FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.239

Report Reference No. ..... :	**GTS20200221009-1-7**
FCC ID. ..... :	**2AJ5B-C68**
Compiled by (position+printed name+signature) . :	File administrators Peter Xiao
Supervised by (position+printed name+signature) . :	Test Engineer Moon Tan
Approved by (position+printed name+signature) . :	Manager Simon Hu
Date of issue ..... :	Mar. 11, 2020
Representative Laboratory Name :	**Shenzhen Global Test Service Co.,Ltd.**
Address ..... :	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Applicant's name ..... :	**SAGE HUMAN ELECTRONICS INTERNATIONAL CO.,LTD.**
Address ..... :	4F.,A Building,Rongli Industrial Park,No.2 Guiyuan Rd.Guihua Community,Guanlan Town,Longhua New Dist, Shenzhen, China
Test specification ..... **:**	
Standard ..... :	FCC CFR 47 PART 15.239 / ANSI C63.10: 2013
TRF Originator ..... :	Shenzhen Global Test Service Co.,Ltd.
Master TRF ..... :	Dated 2014-12

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Test item description..... **:**	**Bluetooth FM transmitter for car**
Trade Mark..... :	N/A
Manufacturer..... :	SAGE HUMAN ELECTRONICS INTERNATIONAL CO.,LTD.
Model/Type reference..... :	C68
Listed Models ..... :	N/A
Modulation Type ..... :	FM
Operation Frequency ..... :	From 88MHz to 108MHz
Hardware Version ..... :	V1.0
Software Version ..... :	V1.0
Rating..... :	Input :DC 12V-24V USB Output:DC 5V/3A, DC 5V/1A Type-C Output:DC 5V/3A
Result..... :	**PASS**

TEST REPORT

Test Report No. :	GTS20200221009-1-7	Mar.11, 2020 Date of issue

Equipment under Test	:	Bluetooth FM transmitter for car
Model /Type	:	C68
Listed Models	:	N/A
Applicant	:	**SAGE HUMAN ELECTRONICS INTERNATIONAL CO.,LTD.**
Address	:	4F.,A Building,Rongli Industrial Park,No.2 Guiyuan Rd.Guihua Community,Guanlan Town,Longhua New Dist, Shenzhen, China
Manufacturer	:	**SAGE HUMAN ELECTRONICS INTERNATIONAL CO.,LTD.**
Address	:	4F.,A Building,Rongli Industrial Park,No.2 Guiyuan Rd.Guihua Community,Guanlan Town,Longhua New Dist, Shenzhen, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.239: Operation in the band 88-108 MHz
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Feb. 24, 2020
Testing commenced on	:	Feb. 24, 2020
Testing concluded on	:	Mar.11, 2020

2.2. Product Description

Product Name	Bluetooth FM transmitter for car
Trade Mark	N/A
Model/Type reference	C68
List Models	N/A
Model Declaration	N/A
Power supply:	Input :DC 12V-24V USB Output:DC 5V/3A, DC 5V/1A Type-C Output:DC 5V/3A
Bluetooth	
Operation frequency	2402-2480MHz
Channel Number	79 channels for Bluetooth (DSS) 40 channels for Bluetooth (DTS)
Channel Spacing	1MHz for Bluetooth (DSS) 2MHz for Bluetooth (DTS)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK for Bluetooth (DSS) GFSK for Bluetooth (DTS)
Antenna Description	Internal Antenna , 0dBi(Max.)
FM Transmitter	
Frequency Range	88 MHz~108 MHz
Channel Spacing	100KHz
Channel Number	199 Channel
Modulation Type	FM
Antenna Description	External Antenna , 0dBi(Max.)

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		●	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

DC 12V

2.4. Short description of the Equipment under Test (EUT)

This is a Bluetooth FM transmitter for car

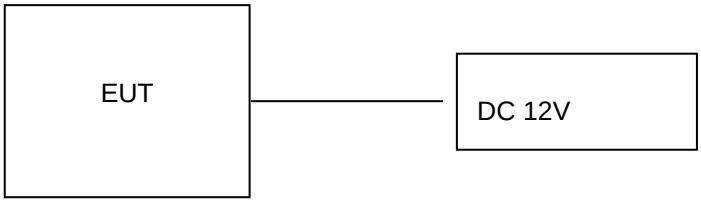
For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 79 channels provided to the EUT. Channel 00/38/78 was selected to test.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	**88.1**	100	98.1
01	88.2	101	98.2
02	88.3	102	98.3
--	--	--	--
--	--	--	--
98	97.9	**198**	**107.9**
99	**98.0**		

2.6. Block Diagram of Test Setup



2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AJ5B-C68** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
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The Computer and Displayer is provided by the laboratory.

