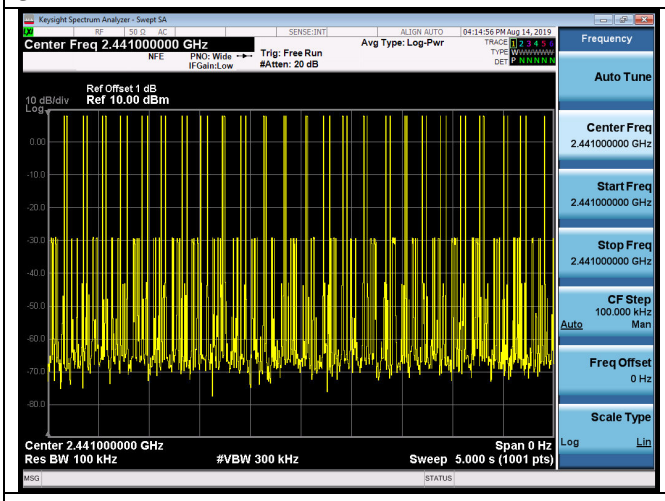
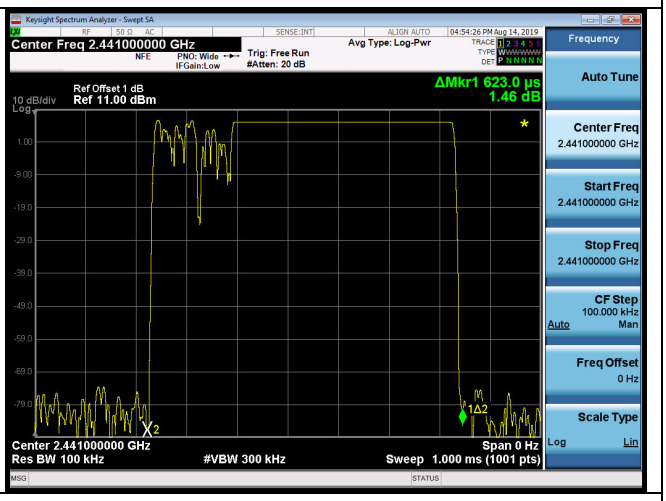
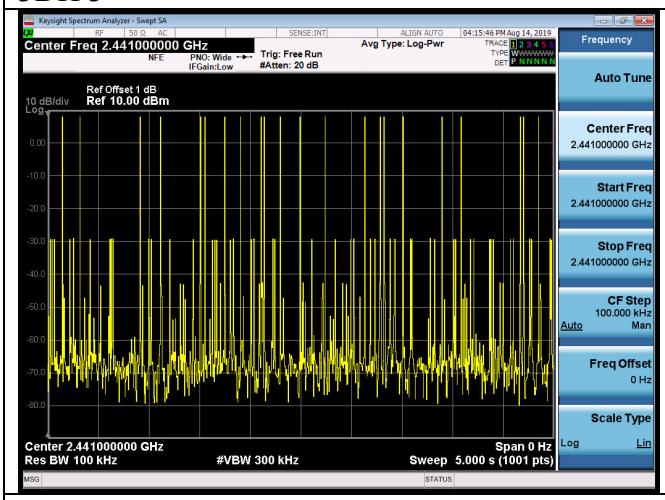
8-DPSK

