FCC Test Report

Report No.:	RF160812C12
Test Model:	LT-100XX, LT-200XX (X can be any alphanumeric character for marketing purpose)
Series Model:	LT-300XX (X can be any alphanumeric character for marketing purpose) (refer to item 3.2 for more details)
Received Date:	Aug. 12, 2016
Test Date:	Aug. 26 ~ Sep. 06, 2016
Issued Date:	Sep. 07, 2016
Applicant:	GlobalSat WorldCom Corporation
Address:	16F., No.186, Jian 1st Rd., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

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Release Control Record

Issue No.	Description	Date Issued
RF160812C12	Original release	Sep. 07, 2016

1 Certificate of Conformity

Product:	LoRa Tracker
Brand:	GlobalSat
Test Model:	LT-100XX, LT-200XX (X can be any alphanumeric character for marketing purpose)
Series Model:	LT-300XX (X can be any alphanumeric character for marketing purpose) (refer to item 3.2 for more details)
Sample Status:	Engineering sample
Applicant:	GlobalSat WorldCom Corporation
Test Date:	Aug. 26 ~ Sep. 06, 2016
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 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 EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Sep. 07, 2016

Suntee Liu / Specialist

Approved by : _____ , **Date:** Sep. 07, 2016

Ken Liu / Senior Manager

2 Summary of Test Results

Hybrid Mode (125kHz Bandwidth, 64 channels)

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -16.36dB at 0.66255MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Minimum Number of Hopping Channels	N/A	Refer to Note
15.247(a)(2)	500 kHz Minimum Bandwidth	N/A	Refer to Note
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.7dB at 55.13MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

N/A: Not Applicable

Note: There is no requirement for this type of hybrid system to comply with the 500 kHz minimum bandwidth normally associated with a DTS transmission; and, there is no minimum number of hopping channels associated with this type of hybrid system.

Hybrid Mode (250kHz Bandwidth, 25 channels)

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -15.15dB at 0.66255MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Minimum Number of Hopping Channels	N/A	Refer to Note
15.247(a)(2)	500 kHz Minimum Bandwidth	N/A	Refer to Note
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -2.9dB at 55.13MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

N/A: Not Applicable

Note: There is no requirement for this type of hybrid system to comply with the 500 kHz minimum bandwidth normally associated with a DTS transmission; and, there is no minimum number of hopping channels associated with this type of hybrid system.

Hybrid Mode (500kHz Bandwidth, 25 channels)

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -14.99dB at 0.66221MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Minimum Number of Hopping Channels	N/A	Refer to Note
15.247(a)(2)	500 kHz Minimum Bandwidth	N/A	Refer to Note
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -4.0dB at 53.18MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

N/A: Not Applicable

Note: There is no requirement for this type of hybrid system to comply with the 500 kHz minimum bandwidth normally associated with a DTS transmission; and, there is no minimum number of hopping channels associated with this type of hybrid system.

Hybrid Mode (500kHz Bandwidth, 8 channels)

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -14.99dB at 0.66221MHz.
15.247(a)(1)(i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(a)(1)(i)	Minimum Number of Hopping Channels	N/A	Refer to Note
15.247(a)(2)	500 kHz Minimum Bandwidth	N/A	Refer to Note
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -4.0dB at 53.18MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

N/A: Not Applicable

Note: There is no requirement for this type of hybrid system to comply with the 500 kHz minimum bandwidth normally associated with a DTS transmission; and, there is no minimum number of hopping channels associated with this type of hybrid system.

DTS Mode (500kHz Bandwidth, 25 channels)

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -14.99dB at 0.66221MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -4.0dB at 53.18MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 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	LoRa Tracker	
Brand	GlobalSat	
Test Model	LT-100XX, LT-200XX (X can be any alphanumeric character for marketing purpose)	
Series Model	LT-300XX (X can be any alphanumeric character for marketing purpose)	
Model Difference	Refer to Note	
Sample Status	Engineering sample	
Power Supply Rating	3.7Vdc (battery) 5Vdc (host)	
Modulation Type	FSK	
Transfer Rate	21.9kbps	
Operating Frequency	902~928MHz	
Number of Channel	Hybrid Mode (125kHz Bandwidth, 64 channels)	64
	Hybrid Mode (250kHz Bandwidth, 25 channels)	25
	Hybrid Mode (500kHz Bandwidth, 25 channels)	25
	Hybrid Mode (500kHz Bandwidth, 8 channels)	8
	DTS Mode (500kHz Bandwidth, 25 channels)	25
Channel Spacing	Hybrid Mode (125kHz Bandwidth, 64 channels)	0.2MHz
	Hybrid Mode (250kHz Bandwidth, 25 channels)	1.6MHz, 0.7MHz, 0.6MHz
	Hybrid Mode (500kHz Bandwidth, 25 channels)	1.6MHz, 0.7MHz, 0.6MHz
	Hybrid Mode (500kHz Bandwidth, 8 channels)	1.6MHz
	DTS Mode (500kHz Bandwidth, 25 channels)	1.6MHz, 0.7MHz, 0.6MHz

Output Power	Hybrid Mode (125kHz Bandwidth, 64 channels)	68.077mW
	Hybrid Mode (250kHz Bandwidth, 25 channels)	67.453mW
	Hybrid Mode (500kHz Bandwidth, 25 channels)	67.143mW
	Hybrid Mode (500kHz Bandwidth, 8 channels)	67.143mW
	DTS Mode (500kHz Bandwidth, 25 channels)	67.143mW
Antenna Type	PCB antenna with -2dBi gain	
Antenna Connector	NA	
Accessory Device	Battery	
Cable Supplied	1.05m shielded USB charger calbe without core	

Note:

1. All models are listed as below (X can be any alphanumeric character for marketing purpose).
   Models LT-100XX, LT-200XX are the representatives for final test.

Brand	Model	Modulation	Hybrid 1.Hopping + 2.DTS	DTS	FW	Note
GlobalSat	LT-100XX	LoRaWAN (Chirp Spread Spectrum)	y		LoRaWAN auto-choose a channel	Use LM-130 module
	LT-200XX	DTS		y	User set a fixed channel, different protocol	Use LM-230 module
	LT-300XX	DTS		y	User set a fixed channel, different protocol	Use LM-230 module

2. The EUT uses following battery.

Model	FT473350P
Rating	3.7Vdc, 820mAh

3.2 Description of Test Modes

64 channels are provided for Hybrid Mode (125kHz Bandwidth):

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	902.3	16	905.5	32	908.7	48	911.9
1	902.5	17	905.7	33	908.9	49	912.1
2	902.7	18	905.9	34	909.1	50	912.3
3	902.9	19	906.1	35	909.3	51	912.5
4	903.1	20	906.3	36	909.5	52	912.7
5	903.3	21	906.5	37	909.7	53	912.9
6	903.5	22	906.7	38	909.9	54	913.1
7	903.7	23	906.9	39	910.1	55	913.3
8	903.9	24	907.1	40	910.3	56	913.5
9	904.1	25	907.3	41	910.5	57	913.7
10	904.3	26	907.5	42	910.7	58	913.9
11	904.5	27	907.7	43	910.9	59	914.1
12	904.7	28	907.9	44	911.1	60	914.3
13	904.9	29	908.1	45	911.3	61	914.5
14	905.1	30	908.3	46	911.5	62	914.7
15	905.3	31	908.5	47	911.7	63	914.9

25 channels are provided for Hybrid Mode (250kHz & 500kHz Bandwidth) & DTS Mode (500kHz Bandwidth):

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	903.0	7	914.2	14	921.5	21	925.7
1	904.6	8	915.8	15	922.1	22	926.3
2	906.2	9	917.4	16	922.7	23	926.9
3	907.8	10	919.0	17	923.3	24	927.5
4	909.4	11	919.7	18	923.9		
5	911.0	12	920.3	19	924.5		
6	912.6	13	920.9	20	925.1		

8 channels are provided for Hybrid Mode (500kHz Bandwidth):

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	903.0	2	906.2	4	909.4	6	912.6
1	904.6	3	907.8	5	911.0	7	914.2

3.2.1 Test Mode Applicability and Tested Channel Detail

Hybrid Mode (125kHz Bandwidth, 64 channels)

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

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Type
-	0 to 63	0, 31, 63	FSK

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	Available Channel	Tested Channel	Modulation Type
-	0 to 63	0, 31, 63	FSK

Power Line Conducted Emission Test:

☒ 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	Available Channel	Tested Channel	Modulation Type
-	0 to 63	0, 31, 63	FSK

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, 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	Available Channel	Tested Channel	Modulation Type
-	0 to 63	0, 31, 63	FSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

Hybrid Mode (250kHz Bandwidth, 25 channels)

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

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

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Power Line Conducted Emission Test:

☒ 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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, 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

Hybrid Mode (500kHz Bandwidth, 25 channels)

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

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

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Power Line Conducted Emission Test:

☒ 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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, 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

Hybrid Mode (500kHz Bandwidth, 8 channels)

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

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

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Type
-	0 to 7	0, 3, 7	FSK

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	Available Channel	Tested Channel	Modulation Type
-	0 to 7	0, 3, 7	FSK

Power Line Conducted Emission Test:

☒ 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	Available Channel	Tested Channel	Modulation Type
-	0 to 7	0, 3, 7	FSK

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, 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	Available Channel	Tested Channel	Modulation Type
-	0 to 7	0, 3, 7	FSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

DTS Mode (500kHz Bandwidth, 25 channels)

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

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

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Power Line Conducted Emission Test:

☒ 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

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, 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	Available Channel	Tested Channel	Modulation Type
-	0 to 24	0, 7, 24	FSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	16 deg. C, 70% RH	120Vac, 60Hz	Nick Hsu
RE<1G	25 deg. C, 65% RH	120Vac, 60Hz	Chris Lin
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Matthew Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

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.

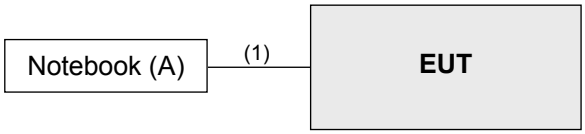
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	S430	MP-2DBFW	PD92230BNHU	-

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB	1	1.05	Y	0	Accessory

3.3.1 Configuration of System under Test

RE<1G, PLC, APCM tests



RE≥1G test

3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
558074 D01 DTS Meas Guidance v03r05
FCC KDB Publication Number: 453039
ANSI C63.10:2013

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results (Hybrid Mode (125kHz Bandwidth, 64 channels))

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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 30dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 12, 2015	Oct. 11, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Aug. 16, 2016	Aug. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Jan. 08, 2016	Jan. 07, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Jan. 18, 2016	Jan. 17, 2017
Preamplifier Agilent	8449B	3008A01960	Aug. 09, 2016	Aug. 08, 2017
Preamplifier Agilent	8447D	2944A10631	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 09, 2016	Aug. 08, 2017
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03(250724)	Aug. 09, 2016	Aug. 08, 2017
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 11, 2016	Aug. 10, 2017
Power Sensor	MA2411B	0738171	Aug. 11, 2016	Aug. 10, 2017

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 4.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

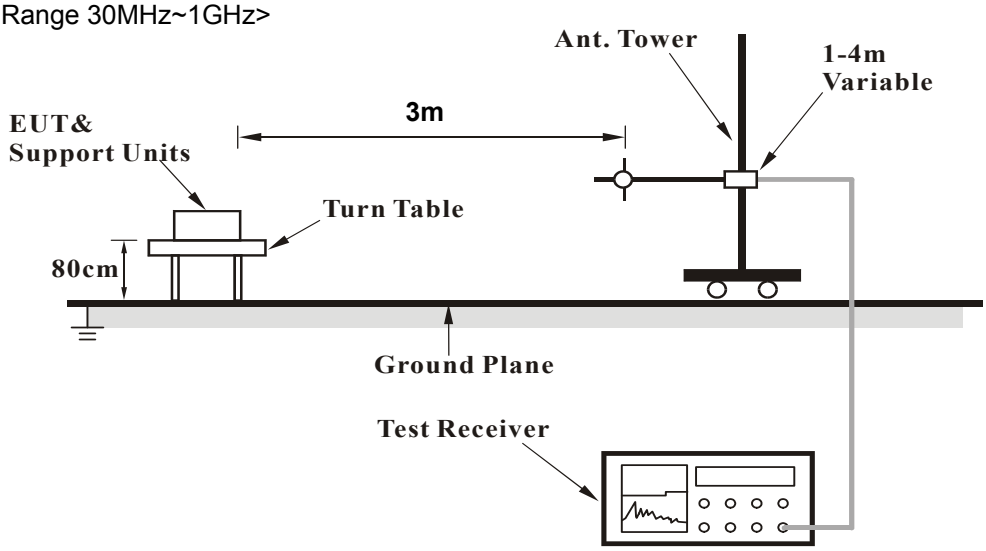
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

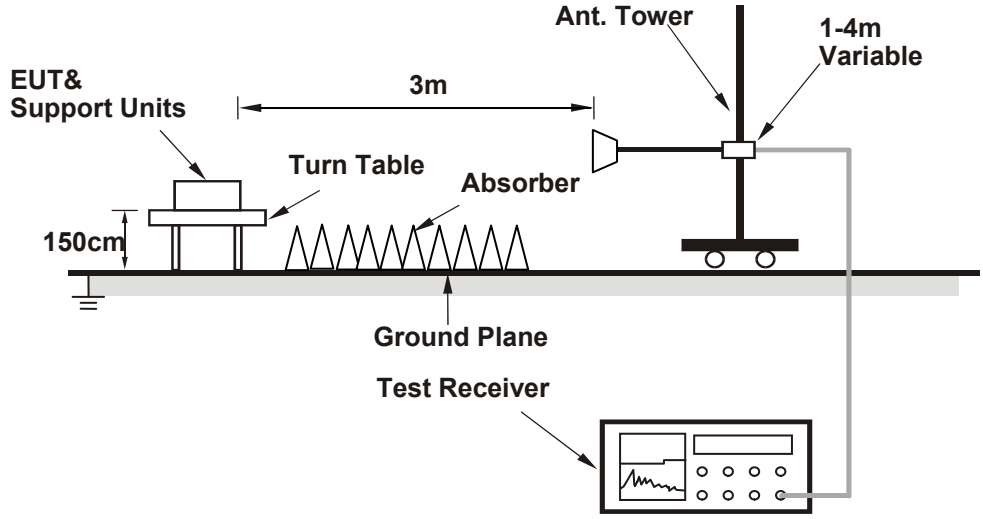
No deviation.

4.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

4.1.6 EUT Operating Conditions

a. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Worst-case Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	#902.00	60.2 PK	80.1	-19.9	1.70 H	166	32.8	27.4
2	#902.00	49.4 AV	69.8	-20.4	1.70 H	166	22.0	27.4
3	*902.30	110.1 PK			1.70 H	166	82.7	27.4
4	*902.30	99.8 AV			1.70 H	166	72.4	27.4
5	1804.60	48.4 PK	74.0	-25.6	1.08 H	76	52.5	-4.1
6	1804.60	45.9 AV	54.0	-8.1	1.08 H	76	50.0	-4.1
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	#902.00	57.9 PK	77.9	-20.0	1.04 V	316	30.5	27.4
2	#902.00	47.3 AV	67.7	-20.4	1.04 V	316	19.9	27.4
3	*902.30	107.9 PK			1.04 V	316	80.5	27.4
4	*902.30	97.7 AV			1.04 V	316	70.3	27.4
5	1804.60	43.5 PK	74.0	-30.5	1.00 V	256	47.6	-4.1
6	1804.60	39.4 AV	54.0	-14.6	1.00 V	256	43.5	-4.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 31	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*908.50	113.7 PK			1.62 H	113	86.0	27.7
2	*908.50	103.4 AV			1.62 H	113	75.7	27.7
3	1817.00	47.9 PK	74.0	-26.1	1.09 H	77	51.9	-4.0
4	1817.00	45.2 AV	54.0	-8.8	1.09 H	77	49.2	-4.0
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	*908.50	108.0 PK			1.02 V	317	80.3	27.7
2	*908.50	97.7 AV			1.02 V	317	70.0	27.7
3	1817.00	44.1 PK	74.0	-29.9	1.00 V	256	48.1	-4.0
4	1817.00	39.2 AV	54.0	-14.8	1.00 V	256	43.2	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 63	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*914.90	114.8 PK			1.59 H	114	87.0	27.8
2	*914.90	104.4 AV			1.59 H	114	76.6	27.8
3	#928.00	52.5 PK	84.8	-32.3	1.59 H	114	24.6	27.9
4	#928.00	40.8 AV	74.4	-33.6	1.59 H	114	12.9	27.9
5	1829.80	48.2 PK	74.0	-25.8	1.06 H	75	52.2	-4.0
6	1829.80	45.6 AV	54.0	-8.4	1.06 H	75	49.6	-4.0
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	*914.90	108.5 PK			1.04 V	314	80.7	27.8
2	*914.90	98.2 AV			1.04 V	314	70.4	27.8
3	#928.00	50.6 PK	78.5	-27.9	1.04 V	314	22.7	27.9
4	#928.00	39.7 AV	68.2	-28.5	1.04 V	314	11.8	27.9
5	1829.80	43.0 PK	74.0	-31.0	1.00 V	260	47.0	-4.0
6	1829.80	37.4 AV	54.0	-16.6	1.00 V	260	41.4	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	70.65	32.7 QP	40.0	-7.3	1.25 H	334	48.7	-16.0
2	119.16	30.6 QP	43.5	-12.9	1.00 H	27	46.7	-16.1
3	239.46	35.8 QP	46.0	-10.2	1.50 H	292	50.4	-14.6
4	383.05	35.1 QP	46.0	-10.9	1.00 H	112	45.9	-10.8
5	743.97	25.7 QP	46.0	-20.3	1.25 H	259	28.7	-3.0
6	901.14	27.6 QP	46.0	-18.4	1.00 H	3	28.2	-0.6
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	55.13	36.1 QP	40.0	-3.9	1.50 V	130	50.2	-14.1
2	119.16	31.7 QP	43.5	-11.8	1.00 V	6	47.8	-16.1
3	190.95	30.3 QP	43.5	-13.2	1.25 V	6	46.6	-16.3
4	425.74	34.3 QP	46.0	-11.7	1.50 V	200	44.1	-9.8
5	532.46	28.5 QP	46.0	-17.5	1.00 V	6	36.6	-8.1
6	730.38	31.6 QP	46.0	-14.4	1.00 V	93	35.2	-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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 31	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	70.65	31.4 QP	40.0	-8.6	1.25 H	357	47.4	-16.0
2	119.16	30.8 QP	43.5	-12.7	1.00 H	16	46.9	-16.1
3	239.46	36.1 QP	46.0	-9.9	1.50 H	273	50.7	-14.6
4	287.97	34.8 QP	46.0	-11.2	1.00 H	86	47.4	-12.6
5	383.05	33.3 QP	46.0	-12.7	1.25 H	84	44.1	-10.8
6	528.58	28.4 QP	46.0	-17.6	1.00 H	251	36.5	-8.1
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	**55.13**	**38.3 QP**	**40.0**	**-1.7**	**1.25 V**	**200**	**52.4**	**-14.1**
2	119.16	31.9 QP	43.5	-11.6	1.00 V	351	48.0	-16.1
3	190.95	31.1 QP	43.5	-12.4	1.50 V	338	47.4	-16.3
4	423.80	31.4 QP	46.0	-14.6	1.00 V	201	41.2	-9.8
5	747.85	33.5 QP	46.0	-12.5	1.50 V	78	36.5	-3.0
6	930.25	28.3 QP	46.0	-17.7	1.00 V	1	28.4	-0.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 63	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	35.1 QP	40.0	-4.9	1.25 H	209	51.8	-16.7
2	119.16	30.1 QP	43.5	-13.4	1.00 H	353	46.2	-16.1
3	198.71	33.3 QP	43.5	-10.2	1.50 H	255	49.8	-16.5
4	299.62	35.1 QP	46.0	-10.9	1.00 H	206	47.5	-12.4
5	383.05	33.9 QP	46.0	-12.1	2.00 H	112	44.7	-10.8
6	798.30	27.2 QP	46.0	-18.8	1.00 H	9	29.4	-2.2
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	57.07	34.7 QP	40.0	-5.3	1.25 V	234	49.0	-14.3
2	119.16	32.8 QP	43.5	-10.7	1.00 V	339	48.9	-16.1
3	190.95	30.3 QP	43.5	-13.2	1.00 V	348	46.6	-16.3
4	377.23	28.8 QP	46.0	-17.2	1.50 V	186	39.6	-10.8
5	423.80	32.4 QP	46.0	-13.6	1.00 V	197	42.2	-9.8
6	499.48	29.8 QP	46.0	-16.2	1.25 V	177	38.3	-8.5

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100220	Nov. 13, 2015	Nov. 12, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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 Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

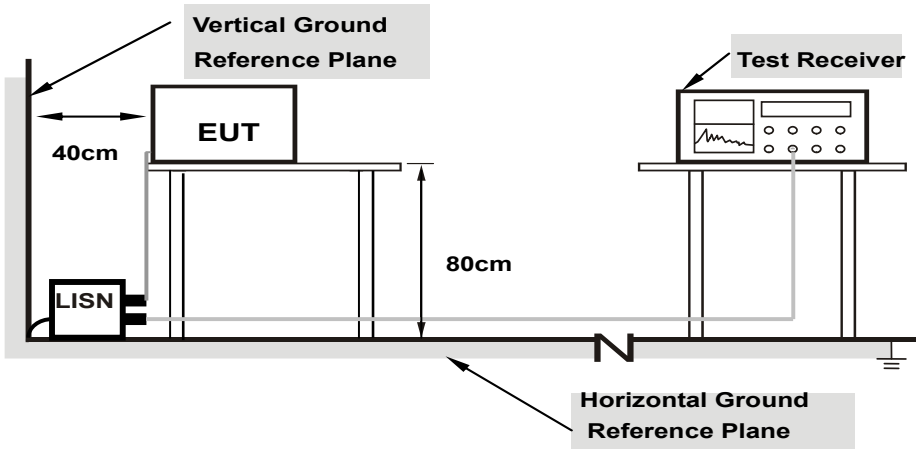
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Condition

Same as 4.1.6.