2.9. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

3.2. Test Facility

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

CNAS (No. CNAS L8169)
Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)
Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.5. Summary of measurement results

Applied Standard: FCC CFR 47 PART 15.239		
FCC Rules	Description of Test	Result
15.239 (a)	Occupied Bandwidth	Compliant
15.239 (b)	Field Strength of Fundamental frequency	Compliant
15.239 (b)	Radiated Spurious Emissions	Compliant
15.207 (a)	AC Conducted Emissions	N/A
15.203	Antenna Requirements	Compliant

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed
3. We tested all test mode and recorded worst case in report

3.6. Equipments Used during the Test

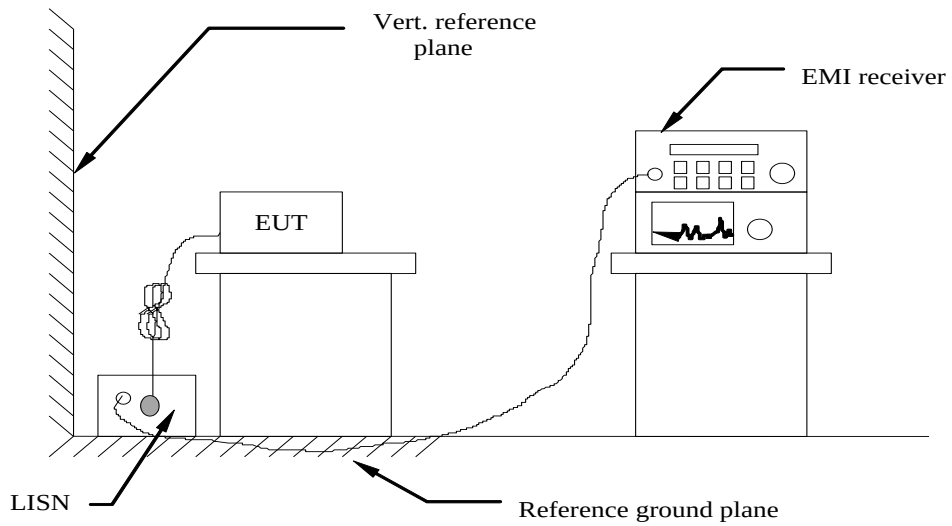
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2019/09/20	2020/09/19
LISN	R&S	ESH2-Z5	893606/008	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESPI3	101841-cd	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESCI7	101102	2019/09/20	2020/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19
Spectrum Analyzer	R&S	FSV40	100019	2019/09/20	2020/09/19
Vector Signal generator	Agilent	N5181A	MY49060502	2019/09/20	2020/09/19
Signal generator	Agilent	E4421B	3610AO1069	2019/09/20	2020/09/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2019/09/20	2020/09/19
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2019/09/23	2020/09/22
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2019/10/12	2020/10/11
Bilog Antenna	Schwarzbeck	VULB9163	000976	2019/05/26	2020/05/25
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV9179	9719-025	2019/09/20	2020/09/19
Amplifier	EMCI	EMC051845B	980355	2019/09/20	2020/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2019/09/20	2020/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2019/09/20	2020/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2019/09/20	2020/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2019/09/20	2020/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2019/09/20	2020/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2019/09/20	2020/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2019/09/20	2020/09/19
Test Control Unit	Tonscend	JS0806-1	178060067	2019/06/20	2020/06/19
Automated filter bank	Tonscend	JS0806-F	19F8060177	2019/06/20	2020/06/19
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013.
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013.
4 The EUT received DC 12V power form battery.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

