

EMC TEST REPORT

Test item : 200CH Handheld Radio Scanner
Model No. : PRO-649
Order No. : DTNC1504-01883
Date of receipt : 2015-04-20
Test duration : 2015-04-21 ~ 2015-04-22
Date of Issue : 2015-05-08

Applicant : The Whistler Group, Inc.
168 Ayer Road, Littleton, MA 01460, USA

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : ANSI C 63.4:2009
FCC Part 15 Subpart B
(Scanning receiver)

Test environment : Temperature : (17 ~ 19) °C,
Humidity : (39 ~ 41) % R.H.

Test result : ☒ Comply ☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.
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Tested by:



Engineer
DaeHwa Eun

Reviewed by:



Technical Manager
YoungKyu Shin

PRESIDENT OF DT&C Co., Ltd.

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1. General Remarks

This report contains the result of tests performed by:

Dt&C Co., Ltd.

Address : 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

<http://www.dtnet.net>

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

Dt&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency	Code	Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
Site Filing	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
	Canada	IC	5740A-1 5740A-2	Registered
	Japan	VCCI	C-1427 R-1364, R-3385, R-4076, R-4180, T-1442, G-338, G754, G-815	Registered
Certification	Korea	KC	KR0034	Designation
	Germany	TUV	CARAT 13 11 86721 001	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

3. General Information of EUT

Kind of Equipment	200CH Handheld Radio Scanner
Model No.	PRO-649
Add Model No	None
Serial No	None
FCC ID	HSXSC01
Supplied Power for Test	INPUT : 120 V, 60 Hz OUTPUT : 9 V
Applicant	The Whistler Group, Inc. 168 Ayer Road, Littleton, MA 01460, USA
Manufacturer	RDX, Inc 106 Daeryung Techno Twon 3, 115 Gasan Digital 2-ro, Guemcheon-gu, Seoul, Korea
Factory	Radix Telecom Phils., Industries Inc. P-IMES Bldg.2. Block 16, Phase IV Peza Rosario Cavite, Philippines

Related Submittal(s) / Grant(s)

Refer to Appendix 3 (Changed Part List)

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2009	C
Radiated Disturbance	ANSI C63.4:2009	C
Antenna Power Conduction	ANSI C63.4:2009	C
C=Comply N/C=Not Comply N/T=Not Tested N/A=Not Applicable		

The data in this test report are traceable to the national or international standards.

4.2 Test environment and conditions

Test Items	Test date (YYYY-MM-DD)	Temp (°C)	Humidity (% R.H.)
Conducted Disturbance	2015-04-21	19	39
Radiated Disturbance	2015-04-21	17	41
Antenna Power Conduction	2015-04-22	19	39

4.3 Test result Summary

(1) Conducted Emission

Frequency [MHz]	Phase	Result [dBμV]	Detector	Limit [dBμV]	Margin [dB]
0.68543	L1	28.7	Quasi-Peak	56.0	27.3

(2) Radiated Emission

Frequency [MHz]	Pol.	Result [dB(μV/m)]	Detector	Limit [dB(μV/m)]	Margin [dB]
445.553	H	38.2	Quasi-Peak	46.0	7.8

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission : The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

5.2 Test Operation Mode

- The EUT was set to constantly scan all bands. (MODE 1)
- The EUT was set to connect PC/IF cable to the scanning receiver for receiving data and status. (MODE 2)

5.3 Support Equipment Used

Unit	Model No.	Serial No.	Manufacturer	CABLE				Back shell	FCC ID
				Connect type	Length (m)	shield	With Ferrite		
Scanning Receiver	PRO-649	N/A	The Whistler Group, Inc.	STEREO	1.6	Non-shield	X	Plastic	DOC
Adaptor	DECU 27035	N/A	Radioshack	POWER	2.0	Non-shield	X	Plastic	DOC
Headset	COV-903	N/A	COSY	STEREO	2.0	Non-shield	X	Plastic	DOC

6. Test Results : Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the PC power through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

Frequency range (MHz)	Limits dB(μV)			
	Quasi-peak		Average	
	Class A	Class B	Class A	Class B
0.15 to 0.50	79	66 to 56	66	56 to 46
0.50 to 5	73	56	60	46
5 to 30		60		50
Note 1 The lower limit shall apply at the transition frequencies.				
Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note) 1. Emission Level = Reading Value + Correction Factor.

2. Correction Factor = Cable Loss + Insertion Loss of LISN

3. Margin = Limit - Emission level

Test Result

MODE 1

Results of Conducted Emission

DTNC

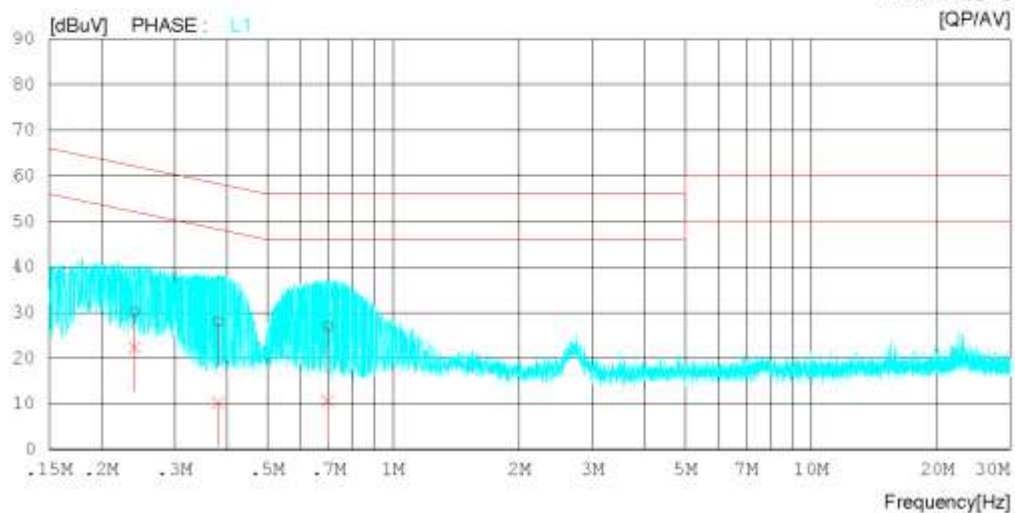
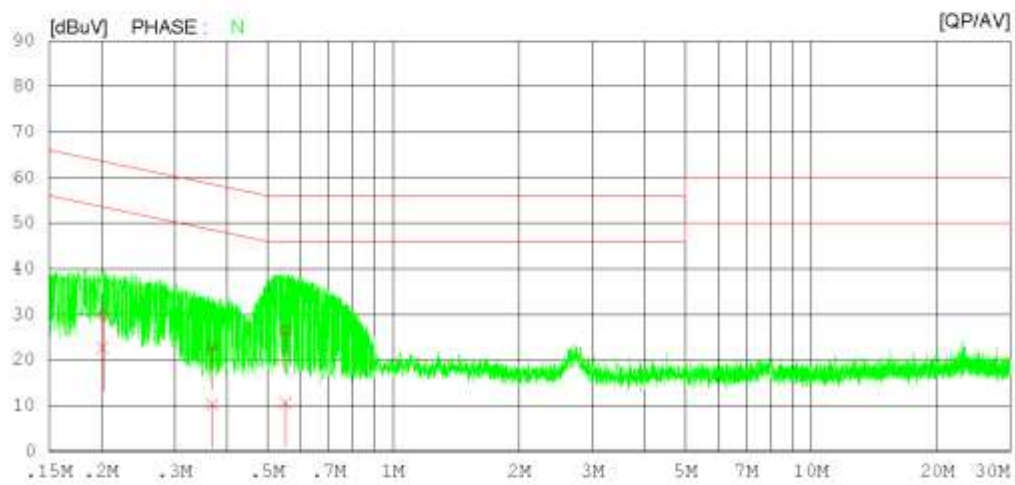
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 39 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

