

FCC Radio Test Report

FCC ID: RWO-RZ040403

This report concerns: Original Grant

Project No.	:	2107C162
Equipment	:	Gaming Headset
Brand Name	:	RAZER
Test Model	:	RZ04-0403
Series Model	:	RZ04-0403XXXX-XXXX(X can be 0-9 or A-Z)
Applicant	:	Razer Inc.
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Date of Receipt	:	Jul. 28, 2021
Date of Test	:	Jul. 28, 2021 ~ Sep. 02, 2021
Issued Date	:	Sep. 03, 2021
Report Version	:	R00
Test Sample	:	Sample No.: DG2021072890 for conducted, DG2021072891 for radiated.
Standard(s)	:	FCC CFR Title 47, Part 15, Subpart C
		FCC KDB 558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

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The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective. Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.



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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Sep. 03, 2021



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC CFR Title 47, Part 15, Subpart C					
Standard(s) Section	Test Item	Test Result	Judgment	Remark	
15.207	AC Power Line Conducted Emissions	APPENDIX A	PASS		
15.247(d) 15.205(a) 15.209(a)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	PASS		
15.247(a)(2)	Bandwidth	APPENDIX E	PASS		
15.247(b)(3)	Maximum Output Power	APPENDIX F	PASS		
15.247(d)	Conducted Spurious Emission	APPENDIX G	PASS		
15.247(e)	Power Spectral Density	APPENDIX H	PASS		
15.203	Antenna Requirement		PASS	Note(2)	

Note:

(1) "N/A" denotes test is not applicable to this device.

(2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.



1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China. BTL's Test Firm Registration Number for FCC: 357015 BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)) The BTL measurement uncertainty as below table:

A. AC power line conducted emissions Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150kHz ~ 30MHz	2.68

B. Radiated emissions Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9kHz ~ 30MHz	-	3.02
		30MHz ~ 200MHz	V	4.26
	CISPR	30MHz ~ 200MHz	Н	3.38
		200MHz ~ 1,000MHz	V	3.98
DG-CB03		200MHz ~ 1,000MHz	Н	3.94
		1GHz ~ 6GHz	-	3.96
		6GHz ~ 18GHz	-	5.24
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

C. Other Measurement:

Test Item	Uncertainty
Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Conducted Spurious Emission	±2.71 dB
Power Spectral Density	±0.86 dB
Temperature	±0.08 °C
Humidity	±1.5%

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
AC Power Line Conducted Emissions	25°C	53%	AC 120V/60Hz	Laughing Zhang
Radiated Emissions-9 kHz to 30 MHz	25°C	60%	DC 5V	Hayden Chen
Radiated Emissions-30 MHz to 1000 MHz	26°C	52%	DC 5V	Hayden Chen
Radiated Emissions-Above 1000 MHz	26°C	52%	DC 5V	Hayden Chen
Bandwidth	24°C	52%	DC 5V	Jesse Wang
Maximum Output Power	24°C	52%	DC 5V	Laughing Zhang
Conducted Spurious Emission	24°C	52%	DC 5V	Jesse Wang
Power Spectral Density	24°C	52%	DC 5V	Jesse Wang



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Gaming Headset
Brand Name	RAZER
Test Model	RZ04-0403
Series Model	RZ04-0403XXXX-XXXX(X can be 0-9 or A-Z)
Model Difference(s)	The system's model name is RZ04-0403XXXX-XXXX (X:Can be 0-9, A-Z), and the system is contain a Gaming Headset (Model name: RZ04-0403)and USB Wireless Transceiver (Model name:RC30-0403).
Power Source	1# Supplied from USB port. 2# Supplied from battery. Model: 553450
Power Rating	1# DC 5V 2# DC 3.7V, 1000mAh, 3.7Wh
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	1Mbps, 2Mbps
Max. Peak Output Power	2Mbps: 5.37 dBm (0.0034 W)
Max. Average Output Power	2Mbps: 5.23 dBm (0.0033 W)

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.





2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3. Table for Filed Antenna:

Ant.	Brand	Model	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	FPC	N/A	4.68

Note: The antenna gain is provided by the manufacturer.



2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode_1Mbps Channel 00/19/39
Mode 2	TX Mode_2Mbps Channel 00/19/39
Mode 3	TX Mode_2Mbps Channel 19

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

AC power line conducted emissions test		
Final Test Mode	Description	
Mode 3	TX Mode_2Mbps Channel 19	

Radiated emissions test - Below 1GHz		
Final Test Mode	Description	
Mode 3	TX Mode_2Mbps Channel 19	

Radiated emissions test - Above 1GHz		
Final Test Mode	Description	
Mode 1	TX Mode_1Mbps Channel 00/19/39	
Mode 2	TX Mode_2Mbps Channel 00/19/39	

Conducted test		
Final Test Mode	Description	
Mode 1	TX Mode_1Mbps Channel 00/19/39	
Mode 2	TX Mode_2Mbps Channel 00/19/39	

Note:

- (1) For radiated emission above 1 GHz test, the spurious points of 1GHz~26.5GHz have been pre-tested and in this report only recorded the worst case. The remaining spurious points are all below the limit value of 20dB.
- (2) For AC power line conducted emissions and radiated emissions below 1 GHz test, the 2Mbps Channel 19 is found to be the worst case and recorded.

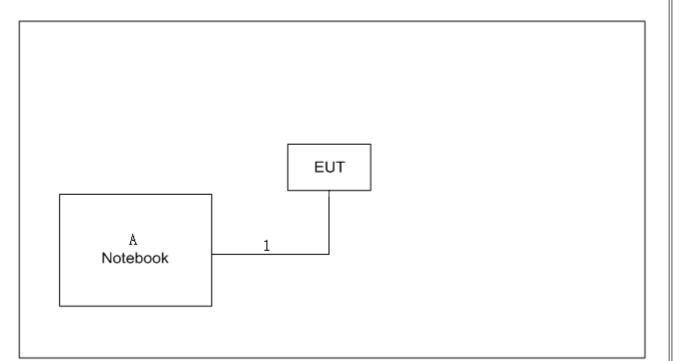
2.3 PARAMETERS OF TEST SOFTWARE

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	AWRDLABV2 1.0.9.9		
Frequency (MHz)	2402	2440	2480
1Mbps	0x05	0x05	0x05
2Mbps	0x05	0x05	0x05



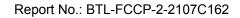
2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
А	Notebook	Lenovo	V310-14ISK	LR07GZNB

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	NO	NO	0.8m





3. AC POWER LINE CONDUCTED EMISSIONS

3.1 LIMIT

Frequency of Emission (MHz)	Limit (d	BμV)
Frequency of Emission (Minz)	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

The following table is the setting of the receiver:

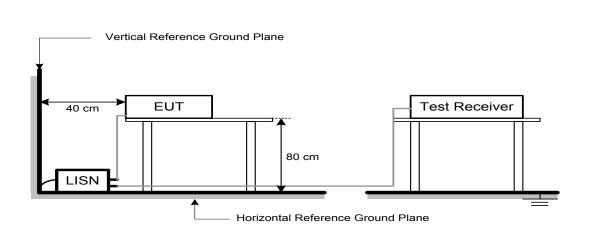
Receiver Parameters	Setting
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.3 DEVIATION FROM TEST STANDARD

No deviation.



3.4 TEST SETUP



3.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.6 TEST RESULTS

Please refer to the APPENDIX A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of [Note]. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a "*" marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150 kHz to 30 MHz.



