

TEST REPORT

of

FCC Part 15 Subpart C

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product : Rear Seat Entertainment 10.2”
Brand: E-LEAD
Model: EL-719-TMC1
Model Difference: N/A
FCC ID: QYK-719TMC1
FCC Rule Part: §15.239, Cat:DXX
Applicant: E-LEAD ELECTRONIC CO., LTD.
Address: NO. 37 Gungdung 1ST RD., Shengang
Shiang, Changhua, 509, TAIWAN, R.O.C.

Test Performed by:

International Standards Laboratory

<Lung-Tan LAB>

*Site Registration No.

BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

*Address:

No. 120, Lane 180, Hsin Ho Rd.

Lung-Tan Dist., Tao Yuan City 325, Taiwan

*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-16LR011FCDXX**

Issue Date : **2016/02/01**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.

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VERIFICATION OF COMPLIANCE

Applicant: E-LEAD ELECTRONIC CO., LTD.
Product Description: Rear Seat Entertainment 10.2"
Brand Name: E-LEAD
Model No.: EL-311
Model Difference: N/A
FCC ID: QYK-719TMC1
Date of test: 2016/01/07 ~ 2016/01/20
Date of EUT Received: 2016/01/07

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:



Date:

2016/02/01

Dion Chang / Engineer

Prepared By:



Date:

2016/02/01

Eva Kao / Technical Supervisor

Approved By:



Date:

2016/02/01

Vincent Su / Technical Manager

Version

Version No.	Date	Description
00	2016/02/01	Initial creation of document

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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Rear Seat Entertainment 10.2"
Brand:	E-LEAD
Model:	EL-719-TMC1
Model different:	N/A
USB port:	one provided for Data link
AUX:	One (Video +Audio)
Power Supply:	12Vdc from Car Battery
TestSW Version:	Hyper terminal for WiFi
RFpower setting:	33 for WiFi

2.4GHz WLAN: 1TX/1RX

Wi-Fi	Frequency Range (MHz)	Channels	Average Power (dBm)	Modulation Technology
802.11b	2412 – 2462(DTS)	11	13 dBm	DSSS
802.11g	2412 – 2462(DTS)	11	7 dBm	OFDM
802.11n	HT20 2412 – 2462(DTS)	11	7 dBm	
	HT40 2422 – 2452(DTS)	7	7 dBm	
Tune-Up Power:		+/- 1.5 dBm		
Modulation type:		CCK, DQPSK, DBPSK for DSSS 256QAM.64QAM. 16QAM, QPSK, BPSK for OFDM		
Antenna Designation:		Printed Antenna , IPEX type connector, gain : -9.86dBi		

The EUT is compliance with IEEE 802.11 b/g/n Standard.

FM:

Frequency Range:	88.1MHz -97.9MHz
Transmit Power:	45.73 dBuV/m (Peak) at 3m
Modulation type:	FM
Transition Rate:	200KHz
Antenna Designation:	monopole Antenna

This test report applies for FM transmitter.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **QYK-719TMC1** filing to comply with Section 15.239 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2014, ANSI C63.10: 2013, 2.5KHz audio signal was used for test. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2014, ANSI C63.10: 2013. FCC Registration Number is: 872200; Designation Number is: TW1036, Canada Registration Number: 4067B-3.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was tested with a test program to fix the Tx frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

2.3 Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 5 and 7 of ANSI C63.4: 2014. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m/1.5m(Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 6 and 11 of ANSI C63.10: 2013.

2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

- a. Emission from the intentional radiator shall be confined with a band 200kHz wide centered on the operation frequency. The 200kHz band shall lie wholly within the frequency range of 88-108 MHz.
- b. The field strength of any emission within the permitted 200kHz band shall not exceed 250 micro volts/meter at 3 meters. (48dB μ V at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.
- c. The field strength of any emissions radiated on any frequency outside of the specified 200kHz band shall not exceed the general radiated emission limits in section Part 15.209.as below.

