



FCC Radio Test Report

FCC ID: 2ACNO-QPP-C1

This report concerns: Original Grant

Project No. : 2004C109
Equipment : qico pad
Brand Name : qico
Test Model : QPP-C1

Series Model : QPP-C101, QPP-C102, QPP-C103

Applicant: I/O INTERCONNECT INC.

Address : 5F, No.19-3, Sanchong Rd., Nangang District, Taipei, Taiwan

Manufacturer : I/O INTERCONNECT INC.

Address : 5F, No.19-3, Sanchong Rd., Nangang District, Taipei, Taiwan

Factory: Jiangsu InvisPower Co., Ltd.

Address : 100 Xinning Road, Gangzha District, Nantong, Jiangsu, China

Date of Receipt : Apr. 18, 2020

Date of Test : Apr. 21, 2020 ~ May 12, 2020

Issued Date : Jun. 08, 2020

Report Version : R00

Test Sample : Engineering Sample No.: DG2020042020 for conducted,

DG2020042021 for radiated

Standard(s) : FCC Part15, Subpart C (15.247)

ncent.Tan

ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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

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IAC-MRA ACCREDITED

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

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.	Jun. 08, 2020



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

	FCC Part15, Subpart C (15.247)					
Standard(s) Section	rd(s) Section Test Item Test Result Judgment					
15.207	AC Power Line Conducted Emissions	APPENDIX A	N/A			
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 Road, Shixia, Dalang Town, Dongguan, Guangdong, 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 test:

Test	Test Site Method Measurement Frequency Range			
DG-	202	CISPR	150 kHz ~ 30 MHz	2.32

B. Radiated emissions Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
		9kHz ~ 30MHz	V	3.79
		9kHz ~ 30MHz	Н	3.57
		30MHz ~ 200MHz	V	4.88
	03 CISPR	30MHz ~ 200MHz	Η	4.14
DG-CB03		200MHz ~ 1,000MHz	V	4.62
DG-CB03		200MHz ~ 1,000MHz	Τ	4.80
		1GHz ~ 6GHz	ı	4.58
		6GHz ~ 18GHz	ı	5.18
		18GHz ~ 26.5GHz	-	3.62
		26.5GHz ~ 40GHz	-	4.00

C. Other Measurement:

Parameter	Uncertainty
Bandwidth	±3.8 %
Maximum Output Powe	±0.95 dB
Conducted Spurious Emission	±2.71 dB
Power Spectral Density	±0.86 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

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	55%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-9K-30MHz	25°C	60%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-30 MHz to 1GHz	24°C	60%	AC 120V/60Hz	Kwok Guo
Radiated Emissions-Above 1000 MHz	24°C	60%	AC 120V/60Hz	Kwok Guo
Bandwidth	24°C	52%	AC 120V/60Hz	Hayden Chen
Maximum Output Power	24°C	52%	AC 120V/60Hz	Laughing Zhang
Conducted Spurious Emission	24°C	52%	AC 120V/60Hz	Hayden Chen
Power Spectral Density	24°C	52%	AC 120V/60Hz	Hayden Chen



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	qico pad
Brand Name	qico
Test Model	QPP-C1
Series Model	QPP-C101, QPP-C102, QPP-C103
Model Difference(s)	Only differ in appearance clolor.
Software Version	V0191
Hardware Version	V1.0
Power Source	DC voltage supplied from AC adapter (Support Unit).
Power Rating	I/P: 100-240V~ 50/60Hz 0.5A MAX O/P: 5V === 3A / 9V === 2A / 12V === 1.5A
Operation Frequency	2402 MHz ~ 2480 MHz
Modulation Technology	GFSK
Bit Rate of Transmitter	1Mbps, 2Mbps
Max. Output Power	2.54 dBm (0.0018 W) For 1Mbps 2.60 dBm (0.0018 W) For 2Mbps

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)		
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.	Manufacturer	P/N	Antenna Type	Connector	Gain (dBi)
1	Semiglead	LA5220P2450-A04	Chip	N/A	2



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 NOTE (1)	
Mode 2	TX Mode Channel 19_2Mbps	

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 2	TX Mode Channel 19_2Mbps	

Radiated emissions test - Below 1GHz		
Final Test Mode	Description	
Mode 2	TX Mode Channel 19_2Mbps	

Radiated emissions test - Above 1GHz		
Final Test Mode	Description	
Mode 1	TX Mode NOTE (1)	

Conducted test		
Final Test Mode	Description	
Mode 1	TX Mode NOTE (1)	

Note:

- (1) The measurements are performed at the high, middle, low available channels.
- (2) For radiated emission above 1 GHz test, 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.
- (3) For radiated spurious emissions below 1 GHz test, TX Mode Channel 19_2Mbps was found to be the worst case and recorded.



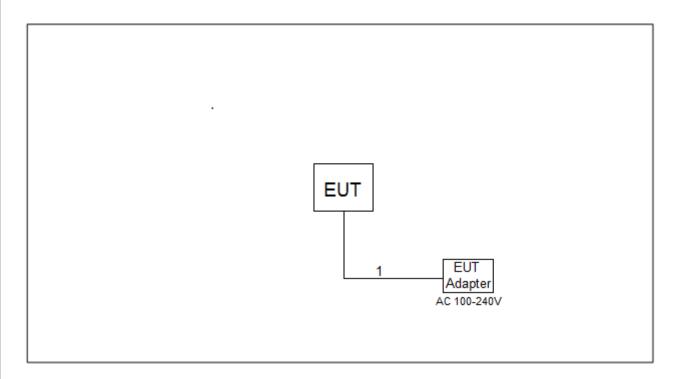
2.3 PARAMETERS OF TEST SOFTWARE

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of BT LE

Test Software	Setup_SmartRF_Studio_7-v2.6.0		
Frequency (MHz)	2402	2440	2480
Parameters(1Mbps)	2	3	3
Parameters(2Mbps)	2	3	3



2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	NO	NO	1.5m



3. AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Fraguency of Emission (MHz)	Limit (dBμV)		
Frequency of Emission (MHz)	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.

The following table is the setting of the receiver

Receiver Parameters	Setting	
Attenuation	10 dB	
Start Frequency	0.15 MHz	
Stop Frequency	30 MHz	
IF Bandwidth	9 kHz	

3.2 TEST PROCEDURE

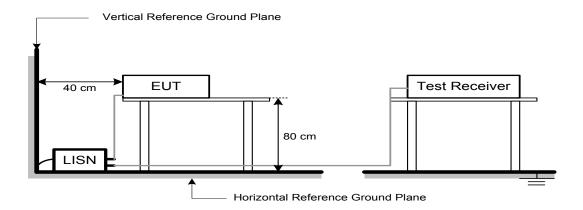
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.

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 <code>『Note』</code>. 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 EMISSION TEST

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	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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 (MHz)	(dBuV/m at 3 m)	
Frequency (MITIZ)	Peak	Average
Above 1000	74	54

Note:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	10th carrier harmonic	
RBW / VBW	RBW 1 MHz VBW 3 MHz peak detector for Pk value	
(Emission in restricted band)	RMS detector for AV value	

Receiver Parameter	Setting	
Attenuation	Auto	
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	



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 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 1 GHz)
- 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.

