



FCC Part 15C Test Report

FCC ID: DLAMW-42BT

IC : 1599B-MW42BT

Applicant: TOA Corporation

Address: 1-10 Takamatsu-cho, Takarazuka, 665-0043 Japan

Manufacturer: TOA Corporation

Address: 1-10 Takamatsu-cho, Takarazuka, 665-0043 Japan

EUT: AUDIO INTERFACE WITH USB AND BLUETOOTH

Trade Mark: -

Model Number: MW-42BT-AM

Date of Receipt: Nov. 20, 2025

Test Date: Nov. 20, 2025-Nov. 27, 2025

Date of Report: Nov. 27, 2025

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

FCC PART 15 C 15.247

ANSI C63.10:2020

Applicable Standards: RSS-247 issue 3 August 2023

RSS-Gen Issue 5, April 2018+Amendment 1, March 2019+Amendment 2, February 2021

ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024

Test Result: Pass

Report Number: DLE-250815043R

Prepared (Test Engineer): Alisa Song

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



Table of Contents	Page
1. SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	5
2. GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF TEST MODES	7
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	7
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	8
2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING	8
2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS	9
3. EMC EMISSION TEST	10
3.1 CONDUCTED EMISSION MEASUREMENT	10
3.1.1 POWER LINE CONDUCTED EMISSION Limits	10
3.1.2 TEST PROCEDURE	10
3.1.3 DEVIATION FROM TEST STANDARD	10
3.1.4 TEST SETUP	11
3.1.5 EUT OPERATING CONDITIONS	11
3.2 RADIATED EMISSION MEASUREMENT	14
3.2.1 RADIATED EMISSION LIMITS	14
3.2.2 TEST PROCEDURE	16
3.2.3 DEVIATION FROM TEST STANDARD	16
3.2.4 TEST SETUP	16
3.2.5 EUT OPERATING CONDITIONS	17
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)	17
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)	18
3.3 RADIATED BAND EMISSION MEASUREMENT	22
3.3.1 TEST REQUIREMENT:	22
3.3.2 TEST PROCEDURE	22
3.3.1 DEVIATION FROM TEST STANDARD	22
3.3.4 TEST SETUP	23
4. POWER SPECTRAL DENSITY TEST	25
4.1 APPLIED PROCEDURES / LIMIT	25
4.1.1 TEST PROCEDURE	25
4.1.2 DEVIATION FROM STANDARD	25
4.1.3 TEST SETUP	25
4.1.4 EUT OPERATION CONDITIONS	25
4.1.5 TEST RESULTS	25
5. -6 DB BANDWIDTH &99% BANDWIDTH TEST	26
5.1 APPLIED PROCEDURES / LIMIT	26



Table of Contents	Page
5.1.1 TEST PROCEDURE	26
5.1.2 DEVIATION FROM STANDARD	27
5.1.3 TEST SETUP	27
5.1.4 EUT OPERATION CONDITIONS	27
5.1.5 TEST RESULT	27
6. PEAK OUTPUT POWER TEST	28
6.1 APPLIED PROCEDURES / LIMIT	28
6.1.1 TEST SETUP	28
6.1.2 EUT OPERATION CONDITIONS	28
6.1.3 TEST RESULT	28
7. CONDUCTED BAND EDGE AND SPURIOUS EMISSION	29
7.1 APPLICABLE STANDARD	29
7.1.1 TEST PROCEDURE	29
7.1.2 DEVIATION FROM STANDARD	29
7.1.3 TEST SETUP	29
7.1.4 EUT OPERATION CONDITIONS	29
7.1.5 TEST RESULTS	29
8. ANTENNA REQUIREMENT	30
9. TEST SETUP PHOTO	31
10. EUT CONSTRUCTIONAL DETAILS	31



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C RSS-247 issue 3 August 2023 RSS-Gen Issue 5, April 2018+Amendment 1, March 2019+Amendment 2, February 2021 ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203/15.247 (c) RSS-Gen Section 6.8	Antenna requirement	PASS	
FCC part 15.207 RSS-Gen Section 8.8	AC Power Line Conducted Emission	PASS	
FCC part 15.247 (b)(3) RSS-247 Section 5.4 (d)	Conducted Peak Output Power	PASS	
FCC part 15.247 (a)(2) RSS-247 Section 5.2 (a) RSS-Gen Section 6.7	-6dB Bandwidth	PASS	
FCC part 15.247 (e) RSS-247 Section 5.2 (b)	Power Spectral Density	PASS	
FCC part 15.247(d) RSS-247 Section 5.5 RSS-Gen Section 8.9 RSS-Gen Section 8.10	Conducted Spurious and Band-edge Emission	PASS	
FCC part 15.205/15.209 RSS-Gen.8.9	Spurious Emission	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report.

Test Lab: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
FCC Test Firm Registration Number: 854456
Designation Number: CN1307
IC Registered No.: 27485
CAB ID.: CN0118



1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$ providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	AUDIO INTERFACE WITH USB AND BLUETOOTH
Trademark	N/A
Model No.:	MW-42BT-AM
Test Model:	MW-42BT-AM
Model Difference	-
BT Version:	5.0
Operation Frequency:	2402~2480MHz
Channel numbers:	40 Channels
Channel separation:	2M
Modulation technology:	GFSK
Antenna Type:	PCB antenna
Antenna gain:	2.0dBi
Power supply:	MODEL: GME24G-240100FUR INPUT: 100-240VAC 50-60Hz 0.8A OUTPUT: DC 24V/1A
Test sample(s) ID:	DLE-250815043R01
HVIN:	MW-42BT-AM

Note:

- 1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.The EUT's all information provided by client.

