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Report No.: GZEM141200692701
Page: 1 of 15
FCC ID: SY9LP506

TEST REPORT

Application No.:	GZEM1412006927CR
Applicant:	GUANGDONG LFF TECHNOLOGY CO., LTD
Manufacturer:	Same as the applicant.
FCC ID:	SY9LP506
Product Name:	TIRE PRESSURE MONITORING SYSTEM
Product Description:	Radio signal receiver with 433.92 MHz as carrier
Model No.:	TPMS-X1, TPMS-X5, LP506 ♣
♣	Please refer to section 3 of this report for further details.
Trade Mark:	SPY
Standards:	CFR 47 FCC PART 15 SUBPART B:2014
Date of Receipt:	2015-01-05
Date of Test:	2015-02-28 to 2015-03-06
Date of Issue:	2015-08-28
Test Result :	Pass*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature

Jerry Chan
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.



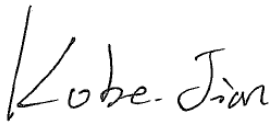
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2015-08-28		Original

Authorized for issue by:				
Tested By				2015-02-28 to 2015-03-06
	(Terry Lai) /Project Engineer			Date
Prepared By				2015-04-01
	(Millie Li) /Clerk			Date
Checked By				2015-04-03
	(Kobe Jian) /Reviewer			Date



3 Test Summary

Electromagnetic Interference (EMI)				
Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30 MHz to 1 GHz)	FCC PART 15 SUBPART B:2014	ANSI C63.4:2009	Class B	PASS
Radiated Emission above 1 GHz	FCC PART 15 SUBPART B:2014	ANSI C63.4:2009	Class B	PASS
Remark : EUT: In this whole report EUT means Equipment Under Test. ♣ Model No.: TPMS-X1, TPMS-X5, LP506 According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference being the model name. Therefore only one model TPMS-X1 was tested in this report.				



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5 General Information

5.1 Client Information

Applicant: GUANGDONG LFF TECHNOLOGY CO., LTD
Address of Applicant: NO.9. YONGCHENG NORTH ROAD, XIAOLAN INDUSTRIAL AREA,
XIAOLAN TWON, ZHONGSHAN CITY, GUANGDONG PROVINCE,
P.R. CHING 528416
Manufacturer: Same as the applicant.
Address of Manufacturer: Same as the applicant.

5.2 General Description of E.U.T.

Product Name: TIRE PRESSURE MONITORING SYSTEM
Model No.: TPMS-X1
Type of Receiver: Superheterodyne receiver

5.3 Details of E.U.T.

Power Supply: DC 12V
Power Cord: N/A

5.4 Description of Support Units

The EUT has been tested with DC 12V battery and sensor(Model: WST002) supplied by SGS.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 General Test Climate During Testing

Temperature: 15-30 °C Humidity: 30~70 %RH Atmospheric Pressure: 860~1060 mbar

5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



5.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co. Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584, G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IEC 60384-1:2006-10 and Rules of procedure IEC 60384-2:2006-10, and the relevant IEC 60384-2 Scheme Operational documents.



6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-12-5	2015-12-5
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-04-19	2015-04-19
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	2015-05-09
EMC2025	Trilog Broadband Antenna 30-1000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3372	2014-07-14	2017-07-14
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-08-31	2016-08-31
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-05-04	2017-05-04
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2013-08-31	2016-08-31
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2012-07-01	2015-07-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2015-03-02	2016-03-02
EMC2065	Amplifier	HP	8447F	N/A	2014-08-25	2015-08-25
EMC0075	310N Amplifier	Sonoma	310N	272683	2015-03-02	2016-03-02
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-03-03	2016-03-03
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHZ	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9170	9170-375	2014-05-26	2017-05-26
EMC2079	High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	009	2015-03-02	2016-03-02
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-04-19	2015-04-19
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-05-03	2016-05-03

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2014-09-15	2015-09-15
EMC0007	DMM	Fluke	73	70671122	2014-09-15	2015-09-15



7 Emission Test Results

7.1 Radiated Emissions, 30MHz to 1GHz

Test Requirement: FCC Part15 B
Test Method: ANSI C63.4
Test Voltage: DC 12V
Test Date: 2015-02-28
Frequency Range: 30MHz to 1GHz
Measurement Distance: 3 m
Detector: Peak for pre-scan
Quasi-Peak if maximised peak within 20dB of limit
(120 kHz resolution bandwidth)
Class / Limit: Class B

Frequency range MHz	Quasi-peak limits dB (μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960	54

At transitional frequencies the lower limit applies.