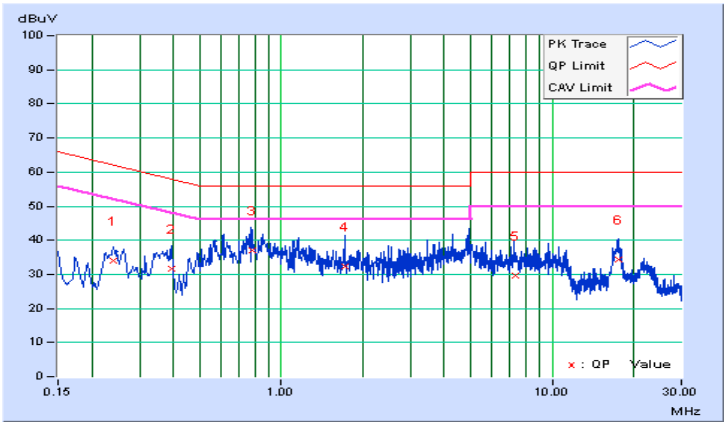
4.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23993	10.10	24.00	16.80	34.10	26.90	62.10	52.10	-28.00	-25.20
2	0.39323	10.17	21.36	12.59	31.53	22.76	58.00	48.00	-26.47	-25.24
3	0.77951	10.25	26.62	14.14	36.87	24.39	56.00	46.00	-19.13	-21.61
4	1.72573	10.35	22.06	12.41	32.41	22.76	56.00	46.00	-23.59	-23.24
5	7.28966	10.63	19.02	10.50	29.65	21.13	60.00	50.00	-30.35	-28.87
6	17.51040	11.24	23.11	16.37	34.35	27.61	60.00	50.00	-25.65	-22.39

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

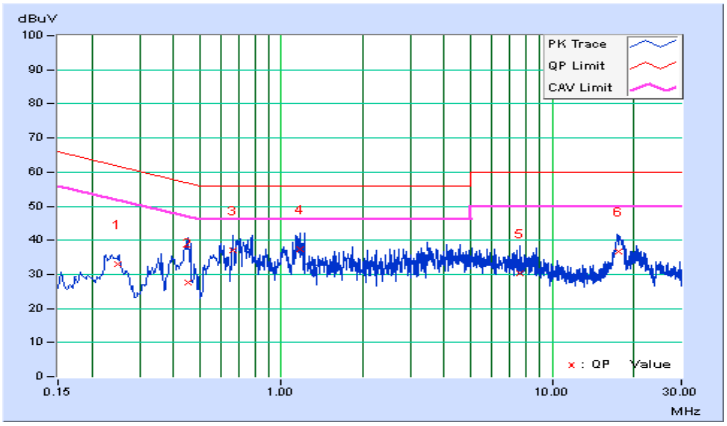


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.24993	10.12	22.80	14.68	32.92	24.80	61.76	51.76	-28.84	-26.96
2	0.45097	10.24	17.21	8.49	27.45	18.73	56.86	46.86	-29.41	-28.13
3	**0.66255**	**10.26**	**26.65**	**19.38**	**36.91**	**29.64**	**56.00**	**46.00**	**-19.09**	**-16.36**
4	1.17056	10.31	27.04	12.71	37.35	23.02	56.00	46.00	-18.65	-22.98
5	7.57118	10.74	19.41	10.46	30.15	21.20	60.00	50.00	-29.85	-28.80
6	17.53777	11.39	25.24	18.34	36.63	29.73	60.00	50.00	-23.37	-20.27

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

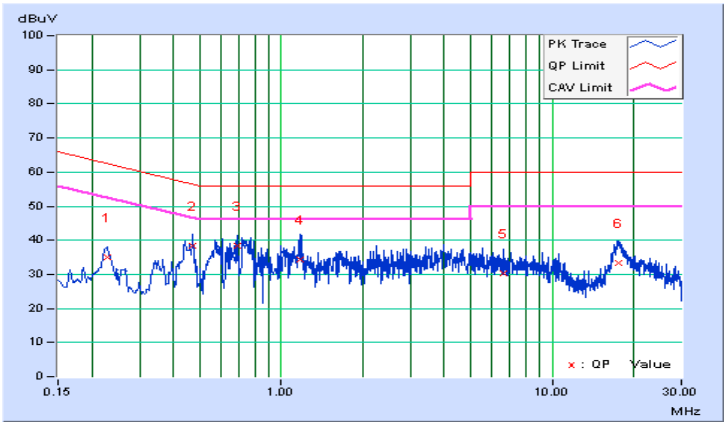


Channel	TX Channel 31	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.09	24.92	19.35	35.01	29.44	62.57	52.57	-27.56	-23.13
2	0.47062	10.18	28.13	15.31	38.31	25.49	56.50	46.50	-18.19	-21.01
3	0.68564	10.23	28.30	13.28	38.53	23.51	56.00	46.00	-17.47	-22.49
4	1.17051	10.30	24.00	11.29	34.30	21.59	56.00	46.00	-21.70	-24.41
5	6.61714	10.60	19.78	11.09	30.38	21.69	60.00	50.00	-29.62	-28.31
6	17.57687	11.25	21.94	15.04	33.19	26.29	60.00	50.00	-26.81	-23.71

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

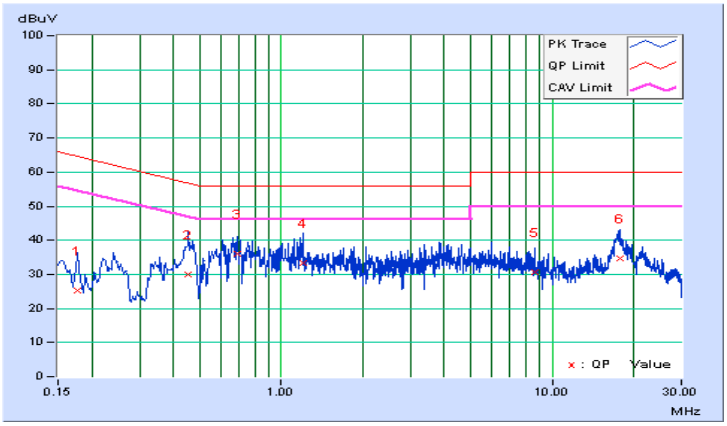


Channel	TX Channel 31	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17737	10.08	15.20	6.63	25.28	16.71	64.61	54.61	-39.33	-37.90
2	0.45455	10.24	19.66	10.76	29.90	21.00	56.79	46.79	-26.89	-25.79
3	0.68564	10.26	25.89	11.82	36.15	22.08	56.00	46.00	-19.85	-23.92
4	1.19788	10.31	23.16	12.64	33.47	22.95	56.00	46.00	-22.53	-23.05
5	8.63861	10.79	19.86	12.23	30.65	23.02	60.00	50.00	-29.35	-26.98
6	17.74891	11.40	23.34	16.25	34.74	27.65	60.00	50.00	-25.26	-22.35

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

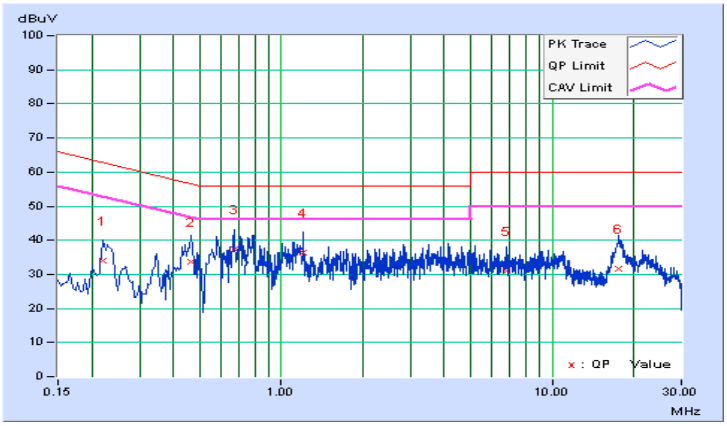


Channel	TX Channel 63	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.21851	10.09	24.06	17.09	34.15	27.18	62.88	52.88	-28.73	-25.70
2	0.46669	10.18	23.62	13.12	33.80	23.30	56.57	46.57	-22.77	-23.27
3	0.67003	10.22	27.20	16.11	37.42	26.33	56.00	46.00	-18.58	-19.67
4	1.20181	10.31	26.01	13.10	36.32	23.41	56.00	46.00	-19.68	-22.59
5	6.75399	10.61	20.45	12.41	31.06	23.02	60.00	50.00	-28.94	-26.98
6	17.66289	11.25	20.51	13.92	31.76	25.17	60.00	50.00	-28.24	-24.83

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

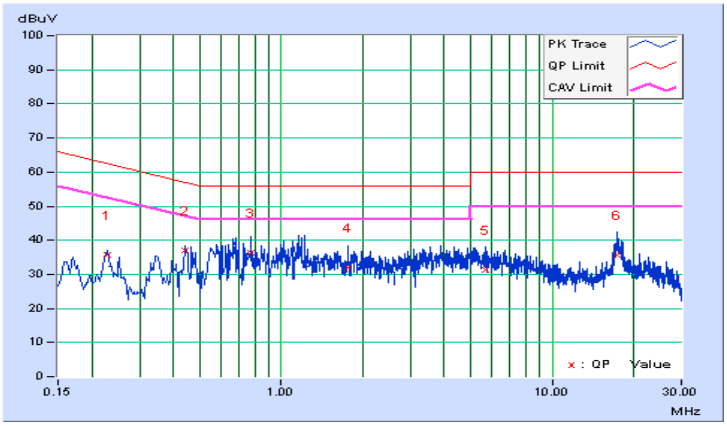


Channel	TX Channel 63	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22791	10.10	25.69	20.18	35.79	30.28	62.53	52.53	-26.74	-22.25
2	0.44390	10.24	26.94	19.42	37.18	29.66	56.99	46.99	-19.81	-17.33
3	0.77169	10.27	26.09	14.33	36.36	24.60	56.00	46.00	-19.64	-21.40
4	1.75638	10.37	21.78	12.95	32.15	23.32	56.00	46.00	-23.85	-22.68
5	5.69047	10.66	20.64	11.27	31.30	21.93	60.00	50.00	-28.70	-28.07
6	17.36964	11.37	24.34	16.49	35.71	27.86	60.00	50.00	-24.29	-22.14

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

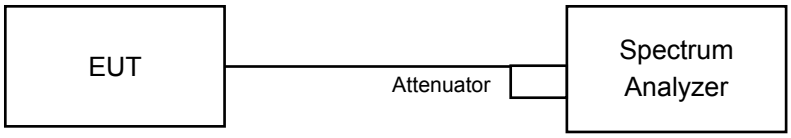


4.3 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

There is no minimum number of hopping channels associated with this type of hybrid system.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

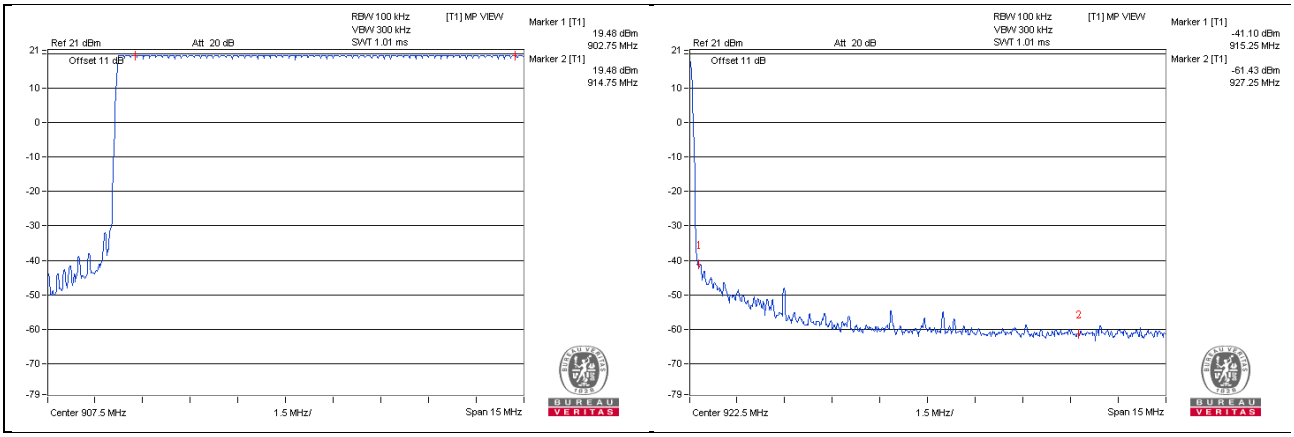
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 Test Results

There are 64 hopping frequencies in the hybrid mode.

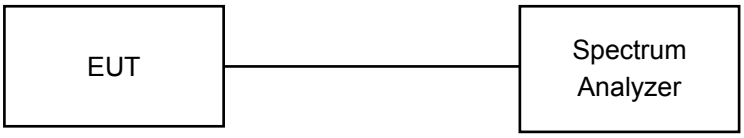


4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

A hybrid system must comply with a 0.4 second/channel maximum dwell time when the hopping function is turned on.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

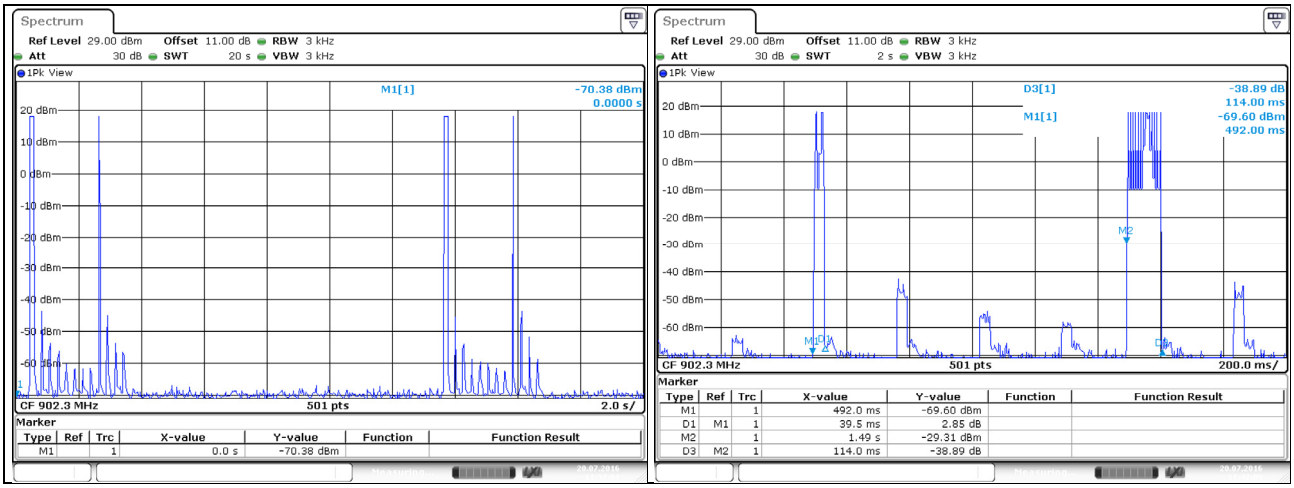
4.4.5 Deviation from Test Standard

No deviation.

4.4.6 Test Results

Number of transmission in a time period	Length of transmission time (msec)	Result (msec)	Limit (msec)
4 times	(39.5+114)*2	307	400

Note: Test plots of the transmitting time slot are shown on following.

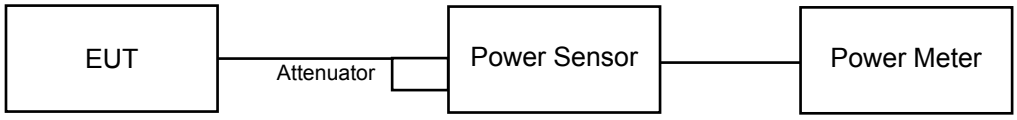


4.5 Conducted Output Power Measurement

4.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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. Record the power level.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
0	902.3	67.764	18.31	30	Pass
31	908.5	67.920	18.32	30	Pass
63	914.9	**68.077**	18.33	30	Pass

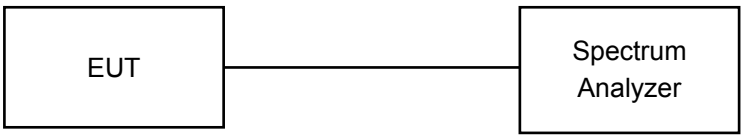
4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

A hybrid system must comply with the power density standard of 8 dBm in any 3 kHz band when the frequency hopping function is turned off

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

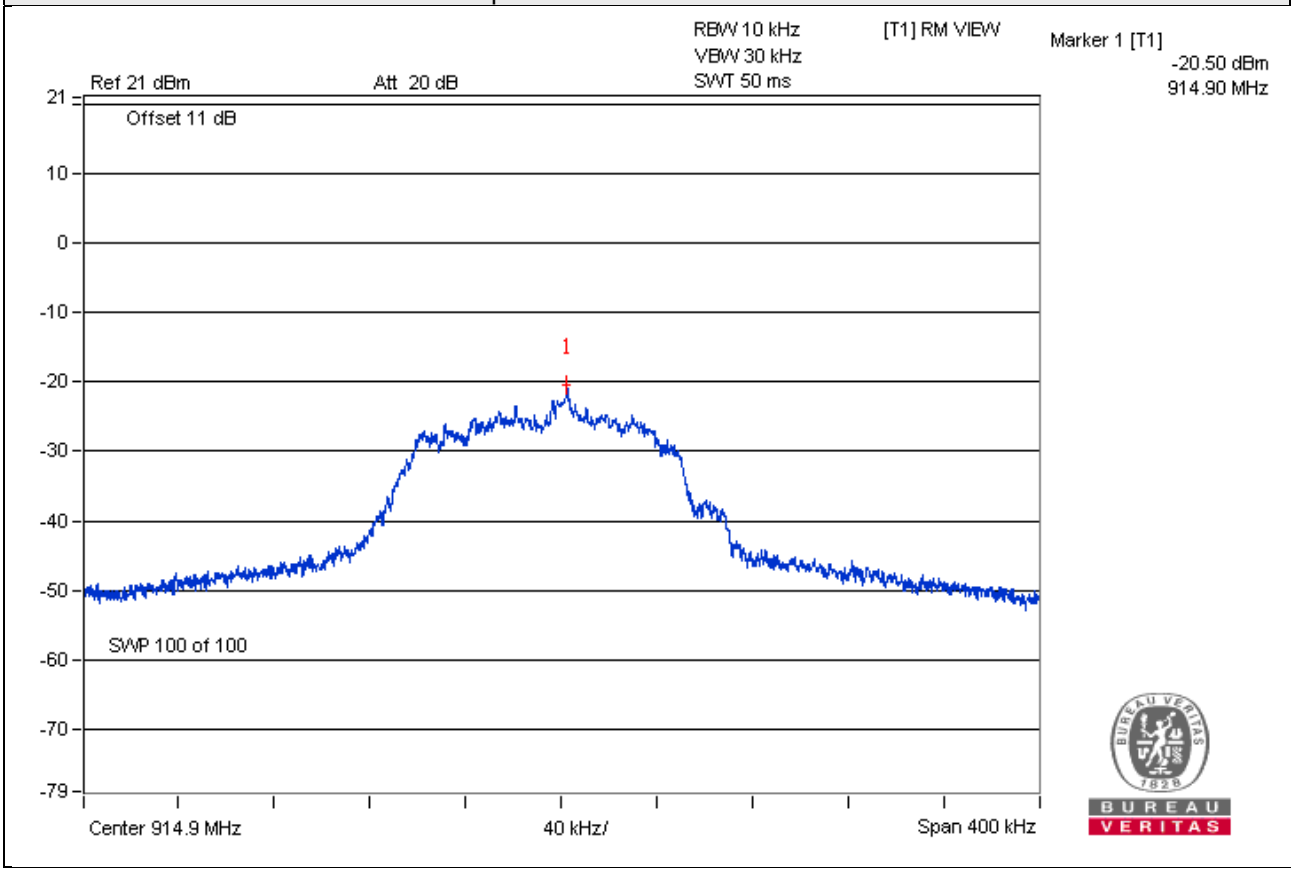
4.6.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
0	902.3	-23.28	8	Pass
31	908.5	-23.65	8	Pass
63	914.9	-20.50	8	Pass

Spectrum Plot of Worst Value

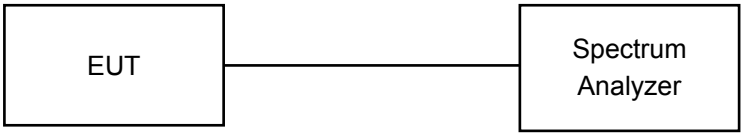


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out Of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 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 OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

4.7.5 Deviation from Test Standard

No deviation.

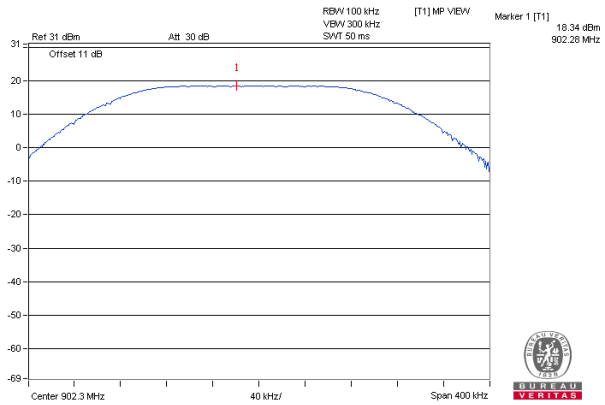
4.7.6 EUT Operating Condition

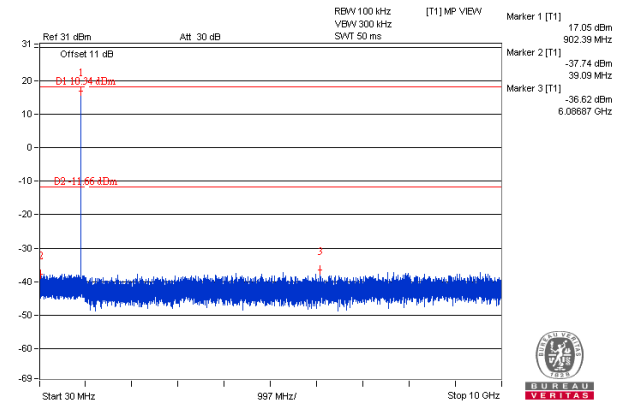
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

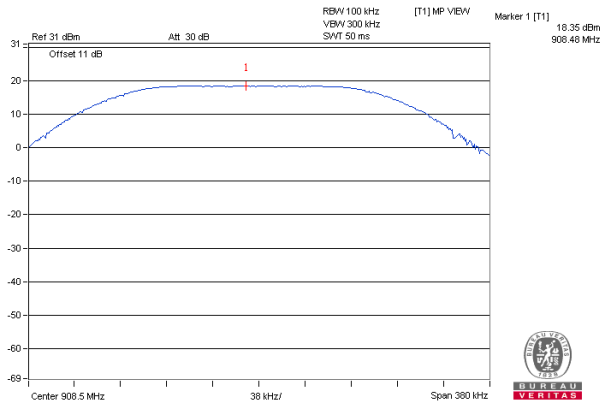
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

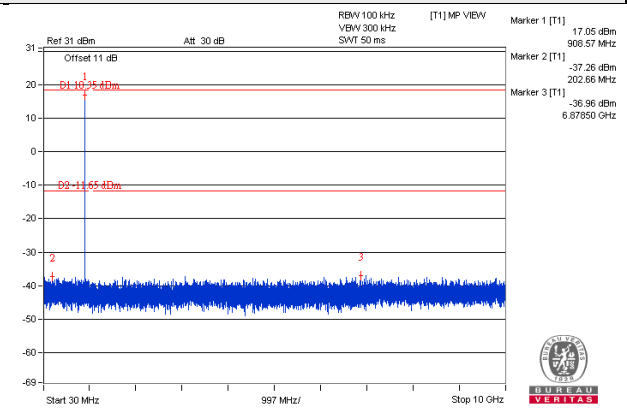
CH 0



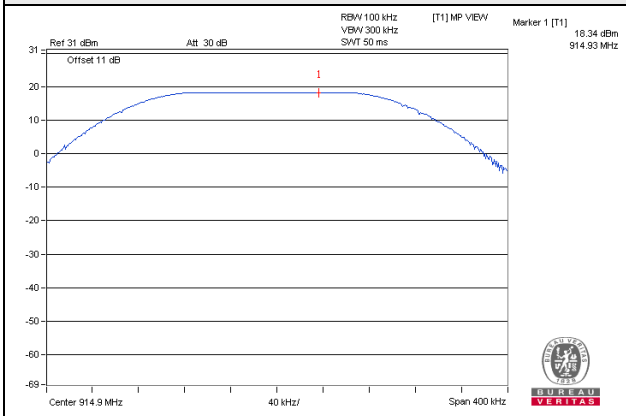


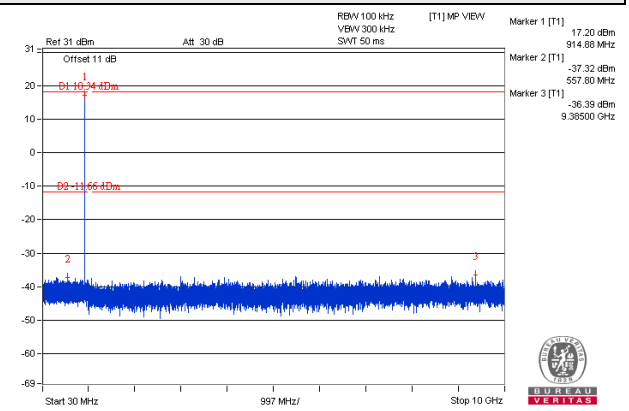
CH 31



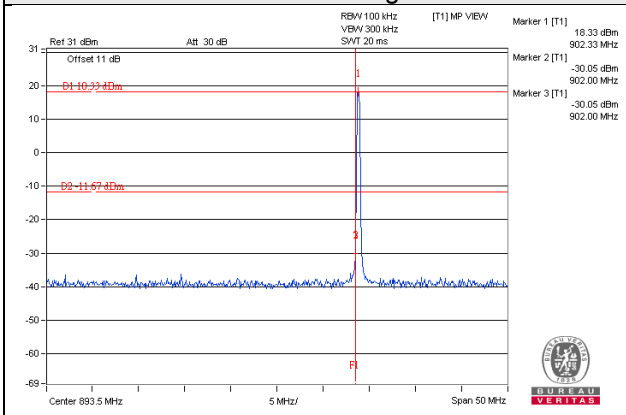


CH 63

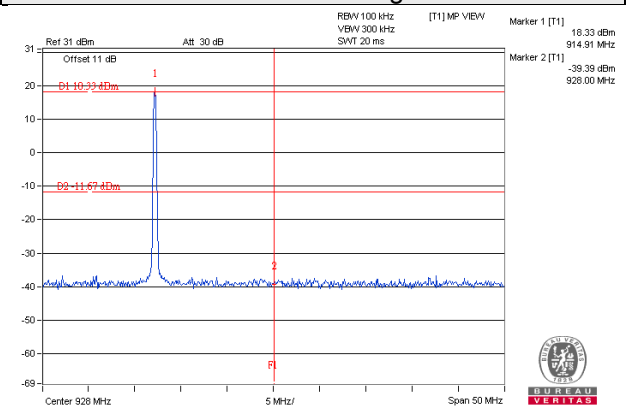




CH 0 Band edge



CH 63 Band edge



5 Test Types and Results (Hybrid Mode (250kHz Bandwidth, 25 channels))

5.1 Radiated Emission and Bandedge Measurement

5.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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 30dB under any condition of modulation.

5.1.2 Test Instruments

Same as 4.1.2.

5.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

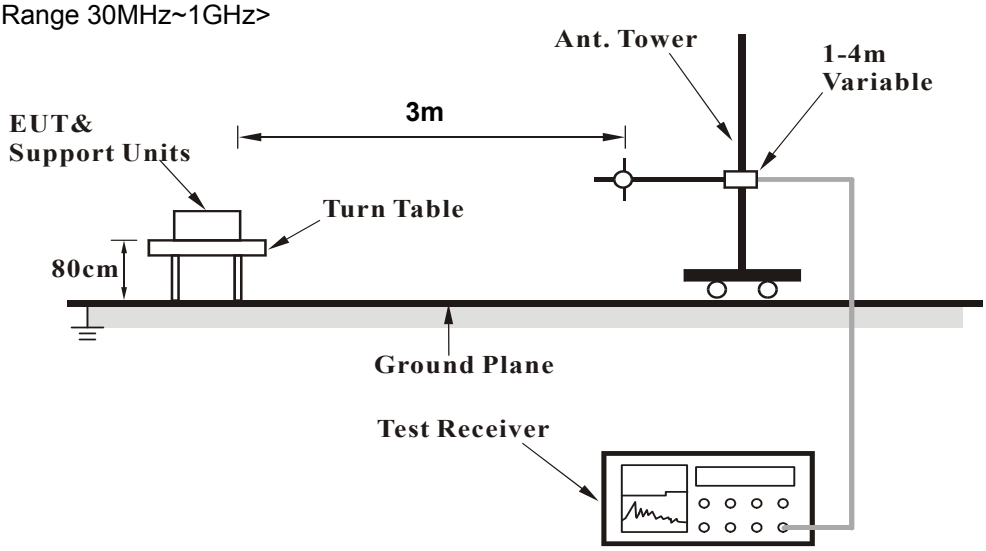
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

5.1.4 Deviation from Test Standard

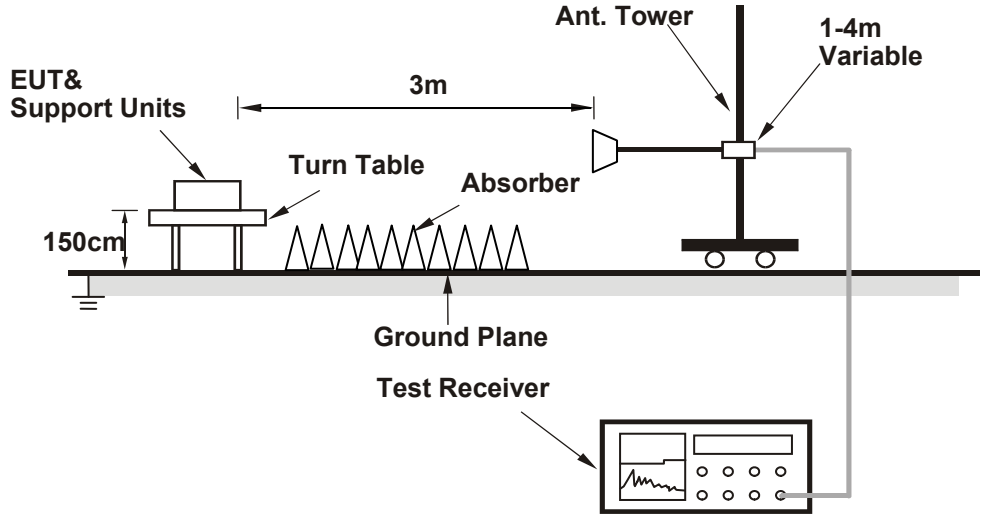
No deviation.

