

FCC Radio Test Report FCC ID: YBN-AIVIP42M0 This report concerns (check one): Original Grant Class I Change Class II Change Project No. :1808C227 Equipment : Car Radio with navigation, BT and WLAN Test Model : AIVIP42M0 Series Model : N/A Applicant : Bosch Car Multimedia GmbH Address : Robert-Bosch-Straße 200; 31139 Hildesheim Date of Receipt : Aug. 29, 2018 Date of Test : Sep. 03, 2018 ~ Sep. 12, 2018 Issued Date : Oct. 12, 2018 : BTL Inc. Tested by M. Cai hay Cai) wid Mao **Testing Engineer Technical Manager** Steven In Authorized Signatory (Steven Lu) BTL INC. No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China. TEL: +86-769-8318-3000 FAX: +86-769-8319-6000





Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

Limitation

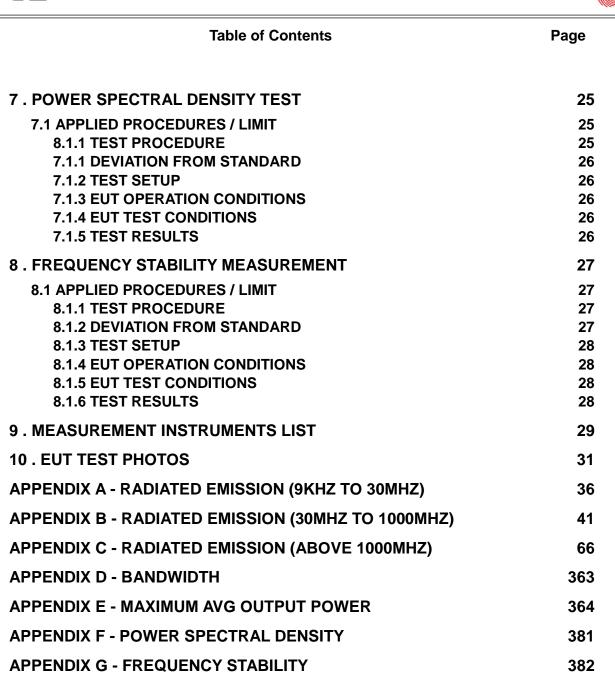
For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.





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REPORT ISSUED HISTORY

Issued No.	Version	Description	Issued Date
BTL-FCCP-3-1808C227	Rev.01	Original Issue.	Sep. 28, 2018
BTL-FCCP-3-1808C227	Rev.02	Changed the test software version	Oct. 12, 2018



1. CERTIFICATION

Brand Name : Test Model :	AIVIP42M0
Series Model :	-
Applicant :	Bosch Car Multimedia GmbH
Manufacturer :	#1 Bosch Car Multimedia GmbH
	#2 Bosch Car Multimedia Portugal, S.A.
Address :	#1 Robert-Bosch-Straße 200; 31139 Hildesheim
	#2 Rua Max Grundig, 35-Lomar, 4705-820 Braga
Factory :	Robert Bosch (Malaysia)
Address :	Free Trade Zone 11900, Bayan Lepas, Penang
Date of Test :	Sep. 03, 2018 ~ Sep. 12, 2018
Test Sample :	Engineering Sample No.: D180907334
Standard(s) :	FCC Part15, Subpart E(15.407) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-3-1808C227) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

Test results included in this report is only for the RLAN UNII-1, UNII-2A, UNII-2C, UNII-3 part.

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart E(15.407)						
Standard(s) Section	Test Item	Judgment	Remark			
15.407(a)	26dB Spectrum Bandwidth	N/A (Note1)				
15.407(a)	Maximum Average Output Power	PASS				
15.407(a)	Power Spectral Density	N/A (Note1)				
15.407(a)	Radiated Emissions	PASS				
15.407(b)	Band Edge Emissions	PASS				
15.407(g)	Frequency Stability	N/A (Note1)				
15.203	Antenna Requirements	N/A (Note1)				

NOTE:

(1)According to customers's requirement, this test item wasn't performed and the test data wasn't contained in this test report.



2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China. BTL's test firm number for FCC: 854385 BTL's designation number for FCC: CN5020

2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor) k=1.96 or k=2(which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y).

The BTL measurement uncertainty as below table:

A. Radiated Measurement:

Test Site	Method	Method Measurement Frequency Range		U, (dB)
		9kHz~30MHz	V	3.79
		9kHz~30MHz	Н	3.57
		30MHz ~ 200MHz	V	3.82
	CISPR	30MHz ~ 200MHz	Н	3.60
DG-CB03		200MHz ~ 1,000MHz	V	3.86
DG-CB03		200MHz ~ 1,000MHz	Н	3.94
		1GHz~18GHz	V	3.12
		1GHz~18GHz	Н	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	Н	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Car Radio with navigation, BT and WLAN				
Brand Name	Bosch				
Test Model	AIVIP42M0				
Series Model	N/A				
Model Difference	N/A				
	Operation Frequency	UNII-1: 5150 ~ 5250 MHz UNII-2A: 5250 ~ 5350 MHz UNII-2C: 5470 ~ 5600 MHz 5650 ~ 5725 MHz UNII-3: 5725 ~ 5850 MHz			
	Modulation Type	OFDM			
	Bit Rate of Transmitter	433.3Mbps			
Product Description	AVG Output Power (Max.)for UNII-1	802.11a: 6.69 dBm 802.11n (20M): 6.63 dBm 802.11n (40M): 6.42 dBm 802.11ac (20M): 2.40 dBm 802.11ac (40M): 2.27 dBm 802.11ac (80M): 1.96 dBm			
	AVG Output Power (Max.)for UNII-2A	802.11a: 6.64 dBm 802.11n (20M): 6.61 dBm 802.11n (40M): 6.24 dBm 802.11ac (20M): 2.41 dBm 802.11ac (40M): 2.10 dBm 802.11ac (80M): 1.87 dBm			
	AVG Output Power (Max.)for UNII-2C	802.11a: 6.13 dBm 802.11n (20M): 6.19 dBm 802.11n (40M): 6.26 dBm 802.11ac (20M): 2.08 dBm 802.11ac (40M): 2.30 dBm 802.11ac (80M): 1.73 dBm			
	AVG Output Power (Max.)for UNII-3	802.11a: 7.07 dBm 802.11n (20M): 7.24 dBm 802.11n (40M): 6.56 dBm 802.11ac (20M): 3.16 dBm 802.11ac (40M): 2.63 dBm 802.11ac (80M): 2.60 dBm			
Power Source	DC voltage supplied from externa	al power supply.			
Power Rating	DC 13.5V				

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2. Channel List:

802.11a 802.11n 20MHz 802.11ac 20MHz		802.11n 40MHz 802.11ac 40MHz		802.11ac 80MHz	
UNI	I-1	UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

802.11n	802.11a 802.11n 20MHz 802.11ac 20MHz		802.11n 40MHz 802.11ac 40MHz		c 80MHz
UNII	-2A	UNII-2A		UNII-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

802.11n	802.11a 802.11n 20MHz 802.11ac 20MHz		802.11n 40MHz 802.11ac 40MHz		c 80MHz
UNII	UNII-2C		UNII-2C		I-2C
Channel	Frequency (MHz)	Channel	nannel Frequency Cha (MHz) Cha		Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550		
108	5540	134	5670		
112	5560				
116	5580				
132	5660				
136	5680				
140	5700				

802.11a 802.11n 20MHz 802.11ac 20MHz		802.11n 40MHz 802.11ac 40MHz		802.11ac 80MHz	
UNI	I-3	UNII-3		UNII-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				





3. Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)	Note
1	N/A	N/A	Internal	N/A	2.5	UNII-1
1	N/A	N/A	Internal	N/A	3.8	UNII-2A
1	N/A	N/A	Internal	N/A	3.6	UNII-2C
1	N/A	N/A	Internal	N/A	3.1	UNII-3

Note:

The EUT incorporates a SISO function. Physically, the EUT provides completed transmitter and receiver.



3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible 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	TX A Mode / CH36, CH40, CH48 (UNII-1)
Mode 2	TX N20 Mode / CH36, CH40, CH48 (UNII-1)
Mode 3	TX N40 Mode / CH38, CH46 (UNII-1)
Mode 4	TX AC80 Mode / CH42 (UNII-1)
Mode 5	TX A Mode / CH52, CH56, CH64 (UNII-2A)
Mode 6	TX N20 Mode / CH52, CH56, CH64 (UNII-2A)
Mode 7	TX N40 Mode / CH54, CH62 (UNII-2A)
Mode 8	TX AC80 Mode / CH58 (UNII-2A)
Mode 9	TX A Mode / CH100, CH116, CH140 (UNII-2C)
Mode 10	TX N20 Mode / CH100, CH116, CH140 (UNII-2C)
Mode 11	TX N40 Mode / CH102, CH110, CH134 (UNII-2C)
Mode 12	TX AC80 Mode / CH106 (UNII-2C)
Mode 13	TX A Mode / CH149,CH157,CH165 (UNII-3)
Mode 14	TX N20 Mode / CH149,CH157,CH165 (UNII-3)
Mode 15	TX N40 Mode / CH151,CH159 (UNII-3)
Mode 16	TX AC80 Mode / CH155 (UNII-3)

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:



	For Radiated Test
Final Test Mode	Description
Mode 1	TX A Mode / CH36, CH40, CH48 (UNII-1)
Mode 2	TX N20 Mode / CH36, CH40, CH48 (UNII-1)
Mode 3	TX N40 Mode / CH38, CH46 (UNII-1)
Mode 4	TX AC80 Mode / CH42 (UNII-1)
Mode 5	TX A Mode / CH52, CH56, CH64 (UNII-2A)
Mode 6	TX N20 Mode / CH52, CH56, CH64 (UNII-2A)
Mode 7	TX N40 Mode / CH54, CH62 (UNII-2A)
Mode 8	TX AC80 Mode / CH58 (UNII-2A)
Mode 9	TX A Mode / CH100, CH116, CH140 (UNII-2C)
Mode 10	TX N20 Mode / CH100, CH116, CH140 (UNII-2C)
Mode 11	TX N40 Mode / CH102, CH110, CH134 (UNII-2C)
Mode 12	TX AC80 Mode / CH106 (UNII-2C)
Mode 13	TX A Mode / CH149,CH157,CH165 (UNII-3)
Mode 14	TX N20 Mode / CH149,CH157,CH165 (UNII-3)
Mode 15	TX N40 Mode / CH151,CH159 (UNII-3)
Mode 16	TX AC80 Mode / CH155 (UNII-3)

Note:

(1) For radiated below 1GHz test, the 802.11a mode is found to be the worst case and recorded.