Frequency (MHz)	Field strength μ V/m	Distance (m)	Field strength at 3m dB μ V/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

- Remark:
1. Emission level in dB μ V/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205, then the general radiated emission limits in § 15.209

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

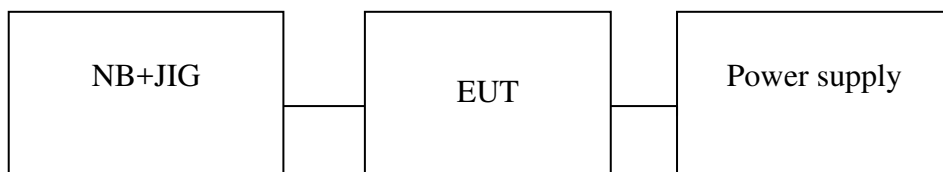


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	IBM	X40	NA	Non-shielded	Non-shielded
2	JIG	NA	NA	NA	Non-shielded	Non-shielded

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Remark
§15.207(a)	Conducted Emission	N/A
§15.239(b)(c)	Radiated Emission	Complied
§15.239(a)	26dB Bandwidth	Complied

4. Description of test modes

The frequency 88.1MHz、93.1MHz and 97.9 MHz are chosen with 2.5kHz audio signal for full testing. And the EUT stay in continuous transmitting mode.

5. CONDUCTED EMISSIONS TEST

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

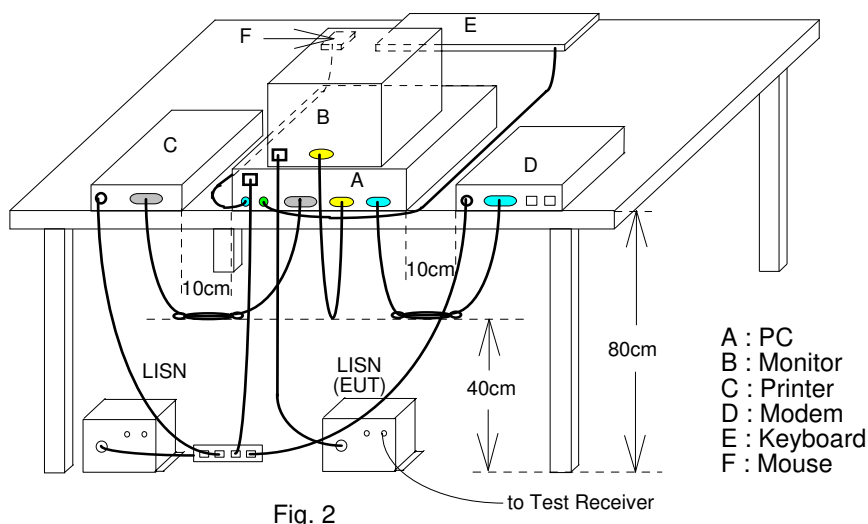


Fig. 2

5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	07/28/2015	07/27/2016
EMI Receiver 17	Rohde & Schwarz	ESCI 7	100887	09/08/2015	09/07/2016
LISN 18	ROHDE & SCHWARZ	ENV216	101424	02/11/2015	02/10/2016
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/12/2015	03/11/2016
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

5.4 Measurement Result:

N/A, the device is powered from car battery.