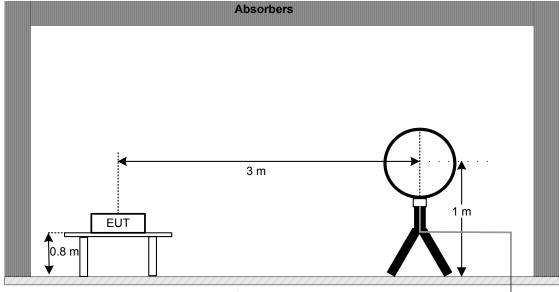
4.3 DEVIATION FROM TEST STANDARD

No deviation



4.4 TEST SETUP

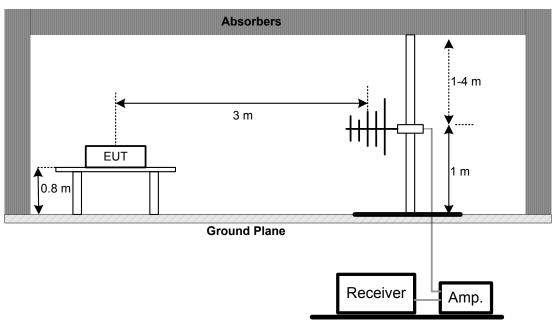
9 kHz-30 MHz



Ground Plane

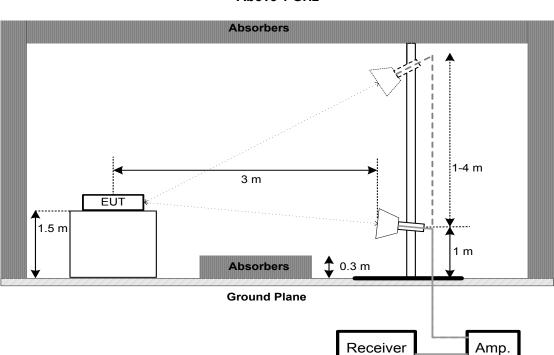


30 MHz to 1 GHz



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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 TEST

5.1 LIMIT

FCC Part15, Subpart C (15.247)						
Section Test Item Limit						
15.247(a)(2)	Bandwidth	>= 500 kHz (6 dB bandwidth)				

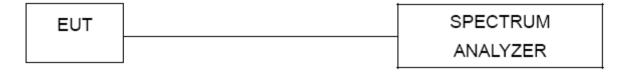
5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100 kHz, VBW=300 kHz, Sweep time = 2.5 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX E.



6. MAXIMUM OUTPUT POWER

6.1 LIMIT

FCC Part15, Subpart C (15.247)				
Section Test Item Limit				
15.247(b)(3) Maximum Output Power 1 watt or 30 dBm				

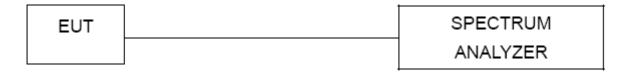
6.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. The maximum conducted output power was performed in accordance with method 11.9.1.1 of ANSI C63.10-2013.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

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. Spectrum Setting: RBW= 100 kHz, VBW=300 kHz, Sweep time = 10 ms.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP

EUT	•	SPECTRUM
		ANALYZER

7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Please refer to the APPENDIX G.



8. POWER SPECTRAL DENSITY TEST

8.1 LIMIT

FCC Part15, Subpart C (15.247)				
Section Test Item Limit				
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. Spectrum Setting: RBW=3 kHz, VBW=10 kHz, Sweep time = auto.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

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, 2021	
2	LISN	EMCO	3816/2	52765	Mar. 01, 2021	
3	TWO-LINE V-NETWORK	R&S	ENV216	101447	Feb. 28, 2021	
4	50Ω Terminator	SHX	TF5-3	15041305	Mar. 01, 2021	
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	
6	Cable	N/A	RG223	12m	Mar. 10, 2021	

	Radiated Emissions - 9 kHz to 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	EM	EM-6876-1	230	Apr. 16, 2021	
2	Cable	N/A	RG 213/U	N/A	May 31, 2020	
3	EMI Test Receiver	R&S	ESCI	100895	Feb. 28, 2021	
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

	Radiated Emissions - 30 MHz to 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2021	
2*	Amplifier	HP	8447D	2944A09673	Aug. 11, 2021	
3	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020	
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 25, 2020	
5	Controller	CT	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	

	Radiated Emissions - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 19, 2021	
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020	
3	Amplifier	Agilent	8449B	3008A02584	Aug. 03, 2020	
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 07, 2021	
5	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020	
6	Controller	CT	SC100	N/A	N/A	
7	Controller	MF	MF-7802	MF780208416	N/A	
8	Cable	mitron	RWLP50-4.0A-KJ-S MSM-12M	N/A	Nov. 25, 2020	
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	





Bandwidth & Maximum Output Power &						
	Power Spectral Density & Antenna Conducted Spurious Emission					
Item	Item Kind of Equipment Manufacturer Type No. Serial No. Calibrated until					
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 03, 2020	

Remark: "N/A" denotes no model name, serial no. or calibration specified.

"*" calibration period of equipment list is three year.

Except * item, all calibration period of equipment list is one year.



10. EUT TEST PHOTO

AC Power Line Conducted Emissions

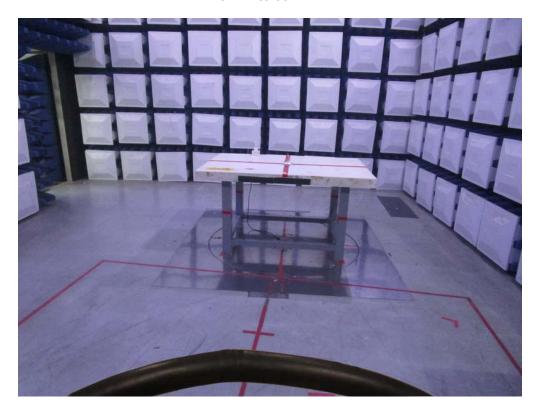


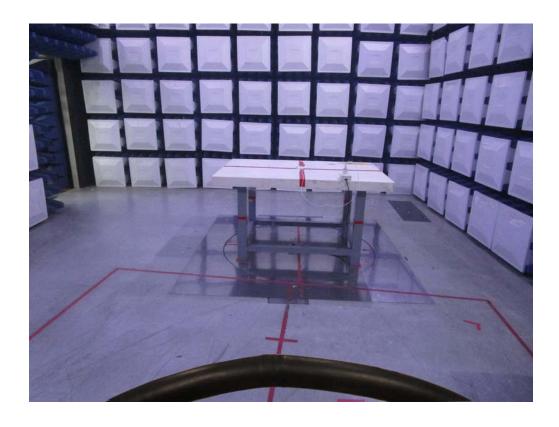




Radiated Emissions Test Photos

9 kHz to 30 MHz

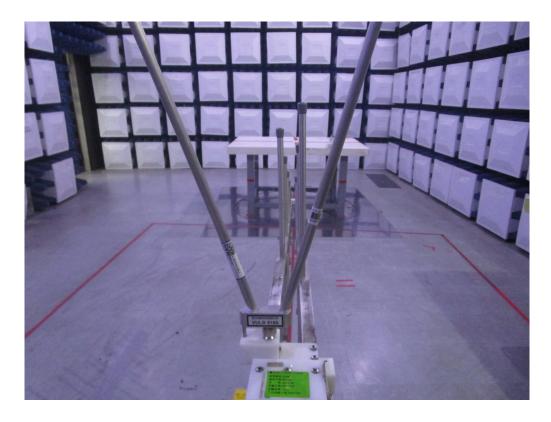






Radiated Emissions Test Photos

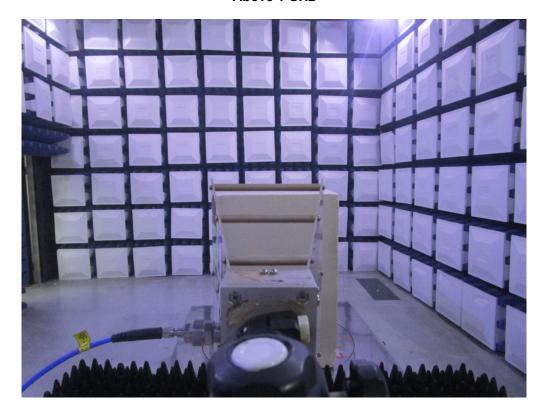






Radiated Emissions Test Photos

Above 1 GHz







APPENDIX A - AC POWER LINE CONDUCTED EMISSIONS



Test Mode: TX Mode Channel 19 _2Mbps

Line dBuV 80.0 70 60 50 40 30 20 10 0.0 0.5 30.000 0.150 (MHz)