(2) The measurements for Maximum Average Output Power are tested, the worst case are A Mode, N20 Mode, N40 Mode and AC80 Mode, only worst case was documented for other test items.





3.3 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 firmware of the final end product

	UNII-1		
Test Software Version	Dut lab	otool_2.0.0.89_Mar. 0	9, 2016
Frequency (MHz)	5180	5200	5240
A Mode	10	10	10
N20 Mode	10	10	10
AC20 Mode	6	6	6
Frequency (MHz)	5190	5230	
N40 Mode	10	10	
AC40 Mode	6	6	
Frequency (MHz)	5210		
AC80 Mode	6		

	UNII-2A			
Test Software Version	Dut lab	Dut labtool_2.0.0.89_Mar. 09, 2016		
Frequency (MHz)	5260	5280	5320	
A Mode	10	10	10	
N20 Mode	10	10	10	
AC20 Mode	6	6	6	
Frequency (MHz)	5270	5310		
N40 Mode	10	10		
AC40 Mode	6	6		
Frequency (MHz)	5290			
AC80 Mode	6			

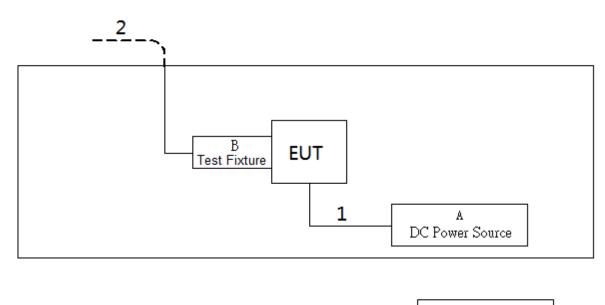


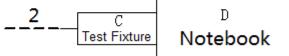
	UNII-20)	
Test Software Version	Dut la	btool_2.0.0.89_Mar. 09	9, 2016
Frequency (MHz)	5500	5580	5700
A Mode	10	10	10
N20 Mode	10	10	10
AC20 Mode	6	6	6
Frequency (MHz)	5510	5550	5670
N40 Mode	10	10	10
AC40 Mode	6	6	6
Frequency (MHz)	5530		
AC80 Mod	6		

	UNII-3		
Test Software Version	Dut labtool_2.0.0.89_Mar. 09, 2016		
Frequency (MHz)	5745	5785	5825
A Mode	10	10	10
N20 Mode	10	10	10
AC20 Mode	6	6	6
Frequency (MHz)	5755	5795	
N40 Mode	10	10	
AC40 Mode	6	6	
Frequency (MHz)	5775		
AC80 Mode	6		



3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





3.5 DESCRIPTION OF SUPPORT UNITS

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	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
А	DC Power Source	TRUE-POWER	GPC30300N	N/A	N/A
В	Test Fixture	N/A	N/A	N/A	N/A
С	Test Fixture	N/A	N/A	N/A	N/A
D	Notebook	Dell	Inspiron 15-7559	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1m	DC Cable
2	NO	NO	10m	RJ45 Cable



4. EMC EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 RADIATED EMISSION LIMITS

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

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(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

Frequencies (MHz)	EIRP Limit (dBm)	Band edge at 3m (dBµV/m)	Harmonic at 1.5m (dBµV/m)
5150-5250	-27	68.3	74.3 (Note 3)
5250-5350	-27	68.3	74.3 (Note 3)
5470-5600 5650-5725	-27	68.3	74.3 (Note 3)
	-27(Note 2)	68.3	74.3 (Note 3)
E72E E8E0	10(Note 2)	105.3	111.3(Note 3)
5725-5850	15.6(Note 2)	110.9	116.9(Note 3)
	27(Note 2)	122.3	128.3(Note 3)

Note:

1. The following formula is used to convert the equipment isotropic radiated power (eirp) to field $-100000\sqrt{30P}$

strength:
$$E = \frac{1000000,30P}{2} \mu V/m$$
, where P is the eirp (Watts)

 a_{limit}

2. According to FCC 16-24,All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below theband edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above orbelow the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

$$FS_{\text{limit}} = FS_{\text{max}} - 20\log 3.$$

measure \downarrow 20log d limit/d measure=20log 3/1.5=6dB.



4.1.2 TEST PROCEDURE

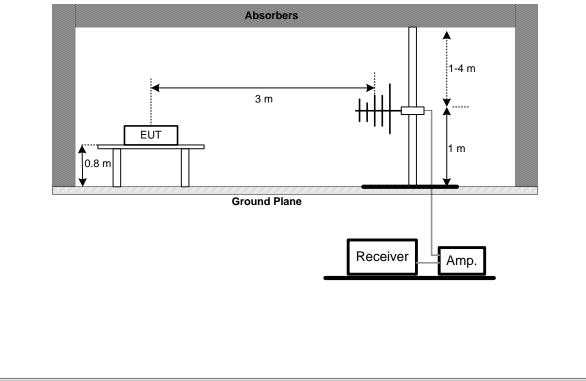
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 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. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item -EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

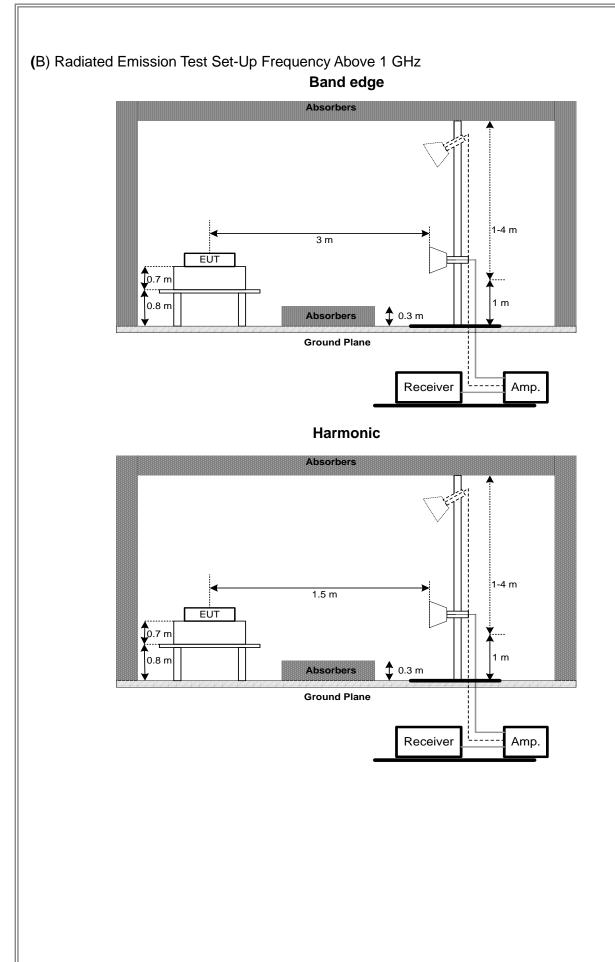
4.1.4 TEST SETUP

(A)Radiated Emission Test Set-Up Frequency Below 1GHz



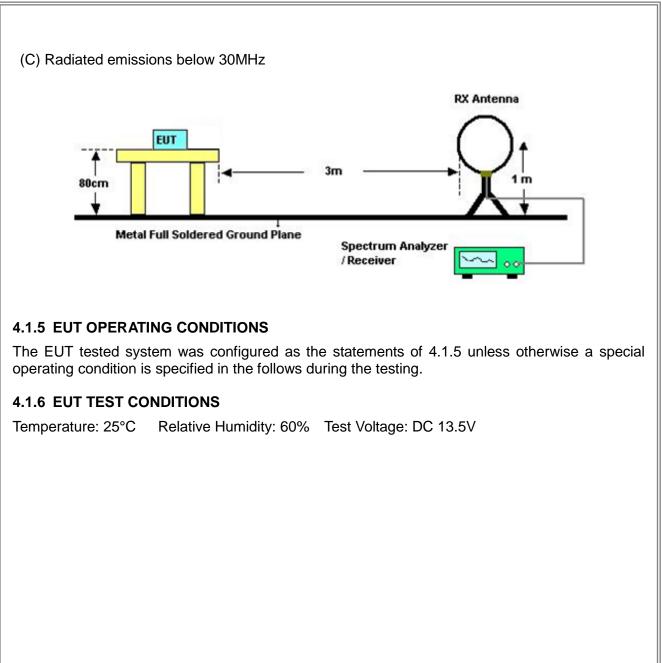














4.1.7 TEST RESULTS (9K TO 30MHz)

Please refer to the Appendix A

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.1.8 TEST RESULTS (BETWEEN 30 TO 1000 MHz)

Please refer to the Appendix B.

4.1.9 TEST RESULTS (ABOVE 1000 MHz)

Please refer to the Appendix C.

Remark:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.

5. 26dB SPECTRUM BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

	FCC Part15, Subpart E				
Test Item	Limit	Frequency Range (MHz)	Result		
	26 dB Bandwidth	5150-5250	PASS		
	26 dB Bandwidth	5250-5350	PASS		
Bandwidth	26 dB Bandwidth	5470-5600	PASS		
Danuwiutii		5650-5725	FA00		
	Minimum 500kHz 6dB	5725-5850	PASS		
	Bandwidth	5725-5650	FA00		

5.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

Spectrum Parameters	Setting	
Attenuation	Auto	
Span Frequency	> 26dB Bandwidth	
RBW	300 kHz(Bandwidth 20MHz)	
KDW	1MHz(Bandwidth 40MHz and 80MHz)	
VBW	1MHz(Bandwidth 20MHz)	
VDVV	3MHz(Bandwidth 40MHz and 80MHz)	
Detector	Peak	
Trace	Max Hold	
Sweep Time	Auto	

c. Measured the spectrum width with power higher than 26dB below carrier

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 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 13.5V

5.1.6 TEST RESULTS

Please refer to the Appendix D.



