



Test Report No.:
FCC2022-0047-RF2

RF Test Report

EUT : **Wall Switch**
MODEL : **WS501-915M**
BRAND NAME : **Milesight**
APPLICANT : **Xiamen Milesight IoT Co., Ltd.**
CLASSIFICATION OF TEST : **N/A**

CVC Testing Technology Co., Ltd.



CVC Testing Technology Co., Ltd.

Test Report No.: FCC2022-0047-RF2

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Applicant		Name: Xiamen Milesight IoT Co., Ltd.	
		Address: Building C09, Software Park Phase III, Xiamen 361024, Fujian, China	
Manufacturer		Name: Xiamen Milesight IoT Co., Ltd.	
		Address: Building C09, Software Park Phase III, Xiamen 361024, Fujian, China	
Equipment Under Test		Name: Wall Switch	
		Model/Type: WS501-915M	
		Additional Model/Type: See Section 2.2	
		Brand: Milesight	
		Serial No.: N/A	
		Sampe No.: 3-1	
Date of Receipt.	2022.08.17	Date of Testing	2022.08.17~2022.11.29
Test Specification		Test Result	
FCC Part 15, Subpart C, Section 15.247		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied.		
	Seal of CVC		
	Issue Date: 2022.12.01		
Tested by:	Reviewed by:	Approved by:	
Xu ZhenFei	Liu YongHai	Chen HuaWen	
Name Signature	Name Signature	Name Signature	
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2022-0047-RF2	Original release	2022.12.01



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
FCC Part 15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
FCC Part 15.247(d) FCC Part 15.209	Radiated Emission and Restricted bands Measurements	PASS	Meet the requirement of limit.
FCC Part 15.247(d)	Out of band Emission and Band edge measurements	PASS	Meet the requirement of limit.
FCC Part 15.247(a)(2)	6dB Bandwidth Measurement	PASS	Meet the requirement of limit.
FCC Part 15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
FCC Part 15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
FCC Part 15.203 FCC Part 15.247(b)	Antenna Requirement	PASS	Meet the requirement of limit.



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
WIFI & Bluetooth Test System 1					/
Communication Shielded Room 1	4m*3m*3m	CRTDSWKSR 44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV30	104337	DZ-000235	R&S	/
Comprehensive Test Instrument	CMW500	137779	DZ-000220	R&S	2023/06/05
Comprehensive Test Instrument	CMW500	169888	DZ-000342	R&S	2022/12/09
LTE Comprehensive Test Instrument	E7515A	MY58010639	DZ-000173	KEYSIGHT	2023/06/05
Analog Signal Generator	SMA100B	103663	DZ-000239-2	R&S	2023/06/05
Vector Signal Generator	SMBV100B	101757	DZ-000239-1	R&S	2023/06/06
Programmable DC Power Supply	E3642A	MY59108106	DZ-000242-2	KEYSIGHT	2023/04/21
Radiation SpuriousTest System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2023/03/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2023/03/02
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2023/06/25
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2023/03/04
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2023/07/31
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2023/06/05
5G Bandstop Filters	WRCJV12-4900- 5100-5900-6100 -50EE	851770	DZ-000186	WI	2023/12/06
Comprehensive tester	CMW500	159000	DZ-000240-2	R&S	2023/12/06
Conducted emission					/
EMI Test Receiver	ESCI	100857	WKNB-0081	R&S	2023-12-08
EMI Test Receiver	ESR3	102394	VG DY-0705	R&S	2023-03-04
LISN	NSLK 8127	8127644	VG DY-0150	SCHWARZBECK	2023-09-04
LISN	NSLK 8128	8128-316	VG DY-0149	SCHWARZBECK	2023-09-04
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	2023-03-03
Plus Limiter (#1)	VTSD 9561 F-N	00515	VG DY-0808	SCHWARZBECK	2023-03-04
Plus Limiter (#2)	VTSD 9561	9561-F017	VG DY-0152	SCHWARZBECK	2024-09-04
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2023-09-04
Impedance Stabilization Network	NTFM8158	8158-0092	VG DY-0356	SCHWARZBECK	2023-06-07
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	2023-06-07
Voltage Probe	TK9420	9420-499	VG DY-0128	SCHWARZBECK	2023-03-04
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNER	2023-09-01
Video Signal Generator	GV-798+	151064920001	VGDS-0215	PROMAX	2023-05-30
Audio Signal Generator	GAG-810	EK871591	EM-000309	GW	2023-12-08
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	2024-08-08
Shielding Room(#2)	GP1A	002	WKNF-0006	LEINING	2024-08-08
Current probe	EZ-17	0816.2063.02	EM-000567	R&S	2023-01-16



1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted emissions	9kHz~30MHz	±2.66dB
2	Radiated emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China
Post Code: 510663 Tel: 020-32293888
FAX: 020-32293889 E-mail: office@cvc.org.cn



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Wall Switch
BRAND	Milesight
MODEL	WS501-915M
ADDITIONAL MODEL	See Section 2.2
FCC ID	2AYHY-WS50X
POWER SUPPLY	AC 120V/60Hz
MODULATION TYPE	Chirp Spread Spectrum
OPERATING FREQUENCY	DTS 500kHz, 903MHz~926.9MHz
NUMBER OF CHANNEL	15
PEAK OUTPUT POWER	19.76dBm (Maximum)
ANTENNA TYPE (Remark 3)	PCB Antenna, -1.79dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A
Remark: <ol style="list-style-type: none">For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.Please refer to the antenna report.EUT photo refer to the report (Report NO.: FCC2022-0047-E).The EUT have SISO function, provides 1 completed transmitter and 1 receiver.	

1.1 ADDITIONAL MODEL/TYPE

Models	
1	NE501-915M
2	WS501-9M
3	NE501-9M
Note: The only differences are silk-screen 、 trade name and model no. for trading purpose.	



2.2 OTHER INFORMATION

Operating frequency of each channel

LORA DR8					
CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	903	5	911.0	10	924.5
1	904.6	6	912.6	11	925.1
2	906.2	7	914.2	12	925.7
3	907.8	8	923.3	13	926.3
4	909.4	9	923.9	14	926.9

Note: The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefor only the data of the test channels were recorded in this report.