5.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

5.1.6 EUT Operating Conditions

Same as 4.1.6.

5.1.7 Test Results

Above 1GHz Worst-case Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	#902.00	60.0 PK	83.3	-23.3	1.63 H	114	32.6	27.4
2	#902.00	50.0 AV	72.9	-22.9	1.63 H	114	22.6	27.4
3	*903.00	113.3 PK			1.63 H	114	85.9	27.4
4	*903.00	102.9 AV			1.63 H	114	75.5	27.4
5	1806.00	47.9 PK	74.0	-26.1	1.09 H	77	52.0	-4.1
6	1806.00	44.8 AV	54.0	-9.2	1.09 H	77	48.9	-4.1
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	#902.00	57.5 PK	77.4	-19.9	1.05 V	314	30.1	27.4
2	#902.00	48.0 AV	67.0	-19.0	1.05 V	314	20.6	27.4
3	*903.00	107.3 PK			1.05 V	314	79.9	27.4
4	*903.00	96.9 AV			1.05 V	314	69.5	27.4
5	1806.00	43.3 PK	74.0	-30.7	1.00 V	262	47.4	-4.1
6	1806.00	39.8 AV	54.0	-14.2	1.00 V	262	43.9	-4.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*914.20	115.1 PK			1.59 H	115	87.3	27.8
2	*914.20	104.7 AV			1.59 H	115	76.9	27.8
3	1828.40	47.8 PK	74.0	-26.2	1.08 H	76	51.8	-4.0
4	1828.40	45.3 AV	54.0	-8.7	1.08 H	76	49.3	-4.0
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	*914.20	107.9 PK			1.04 V	317	80.1	27.8
2	*914.20	98.5 AV			1.04 V	317	70.7	27.8
3	1828.40	43.0 PK	74.0	-31.0	1.00 V	258	47.0	-4.0
4	1828.40	38.2 AV	54.0	-15.8	1.00 V	258	42.2	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*927.50	116.9 PK			1.59 H	120	89.0	27.9
2	*927.50	106.5 AV			1.59 H	120	78.6	27.9
3	#928.00	60.8 PK	86.9	-26.1	1.59 H	120	32.9	27.9
4	#928.00	50.7 AV	76.5	-25.8	1.59 H	120	22.8	27.9
5	1855.00	44.6 PK	74.0	-29.4	1.07 H	70	48.5	-3.9
6	1855.00	41.2 AV	54.0	-12.8	1.07 H	70	45.1	-3.9
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	*927.50	107.9 PK			1.07 V	312	80.0	27.9
2	*927.50	98.5 AV			1.07 V	312	70.6	27.9
3	#928.00	58.2 PK	77.9	-19.7	1.07 V	312	30.3	27.9
4	#928.00	47.5 AV	67.5	-20.0	1.07 V	312	19.6	27.9
5	1855.00	39.8 PK	74.0	-34.2	1.91 V	341	43.7	-3.9
6	1855.00	33.2 AV	54.0	-20.8	1.91 V	341	37.1	-3.9

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	31.9 QP	40.0	-8.1	1.25 H	15	48.6	-16.7
2	119.16	30.6 QP	43.5	-12.9	1.00 H	24	46.7	-16.1
3	239.46	35.6 QP	46.0	-10.4	1.50 H	269	50.2	-14.6
4	336.48	32.6 QP	46.0	-13.4	1.00 H	303	44.2	-11.6
5	396.64	34.0 QP	46.0	-12.0	1.25 H	89	44.5	-10.5
6	901.14	28.5 QP	46.0	-17.5	1.00 H	61	29.1	-0.6
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	**55.13**	**37.1 QP**	**40.0**	**-2.9**	**1.25 V**	**280**	**51.2**	**-14.1**
2	119.16	33.0 QP	43.5	-10.5	1.00 V	335	49.1	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	7	46.9	-16.3
4	423.80	33.4 QP	46.0	-12.6	1.00 V	183	43.2	-9.8
5	532.46	28.2 QP	46.0	-17.8	1.25 V	7	36.3	-8.1
6	798.30	28.6 QP	46.0	-17.4	1.50 V	50	30.8	-2.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	32.3 QP	40.0	-7.7	1.25 H	7	49.0	-16.7
2	119.16	31.0 QP	43.5	-12.5	1.00 H	7	47.1	-16.1
3	239.46	35.7 QP	46.0	-10.3	1.50 H	268	50.3	-14.6
4	383.05	33.9 QP	46.0	-12.1	1.00 H	117	44.7	-10.8
5	751.73	31.2 QP	46.0	-14.8	1.25 H	331	34.1	-2.9
6	934.13	30.3 QP	46.0	-15.7	1.00 H	196	30.3	0.0
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	55.13	32.8 QP	40.0	-7.2	1.25 V	178	46.9	-14.1
2	119.16	32.3 QP	43.5	-11.2	1.00 V	346	48.4	-16.1
3	190.95	30.1 QP	43.5	-13.4	1.50 V	346	46.4	-16.3
4	309.32	26.3 QP	46.0	-19.7	1.00 V	217	38.3	-12.0
5	431.56	32.3 QP	46.0	-13.7	1.25 V	184	41.9	-9.6
6	497.54	29.9 QP	46.0	-16.1	1.00 V	172	38.5	-8.6

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	72.59	34.7 QP	40.0	-5.3	1.25 H	180	51.2	-16.5
2	119.16	30.5 QP	43.5	-13.0	1.00 H	6	46.6	-16.1
3	198.71	33.1 QP	43.5	-10.4	1.00 H	255	49.6	-16.5
4	383.05	33.1 QP	46.0	-12.9	1.50 H	87	43.9	-10.8
5	631.42	23.6 QP	46.0	-22.4	1.00 H	280	29.0	-5.4
6	936.07	29.6 QP	46.0	-16.4	1.00 H	303	29.7	-0.1
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	55.13	36.6 QP	40.0	-3.4	1.25 V	75	50.7	-14.1
2	119.16	33.0 QP	43.5	-10.5	1.00 V	18	49.1	-16.1
3	190.95	29.9 QP	43.5	-13.6	1.50 V	327	46.2	-16.3
4	303.50	29.1 QP	46.0	-16.9	1.00 V	13	41.4	-12.3
5	425.74	32.4 QP	46.0	-13.6	1.35 V	205	42.2	-9.8
6	530.52	28.3 QP	46.0	-17.7	1.00 V	138	36.4	-8.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

5.2 Conducted Emission Measurement

5.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2.2 Test Instruments

Same as 4.2.2.

5.2.3 Test Procedures

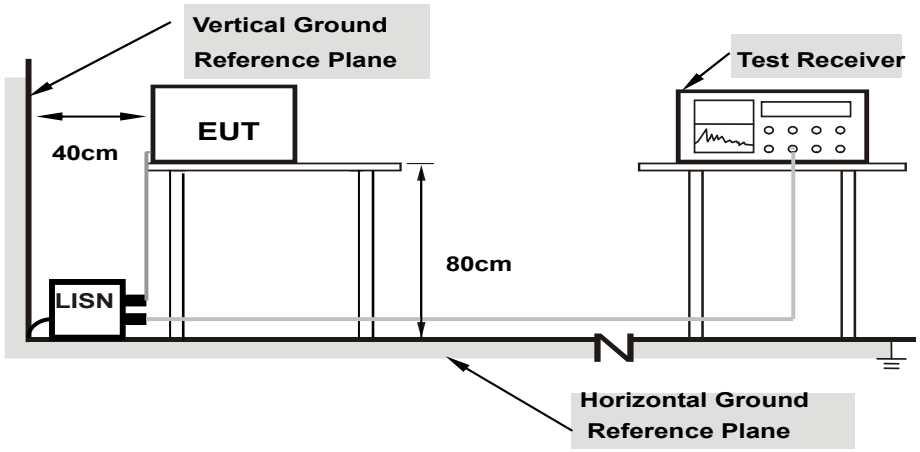
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

5.2.4 Deviation from Test Standard

No deviation.

5.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

5.2.6 EUT Operating Condition

Same as 4.1.6.

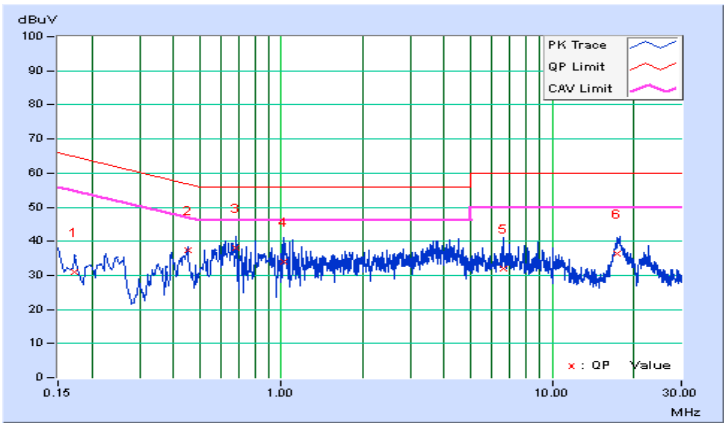
5.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17346	10.08	20.82	11.84	30.90	21.92	64.79	54.79	-33.89	-32.87
2	0.45097	10.18	27.05	18.85	37.23	29.03	56.86	46.86	-19.63	-17.83
3	0.68024	10.23	27.68	13.42	37.91	23.65	56.00	46.00	-18.09	-22.35
4	1.02584	10.29	23.87	12.23	34.16	22.52	56.00	46.00	-21.84	-23.48
5	6.58977	10.60	21.28	13.83	31.88	24.43	60.00	50.00	-28.12	-25.57
6	17.36573	11.23	25.13	19.59	36.36	30.82	60.00	50.00	-23.64	-19.18

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

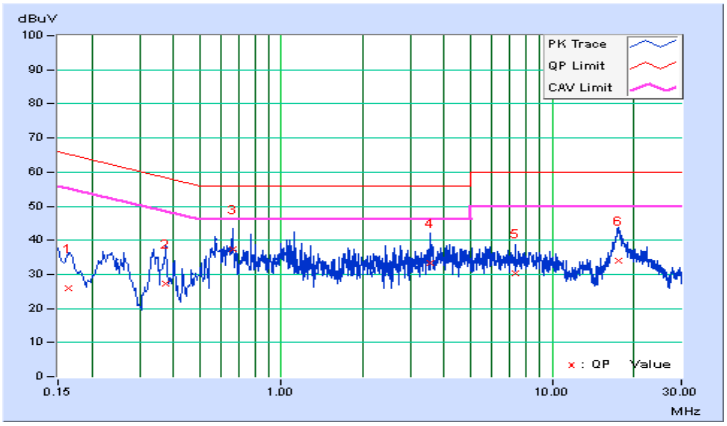


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16482	10.08	15.69	6.56	25.77	16.64	65.22	55.22	-39.45	-38.58
2	0.37678	10.22	16.99	6.06	27.21	16.28	58.35	48.35	-31.14	-32.07
3	**0.66255**	**10.26**	**27.02**	**20.59**	**37.28**	**30.85**	**56.00**	**46.00**	**-18.72**	**-15.15**
4	3.54388	10.54	22.70	13.64	33.24	24.18	56.00	46.00	-22.76	-21.82
5	7.31703	10.73	19.51	10.43	30.24	21.16	60.00	50.00	-29.76	-28.84
6	17.54559	11.39	22.75	16.34	34.14	27.73	60.00	50.00	-25.86	-22.27

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

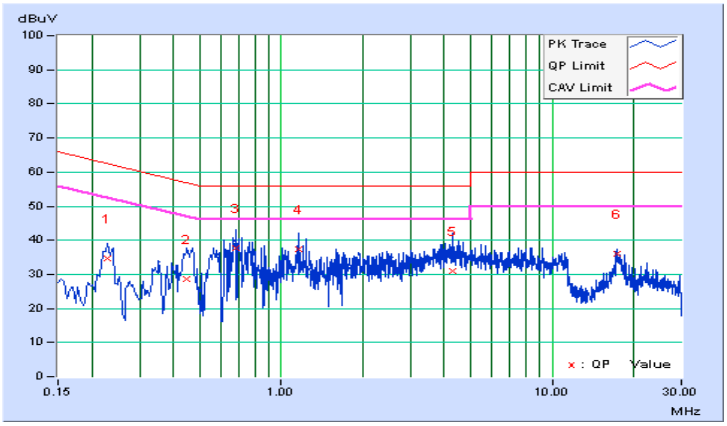


Channel	TX Channel 7	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22731	10.09	24.53	19.58	34.62	29.67	62.55	52.55	-27.93	-22.88
2	0.44742	10.18	18.39	9.18	28.57	19.36	56.92	46.92	-28.35	-27.56
3	0.67785	10.23	27.49	13.00	37.72	23.23	56.00	46.00	-18.28	-22.77
4	1.15487	10.30	26.96	12.81	37.26	23.11	56.00	46.00	-18.74	-22.89
5	4.28678	10.48	20.57	11.12	31.05	21.60	56.00	46.00	-24.95	-24.40
6	17.34227	11.23	24.93	19.45	36.16	30.68	60.00	50.00	-23.84	-19.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

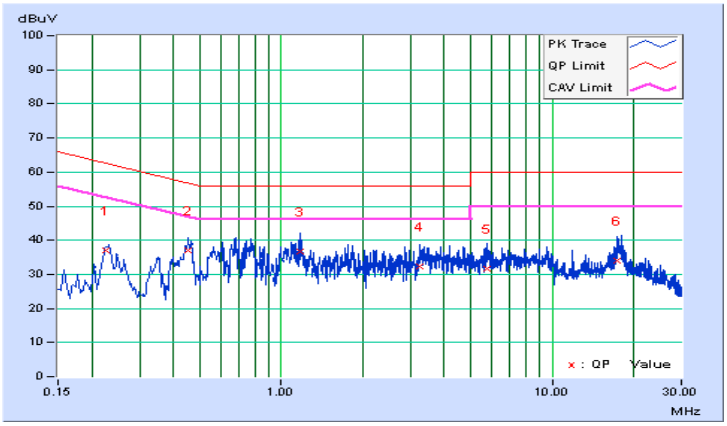


Channel	TX Channel 7	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22434	10.10	27.00	20.76	37.10	30.86	62.66	52.66	-25.56	-21.80
2	0.45498	10.24	26.74	17.85	36.98	28.09	56.78	46.78	-19.80	-18.69
3	1.17056	10.31	26.49	12.64	36.80	22.95	56.00	46.00	-19.20	-23.05
4	3.23890	10.51	21.89	12.18	32.40	22.69	56.00	46.00	-23.60	-23.31
5	5.76867	10.67	20.83	12.09	31.50	22.76	60.00	50.00	-28.50	-27.24
6	17.47912	11.38	22.63	15.93	34.01	27.31	60.00	50.00	-25.99	-22.69

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

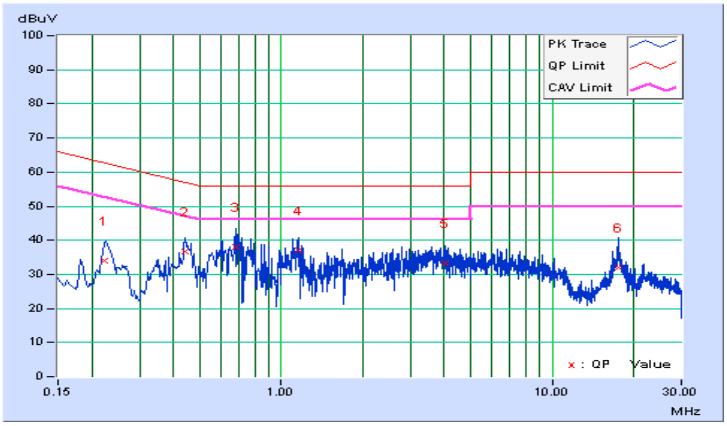


Channel	TX Channel 24	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22375	10.09	23.97	18.19	34.06	28.28	62.68	52.68	-28.62	-24.40
2	0.43934	10.18	26.37	18.26	36.55	28.44	57.07	47.07	-20.52	-18.63
3	0.67785	10.23	27.96	14.28	38.19	24.51	56.00	46.00	-17.81	-21.49
4	1.15487	10.30	26.83	12.77	37.13	23.07	56.00	46.00	-18.87	-22.93
5	4.02481	10.47	22.89	15.95	33.36	26.42	56.00	46.00	-22.64	-19.58
6	17.64334	11.25	20.57	13.81	31.82	25.06	60.00	50.00	-28.18	-24.94

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

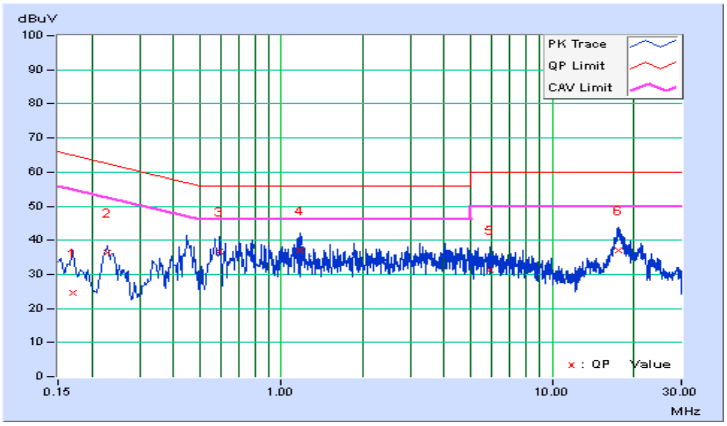


Channel	TX Channel 24	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16967	10.08	14.52	6.17	24.60	16.25	64.98	54.98	-40.38	-38.73
2	0.22791	10.10	26.27	20.86	36.37	30.96	62.53	52.53	-26.16	-21.57
3	0.59183	10.26	26.34	14.32	36.60	24.58	56.00	46.00	-19.40	-21.42
4	1.18224	10.31	26.57	11.98	36.88	22.29	56.00	46.00	-19.12	-23.71
5	5.90943	10.67	20.48	11.22	31.15	21.89	60.00	50.00	-28.85	-28.11
6	17.65116	11.39	25.74	19.50	37.13	30.89	60.00	50.00	-22.87	-19.11

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

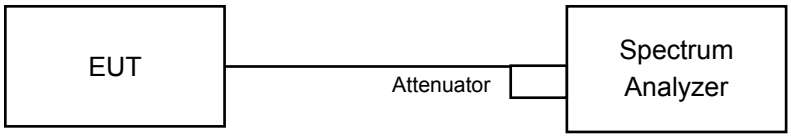


5.3 Number of Hopping Frequency Used

5.3.1 Limits of Hopping Frequency Used Measurement

There is no minimum number of hopping channels associated with this type of hybrid system.

5.3.2 Test Setup



5.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.3.4 Test Procedure

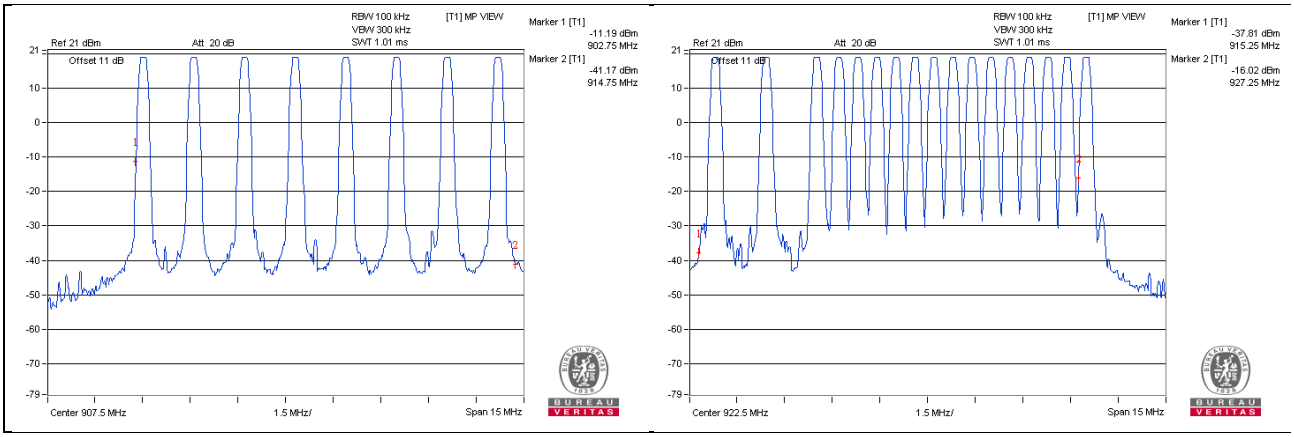
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

5.3.5 Deviation fromTest Standard

No deviation.

5.3.6 Test Results

There are 25 hopping frequencies in the hybrid mode.

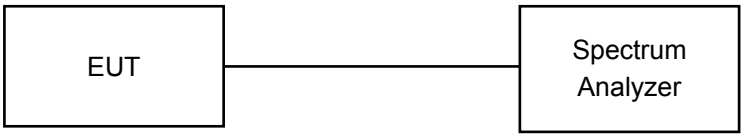


5.4 Dwell Time on Each Channel

5.4.1 Limits of Dwell Time on Each Channel Measurement

A hybrid system must comply with a 0.4 second/channel maximum dwell time when the hopping function is turned on.

5.4.2 Test Setup



5.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

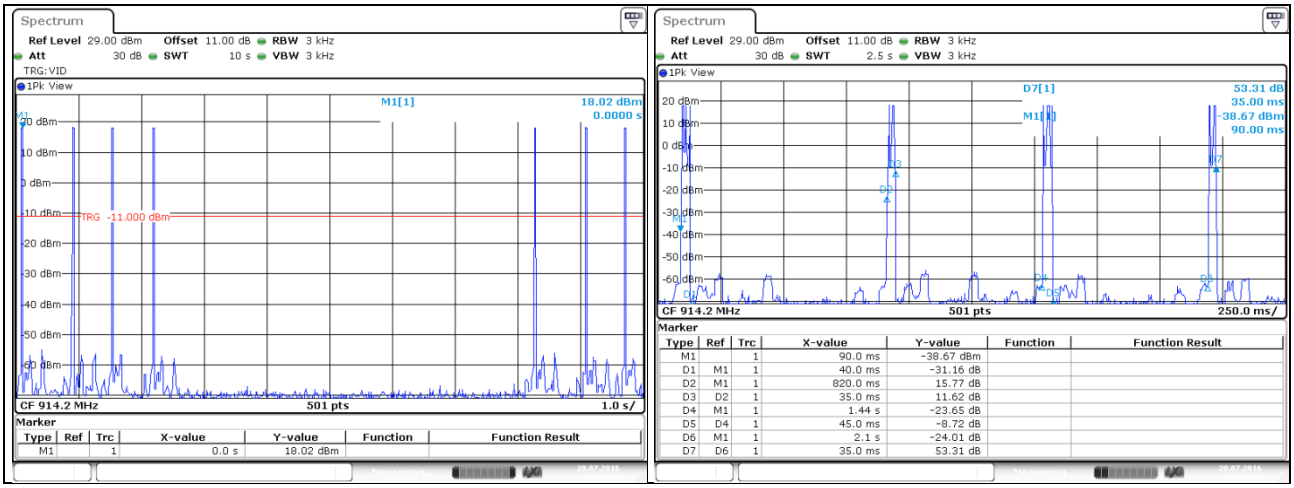
5.4.5 Deviation from Test Standard

No deviation.

5.4.6 Test Results

Number of transmission in a time period	Length of transmission time (msec)	Result (msec)	Limit (msec)
7 times	(40+35+45+35)+(40+35+45)	275	400

Note: Test plots of the transmitting time slot are shown on following.

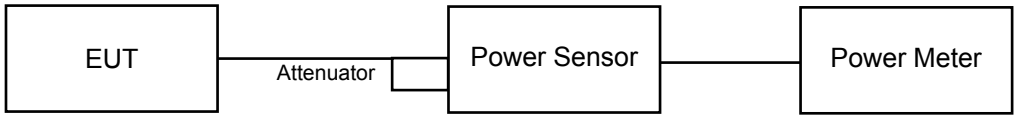


5.5 Conducted Output Power Measurement

5.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

5.5.2 Test Setup



5.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.5.4 Test Procedure

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. Record the power level.

5.5.5 Deviation from Test Standard

No deviation.

5.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

5.5.7 Test Results

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
0	903.0	**67.453**	18.29	30	Pass
7	914.2	**67.453**	18.29	30	Pass
24	927.5	67.143	18.27	30	Pass

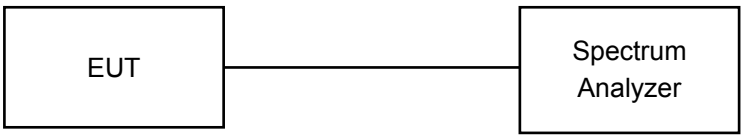
5.6 Power Spectral Density Measurement

5.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

A hybrid system must comply with the power density standard of 8 dBm in any 3 kHz band when the frequency hopping function is turned off

5.6.2 Test Setup



5.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.6.4 Test Procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

5.6.5 Deviation from Test Standard

No deviation.

