	-	-	-27.1	Detector Pk	Pass	122
5235.0	37.018	-	-	54	-17.0	Detector Avg	Pass	
8500.0	54.859	74	-	-	-19.1	Detector Pk	Pass	123
8500.0	42.692	-	-	54	-11.3	Detector Avg	Pass	



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH 54 922.375 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
324.25	43.947	-	46	-	-2.1	Peak values less than QP limit	Pass	124
340.27	43.946	-	46	-	-2.1	Peak values less than QP limit	Pass	
5545.0	49.785	74	-	-	-24.2	Detector Pk	Pass	125
5545.0	37.323	-	-	54	-16.7	Detector Avg	Pass	
8484.0	53.457	74	-	-	-20.5	Detector Pk	Pass	126
8484.0	42.533	-	-	54	-11.5	Detector Avg	Pass	

Antenna A RC4 922.3 MHz

CH 1 922.225 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
250.03	43.489	-	46	-	-2.5	Peak values less than QP limit	Pass	127
276.67	45.077	-	46	-	-0.9	Peak values less than QP limit	Pass	
3365.0	52.418	74	-	-	-21.6	Detector Pk	Pass	128
3365.0	40.222	-	-	54	-13.8	Detector Avg	Pass	
7732.0	52.18	74	-	-	-21.8	Detector Pk	Pass	129
7732.0	40.00	-	-	54	-14.0	Detector Avg	Pass	

CH 56 923.875 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
276.79	44.207	-	46	-	-1.8	Peak values less than QP limit	Pass	130
328.87	43.064	-	46	-	-2.9	Peak values less than QP limit	Pass	
3590	48.529	74	-	-	-25.5	Detector Pk	Pass	131
3590	37.188	-	-	54	-16.8	Detector Avg	Pass	
9856	52.090	74	-	-	-21.9	Detector Pk	Pass	132
7720	40.414	-	-	54	-13.6	Detector Avg	Pass	



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Antenna A RC2 905.2 MHz**CH 1 905.185 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
281.89	44.118	-	46	-	-1.9	Peak values less than QP limit	Pass	133
330.43	43.914	-	46	-	-2.1	Peak values less than QP limit	Pass	
5075	47.57	74	-	-	-26.4	Detector Pk	Pass	134
5075	36.68	-	-	54	-17.3	Detector Avg	Pass	
8460	52.67	74	-	-	-21.3	Detector Pk	Pass	135
8460	41.97	-	-	54	-12.0	Detector Avg	Pass	

CH 54 906.7755 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
276.73	44.561	-	46	-	-1.4	Peak values less than QP limit	Pass	136
320.83	43.375	-	46	-	-2.6	Peak values less than QP limit	Pass	
5380	48.461	74	-	-	-25.5	Detector Pk	Pass	137
5380	35.614	-	-	54	-18.4	Detector Avg	Pass	
8472	52.885	74	-	-	-21.1	Detector Pk	Pass	138
8472	42.001	-	-	54	-12.0	Detector Avg	Pass	

Antenna B RC2 902.2 MHz**CH 1 902.185 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
276.79	44.96	-	46	-	-1.0	Peak values less than QP limit	Pass	139
329.11	43.36	-	46	-	-2.6	Peak values less than QP limit	Pass	
4975	48.054	74	-	-	-25.9	Detector Pk	Pass	140
4975	36.07	-	-	54	-17.9	Detector Avg	Pass	
8428	53.133	74	-	-	-20.9	Detector Pk	Pass	141
8428	42.211	-	-	54	-11.8	Detector Avg	Pass	



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

CH 54 903.7755 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
249.97	43.474	-	46	-	-2.5	Peak values less than QP limit	Pass	142
276.73	45.084	-	46	-	-0.9	Peak values less than QP limit	Pass	
5070	49.966	74	-	-	-24.0	Detector Pk	Pass	143
5070	36.932	-	-	54	-17.1	Detector Avg	Pass	
8400	54.143	74	-	-	-19.9	Detector Pk	Pass	144
8400	42.369	-	-	54	-11.6	Detector Avg	Pass	

Antenna B RC4 920.8 MHz

CH 1 920.725 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
250.03	43.765	-	46	-	-2.2	Peak values less than QP limit	Pass	145
326.95	43.733	-	46	-	-2.3	Peak values less than QP limit	Pass	
3280.0	49.514	74	-	-	-24.5	Detector Pk	Pass	146
3280.0	37.488	-	-	54	-16.5	Detector Avg	Pass	
8484.0	54.006	74	-	-	-20.0	Detector Pk	Pass	147
8484.0	42.624	-	-	54	-11.4	Detector Avg	Pass	

CH 56 922.375 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
249.97	43.422	-	46	-	-2.6	Peak values less than QP limit	Pass	148
328.87	43.601	-	46	-	-2.4	Peak values less than QP limit	Pass	
3160.0	49.261	74	-	-	-24.7	Detector Pk	Pass	149
3160.0	37.271	-	-	54	-16.7	Detector Avg	Pass	
8496.0	53.965	74	-	-	-20.0	Detector Pk	Pass	150
8496.0	42.821	-	-	54	-11.2	Detector Avg	Pass	



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Antenna B RC4 922.3 MHz**CH 1 922.225 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
276.61	43.602	-	46	-	-2.4	Peak values less than QP limit	Pass	151
335.17	45.035	-	46	-	-1.0	Peak values less than QP limit	Pass	
4835.0	48.236	74	-	-	-25.8	Detector Pk	Pass	152
4835.0	35.820	-	-	54	-18.2	Detector Avg	Pass	
8476.0	54.306	74	-	-	-19.7	Detector Pk	Pass	153
8476.0	42.423	-	-	54	-11.6	Detector Avg	Pass	

CH 56 923.875 MHz

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
260.03	43.808	-	46	-	-2.2	Peak values less than QP limit	Pass	154
276.03	44.343	-	46	-	-1.7	Peak values less than QP limit	Pass	
4995.0	48.857	74	-	-	-25.1	Detector Pk	Pass	155
4995.0	36.742	-	-	54	-17.3	Detector Avg	Pass	
8496.0	54.842	74	-	-	-19.2	Detector Pk	Pass	156
8496.0	42.495	-	-	54	-11.5	Detector Avg	Pass	

Antenna B RC2 905.2 MHz**CH 1 905.185 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
250.03	43.636	-	46	-	-2.4	Peak values less than QP limit	Pass	157
329.11	43.862	-	46	-	-2.1	Peak values less than QP limit	Pass	
5085	48.719	74	-	-	-25.3	Detector Pk	Pass	158
5085	36.514	-	-	54	-17.5	Detector Avg	Pass	
8416	53.970	74	-	-	-20.0	Detector Pk	Pass	159
8416	42.423	-	-	54	-11.6	Detector Avg	Pass	

**Test Report No.: 7112310969****Page 54 of 72 Pages****Title:** Test on IoT Repeater- Transceiver Module**Model:** NBX-R1000-RF**FCC ID:** 2AYPY- NBX-R1000-RF**CH 54 906.775 MHz**

Frequency MHz	Radiated emissions, dB μ V/m	Peak limit, dB μ V/m	QP limit, dB μ V/m	Avg limit, dB μ V/m	Margin, dB	Note	Verdict	Plot #
250.15	43.544	-	46	-	-2.5	Peak values less than QP limit	Pass	160
276.67	43.885	-	46	-	-2.1	Peak values less than QP limit	Pass	
4980	47.710	74	-	-	-26.3	Detector Pk	Pass	161
4980	36.304	-	-	54	-17.7	Detector Avg	Pass	
8412	53.40	74	-	-	-20.6	Detector Pk	Pass	162
8412	42.373	-	-	54	-11.6	Detector Avg	Pass	