4. RADIATED EMISSIONS

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000 MHz)

Frequency	(dBuV/m at 3 m)	
(MHz)	Peak	Average
Above 1000	74	54

Note:

(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



4.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)
- b. The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1 GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

The following table is the setting of the receiver:

Spectrum Parameters	Setting	
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz	
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz	
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz	

Spectrum Parameters	Setting	
Start Frequency 1000 MHz		
Stop Frequency	10th carrier harmonic	
RBW / VBW	1 MHz / 3 MHz for PK value	
(Emission in restricted band)	1 MHz / 1/T Hz for AVG value	

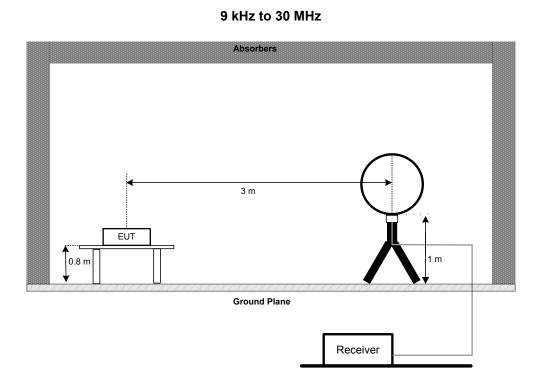
Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30 MHz~1000 MHz for QP detector
Start ~ Stop Frequency	1 GHz~26.5 GHz for PK/AVG detector

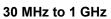


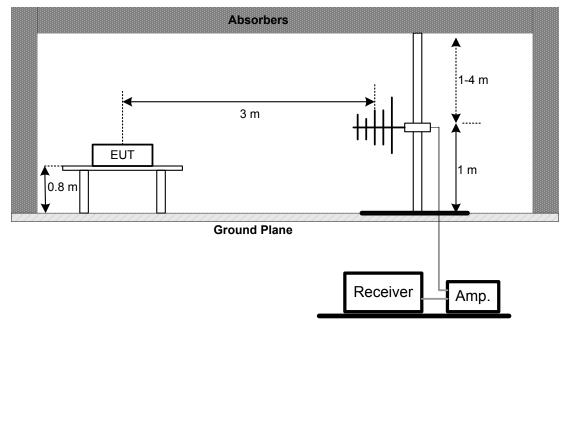
4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP

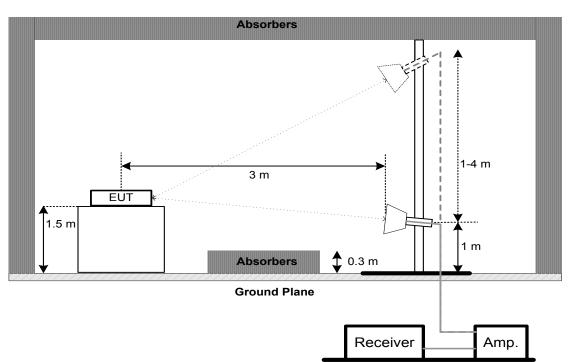








Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT - 9 kHz TO 30 MHz

Please refer to the APPENDIX B.

Remark:

- (1) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
- (2) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.7 TEST RESULT - 30 MHz TO 1000 MHz

Please refer to the APPENDIX C.

4.8 TEST RESULT - ABOVE 1000 MHz

Please refer to the APPENDIX D.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



5. BANDWIDTH

5.1 LIMIT

Section	Test Item	Limit		
FCC 15.247(a)(2)	6 dB Bandwidth >= 500 kHz			
	99% Emission Bandwidth	-		

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. The following table is the setting of the spectrum analyzer:

For 6 dB Bandwidth:

Spectrum Parameters	Setting			
Span Frequency	> Measurement Bandwidth			
RBW	100 kHz			
VBW	300 kHz			
Detector	Peak			
Trace	Max Hold			
Sweep Time	Auto			

For 99% Emission Bandwidth:

Spectrum Parameters	Setting			
Span Frequency	Between 1.5 times and 5.0 times the OBW			
RBW	30 kHz			
VBW	100 kHz			
Detector	Peak			
Trace	Max Hold			
Sweep Time	Auto			

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULTS

Please refer to the APPENDIX E.



6. MAXIMUM OUTPUT POWER

6.1 LIMIT

Section	Test Item	Limit	
FCC 15.247(b)(3)	Maximum Output Power	1.0000 watt or 30.00 dBm	

6.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting			
Span Frequency	≥ 3×RBW			
RBW	3 MHz			
VBW	3 MHz			
Detector	Peak			
Trace	Max Hold			
Sweep Time	Auto			

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULTS

Please refer to the APPENDIX F.





7. CONDUCTED SPURIOUS EMISSION

7.1 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 Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

7.2 TEST PROCEDURE

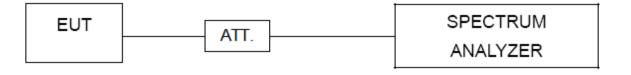
- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULTS

Please refer to the APPENDIX G.



8. POWER SPECTRAL DENSITY

8.1 LIMIT

Section	Test Item	Limit	
FCC 15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)	

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

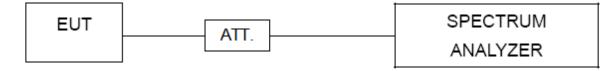
b. The following table is the setting of the spectrum analyzer:

Spectrum Parameters	Setting			
Span Frequency	2 MHz (1 Mbps) / 4 MHz (2 Mbps)			
RBW	3 kHz			
VBW	10 kHz			
Detector	Peak			
Trace	Max Hold			
Sweep Time	Auto			

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

8.6 TEST RESULTS

Please refer to the APPENDIX H.



9. MEASUREMENT INSTRUMENTS LIST

	AC Power Line Conducted Emissions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	EMI Test Receiver	R&S	ESCI	100382	Feb. 28, 2022	
2	LISN	EMCO	3816/2	52765	Feb. 27, 2022	
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 27, 2022	
4	50Ω Terminator	SHX	TF5-3	15041305	Feb. 27, 2022	
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
6	Cable	N/A	RG223	12m	Mar. 09, 2022	
7	643 Shield Room	ETS	6*4*3m	N/A	N/A	

	Radiated Emissions - 9 kHz to 30 MHz									
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until					
1	Loop Antenna	EM	EM-6876-1	230	Apr. 28, 2022					
2	Cable	N/A	RG 213/U	N/A	May 27, 2022					
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 27, 2022					
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A					
5	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022					

	Radiated Emissions - 30 MHz to 1 GHz								
Item	Kind of Equipment	Kind of Equipment Manufacturer		Serial No.	Calibrated until				
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 15, 2022				
2	Amplifier	HP	8447D	2944A08742	Feb. 28, 2022				
3	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022				
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 20, 2022				
5	Controller	СТ	SC100	N/A	N/A				
6	Controller	MF	MF-7802	MF780208416	N/A				
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A				
8	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022				

	Radiated Emissions - Above 1 GHz									
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until					
1	Double Ridged Guide Antenna	ETS	3115	75789	May 10, 2022					
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2022					
3	Amplifier	Agilent	8449B	3008A02584	Jul. 10, 2022					
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022					
5	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022					
6	Controller	СТ	SC100	N/A	N/A					
7	Controller	MF	MF-7802	MF780208416	N/A					
8	Cable	N/A	EMC104-SM-SM-6 000	N/A	Oct. 16, 2021					
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A					
10	Filter	STI	STI15-9912	N/A	Jul. 10, 2022					
11	966 Chambe Room	RM	9*6*6m	N/A	Jul. 24, 2022					



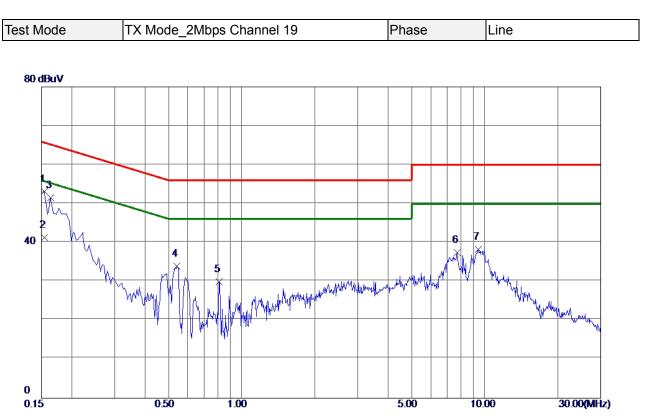
Bandwidth & Maximum Output Power & Power Spectral Density & Conducted Spurious Emission								
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until			
1	Spectrum Analyzer	R&S	FSP40	100185	Jul. 10, 2022			
2	2 Attenuator WOKEN 6SM3502 VAS1214NL Feb. 0							
3	3 RF Cable Tongkaichuan N/A N/A N/A							
4	DC Block	Mini	N/A	N/A	N/A			

Remark: "N/A" denotes no model name, serial no. or calibration specified. All calibration period of equipment list is one year.



APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS

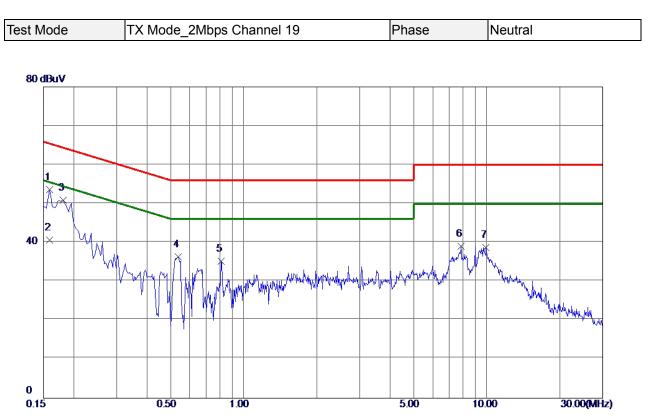




No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1545	43. 40	9.70	53. 10	65.75	-12.65	Peak	
2	0.1545	31.60	9.70	41.30	55.75	-14. 45	AVG	
3	0.1635	41.71	9.77	51.48	65.28	-13.80	Peak	
4	0.5415	23.98	9.93	33. 91	56.00	-22.09	Peak	
5	0.8070	20.00	9.96	29.96	56.00	-26. 04	Peak	
6	7.7055	26.98	10.48	37.46	60.00	-22. 54	Peak	
7	9. 4155	27.56	10.61	38.17	60.00	-21.83	Peak	

- (1) Measurement Value = Reading Level + Correct Factor.
 (2) Margin Level = Measurement Value Limit Value.





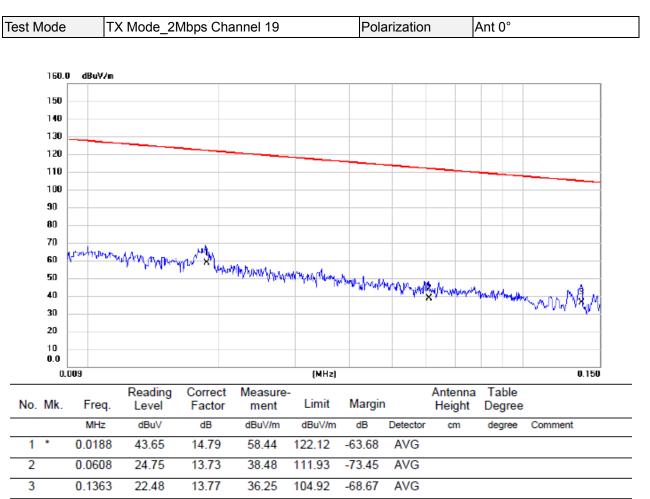
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.1590	43.73	9.81	53. 54	65.52	-11. 98	Peak	
2	0.1590	30.80	9.81	40.61	55. 52	-14. 91	AVG	
3	0. 1815	40.95	9.94	50.89	64.4 2	-13. 53	Peak	
4	0.5370	26.13	10.14	36.27	56.00	-19.73	Peak	
5	0.8070	24.98	10.22	35. 20	56.00	-20.80	Peak	
6	7.8270	28.16	10.84	39.00	60.00	-21.00	Peak	
7	9.9150	27.65	11.01	38.66	60.00	-21.34	Peak	

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.



APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ

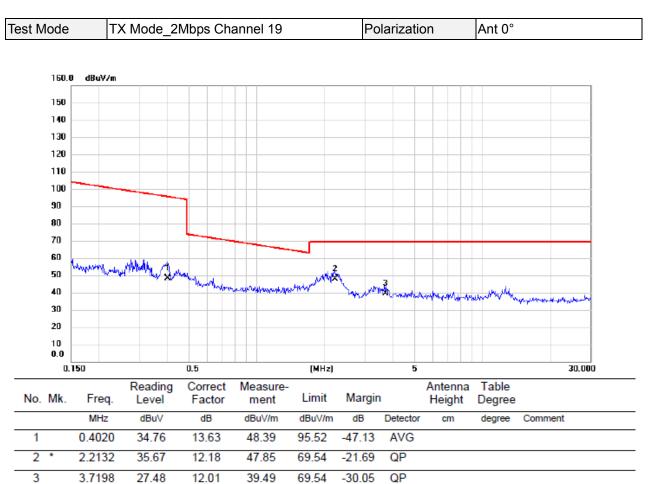




- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



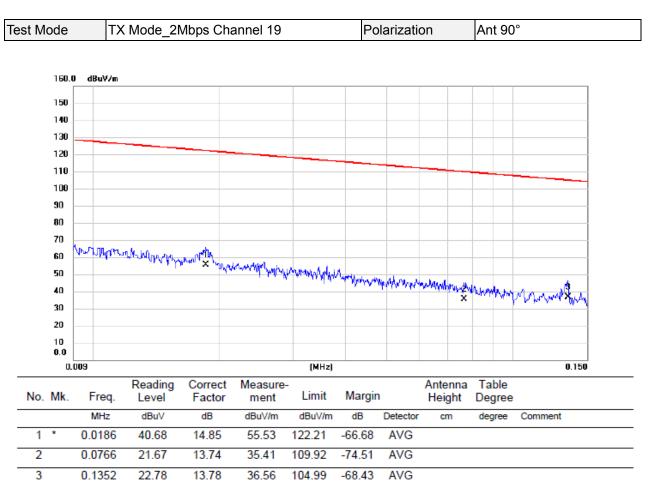




- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.

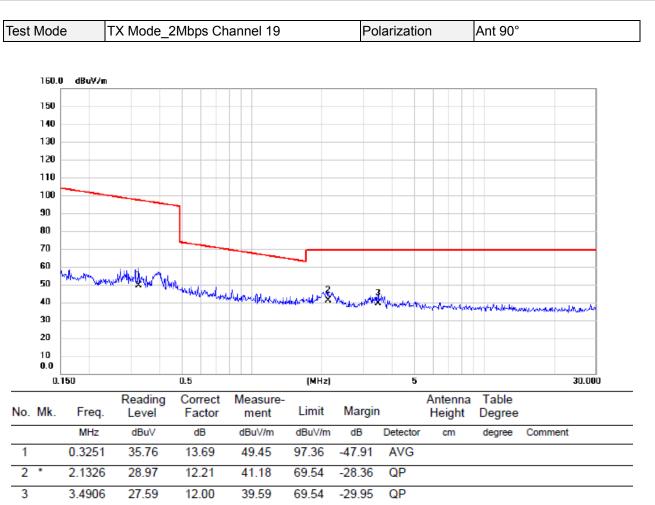






- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



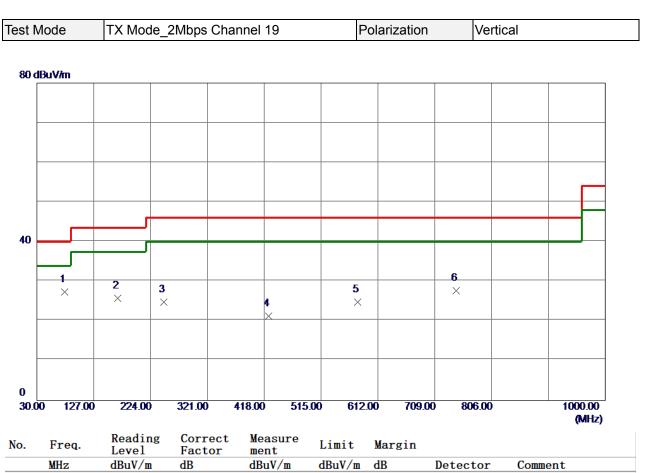


- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ

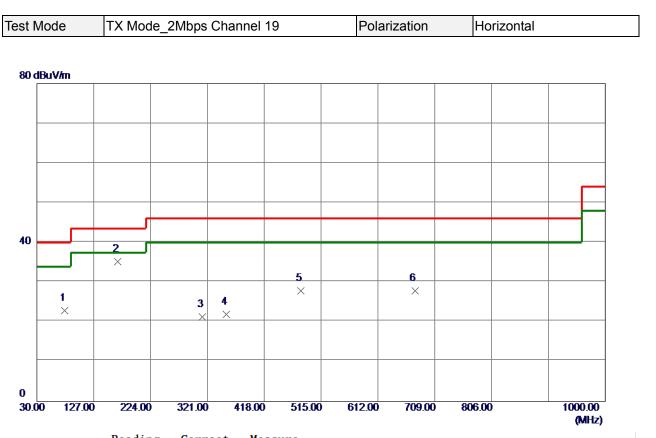




	1104.	Level	Factor	ment	Limit	add 8111		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	77. 5300	45.21	-17.85	27.36	40.00	-12.64	Peak	
2	167.7400	38.34	-12.53	25.81	43. 50	-17.69	Peak	
3	246. 3100	37.86	-13. 10	24.76	46.00	-21.24	Peak	
4	425. 7600	29.32	-8. 0 7	21.25	46.00	-24.75	Peak	
5	577.0800	29.91	-5.17	24.74	46.00	-21.26	Peak	
6	745.8600	29.79	-2. 04	27.75	46.00	-18.25	Peak	

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.