DTNC

Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 39 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.20159	19.9	12.7	9.9	29.8	22.6	63.5	53.5	33.7	30.9	N
2	0.36854	13.0	0.2	10.1	23.1	10.3	58.5	48.5	35.4	38.2	N
3	0.55193	16.4	0.6	10.1	26.5	10.7	56.0	46.0	29.5	35.3	N
4	0.24016	20.1	12.4	10.0	30.1	22.4	62.1	52.1	32.0	29.7	L1
5	0.38157	17.8	0.1	10.1	27.9	10.2	58.2	48.2	30.3	38.0	L1
6	0.69858	16.9	0.6	10.0	26.9	10.6	56.0	46.0	29.1	35.4	L1

MODE 2

Results of Conducted Emission

DTNC

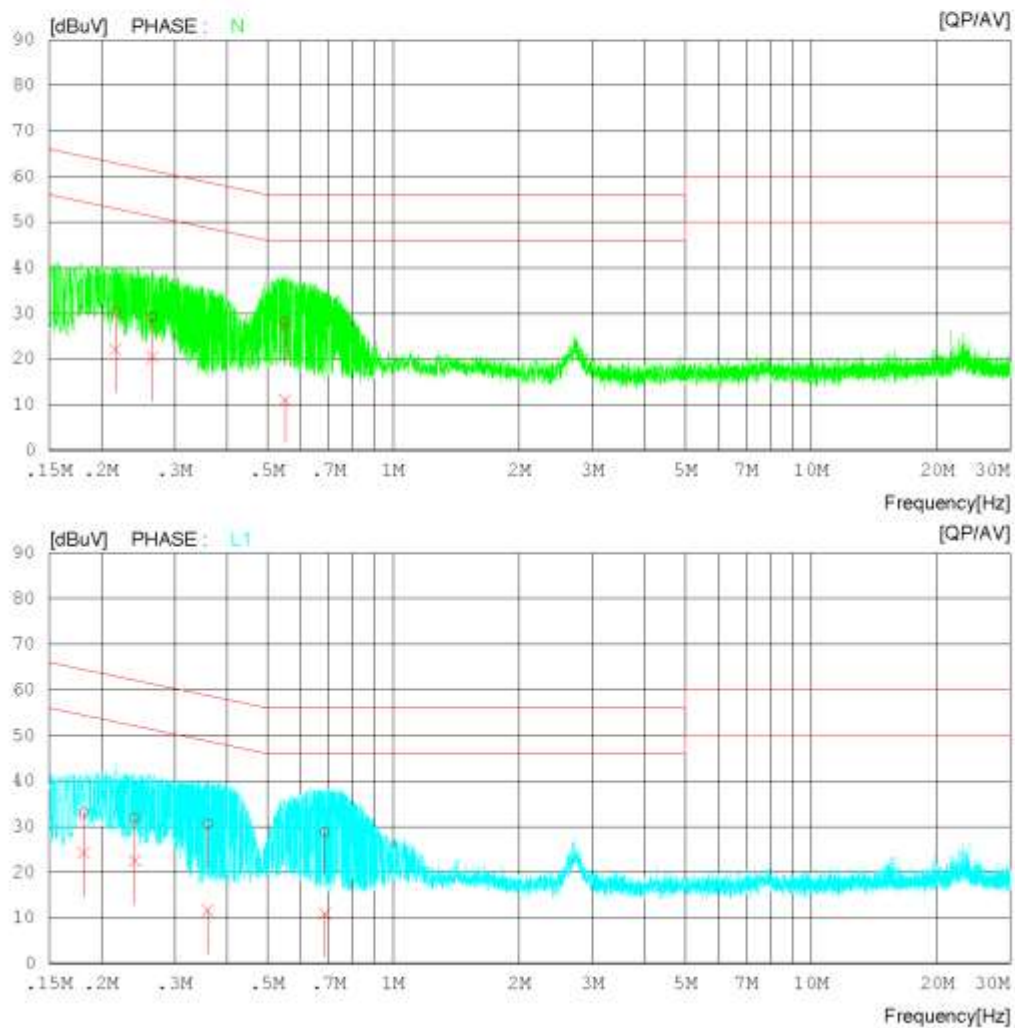
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : PCIF

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 39 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV



Results of Conducted Emission

DTNC

Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : PCIF

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi. : 19 °C 39 % R.H.
Operator :

Memo :

LIMIT : CISPR22_B QP
CISPR22_B AV

NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.21621	20.3	12.2	9.9	30.2	22.1	63.0	53.0	32.8	30.9	N
2	0.26493	19.2	10.5	9.9	29.1	20.4	61.3	51.3	32.2	30.9	N
3	0.55029	18.1	1.0	10.1	28.2	11.1	56.0	46.0	27.8	34.9	N
4	0.18150	23.1	14.2	10.0	33.1	24.2	64.4	54.4	31.3	30.2	L1
5	0.24041	21.9	12.5	10.0	31.9	22.5	62.1	52.1	30.2	29.6	L1
6	0.35956	20.4	1.5	10.1	30.5	11.6	58.7	48.7	28.2	37.1	L1
7	0.68543	18.7	0.9	10.0	28.7	10.9	56.0	46.0	27.3	35.1	L1

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with **ANSI C63.4**.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **10m semi-anechoic chamber**.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Peak detector with 1 MHz RBW and 1 MHz VBW were used for above 1 GHz frequency range, also used linear average detector with defined in CISPR 16-1-1.

For further description of the configuration refer to the picture of the test set-up.

