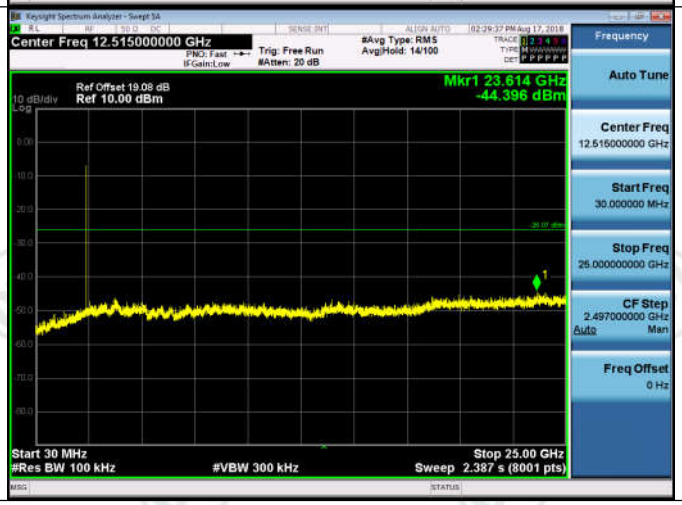
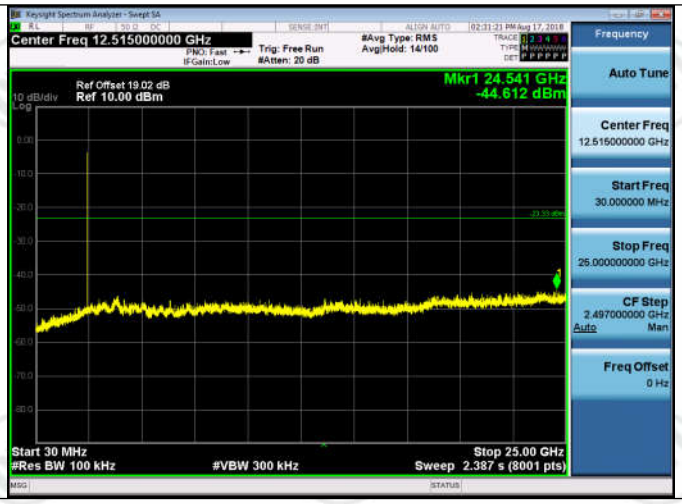
Puw	

π/4DQPSK_HCH_Graphs	
Pref	
Puw	

8DPSK_LCH_Graphs		
Pref		
Puw		

8DPSK_MCH_Graphs		
Pref		

Puw	

8DPSK_HCH_Graphs	
Pref	
Puw	

Appendix H): Pseudorandom Frequency Hopping Sequence

Test Requirement:	47 CFR Part 15**C Section 15.247 (a)(1) requirement:**

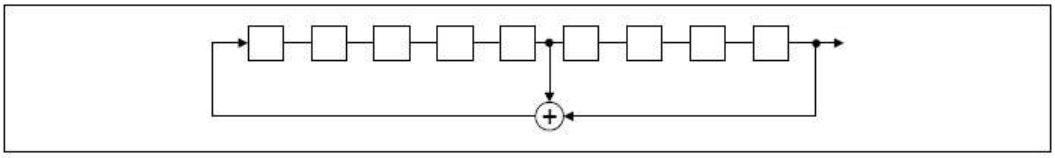
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

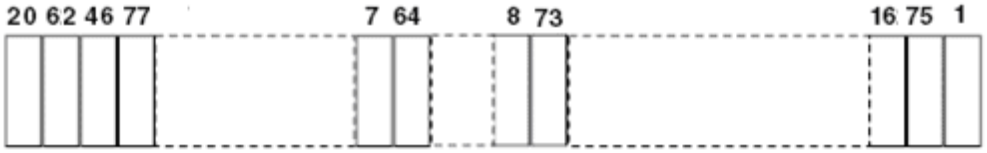
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2^9 -1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

Appendix I): Antenna Requirement

15.203 requirement:

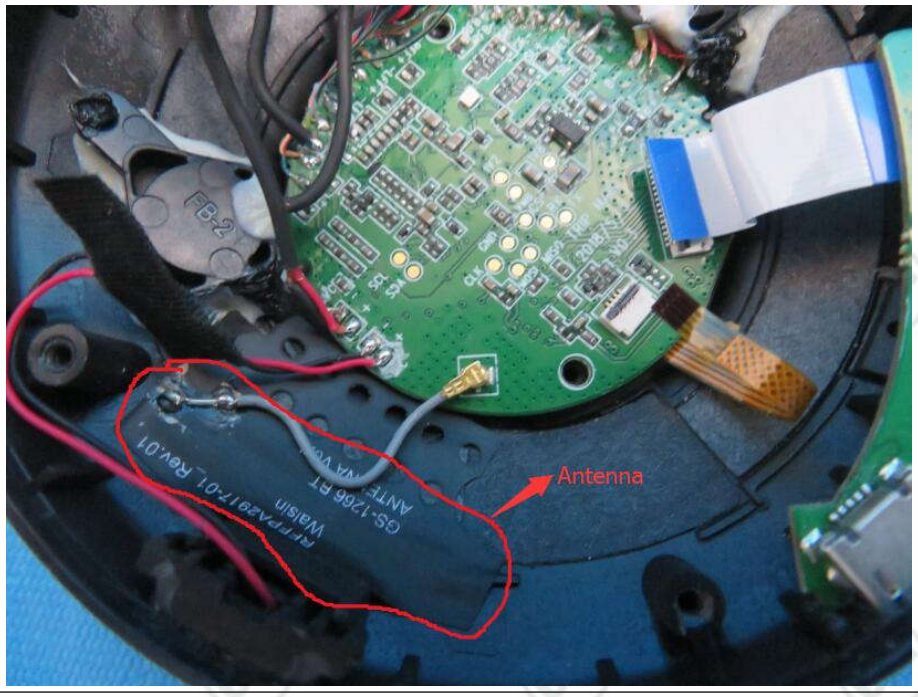
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is FPC Antenna and no consideration of replacement. The best case gain of the antenna is 2dBi



Appendix J): AC Power Line Conducted Emission

Test Procedure:	Test frequency range :150KHz-30MHz 1)The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet sTrip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Limit:	

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

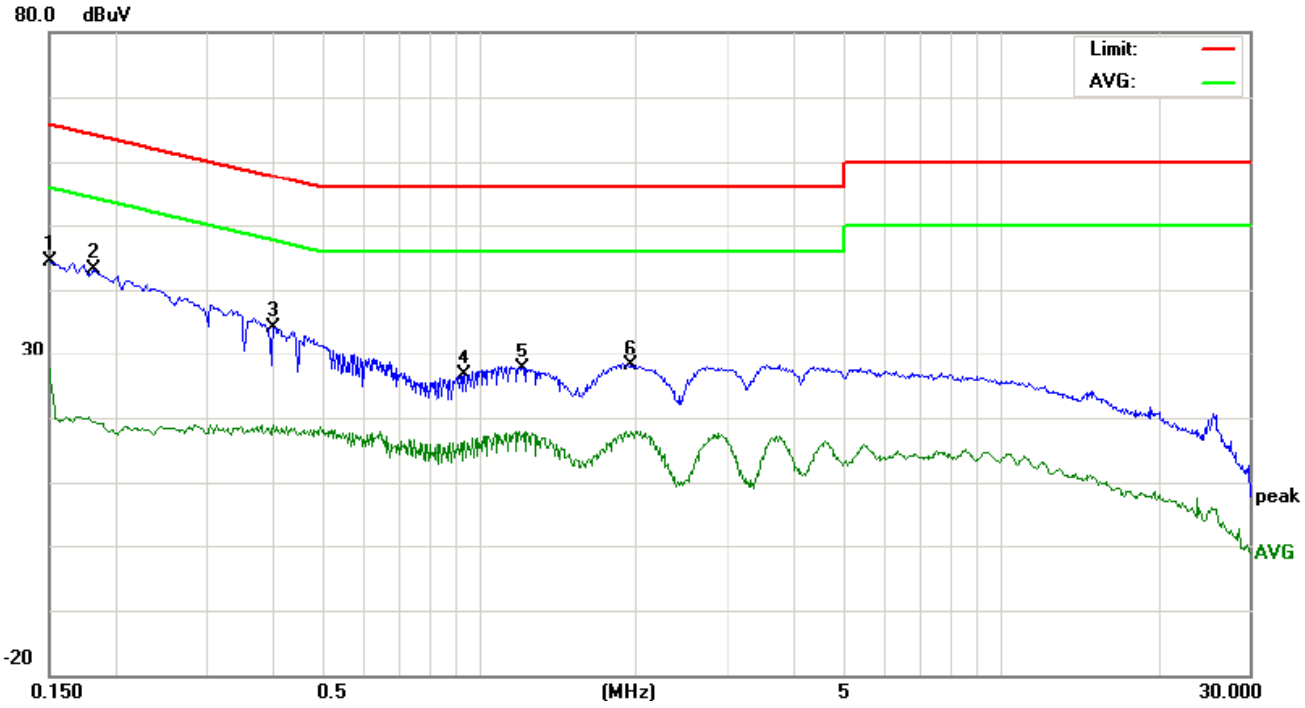
NOTE : The lower limit is applicable at the transition frequency

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

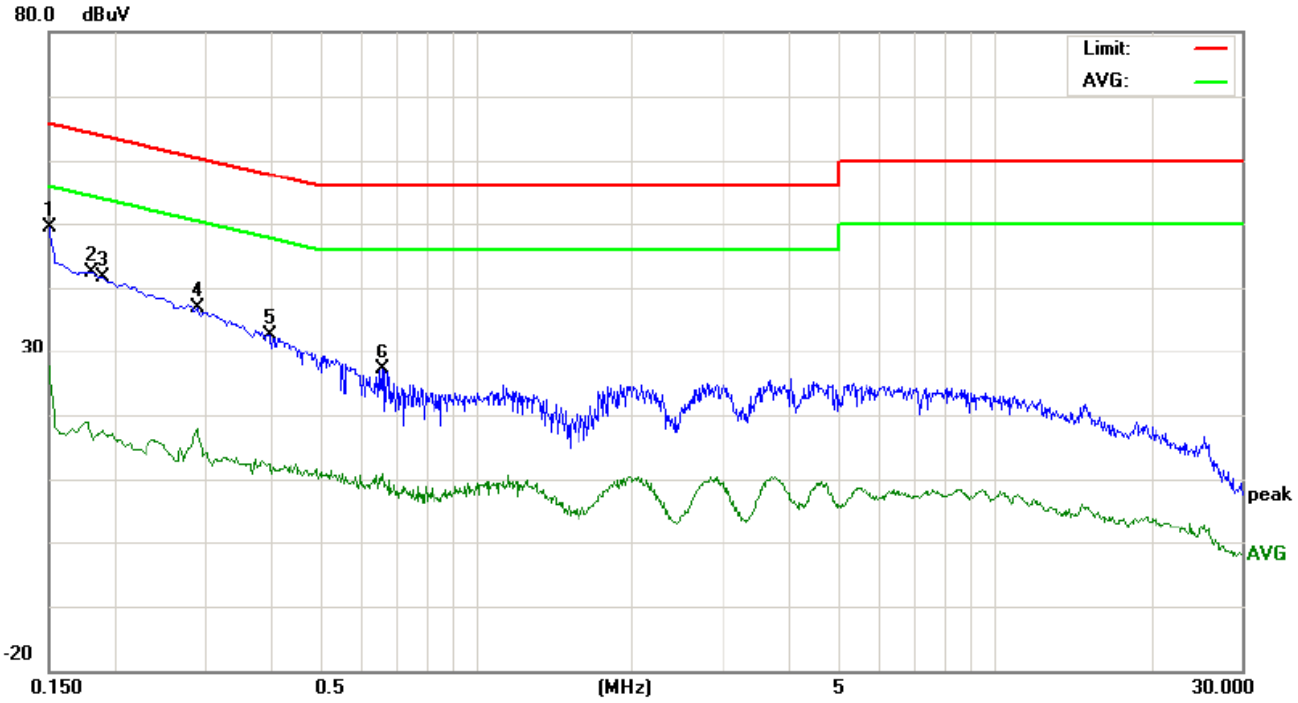
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1499	34.60	31.05	17.76	9.77	44.37	40.82	27.53	66.00	56.00	-25.18	-28.47	P	
2	0.1796	34.64	31.07	17.80	9.73	44.37	40.80	27.53	64.50	54.50	-23.70	-26.97	P	
3	0.4020	24.49	21.35	9.14	9.75	34.24	31.10	18.89	57.81	47.81	-26.71	-28.92	P	
4	0.9418	16.84	13.64	6.63	9.74	26.58	23.38	16.37	56.00	46.00	-32.62	-29.63	P	
5	1.1938	17.78	14.01	8.08	9.72	27.50	23.73	17.80	56.00	46.00	-32.27	-28.20	P	
6	1.9498	18.38	14.60	8.27	9.72	28.10	24.32	17.99	56.00	46.00	-31.68	-28.01	P	