7.1.1 E.U.T. Operation

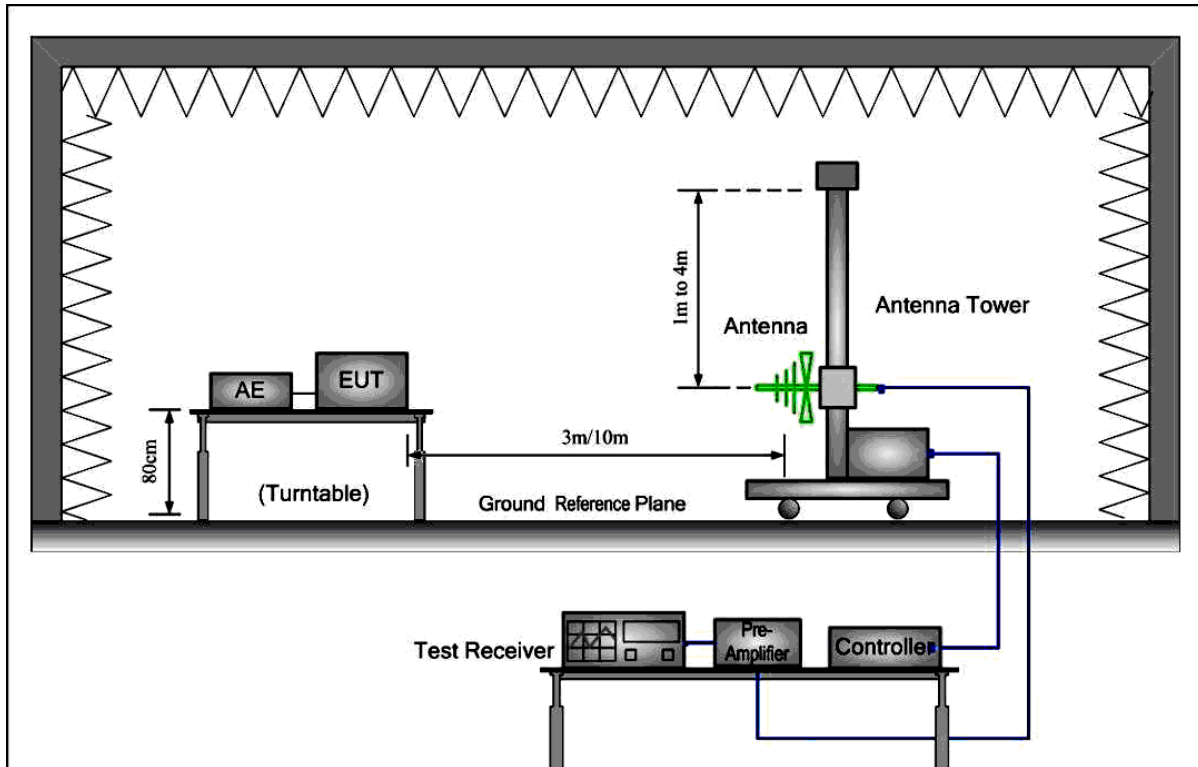
Pre-test with Peak detector with the following mode(s):

- 1: Receiving mode
- 2: Cohere mode

Final test with Quasi-Peak with the following mode(s):

- 1: Receiving mode.