6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000 MHz

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (3 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

Frequency range (MHz)	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)
	Quasi-peak (dBμV/m)	Quasi-peak (dBμV/m)
30 to 230	40	30
230 to 1 000	47	37

(2) Limits for Radiated Emission above 1 000 MHz at a measuring distance of 3 m

Frequency (GHz)	Class A Equipment		Class B Equipment	
	Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
1 to 40	80	60	74	54

Note)1. Emission Level = Reading Value + loss - gain + Ant Factor

2. Margin = Limit - Emission level

3. Loss = Cable loss, Gain = Amp gain, Ant Factor = Antenna Factor

Test Result

< 30 MHz ~ 1 GHz _ MODE 1 >

RADIATED EMISSION

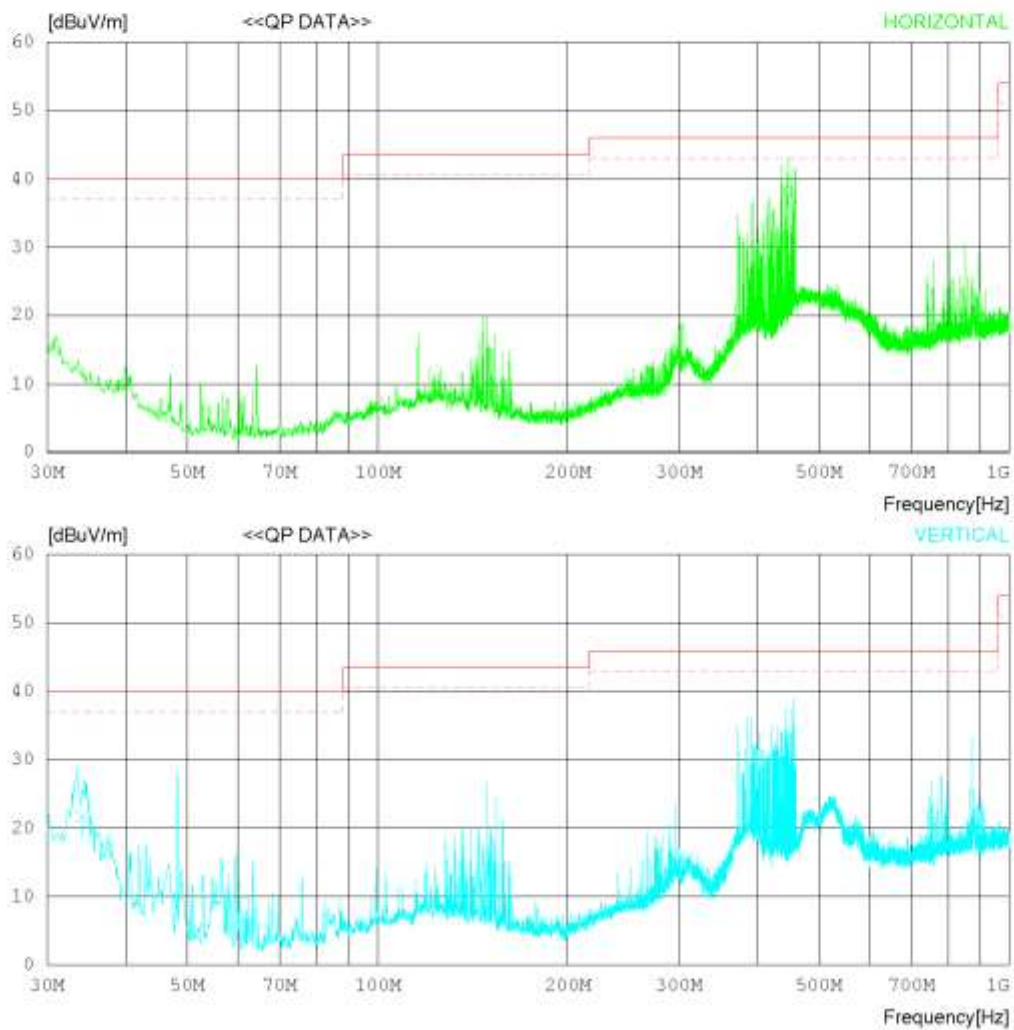
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	438.260	40.0	16.5	2.2	26.3	32.4	46.0	13.6	169	98
2	445.553	45.7	16.6	2.2	26.3	38.2	46.0	7.8	100	243
3	451.766	44.0	16.7	2.2	26.3	36.6	46.0	9.4	100	205
----- Vertical -----										
4	34.079	31.0	16.5	0.8	26.6	21.7	40.0	18.3	100	265
5	48.053	26.5	9.5	0.7	26.6	10.1	40.0	29.9	100	207
6	150.360	28.7	10.5	1.4	26.5	14.1	43.5	29.4	100	0
7	446.036	39.8	16.6	2.2	26.3	32.3	46.0	13.7	100	188
8	452.045	41.2	16.7	2.2	26.3	33.8	46.0	12.2	100	182

< (1 ~ 6) GHz _ Peak _ MODE 1 >

RADIATED EMISSION

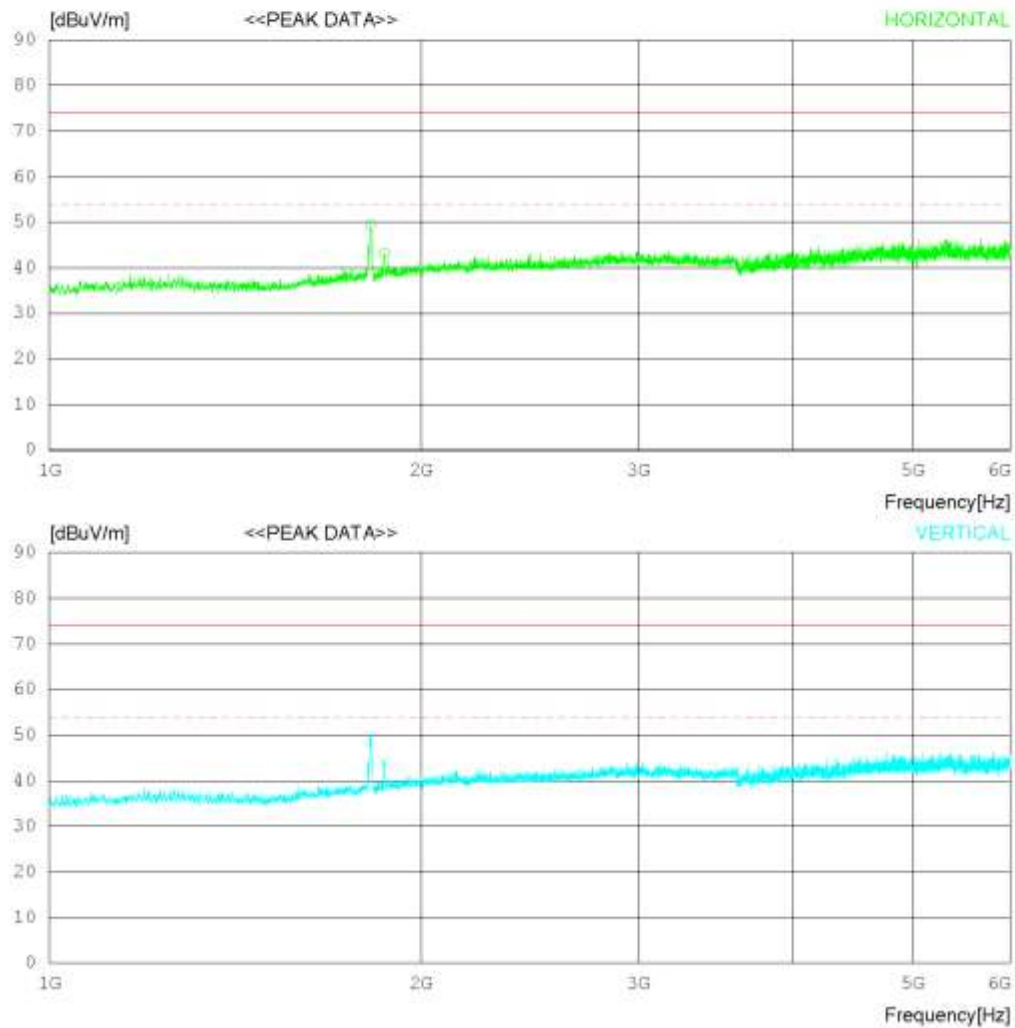
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



