

CFR 47 FCC PART 15 SUBPART C ISED RSS-210 ISSUE 10

TEST REPORT

For

TOY Transmitter

MODEL NUMBER: GF31T2NRR

FCC ID: G6DGF31T2NRR

IC: 9650A-GF31T2NRR

REPORT NUMBER: 4789432917-2

ISSUE DATE: May 06, 2020

Prepared for

NEW BRIGHT INDUSTRIAL CO., LTD 9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG.

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	05/06/2020	Initial Issue	



Summary of Test Results					
Clause	lause Test Items FCC/ISED Rules Test Resu				
1	20dB Bandwidth and 99% Occupied Bandwidth	CFR 47 FCC §15.215 (c) ISED RSS-Gen Clause 6.7	Pass		
2	Radiated Emission	CFR 47 FCC §15.249 (a)(d)(e) ISED RSS-210 Annex B B.10 CFR 47 FCC §15.205 and §15.209 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass		
3	Antenna Requirement	CFR 47 FCC §15.203 ISED RSS-Gen Clause 6.3	Pass		
Note 1: This test report is only published to and used by the applicant, and it is not for evidence purpose in China.					

Note 2: The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C, ISED RSS-210 Issue 10 and ISED RSS-GEN Issue 5 > when <Accuracy Method> decision rule is applied.



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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	NEW BRIGHT INDUSTRIAL CO., LTD
Address:	9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD,
	KOWLOON BAY, KOWLOON, HONG KONG.

Manufacturer Information

Company Name:	NEW BRIGHT INDUSTRIAL CO., LTD
Address:	9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD,
	KOWLOON BAY, KOWLOON, HONG KONG,

EUT Information

EUT Name:	TOY Transmitter
Model:	GF31T2NRR
Sample Received Date:	March 25, 2020
Sample Status:	Normal
Date of Tested:	April 17, 2020~ April 24, 2020

APPLICABLE STANDARDS				
STANDARD TEST RESULTS				
CFR 47 FCC PART 15 SUBPART C	PASS			
ISED RSS-210 Issue 10	PASS			
ISED RSS-GEN Issue 5	PASS			

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, ISED RSS-210 Issue 10 and RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

	A2LA (Certificate No : 4102 01)
Accreditation Certificate	 A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1187) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules. ISED (Company No.: 21320) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320. VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011

Note:

- All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
- The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.
- 3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.



4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty		
Conduction emission	3.62dB		
Radiation Emission test (include Fundamental emission) (9KHz-30MHz)	2.2dB		
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	4.00dB		
Radiation Emission test	5.78dB (1GHz-18GHz)		
(1GHz to 26GHz) (include Fundamental emission)	5.23dB (18GHz-26GHz)		
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	TOY Transmitter		
EUT Description	The EUT is a wireless remote controller.		
Model	GF31T2NRR		
Desident Description	Operation Frequency	2410 MHz ~ 2475 MHz	
Product Description	Modulation Type GFSK		
Battery	DC 3.0V		

5.2. MAXIMUM FIELD STRENGTH

Frequency (MHz)	Channel Number	Max Peak field strength (dBµV/m)		
2410	1[32]	92.51		

5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2410	11	2429	21	2450	31	2469
2	2414	12	2430	22	2452	32	2475
3	2415	13	2431	23	2454	33	
4	2416	14	2433	24	2456	34	
5	2417	15	2434	25	2458	35	
6	2418	16	2439	26	2462	36	
7	2419	17	2441	27	2464	37	
8	2421	18	2442	28	2465	38	
9	2426	19	2443	29	2466	39	
10	2428	20	2446	30	2467	40	

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2410~ 2475	Wire Antenna	0

Test Mode	Transmit and Receive Mode	Description
GFSK	⊠1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

Note: The value of the antenna gain was declared by customer.

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5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 1(Low Channel), CH 19(MID Channel), CH 32(High Channel)	2410MHz, 2443MHz, 2475MHz

5.6. THE WORSE CASE POWER SETTING PARAMETER

The Wors	se Case Power Setting	g Parameter under 24	10 MHz ~ 2475 M	IHz Band
Test Software Version		/		
Modulation Type	Transmit Antenna Number	Test Channel		
		CH 1	CH 19	CH 32
GFSK	1	Default	Default	Default

5.7. TEST ENVIRONMENT

Environment Parameter	Selected Va	lues During Tests	
Relative Humidity	55 ~ 65%		
Atmospheric Pressure:	1	1025Pa	
Temperature	TN	22 ~ 28°C	
	VL	/	
Voltage:	VN	DC 3.0V	
	VH	/	

Note: VL= Lower Extreme Test Voltage VN= Nominal Voltage VH= Upper Extreme Test Voltage TN= Normal Temperature



5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

No support equipment.

I/O CABLES

No I/O cables.

ACCESSORY

No accessory.

TEST SETUP

The EUT have an engineer mode inside.

SETUP DIAGRAM FOR TEST

EUT

Note: New battery was used during all tests.



Radiated Emissions Instrument Model No. Manufacturer Last Cal. Next Cal. Used Equipment Serial No. MXE EMI $\overline{\mathbf{N}}$ **KESIGHT** N9038A MY56400036 Dec. 6, 2019 Dec. 6, 2020 Receiver Hybrid Log $\overline{\mathbf{A}}$ TDK HLP-3003C 130959 Sept.17, 2018 Sept.17,2021 Periodic Antenna \checkmark Preamplifier ΗP 8447D 2944A09099 Dec. 5, 2019 Dec. 5, 2020 **EMI** Measurement \checkmark R&S ESR26 101377 Dec. 05, 2019 Dec.05, 2020 Receiver \checkmark Sept. 17, 2018 Sept. 17, 2021 Horn Antenna TDK HRN-0118 130939 TRS-305- \checkmark Preamplifier TDK PA-02-0118 Dec. 05, 2019 Dec.05, 2020 00067 \checkmark 80000 Loop antenna Schwarzbeck 1519B Jan.17, 2019 Jan.17, 2022 PA-02-001-TRS-302- \checkmark Preamplifier TDK Dec. 05, 2019 Dec.05, 2020 3000 00050 High Gain Horn \checkmark Schwarzbeck **BBHA-9170** 691 Aug.11,2018 Aug.11,2021 Antenna TRS-307- $\overline{\mathbf{A}}$ Preamplifier TDK PA-02-2 Dec. 05, 2019 Dec.05, 2020 00003 Software Used Description Manufacturer Name Version Test Software for Radiated $\overline{\mathbf{A}}$ Farad EZ-EMC Ver. UL-3A1 disturbance Other instruments Model No. Used Manufacturer Serial No. Equipment Last Cal. Next Cal. WHKX10- \checkmark Wi 2700-3000-23 High Pass Filter Dec. 05, 2019 Dec.05, 2020 18000-40SS WRCJV8-2350-2400- \checkmark Band Reject Filter Wainwright 4 Dec. 05, 2019 Dec.05, 2020 2483.5-2533.5-40SS

