FCC Test Report

(Co-Located)

Report No.:	RF200428C03-9
FCC ID:	PZWBHTM80QWG
Test Model:	BHT-M80-QWG
Received Date:	Apr. 28, 2020
Test Date:	Sep. 16 ~ Sep. 17, 2020
Issued Date:	Sep. 28, 2020
Applicant:	DENSO WAVE INCORPORATED
Address:	1 Yoshiike Kusagi Agui-cho,Chita-gun Aichi 470-2297, Japan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration/ Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF200428C03-9	Original release	Sep. 28, 2020

1 Certificate of Conformity

Product:	2D Code Handy Terminal
Brand:	DENSO
Test Model:	BHT-M80-QWG
Sample Status:	Engineering sample
Applicant:	DENSO WAVE INCORPORATED
Test Date:	Sep. 16 ~ Sep. 17, 2020
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407) FCC Part 22, Subpart H FCC Part 24, Subpart E FCC Part 27, Subpart C, D, F, H, L, M ANSI 63.26-2015 ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Sep. 28, 2020
Polly Chien / Specialist

Approved by : _____ , **Date:** Sep. 28, 2020
Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407) FCC Part 22, Subpart H FCC Part 24, Subpart E FCC Part 27, Subpart C, D, F, H, L, M ANSI 63.26-2015 ANSI C63.10-2013		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6) 2.1053 22.917 24.238 27.53(a) 27.53(c) 27.53(h) 27.53(m)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2390.00MHz.

Note:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

2.1 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:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2D Code Handy Terminal		
Brand	DENSO		
Test Model	BHT-M80-QWG		
Sample Status	Engineering sample		
Power Supply Rating	3.85Vdc (Battery) 5.0Vdc / 9.0Vdc / 12.0Vdc (from adapter)		
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM	
	BT EDR	GFSK, π/4-DQPSK, 8DPSK	
	BT LE	GFSK	
	WCDMA	BPSK, QPSK	
	LTE	QPSK, 16QAM	
Modulation Technology	WLAN	DSSS, OFDM	
	BT EDR	FHSS	
Transfer Rate	WLAN	802.11b:11/5.5/2/1Mbps 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps	
	BT EDR	1/2/3Mbps	
	BT LE	1/2Mbps	
Operating Frequency	WLAN	2.4GHz: 2412~2462MHz 5.0GHz: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz	
	BT EDR	2402~2480MHz	
	BT LE	2402~2480MHz	
	WCDMA	WCDMA Band 2	1850~1910MHz
		WCDMA Band 5	824~849MHz
	LTE	LTE Band 2	1850~1910MHz
		LTE Band 4	1710~1755MHz
		LTE Band 5	824~849MHz
		LTE Band 7	2500~2570MHz
		LTE Band 12	698~716MHz
		LTE Band 13	777~787MHz
		LTE Band 17	704~716MHz
		LTE Band 25	1850~1915MHz

Antenna Type	WLAN/BT	Refer to note
	WCDMA	Refer to note
	LTE	Refer to note
Antenna Connector	WLAN/BT	Refer to Note
	WCDMA	Refer to note
	LTE	Refer to note
Accessory Device	Refer to note	
Data Cable Supplied	Refer to note	

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Band	Modulation Mode	TX Function
2.4GHz Band	802.11b	2TX
	802.11g	2TX
	802.11n (HT20)	2TX
	802.11n (HT40)	2TX
5GHz Band	802.11a	2TX
	802.11n (HT20)	2TX
	802.11n (HT40)	2TX
	802.11ac (VHT20)	2TX
	802.11ac (VHT40)	2TX
	802.11ac (VHT80)	2TX

* The bandwidth and modulation are similar for HT20/HT40/ VHT20/VHT40 on 802.11n mode,. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

2. The EUT contains following accessory devices.

Battery 1	
Brand	DENSO
Model	BT1
Rating	3.85Vdc, 4020mAh, 15.47Wh

Battery 2	
Brand	DENSO
Model	BT1S
Rating	3.85Vdc, 2900mAh, 11.16Wh

Adapter	
Brand	CHANNEL WELL TECHNOLOGY
Model	2ACP0183C
Input Power	100-240Vac~0.5A , 50/60Hz
Output Power	5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W
Data Cable	1.45 m shielded USB cable without core

Cradle 1: QC3.0 charge single Cradle (Option)	
Brand	DENSO
Model	CU-M80UQ
Adapter	
Brand	CHANNEL WELL TECHNOLOGY
Model	2ACP0183C
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	5.0Vdc / 3.0A, 15.0W 9.0Vdc / 2.0A, 18.0W 12.0Vdc / 1.5A, 18.0W
Data Cable	1.45 m shielded USB cable without core

Cradle 2: USB Cradle with spare battery charge (Option)	
Brand	DENSO
Model	CU-M80U
Adapter	
Brand	Sunny
Model	SYS1548-5012-T3
Input Power	100-240Vac, 1.5A MAX, 50-60Hz
Output Power	+12.0Vdc, 4.16A
Power cable	DC: 1.16m cable with one core AC: 1.71m non-shielded cable without core
Data Cable	1.45 m shielded USB cable without core

* After pretesting, the EUT with adapter was the worst cases and chose for final test.