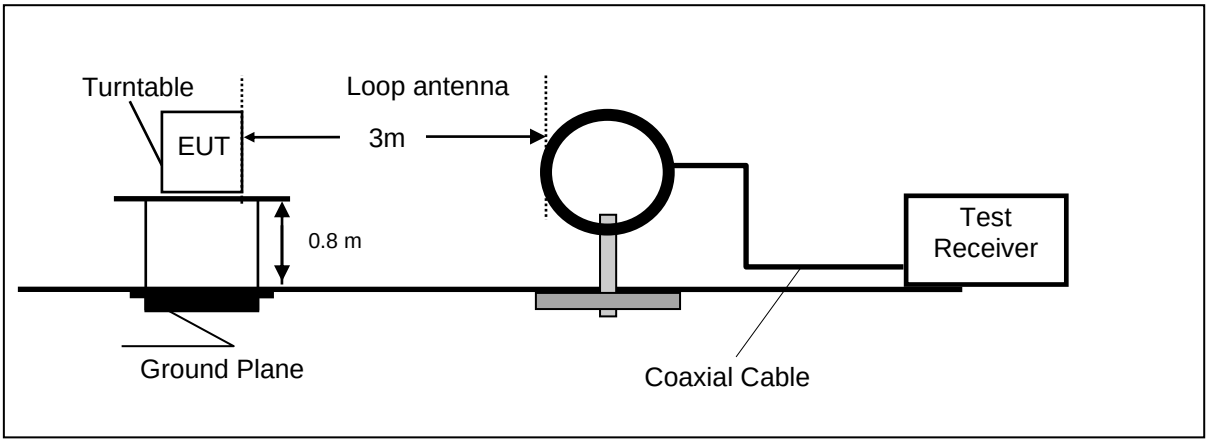
TEST RESULTS

Not Applicable.