6. MAXIMUM AVERAGE OUTPUT POWER

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15, Subpart E					
Test Item	Limit	Frequency Range (MHz)	Result		
	Fixed:1 Watt (30dBm)				
	Mobile and portable:	5150-5250	PASS		
	250mW (24dBm)	250mW (24dBm)			
Average Output	250mW (24dBm)	5250-5350	PASS		
Power	250mM(24dPm)	5470-5600	PASS		
	250mW (24dBm) 5650-5725	5650-5725	FA00		
	1 Watt (30dBm)	5725-5850	PASS		
Note: The maximum e.i.r.p at anyelevation angle above 30 degrees as measured from the					

horizon must not exceed 125mW(21dBm)

6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Test was performed in accordance with method of KDB 789033 D02.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 13.5V

6.1.6 TEST RESULTS

Please refer to the Appendix E.

7. POWER SPECTRAL DENSITY TEST

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15, Subpart E					
Test Item	Limit	Limit Frequency (MHz)			
	Other then Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250	PASS		
Power Spectral	11dBm/MHz	5250-5350	PASS		
Density	11dBm/MHz	5470-5600	PASS		
		5650-5725	DASS		
	30dBm/500kHz	5725-5850	PASS		

8.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

b.	Spectrum Parameter	Setting
	Attenuation	Auto
	Span Fraguanay	Encompass the entire emissions bandwidth (EBW) of the
	Span Frequency	signal
	RBW	= 1MHz.
	VBW	≥ 3MHz.
	Detector	RMS
Trace average		100 trace
	Sweep Time	Auto

Note:

- 1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v01r02, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.
- The value measured with RBW=1MHz is to be added with 10log(500kHz/1MHz) which is -3dB. For example, if the measured value is +10dBm using RBW=1MHz (that is +10dBm/MHz), then the converted value will be +7dBm/500kHz.



7.1.1 DEVIATION FROM STANDARD

No deviation.

7.1.2 TEST SETUP

EUT	SPECTRUM
	ANALYZER

7.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.1.4 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 13.5V

7.1.5 TEST RESULTS

Please refer to the Appendix F.

8. FREQUENCY STABILITY MEASUREMENT

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15, Subpart E				
Test Item	Limit Frequency Range (MHz)		Result	
		5150-5250	PASS	
		5250-5350	PASS	
Frequency Stability	Specified in the user's manual	5470-5600	PASS	
	user s manual	5650-5725	FA33	
		5725-5850	PASS	

8.1.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

b.	Spectrum Parameter	Setting
	Attenuation	Auto
	Span Frequency	Entire absence of modulation emissions bandwidth
	RBW	10 kHz
	VBW	10 kHz
	Sweep Time	Auto

c. For the test extreme voltage $_{\rm 3}\,$ the lowest is 9V and the highest is 16V. d. User manual temperature is -30°C~70°C.

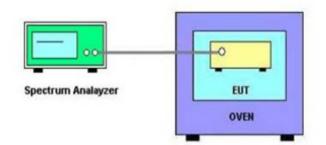
8.1.2 DEVIATION FROM STANDARD

No deviation.





8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: DC 13.5V

8.1.6 TEST RESULTS

Please refer to the Appendix G.



9. MEASUREMENT INSTRUMENTS LIST

	Radiated Emission Measurement - 9kHz TO 30 MHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Loop Antenna	EM	EM-6876-1	230	Feb. 07, 2019	
2	Cable	N/A	RG 213/U	C-102	Jun. 01, 2019	
3	EMI Test Receiver	R&S	ESCI	100382	Mar. 11, 2019	
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	

	Radiated Emission Measurement – 30 MHz TO 1000 MHz						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until		
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 11, 2019		
2	Amplifier	HP	8447D	2944A09673	Aug. 11, 2019		
3	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019		
4	4 Cable emci		LMR-400(30MHz-1 GHz)(8m+5m)	N/A	May 25, 2019		
5	Controller	СТ	SC100	N/A	N/A		
6	Controller	MF	MF-7802	MF780208416	N/A		
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A		

	Radiated Emission Measurement - Above 1 GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 11, 2019	
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2019	
3	Amplifier	Agilent	8449B	3008A02274	Mar. 11, 2019	
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 11, 2019	
5	Receiver	Agilent	N9038A	MY52130039	Aug. 11, 2019	
6	Controller	СТ	SC100	N/A	N/A	
7	Controller	MF	MF-7802	MF780208416	N/A	
8	Cable	mitron	B10-01-01-12M	18072744	Jul. 30, 2019	
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A	



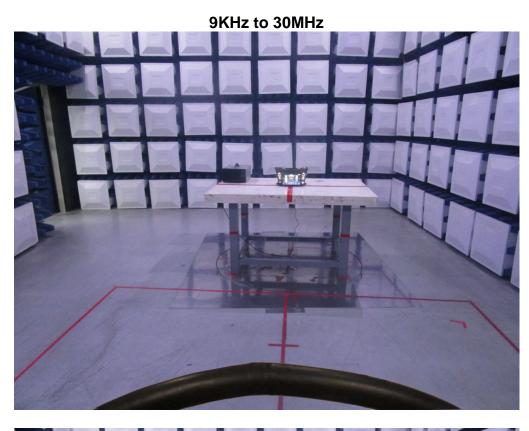
Maximum Average Output Power Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until	
1	Cable	emci	EMC104-SM-SM-900 0(0.01GHz- 26.5GHz)	N/A	N/A	
2	Power Sensor	Agilent	U2021XA	MY53020007	Mar. 11, 2019	
3	Measurement Software	Keysight	EN301893V2.1.1 (V1.02.07)	N/A	N/A	

Remark: "N/A" denotes no model name, serial no. or calibration specified. All calibration period of equipment list is one year.



10. EUT TEST PHOTOS

Radiated Measurement Photos







Radiated Measurement Photos

30MHz to 1000MHz



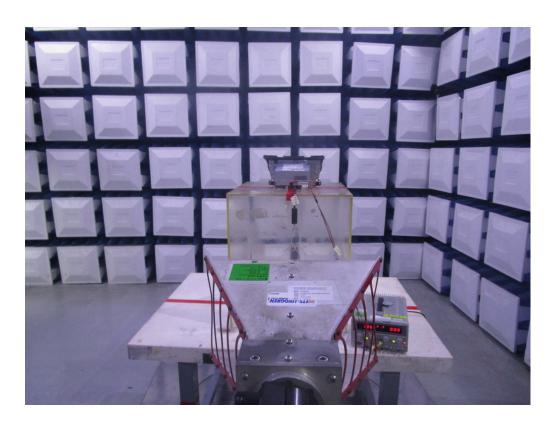




Radiated Measurement Photos

1GHz to 18GHz



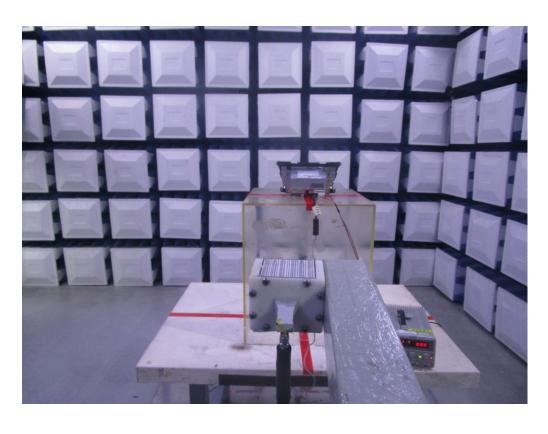




Radiated Measurement Photos

18GHz to 40GHz





Report No.: BTL-FCCP-3-1808C227



Band Edge Measurement Photos





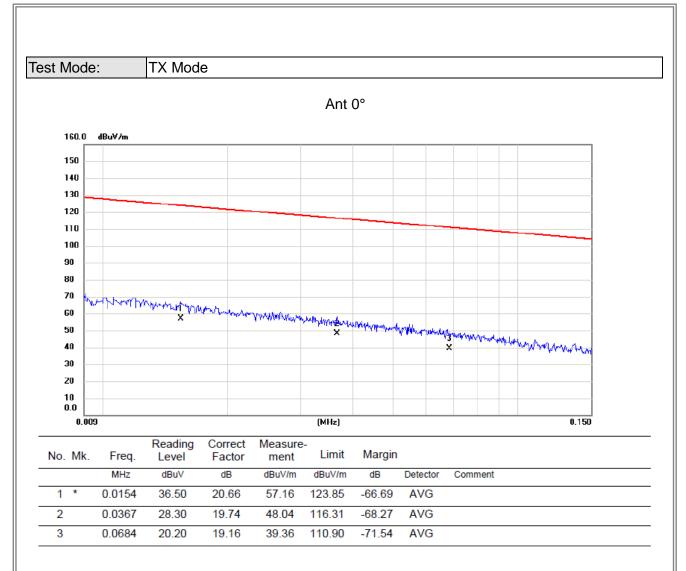
Report No.: BTL-FCCP-3-1808C227



APPENDIX A - RADIATED EMISSION (9KHZ TO 30MHZ)