2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports

EUT CONFIGURE MODE	APPLICABLE TEST ITEMS				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	LORA link

Where **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 14	0	FHSS	DR8

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
- The worst case was found when positioned on x axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 14	0,7,14	FHSS	DR8



ANTENNA PORT CONDUCTED MEASUREMENT:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE
A	0 to 14	0,7,14	FHSS	DR8

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	24.5deg. C, 54%RH	AC 120V/60Hz	Li JiaLing
RE≥1G	24.5deg. C, 54%RH	AC 120V/60Hz	Li JiaLing
PLC	25.2deg. C, 55%RH	AC 120V/60Hz	Li JiaLing
APCM	25.2deg. C, 55%RH	AC 120V/60Hz	Li JiaLing



2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2020

All test items have been performed and recorded as per the above standards

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	N/A	N/A	N/A	N/A	N/A		
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION

3.1.1 Limits

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107) and ICES-003 (Class A: section 6.1)

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 NOTE: 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

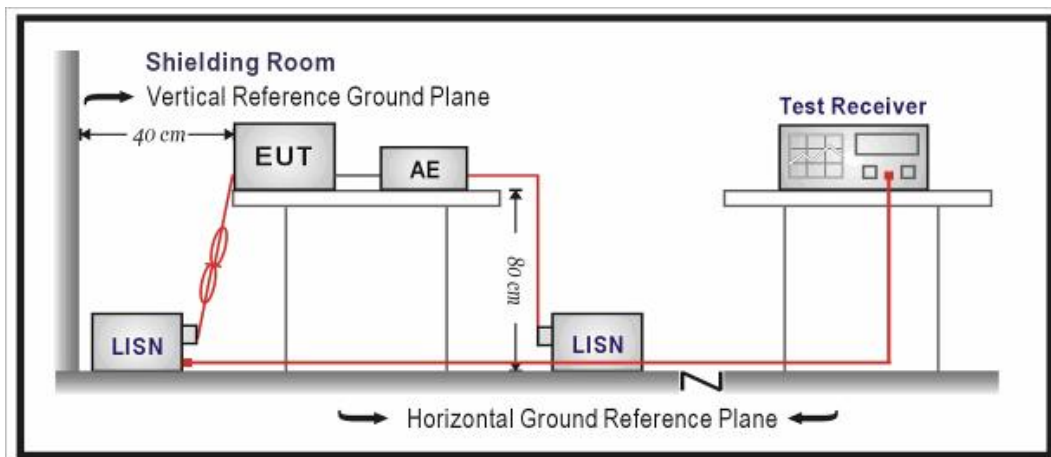
3.1.2 Test Procedures

The basic test procedure was in accordance with ANSI C63.4:2014 (section 7).

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

3.1.3 Test setup

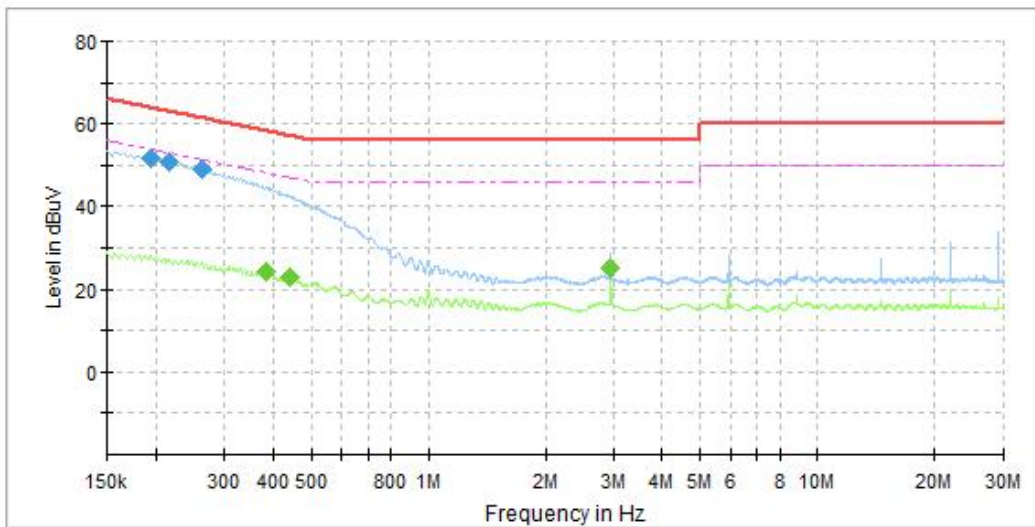




3.1.4 Test Results

CONDUCTED WORST-CASE DATA:

Test Mode	LORA Link	Frequency Range	150KHz ~ 30MHz
Test Voltage	AC 120V/60Hz	PHASE	Line (L)
Environmental Conditions	25.3deg. C,55% RH	Tested By	Liu shiwei

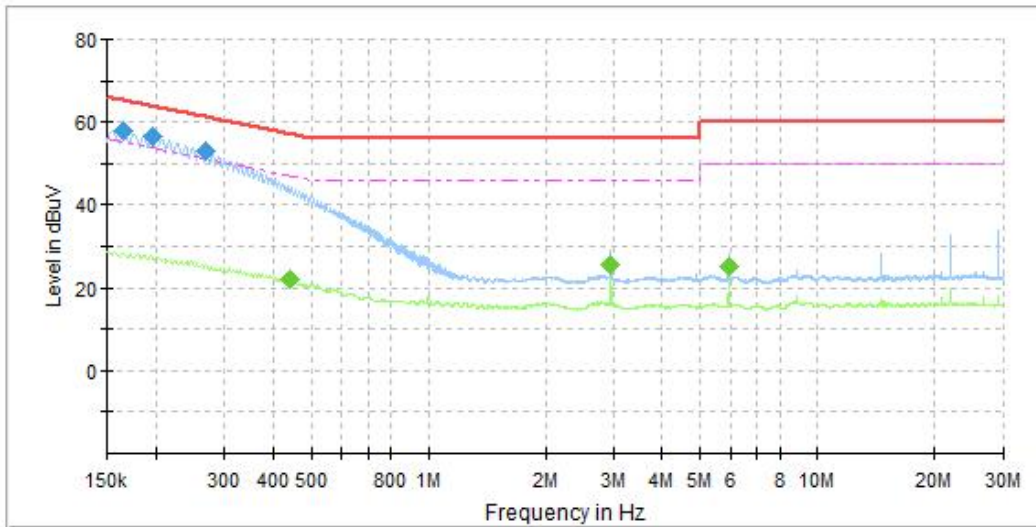


NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.195	51.9	---	63.8	11.9	L1	19.5
2	0.218	50.9	---	62.9	12.0	L1	19.5
3	0.263	49.2	---	61.4	12.2	L1	19.5
4	0.382	---	24.2	48.2	24.1	L1	19.5
5	0.443	---	23.0	47.0	24.0	L1	19.5
6	2.960	---	25.2	46.0	20.8	L1	19.6

Remark: The emission levels of other frequencies were very low against the limit.