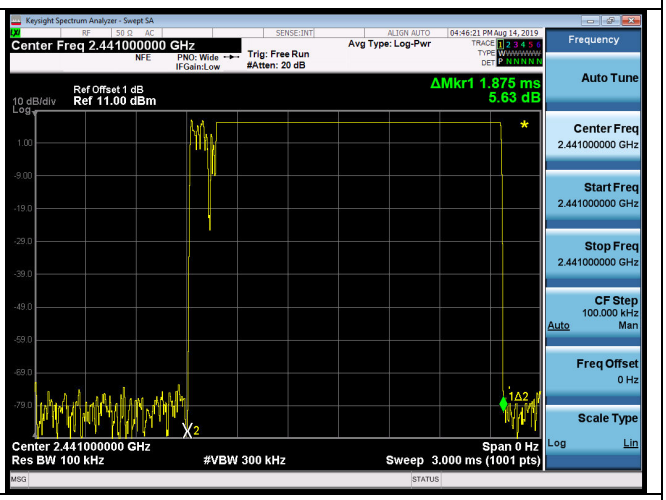
3DH 1



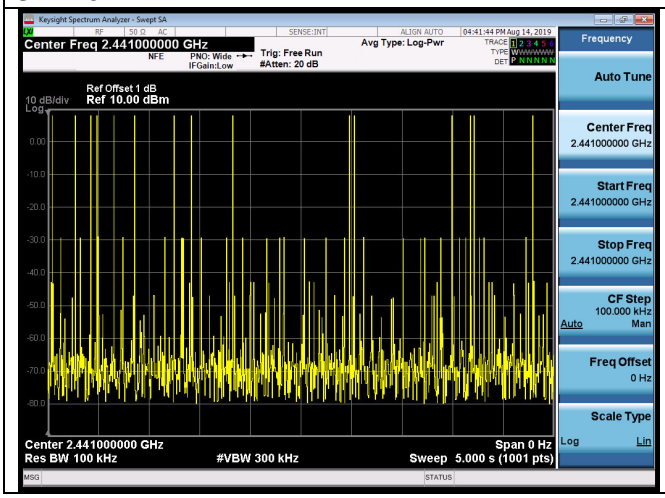


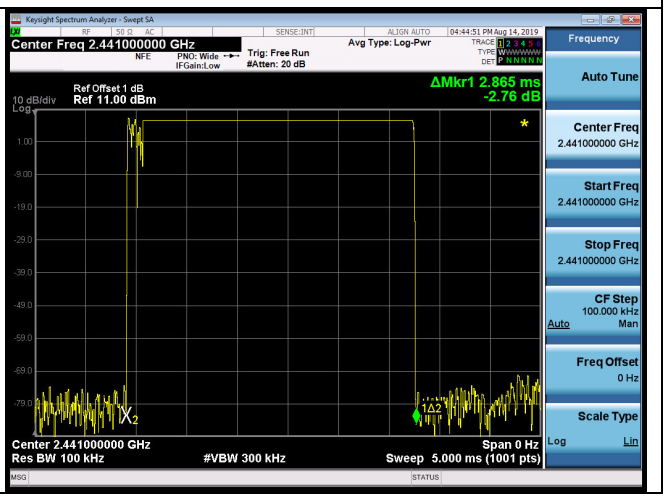
3DH 3





3DH 5





10. MAXIMUM PEAK OUTPUT POWER TEST

10.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Oct.14,18	1 Year
3.	Power sensor	Anritsu	MA2491A	033005	Oct.13,18	1 Year
4.	Attenuator	Agilent	8491B	MY39262165	Oct.14,18	1 Year
5.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

10.2. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt.

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

10.3. Test Procedure

Use the test method descried in ANSI C63.10 clause 7.8.5:
Connected the EUT's antenna port to Power Sensor, and use power meter to test peak output power directly.

10.4. Test Results

EUT: COSMO		
M/N: COSMO COMMUNICATOR VE		
Test date: 2019-08-21	Pressure: 102.3±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Garry	Test site: RF site	Temperature: 25.5±0.6℃

Test Mode	Frequency	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	7.817	21
	2441	9.210	21
	2480	8.321	21
8-DPSK	2402	7.638	21
	2441	9.119	21
	2480	6.902	21
Conclusion: PASS			

11. BAND EDGE COMPLIANCE TEST

11.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	Amplifier	HP	8449B	3008A02495	Apr.23,19	1 Year
3.	Horn Antenna	ETS	3115	9607-4580	Dec.13,18	1 Year
4.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

11.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

11.3. Test Produce

Use the test method descried in ANSI C63.10 clause 7.8.6:
For upper band emissions that are up to two bandwidths(2MHz) away (2483.5MHz to 2485.5MHz）from the band-edge use below produce:

