

FCC Test Report

Equipment : WiFi Home Monitor
Brand Name : Chicony
Model No. : DC-F030
FCC ID : E8HDCF030H40I
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
Equipment Class : DTS
Applicant : Chicony Electronics Co., Ltd.
No.25, Wugong 6th Rd., Wugu Dist.,
New Taipei City 248, Taiwan (R.O.C.)
Manufacturer : Chicony Electronics (Dong Guan) Co.,Ltd.
San Zhong Guan Li Qu, Qingxi Town,
Dongguan City Guangdong 523651
China

The product sample received on Sep. 14, 2015 and completely tested on Sep. 24, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

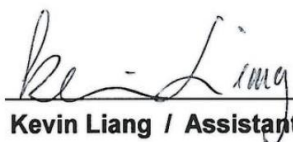

Kevin Liang / Assistant Manager

Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Accessories And Support Equipment.....	7
1.3	Testing Applied Standards	7
1.4	Testing Location Information	7
1.5	Measurement Uncertainty	8
2	TEST CONFIGURATION OF EUT.....	9
2.1	The Worst Case Modulation Configuration	9
2.2	The Worst Case Power Setting Parameter	9
2.3	The Worst Case Measurement Configuration.....	10
2.4	Test Setup Diagram	11
3	TRANSMITTER TEST RESULT	13
3.1	AC Power-line Conducted Emissions	13
3.2	6dB Bandwidth	16
3.3	RF Output Power.....	18
3.4	Power Spectral Density	21
3.5	Transmitter Radiated Bandedge Emissions.....	23
3.6	Radiated Unwanted Emissions	27
4	TEST EQUIPMENT AND CALIBRATION DATA	50

APPENDIX A. TEST PHOTOS

APPENDIX B. PHOTOGRAPHS OF EUT

Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.2837820MHz 41.88 (Margin 18.82dB) - QP 38.24 (Margin 12.46dB) - AV	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 20M: 9.55	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm]: 25.91	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/100kHz]: -7.81	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2397.36 MHz: 22.24 dB Restricted Bands dBuV/m at 3m]: 2389.968 MHz 52.43 (Margin 1.57 dB) – AV 72.89 (Margin 1.11 dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(d)	Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 4924 MHz 52.83 (Margin 1.17 dB) – AV 55.54 (Margin 18.46 dB) - PK	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)
2400-2483.5	b	2412-2462	1-11 [11]	1	22.38
2400-2483.5	g	2412-2462	1-11 [11]	1	25.08
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	25.91

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.
 Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
 Note 3: 802.11g uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
☐	Temporary RF connector provided
☒	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

Antenna General Information			
No.	Ant. Cat.	Ant. Type	Gain (dBi)
1	Integral	PIFA	1.52

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	☒ Production ; ☐ Pre-Production ; ☐ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.:
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.:
☐	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
☐ Operated normally mode for worst duty cycle	
☒ Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
☒ 100.00% - IEEE 802.11b	0.00
☒ 100.00%- IEEE 802.11g	0.00
☒ 100.00%- IEEE 802.11n (HT20)	0.00

1.1.5 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	
Type of DC Source	☒ External AC adapter	☒ From System	☐ Battery

1.2 Accessories And Support Equipment

Accessories				
AC Adapter	Brand Name	Technics-Gp	Model Name	TS122X200-0502R
	Power Rating	I/P: 100-240V ~ 50/60Hz MAX0.45A ; O/P: 5V $\overline{\text{---}}$ 2A		
USB Cable	Brand Name	Ji-Haw	Model Name	150610-3
	Signal Line	3 meter, Shielded cable, without ferrite core		
Mini USB to RJ45 adapter	Brand Name	Ji-Haw	Model Name	0950AD660L-A01
	Signal Line	0.14 meter, Shielded cable, without ferrite core		

Note: Regarding to more detail and other information, please refer to user manual.

Support Equipment - RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5540	DoC
2	Adapter for NB	DELL	HA65NM130	DoC

Support Equipment - AC Conduction and Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5530	DoC
2	Adapter for NB	DELL	LA65NS2-01	DoC

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013
- ♦ FCC KDB 558074 D01 v03r03

1.4 Testing Location Information

Testing Location			
☒	HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.
		TEL	: 886-3-327-3456 FAX : 886-3-327-0973
Test site registered number [636805] with FCC.			
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Anthony	22°C / 58%
RF Conducted	TH06-HY	Howard	23°C / 63%
Radiated Emission	03CH02-HY	Daniel	25.3°C / 52%
FCC Test Site Registration Number			
636805			

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty		
Test Item		Uncertainty
AC power-line conducted emissions		±2.3 dB
Emission bandwidth, 6dB bandwidth		±0.6 %
RF output power, conducted		±0.1 dB
Power density, conducted		±0.6 dB
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.6 dB
	1 – 18 GHz	±0.5 dB
	18 – 40 GHz	±0.5 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.5 dB
	0.15 – 30 MHz	±2.3 dB
	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.6 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature		±0.8 °C
Humidity		±5 %
DC and low frequency voltages		±0.9%
Time		±1.4 %
Duty Cycle		±0.6 %

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	Transmit Chains (N _{TX})	Data Rate / MCS	Worst Data Rate / MCS
11b	1	1-11 Mbps	1 Mbps
11g	1	6-54 Mbps	6 Mbps
HT20	1	MCS 0-7	MCS 0

Note 1: IEEE Std. 802.11n modulation consists of HT20 (HT: High Throughput). The EUT supports HT20.
Worst modulation mode of Guard Interval (GI) is 800ns.

Note 2: Modulation modes consist below configuration:
11b: IEEE 802.11b, 11g: IEEE 802.11g, HT20: IEEE 802.11n

Note 3: RF output power specifies that Maximum Peak Conducted Output Power.

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (2400-2483.5MHz band)				
Test Software Version	PuTTY			
Modulation Mode	N _{TX}	Test Frequency (MHz)		
		NCB: 20MHz		
		2412	2437	2462
11b	1	42.5	44.5	48
11g	1	63.5	63.5	59.5
HT20	1	59	63.5	59.5

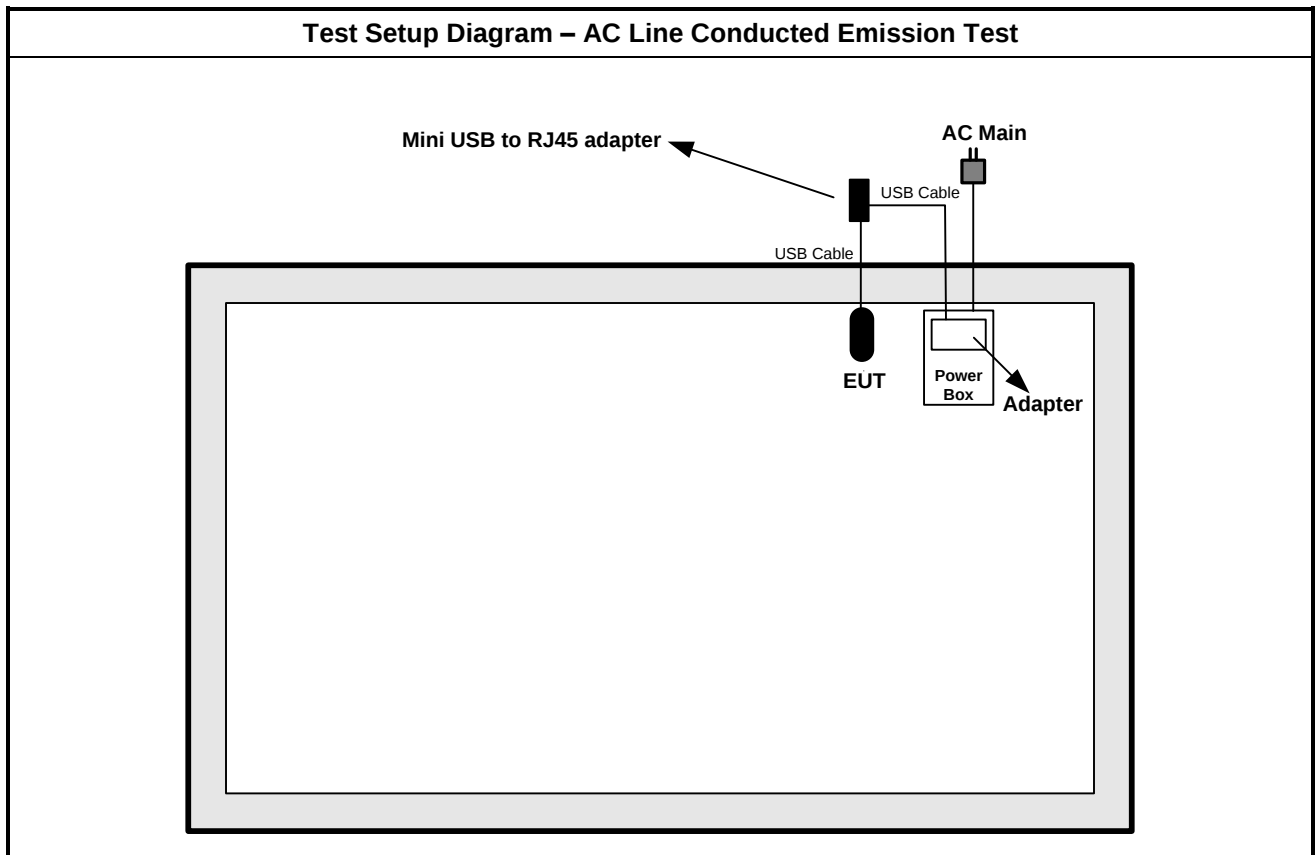
2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	AC power & Transmitting
2	EUT with Notebook via USB cable and mini USB to RJ45 adapter
Operating mode 1 was the worst case and it is recorded in this test report.	

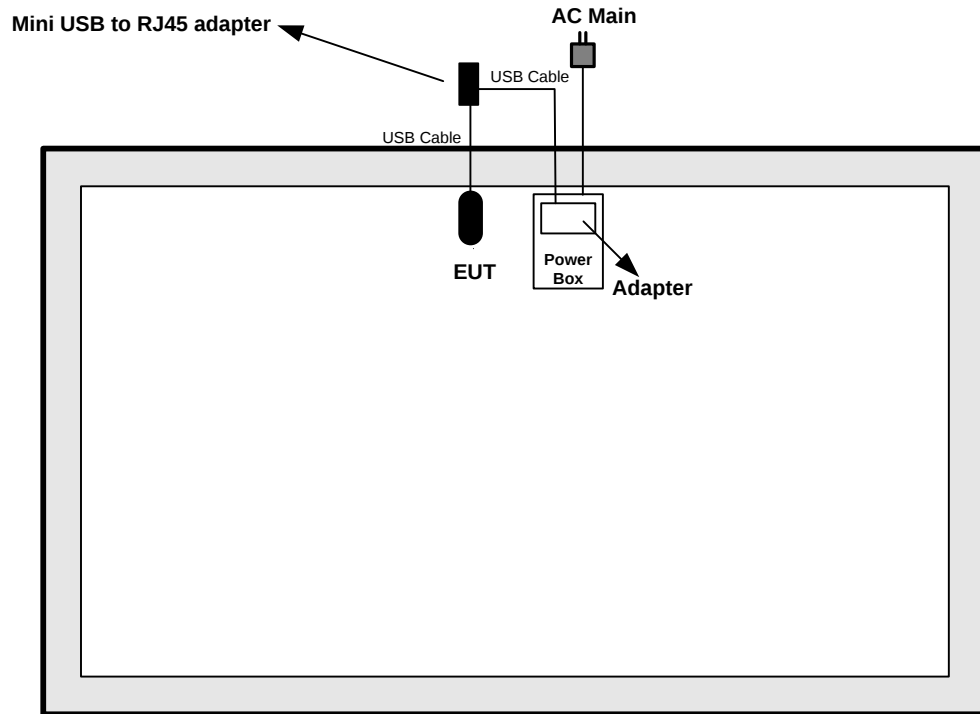
The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Power Spectral Density, 6 dB Bandwidth
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20

The Worst Case Mode for Following Conformance Tests	
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions
Test Condition	Radiated measurement
User Position	☐ EUT will be placed in fixed position.
	☒ EUT will be placed in mobile position and the worst planes is Z.
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes.
Operating Mode	Operating Mode Description
Radiated Emissions < 1GHz	1. AC power & Transmitting
	2. EUT with Notebook via USB cable and mini USB to RJ45 adapter
	Operating mode 1 was the worst case and it is recorded in this test report.
Radiated Emissions > 1GHz	1. AC power & Transmitting
Modulation Mode	11b, 11g, HT20
Orthogonal Planes of EUT	Z Plane
	