Test Mode	LORA Link	Frequency Range	150KHz ~ 30MHz
Test Voltage	AC 120V/60Hz	PHASE	Line (N)
Environmental Conditions	26deg. C,51% RH	Tested By	Liu shiwei



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.166	57.9	---	65.2	7.3	N	19.5
2	0.197	56.4	---	63.7	7.3	N	19.5
3	0.269	52.9	---	61.1	8.2	N	19.6
4	0.443	---	21.9	47.0	25.1	N	19.6
5	2.960	---	25.7	46.0	20.3	N	19.6
6	5.919	---	25.0	50.0	25.0	N	19.7

Remark: The emission levels of other frequencies were very low against the limit.



3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (Microvolts/Meter)	MEASUREMENT DISTANCE (Meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 Measurement procedure

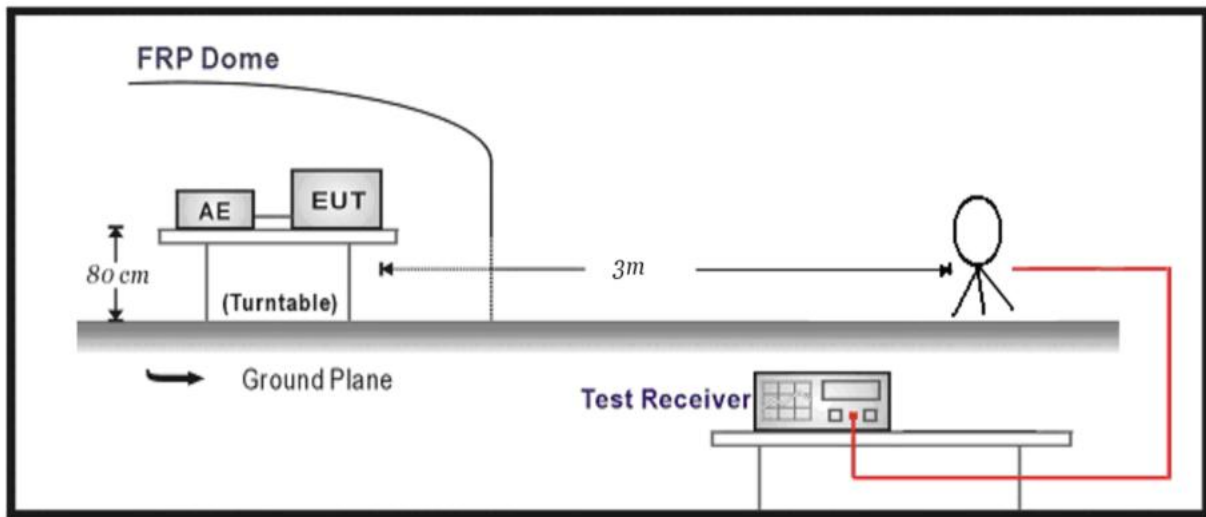
- The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For below 1GHz was used bilog antenna, and above 1GHz was used horn antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

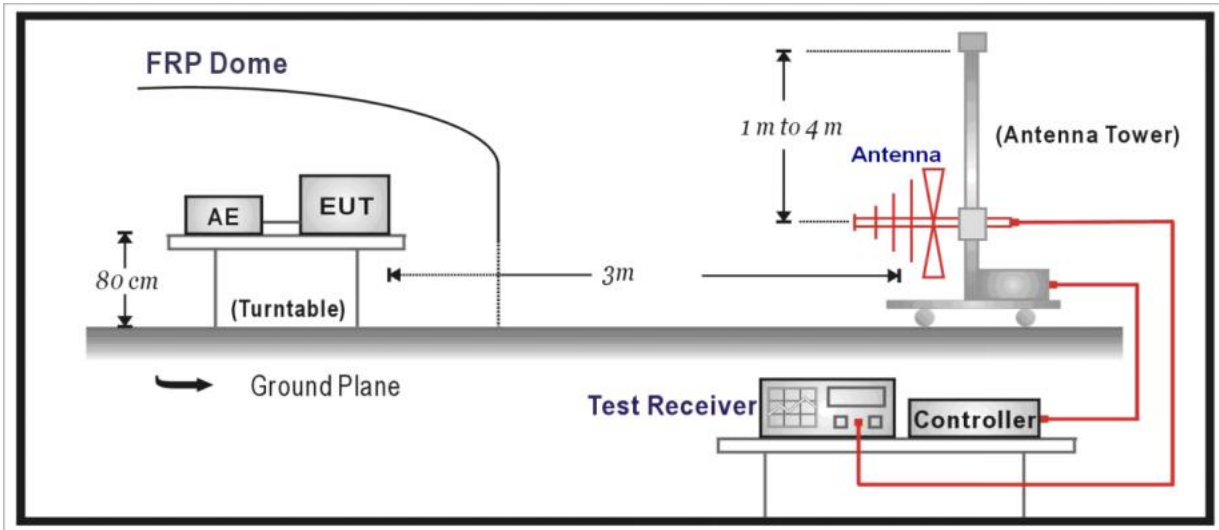
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

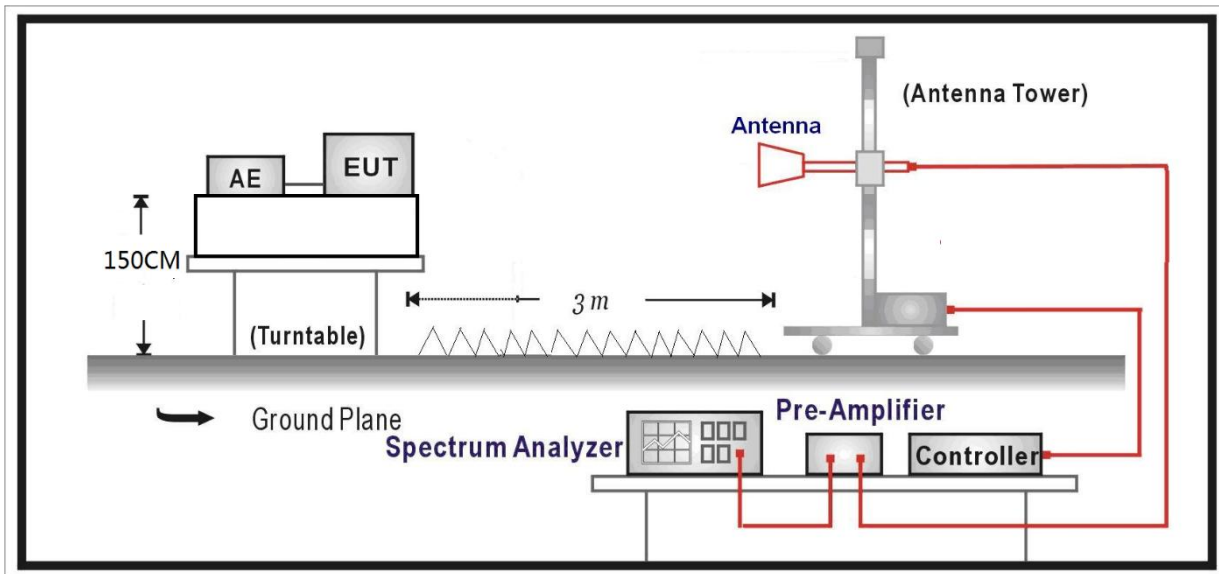
Below 30MHz Test Setup:



Below 1GHz Test Setup:



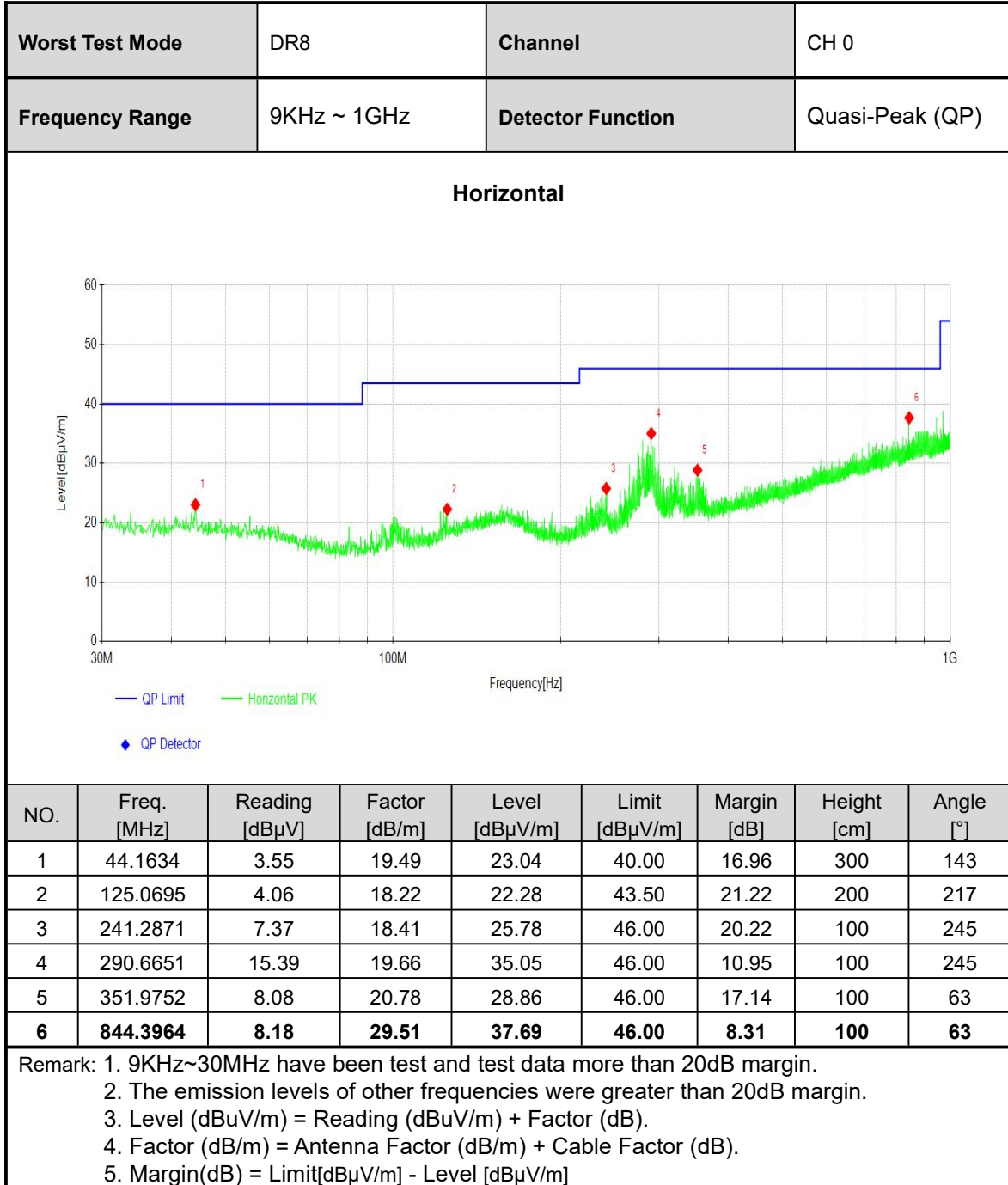
Above 1GHz Test Setup:





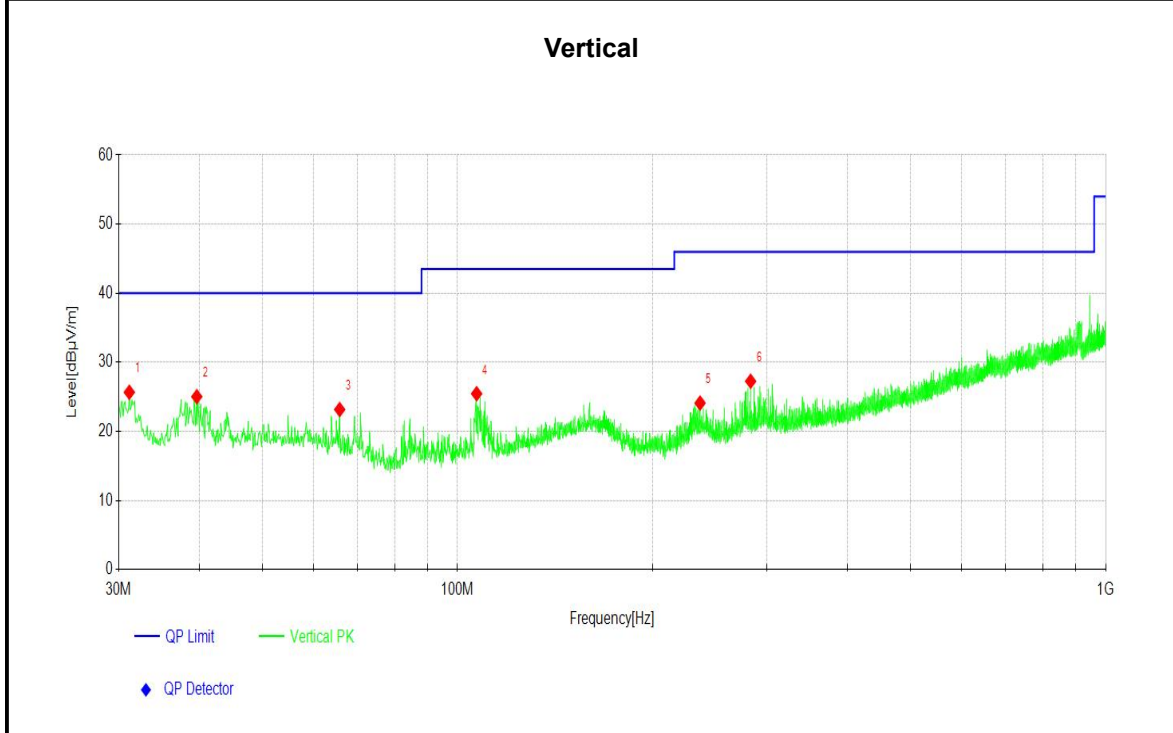
3.2.4 Test results

BELOW 1GHz WORST-CASE DATA:





Worst Test Mode	DR8	Channel	CH 0
Frequency Range	9KHz ~ 1GHz	Detector Function	Quasi-Peak (QP)



NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	31.1641	6.58	19.08	25.66	40.00	14.34	100	43
2	39.6040	5.47	19.56	25.03	40.00	14.97	100	37
3	65.7966	5.38	17.78	23.16	40.00	16.84	100	94
4	107.0257	8.73	16.72	25.45	43.50	18.05	300	32
5	236.7277	5.83	18.27	24.10	46.00	21.90	100	300
6	283.2923	7.85	19.41	27.26	46.00	18.74	100	37

Remark: 1. 9KHz~30MHz have been test and test data more than 20dB margin.
 2. The emission levels of other frequencies were greater than 20dB margin.
 3. Level (dBµV/m) = Reading (dBµV/m) + Factor (dB).
 4. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 5. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]



ABOVE 1GHz DATA

Channel		CH 0		Frequency		903MHz			
Frequency Range		1GHz~9.3G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1806.0000	45.98	7.74	53.72	74.00	20.28	286	21	PK
2	1806.0000	40.05	7.74	47.79	54.00	6.21	302	8	AV
3	2709.0000	36.69	11.23	47.92	54.00	6.08	167	86	AV
4	2709.0000	43.98	11.23	55.21	74.00	18.79	124	106	PK
5	3612.0000	44.16	14.88	59.04	74.00	14.96	241	237	PK
6	3612.0000	35.38	14.88	50.26	54.00	3.74	209	354	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1806.0000	44.13	7.74	51.87	74.00	22.13	203	133	PK
2	1806.0000	36.80	7.74	44.54	54.00	9.46	164	100	AV
3	2709.0000	43.02	11.23	54.25	74.00	19.75	218	100	PK
4	2709.0000	36.05	11.23	47.28	54.00	6.72	175	357	AV
5	3612.0000	42.66	14.88	57.54	74.00	16.46	179	256	PK
6	3612.0000	35.91	14.88	50.79	54.00	3.21	234	289	AV
<p>Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]</p>									



Channel		CH 7		Frequency		914.2MHz			
Frequency Range		1GHz~9.3G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1828.4000	46.01	7.85	53.86	74.00	20.14	204	20	PK
2	1828.4000	40.76	7.85	48.61	54.00	5.39	142	359	AV
3	2742.6000	36.55	12.12	48.67	54.00	5.33	229	359	AV
4	2742.6000	43.59	12.12	55.71	74.00	18.29	273	91	PK
5	3656.8000	42.89	15.14	58.03	74.00	15.97	151	138	PK
6	3656.8000	35.14	15.14	50.28	54.00	3.72	158	151	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1828.4000	44.14	7.85	51.99	74.00	22.01	261	118	PK
2	1828.4000	37.99	7.85	45.84	54.00	8.16	190	118	AV
3	2742.6000	44.01	12.12	56.13	74.00	17.87	237	349	PK
4	2742.6000	36.02	12.12	48.14	54.00	5.86	146	191	AV
5	3656.8000	43.15	15.14	58.29	74.00	15.71	226	316	PK
6	3656.8000	35.86	15.14	51.00	54.00	3.00	278	316	AV
<p>Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]</p>									



Channel		CH 14		Frequency		926.9MHz			
Frequency Range		1GHz~9.3G		Detector Function		PK/AV			
Horizontal									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1853.8000	44.99	8.05	53.04	74.00	20.96	291	342	PK
2	1853.8000	38.97	8.05	47.02	54.00	6.98	308	4	AV
3	2780.7000	36.32	11.24	47.56	54.00	6.44	155	335	AV
4	2780.7000	44.51	11.24	55.75	74.00	18.25	236	191	PK
5	3707.6000	42.77	15.34	58.11	74.00	15.89	119	158	PK
6	3707.6000	35.62	15.34	50.96	54.00	3.04	110	309	AV
Vertical									
NO	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	1853.8000	44.72	8.05	52.77	74.00	21.23	295	354	PK
2	1853.8000	37.33	8.05	45.38	54.00	8.62	154	39	AV
3	2780.7000	36.19	11.24	47.43	54.00	6.57	118	7	AV
4	2780.7000	45.10	11.24	56.34	74.00	17.66	164	190	PK
5	3707.6000	43.20	15.34	58.54	74.00	15.46	279	196	PK
6	3707.6000	35.55	15.34	50.89	54.00	3.11	308	171	AV
<p>Remark: 1. The emission levels of other frequencies were greater than 20dB margin. 2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB). 3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB). 4. Margin(dB) = Limit[dBμV/m] - Level [dBμV/m]</p>									

3.3 6dB BANDWIDTH MEASUREMENT

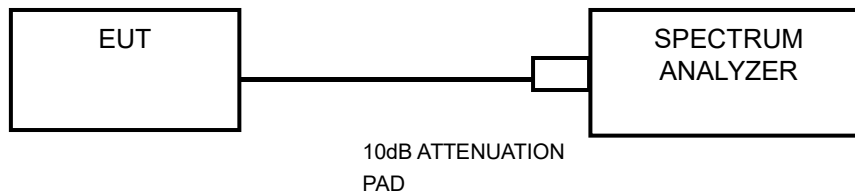
3.3.1 Limits

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

3.3.2 Measurement procedure

- a. Set resolution bandwidth (RBW) = 100KHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