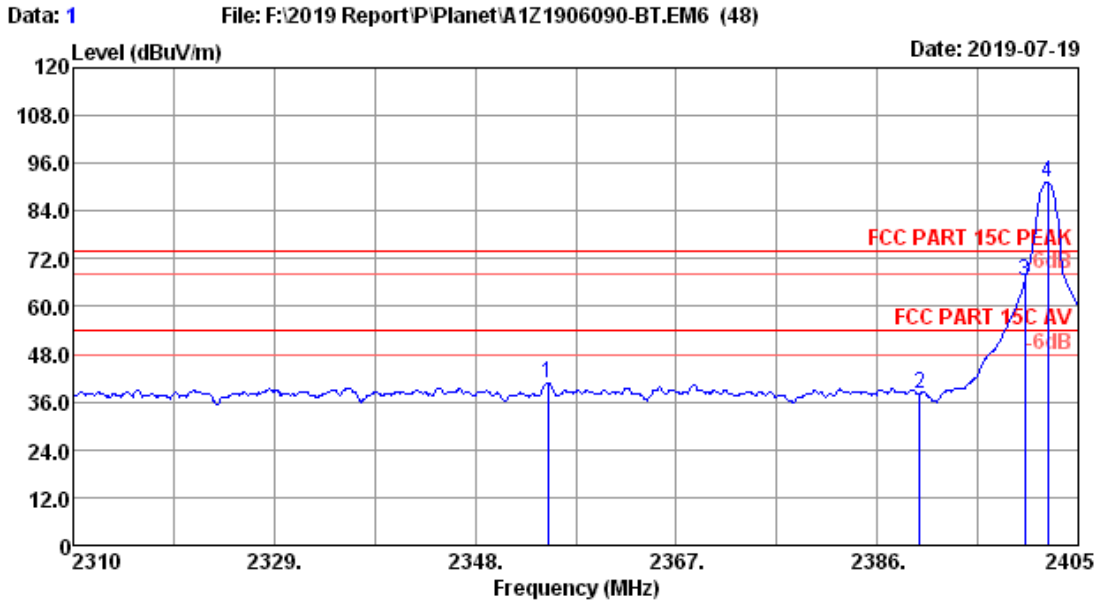
1. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 100KHz and with a video bandwidth 300KHz. Record the peak levels of the fundamental emission and the relevant band-edge emission, Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not a field strength measurement, it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
2. Subtract the delta measured in step (1) from the maximum field strengths measured in clause 4 .The resultant field strengths are then used to determine band-edge compliance as required by Section 15.205

For emissions above two bandwidths away from the band-edge use below produce:

1. The EUT is placed on a insulating material (up to 12mm thick) worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:
   (a) PEAK: RBW=1MHz ;VBW=3MHz, PK detector, Sweep=AUTO
   (b) This is pulse Modulation device a duty cycle factor was used to calculate average level based measured peak level.

11.4. Test Results

Pass (The testing data was attached in the next pages.)
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

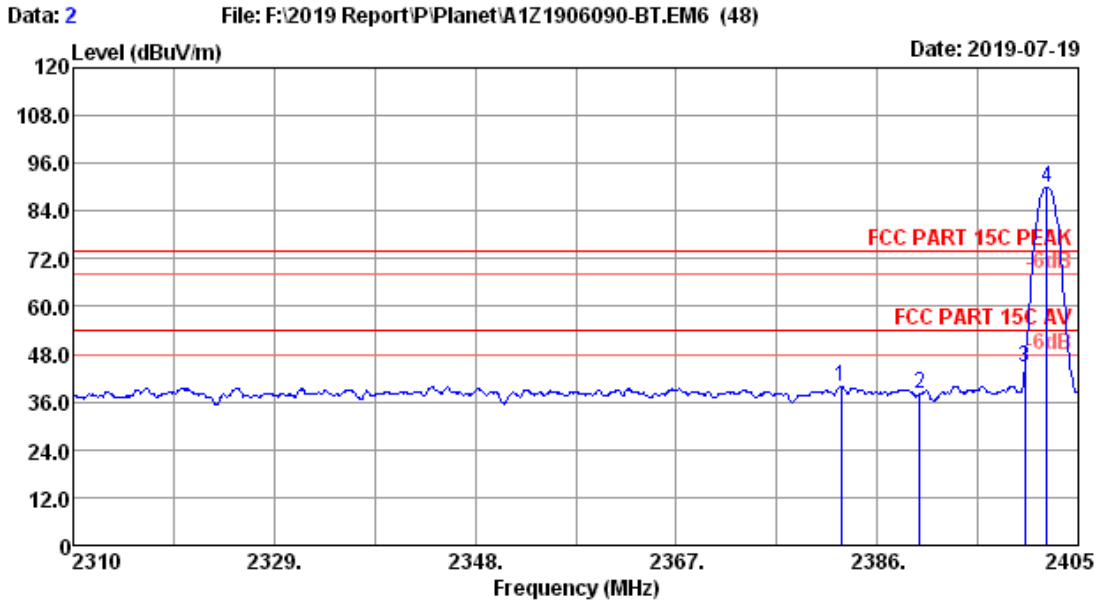


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 GFSK 2402MHz Tx Mode

Data no. : 1
Ant. pol. : HORIZONTAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2354.84	27.52	0.86	35.06	47.40	40.72	74.00	33.28	Peak
2	2389.99	27.71	0.87	35.04	44.39	37.93	74.00	36.07	Peak
3	2399.97	27.71	0.87	35.04	72.90	66.44	74.00	7.56	Peak
4	2402.15	27.71	0.87	35.04	97.74	91.28	74.00	-17.28	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