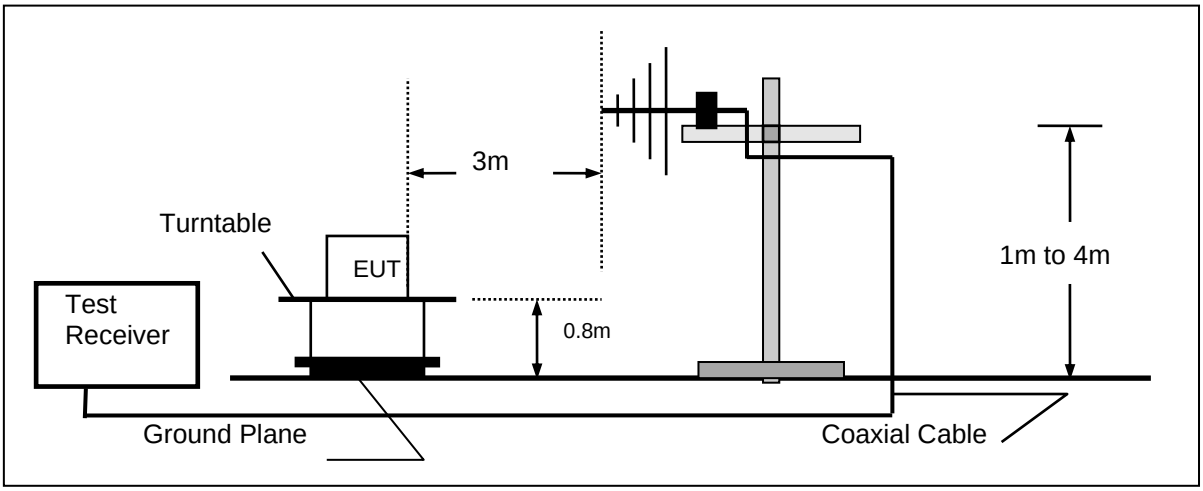
4.2. Radiated Emission

TEST CONFIGURATION

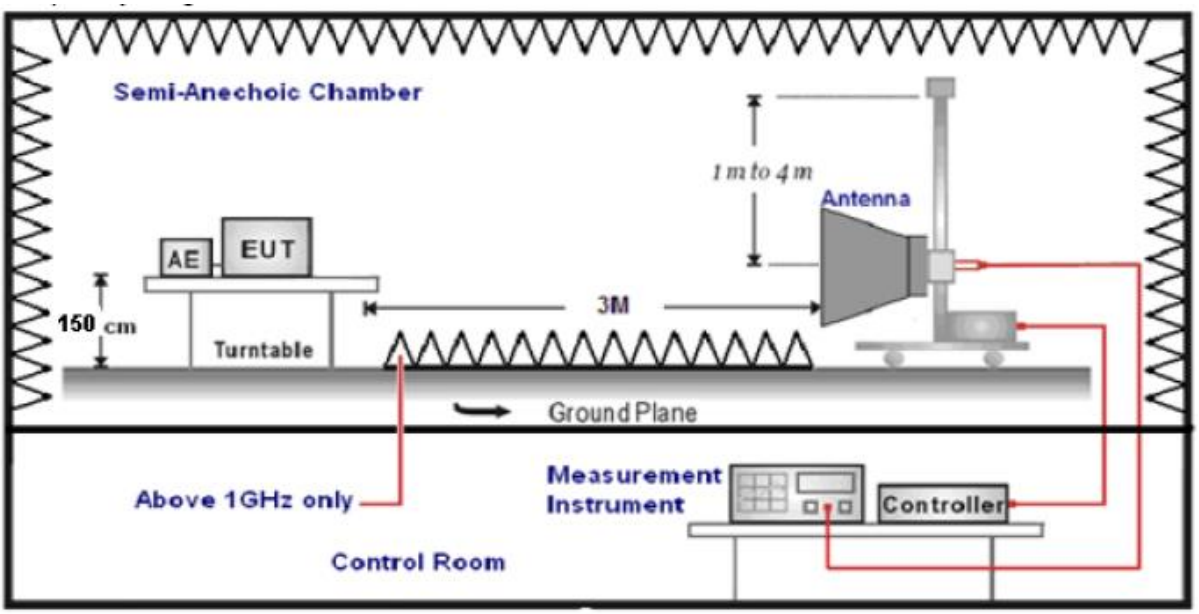
Frequency range 9 KHz – 30MHz



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. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 108MHz.so radiated emission test frequency band from 9KHz 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

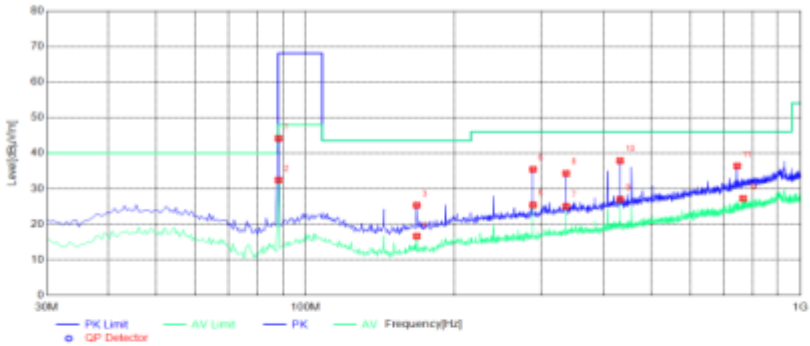
TEST RESULTS

Only record the worst test result in this report.
The test data please refer to following page:

For 30MHz-1GHz

Horizontal(TX-88.1MHz)

Test Graph



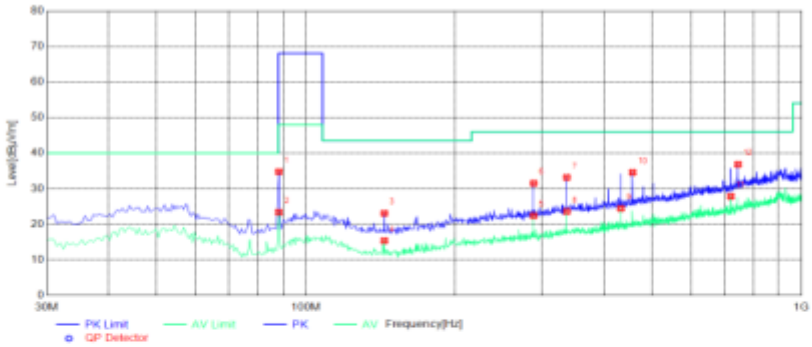
Suspected List

NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	88.2000	55.06	-10.97	44.09	68.00	23.91	100	2	PK	Horizonta	PASS
2	88.2000	43.37	-10.97	32.40	48.00	15.60	100	357	AV	Horizonta	PASS
3	167.7400	36.85	-11.51	25.34	43.50	18.16	100	152	PK	Horizonta	PASS
4	167.7400	28.17	-11.51	16.66	43.50	26.84	100	334	AV	Horizonta	PASS
5	288.0200	33.03	-7.62	25.41	46.00	20.59	100	17	AV	Horizonta	PASS
6	288.0200	43.04	-7.62	35.42	46.00	10.58	100	360	PK	Horizonta	PASS
7	336.0350	31.38	-6.33	25.05	46.00	20.95	100	17	AV	Horizonta	PASS
8	336.0350	40.62	-6.33	34.29	46.00	11.71	100	357	PK	Horizonta	PASS
9	432.0650	31.75	-4.72	27.03	46.00	18.97	100	302	AV	Horizonta	PASS
10	432.0650	42.58	-4.72	37.86	46.00	8.14	100	302	PK	Horizonta	PASS
11	744.4050	36.17	0.21	36.38	46.00	9.62	100	308	PK	Horizonta	PASS
12	765.2600	26.57	0.67	27.24	46.00	18.76	100	201	AV	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 (TX-88.1MHz)