5.9. MEASURING INSTRUMENT AND SOFTWARE USED



6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

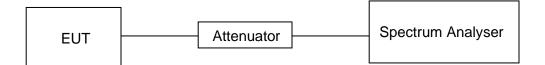
LIMITS

None; for reporting purposes only

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

Temperature	22.8°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.0V

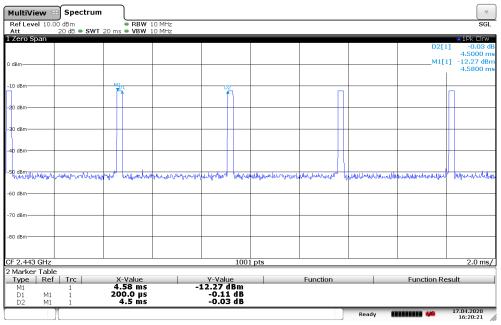
RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)
GFSK	4.6	100	0.046	4.6	-26.74

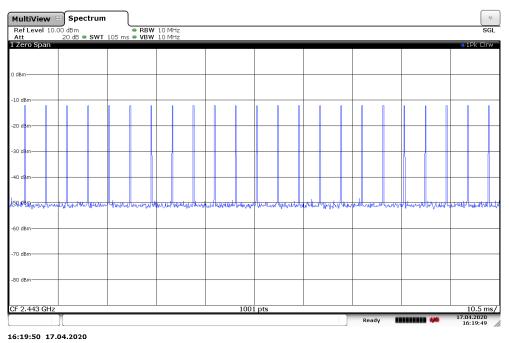
Note: Duty Cycle Correction Factor=20log(x). Where: x is Duty Cycle



ON TIME AND DUTY CYCLE MID CH PLOT



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ON TIME AND DUTY CYCLE MID CH PLOT-2

Note: All the modes had been tested, but only the worst duty cycle recorded in the report.



6.2. 20 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

<u>LIMITS</u>

CFR 47 FCC Part15 (15.249) Subpart C RSS-Gen Issue 5			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.215 (c)	20dB Bandwidth	for reporting purposes only	2400-2483.5
ISED RSS-Gen Clause 6.7 Issue 5	99% Occupied Bandwidth	For reporting purposes only.	2400-2483.5

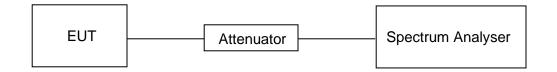
TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test	
Detector	Peak	
RBW	1% to 5% of the occupied bandwidth	
VBW	approximately 3×RBW	
Trace	Max hold	
Sweep	Auto couple	

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB/99% relative to the maximum level measured in the fundamental emission.

TEST SETUP



TEST ENVIRONMENT

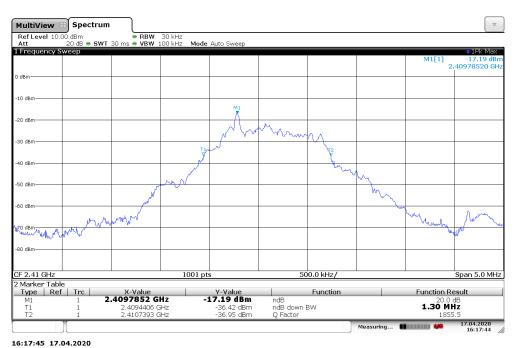
Temperature	22.8°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.0V

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Frequency
(MHz)20dB bandwidth
(MHz)99% bandwidth
(MHz)Result24101.301.2878PASS

20 dB BANDWIDTH LOW CH

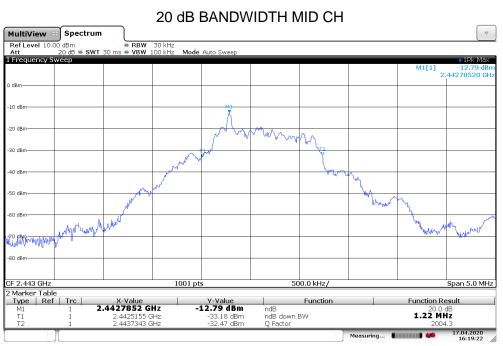


99% OCCUPIED BANDWIDTH LOW CH



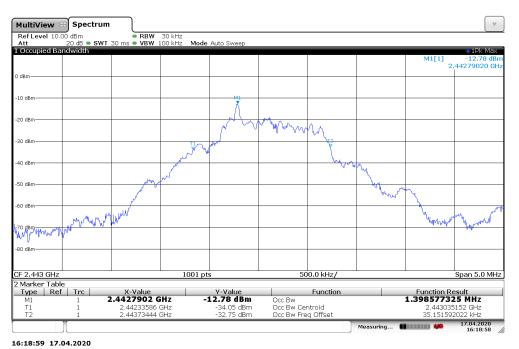


Frequency	20dB bandwidth	99% bandwidth	Result
(MHz)	(MHz)	(MHz)	
2443	1.22	1.3986	PASS



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99% OCCUPIED BANDWIDTH MID CH



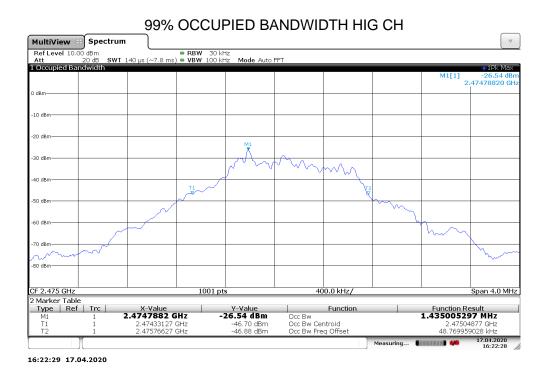


Frequency (MHz)	20dB bandwidth (MHz)	99% bandwidth (MHz)	Result
2475	1.40	1.4350	PASS