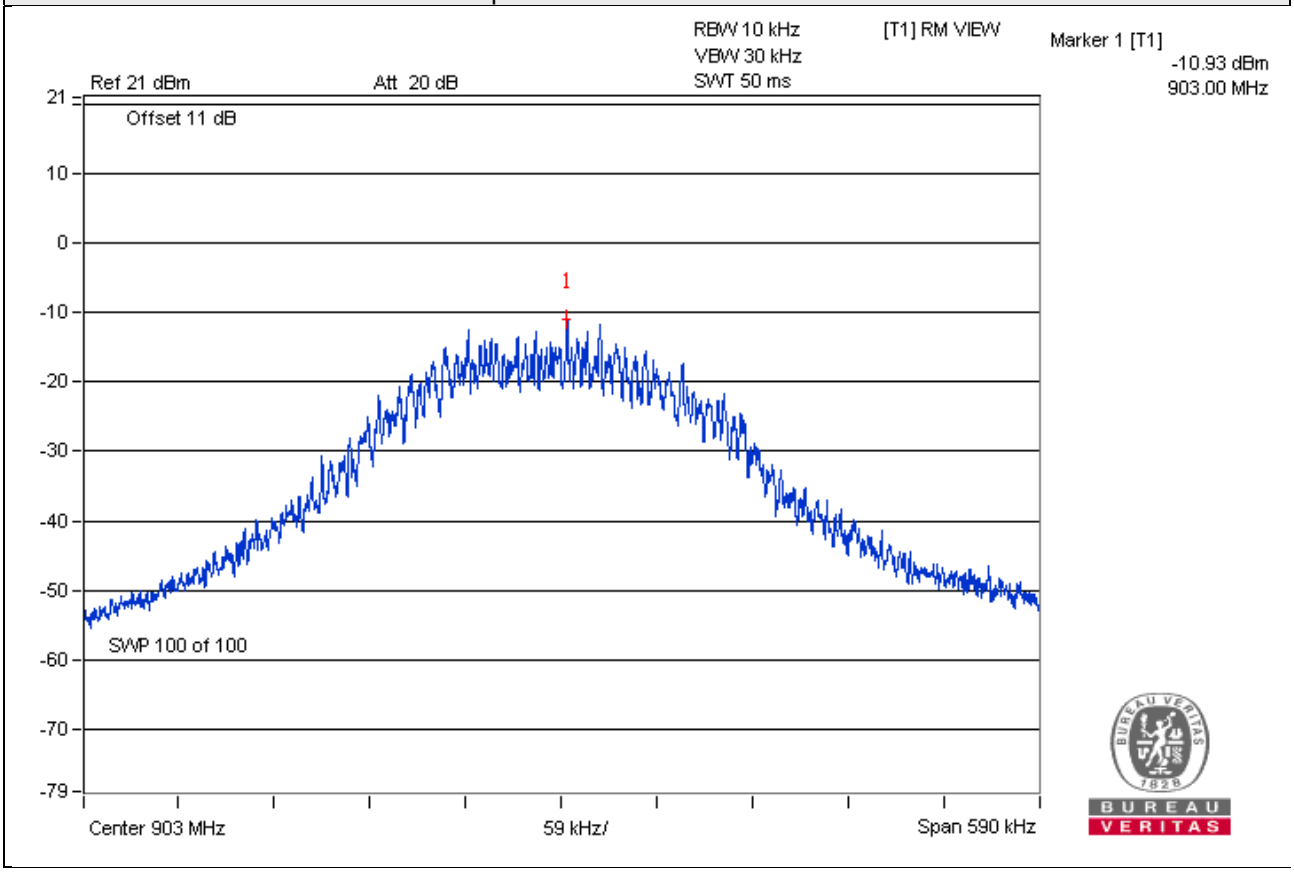
5.6.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

5.6.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
0	903.0	-10.93	8	Pass
7	914.2	-11.73	8	Pass
24	927.5	-12.09	8	Pass

Spectrum Plot of Worst Value

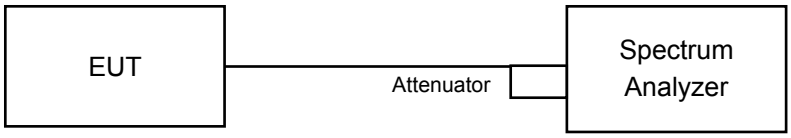


5.7 Conducted Out of Band Emission Measurement

5.7.1 Limits of Conducted Out Of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

5.7.2 Test Setup



5.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

5.7.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 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 OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

5.7.5 Deviation from Test Standard

No deviation.

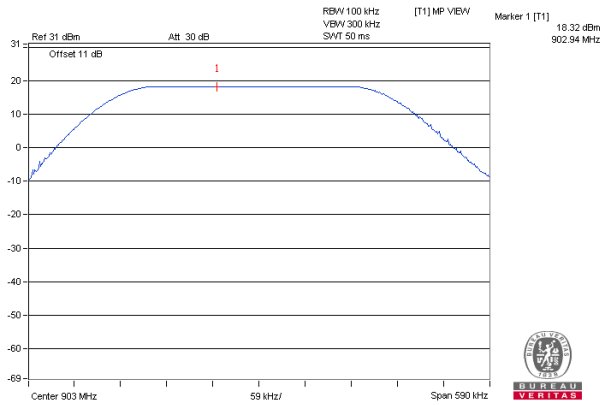
5.7.6 EUT Operating Condition

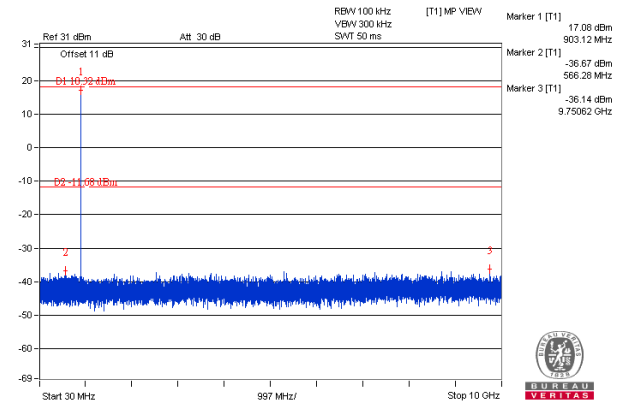
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

5.7.7 Test Results

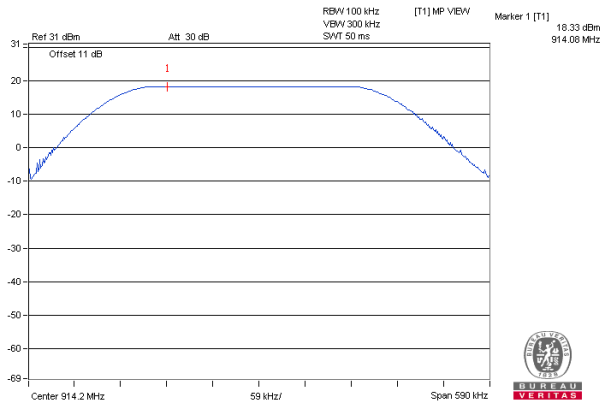
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

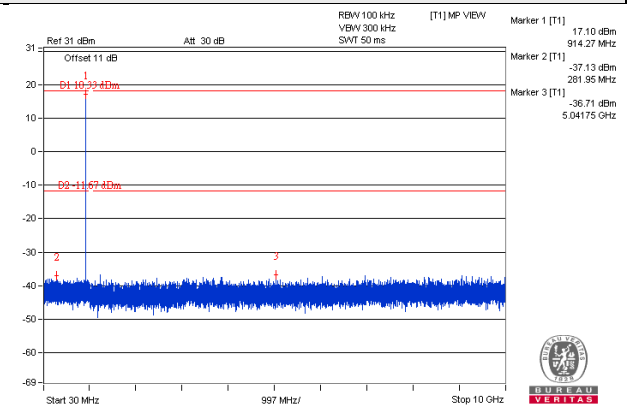
CH 0



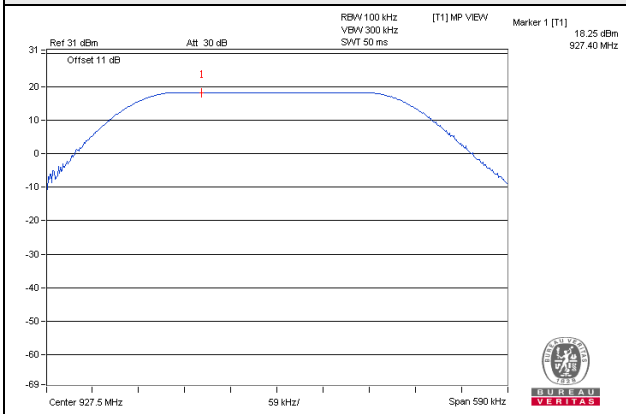


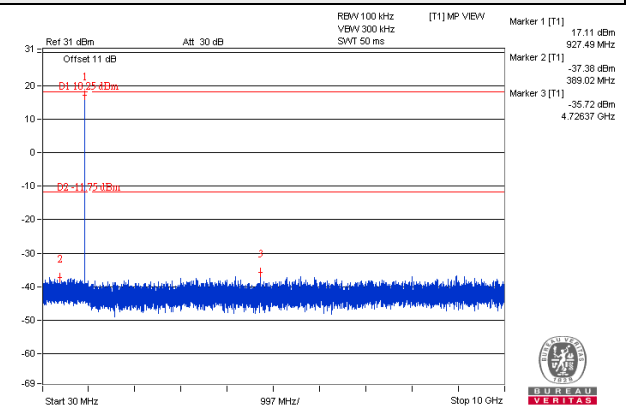
CH 7



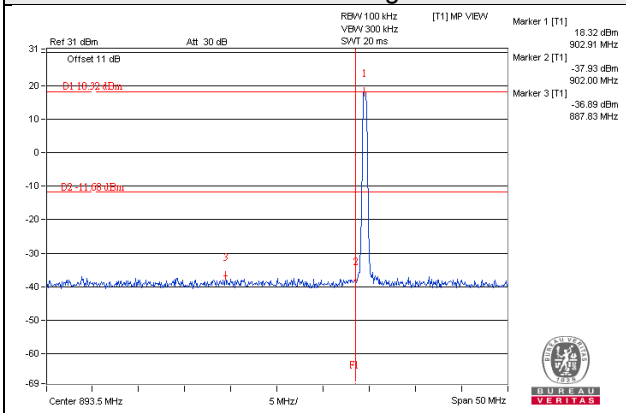


CH 24

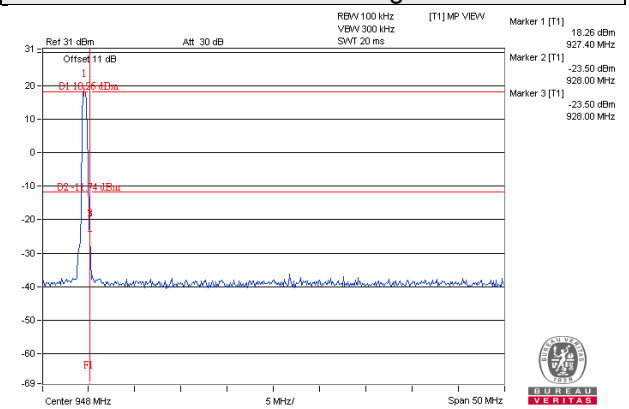




CH 0 Band edge



CH 24 Band edge



6 Test Types and Results (Hybrid Mode (500kHz Bandwidth, 25 channels))

6.1 Radiated Emission and Bandedge Measurement

6.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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 30dB under any condition of modulation.

6.1.2 Test Instruments

Same as 4.1.2.

6.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

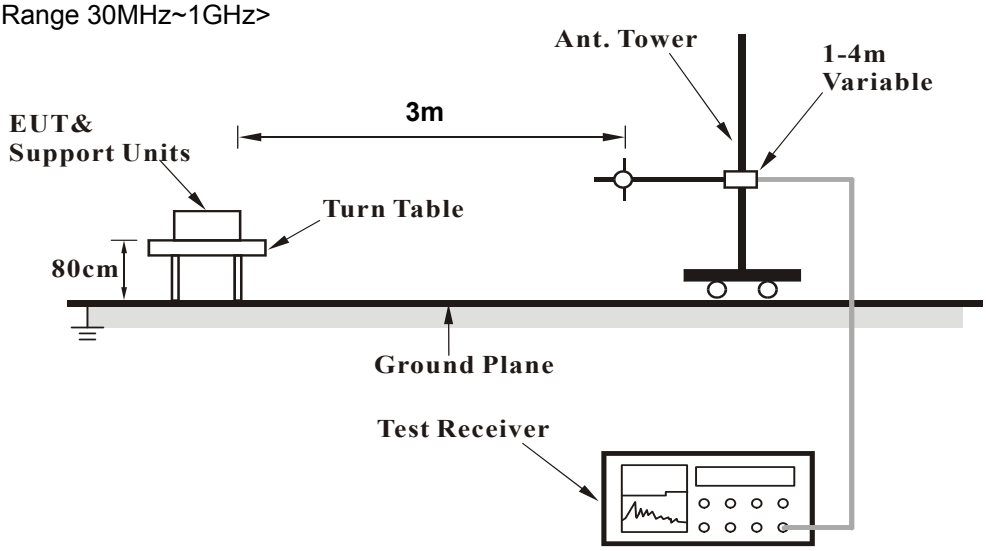
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

6.1.4 Deviation from Test Standard

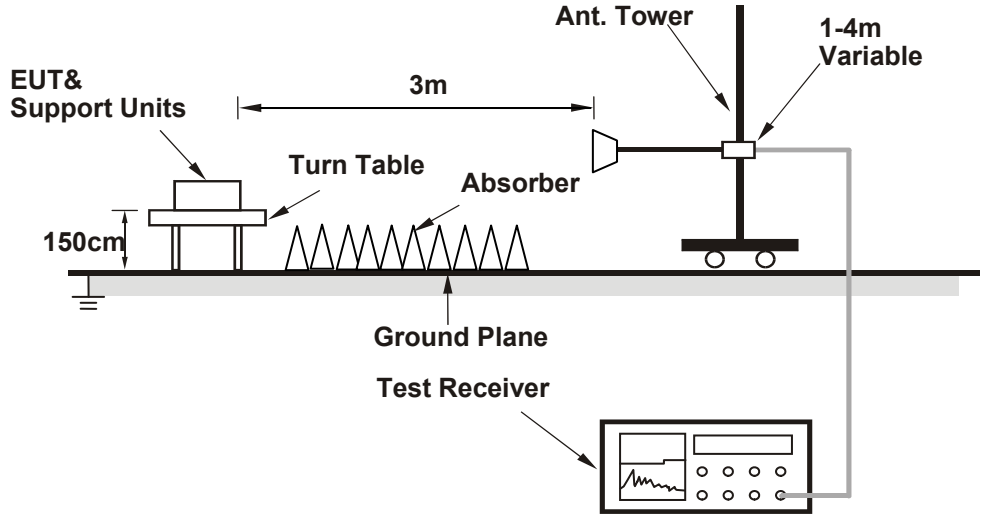
No deviation.

6.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

6.1.6 EUT Operating Conditions

Same as 4.1.6.

6.1.7 Test Results

Above 1GHz Worst-case Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	#902.00	56.7 PK	82.4	-25.7	1.57 H	230	28.7	28.0
2	#902.00	45.8 AV	72.3	-26.5	1.57 H	230	17.8	28.0
3	*903.00	112.4 PK			1.57 H	230	84.4	28.0
4	*903.00	102.3 AV			1.57 H	230	74.3	28.0
5	1806.00	49.3 PK	74.0	-24.7	1.55 H	0	53.4	-4.1
6	1806.00	46.5 AV	54.0	-7.5	1.55 H	0	50.6	-4.1
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	#902.00	55.0 PK	76.0	-21.0	1.05 V	194	27.0	28.0
2	#902.00	43.9 AV	65.8	-21.9	1.05 V	194	15.9	28.0
3	*903.00	106.0 PK			1.05 V	194	78.0	28.0
4	*903.00	95.8 AV			1.05 V	194	67.8	28.0
5	1806.00	42.5 PK	74.0	-31.5	1.45 V	155	46.6	-4.1
6	1806.00	37.5 AV	54.0	-16.5	1.45 V	155	41.6	-4.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*914.20	113.4 PK			1.64 H	231	85.4	28.0
2	*914.20	102.6 AV			1.64 H	231	74.6	28.0
3	1828.40	44.2 PK	74.0	-29.8	1.55 H	98	48.2	-4.0
4	1828.40	42.6 AV	54.0	-11.4	1.55 H	98	46.6	-4.0
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	*914.20	106.9 PK			1.08 V	151	78.9	28.0
2	*914.20	96.7 AV			1.08 V	151	68.7	28.0
3	1828.40	44.0 PK	74.0	-30.0	1.56 V	162	48.0	-4.0
4	1828.40	38.4 AV	54.0	-15.6	1.56 V	162	42.4	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*927.50	115.4 PK			1.64 H	238	87.4	28.0
2	*927.50	104.4 AV			1.64 H	238	76.4	28.0
3	#928.00	80.0 PK	85.4	-5.4	1.64 H	238	52.0	28.0
4	#928.00	64.6 AV	74.4	-9.8	1.64 H	238	36.6	28.0
5	1855.00	41.5 PK	74.0	-32.5	1.10 H	322	45.4	-3.9
6	1855.00	36.2 AV	54.0	-17.8	1.10 H	322	40.1	-3.9
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	*927.50	109.5 PK			1.63 V	158	81.5	28.0
2	*927.50	98.2 AV			1.63 V	158	70.2	28.0
3	#928.00	74.3 PK	79.5	-5.2	1.63 V	158	46.3	28.0
4	#928.00	58.5 AV	68.2	-9.7	1.63 V	158	30.5	28.0
5	1855.00	39.4 PK	74.0	-34.6	1.30 V	122	43.3	-3.9
6	1855.00	30.6 AV	54.0	-23.4	1.30 V	122	34.5	-3.9

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	32.3 QP	40.0	-7.7	1.25 H	7	49.0	-16.7
2	119.16	30.5 QP	43.5	-13.0	1.00 H	9	46.6	-16.1
3	287.97	34.2 QP	46.0	-11.8	1.50 H	7	46.8	-12.6
4	383.05	33.8 QP	46.0	-12.2	1.00 H	357	44.6	-10.8
5	631.42	24.1 QP	46.0	-21.9	2.50 H	319	29.5	-5.4
6	817.70	26.6 QP	46.0	-19.4	1.00 H	153	28.5	-1.9
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	**53.18**	**36.0 QP**	**40.0**	**-4.0**	**1.25 V**	**255**	**49.9**	**-13.9**
2	119.16	32.4 QP	43.5	-11.1	1.00 V	332	48.5	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	349	46.9	-16.3
4	301.56	27.2 QP	46.0	-18.8	1.00 V	7	39.5	-12.3
5	672.17	25.3 QP	46.0	-20.7	1.00 V	188	30.3	-5.0
6	875.91	27.5 QP	46.0	-18.5	1.25 V	173	28.7	-1.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	34.3 QP	40.0	-5.7	1.25 H	153	51.0	-16.7
2	165.73	31.0 QP	43.5	-12.5	1.00 H	297	45.0	-14.0
3	239.46	35.4 QP	46.0	-10.6	1.25 H	267	50.0	-14.6
4	311.26	34.6 QP	46.0	-11.4	1.00 H	213	46.5	-11.9
5	383.05	35.0 QP	46.0	-11.0	1.50 H	104	45.8	-10.8
6	743.97	29.3 QP	46.0	-16.7	1.00 H	221	32.3	-3.0
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	59.01	34.8 QP	40.0	-5.2	1.25 V	205	49.2	-14.4
2	119.16	32.6 QP	43.5	-10.9	1.00 V	339	48.7	-16.1
3	190.95	30.5 QP	43.5	-13.0	1.50 V	352	46.8	-16.3
4	274.39	26.9 QP	46.0	-19.1	1.00 V	196	40.0	-13.1
5	423.80	31.9 QP	46.0	-14.1	1.25 V	172	41.7	-9.8
6	817.70	26.8 QP	46.0	-19.2	1.25 V	272	28.7	-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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	33.1 QP	40.0	-6.9	1.25 H	354	49.8	-16.7
2	119.16	30.5 QP	43.5	-13.0	1.00 H	33	46.6	-16.1
3	239.46	35.6 QP	46.0	-10.4	1.50 H	269	50.2	-14.6
4	287.97	35.0 QP	46.0	-11.0	1.00 H	74	47.6	-12.6
5	383.05	33.3 QP	46.0	-12.7	1.50 H	87	44.1	-10.8
6	532.46	28.8 QP	46.0	-17.2	1.00 H	155	36.9	-8.1
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	57.07	33.2 QP	40.0	-6.8	1.25 V	191	47.5	-14.3
2	119.16	33.0 QP	43.5	-10.5	1.00 V	327	49.1	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	7	46.9	-16.3
4	299.62	27.4 QP	46.0	-18.6	1.00 V	7	39.8	-12.4
5	449.03	31.1 QP	46.0	-14.9	1.25 V	193	40.4	-9.3
6	798.30	26.3 QP	46.0	-19.7	1.00 V	282	28.5	-2.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

6.2 Conducted Emission Measurement

6.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

6.2.2 Test Instruments

Same as 4.2.2.

6.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

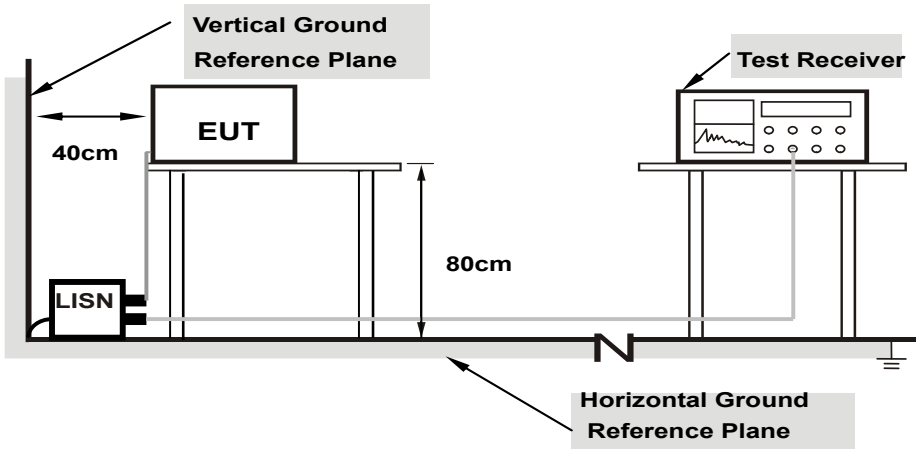
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

6.2.4 Deviation from Test Standard

No deviation.

6.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

6.2.6 EUT Operating Condition

Same as 4.1.6.