Test Graph



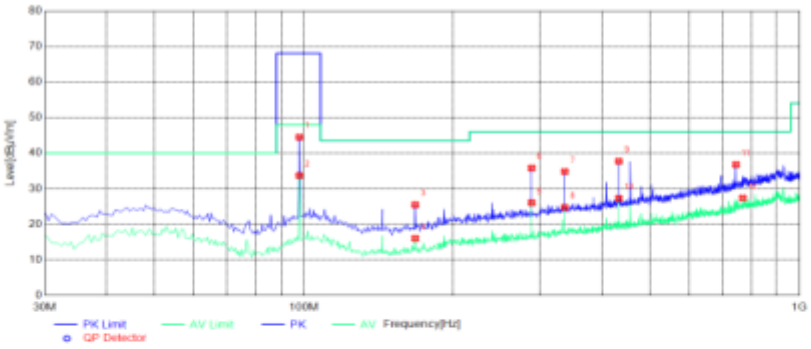
Suspected List

NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	88.2000	45.74	-10.97	34.77	68.00	33.23	100	259	PK	Vertical	PASS
2	88.2000	34.36	-10.97	23.39	48.00	24.61	100	259	AV	Vertical	PASS
3	143.9750	35.66	-12.57	23.09	43.50	20.41	100	41	PK	Vertical	PASS
4	143.9750	27.96	-12.57	15.39	43.50	28.11	100	86	AV	Vertical	PASS
5	288.0200	30.03	-7.62	22.41	46.00	23.59	100	31	AV	Vertical	PASS
6	288.0200	39.14	-7.62	31.52	46.00	14.48	100	28	PK	Vertical	PASS
7	336.0350	39.49	-6.33	33.16	46.00	12.84	100	20	PK	Vertical	PASS
8	336.0350	29.93	-6.33	23.60	46.00	22.40	100	31	AV	Vertical	PASS
9	432.0650	29.19	-4.72	24.47	46.00	21.53	100	201	AV	Vertical	PASS
10	456.3150	38.96	-4.42	34.56	46.00	11.44	100	220	PK	Vertical	PASS
11	720.1550	28.28	-0.45	27.83	46.00	18.17	100	170	AV	Vertical	PASS
12	744.4050	36.62	0.21	36.83	46.00	9.17	100	172	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).

Horizontal (TX-98.0MHz)

Test Graph



Suspected List

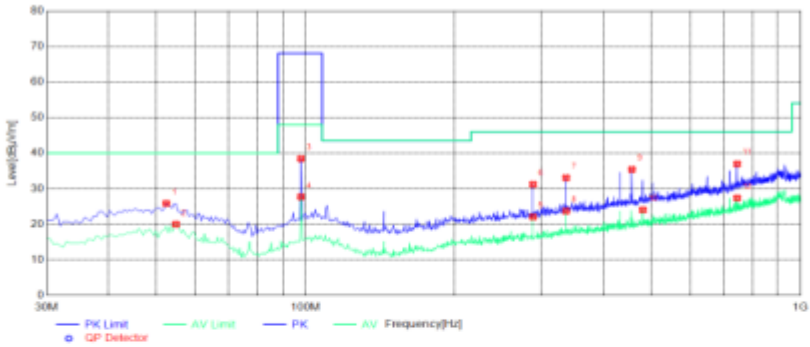
NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	97.9000	53.17	-8.69	44.48	68.00	23.52	100	51	PK	Horizonta	PASS
2	97.9000	42.37	-8.69	33.68	48.00	14.32	100	56	AV	Horizonta	PASS
3	167.7400	36.97	-11.51	25.46	43.50	18.04	100	332	PK	Horizonta	PASS
4	167.7400	27.53	-11.51	16.02	43.50	27.48	100	314	AV	Horizonta	PASS
5	288.0200	33.68	-7.62	26.06	46.00	19.94	100	9	AV	Horizonta	PASS
6	288.0200	43.44	-7.62	35.82	46.00	10.18	100	108	PK	Horizonta	PASS
7	336.0350	41.15	-6.33	34.82	46.00	11.18	100	2	PK	Horizonta	PASS
8	336.0350	31.07	-6.33	24.74	46.00	21.26	100	2	AV	Horizonta	PASS
9	432.0650	42.45	-4.72	37.73	46.00	8.27	100	158	PK	Horizonta	PASS
10	432.0650	31.99	-4.72	27.27	46.00	18.73	100	156	AV	Horizonta	PASS
11	744.4050	36.56	0.21	36.77	46.00	9.23	100	311	PK	Horizonta	PASS
12	768.1700	26.65	0.73	27.38	46.00	18.62	100	69	AV	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 (TX-98.0MHz)