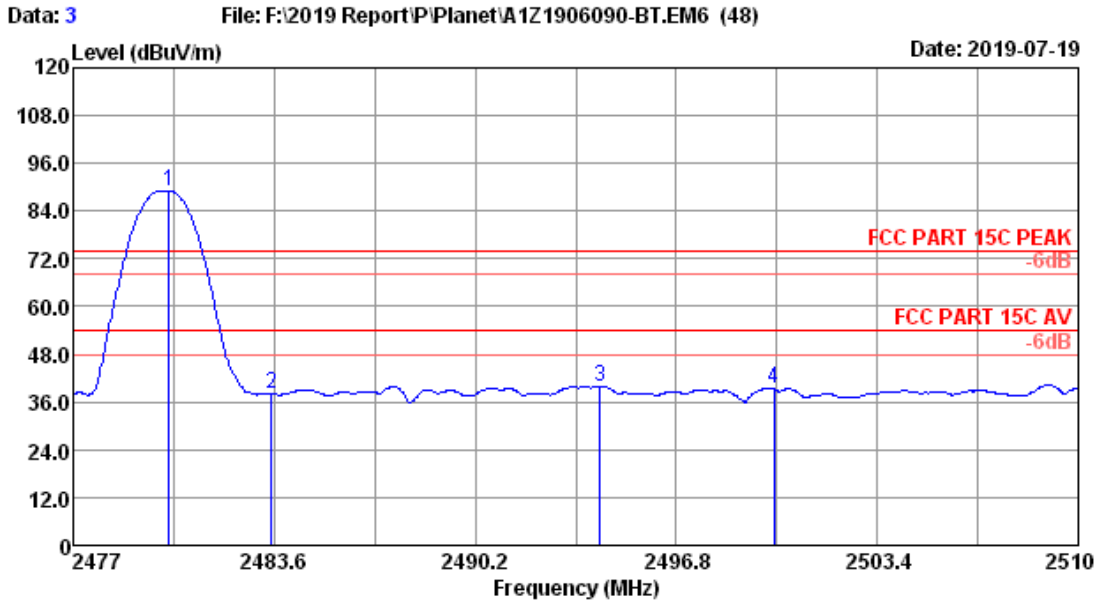


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 GFSK 2402MHz Tx Mode

Data no. : 2
Ant. pol. : VERTICAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2382.58	27.62	0.87	35.05	46.59	40.03	74.00	33.97	Peak
2	2389.99	27.71	0.87	35.04	44.47	38.01	74.00	35.99	Peak
3	2399.97	27.71	0.87	35.04	51.17	44.71	74.00	29.29	Peak
4	2402.06	27.71	0.87	35.04	96.55	90.09	74.00	-16.09	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