3. The EUT uses the following antennas.

For WLAN/BT

Ant. Type	PIFA												
Ant. Connector	Spring												
Ant. 1 (WLAN)													
Frequency (MHz)	2412	2442	2484	5170	5180	5220	5320	5420	5520	5620	5720	5825	5835
Peak Gain (dBi)	0.81	1.36	1.05	3.34	2.97	2.96	2.78	2.88	3.28	3.24	3.45	3.18	3.39
Ant. 1 (BT)													
Frequency (MHz)	2402			2412			2442			2480			
Peak Gain (dBi)	-0.11			0.81			1.36			1.36			
Ant. 2 (WLAN)													
Frequency (MHz)	2412	2442	2484	5170	5180	5220	5320	5420	5520	5620	5720	5825	5835
Peak Gain (dBi)	1.33	1.47	0.29	3.80	3.78	3.65	3.51	2.98	2.99	3.09	3.49	3.53	3.44

For WWAN:

Ant. Type	PIFA		
Ant. Connector	Spring		
GSM850/WCDMA Band 5/LTE Band 5			
Frequency (MHz)	824	836	849
Peak Gain (dBi)	0.18	0.35	**0.69**
GSM1900/WCDMA Band 2/LTE Band 2			
Frequency (MHz)	1850	1880	1910
Peak Gain (dBi)	2.13	1.97	1.65

LTE Band 4			
Frequency (MHz)	1710	1732	1755
Peak Gain (dBi)	1.23	1.15	1.10
LTE Band 7			
Frequency (MHz)	2500	2535	2570
Peak Gain (dBi)	2.51	2.19	2.40
LTE Band 12			
Frequency (MHz)	698	707	716
Peak Gain (dBi)	-1.23	-0.94	-0.69
LTE Band 13			
Frequency (MHz)	777	782	787
Peak Gain (dBi)	0.31	0.58	0.40
LTE Band 17			
Frequency (MHz)	704	710	716
Peak Gain (dBi)	-0.84	-0.73	-0.69
LTE Band 25			
Frequency (MHz)	1850	1882	1915
Peak Gain (dBi)	2.13	2.07	1.75

* The max. gain was chosen for final tests.
* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

4. The WWAN could transmit simultaneously either with WLAN 2.4GHz or 5GHz or BT at the same time.

3.2 Description of Test Modes

For WLAN:

For 2.4GHz

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz

5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290 MHz

For 5500 ~ 5720MHz:

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz
138	5690 MHz		

5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775 MHz

BT EDR:

79 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

BT LE:

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE≥1G	RE<1G	
-	√	√	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b + GSM850	2412 ~ 2462	1 to 11	1 + 128	DSSS
		824.2~848.8	128 to 251		GSM
-	GFSK + GSM850	2402 ~ 2480	0 to 78	39 + 128	GFSK
		824.2~848.8	128 to 251		GSM
-	802.11a + GSM850	5500 ~ 5720	100 to 144	149 + 128	OFDM
		824.2~848.8	128 to 251		GSM

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b + GSM850	2412 ~ 2462	1 to 11	1 + 128	DSSS
		824.2~848.8	128 to 251		GSM
-	GFSK + GSM850	2402 ~ 2480	0 to 78	39 + 128	GFSK
		824.2~848.8	128 to 251		GSM
-	802.11a + GSM850	5500 ~ 5720	100 to 144	149 + 128	OFDM
		824.2~848.8	128 to 251		GSM

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 66% RH	120Vac, 60Hz	Adair Peng
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz	Adair Peng

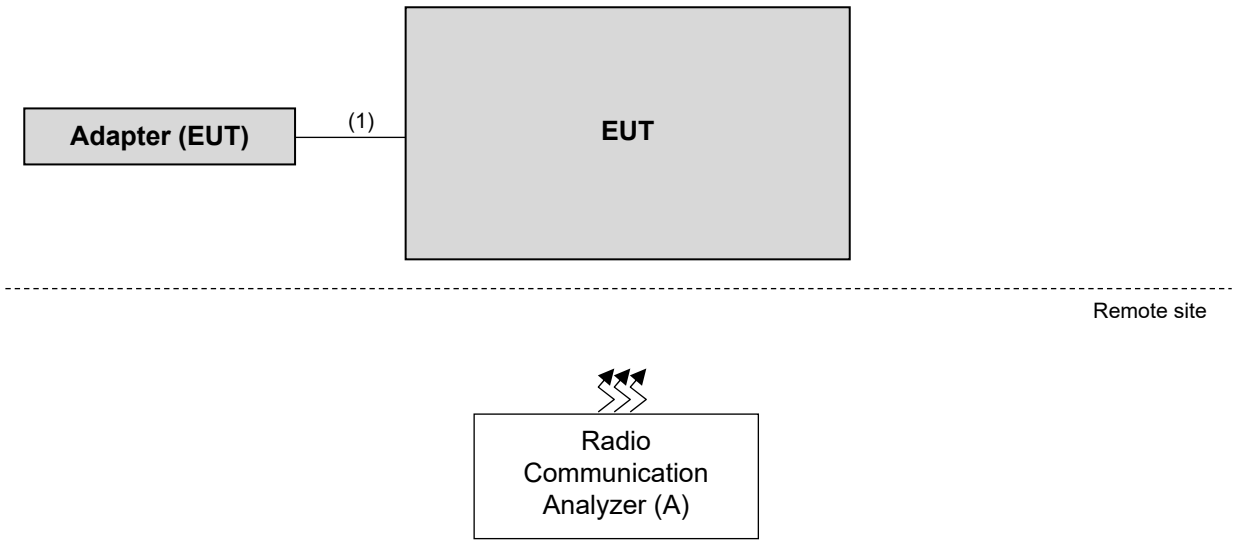
3.3 Description of Support Units

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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	-

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	1.45	Y	0	Accessory of EUT

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specification of the EUT declared by the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)
FCC Part 22, Subpart H
FCC Part 24, Subpart E
FCC Part 27, Subpart C, D, F, H, L, M
ANSI 63.26-2015
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

For WLAN/BT:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
</table>

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

For WWAN

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	ESR3	102579	Jul. 07, 2020	Jul. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 23, 2020	Mar. 22, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190 004/MY55190007/MY55 210005	Jul. 13, 2020	Jul. 12, 2021
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2020	May 31, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 06, 2020	Jun. 05, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.