2. Channel List

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz



2.2 DESCRIPTION OF TEST MODES

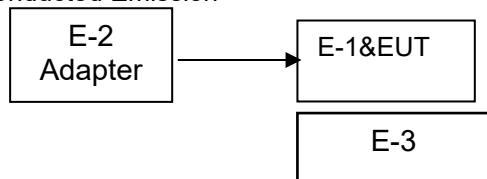
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01
Mode 2	CH20
Mode 3	CH40
Mode 4	Working Mode
For Conducted Emission	
Final Test Mode	Description
Mode 4	Working Mode
For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH20
Mode 3	CH40

Note: 1. The measurements are performed at the highest, middle, lowest available channels.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

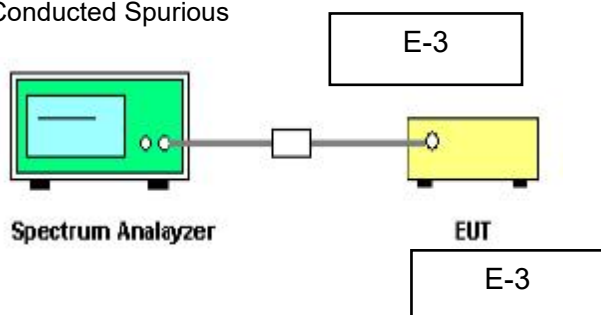
Conducted Emission



Radiated Emission



Conducted Spurious





2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Manufacturer	Equipment	Model/Type No.	Series No.	Note
E-1	TOA Corporation	AUDIO INTERFACE WITH USB AND BLUETOOTH	MW-42BT-AM	N/A	EUT
E-2	TOA Corporation	Adapter	GME24G-240100FUR	N/A	EUT
E-3	TOA Corporation	Remote control	TOA	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

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

Test software	Test program: FCC Assist 1.0.4		
Frequency	2402 MHz	2440MHz	2480 MHz
Power Setting of Software	Default	Default	Default



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 01, 2025	Oct. 31, 2026
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 01, 2025	Oct. 31, 2026
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 01, 2025	Oct. 31, 2026
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 01, 2025	Oct. 31, 2026
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 01, 2025	Oct. 31, 2026
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 01, 2025	Oct. 31, 2026
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 01, 2025	Oct. 31, 2026
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 01, 2025	Oct. 31, 2026
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 01, 2025	Oct. 31, 2026
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 01, 2025	Oct. 31, 2026
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 01, 2025	Oct. 31, 2026
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 01, 2025	Oct. 31, 2026
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 01, 2025	Oct. 31, 2026
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 01, 2025	Oct. 31, 2026
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 01, 2025	Oct. 31, 2026
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 01, 2025	Oct. 31, 2026

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Nov. 01, 2025	Oct. 31, 2026
2	EMI Receiver	R&S	ESR	101421	Nov. 01, 2025	Oct. 31, 2026
3	LISN	R&S	ENV216	102417	Nov. 01, 2025	Oct. 31, 2026
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 01, 2025	Oct. 31, 2026

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMCC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMCC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