7.1.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. Biconical and log periodic antenna was used for the frequency range from 30MHz to 1GHz
3. The EUT was connected to nominal power supply through a mains power outlet which was bonded to the ground reference plane; The mains cables were draped to the ground reference plane. 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, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

Remark: a unmodulated signal same as fundamental frequency of the transmitter is transmitted to activate the superregenerative receiver and maximize the emission of the receiver.

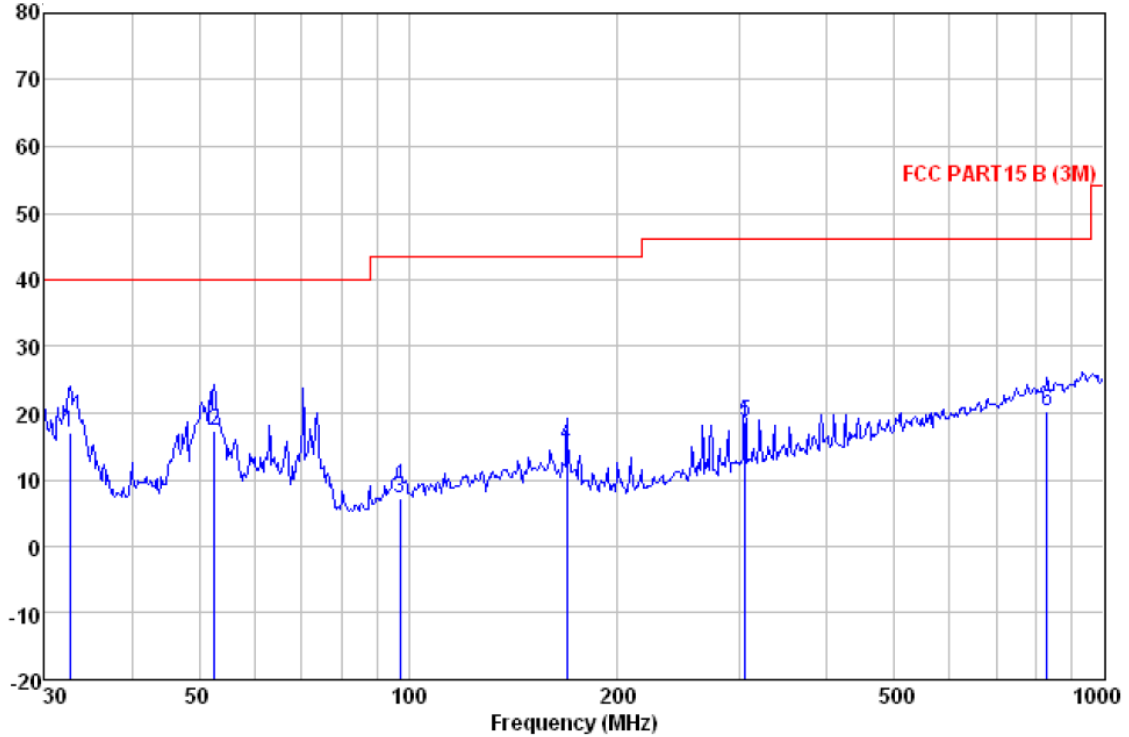


7.1.3 Measurement Data

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Remark
MHz	Level	Factor	Loss	Factor	dBμV/m	Line	Limit	
	dBμV	dB/m	dB	dB	dBμV/m	dBμV/m	dB	
32.634	34.97	12.23	0.86	31.02	17.04	40.00	-22.96	QP
52.575	34.70	12.47	1.10	31.00	17.27	40.00	-22.73	QP
97.115	26.92	9.99	1.37	31.00	7.28	43.50	-36.22	QP
169.005	31.00	13.36	1.80	31.08	15.08	43.50	-28.42	QP
304.610	33.86	13.31	2.41	30.99	18.59	46.00	-27.41	QP
827.493	25.41	21.94	3.83	30.90	20.28	46.00	-25.72	QP