Neutral line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1499	39.72	36.12	17.94	9.77	49.49	45.89	27.71	66.00	56.00	-20.11	-28.29	P	
2	0.1779	32.67	30.25	9.19	9.73	42.40	39.98	18.92	64.58	54.58	-24.60	-35.66	P	
3	0.1900	31.94	29.47	7.79	9.72	41.66	39.19	17.51	64.03	54.03	-24.84	-36.52	P	
4	0.2898	27.09	25.13	8.05	9.77	36.86	34.90	17.82	60.53	50.53	-25.63	-32.71	P	
5	0.3980	22.96	18.45	2.67	9.75	32.71	28.20	12.42	57.89	47.89	-29.69	-35.47	P	
6	0.6580	17.42	15.22	1.04	9.75	27.17	24.97	10.79	56.00	46.00	-31.03	-35.21	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix K): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. 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 from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

Above 1GHz test procedure as below:

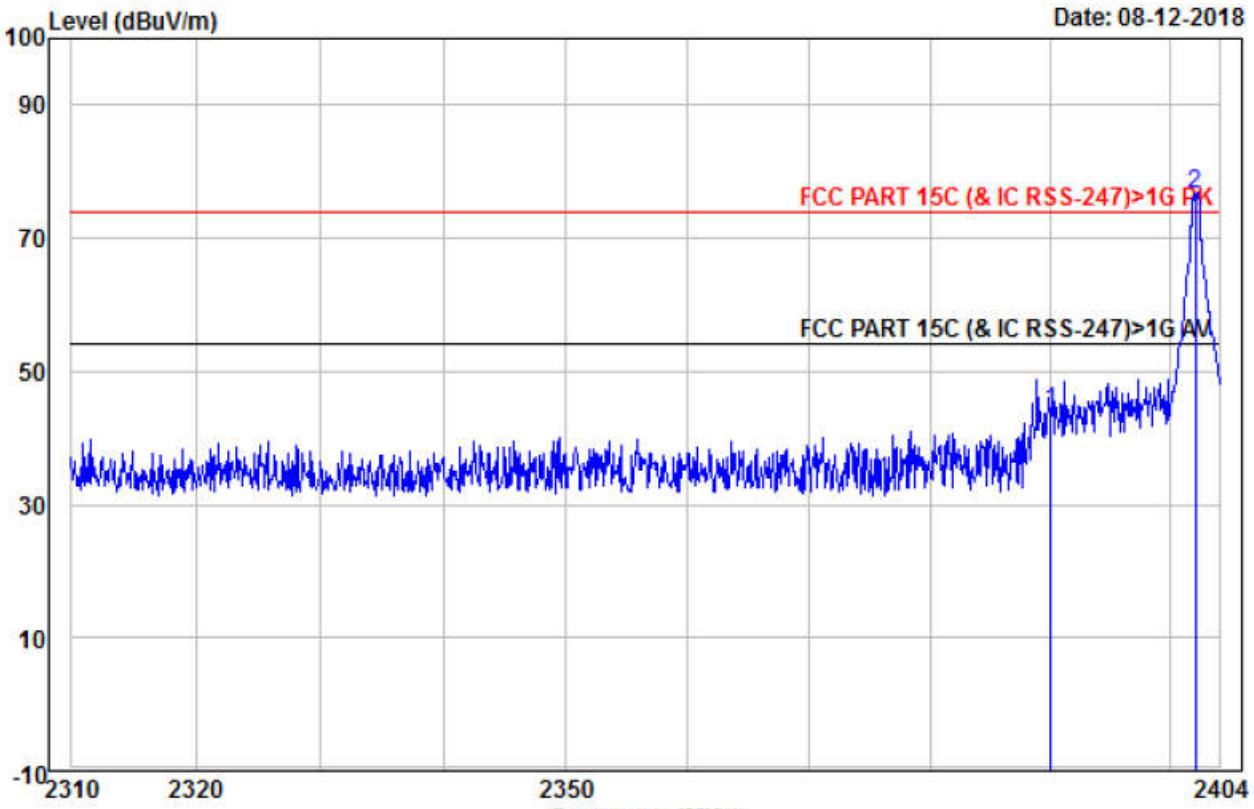
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. b. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

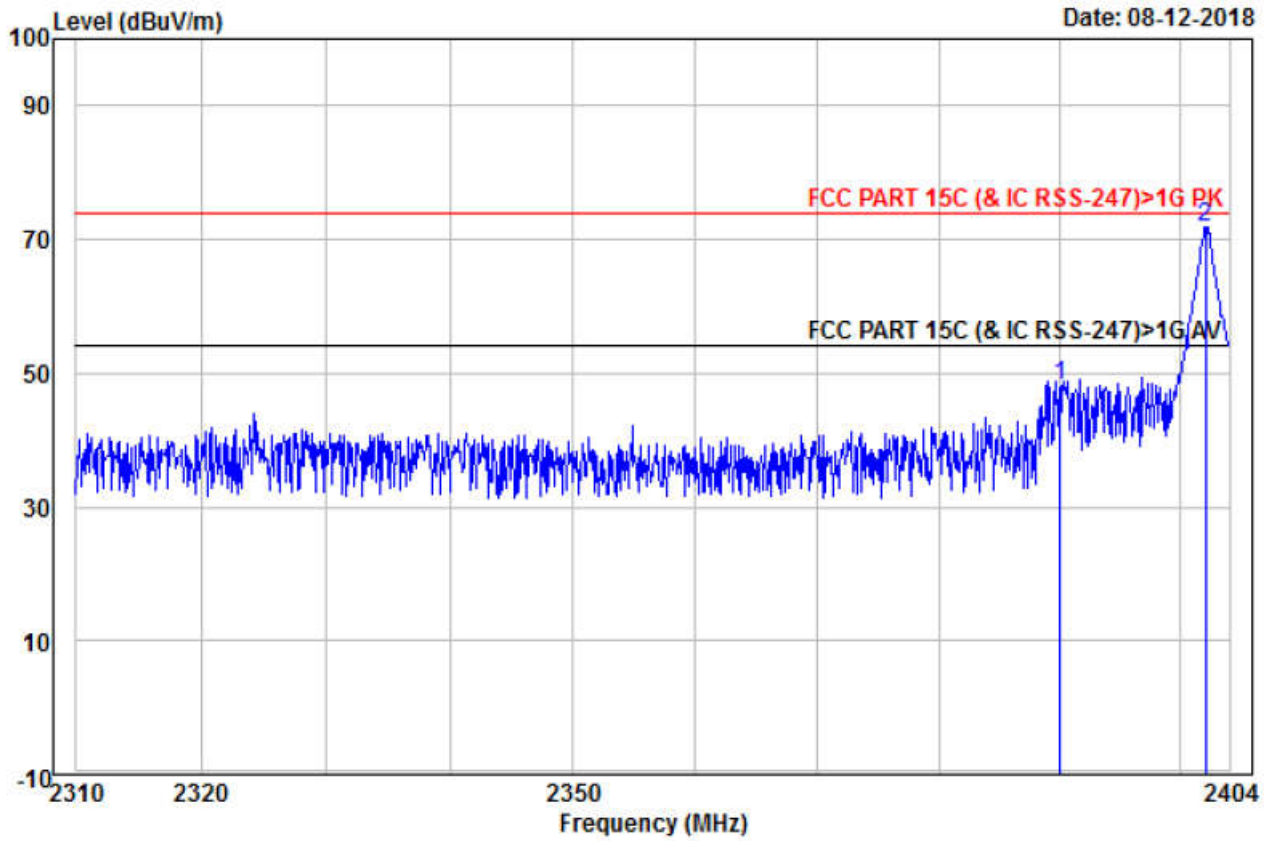
Test plot as follows:

Worse case mode:	GFSK(1-DH5)		
	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



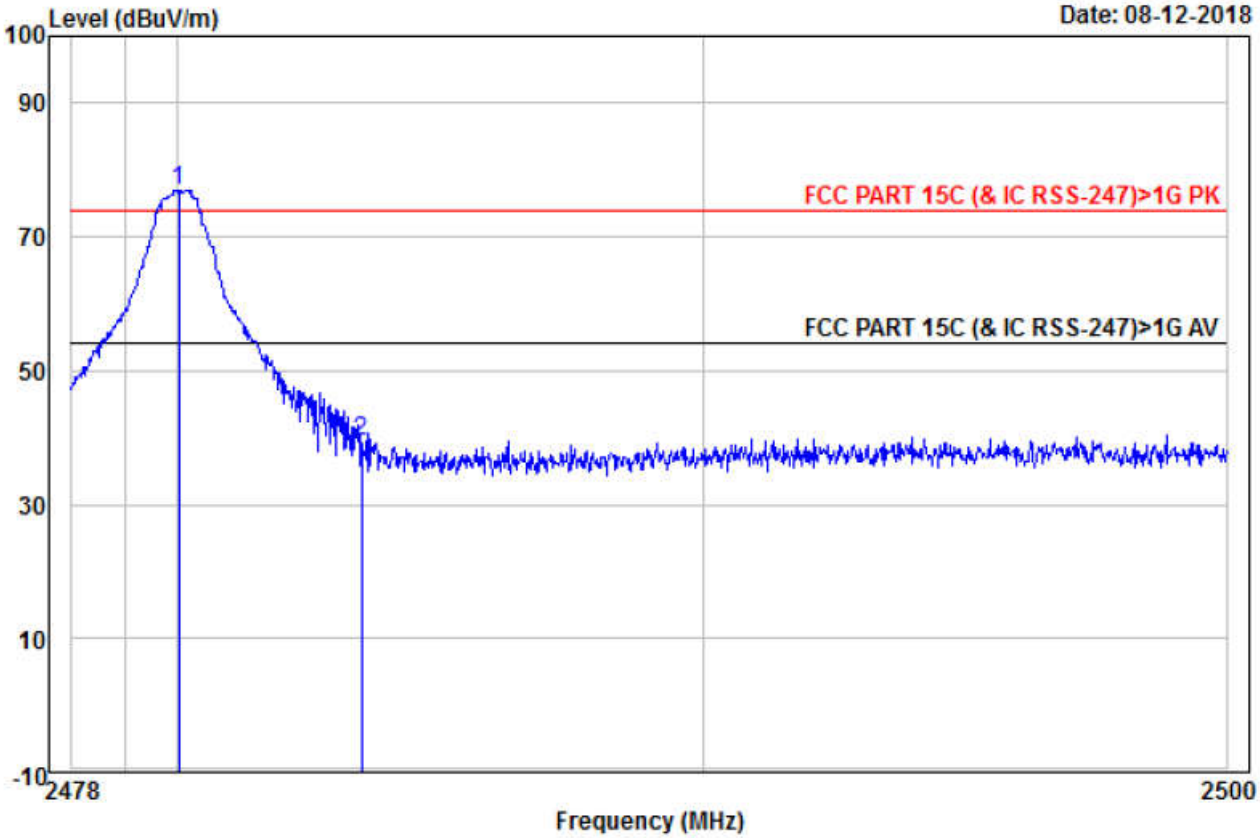
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	57.30	43.98	74.00	-30.02	Horizontal	
2 *	2402.083	27.62	3.07	90.06	76.71	74.00	2.71	Horizontal	

Worse case mode:	GFSK(1-DH5)		
	Test channel: Lowest	Polarization: Vertical	Remark: Peak



