



SPORTON LAB.

Certificate No: ER232843-07AC

CERTIFICATE OF COMPLIANCE

EQUIPMENT : 802.11abgn, USB module

MODEL NO. : WUBR-508N

APPLICANT : SparkLAN Communications, Inc.

8F., No.257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan



I HEREBY

CERTIFY THAT:

The following technical requirements and test specifications are relevant to the presumption of conformity under article 3.2 of the **R&TTE Directive 1999/5/EC**

The equipment was **Passed** the test performed according to

ETSI EN 300 328 V1.8.1 (2012-06)

The test was carried out on **Oct. 24, 2014** SPORTON INTERNATIONAL INC. LAB.

Vic Hsiao / Supervisor

CE Test Report

Equipment : 802.11abgn, USB module
Brand Name : SparkLAN
Model No. : WUBR-508N
Standard : EN 300 328 V1.8.1 (2012-06)
Operating Band : 2400 MHz – 2483.5 MHz
Applicant : SparkLAN Communications, Inc.
Manufacturer : 8F., No.257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan

The product sample received on Sep. 22, 2014 and completely tested on Oct. 24, 2014. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 300 328 V1.8.1 (2012-06) and shown compliance with the applicable technical standards. The equipment under R&TTE Directive 1999/5/EC of article 3.2 harmonized essential for the radio spectrum requirements.

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:


Vic Hsiao / Supervisor



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Summary of Test Result

Harmonized Standard Requirements and Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
3.1	4.3.2.1	RF Output Power	EIRP [dBm]: 19.12	20 dBm	Complied
3.2	4.3.2.2	Power Density	EIRP PSD [dBm/MHz] 8.64	10 dBm/MHz	Complied
-	4.3.2.3	Duty cycle, Tx-Sequence, Tx-gap	Adaptive w/o test	EN 300 328 Clause 4.3.2.3.2	N/A
-	4.3.2.4	Medium Utilisation	Adaptive w/o test	MU > 10%	N/A
3.3	4.3.2.6	Occupied Channel Bandwidth	OCB fall in band Bandwidth [MHz] 20M:17.82 40M:36.56	Fall in band	Complied
3.4	4.3.2.7	Transmitter unwanted emissions in the OOB domain	2484.0 MHz -27.38 dBm (Margin 17.38 dB)	EN 300 328 Figure 3	Complied
3.5	4.3.2.8	Transmitter unwanted emissions in the spurious domain	[e.i.r.p.]: 833.16 MHz -64.89 dBm (Margin 10.89 dB)	EN 300 328 Table 4	Complied
4.1	4.3.2.9	Receiver spurious emissions	[e.i.r.p.]: 960.23 MHz -60.25 dBm (Margin 3.25 dB)	EN 300 328 Table 5	Complied
5.1	4.3.2.5	Adaptivity	COT: 1.34125 ms Idle: 0.640625 ms	IEEE 802.11 IEEE 802.11n	Complied
	4.3.2.10	Receiver Blocking	COT: 1.33125 ms Idle: 0.470625 ms	IEEE 802.11 IEEE 802.11n	Complied



SPORTON INTERNATIONAL INC.
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1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number	Transmit Chains (N _{TX})	EIRP - Output Power (dBm)
2400-2483.5	b	2412-2472	1-13 [13]	1	18.95
2400-2483.5	g	2412-2472	1-13 [13]	1	19.12
2400-2483.5	n (HT20)	2412-2472	1-13 [13]	2	19.01
2400-2483.5	n (HT40)	2422-2462	3-11 [9]	2	19.10

Note 1: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
 Note 2: 802.11g/n 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.
☒	External antenna (dedicated antennas)
☐	Single power level with corresponding antenna(s).
☒	Multiple power level and corresponding antenna(s).

Antenna General Information				
No.	Ant. Cat.	Ant. Type	Model name	Gain (dBi)
1	Extetral	Dipole	GEC6200	3.00

Remark:
 1. IEEE802.11b/g only include 1Tx and EUT was pre-tested Antenna Port 1 and Antenna Port 2 for single chain, the worst case was Antenna Port 2. Therefore only test data (Port 2) was recorded in report.
 2. IEEE802.11n only include 2Tx.

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
☒ 100.00% - IEEE 802.11n (HT40)	0.00

1.1.5 Medium Access Protocol

Medium Access Protocol	
Medium Access Protocol:	☒ IEEE Std. 802.11-2007
	☒ IEEE Std. 802.11n-2009
	☐ IEEE Std. 802.15.4-2006
	☐ IEEE Std. 802.15.1-2005
	☐ Other:
A medium access protocol has been implemented by the equipment. With mechanism designed to facilitate spectrum sharing with other devices in a wireless network. The equipment implements an adequate spectrum sharing mechanism and users will be equal access wireless network.	

1.1.6 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☒ From system	☐ External DC adapter
Test Voltage	☒ Vnom (5 V)	☒ Vmax (5.25 V)	☒ Vmin (4.75 V)
Test Climatic	☒ Tnom (20°C)	☒ Tmax (50°C)	☒ Tmin (0°C)

1.1.7 Adaptive Equipment

Adaptive Equipment	
☐	non-Adaptive Equipment:
	The maximum RF Output Power (e.i.r.p.): ... dBm
	The maximum (corresponding) Duty Cycle: ... %
☒	Adaptive Equipment without the possibility to switch to a non-adaptive mode:
☒	The equipment has implemented an LBT based DAA mechanism:
	☐ The equipment is Frame Based equipment
	☒ The equipment is Load Based equipment
	☐ The equipment can switch dynamically between Frame Based and Load Based equipment
☐	The equipment has implemented an non-LBT based DAA mechanism
☐	The equipment can operate in more than one adaptive mode
☐	Adaptive Equipment which can also operate in a non-adaptive mode

1.2 Support Equipment

Support Equipment - RF Conducted			
No.	Equipment	Brand Name	Model Name
1	Notebook	DELL	E5500

Support Equipment - Radiated Emission			
No.	Equipment	Brand Name	Model Name
1	Notebook	DELL	E5520

Support Equipment – Adaptivity			
No.	Equipment	Brand Name	Model Name
1	AP (Master)	EDIMAX	BR-6228GNS
2	Notebook	DELL	E5510
3	Notebook	DELL	E5530

1.3 Testing Applied Standards

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

- ♦ EN 300 328 V1.8.1 (2012-06)

1.4 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
		TEL : 886-3-327-3456 FAX : 886-3-327-0973	
Test Condition		Test Site No.	Test Engineer
RF Conducted		TH01-HY	Ian
Radiated Emission		05CH01-HY	Sam
Adaptivity Site		DFS01-HY	Ben
			Test Environment
			22.8°C / 62%
			21°C / 63%
			26°C / 62.1%

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	Limit
Radio Frequency		$\pm 8.7 \times 10^{-7}$	$\pm 1 \times 10^{-5}$
RF output power, conducted		± 0.6 dB	± 1.5 dB
Power density, conducted		± 1.2 dB	± 3 dB
Unwanted emissions, conducted	30 – 1000 MHz	± 0.5 dB	± 3 dB
	1 – 12.75 GHz	± 0.7 dB	± 3 dB
All emissions, radiated	30 – 1000 MHz	± 2.3 dB	± 6 dB
	1 – 12.75 GHz	± 2.6 dB	± 6 dB
Temperature		± 0.8 °C	± 1 °C
Humidity		± 3 %	± 5 %
DC and low frequency voltages		± 3 %	± 3 %

2 Test Configuration of EUT

2.1 The Worse 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	2	MCS 8-15	MCS 8
HT40	2	MCS 8-15	MCS 8

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
IEEE Std. 802.11	Test Channel Frequencies (MHz)
b, g, n (HT20) n (HT40)	2412-(F1), 2442-(F2), 2472-(F3) 2422-(F4), 2437-(F5), 2462-(F6)

2.3 The Worse Case Power Setting Parameter

The Worst Case Power Setting Parameter (2400-2483.5MHz band)							
Test Software/Version	RT5x7x QA_V1.0.5.9						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		2412	2442	2472	2422	2437	2462
11b	1	09	0A	0B	-	-	-
11g	1	0F	0F	11	-	-	-
HT20	2	12,0B	11,0B	11,0C	-	-	-
HT40	2	-	-	-	12,0B	11,0C	12,0C

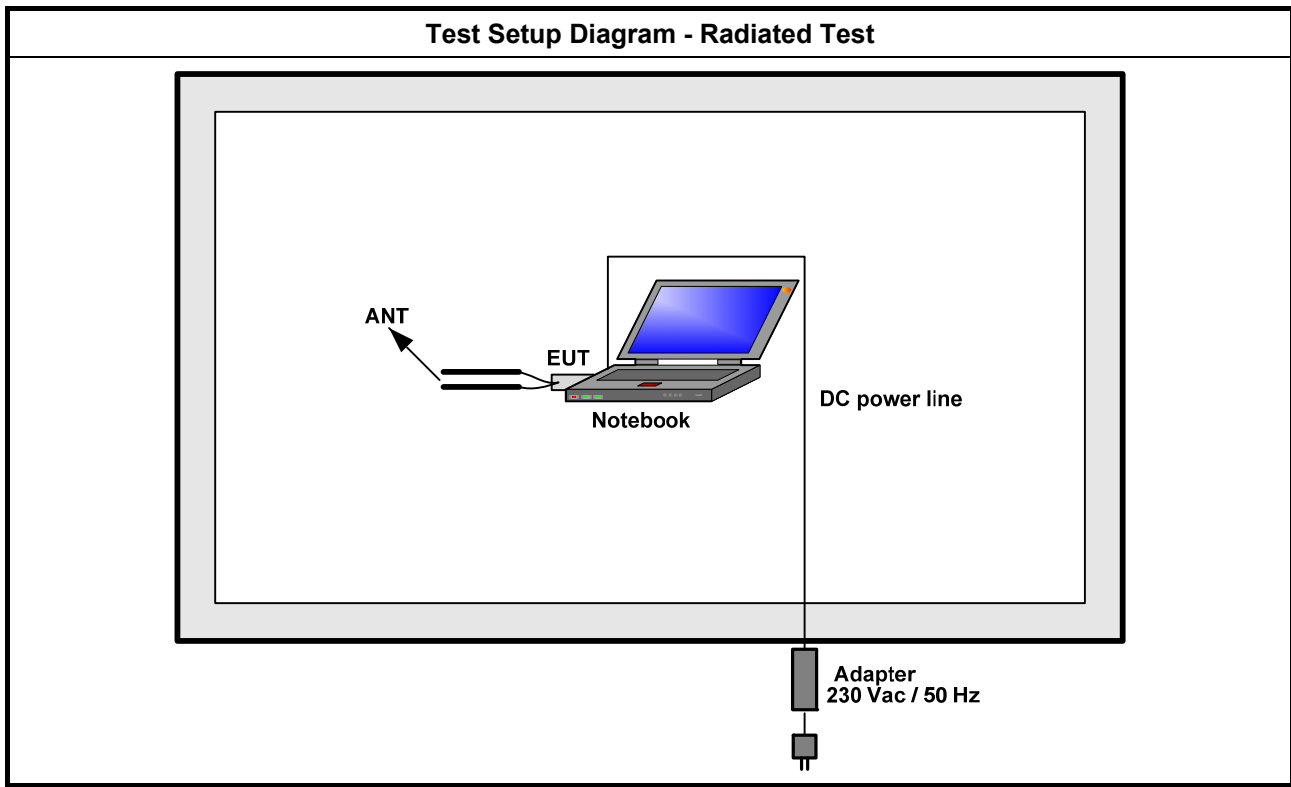
2.4 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Power Density, Occupied Channel Bandwidth Transmitter unwanted emissions in the OOB domain
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20, HT40

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Unwanted Emissions in The Spurious Domain, Receiver Spurious Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
User Position	☐ EUT will be placed in fixed position.		
	☒ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. The worst planes is X.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.		
Operating Mode	Operating Mode Description		
1	Transmit / Receive		
Modulation Mode	11b, 11g, HT20, HT40		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

The Worst Case Mode for Following Conformance Tests	
Tests Item	Adaptivity & Receiver Blocking
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11b, 11g, HT20, HT40

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 RF Output Power

3.1.1 RF Output Power Limit

RF Output Power Limit	
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	mean equivalent isotropic radiated power (e.i.r.p.) ≤ 20 dBm

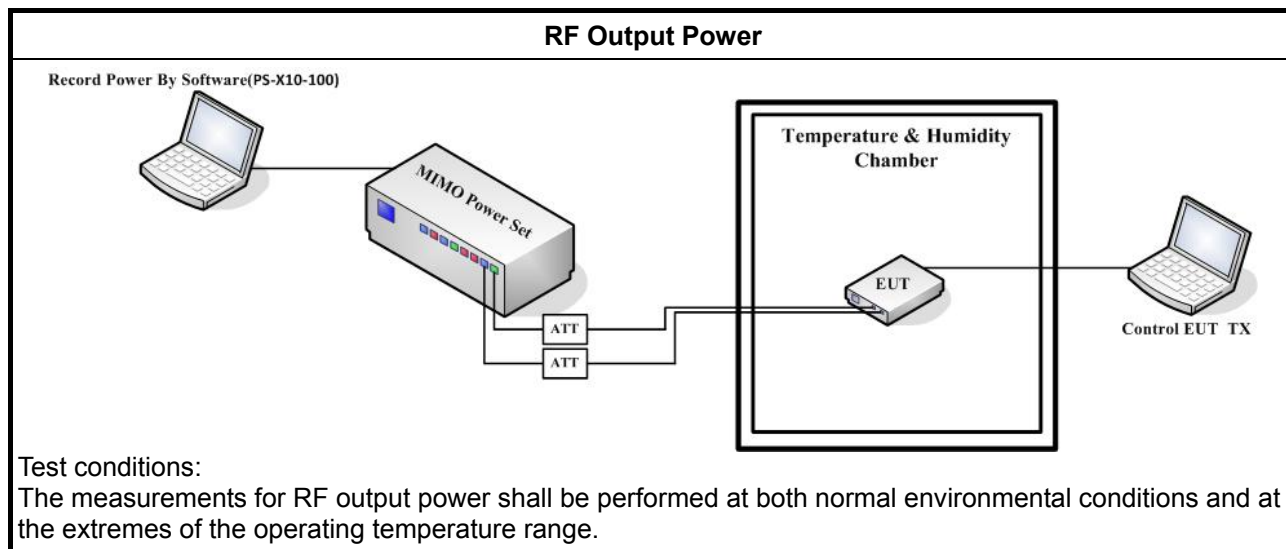
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
☒	The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.
☒	Refer as EN 300 328, clause 5.3.2.2.1 for conducted measurement.
Step 1: Use a fast power sensor suitable for 2,4 GHz and capable of 1 MS/s. Use the following settings: - Sample speed 1 MS/s or faster. - The samples must represent the power of the signal. - Measurement duration: For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) are captured. NOTE 1: For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.	
Step 2: For conducted measurements on devices with multiple transmit chains: - Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports. - Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than half the time between two samples. - For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.	
Step 3: Find the start and stop times of each burst in the stored measurement samples. NOTE 2: The start and stop times are defined as the points where the power is at least 20 dB the RMS burst power calculated in step 4.	
Step 4: Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these Pburst values, as well as the start and stop times for each burst.	
Step 5: The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.	
Step 6: Add the (stated) antenna assembly gain "G" in dBi of the individual antenna. If applicable, add the additional beamforming gain "Y" in dB. If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used. The RF Output Power (P) shall be calculated using the formula below: $P = A + G + Y$ This value, which shall comply with the limit given in clauses 4.3.2.1.2, shall be recorded in the test report.	
☐	Refer as EN 300 328, clause 5.3.2.2.2 for radiated measurement.

3.1.4 Test Setup



3.1.5 Maximum Antenna Gain

Maximum Antenna Gain Result					
Transmit Chains No.		1	2	-	-
Maximum Gain (dBi)-G		3.00	3.00	-	-
Modulation Mode	G+Y (dBi)	N _{TX}	N _{SS} (Min.)	STBC	Beamforming Gain (dB)-Y
11b	3.00	1	1	-	-
11g	3.00	1	1	-	-
HT20	3.00	2	2	-	-
HT40	3.00	2	2	-	-

3.1.6 Test Result of RF Output Power

Test Date: Sep. 22, 2014		RF Output Power Result				
Max. Gain (dBi)		3.00		RF Output Power (dBm)		
Condition	Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 2 (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	11b	1	2412	14.97	17.97	20
TminVmax	11b	1	2412	15.87	18.87	20
TminVmin	11b	1	2412	15.90	18.90	20
TmaxVmax	11b	1	2412	12.94	15.94	20
TmaxVmin	11b	1	2412	12.94	15.94	20
TnomVnom	11b	1	2442	15.04	18.04	20
TminVmax	11b	1	2442	15.95	18.95	20
TminVmin	11b	1	2442	15.91	18.91	20
TmaxVmax	11b	1	2442	12.87	15.87	20
TmaxVmin	11b	1	2442	12.87	15.87	20
TnomVnom	11b	1	2472	14.70	17.70	20
TminVmax	11b	1	2472	15.71	18.71	20
TminVmin	11b	1	2472	15.72	18.72	20
TmaxVmax	11b	1	2472	12.50	15.50	20
TmaxVmin	11b	1	2472	12.51	15.51	20
Result				Complied		

Test Date: Sep. 22, 2014		RF Output Power Result				
Max. Gain (dBi)		3.00		RF Output Power (dBm)		
Condition	Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 2 (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	11g	1	2412	14.59	17.59	20
TminVmax	11g	1	2412	15.95	18.95	20
TminVmin	11g	1	2412	15.91	18.91	20
TmaxVmax	11g	1	2412	12.44	15.44	20
TmaxVmin	11g	1	2412	12.45	15.45	20
TnomVnom	11g	1	2442	14.60	17.60	20
TminVmax	11g	1	2442	15.86	18.86	20
TminVmin	11g	1	2442	15.83	18.83	20
TmaxVmax	11g	1	2442	12.37	15.37	20
TmaxVmin	11g	1	2442	12.34	15.34	20
TnomVnom	11g	1	2472	14.90	17.90	20
TminVmax	11g	1	2472	16.12	19.12	20
TminVmin	11g	1	2472	16.07	19.07	20
TmaxVmax	11g	1	2472	12.63	15.63	20
TmaxVmin	11g	1	2472	12.60	15.60	20
Result				Complied		

Test Date: Sep. 22, 2014		RF Output Power Result						
Max. Gain (dBi)		3.00		RF Output Power (dBm)				
Condition	Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1 (dBm)	Chain Port 2 (dBm)	Sum Chain (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	HT20	2	2412	11.83	11.21	14.54	17.54	20
TminVmax	HT20	2	2412	12.94	12.56	15.76	18.76	20
TminVmin	HT20	2	2412	12.91	12.50	15.72	18.72	20
TmaxVmax	HT20	2	2412	9.92	8.97	12.48	15.48	20
TmaxVmin	HT20	2	2412	9.85	8.89	12.41	15.41	20
TnomVnom	HT20	2	2442	11.76	11.18	14.49	17.49	20
TminVmax	HT20	2	2442	13.02	12.66	15.85	18.85	20
TminVmin	HT20	2	2442	12.97	12.62	15.81	18.81	20
TmaxVmax	HT20	2	2442	9.48	8.55	12.05	15.05	20
TmaxVmin	HT20	2	2442	9.52	8.58	12.09	15.09	20
TnomVnom	HT20	2	2472	11.82	11.61	14.73	17.73	20
TminVmax	HT20	2	2472	13.00	12.99	16.01	19.01	20
TminVmin	HT20	2	2472	12.97	12.92	15.96	18.96	20
TmaxVmax	HT20	2	2472	9.50	9.07	12.30	15.30	20
TmaxVmin	HT20	2	2472	9.48	8.98	12.25	15.25	20
Result				Complied				

