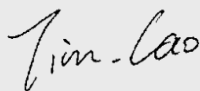
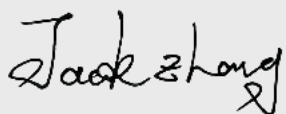


Test report No:

22A0147R-RF-FCC&ISED-P01V02

FCC&ISED TEST REPORT

Product Name	Automotive Infotainment System
Trademark	Mercedes-Benz
Model and /or type reference	NTG7Q HIGH LF2
FCC ID	2AOUZNTG7QHIGLF2
ISED	23650-NTG7QHIGLF2
Applicant's name / address	CONTINENTAL AUTOMOTIVE TECHNOLOGIES GMBH VDO-Strasse 1, 64832 Babenhausen, Germany
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247 FCC CFR Title 47 Part 15 Subpart E ANSI C63.10: 2013 KDB 558074 D01v05r02 KDB 662911 D01v02r01 KDB 789033 D02 v02r01 RSS-Gen Issue 5 /RSS-247 Issue 2
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Tim Cao/Project Engineer 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2023-01-19
Report Version	V1.1
Report template No	Template_FCC Part15C+ Part15E+RSS247-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The EUT and equipment of in the basic standard or applied product / product family standard the climatic values are as below:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	20% - 75%

If the climatic conditions during the tests are within the limits specified by manufacturer, the climatic values are recorded and documented separately in this test report.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Dec. 23, 2022
Date (start test)	Dec. 25, 2022
Date (finish test)	Dec. 28, 2022

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
Tx	: Transmitter
Rx	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
22A0147R-RF-FCC&ISED-P01V02	V1.0	Initial issue of report.	2023-01-04
22A0147R-RF-FCC&ISED-P01V02	V1.1	Modify the test mode on pages P21-P22 and remove the combination of BT and 5GWIFI. P1.0 has expired.	2023-01-19

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. This report is for the pre-test of customer products, only the test report can be issued.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Antenna Informaion;
 - Chapter 1.3 Data Rate.
 - Chapter 1.4 Channel List.

USED EQUIPMENT

Radiated Emission(Below 1GHz) / AC-2

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100176	2022.07.10	2023.07.09
Loop Antenna	R&S	HFH2-Z2	833799/003	2022.04.15	2023.04.14
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2022.08.28	2023.08.27
Coaxial Cable	Huber+Suhner	RG 214	AC3-C	2022.03.30	2023.03.29
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2022.11.22	2023.11.21
Dekra test software	Dekra	-	-	-	-

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Radiated Emission(Above 1GHz) / AC-5

Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2022.12.12	2023.12.11
Amplifier	SKET	LNPA_0118G-45	SK2021041201	2022.04.15	2023.04.14
Preamplifier	EMCI	EMC184045SE	980263	2022.05.21	2023.05.20
DRG Horn Antenna	ETS-Lindgren	3117	00167055	2022.08.29	2023.08.28
Broad-BandHornAntenna	Schwarzbeck	BBHA9170	294	2022.05.19	2023.05.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2022.03.30	2023.03.29
Coaxial Cable	ROSENBERGER	LA1-C011-2000/3000	AC5-40G	2022.03.21	2023.03.20
High-Pass Filter	Wainwright	WHKX7.0/18G-8SS	27	2022.06.07	2023.06.06
Temperature/Humidity Meter	RTS	RTS-8S	AC5-TH	2022.07.07	2023.07.06
Dekra test software	Dekra	-	-	-	-

Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95% .

Test item	Uncertainty
Radiated Emission	Below 1GHz ± 3.8 dB
	Above 1GHz ± 3.9 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name	Automotive Infotainment System
Model No.	NTG7Q HIGH LF2
Trademark.....	Mercedes-Benz
Hardware Version.....	D11
Software Version.....	E329.1
Manufacturer	CONTINENTAL AUTOMOTIVE TECHNOLOGIES GMBH
Manufacturer address.....	VDO-Strasse 1, 64832 Babenhausen, Germany
Factory.....	Continental Automotive Hungary Kft
Factory address	Napmátka u. 6. Building B/D H-1106 Budapest
Model Difference(s)	N/A