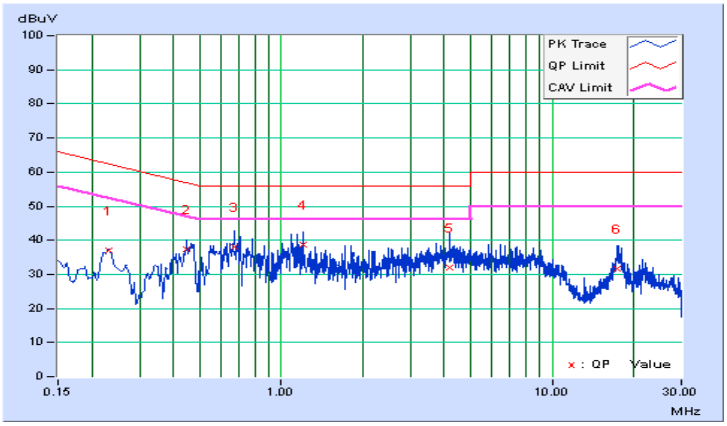
6.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22972	10.09	27.11	21.83	37.20	31.92	62.46	52.46	-25.26	-20.54
2	0.44716	10.18	27.35	19.90	37.53	30.08	56.93	46.93	-19.40	-16.85
3	0.67394	10.22	27.87	14.69	38.09	24.91	56.00	46.00	-17.91	-21.09
4	1.20181	10.31	28.35	14.72	38.66	25.03	56.00	46.00	-17.34	-20.97
5	4.18121	10.48	21.51	11.72	31.99	22.20	56.00	46.00	-24.01	-23.80
6	17.32272	11.23	20.27	13.30	31.50	24.53	60.00	50.00	-28.50	-25.47

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

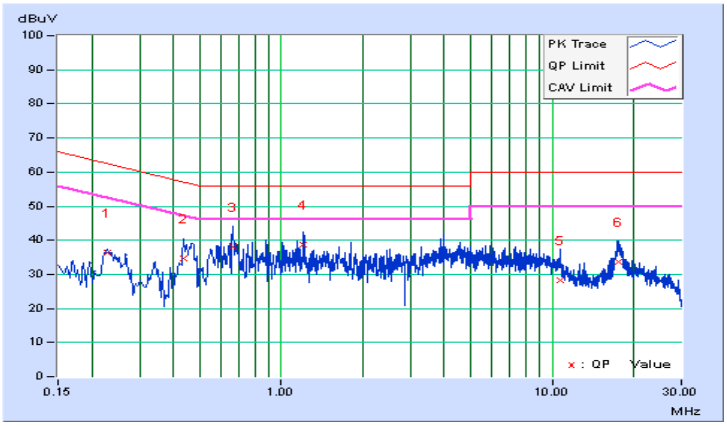


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	26.32	20.82	36.42	30.92	62.57	52.57	-26.15	-21.65
2	0.43543	10.24	24.33	15.70	34.57	25.94	57.15	47.15	-22.58	-21.21
3	**0.66221**	**10.26**	**27.92**	**20.75**	**38.18**	**31.01**	**56.00**	**46.00**	**-17.82**	**-14.99**
4	1.20181	10.31	28.41	16.12	38.72	26.43	56.00	46.00	-17.28	-19.57
5	10.68354	10.90	17.49	10.01	28.39	20.91	60.00	50.00	-31.61	-29.09
6	17.63161	11.39	22.33	15.54	33.72	26.93	60.00	50.00	-26.28	-23.07

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

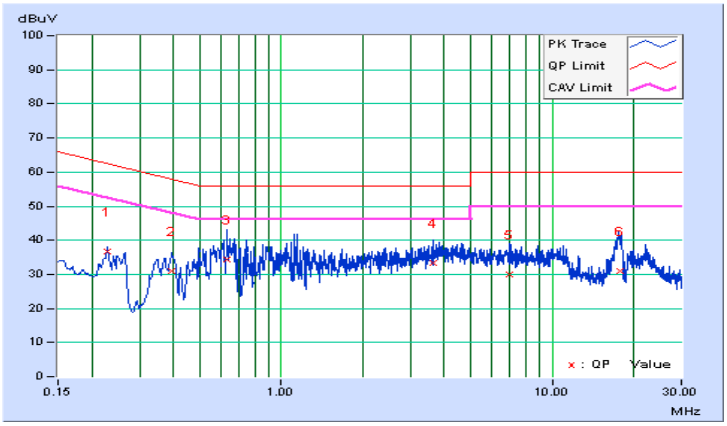


Channel	TX Channel 7	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22820	10.09	26.56	21.94	36.65	32.03	62.51	52.51	-25.86	-20.48
2	0.39635	10.17	20.82	9.26	30.99	19.43	57.93	47.93	-26.94	-28.50
3	0.63093	10.22	24.28	9.68	34.50	19.90	56.00	46.00	-21.50	-26.10
4	3.61817	10.45	22.96	15.74	33.41	26.19	56.00	46.00	-22.59	-19.81
5	6.93776	10.62	19.28	10.30	29.90	20.92	60.00	50.00	-30.10	-29.08
6	17.77237	11.26	19.63	13.42	30.89	24.68	60.00	50.00	-29.11	-25.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

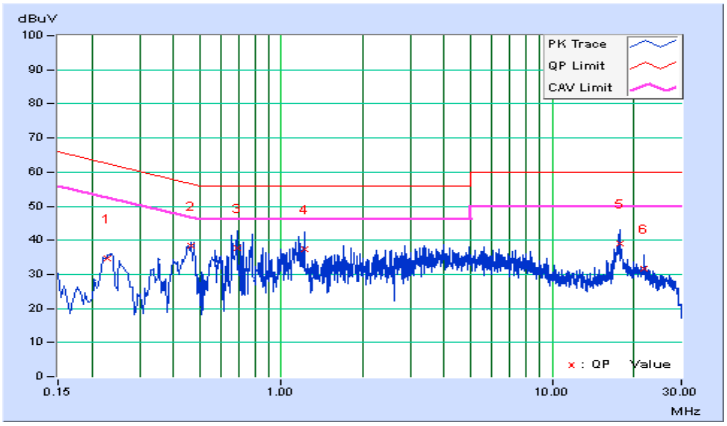


Channel	TX Channel 7	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	24.68	19.32	34.78	29.42	62.57	52.57	-27.79	-23.15
2	0.46669	10.25	28.06	16.31	38.31	26.56	56.57	46.57	-18.26	-20.01
3	0.68564	10.26	27.41	13.58	37.67	23.84	56.00	46.00	-18.33	-22.16
4	1.21352	10.31	27.16	14.26	37.47	24.57	56.00	46.00	-18.53	-21.43
5	17.76455	11.40	27.61	21.70	39.01	33.10	60.00	50.00	-20.99	-16.90
6	21.87005	11.71	19.91	13.53	31.62	25.24	60.00	50.00	-28.38	-24.76

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

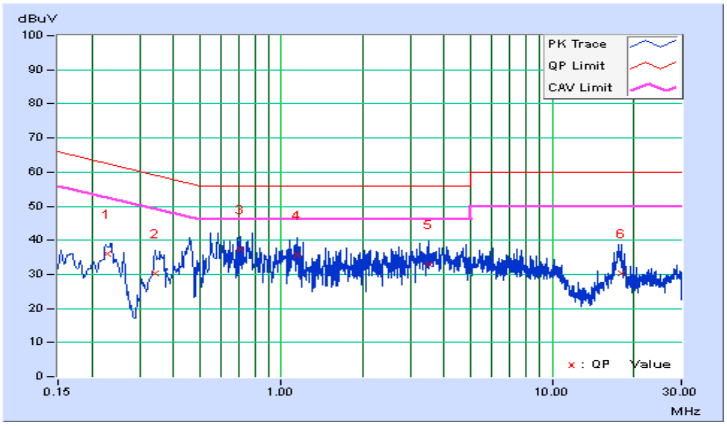


Channel	TX Channel 24	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22820	10.09	25.90	20.70	35.99	30.79	62.51	52.51	-26.52	-21.72
2	0.34159	10.14	20.25	13.33	30.39	23.47	59.16	49.16	-28.77	-25.69
3	0.70913	10.23	27.30	11.48	37.53	21.71	56.00	46.00	-18.47	-24.29
4	1.15096	10.30	25.50	13.42	35.80	23.72	56.00	46.00	-20.20	-22.28
5	3.48523	10.44	22.66	14.26	33.10	24.70	56.00	46.00	-22.90	-21.30
6	17.93659	11.27	19.16	13.22	30.43	24.49	60.00	50.00	-29.57	-25.51

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

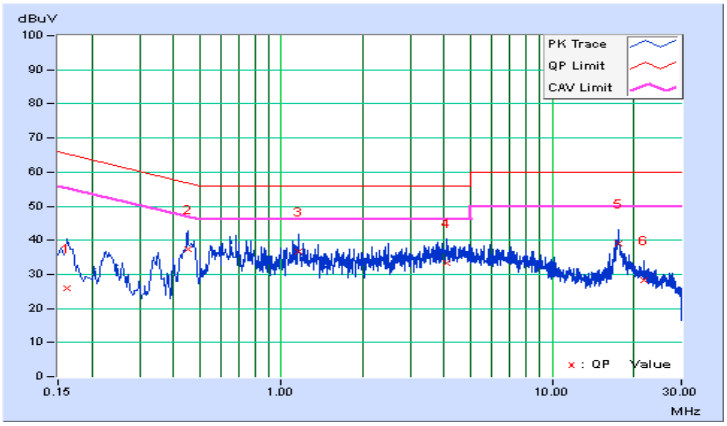


Channel	TX Channel 24	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16139	10.08	15.93	6.27	26.01	16.35	65.39	55.39	-39.38	-39.04
2	0.45097	10.24	26.99	19.50	37.23	29.74	56.86	46.86	-19.63	-17.12
3	1.15878	10.31	26.42	14.44	36.73	24.75	56.00	46.00	-19.27	-21.25
4	4.09910	10.59	22.74	15.63	33.33	26.22	56.00	46.00	-22.67	-19.78
5	17.50649	11.38	27.78	21.99	39.16	33.37	60.00	50.00	-20.84	-16.63
6	21.85441	11.71	16.44	8.44	28.15	20.15	60.00	50.00	-31.85	-29.85

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

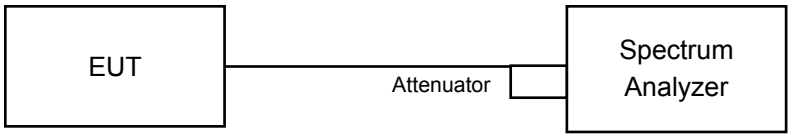


6.3 Number of Hopping Frequency Used

6.3.1 Limits of Hopping Frequency Used Measurement

There is no minimum number of hopping channels associated with this type of hybrid system.

6.3.2 Test Setup



6.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

6.3.4 Test Procedure

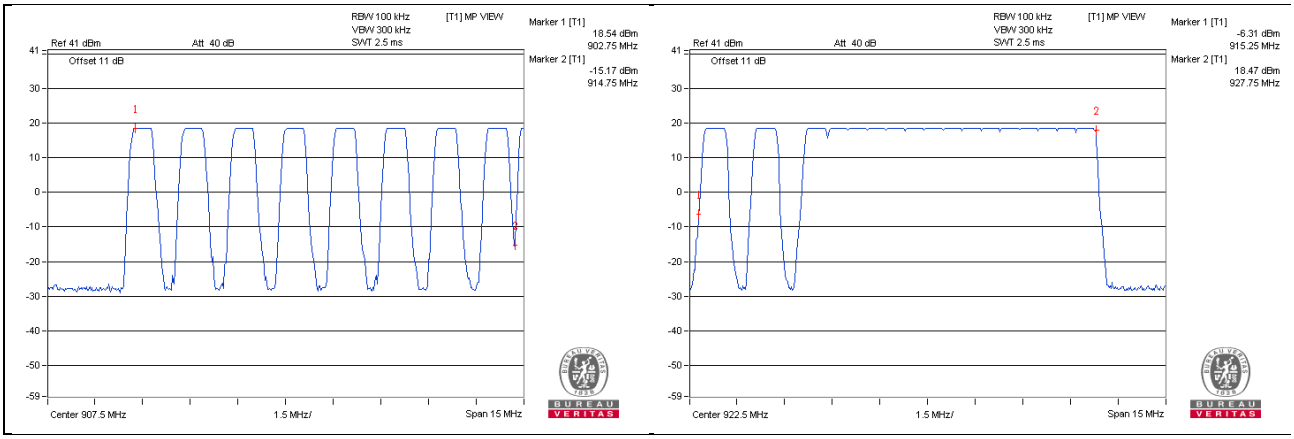
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

6.3.5 Deviation fromTest Standard

No deviation.

6.3.6 Test Results

There are 25 hopping frequencies in the hybrid mode.

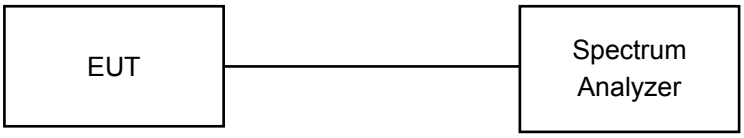


6.4 Dwell Time on Each Channel

6.4.1 Limits of Dwell Time on Each Channel Measurement

A hybrid system must comply with a 0.4 second/channel maximum dwell time when the hopping function is turned on.

6.4.2 Test Setup



6.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

6.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

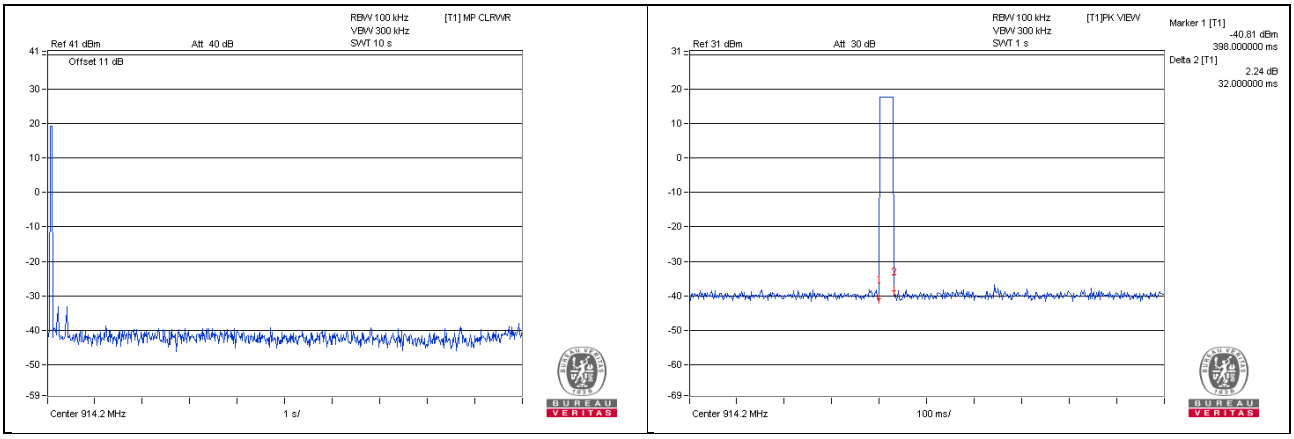
6.4.5 Deviation from Test Standard

No deviation.

6.4.6 Test Results

Number of transmission in a time period	Length of transmission time (msec)	Result (msec)	Limit (msec)
1 time	32*1	32	400

Note: Test plots of the transmitting time slot are shown on following.

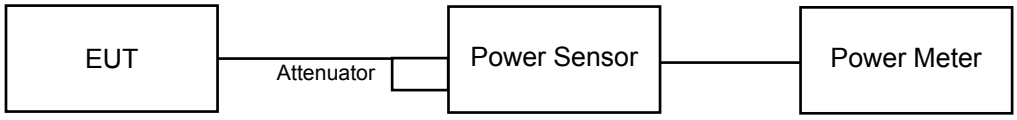


6.5 Conducted Output Power Measurement

6.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

6.5.2 Test Setup



6.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

6.5.4 Test Procedure

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. Record the power level.

6.5.5 Deviation from Test Standard

No deviation.

6.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

6.5.7 Test Results

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
0	903.0	**67.143**	18.27	30	Pass
7	914.2	**67.143**	18.27	30	Pass
24	927.5	66.834	18.25	30	Pass

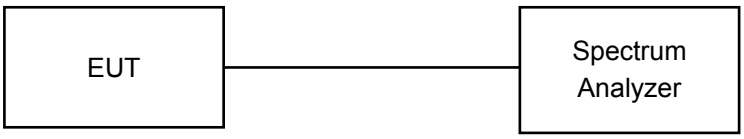
6.6 Power Spectral Density Measurement

6.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

A hybrid system must comply with the power density standard of 8 dBm in any 3 kHz band when the frequency hopping function is turned off

6.6.2 Test Setup



6.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

6.6.4 Test Procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

6.6.5 Deviation from Test Standard

No deviation.

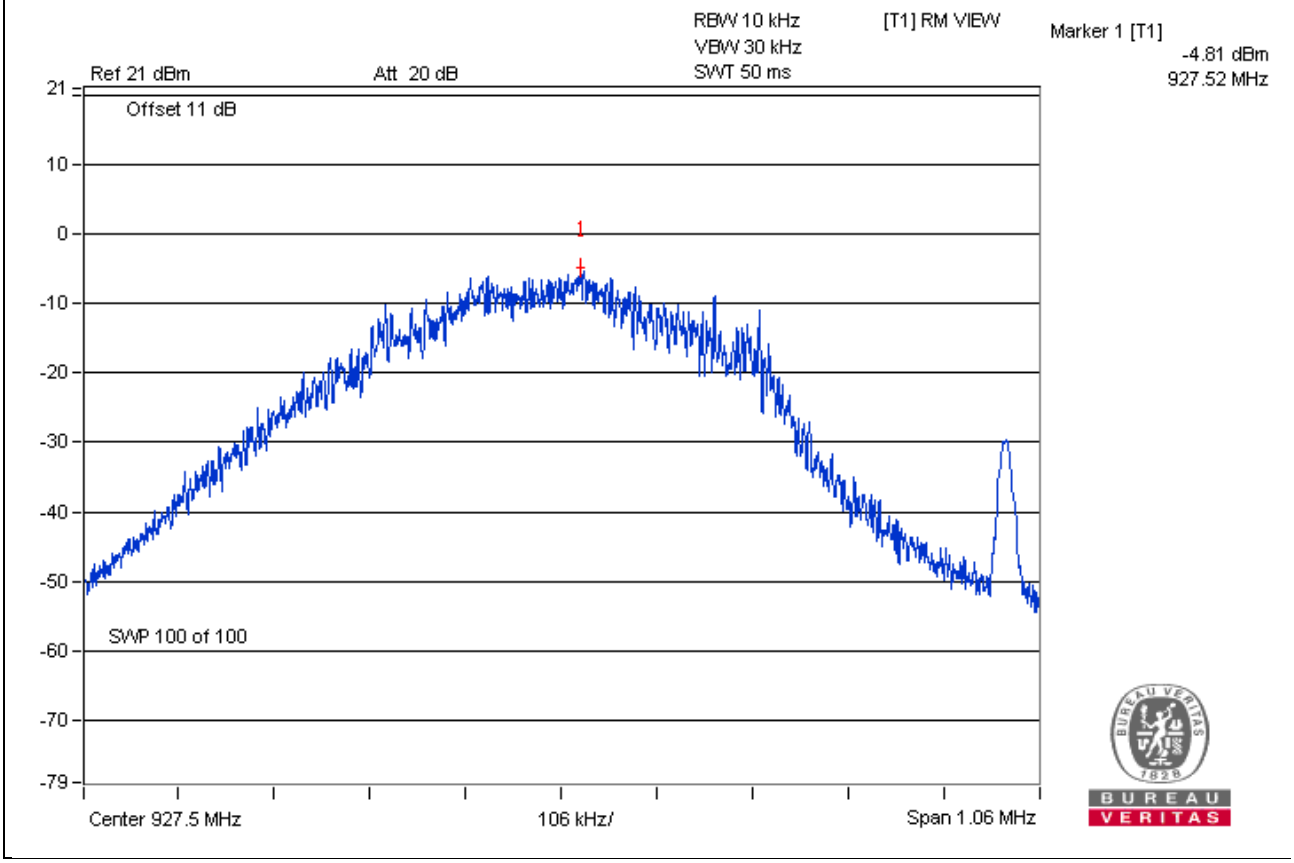
6.6.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

6.6.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
0	903.0	-5.71	8	Pass
7	914.2	-5.16	8	Pass
24	927.5	-4.81	8	Pass

Spectrum Plot of Worst Value

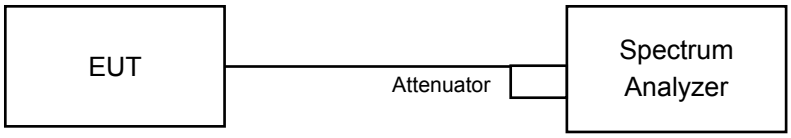


6.7 Conducted Out of Band Emission Measurement

6.7.1 Limits of Conducted Out Of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

6.7.2 Test Setup



6.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

6.7.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 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 OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

6.7.5 Deviation from Test Standard

No deviation.

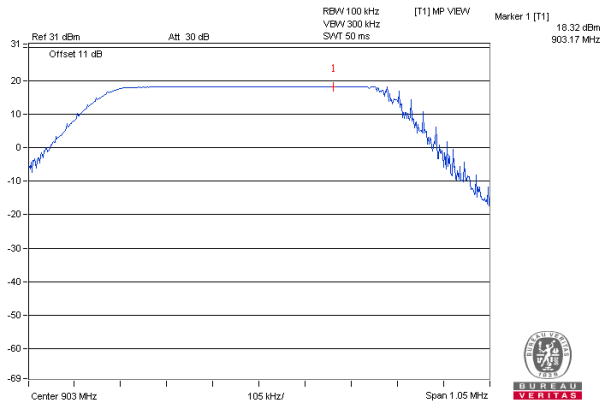
6.7.6 EUT Operating Condition

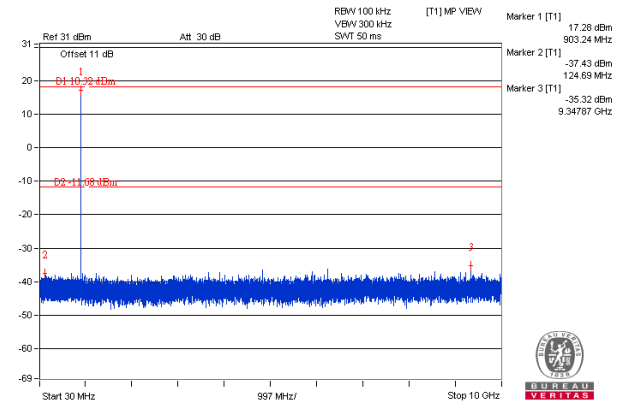
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

6.7.7 Test Results

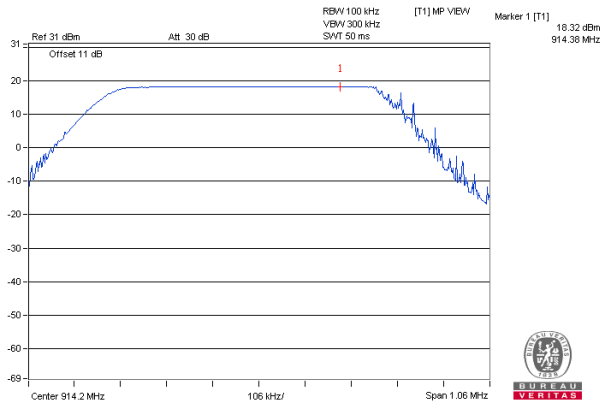
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

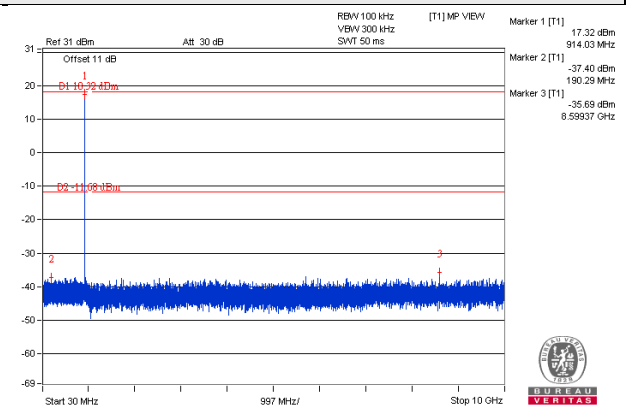
CH 0



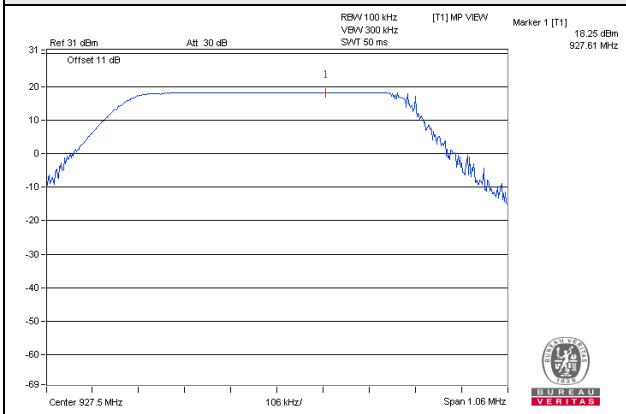


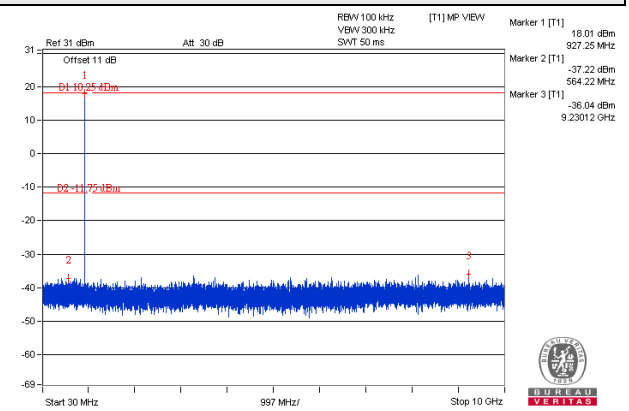
CH 7



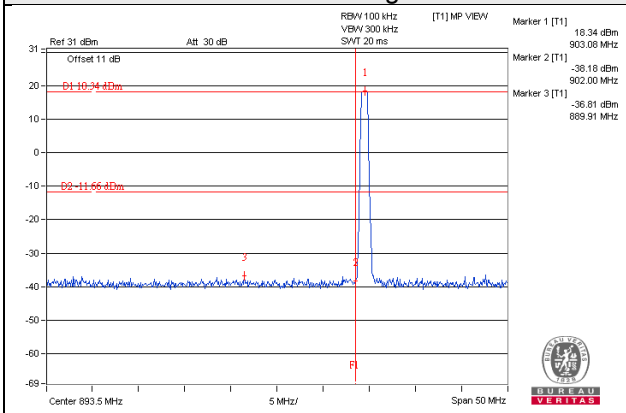


CH 24

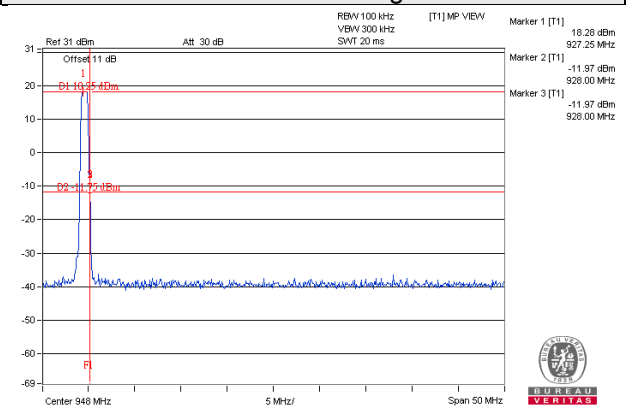




CH 0 Band edge



CH 24 Band edge



7 Test Types and Results (Hybrid Mode (500kHz Bandwidth, 8 channels))

7.1 Radiated Emission and Bandedge Measurement

7.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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 30dB under any condition of modulation.

7.1.2 Test Instruments

Same as 4.1.2.