Test Date: Sep. 22, 2014		RF Output Power Result						
Max. Gain (dBi)		3.00		RF Output Power (dBm)				
Condition	Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1 (dBm)	Chain Port 2 (dBm)	Sum Chain (dBm)	EIRP Power (dBm)	EIRP Limit (dBm)
TnomVnom	HT40	2	2422	11.83	11.03	14.46	17.46	20
TminVmax	HT40	2	2422	13.08	12.57	15.84	18.84	20
TminVmin	HT40	2	2422	13.06	12.60	15.85	18.85	20
TmaxVmax	HT40	2	2422	9.69	8.58	12.18	15.18	20
TmaxVmin	HT40	2	2422	9.64	8.50	12.12	15.12	20
TnomVnom	HT40	2	2437	11.97	11.55	14.78	17.78	20
TminVmax	HT40	2	2437	13.30	12.71	16.03	19.03	20
TminVmin	HT40	2	2437	13.28	12.67	16.00	19.00	20
TmaxVmax	HT40	2	2437	9.38	9.49	12.45	15.45	20
TmaxVmin	HT40	2	2437	9.47	9.53	12.51	15.51	20
TnomVnom	HT40	2	2462	11.89	11.44	14.68	17.68	20
TminVmax	HT40	2	2462	12.94	13.17	16.07	19.07	20
TminVmin	HT40	2	2462	12.98	13.19	16.10	19.10	20
TmaxVmax	HT40	2	2462	9.69	8.98	12.36	15.36	20
TmaxVmin	HT40	2	2462	9.69	9.00	12.37	15.37	20
Result				Complied				

3.2 Power Density

3.2.1 Power Density Limit

Power Density Limit	
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	mean equivalent isotropic radiated power (e.i.r.p.) density ≤ 10 dBm/MHz

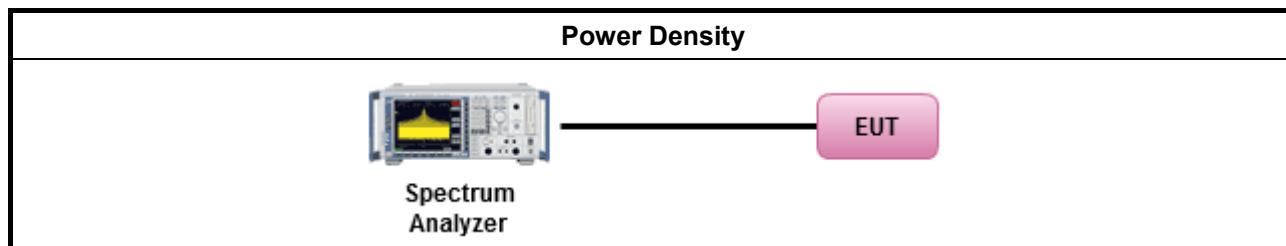
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
☒	Refer as EN 300 328, clause 5.3.3.2.1 for conducted measurement.
Step 1:	Connect the UUT to the spectrum analyzer and use the following settings: - Start & Stop Frequency: 2400 MHz ~ 2483.5MHz - Resolution BW: 10 kHz - Video BW: 30 kHz - Sweep Points: > 8 350 - Detector Mode: RMS - Trace Mode: Max Hold - Sweep time: Auto - Note: For non-continuous signals, wait for the trace to be completed. Save the (trace) data set to a file.
Step 2:	For conducted measurements on smart antenna systems using either operating mode 2 or 3 (see clause 5.1.3.2), repeat the measurement for each of the transmit ports. For each frequency point, add up the amplitude (power) values for the different transmit chains and use this as the new data set.
Step 3:	Add up the values for amplitude (power) for all the samples in the file.
Step 4:	Normalize the individual values for amplitude so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.3.2.
Step 5:	Starting from the first sample in the file (lowest frequency), add up the power of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to #100). This is the Power Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded.
Step 6:	Shift the start point of the samples added up in step 3 by 1 sample and repeat the procedure in step 3 (i.e. sample #2 to #101).
Step 7:	Repeat step 4 until the end of the data set and record the radiated power density values for each of the 1 MHz segments. From all the recorded results, the highest value is the maximum Power Density for the UUT. This value, which shall comply with the limit given in clause 4.3.2.2.2, shall be recorded in the test report.
☐	Refer as EN 300 328, clause 5.3.3.2.2 for radiated measurement.

3.2.4 Test Setup



3.2.5 Test Result of Power Density

Test Date: Sep. 22, 2014			Maximum e.i.r.p. Spectral Density Result			
Modulation Mode	N _{TX}	Freq. (MHz)	PD (dBm/MHz)	Max. Gain (dBi)	EIRP PD (dBm/MHz)	EIRP Limit (dBm/MHz)
11b	1	2412	5.35	3.00	8.35	10
11b	1	2442	5.64	3.00	8.64	10
11b	1	2472	5.24	3.00	8.24	10
11g	1	2412	3.13	3.00	6.13	10
11g	1	2442	3.47	3.00	6.47	10
11g	1	2472	3.73	3.00	6.73	10
HT20	2	2412	2.86	3.00	5.86	10
HT20	2	2442	2.88	3.00	5.88	10
HT20	2	2472	3.05	3.00	6.05	10
HT40	2	2422	-0.21	3.00	2.79	10
HT40	2	2437	0.12	3.00	3.12	10
HT40	2	2462	-0.11	3.00	2.89	10
Result			Complied			

3.3 Occupied Channel Bandwidth

3.3.1 Occupied Channel Bandwidth Limit

Occupied Channel Bandwidth Limit	
Type of Frequency Hopping Equipment:	
☐	Occupied Channel Bandwidth for each hopping frequency fall completely within 2.4 GHz – 2.4835 GHz.
☐	For non-adaptive equipment with e.i.r.p greater than 10 dBm, Occupied Channel Bandwidth $\leq$ 5 MHz.
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	Occupied Channel Bandwidth fall completely within 2.4 GHz – 2.4835 GHz.
☐	For non-adaptive equipment with e.i.r.p greater than 10 dBm, Occupied Channel Bandwidth $\leq$ 20 MHz.

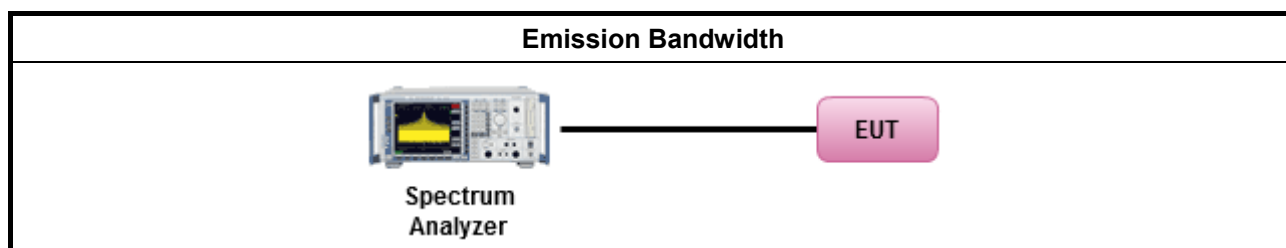
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
☒	Refer as EN 300 328, clause 5.3.8.2.1 for conducted measurement.
☐	The EUT supports single transmit chain and measurements performed on this transmit chain 2.
☒	The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case.
☒	Refer as EN 300 328, clause 5.3.8.2.1 for conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.
☐	Refer as EN 300 328, clause 5.3.8.2.2 clause 5.3.8.2.2 for radiated measurement.

3.3.4 Test Setup

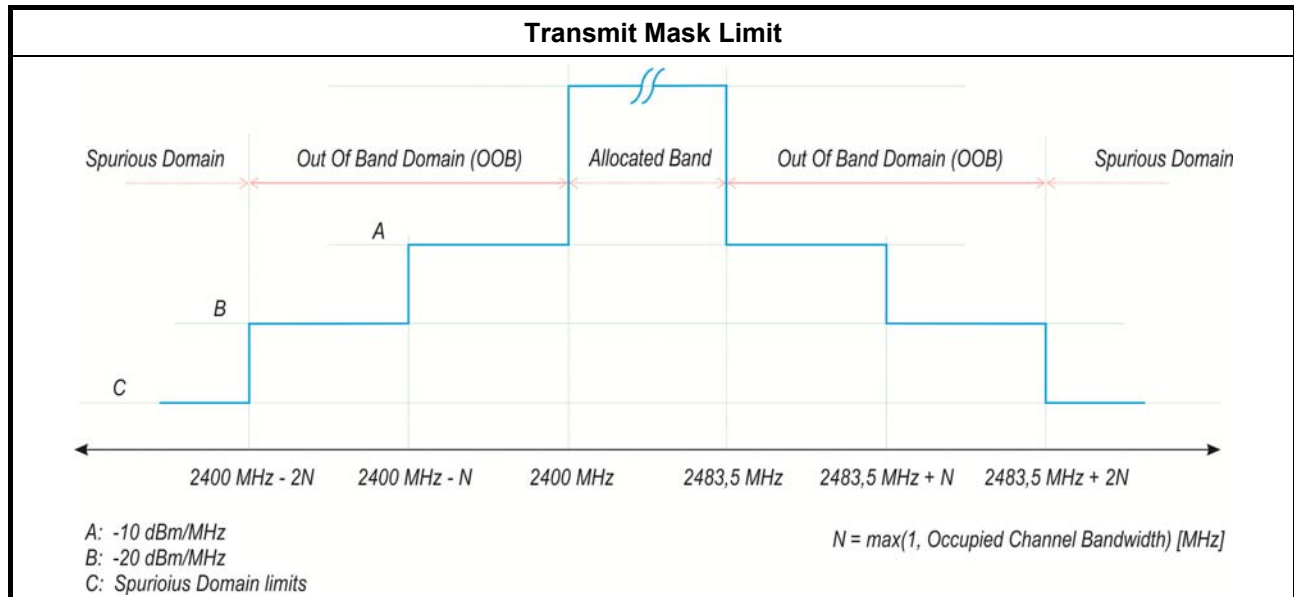


3.3.5 Test Result of Occupied Channel Bandwidth

Test Date: Sep. 22, 2014		Occupied Channel Bandwidth Result			
Modulation Mode	Frequency (MHz)	99% Bandwidth (MHz)	F _L at 99% BW (MHz)	F _H at 99% BW (MHz)	6dB Bandwidth (MHz)
11b	2412	14.65	2404.68400	2419.33600	10.84
11b	2472	14.67	2464.64400	2479.31600	10.84
11g	2412	16.91	2403.56400	2420.47600	16.88
11g	2472	16.91	2463.54400	2480.45600	16.88
HT20	2412	17.89	2403.06400	2420.95600	17.82
HT20	2472	17.89	2463.04400	2480.93600	17.82
HT40	2422	36.10	2403.96900	2440.07100	36.56
HT40	2462	36.10	2443.92900	2480.03100	36.52
Limit		N/A	2400	2483.5	N/A
Result		Complied			

3.4 Transmitter Unwanted Emissions in the Out-of-band Domain

3.4.1 Transmitter Unwanted Emissions in the Out-of-band Domain Limit



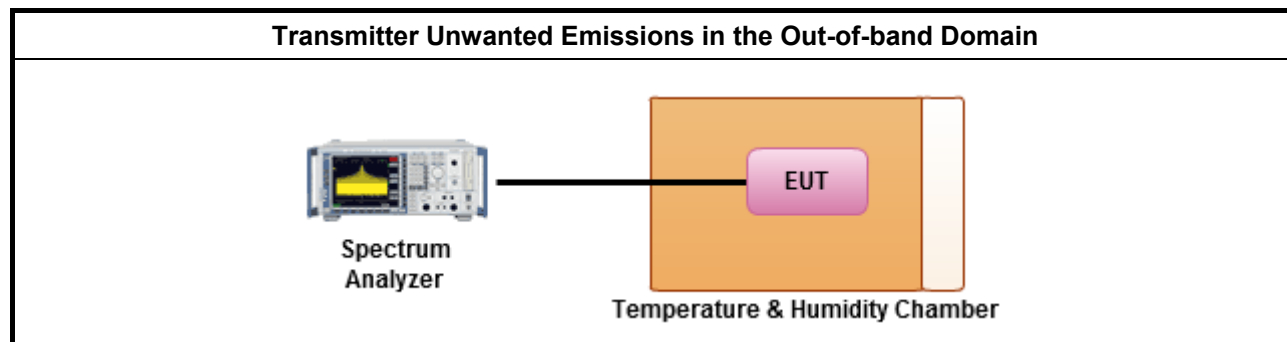
3.4.2 Measuring Instruments

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

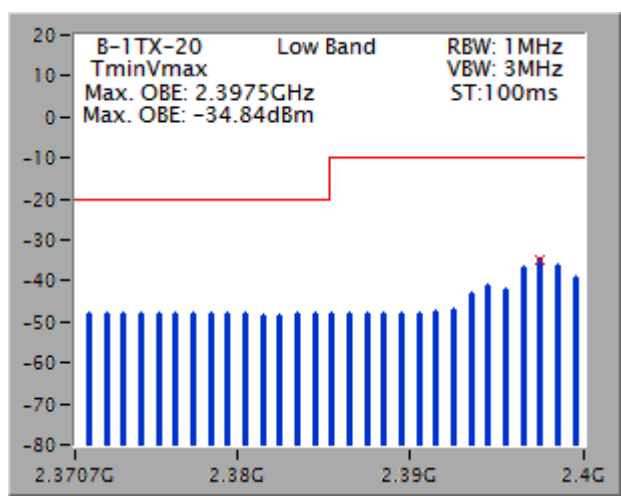
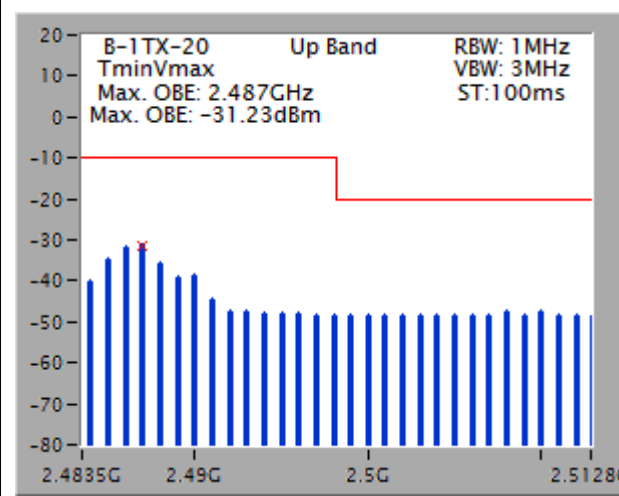
3.4.3 Test Procedures

Test Method	
☒	The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.
☒	Refer as EN 300 328, clause 5.3.9.2.1 for conducted measurement.
☐	The EUT supports single transmit chain and measurements performed on this transmit chain 2.
☒	The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case.
☒	The EUT supports multiple transmit chains using options given below:
☒	Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmit mask limit.
☐	Option 2: the results for each of the transmit chains shall be individually compared with the transmit mask limit. After that these limits have been reduced with $10 \times \log_{10} (A_{ch})$. (Number of active transmit chains).
☐	Refer as EN 300 328, clause 5.3.9.2.2 for radiated measurement.

3.4.4 Test Setup

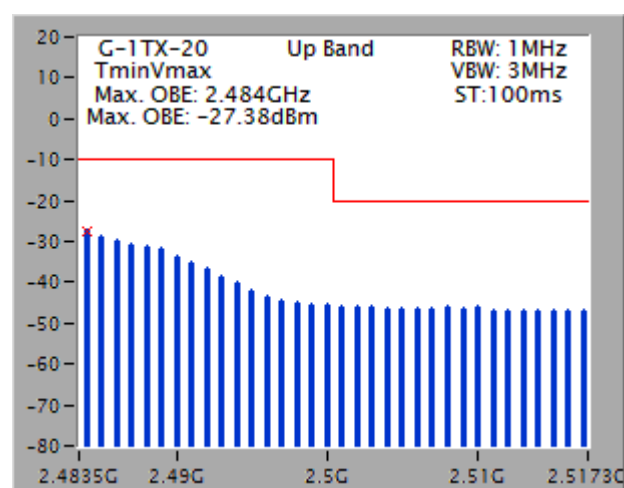
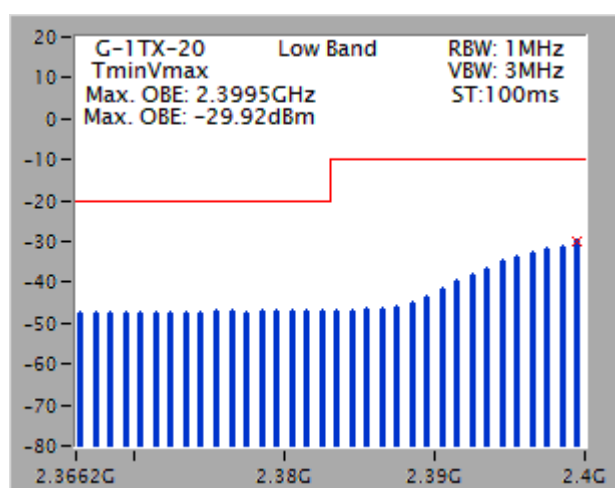


3.4.5 Test Result of Transmitter Unwanted Emissions in the Out-of-band Domain

Transmitter Unwanted Emissions in the Out-of-band Domain Result						
Test Date: Sep. 22, 2014			OOB Emissions (dBm/MHz)			
Condition	Modulation Mode	N _{TX}	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	11b	1	2412	2397.5	-36.99	-10
TminVmax	11b	1	2412	2397.5	-34.84	-10
TminVmin	11b	1	2412	2397.5	-34.85	-10
TmaxVmax	11b	1	2412	2397.5	-41.91	-10
TmaxVmin	11b	1	2412	2397.5	-41.90	-10
TnomVnom	11b	1	2472	2487.0	-33.37	-10
TminVmax	11b	1	2472	2487.0	-31.23	-10
TminVmin	11b	1	2472	2487.0	-31.24	-10
TmaxVmax	11b	1	2472	2487.0	-38.15	-10
TmaxVmin	11b	1	2472	2487.0	-38.14	-10
Low Band				Up Band		
 B-1TX-20 Low Band RBW: 1MHz TminVmax VBW: 3MHz Max. OBE: 2.3975GHz ST:100ms Max. OBE: -34.84dBm				 B-1TX-20 Up Band RBW: 1MHz TminVmax VBW: 3MHz Max. OBE: 2.487GHz ST:100ms Max. OBE: -31.23dBm		
Result				Complied		

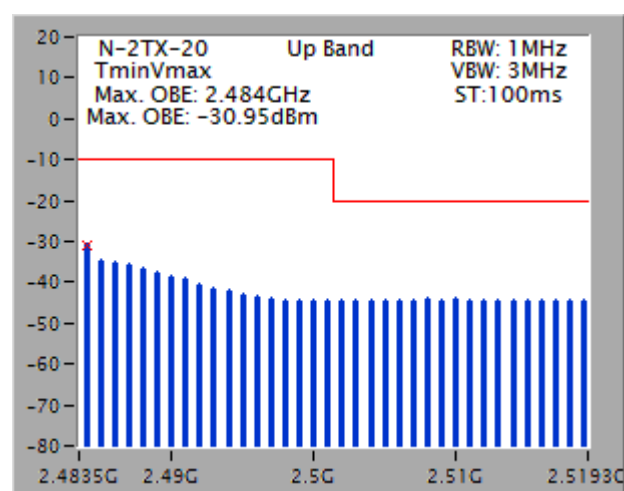
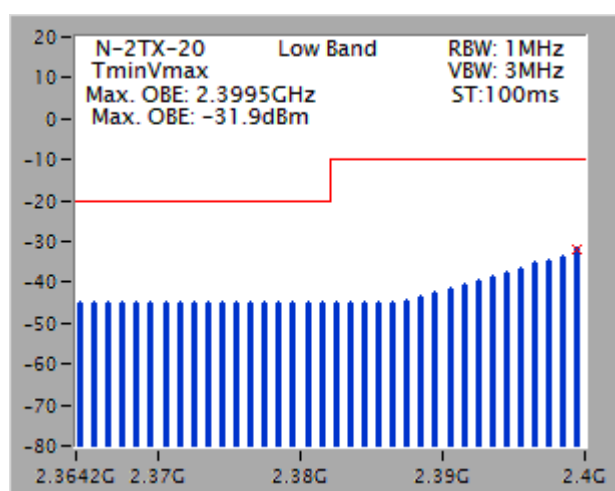
Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _{TX}	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	11g	1	2412	2399.5	-32.69	-10
TminVmax	11g	1	2412	2399.5	-29.92	-10
TminVmin	11g	1	2412	2399.5	-29.96	-10
TmaxVmax	11g	1	2412	2399.5	-36.25	-10
TmaxVmin	11g	1	2412	2399.5	-36.28	-10
TnomVnom	11g	1	2472	2484.0	-30.29	-10
TminVmax	11g	1	2472	2484.0	-27.38	-10
TminVmin	11g	1	2472	2484.0	-27.38	-10
TmaxVmax	11g	1	2472	2484.0	-35.34	-10
TmaxVmin	11g	1	2472	2484.0	-35.42	-10