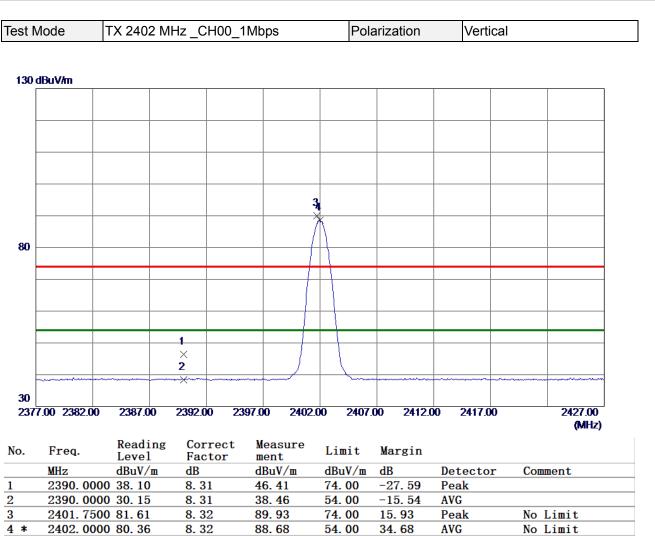
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	77. 5300	40.73	-17.85	22.88	40.00	-17.12	Peak	
2 *	167.7400	47.73	-12.53	35. 20	43. 50	-8.30	Peak	
3	312. 2700	32. 01	-10.66	21.35	46.00	-24.65	Peak	
4	353. 0100	31.83	-9.89	21.94	46.00	-24.06	Peak	
5	480. 0800	34.66	-6.89	27.77	46.00	-18.23	Peak	
6	675. 0500	31.27	-3. 40	27.87	46.00	-18.13	Peak	

- Measurement Value = Reading Level + Correct Factor.
 Margin Level = Measurement Value Limit Value.



APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ





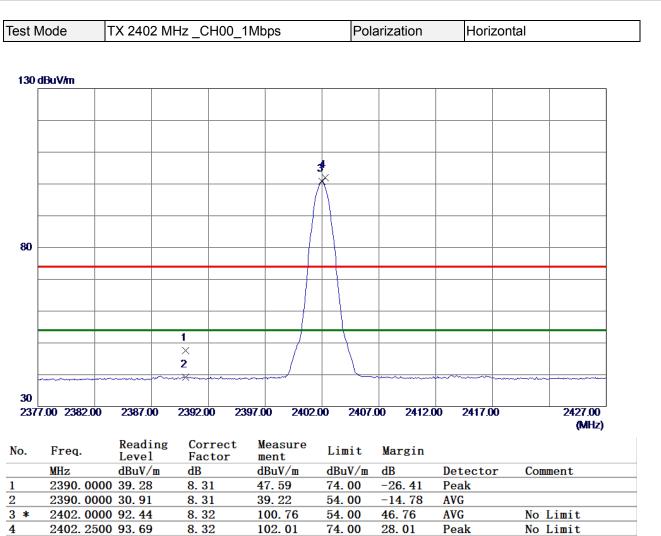
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



ēst N	lode	TX 2402 M	Hz_CH00_ [*]	1Mbps	Pol	arization	Vertical	
90.4	BuV/m							
000								
-								
			×					
			2					
			×					
30								
-20								
	0.00 3550.0	0 6100.00	8650.00 11	200.00 1375	0.00 1630	0.00 18850	.00 21400.00	26500.00
		D 1:	6	м				(MHz)
lo.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
2 *		120 39.28 720 27.12	10. 56 10. 56	<u>49.84</u> 37.68	74.00 54.00	-24. 16 -16. 32	Peak AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





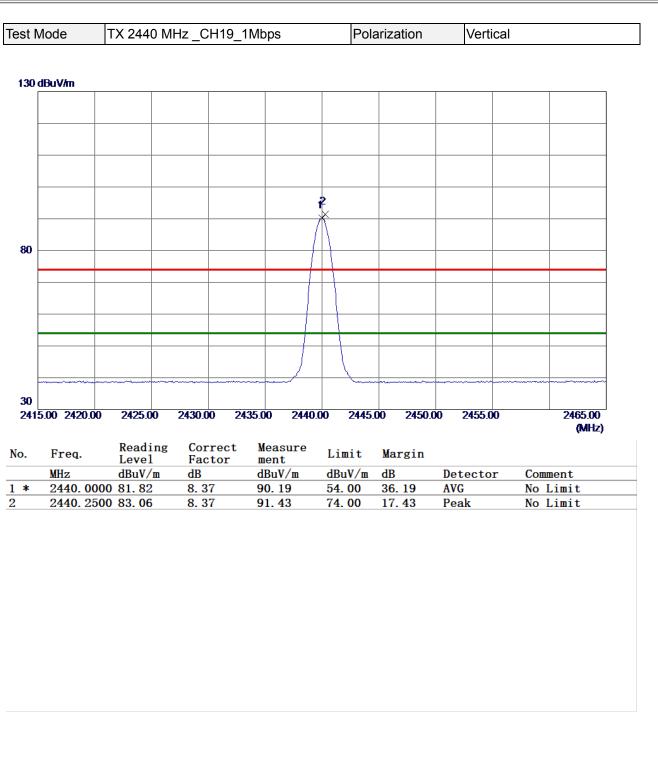
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



lest l	Mode	TX 2402 M	Hz_CH00_	1Mbps	Pola	arization	Horiz	contal	
80.4	dBuV/m								
		1	l						
			ž						
			- ×						
30									
~									
-20 100	0.00 3550.0	0 6100.00	8650.00 1	1200.00 1375	0.00 1630	0.00 18850	0.00 21400.0	00	26500.0
100	0.00 3330.0	0 0100.00	0000.00	1200.00 1313	0.00 10.00	0.00 100.00	.00 21400.		(MHz)
_	_	Reading	Correct	Measure					
lo.	Freq.	Level	Factor	ment	Limit	Margin			
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	c Cor	ment
		350 42.17 900 36.48	10.56	52.73	74.00	-21.27	Peak		
*	7205 39	00 36 48	10.56	47.04	54.00	-6.96	AVG		