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

The following table is the setting of the receiver

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

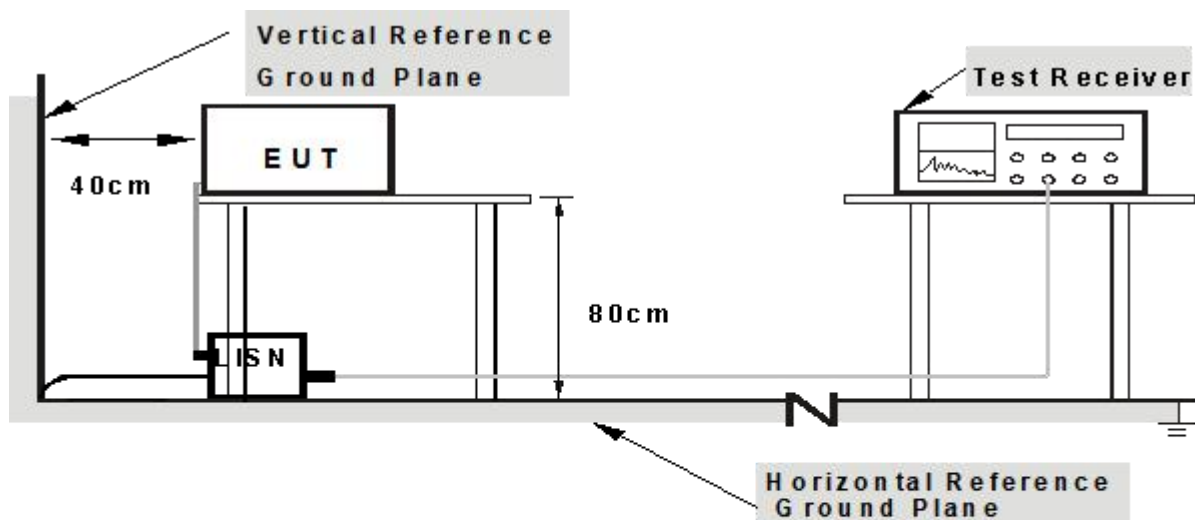
3.1.2 TEST PROCEDURE

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

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

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

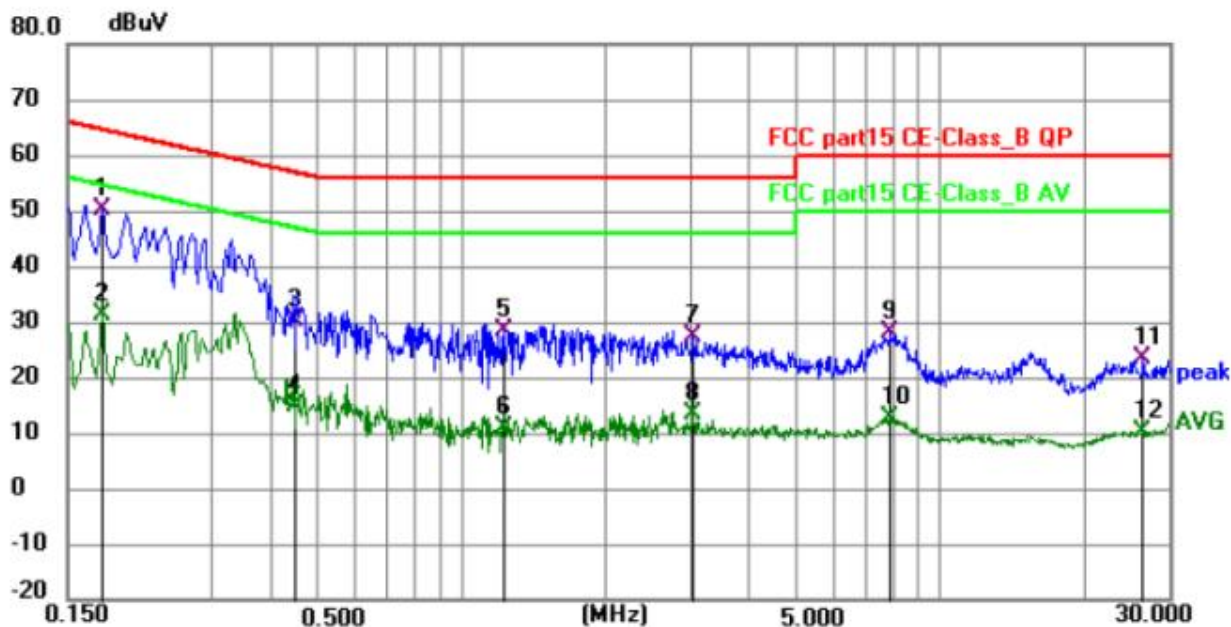
We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

3.1.6 TEST RESULT



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1

Note: Pre-scan all models and recorded the worst case results in this report which is Mode 1



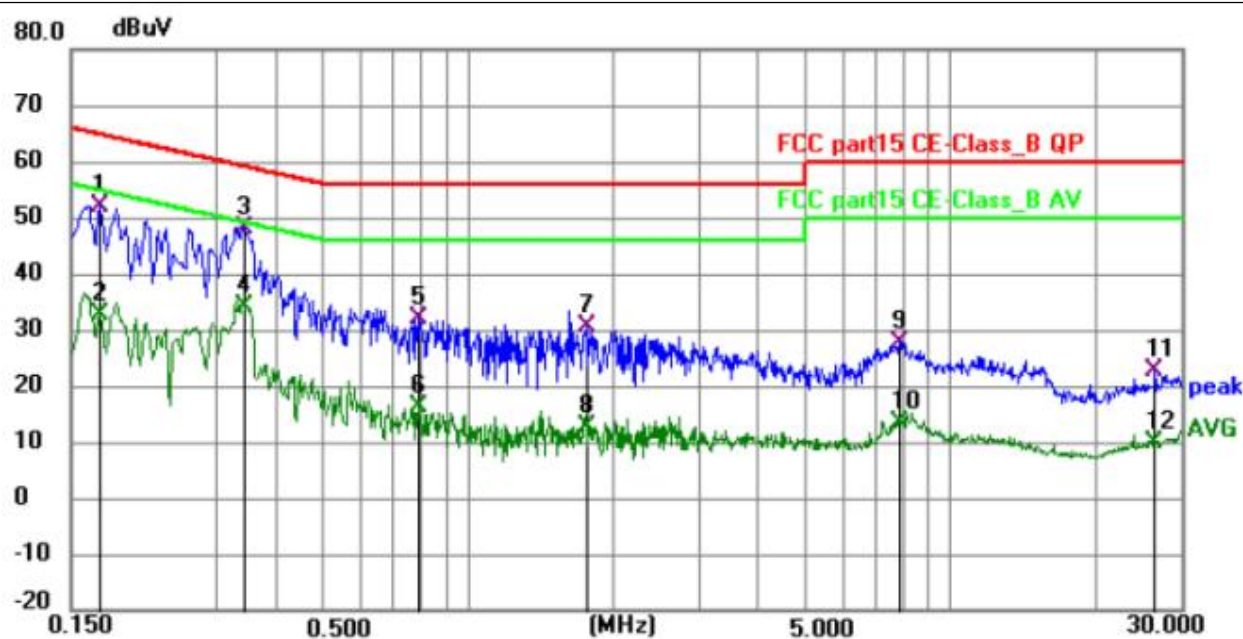
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1770	40.01	10.04	50.05	64.63	-14.58	QP	P	
2	0.1770	21.28	10.04	31.32	54.63	-23.31	AVG	P	
3	0.4515	19.86	10.21	30.07	56.85	-26.78	QP	P	
4	0.4515	4.64	10.21	14.85	46.85	-32.00	AVG	P	
5	1.2255	18.44	10.05	28.49	56.00	-27.51	QP	P	
6	1.2255	0.93	10.05	10.98	46.00	-35.02	AVG	P	
7	3.0525	17.06	10.13	27.19	56.00	-28.81	QP	P	
8	3.0525	3.21	10.13	13.34	46.00	-32.66	AVG	P	
9	7.8585	16.99	10.92	27.91	60.00	-32.09	QP	P	
10	7.8585	1.71	10.92	12.63	50.00	-37.37	AVG	P	
11	26.5065	10.30	12.92	23.22	60.00	-36.78	QP	P	
12	26.5065	-2.81	12.92	10.11	50.00	-39.89	AVG	P	