RADIATED EMISSION

Date : 2015-04-21

Order No.	: DTNC1504-01883	Reference No.	:	
Model No.	: PRO-649	Power Supply	:	120 V 60 Hz
Serial No.	:	Temp/Humi	:	17 °C 41 % R.H.
Test Condition	: SCAN	Operator	:	

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1820.625	63.4	30.7	4.5	49.2	49.4	74.0	24.6	100	0
2	1867.500	56.9	31.0	4.6	49.3	43.2	74.0	30.8	100	284
----- Vertical -----										
3	1820.625	63.2	30.7	4.5	49.2	49.2	74.0	24.8	100	231
4	1867.500	57.9	31.0	4.6	49.3	44.2	74.0	29.8	100	358

< (1 ~ 6) GHz _ Average _ MODE 1 >

RADIATED EMISSION

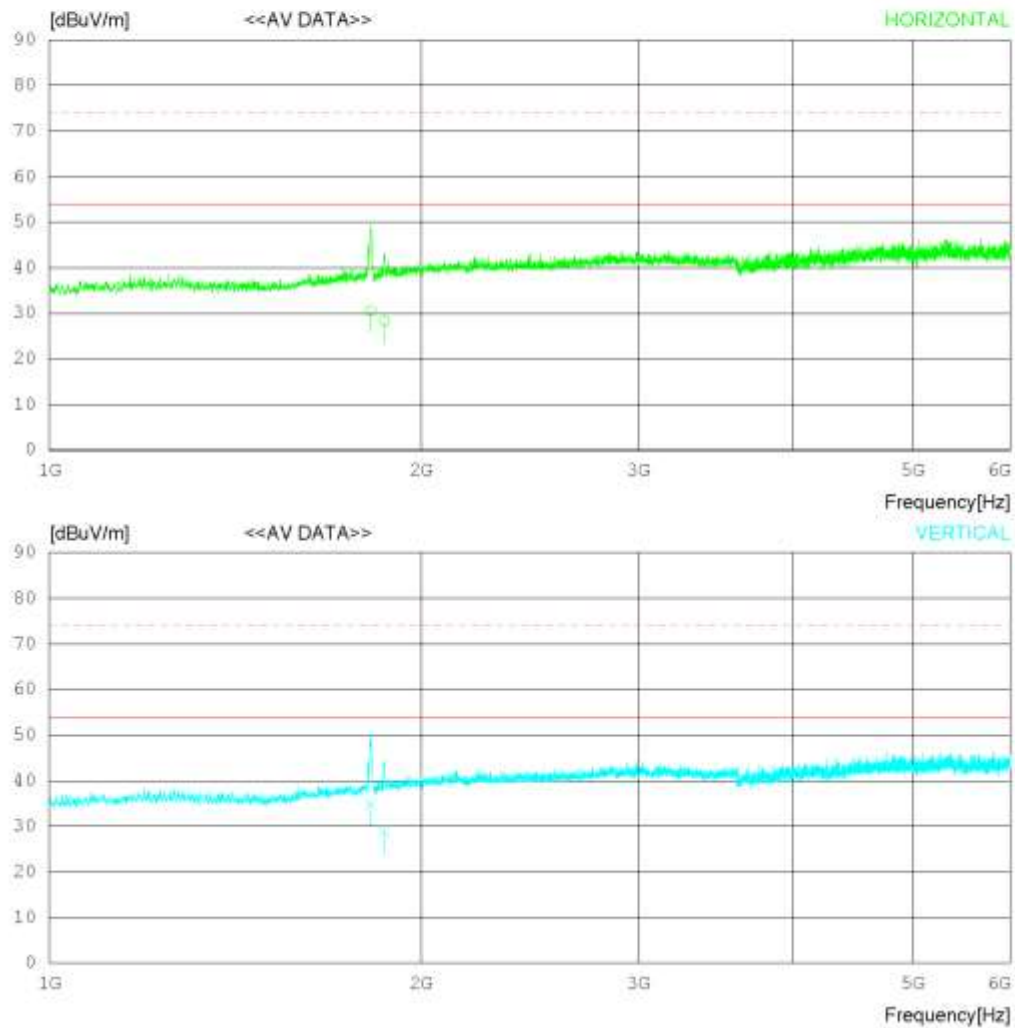
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : SCAN

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



RADIATED EMISSION

Date : 2015-04-21

Order No. : DTNC1504-01883	Reference No. :
Model No. : PRO-649	Power Supply : 120 V 60 Hz
Serial No. :	Temp/Humi : 17 °C 41 % R.H.
Test Condition : SCAN	Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1820.075	44.6	30.7	4.5	49.2	30.6	54.0	23.4	100	96
2	1867.324	42.1	31.0	4.6	49.3	28.4	54.0	25.6	100	284
----- Vertical -----										
3	1820.625	48.9	30.7	4.5	49.2	34.9	54.0	19.1	100	221
4	1867.500	42.5	31.0	4.6	49.3	28.8	54.0	25.2	100	161