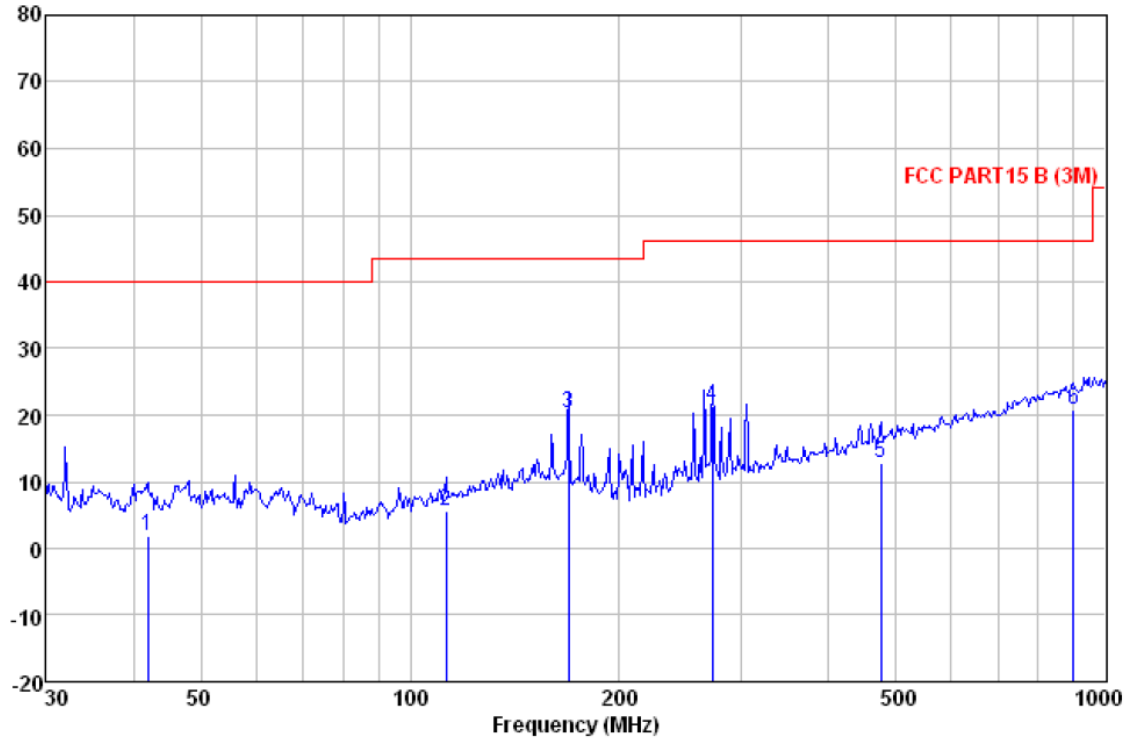
Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Remark
MHz	dBμV	dB/m	dB	dB	dBμV/m	dBμV/m	dB	
42.007	19.21	12.73	1.01	31.01	1.94	40.00	-38.06	QP
112.524	23.92	11.27	1.43	31.01	5.61	43.50	-37.89	QP
169.005	36.16	13.36	1.80	31.08	20.24	43.50	-23.26	QP
272.278	37.53	12.61	2.32	31.02	21.44	46.00	-24.56	QP
475.499	24.03	16.80	3.06	30.98	12.91	46.00	-33.09	QP
900.147	25.09	22.58	4.00	30.90	20.77	46.00	-25.23	QP

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



7.2 Radiated Emissions above 1 GHz

Test Requirement: FCC Part15 B
Test Method: ANSI C63.4
Test Voltage: DC 12V
Test Date: 2015-03-06
Frequency Range: 1 GHz to 6 GHz
Measurement Distance: 3 m
Detector: Peak for pre-scan
Peak and Average if maximised peak within 20dB of limit
(1 MHz resolution bandwidth)

Class / Limit: Class B

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 to 108	1000
108 to 500	2000
500 to 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower
Average limits dB(μ V/m)	Peak limits dB(μ V/m)
54	74