Wireless specification.....	For WIFI 2.4G: 802.11b/g/n For WIFI 5G: 802.11a/n/ac(a20, n20, n40, ac80)
Operating frequency range(s)	2.4GHz: 2400~2483.5MHz 5.2GHz: 5150 ~ 5250MHz 5.8GHz: 5725 ~ 5850MHz
Type of Modulation.....	802.11b: DSSS-DBPSK, DQPSK, CCK 802.11g/n: OFDM-BPSK, QPSK, 16QAM, 64QAM
Number of channels	802.11b/g/n(20MHz): 11 For 5G: 802.11a/n/ac(20MHz): 21 802.11n(40MHz): 11 802.11ac(80MHz): 5

Wireless specification.....	Bluetooth 3.0(FHSS)					
Operating frequency range(s)	2402~2483.5MHz					
Type of Modulation.....	GFSK					
PHYs	☒	GFSK	☒	Pi/4 DQPSK	☒	8DPSK
Data Rate.....	☒	1Mbit/s	☒	2Mbit/s	☒	3Mbit/s
Number of channels	79					

Rated power supply..... :	Voltage and Frequency	
	☐	AC: 100 - 240 V, 50/60 Hz-140W
	☐	AC: 100 - 240 V, 50/60 Hz
	☒	DC: 12 Vdc
	☐	Battery:
	☐	Adapter:
Brand of adapter	N/A	



Adapter model..... :	N/A	
Mounting position :	☐	Tabletop equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☒	Other: Peralatan on-board

1.2 Antenna Information

Antenna model / type number	N/A		
Antenna serial number.....	N/A		
Antenna Delivery	☒	1TX + 1RX	
	☐	2TX + 2RX	
	☐	Others:	
Antenna technology.....	☒	SISO	
	☐	MIMO	☒ CDD
			☐ Beam-forming
Antenna Type.....	☒	External	☐ Dipole
			☐ Sectorized
	☐	Internal	☐ Ceramic Chip
			☐ FPC
			☐ PCB
			☐ Others.....
Antenna Gain	N/A		

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode For Simultaneous transmission	Mode 1: Transmit by 2.4G WIFI + Bluetooth
---	---

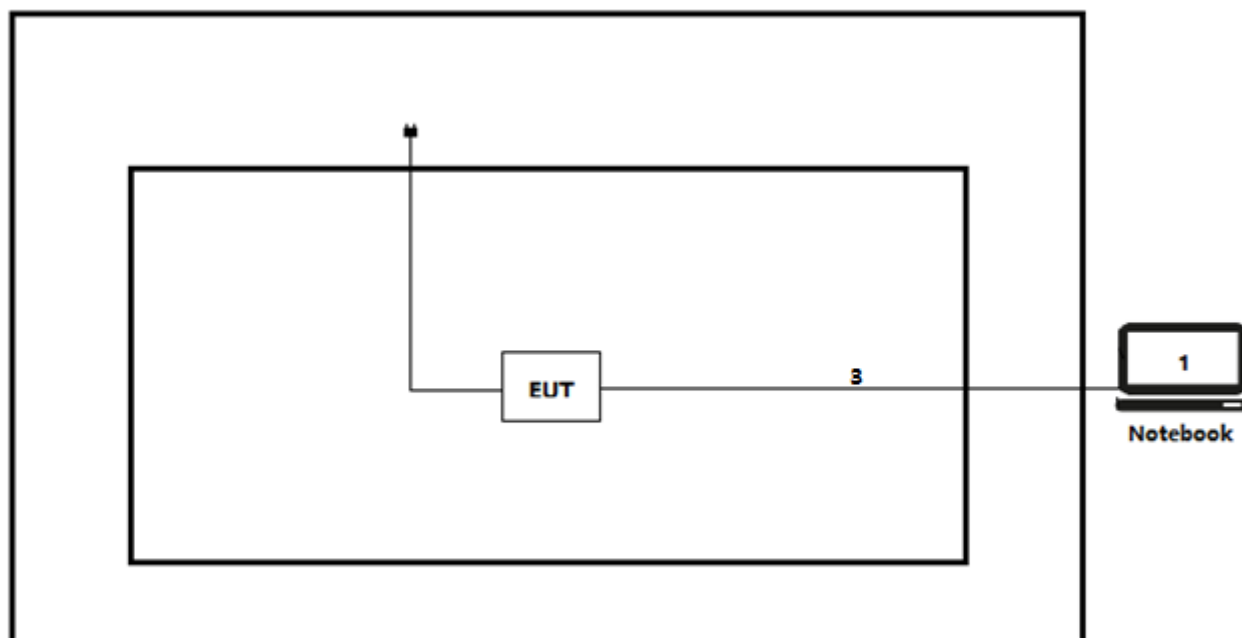
2.2 Auxiliary equipment /Accessories/Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) Notebook	Think pad x220	Lenovo	Adapter
(2) USB Control Cable	N/A	N/A	N/A
(3) USB Control Cable	N/A	N/A	N/A
software	Type / Version	Manufacturer	Supplied by
Putty	N/A	N/A	N/A