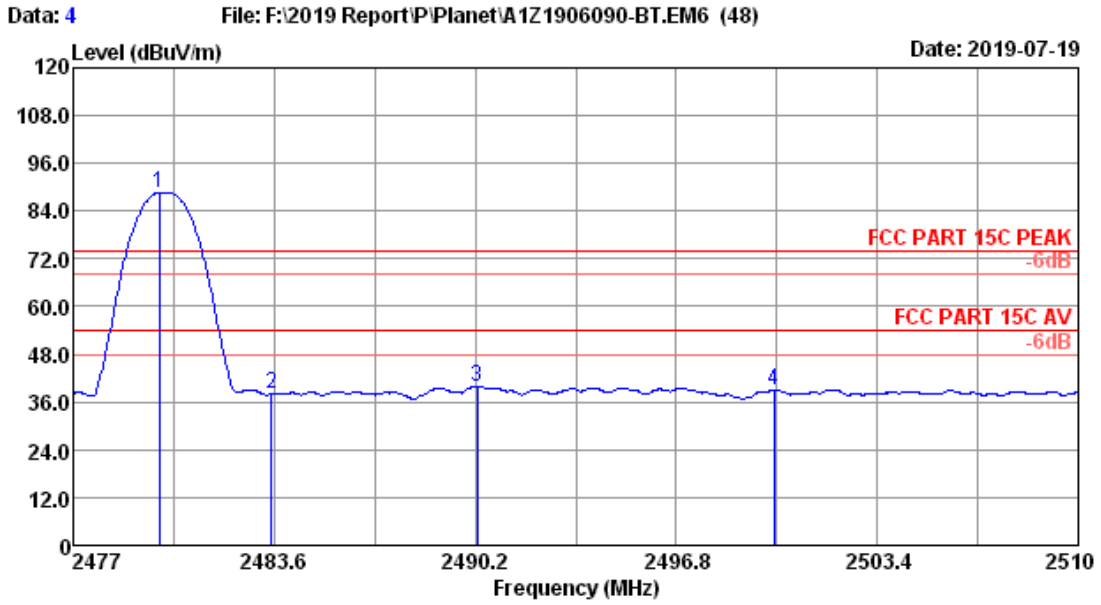


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 GFSK 2480MHz Tx Mode

Data no. : 3
Ant. pol. : VERTICAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.14	27.98	0.89	35.01	95.34	89.20	74.00	-15.20	Peak
2	2483.50	27.98	0.89	35.01	44.18	38.04	74.00	35.96	Peak
3	2494.29	28.03	0.89	35.00	46.15	40.07	74.00	33.93	Peak
4	2500.00	28.03	0.89	35.00	45.29	39.21	74.00	34.79	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

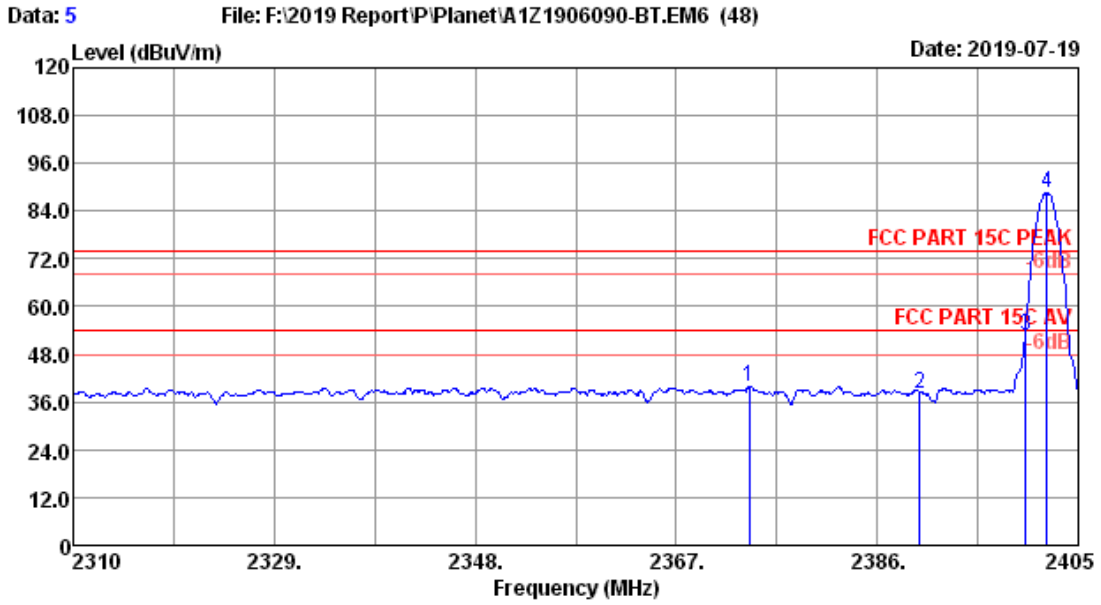


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 GFSK 2480MHz Tx Mode

Data no. : 4
Ant. pol. : HORIZONTAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.84	27.98	0.89	35.01	94.87	88.73	74.00	-14.73	Peak
2	2483.50	27.98	0.89	35.01	44.14	38.00	74.00	36.00	Peak
3	2490.27	28.03	0.89	35.00	45.98	39.90	74.00	34.10	Peak
4	2500.00	28.03	0.89	35.00	44.99	38.91	74.00	35.09	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