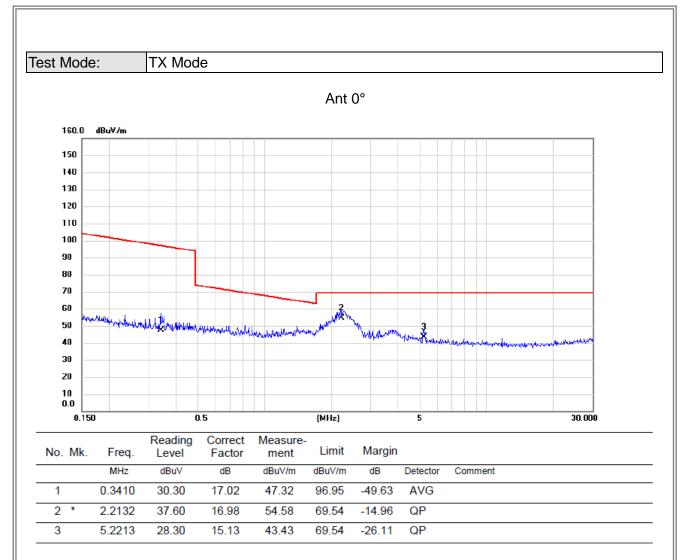






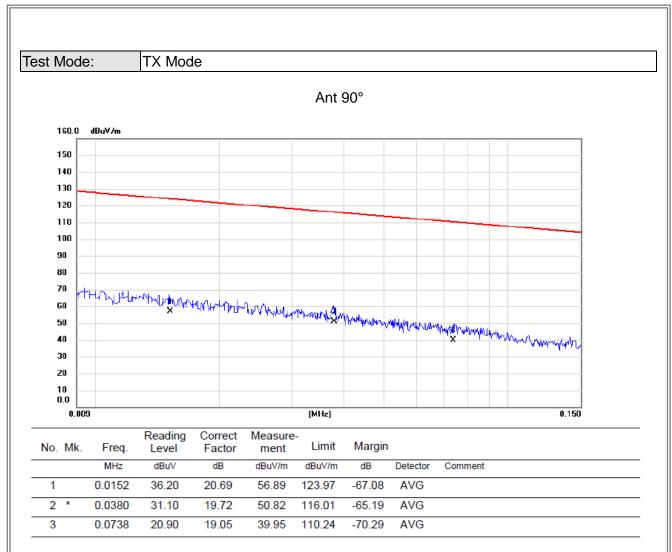
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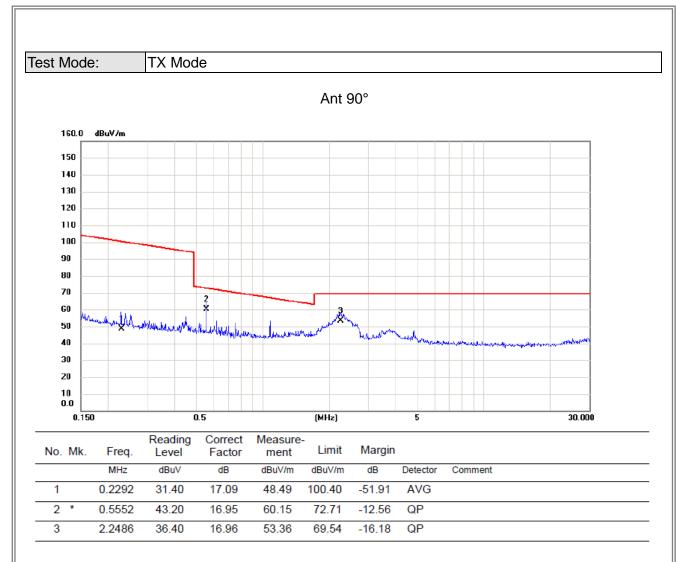
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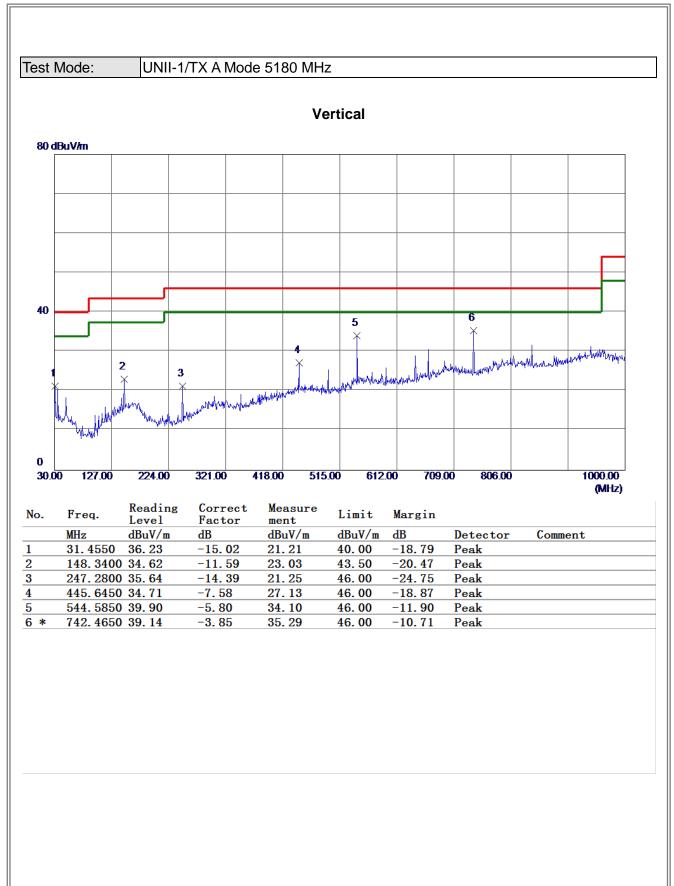




APPENDIX B - RADIATED EMISSION (30MHZ TO 1000MHZ)