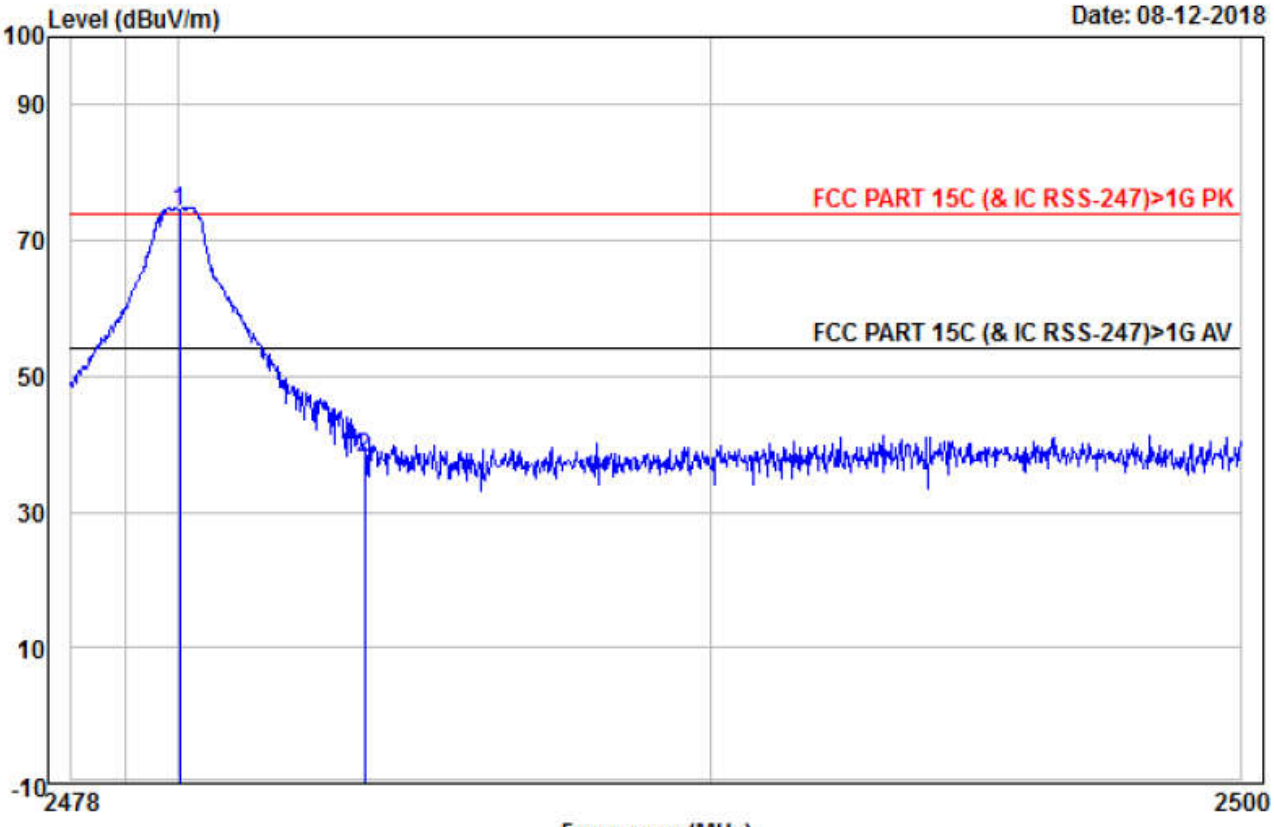
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	61.39	48.07	74.00	-25.93	Vertical	
2	2402.083	27.62	3.07	85.13	71.78	74.00	-2.22	Vertical	

Worse case mode:	GFSK(1-DH5)		
	Test channel: Highest	Polarization: Horizontal	Remark: Peak



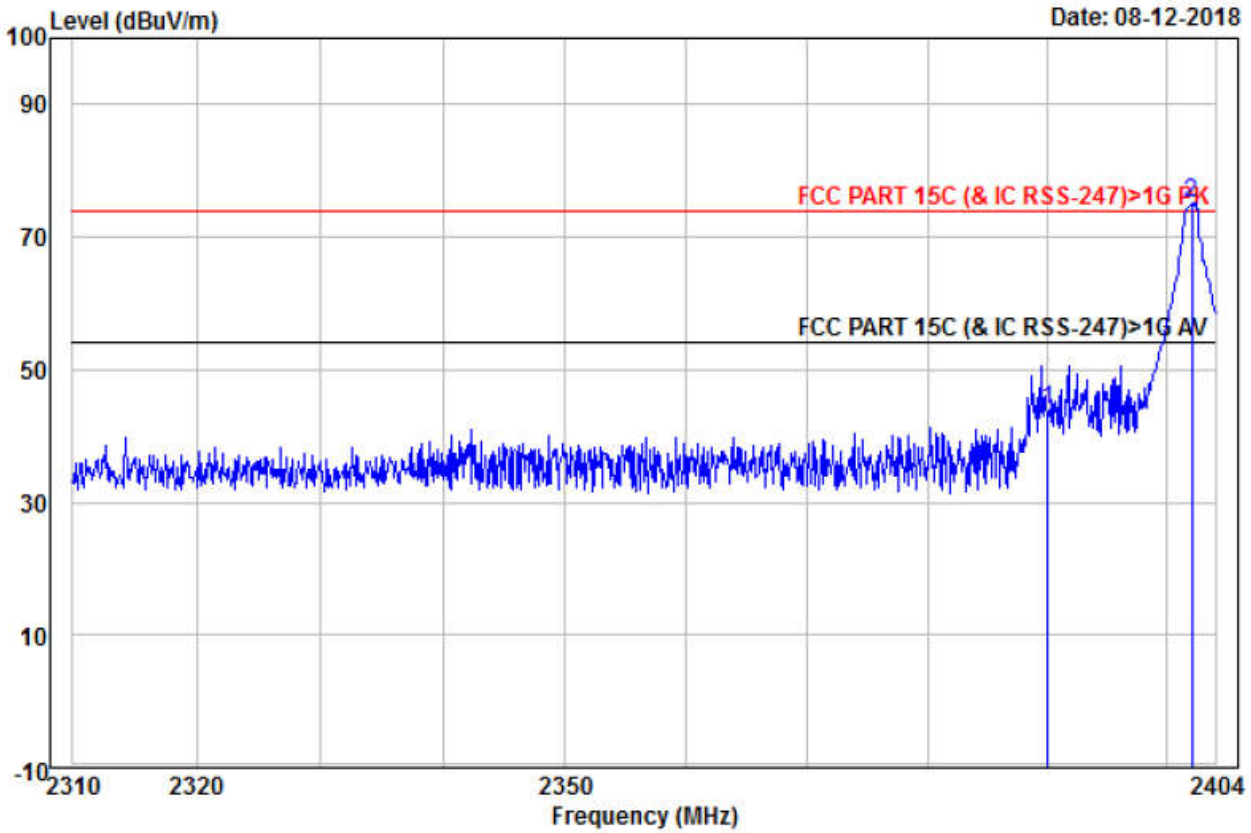
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 *	2480.038	27.59	3.12	90.42	76.99	74.00	2.99	Horizontal	
2	2483.500	27.59	3.12	52.92	39.49	74.00	-34.51	Horizontal	

Worse case mode:	GFSK(1-DH5)		
	Test channel: Highest	Polarization: Vertical	Remark: Peak



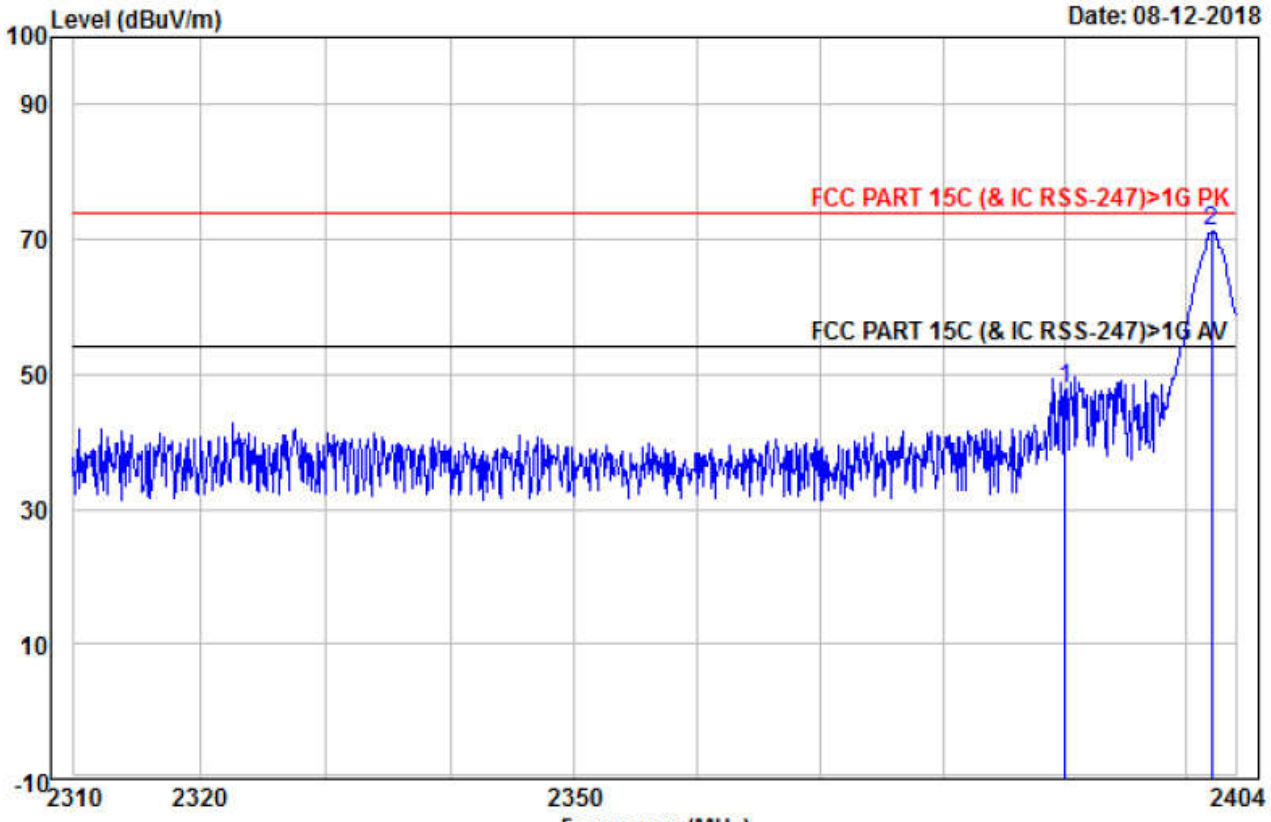
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	* 2480.038	27.59	3.12	87.68	74.25	74.00	0.25	Vertical	
2	2483.500	27.59	3.12	51.38	37.95	74.00	-36.05	Vertical	

Worse case mode:	π/4DQPSK(2-DH5)		
	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



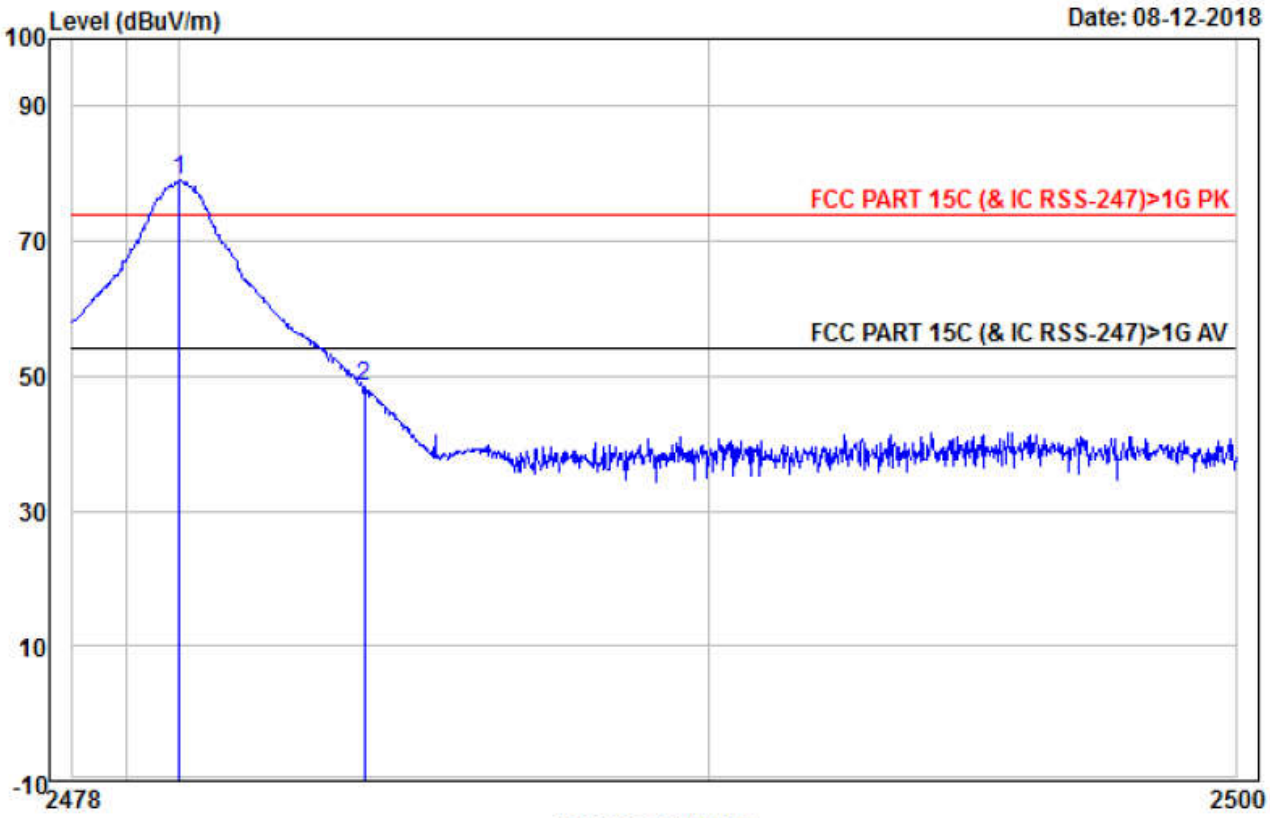
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	57.40	44.08	74.00	-29.92	Horizontal	
2 *	2402.083	27.62	3.07	88.44	75.09	74.00	1.09	Horizontal	