Low Band
Up Band

Result
Complied

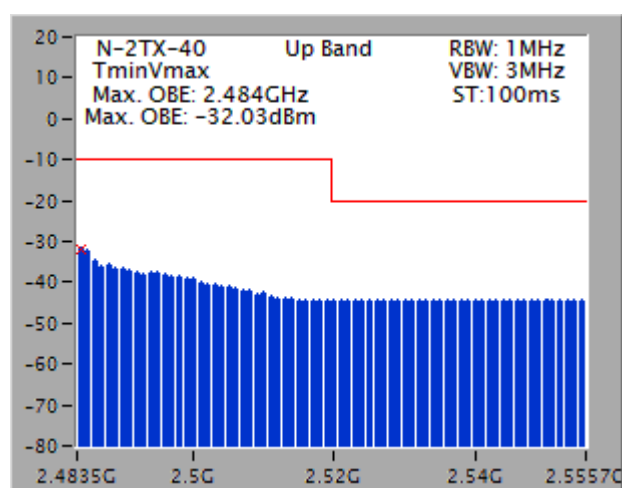
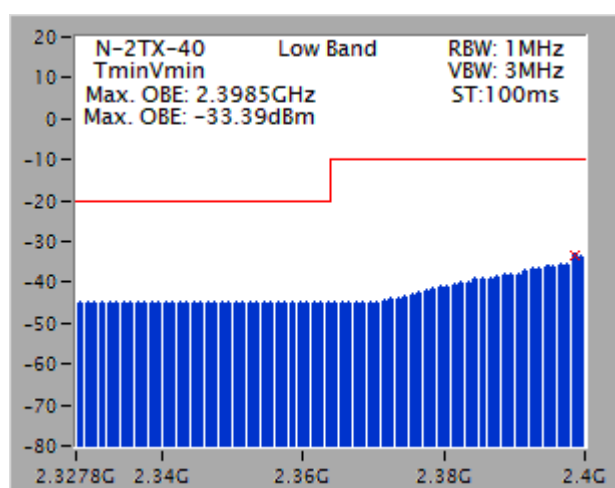
Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _{TX}	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	HT20	2	2412	2399.5	-33.92	-10
TminVmax	HT20	2	2412	2399.5	-31.90	-10
TminVmin	HT20	2	2412	2399.5	-31.90	-10
TmaxVmax	HT20	2	2412	2399.5	-37.14	-10
TmaxVmin	HT20	2	2412	2399.5	-37.26	-10
TnomVnom	HT20	2	2472	2484.0	-32.72	-10
TminVmax	HT20	2	2472	2484.0	-30.95	-10
TminVmin	HT20	2	2472	2484.0	-30.95	-10
TmaxVmax	HT20	2	2472	2484.0	-35.83	-10
TmaxVmin	HT20	2	2472	2484.0	-35.89	-10

Low Band
Up Band

Result
Complied

Transmitter Unwanted Emissions in the Out-of-band Domain Result
Test Date: Sep. 22, 2014
OOB Emissions (dBm/MHz)

Condition	Modulation Mode	N _{TX}	Freq. (MHz)	OOB Freq. (MHz)	OOB Emissions	Limit
TnomVnom	HT40	2	2422	2398.5	-35.52	-10
TminVmax	HT40	2	2422	2398.5	-33.42	-10
TminVmin	HT40	2	2422	2398.5	-33.39	-10
TmaxVmax	HT40	2	2422	2398.5	-38.21	-10
TmaxVmin	HT40	2	2422	2398.5	-38.26	-10
TnomVnom	HT40	2	2462	2484.0	-34.08	-10
TminVmax	HT40	2	2462	2484.0	-32.03	-10
TminVmin	HT40	2	2462	2484.0	-32.03	-10
TmaxVmax	HT40	2	2462	2484.0	-36.84	-10
TmaxVmin	HT40	2	2462	2484.0	-36.90	-10

Low Band
Up Band

Result
Complied

3.5 Transmitter Unwanted Emissions in the Spurious Domain

3.5.1 Transmitter Unwanted Emissions in the Spurious Domain Limit

Frequency Range	Maximum Power e.r.p. (≤ 1 GHz) ; e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

Note 1: spurious domain $\leq (2400 \text{ MHz} - 2N)$ and spurious domain $\geq (2483.5 \text{ MHz} + 2N)$;
 $N = \text{MAX}(1, \text{Occupied Channel Bandwidth}) \text{ MHz}$

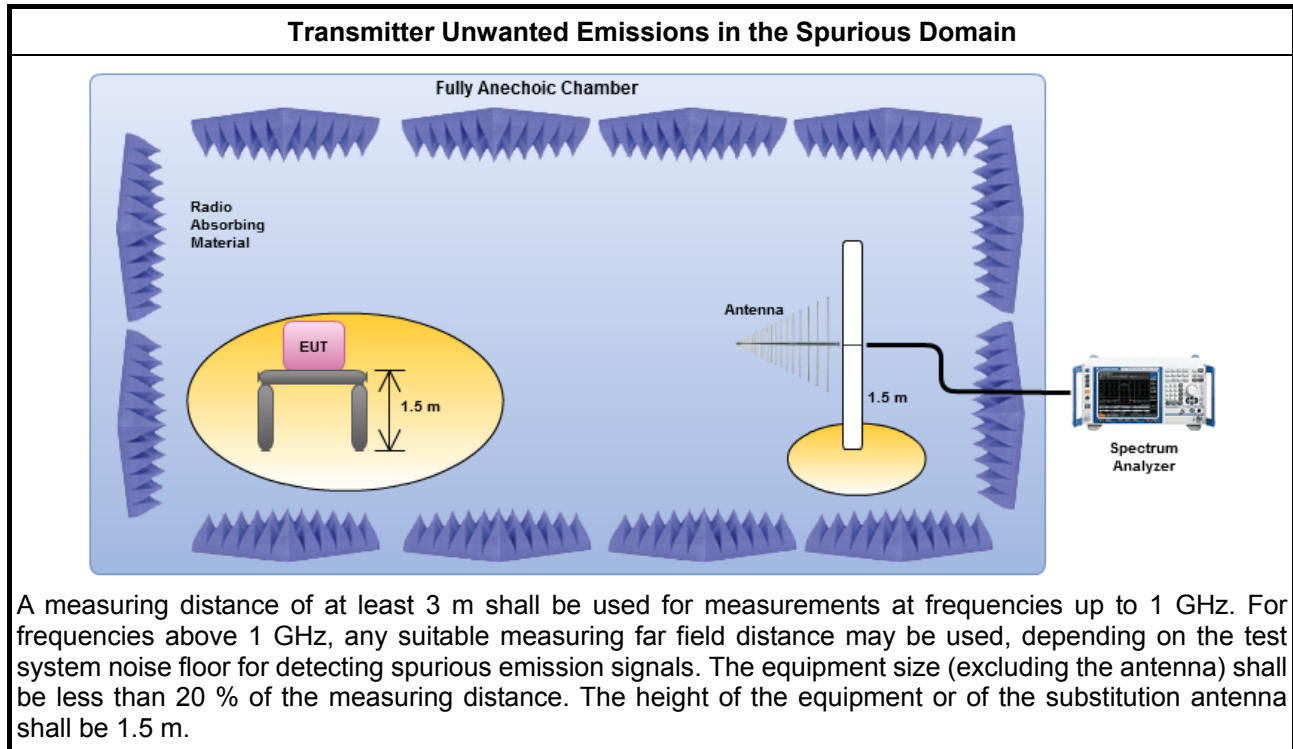
3.5.2 Measuring Instruments

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

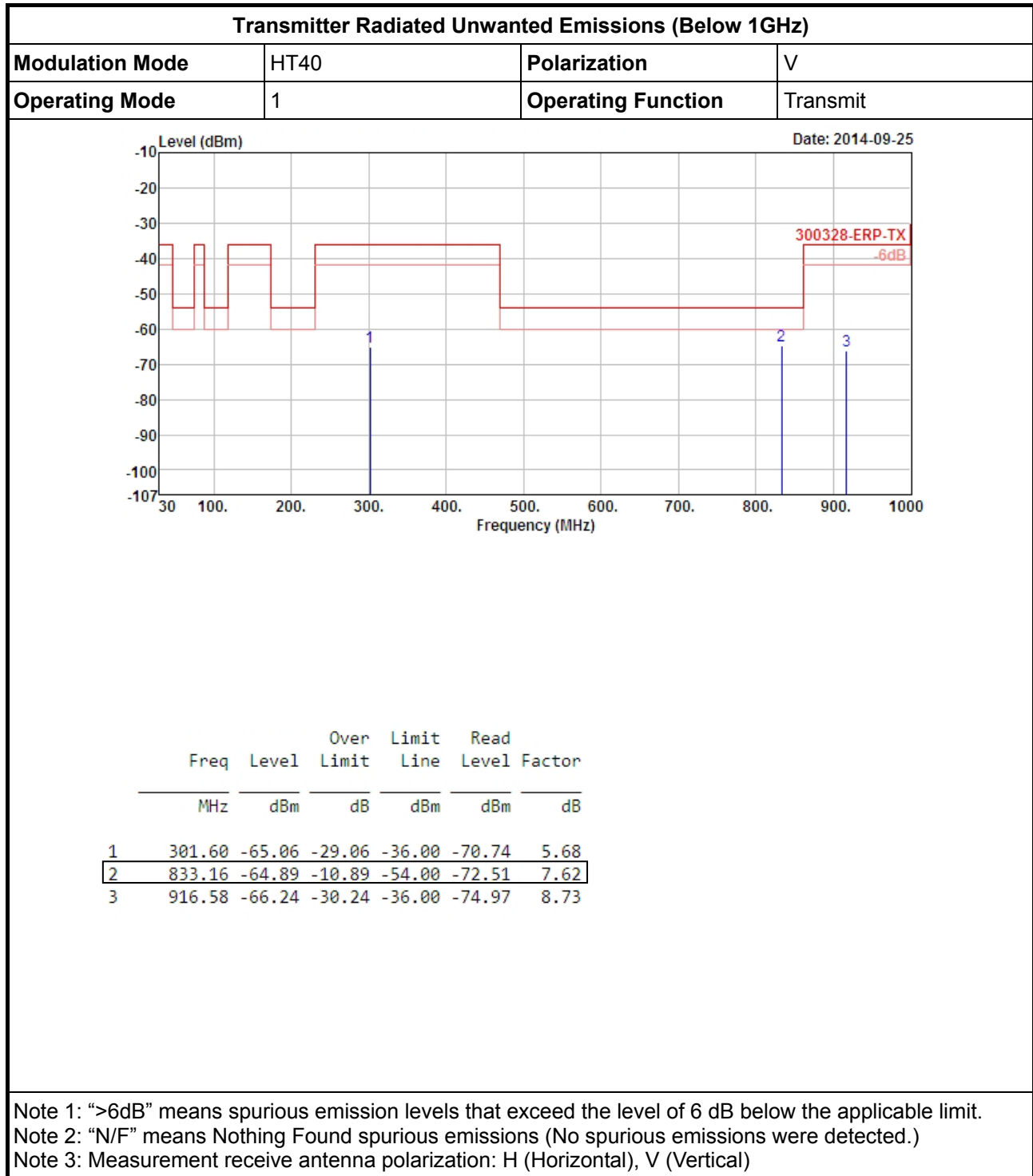
3.5.3 Test Procedures

Test Method	
☐	Refer as EN 300 328, clause 5.3.10.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
☐	The EUT supports single transmit chain and measurements performed on this transmit chain.
☐	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: The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the transmitter spurious emissions limit.
☐	Option 2: the results for each of the transmit chains shall be individually compared with the transmitter spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(A_{ch})$. (Number of active transmit chains).
☐	Equipment with single transmit chain. All measurement had be performed on this transmit chain.
☒	Refer as EN 300 328, clause 5.3.10.2.2 for radiated measurement.

3.5.4 Test Setup

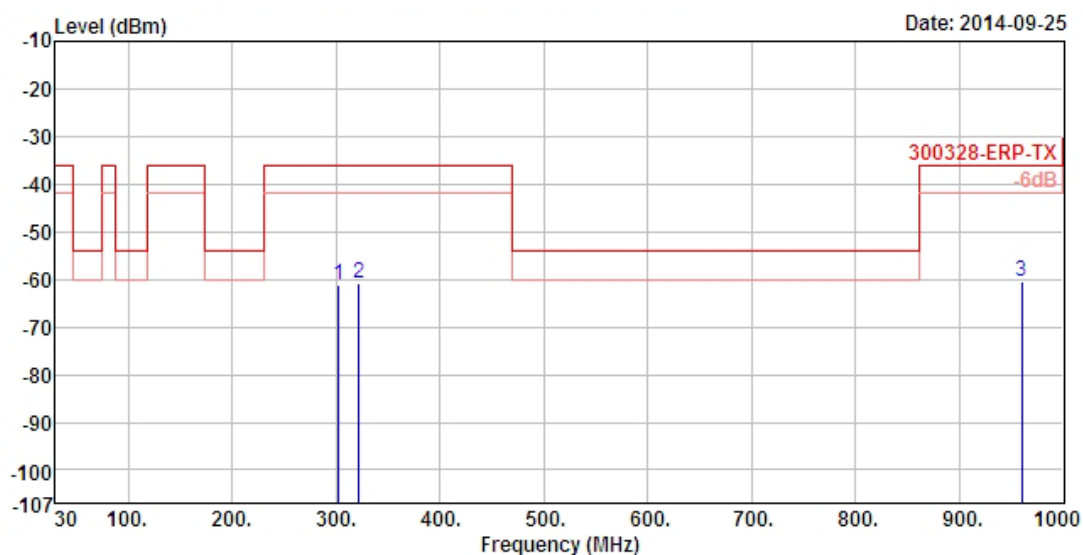


3.5.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)



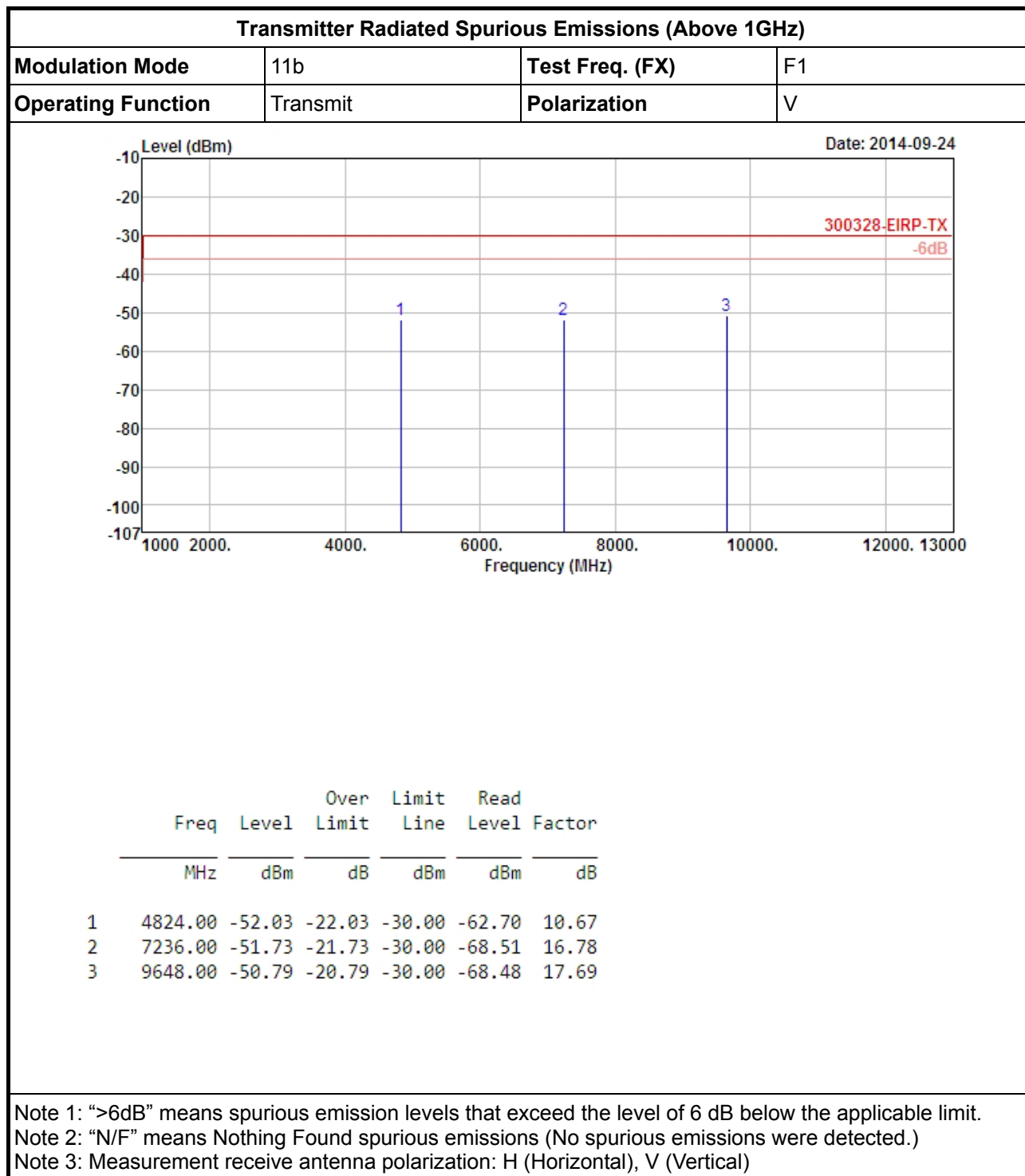
Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation Mode	HT40	Polarization	H
Operating Mode	1	Operating Function	Transmit



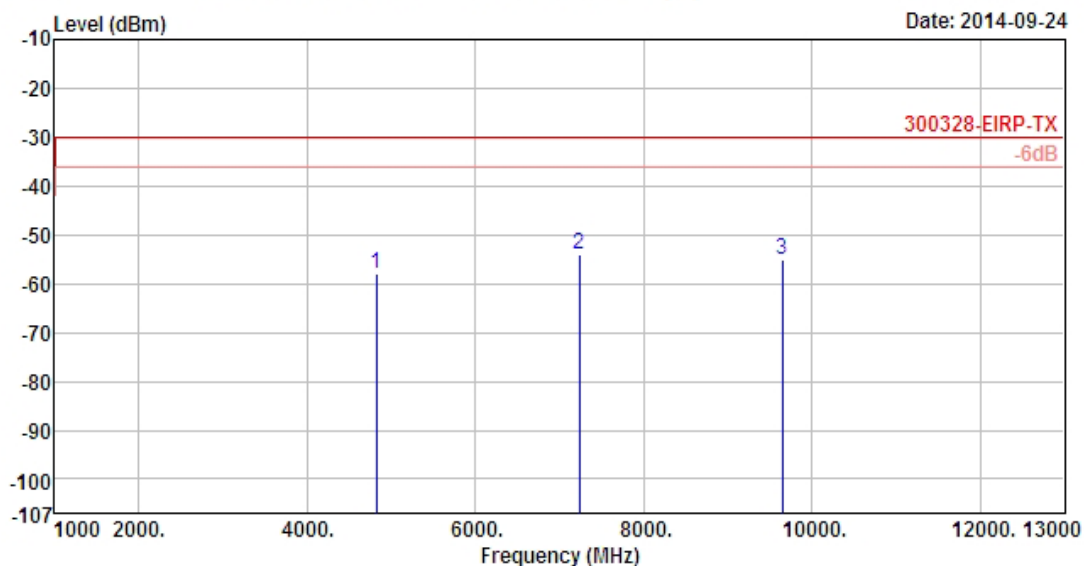
	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	302.57	-61.24	-25.24	-36.00	-60.13	-1.11
2	321.97	-60.68	-24.68	-36.00	-60.32	-0.36
3	960.23	-60.59	-24.59	-36.00	-70.00	9.41