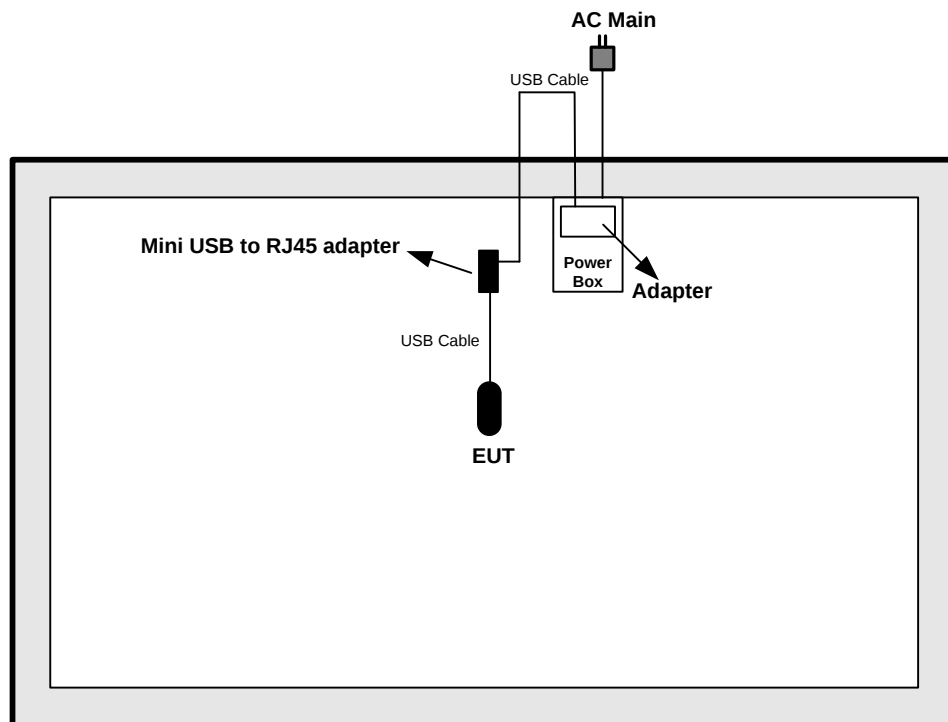
2.4 Test Setup Diagram



Test Setup Diagram - Radiated Test Below 1GHz



Test Setup Diagram - Radiated Test Above 1GHz



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

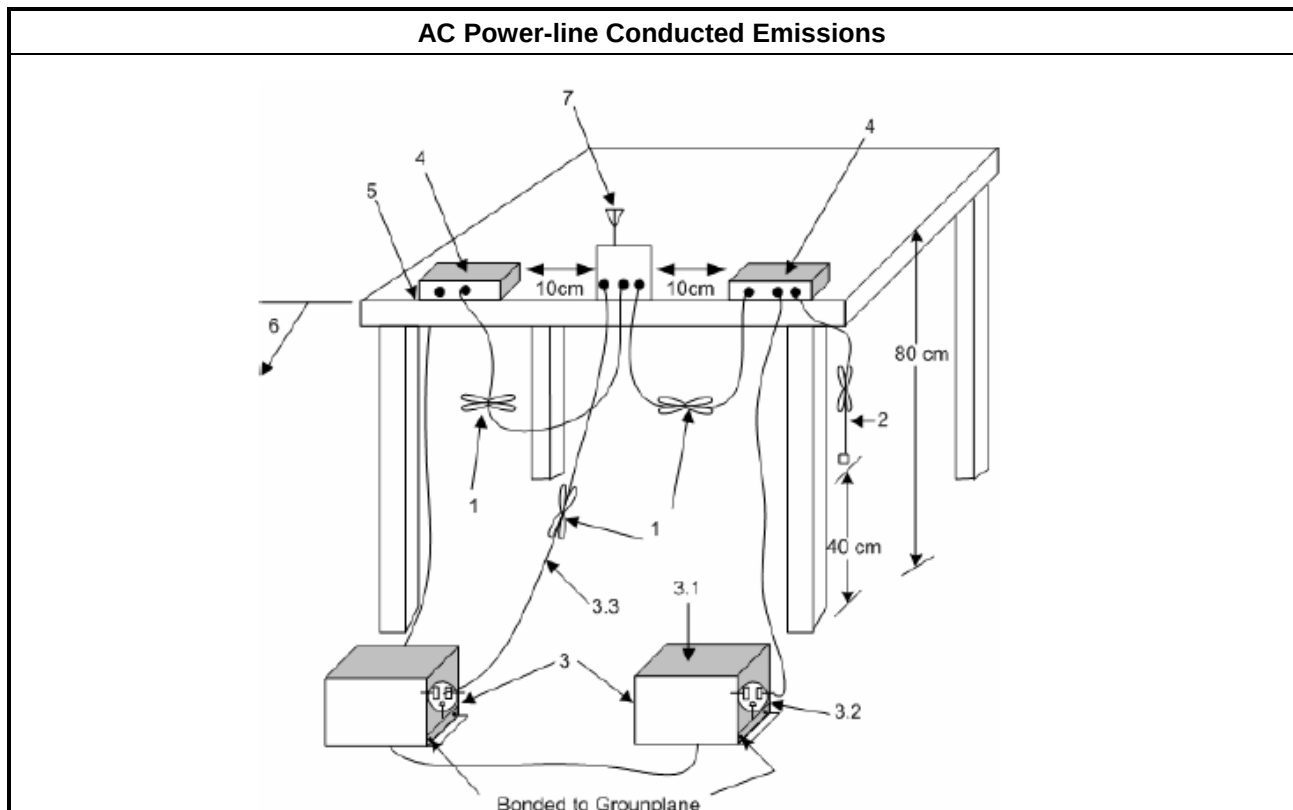
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

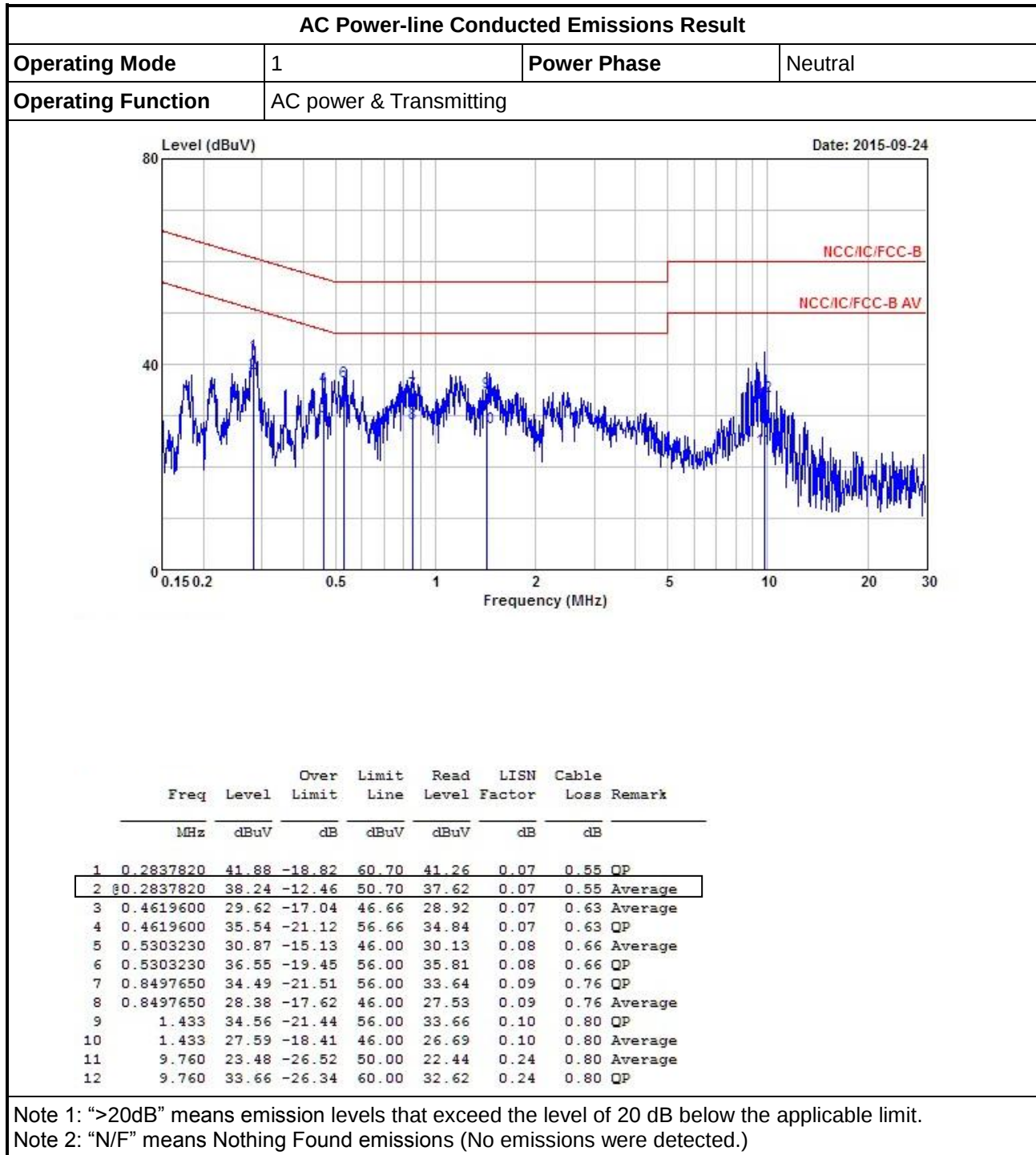
3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup

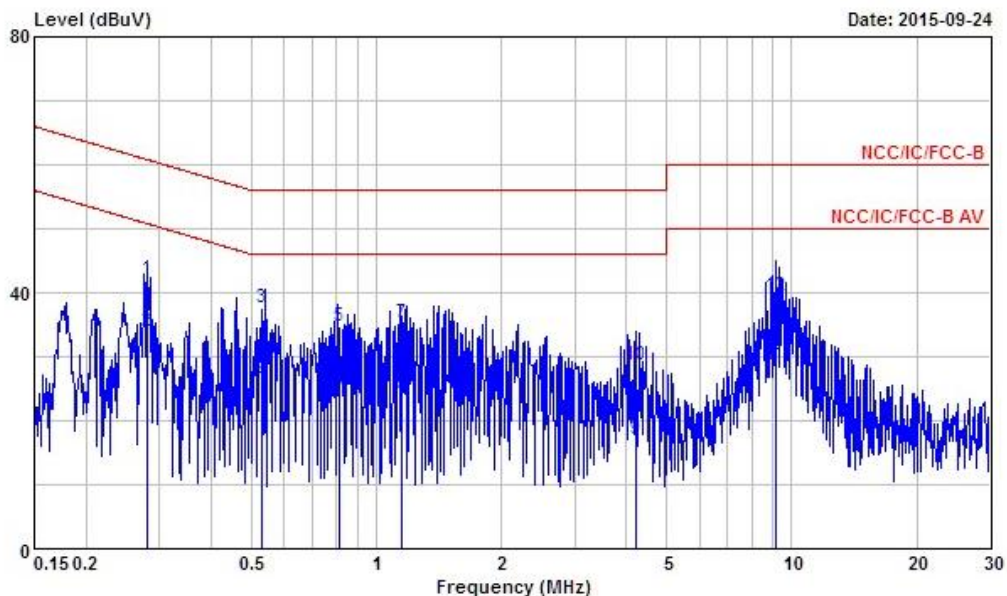


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	AC power & Transmitting		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2817820	42.11	-18.65	60.76	41.50	0.06	0.55	QP
2	0.2817820	33.93	-16.83	50.76	33.32	0.06	0.55	Average
3	0.5318230	37.75	-18.25	56.00	37.02	0.07	0.66	QP
4	0.5318230	26.00	-20.00	46.00	25.27	0.07	0.66	Average
5	0.8111580	34.79	-21.21	56.00	33.96	0.08	0.75	QP
6	0.8111580	24.61	-21.39	46.00	23.78	0.08	0.75	Average
7	1.147	35.15	-20.85	56.00	34.27	0.08	0.80	QP
8	1.147	24.14	-21.86	46.00	23.26	0.08	0.80	Average
9	4.222	17.22	-28.78	46.00	16.37	0.14	0.71	Average
10	4.222	28.63	-27.37	56.00	27.78	0.14	0.71	QP
11	9.149	28.80	-21.20	50.00	27.79	0.22	0.79	Average
12	9.149	39.55	-20.45	60.00	38.54	0.22	0.79	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit	
Systems using digital modulation techniques:	
☒	6 dB bandwidth $\geq$ 500 kHz.