20 dB BANDWIDTH HIG CH



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7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

<u>LIMITS</u>

CFR 47 FCC §15.205 and §15.209

CFR 47 FCC §15.249 (a)(d)(c)(e)

ISED RSS-210 Issue 9 Annex B B.10

RSS-GEN Clause 8.9

The field strength of emissions from intentional radiators operated within these frequency bands					
Frequency (MHz)					
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3		
2400 - 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3		
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3		

Emissions radiated outside of the specified frequency bands above 30MHz					
Frequency Range	Field Strength Limit	Field Strength Limit			
(MHz)	(uV/m) at 3 m	(dBuV/m) at 3 m			
(11112)		Quasi-Peak			
30 - 88	100	40			
88 - 216	150	43.5			
216 - 960	200	46			
Above 960	500	54			
Above 1000	500	Foo Peak Avera			
	500	74	54		

FCC Emissions radiated outside of the specified frequency bands below 30MHz					
Frequency (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			



ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz						
Frequency Magnetic field strength (H-Field) (μA/m) Measurement distance (m)						
9 - 490 kHz ^{Note 1}	6.37/F (F in kHz)	300				
490 - 1705 kHz	63.7/F (F in kHz)	30				
1.705 - 30 MHz	0.08	30				

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

IC Restricted bands please refer to ISED RSS-GEN Clause 8.10

Hz	MHz	GHz
290 - 0.110	149.9 - 150.05	9.0 - 9.2
95 - 0.505	156.52475 - 156.52525	9.3 - 9.5
735 - 2.1905	156.7 - 156.9	10.6 - 12.7
20 - 3.026	162.0125 - 167.17	13.25 - 13.4
25 - 4.128	167.72 - 173.2	14.47 - 14.5
7725 - 4.17775	240 - 285	15.35 - 16.2
0725 - 4.20775	322 - 335.4	17.7 - 21.4
177 - 5.683	399.9 - 410	22.01 - 23.12
215 - 6.218	608 - 614	23.6 - 24.0
26775 - 6.26825	960 - 1427	31.2 - 31.8
1175 - 6.31225	1435 - 1626.5	36.43 - 36.5
91 - 8.294	1645.5 - 1646.5	Above 38.6
362 - 8.366	1660 - 1710	
7625 - 8.38675	1718.8 - 1722.2	
11425 - 8.41475	2200 - 2300	
29 - 12.293	2310 - 2390	
51975 - 12.52025	2483.5 - 2500	
57675 - 12.57725	2655 - 2900	
36 - 13,41	3260 - 3267	
42 - 16.423	3332 - 3339	
69475 - 16.69525	3345.8 - 3358	
80425 - 16.80475	3500 - 4400	
5 - 25.67	4500 - 5150	
5 - 38.25	5350 - 5460	
- 74.6	7250 - 7750	
8 - 75.2	8025 - 8500	

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.



FCC Restricted bands of operation:

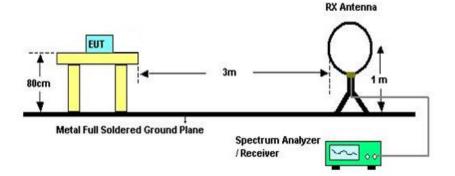
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. ²Above 38.6c



TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80cm meter above ground.

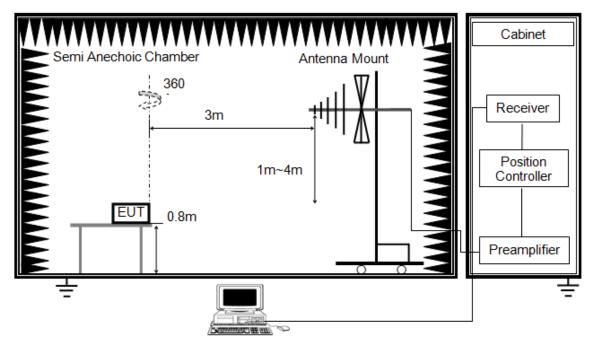
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open field site. Therefore, the sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.



Below 1G



The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured



Above 1G Cabinet emi Anechoic Chamber Antenna Mount 360 Receiver 3m 1m~4m Position Controller EÜT 1.5m 1m Preamplifier 5

The setting of the spectrum analyser

RBW	1M
IV B W	PEAK: 3M AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter or band reject filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

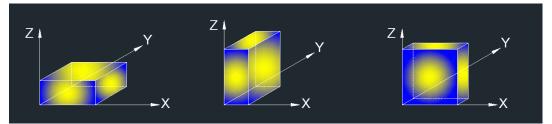
3. The EUT was placed on a turntable with 150cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements. Where necessary, average emission are determined by applying the Duty Cycle Correction Factor to the peak measurements. For the Duty Cycle and Correction Factor please refer to clause 6.1. ON TIME AND DUTY CYCLE.



X axis, Y axis, Z axis positions:



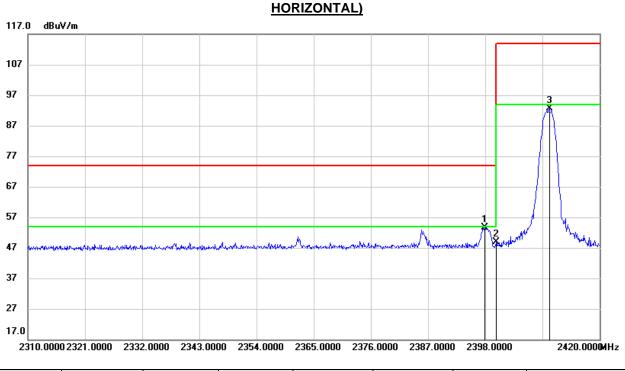
Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

TEST ENVIRONMENT

Temperature	23.6°C	Relative Humidity	60%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.0V

7.2. RESTRICTED BANDEDGE AND FIELD STRENGTH OF INTENTIONAL EMISSIONS

RESTRICTED BANDEDGE AND FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL,



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2397.890	20.55	32.98	53.53	74.00	-20.47	peak
2	2400.000	15.96	32.98	48.94	74.00	-25.06	peak
3	2410.320	59.45	33.06	92.51	114.00	-21.49	peak