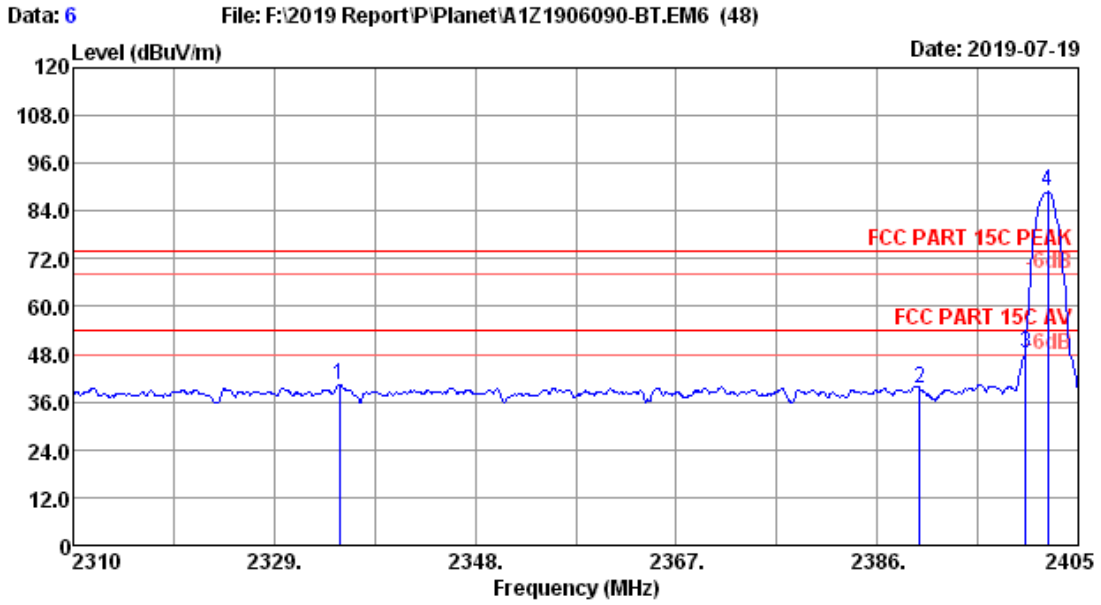


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 8-DPSK 2402MHz Tx Mode

Data no. : 5
Ant. pol. : VERTICAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2373.94	27.62	0.87	35.05	46.53	39.97	74.00	34.03	Peak
2	2390.00	27.71	0.87	35.04	44.72	38.26	74.00	35.74	Peak
3	2400.00	27.71	0.87	35.04	59.10	52.64	74.00	21.36	Peak
4	2402.06	27.71	0.87	35.04	95.04	88.58	74.00	-14.58	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