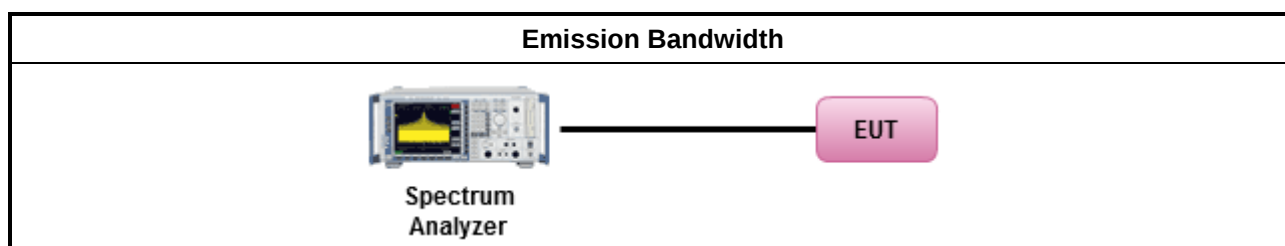
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
☒	For the emission bandwidth shall be measured using one of the options below:
☒	Refer as FCC KDB 558074 D01 v03r03, clause 8.1 Option 1 for 6 dB bandwidth measurement.
☐	Refer as FCC KDB 558074 D01 v03r03, clause 8.2 Option 2 for 6 dB bandwidth measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain 1.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below:
☐	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
☐	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.

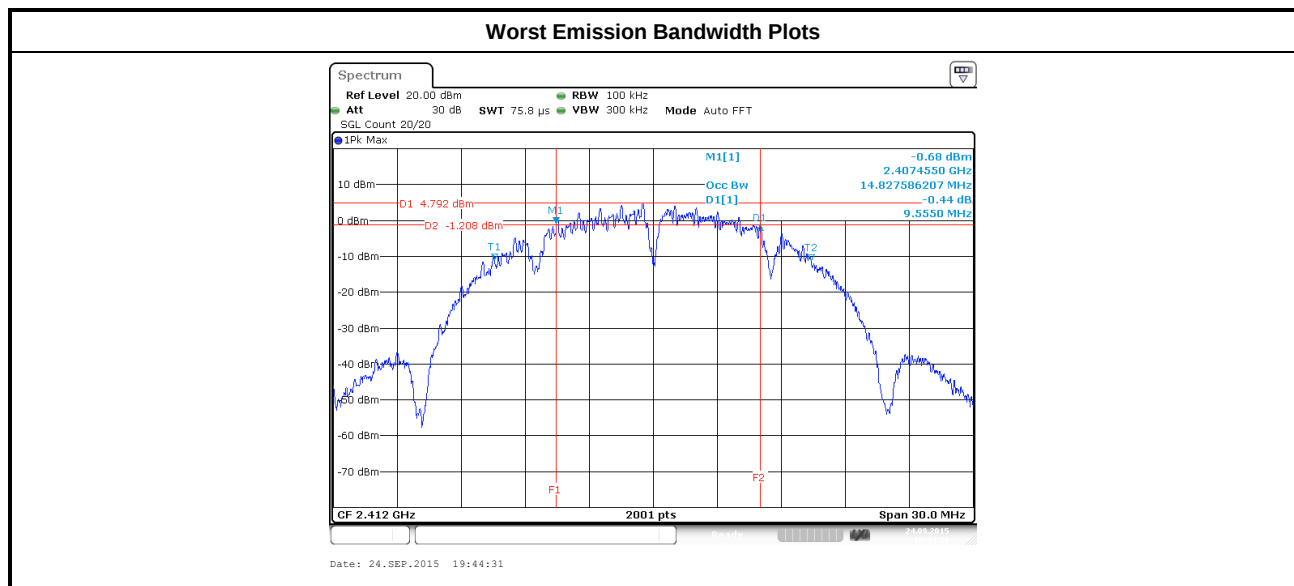
3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result				
Condition			Emission Bandwidth (MHz)	
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth	6dB Bandwidth
11b	1	2412	14.82	9.55
11b	1	2437	14.85	10.06
11b	1	2462	14.72	10.05
11g	1	2412	16.50	16.51
11g	1	2437	16.50	16.47
11g	1	2462	16.47	16.51
HT20	1	2412	17.70	17.77
HT20	1	2437	17.73	17.73
HT20	1	2462	17.64	17.61
Limit			N/A	≥500 kHz
Result			Complied	

Note 1: N_{TX} = Number of Transmit Chains



3.3 RF Output Power

3.3.1 RF Output Power Limit

RF Output Power Limit	
Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit	
☒ 2400-2483.5 MHz Band:	
☒	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
☐	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
☒	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Smart antenna system (SAS):
☐	Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dBm
e.i.r.p. Power Limit:	
☒ 2400-2483.5 MHz Band	
☐	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
☒	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
☐	Smart antenna system (SAS)
☐	Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
☐	Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
☐	Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi. P_{eirp} = e.i.r.p. Power in dBm.	

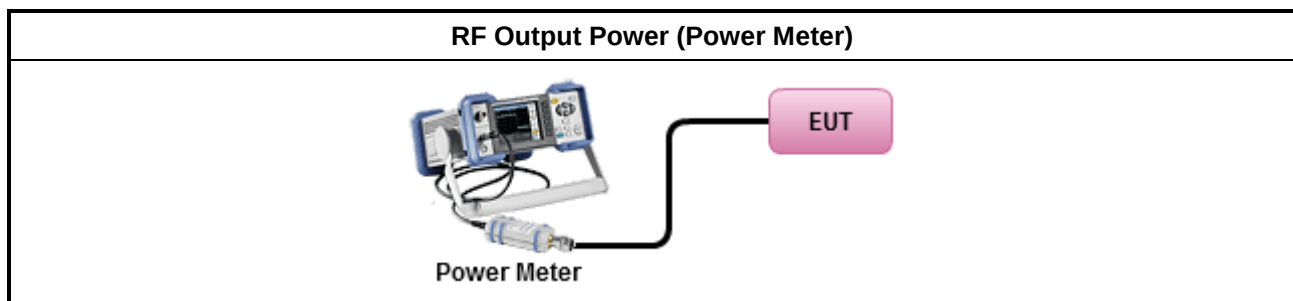
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	Maximum Peak Conducted Output Power
☐	Refer as FCC KDB 558074 D01 v03r03, clause 9.1.1 (RBW ≥ EBW method).
☒	Refer as FCC KDB 558074 D01 v03r03, clause 9.1.2 (peak power meter for VBW ≥ DTS BW).
☒	Maximum Conducted Output Power
	[duty cycle ≥ 98% or external video / power trigger]
☐	Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
☐	Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
☒	Refer as FCC KDB 558074 D01 v03r03, clause 9.2.3 Method AVGPM (using an RF average power meter).
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain 1.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
☐	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup



3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result							
Modulation Mode	N _{TX}	Freq. (MHz)	RF Output Power (dBm)	Power Limit	Ant. (dBi)	EIRP Power	EIRP Limit
11b	1	2412	19.21	30.00	1.52	20.73	36.00
11b	1	2437	20.33	30.00	1.52	21.85	36.00
11b	1	2462	22.38	30.00	1.52	23.90	36.00
11g	1	2412	24.62	30.00	1.52	26.14	36.00
11g	1	2437	25.08	30.00	1.52	26.60	36.00
11g	1	2462	23.70	30.00	1.52	25.22	36.00
HT20	1	2412	23.44	30.00	1.52	24.96	36.00
HT20	1	2437	25.91	30.00	1.52	27.43	36.00
HT20	1	2462	23.86	30.00	1.52	25.38	36.00
Result			Complied				

3.3.6 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power Result							
Modulation Mode	N _{TX}	Freq. (MHz)	RF Output Power (dBm)	Power Limit	Ant. (dBi)	EIRP Power	EIRP Limit
11b	1	2412	16.25	30.00	1.52	17.77	36.00
11b	1	2437	17.36	30.00	1.52	18.88	36.00
11b	1	2462	19.40	30.00	1.52	20.92	36.00
11g	1	2412	19.76	30.00	1.52	21.28	36.00
11g	1	2437	20.18	30.00	1.52	21.70	36.00
11g	1	2462	18.82	30.00	1.52	20.34	36.00
HT20	1	2412	18.20	30.00	1.52	19.72	36.00
HT20	1	2437	20.78	30.00	1.52	22.30	36.00
HT20	1	2462	18.87	30.00	1.52	20.39	36.00
Result			Complied				

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit	
☒	Power Spectral Density (PSD) ≤ 8 dBm/3kHz

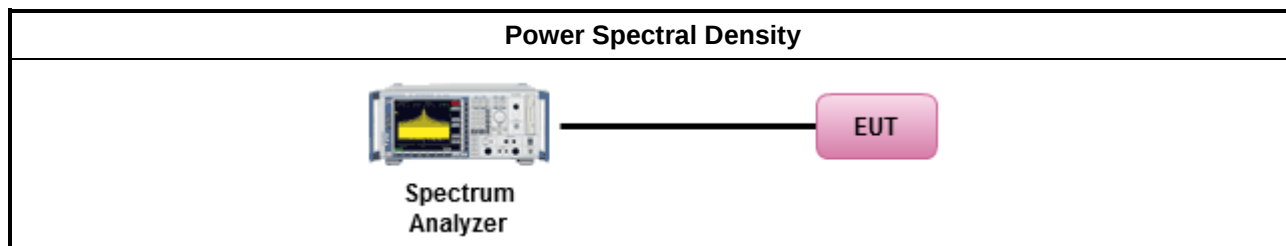
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

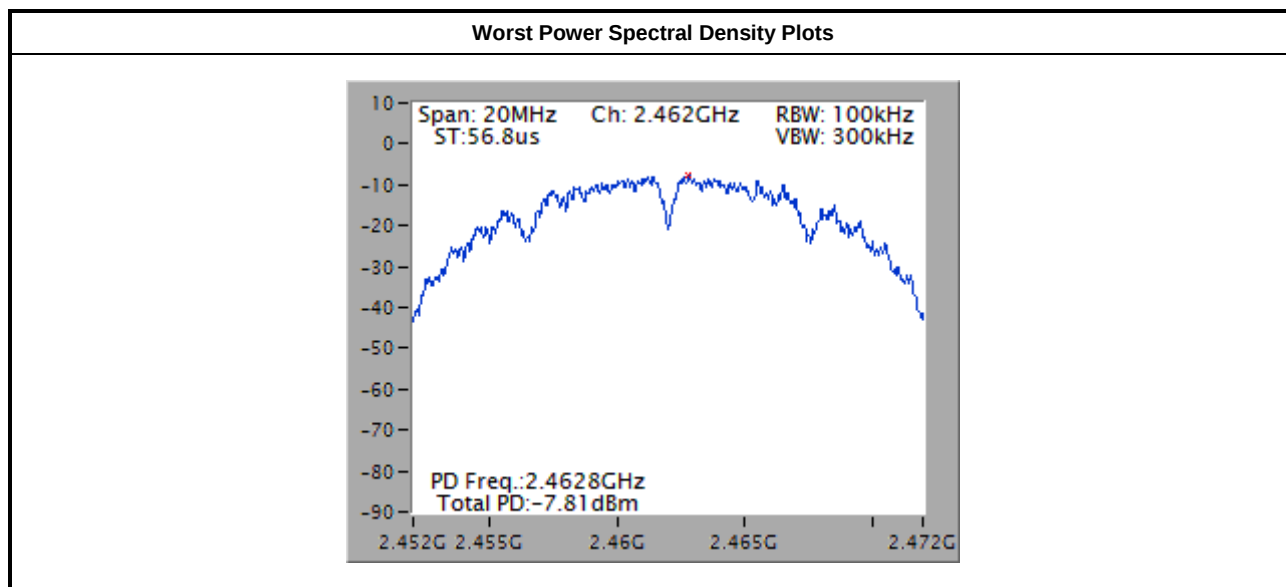
Test Method	
☒	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
☒	Refer as FCC KDB 558074 D01 v03r03, clause 10.2 Method PKPSD (RBW=3-100kHz;detector=peak).
	[duty cycle $\geq 98\%$ or external video / power trigger]
☒	Refer as FCC KDB 558074 D01 v03r03, clause 10.3 Method AVGPS-1 (spectral trace averaging).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 10.4 Method AVGPS-1 Alt. (slow sweep speed)
	duty cycle $< 98\%$ and average over on/off periods with duty factor
☐	Refer as FCC KDB 558074 D01 v03r03, clause 10.5 Method AVGPS-2 (spectral trace averaging).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 10.6 Method AVGPS-2 Alt. (slow sweep speed)
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain 1.
☐	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☐	The EUT supports multiple transmit chains using options given below:
☐	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N_{TX} output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
☐	Option 2: Measure and add $10 \log(N)$ dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with $10 \log(N)$. Or each transmit chains shall be add $10 \log(N)$ to compared with the limit.