Test Graph



Suspected List

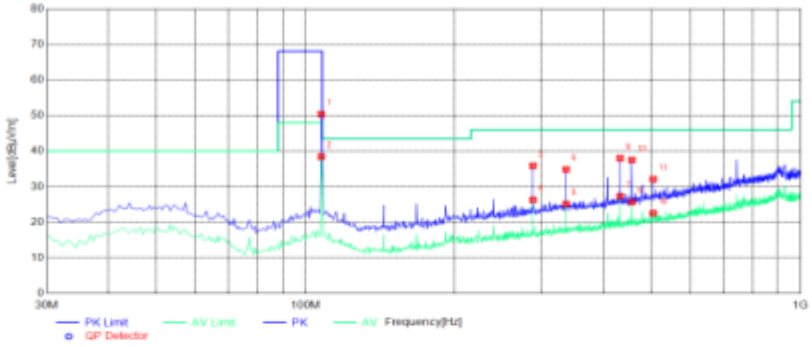
NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	52.3100	32.55	-6.68	25.87	40.00	14.13	100	20	PK	Vertical	PASS
2	54.7350	27.16	-7.15	20.01	40.00	19.99	100	238	AV	Vertical	PASS
3	97.9000	47.11	-8.69	38.42	68.00	29.58	100	64	PK	Vertical	PASS
4	97.9000	36.39	-8.69	27.70	48.00	20.30	100	44	AV	Vertical	PASS
5	288.0200	29.68	-7.62	22.06	46.00	23.94	100	36	AV	Vertical	PASS
6	288.0200	38.84	-7.62	31.22	46.00	14.78	100	41	PK	Vertical	PASS
7	336.0350	39.40	-6.33	33.07	46.00	12.93	100	41	PK	Vertical	PASS
8	336.0350	30.03	-6.33	23.70	46.00	22.30	100	33	AV	Vertical	PASS
9	456.3150	39.81	-4.42	35.39	46.00	10.61	100	319	PK	Vertical	PASS
10	480.0800	27.85	-3.79	24.06	46.00	21.94	100	18	AV	Vertical	PASS
11	744.4050	36.75	0.21	36.96	46.00	9.04	100	180	PK	Vertical	PASS
12	744.4050	27.18	0.21	27.39	46.00	18.61	100	170	AV	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).

Horizontal (TX-107.9MHz)

Test Graph



Suspected List

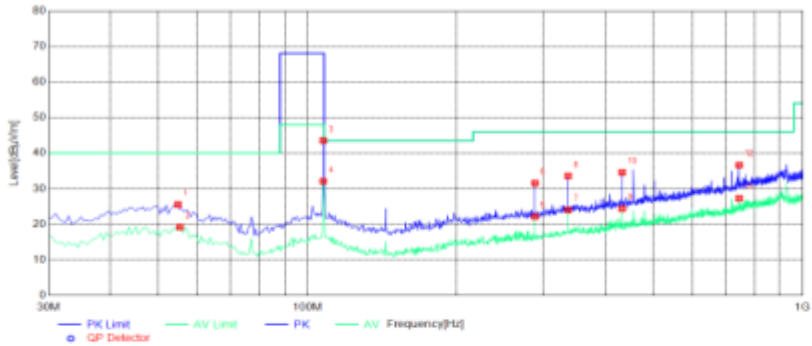
NO.	Frequency [MHz]	Reading [dBμV/m]	Factor [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	107.6000	58.76	-8.37	50.39	68.00	17.61	100	67	PK	Horizonta	PASS
2	107.6000	46.80	-8.37	38.43	48.00	9.57	100	72	AV	Horizonta	PASS
3	288.0200	43.51	-7.62	35.89	46.00	10.11	100	9	PK	Horizonta	PASS
4	288.0200	33.92	-7.62	26.30	46.00	19.70	100	112	AV	Horizonta	PASS
5	336.0350	31.49	-6.33	25.16	46.00	20.84	100	14	AV	Horizonta	PASS
6	336.0350	41.18	-6.33	34.85	46.00	11.15	100	6	PK	Horizonta	PASS
7	432.0650	32.03	-4.72	27.31	46.00	18.69	100	156	AV	Horizonta	PASS
8	432.0650	42.73	-4.72	38.01	46.00	7.99	100	158	PK	Horizonta	PASS
9	456.3150	30.10	-4.42	25.68	46.00	20.32	100	166	AV	Horizonta	PASS
10	456.3150	41.90	-4.42	37.48	46.00	8.52	100	164	PK	Horizonta	PASS
11	503.8450	35.49	-3.39	32.10	46.00	13.90	100	164	PK	Horizonta	PASS
12	503.8450	25.95	-3.39	22.56	46.00	23.44	100	25	AV	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 (TX-107.9MHz)

