TEST REPORT

of

FCC Part 15 Subpart C and CANADA RSS-210

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**2.4G Wireless Transceiver Module**
Brand:	**Sunrise**
Model:	**AI00340**
Model Difference:	**N/A**
FCC ID:	**2AMPP-AI00340**
IC:	**11471A-AI00340**
FCC Rule Part:	**§15.249**
IC Rule Part:	**RSS-210 issue 10: 2019 + Amendment: 2020; RSS-Gen issue 5: 2018 +A1: 2019 + A2: 2021**
Applicant:	**Sunrise Technology Co., Ltd.**
Address:	**No.106, Zhongshan 3rd Rd., Daya Dist., Taichung City 428, Taiwan (R.O.C.)**

Test Performed by:

International Standards Laboratory Corp. LT Lab.
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No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-22LR0008FC**
Issue Date :**2022/02/09**

Testing Laboratory
0997

VERIFICATION OF COMPLIANCE

Applicant:	Sunrise Technology Co., Ltd.
Product Description:	2.4G Wireless Transceiver Module
Brand Name:	Sunrise
Model No.:	AI00340
Model Difference:	N/A
FCC ID:	2AMPP-AI00340
IC:	11471A-AI00340
Date of test:	2022/01/10 ~ 2022/03/04
Date of EUT Received:	2022/01/10

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Weitin Chen	***Date:***	2022/03/07
	Weitin Chen / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	2022/03/07
	Gigi Yeh / Senior Engineer		
Approved By:	Jerry Liu	***Date:***	2022/03/07
	Jerry Liu / Assistant Manager		

Version

Version No.	Date	Description
00	2022/03/07	Initial creation of document

Uncertainty of Measurement

Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	≤30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%
Time	0.01%
DC Voltage	1%

Table of Contents

1. General Information

1.1. Product Description

General:

Product Name	2.4G Wireless Transceiver Module
Brand Name	Sunrise
Model Name	AI00340
Model Difference	N/A
Power Supply	TX: 3Vdc

IC RSS-Gen:

Product SW/HW version	V1.0
Radio SW/HW version	V1.0
PMN (Product Marketing Name)	AI00340
HVIN (Hardware Version Identification Number)	AI00340
FVIN (Firmware Version Identification Number)	N/A
Test SoftWare Version	N/A
RF power setting:	Original

2.4GHz

Frequency Range(MHz)	2402MHz-2480MHz
Modulation type	GFSK
Channel Number	40
Measured Power	82.98dBuV/m at 3 m
Antenna Designation:	PCB Antenna / 1 dBi

This report applies for 2.4GHz.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID**: **2AMPP-AI00340** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules and **IC: 11471A-AI00340** filing to comply with Industry Canada RSS-210 issue 10: 2019 + Amendment: 2020

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013 and RSS-Gen issue 5: 2018 +A1: 2019 + A2: 2021. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory Corp** <LT Lab.> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 487532; Designation Number is: TW0997, Canada Registration Number: 4067B-4.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of ANSI C63.10: 2013 and RSS-Gen issue 5: 2018 +A1: 2019 + A2: 2021. Con-ducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m/1.5m(Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6 and 11 of ANSI C63.10: 2013.

2.4. Limitation

(1) Conducted Emission

According to §15.207 and RSS-Gen §8.8, frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission 15.249(a) and RSS-210, §B.10(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	**Field strength of Fundamental**	**Field strength of Harmonics**	**Distance (m)**
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3

(3) Radiated Emission15.249 (d) and RSS-210, §B.10(b)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 and RSS-Gen as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

(4) Radiated Emission 15.249(e) and RSS-Gen

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak filed strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Remark:
1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205, then the general radiated emission limits in ξ 15.209 apply.

2.5. Configuration of Tested System

Fig. 1 Configuration of Tested System

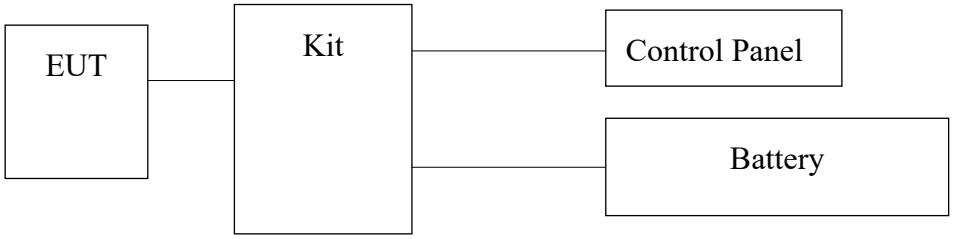


Table 1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Kit	NA	AA0127-RF-V1.1	NA	10cm	NA
2	Battery	Panasonic	AA	NA	NA	20cm
3	Control Panel	NA	AC004M-22 T-02-K3	NA	10cm	NA

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207/ RSS-Gen §8.8	Conducted Emission	N/A
§15.249(a)(d)(e) RSS-210, §B.10(a)(b)	Field Strength Measurement	Compliant
§15.215(c)	20dB band width Measurement	Compliant
RSS-Gen §6.7	99% Power Bandwidth	Compliant

Description of test modes

The EUT has been tested under operating condition.
Test program used to control the EUT for staying in continuous transmitting and receive mode is programmed.