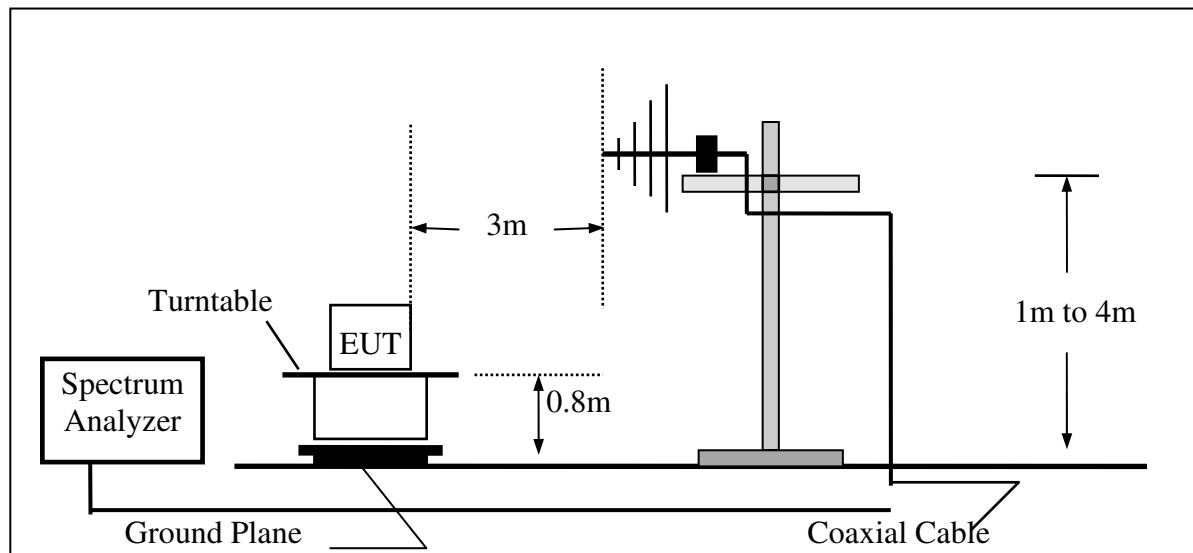
6. RADIATED EMISSION TEST

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
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 measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/30/2015	07/29/2016
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/21/2015	05/20/2016
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/23/2015	05/22/2016
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	06/17/2015	06/16/2017
Bilog Antenna30-1G	Schaffner	CBL 6112D	37873	06/16/2015	06/15/2016
Horn antenna1-18G	ETS	3117	00066665	11/30/2015	11/29/2016
Horn antenna18-26G(04)	Com-power	AH-826	081001	07/24/2015	07/23/2017
Preamplifier9-1000M	HP	8447D	NA	03/12/2015	03/11/2016
Preamplifier1-18G	MITEQ	AFS44-001018 00-25-10P-44	1329256	07/28/2015	07/27/2016
Preamplifier1-26G	EM	EM01M26G	NA	03/11/2015	03/10/2016
Preamplifier26-40G	MITEQ	JS-26004000-2 7-5A	818471	07/23/2015	07/22/2017
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	11/25/2015	11/24/2016
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/02/2015	10/01/2016
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&3742 1/2	11/03/2015	11/02/2017
2.4G Filter	Micro-Tronics	Brm50702	76	12/26/2015	12/25/2016
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A
Test Software	Farad	EZEMC Ver:ISL-03A2	N/A	N/A	N/A

6.4 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:

$$FS = RA + AF + CL - AG$$

Average Value = Peak Value + 20 Log (Ton/Tp) Pulse Modulation

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

6.5 Measurement Result

Fundamental Measurement Result

Operation Mode	: TX mode	Test Date	: 2016/01/19
Fundamental Frequency	: 88.1 MHz	Test By	: Dino
Temp	: 25 °C	Hum.	: 60%

Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
88.09	55.07	-18.32	36.75	67.95	-31.20	Peak	VERTICAL
88.11	61.69	-18.32	43.37	67.95	-24.58	Peak	HORIZONTAL

Operation Mode	: TX mode	Test Date	: 2016/01/19
Fundamental Frequency	: 93.1MHz	Test By	: Dino
Temp	: 25 °C	Hum.	: 60%

Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
93.11	56.73	-18.18	38.55	67.95	-29.40	Peak	VERTICAL
93.09	59.44	-18.19	41.25	67.95	-26.70	Peak	HORIZONTAL

Operation Mode	: TX mode	Test Date	: 2016/01/19
Fundamental Frequency	: 97.9 MHz	Test By	: Dino
Temp	: 25 °C	Hum.	: 60%

Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
97.90	58.73	-17.43	41.30	67.95	-26.65	Peak	VERTICAL
97.91	63.16	-17.43	45.73	67.95	-22.22	Peak	HORIZONTAL

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: Transmitting Mode

Test Date: 2016/01/19

Fundamental Frequency: 88.1MHz

Test By: Dino

Temperature : 25 °C

Humidity : 60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	186.17	47.64	-14.15	33.49	43.50	-10.01	Peak	VERTICAL
2	224.00	48.51	-14.07	34.44	46.00	-11.56	Peak	VERTICAL
3	399.57	41.87	-9.03	32.84	46.00	-13.16	Peak	VERTICAL
4	575.14	38.00	-5.96	32.04	46.00	-13.96	Peak	VERTICAL
5	649.83	41.15	-4.81	36.34	46.00	-9.66	Peak	VERTICAL
6	925.31	37.32	-0.01	37.31	46.00	-8.69	Peak	VERTICAL
1	168.71	53.36	-12.40	40.96	43.50	-2.54	Peak	HORIZONTAL
2	298.69	46.56	-10.99	35.57	46.00	-10.43	Peak	HORIZONTAL
3	399.57	43.17	-9.03	34.14	46.00	-11.86	Peak	HORIZONTAL
4	540.22	42.62	-6.71	35.91	46.00	-10.09	Peak	HORIZONTAL
5	649.83	40.03	-4.81	35.22	46.00	-10.78	Peak	HORIZONTAL
6	925.31	34.85	-0.01	34.84	46.00	-11.16	Peak	HORIZONTAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.
- 6 Peak is below the average limit, so that the average result is not measured