Accessories Information	Cable		
	Length used during test [m]	Attached during test	Shielded
(2)USB Control Cable	1	☒	☒
(3)USB Control Cable	10	☒	☒

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- Ratiated test



2.4 Testing process

1	Setup the EUT shown in Section 2.3.
2	Execute the [Putty!] on the notebook.
3	Configure the test mode, the test channel, and the data rate.
4	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2020	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
FCC CFR Title 47 Part 15 Subpart E Section 15.407	2022	General technical requirements for 5.15-5.25 GHz;5.25-5.35 GHz; 5.47-5.725 GHz;5.725-5.85 GHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01V05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247
KDB 789033 D02 General UNII Test Procedures New Rules v02r01	2017	This document provides guidance for determining emissions compliance of U-NII devices under Part 15, Subpart E of the FCC rules.
KDB 662911 D01 Multiple Transmitter Output v02r01	2013	This document provides guidance for measurement of conducted output emissions of devices or composite systems that employ a transmitter with multiple outputs in the same band or multiple transmitters operating in the same band, with the outputs occupying the same or overlapping frequency ranges.
RSS-Gen Issue 5 Amendment 2	2021	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2	2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Test Item –FCC CFR Title 47 Part 15.247&RSS-247		
Performed Test Item	standard(s)	Verdict
Emissions in restricted frequency bands	FCC 15.247(b)(3)/RSS-Gen Issue 5 Section 8.9	Pass

Test Item –FCC CFR Title 47 Part 15.407&RSS-247		
Performed Test Item	Test Procedure	Verdict
Radiated Emission	FCC CFR Title 47 Part 15 Subpart E: Section 15.209 RSS-Gen Issue 5: Section 8.9 RSS-247 Issue 2: Section 6.2	Pass

Performed Test Item	Remark
Radiated Emission	Test data please refer to Appendix A