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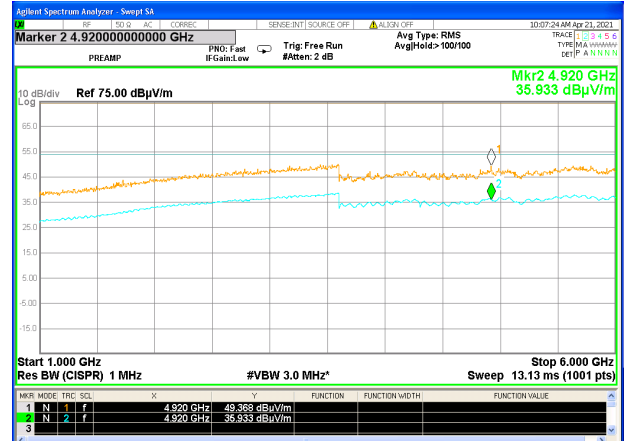
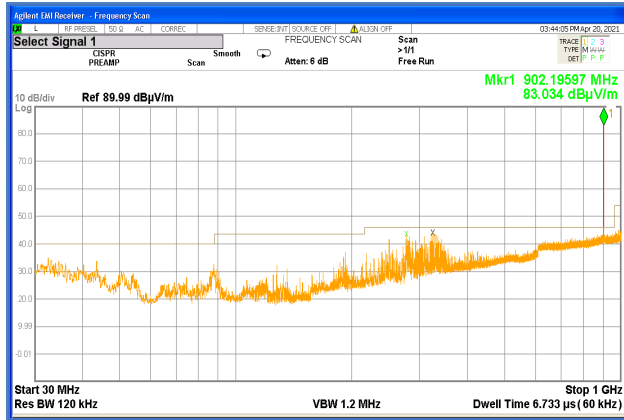
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Title: Test on IoT Repeater- Transceiver Module

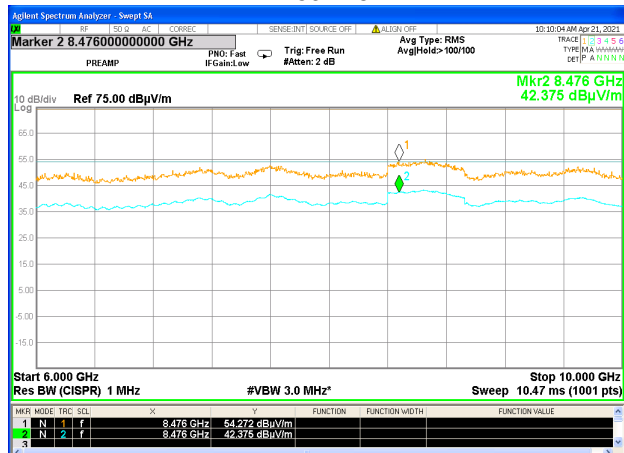
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

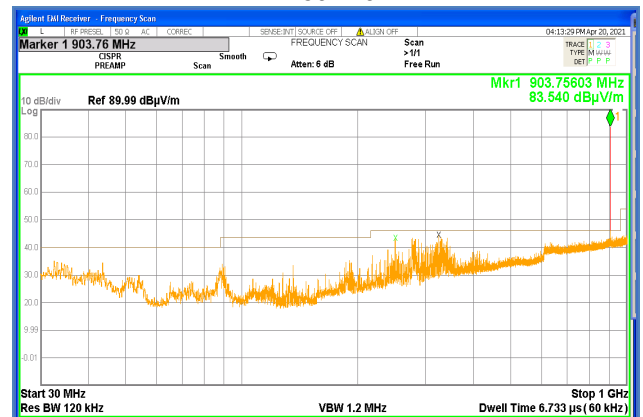
Antenna A
RC2 902.2 MHz



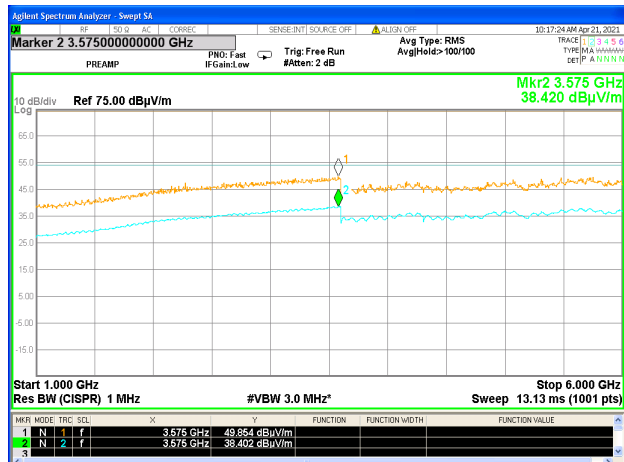
Plot 115



Plot 116



Plot 117



Plot 118



Plot 119

Plot 120



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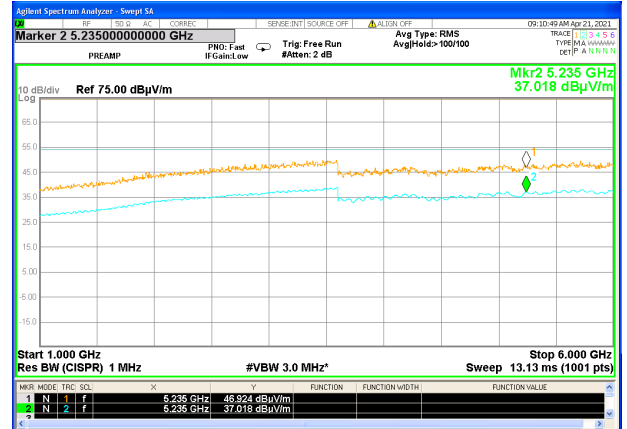
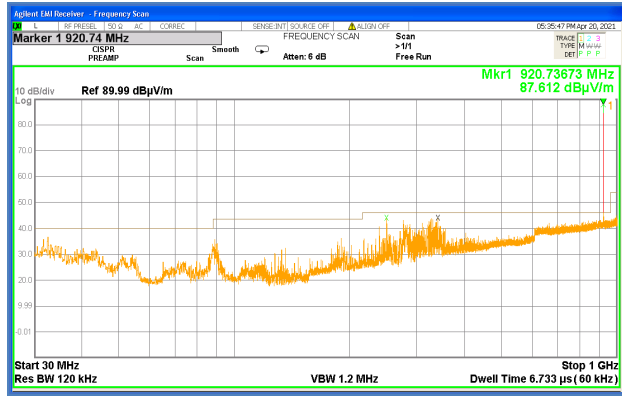
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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