7.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

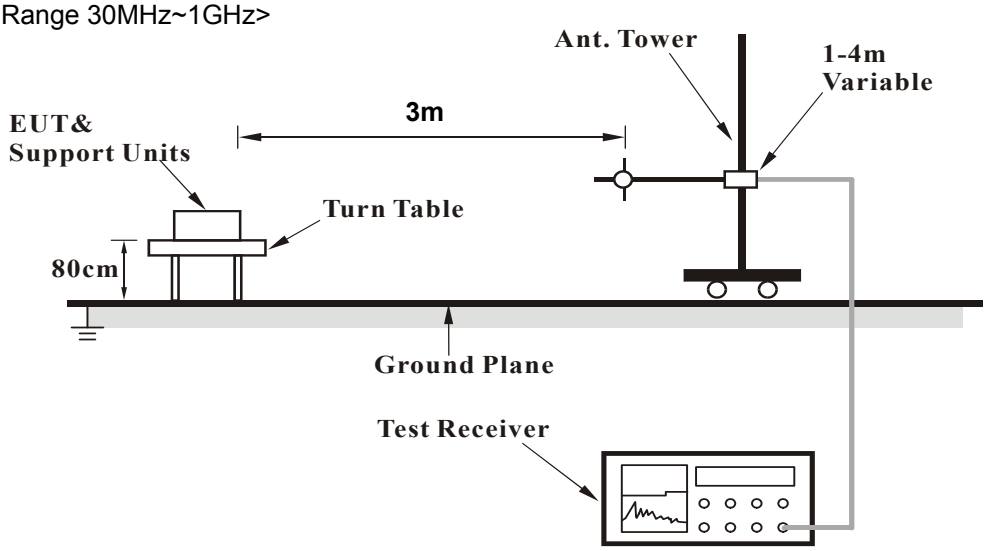
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

7.1.4 Deviation from Test Standard

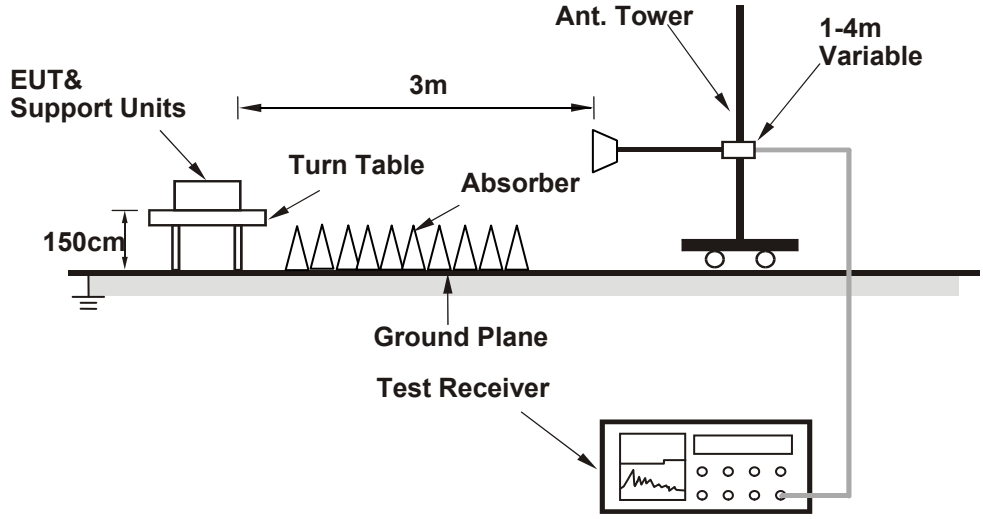
No deviation.

7.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

7.1.6 EUT Operating Conditions

Same as 4.1.6.

7.1.7 Test Results

Above 1GHz Worst-case Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	#902.00	56.7 PK	82.4	-25.7	1.57 H	230	28.7	28.0
2	#902.00	45.8 AV	72.3	-26.5	1.57 H	230	17.8	28.0
3	*903.00	112.4 PK			1.57 H	230	84.4	28.0
4	*903.00	102.3 AV			1.57 H	230	74.3	28.0
5	1806.00	49.3 PK	74.0	-24.7	1.55 H	0	53.4	-4.1
6	1806.00	46.5 AV	54.0	-7.5	1.55 H	0	50.6	-4.1
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	#902.00	55.0 PK	76.0	-21.0	1.05 V	194	27.0	28.0
2	#902.00	43.9 AV	65.8	-21.9	1.05 V	194	15.9	28.0
3	*903.00	106.0 PK			1.05 V	194	78.0	28.0
4	*903.00	95.8 AV			1.05 V	194	67.8	28.0
5	1806.00	42.5 PK	74.0	-31.5	1.45 V	155	46.6	-4.1
6	1806.00	37.5 AV	54.0	-16.5	1.45 V	155	41.6	-4.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*907.80	113.0 PK			1.61 H	228	85.0	28.0
2	*907.80	102.8 AV			1.61 H	228	74.8	28.0
3	1815.60	49.5 PK	74.0	-24.5	1.58 H	0	53.5	-4.0
4	1815.60	46.3 AV	54.0	-7.7	1.58 H	0	50.3	-4.0
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	*907.80	106.8 PK			1.05 V	142	78.8	28.0
2	*907.80	96.8 AV			1.05 V	142	68.8	28.0
3	1815.60	42.9 PK	74.0	-31.1	1.05 V	150	46.9	-4.0
4	1815.60	38.8 AV	54.0	-15.2	1.05 V	150	42.8	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*914.20	113.4 PK			1.64 H	231	85.4	28.0
2	*914.20	102.6 AV			1.64 H	231	74.6	28.0
3	1828.40	44.2 PK	74.0	-29.8	1.55 H	98	48.2	-4.0
4	1828.40	42.6 AV	54.0	-11.4	1.55 H	98	46.6	-4.0
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	*914.20	106.9 PK			1.08 V	151	78.9	28.0
2	*914.20	96.7 AV			1.08 V	151	68.7	28.0
3	1828.40	44.0 PK	74.0	-30.0	1.56 V	162	48.0	-4.0
4	1828.40	38.4 AV	54.0	-15.6	1.56 V	162	42.4	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

Below 1GHz worst-case data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	32.3 QP	40.0	-7.7	1.25 H	7	49.0	-16.7
2	119.16	30.5 QP	43.5	-13.0	1.00 H	9	46.6	-16.1
3	287.97	34.2 QP	46.0	-11.8	1.50 H	7	46.8	-12.6
4	383.05	33.8 QP	46.0	-12.2	1.00 H	357	44.6	-10.8
5	631.42	24.1 QP	46.0	-21.9	2.50 H	319	29.5	-5.4
6	817.70	26.6 QP	46.0	-19.4	1.00 H	153	28.5	-1.9
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	**53.18**	**36.0 QP**	**40.0**	**-4.0**	**1.25 V**	**255**	**49.9**	**-13.9**
2	119.16	32.4 QP	43.5	-11.1	1.00 V	332	48.5	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	349	46.9	-16.3
4	301.56	27.2 QP	46.0	-18.8	1.00 V	7	39.5	-12.3
5	672.17	25.3 QP	46.0	-20.7	1.00 V	188	30.3	-5.0
6	875.91	27.5 QP	46.0	-18.5	1.25 V	173	28.7	-1.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	72.59	31.8 QP	40.0	-8.2	1.25 H	174	48.3	-16.5
2	119.16	30.6 QP	43.5	-12.9	1.00 H	37	46.7	-16.1
3	198.71	32.8 QP	43.5	-10.7	1.50 H	251	49.3	-16.5
4	299.62	34.4 QP	46.0	-11.6	1.00 H	225	46.8	-12.4
5	396.64	32.0 QP	46.0	-14.0	1.00 H	102	42.5	-10.5
6	707.10	27.5 QP	46.0	-18.5	1.25 H	294	31.7	-4.2
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	57.07	34.9 QP	40.0	-5.1	1.25 V	112	49.2	-14.3
2	190.95	31.5 QP	43.5	-12.0	1.00 V	6	47.8	-16.3
3	299.62	28.1 QP	46.0	-17.9	1.50 V	331	40.5	-12.4
4	423.80	32.8 QP	46.0	-13.2	1.25 V	198	42.6	-9.8
5	499.48	29.5 QP	46.0	-16.5	1.00 V	159	38.0	-8.5
6	798.30	26.6 QP	46.0	-19.4	1.50 V	316	28.8	-2.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	34.3 QP	40.0	-5.7	1.25 H	153	51.0	-16.7
2	165.73	31.0 QP	43.5	-12.5	1.00 H	297	45.0	-14.0
3	239.46	35.4 QP	46.0	-10.6	1.25 H	267	50.0	-14.6
4	311.26	34.6 QP	46.0	-11.4	1.00 H	213	46.5	-11.9
5	383.05	35.0 QP	46.0	-11.0	1.50 H	104	45.8	-10.8
6	743.97	29.3 QP	46.0	-16.7	1.00 H	221	32.3	-3.0
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	59.01	34.8 QP	40.0	-5.2	1.25 V	205	49.2	-14.4
2	119.16	32.6 QP	43.5	-10.9	1.00 V	339	48.7	-16.1
3	190.95	30.5 QP	43.5	-13.0	1.50 V	352	46.8	-16.3
4	274.39	26.9 QP	46.0	-19.1	1.00 V	196	40.0	-13.1
5	423.80	31.9 QP	46.0	-14.1	1.25 V	172	41.7	-9.8
6	817.70	26.8 QP	46.0	-19.2	1.25 V	272	28.7	-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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

7.2 Conducted Emission Measurement

7.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

7.2.2 Test Instruments

Same as 4.2.2.

7.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

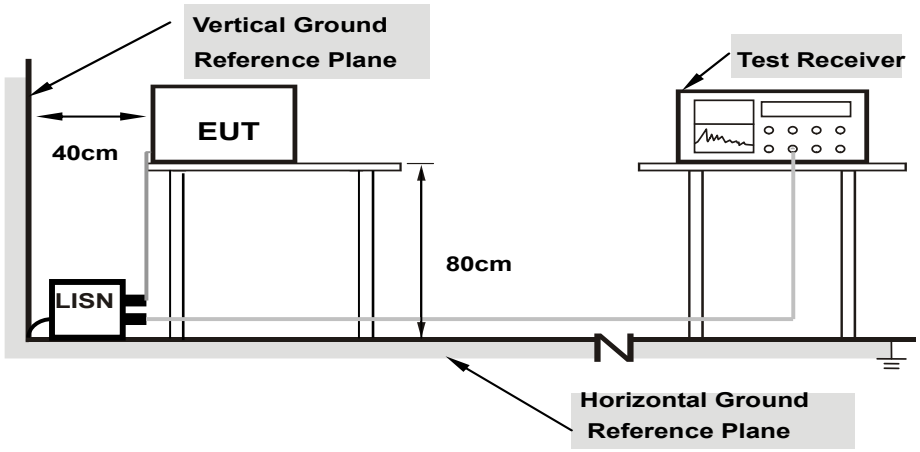
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

7.2.4 Deviation from Test Standard

No deviation.

7.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

7.2.6 EUT Operating Condition

Same as 4.1.6.

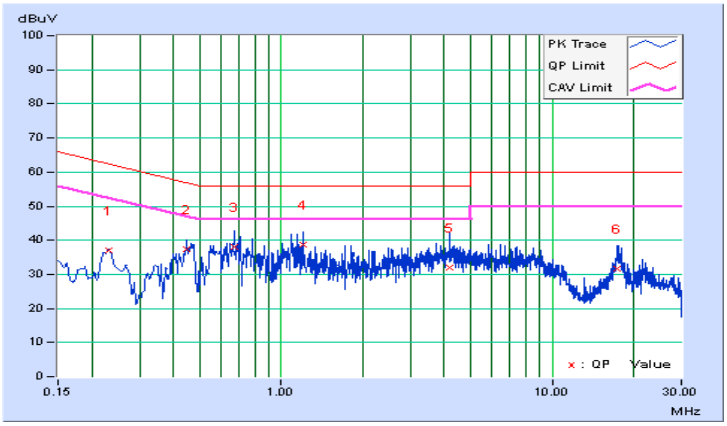
7.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22972	10.09	27.11	21.83	37.20	31.92	62.46	52.46	-25.26	-20.54
2	0.44716	10.18	27.35	19.90	37.53	30.08	56.93	46.93	-19.40	-16.85
3	0.67394	10.22	27.87	14.69	38.09	24.91	56.00	46.00	-17.91	-21.09
4	1.20181	10.31	28.35	14.72	38.66	25.03	56.00	46.00	-17.34	-20.97
5	4.18121	10.48	21.51	11.72	31.99	22.20	56.00	46.00	-24.01	-23.80
6	17.32272	11.23	20.27	13.30	31.50	24.53	60.00	50.00	-28.50	-25.47

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

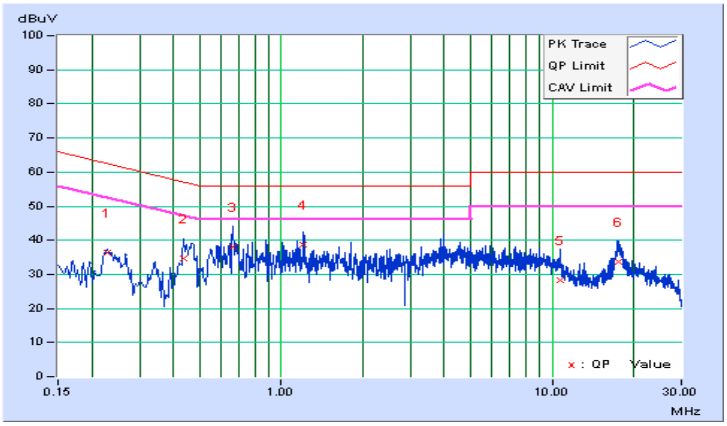


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	26.32	20.82	36.42	30.92	62.57	52.57	-26.15	-21.65
2	0.43543	10.24	24.33	15.70	34.57	25.94	57.15	47.15	-22.58	-21.21
3	**0.66221**	**10.26**	**27.92**	**20.75**	**38.18**	**31.01**	**56.00**	**46.00**	**-17.82**	**-14.99**
4	1.20181	10.31	28.41	16.12	38.72	26.43	56.00	46.00	-17.28	-19.57
5	10.68354	10.90	17.49	10.01	28.39	20.91	60.00	50.00	-31.61	-29.09
6	17.63161	11.39	22.33	15.54	33.72	26.93	60.00	50.00	-26.28	-23.07

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

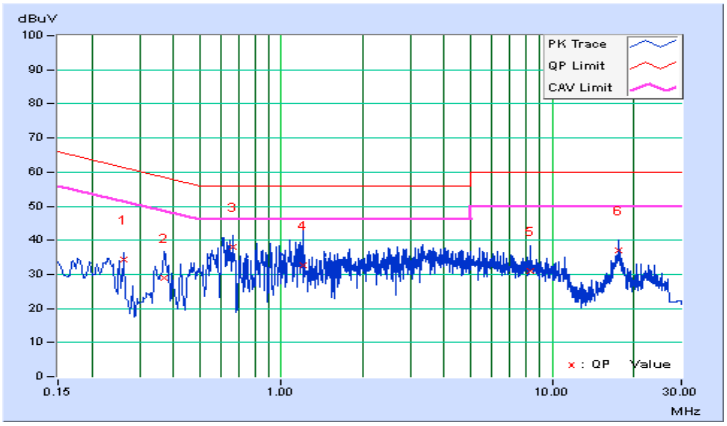


Channel	TX Channel 3	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.26339	10.11	24.35	11.98	34.46	22.09	61.32	51.32	-26.86	-29.23
2	0.36913	10.16	18.74	6.40	28.90	16.56	58.52	48.52	-29.62	-31.96
3	0.66221	10.22	27.75	19.40	37.97	29.62	56.00	46.00	-18.03	-16.38
4	1.20961	10.31	22.43	13.10	32.74	23.41	56.00	46.00	-23.26	-22.59
5	8.27889	10.68	20.26	12.54	30.94	23.22	60.00	50.00	-29.06	-26.78
6	17.59642	11.25	25.90	20.32	37.15	31.57	60.00	50.00	-22.85	-18.43

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

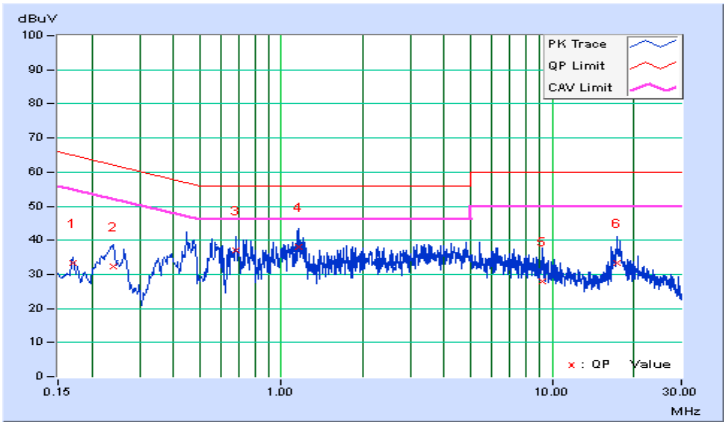


Channel	TX Channel 3	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	10.08	23.10	14.79	33.18	24.87	64.98	54.98	-31.80	-30.11
2	0.23961	10.11	22.10	14.25	32.21	24.36	62.11	52.11	-29.90	-27.75
3	0.67785	10.26	26.78	13.18	37.04	23.44	56.00	46.00	-18.96	-22.56
4	1.16660	10.31	27.67	12.39	37.98	22.70	56.00	46.00	-18.02	-23.30
5	9.25248	10.82	17.19	7.47	28.01	18.29	60.00	50.00	-31.99	-31.71
6	17.35791	11.37	21.80	15.12	33.17	26.49	60.00	50.00	-26.83	-23.51

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

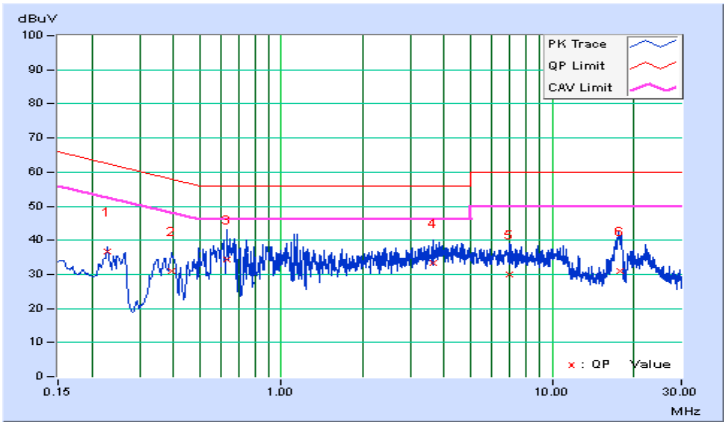


Channel	TX Channel 7	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22820	10.09	26.56	21.94	36.65	32.03	62.51	52.51	-25.86	-20.48
2	0.39635	10.17	20.82	9.26	30.99	19.43	57.93	47.93	-26.94	-28.50
3	0.63093	10.22	24.28	9.68	34.50	19.90	56.00	46.00	-21.50	-26.10
4	3.61817	10.45	22.96	15.74	33.41	26.19	56.00	46.00	-22.59	-19.81
5	6.93776	10.62	19.28	10.30	29.90	20.92	60.00	50.00	-30.10	-29.08
6	17.77237	11.26	19.63	13.42	30.89	24.68	60.00	50.00	-29.11	-25.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

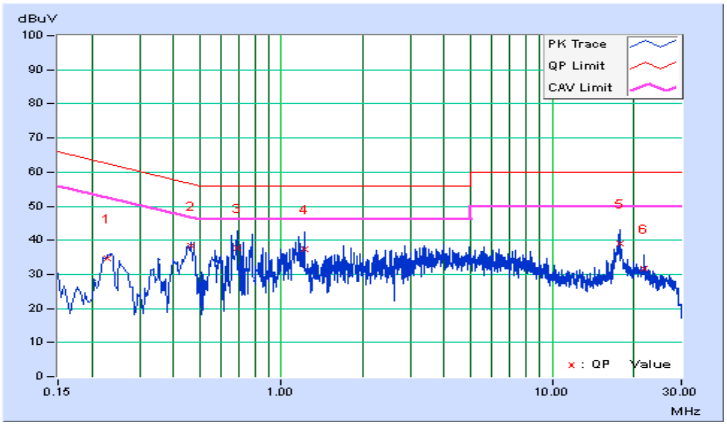


Channel	TX Channel 7	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	24.68	19.32	34.78	29.42	62.57	52.57	-27.79	-23.15
2	0.46669	10.25	28.06	16.31	38.31	26.56	56.57	46.57	-18.26	-20.01
3	0.68564	10.26	27.41	13.58	37.67	23.84	56.00	46.00	-18.33	-22.16
4	1.21352	10.31	27.16	14.26	37.47	24.57	56.00	46.00	-18.53	-21.43
5	17.76455	11.40	27.61	21.70	39.01	33.10	60.00	50.00	-20.99	-16.90
6	21.87005	11.71	19.91	13.53	31.62	25.24	60.00	50.00	-28.38	-24.76

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

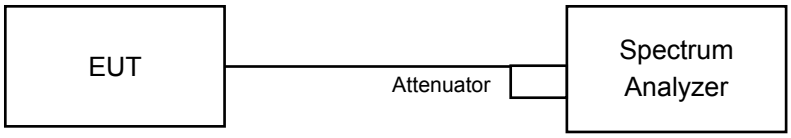


7.3 Number of Hopping Frequency Used

7.3.1 Limits of Hopping Frequency Used Measurement

There is no minimum number of hopping channels associated with this type of hybrid system.

7.3.2 Test Setup



7.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

7.3.4 Test Procedure

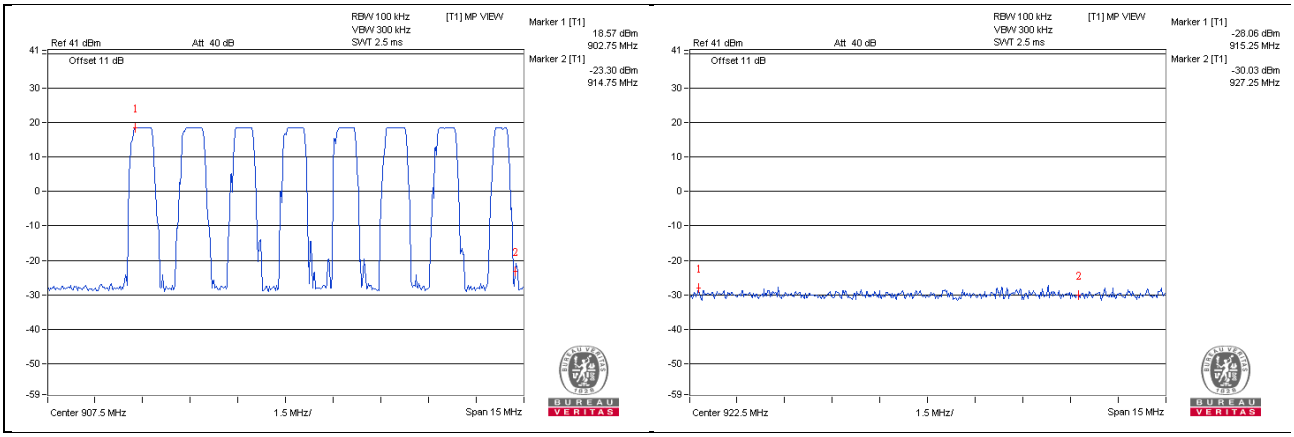
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
d. Set the SA on View mode and then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

7.3.5 Deviation fromTest Standard

No deviation.

7.3.6 Test Results

There are 8 hopping frequencies in the hybrid mode.

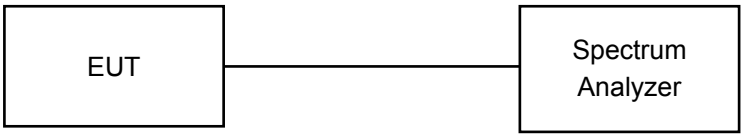


7.4 Dwell Time on Each Channel

7.4.1 Limits of Dwell Time on Each Channel Measurement

A hybrid system must comply with a 0.4 second/channel maximum dwell time when the hopping function is turned on.

7.4.2 Test Setup



7.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

7.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

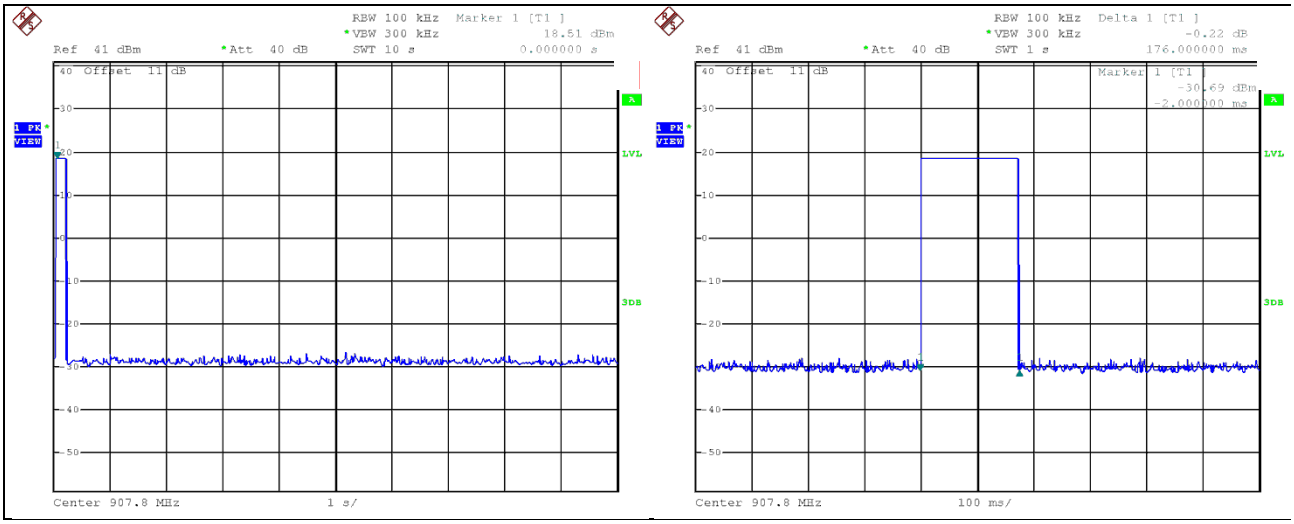
7.4.5 Deviation from Test Standard

No deviation.