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1725	41.65	10.15	51.80	64.84	-13.04	QP	P	
2	0.1725	22.60	10.15	32.75	54.84	-22.09	AVG	P	
3 *	0.3435	37.79	10.26	48.05	59.12	-11.07	QP	P	
4	0.3435	23.75	10.26	34.01	49.12	-15.11	AVG	P	
5	0.7890	21.95	10.06	32.01	56.00	-23.99	QP	P	
6	0.7890	6.12	10.06	16.18	46.00	-29.82	AVG	P	
7	1.7610	20.40	10.06	30.46	56.00	-25.54	QP	P	
8	1.7610	2.64	10.06	12.70	46.00	-33.30	AVG	P	
9	7.8360	16.95	10.86	27.81	60.00	-32.19	QP	P	
10	7.8360	2.48	10.86	13.34	50.00	-36.66	AVG	P	
11	26.4570	9.99	12.74	22.73	60.00	-37.27	QP	P	
12	26.4570	-3.01	12.74	9.73	50.00	-40.27	AVG	P	

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on RSS-Gen&15.205(a), then the 15.209(a)RSS-Gen.8.9 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micovolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

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

For RSS-Gen 8.9 Radiated Emission Limits

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 - General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (μV/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 6 - General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement distance (m)
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.



Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- A. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- B. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- C. The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- D. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- E. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- F. For the actual test configuration, please refer to the related Item –EUT Test Photos.

G. For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

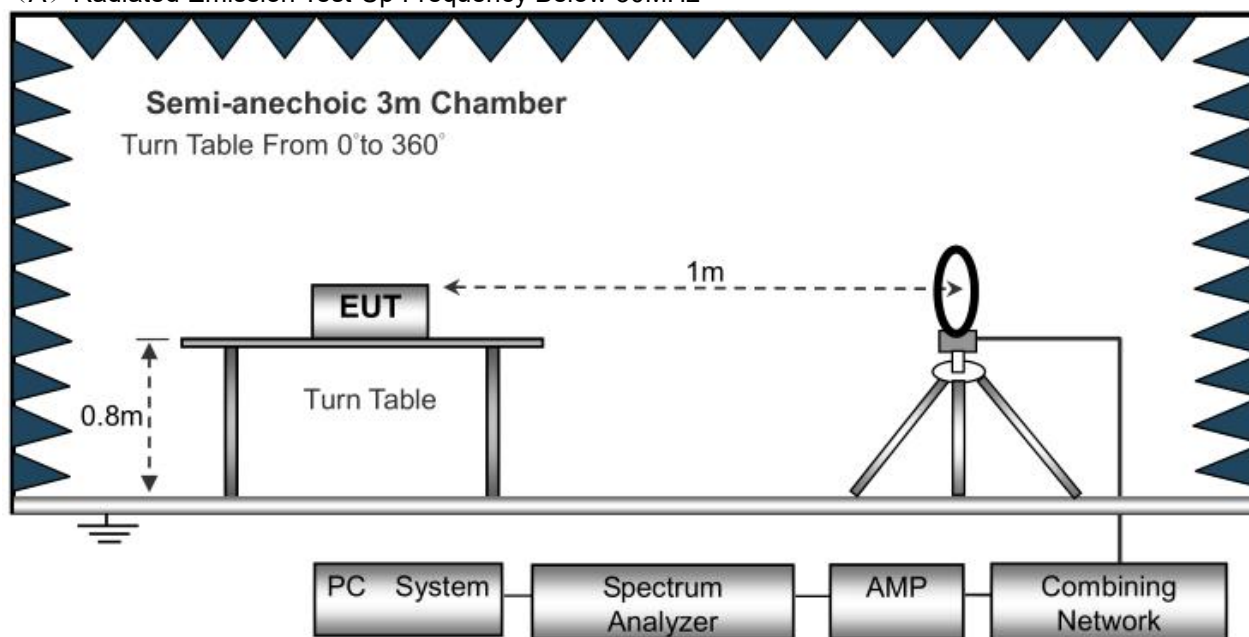
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