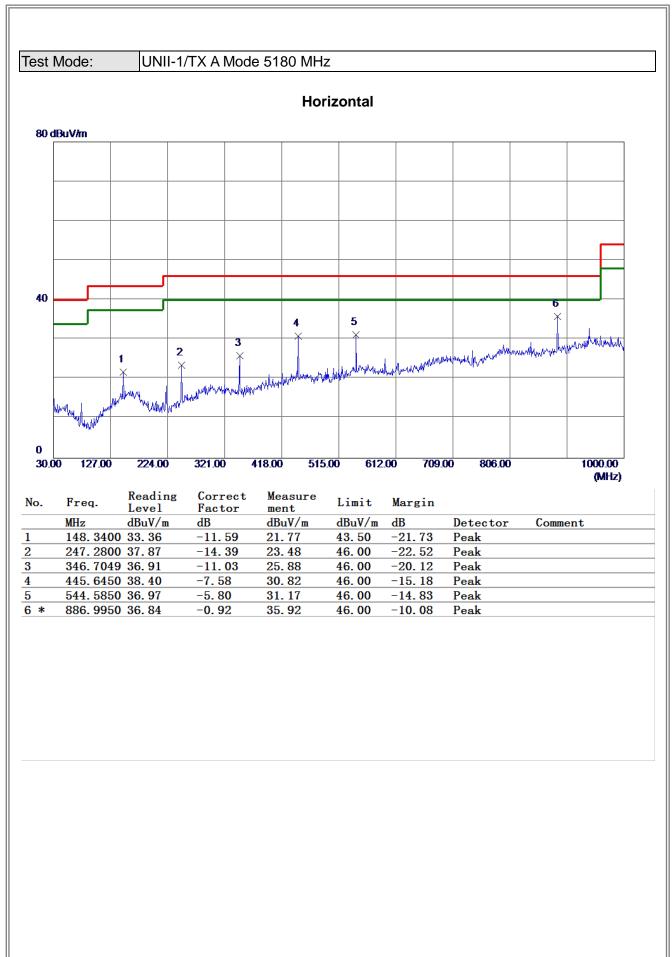






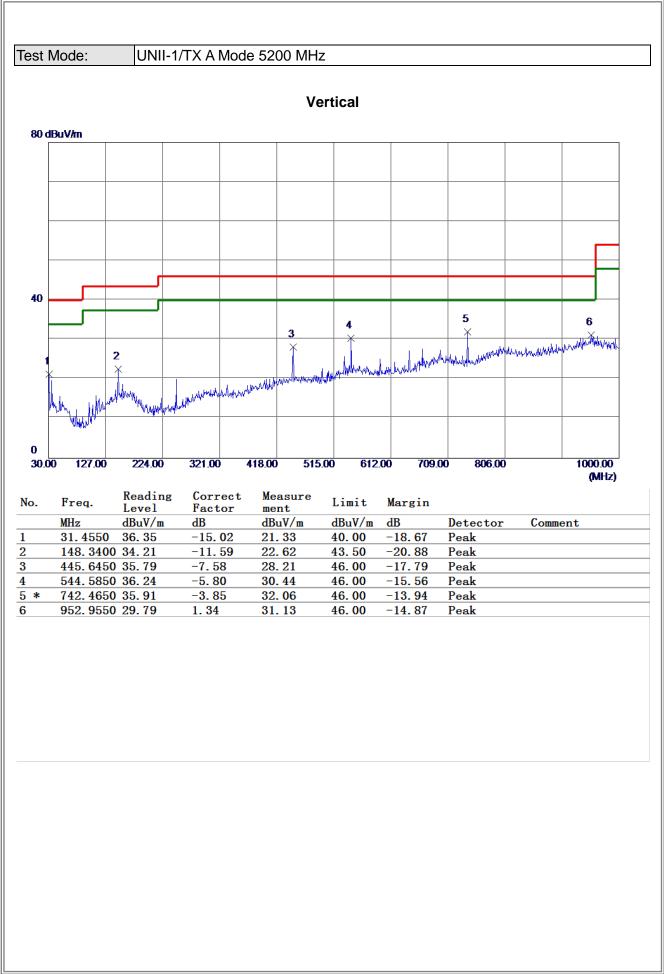






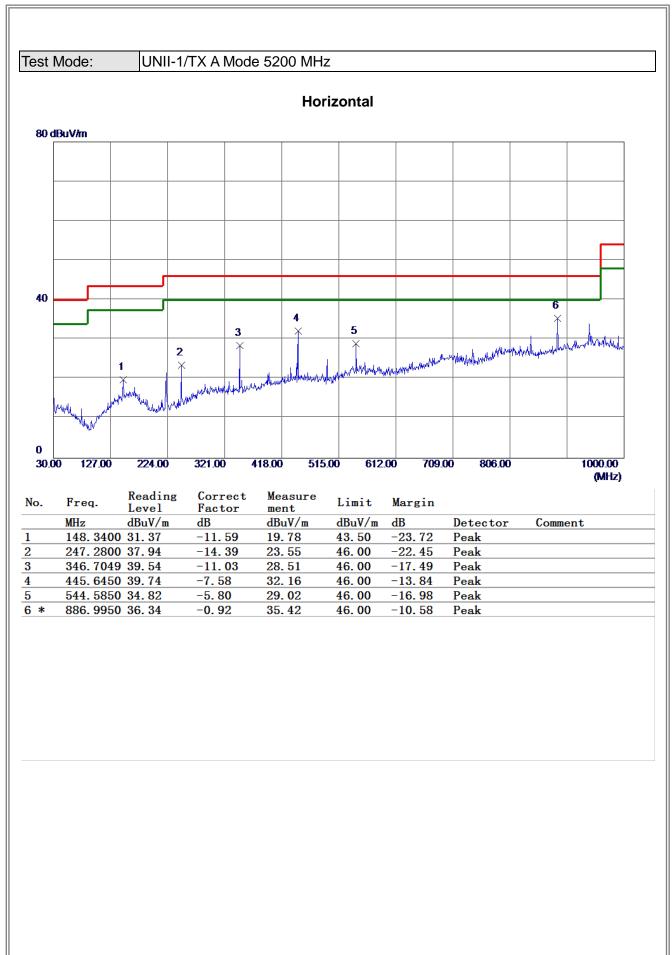






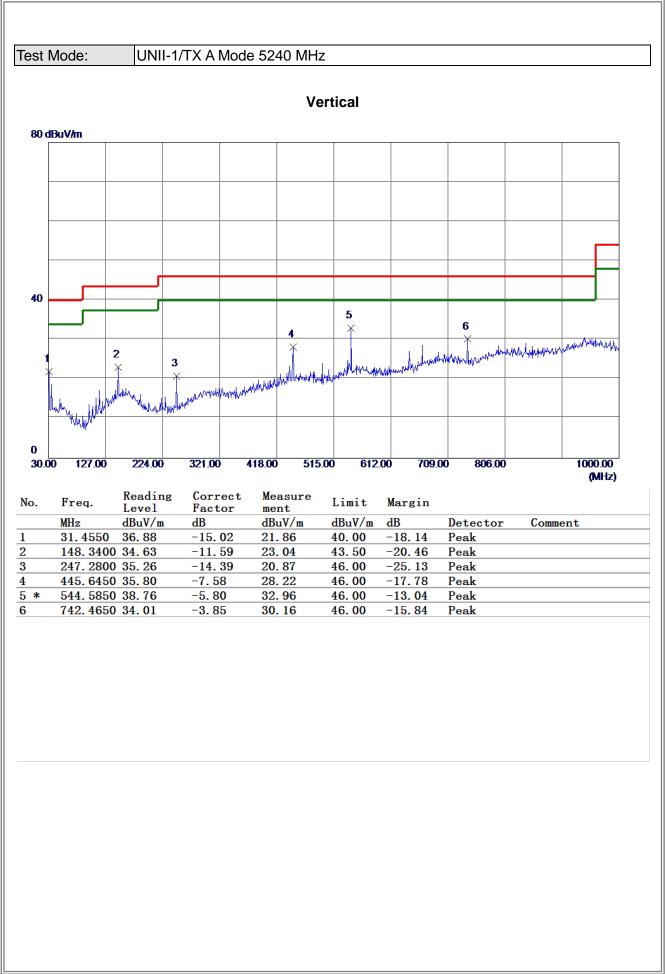






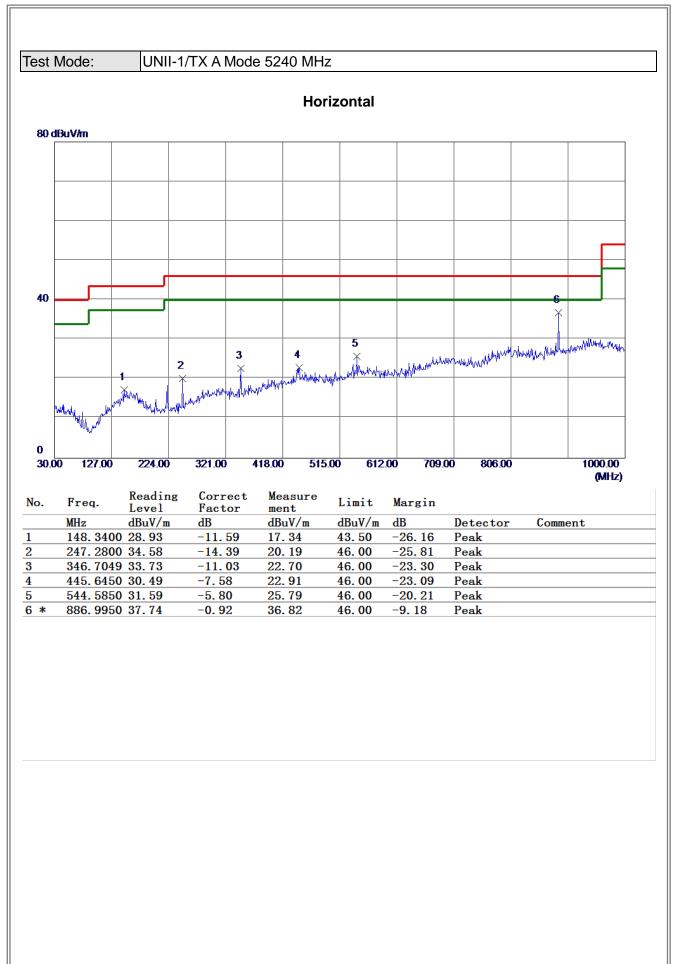






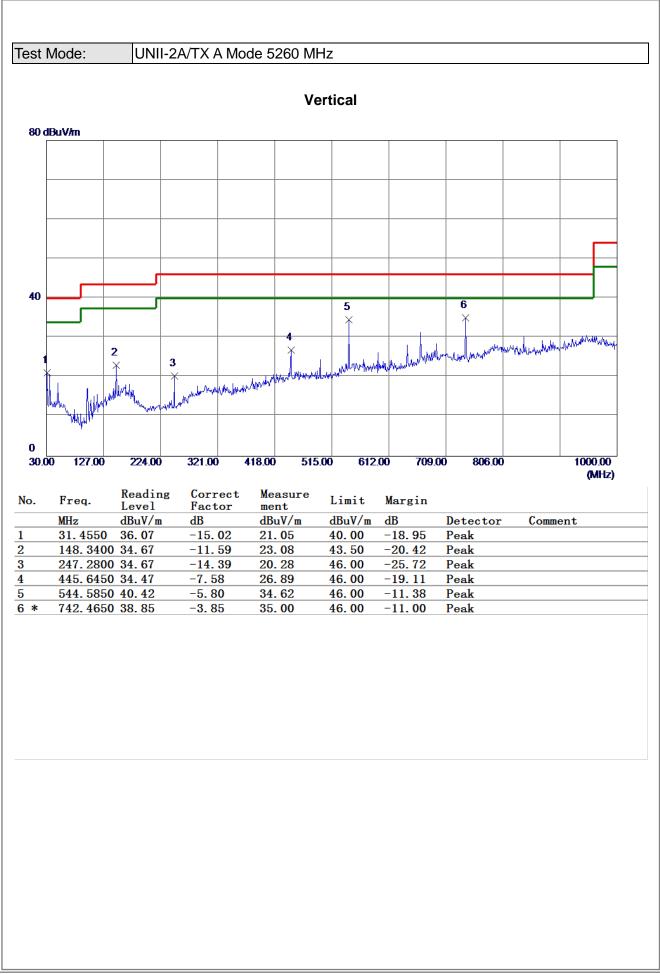