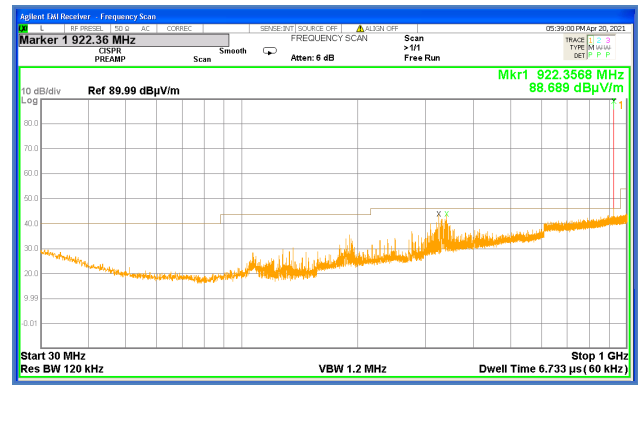
Antenna A
RC4 920.8 MHz



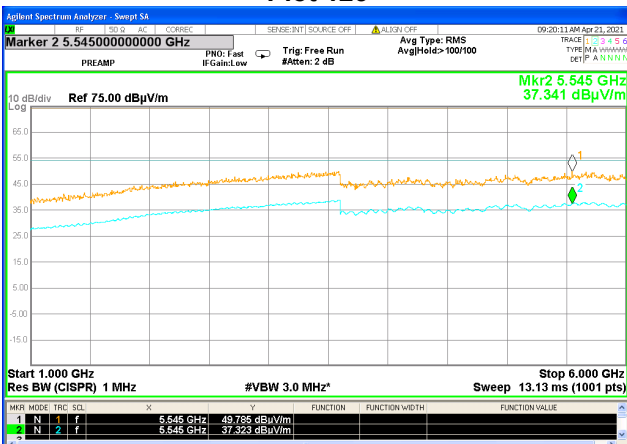
Plot 121



Plot 122



Plot 123



Plot 124



Plot 125

Plot 126



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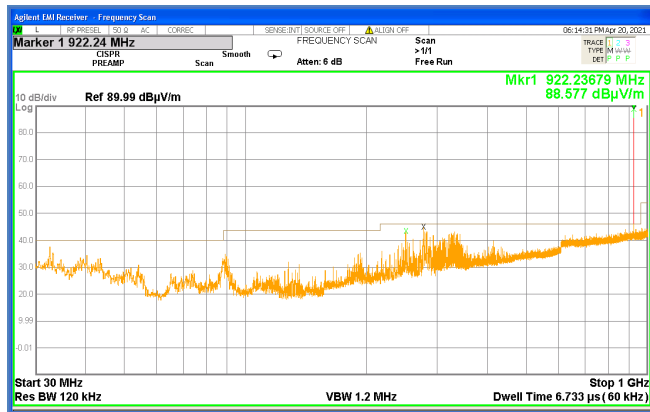
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Title: Test on IoT Repeater- Transceiver Module

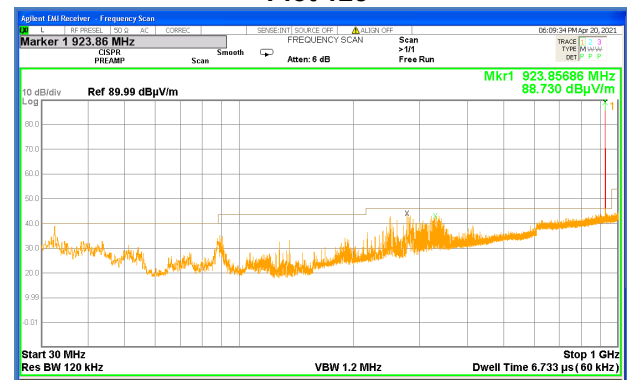
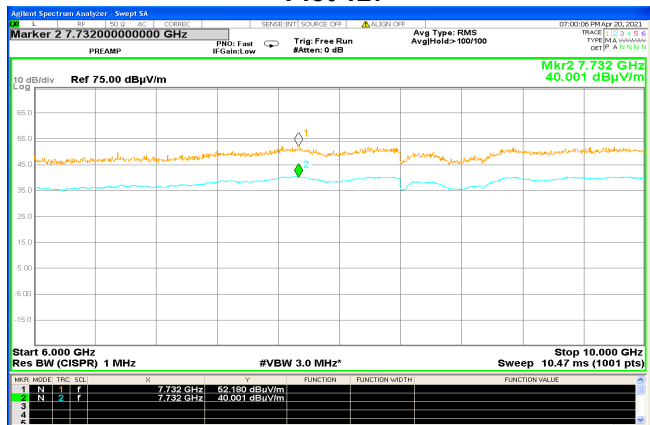
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

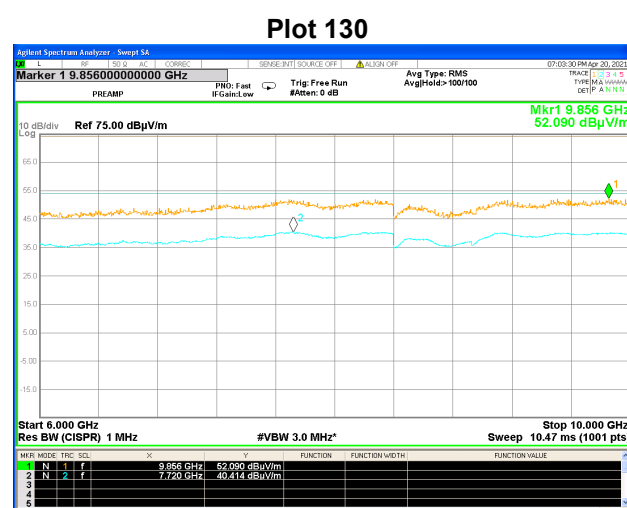
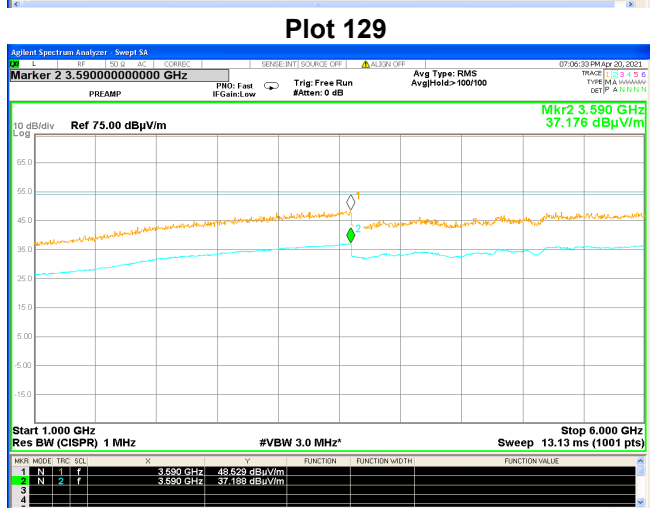
Antenna A
RC4 922.3 MHz



Plot 127



Plot 128



Plot 130



Plot 131

Plot 132



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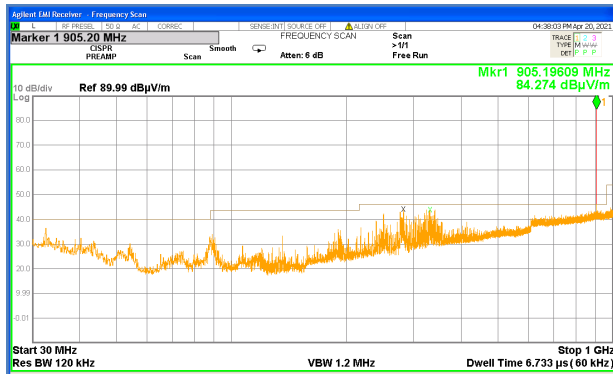
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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