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b


Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	H

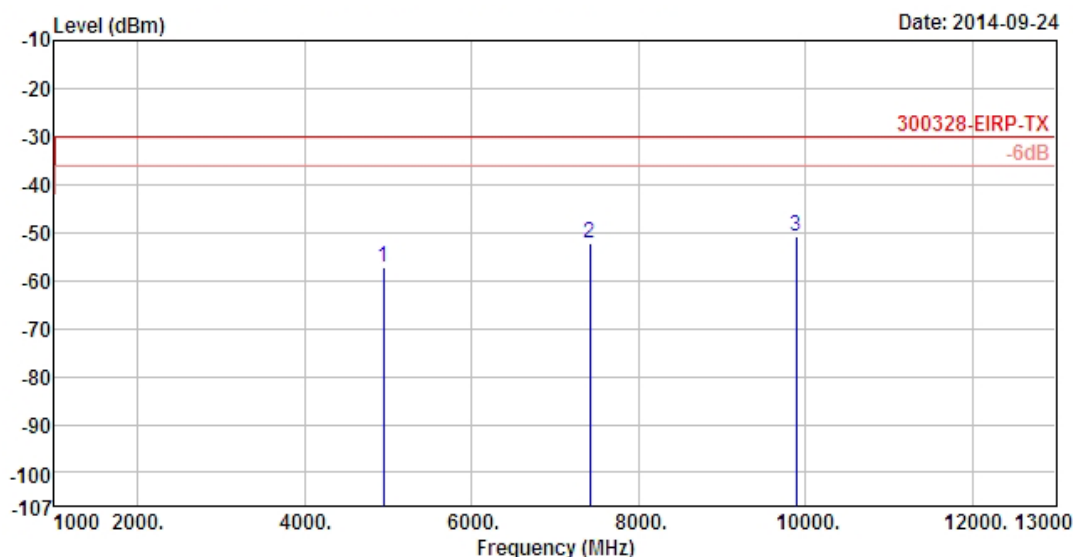


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4824.00	-58.04	-28.04	-30.00	-67.92	9.88
2	7236.00	-54.12	-24.12	-30.00	-68.54	14.42
3	9648.00	-55.06	-25.06	-30.00	-68.76	13.70

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	V

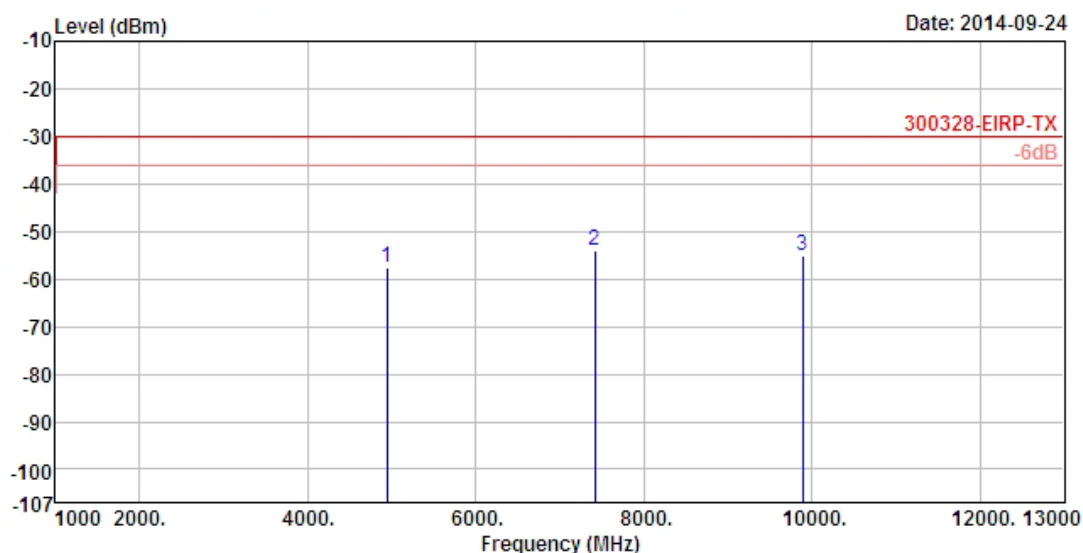


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.00	-57.32	-27.32	-30.00	-68.39	11.07
2	7416.00	-52.22	-22.22	-30.00	-69.55	17.33
3	9888.00	-50.96	-20.96	-30.00	-68.78	17.82

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11b	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	H



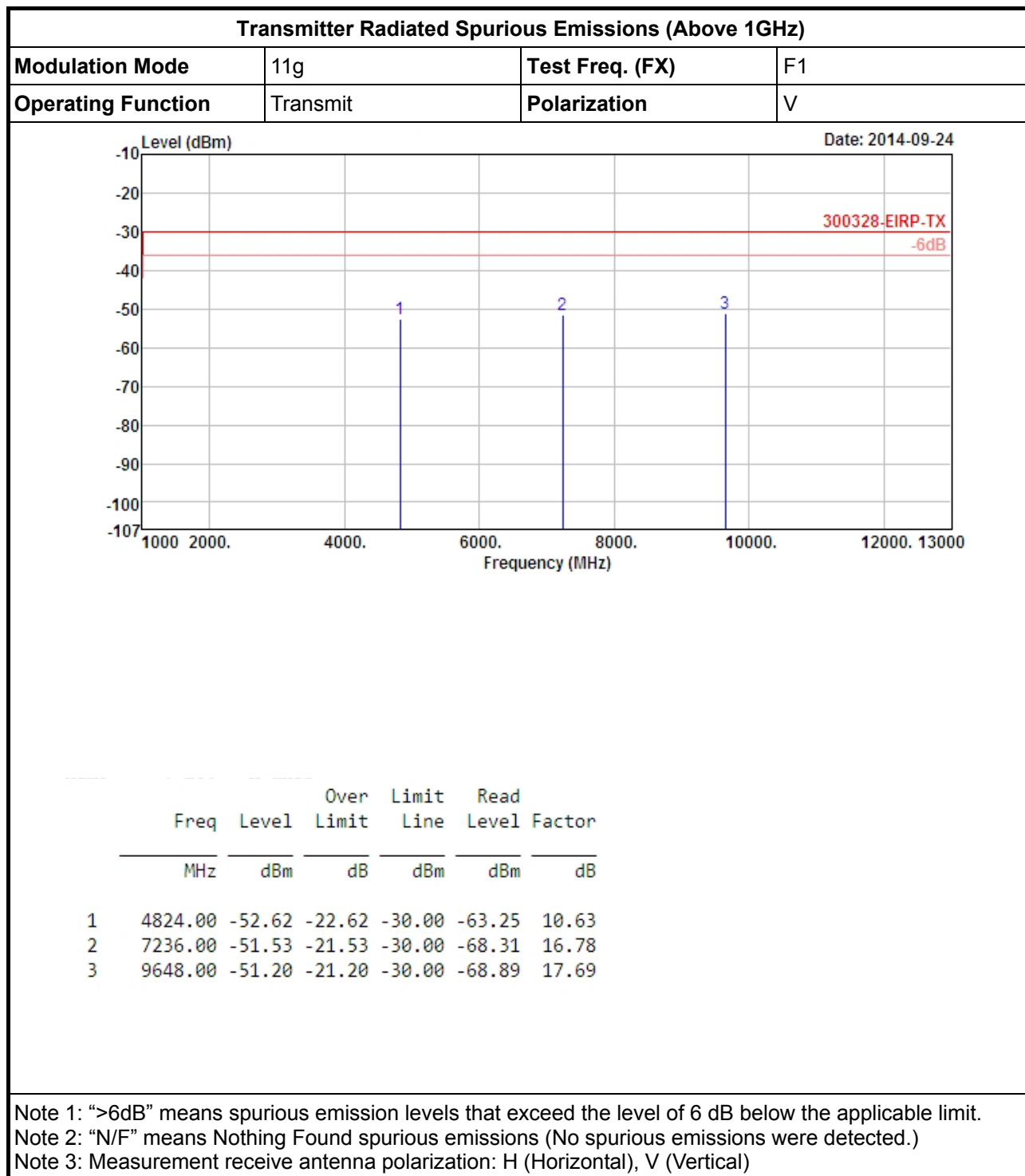
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.00	-57.69	-27.69	-30.00	-68.05	10.36
2	7416.00	-53.88	-23.88	-30.00	-68.64	14.76
3	9888.00	-55.18	-25.18	-30.00	-68.86	13.68

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

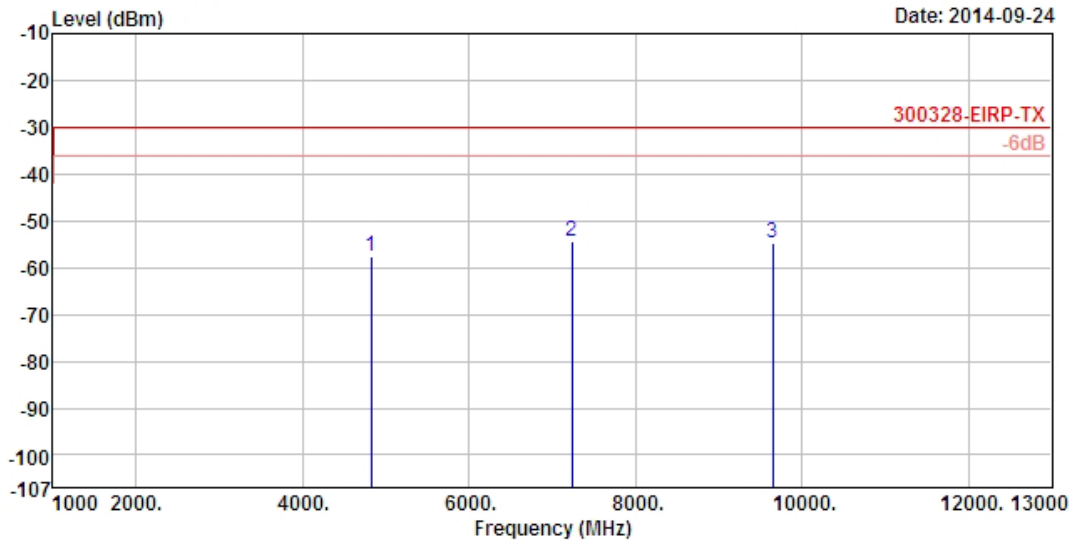
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g



Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	4824.00	-57.54	-27.54	-30.00	-67.42	9.88
2	7236.00	-54.23	-24.23	-30.00	-68.65	14.42
3	9648.00	-54.79	-24.79	-30.00	-68.49	13.70

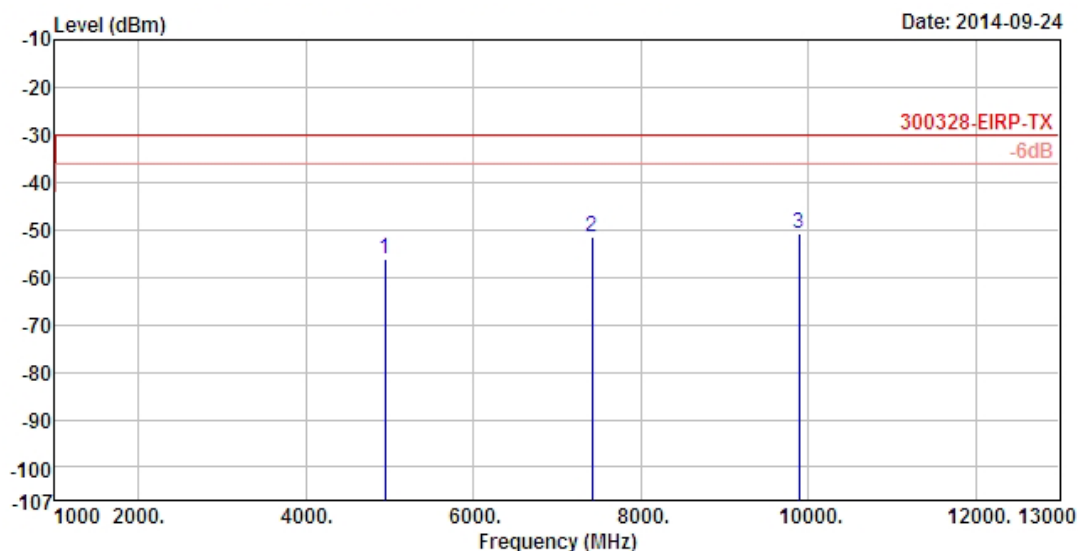
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	V

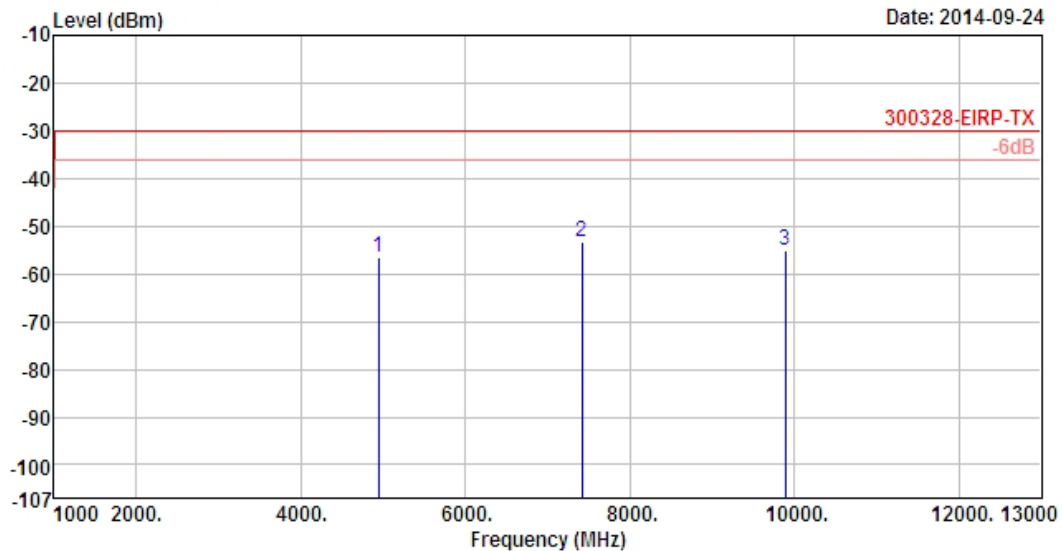


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.00	-56.26	-26.26	-30.00	-67.33	11.07
2	7416.00	-51.53	-21.53	-30.00	-68.86	17.33
3	9888.00	-50.76	-20.76	-30.00	-68.58	17.82

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	11g	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	H

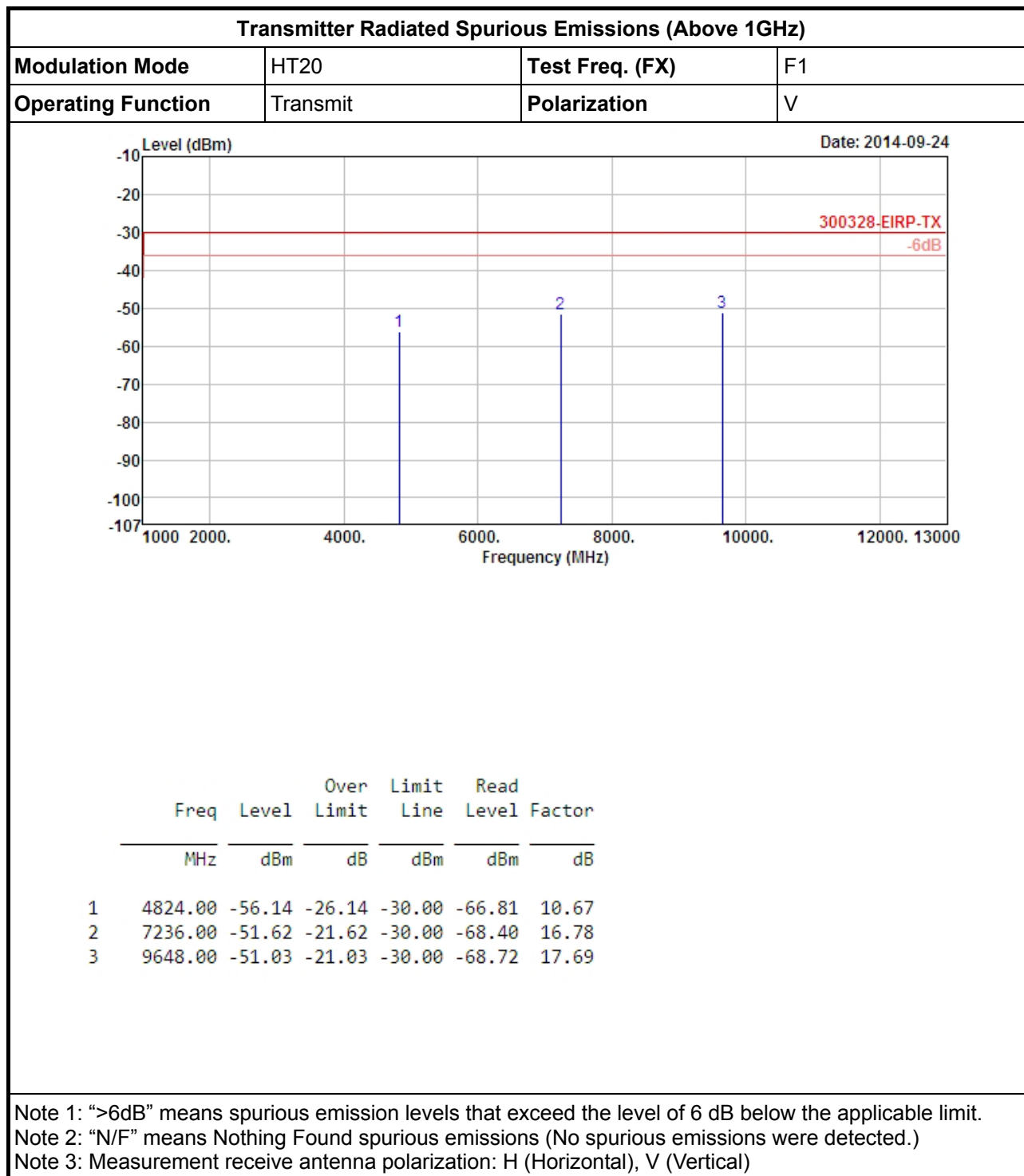


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.00	-56.53	-26.53	-30.00	-66.87	10.34
2	7416.00	-53.35	-23.35	-30.00	-68.11	14.76
3	9888.00	-55.01	-25.01	-30.00	-68.69	13.68

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

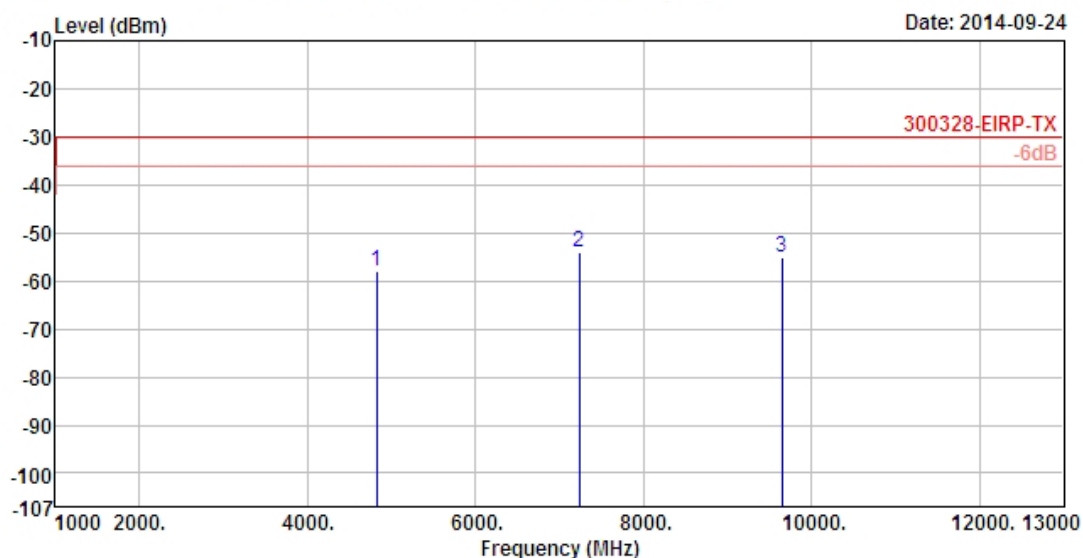
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20


Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	H



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4824.00	-57.80	-27.80	-30.00	-67.68	9.88
2	7236.00	-54.02	-24.02	-30.00	-68.44	14.42
3	9648.00	-55.28	-25.28	-30.00	-68.98	13.70