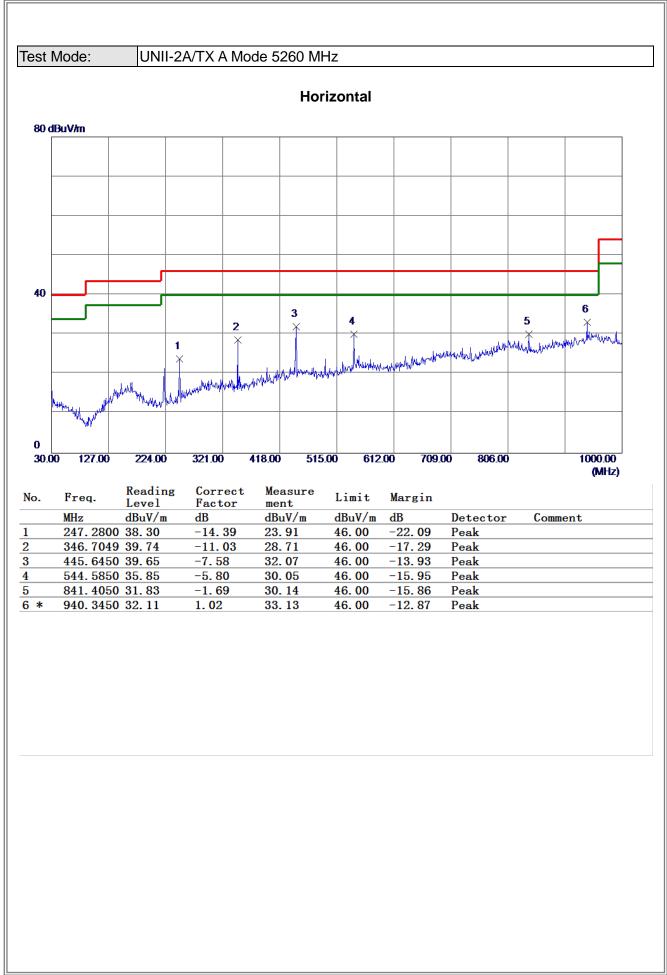






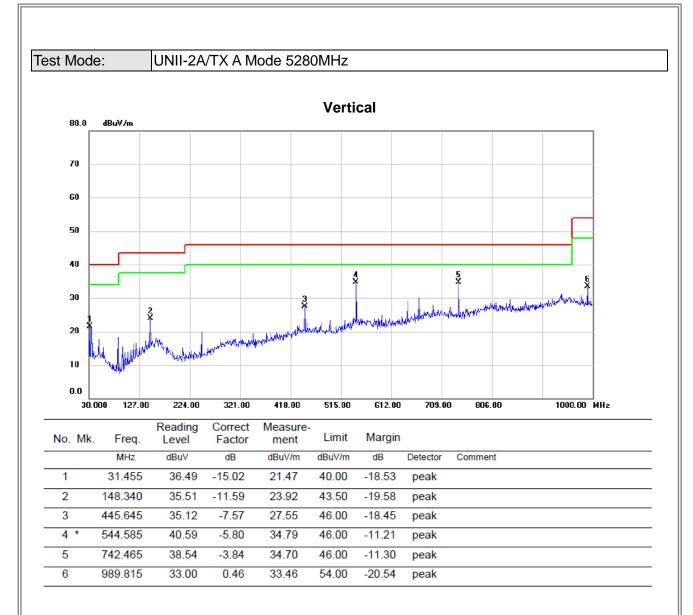




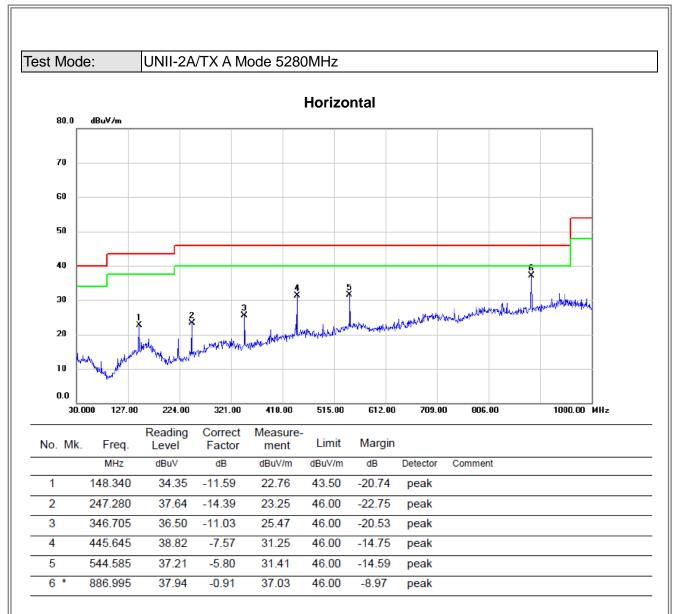






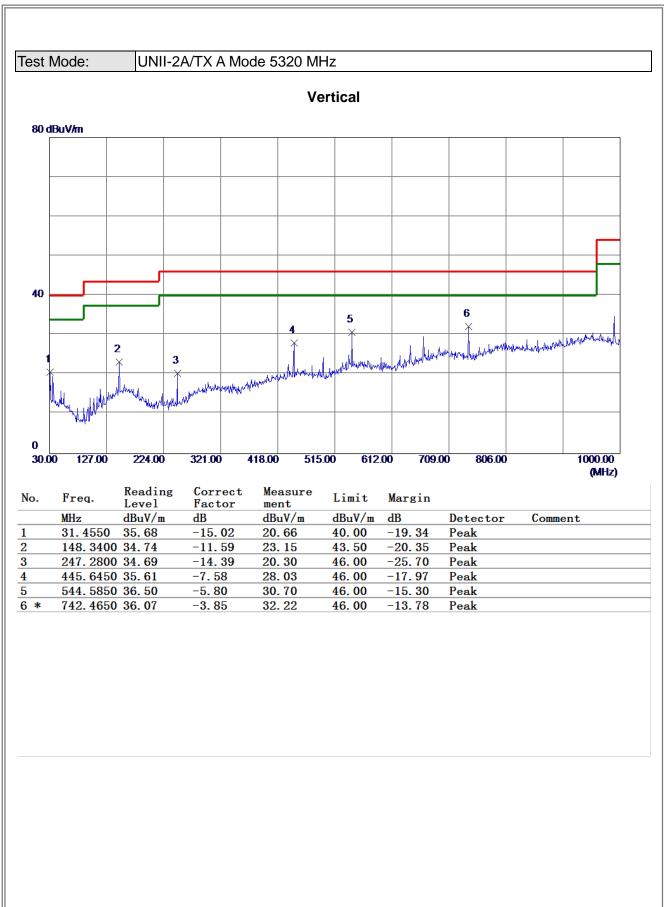






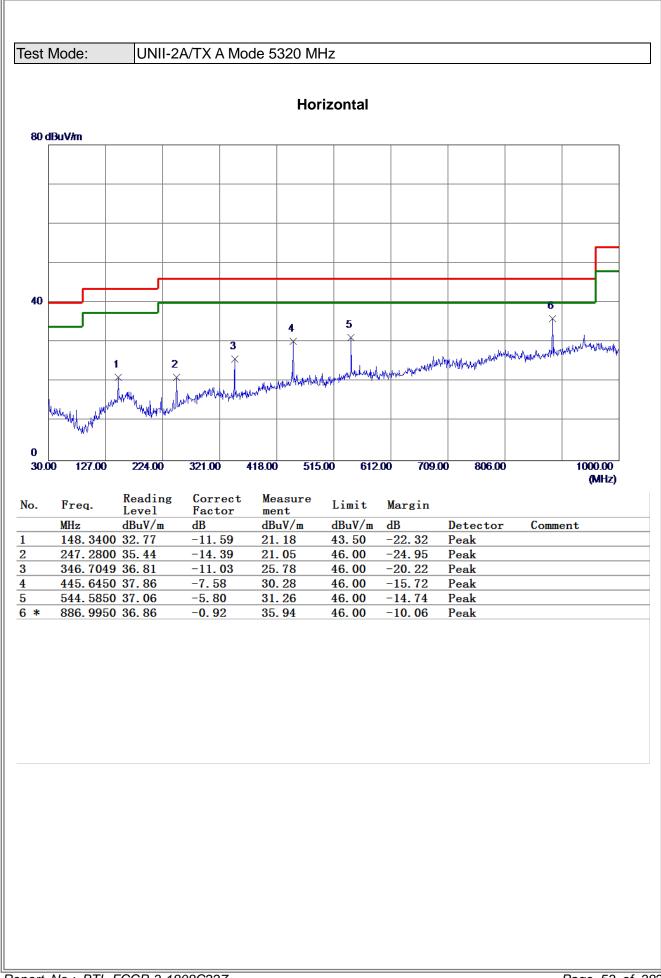






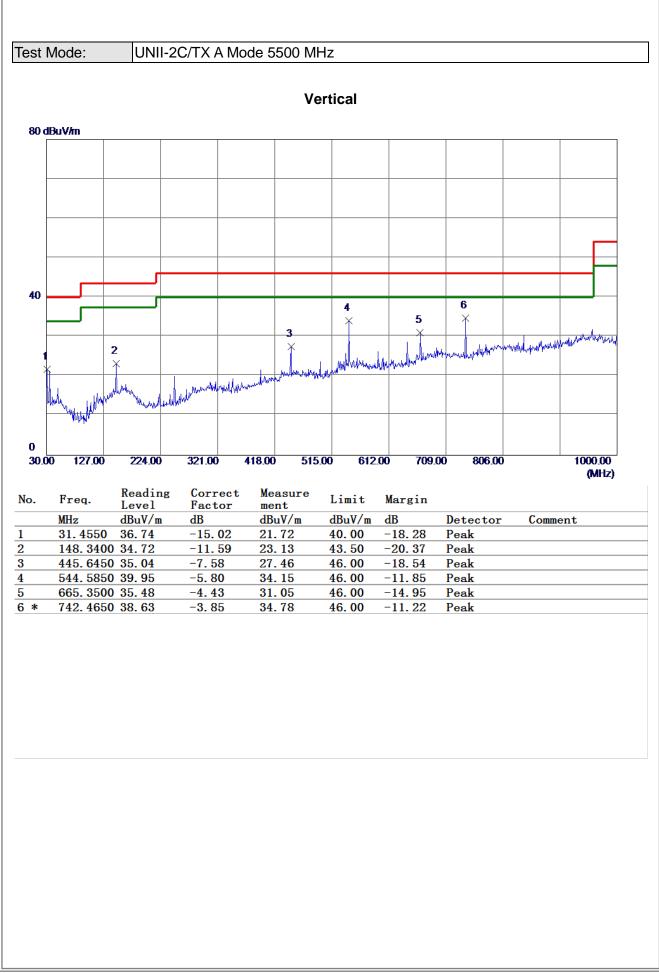