7.2.1 E.U.T. Operation

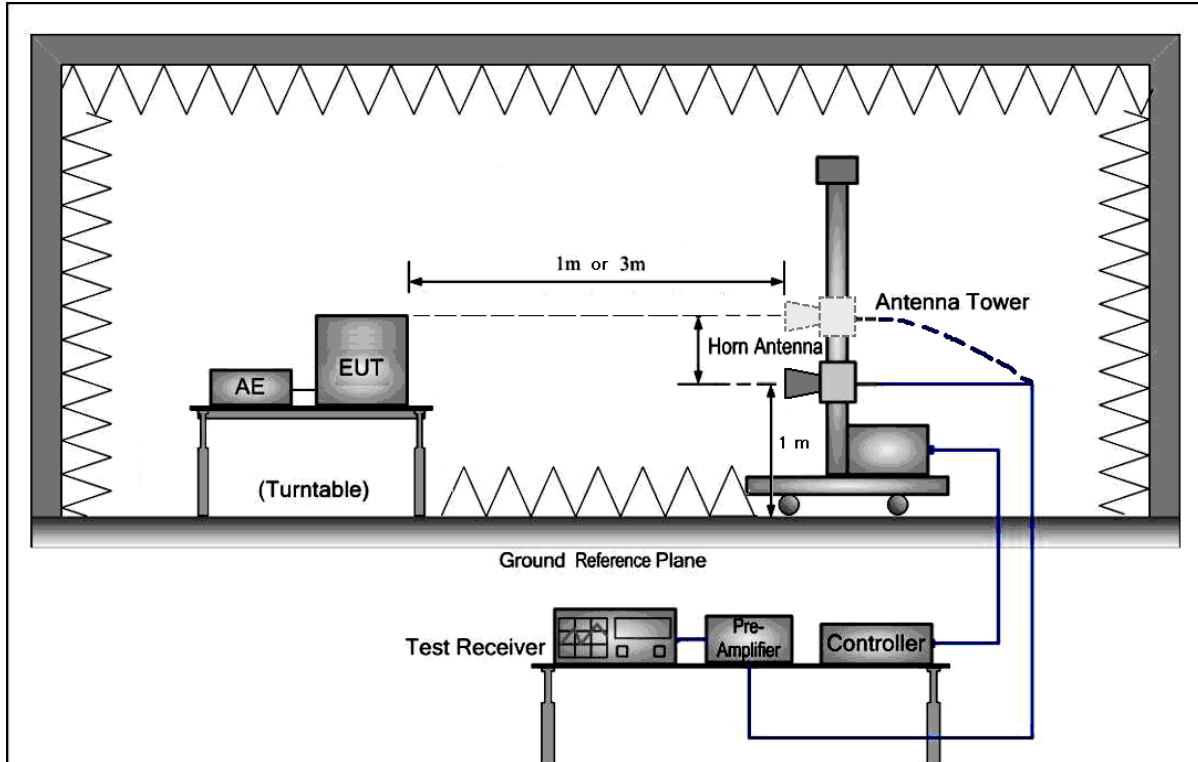
Pre-test with Peak detector with the following mode(s):

- 1: Receiving mode
- 2: Cohere mode

Final test with Quasi-Peak with the following mode(s):

- 1: Receiving mode.

7.2.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a fully-anechoic chamber.
2. Horn antenna was used for the frequency above 1GHz
3. The EUT was connected to nominal power supply through a mains power outlet which was bonded to the ground reference plane; The mains cables were draped to the ground reference plane. 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, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

Remark: a unmodulated signal same as fundamental frequency of the transmitter is transmitted to activate the superregenerative receiver and maximize the emission of the receiver.