Channel Low (2402MHz), Channel Mid (2442MHz), and Channel High (2480MHz) with highest data rate are chosen for full testing.

4. Conducted Emissions Test

4.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

4.2 Test SET-UP (Block Diagram of Configuration)

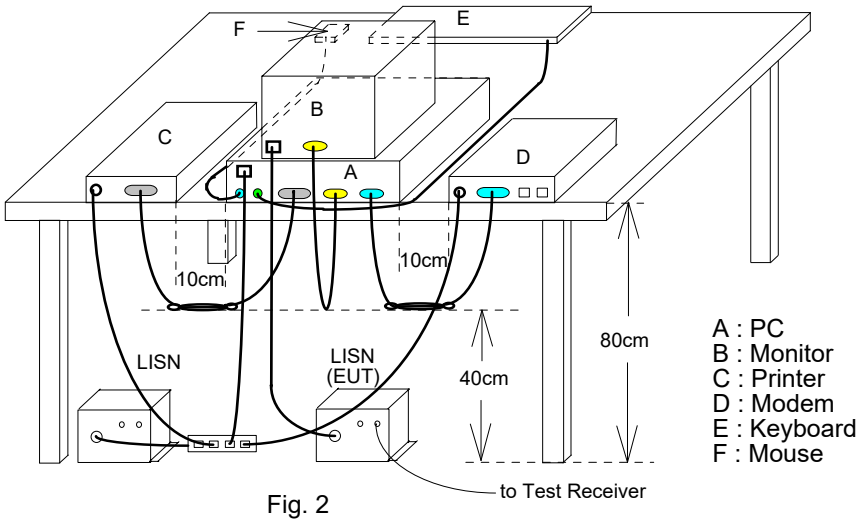


Fig. 2

4.3 Measurement Equipment Used:

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conducted	Power Meter	Anritsu	ML2495A	1116010	09/30/2021	09/30/2022
Conducted	Power Sensor	Anritsu	MA2411B	34NKF50	09/30/2021	09/30/2022
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO33	01/07/2022	01/07/2023
Conducted	Power Sensor	DARE	RPR3006W	13I00030SNO34	01/07/2022	01/07/2023
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO35	06/23/2021	06/23/2022
Conducted	Power Sensor	DARE	RPR3006W	14I00889SNO36	06/23/2021	06/23/2022
Conducted	Temperature Chamber	KSON	THS-B4H100	2287	04/26/2021	04/26/2022
Conducted	DC Power supply	ABM	8185D	N/A	01/06/2022	01/06/2023
Conducted	AC Power supply	EXTECH	CFC105W	NA	N/A	N/A
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	09/28/2021	09/28/2022
Conducted	Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA
Conducted	Test Software	R&S	CMUGO Ver:2.0.0	N/A	N/A	N/A
Conducted	Universal Digital Radio Communication Tester	R&S	CMU200	111968	11/18/2021	11/18/2022
Conducted	Wideband Radio Communication Tester	R&S	CMW500	1201.002K50108 793-JG	10/26/2021	10/26/2022
Conducted	BT Simulator	Agilent	N4010A	MY48100200	NA	NA
Conducted	GPS Simulator	Welnavigate	GS-50	701523	NA	NA
Conducted (TS8997)	Wideband Radio Communication Tester	R&S	CMW500	168811	09/09/2021	09/09/2022
Conducted (TS8997)	Signal Generator	R&S	SMB100B	101085	09/09/2021	09/09/2022
Conducted (TS8997)	Vector Signal Generator	R&S	SMBV100A	263246	09/09/2021	09/09/2022
Conducted (TS8997)	Signal analyzer 40GHz	R&S	FSV40	101884	09/07/2021	09/07/2022
Conducted (TS8997)	OSP150 extension unit CAM-BUS	R&S	OSP150	101107	09/10/2021	09/10/2022
Conducted (TS8997)	Test Software	R&S	EMC32 Ver:11.10.00	NA	NA	NA