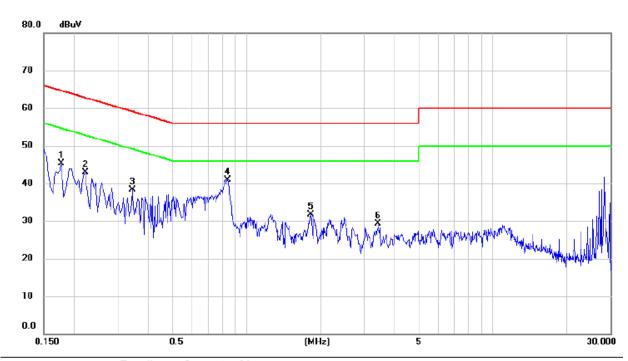
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1680	36.83	9.81	46.64	65.06	-18.42	peak	
2	0.2850	28.88	9.89	38.77	60.67	-21.90	peak	
3	0.5730	29.58	9.96	39.54	56.00	-16.46	peak	
4 *	0.8340	30.04	9.98	40.02	56.00	-15.98	peak	
5	1.2480	18.47	10.03	28.50	56.00	-27.50	peak	
6	11.1975	15.80	10.75	26.55	60.00	-33.45	peak	

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



Test Mode: TX Mode Channel 19 _2Mbps

Neutral



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1770	35.42	9.92	45.34	64.63	-19.29	peak	
2	0.2220	32.98	9.99	42.97	62.74	-19.77	peak	
3	0.3435	28.25	10.05	38.30	59.12	-20.82	peak	
4 *	0.8385	30.67	10.25	40.92	56.00	-15.08	peak	
5	1.8285	21.27	10.40	31.67	56.00	-24.33	peak	
6	3.4260	18.70	10.55	29.25	56.00	-26.75	peak	

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

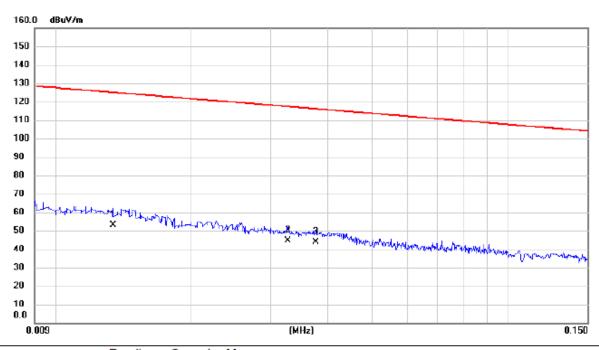


APPENDIX B - RADIATED EMISSION - 9 KHZ TO 30 MHZ



Test Mode: TX Mode Channel 19 _2Mbps

Ant 0°



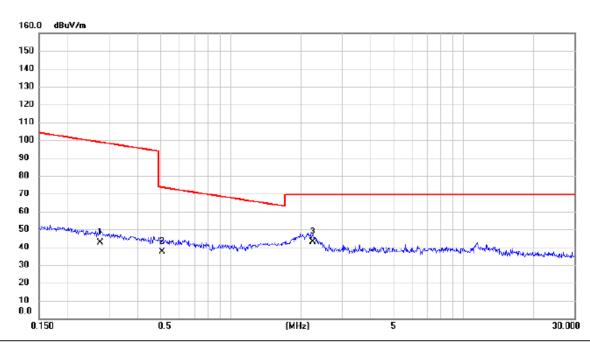
No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Margin			
		MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment	
1	*	0.0134	37.99	15.17	53.16	125.06	-71.90	AVG		
2		0.0326	31.70	12.79	44.49	117.34	-72.85	AVG		
3		0.0376	30.97	12.66	43.63	116.10	-72.47	AVG		

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



Test Mode: TX Mode Channel 19 _2Mbps

Ant 0°



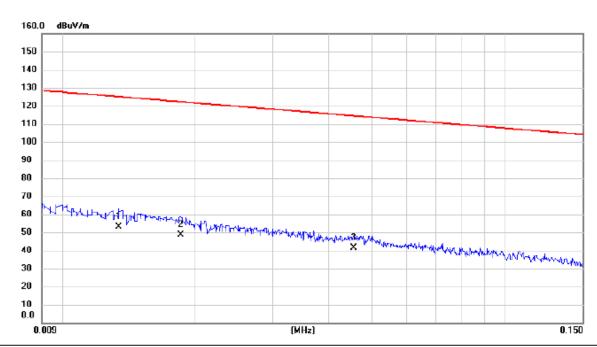
	No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Margin		
_			MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment
-	1		0.2743	30.12	12.44	42.56	98.84	-56.28	AVG	
-	2		0.5072	25.49	11.76	37.25	73.50	-36.25	QP	
	3	*	2.2604	32.04	10.86	42.90	69.54	-26.64	QP	

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



Test Mode: TX Mode Channel 19 _2Mbps

Ant 90°



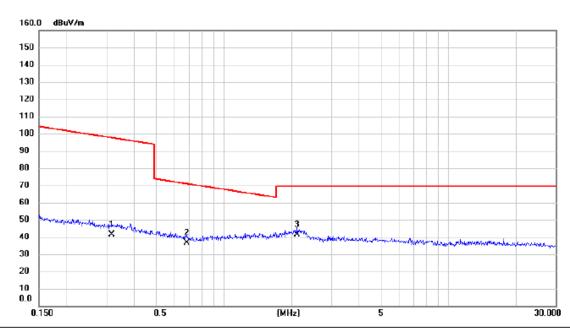
No.	Mk.	Freq.		Correct Factor	Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0134	37.89	15.17	53.06	125.06	-72.00	AVG	
2		0.0185	35.20	13.58	48.78	122.26	-73.48	AVG	
3		0.0456	28.76	12.45	41.21	114.43	-73.22	AVG	

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



Test Mode: TX Mode Channel 19 _2Mbps

Ant 90°



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
	MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	0.3150	28.95	12.31	41.26	97.64	-56.38	AVG	
2	0.6824	24.81	11.70	36.51	70.92	-34.41	QP	
3 *	2.1213	30.59	10.95	41.54	69.54	-28.00	QP	