4.1.3 Test Procedures

For WLAN/BT

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. The height of antenna 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.

d. 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.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 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.

For WWAN

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

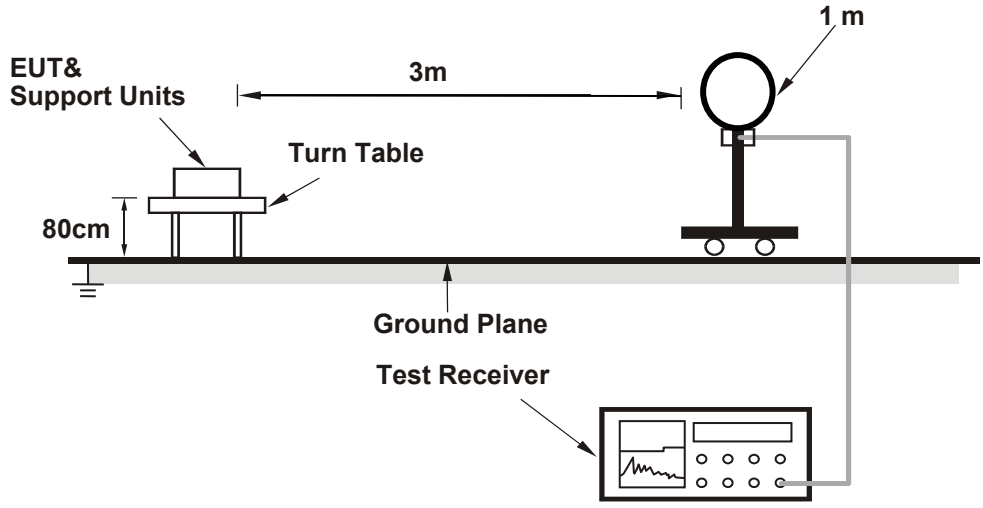
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.1.4 Deviation from Test Standard

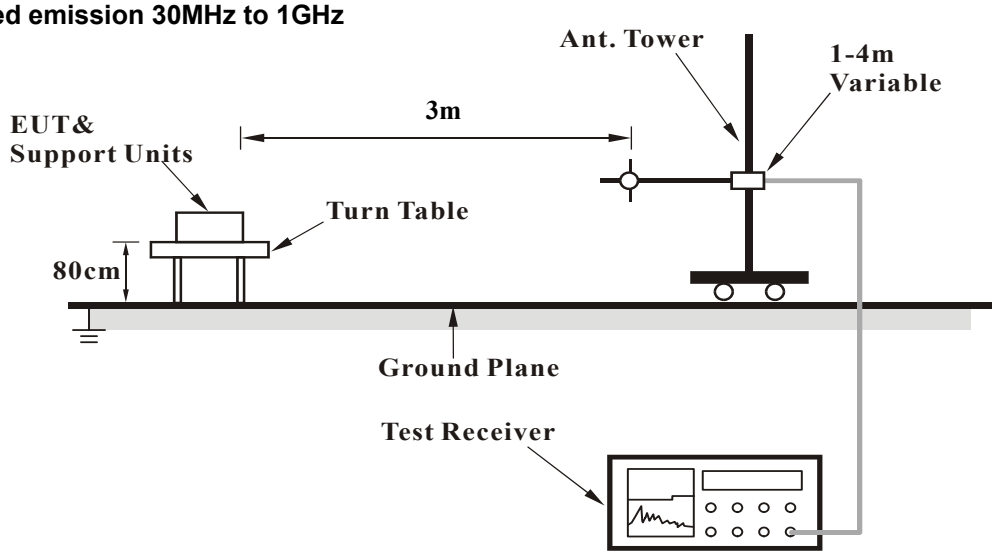
No deviation.