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: Transmitting Mode

Test Date: 2016/01/19

Fundamental Frequency: 93.1MHz

Test By: Dino

Temperature : 25 °C

Humidity : 60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	167.74	46.70	-12.35	34.35	43.50	-9.15	Peak	VERTICAL
2	298.69	42.93	-10.99	31.94	46.00	-14.06	Peak	VERTICAL
3	399.57	41.29	-9.03	32.26	46.00	-13.74	Peak	VERTICAL
4	500.45	40.02	-7.37	32.65	46.00	-13.35	Peak	VERTICAL
5	649.83	38.66	-4.81	33.85	46.00	-12.15	Peak	VERTICAL
6	925.31	33.13	-0.01	33.12	46.00	-12.88	Peak	VERTICAL
1	167.74	50.93	-12.35	38.58	43.50	-4.92	Peak	HORIZONTAL
2	205.57	51.05	-14.71	36.34	43.50	-7.16	Peak	HORIZONTAL
3	298.69	47.38	-10.99	36.39	46.00	-9.61	Peak	HORIZONTAL
4	399.57	48.52	-9.03	39.49	46.00	-6.51	Peak	HORIZONTAL
5	540.22	44.69	-6.71	37.98	46.00	-8.02	Peak	HORIZONTAL
6	649.83	41.83	-4.81	37.02	46.00	-8.98	Peak	HORIZONTAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.
- 6 Peak is below the average limit, so that the average result is not measured

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: Transmitting Mode

Test Date: 2016/01/19

Fundamental Frequency: 97.9MHz

Test By: Dino

Temperature : 25 °C

Humidity : 60 %

No	Freq MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	149.31	47.43	-12.04	35.39	43.50	-8.11	Peak	VERTICAL
2	186.17	50.01	-14.15	35.86	43.50	-7.64	Peak	VERTICAL
3	250.19	44.91	-12.84	32.07	46.00	-13.93	Peak	VERTICAL
4	485.90	41.17	-7.53	33.64	46.00	-12.36	Peak	VERTICAL
5	649.83	38.04	-4.81	33.23	46.00	-12.77	Peak	VERTICAL
6	700.27	39.12	-4.03	35.09	46.00	-10.91	Peak	VERTICAL
1	167.74	53.13	-12.35	40.78	43.50	-2.72	Peak	HORIZONTAL
2	205.57	55.46	-14.71	40.75	43.50	-2.75	Peak	HORIZONTAL
3	298.69	53.17	-10.99	42.18	46.00	-3.82	Peak	HORIZONTAL
4	450.01	44.19	-7.91	36.28	46.00	-9.72	Peak	HORIZONTAL
5	540.22	43.01	-6.71	36.30	46.00	-9.70	Peak	HORIZONTAL
6	649.83	39.49	-4.81	34.68	46.00	-11.32	Peak	HORIZONTAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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.
- 5 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.
- 6 Peak is below the average limit, so that the average result is not measured

7. 26 DB OCCUPIED BANDWIDTH

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW=10KHz, VBW= 30KHz, Span =200KHz.
4. Set SPA Max hold. Mark peak, -26dB.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