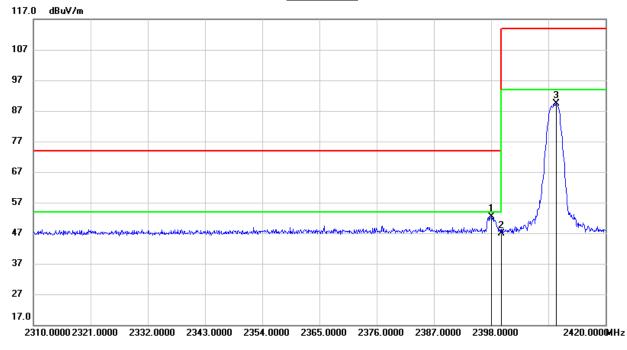
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



RESTRICTED BANDEDGE AND FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2398.000	19.42	32.98	52.40	74.00	-21.60	peak
2	2400.000	13.97	32.98	46.95	74.00	-27.05	peak
3	2410.540	56.41	33.06	89.47	114.00	-24.53	peak

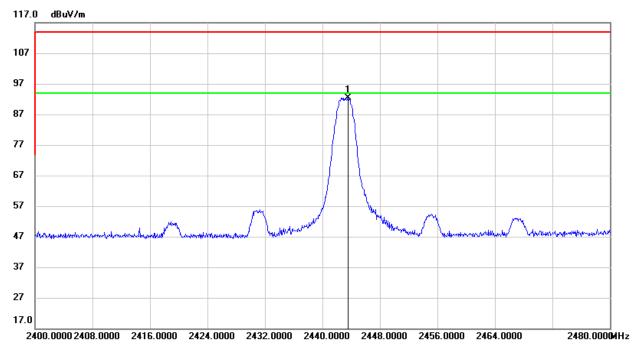
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



FIELD STRENGTH OF INTENTIONAL EMISSIONS (MIDDLE CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2443.520	59.09	33.29	92.38	114.00	-21.62	peak

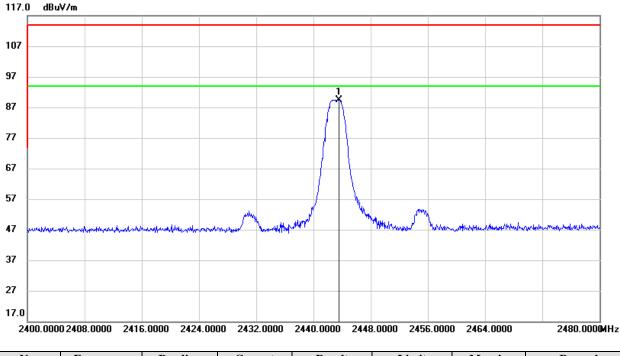
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



FIELD STRENGTH OF INTENTIONAL EMISSIONS (MIDDLE CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2443.520	56.11	33.29	89.40	114.00	-24.60	peak

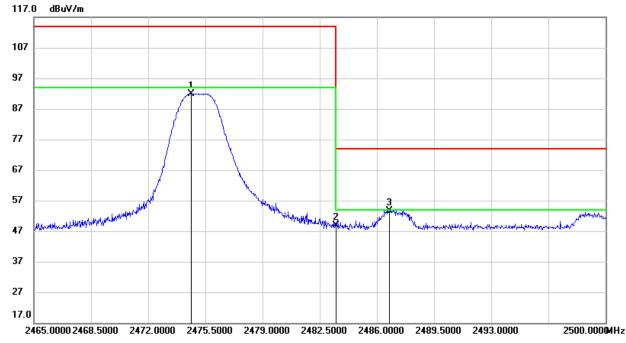
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



RESTRICTED BANDEDGE AND FIELD STRENGTH OF INTENTIONAL EMISSIONS (HIGH CHANNEL, HORIZONTAL)



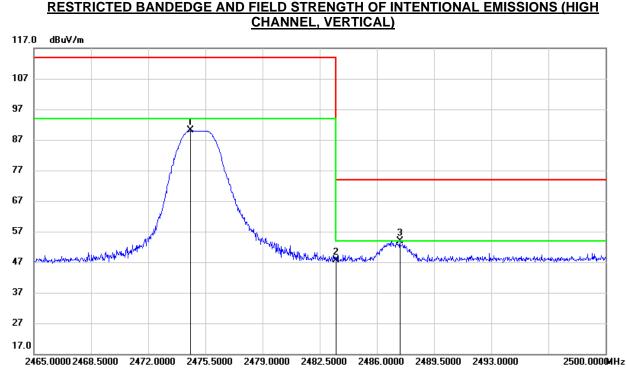
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.625	58.45	33.51	91.96	114.00	-22.04	peak
2	2483.500	15.31	33.58	48.89	74.00	-25.11	peak
3	2486.770	20.09	33.61	53.70	74.00	-20.30	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.590	56.56	33.51	90.07	114.00	-23.93	peak
2	2483.500	14.12	33.58	47.70	74.00	-26.30	peak
3	2487.400	20.25	33.61	53.86	74.00	-20.14	peak

Note: 1. Measurement = Reading Level + Correct Factor.

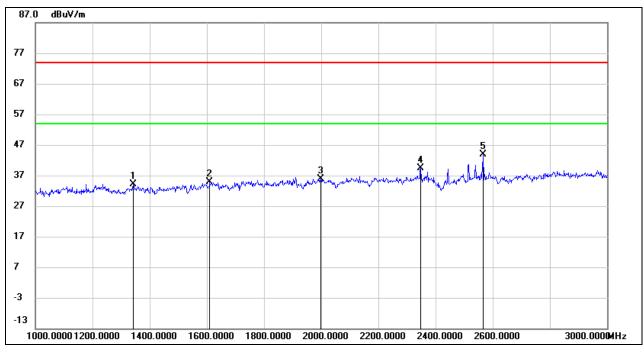
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



7.3. SPURIOUS EMISSIONS (1~3GHz)

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1342.000	46.45	-12.35	34.10	74.00	-39.90	peak
2	1610.000	46.18	-11.35	34.83	74.00	-39.17	peak
3	1998.000	45.82	-9.83	35.99	74.00	-38.01	peak
4	2348.000	47.35	-8.03	39.32	74.00	-34.68	peak
5	2566.000	51.41	-7.52	43.89	74.00	-30.11	peak

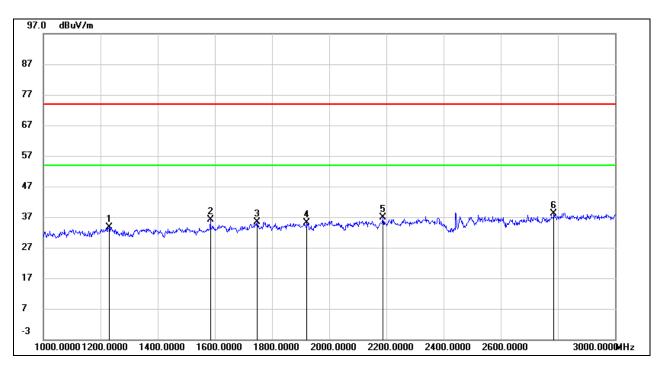
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.





HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1230.000	46.15	-12.58	33.57	74.00	-40.43	peak
2	1584.000	47.70	-11.53	36.17	74.00	-37.83	peak
3	1748.000	45.85	-10.43	35.42	74.00	-38.58	peak
4	1922.000	45.02	-9.93	35.09	74.00	-38.91	peak
5	2188.000	45.52	-8.72	36.80	74.00	-37.20	peak
6	2786.000	44.26	-6.20	38.06	74.00	-35.94	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

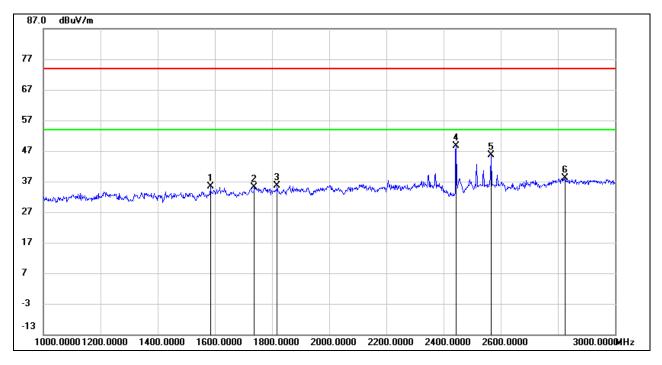
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.



HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1584.000	46.80	-11.53	35.27	74.00	-38.73	peak
2	1738.000	45.78	-10.53	35.25	74.00	-38.75	peak
3	1818.000	45.65	-9.92	35.73	74.00	-38.27	peak
4	2443.000	56.18	-7.55	48.63	/	/	fundamental
5	2566.000	53.25	-7.52	45.73	74.00	-28.27	peak
6	2826.000	44.03	-5.92	38.11	74.00	-35.89	peak

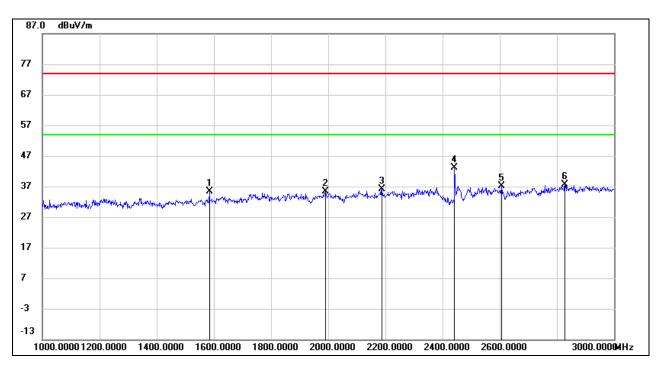
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.





HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1584.000	46.98	-11.53	35.45	74.00	-38.55	peak
2	1990.000	45.29	-9.84	35.45	74.00	-38.55	peak
3	2188.000	44.78	-8.72	36.06	74.00	-37.94	peak
4	2443.000	50.58	-7.57	43.01	/	/	fundamental
5	2606.000	44.83	-7.67	37.16	74.00	-36.84	peak
6	2828.000	43.42	-5.91	37.51	74.00	-36.49	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.





HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1584.000	46.35	-11.53	34.82	74.00	-39.18	peak
2	1724.000	45.30	-10.67	34.63	74.00	-39.37	peak
3	1946.000	44.95	-9.90	35.05	74.00	-38.95	peak
4	2110.000	45.88	-9.10	36.78	74.00	-37.22	peak
5	2475.000	50.66	-7.33	43.33	/	/	fundamental
6	2566.000	53.19	-7.52	45.67	74.00	-28.33	peak

2000.0000

2200.0000

2400.0000

2600.0000

3000.000MHz

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

1400.0000

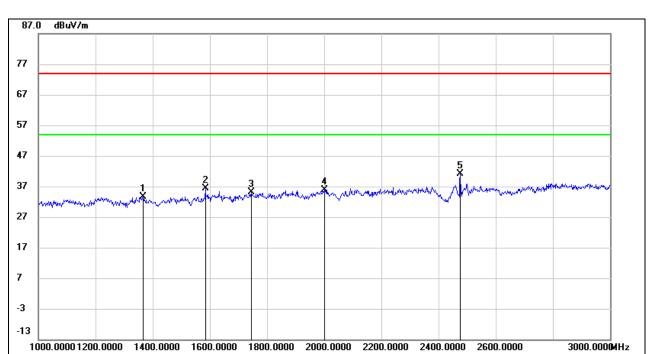
1600.0000

1800.0000

1000.00001200.0000

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.





HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1366.000	46.10	-12.37	33.73	74.00	-40.27	peak
2	1584.000	47.96	-11.53	36.43	74.00	-37.57	peak
3	1744.000	45.65	-10.46	35.19	74.00	-38.81	peak
4	2000.000	45.69	-9.82	35.87	74.00	-38.13	peak
5	2475.000	48.37	-7.33	41.04	/	/	fundamental

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

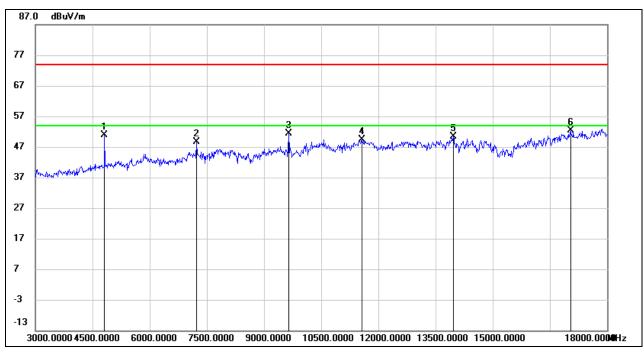
3. Peak: Peak detector.