4.4 Measurement Result:

N/A

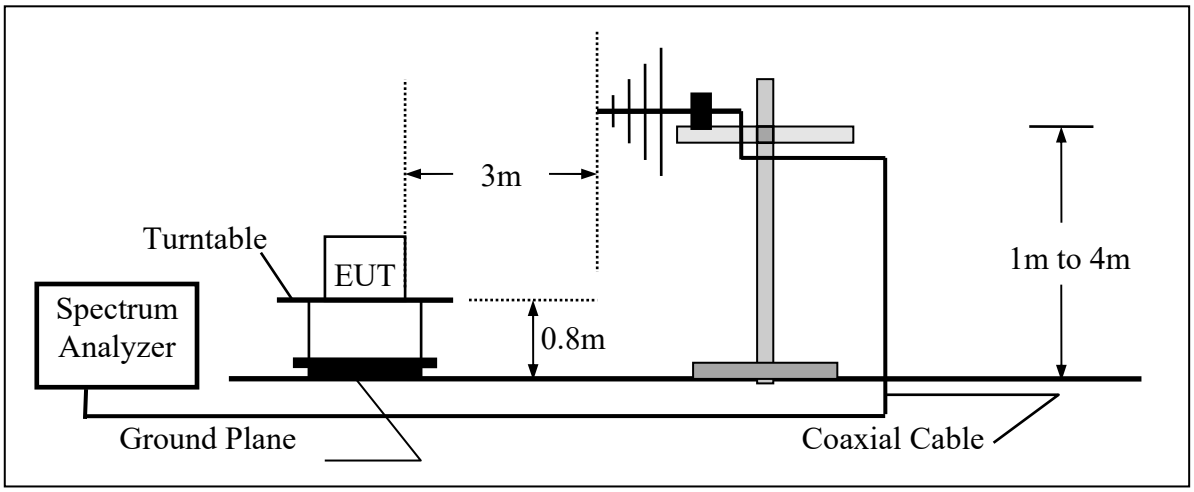
5. Radiated Emission Test

5.1 Measurement Procedure

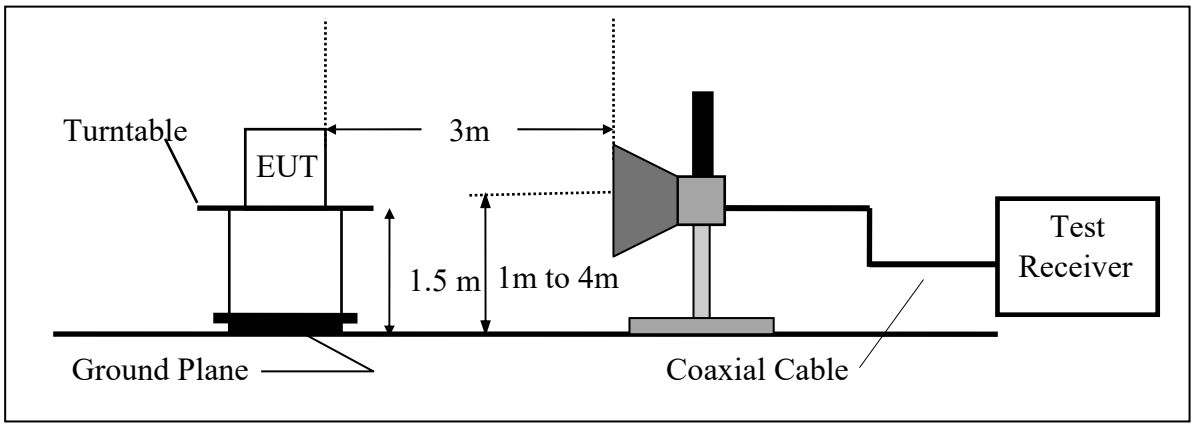
1. The EUT was placed on a turntable that is 0.8m/1.5m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



5.3 Measurement Equipment Used:

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Chamber 19	Signal analyzer	R&S	FSV40	101919	8/18/2021	8/18/2022
Chamber 19	EMI Receiver	R&S	ESR3	102461	5/05/2021	5/05/2022
Chamber 19	Loop Antenna	EM	EM-6879	271	09/29/2021	09/29/2022
Chamber 19	Bilog Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168 w 6dB Att.	9168-736	2/22/2022	2/22/2023
Chamber 19	Horn antenna (1GHz-18GHz)	ETS	3117	00218718	10/12/2021	10/12/2022
Chamber 19	Horn antenna (18GHz-26GHz)	Com-power	AH-826	081001	11/30/2021	11/30/2022
Chamber 19	Horn antenna (26GHz-40GHz)	Com-power	AH-640	100A	03/11/2021	03/11/2022
Chamber 19	Preamplifier (9kHz-1GHz)	HP	8447F	3113A04621	06/22/2021	06/22/2022
Chamber 19	Preamplifier (1GHz - 26GHz)	EM	EM01M26G	060681	05/07/2021	05/07/2022
Chamber 19	Preamplifier (26GHz-40GHz)	MITEQ	JS4-26004000-27-5A	818471	05/07/2021	05/07/2022
Chamber 19	RF Cable (100kHz-26.5GHz)	Huber Suhner	Sucoflex 104A	MY1394/4A & 50886/4A	08/30/2021	08/30/2022
Chamber 19	RF Cable (18GHz-40GHz)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/17/2021	11/17/2022
Chamber 19	Signal Generator	Anritsu	MG3692A	20311	12/28/2021	12/28/2022
Chamber 19	Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

5.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

5.5 Measurement Result

Fundamental Emission Measurement Result

Operation Mode : TX mode
Test Date : 2022/03/02
Temp./ Hum. : 25 ℃/60%
Test By : Weitin

CH Low:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2401.97	90.68	-11.55	79.13	114.00	-34.87	Peak	VERTICAL
1	2401.97	92.43	-11.55	80.88	114.00	-33.12	Peak	HORIZONTAL

CH Mid:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2441.96	92.35	-11.53	80.82	114.00	-33.18	Peak	VERTICAL
1	2441.97	93.16	-11.53	81.63	114.00	-32.37	Peak	HORIZONTAL

CH High:

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2479.96	92.21	-11.44	80.77	114.00	-33.23	Peak	VERTICAL
1	2479.96	94.42	-11.44	82.98	114.00	-31.02	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
4 Spectrum AV mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 10Hz.