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





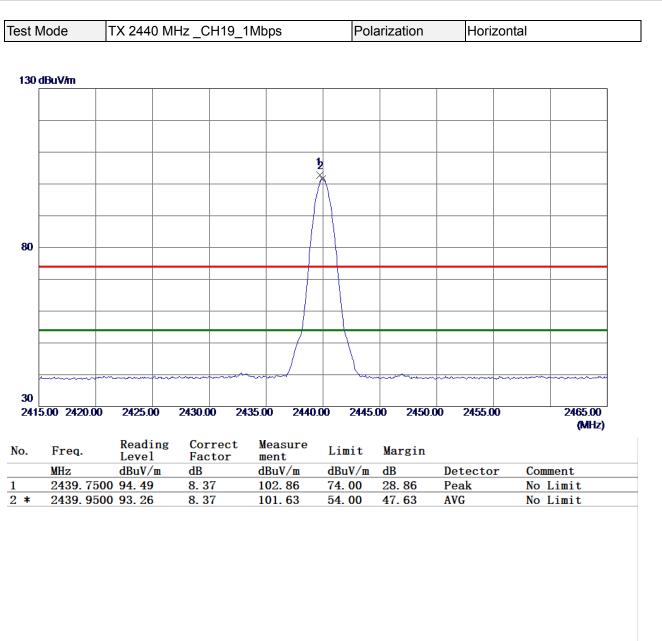
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



est N	lode	TX 2440 M	Hz_CH19_	1Mbps	Pol	arization	Vertical	
80 d	BuV/m							
			1					
			×					
			2 ×					
			×					
30								
-20								
100	0.00 3550.00) 6100.00	8650.00 1	1200.00 1375	0.00 1630	0.00 18850	00 21400.00	26500.00 (MHz)
		Reading	Correct	Measure				(1911-12.)
о.	Freq.	Level	Factor	ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m		Detector	Comment
*		00 38.76 10 27.06	10.70 10.71	49.46 37.77	74.00 54.00	-24. 54 -16. 23	Peak AVG	
Ŧ	1320.09	10 21.00	10.71	51.11	54.00	-10. 23	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





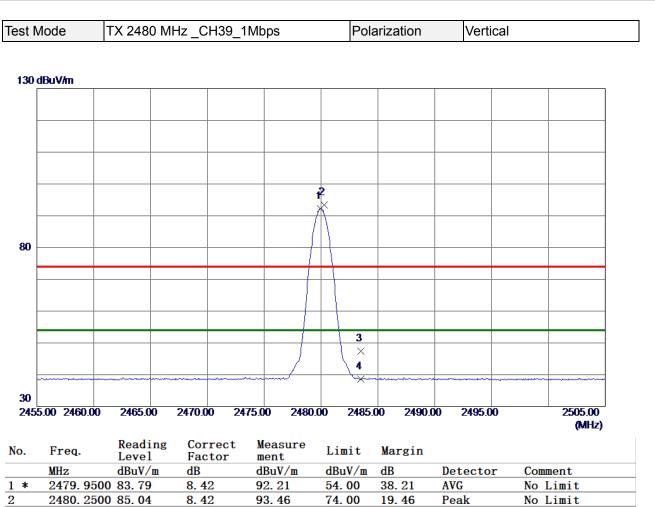
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



90 di	lode	TX 2440 I	MHz_CH1	9_1Mbps	Pol	arization	Horizo	ntal
	BuV/m							
00 0								
-			1					
			ž					
			×					
30								
ŀ								
ŀ								
-20								
	0.00 3550.0	0 6100.00	8650.00	11200.00 1375	50.00 1630	0.00 18850	0.00 21400.00	26500.00 (MHz)
) .	Freq.	Reading Level	Facto	r ment	Limit	Margin		
	MHz	dBuV/m 00 41.24	dB	dBuV/m	dBuV/m		Detector	Comment
*		00 41.24 00 35.73	10. 71 10. 71	51. 95 46. 44	74.00 54.00	-22. 05 -7. 56	Peak AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





74.00

54.00

-26. 52

-15.41

Peak

AVG

REMARKS:

3

4

2483. 5000 39. 06

2483. 5000 30. 17

(1) Measurement Value = Reading Level + Correct Factor.

8.42

8.42

47.48

38.59

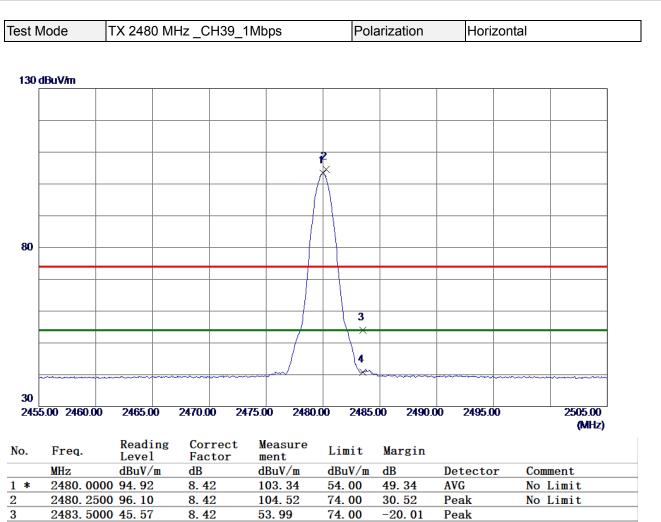
(2) Margin Level = Measurement Value - Limit Value.



Test N	/lode	TX 2480 M	Hz _CH39_′	Mbps	Pol	arization	Vertica	I
80 c	lBuV/m							
			2 ×					
			^					
			1					
			×					
30								
-20	0.00 3550.00	0. 6100.00	90E0.00 44	200.00 42750	0.00 46304	0.00 49950	00 01 400 00	26500.00
100	0.00 30000	0 6100.00	8650.00 11	200.00 1375	0.00 1630	0.00 18850	0.00 21400.00	2000.00 (MHz)
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *		30 27.54 30 39.86	10.86 10.86	38.40 50.72	54.00 74.00	-15.60 -23.28	AVG Peak	
2	1 1 1 0. 11	00 00.00	10.00	00.12	11.00	20.20	TCan	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





54.00

-13.23

AVG

40.77

8.42

REMARKS:

4

2483. 5000 32. 35

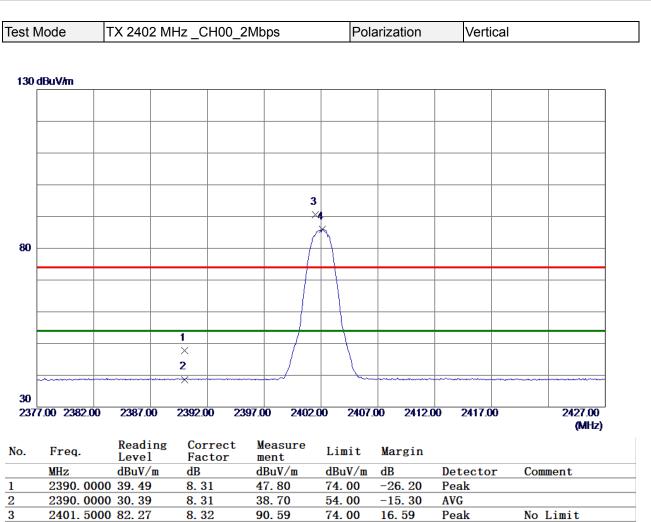
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



	lode	TX 2480 N	/Hz_CH39_	1Mbps	Pol	arization	Horiz	ontal
80 d	BuV <i>i</i> m							
Γ								
ŀ			2					
			Ť –					
			×					
-								
30								
-								
-								
-								
-20								
1000	0.00 3550.0	0 6100.00	8650.00 1	1200.00 1375	0.00 1630	0.00 18850	00 21400.0	0 26500.0 (MHz
-	P	Reading	g Correct	Measure	Linit	W		from ex-
0.	Freq.	Level	Factor	ment	Limit	Margin	D ()	
*	MHz 7436 86	dBuV/m 550 36.25	dB 10. 86	dBuV/m 47.11	dBuV/m 54.00	dB -6. 89	Detector AVG	Comment
-		00 42.36	10.86	53. 22	74.00	-20.78	Peak	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





No Limit 2401. 5000 82. 27 8.32 90. 59 74.00 16.59 Peak 4 * 2402.1000 77.63 8.32 **54.00** 85.95 31.95 AVG No Limit

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



est N	lode	TX 2402 M	Hz _CH00_2I	Vbps	Pola	rization	Vertical	
80 d	BuV/m							
					1 ×			
					2			
					×			
30								
-20								
	0.00 3550.0	0 6100.00	8650.00 112	00.00 13750.0	0 16300	00 18850.0	00 21400.00	26500.00
								(MHz)
o.	Freq.	Reading Level	correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m		Detector	Comment
*		000 36.48	19.58	56.06	74.00	-17.94	Peak	
×	14515.0	000 28.38	19.58	47.96	54.00	-6. 04	AVG	