3.4.4 Test Setup



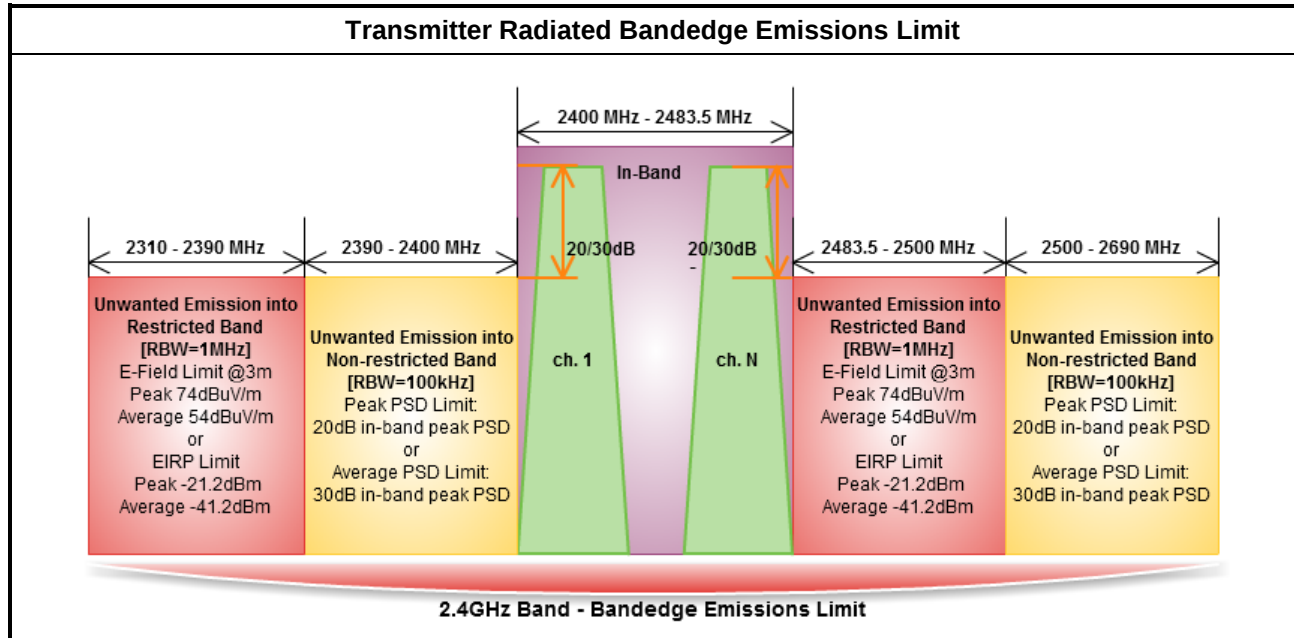
3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result				
Condition			Power Spectral Density	
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain (dBm/100kHz)	PSD Limit (dBm/3kHz)
11b	1	2412	-9.30	8.00
11b	1	2437	-8.12	8.00
11b	1	2462	-7.81	8.00
11g	1	2412	-10.36	8.00
11g	1	2437	-9.36	8.00
11g	1	2462	-11.16	8.00
HT20	1	2412	-11.05	8.00
HT20	1	2437	-9.17	8.00
HT20	1	2462	-10.85	8.00
Result			Complied	



3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



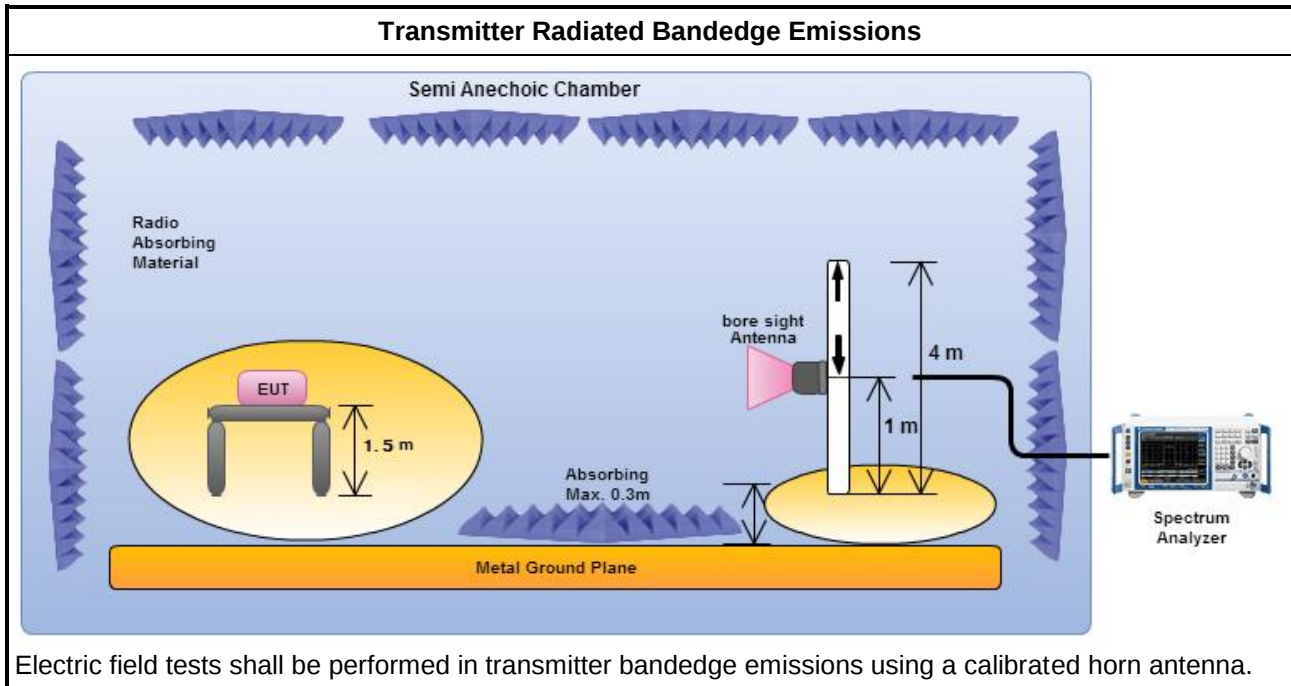
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	Refer as ANSI C63.10, clause 6.10 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 558074 D01 v03r03, clause 11 for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 12 for unwanted emissions into restricted bands.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq$ 98%)
☐	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.3 Option 3 (Reduced VBW $\geq$ 1/T).
☐	Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 11.3 and 12.2.4 measurement procedure peak limit.
☒	For the transmitter bandedge emissions shall be measured using following options below:
☐	Refer as FCC KDB 558074 D01 v03r03, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
☒	Refer as ANSI C63.10, clause 6.10 for band-edge testing.
☐	Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.
☒	For radiated measurement, refer as FCC KDB 558074 D01 v03r03, clause 12.2.7 and ANSI C63.10, clause 6.6. Test distance is 3m.

3.5.4 Test Setup



3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band)								
Modulation	N _{TX}	Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
11b	1	2412	94.32	2399.824	63.32	31.00	20	V
11b	1	2462	96.45	2513.200	63.65	32.80	20	V
11g	1	2412	94.67	2399.152	68.05	26.62	20	V
11g	1	2462	92.80	2500.200	61.98	30.82	20	V
HT20	1	2412	89.13	2397.36	66.89	22.24	20	V
HT20	1	2462	89.77	2547.000	63.74	26.03	20	V

Note 1: Measurement worst emissions of receive antenna polarization

2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11b	1	2412	3	2314.032	60.19	74	2317.840	47.64	54	V
11b	1	2462	3	2498.800	59.51	74	2489.200	47.76	54	V
11g	1	2412	3	2389.856	64.99	74	2389.968	49.44	54	V
11g	1	2462	3	2483.540	67.45	74	2483.800	52.12	54	V
HT20	1	2412	3	2389.968	72.89	74	2389.968	52.43	54	V
HT20	1	2462	3	2483.600	69.77	74	2483.800	52.54	54	V

Note 1: Measurement worst emissions of receive antenna polarization.

3.6 Radiated Unwanted Emissions

3.6.1 Radiated Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. 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 of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more 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). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

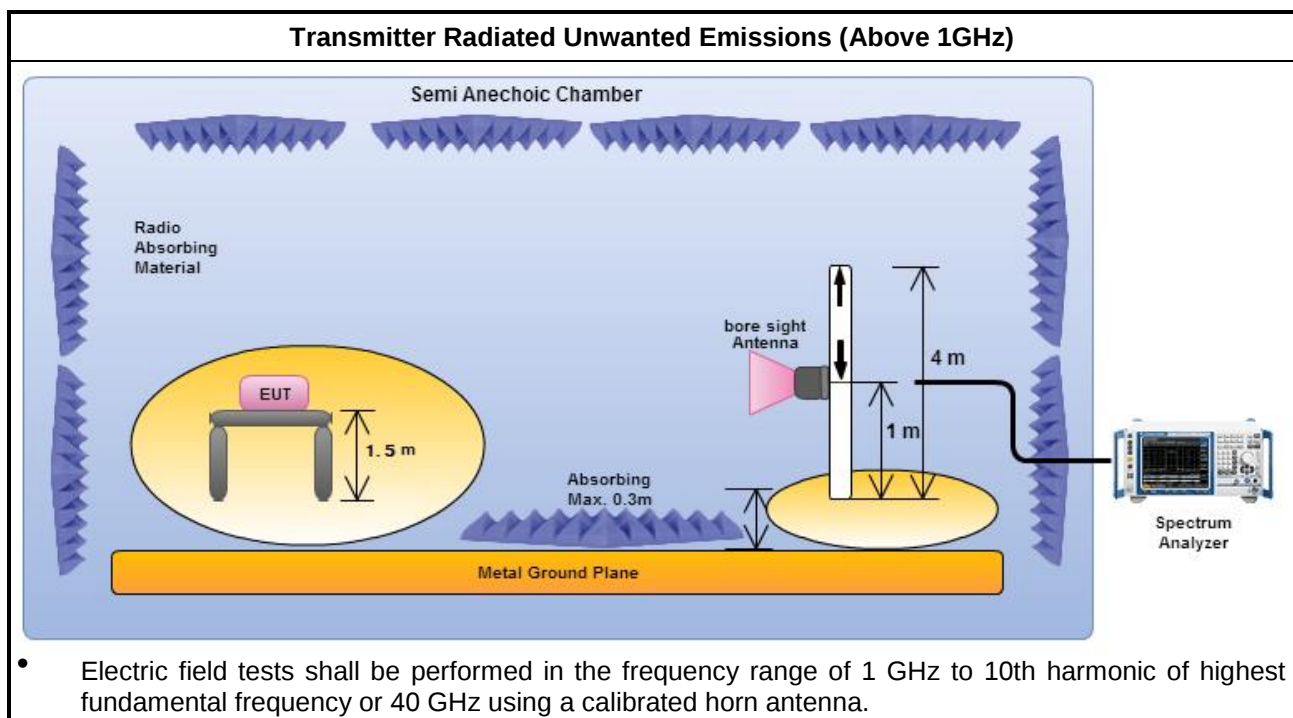
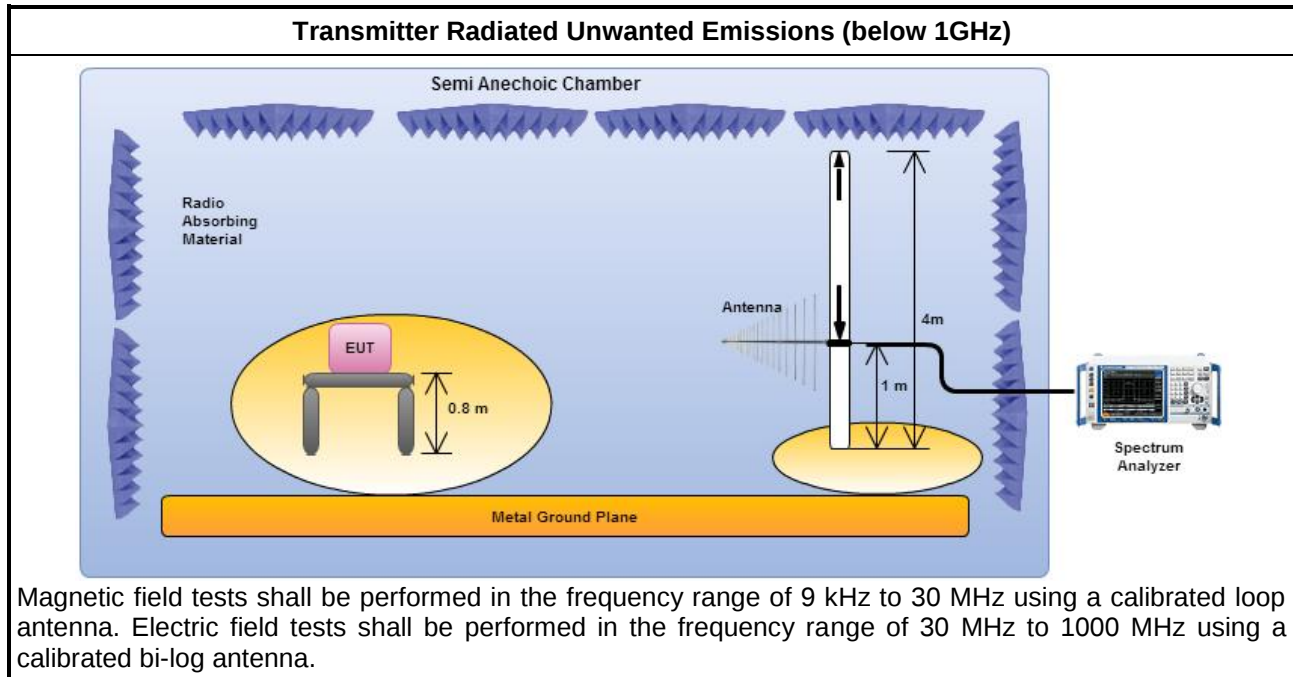
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method	
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. 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 of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 558074 D01 v03r03, clause 11 for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 12 for unwanted emissions into restricted bands.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$)
☐	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
☐	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$).
☐	Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 11.3 and 12.2.4 measurement procedure peak limit.
☒	Refer as FCC KDB 558074 D01 v03r03, clause 12.2.3 measurement procedure Quasi-Peak limit.
☒	For radiated measurement, refer as FCC KDB 558074 D01 v03r03, clause 12.2.7.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz and test distance is 3m.
☒	The any unwanted emissions level shall not exceed the fundamental emission level.
☒	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