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode : TX CH Low
Test Date : 2022/03/02
Temp./ Hum. : 25 ℃/60%
Test By : Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	144.46	27.87	-5.83	22.04	43.50	-21.46	Peak	VERTICAL
2	337.49	27.74	-3.87	23.87	46.00	-22.13	Peak	VERTICAL
3	508.21	27.80	-1.00	26.80	46.00	-19.20	Peak	VERTICAL
4	636.25	28.07	1.63	29.70	46.00	-16.30	Peak	VERTICAL
5	784.66	28.85	4.16	33.01	46.00	-12.99	Peak	VERTICAL
6	898.15	28.32	5.63	33.95	46.00	-12.05	Peak	VERTICAL
1	147.37	28.26	-5.67	22.59	43.50	-20.91	Peak	HORIZONTAL
2	298.69	27.34	-4.68	22.66	46.00	-23.34	Peak	HORIZONTAL
3	409.27	27.74	-2.82	24.92	46.00	-21.08	Peak	HORIZONTAL
4	545.07	28.56	-0.34	28.22	46.00	-17.78	Peak	HORIZONTAL
5	673.11	28.55	1.95	30.50	46.00	-15.50	Peak	HORIZONTAL
6	826.37	28.04	4.74	32.78	46.00	-13.22	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
2 Measuring frequencies from the lowest internal frequency to the 1GHz.
3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90kHz/110-490kHz using PK/AV and other Frequency Band using PK/QP
4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode : TX CH Mid
Temp./ Hum. : 25 ℃/60%
Test Date : 2022/03/02
Test By : Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	150.28	28.62	-5.68	22.94	43.50	-20.56	Peak	VERTICAL
2	319.06	27.63	-4.18	23.45	46.00	-22.55	Peak	VERTICAL
3	425.76	28.23	-2.24	25.99	46.00	-20.01	Peak	VERTICAL
4	531.49	28.51	-0.62	27.89	46.00	-18.11	Peak	VERTICAL
5	637.22	28.47	1.65	30.12	46.00	-15.88	Peak	VERTICAL
6	808.91	28.25	4.36	32.61	46.00	-13.39	Peak	VERTICAL
1	149.31	29.26	-5.83	23.43	43.50	-20.07	Peak	HORIZONTAL
2	288.02	26.64	-4.93	21.71	46.00	-24.29	Peak	HORIZONTAL
3	384.05	29.13	-3.22	25.91	46.00	-20.09	Peak	HORIZONTAL
4	514.03	28.64	-0.88	27.76	46.00	-18.24	Peak	HORIZONTAL
5	675.05	29.10	1.92	31.02	46.00	-14.98	Peak	HORIZONTAL
6	818.61	28.85	4.55	33.40	46.00	-12.60	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
2 Measuring frequencies from the lowest internal frequency to the 1GHz.
3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90kHz/110-490kHz using PK/AV and other Frequency Band using PK/QP
4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Operation Mode : TX CH High
Temp./ Hum. : 25 ℃/60%
Test Date : 2022/03/02
Test By : Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	149.31	28.94	-5.83	23.11	43.50	-20.39	Peak	VERTICAL
2	283.17	26.46	-5.06	21.40	46.00	-24.60	Peak	VERTICAL
3	443.22	28.16	-1.82	26.34	46.00	-19.66	Peak	VERTICAL
4	589.69	28.38	0.67	29.05	46.00	-16.95	Peak	VERTICAL
5	739.07	27.98	3.29	31.27	46.00	-14.73	Peak	VERTICAL
6	841.89	29.11	4.96	34.07	46.00	-11.93	Peak	VERTICAL
1	148.34	30.90	-5.70	25.20	43.50	-18.30	Peak	HORIZONTAL
2	250.19	28.59	-6.64	21.95	46.00	-24.05	Peak	HORIZONTAL
3	384.05	28.23	-3.22	25.01	46.00	-20.99	Peak	HORIZONTAL
4	512.09	28.49	-0.92	27.57	46.00	-18.43	Peak	HORIZONTAL
5	669.23	29.68	2.00	31.68	46.00	-14.32	Peak	HORIZONTAL
6	803.09	28.88	4.29	33.17	46.00	-12.83	Peak	HORIZONTAL

Remark:

1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
2 Measuring frequencies from the lowest internal frequency to the 1GHz.
3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90kHz/110-490kHz using PK/AV and other Frequency Band using PK/QP
4 Measurement result within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	: TX CH Low	Test Date	: 2022/03/02
Temp./ Hum.	: 25 ℃/60%	Test By	: Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	4804.00	51.12	-6.92	44.20	74.00	-29.80	Peak	VERTICAL
2	6866.00	47.47	-3.22	44.25	74.00	-29.75	Peak	VERTICAL
1	4804.00	51.64	-6.92	44.72	74.00	-29.28	Peak	HORIZONTAL
2	7237.00	47.60	-3.17	44.43	74.00	-29.57	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Operation Mode : TX CH Mid
Temp./ Hum. : 25 ℃/60%
Test Date : 2022/03/02
Test By : Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	4884.00	48.73	-6.82	41.91	74.00	-32.09	Peak	VERTICAL
2	7251.00	48.58	-3.20	45.38	74.00	-28.62	Peak	VERTICAL
1	4884.00	49.82	-6.82	43.00	74.00	-31.00	Peak	HORIZONTAL
2	7265.00	47.68	-3.19	44.49	74.00	-29.51	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Operation Mode : TX CH High
Temp./ Hum. : 25 ℃/60%
Test Date : 2022/03/02
Test By : Weitin

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	4960.00	46.09	-6.62	39.47	74.00	-34.53	Peak	VERTICAL
2	7265.00	47.25	-3.19	44.06	74.00	-29.94	Peak	VERTICAL
1	4960.00	46.93	-6.62	40.31	74.00	-33.69	Peak	HORIZONTAL
2	6866.00	47.89	-3.22	44.67	74.00	-29.33	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 “F” denotes fundamental frequency; “H” denotes harmonics frequency. “S” denotes spurious frequency.