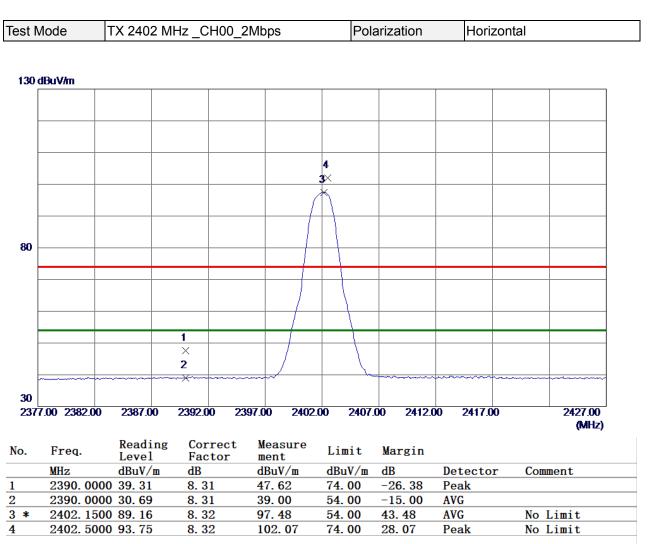
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



est N	lode	TX 2402 M	Hz_CH00_	2Mbps	Pol	arization	Vertical	
80 d	BuV/m							
[
			×					
			_					
			2 ×					
30								
-20								
	0.00 3550.00	6100.00	8650.00 1	1200.00 1375	0.00 1630	0.00 18850	0.00 21400.00	26500.00
								(MHz)
о.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
	7205. 743		10. 56	49.69	74.00	-24. 31	Peak	
*	7206. 256	0 27.10	10.56	37.66	54.00	-16.34	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



est I	/lode	TX 2402	MHz _CH0	0_2Mbps	Pola	arization	Horizo	ontal	
80 c	BuV/m								
					× 2				
					×				
30									
-20 100	0.00 3550.0	0 6100.00	8650.00	11200.00 1	3750.00 16300).00 18850	.00 21400.0	0	26500.00
									(MHz)
о.	Freq.	Readi Level	ng Corre Facto	ect Measu or ment	re Limit	Margin			
	MHz	dBuV/		dBuV/	m dBuV/m	dB	Detector	r Com	lent
*		0000 36.26				-18.16	Peak		
	14515. (0000 28.31	19.58	47.89	54.00	-6.11	AVG		

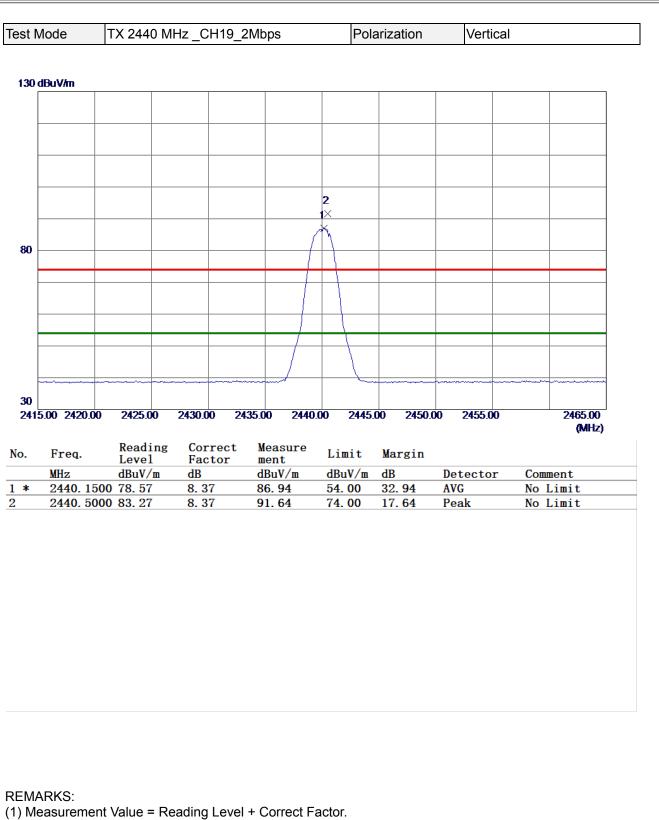
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



	TX 2402	MHz _C	H00_2N	lbps	Pola	arization	Horizo	ontal	
ıV/m									
		2							
		×							
0 3550.00) 6100.00	8650.0	0 1120	0.00 13750	0.00 16300	0.00 18850	.00 21400.0	0	26500.00 (MHz)
	Roadin		roct	Moasuro					(MILE)
	Level	Fac	tor	ment					
								Сош	lent
	Freq. MHz 7201.41	Freq. Readin Level	00 3550.00 6100.00 8650.0 Freq. Reading Cor MHz dBuV/m dB 7201.4150 34.56 10.	X X	X X X X	X X X X	X Image: Contract Measure Limit Margin MHz Limit Margin MB MHz dBuV/m dB dBuV/m dB	X Image: Contract Measure Limit Margin MHz dBuV/m dBuV/m	X Image: Contract Measure Limit Margin MHz dBuV/m dBuV/m

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





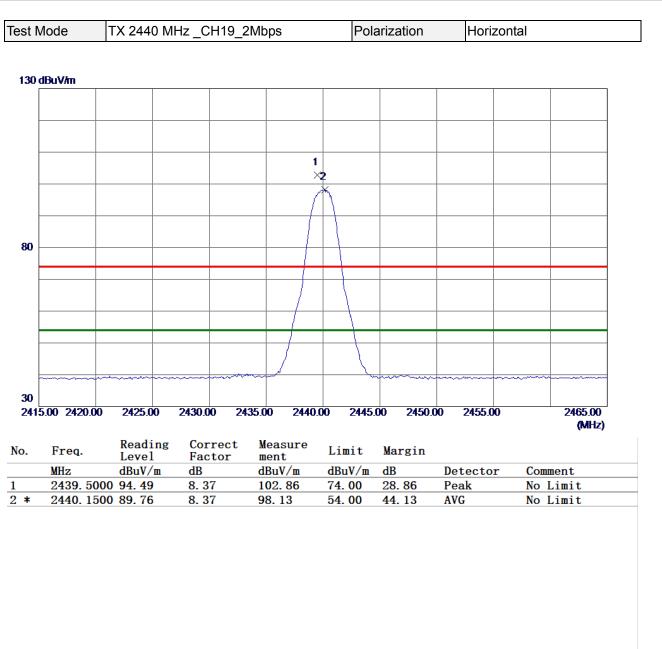
(2) Margin Level = Measurement Value - Limit Value.



Test N	lode	TX 2440 M	Hz _CH19_	_2Mbps	Pol	arization	Vertical	
80 d	BuV/m							
[
			1					
			×					
			2 ×					
			^					
30								
-20								
	0.00 3550.00	0 6100.00	8650.00	11200.00 1375	0.00 1630	0.00 18850	0.00 21400.00	26500.00
			_					(MHz)
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 2 *		20 38.82	10.71	49.53	74.00	-24.47	Peak	
•	1320.33	60 27.08	10.71	37.79	54.00	-16. 21	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





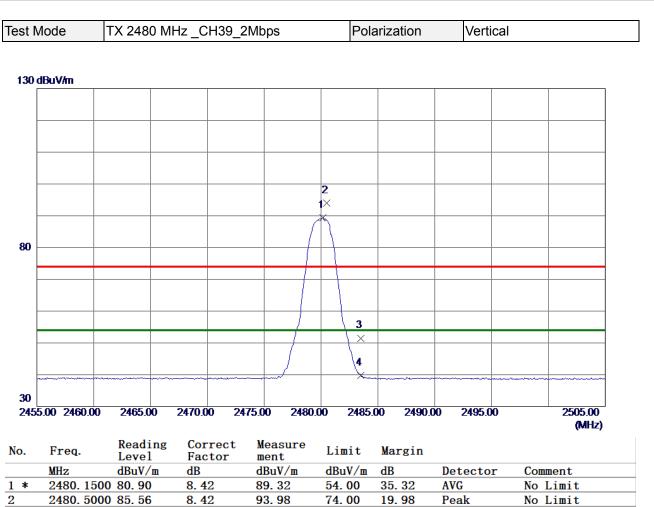
- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



est N	lode	TX 2440 M	Hz _CH19_;	2Mbps	Pol	arization	Horizon	tal
80 c	BuV/m			1				
			1					
			ž					
			×					
30								
30								
-20								
100	0.00 3550.00	0 6100.00	8650.00 1	1200.00 1375	0.00 1630	0.00 18850	0.00 21400.00	26500.00 (MHz)
-	-	Reading	Correct	Measure				(*** 22)
lo.	Freq.	Level	Factor	ment	Limit	Margin		-
1	MHz 7318 62	dBuV/m 00 40.32	dB 10. 70	dBuV/m 51.02	dBuV/m 74.00	dB -22. 98	Detector Peak	Comment
2 *		50 34.21	10.70	44. 91	54.00	-9.09	AVG	

- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





74.00

54.00

-22**.** 50

-14.17

Peak

AVG

REMARKS:

3

4

2483. 5000 43. 08

2483. 5000 31. 41

(1) Measurement Value = Reading Level + Correct Factor.