< 30 MHz ~ 1 GHz _ MODE 2 >

RADIATED EMISSION

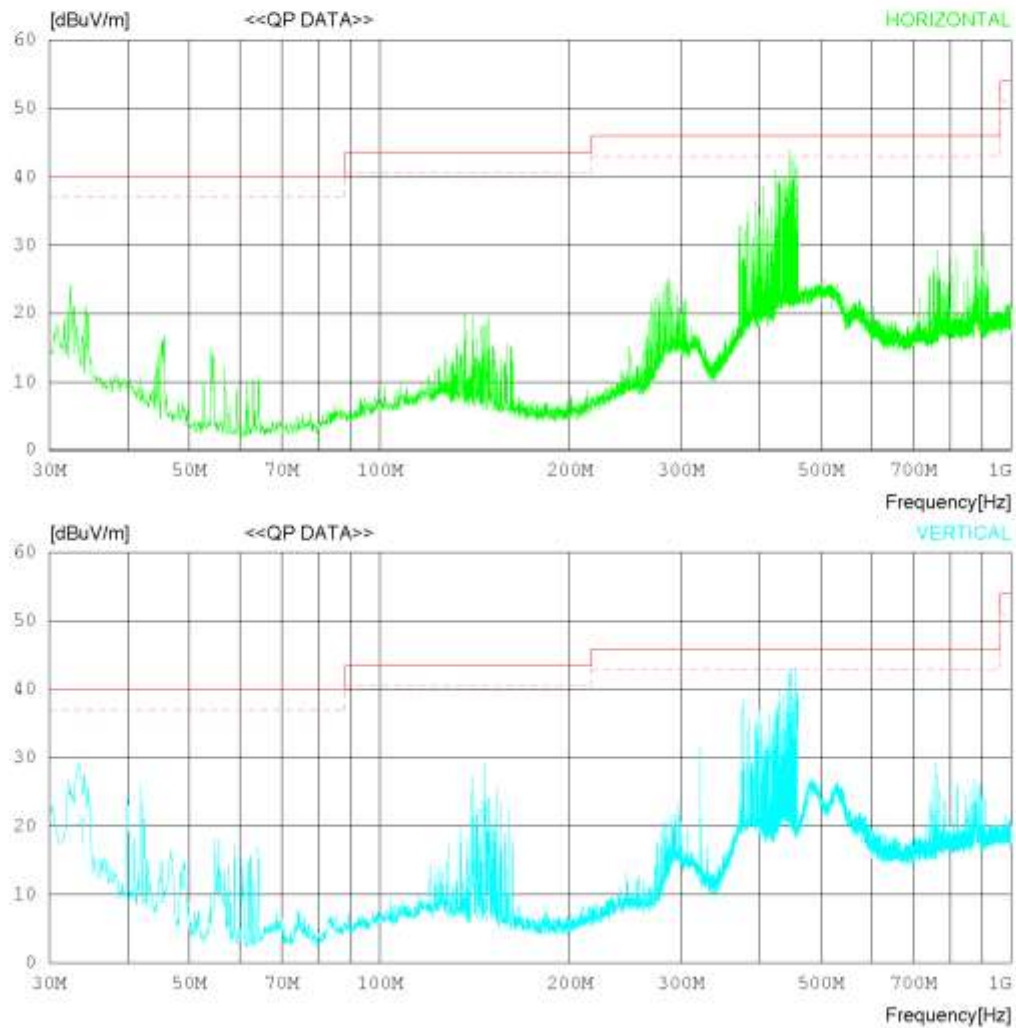
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : PCIF

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB



RADIATED EMISSION

Date : 2015-04-21

Order No.	: DTNC1504-01883	Reference No.	:
Model No.	: PRO-649	Power Supply	: 120 V 60 Hz
Serial No.	:	Temp/Humi	: 17 'C 41 % R.H.
Test Condition	: PCIF	Operator	:

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 3 dB

No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	447.051	44.0	16.7	2.2	26.3	36.6	46.0	9.4	200	0
2	449.150	45.4	16.7	2.2	26.3	38.0	46.0	8.0	100	339
----- Vertical -----										
3	33.811	30.1	16.7	0.8	26.6	21.0	40.0	19.0	199	0
4	147.038	37.3	10.7	1.4	26.5	22.9	43.5	20.6	100	169
5	444.200	43.6	16.6	2.2	26.3	36.1	46.0	9.9	100	227
6	459.056	45.2	16.9	2.2	26.3	38.0	46.0	8.0	199	173

< (1 ~ 6) GHz _ Peak _ MODE 2 >

RADIATED EMISSION

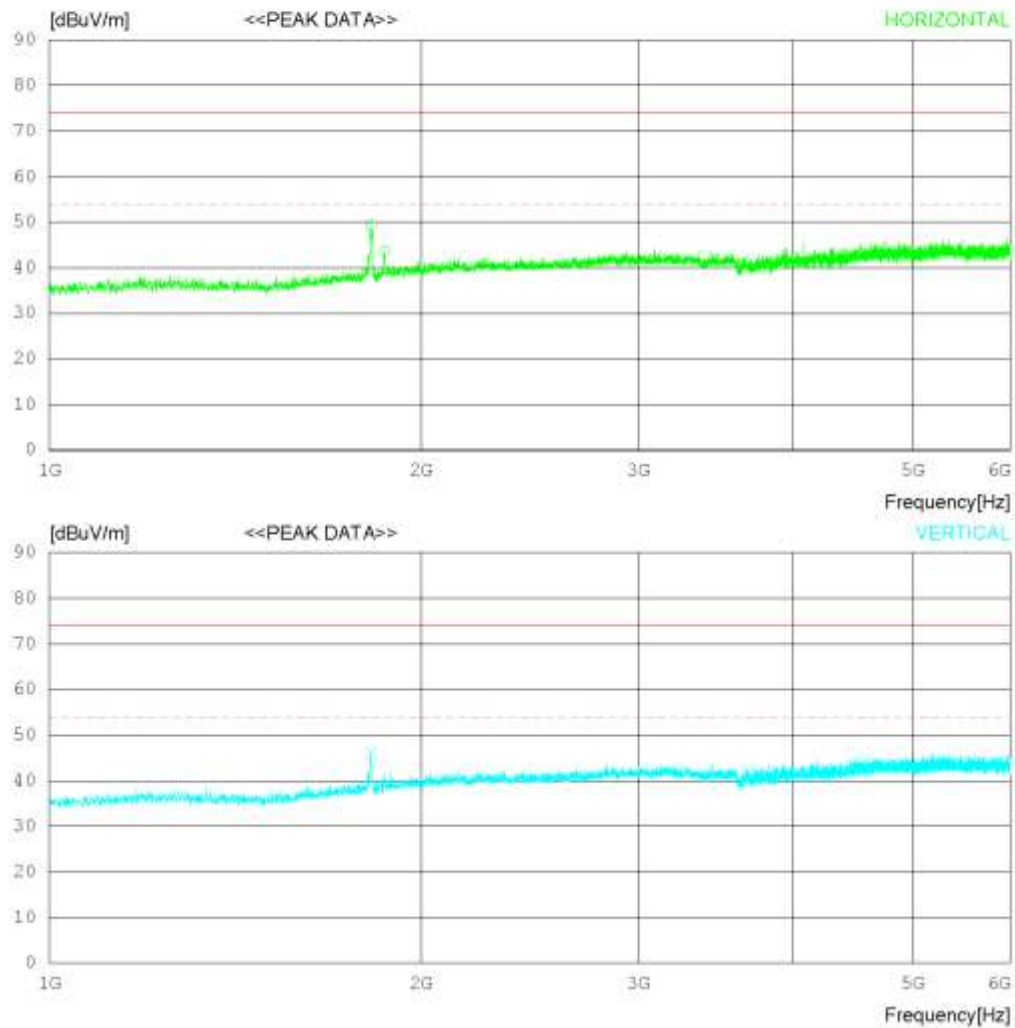
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : PCIF