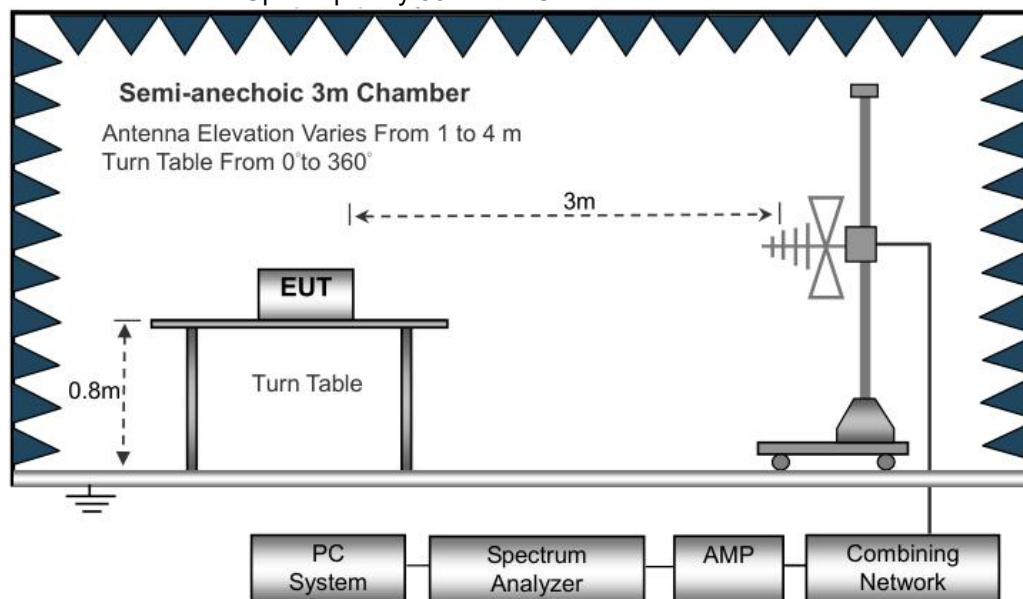
No deviation

3.2.4 TEST SETUP

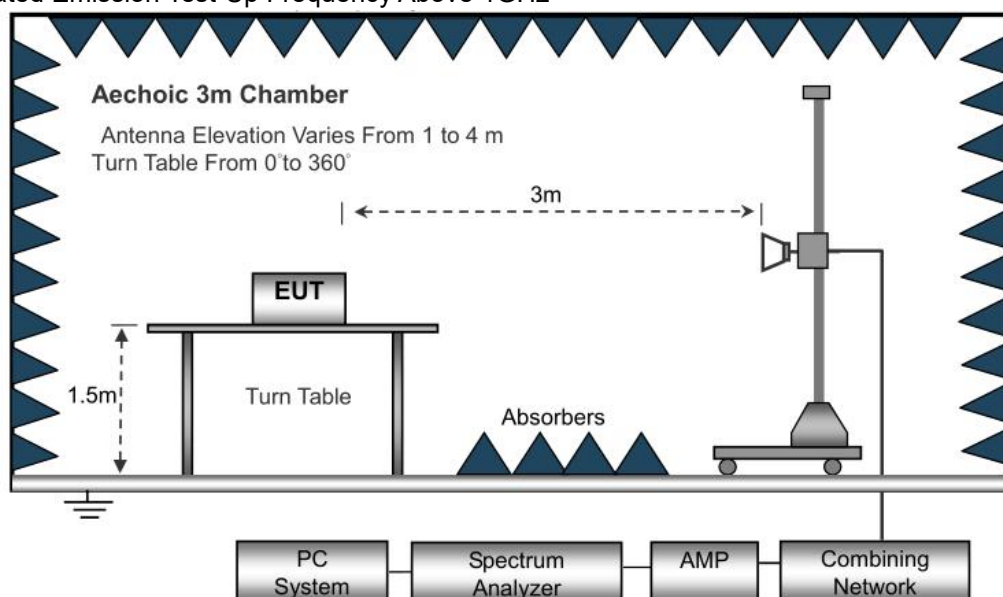
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

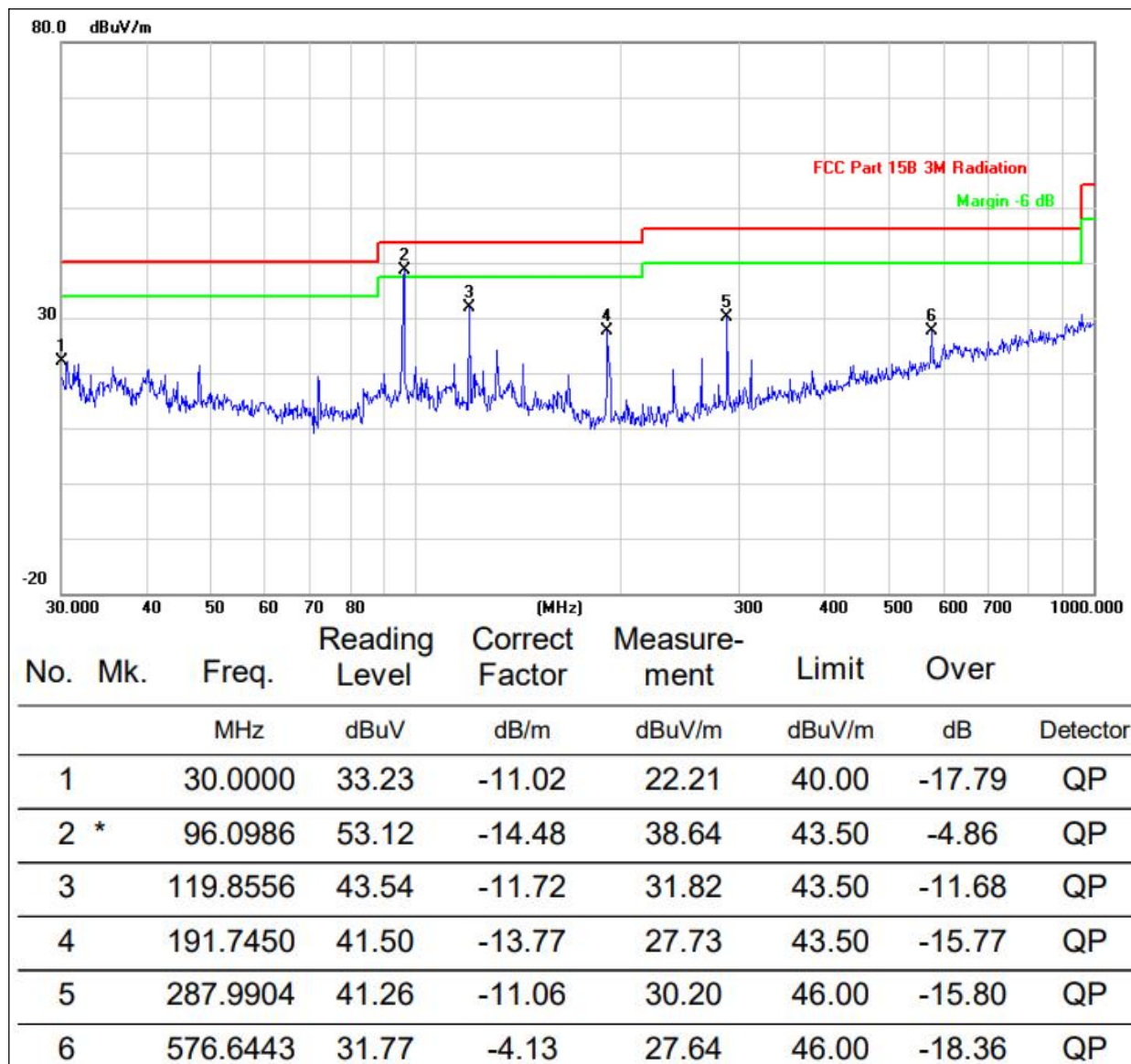
3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