4 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

6 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (Band Edge)

Operation Mode : Band Edge
Test Date : 2022/03/02
Temp./Hum. : 25 ℃/ : 60%
Test By : Weitin

CH Low

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2400.00	58.81	-11.55	47.26	74.00	-26.74	Peak	VERTICAL
2	2401.98	90.58	-11.55	79.03	F	--	Peak	VERTICAL
1	2400.00	59.48	-11.55	47.93	74.00	-26.07	Peak	HORIZONTAL
2	2401.98	92.32	-11.55	80.77	F	--	Peak	HORIZONTAL

CH High

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol V/H
1	2479.95	92.24	-11.44	80.80	F	--	Peak	VERTICAL
2	2483.50	58.32	-11.43	46.89	74.00	-27.11	Peak	VERTICAL
1	2479.97	94.40	-11.44	82.96	F	--	Peak	HORIZONTAL
2	2483.50	59.62	-11.43	48.19	74.00	-25.81	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency

2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

3 Measurement of data within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.

5 Spectrum AV mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3MHz.

6. 20 dB Band Width Measurement

6.1 Measurement Procedure

The EUT was placed on a turn table which is 0.8m above ground plane and Set the EUT in continuously operating mode.

Spectrum Analyzer Setting:

1. Center frequency = nominal center frequency
2. Set span = 2 times to 5 times the OBW.
3. RBW = 1% to 5% of the OBW
4. VBW ≥ 3 x RBW.
5. Detector = Peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. Use 20-dB BW measurement function.