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

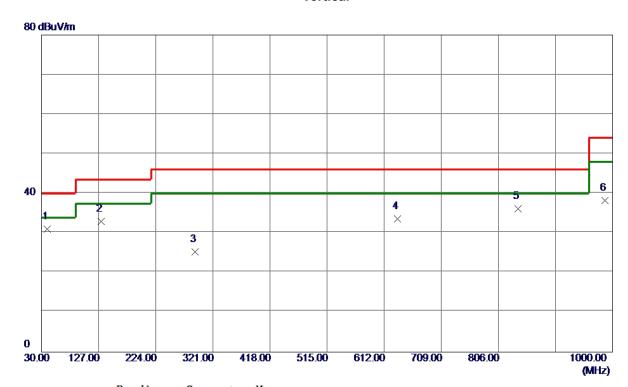


APPENDIX C - RADIATED EMISSION - 30 MHZ TO 1000 MHZ



Test Mode: TX Mode Channel 19 _2Mbps

Vertical



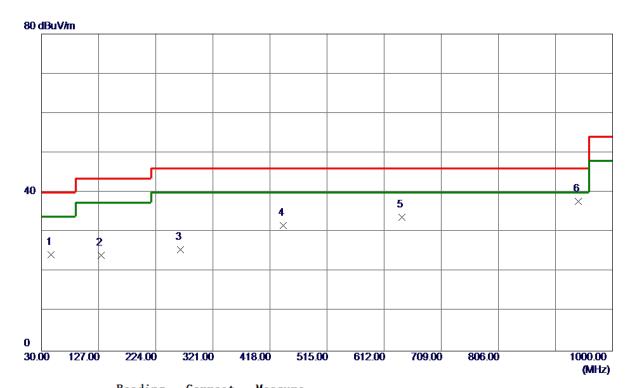
No.	Freq.	Keading Level	Correct Factor	measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	39.7000	36. 74	-5. 68	31.06	40.00	-8.94	Peak	
2	130.8800	39. 27	-6. 31	32. 96	43.50	-10.54	Peak	
3	290. 4450	29. 51	-4. 20	25. 31	46.00	-20.69	Peak	
4	634.3100	29.46	4. 19	33.65	46.00	-12.35	Peak	
5	838. 9800	28.68	7. 55	36. 23	46.00	-9.77	Peak	
6	986. 9050	28. 93	9. 29	38. 22	54.00	-15. 78	Peak	

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



Test Mode: TX Mode Channel 19 _2Mbps

Horizontal



No.	Freq.	Keading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	46.0050	29. 48	-5. 17	24. 31	40.00	-15.69	Peak	
2	130.8800	30. 47	-6. 31	24. 16	43.50	-19. 34	Peak	
3	266. 1950	30. 79	-5. 23	25. 56	46.00	-20.44	Peak	
4	440. 3100	31. 91	-0. 22	31.69	46.00	-14.31	Peak	
5	642. 5550	29. 51	4. 32	33. 83	46.00	-12. 17	Peak	
6 *	941.8000	28. 89	8. 92	37.81	46.00	-8. 19	Peak	

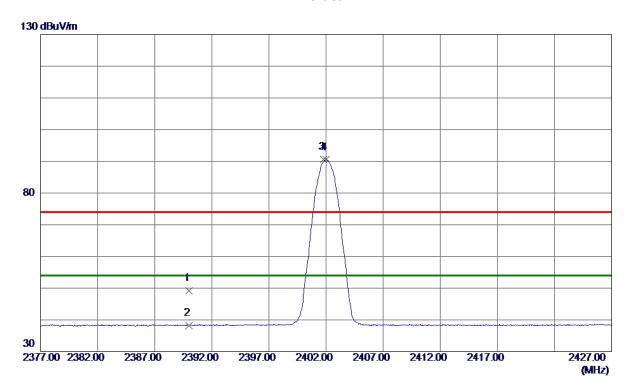
- (1) Measurement Value = Reading Level + Correct Factor.(2) Margin Level = Measurement Value Limit Value.



APPENDIX D - RADIATED EMISSION - ABOVE 1000 MHZ



Vertical

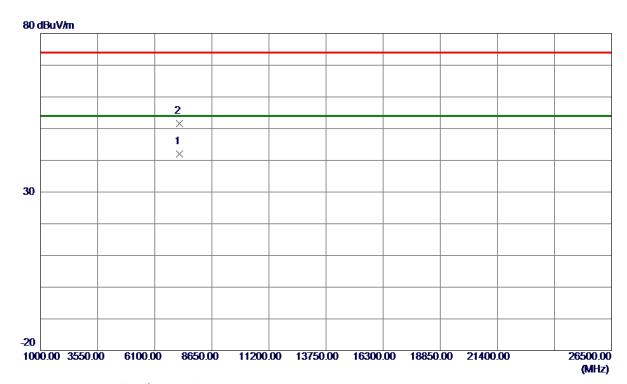


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	38. 68	10. 56	49. 24	74.00	-24.76	Peak	
2	2390.0000	27. 55	10. 56	38. 11	54.00	-15.89	AVG	
3	2401.7750	80. 05	10. 59	90. 64	74.00	16.64	Peak	No Limit
4 *	2402. 0000	79. 91	10. 59	90. 50	54.00	36. 50	AVG	No Limit

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



Vertical

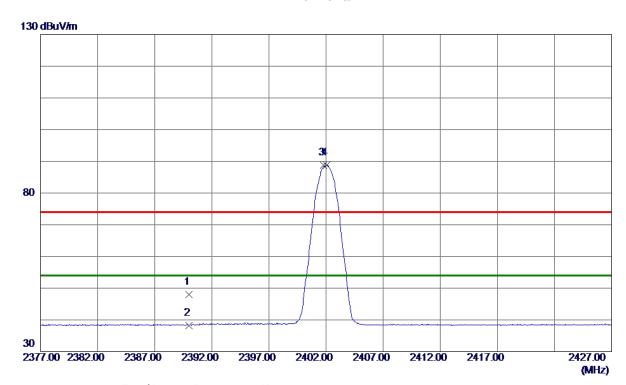


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7206. 2400	29. 13	12.79	41.92	54.00	−12. 08	AVG	
2	7206. 8600	38. 74	12. 79	51. 53	74.00	-22.47	Peak	

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



Horizontal

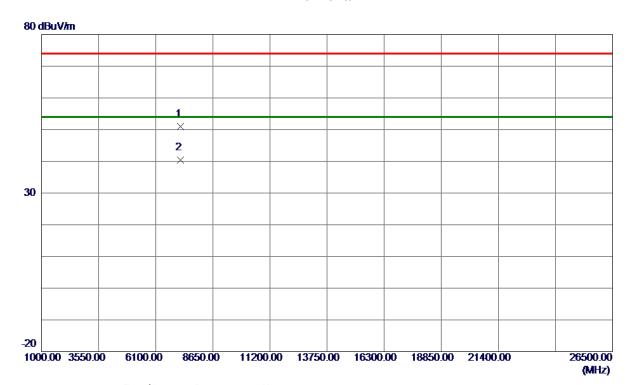


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390. 0000	37. 51	10. 56	48. 07	74.00	-25. 93	Peak	
2	2390. 0000	27. 70	10. 56	38. 26	54.00	-15. 74	AVG	
3	2401.7750	78. 21	10. 59	88. 80	74.00	14.80	Peak	No Limit
4 *	2402.0500	78. 30	10. 59	88. 89	54.00	34.89	AVG	No Limit