7.4 Measurement Results

88.1MHz = 63.51KHz

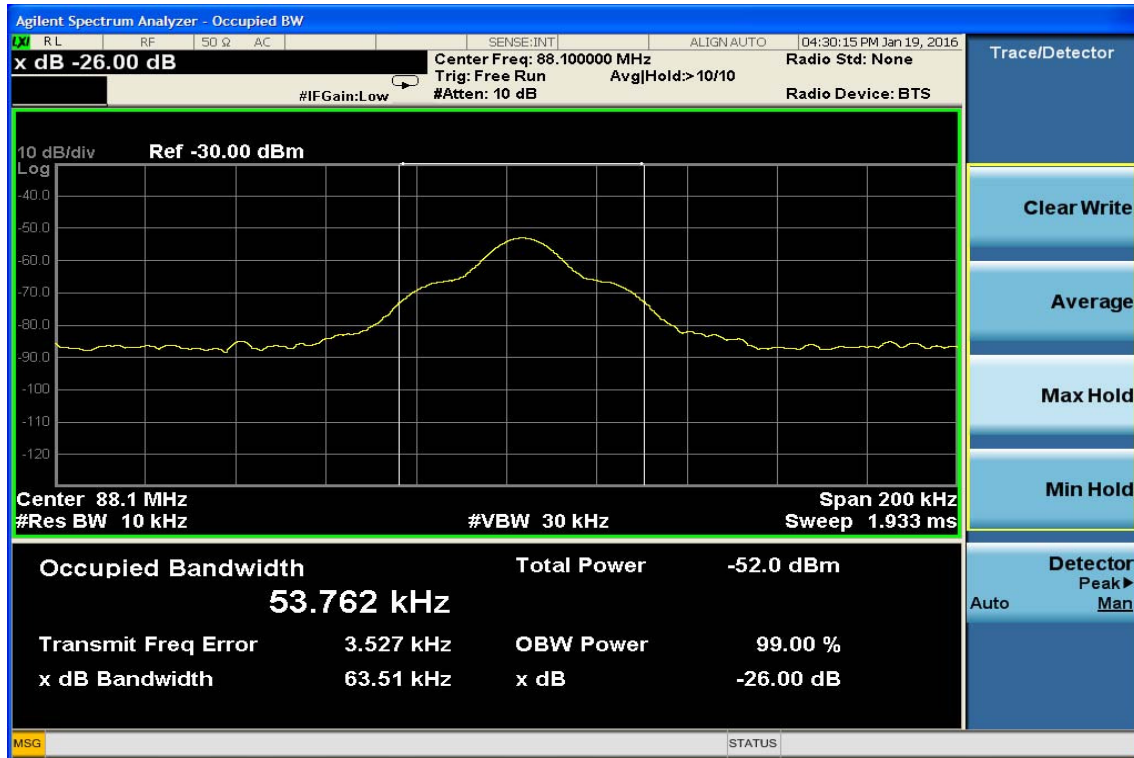
93.1MHz = 61.90KHz

97.9MHz = 61.51 KHz

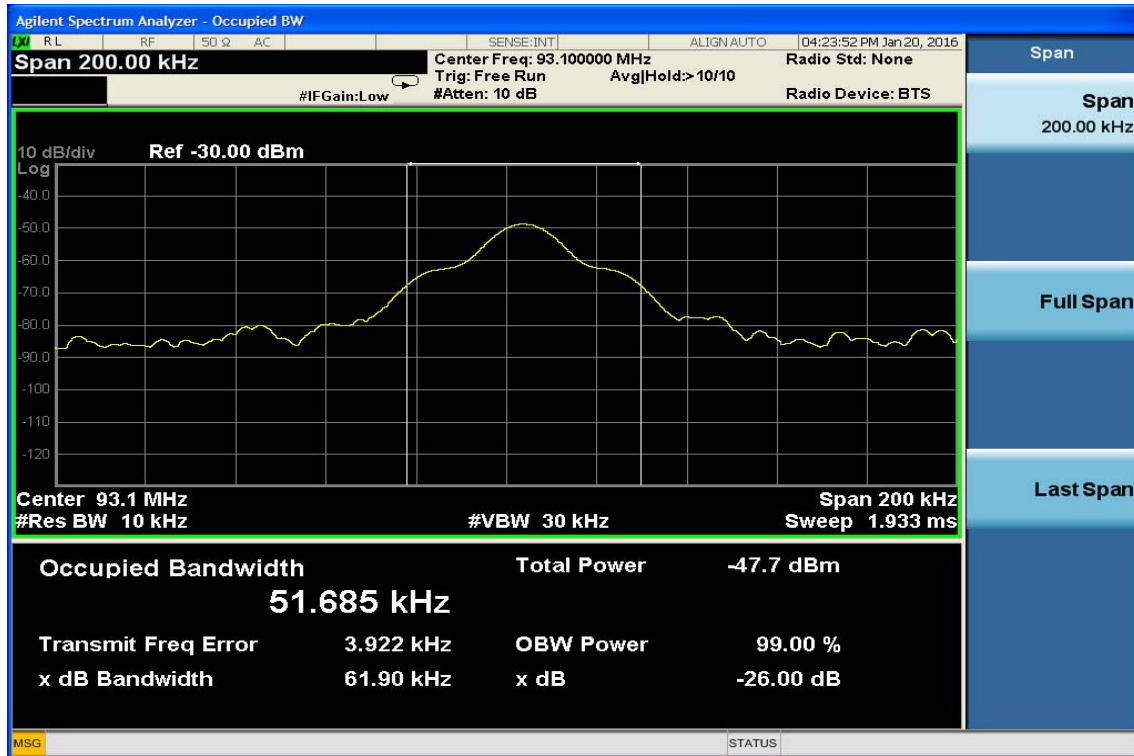
Refer to attached data chart.

26dB Band Width Test Data

CH Low



CH Mid



CH High