8.42

8.42

51. 50

39.83

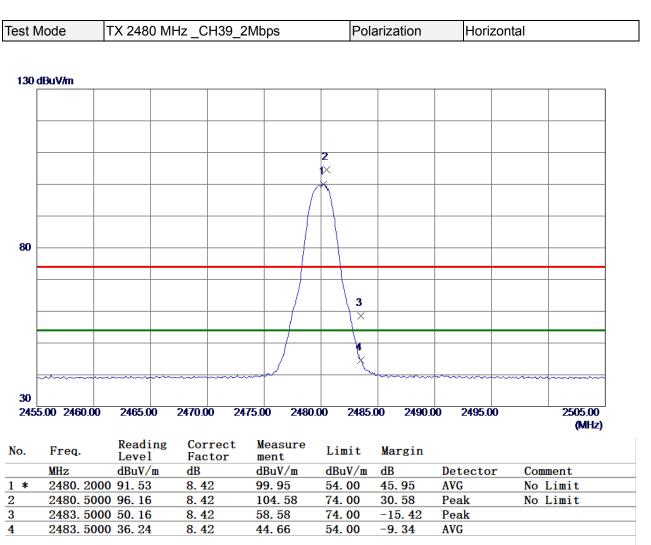
(2) Margin Level = Measurement Value - Limit Value.



Test I	Mode	TX 2480 M	1Hz _CH39_	_2Mbps	Pola	arization	Vertical	
80 (dBuV/m							
			-2 					
			1					
			×					
30								
-20 100	0.00 3550.0	0 6100.00	8650.00 1	1200.00 13750	0.00 16300	0.00 18850	0.00 21400.00	26500.00
								(MHz)
No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m		Detector	Comment
1 * 2		180 27.54 000 39.05	10.86 10.86	38. 40 49. 91	54.00 74.00	-15. 60 -24. 09	AVG Peak	
	1 1 1 0 . 10							

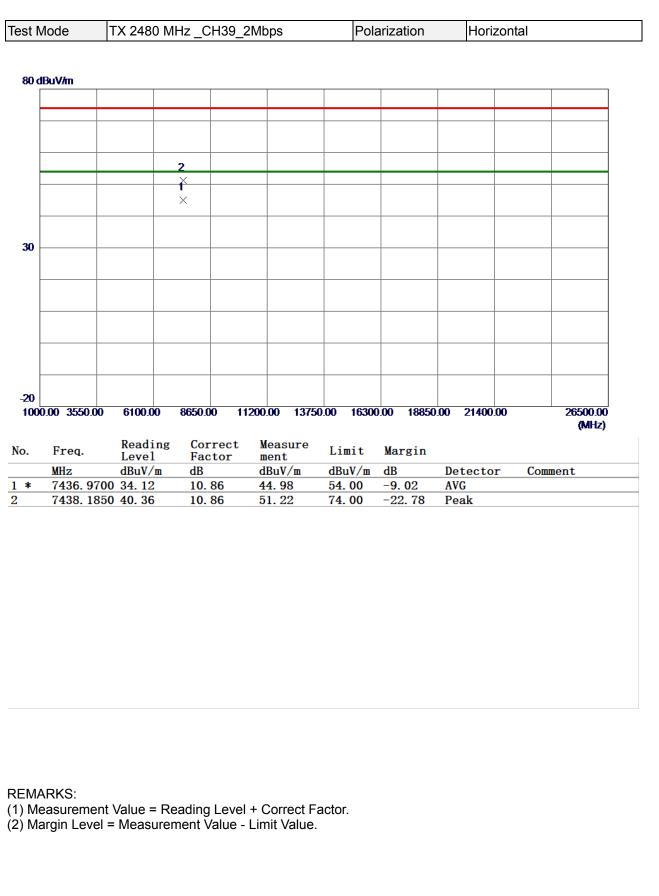
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.





- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value Limit Value.



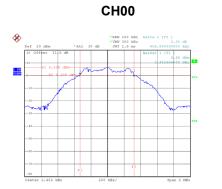


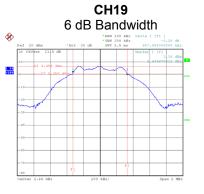


APPENDIX E - BANDWIDTH

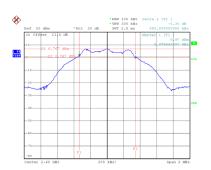


Test Mode TX Mode _1Mbps						
	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Test Result
	00	2402	0.656	1.028	0.5	Pass
	19	2440	0.658	1.036	0.5	Pass
	39	2480	0.680	1.036	0.5	Pass

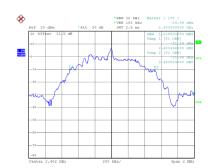




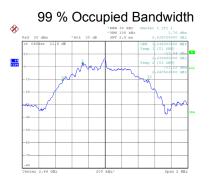
CH39



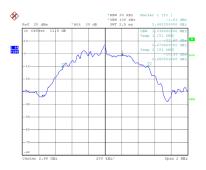
Date: 3.AUG.2021 19:36:27



Date: 3.AUG.2021 19:38:35



Date: 3.AUG.2021 19:40:47



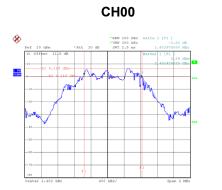
Date: 3.AUG.2021 19:35:37

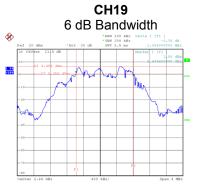
Date: 3.AUG.2021 19:38:41

Date: 3.AUG.2021 19:40:54

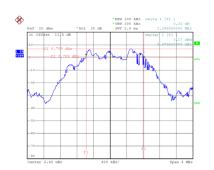


Test Mode TX Mode _2Mbps						
	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	6 dB Bandwidth Min. Limit (MHz)	Test Result
	00	2402	1.404	2.032	0.5	Pass
	19	2440	1.384	2.024	0.5	Pass
	39	2480	1.396	2.000	0.5	Pass

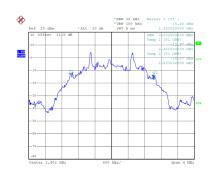




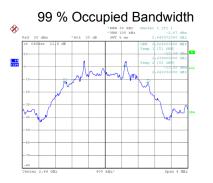
CH39



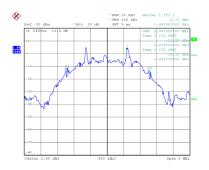
Date: 3.AUG.2021 19:42:47



Date: 3.AUG.2021 19:44:34



Date: 3.AUG.2021 19:46:39



Date: 3.AUG.2021 19:41:58

Date: 3.AUG.2021 19:44:41

Date: 3.AUG.2021 19:46:46

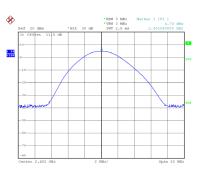


APPENDIX F - MAXIMUM OUTPUT POWER



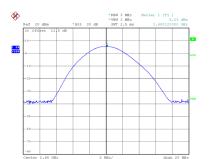
						1
Te	est Mode	TX Mode _1Mbps	S			
	Frequency	Peak Output	Peak Output	Max. Limit	Max. Limit	
	(MHz)	Power (dBm)	Power (W)	(dBm)	(W)	Test Result
	2402	4.74	0.0030	30.00	1.0000	Pass
	2440	5.36	0.0034	30.00	1.0000	Pass
	2480	5.23	0.0033	30.00	1.0000	Pass
	Frequency (MHz)	Average Output Power (dBm)	Average Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
	2402	4.61	0.0029	30.00	1.0000	Pass
	2440	5.20	0.0033	30.00	1.0000	Pass
	2480	5.09	0.0032	30.00	1.0000	Pass