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	54.7350	32.70	-7.15	25.55	40.00	14.45	100	246	PK	Vertical	PASS
2	55.2200	26.61	-7.41	19.20	40.00	20.80	100	259	AV	Vertical	PASS
3	107.6000	51.91	-8.37	43.54	68.00	24.46	100	146	PK	Vertical	PASS
4	107.6000	40.46	-8.37	32.09	48.00	15.91	100	135	AV	Vertical	PASS
5	288.0200	29.78	-7.62	22.16	46.00	23.84	100	4	AV	Vertical	PASS
6	288.0200	39.20	-7.62	31.58	46.00	14.42	100	27	PK	Vertical	PASS
7	336.0350	30.37	-6.33	24.04	46.00	21.96	100	27	AV	Vertical	PASS
8	336.0350	39.90	-6.33	33.57	46.00	12.43	100	14	PK	Vertical	PASS
9	432.0650	29.12	-4.72	24.40	46.00	21.60	100	195	AV	Vertical	PASS
10	432.0650	39.28	-4.72	34.56	46.00	11.44	100	209	PK	Vertical	PASS
11	744.4050	27.07	0.21	27.28	46.00	18.72	100	127	AV	Vertical	PASS
12	744.4050	36.42	0.21	36.63	46.00	9.37	100	174	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).

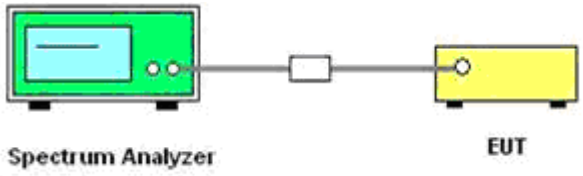
Note: The result below 30MHz and above 1GHz is too low so there is no record. The test setup show in the test setup photograph is the worst case.

4.3. 99% Bandwidth

Limit

According to §15.239 (a) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108MHz.

Block Diagram of Test Setup



Test Procedure

1) The transmitter shall be operated at its maximum carrier power measured under normal test conditions

2) The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

3) The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

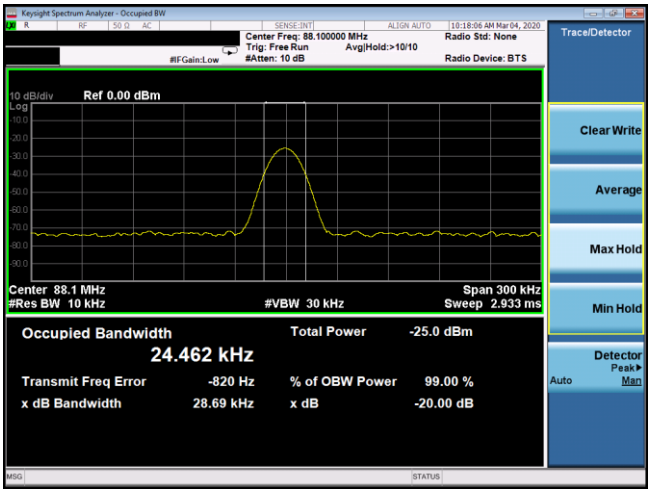
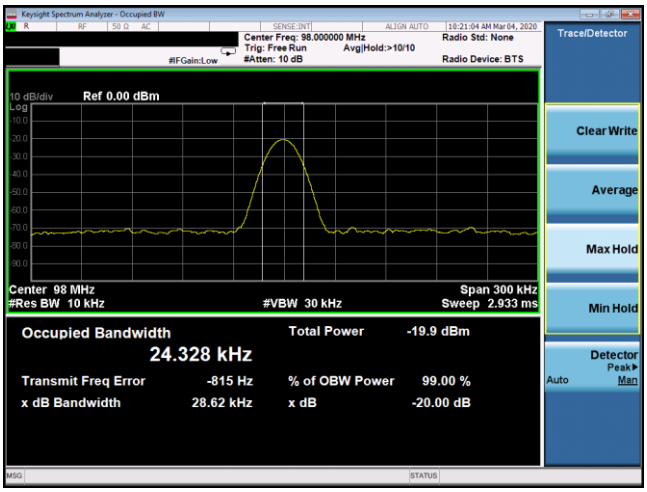
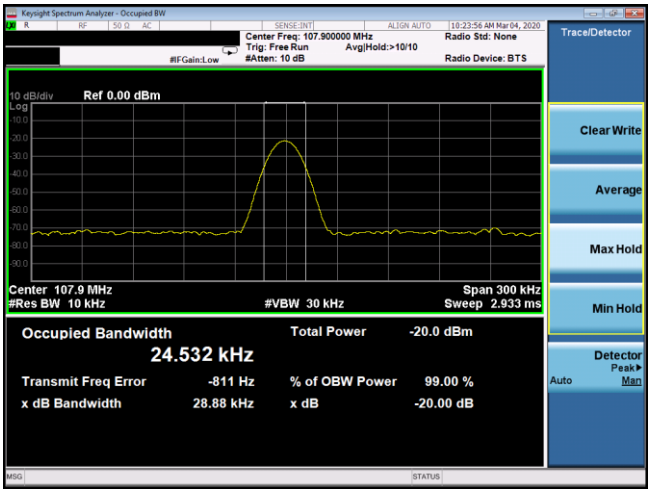
4) Detector function = peak.