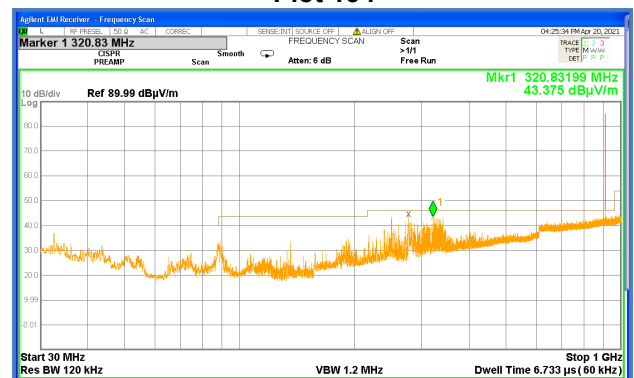
Antenna A
RC2 905.2 MHz



Plot 133



Plot 134



Plot 135



Plot 136



Plot 137

Plot 138



Test Report No.: 7112310969

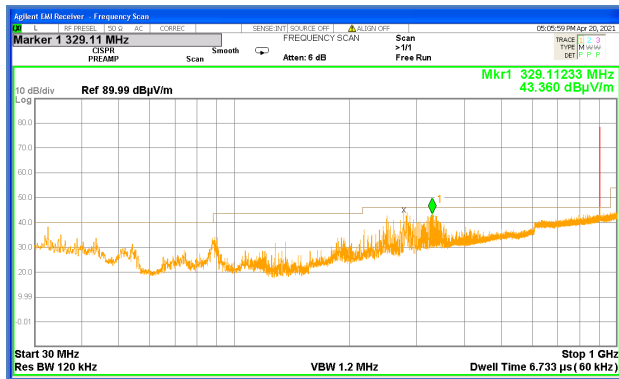
Page 59 of 72 Pages

Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

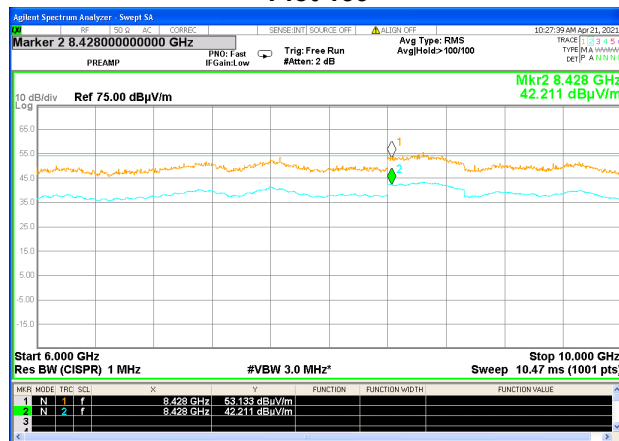
Antenna B
RC2 902.2 MHz



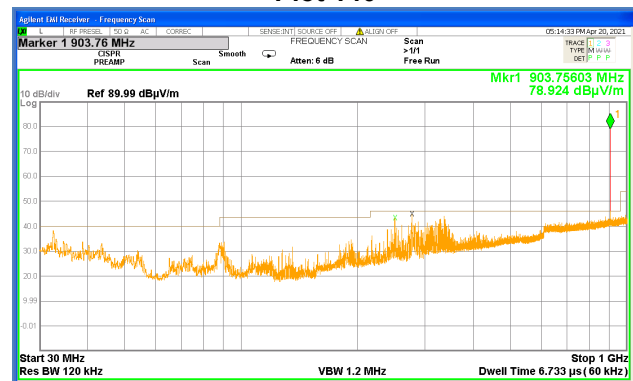
Plot 139



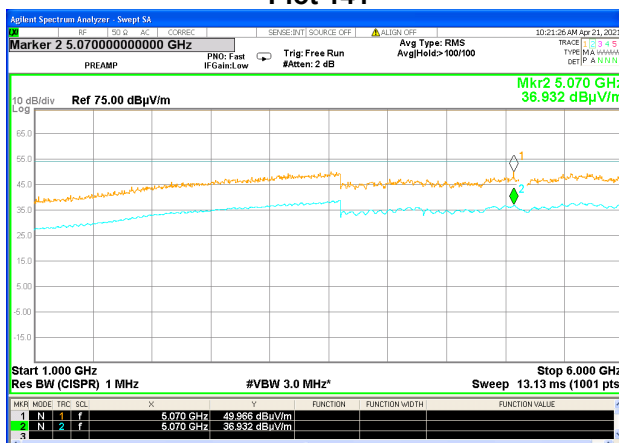
Plot 140



Plot 141



Plot 142



Plot 143



Plot 144



Test Report No.: 7112310969

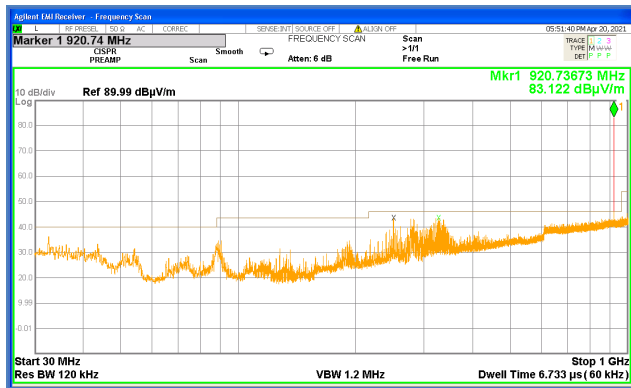
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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

Antenna B
RC4 920.8 MHz



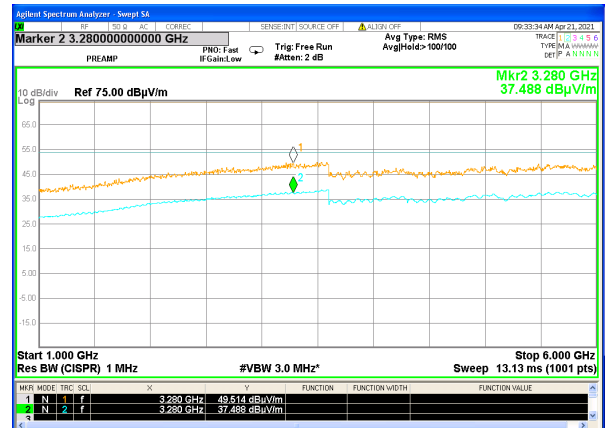
Plot 145



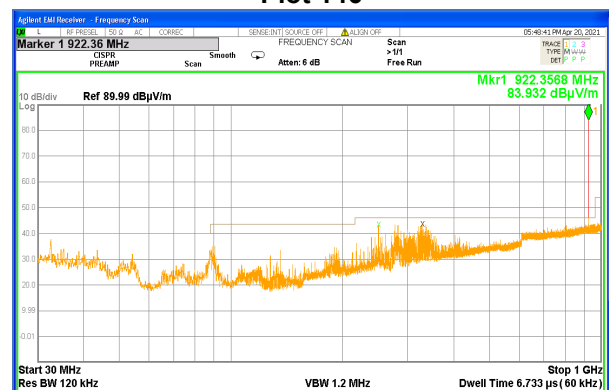
Plot 147



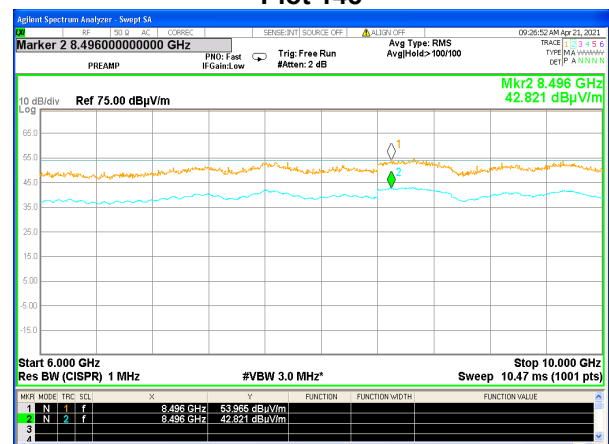
Plot 149



Plot 146



Plot 148



Plot 150



Test Report No.: 7112310969

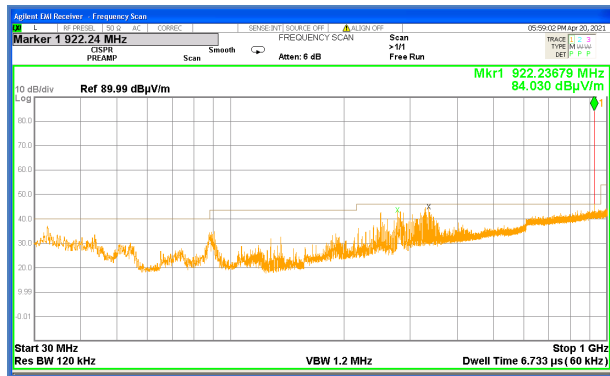
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Title: Test on IoT Repeater- Transceiver Module