CH00



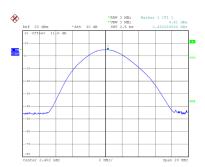


CH39

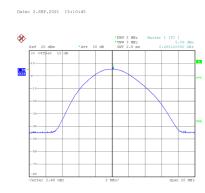


Date: 2.SEP.2021 14:31:32

Date: 2.SEP.2021 14:34:47



Date: 2.SEP.2021 15:10:24



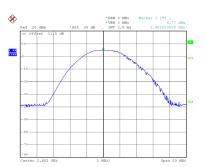
Date: 2.SEP.2021 15:11:56

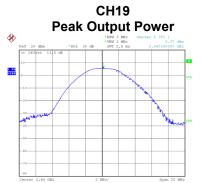
Date: 2.SEP.2021 15:11:36



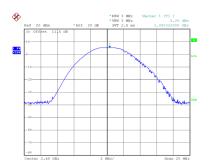
Te	est Mode	TX Mode _2Mbps	5			
		·				
	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
	2402	4.77	0.0030	30.00	1.0000	Pass
	2440	5.37	0.0034	30.00	1.0000	Pass
	2480	5.25	0.0033	30.00	1.0000	Pass
	Frequency (MHz)	Average Output Power (dBm)	Average Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
	2402	4.62	0.0029	30.00	1.0000	Pass
	2440	5.23	0.0033	30.00	1.0000	Pass
	2480	5.09	0.0032	30.00	1.0000	Pass

CH00

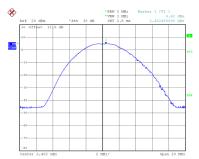




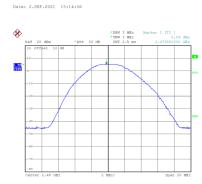
CH39











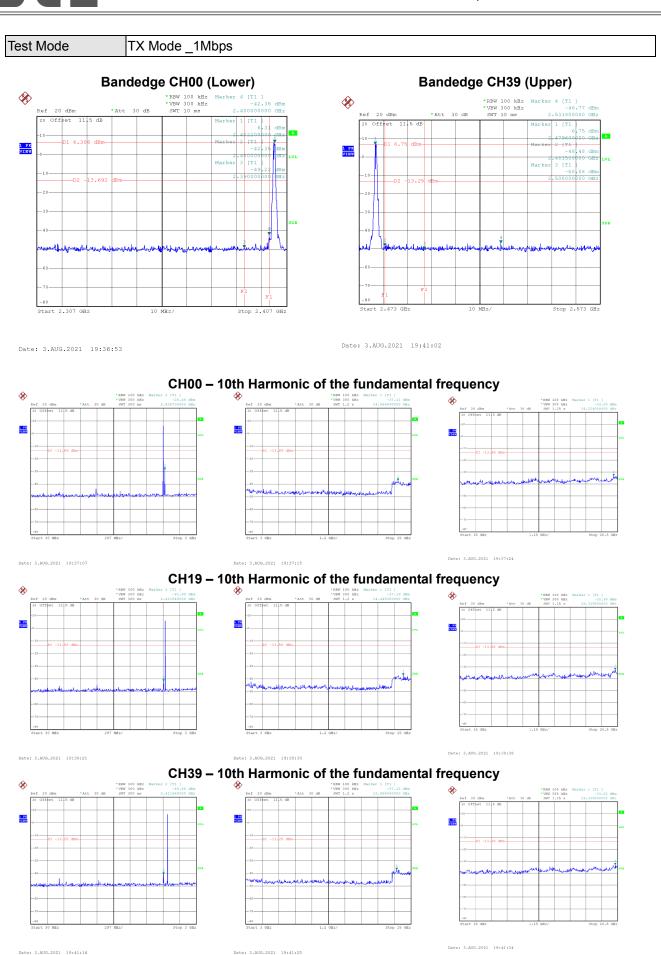
Date: 2.SEP.2021 14:35:51

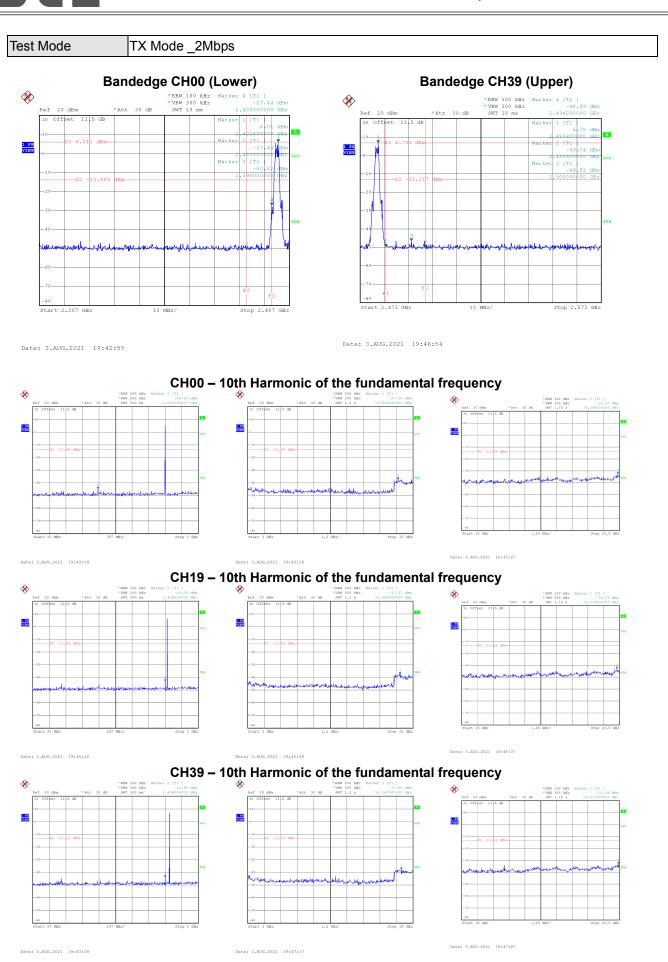
Date: 2.SEP.2021 15:13:22

Date: 2.SEP.2021 15:13:58



APPENDIX G - CONDUCTED SPURIOUS EMISSION



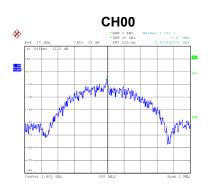




APPENDIX H - POWER SPECTRAL DENSITY



Te	est Mode	TX Mode _1Mb	ps			
	Channel	Frequency	Power Spectral Density	Max. Limit	Test Desult	
	Channel	(MHz)	(dBm/3 kHz)	(dBm/3 kHz)	Test Result	
	00	2402	-7.47	8.00	Pass	
	19	2440	-7.23	8.00	Pass	
	39	2480	-6.87	8.00	Pass	







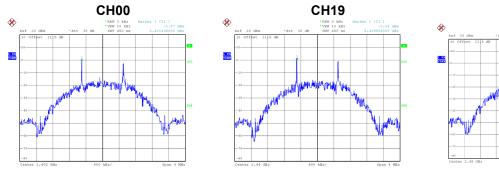
Date: 3.AUG.2021 19:37:31

Date: 3.AUG.2021 19:43:33

Test Mode

TX Mode _2Mbps

Power Spectral Density (dBm/3 kHz) Frequency Max. Limit **Test Result** Channel (MHz) (dBm/3 kHz) 00 2402 -1.07 8.00 Pass 2440 -0.24 8.00 Pass 19 39 2480 -0.01 8.00 Pass



Date: 3.AUG.2021 19:45:44

End of Test Report



Date: 3.AUG.2021 19:47:32

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