4.1.5 Test Setup

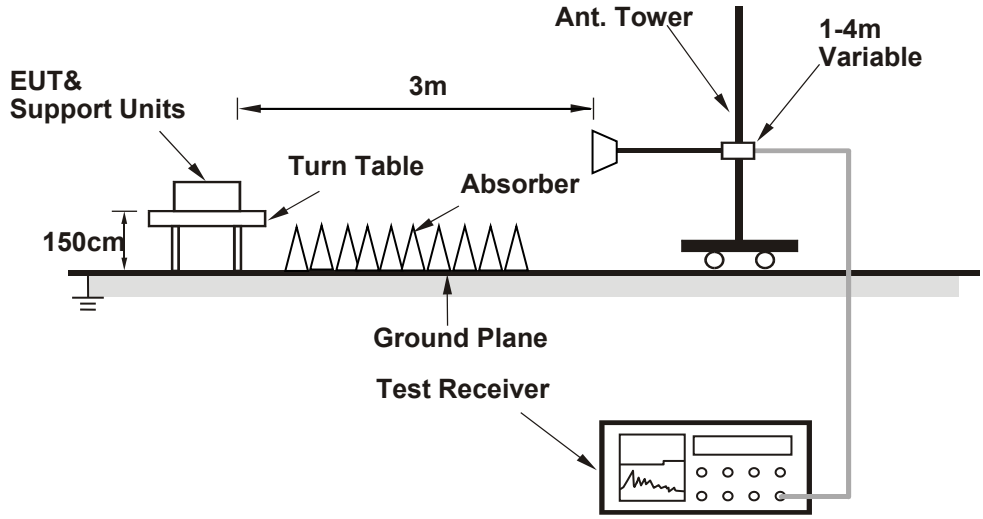
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. The EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

802.11b + GSM850

CHANNEL	CH 1 + CH 128	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.0 PK	74.0	-12.0	1.08 H	308	27.7	34.3
2	2390.00	51.9 AV	54.0	-2.1	1.08 H	308	17.6	34.3
3	*2412.00	106.9 PK			1.08 H	308	72.6	34.3
4	*2412.00	103.1 AV			1.08 H	308	68.8	34.3
5	4824.00	48.6 PK	74.0	-25.4	3.26 H	340	42.4	6.2
6	4824.00	37.2 AV	54.0	-16.8	3.26 H	340	31.0	6.2
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.1 PK	74.0	-11.9	1.90 V	7	27.8	34.3
2	**2390.00**	**53.5 AV**	**54.0**	**-0.5**	**1.90 V**	**7**	**19.2**	**34.3**
3	*2412.00	110.1 PK			1.90 V	7	75.8	34.3
4	*2412.00	106.3 AV			1.90 V	7	72.0	34.3
5	4824.00	48.8 PK	74.0	-25.2	1.36 V	291	42.6	6.2
6	4824.00	40.8 AV	54.0	-13.2	1.36 V	291	34.6	6.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	CH 1 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-1.7	30.7	0.0	30.7	38.5	-7.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-8.8	24.6	0.0	24.6	38.5	-13.9

CHANNEL	CH 1 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-40.4	-43.9	5.5	-38.4	-13.0	-25.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-38.9	-41.1	5.5	-35.6	-13.0	-22.6

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) + 2.15dB.

GFSK + GSM850

CHANNEL	CH 39 + CH 128	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	111.0 PK			1.40 H	321	76.7	34.3
2	*2441.00	89.7 AV			1.40 H	321	55.4	34.3
3	4882.00	48.1 PK	74.0	-25.9	1.43 H	31	42.2	5.9
4	4882.00	26.8 AV	54.0	-27.2	1.43 H	31	20.9	5.9
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	115.7 PK			1.77 V	17	81.4	34.3
2	*2441.00	94.4 AV			1.77 V	17	60.1	34.3
3	4882.00	48.2 PK	74.0	-25.8	1.26 V	290	42.3	5.9
4	4882.00	26.9 AV	54.0	-27.1	1.26 V	290	21.0	5.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	CH 39 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-1.9	30.5	0.0	30.5	38.5	-8.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-8.9	24.5	0.0	24.5	38.5	-14.0

CHANNEL	CH 39 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-40.6	-44.1	5.5	-38.6	-13.0	-25.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-39.0	-41.3	5.5	-35.8	-13.0	-22.8

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) + 2.15dB.

802.1a + GSM850

CHANNEL	CH 149 + CH 128	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5610.26	57.4 PK	68.2	-10.8	1.19 H	43	51.3	6.1
2	*5745.00	113.8 PK			1.19 H	43	71.8	42.0
3	*5745.00	103.9 AV			1.19 H	43	61.9	42.0
4	#5930.13	58.6 PK	68.2	-9.6	1.19 H	43	51.6	7.0
5	11490.00	60.2 PK	74.0	-13.8	3.22 H	156	42.2	18.0
6	11490.00	47.1 AV	54.0	-6.9	3.22 H	156	29.1	18.0
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5635.26	57.0 PK	68.2	-11.2	1.31 V	3	50.8	6.2
2	*5745.00	113.2 PK			1.31 V	3	71.2	42.0
3	*5745.00	102.7 AV			1.31 V	3	60.7	42.0
4	#5969.23	58.7 PK	68.2	-9.5	1.31 V	3	51.8	6.9
5	11490.00	60.1 PK	74.0	-13.9	3.22 V	211	42.1	18.0
6	11490.00	47.2 AV	54.0	-6.8	3.22 V	211	29.2	18.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	CH 149 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-1.6	30.8	0.0	30.8	38.5	-7.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	824.2	-8.6	24.8	0.0	24.8	38.5	-13.7

CHANNEL	CH 149 + CH 128						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-40.5	-44.0	5.5	-38.5	-13.0	-25.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	1648.40	-39.1	-41.4	5.5	-35.9	-13.0	-22.9

Remarks:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) + 2.15dB.