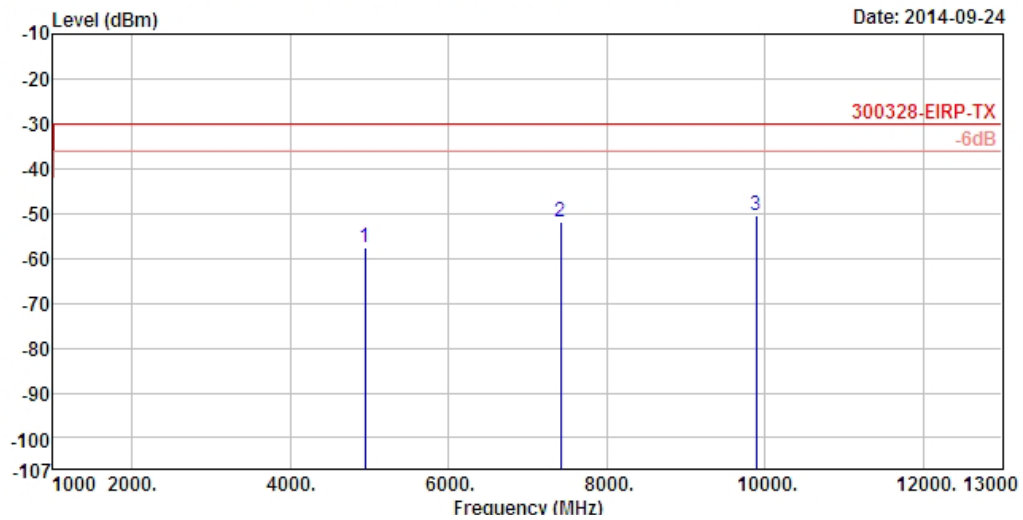
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	V



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	4944.00	-57.51	-27.51	-30.00	-68.58	11.07
2	7416.00	-51.83	-21.83	-30.00	-69.16	17.33
3	9888.00	-50.55	-20.55	-30.00	-68.37	17.82

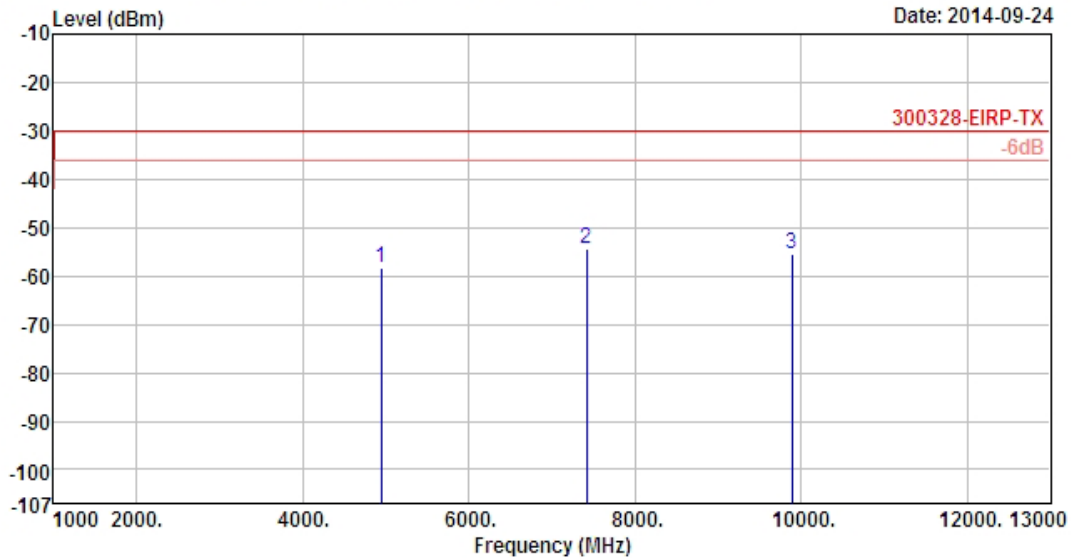
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT20	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	H

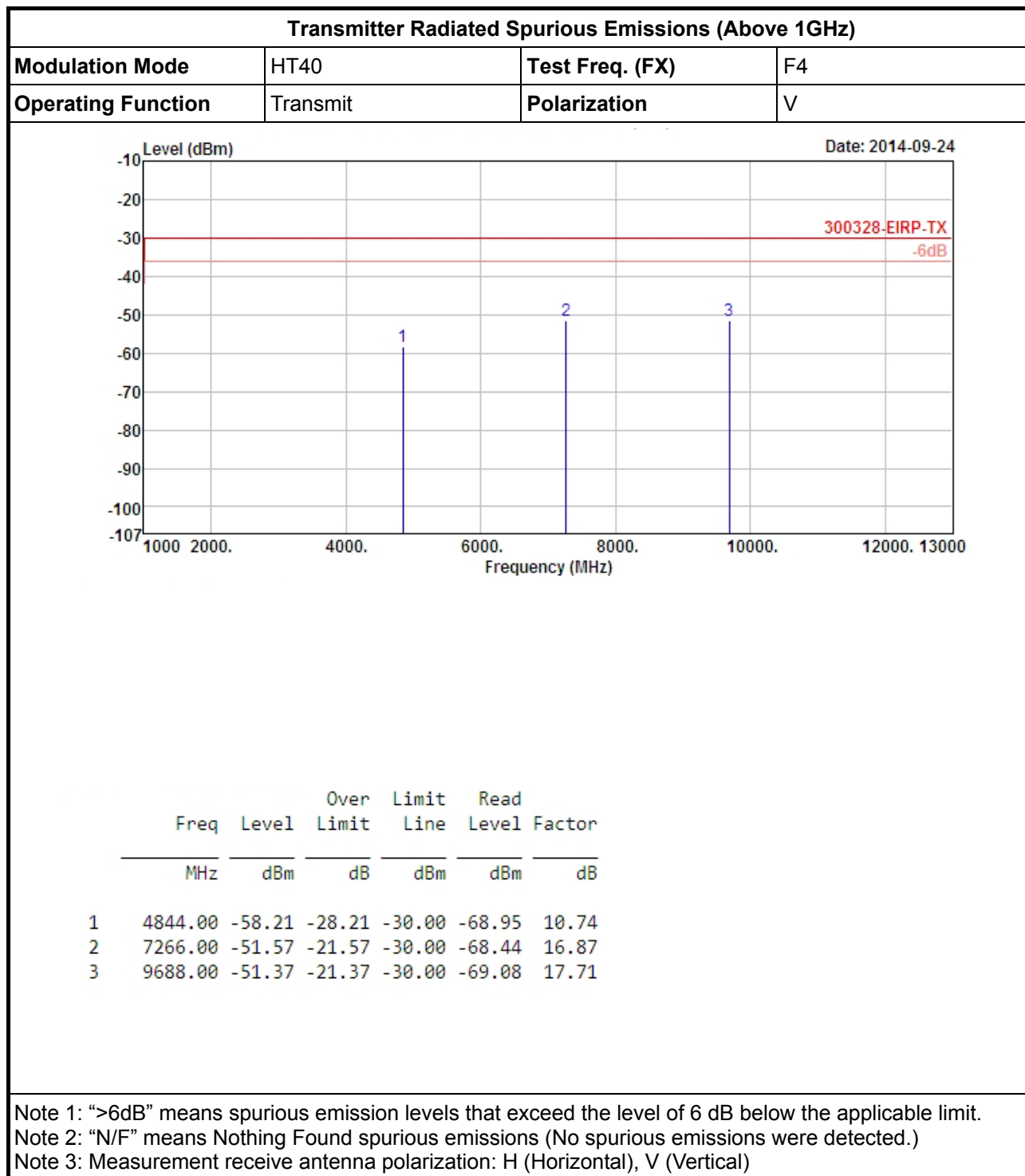


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4944.00	-58.15	-28.15	-30.00	-68.51	10.36
2	7416.00	-54.25	-24.25	-30.00	-69.01	14.76
3	9888.00	-55.28	-25.28	-30.00	-68.96	13.68

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

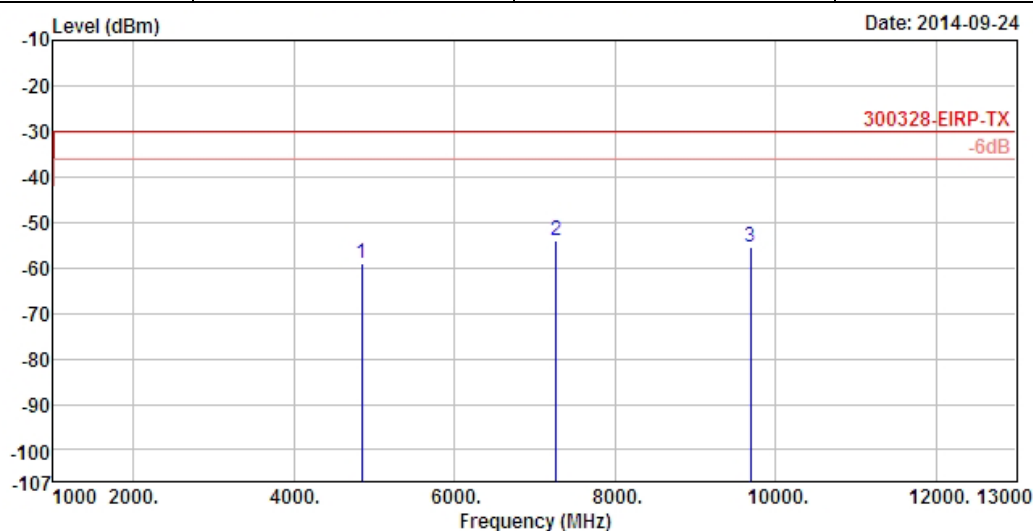
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

3.5.9 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40


Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (FX)	F4
Operating Function	Transmit	Polarization	H



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4844.00	-58.86	-28.86	-30.00	-68.82	9.96
2	7266.00	-54.00	-24.00	-30.00	-68.47	14.47
3	9688.00	-55.53	-25.53	-30.00	-69.23	13.70

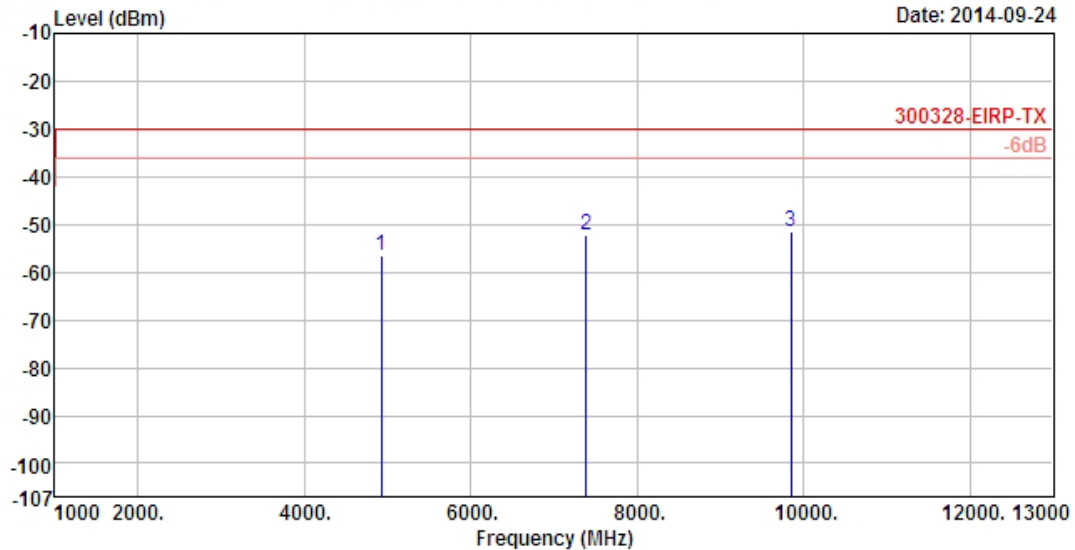
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (FX)	F6
Operating Function	Transmit	Polarization	V



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	4924.00	-56.54	-26.54	-30.00	-67.55	11.01
2	7386.00	-52.17	-22.17	-30.00	-69.41	17.24
3	9848.00	-51.35	-21.35	-30.00	-69.15	17.80

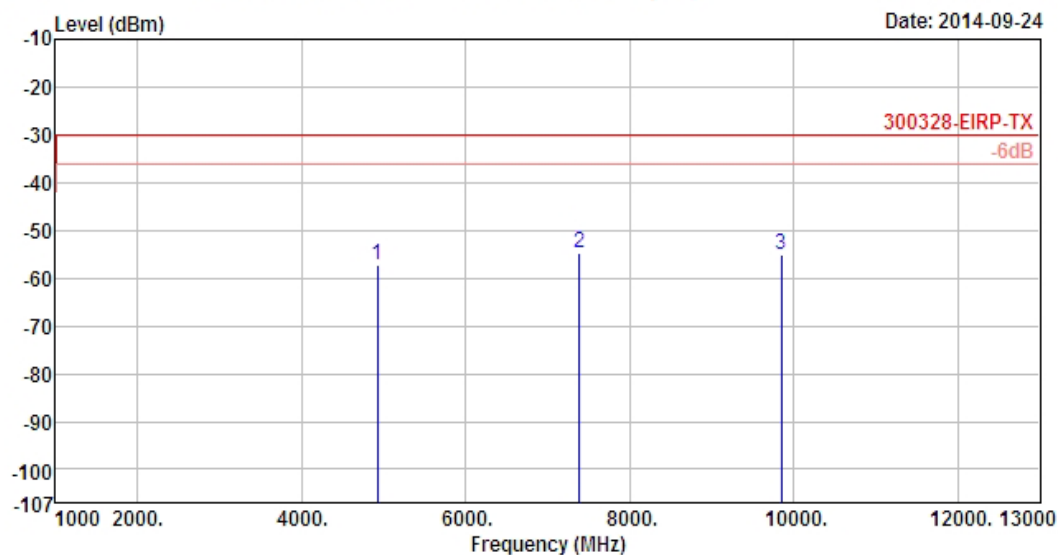
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Transmitter Radiated Spurious Emissions (Above 1GHz)

Modulation Mode	HT40	Test Freq. (FX)	F6
Operating Function	Transmit	Polarization	H



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	4924.00	-57.23	-27.23	-30.00	-67.51	10.28
2	7386.00	-54.74	-24.74	-30.00	-69.45	14.71
3	9848.00	-54.97	-24.97	-30.00	-68.65	13.68

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

4 Receiver Test Result

4.1 Receiver Spurious Emissions

4.1.1 Receiver Spurious Emissions Limit

Frequency Range	Maximum Power e.r.p. (≤ 1 GHz) ; e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

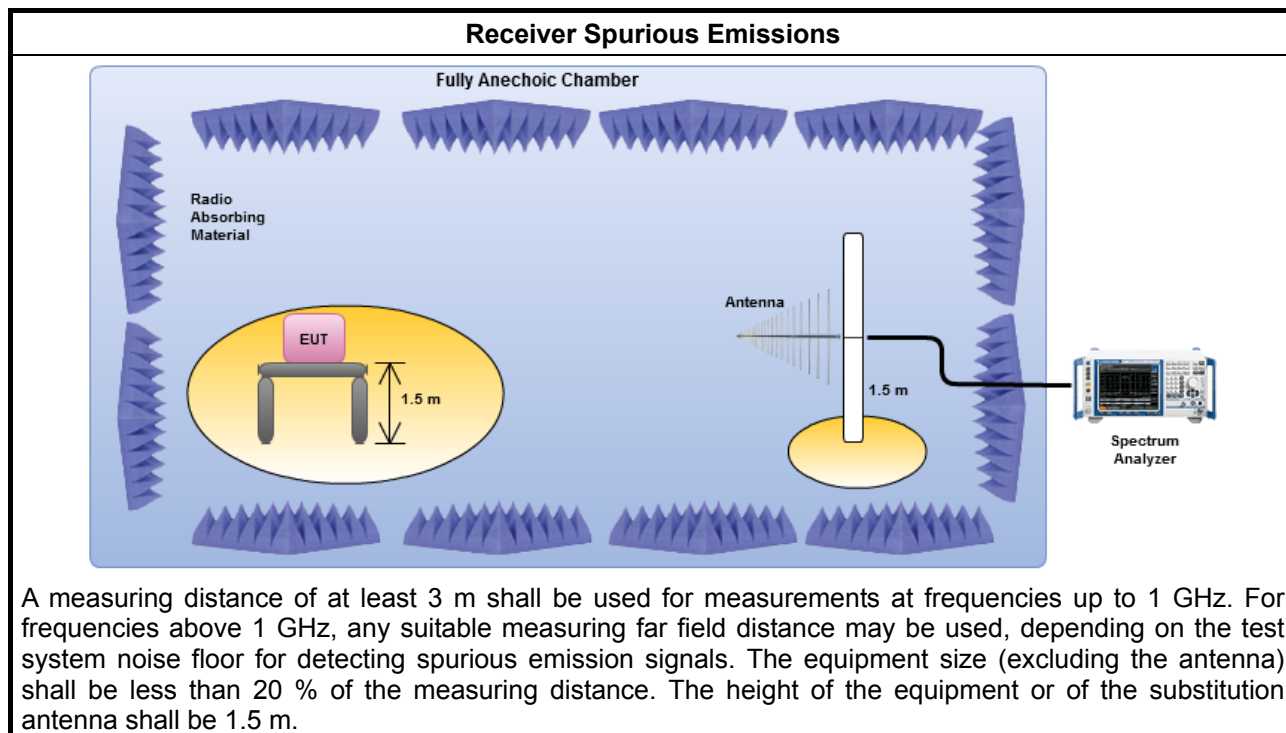
4.1.2 Measuring Instruments

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

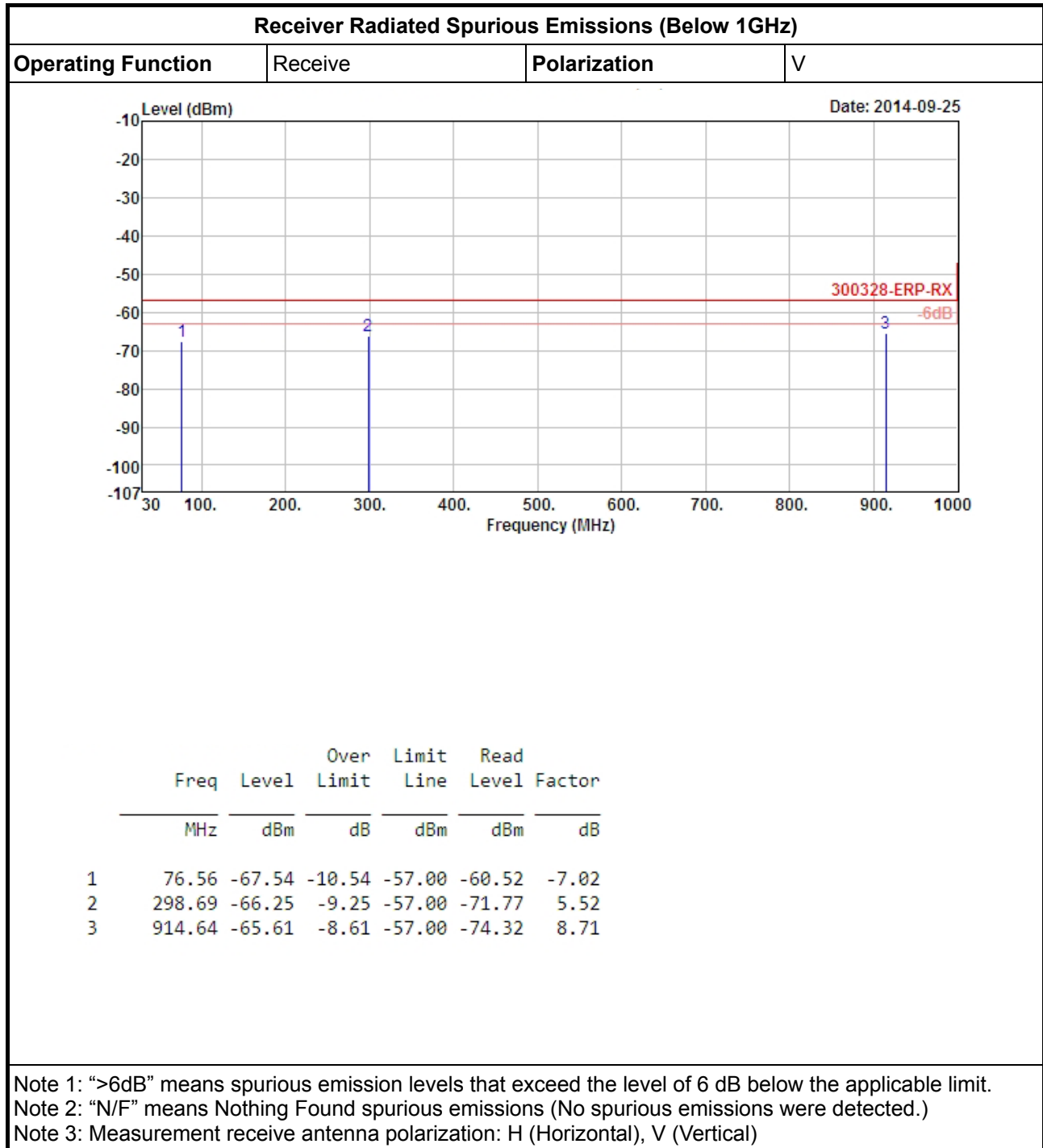
4.1.3 Test Procedures

Test Method	
☐	Refer as EN 300 328, clause 5.3.11.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
☐	The EUT supports single receive chain and measurements performed on this receive chain.
☐	The EUT supports diversity receiving and the results on receive chain port 1 is the worst case.
☐	The EUT supports multiple receive chains using options given below:
☐	Option 1: The trace data for each receive chain has to be individually recorded and each receive chain trace data shall be added and compared with the receiver spurious emissions limit.
☐	Option 2: the results for each of the receive chains shall be individually compared with the receiver spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(A_{ch})$. (Number of active receive chains).
☒	Refer as EN 300 328, clause 5.3.11.2.2 for radiated measurement.