6.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

6.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

6.4 Measurement Results:

CH Low 20dB BW = 9.973kHz

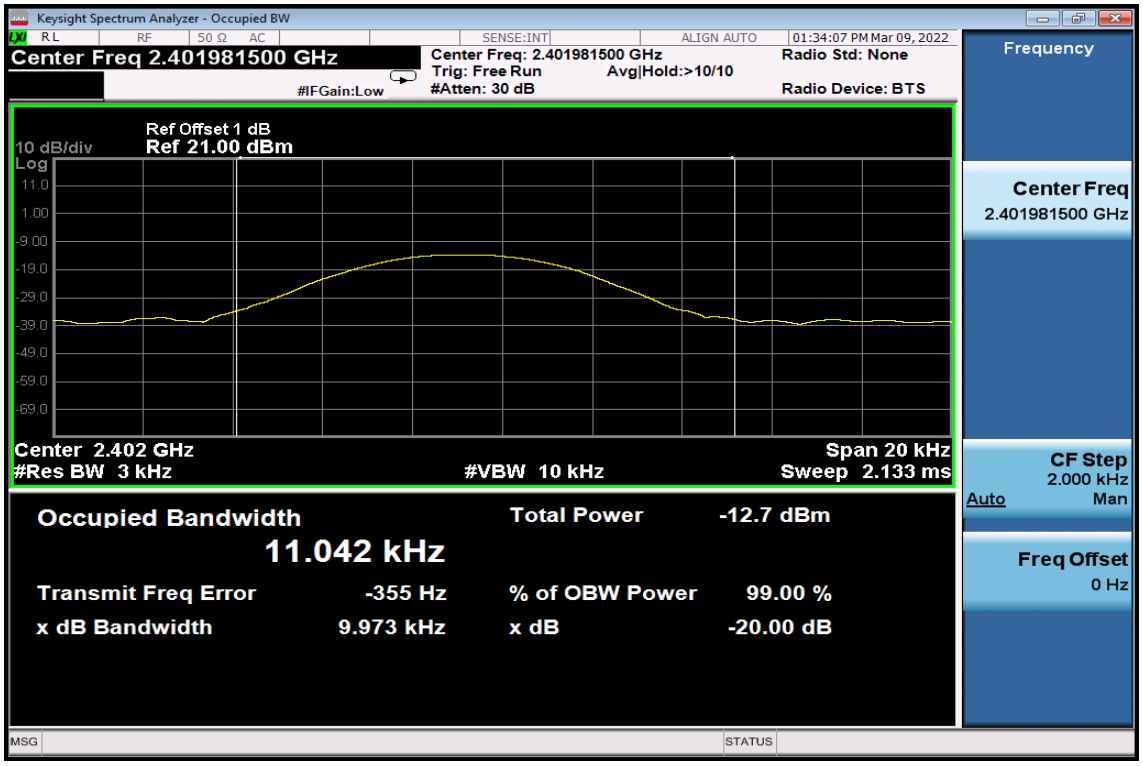
CH Mid 20dB BW = 9.743kHz

CH High 20dB BW = 9.785kHz

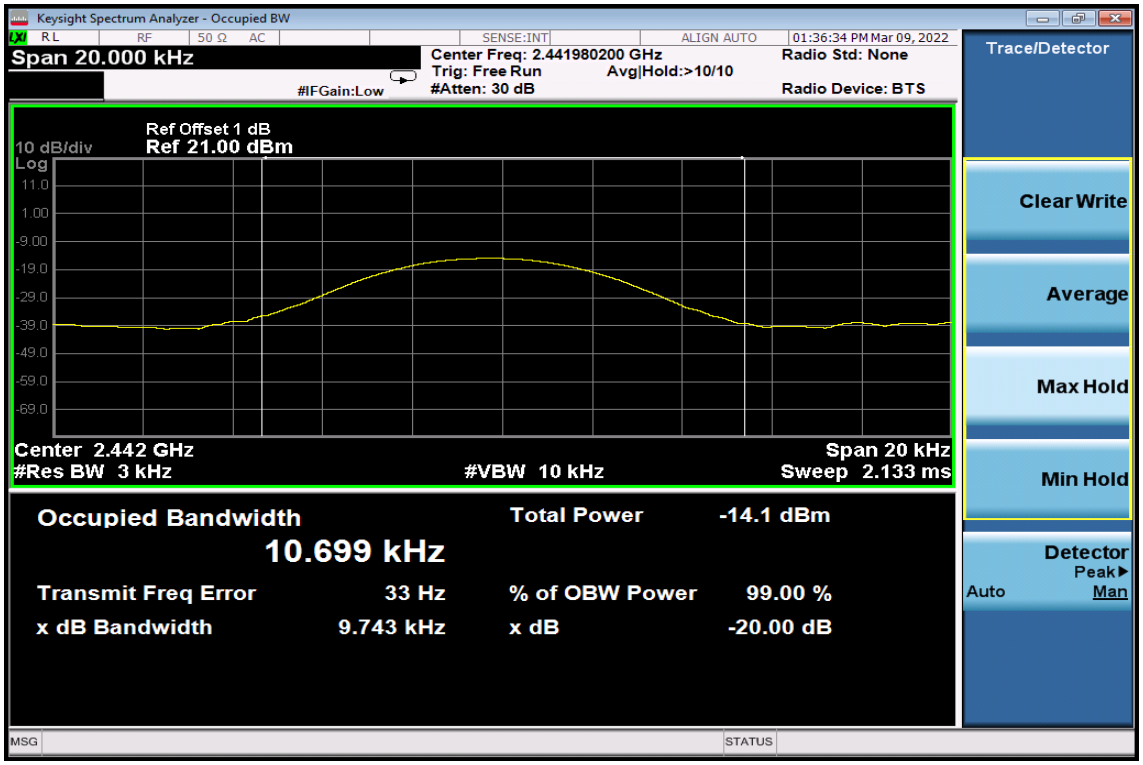
Refer to attached data chart.