Below 1GHz data

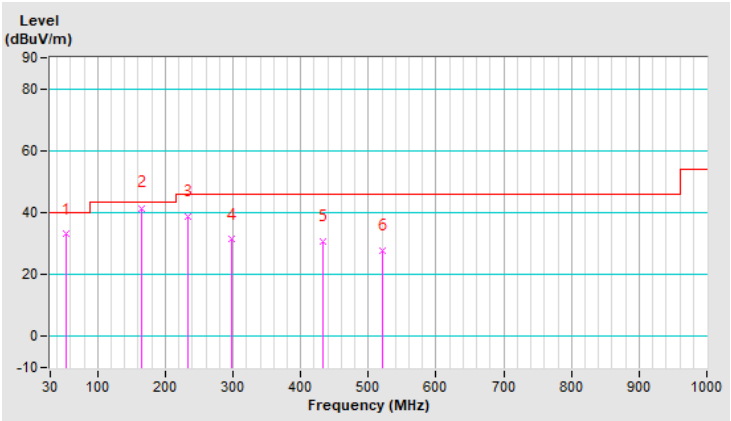
802.11b + GSM850

CHANNEL	CH 1 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	52.49	33.0 QP	40.0	-7.0	1.51 H	181	42.0	-9.0
2	164.96	41.5 QP	43.5	-2.0	1.51 H	267	50.0	-8.5
3	232.43	38.8 QP	46.0	-7.2	1.01 H	245	48.9	-10.1
4	298.51	31.3 QP	46.0	-14.7	1.01 H	246	38.1	-6.8
5	432.06	30.7 QP	46.0	-15.3	2.00 H	267	34.3	-3.6
6	520.62	27.9 QP	46.0	-18.1	1.51 H	11	29.8	-1.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

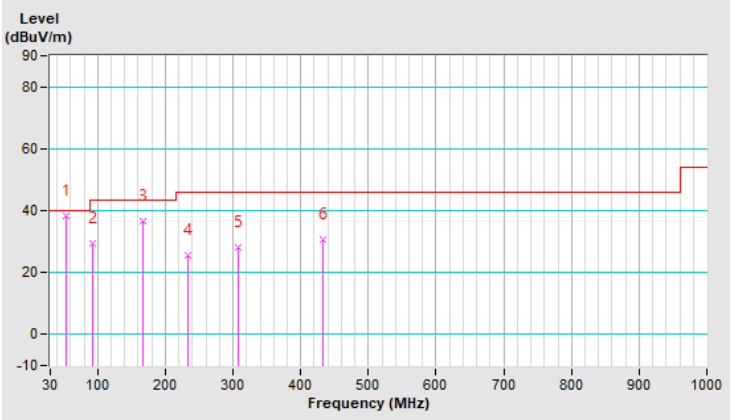


CHANNEL	CH 1 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	52.49	38.4 QP	40.0	-1.6	1.99 V	16	47.4	-9.0
2	91.86	29.3 QP	43.5	-14.2	1.00 V	95	43.5	-14.2
3	166.36	36.8 QP	43.5	-6.7	1.00 V	222	45.4	-8.6
4	232.43	25.5 QP	46.0	-20.5	1.00 V	336	35.6	-10.1
5	306.94	28.0 QP	46.0	-18.0	1.99 V	239	34.5	-6.5
6	432.06	30.6 QP	46.0	-15.4	1.00 V	169	34.2	-3.6

Remarks:

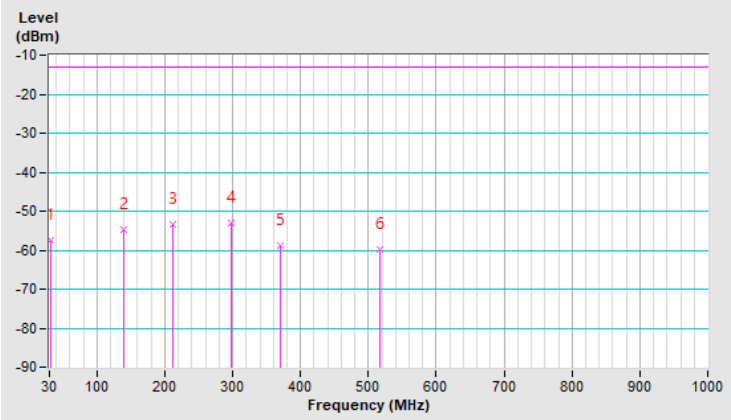
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report



CHANNEL	CH 1 + CH 128	FREQUENCY RANGE	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	32.81	-57.8	-45.7	-11.8	-57.5	-13.0	-44.5
2	139.65	-46.8	-54.4	-0.3	-54.7	-13.0	-41.7
3	211.35	-42.6	-58.8	5.4	-53.4	-13.0	-40.4
4	298.51	-48.7	-58.2	5.1	-53.1	-13.0	-40.1
5	370.20	-54.6	-63.9	5.2	-58.7	-13.0	-45.7
6	516.41	-57.9	-64.7	4.8	-59.9	-13.0	-46.9

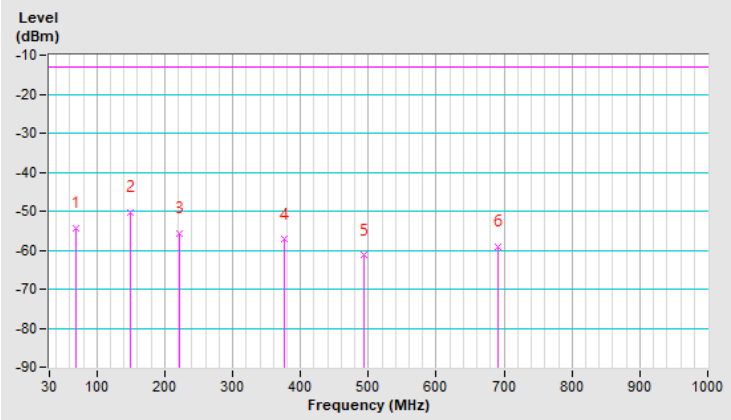
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