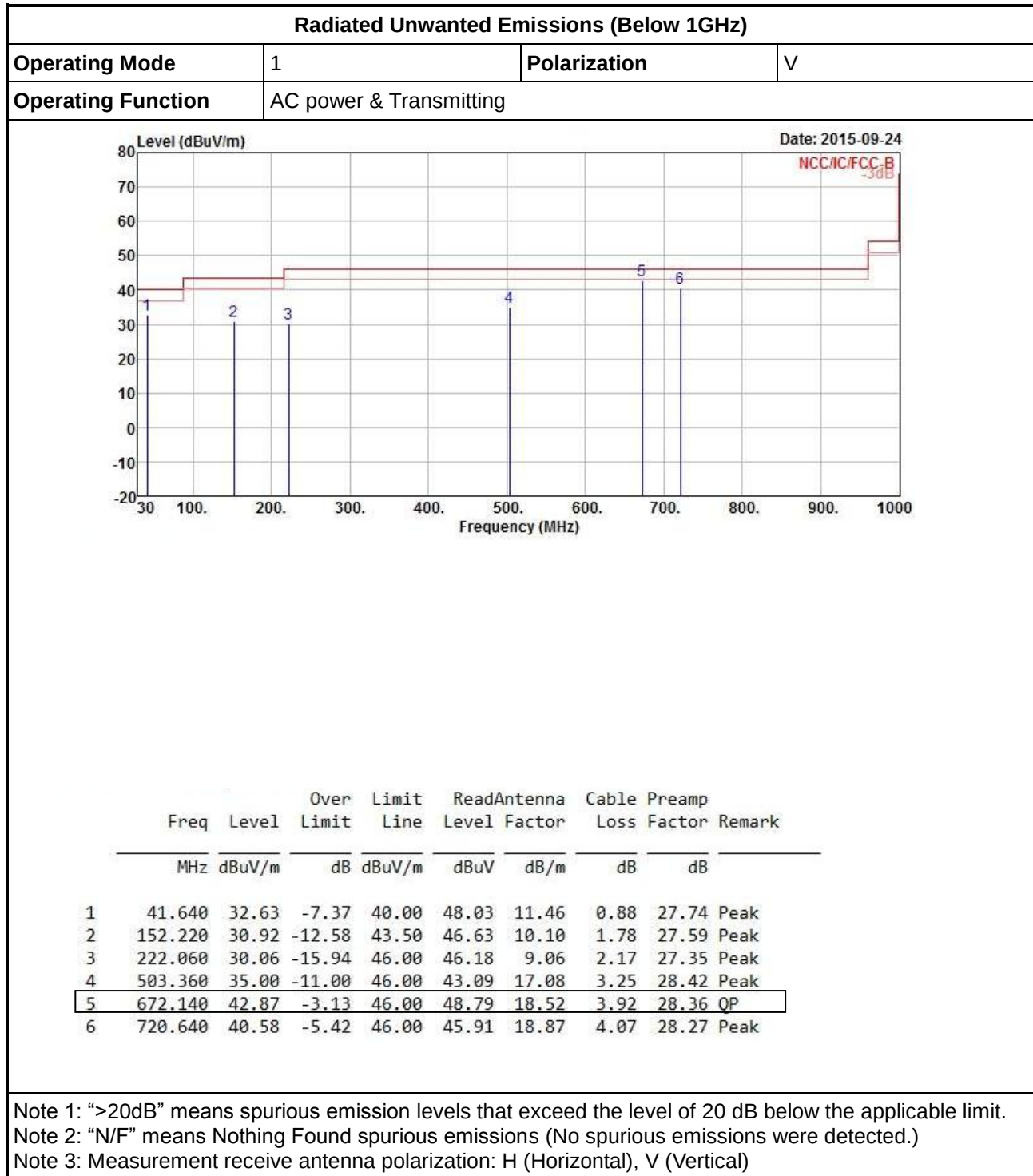
3.6.4 Test Setup



3.6.5 Radiated Unwanted Emissions (Below 30MHz)

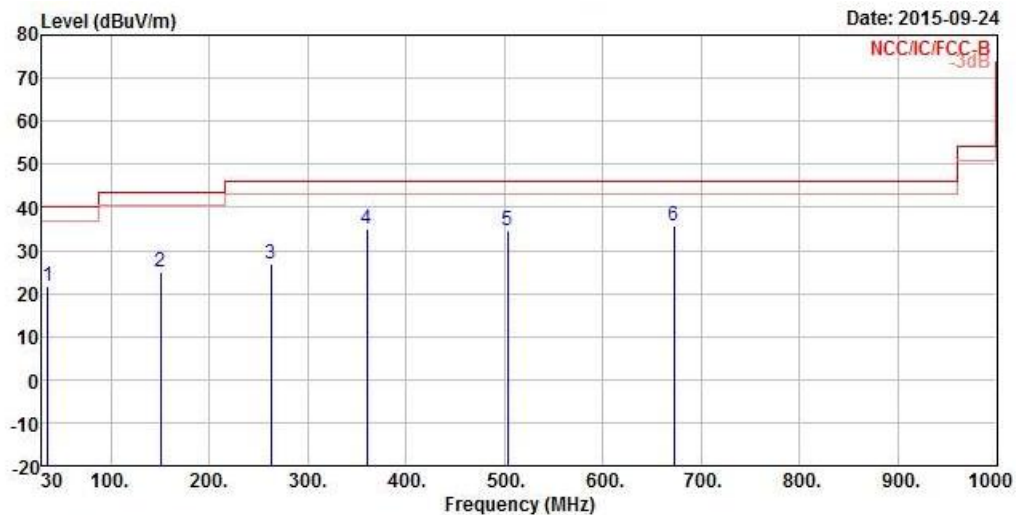
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.6.6 Radiated Unwanted Emissions (Below 1GHz)



Radiated Unwanted Emissions (Below 1GHz)

Operating Mode	1	Polarization	H
Operating Function	AC power & Transmitting		



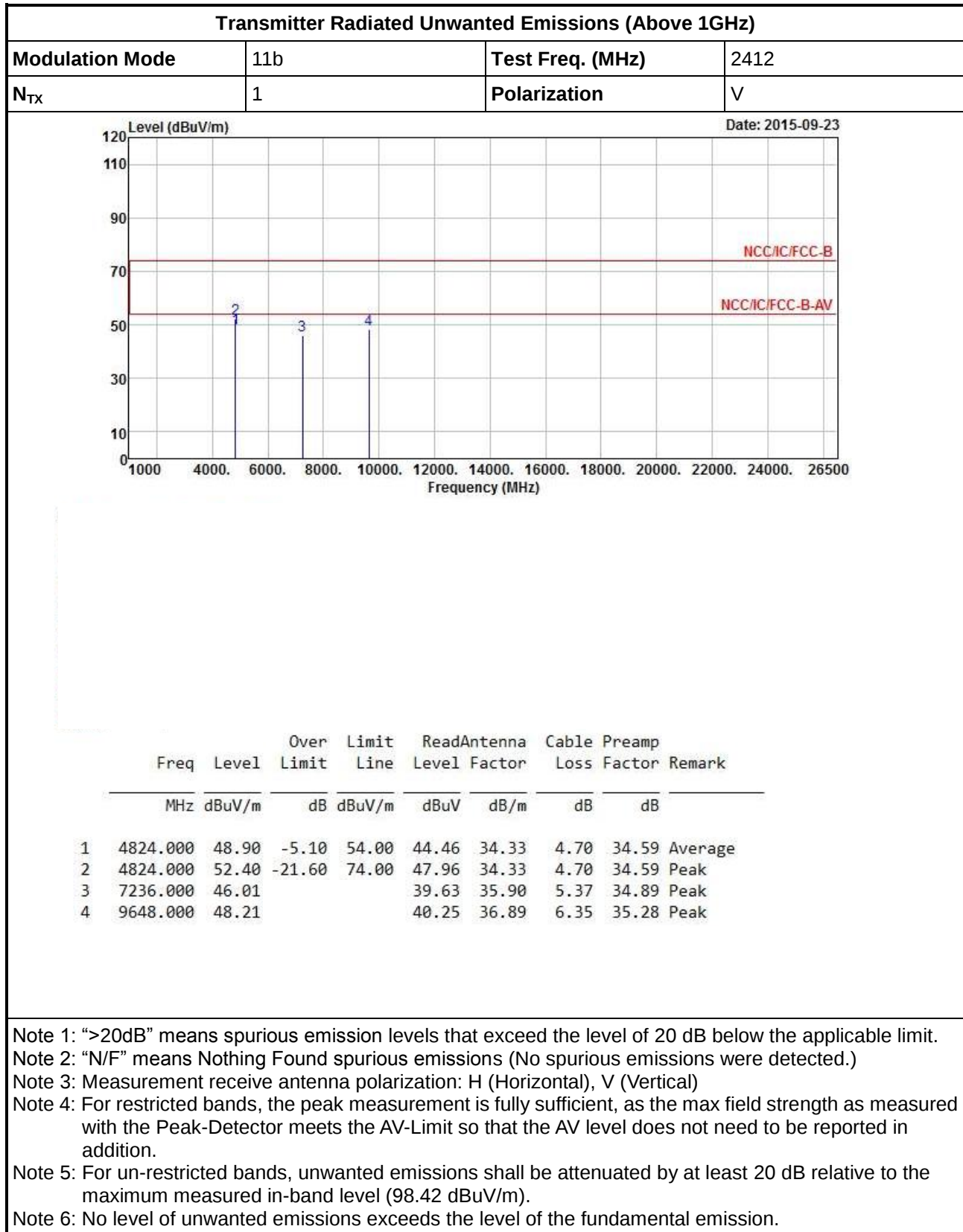
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	35.820	21.61	-18.39	40.00	33.40	15.21	0.82	27.82 Peak
2	150.280	24.87	-18.63	43.50	40.49	10.21	1.77	27.60 Peak
3	262.800	27.02	-18.98	46.00	38.72	13.10	2.38	27.18 Peak
4	359.800	35.15	-10.85	46.00	45.35	14.53	2.82	27.55 Peak
5	503.360	34.46	-11.54	46.00	42.55	17.08	3.25	28.42 Peak
6	672.140	35.84	-10.16	46.00	41.76	18.52	3.92	28.36 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