7.4.6 Test Results

Number of transmission in a time period	Length of transmission time (msec)	Result (msec)	Limit (msec)
1 time	176	176	400

Note: Test plots of the transmitting time slot are shown on following.

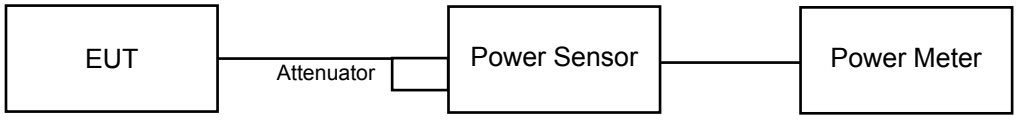


7.5 Conducted Output Power Measurement

7.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

7.5.2 Test Setup



7.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

7.5.4 Test Procedure

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. Record the power level.

7.5.5 Deviation from Test Standard

No deviation.

7.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

7.5.7 Test Results

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
0	903.0	**67.143**	18.27	30	Pass
3	907.8	**67.143**	18.27	30	Pass
7	914.2	**67.143**	18.27	30	Pass

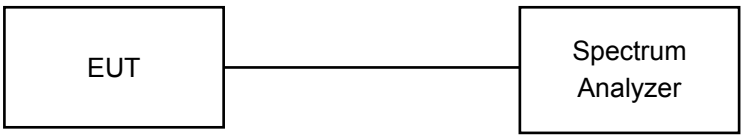
7.6 Power Spectral Density Measurement

7.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

A hybrid system must comply with the power density standard of 8 dBm in any 3 kHz band when the frequency hopping function is turned off

7.6.2 Test Setup



7.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

7.6.4 Test Procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

7.6.5 Deviation from Test Standard

No deviation.

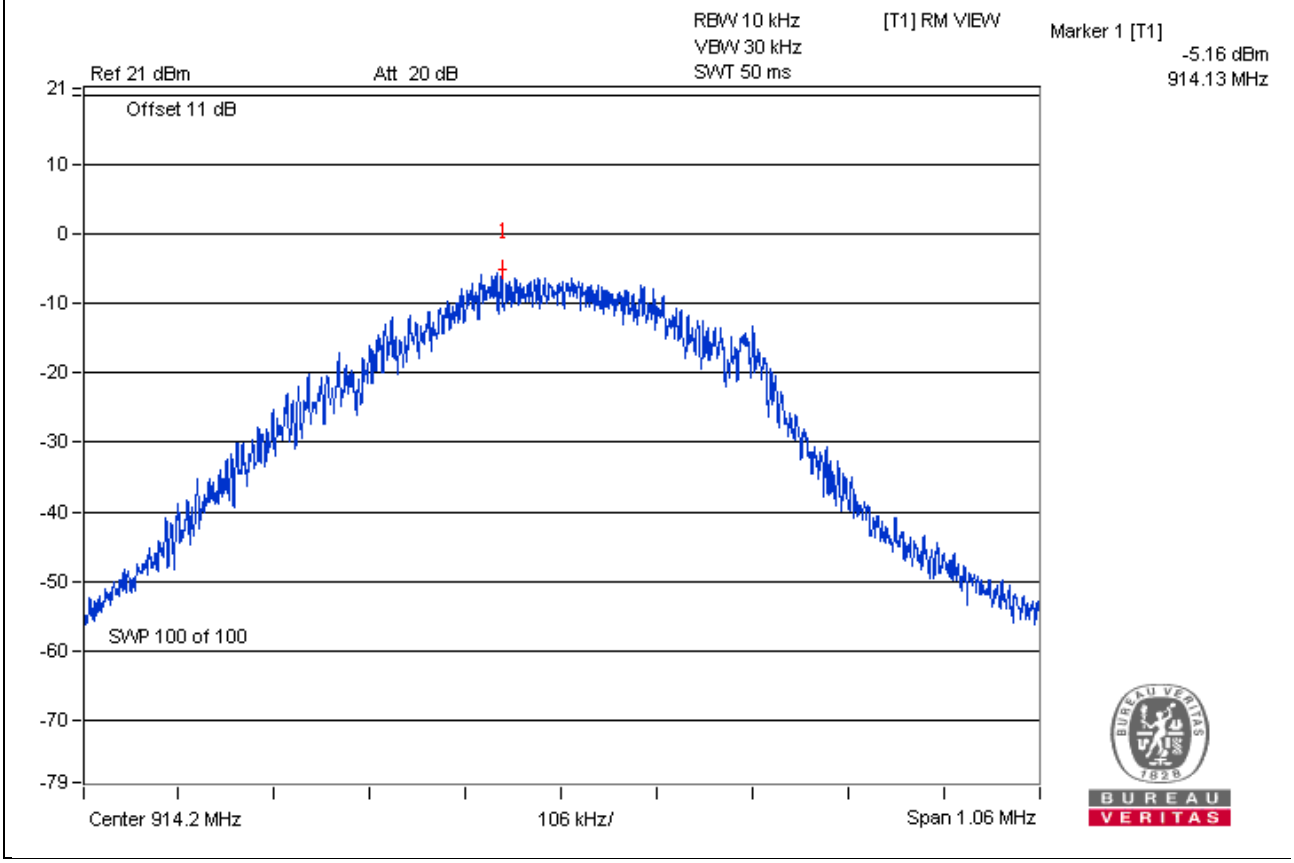
7.6.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

7.6.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
0	903.0	-5.71	8	Pass
3	907.8	-5.37	8	Pass
7	914.2	-5.16	8	Pass

Spectrum Plot of Worst Value

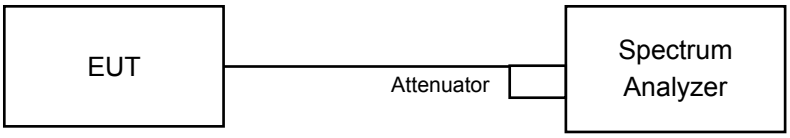


7.7 Conducted Out of Band Emission Measurement

7.7.1 Limits of Conducted Out Of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

7.7.2 Test Setup



7.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

7.7.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 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 OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

7.7.5 Deviation from Test Standard

No deviation.

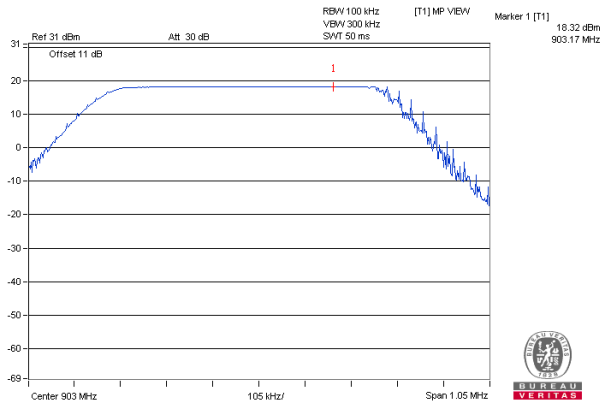
7.7.6 EUT Operating Condition

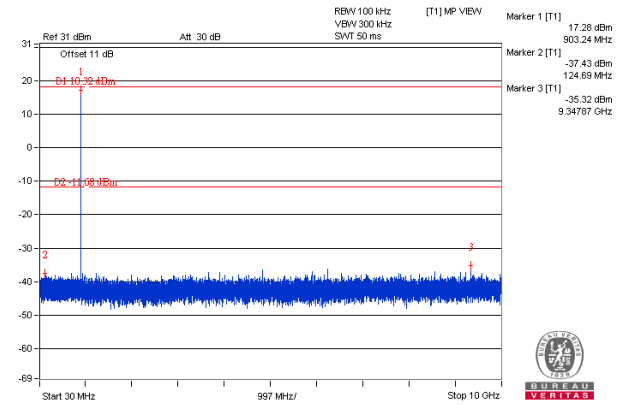
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

7.7.7 Test Results

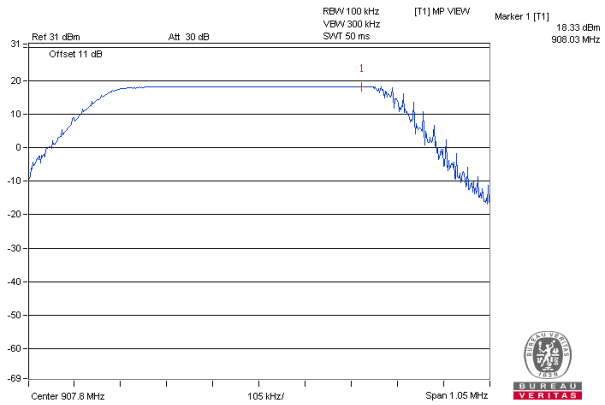
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

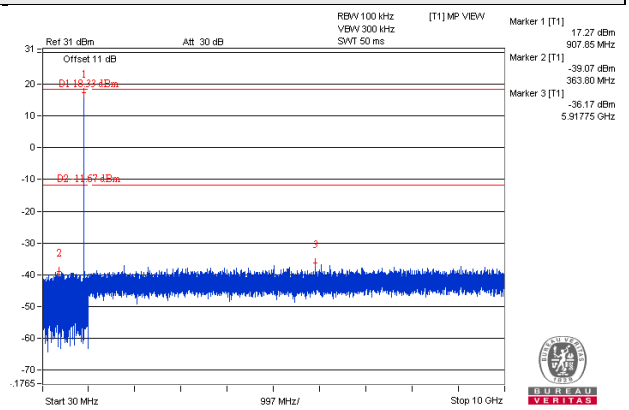
CH 0



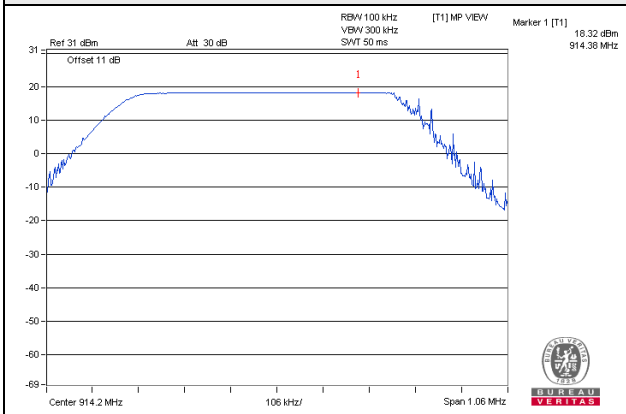


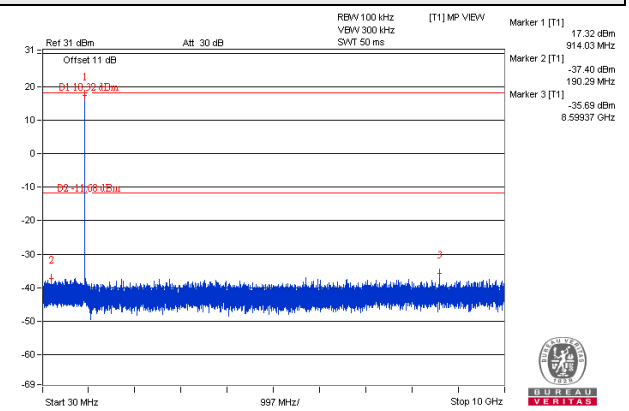
CH 3



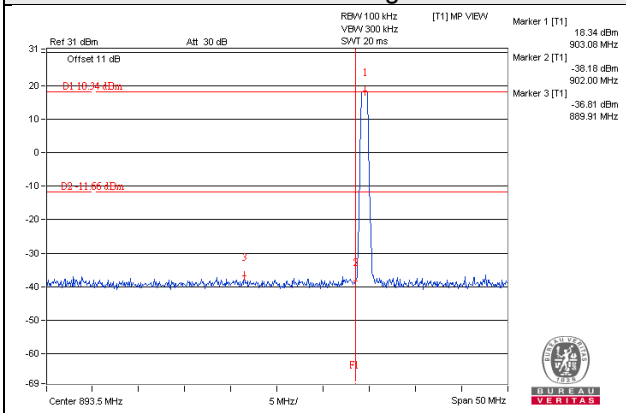


CH 7

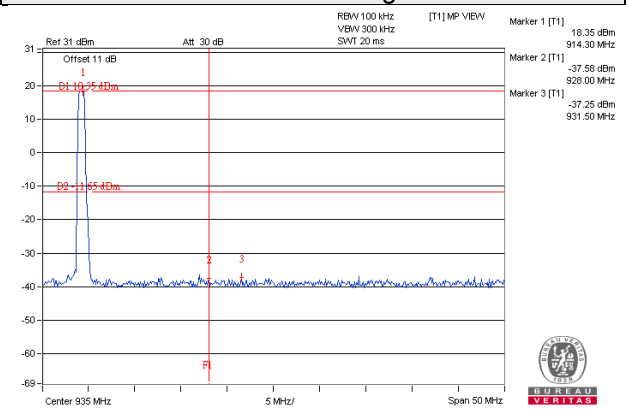




CH 3 Band edge



CH 7 Band edge



8 Test Types and Results (DTS Mode (500kHz Bandwidth, 25 channels))

8.1 Radiated Emission and Bandedge Measurement

8.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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 30dB under any condition of modulation.

8.1.2 Test Instruments

Same as 4.1.2.

8.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

Note:

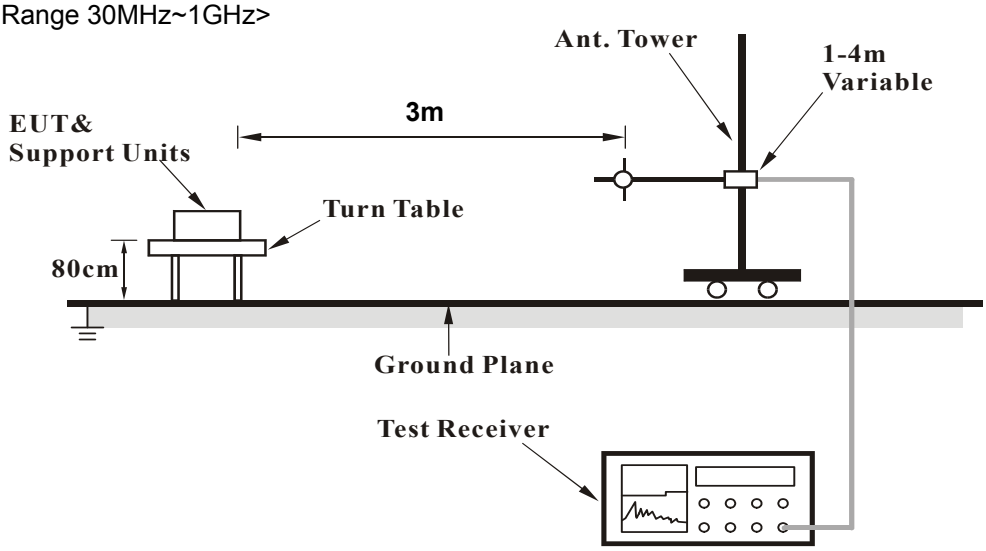
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. For Average measurement, the duty cycle correlation factor be equal to: 20log(3.125 / 100)= -30.1 dB, therefore Average value = peak reading + 20log(duty cycle).
4. All modes of operation were investigated and the worst-case emissions are reported.

8.1.4 Deviation from Test Standard

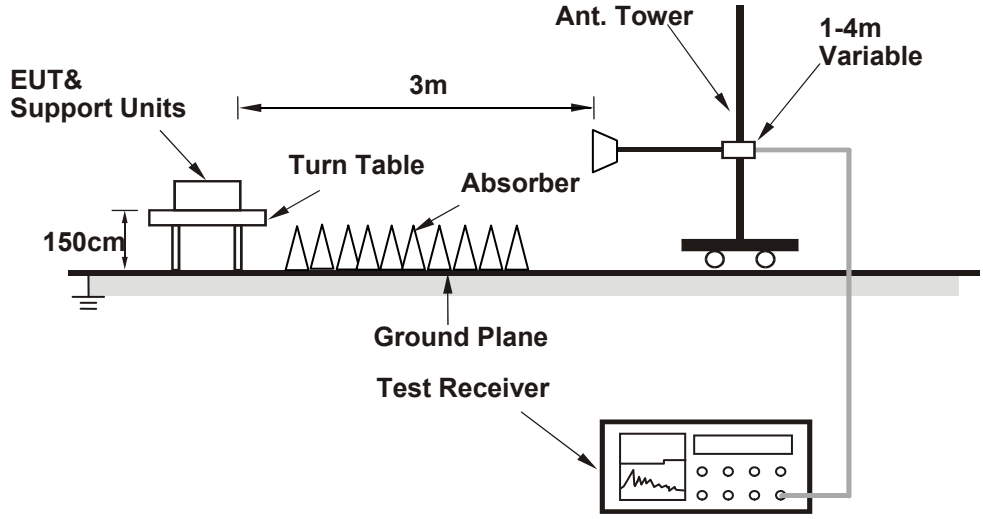
No deviation.

8.1.5 Test Setup

<Frequency Range 30MHz~1GHz>



<Frequency Range above 1GHz>



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

8.1.6 EUT Operating Conditions

Same as 4.1.6.

8.1.7 Test Results

Above 1GHz Worst-case Data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	#902.00	56.7 PK	82.4	-25.7	1.57 H	230	28.7	28.0
2	#902.00	45.8 AV	72.3	-26.5	1.57 H	230	17.8	28.0
3	*903.00	112.4 PK			1.57 H	230	84.4	28.0
4	*903.00	102.3 AV			1.57 H	230	74.3	28.0
5	1806.00	49.3 PK	74.0	-24.7	1.55 H	0	53.4	-4.1
6	1806.00	46.5 AV	54.0	-7.5	1.55 H	0	50.6	-4.1
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	#902.00	55.0 PK	76.0	-21.0	1.05 V	194	27.0	28.0
2	#902.00	43.9 AV	65.8	-21.9	1.05 V	194	15.9	28.0
3	*903.00	106.0 PK			1.05 V	194	78.0	28.0
4	*903.00	95.8 AV			1.05 V	194	67.8	28.0
5	1806.00	42.5 PK	74.0	-31.5	1.45 V	155	46.6	-4.1
6	1806.00	37.5 AV	54.0	-16.5	1.45 V	155	41.6	-4.1

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*914.20	113.4 PK			1.64 H	231	85.4	28.0
2	*914.20	102.6 AV			1.64 H	231	74.6	28.0
3	1828.40	44.2 PK	74.0	-29.8	1.55 H	98	48.2	-4.0
4	1828.40	42.6 AV	54.0	-11.4	1.55 H	98	46.6	-4.0
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	*914.20	106.9 PK			1.08 V	151	78.9	28.0
2	*914.20	96.7 AV			1.08 V	151	68.7	28.0
3	1828.40	44.0 PK	74.0	-30.0	1.56 V	162	48.0	-4.0
4	1828.40	38.4 AV	54.0	-15.6	1.56 V	162	42.4	-4.0

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	30MHz ~ 10GHz		

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	*927.50	115.4 PK			1.64 H	238	87.4	28.0
2	*927.50	104.4 AV			1.64 H	238	76.4	28.0
3	#928.00	80.0 PK	85.4	-5.4	1.64 H	238	52.0	28.0
4	#928.00	64.6 AV	74.4	-9.8	1.64 H	238	36.6	28.0
5	1855.00	41.5 PK	74.0	-32.5	1.10 H	322	45.4	-3.9
6	1855.00	36.2 AV	54.0	-17.8	1.10 H	322	40.1	-3.9
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	*927.50	109.5 PK			1.63 V	158	81.5	28.0
2	*927.50	98.2 AV			1.63 V	158	70.2	28.0
3	#928.00	74.3 PK	79.5	-5.2	1.63 V	158	46.3	28.0
4	#928.00	58.5 AV	68.2	-9.7	1.63 V	158	30.5	28.0
5	1855.00	39.4 PK	74.0	-34.6	1.30 V	122	43.3	-3.9
6	1855.00	30.6 AV	54.0	-23.4	1.30 V	122	34.5	-3.9

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	32.3 QP	40.0	-7.7	1.25 H	7	49.0	-16.7
2	119.16	30.5 QP	43.5	-13.0	1.00 H	9	46.6	-16.1
3	287.97	34.2 QP	46.0	-11.8	1.50 H	7	46.8	-12.6
4	383.05	33.8 QP	46.0	-12.2	1.00 H	357	44.6	-10.8
5	631.42	24.1 QP	46.0	-21.9	2.50 H	319	29.5	-5.4
6	817.70	26.6 QP	46.0	-19.4	1.00 H	153	28.5	-1.9
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	**53.18**	**36.0 QP**	**40.0**	**-4.0**	**1.25 V**	**255**	**49.9**	**-13.9**
2	119.16	32.4 QP	43.5	-11.1	1.00 V	332	48.5	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	349	46.9	-16.3
4	301.56	27.2 QP	46.0	-18.8	1.00 V	7	39.5	-12.3
5	672.17	25.3 QP	46.0	-20.7	1.00 V	188	30.3	-5.0
6	875.91	27.5 QP	46.0	-18.5	1.25 V	173	28.7	-1.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 7	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	34.3 QP	40.0	-5.7	1.25 H	153	51.0	-16.7
2	165.73	31.0 QP	43.5	-12.5	1.00 H	297	45.0	-14.0
3	239.46	35.4 QP	46.0	-10.6	1.25 H	267	50.0	-14.6
4	311.26	34.6 QP	46.0	-11.4	1.00 H	213	46.5	-11.9
5	383.05	35.0 QP	46.0	-11.0	1.50 H	104	45.8	-10.8
6	743.97	29.3 QP	46.0	-16.7	1.00 H	221	32.3	-3.0
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	59.01	34.8 QP	40.0	-5.2	1.25 V	205	49.2	-14.4
2	119.16	32.6 QP	43.5	-10.9	1.00 V	339	48.7	-16.1
3	190.95	30.5 QP	43.5	-13.0	1.50 V	352	46.8	-16.3
4	274.39	26.9 QP	46.0	-19.1	1.00 V	196	40.0	-13.1
5	423.80	31.9 QP	46.0	-14.1	1.25 V	172	41.7	-9.8
6	817.70	26.8 QP	46.0	-19.2	1.25 V	272	28.7	-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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

CHANNEL	TX Channel 24	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 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	74.53	33.1 QP	40.0	-6.9	1.25 H	354	49.8	-16.7
2	119.16	30.5 QP	43.5	-13.0	1.00 H	33	46.6	-16.1
3	239.46	35.6 QP	46.0	-10.4	1.50 H	269	50.2	-14.6
4	287.97	35.0 QP	46.0	-11.0	1.00 H	74	47.6	-12.6
5	383.05	33.3 QP	46.0	-12.7	1.50 H	87	44.1	-10.8
6	532.46	28.8 QP	46.0	-17.2	1.00 H	155	36.9	-8.1
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	57.07	33.2 QP	40.0	-6.8	1.25 V	191	47.5	-14.3
2	119.16	33.0 QP	43.5	-10.5	1.00 V	327	49.1	-16.1
3	190.95	30.6 QP	43.5	-12.9	1.50 V	7	46.9	-16.3
4	299.62	27.4 QP	46.0	-18.6	1.00 V	7	39.8	-12.4
5	449.03	31.1 QP	46.0	-14.9	1.25 V	193	40.4	-9.3
6	798.30	26.3 QP	46.0	-19.7	1.00 V	282	28.5	-2.2

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

8.2 Conducted Emission Measurement

8.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.2.2 Test Instruments

Same as 4.2.2.

8.2.3 Test Procedures

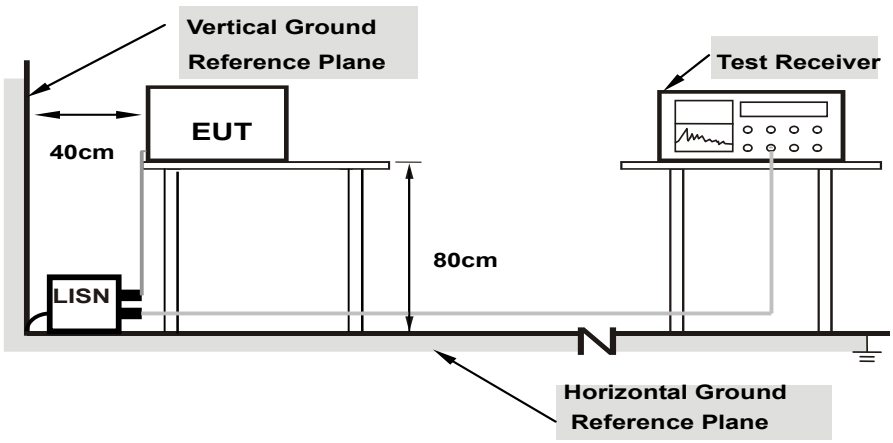
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

8.2.4 Deviation from Test Standard

No deviation.

8.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

8.2.6 EUT Operating Conditions

Same as 4.1.6.