CHANNEL	CH 1 + CH 128	FREQUENCY RANGE	Below 1000 MHz

Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	69.36	-45.2	-49.3	-5.2	-54.5	-13.0	-41.5
2	149.49	-45.5	-50.1	-0.2	-50.3	-13.0	-37.3
3	222.59	-50.5	-61.1	5.4	-55.7	-13.0	-42.7
4	375.83	-55.0	-62.6	5.3	-57.3	-13.0	-44.3
5	493.91	-59.8	-66.3	4.9	-61.4	-13.0	-48.4
6	690.72	-63.2	-64.3	5.2	-59.1	-13.0	-46.1

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



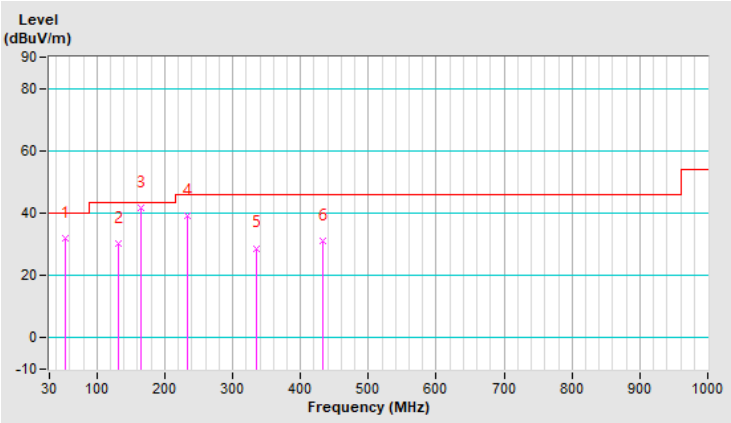
GFSK + GSM850

CHANNEL	CH 39 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	52.49	32.1 QP	40.0	-7.9	1.99 H	147	41.1	-9.0
2	132.62	30.1 QP	43.5	-13.4	1.49 H	219	39.8	-9.7
3	164.96	41.7 QP	43.5	-1.8	1.49 H	258	50.2	-8.5
4	232.43	39.2 QP	46.0	-6.8	1.00 H	252	49.3	-10.1
5	335.06	28.8 QP	46.0	-17.2	1.00 H	221	34.6	-5.8
6	432.06	31.2 QP	46.0	-14.8	1.99 H	196	34.8	-3.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

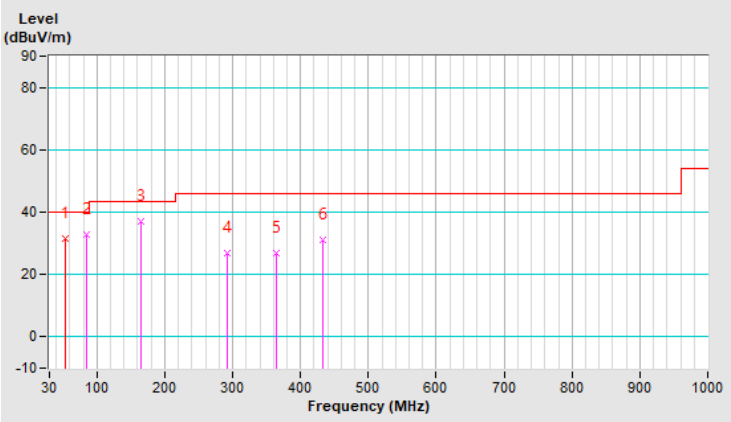


CHANNEL	CH 39 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	52.83	31.4 QP	40.0	-8.6	1.50 V	12	40.4	-9.0
2	84.83	32.6 QP	40.0	-7.4	1.51 V	162	46.7	-14.1
3	164.96	37.2 QP	43.5	-6.3	1.01 V	213	45.7	-8.5
4	292.88	26.9 QP	46.0	-19.1	1.51 V	248	33.8	-6.9
5	364.58	26.9 QP	46.0	-19.1	2.00 V	339	32.1	-5.2
6	432.06	31.3 QP	46.0	-14.7	1.01 V	174	34.9	-3.6

Remarks:

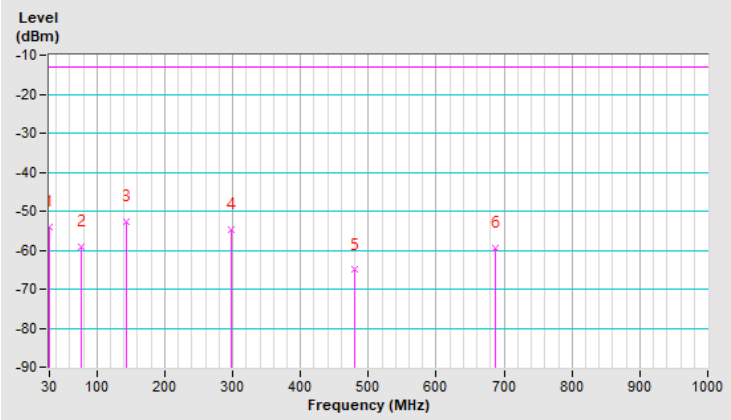
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report