4.1.4 Test Setup



4.1.5 Receiver Radiated Spurious Emissions (Below 1GHz)

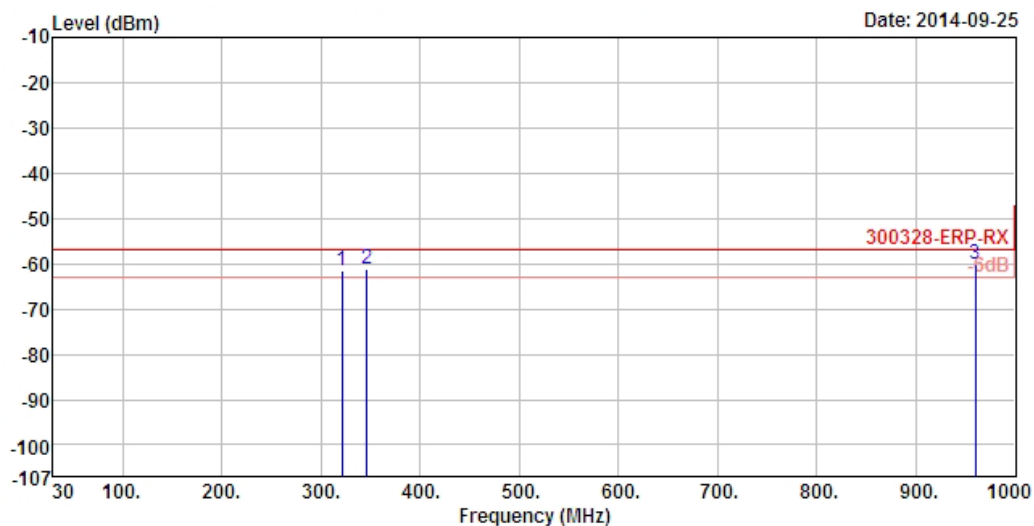


Receiver Radiated Spurious Emissions (Below 1GHz)
Operating Function

Receive

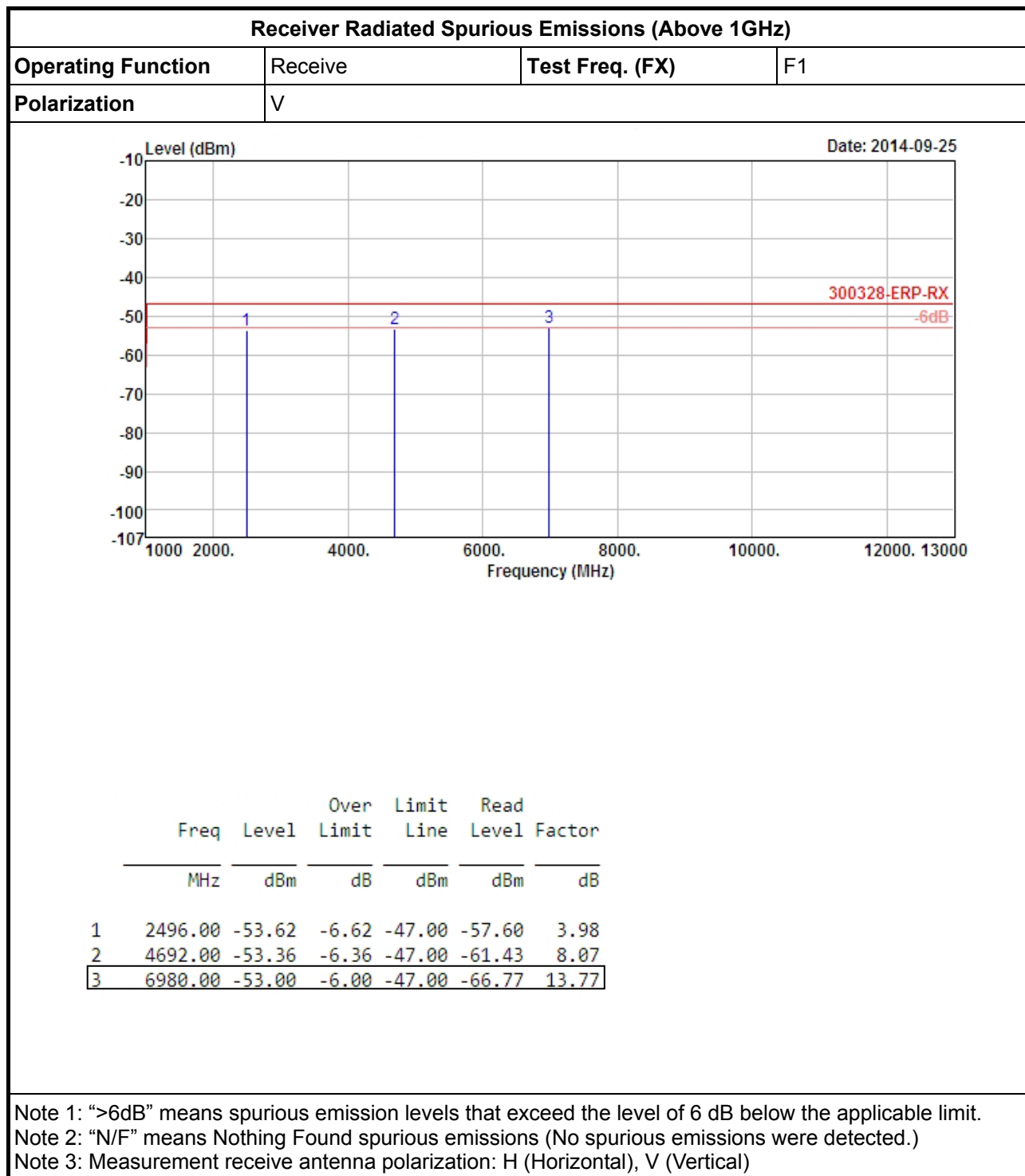
Polarization

H



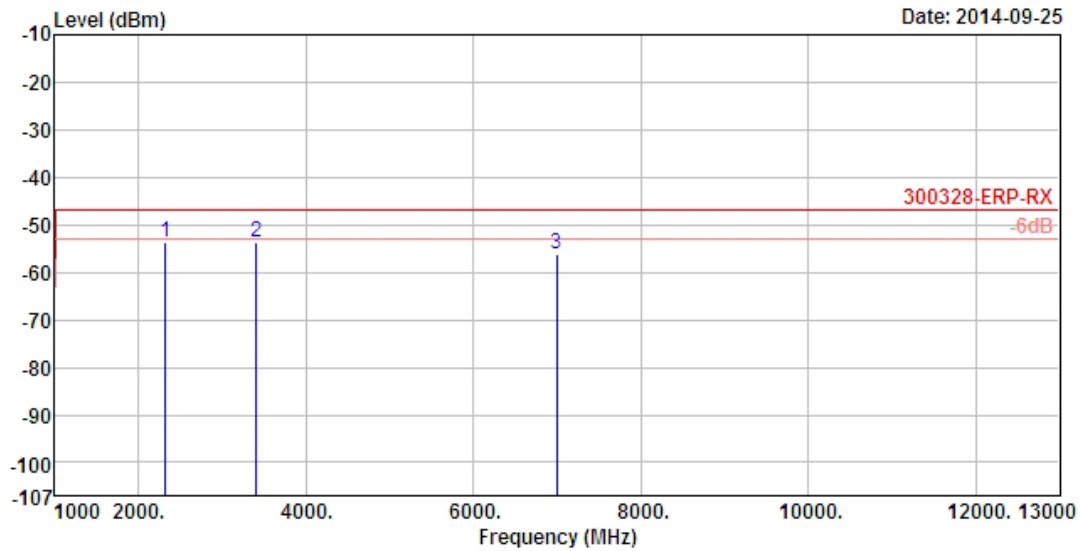
	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	321.00	-61.57	-4.57	-57.00	-61.18	-0.39
2	346.22	-61.22	-4.22	-57.00	-61.73	0.51
3	960.23	-60.25	-3.25	-57.00	-69.66	9.41

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

4.1.6 Receiver Radiated Spurious Emissions (Above 1GHz)


Receiver Radiated Spurious Emissions (Above 1GHz)

Operating Function	Receive	Test Freq. (FX)	F1
Polarization	H		



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	2322.00	-53.84	-6.84	-47.00	-57.83	3.99
2	3408.00	-53.61	-6.61	-47.00	-57.99	4.38
3	6998.00	-56.15	-9.15	-47.00	-67.95	11.80

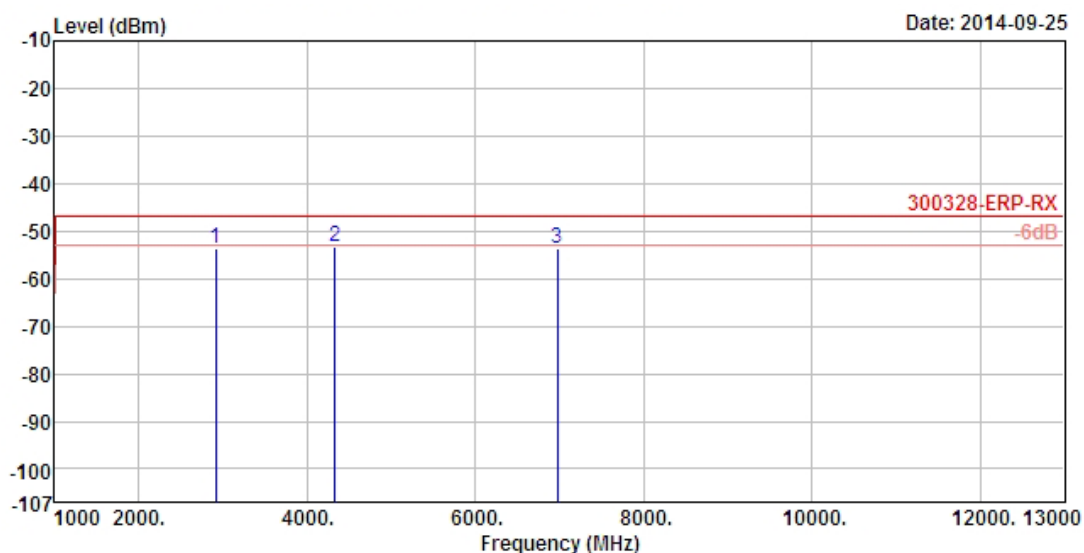
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

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

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

Receiver Radiated Spurious Emissions (Above 1GHz)

Operating Function	Receive	Test Freq. (FX)	F3
Polarization	V		

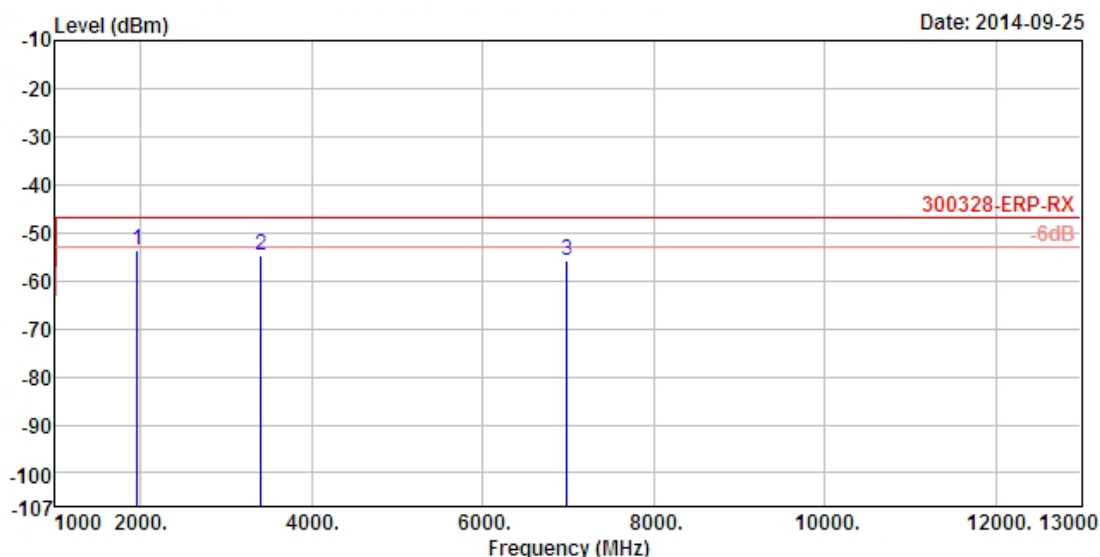


	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	2910.00	-53.55	-6.55	-47.00	-57.37	3.82
2	4330.00	-53.26	-6.26	-47.00	-60.22	6.96
3	6974.00	-53.67	-6.67	-47.00	-67.40	13.73

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

Receiver Radiated Spurious Emissions (Above 1GHz)

Operating Function	Receive	Test Freq. (FX)	F3
Polarization	H		



	Freq	Level	Over	Limit	Read	
	MHz	dBm	Limit	Line	Level	Factor
			dB	dBm	dBm	dB
1	1954.00	-53.67	-6.67	-47.00	-57.54	3.87
2	3408.00	-54.79	-7.79	-47.00	-59.17	4.38
3	6988.00	-55.68	-8.68	-47.00	-67.43	11.75

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 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)

5 Adaptivity Test Result

5.1 Adaptivity and Receiver Blocking

5.1.1 Adaptivity and Receiver Blocking Limit

Adaptivity and Receiver Blocking Limit	
Type of Equipment Using Wide Band Modulations Other than FHSS:	
☒	Only for adaptive systems and RF Output Power > 10 dBm
☐	Non-LBT based Detect and Avoid: ♦ minimum remain unavailable = 1sec; ♦ minimum Idle Period time = 100us; ♦ maximum Channel Occupancy Time (COT) = 40ms ♦ i.e. COT [40ms] + Idle Period [2ms - 5% of COT]; N x [COT+Idle]; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☐	LBT based Detect and Avoid (Frame Based Equipment): ♦ minimum Clear Channel Assessment (CCA) time = 20 us; ♦ CCA declared by the supplier ♦ COT = 1 ms to 10 ms ♦ Idle Period = 5% of COT ♦ e.g. CCA [120us] + COT [10ms] + Idle Period [0.5ms - 5% of COT]; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☒	LBT based Detect and Avoid (Load Based Equipment with spectrum sharing mechanism IEEE Std.): ♦ LBT based spectrum sharing mechanism may implement IEEE Std. 802.11-2007 clauses 15, 17, 18 or 19, in IEEE Std. 802.11n-2009, clause 20 or in IEEE Std. 802.15.4-2006,
☐	LBT based Detect and Avoid (Load Based Equipment): ♦ minimum Clear Channel Assessment (CCA) time = 20 us; ♦ $COT \leq (13 / 32) \times q$ ms; $q=[4..32]$; 1.625ms – 13ms; ♦ R = number of clear idle slots are randomly [1..q]. Every time an Extended CCA is required and the R value stored in a counter. Extended CCA = R x CCA ♦ i.e. for channel occupied then R = 4 idle slots; COT [1.625ms; q=4]; idle slots [1] - Extended CCA [60us, R=3]; ♦ detection threshold level = -70 dBm/MHz + 20 - Pout e.i.r.p. (Pout in dBm);
☒	Short Control Signalling Transmissions: ♦ Short Control Signalling Transmissions shall have a maximum duty cycle of 10 % within an observation period of 50 ms.

Receiver Blocking Parameters				
Equipment Type	Wanted Signal Mean Power from Companion Device	Blocking Signal Frequency (MHz)	Blocking Signal Mean power (dBm)	Type of Interfering Signal
LBT	sufficient to maintain the link (see note 2)	2395 or 2488,5 (see note 1)	-30	CW
Non-LBT	-30 dBm			
Note 1: The highest blocking frequency shall be used for testing the lowest operating hopping frequency, while the lowest blocking frequency shall be used for testing the highest hopping frequency. Note 2: A typical value which can be used in most cases is -50 dBm/MHz.				

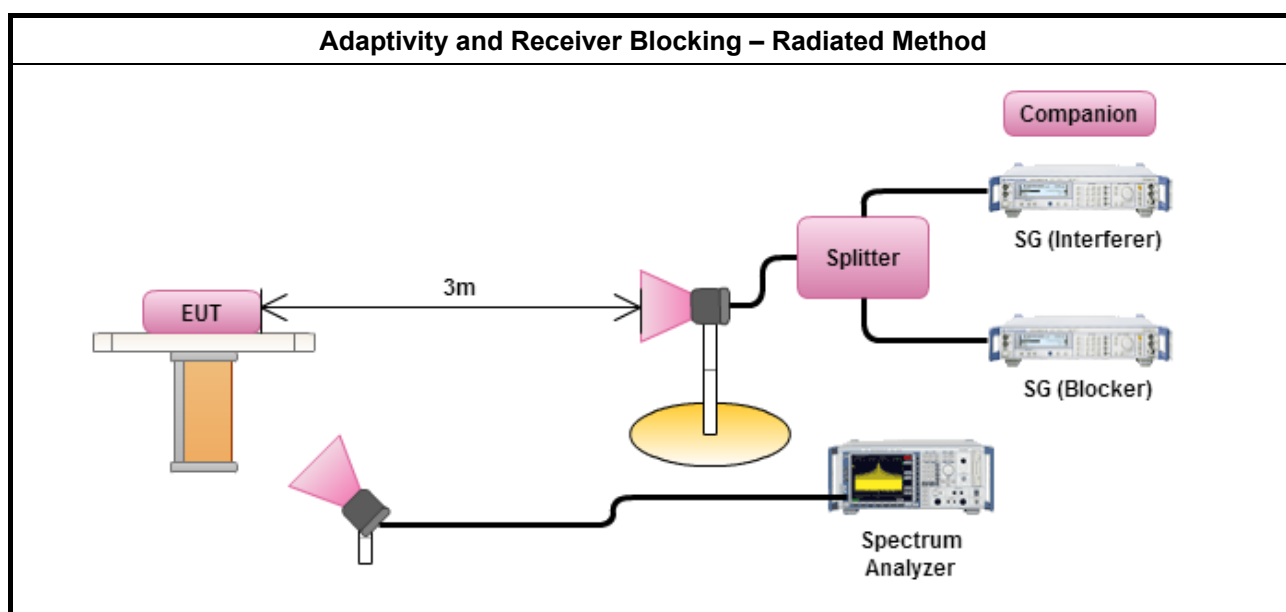
5.1.2 Measuring Instruments

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

5.1.3 Test Procedures

Test Method	
☒	Configure the EUT for normal transmissions with a sufficiently high payload to allow demonstration the adaptive mechanism.
☐	Refer as EN 300 328, clause 5.3.7.2.1 for conducted measurement.
☐	The EUT supports single receive chain and measurements performed on this receive chain.
☐	For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.
☒	Refer as EN 300 328, clause 5.3.7.2.2 for radiated measurement.