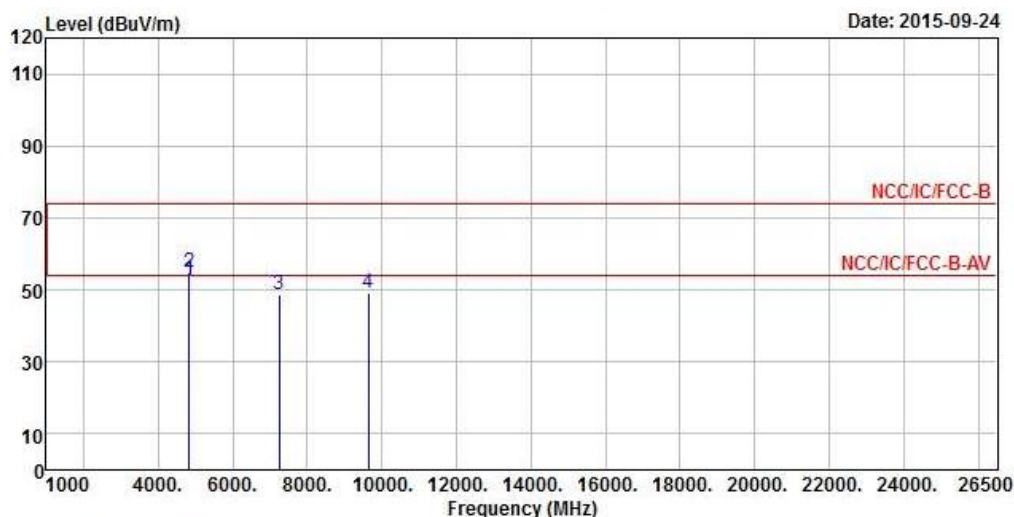
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)



Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2412
N_{TX}	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4824.000	52.51	-1.49	54.00	48.07	34.33	4.70	34.59 Average
2	4824.000	55.10	-18.90	74.00	50.66	34.33	4.70	34.59 Peak
3	7236.000	48.80			42.42	35.90	5.37	34.89 Peak
4	9648.000	49.16			41.20	36.89	6.35	35.28 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

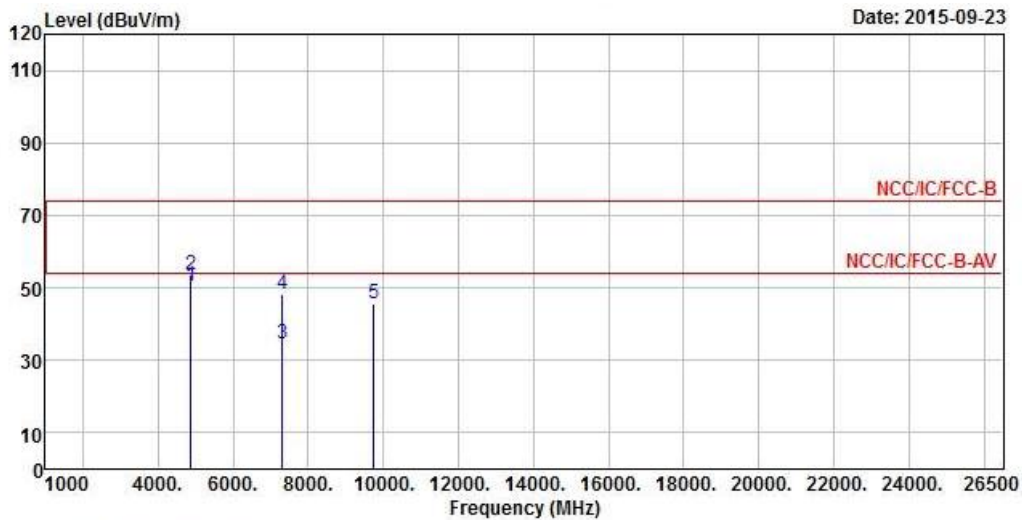
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (98.42 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2437
N _{TX}	1	Polarization	V

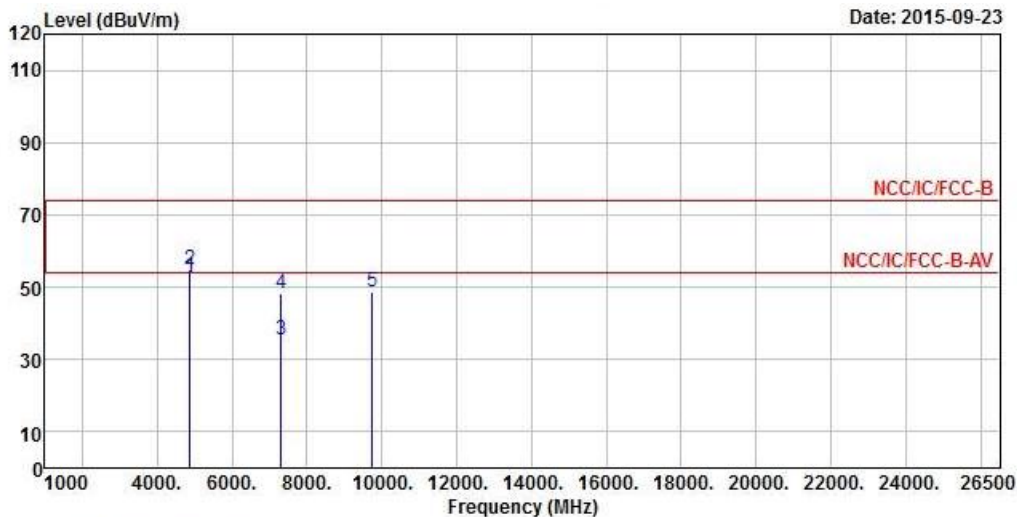


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	50.57	-3.43	54.00	46.10	34.32	4.73	34.58	Average
2	4874.000	53.80	-20.20	74.00	49.33	34.32	4.73	34.58	Peak
3	7311.000	34.37	-19.63	54.00	27.89	35.92	5.47	34.91	Average
4	7311.000	48.06	-25.94	74.00	41.58	35.92	5.47	34.91	Peak
5	9748.000	45.49			37.41	36.96	6.41	35.29	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.53 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	H

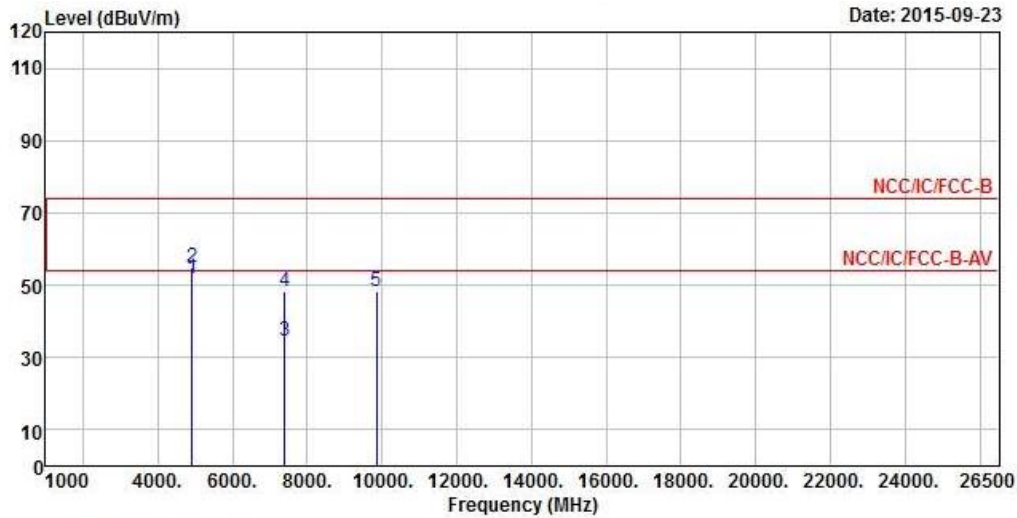


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	52.73	-1.27	54.00	48.26	34.32	4.73	34.58	Average
2	4874.000	55.10	-18.90	74.00	50.63	34.32	4.73	34.58	Peak
3	7311.000	35.25	-18.75	54.00	28.77	35.92	5.47	34.91	Average
4	7311.000	48.10	-25.90	74.00	41.62	35.92	5.47	34.91	Peak
5	9748.000	48.59			40.51	36.96	6.41	35.29	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
- Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.53 dBuV/m).
- Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2462
N_{TX}	1	Polarization	V

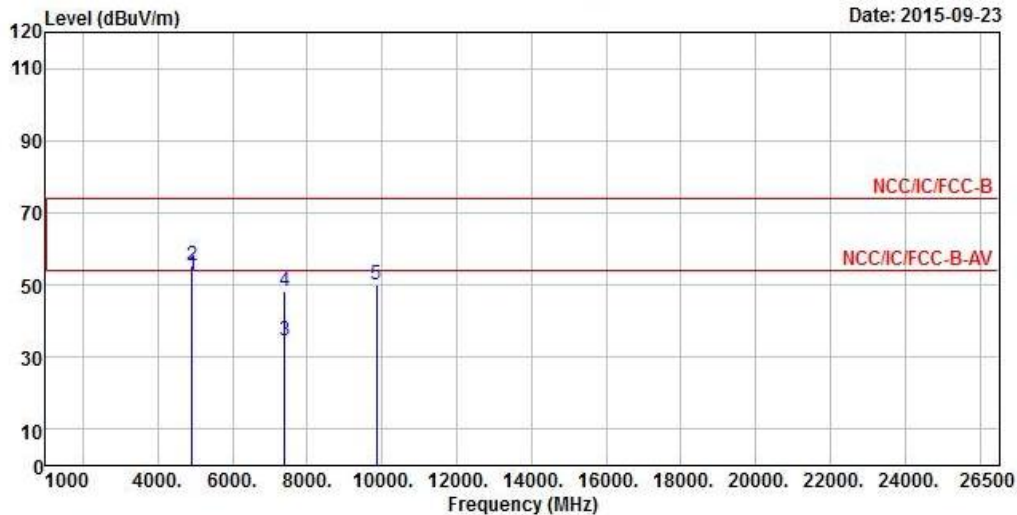


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	51.98	-2.02	54.00	47.45	34.31	4.79	34.57	Average
2	4924.000	54.75	-19.25	74.00	50.22	34.31	4.79	34.57	Peak
3	7386.000	34.36	-19.64	54.00	27.76	35.96	5.57	34.93	Average
4	7386.000	48.11	-25.89	74.00	41.51	35.96	5.57	34.93	Peak
5	9848.000	48.11			39.90	37.01	6.50	35.30	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (100.52 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (MHz)	2462
N_{TX}	1	Polarization	H

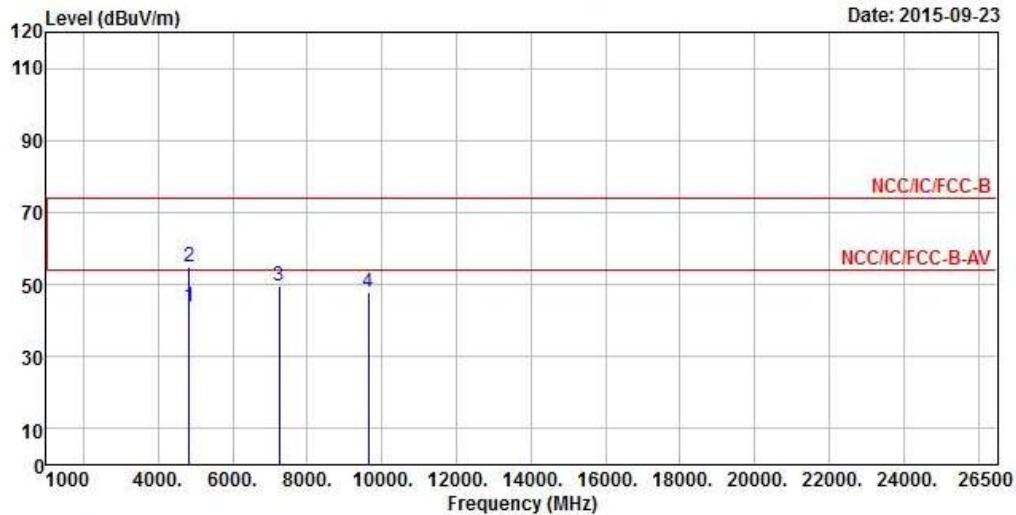


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	52.83	-1.17	54.00	48.30	34.31	4.79	34.57	Average
2	4924.000	55.54	-18.46	74.00	51.01	34.31	4.79	34.57	Peak
3	7386.000	34.68	-19.32	54.00	28.08	35.96	5.57	34.93	Average
4	7386.000	48.21	-25.79	74.00	41.61	35.96	5.57	34.93	Peak
5	9848.000	50.26			42.05	37.01	6.50	35.30	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (100.52 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2412
N_{TX}	1	Polarization	V