Worse case mode:	π/4DQPSK(2-DH5)		
	Test channel: Lowest	Polarization: Vertical	Remark: Peak



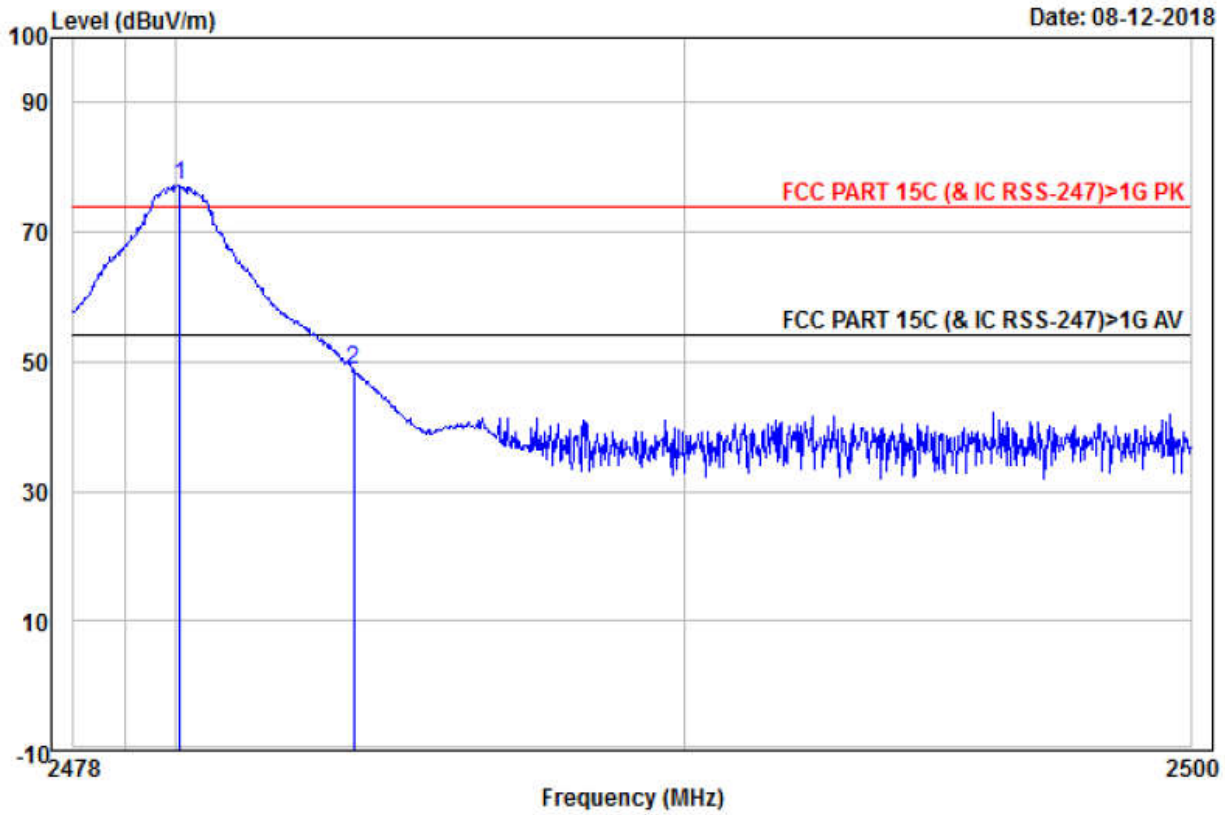
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	61.28	47.96	74.00	-26.04	Vertical	
2	2402.000	27.62	3.07	84.53	71.18	74.00	-2.82	Vertical	

Worse case mode:	π/4DQPSK(2-DH5)		
	Test channel: Highest	Polarization: Horizontal	Remark: Peak



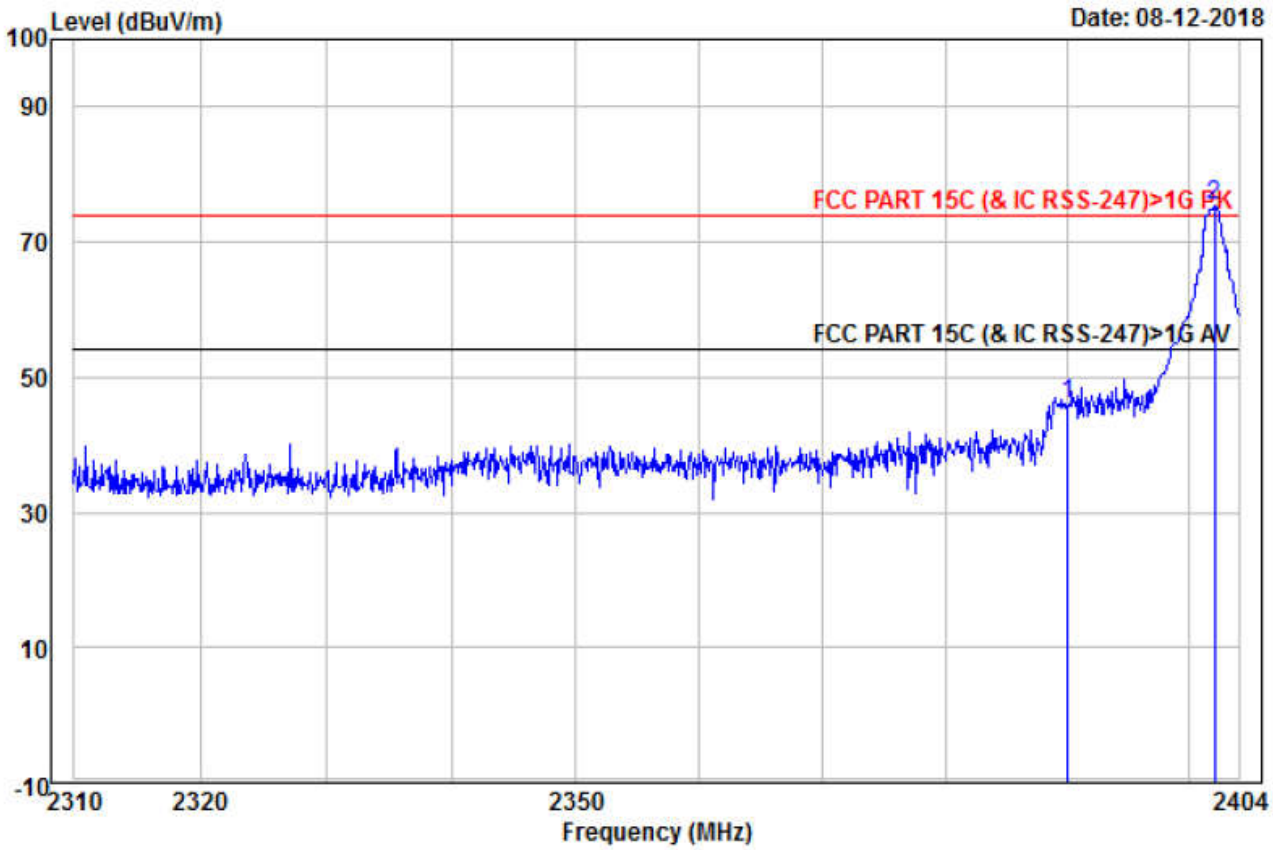
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	* 2480.016	27.59	3.12	92.48	79.05	74.00	5.05	Horizontal	
2	2483.500	27.59	3.12	61.91	48.48	74.00	-25.52	Horizontal	

Worse case mode:	π/4DQPSK(2-DH5)		
	Test channel: Highest	Polarization: Vertical	Remark: Peak



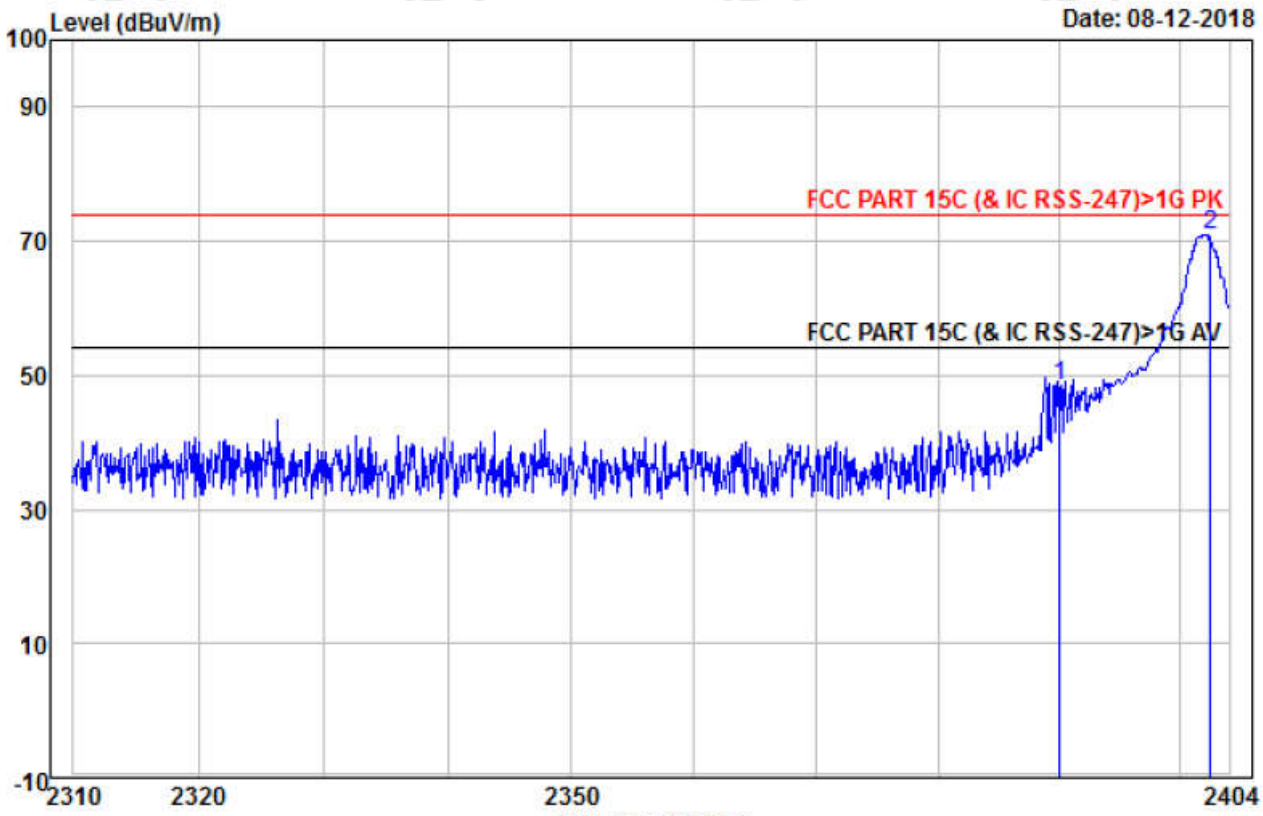
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 *	2480.082	27.59	3.12	90.65	77.22	74.00	3.22	Vertical	
2	2483.500	27.59	3.12	62.21	48.78	74.00	-25.22	Vertical	

Worse case mode:	8DPSK(3-DH5)		
	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