5) Trace = max hold.

Test Results

Frequency (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (KHz)	Limit (KHz)	Conclusion
88.1	28.69	24.46	200.00	PASS
98.0	28.62	24.33	200.00	PASS
107.9	28.88	24.52	200.00	PASS

Remark:
1. Test results including cable loss;
2. Please refer to the following page.

99% and 20dB Bandwidth	
	
Low Channel / 88.1 MHz	Middle Channel / 89.0 MHz
	
High Channel / 107.9 MHz	

4.4. Antenna Requirement

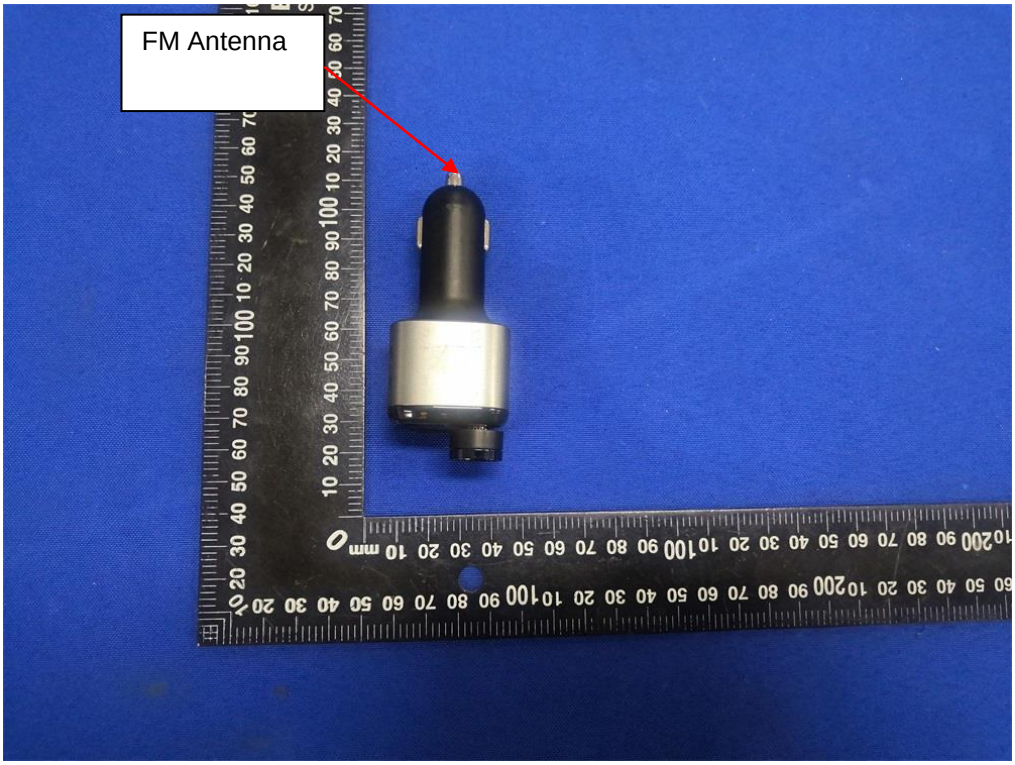
Standard Applicable

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 External 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 0.0dBi.



5. TEST SETUP PHOTOS OF THE EUT

Reference to the test report No. **GTS20200221009-1-5**

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the test report No. **GTS20200221009-1-5**

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