20dB Band Width test Plot

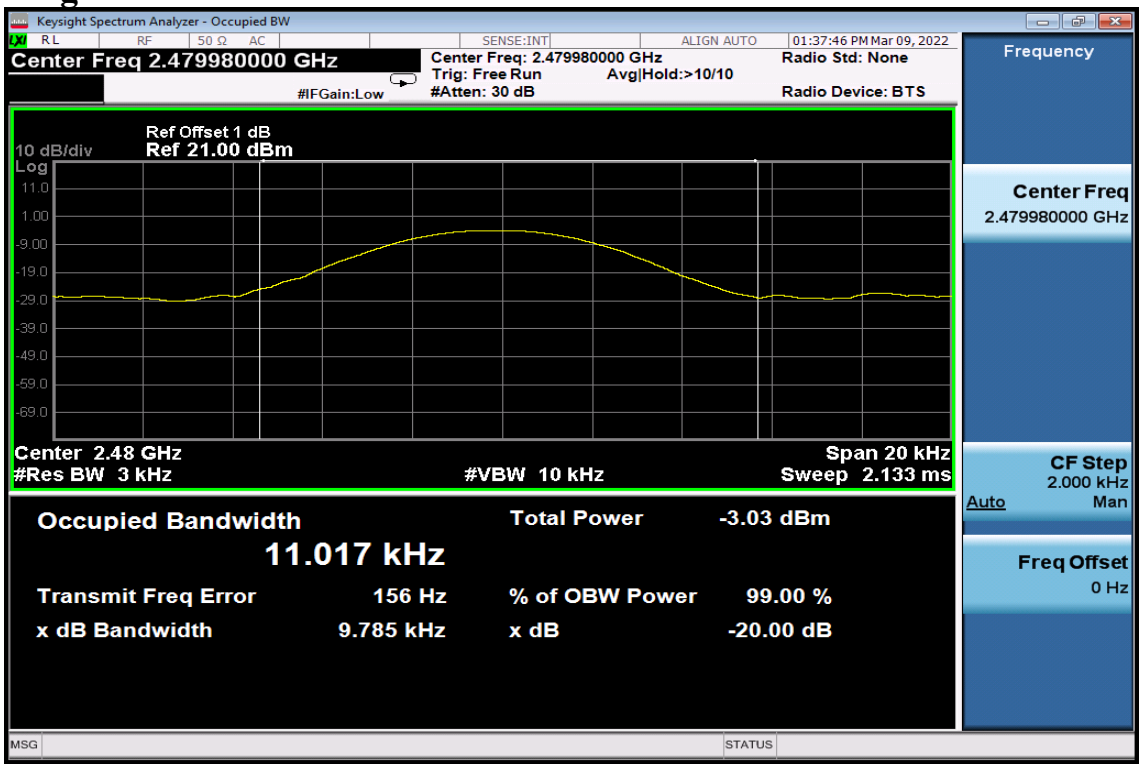
CH Low



CH Mid



CH High


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
01:37:46 PM Mar 09, 2022
Center Freq 2.479980000 GHz
Center Freq: 2.479980000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Center Freq
2.479980000 GHz
Center 2.48 GHz
#Res BW 3 kHz
#VBW 10 kHz
Span 20 kHz
Sweep 2.133 ms
CF Step
2.000 kHz
Auto
Man
Occupied Bandwidth
11.017 kHz
Total Power
-3.03 dBm
Transmit Freq Error
156 Hz
% of OBW Power
99.00 %
x dB Bandwidth
9.785 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

7. 99% Band Width Measurement

7.1 Measurement Procedure

1 Place the EUT on the table and set it in transmitting mode.

2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3 Set the spectrum analyzer as RBW=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto

4 Turn on the 99% bandwidth function, max reading.

5 Repeat above procedures until all frequency measured were complete.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