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



Horizontal

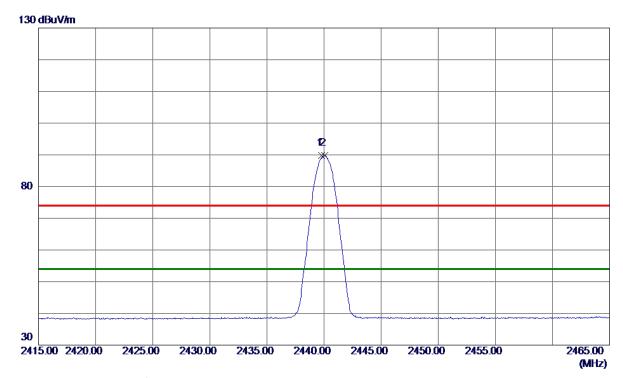


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7206. 1270	38. 17	12. 79	50. 96	74.00	-23.04	Peak	
2 *	7206. 1630	27. 69	12.79	40.48	54.00	-13.52	AVG	

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



Vertical

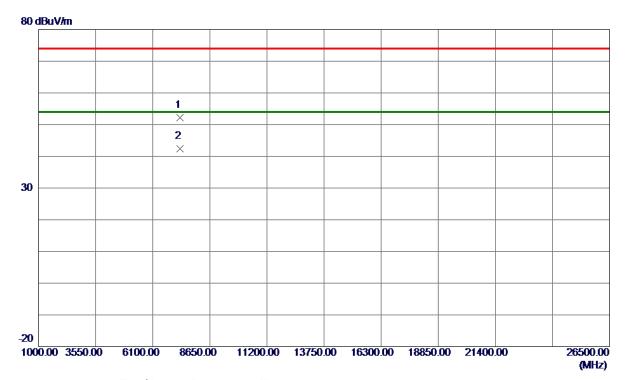


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2439.8000	79. 22	10.67	89. 89	74.00	15.89	Peak	No Limit
2 *	2440. 0500	79. 12	10. 67	89. 79	54.00	35. 79	AVG	No Limit

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



Vertical

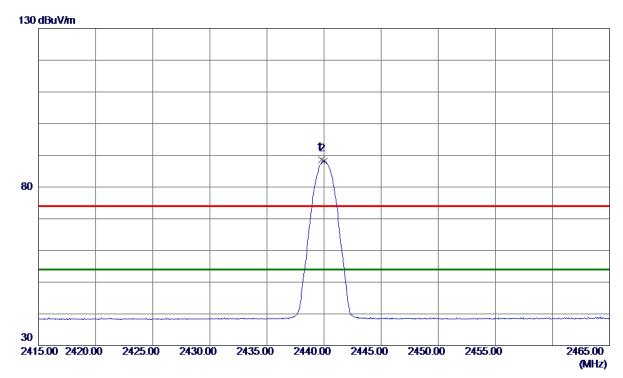


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7319.4580	39. 23	13.02	52. 25	74.00	-21.75	Peak	
2 *	7320. 1320	29. 36	13. 03	42. 39	54.00	-11.61	AVG	

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



Horizontal

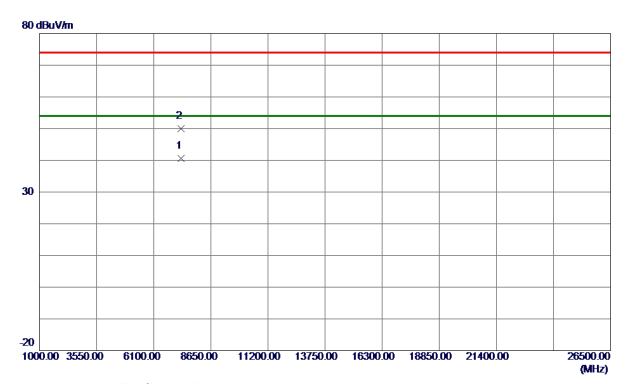


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2439.7750	78. 02	10.67	88. 69	74.00	14.69	Peak	No Limit
2 *	2440. 0250	77. 51	10. 67	88. 18	54.00	34. 18	AVG	No Limit

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



Horizontal

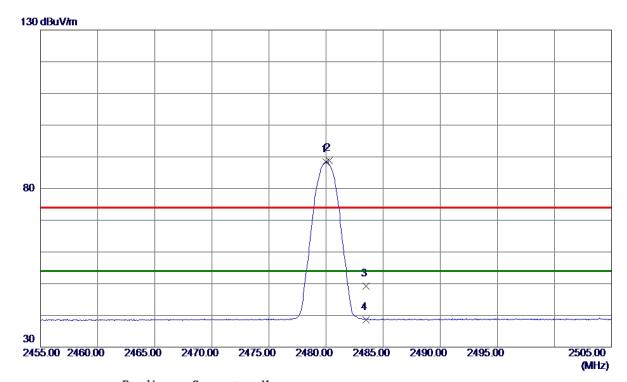


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7319. 5280	27. 59	13.02	40.61	54.00	-13.39	AVG	
2	7319. 6300	37.06	13. 02	50.08	74.00	-23. 92	Peak	

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



Vertical

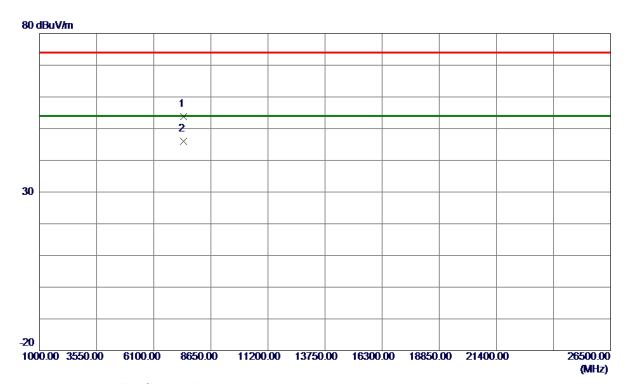


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	2480. 0000	77.68	10.76	88. 44	54.00	34.44	AVG	No Limit
2	2480. 3000	78. 12	10.77	88. 89	74.00	14.89	Peak	No Limit
3	2483. 5000	38. 38	10.77	49. 15	74.00	-24.85	Peak	
4	2483. 5000	27. 92	10.77	38. 69	54.00	-15. 31	AVG	

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



Vertical

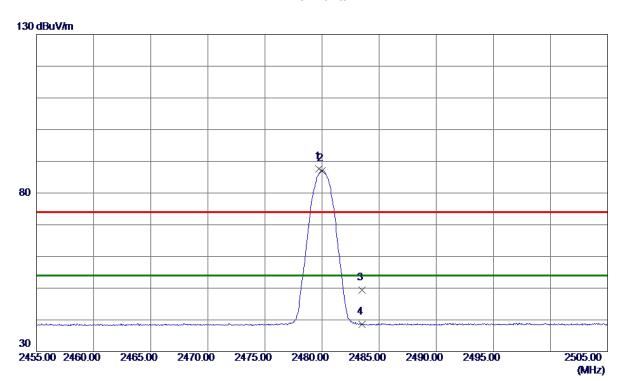


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7439. 3750	40.48	13. 27	53.75	74.00	-20. 25	Peak	
2 *	7440. 0330	32. 67	13. 28	45. 95	54.00	-8. 05	AVG	