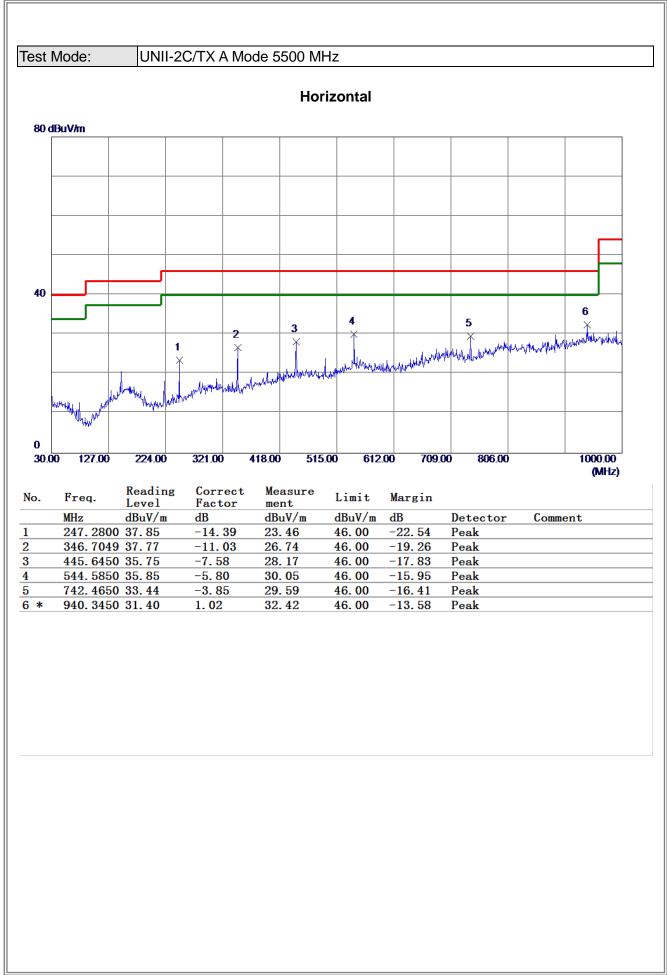






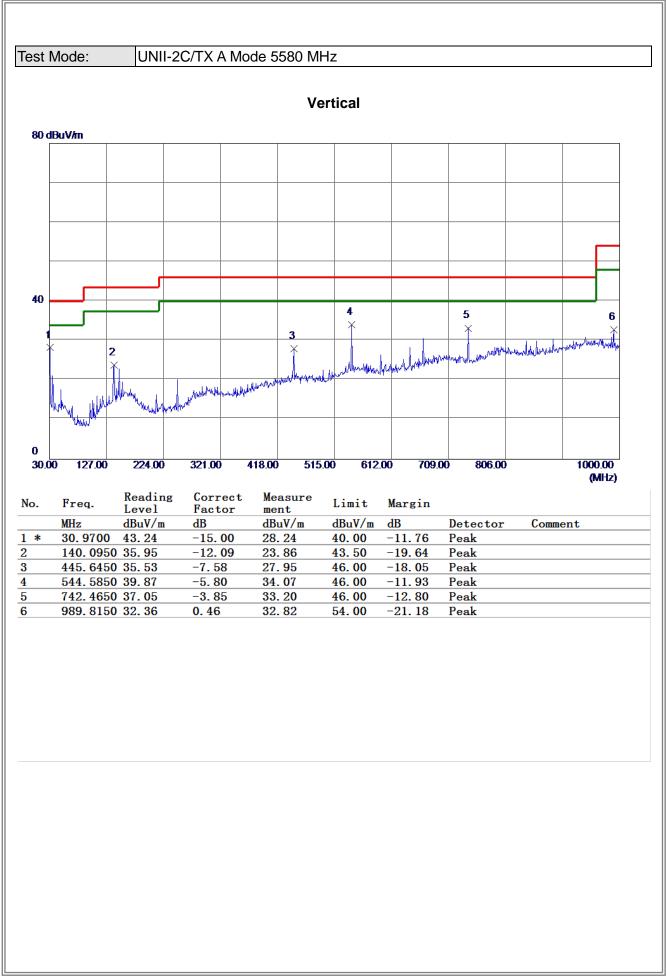






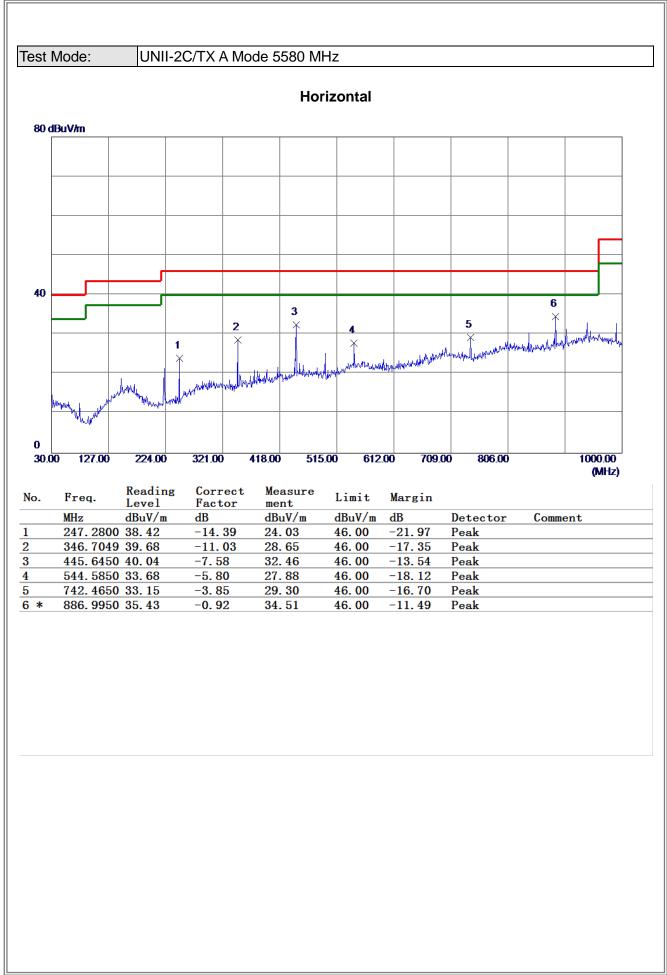






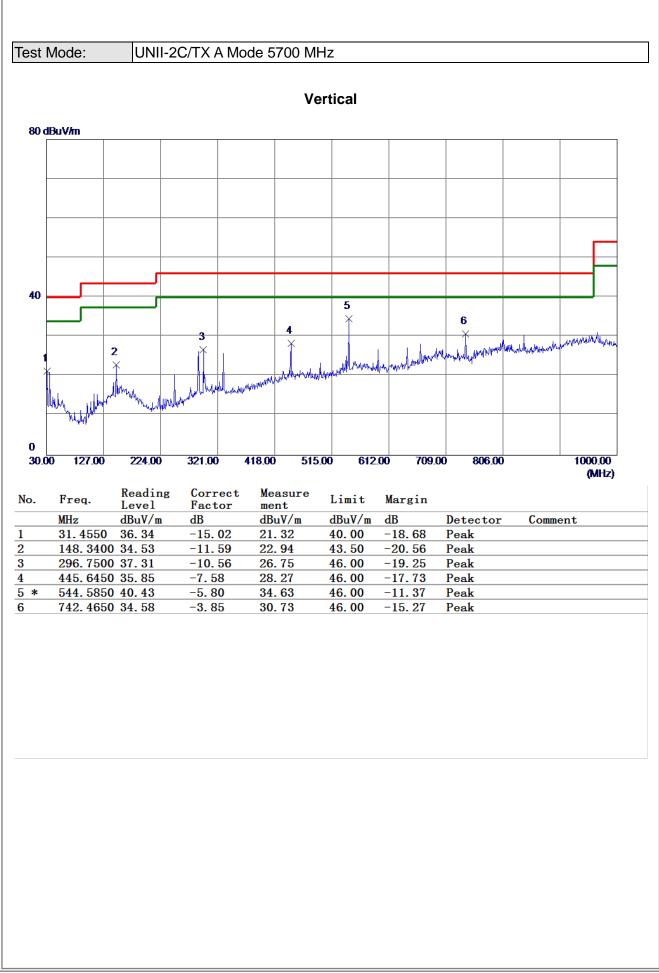






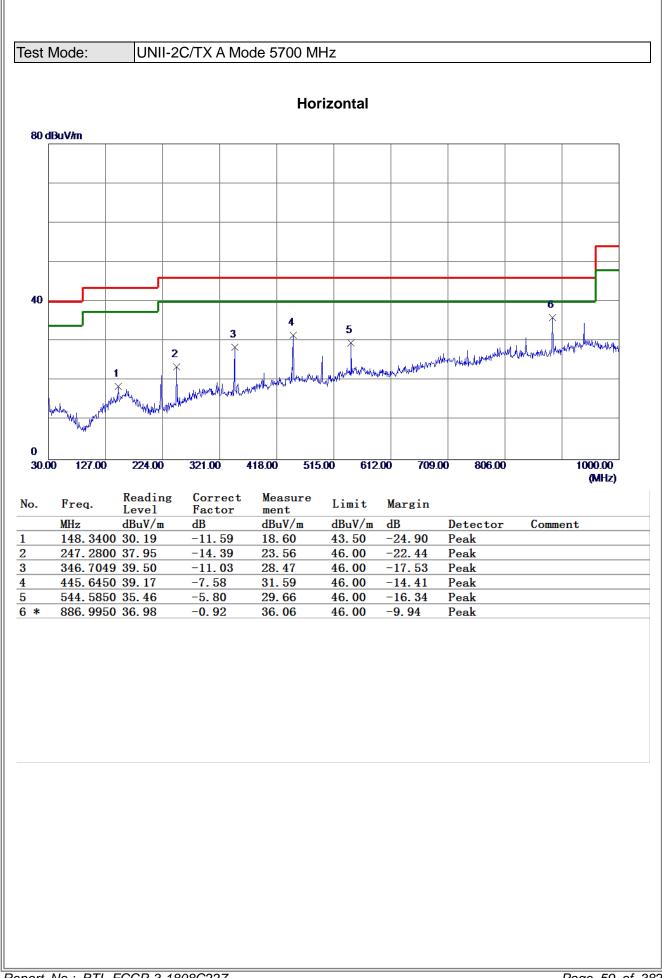






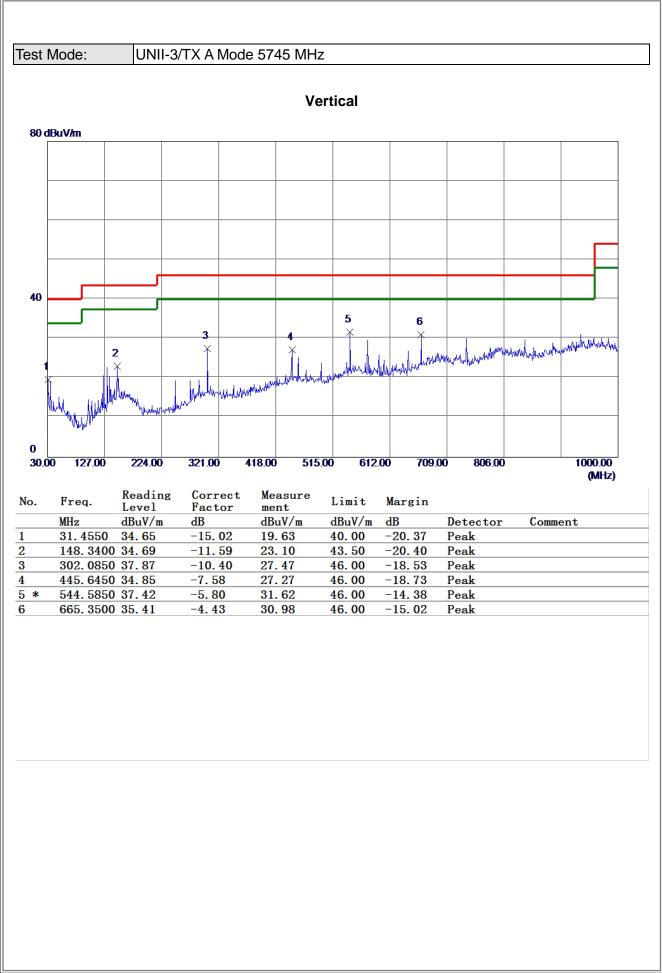