7.4 Measurement Results:

CH Low 99% OBW = 11.042kHz

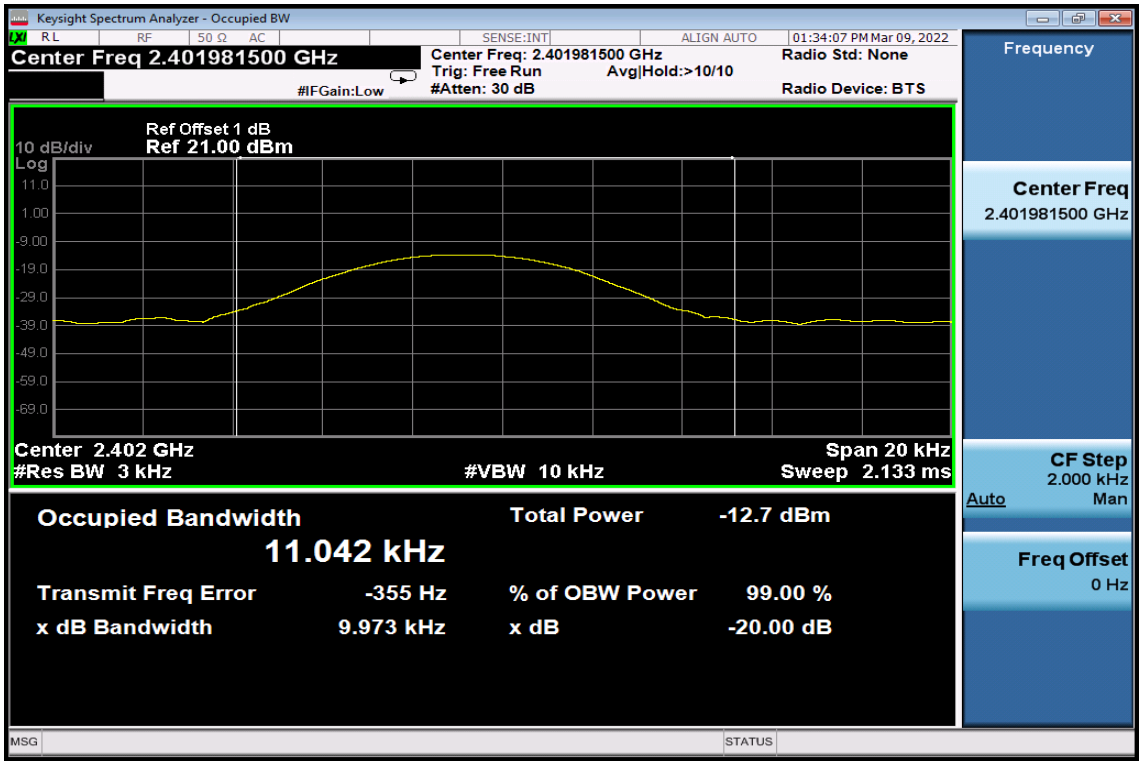
CH Mid 99% OBW = 10.699kHz

CH High 99% OBW = 11.017kHz

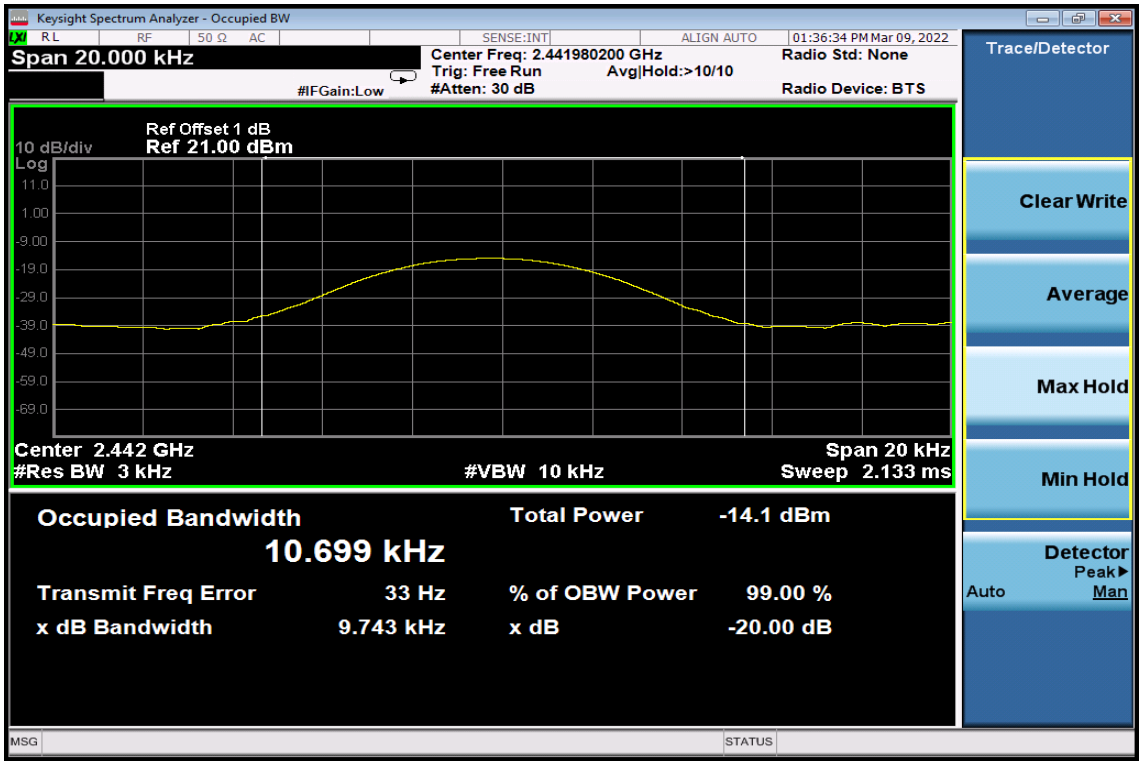
Refer to attached data chart.

99% Band Width test Plot

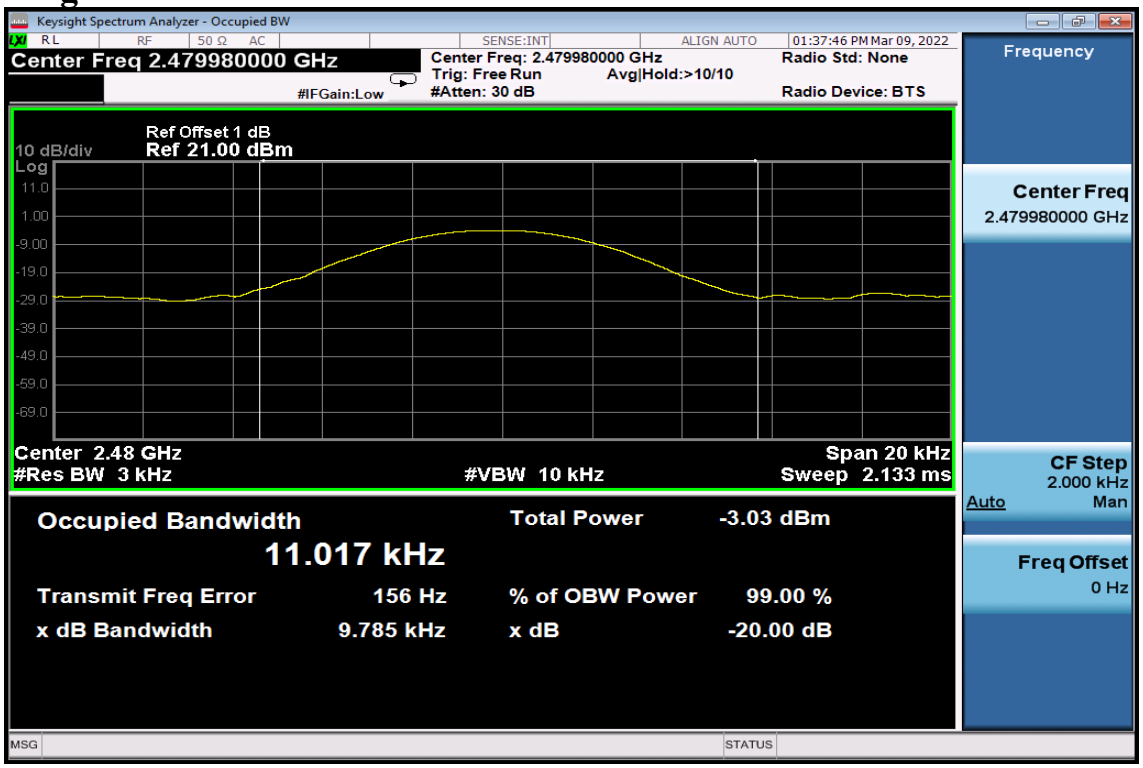
CH Low



CH Mid



CH High


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
01:37:46 PM Mar 09, 2022
Center Freq 2.479980000 GHz
Center Freq: 2.479980000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Center Freq
2.479980000 GHz
Center 2.48 GHz
#Res BW 3 kHz
#VBW 10 kHz
Span 20 kHz
Sweep 2.133 ms
CF Step
2.000 kHz
Auto
Man
Occupied Bandwidth
11.017 kHz
Total Power
-3.03 dBm
Transmit Freq Error
156 Hz
% of OBW Power
99.00 %
x dB Bandwidth
9.785 kHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS