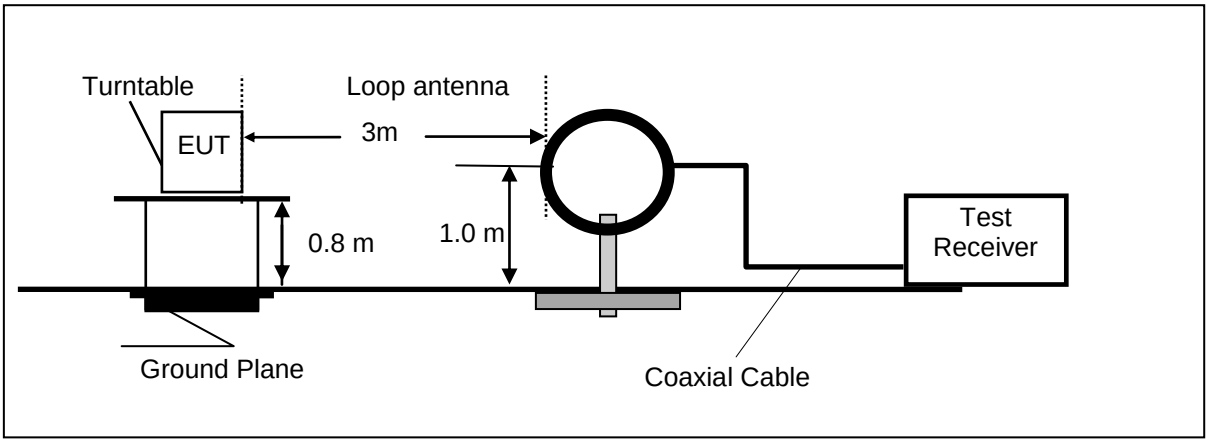
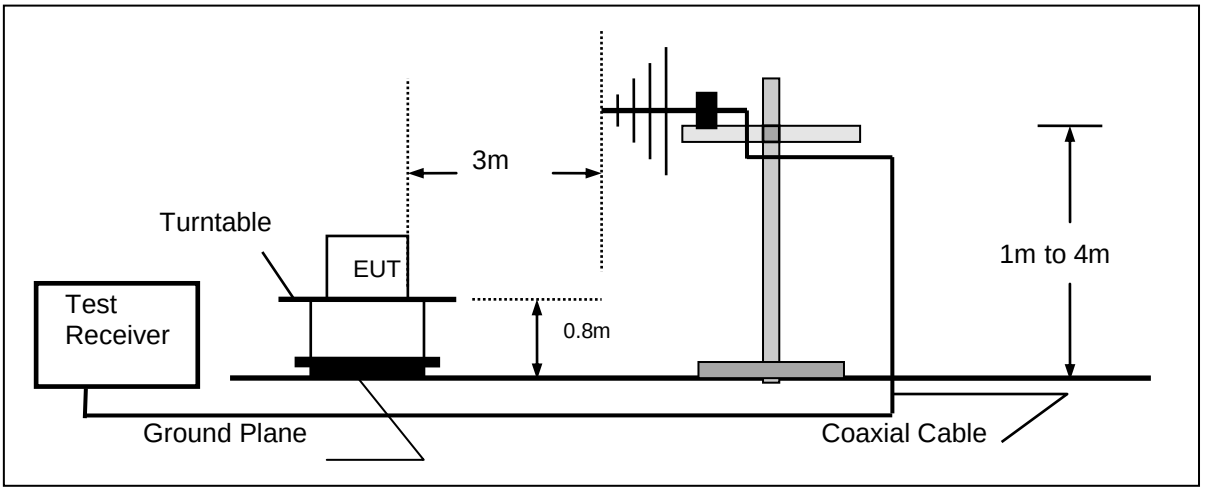
4.2. Radiated Emission

TEST CONFIGURATION

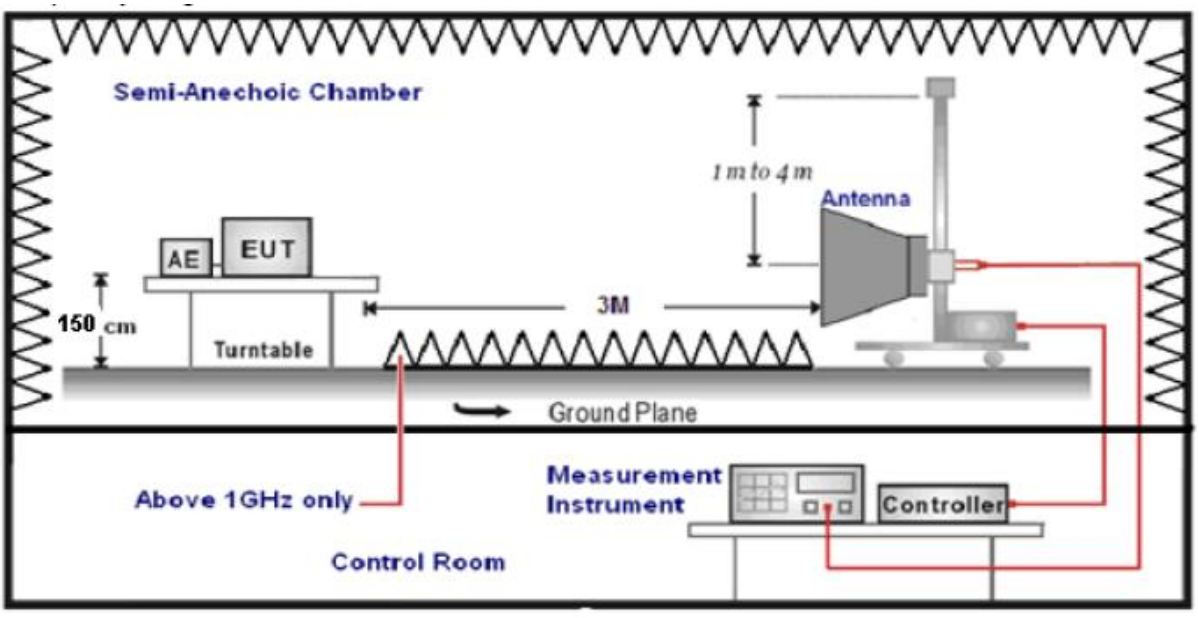
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 30MHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

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

FS = RA + AF + CL - AG

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

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark: We measured Radiated Emission at GFSK mode from 9KHz to 25GHz in AC120V and the worst case was recorded.

Temperature	25℃	Humidity	55%
Test Engineer	Lushan Kong	Configurations	BT

For 9 KHz~30MHz

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

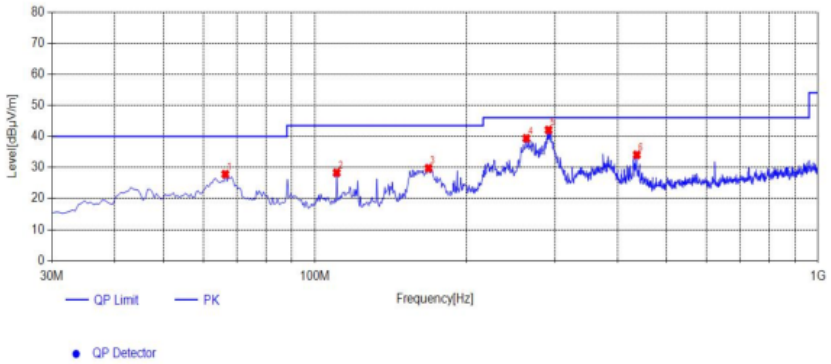
Note:
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

For 30MHz-1GHz
Version A:

Adapter: ADS-65HI-19A-124036F

Horizontal

Test Graph



Suspected List

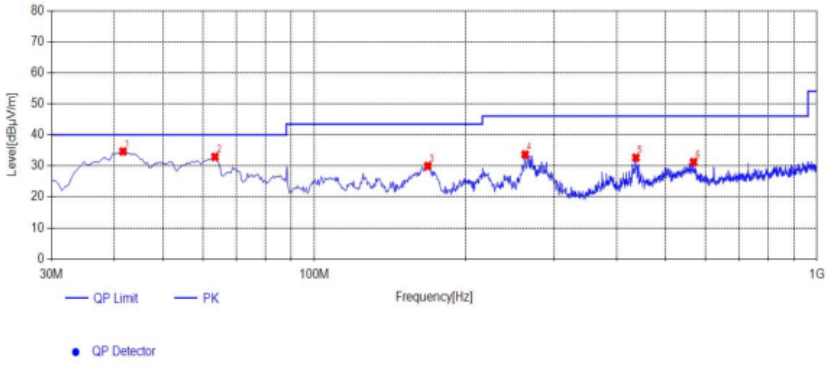
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	40.91	-13.06	27.85	40.00	12.15	100	109	PK	Horizonta	PASS
2	110.51	39.87	-11.56	28.31	43.50	15.19	100	99	PK	Horizonta	PASS
3	168.225	42.55	-12.78	29.77	43.50	13.73	100	286	PK	Horizonta	PASS
4	263.285	47.51	-8.14	39.37	46.00	6.63	100	315	PK	Horizonta	PASS
5	291.415	49.71	-7.64	42.07	46.00	3.93	100	355	PK	Horizonta	PASS
6	436.43	38.20	-4.13	34.07	46.00	11.93	100	189	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.64	46.31	-11.68	34.63	40.00	5.37	100	289	PK	Vertical	PASS
2	63.465	45.08	-12.18	32.90	40.00	7.10	100	154	PK	Vertical	PASS
3	168.225	42.73	-12.78	29.95	43.50	13.55	100	71	PK	Vertical	PASS
4	262.8	41.82	-8.17	33.65	46.00	12.35	100	147	PK	Vertical	PASS
5	436.43	36.76	-4.13	32.63	46.00	13.37	100	331	PK	Vertical	PASS
6	568.35	32.29	-1.06	31.23	46.00	14.77	100	334	PK	Vertical	PASS

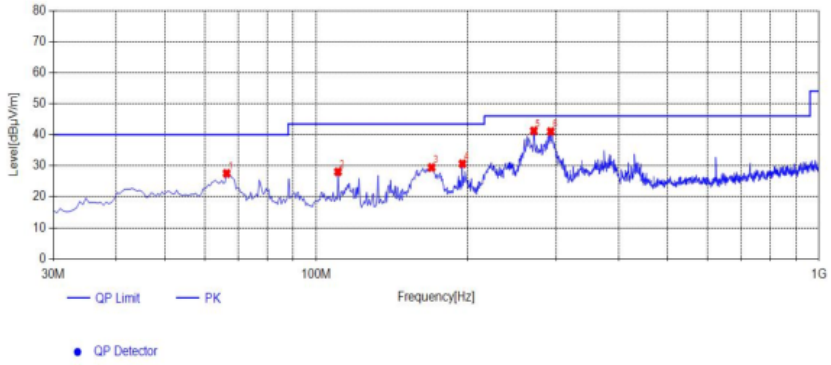
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: SOY-2400150-332-A

Horizontal

Test Graph



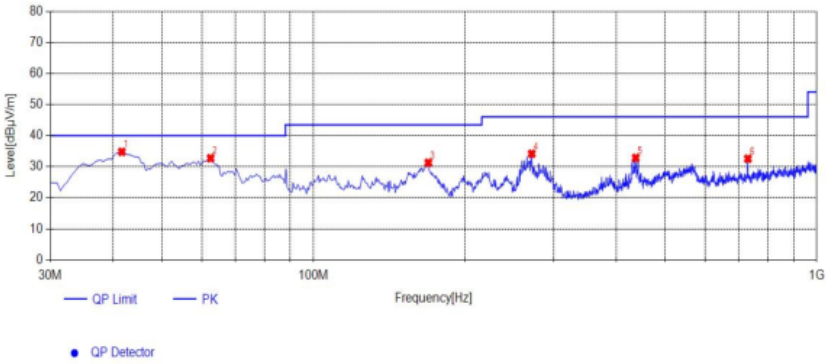
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	40.61	-13.06	27.55	40.00	12.45	100	86	PK	Horizonta	PASS
2	110.51	39.61	-11.56	28.05	43.50	15.45	100	80	PK	Horizonta	PASS
3	169.68	42.21	-12.75	29.46	43.50	14.04	100	269	PK	Horizonta	PASS
4	195.385	41.27	-10.61	30.66	43.50	12.84	100	40	PK	Horizonta	PASS
5	271.045	49.13	-7.88	41.25	46.00	4.75	100	288	PK	Horizonta	PASS
6	292.87	48.65	-7.61	41.04	46.00	4.96	100	193	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.64	46.46	-11.68	34.78	40.00	5.22	100	240	PK	Vertical	PASS
2	62.495	44.63	-11.89	32.74	40.00	7.26	100	154	PK	Vertical	PASS
3	169.195	44.03	-12.75	31.28	43.50	12.22	100	69	PK	Vertical	PASS
4	271.53	42.03	-7.87	34.16	46.00	11.84	100	144	PK	Vertical	PASS
5	436.915	36.95	-4.12	32.83	46.00	13.17	100	342	PK	Vertical	PASS
6	729.855	31.69	0.87	32.56	46.00	13.44	100	329	PK	Vertical	PASS

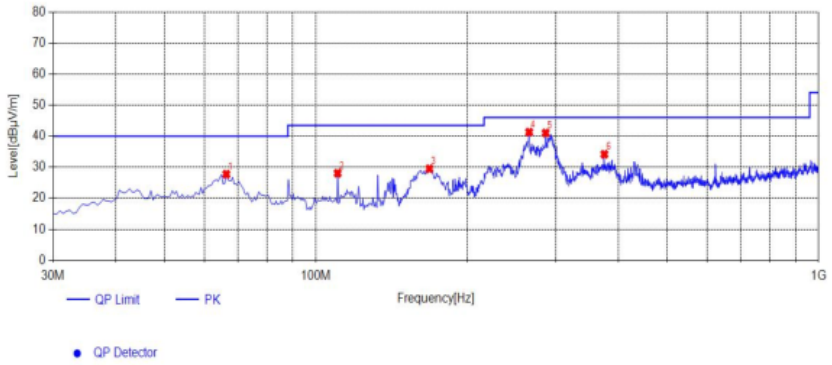
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: CYZS36-240150

Horizontal

Test Graph



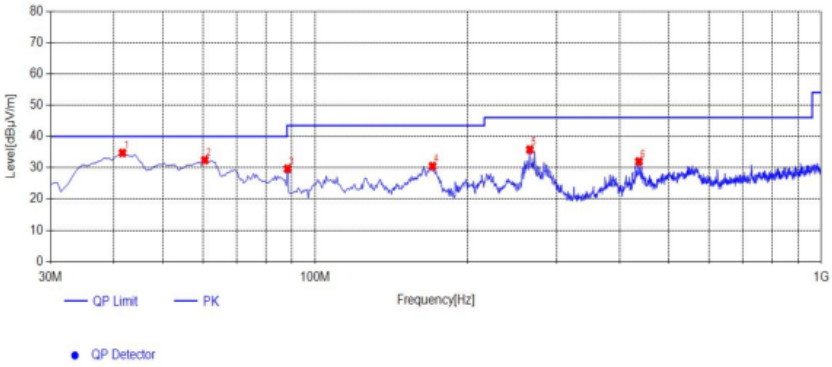
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	40.83	-13.06	27.77	40.00	12.23	100	276	PK	Horizonta	PASS
2	110.51	39.62	-11.56	28.06	43.50	15.44	100	105	PK	Horizonta	PASS
3	168.225	42.30	-12.78	29.52	43.50	13.98	100	289	PK	Horizonta	PASS
4	265.71	49.36	-8.05	41.31	46.00	4.69	100	303	PK	Horizonta	PASS
5	286.565	48.75	-7.71	41.04	46.00	4.96	100	250	PK	Horizonta	PASS
6	374.835	39.89	-5.71	34.18	46.00	11.82	100	236	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.64	46.41	-11.68	34.73	40.00	5.27	100	272	PK	Vertical	PASS
2	60.555	43.86	-11.42	32.44	40.00	7.56	100	163	PK	Vertical	PASS
3	88.2	43.17	-13.50	29.67	43.50	13.83	100	36	PK	Vertical	PASS
4	170.65	43.22	-12.71	30.51	43.50	12.99	100	88	PK	Vertical	PASS
5	265.71	43.86	-8.05	35.81	46.00	10.19	100	147	PK	Vertical	PASS
6	436.43	36.11	-4.13	31.98	46.00	14.02	100	337	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

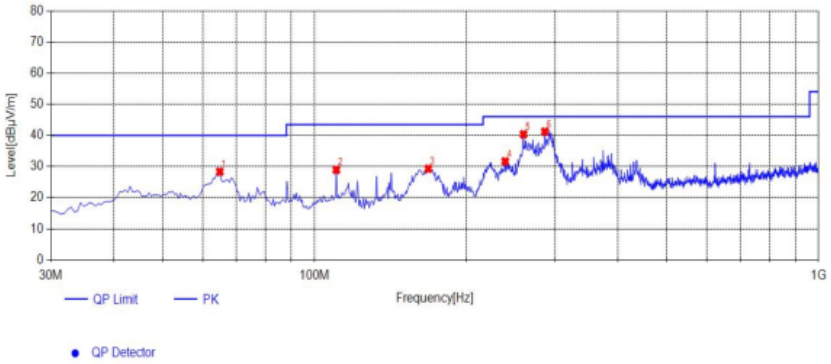
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Version B:

Adapter: ADS-65HI-19A-124036F

Horizontal

Test Graph



Suspected List

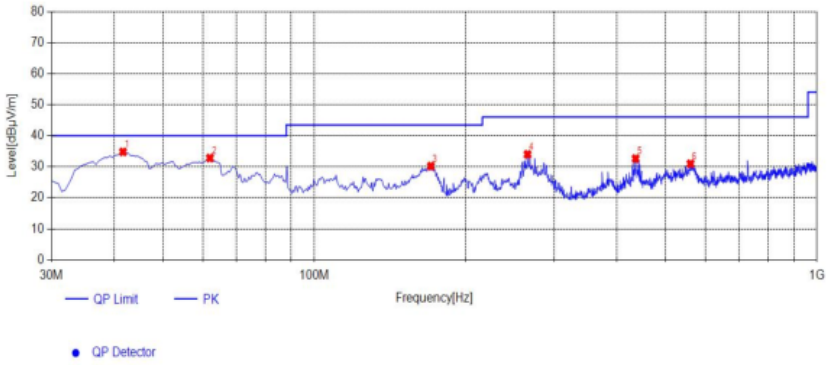
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	64.92	40.98	-12.63	28.35	40.00	11.65	100	281	PK	Horizonta	PASS
2	110.51	40.52	-11.56	28.96	43.50	14.54	100	87	PK	Horizonta	PASS
3	168.225	42.09	-12.78	29.31	43.50	14.19	100	274	PK	Horizonta	PASS
4	239.035	40.75	-9.09	31.66	46.00	14.34	100	30	PK	Horizonta	PASS
5	259.89	48.64	-8.28	40.36	46.00	5.64	100	300	PK	Horizonta	PASS
6	286.565	48.93	-7.71	41.22	46.00	4.78	100	212	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.64	46.48	-11.68	34.80	40.00	5.20	100	192	PK	Vertical	PASS
2	62.01	44.58	-11.76	32.82	40.00	7.18	100	156	PK	Vertical	PASS
3	170.65	42.92	-12.71	30.21	43.50	13.29	100	81	PK	Vertical	PASS
4	265.71	42.05	-8.05	34.00	46.00	12.00	100	124	PK	Vertical	PASS
5	435.945	36.80	-4.16	32.64	46.00	13.36	100	340	PK	Vertical	PASS
6	560.59	32.18	-1.21	30.97	46.00	15.03	100	340	PK	Vertical	PASS

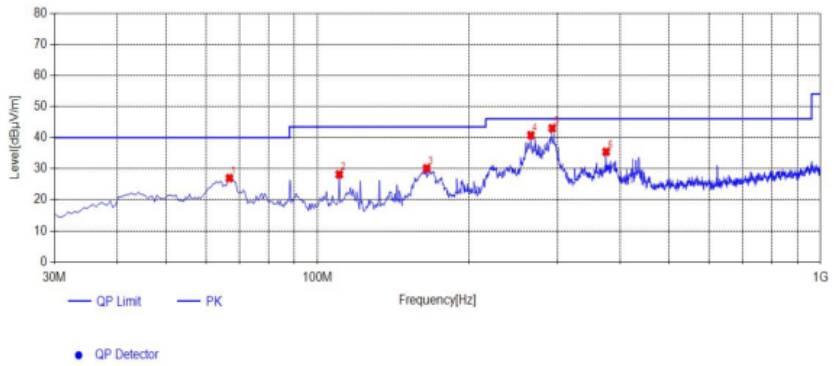
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: SOY-2400150-332-A

Horizontal

Test Graph



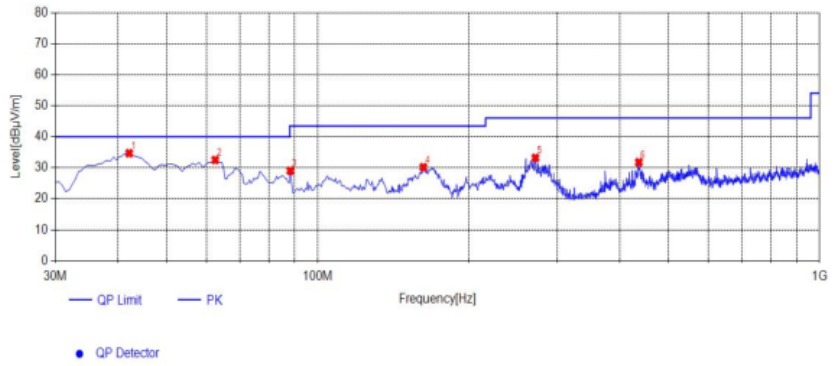
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.86	40.20	-13.20	27.00	40.00	13.00	100	102	PK	Horizonta	PASS
2	110.51	39.74	-11.56	28.18	43.50	15.32	100	92	PK	Horizonta	PASS
3	164.83	43.03	-12.89	30.14	43.50	13.36	100	290	PK	Horizonta	PASS
4	265.71	48.84	-8.05	40.79	46.00	5.21	100	290	PK	Horizonta	PASS
5	292.87	50.62	-7.61	43.01	46.00	2.99	100	211	PK	Horizonta	PASS
6	374.835	41.16	-5.71	35.45	46.00	10.55	100	224	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	42.125	46.28	-11.60	34.68	40.00	5.32	100	193	PK	Vertical	PASS
2	62.495	44.39	-11.89	32.50	40.00	7.50	100	186	PK	Vertical	PASS
3	88.2	42.55	-13.50	29.05	43.50	14.45	100	57	PK	Vertical	PASS
4	162.405	43.22	-13.05	30.17	43.50	13.33	100	239	PK	Vertical	PASS
5	271.53	41.05	-7.87	33.18	46.00	12.82	100	147	PK	Vertical	PASS
6	436.43	35.88	-4.13	31.75	46.00	14.25	100	321	PK	Vertical	PASS

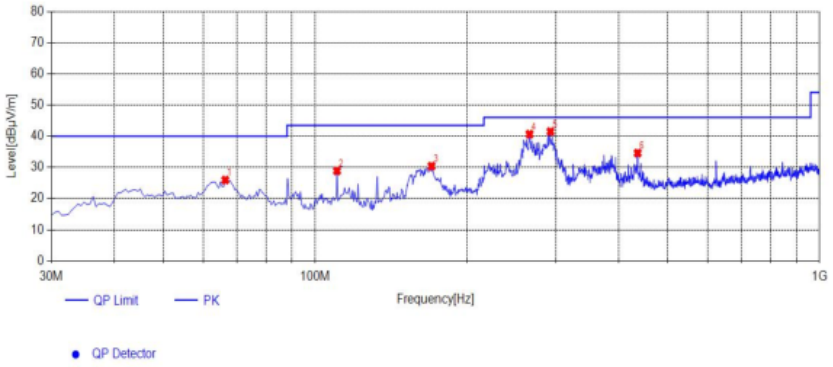
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: CYZS36-240150

Horizontal

Test Graph



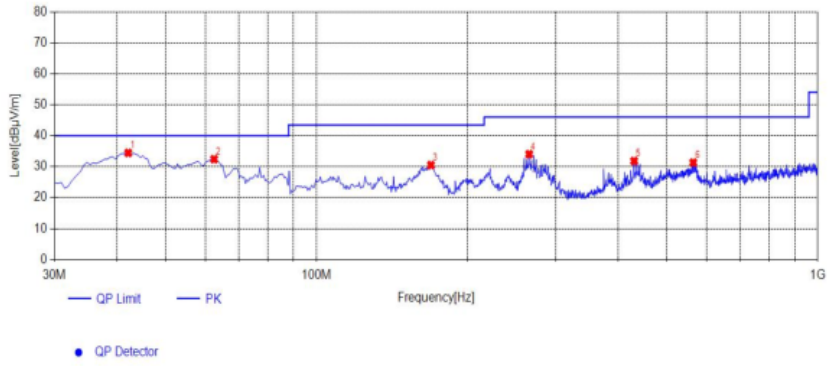
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	39.00	-13.06	25.94	40.00	14.06	100	275	PK	Horizonta	PASS
2	110.51	40.45	-11.56	28.89	43.50	14.61	100	88	PK	Horizonta	PASS
3	170.165	43.13	-12.73	30.40	43.50	13.10	100	272	PK	Horizonta	PASS
4	266.195	48.68	-8.03	40.65	46.00	5.35	100	295	PK	Horizonta	PASS
5	292.87	49.09	-7.61	41.48	46.00	4.52	100	255	PK	Horizonta	PASS
6	435.945	38.75	-4.16	34.59	46.00	11.41	100	187	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	42.125	46.06	-11.60	34.46	40.00	5.54	100	257	PK	Vertical	PASS
2	62.495	44.31	-11.89	32.42	40.00	7.58	100	162	PK	Vertical	PASS
3	169.195	43.27	-12.75	30.52	43.50	12.98	100	60	PK	Vertical	PASS
4	265.71	42.08	-8.05	34.03	46.00	11.97	100	122	PK	Vertical	PASS
5	430.125	36.16	-4.33	31.83	46.00	14.17	100	323	PK	Vertical	PASS
6	564.47	32.47	-1.13	31.34	46.00	14.66	100	323	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

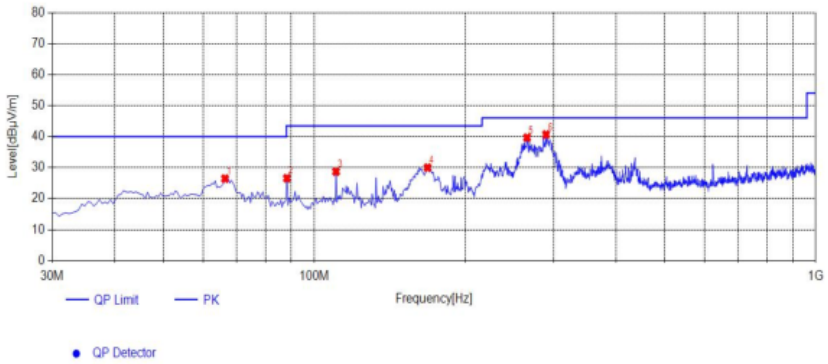
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Version C:

Adapter: ADS-65HI-19A-124036F

Horizontal

Test Graph



Suspected List

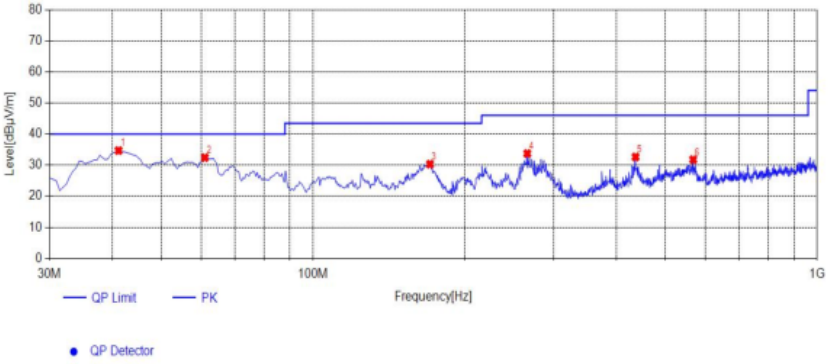
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	39.51	-13.06	26.45	40.00	13.55	100	74	PK	Horizonta	PASS
2	88.2	40.08	-13.50	26.58	43.50	16.92	100	358	PK	Horizonta	PASS
3	110.51	40.28	-11.56	28.72	43.50	14.78	100	97	PK	Horizonta	PASS
4	168.225	42.79	-12.78	30.01	43.50	13.49	100	275	PK	Horizonta	PASS
5	265.71	47.73	-8.05	39.68	46.00	6.32	100	304	PK	Horizonta	PASS
6	289.96	48.34	-7.66	40.68	46.00	5.32	100	248	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.155	46.47	-11.77	34.70	40.00	5.30	100	285	PK	Vertical	PASS
2	61.04	43.96	-11.54	32.42	40.00	7.58	100	203	PK	Vertical	PASS
3	170.65	43.03	-12.71	30.32	43.50	13.18	100	72	PK	Vertical	PASS
4	266.195	41.78	-8.03	33.75	46.00	12.25	100	147	PK	Vertical	PASS
5	436.43	36.77	-4.13	32.64	46.00	13.36	100	331	PK	Vertical	PASS
6	567.865	32.85	-1.07	31.78	46.00	14.22	100	315	PK	Vertical	PASS

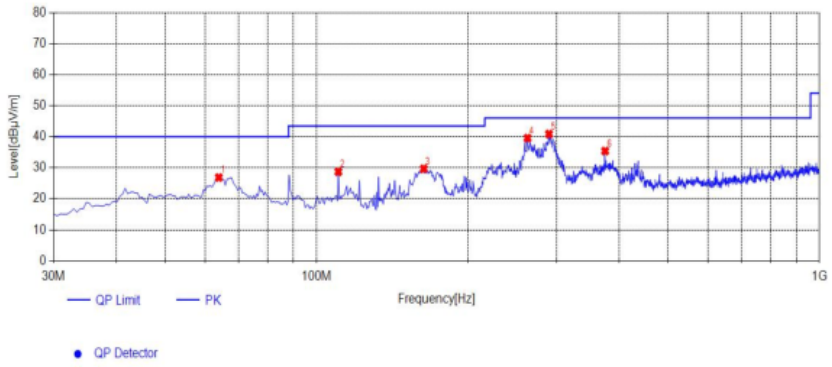
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: SOY-2400150-332-A

Horizontal

Test Graph



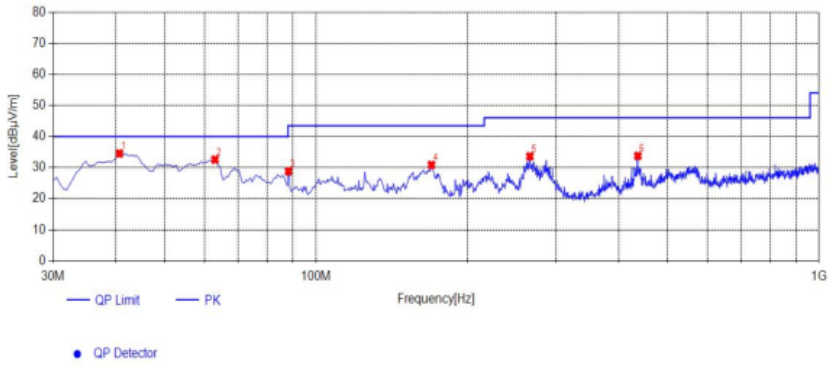
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	63.95	39.20	-12.34	26.86	40.00	13.14	100	308	PK	Horizonta	PASS
2	110.51	40.29	-11.56	28.73	43.50	14.77	100	81	PK	Horizonta	PASS
3	163.375	42.65	-12.98	29.67	43.50	13.83	100	288	PK	Horizonta	PASS
4	262.8	47.73	-8.17	39.56	46.00	6.44	100	295	PK	Horizonta	PASS
5	289.96	48.52	-7.66	40.86	46.00	5.14	100	278	PK	Horizonta	PASS
6	374.835	41.11	-5.71	35.40	46.00	10.60	100	228	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	40.67	46.40	-11.85	34.55	40.00	5.45	100	262	PK	Vertical	PASS
2	62.98	44.58	-12.03	32.55	40.00	7.45	100	140	PK	Vertical	PASS
3	88.2	42.32	-13.50	28.82	43.50	14.68	100	137	PK	Vertical	PASS
4	169.68	43.62	-12.75	30.87	43.50	12.63	100	72	PK	Vertical	PASS
5	266.195	41.64	-8.03	33.61	46.00	12.39	100	147	PK	Vertical	PASS
6	436.43	37.90	-4.13	33.77	46.00	12.23	100	335	PK	Vertical	PASS

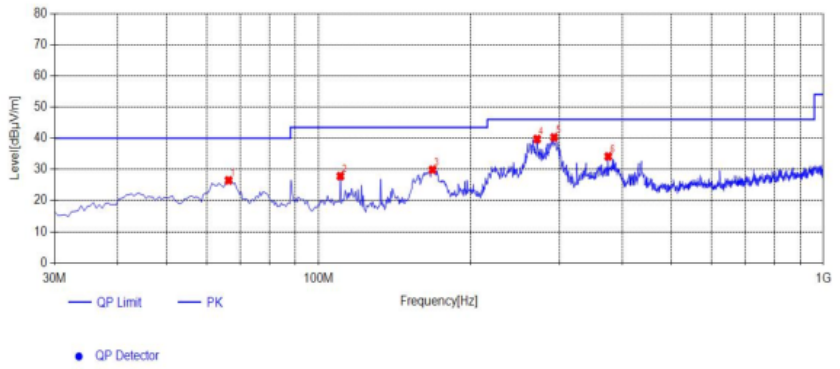
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: CYZS36-240150

Horizontal

Test Graph



Suspected List

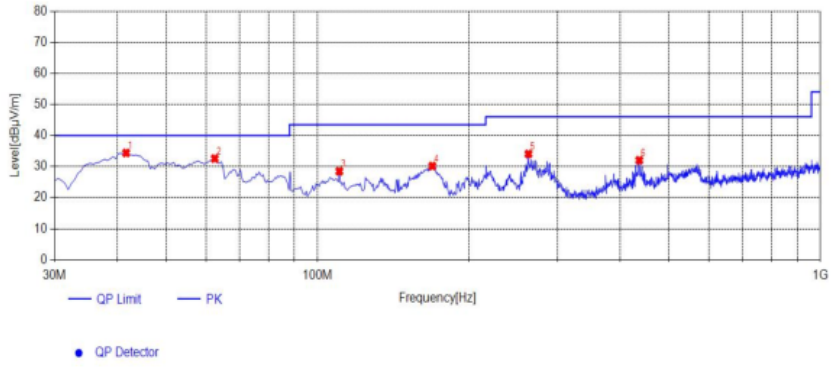
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	39.54	-13.06	26.48	40.00	13.52	100	273	PK	Horizonta	PASS
2	110.51	39.41	-11.56	27.85	43.50	15.65	100	111	PK	Horizonta	PASS
3	168.225	42.66	-12.78	29.88	43.50	13.62	100	283	PK	Horizonta	PASS
4	271.045	47.62	-7.88	39.74	46.00	6.26	100	306	PK	Horizonta	PASS
5	292.87	47.87	-7.61	40.26	46.00	5.74	100	240	PK	Horizonta	PASS
6	374.835	39.86	-5.71	34.15	46.00	11.85	100	220	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.64	46.09	-11.68	34.41	40.00	5.59	100	358	PK	Vertical	PASS
2	62.495	44.47	-11.89	32.58	40.00	7.42	100	150	PK	Vertical	PASS
3	110.51	40.06	-11.56	28.50	43.50	15.00	100	45	PK	Vertical	PASS
4	169.195	42.93	-12.75	30.18	43.50	13.32	100	82	PK	Vertical	PASS
5	262.8	42.23	-8.17	34.06	46.00	11.94	100	144	PK	Vertical	PASS
6	436.43	36.17	-4.13	32.04	46.00	13.96	100	341	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

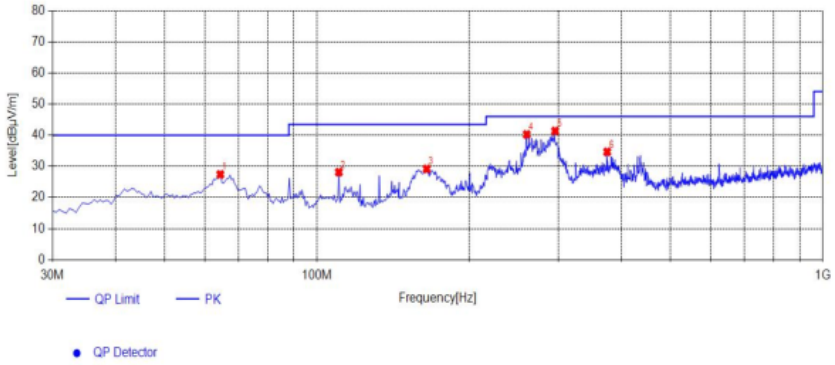
2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Version D:

Adapter: ADS-65HI-19A-124036F

Horizontal

Test Graph



Suspected List

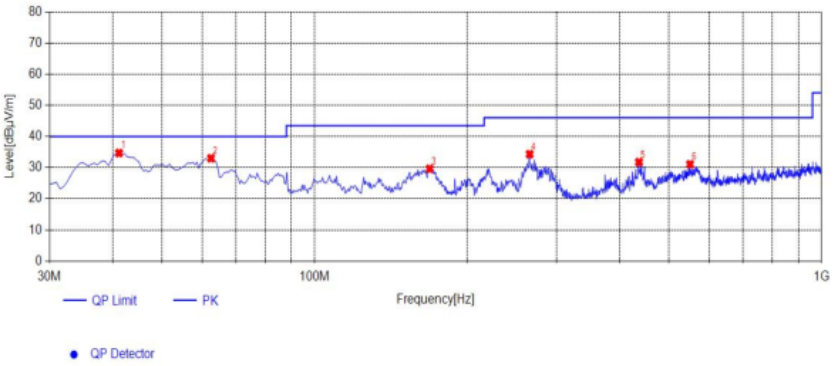
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	64.435	39.90	-12.48	27.42	40.00	12.58	100	285	PK	Horizonta	PASS
2	110.51	39.69	-11.56	28.13	43.50	15.37	100	108	PK	Horizonta	PASS
3	164.83	42.09	-12.89	29.20	43.50	14.30	100	295	PK	Horizonta	PASS
4	259.89	48.54	-8.28	40.26	46.00	5.74	100	289	PK	Horizonta	PASS
5	295.78	48.94	-7.58	41.36	46.00	4.64	100	190	PK	Horizonta	PASS
6	374.835	40.37	-5.71	34.66	46.00	11.34	100	220	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.155	46.47	-11.77	34.70	40.00	5.30	100	6	PK	Vertical	PASS
2	62.495	44.90	-11.89	33.01	40.00	6.99	100	193	PK	Vertical	PASS
3	168.71	42.39	-12.76	29.63	43.50	13.87	100	62	PK	Vertical	PASS
4	265.71	42.37	-8.05	34.32	46.00	11.68	100	137	PK	Vertical	PASS
5	436.43	35.90	-4.13	31.77	46.00	14.23	100	350	PK	Vertical	PASS
6	550.405	32.54	-1.47	31.07	46.00	14.93	100	344	PK	Vertical	PASS

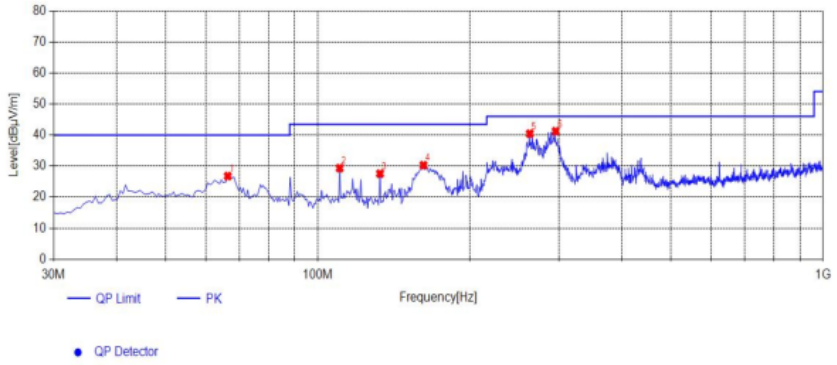
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: SOY-2400150-332-A

Horizontal

Test Graph



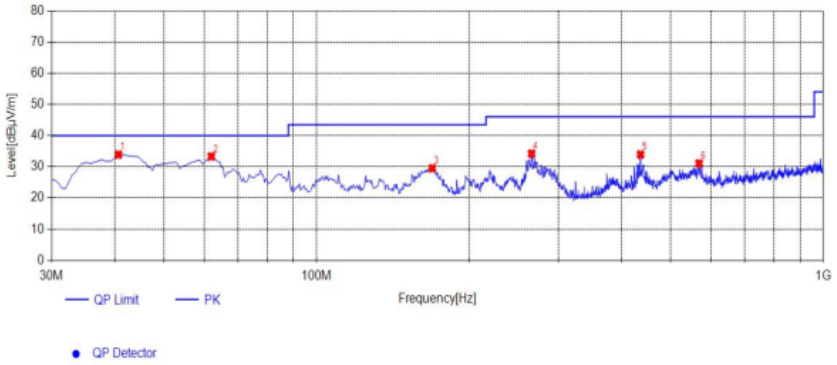
Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	39.86	-13.06	26.80	40.00	13.20	100	259	PK	Horizonta	PASS
2	110.51	40.90	-11.56	29.34	43.50	14.16	100	94	PK	Horizonta	PASS
3	132.82	41.42	-13.85	27.57	43.50	15.93	100	88	PK	Horizonta	PASS
4	161.92	43.38	-13.08	30.30	43.50	13.20	100	288	PK	Horizonta	PASS
5	262.8	48.62	-8.17	40.45	46.00	5.55	100	315	PK	Horizonta	PASS
6	295.78	48.82	-7.58	41.24	46.00	4.76	100	232	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List											
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	40.67	45.77	-11.85	33.92	40.00	6.08	100	354	PK	Vertical	PASS
2	62.01	45.06	-11.76	33.30	40.00	6.70	100	194	PK	Vertical	PASS
3	169.195	42.26	-12.75	29.51	43.50	13.99	100	85	PK	Vertical	PASS
4	265.71	42.26	-8.05	34.21	46.00	11.79	100	132	PK	Vertical	PASS
5	435.945	38.09	-4.16	33.93	46.00	12.07	100	351	PK	Vertical	PASS
6	568.835	32.11	-1.05	31.06	46.00	14.94	100	322	PK	Vertical	PASS

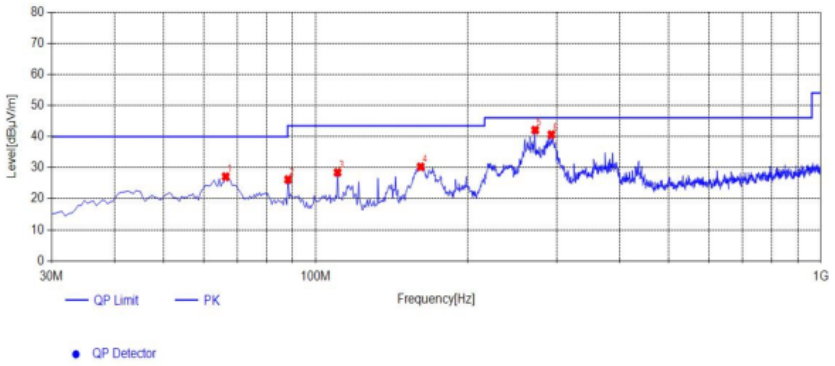
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Adapter: CYZS36-240150

Horizontal

Test Graph



Suspected List

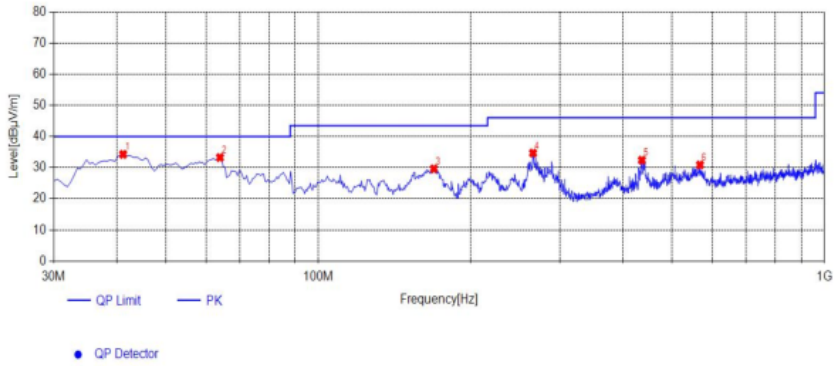
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	66.375	40.20	-13.06	27.14	40.00	12.86	100	85	PK	Horizonta	PASS
2	88.2	39.70	-13.50	26.20	43.50	17.30	100	112	PK	Horizonta	PASS
3	110.51	40.03	-11.56	28.47	43.50	15.03	100	72	PK	Horizonta	PASS
4	161.435	43.41	-13.12	30.29	43.50	13.21	100	282	PK	Horizonta	PASS
5	272.015	49.95	-7.86	42.09	46.00	3.91	100	288	PK	Horizonta	PASS
6	292.87	48.26	-7.61	40.65	46.00	5.35	100	226	PK	Horizonta	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Vertical

Test Graph



Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	41.155	46.04	-11.77	34.27	40.00	5.73	100	2	PK	Vertical	PASS
2	63.95	45.59	-12.34	33.25	40.00	6.75	100	207	PK	Vertical	PASS
3	169.195	42.37	-12.75	29.62	43.50	13.88	100	48	PK	Vertical	PASS
4	265.71	42.74	-8.05	34.69	46.00	11.31	100	138	PK	Vertical	PASS
5	435.945	36.57	-4.16	32.41	46.00	13.59	100	360	PK	Vertical	PASS
6	567.865	31.96	-1.07	30.89	46.00	15.11	100	338	PK	Vertical	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

Note: All modes have been tested and the worst mode is recorded in the report, NFC has two optional antennas, with the worst mode recorded in the report (NFC antenna Model:DS2-52).

For 1GHz to 25GHz

BT LE

Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	50.78	32.44	30.25	7.95	60.92	74.00	-13.08	Peak	Horizontal
4804.00	35.11	32.44	30.25	7.95	45.25	54.00	-8.75	Average	Horizontal
4804.00	53.96	32.44	30.25	7.95	64.10	74.00	-9.90	Peak	Vertical
4804.00	35.56	32.44	30.25	7.95	45.70	54.00	-8.30	Average	Vertical

Channel 19 / 2440 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.00	49.78	32.52	30.31	8.12	60.11	74.00	-13.89	Peak	Horizontal
4880.00	36.01	32.52	30.31	8.12	46.34	54.00	-7.66	Average	Horizontal
4880.00	50.94	32.52	30.31	8.12	61.27	74.00	-12.73	Peak	Vertical
4880.00	36.32	32.52	30.31	8.12	46.65	54.00	-7.35	Average	Vertical

Channel 39 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	51.42	32.68	30.27	7.88	61.71	74.00	-12.29	Peak	Horizontal
4960.00	35.32	32.68	30.27	7.88	45.61	54.00	-8.39	Average	Horizontal
4960.00	48.67	32.68	30.27	7.88	58.96	74.00	-15.04	Peak	Vertical
4960.00	31.18	32.68	30.27	7.88	41.47	54.00	-12.53	Average	Vertical

Note: All modes were tested and the worst mode was recorded in the report (version A_Adapter: ADS-65HI-19A-124036F_NFC antenna Model:DS2-52).

BT LE

Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	50.06	32.44	30.25	7.95	60.20	74.00	-13.80	Peak	Horizontal
4804.00	36.13	32.44	30.25	7.95	46.27	54.00	-7.73	Average	Horizontal
4804.00	54.69	32.44	30.25	7.95	64.83	74.00	-9.17	Peak	Vertical
4804.00	35.10	32.44	30.25	7.95	45.24	54.00	-8.76	Average	Vertical

Channel 19 / 2440 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.00	49.45	32.52	30.31	8.12	59.78	74.00	-14.22	Peak	Horizontal
4880.00	36.56	32.52	30.31	8.12	46.89	54.00	-7.11	Average	Horizontal
4880.00	51.62	32.52	30.31	8.12	61.95	74.00	-12.05	Peak	Vertical
4880.00	36.28	32.52	30.31	8.12	46.61	54.00	-7.39	Average	Vertical

Channel 39 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	50.22	32.68	30.27	7.88	60.51	74.00	-13.49	Peak	Horizontal
4960.00	36.22	32.68	30.27	7.88	46.51	54.00	-7.49	Average	Horizontal
4960.00	49.65	32.68	30.27	7.88	59.94	74.00	-14.06	Peak	Vertical
4960.00	32.30	32.68	30.27	7.88	42.59	54.00	-11.41	Average	Vertical

Note: All modes were tested and the worst mode was recorded in the report (version B_Adapter: ADS-65HI-19A-124036F_NFC antenna Model:DS2-52).

BT LE

Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	50.56	32.44	30.25	7.95	60.70	74.00	-13.30	Peak	Horizontal
4804.00	35.48	32.44	30.25	7.95	45.62	54.00	-8.38	Average	Horizontal
4804.00	53.30	32.44	30.25	7.95	63.44	74.00	-10.56	Peak	Vertical
4804.00	34.36	32.44	30.25	7.95	44.50	54.00	-9.50	Average	Vertical

Channel 19 / 2440 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.00	50.84	32.52	30.31	8.12	61.17	74.00	-12.83	Peak	Horizontal
4880.00	37.32	32.52	30.31	8.12	47.65	54.00	-6.35	Average	Horizontal
4880.00	51.59	32.52	30.31	8.12	61.92	74.00	-12.08	Peak	Vertical
4880.00	36.20	32.52	30.31	8.12	46.53	54.00	-7.47	Average	Vertical

Channel 39 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	50.56	32.68	30.27	7.88	60.85	74.00	-13.15	Peak	Horizontal
4960.00	35.72	32.68	30.27	7.88	46.01	54.00	-7.99	Average	Horizontal
4960.00	49.55	32.68	30.27	7.88	59.84	74.00	-14.16	Peak	Vertical
4960.00	32.31	32.68	30.27	7.88	42.60	54.00	-11.40	Average	Vertical

Note: All modes were tested and the worst mode was recorded in the report (version C_Adapter: ADS-65HI-19A-124036F_NFC antenna Model:DS2-52).

BT LE

Channel 0 / 2402 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	49.96	32.44	30.25	7.95	60.10	74.00	-13.90	Peak	Horizontal
4804.00	35.85	32.44	30.25	7.95	45.99	54.00	-8.01	Average	Horizontal
4804.00	52.96	32.44	30.25	7.95	63.10	74.00	-10.90	Peak	Vertical
4804.00	34.89	32.44	30.25	7.95	45.03	54.00	-8.97	Average	Vertical

Channel 19 / 2440 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4880.00	49.34	32.52	30.31	8.12	59.67	74.00	-14.33	Peak	Horizontal
4880.00	36.72	32.52	30.31	8.12	47.05	54.00	-6.95	Average	Horizontal
4880.00	51.33	32.52	30.31	8.12	61.66	74.00	-12.34	Peak	Vertical
4880.00	36.34	32.52	30.31	8.12	46.67	54.00	-7.33	Average	Vertical

Channel 39 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	50.91	32.68	30.27	7.88	61.20	74.00	-12.80	Peak	Horizontal
4960.00	35.36	32.68	30.27	7.88	45.65	54.00	-8.35	Average	Horizontal
4960.00	49.13	32.68	30.27	7.88	59.42	74.00	-14.58	Peak	Vertical
4960.00	31.82	32.68	30.27	7.88	42.11	54.00	-11.89	Average	Vertical

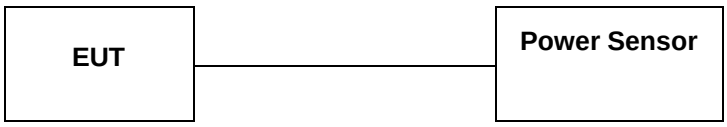
Note: All modes were tested and the worst mode was recorded in the report (version D_Adapter: ADS-65HI-19A-124036F_NFC antenna Model:DS2-52).

Notes:

1). Measuring frequencies from 9 KHz~10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
3). Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4). Measured= Reading- Pre. Fac.+ Ant. Fac.+ Cab. Loss
5). Margin = Measured- Limit

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 558074 D01 15.247 Measurement Guidance v05r02 Section 8.3.1 Maximum peak conducted output power, 8.3.1.3 The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

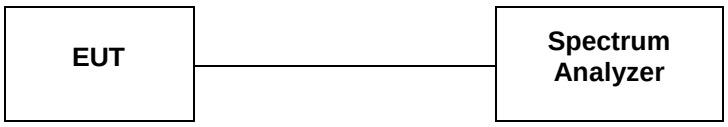
TEST RESULTS

For reporting purpose only.

Please refer to Appendix B.3.

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

1.Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2.Set the RBW =3 kHz.
3.Set the VBW =10 KHz.
4.Set the span to 1.5 times the DTS channel bandwidth.
5.Detector = peak.
6.Sweep time = auto couple.
7.Trace mode = max hold.
8.Allow trace to fully stabilize.
9.Use the peak marker function to determine the maximum power level.
10.If measured value exceeds limit,reduce RBW(no less than 3 kHz)and repeat.
11.The resulting peak PSD level must be 8 dBm.

LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

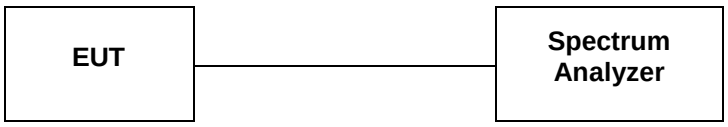
TEST RESULTS

For reporting purpose only.

Please refer to Appendix B.4.

4.5. 99% and 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz.
The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
According to KDB 558074 D01 DTS Meas Guidance v05r02 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

For reporting purpose only.

Please refer to Appendix B.1.

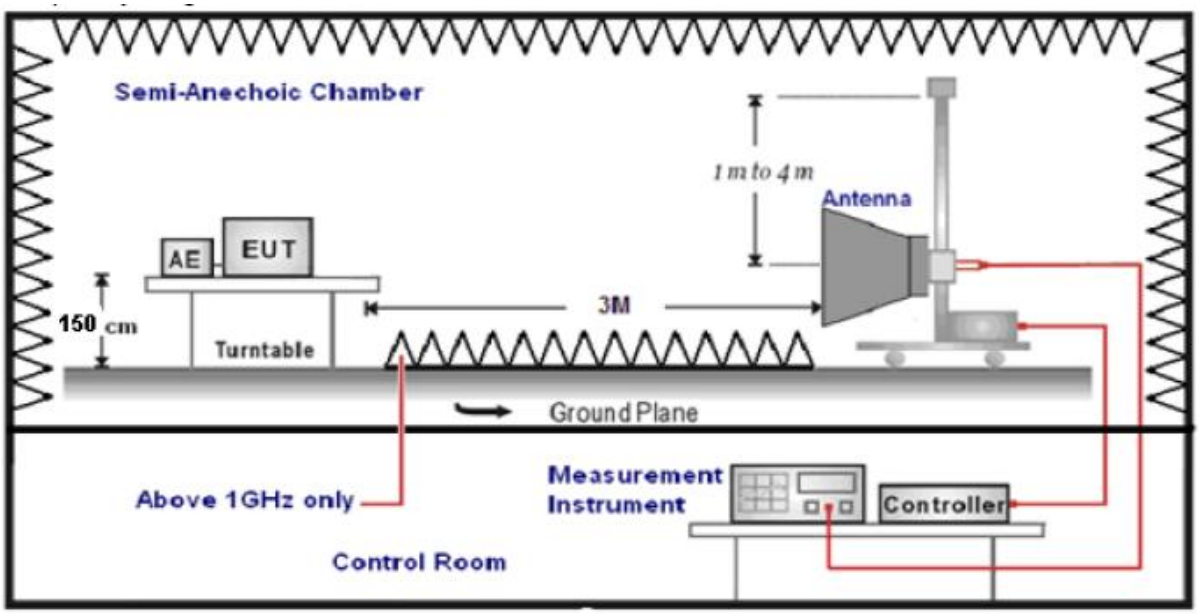
Please refer to Appendix B.2.

4.6. Conducted Spurious Emissions and Band Edge Compliance of RF Emission

TEST REQUIREMENT

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 conducted power limits. If the transmitter complies with the conducted 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1.The EUT was placed on a turn table which is 1.5m above ground plane.
2.Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3.And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4.Repeat above procedures until all frequency measurements have been completed..
5.The distance between test antenna and EUT was 3 meter:
6.Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

LIMIT

Below -20dB of the highest emission level in operating band.
Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)

TEST RESULTS

4.6.1 For Conducted at Restricted Band Measurement

For reporting purpose only.

Please refer to Appendix B.7.

4.6.2 For Conducted Bandedge Measurement

For reporting purpose only.

Please refer to Appendix B.5.

4.6.3 For Conducted Spurious Emissions Measurement

For reporting purpose only.

Please refer to Appendix B.6.

4.7. Antenna Requirement

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 (c), 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.

Test Result

The antenna used for this product is Internal Antenna and 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 only 2.05dBi.

Reference to the **Internal photos**.

5. TEST SETUP PHOTOS OF THE EUT

Reference to the Test Report: **CTA24103100101.**

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the Test Report: **CTA24103100101.**

.....End of Report.....