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)



RADIATED EMISSION

Date : 2015-04-21

Order No.	: DTNC1504-01883	Reference No.	:	
Model No.	: PRO-649	Power Supply	:	120 V 60 Hz
Serial No.	:	Temp/Humi	:	17 °C 41 % R.H.
Test Condition	: PCIF	Operator	:	

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Peak)
FCC Part15 Subpart.B Class B (3m) - 18G(Avg)

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1821.250	63.2	30.7	4.5	49.2	49.2	74.0	24.8	100	358
2	1867.500	57.3	31.0	4.6	49.3	43.6	74.0	30.4	100	358
----- Vertical -----										
3	1821.250	60.0	30.7	4.5	49.2	46.0	74.0	28	100	1

< (1 ~ 6) GHz _ Average _ MODE 2 >

RADIATED EMISSION

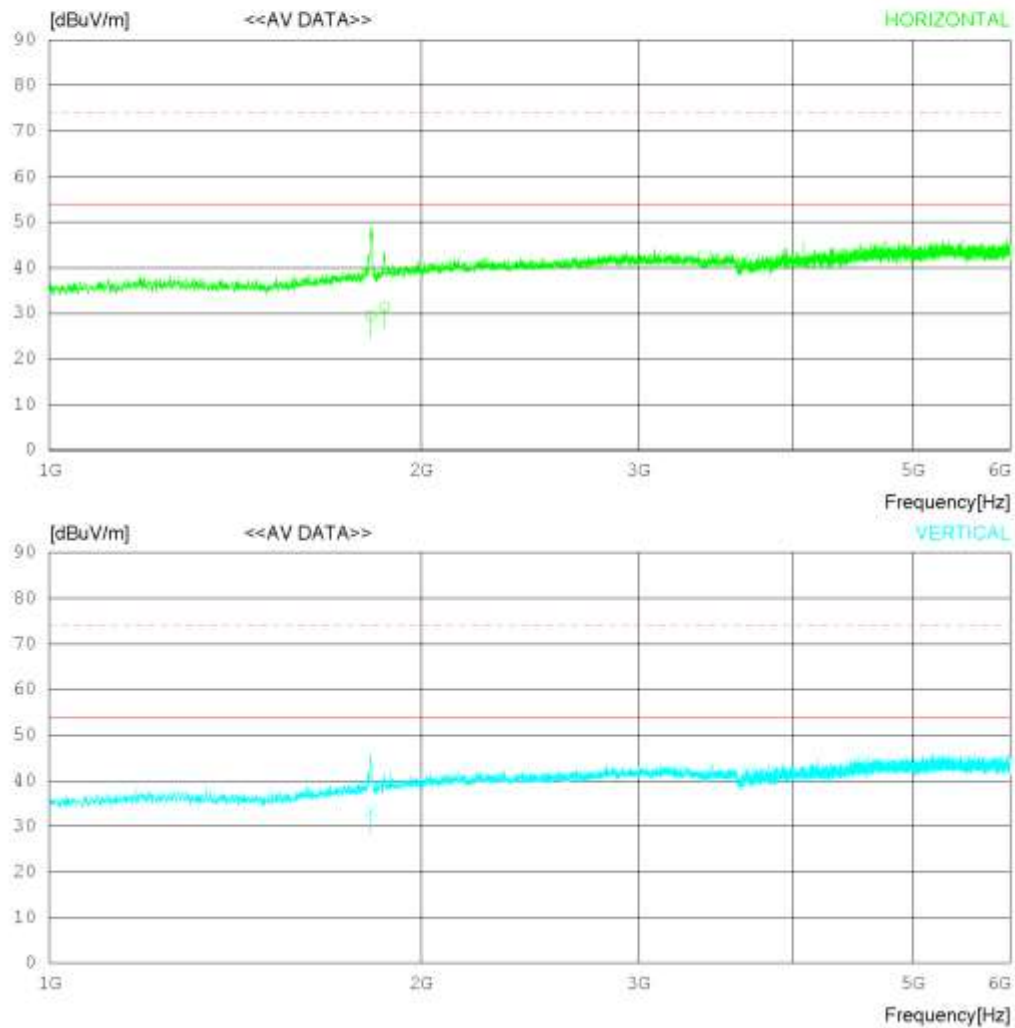
Date : 2015-04-21

Order No. : DTNC1504-01883
Model No. : PRO-649
Serial No. :
Test Condition : PCIF

Reference No. :
Power Supply : 120 V 60 Hz
Temp/Humi : 17 °C 41 % R.H.
Operator :

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)



RADIATED EMISSION

Date : 2015-04-21

Order No.	: DTNC1504-01883	Reference No.	:	
Model No.	: PRO-649	Power Supply	:	120 V 60 Hz
Serial No.	:	Temp/Humi	:	17 °C 41 % R.H.
Test Condition	: PCIF	Operator	:	

Memo :

LIMIT : FCC Part15 Subpart.B Class B (3m) - 18G(Avg)
FCC Part15 Subpart.B Class B (3m) - 18G(Peak)

No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	1821.250	43.5	30.7	4.5	49.2	29.5	54.0	24.5	100	169
2	1867.500	45.1	31.0	4.6	49.3	31.4	54.0	22.6	100	165
----- Vertical -----										
3	1821.250	47.3	30.7	4.5	49.2	33.3	54.0	20.7	100	116

6.3 Antenna Power Conduction

6.3.1 Measurement Procedure

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals.

Antenna conducted power measurements was performed with the EUT antenna terminals connected directly to measuring instrument using a impedance-Matching network to connect the measurement Instrument to the antenna terminals of the EUT.

The losses in decibels in impedance-matching network and cables was added to the measured values in dB μ V.