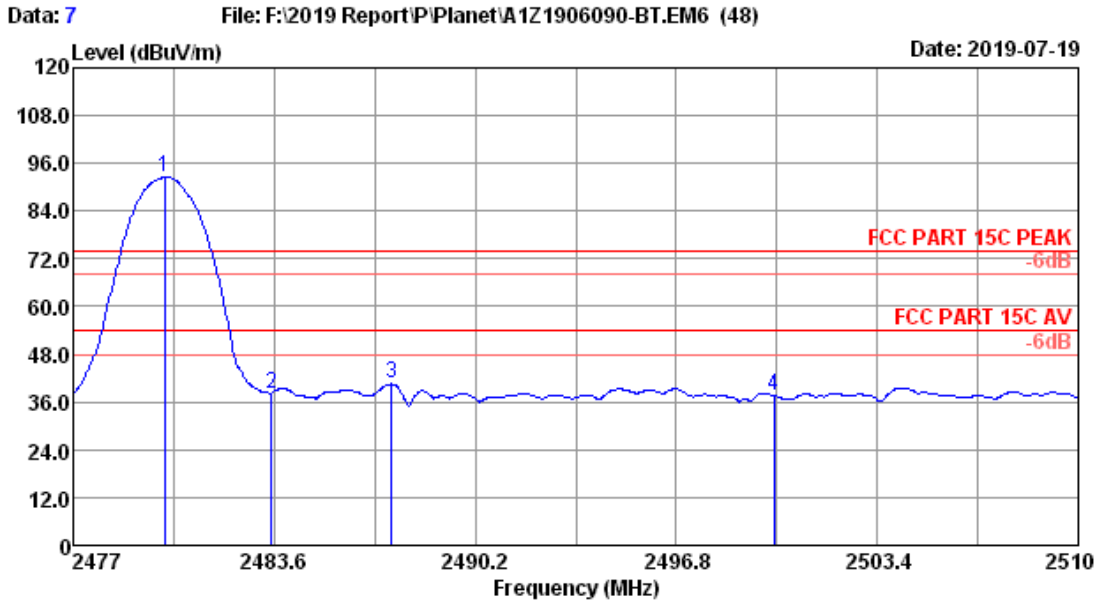


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 8-DPSK 2402MHz Tx Mode

Data no. : 6
Ant. pol. : HORIZONTAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2335.18	27.42	0.86	35.06	47.22	40.44	74.00	33.56	Peak
2	2390.00	27.71	0.87	35.04	45.97	39.51	74.00	34.49	Peak
3	2400.00	27.71	0.87	35.04	54.91	48.45	74.00	25.55	Peak
4	2402.15	27.71	0.87	35.04	95.32	88.86	74.00	-14.86	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

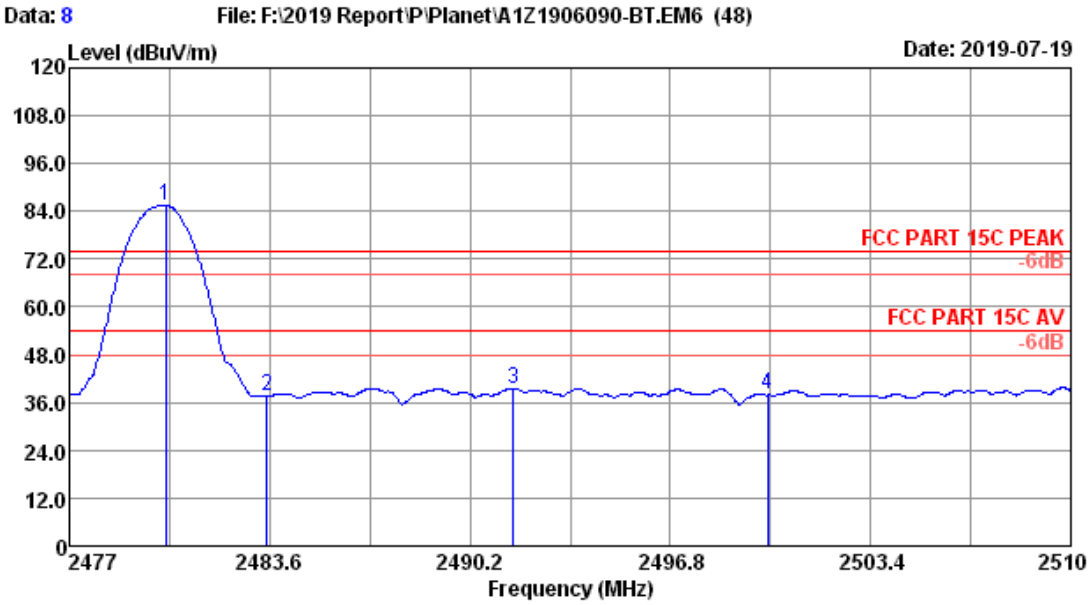


Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 8-DPSK 2480MHz Tx Mode

Data no. : 7
Ant. pol. : HORIZONTAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.98	0.89	35.01	98.56	92.42	74.00	-18.42	Peak
2	2483.50	27.98	0.89	35.01	44.44	38.30	74.00	35.70	Peak
3	2487.46	27.98	0.89	35.01	46.68	40.54	74.00	33.46	Peak
4	2500.00	28.03	0.89	35.00	43.66	37.58	74.00	36.42	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Dis. / Ant. : 3m 2018 3115-4580
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9%
Power rating : AC120V/60Hz
Test Mode : BT3.0 8-DPSK 2480MHz Tx Mode

Data no. : 8
Ant. pol. : VERTICAL
Pre :
Engineer : Garry

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.17	27.98	0.89	35.01	91.73	85.59	74.00	-11.59	Peak
2	2483.50	27.98	0.89	35.01	43.93	37.79	74.00	36.21	Peak
3	2491.62	28.03	0.89	35.00	45.66	39.58	74.00	34.42	Peak
4	2500.00	28.03	0.89	35.00	43.94	37.86	74.00	36.14	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

12. ANTENNA REQUIREMENT

12.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2. Antenna Connected Construction

The antennas used for this product are MONOPOLE antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is -0.1dBi

13. DEVIATION TO TEST SPECIFICATIONS

[NONE]

End of Report