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



Horizontal

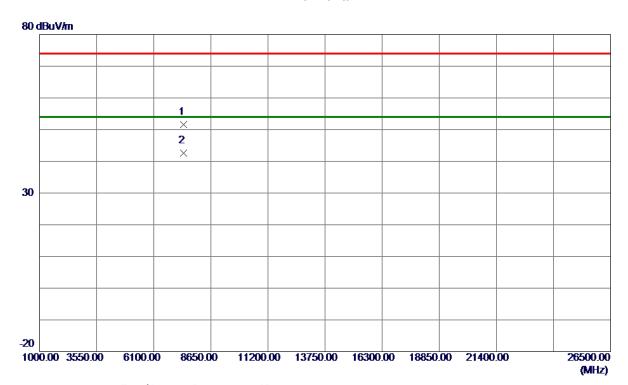


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479.7500	76. 92	10.76	87.68	74.00	13.68	Peak	No Limit
2 *	2480.0000	76. 33	10.76	87. 09	54.00	33.09	AVG	No Limit
3	2483. 5000	38. 59	10.77	49. 36	74.00	-24.64	Peak	
4	2483. 5000	27.83	10.77	38. 60	54.00	-15. 40	AVG	

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



Horizontal

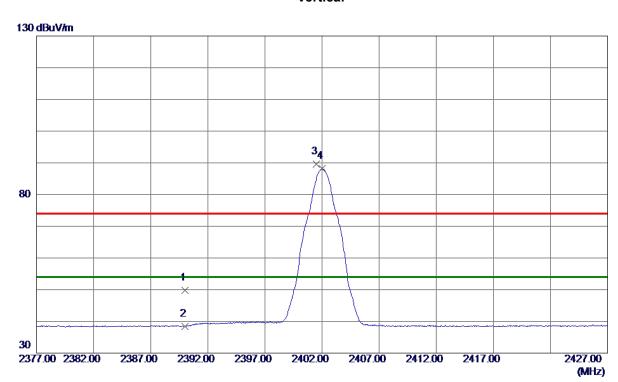


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7439. 3650	38. 24	13. 27	51. 51	74.00	-22.49	Peak	
2 *	7440. 1550	29. 29	13. 28	42. 57	54.00	-11.43	AVG	

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



Vertical

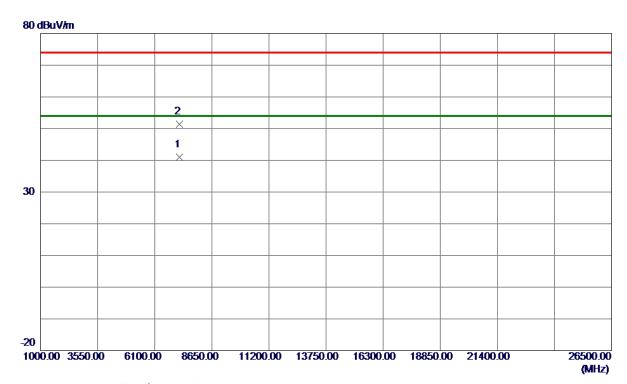


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	39. 29	10. 56	49.85	74.00	-24. 15	Peak	
2	2390.0000	27. 93	10. 56	38. 49	54.00	-15. 51	AVG	
3	2401. 5250	79. 03	10. 59	89. 62	74.00	15.62	Peak	No Limit
4 *	2402. 0250	77. 53	10. 59	88. 12	54.00	34. 12	AVG	No Limit

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



Vertical

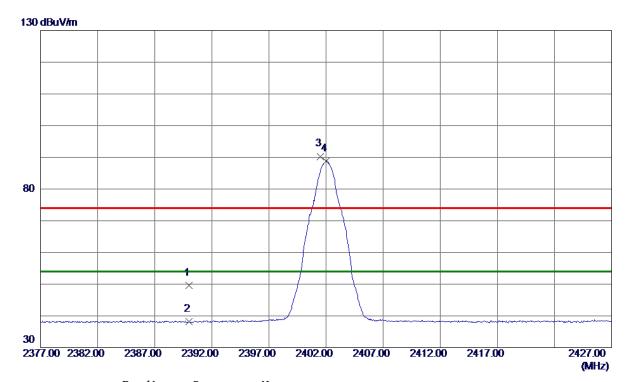


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7207. 1320	28. 15	12.79	40.94	54.00	-13.06	AVG	
2	7207. 5350	38. 67	12. 79	51.46	74.00	-22. 54	Peak	

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



Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2390.0000	39. 12	10. 56	49.68	74.00	-24. 32	Peak	
2	2390.0000	27.67	10. 56	38. 23	54.00	-15. 77	AVG	
3	2401. 5000	79. 71	10. 59	90. 30	74.00	16. 30	Peak	No Limit
4 *	2402. 0250	78. 15	10. 59	88.74	54.00	34.74	AVG	No Limit

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



Horizontal

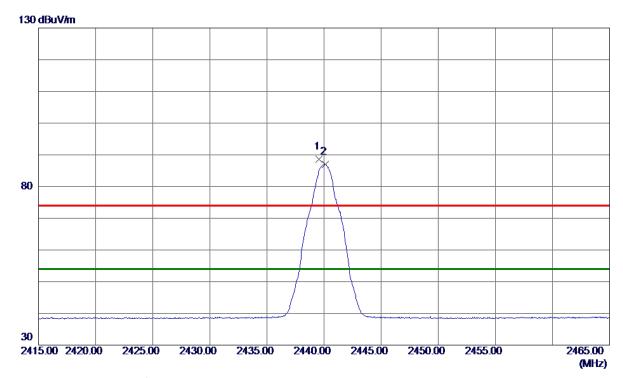


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7207. 2380	26.75	12.79	39. 54	54.00	-14.46	AVG	
2	7207. 4530	37.66	12. 79	50.45	74.00	-23. 55	Peak	

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



Vertical

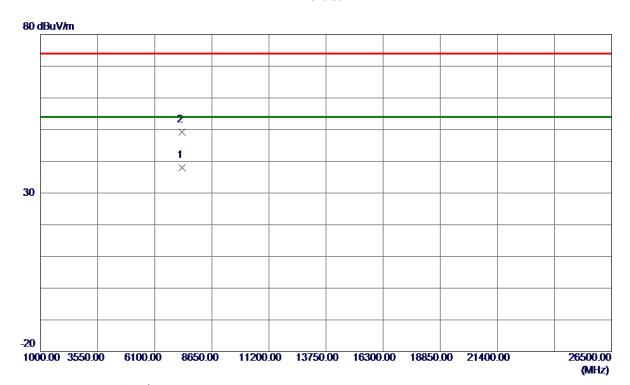


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2439. 5500	77. 99	10. 67	88.66	74.00	14.66	Peak	No Limit
2 *	2440. 1000	76. 39	10. 67	87. 06	54.00	33.06	AVG	No Limit

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



Vertical

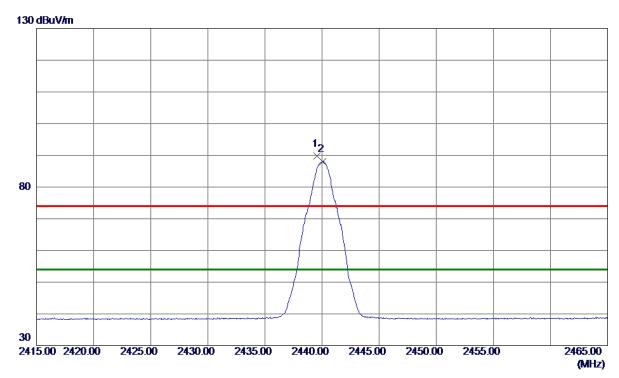


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7318.7170	25. 00	13.02	38. 02	54.00	-15. 98	AVG	
2	7321.4000	36. 09	13. 03	49. 12	74.00	-24.88	Peak	