CHANNEL	CH 39 + CH 128	FREQUENCY RANGE	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-55.0	-41.9	-12.2	-54.1	-13.0	-41.1
2	76.39	-51.1	-56.5	-2.8	-59.3	-13.0	-46.3
3	143.87	-45.4	-52.3	-0.3	-52.6	-13.0	-39.6
4	297.10	-50.4	-60.0	5.1	-54.9	-13.0	-41.9
5	479.86	-62.8	-70.1	5.0	-65.1	-13.0	-52.1
6	687.91	-60.6	-64.8	5.2	-59.6	-13.0	-46.6

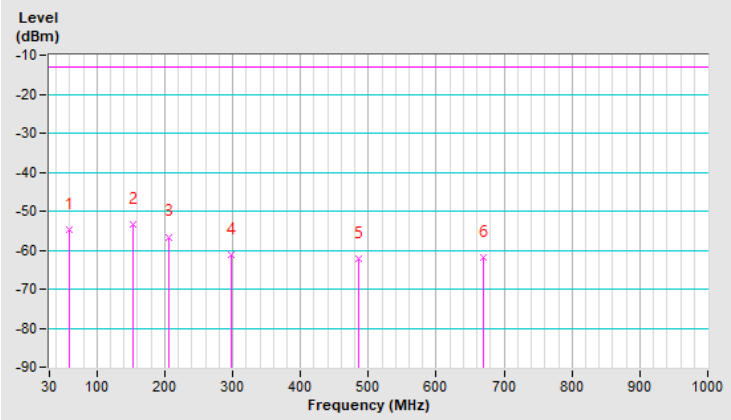
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



CHANNEL	CH 39 + CH 128	FREQUENCY RANGE	Below 1000 MHz

Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	59.52	-45.5	-46.9	-7.7	-54.6	-13.0	-41.6
2	152.30	-49.0	-53.5	0.0	-53.5	-13.0	-40.5
3	205.72	-53.1	-62.0	5.4	-56.6	-13.0	-43.6
4	298.51	-59.8	-66.2	5.1	-61.1	-13.0	-48.1
5	485.48	-60.2	-67.1	5.0	-62.1	-13.0	-49.1
6	669.64	-65.5	-66.7	5.0	-61.7	-13.0	-48.7

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



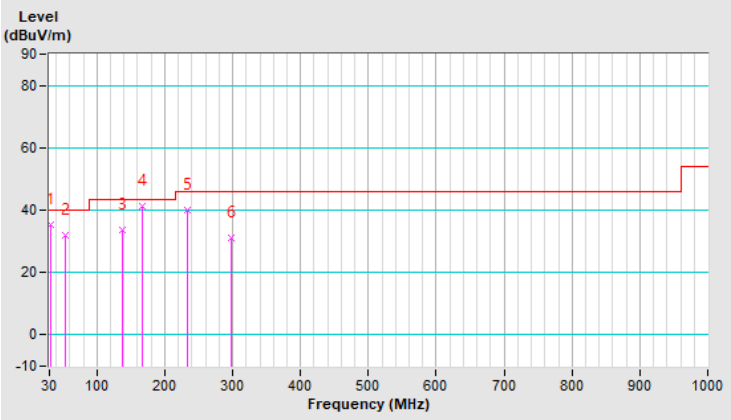
802.11a + GSM850

CHANNEL	CH 149 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	31.41	35.2 QP	40.0	-4.8	1.49 H	288	46.2	-11.0
2	53.90	31.9 QP	40.0	-8.1	1.49 H	200	41.0	-9.1
3	138.25	33.6 QP	43.5	-9.9	2.00 H	227	42.7	-9.1
4	166.36	41.3 QP	43.5	-2.2	1.49 H	270	49.9	-8.6
5	232.43	40.1 QP	46.0	-5.9	1.00 H	239	50.2	-10.1
6	298.51	31.2 QP	46.0	-14.8	1.00 H	235	38.0	-6.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report

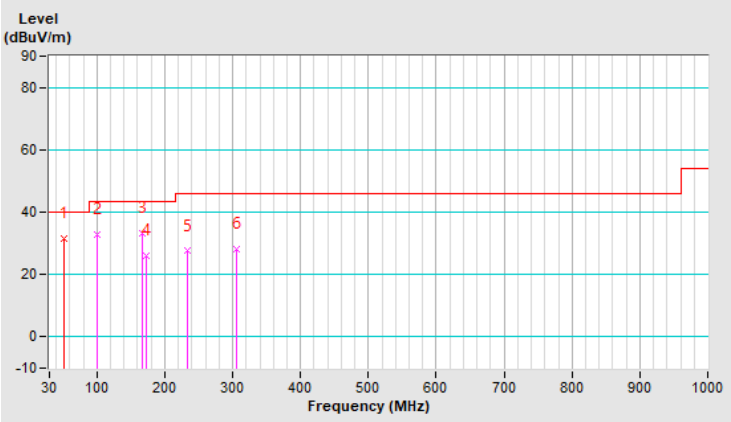


CHANNEL	CH 149 + CH 128	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 m								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.89	31.5 QP	40.0	-8.5	1.00 V	14	40.5	-9.0
2	100.29	32.9 QP	43.5	-10.6	1.01 V	77	46.1	-13.2
3	166.36	33.2 QP	43.5	-10.3	1.01 V	233	41.8	-8.6
4	173.39	26.1 QP	43.5	-17.4	1.01 V	158	35.2	-9.1
5	232.43	27.5 QP	46.0	-18.5	1.01 V	319	37.6	-10.1
6	305.54	28.3 QP	46.0	-17.7	2.00 V	231	34.8	-6.5