4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

4.1 Radiated Emission

VERDICT: PASS

4.1.1 Limit

Standard FCC Part 15 Subpart C Paragraph 15.205; 15.209

Restricted Bands of operation for FCC

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6
13.36 – 13.41	--	--	--

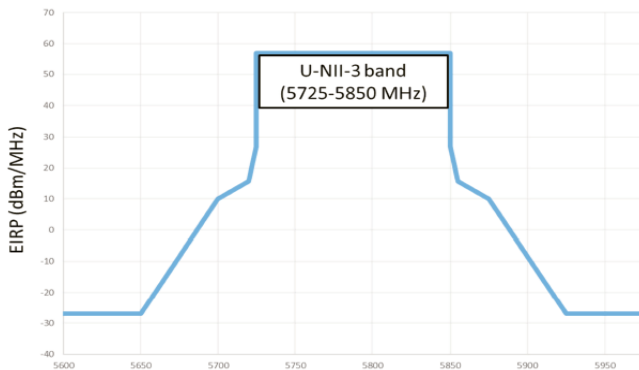
Restricted Band Emissions Limit

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

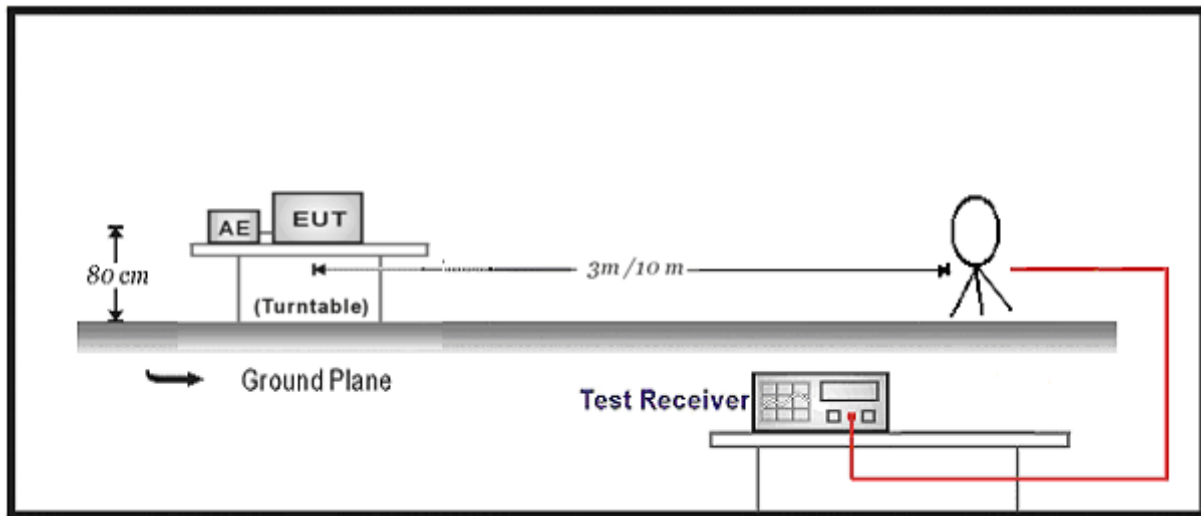
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

FCC Part 15 Subpart E Paragraph 15.407(5)(b) (Unrestricted Band Emissions Limit)

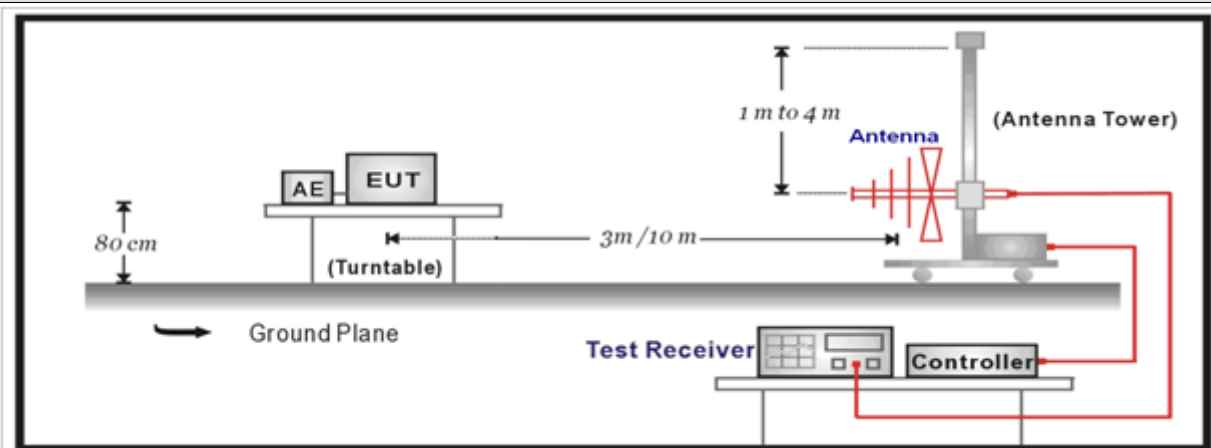
Operating Frequency Band (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength at 3m (dB μ V/m)
5150 - 5250	-27	68.3
Operating Frequency Band (MHz)	EIRP Limit (dBm/MHz)	
5725 - 5850	 U-NII-3 band (5725-5850 MHz)	

4.1.2 Test Setup

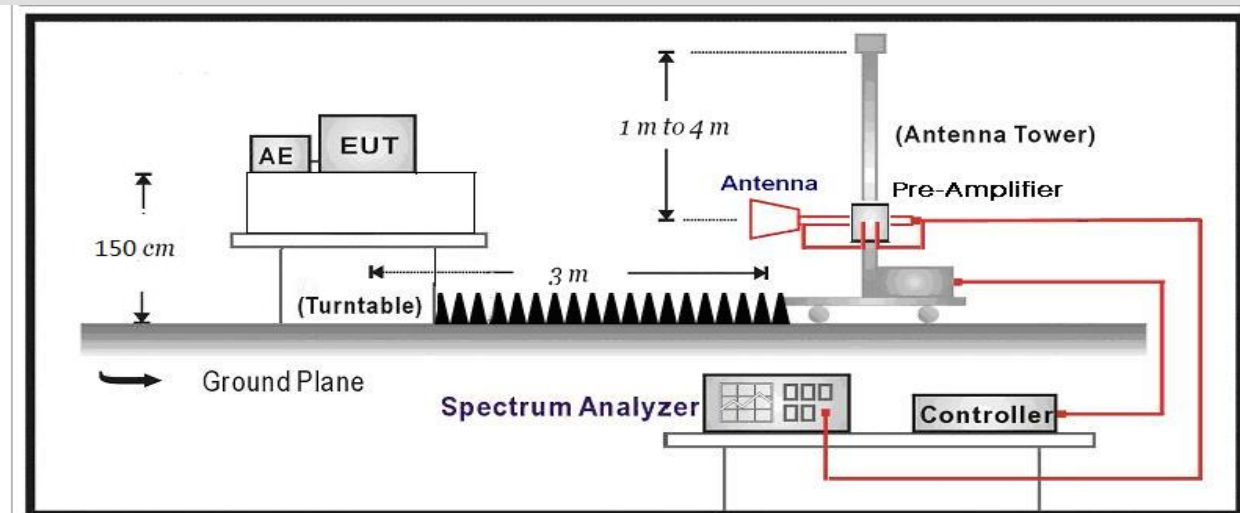
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:

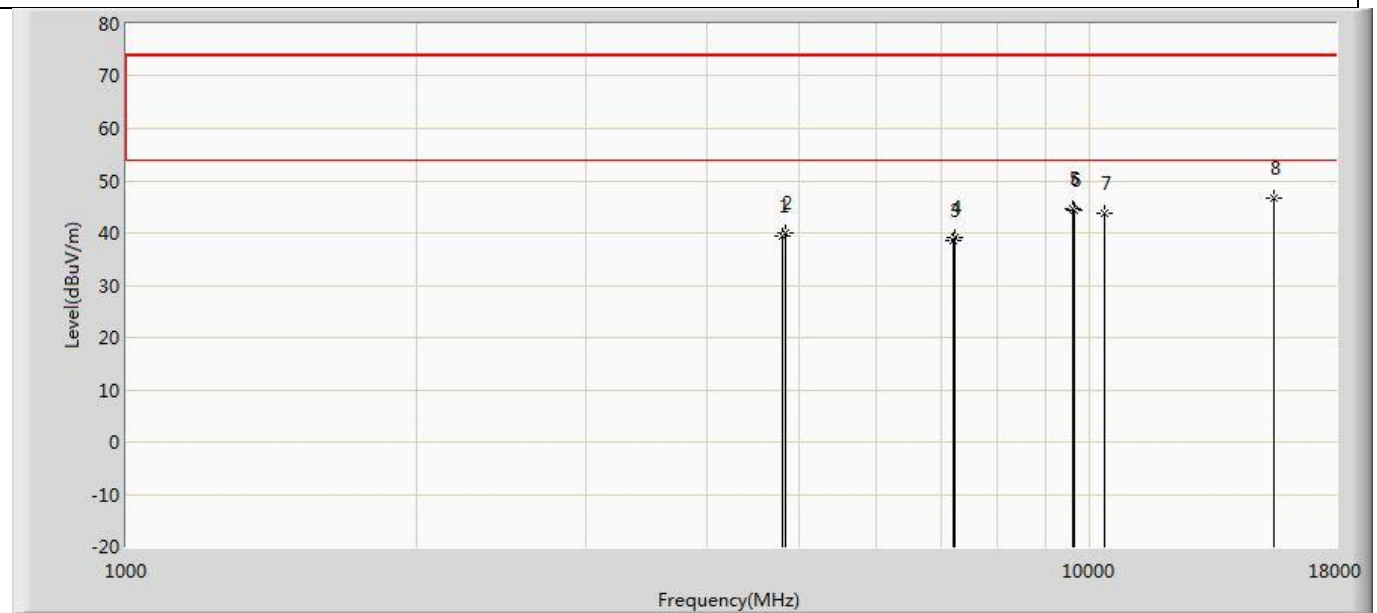


5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

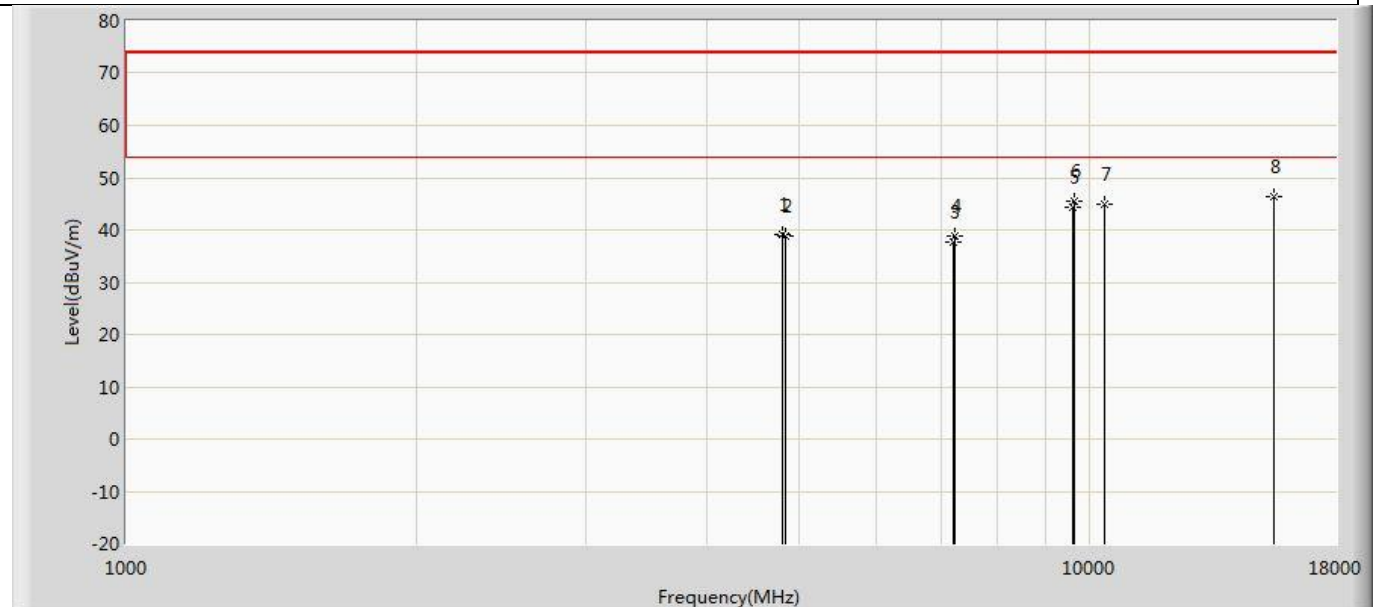
6 TEST RESULT-APPENDIX A: RADIATED EMISSION

Profile: 22A0147R	Page No.: 19
Engineer: liuyu	
Site: AC5	Time: 2022/12/26 - 21:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Horizontal
EUT: NTG7Q HIGH LF2	Power: DC 12V
Note: Mode 1 : Transmit at 2402MHz and 2412MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	39.492	54.472	-34.508	74.000	-14.981	PK
2		4824.000	40.056	54.948	-33.944	74.000	-14.892	PK
3		7206.000	38.450	49.270	-35.550	74.000	-10.820	PK
4		7236.000	39.171	50.015	-34.829	74.000	-10.844	PK
5		9608.000	44.518	52.612	-29.482	74.000	-8.094	PK
6		9648.000	44.248	52.109	-29.752	74.000	-7.860	PK
7		10360.000	43.749	51.161	-30.251	74.000	-7.412	PK
8	*	15540.000	46.764	50.877	-27.236	74.000	-4.113	PK

Profile: 22A0147R	Page No.: 20
Engineer: liuyu	
Site: AC5	Time: 2022/12/26 - 21:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)2022	Polarity: Vertical
EUT: NTG7Q HIGH LF2	Power: DC 12V
Note: Mode 1 : Transmit at 2402MHz and 2412MHz	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	39.087	54.067	-34.913	74.000	-14.981	PK
2		4824.000	38.923	53.815	-35.077	74.000	-14.892	PK
3		7206.000	37.607	48.427	-36.393	74.000	-10.820	PK
4		7236.000	38.721	49.565	-35.279	74.000	-10.844	PK
5		9608.000	44.465	52.559	-29.535	74.000	-8.094	PK
6		9648.000	45.382	53.243	-28.618	74.000	-7.860	PK
7		10360.000	44.881	52.293	-29.119	74.000	-7.412	PK
8	*	15540.000	46.370	50.483	-27.630	74.000	-4.113	PK

Note:

1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, worst case are at least 20dB below the limits, therefore no data appear in the report.
3. The test frequency range, 18GHz~26GHz test result on peak is lower than average limit, all is the noise base, therefore no data appear in the report.
4. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
5. As the radiated emission was performed, so conducted emission was not tested.

_____ The End _____