**3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)**

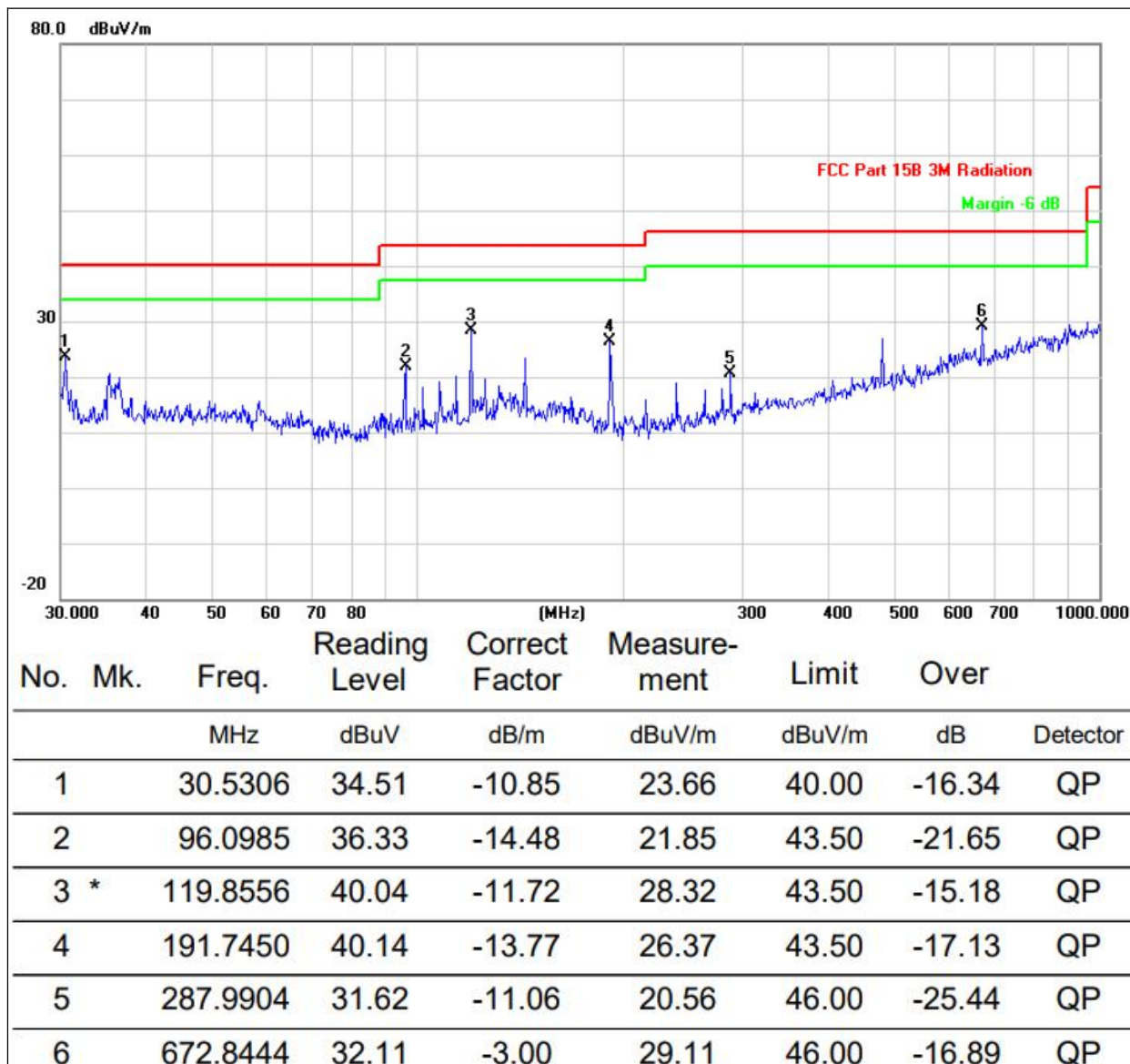
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		

Note: Pre-scan all models and recorded the worst case results in this report which is Mode 1





Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The test data shows only the worst case GFSK 2402 MHz mode