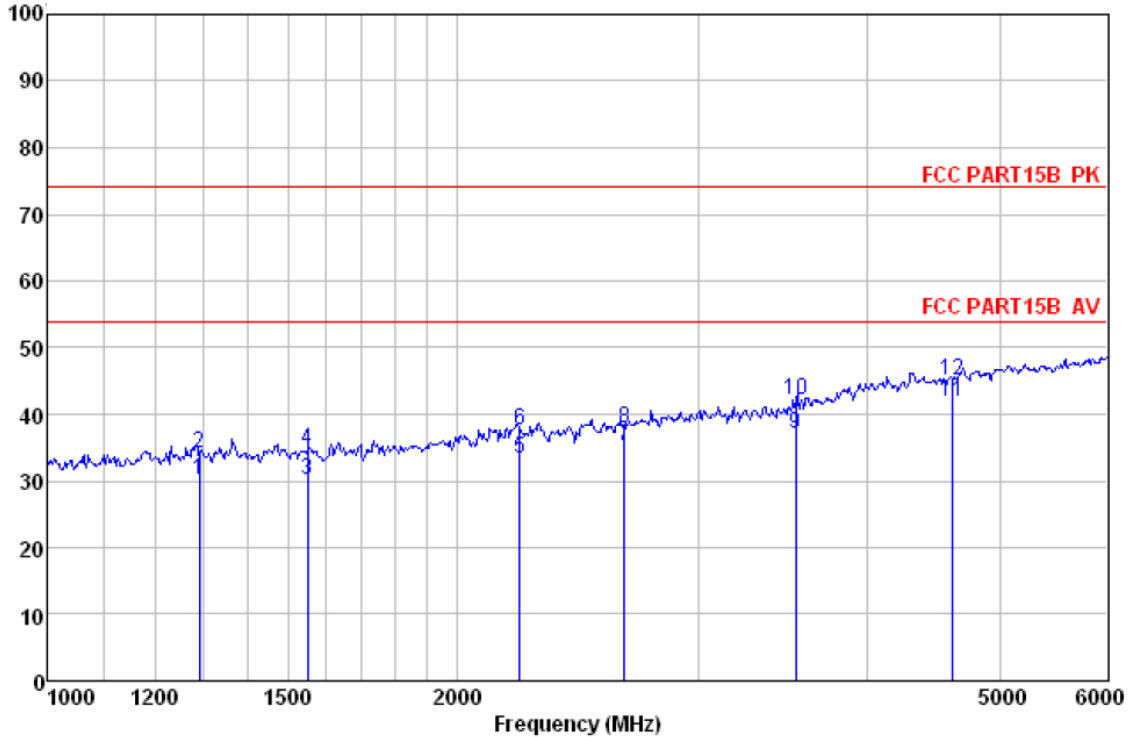


7.2.3 Measurement Data

Vertical:

Peak scan

Level (dBμV/m)



Peak and Average measurement:

Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	Remark
MHz	Level	Factor	Loss	Factor	dBμV/m	Line	Limit	
	dBμV	dB/m	dB	dB	dBμV/m	dBμV/m	dB	
1292.039	49.64	25.49	4.97	49.84	30.26	54.00	-23.74	Average
1292.039	53.64	25.49	4.97	49.84	34.26	74.00	-39.74	Peak
1551.126	49.16	25.09	5.52	49.72	30.05	54.00	-23.95	Average
1551.126	53.89	25.09	5.52	49.72	34.78	74.00	-39.22	Peak
2219.613	48.32	27.96	6.47	49.49	33.26	54.00	-20.74	Average
2219.613	52.74	27.96	6.47	49.49	37.68	74.00	-36.32	Peak
2650.417	49.36	27.97	7.31	49.38	35.26	54.00	-18.74	Average
2650.417	52.04	27.97	7.31	49.38	37.94	74.00	-36.06	Peak
3543.030	48.06	29.06	9.13	49.30	36.95	54.00	-17.05	Average
3543.030	53.30	29.06	9.13	49.30	42.19	74.00	-31.81	Peak
4618.928	48.89	31.08	11.10	49.30	41.77	54.00	-12.23	Average
4618.928	52.14	31.08	11.10	49.30	45.02	74.00	-28.98	Peak