5.1.4 Test Setup

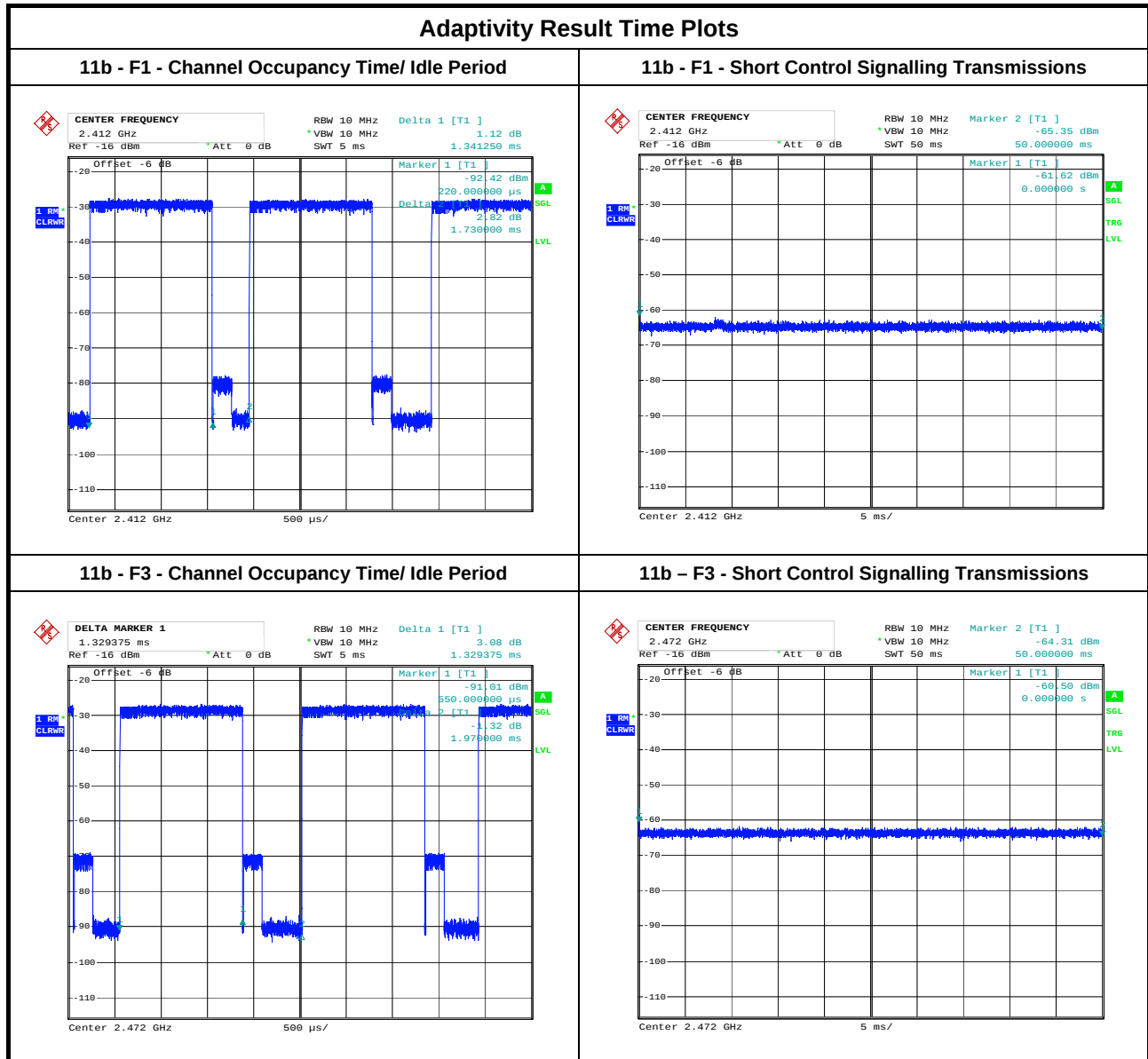


5.1.5 Test Result of Adaptivity and Receiver Blocking

Adaptivity Result					
Detection Threshold Level (dBm)		-70 (-70 dBm/MHz + 20 - Pout e.i.r.p.)			
Modulation Mode	Freq. (MHz)	Channel Occupancy Time (ms)	Idle Period Time (ms)	Short Control Signalling Transmissions (ms)	
				Bin	Time (ms)
11b	2412	1.341250	0.388750	0	0
11b	2472	1.329375	0.640625	0	0
11g	2412	0.356375	0.324875	0	0
11g	2472	0.378875	0.079125	0	0
HT20	2412	0.906000	0.060000	0	0
HT20	2472	0.738000	0.060000	0	0
HT40	2422	0.380000	0.064000	0	0
HT40	2462	0.512000	0.060000	0	0
Limit		N/A	N/A	5 ms in 50ms period	
Result		Complied			
Channel Occupancy Time and Idle Period Time follow as IEEE Std. 802.11-2007 and IEEE 802.11n-2009 specification without restrirction.					

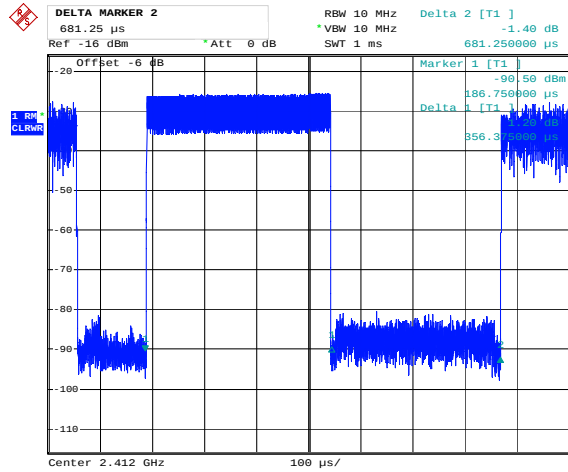
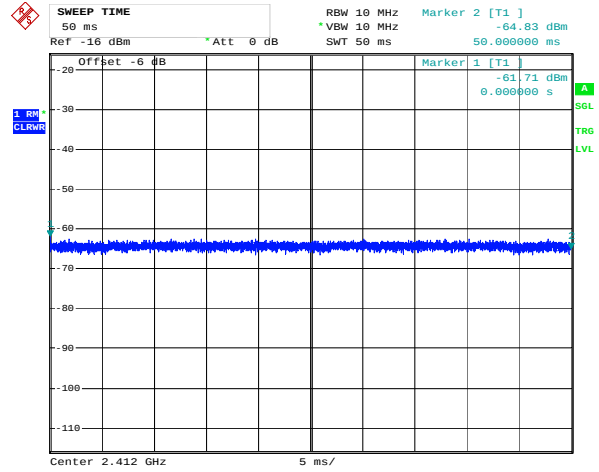
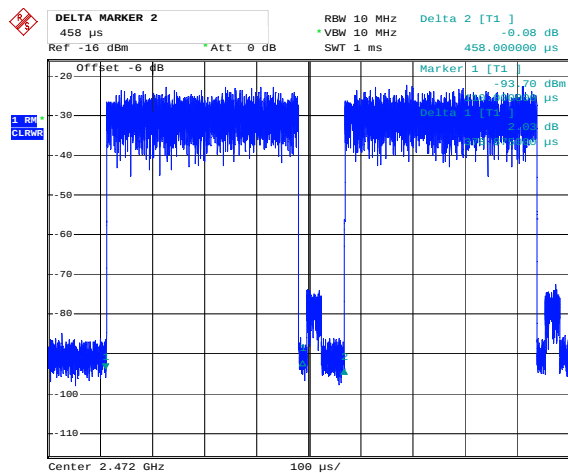
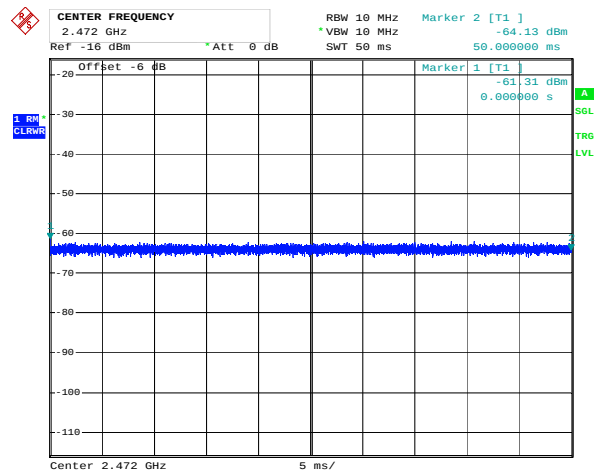
Receiver Blocking Result					
Detection Threshold Level (dBm)		-70 (-70 dBm/MHz + 20 - Pout e.i.r.p.)			
Modulation Mode	Freq. (MHz)	Channel Occupancy Time (ms)	Idle Period Time (ms)	Short Control Signalling Transmissions (ms)	
				Bin	Time (ms)
11b	2412	1.331250	0.318750	0	0
11b	2472	1.329375	0.470625	0	0
11g	2412	0.354125	0.325125	0	0
11g	2472	0.370875	0.101125	0	0
HT20	2412	0.900000	0.060000	0	0
HT20	2472	0.744000	0.060000	0	0
HT40	2422	0.456000	0.060000	0	0
HT40	2462	0.512000	0.060000	0	0
Limit		N/A	N/A	5 ms in 50ms period	
Result		Complied			
Channel Occupancy Time and Idle Period Time follow as IEEE Std. 802.11-2007 specification without restirction.					

5.1.6 Test Result of Adaptivity Time Plots



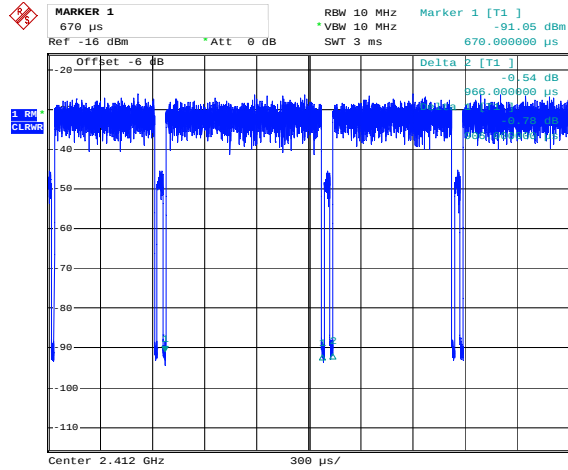
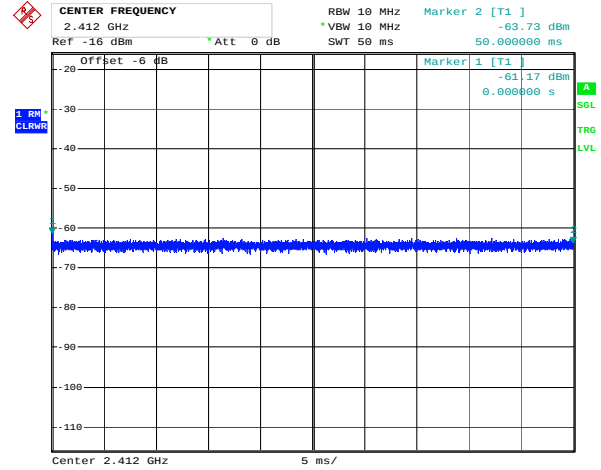
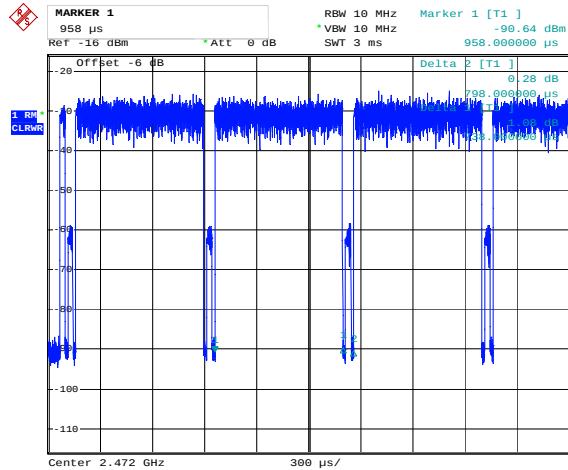
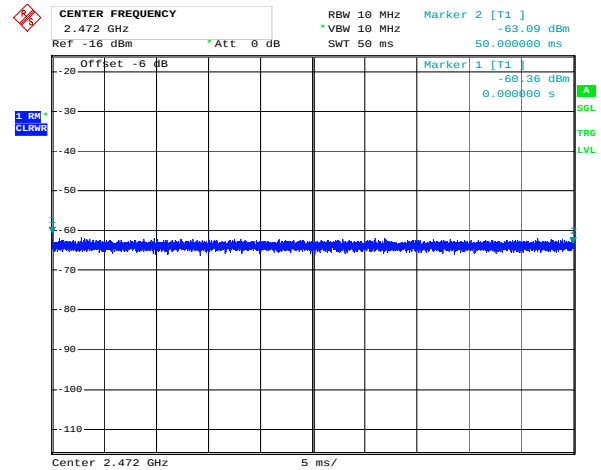
Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Adaptivity Result Time Plots

11g - F1 - Channel Occupancy Time/ Idle Period

11g - F1 - Short Control Signalling Transmissions

11g - F3 - Channel Occupancy Time/ Idle Period

11g - F3 - Short Control Signalling Transmissions


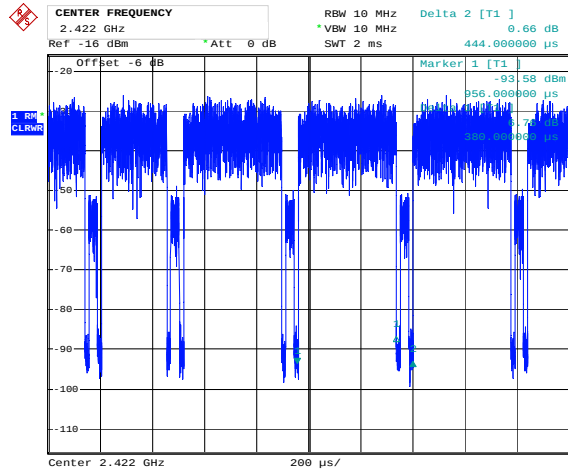
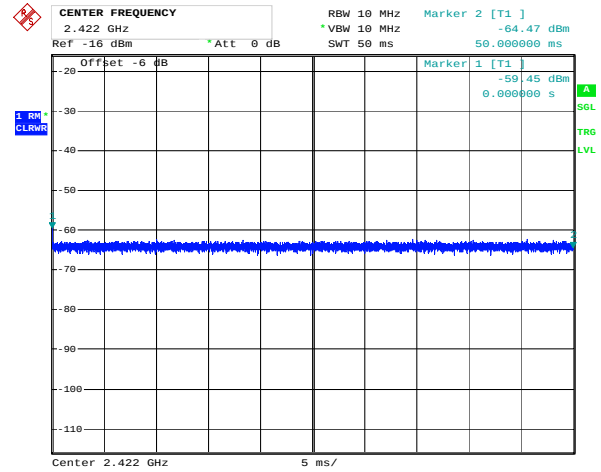
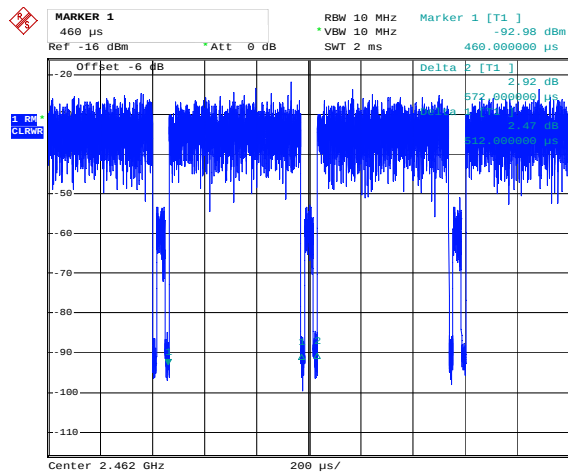
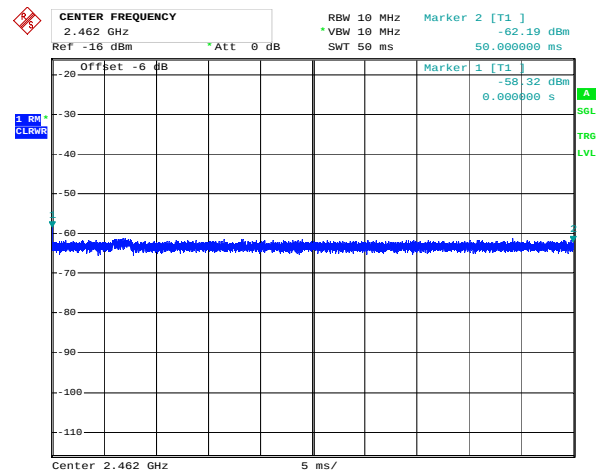
Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Adaptivity Result Time Plots

HT20 - F1 - Channel Occupancy Time/ Idle Period

HT20 - F1 - Short Control Signalling Transmissions

HT20 - F3 - Channel Occupancy Time/ Idle Period

HT20 - F3 - Short Control Signalling Transmissions


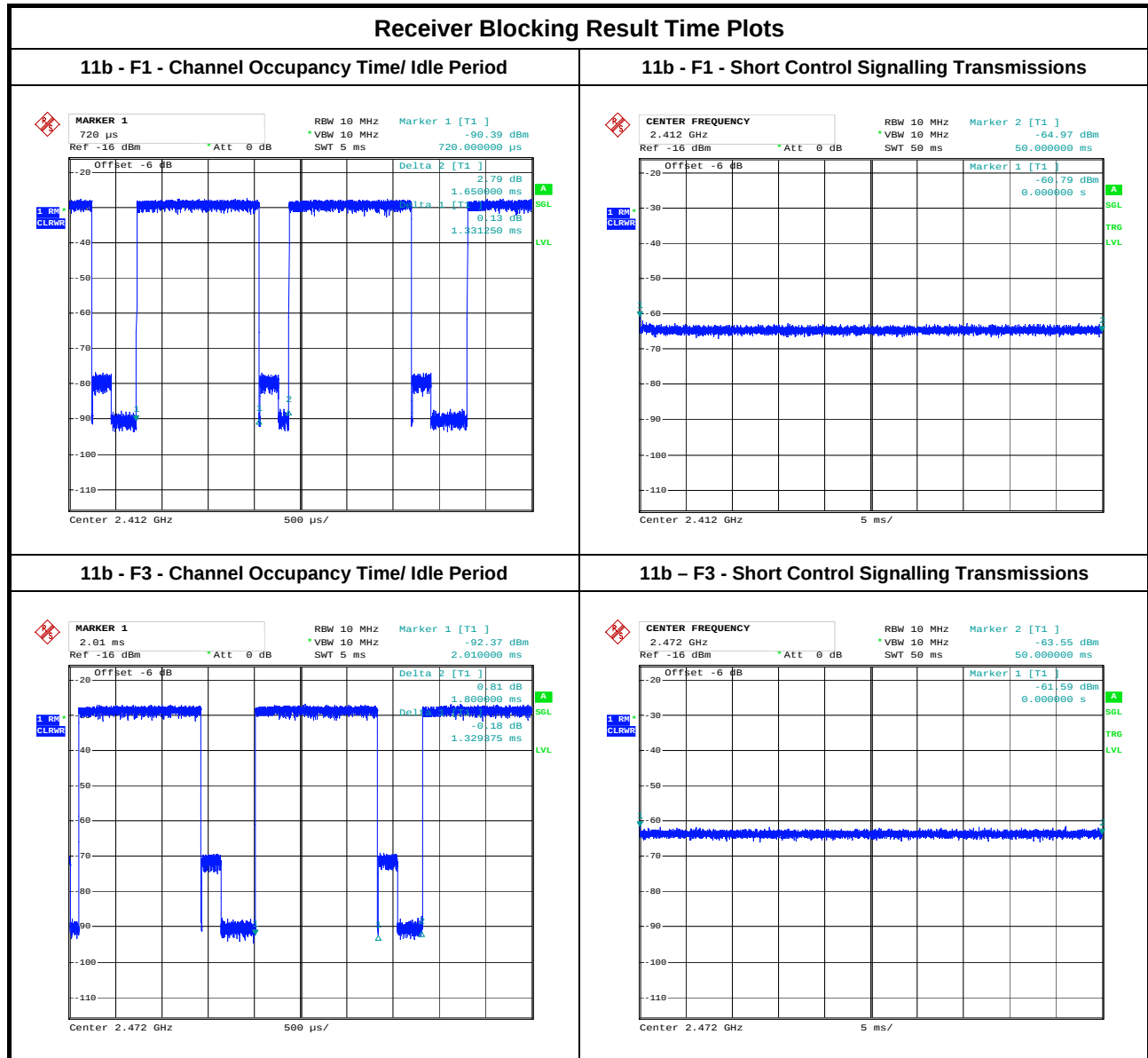
Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Adaptivity Result Time Plots