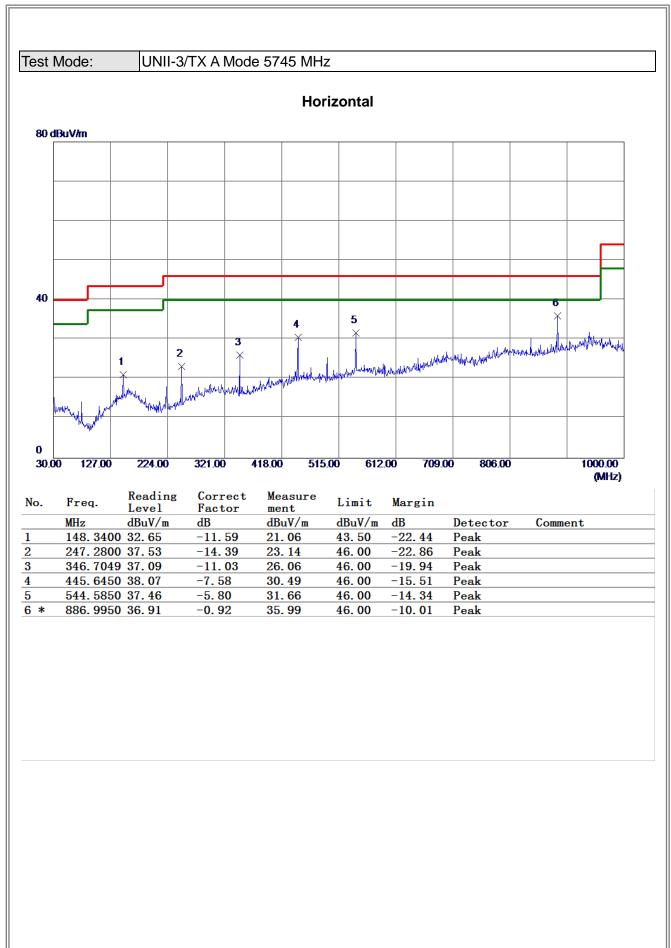






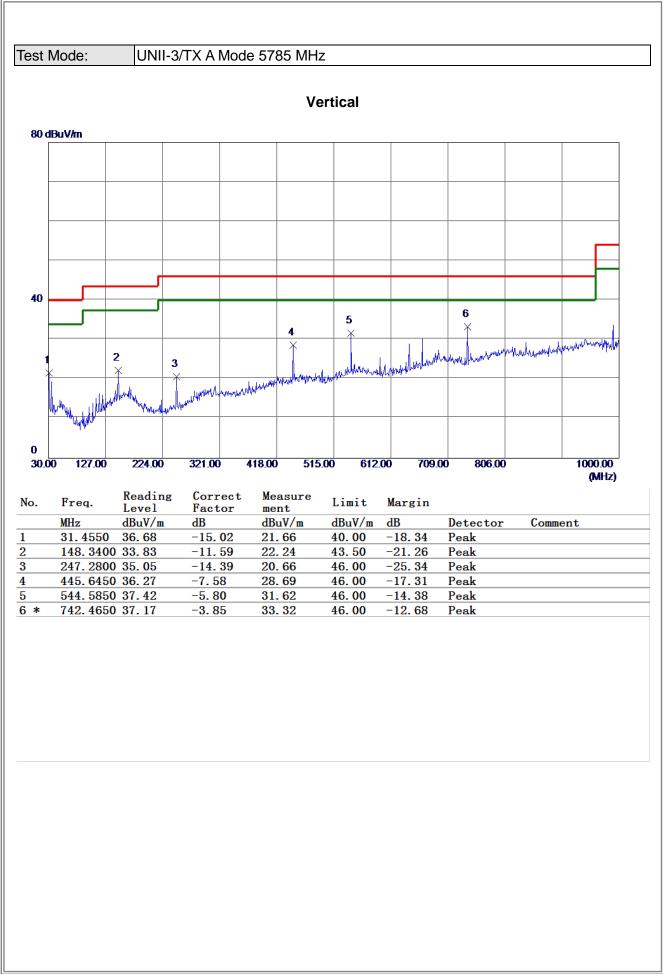






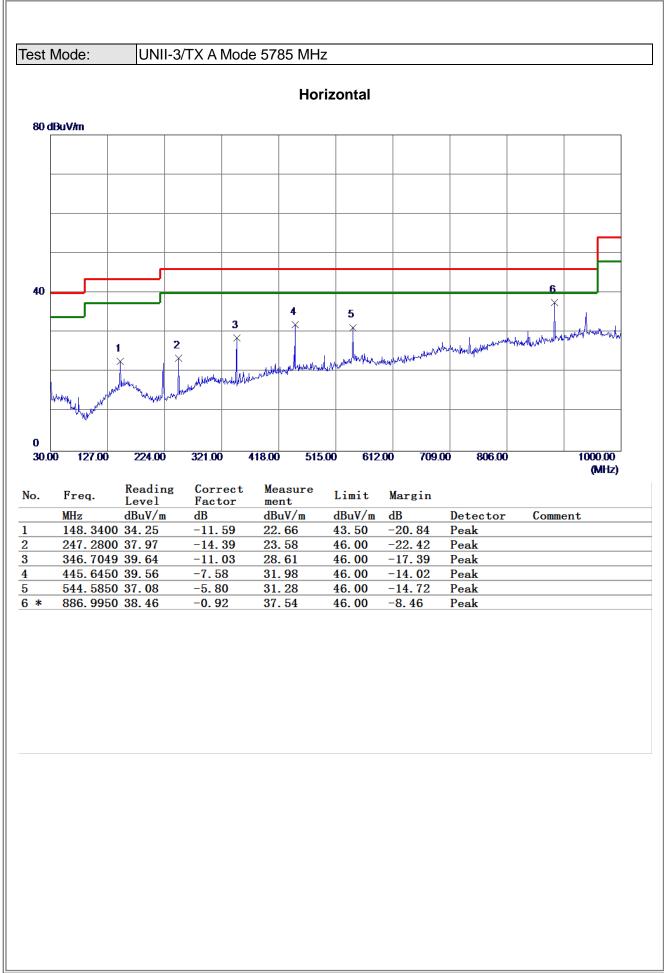






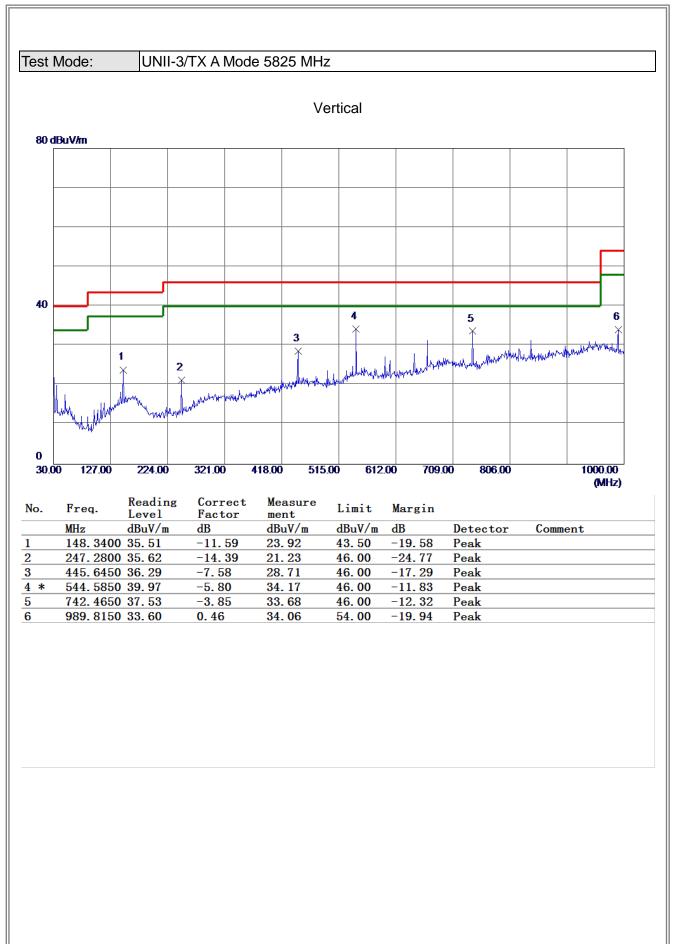






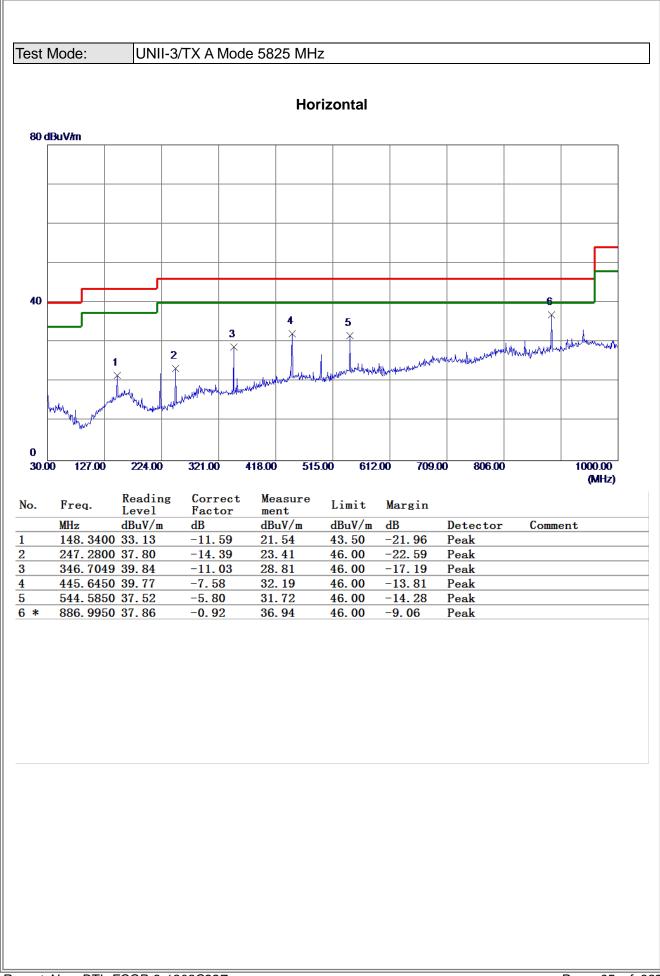














APPENDIX C - RADIATED EMISSION (ABOVE 1000MHZ)