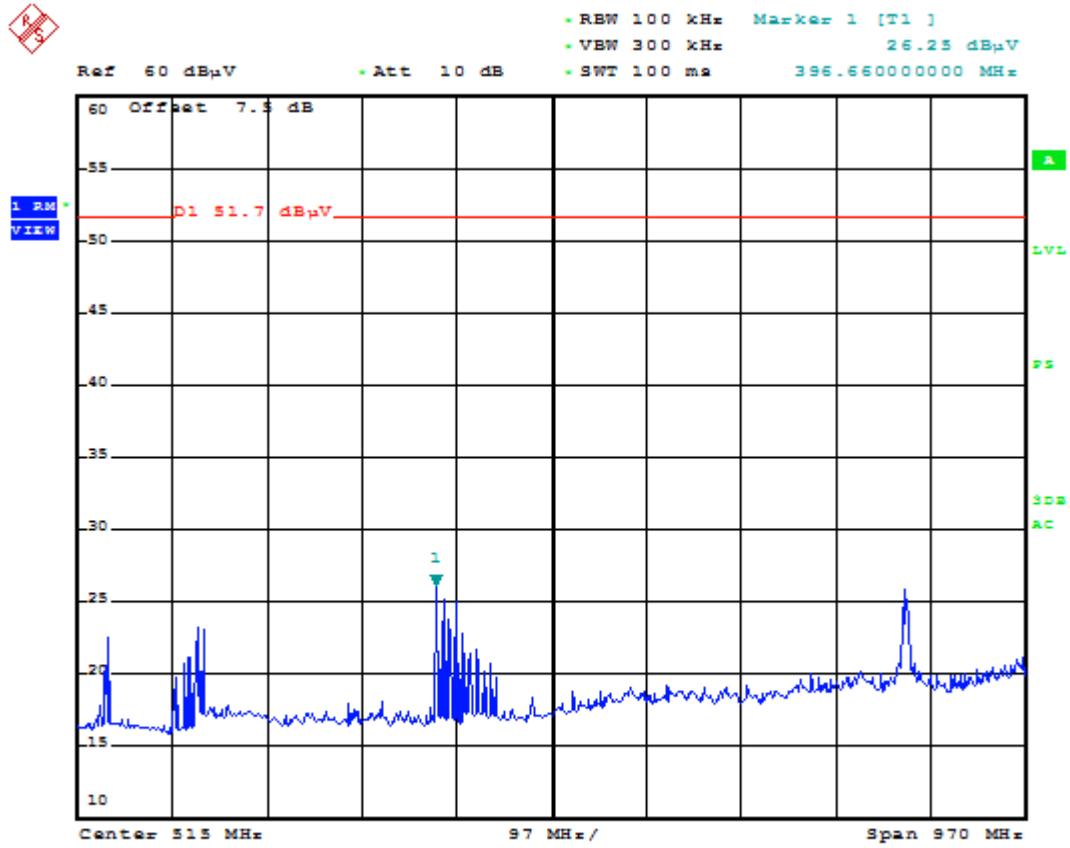
The measurements were repeated with the receiver tuned to a frequency until all of frequencies had been successively measured.

Power in the receive antenna terminals in the ratio of V^2 / R , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.

6.3.2 Limit for Antenna Power Conduction

- Limit : **2nW(51.7 dB μ V)**

Test Result



Appendix 1

List of Test and Measurement Instruments

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Conducted Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0143	TSJ	N/A	N/A	N/A
☐ SPECTRUM ANALYZER	8591E	H/P	3649A05889	N/A	N/A
☐ ARTIFICIAL MAINS NETWORK	PMM L2-16B	NARDA S.T.S. / PMM	000WX20305	2014.06.26	2015.06.26
☐ LISN	KNW-407	KYORITSU	8-317-8	2015.01.07	2016.01.07
☐ 50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06
☒ EMI TEST RECEIVER	ESC17	ROHDE & SCHWARZ	100910	2015.02.25	2016.02.25
☒ LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2014.09.11	2015.09.11
☒ PULSE LIMITER	ESH3-Z2	ROHDE & SCHWARZ	101334	2015.01.07	2016.01.07
☐ 50 OHM TERMINATOR	CT-01	TME	N/A	2015.01.06	2016.01.06

2. Radiated Disturbance

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0121	TSJ	N/A	N/A	N/A
☒ EMI TEST RECEIVER	ESU 8	ROHDE & SCHWARZ	100348	2014.10.21	2015.10.21
☒ BILOG ANTENNA	CBL6112B	SCHAFFNER	2737	2014.12.10	2016.12.10
☒ LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25
☒ HORN ANTENNA	3117	ETS-LINDGREN	00152093	2014.01.30	2016.01.30
☒ PREAMPLIFIER	MLA-100M18-B01-42	TSJ	1872271	2014.05.26	2015.05.26
☐ EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
☐ AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25

3. Antenna Power Conduction

Name of Instrument	Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
☒ EMI TEST RECEIVER	ESC17	ROHDE & SCHWARZ	100910	2015.02.25	2016.02.25
☒ SPLITTER	ZFRSC-42	MINI CIRCUITS	SF624000603	2014.06.27	2015.06.27

Appendix 2

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	N/A	N/A



Changed Part List

TRF-EM-003(00)081218

LOGIC TOP+BOT -> LOGIC PCB ASSY						C289	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C290	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C291	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C292	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C293	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C294	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C295	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C296	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C297	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C298	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C299	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C300	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						C301	CAP CHIP	(0603)47pf 50V +/-5%	GRM188C1H470A01D(Z01D)	ADD	
						D208	DICIDE	SMD, (MARKING S3)	BSS3R(TPH PJ)CUS357	ADD	
						E209	DIODE	SMD, (MARKING S3)	BSS3R(TPH PJ)CUS357	ADD	
						K201	IC SMD	ICPU	MN101EF28G	CHANGED	
JC201	IC SMD	CPU		MN101C38CGP(GRE-0510)							
R224	RES CHIP	470K ohm 1/10W +/-5%		MCR03EZPM74			DELETE				
R225	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZPM73		R225	RES CHIP	(0603) 24K ohm 1/10W +/-5%	MCR03EPPZ43		CHANGED
R226	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZPM73		R226	RES CHIP	(0603) 100K ohm 1/10W +/-5%	MCR03EPPJ04		CHANGED
R227	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZPM73		R227	RES CHIP	(0603) 100K ohm 1/10W +/-5%	MCR03EPPJ04		CHANGED
R228	RES CHIP	18K ohm 1/10W +/-5%		MCR03EZP183		R228	RES CHIP	(0603) 100K ohm 1/10W +/-5%	MCR03EPPJ04		CHANGED
R231	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZP132		R231	RES CHIP	(0603) 1K ohm 1/10W +/-5%	MCR03EPPJ02		CHANGED
R232	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZP132		R232	RES CHIP	(0603) 10K ohm 1/10W +/-5%	MCR03EPPJ03		CHANGED
R238	RES CHIP	1K ohm 1/10W +/-5%		MCR03EZP102			DELETE				
R239	RES CHIP	47K ohm 1/10W +/-5%		MCR03EZPM73		R239	RES CHIP	(0603) 1K ohm 1/10W +/-5%	MCR03EPPJ02		CHANGED
R241	RES CHIP	1K ohm 1/10W +/-5%		MCR03EZP102			DELETE				
						R251	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R252	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R253	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R254	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R256	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R257	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R258	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R261	RES CHIP	(0603) 680 ohm 1/10W +/-5%	MCR03EPPM81		ADD
						R262	RES CHIP	(0603) 1K ohm 1/10W +/-5%	MCR03EPPJ02		ADD
						R263	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R265	RES CHIP	(0603) 1K ohm 1/10W +/-5%	MCR03EPPJ02		ADD
						R266	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						R267	RES CHIP	(0603) 3.3K ohm 1/10W +/-5%	MCR03EPPJ32		ADD
						R268	RES CHIP	(0603) 470K ohm 1/10W +/-5%	MCR03EZPM74		ADD
						R269	RES CHIP	(0603) 10K ohm 1/10W +/-5%	MCR03EPPJ03		ADD
						R270	RES CHIP	(0603) 3.3K ohm 1/10W +/-5%	MCR03EPPJ32		ADD
						R271	RES CHIP	(0603) 470K ohm 1/10W +/-5%	MCR03EZPM74		ADD
						R276	RES CHIP	(0603) 10K ohm 1/10W +/-5%	MCR03EPPJ03		ADD
						R277	RES CHIP	(0603) 47K ohm 1/10W +/-5%	MCR03EZPM73		ADD
						RA200	RES CHIP	BLOCK 1Kohm 1/16W +/-5%	CN1M1TDD1021		ADD
						RA206	RES CHIP	BLOCK 1Kohm 1/16W +/-5%	CN1M1TDD1021		ADD
						RA207	RES CHIP	BLOCK 1Kohm 1/16W +/-5%	CN1M1TDD1021		ADD
						RA208	RES CHIP	BLOCK 1Kohm 1/16W +/-5%	CN1M1TDD1021		ADD
						RA209	RES CHIP	BLOCK 1Kohm 1/16W +/-5%	CN1M1TDD1021		ADD
						17	PCB	LINEAR 2L 2.10mm	7083A132789		
						C131	CAP CHIP	(0603) 20pf 50V +/-5%	GRM188C1H200A01D(Z01D)		
C67	CAP FLECT	SK11 100Vf 16V +/-20%	10V81C101MD0		CHANGED	C67	CAP CHIP	SMD0803 4.0uf 6.3V +/-5%	GRM188B60V75G19		CHANGED