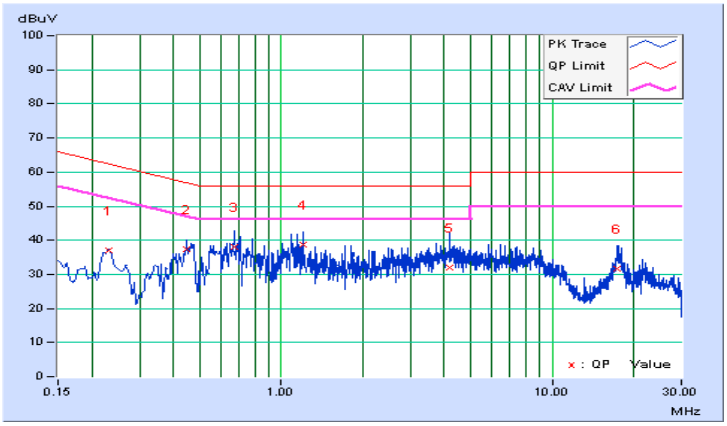
8.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22972	10.09	27.11	21.83	37.20	31.92	62.46	52.46	-25.26	-20.54
2	0.44716	10.18	27.35	19.90	37.53	30.08	56.93	46.93	-19.40	-16.85
3	0.67394	10.22	27.87	14.69	38.09	24.91	56.00	46.00	-17.91	-21.09
4	1.20181	10.31	28.35	14.72	38.66	25.03	56.00	46.00	-17.34	-20.97
5	4.18121	10.48	21.51	11.72	31.99	22.20	56.00	46.00	-24.01	-23.80
6	17.32272	11.23	20.27	13.30	31.50	24.53	60.00	50.00	-28.50	-25.47

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

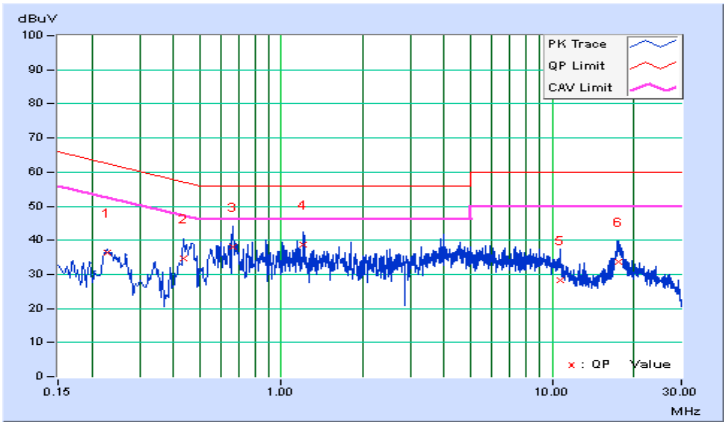


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	26.32	20.82	36.42	30.92	62.57	52.57	-26.15	-21.65
2	0.43543	10.24	24.33	15.70	34.57	25.94	57.15	47.15	-22.58	-21.21
3	**0.66221**	**10.26**	**27.92**	**20.75**	**38.18**	**31.01**	**56.00**	**46.00**	**-17.82**	**-14.99**
4	1.20181	10.31	28.41	16.12	38.72	26.43	56.00	46.00	-17.28	-19.57
5	10.68354	10.90	17.49	10.01	28.39	20.91	60.00	50.00	-31.61	-29.09
6	17.63161	11.39	22.33	15.54	33.72	26.93	60.00	50.00	-26.28	-23.07

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

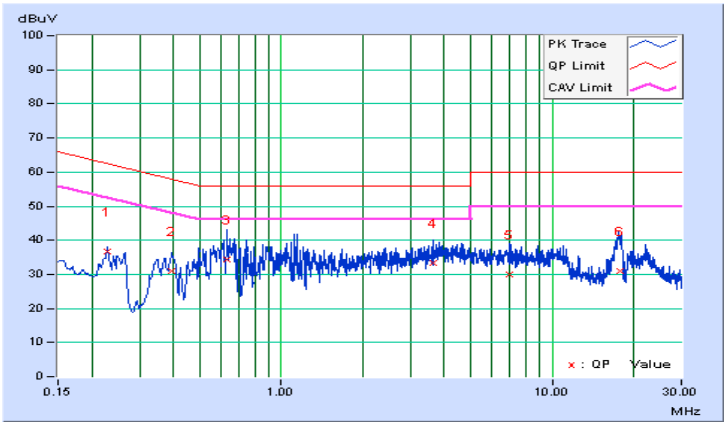


Channel	TX Channel 7	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22820	10.09	26.56	21.94	36.65	32.03	62.51	52.51	-25.86	-20.48
2	0.39635	10.17	20.82	9.26	30.99	19.43	57.93	47.93	-26.94	-28.50
3	0.63093	10.22	24.28	9.68	34.50	19.90	56.00	46.00	-21.50	-26.10
4	3.61817	10.45	22.96	15.74	33.41	26.19	56.00	46.00	-22.59	-19.81
5	6.93776	10.62	19.28	10.30	29.90	20.92	60.00	50.00	-30.10	-29.08
6	17.77237	11.26	19.63	13.42	30.89	24.68	60.00	50.00	-29.11	-25.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

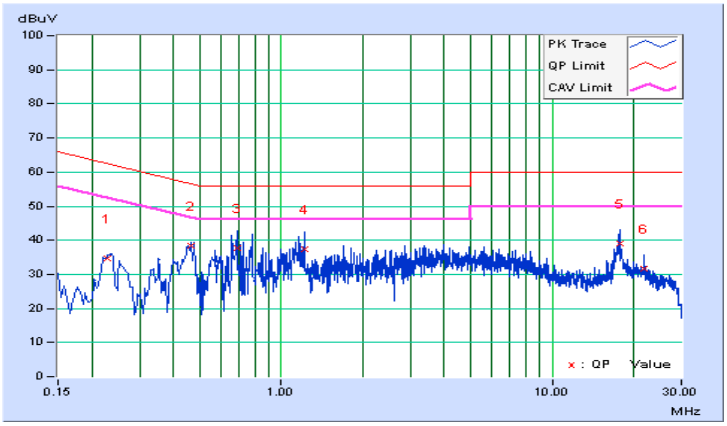


Channel	TX Channel 7	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22672	10.10	24.68	19.32	34.78	29.42	62.57	52.57	-27.79	-23.15
2	0.46669	10.25	28.06	16.31	38.31	26.56	56.57	46.57	-18.26	-20.01
3	0.68564	10.26	27.41	13.58	37.67	23.84	56.00	46.00	-18.33	-22.16
4	1.21352	10.31	27.16	14.26	37.47	24.57	56.00	46.00	-18.53	-21.43
5	17.76455	11.40	27.61	21.70	39.01	33.10	60.00	50.00	-20.99	-16.90
6	21.87005	11.71	19.91	13.53	31.62	25.24	60.00	50.00	-28.38	-24.76

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

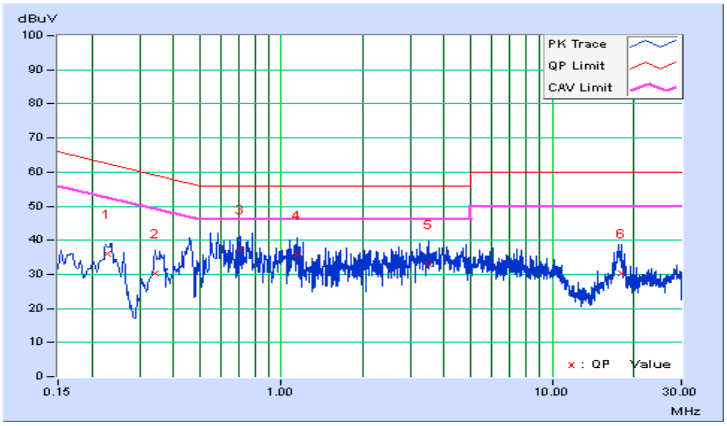


Channel	TX Channel 24	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22820	10.09	25.90	20.70	35.99	30.79	62.51	52.51	-26.52	-21.72
2	0.34159	10.14	20.25	13.33	30.39	23.47	59.16	49.16	-28.77	-25.69
3	0.70913	10.23	27.30	11.48	37.53	21.71	56.00	46.00	-18.47	-24.29
4	1.15096	10.30	25.50	13.42	35.80	23.72	56.00	46.00	-20.20	-22.28
5	3.48523	10.44	22.66	14.26	33.10	24.70	56.00	46.00	-22.90	-21.30
6	17.93659	11.27	19.16	13.22	30.43	24.49	60.00	50.00	-29.57	-25.51

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

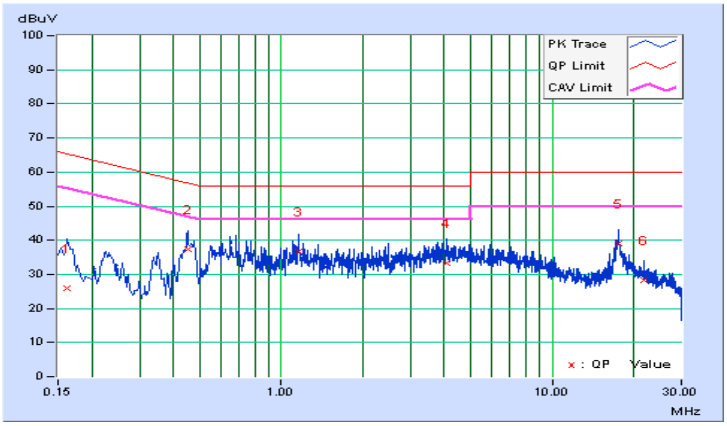


Channel	TX Channel 24	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16139	10.08	15.93	6.27	26.01	16.35	65.39	55.39	-39.38	-39.04
2	0.45097	10.24	26.99	19.50	37.23	29.74	56.86	46.86	-19.63	-17.12
3	1.15878	10.31	26.42	14.44	36.73	24.75	56.00	46.00	-19.27	-21.25
4	4.09910	10.59	22.74	15.63	33.33	26.22	56.00	46.00	-22.67	-19.78
5	17.50649	11.38	27.78	21.99	39.16	33.37	60.00	50.00	-20.84	-16.63
6	21.85441	11.71	16.44	8.44	28.15	20.15	60.00	50.00	-31.85	-29.85

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

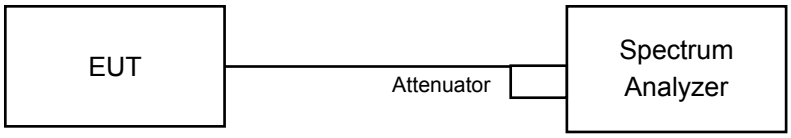


8.3 6dB Bandwidth Measurement

8.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

8.3.2 Test Setup



8.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

8.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x 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

8.3.5 Deviation fromTest Standard

No deviation.

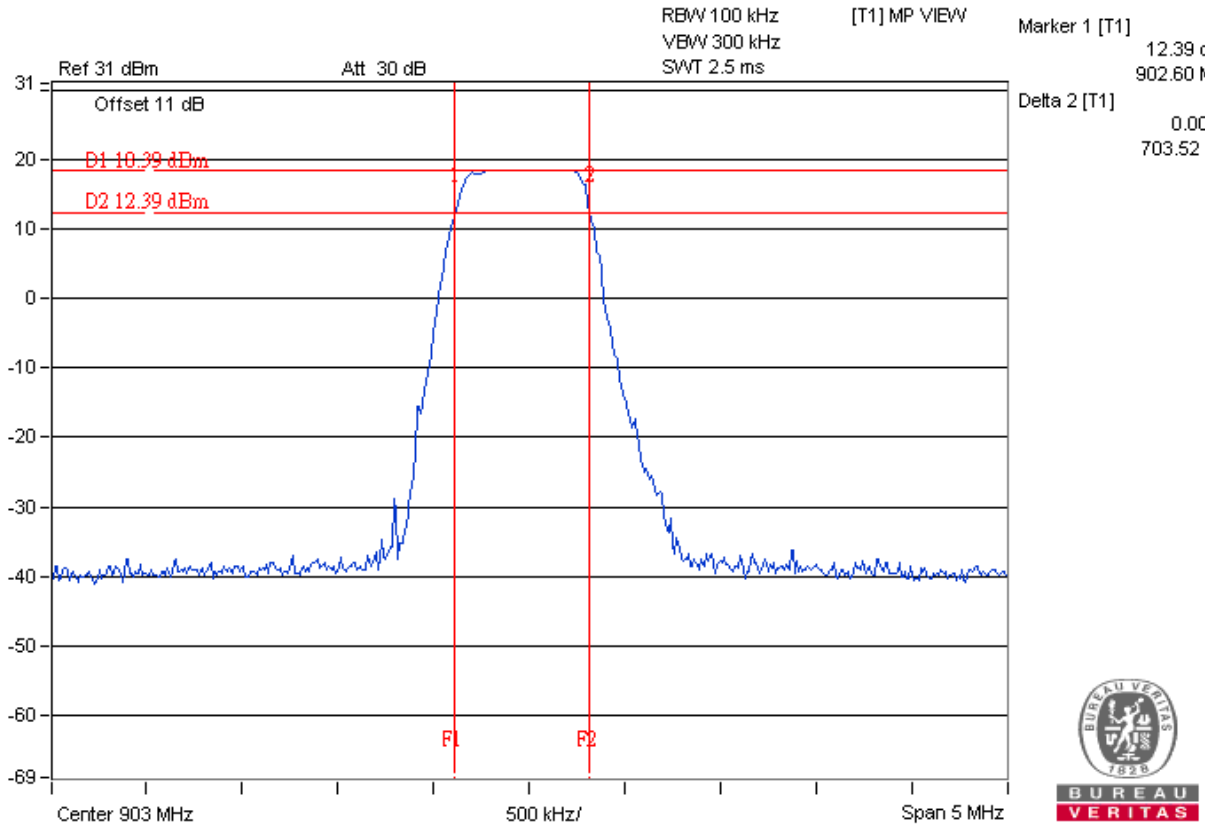
8.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

8.3.7 Test Result

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	903.0	0.70	0.5	Pass
7	914.2	0.70	0.5	Pass
24	927.5	0.70	0.5	Pass

Spectrum Plot of Worst Value

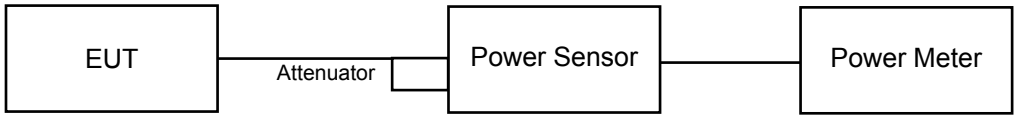


8.4 Conducted Output Power Measurement

8.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

8.4.2 Test Setup



8.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

8.4.4 Test Procedures

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. Record the power level.

8.4.5 Deviation from Test Standard

No deviation.

8.4.6 EUT Operating Conditions

Same as 6.3.6.

8.4.7 Test Results

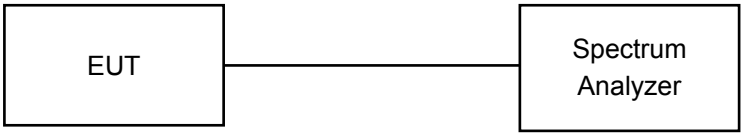
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	903.0	**67.143**	18.27	30	Pass
7	914.2	**67.143**	18.27	30	Pass
24	927.5	66.834	18.25	30	Pass

8.5 Power Spectral Density Measurement

8.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

8.5.2 Test Setup



8.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

8.5.4 Test Procedure

a. Set instrument center frequency to DTS channel center frequency.
b. Set span to at least 1.5 times the OBW.
c. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set VBW ≥3 x RBW.
e. Detector = power averaging (RMS) or sample detector (when RMS not available).
f. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g. Sweep time = auto couple.
h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
i. Use the peak marker function to determine the maximum amplitude level.

8.5.5 Deviation from Test Standard

No deviation.

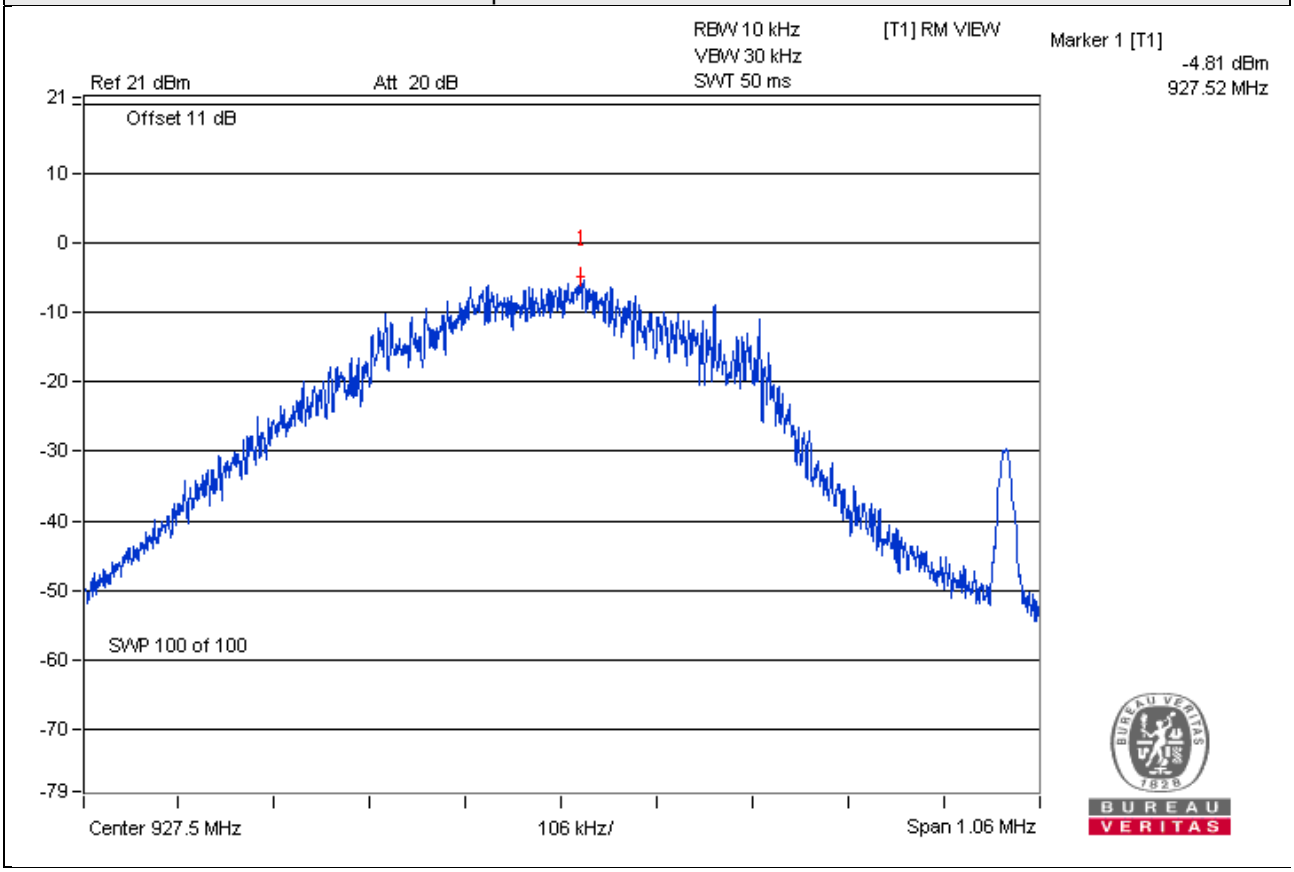
8.5.6 EUT Operating Condition

Same as 6.3.6

8.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
0	903.0	-5.71	8	Pass
7	914.2	-5.16	8	Pass
24	927.5	-4.81	8	Pass

Spectrum Plot of Worst Value

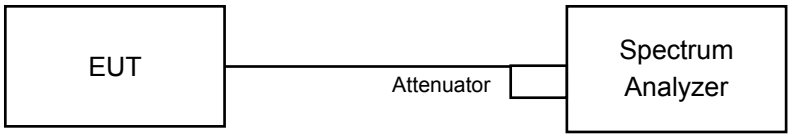


8.6 Conducted Out of Band Emission Measurement

8.6.1 Limits of Conducted Out of Band Emission Measurement

Below -30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

8.6.2 Test Setup



8.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

8.6.4 Test Procedure

Measurement Procedure REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 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 OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

8.6.5 Deviation from Test Standard

No deviation.

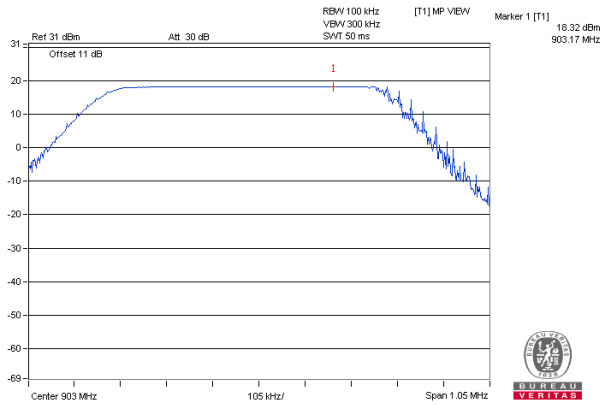
8.6.6 EUT Operating Condition

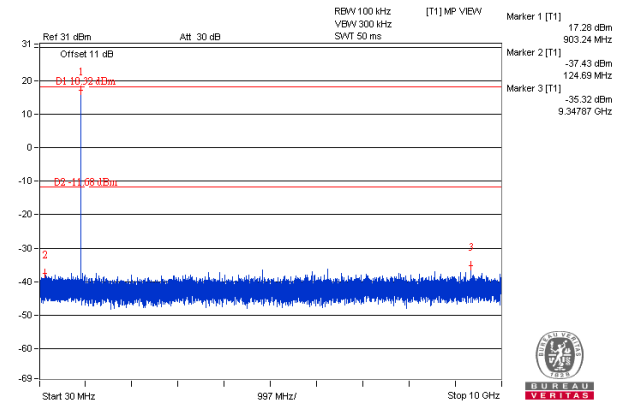
Same as 6.3.6

8.6.7 Test Results

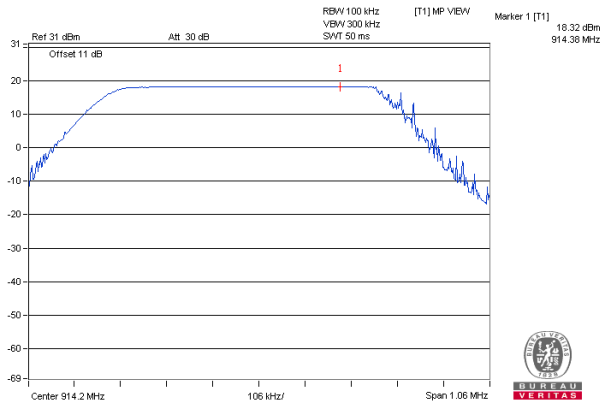
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

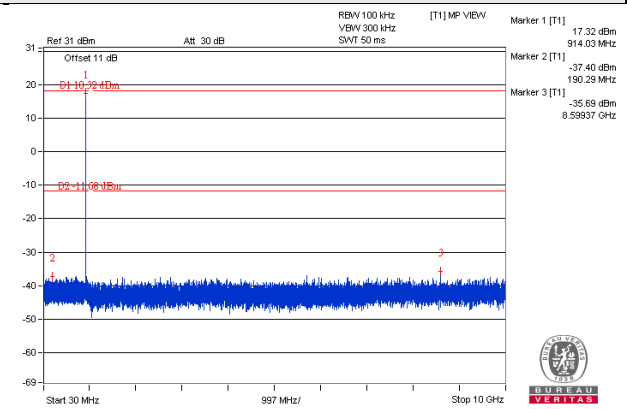
CH 0



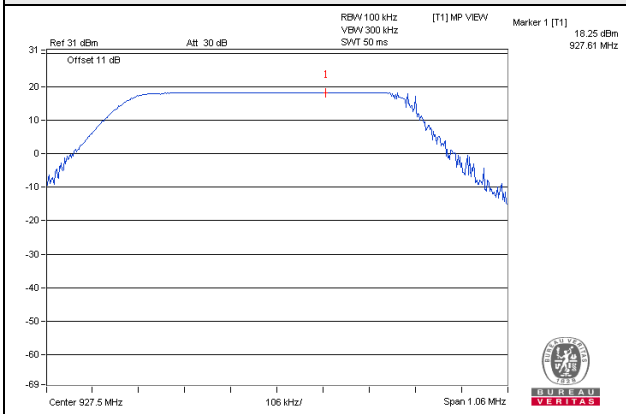


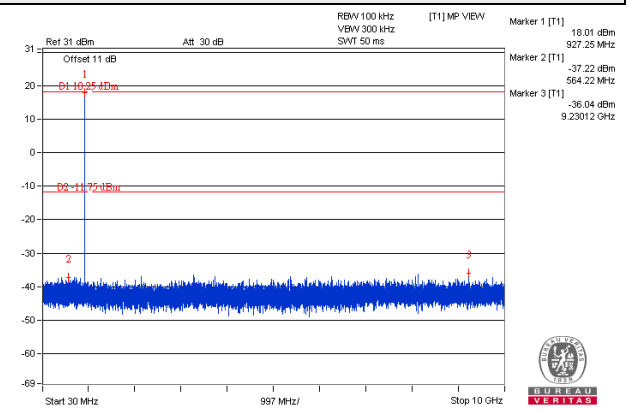
CH 7



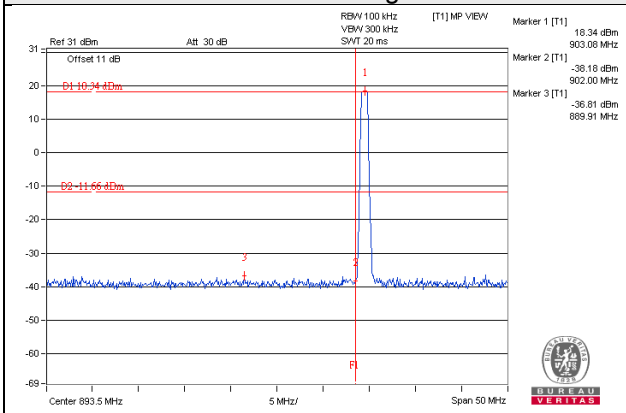


CH 24

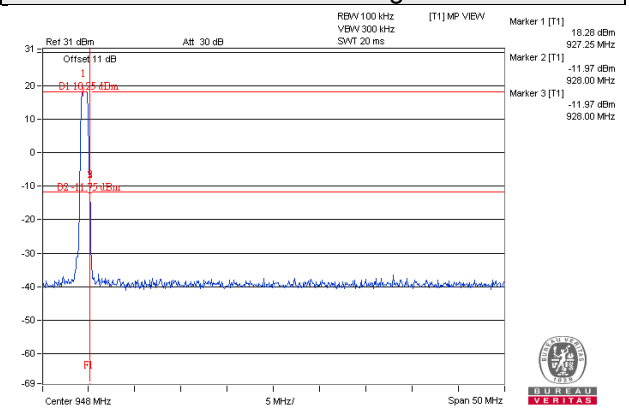




CH 0 Band edge



CH 24 Band edge



9 Pictures of Test Arrangements

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

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

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