4. Filter losses were only considered in then spurious frequency bands and the authorized band was not corrected for BRF losses.



7.4. SPURIOUS EMISSIONS (3~18GHz)

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4815.000	50.27	0.51	50.78	74.00	-23.22	peak
2	7230.000	42.77	5.89	48.66	74.00	-25.34	peak
3	9645.000	41.66	9.66	51.32	74.00	-22.68	peak
4	11565.000	36.13	13.26	49.39	74.00	-24.61	peak
5	13965.000	34.25	16.09	50.34	74.00	-23.66	peak
6	17040.000	31.89	20.49	52.38	74.00	-21.62	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

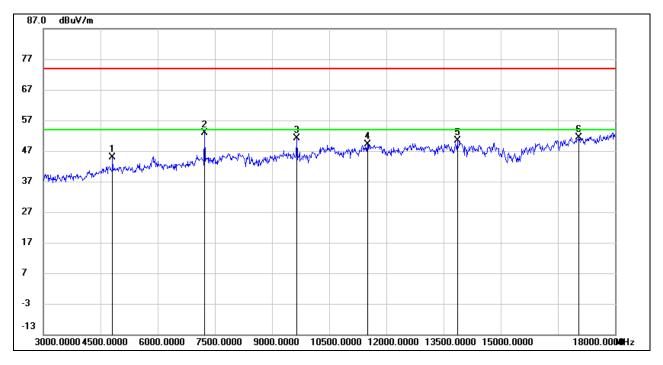
3. Peak: Peak detector.

4. The High Pass filter loss factor already add into the correct factor.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4815.000	44.43	0.51	44.94	74.00	-29.06	peak
2	7230.000	47.02	5.89	52.91	74.00	-21.09	peak
3	9645.000	41.44	9.66	51.10	74.00	-22.90	peak
4	11505.000	35.78	13.42	49.20	74.00	-24.80	peak
5	13860.000	33.78	16.56	50.34	74.00	-23.66	peak
6	17040.000	30.98	20.49	51.47	74.00	-22.53	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

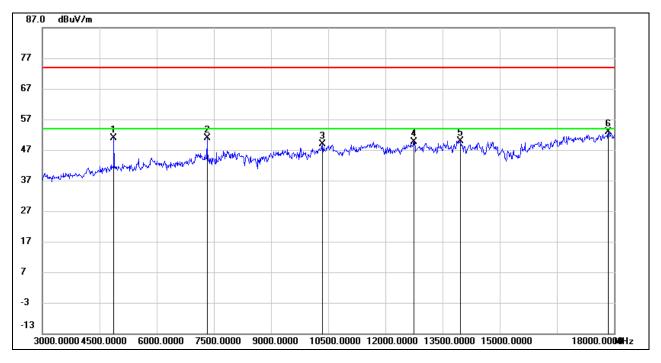
3. Peak: Peak detector.

4. The High Pass filter loss factor already add into the correct factor.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4875.000	50.08	0.76	50.84	74.00	-23.16	peak
2	7320.000	44.76	6.14	50.90	74.00	-23.10	peak
3	10350.000	37.81	11.02	48.83	74.00	-25.17	peak
4	12750.000	34.54	14.98	49.52	74.00	-24.48	peak
5	13965.000	33.91	16.09	50.00	74.00	-24.00	peak
6	17850.000	29.62	23.32	52.94	74.00	-21.06	peak

Note: 1. Measurement = Reading Level + Correct Factor.

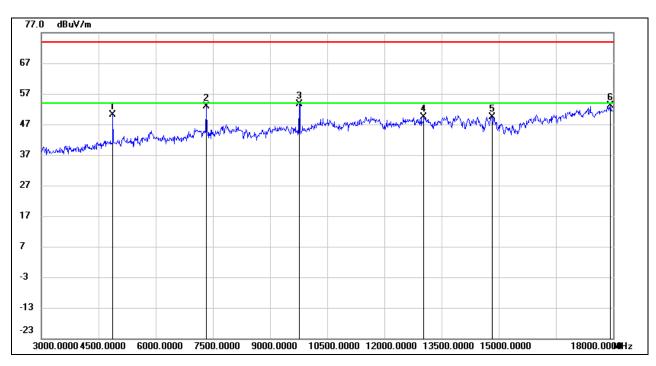
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. The High Pass filter loss factor already add into the correct factor.

5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





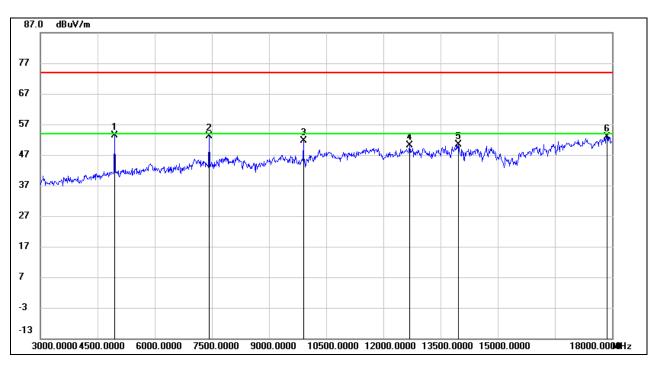
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4875.000	49.45	0.76	50.21	74.00	-23.79	peak
2	7320.000	46.66	6.14	52.80	74.00	-21.20	peak
3	9765.000	43.90	9.69	53.59	74.00	-20.41	peak
4	13035.000	34.23	15.03	49.26	74.00	-24.74	peak
5	14820.000	33.42	15.94	49.36	74.00	-24.64	peak
6	17925.000	29.70	23.37	53.07	74.00	-20.93	peak

Note: 1. Measurement = Reading Level + Correct Factor.

- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Peak: Peak detector.
- 4. The High Pass filter loss factor already add into the correct factor.
- 5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





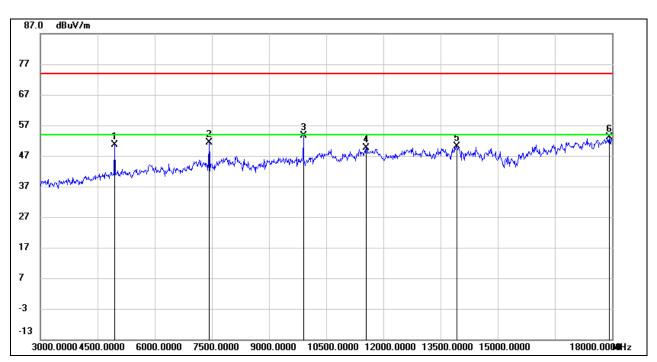
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4950.000	52.33	1.13	53.46	74.00	-20.54	peak
2	7425.000	46.70	6.39	53.09	74.00	-20.91	peak
3	9900.000	41.57	10.08	51.65	74.00	-22.35	peak
4	12690.000	35.87	14.25	50.12	74.00	-23.88	peak
5	13965.000	34.28	16.09	50.37	74.00	-23.63	peak
6	17865.000	29.63	23.33	52.96	74.00	-21.04	peak

Note: 1. Measurement = Reading Level + Correct Factor.

- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Peak: Peak detector.
- 4. The High Pass filter loss factor already add into the correct factor.
- 5. Proper operation of the transmitter prior to adding the filter to the measurement chain.





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4950.000	49.60	1.13	50.73	74.00	-23.27	peak
2	7425.000	44.93	6.39	51.32	74.00	-22.68	peak
3	9900.000	43.66	10.08	53.74	74.00	-20.26	peak
4	11550.000	36.45	13.30	49.75	74.00	-24.25	peak
5	13920.000	34.00	16.17	50.17	74.00	-23.83	peak
6	17925.000	29.74	23.37	53.11	74.00	-20.89	peak

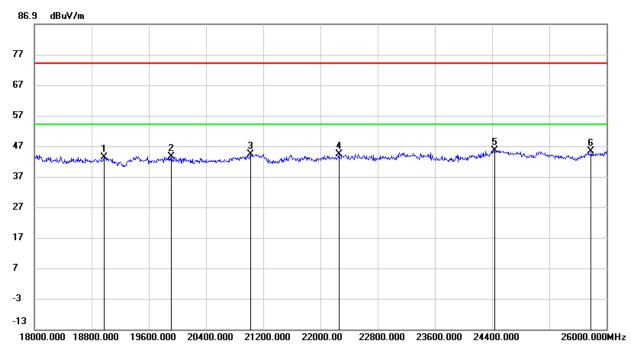
Note: 1. Measurement = Reading Level + Correct Factor.

- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Peak: Peak detector.
- 4. The High Pass filter loss factor already add into the correct factor.
- 5. Proper operation of the transmitter prior to adding the filter to the measurement chain.



7.5. SPURIOUS EMISSIONS (18~26GHz)

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	18976.000	48.16	-4.89	43.27	74.00	-30.73	peak
2	19912.000	47.91	-4.36	43.55	74.00	-30.45	peak
3	21024.000	49.62	-5.30	44.32	74.00	-29.68	peak
4	22256.000	50.45	-6.06	44.39	74.00	-29.61	peak
5	24432.000	48.47	-2.86	45.61	74.00	-28.39	peak
6	25784.000	46.73	-1.49	45.24	74.00	-28.76	peak

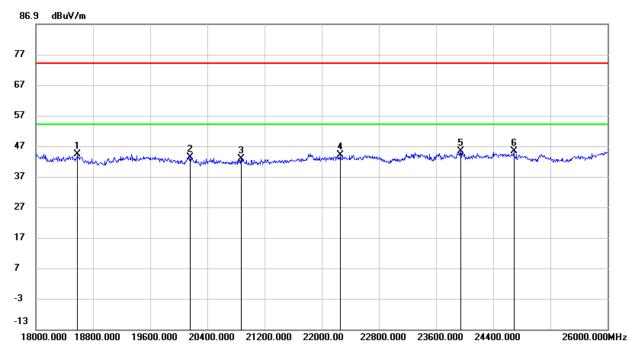
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	18584.000	48.69	-4.53	44.16	74.00	-29.84	peak
2	20160.000	48.07	-4.70	43.37	74.00	-30.63	peak
3	20872.000	48.04	-5.19	42.85	74.00	-31.15	peak
4	22256.000	50.08	-6.06	44.02	74.00	-29.98	peak
5	23944.000	49.45	-4.14	45.31	74.00	-28.69	peak
6	24688.000	47.39	-2.11	45.28	74.00	-28.72	peak

Note: 1. Measurement = Reading Level + Correct Factor.

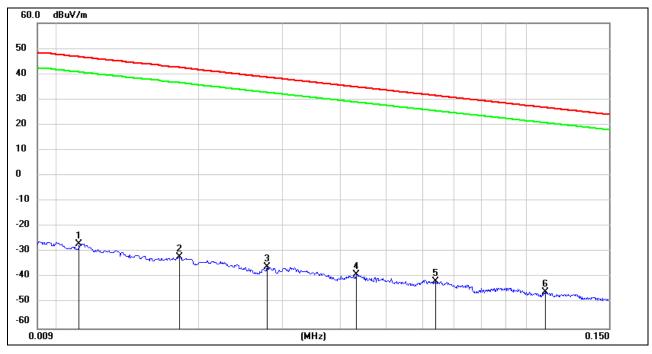
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

Note: All test modes had been tested, only the worst data record in the report.

7.6. SPURIOUS EMISSIONS BELOW 30MHz

SPURIOUS EMISSIONS (LOW CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)



<u>9kHz~ 150kHz</u>

No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Result (dBuA/m)	Limit (dBuA/m)	(dB)	
1	0.0111	74.45	-101.39	-26.94	46.69	-78.44	-4.81	-73.63	peak
2	0.0181	69.35	-101.36	-32.01	42.45	-83.51	-9.05	-74.46	peak
3	0.0279	65.67	-101.38	-35.71	38.69	-87.21	-12.81	-74.40	peak
4	0.0432	62.57	-101.45	-38.88	34.89	-90.38	-16.61	-73.77	peak
5	0.0640	59.95	-101.54	-41.59	31.48	-93.09	-20.02	-73.07	peak
6	0.1097	55.97	-101.77	-45.80	26.80	-97.3	-24.7	-72.60	peak

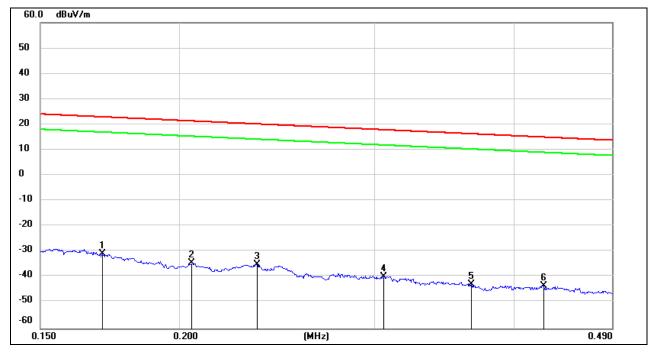
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

4. $dBuA/m = dBuV/m - 20log10(120\pi) = dBuV/m - 51.5$.