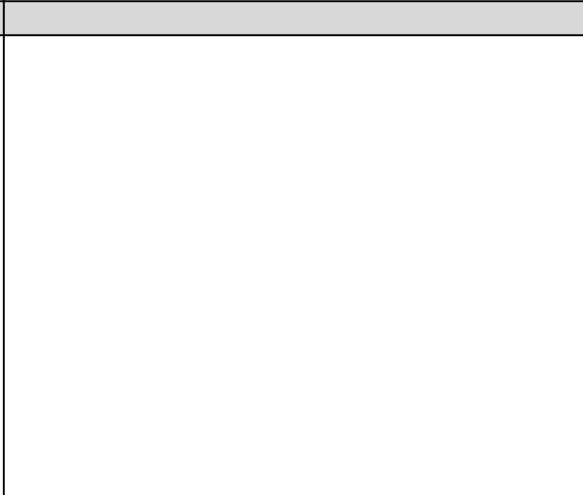
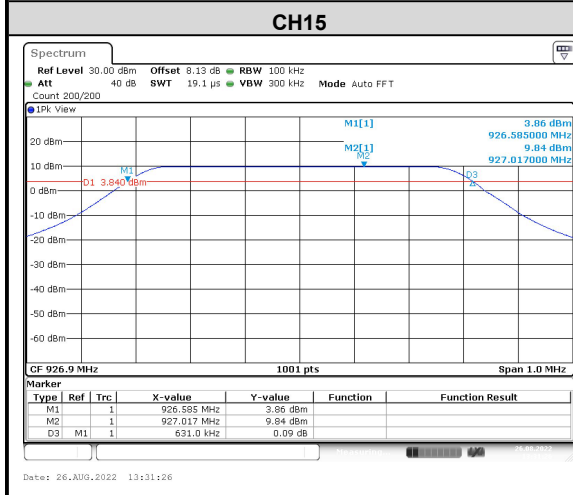
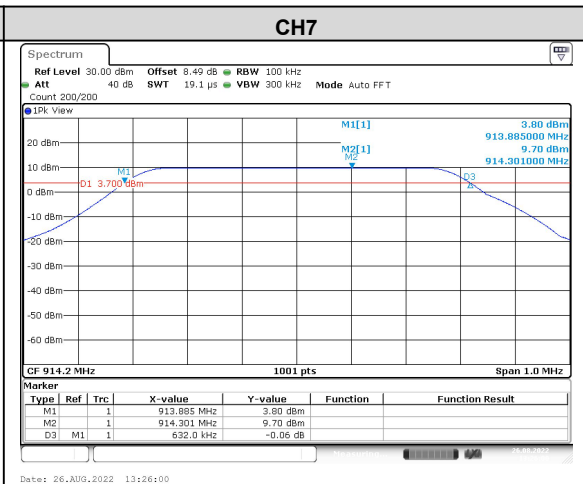
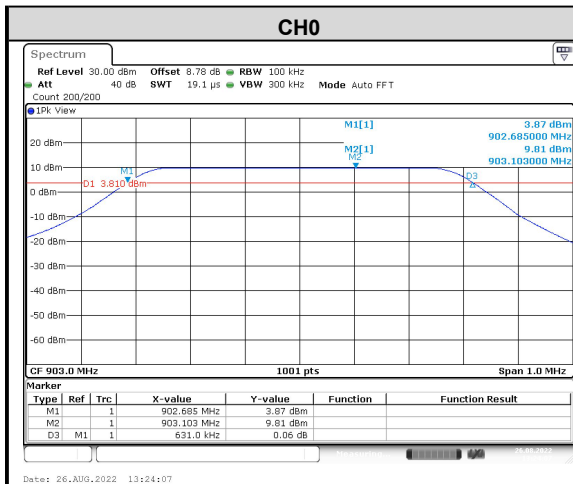
3.3.3 Test setup





3.3.4 Test result

Mode	Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
DR8	0	903.0	631	≥500
	7	914.2	632	≥500
	14	926.9	631	≥500



3.4 CONDUCTED OUTPUT POWER

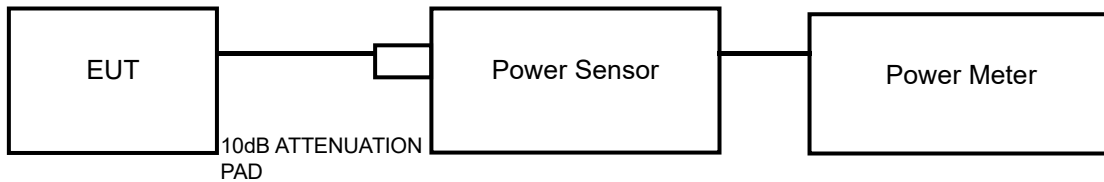
3.4.1 Limits

Forsystems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm).

3.4.2 Measurement procedure

- a. A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.
- b. An average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and set the detector to AVERAGE. Record the power level.

3.4.3 Test setup





3.4.4 Test result

PEAK OUTPUT POWER

GFSK

CHANNEL	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)	Peak Power Limit (mW)	Verdict
0	903.0	19.68	92.90	1000	PASS
7	914.2	19.49	88.92	1000	PASS
14	926.9	19.76	94.62	1000	PASS

AVERAGE OUTPUT POWER (For reference)

CHANNEL	Channel Frequency (MHz)	Average Power (dBm)	Average Power (mW)	Average Power Limit (mW)	Verdict
0	903.0	4.12	2.58	1000	PASS
7	914.2	4.09	2.56	1000	PASS
14	926.9	5.21	3.32	1000	PASS

3.5 POWER SPECTRAL DENSITY MEASUREMENT

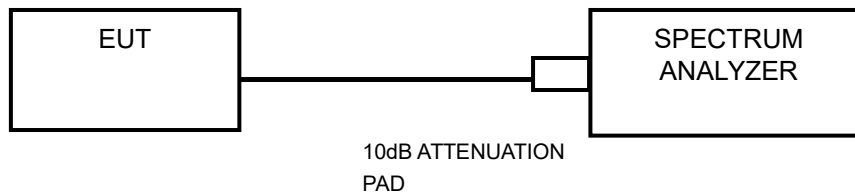
3.5.1 Limits

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

3.5.2 Measurement procedure

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set RBW to: 3KHz
- d. Set VBW $\geq 3 \times$ RBW.
- e. Detector = peak
- f. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- g. Sweep time = auto couple.
- h. Use the peak marker function to determine the maximum amplitude level.