1GHz~25GHz

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2402MHz									
V	4804.00	49.12	30.55	5.77	24.66	49	74.00	-25	Pk
V	4804.00	42.21	30.55	5.77	24.66	42.09	54.00	-11.91	AV
V	7206.00	52.11	30.33	6.32	24.55	52.65	74.00	-21.35	Pk
V	7206.00	41.76	30.33	6.32	24.55	42.3	54.00	-11.7	AV
V	9608.00	50.99	30.85	7.45	24.69	52.28	74.00	-21.72	Pk
V	9608.00	41.43	30.85	7.45	24.69	42.72	54.00	-11.28	AV
V	12010.00	50.06	31.02	8.99	25.57	53.6	74.00	-20.4	Pk
V	12010.00	41.87	31.02	8.99	25.57	45.41	54.00	-8.59	AV
H	4804.00	49.61	30.55	5.77	24.66	49.49	74.00	-24.51	Pk
H	4804.00	41.99	30.55	5.77	24.66	41.87	54.00	-12.13	AV
H	7206.00	52.69	30.33	6.32	24.55	53.23	74.00	-20.77	Pk
H	7206.00	42.35	30.33	6.32	24.55	42.89	54.00	-11.11	AV
H	9608.00	50.46	30.85	7.45	24.69	51.75	74.00	-22.25	Pk
H	9608.00	42.32	30.85	7.45	24.69	43.61	54.00	-10.39	AV
H	12010.00	51.31	31.02	8.99	25.57	54.85	74.00	-19.15	Pk
H	12010.00	41.69	31.02	8.99	25.57	45.23	54.00	-8.77	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2440MHz									
V	4880.00	51.64	30.55	5.77	24.66	51.52	74.00	-22.48	Pk
V	4880.00	41.61	30.55	5.77	24.66	41.49	54.00	-12.51	AV
V	7320.00	50.18	30.33	6.32	24.55	50.72	74.00	-23.28	Pk
V	7320.00	42.32	30.33	6.32	24.55	42.86	54.00	-11.14	AV
V	9760.00	53.16	30.85	7.45	24.69	54.45	74.00	-19.55	Pk
V	9760.00	41.9	30.85	7.45	24.69	43.19	54.00	-10.81	AV
V	12200.00	49.89	31.02	8.99	25.57	53.43	74.00	-20.57	Pk
V	12200.00	41.66	31.02	8.99	25.57	45.2	54.00	-8.8	AV
H	4880.00	49.24	30.55	5.77	24.66	49.12	74.00	-24.88	Pk
H	4880.00	41.41	30.55	5.77	24.66	41.29	54.00	-12.71	AV
H	7320.00	48.44	30.33	6.32	24.55	48.98	74.00	-25.02	Pk
H	7320.00	42.05	30.33	6.32	24.55	42.59	54.00	-11.41	AV
H	9760.00	51.08	30.85	7.45	24.69	52.37	74.00	-21.63	Pk
H	9760.00	42.35	30.85	7.45	24.69	43.64	54.00	-10.36	AV
H	12200.00	48.4	31.02	8.99	25.57	51.94	74.00	-22.06	Pk
H	12200.00	41.72	31.02	8.99	25.57	45.26	54.00	-8.74	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	50.53	30.55	5.77	24.66	50.41	74.00	-23.59	Pk
V	4960.00	42.54	30.55	5.77	24.66	42.42	54.00	-11.58	AV
V	7440.00	51.5	30.33	6.32	24.55	52.04	74.00	-21.96	Pk
V	7440.00	42.07	30.33	6.32	24.55	42.61	54.00	-11.39	AV
V	9920.00	53.04	30.85	7.45	24.69	54.33	74.00	-19.67	Pk
V	9920.00	41.74	30.85	7.45	24.69	43.03	54.00	-10.97	AV
V	12400.00	48.61	31.02	8.99	25.57	52.15	74.00	-21.85	Pk
V	12400.00	41.9	31.02	8.99	25.57	45.44	54.00	-8.56	AV
H	4960.00	52.02	30.55	5.77	24.66	51.9	74.00	-22.1	Pk
H	4960.00	41.43	30.55	5.77	24.66	41.31	54.00	-12.69	AV
H	7440.00	50.72	30.33	6.32	24.55	51.26	74.00	-22.74	Pk
H	7440.00	41.83	30.33	6.32	24.55	42.37	54.00	-11.63	AV
H	9920.00	52.06	30.85	7.45	24.69	53.35	74.00	-20.65	Pk
H	9920.00	42.22	30.85	7.45	24.69	43.51	54.00	-10.49	AV
H	12400.00	51.63	31.02	8.99	25.57	55.17	74.00	-18.83	Pk
H	12400.00	42.36	31.02	8.99	25.57	45.9	54.00	-8.1	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



3.3 RADIATED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205
RSS-Gen.8.10

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Test Frequency Range: All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.

3.3.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.
- Test the EUT in the lowest channel,the Highest channel

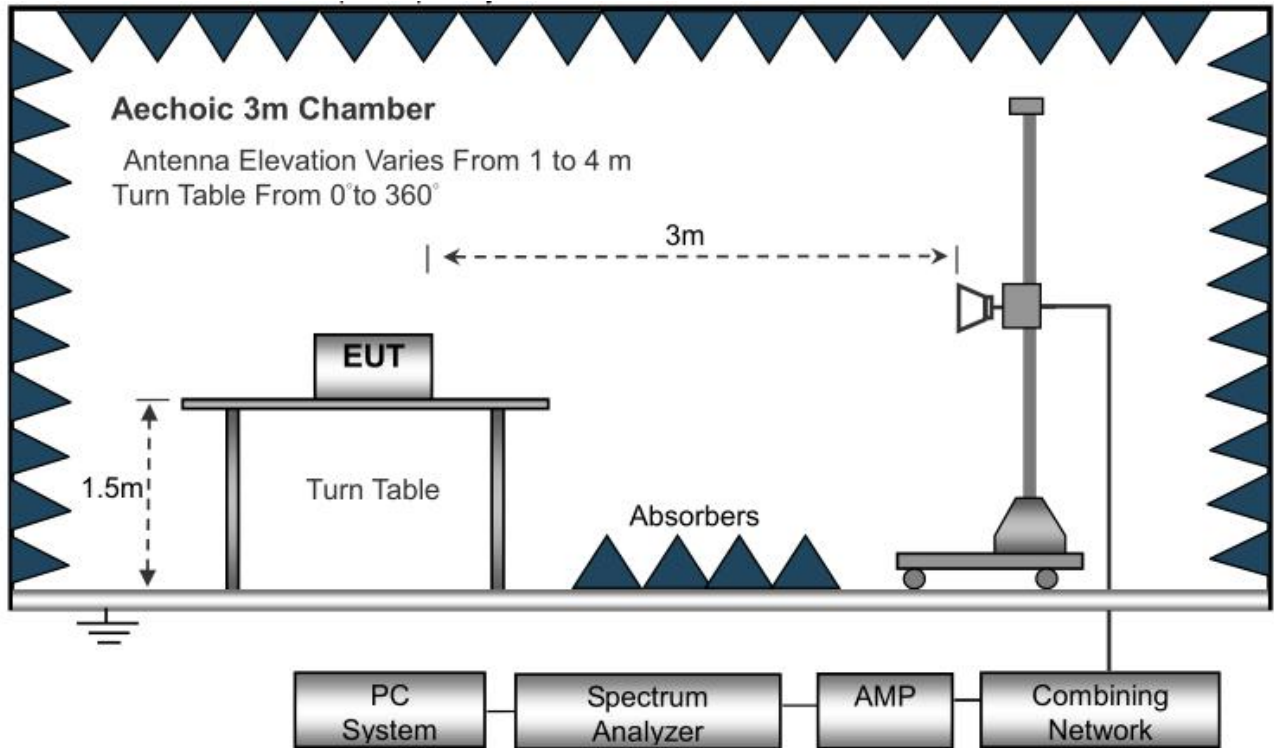
Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.3.1 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**3.3.6 TEST RESULT**