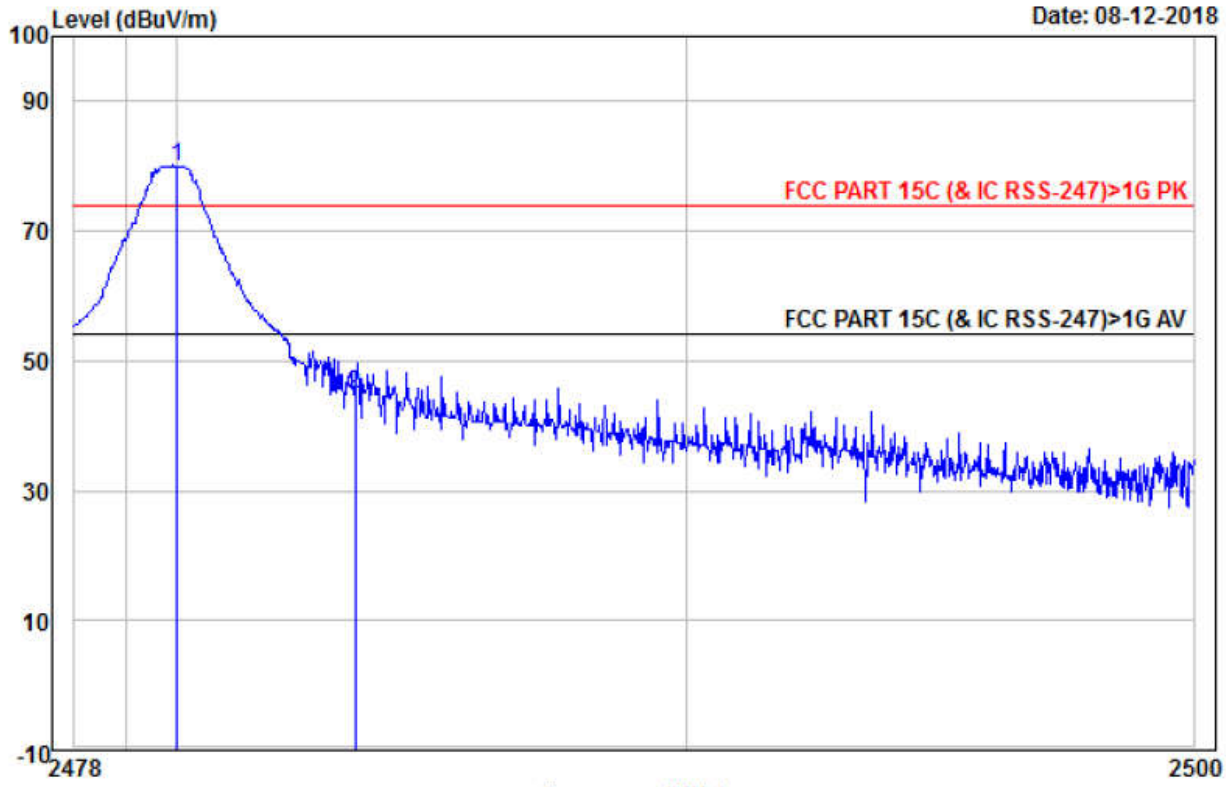
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	59.23	45.91	74.00	-28.09	Horizontal	
2 *	2402.083	27.62	3.07	88.75	75.40	74.00	1.40	Horizontal	

Worse case mode:	8DPSK(3-DH5)		
	Test channel: Lowest	Polarization: Vertical	Remark: Peak



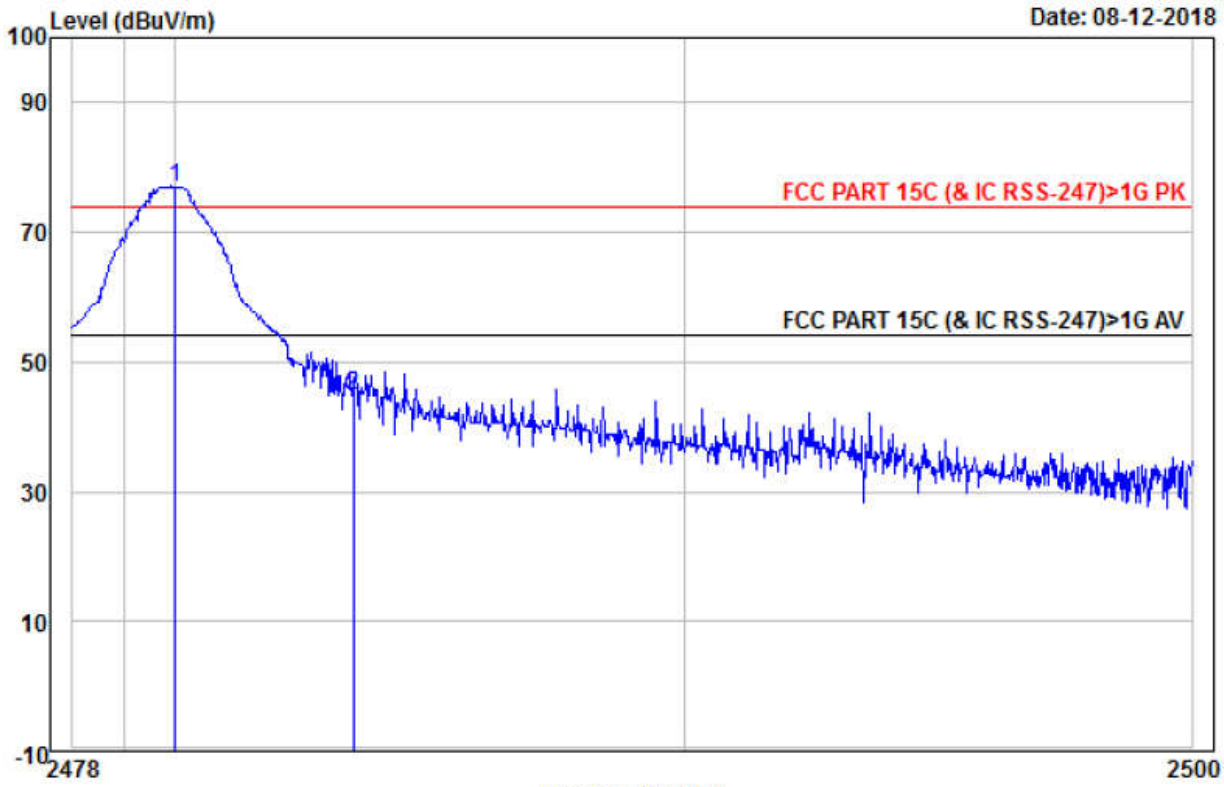
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	27.64	3.07	61.68	48.36	74.00	-25.64	Vertical	
2	2402.460	27.62	3.07	84.13	70.78	74.00	-3.22	Vertical	

Worse case mode:	8DPSK(3-DH5)		
	Test channel: Highest	Polarization: Horizontal	Remark: Peak



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1 *	2480.016	27.59	3.12	93.32	79.89	74.00	5.89	Horizontal	
2	2483.500	27.59	3.12	58.14	44.71	74.00	-29.29	Horizontal	

Worse case mode:	8DPSK(3-DH5)		
	Test channel: Highest	Polarization: Vertical	Remark: Peak



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	* 2480.016	27.59	3.12	90.32	76.89	74.00	2.89	Vertical	
2	2483.500	27.59	3.12	58.14	44.71	74.00	-29.29	Vertical	

Note:
1) Through Pre-scan transmitter mode with all kind of modulation and all kind of data type, find the 1-DH5 of data type is the worse case of GFSK modulation type, the 2-DH5 of data type is the worse case of π/4DQPSK modulation type, the 3-DH5 of data type is the worse case of 8DPSK modulation type in charge + transmitter mode.
2) As shown in this section, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak values are measured.
3) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading -Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix L): Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. 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 from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

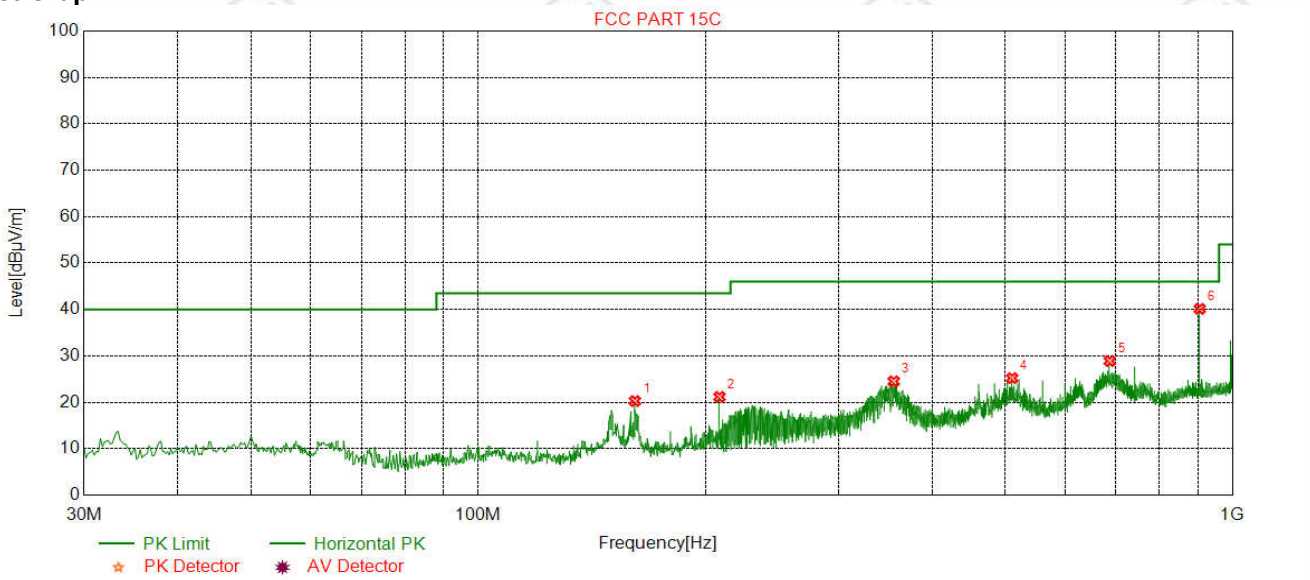
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz

Mode:	π/4DQPSK Transmitting	Channel:	2480
Remark:	QP		

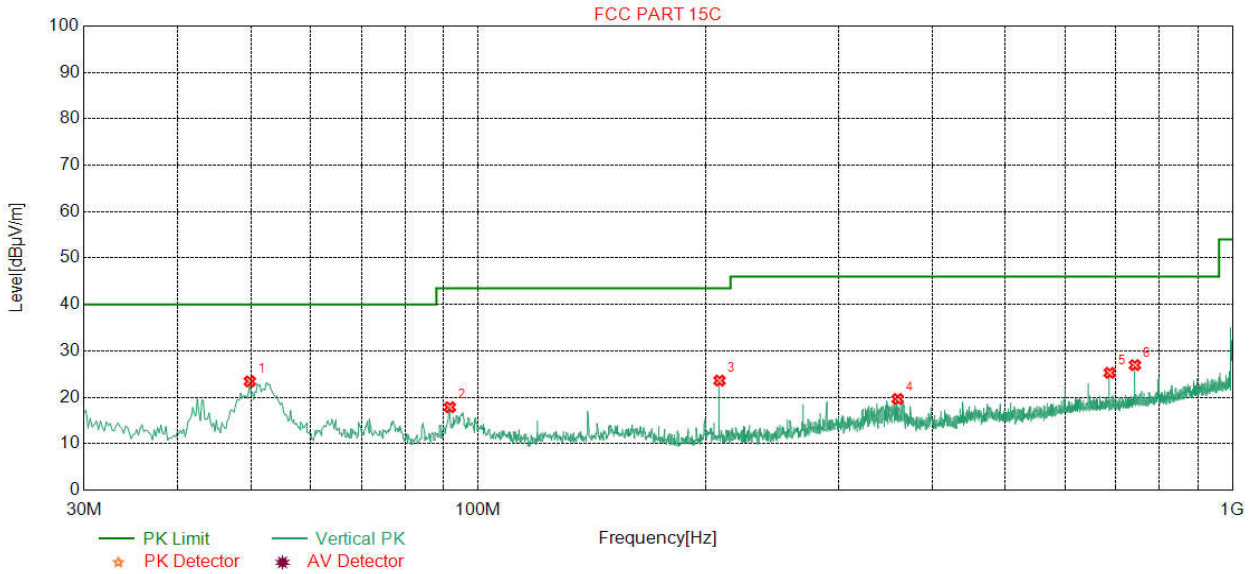
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	161.3643	7.98	1.48	-31.98	42.80	20.28	43.50	23.22	Pass	Horizontal
2	208.9038	11.13	1.71	-31.94	40.28	21.18	43.50	22.32	Pass	Horizontal
3	355.5971	14.42	2.25	-31.85	39.70	24.52	46.00	21.48	Pass	Horizontal
4	510.4401	17.21	2.69	-31.94	37.25	25.21	46.00	20.79	Pass	Horizontal
5	687.5975	19.70	3.14	-32.06	38.13	28.91	46.00	17.09	Pass	Horizontal
6	905.1150	22.13	3.60	-31.53	45.94	40.14	46.00	5.86	Pass	Horizontal

Mode:	π/4DQPSK Transmitting	Channel:	2480
Remark:	QP		

Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	49.7920	13.20	0.80	-32.12	41.55	23.43	40.00	16.57	Pass	Vertical
2	91.7043	9.67	1.11	-32.09	39.19	17.88	43.50	25.62	Pass	Vertical
3	208.9038	11.13	1.71	-31.94	42.70	23.60	43.50	19.90	Pass	Vertical
4	359.8660	14.52	2.27	-31.84	34.69	19.64	46.00	26.36	Pass	Vertical
5	687.5975	19.70	3.14	-32.06	34.49	25.27	46.00	20.73	Pass	Vertical
6	742.5105	20.27	3.26	-32.11	35.52	26.94	46.00	19.06	Pass	Vertical