LINEAR TOP + BOT ==> LINEAR PCB ASSY	C68	CAP ELECT	SX11 33uF 50V +/-20%	UVPHI3H30MD	CHANGED	C68	CAP CHIP	SMD(D0803) 0.1uF 16V +/-10%	GRM188R1C104KA010(Z01D)	CHANGED
	C69	CAP ELECT	4X7 4.7uF 35V +/-20%	USA1V4R7VDD	CHANGED	C69	CAP ELECT	SX11126uF 50V +/-20%	UVPHI H30MD	CHANGED
	D1	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D1	CHIP DIODE	SMD VARCAPS	B8664-02V	CHANGED
	D10	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D10	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D12	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D12	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D14	CHIP DIODE	MARKING V	HVC306A-TRF-E	CHANGED	D14	CHIP DIODE	SMD VARCAPS	B8665-02V	CHANGED
	D15	CHIP DIODE	MARKING V	HVC306A-TRF-E	CHANGED	D15	CHIP DIODE	SMD VARCAPS	B8665-02V	CHANGED
	D16	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D16	CHIP DIODE	SMD VARCAPS	B8664-02V	CHANGED
	D17	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D17	CHIP DIODE	SMD VARCAPS	B8664-02V	CHANGED
	D18	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D18	CHIP DIODE	SMD VARCAPS	B8664-02V	CHANGED
	D19	CHIP DIODE	MARKING V	HVC306A-TRF-E	CHANGED	D19	CHIP DIODE	SMD VARCAPS	B8665-02V	CHANGED
	D2	CHIP DIODE	MARKING 3	HVC306A-8TRF/TRU-E	CHANGED	D2	CHIP DIODE	SMD VARCAPS	B8664-02V	CHANGED
	D20	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D20	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D21	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D21	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D22	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D22	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D24	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D24	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D25	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D25	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D26	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D26	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D3	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D3	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
						D33	DIODE	SMD, (MARKING S3)	153537(PH3/F)CUC357	ADD
	D4	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D4	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D5	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D5	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D6	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D6	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
	D7	CHIP DIODE	MARKING V	HVC306A-TRF-E	CHANGED	D7	CHIP DIODE	SMD VARCAPS	B8665-02V	CHANGED
	D8	CHIP DIODE	MARKING V	HVC306A-TRF-E	CHANGED	D8	CHIP DIODE	SMD VARCAPS	B8665-02V	CHANGED
	D9	CHIP DIODE	MARKING 3	HSQ777-TRF-E	CHANGED	D9	CHIP DIODE	SMD ESC (MARKING UD)	KDS114E	CHANGED
IC2	IC SMD	DC-DC CONVERTER	TQ1181BM1L-G	CHANGED	IC2	IC SMD	DC-DC CONVERTER	AP2015A	CHANGED	
JCR	IC SMD	VOLTAGE REGULATOR	TQ1123SCML-G	CHANGED	JCR	IC SMD	VOLTAGE REGULATOR	XC6209F/352MR(-G)	CHANGED	
JC9	IC SMD	VOLTAGE REGULATOR	TQ1123SCML-G	CHANGED	JC9	IC SMD	VOLTAGE REGULATOR	XC6209F/352MR(-G)	CHANGED	
L12	CHIP COIL		GR-D864	CHANGED	L12	CHIP INDUCTOR	SMD 22uH +/-10%	L33Z18T220K	CHANGED	
Q1	CHIP TRANSISTOR	MARKING V11	3K3K11-(V11)1T12/T28-A	CHANGED	Q1	CHIP TRANSISTOR	FEET	B9908R	CHANGED	
Q3	CHIP TRANSISTOR	MARKING V13	3K3K11-T2A-V13	CHANGED	Q3	CHIP TRANSISTOR	FEET	B9908R	CHANGED	
Q4	CHIP TRANSISTOR	MARKING HE	Z5CA250	CHANGED	Q4	CHIP TRANSISTOR	NPN (MARKING RP)	Z5CA250(T8SL/R,F)	CHANGED	
Q5	CHIP TRANSISTOR	MARKING HE	Z5CA250	CHANGED	Q5	CHIP TRANSISTOR	NPN (MARKING RP)	Z5CA250(T8SL/R,F)	CHANGED	
Q6	CHIP TRANSISTOR	MARKING HE	Z5CA250	CHANGED	Q6	CHIP TRANSISTOR	NPN (MARKING RP)	Z5CA250(T8SL/R,F)	CHANGED	
Q7	CHIP TRANSISTOR	MARKING QD	Z5CA250	CHANGED	Q7	CHIP TRANSISTOR	NPN (MARKING QD)	Z5CA250(T8SL/R,F)	CHANGED	
R71	RES CHIP	100k 1/10W +/-5%	MCRO917P932	CHANGED	R71	RES CHIP	0603 10k 1/10W +/-5%	MCRO917P932	CHANGED	
R72	RES CHIP	220 ohm 1/10W +/-5%	MCRO912P9320	CHANGED	R72	RES CHIP	0603 107k ohm 1/10W +/-5%	MCRO912P9320	CHANGED	
R73	RES CHIP	470k ohm 1/10W +/-5%	MCRO917P9424	DEFETE						