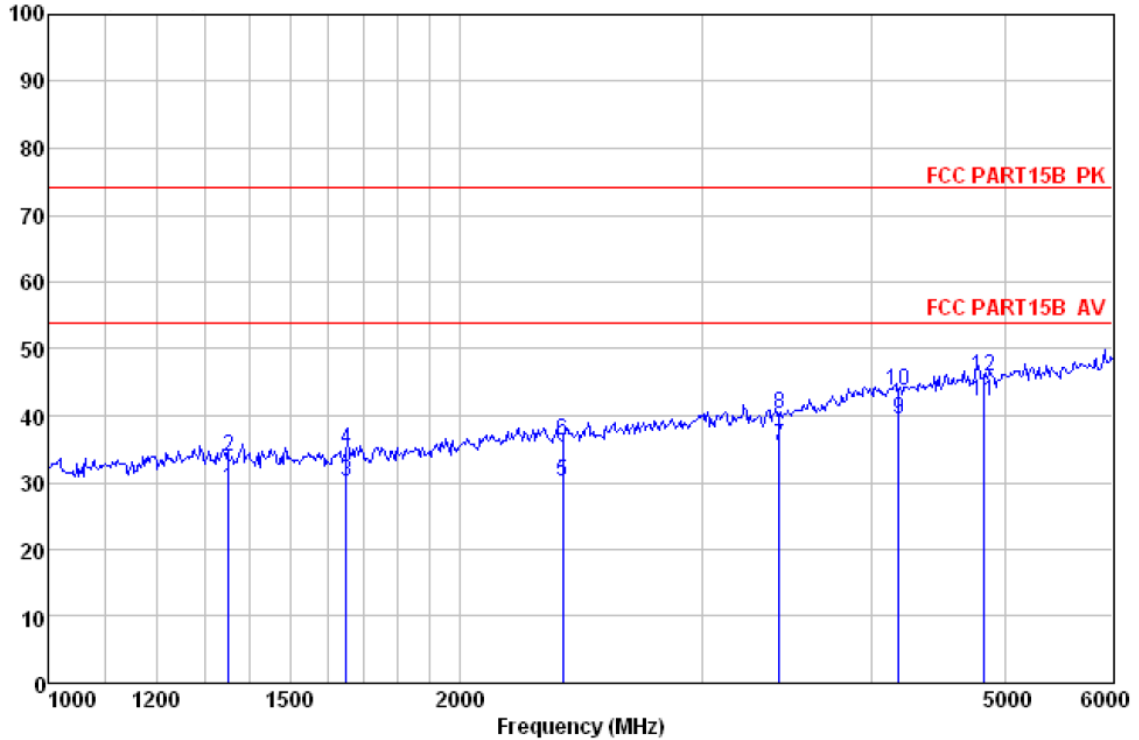
Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.



Horizontal:

Peak scan

Level (dBμV/m)



Peak and Average measurement:

Freq MHz	ReadAntenna Level dBμV	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Level dBμV/m	Limit Line dBμV/m	Over Limit dB	Remark
1353.654	48.32	25.46	5.11	49.81	29.08	54.00	-24.92	Average
1353.654	53.23	25.46	5.11	49.81	33.99	74.00	-40.01	Peak
1648.558	49.12	24.98	5.71	49.68	30.13	54.00	-23.87	Average
1648.558	53.84	24.98	5.71	49.68	34.85	74.00	-39.15	Peak
2376.003	45.28	27.69	6.55	49.45	30.07	54.00	-23.93	Average
2376.003	51.52	27.69	6.55	49.45	36.31	74.00	-37.69	Peak
3418.313	47.54	28.56	8.75	49.30	35.55	54.00	-18.45	Average
3418.313	52.29	28.56	8.75	49.30	40.30	74.00	-33.70	Peak
4185.457	47.51	30.16	11.09	49.30	39.46	54.00	-14.54	Average
4185.457	51.78	30.16	11.09	49.30	43.73	74.00	-30.27	Peak
4830.532	48.76	31.55	11.16	49.30	42.17	54.00	-11.83	Average
4830.532	52.44	31.55	11.16	49.30	45.85	74.00	-28.15	Peak

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

--End of Report--