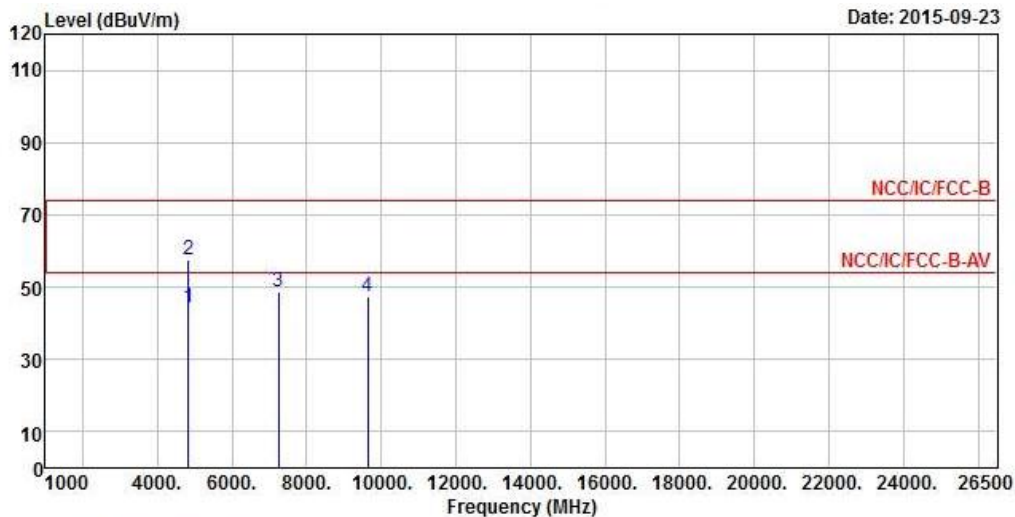


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4824.000	43.87	-10.13	54.00	39.43	34.33	4.70	34.59 Average
2	4824.000	55.12	-18.88	74.00	50.68	34.33	4.70	34.59 Peak
3	7236.000	49.42			43.04	35.90	5.37	34.89 Peak
4	9648.000	47.76			39.80	36.89	6.35	35.28 Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
- Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (103.29 dBuV/m).
- Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2412
N_{TX}	1	Polarization	H

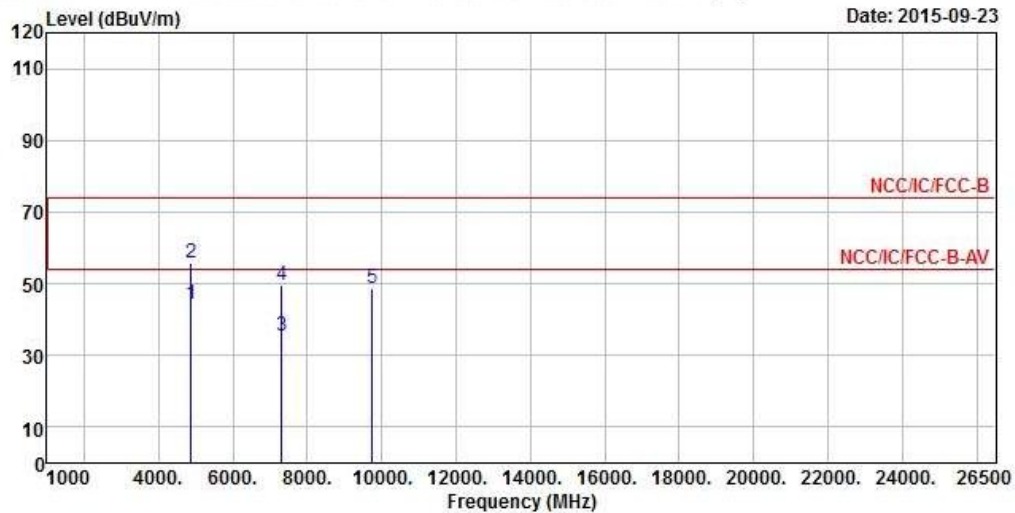


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamplifier Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4824.000	44.36	-9.64	54.00	39.92	34.33	4.70	34.59 Average
2	4824.000	57.65	-16.35	74.00	53.21	34.33	4.70	34.59 Peak
3	7236.000	48.52			42.14	35.90	5.37	34.89 Peak
4	9648.000	47.31			39.35	36.89	6.35	35.28 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (103.29 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	44.37	-9.63	54.00	39.90	34.32	4.73	34.58	Average
2	4874.000	55.83	-18.17	74.00	51.36	34.32	4.73	34.58	Peak
3	7311.000	35.63	-18.37	54.00	29.15	35.92	5.47	34.91	Average
4	7311.000	49.76	-24.24	74.00	43.28	35.92	5.47	34.91	Peak
5	9748.000	48.72			40.64	36.96	6.41	35.29	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

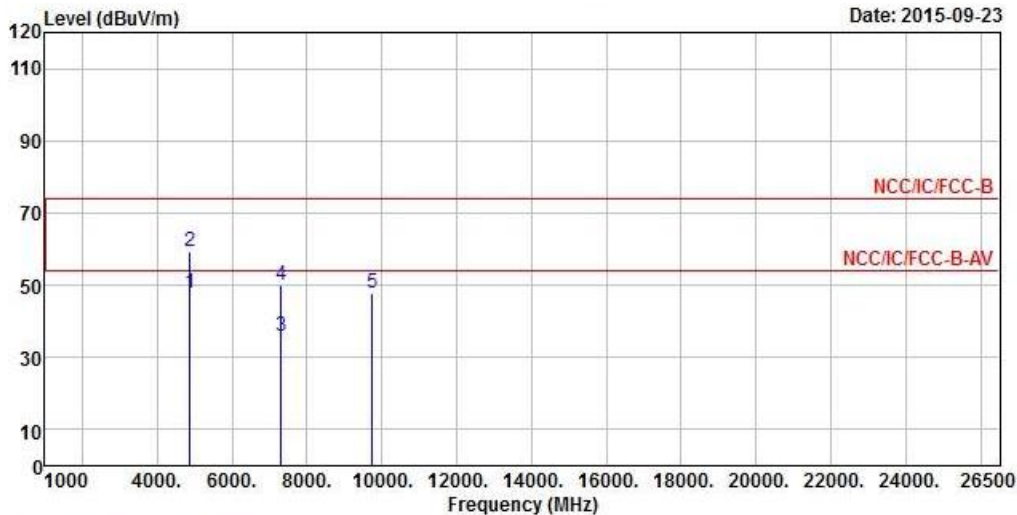
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (104.15 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4874.000	47.67	-6.33	54.00	43.20	34.32	4.73	34.58 Average
2	4874.000	59.42	-14.58	74.00	54.95	34.32	4.73	34.58 Peak
3	7311.000	35.74	-18.26	54.00	29.26	35.92	5.47	34.91 Average
4	7311.000	50.11	-23.89	74.00	43.63	35.92	5.47	34.91 Peak
5	9748.000	47.87			39.79	36.96	6.41	35.29 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

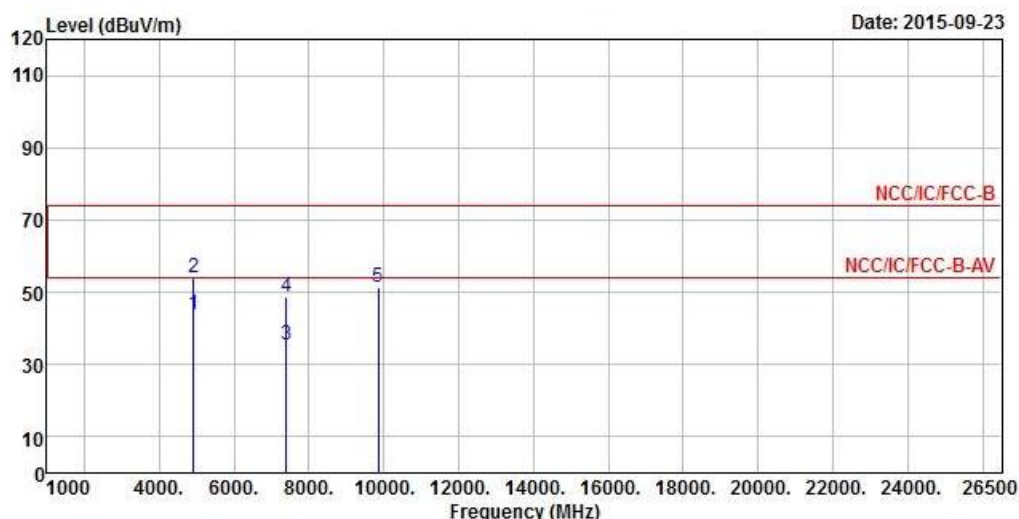
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (104.15 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2462
N_{TX}	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	43.78	-10.22	54.00	39.25	34.31	4.79	34.57	Average
2	4924.000	54.15	-19.85	74.00	49.62	34.31	4.79	34.57	Peak
3	7386.000	35.27	-18.73	54.00	28.67	35.96	5.57	34.93	Average
4	7386.000	48.72	-25.28	74.00	42.12	35.96	5.57	34.93	Peak
5	9848.000	51.22			43.01	37.01	6.50	35.30	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

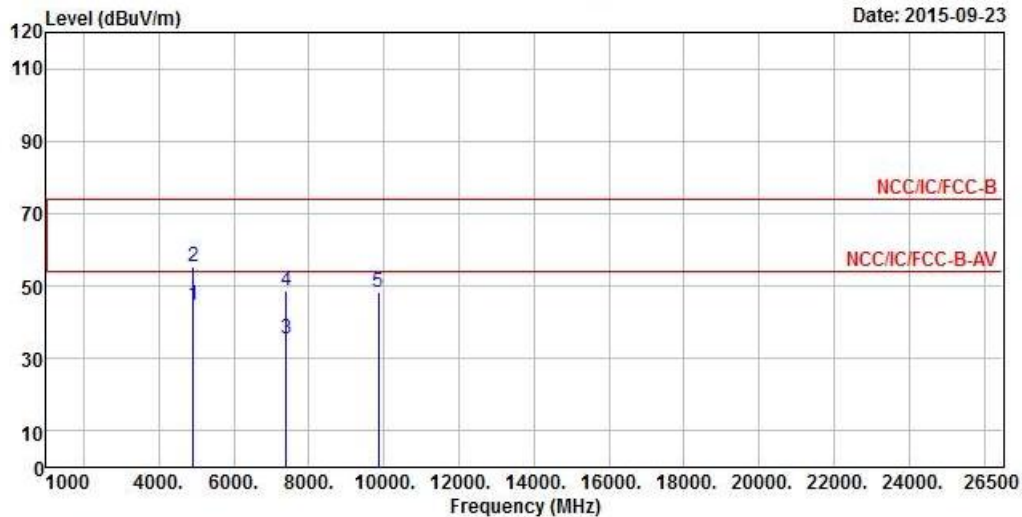
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.65 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (MHz)	2462
N_{TX}	1	Polarization	H

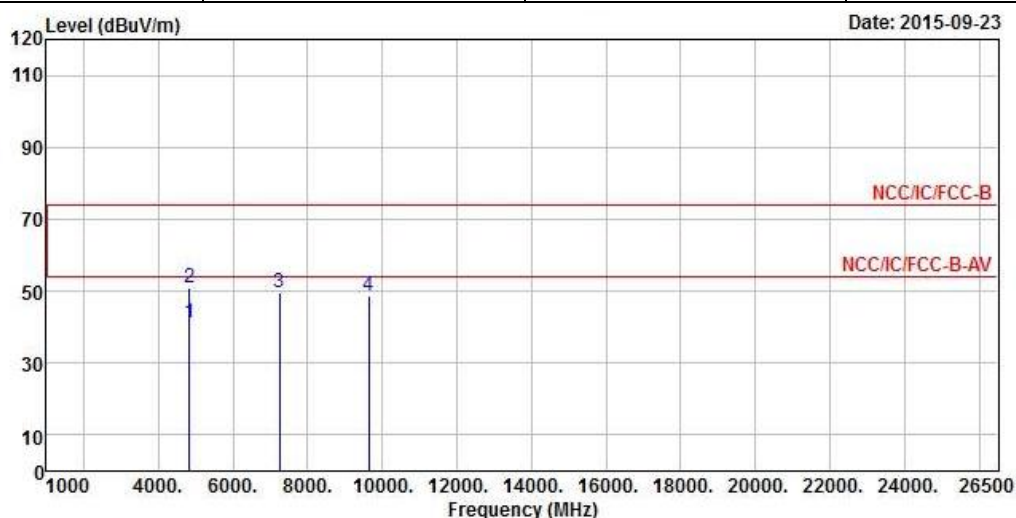


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	44.60	-9.40	54.00	40.07	34.31	4.79	34.57	Average
2	4924.000	55.48	-18.52	74.00	50.95	34.31	4.79	34.57	Peak
3	7386.000	35.57	-18.43	54.00	28.97	35.96	5.57	34.93	Average
4	7386.000	48.67	-25.33	74.00	42.07	35.96	5.57	34.93	Peak
5	9848.000	48.43			40.22	37.01	6.50	35.30	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.65 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2412
N_{TX}	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4824.000	41.27	-12.73	54.00	36.83	34.33	4.70	34.59 Average
2	4824.000	51.03	-22.97	74.00	46.59	34.33	4.70	34.59 Peak
3	7236.000	49.50			43.12	35.90	5.37	34.89 Peak
4	9648.000	48.82			40.86	36.89	6.35	35.28 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