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



Horizontal

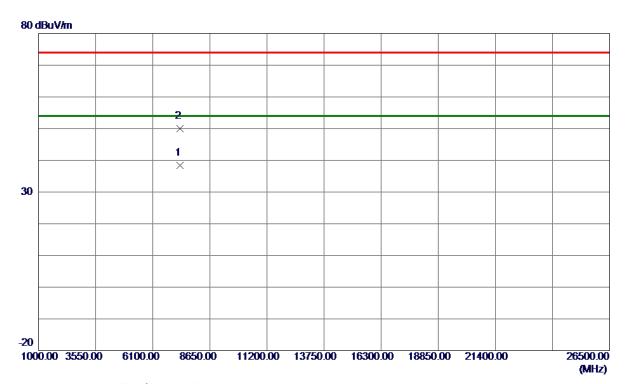


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2439. 5500	79. 03	10.67	89. 70	74.00	15. 70	Peak	No Limit
2 *	2440.0500	77. 38	10.67	88. 05	54.00	34.05	AVG	No Limit

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



Horizontal

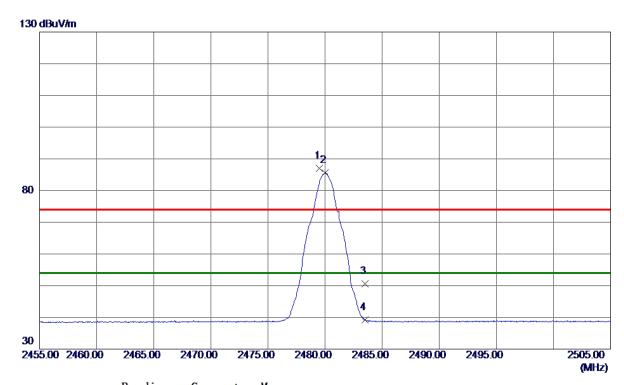


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7321. 1250	25. 39	13.03	38. 42	54.00	-15. 58	AVG	
2	7321. 2450	36. 94	13. 03	49. 97	74.00	-24.03	Peak	

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



Vertical

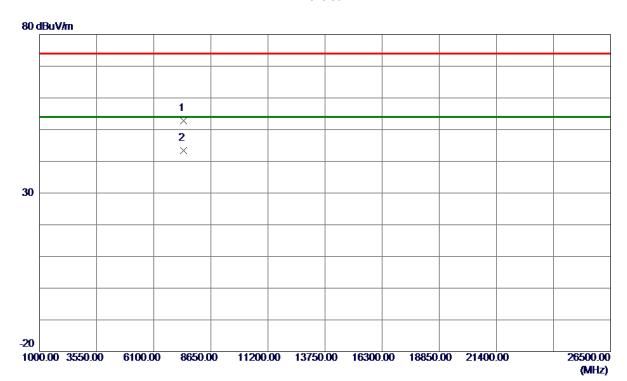


No.	Freq.	Keading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	2479. 5250	76. 28	10.76	87.04	74.00	13.04	Peak	No Limit
2 *	2480. 0250	74. 78	10.76	85. 54	54.00	31. 54	AVG	No Limit
3	2483. 5000	39. 86	10.77	50.63	74.00	-23. 37	Peak	
4	2483. 5000	28. 51	10.77	39. 28	54.00	-14.72	AVG	

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



Vertical

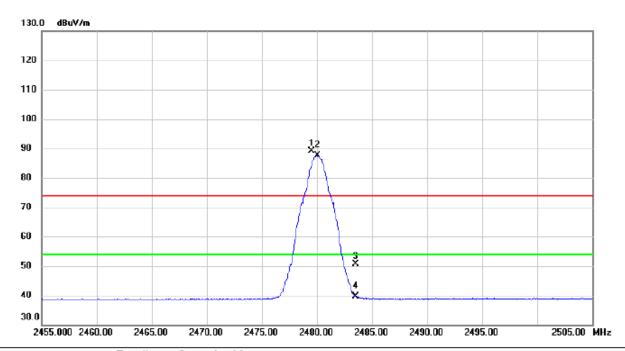


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	7438. 4270	39. 56	13. 27	52.83	74.00	-21. 17	Peak	
2 *	7441. 1400	30. 07	13. 28	43. 35	54.00	-10.65	AVG	

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



Horizontal

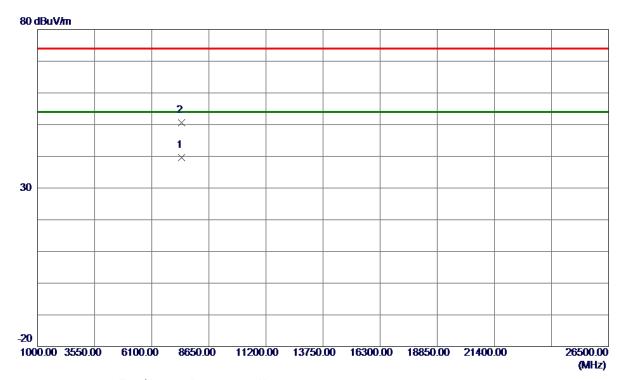


No.	Mk	. Freq.	Reading Level		Measure- ment	Limit	Margin		
		MHz	dBu∀	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	Χ	2479.500	78.25	10.77	89.02	74.00	15.02	peak	No Limit
2	*	2480.000	76.76	10.77	87.53	54.00	33.53	AVG	No Limit
3		2483.500	39.89	10.77	50.66	74.00	-23.34	peak	
4		2483.500	28.92	10.77	39.69	54.00	-14.31	AVG	

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



Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1 *	7441. 3330	26. 39	13. 28	39. 67	54.00	-14.33	AVG	
2	7441. 5020	37. 23	13. 28	50. 51	74.00	-23.49	Peak	

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

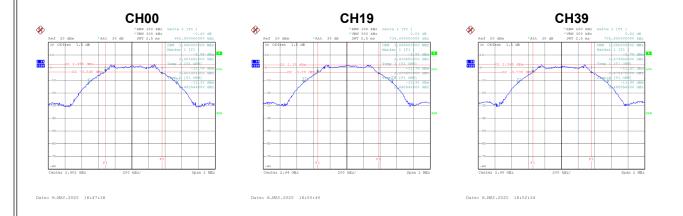


APPENDIX E - BANDWIDTH



Test Mode: CH00, CH19, CH39 - 1Mbps

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Test Result
00	2402	0.682	1.060	500	Pass
19	2440	0.734	1.068	500	Pass
39	2480	0.706	1.080	500	Pass



Test Mode: CH00, CH19, CH39 - 2Mbps

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Emission Bandwidth (MHz)	6 dB Bandwidth Min. Limit (kHz)	Test Result
00	2402	1.372	2.072	500	Pass
19	2440	1.426	2.088	500	Pass
39	2480	1.436	2.088	500	Pass





APPENDIX F - MAXIMUM OUTPUT POWER



	Test Mode :	CH00, CH19, CH39 - 1Mbps
- 1	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	2.31	0.0017	30.00	1.00	Pass
2440	2.54	0.0018	30.00	1.00	Pass
2480	2.16	0.0016	30.00	1.00	Pass