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Margin (dB)	Detector Type
Low Channel: 2402MHz									
H	2390.00	53.8	30.55	5.77	24.66	53.68	74.00	-20.32	PK
H	2390.00	42.77	30.55	5.77	24.66	42.65	54.00	-11.35	AV
H	2400.00	50.95	30.33	6.32	24.55	51.49	74.00	-22.51	PK
H	2400.00	42.61	30.33	6.32	24.55	43.15	54.00	-10.85	AV
V	2390.00	51.69	30.85	7.45	24.69	52.98	74.00	-21.02	PK
V	2390.00	42.55	30.85	7.45	24.69	43.84	54.00	-10.16	AV
V	2400.00	50.87	31.02	8.99	25.57	54.41	74.00	-19.59	PK
V	2400.00	42.22	31.02	8.99	25.57	45.76	54.00	-8.24	AV
High Channel: 2480MHz									
H	2483.50	53.49	30.22	4.85	23.98	52.1	74.00	-21.9	PK
H	2483.50	43.94	30.22	4.85	23.98	42.55	54.00	-11.45	AV
H	2500.00	52.82	30.22	4.85	23.98	51.43	74.00	-22.57	PK
H	2500.00	43.35	30.22	4.85	23.98	41.96	54.00	-12.04	AV
V	2483.50	53.41	30.22	4.85	23.98	52.02	74.00	-21.98	PK
V	2483.50	43.85	30.22	4.85	23.98	42.46	54.00	-11.54	AV
V	2500.00	52.92	30.22	4.85	23.98	51.53	74.00	-22.47	PK
V	2500.00	43.11	30.22	4.85	23.98	41.72	54.00	-12.28	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit									



4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 RSS-247 Section 5.2(b)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

4.1.1 TEST PROCEDURE

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	$RBW \geq 3kHz$
VB	$VBW \geq 3RBW$
Detector	Peak
Trace	RMS
Sweep Time	Auto

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

Measurement Data : The detailed test data see Appendix II

**5. -6 DB BANDWIDTH & 99% BANDWIDTH TEST**

Test Requirement:	FCC Part15 C Section 15.247 (a)(2) RSS-247
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2) RSS-247 Section 5.2(a) & RSS-GEN 6.7	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE**99% BANDWIDTH**

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be at least three times the RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.6.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).



6 DB BANDWIDTH

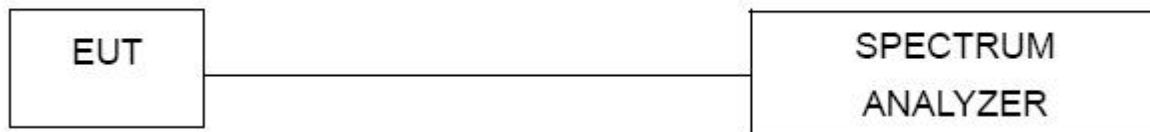
The steps for the first option are as follows:

- a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
- b) Set the VBW $\geq [3 \times \text{RBW}]$.
- c) Detector = peak.
- d) Trace mode = max-hold.
- e) Sweep = No faster than coupled (auto) time.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULT

Measurement Data : The detailed test data see Appendix II



6. PEAK OUTPUT POWER TEST

Test Requirement:	FCC Part15 C Section 15.247 (b)(3) RSS-247
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) RSS-247 Section 5.4(d)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

- a) Set the RBW $\geq$ DTS bandwidth.
- b) Set VBW $\geq$ [3 $\times$ RBW].
- c) Set span $\geq$ [3 $\times$ RBW].
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

6.1.1 TEST SETUP



6.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.3 TEST RESULT

Measurement Data : The detailed test data see Appendix II



7. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d) RSS-247 Section 5.5
Test Method:	KDB558074 D0115.247 Meas Guidance v05r02 and RSS-Gen

7.1 APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

7.1.1 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.6 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 TEST RESULTS

Measurement Data : The detailed test data see Appendix II



8. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi. (ii) RSS-Gen requirement: The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.	
EUT Antenna:	
The antenna is PCB antenna, the best case gain of the antennas is 2.0dBi, reference to the Appendix -EUT PHOTO Internal Photos for details	



9. TEST SETUP PHOTO

Reference to the appendix Test Setup Photo for details.

10. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix External Photos & Internal Photos for details.

***** END OF REPORT *****