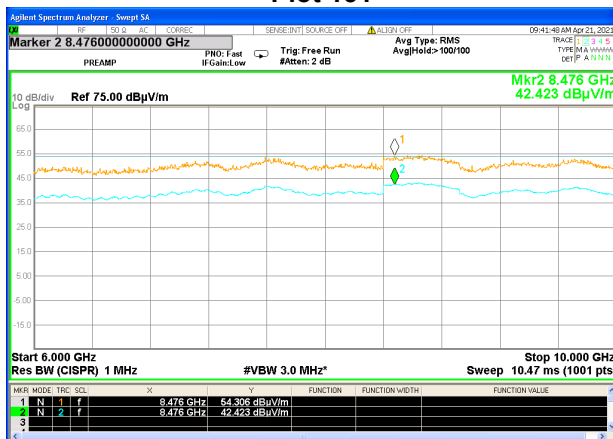
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

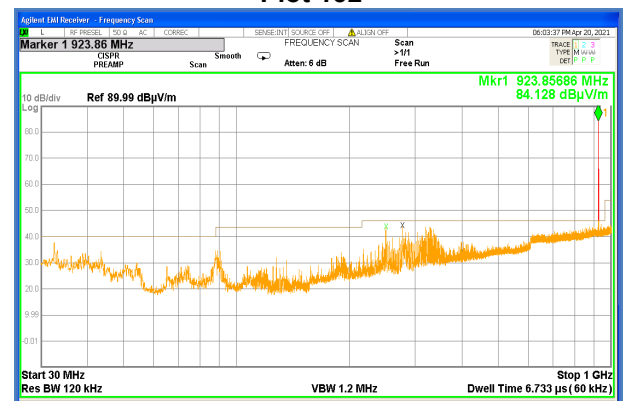
Antenna B
RC4 922.3 MHz



Plot 151



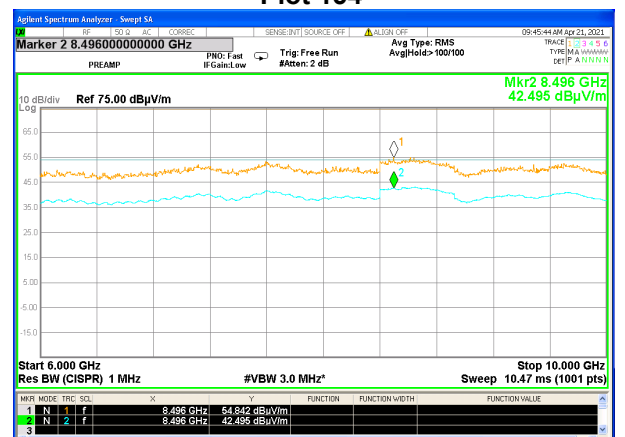
Plot 152



Plot 153



Plot 154



Plot 155

Plot 156



Test Report No.: 7112310969

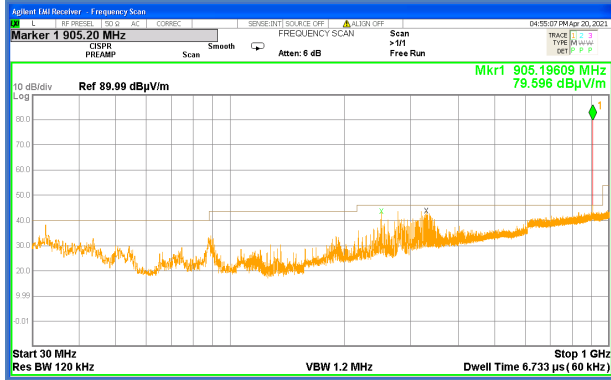
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Title: Test on IoT Repeater- Transceiver Module

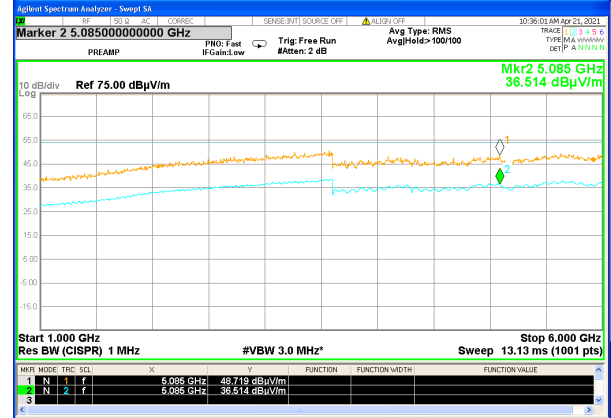
Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

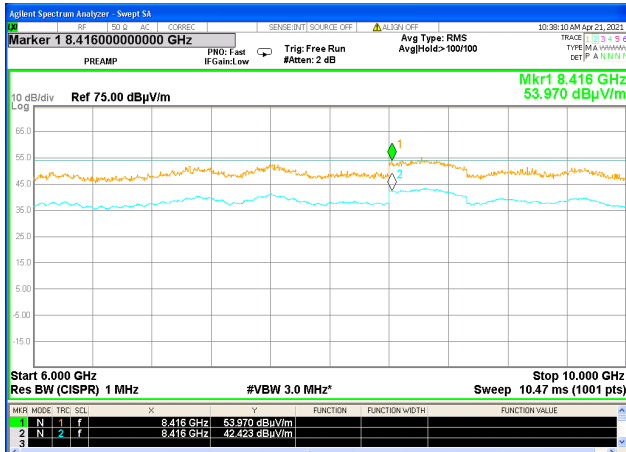
Antenna B
RC2 905.2 MHz



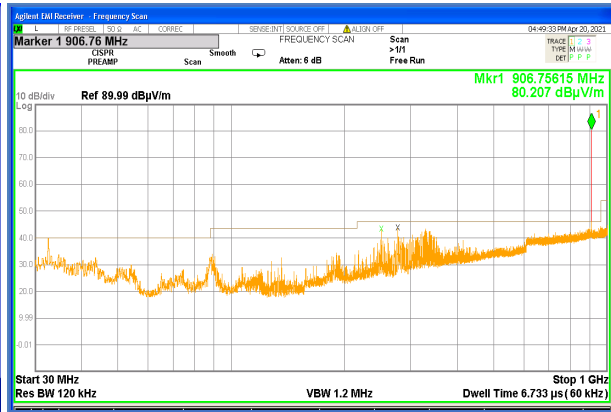
Plot 157



Plot 158



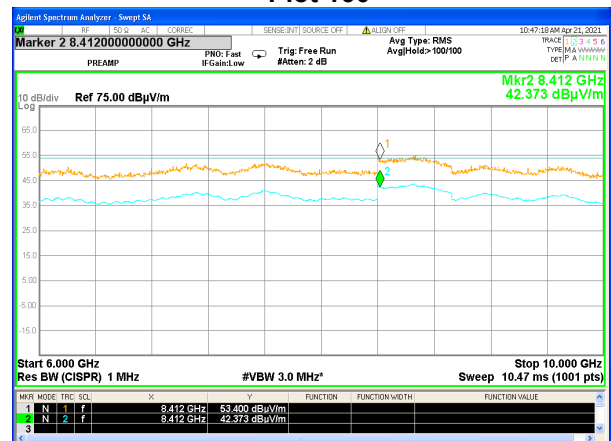
Plot 159



Plot 160



Plot 161



Plot 162



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Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF

FCC ID: 2AYPY- NBX-R1000-RF

7. Unwanted radiated emissions up to 1GHz

Limits & methods:

FCC requirements	15.209		
Test procedure	ANSI 63.10 sec. 6.4 (below 30MHz), sec.6.5 (30-1000MHz). Radiated measurement		
Ambient Temperature	22°C	Relative Humidity	46%
		Air Pressure	1006hPa

Limit:

EUT radiated emission shall not exceed value required in section 15.209.

Test Procedure:

The measurements were conducted in 3m semi-anechoic chamber.

The transmitter was placed on the turn – table.

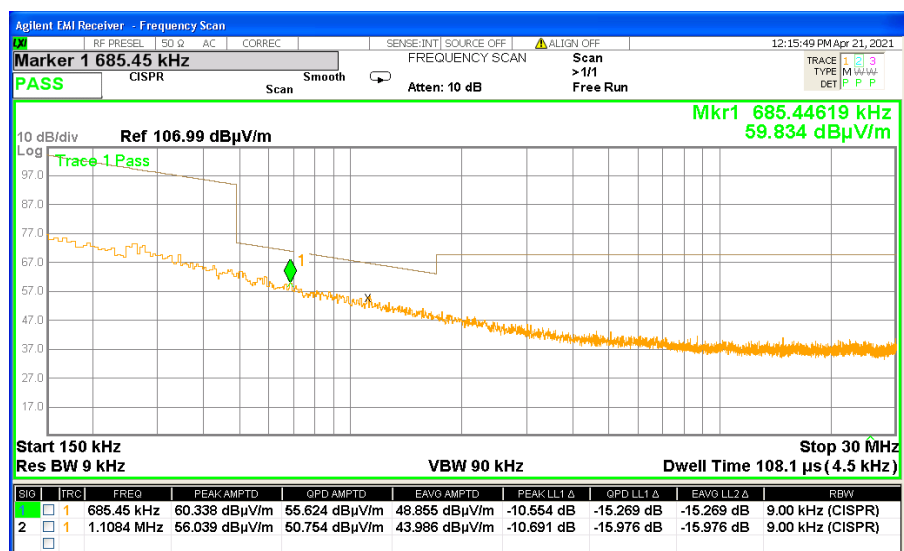
The frequency range from 150 kHz to 1GHz was investigated.

Antennas used: Active Receiving Loop Antenna 0.15 – 30MHz, Biconilog Antenna 30 MHz-2 GHz

The measurements were performed at each frequency where the signal was 10 dB below the limit or less. The levels were maximized by changing antenna polarization from vertical to horizontal, rotating turntable through 360 degree, varying antenna height from 1m to 4m and rerouting EUT cables.

Results:

The results are presented in Table # 1 and the Plots # 163-164.



Plot 163

Radiated emission scan in range 150kHz -30MHz.

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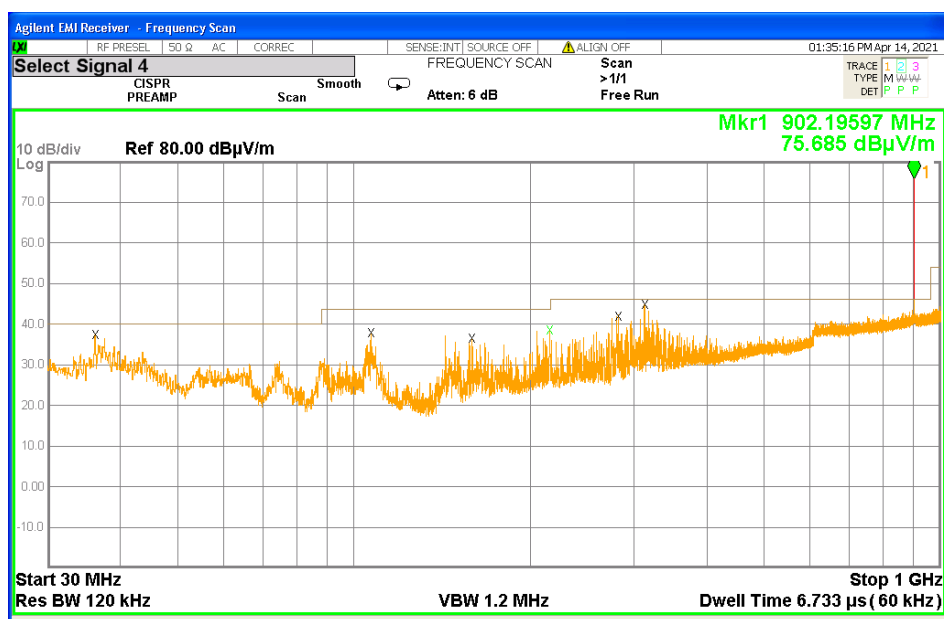
Title: Test on IoT Repeater- Transceiver Module

Model: NBX-R1000-RF FCC ID: 2AYPY- NBX-R1000-RF

Table 1.
Radiated emission test results range 30MHz-1GHz

No.	Frequency (MHz)	Antenna Polariz	Antenna Height (m)	Turntable angle (°)	Emission Level (dB μ V/m)	Limit @ 3 m (dB μ V/m)	Margin (dB)	Result
1	36.1	V	1.0	42	33.4	40.0	-6.6	Pass
2	106.7	V	1.0	220	34.6	43.5	-8.9	Pass
3	158.8	V	1.0	199	27.8	43.5	-15.7	Pass
4	215.1	H	1.0	360	27.3	43.5	-16.2	Pass
5	281.8	H	1.0	268	36.1	46.0	-9.9	Pass
6	312.5	V	1.0	0	32.9	46.0	-13.1	Pass

Note: Emission level = E Reading (dB μ V) + Cable loss (dB) + Antenna Factor (dB/m)
For Cable Loss and Antenna Factor refer to Appendix 2.



Plot 164
Radiated emission scan in range 30MHz- 1GHz.



8. AC power line conducted emission measurements

Limits & methods:

FCC requirements	15.207		
Test procedure	ANSI 63.10 Section 6.2		
Ambient Temperature	22°C	Relative Humidity	46% Air Pressure 1006hPa

Limit:

Frequency, MHz	Class B equipment, dB (μ V)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases linearly with the logarithm of the frequency.

Test Procedure:

EUT was connected to 120VAC main via auxiliary power supply.

The EUT was placed on a table in shielded room at a height 80 cm from floor and 40 cm from the vertical reference plane and at more than 80 cm from any other metal surfaces. The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency range as referred to in the table above. The measurements were made with quasi-peak(CISPR) and average detectors. The position of the EUT cables was varied to determine maximum emission level.