3.5.3 Test setup

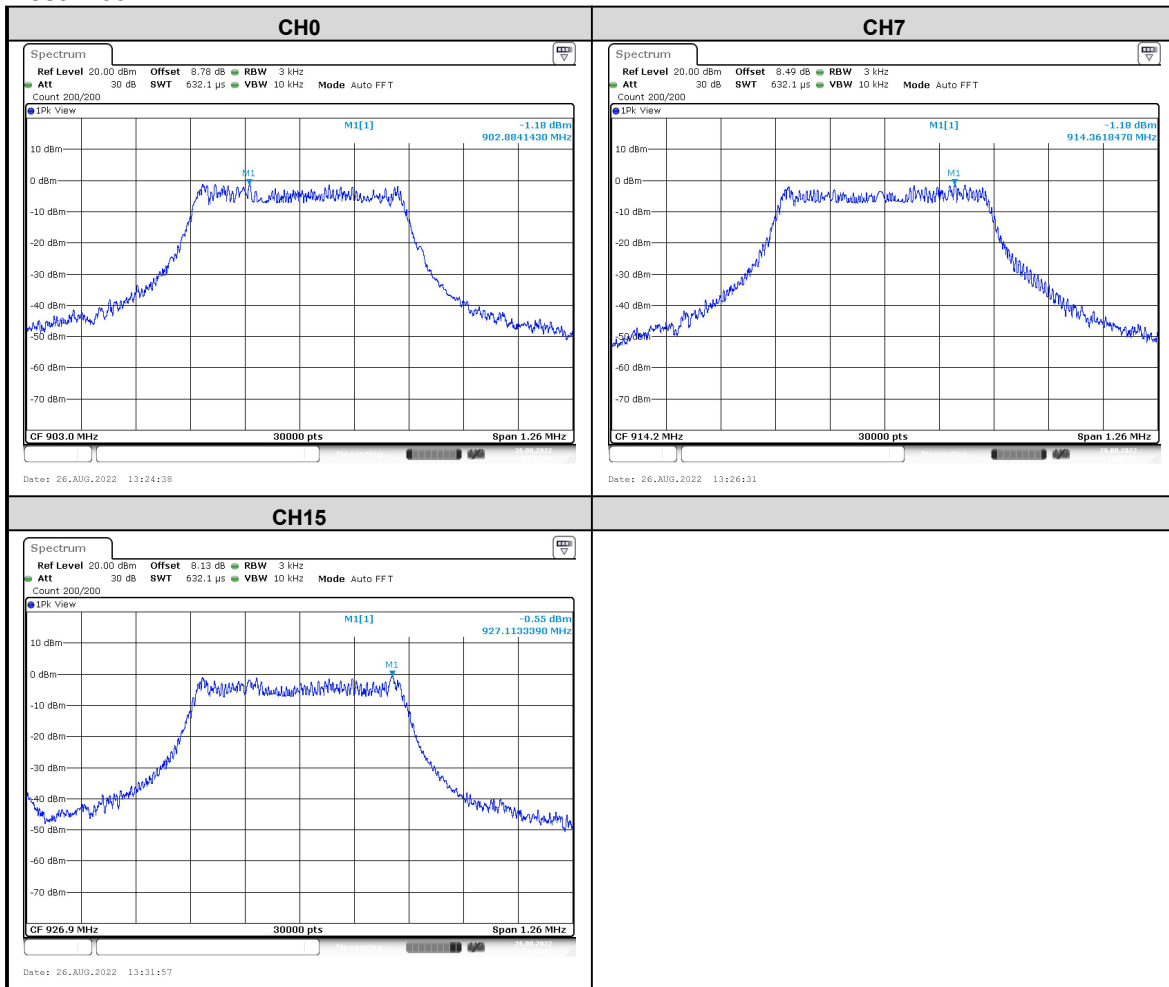




3.5.4 Test result

CHANNEL	CHANNEL FREQUENCY (MHz)	PSD(dBm/3kHz)	Limit (dBm/3kHz)	PASS / FAIL
0	903.0	-1.18	8	PASS
7	914.2	-1.18	8	PASS
14	926.9	-0.55	8	PASS

Test Plot:



3.6 OUT OF BAND EMISSION AND RESTRICTED BANDS MEASUREMENTS

3.6.1 Limits

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

3.6.2 Measurement procedure

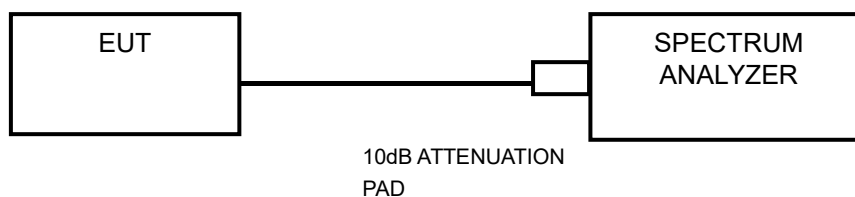
Measurement Procedure -Reference Level

- a. Set the RBW = 100 kHz.
- b. Set the VBW \geq 300 kHz.
- c. Detector = peak.
- d. Sweep time = auto couple.
- e. Trace mode = max hold.
- f. Allow trace to fully stabilize.
- g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure –Unwanted Emission Level

- a. Set RBW = 100 kHz.
- b. Set VBW \geq 300 kHz.
- c. Set span to encompass the spectrum to be examined
- d. Detector = peak.
- e. Trace Mode = max hold.
- f. Sweep = auto couple.