<u>150kHz ~ 490kHz</u>



No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
				Result	Limit	Result	Limit		
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1706	71.01	-101.67	-30.66	22.97	-82.16	-28.53	-53.63	peak
2	0.2053	67.29	-101.73	-34.44	21.35	-85.94	-30.15	-55.79	peak
3	0.2348	66.93	-101.77	-34.84	20.19	-86.34	-31.31	-55.03	peak
4	0.3057	62.26	-101.86	-39.60	17.90	-91.1	-33.6	-57.50	peak
5	0.3662	59.08	-101.93	-42.85	16.33	-94.35	-35.17	-59.18	peak
6	0.4248	58.59	-101.99	-43.40	15.04	-94.9	-36.46	-58.44	peak

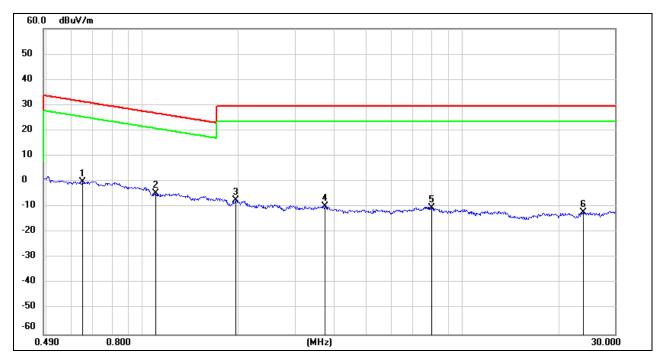
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

4. $dBuA/m = dBuV/m - 20log10(120\pi) = dBuV/m - 51.5$.

<u>490kHz ~ 30MHz</u>



No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
				Result	Limit	Result	Limit		
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.6481	62.07	-62.10	-0.03	31.37	-51.53	-20.13	-31.40	peak
2	1.1021	57.53	-62.22	-4.69	26.76	-56.19	-24.74	-31.45	peak
3	1.9516	54.61	-61.84	-7.23	29.54	-58.73	-21.96	-36.77	peak
4	3.7100	51.70	-61.41	-9.71	29.54	-61.21	-21.96	-39.25	peak
5	8.0151	50.84	-61.07	-10.23	29.54	-61.73	-21.96	-39.77	peak
6	23.8323	48.43	-60.54	-12.11	29.54	-63.61	-21.96	-41.65	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

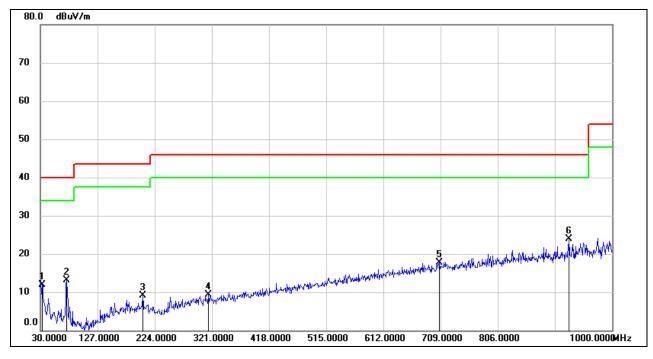
3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

4. $dBuA/m = dBuV/m - 20log10(120\pi) = dBuV/m - 51.5$.

Note: All test modes had been tested, only the worst data record in the report.

7.7. SPURIOUS EMISSIONS BELOW 1GHz AND ABOVE 30MHz

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	32.9100	29.20	-17.33	11.87	40.00	-28.13	QP
2	74.6200	33.37	-20.32	13.05	40.00	-26.95	QP
3	203.6300	25.22	-16.10	9.12	43.50	-34.38	QP
4	315.1800	23.39	-14.04	9.35	46.00	-36.65	QP
5	707.0600	24.50	-6.82	17.68	46.00	-28.32	QP
6	927.2500	27.67	-3.81	23.86	46.00	-22.14	QP

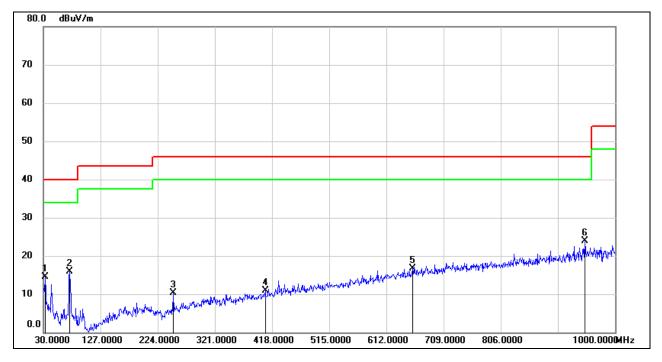
Note: 1. Result Level = Read Level + Correct Factor.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB / m)	(dBuV/m)	(dBuV/m)	(dB)	
1	32.9100	31.77	-17.33	14.44	40.00	-25.56	QP
2	74.6200	36.16	-20.32	15.84	40.00	-24.16	QP
3	250.1900	26.55	-16.34	10.21	46.00	-35.79	QP
4	406.3599	23.46	-12.62	10.84	46.00	-35.16	QP
5	656.6200	24.56	-7.83	16.73	46.00	-29.27	QP
6	948.5900	27.43	-3.45	23.98	46.00	-22.02	QP

Note: 1. Result Level = Read Level + Correct Factor.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

Note: All test modes had been tested, only the worst data record in the report.



8. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RESULTS Complies

END OF REPORT