Results:

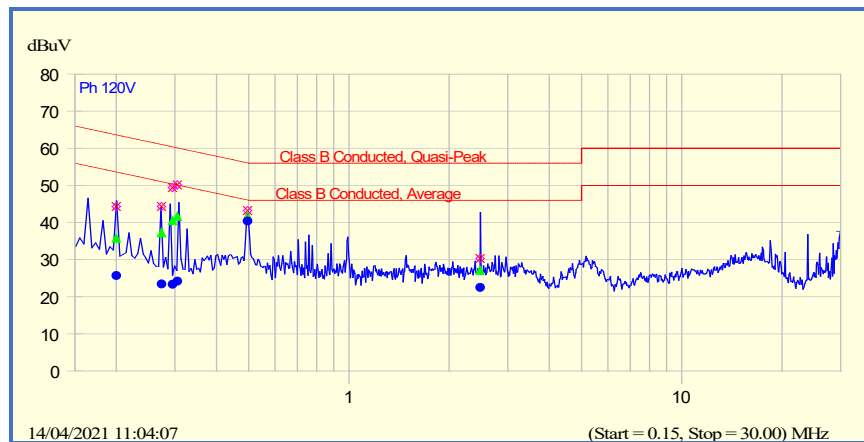
The results are presented in Plots # 165-166.

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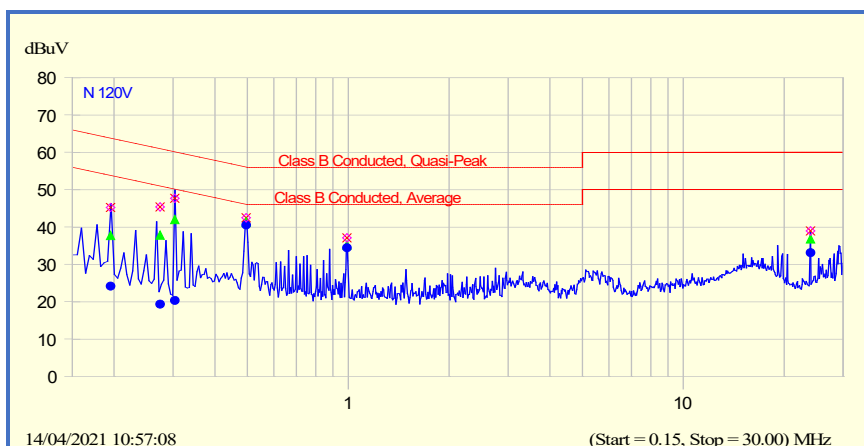
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Frequency MHz	Peak dBμV	QP dBμV	Lim QP dBμV	QP-QP Limit dB	Avg dBμV	Lim Avg dBμV	Avg - Avg Limit dB
0.20	44.3	35.8	63.6	-27.8	25.7	53.6	-27.9
0.27	44.3	37.2	61.0	-23.8	23.5	51.0	-27.6
0.30	49.4	40.5	60.4	-19.9	23.4	50.4	-27.0
0.31	50.1	41.7	60.1	-18.4	24.2	50.1	-25.9
0.50	43.2	41.8	56.1	-14.3	40.4	46.1	-5.7
2.48	30.3	27.1	56.0	-28.9	22.5	46.0	-23.5



Frequency MHz	Peak dBμV	QP dBμV	Lim QP dBμV	QP-QP Limit dB	Avg dBμV	Lim Avg dBμV	Avg - Avg Limit dB
0.20	45.2	37.7	63.8	-26.1	24.1	53.8	-29.7
0.27	45.4	37.8	61.0	-23.2	19.3	51.0	-31.7
0.30	47.7	41.9	60.1	-18.2	20.3	50.1	-29.8
0.50	42.4	41.2	56.1	-14.9	40.5	46.1	-5.6
0.99	37.1	35.1	56.0	-20.9	34.4	46.0	-11.6
23.97	38.9	36.8	60.0	-23.2	33.1	50.0	-16.9

Plot 165- Plot 166
Conducted emission on 120VAC mains. Phase & Neutral



9. Antenna requirements

FCC requirements	15.203
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FCC requirements:

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.

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 exceed

Antenna information and connector construction

Antennas connection			
RP-SMA connector			
External antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Dipole	Huamai	HAS-915TFH	1.7dBi

Results:

According to manufacturer's instruction the EUT antenna is intended to be installed professionally.

This requirement is not applicable



10. Appendix 1: Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding one year.

Instrument	Manufacturer	Model	SII No.	Last calibration date	Next calibration date
EMI Analyzer 10 kHz - 26.5 GHz	HP	E7405A	4944	09/20	09/21
Spectrum Analyzer 9 kHz – 6GHz	R&S	FSL6	5912	09/20	09/21
EMI RECEIVER-MXE 3Hz-44GHz	Agilent	N9038B	6505208	04/21	04/22
LISN 9 kHz – 30 MHz	FCC	LISN- 50/250-32-4-16	5023	03/21	03/23
Active Receiving Loop Antenna	ETS-Lindgren	6507	00144641	11/20	04/22
Bigonilog Antenna 20 MHz - 6000 MHz	ETS-Lindgren	3142D	146490	08/19	08/21
Double Ridged Waveguide Antenna 1-18 GHz	EMCO	3115	0143138	07/21	07/23
Data +Power splitter	-	-	-	N/A	N/A
Semi Anechoic Chamber	ETS-Lindgren	RFSD-F/A-100	5002	N/A	N/A
Multi-Device Positioning Controller	ETS-Lindgren	2090	5002	N/A	N/A
Antenna Tower	ETS-Lindgren	2175	5002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	5002	N/A	N/A
Turntable	ETS-Lindgren	2188	5002	N/A	N/A
Cable RF 1 m	SUCOFLEX	104PE	21325	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm5VI	005	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm6VI	006	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm7VI	007	04/21	04/22
Cable RF 3 m	VPO 2930	K30K30-5003- 300cm8VI	008	04/21	04/22
Attenuator 10dB 5W	-	5W	6502987	04/20	04/22
Attenuator 20dB 5W	-	5W	6502992	04/20	04/22
USB preamplifier 2 GHz – 50 GHz	Keysight	U7227F	MY 55380004	04/21	04/22
Transient limiter 0.009-200 MHz	HP	11947A	3107105	10/20	10/21
Cable	EIM	RG 214/U	8 & 10	01/21	01/22



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11. Appendix 2: Antenna Factor and Cable Loss

Cable Loss (RG214 (6 m) + 5005 (3.8 m) + 5005 (3 m))