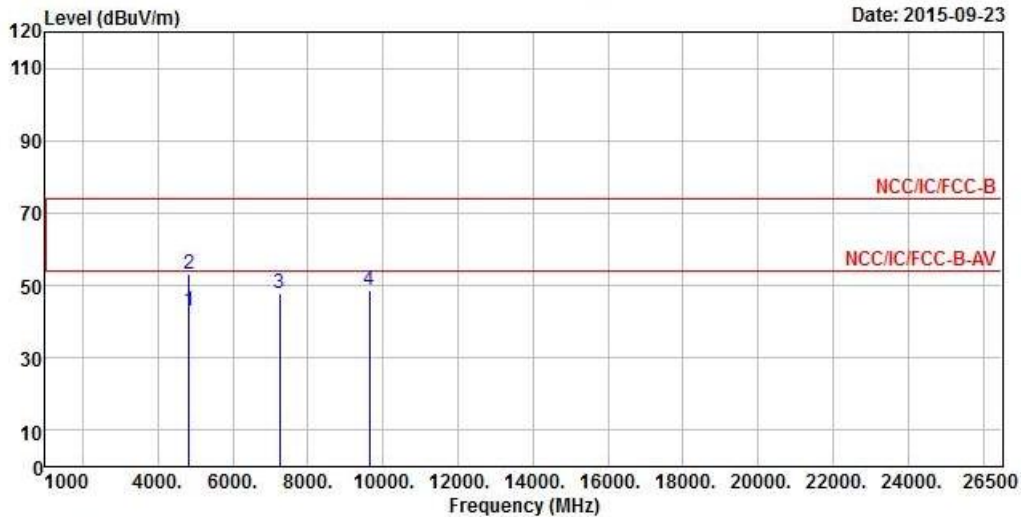
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.28 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2412
N_{TX}	1	Polarization	H

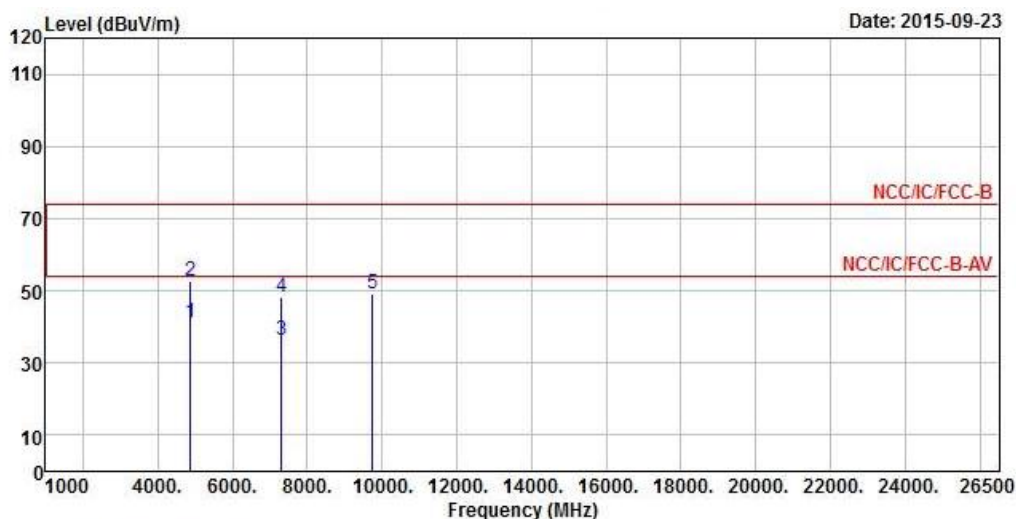


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	42.88	-11.12	54.00	38.44	34.33	4.70	34.59	Average
2	4824.000	53.14	-20.86	74.00	48.70	34.33	4.70	34.59	Peak
3	7236.000	47.93			41.55	35.90	5.37	34.89	Peak
4	9648.000	48.58			40.62	36.89	6.35	35.28	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.28 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4874.000	41.37	-12.63	54.00	36.90	34.32	4.73	34.58 Average
2	4874.000	52.53	-21.47	74.00	48.06	34.32	4.73	34.58 Peak
3	7311.000	36.33	-17.67	54.00	29.85	35.92	5.47	34.91 Average
4	7311.000	48.13	-25.87	74.00	41.65	35.92	5.47	34.91 Peak
5	9748.000	49.14			41.06	36.96	6.41	35.29 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

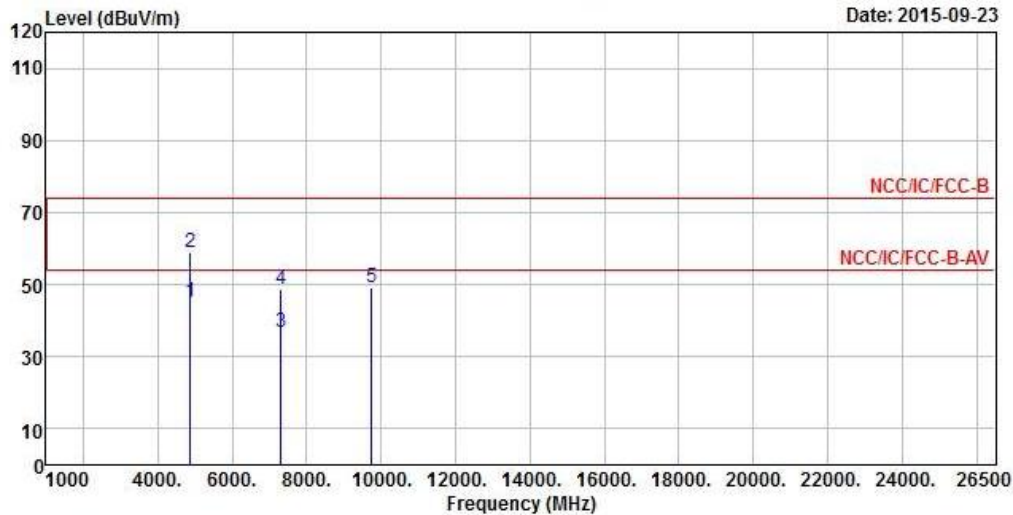
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (105.92 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2437
N_{TX}	1	Polarization	H

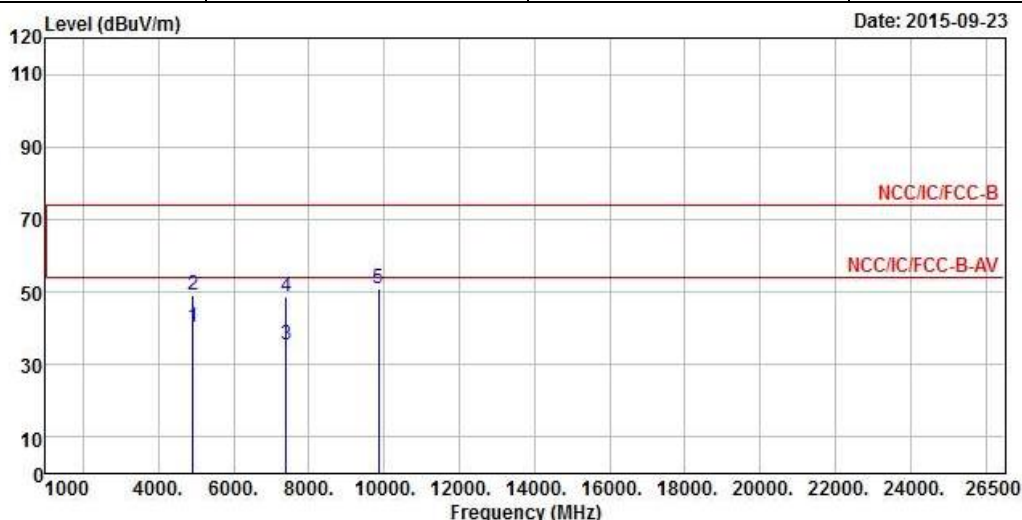


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	45.00	-9.00	54.00	40.53	34.32	4.73	34.58	Average
2	4874.000	58.70	-15.30	74.00	54.23	34.32	4.73	34.58	Peak
3	7311.000	36.83	-17.17	54.00	30.35	35.92	5.47	34.91	Average
4	7311.000	48.49	-25.51	74.00	42.01	35.92	5.47	34.91	Peak
5	9748.000	49.03			40.95	36.96	6.41	35.29	Peak

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
- Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (105.92 dBuV/m).
- Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2462
N_{TX}	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	40.41	-13.59	54.00	35.94	34.31	4.79	34.63	Average
2	4924.000	49.03	-24.97	74.00	44.56	34.31	4.79	34.63	Peak
3	7386.000	35.25	-18.75	54.00	28.68	35.96	5.57	34.96	Average
4	7386.000	48.88	-25.12	74.00	42.31	35.96	5.57	34.96	Peak
5	9848.000	50.82			42.62	37.01	6.50	35.31	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

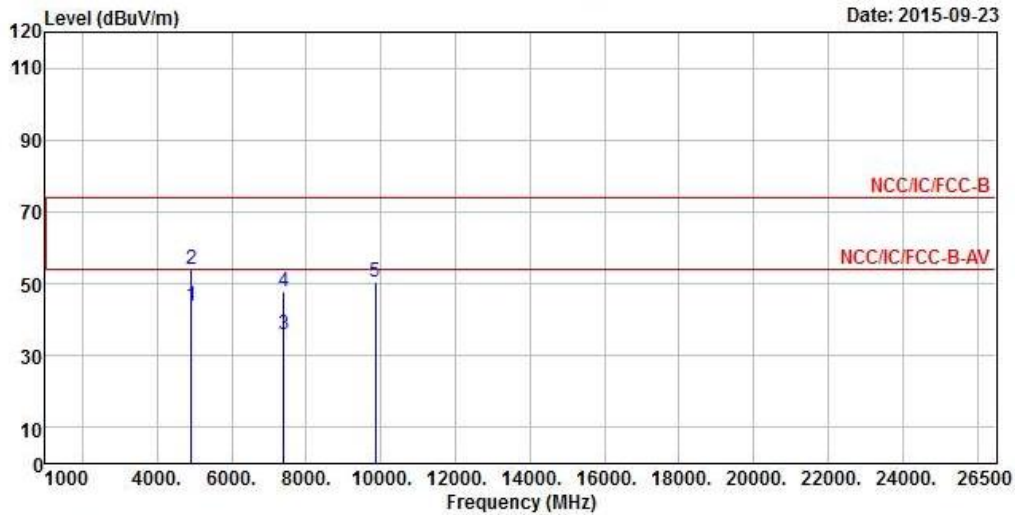
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.27 dBuV/m).

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (MHz)	2462
N _{TX}	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	43.80	-10.20	54.00	39.33	34.31	4.79	34.63	Average
2	4924.000	53.91	-20.09	74.00	49.44	34.31	4.79	34.63	Peak
3	7386.000	35.74	-18.26	54.00	29.17	35.96	5.57	34.96	Average
4	7386.000	47.88	-26.12	74.00	41.31	35.96	5.57	34.96	Peak
5	9848.000	50.55			42.35	37.01	6.50	35.31	Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
 Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
 Note 5: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.27 dBuV/m).
 Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Apr. 15. 2015	AC Conduction
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 22, 2015	AC Conduction
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	Oct. 31, 2014	AC Conduction
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	NCR	AC Conduction

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101500	9kHz ~4 0GHz	May 06, 2015	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 28, 2015	RF Conducted
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jan. 29, 2015	RF Conducted
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jan. 29, 2015	RF Conducted

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Oct. 02, 2014	Radiated Emission
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 03, 2015	Radiated Emission
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 6GHz 3m	Mar 17, 2015	Radiated Emission
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	Jul. 24, 2015	Radiated Emission
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Sep.10.2015	Radiated Emission
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 28, 2014	Radiated Emission
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	Jan. 27, 2015	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 08, 2014	Radiated Emission
RF Cable-high	SUHNER	SUCOFLEX106	MY17173/4	1GHz ~ 40GHz	Mar. 04, 2015	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 18, 2015	Radiated Emission
Turn Table	Chaintek Instruments	3000	MF7802058	0~ 360 degree	N/A	Radiated Emission
Antenna Mast	MF	MF7802	MF780208205	1 ~ 4 m	N/A	Radiated Emission

Note: Calibration Interval of instruments listed above is one year.



FCC Test Report

Report No. : FR590417

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	100330	9kHz~30 MHz	Nov. 10, 2014	Radiated Emission

Note: Calibration Interval of instruments listed above is two years.