T () 4	01100 01140 01100 0141
Test Mode :	CH00, CH19, CH39 - 2Mbps
	,,

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	2.35	0.0017	30.00	1.00	Pass
2440	2.60	0.0018	30.00	1.00	Pass
2480	2.23	0.0017	30.00	1.00	Pass

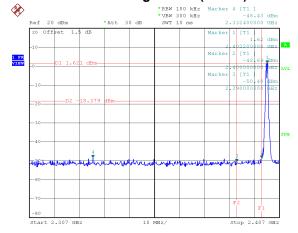


APPENDIX G - CONDUCTED SPURIOUS EMISSION

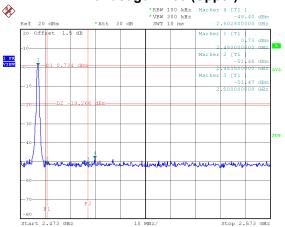


Test Mode: CH00, CH19, CH39 - 1Mbps

Bandedge CH00 (Lower)

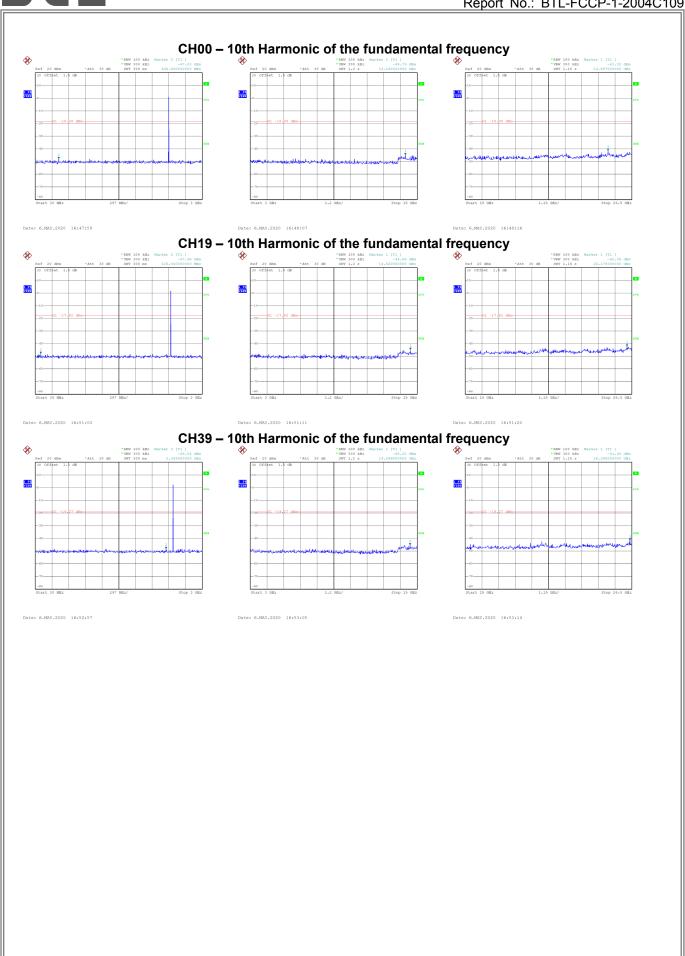


Bandedge CH39 (Upper)



Date: 6.MAY.2020 16:47:45 Date: 6.MAY.2020 16:52:43

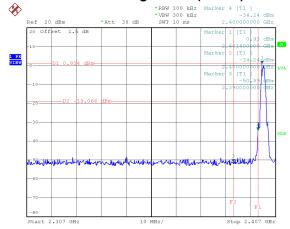




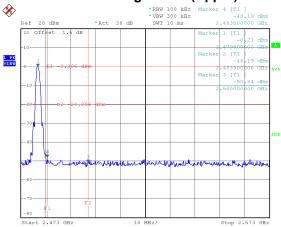


Test Mode: CH00, CH19, CH39 - 2Mbps

Bandedge CH00 (Lower)



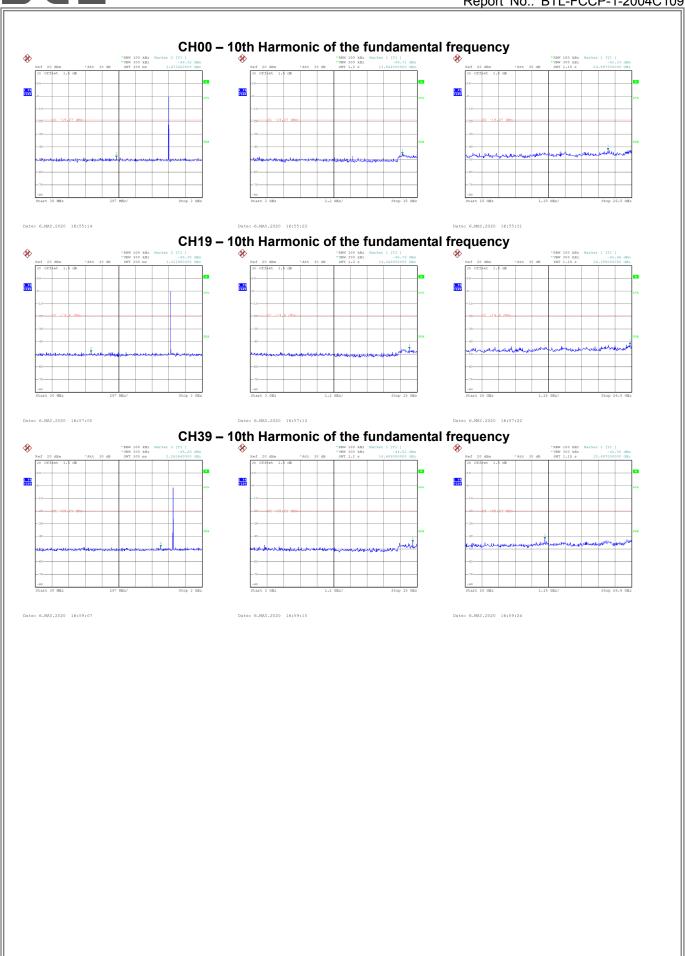
Bandedge CH39 (Upper)



Date: 6.MAY.2020 16:55:00

Date: 6.MAY.2020 16:58:52





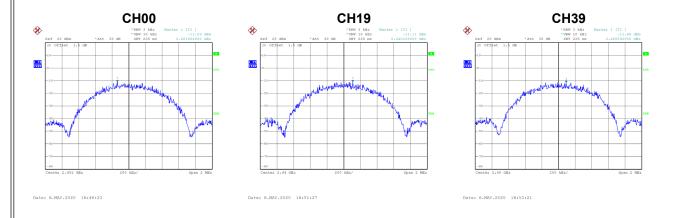


APPENDIX H - POWER SPECTRAL DENSITY



Test Mode:	CH00.	CH19	, CH39 -	1Mbps
TOOL IVIOUG.	oi ioo,	OI I I O	, 01 100	11111000

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Max. Limit (dBm/3 kHz)	Test Result
00	2402	-11.09	8.00	Pass
19	2440	-11.11	8.00	Pass
39	2480	-11.65	8.00	Pass



Test Mode:	CH00, CH19, CH39 - 2Mbps
Tool IIIoao.	101100, 01110

Channel	Frequency (MHz)	Power Spectral Density (dBm/3 kHz)	Max. Limit (dBm/3 kHz)	Test Result
00	2402	-14.48	8.00	Pass
19	2440	-13.11	8.00	Pass
39	2480	-13.87	8.00	Pass



End of Test Report