No.	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)	Frequency (MHz)	Attenuation (dB)
1	0.00	0.0	2.16	0.1	46.76	0.0	1011.00	0.0
2	0.11	0.0	2.27	0.1	48.10	0.7	1061.01	0.1
3	0.11	0.0	2.38	0.1	51.55	0.7	1114.70	0.1
4	0.12	0.0	2.50	0.1	54.13	0.7	1170.43	0.1
5	0.12	0.0	2.63	0.1	56.83	0.7	1228.85	0.1
6	0.13	0.0	2.76	0.1	59.68	0.8	1290.40	0.1
7	0.13	0.0	2.90	0.1	62.66	0.8	1354.92	0.1
8	0.14	0.0	3.04	0.1	65.79	0.8	1422.66	0.1
9	0.15	0.0	3.19	0.2	68.08	0.8	1493.80	0.1
10	0.16	0.0	3.35	0.2	72.54	0.9	1568.49	0.1
11	0.16	0.0	3.52	0.2	76.16	0.9	1646.81	0.1
12	0.17	0.0	3.70	0.2	79.87	0.9	1728.26	0.1
13	0.18	0.0	3.88	0.2	83.67	1.0	1813.72	0.1
14	0.19	0.0	4.08	0.2	88.17	1.0	1903.51	0.1
15	0.20	0.0	4.28	0.2	92.58	1.0	1997.83	0.1
16	0.21	0.0	4.50	0.2	97.21	1.0	2101.82	0.1
17	0.22	0.1	4.72	0.2	102.07	1.0	2207.02	0.1
18	0.23	0.1	4.96	0.2	107.17	1.1	2317.37	0.1
19	0.24	0.1	5.20	0.2	112.53	1.1	2433.24	0.1
20	0.25	0.1	5.46	0.2	118.15	1.1	2554.90	0.1
21	0.27	0.1	5.74	0.2	124.06	1.2	2682.65	0.1
22	0.28	0.1	6.02	0.2	130.26	1.2	2816.76	0.1
23	0.29	0.1	6.33	0.2	136.78	1.2	2957.62	0.1
24	0.31	0.1	6.64	0.2	143.62	1.3	3105.50	0.1
25	0.32	0.1	6.97	0.2	150.80	1.3	3260.77	0.1
26	0.34	0.1	7.32	0.2	158.34	1.3	3423.81	0.1
27	0.36	0.1	7.68	0.2	166.25	1.3	3595.00	0.1
28	0.37	0.1	8.07	0.2	174.57	1.4	3774.75	0.1
29	0.39	0.1	8.48	0.2	183.30	1.4	3963.49	0.1
30	0.41	0.1	8.90	0.2	192.46	1.5	4161.67	0.1
31	0.43	0.1	9.35	0.2	202.08	1.5	4369.75	0.1
32	0.45	0.1	9.81	0.2	212.18	1.6	4588.24	0.1
33	0.48	0.1	10.30	0.2	222.80	1.6	4817.65	0.1
34	0.50	0.1	10.82	0.2	233.94	1.6	5058.53	0.1
35	0.53	0.1	11.36	0.2	245.63	1.7	5311.46	0.1
36	0.55	0.1	11.93	0.2	257.82	1.7	5577.03	0.1
37	0.58	0.1	12.52	0.2	270.61	1.8	5855.88	0.1
38	0.61	0.1	13.15	0.2	284.35	1.8	6148.68	0.1
39	0.64	0.1	13.81	0.2	298.57	1.9	6456.11	0.1
40	0.67	0.1	14.50	0.2	313.50	1.9	6778.91	0.1
41	0.70	0.1	15.22	0.2	329.17	1.9	7117.86	0.1
42	0.74	0.1	15.98	0.2	345.63	2.0	7473.75	0.1
43	0.78	0.1	16.78	0.2	362.91	2.0	7847.44	0.1
44	0.81	0.1	17.62	0.2	381.06	2.0	8239.81	0.1
45	0.86	0.1	18.50	0.2	400.11	1.9	8651.80	0.1
46	0.90	0.1	19.43	0.2	420.12	1.9	9084.39	0.1
47	0.94	0.1	20.40	0.2	441.12	1.9	9538.61	0.1
48	0.99	0.1	21.42	0.2	463.18	1.9	10015.54	0.1
49	1.04	0.1	22.49	0.5	486.34	1.9	10516.32	0.1
50	1.09	0.1	23.62	0.4	510.65	2.2	11042.14	0.1
51	1.15	0.1	24.80	0.5	536.19	2.1	11594.25	0.1
52	1.20	0.1	26.04	0.5	563.00	2.3	12173.86	0.1
53	1.26	0.1	27.34	0.5	591.15	2.5	12782.66	0.1
54	1.33	0.1	28.71	0.4	620.70	2.4	13421.79	0.1
55	1.39	0.1	30.14	0.5	651.74	2.4	14092.88	0.1
56	1.46	0.1	31.65	0.5	684.33	2.7	14797.52	0.1
57	1.54	0.1	33.23	0.5	718.54	2.7	15537.40	0.1
58	1.61	0.1	34.88	0.5	754.47	2.6	16314.27	0.1
59	1.69	0.1	36.64	0.5	792.19	2.7	17128.88	0.1
60	1.78	0.1	38.47	0.6	831.80	2.7	17986.48	0.1
61	1.87	0.1	40.39	0.6	873.39	2.9	18890.00	0.1
62	1.96	0.1	42.41	0.6	917.06	2.8		
63	2.06	0.1	44.53	0.6	962.82	2.9		

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No.	f / MHz	ACF / dB/m	f / MHz	AF / dB/m
1	30	24.163	200	16.944
2	35	21.253	250	19.108
3	40	18.627	300	20.008
4	45	16.523	400	22.244
5	50	15.030	500	24.997
6	60	13.445	600	26.581
7	70	13.336	700	27.633
8	80	12.720	800	28.829
9	90	13.742	900	30.078
10	100	14.609	1000	30.820
11	120	13.716	1250	33.670
12	140	14.187	1500	36.896
13	160	14.964	1750	34.459
14	180	16.537	2000	35.148

Antenna Factor**Double Ridged Waveguide Horn Antenna manufacturer EMCO Type 3115
1 GHz to 18 GHz. 3 m distance**

No.	f / MHz	AF / dB/m	f / MHz	AF / dB/m	f / MHz	AF / dB/m
1	1000	23.6	7000	36.6	13000	39.7
2	1500	25.5	7500	37.3	13500	40.3
3	2000	28.2	8000	37.0	14000	41.0
4	2500	27.6	8500	37.4	14500	40.8
5	3000	29.2	9000	37.7	15000	39.4
6	3500	30.5	9500	38.0	15500	38.8
7	4000	31.7	10000	38.2	16000	39.0
8	4500	31.9	10500	38.5	16500	40.1
9	5000	32.7	11000	38.6	17000	40.8
10	5500	33.8	11500	38.9	17500	42.2
11	6000	35.2	12000	38.8	18000	42.3
12	6500	35.7	12500	39.0		

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12. Appendix 3: Test illustrations



Picture 1
Conducted spurious emission test setup



Picture 2.
LAN-Power Splitter to use PoE technology



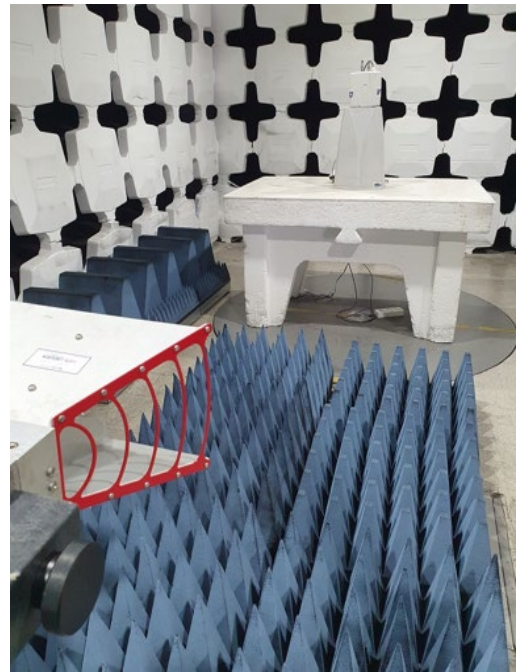
Picture 3.
AC power Adapter

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Picture 4
Radiated spurious emission test setup.

END OF THE DOCUMENT