HT40 - F1 - Channel Occupancy Time/ Idle Period

HT40 - F1 - Short Control Signalling Transmissions

HT40 - F3 - Channel Occupancy Time/ Idle Period

HT40 - F3 - Short Control Signalling Transmissions


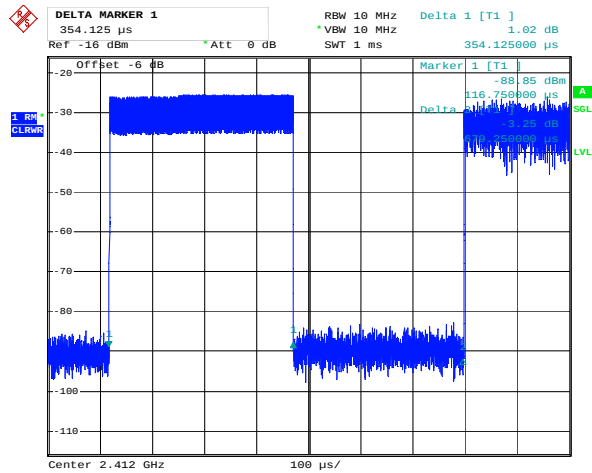
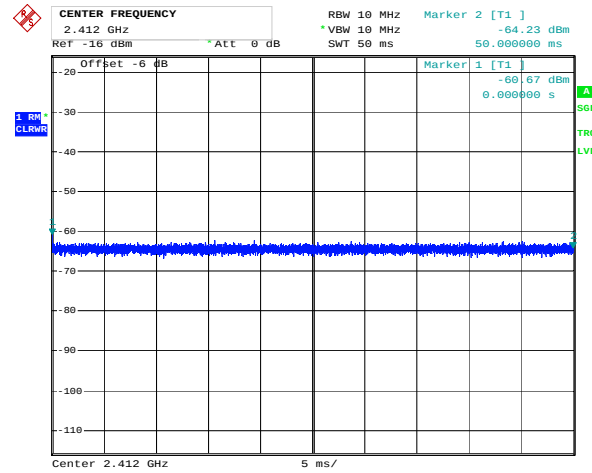
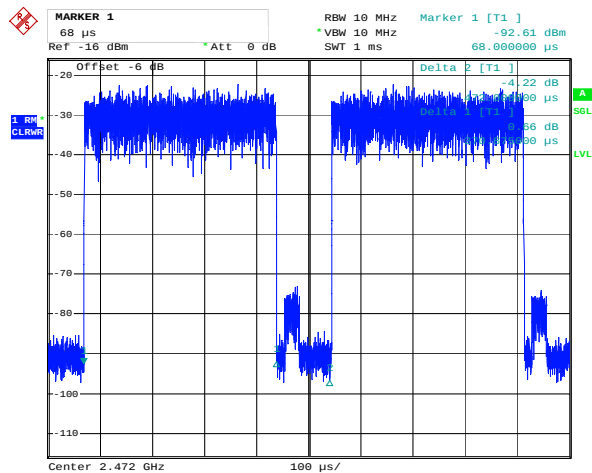
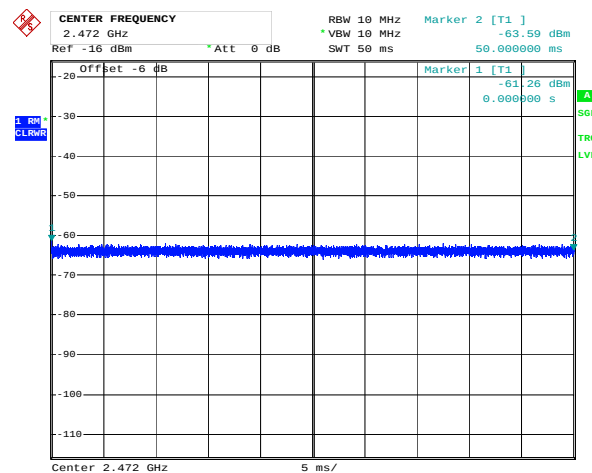
Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

5.1.7 Test Result of Receiver Blocking Time Plots



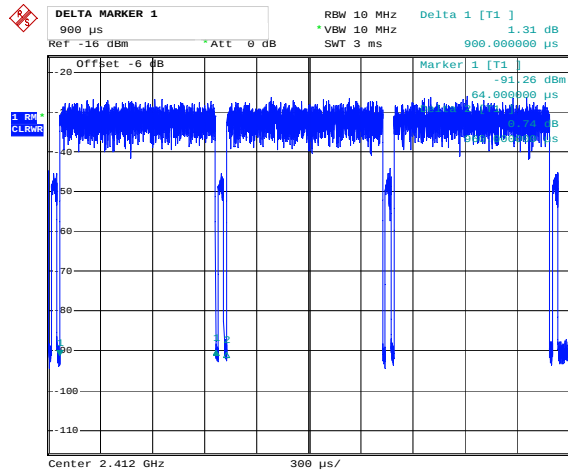
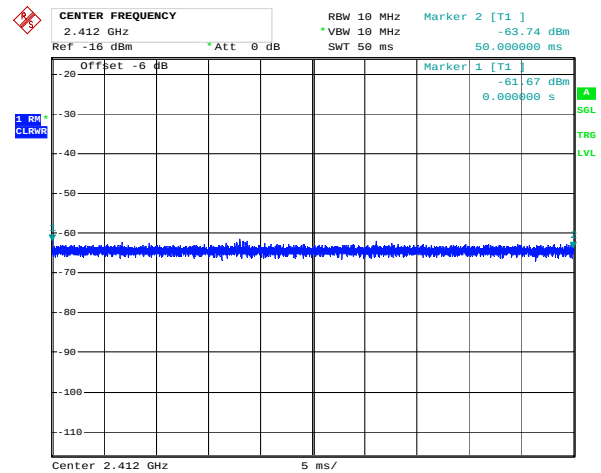
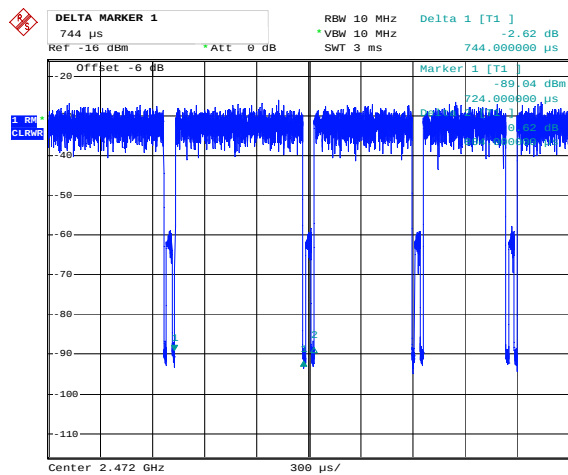
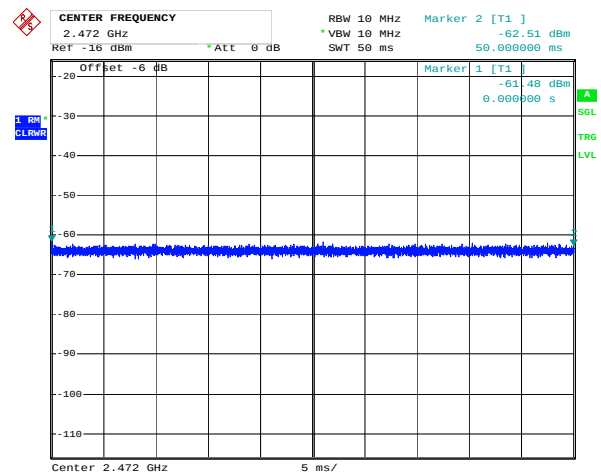
Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Receiver Blocking Result Time Plots

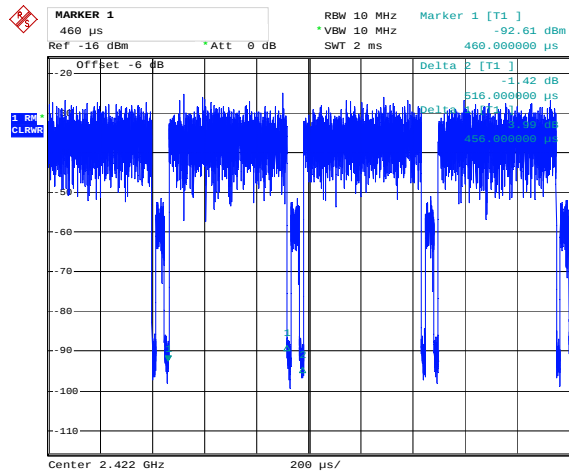
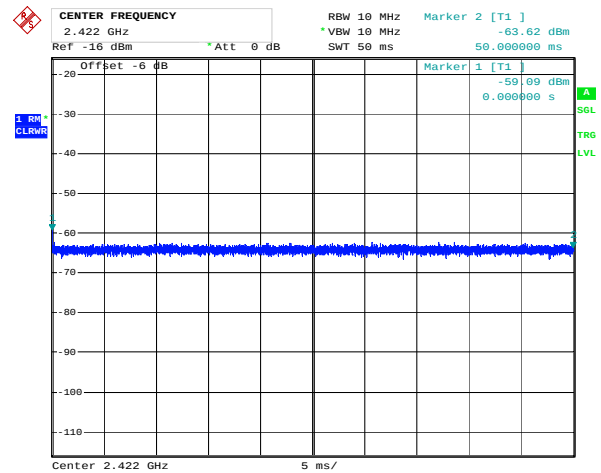
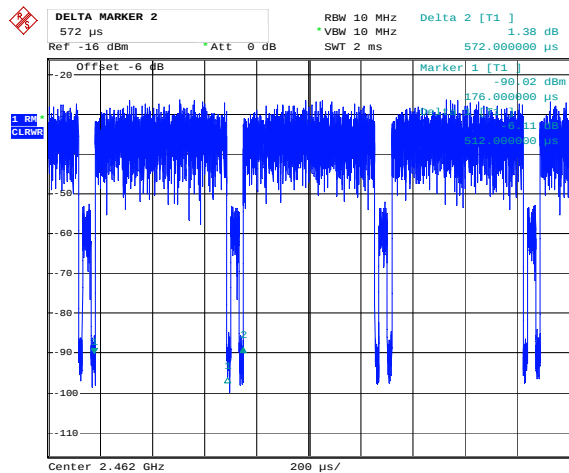
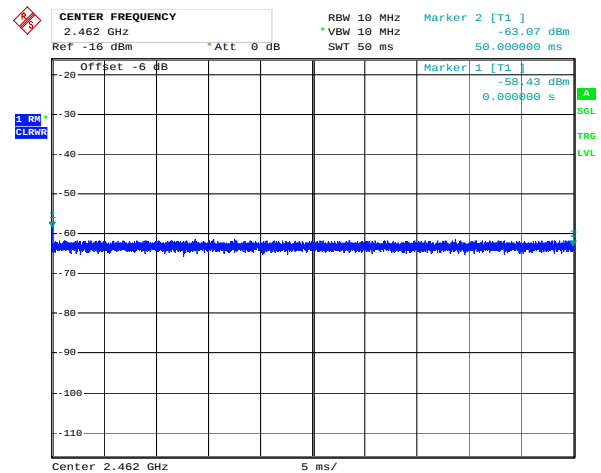
11g - F1 - Channel Occupancy Time/ Idle Period

11g - F1 - Short Control Signalling Transmissions

11g - F3 - Channel Occupancy Time/ Idle Period

11g - F3 - Short Control Signalling Transmissions


Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Receiver Blocking Result Time Plots

HT20 - F1 - Channel Occupancy Time/ Idle Period

HT20 - F1 - Short Control Signalling Transmissions

HT20 - F3 - Channel Occupancy Time/ Idle Period

HT20 - F3 - Short Control Signalling Transmissions


Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

Receiver Blocking Result Time Plots
HT40 - F1 - Channel Occupancy Time/ Idle Period

HT40 - F1 - Short Control Signalling Transmissions

HT40 - F3 - Channel Occupancy Time/ Idle Period

HT40 - F3 - Short Control Signalling Transmissions


Note : In the plots of Short Control Signalling Transmissions, inject the interference signal to the EUT at the beginning.

6 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101013	9kHz ~ 40GHz	Jan. 25, 2014	RF Conducted
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 20, 2013	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 31, 2014	RF Conducted
Power Meter	Agilent	U2021XA	MY53480019	50MHz ~ 18GHz	Feb. 23, 2014	RF Conducted
Power Meter	Agilent	U2021XA	MY53510003	50MHz ~ 18GHz	Feb. 23, 2014	RF Conducted
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_103	10712/4 10709/4	30MHz ~ 26.5GHz	Dec. 02, 2013	RF Conducted
RF Cable-1m	HUBER+SUHNER	SUCOFLEX_104	SN 324557	30MHz ~ 26.5GHz	Dec. 02, 2013	RF Conducted
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	345675/4 345673/4	30MHz ~ 26.5GHz	Dec. 02, 2013	RF Conducted
RF Power Splitter	Worken	0120A02056002D	N/A	2 Way	NA	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	FSV 40	101514	10Hz ~ 40GHz	Jun. 13, 2014	Radiated Emission
Amplifier	Agilent	8447D	2944A11146	10kHz ~ 1.3GHz	Jul. 15, 2014	Radiated Emission
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Mar. 27, 2014	Radiated Emission
Bilog Antenna	SCHAFFNER	CBL6111C	2737	25MHz ~ 2GHz	Oct. 19, 2013	Radiated Emission
Horn Antenna	COM-POWER	AH-118	10091	1GHz ~ 18GHz	Jan. 28, 2014	Radiated Emission
Horn Antenna	ETS	3115	6744	1GHz ~ 18GHz	May 05, 2014	Radiated Emission
RF Cable-R03m	Jye Bao	RG142	CB031	30MHz ~ 1GHz	Dec. 01, 2013	Radiated Emission
RF Cable-10m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	1GHz ~ 26.5GHz	Dec. 01, 2013	Radiated Emission
Turn Table	Chaintek Instruments	3000	MF780208275	0 ~ 360 degree	N/A	Radiated Emission
Antenna Mast	HD	100	HD1000203311	1 ~ 4 m	N/A	Radiated Emission

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP7	100645	9kHz ~ 7GHz	Apr. 17, 2014	Adaptivity
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Nov. 12, 2013	Adaptivity
Horn Antenna	COM-POWER	AH-118	10091	1GHz ~ 18GHz	Jun. 28, 2014	Adaptivity
Horn Antenna	COM-POWER	AH-118	10094	1GHz ~ 18GHz	Apr. 21, 2014	Adaptivity
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	302338	1GHz ~ 26.5GHz	Dec. 03, 2013	Adaptivity
RF Cable-8m	HUBER+SUHNER	SUCOFLEX_104	MY17172/4	0.05GHz ~ 26.5GHz	Dec. 03, 2013	Adaptivity
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_103	53804/3	1GHz ~ 33GHz	Dec. 03, 2013	Adaptivity
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_103	52134	1GHz ~ 33GHz	Dec. 03, 2013	Adaptivity
RF Power Divider	Worken	0120A002201801O	11012007220	2 Way	Dec. 03, 2013	Adaptivity

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



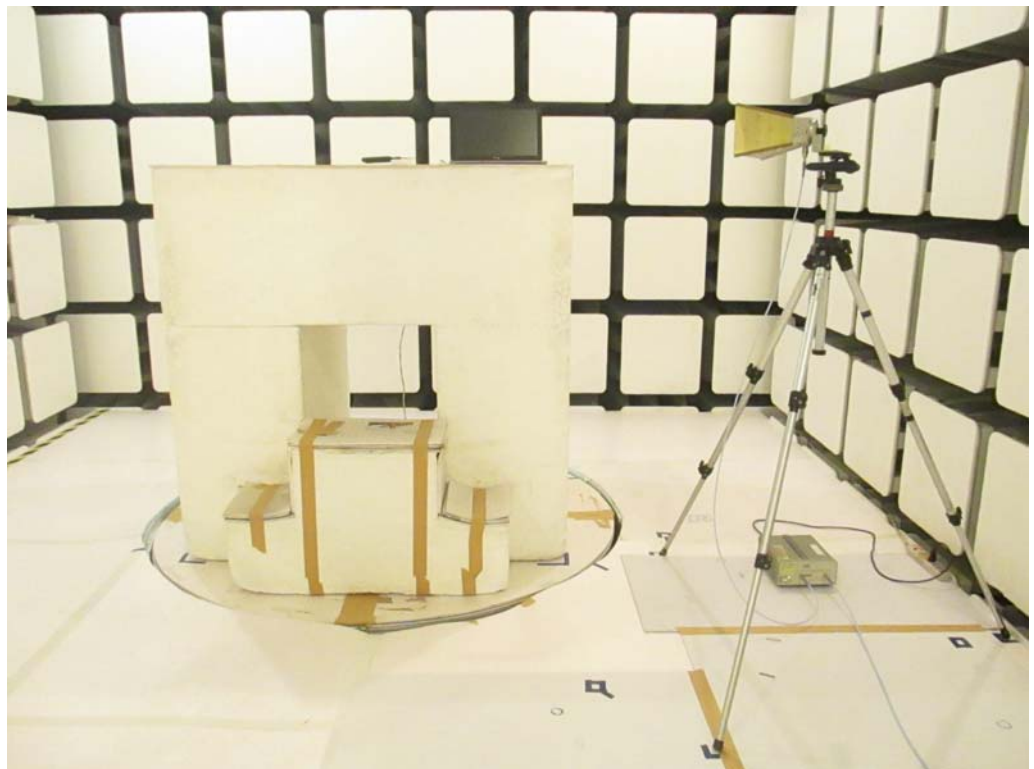
Appendix A. Test Photos

1 Photographs of Radiated Emissions Test Configuration

BILOG ANTENNA



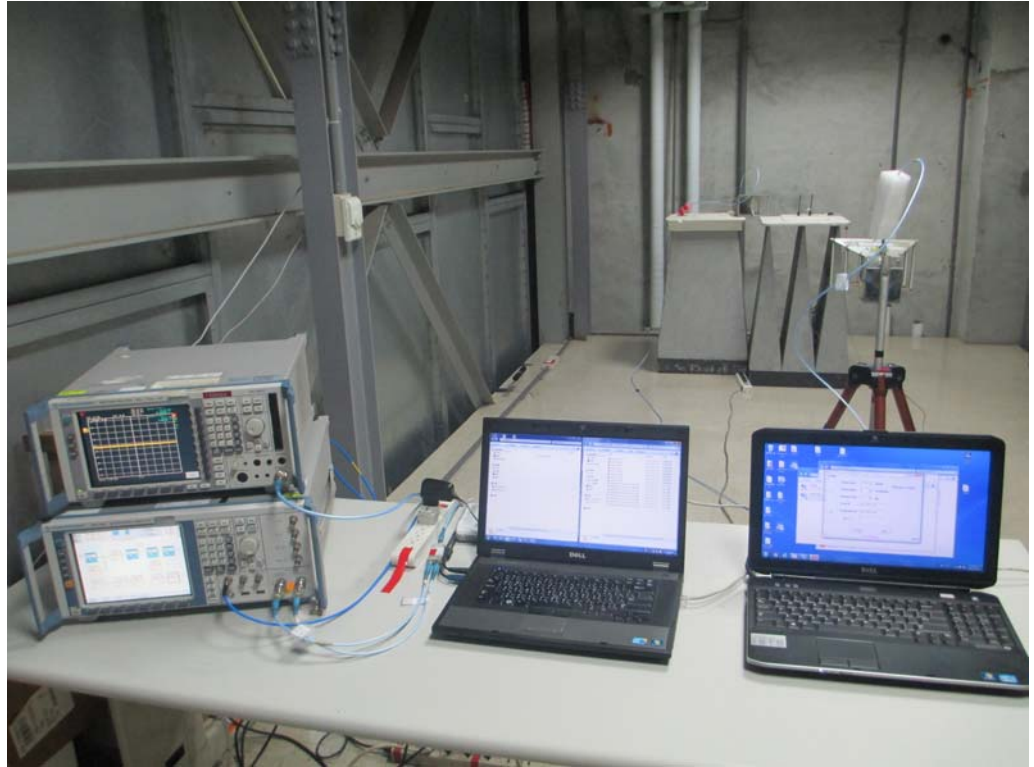
HORN ANTENNA



EUT take a close-up



2 Photographs of Adaptivity Test Configuration



APPENDIX B. Photographs of EUT