Transmitter Emission above 1GHz

Worse case mode: GFSK			Test channel: Lowest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
1792.1584	30.33	3.31	-36.81	51.14	47.97	74.00	26.03	H	Peak
2994.3989	33.19	4.53	-36.72	47.86	48.86	74.00	25.14	H	Peak
4804.0000	34.50	4.55	-36.15	50.37	53.27	74.00	20.73	H	Peak
4804.0000	34.50	4.55	-36.15	44.95	47.85	54.00	6.15	H	Average
7206.0000	36.31	5.81	-36.43	41.47	47.16	74.00	26.84	H	Peak
8479.0729	36.59	6.45	-36.43	43.91	50.52	74.00	23.48	H	Peak
9608.0000	37.64	6.63	-36.79	43.26	50.74	74.00	23.26	H	Peak
1397.6795	28.30	2.90	-37.21	51.23	45.22	74.00	28.78	V	Peak
4804.0000	34.50	4.55	-36.15	53.28	56.18	74.00	17.82	V	Peak
4804.0000	34.50	4.55	-36.15	35.49	38.39	54.00	15.61	V	Average
6100.8101	35.82	5.26	-36.34	42.54	47.28	74.00	26.72	V	Peak
7206.0000	36.31	5.81	-36.43	44.88	50.57	74.00	23.43	V	Peak
8153.3903	36.46	6.42	-36.45	43.27	49.70	74.00	24.30	V	Peak
9608.0000	37.64	6.63	-36.79	42.10	49.58	74.00	24.42	V	Peak

Worse case mode: GFSK			Test channel: Middle						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3163.8164	33.27	4.59	-36.89	46.60	47.57	74.00	26.43	H	Peak
4882.0000	34.50	4.81	-36.10	49.10	52.31	74.00	21.69	H	Peak
4882.0000	34.50	4.81	-36.10	35.55	38.76	24.00	15.24	H	Average
5789.7540	35.46	4.97	-36.04	43.66	48.05	74.00	25.95	H	Peak
7323.0000	36.42	5.85	-36.41	42.91	48.77	74.00	25.23	H	Peak
8427.3927	36.57	6.37	-36.35	43.81	50.40	74.00	23.60	H	Peak
9764.0000	37.71	6.71	-36.83	42.89	50.48	74.00	23.52	H	Peak
1795.3591	30.35	3.31	-36.81	48.67	45.52	74.00	28.48	V	Peak
3190.1440	33.28	4.63	-36.74	45.89	47.06	74.00	26.94	V	Peak
4882.0000	34.50	4.81	-36.10	47.58	50.79	74.00	23.21	V	Peak
6378.7129	35.88	5.37	-36.25	42.21	47.21	74.00	26.79	V	Peak
7323.0000	36.42	5.85	-36.41	43.16	49.02	74.00	24.98	V	Peak
9764.0000	37.71	6.71	-36.83	42.98	50.57	74.00	23.43	V	Peak

Worse case mode: GFSK			Test channel: Highest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3020.4770	33.21	4.89	-36.78	46.71	48.03	74.00	25.97	H	Peak
4960.0000	34.50	4.82	-36.20	46.15	49.27	74.00	24.73	H	Peak
5587.9088	35.14	5.11	-36.11	43.96	48.10	74.00	25.90	H	Peak
6441.1191	35.89	5.48	-36.27	43.58	48.68	74.00	25.32	H	Peak
7440.0000	36.54	5.85	-36.34	42.18	48.23	74.00	25.77	H	Peak
9920.0000	37.77	6.79	-36.82	41.81	49.55	74.00	24.45	H	Peak
3014.6265	33.21	4.90	-36.76	46.50	47.85	74.00	26.15	V	Peak
4960.0000	34.50	4.82	-36.20	43.54	46.66	74.00	27.34	V	Peak
5541.1041	35.07	5.16	-36.06	44.02	48.19	74.00	25.81	V	Peak
7440.0000	36.54	5.85	-36.34	41.10	47.15	74.00	26.85	V	Peak
8413.7414	36.57	6.35	-36.31	44.22	50.83	74.00	23.17	V	Peak
9920.0000	37.77	6.79	-36.82	44.09	51.83	74.00	22.17	V	Peak
9920.0000	37.77	6.79	-36.82	29.22	36.96	54.00	17.04	V	Average

Worse case mode: π/4DQPSK			Test channel: Lowest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3057.5308	33.22	4.81	-36.86	46.45	47.62	74.00	26.38	H	Peak
4804.0000	34.50	4.55	-36.15	48.60	51.50	74.00	22.50	H	Peak
4804.0000	34.50	4.55	-36.15	40.86	43.76	54.00	10.24	H	Average
5691.2691	35.31	5.01	-36.11	43.21	47.42	74.00	26.58	H	Peak
7206.0000	36.31	5.81	-36.43	41.00	46.69	74.00	27.31	H	Peak
8489.7990	36.60	6.47	-36.45	43.73	50.35	74.00	23.65	H	Peak
9608.0000	37.64	6.63	-36.79	43.04	50.52	74.00	23.48	H	Peak
3190.1440	33.28	4.63	-36.74	45.81	46.98	74.00	27.02	V	Peak
4804.0000	34.50	4.55	-36.15	50.75	53.65	74.00	20.35	V	Peak
4804.0000	34.50	4.55	-36.15	35.93	38.83	54.00	15.17	V	Average
6761.9262	36.00	5.68	-36.20	42.74	48.22	74.00	25.78	V	Peak
7206.0000	36.31	5.81	-36.43	40.53	46.22	74.00	27.78	V	Peak
8435.1935	36.57	6.38	-36.37	44.29	50.87	74.00	23.13	V	Peak
9608.0000	37.64	6.63	-36.79	41.87	49.35	74.00	24.65	V	Peak

Worse case mode: π/4DQPSK			Test channel: Middle						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3031.2031	33.21	4.87	-36.82	45.95	47.21	74.00	26.79	H	Peak
4882.0000	34.50	4.81	-36.10	47.58	50.79	74.00	23.21	H	Peak
6373.8374	35.87	5.39	-36.23	42.63	47.66	74.00	26.34	H	Peak
7323.0000	36.42	5.85	-36.41	40.34	46.20	74.00	27.80	H	Peak
8386.4386	36.55	6.29	-36.38	44.12	50.58	74.00	23.42	H	Peak
9764.0000	37.71	6.71	-36.83	42.27	49.86	74.00	24.14	H	Peak
1687.3375	29.64	3.18	-36.87	48.11	44.06	74.00	29.94	V	Peak
3189.1689	33.28	4.63	-36.75	48.62	49.78	74.00	24.22	V	Peak
4882.0000	34.50	4.81	-36.10	45.32	48.53	74.00	25.47	V	Peak
6516.2016	35.91	5.43	-36.19	42.26	47.41	74.00	26.59	V	Peak
7323.0000	36.42	5.85	-36.41	40.77	46.63	74.00	27.37	V	Peak
9764.0000	37.71	6.71	-36.83	43.20	50.79	74.00	23.21	V	Peak

Worse case mode: π/4DQPSK			Test channel: Highest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3191.1191	33.28	4.64	-36.75	46.29	47.46	74.00	26.54	H	Peak
4960.0000	34.50	4.82	-36.20	47.46	50.58	74.00	23.42	H	Peak
6371.8872	35.87	5.39	-36.21	43.19	48.24	74.00	25.76	H	Peak
7440.0000	36.54	5.85	-36.34	39.45	45.50	74.00	28.50	H	Peak
8404.9655	36.56	6.34	-36.28	43.22	49.84	74.00	24.16	H	Peak
9920.0000	37.77	6.79	-36.82	40.06	47.80	74.00	26.20	H	Peak
3196.9697	33.28	4.65	-36.71	47.19	48.41	74.00	25.59	V	Peak
4960.0000	34.50	4.82	-36.20	43.60	46.72	74.00	27.28	V	Peak
5760.5011	35.42	4.95	-36.11	43.23	47.49	74.00	26.51	V	Peak
7440.0000	36.54	5.85	-36.34	40.24	46.29	74.00	27.71	V	Peak
8439.0939	36.58	6.38	-36.38	43.85	50.43	74.00	23.57	V	Peak
9920.0000	37.77	6.79	-36.82	42.56	50.30	74.00	23.70	V	Peak

Worse case mode: 8DPSK			Test channel: Lowest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
1974.5949	31.53	3.44	-36.78	47.99	46.18	74.00	27.82	H	Peak
3376.3876	33.35	4.54	-36.67	45.92	47.14	74.00	26.86	H	Peak
4804.0000	34.50	4.55	-36.15	49.05	51.95	74.00	22.05	H	Peak
4804.0000	34.50	4.55	-36.15	34.16	37.06	54.00	16.94	H	Average
6395.2895	35.88	5.32	-36.32	43.27	48.15	74.00	25.85	H	Peak
7206.0000	36.31	5.81	-36.43	40.93	46.62	74.00	27.38	H	Peak
9608.0000	37.64	6.63	-36.79	42.46	49.94	74.00	24.06	H	Peak
2982.3965	33.17	4.50	-36.75	47.06	47.98	74.00	26.02	V	Peak
4804.0000	34.50	4.55	-36.15	47.79	50.69	74.00	23.31	V	Peak
5701.9952	35.32	5.02	-36.12	42.69	46.91	74.00	27.09	V	Peak
7206.0000	36.31	5.81	-36.43	40.82	46.51	74.00	27.49	V	Peak
8447.8698	36.58	6.40	-36.42	43.35	49.91	74.00	24.09	V	Peak
9608.0000	37.64	6.63	-36.79	43.37	50.85	74.00	23.15	V	Peak

Worse case mode: 8DPSK			Test channel: Middle						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
3195.0195	33.28	4.64	-36.72	46.09	47.29	74.00	26.71	H	Peak
4882.0000	34.50	4.81	-36.10	48.93	52.14	74.00	21.86	H	Peak
4882.0000	34.50	4.81	-36.10	30.80	34.01	4.00	19.99	H	Average
6352.3852	35.87	5.45	-36.14	43.36	48.54	74.00	25.46	H	Peak
7323.0000	36.42	5.85	-36.41	40.29	46.15	74.00	27.85	H	Peak
8382.5383	36.55	6.27	-36.40	44.52	50.94	74.00	23.06	H	Peak
9764.0000	37.71	6.71	-36.83	42.65	50.24	74.00	23.76	H	Peak
1877.3755	30.89	3.40	-36.85	50.06	47.50	74.00	26.50	V	Peak
3191.1191	33.28	4.64	-36.75	46.94	48.11	74.00	25.89	V	Peak
4882.0000	34.50	4.81	-36.10	45.78	48.99	74.00	25.01	V	Peak
5804.3804	35.49	4.99	-36.02	43.30	47.76	74.00	26.24	V	Peak
7323.0000	36.42	5.85	-36.41	40.75	46.61	74.00	27.39	V	Peak
9764.0000	37.71	6.71	-36.83	42.56	50.15	74.00	23.85	V	Peak

Worse case mode: 8DPSK			Test channel: Highest						
Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Polarity	Remark
4391.4641	34.35	4.54	-36.16	44.58	47.31	74.00	26.69	H	Peak
4960.0000	34.50	4.82	-36.20	42.32	45.44	74.00	28.56	H	Peak
6280.2280	35.86	5.42	-36.26	43.46	48.48	74.00	25.52	H	Peak
7440.0000	36.54	5.85	-36.34	40.73	46.78	74.00	27.22	H	Peak
8414.7165	36.57	6.35	-36.31	43.96	50.57	74.00	23.43	H	Peak
9920.0000	37.77	6.79	-36.82	42.69	50.43	74.00	23.57	H	Peak
2154.2308	31.92	3.65	-36.32	49.54	48.79	74.00	25.21	V	Peak
3195.0195	33.28	4.64	-36.72	47.39	48.59	74.00	25.41	V	Peak
4960.0000	34.50	4.82	-36.20	42.62	45.74	74.00	28.26	V	Peak
6386.5137	35.88	5.35	-36.29	44.10	49.04	74.00	24.96	V	Peak
7440.0000	36.54	5.85	-36.34	41.22	47.27	74.00	26.73	V	Peak
9920.0000	37.77	6.79	-36.82	41.76	49.50	74.00	24.50	V	Peak

Note:

1) Through Pre-scan transmitter mode with all kind of modulation and all kind of data type, find the 1-DH5 of data type is the worse case of GFSK modulation type, the 2-DH5 of data type is the worse case of π/4DQPSK modulation type, he 3-DH5 of data type is the worse case of 8DPSKmodulation type in transmitter mode.

2) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. H owever, the peak field strength of any emission shall not exceed the maximum permitted average limits specifie d above by more than 20 dB under any condition of modulation. So, only the peak values are measured.

3) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading -Correct Factor

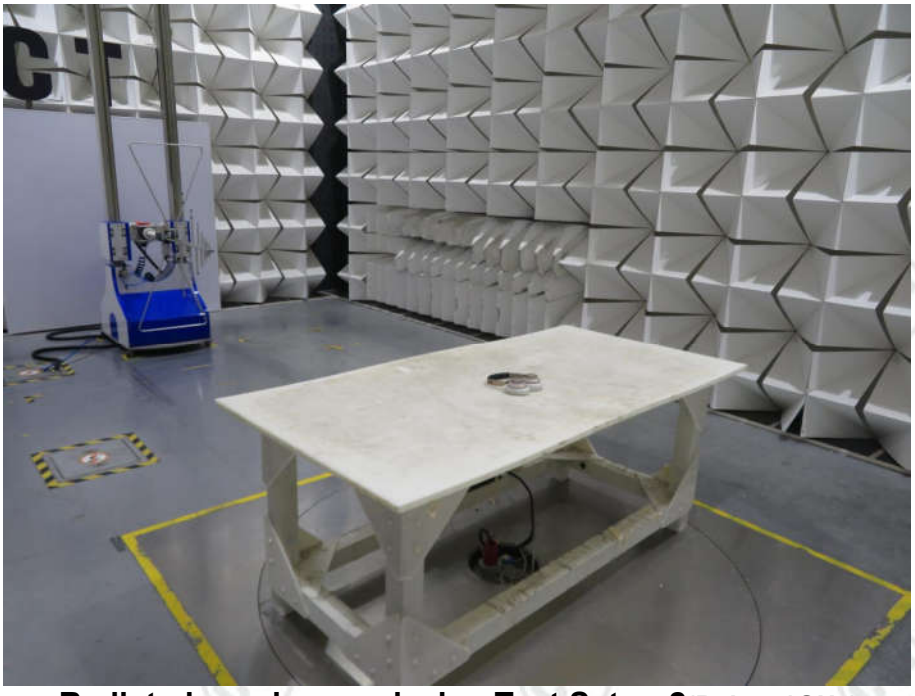
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

4) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

PHOTOGRAPHS OF TEST SETUP

Test model No.: Trip

Radiated spurious emission Test Setup-1(Below 30M)



Radiated spurious emission Test Setup-2(Below 1GHz)

Radiated spurious emission Test Setup-3(Above 1GHz)

Conducted emissions Test Setup

PHOTOGRAPHS OF EUT Constructional Details

Test model No.: Trip

View of Product-1

View of Product-2

View of Product-3

View of Product-4

View of Product-5

View of Product-6

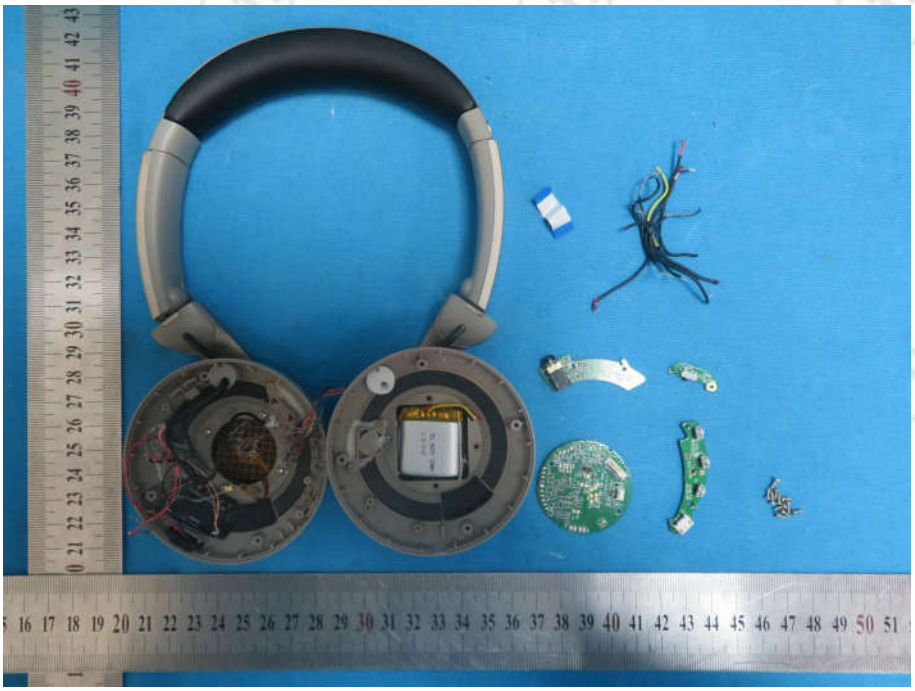
View of Product-7

View of Product-8

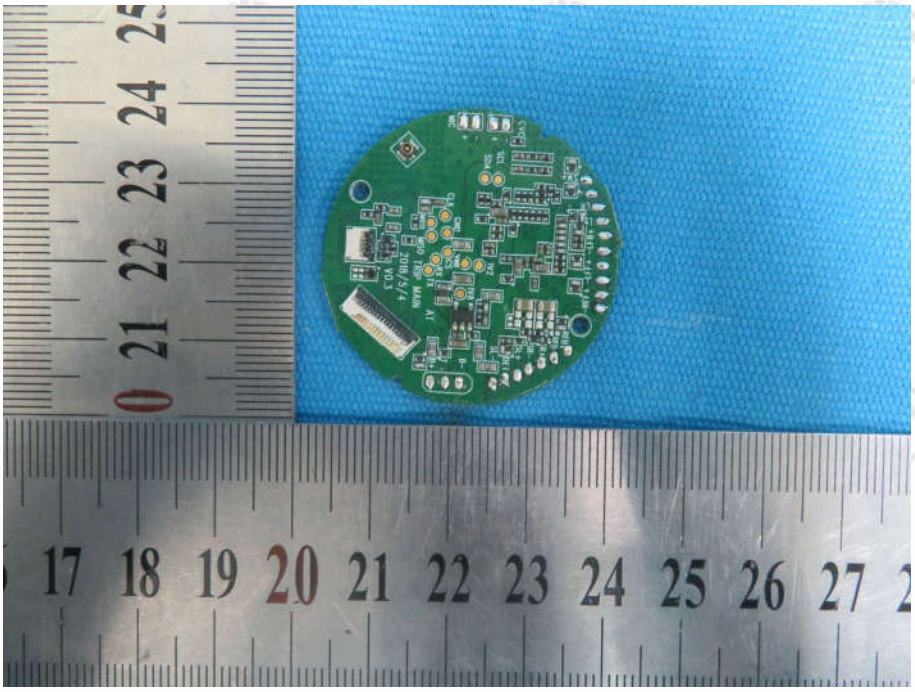
View of Product-9

View of Product-10

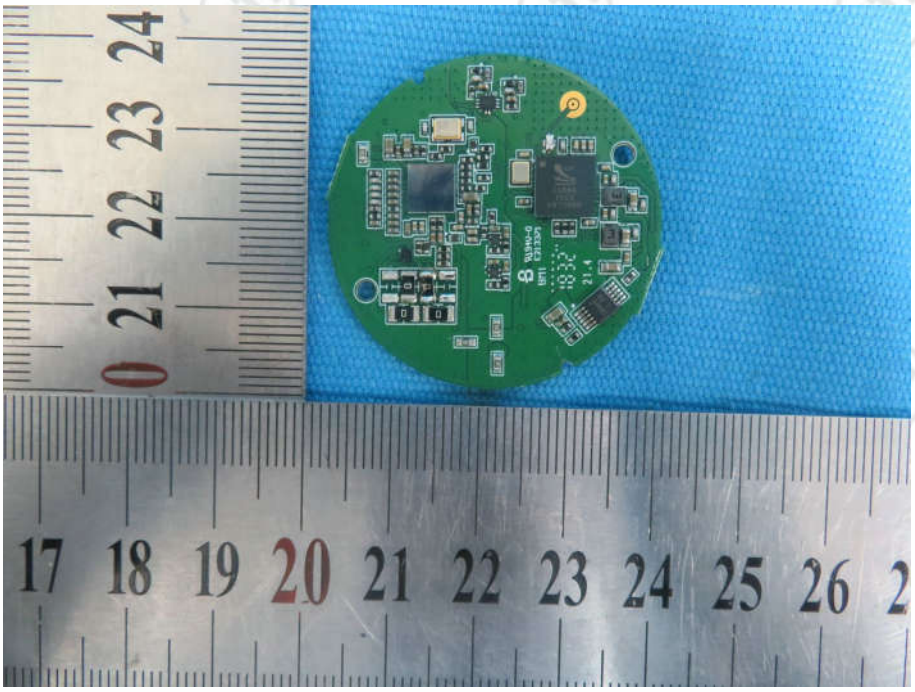
View of Product-11



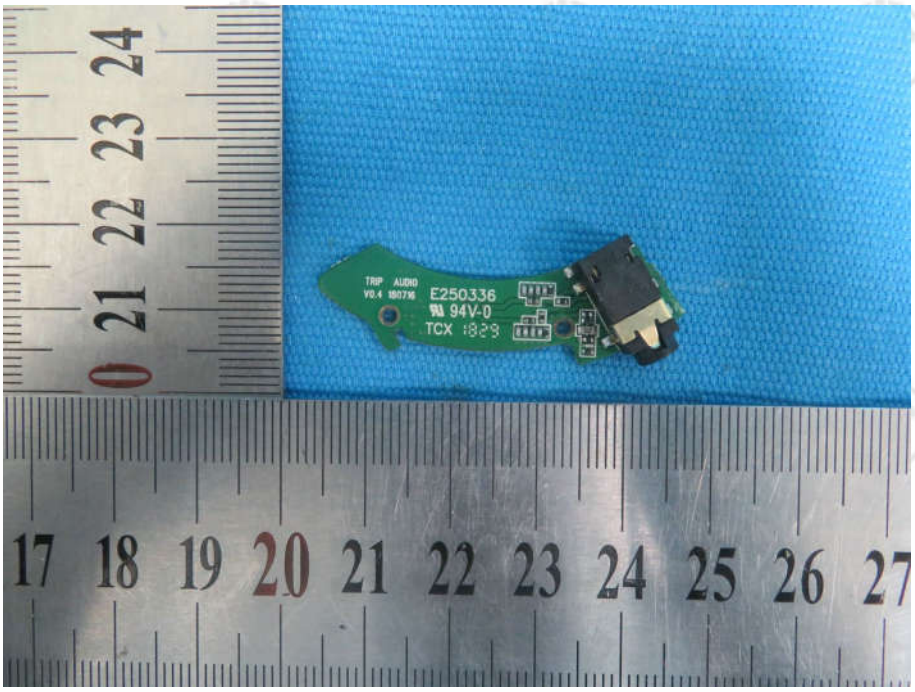
View of Product-12



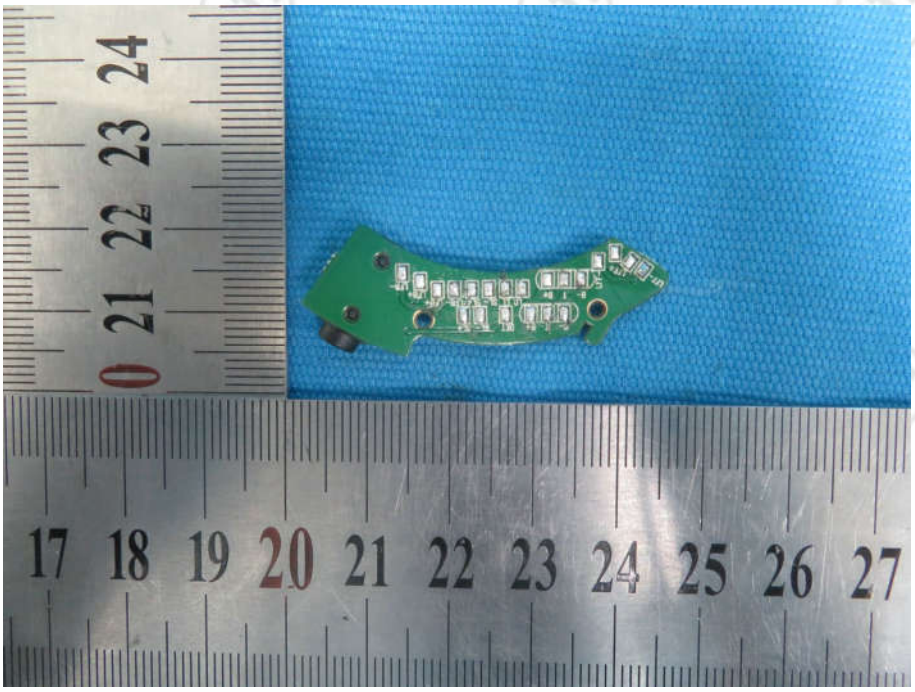
View of Product-13



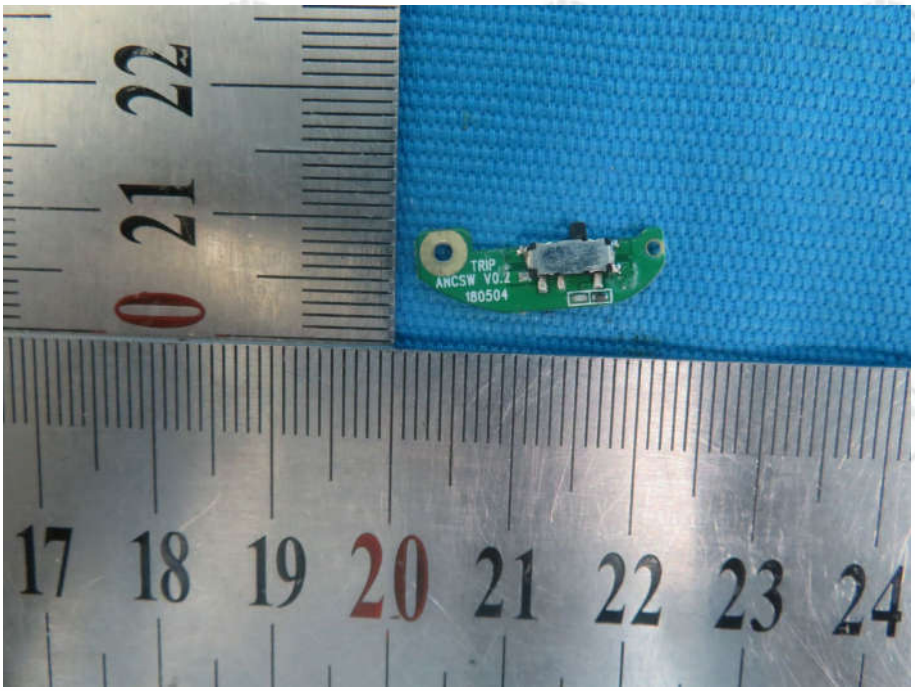
View of Product-14



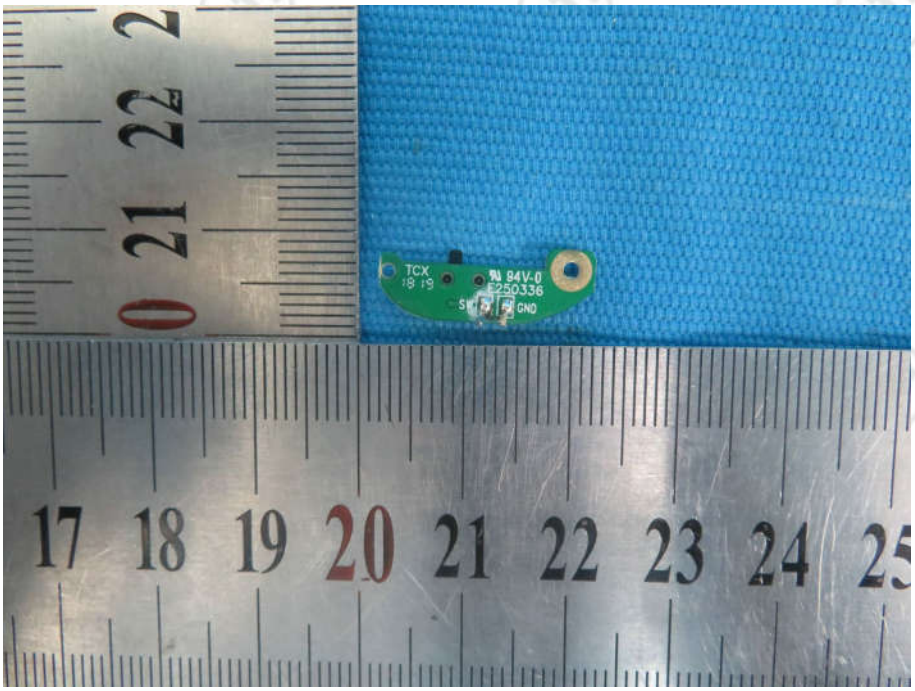
View of Product-15



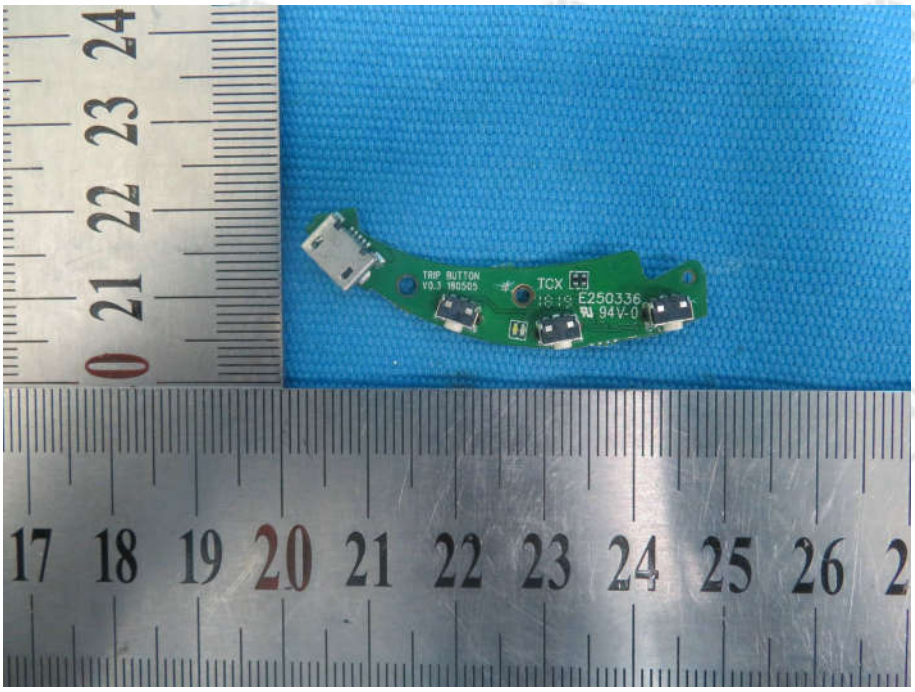
View of Product-16



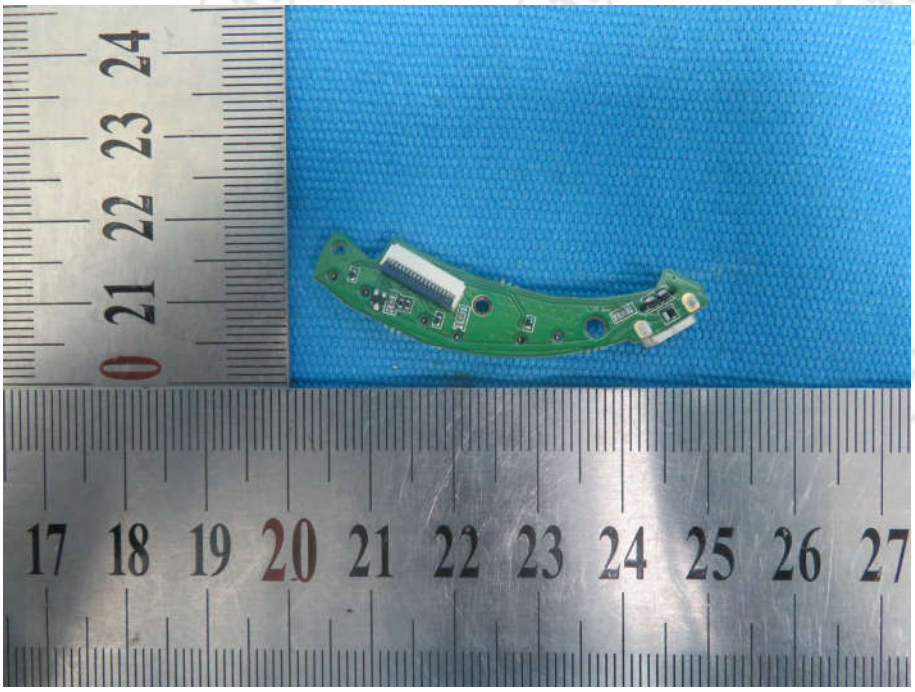
View of Product-17



View of Product-18



View of Product-19

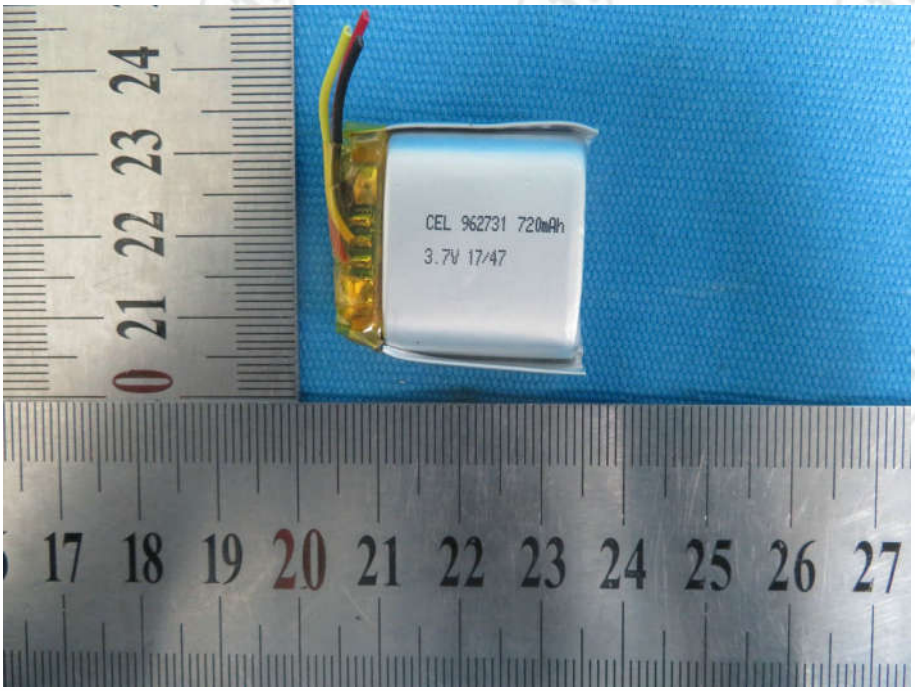


View of Product-20

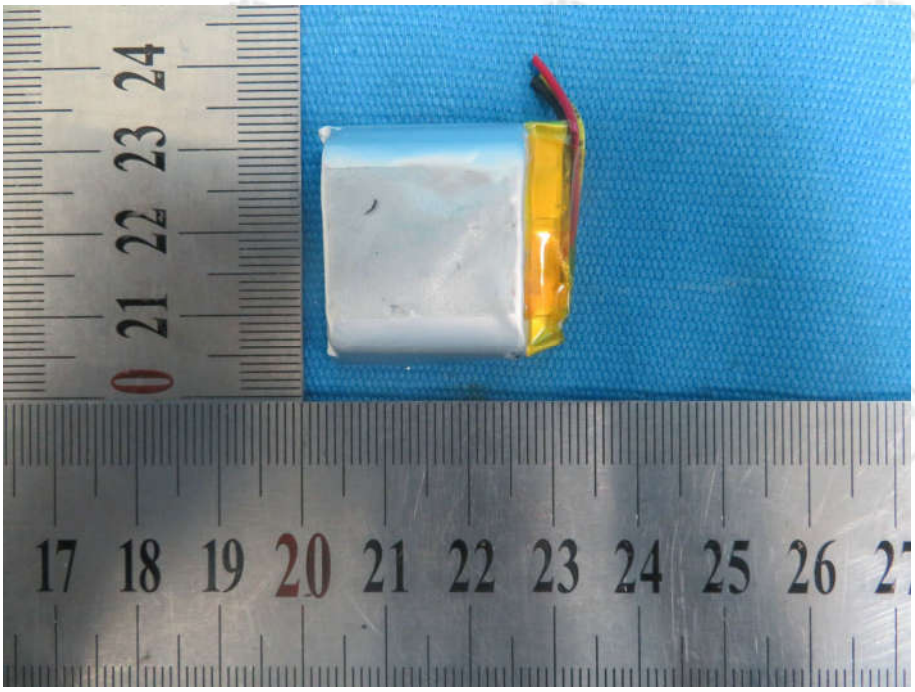
View of Product-21

View of Product-22

View of Product-23



View of Product-24



View of Product-25

*** End of Report ***

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.