Remarks:

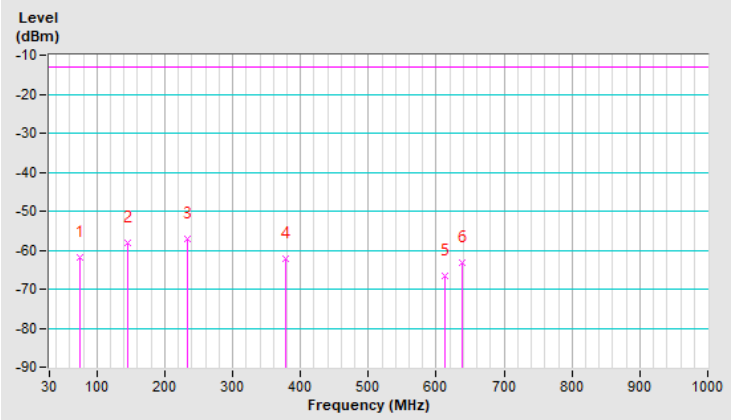
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report



CHANNEL	CH 149 + CH 128	FREQUENCY RANGE	Below 1000 MHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	74.99	-53.5	-58.4	-3.3	-61.7	-13.0	-48.7
2	145.28	-51.0	-57.8	-0.2	-58.0	-13.0	-45.0
3	232.43	-47.2	-62.6	5.4	-57.2	-13.0	-44.2
4	377.23	-58.3	-67.6	5.3	-62.3	-13.0	-49.3
5	613.41	-66.5	-71.2	4.6	-66.6	-13.0	-53.6
6	637.30	-63.7	-67.9	4.7	-63.2	-13.0	-50.2

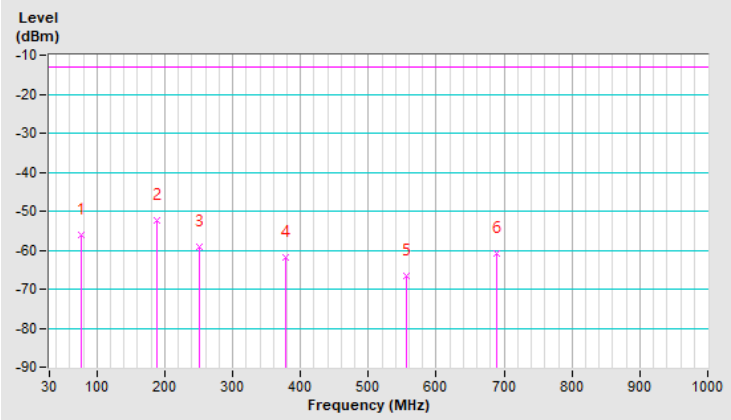
Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



CHANNEL	CH 149 + CH 128	FREQUENCY RANGE	Below 1000 MHz

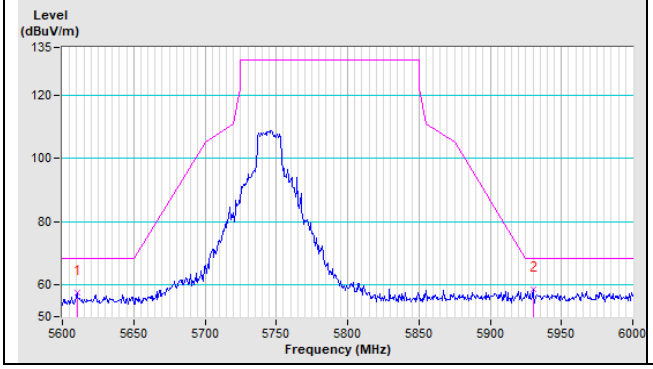
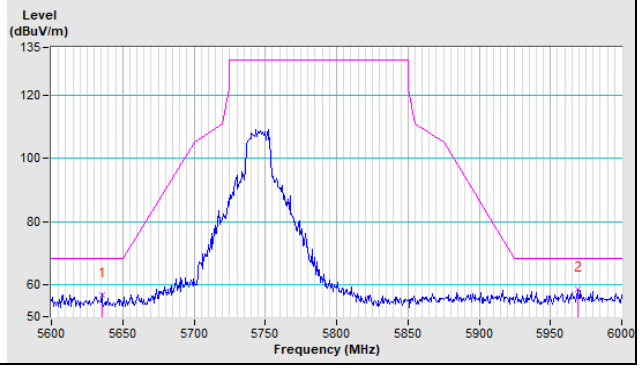
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	76.39	-48.2	-53.3	-2.8	-56.1	-13.0	-43.1
2	187.45	-47.1	-56.2	3.9	-52.3	-13.0	-39.3
3	250.71	-58.4	-64.6	5.4	-59.2	-13.0	-46.2
4	378.64	-59.9	-67.2	5.3	-61.9	-13.0	-48.9
5	555.77	-66.3	-71.2	4.7	-66.5	-13.0	-53.5
6	689.32	-64.8	-66.1	5.2	-60.9	-13.0	-47.9

Remarks:
1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) - Cable Loss (dB) + 2.15dB.



Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

CH 149 5745 MHz	
Horizontal	Vertical
	

5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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