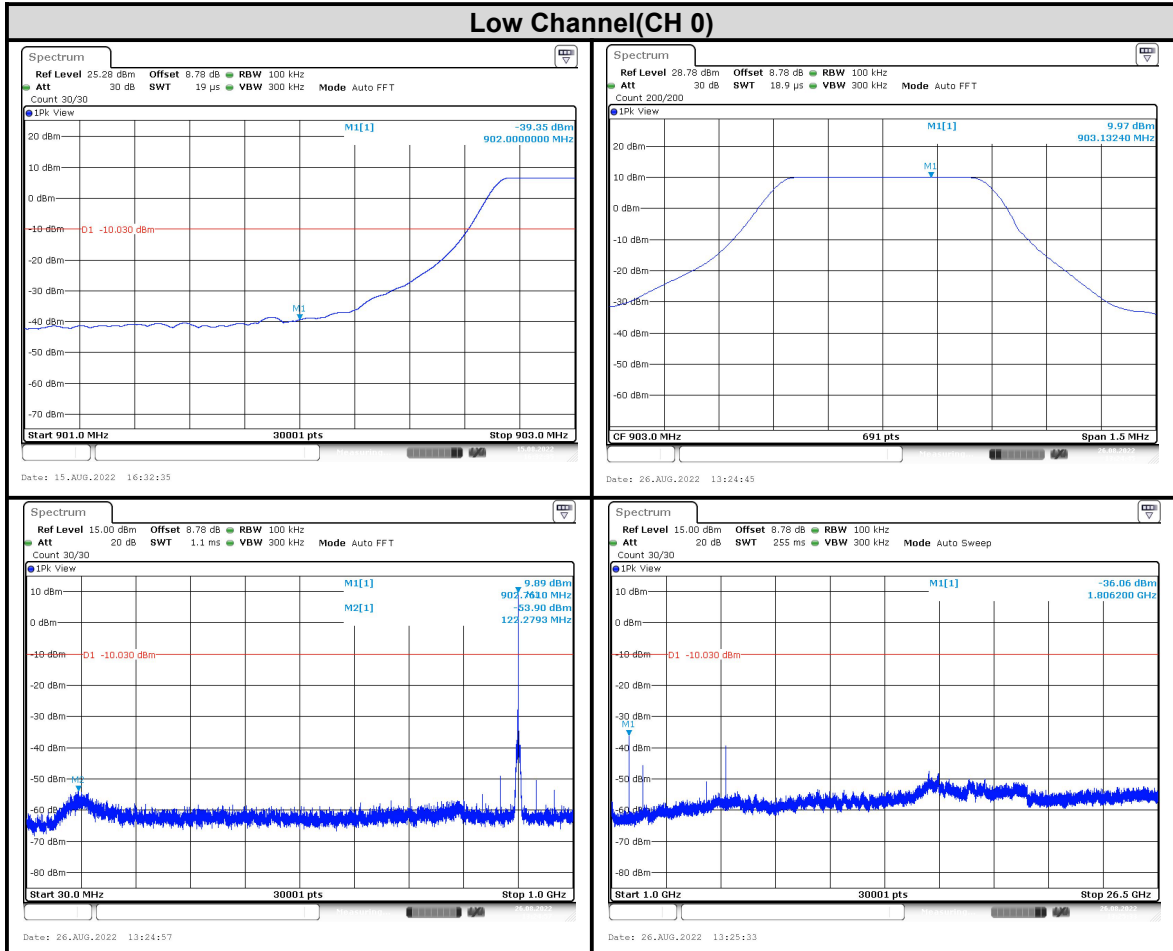
3.6.3 Test setup

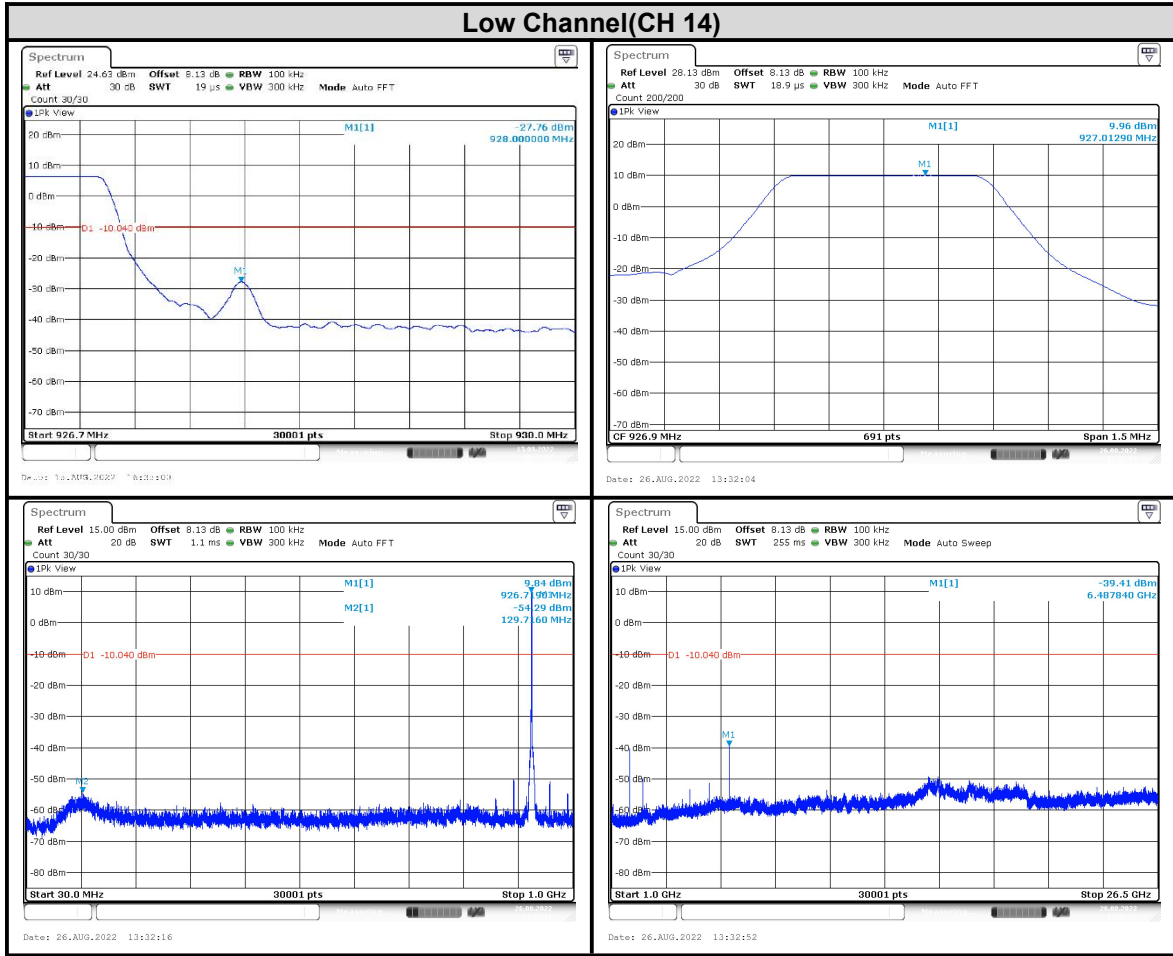




3.6.4 Test result

The spectrum plots are attached on the following images.







4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).



Important

- (1) The test report is valid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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